

FINAL

2006 Water Quality Monitoring
Mill River
Hamden and New Haven, CT

February 2007

Prepared for

Regional Water Authority

Prepared by



List of Figures

Figure 1	Precipitation at Lake Whitney January – September 2006
Figure 2	Summer 2006 Sampling Event Precipitation (72 Hours Prior to each Sampling Event)
Figure 3	Lake Whitney Water Treatment Plant Withdrawals January 1- September 1, 2006
Figure 4	Summer 2006 Mill River Sampling Event Daily Average Flow
Figure 5	Locations Sampled during the Mill River Monitoring
Figure 6	Summer 2006 Mill River Surface Salinity
Figure 7	Summer 2006 Mill River Bottom Salinity
Figure 8	Mill River Downstream Surface Salinity with Flow
Figure 9	Summer 2006 Mill River Surface Dissolved Oxygen
Figure 10	Summer 2006 Mill River Bottom Dissolved Oxygen
Figure 11	Mill River Downstream DO with Flow

List of Tables

Table 1	Mill River Monitoring Data Collected in 2006
Table 2	Weekly Dissolved Oxygen Concentrations
Table 3	2001-2006 Weekly Sampling Average Mill River Surface Dissolved Oxygen

2006 Mill River Water Quality Monitoring

Introduction

This report presents results of continuing studies by the Regional Water Authority (RWA) to document dissolved oxygen (DO) and salinity concentrations in the Mill River downstream of the Lake Whitney water supply reservoir. The objective of these studies, which began in 1998, is to assess the potential effects on the river from reactivating Lake Whitney as a public water supply. The lake served as a water supply from 1862 until its use was temporarily discontinued in 1991. The Regional Water Authority resumed water withdrawals from the reservoir during the summer of 2005 concurrent with completion of the new Lake Whitney Water Treatment Plant (WTP).

As part of a comprehensive environmental assessment of the WTP project, prior baseline studies of DO and salinity patterns in the lower Mill River were conducted in 1998 and annually since 2000. Dissolved oxygen and salinity were both recognized as important parameters to be considered in developing an environmental management plan for the Lake Whitney water withdrawals (Lake Whitney WTP Environmental Evaluation Team, 1999). This was further emphasized by a July 25, 2000 Resolution adopted by the RWA's Five-Member Authority Board that included the following obligation:

“By November 30, 2003, the RWA shall undertake and complete a study of dissolved oxygen concentrations in the downstream Mill River Corridor from the Whitney dam to the Orange Street Bridge, for the purpose of determining the dissolved oxygen concentrations in the spillway plunge pool necessary for maintaining acceptable dissolved oxygen levels downstream.”

Based on the analysis of data collected from 1998 to 2003, 7.0 mg/L was selected as a reasonable target DO for the plunge pool in the Mill River immediately below the Lake Whitney Dam (CH2M HILL, 2003). Based on analysis of data collected during the period, under most circumstances this will result in a surface water DO concentration above 5.0 mg/L at the Orange Street Bridge during dry weather conditions, although DO concentrations slightly below 5.0 mg/L are occasionally observed.

Summer 2006 dissolved oxygen and salinity sampling was performed weekly from July 7 to September 1, as part of the continuing monitoring and assessment effort.

Rainfall during 2006 was unlike previous years' sampling efforts where very dry or very wet conditions were observed. The early spring was very dry and was followed by above average precipitation in late spring and early summer (Figure 1). The recorded precipitation from June to September was 16.7 inches at the Lake Whitney rain gauge. In contrast, 2005 was a dry summer with only 9.3 inches of precipitation recorded. The average precipitation from June to September over the 9 year sampling period is 15.5 inches; 2006 was slightly above average.

Figure 2 presents the rainfall in the 72 hours prior to each sampling event. When analyzing the dissolved oxygen data it is important to note any influences due to stormwater runoff. Rainfall accumulation greater than 0.12 inches is considered wet weather and below 0.12 inches is considered dry weather (in the 72 hours prior to each sampling event). The first three sampling events in July (July 7, 14 and 21) were wet weather events with rainfall ranging from 0.87 to 1.18 inches. From July 28 to August 25 there was little rainfall with only 2 wet weather events on August 4th (0.64 inches) and August 18th (0.18 inches). The remaining three sampling events had no rainfall. September 1st was a wet weather event with 0.71 inches of rainfall.

The WTP became operational in April 2005 and continued operation through 2006. Overall water withdrawals were low in 2006 (Figure 3). From January 1 through September 1, water withdrawals averaged only 33% of the maximum Connecticut Department of Environmental Protection (DEP) registered maximum daily diversion amount and ranged from 23% to 49%. The highest withdrawals occurred during the period from July 7 to August 7 in conjunction with a lake drawdown to facilitate a constructed stormwater wetlands project near the reservoir.

In order to draw down the level of the lake for the constructed stormwater wetlands project, water was released downstream to the river through a blowoff and via an artificial waterfall. After the completion of the stormwater wetland construction project, the minimum release of 4.2 MGD specified in the Management Plan was released by the artificial waterfall while the lake refilled (August 7 to August 25). Operation of the artificial waterfall at 4.2 MGD continued until natural flow over the spillway resumed on August 26, 2006. Figure 4 presents the flow in the Mill River for each of the sampling dates in 2006. Flow is calculated based on the lake level at the spillway and when applicable, measured or estimated downstream releases via the artificial waterfall and/or the blowoff .

Monitoring Methods

From July 7 to September 1, 2006, the RWA conducted weekly dawn DO and salinity monitoring at and below the Lake Whitney dam (i.e., the spillway, plunge pool, the footbridge, the Orange Street Bridge and both sides of the tidegates (Figure 5). Table 1 below presents a summary of the Mill River monitoring data collected in 2006.

TABLE 1
Mill River Monitoring Data collected in 2006

Frequency/Dates	Locations	Parameters
Weekly – July 7 through Sept. 1 (early morning)	Spillway	Temperature, DO, Salinity, specific conductance, pH
	Plunge Pool	
	Footbridge	
	Orange St.	
	Tidegates (North and South)	

As in the previous several years, the weekly data were collected using a Hydrolab Quanta multi-parameter meter that was calibrated prior to each set of water quality measurements. The weekly monitoring data were collected during the early morning when dissolved oxygen is expected to be at its minimum daily concentration. Measurements were collected at one depth at the spillway and plunge pool. At the footbridge, Orange Street Bridge, and the tidegates, measurements were taken near the surface (0.1 to 0.2 m depth) and near the bottom to account for the possible presence of distinct water layers due to salinity intrusion from Long Island Sound. All weekly DO monitoring data are presented in Appendix A.

Monitoring Results

Salinity

The weekly salinity monitoring data are presented in Figure 6 (surface layer) and Figure 7 (bottom layer). Salinity was rarely elevated at Orange Street in 2006 with only 3 of 9 measurements in the surface layer exceeding 1 part per thousand (ppt). There was generally higher saltwater intrusion observed in the bottom layer at Orange St with 3 of 9 dates exceeding 10 ppt, and the highest measurement of 12.8 ppt recorded on August 25. Greater salinity concentrations usually coincided with dry weather and high tide. As expected, salinity levels were elevated at the tide gates with concentrations ranging up to 21.1 ppt in the bottom waters and up to 14 ppt at the surface.

Figure 8 presents surface salinities at Orange Street and the footbridge with river flow as measured at Lake Whitney dam (spillway overflow or downstream release). The salinity increased as the flow gradually decreased through August.

Dissolved Oxygen

Weekly surface layer DO measurements from the Mill River at the spillway, the plunge pool, the footbridge, Orange St. Bridge, and the tide gates are shown in Figure 9. Bottom layer measurements are shown in Figure 10. Table 2 summarizes all of the 2006 DO concentrations at the spillway, plunge pool, footbridge, Orange St. Bridge, and tidegates including average DO concentrations, minimum and maximum. Average DO readings for all weekly monitoring from 2001 to 2006 are shown in Table 3. In general, DO concentrations near the bottom of the water column were lower than DO concentrations near the surface at the footbridge and Orange Street monitoring locations. The DO concentration was below 5.0 mg/L during all of the August sampling events at the footbridge (surface and bottom). The DO was below 5.0 mg/L at Orange St bottom only on August 25th (4.1 mg/L).

Figure 11 presents the DO at the plunge pool, Orange St (surface), and the footbridge (surface) along with the flow in the river as measured at the Lake Whitney dam. The DO at the plunge pool always measured 7.0 mg/L or greater. The DO measurements at the Orange St. Bridge were 5.6 mg/L or greater at the surface for the entire monitoring period. From August 4 to August 25, the surface DO at the footbridge was below 5 mg/L on all sampling dates. These lower DO concentrations coincided with the lower flow of the river due to the period of downstream release in order to refill the Lake. The surface DO

TABLE 2
Weekly Dissolved Oxygen Concentrations

Date	Spillway	Plunge Pool	Footbridge Surface	Footbridge Bottom	Orange Ave Surface	Orange Ave Bottom	North Tidegate Surface	North Tidegate Bottom	South Tidegate Surface	South Tidegate Bottom
7/7/2006	6.2	7.8	6.9	6.9	6.4	6.2	6.1	5.9	5.3	5.4
7/14/2006	6.7	7.4	6.7	6.6	6.4	6.3	6.1	6.0	6.2	6.1
7/21/2006	8.6	7.2	6.2	6.4	5.6	5.6	6.4	6.1	6.2	6.1
7/28/2006	8.5	7.5	6.7	6.4	6.3	6.2	6.6	6.4	6.7	6.7
8/4/2006	11.7	7.3	4.6	4.1	6.7	6.4	4.7	4.5	4.0	3.4
8/11/2006	9.3	7.8	4.1	4.6	8.0	8.0	7.9	5.7	7.6	7.7
8/18/2006	8.5	7.9	3.9	4.1	7.1	7.0	5.6	5.3	5.1	4.7
8/25/2006	8.5	7.7	3.9	3.8	6.6	4.1	5.9	3.8	6.9	7.1
9/1/2006	7.3	8.4	6.3	6.5	7.0	6.7	5.3	4.2	4.5	3.8
Average	8.4	7.7	5.5	5.5	6.7	6.3	6.1	5.3	5.8	5.7
Min	6.2	7.2	3.9	3.8	5.6	4.1	4.7	3.8	4.0	3.4
Max	11.7	8.4	6.9	6.9	8.0	8.0	7.9	6.4	7.6	7.7

Notes:

Bold represents DO concentrations less than 5.0 mg/L.

TABLE 3
2001 – 2006 Weekly Sampling Average Mill River Surface Dissolved Oxygen

Station	2001	2002	2003	2004*	2005	2006
Spillway	8.0	8.0	8.0	8.2	7.6	8.4
Plunge Pool	7.7	7.9	7.9	4.1	7.5	7.7
Footbridge	NA	NA	6.5	6.0	5.2	5.5
Orange St. Bridge	5.9	6.2	6.4	6.8	5.3	6.7
Tide Gates Upstream	NA	NA	6.2	6.2	5.1	6.1
Tide Gates Downstream	NA	NA	6.6	6.1	5.6	5.8

* Flow bypassed around plunge pool July 6 - August 27, 2004 for lake drawdown

NA = No data available

concentration increased to 6.3 mg/L and the bottom DO concentration increased to 6.5 mg/L on September 1 when flow over the spillway resumed.

Surface DO concentrations at the footbridge station were comparable to Orange St. during the month of July 2006. The flow of the river was increased by operating the blowoff in order to lower the lake's water level for the constructed stormwater wetlands project. DO concentrations generally appeared to be more stressed at the footbridge than at Orange St during the downstream release period from August 7 to August 25. This suggests that the DO at the footbridge is more impacted by low flows in the river than the DO at Orange Street.

DO measurements in the plunge pool below the dam during the downstream release period from August 7 to August 25 exceeded the Management Plan 7.0 mg/L performance standard. The artificial waterfall appeared to be very effective at aerating the downstream flow release with DO. DO at Orange St. (surface and bottom) remained above 5.0 mg/L throughout the downstream release period except for one bottom concentration of 4.1 mg/L on August 25.

Due to the increasing influence of tidal effects, stormwater runoff, and combined sewer overflows with increasing distance downstream, Orange St. has been established as the downstream limit for the target DO of 5.0 mg/L. However, to provide a broader understanding of downstream water quality, weekly monitoring was also conducted at the Mill River tide gates, including recording the condition of the tide gates. Dissolved oxygen concentrations at the tide gates are sometimes influenced by turbulence and associated aeration as water flows through the gates. Debris that partially blocked open the tide gates was noted on July 28. The blockages were no longer evident in the following weeks' monitoring. Average DO in 2006 at the tidegates was comparable to concentrations seen in previous years monitoring efforts (Table 3).

Conclusions

This report summarizes the second year of data collection during operation of the new Lake Whitney WTP. In 2006 there were two distinct periods in the data collected for the Mill River; from July 7 to August 7 the flow was increased in the River as the blowoff was operated to lower the Lake for the stormwater wetlands construction project. From August 7 to August 25 minimum downstream release conditions were activated as the Lake was refilled after the construction project. The following conclusions can be drawn from the data collected in 2006:

- Low flows in August resulted in greater salinity concentrations at the footbridge and Orange St than observed during the wet weather, high flow period in July.
- At the tidally influenced stations downstream average DO was comparable to 2001-2004 and higher than 2005 (Table 3). The footbridge station was more severely affected during the low flow period throughout August, while the lowest DO at the Orange St. station generally occurred in response to intense rain events in July (Figure 2).

- The Management Plan downstream release of 4.2 MGD through the artificial waterfall was very effective at meeting and exceeding the plunge pool DO performance standard of 7.0 mg/L when the lake fell below spillway for the construction project. DO was likely enhanced by aeration effects associated with the artificial waterfall.
- August 2006 provided a period of minimum downstream release flows (4.2 MGD) with only one wet weather event on August 18. Orange St DO in previous years has been confounded by rain events where stormwater runoff depressed the DO. Throughout this downstream release period the surface DO at Orange St (surface) exceeded 5.0 mg/L. DO at the bottom also exceeded 5 mg/L during the release period except on August 25th when the DO concentration was 4.1 mg/L.
- During the period of the 4.2 MGD downstream release, DO concentration at the footbridge (surface) ranged between 3.9 and 4.6 mg/L. Unlike Orange St which often has lower DO concentrations during high flow brought on by stormwater events, DO at the footbridge station is more negatively affected by the low flow in the River. This could be because the River becomes shallower and wider at this point, decreasing flow velocity and likely increasing benthic oxygen demand.
- In the past monitoring efforts, low DO concentrations have been associated with stormwater events, low flow and tidal influences. For the vast majority of the 2006 monitoring period the water treatment plant was operating at low withdrawal rates (Figure 1). Although these water withdrawals incrementally affected downstream flows, the combination of the lake lowering and refilling and extended dry weather pattern during August, are believed to be the major factors affecting the observed downstream conditions in summer 2006.

Future monitoring during operating conditions will provide valuable information for assessing the degree of impact, if any, of future public water supply withdrawals on the environmental quality of the lower Mill River. The data collected will be used to assess the success of the Management Plan measures in mitigating potential water supply withdrawal impacts on river DO. Potential alternatives to supplement downstream DO concentrations include plunge pool aeration, and/or changes in the downstream release schedule. Any changes should be carefully weighed against potential consequences to both upstream and downstream interests.

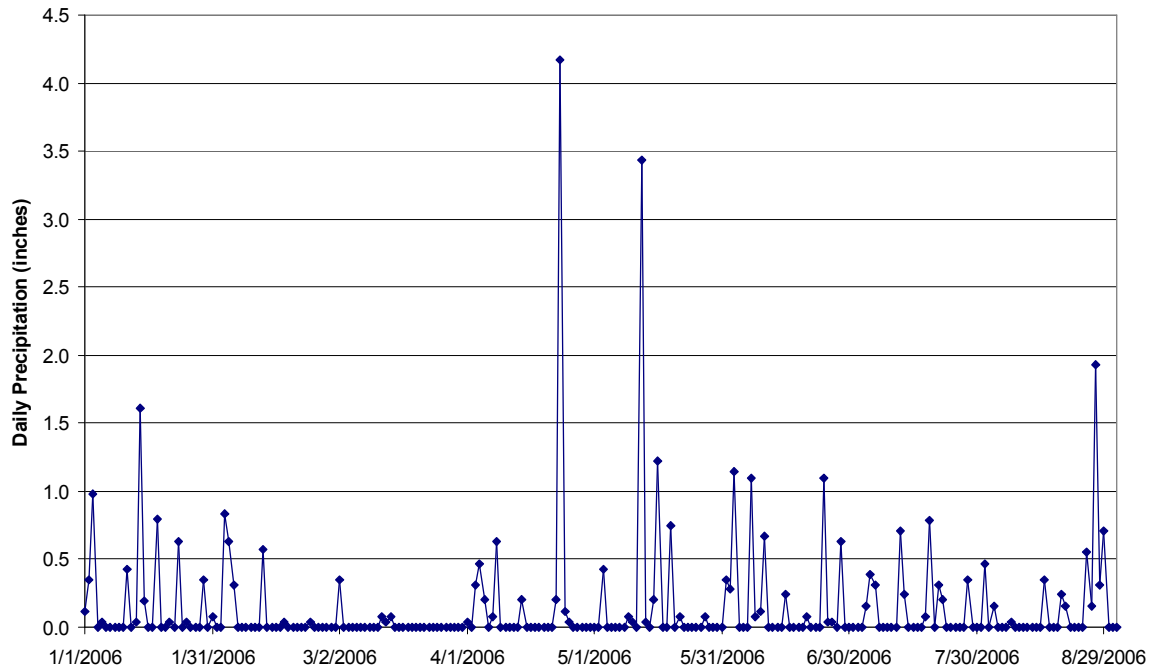
Literature Cited

Lake Whitney WTP Environmental Evaluation Team (1999). *Lake Whitney Water Treatment Plant Environmental Evaluation, Vol. 1: Environmental Evaluation Team Final Report*. Report prepared for the South Central Connecticut Regional Water Authority, New Haven, CT.

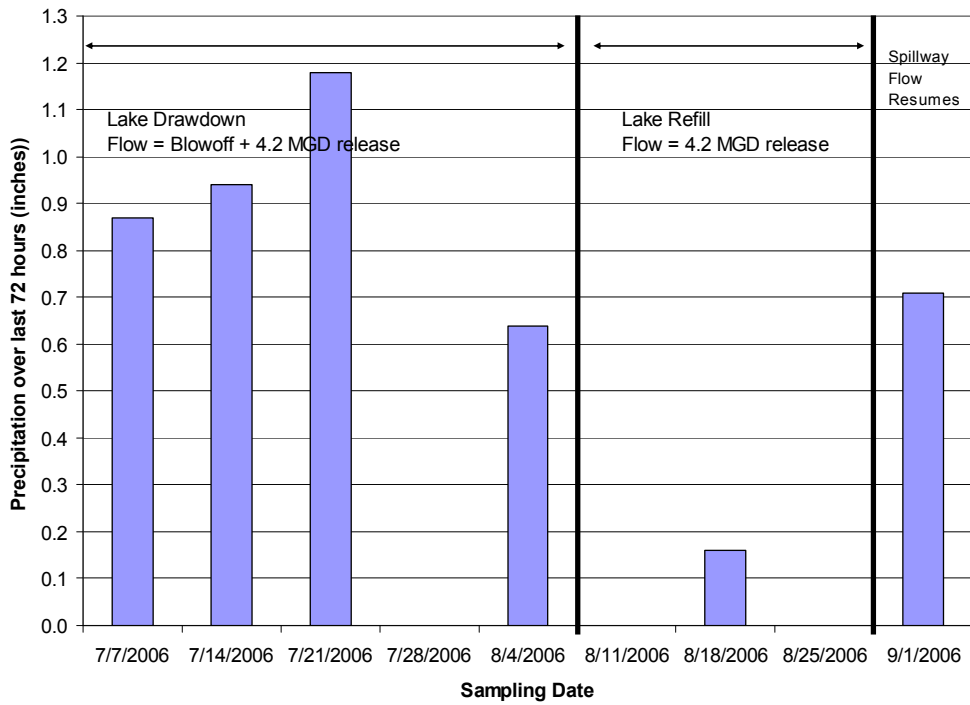
CH2M Hill, 2003. *1998– 2003 Comprehensive Dissolved Oxygen Monitoring in the Lower Mill River, Hamden and New Haven, CT*. Report prepared for the South Central Connecticut Regional Water Authority, New Haven, CT.

Figures

**Figure 1: Precipitation at Lake Whitney
January - September 2006**



**Figure 2: Summer 2006 Sampling Event Precipitation
(72 hours Prior to each Sampling Event)**



**Figure 3: Lake Whitney Water Treatment Plant Daily Withdrawals
Jan 1 - Sept 1, 2006**



Figure 4: Summer 2006 Mill River Sampling Event Daily Average Flow

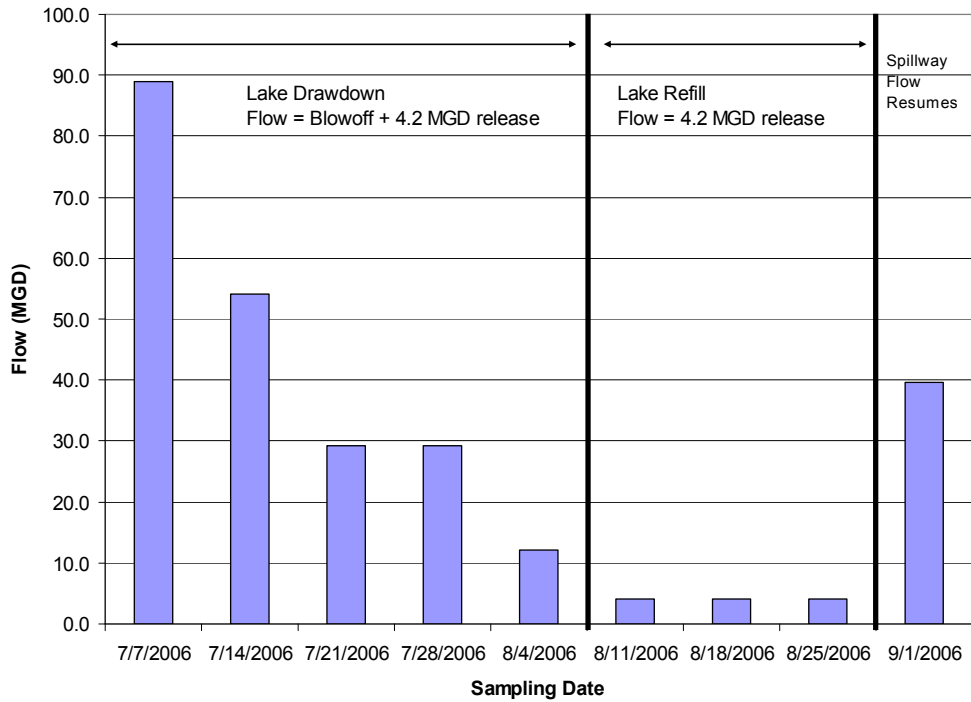


Figure 5 Locations Sampled During Mill River Monitoring

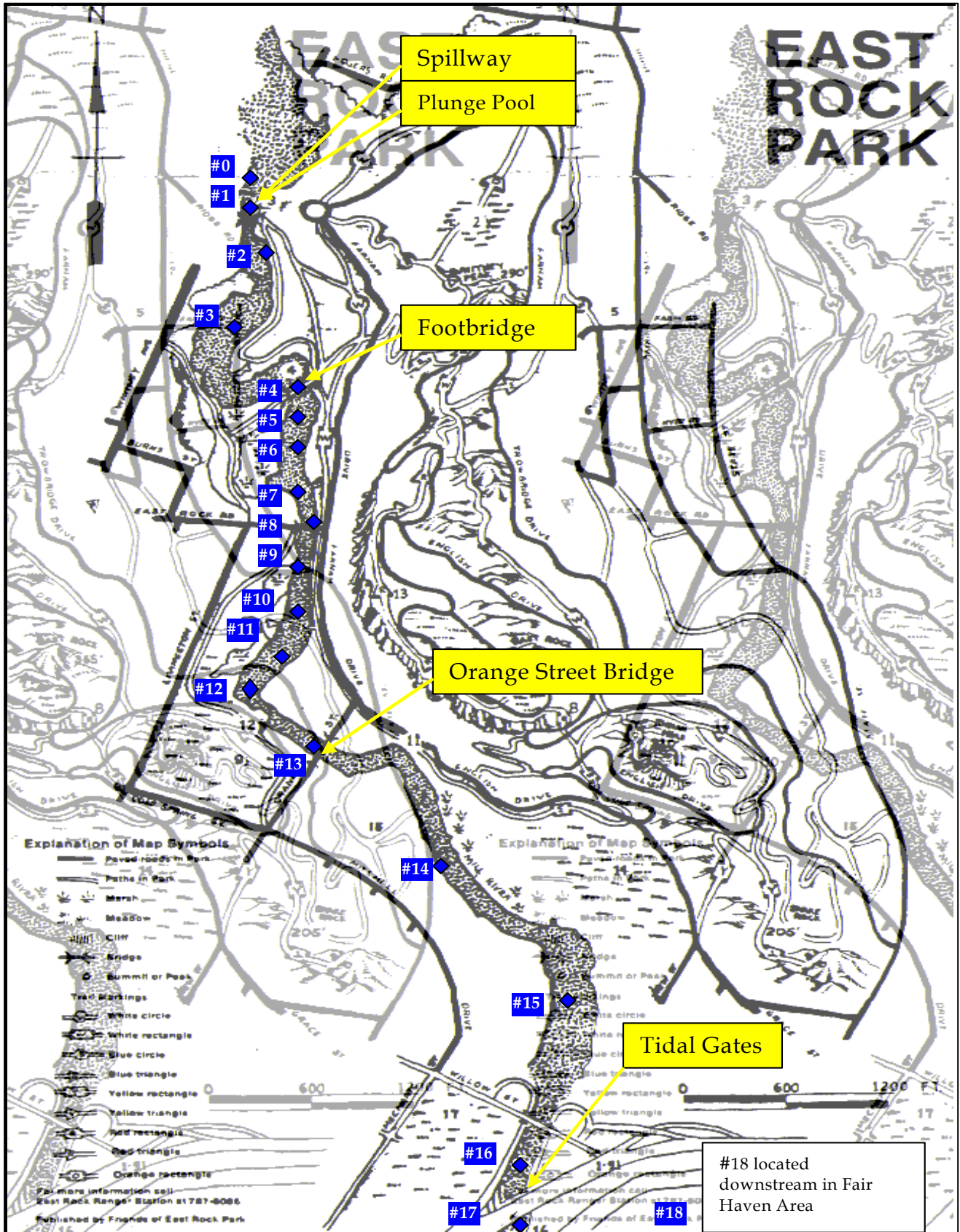


Figure 6: Summer 2006 Mill River Surface Salinity

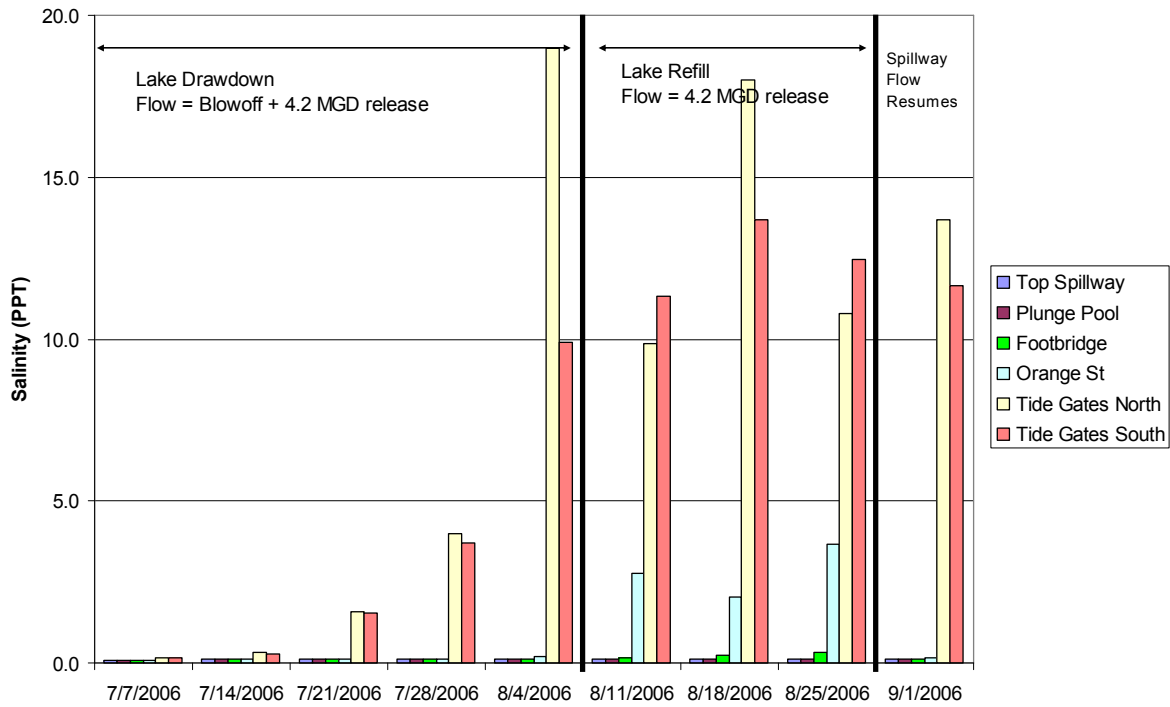


Figure 7: Summer 2006 Mill River Bottom Salinity

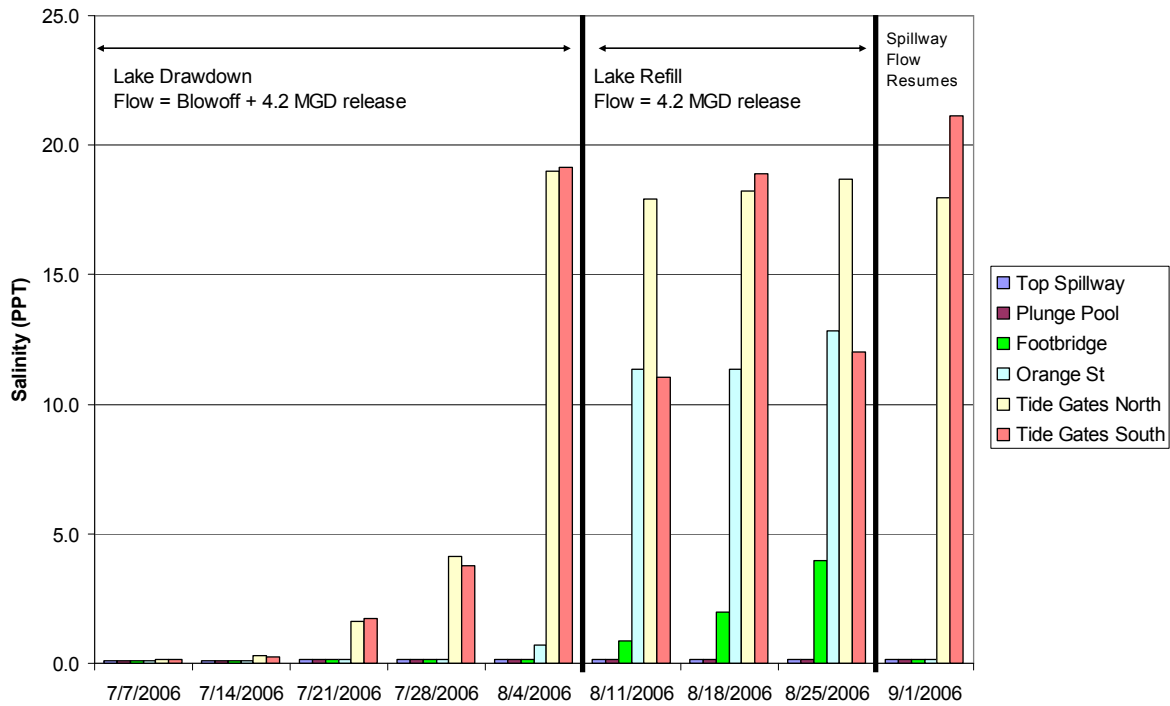


Figure 8: Mill River Downstream Surface Salinity with Flow

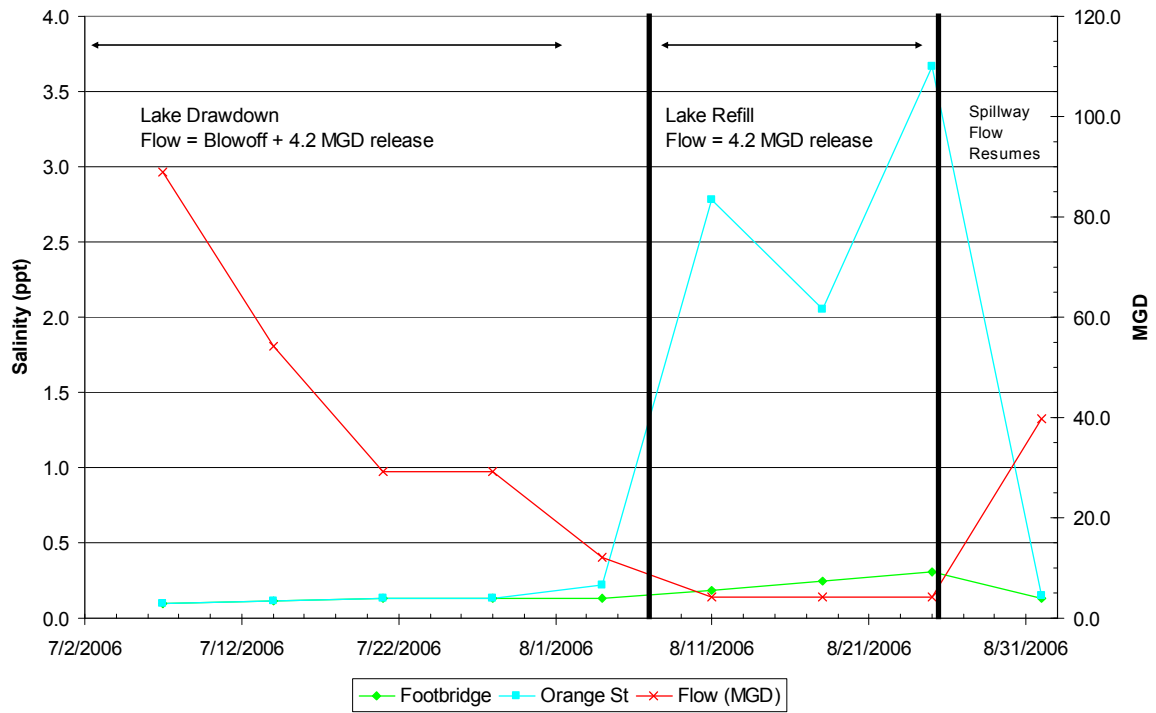


Figure 9: Summer 2006 Mill River Surface Dissolved Oxygen

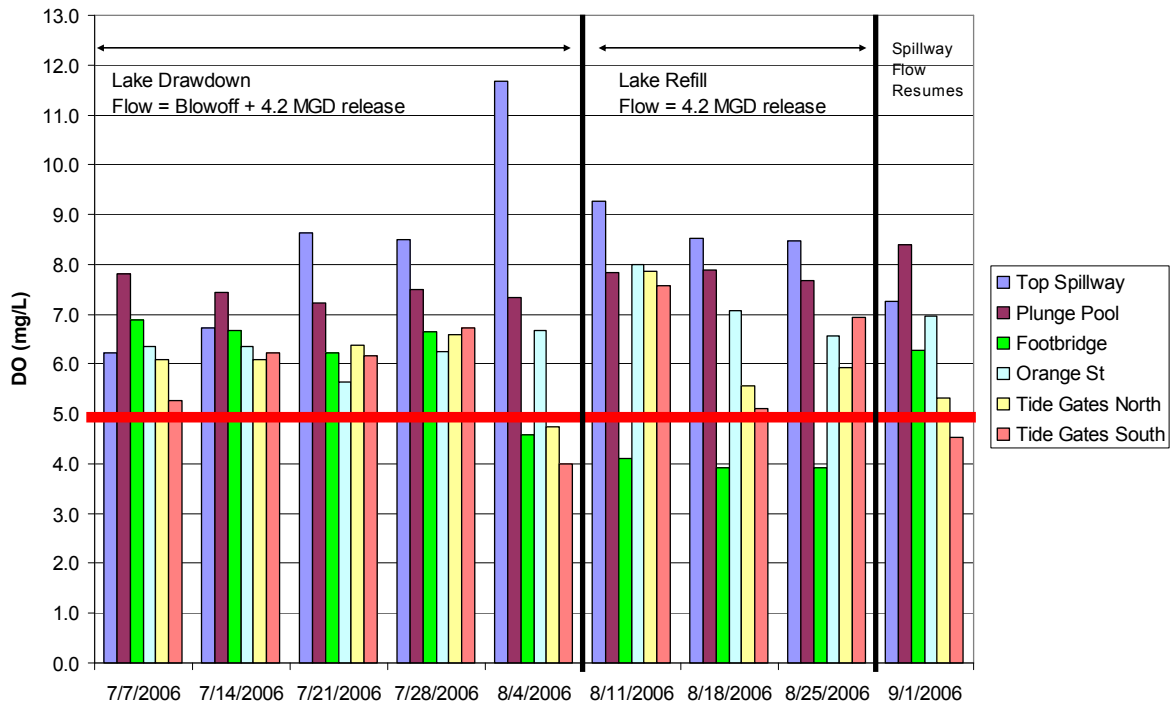


Figure 10: Summer 2006 Mill River Bottom Dissolved Oxygen

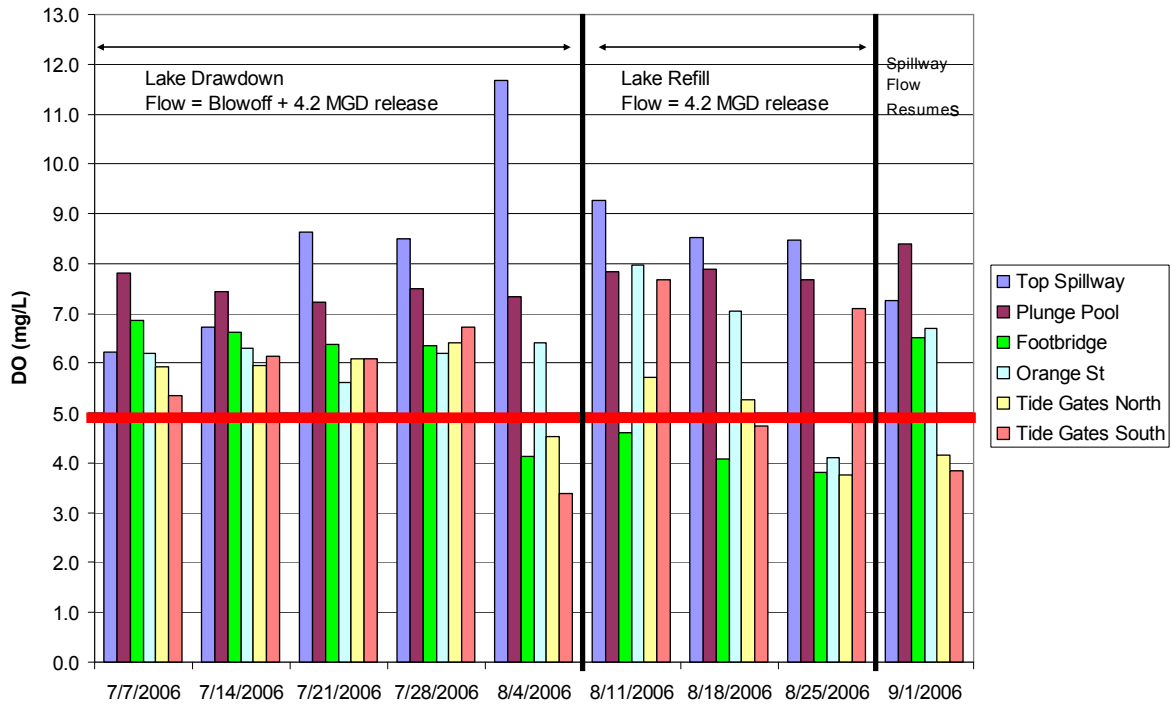
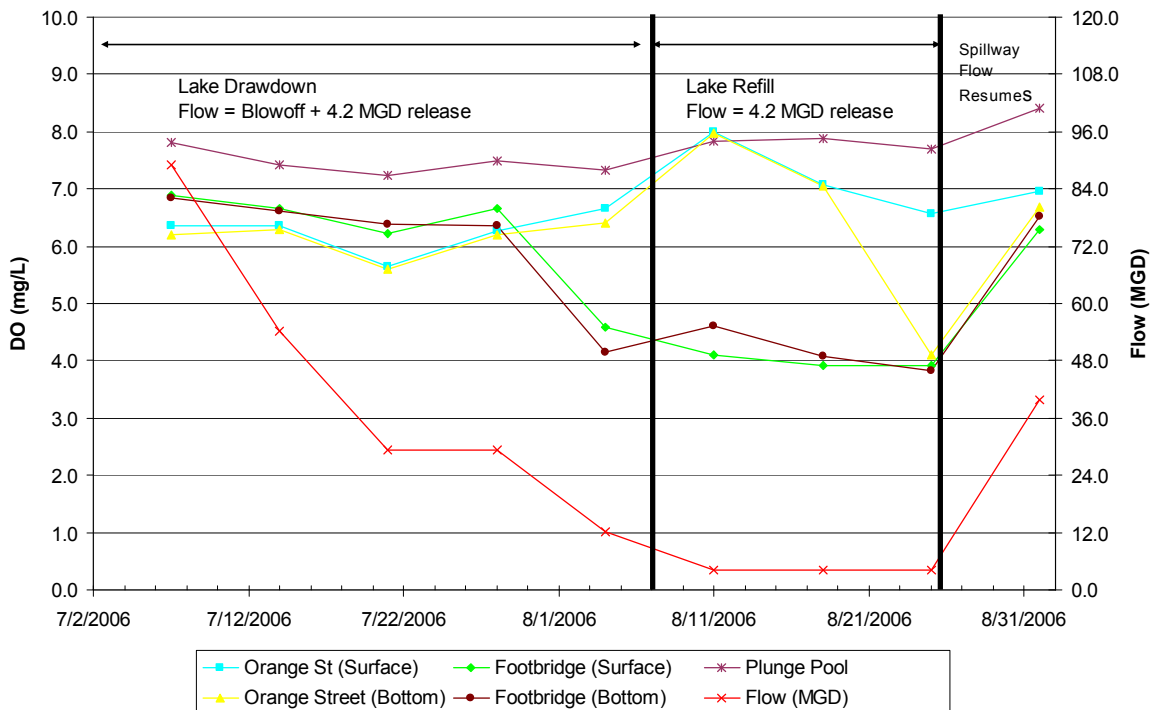


Figure 11: Mill River Downstream DO with Flow



Attachment A
Weekly Monitoring Data

DATE	Station	Time	Depth (m)	Temp (C)	SpC (mS/cm)	Salinity (PSS)	pH	DO (mg/l)	DO%	Tide Stage	Dry or Wet
7/7/2006	0	6:03	0.30	23.30	0.199	0.10	6.90	6.22	72.90	Low	Wet
7/7/2006	1	5:55	0.40	22.90	0.199	0.10	7.20	7.81	90.90	Low	Wet
7/7/2006	4	5:37	0.20	22.60	0.2	0.10	7.10	6.88	79.70	Low	Wet
7/7/2006	4	5:45	0.80	22.60	0.199	0.10	7.00	6.85	79.40	Low	Wet
7/7/2006	6	5:18	0.20	22.61	0.202	0.10	6.90	6.35	73.50	Low	Wet
7/7/2006	6	5:29	0.90	22.61	0.201	0.10	6.80	6.19	71.60	Low	Wet
7/7/2006	7	6:15	0.20	23.20	0.323	0.16	6.90	6.10	71.50	Low	Wet
7/7/2006	7	6:25	0.90	23.20	0.325	0.16	6.90	5.94	69.60	Low	Wet
7/7/2006	8	6:35	0.30	23.20	0.326	0.16	6.95	5.28	61.80	Low	Wet
7/7/2006	8	6:45	0.70	23.20	0.326	0.16	6.91	5.35	62.60	Low	Wet
7/14/2006	0	5:52	0.40	24.85	0.233	0.11	7.19	6.72	81.20	High	Wet
7/14/2006	1	5:45	0.40	22.44	0.237	0.11	7.05	7.43	85.70	High	Wet
7/14/2006	4	5:25	0.30	23.42	0.233	0.11	6.89	6.66	78.30	High	Wet
7/14/2006	4	5:30	1.30	23.41	0.233	0.11	6.86	6.61	77.70	High	Wet
7/14/2006	6	5:12	0.30	23.48	0.233	0.11	6.85	6.36	75.00	High	Wet
7/14/2006	6	5:17	0.90	23.48	0.233	0.11	6.80	6.30	74.20	High	Wet
7/14/2006	7	6:05	0.20	23.54	0.681	0.33	6.89	6.10	72.10	High	Wet
7/14/2006	7	6:10	0.90	23.53	0.682	0.33	6.90	5.95	70.20	High	Wet
7/14/2006	8	6:15	0.20	23.52	0.585	0.28	6.87	6.23	73.50	High	Wet
7/14/2006	8	6:20	0.70	23.52	0.565	0.27	6.87	6.13	72.30	High	Wet
7/21/2006	0	5:53	0.30	26.67	0.261	0.13	7.81	8.62	107.70	Low	Wet
7/21/2006	1	5:43	0.40	24.66	0.262	0.13	7.24	7.24	87.20	Low	Wet
7/21/2006	4	5:35	0.20	25.36	0.264	0.13	7.06	6.22	75.90	Low	Wet
7/21/2006	4	5:38	0.70	25.38	0.263	0.13	7.05	6.38	77.90	Low	Wet
7/21/2006	6	5:17	0.20	25.48	0.266	0.13	7.09	5.64	69.00	Low	Wet
7/21/2006	6	5:24	0.90	25.47	0.264	0.13	7.08	5.61	68.60	Low	Wet
7/21/2006	7	6:05	0.20	25.63	3.06	1.59	7.22	6.39	79.10	Low	Wet
7/21/2006	7	6:10	0.90	25.63	3.1	1.61	7.17	6.09	75.40	Low	Wet
7/21/2006	8	6:16	0.30	25.59	3.01	1.56	7.16	6.18	76.40	Low	Wet

DATE	Station	Time	Depth (m)	Temp (C)	SpC (mS/cm)	Salinity (PSS)	pH	DO (mg/l)	DO%	Tide Stage	Dry or Wet
7/21/2006	8	6:21	0.80	25.66	3.27	1.71	7.13	6.08	75.30	Low	Wet
7/28/2006	0	5:55	0.20	26.54	0.266	0.13	8.27	8.51	106.00	High	Dry
7/28/2006	1	5:50	0.30	25.97	0.267	0.13	7.99	7.50	92.50	High	Dry
7/28/2006	4	5:35	0.20	25.71	0.268	0.13	7.47	6.65	81.80	High	Dry
7/28/2006	4	5:42	0.90	25.71	0.269	0.13	7.46	6.35	78.10	High	Dry
7/28/2006	6	5:24	0.20	25.48	0.273	0.13	7.09	6.26	76.50	High	Dry
7/28/2006	6	5:29	0.90	25.28	0.272	0.13	7.11	6.19	75.30	High	Dry
7/28/2006	7	6:10	0.20	26.28	7.27	4.00	7.66	6.60	83.90	High	Dry
7/28/2006	7	6:15	0.90	26.27	7.48	4.12	7.62	6.42	81.70	High	Dry
7/28/2006	8	6:25	0.20	26.27	6.77	3.71	7.62	6.73	85.50	High	Dry
7/28/2006	8	6:30	0.80	26.26	6.86	3.76	7.59	6.72	85.20	High	Dry
8/4/2006	0	5:53	0.20	30.10	0.257	0.13	8.90	11.68	153.60	Mid	Wet
8/4/2006	1	5:58	0.20	26.70	0.268	0.13	8.00	7.33	91.60	Mid	Wet
8/4/2006	4	6:13	0.20	27.25	0.272	0.13	7.80	4.59	57.90	Mid	Wet
8/4/2006	4	6:15	1.00	27.22	0.273	0.13	7.70	4.14	52.20	Mid	Wet
8/4/2006	6	6:34	0.30	28.36	0.457	0.22	8.00	6.66	85.80	Mid	Wet
8/4/2006	6	6:35	1.00	28.25	1.442	0.72	7.70	6.41	82.90	Mid	Wet
8/4/2006	7	6:46	0.10	26.21	30.6	19.00	7.20	4.74	65.80	Mid	Wet
8/4/2006	7	6:47	0.90	26.22	30.6	19.00	7.10	4.53	63.00	Mid	Wet
8/4/2006	8	6:50	0.30	27.25	16.8	9.88	7.10	4.01	53.80	Mid	Wet
8/4/2006	8	6:51	1.00	26.20	30.8	19.14	7.00	3.39	47.10	Mid	Wet
8/11/2006	0	6:05	0.30	25.72	0.265	0.13	8.78	9.26	113.70	Mid	Dry
8/11/2006	1	5:55	0.40	24.97	0.266	0.13	8.58	7.83	94.80	Mid	Dry
8/11/2006	4	5:40	0.20	23.65	0.371	0.18	7.26	4.10	48.50	Mid	Dry
8/11/2006	4	5:46	0.70	23.99	1.71	0.86	7.21	4.60	55.00	Mid	Dry
8/11/2006	6	5:25	0.20	23.92	5.18	2.78	7.73	7.99	96.60	Mid	Dry
8/11/2006	6	5:30	0.60	25.77	19.1	11.34	7.48	7.98	105.20	Mid	Dry
8/11/2006	7	6:15	0.20	23.80	16.8	9.84	7.79	7.86	99.10	Mid	Dry
8/11/2006	7	6:20	0.70	24.38	29.1	17.94	7.40	5.73	76.60	Mid	Dry

DATE	Station	Time	Depth (m)	Temp (C)	SpC (mS/cm)	Salinity (PSS)	pH	DO (mg/l)	DO%	Tide Stage	Dry or Wet
8/11/2006	8	6:25	0.20	23.90	19.1	11.32	7.61	7.57	96.50	Mid	Dry
8/11/2006	8	6:30	0.40	23.79	18.7	11.06	7.65	7.67	97.20	Mid	Dry
8/18/2006	0	6:15	0.30	25.07	0.276	0.13	8.69	8.53	103.50	Low	Wet
8/18/2006	1	6:10	0.30	24.23	0.28	0.14	8.25	7.89	94.20	Low	Wet
8/18/2006	4	5:55	0.20	22.91	0.511	0.25	7.47	3.92	45.70	Low	Wet
8/18/2006	4	5:59	0.80	24.16	3.78	1.99	7.26	4.07	49.20	Low	Wet
8/18/2006	6	5:35	0.30	23.76	3.89	2.05	7.72	7.08	84.90	Low	Wet
8/18/2006	6	5:44	0.70	25.35	19.1	11.33	7.35	7.04	92.10	Low	Wet
8/18/2006	7	6:33	0.20	24.17	29.2	18.00	7.36	5.55	74.00	Low	Wet
8/18/2006	7	6:38	0.70	24.16	29.5	18.21	7.30	5.27	70.40	Low	Wet
8/18/2006	8	6:40	0.20	24.35	22.7	13.67	7.37	5.10	66.40	Low	Wet
8/18/2006	8	6:45	0.80	24.13	30.5	18.88	7.23	4.73	63.30	Low	Wet
8/25/2006	0	6:20	0.30	24.88	0.286	0.14	8.68	8.47	103.40	Mid	Dry
8/25/2006	1	6:15	0.20	24.25	0.292	0.14	8.19	7.69	91.80	Mid	Dry
8/25/2006	4	6:00	0.20	22.37	0.636	0.31	7.31	3.91	45.10	Mid	Dry
8/25/2006	4	6:05	0.70	25.09	7.23	3.97	7.10	3.82	47.50	Mid	Dry
8/25/2006	6	5:40	0.20	23.75	6.73	3.67	7.46	6.56	79.60	Mid	Dry
8/25/2006	6	5:50	0.70	25.44	21.4	12.83	7.03	4.10	54.10	Mid	Dry
8/25/2006	7	6:30	0.20	23.67	18.3	10.80	7.39	5.93	75.10	Mid	Dry
8/25/2006	7	6:35	0.60	24.33	30.2	18.68	7.14	3.75	50.40	Mid	Dry
8/25/2006	8	6:42	0.20	23.81	20.9	12.48	7.27	6.94	88.90	Mid	Dry
8/25/2006	8	6:47	0.30	23.77	20.2	12.02	7.27	7.09	90.30	Mid	Dry
9/1/2006	0	6:24	0.30	20.35	0.267	0.13	7.64	7.25	80.30	High	Wet
9/1/2006	1	6:15	0.30	19.94	0.267	0.13	7.64	8.40	92.40	High	Wet
9/1/2006	4	6:00	0.20	19.41	0.271	0.13	7.46	6.28	68.30	High	Wet
9/1/2006	4	6:05	1.00	19.41	0.272	0.13	7.39	6.52	70.90	High	Wet
9/1/2006	6	5:45	0.20	19.83	0.318	0.15	7.60	6.96	76.50	High	Wet
9/1/2006	6	5:52	0.90	19.78	0.317	0.15	7.49	6.69	73.30	High	Wet
9/1/2006	7	6:35	0.20	20.38	22.8	13.67	7.16	5.31	64.10	High	Wet

DATE	Station	Time	Depth (m)	Temp (C)	SpC (mS/cm)	Salinity (PSS)	pH	DO (mg/l)	DO%	Tide Stage	Dry or Wet
9/1/2006	7	6:40	0.90	20.75	29.3	17.99	7.10	4.16	52.00	High	Wet
9/1/2006	8	6:45	0.30	20.67	19.7	11.66	7.21	4.53	54.30	High	Wet
9/1/2006	8	6:50	1.00	20.98	33.9	21.13	7.04	3.83	49.00	High	Wet

Notes:

Station

- 0 Spillway
- 1 Plunge Pool
- 4 Footbridge
- 6 Orange Street Bridge
- 7 North of the Tide Gates
- 8 South of the Tide Gates

Surface and bottom measurements were taken at the Footbridge, Orange St, and the Tidegates