Appendices B through F

Lake Whatcom Watershed
Total Phosphorus and Bacteria
Total Maximum Daily Loads

Volume 1. Water Quality Study Findings

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Appendices B through F

Lake Whatcom Watershed
Total Phosphorus and Bacteria
Total Maximum Daily Loads

Volume 1. Water Quality Study Findings

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Appendix B. Data Quality Analysis

Quality Assurance Methods

The Quality Assurance Project Plan (QAPP) for the *Lake Whatcom Watershed Total Phosphorus and Bacteria TMDL* study called for a separate quantitative analysis of bias, precision, and accuracy. Ecology guidance issued in 2004 (*Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*; Lombard and Kirchmer, 2004) calls for a modified approach. Precision can be quantified with duplicate or replicate samples, so the targets in the QAPP still apply. However, the guidance recommends the following approach to bias:

> *Bias due to sample collection, transportation, and storage must usually be inferred through careful observation and professional judgment. These errors can be avoided or minimized through use of standardized procedures by properly trained staff. Bias affecting measurement procedures can be inferred from the results of QC procedures involving the use of blanks, check standards, and spiked samples…Generally, it is not possible to directly estimate the total bias of analytical results. Instead, each of the potential sources of bias is evaluated separately.*

Because accuracy is the combined effect of precision and bias, the assessment of accuracy will consist of a synthesis of the data quality results for those two elements.

A variety of field and laboratory protocols were followed to ensure data quality, as described in the QAPP (Cusimano et al., 2002). Table B-1 shows the dates and parameters for which field data quality procedures were conducted for laboratory parameters.

Overall precision was assessed with field duplicates. The QAPP called for duplicates to be collected for all laboratory samples at a rate of at least 10%. This rate was achieved for biochemical oxygen demand, chloride, chlorophyll, and alkalinity, but was somewhat less for other parameters, with an average duplicate rate of just over 8%.

The pooled relative standard deviation (RSD) was calculated from duplicate pairs for each parameter to compare to data quality RSD targets in the QAPP. For values below the reporting limit, the difference of pairs and average of pairs were set to one-half the reporting limit, and the standard deviation of pairs calculated as the difference of pairs divided by the square root of 2.

Where RSD targets were not met with the entire set of duplicates, the following procedure was followed:

- The pooled RSD was recalculated for only values above the reporting limit. All values above the reporting limit were used if that allowed the RSD target to be met. Otherwise, values above five times the reporting limit were used in the calculation.
- The root mean square error (RMSE) of all paired values were calculated and compared to the reporting limit. If the RMSE of all values was higher than the reporting limit, then the RMSE of values less than five times the reporting limit were calculated and compared to the reporting limit.

- If a single outlier was obviously responsible for missing the target values, the outlier was removed and the targets recalculated.

Laboratory data quality methods followed the protocols described in the Manchester Laboratory Quality Assurance Manual (MEL, 2000). Results of laboratory data quality procedures are provided to the project manager in a weekly Case Narrative.

Data quality for field measurements was primarily assured through calibration procedures prior to every survey. The QAPP called for 10% replication of field measurements, but only tributary dissolved oxygen (DO) measurements met this target with paired readings of a Hydrolab® meter and samples using the Winkler method. Eight paired Winkler measurements were made out of 112 measurements for a replicate rate of about 7%. Hydrolab®-Winkler pairs were also taken for lake profiles, but only one Winkler sample was analyzed for each of 20 profiles, while no Winkler samples were analyzed for the other 19 profiles, for an overall replicate rate of 3.4% of all measurements. No Winkler samples were collected for diurnal DO Hydrolab® measurements, although diurnal measurements could be paired with a proximate profile Hydrolab® measurement.

No paired readings were collected for pH, conductivity, or temperature. Post-calibration (post-survey standards checks) for pH and conductivity occurred after 10 surveys and for DO after 5 surveys, out of 15 surveys total.

Data Quality Results

Table B-2 shows the results for the assessment of total precision through a field duplicate analysis.

- Data quality targets for precision were met for the following parameters based on the pooled RSD of all duplicates: ultimate biochemical oxygen demand, chlorophyll-*a*, total organic carbon, *E. coli* bacteria, nitrate-nitrite, silica, total alkalinity, total dissolved solids, and total persulfate nitrogen.
- Ammonia and 5-day biochemical oxygen demand exceeded the RSD data quality target, but met the RMSE targets based on all values.
- Dissolved organic carbon met the RSD target based on values above the reporting limit and met the RMSE target based on all values.
- Ortho-phosphate met the RSD target based on values above five times the reporting limit and met the RMSE target based on all values.
- Total phosphorus met the RSD target based on all values with a single outlier removed and met the RMSE target based on values below five times the reporting limit.
- Total suspended solids met the RSD target based on values above five times the reporting limit with a single outlier removed, and met the RMSE target based on values below five times the reporting limit with a single outlier removed.
- Total non-volatile suspended solids met the RSD target based on values above five times the reporting limit but did not met RMSE targets.

- Fecal coliform bacteria exceeded the RSD target (a pooled RSD of 38% as compared to the target of 25%), and most values were well above the detection limit. However, a target of 25% is fairly ambitious (for example, the *Lower Skagit Bacteria TMDL* used a target of 50% - see Pickett, 1996), and bacteria is known to be highly variable in the field, so the observed RSD is not sufficiently high to reject the data.
- No chloride data quality targets were set in the QAPP, but the pooled RSD is very low and indicates a high quality of precision.

Table B-3 shows the results of the field blank analysis, which are an indication of measurement bias.

- All blanks were below reporting limits for the following parameters: ammonia, chlorophyll-*a*, total organic carbon, nitrate-nitrite, total alkalinity, total dissolved solids, total suspended solids, and total persulfate nitrogen.
- Dissolved organic carbon, total phosphorus, and total non-volatile suspended solids each had a single blank at or just slightly above the reporting limit.
- One of three orthophosphorus samples and 2 of 4 chloride samples were well above the reporting limit.

Manchester Environmental Laboratory, based on their data quality analyses, found all sample analytical results acceptable for use. Some samples had data quality problems, and the analytical results are reported with qualifications. Exceedances of holding times for bacteria and chlorophyll-*a* analyses were most common, and other miscellaneous problems typical of these parameters also occurred. A few samples analyzed for total and dissolved organic carbon had problems with calibration or matrix interference and were qualified. A few orthophosphorus samples exceeded holding times. With only the noted exceptions, calibration, method blanks, matrix spikes, replicates, and laboratory control samples all met data quality standards.

Overall, data quality for laboratory parameters meets an acceptable level of accuracy. Laboratory qualifications must be taken into account when using the data. In addition, field duplicates indicate that total suspended solids, total non-volatile suspended solids, and fecal coliform bacteria have more variability than originally targeted, and that additional variability should be taken into account when the data are used.

All Hydrolab© meters calibrated correctly to manufacturer's specifications. Post-calibration standard checks (Table B-4) showed that DO met the target of ±0.2mg/L for 2 out of 4 checks, differed from 100% saturation by 1% or less for 3 checks, and the RMSE of checks exceeded the target. Most of the variability was due to a positive bias of the meter above the standard, suggesting a tendency for meter readings to drift upward.

Post-calibration checks of pH all fell within the target accuracy of ±0.2 standard units with almost no bias. Thirteen out of 18 conductivity checks met the target accuracy of ±10 µmho/cm, but the RMSE exceeded the target, and a bias towards higher meter readings was observed.

Differences for 3 out of 8 paired DO measurements using the Winkler method slightly exceeded the target of ±0.2 mg/L, but the pooled standard deviation for the paired differences fell below

the target (Table B-5). These results are typical of the method, and Winkler measurements appear to be of an acceptable quality.

Table B-6 shows the results of paired field measurements with the Hydrolab© meter and Winkler method. Out of 120 pairs, 61% exceeded the target of ±0.2 mg/L, while the pooled standard deviation of the pairs equaled 0.76 mg/L. Out of 15 surveys, only two had pooled standard deviations for the survey that met the target.

Profile readings were paired with diurnal readings from Hydrolab© instruments (Table B-7). The diurnal readings appeared to be biased slightly lower (average residual of -0.2 mg/L), while the RMSE of the paired differences was 0.5 mg/L. Only 2 of the 10 pairs fell within the target of ±0.2 mg/L).

The RMSE for the paired Hydrolab readings were similar to the RMSE for the post-calibration standard checks and for the Hydrolab©-Winkler pairs. The magnitudes of the observed differences are not unexpected, since DO conditions in the lake are highly variable temporally and spatially, so that small differences in the times and locations of the measurements can result in significant differences measurement values.

Overall, Hydrolab® DO measurements often failed to meet targets. Paired readings had overall precision above 0.5 mg/L, and the difference between pairs sometimes exceeded 1.0 mg/L. Some profile measurements were corrected with Winkler data and may have accuracy that approaches the Winkler reading. Overall, variability is high, but not unusual for lake profile monitoring. The DO data are considered acceptable for use as qualified data, for which the observed variability must be taken into account.

Other Data Quality Analyses

Monitoring of water quality parameters that were used in the TMDL study was also conducted by the City of Bellingham, Western Washington University, the Whatcom Creek Remediation project, and the National Atmospheric Deposition Program (NADP).

The City of Bellingham conducted monitoring of tributary water quality and flow, as well as Whatcom Creek outflows, Nooksack Diversion inflows, and lake levels. Water quality monitoring of inflows was conducted in accordance with Scope of Work that included detailed quality assurance procedures to ensure the accuracy and representativeness of data (Wendling, 2002). An analysis of data quality results (Wendling, 2005) showed no deviations from the methodology depicted in the sampling plan throughout the course of the project. All parameters met precision data quality targets in terms of percent RSD, except for a few measurements close to detection levels, for which greater %RSD levels are acceptable.

Data collected by Western Washington University is collected at long-established monitoring locations and undergo rigorous data quality analyses. Each annual monitoring report and other special reports (such as graduate theses) include a *Quality Control* section that outlines data quality procedures and how data meet data quality standards. Data failing to meet data quality

standards are not published. Therefore data collected by Western Washington University are considered to be representative and of acceptable precision.

GeoEngineers Inc. measured groundwater temperatures as part of remediation well monitoring. Two wells were selected from the monitoring array as being most representative of groundwater temperatures near Lake Whatcom, and the number of data was adequate for developing model inputs. According to the Project Officer (Cook, 2005), standard low-flow groundwater monitoring procedures were followed using one of the following units: YSI 55; OxyGuard® Handy Series; Horiba U-10; or Horiba U-22. Specified accuracy of these meters vary between ±0.2 °C (YSI and OxyGuard®) to ±1.0 °C (Horiba). Measurements from multiple wells tended to show about a 2 °C spread, and a seasonal variation of 4 to 8 °C. All temperature probes are factory calibrated, and no laboratory or field check data are available. Data quality must therefore be assumed to have an accuracy of ±1 °C. Although this exceeds the QAPP targets, since these are secondary parameters for a minor model input, the quality of these data are acceptable for this purpose.

The National Atmospheric Deposition Program (NADP) follows an extensive data quality assurance process that complies with EPA and ISO (International Organization for Standardization) environmental data quality standards. Overall, data quality procedures are described in the Quality Management Plan. (Lehmann et al., 2003). Data used for this project came from a QAPP for the National Trends Network (Aubertin, et al., 1991). Data quality is reviewed annually (e.g., Rothert, 2003), and the following excerpt describes data quality procedures and results for 2001:

> *Weekly QA procedures include ensuring that all materials coming into contact with the precipitation samples do not contaminate the samples. Any problems that arise must be investigated and eliminated. All blank analyses, matrix-spiked analyses, internal blind sample analyses for NTN and AIRMoN, and replicate analyses for 2001 were in compliance with the NADP QAP.*
>
> *Monthly evaluation of laboratory control charts, reanalysis samples, Ion Percent Differences, and Conductance Percent Differences showed the CAL to be in compliance with the NADP QAP.*

The NAPD data were collected following quality procedures that meet very high standards. Data collection sites are not in the Lake Whatcom watershed, but are expected to be representative of regional background precipitation chemistry. Since the data are used to characterize a relatively small loading source to the lake, the quality, number, and representativeness of the data are acceptable for use in the TMDL for that purpose.

Table B-1. Locations and Dates of Data Quality Duplicates and Field Blanks

	Survey Dates – 2002											
Parameter	23-Jan	13-Feb	5-Mar	26-Mar	16-Apr	7-May	30-May	16-Jul	14-Aug	17-Sep	12-Nov	10-Dec
Ammonia	D	D	D	D	D	D	D	D	D	D	D	B, D
Biochemical Oxygen Demand						D		D	D			
Chloride												B, D
Chlorophyll	D	D	D	D	D	D	D	D	D	D	D	D
Dissolved Organic Carbon								D	D	D	D	B, D
E. coli								D	D	D	D	D
Fecal Coliform								D	D	D	D	D
Nitrite-Nitrate								D	D	D	D	B, D
Orthophosphate								D	D	D	D	B, D
Phosphorus								D	D	D	D	B, D
Silicon		D		D								
Total Alkalinity								D	D	D	D	B, D
Total Dissolved Solids								D	D		D	B, D
Total Non-Volatile Suspended Solids								D	D	D	D	B, D
Total Organic Carbon	D	D	D	D	D	D	D	D	D	D	D	B, D
Total Persulfate Nitrogen								D	D	D	D	B, D
Total Suspended Solids								D	D	D	D	B, D

	Survey Dates – 2003										
Parameter	7-Jan	28-Jan	18-Feb	19-Mar	2-Apr	22-Apr	28-May	11-Jun	16-Jul	20-Aug	24-Sep
Ammonia	D	B, D	D	B, D	D	D	D	D	D	D	D
Biochemical Oxygen Demand		D		D			D	D	D	D	D
Chloride	D	B, D	D	B, D	D	D	D	D	D	D	D
Chlorophyll	D	B, D	D	B, D	D	D	D	D	D	D	D
Dissolved Organic Carbon	D	B, D	D	B, D	D	D	D	D	D	D	D
E. coli	D	D	D	D	D	D	D	D	D	D	D
Fecal Coliform	D	D	D		D	D	D	D	D	D	D
Nitrite-Nitrate	D	B, D	D	B, D	D	D	D	D	D	D	D
Orthophosphate	D	B, D		B, D	D	D	D	D	D	D	D
Phosphorus	D	B, D	D	B, D	D	D	D	D	D	D	D
Silicon											
Total Alkalinity	D	B, D	D	B, D	D	D	D	D	D	D	D
Total Dissolved Solids	D										
Total Non-Volatile Suspended Solids	D	B, D	D	B, D	D	D	D	D	D	D	D
Total Organic Carbon	D	B, D	D	B, D	D	D	D	D	D	D	D
Total Persulfate Nitrogen	D	B, D	D	B, D	D	D	D	D	D	D	D
Total Suspended Solids	D	B, D	D	B, D	D	D	D	D	D	D	D

Code: B = field blank D = field duplicate

Table B-2. Results of Duplicate Analysis

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Ammonia (mg/l)										
LW_CAR01	1/23/02	10:19	0.013		0.010		0.003	0.012	0.0021	18.4%
LW_AND01	2/13/02	7:45	0.016		0.017		0.001	0.017	0.0007	4.3%
LW_EUC01	3/5/02	8:35	0.017		0.013		0.004	0.015	0.0028	18.9%
LW_SIL01	3/26/02	8:55	0.013		0.018		0.005	0.016	0.0035	22.8%
LW_AUS01	4/16/02	8:05	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_MIL01	5/7/02	0:00	0.016		0.013		0.003	0.015	0.0021	14.6%
LW_SMI01	5/30/02	9:25	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_AND01	7/16/02	8:15	0.021		0.020		0.001	0.021	0.0007	3.4%
LW_AUS01	8/14/02	9:50	0.014		0.013		0.001	0.014	0.0007	5.2%
LW_AUS01	9/17/02	10:40	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_AUS01	11/12/02	10:25	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_SIL01	12/10/02	11:55	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_OLS01	1/7/03	12:40	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_AUS01	1/28/03	10:05	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_MIL01	2/18/03	10:30	0.024		0.021		0.003	0.023	0.0021	9.4%
LW_BRA01	3/19/03	11:45	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_EUC01	4/2/03	10:25	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_CAR01	4/22/03	9:40	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_AND01	5/28/03	13:30	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_BRA01	6/11/03	12:00	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_SIL01	7/16/03	9:40	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_OLS01	8/20/03	9:45	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
LW_SMI01	9/24/03	9:00	0.010	U	0.010	U	0.000	0.010	0.0000	0.0%
						RMSE:	0.0018		**Pooled:**	8.3%
									Pooled (> 0.02):	7.1%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Chlorophyll-*a* (µg/L)										
LW_CAR01	1/23/02	10:19	0.19		0.19		0.00	0.19	0.000	0.0%
LW_AND01	2/13/02	7:45	0.26		0.41		0.15	0.34	0.106	31.7%
LW_EUC01	3/5/02	8:35	0.06		0.05	U	0.01	0.06	0.007	12.9%
LW_SIL01	3/26/02	8:55	3.50		2.80		0.70	3.15	0.495	15.7%
LW_AUS01	4/16/02	8:05	0.80		0.79		0.01	0.80	0.007	0.9%
LW_MIL01	5/7/02		3.00		3.00		0.00	3.00	0.000	0.0%
LW_SMI01	5/30/02	9:25	0.86		0.86		0.00	0.86	0.000	0.0%
LW_AND01	7/16/02	8:15	0.34		0.37		0.03	0.36	0.021	6.0%
LW_AUS01	8/14/02	9:50	0.32		0.33		0.01	0.33	0.007	2.2%
LW_AUS01	9/17/02	10:40	0.60		0.61		0.01	0.61	0.007	1.2%
LW_AUS01	11/12/02	10:25	1.70		0.92		0.78	1.31	0.552	42.1%
LW_SIL01	12/10/02	11:55	1.00		1.50		0.50	1.25	0.354	28.3%
LW_OLS01	1/7/03	12:40	0.70		0.69		0.01	0.70	0.007	1.0%
LW_AUS01	1/28/03	10:05	0.79		0.86		0.07	0.83	0.049	6.0%
LW_MIL01	2/18/03	10:30	2.00		1.90		0.10	1.95	0.071	3.6%
LW_BRA01	3/19/03	11:45	0.31		0.35		0.04	0.33	0.028	8.6%
LW_EUC01	4/2/03	10:25	0.98		1.10		0.12	1.04	0.085	8.2%
LW_CAR01	4/22/03	9:40	6.40		6.30		0.10	6.35	0.071	1.1%
LW_AND01	5/28/03	13:30	1.20		1.10		0.10	1.15	0.071	6.1%
LW_BRA01	6/11/03	12:00	0.33		0.34		0.01	0.34	0.007	2.1%
LW_SIL01	7/16/03	9:40	1.20		1.30		0.10	1.25	0.071	5.7%
LW_OLS01	8/20/03	9:45	0.28		0.21		0.07	0.25	0.049	20.2%
LW_SMI01	9/24/03	9:00	0.49		0.63		0.14	0.56	0.099	17.7%
						RMSE:	0.252		**Pooled:**	14.8%
									Target	**20.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Biochemical Oxygen Demand - 5-day (mg/l)										
LW_SMI01	5/7/02		0.28		0.26		0.02	0.27	0.01	5.2%
LW_SMI01	7/16/02	8:15	0.27		0.25		0.02	0.26	0.01	5.4%
LW1_15	8/14/02	9:50	0.59		0.64		0.06	0.61	0.04	6.5%
LW_SMI0D	1/28/03	10:05	0.06		0.15		0.09	0.11	0.07	61.9%
LW_SMI01	3/19/03	11:45	0.15		0.12		0.04	0.13	0.03	19.2%
LW_SMI01	5/28/03	13:30	0.29		0.28		0.01	0.28	0.01	3.3%
LW3_15	6/11/03	12:00	0.28		0.27		0.01	0.27	0.01	2.6%
LW3_15	7/16/03	9:40	0.08		0.04		0.04	0.06	0.03	47.1%
LW3_15	8/20/03	9:45	0.26		0.24		0.02	0.25	0.01	4.7%
LW3_15	9/24/03	9:00	0.08		0.16		0.08	0.12	0.05	44.6%
						RMSE:	0.05		**Pooled:**	29.2%
									Target	25.0%
Biochemical Oxygen Demand - Ultimate (mg/l)										
LW_SMI01	5/7/02		0.85		0.75		0.10	0.80	0.1	8.8%
LW_SMI01	7/16/02	8:15	0.82		0.76		0.06	0.79	0.0	5.4%
LW1_15	8/14/02	9:50	1.28		1.15		0.13	1.21	0.1	7.7%
LW_SMI01	1/28/03	10:05	1.05		1.03		0.01	1.04	0.0	0.9%
LW_SMI01	3/19/03	11:45	0.76		0.75		0.01	0.75	0.0	1.3%
LW_SMI01	5/28/03	13:30	1.39		1.25		0.14	1.32	0.1	7.4%
LW3_15	6/11/03	12:00	0.75		0.77		0.02	0.76	0.0	1.8%
LW3_15	7/16/03	9:40	1.66		1.61		0.05	1.64	0.0	2.1%
LW3_15	8/20/03	9:45	1.62		1.61		0.01	1.62	0.0	0.4%
LW3_15	9/24/03	9:00	1.69		1.90		0.21	1.80	0.1	8.3%
LW_SMI01	5/7/02		0.85		0.75		0.10	0.80	0.1	8.8%
						RMSE:	0.10		**Pooled:**	5.5%
									Target	25.0%

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Chloride (mg/l)										
LW_SIL01	12/10/02	11:55	9.91		9.79		0.12	9.85	0.085	0.9%
LW_OLS01	1/7/03	12:40	2.37		2.42		0.05	2.40	0.035	1.5%
LW_AUS01	1/28/03	10:05	3.07		3.04		0.03	3.06	0.021	0.7%
LW_MIL01	2/18/03	10:30	2.92		2.95		0.03	2.94	0.021	0.7%
LW_BRA01	3/19/03	11:45	1.73		1.8		0.07	1.77	0.049	2.8%
LW_EUC01	4/2/03	10:25	2.63		2.6		0.03	2.62	0.021	0.8%
LW_CAR01	4/22/03	9:40	1.76		1.77		0.01	1.77	0.007	0.4%
LW_AND01	5/28/03	13:30	0.48		0.47		0.01	0.48	0.007	1.5%
LW_BRA01	6/11/03	12:00	1.77		1.79		0.02	1.78	0.014	0.8%
LW_SIL01	7/16/03	9:40	7.41		7.47		0.06	7.44	0.042	0.6%
LW_OLS01	8/20/03	9:45	6.22		6.21		0.01	6.22	0.007	0.1%
LW_SMI01	9/24/03	9:00	6.26		6.29		0.03	6.28	0.021	0.3%
						RMSE:	0.050		**Pooled:**	1.2%
Dissolved Organic Carbon (mg/l)										
LW_AND01	7/16/02	8:15	1.0	U	1.0	U	0.0	1.0	0.00	0.0%
LW_AUS01	8/14/02	9:50	1.7		1.7		0.0	1.7	0.00	0.0%
LW_AUS01	9/17/02	10:40	3.7		3.8		0.1	3.8	0.07	1.9%
LW_AUS01	11/12/02	10:25	6.6		6.5		0.1	6.6	0.07	1.1%
LW_SIL01	12/10/02	11:55	8.2		8.4		0.2	8.3	0.14	1.7%
LW_OLS01	1/7/03	12:40	4.2		4.0		0.2	4.1	0.14	3.4%
LW_AUS01	1/28/03	10:05	3.3		3.4		0.1	3.4	0.07	2.1%
LW_MIL01	2/18/03	10:30	5.3		5.1		0.2	5.2	0.14	2.7%
LW_BRA01	3/19/03	11:45	2.0		1.8		0.2	1.9	0.14	7.4%
LW_EUC01	4/2/03	10:25	3.4		3.5		0.1	3.5	0.07	2.0%
LW_CAR01	4/22/03	9:40	4.1		4.1		0.0	4.1	0.00	0.0%
LW_AND01	5/28/03	13:30	1.1		1.0	U	0.1	1.1	0.07	6.7%
LW_BRA01	6/11/03	12:00	1.7		1.8		0.1	1.8	0.07	4.0%
LW_SIL01	7/16/03	9:40	5.8		5.7		0.1	5.8	0.07	1.2%
LW_OLS01	8/20/03	9:45	2.0		3.0		1.0	2.5	0.71	28.3%
LW_SMI01	9/24/03	9:00	2.3		2.3		0.0	2.3	0.00	0.0%
						RMSE:	0.28		**Pooled:**	7.7%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
***E. coli* bacteria (#/100mL)**										
LW_AND01	7/16/02	8:15	5		6		1	5.500	0.707	12.9%
LW_AUS01	8/14/02	9:50	230		220		10	225.000	7.071	3.1%
LW_AUS01	9/17/02	10:40	80		80		0	80.000	0.000	0.0%
LW_AUS01	11/12/02	10:25	190		290		100	240.000	70.711	29.5%
LW_SIL01	12/10/02	11:55	730		870		140	800.000	98.995	12.4%
LW_OLS01	1/7/03	12:40	3		3		0	3.000	0.000	0.0%
LW_AUS01	1/28/03	10:05	4		4		0	4.000	0.000	0.0%
LW_MIL01	2/18/03	10:30	130		100		30	115.000	21.213	18.4%
LW_BRA01	3/19/03	11:45	2		3		1	2.500	0.707	28.3%
LW_EUC01	4/2/03	10:25	53		37		16	45.000	11.314	25.1%
LW_CAR01	4/22/03	9:40	4		5		1	4.500	0.707	15.7%
LW_AND01	5/28/03	13:30	14		16		2	15.000	1.414	9.4%
LW_BRA01	6/11/03	12:00	67		59		8	63.000	5.657	9.0%
LW_SIL01	7/16/03	9:40	3300		3400		100	3350.000	70.711	2.1%
LW_OLS01	8/20/03	9:45	96		75		21	85.500	14.849	17.4%
LW_SMI01	9/24/03	9:00	69		74		5	71.500	3.536	4.9%
						RMSE:	50.9		**Pooled:**	15.2%
									Target	**25.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Fecal Coliform bacteria (#/100mL)										
LW_AND01	7/16/02	8:15	11		7		4	9	2.8	31.4%
LW_AUS01	8/14/02	9:50	180		180		0	180	0.0	0.0%
LW_AUS01	9/17/02	10:40	100		96		4	98	2.8	2.9%
LW_AUS01	11/12/02	10:25	240		170		70	205	49.5	24.1%
LW_SIL01	12/10/02	11:55	970		800		170	885	120.2	13.6%
LW_OLS01	1/7/03	12:40	4		2		2	3	1.4	47.1%
LW_AUS01	1/28/03	10:05	3		7		4	5	2.8	56.6%
LW_MIL01	2/18/03	10:30	84		120		36	102	25.5	25.0%
LW_BRA01	3/19/03	11:45	3		4		1	4	0.7	20.2%
LW_EUC01	4/2/03	10:25	40		36		4	38	2.8	7.4%
LW_CAR01	4/22/03	9:40	5		2		3	4	2.1	60.6%
LW_AND01	5/28/03	13:30	16		17		1	17	0.7	4.3%
LW_BRA01	6/11/03	12:00	60		61		1	61	0.7	1.2%
LW_SIL01	7/16/03	9:40	2800		2800		0	2800	0.0	0.0%
LW_OLS01	8/20/03	9:45	85		60		25	73	17.7	24.4%
LW_SMI01	9/24/03	9:00	96		15		81	56	57.3	103.2%
						RMSE:	51.5		**Pooled:**	38.1%
									Target	**25.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Nitrite-Nitrate (mg/l)										
LW_AND01	7/16/02	8:15	0.053		0.053		0.0000	0.053	0.0000	0.0%
LW_AUS01	8/14/02	9:50	0.291		0.291		0.0000	0.291	0.0000	0.0%
LW_AUS01	9/17/02	10:40	0.701		0.701		0.0000	0.701	0.0000	0.0%
LW_AUS01	11/12/02	10:25	0.629		0.629		0.0000	0.629	0.0000	0.0%
LW_SIL01	12/10/02	11:55	0.247		0.258		0.0110	0.253	0.0078	3.1%
LW_OLS01	1/7/03	12:40	1.700		1.700		0.0000	1.700	0.0000	0.0%
LW_AUS01	1/28/03	10:05	1.120		1.120		0.0000	1.120	0.0000	0.0%
LW_MIL01	2/18/03	10:30	0.582		0.579		0.0030	0.581	0.0021	0.4%
LW_BRA01	3/19/03	11:45	1.130		1.130		0.0000	1.130	0.0000	0.0%
LW_EUC01	4/2/03	10:25	0.604		0.603		0.0010	0.604	0.0007	0.1%
LW_CAR01	4/22/03	9:40	0.493		0.491		0.0020	0.492	0.0014	0.3%
LW_AND01	5/28/03	13:30	0.051		0.051		0.0000	0.051	0.0000	0.0%
LW_BRA01	6/11/03	12:00	0.654		0.654		0.0000	0.654	0.0000	0.0%
LW_SIL01	7/16/03	9:40	0.172		0.172		0.0000	0.172	0.0000	0.0%
LW_OLS01	8/20/03	9:45	0.295		0.294		0.0010	0.295	0.0007	0.2%
LW_SMI01	9/24/03	9:00	0.793		0.794		0.0010	0.794	0.0007	0.1%
						RMSE:	0.0029		**Pooled:**	0.8%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Orthophosphate (mg/l)										
LW_AND01	7/16/02	8:15	0.007		0.006		0.0013	0.006	0.0009	14.5%
LW_AUS01	8/14/02	9:50	0.008		0.009		0.0003	0.008	0.0002	2.5%
LW_AUS01	9/17/02	10:40	0.005		0.006		0.0009	0.005	0.0006	11.7%
LW_AUS01	11/12/02	10:25	0.006		0.007		0.0001	0.006	0.0001	1.1%
LW_SIL01	12/10/02	11:55	0.011		0.011		0.0000	0.011	0.0000	0.0%
LW_OLS01	1/7/03	12:40	0.014		0.006		0.0078	0.010	0.0055	54.6%
LW_AUS01	1/28/03	10:05	0.006		0.006		0.0002	0.006	0.0001	2.5%
LW_BRA01	3/19/03	11:45	0.003	U	0.003		0.0003	0.003	0.0002	6.7%
LW_EUC01	4/2/03	10:25	0.008		0.008		0.0001	0.008	0.0001	0.9%
LW_CAR01	4/22/03	9:40	0.006		0.005		0.0006	0.005	0.0004	7.9%
LW_AND01	5/28/03	13:30	0.004		0.004		0.0000	0.004	0.0000	0.0%
LW_BRA01	6/11/03	12:00	0.005		0.005		0.0001	0.005	0.0001	1.3%
LW_SIL01	7/16/03	9:40	0.021		0.022		0.0010	0.022	0.0007	3.3%
LW_OLS01	8/20/03	9:45	0.011		0.011		0.0000	0.011	0.0000	0.0%
LW_SMI01	9/24/03	9:00	0.003		0.003		0.0001	0.003	0.0001	2.3%
						RMSE:	0.0021		**Pooled:**	15.2%
									Pooled (no outlier):	5.9%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Total Phosphorus (mg/l)										
LW_AND01	7/16/02	8:15	0.062		0.060		0.0020	0.061	0.0014	2.3%
LW_AUS01	8/14/02	9:50	0.009		0.011		0.0021	0.010	0.0015	14.9%
LW_AUS01	9/17/02	10:40	0.009		0.009		0.0003	0.009	0.0002	2.4%
LW_AUS01	11/12/02	10:25	0.019		0.018		0.0010	0.019	0.0007	3.8%
LW_SIL01	12/10/02	11:55	0.054		0.021		0.0328	0.037	0.0232	62.0%
LW_OLS01	1/7/03	12:40	0.005		0.004		0.0008	0.005	0.0006	12.0%
LW_AUS01	1/28/03	10:05	0.010		0.010		0.0000	0.010	0.0000	0.0%
LW_MIL01	2/18/03	10:30	0.024		0.019		0.0050	0.022	0.0035	16.4%
LW_BRA01	3/19/03	11:45	0.005		0.006		0.0008	0.005	0.0006	10.9%
LW_EUC01	4/2/03	10:25	0.034		0.029		0.0050	0.032	0.0035	11.2%
LW_CAR01	4/22/03	9:40	0.006		0.006		0.0009	0.006	0.0006	10.7%
LW_AND01	5/28/03	13:30	0.010		0.012		0.0016	0.011	0.0011	10.4%
LW_BRA01	6/11/03	12:00	0.009		0.008		0.0011	0.009	0.0008	8.8%
LW_SIL01	7/16/03	9:40	0.038		0.037		0.0010	0.038	0.0007	1.9%
LW_OLS01	8/20/03	9:45	0.013		0.013		0.0001	0.013	0.0001	0.6%
LW_SMI01	9/24/03	9:00	0.004		0.004		0.0001	0.004	0.0001	1.8%
						RMSE:	0.0084		**Pooled:**	17.8%
									Pooled (no outlier):	9.0%
									Target	**10.0%**
Silica (µg/L)										
LW_AND01	2/13/02	7:45	3650		3760		110	3705	77.8	2.1%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Total Alkalinity (mg/l)										
LW_AND01	7/16/02	8:15	12		12		0.0	12	0.0	0.0%
LW_AUS01	8/14/02	9:50	34		34		0.0	34	0.0	0.0%
LW_AUS01	9/17/02	10:40	28		28		0.0	28	0.0	0.0%
LW_AUS01	11/12/02	10:25	31		31		0.0	31	0.0	0.0%
LW_SIL01	12/10/02	11:55	97		97		0.3	97	0.2	0.2%
LW_OLS01	1/7/03	12:40	14		13		1.0	14	0.7	5.2%
LW_AUS01	1/28/03	10:05	12		12		0.0	12	0.0	0.0%
LW_MIL01	2/18/03	10:30	30		30		0.0	30	0.0	0.0%
LW_BRA01	3/19/03	11:45	8.9		9.2		0.30	9.1	0.21	2.3%
LW_EUC01	4/2/03	10:25	23		23		0.0	23	0.0	0.0%
LW_CAR01	4/22/03	9:40	24		23		1.0	24	0.7	3.0%
LW_AND01	5/28/03	13:30	15		15		0.0	15	0.0	0.0%
LW_BRA01	6/11/03	12:00	15		15		0.0	15	0.0	0.0%
LW_SIL01	7/16/03	9:40	112		111		1.0	112	0.7	0.6%
LW_OLS01	8/20/03	9:45	53		53		0.0	53	0.0	0.0%
LW_SMI01	9/24/03	9:00	36		36		0.0	36	0.0	0.0%
						RMSE:	0.4		**Pooled:**	1.6%
									Target	**10.0%**
Total Dissolved Solids (mg/l)										
LW_AND01	7/16/02	8:15	40		42		2	41	1.4	3.4%
LW_AUS01	8/14/02	9:50	80		78		2	79	1.4	1.8%
LW_AUS01	11/12/02	10:25	92		93		1	93	0.7	0.8%
LW_SIL01	12/10/02	11:55	150		152		2	151	1.4	0.9%
LW_OLS01	1/7/03	12:40	50		51		1	51	0.7	1.4%
						RMSE:	1.7		**Pooled:**	1.9%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Total Non-Volatile Suspended Solids (mg/l)										
LW_AND01	7/16/02	8:15	16		17		1	17	0.7	4.3%
LW_AUS01	8/14/02	9:50	1	U	1	U	0	1	0.0	0.0%
LW_AUS01	9/17/02	10:40	1	U	1	U	0	1	0.0	0.0%
LW_AUS01	11/12/02	10:25	2		2		0	2	0.0	0.0%
LW_SIL01	12/10/02	11:55	6		3		3	5	2.1	47.1%
LW_OLS01	1/7/03	12:40	1	U	1	U	0	1	0.0	0.0%
LW_AUS01	1/28/03	10:05	5		5		0	5	0.0	0.0%
LW_MIL01	2/18/03	10:30	3		3		0	3	0.0	0.0%
LW_BRA01	3/19/03	11:45	1	U	2		1	2	0.7	47.1%
LW_EUC01	4/2/03	10:25	7		7		0	7	0.0	0.0%
LW_CAR01	4/22/03	9:40	1	U	1		0	1	0.0	0.0%
LW_AND01	5/28/03	13:30	5		5		0	5	0.0	0.0%
LW_BRA01	6/11/03	12:00	1	U	3		2	2	1.4	70.7%
LW_SIL01	7/16/03	9:40	3		4		1	4	0.7	20.2%
LW_OLS01	8/20/03	9:45	1	U	1	U	0	1	0.0	0.0%
LW_SMI01	9/24/03	9:00	1	U	1		0	1	0.0	0.0%
						RMSE:	1.0		**Pooled:**	24.8%
								Pooled (detects only):		18.2%
								Pooled (detects only, no outlier):		7.8%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Total Organic Carbon (mg/l)										
LW_CAR01	1/23/02	10:19	4.7		4.8		0.1	4.8	0.07	1.5%
LW_AND01	2/13/02	7:45	1.5		1.5		0.0	1.5	0.00	0.0%
LW_EUC01	3/5/02	8:35	3.2		3.0		0.2	3.1	0.14	4.6%
LW_SIL01	3/26/02	8:55	4.7		5.5		0.8	5.1	0.57	11.1%
LW_AUS01	4/16/02	8:05	3.3		3.3		0.0	3.3	0.00	0.0%
LW_MIL01	5/7/02		5.4		5.0		0.4	5.2	0.28	5.4%
LW_SMI01	5/30/02	9:25	2.7		2.6		0.1	2.7	0.07	2.7%
LW_AND01	7/16/02	8:15	1.0		1.0		0.0	1.0	0.00	0.0%
LW_AUS01	8/14/02	9:50	1.8		1.9		0.1	1.9	0.07	3.8%
LW_AUS01	9/17/02	10:40	3.9		3.9		0.0	3.9	0.00	0.0%
LW_AUS01	11/12/02	10:25	6.5		6.4		0.1	6.5	0.07	1.1%
LW_SIL01	12/10/02	11:55	8.7		8.9		0.2	8.8	0.14	1.6%
LW_OLS01	1/7/03	12:40	4.7		3.8		0.9	4.3	0.64	15.0%
LW_AUS01	1/28/03	10:05	4.2		4.0		0.2	4.1	0.14	3.4%
LW_MIL01	2/18/03	10:30	5.6		5.4		0.2	5.5	0.14	2.6%
LW_BRA01	3/19/03	11:45	1.9		1.9		0.0	1.9	0.00	0.0%
LW_EUC01	4/2/03	10:25	4.1		3.8		0.3	4.0	0.21	5.4%
LW_CAR01	4/22/03	9:40	4.2		4.5		0.3	4.4	0.21	4.9%
LW_AND01	5/28/03	13:30	1.4		1.2		0.2	1.3	0.14	10.9%
LW_BRA01	6/11/03	12:00	1.7		1.9		0.2	1.8	0.14	7.9%
LW_SIL01	7/16/03	9:40	5.9		5.9		0.0	5.9	0.00	0.0%
LW_OLS01	8/20/03	9:45	2.2		2.4		0.2	2.3	0.14	6.1%
LW_SMI01	9/24/03	9:00	2.5		2.5		0.0	2.5	0.00	0.0%
						RMSE:	0.3		**Pooled:**	5.6%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Total Persulfate Nitrogen (mg/l)										
LW_AND01	7/16/02	8:15	0.078		0.079		0.001	0.079	0.0007	0.9%
LW_AUS01	8/14/02	9:50	0.347		0.359		0.012	0.353	0.0085	2.4%
LW_AUS01	9/17/02	10:40	0.786		0.793		0.007	0.790	0.0049	0.6%
LW_AUS01	11/12/02	10:25	0.769		0.772		0.003	0.771	0.0021	0.3%
LW_SIL01	12/10/02	11:55	0.520		0.492		0.028	0.506	0.0198	3.9%
LW_OLS01	1/7/03	12:40	1.750		1.770		0.020	1.760	0.0141	0.8%
LW_AUS01	1/28/03	10:05	1.170		1.170		0.000	1.170	0.0000	0.0%
LW_MIL01	2/18/03	10:30	0.735		0.771		0.036	0.753	0.0255	3.4%
LW_BRA01	3/19/03	11:45	1.150		1.160		0.010	1.155	0.0071	0.6%
LW_EUC01	4/2/03	10:25	0.737		0.729		0.008	0.733	0.0057	0.8%
LW_CAR01	4/22/03	9:40	0.630		0.624		0.006	0.627	0.0042	0.7%
LW_AND01	5/28/03	13:30	0.082		0.078		0.004	0.080	0.0028	3.5%
LW_BRA01	6/11/03	12:00	0.736		0.712		0.024	0.724	0.0170	2.3%
LW_SIL01	7/16/03	9:40	0.423		0.446		0.023	0.435	0.0163	3.7%
LW_OLS01	8/20/03	9:45	0.357		0.349		0.008	0.353	0.0057	1.6%
LW_SMI01	9/24/03	9:00	0.878		0.877		0.001	0.878	0.0007	0.1%
						RMSE:	0.016		**Pooled:**	2.1%
									Target	**10.0%**

Table B-2, continued.

Station ID	Date	Time	Value 1	Qual[1]	Value 2	Qual[1]	Difference	Average	Std Dev	RSD
Total Suspended Solids (mg/l)										
LW_AND01	7/16/02	8:15	19		17		2	18	1.4	7.9%
LW_AUS01	8/14/02	9:50	1	U	1	U	0	1	0.0	0.0%
LW_AUS01	9/17/02	10:40	1	U	1	U	0	1	0.0	0.0%
LW_AUS01	11/12/02	10:25	2		2		0	2	0.0	0.0%
LW_SIL01	12/10/02	11:55	10		4		6	7	4.2	60.6%
LW_OLS01	1/7/03	12:40	1	U	1		0	1	0.0	0.0%
LW_AUS01	1/28/03	10:05	6		6		0	6	0.0	0.0%
LW_MIL01	2/18/03	10:30	4		4		0	4	0.0	0.0%
LW_BRA01	3/19/03	11:45	2		2		0	2	0.0	0.0%
LW_EUC01	4/2/03	10:25	10		10		0	10	0.0	0.0%
LW_CAR01	4/22/03	9:40	2		2		0	2	0.0	0.0%
LW_AND01	5/28/03	13:30	6		7		1	7	0.7	10.9%
LW_BRA01	6/11/03	12:00	1	U	5		4	3	2.8	94.3%
LW_SIL01	7/16/03	9:40	5		5		0	5	0.0	0.0%
LW_OLS01	8/20/03	9:45	1	U	1		0	1	0.0	0.0%
LW_SMI01	9/24/03	9:00	1	U	2		1	2	0.7	47.1%
						RMSE:	1.9		**Pooled:**	30.6%
									Pooled (detects only):	19.6%
									Pooled (detects only, no outlier):	4.5%
									Target	**10.0%**

[1]Data Qualifier: U = The analyte was not detected at or above the reported sample quantitation limit.

Table B-3. Results of Field Blank Analysis.

Date	Parameter	Result	Qual[1]	Units
12/10/02	Ammonia	0.01	U	mg/L
1/28/03	Ammonia	0.01	U	mg/L
3/19/03	Ammonia	0.01	U	mg/L
12/10/02	Chloride	0.25		mg/L
1/28/03	Chloride	0.1	U	mg/L
1/28/03	Chloride	91.8		%
1/28/03	Chloride	0.1	U	mg/L
3/19/03	Chloride	0.17		mg/L
1/28/03	Chlorophyll	0.05	UJ	ug/l
1/28/03	Chlorophyll	0.05	UJ	ug/L
3/19/03	Chlorophyll	0.05	UJ	ug/L
12/10/02	Dissolved Organic Carbon	1	U	mg/L
1/28/03	Dissolved Organic Carbon	1	J	mg/L
3/19/03	Dissolved Organic Carbon	1	U	mg/L
12/10/02	Nitrite-Nitrate	0.01	U	mg/L
1/28/03	Nitrite-Nitrate	0.01	U	mg/L
3/19/03	Nitrite-Nitrate	0.01	U	mg/L
12/10/02	Orthophosphate	0.003	U	mg/L
1/28/03	Orthophosphate	0.0011		mg/L
3/19/03	Orthophosphate	0.003	U	mg/L
12/10/02	Phosphorus	0.003	U	mg/L
1/28/03	Phosphorus	0.0034		mg/L
3/19/03	Phosphorus	0.003	U	mg/L
12/10/02	Total Alkalinity	5	U	mg/L
1/28/03	Total Alkalinity	5	U	mg/L
1/28/03	Total Alkalinity	5	U	mg/L
3/19/03	Total Alkalinity	5	U	mg/L
12/10/02	Total Dissolved Solids	1	U	mg/L
12/10/02	Total Non-Volatile Suspended Solids	1		mg/L
12/10/02	Total Non-Volatile Suspended Solids	1	U	mg/L
1/28/03	Total Non-Volatile Suspended Solids	1	U	mg/L
1/28/03	Total Non-Volatile Suspended Solids	1	U	mg/L
3/19/03	Total Non-Volatile Suspended Solids	1	U	mg/L
3/19/03	Total Non-Volatile Suspended Solids	1	U	mg/L
12/10/02	Total Organic Carbon	1	U	mg/L
1/28/03	Total Organic Carbon	1	UJ	mg/L
3/19/03	Total Organic Carbon	1	U	mg/L
12/10/02	Total Persulfate Nitrogen	0.025	U	mg/L
1/28/03	Total Persulfate Nitrogen	0.025	U	mg/L
3/19/03	Total Persulfate Nitrogen	0.025	U	mg/L
12/10/02	Total Suspended Solids	1	U	mg/L
12/10/02	Total Suspended Solids	1	U	mg/L
1/28/03	Total Suspended Solids	1	U	mg/L
3/19/03	Total Suspended Solids	1	U	mg/L
3/19/03	Total Suspended Solids	1	U	mg/L

[1]Data Qualifiers: U = The analyte was not detected at or above the reported sample quantitation limit.
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Table B-4. Post-survey calibration checks of Hydrolab© meters

Dissolved Oxygen						
Meter	Date	Hydrolab Reading	Standard Value	Hydrolab - Standard	HL-Std SD	Comment
DS 16	8/21/2002	9.19	8.93	**0.26**	0.18	
DS 15	8/21/2002	9.05	8.93	0.12	0.08	
DS 17	12/11/2002	8.6	8.59	0.01	0.01	
DS 17	1/8/2003	101%	100%			
DS18	1/29/2003	100%	100%			
DS18	5/29/2003	100%	100%			
DS 11	5/29/2003	8.62	7.91	**0.71**	**0.50**	
			Average:	**0.28**		
			RMSE:	**0.38**		
pH						
Meter	Date	Hydrolab Reading	Standard Value	Hydrolab – Standard	HL-Std SD	Comment
DS17	12/11/2002	7.00	6.97	0.03	0.02	
DS17	12/11/2002	9.16	9.15	0.01	0.01	
DS17	1/8/2003	6.89	6.97	-0.08	0.06	
DS17	1/8/2003	9.15	9.15	0.00	0.00	
DS18	4/3/2003	6.99	6.97	0.02	0.01	
DS18	4/23/2003	6.91	6.97	-0.06	0.04	
DS18	6/12/2003	7.01	6.97	0.04	0.03	
DS11	6/12/2003	6.97	6.97	0.00	0.00	
DS5	6/12/2003	6.97	6.97	0.00	0.00	
DS8	6/12/2003	6.83	6.97	-0.14	0.10	
DS14	7/17/2003	6.98	6.97	0.01	0.01	
DS11	7/17/2003	6.97	6.97	0.00	0.00	
DS5	7/30/2003	6.90	6.97	-0.07	0.05	
DS8	7/30/2003	6.97	6.97	0.00	0.00	
DS11	8/21/2003	6.98	6.97	0.01	0.01	
DS18	9/25/2003	6.90	6.97	-0.07	0.05	
DS11	9/25/2003	6.97	6.97	0.00	0.00	
DS5	10/1/2003	6.97	6.97	0.00	0.00	
			Average:	-0.01		
			RMSE:	0.05		

Table B-4, continued.

Conductivity						
Meter	Date	Hydrolab Reading	Standard Value	Hydrolab - Standard	HL-Std SD	Comment
DS17	12/11/2002	100.5	100.0	0.5	0.4	
DS17	1/8/2003	100.8	99.8	1.0	0.7	
DS18	4/3/2003	96.5	101.4	-4.9	3.5	
DS18	4/23/2003	118.7	101.1	**17.6**	**12.4**	
DS11	5/29/2003	103.8	101.1	2.7	1.9	
DS18	6/12/2003	104.9	101.1	3.8	2.7	Reading of 180 before probe cleaned
DS11	6/12/2003	106.8	101.1	5.7	4.0	
DS5	6/12/2003	123.3	101.1	**22.2**	**15.7**	
DS8	6/12/2003	119.1	101.1	**18.0**	**12.7**	
DS14	7/17/2003	102.5	101.1	1.4	1.0	Reading of 178.6 before probe cleaned
DS11	7/17/2003	99.9	101.1	-1.2	0.8	
DS8	7/30/2003	130.0	101.1	**28.9**	**20.4**	
DS11	8/21/2003	109.0	101.1	7.9	5.6	High reading before probe cleaned
DS18	8/21/2003	163.4	101.1	**62.3**	**44.1**	High reading before probe cleaned
DS18	9/25/2003	101.5	100.5	1.0	0.7	
DS11	9/25/2003	102.0	100.5	1.5	1.1	
DS5	10/1/2003	92.1	100.5	-8.4	5.9	
DS4	10/1/2003	100.0	100.5	-0.5	0.4	
			Average:	8.9		
			RMSE:	**18.4**		

Table B-5. Comparison of Winkler Dissolved Oxygen Pairs.

Site	Date	Time	DO (Hlab)	Wink1	Wink2	Avg Wink	Wink1 - Wink2	Wink SD
LW_AND01	12/10/2002	9:30	11.59	10.96	10.98	10.97	-0.02	0.01
LW_EUC01	12/10/2002	11:05	9.87	9.53	9.22	9.38	0.31	0.22
LW_SIL01	12/10/2002	12:00	11.64	11.00	11.31	11.16	-0.31	0.22
LW_OLS01	1/7/2003	12:40	12.9	12.40	12.38	12.39	0.02	0.01
LW_AUS01	1/28/2003	10:15	12.51	11.95	11.82	11.89	0.13	0.09
LW_1	5/27/2003	11:21	10.32	10.50	10.50	10.50	0.00	0.00
LW_2	5/27/2003	12:31	10.55	10.60	10.65	10.63	-0.05	0.04
LW_3	5/27/2003	14:01	10.8	10.45	10.75	10.60	-0.30	0.21
							Pooled:	0.14
							% > target:	37.5%

Table B-6. Comparison of Winkler and Hydrolab Dissolved Oxygen Pairs.

								All pairs, Hlab-Wink		Lake only, Hlab-Wink		Tributaries only, Hlab-Wink		Hlab -	Hlab -	Hlab-Wink
Site	Date	Time	DO Hlab	Wink1	Wink2	Hlab - Wink1	Hlab - Wink2	RMSE	Avg Error	RMSE	Avg Error	RMSE	Avg Error	Wink1 SD	Wink2 SD	Pooled SD
LW_1	7/15/2002	11:50	9.15	9.30		-0.15								0.11		
LW_2	7/15/2002	13:32	9.60	9.65		-0.05								0.04		
LW_4	7/15/2002	16:22	10.12	9.75		0.37								0.26		
LW_AND01	7/16/2002	8:15	11.1	10.80		0.30								0.21		
LW_SIL01	7/16/2002	10:50	6.45	8.69		-2.24								1.59		
LW_SMI01	7/16/2002	12:00	10.41	10.00		0.41		0.95	-0.23	0.23	0.06	1.33	-0.51	0.29		0.67
LW_1	8/13/2002	11:01	10.56	9.38		1.18								0.83		
LW_2	8/13/2002	12:25	10.67	9.40		1.27								0.90		
LW_3	8/13/2002	13:05	10.43	9.50		0.93								0.66		
LW_4	8/13/2002	14:20	10.77	9.35		1.42								1.00		
LW_AND01	8/14/2002	9:00	11.9	10.21		1.69								1.20		
LW_AUS01	8/14/2002	9:50	8.71	9.30		-0.59								0.42		
LW_OLS01	8/14/2002	11:20	9.61	9.20		0.41		1.15	0.90	1.21	1.20	1.06	0.50	0.29		0.81
LW_AND01	9/17/2002	9:50	12.31	9.75		2.56								1.81		
LW_AUS01	9/17/2002	10:40	9.67	10.11		-0.44								0.31		
LW_OLS01	9/17/2002	11:50	10.7	9.85		0.85								0.60		
LW_SMI01	9/17/2002	12:20	10.31	10.28		0.03		1.37	0.75					0.02		0.97
LW_AND01	12/10/2002	9:30	11.59	10.96	10.98	0.63	0.61							0.45	0.01	
LW_AUS01	12/10/2002	10:30	12.26	11.74		0.52								0.37		
LW_BRA01	12/10/2002	9:45	11.48	10.56		0.92								0.65		
LW_CAR01	12/10/2002	12:25	11.3	10.74		0.56								0.40		
LW_EUC01	12/10/2002	11:05	9.87	9.53	9.22	0.34	0.65							0.24	0.22	
LW_MIL01	12/10/2002	11:20	8.19	7.75		0.44								0.31		
LW_OLS01	12/10/2002	12:40	12.01	11.41		0.60								0.42		
LW_SIL01	12/10/2002	12:00	11.64	11.00	11.31	0.64	0.33							0.45	0.22	
LW_SMI01	12/10/2002	13:00	12.07	11.71		0.36		0.57	0.55					0.25		0.41
LW_AND01	1/7/2003	9:25	14.31	12.40		1.91								1.35		
LW_AUS01	1/7/2003	10:15	13.42	12.71		0.71								0.50		
LW_BRA01	1/7/2003	9:45	12.95	12.00		0.95								0.67		
LW_CAR01	1/7/2003	12:15	13.07	12.48		0.59								0.42		
LW_EUC01	1/7/2003	10:45	13.54	11.75		1.79								1.27		

Table B-6., continued.

								All pairs, Hlab-Wink		Lake only, Hlab-Wink		Tributaries only, Hlab-Wink		Hlab -	Hlab -	Hlab-Wink
Site	Date	Time	DO Hlab	Wink1	Wink2	Hlab - Wink1	Hlab - Wink2	RMSE	Avg Error	RMSE	Avg Error	RMSE	Avg Error	Wink 1 SD	Wink2 SD	Poole d SD
LW_MIL01	1/7/2003	11:20	15.61	11.51		**4.10**								**2.90**		
LW_OLS01	1/7/2003	12:40	12.9	12.40	12.38	**0.50**	0.52							**0.35**	0.01	
LW_SIL01	1/7/2003	11:45	13.1	12.15		**0.95**								**0.67**		
LW_SMI01	1/7/2003	13:00	12.7	12.26		**0.44**		**1.64**	1.25					**0.31**		**1.16**
LW_AUS01	1/28/2003	10:15	12.51	11.95	11.82	**0.56**	0.69							**0.40**	0.09	
LW_BRA01	1/28/2003	9:45	12.66	11.80		**0.86**								**0.61**		
LW_CAR01	1/28/2003	12:15	13.08	11.88		**1.20**								**0.85**		
LW_EUC01	1/28/2003	10:45	11.59	11.60		-0.01								0.01		
LW_MIL01	1/28/2003	11:20	12.81	10.86		**1.95**								**1.38**		
LW_OLS01	1/28/2003	12:40	13.71	11.96		**1.75**								**1.24**		
LW_SIL01	1/28/2003	11:45	12.13	11.51		**0.62**								**0.44**		
LW_SMI01	1/28/2003	13:00	12.58	11.75		**0.83**		**1.10**	0.94					**0.59**		**0.78**
LW_AND01	2/18/2003	8:50	12.39	11.90		**0.49**								**0.35**		
LW_AUS01	2/18/2003	9:45	12.46	12.40		0.06								0.04		
LW_BRA01	2/18/2003	9:20	11.77	12.10		**-0.33**								**0.23**		
LW_CAR01	2/18/2003	11:20	12.84	12.60		**0.24**								0.17		
LW_EUC01	2/18/2003	10:15	12.13	11.80		**0.33**								**0.23**		
LW_MIL01	2/18/2003	10:25	11.41	11.38		0.03								0.02		
LW_OLS01	2/18/2003	11:30	13.03	12.30		**0.73**								**0.52**		
LW_SIL01	2/18/2003	11:10	12.71	12.00		**0.71**								**0.50**		
LW_SMI01	2/18/2003	11:50	12.59	12.50		0.09		**0.42**	0.26					0.06		**0.29**
LW_AND01	3/19/2003	12:15	12.9	12.40		**0.50**								**0.35**		
LW_AUS01	3/19/2003	11:25	12.26	12.16		0.10								0.07		
LW_BRA01	3/19/2003	11:45	11.71	11.75		-0.04								0.03		
LW_CAR01	3/19/2003	9:50	12.32	12.20		0.12								0.08		
LW_EUC01	3/19/2003	11:00	11.46	11.40		0.06								0.04		
LW_MIL01	3/19/2003	10:50	11.76	11.28		**0.48**								**0.34**		
LW_OLS01	3/19/2003	9:40	13.07	12.35		**0.72**								**0.51**		
LW_SIL01	3/19/2003	10:10	12.4	11.70		**0.70**								**0.49**		
LW_SMI01	3/19/2003	9:00	12.94	12.28		**0.66**		**0.47**	0.37					**0.47**		**0.33**

Table B-6, continued.

								All pairs, Hlab-Wink		Lake only, Hlab-Wink		Tributaries only, Hlab-Wink		Hlab -	Hlab -	Hlab-Wink
Site	Date	Time	DO Hlab	Wink1	Wink2	Hlab - Wink1	Hlab - Wink2	RMSE	Avg Error	RMSE	Avg Error	RMSE	Avg Error	Wink1 SD	Wink2 SD	Pooled SD
LW_AND01	4/2/2003	11:30	12.44	12.00		**0.44**								**0.31**		
LW_AUS01	4/2/2003	10:50	12.11	11.82		**0.29**								**0.21**		
LW_BRA01	4/2/2003	11:10	11.75	11.55		0.20								0.14		
LW_CAR01	4/2/2003	9:25	12.2	11.85		**0.35**								**0.25**		
LW_EUC01	4/2/2003	10:25	11.29	11.37		-0.08								0.06		
LW_MIL01	4/2/2003	10:15	11.49	11.05		**0.44**								**0.31**		
LW_OLS01	4/2/2003	9:10	12.49	12.25		**0.24**								0.17		
LW_SIL01	4/2/2003	9:40	11.81	11.55		**0.26**								0.18		
LW_SMI01	4/2/2003	8:45	12.76	12.50		**0.26**		**0.30**	0.27					0.18		**0.22**
LW_AND01	4/22/2003	11:45	17.98	10.90		**7.08**								**5.01**		
LW_AUS01	4/22/2003	11:15	11.18	11.38		**-0.20**								0.14		
LW_BRA01	4/22/2003	11:30	14.52	11.25		**3.27**								**2.31**		
LW_CAR01	4/22/2003	9:35	11.43	11.28		0.15								0.11		
LW_EUC01	4/22/2003	10:35	11.22	10.75		**0.47**								**0.33**		
LW_MIL01	4/22/2003	10:25	11.07	10.85		**0.22**								0.16		
LW_OLS01	4/22/2003	9:25	11.59	11.45		0.14								0.10		
LW_SIL01	4/22/2003	9:50	11.24	10.90		**0.34**								**0.24**		
LW_SMI01	4/22/2003	9:15	12.3	11.75		**0.55**		**2.62**	1.34					**0.39**		**1.85**
LW_1	5/27/2003	11:21	10.32	10.50	10.50	-0.18								0.13	0.00	
LW_2	5/27/2003	12:31	10.55	10.60	10.65	-0.05								0.04	0.04	
LW_3	5/27/2003	14:01	10.8	10.45	10.75	**0.35**								**0.25**	**0.21**	
LW_AUS01	5/28/2003	12:40	10.62	10.50		0.12								0.08		
LW_BRA01	5/28/2003	13:00	9.89	9.82		0.07								0.05		
LW_CAR01	5/28/2003	9:20	10.78	10.32		**0.46**								**0.33**		
LW_EUC01	5/28/2003	12:00	8.63	9.20		**-0.57**								**0.40**		
LW_MIL01	5/28/2003	11:40	11.23	11.00		**0.23**								0.16		
LW_OLS01	5/28/2003	8:55	12.65	10.50		**2.15**								**1.52**		
LW_SIL01	5/28/2003	9:45	10.12	9.70		**0.42**								**0.30**		
LW_SMI01	5/28/2003	8:20	10.94	10.55		**0.39**		**0.64**	0.23	0.18	-0.02	**0.83**	0.41	**0.28**		**0.45**
LW_1	6/10/2003	10:46	9.51	9.76		**-0.25**								0.18		
LW_3	6/10/2003	13:21	9.68	9.86		-0.18								0.13		

Table B-6, continued.

								All pairs, Hlab-Wink		Lake only, Hlab-Wink		Tributaries only, Hlab-Wink		Hlab -	Hlab -	Hlab-Wink
Site	Date	Time	DO Hlab	Wink1	Wink2	Hlab - Wink1	Hlab - Wink2	RMSE	Avg Error	RMSE	Avg Error	RMSE	Avg Error	Wink1 SD	Wink2 SD	Pooled SD
LW_AUS01	6/11/2003	11:42	10.2	10.10		0.10								0.07		
LW_CAR01	6/11/2003	9:33	10.08	9.95		0.13								0.09		
LW_EUC01	6/11/2003	11:20	7.72	7.80		-0.08								0.06		
LW_OLS01	6/11/2003	9:20	10.5	10.32		0.18								0.13		
LW_SMI01	6/11/2003	8:55	10.46	10.40		0.06		0.15	-0.01	**0.22**	-0.22	0.12	0.08	0.04		0.11
LW_2	7/15/2003	11:57	9.67	9.61		0.06								0.04		
LW_3	7/15/2003	13:21	9.77	9.70		0.07								0.05		
LW_AUS01	7/16/2003	10:55	10.41	9.30		**1.11**								**0.78**		
LW_OLS01	7/16/2003	9:10	10.2	10.03		0.17								0.12		
LW_SMI01	7/16/2003	8:55	10.11	9.80		**0.31**		**0.52**	0.34	0.07	0.07	**0.67**	0.53	**0.22**		**0.37**
LW_1	8/19/2003	10:26	9.43	9.54		-0.11								0.08		
LW_2	8/19/2003	14:27	9.55	9.23		**0.32**								**0.23**		
LW_3	8/19/2003	11:33	9.36	9.15		**0.21**		**0.23**	0.14					0.15		0.16
LW_1	9/23/2003	10:45	9.56	9.50		0.06								0.04		
LW_2	9/23/2003	11:55	9.65	9.71		-0.06								0.04		
LW_3	9/23/2003	13:30	9.56	9.68		-0.12								0.08		
LW_AUS01	9/24/2003	10:50	10.47	10.40		0.07								0.05		
LW_OLS01	9/24/2003	9:45	10.1	10.46		**-0.36**								**0.25**		
LW_SIL01	9/24/2003	10:05	8.55	10.15		**-1.60**								**1.13**		
LW_SMI01	9/24/2003	9:00	9.84	10.30		**-0.46**		**0.65**	-0.35	0.08	-0.04	**0.85**	-0.59	**0.33**		**0.46**
Pooled:								**1.08**	0.49							**0.76**
% > target:																60.8%

Abbreviations:
DO = Dissolved Oxygen
Hlab = Hydrolab meter
Wink = Winkler titration method
RMSE = Root Mean Square Error
Avg = average
SD = standard deviation

Table B-7. Comparison of Paired Profile and Diurnal Readings.

	Profile			Diurnal			
Date	Time	Depth	DO	Time	Depth	DO	Diff
8/13/2002	11:03	1.0	9.35	12:00	1.5	10.53	**-1.18**
8/13/2002	11:20	16.0	0.90	12:00	15.0	1.19	**-0.29**
5/27/2003	11:22	1.0	10.38	12:00	1.5	9.90	**0.48**
5/27/2003	11:30	5.0	11.04	12:00	5.0	10.91	0.13
7/15/2003	10:53	1.0	9.42	12:00	1.5	9.72	**-0.30**
7/15/2003	11:01	5.0	9.64	12:00	5.0	10.24	**-0.60**
8/19/2003	10:27	1.0	9.42	16:30	1.5	9.32	0.10
8/19/2003	10:31	5.0	9.14	16:30	5.0	9.67	**-0.53**
9/23/2003	10:48	1.0	9.61	15:00	1.5	9.85	**-0.24**
9/23/2003	11:00	5.0	9.54	15:00	5.0	9.10	**0.44**
						Average:	-0.20
						RMSE:	**0.52**

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Appendix C.
Water Quality Data

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_AND01	ANDERSON	1/23/02	8:45	2049120	0.020						2.4		
LW_AND01	ANDERSON	2/13/02	7:45	2079120	0.016						1.5		
LW_AND01	ANDERSON	2/13/02	7:45	2079129	0.017						1.5		
LW_AND01	ANDERSON	3/5/02	7:45	2109120	0.018						2.2		
LW_AND01	ANDERSON	3/26/02	7:40	2139120	0.010						1.8		
LW_AND01	ANDERSON	4/16/02	7:35	2169120	0.012						2.8		
LW_AND01	ANDERSON	5/7/02	0:00	2199120	0.012						2.9		
LW_AND01	ANDERSON	5/30/02	7:40	2229140	0.010 U						2.4		
LW_AND01	ANDERSON	6/19/02	7:30	2259120	0.016						2.3		
LW_AND01	ANDERSON	7/16/02	8:15	2298304	0.020	0.053	0.079	0.0057	0.0600	1.0 U	1.0 U		12
LW_AND01	ANDERSON	7/16/02	8:15	2298311	0.021	0.053	0.078	0.0070	0.0620	1.0 U	1.0 U		12
LW_AND01	ANDERSON	8/14/02	9:05	2338266	0.010 U	0.041	0.079	0.0048	0.0727	1.0	1.6		13
LW_AND01	ANDERSON	9/17/02	9:50	2388284	0.010 U	0.148	0.215	0.0056	0.0120	1.7	1.7		15
LW_AND01	ANDERSON	10/15/02	9:40	2428085	0.010 U	0.505	0.555	0.0059	0.0087	2.8	2.6		25
LW_AND01	ANDERSON	11/12/02	9:30	2467200	0.016	0.120	0.217	0.0073	0.0270	3.5	3.8		16
LW_AND01	ANDERSON	11/19/02	17:30	2478804	0.011	1.030	1.280	0.0090	0.0505	9.5	9.9		14
LW_AND01	ANDERSON	11/19/02	17:30	2478805	0.011	1.110	1.370	0.0304	0.1920	9.5	11.1		
LW_AND01	ANDERSON	11/19/02	17:30	2478806	0.014	1.150	1.410	0.0089	0.0447	9.1	10.3		14
LW_AND01	ANDERSON	11/19/02	17:30	2478808	0.013	1.200	1.430	0.0087	0.0483	9.0	9.2		14
LW_AND01	ANDERSON	11/19/02	17:30	2478810	0.012	1.240	1.500	0.0086	0.0424	9.1	9.7		14
LW_AND01	ANDERSON	11/20/02	13:00	2478812	0.010 U	1.190	1.380	0.0079	0.0449	7.6	8.2		15
LW_AND01	ANDERSON	11/20/02	13:00	2478813	0.014	1.180	1.330	0.0075	0.0474	6.7	7.1		
LW_AND01	ANDERSON	11/20/02	13:00	2478814	0.019	1.200	1.390	0.0079	0.0547	7.0	6.9		16
LW_AND01	ANDERSON	12/10/02	9:30	2507200	0.046	0.461	0.666	0.0120	0.0270	5.5	5.4	2.27	26
LW_AND01	ANDERSON	1/7/03	9:30	3027200	0.010 U	0.281	0.347	0.0051	0.0130	3.4	3.7	0.95	17
LW_AND01	ANDERSON	1/28/03	9:25	3057200	0.010 U	0.467	0.539	0.0059	0.0140	3.8	4.0 J	0.97	15
LW_AND01	ANDERSON	2/18/03	8:50	3087200	0.021	0.793	0.898	0.0072	0.0082	2.5	2.7	1.66	20
LW_AND01	ANDERSON	3/19/03	12:15	3127200	0.010 U	0.232	0.272	0.0043	0.0083	2.1	2.2	0.84	17
LW_AND01	ANDERSON	4/2/03	11:30	3147200	0.010 U	0.268	0.323	0.0046	0.0313	2.5	2.4	0.80	17
LW_AND01	ANDERSON	4/9/03	11:30	3158800	0.010 U	0.610	0.784	0.0065	0.0128	3.5	4.3		15
LW_AND01	ANDERSON	4/22/03	11:45	3177200	0.010 U	0.589	0.687	0.0072	0.0130	2.0	2.2	1.64	23
LW_AND01	ANDERSON	5/28/03	13:25	3227213	0.010 U	0.051	0.078	0.0040	0.0117	1.0 U	1.2	0.47	15
LW_AND01	ANDERSON	5/28/03	13:30	3227200	0.010 U	0.051	0.082	0.0040	0.0101	1.1	1.4	0.48	15
LW_AND01	ANDERSON	6/11/03	12:30	3247200	0.010 U	0.049	0.060	0.0050	0.0462	1.0 U	1.0 U	0.40	13
LW_AND01	ANDERSON	7/16/03	11:30	3297200	0.010 U	0.742	0.917	0.0110	0.0260	1.3	1.2	1.87	25
LW_AND01	ANDERSON	8/20/03	12:30	3347200	0.010 U	0.043	0.076	0.0037	0.0193	1.1	1.5	0.58	13

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_AND01	ANDERSON	9/24/03	11:25	3397200	0.010 U	0.373	0.433	0.0041	0.0093	1.0 U	1.1	1.15	18
LW_AND01	ANDERSON	1/28/04	11:50	4054950	0.010 U	0.736	0.798	0.0056	0.0206	3.1	3.6		
LW_AUS01	AUSTIN CR	1/23/02	9:26	2049122	0.010 U						2.4		
LW_AUS01	AUSTIN CR	2/13/02	8:25	2079122	0.010 U						1.8		
LW_AUS01	AUSTIN CR	3/5/02	8:16	2109122	0.010 U						2.0		
LW_AUS01	AUSTIN CR	3/26/02	8:10	2139122	0.010 U						1.8		
LW_AUS01	AUSTIN CR	4/7/02	12:10	2159127	0.010 U						4.6		
LW_AUS01	AUSTIN CR	4/14/02	17:25	2159124	0.010 U						5.6		
LW_AUS01	AUSTIN CR	4/16/02	8:05	2169122	0.010 U						3.3		
LW_AUS01	AUSTIN CR	4/16/02	9:28	2169129	0.010 U						3.3		
LW_AUS01	AUSTIN CR	5/7/02	0:00	2199122	0.010 U						2.6		
LW_AUS01	AUSTIN CR	5/30/02	8:10	2229142	0.010 U						2.4		
LW_AUS01	AUSTIN CR	6/19/02	8:05	2259122	0.016						2.6		
LW_AUS01	AUSTIN CR	7/16/02	9:30	2298306	0.016	0.377	0.427	0.0077	0.0130	1.9	1.8		27
LW_AUS01	AUSTIN CR	8/14/02	9:50	2338268	0.014	0.291	0.347	0.0082	0.0089	1.7	1.8		34
LW_AUS01	AUSTIN CR	8/14/02	9:55	2338273	0.013	0.291	0.359	0.0085	0.0110	1.7	1.9		34
LW_AUS01	AUSTIN CR	9/17/02	10:40	2388286	0.010 U	0.701	0.793	0.0059	0.0090	3.8	3.9		28
LW_AUS01	AUSTIN CR	9/17/02	10:40	2388287	0.010 U	0.701	0.786	0.0050	0.0087	3.7	3.9		28
LW_AUS01	AUSTIN CR	10/15/02	10:40	2428087	0.010 U	0.485	0.558	0.0051	0.0075	2.9	2.9		35
LW_AUS01	AUSTIN CR	11/12/02	10:25	2467202	0.010 U	0.629	0.769	0.0064	0.0190	6.6	6.5		31
LW_AUS01	AUSTIN CR	11/12/02	10:30	2467203	0.010 U	0.629	0.772	0.0065	0.0180	6.5	6.4		31
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478816	0.010 U	1.150	1.380	0.0069	0.0544	10.3	11.2		21
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478817	0.010 U	1.330	1.640	0.0064	0.0926	11.2	14.9		
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478818	0.010 U	1.680	1.960	0.0062	0.0775	12.3	17.3		13
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478820	0.010 U	2.260	2.540	0.0068	0.0930	11.9	14.1		10
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478822	0.010 U	2.400	2.640	0.0240	0.1510	12.0	14.2		10
LW_AUS01	AUSTIN CR	11/20/02	13:00	2478824	0.010 U	2.380	2.580	0.0064	0.0426	10.6	11.6		8
LW_AUS01	AUSTIN CR	11/20/02	13:00	2478825	0.010 U	2.330	2.470	0.0058	0.0210	8.8	9.2		
LW_AUS01	AUSTIN CR	11/20/02	13:00	2478826	0.010 U	2.090	2.220	0.0055	0.0032	7.4	7.5		9.8
LW_AUS01	AUSTIN CR	12/10/02	10:30	2507202	0.010 U	0.540	0.687	0.0072	0.0220	6.3	6.6	10.00	26
LW_AUS01	AUSTIN CR	1/7/03	10:15	3027202	0.010 U	1.160	1.240	0.0060	0.0061	3.9	3.6	4.16	13
LW_AUS01	AUSTIN CR	1/28/03	10:00	3057202	0.010 U	1.120	1.170	0.0056	0.0100	3.4	4.0 J	3.04	12
LW_AUS01	AUSTIN CR	1/28/03	10:05	3057213	0.010 U	1.120	1.170	0.0058	0.0100	3.3 J	4.2 J	3.07	12
LW_AUS01	AUSTIN CR	2/18/03	9:45	3087202	0.010 U	0.925	1.010	0.0064	0.0069	2.8	3.1	3.23	14
LW_AUS01	AUSTIN CR	3/19/03	11:25	3127202	0.010 U	0.777	0.809	0.0054	0.0061	1.8	1.9	3.76	15

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_AUS01	AUSTIN CR	4/2/03	10:50	3147202	0.010 U	0.816	0.886	0.0042	0.0071	2.3	2.3	2.80	14
LW_AUS01	AUSTIN CR	4/9/03	11:00	3158801	0.010 U	0.627	0.772	0.0053	0.0108	3.5	4.3		14
LW_AUS01	AUSTIN CR	4/22/03	11:15	3177202	0.010 U	0.596	0.664	0.0054	0.0052	2.1	2.4	4.48	21
LW_AUS01	AUSTIN CR	5/28/03	12:40	3227202	0.010 U	0.411	0.486	0.0068	0.0102	1.4	1.9	6.40	27
LW_AUS01	AUSTIN CR	6/11/03	11:42	3247202	0.010 U	0.359	0.435	0.0091	0.0132	1.8	1.7	9.45	31
LW_AUS01	AUSTIN CR	7/16/03	10:55	3297202	0.010 U	0.226	0.334	0.0091	0.0220	2.0	2.0	12.80	36
LW_AUS01	AUSTIN CR	8/20/03	11:25	3347202	0.010 U	0.174	0.251	0.0053	0.0111	1.9	1.8	20.20	46
LW_AUS01	AUSTIN CR	9/24/03	10:50	3397202	0.010 U	0.445	0.546	0.0041	0.0093	1.9	2.0	18.50	42
LW_AUS01	AUSTIN CR	1/28/04	10:45	4054952	0.010 U	1.050	0.510	0.0055	0.0274	2.5	2.6		
LW_AUS01	AUSTIN CR	1/28/04	10:45	4054961	0.010 U	0.741	0.831	0.0055	0.0232				
LW_BRA01	BRANNIAN	1/23/02	9:00	2049121	0.011						2.3		
LW_BRA01	BRANNIAN	2/13/02	8:00	2079121	0.012						1.8		
LW_BRA01	BRANNIAN	3/5/02	7:55	2109121	0.019						1.9		
LW_BRA01	BRANNIAN	3/26/02	7:50	2139121	0.010 U						1.9		
LW_BRA01	BRANNIAN	4/16/02	7:43	2169121	0.010 U						2.9		
LW_BRA01	BRANNIAN	5/7/02	0:00	2199121	0.010 U						2.9		
LW_BRA01	BRANNIAN	5/30/02	7:50	2229141	0.010 U						2.2		
LW_BRA01	BRANNIAN	6/19/02	7:45	2259121	0.015						3.1		
LW_BRA01	BRANNIAN	7/16/02	8:50	2298305	0.013	0.419	0.486	0.0061	0.0091	1.9	1.8		13
LW_BRA01	BRANNIAN	8/14/02	9:20	2338267	0.010 U	0.366	0.349	0.0055	0.0170	1.7	1.8		16
LW_BRA01	BRANNIAN	9/17/02	10:10	2388285	0.010 U	0.173	0.312	0.0060	0.0160	4.8	4.9		24
LW_BRA01	BRANNIAN	10/15/02	10:10	2428086	0.010 U	0.133	0.224	0.0052	0.0061	3.7	3.8		24
LW_BRA01	BRANNIAN	11/12/02	9:50	2467201	0.010 U	0.097	0.283	0.0067	0.0220	9.0	9.1		23
LW_BRA01	BRANNIAN	12/10/02	9:45	2507201	0.010 U	0.730	0.873	0.0048	0.0160	5.4	5.1	2.39	14
LW_BRA01	BRANNIAN	1/7/03	9:45	3027201	0.010 U	1.630	1.740	0.0030	0.0030 U	3.1	3.3	1.95	8.4
LW_BRA01	BRANNIAN	1/28/03	9:40	3057201	0.010 U	1.550	1.620	0.0044	0.0095	3.9	4.5 J	1.80	7.6
LW_BRA01	BRANNIAN	2/18/03	9:30	3087201	0.010 U	1.120	1.200	0.0038	0.0051	2.5	3.1	1.66	8.1
LW_BRA01	BRANNIAN	3/19/03	11:45	3127201	0.010 U	1.130	1.150	0.0030 U	0.0048	2.0	1.9	1.73	8.9
LW_BRA01	BRANNIAN	3/19/03	11:45	3127213	0.010 U	1.130	1.160	0.0033	0.0056	1.8	1.9	1.80	9.2
LW_BRA01	BRANNIAN	4/2/03	11:10	3147201	0.010 U	1.070	1.150	0.0030 U	0.0075	2.0	2.3	1.53	8.3
LW_BRA01	BRANNIAN	4/22/03	11:30	3177201	0.010 U	0.958	1.020	0.0030 U	0.0044	2.0	2.2	1.57	10
LW_BRA01	BRANNIAN	5/28/03	13:00	3227201	0.010 U	0.743	0.807	0.0044	0.0074	1.3	1.8	1.63	13
LW_BRA01	BRANNIAN	6/11/03	12:00	3247201	0.010 U	0.654	0.736	0.0054	0.0094	1.7	1.7	1.77	15
LW_BRA01	BRANNIAN	6/11/03	12:05	3247213	0.010 U	0.654	0.712	0.0053	0.0083	1.8	1.9	1.79	15
LW_BRA01	BRANNIAN	7/16/03	11:15	3297201	0.010 U	0.379	0.457	0.0064	0.0120	1.4	1.7	2.05	20

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L		NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L		Chlrd mg/L	Alk mg/L
LW_BRA01	BRANNIAN	1/28/04	11:05	4054951	0.010	U	0.824	0.901	0.0032	0.0245	3.0	3.3			
LW_BRA01	BRANNIAN	1/28/04	11:05	4054959	0.010	U	0.818	0.937	0.0033	0.0218	3.0	3.4			
LW_CAB01	CABLE ST	7/16/02	9:55	2298310											
LW_CAB01	CABLE ST	8/14/02	10:15	2338272											
LW_CAB01	CABLE ST	9/17/02	11:00	2388291											
LW_CAB01	CABLE ST	10/15/02	10:50	2428091											
LW_CAB01	CABLE ST	11/12/02	10:50	2467204											
LW_CAB01	CABLE ST	12/10/02	10:50	2507203											
LW_CAB01	CABLE ST	1/7/03	10:35	3027203											
LW_CAB01	CABLE ST	1/28/03	10:30	3057203											
LW_CAB01	CABLE ST	2/18/03	10:05	3087203											
LW_CAB01	CABLE ST	3/19/03	11:15	3127203											
LW_CAB01	CABLE ST	4/2/03	10:40	3147203											
LW_CAB01	CABLE ST	4/22/03	11:00	3177203											
LW_CAB01	CABLE ST	5/28/03	12:15	3227203											
LW_CAB01	CABLE ST	6/11/03	11:28	3247203											
LW_CAB01	CABLE ST	7/16/03	10:45	3297203											
LW_CAR01	CARPENTER	1/23/02	10:19	2049126	0.010							4.8			
LW_CAR01	CARPENTER	1/23/02	10:19	2049129	0.013							4.7			
LW_CAR01	CARPENTER	2/13/02	9:43	2079126	0.010	U						4.0			
LW_CAR01	CARPENTER	3/5/02	9:15	2109126	0.010	U						3.8			
LW_CAR01	CARPENTER	3/26/02	9:14	2139126	0.011							4.2			
LW_CAR01	CARPENTER	4/16/02	8:50	2169126	0.011							6.1			
LW_CAR01	CARPENTER	5/7/02	0:00	2199126	0.010	U						4.7			
LW_CAR01	CARPENTER	5/30/02	9:05	2229146	0.012							3.8			
LW_CAR01	CARPENTER	6/19/02	9:17	2259126	0.013							3.4			
LW_CAR01	CARPENTER	7/16/02	11:30	2298301	0.018		0.438	0.559	0.0160	0.0230	3.2	3.3			48
LW_CAR01	CARPENTER	12/10/02	12:25	2507209	0.010	U	0.142	0.321	0.0070	0.0080	8.4	9.2		3.64	32
LW_CAR01	CARPENTER	1/7/03	12:15	3027208	0.010	U	1.110	1.260	0.0051	0.0120	7.8	7.5		2.62	14
LW_CAR01	CARPENTER	1/28/03	11:50	3057208	0.010	U	1.020	1.130	0.0056	0.0084	7.4	8.4	J	2.22	14
LW_CAR01	CARPENTER	2/18/03	11:20	3087208	0.010	U	0.821	0.971	0.0057	0.0160	5.9	6.5		1.96	15
LW_CAR01	CARPENTER	3/19/03	9:50	3127208	0.010	U	0.712	0.830	0.0051	0.0078	4.3	4.6		1.93	18
LW_CAR01	CARPENTER	4/2/03	9:25	3147208	0.010	U	0.871	1.020	0.0038	0.0140	5.1	5.1		1.68	16
LW_CAR01	CARPENTER	4/22/03	9:35	3177208	0.010	U	0.491	0.624	0.0051	0.0055	4.1	4.5		1.77	23
LW_CAR01	CARPENTER	4/22/03	9:40	3177213	0.010	U	0.493	0.630	0.0057	0.0064	4.1	4.2		1.76	24
LW_CAR01	CARPENTER	5/28/03	9:20	3227208	0.012		0.322	0.458	0.0082	0.0109	3.6	3.9		1.57	28

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_CAR01	CARPENTER	6/11/03	9:33	3247208	0.014	0.379	0.497	0.0130	0.0155	3.3	3.3	2.15	38
LW_CAR01	CARPENTER	1/28/04	10:15	4054956	0.010 U	1.040	1.130	0.0057	0.0134	5.5	6.0		
LW_OUT01	DAM OUTLET	12/10/02	11:38	2507213	0.010 U	0.104	0.216	0.0030 U	0.0048				
LW_OUT01	DAM OUTLET	1/7/03	11:30	3027212	0.010 U	0.219	0.359	0.0030 U	0.0030 U				
LW_OUT01	DAM OUTLET	1/28/03	11:15	3057212	0.010 U	0.274	0.366	0.0030 U	0.0030 U				
LW_OUT01	DAM OUTLET	2/18/03	10:45	3087212	0.010 U	0.295	0.377	0.0030 U	0.0030 U				
LW_OUT01	DAM OUTLET	3/19/03	10:35	3127212	0.010 U	0.262	0.353	0.0030 U	0.0036				
LW_OUT01	DAM OUTLET	4/2/03	10:00	3147212	0.010 U	0.304	0.405	0.0030 U	0.0036				
LW_OUT01	DAM OUTLET	4/22/03	10:15	3177212	0.010 U	0.285	0.295	0.0030 U	0.0030 U				
LW_OUT01	DAM OUTLET	5/28/03	10:25	3227212	0.013	0.207	0.230	0.0030 U	0.0050				
LW_OUT01	DAM OUTLET	6/11/03	10:15	3247212	0.022	0.199	0.321	0.0030 U	0.0061				
LW_OUT01	DAM OUTLET	7/16/03	10:20	3297212	0.019	0.098	0.278	0.0030 U	0.0100 U				
LW_OUT01	DAM OUTLET	8/20/03	10:50	3347212	0.016	0.039	0.170	0.0030 U	0.0052				
LW_OUT01	DAM OUTLET	9/24/03	10:15	3397212	0.013	0.010	0.160	0.0030 U	0.0053				
LW_EUC01	EUCLID CR	1/23/02	11:01	2049123	0.028						4.3		
LW_EUC01	EUCLID CR	2/13/02	8:43	2079123	0.012						3.1		
LW_EUC01	EUCLID CR	3/5/02	8:35	2109123	0.017						3.2		
LW_EUC01	EUCLID CR	3/5/02	8:37	2109129	0.013						3.0		
LW_EUC01	EUCLID CR	3/26/02	8:28	2139123	0.010 U						3.1		
LW_EUC01	EUCLID CR	4/14/02	18:10	2159123	0.012						6.8		
LW_EUC01	EUCLID CR	4/16/02	8:22	2169123	0.024						4.2		
LW_EUC01	EUCLID CR	5/7/02	0:00	2199123	0.010 U						3.8		
LW_EUC01	EUCLID CR	5/30/02	8:25	2229143	0.018						3.2		
LW_EUC01	EUCLID CR	6/19/02	8:24	2259123	0.029						3.5		
LW_EUC01	EUCLID CR	7/16/02	10:05	2298307	0.024	0.192	0.319	0.0097	0.0250	3.4	3.6		43
LW_EUC01	EUCLID CR	11/12/02	11:00	2467205	0.010 U	0.020	0.188	0.0082	0.0240	7.5	7.1		29
LW_EUC01	EUCLID CR	11/19/02	17:30	2478803	0.010 U	0.797	1.100	0.0190	0.0647	12.0	12.5		26
LW_EUC01	EUCLID CR	12/10/02	11:05	2507204	0.011	0.224	0.370	0.0066	0.0098	5.4	5.9	5.70	36
LW_EUC01	EUCLID CR	1/7/03	10:50	3027204	0.010 U	1.050	1.200	0.0092	0.0130	5.5	5.5	3.94	20
LW_EUC01	EUCLID CR	1/28/03	10:40	3057204	0.010 U	0.930	0.972	0.0095	0.0140	5.3	5.9 J	3.39	17
LW_EUC01	EUCLID CR	2/18/03	10:15	3087204	0.012	0.811	0.949	0.0100	0.0150	3.8	4.5	3.40	22
LW_EUC01	EUCLID CR	3/19/03	11:00	3127204	0.010 U	0.577	0.666	0.0077	0.0140	3.0	3.3	3.31	25
LW_EUC01	EUCLID CR	4/2/03	10:25	3147204	0.010 U	0.604	0.737	0.0076	0.0340	3.4	4.1	2.63	23
LW_EUC01	EUCLID CR	4/2/03	10:25	3147213	0.010 U	0.603	0.729	0.0077	0.0290	3.5	3.8	2.60	23
LW_EUC01	EUCLID CR	4/9/03	10:30	3158803	0.010 U	0.444	0.626	0.0080	0.0331	4.9	6.3		24
LW_EUC01	EUCLID CR	4/22/03	10:35	3177204	0.010 U	0.380	0.503	0.0078	0.0110	3.2	3.4	3.17	30

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L		NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_EUC01	EUCLID CR	5/28/03	12:00	3227204	0.011		0.253	0.359	0.0110	0.0168	2.1	2.7	3.58	42
LW_EUC01	EUCLID CR	6/11/03	11:20	3247204	0.010	U	0.186	0.305	0.0110	0.0163	2.9	3.1	4.47	44
LW_EUC01	EUCLID CR	7/16/03	10:30	3297204	0.012		0.120	0.255	0.0110	0.0220	3.2	3.7	4.67	46
LW_EUC01	EUCLID CR	1/28/04	10:55	4054953	0.010	U	1.040	1.200	0.0093	0.0223	4.1	4.3		
LW_AUS00	LAKE-AUSTIN	1/28/04	12:50	4054962	0.011		0.727	0.833	0.0056	0.0171				
LW_AUS00	LAKE-AUSTIN	1/28/04	12:50	4054963	0.010	U	0.726	0.768	0.0097	0.0159				
LW_LL11_0.3	SITE 1 - 0.3m	7/2/02	15:50	2298280								2.0		
LW_LL11_0.3	SITE 1 - 0.3m	7/15/02	12:35	2298316										
LW_LL11_0.3	SITE 1 - 0.3m	8/13/02	10:30	2338249										
LW_LL11_0.3	SITE 1 - 0.3m	8/13/02	10:35	2338275										
LW_LL11_0.3	SITE 1 - 0.3m	8/13/02	12:25	2338230							2.3	2.2		
LW_LL11_0.3	SITE 1 - 0.3m	9/5/02	10:55	2368280							2.2	2.6		
LW_LL11_0.3	SITE 1 - 0.3m	2/6/03	11:42	3077220								2.3		
LW_LL11_0.3	SITE 1 - 0.3m	4/3/03	11:00	3164082								1.9		
LW_LL11_0.3	SITE 1 - 0.3m	5/8/03	10:30	3197220								1.6		
LW_LL11_0.3	SITE 1 - 0.3m	6/3/03	9:58	3247220								1.7		
LW_LL11_0.3	SITE 1 - 0.3m	7/10/03	9:45	3297220								2.1		
LW_LL11_0.3	SITE 1 - 0.3m	8/7/03	10:35	3327220								1.9		
LW_LL11_0.3	SITE 1 - 0.3m	9/4/03	10:02	3367220								2.3		
LW_LL11_10	Site 1 – 10m	7/2/02	15:30	2298281								1.9		
LW_LL11_10	Site 1 – 10m	8/13/02	12:35	2338232							2.0	2.3		
LW_LL11_10	Site 1 – 10m	9/5/02	12:00	2368282							2.2	2.7		
LW_LL11_10	Site 1 – 10m	2/6/03	10:52	3077221								2.3		
LW_LL11_10	Site 1 – 10m	4/3/03	10:49	3164081								3.4		
LW_LL11_10	Site 1 – 10m	5/8/03	10:00	3197221								1.4		
LW_LL11_10	Site 1 – 10m	6/3/03	9:40	3247221								1.7		
LW_LL11_10	Site 1 – 10m	7/10/03	9:34	3297221								1.9		
LW_LL11_10	Site 1 – 10m	8/7/03	9:50	3327221								2.1		
LW_LL11_10	Site 1 – 10m	9/4/03	9:53	3367221								2.3		
LW_LL11_15	Site 1 – 15m	7/15/02	12:55	2298318										
LW_LL11_15	Site 1 – 15m	8/13/02	10:45	2338251								1.8		
LW_LL11_15	Site 1 – 15m	6/10/03	10:45	3247239								1.7		
LW_LL11_15	Site 1 – 15m	7/15/03	11:00	3297239								1.9		
LW_LL11_15	Site 1 – 15m	8/19/03	10:34	3347239								2.2		
LW_LL11_15	Site 1 – 15m	9/24/03	11:35	3397239								2.1		

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_LL11_20	Site 1 – 20m	7/2/02	15:04	2298282							1.8		
LW_LL11_20	Site 1 – 20m	8/13/02	12:40	2338233						2.1	2.0		
LW_LL11_20	Site 1 – 20m	9/5/02	11:20	2368283						2.2	2.8		
LW_LL11_20	Site 1 – 20m	2/6/03	11:14	3077222							2.3		
LW_LL11_20	Site 1 – 20m	4/3/03	10:19	3164080							2.7		
LW_LL11_20	Site 1 – 20m	5/8/03	9:45	3197222							1.3		
LW_LL11_20	Site 1 – 20m	6/3/03	9:25	3247222							1.4		
LW_LL11_20	Site 1 – 20m	7/10/03	9:20	3297222							1.9		
LW_LL11_20	Site 1 – 20m	8/7/03	10:20	3327222							1.8		
LW_LL11_20	Site 1 – 20m	9/4/03	9:55	3367222							3.3		
LW_LL11_5	Site 1 – 5m	7/15/02	12:45	2298317									
LW_LL11_5	Site 1 – 5m	8/13/02	10:40	2338250									
LW_LL22_0.3	Site 2 - 0.3m	7/2/02	13:10	2298283							2.0		
LW_LL22_0.3	Site 2 - 0.3m	7/15/02	14:00	2298319									
LW_LL22_0.3	Site 2 - 0.3m	8/8/02	12:15	2338234						2.0	2.3		
LW_LL22_0.3	Site 2 - 0.3m	8/13/02	12:00	2338252									
LW_LL22_0.3	Site 2 - 0.3m	9/5/02	13:50	2368284						2.2	2.5		
LW_LL22_0.3	Site 2 - 0.3m	2/6/03	12:59	3077223							2.1		
LW_LL22_0.3	Site 2 - 0.3m	4/3/03	12:00	3164083							1.8		
LW_LL22_0.3	Site 2 - 0.3m	5/8/03	12:30	3197223							1.4		
LW_LL22_0.3	Site 2 - 0.3m	6/3/03	10:50	3247223							1.7		
LW_LL22_0.3	Site 2 - 0.3m	7/10/03	10:40	3297223							1.8		
LW_LL22_0.3	Site 2 - 0.3m	8/7/03	12:15	3327223							1.8		
LW_LL22_0.3	Site 2 - 0.3m	9/4/03	11:07	3367223							2.1		
LW_LL22_10	Site 2 – 10m	7/2/02	12:55	2298284							2.0		
LW_LL22_10	Site 2 – 10m	8/8/02	12:25	2338236						2.3	2.4		
LW_LL22_10	Site 2 – 10m	9/5/02	13:50	2368286						2.1	2.6		
LW_LL22_10	Site 2 – 10m	2/6/03	12:50	3077224							2.1		
LW_LL22_10	Site 2 – 10m	4/3/03	11:45	3164084							2.1		
LW_LL22_10	Site 2 – 10m	5/8/03	12:15	3197224							1.4		
LW_LL22_10	Site 2 – 10m	6/3/03	10:32	3247224							1.7		
LW_LL22_10	Site 2 – 10m	7/10/03	10:30	3297224							1.6		
LW_LL22_10	Site 2 – 10m	8/7/03	11:55	3327224							1.9		
LW_LL22_10	Site 2 – 10m	9/4/03	10:51	3367224							2.2		
LW_LL22_15	Site 2 – 15m	7/15/02	14:20	2298321									

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_LL22_15	Site 2 – 15m	8/13/02	12:10	2338254							1.9		
LW_LL22_15	Site 2 – 15m	6/10/03	12:00	3247240							1.6		
LW_LL22_15	Site 2 – 15m	7/15/03	12:00	3297240							2.0		
LW_LL22_15	Site 2 – 15m	8/19/03	14:21	3347240							1.8		
LW_LL22_15	Site 2 – 15m	9/24/03	12:40	3397240							1.8		
LW_LL22_20	Site 2 – 20m	7/2/02	12:20	2298285							2.0		
LW_LL22_20	Site 2 – 20m	8/8/02	12:30	2338237						2.0	2.2		
LW_LL22_20	Site 2 – 20m	9/5/02	13:15	2368287						2.3	2.8		
LW_LL22_20	Site 2 – 20m	2/6/03	12:30	3077225							2.5		
LW_LL22_20	Site 2 – 20m	4/3/03	11:28	3164085							2.2		
LW_LL22_20	Site 2 – 20m	5/8/03	12:00	3197225							1.5		
LW_LL22_20	Site 2 – 20m	6/3/03	10:20	3247225							1.7		
LW_LL22_20	Site 2 – 20m	7/10/03	10:20	3297225							1.4		
LW_LL22_20	Site 2 – 20m	8/7/03	11:30	3327225							1.8		
LW_LL22_20	Site 2 – 20m	9/4/03	10:40	3367225							2.3		
LW_LL22_5	Site 2 – 5m	7/15/02	14:10	2298320									
LW_LL22_5	Site 2 – 5m	8/13/02	12:05	2338253									
LW_LL31_0.3	Site 3 - 0.3m	7/2/02	14:41	2298286							2.1		
LW_LL31_0.3	Site 3 - 0.3m	7/15/02	15:30	2298322									
LW_LL31_0.3	Site 3 - 0.3m	8/6/02	15:15	2338238						1.8	2.3		
LW_LL31_0.3	Site 3 - 0.3m	8/13/02	12:50	2338255									
LW_LL31_0.3	Site 3 - 0.3m	2/4/03	12:37	3077226							2.0		
LW_LL31_0.3	Site 3 - 0.3m	4/1/03	13:00	3164092							1.7		
LW_LL31_0.3	Site 3 - 0.3m	5/6/03	12:55	3197226							1.6		
LW_LL31_0.3	Site 3 - 0.3m	6/3/03	13:25	3247226							1.4		
LW_LL31_0.3	Site 3 - 0.3m	7/8/03	12:25	3297226							1.8		
LW_LL31_0.3	Site 3 - 0.3m	8/5/03	12:29	3327226							2.0		
LW_LL31_0.3	Site 3 - 0.3m	9/2/03	12:48	3367226							2.2		
LW_LL31_10	Site 3 – 10m	7/2/02	14:25	2298287							2.1		
LW_LL31_10	Site 3 – 10m	8/6/02	15:25	2338240						1.8	2.2		
LW_LL31_10	Site 3 – 10m	2/4/03	12:30	3077227							2.1		
LW_LL31_10	Site 3 – 10m	4/1/03	12:45	3164093							1.6		
LW_LL31_10	Site 3 – 10m	5/6/03	12:40	3197227							1.6		
LW_LL31_10	Site 3 – 10m	6/3/03	13:05	3247227							2.0		
LW_LL31_10	Site 3 – 10m	7/8/03	12:10	3297227							2.0		

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_LL31_10	Site 3 – 10m	8/5/03	12:12	3327227							2.0		
LW_LL31_10	Site 3 – 10m	9/2/03	12:35	3367227							2.1		
LW_LL31_15	Site 3 – 15m	7/15/02	15:50	2298324									
LW_LL31_15	Site 3 – 15m	8/13/02	13:00	2338257							1.7		
LW_LL31_15	Site 3 – 15m	6/10/03	13:20	3247241							1.6		
LW_LL31_15	Site 3 – 15m	7/15/03	13:40	3297241							1.8		
LW_LL31_15	Site 3 – 15m	8/19/03	13:35	3347241							1.9		
LW_LL31_15	Site 3 – 15m	9/24/03	14:20	3397241							1.8		
LW_LL31_20	Site 3 – 20m	7/2/02	14:10	2298288							1.7		
LW_LL31_20	Site 3 – 20m	8/6/02	15:28	2338241						1.8	2.0		
LW_LL31_20	Site 3 – 20m	2/4/03	12:40	3077228							2.1		
LW_LL31_20	Site 3 – 20m	4/1/03	12:37	3164094							2.0		
LW_LL31_20	Site 3 – 20m	5/6/03	12:30	3197228							1.4		
LW_LL31_20	Site 3 – 20m	6/3/03	12:55	3247228							1.7		
LW_LL31_20	Site 3 – 20m	7/8/03	12:00	3297228							2.5		
LW_LL31_20	Site 3 – 20m	8/5/03	12:20	3327228							1.6		
LW_LL31_20	Site 3 – 20m	9/2/03	12:19	3367228							1.8		
LW_LL31_5	Site 3 – 5m	7/15/02	15:40	2298323									
LW_LL31_5	Site 3 – 5m	8/13/02	12:55	2338256									
LW_LL31_80	Site 3 – 80m	7/2/02	13:35	2298289							1.8		
LW_LL31_80	Site 3 – 80m	8/6/02	14:50	2338242						1.6	1.8		
LW_LL31_80	Site 3 – 80m	2/4/03	13:44	3077229							2.2		
LW_LL31_80	Site 3 – 80m	4/1/03	12:20	3164095							1.5		
LW_LL31_80	Site 3 – 80m	5/6/03	12:08	3197229							1.4		
LW_LL31_80	Site 3 – 80m	6/3/03	12:25	3247229							1.2		
LW_LL31_80	Site 3 – 80m	7/8/03	11:40	3297229							1.9		
LW_LL31_80	Site 3 – 80m	8/5/03	11:37	3327229							1.7		
LW_LL31_80	Site 3 – 80m	9/2/03	11:53	3367229							1.9		
LW_LL32_0.3	Site 4 - 0.3m	7/2/02	12:34	2298290							2.0		
LW_LL32_0.3	Site 4 - 0.3m	7/15/02	16:42	2298325									
LW_LL32_0.3	Site 4 - 0.3m	7/15/02	16:44	2298328									
LW_LL32_0.3	Site 4 - 0.3m	8/6/02	12:10	2338243						1.7	2.0		
LW_LL32_0.3	Site 4 - 0.3m	8/13/02	14:00	2338258									
LW_LL32_0.3	Site 4 - 0.3m	9/3/02	12:56	2368293						2.1	2.6		
LW_LL32_0.3	Site 4 - 0.3m	2/6/03	14:46	3077230							2.0		

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_LL32_0.3	Site 4 - 0.3m	4/1/03	11:48	3164086							1.6		
LW_LL32_0.3	Site 4 - 0.3m	5/6/03	11:23	3197230							1.4		
LW_LL32_0.3	Site 4 - 0.3m	6/3/03	11:36	3247230							1.5		
LW_LL32_0.3	Site 4 - 0.3m	7/8/03	11:06	3297230							2.6		
LW_LL32_0.3	Site 4 - 0.3m	8/5/03	10:56	3327230							2.0		
LW_LL32_0.3	Site 4 - 0.3m	9/2/03	10:55	3367230							2.2		
LW_LL32_10	Site 4 – 10m	7/2/02	12:18	2298292							2.0		
LW_LL32_10	Site 4 – 10m	8/6/02	12:22	2338245						1.8	2.3		
LW_LL32_10	Site 4 – 10m	9/3/02	13:06	2368295						2.6	2.5		
LW_LL32_10	Site 4 – 10m	2/6/03	13:55	3077232							2.1		
LW_LL32_10	Site 4 – 10m	4/1/03	11:38	3164087							1.8		
LW_LL32_10	Site 4 – 10m	5/6/03	11:14	3197232							1.4		
LW_LL32_10	Site 4 – 10m	6/3/03	10:30	3247232							1.3		
LW_LL32_10	Site 4 – 10m	7/8/03	10:08	3297232							5.0		
LW_LL32_10	Site 4 – 10m	8/5/03	9:56	3327232							1.6		
LW_LL32_10	Site 4 – 10m	9/2/03	9:55	3367232							2.3		
LW_LL32_15	Site 4 – 15m	7/15/02	16:50	2298327									
LW_LL32_15	Site 4 – 15m	8/13/02	14:10	2338260									
LW_LL32_20	Site 4 – 20m	7/2/02	12:05	2298293							1.8		
LW_LL32_20	Site 4 – 20m	8/6/02	12:25	2338246						1.7	1.9		
LW_LL32_20	Site 4 – 20m	9/3/02	12:36	2368296						2.1	2.2		
LW_LL32_20	Site 4 – 20m	2/6/03	14:12	3077233							2.1		
LW_LL32_20	Site 4 – 20m	4/1/03	11:25	3164089							1.4		
LW_LL32_20	Site 4 – 20m	5/6/03	11:05	3197233							1.2		
LW_LL32_20	Site 4 – 20m	6/3/03	10:40	3247233							1.3		
LW_LL32_20	Site 4 – 20m	7/8/03	10:20	3297233							1.9		
LW_LL32_20	Site 4 – 20m	8/5/03	10:05	3327233							1.5		
LW_LL32_20	Site 4 – 20m	9/2/03	10:10	3367233							1.9		
LW_LL32_5	Site 4 – 5m	7/2/02	12:27	2298291							2.2		
LW_LL32_5	Site 4 – 5m	7/15/02	16:46	2298326									
LW_LL32_5	Site 4 – 5m	8/6/02	12:15	2338244						1.8	2.3		
LW_LL32_5	Site 4 – 5m	8/13/02	14:05	2338259									
LW_LL32_5	Site 4 – 5m	9/3/02	13:18	2368294						2.2	2.5		
LW_LL32_5	Site 4 – 5m	2/6/03	13:50	3077231							2.1		
LW_LL32_5	Site 4 – 5m	4/1/03	11:45	3164088							1.7		
LW_LL32_5	Site 4 – 5m	5/6/03	11:20	3197231							1.3		

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_LL32_5	Site 4 – 5m	6/3/03	10:24	3247231							1.3		
LW_LL32_5	Site 4 – 5m	7/8/03	10:00	3297231							4.3		
LW_LL32_5	Site 4 – 5m	8/5/03	9:46	3327231							2.1		
LW_LL32_5	Site 4 – 5m	9/2/03	9:45	3367231							2.2		
LW_LL32_80	Site 4 - 80m	7/2/02	11:33	2298294							1.8		
LW_LL32_80	Site 4 - 80m	8/6/02	12:30	2338247						1.7	2.0		
LW_LL32_80	Site 4 - 80m	9/3/02	12:07	2368297						2.1	2.2		
LW_LL32_80	Site 4 - 80m	2/6/03	14:46	3077234							2.1		
LW_LL32_80	Site 4 - 80m	4/1/03	11:04	3164090							1.5		
LW_LL32_80	Site 4 - 80m	5/6/03	10:50	3197234							1.4		
LW_LL32_80	Site 4 - 80m	6/3/03	11:08	3247234							1.4		
LW_LL32_80	Site 4 - 80m	7/8/03	10:45	3297234							3.1		
LW_LL32_80	Site 4 - 80m	8/5/03	10:40	3327234							1.6		
LW_LL32_80	Site 4 - 80m	9/2/03	10:35	3367234							1.8		
LW_LL32_90	Site 4 – 90m	7/2/02	11:22	2298295							1.6		
LW_LL32_90	Site 4 – 90m	8/6/02	12:35	2338248						1.7	1.8		
LW_LL32_90	Site 4 – 90m	9/3/02	11:58	2368298						2.8	2.3		
LW_LL32_90	Site 4 – 90m	2/6/03	14:59	3077235							2.3		
LW_LL32_90	Site 4 – 90m	4/1/03	10:55	3164091							1.4		
LW_LL32_90	Site 4 – 90m	5/6/03	10:40	3197235							1.2		
LW_LL32_90	Site 4 – 90m	6/3/03	11:14	3247235							1.3		
LW_LL32_90	Site 4 – 90m	7/8/03	11:05	3297235							3.1		
LW_LL32_90	Site 4 – 90m	8/5/03	10:56	3327235							1.3		
LW_LL32_90	Site 4 – 90m	9/2/03	10:45	3367235							2.0		
LW_MIL01	MILL WHEEL	1/23/02	10:50	2049124	0.030						4.6		
LW_MIL01	MILL WHEEL	2/13/02	8:55	2079124	0.022						4.0		
LW_MIL01	MILL WHEEL	3/5/02	8:45	2109124	0.027						4.1		
LW_MIL01	MILL WHEEL	3/26/02	8:42	2139124	0.020						3.6		
LW_MIL01	MILL WHEEL	4/16/02	8:30	2169124	0.024						6.6		
LW_MIL01	MILL WHEEL	5/7/02	0:00	2199124	0.016						5.4		
LW_MIL01	MILL WHEEL	5/7/02	0:00	2199129	0.013						5.0		
LW_MIL01	MILL WHEEL	5/30/02	8:35	2229144	0.015						5.7		
LW_MIL01	MILL WHEEL	6/19/02	8:40	2259124	0.082						5.8		
LW_MIL01	MILL WHEEL	8/14/02	10:25	2338270									
LW_MIL01	MILL WHEEL	12/10/02	11:20	2507205	0.513	0.206	1.190	0.0140	0.0596	9.7	10.6	7.36	58.3

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_MIL01	MILL WHEEL	1/7/03	11:15	3027205	0.026	0.795	0.969	0.0084	0.0325	7.8	8.6	3.66	24
LW_MIL01	MILL WHEEL	1/28/03	11:10	3057205	0.016	0.770	0.951	0.0088	0.0180	7.2	7.7 J	2.98	23
LW_MIL01	MILL WHEEL	2/18/03	10:25	3087205	0.021	0.579	0.771	0.0065	0.0190	5.1	5.4	2.95	30
LW_MIL01	MILL WHEEL	2/18/03	10:30	3087213	0.024	0.582	0.735		0.0240	5.3	5.6	2.92	30
LW_MIL01	MILL WHEEL	3/19/03	10:50	3127205	0.010 U	0.331	0.468	0.0037	0.0063	4.1	4.8	2.73	31
LW_MIL01	MILL WHEEL	4/2/03	10:15	3147205	0.010 U	0.431	0.592	0.0042	0.0170	4.5	4.2	2.34	30
LW_MIL01	MILL WHEEL	4/22/03	10:25	3177205	0.010 U	0.167	0.230	0.0041	0.0150	4.1	4.4	2.55	35
LW_MIL01	MILL WHEEL	5/28/03	11:40	3227205	0.021	0.015	0.238	0.0057	0.0234	4.4	4.7	2.98	55.1
LW_MIL01	MILL WHEEL	1/28/04	10:50	4054954	0.011	0.893	1.090	0.0092	0.0278	4.9	5.8		
LW_OLS01	OLSEN CR	1/23/02	10:11	2049127	0.010 U						3.2		
LW_OLS01	OLSEN CR	2/13/02	9:50	2079127	0.011 J						2.4		
LW_OLS01	OLSEN CR	3/5/02	9:26	2109127	0.010 U						2.6		
LW_OLS01	OLSEN CR	3/26/02	9:21	2139127	0.010 U						2.9		
LW_OLS01	OLSEN CR	4/16/02	9:05	2169127	0.011						3.4		
LW_OLS01	OLSEN CR	5/7/02	0:00	2199127	0.010 U						2.9		
LW_OLS01	OLSEN CR	5/30/02	9:15	2229147	0.010 U						2.9		
LW_OLS01	OLSEN CR	6/19/02	9:28	2259127	0.010 U						3.0		
LW_OLS01	OLSEN CR	7/16/02	11:40	2298302	0.013	0.429	0.510	0.0110	0.0150	2.4	2.3		33
LW_OLS01	OLSEN CR	8/14/02	11:20	2338263	0.010 U	0.330	0.395	0.0142	0.0140	2.4	2.2		45
LW_OLS01	OLSEN CR	9/17/02	11:50	2388282	0.010 U	0.769	0.870	0.0097	0.0110	4.1	4.1		41
LW_OLS01	OLSEN CR	10/15/02	13:00	2428083	0.010 U	0.531	0.621	0.0052	0.0053	3.6	3.1		50
LW_OLS01	OLSEN CR	11/12/02	12:45	2467210	0.011	0.300	0.490	0.0068	0.0230	9.3	9.0		43
LW_OLS01	OLSEN CR	11/19/02	17:30	2478801	0.010 U	2.170	2.530	0.0060	0.1140	17.4	23.3		17
LW_OLS01	OLSEN CR	12/10/02	12:40	2507210	0.048	0.658	0.860	0.0200	0.0220	6.0	6.3	4.49	37
LW_OLS01	OLSEN CR	1/7/03	12:40	3027209	0.010 U	1.700	1.750	0.0140	0.0051	4.2	4.7	2.37	14
LW_OLS01	OLSEN CR	1/7/03	12:45	3027210	0.010 U	1.700	1.770	0.0062	0.0043	4.0	3.8	2.42	13
LW_OLS01	OLSEN CR	1/28/03	12:10	3057209	0.010 U	1.610	1.680	0.0050	0.0120	4.6	4.9 J	2.25	11
LW_OLS01	OLSEN CR	2/18/03	11:30	3087209	0.010 U	1.290	1.320	0.0056	0.0048	4.0	4.0	2.14	16
LW_OLS01	OLSEN CR	3/19/03	9:40	3127209	0.010 U	1.090	1.150	0.0042	0.0047	2.4	2.5	2.14	14
LW_OLS01	OLSEN CR	4/2/03	9:10	3147209	0.015	1.330	1.410	0.0036	0.0095	3.0	2.9	2.00	12
LW_OLS01	OLSEN CR	4/8/03	17:00	3158816	0.010 U	0.963	1.110	0.0055 J	0.0066	3.2	3.1		15
LW_OLS01	OLSEN CR	4/8/03	19:30	3158817	0.010 U	0.963	1.090	0.0060	0.0067	3.0	3.5		
LW_OLS01	OLSEN CR	4/8/03	21:45	3158818	0.010 U	0.935	1.060	0.0061	0.0090	3.3	3.5		14
LW_OLS01	OLSEN CR	4/8/03	23:30	3158819	0.010 U	0.886	1.030	0.0072	0.0192	3.5	5.0		
LW_OLS01	OLSEN CR	4/9/03	1:30	3158820	0.010 U	0.899	1.060	0.0059 J	0.0132	4.1	4.8		14
LW_OLS01	OLSEN CR	4/9/03	8:45	3158821	0.010 U	0.803	0.945	0.0046	0.0107	5.0	5.3		

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_OLS01	OLSEN CR	4/9/03	11:00	3158822	0.010 U	0.781	0.909	0.0048	0.0081	4.7	5.3		11
LW_OLS01	OLSEN CR	4/9/03	12:30	3158827	0.010 U	0.773	0.902	0.0046	0.0079	4.6	4.3		
LW_OLS01	OLSEN CR	4/22/03	9:25	3177209	0.010 U	1.060	1.150	0.0067	0.0050	2.5	2.5	2.42	22
LW_OLS01	OLSEN CR	5/28/03	8:55	3227209	0.010 U	0.674	0.728	0.0090	0.0097	2.1	2.2	2.24	25
LW_OLS01	OLSEN CR	6/11/03	9:20	3247209	0.010 U	0.556	0.609	0.0150	0.0128	2.2	2.0	3.29	35
LW_OLS01	OLSEN CR	7/16/03	9:10	3297209	0.010 U	0.454	0.542	0.0150	0.0180	2.3	2.4	3.81	42
LW_OLS01	OLSEN CR	8/20/03	9:40	3347209	0.010 U	0.294	0.349	0.0110	0.0127	3.0	2.4	6.21	53.2
LW_OLS01	OLSEN CR	8/20/03	9:45	3347213	0.010 U	0.295	0.357	0.0110	0.0128	2.0	2.2	6.22	53.2
LW_OLS01	OLSEN CR	9/24/03	9:45	3397209	0.010 U	0.620	0.712	0.0088	0.0115	2.6	2.8	6.14	52.9
LW_OLS01	OLSEN CR	1/28/04	9:55	4054957	0.010 U	0.905	0.990	0.0049	0.0662	4.1	4.8		
LW_PAR01	PARK PL	7/16/02	10:35	2298309									
LW_PAR01	PARK PL	8/14/02	10:30	2338271									
LW_PAR01	PARK PL	9/17/02	11:10	2388290									
LW_PAR01	PARK PL	10/15/02	11:15	2428090									
LW_PAR01	PARK PL	11/12/02	11:50	2467207									
LW_PAR01	PARK PL	12/10/02	11:45	2507206									
LW_PAR01	PARK PL	1/7/03	11:35	3027206									
LW_PAR01	PARK PL	1/28/03	11:20	3057206									
LW_PAR01	PARK PL	2/18/03	10:55	3087206									
LW_PAR01	PARK PL	3/19/03	10:30	3127206									
LW_PAR01	PARK PL	4/2/03	9:55	3147206									
LW_PAR01	PARK PL	4/22/03	10:10	3177206									
LW_PAR01	PARK PL	5/28/03	10:15	3227206									
LW_PAR01	PARK PL	6/11/03	9:55	3247206									
LW_PAR01	PARK PL	7/16/03	9:55	3297206									
LW_PAR01	PARK PL	8/20/03	10:37	3347206									
LW_PAR01	PARK PL	9/24/03		3397206									
LW_RAIN	RAIN	10/20/03	6:30	3434015				0.0030 U	0.0022				
LW_RAIN	RAIN	1/28/04	0:15	4054960				0.0030 U	0.0020				
LW_SIL01	SILVER BCH CK	1/23/02	10:48	2049125	0.022						5.6		
LW_SIL01	SILVER BCH CK	2/13/02	9:27	2079125	0.020						4.8		
LW_SIL01	SILVER BCH CK	3/5/02	9:00	2109125	0.017						5.2		
LW_SIL01	SILVER BCH CK	3/26/02	8:55	2139125	0.013						4.7		
LW_SIL01	SILVER BCH CK	3/26/02	8:56	2139129	0.018						5.5		
LW_SIL01	SILVER BCH CK	4/16/02	8:36	2169125	0.017						7.1		

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L		NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L		Chlrd mg/L	Alk mg/L
LW_SIL01	SILVER BCH CK	5/7/02	0:00	2199125	0.010	U						5.6			
LW_SIL01	SILVER BCH CK	5/30/02	8:50	2229145	0.011							5.7			
LW_SIL01	SILVER BCH CK	6/19/02	9:00	2259125	0.012							5.7			
LW_SIL01	SILVER BCH CK	7/16/02	10:50	2298300	0.015		0.289	0.510	0.0270	0.0400	5.5	5.7			127
LW_SIL01	SILVER BCH CK	8/14/02	10:45	2338261	0.010	U	0.456	0.712	0.0423	0.0556	5.8	5.9			135
LW_SIL01	SILVER BCH CK	9/17/02	11:20	2388280	0.010	U	0.066	0.300	0.0270	0.0382	6.4	7.4			146
LW_SIL01	SILVER BCH CK	10/15/02	11:30	2428080	0.010	U	0.144	0.256	0.0190	0.0220	6.3	5.2			135
LW_SIL01	SILVER BCH CK	11/12/02	12:20	2467208	0.010	U	0.186	0.516	0.0210	0.0630	13.3	13.8			78.3
LW_SIL01	SILVER BCH CK	12/10/02	11:50	2507208	0.010	U	0.258	0.492	0.0110	0.0210	8.4	8.9		9.79	96.9
LW_SIL01	SILVER BCH CK	12/10/02	11:55	2507207	0.010	U	0.247	0.520	0.0110	0.0538	8.2	8.7		9.91	97.2
LW_SIL01	SILVER BCH CK	1/7/03	11:50	3027207	0.011		1.040	1.280	0.0100	0.0362	8.5	9.6		6.83	49
LW_SIL01	SILVER BCH CK	1/28/03	11:30	3057207	0.010		0.997	0.883	0.0110	0.0230	9.2	9.7	J	5.22	40
LW_SIL01	SILVER BCH CK	2/18/03	11:10	3087207	0.010	U	0.660	0.903	0.0092	0.0200	6.0	6.7		5.23	49
LW_SIL01	SILVER BCH CK	3/19/03	10:10	3127207	0.010	U	0.495	0.697	0.0090	0.0210	5.3	5.3		5.10	54.9
LW_SIL01	SILVER BCH CK	4/2/03	9:40	3147207	0.010	U	0.625	0.851	0.0070	0.0350	5.9	6.6		3.88	46
LW_SIL01	SILVER BCH CK	4/9/03	10:00	3158802	0.014		0.439	0.751	0.0110	0.0335	7.3	10.0			42
LW_SIL01	SILVER BCH CK	4/22/03	9:50	3177207	0.010	U	0.273	0.477	0.0077	0.0180	5.3	5.6		4.48	61
LW_SIL01	SILVER BCH CK	5/28/03	8:45	3227214											
LW_SIL01	SILVER BCH CK	5/28/03	9:45	3227207	0.010		0.200	0.393	0.0140	0.0275	5.0	5.2		5.83	95.4
LW_SIL01	SILVER BCH CK	6/11/03	9:45	3247207	0.010	U	0.234	0.468	0.0190	0.0397	5.8	5.4		8.30	125
LW_SIL01	SILVER BCH CK	6/11/03	9:50	3247214											
LW_SIL01	SILVER BCH CK	7/16/03	9:40	3297207	0.010	U	0.172	0.423	0.0210	0.0380	5.8	5.9		7.41	112
LW_SIL01	SILVER BCH CK	7/16/03	9:40	3297213	0.010	U	0.172	0.446	0.0220	0.0370	5.7	5.9		7.47	111
LW_SIL01	SILVER BCH CK	8/20/03	10:15	3347207	0.010	U	0.410	0.660	0.0250	0.0336	6.0	5.9		10.60	138
LW_SIL01	SILVER BCH CK	9/24/03	10:05	3397207	0.010	U	0.117	0.353	0.0210	0.0325	5.5	5.6		12.40	134
LW_SIL01	SILVER BCH CK	1/28/04	10:30	4054955	0.010	U	0.966	1.170	0.0120	0.0441	6.1	6.8			
LW_SMI01	SMITH CR	1/23/02	9:58	2049128	0.017							2.7			
LW_SMI01	SMITH CR	2/13/02	10:05	2079128	0.010	U						2.1			
LW_SMI01	SMITH CR	3/5/02	9:37	2109128	0.010	U						2.3			
LW_SMI01	SMITH CR	3/26/02	9:38	2139128	0.010	U						2.9			
LW_SMI01	SMITH CR	4/16/02	9:15	2169128	0.010	U						3.4			
LW_SMI01	SMITH CR	5/7/02	0:00	2199128	0.010	U						2.4			
LW_SMI01	SMITH CR	5/30/02	9:25	2229148	0.010	U						2.6			
LW_SMI01	SMITH CR	5/30/02	9:25	2229149	0.010	U						2.7			
LW_SMI01	SMITH CR	6/19/02	9:40	2259128	0.011							3.0			

Table C-1. Results of Sampling and Laboratory Analysis, Part 1.

Station ID	Station	Date	Time	Sample ID	NH3 mg/L	NO2/3 mg/L	TPN mg/L	Ortho-P mg/L	TP mg/L	DOC mg/L	TOC mg/L	Chlrd mg/L	Alk mg/L
LW_SMI01	SMITH CR	7/16/02	12:20	2298303	0.013	0.601	0.679	0.0067	0.0100	2.0	2.2		25
LW_SMI01	SMITH CR	8/14/02	11:40	2338264	0.011	0.451	0.572	0.0074	0.0053	1.9	2.3		32
LW_SMI01	SMITH CR	9/17/02	12:30	2388283	0.010 U	0.661	0.746	0.0044	0.0035	3.3	3.2		32
LW_SMI01	SMITH CR	10/15/02	12:45	2428084	0.010 U	0.790	0.841	0.0052	0.0037	3.2	2.7		34
LW_SMI01	SMITH CR	11/12/02	13:10	2467211	0.010 U	1.080	1.300	0.0063	0.0200	8.1	9.0		30
LW_SMI01	SMITH CR	11/19/02	17:30	2478800	0.010 U	2.580	2.820	0.0068	0.0525	13.1	14.8		13
LW_SMI01	SMITH CR	12/10/02	13:05	2507211	0.010 U	0.800	0.925	0.0042	0.0087	5.8	6.4	3.85	27
LW_SMI01	SMITH CR	1/7/03	13:00	3027211	0.010 U	2.360	2.100	0.0049	0.0030 U	3.7	3.3	2.05	13
LW_SMI01	SMITH CR	1/28/03	12:20	3057211	0.010 U	1.980	1.760	0.0054	0.0079	4.0 J	4.4 J	1.98	12
LW_SMI01	SMITH CR	2/18/03	11:50	3087211	0.010 U	1.390	1.450	0.0052	0.0034	3.1	3.3	1.82	14
LW_SMI01	SMITH CR	3/19/03	9:00	3127211	0.010 U	1.330	1.320	0.0043	0.0039	2.3	2.4	1.85	14
LW_SMI01	SMITH CR	4/2/03	8:45	3147211	0.019	1.490	1.610	0.0045	0.0076	2.5	2.5	1.76	13
LW_SMI01	SMITH CR	4/8/03	23:45	3158804	0.010 U	0.984	1.130	0.0053	0.0095	3.5	4.0 J		13
LW_SMI01	SMITH CR	4/9/03	1:15	3158805	0.010 U	0.939	1.070	0.0046	0.0060	3.9	4.2		
LW_SMI01	SMITH CR	4/9/03	2:30	3158806	0.010 U	0.911	1.030	0.0085	0.0130	4.2	4.4		13
LW_SMI01	SMITH CR	4/9/03	3:45	3158807	0.010 U	0.923	1.190	0.0170 J	0.0270	4.4	5.0		
LW_SMI01	SMITH CR	4/9/03	6:15	3158808	0.010 U	0.935	1.070	0.0050	0.0067	4.1	4.1		13
LW_SMI01	SMITH CR	4/9/03	9:30	3158809	0.010 U	0.904	1.030	0.0048	0.0054	3.4	3.8		
LW_SMI01	SMITH CR	4/9/03	11:30	3158810	0.010 U	0.890	1.030	0.0042	0.0040	3.5	3.7		12
LW_SMI01	SMITH CR	4/9/03	13:00	3158815	0.010 U	0.885	1.010	0.0042	0.0041	3.2	3.2		
LW_SMI01	SMITH CR	4/22/03	9:15	3177211	0.010 U	1.210	1.280	0.0057	0.0040	1.9	2.3	1.97	17
LW_SMI01	SMITH CR	5/28/03	8:20	3227211	0.010 U	0.820	0.874	0.0056	0.0051	1.7	2.1	1.98	24
LW_SMI01	SMITH CR	6/11/03	8:55	3247211	0.010 U	0.712	0.767	0.0065	0.0069	1.9	1.8	2.83	27
LW_SMI01	SMITH CR	7/16/03	8:55	3297211	0.010 U	0.523	0.607	0.0088	0.0140	1.8	2.0	3.89	33
LW_SMI01	SMITH CR	8/20/03	9:15	3347211	0.010 U	0.313	0.388	0.0055	0.0069	2.2	2.2		
LW_SMI01	SMITH CR	9/24/03	9:00	3397211	0.010 U	0.793	0.878	0.0031	0.0038	2.3	2.5	6.26	36
LW_SMI01	SMITH CR	9/24/03	9:00	3397213	0.010 U	0.794	0.877	0.0030 U	0.0039	2.3	2.5	6.29	36
LW_SMI01	SMITH CR	1/28/04	9:32	4054958	0.010 U	1.120	1.190	0.0053	0.0061	4.1	4.3		

Abbreviations: NH3 = Ammonia; NO2/3 = Nitrate-Nitrite; TPN = Total Persulfate Nitrogen; Ortho-P = Ortho-phosphorus; TP = Total Phosphorus; DOC = Dissolved Organic Carbon; TOC = Total Organic Carbon; Chlrd = Chloride; Alk = Total Alkalinity; mg/L = milligrams per liter; µg/L = micrograms per liter;
Data Qualifiers: J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was not detected at or above the reported sample quantitation limit.

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L		E. coli #/100mL		Fecal Coli. #/100mL		TDS mg/L	TNVSS mg/L		TSS mg/L	
LW_AND01	ANDERSON	1/23/02	8:45	2049120			0.25	J									
LW_AND01	ANDERSON	2/13/02	7:45	2079120	3.650		0.41										
LW_AND01	ANDERSON	2/13/02	7:45	2079129	3.760		0.26										
LW_AND01	ANDERSON	3/5/02	7:45	2109120			0.21	J									
LW_AND01	ANDERSON	3/26/02	7:40	2139120			0.89										
LW_AND01	ANDERSON	4/16/02	7:35	2169120			0.78										
LW_AND01	ANDERSON	5/7/02	0:00	2199120			0.47										
LW_AND01	ANDERSON	5/30/02	7:40	2229140			0.99										
LW_AND01	ANDERSON	6/19/02	7:30	2259120	3.070		1.20										
LW_AND01	ANDERSON	7/16/02	8:15	2298304			0.37	J	6	J	7	J	42	17		19	
LW_AND01	ANDERSON	7/16/02	8:15	2298311			0.34	J	5	J	11	J	40	16		17	
LW_AND01	ANDERSON	8/14/02	9:05	2338266			2.80	J	220	J	230	J	45	29		32	
LW_AND01	ANDERSON	9/17/02	9:50	2388284			1.60	J	140	J	110	J		2		2	
LW_AND01	ANDERSON	10/15/02	9:40	2428085			0.32	J	17	J	19	J	57	1	U	1	U
LW_AND01	ANDERSON	11/12/02	9:30	2467200			2.60	J	100	J	37	J	61	5		7	
LW_AND01	ANDERSON	11/19/02	17:30	2478804	3.709	3.564	16.00		56		53		53	14		21	
LW_AND01	ANDERSON	11/19/02	17:30	2478805										18		26	
LW_AND01	ANDERSON	11/19/02	17:30	2478806	3.623	3.497			69		81		52	14		21	
LW_AND01	ANDERSON	11/19/02	17:30	2478808	3.638	3.508			120		170		52	14		20	
LW_AND01	ANDERSON	11/19/02	17:30	2478810	3.755	3.493			39		39		50	10		14	
LW_AND01	ANDERSON	11/20/02	13:00	2478812	3.726	3.633			10		8		54	5		6	
LW_AND01	ANDERSON	11/20/02	13:00	2478813					11		6						
LW_AND01	ANDERSON	11/20/02	13:00	2478814	3.712	3.663	0.61		8		9		51	3		4	
LW_AND01	ANDERSON	12/10/02	9:30	2507200			0.28	J	45	J	32	J	51	3		4	
LW_AND01	ANDERSON	1/7/03	9:30	3027200			0.25	J	2	J	1	UJ	39	5		6	
LW_AND01	ANDERSON	1/28/03	9:25	3057200			0.31	J	2	J	2	J		7		8	
LW_AND01	ANDERSON	2/18/03	8:50	3087200			0.26	J	1	UJ	2	J		1	U	1	
LW_AND01	ANDERSON	3/19/03	12:15	3127200			0.38		31		10			4		5	
LW_AND01	ANDERSON	4/2/03	11:30	3147200			0.37		1		2			7		8	
LW_AND01	ANDERSON	4/9/03	11:30	3158800					190	J	230	J	40	2		4	
LW_AND01	ANDERSON	4/22/03	11:45	3177200			0.67		4		1			2		3	
LW_AND01	ANDERSON	5/28/03	13:25	3227213			1.10		16	J	17	J		5		7	
LW_AND01	ANDERSON	5/28/03	13:30	3227200			1.20		14		16			5		6	
LW_AND01	ANDERSON	6/11/03	12:30	3247200			0.89		28		21			24		26	
LW_AND01	ANDERSON	7/16/03	11:30	3297200			1.80		1500	J	2000	J		1	U	2	
LW_AND01	ANDERSON	8/20/03	12:30	3347200			1.90		260		280			5		6	
LW_AND01	ANDERSON	9/24/03	11:25	3397200			3.50		29		28	J		6		7	
LW_AND01	ANDERSON	1/28/04	11:50	4054950										54		58	
LW_AUS01	AUSTIN CR	1/23/02	9:26	2049122			0.20	J									
LW_AUS01	AUSTIN CR	2/13/02	8:25	2079122	5.350		0.20	J									
LW_AUS01	AUSTIN CR	3/5/02	8:16	2109122			0.10	J									
LW_AUS01	AUSTIN CR	3/26/02	8:10	2139122			0.46										
LW_AUS01	AUSTIN CR	4/7/02	12:10	2159127													
LW_AUS01	AUSTIN CR	4/14/02	17:25	2159124													
LW_AUS01	AUSTIN CR	4/16/02	8:05	2169122			0.80										
LW_AUS01	AUSTIN CR	4/16/02	9:28	2169129			0.79										
LW_AUS01	AUSTIN CR	5/7/02	0:00	2199122			0.69										
LW_AUS01	AUSTIN CR	5/30/02	8:10	2229142			7.80										

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_AUS01	AUSTIN CR	6/19/02	8:05	2259122	4.720		1.20					
LW_AUS01	AUSTIN CR	7/16/02	9:30	2298306			0.44 J	330 J	330 J	60	1 U	1
LW_AUS01	AUSTIN CR	8/14/02	9:50	2338268			0.32 J	230 J	180 J	80	1 U	1 U
LW_AUS01	AUSTIN CR	8/14/02	9:55	2338273			0.33 J	220 J	180 J	78	1 U	1 U
LW_AUS01	AUSTIN CR	9/17/02	10:40	2388286			0.61 J	80 J	96 J		1 U	1 U
LW_AUS01	AUSTIN CR	9/17/02	10:40	2388287			0.60 J	80 J	100 J		1 U	1 U
LW_AUS01	AUSTIN CR	10/15/02	10:40	2428087			0.33 J	17 J	10 J	87	1 U	1 U
LW_AUS01	AUSTIN CR	11/12/02	10:25	2467202			1.70	190 J	240 J	92	2	2
LW_AUS01	AUSTIN CR	11/12/02	10:30	2467203			0.92	290	170	93	2	2
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478816	4.157	3.963	4.40	240	300	67	9	14
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478817				220	510			
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478818	3.874	3.465		440	370	62	52	81
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478820	3.945	3.420		490	460	63	126	164
LW_AUS01	AUSTIN CR	11/19/02	17:30	2478822	4.031	3.472		360	360	63	62	86
LW_AUS01	AUSTIN CR	11/20/02	13:00	2478824	3.841	3.574		450	400	57	21	29
LW_AUS01	AUSTIN CR	11/20/02	13:00	2478825				73	68			
LW_AUS01	AUSTIN CR	11/20/02	13:00	2478826	4.185	4.072	0.68	53	51	55	4	5
LW_AUS01	AUSTIN CR	12/10/02	10:30	2507202			0.62	31	280	68	2	3
LW_AUS01	AUSTIN CR	1/7/03	10:15	3027202			0.47	11	20	52	1 U	1
LW_AUS01	AUSTIN CR	1/28/03	10:00	3057202			0.86 J	4 J	7 J		5	6
LW_AUS01	AUSTIN CR	1/28/03	10:05	3057213			0.79 J	4 J	3 J		5	6
LW_AUS01	AUSTIN CR	2/18/03	9:45	3087202			0.67	8	8		1	2
LW_AUS01	AUSTIN CR	3/19/03	11:25	3127202			0.62	11	4		2	3
LW_AUS01	AUSTIN CR	4/2/03	10:50	3147202			0.66	17	14		3	4
LW_AUS01	AUSTIN CR	4/9/03	11:00	3158801				93	130	40	2	3
LW_AUS01	AUSTIN CR	4/22/03	11:15	3177202			0.77	14	22		2	2
LW_AUS01	AUSTIN CR	5/28/03	12:40	3227202			1.80	170 J	300 J		1 U	1
LW_AUS01	AUSTIN CR	6/11/03	11:42	3247202			0.95	280	310		1 U	2
LW_AUS01	AUSTIN CR	7/16/03	10:55	3297202			0.64	270	190		1	2
LW_AUS01	AUSTIN CR	8/20/03	11:25	3347202			0.55	84	110		1 U	1 U
LW_AUS01	AUSTIN CR	9/24/03	10:50	3397202			0.51	35	27 J		1 U	1 U
LW_AUS01	AUSTIN CR	1/28/04	10:45	4054952							24	26
LW_AUS01	AUSTIN CR	1/28/04	10:45	4054961								
LW_BRA01	BRANNIAN	1/23/02	9:00	2049121			0.18 J					
LW_BRA01	BRANNIAN	2/13/02	8:00	2079121	2.930		0.13 J					
LW_BRA01	BRANNIAN	3/5/02	7:55	2109121			0.08 J					
LW_BRA01	BRANNIAN	3/26/02	7:50	2139121			0.26					
LW_BRA01	BRANNIAN	4/16/02	7:43	2169121			0.47					
LW_BRA01	BRANNIAN	5/7/02	0:00	2199121			0.51					
LW_BRA01	BRANNIAN	5/30/02	7:50	2229141			0.75					
LW_BRA01	BRANNIAN	6/19/02	7:45	2259121	3.060		0.98					
LW_BRA01	BRANNIAN	7/16/02	8:50	2298305			0.22 J	92 J	77 J	36	1 U	1 U
LW_BRA01	BRANNIAN	8/14/02	9:20	2338267			0.22 J	27 J	18 J	38	1 U	1 U
LW_BRA01	BRANNIAN	9/17/02	10:10	2388285			0.28 J	170 J	180 J		1 U	1 U
LW_BRA01	BRANNIAN	10/15/02	10:10	2428086			0.10 J	31 J	24 J	50	1 U	1 U
LW_BRA01	BRANNIAN	11/12/02	9:50	2467201			0.31 J	24 J	18 J	68	1 U	1 U
LW_BRA01	BRANNIAN	12/10/02	9:45	2507201			0.26 J	11 J	13 J	47	1 U	1 U
LW_BRA01	BRANNIAN	1/7/03	9:45	3027201			0.25 J	2	2	42	1 U	1 U

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_BRA01	BRANNIAN	1/28/03	9:40	3057201			0.37 J	3 J	2 J		1	2
LW_BRA01	BRANNIAN	2/18/03	9:30	3087201			0.33	3 J	4 J		1 U	1
LW_BRA01	BRANNIAN	3/19/03	11:45	3127201			0.31	2	3		1 U	2
LW_BRA01	BRANNIAN	3/19/03	11:45	3127213			0.35	3	4		2	2
LW_BRA01	BRANNIAN	4/2/03	11:10	3147201			0.39	1 U	1 U		2	3
LW_BRA01	BRANNIAN	4/22/03	11:30	3177201			0.63	2	1		1	2
LW_BRA01	BRANNIAN	5/28/03	13:00	3227201			0.50	16	22		1	2
LW_BRA01	BRANNIAN	6/11/03	12:00	3247201			0.33	67	60		1 U	1 U
LW_BRA01	BRANNIAN	6/11/03	12:05	3247213			0.34	59	61		3	5
LW_BRA01	BRANNIAN	7/16/03	11:15	3297201			0.18	140	170		1 U	1 U
LW_BRA01	BRANNIAN	1/28/04	11:05	4054951							23	27
LW_BRA01	BRANNIAN	1/28/04	11:05	4054959							24	28
LW_CAB01	CABLE ST	7/16/02	9:55	2298310				250 J	300 J			
LW_CAB01	CABLE ST	8/14/02	10:15	2338272				3 UJ	3 UJ			
LW_CAB01	CABLE ST	9/17/02	11:00	2388291				68	270 J			
LW_CAB01	CABLE ST	10/15/02	10:50	2428091				4 J	3 J			
LW_CAB01	CABLE ST	11/12/02	10:50	2467204				1100 J	1300 J			
LW_CAB01	CABLE ST	12/10/02	10:50	2507203				170	130			
LW_CAB01	CABLE ST	1/7/03	10:35	3027203				11	3			
LW_CAB01	CABLE ST	1/28/03	10:30	3057203				11 J	1 J			
LW_CAB01	CABLE ST	2/18/03	10:05	3087203				9	9			
LW_CAB01	CABLE ST	3/19/03	11:15	3127203				1 U	1			
LW_CAB01	CABLE ST	4/2/03	10:40	3147203				6	9			
LW_CAB01	CABLE ST	4/22/03	11:00	3177203				16	2			
LW_CAB01	CABLE ST	5/28/03	12:15	3227203				10	1			
LW_CAB01	CABLE ST	6/11/03	11:28	3247203				670 J	690 J			
LW_CAB01	CABLE ST	7/16/03	10:45	3297203				57	49			
LW_CAR01	CARPENTER	1/23/02	10:19	2049126			0.19 J					
LW_CAR01	CARPENTER	1/23/02	10:19	2049129			0.19 J					
LW_CAR01	CARPENTER	2/13/02	9:43	2079126	6.440		0.26 J					
LW_CAR01	CARPENTER	3/5/02	9:15	2109126			0.05 UJ					
LW_CAR01	CARPENTER	3/26/02	9:14	2139126			1.10					
LW_CAR01	CARPENTER	4/16/02	8:50	2169126			1.70					
LW_CAR01	CARPENTER	5/7/02	0:00	2199126			1.50					
LW_CAR01	CARPENTER	5/30/02	9:05	2229146			2.70					
LW_CAR01	CARPENTER	6/19/02	9:17	2259126	7.580		1.10					
LW_CAR01	CARPENTER	7/16/02	11:30	2298301			0.27	200	180	83	1	2
LW_CAR01	CARPENTER	12/10/02	12:25	2507209			0.37	280	320	71	4	5
LW_CAR01	CARPENTER	1/7/03	12:15	3027208			0.23	29	37	59	1 U	1 U
LW_CAR01	CARPENTER	1/28/03	11:50	3057208			0.29 J	43	72		1	2
LW_CAR01	CARPENTER	2/18/03	11:20	3087208			0.33	28	8		2	2
LW_CAR01	CARPENTER	3/19/03	9:50	3127208			0.30	3 J	1 J		1	2
LW_CAR01	CARPENTER	4/2/03	9:25	3147208			0.84	16 J	8 J		4	5
LW_CAR01	CARPENTER	4/22/03	9:35	3177208			6.30 J	5 J	2 J		1 U	2
LW_CAR01	CARPENTER	4/22/03	9:40	3177213			6.40 J	4 J	5 J		1	2
LW_CAR01	CARPENTER	5/28/03	9:20	3227208			2.40 J	51 J	33 J		1	3
LW_CAR01	CARPENTER	6/11/03	9:33	3247208			1.10 J				1 U	2
LW_CAR01	CARPENTER	1/28/04	10:15	4054956							11	12

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_OUT01	DAM OUTLET	12/10/02	11:38	2507213								
LW_OUT01	DAM OUTLET	1/7/03	11:30	3027212								
LW_OUT01	DAM OUTLET	1/28/03	11:15	3057212								
LW_OUT01	DAM OUTLET	2/18/03	10:45	3087212								
LW_OUT01	DAM OUTLET	3/19/03	10:35	3127212								
LW_OUT01	DAM OUTLET	4/2/03	10:00	3147212								
LW_OUT01	DAM OUTLET	4/22/03	10:15	3177212								
LW_OUT01	DAM OUTLET	5/28/03	10:25	3227212								
LW_OUT01	DAM OUTLET	6/11/03	10:15	3247212								
LW_OUT01	DAM OUTLET	7/16/03	10:20	3297212								
LW_OUT01	DAM OUTLET	8/20/03	10:50	3347212								
LW_OUT01	DAM OUTLET	9/24/03	10:15	3397212								
LW_EUC01	EUCLID CR	1/23/02	11:01	2049123			0.56 J					
LW_EUC01	EUCLID CR	2/13/02	8:43	2079123	5.320		0.22 J					
LW_EUC01	EUCLID CR	3/5/02	8:35	2109123			0.06 J					
LW_EUC01	EUCLID CR	3/5/02	8:37	2109129			0.05 UJ					
LW_EUC01	EUCLID CR	3/26/02	8:28	2139123			1.20					
LW_EUC01	EUCLID CR	4/14/02	18:10	2159123								
LW_EUC01	EUCLID CR	4/16/02	8:22	2169123			1.30					
LW_EUC01	EUCLID CR	5/7/02	0:00	2199123			1.30					
LW_EUC01	EUCLID CR	5/30/02	8:25	2229143			0.73					
LW_EUC01	EUCLID CR	6/19/02	8:24	2259123	5.570		0.13					
LW_EUC01	EUCLID CR	7/16/02	10:05	2298307			0.06 J	91 J	68 J	142	1	2
LW_EUC01	EUCLID CR	11/12/02	11:00	2467205			0.24	60	76	84	1 U	1 U
LW_EUC01	EUCLID CR	11/19/02	17:30	2478803				830	680	78	9	14
LW_EUC01	EUCLID CR	12/10/02	11:05	2507204			0.40	54	31	65	1 U	1 U
LW_EUC01	EUCLID CR	1/7/03	10:50	3027204			0.12	29	37 J	61	1 U	1 U
LW_EUC01	EUCLID CR	1/28/03	10:40	3057204			0.28 J	19 J	29 J		1	2
LW_EUC01	EUCLID CR	2/18/03	10:15	3087204			0.53	63	40		2	2
LW_EUC01	EUCLID CR	3/19/03	11:00	3127204			0.80	110	110		3	3
LW_EUC01	EUCLID CR	4/2/03	10:25	3147204			0.98	53	40		7	10
LW_EUC01	EUCLID CR	4/2/03	10:25	3147213			1.10	37	36		7	10
LW_EUC01	EUCLID CR	4/9/03	10:30	3158803				380	450	51	20	29
LW_EUC01	EUCLID CR	4/22/03	10:35	3177204			0.76	27 J	24 J		2	2
LW_EUC01	EUCLID CR	5/28/03	12:00	3227204			0.37	30	29		2	3
LW_EUC01	EUCLID CR	6/11/03	11:20	3247204			0.06	68	70 J		1 U	1 U
LW_EUC01	EUCLID CR	7/16/03	10:30	3297204			0.05 U	100	96		2	2
LW_EUC01	EUCLID CR	1/28/04	10:55	4054953							13	14
LW_AUS00	LW_AUS00	1/28/04	12:50	4054962								
LW_AUS00	LW_AUS00	1/28/04	12:50	4054963								
LW_LL11_0.3	SITE 1 - 0.3m	7/2/02	15:50	2298280								
LW_LL11_0.3	SITE 1 - 0.3m	7/15/02	12:35	2298316	1.650	1.630				40		
LW_LL11_0.3	SITE 1 - 0.3m	8/13/02	10:30	2338249	1.590	1.560				36		
LW_LL11_0.3	SITE 1 - 0.3m	8/13/02	10:35	2338275						35		
LW_LL11_0.3	SITE 1 - 0.3m	8/13/02	12:25	2338230								
LW_LL11_0.3	SITE 1 - 0.3m	9/5/02	10:55	2368280								
LW_LL11_0.3	SITE 1 - 0.3m	2/6/03	11:42	3077220								
LW_LL11_0.3	SITE 1 - 0.3m	4/3/03	11:00	3164082								

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_LL11_0.3	SITE 1 - 0.3m	5/8/03	10:30	3197220								
LW_LL11_0.3	SITE 1 - 0.3m	6/3/03	9:58	3247220								
LW_LL11_0.3	SITE 1 - 0.3m	7/10/03	9:45	3297220								
LW_LL11_0.3	SITE 1 - 0.3m	8/7/03	10:35	3327220								
LW_LL11_0.3	SITE 1 - 0.3m	9/4/03	10:02	3367220								
LW_LL11_10	Site 1 – 10m	7/2/02	15:30	2298281								
LW_LL11_10	Site 1 – 10m	8/13/02	12:35	2338232								
LW_LL11_10	Site 1 – 10m	9/5/02	12:00	2368282								
LW_LL11_10	Site 1 – 10m	2/6/03	10:52	3077221								
LW_LL11_10	Site 1 – 10m	4/3/03	10:49	3164081								
LW_LL11_10	Site 1 – 10m	5/8/03	10:00	3197221								
LW_LL11_10	Site 1 – 10m	6/3/03	9:40	3247221								
LW_LL11_10	Site 1 – 10m	7/10/03	9:34	3297221								
LW_LL11_10	Site 1 – 10m	8/7/03	9:50	3327221								
LW_LL11_10	Site 1 – 10m	9/4/03	9:53	3367221								
LW_LL11_15	Site 1 – 15m	7/15/02	12:55	2298318						42		
LW_LL11_15	Site 1 – 15m	8/13/02	10:45	2338251						41		
LW_LL11_15	Site 1 – 15m	6/10/03	10:45	3247239								
LW_LL11_15	Site 1 – 15m	7/15/03	11:00	3297239								
LW_LL11_15	Site 1 – 15m	8/19/03	10:34	3347239								
LW_LL11_15	Site 1 – 15m	9/24/03	11:35	3397239								
LW_LL11_20	Site 1 – 20m	7/2/02	15:04	2298282								
LW_LL11_20	Site 1 – 20m	8/13/02	12:40	2338233								
LW_LL11_20	Site 1 – 20m	9/5/02	11:20	2368283								
LW_LL11_20	Site 1 – 20m	2/6/03	11:14	3077222								
LW_LL11_20	Site 1 – 20m	4/3/03	10:19	3164080								
LW_LL11_20	Site 1 – 20m	5/8/03	9:45	3197222								
LW_LL11_20	Site 1 – 20m	6/3/03	9:25	3247222								
LW_LL11_20	Site 1 – 20m	7/10/03	9:20	3297222								
LW_LL11_20	Site 1 – 20m	8/7/03	10:20	3327222								
LW_LL11_20	Site 1 – 20m	9/4/03	9:55	3367222								
LW_LL11_5	Site 1 – 5m	7/15/02	12:45	2298317	1.670	1.650				42		
LW_LL11_5	Site 1 – 5m	8/13/02	10:40	2338250	1.590	1.570				36		
LW_LL22_0.3	Site 2 - 0.3m	7/2/02	13:10	2298283								
LW_LL22_0.3	Site 2 - 0.3m	7/15/02	14:00	2298319	1.720	1.710				37		
LW_LL22_0.3	Site 2 - 0.3m	8/8/02	12:15	2338234								
LW_LL22_0.3	Site 2 - 0.3m	8/13/02	12:00	2338252	1.620	1.600				37		
LW_LL22_0.3	Site 2 - 0.3m	9/5/02	13:50	2368284								
LW_LL22_0.3	Site 2 - 0.3m	2/6/03	12:59	3077223								
LW_LL22_0.3	Site 2 - 0.3m	4/3/03	12:00	3164083								
LW_LL22_0.3	Site 2 - 0.3m	5/8/03	12:30	3197223								
LW_LL22_0.3	Site 2 - 0.3m	6/3/03	10:50	3247223								
LW_LL22_0.3	Site 2 - 0.3m	7/10/03	10:40	3297223								
LW_LL22_0.3	Site 2 - 0.3m	8/7/03	12:15	3327223								
LW_LL22_0.3	Site 2 - 0.3m	9/4/03	11:07	3367223								
LW_LL22_10	Site 2 – 10m	7/2/02	12:55	2298284								
LW_LL22_10	Site 2 – 10m	8/8/02	12:25	2338236								

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_LL22_10	Site 2 – 10m	9/5/02	13:50	2368286								
LW_LL22_10	Site 2 – 10m	2/6/03	12:50	3077224								
LW_LL22_10	Site 2 – 10m	4/3/03	11:45	3164084								
LW_LL22_10	Site 2 – 10m	5/8/03	12:15	3197224								
LW_LL22_10	Site 2 – 10m	6/3/03	10:32	3247224								
LW_LL22_10	Site 2 – 10m	7/10/03	10:30	3297224								
LW_LL22_10	Site 2 – 10m	8/7/03	11:55	3327224								
LW_LL22_10	Site 2 – 10m	9/4/03	10:51	3367224								
LW_LL22_15	Site 2 – 15m	7/15/02	14:20	2298321						40		
LW_LL22_15	Site 2 – 15m	8/13/02	12:10	2338254						37		
LW_LL22_15	Site 2 – 15m	6/10/03	12:00	3247240								
LW_LL22_15	Site 2 – 15m	7/15/03	12:00	3297240								
LW_LL22_15	Site 2 – 15m	8/19/03	14:21	3347240								
LW_LL22_15	Site 2 – 15m	9/24/03	12:40	3397240								
LW_LL22_20	Site 2 – 20m	7/2/02	12:20	2298285								
LW_LL22_20	Site 2 – 20m	8/8/02	12:30	2338237								
LW_LL22_20	Site 2 – 20m	9/5/02	13:15	2368287								
LW_LL22_20	Site 2 – 20m	2/6/03	12:30	3077225								
LW_LL22_20	Site 2 – 20m	4/3/03	11:28	3164085								
LW_LL22_20	Site 2 – 20m	5/8/03	12:00	3197225								
LW_LL22_20	Site 2 – 20m	6/3/03	10:20	3247225								
LW_LL22_20	Site 2 – 20m	7/10/03	10:20	3297225								
LW_LL22_20	Site 2 – 20m	8/7/03	11:30	3327225								
LW_LL22_20	Site 2 – 20m	9/4/03	10:40	3367225								
LW_LL22_5	Site 2 – 5m	7/15/02	14:10	2298320	1.730	1.730				37		
LW_LL22_5	Site 2 – 5m	8/13/02	12:05	2338253	1.660	1.620				36		
LW_LL31_0.3	Site 3 - 0.3m	7/2/02	14:41	2298286								
LW_LL31_0.3	Site 3 - 0.3m	7/15/02	15:30	2298322	1.760	1.750				40		
LW_LL31_0.3	Site 3 - 0.3m	8/6/02	15:15	2338238								
LW_LL31_0.3	Site 3 - 0.3m	8/13/02	12:50	2338255	1.640	1.610				36		
LW_LL31_0.3	Site 3 - 0.3m	2/4/03	12:37	3077226								
LW_LL31_0.3	Site 3 - 0.3m	4/1/03	13:00	3164092								
LW_LL31_0.3	Site 3 - 0.3m	5/6/03	12:55	3197226								
LW_LL31_0.3	Site 3 - 0.3m	6/3/03	13:25	3247226								
LW_LL31_0.3	Site 3 - 0.3m	7/8/03	12:25	3297226								
LW_LL31_0.3	Site 3 - 0.3m	8/5/03	12:29	3327226								
LW_LL31_0.3	Site 3 - 0.3m	9/2/03	12:48	3367226								
LW_LL31_10	Site 3 – 10m	7/2/02	14:25	2298287								
LW_LL31_10	Site 3 – 10m	8/6/02	15:25	2338240								
LW_LL31_10	Site 3 – 10m	2/4/03	12:30	3077227								
LW_LL31_10	Site 3 – 10m	4/1/03	12:45	3164093								
LW_LL31_10	Site 3 – 10m	5/6/03	12:40	3197227								
LW_LL31_10	Site 3 – 10m	6/3/03	13:05	3247227								
LW_LL31_10	Site 3 – 10m	7/8/03	12:10	3297227								
LW_LL31_10	Site 3 – 10m	8/5/03	12:12	3327227								
LW_LL31_10	Site 3 – 10m	9/2/03	12:35	3367227								
LW_LL31_15	Site 3 – 15m	7/15/02	15:50	2298324						37		
LW_LL31_15	Site 3 – 15m	8/13/02	13:00	2338257						36		

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_LL31_15	Site 3 – 15m	6/10/03	13:20	3247241								
LW_LL31_15	Site 3 – 15m	7/15/03	13:40	3297241								
LW_LL31_15	Site 3 – 15m	8/19/03	13:35	3347241								
LW_LL31_15	Site 3 – 15m	9/24/03	14:20	3397241								
LW_LL31_20	Site 3 – 20m	7/2/02	14:10	2298288								
LW_LL31_20	Site 3 – 20m	8/6/02	15:28	2338241								
LW_LL31_20	Site 3 – 20m	2/4/03	12:40	3077228								
LW_LL31_20	Site 3 – 20m	4/1/03	12:37	3164094								
LW_LL31_20	Site 3 – 20m	5/6/03	12:30	3197228								
LW_LL31_20	Site 3 – 20m	6/3/03	12:55	3247228								
LW_LL31_20	Site 3 – 20m	7/8/03	12:00	3297228								
LW_LL31_20	Site 3 – 20m	8/5/03	12:20	3327228								
LW_LL31_20	Site 3 – 20m	9/2/03	12:19	3367228								
LW_LL31_5	Site 3 – 5m	7/15/02	15:40	2298323	1.760	1.750				39		
LW_LL31_5	Site 3 – 5m	8/13/02	12:55	2338256	1.650	1.610				37		
LW_LL31_80	Site 3 – 80m	7/2/02	13:35	2298289								
LW_LL31_80	Site 3 – 80m	8/6/02	14:50	2338242								
LW_LL31_80	Site 3 – 80m	2/4/03	13:44	3077229								
LW_LL31_80	Site 3 – 80m	4/1/03	12:20	3164095								
LW_LL31_80	Site 3 – 80m	5/6/03	12:08	3197229								
LW_LL31_80	Site 3 – 80m	6/3/03	12:25	3247229								
LW_LL31_80	Site 3 – 80m	7/8/03	11:40	3297229								
LW_LL31_80	Site 3 – 80m	8/5/03	11:37	3327229								
LW_LL31_80	Site 3 – 80m	9/2/03	11:53	3367229								
LW_LL32_0.3	Site 4 - 0.3m	7/2/02	12:34	2298290								
LW_LL32_0.3	Site 4 - 0.3m	7/15/02	16:42	2298325						41		
LW_LL32_0.3	Site 4 - 0.3m	7/15/02	16:44	2298328						39		
LW_LL32_0.3	Site 4 - 0.3m	8/6/02	12:10	2338243								
LW_LL32_0.3	Site 4 - 0.3m	8/13/02	14:00	2338258						36		
LW_LL32_0.3	Site 4 - 0.3m	9/3/02	12:56	2368293								
LW_LL32_0.3	Site 4 - 0.3m	2/6/03	14:46	3077230								
LW_LL32_0.3	Site 4 - 0.3m	4/1/03	11:48	3164086								
LW_LL32_0.3	Site 4 - 0.3m	5/6/03	11:23	3197230								
LW_LL32_0.3	Site 4 - 0.3m	6/3/03	11:36	3247230								
LW_LL32_0.3	Site 4 - 0.3m	7/8/03	11:06	3297230								
LW_LL32_0.3	Site 4 - 0.3m	8/5/03	10:56	3327230								
LW_LL32_0.3	Site 4 - 0.3m	9/2/03	10:55	3367230								
LW_LL32_10	Site 4 – 10m	7/2/02	12:18	2298292								
LW_LL32_10	Site 4 – 10m	8/6/02	12:22	2338245								
LW_LL32_10	Site 4 – 10m	9/3/02	13:06	2368295								
LW_LL32_10	Site 4 – 10m	2/6/03	13:55	3077232								
LW_LL32_10	Site 4 – 10m	4/1/03	11:38	3164087								
LW_LL32_10	Site 4 – 10m	5/6/03	11:14	3197232								
LW_LL32_10	Site 4 – 10m	6/3/03	10:30	3247232								
LW_LL32_10	Site 4 – 10m	7/8/03	10:08	3297232								
LW_LL32_10	Site 4 – 10m	8/5/03	9:56	3327232								
LW_LL32_10	Site 4 – 10m	9/2/03	9:55	3367232								
LW_LL32_15	Site 4 – 15m	7/15/02	16:50	2298327						41		

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_LL32_15	Site 4 – 15m	8/13/02	14:10	2338260						33		
LW_LL32_20	Site 4 – 20m	7/2/02	12:05	2298293								
LW_LL32_20	Site 4 – 20m	8/6/02	12:25	2338246								
LW_LL32_20	Site 4 – 20m	9/3/02	12:36	2368296								
LW_LL32_20	Site 4 – 20m	2/6/03	14:12	3077233								
LW_LL32_20	Site 4 – 20m	4/1/03	11:25	3164089								
LW_LL32_20	Site 4 – 20m	5/6/03	11:05	3197233								
LW_LL32_20	Site 4 – 20m	6/3/03	10:40	3247233								
LW_LL32_20	Site 4 – 20m	7/8/03	10:20	3297233								
LW_LL32_20	Site 4 – 20m	8/5/03	10:05	3327233								
LW_LL32_20	Site 4 – 20m	9/2/03	10:10	3367233								
LW_LL32_5	Site 4 – 5m	7/2/02	12:27	2298291								
LW_LL32_5	Site 4 – 5m	7/15/02	16:46	2298326						39		
LW_LL32_5	Site 4 – 5m	8/6/02	12:15	2338244								
LW_LL32_5	Site 4 – 5m	8/13/02	14:05	2338259						35		
LW_LL32_5	Site 4 – 5m	9/3/02	13:18	2368294								
LW_LL32_5	Site 4 – 5m	2/6/03	13:50	3077231								
LW_LL32_5	Site 4 – 5m	4/1/03	11:45	3164088								
LW_LL32_5	Site 4 – 5m	5/6/03	11:20	3197231								
LW_LL32_5	Site 4 – 5m	6/3/03	10:24	3247231								
LW_LL32_5	Site 4 – 5m	7/8/03	10:00	3297231								
LW_LL32_5	Site 4 – 5m	8/5/03	9:46	3327231								
LW_LL32_5	Site 4 – 5m	9/2/03	9:45	3367231								
LW_LL32_80	Site 4 - 80m	7/2/02	11:33	2298294								
LW_LL32_80	Site 4 - 80m	8/6/02	12:30	2338247								
LW_LL32_80	Site 4 - 80m	9/3/02	12:07	2368297								
LW_LL32_80	Site 4 - 80m	2/6/03	14:46	3077234								
LW_LL32_80	Site 4 - 80m	4/1/03	11:04	3164090								
LW_LL32_80	Site 4 - 80m	5/6/03	10:50	3197234								
LW_LL32_80	Site 4 - 80m	6/3/03	11:08	3247234								
LW_LL32_80	Site 4 - 80m	7/8/03	10:45	3297234								
LW_LL32_80	Site 4 - 80m	8/5/03	10:40	3327234								
LW_LL32_80	Site 4 - 80m	9/2/03	10:35	3367234								
LW_LL32_90	Site 4 – 90m	7/2/02	11:22	2298295								
LW_LL32_90	Site 4 – 90m	8/6/02	12:35	2338248								
LW_LL32_90	Site 4 – 90m	9/3/02	11:58	2368298								
LW_LL32_90	Site 4 – 90m	2/6/03	14:59	3077235								
LW_LL32_90	Site 4 – 90m	4/1/03	10:55	3164091								
LW_LL32_90	Site 4 – 90m	5/6/03	10:40	3197235								
LW_LL32_90	Site 4 – 90m	6/3/03	11:14	3247235								
LW_LL32_90	Site 4 – 90m	7/8/03	11:05	3297235								
LW_LL32_90	Site 4 – 90m	8/5/03	10:56	3327235								
LW_LL32_90	Site 4 – 90m	9/2/03	10:45	3367235								
LW_MIL01	MILL WHEEL	1/23/02	10:50	2049124			0.79 J					
LW_MIL01	MILL WHEEL	2/13/02	8:55	2079124	6.280		0.65					
LW_MIL01	MILL WHEEL	3/5/02	8:45	2109124			0.37 J					
LW_MIL01	MILL WHEEL	3/26/02	8:42	2139124			1.80					
LW_MIL01	MILL WHEEL	4/16/02	8:30	2169124			2.10					

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_MIL01	MILL WHEEL	5/7/02	0:00	2199124			3.00					
LW_MIL01	MILL WHEEL	5/7/02	0:00	2199129			3.00					
LW_MIL01	MILL WHEEL	5/30/02	8:35	2229144			27.10					
LW_MIL01	MILL WHEEL	6/19/02	8:40	2259124	5.880		5.80 J					
LW_MIL01	MILL WHEEL	8/14/02	10:25	2338270				2000 J	1700 J			
LW_MIL01	MILL WHEEL	12/10/02	11:20	2507205			9.30	260	210	113	13	17
LW_MIL01	MILL WHEEL	1/7/03	11:15	3027205			2.70	250	140	80	2	2
LW_MIL01	MILL WHEEL	1/28/03	11:10	3057205			1.20 J	88 J	74 J		3	4
LW_MIL01	MILL WHEEL	2/18/03	10:25	3087205			1.90	100	120		3	4
LW_MIL01	MILL WHEEL	2/18/03	10:30	3087213			2.00	130	84		3	4
LW_MIL01	MILL WHEEL	3/19/03	10:50	3127205			2.00	92	77		4	5
LW_MIL01	MILL WHEEL	4/2/03	10:15	3147205			2.10	340	340 J		3	4
LW_MIL01	MILL WHEEL	4/22/03	10:25	3177205			2.80	220 J	220 J		3	4
LW_MIL01	MILL WHEEL	5/28/03	11:40	3227205			4.60	210 J	320 J		3	4
LW_MIL01	MILL WHEEL	1/28/04	10:50	4054954							14	17
LW_OLS01	OLSEN CR	1/23/02	10:11	2049127			0.26 J					
LW_OLS01	OLSEN CR	2/13/02	9:50	2079127	5.710		0.37					
LW_OLS01	OLSEN CR	3/5/02	9:26	2109127			0.05 UJ					
LW_OLS01	OLSEN CR	3/26/02	9:21	2139127			0.64					
LW_OLS01	OLSEN CR	4/16/02	9:05	2169127			1.30					
LW_OLS01	OLSEN CR	5/7/02	0:00	2199127			1.20					
LW_OLS01	OLSEN CR	5/30/02	9:15	2229147			2.30					
LW_OLS01	OLSEN CR	6/19/02	9:28	2259127	5.070		1.60					
LW_OLS01	OLSEN CR	7/16/02	11:40	2298302			0.55	49	37	65	1 U	2
LW_OLS01	OLSEN CR	8/14/02	11:20	2338263			0.30	140	100	80	1 U	1 U
LW_OLS01	OLSEN CR	9/17/02	11:50	2388282			0.63 J	130	140		1 U	1 U
LW_OLS01	OLSEN CR	10/15/02	13:00	2428083			0.16	5	11	91	1 U	1 U
LW_OLS01	OLSEN CR	11/12/02	12:45	2467210			1.30	31	16	91	5	7
LW_OLS01	OLSEN CR	11/19/02	17:30	2478801				230	250	67	147	225
LW_OLS01	OLSEN CR	12/10/02	12:40	2507210			0.31	9	19	76	1 U	1 U
LW_OLS01	OLSEN CR	1/7/03	12:40	3027209			0.70	3	4	50	1 U	1 U
LW_OLS01	OLSEN CR	1/7/03	12:45	3027210			0.69	3	2	51	1 U	1
LW_OLS01	OLSEN CR	1/28/03	12:10	3057209			1.10 J	1 U	1		5	7
LW_OLS01	OLSEN CR	2/18/03	11:30	3087209			0.89	1 U	1 U		1	2
LW_OLS01	OLSEN CR	3/19/03	9:40	3127209			0.82	6 J	3 J		1	2
LW_OLS01	OLSEN CR	4/2/03	9:10	3147209			0.85	29 J	26 J		5	6
LW_OLS01	OLSEN CR	4/8/03	17:00	3158816			0.38	3	1 U	45	2	3
LW_OLS01	OLSEN CR	4/8/03	19:30	3158817							1	2
LW_OLS01	OLSEN CR	4/8/03	21:45	3158818				12	9	42	1	2
LW_OLS01	OLSEN CR	4/8/03	23:30	3158819							10	14
LW_OLS01	OLSEN CR	4/9/03	1:30	3158820				82	52	46	10	13
LW_OLS01	OLSEN CR	4/9/03	8:45	3158821							8	10
LW_OLS01	OLSEN CR	4/9/03	11:00	3158822				10	13	39	2	3
LW_OLS01	OLSEN CR	4/9/03	12:30	3158827			0.66				5	6
LW_OLS01	OLSEN CR	4/22/03	9:25	3177209			0.69 J	2 J	5 J		1	2
LW_OLS01	OLSEN CR	5/28/03	8:55	3227209			1.10 J	52 J	80 J		1	3
LW_OLS01	OLSEN CR	6/11/03	9:20	3247209			0.74 J	51 J	45 J		1	2
LW_OLS01	OLSEN CR	7/16/03	9:10	3297209			0.42	110 J	110 J		1 U	1

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_OLS01	OLSEN CR	8/20/03	9:40	3347209			0.21 J	75 J	60 J		1 U	1
LW_OLS01	OLSEN CR	8/20/03	9:45	3347213			0.28 J	96 J	85 J		1 U	1 U
LW_OLS01	OLSEN CR	9/24/03	9:45	3397209			0.31	160	160		4	5
LW_OLS01	OLSEN CR	1/28/04	9:55	4054957							113	120
LW_PAR01	PARK PL	7/16/02	10:35	2298309				480 J	340 J			
LW_PAR01	PARK PL	8/14/02	10:30	2338271				9	29			
LW_PAR01	PARK PL	9/17/02	11:10	2388290				140	130			
LW_PAR01	PARK PL	10/15/02	11:15	2428090				56 J	61 J			
LW_PAR01	PARK PL	11/12/02	11:50	2467207				300	360			
LW_PAR01	PARK PL	12/10/02	11:45	2507206				240	370			
LW_PAR01	PARK PL	1/7/03	11:35	3027206				840 J	860 J			
LW_PAR01	PARK PL	1/28/03	11:20	3057206				550 J	490 J			
LW_PAR01	PARK PL	2/18/03	10:55	3087206				160	180			
LW_PAR01	PARK PL	3/19/03	10:30	3127206				43	69			
LW_PAR01	PARK PL	4/2/03	9:55	3147206				190	160			
LW_PAR01	PARK PL	4/22/03	10:10	3177206				560 J	1100 J			
LW_PAR01	PARK PL	5/28/03	10:15	3227206				54 J	120 J			
LW_PAR01	PARK PL	6/11/03	9:55	3247206				180	210			
LW_PAR01	PARK PL	7/16/03	9:55	3297206				1600 J	1200 J			
LW_PAR01	PARK PL	8/20/03	10:37	3347206				100 J	120 J			
LW_PAR01	PARK PL	9/24/03		3397206				5000 J	3500 J			
LW_RAIN	RAIN	10/20/03	6:30	3434015								
LW_RAIN	RAIN	1/28/04	0:15	4054960								
LW_SIL01	SILVER BCH CK	1/23/02	10:48	2049125			0.86 J					
LW_SIL01	SILVER BCH CK	2/13/02	9:27	2079125	6.110		1.50					
LW_SIL01	SILVER BCH CK	3/5/02	9:00	2109125			0.29 J					
LW_SIL01	SILVER BCH CK	3/26/02	8:55	2139125			3.50					
LW_SIL01	SILVER BCH CK	3/26/02	8:56	2139129			2.80					
LW_SIL01	SILVER BCH CK	4/16/02	8:36	2169125			3.60					
LW_SIL01	SILVER BCH CK	5/7/02	0:00	2199125			4.10					
LW_SIL01	SILVER BCH CK	5/30/02	8:50	2229145			7.40					
LW_SIL01	SILVER BCH CK	6/19/02	9:00	2259125	7.160		1.40					
LW_SIL01	SILVER BCH CK	7/16/02	10:50	2298300			1.20 J	290	290	179	5	8
LW_SIL01	SILVER BCH CK	8/14/02	10:45	2338261			2.80	980	1600	183	16	26
LW_SIL01	SILVER BCH CK	9/17/02	11:20	2388280			1.80 J	1000	1500		2	5
LW_SIL01	SILVER BCH CK	10/15/02	11:30	2428080			0.53	670	630	188	1	2
LW_SIL01	SILVER BCH CK	11/12/02	12:20	2467208			2.10	2200	2400	147	6	10
LW_SIL01	SILVER BCH CK	12/10/02	11:50	2507208			1.50	870	800	152	3	4
LW_SIL01	SILVER BCH CK	12/10/02	11:55	2507207			1.00	730	970	150	6	10
LW_SIL01	SILVER BCH CK	1/7/03	11:50	3027207			1.00	85	92	114	2	2
LW_SIL01	SILVER BCH CK	1/28/03	11:30	3057207			0.96 J	41 J	92 J		1	2
LW_SIL01	SILVER BCH CK	2/18/03	11:10	3087207			1.90	55	48		2	3
LW_SIL01	SILVER BCH CK	3/19/03	10:10	3127207			1.80	84	110		4	5
LW_SIL01	SILVER BCH CK	4/2/03	9:40	3147207			1.40	47	45		3	5
LW_SIL01	SILVER BCH CK	4/9/03	10:00	3158802				510 J	710 J	81	9	12
LW_SIL01	SILVER BCH CK	4/22/03	9:50	3177207			2.70 J	300 J	300 J		2	3
LW_SIL01	SILVER BCH CK	5/28/03	8:45	3227214				1100 J	2100 J			
LW_SIL01	SILVER BCH CK	5/28/03	9:45	3227207			1.30 J	190 J	330 J		4	6

Table C-2. Results of Sampling and Laboratory Analysis, Part 2.

Station ID	Station	Date	Time	Sample ID	Si mg/L	D-Si mg/L	Chlorophyll-*a* µg/L	E. coli #/100mL	Fecal Coli. #/100mL	TDS mg/L	TNVSS mg/L	TSS mg/L
LW_SIL01	SILVER BCH CK	6/11/03	9:45	3247207			2.30	3000 J	3500 J		2	3
LW_SIL01	SILVER BCH CK	6/11/03	9:50	3247214				2200 J	3200 J			
LW_SIL01	SILVER BCH CK	7/16/03	9:40	3297207			1.20	3300 J	2800 J		3	5
LW_SIL01	SILVER BCH CK	7/16/03	9:40	3297213			1.30	3400 J	2800 J		4	5
LW_SIL01	SILVER BCH CK	8/20/03	10:15	3347207			0.96	900	1000 J		2	4
LW_SIL01	SILVER BCH CK	9/24/03	10:05	3397207			3.80	710	610		5	8
LW_SIL01	SILVER BCH CK	1/28/04	10:30	4054955							21	24
LW_SMI01	SMITH CR	1/23/02	9:58	2049128			0.31 J					
LW_SMI01	SMITH CR	2/13/02	10:05	2079128	5.830		0.23 J					
LW_SMI01	SMITH CR	3/5/02	9:37	2109128			0.05 UJ					
LW_SMI01	SMITH CR	3/26/02	9:38	2139128			0.52					
LW_SMI01	SMITH CR	4/16/02	9:15	2169128			0.77					
LW_SMI01	SMITH CR	5/7/02	0:00	2199128			0.47					
LW_SMI01	SMITH CR	5/30/02	9:25	2229148			0.86					
LW_SMI01	SMITH CR	5/30/02	9:25	2229149			0.86					
LW_SMI01	SMITH CR	6/19/02	9:40	2259128	4.790		1.30 J					
LW_SMI01	SMITH CR	7/16/02	12:20	2298303			0.82	44	57	54	1 U	1
LW_SMI01	SMITH CR	8/14/02	11:40	2338264			0.71	84	47	56	1 U	1 U
LW_SMI01	SMITH CR	9/17/02	12:30	2388283			0.33 J	40	31		1 U	1 U
LW_SMI01	SMITH CR	10/15/02	12:45	2428084			0.28	13	5	67	1 U	1 U
LW_SMI01	SMITH CR	11/12/02	13:10	2467211			2.10	44	26	81	2	4
LW_SMI01	SMITH CR	11/19/02	17:30	2478800				63	43	61	16	23
LW_SMI01	SMITH CR	12/10/02	13:05	2507211			0.50	14	20	52	1 U	1 U
LW_SMI01	SMITH CR	1/7/03	13:00	3027211			0.47	1	1	52	1 U	1
LW_SMI01	SMITH CR	1/28/03	12:20	3057211			0.71 J	5	5		8	9
LW_SMI01	SMITH CR	2/18/03	11:50	3087211			0.56	1	3		1	2
LW_SMI01	SMITH CR	3/19/03	9:00	3127211			1.10 J	13 J	6 J		1	2
LW_SMI01	SMITH CR	4/2/03	8:45	3147211			0.58 J	1 UJ	1 J		5	7
LW_SMI01	SMITH CR	4/8/03	23:45	3158804			1.80	22	23	40	8	11
LW_SMI01	SMITH CR	4/9/03	1:15	3158805							4	7
LW_SMI01	SMITH CR	4/9/03	2:30	3158806				25 J	23 J	40	5	8
LW_SMI01	SMITH CR	4/9/03	3:45	3158807							1	3
LW_SMI01	SMITH CR	4/9/03	6:15	3158808				4 J	3 J	41	2	4
LW_SMI01	SMITH CR	4/9/03	9:30	3158809							1 U	1
LW_SMI01	SMITH CR	4/9/03	11:30	3158810				1	1	41	1	1
LW_SMI01	SMITH CR	4/9/03	13:00	3158815			0.55				1	2
LW_SMI01	SMITH CR	4/22/03	9:15	3177211			0.63 J	1 UJ	1 UJ		2	3
LW_SMI01	SMITH CR	5/28/03	8:20	3227211			0.90 J	27 J	35 J		2	2
LW_SMI01	SMITH CR	6/11/03	8:55	3247211			0.99 J	84 J	79 J		1 U	1
LW_SMI01	SMITH CR	7/16/03	8:55	3297211			0.77	120 J	110 J		3	5
LW_SMI01	SMITH CR	8/20/03	9:15	3347211				200 J	180 J			
LW_SMI01	SMITH CR	9/24/03	9:00	3397211			0.49 J	69 J	96 J		1	2
LW_SMI01	SMITH CR	9/24/03	9:00	3397213			0.63 J	74 J	15 J		1 U	1 U
LW_SMI01	SMITH CR	1/28/04	9:32	4054958							67	72

Abbreviations: Si = Unfiltered Silicon; D-Si = Dissolved Silicon; BOD = Biochemical Oxygen Demand; TDS = Total Dissolved Solids; TNVSS = Total Nonvolatile Suspended Solids; TSS = Total Suspended Solids; mg/L = milligrams per liter; µg/L = micrograms per liter; #/100mL = count per one hundred milliliters;
Data Qualifiers: J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was not detected at or above the reported sample quantitation limit.

Table C-3. Biochemical Oxygen Demand – 5-day and Ultimate.

Station ID	Station	Sampling Date	BOD5[1] (mg/l)	BODU[2] (mg/l)	BOD35[3] (mg/l)	k[4]
LW_EUC01	EUCLID CR	5/7/2002	0.70	1.53	1.58	0.11
LW_EUC01	EUCLID CR	7/16/2002	0.60	1.80	1.78	0.11
LW_EUC01	EUCLID CR	1/28/2003	0.23	1.43	1.19	0.04
LW_EUC01	EUCLID CR	3/19/2003	0.19	1.26	0.83	0.03
LW_EUC01	EUCLID CR	5/28/2003	0.25	1.38	1.04	0.04
LW_SIL01	SILVER BCH CK	5/7/2002	0.82	2.17	2.18	0.09
LW_SIL01	SILVER BCH CK	7/16/2002	0.83	2.21	2.20	0.08
LW_SIL01	SILVER BCH CK	1/28/2003	0.38	2.20	1.58	0.04
LW_SIL01	SILVER BCH CK	3/19/2003	0.39	2.12	1.39	0.03
LW_SIL01	SILVER BCH CK	5/28/2003	0.70	2.40	2.17	0.06
LW_SMI01	SMITH CR	5/7/2002	0.28	0.85	0.80	0.06
LW_SMI01	SMITH CR	5/7/2002	0.26	0.75	0.72	0.07
LW_SMI01	SMITH CR	7/16/2002	0.27	0.82	0.81	0.06
LW_SMI01	SMITH CR	7/16/2002	0.25	0.76	0.79	0.06
LW_SMI01	SMITH CR	1/28/2003	0.07	1.05	0.68	0.03
LW_SMI01	SMITH CR	1/28/2003	0.06	1.03	0.81	0.05
LW_SMI01	SMITH CR	3/19/2003	0.15	0.76	0.57	0.05
LW_SMI01	SMITH CR	3/19/2003	0.12	0.75	0.55	0.04
LW_SMI01	SMITH CR	5/28/2003	0.29	1.39	1.10	0.05
LW_SMI01	SMITH CR	5/28/2003	0.28	1.25	1.04	0.05
LW1_15	Site 1 – 15m	8/13/2002	0.59	1.28	1.18	0.07
LW1_15	Site 1 – 15m	8/13/2002	0.64	1.15	0.94	0.08
LW2_15	Site 2 – 15m	8/13/2002	0.43	2.21	1.12	0.02
LW3_15	Site 3 – 15m	8/13/2002	0.22	1.38	0.99	0.03
LW1_15	Site 1 – 15m	6/10/2003	0.33	0.98	0.93	0.07
LW2_15	Site 2 – 15m	6/10/2003	0.31	0.87	0.84	0.08
LW3_15	Site 3 – 15m	6/10/2003	0.28	0.75	0.76	0.07
LW3_15	Site 3 – 15m	6/10/2003	0.27	0.77	0.75	0.06
LW1_15	Site 1 – 15m	7/15/2003	0.24	0.92	0.89	0.07
LW2_15	Site 2 – 15m	7/15/2003	0.07	1.03	0.79	0.04
LW3_15	Site 3 – 15m	7/15/2003	0.08	1.66	0.98	0.02
LW3_15	Site 3 – 15m	7/15/2003	0.04	1.61	0.95	0.02
LW1_15	Site 1 – 15m	8/19/2003	0.26	1.56	1.06	0.03
LW2_15	Site 2 – 15m	8/19/2003	0.45	1.56	1.41	0.06
LW3_15	Site 3 – 15m	8/19/2003	0.26	1.62	1.01	0.03
LW3_15	Site 3 – 15m	8/19/2003	0.24	1.61	0.97	0.03
LW1_15	Site 1 – 15m	9/23/2003	0.60	1.53	1.48	0.09
LW2_15	Site 2 – 15m	9/23/2003	0.16	1.69	1.48	0.02
LW3_15	Site 3 – 15m	9/23/2003	0.08	1.69	1.06	0.06
LW3_15	Site 3 – 15m	9/23/2003	0.16	1.90	1.27	0.06

[1] Biochemical Oxygen Demand – 5 day
[2] Biochemical Oxygen Demand – Ultimate
[3] Biochemical Oxygen Demand – 35 day
[4] Biochemical Oxygen Demand decay coefficient (bottle)

Table C-4. Profile Site Depths and Secchi Depths.

Date	Site ID	Measured Site Depth (m)	Secchi Depth (m)
7/15/2002	LW_1	26.1	5
7/15/2002	LW_2	18.5	5.1
7/15/2002	LW_3	>40	6
7/15/2002	LW_4	>40	5.9
8/13/2002	LW_1	25.0	6
8/13/2002	LW_2	16.9	5.5
8/13/2002	LW_3	>46	6.2
8/13/2002	LW_4	>40	6.1
9/16/2002	LW_1	22.3	3.5
9/16/2002	LW_2	19.7	5.5
9/16/2002	LW_3	86.0	5
9/16/2002	LW_4	109.7	6.2
9/16/2002	LW_GenevaSill	3.0	3
9/16/2002	LW_StrawberrySill	9.0	5
5/27/2003	LW_1	19.5	7
5/27/2003	LW_2	20.0	6
5/27/2003	LW_3	>48.8	6
5/27/2003	LW_GenevaSill	3.8	Na
5/27/2003	LW_StrawberrySill	9.5	Na
6/10/2003	LW_1	19.5	5.8
6/10/2003	LW_2	18.0	6.5
6/10/2003	LW_3	>48	5.9
6/10/2003	LW_GenevaSill	5.2	Na
6/10/2003	LW_StrawberrySill	6.0	Na
7/15/2003	LW_1	20.4	5.5
7/15/2003	LW_2	21.5	6.5
7/15/2003	LW_3	>48.2	7
7/15/2003	LW_GenevaSill	3.5	Na
7/15/2003	LW_StrawberrySill	9.0	Na
8/19/2003	LW_1	18.3	3.8
8/19/2003	LW_2	18.0	5
8/19/2003	LW_3	>49.2	
8/19/2003	LW_GenevaSill	2.0	Na
8/19/2003	LW_StrawberrySill	6.0	Na
9/23/2003	LW_1	18.6	3.7
9/23/2003	LW_2	17.5	6.3
9/23/2003	LW_3	82.6	6.2
9/23/2003	LW_GenevaSill	3.0	Na
9/23/2003	LW_StrawberrySill	8.2	Na

Table C-5. Light Profile Data.

Site	Date	Time	Depth (m)	Light (µmol/sec/m^2)
LW_2	8/13/2002		0.0	1200
LW_2	8/13/2002	12:25	0.5	1100
LW_2	8/13/2002	12:26	1.0	1000
LW_2	8/13/2002		1.5	800.0
LW_2	8/13/2002	12:27	2.0	700.0
LW_2	8/13/2002		2.5	500.0
LW_2	8/13/2002	12:29	3.0	450.0
LW_2	8/13/2002		3.5	370.0
LW_2	8/13/2002	12:30	4.0	320.0
LW_2	8/13/2002		4.5	300.0
LW_2	8/13/2002	12:32	5.0	250.0
LW_2	8/13/2002		5.5	200.0
LW_2	8/13/2002	12:34	6.0	170.0
LW_2	8/13/2002		6.5	130.0
LW_2	8/13/2002	12:35	7.0	115.0
LW_3	8/13/2002		0.0	1300
LW_3	8/13/2002	13:05	0.5	1100
LW_3	8/13/2002	13:06	1.0	900.0
LW_3	8/13/2002		1.5	750.0
LW_3	8/13/2002	13:07	2.0	700.0
LW_3	8/13/2002		2.5	570.0
LW_3	8/13/2002	13:08	3.0	520.0
LW_3	8/13/2002		3.5	450.0
LW_3	8/13/2002	13:09	4.0	350.0
LW_3	8/13/2002		4.5	300.0
LW_3	8/13/2002	13:10	5.0	250.0
LW_3	8/13/2002		5.5	200.0
LW_3	8/13/2002	13:11	6.0	180.0
LW_3	8/13/2002		6.5	150.0
LW_3	8/13/2002	13:12	7.0	145.0
LW_1	5/27/2003	11:20	0.0	1400
LW_1	5/27/2003	11:21	0.5	1100
LW_1	5/27/2003	11:22	1.0	1000
LW_1	5/27/2003	11:23	1.5	800.0
LW_1	5/27/2003	11:24	2.0	700.0
LW_1	5/27/2003	11:25	2.5	530.0
LW_1	5/27/2003	11:26	3.0	480.0
LW_1	5/27/2003	11:27	3.5	420.0
LW_1	5/27/2003	11:28	4.0	370.0
LW_1	5/27/2003	11:29	4.5	300.0
LW_1	5/27/2003	11:30	5.0	240.0
LW_1	5/27/2003	11:31	5.5	170.0
LW_1	5/27/2003	11:32	6.0	145.0
LW_1	5/27/2003	11:33	6.5	140.0
LW_1	5/27/2003	11:34	7.0	115.0
LW_1	5/27/2003	11:35	7.5	100.0
LW_1	5/27/2003	11:36	8.0	74.00
LW_1	5/27/2003	11:37	8.5	60.00
LW_1	5/27/2003	11:38	9.0	54.00
LW_1	5/27/2003	11:39	9.5	45.00
LW_1	5/27/2003	11:40	10.0	43.00

Table C-5. Light Profile Data.

Site	Date	Time	Depth (m)	Light (µmol/sec/m^2)
LW_2	5/27/2003	12:30	0.0	1300
LW_2	5/27/2003	12:31	0.5	980.0
LW_2	5/27/2003	12:32	1.0	763.3
LW_2	5/27/2003	12:33	1.5	622.7
LW_2	5/27/2003	12:34	2.0	455.8
LW_2	5/27/2003	12:35	2.5	433.0
LW_2	5/27/2003	12:36	3.0	378.0
LW_2	5/27/2003	12:37	3.5	306.1
LW_2	5/27/2003	12:38	4.0	275.0
LW_2	5/27/2003	12:39	4.5	248.5
LW_2	5/27/2003	12:40	5.0	201.8
LW_2	5/27/2003	12:41	5.5	175.6
LW_2	5/27/2003	12:42	6.0	153.8
LW_2	5/27/2003	12:43	6.5	116.0
LW_2	5/27/2003	12:44	7.0	108.9
LW_2	5/27/2003	12:45	7.5	93.30
LW_2	5/27/2003	12:46	8.0	71.68
LW_2	5/27/2003	12:47	8.5	62.67
LW_2	5/27/2003	12:48	9.0	50.83
LW_2	5/27/2003	12:49	9.5	44.12
LW_2	5/27/2003	12:50	10.0	42.12
LW_3	5/27/2003	14:00	0.0	1674
LW_3	5/27/2003	14:01	0.5	1201
LW_3	5/27/2003	14:02	1.0	812.6
LW_3	5/27/2003	14:03	1.5	662.6
LW_3	5/27/2003	14:04	2.0	497.3
LW_3	5/27/2003	14:05	2.5	455.8
LW_3	5/27/2003	14:06	3.0	450.1
LW_3	5/27/2003	14:07	3.5	403.1
LW_3	5/27/2003	14:08	4.0	321.5
LW_3	5/27/2003	14:09	4.5	284.2
LW_3	5/27/2003	14:10	5.0	270.6
LW_3	5/27/2003	14:11	5.5	252.8
LW_3	5/27/2003	14:12	6.0	201.0
LW_3	5/27/2003	14:13	6.5	169.0
LW_3	5/27/2003	14:14	7.0	146.5
LW_3	5/27/2003	14:15	7.5	125.2
LW_3	5/27/2003	14:16	8.0	111.8
LW_3	5/27/2003	14:17	8.5	81.42
LW_3	5/27/2003	14:18	9.0	57.91
LW_3	5/27/2003	14:19	9.5	55.88
LW_3	5/27/2003	14:20	10.0	43.20

Table C-5. Light Profile Data.

Site	Date	Time	Depth (m)	Light (µmol/sec/m^2)
LW_1	6/10/2003	10:45	0.0	150.5
LW_1	6/10/2003	10:46	0.5	127.4
LW_1	6/10/2003	10:47	1.0	136.0
LW_1	6/10/2003	10:48	1.5	131.4
LW_1	6/10/2003	10:49	2.0	116.7
LW_1	6/10/2003	10:50	2.5	98.03
LW_1	6/10/2003	10:51	3.0	77.85
LW_1	6/10/2003	10:52	3.5	73.20
LW_1	6/10/2003	10:53	4.0	56.65
LW_1	6/10/2003	10:54	4.5	51.38
LW_1	6/10/2003	10:55	5.0	44.04
LW_1	6/10/2003	10:56	5.5	36.77
LW_1	6/10/2003	10:57	6.0	30.93
LW_1	6/10/2003	10:58	6.5	27.00
LW_1	6/10/2003	10:59	7.0	22.54
LW_1	6/10/2003	11:00	7.5	18.51
LW_1	6/10/2003	11:01	8.0	14.97
LW_1	6/10/2003	11:02	8.5	12.00
LW_2	6/10/2003	12:00	0.0	540.1
LW_2	6/10/2003	12:02	0.5	365.1
LW_2	6/10/2003	12:03	1.0	320.8
LW_2	6/10/2003	12:04	1.5	251.7
LW_2	6/10/2003	12:05	2.0	201.7
LW_2	6/10/2003	12:06	2.5	199.8
LW_2	6/10/2003	12:07	3.0	168.7
LW_2	6/10/2003	12:08	3.5	134.9
LW_2	6/10/2003	12:09	4.0	113.8
LW_2	6/10/2003	12:10	4.5	97.96
LW_2	6/10/2003	12:11	5.0	76.08
LW_2	6/10/2003	12:12	5.5	67.78
LW_2	6/10/2003	12:13	6.0	57.57
LW_2	6/10/2003	12:14	6.5	50.73
LW_2	6/10/2003	12:15	7.0	44.49
LW_2	6/10/2003	12:16	7.5	38.62
LW_3	6/10/2003	13:20	0.0	244.1
LW_3	6/10/2003	13:22	0.5	154.3
LW_3	6/10/2003	13:23	1.0	113.6
LW_3	6/10/2003	13:24	1.5	67.45
LW_3	6/10/2003	13:25	2.0	54.54
LW_3	6/10/2003	13:26	2.5	54.83
LW_3	6/10/2003	13:27	3.0	51.42
LW_3	6/10/2003	13:28	3.5	46.43
LW_3	6/10/2003	13:29	4.0	41.86
LW_3	6/10/2003	13:30	4.5	38.54
LW_3	6/10/2003	13:31	5.0	34.77
LW_3	6/10/2003	13:32	5.5	30.10
LW_3	6/10/2003	13:33	6.0	26.63
LW_3	6/10/2003	13:34	6.5	23.54
LW_3	6/10/2003	13:35	7.0	18.14
LW_3	6/10/2003	13:36	7.5	17.42
LW_3	6/10/2003	13:37	8.0	15.14
LW_3	6/10/2003	13:38	8.5	13.40
LW_3	6/10/2003	13:39	9.0	11.55

Table C-5. Light Profile Data.

Site	Date	Time	Depth (m)	Light (µmol/sec/m^2)
LW_1	7/15/2003	14:33	0.0	1955
LW_1	7/15/2003	14:34	0.5	1400
LW_1	7/15/2003	14:35	1.0	1244
LW_1	7/15/2003	14:36	1.5	871.4
LW_1	7/15/2003	14:37	2.0	755.5
LW_1	7/15/2003	14:38	3.0	546.7
LW_1	7/15/2003	14:39	4.0	367.3
LW_1	7/15/2003	14:40	5.0	244.9
LW_1	7/15/2003	14:41	6.0	172.1
LW_1	7/15/2003	14:42	7.0	99.92
LW_1	7/15/2003	14:43	8.0	78.22
LW_1	7/15/2003	14:44	9.0	46.89
LW_1	7/15/2003	14:45	10.0	30.76
LW_1	7/15/2003	14:46	11.0	17.39
LW_2	7/15/2003	11:56	0.0	2019
LW_2	7/15/2003	11:58	0.5	1223
LW_2	7/15/2003	11:59	1.0	999.2
LW_2	7/15/2003	12:00	1.5	901.0
LW_2	7/15/2003	12:01	2.0	755.6
LW_2	7/15/2003	12:02	2.5	744.4
LW_2	7/15/2003	12:03	3.0	644.5
LW_2	7/15/2003	12:04	3.5	572.1
LW_2	7/15/2003	12:05	4.0	482.9
LW_2	7/15/2003	12:06	4.5	345.6
LW_2	7/15/2003	12:07	5.0	349.6
LW_2	7/15/2003	12:08	6.0	254.8
LW_2	7/15/2003	12:09	7.0	190.4
LW_2	7/15/2003	12:10	8.0	142.0
LW_2	7/15/2003	12:11	9.0	109.0
LW_2	7/15/2003	12:12	10.0	85.37
LW_2	7/15/2003	12:13	11.0	63.66
LW_3	7/15/2003	13:20	0.0	2259
LW_3	7/15/2003	13:22	0.5	1451
LW_3	7/15/2003	13:23	1.0	1195
LW_3	7/15/2003	13:24	1.5	1072
LW_3	7/15/2003	13:25	2.0	826.2
LW_3	7/15/2003	13:27	3.0	644.9
LW_3	7/15/2003	13:29	4.0	469.8
LW_3	7/15/2003	13:31	5.0	378.1
LW_3	7/15/2003	13:33	6.0	293.2
LW_3	7/15/2003	13:35	7.0	216.4
LW_3	7/15/2003	13:37	8.0	162.2
LW_3	7/15/2003	13:39	9.0	109.4
LW_3	7/15/2003	13:40	10.0	80.25
LW_3	7/15/2003	13:41	11.0	60.53

Table C-5. Light Profile Data.

Site	Date	Time	Depth (m)	Light (µmol/sec/m^2)
LW_1	8/19/2003	15:41	0.0	1677
LW_1	8/19/2003	15:42	0.5	851.7
LW_1	8/19/2003	15:43	1.0	665.2
LW_1	8/19/2003	15:44	2.0	410.1
LW_1	8/19/2003	15:45	3.0	239.2
LW_1	8/19/2003	15:46	4.0	167.6
LW_1	8/19/2003	15:47	5.0	150.1
LW_1	8/19/2003	15:48	6.0	77.15
LW_1	8/19/2003	15:49	7.0	51.00
LW_1	8/19/2003	15:50	8.0	29.80
LW_1	8/19/2003	15:51	9.0	17.81
LW_2	8/19/2003	14:45	0.0	1890
LW_2	8/19/2003	14:46	0.5	1457
LW_2	8/19/2003	14:47	1.0	1165
LW_2	8/19/2003	14:48	1.5	638.3
LW_2	8/19/2003	14:49	2.0	539.3
LW_2	8/19/2003	14:50	2.5	504.8
LW_2	8/19/2003	14:51	3.0	451.0
LW_2	8/19/2003	14:52	3.5	293.1
LW_2	8/19/2003	14:53	4.0	244.2
LW_2	8/19/2003	14:54	4.5	215.2
LW_2	8/19/2003	14:55	5.0	213.3
LW_2	8/19/2003	14:56	6.0	184.5
LW_2	8/19/2003	14:59	7.0	139.2
LW_2	8/19/2003	15:00	8.0	101.9
LW_2	8/19/2003	15:01	9.0	75.38
LW_2	8/19/2003	15:02	10.0	54.54
LW_2	8/19/2003	15:03	11.0	31.11
LW_2	8/19/2003	15:04	12.0	24.32

Table C-6. Tributary Field Data.

Site	Date	Time	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L) Hydrolab	DO (mg/L) Winkler 1	DO (mg/L) Winkler 2	DO %Sat Winkler
LW_AND01	7/16/2002	8:15	9.9	7.3	35	11.1	10.8		95.5
LW_AUS01	7/16/2002	9:30	12.8	7.5	77	9.4			
LW_BRA01	7/16/2002	8:50	11.6	6.8	37	9.1			
LW_CAR01	7/16/2002	11:30	14.9	7.5	101	8.1			
LW_EUC01	7/16/2002	10:08	13.6	7.1	95	5.4			
LW_OLS01	7/16/2002	11:40	14.4	7.7	73	7.7			
LW_SIL01	7/16/2002	10:50	15.4	8.1	255	6.5	8.7		87.0
LW_SMI01	7/16/2002	12:00	14.4	7.8	57	10.4	10.0		97.8
LW_AND01	8/14/2002	9:00	12.8	7.2	42	11.9	10.2		96.5
LW_AUS01	8/14/2002	9:50	14.6	7.1	97	8.7	9.3		91.5
LW_BRA01	8/14/2002	9:17	13.2	7.0	37	8.1			
LW_OLS01	8/14/2002	11:20	16.2	7.3	94	9.6	9.2		93.6
LW_SIL01	8/14/2002	10:45	16.6	7.3	254	11.2			
LW_SMI01	8/14/2002	11:40	16.1	7.1	68	12.0			
LW_AND01	9/17/2002	9:50	12.5	7.2	53	12.3	9.8		91.4
LW_AUS01	9/17/2002	10:40	11.3	7.5	102	9.7	10.1		92.3
LW_BRA01	9/17/2002	10:05	11.6	6.9	55	8.6			
LW_OLS01	9/17/2002	11:50	12.0	8.0	102	10.7	9.9		91.3
LW_SIL01	9/17/2002	11:20	12.6	8.1	310	9.5			
LW_SMI01	9/17/2002	12:20	12.5	7.8	84	10.3	10.3		96.4
LW_AND01	11/12/2002	9:30			69		10.5		
LW_AUS01	11/12/2002	10:25			125		9.7		
LW_BRA01	11/12/2002	9:50			63		8.3		
LW_EUC01	11/12/2002	11:00			90		8.8		
LW_OLS01	11/12/2002	12:45			118		9.9		
LW_SIL01	11/12/2002	12:20			150		9.2		
LW_SMI01	11/12/2002	13:10			85		10.2		
LW_AND01	12/10/2002	9:30	6.3	7.2	61	11.6	11.0	11.0	88.8
LW_AUS01	12/10/2002	10:30	5.6	7.3	88	12.3	11.7		93.2
LW_BRA01	12/10/2002	9:45	6.2	7.0	43	11.5	10.6		85.2
LW_CAR01	12/10/2002	12:25	6.3	7.5	78	11.3	10.7		86.8
LW_EUC01	12/10/2002	11:05	6.3	6.9	92	9.9	9.5	9.2	75.9
LW_MIL01	12/10/2002	11:20	5.4	7.1	155	8.2	7.8		61.2
LW_OLS01	12/10/2002	12:40	6.2	7.7	88	12.0	11.4		92.2
LW_SIL01	12/10/2002	12:00	6.4	8.0	217	11.6	11.0	11.3	90.4
LW_SMI01	12/10/2002	13:00	6.3	7.7	67	12.1	11.7		94.7
LW_AND01	1/7/2003	9:25	4.2	7.4	39	14.3	12.4		95.2
LW_AUS01	1/7/2003	10:15	4.7	7.3	47	13.4	12.7		98.7
LW_BRA01	1/7/2003	9:45	4.9	7.1	36	13.0	12.0		93.8
LW_CAR01	1/7/2003	12:15	4.7	7.4	45	13.1	12.5		96.9
LW_EUC01	1/7/2003	10:45	5.4	7.2	57	13.5	11.8		92.9
LW_MIL01	1/7/2003	11:20	4.6	7.1	65	15.6	11.5		89.1
LW_OLS01	1/7/2003	12:40	5.2	7.3	44	12.9	12.4	12.4	97.4
LW_SIL01	1/7/2003	11:45	4.8	7.7	122	13.1	12.2		94.6
LW_SMI01	1/7/2003	13:00	5.7	7.4	45	12.7	12.3		97.7
LW_AND01	1/28/2003	9:25	5.5	7.0	37	19.7	12.2		96.8
LW_AUS01	1/28/2003	10:15	6.6	7.0	43	12.5	12.0	11.8	96.9
LW_BRA01	1/28/2003	9:45	6.3	6.9	35	12.7	11.8		95.6

Table C-6. Tributary Field Data.

Site	Date	Time	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L) Hydrolab	DO (mg/L) Winkler 1	DO (mg/L) Winkler 2	DO %Sat Winkler
LW_CAR01	1/28/2003	12:15	6.8	7.2	46	13.1	11.9		97.3
LW_EUC01	1/28/2003	10:45	7.1	7.0	57	11.6	11.6		95.8
LW_MIL01	1/28/2003	11:20	7.4	6.9	63	12.8	10.9		90.3
LW_OLS01	1/28/2003	12:40	6.5	7.1	43	13.7	12.0		97.2
LW_SIL01	1/28/2003	11:45	7.3	7.5	111	12.1	11.5		95.6
LW_SMI01	1/28/2003	13:00	6.8	7.2	46	12.6	11.8		96.2
LW_AND01	2/18/2003	8:50	5.5	7.4	51	12.4	11.9		94.3
LW_AUS01	2/18/2003	9:45	5.2	7.3	47	12.5	12.4		97.6
LW_BRA01	2/18/2003	9:20	5.2	7.1	32	11.8	12.1		95.3
LW_CAR01	2/18/2003	11:20	5.4	7.5	46	12.8	12.6		99.6
LW_EUC01	2/18/2003	10:15	6.0	7.3	64	12.1	11.8		94.8
LW_MIL01	2/18/2003	10:25	6.3	7.2	79	11.4	11.4		92.1
LW_OLS01	2/18/2003	11:30	4.9	7.6	51	13.0	12.3		96.0
LW_SIL01	2/18/2003	11:10	6.1	7.8	125	12.7	12.0		96.6
LW_SMI01	2/18/2003	11:50	5.4	7.6	46	12.6	12.5		98.9
LW_AND01	3/19/2003	12:15	5.3	7.0	43	12.9	12.4		97.9
LW_AUS01	3/19/2003	11:25	6.1	7.5	53	12.3	12.2		98.0
LW_BRA01	3/19/2003	11:45	6.3	7.2	37	11.7	11.8		95.0
LW_CAR01	3/19/2003	9:50	5.8	7.6	49	12.3	12.2		97.5
LW_EUC01	3/19/2003	11:00	7.0	7.5	65	11.5	11.4		93.8
LW_MIL01	3/19/2003	10:50	7.8	7.3	73	11.8	11.3		94.7
LW_OLS01	3/19/2003	9:40	5.3	7.6	47	13.1	12.4		97.4
LW_SIL01	3/19/2003	10:10	7.0	7.8	128	12.4	11.7		96.5
LW_SMI01	3/19/2003	9:00	5.6	7.7	46	12.9	12.3		97.7
LW_AND01	4/2/2003	11:30	6.0	7.0	31	12.4	12.0		96.5
LW_AUS01	4/2/2003	10:50	6.1	7.3	34	12.1	11.8		95.1
LW_BRA01	4/2/2003	11:10	6.4	7.0	25	11.8	11.6		93.7
LW_CAR01	4/2/2003	9:25	6.0	7.3	35	12.2	11.9		95.2
LW_EUC01	4/2/2003	10:25	7.2	7.3	45	11.3	11.4		94.1
LW_MIL01	4/2/2003	10:15	7.3	7.3	55	11.5	11.1		91.6
LW_OLS01	4/2/2003	9:10	4.9	7.4	33	12.5	12.3		95.7
LW_SIL01	4/2/2003	9:40	7.1	7.6	86	11.8	11.6		95.4
LW_SMI01	4/2/2003	8:45	5.0	7.9	32	12.8	12.5		98.0
LW_AND01	4/22/2003	11:45	8.9	6.9	51	18.0	10.9		94.0
LW_AUS01	4/22/2003	11:15	8.4	7.5	55	11.2	11.4		97.1
LW_BRA01	4/22/2003	11:30	8.3	7.2	31	14.5	11.3		95.7
LW_CAR01	4/22/2003	9:35	8.4	7.5	48	11.4	11.3		96.1
LW_EUC01	4/22/2003	10:35	9.1	7.6	66	11.2	10.8		93.2
LW_MIL01	4/22/2003	10:25	10.2	7.6	73	11.1	10.9		96.6
LW_OLS01	4/22/2003	9:25	7.9	7.6	52	11.6	11.5		96.5
LW_SIL01	4/22/2003	9:50	9.5	7.7	125	11.2	10.9		95.3
LW_SMI01	4/22/2003	9:15	7.8	7.8	45	12.3	11.8		98.6
LW_AND01	5/28/2003	13:30	8.9	7.0	30	13.4			
LW_AUS01	5/28/2003	12:40	12.4	7.6	67	10.6	10.5		98.4
LW_BRA01	5/28/2003	13:00	11.3	6.9	33	9.9	9.8		89.6
LW_CAR01	5/28/2003	9:20	11.7	7.4	53	10.8	10.3		95.0
LW_EUC01	5/28/2003	12:00	12.1	7.3	83	8.6	9.2		85.6
LW_MIL01	5/28/2003	11:40	18.4	8.1	101	11.2	11.0		117.2

Table C-6. Tributary Field Data.

Site	Date	Time	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L) Hydrolab	DO (mg/L) Winkler 1	DO (mg/L) Winkler 2	DO %Sat Winkler
LW_OLS01	5/28/2003	8:55	11.3	7.4	52	12.7	10.5		95.8
LW_SIL01	5/28/2003	9:45	14.1	7.9	176	10.1	9.7		94.3
LW_SMI01	5/28/2003	8:20	11.6	7.7	47	10.9	10.6		97.0
LW_AND01	6/11/2003	12:30	9.5	7.3	35	11.9			
LW_AUS01	6/11/2003	11:42	13.2	7.7	97	10.2	10.1		96.4
LW_BRA01	6/11/2003	12:00	11.8	7.4	42	9.7			
LW_CAR01	6/11/2003	9:33	12.8	7.7	82	10.1	10.0		94.0
LW_EUC01	6/11/2003	11:20	13.1	7.3	103	7.7	7.8		74.1
LW_MIL01	6/11/2003	10:30	20.9	7.6	152	5.1			
LW_OLS01	6/11/2003	9:20	12.5	7.7	81	10.5	10.3		96.8
LW_SIL01	6/11/2003	9:45	13.8	8.2	265	10.2			
LW_SMI01	6/11/2003	8:55	12.6	8.0	65	10.5	10.4		97.7
LW_AND01	7/16/2003	11:30	13.1	7.1	66	10.0			
LW_AUS01	7/16/2003	10:55	14.6	7.7	119	10.4	9.3		91.4
LW_BRA01	7/16/2003	11:15	13.4	7.5	53	7.4			
LW_EUC01	7/16/2003	10:30	15.4	7.7	108	8.2			
LW_OLS01	7/16/2003	9:10	14.2	7.9	96	10.2	10.0		97.7
LW_SIL01	7/16/2003	9:40	15.7	8.2	231	9.8			
LW_SMI01	7/16/2003	8:55	14.8	7.8	81	10.1	9.8		96.8
LW_AND01	8/20/2003	12:30	16.8	7.9	43		9.3		95.6
LW_AUS01	8/20/2003	11:25	15.1	8.4	133		9.6		95.4
LW_OLS01	8/20/2003	9:40	14.1	7.6	120		10.0		96.8
LW_SIL01	8/20/2003	10:15	14.9	7.8	254		9.6		94.4
LW_AND01	9/24/2003	11:25	12.4	7.8	53	10.5			
LW_AUS01	9/24/2003	10:50	10.3	8.0	139	10.5	10.4		92.8
LW_OLS01	9/24/2003	9:45	11.2	7.5	121	10.1	10.5		95.2
LW_SIL01	9/24/2003	10:05	12.0	7.8	270	8.6	10.2		94.1
LW_SMI01	9/24/2003	9:00	11.0	7.4	94	9.8	10.3		93.4

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_1	7/15/2002	11:50	0.2	20.3	7.9	55	9.3
LW_1	7/15/2002	12:03	1.0	20.1	7.9	55	9.5
LW_1	7/15/2002	12:05	2.0	19.8	8.0	55	9.5
LW_1	7/15/2002	12:06	3.0	19.6	8.0	55	9.5
LW_1	7/15/2002	12:07	4.0	19.6	7.9	55	9.7
LW_1	7/15/2002	12:08	5.0	19.5	7.9	55	9.3
LW_1	7/15/2002	12:10	6.0	18.1	8.1	54	10.0
LW_1	7/15/2002	12:13	7.0	17.2	8.0	54	9.8
LW_1	7/15/2002	12:15	8.0	15.0	7.8	54	10.6
LW_1	7/15/2002	12:16	9.0	14.1	7.7	54	10.0
LW_1	7/15/2002	12:17	10.0	13.2	7.4	54	9.0
LW_1	7/15/2002	12:20	11.0	12.0	7.3	54	7.2
LW_1	7/15/2002	12:22	12.0	11.1	7.1	54	5.1
LW_1	7/15/2002	12:25	13.0	10.6	6.9	55	4.2
LW_1	7/15/2002	12:26	15.0	10.3	6.9	55	3.9
LW_1	7/15/2002	12:27	18.0	10.2	6.8	54	3.3
LW_1	7/15/2002	12:30	25.0	10.1	6.7	55	3.3
LW_2	7/15/2002	13:32	0.3	19.7	7.8	54	9.7
LW_2	7/15/2002	13:34	1.0	19.6	7.9	54	9.6
LW_2	7/15/2002	13:35	2.0	19.3	7.9	54	9.6
LW_2	7/15/2002	13:37	3.0	19.2	7.9	54	9.7
LW_2	7/15/2002	13:38	4.0	19.0	8.0	54	9.8
LW_2	7/15/2002	13:39	5.0	18.9	8.0	54	9.6
LW_2	7/15/2002	13:40	6.0	18.8	8.0	54	9.7
LW_2	7/15/2002	13:42	7.0	18.7	8.0	54	9.4
LW_2	7/15/2002	13:44	8.0	18.5	8.0	54	9.3
LW_2	7/15/2002	13:45	9.0	18.5	8.0	54	9.3
LW_2	7/15/2002	13:46	10.0	18.4	8.0	54	9.4
LW_2	7/15/2002	13:48	11.0	16.7	7.8	53	9.7
LW_2	7/15/2002	13:49	12.0	15.4	7.7	53	9.6
LW_2	7/15/2002	13:50	13.0	12.5	7.5	53	8.7
LW_2	7/15/2002	13:51	14.0	11.7	7.4	53	8.4
LW_2	7/15/2002	13:52	15.0	11.4	7.3	53	8.0
LW_2	7/15/2002	13:53	16.0	10.9	7.1	53	7.1
LW_2	7/15/2002	13:59	18.0	10.2	7.0	54	5.4
LW_4	7/15/2002	16:22	0.3	18.8	7.8	54	9.8
LW_4	7/15/2002	16:24	1.0	18.8	7.8	54	9.7
LW_4	7/15/2002	16:25	3.0	18.8	7.8	54	9.5
LW_4	7/15/2002	16:25	5.0	18.6	7.8	54	9.6
LW_4	7/15/2002	16:26	7.0	18.5	7.8	54	9.6
LW_4	7/15/2002	16:27	9.0	17.9	7.9	54	9.6
LW_4	7/15/2002	16:28	11.0	17.3	7.7	53	9.6
LW_4	7/15/2002	16:29	13.0	16.4	7.6	53	9.7
LW_4	7/15/2002	16:29	15.0	14.7	7.4	53	9.6
LW_4	7/15/2002	16:32	17.0	13.3	7.4	53	9.7
LW_4	7/15/2002	16:33	20.0	10.6	7.3	53	9.8
LW_4	7/15/2002	16:34	25.0	8.3	7.3	52	9.9
LW_4	7/15/2002	16:35	30.0	7.0	7.2	52	10.1

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_4	7/15/2002	16:36	35.0	6.7	7.1	52	10.1
LW_4	7/15/2002	16:37	40.0	6.5	7.1	52	10.2
LW_1	8/13/2002	11:01	0.5	21.3	8.3	55	9.4
LW_1	8/13/2002	11:03	1.0	21.2	8.3	55	9.4
LW_1	8/13/2002	11:04	2.0	21.1	8.3	55	9.4
LW_1	8/13/2002	11:05	3.0	21.0	8.4	55	9.3
LW_1	8/13/2002	11:05	4.0	20.5	8.4	55	9.5
LW_1	8/13/2002	11:06	5.0	20.1	8.5	55	9.6
LW_1	8/13/2002	11:07	6.0	19.6	8.4	55	9.6
LW_1	8/13/2002	11:08	7.0	19.1	8.3	55	9.3
LW_1	8/13/2002	11:10	8.0	18.3	8.1	55	9.2
LW_1	8/13/2002	11:12	9.0	15.4	7.9	55	9.2
LW_1	8/13/2002	11:14	10.0	12.9	7.5	55	5.6
LW_1	8/13/2002	11:15	11.0	11.9	7.3	55	3.9
LW_1	8/13/2002	11:17	12.0	11.2	7.1	56	2.0
LW_1	8/13/2002	11:18	13.0	11.0	7.0	56	1.6
LW_1	8/13/2002	11:19	14.0	10.8	6.9	57	1.1
LW_1	8/13/2002	11:20	16.0	10.6	6.8	56	0.9
LW_1	8/13/2002	11:22	18.0	10.5	6.8	56	0.7
LW_1	8/13/2002	11:25	20.0	10.4	6.7	56	0.5
LW_1	8/13/2002	11:27	24.0	10.3	6.8	57	0.4
LW_2	8/13/2002	12:25	0.5	20.5	8.0	54	9.4
LW_2	8/13/2002	12:26	1.0	20.4	8.0	54	9.3
LW_2	8/13/2002	12:27	2.0	20.2	8.1	54	9.3
LW_2	8/13/2002	12:29	3.0	19.7	8.2	54	9.4
LW_2	8/13/2002	12:30	4.0	19.2	8.3	54	9.4
LW_2	8/13/2002	12:32	5.0	19.0	8.2	54	9.4
LW_2	8/13/2002	12:34	6.0	18.9	8.2	54	9.4
LW_2	8/13/2002	12:35	7.0	18.7	8.2	54	9.3
LW_2	8/13/2002	12:36	8.0	18.6	8.1	54	9.7
LW_2	8/13/2002	12:38	9.0	18.4	8.0	54	9.1
LW_2	8/13/2002	12:39	10.0	18.2	7.9	53	9.1
LW_2	8/13/2002	12:41	11.0	17.4	7.9	53	8.9
LW_2	8/13/2002	12:43	12.0	16.6	7.7	53	8.8
LW_2	8/13/2002	12:45	14.0	12.9	7.5	53	7.0
LW_2	8/13/2002	12:47	16.0	11.5	7.3	54	4.9
LW_2	8/13/2002	12:50	16.5	11.4	7.1	54	4.5
LW_3	8/13/2002	13:05	0.5	20.9	8.1	54	9.5
LW_3	8/13/2002	13:06	1.0	20.7	8.1	54	9.5
LW_3	8/13/2002	13:07	2.0	20.1	8.2	54	9.5
LW_3	8/13/2002	13:09	4.0	19.9	8.3	54	9.6
LW_3	8/13/2002	13:11	6.0	19.6	8.2	52	9.6
LW_3	8/13/2002	13:14	8.0	18.8	8.1	53	9.6
LW_3	8/13/2002	13:15	10.0	18.3	8.0	53	9.4
LW_3	8/13/2002	13:16	12.0	17.0	7.8	53	9.4
LW_3	8/13/2002	13:17	14.0	14.3	7.6	52	9.5
LW_3	8/13/2002	13:18	16.0	12.4	7.5	52	9.5
LW_3	8/13/2002	13:19	18.0	10.3	7.4	52	9.4

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_3	8/13/2002	13:20	20.0	9.1	7.3	52	9.7
LW_3	8/13/2002	13:21	24.0	7.9	7.3	51	9.8
LW_3	8/13/2002	13:22	28.0	7.2	7.3	51	9.8
LW_3	8/13/2002	13:23	32.0	6.9	7.2	51	9.9
LW_3	8/13/2002	13:24	36.0	6.6	7.2	51	9.9
LW_3	8/13/2002	13:25	40.0	6.5	7.2	51	10.1
LW_3	8/13/2002	13:26	46.0	6.4	7.2	51	10.0
LW_4	8/13/2002	14:20	0.5	20.9	7.9	54	9.4
LW_4	8/13/2002	14:21	1.0	20.9	8.0	54	9.1
LW_4	8/13/2002	14:22	2.0	20.7	8.0	54	9.1
LW_4	8/13/2002	14:23	4.0	20.4	8.1	54	9.1
LW_4	8/13/2002	14:24	6.0	20.2	8.1	54	9.1
LW_4	8/13/2002	14:25	8.0	20.2	8.1	54	9.1
LW_4	8/13/2002	14:26	10.0	19.4	8.0	53	9.1
LW_4	8/13/2002	14:27	12.0	17.7	7.9	53	9.1
LW_4	8/13/2002	14:28	14.0	15.1	7.7	52	9.0
LW_4	8/13/2002	14:29	16.0	13.4	7.6	52	9.0
LW_4	8/13/2002	14:30	20.0	10.2	7.6	52	9.1
LW_4	8/13/2002	14:31	24.0	8.0	7.5	51	9.4
LW_4	8/13/2002	14:32	28.0	7.2	7.4	51	9.5
LW_4	8/13/2002	14:33	32.0	6.8	7.4	51	9.6
LW_4	8/13/2002	14:34	36.0	6.7	7.3	51	9.5
LW_4	8/13/2002	14:35	40.0	6.5	7.3	51	9.6
LW_1	9/16/2002	10:51	0.3	19.3	8.5	55	9.3
LW_1	9/16/2002	10:52	1.0	19.3	8.5	55	9.2
LW_1	9/16/2002	10:53	2.0	19.3	8.5	55	9.2
LW_1	9/16/2002	10:54	3.0	19.3	8.5	56	8.9
LW_1	9/16/2002	10:55	4.0	19.3	8.5	55	8.7
LW_1	9/16/2002	10:56	5.0	19.3	8.4	55	8.9
LW_1	9/16/2002	10:57	6.0	19.3	8.4	55	8.7
LW_1	9/16/2002	10:58	7.0	19.3	8.4	55	8.8
LW_1	9/16/2002	10:59	8.0	19.3	8.4	55	8.7
LW_1	9/16/2002	11:00	9.0	18.2	8.0	56	6.9
LW_1	9/16/2002	11:01	10.0	14.4	7.6	58	2.6
LW_1	9/16/2002	11:02	11.0	13.0	7.4	59	0.4
LW_1	9/16/2002	11:03	12.0	11.7	7.2	59	0.3
LW_1	9/16/2002	11:04	13.0	11.3	7.1	59	0.2
LW_1	9/16/2002	11:05	14.0	10.9	7.0	58	0.2
LW_1	9/16/2002	11:06	15.0	10.7	7.0	59	0.2
LW_1	9/16/2002	11:07	16.0	10.7	6.9	59	0.2
LW_1	9/16/2002	11:08	17.0	10.5	6.9	59	0.2
LW_1	9/16/2002	11:09	18.0	10.5	6.9	59	0.2
LW_1	9/16/2002	11:10	19.0	10.4	6.8	63	0.2
LW_1	9/16/2002	11:11	20.7	10.3	6.8	65	0.2
LW_GenevaSill	9/16/2002	11:25	0.3	18.7	7.8	55	9.0
LW_GenevaSill	9/16/2002	11:26	1.0	18.7	7.8	55	8.9
LW_GenevaSill	9/16/2002	11:27	2.0	18.7	7.8	55	8.9
LW_GenevaSill	9/16/2002	11:28	3.0	18.7	7.8	55	8.8

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_2	9/16/2002	11:44	0.3	19.0	7.9	54	8.5
LW_2	9/16/2002	11:45	1.0	19.0	7.9	54	8.6
LW_2	9/16/2002	11:46	2.0	19.0	7.9	54	8.7
LW_2	9/16/2002	11:47	3.0	19.0	7.9	54	8.4
LW_2	9/16/2002	11:48	4.0	19.0	8.0	54	8.4
LW_2	9/16/2002	11:49	5.0	19.0	7.9	54	8.6
LW_2	9/16/2002	11:50	6.0	19.0	8.0	54	8.5
LW_2	9/16/2002	11:51	7.0	19.0	8.0	54	8.4
LW_2	9/16/2002	11:52	8.0	18.9	7.9	54	8.8
LW_2	9/16/2002	11:53	9.0	18.9	8.0	54	8.8
LW_2	9/16/2002	11:54	10.0	18.9	7.9	54	8.7
LW_2	9/16/2002	11:55	11.0	18.9	7.9	54	8.6
LW_2	9/16/2002	11:56	12.0	17.8	7.7	54	7.6
LW_2	9/16/2002	11:57	13.0	16.7	7.3	54	6.2
LW_2	9/16/2002	11:58	14.0	14.2	7.4	54	3.9
LW_2	9/16/2002	11:59	16.0	11.6	7.1	56	0.3
LW_2	9/16/2002	12:00	18.0	10.9	6.9	58	0.2
LW_2	9/16/2002	12:01	20.0	10.8	6.8	62	0.2
LW_StrawberrySill	9/16/2002	12:11	0.3	19.0	7.9	54	9.0
LW_StrawberrySill	9/16/2002	12:12	1.0	19.0	7.9	54	8.9
LW_StrawberrySill	9/16/2002	12:13	2.0	19.0	7.9	54	8.8
LW_StrawberrySill	9/16/2002	12:14	3.0	19.0	7.9	54	8.8
LW_StrawberrySill	9/16/2002	12:15	4.0	18.9	8.0	54	8.8
LW_StrawberrySill	9/16/2002	12:16	5.0	18.9	8.0	54	8.7
LW_StrawberrySill	9/16/2002	12:17	6.0	18.9	8.0	54	8.8
LW_StrawberrySill	9/16/2002	12:18	7.0	18.9	8.0	54	8.8
LW_StrawberrySill	9/16/2002	12:19	8.0	18.9	8.0	54	8.7
LW_StrawberrySill	9/16/2002	12:20	9.0	18.9	8.0	54	8.3
LW_3	9/16/2002	12:43	0.3	18.9	7.6	54	9.1
LW_3	9/16/2002	12:44	1.0	18.9	7.7	54	9.1
LW_3	9/16/2002	12:45	2.0	18.9	7.7	54	8.9
LW_3	9/16/2002	12:46	3.0	18.9	7.8	54	8.9
LW_3	9/16/2002	12:47	4.0	18.9	7.8	54	8.8
LW_3	9/16/2002	12:48	5.0	18.9	7.8	54	8.8
LW_3	9/16/2002	12:49	6.0	18.9	7.9	54	8.8
LW_3	9/16/2002	12:50	7.0	18.9	7.9	54	8.8
LW_3	9/16/2002	12:51	8.0	18.9	7.9	54	8.8
LW_3	9/16/2002	12:52	9.0	18.9	7.9	54	8.8
LW_3	9/16/2002	12:53	10.0	18.9	7.9	54	8.8
LW_3	9/16/2002	12:54	11.0	18.9	7.8	54	8.6
LW_3	9/16/2002	12:55	12.0	18.2	7.7	54	8.5
LW_3	9/16/2002	12:56	13.0	18.0	7.6	54	8.4
LW_3	9/16/2002	12:57	14.0	17.1	7.6	53	8.2
LW_3	9/16/2002	12:58	16.0	15.3	7.5	53	8.0
LW_3	9/16/2002	12:59	18.0	11.9	7.4	52	8.2
LW_3	9/16/2002	13:00	20.0	10.3	7.4	52	8.4
LW_3	9/16/2002	13:01	22.0	8.9	7.3	52	8.7
LW_3	9/16/2002	13:02	25.0	7.7	7.3	51	8.9
LW_3	9/16/2002	13:03	30.0	7.0	7.2	51	9.3

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_3	9/16/2002	13:04	35.0	6.7	7.2	51	9.3
LW_3	9/16/2002	13:05	40.0	6.6	7.2	51	9.4
LW_4	9/16/2002	13:13	0.3	18.7	7.7	54	8.7
LW_4	9/16/2002	13:14	1.0	18.7	7.7	53	8.3
LW_4	9/16/2002	13:15	2.0	18.7	7.7	53	8.6
LW_4	9/16/2002	13:16	3.0	18.7	7.7	53	8.6
LW_4	9/16/2002	13:17	4.0	18.7	7.7	53	8.6
LW_4	9/16/2002	13:18	5.0	18.7	7.7	54	8.4
LW_4	9/16/2002	13:19	6.0	18.7	7.6	53	8.4
LW_4	9/16/2002	13:20	7.0	18.7	7.6	54	8.4
LW_4	9/16/2002	13:21	8.0	18.6	7.5	53	8.3
LW_4	9/16/2002	13:22	9.0	18.2	7.4	53	8.1
LW_4	9/16/2002	13:23	10.0	17.9	7.3	53	7.9
LW_4	9/16/2002	13:24	11.0	17.6	7.3	53	8.0
LW_4	9/16/2002	13:25	13.0	16.4	7.2	53	7.8
LW_4	9/16/2002	13:26	15.0	14.3	7.2	52	7.8
LW_4	9/16/2002	13:27	16.0	12.3	7.2	52	7.8
LW_4	9/16/2002	13:28	18.0	10.6	7.2	52	8.2
LW_4	9/16/2002	13:29	20.0	9.5	7.2	51	8.5
LW_4	9/16/2002	13:30	25.0	7.5	7.3	51	9.0
LW_4	9/16/2002	13:31	30.0	6.9	7.3	51	9.5
LW_4	9/16/2002	13:32	35.0	6.6	7.3	51	9.7
LW_4	9/16/2002	13:33	40.0	6.5	7.3	51	9.9
LW_1	5/27/2003	11:21	0.5	16.1	7.8	56	10.4
LW_1	5/27/2003	11:22	1.0	16.1	7.9	56	10.4
LW_1	5/27/2003	11:24	2.0	15.6	7.9	56	10.4
LW_1	5/27/2003	11:26	3.0	14.8	8.0	55	10.8
LW_1	5/27/2003	11:28	4.0	13.9	8.1	55	11.2
LW_1	5/27/2003	11:30	5.0	13.5	8.1	55	11.0
LW_1	5/27/2003	11:32	6.0	13.3	8.0	55	11.0
LW_1	5/27/2003	11:34	7.0	12.8	7.9	54	10.8
LW_1	5/27/2003	11:36	8.0	12.4	7.8	54	10.8
LW_1	5/27/2003	11:38	9.0	12.2	7.7	54	10.4
LW_1	5/27/2003	11:40	10.0	11.5	7.5	55	9.8
LW_1	5/27/2003	11:41	11.0	11.0	7.3	55	9.1
LW_1	5/27/2003	11:42	12.0	10.8	7.3	55	9.1
LW_1	5/27/2003	11:43	14.0	10.4	7.2	55	8.4
LW_1	5/27/2003	11:44	16.0	10.1	7.1	55	8.0
LW_1	5/27/2003	11:45	18.0	10.0	7.1	55	7.5
LW_1	5/27/2003	11:46	19.5	10.0	7.0	55	7.4
LW_GenevaSill	5/27/2003	12:00	0.5	16.4	8.0	56	10.5
LW_GenevaSill	5/27/2003	12:01	1.0	16.2	7.9	56	10.6
LW_GenevaSill	5/27/2003	12:02	2.0	15.8	7.9	55	10.7
LW_GenevaSill	5/27/2003	12:03	3.0	14.0	8.1	54	11.3
LW_GenevaSill	5/27/2003	12:04	3.8	14.1	8.2	54	11.3
LW_2	5/27/2003	12:31	0.5	16.0	7.9	55	10.6
LW_2	5/27/2003	12:32	1.0	15.3	8.0	55	10.7
LW_2	5/27/2003	12:34	2.0	14.8	8.0	54	10.9

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_2	5/27/2003	12:36	3.0	14.2	8.1	54	11.1
LW_2	5/27/2003	12:38	4.0	14.0	8.1	54	11.2
LW_2	5/27/2003	12:40	5.0	13.7	8.2	54	11.2
LW_2	5/27/2003	12:42	6.0	13.6	8.2	54	11.3
LW_2	5/27/2003	12:44	7.0	13.0	8.2	54	11.3
LW_2	5/27/2003	12:46	8.0	12.4	8.1	54	11.3
LW_2	5/27/2003	12:48	9.0	12.2	8.0	54	11.3
LW_2	5/27/2003	12:50	10.0	11.7	7.9	53	11.1
LW_2	5/27/2003	12:51	11.0	11.4	7.8	53	11.1
LW_2	5/27/2003	12:52	12.0	11.1	7.7	53	10.9
LW_2	5/27/2003	12:53	14.0	10.3	7.6	53	10.6
LW_2	5/27/2003	12:54	16.0	9.4	7.4	53	9.5
LW_2	5/27/2003	12:55	18.0	9.2	7.2	53	9.0
LW_2	5/27/2003	12:56	20.0	9.0	7.1	53	8.3
LW_StrawberrySill	5/27/2003	13:15	0.5	16.9	7.9	55	10.4
LW_StrawberrySill	5/27/2003	13:16	1.0	15.3	7.9	55	10.7
LW_StrawberrySill	5/27/2003	13:17	2.0	14.8	8.0	55	10.9
LW_StrawberrySill	5/27/2003	13:18	3.0	14.3	8.1	54	11.1
LW_StrawberrySill	5/27/2003	13:19	4.0	13.8	8.2	54	11.2
LW_StrawberrySill	5/27/2003	13:20	5.0	13.7	8.2	54	11.3
LW_StrawberrySill	5/27/2003	13:21	6.0	13.5	8.2	54	11.4
LW_StrawberrySill	5/27/2003	13:22	7.0	13.1	8.2	54	11.3
LW_StrawberrySill	5/27/2003	13:23	8.0	12.5	8.1	54	11.3
LW_StrawberrySill	5/27/2003	13:24	9.0	12.2	8.0	54	11.3
LW_3	5/27/2003	14:01	0.5	15.4	8.0	55	10.8
LW_3	5/27/2003	14:02	1.0	15.3	8.1	54	10.7
LW_3	5/27/2003	14:04	2.0	15.0	8.1	54	10.7
LW_3	5/27/2003	14:06	3.0	14.6	8.2	54	11.0
LW_3	5/27/2003	14:08	4.0	13.6	8.3	54	11.1
LW_3	5/27/2003	14:10	5.0	13.4	8.3	54	11.1
LW_3	5/27/2003	14:12	6.0	13.3	8.3	54	11.2
LW_3	5/27/2003	14:14	7.0	13.1	8.3	54	11.2
LW_3	5/27/2003	14:16	8.0	12.3	8.3	54	11.3
LW_3	5/27/2003	14:18	9.0	11.9	8.2	54	11.2
LW_3	5/27/2003	14:20	10.0	11.8	8.1	54	11.1
LW_3	5/27/2003	14:21	11.0	11.6	8.0	53	11.1
LW_3	5/27/2003	14:22	12.0	11.5	7.9	53	11.1
LW_3	5/27/2003	14:23	14.0	11.1	7.8	54	10.9
LW_3	5/27/2003	14:24	16.0	10.7	7.7	53	10.9
LW_3	5/27/2003	14:25	18.0	9.8	7.7	53	10.8
LW_3	5/27/2003	14:26	20.0	9.2	7.6	53	10.7
LW_3	5/27/2003	14:27	22.0	8.9	7.6	53	10.7
LW_3	5/27/2003	14:28	24.0	8.5	7.5	53	10.6
LW_3	5/27/2003	14:29	28.0	8.0	7.4	53	10.5
LW_3	5/27/2003	14:30	32.0	7.7	7.4	53	10.5
LW_3	5/27/2003	14:31	36.0	7.5	7.4	53	10.4
LW_3	5/27/2003	14:32	40.0	7.4	7.3	53	10.3
LW_3	5/27/2003	14:33	45.0	7.3	7.3	53	10.3

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_3	5/27/2003	14:34	48.8	7.3	7.3	53	10.3
LW_1	6/10/2003	10:46	0.2	19.1	7.8	52	9.7
LW_1	6/10/2003	10:47	1.0	19.1	7.8	52	9.7
LW_1	6/10/2003	10:49	2.0	19.1	7.8	52	9.7
LW_1	6/10/2003	10:51	3.0	19.1	7.8	52	9.7
LW_1	6/10/2003	10:53	4.0	18.9	7.8	52	9.8
LW_1	6/10/2003	10:55	5.0	16.0	8.1	51	11.1
LW_1	6/10/2003	10:57	6.0	15.3	8.3	51	11.6
LW_1	6/10/2003	10:59	7.0	14.5	8.4	51	11.7
LW_1	6/10/2003	11:01	8.0	13.7	8.3	51	11.6
LW_1	6/10/2003	11:03	9.0	12.4	7.6	51	10.1
LW_1	6/10/2003	11:05	10.0	11.8	7.4	51	9.2
LW_1	6/10/2003	11:06	11.0	11.1	7.3	51	8.1
LW_1	6/10/2003	11:07	12.0	10.9	7.2	51	7.4
LW_1	6/10/2003	11:08	14.0	10.6	7.1	51	6.8
LW_1	6/10/2003	11:09	16.0	10.4	7.0	51	6.5
LW_1	6/10/2003	11:10	18.0	10.4	7.0	51	6.4
LW_1	6/10/2003	11:11	19.0	10.4	6.9	51	6.3
LW_GenevaSill	6/10/2003	11:37	0.2	18.7	7.8	51	9.9
LW_GenevaSill	6/10/2003	11:38	1.0	18.7	7.8	51	9.8
LW_GenevaSill	6/10/2003	11:39	2.0	18.3	7.9	51	10.0
LW_GenevaSill	6/10/2003	11:40	3.0	17.7	7.9	51	10.3
LW_GenevaSill	6/10/2003	11:41	4.0	16.5	8.1	51	11.0
LW_GenevaSill	6/10/2003	11:42	5.0	16.1	8.2	51	11.0
LW_2	6/10/2003	12:01	0.2	18.8	7.8	51	9.9
LW_2	6/10/2003	12:03	1.0	18.9	7.8	51	10.0
LW_2	6/10/2003	12:05	2.0	18.9	7.8	51	9.9
LW_2	6/10/2003	12:07	3.0	18.9	7.8	51	10.0
LW_2	6/10/2003	12:09	4.0	18.8	7.8	51	10.0
LW_2	6/10/2003	12:11	5.0	18.7	7.8	51	10.0
LW_2	6/10/2003	12:13	6.0	18.6	7.8	51	10.0
LW_2	6/10/2003	12:15	7.0	18.5	7.8	51	10.1
LW_2	6/10/2003	12:17	8.0	18.5	7.8	51	10.1
LW_2	6/10/2003	12:18	9.0	18.0	7.9	51	10.4
LW_2	6/10/2003	12:19	10.0	16.5	7.9	51	10.8
LW_2	6/10/2003	12:20	12.0	12.3	7.8	49	10.7
LW_2	6/10/2003	12:21	14.0	10.5	7.3	49	10.1
LW_2	6/10/2003	12:22	16.0	10.0	7.2	49	9.5
LW_2	6/10/2003	12:23	18.0	9.8	7.1	49	9.0
LW_StrawberrySill	6/10/2003	12:42	0.2	18.8	7.8	51	9.9
LW_StrawberrySill	6/10/2003	12:43	1.0	18.8	7.8	51	9.9
LW_StrawberrySill	6/10/2003	12:44	2.0	18.7	7.8	51	9.9
LW_StrawberrySill	6/10/2003	12:45	3.0	18.6	7.8	51	9.9
LW_StrawberrySill	6/10/2003	12:46	4.0	18.5	7.8	51	9.9
LW_StrawberrySill	6/10/2003	12:47	5.0	18.5	7.8	51	9.9
LW_StrawberrySill	6/10/2003	12:48	6.0	18.2	7.8	51	10.1
LW_3	6/10/2003	13:21	0.2	18.2	7.9	51	10.1
LW_3	6/10/2003	13:23	1.0	18.2	7.8	51	10.0

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_3	6/10/2003	13:25	2.0	18.1	7.9	51	9.9
LW_3	6/10/2003	13:27	3.0	18.1	7.9	51	9.9
LW_3	6/10/2003	13:29	4.0	18.1	7.8	51	9.9
LW_3	6/10/2003	13:31	5.0	18.1	7.8	51	9.9
LW_3	6/10/2003	13:33	6.0	18.1	7.8	51	9.9
LW_3	6/10/2003	13:35	7.0	17.9	7.8	51	10.1
LW_3	6/10/2003	13:37	8.0	16.0	7.9	50	10.6
LW_3	6/10/2003	13:39	9.0	14.8	7.9	50	10.9
LW_3	6/10/2003	13:40	10.0	12.8	7.7	50	10.9
LW_3	6/10/2003	13:41	12.0	11.8	7.6	49	11.0
LW_3	6/10/2003	13:42	14.0	11.0	7.5	49	10.9
LW_3	6/10/2003	13:43	16.0	10.6	7.4	49	10.8
LW_3	6/10/2003	13:44	18.0	10.2	7.3	49	10.7
LW_3	6/10/2003	13:45	22.0	8.3	7.2	49	10.6
LW_3	6/10/2003	13:46	26.0	8.0	7.1	49	10.6
LW_3	6/10/2003	13:47	30.0	7.6	7.1	49	10.5
LW_3	6/10/2003	13:48	35.0	7.5	7.1	49	10.5
LW_3	6/10/2003	13:49	40.0	7.4	7.1	49	10.5
LW_3	6/10/2003	13:50	48.0	7.3	7.1	49	10.3
LW_1	7/15/2003	10:51	0.3	21.0	8.5	55	9.6
LW_1	7/15/2003	10:53	1.0	20.9	8.5	55	9.4
LW_1	7/15/2003	10:55	2.0	20.8	8.4	55	9.5
LW_1	7/15/2003	10:57	3.0	20.8	8.4	55	9.4
LW_1	7/15/2003	10:59	4.0	20.8	8.4	55	9.4
LW_1	7/15/2003	11:01	5.0	20.2	8.4	55	9.6
LW_1	7/15/2003	11:03	6.0	19.2	8.6	55	10.2
LW_1	7/15/2003	11:05	7.0	17.7	8.6	55	10.7
LW_1	7/15/2003	11:07	8.0	16.3	8.5	55	11.0
LW_1	7/15/2003	11:09	9.0	14.1	8.0	54	10.5
LW_1	7/15/2003	11:11	10.0	13.0	7.9	54	9.1
LW_1	7/15/2003	11:12	11.0	12.1	7.5	55	7.3
LW_1	7/15/2003	11:13	12.0	11.6	7.3	55	5.0
LW_1	7/15/2003	11:14	13.0	11.1	7.1	56	3.5
LW_1	7/15/2003	11:15	14.0	10.9	6.9	56	3.1
LW_1	7/15/2003	11:16	16.0	10.8	6.8	56	2.7
LW_1	7/15/2003	11:17	18.0	10.6	6.8	56	2.5
LW_1	7/15/2003	11:18	20.4	10.5	6.7	57	2.1
LW_GenevaSill	7/15/2003	11:38	0.3	21.5	8.4	55	9.8
LW_GenevaSill	7/15/2003	11:39	1.0	21.1	8.4	55	9.7
LW_GenevaSill	7/15/2003	11:40	2.0	20.3	8.4	55	9.8
LW_GenevaSill	7/15/2003	11:41	3.0	19.9	8.4	54	10.0
LW_GenevaSill	7/15/2003	11:42	3.5	19.9	8.4	54	10.0
LW_2	7/15/2003	11:57	0.3	20.3	8.2	54	9.7
LW_2	7/15/2003	11:59	1.0	20.3	8.2	54	9.8
LW_2	7/15/2003	12:01	2.0	20.3	8.2	54	9.7
LW_2	7/15/2003	12:03	3.0	19.9	8.3	54	9.8
LW_2	7/15/2003	12:05	4.0	19.7	8.3	54	9.9
LW_2	7/15/2003	12:07	5.0	19.5	8.3	54	10.0

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_2	7/15/2003	12:08	6.0	19.5	8.3	54	10.0
LW_2	7/15/2003	12:09	7.0	19.3	8.3	54	9.9
LW_2	7/15/2003	12:10	8.0	19.1	8.3	54	9.9
LW_2	7/15/2003	12:11	9.0	19.0	8.2	54	10.0
LW_2	7/15/2003	12:12	10.0	18.5	8.2	54	9.9
LW_2	7/15/2003	12:13	11.0	17.1	8.0	53	10.0
LW_2	7/15/2003	12:14	12.0	15.4	7.9	53	10.1
LW_2	7/15/2003	12:15	14.0	11.8	7.5	53	8.1
LW_2	7/15/2003	12:16	16.0	11.1	7.3	52	7.1
LW_2	7/15/2003	12:17	18.0	10.7	7.1	53	6.4
LW_2	7/15/2003	12:18	20.0	10.6	6.9	53	5.9
LW_2	7/15/2003	12:19	21.5	10.6	6.8	53	5.3
LW_StrawberrySill	7/15/2003	12:45	0.3	20.4	8.2	54	9.8
LW_StrawberrySill	7/15/2003	12:46	1.0	20.3	8.2	54	9.7
LW_StrawberrySill	7/15/2003	12:47	2.0	20.1	8.2	54	9.8
LW_StrawberrySill	7/15/2003	12:48	3.0	19.8	8.3	54	9.9
LW_StrawberrySill	7/15/2003	12:49	4.0	19.7	8.3	54	9.7
LW_StrawberrySill	7/15/2003	12:50	5.0	19.5	8.3	54	9.9
LW_StrawberrySill	7/15/2003	12:51	6.0	19.5	8.3	54	9.9
LW_StrawberrySill	7/15/2003	12:52	7.0	19.4	8.3	54	9.8
LW_StrawberrySill	7/15/2003	12:53	8.0	19.3	8.3	54	9.9
LW_StrawberrySill	7/15/2003	12:54	9.0	19.0	8.2	54	9.9
LW_3	7/15/2003	13:21	0.3	20.2	8.3	54	9.8
LW_3	7/15/2003	13:23	1.0	20.2	8.3	54	9.8
LW_3	7/15/2003	13:25	2.0	20.1	8.3	54	9.8
LW_3	7/15/2003	13:27	3.0	20.1	8.3	54	9.8
LW_3	7/15/2003	13:29	4.0	19.9	8.3	54	9.8
LW_3	7/15/2003	13:31	5.0	19.7	8.3	54	9.8
LW_3	7/15/2003	13:33	6.0	19.6	8.3	54	9.8
LW_3	7/15/2003	13:35	7.0	19.3	8.3	54	9.9
LW_3	7/15/2003	13:37	8.0	19.0	8.3	54	10.0
LW_3	7/15/2003	13:39	9.0	18.4	8.2	54	10.0
LW_3	7/15/2003	13:40	10.0	17.7	8.1	53	10.1
LW_3	7/15/2003	13:41	11.0	17.0	8.0	53	10.2
LW_3	7/15/2003	13:41	12.0	16.6	7.9	53	10.2
LW_3	7/15/2003	13:42	14.0	13.7	7.6	52	10.1
LW_3	7/15/2003	13:43	16.0	11.6	7.5	52	10.2
LW_3	7/15/2003	13:44	18.0	11.0	7.4	52	10.2
LW_3	7/15/2003	13:45	22.0	9.2	7.3	52	10.1
LW_3	7/15/2003	13:46	26.0	8.2	7.3	52	10.1
LW_3	7/15/2003	13:47	30.0	7.7	7.2	51	10.1
LW_3	7/15/2003	13:48	34.0	7.5	7.2	51	10.1
LW_3	7/15/2003	13:49	38.0	7.4	7.2	51	10.1
LW_3	7/15/2003	13:50	42.0	7.4	7.2	51	10.1
LW_3	7/15/2003	13:51	48.2	7.3	7.2	52	10.0
LW_1	8/19/2003	10:26	0.3	21.8	8.3	57	9.5
LW_1	8/19/2003	10:27	1.0	21.9	8.3	56	9.4
LW_1	8/19/2003	10:28	2.0	21.8	8.3	56	9.3

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_1	8/19/2003	10:29	3.0	21.8	8.3	56	9.2
LW_1	8/19/2003	10:30	4.0	21.8	8.3	57	9.2
LW_1	8/19/2003	10:31	5.0	21.8	8.3	56	9.1
LW_1	8/19/2003	10:32	6.0	21.7	8.3	56	9.1
LW_1	8/19/2003	10:33	7.0	20.8	8.1	56	9.1
LW_1	8/19/2003	10:34	8.0	18.6	7.9	56	9.8
LW_1	8/19/2003	10:35	9.0	16.5	7.5	56	9.3
LW_1	8/19/2003	10:36	10.0	13.8	7.2	57	5.6
LW_1	8/19/2003	10:37	11.0	12.6	7.0	59	1.5
LW_1	8/19/2003	10:38	12.0	11.5	6.8	60	0.3
LW_1	8/19/2003	10:39	15.0	11.0	6.7	61	0.3
LW_1	8/19/2003	10:40	17.0	10.9	6.7	61	0.3
LW_1	8/19/2003	10:41	18.3	10.9	6.6	61	0.2
LW_2	8/19/2003	14:27	0.3	21.6	8.2	55	9.4
LW_2	8/19/2003	14:28	1.0	21.6	8.2	55	9.3
LW_2	8/19/2003	14:29	2.0	21.5	8.2	55	9.3
LW_2	8/19/2003	14:30	3.0	21.3	8.2	55	9.4
LW_2	8/19/2003	14:31	4.0	21.2	8.2	55	9.3
LW_2	8/19/2003	14:32	5.0	21.2	8.2	55	9.3
LW_2	8/19/2003	14:33	6.0	21.1	8.1	55	9.3
LW_2	8/19/2003	14:34	7.0	21.0	8.1	55	9.3
LW_2	8/19/2003	14:35	8.0	21.0	8.1	55	9.3
LW_2	8/19/2003	14:36	9.0	20.9	8.0	55	9.3
LW_2	8/19/2003	14:37	10.0	20.8	8.0	55	9.2
LW_2	8/19/2003	14:38	11.0	20.3	7.8	55	9.0
LW_2	8/19/2003	14:39	12.0	17.8	7.6	54	9.0
LW_2	8/19/2003	14:40	13.0	15.0	7.4	54	8.4
LW_2	8/19/2003	14:41	14.0	13.4	7.2	56	7.0
LW_2	8/19/2003	14:42	16.0	12.1	7.0	55	4.5
LW_2	8/19/2003	14:43	18.0	11.4	6.8	56	2.3
LW_3	8/19/2003	11:33	0.3	21.2	8.0	55	9.5
LW_3	8/19/2003	11:34	1.0	21.2	8.0	55	9.4
LW_3	8/19/2003	11:35	2.0	21.2	8.0	55	9.5
LW_3	8/19/2003	11:36	3.0	21.1	8.0	55	9.4
LW_3	8/19/2003	11:37	4.0	21.1	8.0	55	9.4
LW_3	8/19/2003	11:38	5.0	21.0	8.0	55	9.4
LW_3	8/19/2003	11:39	6.0	20.8	8.0	55	9.5
LW_3	8/19/2003	11:40	7.0	20.7	8.0	55	9.5
LW_3	8/19/2003	11:41	8.0	20.7	8.0	55	9.4
LW_3	8/19/2003	11:42	9.0	20.7	8.0	55	9.4
LW_3	8/19/2003	11:43	10.0	20.6	7.9	55	9.4
LW_3	8/19/2003	11:44	11.0	20.2	7.9	55	9.4
LW_3	8/19/2003	11:45	12.0	18.9	7.8	55	8.8
LW_3	8/19/2003	11:46	13.0	17.2	7.6	54	9.7
LW_3	8/19/2003	11:47	14.0	15.2	7.5	53	9.9
LW_3	8/19/2003	11:48	15.0	14.1	7.5	53	9.9
LW_3	8/19/2003	11:49	17.0	13.1	7.4	53	9.9
LW_3	8/19/2003	11:50	19.0	10.8	7.3	53	9.8
LW_3	8/19/2003	11:51	25.0	8.3	7.1	52	9.7

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_3	8/19/2003	11:52	30.0	7.7	7.1	52	9.8
LW_3	8/19/2003	11:53	35.0	7.5	7.1	52	9.8
LW_3	8/19/2003	11:54	40.0	7.4	7.1	52	9.9
LW_3	8/19/2003	11:55	45.0	7.4	7.1	52	9.8
LW_3	8/19/2003	11:56	49.2	7.4	7.1	52	9.8
LW_GenevaSill	8/19/2003	15:18	0.3	22.6	8.3	56	9.4
LW_GenevaSill	8/19/2003	15:19	1.0	22.6	8.3	56	9.4
LW_GenevaSill	8/19/2003	15:20	2.0	22.5	8.3	56	9.4
LW_StrawberrySill	8/19/2003	14:03	0.3	21.6	8.1	55	9.5
LW_StrawberrySill	8/19/2003	14:04	1.0	21.5	8.2	55	9.4
LW_StrawberrySill	8/19/2003	14:05	2.0	21.4	8.1	55	9.3
LW_StrawberrySill	8/19/2003	14:06	3.0	21.3	8.1	55	9.3
LW_StrawberrySill	8/19/2003	14:07	4.0	21.3	8.1	55	9.3
LW_StrawberrySill	8/19/2003	14:08	5.0	21.1	8.1	55	9.4
LW_StrawberrySill	8/19/2003	14:09	6.0	21.0	8.1	55	9.3
LW_1	9/23/2003	10:45	0.3	18.2	8.1	54	9.7
LW_1	9/23/2003	10:48	1.0	18.2	8.1	54	9.6
LW_1	9/23/2003	10:51	2.0	18.1	8.0	54	9.6
LW_1	9/23/2003	10:54	3.0	18.1	8.0	54	9.6
LW_1	9/23/2003	10:57	4.0	18.1	8.0	54	9.5
LW_1	9/23/2003	11:00	5.0	18.0	8.0	54	9.5
LW_1	9/23/2003	11:03	6.0	18.0	7.9	54	9.5
LW_1	9/23/2003	11:06	7.0	17.8	7.9	54	9.2
LW_1	9/23/2003	11:09	8.0	17.6	7.7	54	8.5
LW_1	9/23/2003	11:12	9.0	17.3	7.5	54	7.7
LW_1	9/23/2003	11:15	10.0	16.5	7.0	56	2.5
LW_1	9/23/2003	11:16	11.0	13.2	6.8	61	0.3
LW_1	9/23/2003	11:17	12.0	12.4	6.7	63	0.3
LW_1	9/23/2003	11:18	16.0	11.0	6.6	64	0.2
LW_1	9/23/2003	11:20	18.6	10.9	6.6	64	0.2
LW_GenevaSill	9/23/2003	11:32	0.3	18.4	7.9	53	9.5
LW_GenevaSill	9/23/2003	11:33	1.0	18.4	7.9	53	9.4
LW_GenevaSill	9/23/2003	11:34	2.0	18.2	7.9	53	9.4
LW_GenevaSill	9/23/2003	11:35	3.0	17.9	7.8	54	8.6
LW_2	9/23/2003	11:55	0.3	18.7	8.1	52	9.7
LW_2	9/23/2003	11:57	1.0	18.6	8.1	53	9.7
LW_2	9/23/2003	11:59	2.0	18.4	8.2	53	9.7
LW_2	9/23/2003	12:01	3.0	18.4	8.1	53	9.7
LW_2	9/23/2003	12:03	4.0	18.4	8.1	53	9.6
LW_2	9/23/2003	12:05	5.0	18.4	8.1	53	9.6
LW_2	9/23/2003	12:07	6.0	18.3	8.1	53	9.6
LW_2	9/23/2003	12:09	7.0	18.3	8.1	53	7.6
LW_2	9/23/2003	12:11	8.0	18.3	8.1	53	9.6
LW_2	9/23/2003	12:13	9.0	18.2	8.0	53	9.4
LW_2	9/23/2003	12:15	10.0	18.1	7.9	53	9.3
LW_2	9/23/2003	12:18	11.0	18.0	7.7	53	9.0
LW_2	9/23/2003	12:21	12.0	18.0	7.6	53	8.6
LW_2	9/23/2003	12:24	13.0	17.8	7.4	53	8.3

Table C-7. Lake Whatcom Hydrolab© Profile Data.

Site	Date	Time	Depth (m)	Temp (°C)	pH (s.u.)	COND (µS/cm)	DO (mg/L)
LW_2	9/23/2003	12:27	14.0	15.7	6.8	54	3.0
LW_2	9/23/2003	12:30	15.0	13.0	6.6	56	0.3
LW_2	9/23/2003	12:33	16.0	11.9	6.6	57	0.3
LW_2	9/23/2003	12:35	17.5	11.4	6.6	57	0.3
LW_StrawberrySill	9/23/2003	13:02	0.3	18.6	8.1	53	9.7
LW_StrawberrySill	9/23/2003	13:03	1.0	18.6	8.1	53	9.7
LW_StrawberrySill	9/23/2003	13:04	2.0	18.5	8.1	53	9.7
LW_StrawberrySill	9/23/2003	13:05	3.0	18.5	8.1	53	9.7
LW_StrawberrySill	9/23/2003	13:06	4.0	18.4	8.1	53	9.7
LW_StrawberrySill	9/23/2003	13:07	5.0	18.4	8.1	53	9.7
LW_StrawberrySill	9/23/2003	13:08	6.0	18.4	8.1	53	9.7
LW_3	9/23/2003	13:30	0.3	18.5	8.1	53	9.7
LW_3	9/23/2003	13:31	1.0	18.5	8.1	53	9.7
LW_3	9/23/2003	13:32	2.0	18.5	8.1	53	9.7
LW_3	9/23/2003	13:33	3.0	18.4	8.1	53	9.7
LW_3	9/23/2003	13:34	4.0	18.3	8.2	53	9.7
LW_3	9/23/2003	13:35	5.0	18.3	8.2	53	9.7
LW_3	9/23/2003	13:36	6.0	18.2	8.2	53	9.7
LW_3	9/23/2003	13:37	7.0	18.2	8.1	53	9.7
LW_3	9/23/2003	13:38	8.0	18.2	8.1	53	9.7
LW_3	9/23/2003	13:39	9.0	18.1	8.0	53	9.6
LW_3	9/23/2003	13:40	10.0	18.1	8.0	53	9.5
LW_3	9/23/2003	13:41	11.0	18.1	8.0	53	9.5
LW_3	9/23/2003	13:42	12.0	18.0	7.9	53	9.5
LW_3	9/23/2003	13:43	13.0	18.0	7.9	53	9.5
LW_3	9/23/2003	13:44	14.0	17.8	7.8	52	9.4
LW_3	9/23/2003	13:45	15.0	17.6	7.7	52	9.3
LW_3	9/23/2003	13:46	16.0	17.1	7.6	52	9.3
LW_3	9/23/2003	13:47	17.0	14.6	7.3	51	8.8
LW_3	9/23/2003	13:48	18.0	12.1	7.2	51	8.8
LW_3	9/23/2003	13:49	20.0	10.3	7.1	50	8.9
LW_3	9/23/2003	14:05	22.0	9.7	7.1	50	8.9
LW_3	9/23/2003	14:06	26.0	8.1	7.0	50	9.0
LW_3	9/23/2003	14:07	30.0	7.7	7.0	50	9.3
LW_3	9/23/2003	14:08	34.0	7.6	7.0	50	9.3
LW_3	9/23/2003	14:09	38.0	7.5	7.0	48	9.4
LW_3	9/23/2003	14:10	42.0	7.4	6.9	49	9.3
LW_3	9/23/2003	14:11	46.0	7.4	6.9	51	9.4
LW_3	9/23/2003	14:12	49.1	7.4	6.9	50	9.3

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Appendix D.
Phytoplankton Identification Summaries

Lake Whatcom, 2002 Phytoplankton

The phytoplankton in Lake Whatcom was sampled on July 2, August 13, and September 5, 2002. Three sites and three depths were sampled, for a total of 27 samples in 2002.

Species Present

The attached Project Algae Species List for all 27 Lake Whatcom samples shows that the most common algae for the samples collected were:

- Cyclotella stelligera 43.3%
- Rhodomonas minuta 18.0
- Cyclotella comta 14.9
- Cryptomonas erosa 6.6
- Cyclotella kutzingiana 3.6
- Cyclotella ocellata 2.9
- Ankistrodesmus falcatus 1.3
- Sphaerocystis schroeteri 1.2

All other algae were less than 1% for the combined samples.

Cyclotella stelligera is a very small centric diatom characteristic of clear, oligotrophic lakes. Rhodomonas minuta, a cryptophyte, is a very widespread alga that occurs under a wide range of ecological conditions. The three other species of Cyclotella are generally found in oligotrophic, sometimes mesotrophic lakes. Cryptomonas erosa, like Rhodomonas minuta, is a widespread cryptophyte occurring in a diversity of habitats; it tends to be more common in cooler and lower light waters than Rhodomonas minuta. Ankistrodesmus falcatus and Sphaerocystis schroeteri are green algae common to oligotrophic to mesotrophic lakes.

Algae Abundance

The abundance of phytoplankton can be represented in various ways, including density (number per mL), biovolume (cubic micrometers per mL), and calculations of biovolume into a Trophic State Index (TSI).

The algal densities for Lake Whatcom for this sampling period ranged from 426 to 2,047 per mL, with an average for all 27 samples of 1,084 per mL.

The algal biovolumes ranged from 138,570 to 1,554,666 cubic micrometers per mL, with an average of 478,946.

The TSI's ranged from 35.6 to 53.0, with an average of 43.0.

These abundances indicate Lake Whatcom to be classified in the mesotrophic range.

Relationships Between Sites

Species Composition

For all dates, each site had the following algae common:

Site 1	Site 2	Site 3
Cyclotella stelligera	Cyclotella stelligera	Cyclotella stelligera
Cyclotella comta	Rhodomonas minuta	Rhodomonas minuta
Rhodomonas minuta	Cyclotella comta	Cyclotella comta
Cryptomonas erosa	Cryptomonas erosa	Cryptomonas erosa

All sites had very similar species compositions; site 1 was slightly different from 2 and 3.

Similarity Indices (SI) were calculated between each pair of sites (1+2, 2+3, and 1+3) for each month. The average SI's were:

- Sites 1 + 2 average SI = 72
- Sites 2 + 3 average SI = 81
- Sites 1 + 3 average SI = 66

From these SI data, it appears that sites 2 and 3 are most similar, followed by sites 1 and 2. Sites 1 and 3 are least similar, in terms of phytoplankton species composition.

Species Abundance

Using the Trophic State Index (TSI) to represent algal abundance, the following averages of all 9 samples per site were found:

- Site 1 average TSI = 44.6
- Site 2 average TSI = 42.6
- Site 3 average TSI = 41.9

Site 1, considering the average of all 3 depths on all 3 dates, had the most algae, and site 3 had the least. Sites 2 and 3 were slightly more similar together (TSI difference = 0.7) than site 1 with any other (TSI differences = 2.0 and 2.7).

Relationships Between Dates

Species Composition

Species lists compiled from all sites and depths within each sampling date show the following common algae:

July 2, 2003	August 13, 2002	September 5, 2002
Cyclotella stelligera	Cyclotella stelligera	Cyclotella stelligera
Cyclotella comta	Rhodomonas minuta	Rhodomonas minuta
Rhodomonas minuta	Cryptomonas erosa	Cyclotella comta
Cryptomonas erosa	Cyclotella comta	Cryptomonas erosa

The phytoplankton species communities are very similar between each month that Lake Whatcom was sampled. The 4 most common algae were present each month, with only slight differences in relative abundance.

Similarity Indices (SI's) were calculated using all surface samples at all sites between each date. The average SI's were:

- July + August average SI = 49
- August + September average SI = 55
- July + September average SI = 64

Interestingly, the phytoplankton species communities were most similar between July and September (SI = 64).

Species Abundance

Using the Trophic State Index (TSI) to represent algal abundance, the following averages of all 9 samples per date were found:

- July 2 average TSI = 47.3
- August 13 average TSI = 41.6
- September 5 average TSI = 40.1

The highest algal abundance was during July (TSI = 47.3), and the lowest was during September (TSI = 40.1).

Jim Sweet
Aquatic Analysts
February 28, 2003

Lake Whatcom, 2003 Phytoplankton

The phytoplankton in Lake Whatcom were sampled on May 6-8, June 3-5, July 8-10, August 5-7, and September 2-4, 2003. Three sites and three depths were sampled, for a total of 45 samples in 2003.

There were also 27 samples collected on 3 occasions in 2002; comparisons between years are reported.

Species Present

The attached Project Algae Species List for all 45 Lake Whatcom samples shows the most common algae, in terms of relative densities, were:

- Cyclotella stelligera 41.4%
- Rhodomonas minuta 15.7
- Cyclotella comta 10.9
- Synedra radians 6.1
- Cyclotella ocellata 6.1
- Cryptomonas erosa 4.0
- Anacystis marina 3.8
- Dinobryon sertularia 2.7

All other algae were less than 1% for the combined samples.

Cyclotella stelligera is a very small centric diatom characteristic of clear, oligotrophic lakes. Rhodomonas minuta, a cryptophyte, is a very widespread alga that occurs under a wide range of ecological conditions. The two other species of Cyclotella are generally found in oligotrophic, sometimes mesotrophic lakes. Cryptomonas erosa, like Rhodomonas minuta, is a widespread cryptophyte occurring in a diversity of habitats; it tends to be more common in cooler and lower light waters than Rhodomonas minuta.

New to this "most common algae" list in 2003 are Synedra radians, Anacystis marina, and Dinobryon sertularia. Synedra radians tends to be found more often in eutrophic lakes. Anacystis marina and Dinobryon sertularia are more typical of mesotrophic to oligtotrophic lakes.

Algae Abundance

The abundance of phytoplankton can be represented in various ways, including density (number per mL), biovolume (cubic micrometers per mL), and calculations of biovolume into a Trophic State Index (TSI).

The table below gives the minimum, maximum, and average abundances for all 45 samples collected in 2003 from Lake Whatcom:

Lake Whatcom, 2003	Density	Biovolume	TSI
Minimum	481	137,801	35.6
Maximum	4,905	2,117,227	55.3
Average	1,665	490,562	43.0

These abundances indicate Lake Whatcom to be classified in the mesotrophic range.

Relationships Between Sites

Species Composition

Combining all 15 samples (all dates and depths) for each site, the following algae were most common (see attached Project Algae Species Lists for complete list of algae):

Site 1	Site 2	Site 3
Cyclotella stelligera	Cyclotella stelligera	Cyclotella stelligera
Rhodomonas minuta	Rhodomonas minuta	Rhodomonas minuta
Cyclotella comta	Cyclotella comta	Cyclotella ocellata
Synedra radians	Cyclotella ocellata	Cyclotella comta
Anacystis marina	Synedra radians	Synedra radians

Overall, all sites were similar in terms of algal species composition; only minor shifts in the top 5 algae occurred. Cyclotella ocellata was less common at site 1 than the other sites, and Anacystis marina was more common at site 1.

Similarity Indices (SI) were calculated between each pair of sites for each month, given in the following table: (using 0.3 meter samples only)

SI's	May	June	July	August	September	Average
1 + 2	83	55	72	47	53	62
2 + 3	87	71	61	92	83	79
1 + 3	80	43	54	48	46	54

Each month, sites 2 and 3 were most similar, and sites 1 and 3 were least similar (August close).

Species Abundance

Using the Trophic State Index (TSI) to represent algal abundance, the following averages of all 15 samples per site were found:

- Site 1 average TSI = 43.7
- Site 2 average TSI = 42.7
- Site 3 average TSI = 42.8

Site 1 had slightly more algae than the other two sites. However, the range of TSI's is low and very little difference in algae abundance exist between the sites.

Relationships Between Dates

Species Composition

Species lists compiled from all sites and depths within each sampling date of 2003 show the following common algae:

May	June	July	August	September
Cyclotella stelligera	Cyclotella stelligera	Cyclotella comta	Cyclotella stelligera	Rhodomonas minuta
Synedra radians	Cyclotella comta	Rhodomonas minuta	Synedra radians	Cyclotella ocellata
Rhodomonas minuta	Rhodomonas minuta	Cyclotella stelligera	Rhodomonas minuta	Anacystis marina
Dinobryon sertularia	Cryptomonas erosa	Cryptomonas erosa	Cryptomonas erosa	Cyclotella stelligera
Cryptomonas erosa	Dinobryon sertularia	Dinobryon sertularia	Cyclotella comta	Cryptomonas erosa

In general, the same species occurred each month in Lake Whatcom; only the relative abundances of each shifted somewhat.

Algae Abundance

Using the Trophic State Index (TSI) to represent algal abundance, the following averages of all 9 samples per date were found:

- May average TSI = 45.6
- June average TSI = 41.5
- July average TSI = 47.7
- August average TSI = 41.5
- September average TSI = 38.9

The highest algal abundance was during July (TSI = 47.7), and the lowest was during September (TSI = 38.9). However, the range of TSI's (38.9 to 47.7) are all fairly close (all mesotrophic), and only small differences between months were observed in the algal abundances.

Relationships Between 2002 and 2003

Species Composition

The following table gives the combined relative abundances of the most common algae for all samples collected within each year (27 in 2002; 45 in 2003):

Algae Species	2002	2003
Cyclotella stelligera	43.3	41.4
Rhodomonas minuta	18.0	15.7
Cyclotella comta	14.9	10.9
Synedra radians	0.4	6.1
Cyclotella ocellata	2.9	6.1
Cryptomonas erosa	6.6	4.0
Anacystis marina	0.0	3.8
Dinobryon sertularia	0.8	2.7
Ankistrodesmus falcatus	1.3	0.8
Sphaerocystis schroeteri	1.2	0.3
Cyclotella kutzingiana	3.6	0.0

The top three algae – Cyclotella stelligera, Rhodomonas minuta, and Cyclotella comta, had the same rank in both 2002 and 2003, and their relative densities were similar. Most other common algae shifted in rank somewhat, and a few algae common in one year were absent in the other year (Anacystis marina, Cyclotella kutzingiana).

Jim Sweet
Aquatic Analysts
December 15, 2003

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Appendix E.
Lake Whatcom CE-QUAL-W2 Calibration Error Statistics

History of Calibration

- July 2005: Original Calibration with CE-QUAL-W2 version 3.2 (Berger and Wells, 2005).
- January 2007: Sediment variable stoichiometry feature added to modeling program. Second model calibration (Berger and Wells, 2007a).
- August 2007: CE-QUAL-W2 version 3.5 officially released which includes variable stoichiometry feature.
- November 2007: Third model calibration with HSPF-generated tributary flows and phosphorus (Berger and Wells, 2007b).
- February 2008: Minor modifications to model parameters and calibration check (Berger, 2008a).
- July 2008: Minor modifications to water balance approach and calibration check (Berger, 2008b)

Hydrodynamic Calibration

Table E-1. Water level error statistics (in meters).

Mean Error	Absolute Mean Error	Root Mean Square Error
0.00	0.01	0.01

Temperature Calibration

Table E-2. Temperature profile error statistics.

Site	Model Segment #	Mean Error (Celsius)	Absolute Mean Error (Celsius)	Root Mean Square Error (Celsius)
LW1	61	-0.11	0.69	0.79
LW2	52	0.14	0.57	0.67
LW3	25	-0.08	0.42	0.53
LW4	11	-0.11	0.52	0.62
Intake	54	-0.04	0.45	0.50
	Average	-0.04	0.53	0.62

Table E-2. CE-QUAL-W2 water quality variables (coefficients) for Lake Whatcom model.

Variable	Description	Units	Default values*	Calibration Values
Hydrodynamics and Longitudinal Transport				
AX	Longitudinal eddy viscosity (for momentum dispersion)	m^2/sec	1	1
DX	Longitudinal eddy diffusivity (for dispersion of heat and constituents)	m^2/sec	1	1
Temperature				
CBHE	Coefficient of bottom heat exchange	Wm^2/sec	0.30	0.30
TSED	Sediment (ground) temperature	°C	12.8	11.5
WSC	Wind sheltering coefficient		0.85	0.6-3.3
BETA	Fraction of incident solar radiation absorbed at the water surface		0.45	0.45
Water Quality				
EXH20	Extinction for water	/m	0.25	0.25 for wb 1 0.28 for wb 2
EXSS	Extinction due to inorganic suspended solids	m^3/m/g	0.01	0.1
EXOM	Extinction due to organic suspended solids	m^3/m/g	0.17	0.10 for wb 1 0.08 for wb 2
EXA	Extinction due to organic algal type 1	m^3/m/g	0.1	0.1
SSS	Suspended solids settling rate	m/day	2	1.5
AG1	Algal growth rate for algal type 1	/day	1.1	1.65
AM1	Algal mortality rate for algal type 1	/day	0.01	0.07
AE1	Algal excretion rate for algal type 1	/day	0.01	0.04
AR1	Algal dark respiration rate for algal type 1	/day	0.02	0.04
AS1	Algal settling rate for algal type 1	/day	0.14	0.1
ASAT1	Saturation intensity at maximum photosynthetic rate for algal type 1	W/m^2	150	50
APOM1	Fraction of algal biomass lost by mortality to detritus for algal type 1		0.8	0.9
AT11	Lower temperature for algal growth for algal type 1	°C	10	4
AT21	Lower temperature for maximum algal growth for algal type 1	°C	30	10
AT31	Upper temperature for maximum algal growth for algal type 1	°C	35	14
AT41	Upper temperature for algal growth for algal type 1	°C	40	25
AK11	Fraction of algal growth rate at ALGT1 for		0.1	0.2

Variable	Description	Units	Default values*	Calibration Values
	algal type 1			
AK21	Fraction of maximum algal growth rate at ALGT2 for algal type 1		0.99	0.6
AK31	Fraction of maximum algal growth rate at ALGT3 for algal type 1		0.99	0.99
AK41	Fraction of algal growth rate at ALGT4 for algal type 1		0.1	0.1
ALGP-A1	Stoichiometric equivalent between organic matter and phosphorus for algal type 1		0.011	0.004
ALGN-A1	Stoichiometric equivalent between organic matter and nitrogen for algal type 1		0.08	0.08
ALGC-A1	Stoichiometric equivalent between organic matter and carbon for algal type 1		0.45	0.55
ACHLA3	Ration between algal biomass and chlorophylla for algal type 3		145	130
AG2	Algal growth rate for algal type 2	/day	1.1	1.8
AM2	Algal mortality rate for algal type 2	/day	0.01	0.06
AE2	Algal excretion rate for algal type 2	/day	0.01	0.04
AR2	Algal dark respiration rate for algal type 2	/day	0.02	0.04
AS2	Algal settling rate for algal type 2	/day	0.14	0.1
ASAT2	Saturation intensity at maximum photosynthetic rate for algal type 2	W/m^2	150	75
APOM2	Fraction of algal biomass lost by mortality to detritus for algal type 2		0.8	0.8
AT12	Lower temperature for algal growth for algal type 2	^oC	10	8
AT22	Lower temperature for maximum algal growth for algal type 2	^oC	30	12
AT32	Upper temperature for maximum algal growth for algal type 2	^oC	35	16
AT42	Upper temperature for algal growth for algal type 2	^oC	40	30
AK12	Fraction of algal growth rate at ALGT1 for algal type 2		0.1	0.1
AK22	Fraction of maximum algal growth rate at ALGT2 for algal type 2		0.99	0.6
AK32	Fraction of maximum algal growth rate at ALGT3 for algal type 2		0.99	0.99
AK42	Fraction of algal growth rate at ALGT4 for algal type 2		0.1	0.1
ALGP-A2	Stoichiometric equivalent between organic matter and phosphorus for algal type 2		0.011	0.0035
ALGN-A2	Stoichiometric equivalent between organic matter and nitrogen for algal type 2		0.08	0.08
ALGC-A2	Stoichiometric equivalent between organic matter and carbon for algal type 2		0.45	0.55

Variable	Description	Units	Default values*	Calibration Values
ACHLA2	Ration between algal biomass and chlorophylla for algal type 2		145	90
AG3	Algal growth rate for algal type 3	/day	1.1	1.85
AM3	Algal mortality rate for algal type 3	/day	0.01	0.06
AE3	Algal excretion rate for algal type 3	/day	0.01	0.04
AR3	Algal dark respiration rate for algal type 3	/day	0.02	0.04
AS3	Algal settling rate for algal type 3	/day	0.14	0.01
ASAT3	Saturation intensity at maximum photosynthetic rate for algal type 3	W/m^2	150	130
APOM3	Fraction of algal biomass lost by mortality to detritus for algal type 3		0.8	0.9
AT13	Lower temperature for algal growth for algal type 3	^oC	10	8
AT23	Lower temperature for maximum algal growth for algal type 3	^oC	30	16
AT33	Upper temperature for maximum algal growth for algal type 3	^oC	35	20
AT43	Upper temperature for algal growth for algal type 3	^oC	40	30
AK13	Fraction of algal growth rate at ALGT1 for algal type 3		0.1	0.1
AK23	Fraction of maximum algal growth rate at ALGT2 for algal type 3		0.99	0.60
AK33	Fraction of maximum algal growth rate at ALGT3 for algal type 3		0.99	0.99
AK43	Fraction of algal growth rate at ALGT4 for algal type 3		0.1	0.1
ALGP-A3	Stoichiometric equivalent between organic matter and phosphorus for algal type 3		0.011	0.003
ALGN-A3	Stoichiometric equivalent between organic matter and nitrogen for algal type 3		0.08	0.08
ALGC-A2	Stoichiometric equivalent between organic matter and carbon for algal type 3		0.45	0.55
ACHLA3	Ration between algal biomass and chlorophylla for algal type 3		145	90
LDOMDK	Labile DOM decay rate	/day	0.12	WB1:0.060 WB2:0.060
LRDDK	Labile to refractory decay rate	/day	0.001	0.01
RDOMDK	Maximum refractory decay rate	/day	0.001	0.001
LPOMDK	Labile Detritus decay rate	/day	0.06	WB1:0.020 WB2:0.020
POMS	Detritus settling rate	m/day	0.35	WB1:1.0 WB2:0.3
RPOMDK	Refractory Detritus decay rate	/day		0.001
OMT1	Lower temperature for organic matter decay	^oC	4	4

Variable	Description	Units	Default values*	Calibration Values
OMT2	Lower temperature for maximum organic matter decay	°C	20	20
OMK1	Fraction of organic matter decay rate at OMT1		0.2	0.2
OMK2	Fraction of organic matter decay rate at OMT2		0.99	0.99
PARTP	Phosphorous partitioning coefficient for suspended solids		1.2	0
PO4R	Sediment release rate of phosphorus, fraction of SOD		0.001	WB1:0.0001 WB2:0.0001
AHSP1	Algal half-saturation constant for phosphorous – algae 1	g/m	0.009	0.002
AHSP2	Algal half-saturation constant for phosphorous – algae 2	g/m	0.009	0.0025
AHSP3	Algal half-saturation constant for phosphorous –algae 3	g/m	0.009	0.002
NH4DK	Ammonia decay rate (nitrification rate)	/day	0.12	0.25
AHSN	Algal half-saturation constant for ammonia	g/m^3	0.014	0.014
NH4T1	Lower temperature for ammonia decay	°C	5	5
NH4T2	Lower temperature for maximum ammonia decay	°C	20	25
NH4K1	Fraction of nitrification rate at NH4T1		0.1	0.1
NH4K2	Fraction of nitrification rate at NH4T2		0.99	0.99
NO3DK	Nitrate decay rate (denitrification rate)	/day	0.102	0.05
NO3S	Denitrification rate from sediments	m/day	1.0	0.1
\NO3T1	Lower temperature for nitrate decay	°C	5	5
NO3T2	Lower temperature for maximum nitrate decay	°C	20	25
NO3K1	Fraction of denitrification rate at NO3T1		0.1	0.1
NO3K2	Fraction of denitrification rate at NO3T2		0.99	0.99
CO2R	Sediment carbon dioxide release rate, fraction of sediment oxygen demand		1.2	WB1:2.0 WB2:1.0
O2NH4	Oxygen stoichiometric equivalent for ammonia decay		4.57	4.57
O2OM	Oxygen stoichiometric equivalent for organic matter decay		1.4	1.4
O2AR	Oxygen stoichiometric equivalent for dark respiration		1.4	1.1
O2AG	Oxygen stoichiometric equivalent for algal growth		1.4	1.8
O2LIM	Dissolved oxygen concentration at which anaerobic processes begin	g/m^3	0.05	0.1
SEDB	Sediment burial rate	/day		0.007

* Cole and Wells (2006)

Table E-3. Model-data error statistics for orthophosphorus.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	0.003	0.005	0.006
LW2	52	0.001	0.003	0.003
LW3	25	0.001	0.002	0.002
LW4	11	0.001	0.002	0.002
INTAKE	54	-0.001	0.002	0.002
Average		0.001	0.003	0.003

Table E-4. Model-data error statistics for ammonia nitrogen.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	-0.005	0.030	0.037
LW2	52	-0.002	0.020	0.030
LW3	25	0.002	0.005	0.006
LW4	11	0.001	0.004	0.005
INTAKE	54	0.006	0.007	0.007
Average		0.000	0.013	0.017

Table E-5. Model-data error statistics for nitrite-nitrate nitrogen.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	0.09	0.11	0.12
LW2	52	0.02	0.05	0.05
LW3	25	0.00	0.04	0.04
LW4	11	-0.01	0.04	0.04
INTAKE	54	0.02	0.05	0.05
Average		0.02	0.06	0.06

Table E-6. Model-data error statistics for dissolved oxygen.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	0.35	1.00	1.32
LW2	52	-0.12	0.68	0.77
LW3	25	0.15	0.58	0.68
LW4	11	0.26	0.68	0.75
INTAKE	54	-0.02	0.66	0.69
Average		0.12	0.72	0.84

Table E-7. Model-data error statistics for alkalinity.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	-2.40	2.40	2.52
LW2	52	-1.45	1.45	1.61
LW3	25	-0.76	0.76	0.84
LW4	11	-0.55	0.57	0.67
INTAKE	54	-1.10	1.10	1.11
Average		-1.25	1.26	1.35

Table E-8. Model-data error statistics for total persulfate nitrogen.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	0.06	0.08	0.10
LW2	52	-0.04	0.06	0.07
LW3	25	-0.04	0.05	0.05
LW4	11	-0.05	0.06	0.06
INTAKE	54	-0.04	0.04	0.04
Average		-0.02	0.06	0.06

Table E-9. Model-data error statistics for total phosphorus.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	0.001	0.005	0.007
LW2	52	0.000	0.004	0.004
LW3	25	0.000	0.003	0.004
LW4	11	0.001	0.003	0.004
INTAKE	54	0.000	0.003	0.003
Average		0.000	0.004	0.004

Table E-10. Model-data error statistics for chlorophyll a.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	0.34	1.49	1.77
LW2	52	-0.51	0.96	1.10
LW3	25	-0.74	1.03	1.12
LW4	11	-0.58	0.88	0.98
INTAKE	54	-0.16	1.31	1.32
Average		-0.33	1.13	1.26

Table E-11. Model-data error statistics for pH.

Site ID	Model Segment #	Mean Error (mg/l)	Mean Absolute Error (mg/l)	Root Mean Square Error (mg/l)
LW1	61	-0.13	0.29	0.37
LW2	52	-0.13	0.23	0.27
LW3	25	0.02	0.19	0.21
LW4	11	0.08	0.19	0.22
INTAKE	54	-0.20	0.35	0.36
Average		-0.07	0.25	0.29

Appendix F.
Bacterial Analysis Method

Statistical Theory of Rollback

The statistical rollback method proposed by Ott (1995) describes a way to use a numeric distribution of a water quality parameter to estimate the distribution after abatement processes are applied to sources. The method relies on basic dispersion and dilution assumptions and their effect on the distribution of a chemical or a bacterial population at a monitoring site downstream from a source. It then provides a statistical estimate of the new population after a chosen reduction factor is applied to the existing pollutant source. In the case of the Total Maximum Daily Load (TMDL), compliance with the most restrictive of the dual fecal coliform (FC) criteria will determine the reduction factor needed. This method has been used in many Ecology bacteria TMDLs, including Joy and Swanson (2005) and Ahmed and Rountry (2007).

As with many water quality parameters, FC counts collected over time at an individual site usually follow a log-normal distribution. Thus, log-normal distribution properties can be used to estimate the geometric mean and 90th percentile bacterial concentrations. When these estimates are higher than the standards, the target reductions are simply estimated by rolling back the estimated geometric mean or 90th percentile concentrations (whichever is most restrictive) to the respective water quality standards. Here is how the process works:

a) The data are first plotted on a log-scale against a linear cumulative probability function. A straight line signifies a log-normal distribution of the data.

b) The geometric mean of the data has a cumulative probability of 0.5. Alternately, the geometric mean can be estimated by the following formula:

$$\text{geometric mean} = 10^{\mu_{\log}}$$

where: $\mu_{\log}$ = mean of the log-transformed data

c) The 90th percentile of the data has a cumulative probability of 0.9. This is equivalent to the "no more than 10% samples exceeding …." criterion in the fecal coliform standard (WAC 173-201A). Alternately, the 90th percentile can also be estimated by using the following statistical equation:

$$90^{th}\ \text{percentile} = 10^{(\mu_{\log} + 1.28\sigma_{\log})}$$

where: $\sigma_{\log}$ = standard deviation of the log-transformed data

d) The target percent reduction required is the higher of the following two comparisons.

$$\left[\frac{\text{observed } 90^{\text{th}} \text{ percentile} - 90^{\text{th}} \text{ percentile criterion}}{\text{observed 90th percentile}}\right] \text{x } 100$$

or:

$$\left[\frac{\text{observed geometric mean} - \text{geometric mean criterion}}{\text{observed geometric mean}}\right] \text{x } 100$$

e) As "best management practices" for nonpoint sources and treatment technologies for point sources are implemented and the target reductions are achieved, a new but similar distribution (same coefficient of variation) of the data is assumed to be realized with the previous mean and standard deviation reduced by the target percent reductions.

f) If the 90th percentile is limiting, then the goal would be to meet the 90th percentile fecal coliform standard, and no goals would be set for the geometric mean since, with the implementation of the target reductions, the already low geometric mean would only get better. Similarly, if the geometric mean is limiting, the goal would be to achieve the geometric mean standard with no goal for the already low 90th percentile concentration.

The 50th percentile (an estimate of the geometric mean) and the 90th percentile (a representation of the level over which 10% of the samples lie) can be located along a line plotted from an equation estimating the original monthly FC data distribution.

In Figure F1, these numbers are 173 cfu/100 mL and 585 cfu/100 mL, respectively. Using the Ott statistical rollback method, the 90th percentile value is then reduced to 400 cfu/100 mL (*Secondary Contact Recreation* 90th percentile criterion), since 173 cfu/100 mL meets the *Secondary Contact* geometric mean criterion. The new distribution is plotted parallel to the original. The estimate of the geometric mean for this new distribution, located at the 50th percentile, is 118 cfu/100 mL. The result is a geometric mean target of a sample distribution that would likely have less than 10% of its samples over 400 cfu/100 mL. A 32% FC reduction is required from combined sources to meet this target distribution from the simple calculation: (585 - 400) / 585 = 0.316 * 100 = 31.6% (rounded to 32%).

The following is a summary of the major theorems and corollaries for the Statistical Theory of Rollback (STR) from *Environmental Statistics and Data Analysis* by Ott (1995).

1. If Q = the concentration of a contaminant at a source, and D = the dilution-diffusion factor, and X = the concentration of the contaminant at the monitoring site, then X = Q*D.
2. Successive random dilution and diffusion of a contaminant Q in the environment often result in a log-normal distribution of the contaminant X at a distant monitoring site.
3. The coefficient of variation (CV) of Q is the same before and after applying a "rollback" (i.e., the CV in the post-control state will be the same as the CV in the pre-control state). The rollback factor = r, a reduction factor expressed as a decimal (a 70% reduction would be a rollback factor of 0.3). The random variable Q represents a pre-control source output state and rQ represents the post-control state.

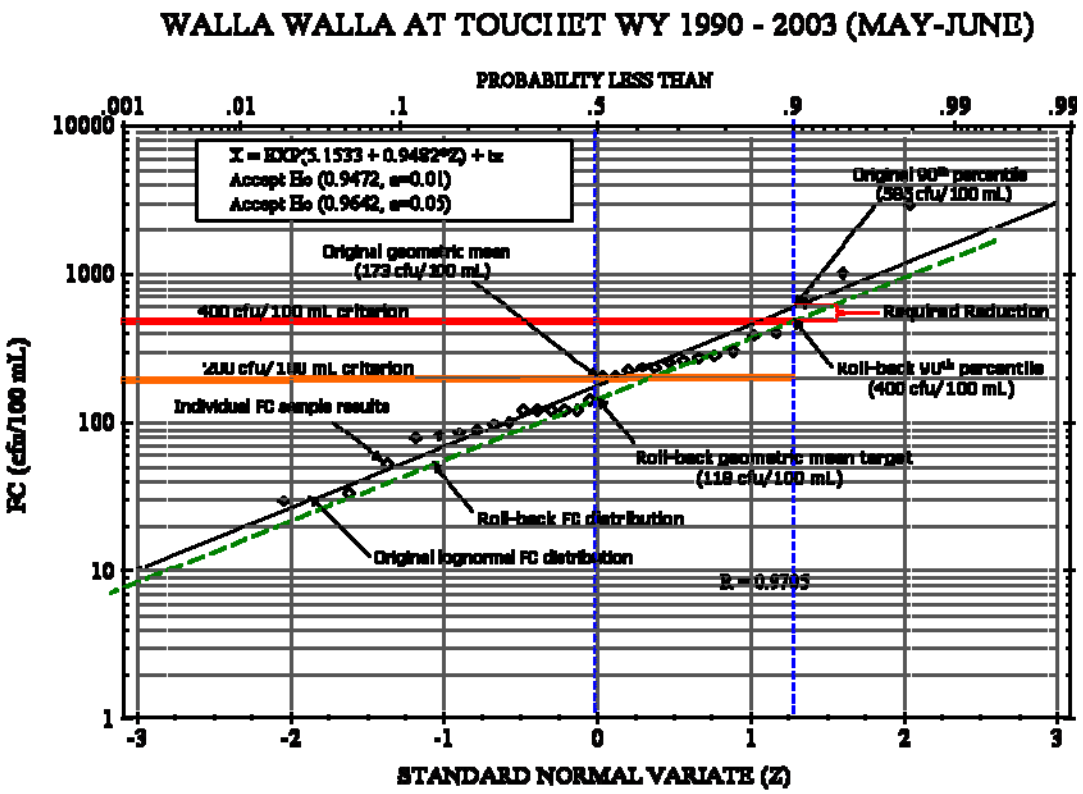

Figure F1. A graphical illustration of the Ott Statistical Rollback Method.

4. If D remains consistent in the pre-control and post-control states (long-term hydrological and climatic conditions remain unchanged), then CV(Q)*CV(D)=CV(X), and CV(X) will be the same before and after the rollback is applied.
5. If X is multiplied by the rollback factor, then the variance in the post-control state will be multiplied by r^2, and the post-control standard deviation will be multiplied by r.
6. If X is multiplied by the rollback factor, the quantiles of the concentration distribution will be scaled geometrically.
7. If any random variable is multiplied by r, then its expected value and standard deviation also will be multiplied by r, and its CV will be unchanged. (Ott uses "expected value" for the mean.)

Statistical Formulas for Deriving Percentile Values

The 90th percentile value for a population can be derived in several ways. The set of FC counts collected at a site were subjected to a statistically-based formula (Zar, 1984). The estimated 90th percentile is calculated by:

(a) Calculating the arithmetic mean and standard deviation of the sample result logarithms (base 10);
(b) Multiplying the standard deviation in (a) by 1.28;
(c) Adding the product from (b) to the arithmetic mean;
(d) Taking the antilog (base 10) of the results in (c) to get the estimated 90th percentile.

The 90th percentile derived using this formula assumes a log-normal distribution of the FC data. The variability in the data is expressed by the standard deviation, and with some datasets it is possible to calculate a 90th percentile greater than any of the measured data.

Beales Ratio Equation

Beales ratio estimator from *Principles of Surface Water Quality Modeling and Control* by Thomann and Mueller (1987) provides a mass loading rate estimate of a pollutant. The formula for the unbiased stratified ratio estimator is used when continuous flow data are available for sites with less frequent pollutant sample data. The average load is then:

$$\overline{W}_p = \overline{Q}_p \cdot \frac{\overline{W}_c}{\overline{Q}_c} \cdot \left[\frac{1 + \left(1/n\right) \cdot \left(S_{QW} / \left(\overline{Q}_c \overline{W}_c\right)\right)}{1 + \left(1/n\right) \cdot \left(S_Q^2 / \overline{Q}_c^2\right)} \right]$$

where,

$\overline{W}_p$ is the estimated average load for the period,
p is the period,
$\overline{Q}_p$ is the mean flow for the period,
$\overline{W}_c$ is the mean daily loading for the days on which pollutant samples were collected,
$\overline{Q}_c$ is the mean daily flow for days when samples were collected,
n is the number of days when pollutant samples were collected.

Also,

$$S_{QW} = [1 / (n-1)] * \left[\left(\sum_{i=1}^{n} Q_{ci} * W_{ci} \right) - n * \overline{W_c} \, \overline{Q_c} \right]$$

and

$$S^2_Q = [1/ (n-1)] * \left[\left(\sum_{i=1}^{n} Q_{ci}^2 \right) - n * \overline{Q_c^2} \right]$$

where,

Q_{ci} are the individually measured flows,
W_{ci} is the daily loading for the day the pollutant samples were collected.