
APPENDIX A
Point Source Discharges

Point Source Discharges in Subsegment 020303

FILE NUMBER	COMPANY	FACILITY	LOCATION	FACILITY TYPE	RECEIVING WATER	SIC	INCLUDED IN MODEL?	INCLUDED IN TMDL?
LA0100595	AVONDALE CONTAINER YARD INC		AVONDALE, 101 AVONDALE GARDEN RD	CARGO CONTAINER REPAIR	DITCH-LAKE CATAOUATCHE	4231	no	no
WP2852	US OIL & GAS INC		COUBA ISLAND FIELD	OIL/GAS EXP. PROD. & DEV.	LAKE CATAOUATCHE, BAYOU BARDEAUX, BAYOU COUBA, LAKE SALVADOR	1311	no	no
LA0032131	ST CHARLES PAR	LULING OXIDATION POND	LULING, LAT 29 52 40 N LONG 90 21 40 W	OX POND	GEORGE COUSIN CANAL THEN LK CATAOUA	4952	no	YES
LA0075981	INTERNATIONAL MATEX TANK TERMINALS	AVONDALE TERMINAL	AVONDALE, 5450 RIVER RD	BULK LIQUID STORAGE	LABRANCHE CANAL	4226	no	no
LA0046221	ADM/GROWMARK	AMA FACILITY	AMA, RIVER RD, HWY 18	GRAIN ELEVATOR	LAKE CATAHOULA VIA CANALS	5153	no	YES
LAG830124	CIRCLE K STORES INC	STORE #2841	BOUTTE 13366 US HWY 90	ICAPC PETRO UST	LAKE CATAOUATCHE	9999	no	no
LA0054542	ATCHISON CASTINGS	FKA AVONDALE IND SVC FOUNDRY DIV	WAGGAMAN, 536 MODERN FARMS RD	FOUNDRY	INNER CATAOUATCHE C-CATAOUATCHE L	3325	no	no
LA0107093	SCHMILL'S GATOR FARM INC		LULING, 104 ELLINGTON AVE	ALLIGATOR FARM	COUSIN CANAL-LAKE CATAOUATCHE	279	no	YES

APPENDIX B

Calibration Survey Results

SUMMARY OF DATA COLLECTED DURING CALIBRATION SURVEY- LAKE CATAOUATCHE- 020303

Station	Date	Time	Total Depth of Water		Depth of WQ Measurements (m)	In situ Measurements						Nitrate NO ₃ -N (mg/L)	Nitrite NO ₂ -N (mg/L)	NH ₃ -N (mg/L)	TKN (mg/L)	Ortho P (mg/L)	Total P (mg/L)	Chloro A (mg/L)	Lab pH (su)	TSS (mg/L)	
			(ft)	(m)		Temp. (°C)	DO (mg/L)	DO Sat. (%)	Conduc. (umhos)	pH (su)											
020303-0	8/21/2002	1230	4	1.2	0.6	28.8	2.2	29	1280	7.6*	<0.1	<0.1	0.2	1.4	0.2	0.32	<0.01		7.5	5.7	
020303-1A	8/21/2002	740	9.8	3	1	28.7	1.7	22	1250	6.9	<0.1	<0.1	0.2	1.4	0.2	0.32	<0.01		7.5	5.7	
					2	28.6	1.8	23	1250	6.8											
					3	28.5	0.6	8	1250	6.7											
020303-1B	8/21/2002	800			1	28.7	1.8	23	1250	6.8	<0.1	<0.1	0.23	1.4	0.2	0.32	0.012		7.5	5.4	
020303-2	8/21/2002	815	9.2	2.8	1	29.2	1.9	25	1240	6.8											
					2	29	0.7	9	1250	6.7											
					2.5	28.9	0.1	1	1250	6.7											
020303-3	8/21/2002	840	9.3	2.8	1	29.6	1.7	22	1200	6.8	<0.1	<0.1	0.24	2	0.22	0.4	0.021		7.4	11	
					2	29.6	1.5	20	1200	6.8											
					2.5	29.6	1.5	20	1200	6.8											
020303-3.5	8/21/2002	1230			0.6	30	2.3	30	1090	7.4											
020303-4	8/21/2002	900	7.2	2.2	1	30	2.3	30	1030	6.9											
					2	30	2	26	1030	6.9											
020303-5	8/21/2002	915	2.7	0.8	0.3	30.2	1	133	995	6.7											
020303-6	8/21/2002		7.2	2.2	1	31	5	67	938	7.7*											
					2	30.7	4.4	59	925												
020303-7	8/21/2002	1410	7.2	2.2	1	30.9	7.1	95	1570	7.8*	<0.1	<0.1	0.12	1.2	0.11	0.11	<0.01		7.7	<5	
					2	30.6	6.7	90	1580												
020303-8	8/21/2002	945	4.2	1.3	1	31.4	5.9	80	980	7.6											
					2	31.4	6	81	980	7.6											
020303-9	8/21/2002	1430	8.1	2.5	1	30.2	7.4	98	1620	8.3*	<0.1	<0.1	0.13	1.4	<0.02	0.092	0.028		7.9	7.1	
					2	29.9	6.4	85	1630												
020303-10	8/21/2002	1555	8.2	2.5	1	31.9	7.1	97	1290	7.9*	<0.1	<0.1	0.12	1.4	0.04	0.1	<0.01		7.9	<5	
					2.5	31.2	5.2	70	1250												
020303-11	8/21/2002	1745	8.2	2.5	1	31.3	8	108	1800	8.6*											
					2	30.9	7.1	95	1800												
020303-12	8/21/2002	1725	5.2	1.6	1	30.8	6.9	93	1480	7.5*	<0.1	<0.1	0.13	1.4	0.1	0.19	0.023		7.6	8	
					1.5	30.7	6.6	88	1480												
020303-13	8/21/2002	1650	7.9	2.4	1	31.7	7.7	105	1920	7.8*											
					2	30.6	6.5	87	1860												
020303-14	8/21/2002	1620	6.2	1.9	1	31.6	7	95	1910	7.5*	<0.1	<0.1	0.12	0.87	<0.02	0.12	0.012		7.4	11	
					1.75	31.2	6	81	1870												

Notes: * Used a Hach Meter for pH

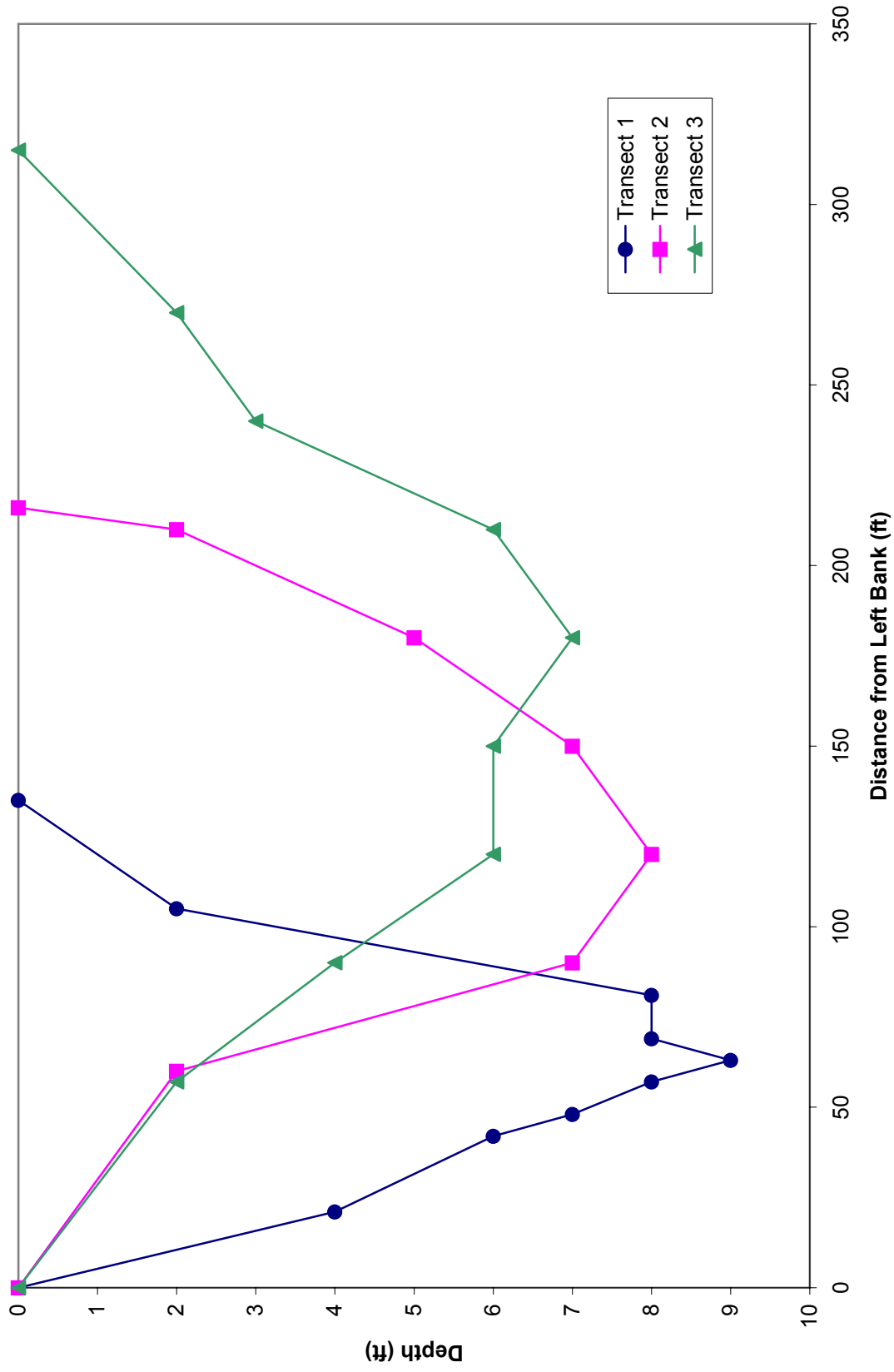
FILE: R:\PROJECTS\2110-611\CD_LAKE_CATAPP B CALIB SURVEY\REACH_WQ_DATA.XLS

Summary of CBODu values and Rates for Lake Cataouatche Calibration Survey

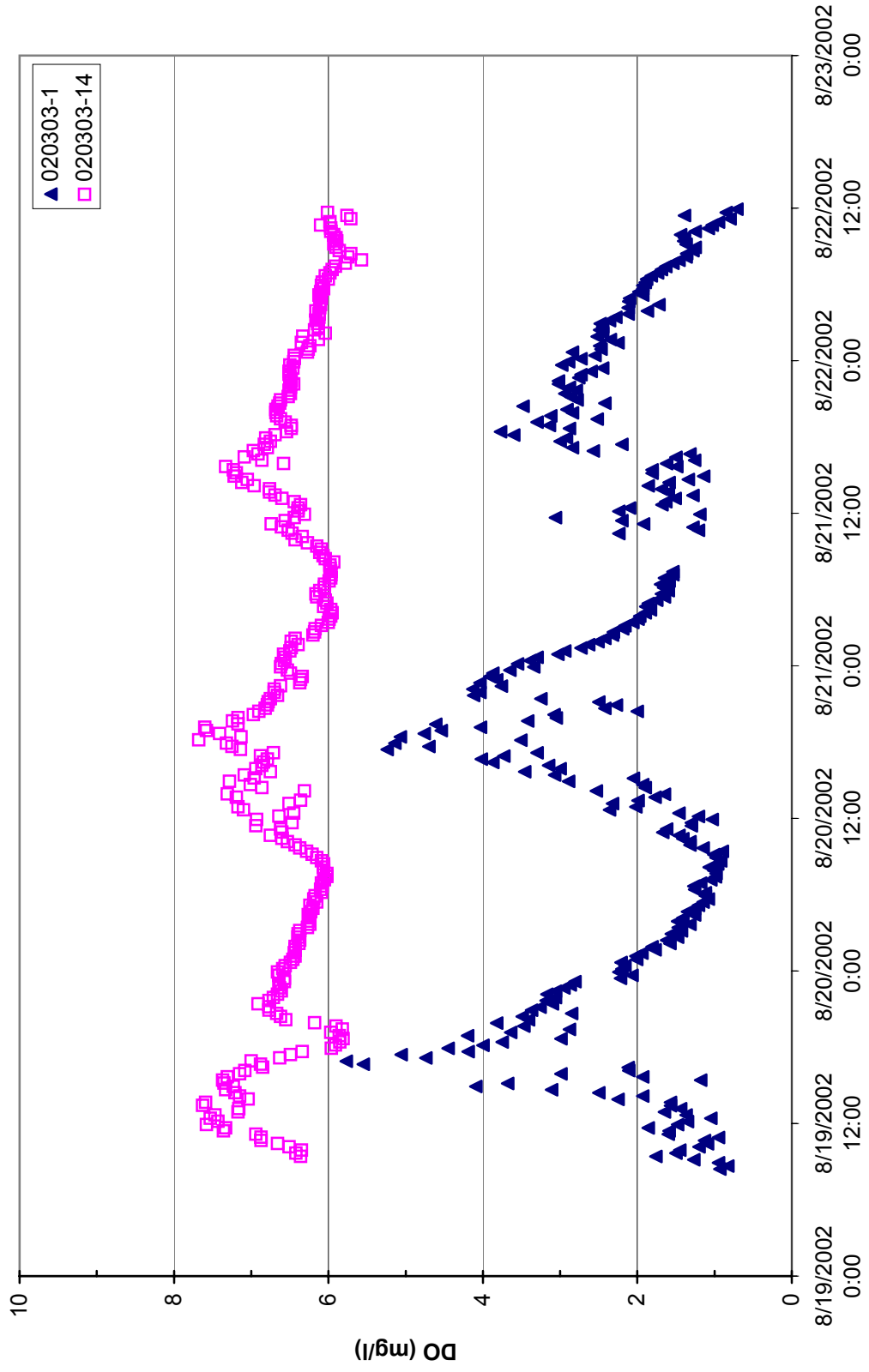
Sample No.	CBODu (mg/L)	CBODu rate (day ⁻¹)
020303-1A	3.92	0.22
020303-1B	4.14	0.38
020303-3	4.86	0.21
020303-7	2.78	0.27
020303-9	5.74	0.31
020303-10	2.36	0.24
020303-12	5.75	0.18
020303-14	2.61	0.21
AVG =	4.02	0.25

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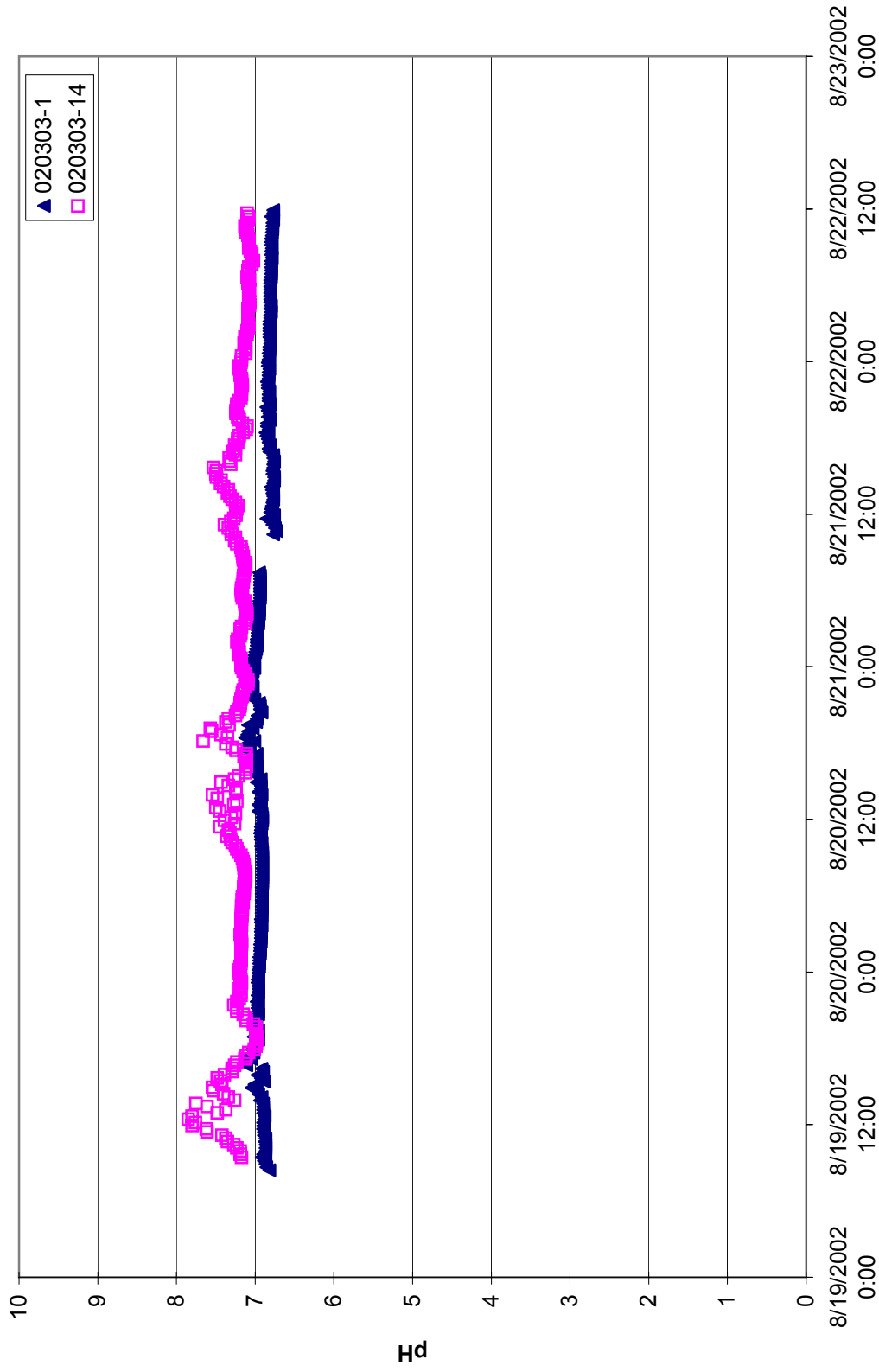
Cross Sections in Bayou Verret North of Lake Cataouatche



Continuous DO for Lake Cataouatche Calibration Survey



Continuous pH for Lake Cataouatche Calibration Survey



Instructions for the worksheet:

1. Enter the appropriate data into the green highlighted cells. The 60th or final day analysis data goes into the far right date column. The rest of the analysis data goes in the columns to the left of the 60th or final day values. The NOx data for the analysis start date goes in the NOx section underneath the analysis start date.
2. Click on the "Measured BOD" tab at the bottom of the page and follow that page's instructions. This page can be printed for reporting purposes.

Survey Stream and date:

Lake Cataouatche Calibration Survey

Sample Collection date: 08/21/02 Analysis Start date: 08/22/02

Total BOD data														
Item No.	Sample No.	Daily analysis start dates:												
		2	5	9	14	20								
1	020303-1A	1.00	2.80	3.40	3.60	3.80								
2	020303-1B	2.30	3.30	3.90	4.20	4.30								
3	020303-3	2.00	3.00	4.10	4.60	4.90								
4	020303-7	1.00	2.00	2.60	2.70	2.70								
5	020303-9	3.10	4.20	5.20	5.70	6.00								
6	020303-10	1.00	1.50	2.20	2.30	2.30								
7	020303-12	1.00	3.30	4.40	5.50	5.30								
8	020303-14	1.00	1.50	2.40	2.50	2.50								
9														
10														
11														
12														
13														
14														
15														

(NO ₂ +NO ₃) as Nitrogen data (mg/l)														
Item No.	Sample No.	Daily analysis start dates												
		2	5	9	14	20								
1	020303-1A													
2	020303-1B													
3	020303-3													
4	020303-7													
5	020303-9													
6	020303-10													
7	020303-12													
8	020303-14													
9														
10														
11														
12														
13														
14														
15														

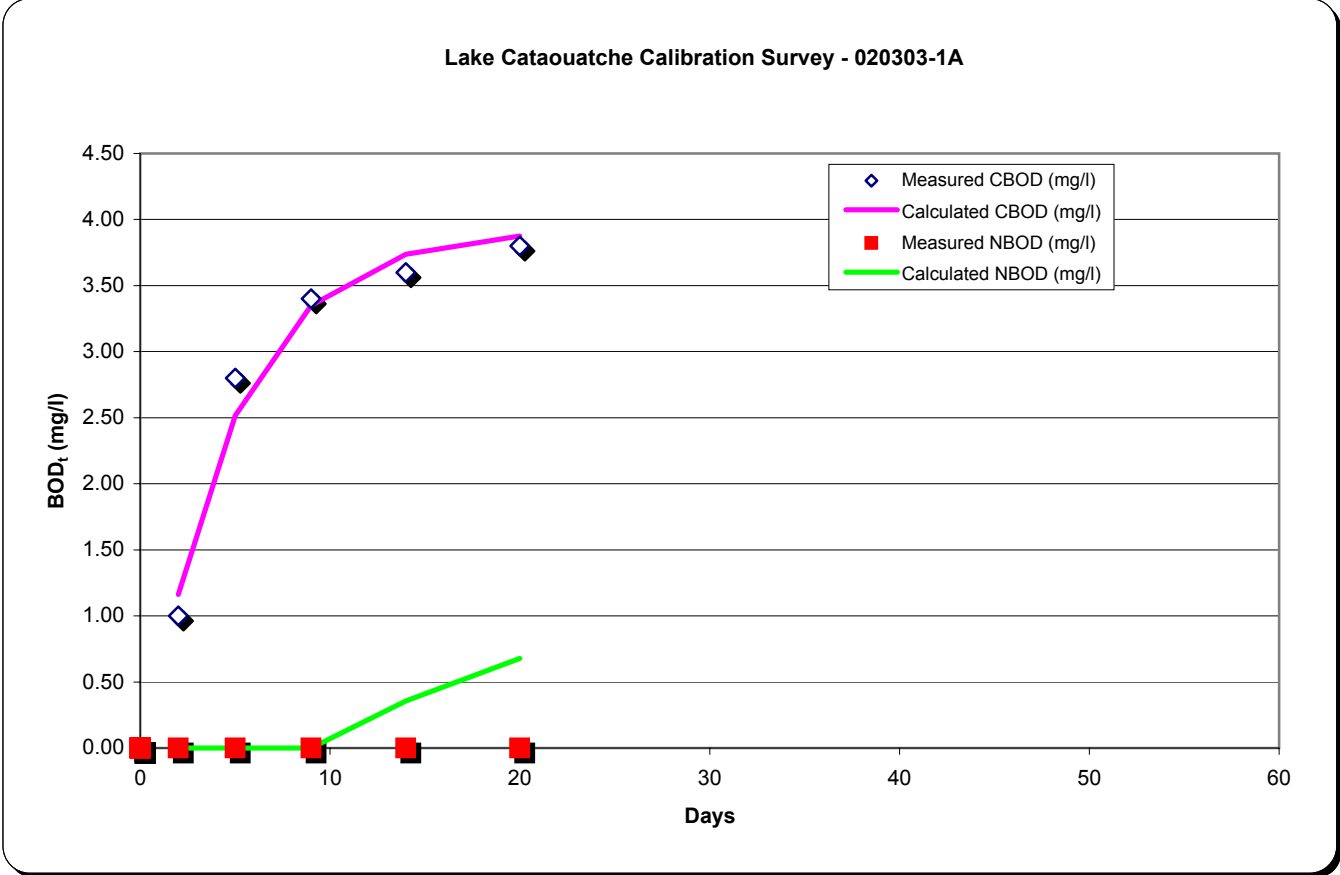
Notes:
 1. CBOD detection level was 2.0 mg/L.
 2. A CBOD concentration of 1.0 mg/L was assumed for samples with a reported CBOD concentration of <2.0 mg/L on Day 2.
 3. A CBOD concentration of 1.5 mg/L was assumed for samples with a reported CBOD concentration of <2.0 mg/L on Day 5.

BOD Analysis of the for:

Lake Cataouatche Calibration Survey - 020303-1A

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NO _x as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	1.00	0.00		1.00	0.00	1.16
5	2.80	0.00		2.80	0.00	2.52
9	3.40	0.00		3.40	0.00	3.35
14	3.60	0.00		3.60	0.36	3.74
20	3.80	0.00		3.80	0.68	3.87
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				

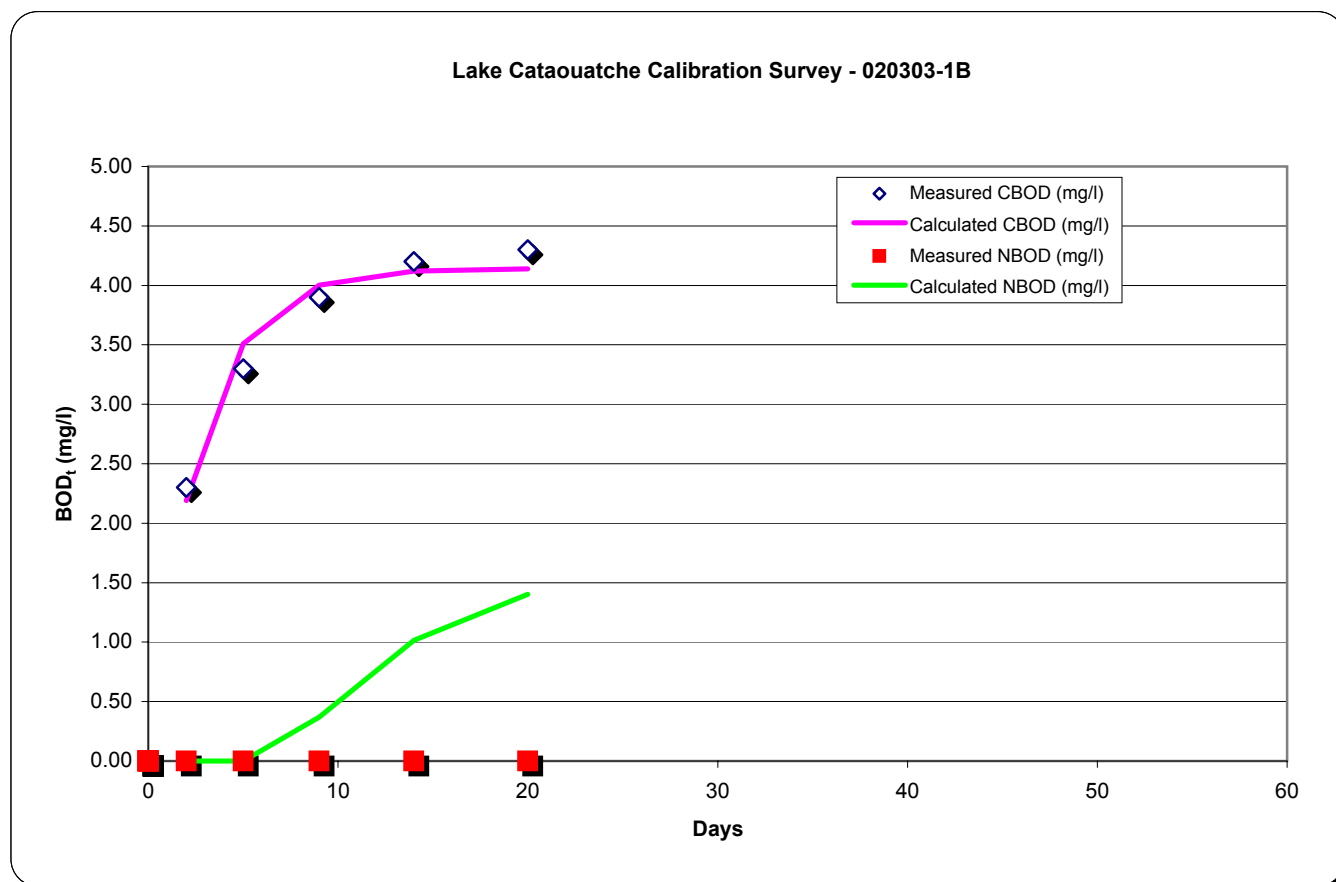
0.84	3.92	UBOD (mg/l)
0.18	0.22	k rate (1/day)
10.99	0.43	Lag time (days)



- Note 1 - Days from the BOD test start date.
- Note 2 - Measured total BOD at time in "Days" column.
- Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
- Note 4 - Calculated by multiplying the measured (NO₂ + NO₃ as nitrogen) minus the day zero (NO₂ + NO₃ as nitrogen) by 4.57.
- Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
- Note 6 - Calculated from the formula {NBOD_t=UNBOD[1-e-(k(t-lag))]} using the listed values of UNBOD, k decay rate and lag time.
- Note 7 - Calculated from the formula {CBOD_t=UCBOD[1-e-(k(t-lag))]} using the listed values of UCBOD, k decay rate and lag time.
- Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NO _x as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	2.30	0.00		2.30	0.00	2.19
5	3.30	0.00		3.30	0.00	3.51
9	3.90	0.00		3.90	0.37	4.00
14	4.20	0.00		4.20	1.02	4.12
20	4.30	0.00		4.30	1.40	4.14
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				

1.73	4.14	UBOD (mg/l)
0.13	0.38	k rate (1/day)
7.15	0.00	Lag time (days)



Note 1 - Days from the BOD test start date.

Note 2 - Measured total BOD at time in "Days" column.

Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.

Note 4 - Calculated by multiplying the measured (NO₂ + NO₃ as nitrogen) minus the day zero (NO₂ + NO₃ as nitrogen) by 4.57.

Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.

Note 6 - Calculated from the formula {NBOD_t=UNBOD[1-e-(k(t-lag))]} using the listed values of UNBOD, k decay rate and lag time.

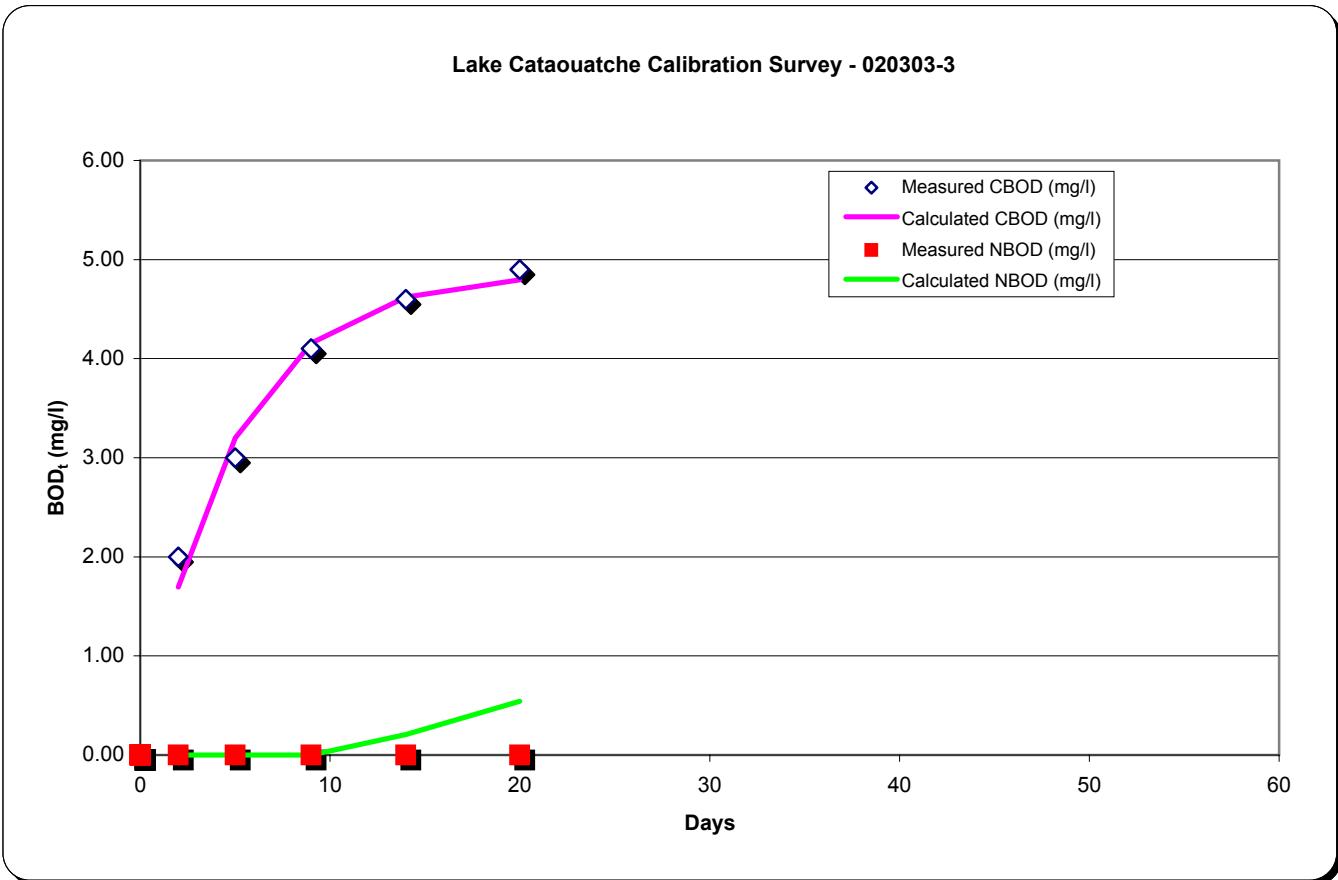
Note 7 - Calculated from the formula {CBOD_t=UCBOD[1-e-(k(t-lag))]} using the listed values of UCBOD, k decay rate and lag time.

Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

BOD Analysis of the for:

Lake Cataouatche Calibration Survey - 020303-3

Measured Data					Calculated Data		
Days	Total BOD (mg/l)	NO _x as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)	
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7	
0		0.00					
2	2.00	0.00		2.00	0.00	1.70	
5	3.00	0.00		3.00	0.00	3.20	
9	4.10	0.00		4.10	0.00	4.16	
14	4.60	0.00		4.60	0.21	4.62	
20	4.90	0.00		4.90	0.54	4.79	
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
0	0.00	0.00					
					0.86	4.86	UBOD (mg/l)
					0.12	0.21	k rate (1/day)
					11.72	0.00	Lag time (days)



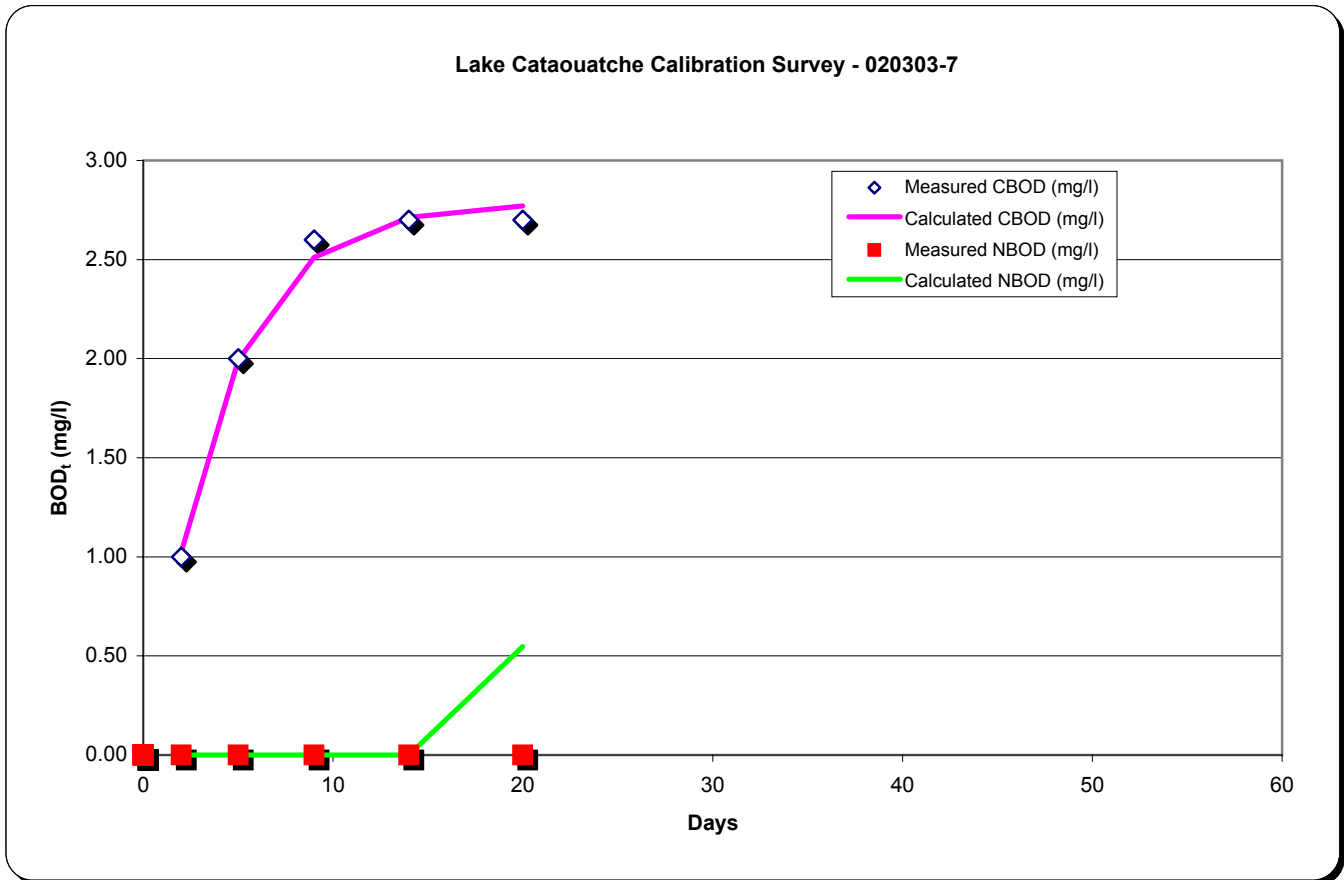
- Note 1 - Days from the BOD test start date.
- Note 2 - Measured total BOD at time in "Days" column.
- Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
- Note 4 - Calculated by multiplying the measured (NO₂ +NO₃ as nitrogen) minus the day zero (NO₂ +NO₃ as nitrogen) by 4.57.
- Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
- Note 6 - Calculated from the formula {NBOD_t=UNBOD[1-e-(k(t-lag))]} using the listed values of UNBOD, k decay rate and lag time.
- Note 7 - Calculated from the formula {CBOD_t=UCBOD[1-e-(k(t-lag))]} using the listed values of UCBOD, k decay rate and lag time.
- Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

BOD Analysis of the for:

Lake Cataouatche Calibration Survey - 020303-7

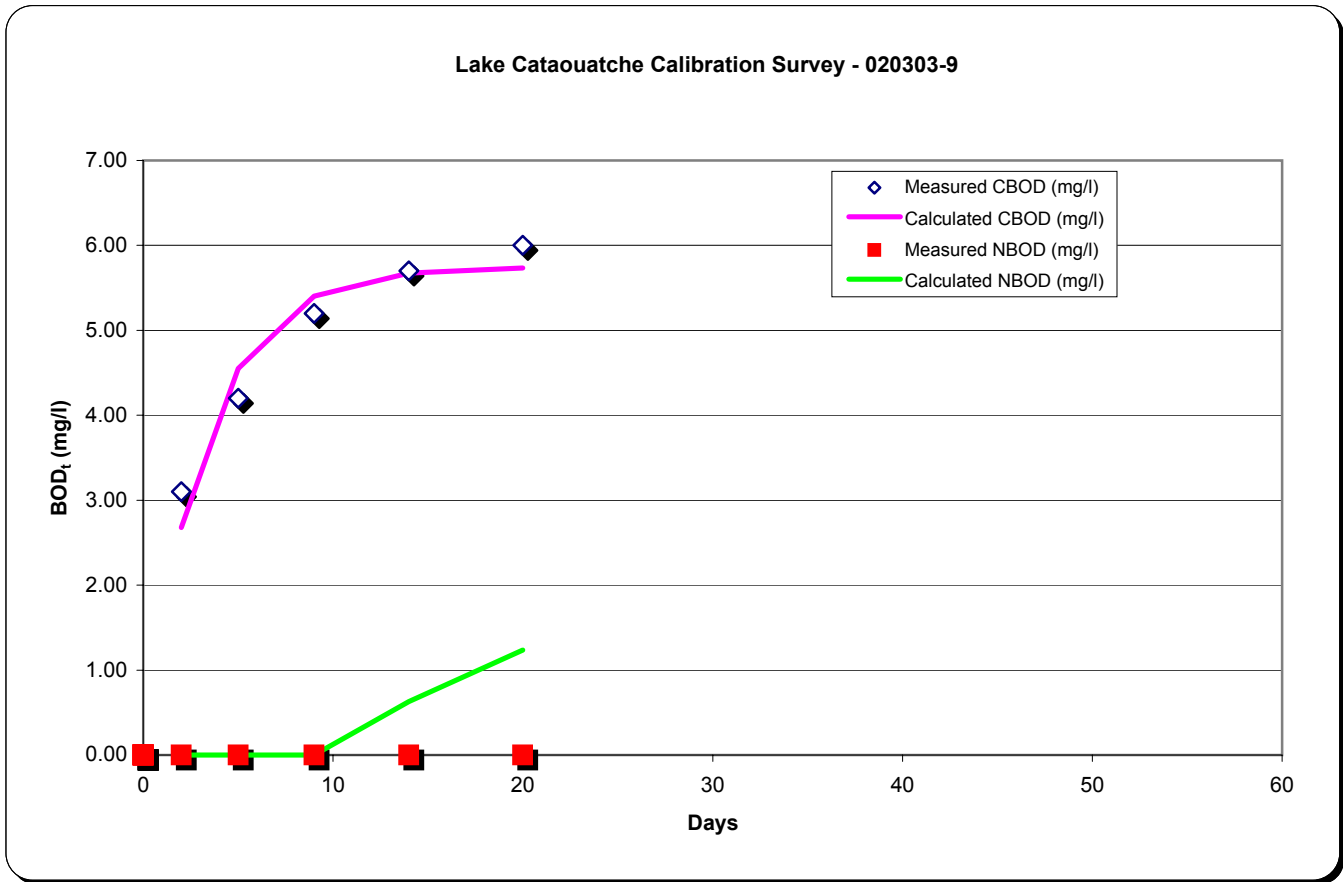
Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NOx as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	1.00	0.00		1.00	0.00	1.03
5	2.00	0.00		2.00	0.00	1.99
9	2.60	0.00		2.60	0.00	2.51
14	2.70	0.00		2.70	0.00	2.71
20	2.70	0.00		2.70	0.55	2.77
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				

1.01	2.78	UBOD (mg/l)
0.18	0.27	k rate (1/day)
15.60	0.27	Lag time (days)



- Note 1 - Days from the BOD test start date.
- Note 2 - Measured total BOD at time in "Days" column.
- Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
- Note 4 - Calculated by multiplying the measured (NO₂ + NO₃ as nitrogen) minus the day zero (NO₂ + NO₃ as nitrogen) by 4.57.
- Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
- Note 6 - Calculated from the formula {NBOD_t=UNBOD[1-e^{-k(t-lag)}]} using the listed values of UNBOD, k decay rate and lag time.
- Note 7 - Calculated from the formula {CBOD_t=UCBOD[1-e^{-k(t-lag)}]} using the listed values of UCBOD, k decay rate and lag time.
- Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NO _x as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	3.10	0.00		3.10	0.00	2.68
5	4.20	0.00		4.20	0.00	4.55
9	5.20	0.00		5.20	0.00	5.40
14	5.70	0.00		5.70	0.63	5.67
20	6.00	0.00		6.00	1.23	5.73
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
					1.54	5.74
					0.18	0.31
					11.12	0.00
						UBOD (mg/l)
						k rate (1/day)
						Lag time (days)



Note 1 - Days from the BOD test start date.

Note 2 - Measured total BOD at time in "Days" column.

Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.

Note 4 - Calculated by multiplying the measured (NO₂ + NO₃ as nitrogen) minus the day zero (NO₂ + NO₃ as nitrogen) by 4.57.

Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.

Note 6 - Calculated from the formula {NBODt=UNBOD[1-e-(k(t-lag))]} using the listed values of UNBOD, k decay rate and lag time.

Note 7 - Calculated from the formula {CBODt=UCBOD[1-e-(k(t-lag))]} using the listed values of UCBOD, k decay rate and lag time.

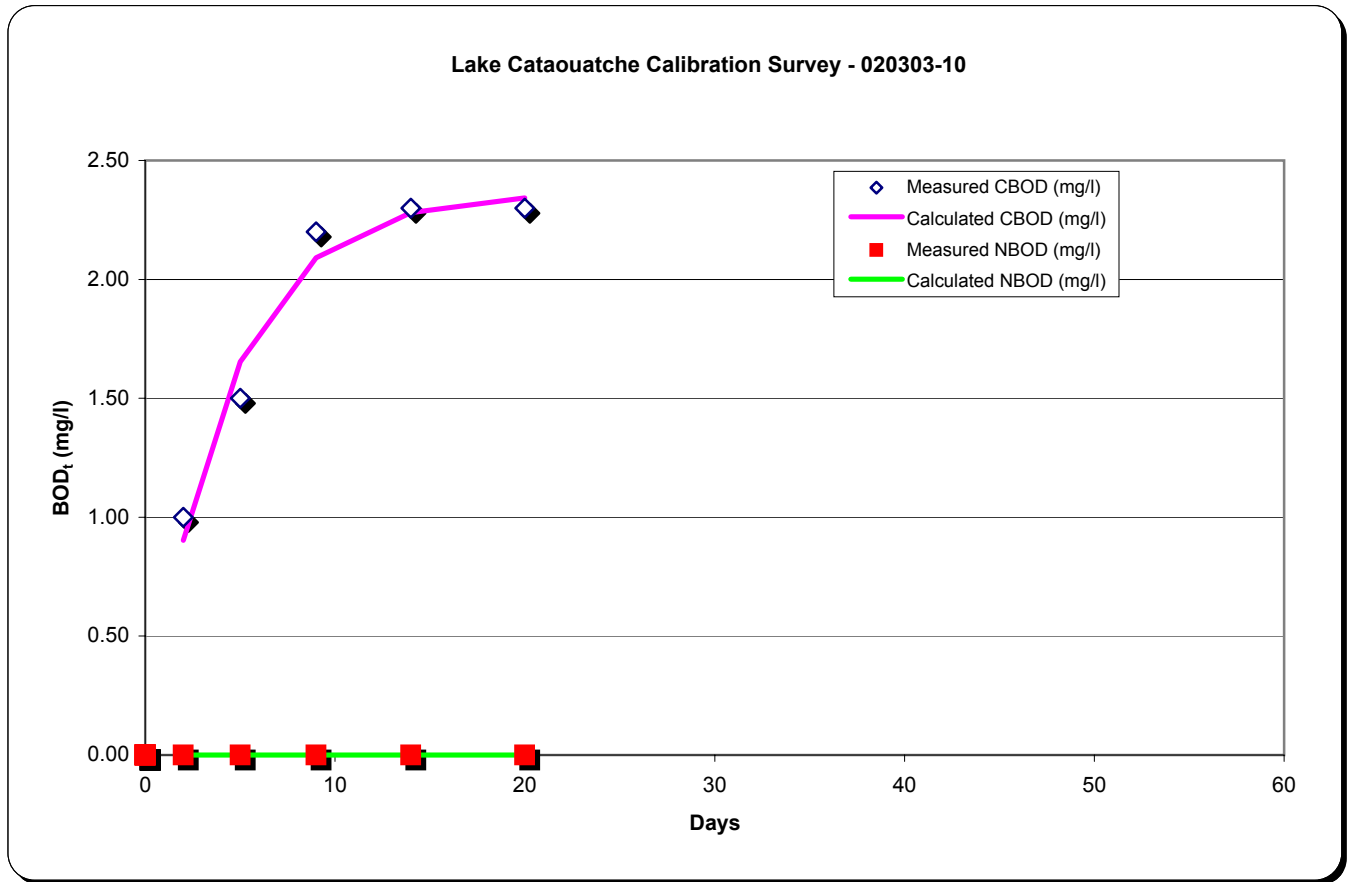
Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

BOD Analysis of the for:

Lake Cataouatche Calibration Survey - 020303-10

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NOx as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	1.00	0.00		1.00		0.90
5	1.50	0.00		1.50		1.65
9	2.20	0.00		2.20		2.09
14	2.30	0.00		2.30		2.28
20	2.30	0.00		2.30		2.34
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
					0.00	2.36
					0.00	0.24
					0.00	0.00

0.00	2.36	UBOD (mg/l)
0.00	0.24	k rate (1/day)
0.00	0.00	Lag time (days)



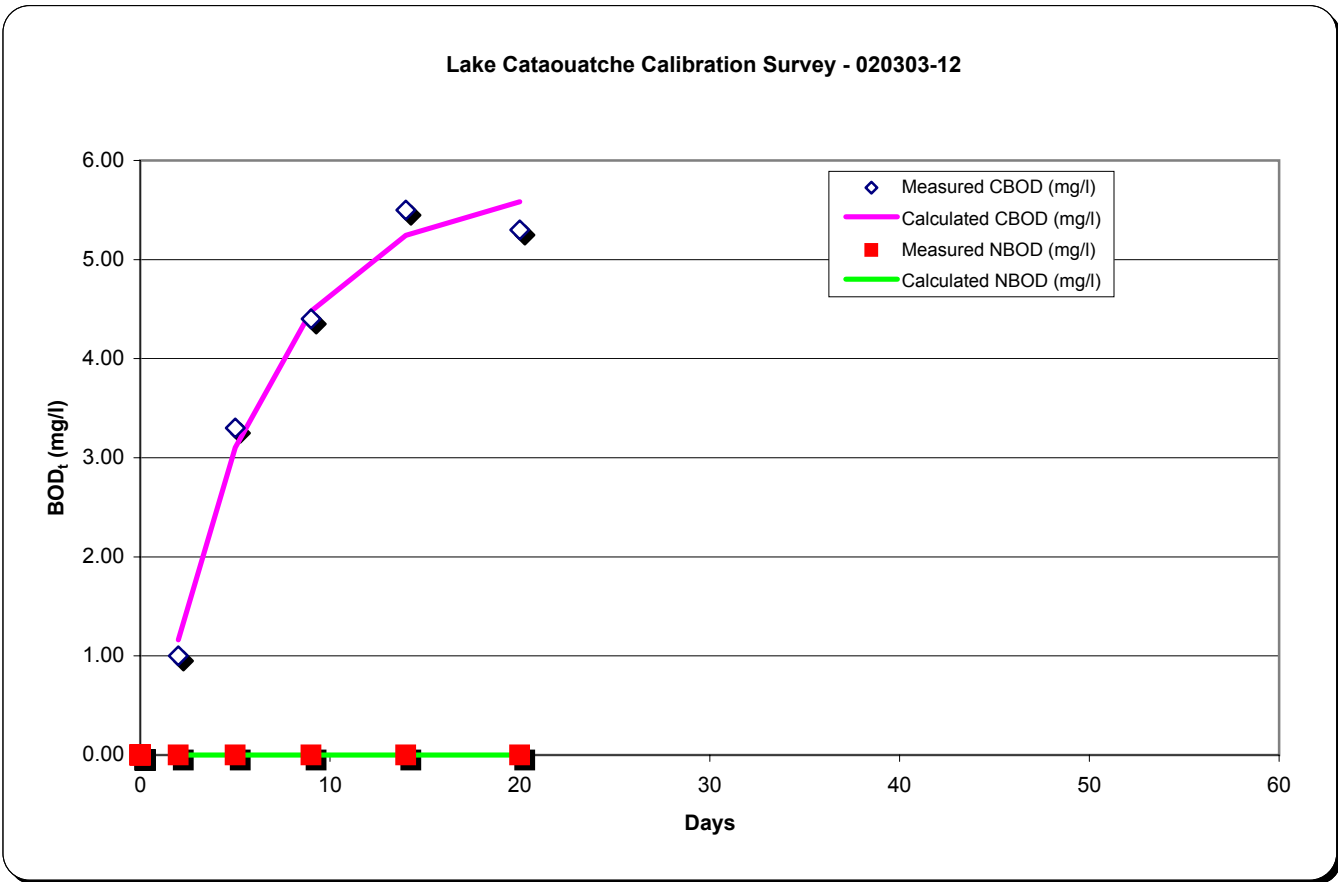
- Note 1 - Days from the BOD test start date.
- Note 2 - Measured total BOD at time in "Days" column.
- Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
- Note 4 - Calculated by multiplying the measured (NO₂ + NO₃ as nitrogen) minus the day zero (NO₂ + NO₃ as nitrogen) by 4.57.
- Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
- Note 6 - Calculated from the formula {NBODt=UNBOD[1-e-(k(t-lag))]} using the listed values of UNBOD, k decay rate and lag time.
- Note 7 - Calculated from the formula {CBODt=UCBOD[1-e-(k(t-lag))]} using the listed values of UCBOD, k decay rate and lag time.
- Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

BOD Analysis of the for:

Lake Cataouatche Calibration Survey - 020303-12

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NOx as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	1.00	0.00		1.00		1.16
5	3.30	0.00		3.30		3.10
9	4.40	0.00		4.40		4.48
14	5.50	0.00		5.50		5.24
20	5.30	0.00		5.30		5.58
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				
0	0.00	0.00				

0.00	5.75	UBOD (mg/l)
0.00	0.18	k rate (1/day)
0.00	0.77	Lag time (days)



- Note 1 - Days from the BOD test start date.
- Note 2 - Measured total BOD at time in "Days" column.
- Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
- Note 4 - Calculated by multiplying the measured (NO₂ +NO₃ as nitrogen) minus the day zero (NO₂ +NO₃ as nitrogen) by 4.57.
- Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
- Note 6 - Calculated from the formula {NBODt=UNBOD[1-e-(k(t-lag))]} using the listed values of UNBOD, k decay rate and lag time.
- Note 7 - Calculated from the formula {CBODt=UCBOD[1-e-(k(t-lag))]} using the listed values of UCBOD, k decay rate and lag time.
- Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

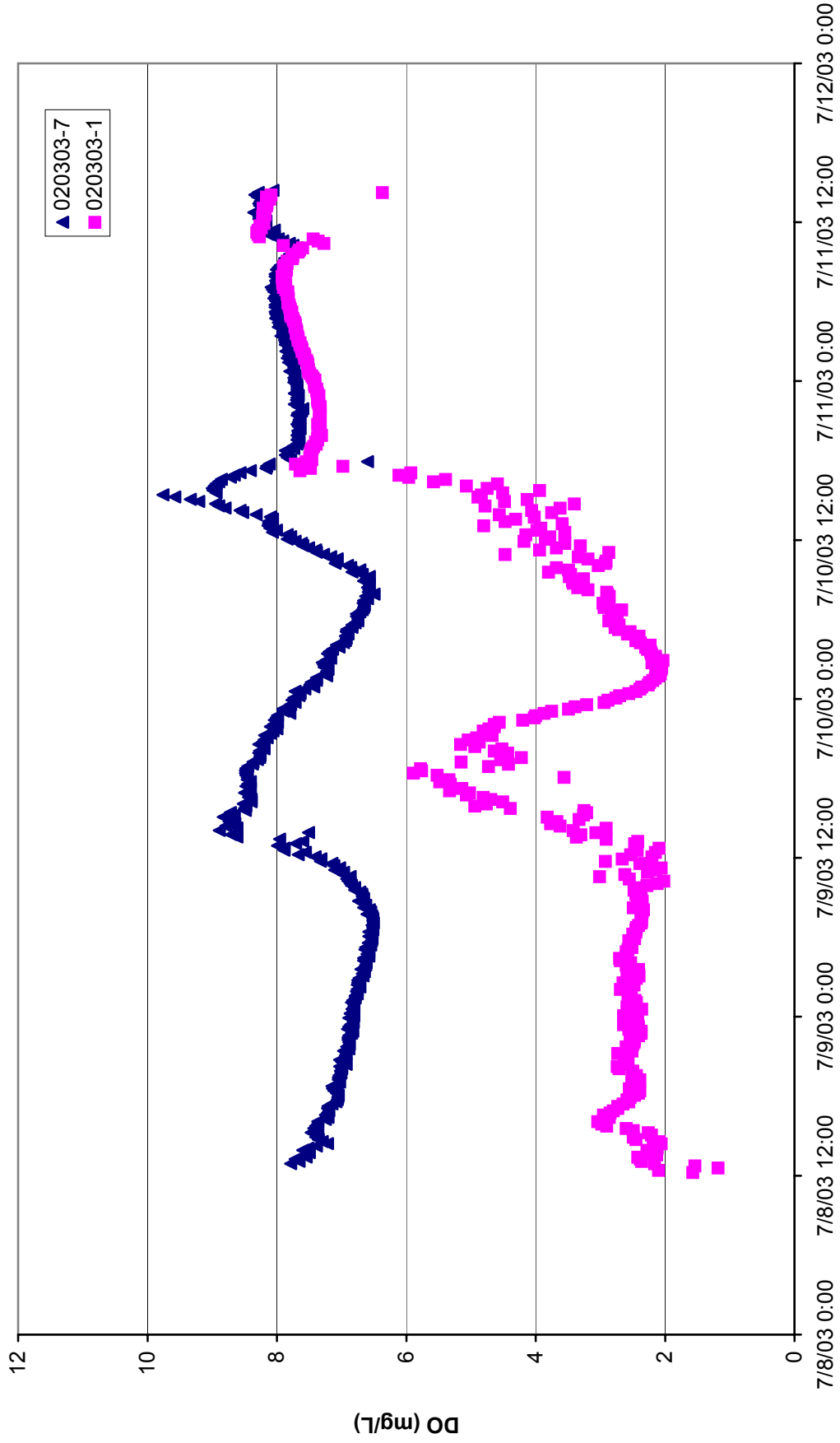
APPENDIX C

Verification Survey Results

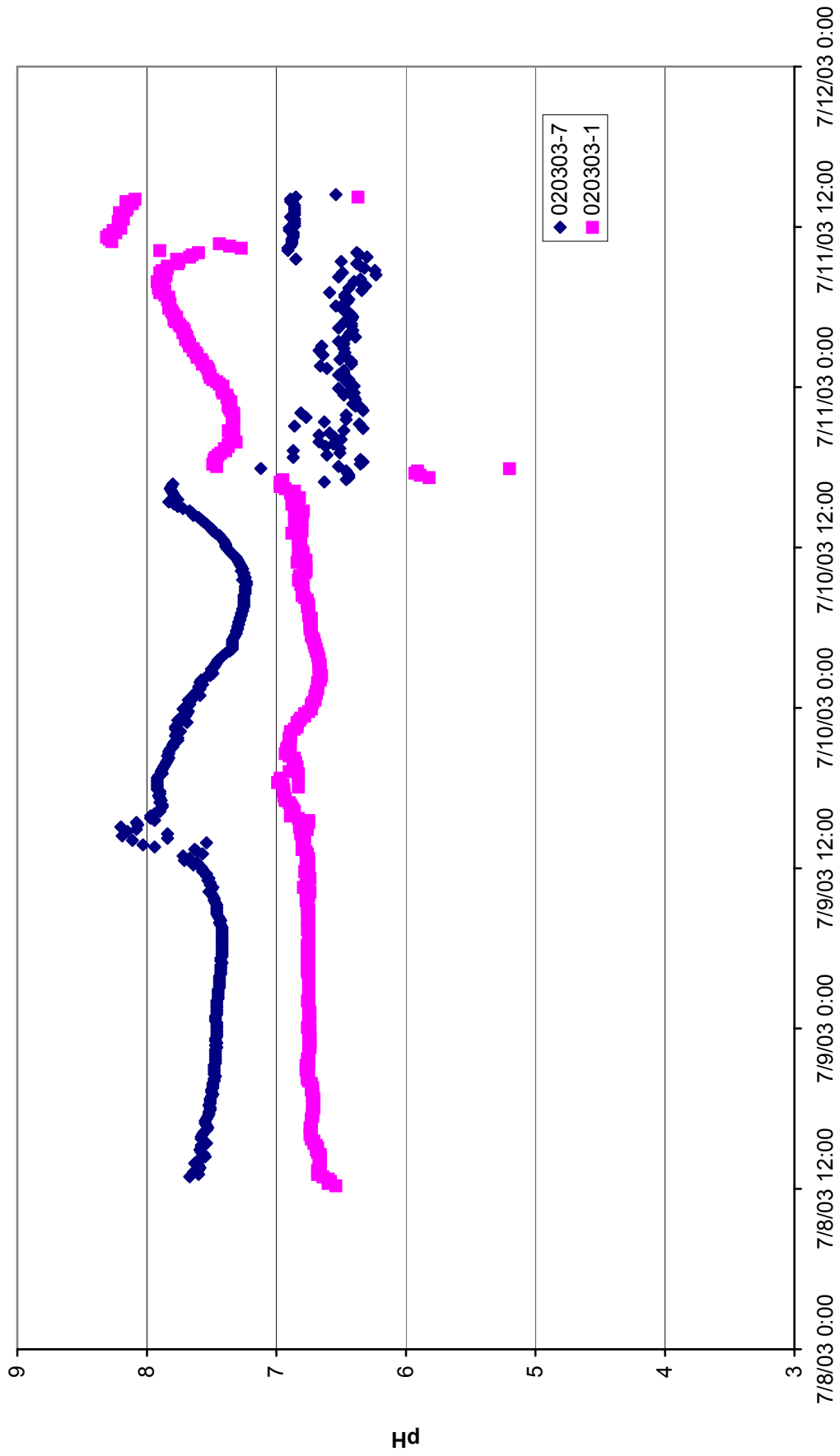
SUMMARY OF DATA COLLECTED DURING VERIFICATION SURVEY - LAKE CATAOUATCHIE - 020303

Station	Date	Time	Total Depth of Water (ft)		Depth of WQ Measurements (ft)	Temp (°C)	In situ Measurements				TKN (mg/L)	NH ₄ -N (mg/L)	Nitrate NO ₃ -N (mg/L)	Ortho P (mg/L)	Total P (mg/L)	Chloro A (mg/L)	TSS (mg/L)
			(ft)	(ft)			DO (mg/L)	DO Sat (%)	Conduc. (µmhos)	pH (su)							
020303-1	7/9/2003	1450	9.6	2.9	0.33	30.7	4.7	63	260	6.5	1.5	0.19	<0.1	0.26	0.39	<0.02	15
					1	29.5	3.8	50	250	6.4							
					2	26.1	1.5	19	250	**							
020303-2	7/9/2003	1435	9	2.74	0.33	34.1	6.3	89	270	7.1	2	0.24	<0.1	0.22	<0.02	7.2	
					1	27.4	2.8	35	260	7.3							
					2	26.3	1.8	22	260	**							
020303-3	7/9/2003	1420	9	2.74	0.33	30.9	5.4	73	270	7.1	2	0.24	<0.1	0.32	<0.02	7.2	
					1	27.7	2.8	36	270	7.2							
					2	26.5	1.6	20	270	**							
020303-4	7/9/2003	1400	6.6	2.01	0.33	31.1	3.0	40	440	6.7	2	0.24	<0.1	0.32	<0.02	7.2	
					1	27.5	2.1	27	460	6.3							
					2	26.5	1.9	24	470	**							
020303-5	7/9/2003	1040	4	1.21	0.33	26.8	0.6	8	300	6.6	2	0.24	<0.1	0.32	<0.02	7.2	
					1	26.6	0.4	5	300	**							
					2	26.6	0.4	5	300	**							
020303-15	7/9/2003	1100	4.9	1.49	0.33	29.9	4.7	61	300	7.4	2	0.24	<0.1	0.32	<0.02	7.2	
					1	28.1	6.3	81	350	6.9							
					2	27.7	5.8	74	370	**							
020303-7A	7/9/2003	1315	7.3	2.23	0.33	29.6	9.2	121	760	6.3	2	0.24	<0.1	0.32	0.069	<0.02	<5
					1	29.3	8.0	105	730	7.9							
					2	27.4	6.7	85	490	**							
020303-7B	7/9/2003	1325	7.3	2.23	0.33	31.1	9.2	124	970	8.4	2	0.24	<0.1	0.32	0.074	<0.02	<5
					1	28.4	7.8	100	610	7.9							
					2	27.4	6.5	82	490	**							
020303-8	7/9/2003	1010	4.4	1.34	0.33	29.0	7.0	81	480	7.8	2	0.24	<0.1	0.32	0.074	<0.02	<5
					1	28.6	6.6	85	470	7.3							
					2	27.9	7.9	101	1020	6.8							
020303-9	7/9/2003	850	8	2.44	0.33	27.9	7.9	101	1020	6.8	2	0.24	<0.1	0.32	0.071	<0.02	<5
					1	27.8	7.9	101	1040	6.8							
					2	27.5	7.6	96	1130	**							
020303-9	7/9/2003	1205	8	2.44	0.33	30.8	8.9	119	1060	8.2	2	0.24	<0.1	0.32	0.071	<0.02	<5
					1	28.7	8.7	113	1050	8.02							
					2	27.6	8.2	104	1130	**							
020303-10	7/9/2003	1345	7.7	2.35	0.33	30.0	7.9	105	1290	7.4	2	0.24	<0.1	0.32	0.054	<0.02	<5
					1	29.9	7.8	103	1290	7.3							
					2	28.2	8.0	103	1320	**							
020303-11	7/9/2003	925	7.9	2.41	0.33	28.5	8.2	106	1000	7.5	2	0.24	<0.1	0.32	0.054	<0.02	7.2
					1	28.3	8.4	108	1020	7.4							
					2	27.5	7.6	96	1090	**							
020303-12	7/9/2003	1135	4.9	1.49	0.33	30.3	4.3	57	500	7.4	2	0.24	0.18	0.21	0.3	<0.02	7.2
					1	27.4	2.8	35	510	7							
					2	27.4	2.8	35	510	7							
020303-13	7/9/2003	945	8.2	2.5	0.33	28.8	7.7	100	1330	7.7	2	0.24	0.18	0.21	0.3	<0.02	7.2
					1	28.3	7.7	99	1320	7.9							
					2	27.6	7.2	91	1320	**							
020303-14	7/9/2003	1245	6.5	1.98	0.33	30.4	8.2	109	1580	8.1	2	0.24	<0.1	0.21	0.043	<0.02	<5
					1	29.8	8.3	109	1550	7.9							
					2	27.9	7.9	101	1560	**							
020303-14 (Duplicate)	7/9/2003	1245	6.5	1.98	0.33	27.7	6.1	78	1670	7.4	2	0.24	<0.1	0.21	0.046	<0.02	<5
					1	27.7	6.1	78	1670	**							
					2	27.7	6.1	78	1670	**							

Continuous DO for Lake Cataouatche Verification Survey



Continuous pH for Lake Cataouatche Verification Survey



Summary of CBODu values and Rates for Lake Cataouatche Verification Survey

Sample No.	CBODu (mg/L)	CBODu rate (1/day)
020303-1	2.62	0.25
020303-3	2.31	0.25
020303-7a	2.47	0.27
020303-7b	2.08	0.29
020303-9	2.08	0.29
020303-10	7.54	0.05
020303-12	5.30	0.08
020303-14	2.12	0.60
020303-14 duplicate	2.12	0.60
AVG =	3.18	0.30

FILE: R:\PROJECTS\2110-611\CD_LAKE_CAT\APP C VERIF SURVEY\LAKE CATAOUATCHE GSBOD.XLS

Instructions for the worksheet:

1. Enter the appropriate data into the green highlighted cells. The 60th or final day analysis data goes into the far right date column. The rest of the analysis data goes in the columns to the left of the 60th or final day values. The NOx data for the analysis start date goes in the NOx section underneath the analysis start date.
2. Click on the "Measured BOD" tab at the bottom of the page and follow that page's instructions. This page can be printed for reporting purposes.

Survey Stream and date:

Lake Cataouatche Verification Survey

Sample Collection date: 07/09/03

Analysis Start date:

Total BOD data														
Item No.	Sample No.	2	5	9	14	20	Daily analysis start dates:							
1	020303-1	1.00	1.50	2.60	3.00	2.10								
2	020303-3	1.00	1.50	2.10	2.60	2.00								
3	020303-7a	1.00	1.50	2.50	2.80	2.00								
4	020303-7b	1.00	1.50	2.00	2.10	2.00								
5	020303-9	1.00	1.50	2.00	2.10	2.00								
6	020303-10	1.00	1.50	2.00	5.40	4.30								
7	020303-12	1.00	1.50	2.00	4.70	3.70								
8	020303-14	2.00	2.00	2.00	2.00	2.00								
9	020303-14 duplicate	2.00	2.00	2.00	2.00	2.00								
10														
11														
12														
13														
14														
15														

NOTE: all 020303-14 and 020303-14 duplicates were <2 mg/L (easier to do this than write 10 comments).

Daily analysis start dates:														
Item No.	Sample No.	2	5	9	14	20	Daily analysis start dates:							
1	020303-1	0.00	0.00	0.00	0.00	0.00								
2	020303-3	0.00	0.00	0.00	0.00	0.00								
3	020303-7a	0.00	0.00	0.00	0.00	0.00								
4	020303-7b	0.00	0.00	0.00	0.00	0.00								
5	020303-9	0.00	0.00	0.00	0.00	0.00								
6	020303-10	0.00	0.00	0.00	0.00	0.00								
7	020303-12	0.00	0.00	0.00	0.00	0.00								
8	020303-14	0.00	0.00	0.00	0.00	0.00								
9	020303-14 duplicate	0.00	0.00	0.00	0.00	0.00								
10														
11														
12														
13														
14														
15														

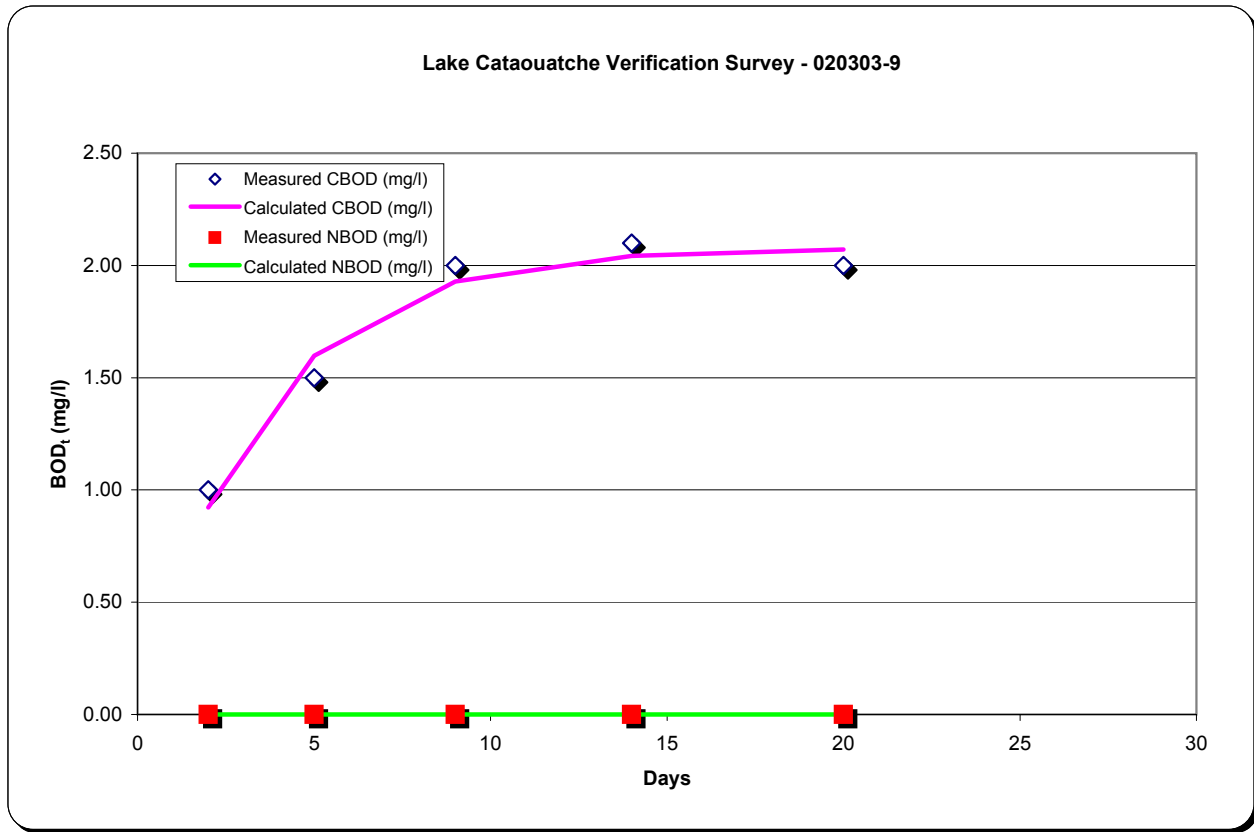
Notes:

1. CBOD detectin level was 2.0 mg/L.
2. A CBOD concentration of 1.0 mg/L was assumed for samples with a reported CBOD concentration of <2.0 mg/L on Day 2.
3. A CBOD concentration of 1.5 mg/L was assumed for samples with a reported CBOD concentration of <2.0 mg/L on Day 5.
4. A CBOD concentration of 2.0 mg/L was assumed for samples with a reported CBOD concentration of <2.0 mg/L on Day 9.

BOD Analysis of the for: Lake Cataouatche Verification Survey - 020303-9

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NOx as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	1.00	0.00	0.00	1.00	0.00	0.92
5	1.50	0.00	0.00	1.50	0.00	1.60
9	2.00	0.00	0.00	2.00	0.00	1.93
14	2.10	0.00	0.00	2.10	0.00	2.04
20	2.00	0.00	0.00	2.00	0.00	2.07
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				

0.00	2.08	UBOD (mg/l)
0.00	0.29	k rate (1/day)
0.00	0.00	Lag time (days)



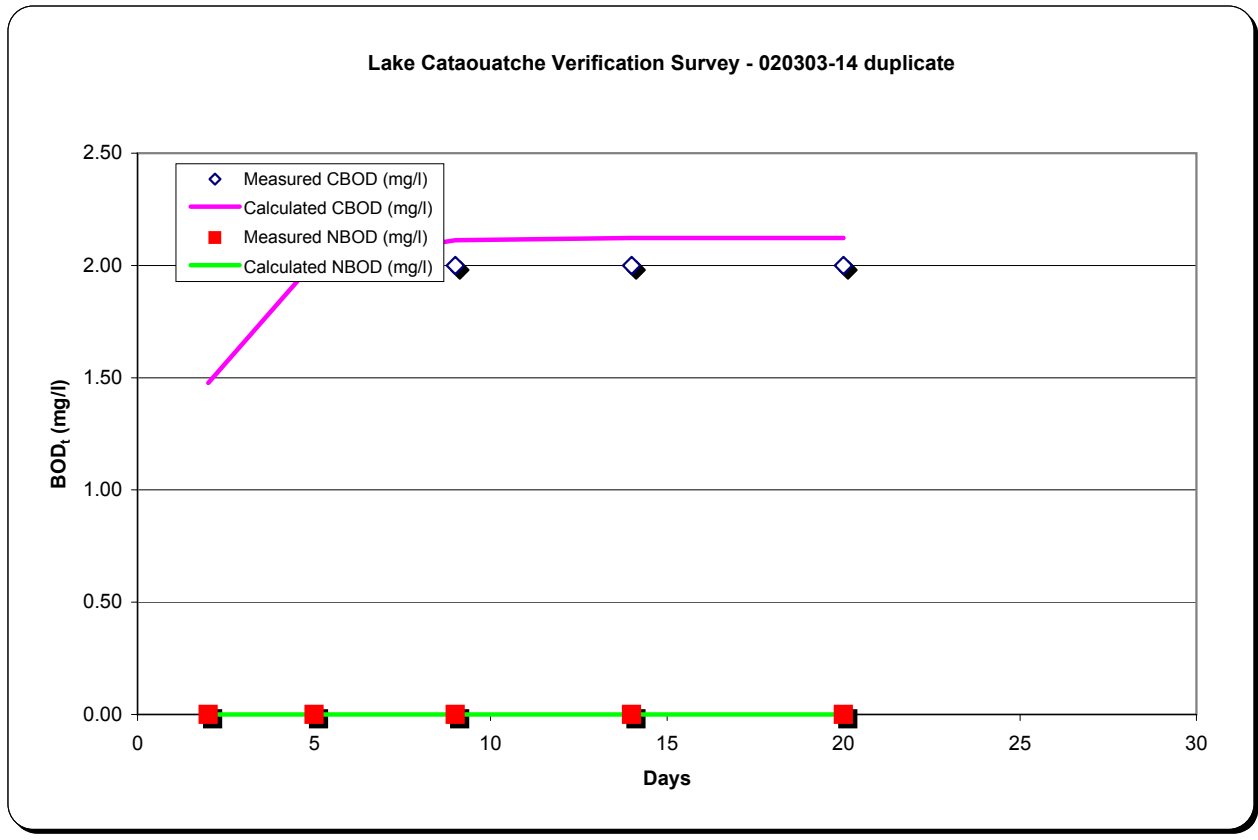
Note 1 - Days from the BOD test start date.
 Note 2 - Measured total BOD at time in "Days" column.
 Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
 Note 4 - Calculated by multiplying the measured (NO₂ +NO₃ as nitrogen) minus the day zero (NO₂ +NO₃ as nitrogen) by 4.57.
 Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
 Note 6 - Calculated from the formula {NBOD_t=UNBOD[1-e^{-(k(t-lag))}]} using the listed values of UNBOD, k decay rate and lag time.
 Note 7 - Calculated from the formula {CBOD_t=UCBOD[1-e^{-(k(t-lag))}]} using the listed values of UCBOD, k decay rate and lag time.
 Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

BOD Analysis of the for:

Lake Cataouatche Verification Survey - 020303-14 duplicate

Measured Data					Calculated Data	
Days	Total BOD (mg/l)	NOx as N (mg/l)	NBOD (mg/l)	CBOD (mg/l)	NBOD (mg/l)	CBOD (mg/l)
Note 1	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7
0		0.00				
2	2.00	0.00	0.00	2.00	0.00	1.48
5	2.00	0.00	0.00	2.00	0.00	2.01
9	2.00	0.00	0.00	2.00	0.00	2.11
14	2.00	0.00	0.00	2.00	0.00	2.12
20	2.00	0.00	0.00	2.00	0.00	2.12
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				
	0.00	0.00				

0.00	2.12	UBOD (mg/l)
0.00	0.60	k rate (1/day)
0.00	0.00	Lag time (days)



- Note 1 - Days from the BOD test start date.
- Note 2 - Measured total BOD at time in "Days" column.
- Note 3 - Measured (NO₂ + NO₃ as nitrogen) at time in "Days" column.
- Note 4 - Calculated by multiplying the measured (NO₂ + NO₃ as nitrogen) minus the day zero (NO₂ + NO₃ as nitrogen) by 4.57.
- Note 5 - Determined by subtracting the calculated NBOD from the measured total BOD.
- Note 6 - Calculated from the formula {NBOD_t=UNBOD[1-e^{-(k(t-lag))}]} using the listed values of UNBOD, k decay rate and lag time.
- Note 7 - Calculated from the formula {CBOD_t=UCBOD[1-e^{-(k(t-lag))}]} using the listed values of UCBOD, k decay rate and lag time.
- Note 8 - Nox nondetects were input at 1/2 the detection level = 0.025 mg/l.

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APPENDIX D

Dispersion Coefficient Calculations

DYE CONCENTRATIONS VS. DISTANCE FOR BAYOU NORTH OF LAKE CATAOUATCHE (Subsegment 020303)
 ASSUMES 1-D ANALYSIS (LATERALLY AND VERTICALLY MIXED) OF SLUG INJECTION
 COMPARES THEORETICAL WITH FTN FIELD DATA FROM AUGUST 21-22, 2002
 PHM 9-11-02 (revised 5-28-03)

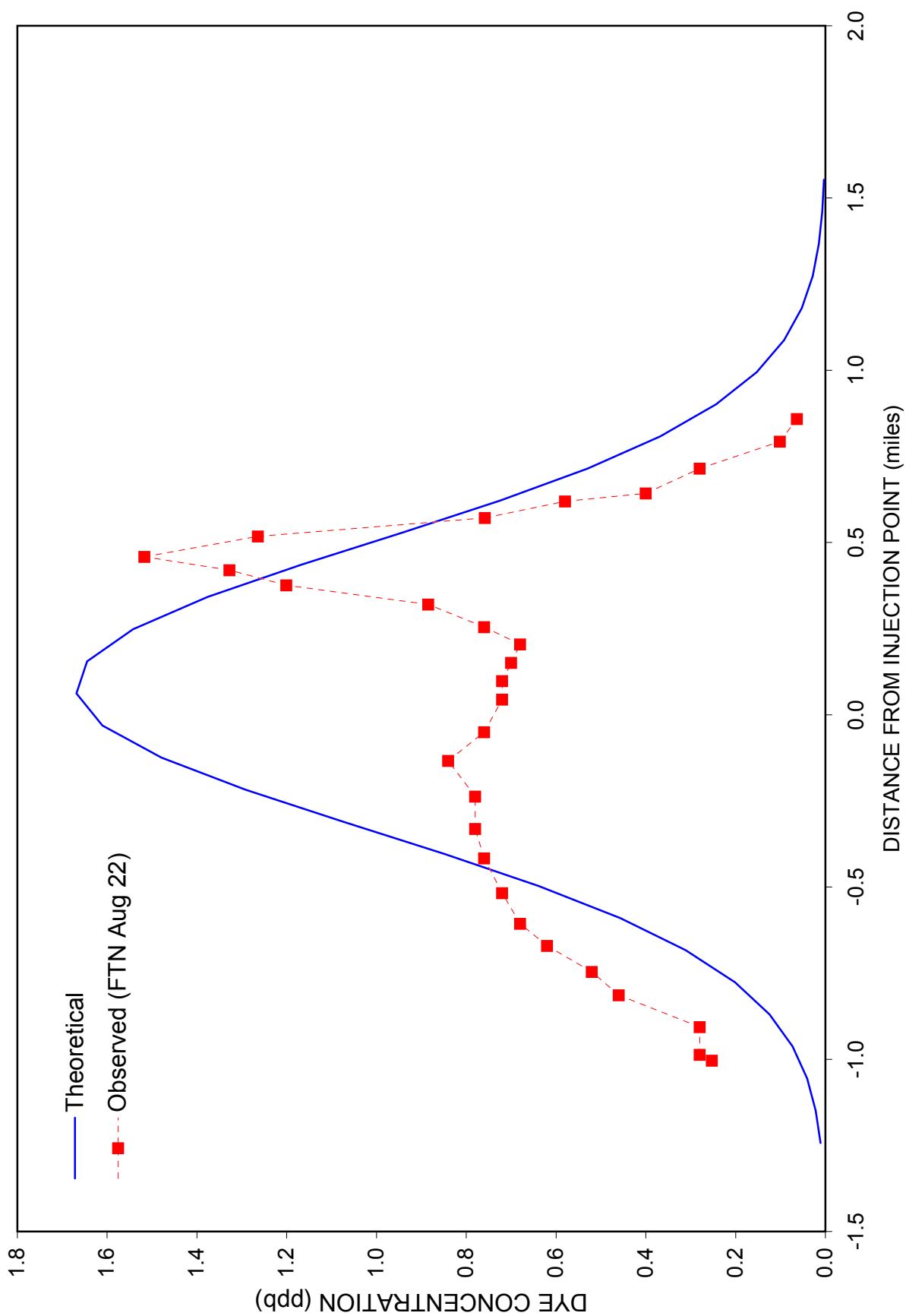
AVG FLOW = 5.2 cfs (calculated)
 AVG VELOCITY = 0.005 ft/sec (adjusted to get predicted and observed data lined up horizontally)
 AVG XS AREA = 1041 ft² (calculated)
 AVG DEPTH = 4.7 ft (average of 3 measured XS's)
 AVG WIDTH = 220 ft (average of 3 measured XS's)
 ELAPSED TIME = 24 hr (approx elapsed time from injection to 4th set of measurements)
 INJECT. MASS = 15 lbs stock solution (20% dye)

PREDICTED MAXIMUM DYE CONCENTRATION = 8.35 ppb (1-D advective dispersion equation)
 ADJUSTMENT FACTOR FOR DYE LOSS = 0.2 (chlorine, adsorption, photodegradation)
 ADJUSTED MAXIMUM DYE CONCENTRATION = 1.67 ppb (after applying dye loss factor)

LONGITUDINAL DISPERSION COEFFICIENT = 5.6 ft²/sec (eqn. 5.19 from Fischer et al, 1979)
 ADJUSTMENT FACTOR FOR DISPERSION = 5 ("calibration" factor)
 ADJUSTED LONGITUDINAL DISPERS. COEFF. = 28.1 ft²/sec (after applying adjustment factor)
 = 2.61 m²/sec (converted to metric)

DISTANCE DOWNSTREAM FROM INJECTION			DISTANCE DOWNSTREAM FROM INJECTION		
(meters)	(miles)	PREDIC. CONC. (ppb)	(meters)	(miles)	OBSERV. CONC. (ppb)
-2000	-1.24	0.01	-1615	-1.00	0.25
-1850	-1.15	0.02	-1589	-0.99	0.28
-1700	-1.06	0.04	-1458	-0.91	0.28
-1550	-0.96	0.07	-1310	-0.81	0.46
-1400	-0.87	0.12	-1201	-0.75	0.52
-1250	-0.78	0.20	-1079	-0.67	0.62
-1100	-0.68	0.31	-976	-0.61	0.68
-950	-0.59	0.46	-833	-0.52	0.72
-800	-0.50	0.64	-671	-0.42	0.76
-650	-0.40	0.85	-533	-0.33	0.78
-500	-0.31	1.07	-382	-0.24	0.78
-350	-0.22	1.29	-215	-0.13	0.84
-200	-0.12	1.48	-81	-0.05	0.76
-50	-0.03	1.61	71	0.04	0.72
100	0.06	1.67	157	0.10	0.72
250	0.16	1.64	242	0.15	0.70
400	0.25	1.54	330	0.20	0.68
550	0.34	1.38	410	0.25	0.76
700	0.43	1.17	515	0.32	0.88
850	0.53	0.94	605	0.38	1.20
1000	0.62	0.72	675	0.42	1.33
1150	0.71	0.53	738	0.46	1.52
1300	0.81	0.37	834	0.52	1.26
1450	0.90	0.24	919	0.57	0.76
1600	0.99	0.15	997	0.62	0.58
1750	1.09	0.09	1035	0.64	0.40
1900	1.18	0.05	1151	0.72	0.28
2050	1.27	0.03	1276	0.79	0.10
2200	1.37	0.01	1382	0.86	0.06
2350	1.46	0.01			
2500	1.55	0.00			

SPREAD OF DYE SLUG IN BAYOU NORTH OF LAKE CATAOUATCHE (020303)



APPENDIX E

Model Inputs Calibration Survey

APPENDIX E. LAKE CATAOUATCHE MODEL INPUTS FOR CALIBRATION

Table E.1. Calibration Inputs for Hydraulics (Data Types 9 and 10).

Parameter name or description	Reach(es)	Value used in model	Data Source / Comment
Velocity coefficient, a	1	0.0062200	Calculated from measured widths and depths; 1/(width * depth). Widths measured every half kilometer on DOQQs. Depths taken from transects measured August 2002 (calibration survey). Depths assigned to reaches as indicated below in Depth Coefficient.
	2	0.0057300	
	3	0.0053900	
	4	0.0001420	
	5	0.0000730	
	6	0.0000730	
	7	0.0000658	
Velocity exponent, b	1 – 7	1	Set to 1.0 because changes in flow rate between calibration and projection are assumed to cause negligible changes in depth and width; therefore velocity will be directly proportional to flow rate.
Depth coefficient, c	1	2.7	Depth at calibration survey transect 1, river km 13
	2	2.4	Depth at calibration survey transect 2, river km 10
	3	2.1	Depth at calibration survey transect 3, river km 7
	4	2.2	Depth at calibration survey station 020303-6
	5	2.4	Average of depths at calibration survey stations 020303-7, 020303-9, 020303-10 and 020303-13
	6	2.5	Depth at calibration survey station 020303-11
	7	1.8	Average of depths at calibration survey stations 020303-12 and 020303-14
Depth exponent, d	1 – 7	0	Set to zero because changes in flow rate between calibration and projection are assumed to cause negligible changes in depth.
Depth constant, e	1 – 7	0	
Dispersion coefficient (m ² /sec)	1-3	0.5	Initially set to value from dye study (2.6 m ² /sec), but reduced during calibration
	4-7	2.6	Value from dye study in Bayou Verret

Table E.2. Calibration Inputs for Initial Conditions (Data Type 11).

Parameter name or description	Reach(es)	Value used in model	Data Source / Comment
Temperature, °C	1	28.7	Calibration survey on 8/21/02; average of stations 020303-1A and 020303-1B
	2	29.2	Calibration survey on 8/21/02 station 020303-2 1 m depth
	3	29.6	Calibration survey on 8/21/02 station 020303-3 1 m depth
	4	31.0	Calibration survey on 8/21/02 station 020303-6, 1 m depth
	5	31.4	Calibration survey on 8/21/02; average of stations 020303-7 and 020303-10 at 1 m depth
	6	31.0	Calibration survey on 8/21/02; average of stations 020303-9 and 020303-13 at 1 m depth
	7	31.3	Calibration survey on 8/21/02 station 020303-11 at 1 m depth
Salinity, ppt	1	0.70	Calculated from conductivity. Sources of conductivity measurements same as for temperatures listed above.
	2	0.69	
	3	0.67	
	4	0.52	
	5	0.80	
	6	0.99	
	7	1.01	
DO, mg/L	1	2.6	Estimated daily average from calibration survey on 8/21/02; average of stations 020303-1A and 020303-1B
	2	2.8	Estimated daily average from calibration survey on 8/21/02 station 020303-2 at 1 m depth
	3	2.5	Estimated daily average from calibration survey on 8/21/02 station 020303-3 at 1 m depth
	4	5.0	Estimated daily average from calibration survey on 8/21/02 station 020303-6 at 1 m depth
	5	6.8	Estimated daily average from calibration survey on 8/21/02; average of stations 020303-7 and 020303-10 at 1 m depths
	6	6.9	Estimated daily average from calibration survey on 8/21/02; average of stations 020303-9 and 020303-13 at 1 m depths
	7	7.7	Estimated daily average from calibration survey on 8/21/02 station 020303-11 at 1 m depths

Ammonia N, mg/L	1	0.22	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B
	2	0.23	Linear interpolation of reaches 1 and 3
	3	0.24	Calibration survey 8/21/02 station 020303-3
	4	0.18	Linear interpolation of reaches 3 and 5
	5	0.12	Calibration survey 8/21/02; averages of stations 020303-7 and 020303-10
	6	0.13	Calibration survey 8/21/02 station 020303-9
	7	0.13	Linear interpolation of reach 6 and lower boundary conditions (average of stations 020303-12 and 020303-14)
NO3 + NO2 N, mg/L	1 – 7	0.05	Set to half of detection (0.1 mg/L) because all measurements of NO2-N and NO3-N during calibration survey were less than detection
Phosphorus, mg/L	1	0.20	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B
	2	0.21	Linear interpolation of reaches 1 and 3
	3	0.22	Calibration survey 8/21/02 station 020303-3
	4	0.15	Linear interpolation of reaches 3 and 5
	5	0.08	Calibration survey 8/21/02; averages of stations 020303-7 and 020303-10
	6	0.02	Calibration survey 8/21/02 station 020303-9
	7	0.04	Linear interpolation of reach 6 and lower boundary conditions (average of stations 020303-12 and 020303-14)
Chlorophyll, ug/L	1	8.5	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B
	2	14.8	Linear interpolation of reaches 1 and 3
	3	21.0	Calibration survey 8/21/02 station 020303-3
	4	13.0	Linear interpolation of reaches 3 and 5
	5	5.0	Calibration survey 8/21/02; averages of stations 020303-7 and 020303-10
	6	28.0	Calibration survey 8/21/02 station 020303-9
	7	22.8	Linear interpolation of reach 6 and lower boundary conditions (average of stations 020303-12 and 020303-14)

Table E.3. Calibration Inputs for Kinetic Coefficients (Data Types 3, 6, 12 and 13).

Parameter name or description	Reach(es)	Value used in model	Data Source / Comment
Reaeration option	1 – 7	1	K2=a
Reaeration rate, K ₂	1	0.24/day	Calculated by dividing the surface transfer coefficient of 0.664 m/day by the reach depth. Reach depths given in Data Type 9 were used to calculate reaeration rates.
	2	0.28/day	
	3	0.31/day	
	4	0.37/day	Calculated by dividing the wind-aided surface transfer coefficient of 0.82 m/day by the reach depth. Reach depths given in Data Type 9 were used to calculate reaeration rates.
	5	0.34/day	
	6	0.33/day	
	7	0.46/day	
CBOD _u decay rate	1 – 7	0.05/day	Started with average of rates calculated from calibration survey measurements using GSBOD spreadsheet provided by LDEQ; adjusted for calibration.
Organic N decay rate	1 – 7	0.01/day	Adjusted for calibration; value used in other previous DO modeling in southern Louisiana is 0.02/day.
Ammonia N decay rate	1 – 3	0.05/day	Adjusted for calibration; value used in other previous DO modeling in southern Louisiana is 0.10/day.
	4 – 7	0.10/day	
Total daily radiation	1 – 7	416 langleys	Long term average daily solar radiation for New Orleans for August
Nitrogen half saturation constant	1 – 7	0.2 mg/L	Lower end of range in QUAL-TX user's manual (adjusted during calibration)
Phosphorus half saturation constant	1 – 7	0.03 mg/L	Lower end of range in QUAL-TX user's manual (adjusted during calibration)
Light half saturation constant	1 – 7	10 langleys per hour	Lower end of range in QUAL-TX user's manual (adjusted during calibration)
Algae max. growth rate	1 – 3	1.35/day	Calibration parameter
	4 – 7	1.05/day	
Algae respiration rate	1 – 7	0.10/day	Selected based on literature values
Algae settling rate	1 – 3	0.5 m/day	Selected based on literature values; adjusted for calibration
	4 – 7	0.2 m/day	
Secchi depth with no algae present	1 – 7	1.0 m	Assumed based on typical Secchi depths from LDEQ monitoring in Barataria basin
Algae to chlorophyll ratio	1 – 7	0.06 mg algae / μg chlorophyll	Assumes carbon to chlorophyll ratio is 30 (default value in WASP) and carbon is 50% of algal biomass
Conversion of settled algae to SOD	1 – 7	0.08 mg O ₂ per μg chlorophyll	Assumes carbon to chlorophyll ratio is 30 (default value in WASP) and oxygen consumed per unit of carbon decayed is 32/12 (based on conversion of C to CO ₂).

Table E.4. Calibration Inputs for NPS Loads (Data Types 12, 13 and 19).

Parameter name or description	Reach	Value used in model	Data Source / Comment
Sediment oxygen demand, g/m ² /day	1	1.6	These values were treated as calibration parameters by adjusting them to until the model output was similar to the calibration target values.
	2	1.6	
	3	1.3	
	4	0.5	
	5	0	
	6	0	
	7	0	
Benthic ammonia, g/m ² /day	1	0.0025	
	2	0.0025	
	3	0.002	
	4	0.002	
	5	0.002	
	6	0.002	
	7	0.002	
Benthic phosphorus, g/m ² /day	1	0.0063	
	2	0.0063	
	3	0.0063	
	4	0	
	5	0	
	6	0	
	7	0	
CBODu mass loads, kg/day	1	68	
	2	198	
	3	120	
	4	2600	
	5	5000	
	6	16600	
	7	3600	
Organic nitrogen mass loads, kg/day	1	1.0	
	2	14.5	
	3	9.0	
	4	100	
	5	325	
	6	750	
	7	150	

Table E.5. Calibration Inputs for Headwater (Data Types 20, 21, and 22).

Name of inflow	Parameter name	Value used in model	Data Source / Comment
Headwater Bayou Verret	Flow rate	0.0021 m ³ /sec	See section 4.8
	Temperature	28.8 C	Calibration survey 8/21/02; average of station 020303-1A and 020303-1B at 1 m depth
	Specific conductivity	1250 : mhos	
	DO	3.2 mg/L	24 hour average of continuous monitoring data on 8/21/02 from station 020303-1
	CBODu	4.03 mg/L	Based on data from calibration survey and calculated using LDEQ spreadsheet
	Organic N	1.19 mg/L	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B TKN minus ammonia
	Ammonia N	0.22 mg/L	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B
	NO ₂ + NO ₃	0.05 mg/L	Set to half the detection level since measurement was less than detection
	Phosphorus	0.20 mg/L	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B
	Chlorophyll	12 ug/L	

Table E.6. Calibration Inputs for Wasteload (Data Types 24, 25, and 26).

Name of inflow	Parameter name	Value used in model	Data Source / Comment
Louisiana Cypress Lumber Canal	Flow rate	0.90 m ³ /sec	See Section 4.10
	Temperature	30.2 C	Calibration survey station 020303-5, 1 m depth
	Specific conductivity	995 : mhos	
	DO	1.47 mg/L	Estimated average daily DO (see Section 4.10) using calibration survey 8/21/02 station 020303-1
	CBODu	4.03 mg/L	Calculated from calibration survey 8/21/02 station 020303-1A and 020303-1B using GSBOD spreadsheet provided by LDEQ
	Organic N	1.19 mg/L	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B TKN minus ammonia
	Ammonia N	0.22 mg/L	Calibration survey 8/21/02 average of stations 020303-1A and 020303-1B
	NO ₂ + NO ₃	0.05 mg/L	Set to half the detection limit because measurement was less than detection
	Phosphorus	0.20 mg/L	Calibration survey 8/21/02 average of stations 020303-1A and 020303-1B
	Chlorophyll	12 ug/L	
Davis Pond Freshwater Diversion	Flow rate	10.0 m ³ /sec	See Section 4.10
	Temperature	30.2 C	Calibration survey station 020303-5, 1 m depth
	Specific conductivity	995 : mhos	
	DO	1.47 mg/L	Estimated average daily DO (see Section 4.10) using calibration survey 8/21/02 station 020303-1
	CBODu	4.03 mg/L	Calculated from calibration survey 8/21/02 station 020303-1A and 020303-1B using GSBOD spreadsheet provided by LDEQ
	Organic N	1.19 mg/L	Calibration survey 8/21/02; average of stations 020303-1A and 020303-1B TKN minus ammonia
	Ammonia N	0.22 mg/L	Calibration survey 8/21/02 average of stations 020303-1A and 020303-1B
	NO ₂ + NO ₃	0.05 mg/L	Set to half the detection limit because measurement was less than detection
	Phosphorus	0.20 mg/L	Calibration survey 8/21/02 average of stations 020303-1A and 020303-1B
	Chlorophyll	12 ug/L	

Table E.7. Calibration Inputs for Lower Boundary Conditions (Data Type 27).

Parameter name	Value used in model	Data Source / Comment
Temperature	31.2 C	Calibration survey 8/21/02; average of stations 020303-12 and 020303-14, 1 m depth
Salinity	0.950 ppt	Calculated from calibration survey 8/21/02 average of stations 020303-12 and 020303-14 specific conductivity at 1 m
Specific Conductivity	1695 : mhos	Calibration survey 8/21/02; average of stations 020303-12 and 020303-14, 1 m depth
DO	6.46 mg/L	Daily average DO (see Section 4.10) from continuous monitoring data at station 020303-14 during calibration survey 8/21/02, 1 m depth
CBODu	4.18 mg/L	Calculated from calibration survey 8/21/02; average of stations 020303-12 and 020303-14 using GSBOD spreadsheet provided by LDEQ
Organic N	1.01 mg/L	Calibration survey 8/21/02; average of stations 020303-12 and 020303-14 TKN minus ammonia
Ammonia N	0.13 mg/L	Calibration survey 8/21/02; average of stations 020303-12 and 020303-14
NO ₂ + NO ₃	0.05 mg/L	Set to half the detection limit because measurement was less than detection
Phosphorus	0.06 mg/L	Calibration survey 8/21/02; average of stations 020303-12 and 020303-14
Chlorophyll	17.5 ug/L	

APPENDIX F

Calculation of K_L (Calibration Survey)

Wind Aided Reaeration for Lake Cataouatche

Wind Aided Reaeration Coefficient Equation (Eq.3-23 from Rates, Constants, and Kinetics publication)

$$K_L \text{ with wind} = K_L \text{ without wind} [1 + (0.2395 V_w^{1.643})] \quad \text{Equation 1}$$

V_w = wind velocity in meters per second

K_2 = reaeration in 1/day that does not account for wind effects. For Louisiana equation use $K_2 = 0.664/D$.

D = depth in meters

$K_L = K_2 * D$ (=oxygen transfer coefficient "a" in model)

Formula to correct wind speed for elevation (obtained from LDEQ):

$$V_{w@ \text{ height } z} = V_{w@ \text{ height } s} [(z/s)^{0.143}] \quad \text{Equation 2}$$

CALCULATIONS FOR CALIBRATION PERIOD:

Calibration Period: August 20, 2002

Station	Average Wind Speed (knots)	Average Wind Speed (m/s)	Height of Wind Measurement (m)	Height for Calculating Wind-Aided K_L (m)	Wind Speed at Surface using Eqn 2 (m/s)	K_L without wind (m/day)	K_L with wind using Eqn 1 (m/day)
New Orleans Intl. Airport	3.7	1.9	10	0.1	1.0	0.664	0.82

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APPENDIX G

Literature Values for Mineralization Rates

TABLE 5-3. RATE COEFFICIENTS FOR NITROGEN TRANSFORMATIONS

POH + DOM		DOM + NH ₃		PON + NH ₃		NH ₃ + NO ₂		NH ₃ + NO ₃		NO ₂ + NO ₃		SCOM + NH ₃		References
K	θ	K	θ	K	θ	K	θ	K	θ	K	θ	K	θ	
Calibration Values														
0.035	(linear)	0.035	(linear)	0.035	(linear)	0.04	(linear)	0.04	(linear)	0.04	(linear)	0.04	(linear)	Thomann <u>et al.</u> , (1975)
0.03**	1.08	0.03**	1.08	0.03**	1.08	0.12***	1.08	0.12***	1.08	0.12***	1.08	0.0025	1.08	Thomann <u>et al.</u> , (1979)
0.03***	1.08	0.03***	1.08	0.03***	1.08	0.20	1.08	0.20	1.08	0.20	1.08	0.0004	1.08	Di Toro & Connolly (1980)
0.03***	1.08	0.03***	1.08	0.03***	1.08	0.09-0.13***	1.08	0.09-0.13***	1.08	0.09-0.13***	1.08	0.0004	1.08	Di Toro & Matystik (1980)
0.075	1.08	0.075	1.08	0.075	1.08	0.025***	1.08	0.025***	1.08	0.025***	1.08	0.0004	1.08	Thomann & Fitzpatrick (1982)
0.14	(linear)	0.14	(linear)	0.14	(linear)	0.025***	1.08	0.025***	1.08	0.025***	1.08	0.0004	1.08	O'Connor <u>et al.</u> , (1981)
0.001	1.02	0.001	1.02	0.001	1.02	0.003-0.03	1.02	0.003-0.03	1.02	0.003-0.03	1.02	0.001	1.02	Salas & Thomann (1978)
0.020 (linear)	0.020 (linear)	0.020 (linear)	0.020 (linear)	0.020 (linear)	0.020 (linear)	0.060	(linear)	0.060	(linear)	0.060	(linear)	0.001	1.02	Chen & Orlob (1972, 1975)
0.020 (linear)	0.020 (linear)	0.020 (linear)	0.020 (linear)	0.020 (linear)	0.020 (linear)	0.1	(linear)	0.1	(linear)	0.1	(linear)	0.001	1.02	Scavia <u>et al.</u> , (1975)
0.02	1.020	0.02	1.020	0.02	1.020	0.1	1.020	0.1	1.020	0.1	1.020	0.001	1.02	Scavia (1980)
0.02 (linear)	0.024 (linear)	0.02 (linear)	0.024 (linear)	0.02 (linear)	0.024 (linear)	0.16	(linear)	0.16	(linear)	0.16	(linear)	0.001	1.02	Bowle <u>et al.</u> , (1980)
0.003	1.020	0.003	1.020	0.003	1.020	0.02	1.047	0.02	1.047	0.02	1.047	0.0015	1.047	Canale <u>et al.</u> , (1976)
0.1	1.047	0.1	1.047	0.1	1.047	0.02	1.047	0.02	1.047	0.02	1.047	0.0015	1.047	Tetra Tech (1980)
0.01**	NI	0.01**	NI	0.01**	NI	0.25	1.047	0.25	1.047	0.25	1.047	0.0015	1.047	Porcella <u>et al.</u> , (1983)
0.005**	1.08	0.005**	1.08	0.005**	1.08	0.95-1.8***	1.14	0.95-1.8***	1.14	0.95-1.8***	1.14	0.95-1.8***	1.14	Nyholm (1978)
0.1**	1.02	0.1**	1.02	0.1**	1.02	0.95-1.8***	1.14	0.95-1.8***	1.14	0.95-1.8***	1.14	0.95-1.8***	1.14	Bierman <u>et al.</u> , (1980)
0.2**	1.072	0.2**	1.072	0.2**	1.072	0.95-1.8***	1.14	0.95-1.8***	1.14	0.95-1.8***	1.14	0.95-1.8***	1.14	Jorgensen (1976)
														Jorgensen <u>et al.</u> , (1978)

(continued)

APPENDIX H

DO Calculations

Table H.1. Estimation of Daily Average DO Using Continuous Data for Station 020203-1 from Calibration Survey.

Continuous Monitoring Data (020203-1)				Instantaneous Data				
<u>Date/Time</u>	<u>DO (mg/L)</u>	DO as fraction of daily average	Moving average of fraction of daily avg.	<u>Station</u>	<u>Date</u>	<u>Time</u>	Measured DO at sampling time (mg/L)	Estimated daily avg DO at this station (mg/L)
08/21/02 00:09	3.55	1.4015						
08/21/02 00:24	3.39	1.3384						
08/21/02 00:39	3.3	1.3028	1.2799					
08/21/02 00:54	3.03	1.1962	1.2152					
08/21/02 01:09	2.94	1.1607	1.1552					
08/21/02 01:24	2.73	1.0778	1.0928					
08/21/02 01:39	2.63	1.0383	1.0446					
08/21/02 01:54	2.51	0.9910	0.9957					
08/21/02 02:09	2.42	0.9554	0.9625					
08/21/02 02:24	2.32	0.9159	0.9278					
08/21/02 02:39	2.31	0.9120	0.9001					
08/21/02 02:54	2.19	0.8646	0.8717					
08/21/02 03:09	2.16	0.8528	0.8457					
08/21/02 03:24	2.06	0.8133	0.8188					
08/21/02 03:39	1.99	0.7857	0.7959					
08/21/02 03:54	1.97	0.7778	0.7699					
08/21/02 04:09	1.9	0.7501	0.7564					
08/21/02 04:24	1.83	0.7225	0.7462					
08/21/02 04:39	1.89	0.7462	0.7288					
08/21/02 04:54	1.86	0.7343	0.7091					
08/21/02 05:09	1.75	0.6909	0.6980					
08/21/02 05:24	1.65	0.6514	0.6751					
08/21/02 05:39	1.69	0.6672	0.6593					
08/21/02 05:54	1.6	0.6317	0.6554					
08/21/02 06:09	1.66	0.6554	0.6506					
08/21/02 06:24	1.7	0.6712	0.6475					
08/21/02 06:39	1.59	0.6277	0.6427					
08/21/02 06:54	1.65	0.6514	0.6333					
08/21/02 07:09	1.54	0.6080	0.6664					
08/21/02 07:24	1.54	0.6080	0.6656					
08/21/02 07:39	2.12	0.8370	0.6680*	020203-1A	8/21/2002	7:40	1.70	2.54
08/21/02 07:54	1.58	0.6238	0.6704*	020303-1B	8/21/2002	8:00	1.80	2.69
08/21/02 08:09	8.1		0.6727*	020203-2	8/21/2002	8:15	1.90	2.82
08/21/02 08:24	0.15		0.6751*					
08/21/02 08:39	1.52		0.6775*	020203-3	8/21/2002	8:40	1.70	2.51
08/21/02 08:54	7.55		0.6798*	020203-4	8/21/2002	9:00	2.30	3.38
08/21/02 09:09	7.32		0.6822*	020203-5	8/21/2002	9:15	1.00	1.47
08/21/02 09:24	0.94		0.6846*					
08/21/02 09:39	7.46		0.6870*					
08/21/02 09:54	6.63		0.6893*					
08/21/02 10:09	6.66		0.6917*					
08/21/02 10:24	2.24	0.8844	0.6941*	020203-3.5	8/21/2002	10:30	2.30	3.31
08/21/02 10:39	1.21	0.4777	0.6964*					
08/21/02 10:54	1.28	0.5053	0.6988					
08/21/02 11:09	1.92	0.7580	0.7635					
08/21/02 11:24	2.2	0.8686	0.7620					
08/21/02 11:39	3.06	1.2081	0.8378					
08/21/02 11:54	1.19	0.4698	0.8520					
08/21/02 12:09	2.24	0.8844	0.8109					
08/21/02 12:24	2.1	0.8291	0.6980	020203-0	8/21/2002	12:30	2.20	3.15
08/21/02 12:39	1.68	0.6633	0.7233					
08/21/02 12:54	1.63	0.6435	0.6475					
08/21/02 13:09	1.51	0.5962	0.6080					

Continuous Monitoring Data (020203-1)

Instantaneous Data

<u>Date/Time</u>	<u>DO (mg/L)</u>	<u>DO as fraction of daily average</u>	<u>Moving average of fraction of daily avg.</u>
08/21/02 13:24	1.28	0.5053	0.6088
08/21/02 13:39	1.6	0.6317	0.6269
08/21/02 13:54	1.69	0.6672	0.6333
08/21/02 14:09	1.86	0.7343	0.6380
08/21/02 14:24	1.59	0.6277	0.6017
08/21/02 14:39	1.34	0.5290	0.6112
08/21/02 14:54	1.14	0.4501	0.6072
08/21/02 15:09	1.81	0.7146	0.5993
08/21/02 15:24	1.81	0.7146	0.6214
08/21/02 15:39	1.49	0.5883	0.6309
08/21/02 15:54	1.62	0.6396	0.6064
08/21/02 16:09	1.26	0.4975	0.5677
08/21/02 16:24	1.5	0.5922	0.6530
08/21/02 16:39	1.32	0.5211	0.7493
08/21/02 16:54	2.57	1.0146	0.8236
08/21/02 17:09	2.84	1.1212	0.9420
08/21/02 17:24	2.2	0.8686	1.0683
08/21/02 17:39	3	1.1844	1.1497
08/21/02 17:54	2.92	1.1528	1.2231
08/21/02 18:09	3.6	1.4213	1.2768
08/21/02 18:24	3.77	1.4884	1.2878
08/21/02 18:39	2.88	1.1370	1.3178
08/21/02 18:54	3.14	1.2397	1.2326
08/21/02 19:09	3.3	1.3028	1.1812
08/21/02 19:24	2.52	0.9949	1.1781
08/21/02 19:39	3.12	1.2318	1.1599
08/21/02 19:54	2.84	1.1212	1.1741
08/21/02 20:09	2.91	1.1489	1.1662
08/21/02 20:24	3.48	1.3739	1.1394
08/21/02 20:39	2.42	0.9554	1.1410
08/21/02 20:54	2.78	1.0975	1.1433
08/21/02 21:09	2.86	1.1291	1.0889
08/21/02 21:24	2.94	1.1607	1.1252
08/21/02 21:39	2.79	1.1015	1.1441
08/21/02 21:54	2.88	1.1370	1.1568
08/21/02 22:09	3.02	1.1923	1.1426
08/21/02 22:24	3.02	1.1923	1.1378
08/21/02 22:39	2.76	1.0897	1.1157
08/21/02 22:54	2.73	1.0778	1.0707
08/21/02 23:09	2.6	1.0265	1.0675
08/21/02 23:24	2.45	0.9673	1.0778
08/21/02 23:39	2.98	1.1765	
08/21/02 23:54	2.89	1.1410	
Average:	2.53		

<u>Station</u>	<u>Date</u>	<u>Time</u>	<u>Measured DO at sampling time (mg/L)</u>	<u>Estimated daily avg DO at this station (mg/L)</u>
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* denotes values obtained by linear interpolation due to inconsistencies in continuous monitoring data

Table H.2. Estimation of Daily Average DO Using Continuous Data for Station 020203-14 from Calibration Survey.

<u>Continuous Monitoring Data (020203-14)</u>			<u>Instantaneous Data</u>				
<u>Date/Time</u>	<u>DO (mg/L)</u>	<u>DO as fraction of daily average</u>	<u>Station</u>	<u>Date</u>	<u>Time</u>	<u>Measured DO at sampling time (mg/L)</u>	<u>Estimated daily avg DO at this station (mg/L)</u>
08/21/02 00:11	6.61	1.0236					
08/21/02 00:26	6.57	1.0174					
08/21/02 00:41	6.56	1.0158					
08/21/02 00:56	6.58	1.0189					
08/21/02 01:11	6.5	1.0065					
08/21/02 01:26	6.48	1.0034					
08/21/02 01:41	6.39	0.9895					
08/21/02 01:56	6.48	1.0034					
08/21/02 02:11	6.43	0.9957					
08/21/02 02:26	6.2	0.9601					
08/21/02 02:41	6.18	0.9570					
08/21/02 02:56	6.17	0.9554					
08/21/02 03:11	6.09	0.9430					
08/21/02 03:26	6	0.9291					
08/21/02 03:41	5.99	0.9276					
08/21/02 03:56	5.97	0.9245					
08/21/02 04:11	5.95	0.9214					
08/21/02 04:26	5.97	0.9245					
08/21/02 04:41	6.06	0.9384					
08/21/02 04:56	6.02	0.9322					
08/21/02 05:11	6.04	0.9353					
08/21/02 05:26	6.15	0.9523					
08/21/02 05:41	6.16	0.9539					
08/21/02 05:56	6.11	0.9461					
08/21/02 06:11	6.05	0.9368					
08/21/02 06:26	6.05	0.9368					
08/21/02 06:41	5.99	0.9276					
08/21/02 06:56	5.97	0.9245					
08/21/02 07:11	5.97	0.9245					
08/21/02 07:26	5.97	0.9245					
08/21/02 07:41	5.98	0.9260					
08/21/02 07:56	5.98	0.9260					
08/21/02 08:11	5.93	0.9183					
08/21/02 08:26	6.04	0.9353					
08/21/02 08:41	6.07	0.9399					
08/21/02 08:56	6.11	0.9461					
08/21/02 09:11	6.09	0.9430					
08/21/02 09:26	6.15	0.9523					
08/21/02 09:41	6.27	0.9709	020203-8	8/21/2002	9:45	5.9	6.08
08/21/02 09:56	6.43	0.9957	020203-6	8/21/2002	10:00	5.00	5.02
08/21/02 10:11	6.34	0.9818					
08/21/02 10:26	6.47	1.0019					
08/21/02 10:41	6.52	1.0096					
08/21/02 10:56	6.61	1.0236					
08/21/02 11:11	6.74	1.0437					
08/21/02 11:26	6.56	1.0158					
08/21/02 11:41	6.44	0.9972					
08/21/02 11:56	6.31	0.9771					
08/21/02 12:11	6.39	0.9895					
08/21/02 12:26	6.39	0.9895					
08/21/02 12:41	6.36	0.9849					
08/21/02 12:56	6.44	0.9972					

Continuous Monitoring Data (020203-14)

Instantaneous Data

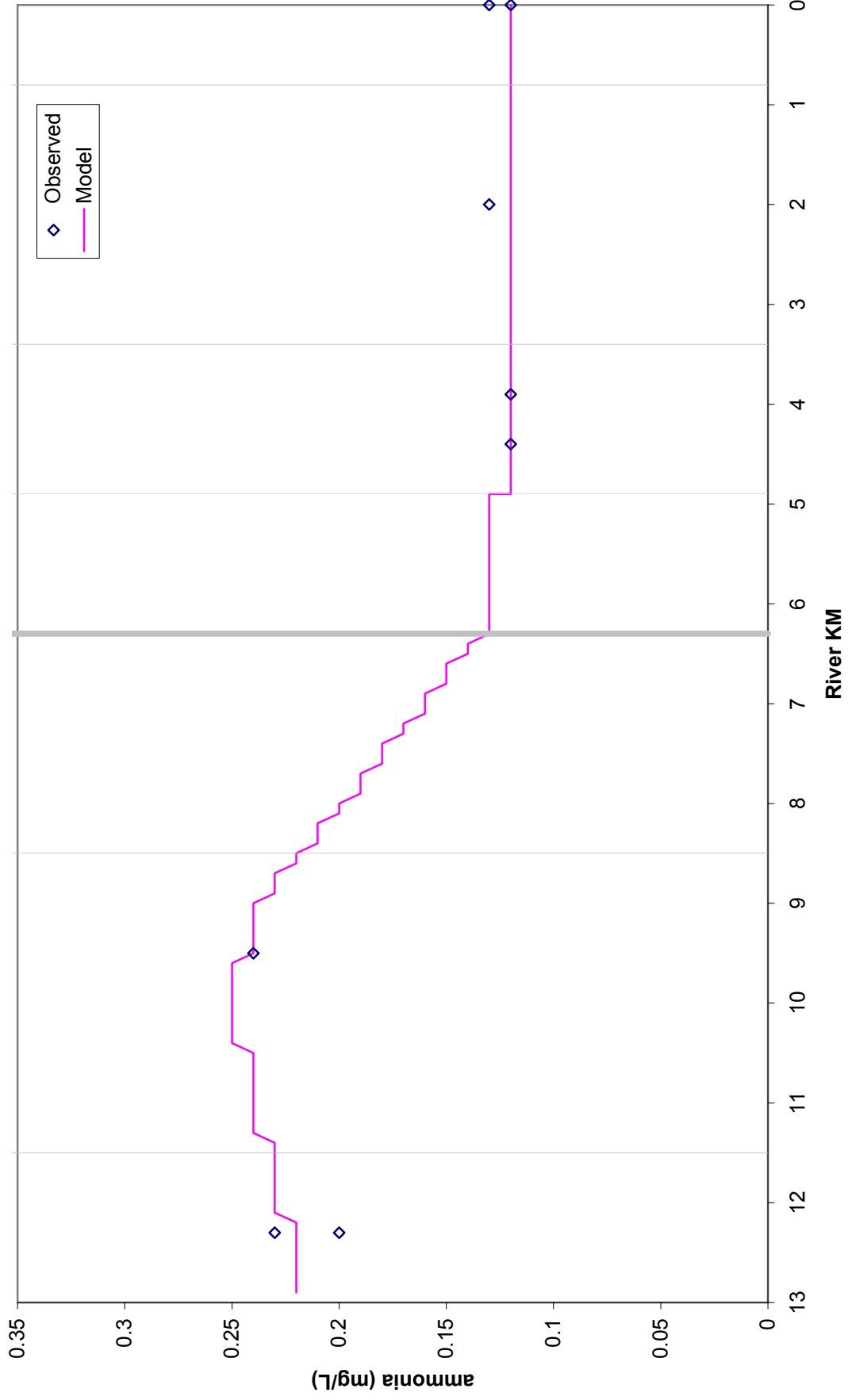
<u>Date/Time</u>	<u>DO (mg/L)</u>	<u>DO as fraction of daily average</u>	<u>Station</u>	<u>Date</u>	<u>Time</u>	<u>Measured DO at sampling time (mg/L)</u>	<u>Estimated daily avg DO at this station (mg/L)</u>
08/21/02 13:11	6.6	1.0220					
08/21/02 13:26	6.69	1.0360					
08/21/02 13:41	6.76	1.0468					
08/21/02 13:56	6.76	1.0468					
08/21/02 14:11	6.96	1.0778	020203-7	8/21/2002	14:10	7.10	6.59
08/21/02 14:26	7.12	1.1025	020203-9	8/21/2002	14:30	7.40	6.71
08/21/02 14:41	7.05	1.0917					
08/21/02 14:56	7.22	1.1180					
08/21/02 15:11	7.19	1.1134					
08/21/02 15:26	7.23	1.1196					
08/21/02 15:41	7.33	1.1351					
08/21/02 15:56	6.58	1.0189	020203-10	8/21/2002	15:55	7.10	6.97
08/21/02 16:11	6.86	1.0623					
08/21/02 16:26	7.09	1.0979	020203-14	8/21/2002	16:20	7.00	6.38
08/21/02 16:41	6.91	1.0700					
08/21/02 16:56	6.97	1.0793	020203-13	8/21/2002	16:50	7.70	7.13
08/21/02 17:11	6.79	1.0514					
08/21/02 17:26	6.83	1.0576	020203-12	8/21/2002	17:25	6.90	6.52
08/21/02 17:41	6.75	1.0452	020203-11	8/21/2002	17:45	8.00	7.65
08/21/02 17:56	6.81	1.0545					
08/21/02 18:11	6.69	1.0360					
08/21/02 18:26	6.54	1.0127					
08/21/02 18:41	6.48	1.0034					
08/21/02 18:56	6.48	1.0034					
08/21/02 19:11	6.56	1.0158					
08/21/02 19:26	6.62	1.0251					
08/21/02 19:41	6.67	1.0329					
08/21/02 19:56	6.68	1.0344					
08/21/02 20:11	6.68	1.0344					
08/21/02 20:26	6.65	1.0298					
08/21/02 20:41	6.63	1.0267					
08/21/02 20:56	6.62	1.0251					
08/21/02 21:11	6.52	1.0096					
08/21/02 21:26	6.49	1.0050					
08/21/02 21:41	6.51	1.0081					
08/21/02 21:56	6.49	1.0050					
08/21/02 22:11	6.45	0.9988					
08/21/02 22:26	6.48	1.0034					
08/21/02 22:41	6.5	1.0065					
08/21/02 22:56	6.51	1.0081					
08/21/02 23:11	6.51	1.0081					
08/21/02 23:26	6.46	1.0003					
08/21/02 23:41	6.5	1.0065					
08/21/02 23:56	6.45	0.9988					
AVERAGE:	6.46						

FILE: R:\PROJECTS\2110-611\CD_LAKE_CAT\APP H DO CAL (CALIB SURVEY)\DO CALCULATIONS-LK_CAT-CALIB.XLS

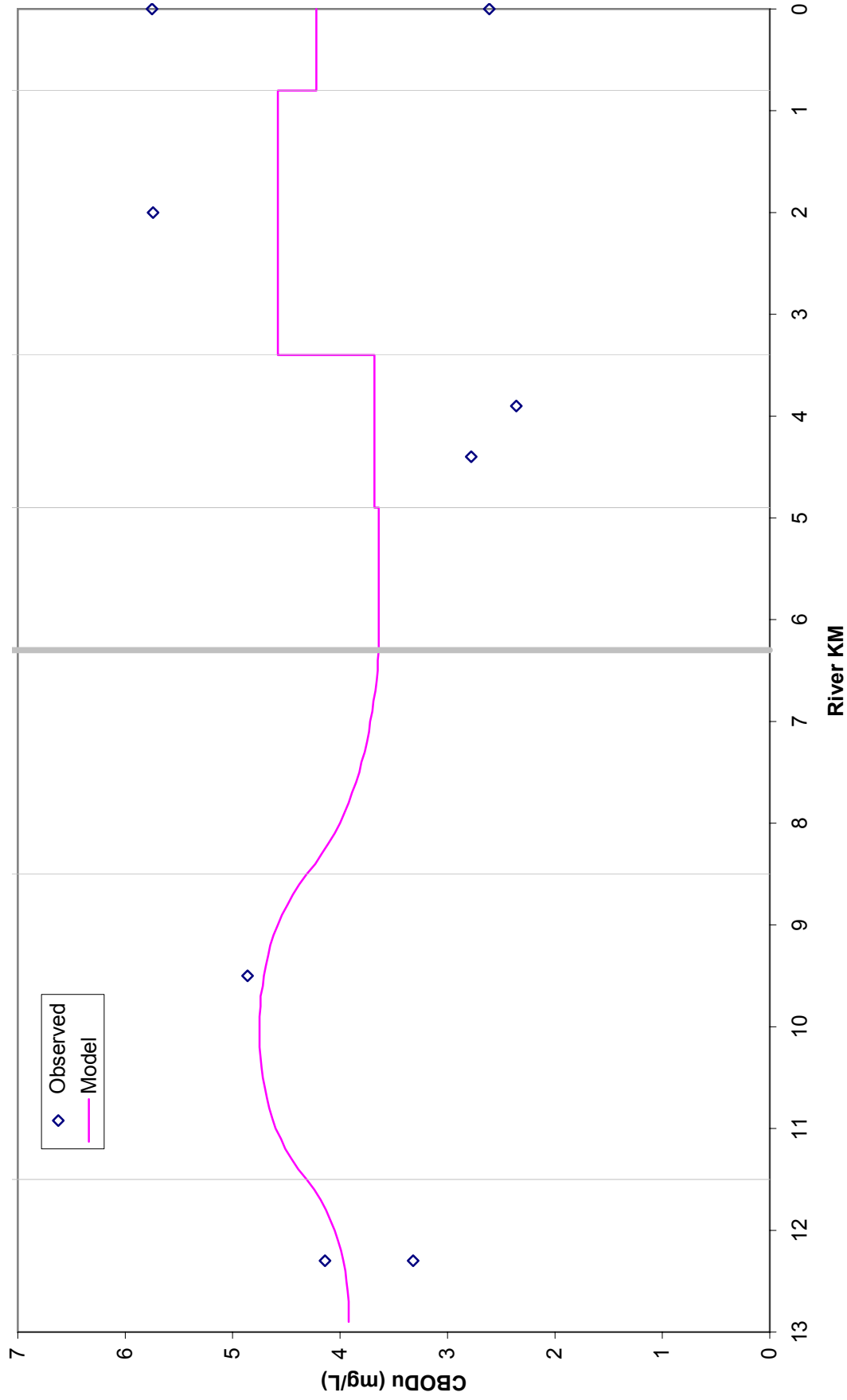
APPENDIX I

Plots of Calibration Model Results

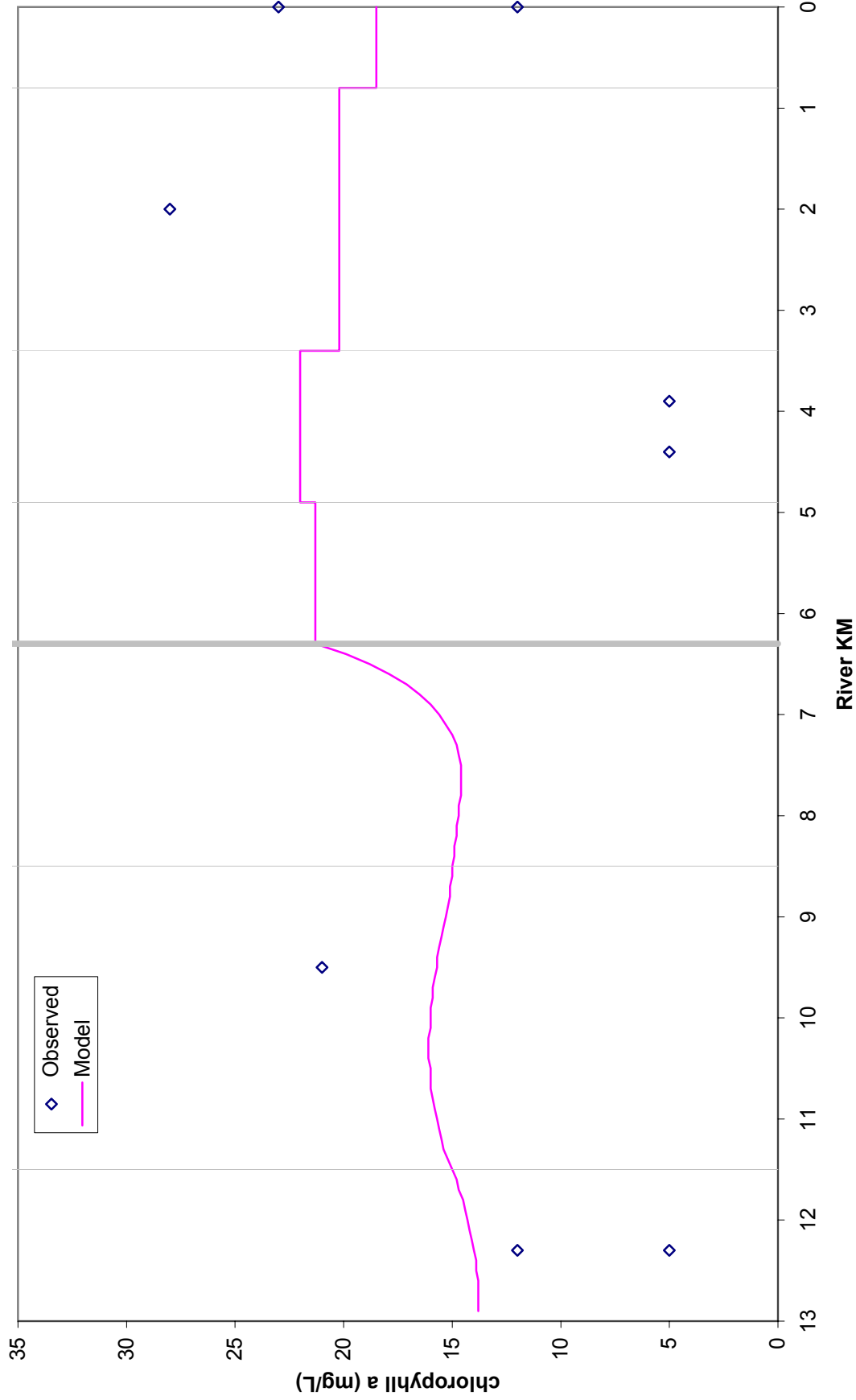
Ammonia Nitrogen Calibration for Lake Cataouatche



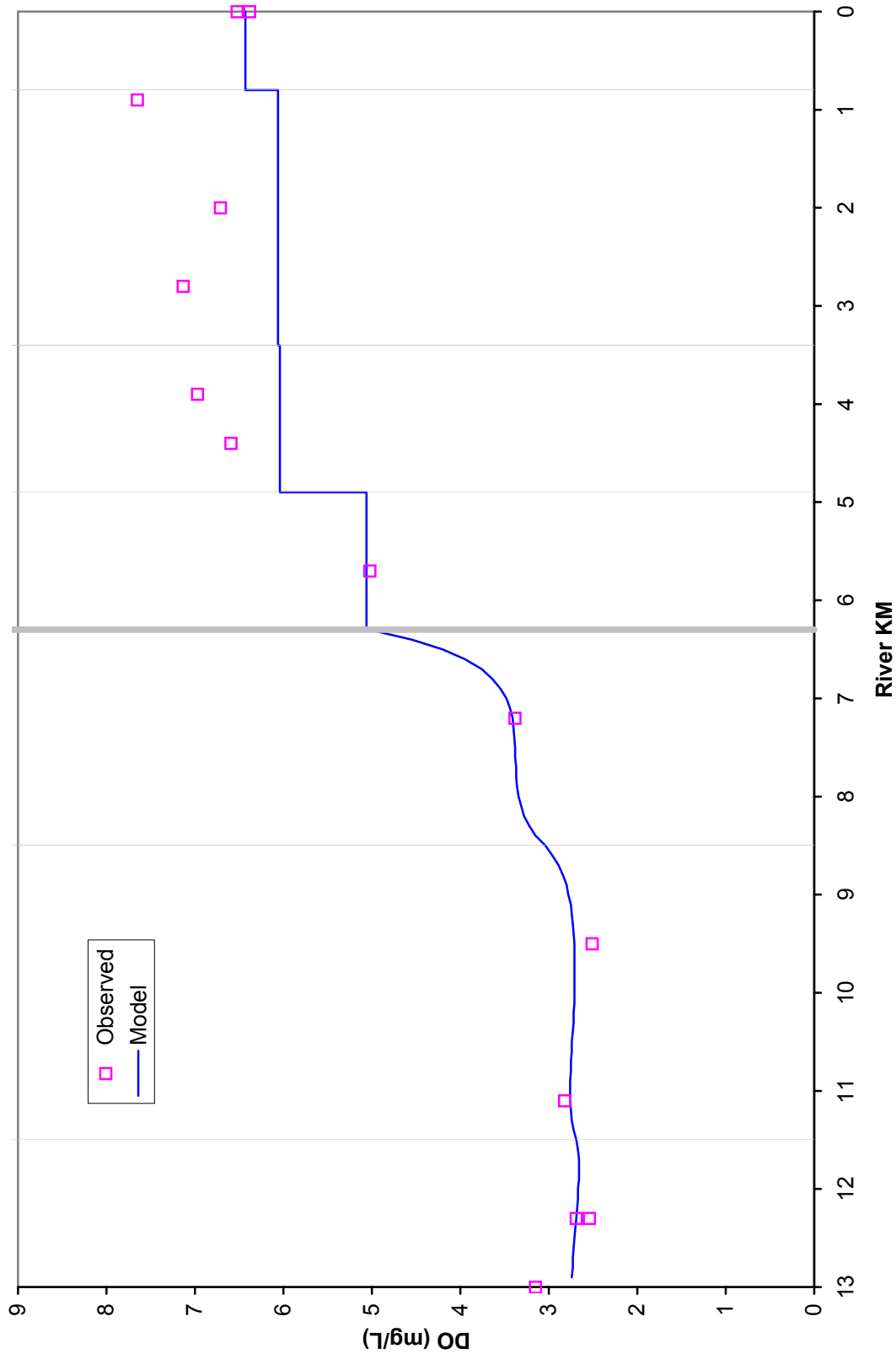
CBODu Calibration for Lake Cataouatche



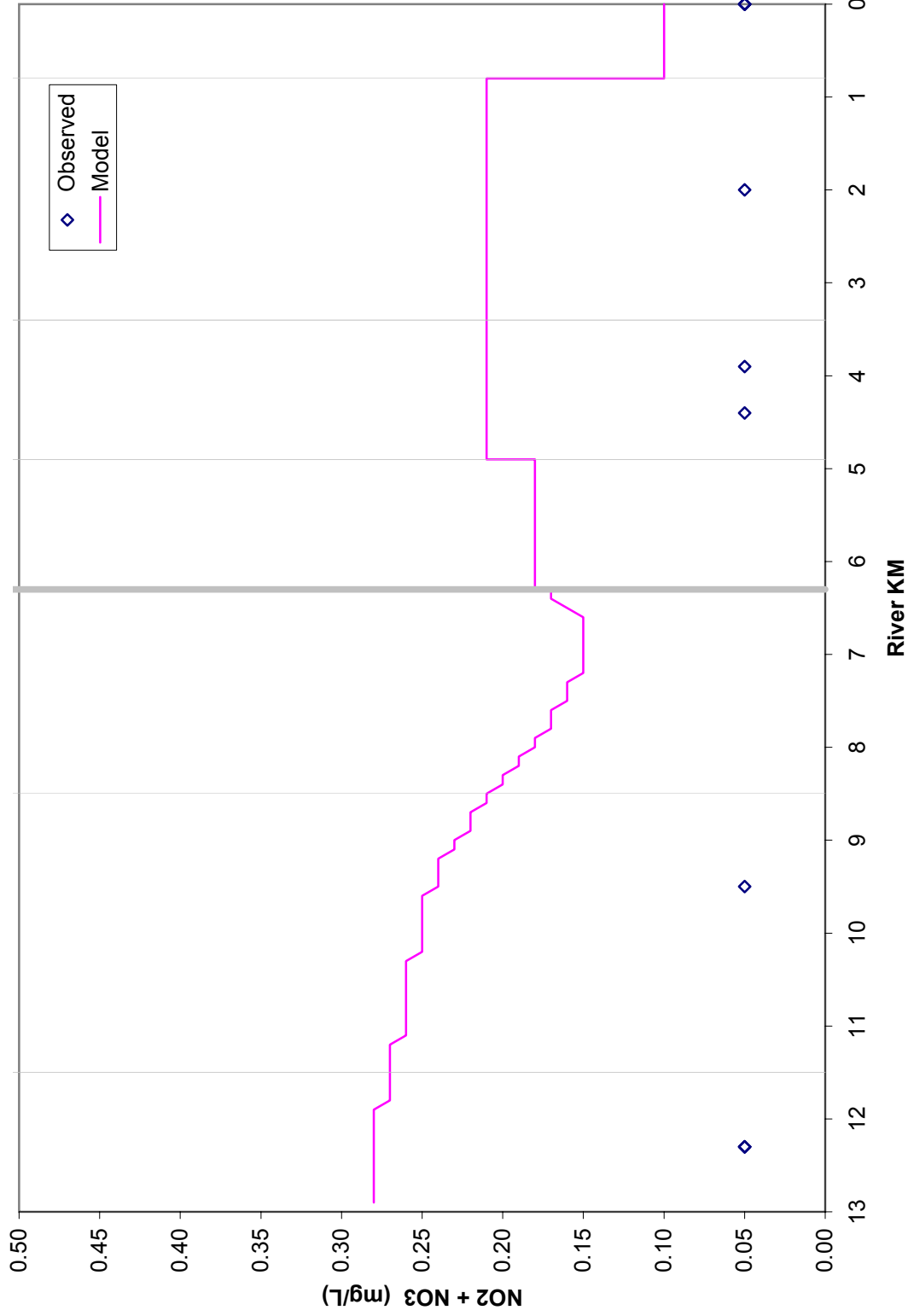
Chlorophyll Calibration for Lake Cataouatche



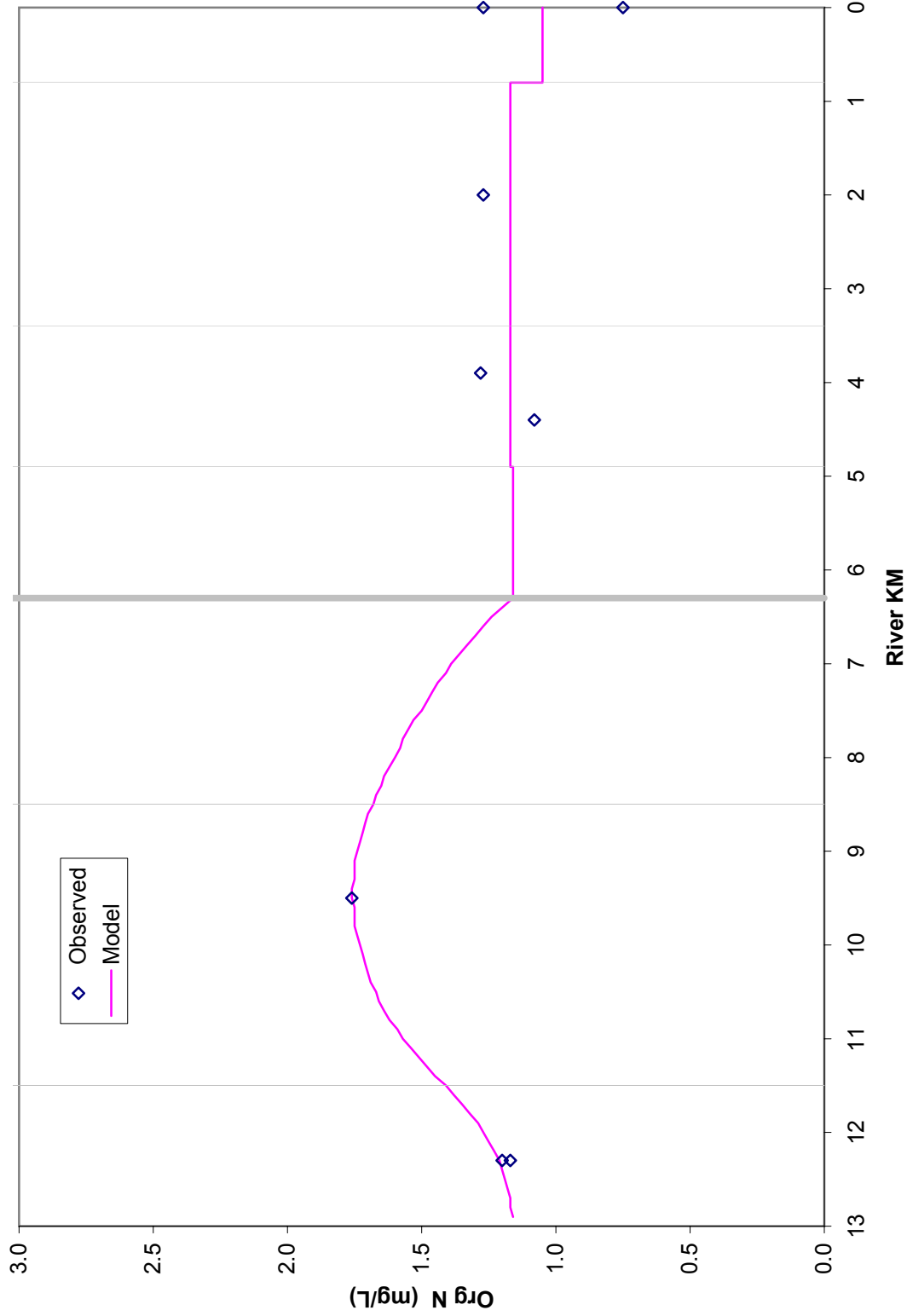
DO Calibration for Lake Cataouatche



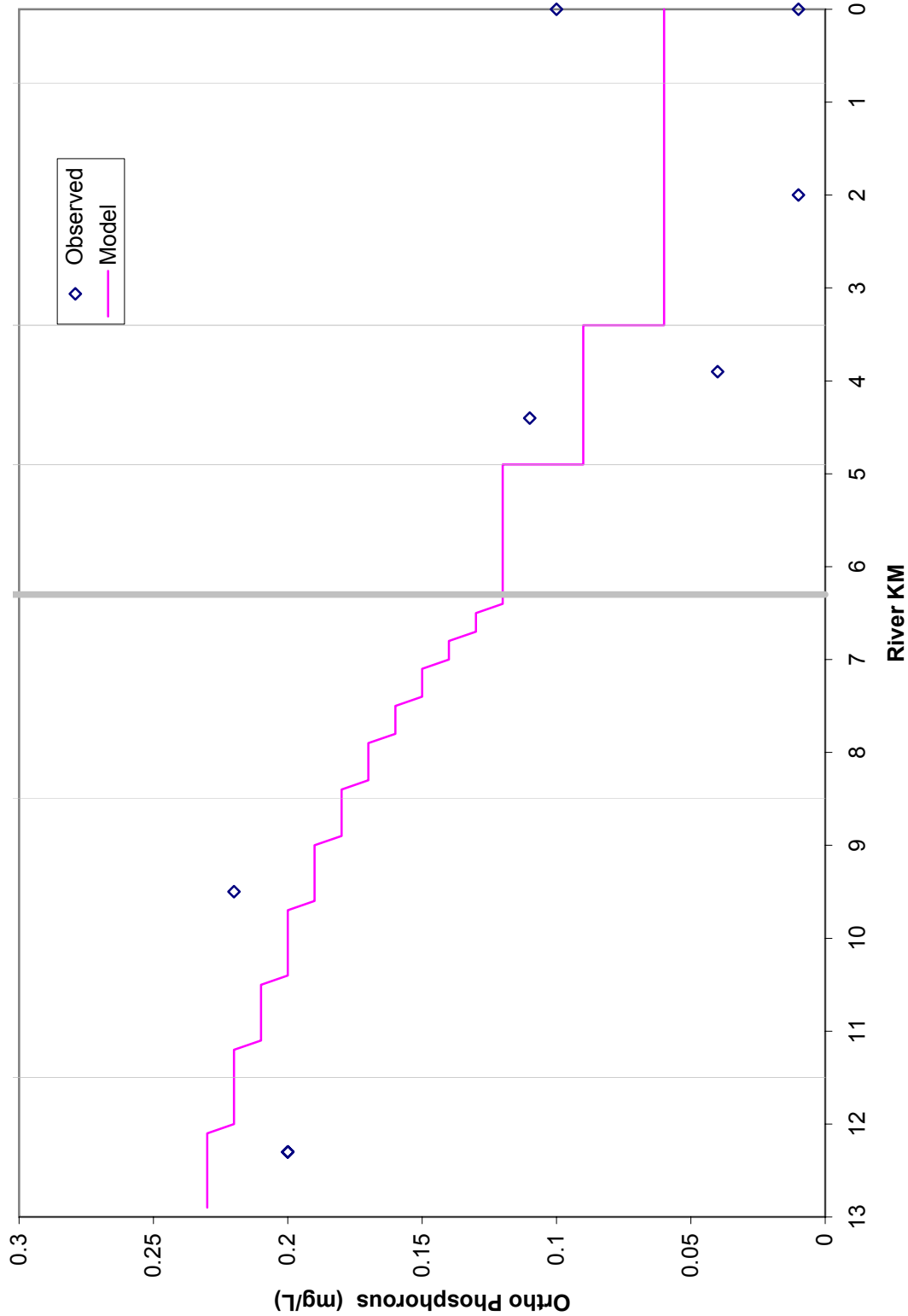
Nitrate + Nitrite Calibration for Lake Cataouatche



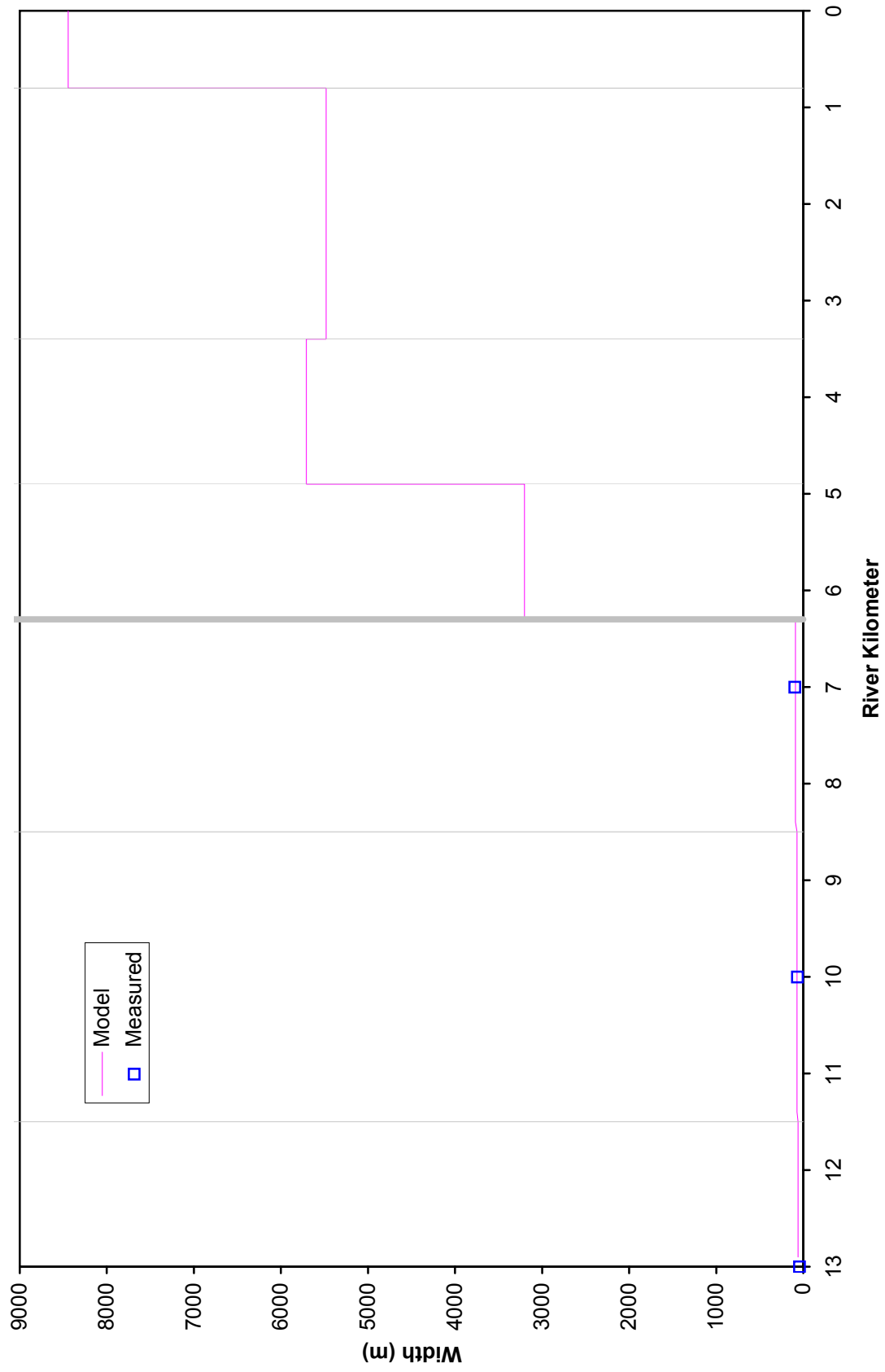
Organic Nitrogen Calibration for Lake Cataouatche



Phosphorus Calibration for Lake Cataouatche



Modeled and Observed Widths for Lake Cataouatche



Modeled and Observed Depths for Lake Cataouatche

