Sabattus River Data Report
August 2002 Survey
April 2003
DEPLW0591

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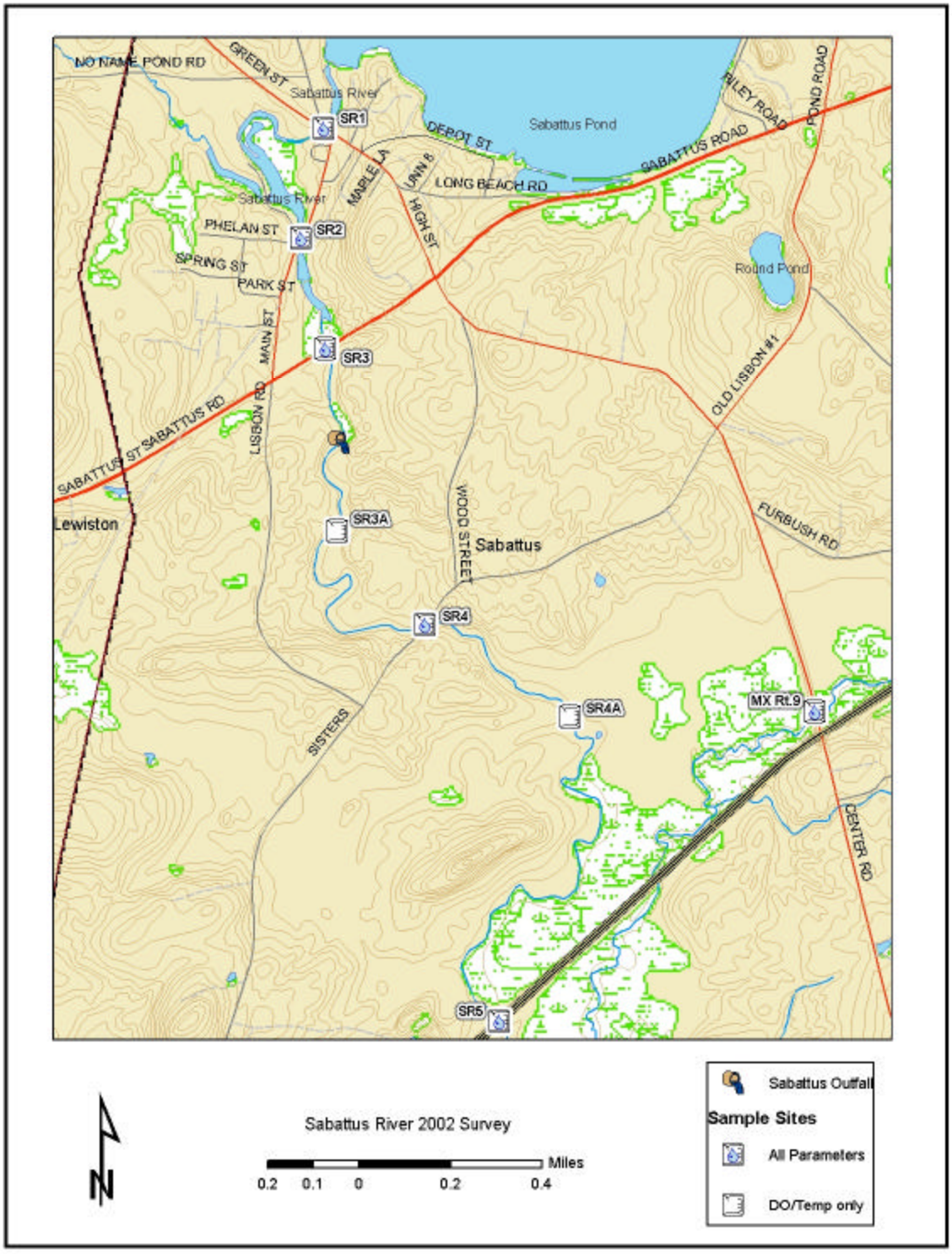
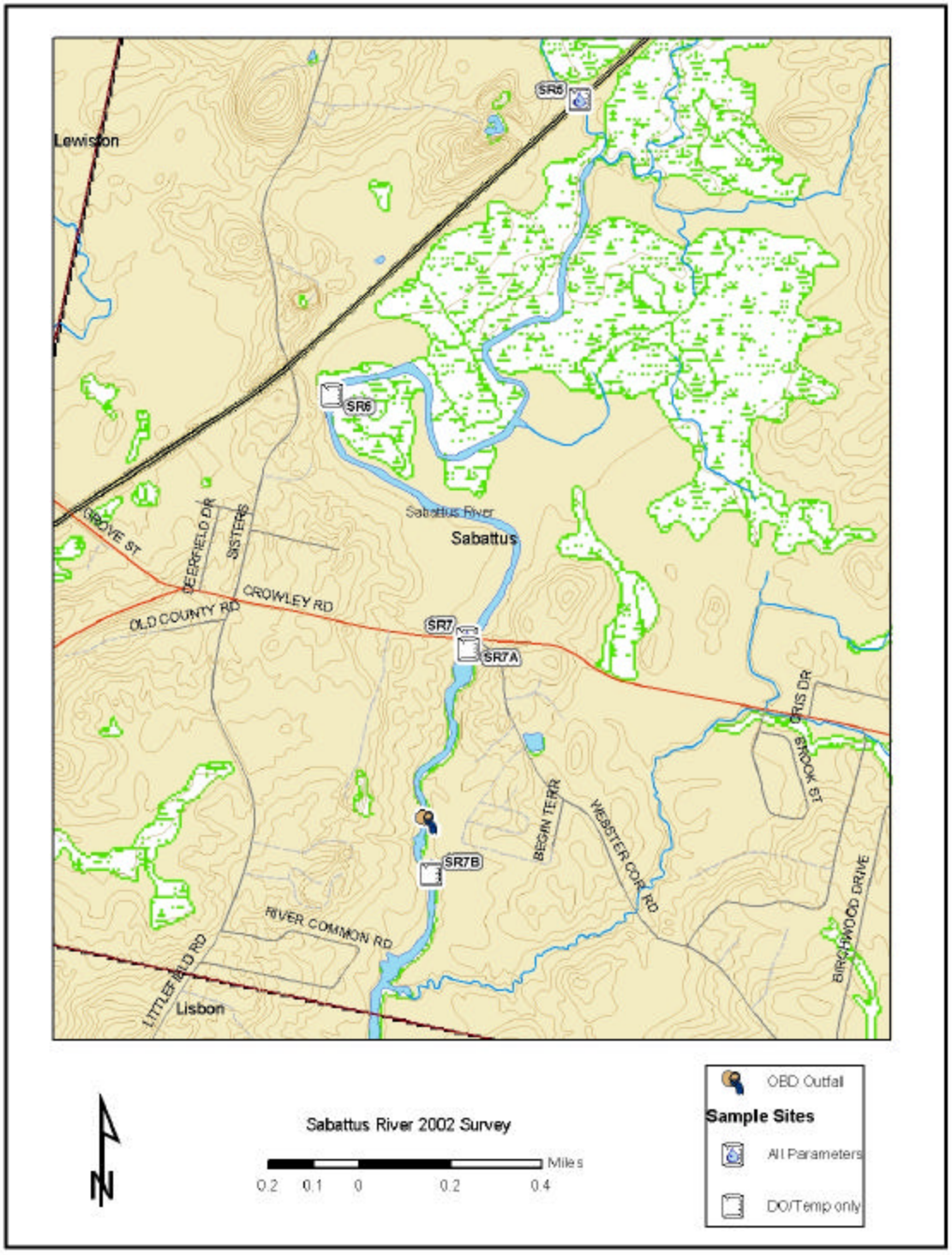
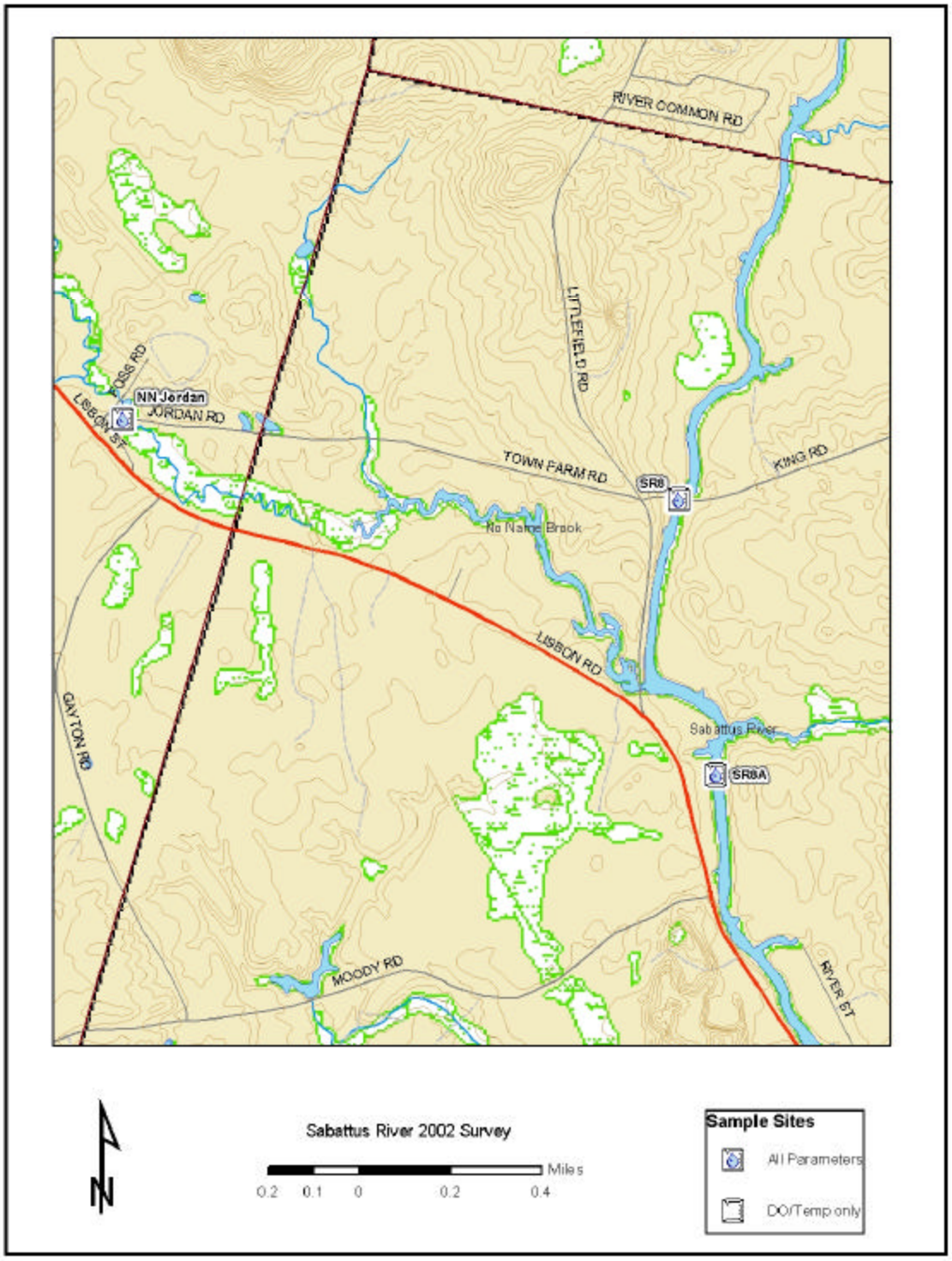
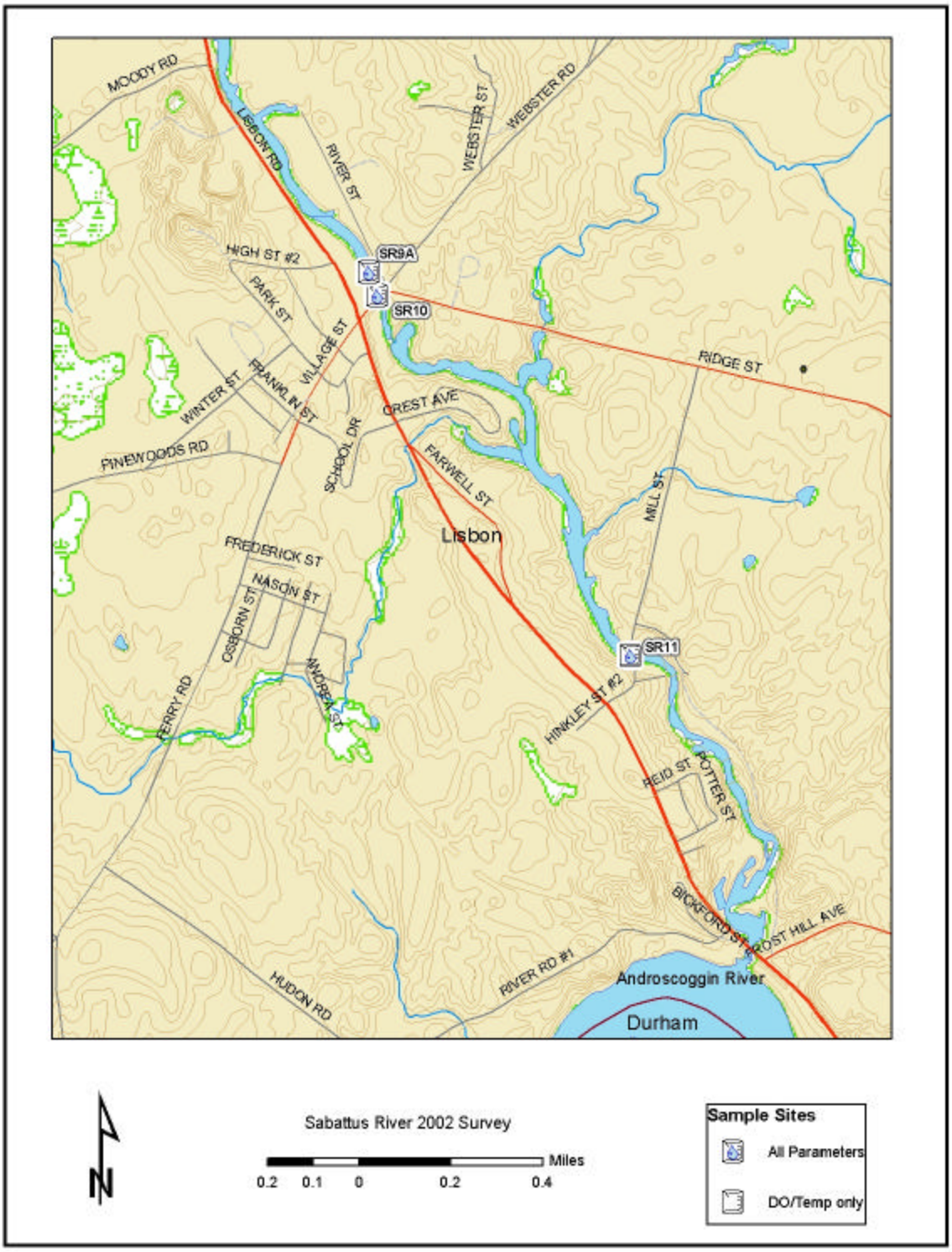
Location Maps




Lewiston
SR5
SR6
Sabattus River
Sabattus
GROVE ST
DEERFIELD DR
SISTERS
CROWLEY RD
OLD COUNTY RD
SR7
SR7A
BRIS DR
BROOK ST
BEGIN TERR
WEBSTER COR RD
SR7B
RIVER COMMON RD
LITTLEFIELD RD
Lisbon
BIRCHWOOD DRIVE
N
Sabattus River 2002 Survey
Miles
0.2 0.1 0 0.2 0.4
OBD Outfall
Sample Sites
All Parameters
DO/Temp only


RIVER COMMON RD
LITTLEFIELD RD
LOSS RD
NN Jordan
JORDAN RD
LISBON ST
TOWN FARM RD
SR8
KING RD
No Name Brook
LISBON RD
GAYTON RD
Sabattus River
SR8A
MOODY RD
RIVER ST
N
Sabattus River 2002 Survey
Miles
0.2 0.1 0 0.2 0.4
Sample Sites
All Parameters
DO/Temp only


MOODY RD
LISBON RD
RIVER ST
WEBSTER ST
WEBSTER RD
HIGH ST #2
SR9A
SR10
PARK ST
VILLAGE ST
RIDGE ST
WINTER ST
FRANKLIN ST
CREST AVE
SCHOOL DR
PINEWOODS RD
FARWELL ST
MILL ST
Lisbon
FREDERICK ST
NASON ST
OSBORN ST
MURPHY ST
SR11
FERRY RD
HINKLEY ST #2
REID ST
POTTER ST
BICKFORD ST
FROST HILL AVE
HUDSON RD
RIVER RD #1
Androscoggin River
Durham
N
Sabattus River 2002 Survey
Miles
0.2 0.1 0 0.2 0.4
Sample Sites
All Parameters
DO/Temp only

Introduction

The Sabattus River (class C to below Lisbon) forms the outlet of Sabattus Pond and extends approximately 10 miles to the Androscoggin River. The town of Sabattus (0.12 MGD) discharges treated wastewater to the Sabattus River approximately 0.9 mile below the pond. A small residential discharge (MEU501622, 0.02 MGD) is located about 0.4 mile below Crowley Road bridge. Maine Electronics (0.079 MGD) discharges treated groundwater to the Sabattus River in Lisbon. River flow is regulated at the outlet dam (minimum flow 2.5 cfs).

Sabattus Pond experiences algae blooms each year and is on the state's 303d list for non-attainment of water quality standards requiring a TMDL (total maximum daily load analysis). A number of dams are located on the river. Water withdrawals for irrigation reduce river flows. All these factors may contribute to dissolved oxygen (DO) problems. During 1994, non-attainment of DO standards was measured at two sites on the river. The Sabattus River is also on the state's 303d TMDL list for non-attainment of water quality standards (listed for DO and nutrient loading). A water quality study was initiated during the summer of 2000 with the completion of a three day intensive survey (see Sabattus River Data Report August 2000 Survey, November 2001, #DEPLW0446).

A second survey was made during August 2002. The details of this study are outlined in the workplan (Sabattus River Work Plan, June 2002). Other DEP personnel also performed Macroinvertebrate sampling during 2002. The results from these surveys should provide sufficient data for developing a water quality model and TMDL for the Sabattus River.

This report presents the results of the 2002 study. As during 2000, the study focused on the segment between Sabattus Pond and Lisbon Center, a distance of approximately 9 miles. The drainage area of the Sabattus River at the outlet of Sabattus Pond is 33.8 $mi.^2$ and at the confluence of the Androscoggin River is 73.8 $mi.^2$. Most of this river segment is classified C, requiring among other standards, a minimum DO concentration of 5 ppm or 60% saturation, whichever is greater and a monthly average of 6.5 ppm. Below the Lisbon urban area (Mill Street) the river is classified B, requiring a minimum DO concentration of 7 ppm or 75% saturation.

Hydrologic Data

As part of the data collection for developing a water quality model it is necessary to collect sufficient physical data for representation of the river hydrology. These data include sufficient river flow measurements during each survey to establish a flow balance for the study segment and transect measurements (widths and depths) at representative sites within the study segment. The following tables 1 and 2 present the flow and stage data. Table 3 presents the results from the 2002 transect measurements.

Table 1 Flow Measurements

		Flow, cfs (stage, ft.)					
	DA, $mi.^2$	8/19/02	8/20/02	8/21/02	8/22/02	8/23/02	8/28/02
Sabattus River, Rt. 126 bridge	34.9	5.95 (5.72)	(5.73)	(5.73)	-	(5.72)	(5.77)
Barker Brook, Ridge St.	3.6	0*	-	-	-	-	-
Noname Brook, Jordan Rd.	11.8	0.46	-	-	-	-	-
Sabattus River, above Webster Rd.	67.1	7.98	-	-	-	-	-
Sabattus Treatment Plant (MGD)	-	0.058	0.058	0.052	0.057	0.064	0.065

*beaver dam, backwatered, no flow

Table 2 2002 Stage Measurements

	stage, ft.	
	08/20/02	Datum
above falls at bridge	2.88	(left pier, from seam)
King Rd. bridge	10.92	(center of bridge, top of upstream railing)
Lisbon dam impoundment	5.16	(from top corner, see transect field notes)
Mill St.	11.14	(top of concrete rail, see field sheet)

Table 3 2002 Transect Data

		Ave.			
Transect	Width	Depth, ft.	Area, $ft.^2$	Flow, cfs	Vel, fps
T6	32.0	1.69	54.0	5.96	0.11
T7	37.3	1.68	62.4	6.00	0.10
T8	34.0	0.60	20.3	6.03	0.30
T9	35.0	1.03	36.0	6.04	0.17
T10	27.0	1.15	30.9	6.07	0.20
T11	34.4	1.14	39.2	6.07	0.15
T12	34.4	1.16	40.0	6.09	0.15
T13	23.8	1.38	32.7	6.13	0.19
T14	34.5	1.28	44.1	6.18	0.14
T15	34.3	1.47	50.2	6.22	0.12
T16	35.0	0.89	31.2	6.25	0.20
T17	39.7	3.60	142.8	6.57	0.05

Ambient Chemical Data

The ambient chemical data collected during the August 2002 survey included dissolved oxygen (DO), temperature, total phosphorous (TP), orthophosphorous (PO4), total kjeldhal nitrogen (TKN), ammonia nitrogen (NH3), nitrite plus nitrate nitrogen (NOx), chlorophyll a (chl-a), ultimate carbonaceous biochemical oxygen demand (CBODu) and ultimate nitrogenous biochemical oxygen demand (NBODu). pH and E. coli bacteria were also sampled. These parameters were sampled/measured during the early morning, except for three afternoon samples for TP and chl-a (to investigate any diurnal effects). These data

are included on page A4 in the appendix. In addition, DO, temperature and pH were also measured during the afternoon to capture diurnal effects. These data are included in tables starting on page A1 in the appendix. In addition, a recording sonde was set out at station SR7B which measured and recorded DO and temperature continuously during the survey. The following charts summarize the DO measurements and sonde temperature measurements from the August 2002 survey.

Figure 1 Sabattus River DO

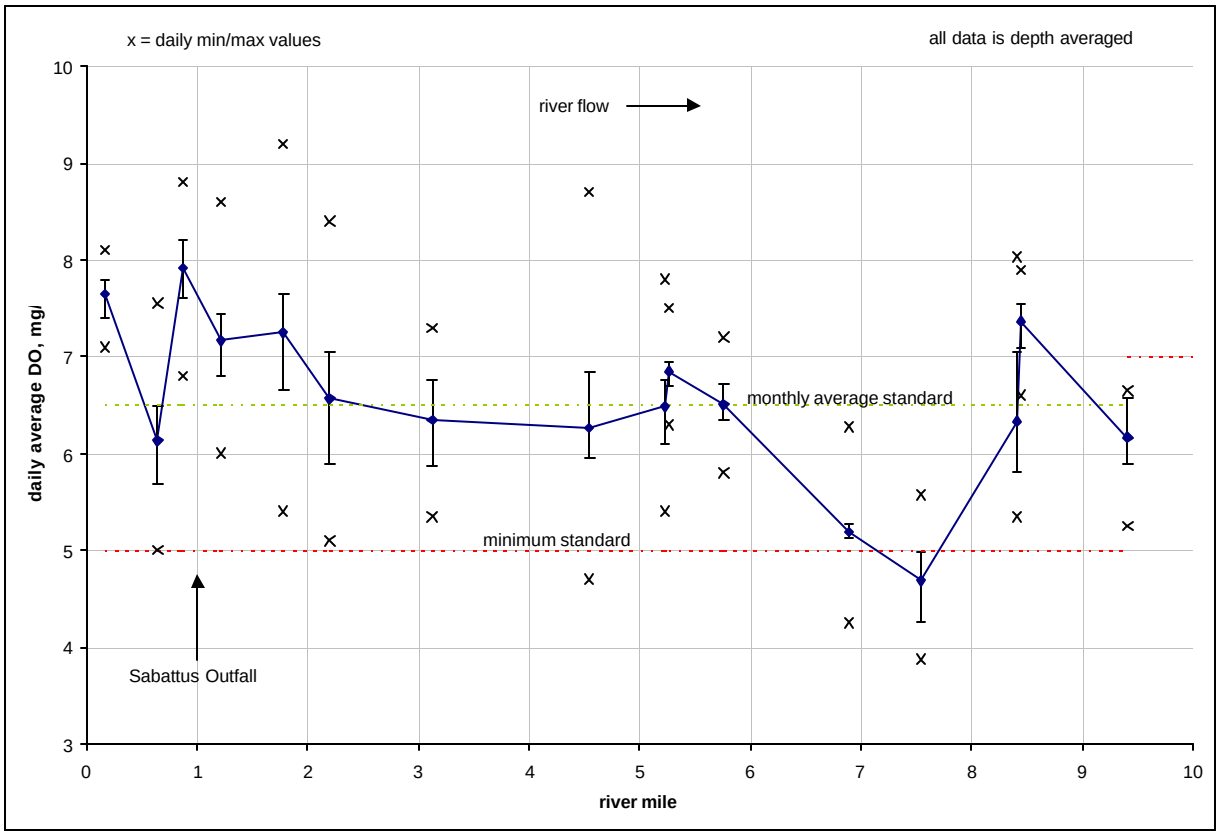


Figure 2 Sabattus River Sonde DO

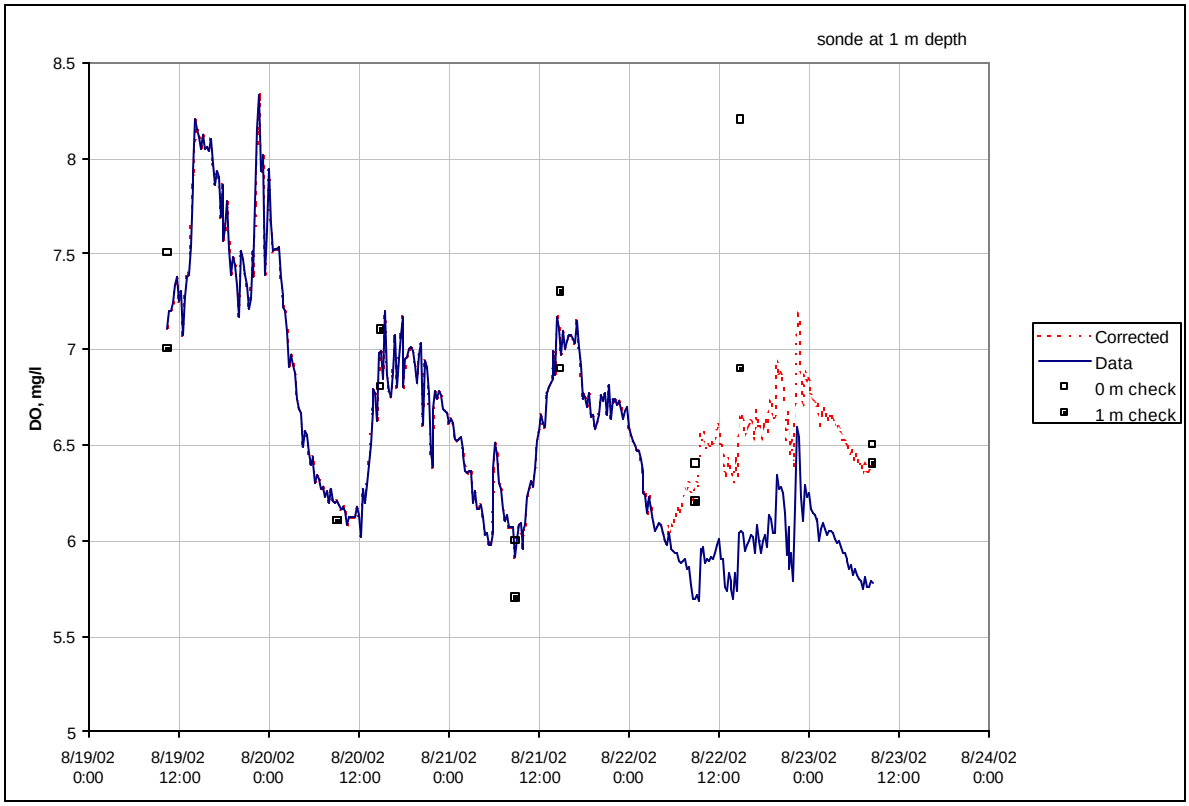
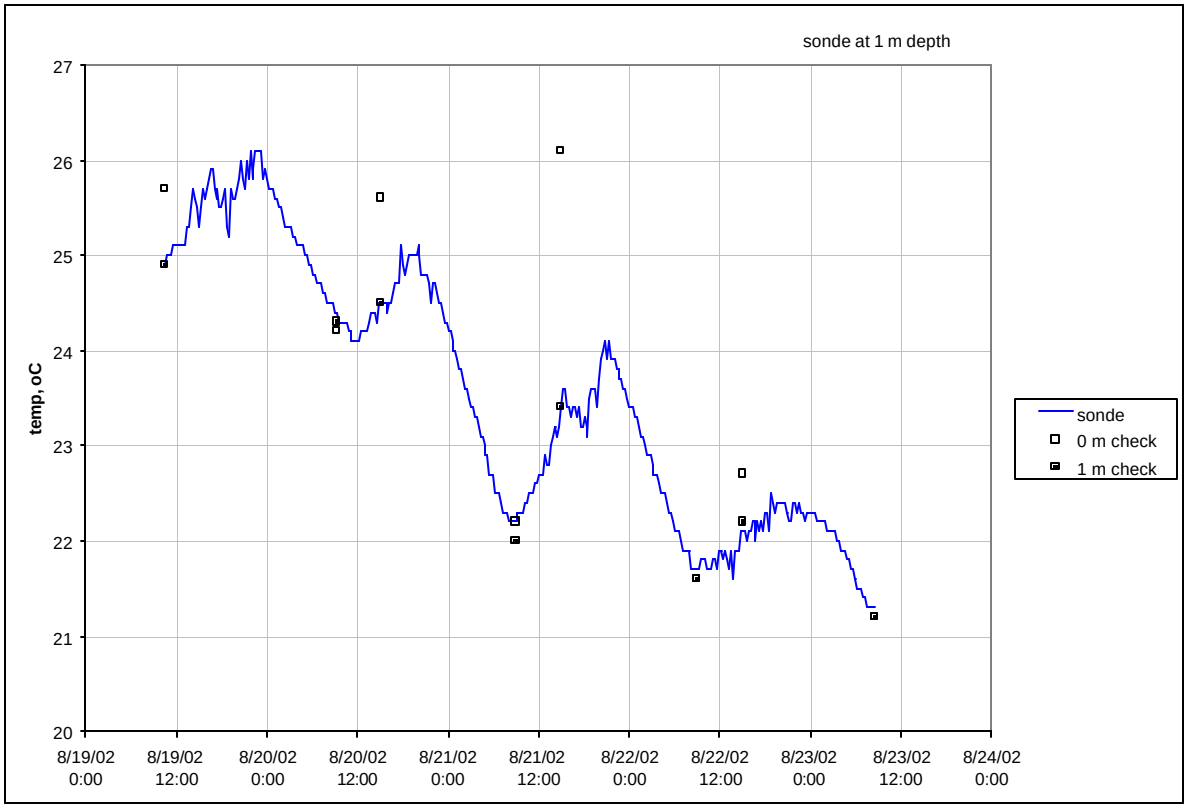


Figure 3 Sabattus River Sonde Temperature



The following figures show plots of the phosphorous, chl-a, CBOD and NBOD data from the 2002 survey.

Figure 4 Sabattus River Average P Conc.

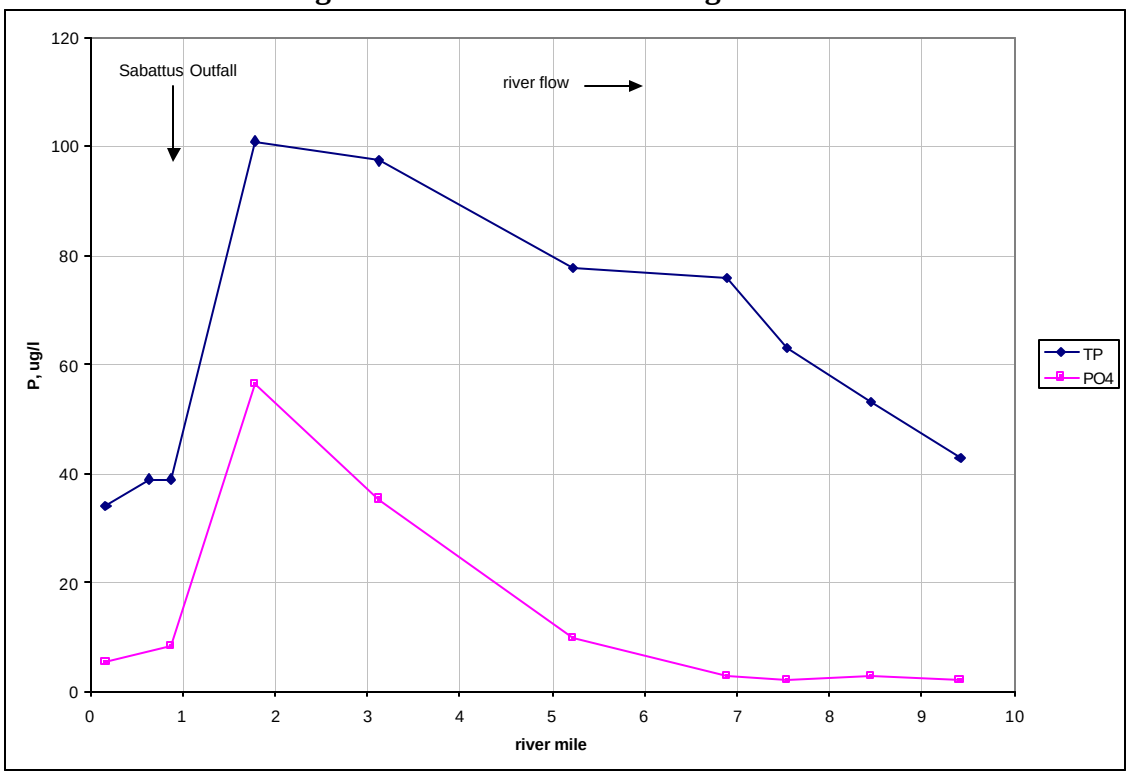


Figure 5 Sabattus River Average Chl-a

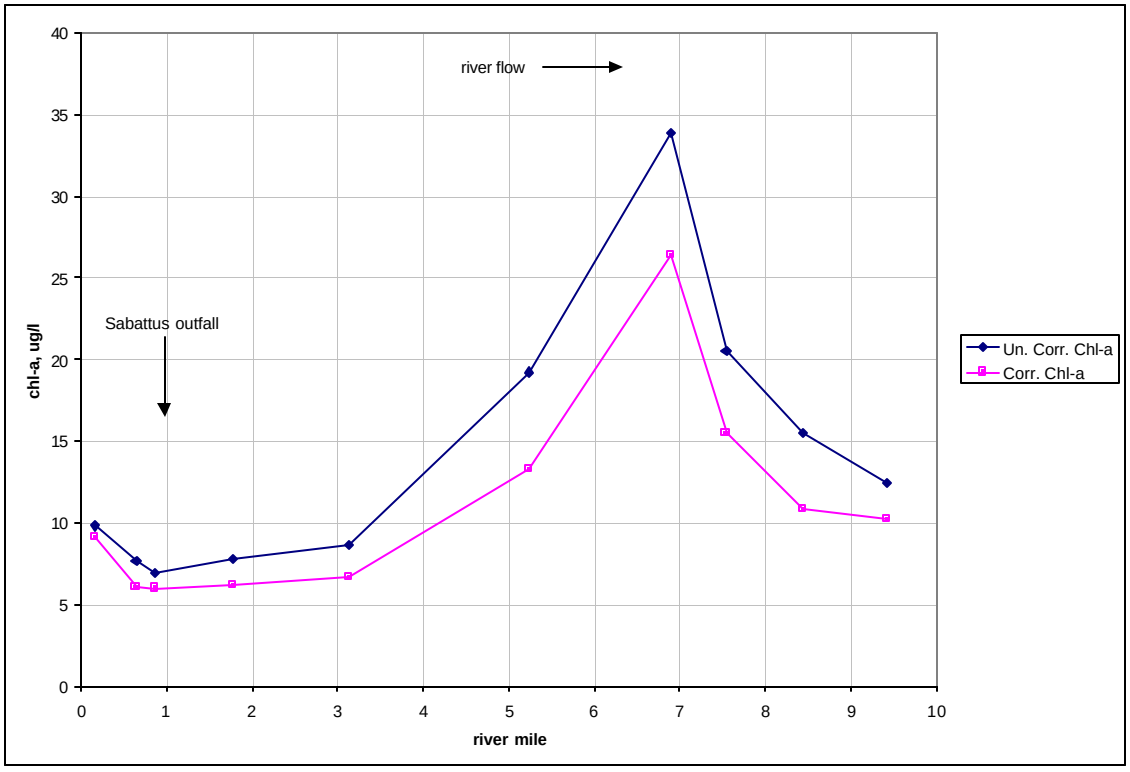
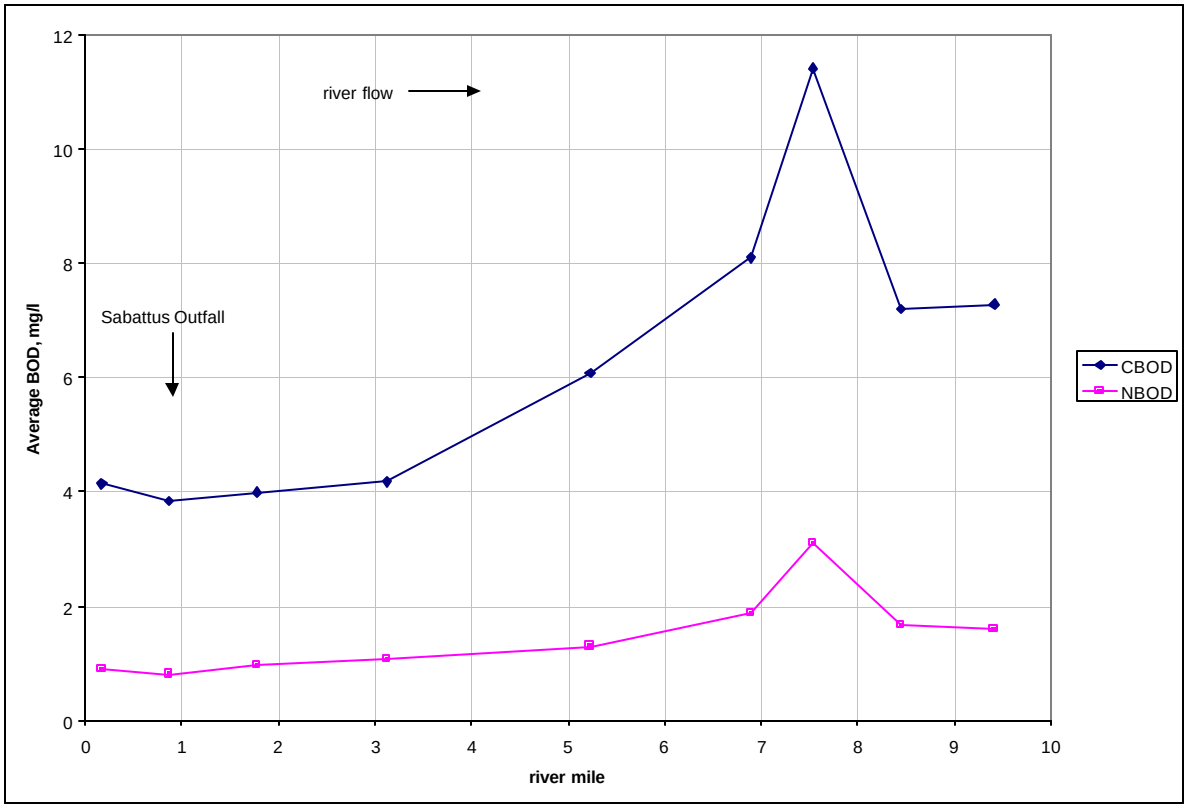


Figure 6 Sabattus River Average BOD

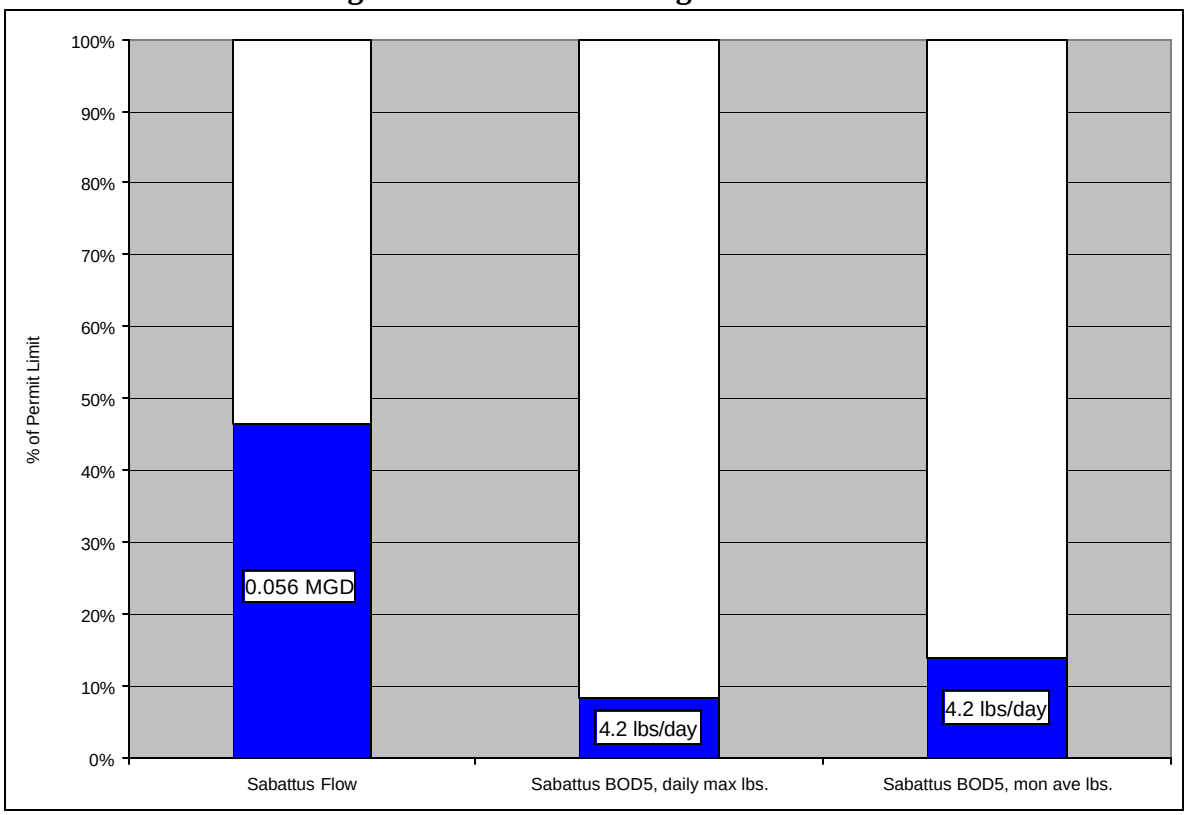


Effluent Data

The Sabattus treatment plant effluent was also sampled during the study for total phosphorous (TP), orthophosphorous (PO4), total kjeldhal nitrogen (TKN), ammonia nitrogen (NH3), nitrite plus nitrate nitrogen (NOx), ultimate carbonaceous biochemical oxygen demand (CBODu) and ultimate nitrogenous biochemical oxygen demand (NBODu) and 5 day biochemical demand (BOD5). The samples were collected as 24-hour composites. These data are included on page A4 in the appendix.

In general the effluent BOD5 and flow were well below permit requirements (see following chart).

Figure 7 Sabattus Discharge vs. Permit



The discharge from a mobile home park OBD (overboard discharge) was also sampled (see page A4 in the appendix).

Quality Control

Proper quality control should be followed to assure that all of the data that will be collected are good data. Dissolved oxygen meters were calibrated initially before sampling and checked periodically throughout the day. In addition, the meters (DO/temperature and pH) of adjacent sampling teams were cross checked both prior to sampling and after completion of sampling to assure the readings from one portion of the river to another are consistent and accurate. The dissolved oxygen readings should agree to within 0.3 ppm and temperatures to within 2^{o} C. The results of the meter cross checks are shown on page A5 of the appendix.

The three-day surveys included ambient and effluent field duplicates. A comparison of the duplicate results is presented in the appendix. In general, the average duplicate variation was within 17% except for bacteria which averaged 102% (range of from 0% to 250%). DO, temperature, pH, NH3, NOx and TP duplicates averaged within 5%. Lab QAQC is available on request.

Discussion

Based upon the 2002 daily averaged data, the Sabattus River attained class C DO criteria at all sites except one and a small number of morning DO readings were non-attainment for class C. It should be noted that the site DO values for the deeper stations are depth averaged values which may include low, near bottom DO readings. In general DO standards are to be met at all times and locations (depths). Significant diurnal DO variation was measured (greater than 2 mg/l) at a number of sites, indicative of plant growth/nutrient enrichment effects. River flow during the survey was approximately two times greater than the minimum flow at the lake outlet or about half that of the 2000 survey. The flow and BOD5 loading from the Sabattus treatment plant were less than permit levels.

There was a significant increase in instream phosphorous below the Sabattus outfall. Increased chl-a concentrations were measured in the Lisbon impoundment. Instream BOD increased within the Lisbon impoundment, but part of this may be due to the high chl-a in the BOD sample.

The Sabattus River is targeted for completion of a TMDL (total maximum daily load analysis) by 2004.

Appendix

DO/TEMP/PH DATA A1
SABATTUS RIVER 2002 CHEMICAL DATA A4
METER CROSS CHECKS A5
FIELD DUPLICATES A7
SURVEY WEATHER CONDITIONS A15
SABATTUS RIVER STAGE/DISCHARGE A16
PHOTOGRAPHS A17

DO/Temp/pH Data

Date:	08/20/02						
Station		Depth m	pH	DO mg/l	Temp °C	% Sat	
SR1	05:50	mid	7.5	7.1	24.6	85%	
	13:00	mid	7.7	7.7	25.5	94%	
	06:05	0	7.1	5.3	24.0	63%	
		1	-	5.3	24.0	63%	
SR2		2	-	4.4	24.0	52%	
	13:10	0	7.1	6.4	24.2	76%	
		1	-	6.3	24.0	75%	
SR3	06:30	mid	7.1	6.8	24.5	82%	
	13:25	mid	7.5	8.4	25.1	102%	
SR3A	07:20	mid	7.1	6.0	23.8	71%	
	13:50	mid	7.4	7.6	25.0	92%	
SR4	07:40	mid	7.0	5.4	23.0	63%	
	14:10	mid	7.2	7.9	24.8	95%	
SR4A	08:00	mid	7.0	5.1	22.8	59%	
	14:25	mid	7.3	6.7	24.1	80%	
SR5	06:06	bucket	6.9	5.35	23.4	63%	
	16:00	bucket	7.2	6.4	24.4	77%	
SR6	8:20	mid	6.9	5.4	23.8	64%	
	14:45	mid	7.3	6.6	24.6	79%	
SR7	08:45	mid	7.0	6.2	24.3	74%	
	14:58	mid	7.1	7.3	25.3	89%	
SR7A	08:55	mid	7.1	6.6	24.1	79%	
	15:07	mid	7.3	6.8	25.4	83%	
	09:13	0	7.0	6.1	24.2	73%	
SR7B		1	-	6.1	24.3	73%	bot 1.5
	14:55	0	7.35	6.8	25.6	83%	
		1	-	7.1	24.5	85%	
		1.5	-	5.9	24.1	70%	bot 1.7
	08:40	0	7.1	7.0	24.7	84%	
		1	-	6.8	24.7	82%	
SR8		2	-	0.2	23.1	2%	bot 2.9
	14:40	0	7.3	8.9	25.8	109%	
		1	-	7.6	24.7	91%	
		2	-	0.3	22.9	3%	bot 2.8
	08:13	0	7.0	6.8	24.8	82%	
		1	-	6.8	24.8	82%	
		1.5	-	6.0	24.7	72%	
		2	-	1.9	23.4	22%	
SR8A		3	-	0.0	20.4	0%	bot 3.5
	14:12	0	7.2	8.5	25.8	104%	
		1	-	7.3	24.8	88%	
		2	-	2.7	23.6	32%	
		3	-	0.1	20.4	1%	bot 3.7
	07:41	0	7.1	7.55	24.6	91%	
		1	-	7.5	24.7	90%	
SR9A		2	-	3.2	23.7	38%	bot 2.3
	13:43	0	7.3	8.0	25.4	98%	
		1	-	8.3	25.1	101%	
		2	-	7.8	24.6	94%	bot 2.5
SR10	07:15	mid	7.3	7.3	24.4	87%	
	13:30	mid	7.5	7.8	25.4	95%	
	06:44	0	7.1	6.5	24.6	78%	
SR11		1	-	6.5	24.6	78%	bot 1.3
	13:17	0	7.3	6.7	25.0	81%	
		1	-	6.6	24.5	79%	
MX	06:50	mid	7.1	5.2	21.2	59%	
Rt. 9	13:40	mid	7.2	4.9	21.5	56%	
NN	06:28	mid	6.9	3.2	22.4	37%	
Jordan	15:36	0	7.1	5.0	24.7	60%	
Rd.		1	-	4.0	23.5	47%	
SAB	10:45	mid	-	7.9	19.4	86%	

no flow at Barker Brook

Date:	08/21/02						
Station		Depth m	pH	DO mg/l	Temp °C	% Sat	
SR1	05:45	mid	7.2	7.5	23.5	88%	
	13:00	mid	7.8	8.1	26.0	100%	
SR2	06:00	0	6.9	5.5	22.1	63%	
		1	-	5.3	22.2	61%	
	13:15	0	7.2	7.6	25.3	92%	
		1	-	6.5	22.7	75%	
SR3	06:15	mid	7.1	7.1	22.3	82%	
	13:30	mid	7.5	8.8	24.5	106%	
SR3A*	06:50	mid	7.2	6.1	21.3	69%	
	14:00	mid	7.1	8.4	24.5	101%	
SR4	07:10	mid	7.15	5.9	20.3	65%	
	14:20	mid	7.4	9.0	24.6	108%	
SR4A	07:30	mid	7.1	5.6	20.0	62%	
	14:35	mid	7.2	7.9	24.0	94%	
SR5	05:54	mid	6.9	5.7	20.7	64%	
	16:03	mid	7.3	7.1	23.5	84%	
SR6	7:50	mid	6.9	4.7	22.1	54%	
	14:53	mid	7.3	7.2	25.4	88%	
SR7	08:10	mid	7.0	5.4	22.6	62%	
	15:05	mid	7.2	7.8	24.2	93%	
SR7A	08:20	mid	7.1	6.3	22.5	73%	
	15:10	mid	7.3	7.5	24.3	90%	
SR7B	08:56	0	7.1	6.0	22.2	69%	
		1	-	5.7	22.0	65%	
		1.5	-	5.7	22.0	65%	bot 1.7
	15:07	0	7.25	6.9	26.1	85%	
		1	-	7.3	23.4	86%	
		1.5	-	7.1	22.6	82%	
SR8	08:24	0	7.0	5.7	22.8	66%	
		1	-	5.6	22.9	65%	
		2	-	5.4	22.8	63%	
		2.5	-	0.2	22.1	2%	
		3	-	0.3	18.7	3%	bot 3.3
	14:42	0	7.8	10.8	26.5	134%	
		1	-	8.3	23.6	98%	
		2	-	5.7	22.9	66%	
		3	-	0.3	18.3	3%	bot 3.2
SR8A	07:57	0	6.9	6.0	23.3	70%	
		1	-	5.9	23.4	69%	
		2	-	5.5	23.3	64%	
		3	-	0.2	20.5	2%	bot 3.5
	14:17	0	7.3	9.1	25.4	111%	
		1	-	7.3	23.7	86%	
		2	-	5.7	23.3	67%	
		3	-	0.2	20.4	2%	bot 3.5
SR9A	07:25	0	7.0	6.4	23.6	75%	
		1	-	6.2	23.6	73%	
		2	-	5.6	23.6	66%	
		2.5	-	3.2	23.2	37%	bot 2.7
	14:00	0	7.3	8.6	25.6	105%	
		1	-	8.3	24.3	99%	
		2	-	3.9	23.4	46%	bot 2.5
SR10	07:05	mid	7.2	7.0	23.3	82%	bot 0.5
	13:25	mid	7.6	7.9	25.6	97%	
SR11	06:44	0	7.0	5.8	23.5	68%	
		1	-	5.7	23.6	67%	
		1.5	-	5.7	23.6	67%	
	13:15	0	7.4	6.8	25.1	82%	
		1	-	6.4	23.8	76%	
		1.5	-	5.8	23.6	68%	
MX	06:30	mid	7.1	4.7	19.2	51%	
Rt. 9	13:45	mid	7.2	6.7	20.5	74%	
NN	06:24	0	6.9	2.6	20.0	29%	
Jordan		1	-	2.6	20.0	29%	bot 1
Rd.	15:44	0	7.1	4.6	23.8	54%	
		1	-	4.3	23.6	51%	bot 1.1
SAB	09:25	mid	-	8.3	18.8	89%	

*revised site 100 yds downstream
no flow at Barker Brook

Date:	08/22/02						
Station		Depth m	pH	DO mg/l	Temp °C	% Sat	
SR1	08:20	mid	7.3	7.4	23.5	87%	
	12:55	mid	7.5	8.1	24.1	96%	
SR2	08:05	0	6.9	5.5	21.5	62%	
		1	-	5.4	21.5	61%	
	13:05	0	7.3	7.9	23.1	92%	
		1	-	7.2	22.5	83%	
SR3	07:55	mid	7.3	7.6	22.1	87%	
	13:15	mid	7.4	8.8	22.4	101%	
SR3A*	07:20	mid	7.0	6.3	20.9	71%	
	13:40	mid	7.2	8.6	22.7	100%	
SR4	06:55	mid	7.1	6.1	19.7	67%	
	14:00	mid	7.3	9.2	22.4	106%	
SR4A	06:35	mid	7.0	5.7	19.6	62%	
	14:20	mid	7.4	8.4	21.6	95%	
SR5	05:57	bucket	7.0	6.2	19.7	68%	
	15:57	bucket	7.3	7.3	21.2	82%	
SR6	6:15	mid	6.9	5.0	21.5	57%	
	14:40	mid	7.5	8.7	22.4	100%	
SR7	06:03	mid	7.0	5.6	22.1	64%	
	14:50	mid	7.1	6.6	22.3	76%	
SR7A	05:50	mid	7.0	6.6	22.0	75%	
	15:00	mid	7.2	7.3	22.5	84%	
SR7B	09:05	0	7.0	6.4	21.6	73%	
		1	-	6.2	21.6	70%	
		1.5	-	6.1	21.6	69%	bot 1.8
	15:02	0	?	8.2	22.7	95%	
		1	-	6.9	22.2	79%	
		1.5	-	6.5	21.8	74%	
SR8	08:45	0	6.9	6.1	22.0	70%	
		1	-	6.0	22.1	69%	
		2	-	5.8	22.0	66%	
		2.5	-	5.8	22.0	66%	
		3	-	0.2	18.4	2%	bot 3.1
	14:45	0	7.2	8.7	23.2	102%	
		1	-	8.2	22.7	95%	
		2	-	6.2	22.1	71%	
		3	-	0.3	19.7	3%	bot 3.2
SR8A	07:55	0	6.85	5.75	22.6	67%	
		1	-	5.9	22.6	68%	
		2	-	5.95	22.6	69%	
		3	-	0.2	20.8	2%	bot 3.5
	14:17	0	7.2	7.5	23.3	88%	
		1	-	7.2	23.0	84%	
		2	-	5.6	22.6	65%	
		3	-	0.4	21.1	4%	bot 3.5
SR9A	07:22	0	6.9	5.55	22.2	64%	
		1	-	5.5	22.3	63%	
		2	-	5.4	22.2	62%	
		2.5	-	5.2	22.2	60%	bot 2.7
	13:41	0	7.1	7.1	23.0	83%	
		1	-	5.9	22.5	68%	
		2	-	5.6	22.4	65%	bot 2.5
SR10	05:55	mid	7.1	6.6	21.8	75%	
	13:26	mid	7.4	7.6	22.7	88%	
SR11	06:35	0	7.0	5.3	22.1	61%	
		1	-	5.25	22.2	60%	
		1.5	-	5.2	22.2	60%	bot 1.8
	13:11	0	7.4	7.0	23.1	82%	
		1	-	6.7	22.7	78%	
		1.5	-	5.95	22.4	69%	
MX	07:37	mid	7.0	4.9	18.3	52%	
Rt. 9	13:28	mid	7.2	6.2	19.1	67%	
NN	06:19	0	6.9	3.0	18.9	32%	
Jordan		1	-	2.95	19.0	32%	
Rd.	15:35	0	7.05	4.6	21.0	52%	
		1	-	4.4	20.9	49%	bot 1.2
SAB	09:41	-	-	8.2	18.2	87%	

*revised site 100 yds downstream
no flow at Barker Brook

Sabattus River 2002 Chemical Data

Sabattus River, Aug 2002 Survey

Station	Date	Time	Notes	E Coli	TKN mg/l	NH3 mg/l	NOx mg/l	TP ppb	PO4 ppb	Chl-a, ppb uncor	Chl-a, ppb cor	DEP BOD5 mg/l	STP BOD5 mg/l	TBOD mg/l	NBOD mg/l	CBOD mg/l	final NOx
	08/20/02	5:50	-	150	0.4	0.02	0.02	39	5	9.1	9.1	-	-	5.0	0.9	4.1	0.22
SR1	08/21/02	5:45	-	10	0.4	0.02	0.01	30	5	8.7*	8.0	-	-	4.9	0.9	4.0	0.22
	08/22/02	8:20	-	10	0.4	0.02	0.01	33	6	11.7	10.4	-	-	5.3	1.0	4.3	0.23
	08/20/02	6:05	-	-	-	-	-	42	-	8.6*	6.9	-	-	-	-	-	-
SR2	08/21/02	6:00	-	-	-	-	-	37	-	6.6*	5.1	-	-	-	-	-	-
	08/21/02	13:15	-	-	-	-	-	31	-	5.1*	5.9	-	-	-	-	-	-
	08/22/02	8:05	-	-	-	-	-	38	-	7.8*	6.4	-	-	-	-	-	-
	08/20/02	6:30	-	100	0.5	0.03	0.04	42	9	7.1*	6.1	-	-	4.7	0.8	3.9	0.23
SR3	08/21/02	6:15	-	30	0.5	0.02	0.04	38	8	6.9*	6.1	-	-	4.2	0.9	3.3	0.24
	08/22/02	7:55	-	30	0.5	0.02	0.03	37	8	7.0*	5.9	-	-	5.0	0.7	4.3	0.2
	08/20/02	7:40	-	360	0.6	0.05	0.44	100	60	8.8	7.5	-	-	4.9	0.9	4.0	0.65
	08/21/02	7:10	-	30	0.5	0.05	0.27	83	39	7.3*	5.3	-	-	4.8	1.1	3.7	0.53
SR4	08/21/02	14:20	-	-	-	-	-	-	63	5.5*	5.6	-	-	-	-	-	-
	08/22/02	6:55	-	20	0.6	0.04	0.54	120	70	7.4*	5.9	-	-	5.2	0.9	4.3	0.75
	dup	7:03	-	70	0.6	0.04	0.53	110	69	7.8*	6.9	-	-	5.2	0.8	4.4	0.71
	08/20/02	6:06	-	40	0.6	0.06	0.22	110	35	10.6	8.0	-	-	6.0	1.2	4.8	0.5
SR5	08/21/02	5:54	-	20	0.6	0.06	0.23	90	34	8.1*	6.4	-	-	4.9	1.0	3.9	0.46
	dup	6:00	-	10	0.5	0.06	0.24	89	34	8.9*	5.9	-	-	4.7	1.0	3.7	0.48
	08/22/02	5:57	-	20	0.6	0.05	0.32	92	37	7.4*	5.6	-	-	4.8	1.0	3.8	0.55
	08/20/02	8:45	-	20	0.6	0.04	0.09	84	9	20.8	14.7	-	-	9.5	2.1	7.4	0.57
SR7	08/21/02	8:10	-	<10	0.6	0.03	0.11	76	11	18.5	11.7	-	-	6.4	0.6	5.8	0.25
	08/22/02	6:03	-	<10	0.5	0.02	0.12	73	10	18.4	13.6	-	-	6.2	1.2	5.0	0.4
	08/20/02	8:40	core	20	0.9	<.01	0.01	84	4	37.7	31.2	-	-	10.9	2.2	8.7	0.52
SR8	08/21/02	8:24	core	<10	0.6	<.01	<.01	71	3	27.8	19.2	-	-	9.1	1.8	7.3	0.42
	08/21/02	14:42	core	-	-	-	-	68	-	32.2	27.0	-	-	-	-	-	-
	08/22/02	8:45	core	<10	0.7	<.01	<.01	73	2	36.0	28.8	-	-	9.9	1.6	8.3	0.38
	08/21/02	14:17	S=1.4m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SR8A	08/22/02	7:55	-	<10	0.7	<.01	<.01	63	2	20.5	15.5	-	-	14.5	3.1	11.4	0.72
	08/22/02	14:17	S=1.5m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SR9A	08/21/02	14:00	S=1.5m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/22/02	13:41	S=1.5m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/20/02	7:15	-	40	0.6	0.02	0.01	46	2	13.0	10.4	-	-	7.3	1.2	6.2	0.28
SR10	08/21/02	7:05	-	20	0.6	0.01	0.01	56	4	16.6	10.7	-	-	10.0	1.9	8.1	0.45
	08/22/02	5:55	-	<10	0.5	0.01	0.01	57	3	16.8	11.5	-	-	9.2	1.9	7.3	0.45
	08/20/02	6:44	-	<10	0.4	<.01	<.01	39	2	9.8	8.3	-	-	5.9	1.0	4.9	0.23
SR11	dup	6:50	-	<10	0.5	<.01	<.01	37	<1	10.5	9.1	-	-	5.8	0.8	5.0	0.2
	08/21/02	6:44	-	<10	0.5	<.01	<.01	45	2	13.3	10.4	-	-	8.5	1.8	6.7	0.41
	08/22/02	6:35	-	10	0.5	<.01	<.01	45	2	14.3	12.0	-	-	12.3	2.1	10.2	0.49
NN (Jordan)	08/21/02	6:24	-	20	0.7	<.01	<.01	82	2	23.1	16.6	-	-	11.1	1.7	9.4	0.40
MX	08/20/02	6:50	-	300	0.6	0.05	0.02	58	3	9.8	8.5	-	-	10.4	2.0	8.4	0.48
Rt. 9	dup	7:00	-	620	0.6	0.05	0.02	60	2	12.1	10.4	-	-	8.4	1.6	6.8	0.39
	08/20/02	-	comp.	-	3**	0.76	29	4900	4600	-	-	12.4	-	29.9	0.0	29.9	28.4
SAB	08/21/02	-	comp.	-	6**	0.9	30	5200	4300	-	-	>18	9	68.9	7.5	61.4	31.7
	dup	-	comp.	-	6#	0.89	31	5200	4300	-	-	>18	-	41.8	0.0	41.8	26.7
	08/22/02	-	comp.	-	3#	0.22	29	4600	4200	-	-	4.0	-	26.1	0.0	26.1	24.9
OBD	08/28/02	11:00	grab	-	1.7	0.94##	15	1600	1500	-	-	1.6	-	10.1	0.5	9.6104	15.1

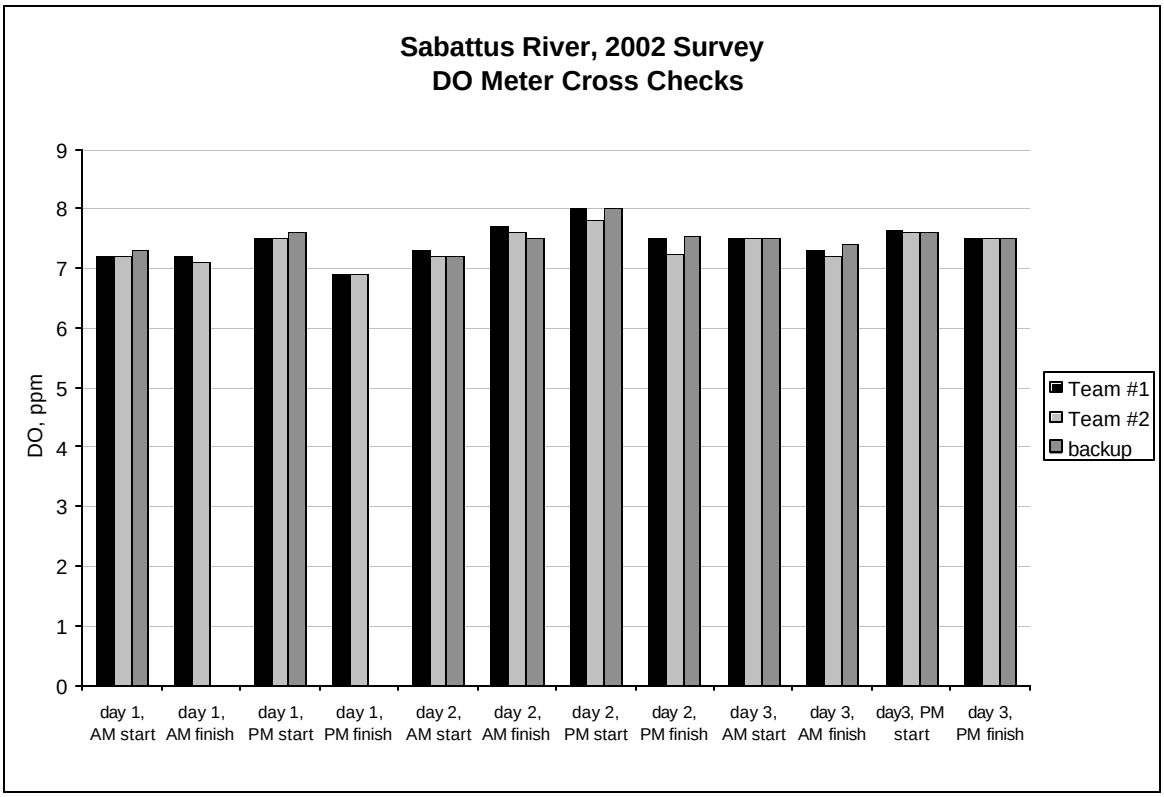
*OD @ 664 nm <0.1 or > 1.0

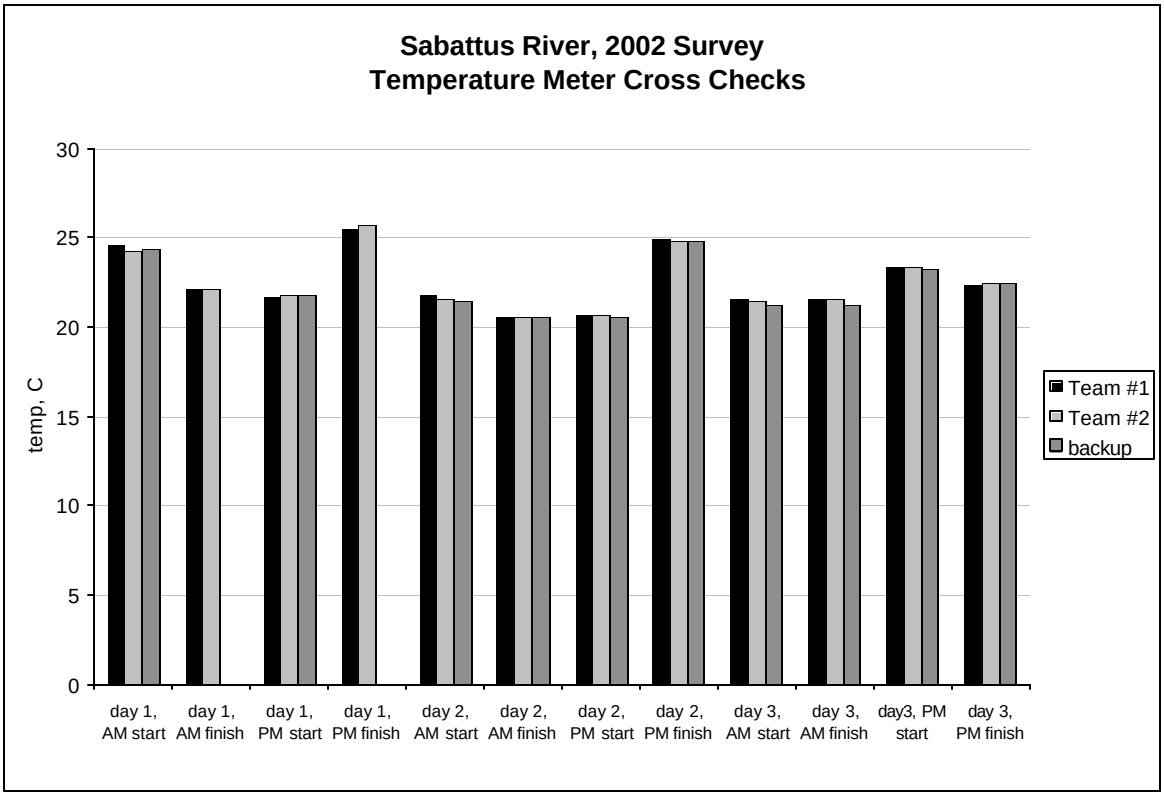
**Possible interferences present

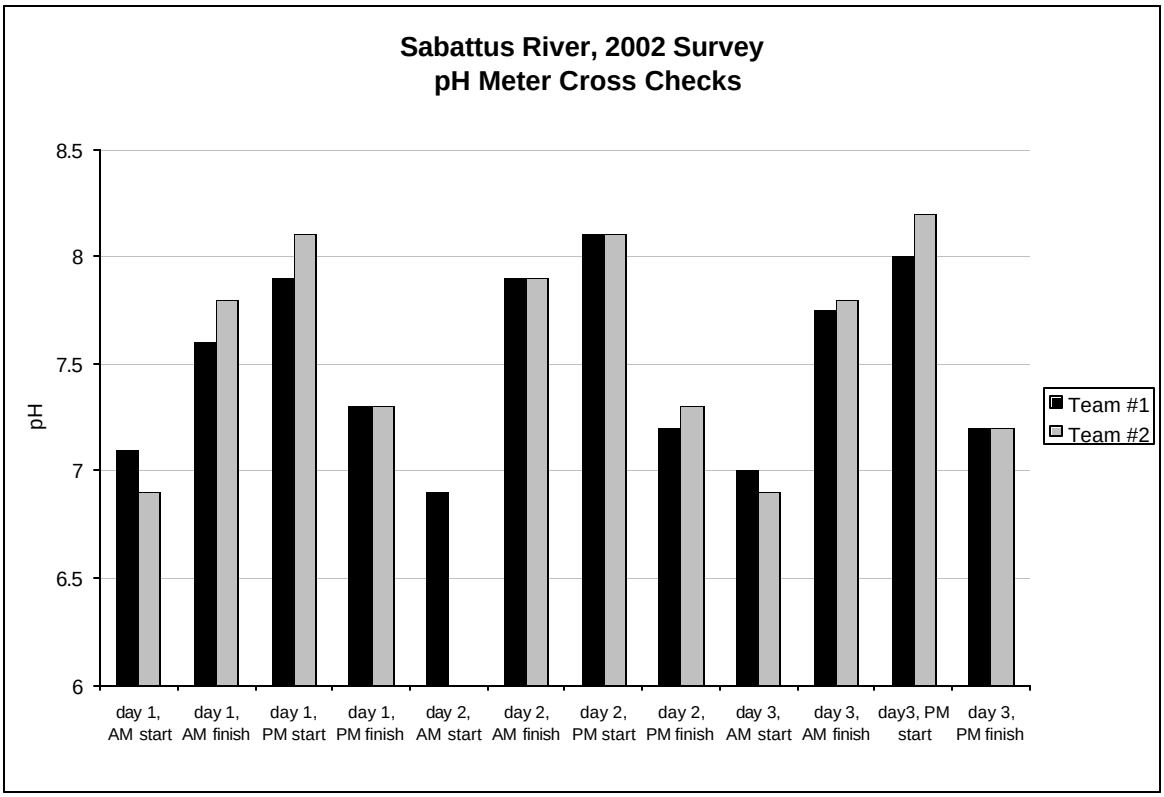
#Outside 28 day holding time, Possible interferences present

##NPDES required distillation is not performed for NH3 eff

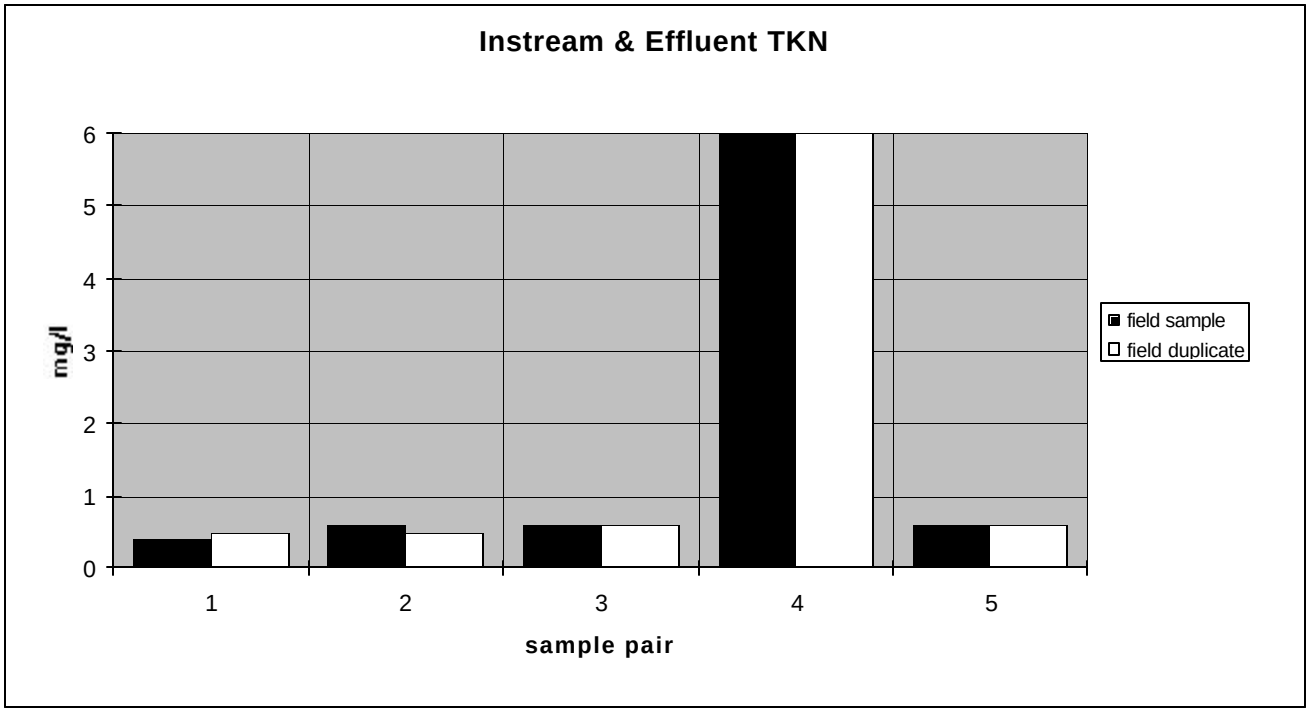
Meter Cross Checks

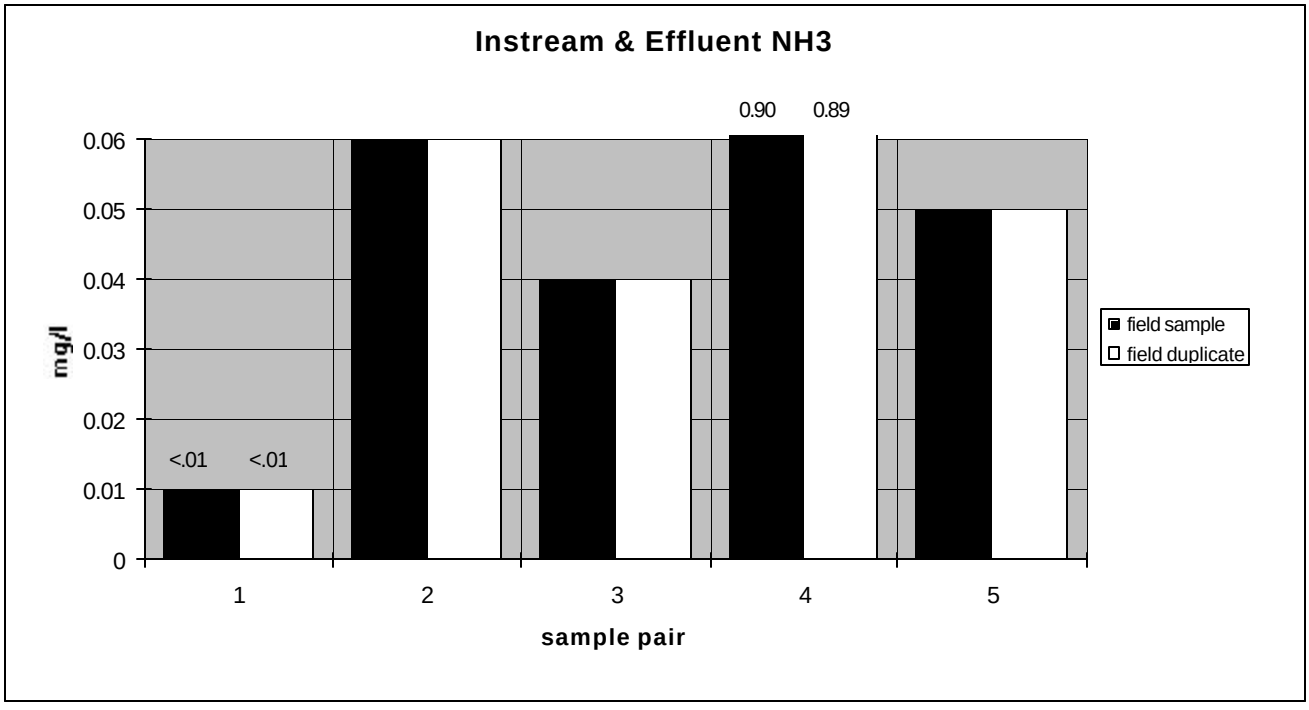


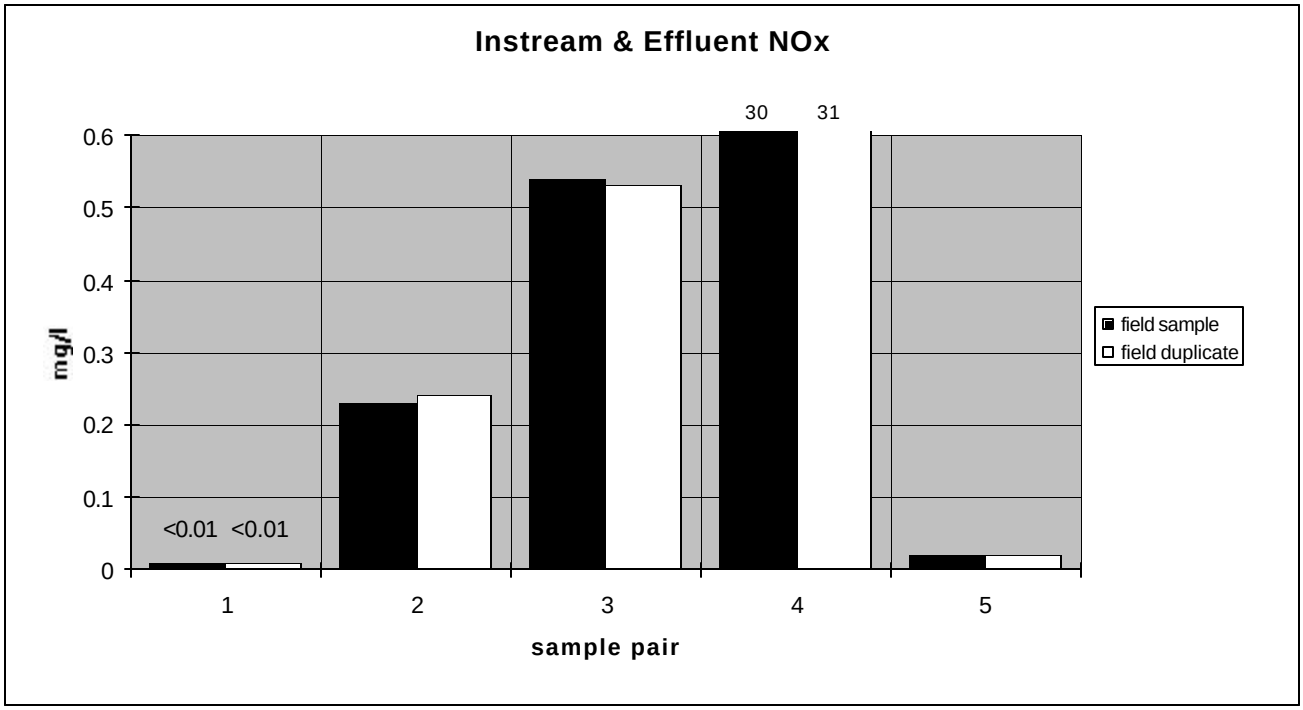


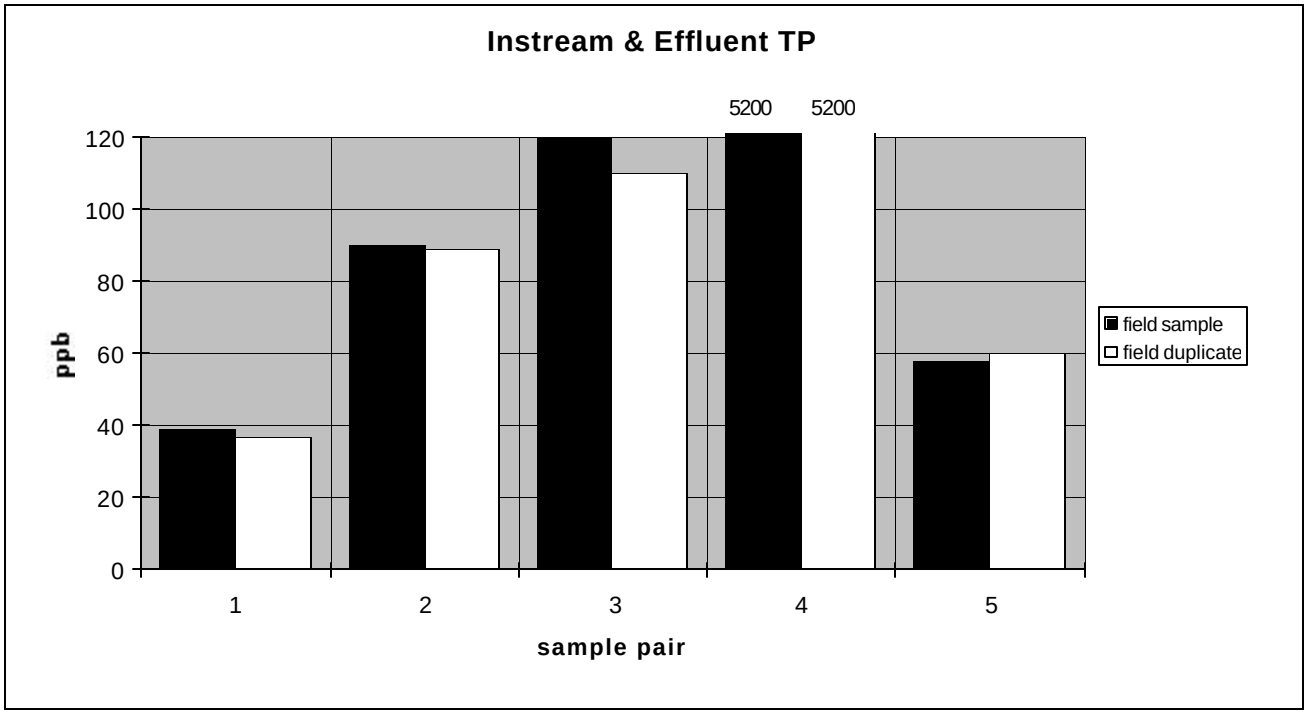

Sabattus River, 2002 Survey
pH Meter Cross Checks
pH
8.5
8
7.5
7
6.5
6
day 1, AM start
day 1, AM finish
day 1, PM start
day 1, PM finish
day 2, AM start
day 2, AM finish
day 2, PM start
day 2, PM finish
day 3, AM start
day 3, AM finish
day3, PM start
day 3, PM finish
Team #1
Team #2

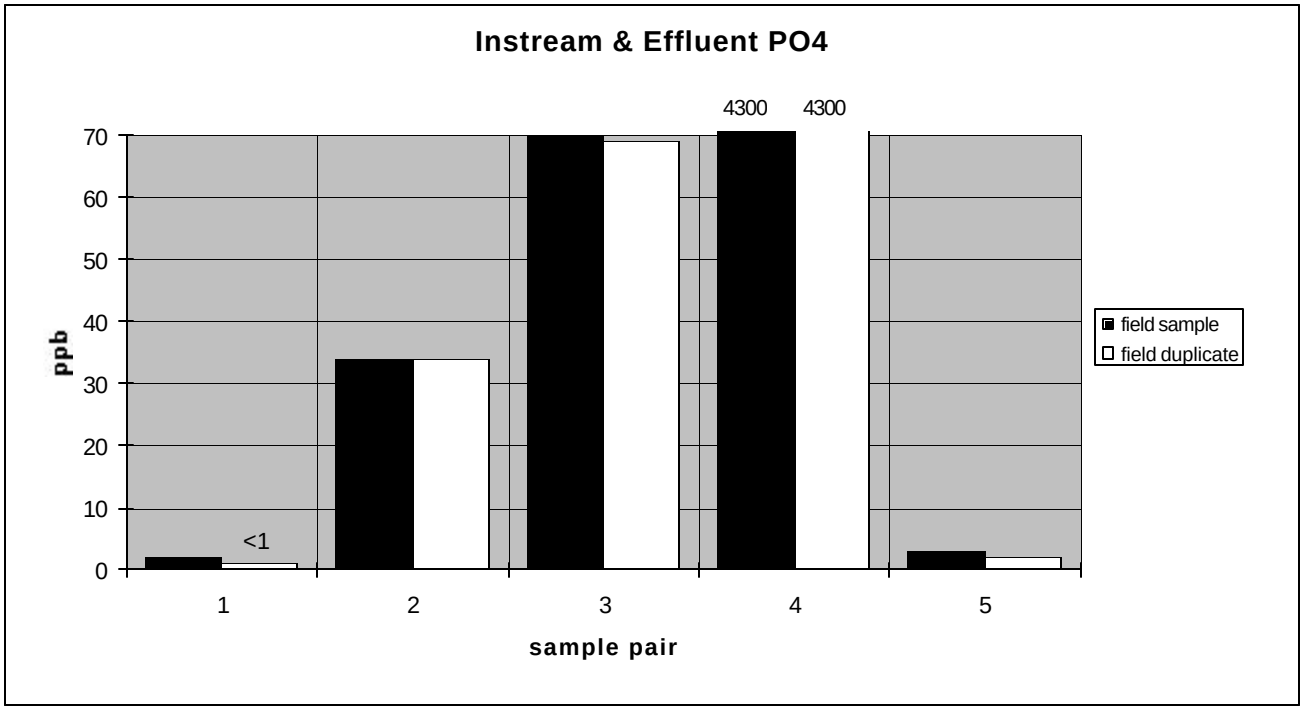
Field Duplicates

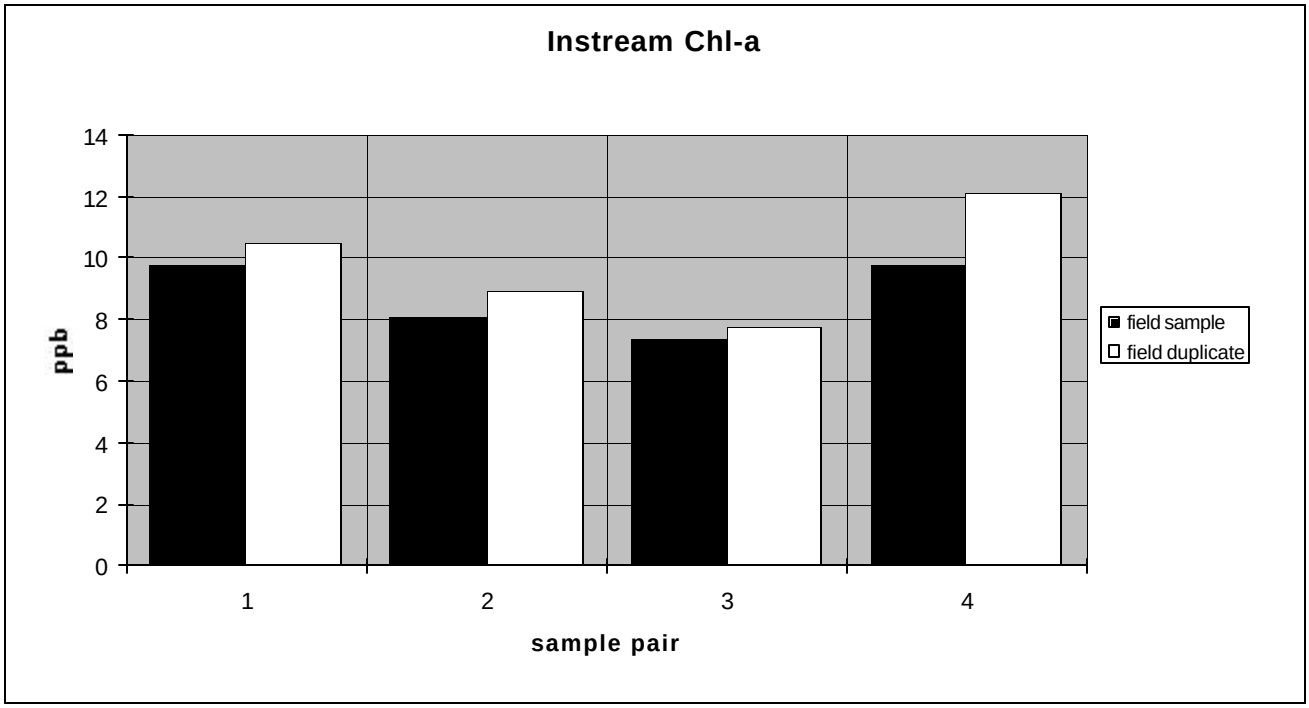


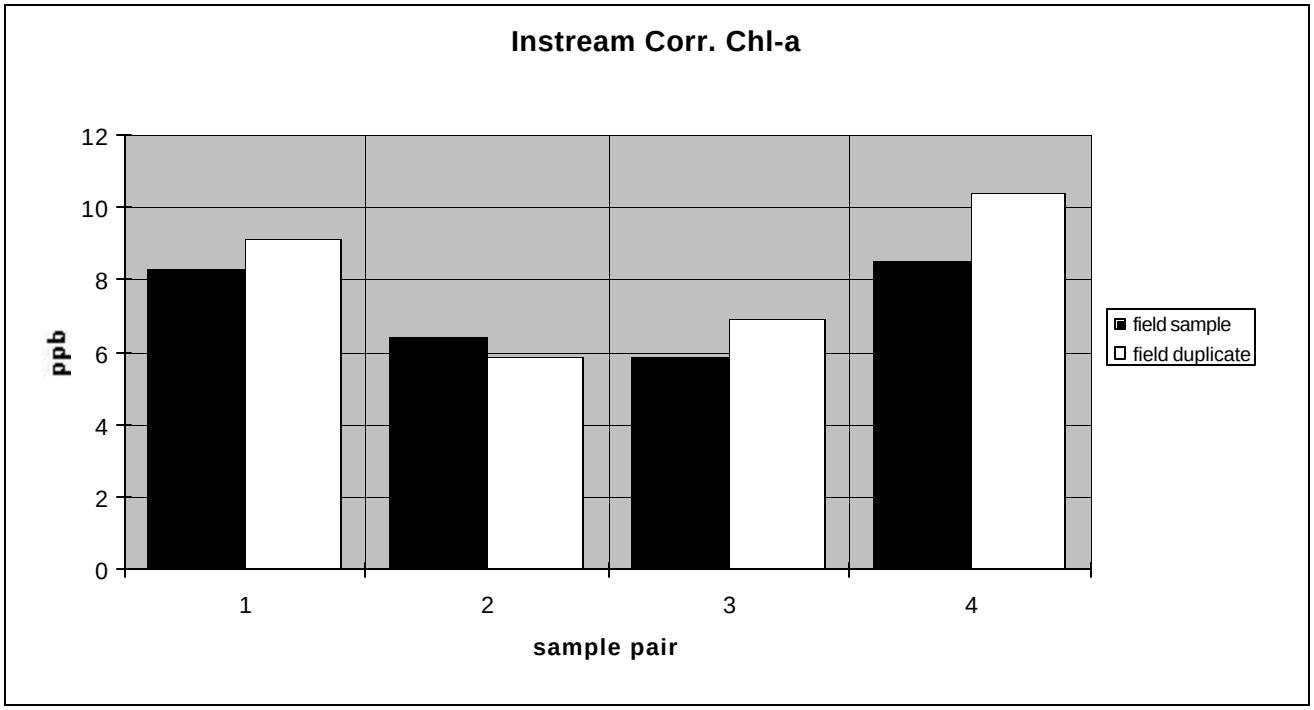


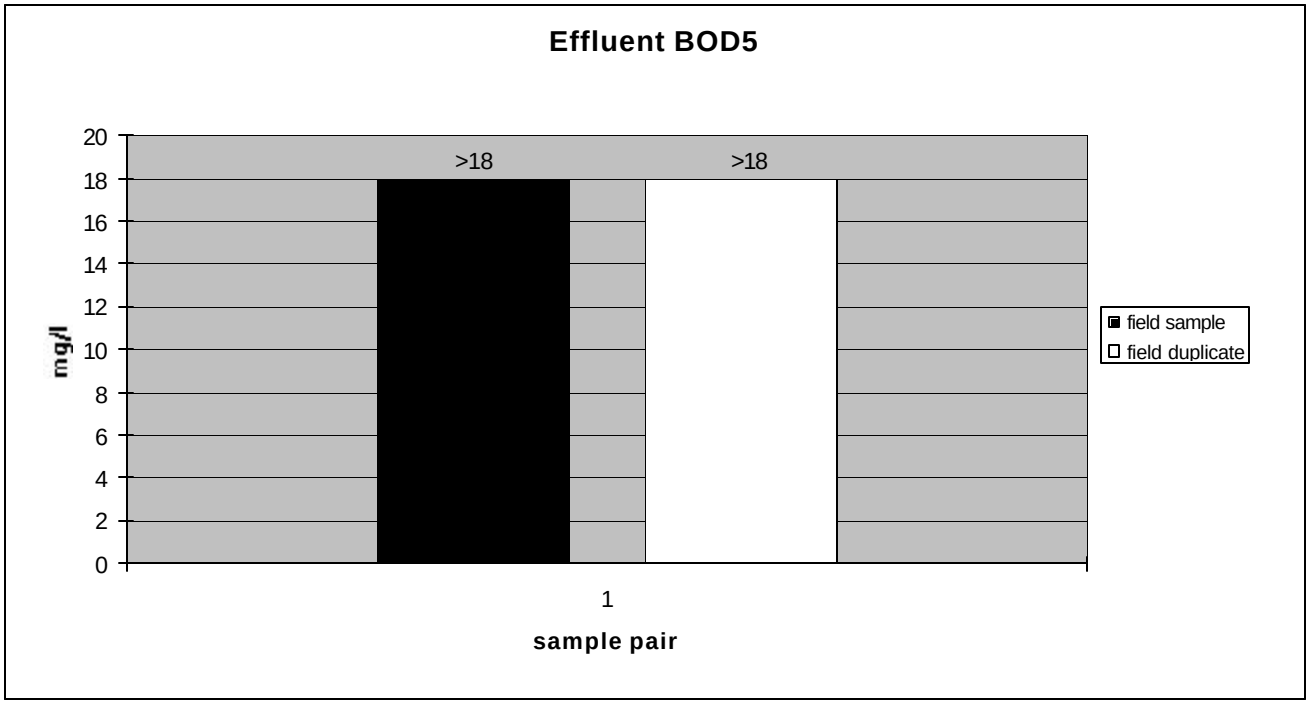

Instream & Effluent NOx
30
31
0.6
0.5
0.4
0.3
0.2
0.1
0
mg/l
<0.01 <0.01
1
2
3
4
5
sample pair
field sample
field duplicate

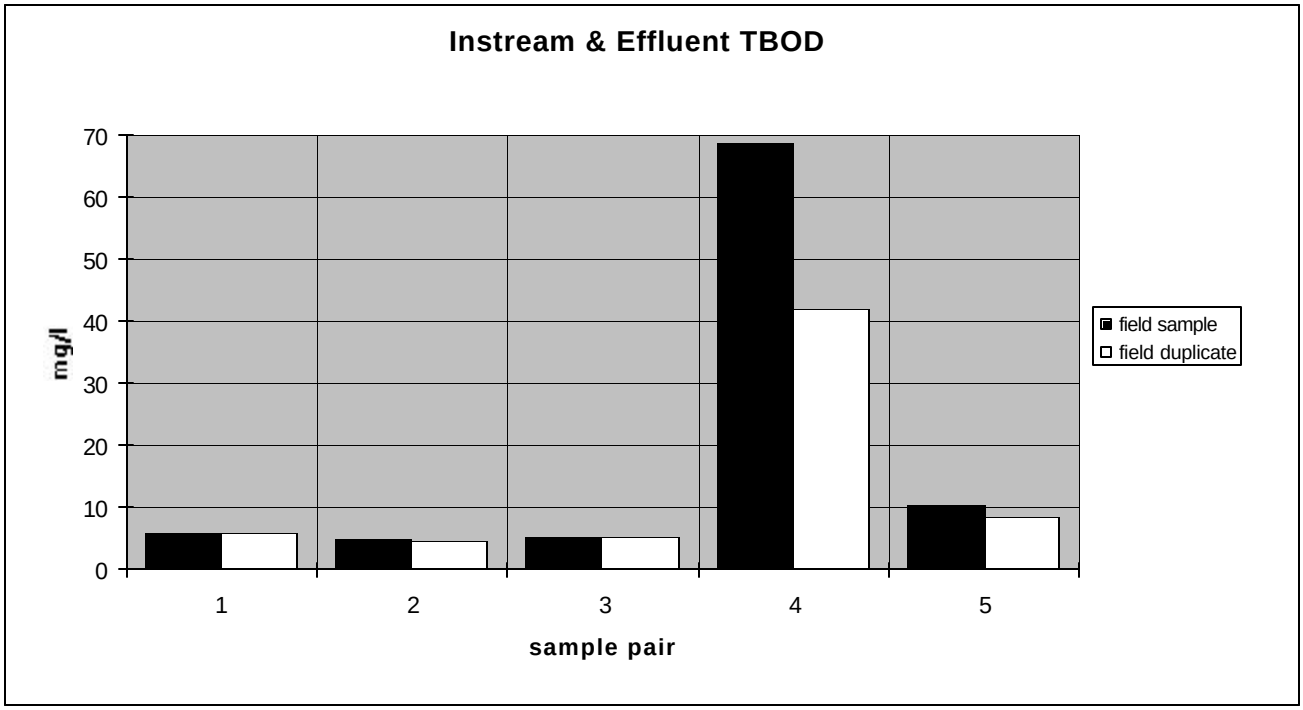

Instream & Effluent TP
5200
5200
120
100
80
60
40
20
0
ppb
1
2
3
4
5
sample pair
field sample
field duplicate

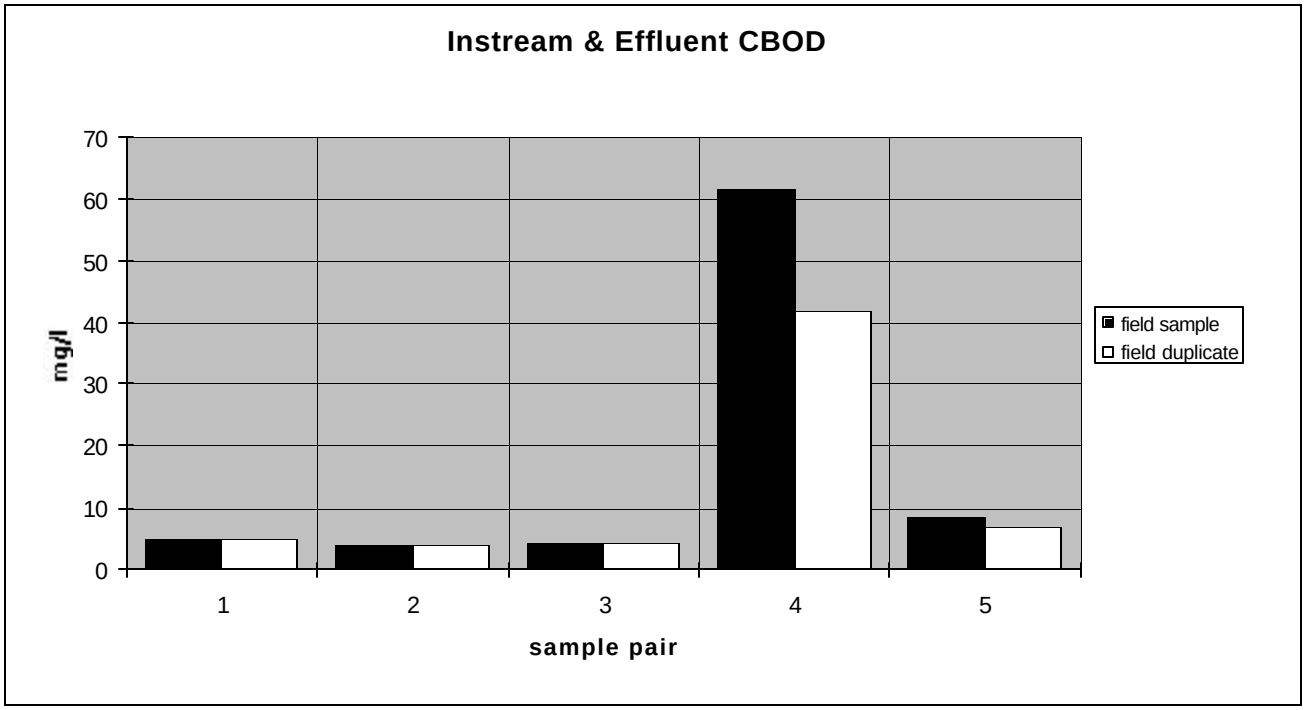

Instream & Effluent PO4
4300
4300
70
60
50
40
30
20
10
0
ppb
<1
1
2
3
4
5
sample pair
field sample
field duplicate

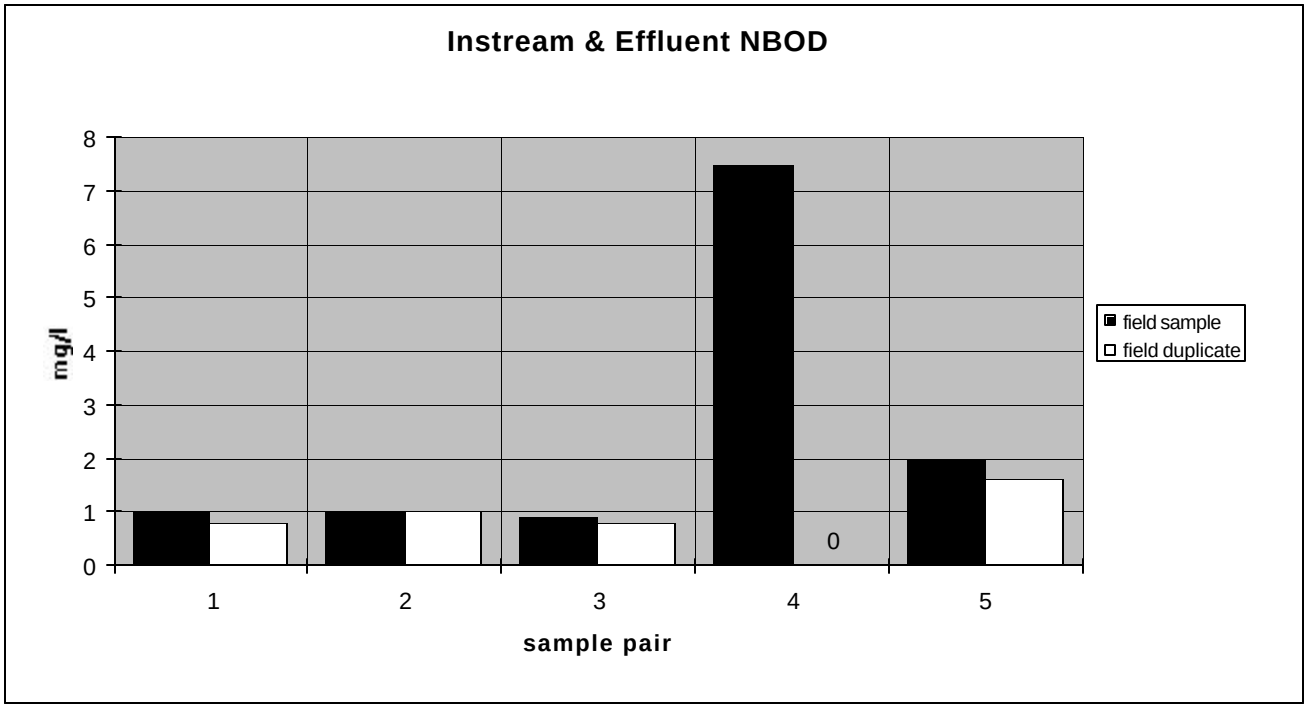

Instream Chl-a
14
12
10
8
6
4
2
0
ppb
1
2
3
4
sample pair
field sample
field duplicate

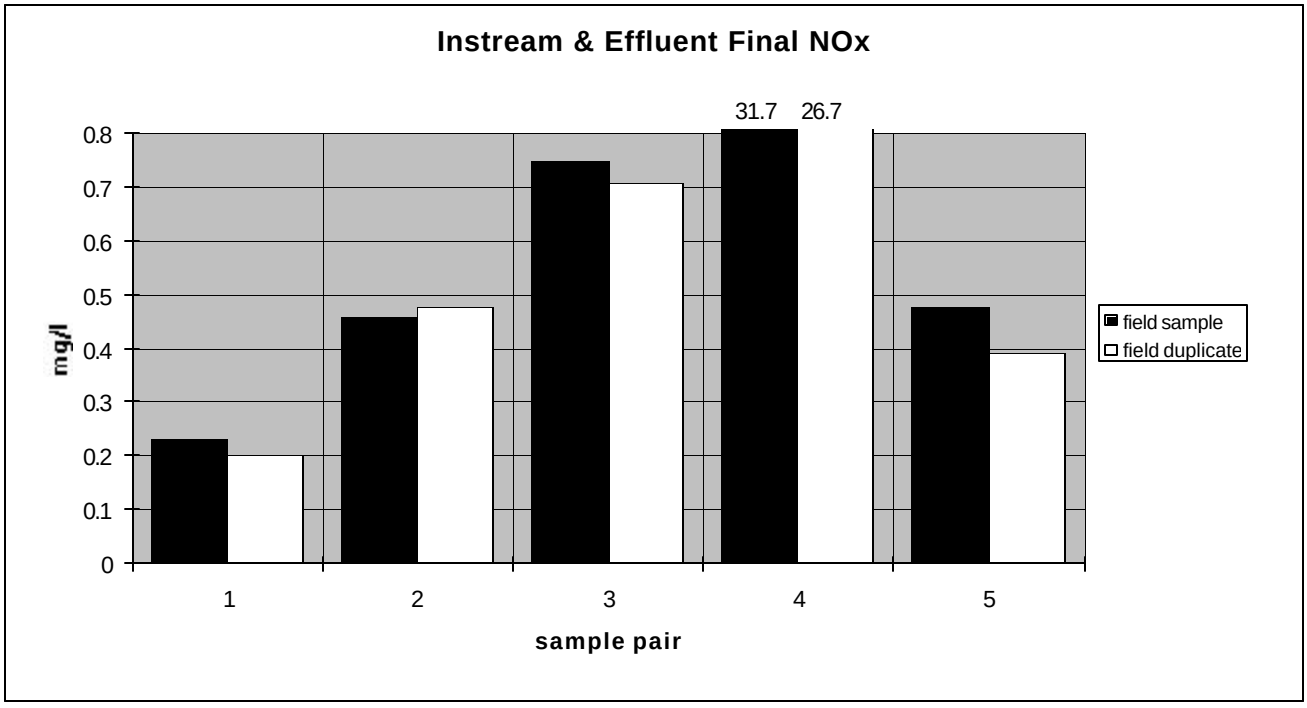

Instream Corr. Chl-a
12
10
8
6
4
2
0
ppb
1
2
3
4
sample pair
field sample
field duplicate

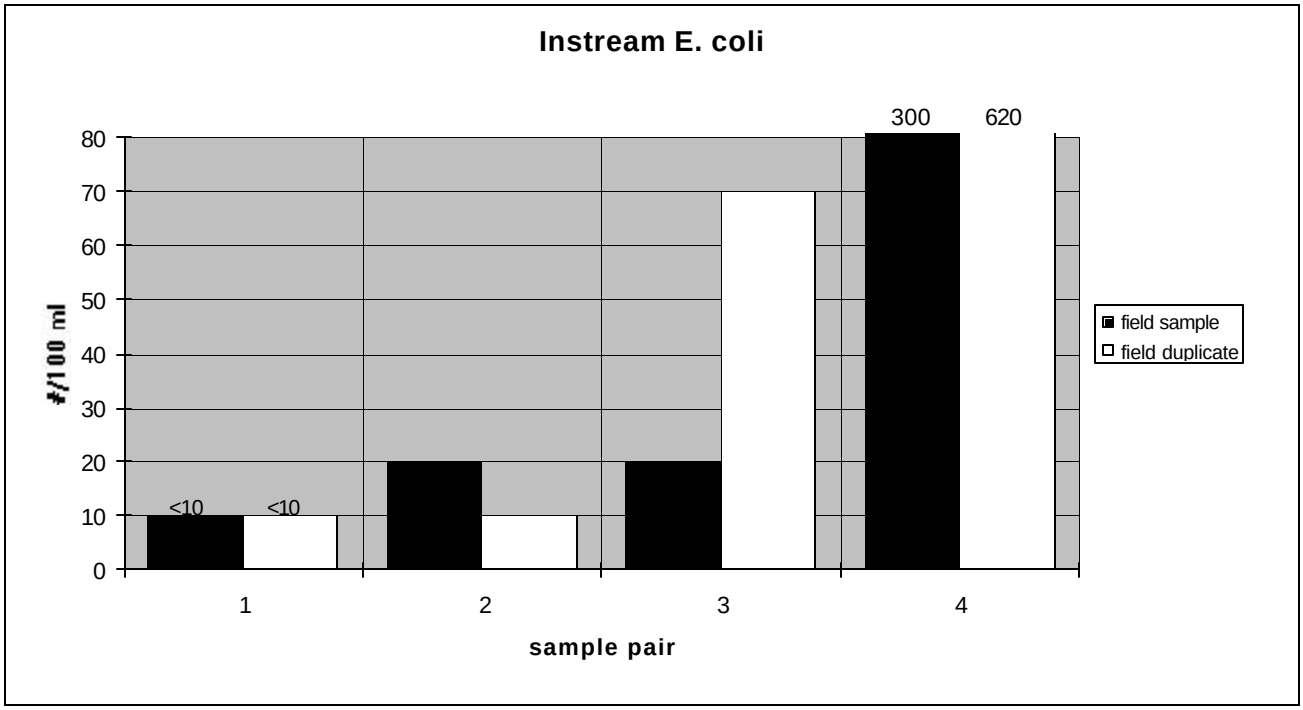

Effluent BOD5
20
18
16
14
12
10
8
6
4
2
0
mg/l
>18
>18
1
sample pair
field sample
field duplicate

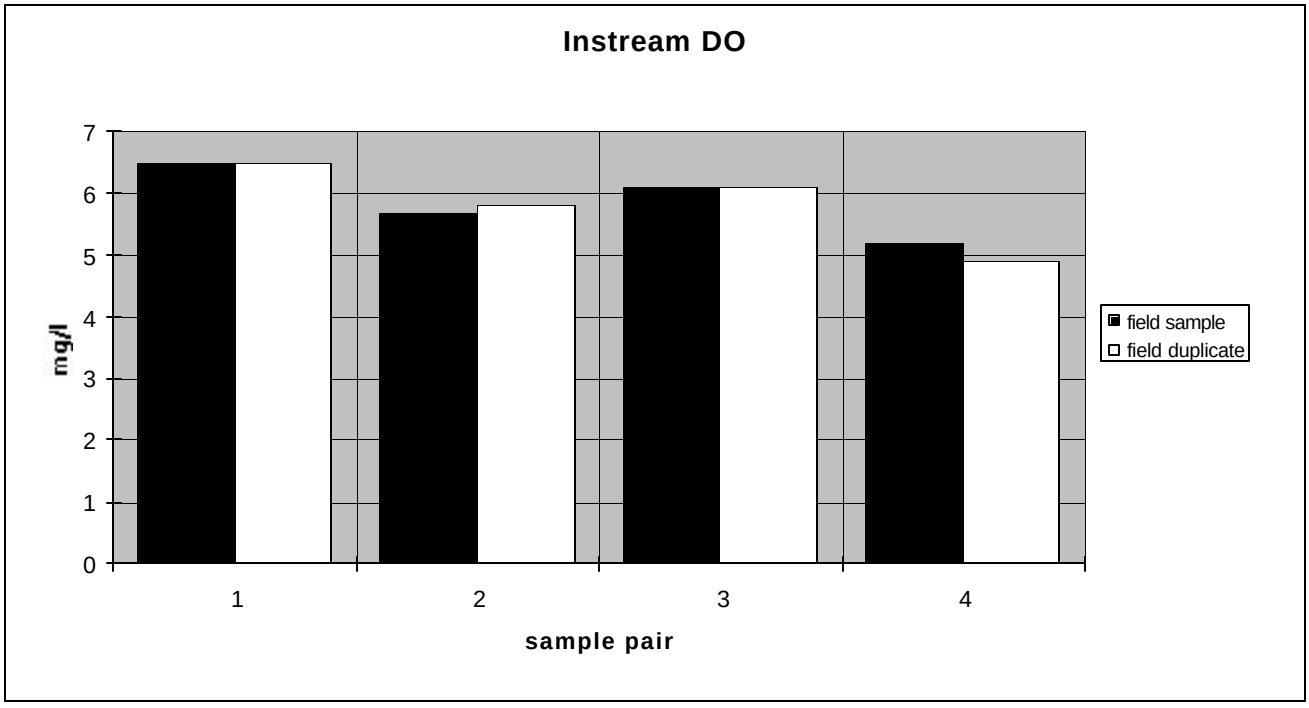

Instream & Effluent TBOD
70
60
50
40
30
20
10
0
mg/l
1
2
3
4
5
sample pair
field sample
field duplicate

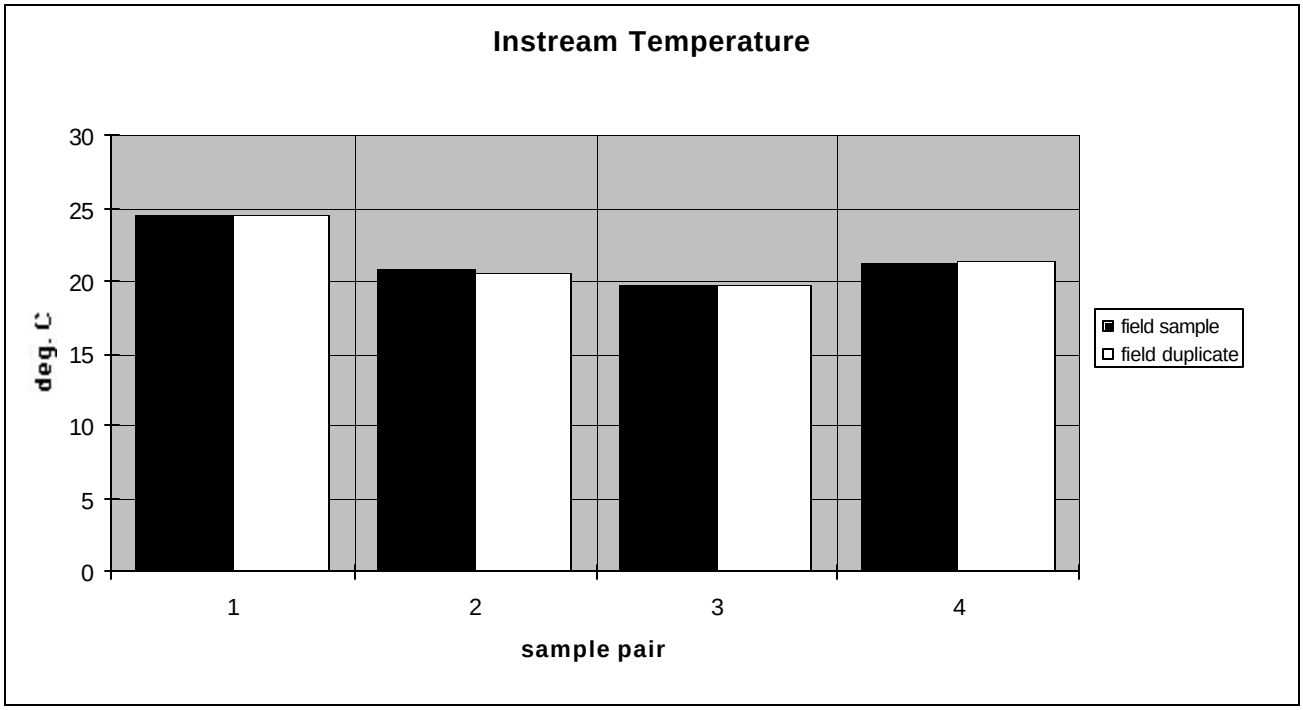

Instream & Effluent CBOD
70
60
50
40
30
20
10
0
mg/l
1
2
3
4
5
sample pair
field sample
field duplicate

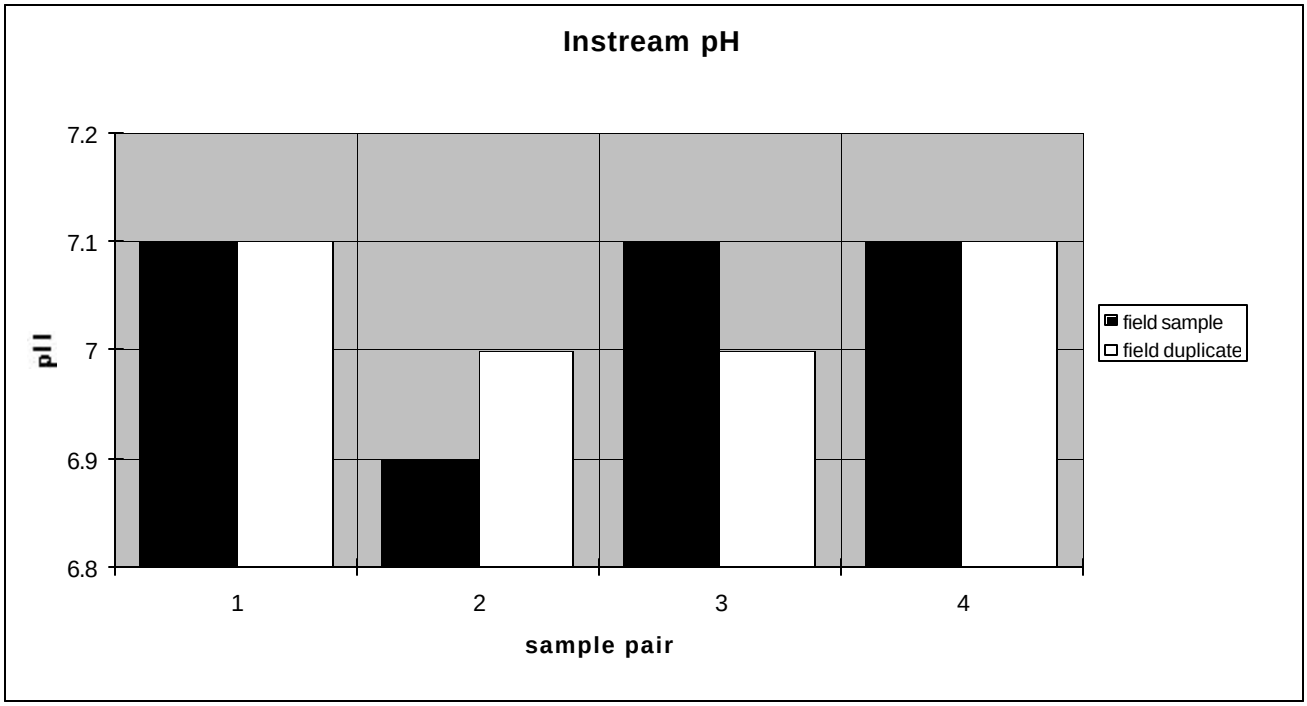

Instream & Effluent NBOD
mg/l
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
sample pair
field sample
field duplicate


Instream & Effluent Final NOx
mg/l
31.7
26.7
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
sample pair
field sample
field duplicate


Instream E. coli
#/100 ml
80
70
60
50
40
30
20
10
0
<10
<10
300
620
1
2
3
4
sample pair
field sample
field duplicate


Instream DO
mg/l
7
6
5
4
3
2
1
0
1
2
3
4
sample pair
field sample
field duplicate


Instream Temperature
30
25
20
15
10
5
0
deg. C
1
2
3
4
sample pair
field sample
field duplicate


Instream pH
7.2
7.1
7
6.9
6.8
pH
1
2
3
4
sample pair
field sample
field duplicate

Survey Weather Conditions

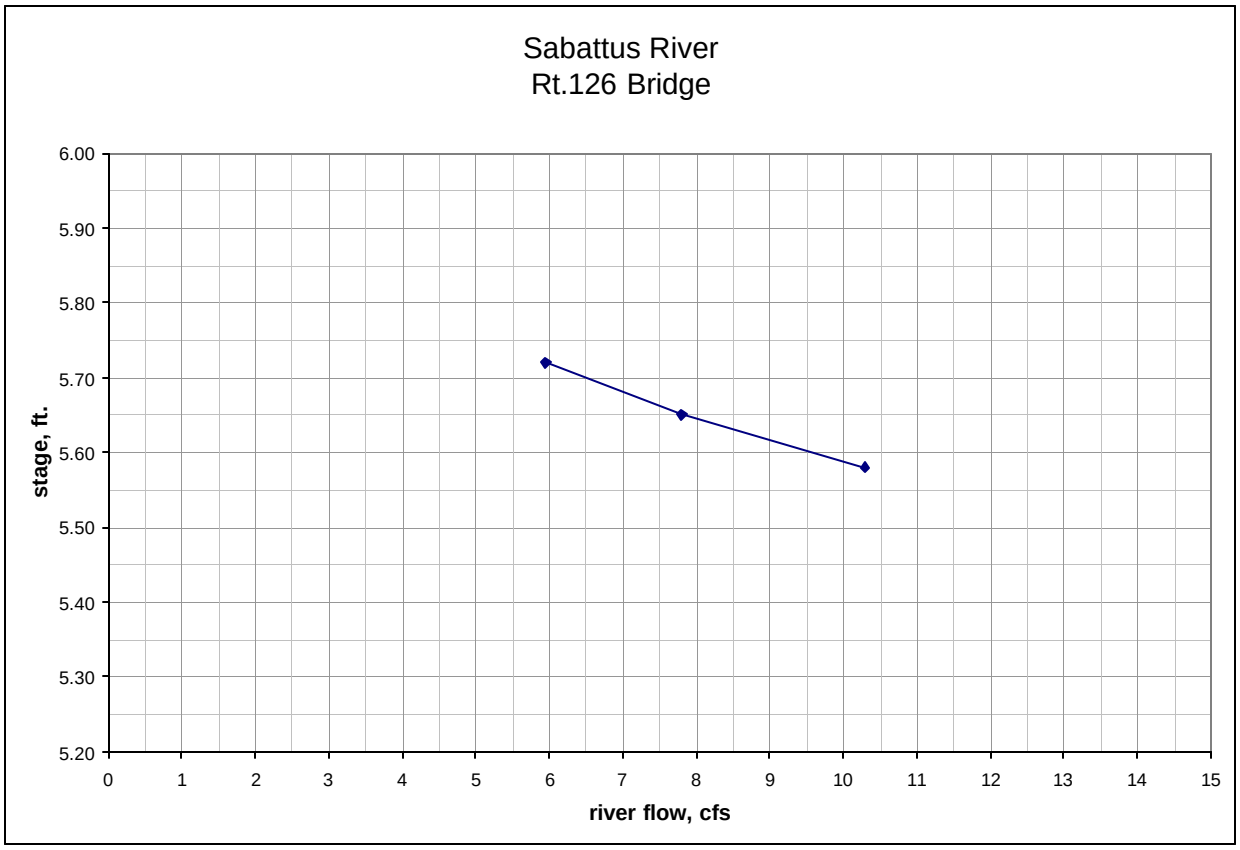
Survey Notes

date	AM	PM
8/20/2002	light rain	sunny
8/21/2002	clear 50s	sunny 80
8/22/2002	clear 50s-75% sun	cloudy 70s

Weather Service for Lewiston

		temp, °F									
date	time	min	max	precip	time	temp, °F	sky	DP, °F	RH, %	Wind, mph	Press, in.
8/19/2002	8:16	63	88	-	-	-	-	-	-	-	-
8/20/2002	-	-	-	-	17:00	81	fair	50	34	N14G18	30.00
8/21/2002	10:30	48	80	-	18:00	75	fair	48	38	S9	30.22
8/22/2002	8:18	46	79	-	-	-	-	-	-	-	-
8/23/2002	8:22	63	79	-	6:00	63	mocldy	48	59	NE9	30.01
8/23/2002	-	-	-	-	14:00	73	fair	45	35	N6	30.03

Sabattus River Stage/Discharge



Photographs

Rt. 126 bridge, site SR3

Old Lisbon Road Bridge, site SR4