PHYSICAL, CHEMICAL AND BIOLOGICAL

ASSESSMENT OF THE

BAYOU BARTHOLOMEW WATERSHED

Ashley, Chicot, Cleveland, Desha,
Drew, Lincoln, and Jefferson Counties, Arkansas

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
Water Division

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INTRODUCTION

Bayou Bartholomew, a tributary to the Ouachita River in the Red River Basin, has its origins near the city of Pine Bluff in central Arkansas. It meanders southeasterly through seven counties in the southeast part of the State and enters Louisiana just southeast of Crossett, Arkansas. It continues south-westward through northeast Louisiana until it enters the Ouachita River just north of Monroe, Louisiana. In Arkansas and Louisiana, it flows along the escarpment between the Gulf Coastal Plains and Delta ecoregions. The main stem of the Bayou lies in the Delta ecoregion, except for its headwaters in and around the Pine Bluff area, which arise in the Gulf Coastal Plains ecoregion. The tributaries entering the Bayou from the west are mainly located in the Gulf Coastal Plains ecoregion, but enter the Delta Ecoregion before entering the Bayou. The tributaries entering the Bayou from the east lie entirely with the Delta ecoregion.

There are approximately 1.2 million acres in the Bayou Bartholomew watershed, 1 million in Arkansas and 200,000 in Louisiana. Land use activities have been estimated to be 65% - 75% silviculture, 20%-30% agriculture, and 2% urban. The forest lands are located west of the Bayou in the Gulf Coastal Plains ecoregion and are managed for soft wood production. The agriculture lands are located adjacent to the Bayou and in the narrow eastern portion of the watershed in the Delta ecoregion. Additional uses include limited confined animal operations, pasture, and some resource extraction. Recreation, mainly hunting and fishing, occur on the Bayou and throughout watershed. There is one Game and Fish Commission Wildlife Management area located around Seven Devils Lake, and six Arkansas Significant Publicly-Owned Lakes within the watershed. These include Lakes Pine Bluff, Cane Creek, Wallace, Grampus, Wilson and Enterprise.

Arkansas' 1998 Water Quality Inventory Report (305(b)) identifies 359.4 stream miles in the watershed, of which 330.5 are being assessed using monitoring data. This data identified three stream segments within the basin totaling 59.7 stream miles not supporting the fish consumption use due to mercury contamination. The source is unknown. Six segments of the Bayou and its tributaries comprising 301.9 stream miles were assessed as not supporting the aquatic life use because of heavy silt loading. The source is suspected to be from agricultural land uses in the watershed. All other designated uses are being maintained.

The designated uses for Bayou Bartholomew include: 1) Primary Contact Recreation; 2) Secondary Contact Recreation; 3) Domestic, Industrial and Agricultural Water Supply; and 4) Gulf Coastal Plains and Delta Ecoregions Fisheries. The Bayou is extensively used as a water supply for the irrigation of adjacent crop lands.

Bayou Bartholomew is an important water body resource to the State from both a water quality and a water quantity aspect. Addressing the watersheds nonpoint source pollution issues is a top priority for the Bayou Bartholomew Alliance which was incorporated in October 1995 as a non-profit organization and is a public support group composed of local land owners and concerned citizens. Representatives from local, state, and federal government agencies formed and operate a technical support group of the Alliance at the request from the Alliance's Board of Directors.

GOALS AND OBJECTIVES

The main objective of this survey was to assess the waters of the Bayou Bartholomew watershed (USGS HUA 08040205 1601-1611) by identifying areas of water quality impairment, their causes and sources, and to better delineate impairments by subbasin to direct implementation of corrective actions.

The goals of this survey were to:

1) Develop environmental indicators and set attainment goals to assess the effectiveness of best management practices implementations.
2) Provide detailed information of the environmental measurements needed to determine and establish the attainment goals of the identified environmental indicators.

1998 ASSESSMENT SURVEY WORK PLAN

This assessment of Bayou Bartholomew occurred over a two year period with six major activities: 1) an overall watershed land use survey; 2) a synoptic water quality, macroinvertebrate and fish community survey by subbasin; 3) a ground water quality assessment over a two year period; 4) a stream bank, riparian zone habitat survey; 5) an intensive water quality, macroinvertebrate and fish community survey; and 6) a sediment survey.

The sample stations are listed in Table 1. They were located at the base of the major subbasins, along the main stem of the Bayou, and at other strategic points (Figure 1) to determine background conditions and loadings from nonpoint pollution sources. Macroinvertebrate and fish communities were sampled at selected stations to obtain a representative data base throughout the watershed. Storm flow grab samples were collected from all of the synoptic sites to determine nonpoint source inputs. Water quality parameters analyzed for included the routine water quality indicators, pesticides, metals, and fecal coliform bacteria (Table 2). In addition, USGS flow gaging stations were established along the Bayou in conjunction with the previously established flow stations in order to estimate storm flows to determine pollutant loadings.

Ground water quality samples were collected from irrigation wells in the areas of the watershed that lacked sufficient data to determine current ground water conditions. In addition, previously sampled areas of the watershed that had demonstrated some ground water quality impairments were re-sampled for further delineation of the impairments. Water quality parameters analyzed included the routine ground water quality indicators, pesticides, and metals. Well logs were obtained whenever possible to determine well characteristics.

Sediments were collected from those sites listed in Table 1 identified with an "S" in the Samples column. The sediments were analyzed for metals.

Table 1: BAYOU BARTHOLOMEW SAMPLE SITES

SITE ID	WATER BODY / LOCATION (Sec., Twnshp, Rnge)	County	WS	Samples W	M	F	S	O	Latitude Longitude
OUA0143	Bayou Bartholomew	Jefferson	31	X	X	X	X	X	34 12 00.113N 92 03 55.410W
	on Oak Wood Road in Pine Bluff (Sec 13, T6S, R10W)								
OUA0144	Nevins Creek	Jefferson	16	X	X	X	X	X	34 10 57.031N 92 03 09.848W
	on Good Faith Road in Pine Bluff (Sec 19, T6S, R10W)								
OUA0145	Harding Creek	Jefferson	5	X	X	X	X	X	34 11 41.319N 92 02 26.643W
	on west 34th Street in Pine Bluff (Sec 19, T6S, R10W)								
OUA0146	Unnamed Tributary	Jefferson	2	X			X	X	34 11 08.514N 92 00 11.217W
	on Main Street in Pine Bluff off Hwy. 15 (Sec 22, T6S, R9W)								
OUA0147	Bayou Imbeau	Jefferson	7	X	X	X	X	X	34 11 37.863N 91 58 39.275W
	on 38th Street off Hwy. 15, south of US 65 (Sec 23, T6S, R9W)								
OUA33	Bayou Bartholomew	Jefferson	112	X	X	X	X	X	34 06 26.650N 91 54 05.240W
	2 mi. south of Ladd off Hwy 425 (Sec. 22, T7S, R8W)								
OUA0148	Bayou Bartholomew	Lincoln	134	X			X	X	34 03 16.176N 91 49 44.812W
	at Co. Rd. 1.8 mi. south of Tarry off US. 425 (Sec 6, T8S, R7W)								
OUA0160	Melton's Creek	Lincoln	22	X					34 03 17.819N 91 49 57.618W
	at Co. Rd. 2 mi. south of Tarry off US. 425 (Sec 6, T8S, R7W)								
OUA0149	Cousart Bayou	Lincoln	40	X	X	X	X	X	34 05 14.907N 91 46 18.033W
	at Co. Rd. 2 mi. south. of Tamo off US 65 (Sec 26, T7S, R7W)								
OUA0150	Jack's Bayou	Jefferson	12	X	X	X	X	X	34 06 05.583N 91 45 42.264W
	at Co. Rd. 1 mi. south of Tamo off US 65 (Sec 23, T7S, R7W)								
OUA0151	Deep Bayou	Lincoln	87	X	X	X	X	X	34 02 04.691N 91 42 34.117W
	at Hwy 11, 3 mi. south. of Grady (Sec 17, T8S, R6W)								
OUA0152	Cross Bayou	Lincoln	11	X			X		33 55 11.351N 91 40 52.364W
	Co. Rd. 2 mi. south. of Hwy 114 near Fresno (Sec 14, T9S, R6W)								
UWBYB03	Bayou Bartholomew	Lincoln	380	X	X		X	X	33 51 59.243N 91 39 22.563W
	Garrett Bridge at Hwy 54 , (Sec 6, T10S R5W)								

Table 1: BAYOU BARTHOLOMEW SAMPLE SITES (cont.)

SITE ID	WATER BODY	LOCATION (Sec., Twnshp, Rnge)	County	WS	W	M	F	S	O	Latitude	Longitude
OUA0153	Ables' Creek	Hwy 54 south. of Tyro (Sec 20, T10S, R6W)	Lincoln	36	X	X				33 49 29.191N	91 44 06.873W
OUA0158	Ables Creek	Hwy 138 north. of Selma (Sec 24, T11S, R5W)	Drew	110	X	X	X	X	X	33 44 11.297N	91 33 41.443W
UWBYB02	Bayou Bartholomew	Hwy 4 west. of McGeHee (Sec. 25, T12S, R4W)	Desha	576	X	X		X		33 37 42.415N	91 26 46.881W
UWCOC02	Cut-Off Creek	14 mi. east of Monticello at Hwy 4 (Sec. 11, T12S, R5W)	Drew	92	X	X	X		X	33 40 22.197N	91 34 47.935W
OUA0157	Cut-Off Creek	Hwy 35 east of Collins (Sec 31, T13S, R4W)	Drew	191	X	X	X		X	33 33 22.118N	91 31 49.337W
OUA0156	Wolf Creek	Co. Rd. south of Collins, 3.5 mi. S. off Hwy 35 (Sec 14, T14S, R5W)	Drew	60	X					33 28 54.476N	91 35 06.719W
UWCOC01	Cut-Off Creek	Co. Rd. northeast of Boydell off US 165 (Sec 20, T15S, R4W)	Ashley	321	X	X	X	X	X	33 23 01.230N	91 31 41.890W
OUA0155	Bearhouse Creek	Co. Rd. 75, 0.75 north of Snyder (Sec 22, T16S, R5W)	Ashley	103	X	X		X		33 17 48.281N	91 36 21.659W
OUA0154	Bayou Bartholomew	Hwy 278 2 mi. west of Portland (Sec 8, T17S, R4W)	Ashley	1113	X	X	0	X	X	33 14 09.062N	91 32 05.219W
OUA13	Bayou Bartholomew	west of Jones LA no La. 834, off US 165 (Sec. 9, T23N, R8E)	Morehouse	1158	X	X	X	X	X	32 59 25.000N	91 31 20.000W
OUA12A	Overflow Creek	La. Hwy 590, 1.5 mi. west of La. Hwy. 591 (Sec. 13, T23N, R7E)	Morehouse	260	X					32 58 55.000N	91 48 20.000W
OUA12	Chemin-A-Haut Creek	La. Hwy 834, 4.5 mi. east of US 165 (Sec. 13, T23N, R6E)	Morehouse	87	X					32 59 02.000N	91 42 06.000W

W - Water Sample Site
M - Macroinvertebrate Sample Site
F - Fish Community Sample Site
S - Sediment Sample Site
O - Diurnal Dissolved Oxygen Sample Site
WS - Watershed Area (Acres)
Sec. - Section Number
Tnsp. - Township
Rng. - Range
Co. Rd. - County Road

0 – Fish collected in Bayou Bartholomew on Ashley County road just south of Drew County line.

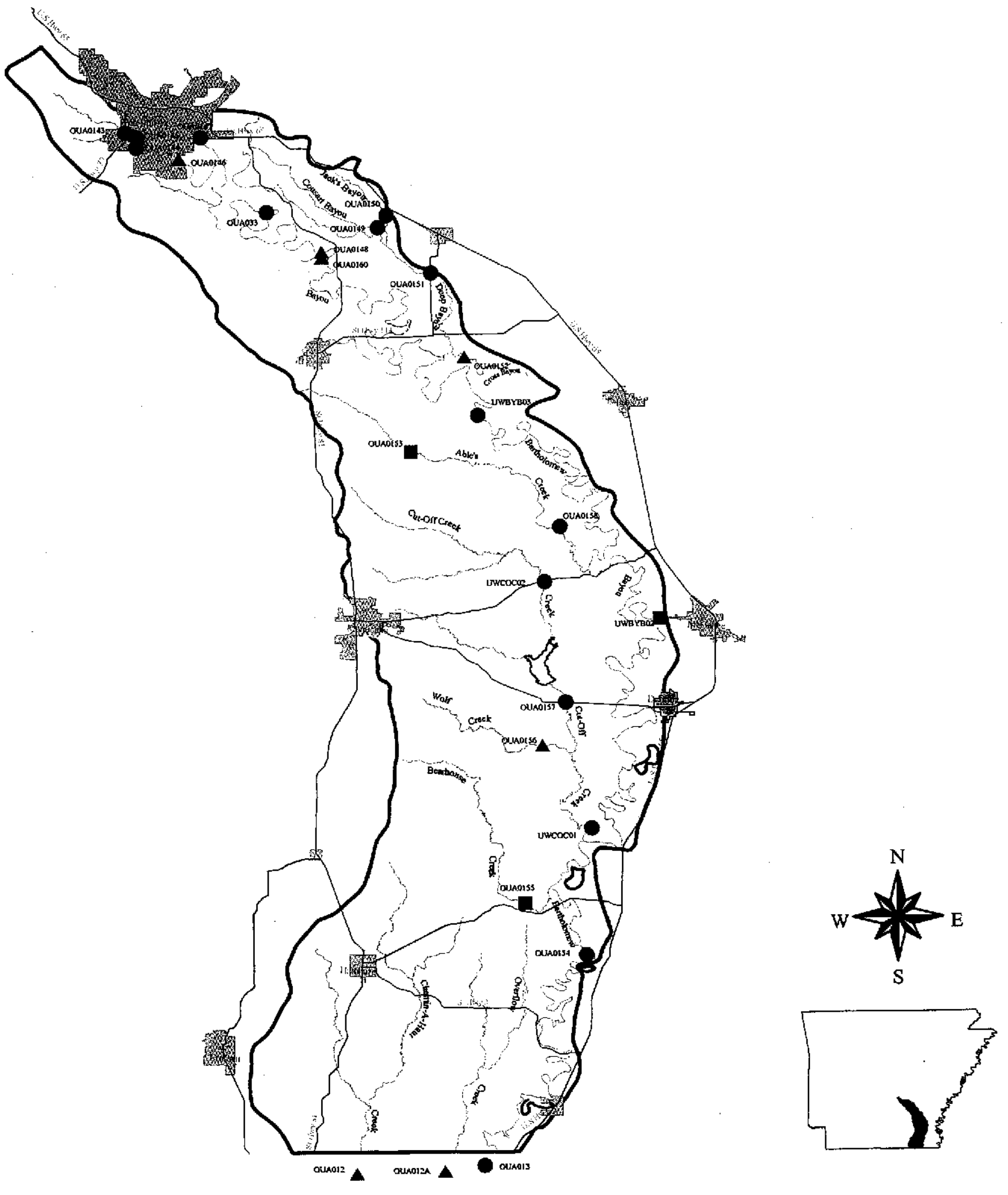


Figure 1
Water Quality, Fish and Macroinvertebrate
Sample Sites

Water Division
Arkansas Department of
Environmental Quality

Legend

- Streams
- AR Highways
- ▲ Water Quality Only Sites
- ■ Water Quality & Macroinvertebrate Sites
- ● Water Quality, Fish & Macroinvertebrate Sites

Table 2 - Water Quality Parameters

In-Situ & Lab Analyses	Metals, Dissolved	Pesticides		
pH	Aluminum	Acifluorfen	Endosulfan-I	Prometryn
Dissolved Oxygen	Barium	Alachlor	Endosulfan-II	Propachlor
Temperature	Beryllium	Aldrin	Endosulfan-Sulfate	Propanil
Flow	Boron	Ametryn	Endrin	Propazine
Ammonia Nitrogen	Cadmium	Atrazine	Fluometuron	Silvex
Nitrate-Nitrite Nitrogen	Calcium	Bentazon	Fluchloralin	Simazine
Total Phosphorus	Chromium	Captan	Fonofos	Terbutryn
Ortho-Phosphorus	Cobalt	Carboxin	Heptachlor	Trifluralin
Chlorides	Copper	Chlorpyrifos	Hexazinone	
Sulfates	Iron	Cyanazine	Imazaquin	
Total Dissolved Solids	Lead	Cyprazine	Malathion	
Total Suspended Solids	Manganese	p-p-DDD	Methoxychlor	
Total Hardness	Nickel	p-p-DDE	Methyl-parathion	
Turbidity	Potassium	p-p-DDT	Metolachlor	
Total Organic Carbon	Sodium	Diazinon	Metribuzin	
Fecal Coliform Bacteria	Vanadium	Dieldrin	Molinate	
	Zinc	Dipropetryn	Pendimethalin	

HISTORICAL WATER QUALITY DATA

Water quality data has been collected from Bayou Bartholomew from sample sites south of Ladd, Arkansas (OUA33) in Lincoln County, and west of Jones, Louisiana (OUA13) in Moorehouse Parish for over 20 years. Data from between 1989 and 1999 (Table 3) indicate that turbidity levels exceeded the Gulf Coastal Plains Ecoregion instream water quality criteria of 21 NTUs (Table 4) in 75% of the samples collected from OUA33 and in 93% of the samples collected from OUA13. However, less than ten percent (10%) of the samples exceeded the Delta ecoregion storm flow assessment criteria of 100 NTUs. Turbidity levels have ranged from 1.8 NTUs to 620 NTUs at OUA33, and 7.5 NTUs to 265 NTUs at OUA13. The mean values were 48.52 NTUs at OUA33 and 50.25 NTUs at OUA13. Total suspended solids concentrations ranged from 13 mg/L to 592 mg/L at OUA33 and 13 mg/L to 556 mg/L at OUA13 with mean concentrations of 105.86 mg/L and 127.81 mg/L, respectively. The turbidity concentrations at these sites was the only water quality parameter to consistently exceed water quality standards. The data for each of the other water quality parameters such as dissolved oxygen, temperature, chlorides, sulfates and total dissolved solids, indicate that less than 1.0% of the samples collected from 1989 to 1999 failed to meet instream water quality standards. The water temperature standard at OUA33 was exceeded in 8.0% of the samples collected.

Data from the Arkansas Mercury Task Force (1995) indicate that mercury concentrations in the edible fish tissue samples collected form Bayou Bartholomew exceed Federal Food and Drug Administration's human health criteria. Fish consumption advisories were activated for the portion of the Bayou from Arkansas Highway 35 in Drew County to the Bayou confluence with Little Bayou in Ashley County, and for Cut-Off Creek from Arkansas Highway 35 in Drew County to its confluence with the Bayou in Ashley County.

Table 3 - Historical Water Quality Data

OUA33 - South of Ladd, Arkansas (1989-1999)

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples Exceeding Standard
Dissolved Oxygen mg/L	6.38	224	11.00	0.02	<1.0
pH	6.80	223	8.53	5.88	<1.0
Temperature °C	19.48	221	35.00	1.00	8.0
Total Suspended Solids mg/L	34.25	221	422.00	1.00	
NO2+NO3-N mg/L	0.14	218	1.76	0.01	
Total Phosphorus mg/l	0.23	209	1.16	0.03	
Total Hardness mg/L	36.10	201	122.00	10.00	
Chloride mg/L	8.15	217	90.00	0.50	<1.0
Sulfate mg/L	10.19	211	38.00	1.00	<1.0
Total Dissolved Solids mg/L	105.86	213	592.00	13.00	
Turbidity NTU	48.52	224	620.00	1.80	<10.0

OUA13 - Near Jones, Louisiana (1989-1999)

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples Exceeding Standard
Dissolved Oxygen mg/L	6.76	196	12.00	2.30	<1.0
pH	7.05	206	8.03	5.96	0.0
Temperature °C	18.89	219	34.60	2.00	<1.0
Total Suspended Solids mg/L	32.33	213	205.00	3.00	
NO2+NO3-N mg/L	0.21	213	1.11	0.01	
Total Phosphorus mg/l	0.23	200	1.53	0.03	
Total Hardness mg/L	48.71	195	127.00	12.00	
Chloride mg/L	12.51	198	175.00	0.50	<1.0
Sulfate mg/L	9.89	203	60.00	1.00	<1.0
Total Dissolved Solids mg/L	127.81	204	556.00	13.00	<1.0
Turbidity NTU	50.25	211	265.00	7.50	<10.0

Table 4 - Water Quality Standards and Criteria*

Gulf Coastal Plains Ecoregion

	Primary	Critical*		Bayou Bartholomew	Tributaries
Dissolved Oxygen (mg/L)			Chlorides	30 mg/Il9 mg/L	
< 10 sq. mil. Watershed	5	2	Sulfates	30 mg/L	41 mg/L
10 - 500 sq. mi. watershed	5	3	Total Dissolved Solids	220 mg/L	138 mg/L
> 500 sq. mi. watershed	5	5			
Temperature 30 °C			Turbidity	32 NTUs	32 NTUs

Delta Ecoregion

	Primary	Critical*		Least Altered	Channel Altered
Dissolved Oxygen (mg/L)			Chlorides	48 mg/L	17 mg/L
< 10 sq. mil. Watershed	5	2	Sulfates	37 mg/L	23 mg/L
10 - 100 sq. mi. watershed	5	3	Total Dissolved Solids	390 mg/L	240 mg/L
> 100 sq. mi. watershed	5	5	Turbidity	84 NTUs	100 NTUs
Temperature 32 °C					

*Critical Season standards apply when water temperatures reach 22 °C, usually between May and September.

Bacteria: Extraordinary Resource Waters - At no time shall the fecal coliform content exceed a geometric mean of 200/100 ml in any size watershed.

Primary Contact Waters - Between April 1 and September 30, the fecal coliform content shall not exceed a geometric mean of 200/100 ml nor shall more than 10 percent of the total samples during any 30-day period exceed 400/100 ml. During the remainder of the calender year, these criteria may be exceeded, but at no time shall the fecal coliform content exceed the level necessary to support secondary contact recreation.

Secondary Contact Waters - The fecal coliform content shall not exceed a geometric mean of 1000/100 ml, nor equal or exceed 2000/100 ml in more than 10 percent of the samples taken in any 30-day period.

Dissolved Metals: Dissolved metals standards are based on ecoregion hardness values.

* State of Arkansas Department of Pollution Control and Ecology, Regulation No. 2, January 1998.

Un-Assessed Waters Survey Data

Five short-term sites were established as part of the 1996 "Un-Assessed Waters Survey" and have continued to be sampled as part of the "Roving Water Quality Monitoring Network.". These sites were sampled nine times between 1996 and 1998. Two sites were located on Cut-Off Creek and three sites were located on the Bayou between. Location data for these sites are in Table 1. The data collected from these sites during that survey is summarized in Table 5.

Data from these sites indicated that there were some occasional problems with low dissolved oxygen concentrations, especially in the slower moving middle portion of the bayou during the hotter periods of the year. There also was an occasional problem with fecal coliform concentrations exceeding the secondary contact recreation criteria. Chloride, sulfate and total dissolved solids concentrations exceeded water quality criteria, but were mostly limited to one-time events. The most common standard exceeded was in stream turbidity. All stations exceeded the criteria for turbidity concentrations above the standard in 38% to 89% of the samples collected.

Table 5 - Historical Water Quality Data collected from 1994 to 1996

UWBYB01 - Bayou Bartholomew at Highway 82 Near Thebes

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples[1] Exceeding Standard
Dissolved Oxygen mg/L	5.50	7	7.00	3.60	11
pH	7.02	7	7.42	6.59	0
Temperature °C	22.03	9	30.00	10.20	0
Total Suspended Solids mg/L	12.78	9	23.00	4.00	
NO2+NO3-N mg/L	0.19	9	0.46	0.05	
Total Phosphorus mg/l	0.18	8	0.27	0.09	
Total Hardness mg/L	50.57	9	113.00	20.00	
Chloride mg/L	13.61	9	28.00	3.00	0
Sulfate mg/L	10.38	9	15.00	7.60	0
Total Dissolved Solids mg/L	122.11	9	179.00	79.00	0
Turbidity NTU	31.22	9	58.00	12.00	55
Fecal Coliform col/100 ml		9	155	14	0

UWBYB02 - Bayou Bartholomew at Highway 4 near McGehee

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples[1] Exceeding Standard
Dissolved Oxygen mg/L	5.03	8	7.50	2.60	63
pH	7.12	8	7.70	6.73	0
Temperature °C	21.89	9	29.00	10.00	0
Total Suspended Solids mg/L	22.66	9	79.00	3.50	
NO2+NO3-N mg/L	0.19	9	0.14	<0.05	
Total Phosphorus mg/l	0.27	9	0.41	0.08	
Total Hardness mg/L	62.01	9	153.00	22.00	
Chloride mg/L	18.09	9	53.11	4.69	11
Sulfate mg/L	11.02	9	15.90	5.00	0
Total Dissolved Solids mg/L	161.33	9	253.00	121.00	11
Turbidity NTU	52.71	9	160.00	6.10	78
Fecal Coliform col/100 ml		9	2450	43	11

[1] Delta Ecoregion, Least-Disturbed Standards
[2] Gulf Coastal Plains Ecoregion Standards

UWBYB03 - Bayou Bartholomew at Highway 54, Garrett Bridge

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples[1] Exceeding Standard
Dissolved Oxygen mg/L	4.66	9	8.30	4.30	0
pH	7.21	8	7.73	6.78	0
Temperature °C	21.78	9	29.80	9.40	0
Total Suspended Solids mg/L	32.56	9	72.00	10.50	
NO2+NO3-N mg/L	0.26	9	0.49	0.09	
Total Phosphorus mg/l	0.27	9	0.49	0.11	
Total Hardness mg/L	68.37	9	246.00	19.00	
Chloride mg/L	21.67	9	93.87	4.92	11
Sulfate mg/L	12.20	9	21.90	3.90	0
Total Dissolved Solids mg/L	167.89	9	386.00	102.00	11
Turbidity NTU	64.47	9	140.00	8.20	89
Fecal Coliform col/100 ml		9	>2000	147	11

UWCOC01 - Cut-Off Creek Northeast of Boydell

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples[2] Exceeding Standard
Dissolved Oxygen mg/L	4.92	8	8.50	3.30	0
pH	6.73	8	7.10	6.30	0
Temperature °C	22.63	7	30.60	9.80	14
Total Suspended Solids mg/L	16.63	8	30.00	9.00	
NO2+NO3-N mg/L	0.12	8	0.25	<0.02	
Total Phosphorus mg/l	0.16	8	0.10	0.28	
Total Hardness mg/L	29.69	8	64.50	15.00	
Chloride mg/L	11.10	8	23.00	3.46	13
Sulfate mg/L	10.19	8	15.10	3.20	0
Total Dissolved Solids mg/L	98.12	8	124.00	65.00	0
Turbidity NTU	25.73	8	85.00	6.80	38
Fecal Coliform col/100 ml		8	2400	27	13

UWCOC02 - Cut-Off Creek at Highway 4 east of Monticello

Parameter	Mean	No. of Samples	Maximum	Minimum	% Samples[2] Exceeding Standard
Dissolved Oxygen mg/L	6.29	8	9.40	5.00	0
pH	6.94	7	7.21	6.74	0
Temperature °C	21.71	8	30.30	9.40	1
Total Suspended Solids mg/L	8.13	8	12.50	2.00	
NO2+NO3-N mg/L	0.14	8	0.45	0.04	
Total Phosphorus mg/l	0.66	8	1.20	0.14	
Total Hardness mg/L	23.40	8	38.00	10.00	
Chloride mg/L	7.80	8	16.20	2.40	0
Sulfate mg/L	18.05	8	28.40	7.60	0
Total Dissolved Solids mg/L	99.13	8	158.00	52.00	13
Turbidity NTU	26.39	8	85.00	7.40	50
Fecal Coliform col/100 ml		8	>2400	40	13

WATERSHED CHARACTERISTICS

LOCATION

Bayou Bartholomew headwaters are located south and west of Pine Bluff, Arkansas in Jefferson County. The Bayou flows southward through Lincoln, Drew and Ashley counties and enters Louisiana near Bonita in Moorehouse Parish. The majority of the watershed lies in the Gulf Coastal Plains ecoregion. A small portion of the extreme eastern edge of the watershed and a section south and east of Pine Bluff to Garrett Bridge is in the Delta ecoregion. Most of the tributaries of the Bayou originate in the western portion of the watershed and flow east-to-southeast. There is a group of tributaries in the northern portion of the watershed that originate on the eastern side of the Bayou. These tributaries are southeast of Pine Bluff and flow south towards the Bayou. The Bayou drains seven counties in Arkansas, the four listed above along with portions of Cleveland, Desha, and Chicot counties.

LAND USE

Many estimates have been made concerning the land use of the 1.2 million acres of land in the Bayou's watershed. The EPA Basins 2.0 land use model estimates the land use as 38% agriculture, 56% forestry, 4% wetland, and 2% urban. The majority of the forest land lies west of the Gulf Coastal Plains escarpment. This escarpment is a small rise in land elevation that occurs between the Gulf Coastal Plains ecoregion and the Delta ecoregion. There is a dramatic land use change from forestry to row crop agriculture when traveling across this escarpment. Figure 2 depicts the land use in the watershed.

The forestry practices consist mainly of pine tree plantations for pulpwood production. However, there is some hardwood and natural areas such as the Cut-Off Creek Wildlife Management Area. The agricultural practices are mainly row crops of cotton, soybeans, and rice. However, there is some corn, milo, wheat, and pine trees grown. In addition to these uses, there are numerous lakes, swamps and brakes that occur throughout the watershed.

Figure 3 depicts the locations of the confined animal operations (CAO). Appendix 1 is a list of the operations, their locations, and the number of houses per operation. There are 43 CAOs, 133 total houses, in the Bayou Bartholomew watershed. Most of these operations are broiler production facilities. However, there are some laying operations located in the Ables Creek watershed. The majority of the operations are located in Lincoln County around Star City. There are no current operations located south of Lincoln County. Most of the litter from these operations is land applied on adjacent pasture land, but there is some being applied to the row crop agriculture land within the county.

Figure 2
Land Use Map of
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

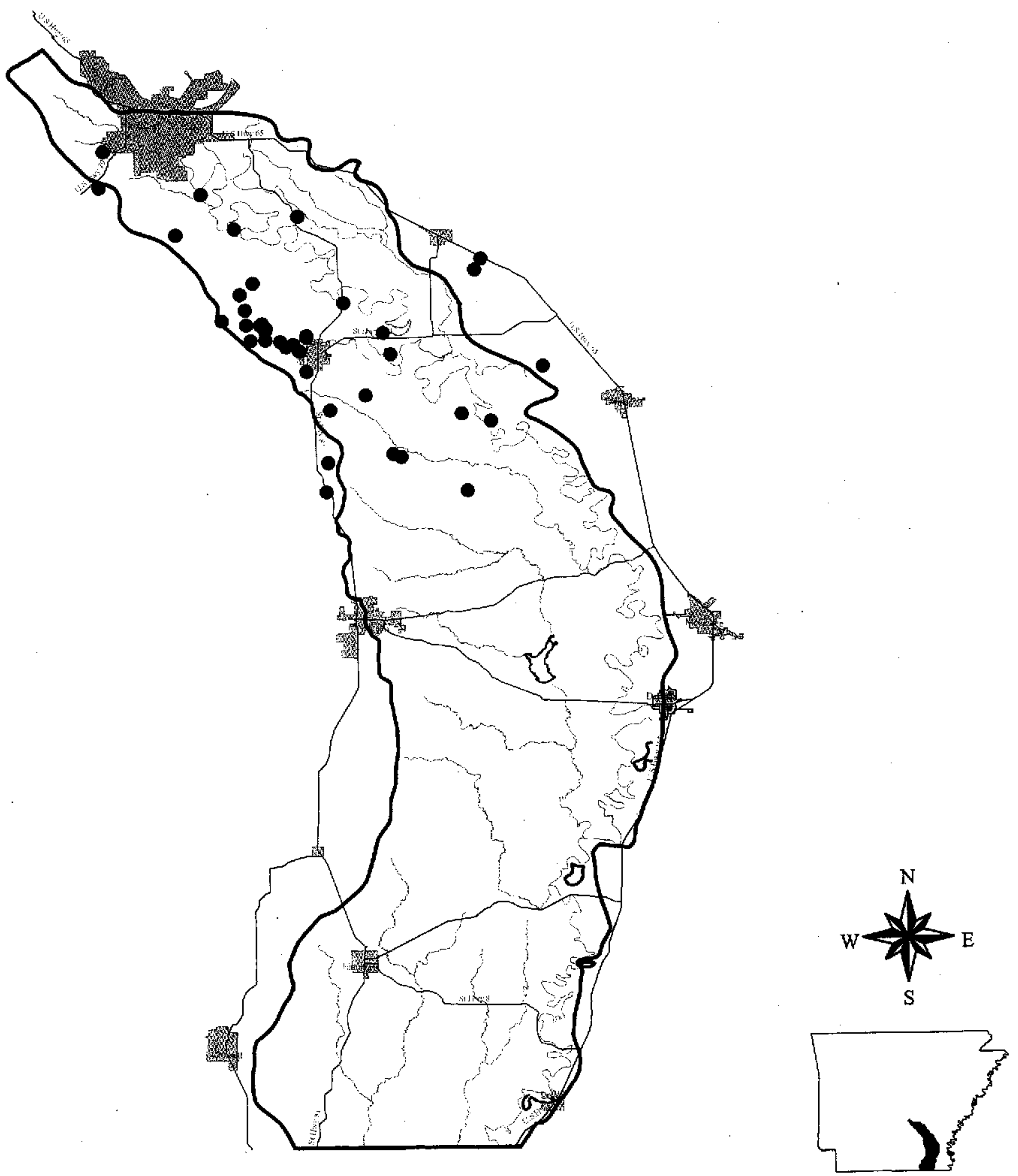


Figure 3
Confined Animal Operations Within
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

GEOLOGIC SETTING

From an altitude of about 200 feet at Pine Bluff, the Mississippi River alluvial plain slopes southward at less than a foot per mile to an altitude of approximately 100 feet at the Louisiana border (Broom and Reed, 1973). The great thickness of the alluvial deposits of the Mississippi River valley is the product of large-scale erosion and deposition during the Pleistocene and Recent epochs.

The older Pleistocene deposits are found in the upland terraces in the watershed (Figure 4), which were subsequently down cut by later periods of glacial melting that formed the present floodplain deposits of younger Pleistocene and Recent deposits (Boswell, et al., 1968). Gravel and coarse sands were deposited in the early stages of valley fill by streams of large loads and higher flows, and as the carrying load was diminished, the finer material was deposited (Krinitzsky and Wire, 1964). As such, the alluvial deposits are characterized by an upward fining of gravels and coarse sands at the bottom, and silt and clay particles in the upper section. These deposits are thickest in the valley fill sections of both the Mississippi and large feeder streams and thinner as one moves up onto the buried valley slopes.

The recent alluvial deposits generally range in thickness from about 100 - 150 feet across the watershed (Broom and Reed, 1973); however, in various places in the watershed, normally along ancient and present channel fills, they can attain larger thicknesses. A review of well logs, together with conversations with farmers in the Delta region, revealed both an average of approximately 100 feet and a propensity of wells at a 100 feet or less throughout the Delta. Rising up onto an escarpment, which creates a relief of approximately 20 - 40 feet across the watershed, one enters onto the older floodplain formed by Pleistocene deposits commonly referred to as "terrace" deposits. These deposits attain maximum thicknesses of 250 feet (Klein et al., 1950) in Jefferson County and up to 200 feet thick to the south in Ashley County (Hewitt et al., 1949). Similar to the Recent deposits, there is a coarsening downward sequence from clays and silts at the surface to sands and gravels near the base, and the terrace deposits attain their greatest thickness along channel fill and other depressions. The lower part commonly consists of a sand and gravel mixture; however, in areas of rudimentary stratification, clean gravel sections can attain thicknesses of up to approximately ten feet. Hewitt et al. (1949) describes a buried channel which presumably represents an old cutoff channel from an ancient Bayou Bartholomew into the ancient Ouachita river. The channel runs from the northeast to the southwest and is located along a line passing through an area northwest of Crossett, through Hamburg and into Mist, Arkansas in Ashley County. Wells attain a maximum depth of approximately 170 feet in the channel. Several farmers described a "fault line" in which they attain their greatest yields, and one farmer stated that a recent well advanced to the south of this area produced yields less than 1000 gpm. Upon further inspection, the "fault line" referred to by the farmers was in alignment with the buried channel. The terrace deposits are widest across the watershed in southern Drew and Ashley counties (Figure 4).

In the northwest section of the watershed are outcrops of Tertiary-aged rocks of the Jackson Formation (Figure 4). The Jackson Formation basically extends from southern Drew County into southwestern Jefferson County, with minor outcrops in Ashley County. However, the dominant outcrops are located mainly in Drew and Lincoln counties and range in width upwards to approximately 12 miles. The deposits thin from the northwest to the southeast, attaining a thickness

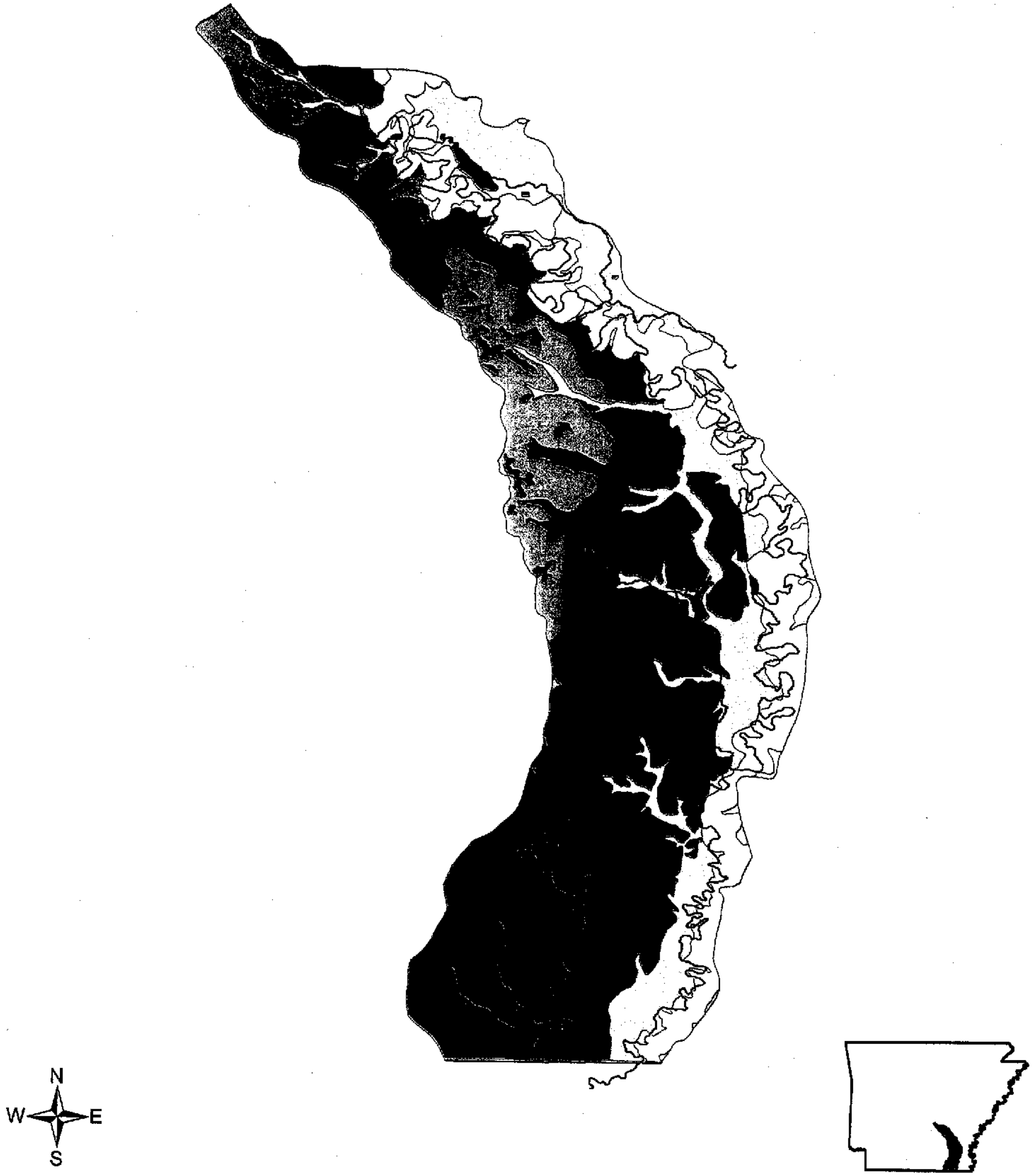


Figure 4
Geologic Map of
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

Legend

streams

CATEGORY

- Qcm -- Alluvium
- Qso -- Alluvium
- Qt -- Terrace_deposits
- Tj -- Jackson group
- Qal -- Alluvium
- Wb -- Waterbodies

of 400 - 500 feet along the Monticello ridge in Lincoln county where protected by younger Pliocene deposits (Bedinger and Reed, 1961; Broom and Reed, 1973); upwards to 250 feet in Drew County (Onellion, 1956); and upwards to 30 feet in Ashley County (Hewitt et al., 1949).

The Jackson Formation is the youngest of the Tertiary strata in the watershed. It is entirely a marine formation in the watershed and is composed of a calcareous, glauconitic yellow to green clay in the lower section and green-grey, blocky clay with some beds containing abundant hematite nodules in the upper part. Although the Jackson is dominantly clay, it does contain a few sand beds of very fine-grained, water-saturated sands, which were used primarily for domestic water supply (Onellion, 1956).

Unconformably overlying the Jackson Formation and serving as the caprock along the ridge formed by the Jackson deposits, are younger deposits presumably of Pliocene age. These deposits form a narrow, broken band along the center of the exposed Jackson Formation in Drew and Lincoln counties. The Pliocene deposits are believed to represent remnants of an extensive blanket of fluvial gravel and associated materials deposited by pre-Pleistocene streams across a late Tertiary erosional surface. They consist predominantly of cross-bedded sand, gravelly sand and silty sand containing many pockets of poorly sorted gravel (Onellion, 1956) and have average thicknesses ranging from 25 - 40 feet in the watershed (Bedinger and Reed, 1961).

POINT SOURCE DISCHARGES

There are fifteen point source dischargers in the Bayou Bartholomew watershed. Appendix 2 list these dischargers, their locations, receiving streams, discharge limits and design flows. Figure 5 depict the locations of the discharges in the watershed.

The largest of the dischargers is the City of Monticello which has a hydrologic controlled release (HCR) design flow not to exceed 3.1 cfs. An HCR system limits the discharge not to exceed a certain percentage of the background stream flow. For the City of Monticello, these percentages are 52% of the stream flow from May thru October and 78% of the stream flow November thru April. This discharge enters Godfrey Creek, a headwater tributary of Cut-Off Creek and flows approximately 40 stream miles to Bayou Bartholomew.

The Cities of McGehee and Dermott are the next largest dischargers. Both have a design flow of 0.6 mgd, or 600,000 gallons per day. Both discharge through pipes directly into the Bayou. The City of McGehee's discharge enters the Bayou approximately 1.5 miles south of the Highway 4 bridge, and the City of Dermott's discharge enters the Bayou just downstream of the Highway 35 bridge.
The City of Hamburg discharges into Chemin-A-Haut Creek east of the city. They have a HCR design flow not to exceed 36% of the background stream flow from November to April. They are not permitted to discharge from May to October. Evaporation from the three-cell lagoon system usually exceeds inflow during the summer months.

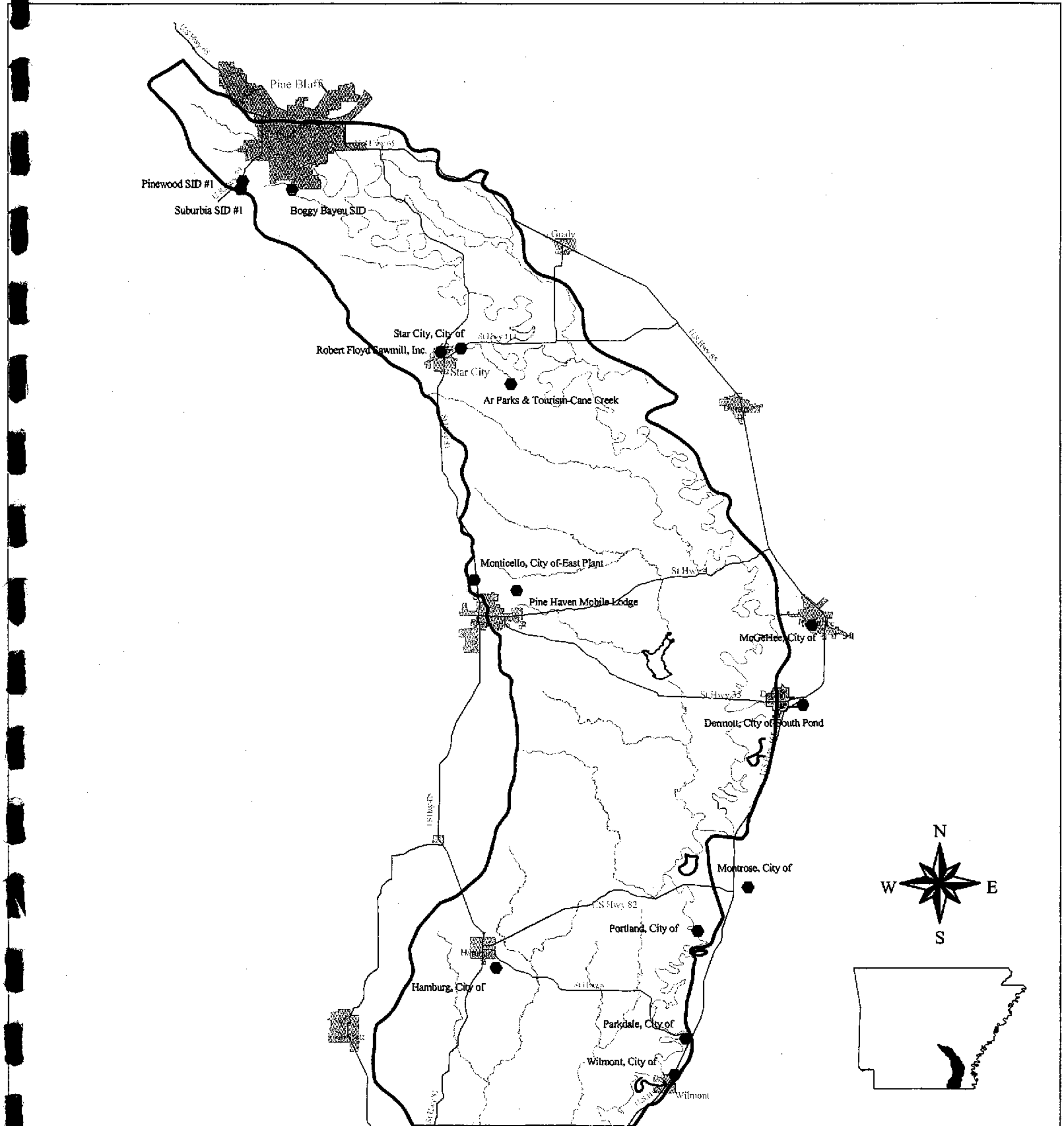


Figure 5
NPDES Permitted Facilities Within
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

Legend
- Streams
- AR Highways
- NPDES Permitted Facility

The Star City and Cane Creek Lake State Park facilities discharge directly into, or just upstream of Cane Creek Lake. The design flows of these facilities are 0.375 mgd and 0.009 mgd, respectively. The remainder of the city effluents, Wilmot, Parkdale, Portland, and Montrose, have small design flows, usually less than 0.2 mgd, and enter the Bayou by effluent ditches in the lower portion of the watershed.

All of these municipal treatment facilities, except that of Star City, are three cell lagoon systems. These systems usually lose more water through evaporation during the summer months than they gain as inflow. Thus, during the critical low-flow months of the summer and early fall, these facilities typically do not discharge any effluent. During the wetter winter and spring months, the flow in the Bayou is high enough that the minimal amount of effluent from these facilities is not noticeable.

The discharges from the sewer improvement districts (SID), Boggy Bayou, Pinewood, Suburbia, and Pine Haven Mobile Lodge, all have design flows of 0.05 mgd or less. Each of these have secondary treatment systems and discharge into tributaries of the Bayou. Because the discharges from these facilities are so small, they are probably not having any effect on the Bayou.

WATER QUALITY ASSESSMENT

SAMPLING EVENT OVERVIEWS

Thirteen water quality sampling events were completed from November 1998 through September 2000. Below is a synopsis of the weather conditions prior to each sampling event:

November 9, 1998

Average rainfall had occurred throughout the fall of 1998, but ambient air temperatures were above normal. This resulted in a low flow fall event of average flows.

January 12, 1999

This was an early winter sampling event. From December 20 until about January 8, there were several storm events and cold temperatures. Two ice storms occurred in the middle of the State, with long-duration, moderate-intensity rainfall in the southern portion of the State. The fields in southern Arkansas were flooded. Most flows were below bank full in the upper section of the Bayou, and just above bank full in the lower section.

February 1, 1999

There was above average rainfall throughout January. Severe storms January 21 produced heavy amounts of rainfall. A slow moving system January 28-30 produced about four inches of rain around Pine Bluff, six inches around Star City, and almost eight inches in the southern portions of the watershed. Most of the water had already drained from the tributaries and into the main stem of the Bayou in the upper watershed during this sampling event. The storm flow surge seemed to be in the mid-portion of the Bayou.

March 9, 1999

Since February, rainfall amounts have been below normal. There were some heavy storms in the watershed, mostly the lower sections around March 5, and one slow moving storm event went through the watershed on March 8. However, there was only about 1.5 inches of rain from these two storm events. Many fields in the watershed had already been planted or prepared for planting.

August 30, 1999

Above average temperatures and well below average rainfall had occurred since May. There was less than one inch of rainfall since the first of August. Many sites, especially the tributaries, had either no water or were only enduring pools. The flow in the Bayou was normal for this time of year because of return flow from irrigated crop land.

September 27, 1999

The first part of September had some storm events dropping one to two inches of rain, but this resulted in no significant run off. Ambient air temperatures also fell to below normal during this storm event and the following days. The flow in the tributaries was at normal low flow conditions, and the flow in the main stem of the Bayou began to drop out as irrigation decreased and harvest began.

October 25, 1999

A three-day storm event from October 7-10 came through the State dropping from two to three inches of rain. The flow in the Bayou at Garrett Bridge rose about six inches, but by the time the sample was taken, most of the flow was back to base flow and most of the tributaries were at very low flow or no flow.

January 18, 2000

Many storm events occurred during November and December, most of which had only an inch or less of rainfall and produced little to no noticeable runoff. A two-day storm event December 3-5 produced locally heavy downpours resulting in up to two inches of rain in some areas. There was not much noticeable runoff from this event either; about a six inch rise at Garrett Bridge which peaked on the seventh, and about a two inch rise near Portland which peaked on the fifth. Another rainfall event occurred on December 9, dropping one inch of rain, but resulting in only a one inch rise in the gages at Garrett Bridge and Portland.

During December 11,12,13 a large rain event occurred across the state dropping about two inches of rain throughout the watershed. This resulted in a five foot rise in the gage at Garrett Bridge, peaking on December 15 at 8.3 feet. This was an increase in flow from 50 cfs to 550 cfs. The gage at Portland did not peak until December 21.

February 29, 2000

A two-day snow event from January 28- 29 resulted in about 12 to 18 inches of snow accumulation throughout the watershed. This resulted in only a slight rise in the flow in the Bayou. A two-day storm event on February 15-16 resulted in about an inch of rainfall throughout the watershed, but there was still only a slight rise in the gages in the Bayou. A 24-hour rain event on February 28-29 resulted in about 1.25 inches of rainfall in Pine Bluff and only about an inch of rain around Wilmot. However, a substantial rise in the gages, from 2.9 to almost 7 by February 28 at Garrett Bridge, and from 12 to 13.5 at Portland on February 28
had occurred. The samples from this sampling event were collected right at peak flow at Garrett Bridge, and just before peak flow at Bayou Bartholomew at the Highway 4 bridge near McGehee. However, most of tributary stations in the lower portion of the watershed were collected after the peak flow had occurred.

March 21, 2000

Between March 16 and March 19, approximately three inches of rain fell throughout the watershed. Flows at all stations were above normal. A peak flow sample was collected from the lower Bayou stations.

April 4, 2000

Two inches of rain fell throughout the watershed on March 26. The first week of April was also very rainy. Some reports estimated over nine inches of rain had fallen in three days in the lower portion of the watershed. However, the upper portion of the watershed had only about five inches. The tributaries in the upper watershed were flowing at about one-half bank full while the main stem of the Bayou was flowing at just below bank full. The tributaries and the Bayou in the lower portion of the watershed were all flowing at or above bank full.

June 5, 2000 sample.

There were no other rain events in April. However, many storms during the month of May resulted in about six inches of accumulated rainfall, but there was little to no runoff noticed. A three-day storm event occurred June 3-5 resulting in about two inches of rain in the watershed. There was not much affect on the flows in the Bayou, however many of the main Bayou sites were observed to be at or just below bank full.

September 12, 2000

Since the first week of June, there was little to no measurable rainfall. Ambient air temperatures were much above normal reaching temperatures of 111 degrees. The flows in the main stem of the Bayou remain a little above average due to return flows from the heavy irrigating that had occurred. The tributaries were reduced to standing pools or were completely dry.

WATER CHEMISTRY DATA

Figure WQ-1 depicts the locations of the water quality sampling stations. Appendix 3 outlines all of the water quality data collected during the survey.

Basic Parameters

Base flow conditions throughout the watershed generally occurred in late summer to early fall. The smaller, headwater streams experience base flow conditions in early summer and mid winter, and tend to cease flowing in late summer and early fall. Base flows generally range from no-flow situations to flows of less than 30 cubic feet per second (cfs) at the larger main stem sites. Storm flows during the survey were measured between 4000 cfs to as high as 5880 cfs in the main stem of the Bayou, with peak flows generally less than 1000 cfs in the Bayou tributaries.

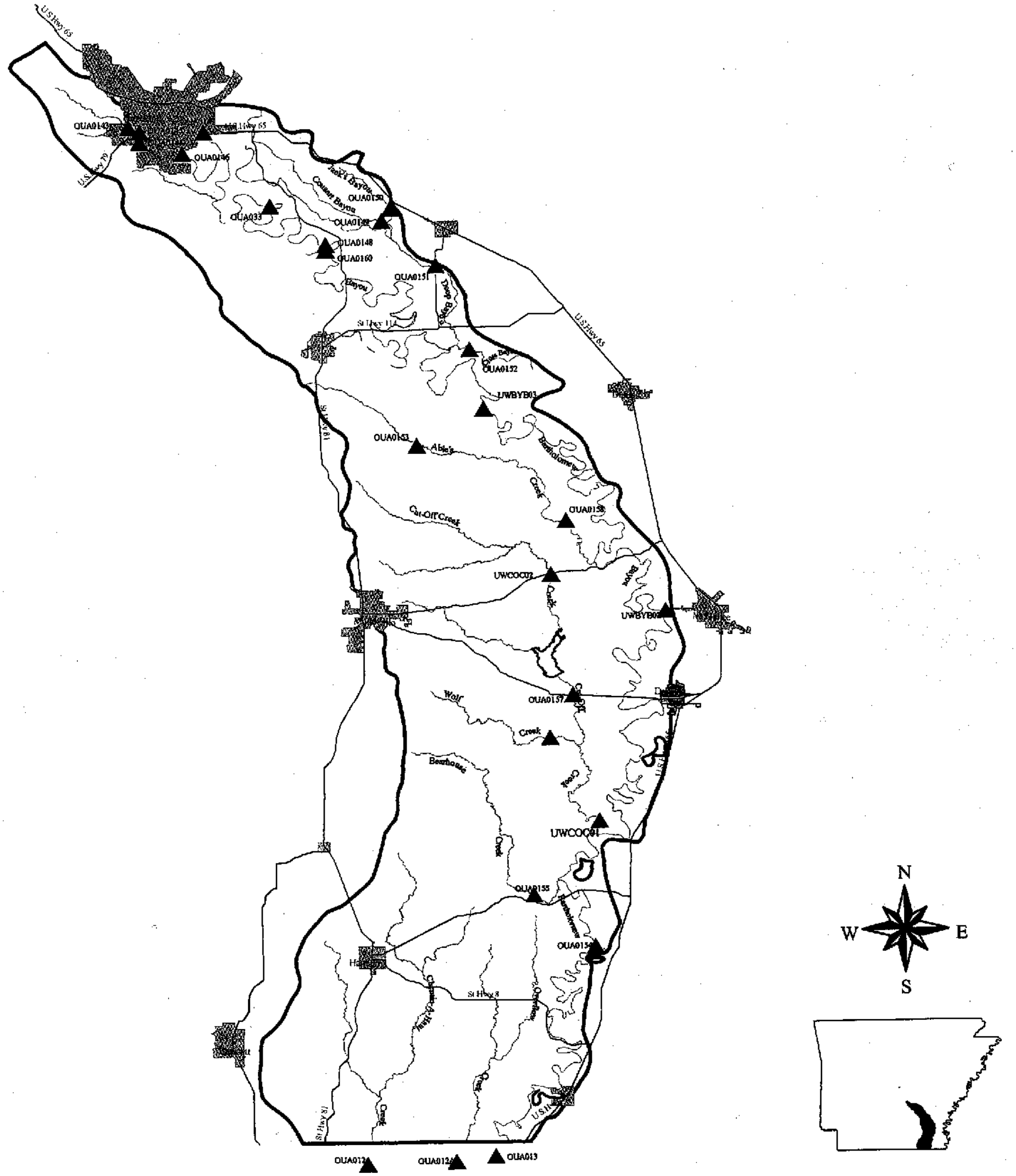


Figure WQ-1
Water Quality Sample Sites in the Bayou Bartholomew Watershed

Water Division
Arkansas Department of Environmental Quality

Legend

- Streams
- AR Highways
- ▲ Water Quality Only Sites
- ■ Water Quality & Macroinvertebrate Sites
- ● Water Quality, Fish & Macroinvertebrate Sites

Water temperatures ranged from 4.3°C in Bayou Bartholomew south of Ladd (OUA33) in January, 1999 to 28.9°C in Bayou Bartholomew west of Portland (OUA0154) in August, 1999, Figure WQ-1. Harding Creek (OUA145) had the highest average water temperature of any of the tributary sites. Bayou Bartholomew at Hwy. 4 had the highest average water temperature. The Bayou on Oakwood Road and the upper Ables Creek site had the lowest average water temperatures. The ecoregion standards for maximum in stream water temperature are 30.0°C for Delta streams and 32.0°C for Gulf Coastal Plains streams (ADEQ, 1998). None of the water temperatures measured during the survey exceeded these standards.

The pH values measured during the survey ranged from 4.89 at OUA12 during the February 1999 sampling event to 8.90 at OUA145 during the January 2000 sampling event, Figure WQ-1. There were 10 values recorded below 6.0 during the survey, seven of which occurred in the lower portion of the watershed during a substantial storm event. There were 20 readings recorded above 8.0. The majority of these occurred in the upper portion of the Bayou and its tributaries.

The Gulf Coastal Plains and Delta ecoregion standards for dissolved oxygen (DO) is 5.0 mg/L during the primary season, and ranges between 2.0 mg/L to 5.0 mg/L during the critical season depending on watershed size (Table 4 - Water Quality Standards and Criteria). Dissolved oxygen concentrations ranged from 0.16 mg/L in Main Street tributary in September, 1999 to 16.14 mg/L in Cousart Bayou in January, 1999 (Figure WQ-2). Five sample sites, OUA145, BYB03, OUA153, OUA158, OUA157 did not have a DO standard violation during the survey. Figure WQ-2 depicts the DO concentrations measured during the survey.

The uppermost Bayou site (OUA143) and Nevins Creek, OUA144, had minimal DO violations. Each of the violations occurred during either a low-flow or a no-flow situation. At the Main Street tributary site (OUA146), 62% of the samples collected had DO concentrations below the standard. These concentrations ranged from 0.16 mg/L to 5.9 mg/L. The Bayou Imbeau site (OUA147) had five DO samples (38%) below the standard. Meltons Creek, OUA160, had the highest percentage of violations at 80%. However, only five samples were collected from this site and concentrations remained above 1.75 mg/L. Cousart, Jacks, Deep, and Cross bayous, which drain the area south of Pine Bluff, each had only one DO concentrations below the standard during the survey. Three of these occurred during the same sampling event in September 2000. Neither of the Ables Creek sites had any DO concentrations below 3.0 mg/L. The upper Cut-Off Creek sites (COC02 and OUA157) had only one DO concentration below the standard. The lower site (COC01) and the Wolf Creek site, a tributary to Cut-Off Creek, had three and four concentrations below the standard. Bearhouse Creek had two readings below the standard with DO concentrations ranging between 3.7 mg/L and 8.9 mg/L. Overflow Creek (OUA12A) only had one sample below the standard, but Chemin-A-Haut Creek (OUA12) had 5 samples below the standard. The main stem Bayou sites generally had no more than two DO concentrations below the standard. Most of the violations occurred during the September 2000 sample event.

Figure WQ-2

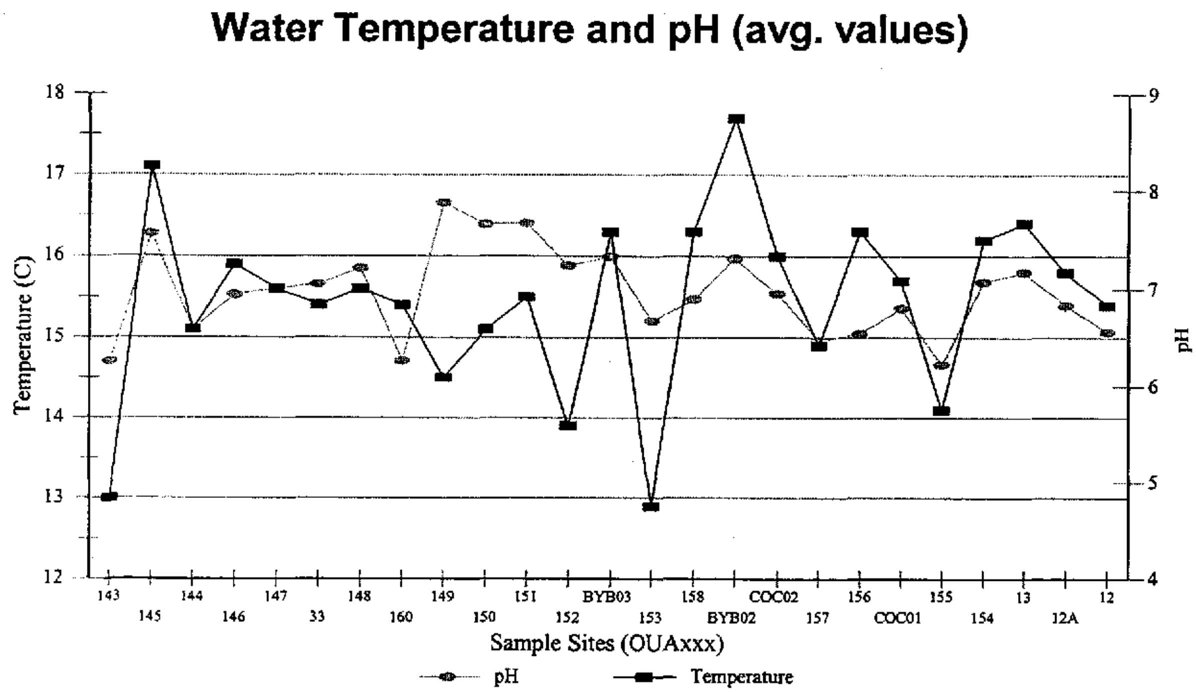
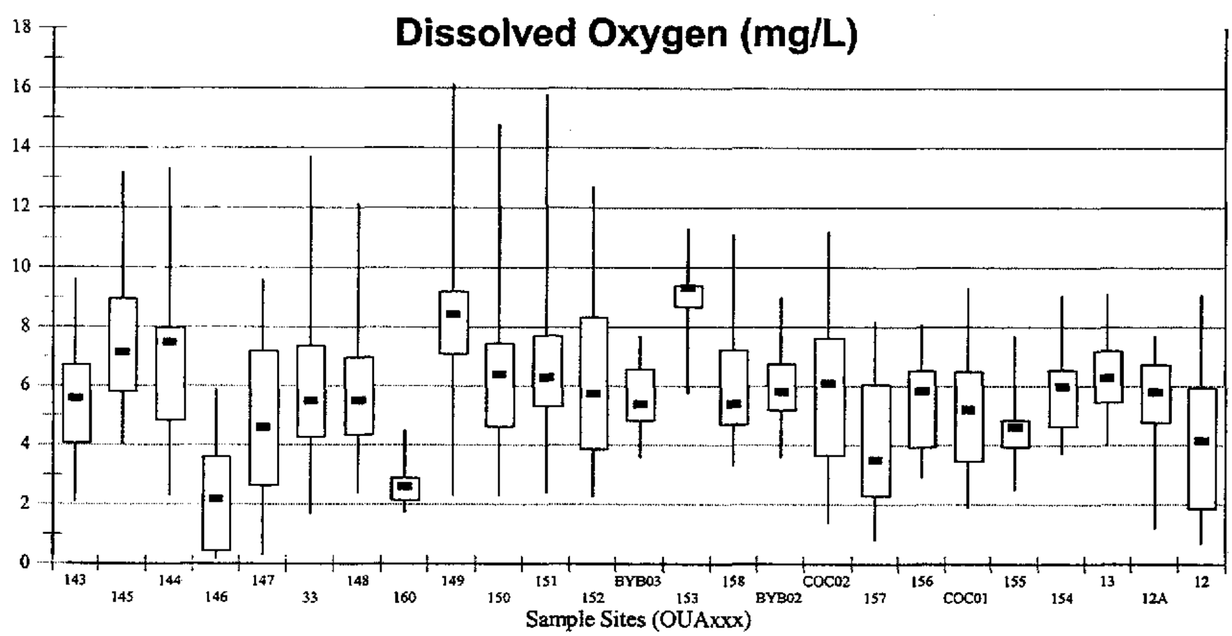


Figure WQ-3



Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

The turbidity standard for the Gulf Coastal Plains ecoregion streams is 21 NTUs at base flow conditions. The standard for Least-Altered Delta ecoregion streams is 45 NTUs at base flow and for Channel-Altered Delta ecoregion streams it is 75 NTUs. Turbidity readings ranged from 1.3 NTUs in Cousart Bayou in November 1998 to 580 NTUs in Cross Bayou in January, 1999. Of the 289 readings taken during the survey, only 24%, were above the standard. The majority of the elevated values occurred in the winter and early spring and were associated with large storm events. The tributaries in and around the Pine Bluff area (OUA143, OUA145, OUA144, OUA146, and OUA147) usually had turbidity values below 40 NTUs. Turbidity values in Meltons Creek (OUA160) never exceeded 10 NTUs. The Deep Bayou (OUA151) drainage, including its tributaries, OUA149, OUA150, and OUA152, had values ranging from 1.4 NTUs to 580 NTUs with median values ranging from 20 NTUs to 155 NTUs. Ables Creek had turbidity values ranging from 8.5 NTUs at the upper site (OUA153) to 520 NTUs and the lower site. The Cut-Off Creek drainage basin, including OUA156, OUA157, UWCOC01, and UWCOC02, had values ranging from 1.9 NTUs to 69 NTUs. Bearhouse Creek (OUA155) values ranged from 13 NTUs to 25 NTUs. At Overflow Creek (OUA12A) values ranged from 2.2 NTUs to 100 NTUs, and Chemin-A-Haut Creek values (OUA12) never exceeded 25 NTUs. The main stem Bayou sites ranged from 3.3 NTUs to 210 NTUs. Median values increase in value downstream from OUA143 to Garrett Bridge (UWBYB03), then begin to decrease through OUA13. Figure WQ-3 illustrates the maximum, minimum, median, and 25th and 75th percentile values for the turbidity readings taken during the survey.

Total suspended solids (TSS) concentrations ranged from <1.0 mg/L at several sites on several occasions, to 464 mg/L in Ables Creek (OUA0158) during the March 1999 sampling event. The tributaries in-and-around the Pine Bluff area generally had TSS values of less than 15 mg/L. During storm flows, these values rarely exceeded 30 mg/L. The Deep Bayou drainage basin had consistently high TSS values, usually over 100 mg/L, during storm flows, but generally less than 10 mg/L at low-flow. Median values ranged from 11 mg/L to 53 mg/L. The Ables Creek drainage area displayed this same pattern of TSS concentrations, but had lower median values, even though the lower Ables Creek site (OUA158) had the highest TSS concentration recorded during the survey of 464 mg/L. Most of the samples collected in the Cut-Off Creek drainage had low TSS values except during the larger storm events. The lower Cut-Off Creek site had some elevated TSS values during storm flow events, but none greater than 69 mg/L. The median values from these sites were all below 10 mg/L. The main stem Bayou sites had TSS concentrations ranging from 4.0 mg/L at OUA143 to 155 mg/L at UWBYB02. Median TSS values increase from OUA143 to UWBYB03 and then begin to decrease in value from UWBYB03 to OUA13. Figure WQ-4 depicts the maximum, minimum, median, and 25th and 75th percentile TSS concentrations recorded the survey.

Figure WQ-4

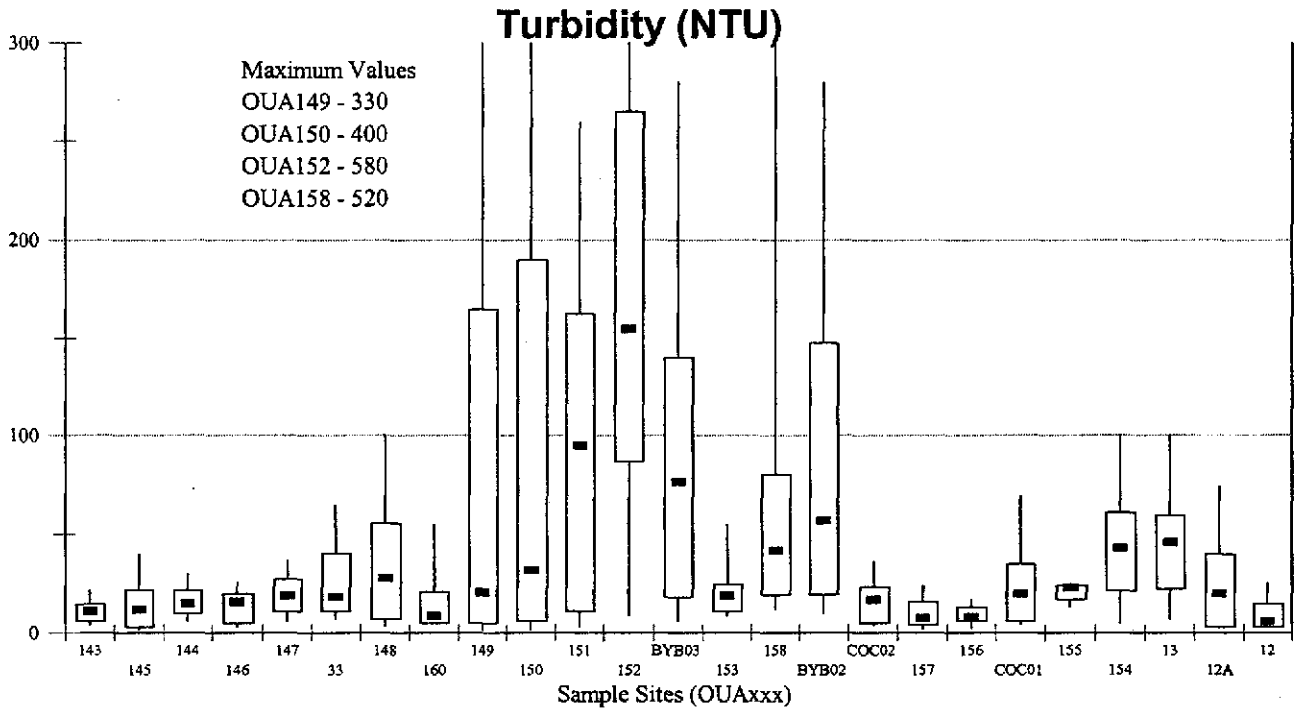
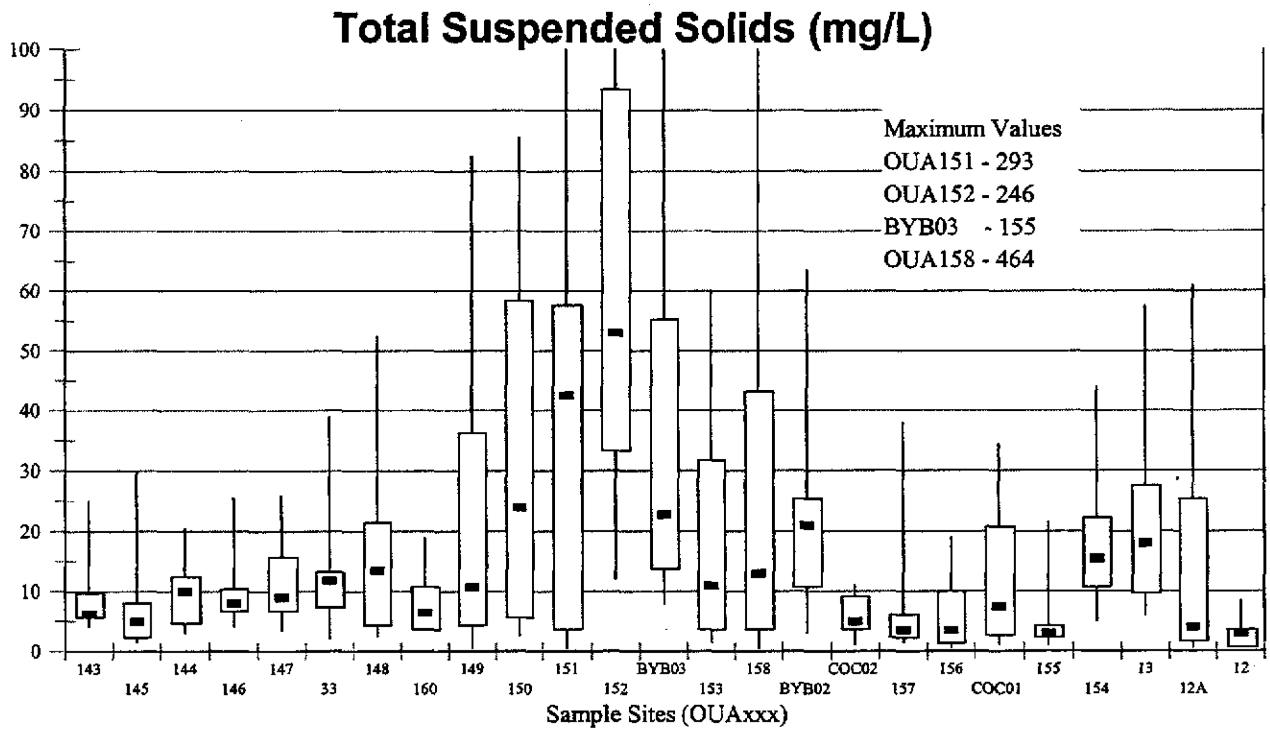


Figure WQ-5



Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

Chloride concentrations in the upstream tributaries and in the headwaters of the lower watershed tributaries were generally less than 10.0 mg/L, but ranged from 0.92 mg/L to 71.8 mg/L. Figure WQ-5 depicts the maximum, minimum, median, and 25th and 75th percentiles of the chloride concentrations collected during the survey. Chloride concentrations in the Deep Bayou drainage ranged from just over 1.0 mg/L to 121.50 mg/L. The highest concentrations occurred during the low flow months. Storm flow concentrations were generally less than 20 mg/L. Ables Creek chloride concentrations ranged from 1.0 mg/L to 30.20 mg/L. The highest concentrations occurred during low-flow. Chloride concentrations from the Cut-Off Creek watershed ranged from 0.93 mg/L to 40.18 mg/L. All of the elevated concentrations occurred during low-flow sampling events. The highest concentrations of chlorides in the main stem of the Bayou occurred at BYB03, which is downstream of the Deep Bayou watershed. These also occurred during low-flow sampling events. Concentrations throughout the main stem ranged from 1.71 mg/L to 72.5 mg/L.

Sulfate concentrations ranged from 1.02 mg/L at OUA156 to 107.68 mg/L at OUA157 during the January 2000 sampling event. Figure WQ-6 depicts the maximum, minimum, median, and 25th and 75th percentiles of the sulfate concentrations collected during the survey. The tributaries in the upper portion of the watershed generally had sulfate concentrations of less than 10.0 mg/L with median values around 5.0 mg/L. However, Nevins Creek (OUA144) had sulfate concentrations two to three time higher than the other tributaries with a median value near 13.0 mg/L. The Cousart Bayou (OUA149) and Deep Bayou (OUA151) sulfate concentrations were almost identical except for the maximum values. Jacks Bayou (OUA150) and Cross Bayou (OUA152) also had similar values, but their median values were two to three times lower than those of Cousart Bayou and Deep Bayou. The upper Ables Creek (OUA153) median sulfate value was almost twice that of the lower Ables Creek (OUA158) site value. The Cut-Off Creek drainage basin sites all had low median values and few values greater than 10 mg/L, except for the upper Cut-Off Creek site. Almost half of the values from this site were greater than 10 mg/L. Cut-Off Creek at Hwy 35 (OUA157) had the highest recorded sulfate value of 107.50 mg/L. The upper Bayou site (OUA143) had the highest median value of all of the Bayou sites. The lower Bayou site (OUA13) had the highest maximum value of all of the Bayou sites at 30.20 mg/L.

Figure WQ-7 depicts the maximum, minimum, median, and 25th and 75th percentiles of the total dissolved solids (TDS) concentrations recorded during the survey. The TDS values ranged from 47.5 mg/L at OUA146 in March, 1999 to 556 mg/L at OUA149 in November, 1998. The tributaries in and around Pine Bluff all had low TDS concentrations with median values less than 100 mg/L. The highest readings occurred during the August, 1999 low-flow sampling event at OUA146; it was 197 mg/L. The maximum value at OUA147 was175 mg/L. The Deep Bayou drainage basin had the highest TDS values and the most consistently elevated TDS values of any drainage area in the watershed. Median TDS values for this area ranged from 235 mg/L to 338 mg/L. Maximum values were all over 400 mg/L and minimum values were never less than 140 mg/L.

Figure - WQ - 6

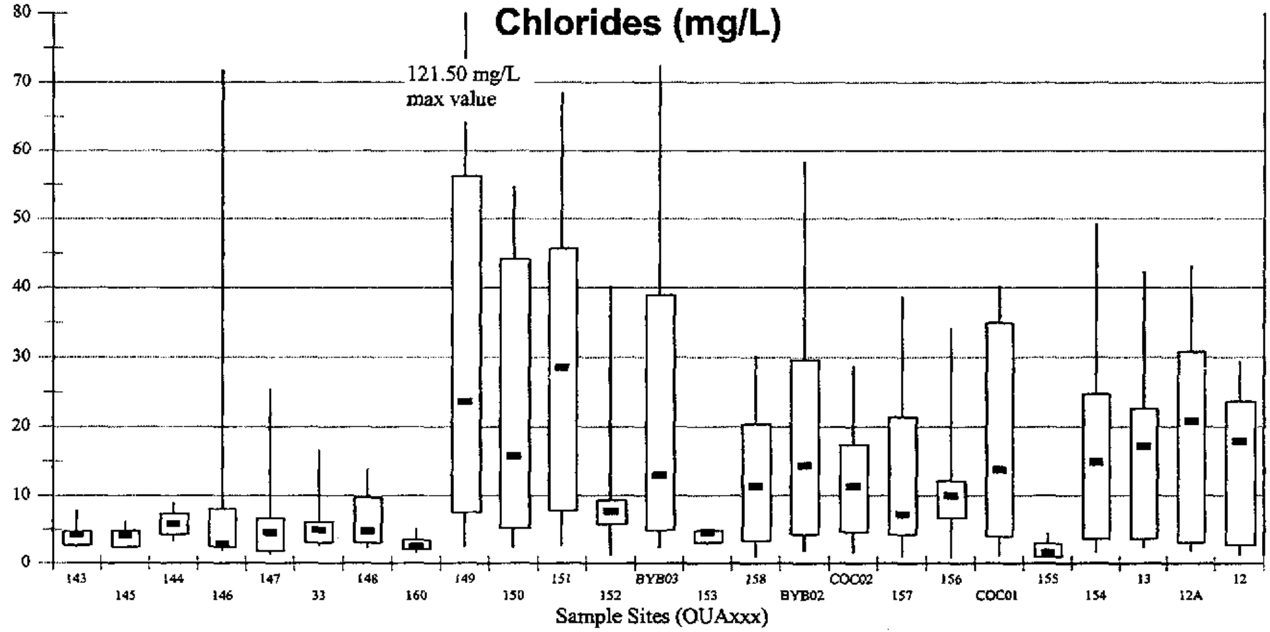
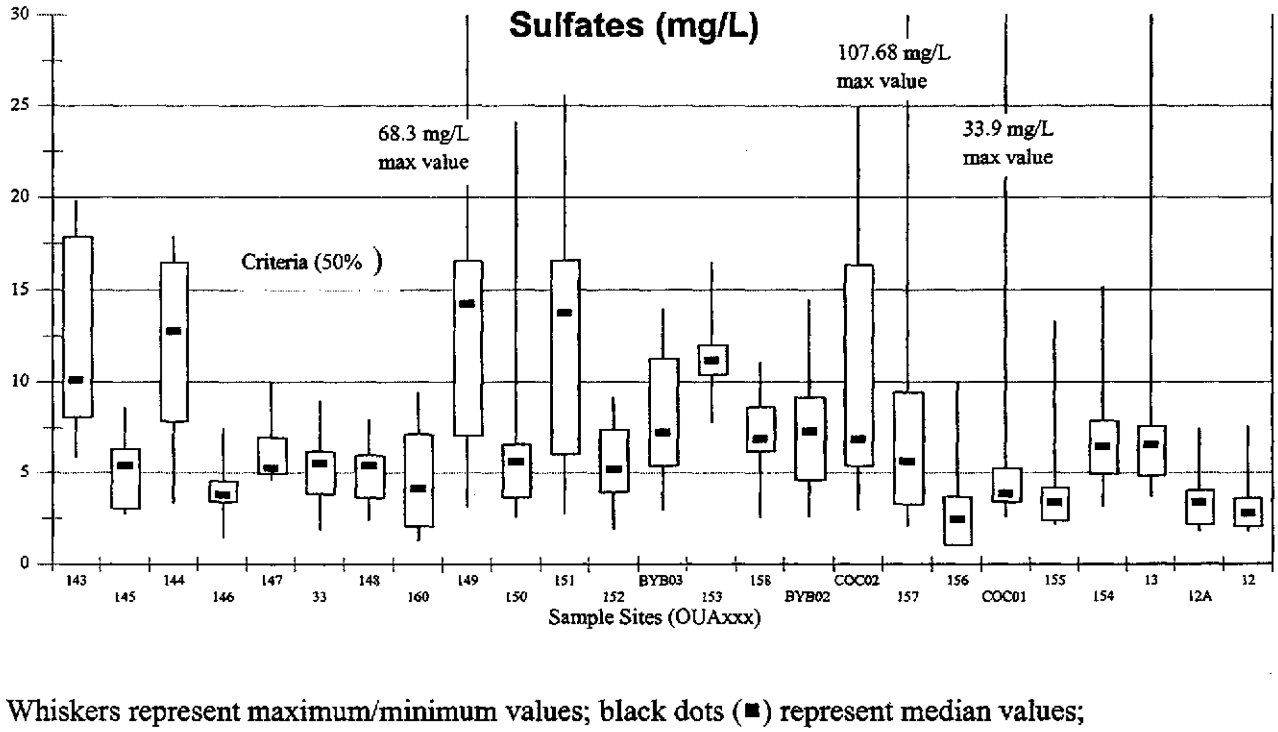
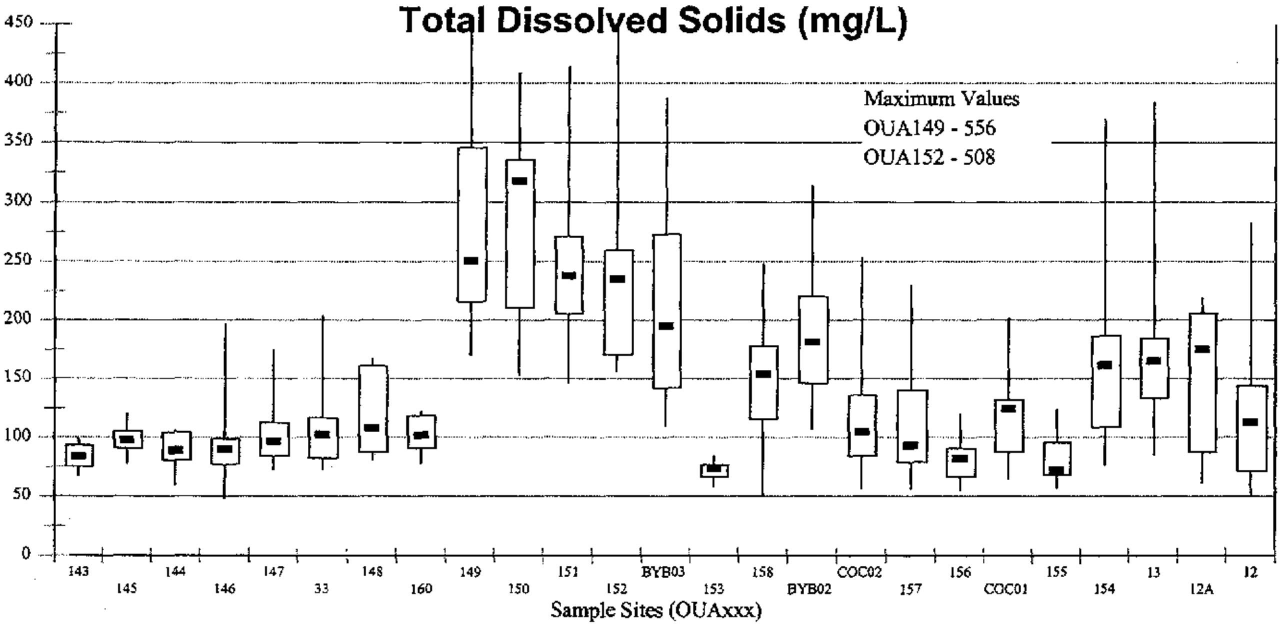


Figure WQ-7



Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

Figure WQ - 8



Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

The lower Ables Creek site (OUA158) had noticeably higher TDS values than the other tributaries to the Bayou. Cut-Off Creek drainage basin and Bearhouse Creek TDS values were similar to the values of the upper tributary sites. Median values were less than 125 mg/L and maximum values were all below 255 mg/L. The minimum concentrations at four of the five sites was between 55 mg/L and 57 m/L. The TDS values at the main stem Bayou sites displayed the same pattern as the TSS, turbidity, and chloride values in that the values increase downstream to Garret Bridge and then decrease in value toward the lower stations. The upper most site (OUA143) had a median value of 84 mg/L and a maximum value of 99 mg/L. OUA33 had a median value of 102 mg/L and a maximum value of 204 mg/L. The site a Garrett Bridge (UWBYB03) had a median value of 195 mg/L and a maximum value of 388 mg/L. From here the median values begin to decrease and OUA13 had a median value of 165 mg/L, but the maximum value was 384 mg/L.

Overall, ammonia nitrogen concentrations were typically below 0.1 mg/L. The values ranged from less than the detection limit of 0.005 mg/L to 4.17 mg/L at OUA150, February 2000. The upper tributary sites had values ranging from <0.005 mg/L to 0.735 mg/L. Almost 50% of the samples collected from these tributaries had concentrations <0.1 mg/L. The Deep Bayou drainage area had concentrations ranging from 0.005 mg/L to 4.17 mg/L. Almost 48% of the samples collected from this drainage area had concentrations <0.1 mg/L. The ammonia nitrogen concentrations in the tributaries in the lower portion of the watershed were generally less than 0.05 mg/L with some isolated higher concentrations.

The main stem Bayou generally had higher ammonia nitrogen concentrations at the Garrett Bridge site than the upstream and downstream sites. Most all of the samples collected from the main stem of the Bayou had concentrations below 0.10 mg/L.

The concentrations of nitrate + nitrite nitrogen (nitrate), total phosphorus (TPhos) and ortho-phosphorus (OPhos) all had similar patterns (Figures WQ-8, WQ-9, WQ-10). Each parameter indicates that there are slightly higher concentrations in the middle portion of the Bayou as compared to the sample sites in the upper and lower sections of the Bayou. Nitrate concentrations ranged from below the detection limit of 0.002 mg/L to 2.19 mg/L at OUA0158. Eight sites had median concentrations above 0.19 mg/L. The upper Ables Creek site (OUA0153) had the highest median value of 0.35 mg/L. Total phosphorus concentrations ranged from below the detection limit to a maximum of 2.05 mg/L which occurred at COC02. In the main stem of the Bayou, TPhos concentrations were highest at Garrett Bridge. There were four sites with TPhos concentrations above 1.0 mg/L. Cross Bayou (OUA0152) had the highest OPhos median value of 0.35 mg/L. Ortho-phosphorus concentrations mirrored TPhos concentrations in that the highest maximum concentration occurred at COC02, and the highest main stem value occurred at Garrett Bridge. Jacks Bayou (OUA0150) had the highest median value of 0.19 mg/L.

Fecal Coliform Bacteria

Fecal coliform bacteria samples were collected during each of the thirteen sampling events. In addition, samples were collected between April 1 and September 30 in 1999 and 2000 in order to achieve eight samples during the primary contact recreation season. Fecal coliform concentrations ranged from less than 4 colonies per 100 ml (<4/100ml) of sample to greater than 2000 col/100ml. The water quality standard for fecal coliform content to protect primary contact recreation is: "Between April 1 and September 30, the fecal coliform content ...nor shall more than 10 percent of the total samples during any 30-day period exceed 400/100ml." During the remainder of the year, "at no time shall the fecal coliform content exceed the level necessary to support secondary contact recreation." For secondary contact waters: "The fecal coliform content...nor equal or exceed 2000/100ml in more than ten percent of the samples taken during any 30-day period." ADPC&E, 1998.

Approximately 26% of the 351 samples collected during the primary contact season exceeded the standard. Figure WQ-12 depicts the percentage of samples with fecal coliform concentrations above 400 col/100 ml during the primary contact recreation season from each of the stations.

Figure - WQ - 9

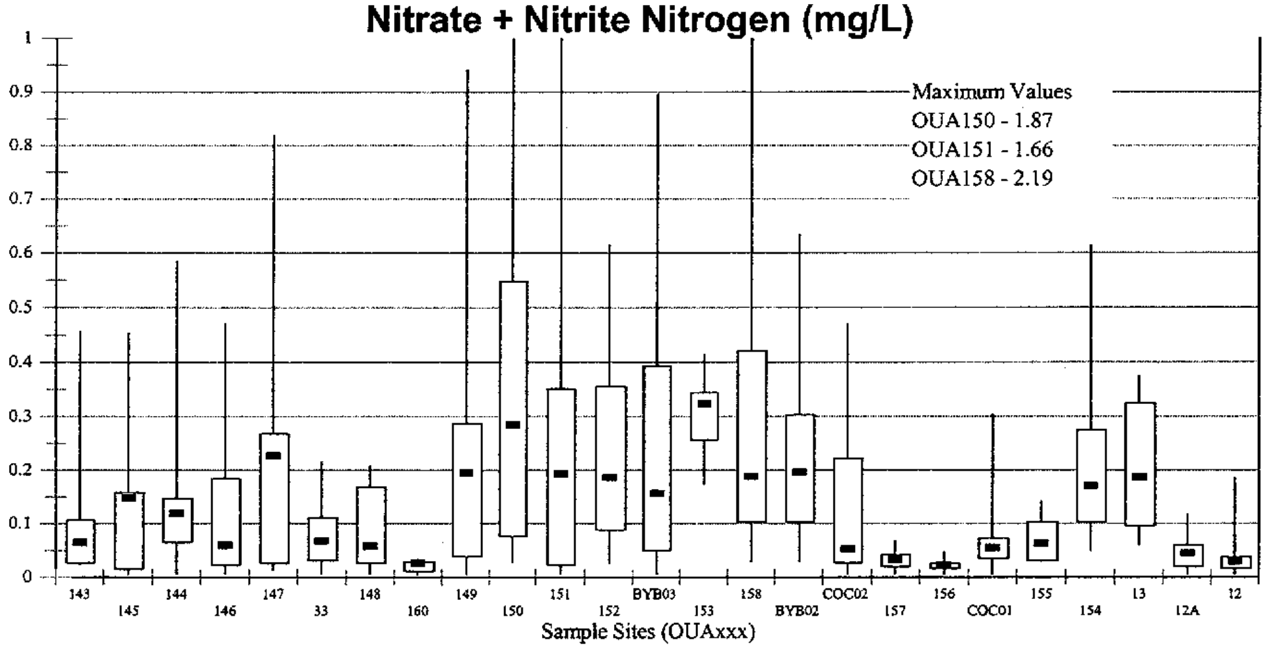
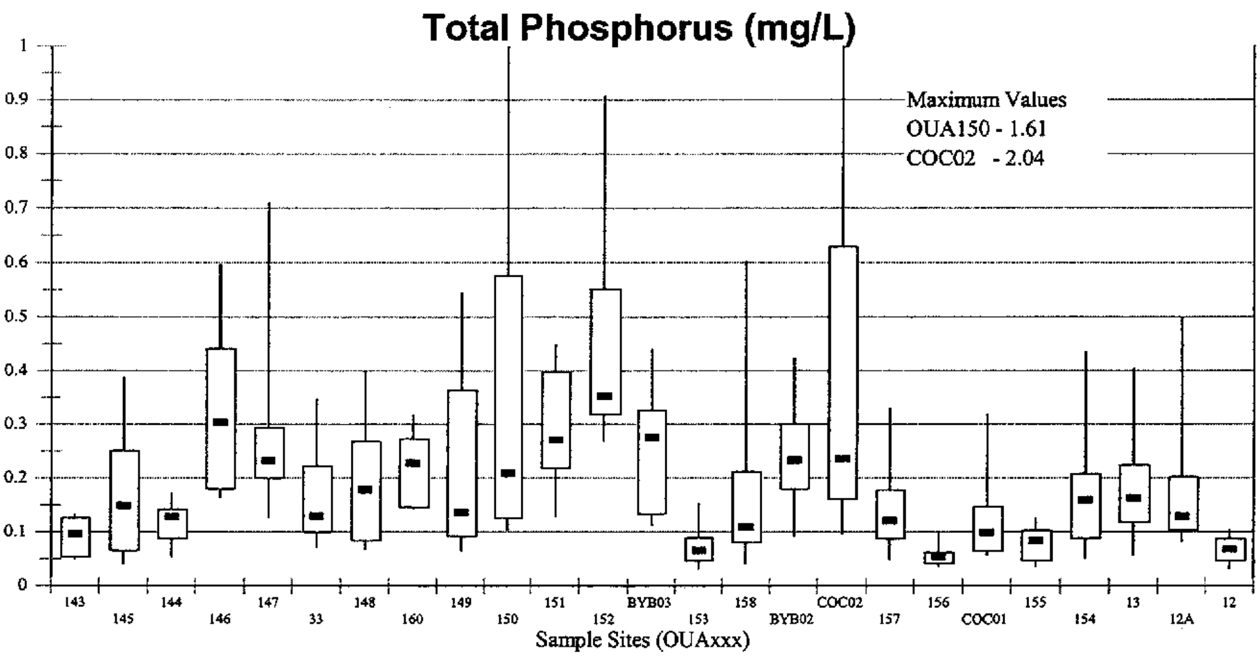
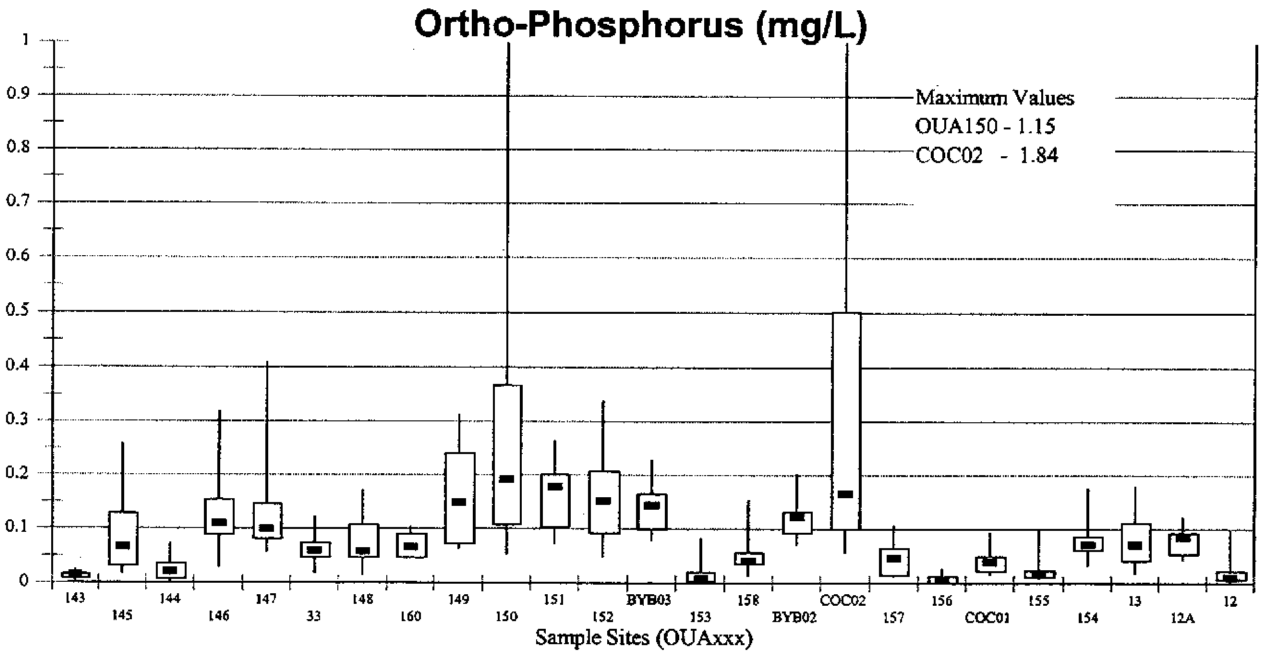


Figure WQ - 10



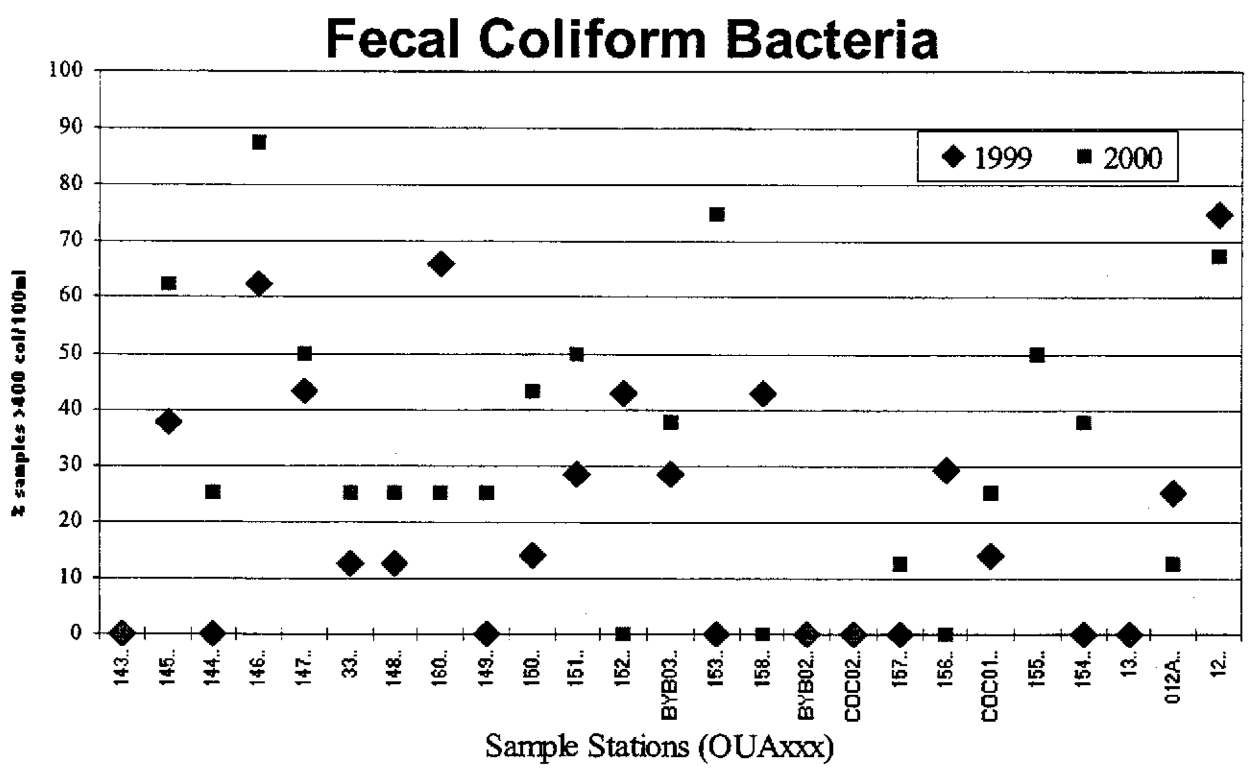
Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

Figure - WQ-11



Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

Figure WQ-12



The three tributaries draining Pine Bluff including Harding Creek (OUA0145), unnamed tributary at Main Street (OUA0146), and Bayou Imbeau (OUA0147), had the highest percentage of samples above the standard. However, OUA145 and OUA146 have watersheds of less ten square miles, thus this standard does not apply. Melton's Creek, Chemin-A-Haut Creek, and Cross Bayou also displayed a high percentage of samples above the standard. These small tributaries usually only flow during the early spring or after storm events. They are either reduced to stagnant pools or dry up completely during the summer months. This is also true of Bearhouse Creek, upper Ables Creek, Bayou Bartholomew at Oakwood Road (OUA0143), Nevins Creek, and Cut-Off Creek at Hwy 35 (OUA0157). Thus, primary contact recreation during the swimming season is very unlikely to occur in these tributaries.

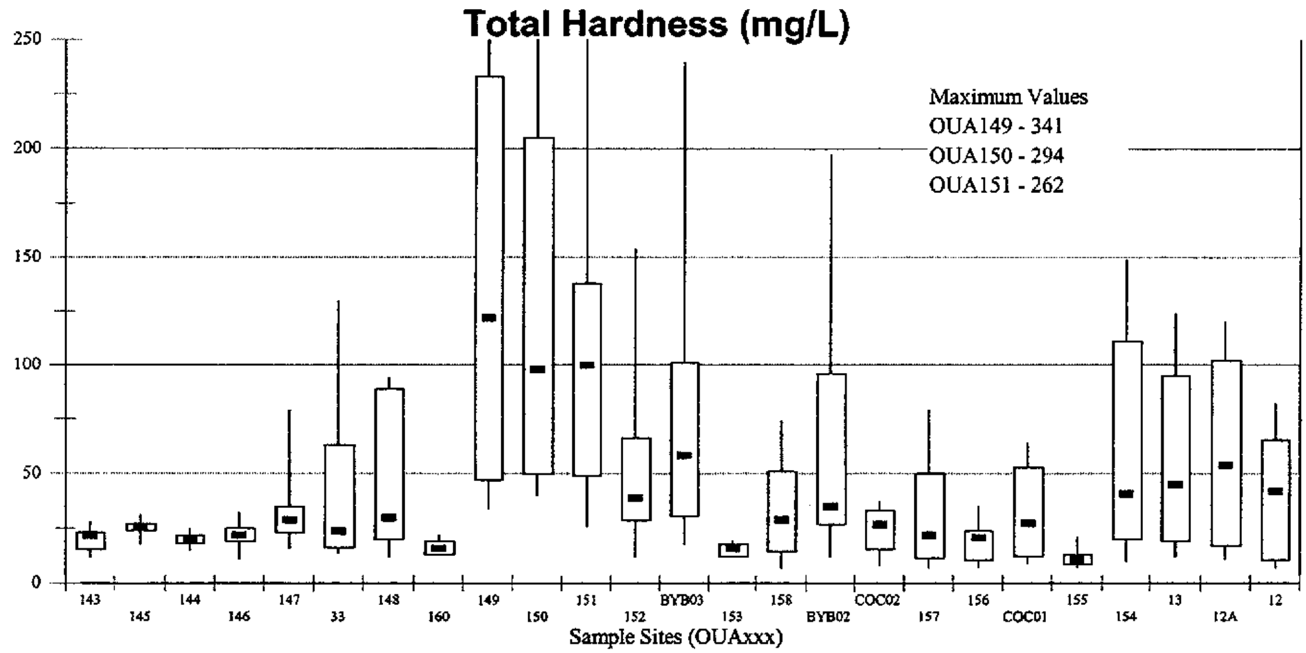
About 25% of the fecal coliform samples collected at most of the main stem Bayou sites and the larger tributary sites were above the standard. The majority of these concentrations coincided with large storm events and high flow conditions. Generally, turbidity concentrations were elevated during these events suggesting a nonpoint source origin to the bacteria, and not a man-induced origin. In addition, it is not conclusive that the bacteria detected during these events were from warm blooded animals or from common soil bacteria.

Total Hardness and Metals

Total hardness values ranged from 7.0 mg/L at numerous sites in February, 1999 to 341 mg/L at OUA0149 in November 1998. The hardness values of the tributaries reflect the ecoregion in which they are located. Those tributaries draining the Pine Bluff area have low hardness values. Maximum values rarely exceeded 30 mg/L, which is similar to the Gulf Coastal Plains ecoregion values. These tributaries also display the normal seasonal variation of higher values in the summer and fall, lower in the winter and spring. The tributaries of the Deep Bayou watershed had hardness values similar to the Delta ecoregion with the similar seasonal variations as above. However, the maximum values are about two times greater than the Delta ecoregion reference streams and the median values were all near 100 mg/L. Ables Creek and Cut-Off Creek hardness values are most similar to Gulf Coastal Plains ecoregion streams. Maximum values rarely exceeded 75 mg/L and median values were near 25 mg/L. Seasonal variation was also noticeable and typical of Gulf Coastal streams. The hardness values of the main stem Bayou sites displayed the same pattern as the previous water quality parameters. The highest values were recorded from the Garrett Bridge site, with lower values occurring both upstream and downstream. The upper two Bayou sites (OUA33 and OUA148) had median values similar to Gulf Coastal Plains stream but had maximum values more similar to Delta ecoregion streams. The middle Bayou sites (UWBYB03 and UWBYB02) had lower median values than the Deep Bayou sites, but had maximum values near or above 200 mg/L. The two lower sites (OUA154 and OUA13) had median values just below 50 mg/L with maximum values below 150 mg/L.

The dissolved metals which had only sporadic detections and usually in very low concentrations included beryllium, cadmium, nickel, and selenium. These metals, except for nickel, generally had less than 10 detections and were generally in concentrations of less than 1.0 ug/L. Those metals frequently detected but usually in low concentrations were chromium, cobalt, copper, lead and vanadium.

Figure WQ-13



Whiskers represent maximum/minimum values; black dots (■) represent median values; boxes represent the 25th Percentile and 75th Percentile.

These metals were detected in about half of the samples collected, but were generally in concentrations less than 3.0 ug/L. The highest metals concentrations detected were aluminum, 1838 ug/L at OUA158, January 2000, and iron, 2305 ug/L at OUA146, September 1999. Neither of these concentrations were at toxic levels. Iron was the most widely detected metal, occurring in over 92% of the samples collected. Greater than 85% of the samples collected had detectable levels of zinc, 71% had detectable levels of aluminum, and 61% of the samples had detectable levels of vanadium.

The metals can be divided into four groups based on level of detection, watershed occurrence, tributary versus main stem, ecoregion distribution, and basin wide detections. Metals associated with forested watersheds primarily the Gulf Coastal Plains ecoregion, were beryllium, cobalt, copper, lead and zinc. The highest concentrations of copper, lead, and zinc occurred in the tributaries around Pine Bluff. Metals most commonly detected in, or with the highest concentration in those tributaries associated with the Delta ecoregion were aluminum, barium, calcium, sodium, and vanadium. Metals found frequently throughout the watershed included boron, iron, magnesium and manganese. A list of the metals and the concentrations detected is found in Appendix 3.

72-Hour Dissolved Oxygen Profiles

Dissolved oxygen was recorded for 72 hours during June, July, August and September at the following sites: OUA143, OUA145, OUA146, OUA147, OUA149, OUA150, OUA151, OUA160, OUA33, OUA148, UWBYB03, OUA158, OUA157, UWCOC01, UWCOC02, UWBYB02, OUA154, and OUA13. Figures WQ-13 thru WQ-29 depict the data collected.

The dissolved oxygen (DO) profile from Harding Creek (OUA145), Figure WQ-13, suggest that there is elevated algae production in the stream. This is evident by the 3.0 mg/L to 7.0 mg/L diel change in the DO concentration. In addition, the DO was supersaturated to as high as 170% at peak concentration. These characteristics are probably occurring because the water clarity at this site was usually the depth of the water column, there is no stream canopy at this site, the water pools up behind in-stream flow regulating structures, and there was usually an abundance of nutrients present at this site from urban run-off.

The DO profile in the unnamed tributary at Main Street (OUA146), Figure WQ-14, suggest that there is a depressed DO concentration persistent in the summer months with only some recovery during the higher flow months of spring. The bottom substrate at this site is comprised of a thick mat of small woody debris and leaf litter. The creek is a channelized ditch which only flows during the wetter months of the year and after storm events but maintains a pool of water three feet deep throughout the summer and fall. There was never a "flushing flow" observed at this site during this survey. Thus, the woody debris and leaf litter continually decomposes, releasing tannins and staining the water which limits light penetration. The dense canopy at this site also limits light penetration. This limits DO production while the decomposition increases DO consumption, thus reducing the DO to anoxic levels.

Bayou Imbeau's (OUA147) DO profile, Figure WQ-15, suggest that there is excessive in stream algae production. The overnight anoxic conditions and the sharp rise in DO concentration just after sunrise supports this assumption. This stream is a channelized ditch draining the City of Pine Bluff. It only flows during the wetter months and/or after storm events. There is a thick canopy cover over most of the creek, except at the sample site where all of the canopy has been cleared for the highway right-of-way. In addition, this creek receives "flushing flows," as was observed during the larger storm events of late fall and early winter. Thus, there is not year-around decomposition occurring in the stream which probably allows the DO concentrations to remain above anoxic conditions during the cooler months of the year. The anoxic conditions in this creek probably only occur during the summer months during the peak algae production period and is caused by the uptake of DO by the algae and other macrophytes and not by the decomposition of large amounts of woody debris and leaf litter.

The DO profiles of Jack's Bayou (OUA150) and Cousart Bayou (OUA149), Figure WQ-16 and Figure WQ-17, are very similar. Both indicate that there is excessive algae production, as is evident by the DO becoming super-saturated each day. Saturation values over 200% occurred at OUA149 and diel fluctuations of 6.0 mg/L to 12.0 mg/L also occurred. Both sites show that there was cloud cover limiting DO production on the last sampling day. Both sites have excellent water clarity and sparce canopy cover enhancing light penetration. The instream flow of these systems is almost entirely tail-water runoff from row-crop agriculture.

Figures WQ-14

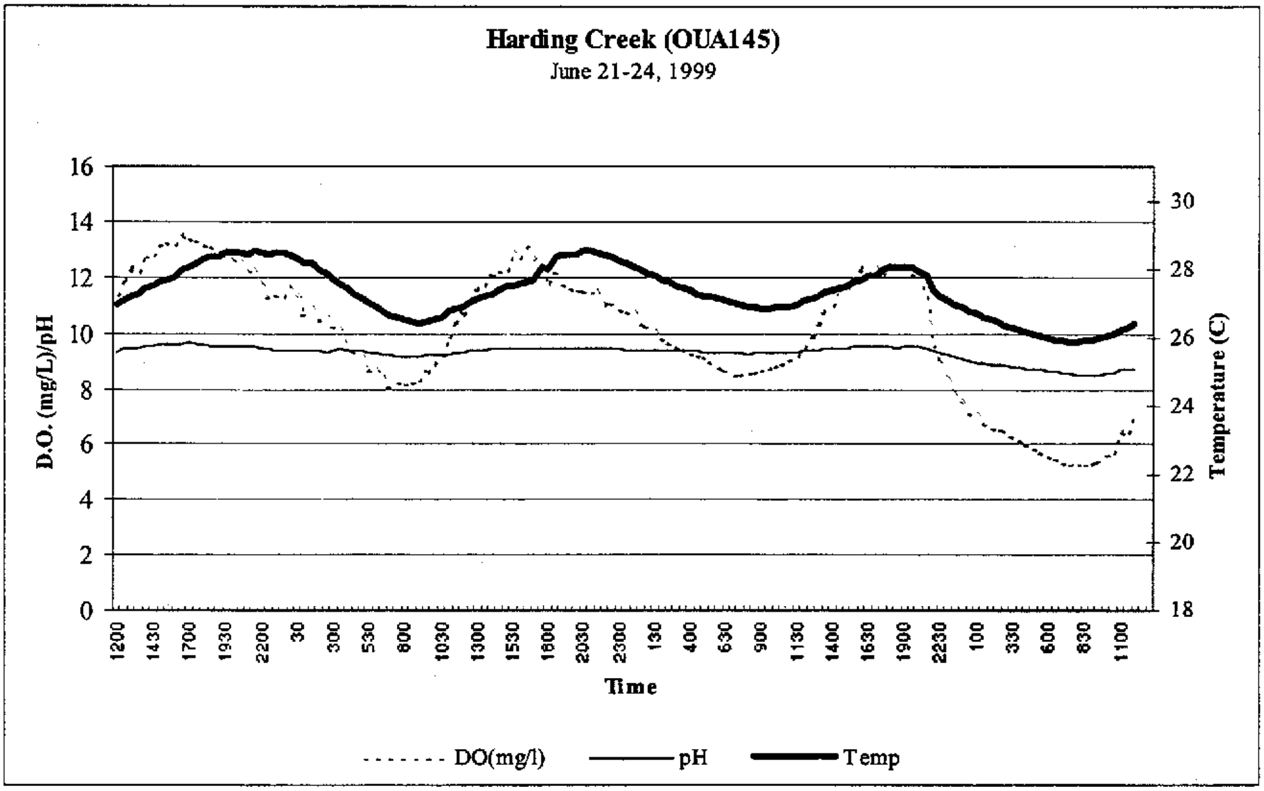


Figure WQ-15

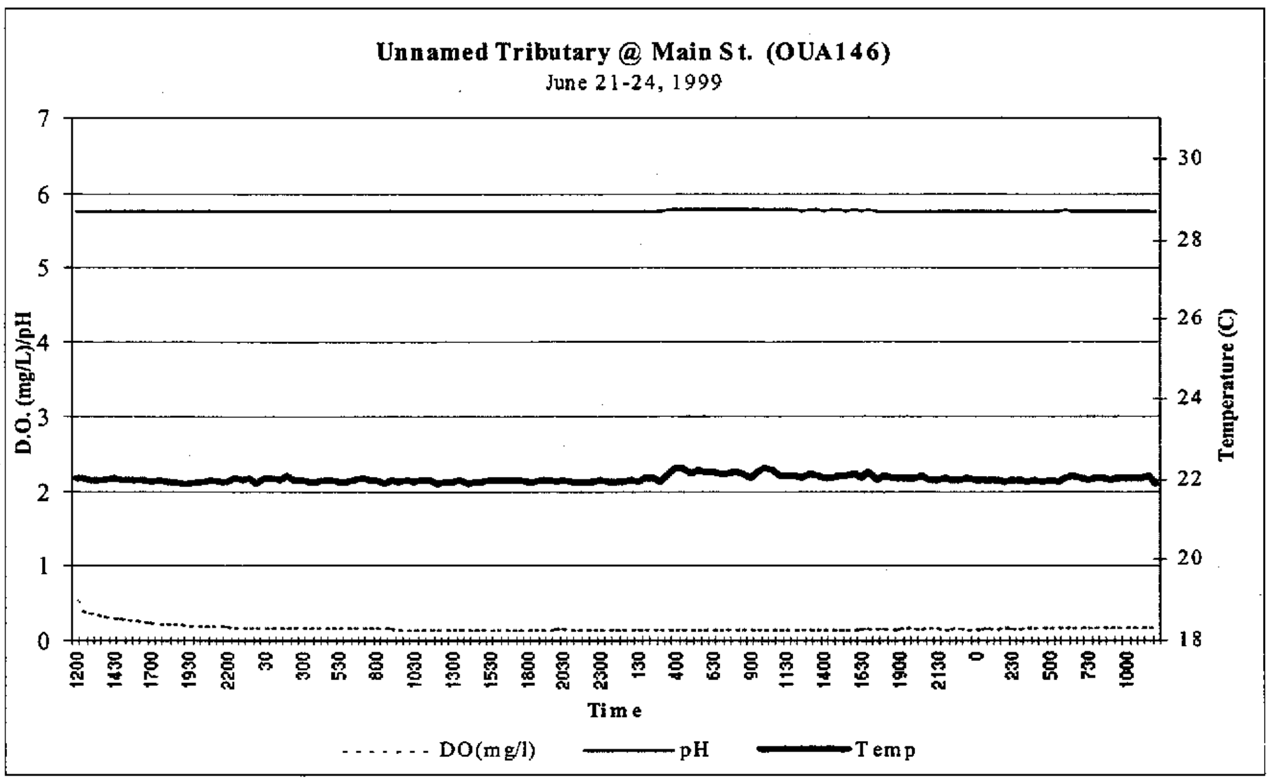


Figure WQ-16

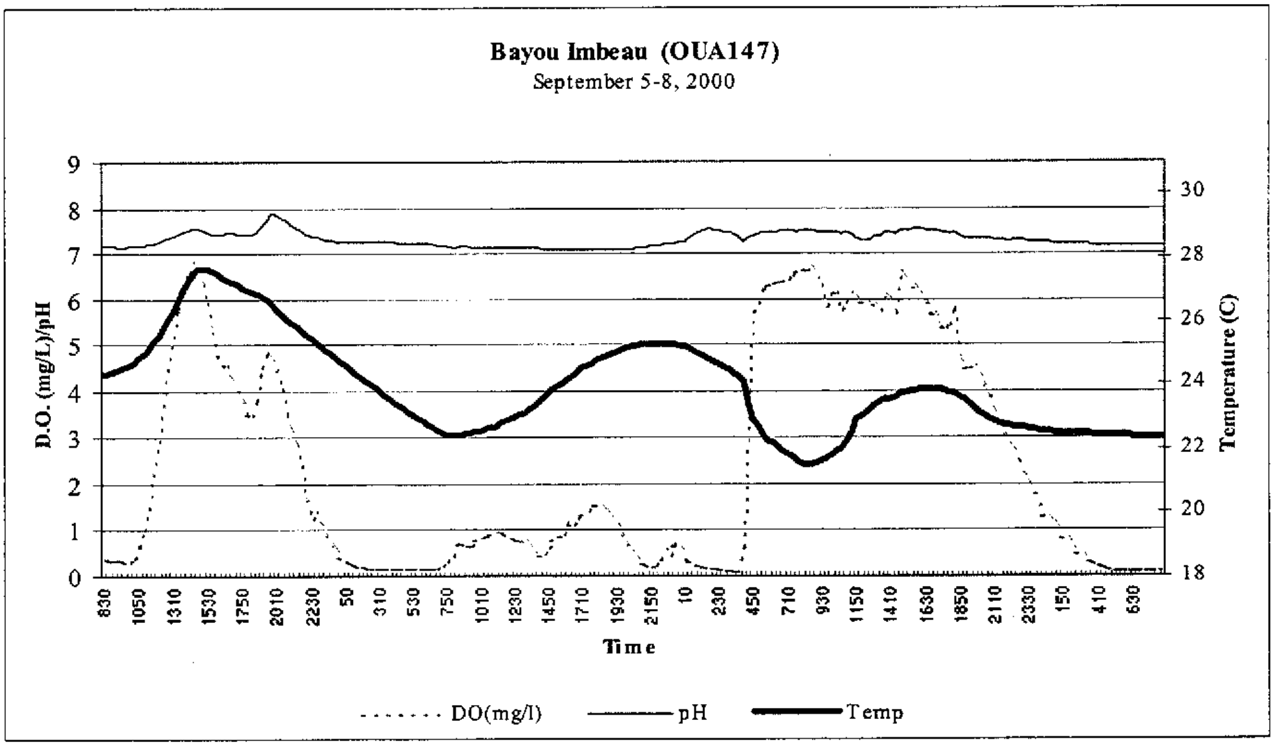


Figure WQ-17

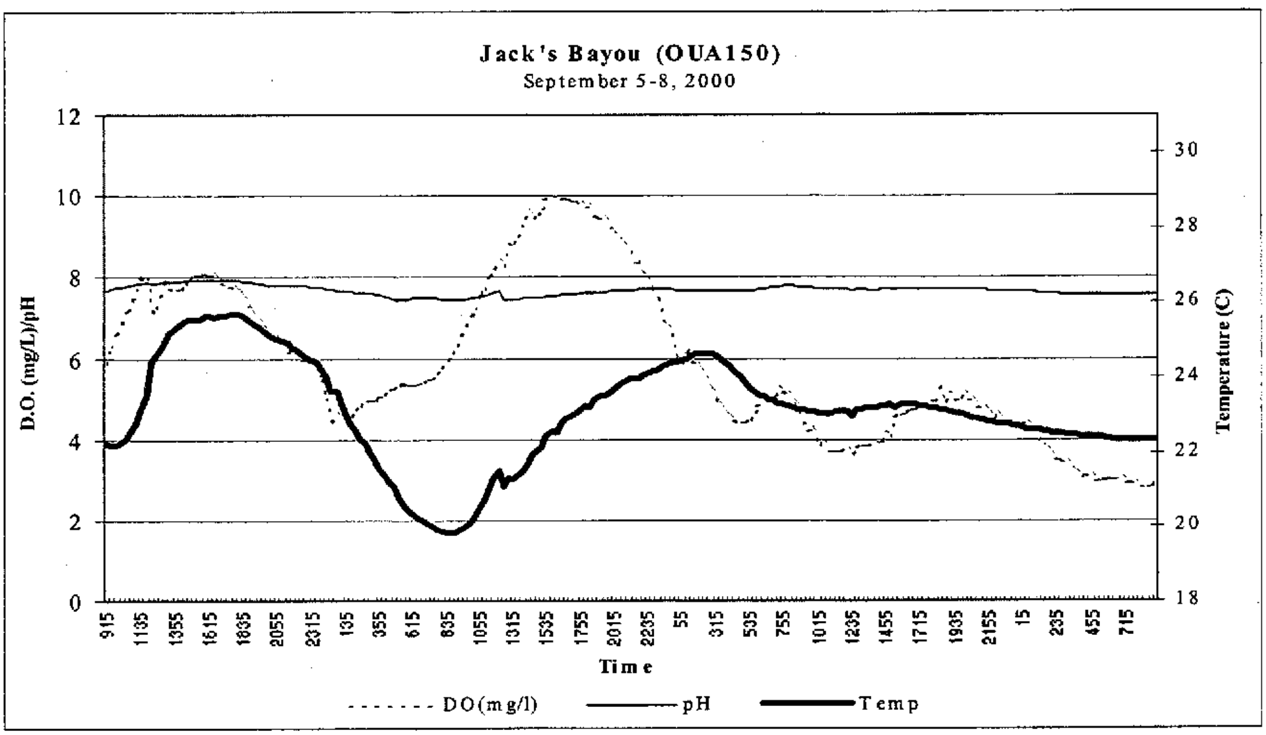
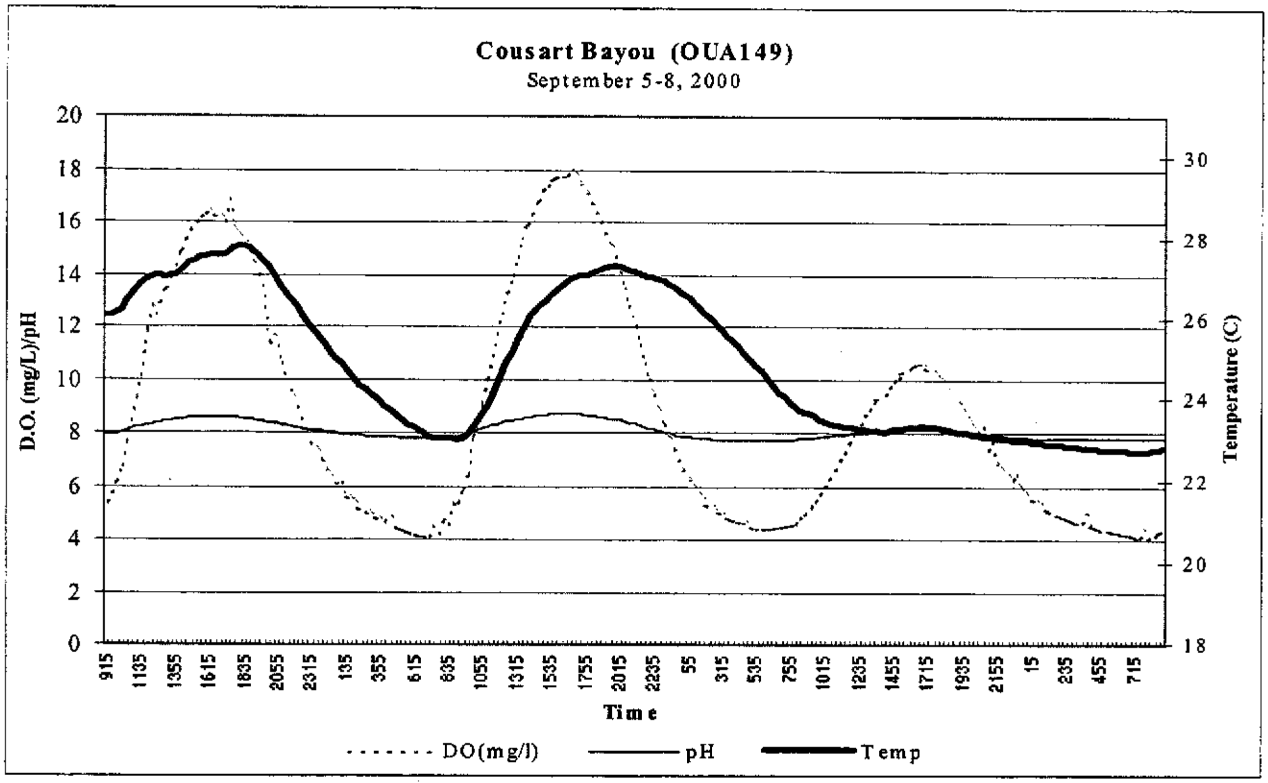


Figure WQ-18



In addition, both sites consisted of large pools located behind in stream flow regulating structures. Differences between these sites are Jack's Bayou is smaller than Cousart Bayou, has a smaller channel, a more dense canopy cover, and is influenced more by irrigation inflow. This is evident by the differences in the water temperatures between the two sites. However, both sites seem to be maintaining DO concentrations at or slightly above the channeled-altered Delta ecoregion DO standard of 3.0 mg/L.

The DO profile of Deep Bayou (OUA151), Figure WQ-18, indicates that the DO concentration remains fairly constant diurnally. This profile also demonstrates the presence of cloud cover on the final day of deployment as seen by the reduced water temperatures and lower maximum DO. Also, the DO concentration at this site only fluctuated about 2.0 mg/L daily indicating that there is little algae production occurring. This site had a continuous flow, excellent canopy cover, little to no woody debris or leaf litter, and maintained the 5.0 mg/L DO standard for channel-altered Delta ecoregion streams.

All the DO profiles collected from September 30 to October 2, 2000 show a very similar pattern of little diurnal DO fluctuation, a three day downward trend in the DO concentration, but a normal fluctuation in the water temperature. This is evident in the DO profile of Able's Creek (OUA158), Figure WQ-19. Initial DO concentrations were around 5.5 mg/L and were last recorded at about 3.5 mg/L with less than a 1.0 mg/L daily fluctuation. The instream water temperature fluctuated almost 3 °C each day with an average instream temperature of 18.5 °C.

Figure WQ-19

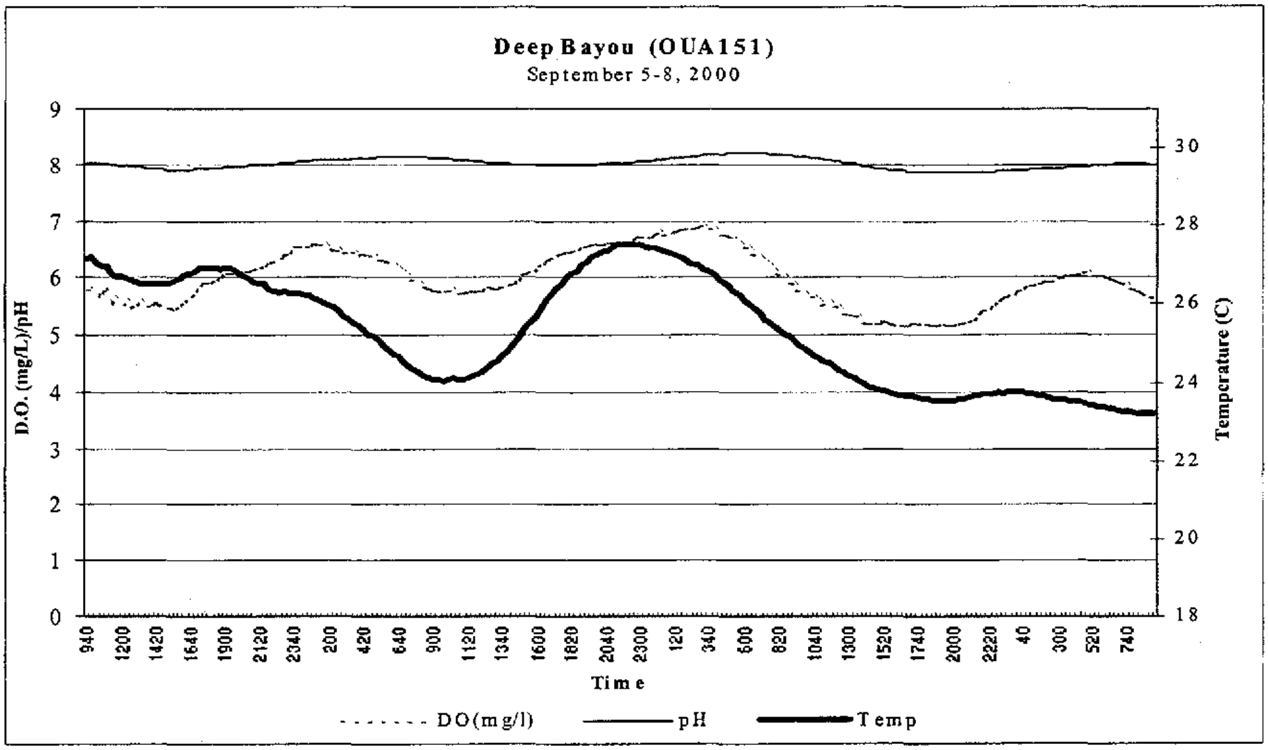
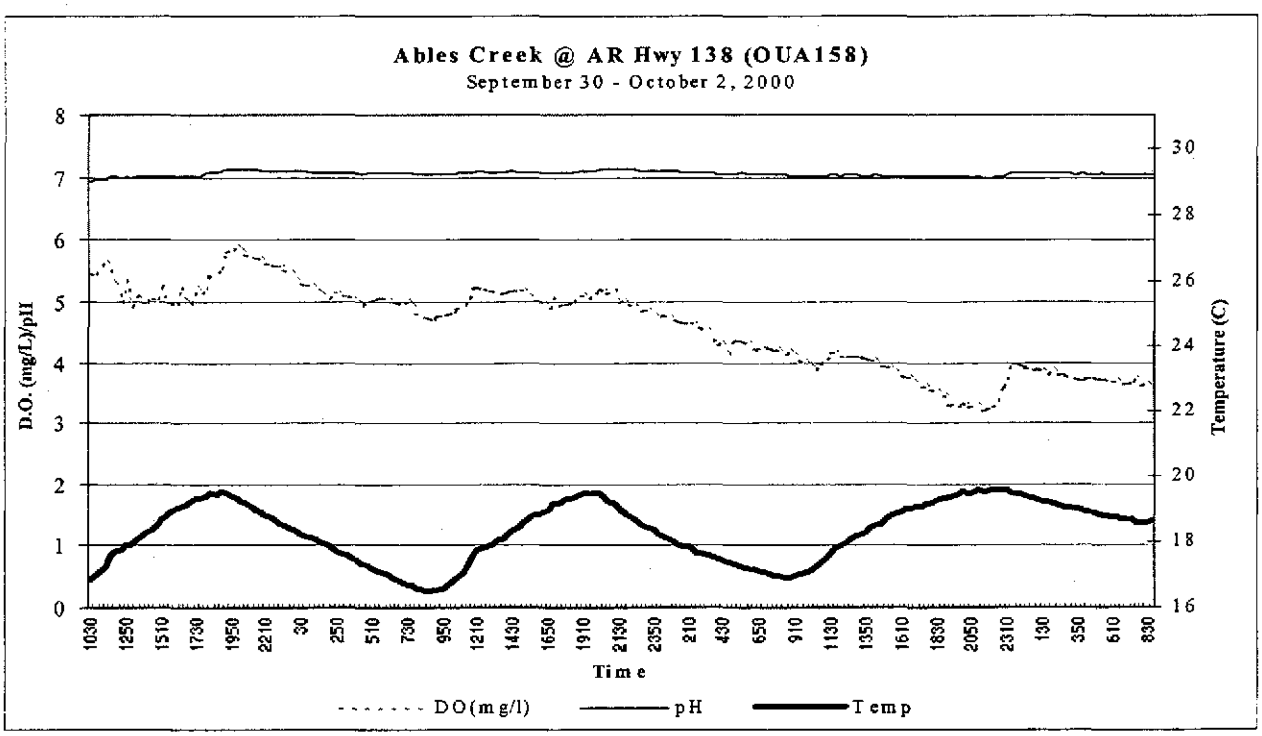


Figure WQ-20



This was the lowest of all sites sampled during this period indicating that there is some irrigation return flow influence at this site. These profiles were probably affected by the heavy cloud cover that was present during the sampling period, a light rain fall on the third day of the sampling, and day time temperatures were near 100°F.

The three DO profiles from the Cut-Off Creek sites, Figures WQ-20, WQ-21, and WQ-22, all displayed similar patterns. There is some fluctuation in the DO concentration and water temperatures the first two days of the sampling with little to no change in the DO concentration on the third day. There was also little to no change in the water temperatures at the upper and lower sites (UWCOC02, UWCOC01), but the middle site (OUA157) displayed an almost 3°C change. The DO and temperature concentrations at the upper and lower Cut-Off Creek sites were likely influenced by the dense canopy at each site and the heavy cloud cover that was present on the third day of sampling. Neither site demonstrated a large diurnal DO fluctuation, but both sites struggled to meet Gulf Coastal Plains ecoregion DO standards. Both sites had some minimal flow throughout the year. However, the middle Cut-Off Creek site (OUA157) was reduced to stagnant pools by August of each year probably due to Seven Devils Lake which is just upstream form the site. These shallow pools were filled with decomposing woody debris and leaf litter, and dark stained water. This helped to increase the average water temperature at this site 2°C to 3°C over the upper and lower sites. The cloud cover on the third day of sampling suppressed any DO production causing anoxic conditions to exist throughout the day. This site had the lowest average DO concentration of the three sites. The upper site had an average DO of 1.56 mg/L, and the lower sited had an average DO of 2.9 mg/L. None of the sites maintained the Gulf Coastal Plains ecoregion DO concentration standard of 3.0 mg/L.

The DO profile from Bayou Bartholomew at Oakwood Road (OUA143), Figure WQ-23, seems to be typical of small Gulf Coastal Plains ecoregion streams. This stream ceases to flow in early June, but remains as a series of small pools throughout summer and fall. The Bayou at this site has a very dense canopy that provides abundant woody debris and leaf litter to the stream and severely limits any sunlight penetration. This is apparent by the constant water temperature at the site. The combination of the decomposition of this material, the heavy canopy cover, and irrigation water inflows reduces in stream DO concentrations to anoxic conditions. These same characteristics and DO and temperature profiles were observed at the unnamed tributary site at Main Street, (OUA146), Figure WQ-14.

The canopy cover at Bayou Bartholomew near Ladd (OUA33) is sparse as compared to the canopy cover along the rest of the Bayou. Most of the canopy has been cleared immediately upstream of the sample site allowing for abundant light penetration. In addition, the flow in this section of the Bayou has been slowed by beaver dams, thus allowing the water to remain in direct sunlight for longer periods of time optimizing algal activity. The DO profile at this site illustrates this through a 5 to 7 mg/L diel increase in DO (Figure WQ-24). However, the third day of the sampling period shows the effect of irrigation water inflow from an upstream soybean field. The DO deficient irrigation water suppressed the DO on the third day and kept the instream water temperature from rising above 25°C.

Figure WQ-21

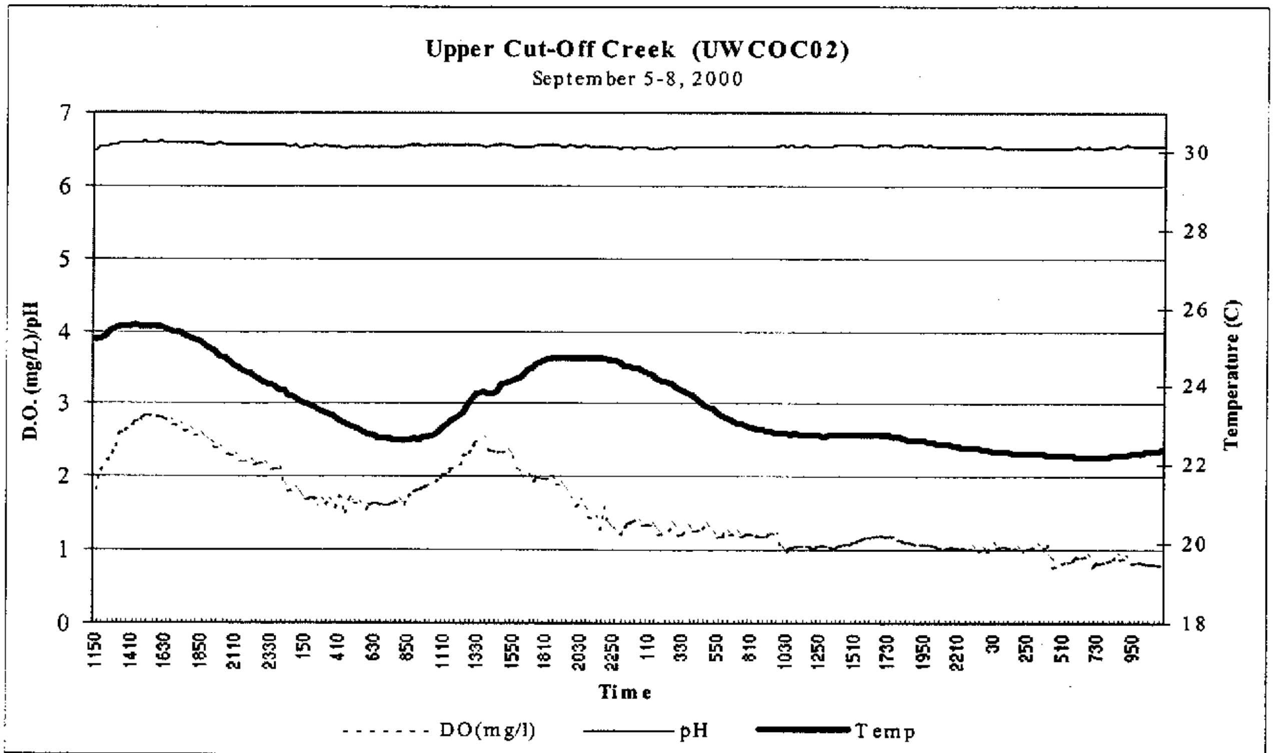


Figure WQ-22

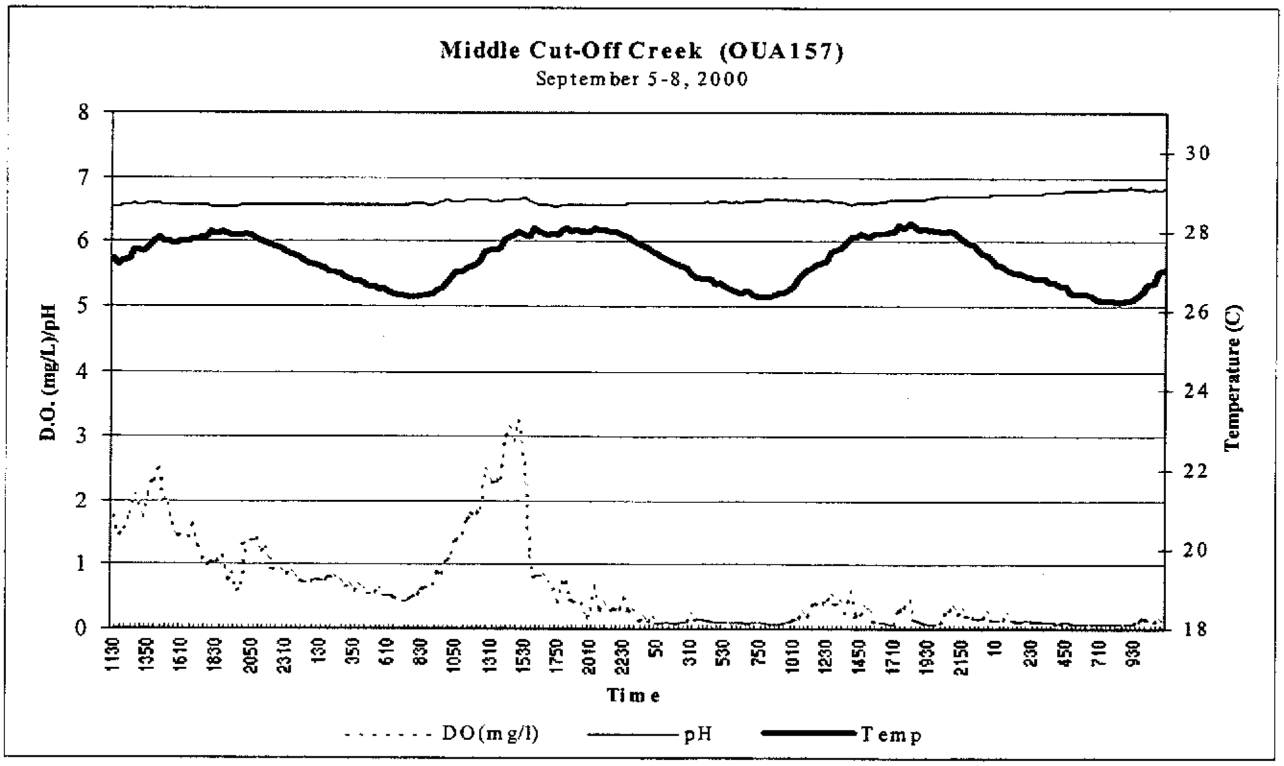


Figure WQ-23

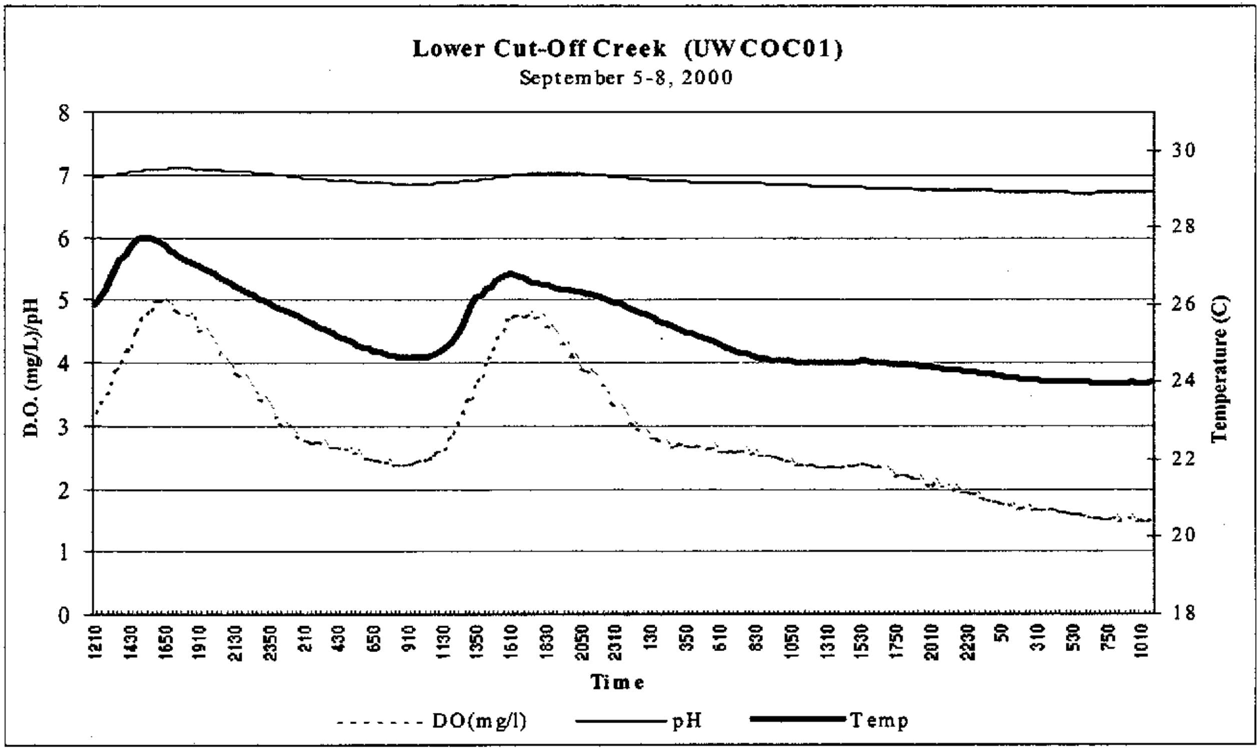
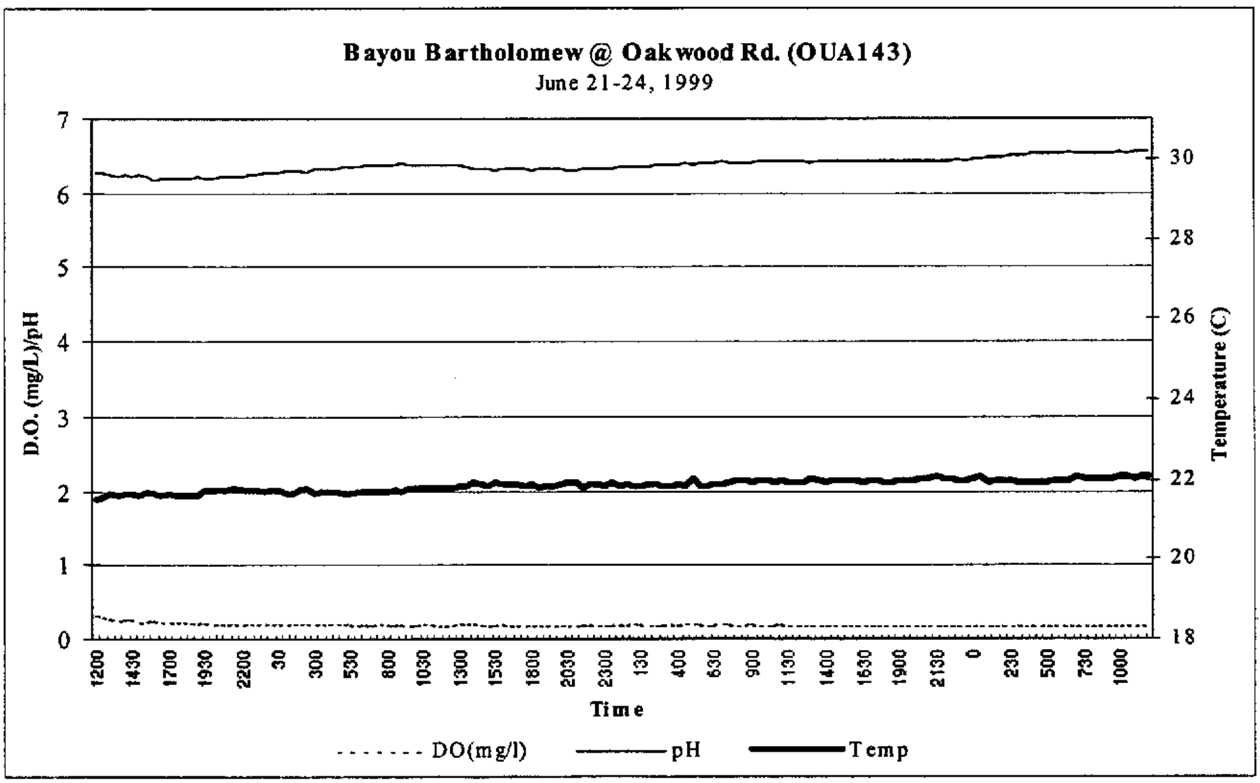


Figure WQ-24



Bayou Bartholomew near Tarry (OUA148) has a denser canopy cover than OUA33, but the channel is wider and the water depth is shallower. Secchi disk transparency was usually 100% of the water depth from August through late fall. The DO concentration fluctuated about 5.0 mg/L each day but never reached 100% saturation (Figure WQ-25). This indicates that there is abundant algae production occurring, but that the dense canopy is probably helping to limit algae activity somewhat. This site had the highest water temperature recorded.

Bayou Bartholomew at Garrett Bridge (UWBYB03) has a deep narrow channel, very dense canopy, and a moderate water velocity. The bottom substrate is soft mud to sand with areas of thick leaf litter and woody debris. During late summer, the flow in the Bayou is primarily comprised of irrigation water from tail-water return flows and rice field drainage. This site is downstream of the Deep Bayou confluence which is the watershed draining primarily agriculture land south and east of Pine Bluff. This large inflow of irrigation water from Deep Bayou in conjunction with the dense canopy and bottom substrate material is probably helping to keep the water temperature and DO concentration depressed somewhat (Figure WQ-26). The water temperature in the Bayou near Garrett Bridge only reached temperatures near 20°C in late September and early October as compared to near 23°C further downstream. The DO fluctuated between 3.0 mg/L and 5.0 mg/L, only increasing to reach 4.0 mg/L the last two days of the sampling.

The DO deficient irrigation water could be depressing the DO somewhat. In addition, the cloud cover present on the last two days of sampling and heavy canopy cover at the site could also be limiting light penetration and slowing oxygen production in the Bayou. This site is not maintaining the DO concentration standard for Delta ecoregion streams of 5.0 mg/L, but is maintaining the Gulf Coastal Plains ecoregion standard of 3.0 mg/L. The Bayou runs along a fall line between these two ecoregions and takes on characteristics of both regions. Thus, it is difficult to assign either standard specifically.

Bayou Bartholomew at Arkansas Highway 278 (OUA154) has a wider channel than that at Garrett Bridge, a less dense canopy cover, a moderate velocity, and shallower water. The bottom substrate is soft mud to sand with areas of woody debris and leaf litter. This portion of the Bayou is not as influenced by tail-water inflows as the upstream sections. This is somewhat apparent by the warmer water temperatures at this site as compared to Garrett Bridge. However, diurnal DO concentrations are quite similar to those at Garrett Bridge. The DO concentrations ranged from just over 4.0 mg/L to about 2.5 mg/L (Figure WQ-27) and are probably being somewhat depressed by the dense canopy cover and the bottom substrate material. This section of the Bayou is not maintaining either the Delta ecoregion or the Gulf Coastal Plains ecoregion DO standard.

Figure WQ-25

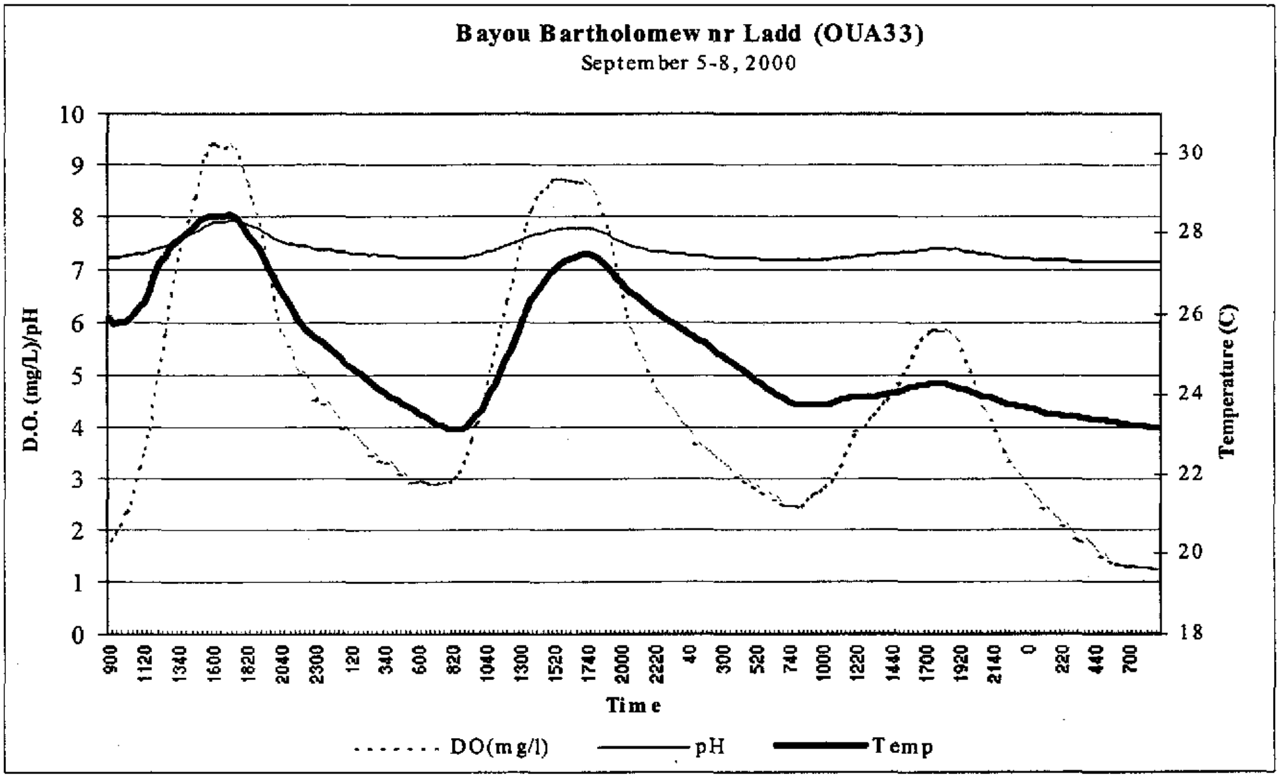


Figure WQ-26

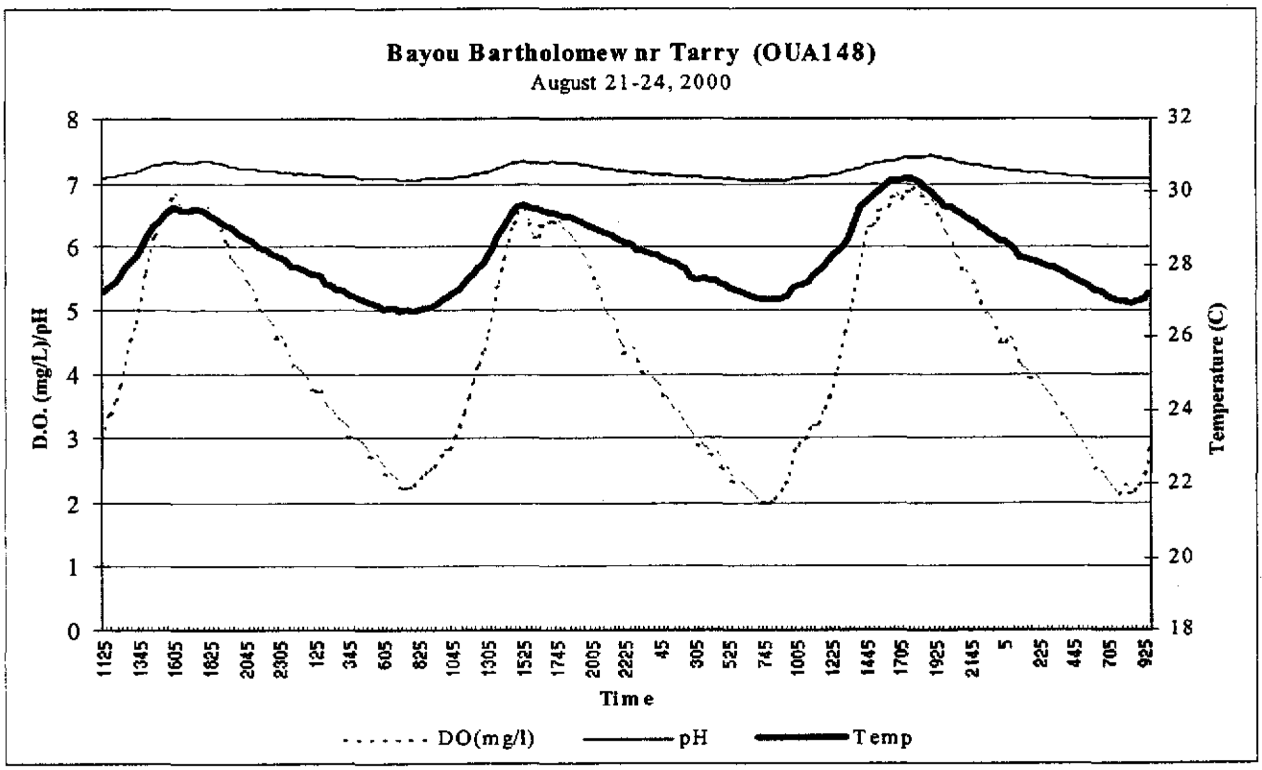
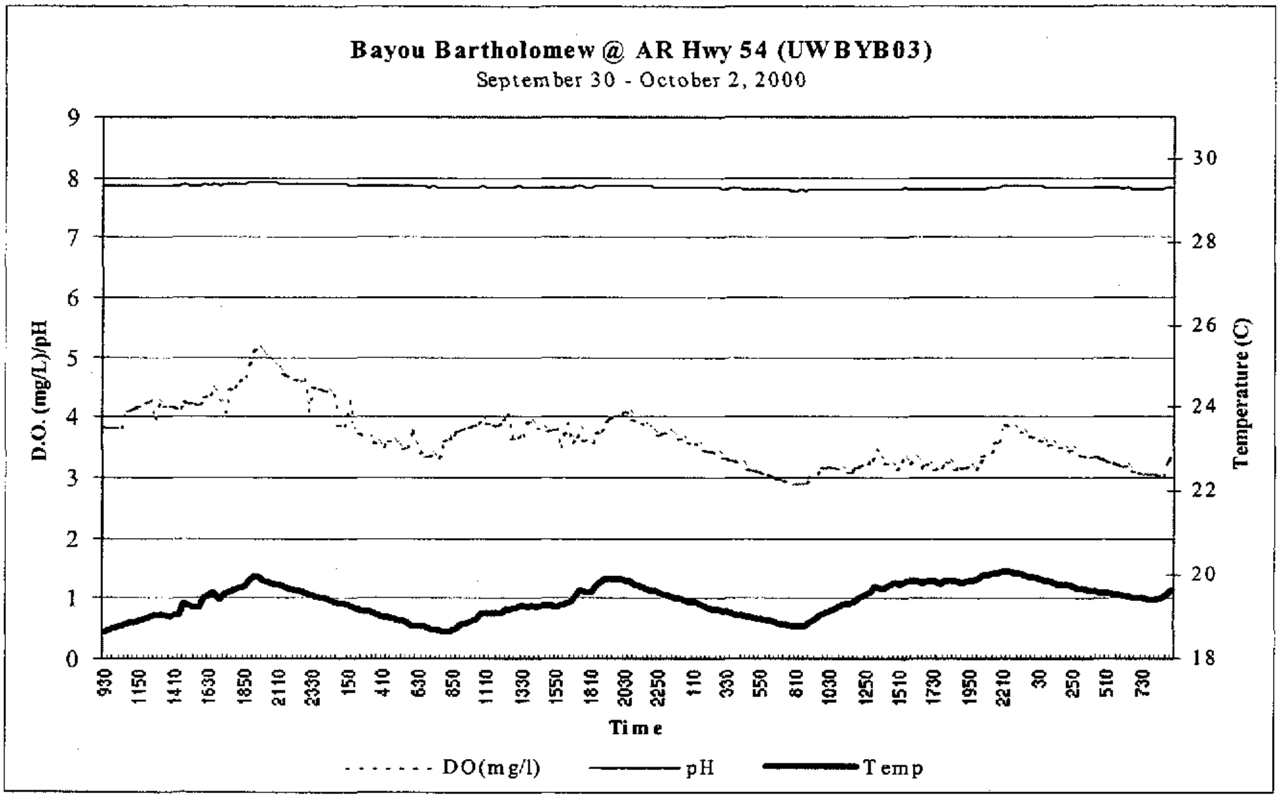


Figure WQ-27



The Bayou at La. Hwy. 165 (OUA13) has a wide, moderately deep channel, and a moderately dense canopy. However, the canopy can not span the Bayou in this section because of the width of the Bayou. The bottom substrate is mainly sand with areas of soft mud. Woody debris and leaf litter is not as apparent in this section of the Bayou as the upstream sections. Water temperatures in this section of the Bayou are slightly warmer than upstream sections, but DO concentrations are almost twice as high. The DO concentration fluctuated between 7.7 mg/L and 9.3 mg/L, becoming saturated only during the warmest time of the day, Figure WQ-28. This section of the Bayou seems to be attaining all DO standards.

Figure WQ-28

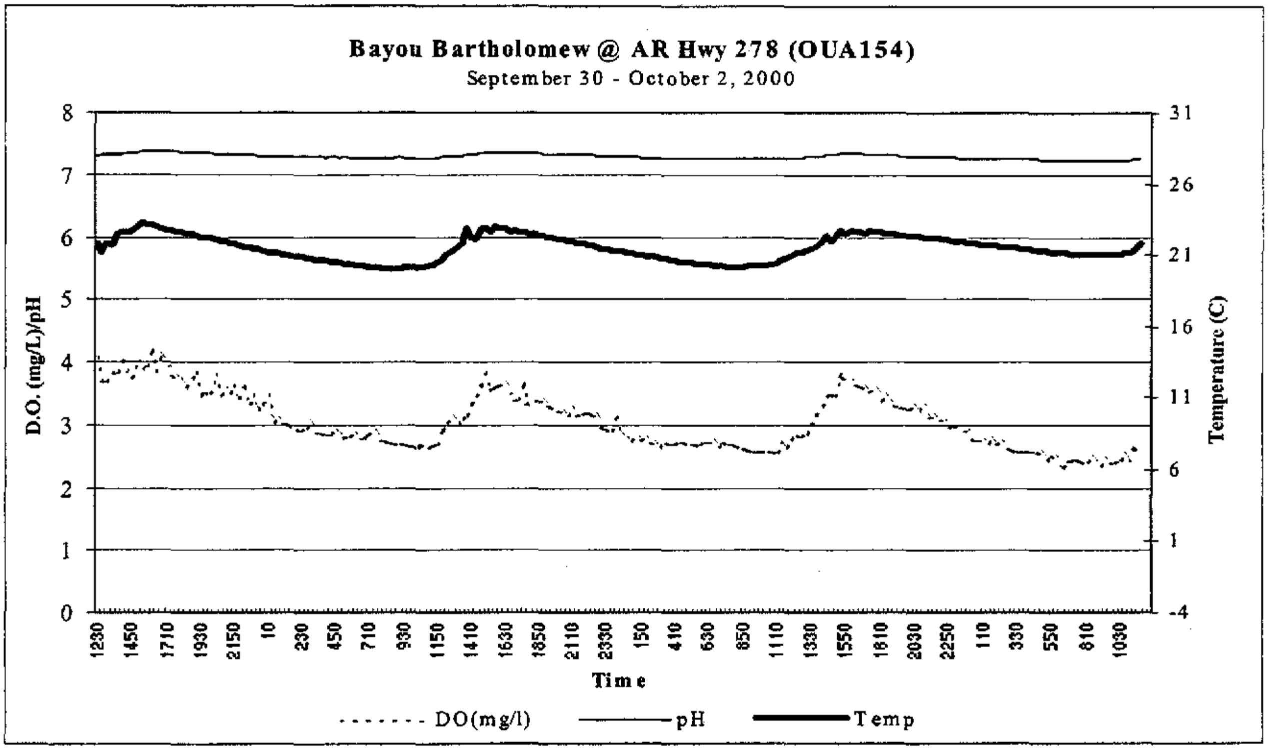
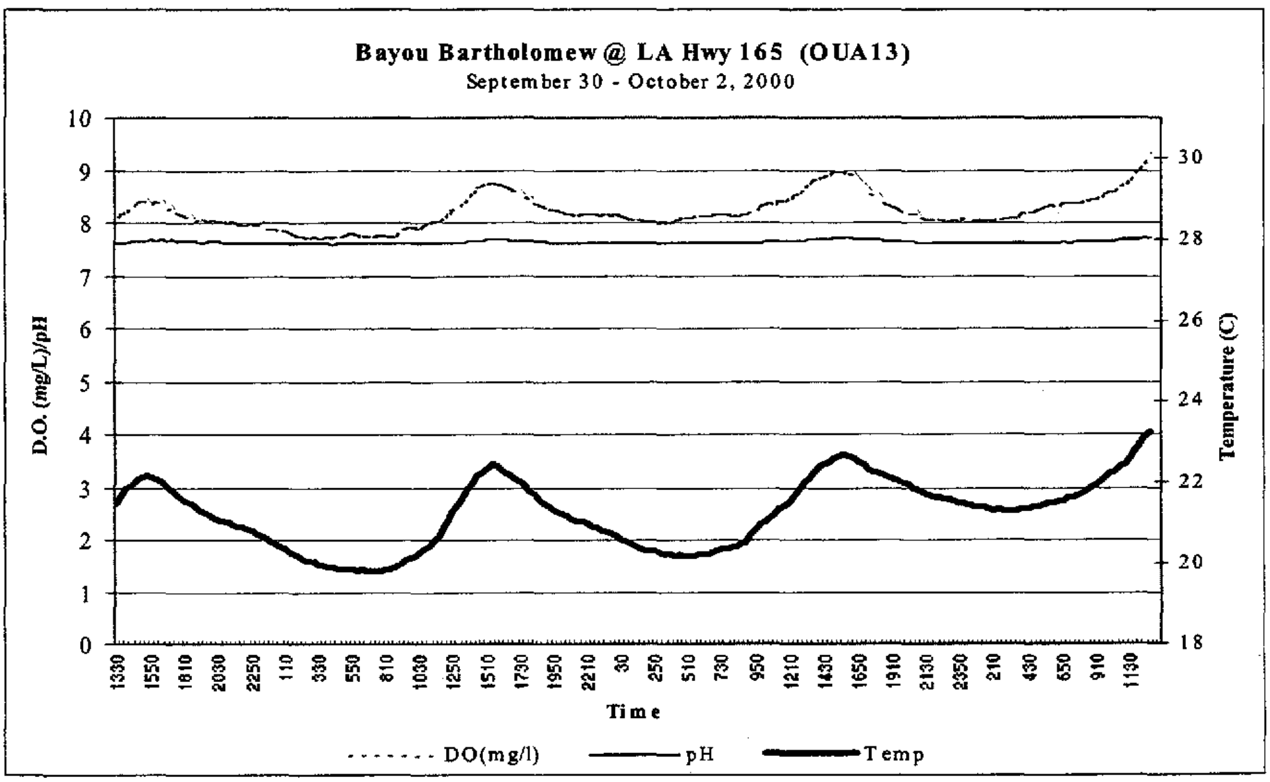


Figure WQ-29



WATER QUALITY DISCUSSION

Upper Watershed Tributaries - Nevins Creek, Harding Creek, Main Street Tributary, Bayou Imbeau

The tributaries in the uppermost portion of the watershed, Nevins Creek, Harding Creek, Main Street Tributary, and Bayou Imbeau have no flow for a large portion of the year - usually from early summer to mid-winter. These tributaries had dissolved oxygen concentrations below the standard 40% to 80% of the time. Diurnal dissolved oxygen (DO) concentrations cycled between 3.0 mg/L to 7.0 mg/L, indicating that there may be some nutrient enrichment occurring or the DO is being influenced by decaying organic matter.

Turbidity and suspended solids were not a problem in these tributaries. The only elevated concentrations occurred during low-flow situations indicating that these values are from algae production and not suspended sediments. Chloride concentrations were also relatively low throughout the survey in these tributaries, except for one sample collected from the Main Street tributary in August, 1999. This sample had a chloride concentration that was approximately 15 times greater than the average concentration from that site. This was most likely due to the decaying animals that were observed in and near the water at the time of sampling. The sulfate concentrations in Nevins Creek were almost twice those from the other tributary sites, although this concentration was well below the sulfate standard. The mean total dissolved solids concentrations were all well below the standard, even though a couple sites had values which exceeded the standard.

Nutrient concentrations were somewhat elevated when comparing them to values from Melton's Creek and the Upper Cut-off Creek sites. This is probably a reflection of the urban watershed in which these sites are located versus the forested watersheds from Melton's and Cut-Off Creeks. Nutrient runoff from lawns and perhaps from failing septic tanks could be contributing to the elevated nutrient concentrations.

The urbanization of the watersheds is probably the reason for the violations of the bacteria standard for the sites around Pine Bluff as well. The sample sites on these tributaries exceeded the fecal coliform primary-contact recreation standard more than any other sites sampled. However, because most of the watersheds are less than ten square miles, the primary contact standard does not apply. Only Nevins Creek has a watershed greater than ten square miles. Twenty-five percent of the samples collected in Nevins Creek during 2000 and no samples collected in 1999 exceeded the designated use criteria.

Each of these streams had typical Gulf Coastal Plains total hardness values, generally less than 30 mg/L. Metals concentrations from these tributaries were also low. However, the highest concentrations of several metals, copper, lead and zinc, occurred in these tributaries. This is probably a reflection of the urban watershed influence on these streams. Even though these streams had some standards violations, each of them are maintaining their designated uses.

Deep Bayou Watershed - Cousart Bayou, Jack's Bayou, Deep Bayou, Cross Bayou

Deep Bayou and its tributaries, Cousart Bayou, Jacks Bayou, and Cross Bayou, all maintained flow until mid-September. This was due to irrigation water entering these tributaries throughout the growing season. This water depresses the water temperatures in these Bayous. The flow in these tributaries decreases dramatically in mid September once crop irrigation ceases. These tributaries do maintain some year-round flow, however. The higher base flows and cooler water temperatures help to maintain DO concentrations and increase diurnal DO concentrations.

The Deep Bayou tributaries had the highest and most consistently elevated turbidity values, most of which occurred during the winter and early spring months and were associated with large storm events. Almost 90% of the low-flow samples from Cross Bayou exceeded the standard. This Bayou does not flow for most of the year, the area around the sample site has limited canopy, and dense algae growth occurs during the summer months, thus causing the high turbidity values during low-flow situations. The TSS concentrations in these bayous mirror turbidity values, except during the largest storm events. A percentage of the turbidity during the largest storm events is from very small clay particles. This material passes through the typical four micron filter and is not accounted for as suspended solids. It does appear as dissolved solids, however. This is apparent when comparing suspended solids values with turbidity values for these sites. There are large increases in turbidity during storm events, but not large increases in suspend solids concentrations. However, by examining the dissolved solids concentrations for the same samples, it is seen that there is a large increase in total dissolved solids but there is not a substantial increase in the typical dissolved solids constituents. This is suggesting that the increase in turbidity is from clay particles that pass through the four micron filter used for suspended solids analysis. All of these sites have excessive turbidity during storm flows, and Cross Bayou is exceeding the criteria for instream turbidity during low-flows.

This also presents a problem with the dissolved solids concentrations. Elevated dissolved solids concentrations due to clay particles is not a true reflection of dissolved solids concentrations. Thus, determining true dissolved solids standard violations is somewhat difficult. These water bodies did have elevated chloride concentrations and dissolved solids concentrations that exceeded the standards. Over 43% of the samples collected from these sites exceeded the chloride standards. Most of the elevated concentrations occurred during low-flow, indicating that the chlorides are most likely coming from irrigation return-flow water. In addition, all of these sites exceed the criteria for instream total dissolved solids concentrations.

Nutrient concentrations in the Deep Bayou watershed were usually low. However, the highest concentration of ammonia-nitrogen (4.17 mg/L) recorded during the survey occurred in Deep Bayou (OUA151). Jack's Bayou had one of the highest concentrations for nitrate+nitrite nitrogen, total phosphorus, and orthophosphorus (OPhos). Median OPhos concentrations were noticeably higher in this watershed as compared to the other samples sites. This may be a reflection of the organic and inorganic fertilizers used on the row crops in the watershed.

Fecal coliform bacteria concentrations from these sites exceeded the standard in 50% of the samples collected. The Deep Bayou site and Jacks Bayou had more exceedances than the other two sites. Some of the violations occurred during late spring and early summer storm events suggesting that bacteria associated with soil particles could be contributing to the bacteria concentrations. In addition, chicken litter is applied to the row-crop fields in this watershed.

The seasonal variation of total hardness values in these tributaries were similar to the Delta ecoregion values, but the maximum values were two to three times greater and the median values were all greater than 100 mg/L. This is probably a reflection of the ground water influence in these tributaries.

Middle Watershed Tributaries - Ables Creek, Cut-Off Creek, Bearhouse Creek

Flow in these tributaries varies greatly. Upper Ables Creek and Bearhouse Creek have no flow most of the year. The middle Cut-Off Creek site does not flow from late summer to late fall. The upper Cut-Off Creek site maintains some flow throughout the year, probably from ground water influence. Flow in the lower Ables Creek site is influenced by irrigation return flow. Minimal flow values occur in September after irrigation discontinues. The lower Cut-Off Creek site maintains some flow throughout the year but does not seem to receive significant irrigation return flow. Dissolved oxygen (DO) concentrations during the critical season seems to be directly correlated with flow. Those sites with some flow had better DO concentrations than sites that formed only enduring pools. The water at these sites tends to be stained by decaying organic matter.

The upper Ables Creek site generally had low turbidity values, but the lower Ables Creek site had extremely high turbidity values during storm events. This is a reflection of the watersheds which are mostly forested in the headwaters but with a large amount of row-crop agriculture in the lower sections. Clay particles are evidently causing elevated turbidity during the larger storm events, just as they were in the Deep Bayou area. Turbidity values in Cut-Off Creek were quite different than in Ables Creek. Storm flow turbidity values in Cut-Off Creek were all generally less than 70 NTU, even though the lower section of the Cut-Off Creek watershed does have some row-crop agriculture. The majority of the storm flow in Cut-Off Creek originates from forested land use areas. Low-flow turbidity values exceeded the standard about 25% of the time. Most of these violations occurred at those sites with minimal to no flow during the summer months. This turbidity is mostly due to the tannins in the water and possibly from algae production.

Approximately 25% of the chloride concentrations from these sites exceeded the standard. All of these values occurred during low-flow conditions, most of which were in the lower Cut-Off Creek sites. These elevated chloride concentrations are most likely due to irrigation water flowing into the lower portion of the creek from row-crop fields. The sulfate concentrations were greatest in the upper portions of the watersheds. The elevated sulfate concentrations elevated the dissolved solids concentrations in the upper sites and the elevated chloride concentrations elevated the dissolved solids concentrations at the lower watershed sites. Only the lower Ables Creek site is exceeding the instream water quality criteria for total dissolved solids concentrations.

The nutrient concentrations in this group of streams was generally low, but there were some elevated concentrations during storm events. The upper Ables Creek site had the highest median nitrate-nitrite nitrogen concentration of any of the sites. The lower Ables Creek site had the highest recorded nitrate-nitrite nitrogen concentration during the survey. This watershed has the greatest number of poultry houses located in it than any other watershed. The upper Cut-Off Creek site had the highest maximum and one of the highest Tphos and Ophos values recorded during the survey. This site is downstream of adjacent pasture lands that receive chicken litter applications.

Three of these sites are exceeding the fecal coliform bacteria criteria. Approximately 75% of the samples collected in 2000 at the upper Ables Creek site exceeded the standard. However, none of the samples in 1999 exceeded the standard. There were four samples collected from this site in 2000, three of which were collected during large runoff events. The site dried up about mid June, 2000. Thus, this site actually does not support a primary contact recreation use during the swimming season based on flow. The lower Ables Creek site had almost 43% of the samples collected during the swimming season exceeding the standard. However, none of the samples collected in 1999 exceeded the standards. Taking both years into account, only 20% of the samples exceeded the standard, thus meeting the instream primary contact recreation criteria. The only other site exceeding the criteria was the Wolf Creek site, OUA156. This site is actually a wetland. None of the samples collected during 2000 exceeded the standards, and only two samples exceeded the standard in 1999. Taking both years into account, less than 14% of the samples collected from this site during the swimming season exceeded the standards, thus meeting the instream primary contact recreation standard.

Main Stem Bayou Sites - OUA143, OUA33, OUA148, UWBYB03, UWBYB02, OUA154, OUA13

The flow at the main stem Bayou sites varied greatly. The flow at the Oak Wood Road site was heavily dependant on storm events throughout the year. The site ceased to flow even during the spring if heavy rains did not occur. The site south of Ladd usually had flow throughout the year, and picked up some irrigation return flow during the late growing season. From this site to the lowest most site near Jones, LA., the Bayou had continuous flow. There was a definite irrigation return flow influence on the Bayou. The lowest flows did not generally occur until late September after irrigation had ceased. There was also a noticeable decrease in flow during the first week of September each year, reflecting the mass reduction in crop irrigation. The slope and depth of the Bayou also influenced the flow. The upper and lower sections were usually shallower and had more velocity than the section between Garrett Bridge and Highway 4. This section was generally deeper and slower moving.

Median DO concentrations along the main stem of the Bayou were all above 50.0 mg/L. There were occasions when the concentrations dropped below 3.0 mg/L, but these were in the upper most sites when minimal to no flow occurred. The lower site near Jones, Louisiana had a median concentration greater than 6.0 mg/L, and a minimal concentration near 4.0 mg/L. The standard for this section of the Bayou is 5.0 mg/L. Diurnal dissolved oxygen concentrations in the upper section of the Bayou were generally less than 3.0 mg/L. This was probably the result of low- to no-flow conditions and the lack of a tree-covered riparian zone resulting in excessive algae growth. The mid-section of the Bayou generally had concentrations remaining near 3.0 mg/L. This area of the Bayou may be experiencing some depressed DO concentrations due to the influence of the irrigation water entering the Bayou. This site is meeting the DO standard for Gulf Coastal Plains ecoregions streams, but not Delta ecoregion streams. The site near Jones, Louisiana had diurnal concentrations above 7.0 mg/L. Overall, dissolved oxygen concentration standards were generally being maintained throughout the Bayou in those areas where there was some year-round flow. In the upper watershed, lack of flow caused the dissolved oxygen concentrations to fall below the standards.

The median turbidity concentrations in the upper section of the Bayou were generally less than 30 NTUs. However, the two middle stations, Garrett Bridge and Highway 4, had median concentrations above 50 NTUs. These stations are being influenced by the inflow from the Deep Bayou watershed which also displayed elevated turbidity concentrations. The lower stations had median concentrations below 50 NTUs. The tributaries entering the Bayou below the confluence of Deep Bayou originate in the forested hills of the Gulf Coastal Plains. These tributaries all had low median turbidity values which helped to improve the turbidity values of the lower Bayou. This same pattern was seen in the total suspended solids concentrations. The Bayou sites below the confluence of Deep Bayou had the highest concentrations. Turbidity values at the Bayou sites below the confluence of Able's Creek (UWBYB02) were also influenced by the inflow of Ables Creek, especially during the larger winter storm events.

Total dissolved solids concentrations were below 20 mg/L at the upper Bayou sites, but increased substantially below the confluence of Deep Bayou. The concentrations remained about the same from there to the lower Bayou sites. There is an obvious influence on Bayou Bartholomew from the Deep Bayou watershed. This also helped to elevate the total hardness values at the Garrett Bridge and Highway 4 sites.

There were only two sites on the Bayou where primary contact recreation criteria for fecal coliform bacteria was not met. The sites at Garrett Bridge and Highway 278 west of Portland had 38 % of the samples collected in 2000 exceed the standard. All of the remaining sites on the Bayou fully met the criteria for fecal coliform bacteria concentrations during both years the samples were collected.

PESTICIDES

Pesticide samples were collected three to four times from 23 of the sample sites. Appendix 3 is a list of the samples sites, pesticides analyzed and the results of the analyses. Sixteen of the 39 pesticides analyzed did not have any detections.

Eight percent (8%) of the samples collected had detections of acifluorfen (Blazer) ranging from 0.0258 ug/L to 0.1062 ug/L. This is a post-emergence, broadleaf herbicide used on soybeans and rice. It has a soil half life of 4.5 days and is toxic to fish at concentrations greater than 54 mg/L (Farm Chemical Handbook, 1996 - to be referenced as FCH 96 throughout the remainder of this document). This herbicide was detected only in the lower portion of the watershed during the August and September 1999 sampling events.

Atrazine was detected in 18% of the samples collected, in concentrations ranging from 0.0098 ug/L to 0.2263 ug/L. It is used as a season long herbicide mainly in corn and sorghum. It is commonly premixed with other herbicides such as bentazon and cyanazine. Bentazon was detected in 53% of samples collected and 13% of the samples collected contained detectable levels of cyanazine. Bentazon, also know as Basagran, was the most widely and frequently detected pesticide during the survey. It is a post-emergent herbicide used on row crops, vegetable farms, lawns, and urban gardens. It has a 13 day soil half-life and is toxic to fish in concentrations >100 mg/L (FCH 96). It was detected in all eight samples collected from Deep Bayou and its tributaries and was also detected in the Pine Bluff tributaries. Cyanazine, however, was only detected in the row crop areas of the Bayou. It is a selective post- and/or pre-emergent herbicide used on corn and cotton and is toxic to fish in concentrations >16 mg/L (FCH 96).

Diazinon was detected in six samples, all of which were in the Pine Bluff tributaries in concentrations ranging from 0.059 ug/L to 0.387 ug/L. It is a insecticide used mainly in urban areas to control household and yard insects, as well as urban garden pests. It is commonly mixed with chlorpyrifos, also know as Dursban to control ants (FCH 96). Chlorpyrifos was not detected during this survey.

Malathion was detected in 20% of the samples collected at concentrations ranging from 0.033 ug/L to 0.374 ug/L. It is an insecticide used on some row crops, but mainly on fruits, vegetables, and stored grain. The NRCS Boll Weevil Eradication Program uses malathion as its primary insecticide applying it mainly to cotton fields and surrounding areas. It is toxic to fish in concentrations above 200 ppm (FCH 96). Most of the detections during this survey occurred in August and September, 1999 and were scattered throughout the watershed.

Metolachlor was one of the most frequently detected pesticides during the survey. It was detected in 42% of the samples in concentrations ranging from 0.009 ug/L to 9.15 ug/L. It is a pre-emergent herbicide incorporated into the soil and used on a wide variety of crops. Because it is applied as a granule, it is very persistent in the environment. Its soil half-life is 64 days. It is very mobile in sand or sandy/loam soils and very soluble (FCH 96). It was most commonly detected in the Deep Bayou drainage and at the Bayou Bartholomew sites from Garrett Bridge to OUA13 near Jones, Louisiana.

Metribuzin is a herbicide that controls broadleaf weeds and grasses in established crops. It sometimes comes premixed with trifluralin or metolachlor. It was detected in nine percent (9%) of the samples collected. Six of those occurred during the June 2000 sampling event. Concentrations ranging from 0.0248 ug/L to 1.807 ug/L.

Molinate was detected in 49% of the samples collected throughout the watershed in concentrations ranging from 0.0054 ug/L to 76.383 ug/L. It was one of the two pesticides detected at the Melton's Creek site; the other was bentazon. Molinate is used on rice to control water grasses. It is toxic to certain species of fish above 30 mg/L (FCH 96). The only locations molinate was not detected was in the non-crop land watersheds.

Pendimethalin, also know as Prowl and Squadron, was detected in only eight samples, all of which occurred during the month of June. All of the concentrations detected were less than 0.1 ug/L. Seven of the eight detections occurred in the Deep Bayou drainage and/or at Garrett Bridge which is just downstream of Deep Bayou. This is a selective herbicide used on established cotton and soybeans.

Prometryn was detected in 16 samples, most of which occurred during the June and September 1999 sampling events. The highest concentration of this herbicide of 0.127 ug/L, was found at OUA148 during the June 1999 sampling event. This herbicide is used to control broadleaf weeds in soybeans and cotton as either a pre- or post-emergent. It has an LC_{50} concentration of 10 mg/L for fish (bluegill) (FCH 96).

Trifluralin was detected in only two samples, both of which were in concentrations of less than 0.011 ug/L. Trifluralin is a selective pre-emergent herbicide used mostly of fruits and vegetables. It is somewhat toxic to fish, but is very insoluble in water.

Discussion

Pesticide samples were collected three to four times from 23 of the samples sites in the watershed. Twenty-three different pesticides were detected during the survey. The most frequently detected pesticide was molinate which was detected in 49% of the samples collected. It was detected in the greatest concentration at 76.383 ug/L. Metolachlor was also frequently detected and had a maximum concentration of 9.15 ug/L. Most of the pesticide detections were herbicides used throughout the growing season on a variety of different crops.

Diazinon, an insecticide, was detected only in those tributaries in and around the Pine Bluff area. This insecticide is commonly used in urban areas to control pests. Malathion was the other commonly detected insecticide found throughout the watershed. It is the pesticide of choice for the Boll Weevil eradication program, thus explaining its occurrence throughout the watershed.

None of the pesticides detected in this survey were near toxic concentrations. They were all found in limited numbers at low concentrations. They were also only detected in areas of the Bayou and during times of the year when and where they would be expected to be present.

SEDIMENTS

Sediment samples were collected from nine tributary sites and at six location along the main stem of the Bayou for pesticides and metals analyses. Appendix 4 lists the sites from which sediments were sampled, the parameters analyzed, and the results of the analyses.

Seventeen metals were analyzed from the sediment samples. Neither beryllium nor cadmium was detected in any of the samples. Arsenic, chromium, copper and nickel were detected from most locations but were in concentrations of less than 5.0 mg/kg. According to Pendias, 2001, these concentrations are near or below the background concentrations found in sand, silt, clay, or organic rich soils, Table S-1.

Cobalt, lead, selenium, and vanadium were detected in concentrations of less than 50 mg/kg. The highest concentrations of cobalt occurred in Cousart Bayou (25.10 mg/kg) and Jacks' Bayou (18.90 mg/kg). Background concentrations for cobalt usually range between 3.5 mg/kg to 11 mg/kg (Pendias, 2001) depending on the soil type. The highest concentrations of lead were 30.90 mg/kg at UWBYB03 and 20.90 mg/kg at UWBYB02. Both of these concentrations were just above the naturally occurring background levels reported by Pendias, 2001. Selenium was detected at only two sites in the Deep Bayou watershed at 6.60 mg/kg and10.30 mg/kg. This metal is commonly used in pesticides and fertilizers, which may be the reason for the its elevated concentrations at these sites (Pendias, 2001). Vanadium was detected at all sites, but its maximum concentration was only 6.20 mg/kg. This is well below the normal background concentration range of 38 mg/Kg to 87 mg/kg (Pendias, 2001).

Barium concentrations ranged from 20.00 mg/kg at OUA144 to 386 mg/kg at OUA150. The concentration of barium from the Deep Bayou tributaries, were almost 33% greater than the next lower concentration of 193.00 mg/kg at OUA155. None of the values exceeded the normal background concentration range of 265 mg/kg in organic rich soil, 675 mg/kg in silty soil, or 535 mg/kg in clay soils. The zinc concentrations at these two sites were above the background levels reported by Pendias (Pendias 2001) of 34 mg/kg to 67 mg/kg. They were 104 mg/kg at OUA150 and 77.40 mg/kg at OUA149. Zinc is commonly used is pesticides and fertilizers, which may be the reason for the slightly elevated concentrations at this site.

Manganese concentrations ranged from 57 mg/kg at OUA144 to 1000 mg/kg at UWCOCO1. Background concentrations for manganese normally range from 260 mg/kg to580 mg/kg. Four other sites had concentrations above background levels; these include OUA33, OUA149, able S-1: Mean Background Metals Concentrations in Sediments

Metal	mg/kg, dry weight	Metal	mg/kg, dry weight
Aluminum*	71,000	Lead	17 to 24
Arsenic	5.1 to 7.7	Magnesium*	5,000
Barium	265 to 675	Manganese	260 to 580
Beryllium	usually < 10 ppm	Mercury	0.08 to 0.28
Cadmium	0.21 to 0.73	Nickel	12 to 17
Chromium	20 to 55	Selenium	0.3 to 0.5
Cobalt	3.5 to 11	Vanadium	38 to 87
Copper	14 to 29	Zinc	34 to 67
Iron*	38,000		

Source: Pendias, 2001. *Bower, 1966.

OUA150, and OUA158. This metal is commonly used in pesticides and fertilizers to enhance plant nutrient uptake. Each of these six sites are located near row-crop agriculture which may explain the elevated concentrations.

Magnesium concentrations ranged from 147 mg/kg at OUA144 to 7950 mg/kg at OUA149 and 13,800 mg/kg at OUA150. The latter two were the only sites to have concentration above the normal background concentration of 5000 mg/kg reported by Bower, 1966. This element is essential to plant growth and is commonly applied with regular fertilizer applications.

Iron was detected in concentrations ranging from 1550 mg/kg at OUA144 to 36,600 mg/kg at OUA150. Cousart Bayou and Jack's Bayou had iron concentrations of more than twice that of the next highest level detected. Pendias states that iron is "found in higher concentrations in clay soils than in sandy or organic rich soils." The sediments in the tributaries of Deep Bayou were dominated by clays. In addition, Bower, 1966, reports that background iron concentrations in sediment are near 38,000 mg/kg. Thus, these concentrations seem to be normal.

Aluminum concentrations ranged from 2100 mg/Kg at OUA144 to 37,800 mg/kg at OUA150. There is some discrepancy in what is the normal background concentration of aluminum is sediment. Pendias reports that background concentrations range between 500 mg/kg to 10,000 mg/kg, depending on soil type while Bower reports background concentrations to be near 71,000 mg/kg. The higher concentrations of aluminum detected in this survey were located in areas with higher concentrations of clay in the sediments. The aluminum values detected are probably typical for this ecoregion and these soil types.

Sediment samples for total mercury analysis were collected from nine tributary sites and all seven main stem Bayou sites. It was detected at 13 sites in concentrations ranging from <0.05 mg/kg at several sites to 0.136 kg/mg at UWCOC01. Pendias reports that background concentrations of mercury in sediment ranges from 0.08 mg/Kg in clay dominated soils to 0.28 mg/kg in organic rich soils. The concentrations detected in this survey are right in line with these values. The highest concentrations were usually located in the streams with a greater abundance of organic rich soils. There were some elevated concentrations in the Deep Bayou tributaries which are mainly clay soil dominated. The reason for these higher concentrations is unknown.

There were only six pesticides detected from the sediment samples. Only seven percent of the analyses for pesticides in sediments were above the detectable level. Molinate was detected from seven sites in concentrations ranging from 0.0048 mg/kg to 0.0266 mg/kg. Because molinate is a rice herbicide, it is somewhat insoluble, thus allowing it to adsorb to soil particles and settle out onto the stream bed. Trifluralin and metolachlor were the only other modern pesticides detected in the sediments. Each were detected at only one location and in concentrations of less than 0.004 ug/L.

The pesticide p-p'-DDT and its derivatives, p-p'-DDE and p-p'-DDD, accounted for 27 of the 36 detections. They occurred in concentrations ranging from 0.001 ug/L to 0.865 ug/L. The greatest concentration was p-p'-DDT and occurred at UWBYB03. The derivative p-p'-DDE was detected at all of the sites sampled except the three upper most sites around Pine Bluff. It is the third phase break down product of p-p'-DDT. According to EXTOXNET, DDT is "...very highly persistent in the environment..." and has a soil half-life of 2 to 15 years and a water half-life of 28 to 56 days. It also states that DDT is ...very highly toxic to many aquatic species". The reported 96 hour LC_{50} to aquatic invertebrates is between 0.18 ug/L to 7.0 ug/L and the 96 hour LC_{50} to fish ranges between 1.5 ug/L for largemouth bass, 4.8 ug/L for bluegill, and 8.6 ug/L to black bullheads. The derivatives of DDT, DDE and DDD, have similar solubility, half-life, and toxicity characteristics as DDT (USDA 1996).

GROUND WATER QUALITY ASSESSMENT

Ground water quality was assessed in the Bayou Bartholomew watershed by sampling 119 alluvial wells and one spring. The wells were chosen in a random order to reflect the best distribution of the planned number of monitoring sites (originally 100 wells). The alluvial aquifer was monitored solely as the shallow-most aquifer reflecting potential impacts from non-point sources of pollution. Two deeper aquifers, the Cockfield and Sparta aquifers, are important aquifers within the watershed, but do not have surface exposures or recharge areas within the watershed. The Jackson Formation is exposed at the surface throughout the northwestern portion of the watershed, predominately in Drew and Lincoln counties. This formation is more strictly defined as a confining unit, where present, between the alluvial and Cockfield aquifers. However, the Jackson does contain thin sand lenses and historically supplied water to numerous households in the watershed. Most of these wells were drilled at the turn of the century and up through the early 1950s. With the growth of community water systems, together with the small yields and poor water quality associated with the Jackson deposits, operational wells in the Jackson currently are scarce within the watershed. Where present and operational, these wells are mainly used for purposes other than drinking water; such as watering gardens, stock animals and other uses. One well sampled for the present study, LINC19, is believed to be in or receiving water from the Jackson Formation and is discussed in further detail in the sections below.

Although every effort was made to evenly distribute the ground-water sampling sites across the watershed, this task was made difficult by the distribution of alluvial wells. Alluvial wells dominantly are used for irrigation purposes, and the majority of these are located in the productive Delta ecoregion, which occupies a thin veneer along the eastern portion of the watershed. Approximately 2/3 of the western portion of the watershed, mainly in Ashley and Drew counties, correlated with the upland terrace deposits and is dominated by silviculture. As such, there are significantly fewer alluvial wells in these areas. Through an extensive search of well logs and meetings with personnel of local Conservation District offices in Lincoln, Drew and Ashley counties, both irrigation and domestic wells were located, of which 25 were sampled for the present study. Because agriculture represents the greatest threat to the alluvial aquifer from the extensive use of pesticides on row-crop areas, decisions were made to have the greatest number of sampling sites in the delta portion of the watershed.

SUBSURFACE HYDROLOGY

Ground water stored in the sands and gravels of the alluvial deposits within the watershed provide the most important source of water to all of the counties through which flows the Bayou Bartholomew river. In all combined counties, Jefferson, Lincoln, Drew, and Ashley counties, which contain the dominant land mass in the watershed, ground water accounts for over 80% of the total water use. In all counties except for Jefferson, which uses the Sparta extensively for municipal and industrial use, the Quaternary deposits account for over 97% of the total ground water; nearly 90% of this exclusively used for irrigations purposes (Terry Holland, written communication; Holland, T.W., 1999).

There are two main reasons for the extensive use of the alluvial aquifer for irrigation and other uses: (1) the alluvial deposits provide a shallow, productive aquifer, and the depths and the costs associated with well-drilling are less than that for deeper wells advanced into the Claiborne group, and (2) the high yield associated with the alluvial deposits provide the amounts necessary for irrigating large tracts of land. Although the average yield for alluvial wells is approximately 1600 gpm, yields of up to 2000 gpm are common throughout the watershed, and are upwards to 3000 gpm and greater in some portions of the watershed (Klein et al., 1950; Onellion, 1956; Bedinger and Reed, 1961; Boswell et al., 1968). The type of sediments overlying the surface of the alluvial deposits vary in their permeability, and, as such, the aquifer can be partially confined in many areas. The lower permeability materials also affect recharge to the aquifer through penetration of rainfall and irrigation water through the land surface. Krinitzsky and Wire (1964) listed direct penetration by percolating rainfall as the most important source of recharge to the aquifer followed secondly by stream capture and irrigation return, and thirdly by underflow from lower aquifers. Their report estimated approximately 5% of precipitation percolates into the earth as ground-water recharge. However, Broom and Reed (1973) provided model calculations which estimated that up to 70% of recharge was from stream capture as a result of intense pumping, which lowered the water table resulting in a losing stream scenario.

The direction of ground water flow in the alluvial aquifer is dominantly southward with the slope of the land within the watershed. This flow pattern is affected both by streams acting as both drains and sources of recharge, and, during the irrigation season, by pumping wells which can induce large local cones of depression. Broom and Reed (1973) state that Bayou Bartholomew serves as a drain for the ground water in the northwestern part of the watershed (Jefferson and Lincoln counties), and serves as a drain to the west and a recharge source to the east of the bayou in the lower sections of the bayou. Their assessment is based on the fact that flow lines perpendicular to the potentiometric surface in much of Drew and Ashley counties is from the west to the east across the bayou. Another explanation is that the bayou has little effect either as a drain or a recharge source and does not affect the ground water flow in the lower section of the watershed. In either case, current potentiometric maps depict similar directions of flow for both the upper part of the watershed, where the bayou acts dominantly as a drain, and the lower part of the watershed, where the dominant flow is to the south/southeast and is not effected by the bayou according to scale dictated by the number of sampling sites (Stanton, et al., 1998; Joseph, 1999).

The upland terrace deposits, similar to the delta alluvial deposits, are capable of large yields in areas of channel fills and depressions. Hewitt et al. (1949) stated that the terrace deposits were the most important source of water for Ashley County in late 1940s. Wells in some of the old Pleistocene channels can yield as much as 2,500 gpm. Their report also speculated that recharge was probably limited as the upper part of the deposits are composed dominantly of fine-grained silty to sandy clay. In unison with the observation that many of the channel fills and depression are not interconnected, they attributed varying water quality to aquifer thinning, isolated basins and channel fills, and poor recharge. Bedinger and Reed (1963) listed yields of only a few hundred gpm for wells completed in the terrace deposits in Desha and Lincoln counties. However, many of these wells were <100 feet and probably do not penetrate the full thickness of the aquifer, where better yields may be obtained. A review of well logs for this report revealed well depths consistently between 120 - 170 feet with a maximum depth of 172 feet in Ashley County. Although many wells were less than 100 feet in depth, primarily in Lincoln and parts of Drew County, these wells were mostly domestic and most probably did not extend to the base of the aquifer. The deeper wells undoubtedly reflect the thickness of the terrace deposits as compared to the recent alluvial deposits in the delta, and are in agreement with formation thicknesses provided by Onellion (1956) of 175 feet one mile east of the Monticello ridge, where the old channel is deepest, to approximately 95 feet near the border in Drew County.

The Jackson Formation and overlying Pliocene deposits have sufficient yield for use as a domestic water supply, based on the extensive history of both deposits as domestic and farm supply sources. A review the various reports listed in this study revealed no fewer than 90 Jackson and 35 Pliocene wells in Drew and Lincoln counties, and six wells in the Jackson Formation in Jefferson County. The combined effects of poor yields, little movement, and resulting high mineralization makes the Jackson a poor choice as a dependable water supply, where other supplies are available. With the advent and large growth of community water systems, operational wells in the Jackson and/or Pliocene deposits are difficult to locate. Only one homeowner interviewed for this report had an operational well (used for watering the garden), which was completed in the Jackson Formation, based on water quality and state geologic maps.

Most wells in the Jackson researched for this study were less than 50 feet deep and many less than 30 feet; however, four wells were greater than 150 feet. All of the wells noted as being completed in the Pliocene deposits were less than 50 feet deep. Water quality in the Pliocene deposits is much less mineralized than that in the Jackson; however, the deposits are thin, averaging 10 - 15 feet thick and upwards to 50 feet or so, the saturated portion is very thin, and yields are typically low (Onellion, 1956). Flow is radially outward and discharges at the contact with the Jackson Formation in the forms of seeps and springs (Bedinger and Reed, 1961).

METHODOLOGY

The intended goal of the ground-water sampling phase of the investigation was two-fold: first, to assess potential non-point source impacts to ground water, primarily from extensive pesticide use, and, second, to report on the overall ground-water quality of the Quaternary alluvium in the delta versus the terrace deposits in the upland region. Figure GW-1 shows the location of the sampling sites for the present study. Appendix 5 lists information concerning the location of all ground-water sampling sites. Out of 118 alluvial wells sampled for the present study, 25 of these were in terrace deposits in Ashley and Drew counties, and all of the remaining wells were agricultural wells in the delta. Although most of the agricultural wells were associated with row-crop operations, some of these wells were located at fish-production farms.

The wells were sampled during the summer season in 1999 (33 wells) and 2000 (86 wells). All wells were sampled as near to the wellhead as possible through available faucets and other outlets. Most wells were in use at the time; however, where wells were turned on for sampling purposes, the well was allowed to run for a minimum of ten minutes until field-measured parameters had stabilized prior to sampling. All samples were collected in approved containers for the selected parameters. Samples were filtered through disposable 0.45 μm pore-sized membrane in the field for metal analyses and preserved with nitric acid. All other samples were unfiltered samples, stored on ice, and delivered to

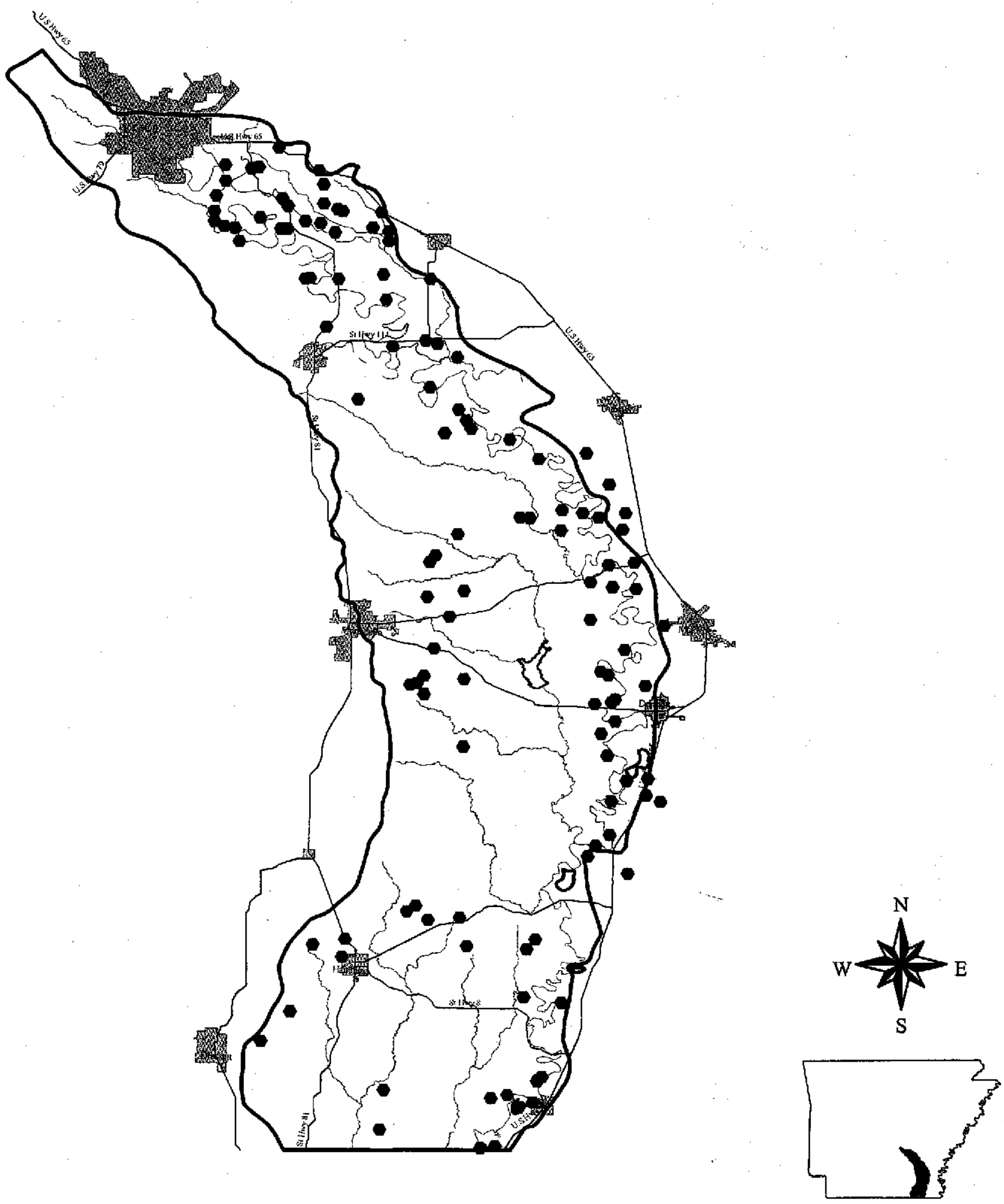


Figure GW-1
Location of Wells Within
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

Legend
Streams
AR Highways
Well

the Department laboratory under chain-of-custody requirements by the sampling team. All samples were analyzed for major and minor cations and anions, nutrients, trace metals, pesticides and total dissolved solids. Analysis for pH, conductance and temperature were performed in the field at the time of sampling with an Orion™ multifunction portable meter. For a listing of analytical methodologies, see the Quality Assurance Project Plan for this survey.

WATER QUALITY

INORGANIC AND GENERAL WATER QUALITY

In general, the water quality in the alluvial aquifer throughout the watershed is very good as compared to national drinking water quality criteria. The largest problem in using the water for either domestic or industrial uses (and to a certain extent, irrigation purposes) is the high iron, manganese and hardness in the ground water associated with problems ranging from staining and scale formation to objectionable taste. Secondary maximum contaminant levels (MCLs) have been set for many of these inorganic substances for reasons other than hazards to human health. Violations of the secondary MCLs were noted for total dissolved solids (TDS), iron, manganese and aluminum. There is not sufficient room for listing all references to the high iron and manganese content in the alluvial aquifer. It is sufficient to state that elevated concentrations of both metals are ubiquitous throughout the aquifer, and have been referenced by nearly every author reporting on water quality in the alluvial aquifer in Arkansas. Iron concentrations were greater than the MCL of 300 μg/L in all but 24 wells; 23 of which are located in the upland terrace deposits (see next section). Manganese was greater than the secondary MCL of 50 μg/L in all but 18 of the wells. Most wells sampled for the study were below the secondary MCL of 500 mg/L TDS, except for 9 wells, which ranged upwards to 746 mg/L. Five wells exceeded the secondary MCL of 200 μg/L for aluminum. Although there are many scales for determining hardness in the literature, most are similar in their descriptions and within 10 mg/L of one another. The present study used Doll et al. (1963), which states that soft water is that less than or equal to 60 mg/L; moderately hard between 61 and 120 mg/L; hard between 121 and 180 mg/L; and very hard water all those greater than 180 mg/L. Accordingly 15 wells (13%) in the present study would be classified as soft; 31 wells (26%) classified as moderately hard; 34 wells (29%) classified as hard; and 38 wells (32%) classified as very hard. The large numbers of wells (61%) classified as hard to very hard in combination with the high iron and manganese reveal some of the undesirable qualities associated with domestic and industrial uses of the alluvial aquifer.

Table GW-1 lists selected statistical analyses for the all of the wells in the alluvial aquifer with full chemical analyses, with the exception of LIN19, which was completed in the Jackson Formation and does not reflect the typical chemistry associated with the alluvial aquifer (for a complete list of chemical analyses, see Appendix 6). In general, there is a high variability of water quality within the alluvial aquifer, and no unifying characteristics that can be used to fingerprint ground water as originating from the alluvial aquifer. The ground water is typically a calcium-bicarbonate to a calcium + magnesium-bicarbonate water type, and with the exception of eight wells in the terrace deposits, the water type was similar to that of the alluvial aquifer outside of the watershed. Because alkalinity was not measured on some of the sample runs, a complete analysis of all major cations and anions were performed on

Table GW-1. Statistical analysis of selected parameters for wells in the alluvial aquifer.

Parameter	Minimum	Maximum	Mean	Median	Standard Deviation
Calcium, mg/L	3.6	110	42	40	24.6
Magnesium, mg/L	1.4	29.5	9.9	8.5	5.7
Potassium, mg/L	0.5	4.9	1.9	1.8	0.7
Sodium, mg/L	4.2	76	24	20	13.7
Chloride, mg/L	4.2	93	20	16	15.2
Sulfate, mg/l	0.9	93	10.6	5.5	15.9
Bicarbonate, mg/L	32	442	202	196	102.7
TDS, mg/L	92	539	255	235	98.7
Iron, mg/L	<0.015	41.4	10.0	8.8	8.5

only 98 of the 118 alluvial wells. Calcium was the dominant cation in 84 of the 98 samples (85%) and was greater than 50% of the total cations in 57 of the 98 samples (58%). Bicarbonate was greater than 50% of the total anions in all but one of the samples, ASH027, in which chloride ions dominated with 66% of the total anion molar concentration.

Chloride concentrations range from approximately 4 mg/L to 137 mg/L, with a median concentration of 17 mg/L and a mean concentration of 25 mg/L. Four wells have concentrations exceeding 100 mg/L and are located in Jefferson and Lincoln counties. Isolated areas of chloride concentrations >100 mg/l and ranging upwards to >300 mg/L are located in parts of Jefferson, Lincoln and Desha counties and have been documented in other publications including Fitzpatrick (1985), Klein et al. (1950), Bedinger and Reed (1961) and Kresse et al. (1997). In many cases, these areas of >100 mg/L chloride are less than 5 miles in diameter, and there is no definitive documentation as to their origin. Possible causes include the Arkansas River, which maintains current maximum annual concentrations exceeding 200 mg/L (unpublished ADEQ data); older contamination from an ancestral channel, when concentrations exceeded 1000 mg/L, which were never flushed from less permeable zones within the aquifer; poor surface recharge leading to minimal flushing and increased residence time for the ground water underflow from other parts of the aquifer; downward percolation by irrigation water, which has been enriched in salts by evaporation at the surface; and up-welling of poor quality water in Tertiary sediments through thinning portions of the confining layer. Problems associated with bypass through the annulus of poorly-constructed wells would have to be discounted largely by the absence of nitrate and other surface contaminants. Further research is necessary to determine these sources, and low cost alternatives without the necessity of monitoring-well installations might include sampling of existing wells over a growing season for observation of trends in salt concentrations, examination of the soil types, and monitoring of water levels.

Although the chloride concentrations are below the secondary MCL of 250 mg/L for all wells, the importance of addressing salinity is related to the various problems imposed by the use of high salinity waters for irrigation purposes. High chloride concentrations can pose immediate problems, including the burning of crop foliage, to long-term effects, including the reduction in a plant's ability to take up water as a result of an increase in the osmotic pressure of soils (McFarland et al., 1998). High sodium levels commonly encountered in high salinity waters can cause soil structure deterioration and water infiltration problems (Cardon and Mortvedt, 2001).

Agronomists commonly use the conductance of irrigation waters to determine suitability from a salinity standpoint. The USDA (1969) and the University of Arkansas Cooperative Extension Service (CES, unpublished data) both list irrigation waters with conductance values exceeding 750 μS/cm as waters of concern as related to salinity. The CES also lists 70 mg/L chloride as posing potential problems for crops, especially to rice. These values are site-specific and are affected by soil type and chemistry and amount of annual flushing. Seven water samples had chloride concentrations exceeding 70 mg/L, and ten samples had conductance values exceeding 750 μS/cm. All seven samples with high chloride concentrations (>70 mg/L) had conductance values exceeding 750 μS/cm, and show a very good correlation between chlorides and conductance at this range, making the less-expensive field conductance reading an excellent screening tool for assessing potential problems with irrigation waters.

Concentrations for nitrate ranged from non-detect at 0.01 mg/L to 0.94 mg/L, with a mean concentration of 0.06 mg/L and a median concentration of 0.02 mg/L. There were 25 wells with non-detect concentrations out of 119 wells. These results are similar to those of Kresse (1997), which noted nitrate concentrations ranging upwards to 0.26 mg/L in 77 wells in parts of Jefferson, Desha and Phillips counties. The low concentrations of nitrate in the alluvial aquifer, especially with regard to the high detection rate of pesticides (see pesticide section below), may be the result of several mechanisms including potential de-nitrification of nitrates in the subsurface, mixing and dilution at the deeper point of withdrawal for most wells, and maintenance of recommended rates of fertilizer and uptake by crops. It should be noted that the dominant crop type noted for the present investigation was soybeans and cotton. Steele et al. (1994) noted that shallow alluvial wells (<50 feet) in Woodruff County had median nitrate concentrations of 2.94 mg/L, whereas deep wells (>50 feet) had median concentrations of 0.13 mg/L, and suggested de-nitrification with depth as a possible reason for the difference. These findings, while limited in extent, show differences in nitrate concentrations for shallow versus deep wells and would suggest de-nitrification or mixing and dilution with depth as dominant causes for lack of nitrates with depth. However, most of the shallow wells were domestic wells and the impact of on-site septic systems cannot be negated, while most of the deeper wells were irrigation wells and would not have this input. The differences between the shallow and deep wells may be directly attributable to the well type and source inputs.

Concentrations for arsenic in the ground water samples ranged from non-detect at <1 μg/L to 50.67 μg/L. The U.S. Environmental Protection Agency recently revised the MCL for arsenic from 50 μg/L to 10 μg/L. The final proposed rule was published in the Federal Register (66 FR 6976, January 22, 2001). Community water systems and non-community, non-transient water systems with arsenic exceeding 10 μg/L in their drinking water will be required to reduce the arsenic concentrations. Compliance with the 10 μg/L MCL is required 5 years after the publication of the final rule, which will be in January, 2006. Only one well sampled for the present study had an arsenic concentration exceeding 50 μg/L; however, 21 of 118 alluvial wells had concentrations exceeding 10 μg/L. As such, there may be potential problems with arsenic concentrations in the alluvial aquifer from a health consideration that have not been previously documented in the literature. A review of data within the Department files revealed that this problem is not observed in the deeper Tertiary aquifers, including the Cockfield and Sparta aquifers. In addition, there were no elevated arsenic concentrations in water samples from wells located in the terrace deposits. A more detailed discussion on the difference in arsenic concentrations between the two geologic provinces is presented in the next section.

WATER QUALITY IN ALLUVIAL DELTA VERSUS UPLAND TERRACE DEPOSITS

During the planning phase for the present investigation, every effort was made to sample a uniform distribution of alluvial wells in the Quaternary terrace deposits. Ultimately, 25 terrace wells were selected in Ashley and Drew counties and included both irrigation and domestic wells. Because of the high iron content associated with the alluvial aquifer, the samples which are not preserved for metal analyses show a strong yellow to orange tint within hours of sampling, although clear and transparent at the time of sampling. By the next morning there is often a noticeable and appreciable quantity of iron oxide on the bottom of the container. It was noted that the samples from the terrace deposits remained clear the next day and, together with conversations with area farmers, indicated possible chemical differences between the ground water in the delta versus that in the terrace deposits.

A cursory inspection of the data from both sets showed marked differences in the iron and manganese concentrations. Iron concentrations in the delta deposits ranged from 291 to 41,390 μg/L, with a mean and median concentrations of 12,548 μg/L and 11,600 μg/L, respectively. However, 16 of the 25 terrace wells were below the detection limit of 15 μg/L, with a mean iron concentration (using 7.5 μg/L for non-detect samples) of 340 μg/L. Similarly, 8 of the 25 terrace wells revealed manganese concentrations less than the detection limit of 0.5 μg/L, and had a mean concentration of 192 μg/L versus 620 μg/L for the delta wells. Because there were large apparent differences in the mean concentrations for arsenic, barium, boron, and possibly other constituents, a *z*-test was performed to investigate the statistical significance of the perceived differences. A *z*-test is a statistical test that evaluates the differences between the means of two sample populations using calculated variances for each set, and was chosen because of the distribution of the sample concentrations. The results of the *z*-test are provided in Appendix 6. Large, statistically significant differences were noted between the two sets of data for iron ($p = 0$) and manganese ($p = 2.5E-4$), as expected, and additionally for arsenic ($p = 2.2E-10$) and barium ($p = 1.1 E-19$).

The most likely controlling factor influencing the concentration of barium in the alluvial ground water is its absorption by metal oxides. Hem (1989) noted that barium is commonly found in deep-sea manganese nodules and also in freshwater manganese oxide deposits. The fact that the delta wells have significant increases in barium, in addition to iron and manganese, appears to support co-precipitation as the source for the increased barium. The source of increased arsenic in the delta wells is complicated by its large use in pesticide formulations over the years. However, when applied as a pesticide, arsenic competes with phosphorus in the soil and forms insoluble salts with various metals (USDA, 1996), and is listed as having a "low" leaching potential (Wauchope, 1988). A major inorganic factor acting to maintain concentrations of arsenic at low levels is adsorption by hydrous iron oxide (Hem, 1989). Because the arsenic, similar to barium, is elevated along with iron and manganese in the delta deposits and appears relatively immobile in soils, it appears more likely that the arsenic is associated with an inorganic source rather than through pesticide application. Additionally, the fact that the arsenic concentrations are typically 2-5 orders of magnitude higher than the pesticide concentrations would support an inorganic source for the arsenic.

Broom and Reed (1973), reporting on the aquifer-stream relationship in Bayou Bartholomew, list differences between the terrace and delta deposits, and state that the water from the terrace deposits is a sodium-bicarbonate type, which is lower in TDS, hardness and iron and has a lower pH than water from the delta alluvial deposits. However, results from the present investigation revealed that the mean, median and range of concentrations for TDS are very similar for both aquifer systems. Furthermore, although 7 of the 25 wells in the terrace deposits had waters of a sodium-bicarbonate chemistry, which were all located within Drew County, the remaining water samples were calcium-dominated water types. Values for pH were ranged from 6.0 to 7.4 for both areas and had similar mean and median values. As such, there does not appear to be consistent differences in water type or general chemistry based on data for this report by which to differentiate the two aquifer systems, except for the significant differences in iron, manganese and arsenic. Several areas within the alluvial aquifer as a whole have water types trending from a calcium-bicarbonate to a sodium-bicarbonate water type, which is a result of cation exchange, mixing with other water sources, or a combination of both, and is controlled by multiple processes including amount of flushing, surface recharge, residence time, aquifer transmissivity and other physical processes and site characteristics.

WATER QUALITY IN THE JACKSON FORMATION

Conversations with several residents revealed a paucity of domestic wells in the Jackson Formation for Drew and Lincoln counties and, together with the listed objectives for the investigation, efforts were focused on water quality in the quaternary deposits, with little attention to the saturated portions of the exposed Tertiary and Pliocene deposits. One sample, LINC19, was taken from domestic well in Star City, which was originally thought to be completed in the terrace deposits. However, the sodium concentration of 243 mg/L was over three times the maximum concentration in the other wells (75 mg/L) and an order of magnitude larger than the mean concentration of 25.7 mg/L for all other wells. The sulfate concentration of 211 mg/L was similarly elevated over the maximum and mean concentrations of 93 mg/L and 11.7 mg/L, respectively. Boron and zinc were also elevated with respect to the other wells, and the boron concentration of 1,356 μg/L exceeded the EPA health advisory limit of 600 μg/L. Onellion (1956) cited high concentrations of sulfate (maximum concentration of 3,080 mg/L), some elevated concentrations of chloride, and appreciable quantities of cations in the waters from the Jackson Formation in Drew County, and attributed this to the low permeability and restricted movement of ground water. Bedinger and Reed (1961) cited variation in the water quality (poor to fair) in the Jackson in Lincoln County and stated that the water is high in sulfate, although less mineralized than that in Drew County. Their data reveals a wide range in sulfate concentrations with a maximum concentration 2,360 mg/L. A close inspection of the geologic map revealed that LINC19, previously thought to be in the terrace deposits, is close to the mapped contact of the Jackson Formation and terrace deposits, and is either completed in Jackson Formation or receiving significant water from this source.

One spring (LINC20) that was previously used to water a poultry house was sampled in Lincoln County. The location of the spring and household is very near the contact of the Pliocene deposits and Jackson Formation, according to the state geologic map. The house is situated at the top of a dissected plateau and the spring is approximately 35 feet below the elevation of the homestead and the poultry house. The possibility that the spring is emitted from the pliocene deposits at the contact of the Jackson clay, is consistent with the observation that the flow in the Pliocene deposits is radially outward from the central portion of the outcrop to exposed formational contacts as seeps and springs on top of the Jackson (Onellion, 1956). The low pH (4.86) and TDS concentration (76 mg/L) indicates a water of short residence time with little buffering. The spring also contained the only detected beryllium concentration (0.2 μg/L) and the highest copper concentration (5.2 μg/L), which is possibly a result of the low pH combined with the near surface input and short residence time for the ground water. LINC20 also had the highest nitrate concentration (6.5 mg/L) and the only nitrate concentration >1.0 mg/L; a probable result of the near proximity and the drainage alignment with the poultry house.

RESULTS OF PESTICIDE INVESTIGATION

All ground water samples were analyzed for 61 pesticides and pesticide byproducts. Appendix 6 lists the results of all pesticide analyses and the percent recovery for the surrogate compounds. Pesticides were detected in 28 of the 119 well-water samples (no detections for LIN20, the spring sample), resulting in a 24% detection rate for the wells. A similar nonpoint source investigation by ADEQ in 1996, which documented water quality in 77 wells in parts of Jefferson, Desha and Phillips counties for the same suite of pesticides, listed 24 wells with pesticide detections for a detection rate of 31% (Kresse et al., 1997). Table GW-2 lists the wells with positive pesticide detections and the corresponding pesticide concentrations. Pesticide concentrations range from 0.002 μg/L to 0.519 μg/L. Bentazon was the most frequently detected pesticide, and 19 of the 24 wells (56 % of pesticide detections) with positive detections contained detectable concentrations of bentazon. This result is similar to that of other studies which showed bentazon as the most frequently detected pesticide. Kresse et al. (1977) noted that bentazon accounted for 37% of the total detections in a 1996 study, and Nichols et al. (1996) revealed that bentazon accounted for 43% of the total detections of wells sampled throughout the Mississippi alluvial plain of Arkansas over an approximate 5-year sampling period. Figure GW-2 shows the detection percentage for all pesticide detections for the present study.

The migration of pesticides to the ground water table is dependent on several factors including site characteristics, management practices, weather conditions and pesticide chemical characteristics. Important site characteristics include the depth to the water table, permeability of surface soil and subsurface material, and the fraction organic carbon in the soils. Rainfall amount and intensity are critical for generation of percolating recharge waters acting as a transport mechanism. Additionally, management practices regarding irrigation timing and rates together with flooding of certain crops can influence the downward movement of water. Other practices including pesticide storing, handling, mixing and application methods can influence the amount of pesticide applied or spilled onto the land, increasing the potential for migration to the subsurface. Temperature can be a critical factor in the stability of certain pesticides in surficial soils. Lastly, but perhaps most importantly, chemical characteristics which affect the stability and mobility of pesticides in the environment appear to be the most critical factor in controlling the types of pesticides detected in ground water in Arkansas.

Given the above factors, it is reasonable to assume that the greatest potential for pesticide leaching is through the use of highly soluble pesticides onto permeable soils overlying shallow ground water, followed by intense and heavy rainfall. Furthermore, it should be easy to predict the occurrence of pesticides according to their type, and model these occurrences according to important site characteristics retarding their transport. However, Barbash and Resek (1996) who conducted an excellent review of studies throughout North America concerning the occurrence, distribution and trends of pesticides in ground water, noted that the pesticides from every chemical class, including extremely hydrophobic pesticides, have been detected in ground water around the nation.

Table GW-2. List of wells with positive pesticide detections (all detections in $\mu g/L$).

Station	2,4 -D	Bentaszon	Acifuorfe	Molinate	Simazine	Prometryn	Terbutryn	Metolachlo	Cyanazine	Pendimethalin	p-p-DDE	Methoxychlor
DREW03										0.013		
LINC01		0.025										
ASH04		0.024										
DREW05		0.025										
ASH07		0.023										
ASH09						0.440						
ASH10						0.050						
ASH11						0.011						
ASH15											0.009	
ASH17		0.094										
ASH18		0.014										
LINC05	0.025						0.127					
JEF01		0.058										
JEF02		0.017							0.010			0.002
JEF09		0.033						0.007				
JEF13		0.519										
LINC08		0.018										
LINC10		0.069		0.048								
LINC11		0.014										
LINC14				0.486								
LINC16		0.043										
LINC17		0.006										
DREW16		0.035										
JEF022		0.040										
LINC21			0.265									
DREW31					0.015							
LINC22		0.007										
LINC23		0.009										

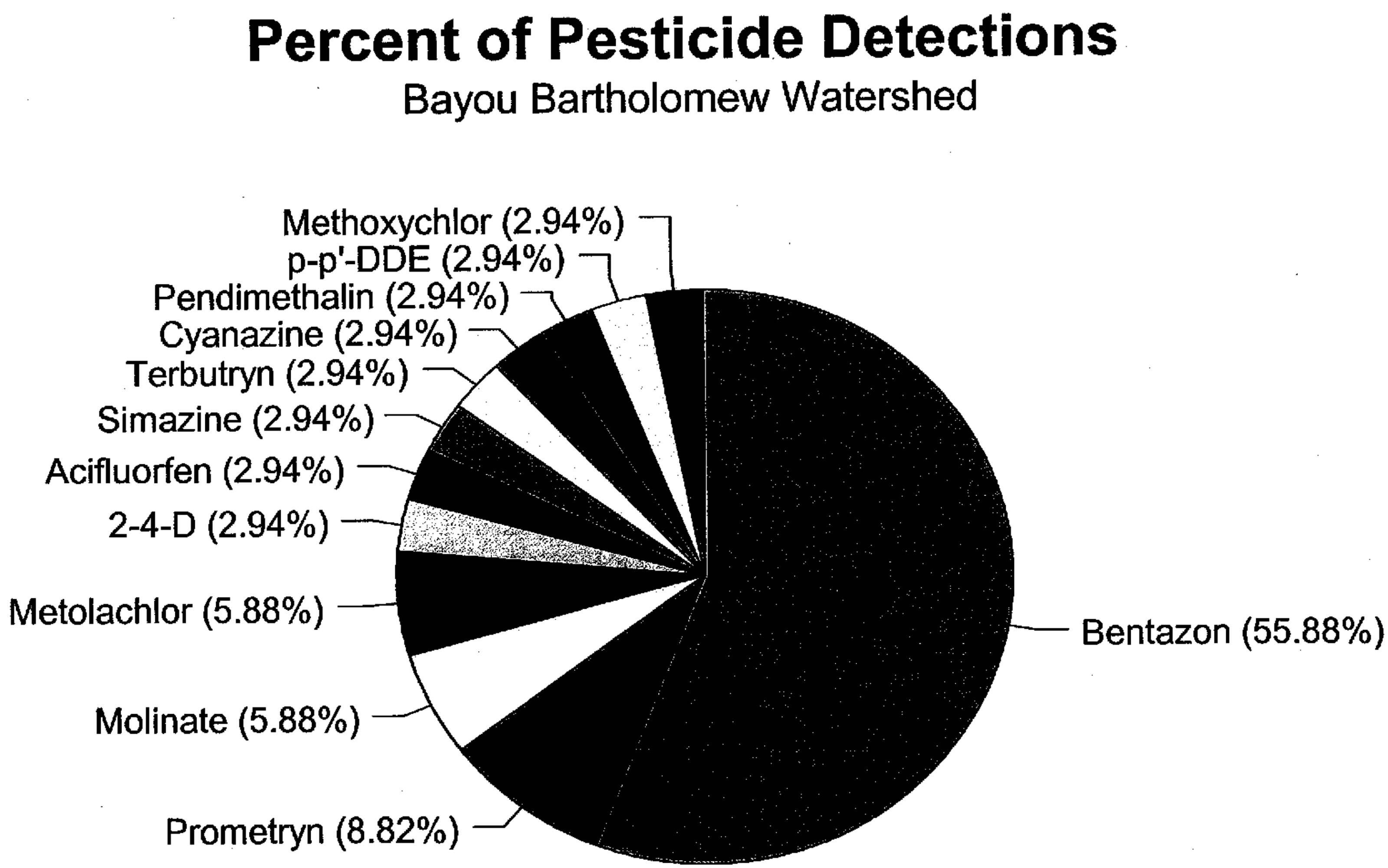


Figure GW-2. Percent of pesticide detections in ground water in Bayou Bartholomew watershed.

They attributed the widespread detection of a number of hydrophobic pesticides in ground water to preferential transport along macropore regions in the soil profile. They also cited preferential transport as a dominant cause in the poor performance of most mathematic models and vulnerability assessments in predicting the occurrence and distribution of pesticides. In addition to preferential transport, secondary causes for the poor performance of prediction tools were (1) variations in listed adsorption and field half-life values, and (2) variations in the detection limits.

A problem in assessing pesticide data on any level, especially on a nationwide basis, is the large differences between investigators in every phase of a pesticide investigation from planning to laboratory analysis. In Arkansas, there are currently three major agencies investigating the occurrence of pesticides in ground water: the ADEQ, the Arkansas Water Resource Center (AWRC) and, to a lower extent, the USGS. Kresse (1997) noted differences in the data sets between all three agencies in the detection limits and types of pesticides. For instance, the USGS did not have bentazon, molinate, aciflurofen and fluometuron in their set of analytes, although these pesticides were in the top five most frequently detected pesticides in the state. Conversely, the AWRC did not include prometryn, ametryn or silvex in their analyses, although ADEQ and USGS included all three of the pesticides, and all three were detected more than once. The percentage of wells with positive pesticide detections ranged from 31% to 33% for the ADEQ and the USGS, respectively; whereas, the AWRC only showed a 6% detection rate. The differences in the detection rates were dominantly the result of the higher detection limits for the AWRC. In addition, many of the wells sampled by the AWRC were domestic wells, whereas most all the wells sampled by the ADEQ were irrigation wells.

Unfortunately, because the farmers are not required to report pesticide use, there is no reputable means to assess the most frequently used pesticides in the state. Pesticide sales data are available, but not of desirable quality for many reasons including sales across state and county lines. Kresse (1997) used soybean, corn and rice pesticide survey reports by the U of A CES in conjunction with crop production figures to assess the most frequently used pesticides. Although the table provides an accurate representation of pesticide use in 1996, major changes in seed formulations have led to changes in current pesticide use. For example, Roundup Ready ® soybeans have greatly diminished the use of bentazon, trifluralin and aciflurofen, and increased the use of gyphosate. Similar changes have resulted in the increased the use of bromoxynil in cotton (Ford Baldwin, CES, personal communication). Many other pesticides are used only with exemptions from restricted-use requirements by the federal government and may be used only within a limited time frame (one or two seasons). However, because many of the pesticides are very persistent in the ground water environment, the table from the 1997 report is a good representation for pesticides used both historically and currently in the state, although the frequency of use has changed with current practices. The lack of accurate and quantitative numbers for actual usage underscores the lack of information required by investigators for purposes of both planning and correlation analyses at the level of quality desired, and, combined with differences in the instrumentation and detection limits for individual agencies, creates problems in interpreting the data statewide.

The above discussion is not necessarily an academic exercise. The Arkansas Plant Board requires data on the occurrence of pesticides in ground water to evaluate which pesticides pose problems to the environment. The USGS data, prior to 1997, would not have revealed the frequency of which bentazon is detected in ground water, whereas the detection frequency by the AWRC (6%) would suggest that very few wells have detectable pesticide concentrations. Various mathematical models have been used by the U of A at Fayetteville to predict the occurrence of pesticides based on site characteristics or vulnerability indices. Because they originally used the AWRC data base, the data was too limited to produce statistical significance and to draw any substantiative conclusions. Results of the modeling to date have only been of marginal success (Lin et al., 1999). However, many of the problems complicating the correlation and prediction process may be related more directly to the resolution of the data layers (vulnerability indices) and spatial variability in the soil characteristics than the detection limits and type of pesticide data (Don Scott, personal communication, 2001). Another factor that cannot be overlooked is short-circuiting or bypass, in which back-siphoning, direct entry along well annulus, or spillage in conjunction with preferential transport via macropore regions in the soil allow rapid transport to the ground water table. Because most vulnerability models primarily are designed to evaluate transport based solely on site characteristics, and bypass can occur in vulnerable and non-vulnerable areas, such occurrences can limit the success of the models in correlating pesticide detections to vulnerable areas.

In spite of the problems associated with the correlation of observed data to that of predicted data, the ADEQ continues to detect only medium to high solubility pesticides in ground water; a fact that would seem to validate prediction models. Figures GW-3 and GW-4 graphically depict the correlation between solubility and adsorption (Koc) for pesticides with two or more detections to date by the ADEQ in ground water and surface water, respectively. The high detection of low solubility pesticides in surface water attests to the fact that facilitated transport by loss of fines during rainstorm events acts to deliver virtually insoluble pesticides into streams and other surface water bodies. Their lack of detection in ground water fits predictive models, which theorize that pesticides with a high affinity for organic matter and low solubility are vertically retarded with respect to percolating recharge waters and, as such, have a low probability for transport to ground water. The figures also reveal the high number of pesticide detections in surface water as compared to the detections in ground water. The detection of dominantly high solubility, low adsorption pesticides in ground water lends support to the assumption that inadequate data layers and spatial variability may be the dominant factor affecting vulnerability modeling in Arkansas.

Up through the summer of 2000, over 110 pesticides detections have been recorded in almost as many wells by the combined efforts of the ADEQ and the AWRC. Approximately 600 wells have been sampled for the occurrence of pesticides in the Mississippi Embayment and Costal Plain regions of the state. However, very little progress has been made toward determination of the source and/or transport mechanisms by which pesticides are reaching the ground water table. The use of referenced material on reported field observations and resulting implications of these observations can lead to erroneous predictions of pesticide transport mechanisms. For instance, there are abundant statements in the literature related to the limited extent of residues in a field soil core or laboratory column, which in many cases is believed to represent the maximum extent of vertical transport for a given pesticide.

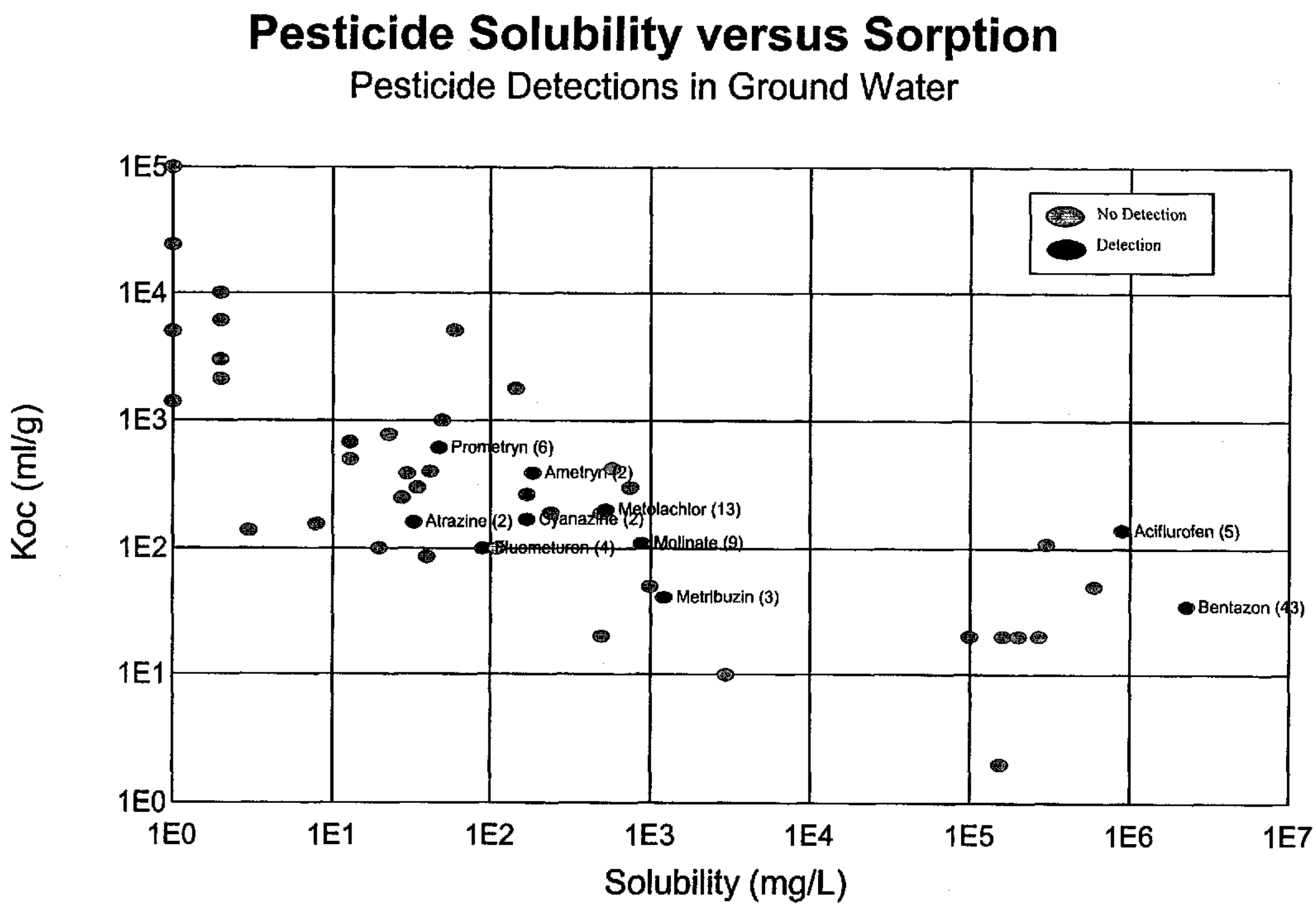


Figure GW-3. Pesticide solubility versus sorption (Koc) for most frequently used pesticides in Arkansas. Detected pesticides represent pesticides with two or more detections in ground water.

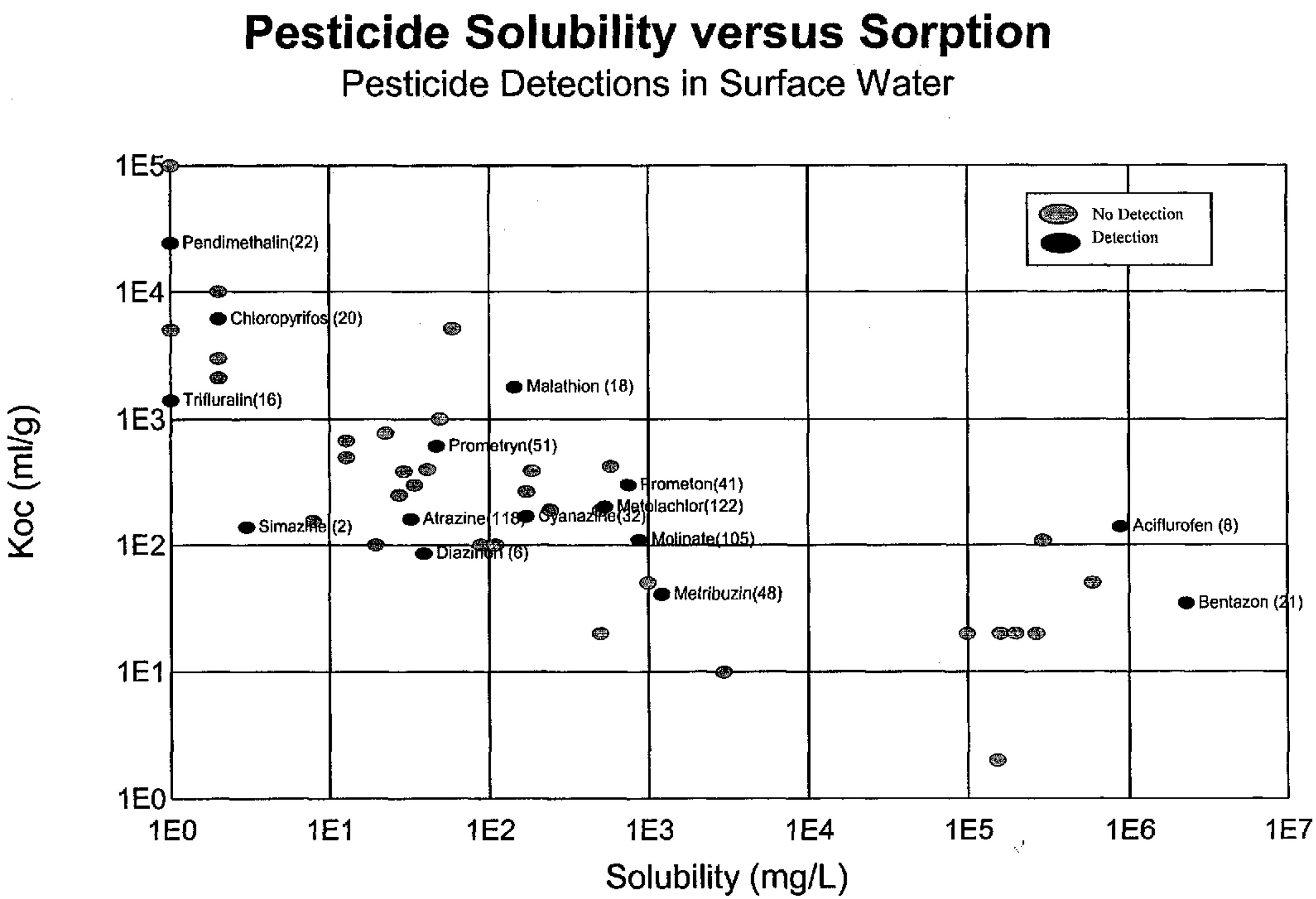


Figure GW-4. Pesticide solubility versus sorption for most frequently used pesticides in Arkansas. Detected pesticides are those with two or more detections in surface water.

Examples such as "lysimeter studies clearly demonstrate bentazone does not leach" (Meister, 1996), and "bentazone is degraded more quickly than it can leach" (BCPC, 1999), together with the fact that it is listed as having a "medium" leaching potential as a result of the relatively short field half-life of 10 days (Wauchope, 1988), suggest a very low potential for ground water contamination. However, bentazon accounts for over half of the pesticide detections and has been detected in over 50 wells in Arkansas. In view of the statements concerning the non-leaching nature of bentazon, an initial assumption would be that its occurrence is dominantly the result of a point-source or near-wellhead source.

Speculations concerning the source of pesticides in the alluvial aquifer in Arkansas have directly suffered from such misinformation concerning the fate and transport for specific pesticides. The Arkansas Soil and Water Conservation Commission (ASWCC, 1996) in an amendment to its Nonpoint Source Pollution Management Program stated that "The detection of a specific pesticide, bentazon (not known to leach below the plow layer), suggests that improperly constructed water wells may provide contaminant pathways into ground water." Although improperly-constructed wells are potential pathways for ground water contamination, the detection of bentazon as an implication of a point-source of contamination is contrary to its transport characteristics based on the chemical properties for bentazon. Bentazon in its soluble salt formulation is infinitely soluble; in deionized water, 2.3 kg of sodium bentazon will dissolve in one liter of water. In combination with a relatively low Koc value of 34 ml/g, these characteristics indicate a high mobility and high potential for ground water contamination. Bentazon, although a fairly high-use pesticide, especially in soybean production, was listed as #14 on the list of most-frequently used pesticides in Arkansas (Kresse, 1997); however, it is the pesticide most frequently detected in ground water in Arkansas.

Cavalier et al. (1989) noted only one well with a positive pesticide detection and attributed [illegible] source to localized spillage or handling error, as previous and subsequent sampling at this well fai[illegible]o detect any pesticides. They attributed the lack of detections to abundant clay soils, low percolatio[illegible]ates and deeper ground water table, which culminate in a low vulnerability for Arkansas soils. However, bentazon was not one of the analytes, and the detection limits ranged from 0.1 to 0.5 $\mu g/L$. Senseman et al. (1997) focused on mixing/loading sites and stated that pesticide proximity to wells during mixing/loading activities was a greater influence on ground water contamination than chemical or site characteristics, because most of the soils were not listed as well-drained, and, as such, were not perceived as conducive to leaching by pesticides.

Statistical comparisons between vulnerability indices and ground water detections have sought to distinguish contamination from normal application versus "quasi" point sources of pesticides (Lin et al., 1999). Because these studies have met with only limited success, there is a tendency to explain the lack of correlation by contamination at the wellhead and exclude normal application practices as a dominant source. However, this may be unrealistic in view of the large scale for the data layers and spatial variability of soils at the site level. Barbash and Resek (1999) stated that most of the vulnerability studies nationwide have been unsuccessful in predicting contaminant occurrence in ground water; of the 19 studies reviewed, only 10 of these had significant results, two of which observed relations opposite to that expected (i.e., more severe contamination in areas deemed to be less vulnerable). Of the 10 studies reviewed that used the DRASTIC system or another arbitrary scoring system, only three revealed significant, positive correlations between predicted and observed contamination. They cited a number of reasons for the limited success including (1) neglect of significant physical and chemical processes that influence the transport and fate of pesticides in the subsurface, including preferential transport and transformations, (2) the inappropriate use or weighting of one or more vulnerability factors, and (3) the use of large-scale input data for predicting contamination occurring on a local scale.

Some attempts at defining sources of contamination in Arkansas have been based on purely corollary observations. ASWCC (1996) stated that "Because there is an inconsistent pattern of pesticide detections ... the threat is likely from pseudo point sources such as inflow through improperly constructed wells, spillage at mixing and handling facilities, and improper handling of bulk quantities of chemicals rather than from general application and leaching pesticides." Nichols et al. (1993) and Steele et al. (1993) both noted the possibility of back-siphoning or some form of wellhead contamination to explain both the spatial variance in the pesticide detections and the temporal nature of their occurrence (not detected in re-sampling events). However, Steele et al. (1993) did cite the possibility of preferential transport through macropore zones as a possible route. Barbash and Resek (1999) discussed the ongoing debate by researchers concerning pesticide sources across the nation and noted at least three different criteria that were used to distinguish between point and nonpoint sources including: (1) spatial patterns of contamination: (2) transiency of pesticide detections in individual wells: and (3) severity of contamination. In comparisons of nationwide, site-specific studies on both point and nonpoint sources for pesticides, they indicated that none of the above criteria can reliably distinguish the source of contamination, although point sources are constantly invoked to explain spatial variance and transiency of detections in the Arkansas data.

Kresse et al. (1996) conducted a site investigation in Augusta, Arkansas, in which repeated sampling by the AWRC and the Department had confirmed the presence of elevated concentrations of bentazon (upwards to 70 μg/L) in a domestic well surrounded by crop land. Installation of four monitoring wells also revealed the presence of dinoseb upgradient from the domestic well; a pesticide that had been banned since 1986. Bentazon had not been used by the present owner since acquisition of the land, which indicated that both dinoseb or bentazon had been present in the ground water for over 10 years, although void of a surface input source over this period of time. Determination of ground-water flow directions, analytical water chemistry, soil type, and review of the site history and past pesticide use indicated that the contamination had occurred from repeated spills from mixing/loading activities and possible releases from the numerous pesticide containers found at the site during the land acquisition. Well-water samples continue to reveal bentazon at greater than 10μg/L at the present date, and demonstrates the persistence of both pesticides in the subsurface environment, although bentazon has a field half-life of only 10 days. The persistence of such a high solubility pesticide over time was attributed to diffusion from less-permeable micropore regions in the soil profile. The investigation also illustrated the potential dangers in relying on field half-lives for predicting pesticide leaching potential, as bentazon has a reported field half life of 10 days (Wauchope, 1988).

Much of the above discussions concerning sources of pesticides in ground water illustrates the lack of information concerning the dominant mechanisms by which pesticides are transported to the ground water table in Arkansas. In view of the lack of information at the site level in combination with the lack of success of present modeling efforts, the possibility of contamination from normal application cannot be overlooked by investigators. Most of the wells sampled for the present investigation were in the middle of fields, and not in proximity to established or potential mixing/loading sites. The abundance of low-level detections of soluble pesticides throughout the watershed and the lack of detection for hydrophobic classes of pesticides, together with information to date concerning the numerous pesticide detections throughout the delta, provide strong corollary evidence for vertical migration of pesticides through normal application practices. The determination of dominant transport mechanisms for pesticide transport to the subsurface will only be gained through additional site investigations and improvement in the resolution of vulnerability indices used in current models.

SUMMARY AND CONCLUSIONS

Ground water quality was assessed in the Bayou Bartholomew watershed through the analysis of 119 wells and one spring sample. All the wells were completed in Quaternary deposits; 25 in the upland terrace and 93 in the delta portion of the watershed. One well was completed in the Jackson Formation. Concentrations for all parameters in samples from the alluvial aquifer are below the primary drinking water standards, with the exception of one well, which exceeded the maximum contaminant level for arsenic. Violations for secondary maximum contaminant levels, which are instituted for aesthetic reasons as opposed to health concerns, were noted for iron, manganese and aluminum.

A proposed revision in the MCL for arsenic was published in the Federal Register (66 FR 6976) on January 22, 2001, which effectively lowered the drinking water standard from 50 μg/L to 10 μg/L for arsenic. Only one well exceeded the 50 μg/L level for the present study; however, 21 wells in the delta region exceeded the 10 μg/L level, which suggests a potential health threat where the water is used for drinking water purposes. The absence of elevated levels (> 10 μg/L) in the terrace deposits, together with other corollary evidence, suggests the source of arsenic may be inorganic and related to the mineralogy of the delta alluvial deposits.

The samples were analyzed for 61 pesticides and pesticide byproducts. Pesticides were detected in 28 of the 119 well. Bentazon was the most frequently detected pesticide, accounting for 56% of the detections. Pesticide concentrations were low, ranging from 0.002 μg/L to 0.519 μg/L, which were 3-5 orders of magnitude below listed MCLs and/or health advisory limits. The low pesticide and nitrate concentrations suggest that agricultural impacts to ground water are minimal. The frequent occurrence of bentazon suggests that it has a strong leaching potential and the necessity of further monitoring to evaluate its extent and magnitude within the watershed.

The one sample taken from the well completed in the Jackson Formation revealed elevated concentrations of sodium, sulfate, boron and zinc. The poor quality and low yield of water from the Jackson Formation has been documented in several older USGS reports. The Jackson Formation was extensively used in the past for domestic supply, but the growth of community water systems has negated its present use as a drinking water supply. As such, little emphasis was placed on documenting water quality in this aquifer system for the present report.

One spring sample emanating from the Pliocene deposits, which overlie the Jackson Formation revealed an elevated nitrate concentration of 6.5 mg/L. The source of nitrate appears to be the result of an upgradient poultry house. However, there are very few poultry operations in the watershed, and these were not viewed as major nonpoint source inputs within the watershed. The low pH (4.9) and TDS concentration (76 mg/L) suggests that the spring water was of short residence time in the system and probably from a near source input with little buffering. Ground water from the Pliocene deposits, similar to that from the Jackson Formation, was previously used for small domestic supply purposes; however, community systems have also precluded use of these waters as current drinking water sources.

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AQUATIC MACROINVERTEBRATE ANALYSIS

SAMPLE SITES

Aquatic macroinvertebrates were collected in the Fall of 1999 and Spring of 2000 at OUA0147, OUA0033, UWBYB03, OUA0158, UWCOC02 and OUA0150. High flows prevented spring samples from being collected at OUA0149, OUA0151, UWBYB02, OUA0157, UWCOC01, OUA0154 and OUA0013. Sites sampled during the Spring 2000 include OUA0143, OUA0145, OUA0144, OUA0148, OUA0153 and OUA0155. Figure M-1 depicts the locations of the sites.

METHODOLOGY

Rapid bioassessment (RBA) techniques were used for collection of aquatic macroinvertebrate communities in the watershed. These techniques are described in Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers (Barbour et al, 1999). A modified version of Protocol III was utilized to determine if there were any water quality impairments.

Five minute samples were collected by jabbing a 30.5 cm wide D-shaped dip net along selected stream banks and substrate disturbing the habitat to allow water to carry suspended materials into the net. After collecting, the sample was washed through a sieve and after all large organic and inorganic debris was removed, it was placed in a 1.0 L jar. The sample was preserved with 70% ethanol to be transported to the lab for identification and enumeration.

In the lab, the sample was placed into a 9" x 13" dissecting pan. The pan was swirled to evenly distribute the sample and a 4 inch (10 cm) ring was randomly placed on the sample. Organisms were removed until the ring was depleted of organisms. If less than 95 organisms were encountered in the ring, the sample was swirled again and the ring randomly replaced on the sample. The same procedure was followed until a minimum of 95 organisms was removed from the sample. In cases where more than 100 organisms were encountered in a ring, the entire ring was picked to comprise the subsample. In cases where fewer than 100 organisms were collected in the sample, all organisms were removed from the sample.

Taxonomic determinations were conducted by one person to reduce bias. Organisms were identified to the lowest feasible taxonomical level using keys by Merrit and Cummins (1996) and Pennak (1978). Taxa determinations were checked against regional data to ensure accurate determinations. Taxa and raw tallies were recorded on a bench sheet before enumerating and entering into a modified EPA Region 6 spreadsheet program for further analysis. Modifications were made to use genus-level identifications.

Community comparisons were made using the multi-metric approach. Metrics utilized are listed in Table M-1. These were the most appropriate matrices for the Delta and Gulf Coastal Ecoregion streams and have been utilized in other ADEQ documents concerning biological integrity and water quality.

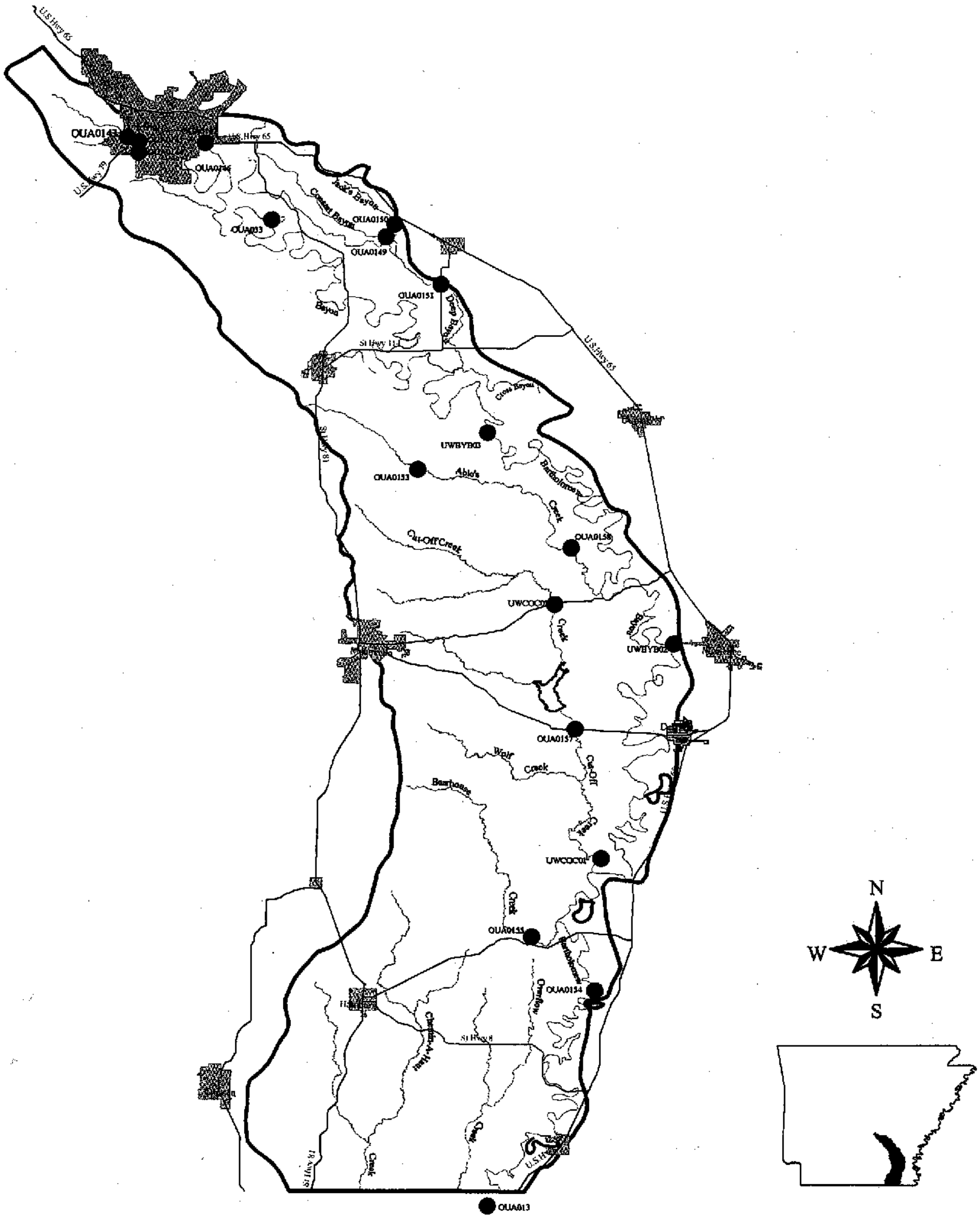

Figure M - 1
Macroinvertebrate Collection Sites
in the
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

Legend
- Streams
- AR Highways
- ▲ Water Quality Only Sites
- ■ Water Quality & Macroinvertebrate Sites
- ● Water Quality, Fish & Macroinvertebrate Sites

Table M-1. Aquatic Macroinvertebrate Metrics Utilized for Determination of Water Quality Impairments

	Metric	Description	Predicted Response to Perturbation
Richness Measures	Taxa Richness	Measures the overall variety of the macroinvertebrate assemblage	Decrease
	Number of Coleoptera	Number of taxa in the insect order Coleoptera (beetles)	Decrease
	EPT Index	Number of taxa in the insect orders Ephemeroptera, Plecoptera & Trichoptera	Decrease
Tolerance Values	Hilsenhoff Biotic Index	Uses tolerance values to weight abundance in an estimate of overall pollution.	Increase
	% Pollution Tolerant Taxa	Percent of taxa with tolerance values ≥7.	Increase
	Number of Intolerant Taxa	Number of taxa with tolerance values ≤3.	Decrease
	% Contribution of Dominant Taxa	Measures the dominance of the single most abundant taxon.	Increase
Composition Measures	% EPT	Relative abundance of the insect orders Ephemeroptera, Plecoptera and Trichoptera	Decrease
	% Ephemeroptera	Relative abundance of the insect order Ephemeroptera	Decrease
	Shannon-Weiner Diversity	Incorporates both richness and evenness in providing information on the make-up of the assemblage and relative contribution of the populations to the community.	Decrease
Trophic	Number of Functional Feeding Groups	Provides information on the balance of feeding strategies in the benthic assemblage.	Variable
	Prevalence of Dominant Functional Feeding Group	Measures the dominance of the single most abundant functional feeding group.	Increase

Richness measures reflect the diversity of the aquatic assemblage (Resh et al. 1995). Increasing diversity correlates with increasing health of the assemblage and suggests that niche space, habitat and food source are adequate to support survival and propagation of many species. The number of Coleoptera taxa is an uncommon richness metric. Many beetles are facultative in their tolerance to perturbation (Gilbert 1989). However, they represent a large, diverse component of the Bayou Bartholomew Watershed and contain many sensitive taxa

Measures of composition provide information on the make-up of the assemblage and the relative contribution of the populations to the total fauna. Relative abundance is used rather than absolute abundance, because the relative contribution of individuals to the total fauna - a reflection of interactive principles - is more informative than abundance data on populations without a knowledge of the interaction among taxa (Plafkin et al. 1989; Barbour et al. 1995). The premise is that a healthy and stable assemblage will be relatively consistent in its proportional representation, though individual abundances may vary in magnitude. Percentage of the dominant taxon is a simple measure of redundancy (Plafkin et al. 1989). A high level of redundancy is equated with the dominance of a pollution tolerant organism and a lowered diversity.

Measures of tolerance indicate sensitivity of the assemblage and component species to various types of perturbation (Hilsenhoff 1987). Trophic metrics are surrogates of complex processes such as trophic interaction, production and food source availability (Karr et al 1986; Plafkin et al. 1989). Trophic metrics are evaluated as relative abundance. Specialized feeders, e.g. scrapers, piercers and shredders, are the more sensitive organisms and are thought to be well represented in healthy systems. Generalists, e.g. collectors, have a broader range of acceptable foods, and thus are more tolerant to pollution that might alter availability of food sources.

Physical habitat evaluations are used to help explain or diagnose much of the observed variation in species composition and abundance that occurs between different habitat structures and associated hydraulic characteristics. These evaluations are an observational approach to assessing various habitat parameters that assigns a numeric score (0-20) to each parameter (Appendix 7). Scores are separated into four broad categories/conditions consisting of poor, 0-5; marginal, 6-10; sub-optimal, 11-15; and optimal, 16-20. Pool habitat parameters assessed are presented in Table M-2.

No reference sites were identified for this assessment since the main objective was to better identify areas of water quality impairment resulting from nonpoint sources. Nonpoint source pollution has been difficult to assess due to a lack of techniques to monitor and assess impairment. Evaluation of water quality is generally inadequate because pollution from chemical nonpoint sources may be transient, unpredictable and interpreting the impact on aquatic macroinvertebrates is confounded by the occurrence of physical habitat alteration within the Bayou Bartholomew watershed.

Table M-2. Aquatic macroinvertebrate habitat assessment scores from selected sites within Bayou Bartholomew watershed, Fall 1999 and Spring 2000.

September, 1999 (BP assessor)	B. Imbeau **OUA0147**	B. Barth **OUA0033**	B. Barth **UWBYB03**	B. Barth **UWBYB02**	B. Barth **OUA0154**	B. Barth **OUA0013**	Cousart B. **OUA0149**	Jack's B. **OUA0150**	Deep B. **OUA0151**	L. Ables **OUA158**	U. Cut-off **UWCOC02**	M. Cut-off **OUA0157**	L. Cut-off **UWCOC01**
Bottom Subst./Instream Cover	7	11	19	14	10	11	5	10	9	11	15	16	16
Pool Bottom Substrate	15	13	19	11	12	12	10	10	11	12	15	15	11
Pool Variability	16	16	19	14	12	16	10	10	10	16	17	10	10
Canopy Cover	16	10	16	16	14	16	16	16	16	18	14	15	16
Channel Alteration	7	11	10	12	13	10	3	3	7	12	12	11	11
Deposition	7	9	9	11	10	7	10	3	6	4	11	10	8
Channel Sinuosity	3	4	7	4	7	8	3.5	3	5	7	8	5	8
Bank Stability	9	9	9	9	9	9	9	5	7	9	9	9	7
Bank Vegetative Stability	9	3	5	5	5	7	10	10	9	8	9	8	7
Dominant Streamside Cover	5	6	8	6	9	8	5	5	5	6	9	8	9
Riparian Buffer Zone	9	9	6	5	9	6	4	5	4	6	10	9	6
Flow													
Score	94	92	121	102	101	104	81.5	75	85	103	119	107	103

May/June 2000 (CD assessor)	B. Imbeau **OUA0147**	Harding C. **OUA0145**	Nevins C. **OUA0144**	B. Barth **OUA0143**	B. Barth **OUA0033**	B. Barth **UWBYB03**	Jack's **OUA150**	Melton's **OUA148**	U. Ables **OUA0153**	L. Ables **OUA158**	U. Cut-off **UWCOC02**	Bearhouse **OUA0155**
Bottom Subst./Instream Cover	6	5	12	8	12	14	10	8	6	11	12	16
Pool Bottom Substrate	6	8	12	10	12	16	5	8	8	11	14	13
Pool Variability	5	5	12	8	12	10	5	5	7	8	6	5
Canopy Cover	11	5	14	16	12	12	11	16	16	11	15	11
Channel Alteration	3	3	11	12	7	10	5	8	14	12	13	14
Deposition	3	3	10	8	7	10	3	8	10	8	10	8
Channel Sinuosity	4	2	10	12	7	7	3	10	12	10	10	12
Bank Stability	7	6	6	9	9	8	6	9	8	8	7	9
Bank Vegetative Stability	8	2	5	9	9	8	9	5	9	5	7	7
Dominant Streamside Cover	7	4	6	8	8	8	9	8	8	8	7	8
Riparian Buffer Zone	8	3	8	8	8	9	3	6	10	5	8	8
Flow												
Score	60	43	98	100	95	103	66	85	108	98	101	103

RESULTS

A better understanding was provided of upstream to downstream trends and specific areas of concern within the watershed by separating sites from the mainstem Bayou Bartholomew (OUA0033; UWBYB03; UWBYB02; OUA0154; OUA0013), Pine Bluff area (OUA0147), Delta tributaries (OUA0149; OUA0150; OUA0151) and Gulf Coastal tributaries (OUA0158; UWCOC02; UWCOC01; OUA157). Summary results are presented in Table M-3 and Appendix 8.

The importance of EPT organisms in Bayou Bartholomew watershed was similar to their importance in rocky bottom streams with two exceptions: 1) richness and abundance were generally lower, and 2) Plecoptera were rare. Plecoptera were also rare in statewide studies of low-gradient streams in Arkansas (ADPCE 1987; ADEQ small watershed project). Approximately 7% of the 1,365 organisms identified in the fall samples and 13% of the 1,375 organisms identified in the spring samples were EPT's. Ephemeroptera were an important group representing 94% and 76% of all EPT's collected in the fall and spring, respectively.

In the fall and spring, mainstem sites had an average EPT richness of 2 and an average % EPT abundance of 13. In the fall, average EPT richness was the highest, 3, in the Delta tributaries and the lowest, 1, in the Gulf Coastal Plain and Pine Bluff Area tributaries. Average % EPT abundance for the fall period was 5 in the Delta and Gulf Coastal Plain tributaries. Average EPT richness for spring samples was the highest, 3, in Gulf Coastal Plain tributaries and the lowest, 1, in the Delta tributaries. Average % EPT abundance for the spring period was 6, 12 and 19 in the Pine Bluff Area, Delta and Gulf Coastal Plain tributaries, respectively.

A widespread depositional mayfly *Caenis* was generally the dominant EPT at all sites during both sampling periods. Pollution intolerant (HBI $\leq$3) Ephemeroptera were rare. Pollution intolerant mayflies were collected during the fall period at three sites, UWBYB03, OUA0013 and UWCOC01. During the spring period, pollution intolerant mayflies were collected from 4 sites, OUA0145, OUA0153, UWCOC02 and OUA0143.

Fall 1999

Mainstem Bayou Bartholomew

OUA0033 and OUA0013 had the greatest variety (diversity) and stability of mainstem sites examined. A slightly higher presence of scrapers than normally seen in Delta streams was observed at OUA0033 and OUA0013. Pollution tolerance (HBI) was intermediate and indicative of fair to good water quality. Diversity was low at UWBYB02 and UWBYB03 due to the dominant three taxa comprising 72% and 89% of the community, respectively. UWBYB02 and UWBYB03 communities were comprised of organisms tolerant to perturbation. Taxa richness was reduced (10) at UWBYB03 compared to other sites. Glass shrimp *Palaemonetes* was dominant at the four upstream sites. *Caenis* was dominant at OUA0013.

Table M-3. Metric results for aquatic macroinvertebrates collected from selected sites within Bayou Bartholomew watershed, Fall 1999 and Spring 2000.

Fall 1999	B. Bart. OUA0033	B. Bart. UWBYB03	B. Bart. UWBYB02	B. Bart OUA0154	B. Bart. OUA0013	B. Imbeau OUA0147	Cousart B. OUA0149	Jack's B. OUA0150	Deep B. OUA0151	L. Ables C. OUA158	U. Cut-Off Cr. UWCOC02	M. Cut-Off Cr. OUA0157	L. Cut-Off Cr. UWCOC01
Taxa Richness *	17	10	16	15	19	18	24	18	17	18	16	22	16
EPT Index *	3	1	1	2	4	1	4	1	3	1	0	1	2
% EPT	7.2	0.8	1.9	17.4	38.6	1.0	8.2	1.1	4.9	1.6	0.0	6.7	6.3
% Ephemeroptera	6.2	0.8	1.9	17.4	37.5	0.0	7.3	1.1	2.9	1.6	0.0	6.7	6.3
Hilsenhoff Biotic Index *	6.34	6.75	6.75	6.15	5.74	5.85	7.48	6.75	6.18	6.27	6.47	6.56	6.55
%Contribution of Dominant Taxa*	32.0	51.1	45.6	46.2	34.1	48.1	24.8	33.3	37.3	50.0	16.7	22.5	46.9
No.of Functional Groups Represented	4	4	4	4	4	5	5	4	4	3	5	2	4
Prevalence of Dominant Functional Group	45.4	51.1	50.5	74.2	56.2	52.4	73.5	43.3	42.2	56.6	50.6	50.6	65.6
Diversity	3.072	1.898	2.668	2.753	3.456	2.489	3.518	3.205	2.822	2.838	3.510	3.727	2.623
% tolerant	44.4	54.1	56.7	53.8	20.5	36.5	69.1	32.2	41.7	58.2	31.3	35.1	19.8
# Intolerant	0	1	3	0	4	2	1	0	1	3	0	0	1
% Scrapers	14.43%	3.76%	0.00%	1.52%	11.36%	52.88%	6.19%	15.56%	6.80%	4.10%	20.83%	0.00%	1.04%
% Filterers	0.00%	0.00%	0.00%	0.00%	0.00%	1.92%	0.88%	34.44%	10.78%	0.00%	0.00%	1.12%	0.00%
% Miners	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%
% Predators	45.36%	43.61%	44.66%	21.97%	26.14%	29.81%	73.45%	42.22%	42.16%	39.34%	53.13%	49.44%	32.29%
% Collectors	39.18%	51.13%	50.49%	74.24%	56.82%	7.69%	18.58%	7.78%	41.18%	56.56%	23.96%	49.44%	65.63%
% Shredders	0.00%	0.00%	0.97%	0.00%	0.00%	0.96%	0.88%	0.00%	0.00%	0.00%	1.04%	0.00%	0.00%
% Piercers	1.03%	1.50%	3.88%	2.27%	6.73%	6.73%	0.00%	0.00%	0.00%	0.00%	1.04%	0.00%	1.04%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Dominant 1	*Palaemonetes*	*Palaemonetes*	*Palaemonetes*	*Palaemonetes*	*Caenis*	Viviparidae	*Berosus* (L)	*Corbicula*	*Palaemonetes*	*Palaemonetes*	*Palaemonetes*	*Lirceus*	*Gammarus*
Dominant 2	*Argia*	*Eubranchipus*	*Eubranchipus*	*Caenis*	Chironomid #1	*Peltodytes*	*Enallagma*	Chironomid #1	*Argia*	Chironomid #1	*Stenelmis* (L)	*Palaemonetes*	*Palaemonetes*
Dominant 3	*Stenelmis* (L)	*Argia*	*Peltodytes*	*Argia*	*Palaemonetes*	*Hesperocorixa*	*Peltodytes*	*Peltodytes*	Chironomid #1	*Argia*	*Macromia*	*Argia*	Chironomid #1

Spring 2000	B. Barth. OUA0143	B. Barth OUA0033	B. Barth UWBYB03	Harding Cr OUA0145	Nevins Cr OUA0144	B. Imbeau OUA0147	Melton's Cr OUA0160	Jack's B. OUA0150	U. Able's OUA0153	L. Able's OUA158	U. Cut-off UWCOC02	Bearhouse OUA0155
Taxa Richness *	24	19	24	18	21	16	20	19	22	24	21	13
EPT Index *	2	1	3	2	3	1	0	1	4	3	3	2
% EPT	3.1	25.8	9.1	7.1	8.3	1.4	0.0	23.1	14.6	28.0	13.1	22.1
% Ephemeroptera	3.1	25.0	0.9	7.1	6.5	1.4	0.0	23.2	12.4	28.0	10.3	0.0
Hilsenhoff Biotic Index *	5.40	6.87	3.71	5.59	4.69	5.79	4.09	6.83	4.00	5.78	5.33	4.76
%Contribution of Dominant Taxa*	0.418	0.336	0.409	0.271	0.250	0.274	0.654	0.296	0.236	0.256	0.262	0.366
No.of Functional Groups Represented	4	5	6	6	4	5	5	5	4	6	6	3
Prevalence of Dominant Functional Group	0.796	0.594	0.609	0.439	0.676	0.315	0.846	0.426	0.494	0.536	0.682	0.621
Diversity	3.376	2.747	3.378	3.324	3.194	3.070	2.247	3.411	3.378	3.376	3.515	2.502
% tolerant	33.1	27.3	69.4	57.1	44.4	45.2	24.0	84.3	27.0	52.0	46.7	46.9
# Intolerant	1.0	1.0	1.0	2.0	1.0	2.0	1.0	2.0	1.0	1.0	0.0	0.0
% Scrapers	1.02%	3.91%	12.73%	9.35%	0.93%	27.40%	0.96%	3.70%	4.49%	11.20%	9.35%	0.00%
% Filterers	0.00%	1.56%	8.18%	0.93%	3.70%	10.96%	8.65%	8.33%	1.12%	3.20%	3.74%	4.14%
% Miners	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
% Predators	79.59%	34.38%	60.91%	39.25%	67.59%	31.51%	84.62%	15.74%	44.94%	29.60%	16.82%	33.79%
% Collectors	16.33%	59.38%	12.73%	43.93%	27.78%	20.55%	4.81%	42.59%	49.44%	53.60%	68.22%	62.07%
% Shredders	3.06%	0.78%	3.64%	5.61%	0.00%	9.59%	0.96%	29.63%	0.00%	1.60%	0.93%	0.00%
% Piercers	0.00%	0.00%	1.82%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.93%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Dominant 1	*Ischnura*	*Gammarus*	Cambaridae	*Palaemonetes*	Chironomid (L)	*Physa*	Chironomid (L)	*Peltodytes* (A)	Chironomid (L)	*Caenis*	*Gammarus*	*Lirceus*
Dominant 2	Chironomid (L)	*Caenis*	*Stenelmis* (L)	*Enallagma*	*Lirceus*	Hirudinea	*Sphaerium*	*Caenis*	*Gammarus*	*Palaemonetes*	*Hyallela*	*Caecidotea*
Dominant 3	*Palaemonetes*	Cambaridae	*Enallagma*	*Physa/Helisoma*	*Ischnura*	*Hyallela*	*Notonecta*	*Palaemonetes*	*Palpomyia*	Cambaridae	*Lirceus*	*Perlesta*

Mainstem sites received similar habitat scores (Table M-2). Habitat parameters having the greatest effect on benthic community composition at these sites include flow, shoreline vegetation and mud/silt substrate. As watershed size increased predator composition decreased and collector composition increased.

Pine Bluff Area

At Bayou Imbeau (OUA0147) scrapers (snails) and collectors comprised 53% and 8% of the total organisms, respectively. Five functional feeding groups were present. Diversity and EPT index was low. The dominant three taxa comprised 70% of the community and had an average tolerance value of 7.2.

Instream cover, especially algae and aquatic macrophyte abundance, has an important role in determining benthic community composition in late summer and fall at Bayou Imbeau. Habitat parameters having an unfavorable effect on benthic community composition include channel alteration, flow and deposition.

Delta Tributaries

Taxa richness and diversity was lowest at Deep Bayou and highest at Cousart Bayou. However, Deep Bayou's assemblage was less tolerant to perturbation than Cousart Bayou's assemblage. Composition of functional feeding groups and dominant taxa were variable. The benthic community at Deep Bayou (OUA0151) was similar to typical delta streams although there was a higher presence of filter feeders. The exotic Asian Clam *Corbicula* was dominant in Jack's Bayou (OUA0150).

Riparian buffer zones have been severely reduced at these three sites. Bank stability, shoreline vegetation and instream cover/substrate are the primary physical components affecting benthic community composition at these sites. Habitat parameters were similar and should support similar communities.

Gulf Coastal Tributaries

Taxa richness (22) and diversity (3.73) was highest at middle Cut-off Creek (OUA0157) and lowest at lower Cut-off Creek (UWCOC01). The dominant three taxa comprised 77% of the community, but had an average tolerance value of 5.6. Community tolerance to perturbation was similar at all three Cut-off Creek sites. Composition of functional feeding groups was similar to typical Gulf Coastal Ecoregion streams at all sites except UWCOC02. There was a large presence (21%) of scrapers and reduced presence of collectors (24%) at UWCOC02. The percent dominance by a taxon was lowest at upper Cut-off Creek (UWCOC02) and progressively increased at downstream sites. Habitat parameters for these sites were similar and capable of supporting similar communities. One exception might be low flow, if any, during prolonged dry periods. There were no apparent trends associated with watershed size.

Spring 2000

A better understanding was provided of upstream to downstream trends and specific areas of concern within the watershed by separating sites from the mainstem Bayou Bartholomew (OUA0143; OUA0033; UWBYB03;), Pine Bluff area (OUA0144; OUA0145; OUA0147), Delta tributaries (OUA0160; OUA0150;) and Gulf Coastal tributaries (OUA0153; OUA0158; UWCOC02; OUA155). Summary results are presented in Table M-3 and Appendix 8.

Mainstem Bayou Bartholomew

HBI was indicative of a assemblage tolerant to perturbation at OUA0143. Downstream sites improved slightly to a more moderate tolerance. Taxa richness and diversity were the highest at OUA0143 and UWBYB03, while dominant taxa were variable. UWBYB03 had a slightly higher presence of scraper (13%) and filter (8%) feeders than normally seen in Delta streams. Diversity was low at OUA0033 due to a high presence (79%) of the dominant three taxa. Average tolerance value for the dominant three taxa was 6.8 which is indicative of organisms tolerant to perturbation. Flow was a limiting factor at OUA0143 which had the most extensive naturally occurring riparian cover compared to severely reduced riparian cover at downstream sites. Instream habitat was similar.

Pine Bluff Area

Taxa richness, diversity and percent dominance by taxon were similar for all sites. EPT ranged from zero (OUA0145) to three (OUA0144). The higher EPT presence at OUA0144 was most likely due to the presence of riffles and less habitat alteration compared to an absence of riffles in the channelized sites at OUA0145 and OUA0147. HBI ranged from 5.89 at Bayou Imbeau (OUA0147) to 6.75 at Nevins Creek (OUA0144) . At Bayou Imbeau (OUA0147) scrapers (snails) and collectors comprised 27% and 21% of the total organisms, respectively.

Instream cover and shoreline vegetation is lacking in the spring at Bayou Imbeau and Harding Creek. Habitat parameters having an unfavorable effect on benthic community composition include channel alteration, flow and deposition in Bayou Imbeau and Harding Creek. Urban influence and channelization are minimal in Nevins Creek compared to Bayou Imbeau and Harding Creek.

Delta Tributaries

HBI for Melton's Creek and Jack's Bayou was 6.42 and 7.47, respectively. Chironomid larvae were dominant (65%) in Melton's Creek. The dominant three taxa, *Peltodytes* (A), *Caenis* and *Palaemonetes*, occurring at Jack's Bayou are widespread and common to the Delta Ecoregion. EPT taxa were not present at Melton's Creek and represented only by *Caenis* at Jack's Bayou.

Melton's Creek is typically dry during summer and fall months limiting aquatic macroinvertebrate colonization. Habitat was similar to the fall 1999 collection at Jack's Bayou. Differences in community composition are probably best explained by seasonal variation.

Gulf Coastal Tributaries

Taxa richness was low (13) at Bearhouse Creek compared to the other three sites sampled (21-24). The dominant three taxa were variable. Percent contribution of dominant taxa was slightly higher at Bearhouse Creek (36.6%) than the other three sites. HBI ranged from 6.36 at upper Able's Creek to 7.04 at lower Able's Creek. HBI values ≥ 7 are typically associated with communities that are tolerant to perturbation. Collectors were the dominant feeding group at all sites. Bearhouse Creek was the only site where no scrapers were collected. The sites that remain wet year round, e.g. upper Cut-off Creek and lower Able's Creek, had the highest number (6) of functional feeding groups.

Habitat parameters for all these sites were similar and capable of supporting similar communities. Flow is the primary limiting factor at Bearhouse Creek and upper Able's Creek since flows are restricted to wet periods. There were no apparent trends associated with watershed size.

DISCUSSION

The glass shrimp *Palaemonetes* was present at all sites during the fall sample period, but its abundance was notably reduced at Bayou Imbeau, Cousart and Jack's bayous. This organism is common to alluvial streams in Arkansas. Its full colonization potential in Bayou Imbeau may be limited due to low dissolved oxygen from excessive growth of aquatic macrophytes and algae, low flow during late summer and fall, and the lack of suitable habitat in these channelized ditches.

Chironomid larvae were the dominant or the second most abundant taxa at four sites (OUA0143, OUA0144, OUA0160 and OUA0153) while other sites were variable during the spring sampling period. These four sites typically have prolonged periods without flow. The relatively short life cycle and aerial swarm mating strategy enable these organisms to colonize waterbodies in a short period of time when conditions permit. The expansion and contraction of changing flow regimes observed in perennial streams during the spring sampling period alters aquatic insect distribution. Habitat availability is constantly in flux and most likely accounted for the variability of dominant taxa observed in perennial streams.

The partitioning of aquatic resources presumably enhances the biotic stability in aquatic ecosystems (Merritt and Cummins, 1996.). Collectors and predators typically dominate, in that order, streams in the Delta and Gulf Coastal ecoregions. Scraper and filter feeders compose a smaller percentage (<10%) of the aquatic macroinvertebrate community. Shifts in these groups may be an indication of perturbation (i.e. riparian zone alterations) within the system.

Fall feeding group composition was markedly different from other sites in Bayou Imbeau (spring and fall samples), Cousart Bayou, Jack's Bayou and upper Cut-off Creek. Bayou Imbeau and upper Cut-off Creek were inundated with algae and macrophyte growth. Elevated total phosphorus concentrations may contribute to this growth during low flow conditions. Algae and macrophyte presence has caused a shift in the community from collectors to scrapers and piercers. OUA0033 and OUA0013 also had a slightly higher prevalence of scrapers than typically occurs in this region.

In spring samples, differences were observed between functional feeding group composition in ephemeral and perennial streams. Large total biomass of the numerous chironomid larvae confer ecological energetic significance as consumers and as prey (Merritt and Cummins, 1996). Chironomid larvae are also considered predaceous and are fed upon extensively by other aquatic predators. This explains the high prevalence of predators in ephemeral streams. It also may suggest that ephemeral streams within this watershed are typically dominated by predators rather than collectors.

Fall HBI values were characteristic of communities with an intermediate tolerance (fair to good water quality) to pollution. Cousart Bayou was the exception with a pollution tolerant community (HBI = 7.48). High taxa richness and EPT taxa can be contributed to a greater diversity of habitat (i.e. occasional riffles) in the sample reach. Populations were evenly distributed and the prevalence of the dominant taxa was low. This would seem to indicate that habitat is suitable for this community and that water quality may be limiting full colonization potential of intolerant taxa.

Four other fall communities, lower Cut-Off Creek, Bayou Imbeau, and Bayou Bartholomew at Garret Bridge and at Arkansas Highway 4, were of concern. The dominant three taxa at these sites comprised 70 to 89 percent of the community. The premise is that healthy and stable communities will be relatively consistent in its proportional representation. A high average tolerance value (7.2 and 6.7) for the dominant three taxa at Bayou Imbeau and Bayou Bartholomew at Arkansas Highway 4 suggests community health and stability may have been compromised by perturbation(s). The tolerance values for the dominant three taxa at Lower Cut-off Creek and Bayou Bartholomew at Garrett Bridge were intermediate and may suggest that perturbation at these sites is less severe.

Spring aquatic macroinvertebrate communities had an intermediate tolerance to pollution. Bayou Bartholomew at Garrett Bridge and Jack's Bayou were the exceptions with a pollution tolerant community. High dominance (79%) and average tolerance value (6.8) by the dominant three taxa at OUA0033 suggests that community health and stability may be compromised. High turbidity and TSS may be limiting pollution intolerant taxa during high flow periods that occur during the spring.

Fall samples from the mainstem Bayou Bartholomew sites revealed a high prevalence of dominant taxa that is also reflected in low diversities. Habitat was suitable for full colonization at UWBYB03 and comparable to other mainstem sites. Taxa richness and diversity was considerably lower at this site compared to other mainstem sites. No major water quality differences were apparent between mainstem sites. However, prevalence of the dominant taxa, an indicator of perturbation (i.e. higher mean turbidity), increased at mainstem stations.

Community instability at OUA0155 and OUA0160 can be attributed to a lack of water (flow) during prolonged dry periods. For this reason, these communities are dominated by organisms tolerant of perturbation, lack of flow and habitat in this case, and reduced diversity. These communities are representative of these ephemeral systems that lack niche space, habitat and food sources to sustain intolerant organisms. Instability at OUA0155 and OUA0160 is due to natural conditions rather than anthropogenic influences.

In summary, ephemeral streams within the Bayou Bartholomew watershed are limited primarily by habitat availability (i.e. suitable flow). The ephemeral nature of these streams favor organisms with a relatively short life cycle, intermediate pollution tolerance and aerial mating strategy. High turbidity, TSS and TDS are possibly limiting full colonization potential in mainstem Bayou Bartholomew sites. High HBI values in Cousart and Jack's Bayous may be indicative of seasonal water quality impairments. Sample sites on Nevins Creek and Bayou Bartholomew at Oakwood Road are upstream of heavily urbanized areas in Pine Bluff and do not appear to be influenced by urban runoff. Indications are that community alterations have occurred in Harding Creek and Bayou Imbeau as a result of channelization and urban runoff. Community stability generally appears to be the least impacted in the gulf coastal streams.

With few exceptions, aquatic insects are dependant on the terrestrial environment. Efforts should be made to implement best management plans (BMP) in Bayou Bartholomew watershed. These efforts should concentrate on restoring/maintaining riparian buffer zones along Bayou Bartholomew and its delta tributaries. BMP implementation should reduce non-point pollutants (i.e. TSS) subsequently improving water quality, instream habitat and overall aquatic community stability (health). A healthy system may be defined as a community that is stable (e.g. niche space, habitat and food source are adequate to support survival and propagation of many species), relatively consistent in its proportional representation and well represented by sensitive organisms.

FISH COMMUNITY

Fish community surveys were conducted at the stations listed below. Figure F-1 depicts the sites were fish community collections were made.

STATION LOCATION

OUA0143 - Bayou Bartholomew at Oak Wood Road, Jefferson County.
OUA0144 - Nevins Creek at Good Faith Road, Jefferson County.
OUA0145 - Harding Creek on West 34th Street, Jefferson County.
OUA0147 - Bayou Imbeau on 38th Street, Jefferson County.
OUA033 - Bayou Bartholomew 2.0 miles south of Ladd off Hwy. 425, Jefferson County.
OUA0149 - Cousart Bayou 2.0 miles south of Tamo off Hwy. 65, Lincoln County.
OUA0150 - Jack's Bayou 1 mile south of Tamo off Hwy. 65, Jefferson County.
OUA0151 - Deep Bayou at Hwy. 11 south of Grady, Lincoln County.
OUA0158 - Ables Creek at Hwy 138 north of Selma, Drew County.
UWCOC02 - Cut-Off Creek at Hwy. 4, 14 miles east of Monticello, Drew County.
UWCOC01 - Cut-Off Creek on county road northeast of Boydell, Ashley County.
- Bayou Bartholomew on county road northeast of Boydell, Ashley County.
OUA013 - Bayou Bartholomew at La. Hwy. 834 west of Jones, Moorehouse Parish.

METHODOLOGY

A Smith-Root model 15-B backpack electrofishing device with pulsed DC current was used. The device was used in the shallow pools while wading upstream and dipping the stunned fishes from the water with dip nets. The riffles were collected by posting a twenty foot seine near the toe of the riffle and while working the electrofisher in a downstream direction through the riffle, the bottom substrate was disrupted and the fish were herded into the seine or washed in by the current. In addition, a barge electrofishing unit with pulsed DC current was used to collect fish from OUA13, and the Bayou Bartholomew "Boydell" site in northern Ashley County.

Fish species of all types were collected from all available habitat within the sample area until a fully representative sample of the species in the area was thought to be obtained. Larger specimens were field identified and released. The smaller specimens and those needing further identification were preserved in a ten percent formalin solution and returned to the lab.

HABITAT EVALUATION

Habitat evaluations were performed at all sites and were comprised of five parameters each consisting of three to seven variables. These parameters included: 1) habitat type; 2) habitat quantity; 3) quantity of substrate type based on fish use; 4) quantity of in stream cover; and 5) sediment on substrate. Each parameter for substrate type and in stream cover was given a score depending on its abundance. The scores given to the substrate parameters were multiplied

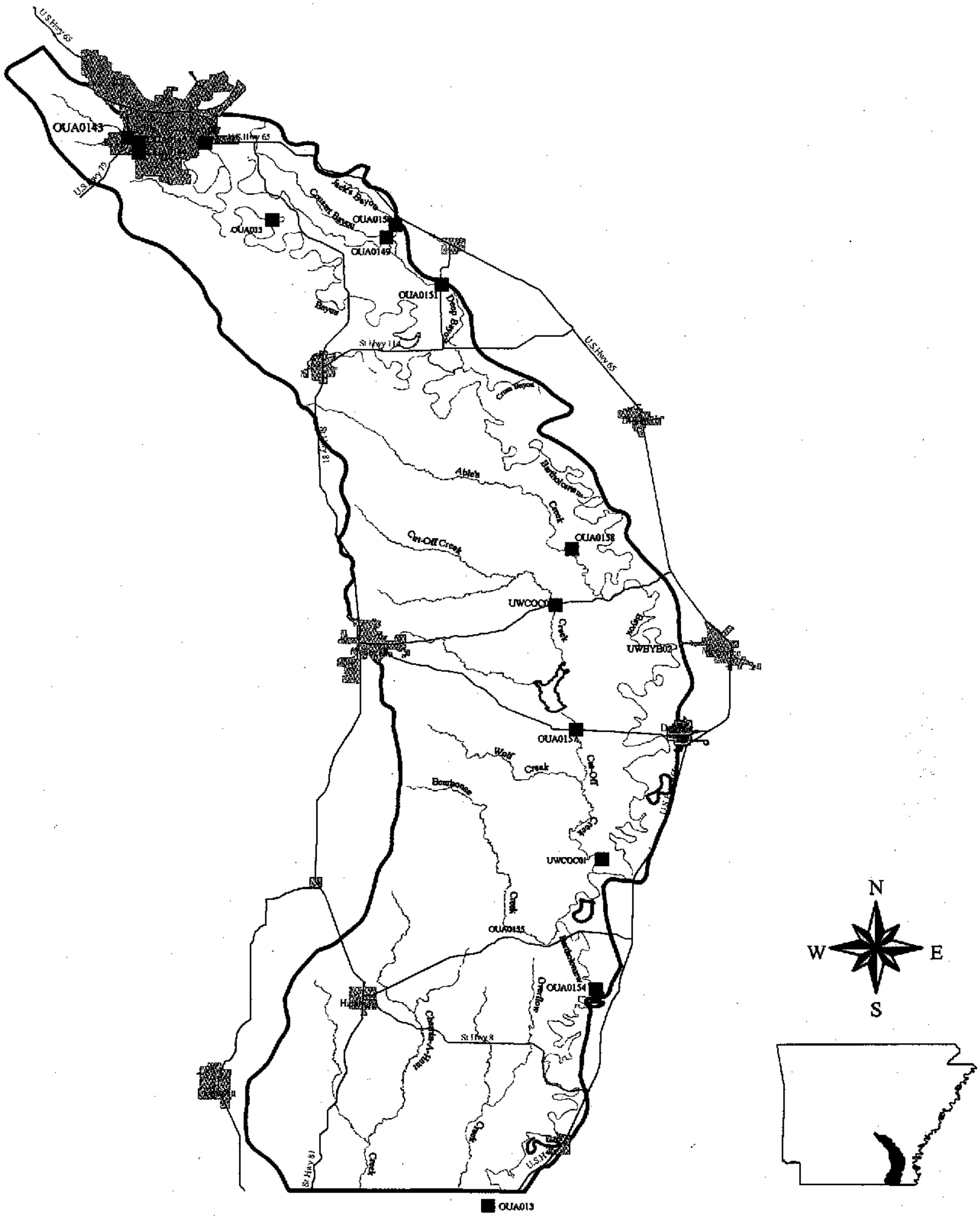

Figure F - 1
Fish Community Collection Sites
in the
Bayou Bartholomew Watershed

Water Division
Arkansas Department of
Environmental Quality

Legend
- Streams
- AR Highways
- ▲ Water Quality Only Sites
- ■ Water Quality & Macroinvertebrate Sites
- ● Water Quality, Fish & Macroinvertebrate Sites

by a factor to adjust these scores based on how they relate to fish habitat quality. Habitat type length, depth and width measurements were estimated for each habitat type and recorded in feet. The sediment on substrate parameter was scored according to the degree of embededness.

A total score for each habitat type was calculated by summing the scores for the substrate type, in stream cover and sediment on substrate. The scores from like habitat types were averaged for each sampling station. The lengths of each habitat type were also summed. The total habitat type lengths were then divided by 100 and multiplied by the average habitat type score. This score is the Ichthyofauna Habitat Index (IHI). Appendix 9 outlines the habitat types and the in stream habitat ratings at each site.

FISH COMMUNITY EVALUATION METHOD

The fish communities were evaluated by directly comparing the community structures at each site to the fish communities of least-disturbed, Typical Gulf Coastal Plains, Least-Altered Delta, and Channel-Altered Delta ecoregion reference streams of similar watershed size. A fish community structure index (CSI) was calculated using eight of these parameters based on ecoregion reference stream data to generate the scoring criteria (Table F-1). Seventeen different parameters were compared between each of the communities and the reference streams.

TABLE F-1 – Fish Community Biocriteria

Typical Gulf Coastal Plains Ecoregion Reference Streams

Metric (% community, except Diversity Index)	SCORE		
	4	2	0
Cyprinidae	5-35	<5 or 36-45	>45
Ictaluridae	>1[1]	0.5 - 1[1]	<0.5 or >8 Bullheads
Centrarchidae	28 - 47[2]	18 - 28 or 47 - 57[2]	<18 or >57 or >8% Green Sunfish
Percidae	>10	6-10	<6
Sensitive Individuals	>1	1 - 0.5	<0.5
Primary TFL	<15	15 - 22	>22
Key Individuals	>19	13 - 19	<13
Diversity Index	>3.89	3.89 - 3.65	<3.65

1 – no more that 8% bullheads   2 – no more than 8% Green sunfish

Total Score	Degree of Support	Waters of Concern (✔)
25-32	Fully Supporting	No actions needed at this time.
24-17	Generally Supporting	✔ No immediate actions, continue monitoring.
16-9	Impaired	✔ Determination of cause and source; schedule corrective action.
0-8	Not Supporting	✔ Immediate actions needed; develop plan for remediation.

TABLE F-1 – Fish Community Biocriteria (cont)

Least-Disturbed Delta Ecoregion Reference Streams

Metric (% community, except Diversity Index)	SCORE		
	4	2	0
Cyprinidae	10 - 30	5 - 10 or 30 - 45	<5 or >45
Ictaluridae	>3[1]	1 – 3[1]	<1 or >13% Bullheads
Centrarchidae	15 - 45[2]	5 - 15 or 45 - 60[2]	<5 or >60 or >8% Green sunfish
Percidae	>3	1 - 3	<1
Sensitive Individuals	NA	NA	NA
Primary TFL	<15	15 - 25	>25
Key Individuals	>10	5 - 10	<5
Diversity Index	>3.37	3.37-3.01	<3.01

1 – no more than 13% bullheads 2 – no more than 8% Green sunfish

Total Score	Degree of Support	Waters of Concern (✔)
22-28	Fully Supporting	No actions needed at this time.
21-15	Generally Supporting	✔ No immediate actions, continue monitoring.
14-8	Impaired	✔ Determination of cause and source; schedule corrective action.
0-7	Not Supporting	✔ Immediate actions needed; develop plan for remediation.

Channel-Altered Delta Ecoregion Reference Streams

Metric (% community, except Diversity Index)	SCORE		
	4	2	0
Cyprinidae	10 - 26	2 - 10 or 26 - 34	<2 or >43
Ictaluridae	6 - 40[1]	3 - 6 or 40 - 50[1]	<3 or >50 or >3% bullheads
Centrarchidae	6 - 40[2]	3 - 6 or 40 - 55[2]	< 3 or >55 or >30% Green Sunfish
Percidae	>0.1	0.1 - 0.5	<0.1
Sensitive Individuals	NA	NA	NA
Primary TFL	<20	20 - 30	>30
Key Individuals	>25	10 - 25	<10
Diversity Index	>2.51	2.51 - 2.30	<2.30

1 – no more than 3% bullheads 2 – no more than 30% Green sunfish

Total Score	Degree of Support	Waters of Concern (✔)
22-28	Fully Supporting	No actions needed at this time.
21-15	Generally Supporting	✔ No immediate actions, continue monitoring.
15-8	Impaired	✔ Determination of cause and source; schedule corrective action.
0-7	Not Supporting	✔ Immediate actions needed; develop plan for remediation.

The CSI is determined by the sum of the scores for each metric for each fish community. The relative scores were developed from average values from appropriate ecoregion reference stream data.

The final determination of support is derived by utilizing all of the indices, the overall fish community, and the habitat and stream characteristics. Best professional judgement is also used in those unique situations when the metrics can not properly delineate the status of the fish communities based on the data collected.

The sample sites collected were categorized into three ecoregion types, as listed above, based on stream channel morphology and watershed characteristics. They are as follows:

Typical Gulf Coastal Plains:	OUA0143, OUA0144, UWCOC02,
Channel-Altered Delta:	OUA0145, OUA0147, OUA0149, OUA0150, OUA0151
Least-Disturbed Delta:	OUA033, OUA0158, UWBYB02, UWCOC01, OUA013, Bayou Bartholomew near Boydell

RESULTS

Fish community samples from the smaller watershed sites were collected in late spring and early summer. The larger main stem sites were collected in late summer and early fall. There were 19 species of fish collected at OUA0143, 15 at OUA0144, 4 at OUA0145, 14 at OUA0147, 24 at OUA33, 13 at OUA0149, 18 at OUA0150, 27 at OUA0151, 31 at OUA0158, 30 at UWCOC02, 26 at UWCOC01, 41 at the Bayou site, and 40 at OUA013. Table F-2 depicts the community structure from each site as percent community composition of each family and the biotic index parameters; sensitive species, key species, primary trophic level species, the diversity index (Shannon-Wiener, log base 2), and the catch per unit effort (in minutes). Key individuals are "Fishes which are normally dominant species within the important groups such as fish families or trophic feeding levels" (ADPC&E, 1998). A complete species list per station is located in Appendix 10.

The fish community at the Bayou Bartholomew site at Oakwood Road (OUA0143) Typical Gulf Coastal Plains ecoregion (TGC), was dominated by the bluegill and longear sunfish. These species accounted for over 63% of the community. There were nine species of sunfish collected accounting for over 83% of the total community. The cyprinids comprised eight percent of the community, with only two species present. There were no sensitive species collected, and only four percent of the community were Key individuals. The diversity index was 2.88, and the catch per unit of effort was 9.89 fish per minute. Three run habitats and five pool habitats were sampled, totaling approximately 500 feet of stream. The substrates varied from mostly small gravel to sand and mud. In stream cover was fairly abundant in the pools and deeper runs, but somewhat lacking in the shallow runs. Stream flow was minimal, with no water in the stream at the upper end of the sample area. Overall, the in stream habitat was good.

TABLE F-2 -- COMMUNITY STRUCTURE (Percent Community)							
Parameter	Sample Site						
	143	144	145	147	149	150	151
Cyprinidae	8.21	0.00	0.17	0.36	7.84	7.99	16.24
Catostomidae	0.00	4.56	0.00	0.00	0.00	0.00	0.00
Ictaluridae	1.49	0.00	0.00	0.10	4.90	38.54	10.43
Centrarchidae	83.33	75.52	42.12	5.41	57.84	26.90	44.72
Percidae	0.25	3.31	0.00	0.00	0.00	0.00	1.33
Total Species	19	15	4	14	13	18	27
No. Sen. Species	0	0	0	0	0	0	0
No. Sen. Inds.	0	0	0	0	0	0	0
% Sens. Inds.	0	0	0	0	0	0	0
No. Primary Inds	16	5	1	7	15	1	29
% Primary Inds	3.98	2.07	0.17	0.36	14.71	0.36	3.51
No. Key Inds.	18	2	242	20	45	141	33
% Key Inds.	4.48	0.83	40.13	1.04	44.11	51.27	3.99
Diversity Index	2.88	2.51	1.11	0.92	3.05	2.91	3.40
Catch per Unit Effort	9.89	4.35	12.46	47.95	2.80	8.85	11.25

Parameter	Sample Site					
	158	COC0	COC01	033	Bayou	013
Cyprinidae	21.71	11.31	25.33	8.74	54.57	59.53
Catostomidae	1.78	1.76	0.00	3.49	0.36	1.07
Ictaluridae	4.92	1.51	7.14	1.31	0.90	1.47
Centrarchidae	35.58	29.65	31.83	63.33	32.71	26.69
Percidae	4.27	7.29	11.04	0.44	3.24	2.14
Total Species	31	30	26	24	41	40
No. Sen. Species	3	2	1	2	2	3
No. Sen. Inds.	6	13	1	2	58	26
% Sens. Inds.	2.14	0.8	0.65	0.88	2.09	1.74
No. Primary Inds	46	5	8	15	1093	258
% Primary Inds	16.37	1.26	5.19	6.55	39.38	17.26
No. Key Inds.	43	14	8	75	278	30
% Key Inds.	15.29	3.52	5.21	32.75	10.01	2.01
Diversity Index	4.13	4.35	4.21	3.69	3.19	3.31
Catch per Unit Effort	5.65	6.46	3.08	3.84	30.02	17.50

The fish community in Nevins Creek (OUA0144) (TGC) was dominated by centrarchids, over 75% of the community, with the bluegill comprising almost 57% of the community. The were no cyprinids and no sensitive individuals collected. There were two darter species collected accounting for a little more than three percent of the community. Less than one percent of the community was Key individuals. The diversity index was 2.51; the catch per unit of effort was 4.35 fish per minute. The habitat at this location was comprised of two riffles, one run and four pools covering over 900 feet of stream. The substrates consisted mainly of sand and silt with some gravel and one rip-rap riffle. In stream cover consisted of woody debris, root wads and leaf packs in the pools and runs and some woody debris and aquatic vegetation in the riffles. Stream flow at the time of the sampling event was less than one cubic foot per second. Overall, the in stream habitat was rated as good.

Harding Creek (OUA0145) had the poorest fish community of all sites sampled. Only four species were collected. The sample was dominated by mosquitofish, comprising almost 58% of the sample, and the green sunfish, comprising over 40% of the sample. Key individuals, the green sunfish, comprised over 40% of the community. The diversity index was 1.11 and the catch per unit of effort was 12.46 fish per minute. Four pool habitats were sampled behind flow-control structures, and one long run was sampled comprising 3100 feet. The substrate in the pools was mainly hard-pan clay, with some silt and sand. There was very little in stream cover in the pools. At the head of each pool was a pile of rip-rap controlling erosion below the flow-control structures. The run habitat substrate was a mixture of hard-pan clay with areas of silt, sand, and gravel and was covered with algae. There was very little instream cover. Stream flow at the time of the sampling event was less than one cubic foot per second. The overall habitat rating was poor.

The fish community in Bayou Imbeau (OUA0147) was dominated by the mosquitofish, comprising over 85% of the community. Golden topminnows comprised over seven percent of the community. The bantam sunfish was the dominant sunfish, comprising just over three percent of the total community. This site had the lowest diversity index, 0.92 but the highest catch per unit effort, 47.95 fish per minute. There were no Key individuals collected. There were four run habitats and four pool habitats sampled. The substrate throughout the sample area consisted of sand, silt and mud with aquatic vegetation and algae present. In stream cover was moderate; mostly wood debris, undercut banks, root wads, and aquatic vegetation. The area sampled at this site, 1160 total stream feet, is a low-maintenance channelized ditch. The in stream flow at the time of sampling was less than one cubic foot per second. The overall habitat was rated as good.

The Cousart Bayou sample (OUA0149) was a typical Delta ecoregion, irrigation ditch that is regularly maintained. The community was dominated by the green sunfish, comprising over 24% of the community. The sunfish family made up almost 58% of the community. The gizzard shad comprised almost 15% of the community and 10% of the community was comprised of spotted gar. Just over 38% of the community were Key individuals. The diversity index was 3.05, and the catch per unit of effort was 2.8 fish per minute, the lowest of all sites. The habitat consisted of one run of about 1600 feet. The substrate was mainly sand with some areas of silt and mud. In stream cover consisted of small woody debris and trash. The flow at the time of sampling was approximately two cubic feet per second. Overall, the habitat was rated as moderate, but lacking diversity.

Jacks Bayou (OUA0150), a tributary to Cousart Bayou, is a maintained, channelized, ditch. This community was dominated by the catfish family, over 38% of the community, with the channel catfish comprising 32% of the community. Almost all of the channel catfish collected were young-of-year specimens. The next most abundant species was the mosquitofish, comprising 24% of the community. The green sunfish comprised 16% of the community, and the sunfish family comprised almost 26% of the community. Five species of minnows were collected, comprising eight percent of the community. There were also 14 specimens of the tadpole madtom collected, which was a little over five percent of the community. Over 51% of the community was comprised of Key individuals. The diversity index was 2.91 and the catch per unit of effort was 8.85 fish per minute. There were two run habitats and one short riffle habitat sampled totaling about 900 feet of stream. The substrate throughout the sample area consisted mainly of sand, with areas of mud and silt. In stream cover consisted mainly of small woody debris, some undercut banks and some hanging vegetation. There was an area of aquatic vegetation in the riffle area. The stream flow at the time of sampling was about two cubic feet per second. Overall, the in stream habitat was rated as moderate. The stream habitat diversity was a little better than that of Cousart Bayou.

The Deep Bayou sample site (OUA0151) was located in an area of the stream that had once been channelized, but very little maintenance had been performed on the area since. However, just downstream of the sampled area, Deep Bayou is maintained regularly as a channelized ditch. This community was dominated by the sunfish family, almost 48% of the community, with the longear and green sunfishes comprising almost 21% and 19% of the community, respectively. The mosquitofish comprised over 19% of the community. Six minnow species were collected comprising over 16% of the community and the catfishes comprised over 10% of the community. There were five specimens of the tadpole madtom collected and 11 specimens of the mud darter collected. Only four percent of the community was Least-Disturbed Delta ecoregion Key species. However, almost 33% of the community was comprised of Channel-Altered Delta ecoregion Key individuals. The diversity index was 3.40, and the catch per unit of effort was 11.25 fish per minute. Two riffle, three run, and six pool habitats were sampled totaling about 1400 feet of stream. The substrate throughout the sample area consisted mainly of sand, with some areas of mud and silt. The shallow riffles were caused by woody debris and sediment deposition. There were areas of undercut banks in the pools and runs. Most in stream cover consisted of woody debris, root wads, cypress trees, hanging vegetation, and some aquatic vegetation. The stream flow at the time of the sampling event was approximately five cubic feet per seconds. Overall, the habitat was rated as good to excellent.

No single species dominated the fish community in Ables Creek (OUA0158). The longear sunfish, the mosquitofish, and the silvery minnow were the most abundant species collected. The sunfishes was the dominant fish family comprising over 35% of the community. The minnow family comprised almost 22% of the community with six species. There were two species of madtom collected which comprised almost 3% of the community. There were also four darter species collected comprising over four percent of the community. Key individuals accounted for over 15% of the community. The diversity index was 4.13, and the catch per unit of effort was 5.65 fish per minute. Two riffle habitats, three run habitats and three pool habitats were sampled totaling 615 feet of stream. The substrate throughout the sample area consisted of sand with areas of silt and mud in the pools. Woody debris was the main in stream cover, along with root wads, cypress trees, some undercut banks and hanging vegetation. Stream flow at the time of sampling was over five cubic feet per second. Overall, the habitat was rated as good to excellent.

The fish community at the upper Cut-Off Creek site (UWCOC02) was dominated by the blackspotted topminnow which comprised over 29% of the community. The topminnow family, represented by four species, accounted for over 35% of the community. Eight sunfish species were collected, comprising almost 30% of the community. The longear sunfish and the spotted sunfish were almost 11% and 9% of the community, respectively. There were four minnow species collected accounting for over 11% of the community. The darter family was represented by five species and comprised over seven percent of the community. Sensitive individuals, including two of the darter species collected, comprised less than one percent of the community. Less than four percent of the community was Typical Gulf Coastal Plains (TGC) key individuals. The diversity index was 4.35 and the catch per unit of effort was 6.46 fish per minute. Five run habitats and five pool habitats were sampled at this site totaling about 840 feet of stream. The substrate throughout the sample area consisted mainly of silt, mud and sand. Much of the bottom was covered with leaves and/or small woody debris. In stream cover consisted of woody debris, root wads, leaf packs, aquatic vegetation, hanging vegetation, and undercut banks. Stream flow at the time of the sampling event was less than one cubic foot per second. Overall, the habitat was rated as excellent.

The lower Cut-Off creek site (UWCOC01) fish community was dominated by the sunfish family, comprising almost 32% of the community, with the dollar sunfish and the longear sunfish accounting for over 11% and 7% of the community, respectively. Five minnow species were collected accounting for over 35% of the community. There were two madtom species collected and four darter species collected accounting for over 6% and 11% of the community, respectively. A little more than five percent of the community were TGC ecoregion Key individuals. Less than one percent of the community were sensitive individuals. The diversity index was 4.21, and the catch per unit effort was 3.08 fish per minute. One riffle, one run, and three pool habitats were sampled totaling 390 feet of stream. The depth of the water above and below the sample area limited the available area to sample. The substrate throughout the sample area was primarily mud and silt, with areas of sand. Small woody debris and leaf material also helped comprise the bottom substrate. In stream habitat was mainly woody debris and cypress trees. There were also some root wads, leaf packs, undercut banks, aquatic vegetation, and hanging vegetation. Stream flow at the time of the sampling event was less than two cubic feet per second. Overall, the habitat was rated as excellent.

The Bayou Bartholomew near Ladd (OUA033) fish community was dominated by the sunfish family, accounting for over 63% of the community. The bluegill sunfish and the longear sunfish comprised over 23% and 16% of the community, respectively. The minnow family accounted for just about nine percent of the community. Six other species each comprised between 3% to 6% of the community. There was only one darter specimen collected and no madtoms were collected. Almost 33% of the community was Least-Disturbed Delta (LDD) ecoregion Key individuals. The diversity index was 3.69 and the catch per unit effort was 3.84 fish per minute. Two riffle, three run and four pool habitats were collected totaling 1420 feet of stream. The substrate throughout the sample area was mostly soft bottom mud and silt. There were some areas with a firm bottom with some sand. In stream habitat was mainly woody debris and root wads. There was some aquatic and hanging vegetation, and a little area of undercut bank. The stream flow at the time of sampling was less than one cubic foot per second. Overall, the habitat was rated as good.

The Bayou Bartholomew site near Boydell, was dominated by the eight minnow species accounting for over 54% of the community. The silvery minnow comprised almost 38% of the community. There were 11 sunfish species collected accounting for almost 33% of the community. The longear sunfish comprised almost 21% of the community. There was also a surprising large number of spotted bass, 102 specimens, collected at this site. The darter family was represented by eight species, but comprised only a little more than 3% of the community. Sensitive individuals comprised only two percent of the community and LDD Key individuals comprised only ten percent of the community. Thirty-nine percent (39%) of the community were primary feeding group individuals. The diversity index was 3.19, and the catch per unit effort was 30.02 fish per minute. There were three run habitats and three pool habitats collected totaling 2270 feet of stream. The substrate throughout the sample area was almost entirely sand. There were a few areas of mud and silt. The instream cover consisted mainly of large woody debris and root wads. There was some hanging and aquatic vegetation, and a few areas of leafy debris. Water depth ranged from near five feet to expanded areas where the water was just a few inches deep. The average water depth was less than two feet. The stream flow was less than five cubic feet per second. Overall, the habitat was rated as good to excellent.

The minnow family also dominated the community at the Bayou Bartholomew site near Jones, La., (OUA013) comprising almost 60% of the community. There were eight species of minnow collected with the bullhead minnow accounting for almost 27% of the community. There were ten sunfish species collected, accounting for almost 27% of the community. The longear sunfish accounted for 23% of the community. Five catfish species were collected with two madtom species present. There were no bullhead catfish species collected. A little over two percent of the community were darters. Six species of darters were present with the dusky darter being the most abundant. One river redhorse specimen was collected. Just of 17% of the community were primary feeders, less than two percent of the community were sensitive individuals, and only two percent of the community were LDD Key individuals. The diversity index was 3.31, and the catch per unit effort was 17.50 fish per minute. Two run habitats and three pool habitats totaling 1340 feet of stream were sampled. The substrate throughout the sample area was primarily sand. There were some areas of silt and mud. In stream cover consisted mainly of woody debris, root wads and hanging vegetation. There was some undercut banks and aquatic vegetation. Water depth ranged from near seven feet to a couple of small areas of water depths of about four inches. The average water depth was about three feet. The stream flow at the time of sample was less than five cubic feet per second. The overall habitat was rated as excellent.

DISCUSSION

The Typical Gulf Coastal Plains sites, OUA0143, OUA0144, and UWCOC02, drained watersheds of 31 mi^2, 16 mi^2, 96 mi^2 respectively. The fish community in Bayou Bartholomew at Oakwood Road (OUA0143) was listed as impaired, Table F-3. It is affected by the lack of flow throughout most of the year. There were no riffles present in the sample area, thus limiting the darter population. The sunfish family dominated the community. The diversity index was low because two species comprised over 62% of the community. This site is probably not as impaired as the metrics suggest because the community structure is typical of a seasonal Gulf Coastal Plains fishery.

The community at Nevins Creek (OUA0144) was listed as not supporting, Table F-3. It scored only four points out of a possible 32. There were no minnows or catfishes collected at the site, and because the site was heavily dominated by one species, it had a very low diversity index. The fish community at this site is greatly influenced by flow; the lack of it throughout most of the year. This site is probably not as impaired as the metrics suggest because this type of community structure is typical a seasonal Gulf Coastal Plains fishery.

The other Gulf Coastal Plains site was Cut-Off Creek at the Highway 4 bridge. This site was listed as fully supporting. Unlike the first two sites, this site has flow throughout most of the year. What is unusual about this site is that it had a very low percentage of Key Individuals present. Key individuals are species that are expected to be well established in water bodies of particular ecoregions. It did, however, have the highest diversity index, 4.35, of all sites collected.

The Channel-Altered Delta (CAD) ecoregion sites draining Pine Bluff, Harding Creek (OUA145) and Bayou Imbeau (OUA0147), were both listed as not supporting the fish community. The habitat at both of these sites had been severely altered through channelization. In addition, both of these sites have small watersheds, less than 10 sq. mi., resulting in a lack flow throughout most of the year. There were only two metrics which received points from both of these sites. Because there were no primary feeders collected from either site, this metric was given four points at each site. These communities were dominated by either one or two species, thus limiting the diversity index. In addition, the Harding Creek site scored four points in the Key Individual category because of the large number of green sunfish present at the site. The fish community at each of these sites seems to be somewhat impaired.

The other CAD sites Cousart Bayou (OUA149), Jack's Bayou (OUA0150) and Deep Bayou (OUA0151) had much better fish communities than the Pine Bluff Tributaries. The Cousart Bayou site is listed as generally supporting and Jack's Bayou and Deep Bayou are listed as fully supporting, Table F-3. The Cousart Bayou site could very easily be listed higher by a slight shift in the fish community. A slight reduction in the percent community of the sunfish family and a slight increase in percent community of the minnow family and catfish family could increase the score enough (16 to 22) for this site to be listed as fully supporting. This shift in species would also help the score for Jack's Bayou. Both of these sites, however, lack darters and sensitive species. This is most likely due to a lack of favorable darter habitat at both of these sites.

TABLE F-3 -- FISH COMMUNITY BIOTIC INDEX SCORES							
Parameter	Sample Site						
	143	144	145	147	149	150	151
Cyprinidae	4	0	0	0	2	2	4
Ictaluridae	4	0	0	0	2	4	4
Centrarchidae	0	0	0	2	0	4	2
Percidae	0	0	0	0	0	0	4
% Sens. Inds.	0	0	0	0	0	0	NA
% Primary Inds	4	4	4	4	4	4	4
% Key Inds.	4	0	4	0	4	4	4
Diversity Index	0	0	0	0	4	4	4
Total Score	16	4	8	6	16	22	26
Support Degree	I	NS	NS	NS	GS	FS	FS

Parameter	Sample Site					
	158	COC02	COC01	033	Bayou	013
Cyprinidae	4	4	4	2	0	0
Ictaluridae	4	4	4	2	0	4
Centrarchidae	4	4	4	0	4	4
Percidae	4	2	4	0	4	2
% Sens. Inds.	NA	2	NA	NA	NA	NA
% Primary Inds	2	4	4	4	0	2
% Key Inds.	4	0	2	4	4	0
Diversity Index	4	4	4	4	2	2
Total Score	26	24	26	16	14	14
Support Degree	FS	FS	FS	GS	I	I

Support Degree

<u>Gulf Coastal Plains</u>

25 - 32 FS - Fully Supporting
24 - 17 GS - Generally Supporting
16 - 9 I - Impaired
0 - 8 NS - Not Supporting

<u>Delta</u>

22 - 28 FS - Fully Supporting
27 - 15 GS - Generally Supporting
14 - 8 I - Impaired
7 - 0 NS - Not Supporting

NOTE: The Delta ecoregion criteria does not have a value for sensitive species. The "Degree of Support" ranking is based on a 0 to 28 scale.

The Deep Bayou community lost points in only one category; percent community of the sunfish family. Almost 45% of the community was comprised of sunfishes, but eight different sunfish species were collected. Perhaps the only deficiencies in this community is the higher percent community of green sunfish and the low darter species count.

The remainder of the sites, Ables Creek (OUA158), Cut-Off Creek (UWCOC01) northeast of Boydell, Bayou Bartholomew near Ladd (OUA33), Bayou Bartholomew northeast of Boydell (Bayou), and Bayou Bartholomew near Jones, Louisiana (OUA13) are Least-Disturbed Delta (LDD) ecoregion sites, or sites that have not been influenced by channelization. Each of these sites have some year-round flow; minimum flows ranged from about one CFS in Cut-Off Creek and OUA33 to near 50 cubic feet per second at OUA13.

The Ables Creek and Cut-Off Creek fish communities were all scored as fully supporting, Table F-3. Both of these sites scored 26 out of 28 possible points. Ables Creek had a slight over abundance of primary feeders, and Cut-Off Creek had a reduced number of Key Individuals. Both sites had excellent diversity. The diversity index for Ables Creek and Cut-Off Creek was 4.13 and 4.21, respectively.

The Bayou site at OUA033 near Ladd, was listed as generally supporting. Over 63% of the fish community at the Bayou Bartholomew site near Ladd was dominated by the sunfish family. This site scored lowest in the family percentage categories. It did have an excellent population of Key Individuals and the diversity of the community was excellent. The habitat that was sampled at this location was probably the main cause for the lower support ranking. Most of the habitat that was sampled were pools, thus reducing the number of individuals normally found in runs and riffles. This site probably has a better fish community than is reflected by its score.

The lower Bayou sites, "Bayou" northeast of Boydell, and OUA013 near Jones, Louisiana were both listed as impaired. Over 50% of each community was comprised of two species. The longear sunfish and silvery minnow dominated the "Bayou" site, and the longear sunfish and bullhead minnow dominated at OUA013. The dominance of two species depressed the diversity indexes at each of these sites. Both sites were heavily dominated by the minnow family which comprised over 55% of the community at each site. A lack of Key Individuals at OUA013 and an over abundance of primary feeders caused each site to score lower. Over 40 species of fish were collected from each of these sites. This included six to eight darter species and two to three madtom species. Both of these sites display characteristics of Gulf Coastal Plains ecoregion and Delta ecoregion fish communities, as well as characteristic of big river communities. Thus it is difficult to compare stream data and metrics developed from specific ecoregions with stream sites located in transition zones between ecoregions. Both of these sites are probably supporting a good fish community, despite what the metrics indicate.

MERCURY

Fish tissue samples for mercury analysis were collected from three sites along the main stem of the Bayou. These sites are near Byrd Park in Pine Bluff, Jefferson County; near Hwy 144 in Ashley County (Bayou Site); and at OUA13 in Moorehouse Parish near Jones Louisiana. Composite samples consisting of left side fillets from five black basses between 11 inches and 17 inches in length were analyzed. Table F - 4 outlines the size of each fish in each composite and the level of mercury detected in the composite.

Table F - 4–Fish Fillet Size and Mercury Concentrations

Fillet	Byrd Park		Hwy 144		OUA13	
	Length (mm)	Weight (gm)	Length (mm)	Weight (gm)	Length (mm)	Weight (gm)
1	301	370	295	363	270	351
2	313	320	320	537	295	382
3	347	624	320	516	320	540
4	373	860	320	520	320	592
5	425	1320	345	645	345	710
Mercury	**0.483 mg/kg**		**0.466 mg/kg**		**0.721 mg/kg**	

These concentrations are very similar to what the Arkansas Mercury Task Force, 1995, found in the early 1990's. The Food and Drug Administration and Environmental Protection Agency has recently issued new guidelines for mercury in fish tissue levels of 0.3 mg/kg. Currently, there are only two segments, 125 stream miles, of the Bayou on the fish consumption advisory list covering the area between Arkansas Highway 82 near Thebes to Arkansas Highway 4 near McGehee. Using the new criteria would place the entire length of the Bayou and Cut-Off Creek, 326 total stream miles, on the Mercury Advisory list.

Conclusions/Recommendations

CONCLUSIONS

A two year survey of the Bayou Bartholomew watershed resulted in the collection of numerous water quality, macroinvertebrate, and fish community samples as well as a comprehensive land use survey. Listed below are the main conclusions derived from this assessment survey:

1) Historical water quality data from the Ambient Water Quality Monitoring Network and the Roving Monitoring Network indicate that there were occasionally very high values of instream turbidity. In addition, current fish tissue consumption advisories suggest limiting the consumption of certain species of fishes and certain size classes of fish due to mercury contamination.

2) The majority of the watershed west of the bayou lies in the Gulf Coastal Plains ecoregion. The eastern section of the watershed and the portion south and east of Pine Bluff to near Garrett Bridge is in the Delta ecoregion.

3) The small to moderately sized Gulf Coastal Plains ecoregion streams ceased to flow in early summer and during the drier winter months and were somewhat flashy during storm events. The small to moderately sized Delta ecoregion streams usually had continuous flow throughout the year. They were influenced by irrigation return flow and were slower to return to base flow conditions after storm events.

4) Land use in the upper portion of the watershed is a mix of row crop agriculture with some scattered urban areas. Silviculture is the dominant land use in the Gulf Coastal Plains section of the watershed. However, there are numerous small farms, mostly cattle operations and some poultry operations, scattered throughout this portion. The portion that lies in the Delta ecoregion is predominately row-crop agriculture with a few scattered poultry operations.

5) There are 43 confined animal operations (CAOs), all poultry farms containing 133 total houses, in the watershed. All of the operations are located north of Monticello. Almost half of the operations and over half of the houses were located around Star City. There were nine poultry operations totalling 37 houses located in the Delta ecoregion.

6) There are 15 point source dischargers in the watershed. Design flows range from a no discharge limit to an hydrologic controlled release of 3.1 cubic feet per second. None of the larger city systems produce enough volume during the summer months to have a regular discharge.

7) Many of the tributary sites and the upper Bayou sites were reduced to intermittent pools by early July each year. Flow in the main stem of the Bayou is greatly influenced by irrigation water. Low flows in the Bayou do not occur until late September when irrigation return flow ceases.

8) Minimum dissolved oxygen concentrations were at a level of concern mainly at those sites that had minimal to no-flow during the critical season. Those sites with continuous critical season flow and minimal dissolved oxygen concentrations were Bayou Bartholomew at Hwy. 4 (UWBYB02), Cut-Off Creek near Boydell (UWCOC01), Bayou Bartholomew at Hwy. 278 (OUA0154), and Bayou Bartholomew near Jones, La. (OUA013).

9) Base flow turbidity criteria was not attained at Bayou Imbeau (OUA0147) and Cross Bayou (OUA152). Each of these sites were reduced to small pools throughout most of the critical season. Storm flow turbidity was excessive at 10 sites; Bayou Bartholomew (OUA0148), Cousart Bayou (OUA0149), Jack's Bayou (OUA0150), Deep Bayou (OUA0151), Cross Bayou (OUA0152), Bayou Bartholomew at Garrett Bridge (UWBYB03), Ables Creek (OUA0158), Bayou Bartholomew at Hwy. 4 (UWBYB02), and Overflow Creek (OUA12A). Most of these sites are in the Deep Bayou watershed, or are heavily influenced by row-crop agriculture.

10) Total suspended solids concentrations reflected the turbidity values for the most part. On most occasions, clay particles were the dominant component causing high turbidity values.

11) The Deep Bayou watershed sites had the highest maximum and median total dissolved solids (TDS) concentrations of all samples collected. Delta ecoregion TDS criteria was not attained at five sites; Cousart Bayou (OUA0149), Jack's Bayou (OUA0150), Deep Bayou (OUA0151), Cross Bayou (OUA0152), and Gulf Coastal Plains TDS criteria was not attained at Overflow Creek (OUA12A).

12) Only one site had an ammonia-nitrogen concentrations >1.0 mg/L. The Deep Bayou watershed sites had the most elevated concentrations of all sites. Poultry litter is commonly used as a fertilizer in this watershed.

13) Nutrient concentrations were highest in the Deep Bayou watershed and at Garrett Bridge on Bayou Bartholomew, which is just below the confluence of Deep Bayou. Upstream sites generally had concentrations at or just above the detection limit. The nutrient concentrations at Garrett Bridge seem to be influenced by the inflow of water from the Deep Bayou watershed.

14) Almost all of the sample sites had occasional elevated concentrations of fecal coliform bacteria. Seven sites, Jack's Bayou (OUA0150), Deep Bayou (OUA0151), Cross Bayou (OUA0152), Bayou Bartholomew at Garrett Bridge (UWBYB03), Able's Creek at Hwy. 54 (OUA0153), Able's Creek near Selma (OUA0158), Wolf Creek (OUA0156), and Bayou Bartholomew at Hwy. 278 (OUA0154), exceeded the criteria for instream bacteria concentrations. Most of these sites are in the middle portion of the watershed which is heavily influenced by row-crop agriculture with poultry litter application practices. OUA0153 has a very small watershed and OUA0156 is a wetland site. In addition, many of these sites only exceeded the criteria one out of the two years sampled.

15) Metals concentrations and total hardness values were typical of the represented ecoregions.

16) Metolachlor and Molinate were the most widely and commonly detected pesticides occurring in 42% and 49% of the samples collected, respectively. Molinate had the highest concentration of any pesticide detected. Diazinon was detected mainly in the tributaries draining the city of Pine Bluff. None of the pesticides detected were at toxic levels.

17) One well, located in the Gulf Coastal Plains ecoregion, had a concentration of arsenic above the current drinking water standard. An additional 21 wells in the Delta ecoregion had Arsenic concentrations above the proposed drinking water standard. These wells are almost exclusively used for irrigation.

18) Pesticides were detected in 29 of the 120 ground water samples collected. Bentazon was the most commonly detected pesticide occurring in over 56% of the samples. Concentrations of all pesticides analyzed for were 3-5 orders of magnitude below the listed maximum contaminant levels and/or health advisory limits.

19) Habitat is the single most limiting parameter to the macroinvertebrate communities in the ephemeral streams within the Bayou watershed. Channelization, and alterations to riparian buffer zones has limited the macroinvertebrate community at several locations.

20) Macroinvertebrate community stability appears to be the least impacted in the GCP streams.

21) The macroinvertebrate communities in the Deep Bayou and Pine Bluff tributaries maybe indicative of seasonal water clarity impairments

22) The fish communities at OUA0144, OUA0145, and OUA0147 were listed as not supporting. This is most probably due to primarily a lack of flow during the critical season in these creeks. The communities at OUA0143, OUA0149, the Bayou site just south of the Drew County line, and OUA013, were listed as impaired. The community at OUA0143 is limited by the lack of instream flow during the critical season and the community at OUA0149 is most likely being effected by channel alterations and maintenance activities. The ecoregion based metrics used to determine the support status at the Bayou site and at OUA013 probably are not well adapted for these communities because they show characteristics from two different ecoregions. The rest of the communities were all listed as either generally supporting or fully supporting.

RECOMMENDATIONS

Nonpoint source best management practices (BMP) in the Bayou Bartholomew watershed need to be disbursed based on the land use in the area and the deficiencies of the receiving stream. Practices to reduce contaminants from urban runoff into those streams in the Pine Bluff area to reduce solid waste, nutrients, and fecal contamination need to be implemented in the Pine Bluff area. In addition, instream habitat enhancement and riparian zone management practices would help to maintain and enhance the aquatic life of these tributaries.

The tributaries in the Deep Bayou watershed and the lower Ables Creek drainage are all influenced by high turbidity and total suspended and dissolved solids concentrations. Reducing storm flow runoff and sediment contributions into these tributaries, and establishing riparian zones and improving instream habitat are all needed in these basins.

Solid waste is a problem throughout the watershed. Developing waste management strategies, recycling plans and education programs are needed to reduce and/or eliminate roadside and creek side dumping.

Water conservation practices need to be implemented throughout the watershed. From early April through September there is a constant inflow of irrigation water that is either being lost from the fields through busted levees or is intentionally being drained into the Bayou. Flooding soybean fields with rice water drainage would be a practical use for this water instead of allowing it to be lost down the Bayou. In addition, scattered throughout the watershed are numerous abandoned catfish ponds and small impoundments. These structures could be pumped full during the winter months and then the water used for irrigation purposes instead of using ground water resources.

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APPENDIX 1

CONFINED ANIMAL OPERATIONS

Locations
Type of Operation
Number of Houses

Appendix 1 - Confined Animal Operations

County	Houses	Latitude	Longitude	Sec-Tnshp-Range	TYPE	Location
Jefferson	1	34 10 53.56	92 05 31.67	Sec 23 T6S R10W	Chicken	East of Sulphur Springs off Hwy 54
Jefferson	4	34 06 12.00	91 51 58.00	Sec 24 T7S R8W	Chicken	1/4 mi. E. off Hwy 425, 2.75 mi. N. of Tarry
Jefferson	2	34 08 22.45	92 01 10.74	Sec 4 T7S R9W	Chicken	1.5 mi. west of Hwy 15 near Boggy Bayou subdivision
Jefferson	4	34 07 48.82	91 58 43.45	Sec 11 T7S R9W	Chicken	1.0 mi. east of Hwy 15, 2 mi. north of Pinebergen
Jefferson	3	34 05 00.50	92 00 31.50	Sec 28 T7S R9W	Chicken	0.75 mi. W. on Hwy 15 from Hwy 54 intc.
Cleveland	2	33 58 53.50	92 57 21.40	Sec 36 T8S R9W	Chicken	0.3 mi. E. of Hwy 54 on Co. Rd., 0.8 mi. N. of Glendale
Lincoln	5	34 05 24.00	91 56 25.00	Sec 30 T7S R8W	Chicken	4.3 mi. E. of Hwy 425, off Co. Rd. 2. mi. N. of Tarry
Lincoln	4	34 03 08.29	91 39 00.75	Sec 12 T8S R6W	Chicken	off Hwy 65 South of Grady
Lincoln	8	34 02 21.59	91 39 27.28	Sec 12 T8S R6W	Chicken	off Hwy 65 South of Grady
Lincoln	4	34 00 06.00	91 48 47.00	Sec 28 T8S R7W	Chicken	0.6 mi. S. of Nebo on Hwy 425
Lincoln	2	34 01 33.10	91 55 09.70	Sec 17 T8S R8W	Chicken	W. on co. Rd. 0.5 mi. N. of Griffith Springs
Lincoln	8	34 00 45.10	91 55 42.50	Sec 20 T8S R8W	Chicken	at Griffith Springs on Co. Rd. 72
Lincoln	2	33 59 39.38	91 55 43.44	Sec 32 T8S R8W	Chicken	1 mi. west of Feenyville on Feenyville Road
Lincoln	2	33 58 41.39	91 54 32.19	Sec 33 T8S R8W	Chicken	Just north of Feenyville on Feenyville Road
Lincoln	6	33 55 29.50	91 34 41.27	Sec 14 T9S R5W	Chicken	adjacent to Hwy 83 1.7 mi north of Hwy 54 south of Gould
Lincoln	2	33 56 26.00	91 45 29.00	Sec 7 T9S R6W	Chicken	3.5 mi. So. of Hwy 11 on Cane Creek Lake rd.
Lincoln	6	33 58 11.89	91 49 52.68	Sec 4 T9S R7W	Chicken	1.5 mi. N. on Hwy 425 from Hwy 11
Lincoln	2	33 57 10.55	91 52 21.47	Sec 6 T9S R7W	Chicken	2 mi northwest of Star City
Lincoln	4	33 57 48.00	91 51 25.30	Sec 6 T9S R7W	Chicken	at end of Co. Rd., 1.5 mi. N. on Co. Rd. 8 from Hwy212
Lincoln	2	33 57 44.80	91 51 25.30	Sec 6 T9S R7W	Chicken	at end of Co. Rd., 1.5 mi. N. on Co. Rd. 8 from Hwy212
Lincoln	3	33 57 46.00	91 51 25.30	Sec 6 T9S R7W	Chicken	at end of Co. Rd., 1.5 mi. N. on Co. Rd. 8 from Hwy212
Lincoln	2	33 57 42.00	91 51 25.30	Sec 6 T9S R7W	Chicken	at end of Co. Rd., 1.5 mi. N. on Co. Rd. 8 from Hwy212
Lincoln	2	33 57 40.00	91 51 25.30	Sec 6 T9S R7W	Chicken	at end of Co. Rd., 1.5 mi. N. on Co. Rd. 8 from Hwy212
Lincoln	5	33 56 41.10	91 51 55.60	Sec 7 T9S R7W	Chicken	off Hwy 212, 1 mi. W. of Hwy 114 jnct.

Appendix 1 - Confined Animal Operations

County	Houses	Latitude	Longitude	Sec-Tnshp-Range	TYPE	Location
Lincoln	3	33 55 15.50	91 51 27.31	Sec 19 T9S R7W	Chicken	off Hwy 11 southwest of Star City
Lincoln	3	33 53 31.50	91 47 17.50	Sec 35 T9S R7W	Chicken	on Co. Rd. 2 mi. N. of Hwy 54 out of Little Garnett
Lincoln	1	33 58 00.03	91 52 52.19	Sec 1 T9S R8W	Chicken	4 mi northwest of Star City
Lincoln	2	33 57 23.73	91 53 15.98	Sec 1 T9S R8W	Chicken	3 mi northwest of Star City off Hwy 212
Lincoln	2	33 58 20.48	91 54 16.68	Sec 2 T9S R8W	Chicken	1 mi southeast of Feenyville on Feenyville Road
Lincoln	1	33 57 30.11	91 54 18.55	Sec 2 T9S R8W	Chicken	1 mi southeasr of Feenyville on Feenyville Road
Lincoln	2	33 58 10.67	91 54 19.48	Sec 2 T9S R8W	Chicken	1.5 mi southeast of Feenyville on Feenyville Road
Lincoln	6	33 57 27.72	91 55 21.69	Sec 3 T9S R8W	Chicken	4 mi west of Star City on Hwy 212
Lincoln	1	33 58 33.83	91 54 39.72	Sec 3 T9S R8W	Chicken	southwest of Feenyville
Lincoln	2	33 58 35.43	91 55 39.82	Sec 4 T9S R8W	Chicken	1 mi west of Feenyville on Feenyville Road
Lincoln	8	33 51 40.00	91 38 24.00	Sec 8 T10S R5W	Chicken	1 mi. S. of Hwy 54 near Garrett Bridge
Lincoln	2	33 52 12.70	91 40 28.79	Sec 1 T10S R6W	Chicken	off Hwy 54 northwest of Garrett Bridge
Lincoln	1	33 50 57.00	91 46 02.00	Sec 18 T10S R6W	Chicken	0.9 mi. E. on Co. Rd. at Garnett
Lincoln	1	33 49 25.00	91 45 23.00	Sec 19 T10S R6W	Chicken	S. of Hwy. 54, 1.2 mi. E. of Hwy 83
Lincoln	2	33 49 12.00	91 44 48.00	Sec 29 T10S R6W	Chicken	off Hwy. 54, 0.5 mi. W. of Hwy 83
Lincoln	4	33 52 30.20	91 49 49.00	Sec 4 T10S R7W	Chicken	on Co. rd. 0.6 mi. E. of Hwy 54, 2.5 mi. S. of Hwy 425
Lincoln	3	33 48 50.00	91 49 59.50	Sec 32 T10S R7W	Chicken	0.2 mi. W. of Hwy 425 on Co. Rd. 6.5 mi. S. of Hwy 54
Drew	2	33 46 48.50	91 40 07.50	Sec 1 T11S R7W	Chicken	2 mi. W. on Co. Rd. 83 off Co. Rd. 88
Drew	2	33 46 47.14	91 50 08.02	Sec 4 T11S R7W	Chicken	off U.S. Hwy 425 approx. 11 mi north of Monticello
Total Houses	133					

APPENDIX 2

POINT SOURCE DISCHARGERS

Locations
Design Flow
Permit Limits

Appendix - 2

Point Source Discharges

Permit No.	Facility Name	Latitude	Longitude	County
	Receiving Waters - Location of Discharge			**Discharge Limits**
AR0021831	Monticello, City of	33 39 35	91 45 20	Drew
	Godfrey Creek - Cut-off Creek, off county road off Hwy. 83 northeast of Monticello (Sec 18, T12S, R6S). Permitted to discharge up to 52% of background stream flow May-Oct.. and 78% Nov.-Apr., not to exceed 3.1 cfs.			30/90 DO=3 HCR
AR0022071	McGeHee, City of	33 37 00	91 23 56	Desha
	Bayou Bartholomew - 1.5 miles south of Hwy. 4 on county road (Sec 6, T13S, R3W)			25/90/6 May-Oct 30/90 Nov-Apr 0.6 mgd
AR0022144	Wilmot, City of	33 04 16	91 33 52	Ashley
	Bayou Bartholomew - just downstream of the Hwy. 52 bridge (Sec 12, T19S, R5W)			30/90 year round 0.2 mgd
AR0022250	Dermott, City of, South Pond	33 31 14	91 24 34	Chicot
	Bayou Bartholomew - south of Hwy 35, (Sec 6, T14S, R3W)			25/90/3/6 May-Oct 30/90 Nov-Apr 0.6 mgd
AR0034029	Hamburg, City of	33 13 43	91 46 10	Ashley
	Chemin-A-Haut Creek east of Highway 8, east of the City. (Sec 13, T17S, R7W). Permitted to discharge up to 36% of the background stream flow Nov.-Apr. No discharge permitted during critical season, May-Oct.			30/90 Nov-Apr HCR
AR0034371	Portland, City of	33 14 45	91 32 12	Ashley
	Tributary, Bayou Bartholomew - located north of Hwy 278 and approximately o.5 mi. east of the Bayou. (Sec 9, T17S, R4W)			30*/30 0.1 mgd
AR0037141	Parkdale, City of	33 06 54	91 33 04	Ashley
	Bayou Bartholomew - 1 mile south of Hwy. 8 and Hwy 65 intersection (Sec 30, T18S, R4W)			30/90 0.1 mgd
AR0037885	Boggy Bayou SID	34 08 47	91 01 43	Jefferson
	Tributary, Boggy Bayou approximately 300 yards east of county road 4 miles north of Hwy 54 (Sec 5, T7S, R9W).			20/20/5/3, May-Oct 20/20/12 Nov-Apr 0.01 mgd
AR0039144	Pinewood SID #1	34 09 28.36	92 05 29.14	Jefferson
	Tributary to Nevins Creek - off South Pinewood Road approximately 0.1 mi. west of U.S. Hwy. 79 (Sec35, T7S, R10W). (Note: Same location for Suburbia SID)			20/20/5/3, May-Oct 20/20/12 Nov-Apr 0.05 mgd

Permit No.	Facility Name	Latitude	Longitude	County
	Receiving Waters - Location of Discharge			**Discharge Limits**
AR0041297	Montrose, City of	33 17 56	91 28 33	Ashley
	Bayou Bartholomew 1.5 miles south of U.S. Hwy 82 and 2.75 miles west of U.S. 165 (Sec 29, T16S, R4W)			30/90 year round 0.1 mgd
AR0041602	Suburbia SID #1	34 09 28.36	92 05 29.14	Jefferson
	Tributary to Nevins Creek - off South Pinewood Road approximately 0.1 mi. west of U.S. Hwy. 79 (Sec35, T7S, R10W). (Note: Same location for Pinewood SID)			20/20/5/3, May-Oct 20/20/12 Nov-Apr 0.012 mgd
AR0045888	Ar. Parks and Tourism, Cane Creek	33 54 55.16	91 45 52.04	Lincoln
	Cane Creek Lake - in lake near campground (sec19, T9S, R6W).			10/15/5 May-Oct 10/15/10 Nov-Apr 0.009 mgd
AR0046477	Star City, City of	33 57 14.8	91 49 16.71	Lincoln
	Cane Creek, just upstream of Cane Creek lake at Hwy 11 bridge, approximately 2 miles east of U.S. Hwy 425 (Sec 4, T9S, R7W).			10/15/5/5 May-Oct 10/15/8/6 Nov-Apr 0.375 mgd
AR0047350	Pine Haven Mobile Lodge	33 40 23	91 48 26	Drew
	Godfrey Creek - Cut-Off Creek, 3 miles north of Hwy 4 just east of U.S. Hwy 425 (Sec 10, T12S, R7W).			20/20/5/3, May-Oct 20/20/12 Nov-Apr 0.004 mgd

APPENDIX 3

SURFACE WATER QUALITY DATA

Water Quality Parameters
Metals
Pesticides

Appendix 3 - Water Quality Data

Date	Flow (cfs) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	Pool	1.4	0.0	<1.0	1.3	25.0	~3.0	NC	0.2	0.0	22.0	Pool	15.0	Dry	NT	18.0	<1.0	Pool	Swamp	<2.0	Dry	8.5	63.0	NT	NT
990112	0.1	1.4	4.4	<1.0	0.8	46.0	THTM	NC	17.6	8.2	70.0	0.8	1390.0	7.3	NT	1740.0	THTM	THTM	Swamp	~12.0	THTM	2660.0	2630.0	NT	NT
990201	THTM	0.6	11.9	THTM	THTM	78.0	THTM	NC	THTM	11.0	990.0	<1.0	3130.0	~7.00	NT	4100.0	THTM	THTM	Swamp	THTM	THTM	5880.0	4110.0	NT	NT
990309	<1.0	0.5	~5.0	<1.0	0.8	0.1	~2.0	0.8	<3.0	<1.0	1.0	<1.0	107.0	THTM	NT	187.0	4.5	66.5	Swamp	THTM	4.0	552.0	1500.0	NT	NT
990830	DRY	Pool	Pool	<1.0	<1.0	0.1	2.5	Dry	3.8	0.8	2.6	<1.0	51.0	Dry	7.0	45.0	Pool	Pool	Swamp	1.9	Dry	59.0	72.0	NT	NT
990927	DRY	Pool	Pool	<1.0	Pool	0.0	~2.0	Dry	<2.0	<1.0	7.0	Dry	5.7	Dry	6.0	24.0	0.5	Pool	Swamp	<1.0	Dry	37.0	41.0	NT	NT
991025	DRY	Pool	Pool	<1.0	Pool	0.0	~2.0	Dry	Pool	<1.0	5.0	Dry	13.0	Dry	4.0	36.0	<1.0	Pool	Swamp	<1.0	Dry	30.0	29.0	NT	NT
000118	DRY	<1.0	Pool	<1.0	<0.5	0.0	~2.0	Dry	<1.0	<1.0	<1.0	Dry	24.0	Dry	3.0	16.0	<1.0	<1.0	Swamp	<1.0	Dry	37.0	60.0	NT	NT
000229	Pool	1.5	2.0	2.0	0.5	0.0	THTM	Pool	14.7	1.3	550.0	0.9	507.0	11.8	40.0	149.0	27.1	1.7	Swamp	THTM	THTM	160.0	123.0	NT	NT
000321	<1.0	<1.0	<1.0	<1.0	<1.0	NT	THTM	THTM	32.1	11.0	960.0	0.6	932.0	18.7	84.0	570.0	THTM	THTM	Swamp	THTM	0.4	1140.0	854.0	NT	NT
000404	<1.0	THTM	THTM	<1.0	~1.0	0.0	THTM	THTM	THTM	THTM	160.0	16.4	1010.0	THTM	1000.0	1850.0	THTM	THTM	Swamp	THTM	THTM	3590.0	2240.0	NT	NT
000605	<1.0	THTM	THTM	<1.0	~1.0	16.0	THTM	2.9	42.4	7.6	130.0	Dry	359.0	3.0	14.5	459.0	~2.0	29.6	Swamp	THTM	55.0	551.0	660.0	NT	NT
000912	DRY	Pool	Pool	Pool	5.8	0.0	~3.0	DRY	~4.0	2.7	53.0	DRY	23.0	DRY	0.5	12.0	<1.0	Pool	Swamp	Pool	DRY	38.0	28.0	NT	NT

Date	Temperature (Degrees C) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	11.5	13.0	12.2	12.7	12.8	11.9	12.4	NC	12.5	12.9	12.3	12.6	12.6	Dry	15.9	16.3	16.8	16.7	14.8	16.1	DRY	15.5	14.9	15.8	13.1
990112	5.9	7.2	5.7	5.1	5.9	4.3	4.9	NC	5.5	5.3	4.6	6.8	6.3	7.3	5.8	6.5	5.9	5.9	8.0	5.0	6.7	5.5	6.5	6.5	6.6
990201	9.6	10.6	9.9	10.7	10.4	10.4	10.3	NC	10.0	9.9	10.4	10.3	11.0	10.7	11.4	11.9	11.0	11.7	11.4	11.8	11.9	12.0	12.1	12.7	12.3
990309	9.6	11.4	10.1	11.9	11.3	11.1	12.2	10.6	11.1	11.2	11.9	12.1	13.0	12.8	13.4	13.3	13.3	13.9	15.6	13.5	13.9	13.6	14.5	13.3	13.2
990830	Dry	27.2	26.3	25.9	23.8	25.3	27.2	Dry	26.2	25.6	26.1	27.1	27.0	Dry	27.2	27.8	26.0	25.7	28.5	27.2	Dry	28.9	28.5	25.7	25.6
990927	Dry	22.2	Dry	19.4	19.1	20.7	20.9	Dry	20.0	21.2	21.7	Dry	21.7	Dry	22.7	24.7	21.0	7.8	7.8	7.7	Dry	8.0	7.6	7.2	6.7
991025	Dry	12.0	Dry	10.1	9.9	9.6	9.1	Dry	8.0	9.0	9.4	Dry	13.1	Dry	10.5	13.5	11.0	10.5	13.8	12.1	Dry	14.3	13.0	11.9	11.4
000118	Dry	14.9	11.9	12.5	13.3	12.3	12.9	Dry	12.5	12.7	12.8	Dry	12.1	Dry	14.1	12.4	14.0	13.0	14.8	12.4	Dry	11.9	13.1	15.8	13.1
000229	13.6	17.1	14.6	16.7	15.1	14.5	14.4	13.9	14.0	13.0	14.2	13.0	13.5	11.1	13.0	15.6	12.5	15.1	15.1	15.3	13.3	15.3	15.5	14.7	14.9
000321	15.0	17.1	13.5	15.1	14.8	14.8	15.0	15.1	14.8	14.8	14.4	15.6	15.0	12.7	14.1	19.5	13.8	15.5	15.5	15.9	14.6	16.2	15.8	16.0	16.1
000404	16.7	18.4	14.7	17.1	17.3	16.3	15.4	15.1	14.4	13.3	14.9	13.9	15.8	13.6	14.0	17.0	15.0	17.0	16.0	17.0	16.0	17.0	17.0	16.0	16.0
000605	22.1	24.3	21.8	23.8	23.5	24.1	23.7	22.5	NC	23.4	23.8	Dry	25.3	22.4	23.8	24.9	23.2	Dry	25.4	25.5	22.5	25.6	26.2	24.1	24.8
000912	Dry	27	25.6	25.8	25.8	25.1	24.8	Dry	24.7	24.5	25.3	Dry	25.7	Dry	25.4	26.3	24.5	25.8	24.9	25.2	Dry	26.9	28.1	26	25.8

Date	Dissolved Oxygen (mg/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	2.10	6.37	7.87	2.19	2.71	6.28	5.51	NC	10.31	7.51	4.95	2.27	4.91	Dry	7.30	6.30	5.40	4.90	3.70	3.10	Dry	6.20	7.90	6.30	1.40
990112	7.01	13.20	13.30	2.70	8.30	13.70	12.14	NC	16.14	14.78	15.80	12.70	EM	11.30	11.10	9.00	11.20	8.20	8.10	9.30	7.70	8.90	9.10	7.40	9.10
990201	9.61	8.95	11.52	4.73	8.38	8.18	7.62	NC	8.88	9.90	7.37	7.75	6.72	9.34	6.18	8.71	7.99	6.60	6.60	5.80	6.50	6.60	6.30	5.00	7.60
990309	4.80	7.10	8.00	5.90	6.80	7.50	7.00	4.50	9.00	8.20	8.00	8.90	7.70	9.40	8.20	6.70	8.00	6.04	5.85	7.77	4.63	6.53	7.03	5.35	5.12
990830	Dry	6.50	2.80	0.20	0.30	4.30	5.90	Dry	7.10	5.50	5.70	3.70	NC	Dry	4.60	5.80	3.90	1.00	6.50	3.50	Dry	3.80	5.50	6.10	1.10
990927	Dry	Dry	Dry	0.16	1.46	4.39	4.95	Dry	7.17	3.02	5.55	Dry	5.42	Dry	4.72	7.33	2.99	1.50	6.10	2.90	Dry	6.00	6.20	5.80	3.00
991025	Dry	8.95	Dry	0.75	2.82	7.32	6.95	Dry	9.75	4.66	5.26	Dry	6.16	Dry	5.30	4.55	7.14	0.80	6.10	3.50	Dry	6.50	8.60	6.80	2.00
000118	Dry	13.20	2.30	0.50	9.60	3.90	5.20	Dry	9.38	7.20	8.80	Dry	4.80	Dry	4.60	5.20	3.10	3.20	7.00	6.30	Dry	6.00	7.70	6.70	6.00
000229	6.40	7.40	6.70	1.80	5.60	5.50	5.70	2.20	8.00	5.80	7.60	4.00	6.70	9.60	7.30	6.85	7.50	6.03	4.01	7.05	2.50	9.06	7.03	7.70	4.16
000321	6.40	7.20	7.50	3.40	4.60	5.00	4.20	3.70	7.50	6.40	6.40	5.10	4.90	9.00	7.20	5.60	7.10	2.60	4.60	5.50	4.20	4.70	5.70	4.70	5.70
000404	2.80	4.30	7.90	4.20	5.80	5.50	4.10	2.60	6.80	6.80	6.30	6.40	5.40	8.50	5.40	5.30	6.10	3.80	5.60	5.20	3.80	4.50	4.40	4.80	5.90
000605	4.62	4.05	6.65	3.15	3.60	3.04	2.40	1.75	NC	3.53	5.40	Dry	3.75	5.75	4.87	4.44	3.74	Dry	2.90	1.90	4.90	3.70	4.00	1.20	1.90
000912	Dry	4.40	3.10	0.20	0.50	1.70	4.40	Dry	2.30	2.30	2.40	Dry	3.60	Dry	3.30	3.60	1.40	3.10	3.10	4.50	Dry	4.80	4.50	4.70	0.70

Appendix 3 - Water Quality Data

Date	pH (standard units) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	6.60	7.15	6.51	6.72	EM	6.50	6.95	NC	8.25	7.92	7.68	7.48	7.68	Dry	7.36	7.51	7.15	6.75	6.83	7.32	Dry	7.67	7.81	7.25	6.71
990112	5.81	7.55	6.53	7.25	6.99	6.94	7.20	NC	7.66	7.49	7.90	7.40	7.40	7.20	7.05	7.02	6.90	6.22	6.56	7.06	7.63	7.13	7.35	7.10	6.90
990201	6.04	6.70	5.98	6.70	6.56	6.63	6.64	NC	6.86	7.16	7.07	6.96	6.87	5.98	6.02	6.67	6.40	5.35	5.15	5.58	5.15	5.70	6.40	4.89	5.43
990309	5.60	6.89	7.01	6.79	6.61	6.91	6.76	6.35	8.66	8.04	7.93	6.94	6.96	6.79	6.20	7.36	7.10	6.71	6.23	6.86	6.51	6.91	6.77	6.64	6.87
990830	Dry	8.66	6.75	7.01	7.12	7.85	7.80	Dry	8.15	8.02	8.15	7.46	NC	Dry	7.46	7.98	7.58	6.84	6.57	6.87	Dry	7.28	7.25	7.08	6.55
990927	Dry	8.72	Dry	7.03	7.07	7.82	7.50	Dry	8.06	7.87	8.17	Dry	7.91	Dry	7.26	8.04	7.22	7.80	7.80	7.70	Dry	7.95	7.60	7.20	6.68
991025	Dry	8.30	Dry	7.15	7.40	7.95	8.05	Dry	8.75	8.26	8.05	Dry	7.90	Dry	8.08	8.21	8.02	7.23	7.37	7.33	Dry	7.72	7.75	7.39	6.56
000118	Dry	8.90	5.97	7.05	7.50	7.11	7.13	Dry	8.20	7.83	7.95	Dry	7.16	Dry	8.88	7.05	7.05	5.73	6.74	7.00	Dry	7.39	7.32	7.47	7.63
000229	7.05	7.36	6.95	7.07	6.98	6.86	6.98	6.27	7.59	7.55	7.55	7.19	7.15	6.66	6.77	6.90	6.86	6.26	6.43	6.64	6.23	7.14	7.14	7.22	6.60
000321	5.99	7.20	6.33	6.59	7.01	6.32	7.19	5.75	7.34	7.32	7.18	7.11	7.10	6.75	6.26	7.30	6.32	6.23	6.35	6.47	6.21	6.66	6.88	6.24	6.04
000404	6.49	7.11	6.84	7.18	7.13	6.70	6.92	6.29	7.50	7.46	7.39	7.40	6.93	6.39	6.34	6.67	6.05	5.96	6.02	6.22	5.98	6.40	6.70	6.30	6.20
000605	6.43	6.70	6.78	7.00	6.75	6.70	7.15	6.65	NC	7.11	7.10	Dry	7.19	6.90	6.72	7.04	6.84	Dry	6.33	6.44	5.84	6.62	6.76	6.73	6.46
000912	Dry	7.01	6.83	6.64	6.89	7.32	7.48	Dry	7.53	7.61	7.6	Dry	7.67	Dry	7.19	7.3	6.88	6.54	6.64	6.87	Dry	7.35	7.49	7.29	6.60

Date	Turbidity (NTU's) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	5.90	8.20	5.90	10.00	12.00	7.10	8.10	NC	1.30	7.50	6.70	51.00	17.00	Dry	12.00	10.00	29.00	4.40	8.50	5.30	Dry	6.10	7.70	2.20	2.70
990112	13.00	21.00	11.00	18.00	26.00	43.00	37.00	NC	330.00	180.00	240.00	580.00	100.00	8.50	42.00	210.00	30.00	24.00	11.00	43.00	23.00	75.00	46.00	25.00	25.00
990201	10.50	25.00	23.00	26.00	27.00	38.00	61.00	NC	160.00	220.00	140.00	230.00	140.00	21.00	22.00	100.00	18.00	21.00	16.00	19.00	17.00	33.00	59.00	20.00	16.00
990309	12.00	40.00	11.00	23.00	26.00	15.00	32.00	5.90	33.00	32.00	95.00	300.00	140.00	55.00	520.00	65.00	9.20	7.60	3.60	23.00	18.00	43.00	36.00	37.00	7.00
990830	Dry	4.00	14.00	7.00	7.60	13.00	5.40	Dry	8.60	12.00	21.00	8.80	NC	Dry	20.00	18.00	5.80	4.80	8.10	11.00	Dry	23.00	24.00	9.20	4.20
990927	Dry	1.90	Dry	6.10	15.00	7.10	6.80	Dry	6.00	5.10	6.80	Dry	8.40	Dry	34.00	10.00	6.00	1.90	6.80	5.80	Dry	15.00	23.00	4.10	3.70
991025	Dry	1.50	Dry	3.20	6.90	7.40	3.30	Dry	3.50	1.40	3.00	Dry	5.80	Dry	15.00	46.00	5.10	3.20	6.60	4.20	Dry	4.40	7.20	2.40	2.90
000118	Dry	2.20	8.90	4.70	14.00	19.00	15.00	Dry	4.50	7.10	12.[illegible]	Dry	33.00	Dry	84.00	30.00	13.00	3.20	2.30	6.90	Dry	52.00	52.00	4.20	3.30
000229	6.90	12.00	17.00	16.00	28.00	63.00	50.00	55.00	95.00	180.00	140.00	210.00	280.00	16.00	160.00	280.00	36.00	6.00	3.90	27.00	25.00	60.00	61.00	74.00	3.60
000321	16.00	14.00	18.00	19.00	19.00	65.00	100.00	9.40	170.00	400.00	150.00	100.00	140.00	8.70	72.00	140.00	31.00	14.00	12.00	69.00	24.00	63.00	62.00	48.00	17.00
000404	4.20	24.00	25.00	23.00	37.00	34.00	100.00	8.90	190.00	150.00	200.00	100.00	160.00	26.00	66.00	170.00	21.00	12.00	17.00	20.00	13.00	51.00	100.00	29.00	14.00
000605	22.00	19.00	30.00	19.00	37.00	18.00	24.00	5.80	NC	220.00	260.00	Dry	53.00	19.00	79.00	57.00	17.00	8.50	7.10	61.00	24.00	100.00	59.00	53.00	12.00
000912	Dry	4.50	15.00	5.90	5.60	NC	NC	Dry	8.40	3.50	25.00	Dry	19.00	Dry	13.00	20.00	3.70	22.00	16.00	32.00	Dry	22.00	19.00	6.90	5.80

Date	Total Suspended Solids (mg/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	6.00	2.50	15.00	8.00	6.50	7.50	3.50	NC	<1.00	4.00	<1.00	55.00	11.50	Dry	<1.00	3.00	4.50	2.00	10.00	1.00	Dry	5.00	6.00	<1.00	<1.00
990112	4.00	5.00	3.00	8.00	3.50	13.00	3.00	NC	82.50	54.00	42.50	89.50	22.00	1.50	13.00	11.00	8.00	2.50	2.00	7.50	1.00	11.50	8.00	2.00	<1.00
990201	10.50	5.00	10.00	4.00	8.00	10.50	17.00	NC	41.50	85.50	37.50	97.50	36.50	23.50	3.50	21.00	2.00	3.00	1.50	3.50	2.00	6.00	9.50	3.00	<1.00
990309	9.00	30.00	12.50	25.50	15.50	11.50	52.50	4.00	12.00	24.00	57.00	246.50	155.50	60.00	464.00	23.00	5.00	3.50	<1.00	15.00	3.00	11.00	11.00	32.50	1.50
990830	Dry	5.00	16.00	10.00	20.00	12.50	5.00	Dry	9.50	20.50	47.00	35.50	NC	Dry	10.50	18.00	3.00	20.50	10.00	6.00	Dry	22.00	18.00	4.00	4.00
990927	Dry	2.00	Dry	7.00	16.50	7.50	10.00	Dry	7.50	6.00	4.00	Dry	10.00	Dry	13.50	11.00	9.50	2.00	4.50	1.00	Dry	15.50	27.00	2.00	3.50
991025	Dry	1.50	Dry	22.50	9.00	2.00	2.50	Dry	4.00	2.50	1.50	Dry	8.00	Dry	1.50	15.00	1.00	5.50	6.00	1.50	Dry	5.50	10.00	2.00	3.00
000118	Dry	1.50	3.50	4.00	4.00	7.00	7.00	Dry	2.50	3.50	4.00	Dry	15.00	Dry	4.00	7.00	9.50	1.50	2.00	3.00	Dry	19.00	26.50	<1.00	1.00
000229	5.50	6.50	4.50	6.00	8.50	39.00	19.00	19.00	12.00	40.50	59.50	27.50	76.00	4.00	41.00	37.50	11.00	3.50	1.00	16.50	3.00	28.00	29.00	23.00	4.50
000321	6.50	8.00	5.50	7.00	7.00	13.50	23.50	4.00	31.00	85.00	56.50	12.00	22.00	4.00	62.00	31.00	9.00	4.00	1.50	34.50	4.50	14.50	57.50	41.50	3.50
000404	6.00	7.00	12.00	8.50	15.50	12.00	27.00	8.00	65.00	71.50	101.50	51.00	74.00	34.50	23.00	63.50	4.50	3.00	3.50	10.50	3.50	16.50	36.50	11.00	2.50
000605	25.00	8.50	20.50	9.00	26.00	19.50	19.50	6.50	NC	45.00	293.00		31.50	11.00	49.50	23.50	8.00	8.00	19.00	34.00	21.50	44.00	19.50	61.00	8.50
000912	Dry	18.00	6.50	11.50	10.00	NC	NC	Dry	5.00	6.00	24.50	Dry	23.50	Dry	9.00	22.50	4.00	38.00	10.50	33.50	Dry	23.00	16.50	5.00	3.00

Appendix 3 - Water Quality Data

	Chlorides (mg/L)							Station Number (OUA****)																
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	2.63	2.69	7.15	2.87	5.61	5.50	5.06	NC	121.50	22.30	28.60	36.60	15.30	Dry	29.40	23.80	22.10	16.30	15.00	27.70	Dry	36.30	35.60	29.10	27.30
990112	4.17	6.22	7.43	9.92	4.64	3.05	2.75	NC	8.52	5.55	8.15	6.27	3.60	4.82	3.71	3.93	4.68	4.37	7.02	4.34	1.76	4.01	3.65	3.16	2.87
990201	2.43	2.38	3.83	2.19	1.43	2.69	2.32	NC	2.45	2.38	2.75	1.32	2.35	2.76	1.01	1.85	1.60	1.00	0.93	1.04	0.92	1.71	2.41	1.90	1.27
990309	4.50	2.76	8.99	1.93	2.76	4.90	4.67	2.33	13.30	7.51	13.90	7.14	10.80	3.89	3.73	5.54	6.67	3.68	8.65	3.25	3.34	4.07	2.89	2.51	5.89
990830	Dry	5.20	3.31	71.80	25.40	12.50	13.90	Dry	64.80	49.80	62.90	40.20	NC	Dry	25.60	49.50	27.70	28.60	10.01	22.10	Dry	23.80	21.80	30.40	18.70
990927	Dry	5.09	Dry	13.20	13.00	16.70	11.30	Dry	85.20	54.70	53.40	Dry	72.50	Dry	25.40	58.40	28.70	38.70	11.80	37.30	Dry	49.30	35.70	28.10	22.90
991025	Dry	4.63	Dry	2.68	4.93	6.52	12.20	Dry	47.70	45.90	68.50	Dry	62.00	Dry	18.70	16.60	22.80	34.10	11.40	34.10	Dry	35.30	42.30	20.80	25.80
000118	Dry	4.36	5.85	6.66	11.78	5.63	6.80	Dry	94.18	24.69	43.06	Dry	16.67	Dry	11.35	25.03	15.53	18.96	34.21	40.18	Dry	22.27	21.07	31.87	17.95
000229	7.81	4.73	7.14	3.24	3.25	5.06	8.10	1.58	13.30	10.60	18.30	8.36	18.70	4.92	7.74	14.40	11.36	14.00	32.40	13.80	4.46	14.90	17.20	33.40	29.40
000321	4.55	4.20	5.34	2.74	1.96	3.69	3.80	5.17	5.43	4.43	6.56	10.30	10.20	4.84	4.08	7.71	4.94	7.29	8.47	6.55	1.67	7.77	10.60	7.83	2.43
000404	4.95	3.56	4.03	1.96	2.18	3.13	3.43	2.85	5.25	4.08	5.85	5.21	5.61	2.76	1.71	2.32	1.95	3.31	1.68	2.08	1.22	2.66	3.94	3.31	1.34
000605	3.24	2.66	5.12	2.53	2.16	3.18	3.02	2.48	NC	15.80	32.30	Dry	4.02	4.61	15.20	4.46	12.30	5.76	5.35	5.38	1.38	4.70	5.48	8.59	8.14
000912	Dry	3.98	7.39	7.36	4.60	NC	NC	Dry	34.00	43.50	31.20	Dry	59.20	Dry	30.20	43.50	11.20	6.25	13.20	40.00	Dry	27.50	24.70	43.20	28.50

	Sulfates (mg/L)							Station Number (OUA****)																
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	5.90	7.35	7.89	5.03	7.64	4.02	5.16	NC	68.30	24.10	15.70	1.97	8.52	Dry	4.09	14.50	6.39	4.16	1.18	2.59	Dry	7.64	6.54	3.38	5.05
990112	16.50	6.33	17.90	7.46	7.53	6.14	5.90	NC	6.41	4.56	6.24	4.73	5.55	16.50	11.10	4.68	13.80	9.36	4.10	7.36	4.23	5.88	5.22	3.98	4.21
990201	8.15	5.39	10.00	4.58	5.08	6.17	4.47	NC	3.10	2.56	2.75	1.91	2.97	10.40	2.58	2.62	5.44	2.66	2.45	2.85	2.41	3.15	3.69	2.19	2.25
990309	8.46	6.60	16.10	4.54	5.13	8.94	7.92	2.14	7.44	3.65	5.49	9.15	6.77	11.20	7.60	6.58	22.20	6.48	2.56	3.97	2.16	4.39	4.46	2.01	2.12
990830	Dry	2.82	3.36	1.47	5.46	1.87	2.62	Dry	15.20	5.04	16.10	5.63	NC	Dry	7.85	10.01	4.20	2.49	1.03	3.89	Dry	6.46	6.24	3.28	2.78
990927	Dry	2.76	Dry	2.54	5.25	1.91	2.82	Dry	30.30	3.03	13.80	Dry	14.00	Dry	9.28	11.60	5.10	3.32	1.29	3.46	Dry	9.56	7.44	2.26	2.09
991025	Dry	3.12	Dry	2.32	6.73	6.53	2.40	Dry	17.50	6.28	18.10	Dry	12.20	Dry	6.85	7.09	6.87	2.11	1.42	2.78	Dry	7.29	7.88	1.80	2.16
000118	Dry	2.85	7.92	3.57	7.91	4.87	6.02	Dry	56.97	5.63	25.62	Dry	11.53	Dry	6.89	13.75	24.98	107.68	10.03	3.87	Dry	15.16	15.14	3.78	7.56
000229	11.80	5.40	16.60	3.61	4.75	5.42	6.59	6.36	13.40	7.67	9.85	7.41	10.60	12.30	6.47	8.85	14.39	23.40	4.37	33.90	13.30	14.30	30.20	7.00	3.68
000321	19.20	5.51	17.50	3.82	5.01	6.15	5.64	9.45	7.61	6.73	5.08	7.39	7.26	16.30	10.80	7.31	11.40	9.70	3.54	6.06	4.45	6.11	6.82	7.44	3.56
000404	19.80	6.28	12.90	3.79	5.17	5.62	5.76	4.13	6.44	3.72	6.13	4.81	5.49	10.50	3.53	3.69	5.92	5.67	3.39	3.68	3.37	3.95	4.87	2.83	3.12
000605	8.15	5.34	12.80	3.46	4.87	3.83	3.94	1.27	NC	9.41	22.00	Dry	4.60	7.76	8.41	4.24	22.10	5.33	1.12	5.00	2.56	5.02	4.89	3.65	2.38
000912	Dry	8.63	4.33	6.05	10.00	NC	NC	Dry	15.60	6.50	14.20	Dry	12.10	Dry	6.30	8.83	2.99	6.29	1.02	3.55	Dry	7.23	6.55	4.15	1.79

	Total Dissolved Solids (mg/L)							Station Number (OUA****)																
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	67.00	82.00	88.00	77.00	86.00	194.00	89.00	NC	556.00	368.00	398.00	464.00	219.00	Dry	?248	?264	?254	?93	?100	?202	Dry	?370	?384	?203	?282
990112	85.00	105.00	89.00	98.00	89.00	85.00	87.00	NC	290.00	182.00	239.00	508.00	135.00	66.00	81.00	208.00	82.00	80.00	62.00	89.00	69.00	108.00	85.00	72.00	72.00
990201	75.00	99.00	82.00	90.00	73.00	80.00	99.00	NC	170.00	184.00	146.00	162.00	136.00	58.00	50.00	107.00	56.00	56.00	55.00	65.00	57.00	76.00	92.00	61.00	52.00
990309	77.00	77.50	93.00	47.50	72.50	72.50	81.00	77.50	206.50	153.00	189.50	156.00	178.00	84.50	180.50	126.00	85.50	71.50	58.00	85.50	81.00	110.00	94.50	74.50	72.50
990830	Dry	105.00	59.00	197.00	175.00	204.00	167.00	Dry	401.00	409.00	414.00	263.00	NC	Dry	184.00	285.00	153.00	133.00	88.00	115.00	Dry	182.00	160.00	175.00	133.00
990927	Dry	98.00	Dry	99.00	132.00	189.00	162.00	Dry	485.00	322.00	311.00	Dry	388.00	Dry	154.00	314.00	135.00	155.00	82.00	131.00	Dry	254.00	201.00	213.00	146.00
991025	Dry	93.00	Dry	60.00	83.50	116.50	153.00	Dry	266.50	318.00	356.00	Dry	320.50	Dry	136.00	151.50	105.00	135.50	67.00	121.50	Dry	211.00	221.50	205.50	156.50
000118	Dry	98.50	77.50	106.50	125.50	105.50	98.00	Dry	405.00	275.00	258.00	Dry	150.50	Dry	176.50	173.00	177.50	230.00	119.50	134.50	Dry	173.00	165.00	185.50	113.00
000229	82.50	98.00	101.50	78.50	92.00	99.00	117.00	122.00	223.50	285.00	216.50	256.00	297.00	71.00	203.50	200.50	138.50	153.50	112.50	145.50	124.00	161.00	175.00	219.00	143.00
000321	99.00	113.00	106.00	92.00	98.00	116.00	161.00	117.00	220.00	383.00	194.00	214.00	202.00	76.00	117.00	181.00	103.00	123.00	84.00	126.00	100.00	137.00	197.00	121.00	84.00
000404	97.00	120.50	105.50	95.50	108.00	96.50	160.00	102.00	209.50	212.50	206.50	174.00	195.00	74.00	92.00	146.00	80.00	81.00	74.50	81.00	69.00	99.50	135.00	89.50	67.50
000605	89.00	97.50	105.50	87.50	97.00	80.00	85.50	92.50	NC	327.50	226.50	Dry	109.00	77.00	149.00	125.50	134.50	82.50	68.50	124.50	72.00	150.50	134.00	139.50	99.00
000912	Dry	87.00	82.00	87.00	102.00	NC	NC	Dry	234.50	359.50	238.00	Dry	344.50	Dry	170.50	255.50	102.00	82.00	98.00	151.50	Dry	200.00	180.00	207.50	172.00

Appendix 3 - Water Quality Data

Date	Total Organic Carbon (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	9.60	9.50	11.20	12.70	9.00	9.60	8.20	NC	5.30	11.40	12.40	19.50	8.70	Dry	7.60	9.10	8.00	9.40	17.00	7.10	Dry	6.70	5.20	6.40	8.90
990112	14.40	12.90	9.30	11.80	10.20	11.20	13.10	NC	9.80	11.10	13.80	9.10	13.60	7.20	11.10	8.70	11.00	15.70	14.10	15.70	17.30	12.10	14.70	15.30	16.10
990201	14.80	15.80	14.70	13.60	13.80	14.20	15.70	NC	12.90	9.10	11.40	5.20	10.70	6.90	12.90	10.00	13.10	16.20	15.70	18.10	17.20	15.50	12.20	14.40	13.60
990309	NC	NC	NC	NC	NC	NC	NC	NC	NC	9.20	12.80	8.30	11.70	11.40	7.70	10.00	7.80	15.20	13.40	17.50	17.60	13.20	12.30	14.00	13.70
990830	Dry	3.10	9.20	10.70	5.40	6.40	7.10	Dry	5.10	5.60	5.70	7.40	NC	Dry	4.90	5.70	7.90	9.90	10.40	8.50	Dry	5.70	6.20	8.90	10.10
990927	Dry	1.50	Dry	11.30	8.50	7.70	6.70	Dry	3.90	5.90	6.10	Dry	4.90	Dry	3.50	5.00	6.70	7.80	10.70	6.10	Dry	5.10	5.00	2.30	8.10
991025	Dry	1.53	Dry	10.16	6.89	7.51	7.17	Dry	6.48	6.95	10.01	Dry	5.38	Dry	7.88	7.62	6.67	7.86	9.97	6.25	Dry	1.23	4.79	1.19	8.31
000118	Dry	1.90	9.00	9.20	7.60	8.90	8.80	Dry	9.90	9.70	8.50	Dry	7.70	Dry	10.90	7.60	13.20	12.50	12.50	5.10	Dry	7.30	7.90	6.05	9.02
000229	11.1	8.1	12.5	11.0	9.6	10.8	10.5	21.3	12.8	16.0	15.2	12.7	12.4	8.1	15.4	14.2	10.8	19.4	15.9	13.6	19.4	10.9	10.2	13.0	10.9
000321	10.30	7.97	11.00	9.63	7.99	10.30	12.80	19.50	11.20	12.00	11.20	10.10	11.10	5.12	10.40	12.70	10.30	17.80	12.80	15.40	16.40	14.70	10.80	15.90	13.20
000404	11.50	13.10	14.50	12.30	10.60	14.50	14.10	24.30	13.60	13.90	12.50	11.20	12.50	8.93	11.90	11.50	13.50	14.80	15.20	14.20	15.50	13.60	13.50	15.20	13.60
000605	15.99	11.59	16.71	11.38	11.14	13.44	13.93	26.41	NC	17.28	12.30	Dry	14.38	7.74	10.74	13.91	10.36	15.36	13.14	19.20	14.66	12.56	14.67	20.47	11.42
000912	Dry	9.90	8.80	13.80	12.10	NC	NC	Dry	9.70	8.60	9.60	Dry	5.60	Dry	5.10	5.50	7.70	12.00	9.10	7.30	Dry	5.90	6.60	8.30	8.40

Date	Biochemical Oxygen Demand (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	2.09	3.45	6.16	>6.27	4.93	3.02	2.43	NC	0.67	1.79	2.45	>6.79	1.14	Dry	1.54	1.08	1.99	1.87	>7.95	2.60	Dry	0.98	0.92	0.50	1.65
990112	1.43	1.83	0.85	4.41	2.13	1.36	1.41	NC	1.87	2.47	1.98	4.03	1.63	0.58	1.41	1.41	1.55	1.97	1.73	2.61	1.54	1.63	1.79	1.86	1.53
990201	1.60	2.20	1.80	2.60	2.60	2.30	2.60	NC	2.30	2.90	2.40	2.30	1.90	0.90	1.90	1.70	1.50	2.30	1.80	2.50	2.10	2.30	2.00	2.00	1.70
990309	2.41	5.25	1.82	5.75	3.75	1.58	1.95	2.07	1.58	2.18	2.10	5.81	2.21	3.43	2.99	1.45	1.02	1.61	1.07	1.96	1.54	1.22	1.12	2.08	1.50
990830	Dry	1.23	3.26	5.89	3.28	1.37	1.46	Dry	0.64	0.92	0.98	2.98	NC	Dry	1.21	1.18	1.76	1.65	3.61	1.92	Dry	1.35	1.07	0.96	2.19
990927	Dry	1.25	Dry	4.81	4.27	1.60	1.25	Dry	0.55	1.02	1.16	Dry	0.86	Dry	0.90	0.73	3.30	2.40	2.44	0.83	Dry	1.11	0.78	0.39	1.80
991025	Dry	1.11	Dry	4.87	3.19	1.10	1.16	Dry	0.96	0.85	2.04	Dry	1.12	Dry	0.92	1.04	1.09	1.71	1.19	0.91	Dry	1.09	1.11	0.39	2.20
000118	Dry	0.77	2.49	5.98	3.21	2.67	3.30	Dry	1.60	1.27	1.15	Dry	1.36	Dry	1.65	1.38	3.76	2.16	1.66	1.21	Dry	1.12	1.16	0.79	1.45
000229	3.32	3.22	2.46	4.92	2.87	2.38	2.71	4.48	2.68	4.19	4.13	3.49	2.56	1.04	3.69	2.44	3.47	2.41	2.10	1.70	2.37	1.31	1.03	3.03	1.20
000321	2.40	2.64	1.79	3.37	2.25	1.96	2.93	2.74	2.36	3.62	2.71	3.90	1.85	0.80	2.42	1.94	1.88	2.31	1.40	2.62	2.72	2.25	1.63	2.87	2.51
000404	4.12	4.29	2.73	4.46	3.24	2.40	2.22	3.75	3.91	4.96	3.64	4.91	2.11	1.35	2.95	1.99	2.52	2.11	2.56	2.39	2.43	1.91	1.69	2.17	2.05
000605	2.49	2.75	2.15	3.11	3.70	2.26	1.72	2.75	NC	7.84	6.96	Dry	1.71	1.44	2.61	1.76	1.57	1.92	3.14	2.06	2.37	1.89	1.38	4.14	1.55
000912	Dry	5.15	2.89	>8.13	>7.93	NC	NC	Dry	4.16	1.71	5.50	Dry	1.15	Dry	1.06	1.00	2.10	5.03	2.24	1.39	Dry	2.21	1.42	1.03	2.95

Date	Ammonia Nitrogen, NH3-N (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.033	0.033	0.469	0.035	0.230	0.049	0.043	NC	0.036	0.079	0.031	0.045	0.046	Dry	0.057	0.042	0.056	0.035	0.042	0.114	Dry	0.069	0.036	0.034	0.068
990112	0.035	0.304	0.099	0.148	0.314	0.049	0.029	NC	0.244	0.221	0.191	0.619	0.058	0.021	0.032	0.120	0.022	0.012	0.011	0.026	0.016	0.045	0.026	0.013	0.014
990201	0.018	0.100	0.095	0.060	0.068	0.014	0.023	NC	0.085	0.155	0.067	0.121	0.063	0.042	<0.005	0.048	<0.005	0.005	<0.005	0.006	0.005	0.009	0.025	0.023	<0.005
990309	0.029	0.231	0.179	0.211	0.227	0.210	0.058	0.025	0.031	0.158	0.040	0.079	<0.005	0.130	0.011	0.079	0.082	0.117	0.145	0.096	0.065	0.060	0.040	0.080	0.105
990830	Dry	0.038	0.007	0.099	<0.005	<0.005	<0.005	Dry	<0.005	0.008	0.014	<0.005	NC	Dry	0.070	<0.005	<0.005	0.017	<0.005	0.019	Dry	0.075	0.034	<0.005	<0.005
990927	Dry	<0.005	Dry	0.735	0.068	0.026	<0.005	Dry	0.008	0.034	<0.005	Dry	0.007	Dry	0.056	<0.005	<0.005	0.018	0.005	0.026	Dry	0.053	0.024	<0.005	<0.005
991025	Dry	<0.005	Dry	0.013	0.269	<0.005	0.009	Dry	0.017	0.049	<0.005	Dry	0.005	Dry	0.071	0.148	<0.005	<0.005	<0.005	0.021	Dry	<0.005	<0.005	<0.005	<0.005
000118	Dry	0.015	0.032	0.029	0.012	<0.005	0.029	Dry	0.020	0.021	0.023	Dry	0.034	Dry	0.103	0.058	<0.005	<0.005	0.010	0.008	Dry	0.100	0.074	<0.005	0.011
000229	0.011	0.292	0.027	0.031	0.311	0.061	0.033	0.031	0.230	4.170	0.397	0.449	0.274	0.013	0.269	0.171	0.153	0.044	0.012	0.061	0.045	0.107	0.095	0.188	0.025
000321	0.014	0.335	0.019	0.278	0.205	0.047	0.079	0.041	0.201	0.574	0.143	0.498	0.100	0.007	0.107	0.099	0.091	0.046	0.010	0.072	0.027	0.087	0.138	0.043	0.021
000404	0.028	0.408	0.053	0.154	0.16	0.049	0.121	0.073	0.151	0.245	0.154	0.452	0.098	0.046	0.044	0.099	0.017	0.029	0.009	0.025	0.017	0.056	0.077	0.048	0.017
000605	0.098	0.172	0.102	0.198	0.281	0.212	0.110	0.362	NC	1.736	0.787	Dry	0.071	0.102	0.240	0.056	0.084	0.196	<0.005	0.116	0.078	0.133	0.127	0.321	0.064
000912	Dry	<0.005	0.069	0.305	0.255	NC	NC	Dry	0.139	0.029	0.038	Dry	<0.005	Dry	0.070	0.038	0.019	0.103	<0.005	0.051	Dry	0.031	0.043	0.007	0.017

Appendix 3 - Water Quality Data

Date	Nitrate + Nitrite Nitrogen, NO3 + NO2-N (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.023	0.260	0.585	0.273	0.819	0.035	0.038	NC	0.028	0.286	0.027	0.029	0.074	Dry	0.076	0.071	0.084	0.033	0.028	0.037	Dry	0.064	0.060	0.033	0.048
990112	0.051	0.211	0.181	0.336	0.363	0.102	0.077	NC	0.247	0.356	0.224	0.218	0.157	0.414	0.322	0.333	0.233	0.055	0.020	0.069	0.036	0.189	0.093	0.022	0.032
990201	0.113	0.151	0.119	0.177	0.225	0.095	0.111	NC	0.164	0.250	0.128	0.156	0.155	0.290	0.028	0.141	0.035	0.033	0.032	0.030	0.029	0.070	0.093	0.021	0.016
990309	0.457	0.454	0.472	0.472	0.460	0.039	0.035	0.028	0.229	0.109	0.194	0.111	0.298	0.324	0.714	0.241	0.030	0.068	0.019	0.065	0.045	0.171	0.187	0.047	0.049
990830	Dry	0.029	0.029	0.022	0.034	0.041	0.032	Dry	0.050	0.053	0.055	0.026	NC	Dry	0.470	0.107	0.053	0.034	0.026	0.055	Dry	0.146	0.223	0.060	0.033
990927	Dry	0.015	Dry	0.025	0.021	0.030	0.023	Dry	0.047	0.027	0.020	Dry	0.029	Dry	0.082	0.068	0.031	0.037	0.026	0.044	Dry	0.133	0.203	0.038	0.023
991025	Dry	0.02	Dry	0.025	0.028	0.026	0.024	Dry	0.026	0.081	0.022	Dry	0.024	Dry	0.109	0.336	0.026	0.025	0.022	0.036	Dry	0.614	0.099	0.057	0.020
000118	Dry	<0.010	<0.010	<0.010	0.028	<0.010	<0.010	Dry	<0.010	0.042	<0.010	Dry	<0.010	Dry	0.116	0.028	<0.010	<0.010	<0.010	<0.010	Dry	0.288	0.363	<0.010	<0.010
000229	0.030	0.149	0.120	0.060	0.373	0.189	0.177	0.026	0.941	1.872	0.675	0.615	0.896	0.404	0.405	0.634	0.470	0.024	0.024	0.103	0.082	0.271	0.346	0.117	0.030
000321	0.100	0.091	0.146	0.039	0.228	0.103	0.176	0.014	0.271	1.273	0.222	0.316	0.442	0.228	0.210	0.272	0.228	<0.010	<0.010	0.066	0.142	0.174	0.317	0.015	0.050
000404	0.029	0.173	0.108	0.150	0.228	0.119	0.209	0.034	0.305	0.354	0.329	0.396	0.426	0.352	0.107	0.197	0.067	0.023	0.047	0.054	0.110	0.106	0.171	0.045	0.024
000605	0.079	0.154	0.147	0.209	0.237	0.217	0.161	<0.010	NC	1.122	1.661	Dry	0.270	0.174	2.189	0.293	0.220	<0.065	<0.010	0.305	0.035	0.409	0.375	0.061	0.186
000912	Dry	0.016	0.026	0.012	0.012	NC	NC	Dry	0.377	0.334	0.420	Dry	0.097	Dry	0.189	0.149	0.024	0.027	0.021	0.083	Dry	0.049	0.127	0.084	0.015

Date	Total Phosphorus (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.053	0.075	0.135	0.163	0.157	0.107	0.088	NC	0.065	0.111	0.213	0.343	0.112	Dry	0.041	0.092	0.144	0.067	0.102	0.070	Dry	0.051	0.058	0.082	0.030
990112	0.056	0.137	0.054	0.183	0.127	0.122	0.110	NC	0.545	0.424	0.434	0.633	0.276	0.031	0.074	0.392	0.095	0.103	0.042	0.103	0.038	0.187	0.138	0.088	0.043
990201	0.049	0.162	0.076	0.174	0.159	0.131	0.179	NC	0.358	0.496	0.326	0.271	0.309	0.039	0.060	0.232	0.120	0.048	0.036	0.067	0.036	0.095	0.179	0.098	0.037
990309	0.108	0.229	0.077	0.177	0.198	0.130	0.248	0.144	0.137	0.208	0.242	0.907	0.312	0.153	0.602	0.252	0.163	0.116	0.042	0.199	0.108	0.228	0.221	0.234	0.084
990830	Dry	0.065	0.129	0.376	0.613	0.104	0.105	Dry	0.119	0.141	0.154	0.269	NC	Dry	0.077	0.136	0.320	0.155	0.059	0.112	Dry	0.134	0.149	0.125	0.057
990927	Dry	0.041	Dry	0.597	0.261	0.071	0.062	Dry	0.091	0.103	0.149	Dry	0.138	Dry	0.105	0.111	0.276	0.083	0.041	0.061	Dry	0.092	0.127	0.131	0.048
991025	Dry	0.049	Dry	0.442	0.233	0.085	0.067	Dry	0.097	0.124	0.272	Dry	0.118	Dry	0.109	0.234	0.197	0.125	0.050	0.057	Dry	0.067	0.082	0.128	0.075
991025	Dry	0.049	Dry	0.442	0.233	0.085	0.067	Dry	0.097	0.124	0.272	Dry	0.118	Dry	0.109	0.234	0.197	0.125	0.050	0.057	Dry	0.067	0.082	0.128	0.075
000118	Dry	0.073	0.160	0.319	0.217	0.276	0.208	Dry	0.130	0.209	0.128	Dry	0.231	Dry	0.277	0.180	1.762	0.086	0.058	0.088	Dry	0.206	0.200	0.143	0.061
000229	0.132	0.253	0.172	0.303	0.311	0.252	0.224	0.258	0.358	0.807	0.397	0.470	0.441	0.092	0.376	0.301	2.044	0.205	0.101	0.146	0.125	0.258	0.224	0.343	0.091
000321	0.086	0.272	0.111	0.306	0.274	0.213	0.326	0.148	0.379	0.770	0.343	0.337	0.290	0.058	0.162	0.285	0.318	0.178	0.062	0.174	0.084	0.208	0.405	0.171	0.087
000404	0.133	0.390	0.103	0.243	0.215	0.178	0.401	0.229	0.465	0.576	0.449	0.363	0.369	0.081	0.144	0.424	0.167	0.118	0.064	0.097	0.059	0.194	0.340	0.202	0.056
000605	0.121	0.251	0.142	0.190	0.294	0.347	0.395	0.318	NC	1.608	0.430	Dry	0.428	0.066	0.212	0.419	1.121	0.262	0.083	0.319	0.087	0.436	0.379	0.499	0.105
000912	Dry	0.210	0.140	0.560	0.710	NC	NC	Dry	0.330	0.210	0.250	Dry	0.190	Dry	0.100	0.190	0.630	0.330	0.050	0.140	Dry	0.130	0.120	0.090	0.090

Date	Ortho-Phosphorus (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.016	0.048	0.019	0.091	0.100	0.049	0.040	NC	0.089	0.125	0.265	0.048	0.106	Dry	0.021	0.083	0.131	0.019	0.027	0.022	Dry	0.033	0.036	0.088	0.013
990112	0.013	0.067	0.014	0.054	0.068	0.051	0.064	NC	0.257	0.203	0.179	0.338	0.125	0.008	0.025	0.199	0.056	0.049	0.005	0.041	0.013	0.089	0.072	0.044	0.012
990201	0.024	0.128	0.037	0.136	0.128	0.067	0.097	NC	0.199	0.221	0.170	0.125	0.160	0.020	0.037	0.120	0.102	0.026	0.013	0.043	0.022	0.058	0.111	0.065	0.025
990309	<0.005	0.113	<0.005	0.101	0.096	0.053	0.059	0.046	0.069	0.111	0.073	0.073	0.086	0.083	0.012	0.075	0.098	0.052	0.021	0.089	0.099	0.068	0.019	0.043	0.098
990830	Dry	0.034	0.006	0.040	0.094	0.053	0.058	Dry	0.102	0.104	0.108	0.103	NC	Dry	0.042	0.102	0.228	0.035	0.006	0.049	Dry	0.067	0.069	0.058	0.012
990927	Dry	0.017	Dry	0.155	0.057	0.018	0.029	Dry	0.070	0.053	0.096	Dry	0.100	Dry	0.039	0.071	0.167	0.018	<0.005	0.025	Dry	0.038	0.046	0.093	<0.005
991025	Dry	0.019	Dry	0.029	0.085	0.029	0.014	Dry	0.063	0.089	0.221	Dry	0.078	Dry	0.038	0.125	0.130	0.012	<0.005	0.016	Dry	0.078	0.022	0.089	<0.005
000118	Dry	0.023	0.021	0.097	0.059	0.096	0.050	Dry	0.079	0.158	0.083	Dry	0.131	Dry	0.108	0.097	1.577	0.012	<0.005	0.016	Dry	0.072	0.068	0.086	0.009
000229	0.005	0.128	0.073	0.154	0.211	0.069	0.052	0.066	0.239	0.612	0.184	0.277	0.229	0.008	0.154	0.122	1.840	0.088	<0.005	0.036	0.026	0.095	0.079	0.107	<0.005
000321	0.012	0.161	0.024	0.191	0.172	0.082	0.137	0.051	0.226	0.432	0.188	0.179	0.158	0.005	0.041	0.129	0.215	0.067	0.006	0.054	0.016	0.084	0.18	0.052	0.024
000404	0.015	0.259	0.035	0.143	0.145	0.071	0.165	0.104	0.245	0.368	0.225	0.184	0.179	0.019	0.055	0.179	0.095	0.047	0.018	0.036	0.019	0.086	0.159	0.096	0.016
000605	0.015	0.126	0.035	0.110	0.113	0.122	0.172	0.090	NC	1.154	0.110	Dry	0.187	<0.005	0.048	0.202	0.855	0.107	0.012	0.094	0.009	0.176	0.158	0.123	0.022
000912	Dry	0.053	<0.005	0.318	0.410	NC	NC	Dry	0.313	0.192	0.201	Dry	0.16	Dry	0.077	0.131	0.501	0.064	<0.005	0.040	Dry	0.063	0.075	0.057	0.009

Appendix 3 - Water Quality Data

Date	Total Hardness (mg/L)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	14.00	24.00	18.00	19.00	29.00	46.00	30.00	NC	341.00	188.00	137.00	135.00	67.00	Dry	72.00	96.00	37.00	28.00	23.00	64.00	Dry	128.00	118.00	120.00	82.00
990112	22.00	28.00	22.00	32.00	30.00	14.00	14.00	NC	48.00	47.00	40.00	27.00	18.00	18.00	15.00	19.00	16.00	11.00	10.00	10.00	9.00	15.00	14.00	12.00	10.00
990201	12.00	24.00	15.00	20.00	16.00	14.00	12.00	NC	34.00	40.00	26.00	12.00	19.00	12.00	7.00	12.00	8.00	7.00	7.00	9.00	7.00	10.00	12.00	11.00	7.00
990309	22.00	18.00	23.00	11.00	20.00	22.00	22.00	14.00	121.00	98.00	89.00	42.00	56.00	13.00	15.00	29.00	27.00	16.00	13.00	18.00	15.00	25.00	20.00	18.00	25.00
990830	Dry	25.00	20.00	28.00	79.00	130.00	94.00	Dry	257.00	294.00	262.00	154.00	NC	Dry	74.00	166.00	36.00	50.00	28.00	43.00	Dry	95.00	80.00	81.00	57.00
990927	Dry	26.00	Dry	25.00	57.00	125.00	94.00	Dry	295.00	217.00	194.00	Dry	240.00	Dry	50.00	197.00	35.00	64.00	25.00	52.00	Dry	149.00	109.00	115.00	65.00
991025	Dry	26.00	Dry	18.00	31.00	63.00	89.00	Dry	165.00	205.00	212.00	Dry	203.00	Dry	51.00	51.00	30.00	57.00	23.00	Dry	Dry	125.00	124.00	119.00	68.00
000118	Dry	25.00	19.00	27.00	42.00	45.00	40.00	Dry	225.00	173.00	138.00	Dry	64.00	Dry	30.00	74.00	27.00	79.00	24.00	55.00	Dry	71.00	66.00	94.00	42.00
000229	26.00	26.00	22.00	21.00	22.00	20.00	35.00	19.00	58.00	72.00	66.00	36.00	61.00	16.00	24.00	35.00	17.00	22.00	20.00	31.00	21.00	41.00	45.00	54.00	55.00
000321	22.00	28.00	21.00	25.00	26.00	17.00	17.00	16.00	46.00	46.00	50.00	43.00	43.00	18.00	16.00	28.00	16.00	12.00	11.00	14.00	11.00	21.00	33.00	19.00	11.00
000404	28.00	31.00	19.00	22.00	27.00	15.00	21.00	13.00	41.00	51.00	41.00	30.00	32.00	13.00	10.00	14.00	10.00	10.00	10.00	10.00	11.00	14.00	18.00	17.00	9.00
000605	17.00	27.00	20.00	23.00	24.00	24.00	25.00	22.00	NC	89.00	100.00	Dry	29.00	19.00	29.00	33.00	30.00	16.00	21.00	24.00	9.00	30.00	31.00	53.00	33.00
000912	Dry	26.00	25.00	20.00	35.00	75.00	91.00	Dry	123.00	236.00	131.00	Dry	223.00	Dry	74.00	144.00	33.00	24.00	35.00	59.00	Dry	111.00	95.00	102.00	79.00

Date	Fecal Coliform (Colonies/100ml)							Station Number (OUA****)																	
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981119	>600	>600	>600	>600	>600	>600	NS	>600	>600	>600	260	>600	>600		>600	>600	>600	>600	>600	>6000		>600	>600	>600	>600
990112	160	>1200	860	>1200	600	170	NS	135	2100	280	>1000	3400	460	135	145	660	600	105	~28	265	165	140	210	160	115
990201	720	>1200	>1200	>1200	>1200	>1200	NS	>1200	>1300	>700	>700	>6000	430	~312	~348	>800	290	180	1020	420	400	600	305	620	235
990309	168	>2000	1834	>2000	>2000	124	160	184	96	204	192	2600	867	>2000	810	312	1100	~39	~18	96	~21	108	212	600	88
990621	<4	~70	~44	>1632	240	140	100	>1400	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC	~65		~35	DRY	~65	140	83	>870
990628	~65	>2200	~52	>766	>231	>231	>297	>1254	>165	>396	>363	>660	>3036	>165	>627	>132	>396	>198	>165	>132	>858	>264	>297	>891	>1188
990714	~77	~250	~62	~1567	~470	~146	~233	~333	~146	~433	~220	~1,966	~900	~300	~123	~200	~138	~170	~23	~333	DRY	~130	~146	~170	>2000
990727	~25	~61	~11	360	<4	~200	96	DRY	164	566	1032	1332	100	DRY	160	184	100	232	80	~79	DRY	~64	248	160	1365
990817	~7	~29	~43	~36	~152	~232	~1033	DRY	~50	~144	~467	~533	~500	DRY	~204	~156		<4	~833	~40	DRY	~61	~100	~264	~4066
990830	DRY	~615	~70	~1667	>2000	~300	~300	DRY	~105	~367	~167	~61	~195	DRY	~400	~70	~467	~145	~17	~125	DRY	~70	~160	~155	~425
990915	DRY	~1300	~70	>2000	void	~367	~305	DRY	~267	~22	~43	~74	~667	DRY	~1400	~167	~210	~370	~733	~533	DRY	~70	~167	~400	~867
990927	DRY	~74	DRY	~140	~1166	~800	~265	DRY	DRY	~30	~35	DRY	~210	DRY	~1533	~95	~4	~87	~4	~485	DRY	~17	~175	~800	~115
991025	DRY	140	DRY	>2000	~1033	~380	~46	DRY	~4	~4	~233	DRY	~200	DRY	~46	~200	~54	~25	~11	~367	DRY	~32	~7	~260	~867
000118	DRY	~9	~4	~4	~43	~465	~30	DRY	~9	~91	135	DRY	~460	DRY	310	305	375	~61	~17	250	DRY	205	270	~52	~78
000229	~61	>2000	867	140	733	~633	1698	255	~108	`123	440	>2000	>2000	`460	~495	1033	270	350	~83	305	370	~500	385	>2000	~22
000321	250	>2000	430	~215	220	240	667	~77	~38	~138	130	160	350	160	210	270	~78	230	~28	200	115	~167	330	205	185
000404	~62	900	>2000	>2000	767	460	767	~146	1433	480	620	330	1233	490	290	290	270	145	135	~95	160	1133	175	~95	~70
000508	245	~82	220	390	295	110	227	~78	800	1600	1333	105	320	~365	160	250	170	160	~39	115	250	140	~17	~30	165
000605	240	>2000	1665	>2000	>2000	105	110	~4	113	>2000	>2000	DRY	105	>2000	~83	305	~44	310	~52	899	1432	932	195	899	170
000627	~22	~630	130	700	~95	160	~52	933	125	~367	135	DRY	~167	~52	~52	~44	~83	125	~48	120	>2700	~35	~78	110	~2700
000713	~39	~35	~22	1866	~9	767	115	DRY	~333	100	~83	DRY	~57	DRY	155	~167	~31	350	~46	~26	DRY	140	130	130	>500
000809	DRY	~35	~91	466	833	205	899	DRY	130	~78	120	DRY	295	DRY	~61	180	170	~70	~30	~52	DRY	260	~70	195	430
000912	DRY	>2000	135	>2000	>2000	320	290	DRY	300	155	433	DRY	>2000	DRY	433	130	~78	866	300	2065	DRY	766	110	160	1432
000920	DRY	>2000	~67	~600	160	~57	150	DRY	125	DRY	95	DRY	~833	DRY	135	165	~9	230	57	57	DRY	61	305	185	966

QA/QC Samples did not meet QA/QC criteria

Appendix 3 - Metals Data

Date	Aluminum (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	<127.00	140.90	<127.00	183.30	165.40	146.20	131.10	NC	620.40	363.20	305.00	272.60	195.70	Dry	188.50	241.20	<127.00	<127.00	<127.00	<127.00	Dry	257.80	244.70	272.70	183.60
990112	178.40	336.10	214.80	269.20	324.10	299.10	321.20	NC	500.40	771.80	828.00	1028.00	643.00	182.00	285.00	281.80	483.00	584.60	426.00	507.30	568.30	381.40	417.90	367.70	669.80
990201	496.30	870.60	454.30	658.20	444.50	433.00	309.60	NC	368.60	543.80	759.40	1418.00	870.60	197.90	529.70	437.30	703.00	614.80	430.30	685.00	519.70	533.10	469.90	351.40	448.60
990309	<127.00	551.70	<127.00	322.90	313.90	175.30	204.00	231.20	139.20	152.70	195.00	507.20	377.40	594.20	465.50	317.40	167.40	318.20	214.70	361.80	430.80	342.80	283.50	450.90	366.50
990830	Dry	<127.00	<127.00	<127.00	<127.00	130.50	<127.00	Dry	241.10	276.10	250.30	145.80	NC	Dry	<127.00	161.20	<127.00	<127.00	<127.00	<127.00	Dry	<127.00	132.80	<127.00	<127.00
990927	Dry	<127.00	Dry	<127.00	<127.00	<127.00	<127.00	Dry	230.30	187.50	166.80	Dry	203.60	Dry	187.30	173.80	<127.00	<127.00	<127.00	<127.00	Dry	<127.00	127.50	140.90	<127.00
991025	Dry	<127.00	Dry	<127.00	<127.00	<127.00	<127.00	Dry	173.20	188.60	199.30	Dry	197.60	Dry	<127.00	197.80	<127.00	<127.00	<127.00	<127.00	Dry	<127.00	<127.00	135.70	<127.00
000118	Dry	<127.00	157.00	<127.00	138.40	196.40	193.10	Dry	181.50	145.80	150.40	Dry	266.20	Dry	1838.00	311.60	479.70	<127.00	<127.00	<127.00	Dry	360.50	364.70	<127.00	168.10
000229	<127.00	197.10	145.90	187.80	<127.00	<127.00	239.40	172.40	606.10	619.60	442.70	481.10	315.80	307.40	1432.00	307.00	976.30	350.10	143.60	251.50	503.50	216.70	290.10	651.50	<127.00
000321	181.80	<127.00	227.20	178.70	129.10	206.60	866.00	216.50	558.00	24.00	46.00	34.00	47.00	<127.00	<127.00	<127.00	166.50	333.30	244.70	249.70	338.80	168.40	<127.00	154.50	303.00
000404	<127.00	198.00	296.90	200.30	151.30	315.70	398.20	218.30	<127.00	<127.00	<127.00	1070.00	<127.00	261.10	313.50	254.80	335.50	292.90	329.10	247.40	291.70	228.70	208.10	159.40	300.70
000605	163.50	<127.00	189.00	141.80	129.70	<127.00	<127.00	<127.00	NC	660.10	859.80	Dry	<127.00	<127.00	358.20	<127.00	<127.00	<127.00	<127.00	283.10	225.70	357.60	<127.00	<127.00	133.90
000912	Dry	<127.00	<127.00	<127.00	<127.00	<127.00	<127.00	Dry	<127.00	205	<127.00	Dry	189.4	Dry	<127.00	162.2	<127.00	<127.00	<127.00	<127.00	Dry	<127.00	<127.00	<127.00	<127.00

Date	Barium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	30.50	45.90	36.40	24.60	39.80	28.90	32.20	NC	167.90	134.10	77.40	81.00	48.10	Dry	60.50	71.80	23.90	35.00	32.30	75.50	Dry	101.00	94.90	91.70	134.40
990112	61.20	59.20	58.90	44.20	41.10	22.00	21.70	NC	35.50	36.70	32.60	28.70	22.10	50.90	30.40	23.10	31.70	17.50	25.10	19.40	30.90	22.50	23.30	13.10	32.00
990201	37.40	46.30	46.10	29.50	26.50	26.80	23.10	NC	29.30	31.40	24.50	16.40	23.90	41.80	18.40	18.40	22.10	20.90	28.50	17.90	30.00	23.10	23.80	14.50	27.90
990309	43.60	32.10	48.30	21.30	30.50	31.00	30.70	26.70	67.30	64.30	50.20	39.90	40.80	46.60	18.90	27.30	32.20	29.00	34.40	27.60	57.50	30.10	27.30	20.50	51.10
990830	Dry	64.70	49.10	52.20	97.80	74.70	58.90	Dry	139.40	153.00	142.60	80.90	NC	Dry	67.50	106.10	28.80	55.20	16.70	55.30	Dry	88.10	80.10	50.10	107.30
990927	Dry	55.90	Dry	45.00	74.30	60.90	68.80	Dry	144.20	130.10	108.40	Dry	126.70	Dry	50.30	124.50	30.90	56.60	39.80	61.30	Dry	122.80	99.30	99.70	107.20
991025	Dry	50.10	Dry	17.10	47.40	32.50	64.40	Dry	98.70	113.80	113.60	Dry	112.10	Dry	56.10	45.90	20.80	48.50	25.00	52.70	Dry	103.30	100.60	103.60	103.40
000118	Dry	45.10	38.70	38.20	26.10	32.90	38.30	Dry	122.80	112.10	77.70	Dry	44.40	Dry	39.60	55.60	22.80	94.90	45.40	42.70	Dry	62.60	60.60	70.10	66.70
000229	39.80	39.60	41.30	33.20	36.50	27.80	40.30	39.00	47.90	56.00	47.40	38.30	45.50	40.90	39.70	37.80	25.40	35.60	48.90	50.20	61.60	50.00	55.90	45.90	91.20
000321	41.30	43.20	38.60	31.40	36.20	25.50	23.20	32.60	29.40	29.70	27.80	33.40	35.60	43.90	35.50	26.20	22.40	21.70	31.70	21.00	35.00	26.00	30.70	25.50	35.40
000404	50.50	50.10	42.30	31.30	40.50	28.90	32.40	29.40	28.10	36.30	27.00	37.40	29.00	41.70	18.20	18.70	25.90	23.00	32.60	24.60	37.00	25.50	26.70	18.50	32.30
000605	32.90	44.80	41.90	31.50	31.20	34.80	34.60	43.80	Dry	57.50	69.20	Dry	23.60	47.90	48.70	26.60	30.00	34.90	63.20	44.90	46.80	35.90	32.20	57.70	82.40
000912	Dry	77.2	49.8	42.5	56	54.4	56.9	Dry	84.5	129.7	81.8	Dry	117.8	Dry	58.3	94.5	26.6	49.1	42.3	59.7	Dry	97.8	82.7	70.9	161.9

Date	Beryllium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	NC	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11
990112	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	NC	<0.11	<0.11	<0.11	<0.11	<0.11	0.20	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
990201	0.20	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	NC	<0.11	<0.11	<0.11	<0.11	<0.11	0.20	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
990309	0.20	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	0.30	<0.11	<0.11	<0.11	<0.11	<0.11	0.20	<0.11	<0.11	<0.11	<0.11	<0.11	0.30	0.40	<0.11	<0.11	0.20	<0.11
990830	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	NC	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11
990927	Dry	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	Dry	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11
991025	Dry	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	Dry	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11
000118	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	Dry	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11
000229	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
000321	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
000404	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	0.20	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
000605	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	NC	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
000912	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	Dry	<0.11	Dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	Dry	<0.11	<0.11	<0.11	<0.11

Appendix 3 - Metals Data

Date	Boron (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	24.90	34.30	59.40	34.40	34.00	27.80	34.00	NC	36.20	145.80	42.50	23.80	40.70	Dry	34.30	49.30	32.60	18.60	13.80	34.00	Dry	53.90	48.50	26.70	32.30
990112	10.40	63.60	35.30	25.80	21.00	16.80	14.90	NC	13.90	19.70	14.10	13.00	15.10	<4.5	8.00	14.90	7.70	13.10	9.80	14.60	6.50	17.50	18.90	15.30	10.00
990201	14.70	26.10	22.10	18.80	18.50	18.70	16.40	NC	18.50	19.60	16.70	9.90	17.50	7.30	8.90	13.50	11.40	9.30	8.70	14.00	10.00	13.90	15.70	13.00	9.10
990309	6.30	27.10	34.60	14.90	17.10	18.90	16.10	7.90	20.70	25.10	20.20	20.50	19.50	6.00	8.70	16.10	13.00	8.10	6.60	6.80	9.60	13.50	13.40	10.90	7.80
990830	Dry	41.70	29.40	62.90	46.20	38.80	44.30	Dry	47.60	52.10	48.40	36.90	NC	Dry	40.20	49.00	54.00	49.20	12.20	26.40	Dry	49.90	49.00	66.10	22.60
990927	Dry	44.10	Dry	39.10	45.80	34.30	44.70	Dry	50.20	51.30	46.10	Dry	45.50	Dry	36.30	45.20	45.60	45.90	11.40	25.10	Dry	45.00	58.80	22.40	14.60
991025	Dry	0.00	Dry	0.00	0.00	0.00	0.00	Dry	0.00	0.00	0.00	Dry	0.00	Dry	0.00	0.00	0.00	35.10	10.40	20.70	Dry	34.80	40.90	15.60	16.60
000118	Dry	39.30	34.80	34.90	45.40	23.30	28.30	Dry	27.00	32.90	26.80	Dry	30.80	Dry	22.40	29.00	76.40	25.90	12.50	19.70	Dry	32.10	30.50	21.30	21.60
000229	16.30	40.30	54.80	9.20	14.00	15.60	13.40	14.60	20.10	25.70	20.90	10.70	13.60	<4.50	14.80	13.00	53.40	4.90	0.00	4.40	4.00	17.00	16.00	23.00	25.00
000321	21.20	37.80	40.40	19.10	24.20	26.80	23.20	18.30	21.90	26.30	21.30	24.20	24.10	<4.50	10.70	21.90	18.00	15.90	10.90	17.50	15.00	21.10	24.40	23.50	14.10
000404	19.60	38.70	35.90	17.40	26.40	19.90	26.50	16.40	28.40	33.40	25.10	20.10	25.00	9.30	11.90	17.50	15.00	12.70	12.80	14.80	15.00	18.40	21.80	16.40	13.30
000605	21.20	33.60	43.10	25.10	29.20	24.30	24.90	12.90	Dry	49.10	38.20	Dry	30.20	10.10	31.60	33.30	47.40	16.70	10.70	19.80	13.20	34.30	28.00	24.10	16.00
000912	Dry	33.50	37.60	29.50	58.30	30.30	36.60	Dry	40.30	52.70	40.20	Dry	42.60	Dry	30.70	36.90	31.10	23.00	15.00	32.50	Dry	50.60	48.60	64.30	19.50

Date	Cadmium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.15	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	NC	<0.14	<0.14	<0.14	0.58	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	<0.14
990112	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	NC	<0.14	<0.14	1.03	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
990201	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	NC	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.21	<0.14	<0.14	<0.14	<0.14	<0.14
990309	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
990830	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	NC	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	<0.14
990927	Dry	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	Dry	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	<0.14
991025	Dry	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	Dry	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	0.22	<0.14
000118	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	Dry	<0.14	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	<0.14
000229	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.15	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.14	<0.14	<0.14	<0.14	<0.14
000321	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.16	<0.14
000404	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.20	<0.14	<0.14	<0.14	<0.14
000605	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	NC	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	0.17	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
000912	Dry	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	Dry	<0.14	Dry	<0.14	<0.14	0.20	<0.14	<0.14	<0.14	Dry	<0.14	<0.14	<0.14	<0.14

Date	Calcium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	3.80	7.80	4.70	6.70	8.90	11.40	7.20	NC	92.10	49.00	35.30	32.20	16.80	Dry	16.60	23.70	8.60	6.30	5.90	13.90	Dry	31.40	28.90	35.20	22.10
990112	6.10	8.60	5.30	10.60	8.90	3.30	3.30	NC	12.30	11.80	9.80	6.10	4.30	3.60	3.00	4.60	3.30	2.30	2.30	2.20	2.20	3.50	3.20	2.40	2.40
990201	3.00	7.50	3.80	6.10	4.70	3.40	2.80	NC	8.70	10.20	6.50	2.60	4.50	2.40	1.70	2.80	1.70	1.60	1.80	2.10	1.80	2.40	2.90	2.50	1.80
990309	6.20	5.80	5.90	3.60	6.00	5.50	5.30	3.40	30.40	25.90	22.80	10.40	14.00	2.80	3.40	7.30	6.30	3.60	3.10	4.40	4.00	6.00	5.00	4.00	6.60
990830	Dry	7.30	5.20	9.70	21.60	33.00	22.30	Dry	66.30	75.80	67.60	37.40	NC	Dry	16.70	40.80	8.30	10.90	7.40	9.90	Dry	24.00	19.90	18.40	15.60
990927	Dry	7.40	Dry	8.50	15.40	28.90	22.00	Dry	74.40	48.80	46.50	Dry	60.80	Dry	11.20	48.40	7.90	13.50	6.50	11.60	Dry	36.80	26.80	33.80	16.70
991025	Dry	7.60	Dry	5.90	8.80	15.40	20.50	Dry	41.80	47.10	51.80	Dry	50.20	Dry	11.20	12.50	6.60	12.20	5.70	11.40	Dry	31.80	30.60	37.20	17.70
000118	Dry	7.50	5.10	8.80	12.40	11.80	9.90	Dry	57.60	42.80	35.20	Dry	15.90	Dry	6.80	18.70	6.60	18.80	6.00	12.90	Dry	17.90	16.80	25.60	10.70
000229	7.60	8.20	5.50	7.10	6.70	5.10	8.40	4.60	15.00	18.20	16.40	8.80	15.50	3.10	5.40	8.20	4.00	5.20	5.00	7.40	5.70	9.90	11.10	11.70	14.60
000321	6.10	9.00	5.30	8.30	8.20	4.30	3.90	3.70	11.80	12.10	13.00	10.70	10.70	3.70	3.60	7.20	3.80	3.20	2.90	3.30	3.00	5.30	8.50	4.50	2.80
000404	7.90	10.10	4.80	7.30	8.60	3.60	5.20	3.10	10.40	13.00	10.60	7.40	8.00	2.70	2.30	3.20	2.20	2.40	2.50	2.50	2.90	3.40	4.40	3.70	2.40
000605	4.90	8.80	5.20	7.90	7.70	6.50	6.40	5.30	NC	22.10	26.20	Dry	7.50	4.20	6.30	8.50	7.00	4.00	5.90	5.80	2.60	7.60	7.70	12.80	9.30
000912	Dry	8.40	6.50	6.50	10.90	18.10	23.30	Dry	31.10	58.30	33.20	Dry	57.30	Dry	17.30	35.30	7.70	5.90	9.10	13.70	Dry	28.30	24.70	23.80	21.20

Appendix 3 - Metals Data

	Chromium (ug/L)							Station Number (OUA****)																	
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	NC	<0.40	<0.40	<0.40	<0.40	<0.40	Dry	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	Dry	<0.40	<0.40	<0.40	<0.40
990112	<0.40	0.66	<0.40	<0.40	0.51	<0.40	<0.40	NC	0.42	<0.40	<0.40	0.42	<0.40	<0.40	<0.40	0.55	<0.40	0.81	0.71	0.56	0.55	0.60	0.62	0.53	0.63
990201	0.42	0.51	<0.40	0.77	0.48	<0.40	<0.40	NC	0.53	0.47	0.87	1.02	0.40	<0.40	0.42	0.43	<0.40	<0.40	<0.40	0.59	<0.40	<0.40	0.42	<0.40	<0.40
990309	<0.40	0.81	<0.40	0.63	0.51	<0.40	<0.40	0.52	<0.40	<0.40	<0.40	0.43	<0.40	0.58	<0.40	<0.40	<0.40	0.54	0.45	0.60	0.57	0.43	<0.40	0.59	<0.40
990830	Dry	<0.40	<0.40	0.49	0.55	0.50	0.52	Dry	0.73	0.79	0.66	0.53	NC	Dry	0.40	0.41	<0.40	<0.40	<0.40	<0.40	Dry	0.40	0.43	<0.40	0.42
990927	Dry	<0.40	Dry	0.45	<0.40	<0.40	<0.40	Dry	<0.40	0.56	<0.40	Dry	<0.40	Dry	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	Dry	<0.40	<0.40	<0.40	<0.40
991025	Dry	<0.40	Dry	0.71	<0.40	0.40	<0.40	Dry	0.53	0.61	0.74	Dry	<0.40	Dry	<0.40	<0.40	0.44	0.43	<0.40	<0.40	Dry	<0.40	<0.40	<0.40	<0.40
000118	Dry	0.54	0.59	0.55	0.43	0.57	0.47	Dry	1.02	0.99	0.82	Dry	0.68	Dry	2.07	0.57	0.84	<0.40	<0.40	<0.40	Dry	2.75	0.45	0.84	0.80
000229	0.68	1.16	1.05	1.34	1.05	0.75	1.08	1.04	1.52	1.71	1.86	1.15	1.57	0.78	1.62	1.25	1.82	1.23	1.02	1.26	1.43	0.79	0.9	1.09	1.01
000321	0.56	0.65	0.60	1.02	0.83	0.63	1.30	0.65	0.86	0.47	0.55	0.40	0.42	<0.40	<0.40	0.58	0.59	1.03	0.78	0.64	0.78	0.50	<0.40	0.69	0.69
000404	0.70	1.10	0.90	1.30	0.90	0.70	0.80	1.00	0.70	0.50	0.70	0.90	0.70	0.70	0.90	0.60	0.70	0.80	0.40	0.60	0.70	0.60	0.60	0.60	0.70
000605	0.73	1.10	0.42	1.22	0.86	0.48	<0.40	0.65	Dry	1.01	1.16	Dry	0.54	0.5	0.55	0.84	0.73	0.92	0.54	1.13	0.77	0.56	0.44	0.44	0.54
000912	Dry	<0.40	<0.40	0.70	<0.40	<0.40	<0.40	Dry	<0.40	<0.40	<0.40	Dry	<0.40	Dry	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	Dry	<0.40	<0.40	<0.40	<0.40

	Cobalt B105(ug/L)							Station Number (OUA****)																	
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.57	<0.50	0.54	<0.50	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<0.50	0.53	<0.50	Dry	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	Dry	<0.50	<0.50	<0.50	<0.50
990112	5.74	<0.50	1.62	0.54	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<0.50	<0.50	<0.50	1.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
990201	1.23	<0.50	1.50	<0.50	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<0.50	<0.50	<0.50	1.33	<0.50	<0.50	<0.50	<0.50	<0.50	1.73	<0.50	<0.50	<0.50	<0.50	<0.50
990309	2.14	<0.50	0.81	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	<0.50	<0.50	0.85	<0.50	1.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.81	<0.50	<0.50	<0.50	<0.50
990830	Dry	<0.50	0.82	0.71	0.51	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	<0.50	NC	Dry	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	<0.50
990927	Dry	<0.50	Dry	0.59	<0.50	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	Dry	<0.50	Dry	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	<0.50
991025	Dry	<0.50	Dry	0.61	<0.50	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	Dry	<0.50	Dry	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	<0.50
000118	Dry	<0.50	0.99	<0.50	<0.50	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	Dry	<0.50	Dry	0.51	<0.50	0.90	2.81	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	<0.50
000229	1.33	<0.50	<0.50	0.82	0.71	<0.50	<0.50	0.74	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	1.34	<0.50	<0.50	2.65	<0.50	<0.50	<0.50	<0.50
000321	2.57	<0.50	1.31	0.74	<0.50	<0.50	<0.50	1.14	<0.50	<0.50	<0.50	<0.50	<0.50	0.82	0.85	<0.50	<0.50	0.64	<0.50	<0.50	<0.50	<0.50	<0.50	0.66	<0.50
000404	3.60	<0.50	1.20	<0.50	<0.50	<0.50	<0.50	1.10	<0.50	<0.50	<0.50	<0.50	<0.50	1.30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
000605	0.68	<0.50	1.07	<0.50	<0.50	0.66	<0.50	3.36	NC	0.67	0.56	Dry	<0.50	2.00	0.63	<0.50	0.63	1.02	1.23	1.13	0.59	<0.50	<0.50	2.25	<0.50
000912	Dry	<0.50	0.60	0.80	0.70	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	Dry	<0.50	Dry	<0.50	<0.50	0.50	0.80	<0.50	<0.50	Dry	<0.50	<0.50	<0.50	0.60

	Copper (ug/L)							Station Number (OUA****)																	
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	2.68	3.02	0.95	4.43	3.19	1.03	1.09	NC	3.65	2.47	2.47	4.33	1.23	Dry	1.21	2.66	2.94	0.88	1.19	1.55	Dry	1.50	1.29	0.57	0.96
990112	0.92	3.58	0.77	5.90	2.73	1.14	1.32	NC	2.46	2.02	6.02	2.03	1.90	<0.50	0.98	2.21	0.94	1.46	1.31	1.58	1.15	2.21	1.39	2.13	1.18
990201	1.14	3.22	1.30	3.29	2.81	1.58	2.31	NC	2.23	1.85	2.61	1.34	1.85	0.51	0.96	1.45	0.93	0.98	1.04	2.27	0.93	1.39	1.67	2.02	0.79
990309	<0.50	0.64	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
990830	Dry	1.17	0.56	1.90	0.69	0.66	0.84	Dry	1.80	1.57	1.71	0.74	NC	Dry	0.94	1.17	1.07	0.81	<0.50	1.03	Dry	1.07	1.19	0.89	0.69
990927	Dry	1.34	Dry	1.23	0.75	1.58	0.76	Dry	1.82	2.22	2.32	Dry	1.79	Dry	6.21	2.07	6.12	0.93	0.69	0.91	Dry	1.24	1.25	<0.50	0.69
991025	Dry	0.83	Dry	3.69	1.43	1.08	0.87	Dry	2.39	1.61	1.94	Dry	1.26	Dry	1.79	1.58	2.50	1.06	0.83	1.34	Dry	1.80	1.39	7.45	1.01
000118	Dry	<0.50	<0.50	1.26	1.11	<0.50	<0.50	Dry	2.30	1.31	1.97	Dry	1.24	Dry	2.36	1.36	2.61	0.74	<0.50	<0.50	Dry	0.85	0.80	<0.50	<0.50
000229	1.48	3.96	1.63	3.32	3.29	1.45	1.40	4.25	3.46	3.04	3.10	2.09	2.44	1.06	2.20	2.16	2.96	1.99	1.12	1.83	4.04	3.76	1.62	2.15	0.76
000321	<0.50	2.58	<0.50	2.62	2.60	<0.50	0.99	<0.50	1.60	0.69	0.73	<0.50	0.95	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	<0.50	11.30	<0.50
000404	1.30	5.10	1.90	4.70	4.00	1.70	2.20	2.00	3.00	2.60	2.90	2.20	2.10	1.30	1.40	2.10	1.20	1.90	1.80	4.10	12.00	2.70	2.40	2.10	1.80
000605	1.81	4.22	2.34	5.95	4.12	1.14	1.51	0.62	Dry	2.84	3.97	Dry	2.22	1.00	2.08	2.63	1.15	0.87	0.66	1.86	1.35	1.97	2.23	1.18	0.96
000912	Dry	2.40	<0.50	4.30	2.10	2.00	1.30	Dry	2.10	1.40	2.20	Dry	1.00	Dry	0.80	0.70	3.30	<0.50	<0.50	0.50	Dry	0.60	0.90	1.00	1.10

Appendix 3 - Metals Data

Date	Iron (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	367.50	177.30	625.80	331.10	274.60	290.00	313.90	NC	26.60	28.20	92.70	191.00	120.60	Dry	65.00	127.40	51.10	356.10	381.20	277.60	Dry	31.30	24.90	45.50	100.50
990112	1075.00	363.10	536.70	400.40	318.00	381.70	314.30	NC	404.10	338.00	730.80	682.30	573.80	235.40	222.70	227.70	290.90	446.70	377.80	395.50	358.00	295.10	318.10	301.90	373.50
990201	502.20	737.60	688.60	493.80	385.00	481.70	439.60	NC	380.00	376.90	620.50	865.60	670.00	224.40	331.60	356.40	417.80	409.40	274.80	536.80	315.30	423.90	384.70	374.70	299.70
990309	2260.00	445.00	893.00	224.00	477.00	638.00	655.00	1170.00	82.00	116.00	248.00	418.00	414.00	603.00	507.00	522.00	545.00	801.00	578.00	1270.00	1370.00	748.00	568.00	791.00	933.00
990830	Dry	145.40	646.10	1153.00	1299.00	47.50	56.40	Dry	19.90	25.10	19.20	81.70	NC	Dry	121.70	<15.00	287.90	422.50	341.90	219.20	Dry	30.60	91.30	446.30	91.90
990927	Dry	101.80	Dry	2305.00	400.50	40.80	63.70	Dry	18.20	21.80	17.60	Dry	<15.00	Dry	240.60	<15.00	179.80	122.20	275.50	82.50	Dry	<15.00	20.70	44.90	71.10
991025	Dry	95.80	Dry	1028.00	546.00	100.90	44.50	Dry	<15.00	<15.00	81.10	Dry	<15.00	Dry	327.40	208.20	166.20	558.80	274.50	100.20	Dry	<15.00	28.10	78.90	254.00
000118	Dry	88.30	1416.00	964.10	555.30	401.60	426.50	Dry	<15.00	<15.00	37.00	Dry	255.50	Dry	1162.00	254.70	472.50	415.30	251.40	140.80	Dry	264.90	267.40	192.50	231.30
000229	565.10	509.10	364.20	545.10	476.20	224.60	286.50	425.60	478.50	391.00	402.30	381.70	247.80	432.60	1094.00	286.10	907.80	2071.00	952.40	561.50	1010.00	354.10	351.90	1108.00	171.60
000321	431.00	488.00	441.00	523.00	398.00	357.00	648.00	1140.00	364.00	51.00	114.00	69.00	98.00	302.00	356.00	217.00	368.00	1300.00	618.00	649.00	510.00	518.00	160.00	478.00	313.00
000404	1159.00	576.00	604.00	411.00	451.00	725.00	551.00	1941.00	124.00	128.00	109.00	729.00	176.00	347.00	336.00	236.00	332.00	747.00	369.00	452.00	354.00	357.00	293.00	527.00	299.00
000605	699.00	431.00	720.00	278.00	455.00	1030.00	619.00	2250.00	NC	276.00	515.00	Dry	269.00	801.00	396.00	128.00	394.00	769.00	626.00	988.00	736.00	436.00	412.00	1020.00	684.00
000912	Dry	524.70	726.30	672.20	601.10	88.00	20.90	Dry	67.40	33.80	58.80	Dry	<15.00	Dry	23.90	<15.00	341.70	465.00	335.00	45.40	Dry	4.90	7.10	34.00	529.00

Date	Lead (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	0.67	0.93	0.54	1.52	1.94	<0.30	<0.30	NC	<0.30	<0.30	<0.30	0.36	<0.30	Dry	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	<0.30
990112	0.65	1.31	<0.30	1.83	1.49	<0.30	<0.30	NC	0.45	0.32	0.79	0.51	0.40	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
990201	0.55	1.31	0.63	1.80	1.39	0.48	0.43	NC	0.50	0.40	0.47	0.44	0.39	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.46	<0.30	<0.30	<0.30	<0.30	<0.30
990309	0.96	1.81	0.47	1.61	2.09	0.61	0.61	0.45	<0.30	<0.30	<0.30	0.36	0.38	0.42	0.36	0.61	0.34	0.39	<0.30	0.68	0.80	0.61	0.40	0.45	0.41
990830	Dry	<0.30	0.54	0.55	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	<0.30	NC	Dry	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	<0.30
990927	Dry	<0.30	Dry	1.43	0.70	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	Dry	<0.30	Dry	0.33	<0.30	0.81	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	<0.30
991025	Dry	<0.30	Dry	1.31	1.26	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	Dry	<0.30	Dry	0.31	<0.30	<0.30	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	1.13	<0.30
000118	Dry	<0.30	<0.30	0.91	1.12	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	Dry	<0.30	Dry	0.74	<0.30	0.36	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	<0.30
000229	0.50	0.82	<0.30	1.43	1.25	<0.30	<0.30	<0.30	0.53	0.38	0.45	0.43	0.31	<0.30	0.58	0.39	0.69	0.78	<0.30	<0.30	1.23	0.43	<0.30	0.64	<0.30
000321	<0.30	0.57	<0.30	1.33	0.98	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.50	<0.30
000404	0.50	1.50	0.50	2.00	1.80	0.40	0.40	0.40	<0.30	<0.30	<0.30	0.80	<0.30	<0.30	<0.30	<0.30	<0.30	0.40	<0.30	0.30	0.70	<0.30	<0.30	0.30	<0.30
000605	0.40	1.06	0.58	1.59	1.48	0.49	<0.30	<0.30	NC	<0.30	0.75	Dry	<0.30	<0.30	0.43	<0.30	<0.30	<0.30	<0.30	0.51	0.32	<0.30	<0.30	0.41	<0.30
000912	Dry	<0.30	0.30	1.70	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	Dry	<0.30	Dry	<0.30	<0.30	0.70	<0.30	<0.30	<0.30	Dry	<0.30	<0.30	<0.30	<0.30

Date	Magnesium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	1.10	1.00	1.60	0.90	1.70	4.20	3.00	NC	27.00	15.90	11.80	13.30	6.20	Dry	7.40	8.80	3.70	2.90	2.00	7.10	Dry	12.10	11.10	7.90	6.60
990112	1.70	1.50	2.10	1.40	1.90	1.40	1.30	NC	4.30	4.30	3.80	2.90	1.90	2.10	1.70	1.90	1.70	1.20	1.00	1.20	0.90	1.60	1.50	1.40	1.00
990201	1.10	1.40	1.40	1.00	1.00	1.30	1.20	NC	3.00	3.50	2.50	1.40	1.90	1.40	0.70	1.20	0.90	0.70	0.70	1.00	0.60	1.10	1.30	1.20	0.60
990309	1.60	0.90	2.00	0.60	1.20	2.00	2.00	1.40	10.90	8.20	7.90	3.80	5.10	1.60	1.60	2.70	2.80	1.60	1.20	1.80	1.30	2.40	1.90	1.90	2.00
990830	Dry	1.70	1.60	1.00	6.00	11.50	9.30	Dry	22.10	25.40	22.70	14.80	NC	Dry	7.80	15.50	3.60	5.50	2.20	4.50	Dry	8.60	7.20	8.60	4.50
990927	Dry	1.70	Dry	0.90	4.60	12.70	9.60	Dry	26.40	23.10	18.80	Dry	21.40	Dry	5.40	18.40	3.60	7.20	2.20	5.50	Dry	13.90	10.20	7.40	5.70
991025	Dry	1.60	Dry	0.80	2.20	5.90	9.10	Dry	14.60	21.20	20.00	Dry	18.90	Dry	5.60	4.90	3.30	6.40	2.10	5.60	Dry	11.10	11.60	8.30	5.80
000118	Dry	1.60	1.50	1.30	2.80	3.70	3.60	Dry	19.60	16.10	12.20	Dry	6.00	Dry	3.10	6.80	2.50	7.90	2.20	5.70	Dry	6.30	5.80	7.20	3.80
000229	1.70	1.40	1.90	0.80	1.40	1.90	3.30	1.90	5.00	6.50	6.00	3.50	5.40	1.90	2.60	3.50	1.60	2.30	1.90	3.10	1.60	3.90	4.30	6.00	4.50
000321	1.60	1.50	1.90	0.90	1.40	1.50	1.80	1.60	4.00	4.00	4.30	3.90	4.00	2.10	1.70	2.50	1.50	1.10	1.00	1.30	0.90	1.90	2.90	2.00	0.90
000404	2.10	1.50	1.70	1.00	1.40	1.40	1.90	1.30	3.70	4.40	3.60	2.90	2.80	1.50	1.00	1.30	1.00	1.10	0.90	1.00	1.00	1.40	1.80	1.80	0.80
000605	1.20	1.10	1.70	0.90	1.10	2.00	2.10	2.00	NC	8.10	8.50	Dry	2.60	2.10	3.20	2.90	3.00	1.60	1.60	2.20	0.60	2.70	2.70	5.00	2.50
000912	Dry	1.30	2.00	0.80	2.00	7.10	8.00	Dry	10.90	22.10	11.70	Dry	19.40	Dry	7.40	13.70	3.40	2.20	2.90	6.10	Dry	9.70	8.00	10.40	6.30

Appendix 3 - Metals Data

	Manganese (ug/L)							Station Number (OUA****)																	
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	224.10	11.10	97.10	57.30	38.70	116.70	154.00	NC	7.80	51.30	86.30	425.10	58.70	Dry	273.10	61.10	394.90	259.40	113.10	1195.00	Dry	151.70	128.90	75.40	586.80
990112	856.90	30.70	207.40	183.40	90.30	23.80	6.70	NC	7.90	9.80	11.80	9.90	7.10	245.10	99.90	7.70	66.30	48.80	25.80	36.30	44.90	11.20	15.50	13.70	12.50
990201	114.20	39.40	169.80	81.20	63.00	18.10	17.30	NC	10.80	13.90	10.80	8.80	7.80	185.80	20.00	11.80	17.70	44.50	20.20	45.10	29.10	28.90	12.30	36.30	10.70
990309	337.70	36.40	134.60	80.40	85.20	95.20	89.80	301.20	42.60	24.10	17.30	316.50	72.70	284.30	100.40	60.60	125.80	79.00	54.40	172.90	359.50	111.50	69.60	111.70	167.70
990830	Dry	8.40	354.90	343.70	2090.00	299.00	117.70	Dry	13.50	50.70	18.00	632.40	NC	Dry	390.70	212.70	1301.00	867.10	384.70	891.60	Dry	463.70	358.10	73.90	1419.00
990927	Dry	8.00	Dry	223.80	323.10	237.60	128.10	Dry	11.80	115.60	37.30	Dry	172.80	Dry	420.40	271.30	716.70	501.20	459.00	667.40	Dry	448.80	314.80	294.00	470.40
991025	Dry	6.20	Dry	242.00	224.00	53.00	95.00	Dry	2.00	163.00	102.00	Dry	111.00	Dry	805.00	185.00	188.00	254.50	125.20	699.60	Dry	314.40	291.10	228.50	541.90
000118	Dry	13.50	324.40	359.80	98.60	607.50	288.70	Dry	22.20	70.10	43.90	Dry	121.80	Dry	291.20	132.40	695.00	2495.00	123.50	255.60	Dry	141.70	114.70	111.50	131.40
000229	320.70	82.80	54.40	365.60	237.90	53.60	38.70	621.50	17.10	38.60	17.60	71.80	13.20	62.80	107.10	44.10	68.60	568.50	152.10	365.00	1076.00	134.00	140.20	99.60	503.40
000321	350.40	75.30	134.00	243.70	132.10	36.00	30.20	703.10	19.40	29.00	33.50	70.00	10.50	137.40	256.40	27.70	96.80	158.10	33.80	131.60	131.00	70.20	33.40	142.20	63.80
000404	881.60	60.00	100.60	68.40	66.30	71.30	41.40	465.60	9.80	31.60	7.50	45.90	13.80	196.20	26.30	19.60	34.20	90.60	37.70	68.50	80.90	44.10	35.60	60.90	23.90
000605	135.40	38.10	106.20	34.80	70.70	843.10	341.70	3495.00	NC	96.70	28.50	Dry	177.20	783.90	439.30	75.30	710.90	428.10	1884.00	875.90	205.40	168.00	181.80	2195.00	693.30
000912	Dry	122.00	458.30	375.90	547.00	522.90	265.70	Dry	32.10	51.50	22.30	Dry	135.20	Dry	447.50	234.70	3379.00	1327.00	1436.00	882.00	Dry	546.20	365.40	155.00	3218.00

	Nickel (ug/L)							Station Number (OUA****)																	
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	NC	2.16	2.15	2.03	2.46	<2.00	Dry	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	<2.00
990112	2.53	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	NC	<2.00	<2.00	<2.00	<2.00	<2.00	2.29	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
990201	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	NC	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	2.67	<2.00	<2.00	<2.00	<2.00	<2.00
990309	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
990830	Dry	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	<2.00	NC	Dry	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	<2.00
990927	Dry	<2.00	Dry	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	2.04	<2.00	Dry	<2.00	Dry	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	<2.00
991025	Dry	<2.00	Dry	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	Dry	<2.00	Dry	2.06	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	2.80	<2.00	<2.00
000118	Dry	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	2.02	<2.00	<2.00	Dry	<2.00	Dry	2.08	<2.00	3.22	3.54	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	<2.00
000229	<2.00	<2.00	<2.00	<2.00	2.38	<2.00	<2.00	3.56	<2.00	<2.00	2.11	<2.00	<2.00	<2.00	2.16	<2.00	2.19	3.67	<2.00	2.29	4.87	<2.00	<2.00	2.14	<2.00
000321	2.21	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	2.40	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	2.04	<2.00	<2.00	2.90	<2.00	<2.00	2.03	<2.00	<2.00	3.09	<2.00
000404	2.80	2.20	2.30	<2.00	2.20	<2.00	<2.00	3.10	<2.00	<2.00	<2.00	<2.00	<2.00	2.50	<2.00	<2.00	<2.00	2.00	<2.00	2.00	2.60	2.20	2.10	7.80	<2.00
000605	<2.00	<2.00	2.00	<2.00	<2.00	<2.00	<2.00	2.93	NC	2.36	2.51	Dry	2.14	2.23	<2.00	2.04	2.49	<2.00	<2.00	2.77	2.15	2.27	2.49	3.10	<2.00
000912	Dry	<2.00	<2.00	<2.00	2.20	2.10	<2.00	Dry	<2.00	<2.00	<2.00	Dry	<2.00	Dry	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	Dry	<2.00	<2.00	<2.00	<2.00

	Potassium (ug/L)							Station Number (OUA****)																	
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	4.50	4.70	4.70	4.90	4.30	5.50	4.20	NC	6.00	8.30	9.30	11.70	6.10	Dry	4.40	8.10	4.40	3.40	3.30	4.30	Dry	3.90	4.40	4.30	10.10
990112	3.50	5.60	3.80	4.50	4.40	3.70	3.70	NC	5.00	6.20	5.80	3.90	3.40	3.20	3.00	4.20	4.10	3.60	2.20	3.60	3.80	3.60	3.70	5.00	2.40
990201	2.40	4.60	3.20	3.70	3.30	2.20	2.80	NC	4.20	4.60	3.80	1.50	2.20	1.60	1.40	3.60	1.10	2.30	2.30	2.00	1.50	1.30	2.50	3.50	3.10
990309	1.70	<0.46	0.60	2.10	<0.46	<0.46	3.00	1.10	3.00	2.00	1.30	3.60	2.20	<0.46	<0.46	1.00	2.30	1.80	<0.46	2.20	0.60	<0.46	2.00	3.30	0.60
990830	Dry	7.50	3.30	4.10	6.10	4.40	4.40	Dry	4.30	4.50	4.80	3.90	NC	Dry	3.70	4.30	4.40	3.80	1.60	2.80	Dry	4.10	4.90	10.30	5.70
990927	Dry	8.50	Dry	7.30	8.80	6.10	5.10	Dry	5.20	6.30	7.40	Dry	5.80	Dry	6.40	5.30	4.90	6.20	3.20	5.30	Dry	5.90	5.10	3.50	5.90
991025	Dry	7.60	Dry	4.50	5.20	4.80	5.60	Dry	7.20	5.80	11.50	Dry	6.10	Dry	11.20	7.60	5.00	5.30	1.70	4.10	Dry	4.00	4.50	1.30	9.00
000118	Dry	8.50	6.00	7.00	5.90	6.40	6.80	Dry	8.20	9.70	9.00	Dry	4.60	Dry	5.10	4.90	6.10	4.50	5.30	3.50	Dry	6.00	5.80	4.40	6.70
000229	5.30	7.90	5.40	3.00	1.90	4.50	5.80	4.50	5.10	6.10	5.20	4.70	4.10	2.70	5.50	3.80	6.70	1.40	2.70	2.50	2.30	3.80	3.70	7.00	5.50
000321	3.20	6.20	2.60	2.90	2.60	3.50	5.10	3.50	4.70	6.20	5.10	5.70	4.70	2.60	3.70	3.70	3.80	2.50	1.80	2.20	2.20	3.00	4.00	3.40	2.50
000404	5.50	8.10	4.00	4.80	4.70	4.80	4.60	4.00	3.80	5.80	4.10	4.70	4.00	3.60	5.30	4.60	5.80	3.40	3.60	3.50	2.60	3.50	4.50	4.10	3.30
000605	2.60	4.10	3.10	2.70	3.00	3.40	3.40	2.10	NC	10.40	5.10	Dry	3.90	2.20	4.20	5.90	4.70	2.20	2.10	2.40	1.50	4.50	5.10	5.20	6.90
000912	Dry	6.10	6.00	6.20	7.50	5.80	5.70	Dry	9.50	6.40	6.60	Dry	4.30	Dry	3.60	5.00	5.80	2.90	3.60	3.90	Dry	4.70	5.30	9.60	8.40

Appendix 3 - Metals Data

Date	Selenium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	NC	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00
990112	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	NC	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
990201	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	NC	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
990309	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
990830	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	NC	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00
990927	Dry	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	Dry	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00
991025	Dry	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	Dry	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00
000118	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	Dry	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00
000229	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
000321	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
000404	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
000605	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	NC	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
000912	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	Dry	<3.00	Dry	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	Dry	<3.00	<3.00	<3.00	<3.00

Date	Sodium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	3.60	6.50	11.70	6.80	8.00	5.90	5.40	NC	51.90	15.60	16.10	29.50	14.10	Dry	18.20	14.10	20.50	12.00	12.90	15.60	Dry	28.30	25.70	20.00	22.20
990112	6.90	16.50	10.30	14.50	7.00	3.90	3.40	NC	9.10	5.30	7.30	8.80	4.00	5.20	4.20	4.30	5.60	6.40	5.90	5.30	1.80	4.70	3.60	3.20	3.10
990201	3.00	6.30	4.50	3.50	1.60	3.00	2.70	NC	3.80	3.50	3.00	1.70	2.70	3.10	0.80	1.90	2.10	0.70	0.80	0.90	0.70	1.50	1.90	1.50	1.10
990309	6.50	5.50	11.40	2.80	4.00	6.80	6.10	3.10	19.00	9.70	13.20	7.50	9.60	3.20	4.70	5.70	9.70	4.00	5.90	3.60	3.90	4.10	2.80	2.60	6.10
990830	Dry	20.60	4.70	55.50	27.60	17.00	19.10	Dry	41.40	35.90	42.20	31.30	NC	Dry	24.00	32.70	34.00	21.90	10.10	13.20	Dry	20.80	18.20	18.60	18.70
990927	Dry	20.30	Dry	14.30	16.70	21.10	20.40	Dry	58.20	40.10	37.00	Dry	43.50	Dry	22.70	39.80	29.10	29.40	12.80	19.40	Dry	31.60	29.30	23.70	25.50
991025	Dry	20.60	Dry	5.50	9.60	12.10	19.70	Dry	28.80	40.10	35.40	Dry	38.20	Dry	12.90	12.50	28.20	29.50	13.50	20.10	Dry	27.30	30.90	20.40	26.50
000118	Dry	22.90	8.30	20.30	24.10	8.10	9.20	Dry	50.00	25.20	30.50	Dry	13.60	Dry	7.70	17.40	37.20	26.30	23.10	21.10	Dry	18.20	16.30	24.80	17.10
000229	6.70	12.90	11.70	5.80	5.30	7.60	10.10	2.20	13.60	14.00	16.60	7.80	13.30	5.20	8.20	12.80	28.50	20.00	25.00	17.00	5.00	15.00	18.00	21.00	25.00
000321	6.30	11.60	6.80	4.70	3.60	5.20	6.50	5.20	9.60	8.30	11.40	12.00	13.00	6.60	5.90	7.00	8.40	11.20	7.50	7.10	2.00	7.30	7.90	7.20	2.90
000404	8.40	8.30	5.50	3.90	5.20	5.10	5.50	4.10	9.00	6.60	8.20	5.90	5.90	4.10	2.80	2.90	3.10	6.00	2.20	3.40	1.90	3.60	4.40	4.00	1.70
000605	4.60	6.80	7.00	5.50	5.20	5.50	4.00	4.20	NC	12.40	21.10	Dry	5.00	5.20	11.30	7.30	22.40	8.30	5.10	7.10	1.50	6.30	7.40	11.20	7.60
000912	Dry	11.00	10.80	11.10	10.00	13.20	17.60	Dry	22.40	33.90	22.50	Dry	38.10	Dry	22.70	32.40	15.00	8.70	11.20	20.90	Dry	21.90	20.90	26.00	22.60

Date	Vanadium (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	<1.00	<1.00	<1.00	1.20	1.28	<1.00	<1.00	NC	2.72	2.96	2.54	1.29	1.48	Dry	<1.00	1.66	<1.00	<1.00	<1.00	<1.00	Dry	1.52	1.37	1.42	<1.00
990112	<1.00	<1.00	<1.00	<1.00	1.08	<1.00	1.03	NC	2.06	2.22	1.55	1.82	1.31	<1.0	<1.00	1.12	1.16	1.28	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	1.03
990201	<1.00	1.35	<1.00	1.28	1.25	<1.00	1.07	NC	2.42	2.64	2.42	2.14	1.66	<1.0	1.08	1.43	<1.00	<1.00	<1.00	2.82	<1.00	1.03	1.36	1.24	<1.00
990309	1.20	1.55	<1.00	1.34	1.44	1.06	1.34	1.25	1.88	2.04	2.08	1.31	1.82	1.17	1.10	1.71	<1.00	1.15	<1.00	1.68	1.86	1.57	1.41	1.65	1.01
990830	Dry	<1.00	<1.00	<1.00	<1.00	1.87	1.67	Dry	3.28	3.16	3.65	1.05	NC	Dry	1.88	3.39	1.18	<1.00	<1.00	1.15	Dry	2.29	2.22	1.40	<1.00
990927	Dry	<1.00	Dry	<1.00	<1.00	1.09	1.12	Dry	2.70	2.46	5.15	Dry	3.27	Dry	1.27	2.69	<1.00	<1.00	<1.00	<1.00	Dry	1.70	1.38	1.13	<1.00
991025	Dry	<1.00	Dry	<1.00	<1.00	<1.00	<1.00	Dry	2.45	1.43	1.85	Dry	1.50	Dry	1.03	1.52	<1.00	<1.00	<1.00	<1.00	Dry	<1.00	<1.00	<1.00	<1.00
000118	Dry	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	Dry	2.79	1.85	1.69	Dry	1.25	Dry	3.28	1.27	1.72	<1.00	<1.00	<1.00	Dry	1.66	<1.00	<1.00	<1.00
000229	<1.00	1.18	<1.00	1.36	1.57	<1.00	1.40	1.00	4.00	4.15	3.47	2.52	2.62	<1.00	2.36	2.33	3.63	1.63	<1.00	1.16	2.11	1.74	1.49	2.13	<1.00
000321	<1.00	1.01	<1.00	1.28	1.42	<1.00	2.18	<1.00	3.01	2.84	1.98	1.55	1.54	<1.00	1.14	1.33	1.27	1.75	<1.00	1.23	1.09	1.21	1.10	2.00	<1.00
000404	<1.00	1.30	<1.00	1.30	1.40	1.10	1.50	1.20	2.10	2.10	1.70	2.50	1.40	<1.00	<1.00	1.30	<1.00	1.30	<1.00	1.00	<1.00	1.20	1.40	1.60	<1.00
000605	<1.00	1.05	<1.00	1.34	1.55	1.15	1.27	<1.00	NC	4.37	3.98	Dry	2.09	<1.00	1.56	2.44	1.60	<1.00	<1.00	1.77	1.21	2.36	2.17	1.67	1.11
000912	Dry	<1.00	<1.00	1.50	1.20	<1.00	1.00	Dry	2.80	2.10	3.00	Dry	2.90	Dry	1.20	2.50	<1.00	<1.00	<1.00	<1.00	Dry	1.70	1.90	1.20	<1.00

Appendix 3 - Metals Data

	Zinc (ug/L)							Station Number (OUA****)																		
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13	12A	12
981109	4.20	45.50	<1.00	29.30	14.40	2.20	1.10	NC	1.10	2.20	3.80	3.40	1.30	Dry	3.10	2.10	<1.00	2.00	1.40	4.40	Dry	2.50	<1.00	3.40	4.50
990112	30.20	33.60	12.60	42.70	22.60	4.60	3.00	NC	3.40	2.20	4.90	4.90	3.30	9.30	6.80	2.60	9.80	6.00	6.40	4.20	5.00	3.30	3.00	3.70	3.90
990201	11.40	43.20	13.50	32.80	22.40	5.20	4.00	NC	4.20	3.00	4.00	3.90	3.60	6.40	2.80	3.50	4.90	5.10	5.10	4.90	4.70	3.60	5.10	7.40	3.20
990309	6.90	46.70	7.30	22.50	18.00	<1.00	1.20	2.30	3.80	<1.00	<1.00	2.30	1.40	6.20	<1.00	<1.00	1.70	2.90	<1.00	2.30	12.00	2.50	2.40	2.40	<1.00
990830	Dry	4.20	2.40	1.50	8.40	<1.00	<1.00	Dry	<1.00	<1.00	1.10	1.90	NC	Dry	1.40	<1.00	1.40	1.10	1.70	<1.00	Dry	1.00	<1.00	<1.00	1.80
990927	Dry	4.90	Dry	3.60	2.40	2.10	1.80	Dry	2.40	3.50	2.70	Dry	1.70	Dry	12.00	3.00	8.50	4.00	3.10	5.10	Dry	2.70	1.60	<1.00	1.40
991025	Dry	2.10	Dry	4.50	3.20	<1.00	<1.00	Dry	<1.00	<1.00	1.90	Dry	<1.00	Dry	<1.00	<1.00	1.30	<1.00	1.40	1.80	Dry	1.10	<1.00	2.00	2.00
000118	Dry	2.00	3.10	3.50	2.60	1.70	2.60	Dry	<1.00	1.50	<1.00	Dry	24.00	Dry	2.40	<1.00	6.00	49.40	2.40	<1.00	Dry	1.30	1.70	<1.00	<1.00
000229	7.70	27.50	7.70	17.60	15.10	1.40	2.00	8.20	2.70	1.60	1.30	2.20	1.50	4.00	3.20	2.60	8.10	11.00	4.50	5.00	15.00	2.30	2.80	2.60	2.10
000321	29.00	24.80	11.30	22.00	18.60	3.50	4.50	7.00	2.00	1.10	1.50	1.40	1.10	5.30	3.50	1.40	5.70	6.10	1.80	2.80	3.70	3.20	1.70	3.40	4.90
000404	13.30	56.80	11.10	30.00	21.60	4.90	3.90	5.00	2.00	2.50	2.50	4.30	3.20	7.80	3.80	3.60	6.70	7.30	5.50	11.60	26.60	5.60	3.40	4.20	10.00
000605	14.90	44.50	18.80	27.60	22.90	7.60	9.30	5.50	NC	13.00	11.10	Dry	6.50	6.70	7.80	6.80	6.20	4.20	5.10	6.70	4.30	1.00	1.60	<1.00	5.40
000912	Dry	30.40	5.30	11.30	10.60	4.80	4.00	Dry	5.50	2.10	3.00	Dry	2.20	Dry	2.90	4.60	8.90	3.30	4.80	2.50	Dry	2.50	2.60	2.70	1.70

Appendix 3 - Pesticide Data

	2-4-D (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	0.0403	NC	NC	NC	NC	0.0894	0.0625	NC	0.6958	0.0414	0.3568	0.027	NC	NC	NC	0.0933	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.16067	<.21304	0.1021	0.2752	NC	NC	<.02436	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02455	NC	<.02945	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02027	<.02353	NC	<.05390	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	0.3078	NC	NC	NC	NC	NC	NC	NC	NC	<.01662	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01055	<.01505	<.01419	<.01797	NC	NC	NC	<.01496	<.02390	<.01669	0.0196	NC	NC	<.01995	NC	<.01245	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01468	<.1071	NC	NC	NC	NC	NC	<.00877	NC	NC	<.01261	NC	<.01634	<.01895	<.00962	NC	<.00822	<.00706
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	0.0481	NC	NC	NC	NC	0.0819	0.092	NC	NC	<.01282	<.03556	NC	<.03556	NC	NC	<.16444	NC	NC	NC	NC	NC	0.0115	<.00724

	2-4-5-T (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.02550	NC	NC	NC	NC	<.00827	<.01250	NC	<.01169	<.00863	<.00665	<.00671	NC	NC	NC	<.01221	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.15275	<16306	<.01435	<.01465	NC	NC	<.01334	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05407	NC	<.01547	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01899	<.02766	NC	<.03360	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.01356	NC	NC	NC	NC	NC	NC	NC	NC	<.01011	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.00581	<.00886	<.00621	<.01064	NC	NC	NC	<.01043	<.01229	<.00895	<.01067	NC	NC	<.01405	NC	<.00630	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00705	<.01213	NC	NC	NC	NC	NC	<.00822	NC	NC	<.00694	NC	<.00524	<.00915	<.00717	NC	<.01338	<.00873
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.00855	NC	NC	NC	NC	<.00859	<.00655	NC	NC	<.00909	<.02222	NC	<.02222	NC	NC	<.08889	NC	NC	NC	NC	NC	<.00547	NC

	2-4-DB (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01615	NC	NC	NC	NC	<.01304	<.01938	NC	<.00996	<.01367	<.00712	<.01179	NC	NC	NC	<.01024	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.07662	<.09199	<.09665	<.04532	NC	NC	<.03742	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.04641	<.05368	NC	<.06585	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.03140	NC	NC	NC	NC	NC	NC	NC	NC	<.01997	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01688	<.00813	<.02186	<.01301	NC	NC	NC	<.01117	<.01566	<.01095	<.01049	NC	NC	<.01612	NC	<.00771	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01092	<.01084	NC	NC	NC	NC	NC	<.01133	NC	NC	<.00741	NC	<.01127	<.01406	<.00562	NC	<.00863	<.00965
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.01279	NC	NC	NC	NC	<.01447	NC	NC	NC	<.01747	<.06667	NC	<.06667	NC	NC	<.35556	NC	NC	NC	NC	NC	<.01227	NC

	Acifluorfen (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.03810	NC	NC	NC	NC	<.03296	<.02846	NC	<.02496	<.01406	<.02154	<.02505	NC	NC	NC	<.03425	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.20002	<.25470	<.21420	<.07053	NC	NC	<.11352	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06600	NC	<.05154	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.08154	NC	NC	<.03354	<.06741	NC	<.07208	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.07165	NC	NC	NC	NC	NC	NC	NC	NC	<.07861	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.02085	<.03178	<.01275	<.02727	NC	NC	NC	0.0685	<.03675	0.1062	0.0725	NC	NC	0.0673	NC	0.0258	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01503	<.00952	NC	NC	NC	NC	NC	0.0588	NC	NC	0.0531	NC	<.00939	<.01496	<.01310	NC	0.0614	0.0449
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.01738	NC	NC	NC	NC	<.01546	<.02061	NC	NC	<.01823	<.01525	NC	<.02222	NC	NC	<.03333	NC	NC	NC	NC	NC	<.01525	NC

Appendix 3 - Pesticide Data

	Alachlor (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01157	NC	NC	NC	NC	<.01454	NC	<.00781	<.00584	<.00930	<.01330	<.02602	NC	NC	NC	<.01112	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.05405	<.05871	<.09514	<.04053	NC	NC	<.03548	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03933	NC	<.01785	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02501	NC	NC	<.02859	<.03522	NC	<.03959	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.07459	<.02675	<.02627	NC	<.03453	<.02921	<.03260	<.04713	<.02967	<.02032	NC	<.02351	NC	NC	NC	NC	NC	<.03452	<.03096
990817	NC	<.01193	<.01515	<.02910	<.01365	NC	NC	NC	<.01896	<.01451	<.01038	<.01340	NC	NC	<.02142	NC	<.01660	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00534	<.00373	NC	NC	NC	NC	NC	<.00350	NC	NC	<.00580	NC	<.00592	<.00531	<.00593	NC	<.00872	<.00493
000321	NC	NC	NC	NC	NC	<.01799	<.02897	NC	<.02714	<.01463	<.02878	<.02114	<.01428	NC	NC	<.01655	NC	NC	NC	NC	NC	<.02724	<.02646
000404	<.03558	<.03458	<.02856	NC	<.03021	NC	NC	<.02560	NC	NC	NC	NC	NC	<.02547	<.02629	NC	<.03739	NC	NC	NC	<.03958	<.03553	<.02671
000605	<.00582	NC	NC	NC	NC	<.00359	<.00328	NC	NC	<.00[illegible]	[illegible]0399	NC	<.00507	NC	NC	<.00451	NC	NC	NC	NC	NC	<.00579	<.00415

	Aldrin (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01229	NC	NC	NC	NC	<.01707	NC	<.01141	<.01240	<.01139	<.01165	<.03731	NC	NC	NC	<.00886	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.09304	<.11968	<.23538	<.27377	NC	NC	<.13576	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05407	NC	<.01547	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05914	NC	NC	<.05204	<.04909	NC	<.10611	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.12976	<.06150	<.06262	NC	<.04456	<.12430	<.09368	<.06137	<.06631	<.02336	NC	<.04922	NC	NC	NC	NC	NC	<.05363	<.04380
990817	NC	<.04161	<.05790	<.06235	<.03703	NC	NC	NC	<.03267	<.05246	<.03546	<.04843	NC	NC	<.02694	NC	<.04306	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00512	<.00767	NC	NC	NC	NC	NC	<.00775	NC	NC	<.00630	NC	<.00866	<.00644	<.00683	NC	<.00866	<.00526
000321	NC	NC	NC	NC	NC	<.09586	<.09509	NC	<.05231	<.03935	<.03927	<.03936	<.01940	NC	NC	<.04670	NC	NC	NC	NC	NC	<.03296	<.05275
000404	<.04406	<.04673	<.04594	NC	<.08639	NC	NC	<.04460	NC	NC	NC	NC	NC	<.04355	<.05587	NC	<.05817	NC	NC	NC	<.06011	<.07195	<.06283
000605	<.01604	NC	NC	NC	NC	<.01033	<.00944	NC	NC	<.01238	<.01355	NC	<.01206	NC	NC	<.01240	NC	NC	NC	NC	NC	<.01566	<.01241

	Ametryn (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00513	NC	NC	NC	NC	<.00352	NC	<.00467	<.00431	<.00659	<.00442	<.02231	NC	NC	NC	<.00442	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03298	<.04437	<.08802	<.06951	NC	NC	<.04658	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02969	NC	<.05073	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02104	NC	NC	<.02197	<.01860	NC	<.03170	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.09770	<.04427	<.03519	NC	<.03313	<.03399	<.02718	<.05292	<.02933	<.02832	NC	<.03644	NC	NC	NC	NC	NC	<.01822	<.02977
990817	NC	<.01903	<.02710	<.02698	<.01789	NC	NC	NC	<.01589	<.01349	<.01275	<.01996	NC	NC	<.01276	NC	<.01348	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00171	<.00233	NC	NC	NC	NC	NC	<.00314	NC	NC	<.00280	NC	<.00280	<.00375	<.00294	NC	<.00334	<.00320
000321	NC	NC	NC	NC	NC	<.04417	<.03547	NC	<.03137	<.02178	<.03019	<.02574	<.02234	NC	NC	<.02006	NC	NC	NC	NC	NC	<.02334	<.02370
000404	<.03987	<.02900	<.03521	NC	<.04202	NC	NC	<.02600	NC	NC	NC	NC	NC	<.02053	<.03007	NC	<.01839	NC	NC	NC	<.03008	<.04314	<.02653
000605	<.00562	NC	NC	NC	NC	<.00348	<.00302	NC	NC	<.00472	<.00564	NC	<.00460	NC	NC	<.00318	NC	NC	NC	NC	NC	<.00520	<.00404

	Atrazine (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	0.0098	NC	NC	NC	NC	<.00320	NC	<.00467	<.00969	<.01111	<.00397	<.01788	NC	NC	NC	<.00554	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03847	<.04956	<.08321	<.08411	NC	NC	<.02669	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02987	NC	<.01355	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01963	NC	NC	<.02972	<.02545	NC	<.03535	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.03013	0.0382	<.03216	NC	<.03396	<.04931	<.02183	<.03752	<.02914	<.03321	NC	<.03475	NC	NC	NC	NC	NC	0.0598	0.0899
990817	NC	<.01846	<.01685	<.03268	<.00983	NC	NC	NC	<.01132	<.02571	<.01170	<.01873	NC	NC	<.01760	NC	<.01028	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00392	<.00255	NC	NC	NC	NC	NC	<.00378	NC	NC	<.00306	NC	<.00378	<.00464	<.00360	NC	<.00327	<.00437
000321	NC	NC	NC	NC	NC	0.0778	<.03651	NC	<.03114	0.0148	<.04047	<.01994	<.01192	NC	NC	0.0485	NC	NC	NC	NC	NC	<.02404	0.0351
000404	<.03074	<.04584	0.0254	NC	<.02490	NC	NC	<.02186	NC	NC	NC	NC	NC	<.02578	0.2263	NC	<.02828	NC	NC	NC	<.02568	<.02057	<.02777
000605	<.00606	NC	NC	NC	NC	0.0101	0.011	NC	NC	0.0155	0.0163	NC	<.00533	NC	NC	0.0176	NC	NC	NC	NC	NC	0.0338	0.0329

Appendix 3 - Pesticide Data

	Bentazon (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.02910	NC	NC	NC	NC	<.00927	<00996	NC	0.0964	0.0379	0.0755	0.0635	NC	NC	NC	0.0268	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.08783	<.03660	0.1427	0.0613	NC	NC	0.1685	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.07269	NC	<.04509	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0.0171	NC	NC	<.01395	0.0673	NC	0.1515	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.00568	NC	NC	NC	NC	NC	NC	NC	NC	<.00572	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01031	<.00714	<.00702	<.00687	NC	NC	NC	0.2567	0.3127	0.4014	0.1962	NC	NC	0.2551	NC	0.1657	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00648	0.0147	NC	NC	NC	NC	NC	0.3586	NC	NC	0.3787	NC	<.84644	<.01404	<.17138	NC	0.2829	0.2706
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.00610	NC	NC	NC	NC	<.00405	<.00622	NC	NC	3.2257	1.0021	NC	0.16589	NC	NC	<.17778	NC	NC	NC	NC	NC	0.4877	NC

	Chlorpyrifos (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01084	NC	NC	NC	NC	<.00579	NC	<.00634	<.00491	<.00773	<.00575	<.01266	NC	NC	NC	<.00735	NC	NC	NC	NC	NC	NC	NC
990309	<.00684	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.08955	<.06077	<.03683	<.11549	NC	NC	<.04111	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.04892	NC	<.02173	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02131	NC	NC	<.01578	<.05507	NC	<.05095	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.04204	<.04586	<.02891	NC	<.04049	<.02983	<.03677	<.02260	<.02613	<.04676	NC	<.01439	NC	NC	NC	NC	NC	<.04239	<.03430
990817	NC	<.02151	<.02170	<.04079	<.03114	NC	NC	NC	<.01876	<.02822	<.02001	<.02585	NC	NC	<.01433	NC	<.01607	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00256	<.00256	NC	NC	NC	NC	NC	<.00296	NC	NC	<.00312	NC	<.00465	<.00192	<.00326	NC	<.00744	<.00263
000321	NC	NC	NC	NC	NC	<.04643	<.02777	NC	<.03370	<.02286	<.05019	<.01738	<.02631	NC	NC	<.01832	NC	NC	NC	NC	NC	<.01433	<.02025
000404	<.03658	<.05212	<.02500	NC	<.03725	NC	NC	<.03292	NC	NC	NC	NC	NC	<.02616	<.03909	NC	<.02233	NC	NC	NC	<.02997	<.04759	<.03577
000605	<.00922	NC	NC	NC	NC	<.00681	<.00555	NC	NC	<.00887	<.01132	NC	<.00726	NC	NC	<.00725	NC	NC	NC	NC	NC	<.01068	<.00868

	Cyanazine (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01015	NC	NC	NC	NC	<.01394	NC	<.01121	0.0484	<.01158	0.0195	<.04347	NC	NC	NC	<.00625	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.11786	<.05289	<.22416	<.15860	NC	NC	<.04520	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06064	NC	<.04491	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03536	NC	NC	<.02595	<.03201	NC	<.03637	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.16737	<.08408	<.06340	NC	0.0467	<.07594	0.0831	<.04213	0.1541	<.04927	NC	1.948	NC	NC	NC	NC	NC	0.2526	0.0911
990817	NC	<.02506	<.02404	<.04776	<.11172	NC	NC	NC	<.02595	<.01881	<.01859	<.02794	NC	NC	<.02440	NC	<.02320	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00596	<.00564	NC	NC	NC	NC	NC	<.00633	NC	NC	<.00980	NC	0.0115	<.00427	<.00628	NC	0.0365	0.0276
000321	NC	NC	NC	NC	NC	<.05000	<.04919	NC	<.06119	<.03939	<.08233	<.03425	0.0755	NC	NC	<.03124	NC	NC	NC	NC	NC	<.03588	<.05190
000404	<.05311	<.07657	<.04178	NC	<.05509	NC	NC	<.04917	NC	NC	NC	NC	NC	<.04635	<.06964	NC	<.03714	NC	NC	NC	<.07425	<.05293	<.04364
000605	<.00535	NC	NC	NC	NC	<.00357	<.00340	NC	NC	<.00462	<.00453	NC	<.00398	NC	NC	<.00417	NC	NC	NC	NC	NC	<.00511	<.00466

	p-p-DDD (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00216	NC	NC	NC	NC	<.00386	NC	<.00512	<.00256	<.00267	<.00448	<.01299	NC	NC	NC	<.00307	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.01983	<.01313	<.07562	<.05374	NC	NC	<.01524	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.13792	NC	<.14405	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00794	NC	NC	<.01679	<.01224	NC	<.00734	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.02021	<.00907	<.01406	NC	<.01545	<.02534	<.00807	<.01471	<.00618	<.00869	NC	<.01329	NC	NC	NC	NC	NC	<.01117	<.01015
990817	NC	<.00479	<.00728	<.00904	<.00673	NC	NC	NC	<.00679	<.00615	<.00841	<.00820	NC	NC	<.00602	NC	<.00517	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00182	<.00152	NC	NC	NC	NC	NC	<.00149	NC	NC	<.00109	NC	<.00177	<.00183	<.00224	NC	<.00205	<.00094
000321	NC	NC	NC	NC	NC	<.01598	<.01326	NC	<.01676	<.01112	<.01154	<.00966	<.00801	NC	NC	<.01119	NC	NC	NC	NC	NC	<.00641	<.01169
000404	<.01448	<.01574	NC	NC	<.01211	NC	NC	<.01229	NC	NC	NC	NC	NC	<.00565	<.00897	NC	<.01245	NC	NC	NC	<.01141	<.01031	<.01078
000605	<.00195	NC	NC	NC	NC	<.00145	<.00216	NC	NC	<.00140	<.00169	NC	<.00145	NC	NC	<.00164	NC	NC	NC	NC	NC	<.00179	<.00166

Appendix 3 - Pesticide Data

Date	p-p-DDE (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00115	NC	NC	NC	NC	<.00304	NC	<.00323	<.00193	<.00178	<.00330	0.0096	NC	NC	NC	<.00307	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.01023	<.00817	<.02906	<.02175	NC	NC	<.00673	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.36683	NC	<.24658	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00229	NC	NC	<.00561	<.00323	NC	<.01103	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.00785	<.01186	<.00947	NC	<.00859	<.01400	<.00537	<.00742	<.00344	<.00357	NC	<.00771	NC	NC	NC	NC	NC	<.00779	<.00954
990817	NC	<.00722	<.00740	<.01732	<.00806	NC	NC	NC	<.00667	<.00894	<.00546	<.00584	NC	NC	<.00703	NC	<.00722	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00044	<.00044	NC	NC	NC	NC	NC	<.00045	NC	NC	0.0015	NC	<.00062	<.00046	<.00099	NC	<.00083	0.0057
000321	NC	NC	NC	NC	NC	<.01619	<.01134	NC	<.00739	0.0093	<.00980	<.00497	<.00583	NC	NC	<.00945	NC	NC	NC	NC	NC	<.00926	<.01303
000404	<.01082	<.01139	<.00707	NC	<.01209	NC	NC	<.00957	NC	NC	NC	NC	NC	<.00898	<.01419	NC	<.01156	NC	NC	NC	<.00947	<.01366	<.01216
000605	<.00185	NC	NC	NC	NC	<.00141	<.00080	NC	NC	<.00145	<.00136	NC	<.00129	NC	NC	<.00174	NC	NC	NC	NC	NC	<.00085	<.00158

Date	p-p-DDT (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00155	NC	NC	NC	NC	<.00278	NC	<.00368	<.00184	<.00192	<.00322	<.00934	NC	NC	NC	<.00221	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.01882	<.01246	<.07175	<.05100	NC	NC	<.01446	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01044	NC	<.01056	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00753	NC	NC	<.01593	<.01162	NC	<.00697	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.02094	<.00940	<.01457	NC	<.01601	<.02627	<.00837	<.01525	<.00640	<.00901	NC	<.01378	NC	NC	NC	NC	NC	<.01158	<.01052
990817	NC	<.00558	<.00848	<.01053	<.00783	NC	NC	NC	<.00790	<.00716	<.00980	<.00954	NC	NC	<.00701	NC	<.00602	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00160	<.00133	NC	NC	NC	NC	NC	<.00131	NC	NC	<.00095	NC	<.00155	<.00161	<.00197	NC	<.00180	<.00082
000321	NC	NC	NC	NC	NC	<.01288	<.01069	NC	<.01351	<.00896	<.00985	<.00795	<.00683	NC	NC	<.00928	NC	NC	NC	NC	NC	<.00531	<.00943
000404	<.01191	<.01295	<.00536	NC	<.00996	NC	NC	<.01011	NC	NC	NC	NC	NC	<.00465	<.00738	NC	<.01024	NC	NC	NC	<.00938	<.00854	<.00893
000605	<.00225	NC	NC	NC	NC	<.00167	<.00238	NC	NC	<.00204	<.00247	NC	<.00213	NC	NC	<.00240	NC	NC	NC	NC	NC	<.00262	<.00243

Date	Diazinon (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01200	NC	NC	NC	NC	<.01503	NC	<.01066	<.01061	<.01287	<.00653	<.02874	NC	NC	NC	<.00859	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.05686	0.0586	<.08426	0.101	NC	NC	<.04425	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05094	NC	<.02796	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03077	NC	NC	<.03577	<.05276	NC	<.02812	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	0.2153	<.06511	<.03474	NC	<.05208	<.05431	<.03205	<.04460	<.04676	<.02789	NC	<.06361	NC	NC	NC	NC	NC	<.03091	<.03492
990817	NC	<.03129	<.02899	<.05933	<.02477	NC	NC	NC	<.02815	<.02419	<.02202	<.02975	NC	NC	<.02697	NC	<.03166	NC	NC	NC	NC	NC	NC
990927	NC		NC	NC	NC	<.01276	<.00921	NC	NC	NC	NC	NC	<.01424	NC	NC	<.00745	NC	<.01349	<.01564	<.01329	NC	<.01194	<.00892
000321	NC	NC	NC	NC	NC	<.06324	<.03382	NC	<.03013	<.03626	<.05080	<.02338	<.03160	NC	NC	<.03437	NC	NC	NC	NC	NC	<.04242	<.04747
000404	<.03500	0.3189	0.0649	NC	0.3873	NC	NC	<.03007	NC	NC	NC	NC	NC	<.02930	<.05890	NC	<.04738	NC	NC	NC	<.03621	<.05202	<.04606
000605	<.01238	NC	NC	NC	NC	<.00822	<.01178	NC	NC	<.00975	<.01111	NC	<.00812	NC	NC	<.01034	NC	NC	NC	NC	NC	<.01162	<.00904

Date	Dicamba (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.02441	NC	NC	NC	NC	<.02275	<.34593	NC	<.13749	<.05909	<.00414	<.01412	NC	NC	NC	<.02416	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.17745	<.13979	0.1535	<.02272	NC	NC	<.02651	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.12653	NC	<.27078	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02027	<.01912	NC	<.04787	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.01161	NC	NC	NC	NC	NC	NC	NC	NC	<.00728	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.00663	<.01418	<.01115	<.01026	NC	NC	NC	<.01045	<.01301	<.0095[illegible]	[illegible]983	NC	NC	<.01504	NC	<.01173	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00866	<.00645	NC	NC	NC	NC	NC	<.01227	NC	NC	<.02425	NC	<.00742	<.00630	<.00589	NC	<.00940	<.00763
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.00879	NC	NC	NC	NC	<.00991	<.00675	NC	NC	<.00767	<.01333	NC	<.01333	NC	NC	<.04000	NC	NC	NC	NC	NC	<.00426	<.00493

Dichloroprop (ug/L) — Station Number (OUA****)

Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.04132	NC	NC	NC	NC	<.02202	<.02344	NC	<.00641	<.01262	<.00608	<.01601	NC	NC	NC	<.00633	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.34681	<.28813	<.10535	<.04775	NC	NC	<.01669	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06042	NC	<.04401	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06009	<.04858	NC	<.03856	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	0.128	NC	NC	NC	NC	NC	NC	NC	NC	<.03596	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01217	<.02776	<.02182	<.02637	NC	NC	NC	<.01917	<.02204	<.01399	<.01805	NC	NC	<.03681	NC	<.02009	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00859	<.01293	NC	NC	NC	NC	NC	<.00917	NC	NC	<.00818	NC	<.00983	<.01204	<.00881	NC	<.01050	<.00969
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.01683	NC	NC	NC	NC	<.02214	<.00675	NC	NC	<.01387	<.02222	NC	<.02222	NC	NC	<.12222	NC	NC	NC	NC	NC	<.01271	<.01257

3-5-Dichlorobenzoic Acid (ug/L) — Station Number (OUA****)

Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.03116	NC	NC	NC	NC	<.02299	<.04448	NC	<.03234	<.02845	<.01693	<.02065	NC	NC	NC	<.01046	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.18404	<.27927	<.06256	<.02266	NC	NC	<.03048	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03306	NC	<.06756	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02027	<.01912	NC	<.04787	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.01161	NC	NC	NC	NC	NC	NC	NC	NC	<.00728	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01884	<.01007	<.01188	<.01823	NC	NC	NC	<.00742	<.01422	<.01016	<.01019	NC	NC	<.01559	NC	<.01389	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01166	<.01256	NC	NC	NC	NC	NC	<.01278	NC	NC	<.01433	NC	<.01313	<.01043	<.00869	NC	<.00926	<.01376
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.00885	NC	NC	NC	NC	<.00871	<.00910	NC	NC	<.01035	<.02222	NC	<.02222	NC	NC	<.06889	NC	NC	NC	NC	NC	NC	<.00645

Dieldrin (ug/L) — Station Number (OUA****)

Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.03431	NC	NC	NC	NC	<.03232	NC	<.03918	<.02270	<.03610	<.02182	<.06254	NC	NC	NC	<.02794	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.16188	<.06963	<.36601	<.18867	NC	NC	<.09385	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06801	NC	<.06391	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05027	NC	NC	<.11892	<.09685	NC	<.08269	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.15899	<.05897	<.08201	NC	<.05314	<.10102	<.04789	<.09645	<.07988	<.04865	NC	<.10151	NC	NC	NC	NC	NC	<.05554	<.12430
990817	NC	<.08632	<.09594	<.22938	<.04211	NC	NC	NC	<.04544	<.04798	<.07493	<.08514	NC	NC	<.05621	NC	<.09738	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.02105	<.02668	NC	NC	NC	NC	NC	<.02378	NC	NC	<.02010	NC	<.02251	<.02900	<.02306	NC	<.02396	<.01990
000321	NC	NC	NC	NC	NC	<.09545	<.08009	NC	<.07650	<.04122	<.07997	<.03652	<.05457	NC	NC	<.04629	NC	NC	NC	NC	NC	<.06189	<.04953
000404	<.09933	<.10249		NC	<.12890	NC	NC	<.08760	NC	NC	NC	NC	NC	<.08663	<.05859	NC	<.08040	NC	NC	NC	<.06617	<.09316	<.08261
000605	<.03637	NC	NC	NC	NC	<.02120	<.03462	NC	NC	<.02855	<.04399	NC	<.03099	NC	NC	<.02318	NC	NC	NC	NC	NC	<.03543	<.03031

Dinoseb (ug/L) — Station Number (OUA****)

Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.02021	NC	NC	NC	NC	<.01634	<.03123	NC	<.01069	<.00870	<.01561	<.02575	NC	NC	NC	<.01853	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.17480	<.17677	<.07963	<.07535	NC	NC	<.03410	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.04866	NC	<.05132	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02536	<.02867	NC	<.05145	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.02666	NC	NC	NC	NC	NC	NC	NC	NC	<.02500	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01631	<.02238	<.01571	<.02091	NC	NC	NC	<.02344	<.02301	<.02262	<.02354	NC	NC	<.02631	NC	<.01238	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01331	<.01137	NC	NC	NC	NC	NC	<.00901	NC	NC	<.00725	NC	<.01513	<.01393	<.00712	NC	<.01328	<.01166
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.01296	NC	NC	NC	NC	<.01252	<.02276	NC	NC	<.02062	<.01111	NC	<.01111	NC	NC	<.05622	NC	NC	NC	NC	NC	<.00833	NC

Date	Endosulfan-I (ug/L)							Station Number (OUA****)															
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.08548	NC	NC	NC	NC	<.10596	NC	<.09378	<.10418	<.11488	<.09575	<.18739	NC	NC	NC	<.16422	NC	NC	NC	NC	NC	NC	NC
990621	NC	<1.0348	<.93142	<2.3393	<1.4740	NC	NC	<.85806	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05246	NC	<.02880	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.34000	NC	NC	<.77399	<.92455	NC	<1.1979	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.66839	<.68162	<.82233	NC	<.73093	<.65366	<.90933	<.56158	<.53754	<.97244	NC	<.47916	NC	NC	NC	NC	NC	<.30051	<.50104
990817	NC	<.19462	<.24109	<.32680	<.17517	NC	NC	NC	<.26526	<.15726	<.21767	<.21346	NC	NC	<.18171	NC	<.21622	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.11509	<.08933	NC	NC	NC	NC	NC	<.10131	NC	NC	<.07947	NC	<.10429	<.09566	<.06907	NC	<.05150	<.07313
000321	NC	NC	NC	NC	NC	<.52950	<.39016	NC	<.41357	<.44183	<.63050	<.35061	<.29563	NC	NC	<.19192	NC	NC	NC	NC	NC	<.35888	<.26599
000404	<.33264	<.49032	<.35505	NC	<.48331	NC	NC	<.38132	NC	NC	NC	NC	NC	<.39747	<.44881	NC	<.41735	NC	NC	NC	<.29045	<.68048	<.37695
000605	<.12791	NC	NC	NC	NC	<.16394	<.17791	NC	NC	<.17648	<.21325	NC	<.12365	NC	NC	<.19243	NC	NC	NC	NC	NC	<.14766	<.14180

Date	Endosulfan-II (ug/L)							Station Number (OUA****)															
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.08406	NC	NC	NC	NC	<.08280	NC	<.09774	<.06163	<.06075	<.06609	<.33880	NC	NC	NC	<.06650	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.29381	<.28431	<1.6884	<.55737	NC	NC	<.42096	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.04882	NC	<.02680	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.22373	NC	NC	<.24562	<.16190	NC	<.38551	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.52883	<.38314	<.47761	NC	<.21055	<.30904	<.41122	<.31604	<.28655	<.23710	NC	<.23025	NC	NC	NC	NC	NC	<.18571	<.34397
990817	NC	<.14120	<.22358	<.44640	<.17068	NC	NC	NC	<.20538	<.19445	<.15175	<.30155	NC	NC	<.18102	NC	<.20808	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.04914	<.05191	NC	NC	NC	NC	NC	<.06385	NC	NC	<.05228	NC	<.09063	<.06629	<.05536	NC	<.06686	<.05352
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	<.20293	<.26537	NC	NC	<.19550	NC	NC	<.12121	NC	NC	NC	NC	NC	<.17069	<.14924	NC	<.17789	NC	NC	NC	<.15079	<.31692	<.14880
000605	<.05893	NC	NC	NC	NC	<.04454	<.06031	NC	NC	<.06487	<.08151	NC	<.05437	NC	NC	<.05870	NC	NC	NC	NC	NC	<.06570	<.06098

Date	Endosulfan-Sulfate (ug/L)							Station Number (OUA****)															
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01129	NC	NC	NC	NC	<.01300	NC	<.01604	<.00532	<.00665	<.01193	<.03670	NC	NC	NC	<.01190	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.07485	<.06982	<.40772	<.09319	NC	NC	<.05670	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.27745	NC	<.09853	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.04079	NC	NC	<.06918	<.05006	NC	<.07036	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.08981	<.08435	<.09358	NC	<.04732	<.04269	<.04173	<.05921	<.04369	<.04145	NC	<.05153	NC	NC	NC	NC	NC	<.03458	<.03888
990817	NC	<.02829	<.03228	<.03295	<.02663	NC	NC	NC	<.01363	<.03365	<.02186	<.03630	NC	NC	<.04689	NC	<.01854	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00268	<.00402	NC	NC	NC	NC	NC	<.00369	NC	NC	<.00512	NC	<.00567	<.00583	<.00636	NC	<.00774	<.00368
000321	NC	NC	NC	NC	NC	<.08202	<.06795	NC	<.06207	<.03344	<.04723	<.05473	<.03494	NC	NC	<.03397	NC	NC	NC	NC	NC	<.03492	<.03599
000404	<.03557	<.08023	<.04021	NC	<.07050	NC	NC	<.04736	NC	NC	NC	NC	NC	<.04202	<.04214	NC	<.05171	NC	NC	NC	<.04051	<.07366	<.06024
000605	<.00741	NC	NC	NC	NC	<.00536	<.00564	NC	NC	<.00675	<.00630	NC	<.00831	NC	NC	<.00619	NC	NC	NC	NC	NC	NC	NC

Date	Endrin (ug/L)							Station Number (OUA****)															
	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.02628	NC	NC	NC	NC	<.03467	NC	<.02641	<.02677	<.02321	<.02500	<.08144	NC	NC	NC	<.01871	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.18327	<.21537	<.48879	<.59547	NC	NC	<.28452	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06837	NC	<.02430	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.12576	NC	NC	<.10885	<.09753	NC	<.23949	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.23458	<.10764	<.11790	NC	<.08020	<.28611	<.18665	<.12315	<.13290	<.04944	NC	<.08247	NC	NC	NC	NC	NC	<.09451	<.08785
990817	NC	<.06511	<.10161	<.10400	<.05893	NC	NC	NC	<.05298	<.08239	<.05911	<.08029	NC	NC	<.04200	NC	<.07794	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01294	<.01939	NC	NC	NC	NC	NC	<.02006	NC	NC	<.01606	NC	<.02191	<.01560	<.01701	NC	<.03101	<.01333
000321	NC	NC	NC	NC	NC	<.20123	<.21944	NC	<.14342	<.08822	<.09264	<.07899	<.05306	NC	NC	<.10363	NC	NC	NC	NC	NC	<.07659	<.11285
000404	<.08928	<.09383	NC	NC	<.13621	NC	NC	<.08697	NC	NC	NC	NC	NC	<.09098	<.10678	NC	<.11355	NC	NC	NC	<.11951	<.16661	<.13554
000605	<.03003	NC	NC	NC	NC	<.01940	<.01766	NC	NC	<.02317	<.02351	NC	<.02249	NC	NC	<.02204	NC	NC	NC	NC	NC	NC	NC

Date	Fonofos (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00958	NC	NC	NC	NC	<.00516	NC	<.00774	<.00483	<.00660	<.00684	<.01512	NC	NC	NC	<.00855	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.04971	<.03395	<.13675	<.07897	NC	NC	<.03493	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02436	NC	<.01717	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01414	NC	NC	<.01601	<.01470	NC	<.02589	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.05535	<.04378	<.01994	NC	<.01798	<.03426	<.02474	<.02026	<.01835	<.01440	NC	<.02928	NC	NC	NC	NC	NC	<.02176	<.02081
990817	NC	<.02170	<.02189	<.06885	<.01410	NC	NC	NC	<.01862	<.01380	<.00872	<.03240	NC	NC	<.02259	NC	<.02446	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01213	<.00793	NC	NC	NC	NC	NC	<.00743	NC	NC	<.00543	NC	<.00871	<.00669	<.00542	NC	<.00510	<.00435
000321	NC	NC	NC	NC	NC	<.03045	<.01972	NC	<.03398	<.02280	<.02579	<.02249	<.01584	NC	NC	<.01229	NC	NC	NC	NC	NC	<.01044	<.01821
000404	<.02346	<.03955	<.01530	NC	<.02829	NC	NC	<.02222	NC	NC	NC	NC	NC	<.01549	<.01557	NC	<.02208	NC	NC	NC	<.02514	<.02348	<.01330
000605	<.00949	NC	NC	NC	NC	<.00737	<.00753	NC	NC	<.00914	<.01389	NC	<.00709	NC	NC	<.00685	NC	NC	NC	NC	NC	<.01000	<.00785

Date	Heptachlor (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00673	NC	NC	NC	NC	<.00616	NC	<.00568	<.00435	<.00720	<.00981	<.01877	NC	NC	NC	<.00580	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.01962	<.04180	<.11698	<.04729	NC	NC	<.02202	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01594	NC	<.01338	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00551	NC	NC	<.02033	<.02453	NC	<.01823	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.05421	<.02741	<.02854	NC	<.04233	<.02359	<.01740	<.02474	<.02382	<.01661	NC	<.03441	NC	NC	NC	NC	NC	<.03059	<.01726
990817	NC	<.04409	<.02594	<.06924	<.03313	NC	NC	NC	<.02143	<.02757	<.01871	<.03228	NC	NC	<.02662	NC	<.01513	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01055	<.00899	NC	NC	NC	NC	NC	<.00754	NC	NC	<.00624	NC	<.00511	<.00921	<.00684	NC	<.00595	<.00519
000321	NC	NC	NC	NC	NC	<.02908	<.02797	NC	<.03652	<.03012	<.03413	<.02900	<.02500	NC	NC	<.02106	NC	NC	NC	NC	NC	<.01786	<.03205
000404	<.02353	<.02535	<.01532	NC	<.02473	NC	NC	<.02113	NC	NC	NC	NC	NC	<.02274	<.02233	NC	<.02078	NC	NC	NC	<.03582	<.03145	<.03404
000605	<.01068	NC	NC	NC	NC	<.00688	<.00861	NC	NC	<.01237	<.01635	NC	<.00996	NC	NC	<.00965	NC	NC	NC	NC	NC	<.00761	<.00872

Date	Hexazinone (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00859	NC	NC	NC	NC	<.00863	NC	<.00784	<.00680	<.00758	<.00594	<.02020	NC	NC	NC	<.00543	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.04653	<.02482	<.16807	<.08245	NC	NC	<.03089	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02434	NC	<.02822	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02019	NC	NC	<.01546	0.041	NC	<.02277	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.07539	<.01597	<.03664	NC	<.01115	<.04878	<.02506	<.04510	<.02112	<.01119	NC	<.01775	NC	NC	NC	NC	NC	0.0574	<.02476
990817	NC	<.01223	<.01657	<.03189	<.00973	NC	NC	NC	<.00704	<.01560	<.00763	<.01218	NC	NC	<.01339	NC	<.01234	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00570	<.00523	NC	NC	NC	NC	NC	<.00442	NC	NC	<.00386	NC	<.00478	0.0816	<.00547	NC	<.00772	<.00612
000321	NC	NC	NC	NC	NC	<.04262	<.03072	NC	<.03575	<.02947	<.02655	<.01589	<.04471	NC	NC	<.02257	NC	NC	NC	NC	NC	<.02066	<.03513
000404	<.02993	<.04232	<.02219	NC	<.04046	NC	NC	<.01879	NC	NC	NC	NC	NC	<.03027	0.3912	NC	<.02118	NC	NC	NC	<.03256	<.03128	<.03430
000605	<.00395	NC	NC	NC	NC	<.00384	<.00290	NC	NC	<.00355	<.00499	NC	<.00283	NC	NC	<.00341	NC	NC	NC	NC	NC	<.00365	<.00506

Date	Malathion (ug/L) 143	145	144	146	147	33	148	Station Number (OUA****) 160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01335	NC	NC	NC	NC	<.01399	NC	<.01609	<.01026	<.01096	<.01479	<.02701	NC	NC	NC	<.01160	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.02734	<.04267	<.14687	<.11185	NC	NC	<.04234	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03495	NC	<.02985	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01464	NC	NC	<.03290	<.03777	NC	<.04269	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.06545	<.05963	<.04980	NC	<.04269	<.04308	<.03834	<.03625	<.05123	<.04596	NC	<.03127	NC	NC	NC	NC	NC	<.03154	<.02211
990817	NC	<.02962	<.04186	<.08894	<.02651	NC	NC	NC	0.092	0.1009	0.0705	0.3743	NC	NC	0.0596	NC	0.049	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	0.1174	0.0633	NC	NC	NC	NC	NC	0.1559	NC	NC	0.3167	NC	0.0796	0.0334	0.0985	NC	0.0754	0.0727
000321	NC	NC	NC	NC	NC	<.03956	<.03979	NC	<.03747	<.03409	<.05550	<.05235	<.02046	NC	NC	<.02547	NC	NC	NC	NC	NC	<.03122	<.03435
000404	<.03838	<.07090	<.02858	NC	<.04050	NC	NC	<.03155	NC	NC	NC	NC	NC	<.02159	<.03035	NC	<.02952	NC	NC	NC	<.04574	<.04577	<.04248
000605	<.01110	NC	NC	NC	NC	<.00847	<.01204	NC	NC	<.01094	<.01660	NC	<.01138	NC	NC	0.1182	NC	NC	NC	NC	NC	0.0581	0.0528

Appendix 3 - Pesticide Data

	Methoxychlor (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00143	NC	NC	NC	NC	<.00093	NC	<.00141	<.00121	<.00175	<.00124	<.00634	NC	NC	NC	<.00122	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.00962	<.01182	<.02705	<.02238	NC	NC	<.01445	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03347	NC	<.04381	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00662	NC	NC	<.00680	<.00547	NC	<.01059	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.03173	<.01392	<.01190	NC	<.01071	<.01405	<.00973	<.01908	<.01056	<.01077	NC	<.01097	NC	NC	NC	NC	NC	<.00577	<.01073
990817	NC	<.00692	<.01106	<.01047	<.00662	NC	NC	NC	<.00599	<.00493	<.00494	<.00769	NC	NC	<.00463	NC	[illegible]	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00056	<.00076	NC	NC	NC	NC	NC	<.00105	NC	NC	<.00092	NC	<.00092	<.00118	<.00095	NC	<.00105	<.00105
000321	NC	NC	NC	NC	NC	<.01200	<.01059	NC	<.01113	<.00632	<.00720	<.00638	<.00618	NC	NC	<.00528	NC	NC	NC	NC	NC	<.00644	<.00656
000404	<.00998	<.00719	<.00830	NC	<.01065	NC	NC	<.00626	NC	NC	NC	NC	NC	<.00530	<.00710	NC	<.00444	NC	NC	NC	<.00739	<.01186	<.00679
000605	<.00165	NC	NC	NC	NC	<.00103	<.00097	NC	NC	<.00175	<.00194	NC	<.00170	NC	NC	<.00112	NC	NC	NC	NC	NC	<.00186	<.00141

	Methyl Parathion (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00664	NC	NC	NC	NC	<.00921	NC	<.00616	<.00669	<.00615	<.00629	<.02014	NC	NC	NC	<.00478	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03177	<.04086	<.08036	<.09347	NC	NC	<.04635	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03646	NC	<.02910	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02019	NC	NC	<.01777	<.01676	NC	<.03623	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.06376	<.03022	<.03077	NC	<.02190	<.06108	<.04603	<.03016	<.03258	<.01148	NC	<.02418	NC	NC	NC	NC	NC	<.02635	<.02153
990817	NC	<.01582	<.02202	<.02371	<.01408	NC	NC	NC	<.01242	<.01995	<.01349	<.01842	NC	NC	<.01024	NC	<.01638	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00221	<.00331	NC	NC	NC	NC	NC	<.00334	NC	NC	<.00272	NC	<.00374	<.00278	<.00295	NC	<.00374	<.00227
000321	NC	NC	NC	NC	NC	<.05211	<.05170	NC	<.02844	<.02139	<.02357	<.02255	<.01165	NC	NC	<.02617	NC	NC	NC	NC	NC	<.01847	<.02868
000404	<.02524	<.02678	<.02632	NC	<.03804	NC	NC	<.02555	NC	NC	NC	NC	NC	<.02495	<.03201	NC	<.03333	NC	NC	NC	<.03444	<.04031	<.03520
000605	<.00820	NC	NC	NC	NC	<.00526	<.00488	NC	NC	<.00624	<.00683	NC	<.00608	NC	NC	<.00625	NC	NC	NC	NC	NC	<.00789	<.00626

	Metolachlor (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00575	NC	NC	NC	NC	<.00447	NC	<.00338	0.1796	0.0206	0.1097	0.0138	NC	NC	NC	0.0597	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.02484	<.01301	<.05678	<.02671	NC	NC	<.00941	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.03703	NC	<.02223	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0.0881	NC	NC	<.01407	0.0561	NC	0.0557	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	0.2526	<.01551	<.00818	NC	0.1608	0.2435	0.1979	<.02483	0.813	<.01095	NC	0.1677	NC	NC	NC	NC	NC	0.3546	1.2229
990817	NC	<.00810	<.01134	<.02796	<.00426	NC	NC	NC	0.2729	0.0538	0.3445	<.01109	NC	[illegible]	[illegible]	NC	0.0087	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00416	<.00290	NC	NC	NC	NC	NC	0.0465	NC	NC	0.0688	NC	<.00330	<.00414	<.00300	NC	0.0444	0.0436
000321	NC	NC	NC	NC	NC	<.01676	<.01097	NC	0.1433	0.1638	0.0645	<.01051	0.1095	NC	NC	0.0432	NC	NC	NC	NC	NC	0.0103	0.0337
000404	<.01446	<.02034	<.01021	NC	<.01451	NC	NC	<.01146	NC	NC	NC	NC	NC	<.00630	<.01376	NC	<.01341	NC	NC	NC	<.00945	<.01473	<.01822
000605	<.00205	NC	NC	NC	NC	0.008	0.0098	NC	NC	0.4544	9.1473	NC	0.3267	NC	NC	1.075	NC	NC	NC	NC	NC	1.8432	0.515

	Metribuzin (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00567	NC	NC	NC	NC	<.00562	<.00439		<.00119	<.00613	<.00489	<.01434	NC	NC	NC	<.00870	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03681	<.06305	<.10482	<.06669	NC	NC	<.01918	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02314	NC	<.01811	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01840	NC	NC	<.02303	<.02674	NC	<.01289	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.05921	<.03915	<.03984	NC	<.01708	<.02065	<.01944	<.02655	0.0415	<.01939	NC	<.02240	NC	NC	NC	NC	NC	0.0248	<.02015
990817	NC	<.03107	<.01460	<.05002	<.01308	NC	NC	NC	<.01659	<.02297	<.01159	<.02823	NC	NC	<.01397	NC	<.02003	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00451	<.00270	NC	NC	NC	NC	NC	<.00363	NC	NC	<.00239	NC	<.00400	<.00472	<.00461	NC	<.00427	<.00462
000321	NC	NC	NC	NC	NC	<.05538	<.03093	NC	<.04898	<.02787	<.02612	<.03272	<.03029	NC	NC	<.02363	NC	NC	NC	NC	NC	<.03131	<.05450
000404	<.04306	<.09392	<.03780	NC	<.04663	NC	NC	<.04012	NC	NC	NC	NC	NC	<.03636	<.05060	NC	<.02612	NC	NC	NC	<.03890	<.02601	<.02386
000605	<.01031	NC	NC	NC	NC	<.00739	<.00956	NC	NC	0.0495	1.8065	NC	0.0559	NC	NC	0.1641	NC	NC	NC	NC	NC	0.4475	0.0975

	Molinate (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00418	NC	NC	NC	NC	<.00511	NC	<.00471	0.0151	0.0322	0.0099	0.1364	NC	NC	NC	0.0055	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.01716	<.01765	0.1102	<.01069	NC	NC	0.0574	NC	NC	NC	NC	NC	NC	NC	NC	NC	0.0391	NC	0.0476	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0.0112	NC	NC	<.01290	0.3493	NC	<.01897	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.03625	2.9785	0.3271	NC	76.383	22.218	29.77	8.4968	11.45	<.00516	NC	2.6002	NC	NC	NC	NC	NC	1.143	0.9689
990817	NC	<.01562	<.01830	<.05919	<.02266	NC	NC	NC	0.062	0.311	0.1824	0.1352	NC	NC	0.0239	NC	<.01033	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	0.0261	<.00549	NC	NC	NC	NC	NC	0.0659	NC	NC	0.0293	NC	0.0308	<.00614	0.0092	NC	0.0193	0.0215
000321	NC	NC	NC	NC	NC	<.02694	<.01641	NC	<.01632	<.01041	<.01760	0.0289	<.01113	NC	NC	<.02113	NC	NC	NC	NC	NC	<.01629	<.01961
000404	<.01825	<.02770	<.01548	NC	<.02169	NC	NC	<.01260	NC	NC	NC	NC	NC	<.02075	<.01136	NC	<.01933	NC	NC	NC	<.01481	<.02023	<.01575
000605	0.0101	NC	NC	NC	NC	0.0114	0.0059	NC	NC	0.0475	0.1804	NC	0.0588	NC	NC	0.22	NC	NC	NC	NC	NC	0.0774	0.0058

	Pendimethalin (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00283	NC	NC	NC	NC	<.00420	NC	<.00387	<.00297	<.00327	<.00396	0.0279	NC	NC	NC	<.00226	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03361	<.02060	<.04555	<.02576	NC	NC	<.02826	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.69739	NC	<.85630	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01398	NC	NC	<.01467	<.02720	NC	<.00931	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.04517	<.03086	<.02117	NC	0.0895	<.02656	0.07	0.0157	0.0732	<.01954	NC	<.01599	NC	NC	NC	NC	NC	<.02248	0.1143
990817	NC	<.01696	<.00908	<.01996	<.00777	NC	NC	NC	<.00525	<.00803	<.00725	<.00953	NC	NC	<.00764	NC	<.00749	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00257	<.00281	NC	NC	NC	NC	NC	<.00247	NC	NC	<.00231	NC	<.00259	<.00192	<.00258	NC	<.00303	<.00213
000321	NC	NC	NC	NC	NC	<.02022	<.01804	NC	<.01494	<.00912	<.01553	<.01673	<.01266	NC	NC	<.01443	NC	NC	NC	NC	NC	<.01254	<.00824
000404	<.01549	<.02276	<.01654	NC	<.02147	NC	NC	<.01462	NC	NC	NC	NC	NC	<.00798	<.01266	NC	<.01692	NC	NC	NC	<.01312	<.02114	<.02042
000605	<.00497	NC	NC	NC	NC	<.00366	<.00456	NC	NC	0.0182	0.0939	NC	0.0064	NC	NC	<.00586	NC	NC	NC	NC	NC	0.0157	<.00315

	Picloram (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.04162	NC	NC	NC	NC	<.00817	<.01900	NC	<.01307	<.02062	<.00781	<.01417	NC	NC	NC	<.01416	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.08478	<.06917	<.06251	<.04656	NC	NC	<.02168	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02987	NC	<.01355	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01438	<.01983	NC	<.02306	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.02694	NC	NC	NC	NC	NC	NC	NC	NC	<.01278	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01834	<.01304	<.01177	<.01301	NC	NC	NC	<.01117	<.01724	<.02637	<.03046	NC	NC	<.02957	NC	<.01458	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01299	<.01352	NC	NC	NC	NC	NC	<.00834	NC	NC	<.00999	NC	<.01410	<.00529	<.00566	NC	<.00971	<.00902
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.00569	NC	NC	NC	NC	<.00694	<.00880	NC	NC	<.00840	<.02444	NC	<.02444	NC	NC	<.05333	NC	NC	NC	NC	NC	<.00641	NC

	Pentachtorophenol (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	0.1645	NC	NC	NC	NC	0.1085	0.4273	NC	0.1007	0.0289	0.02	<.01445	NC	NC	NC	0.0514	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.19054	<.16077	<.11784	<.04879	NC	NC	<.09156	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.06600	NC	<.05154	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.04298	<.02630	NC	<.05244	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.03618	NC	NC	NC	NC	NC	NC	NC	NC	<.05020	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01071	<.01400	<.00982	<.01681	NC	NC	NC	<.01375	<.01079	<.01886	<.00803	NC	NC	<.01851	NC	<.00664	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00613	<.01443	NC	NC	NC	NC	NC	<.00659	NC	NC	<.00641	NC	<.00912	<.00555	<.00677	NC	<.00740	<.00629
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.01427	NC	NC	NC	NC	<.01550	<.01650	NC	NC	<.01974	<.02222	NC	<.02222	NC	NC	<.05333	NC	NC	NC	NC	NC	<.01179	<.01988

Appendix 3 - Pesticide Data

	Prometryn (ug/L)							Station Number (OUA****)														
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00584	NC	NC	NC	NC	<.00496	NC	<.00352	<.00526	<.00541	<.00575	<.02215	NC	NC	NC	<.00768	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.02499	<.02683	<.09952	<.11700	NC	NC	<.03183	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00991	NC	<.01002	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02415	NC	NC	<.02457	<.03976	NC	<.02326	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.07627	<.02141	0.1274	NC	<.03638	0.0901	0.0308	0.1047	0.1536	<.01464	NC	0.0828	NC	NC	NC	NC	NC	0.074	0.0437
990817	NC	<.01377	<.01794	<.01998	<.01265	NC	NC	NC	<.01043	<.01212	<.00903	<.01606	NC	NC	<.01487	NC	<.01258	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00138	0.0127	NC	NC	NC	NC	NC	<.00216	NC	NC	0.0079	NC	0.0267	<.00288	0.0077	NC	0.0133	0.0099
000321	NC	NC	NC	NC	NC	<.03161	<.02104	NC	<.03448	<.01594	<.02911	<.03220	<.02475	NC	NC	<.02008	NC	NC	NC	NC	NC	<.01771	<.03219
000404	<.04104	<.02923	<.03352	NC	<.03116	NC	NC	<.02250	NC	NC	NC	NC	NC	<.02118	<.02277	NC	<.02916	NC	NC	NC	<.02535	<.03012	<.03476
000605	<.00533	NC	NC	NC	NC	<.00346	<.00376	NC	NC	<.00640	<.00565	NC	<.00497	NC	NC	<.00473	NC	NC	NC	NC	NC	0.0144	0.0547

	Propachlor (ug/L)							Station Number (OUA****)														
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00459	NC	NC	NC	NC	<.00731	NC	<.00752	<.00703	<.00917	<.00970	<.02487	NC	NC	NC	<.00644	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.02350	<.01550	<.09431	<.06453	NC	NC	<.01307	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02590	NC	<.02450	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01772	NC	NC	<.01487	<.02495	NC	<.01567	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.06051	<.01885	<.03856	NC	<.02265	<.01243	<.02528	<.03738	<.01675	<.00864	NC	<.04514	NC	NC	NC	NC	NC	<.02240	<.02965
990817	NC	<.01691	<.01966	<.06228	<.01229	NC	NC	NC	<.01523	<.00805	<.01180	<.01739	NC	NC	<.01489	NC	<.01568	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01037	<.00767	NC	NC	NC	NC	NC	<.01335	NC	NC	<.01605	NC	<.00530	<.00687	<.00788	NC	<.00591	<.00806
000321	NC	NC	NC	NC	NC	<.02297	<.02705	NC	<.01441	<.01625	<.02170	<.01774	<.02041	NC	NC	<.01741	NC	NC	NC	NC	NC	<.02052	<.02087
000404	<.01837	<.02829	<.02126	NC	<.03975	NC	NC	<.03359	NC	NC	NC	NC	NC	<.02321	<.01595	NC	<.02450	NC	NC	NC	<.02193	<.02973	<.02708
000605	<.00550	NC	NC	NC	NC	<.00468	<.00476	NC	NC	<.02114	<.00919	NC	<.00682	NC	NC	<.00555	NC	NC	NC	NC	NC	0.0071	<.00360

	Propazine (ug/L)							Station Number (OUA****)														
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00309	NC	NC	NC	NC	<.00614	NC	<.00490	<.00520	<.00215	<.00467	<.01305	NC	NC	NC	<.00372	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03306	<.01593	<.12762	<.06335	NC	NC	<.02907	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00958	NC	<.01130	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.01891	NC	NC	<.02244	<.02769	NC	<.03555	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.08126	<.03129	<.02935	NC	<.03389	<.01994	<.02717	<.02630	<.01390	<.02728	NC	<.03384	NC	NC	NC	NC	NC	<.03531	<.02508
990817	NC	<.01569	<.01599	<.02633	<.01018	NC	NC	NC	<.01203	<.01188	<.01088	<.01408	NC	NC	<.01666	NC	<.01510	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00277	<.00204	NC	NC	NC	NC	NC	<.00191	NC	NC	<.00138	NC	<.00216	<.00275	<.00243	NC	<.00214	<.00270
000321	NC	NC	NC	NC	NC	<.01815	<.01892	NC	<.01527	<.00738	<.01986	<.01740	<.01251	NC	NC	<.01469	NC	NC	NC	NC	NC	<.01858	<.01441
000404	<.02716	<.03962	<.02046	NC	<.03340	NC	NC	<.01653	NC	NC	NC	NC	NC	<.01397	<.01716	NC	<.01690	NC	NC	NC	<.01716	<.02423	<.01217
000605	<.00292	NC	NC	NC	NC	<.00302	<.00267	NC	NC	<.00358	<.00400	NC	<.00349	NC	NC	<.00331	NC	NC	NC	NC	NC	<.00370	<.00389

	Silvex (ug/L)							Station Number (OUA****)														
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.04549	NC	NC	NC	NC	<00893	<.02077	NC	<.01429	<.02254	<.00853	<.01548	NC	NC	NC	<.01547	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.11164	<.09108	<.08231	<.06131	NC	NC	<.02855	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.13699	NC	<.11701	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.02021	NC	NC	<.01894	<.02611	NC	<.03036	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.03548	NC	NC	NC	NC	NC	NC	NC	NC	<.01683	NC	NC	NC	NC	NC	NC	NC	NC	NC
990817	NC	<.01867	<.01328	<.01198	<.01823	NC	NC	NC	<.01118	<.01755	<.02685	<.03102	NC	NC	<.03011	NC	<.01485	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.01826	<.01901	NC	NC	NC	NC	NC	<.01173	NC	NC	<.01404	NC	<.01982	<.00744	<.00796	NC	<.01365	<.01268
000321	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000404	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
000605	<.00846	NC	NC	NC	NC	<.01032	<.01308	NC	NC	<.01248	<.01111	NC	<.01111	NC	NC	<.06000	NC	NC	NC	NC	NC	<.00952	NC

Appendix 3 - Pesticide Data

	Simazine (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.01657	NC	NC	NC	NC	<.02465	<.01898	NC	<.01493	<.01536	<.01734	<.03493	NC	NC	NC	<.01895	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.25150	<.20618	<.23574	<.33980	NC	NC	<.20484	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.28365	NC	<.24229	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.05935	NC	NC	<.09588	<.04511	NC	<.10133	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.30749	<.17112	<.12208	NC	<.14394	<.07603	<.07973	<.17911	<.10373	<.03649	NC	<.13037	NC	NC	NC	NC	NC	<.08452	<.12777
990817	NC	<.05160	<.03375	<.11639	<.04953	NC	NC	NC	<.05706	<.07936	<.04448	<.09169	NC	NC	<.06543	NC	<.03447	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.02508	<.01697	NC	NC	NC	NC	NC	<.02100	NC	NC	<.02131	NC	<.00989	<.01603	<.01040	NC	<.01151	<.01746
000321	NC	NC	NC	NC	NC	0.1787	0.1124	NC	<.08254	<.05234	<.11316	<.09368	<.05356	NC	NC	<.08589	NC	NC	NC	NC	NC	<.06859	<.07265
000404	<.11435	<.12700	<.07713	NC	<.07933	NC	NC	<.06801	NC	NC	NC	NC	NC	<.09538	<.08739	NC	<.07273	NC	NC	NC	<.05835	<.12886	<.08951
000605	<.01464	NC	NC	NC	NC	<.01209	<.01508	NC	NC	<.01300	<.01844	NC	<.01266	NC	NC	<.01314	NC	NC	NC	NC	NC	<.01845	<.01631

	Terbutryn (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00351	NC	NC	NC	NC	<.00618	NC	<.00296	<.00262	<.00325	<.00302	<.02004	NC	NC	NC	<.00343	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.03191	<.03117	<.07123	<.03327	NC	NC	<.02773	NC	NC	NC	NC	NC	NC	NC	NC	NC	<2.7813	NC	<7.0009	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00629	NC	NC	<.00535	<.01132	NC	<.01442	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.02629	<.02445	<.01416	NC	<.00798	<.02508	<.02332	<.02389	<.01188	<.01674	NC	<.02697	NC	NC	NC	NC	NC	<.01268	<.02040
990817	NC	<.01217	<.01281	<.02988	<.01382	NC	NC	NC	<.01119	<.00967	<.00678	<.00881	NC	NC	<.01206	NC	<.00938	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00073	<.00235	NC	NC	NC	NC	NC	<.00193	NC	NC	<.00195	NC	<.00202	<.00339	<.00262	NC	<.00215	<.00151
000321	NC	NC	NC	NC	NC	<.01865	<.01630	NC	<.01944	<.01331	<.01511	<.01267	<.01340	NC	NC	<.01454	NC	NC	NC	NC	NC	<.01298	<.01794
000404	<.02494	<.02840	<.02564	NC	<.02101	NC	NC	<.01699	NC	NC	NC	NC	NC	<.01519	<.02223	NC	<.01305	NC	NC	NC	<.01889	<.02565	<.01691
000605	<.00492	NC	NC	NC	NC	<.00384	<.00247	NC	NC	<.00435	<.00310	NC	<.00373	NC	NC	<.00391	NC	NC	NC	NC	NC	<.00491	<.00415

	Trifluralin (ug/L)							Station Number (OUA****)															
Date	143	145	144	146	147	33	148	160	149	150	151	152	BYB03	153	158	BYB02	COC02	157	156	COC01	155	154	13
990309	<.00372	NC	NC	NC	NC	<.00381	NC	<.00305	<.00291	<.00200	<.00218	<.00615	NC	NC	NC	<.00318	NC	NC	NC	NC	NC	NC	NC
990621	NC	<.01137	<.00805	<.05000	<.02333	NC	NC	<.01204	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.97302	NC	<2.0054	NC	NC	NC
990622	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	<.00450	NC	NC	<.00268	<.00990	NC	<.00997	NC	NC	NC	NC	NC	NC
990628	NC	NC	NC	NC	<.01928	<.01560	<.01314	NC	<.01994	<.00726	<.01695	<.01208	<.00417	<.01469	NC	0.0111	NC	NC	NC	NC	NC	<.00679	<.00929
990817	NC	<.00670	<.00779	<.01259	<.00384	NC	NC	NC	<.00837	<.00549	<.00573	<.01167	NC	NC	<.00566	NC	<.00696	NC	NC	NC	NC	NC	NC
990927	NC	NC	NC	NC	NC	<.00049	<.00095	NC	NC	NC	NC	NC	<.00092	NC	NC	<.00078	NC	<.00052	<.00047	<.00052	NC	<.00094	<.00064
000321	NC	NC	NC	NC	NC	<.01411	<.00963	NC	<.00709	<.00771	<.00866	<.00978	<.00630	NC	NC	<.01227	NC	NC	NC	NC	NC	<.01025	<.00933
000404	<.01135	<.01506	<.00945	NC	<.01184	NC	NC	<.00831	NC	NC	NC	NC	NC	<.01035	<.01198	NC	<.01579	NC	NC	NC	<.01212	<.00829	<.00974
000605	<.00161	NC	NC	NC	NC	<.00124	<.00078	NC	NC	<.00203	<.00100	NC	<.00128	NC	NC	<.00131	NC	NC	NC	NC	NC	0.01	<.00180

APPENDIX 4

SEDIMENT DATA

Metals
Pesticides

Appendix 4 - Sediment Data
Metals and Pesticides

Date - 991101

Metals (mg/Kg)

	143	145	144	147	33	148	149	150	152	BYB03	158	BYB02	COC01	155	154	13
Aluminum	NA	5600.00	2100.00	15000.00	14700.00	15400.00	24600.00	37800.00	25400.00	24300.00	27300.00	21500.00	20400.00	28100.00	8140.00	5390.00
Arsenic	NA	<0.10	<0.10	0.40	<0.10	0.10	<0.10	0.80	0.20	0.33	0.10	0.60	<0.10	<0.10	0.20	0.90
Barium	NA	23.00	20.00	96.70	151.00	131.00	375.00	386.00	140.00	163.00	162.00	163.00	172.00	193.00	59.30	59.80
Beryllium	NA	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	NA	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
Chromium	NA	1.80	1.70	4.40	1.70	2.00	2.00	3.70	4.70	4.70	4.50	4.60	4.10	4.40	3.40	2.80
Cobalt	NA	2.40	1.60	8.00	12.80	8.90	25.10	18.90	7.40	13.60	11.40	10.10	13.90	9.00	3.90	4.50
Copper	NA	1.00	0.70	1.20	0.90	0.90	1.00	2.20	2.50	2.00	1.90	3.20	2.60	2.40	1.40	1.10
Irom	NA	6280.00	1550.00	14400.00	17700.00	13500.00	34700.00	36600.00	14100.00	19000.00	14200.00	17100.00	14100.00	13700.00	6920.00	9850.00
Lead	NA	4.60	3.20	18.00	4.60	4.70	4.40	29.80	11.10	20.90	10.20	30.90	14.10	14.90	4.70	5.80
Magnesium	NA	456.00	147.00	2410.00	4040.00	3610.00	7950.00	13800.00	4710.00	3990.00	4310.00	4680.00	3920.00	3790.00	1460.00	1280.00
Manganese	NA	58.00	57.00	500.00	774.00	387.00	866.00	849.00	218.00	465.00	752.00	511.00	1000.00	447.00	211.00	460.00
Mercury	0.08	<0.05	<0.05	0.07	<0.05	0.10	0.08	0.11	0.12	0.09	0.07	0.13	0.14	0.10	0.06	<0.05
Nickel	NA	0.70	<0.53	1.20	0.70	0.80	0.80	3.40	3.20	3.60	2.90	4.20	3.80	2.60	2.50	2.20
Selenium	NA	<2.70	<2.70	<2.70	<2.70	<2.70	6.60	10.30	<2.70	<2.70	<2.70	<2.70	<2.70	<2.70	<2.70	<2.70
Vanadium	NA	2.00	2.00	6.80	2.60	2.90	2.80	6.20	6.10	6.60	6.10	6.00	5.70	5.90	4.90	5.70
Zinc	NA	29.00	11.00	41.50	66.50	65.60	77.40	104.00	53.00	41.50	52.50	62.20	59.70	64.80	22.00	16.50

Appendix 4 - Sediment Data
Metals and Pesticides

Date - 991101 Pesticides (ug/L)

	143	145	144	147	33	148	149	150	152	BYB03	158	BYB02	COC01	155	154	13
Molinate	<.00190	<.00047	<.00433	<.00113	0.01112	<.00335	0.01265	<.00093	0.02657	0.00674	0.00787	0.00485	0.01339	<.00266	<.00130	<.00083
Propachlor	<.00172	<.00053	<.00371	<.00139	<.00210	<.00611	<.00078	<.00141	<.00154	<.00117	<.00100	<.00121	<.00246	<.00187	<.00101	<.00062
Trifluralin	<.00114	<.00012	<.00222	<.00010	<.00021	<.00029	<.00017	<.00019	0.00385	<.00022	<.00036	<.00031	<.00055	<.00026	<.00032	<.00019
Prometon	<.00309	<.00050	<.00476	<.00081	<.00119	<.00209	<.00071	<.00140	<.00159	<.00079	<.00116	<.00095	<.00154	<.00177	<.00100	<.00064
Simazine	<.01137	<.00195	<.02508	<.00245	<.00276	<.00572	<.00163	<.00231	<.00276	<.00223	<.00385	<.00352	<.00615	<.00403	<.00191	<.00197
Atrazine	<.00244	<.00035	<.00576	<.00093	<.00071	<.00162	<.00061	<.00098	<.00112	<.00073	<.00112	<.00083	<.00161	<.00127	<.00080	<.00041
Diazinon	<.00424	<.00096	<.00838	<.00196	<.00153	<.00312	<.00096	<.00223	<.00247	<.00129	<.00180	<.00116	<.00252	<.00265	<.00141	<.00097
Fonofos	<.00386	<.00134	<.01135	<.00393	<.00316	<.00713	<.00171	<.00312	<.00444	<.00205	<.00289	<.00239	<.00541	<.00657	<.00262	<.00299
Cyprazine	<.00222	<.00065	<.00690	<.00072	<.00068	<.00140	<.00062	<.00070	<.00097	<.00052	<.00100	<.00086	<.00129	<.00124	<.00075	<.00048
Metribuzin	<.00375	<.00068	<.00760	<.00172	<.00147	<.00415	<.00122	<.00135	<.00167	<.00095	<.00177	<.00114	<.00226	<.00211	<.00111	<.00083
Methyl-Parathion	<.00411	<.00063	<.00801	<.00079	<.00134	<.00180	<.00070	<.00069	<.00093	<.00072	<.00108	<.00106	<.00174	<.00153	<.00093	<.00061
Alachlor	<.00210	<.00057	<.01028	<.00110	<.00116	<.00250	<.00038	<.00073	<.00090	<.00040	<.00101	<.00114	<.00134	<.00119	<.00049	<.00071
Ametryn	<.00322	<.00056	<.00851	<.00077	<.00090	<.00127	<.00062	<.00056	<.00104	<.00043	<.00098	<.00097	<.00136	<.00090	<.00065	<.00056
Prometryn	<.00238	<.00058	<.00553	<.00060	<.00062	<.00149	<.00073	<.00083	<.00084	<.00084	<.00118	<.00094	<.00181	<.00122	<.00071	<.00047
Heptachlor	<.00359	<.00165	<.00870	<.00312	<.00349	<.00595	<.00297	<.00240	<.00553	<.00227	<.00326	<.00257	<.00561	<.00637	<.00259	<.00163
Terbutryn	<.00211	<.00026	<.00440	<.00038	<.00071	<.00136	<.00050	<.00045	<.00082	<.00040	<.00077	<.00071	<.00116	<.00068	<.00048	<.00037
Metolachlor	<.00151	<.00024	<.00394	<.00047	<.00051	<.00154	<.00027	0.0021	<.00066	<.00037	<.00062	<.00048	<.00118	<.00082	<.00036	<.00022
Malathion	<.00527	<.00181	<.01954	<.00224	<.00400	<.00498	<.00404	<.00327	<.00379	<.00313	<.00296	<.00350	<.00692	<.00954	<.00291	<.00175
Chlorpyrifos	<.00429	<.00107	<.00746	<.00113	<.00146	<.00197	<.00129	<.00160	<.00172	<.00097	<.00238	<.00118	<.00255	<.00260	<.00109	<.00092
Cyanazine	<.00431	<.00101	<.01220	<.00084	<.00161	<.00192	<.00109	<.00104	<.00167	<.00110	<.00169	<.00129	<.00202	<.00209	<.00133	<.00074
Aldrin	<.00783	<.00121	<.01522	<.00151	<.00255	<.00343	<.00163	<.00160	<.00195	<.00152	<.00226	<.00222	<.00366	<.00322	<.00216	<.00142
Pendimethalin	<.00164	<.00045	<.00365	<.00051	<.00095	<.00163	<.00051	<.00055	0.01108	<.00059	<.00086	<.00059	<.00111	<.00109	<.00063	<.00043
Endosulfan-I	<.05085	<.02254	<.09129	<.02031	<.03593	<.05418	<.01771	<.01879	<.03420	<.02230	<.02788	<.02632	<.05616	<.06214	<.02111	<.01225
p-p'-DDE	<.00098	<.00014	<.00187	0.00988	0.03346	0.03841	0.01301	0.01814	0.05721	0.01228	0.00446	0.0204	0.01303	0.01772	0.00873	0.00112
Dieldrin	<.01303	<.00518	<.03365	<.00759	<.00856	<.02423	<.00462	<.00644	<.01155	<.00787	<.00786	<.00580	<.01867	<.02634	<.00613	<.00479
Endrin	<.01472	<.00207	<.03010	<.00286	<.00414	<.00772	<.00264	<.00272	<.00353	<.00303	<.00376	<.00387	<.00716	<.00648	<.00378	<.00274
Endosulfan-II	<.01943	<.00472	<.04826	<.00717	<.00876	<.02371	<.00630	<.00830	<.01045	<.00778	<.01168	<.00885	<.01853	<.02178	<.01069	<.00655
p-p'-DDD	<.00100	<.00016	<.00275	0.00485	0.01686	<.00066	0.00195	0.00489	0.01211	0.18176	0.00216	0.00624	0.01316	<.00056	0.00244	<.00020
Endosulfan-Sulfate	<.00585	<.00118	<.01623	<.00102	<.00136	<.00265	<.00091	<.00094	<.00123	<.00083	<.00154	<.00113	<.00276	<.00156	<.00087	<.00112
p-p'-DDT	<.00079	<.00012	<.00216	<.00028	0.0162	<.00052	<.00032	0.00234	0.00586	0.46527	<.00041	<.00044	<.00080	<.00079	<.00041	<.00030
Hexazinone	<.00150	<.00055	<.00649	<.00069	<.00088	<.00195	<.00040	<.00058	<.00071	<.00069	<.00106	<.00080	<.00141	<.00082	<.00060	<.00041
Methoxychlor	<.00075	<.00012	<.00209	<.000;8	<.00018	<.00035	<.00023	<.00022	<.00038	<.00017	<.00032	<.00033	<.00052	<.00035	<.00026	<.00024

APPENDIX 5

GROUND WATER

List of Wells Sampled

Site Names
Location Data

Appendix 5 - Sampled Wells

WELL NAME	Collection Date / Location	County	Latitude	Longitude (Sec. Twnshp. Rng.)
ASH01	08/23/1999	Ashley	33 20 00.40	91 30 44.89
	1.5 mi. west of Boydell			(Sec. 28, T15S,R4W)
ASH02	08/23/1999	Ashley	33 21 14.12	91 31 18.75
	1.5 mi. west of US165, southwest of Boydell			(Sec. 33, T15S, R4W)
ASH03	08/23/1999	Ashley	33 20 00.98	91 28 30.63
	1.25 mi. east of US 165, southeast of Boydell			(Sec. 1, T16S, R4W)
ASH04	08/23/1999	Ashley	33 22 46.17	91 29 45.55
	1.o mi west of US 165, northwest of Boydell			(Sec. 22, T15S, R4W)
ASH05	09/07/1999	Ashley	33 00 33.51	91 39 01.57
	1.75 mi. west of US 165 southwest of Wilmot			(Sec 31, T19S, R5W)
ASH06	09/07/1999	Ashley	33 00 40.64	91 37 58.62
	0.75 mi. west of US 165 southwest of Wilmot			(Sec. 32, T19S, R5W)
ASH07	09/07/1999	Ashley	33 03 27.13	91 36 15.46
	2.0 mi. west of US165, west of Wilmot			(Sec. 10, T19S, R5W)
ASH08	09/07/1999	Ashley	33 03 47.86	91 35 14.61
	1.25 mi. west of US 165 west of Wilmot			(Sec. 11, T19S, R5W)
ASH09	09/07/1999	Ashley	33 04 06.65	91 38 14.93
	4.o mi. west of US 165, 0.5 mi. north of Hwy. 52, west of Wilmot			(Sec. 8, T19S, R5W)
ASH10	09/07/1999	Ashley	33 04 19.82	91 37 03.50
	3.0 mi. west of US 165 just off Hwy 52 west of Wilmot			(Sec. 4, T19S, R5W)
ASH11	09/07/1999	Ashley	33 05 35.04	91 34 37.03
	1.5 mi. west of US 165 north of Wilmot, northern well in Section 35			(Sec. 35, T18S, R5W)
ASH12	09/07/1999	Ashley	33 05 17.24	91 34 57.19
	1.5 mi. west of US 165 north of Wilmot, southern well in Section 35			(Sec. 35, T18S, R5W)
ASH13	09/20/1999	Ashley	33 10 50.61	91 33 12.97
	1.5 mi. east of US 165 west of Sunshine			(Sec. 31, T17S, R4W)
ASH15	09/20/1999	Ashley	33 11 14.20	91 35 52.78
	4.0 mi. west of US 165 west of Sunshine			(Sec. 27, T17S, R5W)
ASH17	09/20/1999	Ashley	33 15 19.54	91 35 02.84
	4.0 mi. west of US 165, 2.5 mi. south of US 82, northwest of Portland			(Sec. 2, T17S, R5W)
ASH18	9/20/1999	Ashley	33 14 37.36	91 35 39.37
	5.0 mi. west of US 165, 3 mi. south of US 82, west of Portland			(Sec. 11, T17S, R5W)
ASH19	09/20/1999	Ashley	33 14 51.80	91 39 56.33
	2.0 mi. south of US 82 east of Hamburg			(Sec. 12, T17S, R6W)
ASH20	09/20/1999	Ashley	33 16 53.58	91 40 26.47
	0.25 mi. north of US 82, 11 mi. west of US 165, west of Montrose			(Sec. 25, T16S, R6W)

WELL NAME	Collection Date	County	Latitude	Longitude
	Location			(Sec. Twnshp. Rng.)
ASH21	09/05/2000	Ashley	33 15 22.70	91 48 32.28
	0.2 mi west of US 425 1.5 mi. north of US 82 north of Hamburg			(Sec. 3, T17S, R7W)
ASH22	09/05/2000	Ashley	33 15 01.62	91 50 49.62
	0.1 west of Hwy. 189, 3.0 mi. northwest of Hamburg			(Sec. 5, T17S, R7W)
ASH23	09/05/2000	Ashley	33 14 07.02	91 48 46.32
	0.1 mi. west of Hwy. 189, 0.75 mi. northwest of Hamburg			(Sec. 15, T17S, R7W)
ASH24	09/05/2000	Ashley	33 10 14.99	91 52 25.26
	south of Hwy. 52, 3.25 mi. west of US 425 southwest of Hamburg			(Sec. 1, T18[illegible]W)
ASH25	09/05/2000	Ashley	33 08 11.11	91 54 29.30
	north of US 82, 5.5 mi. west of US 425 east of Crossett			(Sec. 15, T18S, R8W)
ASH26	09/05/2000	Ashley	33 04 41.83	91 45 51.28
	4.75 mi. east of US 425, near Berlin, south of Hamburg			(Sec. 6, T19S, R6W)
ASH27	09/05/2000	Ashley	33 01 53.83	91 46 08.43
	4.75 mi. east of US 425, near Extra Church, Berlin, south of Hamburg			(Sec. 24, T19S, R7W)
ASH28	09/05/2000	Ashley	33 16 44.17	91 42 40.48
	0.75 mi. north of US 82, 5.5 mi. east of Hamburg near Mist			(Sec. 27, T16S, R6W)
ASH29	09/05/2000	Ashley	33 17 45.09	91 43 32.50
	2.5 mi. north of US 82, northwest of Mist			(Sec. 20, T16S, R6W)
ASH30	09/05/2000	Ashley	33 17 21.86	91 44 10.65
	0.75 mi. north of US 82, 4.0 mi. east of Hamburg near Mist			(Sec. 29, T16S, R6W)
CHI01	08/23/1999	Chicot	33 25 35.09	91 27 11.92
	0.5 mi. east of US 165, 2.5 mi. north of Hwy 144 northeast of Boydell			(Sec. 6, T15S, R3W)
CHI02	08/29/2000	Chicot	33 33 14.54	91 27 13.33
	4.0 mi. west of US 65, 2.0 mi. north of Hwy. 35 north of Dermott			(Sec. 19, T13S, R3W)
CHI03	08/23/1999	Chicot	33 26 44.58	91 27 03.64
	o.1 mi. west of US 165, 1.0 mi. north of Hwy 922 south of Dermott			(Sec. 03, T14S, R3W)
CHI04	08/23/1999	Chicot	33 25 07.61	91 27 03.64
	1.5 mi. east of US 165, 1.5 mi. north of Hwy 144 northeast of Boydell			(Sec. 8, T15S, R3W)
DES01	08/09/1999	Desha	33 47 31.82	91 29 44.77
	2.0 mi. west of US 65, 7.0 miles south of Dumas			(Sec. 34, T10S, R4W)
DES02	08/09/1999	Desha	33 49 43.47	91 31 21.90
	2.75 mi. west of US 65, 4 mi. south of Dumas			(Sec. 17, T10S, R4W)
DES03	07/11/2000	Desha	33 37 31.77	91 25 53.77
	0.5 mi. south of Hwy 4, 3.0 mi. west of US 65, west of McGehee			(Sec. 29, T12S, R3W)
DRE01	08/09/1999	Drew	33 40 15.45	91 29 32.32
	2.0 mi. south of Hwy 277, 3.0 mi. east of Hwy 4 southwest of Tillar			(Sec. 10, T12S, R4W)

WELL NAME	Collection Date	County	Latitude	Longitude
	Location			(Sec. Twnshp. Rng.)
DRE02	08/09/1999	Drew	33 35 57.92	91 31 05.35
	0.2 mi north of Hwy 4, 3 mi south of Hwy 277 southwest of Tillar			(Sec. 28, T12S, R4W)
DRE03	08/09/1999	Drew	33 40 08.01	91 27 51.40
	2.0 mi. west of US 65, 2.5 mi. south of Tillar			(Sec. 12, T12S, R4W)
DRE04	08/09/1999	Drew	33 44 20.03	91 28 49.04
	1.25 mi west of US 65, 2.0 mi. south of Winchester			(Sec. 14, T11S, R4W)
DRE05	08/23/1999	Drew	33 25 10.73	91 29 38.10
	2.0 mi. west of US 165, 1.5 mi. south of Hwy. 922 west of Jerome			(Sec. 3, T15S, R4W)
DRE06	08/29/2000	Drew	33 26 35.48	91 28 34.59
	1.75 mi. west of US 165, adjacent to Hwy. 922 north of Jerome			(Sec. 35, T14S, R3W)
DRE07	07/11/2000	Drew	33 35 48.25	91 28 40.89
	5.5 mi. west of US 165, 2.0 mi. south of Hwy. 4, northwest of Dermott			(Sec. 2, T13S, R4W)
DRE08	07/11/2000	Drew	33 34 14.92	91 30 21.20
	7.5 mi. west of US 165, 3 mi. north of Hwy. 35 northwest of Dermott			(Sec. 16, T13S, R4W)
DRE09	07/11/2000	Drew	33 34 00.54	91 29 50.63
	6.5 mi. west of US 165, 2.5 mi. north of Hwy. 4 northwest of Dermott			(Sec. 15, T13S, R4W)
DRE10	07/11/2000	Drew	33 32 16.82	91 29 22.64
	4.5 mi. west of US 65, 1.0 mi. north of Hwy. 35, west of Dermott			(Sec. 26, T13S, R4W)
DRE11	07/11/2000	Drew	33 32 05.60	91 29 36.40
	4.75 mi. west of US 65, 0.5 mi. north of Hwy. 35, west of Dermott			(Sec. 34, T13S, R4W)
DRE12	07/11/2000	Drew	33 31 58.52	91 30 46.95
	5.75 mi. west of US 65, 0.5 mi. north of Hwy. 35, west of Dermott			(Sec. 33, T13S, R4W)
DRE13	07/11/2000	Drew	33 30 44.59	91 29 22.76
	4.5 mi. west of US 65, 1.25 mi. south of Hwy 35, west of Dermott			(Sec. 2, T14S, R4W)
DRE14	07/11/2000	Drew	33 29 54.17	91 30 20.60
	4.0 mi. west of US 65, 2.25 mi. south of Hwy. 35, west of Dermott			(Sec. 9, T14S, R4W)
DRE15	07/11/2000	Drew	33 28 21.12	91 29 54.70
	3.25 mi. west of Us 65, 3.75 mi. south of Hwy 35, south of Dermott			(Sec. 22, T14S, R4W)
DRE16	08/29/2000	Drew	33 42 00.42	91 27 59.59
	1.5 mi. west of US 165, adjacent to Hwy. 277, southwest of Tillar			(Sec. 35, T11S, R4W)
DRE17	08/01/2000	Drew	33 41 50.06	91 29 48.75
	3.25 mi. west of US 165, 0.5 mi. north of Hwy. 277, west of Tillar			(Sec. 34, T11S, R4W)
DRE18	08/01/2000	Drew	33 40 37.68	91 31 04.70
	5.0 mi. west of US 165, adjacent to Hwy. 277, southwest of Tillar			(Sec. 9, T12S, R4W)
DRE19	08/01/2000	Drew	33 45 43.02	91 33 04.97
	5.0 mi. west of US 65, adjacent to Hwy. 138, west of Winchester			(Sec. 7, T11S, R4W)

WELL NAME	Collection Date / Location	County	Latitude	Longitude (Sec. Twnshp. Rng.)
DRE20	08/01/2000	Drew	33 45 31.97	91 31 36.93
	4.0 mi. west of US 65, just south of Hwy. 138, west of Winchester			(Sec. 8, T11S, R4W)
DRE21	08/01/2000	Drew	33 44 18.11	91 33 10.24
	5.5 mi. west of US 65, just east of Hwy. 138, southwest of Winchester			(Sec. 19, T11S, R4W)
DRE22	08/29/2000	Drew	33 45 13.78	91 36 02.37
	2.0 mi. east of Hwy. 293, 1.75 mi. north of Hwy. 238, north of Selma			(Sec. 15, T11S, R5W)
DRE23	08/01/2000	Drew	33 45 10.36	91 35 21.91
	2.5 mi. east of Hwy. 293, 1.5 mi. north of Hwy. 238, north of Selma			(Sec. 14, T11S, R5W)
DRE24	08/01/2000	Drew	33 45 12.47	91 30 30.37
	2.5 mi. west of US 65, 1.5 mi. south of Hwy. 138, southwest of Winchester			(Sec. 16, T11S, R4W)
DRE25	08/01/2000	Drew	33 45 30.75	91 28 36.56
	1.2 mi. west of US 65, 1.2 mi. south of Hwy 138, south of Winchester			(Sec. 11, T11S, R4W)
DRE26	08/15/2000	Drew	33 43 32.56	91 42 04.02
	4.0 mi. east of Hwy. 83, 3.0 mi. north of Hwy. 138 northeast of Monticello			(Sec. 4, T11S, R6W)
DRE27	08/15/2000	Drew	33 42 04.53	91 42 27.97
	3.5 mi. east of Hwy. 83, 2.5 mi. north of Hwy. 138 northeast of Monticello			(Sec. 3, T12S, R6W)
DRE28	08/15/2000	Drew	33 44 02.77	91 40 29.85
	4.0 mi. east of Hwy. 83, 3.5 mi. north of Hwy. 138 northeast of Monticello			(Sec. 24, T11S, R6W)
DRE29	08/15/2000	Drew	33 40 02.53	91 40 03.36
	0.75 mi. south of Hwy. 138, 7.0 mi. northeast of Monticello			(Sec. 12, T12S, R6W)
DRE30	08/15/2000	Drew	33 39 36.57	91 42 39.97
	0.25 mi. south of Hwy. 138, 5.0 mi. northeast of Monticello			(Sec. 15, T12S, R6W)
DRE31	08/15/2000	Drew	33 38 12.30	91 41 05.18
	adjacent to Hwy 4, 6.0 mi. east of Monticello			(Sec. 26, T12S, R6W)
DRE32	08/22/2000	Drew	33 35 56.69	91 42 11.66
	adjacent to Hwy 35, 5.0 mi. southeast of Monticello			(Sec. 3, T13S, R6W)
DRE33	08/22/2000	Drew	33 33 44.19	91 40 05.08
	1.0 mi. south of Hwy. 35, 6.0 mi. east of Hwy 83, southeast of Monticello			(Sec. 13, T13S, R6W)
DRE34	08/22/2000	Drew	33 32 40.53	91 42 54.13
	3.75 mi. south of Hwy. 35, 3.0 mi. east of Hwy 83, southeast of Monticello			(Sec. 27, T13S, R6W)
DRE35	08/22/2000	Drew	33 33 20.85	91 43 53.51
	3.2 mi. south of Hwy. 35, 2.25 mi. east of Hwy 83, southeast of Monticello			(Sec. 21, T13S, R6W)
DRE36	08/22/2000	Drew	33 33 26.61	91 43 25.13
	3.25 mi. south of Hwy. 35, 2.5 mi. east of Hwy 83, southeast of Monticello			(Sec. 21, T13S, R6W)
DRE37	08/22/2000	Drew	33 33 58.54	91 42 53.70
	2.25 mi. south of Hwy. 35, 3.5 mi. east of Hwy 83, southeast of Monticello			(Sec. 16, T13S, R6W)

WELL NAME	Collection Date	County	Latitude	Longitude
	Location			(Sec. Twnshp. Rng.)
DRE38	08/22/2000	Drew	33 28 59.02	91 40 08.46
	6.75 mi. south of Hwy. 35, 4.5 mi. east of Hwy 83, southeast of Monticello			(Sec. 13, T14S, R6W)
JEF01	05/09/2000	Jefferson	34 06 58.27	91 48.56.30
	0.5 mi. east of Hwy 199, 3.0 mi. south of US 65, south of Moscow			(Sec. 17, T7S, R7W)
JEF02	05/09/2000	Jefferson	34 06 49.79	91 48 35.09
	adjacent to Hwy 199, 3.0 mi. south of US 65, south of Moscow			(Sec. 16, T7S, R7W)
JEF03	05/09/2000	Jefferson	34 06 45.34	91 45 51.75
	0.5 mi. west of US 65 west of Tamo			(Sec. 14, T7S, R7W)
JEF04	07/18/2000	Jefferson	34 09 56.59	91 54 28.74
	0.5 mi. east of US425, 1.5 mi. south of US 65, north of Ladd			(Sec. 28, T6S, R8W)
JEF05	07/18/2000	Jefferson	34 09 50.69	91 54 59.55
	adjacent to US425, 1.75 mi. south of US 65, north of Ladd			(Sec. 28, T6S, R8W)
JEF06	07/18/2000	Jefferson	34 07 44.09	91 52 49.81
	0.5 mi. east of US 425, 3.5 mi. south of US 65, southeast of Ladd			(Sec. 11, T7S, R8W)
JEF07	07/18/2000	Jefferson	34 07 12.77	91 52 25.84
	0.5 mi. east of US 425, 4.0 mi. south of US 65, southeast of Ladd			(Sec. 14 T7S, R8W)
JEF08	07/18/2000	Jefferson	34 06 09.07	91 51 13.45
	1.0 mi. east of US 425, 4.5 mi. south of US 65, southeast of Ladd			(Sec. 24, T7S, R8W)
JEF09	07/18/2000	Jefferson	34 07 22.43	91 49 56.42
	1.5 mi. west of Hwy. 199, 3.0 mi. south of US 65, southwest of Moscow			(Sec. 17, T7S, R7W)
JEF10	07/18/2000	Jefferson	34 05 58.61	91 50 09.32
	2.25 mi. east of US 425, 4.0 mi. south of US 65, southeast of Ladd			(Sec. 19, T7S, R7W)
JEF11	07/18/2000	Jefferson	34 08 42.56	91 49 56.46
	1.5 mi. west of Hwy. 199, 1.0 mi. south of US 65, west of Moscow			(Sec. 5, T7S, R7W)
JEF12	07/18/2000	Jefferson	34 09 42.81	91 50 15.46
	adjacent to US 65, 2.25 mi. west of Hwy 199, west of Moscow			(Sec. 31, T6S, R7W)
JEF13	07/18/2000	Jefferson	34 11 17.21	91 53 03.39
	adjacent to US 65, 1.0 mi. west of Hwy 199, west of Moscow			(Sec. 33, T6S, R7W)
JEF14	08/08/2000	Jefferson	34 05 37.14	91 52 28.14
	adjacent to Jefferson County Line Road, 0.25 mi. west of US 425			(Sec. 23, T7S, R8W)
JEF15	08/08/2000	Jefferson	34 05 36.69	91 52 56.00
	adjacent to Jefferson County Line Road, 1.0 mi. west of US 425			(Sec. 22, T7S, R8W)
JEF16	08/08/2000	Jefferson	34 06 24.14	91 54 23.44
	1.0 mi. north of Jefferson County Line Road, 2.0 mi. west of US 425			(Sec. 21, T7S, R8W)
JEF17	08/08/2000	Jefferson	34 05 40.37	91 56 08.92
	adjacent to Jefferson County Line Road, 4.0 mi. west of US 425			(Sec. 19, T7S, R8W)

WELL NAME	Collection Date	County	Latitude	Longitude
	Location			(Sec. Twnshp. Rng.)
JEF18	08/08/2000	Jefferson	34 05 47.05	91 56 54.37
	2.5 mi. east of Hwy 15, 5.0 mi. west of US 425, east of Pinebergen			(Sec. 19, T7S, R8W)
JEF19	08/08/2000	Jefferson	34 06 09.43	91 57 35.15
	2.0 mi. east of Hwy 15, 5.5 mi. west of US 425, east of Pinebergen			(Sec. 24, T7S, R9W)
JEF20	08/08/2000	Jefferson	34 06 52.43	91 57 35.52
	2.0 mi. east of Hwy 15, 5.0 mi. west of US 425, northeast of Pinebergen			(Sec. 23, T7S, R9W)
JEF21	08/08/2000	Jefferson	34 07 57.43	91 57 26.93
	2.0 mi. west of Hwy 15, 4.5 mi. south of US 65, west of Ladd			(Sec. 12, T7S, R9W)
JEF22	08/08/2000	Jefferson	34 38 58.69	91 56 47.78
	2.0 mi. west of US 425, 3.25 mi. south of US 65, west of Ladd			(Sec. 6, T7S, R8W)
JEF23	08/08/2000	Jefferson	34 10 06.44	91 56 50.23
	2.0 mi. west of US 425, 1.5 mi. south of US 65, northwest of Ladd			(Sec. 30, T6S, R8W)
LIN01	08/09/1999	Lincoln	33 49 19.38	91 34 43.32
	2.0 mi. east of Hwy. 293, 5.5 mi. south of Hwy 54, west of Pickens			(Sec. 23, T10S, R5W)
LIN02	08/09/1999	Lincoln	33 50 40.83	91 36 45.50
	0.5 mi. west of Hwy 293, 2.25 mi. south of Hwy 54, west of Pickens			(Sec. 16, T10S, R5W)
LIN03	08/09/1999	Lincoln	33 52 02.14	91 39 51.45
	adjacent to Hwy 54, 3.o mi. west of Hwy 293, west of Garrett Bridge			(Sec. 6, T10S, R5W)
LIN04	08/16/2000	Lincoln	33 52 47.10	91 40 24.62
	1.5 mi. north of Hwy 54, northwest of Garrett Bridge			(Sec. 36, T9S, R6W)
LIN05	08/16/2000	Lincoln	33 51 27.39	91 39 31.59
	1.0 mi. south of Garrett Bridge, southwest of Garrett Bridge			(Sec. 7, T10S, R5[illegible]
LIN06	08/16/2000	Lincoln	33 51 10.41	91 41 24.64
	1.0 mi. north of Hwy 54, 1.75 mi. west of Garrett Bridge			(Sec. 11, T10S, R6W)
LIN07	05/09/2000	Lincoln	34 05 20.15	91 49 08.20
	1.0 mi. west of Hwy 199, 1.75 mi. north of US 425, northeast of Tarry			(Sec. 29, T7S, R7W)
LIN08	07/25/2000	Lincoln	34 05 40.03	91 46 28.29
	2.0 mi. east of Hwy 199, 2.0 mi. south of US 65, south of Tamo			(Sec. 26, T7S, R7W)
LIN09	07/25/2000	Lincoln	34 05 25.63	91 45 23.40
	3.0 mi. east of Hwy 199, 1.5 mi. south of US 65, south of Tamo			(Sec. 25, T7S, R7W)
LIN10	07/25/2000	Lincoln	34 04 42.78	91 45 20.89
	3.5 mi. east of US 425, 2.5 mi. south of US 65, south of Tamo			(Sec. 36, T7S, R7W)
LIN11	07/25/2000	Lincoln	34 02 21.44	91 45 43.79
	2.75 mi. east of US 425, 4.75 mi. north of Hwy 11, east of Yorktown			(Sec. 14, T8S, R7W)
LIN12	07/25/2000	Lincoln	34 00 32.76	91 45 32.72
	3.25 mi. east of US 425, 3.0 mi. north of Hwy 11, east of Yorktown			(Sec. 24, T8S, R7W)

WELL NAME	Collection Date	County	Latitude	Longitude
	Location			(Sec. Twnshp. Rng.)
LIN13	07/25/2000	Lincoln	33 57 13.78	91 45 04.76
	0.5 mi. south of Hwy 11, 1.0 mi. west of Hwy 293, west of Fresno			(Sec. 6, T9S, R6W)
LIN14	07/25/2000	Lincoln	33 57 33.15	91 42 44.63
	0.25 mi. south of Hwy 11, 1.25 mi. east of Hwy 293, south of Fresno			(Sec. 3, T9S, R6W)
LIN15	07/25/2000	Lincoln	33 57 24.10	91 41 54.59
	0.75 mi. south of Hwy 11, 2.0 mi. east of Hwy 293, south of Fresno			(Sec. 3, T9S, R6W)
LIN16	07/25/2000	Lincoln	33 56 25.82	91 40 30.36
	2.0 mi. south of Hwy 114, 2.75 mi. west of Hwy 293, south of Fresno			(Sec. 12, T9S, R6W)
LIN17	07/25/2000	Lincoln	34 02 01.57	91 42 23.37
	0.5 mi. east of Hwy. 11, 4.75 mi. north of Hwy 114, south of Grady			(Sec. 16, T8S, R6W)
LIN18	08/15/2000	Lincoln	34 02 01.79	91 48 53.72
	0.25 mi. east of US 425, 5.25 mi. north of Hwy 11, north of Yorktown			(Sec. 16, T8S, R7W)
LIN19	08/15/2000	Lincoln	33 58 36.84	91 49 45.25
	adjacent to US 425, 2.0 mi. north of Hwy. 11, north of Star City			(Sec. 32, T8S, R7W)
LIN20	08/15/2000	Lincoln	33 53 31.30	91 47 31.18
	3.5 mi. east of US 425, 2.25 mi. north of Hwy 54 at Calhoun			(Sec. 35, T95S, R7W)
LIN21	08/15/2000	Lincoln	33 54 20.82	91 42 25.98
	adjacent to Hwy 293, 3.5 mi. south of Hwy 11, south of Fresno			(Sec. 27, T9S, R6W)
LIN22	08/22/2000	Lincoln	34 02 07.10	91 50 52.96
	2.5 mi. east of US 425, 5.0 mi. north of Hwy 114, west of Yorktown			(Sec. 24, T8S, R8W)
LIN23	08/22/2000	Lincoln	34 02 04.99	91 51 13.25
	2.0 mi. west of US 425, 6.0 mi. north of Hwy 114, northwest of Yorktown			(Sec. 13, T8S, R8W)
LIN24	08/15/2000	Lincoln	33 44 02.77	91 40 29.85
	1.0 mi. south of Jefferson County Line Road, 5.0 mi. west of US 425			(Sec. 29, T7S, R8W)

APPENDIX 6

GROUND WATER QUALITY DATA

Metals
General Chemistry
Pesticides
z-Test Analysis

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium
ASH01	990823	<127.00	4.42	301.60	<0.11	17.20	<0.14	40.00	0.43	<0.50	<0.50	19400.00	<0.30	9.10	716.30	<2.00	2.30
ASH02	990823	<127.00	10.35	248.40	<0.11	51.40	<0.14	64.30	0.50	0.83	<0.50	3940.00	<0.30	15.40	498.20	2.33	0.80
ASH03	990823	<127.00	32.31	401.10	<0.11	17.10	<0.14	87.50	0.45	<0.50	<0.50	8480.00	<0.30	24.70	1490.00	<2.00	0.90
ASH04	990823	<127.00	1.63	381.60	<0.11	<4.50	<0.14	55.60	<0.40	<0.50	0.65	16400.00	<0.30	13.60	707.20	<2.00	2.90
ASH05	990907	167.10	2.21	304.60	<0.11	55.00	<0.14	49.50	0.86	<0.50	1.07	11720.00	<0.30	15.50	947.00	<2.00	2.30
ASH06	990907	133.90	<1.00	246.80	<0.11	34.80	<0.14	37.20	0.53	<0.50	<0.50	14970.00	<0.30	8.00	592.30	<2.00	1.10
ASH07	990907	<127.00	<1.00	136.50	<0.11	32.60	<0.14	7.10	0.47	<0.50	<0.50	17400.00	<0.30	1.60	792.40	<2.00	2.10
ASH08	990907	<127.00	<1.00	124.00	<0.11	26.00	<0.14	33.60	0.89	<0.50	<0.50	3824.00	<0.30	6.70	412.30	<2.00	1.50
ASH09	990907	286.50	2.25	426.40	<0.11	45.70	<0.14	110.10	1.09	<0.50	0.96	10650.00	<0.30	24.30	1289.00	2.16	1.80
ASH10	990907	296.00	2.18	143.40	<0.11	37.80	<0.14	108.20	0.61	<0.50	1.57	11050.00	<0.30	29.50	1090.00	<2.00	1.70
ASH11	990907	<127.00	1.54	346.50	<0.11	44.50	<0.14	40.40	0.66	<0.50	<0.50	32000.00	<0.30	8.70	900.90	<2.00	2.50
ASH12	990907	<127.00	<1.00	205.80	<0.11	16.60	<0.14	23.30	0.55	<0.50	<0.50	19520.00	<0.30	6.60	591.30	<2.00	1.40
ASH13	990920	<127.00	<1.00	202.90	<0.11	106.70	<0.14	39.70	<0.40	<0.50	1.05	4160.00	<0.30	9.10	253.00	<2.00	1.70
ASH15	990920	<127.00	<1.00	329.10	<0.11	178.00	<0.14	53.10	<0.40	<0.50	1.15	704.00	<0.30	13.00	119.60	<2.00	2.50
ASH17	990920	<127.00	5.52	489.40	<0.11	22.80	<0.14	82.30	<0.40	<0.50	<0.50	9180.00	<0.30	27.10	312.10	<2.00	0.90
ASH18	990920	<127.00	12.73	415.00	<0.11	<4.50	<0.14	59.70	<0.40	<0.50	<0.50	15400.00	<0.30	18.40	666.20	<2.00	1.80
ASH19	990920	<127.00	<1.00	204.00	<0.11	11.80	<0.14	74.70	1.06	<0.50	<0.50	<15.00	<0.30	11.60	<0.50	<2.00	2.20
ASH20	990920	<127.00	<1.00	93.80	<0.11	13.30	<0.14	50.80	1.00	<0.50	<0.50	<15.00	<0.30	7.40	15.30	<2.00	2.30
ASH21	000905	<127.00	<1.00	94.98	<0.11	70.41	<0.14	75.61	<0.40	<0.50	0.56	<15.00	<0.30	17.60	<0.50	<2.00	2.19
ASH22	000905	<127.00	<1.00	53.73	<0.11	147.50	<0.14	83.97	<0.40	<0.50	0.85	<15.00	<0.30	21.60	7.54	<2.00	3.22
ASH23	000905	<127.00	1.18	155.10	<0.11	52.03	<0.14	71.18	<0.40	<0.50	<0.50	42.40	<0.30	15.00	2.53	<2.00	1.71
ASH24	000905	<127.00	<1.00	124.00	<0.11	62.69	<0.14	79.80	<0.40	<0.50	<0.50	<15.00	<0.30	16.70	1.71	<2.00	1.93
ASH25	000905	<127.00	<1.00	79.53	<0.11	101.20	<0.14	90.31	<0.40	<0.50	1.29	<15.00	<0.30	21.10	<0.50	<2.00	1.99
ASH26	000905	<127.00	<1.00	158.30	<0.11	7.77	<0.14	10.19	<0.40	2.64	<0.50	148.00	<0.30	3.51	2946.00	76.97	1.73
ASH27	000905	<127.00	<1.00	56.90	<0.11	7.64	<0.14	7.55	<0.40	<0.50	1.39	93.90	0.35	2.19	380.70	<2.00	1.77
ASH28	000905	<127.00	<1.00	216.20	<0.11	28.30	<0.14	83.78	<0.40	<0.50	0.94	<15.00	<0.30	17.90	34.37	<2.00	1.96
ASH29	000905	<127.00	<1.00	154.00	<0.11	45.30	<0.14	71.66	<0.40	<0.50	0.73	<15.00	0.37	16.40	<0.50	<2.00	2.07
ASH30	000905	<127.00	<1.00	216.90	<0.11	46.58	<0.14	78.57	<0.40	<0.50	1.18	<15.00	<0.30	18.20	<0.50	<2.00	1.70
CHI01	990823	<127.00	<1.00	297.80	<0.11	8.90	<0.14	53.30	<0.40	<0.50	<0.50	7000.00	<0.30	10.00	562.20	<2.00	1.60
CHI02	990823	<127.00	2.24	205.90	<0.11	<4.50	<0.14	43.70	<0.40	<0.50	<0.50	12000.00	<0.30	11.10	862.40	<2.00	1.60
CHI03	990823	<127.00	1.07	267.50	<0.11	<4.50	<0.14	50.90	0.42	<0.50	<0.50	14400.00	<0.30	9.70	379.10	<2.00	2.00
CHI04	990823	<127.00	<1.00	335.10	<0.11	<4.50	<0.14	58.60	<0.40	<0.50	<0.50	19600.00	<0.30	13.80	1062.00	<2.00	2.70
DESHA01	990809	129.20	11.76	377.00	<0.11	31.70	<0.14	68.60	0.56	<0.50	<0.50	15560.00	<0.30	13.50	807.00	<2.00	2.40
DESHA02	990809	<127.00	20.75	243.70	<0.11	21.90	<0.14	58.10	0.52	<0.50	<0.50	31100.00	<0.30	12.60	534.20	<2.00	2.40
DESHA03	000711	<127.00	2.03	401.30	<0.11	<4.50	<0.14	37.50	<0.40	<0.50	<0.50	23900.00	<0.30	7.88	484.60	<2.00	1.92
DREW01	990809	<127.00	1.92	290.90	<0.11	13.50	<0.14	26.40	0.49	<0.50	<0.50	36270.00	<0.30	5.70	828.10	<2.00	4.90

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium
DREW02	990809	<127.00	5.86	229.10	<0.11	17.80	<0.14	38.80	<0.40	<0.50	<0.50	5581.00	<0.30	11.10	786.10	<2.00	2.50
DREW03	990809	<127.00	1.12	296.00	<0.11	14.00	<0.14	29.70	0.53	<0.50	<0.50	26480.00	<0.30	8.20	490.30	<2.00	3.10
DREW04	990809	<127.00	2.17	295.40	<0.11	26.30	<0.14	48.90	0.60	<0.50	<0.50	15260.00	<0.30	11.00	607.70	<2.00	1.70
DREW05	990823	<127.00	1.12	120.80	<0.11	<4.50	<0.14	15.00	<0.40	<0.50	<0.50	7070.00	<0.30	4.00	461.40	<2.00	1.10
DREW06	990823	<127.00	1.40	212.10	<0.11	<4.50	<0.14	34.50	<0.40	<0.50	<0.50	11000.00	<0.30	6.90	681.80	<2.00	1.80
DREW07	000711	<127.00	1.20	165.30	<0.11	<4.50	<0.14	31.61	<0.40	<0.50	<0.50	11100.00	<0.30	7.37	224.30	<2.00	1.17
DREW08	000711	<127.00	1.72	212.70	<0.11	<4.50	<0.14	28.67	<0.40	<0.50	<0.50	14600.00	<0.30	7.61	755.00	<2.00	1.31
DREW09	000711	<127.00	<1.00	195.60	<0.11	<4.50	<0.14	27.16	0.47	<0.50	<0.50	15300.00	<0.30	6.08	373.40	<2.00	1.22
DREW10	000711	<127.00	1.48	174.60	<0.11	<4.50	<0.14	22.39	<0.40	<0.50	<0.50	14700.00	<0.30	5.15	448.00	<2.00	1.63
DREW11	000711	<127.00	1.67	185.60	<0.11	<4.50	<0.14	17.97	<0.40	<0.50	<0.50	12900.00	<0.30	5.51	282.10	<2.00	1.55
DREW12	000711	<127.00	1.53	237.10	<0.11	<4.50	<0.14	43.76	<0.40	<0.50	<0.50	19600.00	<0.30	9.95	551.40	<2.00	1.13
DREW13	000711	<127.00	<1.00	228.10	<0.11	<4.50	<0.14	36.69	<0.40	<0.50	1.06	15600.00	<0.30	6.42	327.30	<2.00	1.97
DREW14	000711	<127.00	<1.00	207.00	<0.11	<4.50	<0.14	44.88	0.65	<0.50	<0.50	10700.00	<0.30	9.19	427.80	<2.00	1.08
DREW15	000711	169.90	<1.00	424.80	<0.11	13.62	<0.14	88.19	<0.40	<0.50	<0.50	11900.00	<0.30	16.60	494.70	<2.00	1.85
DREW16	000801	<127.00	4.00	240.60	<0.11	<4.50	0.28	24.40	<0.40	<0.50	<0.50	22600.00	0.35	6.80	741.50	<2.00	1.80
DREW17	000801	<127.00	<1.00	312.10	<0.11	<4.50	0.34	36.00	<0.40	<0.50	<0.50	11600.00	0.38	6.20	494.50	<2.00	1.40
DREW18	000801	<127.00	1.04	235.90	<0.11	<4.50	0.40	28.00	<0.40	<0.50	<0.50	13800.00	0.54	6.40	684.50	<2.00	1.00
DREW19	000801	<127.00	1.32	225.00	<0.11	<4.50	0.45	24.90	<0.40	<0.50	<0.50	19800.00	0.56	7.20	488.60	<2.00	2.30
DREW20	000801	<127.00	<1.00	332.60	<0.11	<4.50	0.18	51.70	<0.40	<0.50	<0.50	17900.00	0.31	11.40	501.60	<2.00	1.70
DREW21	000801	<127.00	2.82	123.70	<0.11	16.70	0.23	22.40	<0.40	<0.50	0.51	5770.00	0.41	6.40	661.30	<2.00	1.00
DREW22	000801	<127.00	2.15	72.10	<0.11	<4.50	0.70	13.30	<0.40	1.67	3.01	4310.00	1.29	4.60	717.30	11.64	0.70
DREW23	000801	<127.00	8.71	67.70	<0.11	<4.50	<0.14	12.70	<0.40	<0.50	2.09	5730.00	0.54	3.70	830.40	<2.00	0.50
DREW24	000801	<127.00	<1.00	261.40	<0.11	<4.50	0.45	41.70	<0.40	<0.50	<0.50	12200.00	0.70	7.40	353.30	<2.00	0.90
DREW25	000801	<127.00	<1.00	467.30	<0.11	<4.50	0.42	66.10	<0.40	<0.50	<0.50	18700.00	0.70	12.00	406.00	<2.00	1.00
DREW26	000815	<127.00	<1.00	43.40	<0.11	18.30	<0.14	8.30	1.59	<0.50	<0.50	<15.00	<0.30	3.10	3.50	<2.00	1.40
DREW27	000815	<127.00	<1.00	83.50	<0.11	60.90	<0.14	18.30	2.59	<0.50	0.63	<15.00	<0.30	6.60	7.90	<2.00	2.00
DREW28	000815	<127.00	<1.00	22.00	<0.11	11.90	<0.14	3.60	0.84	<0.50	0.63	<15.00	<0.30	1.40	0.50	<2.00	1.40
DREW29	000815	<127.00	<1.00	24.80	<0.11	10.80	<0.14	4.30	1.11	<0.50	<0.50	<15.00	<0.30	1.50	<0.50	<2.00	1.10
DREW30	000815	<127.00	<1.00	35.50	<0.11	16.60	<0.14	8.10	1.66	<0.50	0.53	<15.00	<0.30	2.60	<0.50	<2.00	1.20
DREW31	000815	<127.00	<1.00	61.00	<0.11	23.60	<0.14	9.40	0.76	<0.50	0.72	<15.00	<0.30	3.50	0.70	<2.00	1.30
DREW32	000822	<127.00	2.34	34.10	<0.11	<4.50	<0.14	24.60	<0.40	0.86	<0.50	6510.00	<0.30	5.30	605.10	<2.00	1.20
DREW33	000822	<127.00	<1.00	38.00	<0.11	4.90	<0.14	7.30	1.72	<0.50	<0.50	<15.00	<0.30	2.10	<0.50	<2.00	0.90
DREW34	000822	<127.00	<1.00	58.40	<0.11	17.80	<0.14	58.40	<0.40	<0.50	<0.50	135.00	<0.30	10.60	61.20	<2.00	1.70
DREW35	000822	<127.00	<1.00	46.60	<0.11	23.90	<0.14	31.00	1.11	<0.50	0.50	250.00	<0.30	7.90	79.50	<2.00	1.50
DREW36	000822	<127.00	<1.00	36.40	<0.11	14.40	<0.14	55.70	0.42	<0.50	<0.50	833.00	<0.30	9.40	199.40	<2.00	1.40
DREW37	000822	<127.00	1.51	60.30	<0.11	11.40	<0.14	62.20	<0.40	<0.50	0.57	176.00	<0.30	9.00	142.80	<2.00	1.50

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station ID	Date	Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium
DREW38	000822	<127.00	3.55	148.50	<0.11	8.30	<0.14	62.20	<0.40	<0.50	0.67	192.00	<0.30	9.60	316.50	<2.00	1.30
JEF01	000508	312.70	5.25	589.60	<0.11	41.60	<0.14	143.10	3.00	<0.50	0.89	10700.00	<0.30	32.40	966.30	2.00	2.90
JEF02	000508	280.00	4.25	523.10	<0.11	41.80	<0.14	102.10	2.58	<0.50	0.72	7631.00	<0.30	25.70	855.10	2.04	2.10
JEF03	000508	219.40	3.49	334.70	<0.11	48.60	<0.14	74.20	2.23	<0.50	<0.50	5549.00	<0.30	20.80	374.50	<2.00	1.30
JEF04	000718	<127.00	2.93	269.60	<0.11	<4.50	0.19	48.70	<0.40	<0.50	4.64	15400.00	<0.30	10.10	287.50	<2.00	1.40
JEF05	000718	<127.00	17.25	265.80	<0.11	<4.50	<0.14	48.50	<0.40	1.47	<0.50	23000.00	<0.30	10.30	573.30	2.15	1.50
JEF06	000718	<127.00	11.96	128.40	<0.11	8.60	<0.14	48.60	<0.40	<0.50	<0.50	8720.00	<0.30	11.70	414.80	<2.00	4.90
JEF07	000718	<127.00	12.78	122.80	<0.11	10.50	<0.14	37.60	<0.40	<0.50	<0.50	6600.00	<0.30	9.60	383.30	<2.00	4.20
JEF08	000718	<127.00	12.56	160.00	<0.11	22.00	<0.14	40.50	<0.40	<0.50	<0.50	3890.00	<0.30	9.60	409.40	<2.00	3.40
JEF09	000718	<127.00	7.74	775.80	<0.11	8.60	<0.14	134.20	0.53	0.70	1.42	10500.00	<0.30	33.50	844.30	2.92	1.70
JEF10	000718	<127.00	2.34	192.50	<0.11	29.60	<0.14	48.30	<0.40	<0.50	<0.50	3410.00	<0.30	12.40	287.40	<2.00	<0.46
JEF11	000718	<127.00	1.55	337.90	<0.11	24.40	<0.14	90.60	0.56	<0.50	1.05	5740.00	<0.30	22.30	1068.00	<2.00	<0.46
JEF12	000718	152.40	22.73	367.20	<0.11	16.70	<0.14	113.30	0.70	<0.50	<0.50	10500.00	<0.30	20.70	663.60	2.15	<0.46
JEF13	000718	158.40	2.55	457.50	<0.11	16.60	<0.14	100.70	<0.40	<0.50	<0.50	12700.00	<0.30	24.60	1802.00	<2.00	<0.46
JEF14	000808	<127.00	50.67	126.90	<0.11	22.30	<0.14	53.00	<0.40	<0.50	<0.50	5970.00	<0.30	12.10	453.20	<2.00	2.60
JEF15	000808	<127.00	40.18	122.30	<0.11	6.80	<0.14	49.40	0.52	<0.50	<0.50	12600.00	<0.30	10.70	562.40	<2.00	1.90
JEF16	000808	<127.00	31.82	151.10	<0.11	10.50	<0.14	42.70	0.65	0.94	<0.50	9390.00	<0.30	9.00	791.60	<2.00	1.60
JEF17	000808	<127.00	13.55	152.70	<0.11	<4.50	<0.14	23.70	0.62	<0.50	<0.50	20100.00	<0.30	6.40	699.60	<2.00	2.30
JEF18	000808	<127.00	2.58	166.20	<0.11	<4.50	<0.14	23.60	0.85	<0.50	<0.50	15900.00	<0.30	7.00	639.00	<2.00	1.90
JEF19	000808	<127.00	1.66	213.00	<0.11	<4.50	<0.14	22.90	0.91	<0.50	<0.50	12400.00	<0.30	5.60	353.00	<2.00	2.00
JEF20	000808	<127.00	3.29	159.40	<0.11	<4.50	<0.14	21.70	0.82	<0.50	<0.50	8780.00	<0.30	8.20	487.70	<2.00	2.10
JEF21	000808	<127.00	20.22	182.40	<0.11	<4.50	<0.14	27.70	<0.40	<0.50	<0.50	8830.00	<0.30	7.90	1320.00	<2.00	2.00
JEF22	000808	<127.00	2.05	161.50	<0.11	<4.50	<0.14	10.60	0.60	0.66	<0.50	29000.00	<0.30	4.10	527.80	<2.00	2.60
JEF23	000808	<127.00	1.91	122.70	<0.11	<4.50	<0.14	38.00	0.75	<0.50	0.60	8610.00	<0.30	6.90	389.00	<2.00	2.80
LIN01	990809	<127.00	4.07	272.20	<0.11	20.50	<0.14	48.90	<0.40	<0.50	<0.50	20220.00	<0.30	9.20	355.20	<2.00	2.20
LIN02	990809	<127.00	7.41	216.20	<0.11	29.60	<0.14	40.90	0.43	<0.50	<0.50	17220.00	<0.30	8.30	301.00	<2.00	2.60
LIN03	990809	<127.00	19.34	115.40	<0.11	8.90	<0.14	21.60	<0.40	0.55	<0.50	14730.00	<0.30	5.80	421.00	<2.00	1.90
LIN04	000508	<127.00	11.84	279.90	<0.11	37.40	<0.14	24.60	1.95	<0.50	0.72	41390.00	<0.30	6.80	688.60	<2.00	2.70
LIN05	000508	<127.00	<1.00	84.20	<0.11	16.60	<0.14	23.30	1.26	<0.50	<0.50	291.00	<0.30	7.20	34.60	<2.00	1.90
LIN06	000508	<127.00	<1.00	44.30	<0.11	9.80	<0.14	7.40	1.07	<0.50	<0.50	3881.00	<0.30	2.00	81.90	<2.00	1.30
LIN07	000508	<127.00	3.96	203.70	<0.11	44.90	<0.14	42.30	1.60	<0.50	<0.50	2658.00	<0.30	11.30	307.00	<2.00	1.30
LIN08	000724	159.90	7.64	476.40	<0.11	30.40	<0.14	99.00	<0.40	<0.50	2.42	7030.00	<0.30	23.60	1184.00	2.43	3.60
LIN09	000724	<127.00	4.34	464.00	<0.11	36.10	<0.14	83.00	<0.40	0.68	0.98	4230.00	<0.30	19.20	357.70	2.13	2.90
LIN10	000724	147.90	4.30	607.50	<0.11	21.50	<0.14	113.90	<0.40	<0.50	2.00	8950.00	0.74	25.40	639.70	2.74	3.80
LIN11	000724	<127.00	9.43	260.60	<0.11	14.10	<0.14	48.90	<0.40	<0.50	0.70	6930.00	<0.30	9.90	295.90	<2.00	3.30
LIN12	000724	<127.00	9.51	234.30	<0.11	<4.50	<0.14	28.30	0.41	<0.50	0.89	15800.00	<0.30	6.50	393.50	<2.00	2.70

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Aluminum	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium
LIN13	000724	<127.00	15.30	219.50	<0.11	<4.50	<0.14	41.90	<0.40	1.72	0.91	18800.00	<0.30	10.40	1121.00	<2.00	2.70
LIN14	000724	<127.00	13.21	228.80	<0.11	36.30	<0.14	48.90	<0.40	0.77	0.80	4140.00	0.40	13.70	1065.00	<2.00	2.40
LIN15	000724	<127.00	9.54	266.10	<0.11	30.10	<0.14	44.30	<0.40	0.57	0.70	2410.00	<0.30	11.80	787.10	<2.00	2.20
LIN16	000724	<127.00	3.96	194.80	<0.11	22.50	<0.14	43.00	<0.40	<0.50	0.72	5120.00	<0.30	11.20	272.60	<2.00	2.20
LIN17	000724	156.60	3.59	355.40	<0.11	31.90	<0.14	99.40	0.57	<0.50	1.32	6210.00	<0.30	23.70	800.40	2.26	3.20
LIN18	000815	<127.00	20.29	224.70	<0.11	18.40	<0.14	34.10	0.62	0.71	<0.50	6570.00	<0.30	8.20	613.70	<2.00	1.90
LIN19	000815	<127.00	<1.00	17.60	<0.11	1356.00	<0.14	21.10	<0.40	<0.50	4.70	50.20	<0.30	6.50	233.30	<2.00	8.50
LIN20	000815	<127.00	<1.00	106.80	0.20	8.30	<0.14	1.50	0.50	2.38	5.18	<15.00	0.61	3.40	63.90	2.18	3.30
LIN21	000815	<127.00	26.16	118.60	<0.11	<4.50	<0.14	24.80	<0.40	6.60	0.81	16600.00	<0.30	7.20	1013.00	2.60	2.00
LIN22	000822	<127.00	9.87	85.10	<0.11	<4.50	<0.14	18.50	<0.40	0.50	<0.50	7230.00	<0.30	4.90	596.40	<2.00	1.00
LIN23	000822	<127.00	2.99	54.70	<0.11	4.70	<0.14	13.60	<0.40	<0.50	<0.50	3170.00	<0.30	4.80	585.00	<2.00	2.00
LIN24	000822	<127.00	3.49	282.10	<0.11	<4.50	<0.14	35.90	<0.40	<0.50	<0.50	14600.00	<0.30	12.00	898.80	<2.00	3.40

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Selenium	Sodium	Vanadium	Zinc	Hardness	SiO2	pH	Water Temp	Alkalinity	Conductivity	Dicamba	Dichlorprop	2-4-D
ASH01	990823	<3.00	31.20	<1.00	<1.00	137.00	31.50	6.49	18.10	167.50	452.00	<.02277	<.04294	<.01144
ASH02	990823	<3.00	22.70	2.10	1.90	224.00	27.50	6.95	18.50	261.00	522.00	<.03896	<.02645	<.01174
ASH03	990823	<3.00	19.10	<1.00	<1.00	320.00	27.60	6.92	18.00	329.50	695.00	<.01062	<.02478	<.00770
ASH04	990823	<3.00	34.10	<1.00	<1.00	195.00	30.10	6.68	18.40	216.00	569.00	<.00771	<.02131	<.01490
ASH05	990907	<3.00	21.50	1.22	?0.00	187.00	28.00	6.50	18.80	211.00	534.00	<.01831	<.01739	<.02146
ASH06	990907	<3.00	14.00	1.15	?0.00	126.00	36.60	6.44	18.40	160.00	350.00	<.00696	<.01006	<.03040
ASH07	990907	<3.00	4.20	<1.00	?0.00	24.00	15.50	6.50	18.10	59.50	144.00	<.03540	<.02492	<.01021
ASH08	990907	<3.00	11.40	2.12	?0.00	111.00	30.50	6.70	18.40	141.50	306.00	<.04972	<.03310	<.02733
ASH09	990907	<3.00	35.30	1.54	?0.00	375.00	29.50	6.92	18.40	362.50	857.00	<.01145	<.01760	<.01197
ASH10	990907	<3.00	64.20	<1.00	?0.00	392.00	30.30	7.01	19.10	257.60	834.00	<.07135	<.03422	<.01730
ASH11	990907	<3.00	25.90	<1.00	?0.00	137.00	40.00	6.53	18.60	186.00	490.00	<.03989	<.02320	<.01872
ASH12	990907	<3.00	10.50	<1.00	?0.00	85.00	39.10	6.62	18.20	125.00	272.00	<.09397	<.04782	<.02710
ASH13	990920	<3.00	49.50	<1.00	1.40	137.00	27.20	6.98	18.10	222.00	488.00	<.00616	<.01754	<.01418
ASH15	990920	<3.00	57.20	<1.00	2.00	186.00	20.10	7.42	18.80	268.00	634.00	<.00775	<.00796	<.01905
ASH17	990920	<3.00	46.80	<1.00	1.80	317.00	28.00	6.93	18.30	340.00	819.00	<.00616	<.00786	<.01248
ASH18	990920	<3.00	37.10	<1.00	<1.00	225.00	35.00			252.00		<.01792	<.02272	<.01697
ASH19	990920	<3.00	23.30	2.49	2.30	234.00	38.70	7.14	19.70	252.00	532.00	<.05045	<.04214	<.02169
ASH20	990920	<3.00	19.00	1.72	3.20	157.00	38.40	7.21	19.00	182.00	386.00	<.01980	<.01453	<.00983
ASH21	000905	<3.00	47.70	3.45	7.11	261.00	29.90	7.28	18.90	305.00	682.00	<0.00453	<0.00954	<0.00622
ASH22	000905	<3.00	75.90	3.17	2.34	299.00	31.60	7.38	19.50	341.00	823.00	<0.00453	<0.00954	<0.00622
ASH23	000905	4.11	45.40	2.16	2.15	240.00	30.10	7.42	19.70	274.00	635.00	<0.00453	<0.00954	<0.00622
ASH24	000905	<3.00	46.50	1.84	2.17	268.00	30.00	7.23	19.60	302.00	690.00	<0.00453	<0.00954	<0.00622
ASH25	000905	<3.00	67.70	2.63	3.54	312.00	32.60	7.18	19.70	338.00	830.00	<0.00453	<0.00954	<0.00622
ASH26	000905	<3.00	14.20	1.18	14.61	40.00	48.50	6.29	19.80	38.00	168.00	<0.00453	<0.00954	<0.00622
ASH27	000905	<3.00	24.40	<1.00	8.85	28.00	54.50	5.96	19.00	26.00	185.00	<0.00453	<0.00954	<0.00622
ASH28	000905	<3.00	35.00	2.52	5.63	283.00	34.90	7.08	19.50	320.00	638.00	<0.00453	<0.00954	<0.00622
ASH29	000905	<3.00	41.40	1.88	5.38	246.00	30.60	7.35	19.60	304.00	615.00	<0.00453	<0.00954	<0.00622
ASH30	000905	<3.00	40.60	2.67	2.56	271.00	30.80	7.22		319.00	650.00	<0.00453	<0.00954	<0.00622
CHI01	990823	<3.00	13.40	<1.00	1.00	174.00	35.80	6.71	19.60	196.00	433.00	<.01130	<.02187	<.01748
CHI02	990823	<3.00	14.80	<1.00	3.40	155.00	30.90	6.90	18.00	167.00	405.00	<.03093	<.03291	<.01709
CHI03	990823	<3.00	19.80	<1.00	<1.00	167.00	34.00	7.09	18.20	203.50	316.00	<.01671	<.02496	<.01551
CHI04	990823	<3.00	20.20	<1.00	1.40	203.00	37.70	6.75	18.30	208.00	538.00	<.00659	<.02736	<.02285
DESHA01	990809	<3.00	23.80	<1.00	<1.00	227.00	29.00	6.72	17.90	233.00	541.00	<.00579	<.01518	<.00658
DESHA02	990809	<3.00	13.90	<1.00	<1.00	197.00	29.00	6.81	17.80	219.00	482.00	?<.00962	?<.01605	?<.01392
DESHA03	000711	<3.00	19.30	<1.00	2.31	126.00	34.00	6.75	18.30	139.00	395.00	<0.00453	<0.00954	<0.00622
DREW01	990809	<3.00	12.30	<1.00	<1.00	89.00	34.00	6.44	17.90	141.00	334.00	<.00517	<.01264	<.01233

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Selenium	Sodium	Vanadium	Zinc	Hardness	SiO2	pH	Water Temp	Alkalinity	Conductivity	Dicamba	Dichlorprop	2-4-D
DREW02	990809	<3.00	27.10	<1.00	2.00	143.00	46.00	6.09	18.50	126.00	418.00	<.01231	<.00798	<.01038
DREW03	990809	<3.00	10.60	<1.00	<1.00	108.00	33.00	6.45	17.80	148.00	318.00	<.01161	<.01895	<.01643
DREW04	990809	<3.00	13.30	<1.00	<1.00	168.00	31.00	6.71	18.00	178.00	391.00	<.00809	<.01649	<.00715
DREW05	990823	<3.00	9.50	<1.00	<1.00	54.00	27.80	6.69	17.90	64.50	186.00	<.01387	<.02740	<.01313
DREW06	990823	<3.00	12.80	<1.00	<1.00	115.00	31.50	6.75	18.40	133.50	454.00	<.23382	<.57691	<.09561
DREW07	000711	<3.00	18.70	<1.00	1.74	109.00	31.20	6.89	18.20	134.00	320.00	<0.00453	<0.00954	<0.00622
DREW08	000711	<3.00	33.90	<1.00	<1.00	103.00	41.00	6.78	18.50	104.00	395.00	<0.00453	<0.00954	<0.00622
DREW09	000711	<3.00	21.40	<1.00	6.90	93.00	36.50	6.76	18.10	105.00	317.00	<0.00453	<0.00954	<0.00622
DREW10	000711	<3.00	15.40	<1.00	2.47	77.00	33.90	6.56	18.20	80.50	258.00	<0.00453	<0.00954	<0.00622
DREW11	000711	<3.00	18.00	1.01	<1.00	68.00	35.30	6.59	18.10	70.30	247.00	<0.00453	<0.00954	<0.00622
DREW12	000711	<3.00	34.70	<1.00	<1.00	150.00	36.00	6.86	18.20	168.00	473.00	<0.00453	<0.00954	<0.00622
DREW13	000711	<3.00	19.40	<1.00	6.98	118.00	32.20	6.86	18.10	125.00	337.00	<0.00453	<0.00954	<0.00622
DREW14	000711	<3.00	14.60	2.05	2.28	150.00	31.90	6.87	16.40	151.00	351.00	<0.00453	<0.00954	<0.00622
DREW15	000711	<3.00	44.70	<1.00	1.60	289.00	28.70	7.00	18.40	288.00	718.00	<0.00453	<0.00954	<0.00622
DREW16	000801	<3.00	8.40	<1.00	<1.00	89.00	32.40	6.48	17.10	95.00	276.00	<0.00453	<0.00954	<0.00622
DREW17	000801	<3.00	10.90	<1.00	<1.00	115.00	35.70	6.60	18.10	105.00	304.00	<0.00453	<0.00954	<0.00622
DREW18	000801	<3.00	12.00	<1.00	1.10	96.00	37.90	6.61	18.10	94.50	279.00	<0.00453	<0.00954	<0.00622
DREW19	000801	<3.00	14.50	<1.00	<1.00	92.00	34.20	6.52	18.30	104.00	301.00	<0.00453	<0.00954	<0.00622
DREW20	000801	<3.00	21.10	<1.00	<1.00	176.00	32.10	6.58	18.40	164.00	478.00	<0.00453	<0.00954	<0.00622
DREW21	000801	<3.00	22.90	<1.00	<1.00	82.00	44.70	6.92	18.40	91.00	281.00	<0.00453	<0.00954	<0.00622
DREW22	000801	<3.00	14.40	<1.00	3.20	52.00	50.00	6.43	18.10	55.00	190.00	<0.00453	<0.00954	<0.00622
DREW23	000801	<3.00	13.50	1.26	1.30	47.00	53.10	6.57	18.40	61.00	166.00	<0.00453	<0.00954	<0.00622
DREW24	000801	<3.00	18.60	<1.00	<1.00	135.00	33.90	6.80	18.20	142.00	367.00	<0.00453	<0.00954	<0.00622
DREW25	000801	<3.00	22.30	<1.00	<1.00	214.00	30.90	6.78	17.70	206.00	531.00	VOID	VOID	VOID
DREW26	000815	<3.00	24.30	<1.00	2.90	33.00	56.20	6.48	18.50	49.00	176.00	<0.00453	<0.00954	<0.00622
DREW27	000815	<3.00	41.10	2.32	3.20	73.00	53.80	6.76	18.50	88.00	331.00	<0.00453	<0.00954	<0.00622
DREW28	000815	<3.00	13.60	<1.00	4.20	15.00	44.70	6.11	17.60	32.00	88.00	<0.00453	<0.00954	<0.00622
DREW29	000815	<3.00	14.10	1.38	3.50	17.00	52.10	6.26	18.50	34.00	95.00	<0.00453	<0.00954	<0.00622
DREW30	000815	<3.00	20.40	<1.00	2.80	31.00	53.50	6.30	18.80	47.50	152.00	<0.00453	<0.00954	<0.00622
DREW31	000815	<3.00	25.10	1.22	3.60	38.00	52.20	6.41	18.50	68.00	175.00	<0.00453	<0.00954	<0.00622
DREW32	000822	<3.00	11.40	<1.00	4.60	83.00	52.10	6.99	18.70	86.50	238.00	<0.00453	<0.00954	<0.00622
DREW33	000822	<3.00	13.50	2.18	3.80	27.00	52.20	6.10	18.00	37.00	123.00	<0.00453	<0.00954	<0.00622
DREW34	000822	<3.00	23.60	1.65	3.10	189.00	46.30	7.38	18.50	223.00	465.00	<0.00453	<0.00954	<0.00622
DREW35	000822	<3.00	25.80	1.83	3.10	110.00	49.70	6.95	19.10	141.00	331.00	<0.00453	<0.00954	<0.00622
DREW36	000822	<3.00	21.50	1.45	3.00	178.00	52.00	7.34	18.90	199.00	424.00	<0.00453	<0.00954	<0.00622
DREW37	000822	<3.00	19.80	1.68	3.40	192.00	47.50	7.43	18.50	213.00	462.00	VOID	VOID	VOID

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station ID	Date	Selenium	Sodium	Vanadium	Zinc	Hardness	SiO2	pH	Water Temp	Alkalinity	Conductivity	Dicamba	Dichlorprop	2-4-D
DREW38	000822	<3.00	19.40	1.55	4.00	195.00	41.20	7.29	18.00	208.00	454.00	<0.00453	<0.00954	<0.00622
JEF01	000508	<3.00	71.90	1.97	1.20	491.00		6.81	17.70		1180.00	<.01199	<.04120	<.01298
JEF02	000508	<3.00	54.70	1.68	1.00	361.00		6.81	18.00		896.00	<.01068	<.03143	<.01777
JEF03	000508	<3.00	31.20	1.45	1.70	271.00		6.97	17.60		639.00	<.00642	<.01819	<.00967
JEF04	000718	<3.00	26.10	<1.00	<1.00	163.00	36.80	6.68	17.80			<0.00453	<0.00954	<0.00622
JEF05	000718	<3.00	22.60	<1.00	<1.00	164.00	35.10	6.69	17.70			<0.00453	<0.00954	<0.00622
JEF06	000718	<3.00	21.10	<1.00	<1.00	170.00	38.00	6.73	17.80			<0.00453	<0.00954	<0.00622
JEF07	000718	<3.00	17.60	<1.00	<1.00	133.00	38.90	6.74	17.90			<0.00453	<0.00954	<0.00622
JEF08	000718	<3.00	18.00	<1.00	<1.00	141.00	38.30	6.86	17.80			<0.00453	<0.00954	<0.00622
JEF09	000718	<3.00	64.30	<1.00	<1.00	473.00	29.40	6.84	17.90			<0.00453	<0.00954	<0.00622
JEF10	000718	<3.00	17.90	<1.00	1.60	172.00	36.60	6.91	18.10			<0.00453	<0.00954	<0.00622
JEF11	000718	<3.00	33.10	<1.00	1.10	318.00	28.00	6.94	17.90			<0.00453	<0.00954	<0.00622
JEF12	000718	<3.00	12.20	1.06	<1.00	368.00	24.70	7.06	18.00			<0.00453	<0.00954	<0.00622
JEF13	000718	<3.00	26.60	1.25	2.00	353.00	32.10	6.91	17.30			<0.00453	<0.00954	<0.00622
JEF14	000808	<3.00	21.60	<1.00	1.70	182.00	31.70	6.73	17.90	212.00	436.00	<0.00453	<0.00954	<0.00622
JEF15	000808	<3.00	20.40	<1.00	2.40	167.00	31.20	6.94	17.90	197.00	419.00	<0.00453	<0.00954	<0.00622
JEF16	000808	<3.00	17.60	<1.00	2.40	144.00	32.30	6.89	17.90	171.00	357.00	<0.00453	<0.00954	<0.00622
JEF17	000808	<3.00	16.50	<1.00	2.00	85.00	34.10	6.52	17.50	97.50	292.00	<0.00453	<0.00954	<0.00622
JEF18	000808	<3.00	29.60	<1.00	1.10	88.00	32.20	6.64	17.60	106.00	338.00	<0.00453	<0.00954	<0.00622
JEF19	000808	<3.00	23.00	<1.00	2.80	80.00	36.70	6.39	17.30	95.50	290.00	<0.00453	<0.00954	<0.00622
JEF20	000808	<3.00	18.50	1.43	2.70	88.00	30.40	6.51	17.70	105.00	271.00	<0.00453	<0.00954	<0.00622
JEF21	000808	<3.00	16.50	1.05	2.00	102.00	51.70	6.57	17.60	123.00	288.00	<0.00453	<0.00954	<0.00622
JEF22	000808	<3.00	10.70	1.02	<1.00	43.00	29.60	6.31	17.30	86.50	226.00	<0.00453	<0.00954	<0.00622
JEF23	000808	<3.00	15.60	<1.00	3.20	123.00	32.00	6.78	17.90	141.00	315.00	<0.00453	<0.00954	<0.00622
LIN01	990809	<3.00	11.90	<1.00	<1.00	160.00	36.00	6.64	17.90	183.00	394.00	<.01033	<.01264	<.00822
LIN02	990809	<3.00	19.00	<1.00	1.90	136.00	34.00	6.72	18.00	171.00	371.00	?<.42600	?<.33633	?<.11364
LIN03	990809	<3.00	15.20	<1.00	1.60	78.00	42.00	6.77	18.90	93.00	266.00	<.03263	<.01872	<.01461
LIN04	000508	<3.00	33.20	1.78	1.80	90.00		6.62	18.50		433.00	<.00995	<.02083	<.02299
LIN05	000508	<3.00	20.90	<1.00	3.70	88.00		6.38	18.80		279.00	<.00807	<.04190	0.0246
LIN06	000508	<3.00	13.90	<1.00	4.50	27.00		6.07	18.90		145.00	<.01867	<.04049	<.01943
LIN07	000508	<3.00	20.80	<1.00	2.00	152.00		6.91	18.30		377.00	<.00847	<.01599	<.01151
LIN08	000724	<3.00	55.40	1.91	6.20	344.00	29.20	6.50	18.00	223.80	914.00	<0.00453	<0.00954	<0.00622
LIN09	000724	<3.00	36.40	2.19	3.00	286.00	26.80	7.05	18.10		700.00	<0.00453	<0.00954	<0.00622
LIN10	000724	<3.00	62.30	1.29	4.40	389.00	28.10	6.80	18.30		1031.00	<0.00453	<0.00954	<0.00622
LIN11	000724	<3.00	27.80	<1.00	1.50	163.00	33.90	6.79	17.60	191.00	444.00	<0.00453	<0.00954	<0.00622
LIN12	000724	<3.00	15.00	<1.00	3.60	97.00	38.30	6.65	17.90	111.60	298.00	<0.00453	<0.00954	<0.00622

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Selenium	Sodium	Vanadium	Zinc	Hardness	SiO2	pH	Water Temp	Alkalinity	Conductivity	Dicamba	Dichlorprop	2-4-D
LIN13	000724	<3.00	32.40	1.11	5.30	147.00	29.50	6.75	18.30	171.90	480.00	<0.00453	<0.00954	<0.00622
LIN14	000724	<3.00	23.90	<1.00	2.70	179.00	31.50	7.01	18.20	220.70	483.00	<0.00453	<0.00954	<0.00622
LIN15	000724	<3.00	18.60	<1.00	4.60	159.00	35.30	7.01	18.20	201.30	396.00	<0.00453	<0.00954	<0.00622
LIN16	000724	<3.00	22.70	<1.00	2.40	153.00	31.30	7.01	17.70	166.70	391.00	<0.00453	<0.00954	<0.00622
LIN17	000724	<3.00	58.10	1.11	8.20	346.00	26.00	7.22	18.00		939.00	<0.00453	<0.00954	<0.00622
LIN18	000815	<3.00	19.50	1.13	2.80	119.00	33.10	6.76	17.90	148.00	331.00	<0.00453	<0.00954	<0.00622
LIN19	000815	<3.00	243.00	1.05	431.30	79.00	24.00	7.74	20.30	260.00	1211.00	<0.00453	<0.00954	<0.00622
LIN20	000815	<3.00	7.70	<1.00	10.00	18.00	14.10	4.86	20.50	0.00	100.00	<0.00453	<0.00954	<0.00622
LIN21	000815	<3.00	33.70	<1.00	14.50	91.00	28.60	6.55	18.10	133.00	356.00	<0.00453	<0.00954	<0.00622
LIN22	000822	<3.00	13.10	<1.00	3.40	66.00	45.20	6.58	17.70	84.00	221.00	<0.00453	<0.00954	<0.00622
LIN23	000822	<3.00	11.00	<1.00	3.50	54.00	34.40	6.63		63.50	179.00	<0.00453	<0.00954	<0.00622
LIN24	000822	<3.00	25.50	<1.00	2.00	139.00	38.50	6.70	17.70	162.00	451.00	<0.00453	<0.00954	<0.00622

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Pentachlorophenol	Silvex	2-4-5-T	Dinoseb	2-4-DB	Bentazon	Picloram	Acifluorfen	Nitrobenzene-d5	2-Fluorobiphe	Terphenyl-d14	Molinate
ASH01	990823	<.01145	<.01696	<.00874	<.01943	<.01579	<.00628	<.01544	<.01936	85.4680	86.6170	85.4840	<.00715
ASH02	990823	<.00629	<.00816	<.00960	<.01246	<.01709	<.00806	<.00742	<.01330	93.8960	87.5570	75.6160	<.00322
ASH03	990823	<.00934	<.01345	<.00831	<.01079	<.01315	<.00697	<.01224	<.01316	97.5160	87.9580	75.2420	<.00448
ASH04	990823	<.00936	<.01213	<.00952	<.01544	<.01412	0.0240	<.01104	<.01846	79.7840	93.1760	68.9640	<.00811
ASH05	990907	<.00340	<.01521	<.01096	<.00654	<.02160	<.00422	<.01082	<.01252	88.7260	85.0460	89.1250	<.00490
ASH06	990907	<.00673	<.01160	<.01364	<.00490	<.02965	<.00636	<.00825	<.01519	82.8610	77.3100	73.7900	<.00436
ASH07	990907	<.00811	<.01495	<.01154	<.00742	<.01455	0.0236	<.01063	<.02177	86.4900	71.0260	70.1320	<.00460
ASH08	990907	<.00989	<.02032	<.01216	<.01599	<.02548	<.00642	<.01445	<.02257	74.1390	82.5510	83.7500	<.00160
ASH09	990907	<.00625	<.00844	<.01281	<.00691	<.01058	<.00485	<.00600	<.01485	77.6260	83.9140	83.1500	<.00371
ASH10	990907	<.01070	<.01209	<.01549	<.01106	<.01510	<.00284	<.00860	<.01086	82.6570	85.7030	88.9130	<.00435
ASH11	990907	<.00954	<.01316	<.01098	<.01114	<.01195	<.00423	<.00936	<.01343	77.8340	78.7060	80.1410	<.00400
ASH12	990907	<.00708	<.01904	<.01742	<.01814	<.02306	<.00572	<.01354	<.01398	74.8120	87.2030	73.9090	<.00479
ASH13	990920	<.00641	<.01060	<.00983	<.01204	<.01789	<.00624	<.00754	<.01047	95.0790	93.8980	102.3000	<.00291
ASH15	990920	<.01241	<.02908	<.00693	<.01122	<.02022	<.00905	<.02068	<.01476	80.8170	92.9610	93.6040	<.00480
ASH17	990920	<.00811	<.00687	<.00636	<.00624	<.01473	0.0940	<.00488	<.00859	99.7130	90.4410	93.8980	<.00435
ASH18	990920	<.00650	<.01173	<.00886	<.01395	<.03022	0.0138	<.00834	<.01217	96.2410	94.0560	93.8350	<.00382
ASH19	990920	<.00634	<.01195	<.01627	<.01006	<.02354	<.00542	<.00850	<.01657	95.5040	82.6410	89.0950	<.00360
ASH20	990920	<.00985	<.00825	<.01204	<.01167	<.01137	<.00369	<.00587	<.01711	96.9920	96.2290	99.4240	<.00276
ASH21	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	37.7800	40.4600	55.9200	<0.00227
ASH22	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	59.2400	64.1800	56.5900	<0.00227
ASH23	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	49.3400	53.4300	58.0800	<0.00227
ASH24	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	46.2800	49.9800	56.1100	<0.00227
ASH25	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	50.7300	56.9600	56.0100	<0.00227
ASH26	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	61.4800	62.3100	58.8400	<0.00227
ASH27	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	49.0100	53.2400	55.0500	<0.00227
ASH28	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	0.3689	0.3800	0.3961	<0.00227
ASH29	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	58.7300	57.9200	56.4000	<0.00227
ASH30	000905	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	57.2900	58.8600	56.1800	<0.00227
CHI01	990823	<.00998	<.01869	<.01015	<.01482	<.02209	<.00958	<.01701	<.01407	95.5000	102.8200	88.3140	<.00675
CHI02	990823	<.00885	<.01377	<.01081	<.01227	<.01923	<.00680	<.01253	<.02695	102.7200	86.6550	83.6860	<.00583
CHI03	990823	<.01427	<.01918	<.01210	<.03452	<.02870	<.01116	<.01746	<.02681	97.7430	83.7180	88.6110	<.00494
CHI04	990823	<.00661	<.01599	<.01512	<.02354	<.08533	<.01269	<.01455	<.03129	98.4500	90.0860	84.3610	<.00448
DESHA01	990809	<.00558	<.00908	<.00848	<.00595	<.01728	<.00342	<.00892	<.01811	75.2340	93.2210	84.3460	<.01422
DESHA02	990809	?<.01510	?<.01228	?<.00819	?<.01840	?<.03130	?<.00661	?<.01206	?<.02099	74.3790	88.5020	81.8740	<.00537
DESHA03	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	99.8300	84.3800	79.7200	<0.00227
DREW01	990809	<.00576	<.00780	<.00583	<.01228	<.01782	<.00470	<.00766	<.01494	78.2670	90.4080	88.9990	<.00487

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Pentachlorophenol	Silvex	2-4-5-T	Dinoseb	2-4-DB	Bentazon	Picloram	Acifluorfen	Nitrobenzene-d5	2-Fluorobiphe	Terphenyl-d14	Molinate
DREW02	990809	<.00650	<.00925	<.00740	<.01039	<.01885	<.00497	<.00908	<.01264	90.2910	106.5100	83.7360	<.01513
DREW03	990809	<.01232	<.01503	<.01403	<.01641	<.03039	<.01132	<.01476	<.02397	88.2490	106.4100	78.7700	<.01488
DREW04	990809	<.00793	<.00645	<.00602	<.01056	<.02071	<.00486	<.00633	<.01157	80.4630	95.5310	90.1470	<.00762
DREW05	990823	<.01120	<.00726	<.00534	<.01664	<.01437	0.2476	<.00661	<.01184	88.8480	87.9180	83.1310	<.00544
DREW06	990823	<.18061	<.21485	<.11600	<.50100	<.10794	<.12250	<.19553	<.28434	101.0700	88.8160	74.4340	<.00679
DREW07	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	83.1900	70.4300	[illegible]	<0.00227
DREW08	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	91.1600	77.0000	87.5900	<0.00227
DREW09	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	89.9000	76.8200	83.3600	<0.00227
DREW10	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	84.7400	68.4900	83.1200	<0.00227
DREW11	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	85.9000	73.3300	78.8000	<0.00227
DREW12	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	82.3800	77.1100	79.6900	<0.00227
DREW13	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	91.4000	77.0100	83.0500	<0.00227
DREW14	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	80.5600	68.6500	80.8400	<0.00227
DREW15	000711	<0.00388	<0.00567	<0.00312	<0.00714	<0.00920	<0.00416	<0.00444	<0.01075	82.3300	73.1100	77.5400	<0.00227
DREW16	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0348	<0.00444	<0.01075	64.5800	63.5600	71.6500	<0.00227
DREW17	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	61.7600	57.3800	68.0000	<0.00227
DREW18	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	72.7400	61.7500	70.1400	<0.00227
DREW19	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	79.4400	77.6100	79.5900	<0.00227
DREW20	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	69.5400	67.4500	75.4400	<0.00227
DREW21	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	69.9400	58.0100	68.7900	<0.00227
DREW22	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	74.4800	67.5600	75.9300	<0.00227
DREW23	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	64.6300	58.0700	71.1300	<0.00227
DREW24	000801	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	68.9700	65.3500	69.5400	<0.00227
DREW25	000801	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	77.2300	78.0700	68.1500	<0.00227
DREW26	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	80.0100	69.9700	63.8100	<0.00227
DREW27	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	59.4900	54.8200	62.9100	<0.00227
DREW28	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	67.0100	61.4200	63.9400	<0.00227
DREW29	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	51.3400	56.1300	61.7000	<0.00227
DREW30	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	53.5600	53.8200	63.6200	<0.00227
DREW31	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	68.6300	67.2800	60.8200	<0.00227
DREW32	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	60.9500	58.6200	57.8200	<0.00227
DREW33	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	54.4000	60.2600	64.6200	<0.00227
DREW34	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	59.8700	56.0300	62.8800	<0.00227
DREW35	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	61.5500	69.0300	56.1900	<0.00227
DREW36	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	59.8300	62.6100	55.0600	<0.00227
DREW37	000822	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	55.4400	58.5800	60.3600	<0.00227

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Pentachlorophenol	Silvex	2-4-5-T	Dinoseb	2-4-DB	Bentazon	Picloram	Acifluorfen	Nitrobenzene-d5	2-Fluorobiphe	Terphenyl-d14	Molinate
DREW38	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	64.6300	69.2700	53.1400	<0.00227
JEF01	000508	<.02409	<.01591	<.01327	<.01818	<.06607	0.0584	<.01203	<.02605	101.8500	98.6820	99.5700	<.00366
JEF02	000508	<.02299	<.01769	<.01378	<.02102	<.07747	0.0173	<.01338	<.03678	102.7800	96.1920	100.7900	<.00263
JEF03	000508	<.01383	<.01594	<.00807	<.01774	<.04710	<.00615	<.01205	<.01968	84.1640	92.3560	107.6100	<.00353
JEF04	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	73.6800	69.0100	74.5300	<0.00227
JEF05	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	80.0500	75.9400	73.7200	<0.00227
JEF06	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	88.6400	77.1700	62.6500	<0.00227
JEF07	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	86.2770	70.5900	67.7130	<0.00227
JEF08	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	81.8100	75.9000	77.9100	<0.00227
JEF09	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0326	<0.00444	<0.01075	82.8700	80.9200	77.2800	<0.00227
JEF10	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	76.9800	70.0600	81.9500	<0.00227
JEF11	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	99.1000	86.3900	76.7800	<0.00227
JEF12	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	81.9800	77.0100	78.4200	<0.00227
JEF13	000718	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.5192	<0.00444	<0.01075	86.2300	72.2900	76.1400	<0.00227
JEF14	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	61.1700	66.8100	67.0700	<0.00227
JEF15	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	67.9700	66.4500	70.6600	<0.00227
JEF16	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	69.2200	65.9000	65.9800	<0.00227
JEF17	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	70.3400	63.8500	63.9200	<0.00227
JEF18	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	68.4200	67.5300		<0.00227
JEF19	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	60.8200	61.1300	68.0100	<0.00227
JEF20	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	52.6900	56.3800	59.4000	<0.00227
JEF21	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	58.9300	58.0800	65.3700	<0.00227
JEF22	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0404	<0.00444	<0.01075	55.0100	58.1200	64.3700	<0.00227
JEF23	000808	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	62.3800	59.6700	58.0300	<0.00227
LIN01	990809	<.01169	<.00792	<.00739	<.01453	<.02487	0.0251	<.00778	<.01895	80.8520	88.6090	83.4590	<.00983
LIN02	990809	?<.15931	?<.31566	?<.09894	?<.33347	?<.10256	?<.14724	?<.31000	?<.33256	86.2080	79.4380	79.8630	<.01025
LIN03	990809	<.01394	<.04722	<.01234	<.04209	<.03775	<.01280	<.04638	<.03616	83.4230	81.2440	86.2450	<.00663
LIN04	000508	<.01154	<.01401	<.00736	<.01311	<.08996	<.00709	<.01060	<.01908	84.6850	98.6610	104.1400	<.00405
LIN05	000508	<.01467	<.00960	<.00834	<.01581	<.04244	<.00624	<.00726	<.02061	85.1850	94.3440	100.9600	<.00309
LIN06	000508	<.04006	<.02454	<.01967	<.03625	<.09107	<.01748	<.01856	<.04919	104.6500	82.6430	100.4800	<.00367
LIN07	000508	<.01858	<.01529	<.00861	<.01665	<.05195	<.00698	<.01156	<.02238	89.2920	83.7350	94.6230	<.00264
LIN08	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0176	<0.00444	<0.01075	82.7800	90.4800	81.5100	<0.00227
LIN09	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	75.0300	78.0000	73.4900	<0.00227
LIN10	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0688	<0.00444	<0.01075	71.8400	81.4300	79.8700	0.0476
LIN11	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0143	<0.00444	<0.01075	72.5400	69.9400	67.8500	<0.00227
LIN12	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	76.4700	70.1300	63.5700	<0.00227

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Pentachlorophenol	Silvex	2-4-5-T	Dinoseb	2-4-DB	Bentazon	Picloram	Acifluorfen	Nitrobenzene-d5	2-Fluorobiphe	Terphenyl-d14	Molinate
LIN13	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	87.4900	90.1800	80.3300	<0.00227
LIN14	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	65.6900	65.4400	75.3000	0.4859
LIN15	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	86.9600	85.4100	75.4100	<0.00227
LIN16	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0435	<0.00444	<0.01075	66.2400	66.9900	71.8700	<0.00227
LIN17	000724	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0061	<0.00444	<0.01075	76.0200	78.7400	75.4400	<0.00227
LIN18	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	73.9000	76.5900	60.4200	<0.00227
LIN19	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	63.3700	59.0200	62.6900	<0.00227
LIN20	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	61.7500	63.4800	61.1000	<0.00227
LIN21	000815	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	0.2647	74.8600	66.0100	64.9300	<0.00227
LIN22	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0065	<0.00444	<0.01075	63.6900	70.6100	57.6500	<0.00227
LIN23	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	0.0087	<0.00444	<0.01075	63.3600	69.0800	52.3100	<0.00227
LIN24	000822	<0.00388	<0.00567	<0.00312	<0.00714	<0.00921	<0.00416	<0.00444	<0.01075	58.7600	60.6300	56.9000	<0.00227

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Propachlor	Trifluralin	Alpha-BHC	Atraton	Prometon	Simazine	Atrazine	Propazine	Beta-BHC	Gamma-BHC	Terbuthylazine	Diazinon	Fluchloralin
ASH01	990823	<.01326	<.00541	<.07786	<.02085	<.02143	<.04318	<.01397	<.01230	<.08037	<.08033	<.06352	<.01963	<.00693
ASH02	990823	<.00624	<.00534	<.01003	<.00637	<.00825	<.01917	<.00569	<.00392	<.01035	<.01034	<.02875	<.01715	<.00717
ASH03	990823	<.00587	<.00666	<.06077	<.01028	<.03086	<.01571	<.00597	<.00681	<.06272	<.06269	<.07098	<.01418	<.00969
ASH04	990823	<.00601	<.00415	<.04746	<.00610	<.01704	<.02583	<.00646	<.00582	<.04899	<.04897	<.02499	<.01381	<.00494
ASH05	990907	<.03304	<.00203	<.01193	<.01728	<.01206	<.01839	<.00557	<.00505	<.01514	<.01302	<.02552	<.01247	<.00435
ASH06	990907	<.03735	<.00077	<.00369	<.00374	<.00803	<.01231	<.00344	<.00178	<.00468	<.00403	<.01040	<.00786	<.00132
ASH07	990907	<.03457	<.00143	<.00733	<.00909	<.00576	<.01039	<.00285	<.00347	<.00931	<.00800	<.01507	<.00569	<.00229
ASH08	990907	<.02336	<.00100	<.00607	<.00645	<.00920	<.00936	<.00344	<.00385	<.00770	<.00663	<.02139	<.00836	<.00177
ASH09	990907	<.01736	<.00132	<.00447	<.00603	<.00769	<.01204	<.00330	<.00220	<.00567	<.00487	<.00983	<.00841	<.00228
ASH10	990907	<.01855	<.00103	<.02069	<.00874	<.00656	<.00972	<.00382	<.00143	<.02625	<.02257	<.01366	<.00831	<.00176
ASH11	990907	<.01750	<.00113	<.00626	<.00911	<.00667	<.00881	<.00267	<.00166	<.00795	<.00684	<.01007	<.00788	<.00209
ASH12	990907	<.02130	<.00101	<.00575	<.00635	<.00597	<.00845	<.00347	<.00246	<.00729	<.00627	<.00966	<.00651	<.00160
ASH13	990920	<.00561	<.00042	<.01279	<.00623	<.00778	<.02063	<.00485	<.00524	<.01452	<.01307	<.01735	<.01286	<.00071
ASH15	990920	<.00545	<.00036	<.01001	<.00627	<.00556	<.02434	<.00399	<.00480	<.01136	<.01023	<.02236	<.01591	<.00060
ASH17	990920	<.00501	<.00047	<.01033	<.00544	<.00554	<.01422	<.00410	<.00352	<.01173	<.01056	<.01936	<.00691	<.00074
ASH18	990920	<.00510	<.00048	<.01299	<.00689	<.00602	<.01439	<.00537	<.00459	<.01475	<.01328	<.02056	<.00964	<.00078
ASH19	990920	<.00295	<.00057	<.00532	<.00305	<.00528	<.01078	<.00252	<.00284	<.00604	<.00544	<.01263	<.00634	<.00100
ASH20	990920	<.00300	<.00042	<.00683	<.00402	<.00664	<.01300	<.00269	<.00323	<.00775	<.00698	<.01974	<.00921	<.00060
ASH21	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH22	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH23	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH24	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH25	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH26	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH27	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH28	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH29	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
ASH30	000905	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
CHI01	990823	<.01128	<.00469	<.09017	<.00976	<.03245	<.01835	<.00711	<.00908	<.09307	<.09303	<.02873	<.01834	<.00622
CHI02	990823	<.00698	<.00378	<.07033	<.01071	<.02138	<.03183	<.00322	<.00671	<.07260	<.07256	<.02736	<.01936	<.00521
CHI03	990823	<.00914	<.00842	<.07060	<.01879	<.03218	<.02174	<.01308	<.00985	<.07287	<.07284	<.03605	<.01814	<.01327
CHI04	990823	<.00951	<.00699	<.05764	<.01075	<.02730	<.02217	<.01183	<.00705	<.05950	<.05947	<.04278	<.01470	<.01008
DESHA01	990809	<.00527	<.01077	<.01129	<.00754	<.01045	<.03558	<.01501	<.00798	<.01303	<.01109	<.08281	<.01453	<.01696
DESHA02	990809	<.00711	<.00995	<.00559	<.01619	<.01104	<.02099	<.01972	<.01226	<.00646	<.00550	<.06997	<.01428	<.01554
DESHA03	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW01	990809	<.00853	<.00670	<.01505	0.0214	0.0170	<.02658	<.00563	<.00548	<.01737	<.01479	<.06832	<.01483	<.00948

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Propachlor	Trifluralin	Alpha-BHC	Atraton	Prometon	Simazine	Atrazine	Propazine	Beta-BHC	Gamma-BHC	Terbuthylazine	Diazinon	Fluchloralin
DREW02	990809	<.00766	<.01015	<.00768	<.01020	<.01156	<.01133	<.00623	<.00730	<.00887	<.00755	<.03375	<.01326	<.01150
DREW03	990809	<.01132	<.00477	<.00993	<.01601	<.00703	<.02230	<.01107	<.00950	<.01147	<.00976	<.08242	<.01752	<.00666
DREW04	990809	<.00656	<.00991	<.00858	<.00968	<.00964	<.02917	<.00478	<.01108	<.00991	<.00843	<.10152	<.00682	<.01419
DREW05	990823	<.00867	<.00518	<.07058	<.00682	<.02588	<.02373	<.00517	<.00393	<.07285	<.07282	<.03986	<.01067	<.00738
DREW06	990823	<.00513	<.00621	<.06555	<.01095	<.03102	<.02532	<.00580	<.00709	<.06766	<.06762	<.03736	<.02014	<.00873
DREW07	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW08	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW09	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW10	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW11	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW12	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW13	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW14	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW15	000711	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW16	000801	<0.00217	<0.00162	<0.00106	0.0112	0.0228	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW17	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW18	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW19	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW20	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW21	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW22	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW23	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW24	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW25	000801	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW26	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW27	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW28	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW29	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW30	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW31	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	0.0151	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW32	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW33	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW34	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW35	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW36	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
DREW37	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Propachlor	Trifluralin	Alpha-BHC	Atraton	Prometon	Simazine	Atrazine	Propazine	Beta-BHC	Gamma-BHC	Terbuthylazine	Diazinon	Fluchloralin
DREW38	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF01	000508	<.00416	<.00153	<.00727	<.00417	<.00500	<.01360	<.00318	<.00256	<.00742	<.00722	<.02193	<.00857	<.00264
JEF02	000508	<.00352	<.00114	<.00679	<.00358	<.00547	<.01213	<.00277	<.00238	<.00691	<.00665	<.02079	<.00928	<.00188
JEF03	000508	<.00390	<.00113	<.00526	<.00319	<.00399	<.01260	<.00266	<.00212	<.00535	<.00515	<.02048	<.00648	<.00159
JEF04	000718	<0.00217	<0.00162	<0.00106	0.0188	0.0200	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF05	000718	<0.00217	<0.00162	<0.00106	0.0121	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF06	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF07	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF08	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF09	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF10	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF11	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF12	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF13	000718	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF14	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF15	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF16	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF17	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF18	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF19	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF20	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF21	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF22	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
JEF23	000808	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN01	990809	<.00691	<.00420	<.00841	<.01139	<.01131	<.02845	<.02410	<.00928	<.00971	<.00827	<.07578	<.01358	<.00625
LIN02	990809	<.00566	<.01004	<.00905	<.01532	<.01141	<.01917	<.01513	<.01446	<.01045	<.00890	<.06259	<.01070	<.01606
LIN03	990809	<.00714	<.00650	<.01342	<.00983	<.00544	<.02834	<.00866	<.00501	<.01550	<.01319	<.06121	<.00985	<.01071
LIN04	000508	<.00517	<.00104	<.00565	<.00257	<.00486	<.00983	<.00335	<.00197	<.00577	<.00561	<.01238	<.00771	<.00174
LIN05	000508	<.00330	<.00108	<.00424	<.00371	<.00472	<.01202	<.00307	<.00304	<.00433	<.00421	<.01770	<.00869	<.00201
LIN06	000508	<.00672	<.00188	<.00761	<.00523	<.00673	<.01839	<.00454	<.00298	<.00777	<.00757	<.01692	<.00909	<.00343
LIN07	000508	<.00322	<.00138	<.00560	<.00375	<.00525	<.01191	<.00291	<.00237	<.00570	<.00549	<.02209	<.00902	<.00215
LIN08	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN09	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN10	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN11	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN12	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Propachlor	Trifluralin	Alpha-BHC	Atraton	Prometon	Simazine	Atrazine	Propazine	Beta-BHC	Gamma-BHC	Terbuthylazine	Diazinon	Fluchloralin
LIN13	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN14	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN15	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN16	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN17	000724	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN18	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN19	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN20	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN21	000815	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN22	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN23	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172
LIN24	000822	<0.00217	<0.00162	<0.00106	<0.00318	<0.00171	<0.00202	<0.0016	<0.00179	<0.0034	<0.00072	<0.0042	<0.00343	<0.00172

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Fonofos	Delta-BHC	Cyprazine	Metribuzin	Methyl-Parathion	Alachlor	Ametryn	Prometryn	Heptachlor	Terbutryn	Metolachlor	Malathion
ASH01	990823	<.01210	<.09499	<.00510	<.01140	<.01078	<.00864	<.01032	<.00789	<.01460	<.00487	<.00568	0.0407
ASH02	990823	<.01073	<.01223	<.00307	<.00393	<.00911	<.00333	<.00596	<.00462	<.00619	<.00420	<.00253	0.0094
ASH03	990823	<.01069	<.07414	<.00638	<.01087	<.00920	<.00579	<.00556	<.01011	<.00629	<.00800	<.00250	<.01007
ASH04	990823	<.00866	<.05791	<.00409	<.00630	<.00489	<.00416	<.00517	<.00502	<.00814	<.00405	<.00213	0.0622
ASH05	990907	<.00969	<.01710	<.00431	<.00577	<.00725	<.00605	<.00662	<.00480	<.01727	<.00657	<.00403	0.0527
ASH06	990907	<.00551	<.00529	<.00295	<.00396	<.00401	<.00371	<.00241	<.00282	<.00703	<.00402	<.00301	<.01420
ASH07	990907	<.00921	<.01051	<.00274	<.00414	<.00424	<.00361	<.00366	<.00197	<.00525	<.00296	<.00439	<.01149
ASH08	990907	<.00801	<.00870	<.00219	<.00441	<.00390	<.00231	<.00337	<.00349	<.00799	<.00433	<.00445	<.01482
ASH09	990907	<.00428	<.00640	<.00172	<.00420	<.00317	<.00440	<.00335	0.4402	<.00662	<.00304	<.00245	0.0112
ASH10	990907	<.00410	<.02965	<.00290	<.00341	<.00387	<.00280	<.00211	0.0496	<.01799	<.00313	<.00306	<.01086
ASH11	990907	<.00534	<.00898	<.00361	<.00461	<.00290	<.00217	<.00200	0.0110	<.00376	<.00241	<.00301	<.01222
ASH12	990907	<.00418	<.00824	<.00231	<.00354	<.00352	<.00533	<.00256	<.00284	<.00818	<.00249	<.00237	0.0509
ASH13	990920	<.00781	<.01504	<.00327	<.00546	<.00326	<.00557	<.00560	<.00349	<.00677	<.00328	<.00169	0.0981
ASH15	990920	<.00618	<.01177	<.00397	<.00982	<.00468	<.00605	<.00433	<.00448	<.00489	<.00281	<.00139	<.00837
ASH17	990920	<.00637	<.01215	<.00327	<.00446	<.00355	<.00455	<.00617	<.00301	<.00398	<.00212	<.00224	<.00580
ASH18	990920	<.00549	<.01528	<.00334	<.05436	<.00311	<.00506	<.00364	<.00280	<.00614	0.1272	<.00213	<.01163
ASH19	990920	<.00572	<.00625	<.00228	<.00535	<.00201	<.00563	<.00360	<.00436	<.00236	<.00128	<.00157	<.00374
ASH20	990920	<.00522	<.00803	<.00200	<.00369	<.00320	<.00475	<.00250	<.00274	<.00474	<.00206	<.00114	<.00762
ASH21	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH22	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH23	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH24	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH25	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH26	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH27	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH28	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH29	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
ASH30	000905	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
CHI01	990823	<.00968	<.11001	<.01113	<.00903	<.01179	<.00532	<.01109	<.00957	<.01164	<.00555	<.00320	<.01804
CHI02	990823	<.00774	<.08581	<.00645	<.00767	<.00788	<.00520	<.01435	<.00958	<.00468	<.00385	<.00358	0.0846
CHI03	990823	<.00856	<.08613	<.00946	<.02198	<.01257	<.00880	<.00583	<.00809	<.00970	<.00703	<.00407	0.0476
CHI04	990823	<.01320	<.07033	<.00726	<.01362	<.01028	<.00499	<.01133	<.00912	<.01108	<.00759	<.00372	<.00984
DESHA01	990809	<.00555	<.01374	<.01073	<.01272	<.01278	<.00612	<.01756	<.01142	<.00873	<.01373	<.00322	<.02012
DESHA02	990809	<.01681	<.00681	<.00598	<.01270	<.01669	<.00915	<.00625	<.00926	<.00991	<.01073	<.00747	<.01730
DESHA03	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW01	990809	<.01143	<.01832	<.00723	<.00654	<.00521	<.00613	<.00484	<.00676	<.00659	<.00365	<.00376	<.01631

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Fonofos	Delta-BHC	Cyprazine	Metribuzin	Methyl-Parathion	Alachlor	Ametryn	Prometryn	Heptachlor	Terbutryn	Metolachlor	Malathion
DREW02	990809	<.01472	<.00936	<.00785	<.01248	<.00456	<.01017	<.01442	<.01081	<.01177	<.00525	<.00533	<.01377
DREW03	990809	<.01320	<.01210	<.01002	<.01544	<.01575	<.01273	<.01509	<.01173	<.01098	<.01245	<.00480	<.01934
DREW04	990809	<.01008	<.01045	<.01030	<.01245	<.01251	<.00580	<.01343	<.00760	<.01106	<.01236	<.00582	<.02046
DREW05	990823	<.00806	<.08611	<.00777	<.00571	<.00747	<.00481	<.00681	<.00695	<.00529	<.00376	<.00233	0.0646
DREW06	990823	<.01233	<.07997	<.00747	<.00951	<.00566	<.00687	<.00924	<.00660	<.00938	<.00552	<.00277	<.01298
DREW07	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW08	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	0.0537
DREW09	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	0.0612
DREW10	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	0.0490
DREW11	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW12	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW13	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW14	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW15	000711	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW16	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	0.0041	<0.00309	<0.00176	<0.00126	<0.00179
DREW17	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW18	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW19	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW20	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW21	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW22	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW23	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW24	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW25	000801	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW26	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW27	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW28	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW29	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW30	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW31	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW32	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW33	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW34	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW35	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW36	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
DREW37	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Fonofos	Delta-BHC	Cyprazine	Metribuzin	Methyl-Parathion	Alachlor	Ametryn	Prometryn	Heptachlor	Terbutryn	Metolachlor	Malathion
DREW38	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF01	000508	<.00608	<.00910	<.00323	<.00581	<.00562	<.00340	<.00354	<.00390	<.00594	<.00305	<.00220	<.00530
JEF02	000508	<.00456	<.00850	<.00264	<.00465	<.00307	<.00235	<.00261	<.00357	<.00460	<.00226	<.00149	<.00409
JEF03	000508	<.00514	<.00658	<.00272	<.00404	<.00303	<.00303	<.00208	<.00285	<.00490	<.00257	<.00159	<.00453
JEF04	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	0.0160	0.0123	<0.00309	0.0081	<0.00126	<0.00179
JEF05	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF06	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF07	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF08	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF09	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	0.0073	<0.00179
JEF10	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF11	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF12	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF13	000718	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF14	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF15	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF16	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF17	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF18	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF19	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF20	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	0.0113
JEF21	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF22	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
JEF23	000808	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	0.0097
LIN01	990809	<.01844	<.01025	<.01161	<.01159	<.02013	<.00727	<.01434	<.01724	<.00979	<.00874	<.00659	<.02624
LIN02	990809	<.00841	<.01102	<.00746	<.01566	<.01243	<.00760	<.00979	<.01804	<.00929	<.01031	<.00310	<.01954
LIN03	990809	<.00700	<.01634	<.00758	<.01064	<.00927	<.00903	<.00800	<.00772	<.00379	<.01075	<.00381	<.01267
LIN04	000508	<.00655	<.00707	<.00197	<.00628	<.00336	<.00233	<.00248	<.00270	<.00569	<.00209	<.00158	<.00535
LIN05	000508	<.00845	<.00531	<.00254	<.00600	<.00303	<.00283	<.00317	<.00200	<.00442	<.00395	<.00124	<.00515
LIN06	000508	<.00899	<.00953	<.00305	<.00524	<.00524	<.00348	<.00392	<.00388	<.00554	<.00410	<.00277	<.01622
LIN07	000508	<.00487	<.00702	<.00271	<.00502	<.00357	<.00317	<.00287	<.00385	<.00499	<.00207	<.00200	<.00373
LIN08	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN09	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN10	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN11	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN12	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Fonofos	Delta-BHC	Cyprazine	Metribuzin	Methyl-Parathion	Alachlor	Ametryn	Prometryn	Heptachlor	Terbutryn	Metolachlor	Malathion
LIN13	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN14	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN15	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN16	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN17	000724	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN18	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN19	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN20	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN21	000815	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	0.1119	<0.00179
LIN22	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN23	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	<0.00179
LIN24	000822	<0.00181	<0.00252	<0.00132	<0.00298	<0.00174	<0.0018	<0.0014	<0.00157	<0.00309	<0.00176	<0.00126	0.0134

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Dipropetryn	Chlorpyrifos	Cyanazine	Aldrin	Pendimethalin	Heptachlor-Epoxide	Endosulfan-I	p-p'-DDE	Dieldrin	Endrin	Endosulfan-II	p-p'-DDD
ASH01	990823	<.00533	<.01343	<.01227	<.02308	<.00634	<.02015	<.13581	<.00500	<.04332	<.03864	<.15916	<.00503
ASH02	990823	<.00780	<.00450	<.01489	<.01951	<.00681	<.01054	<.14515	<.00324	<.02196	<.02815	<.10304	<.00238
ASH03	990823	<.00709	<.01618	<.01673	<.01970	<.00501	<.02623	<.10337	<.00746	<.02152	<.02931	<.10909	<.00249
ASH04	990823	<.00487	<.00624	<.00824	<.01048	<.00460	<.01032	<.08247	<.00247	<.03108	<.01657	<.11537	<.00255
ASH05	990907	<.01054	<.01077	<.02009	<.01398	<.00589	<.00814	<.18188	<.00316	<.09063	<.07359	<.13256	<.00490
ASH06	990907	<.00378	<.00311	<.00870	<.00774	<.00302	<.00388	<.07744	<.00087	<.02639	<.02904	<.03555	<.00095
ASH07	990907	<.00365	<.00458	<.01040	<.00817	<.00188	<.00272	<.10020	<.00151	<.03423	<.03258	<.05433	<.00126
ASH08	990907	<.00795	<.00518	<.01022	<.00751	<.00277	<.00497	<.13174	<.00146	<.03080	<.02956	<.05841	<.00295
ASH09	990907	<.00397	<.00523	<.00804	<.00610	<.00200	<.00355	<.11841	<.00088	<.03005	<.02550	<.03505	<.00156
ASH10	990907	<.00459	<.00393	<.01354	<.00746	<.00254	<.00412	<.08883	<.00145	<.02424	<.03232	<.05080	<.00187
ASH11	990907	<.00505	<.00430	<.00842	<.00558	<.00240	<.00351	<.07830	<.00151	<.02344	<.02243	<.04338	<.00112
ASH12	990907	<.00451	<.00523	<.00808	<.00678	<.00261	<.00412	<.09918	<.00092	<.02094	<.02957	<.07302	<.00163
ASH13	990920	<.00624	<.00710	<.01118	<.00761	<.00262	<.00263	<.05139	<.00034	<.01862	<.02140	<.06445	<.00226
ASH15	990920	<.00464	<.00513	<.01174	<.01092	<.00256	<.00148	<.05796	?.00910	<.01995	<.03201	<.06167	<.00331
ASH17	990920	<.00368	<.00740	<.00635	<.00829	<.00173	<.00137	<.07441	<.00047	<.01785	<.02353	<.04647	<.00157
ASH18	990920	<.00403	<.00628	<.00871	<.00727	<.00270	<.00109	<.07347	<.00037	<.01743	<.02207	<.04617	<.00330
ASH19	990920	<.00320	<.00450	<.00431	<.00470	<.00267	<.00260	<.07521	<.00063	<.01695	<.01369	<.03456	<.00168
ASH20	990920	<.00294	<.00549	<.00549	<.00748	<.00358	<.00187	<.05561	<.00038	<.01483	<.02389	<.02737	<.00193
ASH21	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH22	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH23	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH24	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH25	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH26	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH27	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH28-	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH29	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
ASH30	000905	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
CHI01	990823	<.00951	<.01348	<.01488	<.02525	<.00804	<.02022	<.09624	<.01002	<.06081	<.04190	<.12549	<.00187
CHI02	990823	<.00579	<.01192	<.00709	<.01688	<.00801	<.01163	<.14874	<.00660	<.03051	<.02802	<.13542	<.00275
CHI03	990823	<.00782	<.02567	<.01067	<.02693	<.00910	<.02606	<.23500	<.00920	<.04943	<.04136	<.12505	<.00576
CHI04	990823	<.00907	<.02076	<.01636	<.02201	<.00719	<.02646	<.10722	<.01228	<.03438	<.03372	<.09222	<.00412
DESHA01	990809	<.00804	<.03702	<.01398	<.03021	<.00990	<.04048	<.07722	<.01309	<.04477	<.04228	<.02738	<.00245
DESHA02	990809	<.00658	<.01996	<.01687	<.03944	<.00448	<.03249	<.10933	<.01032	<.06244	<.05093	<.04850	<.00622
DESHA03	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW01	990809	<.00627	<.01651	<.01006	<.01232	<.00772	<.02526	<.10733	<.01314	<.03568	<.01762	<.12648	<.00196

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Dipropetryn	Chlorpyrifos	Cyanazine	Aldrin	Pendimethalin	Heptachlor-Epoxide	Endosulfan-I	p-p'-DDE	Dieldrin	Endrin	Endosulfan-II	p-p'-DDD
DREW02	990809	<.01460	<.01082	<.00718	<.01078	<.00597	<.02647	<.22245	<.00518	<.03260	<.01559	<.06815	<.00304
DREW03	990809	<.01363	<.01537	<.02084	<.03722	0.0135	<.02549	<.18727	<.01485	<.04745	<.04972	<.22926	<.00317
DREW04	990809	<.01457	<.03138	<.01928	<.02955	<.00776	<.02792	<.18192	<.01072	<.04468	<.03954	<.07016	<.00687
DREW05	990823	<.00501	<.01546	<.01519	<.01601	<.00670	<.00888	<.14137	<.00449	<.03250	<.02785	<.13209	<.00455
DREW06	990823	<.01231	<.01284	<.00945	<.01212	<.00807	<.01330	<.16882	<.00811	<.04494	<.01983	<.11182	<.00381
DREW07	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW08	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW09	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW10	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW11	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW12	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW13	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW14	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW15	000711	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW16	000801	0.0171	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW17	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW18	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW19	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW20	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW21	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW22	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW23	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW24	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW25	000801	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW26	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW27	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW28	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW29	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW30	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW31	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW32	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW33	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW34	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW35	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW36	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
DREW37	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Dipropetryn	Chlorpyrifos	Cyanazine	Aldrin	Pendimethalin	Heptachlor-Epoxide	Endosulfan-I	p-p'-DDE	Dieldrin	Endrin	Endosulfan-II	p-p'-DDD
DREW38	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF01	000508	<.00437	<.00734	<.00524	<.01003	<.00293	<.00846	<.12898	<.00183	<.02465	<.01767	<.03722	<.00209
JEF02	000508	<.00648	<.00516	0.0100	<.00574	<.00242	<.00318	<.08998	<.00099	<.02633	<.01065	<.04473	<.00136
JEF03	000508	<.00401	<.00434	<.00631	<.00568	<.00268	<.00495	<.09918	<.00099	<.02225	<.01116	<.04408	<.00157
JEF04	000718	0.0217	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF05	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF06	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF07	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF08	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF09	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF10	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF11	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF12	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195		<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF13	000718	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF14	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF15	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF16	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF17	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF18	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF19	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF20	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF21	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF22	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
JEF23	000808	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN01	990809	<.01175	<.03041	<.01354	<.04757	<.01491	<.03097	<.15602	<.00591	<.03806	<.06349	<.10278	<.00471
LIN02	990809	<.00593	<.03181	<.00981	<.02938	<.00371	<.03064	<.16322	<.01173	<.04825	<.03676	<.05222	<.00369
LIN03	990809	<.01131	<.01530	<.01803	<.02189	<.00434	<.02207	<.18642	<.00959	<.03165	<.02879	<.04302	<.00273
LIN04	000508	<.00345	<.00581	<.00580	<.00599	<.00233	<.00487	<.18087	<.00135	<.02674	<.01084	<.03839	<.00193
LIN05	000508	<.00484	<.00565	<.00613	<.00541	<.00360	<.00473	<.07331	<.00094	<.10912	<.00958	<.05029	<.00212
LIN06	000508	<.00615	<.00887	<.00820	<.00935	<.00443	<.00826	<.16955	<.00175	<.18796	<.01558	<.07075	<.00209
LIN07	000508	<.00395	<.00630	<.00453	<.00669	<.00310	<.00615	<.12892	<.00105	<.02657	<.01178	<.03345	<.00149
LIN08	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN09	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN10	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN11	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN12	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Dipropetryn	Chlorpyrifos	Cyanazine	Aldrin	Pendimethalin	Heptachlor-Epoxide	Endosulfan-I	p-p'-DDE	Dieldrin	Endrin	Endosulfan-II	p-p'-DDD
LIN13	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN14	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN15	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN16	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN17	000724	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN18	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN19	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN20	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN21	000815	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN22	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN23	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027
LIN24	000822	<0.00176	<0.00298	<0.00445	<0.00314	<0.00195	<0.00274	<0.00892	<0.00192	<0.00818	<0.00646	<0.00674	<0.0027

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Endosulfan-Sulfate	p-p'-DDT	Hexazinone	Methoxychlor	Technical-Chlordane	Bromide(Br)	Chloride(Cl)	Fluoride(F)	Sulfate(SO4)	NH3-N	NO3-N
ASH01	990823	<.01775	<.00639	<.00945	<.00404	<.07752	0.13	24.10	0.298	8.63	0.562	0.019
ASH02	990823	<.01155	<.00303	<.00286	<.00201	<.05589	0.10	9.70	0.381	5.00	0.868	0.105
ASH03	990823	<.01136	<.00316	<.00565	<.00193	<.08106	0.12	17.90	0.422	15.7	0.781	0.01
ASH04	990823	<.00995	<.00324	<.00460	<.00191	<.03686	0.18	37.50	0.192	11.9	0.349	0.01
ASH05	990907	<.01715	<.00437	<.02679	<.00287	<.04400	0.15	17.80	0.309	7.36	0.635	0.031
ASH06	990907	<.00232	<.00084	<.00940	<.00075	<.02858	0.07	8.58	0.305	4.17	0.583	0.017
ASH07	990907	<.00427	<.00112	<.00882	<.00121	<.02554	0.05	4.19	0.113	1.42	1.24	0.024
ASH08	990907	<.00571	<.00263	<.00881	<.00109	<.02078	0.09	8.69	0.306	1.11	0.313	<0.010
ASH09	990907	<.00557	<.00139	<.00633	<.00115	<.02606	0.78	92.70	0.408	83.2	0.663	0.04
ASH10	990907	<.00535	<.00167	<.01165	<.00076	<.01906	0.67	80.30	0.295	40.6	0.599	0.031
ASH11	990907	<.00392	<.00100	<.01114	<.00066	<.02259	0.28	40.30	0.312	2.19	0.346	<0.010
ASH12	990907	<.00490	<.00146	<.00973	<.00092	<.03755	0.06	11.20	0.27	11.8	0.192	0.015
ASH13	990920	<.00409	<.00182	<.01083	<.00174	<.01391	0.11	16.60	0.255	2.79	0.381	0.085
ASH15	990920	<.00148	<.00265	<.01272	<.00140	<.01141	0.21	38.30	0.232	9.31	0.496	0.024
ASH17	990920	<.00562	<.00126	<.00960	<.00194	<.02108	0.21	35.30	0.474	44.4	1.19	0.022
ASH18	990920	<.00563	<.00264	<.00938	<.00122	<.01119	0.18	29.40	0.375	27.8	0.281	0.033
ASH19	990920	<.00369	<.00135	<.00722	<.00116	<.02148	0.14	19.80	0.193	2.77	0.024	0.151
ASH20	990920	<.00610	<.00155	<.00851	<.00088	<.02015	0.12	15.00	0.266	2.06	0.018	0.195
ASH21	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.17	22.60	0.22	31.3	<0.005	<0.010
ASH22	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.09	21.20	0.23	93.4	<0.005	<0.010
ASH23	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.32	39.40	0.23	14	<0.005	0.184
ASH24	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.23	28.80	0.21	34	<0.005	0.042
ASH25	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.18	26.30	0.13	80.6	<0.005	0.019
ASH26	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.21	25.90	0.09	0.9	0.126	<0.010
ASH27	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.30	38.40	0.09	1.4	<0.005	0.038
ASH28	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.17	22.10	0.2	6.1	<0.005	0.063
ASH29	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.13	19.90	0.21	13.1	<0.005	<0.010
ASH30	000905	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.17	20.20	0.23	11.9	<0.005	<0.010
CHI01	990823	<.01556	<.00238	<.00637	<.00430	<.13090	0.11	14.10	0.245	4.29	0.383	0.017
CHI02	990823	<.01091	<.00349	<.00974	<.00557	<.05817	0.09	16.40	0.366	6.62	0.505	0.025
CHI03	990823	<.01491	<.00732	<.00944	<.00209	<.07817	0.12	19.00	0.259	3.68	0.425	<0.010
CHI04	990823	<.01268	<.00523	<.00917	<.00406	<.09981	0.22	41.60	0.205	6.88	0.538	<0.010
DESHA01	990809	<.03007	<.00332	<.00526	<.00745	<.10658	0.16	31.10	0.278	5.52	0.498	0.081
DESHA02	990809	<.02828	<.00846	<.00789	<.00245	<.16995	0.08	9.30	0.297	3.05	0.43	0.03
DESHA03	000711	<0.00357	<0.00106	0.0150	<0.00203	<0.00876	0.10	15.12	0.18	10.31	0.258	0.054
DREW01	990809	<.02066	<.00267	<.00323	<.00210	<.04890	0.07	14.70	0.168	5.26	0.745	0.012

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Endosulfan-Sulfate	p-p'-DDT	Hexazinone	Methoxychlor	Technical-Chlordane	Bromide(Br)	Chloride(Cl)	Fluoride(F)	Sulfate(SO4)	NH3-N	NO3-N
DREW02	990809	<.02576	<.00413	<.00554	<.00632	<.06766	0.22	45.80	0.25	17.2	0.162	0.048
DREW03	990809	<.02845	<.00431	<.00595	<.00611	<.15020	0.09	8.59	0.253	5.43	0.483	0.031
DREW04	990809	<.03743	<.00933	<.00320	<.00545	<.11894	0.08	10.70	0.264	2.82	0.342	0.028
DREW05	990823	<.01156	<.00578	<.00582	<.00277	<.05605	0.04	7.30	0.143	11.4	0.12	0.335
DREW06	990823	<.01188	<.00484	<.00399	<.00353	<.06062	0.08	10.50	0.242	9.57	0.304	0.01
DREW07	000711	<0.00357	<0.00106	0.0038	<0.00203	<0.00876	0.05	8.33	0.22	1.39	0.278	0.023
DREW08	000711	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.20	39.44	0.15	11.59	0.235	0.028
DREW09	000711	<0.00357	0.0035	<0.00208	<0.00203	<0.00876	0.08	16.80	0.13	7.57	0.426	0.024
DREW10	000711	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.05	9.69	0.12	10.54	0.203	0.146
DREW11	000711	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.05	9.51	0.11	13.8	0.15	0.946
DREW12	000711		<0.00106	<0.00208	<0.00203	<0.00876	0.18	29.34	0.14	2.91	0.214	0.021
DREW13	000711	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.06	15.21	0.14	1.9	0.264	0.024
DREW14	000711	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.05	10.12	0.12	2.34	0.411	0.026
DREW15	000711	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.34	60.10	0.21	4.28	0.653	0.023
DREW16	000801	<0.00357	<0.00106	0.0352	<0.00203	<0.00876	<0.01	5.05	0.16	3.62	0.25	<0.01
DREW17	000801	<0.00357	<0.00106	0.0166	<0.00203	<0.00876	<0.01	7.77	0.2	6.61	0.17	<0.01
DREW18	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.07	8.66	0.18	12.75	0.16	<0.01
DREW19	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	10.05	0.18	5.31	0.24	<0.01
DREW20	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.22	23.46	0.2	15.95	0.35	<0.01
DREW21	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.03	23.56	0.23	4.29	0.19	<0.01
DREW22	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.19	20.56	0.14	2.94	0.03	<0.01
DREW23	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.07	9.15	0.17	3.94	0.06	<0.01
DREW24	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.10	15.33	0.2	9.36	0.19	<0.01
DREW25	000801	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.09	27.20	0.2	6.17	0.2	<0.01
DREW26	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.17	20.24	0.14	2.66	<0.005	0.241
DREW27	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.31	35.63	0.18	16.6	<0.005	0.196
DREW28	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	4.43	0.08	3.09	0.016	0.14
DREW29	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.04	5.37	0.12	2.78	<0.005	0.197
DREW30	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.10	13.55	0.12	3.86	<0.005	0.175
DREW31	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	9.57	0.15	3.14	<0.005	0.066
DREW32	000822	<0.00357	<0.00106	0.0104	<0.00203	<0.00876	0.12	12.06	0.21	2.56	0.082	0.033
DREW33	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.13	13.02	0.13	1.31	0.009	0.352
DREW34	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.13	16.47	0.17	3.36	0.028	0.031
DREW35	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.13	15.94	0.24	7.76	0.014	0.126
DREW36	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.11	15.41	0.18	3.18	0.012	0.065
DREW37	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.17	21.68	0.15	4.06	0.026	0.04

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Endosulfan-Sulfate	p-p'-DDT	Hexazinone	Methoxychlor	Technical-Chlordane	Bromide(Br)	Chloride(Cl)	Fluoride(F)	Sulfate(SO4)	NH3-N	NO3-N
DREW38	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.21	22.98	0.16	2.91	0.026	0.03
JEF01	000508	<.00803	<.00161	<.00317	<.00075	<.04548	0.52	116.00	0.327	53.1	0.451	<0.010
JEF02	000508	<.00490	<.00101	<.00310	0.0019	<.04007	0.27	73.20	0.265	28.5	0.38	<0.010
JEF03	000508	<.00526	<.00116	<.00219	<.00050	<.03727	0.10	23.40	0.384	1.41	0.442	<0.010
JEF04	000718	<0.00357	0.0048	0.0261	<0.00203	<0.00876	0.14	23.57	0.18	10.32	0.3068	0.0157
JEF05	000718	<0.00357	<0.00106	0.0095	<0.00203	<0.00876	0.13	19.23	0.18	2.75	0.3492	0.0172
JEF06	000718	<0.00357	0.0058	<0.00208	<0.00203	<0.00876	0.18	43.67	0.23	2.24	0.32	0.0196
JEF07	000718	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.12	22.55	0.22	2.54	0.2274	0.0185
JEF08	000718	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.09	11.89	0.22	1.24	0.2341	0.0155
JEF09	000718	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.42	109.40	0.27	85.23	0.3308	0.0186
JEF10	000718	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	11.35	0.25	2.56	0.1569	0.017
JEF11	000718	<0.00357	0.0026	<0.00208	<0.00203	<0.00876	0.14	34.05	0.37	8.96	0.2376	0.0186
JEF12	000718	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.07	12.75	0.23	3.99	0.3985	0.0234
JEF13	000718	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.09	12.12	0.28	18.1	0.3226	0.0768
JEF14	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	8.75	0.22	1.58	0.136	0.025
JEF15	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.07	6.64	0.23	0.95	0.131	0.027
JEF16	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	4.82	0.21	1.16	0.071	0.028
JEF17	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.16	23.21	0.15	1.74	0.113	0.022
JEF18	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.12	22.26	0.2	14.32	0.109	0.204
JEF19	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.14	18.04	0.2	13.76	0.083	0.206
JEF20	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	10.58	0.2	7.6	0.051	0.868
JEF21	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	8.65	0.21	7.34	0.205	0.195
JEF22	000808	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	9.62	0.08	7.29	0.11	0.022
JEF23	000808	<0.00357	0.0138	<0.00208	<0.00203	<0.00876	<0.01	6.57	0.23	6.29	0.056	0.033
LIN01	990809	<.04282	<.00640	<.01269	<.00580	<.16573	0.10	14.20	0.233	4.81	0.387	0.027
LIN02	990809	<.03794	<.00502	<.00425	<.00371	<.06844	0.10	11.40	0.267	5.14	0.455	0.05
LIN03	990809	<.01991	<.00371	<.00534	<.00319	<.08330	0.14	24.20	0.251	5.27	0.321	0.038
LIN04	000508	<.00515	<.00149	<.00197	<.00054	<.03617	0.20	34.70	0.114	0.81	0.421	<0.010
LIN05	000508	<.00590	<.00164	<.00358	<.00067	<.02420	0.36	38.90	0.1	4.49	<0.005	?0.216
LIN06	000508	<.00546	<.00162	<.00376	<.00078	<.04495	0.14	13.70	0.029	2.62	0.058	<0.010
LIN07	000508	<.00497	<.00110	<.00227	<.00062	<.03113	0.08	8.56	0.314	1.83	0.215	<0.010
LIN08	000724	<0.00357	0.0167	0.0233	<0.00203	<0.00876	0.21	62.30	0.3	38.23	0.24	0.026
LIN09	000724	<0.00357	<0.00106	0.0284	<0.00203	<0.00876	0.10	37.39	0.32	5.84	0.26	0.152
LIN10	000724	<0.00357	<0.00106	0.0171	<0.00203	<0.00876	0.30	137.35	0.28	42.17	0.32	0.019
LIN11	000724	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.10	21.84	0.19	5.08	0.21	0.017
LIN12	000724	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.07	11.60	0.2	1.19	0.25	0.016

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	Endosulfan-Sulfate	p-p'-DDT	Hexazinone	Methoxychlor	Technical-Chlordane	Bromide(Br)	Chloride(Cl)	Fluoride(F)	Sulfate(SO4)	NH3-N	NO3-N
LIN13	000724	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.16	28.43	0.21	11.75	0.15	0.021
LIN14	000724	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.08	22.94	0.34	3.45	0.22	0.021
LIN15	000724	<0.00357	0.0144	<0.00208	<0.00203	<0.00876	0.06	7.46	0.32	1.94	0.17	0.022
LIN16	000724	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.07	13.15	0.26	11.02	0.19	0.039
LIN17	000724	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.32	118.85	0.33	33.94	0.33	0.022
LIN18	000815	<0.00357	<0.00106	0.0166	<0.00203	<0.00876	<0.01	10.85	0.28	10.9	0.164	0.037
LIN19	000815	<0.00357	<0.00106	0.0080	<0.00203	<0.00876	0.19	33.96	0.26	211.91	0.664	0.389
LIN20	000815	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	<0.01	8.45	0.04	1.28	<0.005	6.492
LIN21	000815	<0.00357	0.0019	<0.00208	<0.00203	<0.00876	0.07	14.65	0.23	12.82	0.057	0.03
LIN22	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.10	12.54	0.13	5.12	0.115	0.038
LIN23	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.05	10.88	0.15	5.67	<0.005	0.023
LIN24	000822	<0.00357	<0.00106	<0.00208	<0.00203	<0.00876	0.22	42.87	0.24	5.51	0.066	0.029

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	O-PHOS	T-PHOS	TKN	TOC	TSS	TDS
ASH01	990823	0.017	0.947	0.777	3.00	39.00	245.00
ASH02	990823	0.017	0.554	1.185	1.27	9.50	303.00
ASH03	990823	0.018	0.976	1.177	1.48	20.00	398.00
ASH04	990823	0.008	0.55	0.636	1.94	30.00	315.00
ASH05	990907	?0.019	13.343	1.694	9.60	598.00	267.00
ASH06	990907	?0.025	0.902	0.796	6.20	10.00	222.00
ASH07	990907	?0.048	0.318	1.434	5.20	1.50	92.00
ASH08	990907	?0.030	0.607	0.439	4.60	7.50	188.00
ASH09	990907	?0.011	0.669	0.731	3.50	23.00	504.00
ASH10	990907	?0.045	0.656	0.678	2.00	15.00	714.00
ASH11	990907	?0.081	0.734	0.439	3.90	9.50	290.00
ASH12	990907	?0.061	0.413	0.173	1.60	7.00	190.00
ASH13	990920	0.02	0.433	0.468	2.01	6.00	285.00
ASH15	990920	0.034	0.099	0.499	0.54	<1.00	363.00
ASH17	990920	0.016	0.895	1.43	1.18	18.50	464.00
ASH18	990920	0.02	0.461	0.465	2.06	26.50	364.00
ASH19	990920	0.096	0.08	<0.05	0.40	<1.00	321.00
ASH20	990920	0.129	0.109	<0.05	0.39	<1.00	243.00
ASH21	000905	0.06	0.036	0.706	?1.80	<1.00	412.50
ASH22	000905	0.086	0.053	0.647	?1.30	<1.00	539.00
ASH23	000905	0.056	0.036	0.556	?1.20	<1.00	381.50
ASH24	000905	0.053	0.037	0.609	?1.00	<1.00	421.00
ASH25	000905	0.048	0.03	0.822	?1.10	<1.00	531.00
ASH26	000905	0.356	0.298	0.866	?1.10	<1.00	140.00
ASH27	000905	0.156	0.121	0.594	?1.20	<1.00	152.50
ASH28	000905	0.08	0.045	0.484	?1.00	<1.00	392.50
ASH29	000905	0.063	0.041	0.77	?0.90	<1.00	381.50
ASH30	000905	0.056	0.034	0.524	?1.40	<1.00	389.00
CHI01	990823	0.02	0.574	0.686	2.35	14.50	254.00
CHI02	990823	0.02	0.657	0.8	2.47	24.50	224.00
CHI03	990823	0.034	1.012	0.662	2.70	24.00	256.00
CHI04	990823	0.046	0.844	0.866	2.47	29.50	305.00
DESHA01	990809	0.032	0.486	0.678		19.50	312.00
DESHA02	990809	0.016	0.566	0.647		53.50	250.50
DESHA03	000711	?0.040	1.026	0.44	2.60	41.00	215.00
DREW01	990809	0.05	0.681	1.023		32.50	178.00

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	O-PHOS	T-PHOS	TKN	TOC	TSS	TDS
DREW02	990809	0.02	0.315	0.222		4.50	271.00
DREW03	990809	0.078	0.52	0.572		23.00	176.00
DREW04	990809	0.018	0.936	0.554		24.50	224.50
DREW05	990823	0.015	0.232	0.237	0.97	7.00	122.00
DREW06	990823	0.025	0.605	0.59	2.29	17.50	186.00
DREW07	000711	?0.056	0.9	0.455	2.01	14.00	196.00
DREW08	000711	?0.066	0.507	0.262	1.10	12.50	247.00
DREW09	000711	?0.080	0.794	0.535	1.24	10.50	197.00
DREW10	000711	?0.087	0.5	0.22	1.75	4.00	177.00
DREW11	000711	?0.064	0.537	0.096	1.80	2.50	173.00
DREW12	000711	?0.072	0.672	0.342	3.32	24.50	273.00
DREW13	000711	?0.092	0.841	0.309	2.19	10.50	204.00
DREW14	000711	?0.029	1.019	0.877	8.05	15.50	224.00
DREW15	000711	?0.054	0.996	1.093	2.88	17.50	418.00
DREW16	000801	0.04	?0.63	?0.449	5.74	14.50	181.00
DREW17	000801	0.01	?0.477	?0.171	1.92	7.50	208.00
DREW18	000801	0.01	?0.479	?0.114	1.51	5.50	186.00
DREW19	000801	0.02	?0.64	?0.361	2.89	10.00	198.00
DREW20	000801	0.02	?0.611	?0.615	2.17	9.50	296.00
DREW21	000801	0.01	?0.323	?0.129	<1.00	4.00	190.00
DREW22	000801	0.01	?0.177	?0.158	<1.00	1.50	156.00
DREW23	000801	0.02	?0.275	?<0.05	<1.00	2.00	139.00
DREW24	000801	0.01	?0.64	?0.214	1.95	4.50	236.00
DREW25	000801	0.02	?0.745	?0.407	3.18	18.00	319.00
DREW26	000815	0.371	0.246	<0.05	<1.00	0.50	153.00
DREW27	000815	0.404	0.285	<0.05	<1.00	1.00	236.00
DREW28	000815	0.149	0.044	<0.05	<1.00	0.50	104.00
DREW29	000815	0.272	0.157	<0.05	<1.00	0.50	117.00
DREW30	000815	0.238	0.115	<0.05	<1.00	0.50	147.00
DREW31	000815	0.289	0.166	<0.05	<1.00	0.50	154.00
DREW32	000822	0.131	0.252	?0.876	<1.00	5.50	174.00
DREW33	000822	0.307	0.184	?0.561	<1.00	0.50	121.00
DREW34	000822	0.223	0.148	?1.284	<1.00	2.00	306.00
DREW35	000822	0.342	0.31	?1.269	<1.00	1.00	231.00
DREW36	000822	0.186	0.212	?0.984	<1.00	3.00	282.00
DREW37	000822	0.246	0.198	?0.259	<1.00	1.00	307.00

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	O-PHOS	T-PHOS	TKN	TOC	TSS	TDS
DREW38	000822	0.357	0.297	?<0.05	<1.00	2.00	296.00
JEF01	000508	<0.005	0.853	0.842	1.91	16.50	703.00
JEF02	000508	<0.005	0.672	0.559	2.20	27.00	522.00
JEF03	000508	<0.005	0.702	0.699	2.00	10.50	379.00
JEF04	000718	?0.0268	0.839		?1.53	16.50	271.00
JEF05	000718	?0.0634	0.817		?1.97	24.50	262.00
JEF06	000718	?0.0268	0.634		?1.67	8.00	290.00
JEF07	000718	?0.0201	0.585		?1.65	5.00	224.00
JEF08	000718	?0.0101	0.455		?1.63	5.00	223.00
JEF09	000718	?<0.005	0.637		?1.82	23.50	746.00
JEF10	000718	?0.0063	0.434		?1.82	5.50	247.00
JEF11	000718	?0.0054			?1.90	10.00	406.00
JEF12	000718	?<0.005			?1.84	22.50	402.00
JEF13	000718	?0.0478			?4.68	14.50	443.00
JEF14	000808	0.022	0.501	0.391	1.62	13.00	306.00
JEF15	000808	0.024	0.76	0.397	1.32	21.50	278.00
JEF16	000808	0.024	0.569	0.286	1.44	12.50	249.00
JEF17	000808	0.096	0.45	0.192	1.10	1.50	208.00
JEF18	000808	0.091	0.562	0.054	1.23	4.00	220.00
JEF19	000808	0.088	0.427	<0.05	0.53	1.00	211.00
JEF20	000808	0.059	0.309	<0.05	0.33	2.00	199.00
JEF21	000808	0.058	0.349	0.559	3.01	4.00	227.00
JEF22	000808	0.10	0.29	0.20	1.20	2.50	168.00
JEF23	000808	0.018	0.778	0.201	0.58	12.00	215.00
LIN01	990809	0.04	0.862	0.632		21.50	236.00
LIN02	990809	0.018	0.923	0.688		24.50	218.00
LIN03	990809	0.04	0.672	0.372		10.00	171.50
LIN04	000508	<0.005	1.173	0.878	11.40	35.50	261.00
LIN05	000508	0.136	0.194	0.27	1.53	6.50	199.00
LIN06	000508	0.084	0.171	0.29	1.56	3.00	112.50
LIN07	000508	0.05	0.58	0.405	1.97	31.50	236.50
LIN08	000724	0.01	?0.454	0.264	2.06	12.00	523.00
LIN09	000724	0.01	?0.524	0.277	2.66	11.00	404.00
LIN10	000724	0.01	?0.531	0.326	2.16	14.50	603.00
LIN11	000724	0.02	?0.656	<0.05	2.17	7.00	266.00
LIN12	000724	0.03	?1.232	0.274	3.02	314.00	179.00

Appendix 6 - Bayou Bartholomew General Chemistry, Metals, and Nutrients

Station_ID	Date	O-PHOS	T-PHOS	TKN	TOC	TSS	TDS
LIN13	000724	0.02	?0.798	<0.05	2.80	15.00	272.00
LIN14	000724	0.01	?0.341	0.06	1.84	69.50	268.00
LIN15	000724	0.02	?0.25	<0.05	1.83	5.00	245.00
LIN16	000724	0.02	?0.392	0.119	2.00	11.00	234.00
LIN17	000724	0.01	?0.521	0.279	2.08	12.50	539.00
LIN18	000815	0.069	0.406	0.319	<1.00	10.00	203.00
LIN19	000815	0.214	0.186	0.988	<1.00	2.50	796.00
LIN20	000815	0.029	0.027	<0.05	<1.00	0.50	76.00
LIN21	000815	0.087	0.624	0.14	<1.00	13.50	213.00
LIN22	000822	0.088	0.381	?0.157	<1.00	1.50	166.00
LIN23	000822	0.06	0.151	?0.881	1.91	18.50	137.00
LIN24	000822	0.111	0.532	?0.237	<1.00	4.50	176.00

Results of z-Test Analysis

z-Test: Two-Sample for Means	Arsenic	
	Variable 1	*Variable 2*
Mean	6.760967742	0.7632
Known Variance	84.073	0.5183
Observations	0	0
Hypothesized Mean Difference	0	
z	6.23704928573713	
P(Z<=z) one-tail	2.229507659762E-10	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	1.114753829881E-10	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Barium	
	Variable 1	*Variable 2*
Mean	258.241935	91.9976
Known Variance	17166.4	3851.2
Observations	0	0
Hypothesized Mean Difference	0	
z	9.03404504624389	
P(Z<=z) one-tail	1.084202172486E-19	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	5.421010862428E-20	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Boron	
	Variable 1	*Variable 2*
Mean	17.8776344	32.78456
Known Variance	585.7	1193.2
Observations	0	0
Hypothesized Mean Difference	0	
z	-2.0280902705984	
P(Z<=z) one-tail	0.0212755183391653	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0.0106377591695826	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Iron	
	Variable 1	*Variable 2*
Mean	12547.62366	340.012
Known Variance	61000000	1681907
Observations	0	0
Hypothesized Mean Difference	0	
z	14.3550404788383	
P(Z<=z) one-tail	0	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Calcium	
	Variable 1	*Variable 2*
Mean	47.8313978	45.26092
Known Variance	840.9	1010.5
Observations	0	0
Hypothesized Mean Difference	0	
z	0.365492367797097	
P(Z<=z) one-tail	0.357371951479688	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0.178685975739844	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Manganese	
	Variable 1	*Variable 2*
Mean	619.931183	192.28996
Known Variance	95289.2	351596.9
Observations	0	0
Hypothesized Mean Difference	0	
z	3.48142190728935	
P(Z<=z) one-tail	0.0002493795966857	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0.0001246897983429	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Potassium	
	Variable 1	*Variable 2*
Mean	1.961827957	1.7068
Known Variance	0.8536	0.2403
Observations	0	0
Hypothesized Mean Difference	0	
z	1.86045292562982	
P(Z<=z) one-tail	0.0314107370697344	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0.0157053685348672	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Chloride	
	Variable 1	*Variable 2*
Mean	25.776129	20.258
Known Variance	684.9	80.3
Observations	0	0
Hypothesized Mean Difference	0	
z	1.70291022074074	
P(Z<=z) one-tail	0.0442924364035147	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0.0221462182017573	
z Critical two-tail	1.95996399257784	

z-Test: Two-Sample for Means	Total Dissolved Solids	
	Variable 1	*Variable 2*
Mean	278.489247	277.30
Known Variance	17192	16714
Observations	0	0
Hypothesized Mean Difference	0	
z	0.0407090263641208	
P(Z<=z) one-tail	0.483763932780903	
z Critical one-tail	1.64485363087206	
P(Z<=z) two-tail	0.241881966390452	
z Critical two-tail	1.95996399257784	

APPENDIX 7

AQUATIC MACROINVERTEBRATE

Pool Habitat Parameters

POOL HABITAT EVALUATION

STREAM____________________ DATE__________ COLLECTORS______________

LOCATION____________________________________ ECOREGION__________

LAND USE

URBAN__________ ANIMAL/AGRI__________ SILVICULTURE______________

LENGTH__________ WATER WIDTH__________ MEAN VELOCITY (ft/sec.)__________

Bottom Substrate/instream Cover	Greater than 50% mix of submerged logs, undercut banks, or other stable habitat. 16-20	30-50% mix. This is adequate habitat. 11-15	10-30% mix. 6-10	<10% mix. Lack of habitat is obvious. 0-5
Pool bottom substrate	Firm sand and possibly some gravel with root wads and coarse woody debris. 16-20	Mixture of soft sand, mud or clay, mud may be dominant, some root wads and submerged vegetation present. 11-15	All mud or clay, or channelized with sand bottom; little or no submerged habitat. 6-10	Hard-pan clay or bedrock; no root wads or vegetation. 0-5
Pool variability	Even mix of deep/ shallow, large/small pools present 16-20	Majority of pools large and deep; few shallow 11-15	Shallow pools much more prevalent than deep pools 6-10	Majority of pools small and shallow, or pools absent 0-5
Canopy Cover	Mix of areas shaded and receiving direct sunlight 16-20	Covered by sparse canopy; entire surface w/ filtered light 11-15	Completely covered by dense canopy. 6-10	Full sunlight 0-5
Channel alteration	Little or none 12-15	Some new increase in bar formation or channelization activities 8-11	Moderate deposition of sediment, pools partially filled and/or channelization on one or both banks 4-7	Heavy deposits of sediment, increased bar development, pools filled w/ silt and/or extensive channelization 0-3
Deposition	>5% affected 12-15	5-30% affected, moderate accumulation of sediment around snags and vegetation 8-11	5-30% affected, major depositions around snags and emergent vegetation 4-7	Channelized, pools almost filled with sediment 0-3
Channel sinuosity	Channel length 3-4X straight line distance 12-15	Channel length 2-3X straight line distance 8-11	Channel length 1-2X straight line distance 4-7	Channel straight 0-3
Bank stability	Stable 9-10	Moderately stable 6-8	Moderately unstable 3-5	Unstable 0-2
Bank Vegetative stability	>90% covered 9-10	70-89% covered 6-8	50-79% covered 3-5	< 50% covered 0-2
Dominant Streamside cover	Shrub 9-10	Tree 6-8	Grass 3-5	>50% bare 0-2
Riparian Buffer Zone	>50 m 9-10	25-50 m 6-8	10-25 m 3-5	<10 m 0-2
Total				

APPENDIX 8

AQUATIC MACROINVERTEBRATES

Summary Results

Fall 1999 and Spring 2000 Samplings

Aquatic Macroinvertebrate Summary Results
Fall 1999

TAXA	HBI	GRP	EPT	B. Imbeau OUA0147	B. Bart. OUA0033	Cousart B. OUA0149	Jacks B. OUA0150	Deep B. OUA0151	B. Bart BYB03	L. Ables OUA158	B. Bart BYB02	U. Cut-Off COC02	M. Cut-Off OUA0157	L. Cut-Off COC01	B. Bart OUA0154	B. Bart. OUA0013
Hirudinea	3	PRE	N	1	1	0	0	0	0	2	0	0	0	1	1	0
Eubranchipus	7.7	PRE	N	0	1	1	0	0	42	3	18	0	0	1	7	0
Lirceus	7.7	COL	N	0	0	0	0	0	0	0	0	3	20	0	6	3
Hyallela azetca	4	COL	N	0	0	0	0	0	0	2	0	0	1	0	0	0
Gammarus	2	COL	N	0	0	0	0	0	0	0	1	4	0	45	5	1
Cambaridae (F)	3	COL	N	2	1	0	1	0	0	0	0	0	0	0	5	0
Orconectes	2.7	COL	N	0	0	0	0	0	0	3	2	0	0	0	0	0
Palaemonetes	3	COL	N	1	31	7	2	38	68	61	47	16	12	12	61	10
Viviparidae	4	SCR	N	50	0	2	0	2	0	5	0	0	0	0	0	0
Lymnaeidae	3	COL	N	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancylidae	4	COL	N	0	0	0	0	0	0	0	0	0	5	0	0	0
Physidae	4	SCR	N	4	0	0	6	0	4	0	0	0	0	0	0	3
Planorbidae	6	COL	N	1	0	1	0	1	0	0	0	0	0	0	0	0
Ligumia subrostrata	8	FIL	N	0	0	0	1	0	0	0	0	0	0	0	0	0
Lampsilis teres	8	FIL	N	0	0	0	0	1	0	0	0	0	0	0	0	0
Corbicula	6.3	FIL	N	0	0	1	30	10	0	0	0	0	0	0	0	0
Sphaeriidae	7.7	FIL	N	2	0	0	0	0	0	0	0	0	1	0	0	2
Caenis	7.6	COL	Y	0	3	9	1	2	0	2	1	0	6	2	21	30
Hexagenia	4.7	COL	Y	0	0	1	0	0	0	0	0	0	0	0	0	1
Ephemerella	2.9	COL	Y	0	0	0	0	0	0	0	0	0	0	0	0	2
Stenacron	3.1	SCR	Y	0	3	0	0	0	0	0	0	0	0	0	2	0
Heptagenia	2.8	SCR	Y	0	0	0	0	0	1	0	0	0	0	0	0	0
Ameletus	2.1	COL	Y	0	0	0	0	0	0	0	0	0	0	4	0	0
Tricorythodes	5.4	COL	Y	0	0	1	0	0	0	0	0	0	0	0	0	0
Boyeria	6.3	PRE	N	0	1	0	0	0	1	1	0	0	4	1	0	2
Enallagma	9	PRE	N	0	8	25	5	0	0	3	0	6	1	0	0	0
Argia	5.1	PRE	N	0	20	5	0	22	8	11	7	12	9	2	10	2
Ischnura	1	PRE	N	0	0	0	0	0	0	0	0	0	1	0	0	0
Epicordulia	0	PRE	N	0	0	0	0	0	0	2	0	0	0	0	0	0
Somatochlora	4.45	PRE	N	0	0	3	0	0	0	0	0	0	8	0	1	0
Tetragoneuria	3	COL	N	0	2	0	0	0	0	0	0	0	0	0	0	0
Dromogomphus	9.7	PRE	N	0	0	1	0	1	0	2	0	4	0	0	0	0
Gomphus	4.9	PRE	N	0	1	0	0	0	0	0	1	0	0	0	3	0

Aquatic Macroinvertebrate Summary Results
Fall 1999

TAXA	HBI	GRP	EPT	B. Imbeau OUA0147	B. Bart. OUA0033	Cousart B. OUA0149	Jacks B. OUA0150	Deep B. OUA0151	B. Bart BYB03	L. Ables OUA158	B. Bart BYB02	U. Cut-Off COC02	M. Cut-Off OUA0157	L. Cut-Off COC01	B. Bart OUA0154	B. Bart. OUA0013
Erythrodiplax	7.7	PRE	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Pachydiplax	5	PRE	N	0	0	0	0	0	0	0	0	0	1	0	0	0
Sympetrum	2	PRE	N	0	0	0	0	0	0	0	0	0	5	0	0	0
Libellula	9.8	PRE	N	0	3	0	0	0	0	0	1	0	0	0	0	0
Perithemis	10	PRE	N	0	0	0	0	0	0	0	0	0	0	0	3	0
Brechmorhoga	5	COL	N	0	0	0	0	0	0	0	0	0	0	0	0	1
Macromia	6.7	PRE	N	0	8	1	0	2	1	3	7	13	1	2	0	3
Belostoma	9.8	PRE	N	1	0	0	1	1	0	0	0	0	1	1	0	0
Lethocerus	2.7	SHR	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Hesperocorixa	9	PIE	N	7	1	0	0	0	2	0	4	1	0	1	3	4
Metrobates	6	PRE	N	0	0	0	1	0	0	0	0	2	1	0	0	0
Hydrometra	6.6	SHR	N	0	0	1	0	0	0	0	0	0	0	0	0	0
Ranatra	7.5	PRE	N	0	0	2	2	1	0	0	0	0	1	0	0	0
Notonecta	2	PRE	N	1	0	0	0	0	0	0	0	1	0	0	0	0
Agapetus	0	SCR	Y	1	0	0	0	0	0	0	0	0	0	0	0	0
Glossosoma	1.5	SCR	Y	0	0	0	0	1	0	0	0	0	0	0	0	0
Hydroptila	4	COL	Y	0	0	0	0	1	0	0	0	0	0	0	0	0
Nerophilus	1.6	SCR	Y	0	0	1	0	0	0	0	0	0	0	0	0	0
Wormaldia	0.4	COL	Y	0	0	0	0	0	0	0	0	0	0	0	0	1
Cyrnellus	0	COL	Y	0	1	0	0	0	0	0	0	0	0	0	0	0
Laccophilus	10	PRE	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Coptotomus	9	PRE	N	0	0	0	0	0	0	0	0	0	0	2	0	0
Hydroporus	5	PRE	N	0	0	0	0	0	0	4	0	4	4	1	1	0
Hydrovatus	5	PRE	N	0	0	1	0	0	0	0	0	0	1	0	0	0
Dubiraphia (L)	6.4	COL	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Stenelmis (L)	5.4	SCR	N	0	11	4	5	4	0	0	0	15	0	1	0	7
Stenelmis (A)	5.4	SCR	N	0	0	0	3	0	0	0	0	3	0	0	0	0
Microcylloepus (L)	1	SHR	N	0	0	0	0	0	0	0	1	0	0	0	0	0
Ancyronyx	4	COL	N	0	0	0	0	0	0	0	0	0	0	0	0	1
Ordobrevia	2.7	COL	N	0	0	1	0	0	0	0	0	0	0	0	0	0
Dineutus	3	SHR	N	0	0	0	0	0	0	0	0	1	0	0	0	0
Gyretes (L)	4.9	PRE	N	0	0	0	0	0	0	4	0	0	0	0	0	0
Peltodytes	5	PRE	N	26	0	11	10	0	0	1	9	0	0	3	0	1

Aquatic Macroinvertebrate Summary Results
Fall 1999

TAXA	HBI	GRP	EPT	B. Imbeau OUA0147	B. Bart. OUA0033	Cousart B. OUA0149	Jacks B. OUA0150	Deep B. OUA0151	B. Bart BYB03	L. Ables OUA158	B. Bart BYB02	U. Cut-Off COC02	M. Cut-Off OUA0157	L. Cut-Off COC01	B. Bart OUA0154	B. Bart. OUA0013
Haliplus (L)	4	PRE	N	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*
Hydrobiomorpha (L)	4	COL	N	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*
Tropisternus (L)	9.8	COL	N	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Berosus (L)	8.6	PRE	N	*0*	*0*	*28*	*2*	*1*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*
Tropisternus	9.8	COL	N	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Hydrocanthus	4	COL	N	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Cyphon (L)	7	PRE	N	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*
Athericidae	2	PIE	N	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*
Alluaudomyia	0	PRE	N	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Chaoborus	8.5	PRE	N	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Chironomid #1 (L)	3	PRE	N	*0*	*1*	*4*	*16*	*13*	*5*	*12*	*1*	*9*	*4*	*17*	*3*	*13*
Chironomid #2 (p)	3	PRE	N	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Empididae	4	SCR	N	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*
Pelecorhynchidae	5	PRE	N	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*
Phoridae	0	COL	N	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Simulium	4.4	COL	N	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Ceratopogonidae	8.1	COL	N	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*
				104	97	113	90	102	133	122	103	96	89	96	132	88

Aquatic Macroinvertebrate Summary Results
Spring 2000

TAXA	HBI	GRP	EPT	B. Bart OUA0143	Harding OUA0145	Nevins OUA0144	B. Imbeau OUA0147	B. Bart. OUA0033	Meltons OUA0160	Deep B. OUA0151	B. Bart BYB03	U. Ables OUA158	L. Ables OUA158	U. Cut-Off COC02	Bearhouse OUA0157
Hirudinea	3	PRE	N	0	1	2	25	4	0	1	0	0	1	0	6
Eubranchipus	7.7	PRE	N	0	9	0	0	0	0	0	0	1	0	0	1
Lirceus	7.7	COL	N	0	0	17	0	0	0	3	5	4	1	15	53
Caecidotea	4	COL	N	0	0	0	0	0	0	0	0	1	0	0	34
Synurella	4	COL	N	0	0	0	0	0	3	0	0	0	0	0	0
Hyallela azetca	7.9	COL	N	0	0	0	24	0	0	1	0	0	0	16	0
Gammarus	2	COL	N	1	0	0	0	43	0	1	1	21	3	28	1
Cambaridae	8.3	PRE	N	0	1	2	0	27	0	1	45	1	15	3	0
Orconectes	N/A	N/A	N/A	0	0	0	1	0	0	0	0	0	0	0	0
Palaemonetes	N/A	N/A	N/A	6	29	4	0	1	0	15	7	5	20	2	0
Lymnaeidae	3	COL	N	2	0	0	0	1	0	0	0	0	6	0	0
Physa	N/A	N/A	N/A	0	10	0	40	1	1	3	0	1	0	8	0
Planorbidae	6	COL	N	0	0	0	0	0	0	1	0	1	1	0	1
Helisoma	6.5	COL	N	0	10	0	4	0	0	0	0	0	0	1	0
Potamilus purpuratus	8	FIL	N	0	0	0	0	1	0	0	0	0	0	0	0
Plectomerus dombeyanus	8	FIL	N	0	0	0	0	0	0	0	0	0	1	0	0
Corbicula	6.3	N/A	N/A	0	0	0	0	0	0	5	1	0	0	0	0
Sphaerium	7.7	FIL	N	0	1	3	16	1	9	4	2	1	3	4	5
Caenis	7.6	COL	Y	2	3	7	2	31	0	25	1	4	32	5	0
Hexagenia	4.7	COL	Y	0	0	0	0	0	0	0	0	0	2	0	0
Ephemerellidae	2.9	COL	Y	0	5	0	0	0	0	0	0	4	0	6	0
Siphlonurus	7	COL	Y	1	0	0	0	0	0	0	0	0	0	0	0
Tricorythodes	5.4	COL	Y	0	0	0	0	0	0	0	0	0	0	0	0
Aeschna	5	PRE	N	0	0	1	0	0	0	0	0	0	0	0	0
Boyeria	6.3	PRE	N	0	0	0	0	0	0	0	1	0	0	0	0
Nasiaeschna	8	PRE	N	0	0	0	0	0	0	0	1	0	0	0	0
Enallagma	9	PRE	N	0	17	0	5	5	0	9	7	0	0	0	0
Argia	5.1	PRE	N	0	0	0	0	0	0	0	0	0	0	0	0
Ischnura	1	PRE	N	41	0	13	0	0	0	0	0	0	0	0	0
Epicordulia	0	PRE	N	0	0	0	0	0	0	2	0	0	0	0	0
Somatochlora	4.45	PRE	N	0	0	0	1	0	0	0	0	1	0	0	0
Tetragoneuria	3	COL	N	0	0	0	0	0	0	0	0	0	0	0	0
Tramea	9	PRE	N	0	0	0	0	0	0	1	0	0	0	0	0
Gomphus	4.9	PRE	N	0	0	0	0	1	0	1	2	0	0	0	0
Sympetrum	7.3	PRE	N	2	0	0	0	0	0	0	0	0	0	0	0
Libellula	9.8	PRE	N	2	0	3	0	0	0	0	0	0	0	0	0

Aquatic Macroinvertebrate Summary Results
Spring 2000

TAXA	HBI	GRP	EPT	B. Bart OUA0143	Harding OUA0145	Nevins OUA0144	B. Imbeau OUA0147	B. Bart. OUA0033	Meltons OUA0160	Deep B. OUA0151	B. Bart BYB03	U. Ables OUA158	L. Ables OUA158	U. Cut-Off COC02	Bearhouse OUA0157
Orthemis	6	PRE	N	0	0	0	1	0	0	0	0	0	0	0	0
Macromia	6.7	PRE	N	0	0	0	0	0	0	0	1	0	3	0	0
Perlesta	0	PRE	Y	0	0	1	0	0	0	0	3	2	0	3	31
Belostoma	9.8	PRE	N	2	0	0	2	0	1	0	0	0	0	0	0
Lethocerus	2.7	SHR	N	0	0	0	0	0	0	0	0	0	0	0	0
Hesperocorixa	9	PIE	N	0	0	0	0	0	0	0	2	0	1	1	0
Trichocorixa	5	PRE	N	4	0	0	0	0	2	0	0	0	0	0	0
Metrobates	6	PRE	N	0	0	0	0	0	0	0	0	0	0	0	0
Limnoporus	5	SHR	N	2	0	0	0	0	0	0	0	0	0	0	0
Hydrometra	6.6	SHR	N	0	0	0	0	0	0	0	0	0	0	0	0
Pelocoris	5	PRE	N	0	0	0	0	0	1	0	0	0	0	0	0
Ranatra	7.5	PRE	N	3	1	0	1	0	2	0	1	0	0	0	0
Notonecta	2	PRE	N	0	0	0	0	0	4	0	0	0	0	0	0
Cheumatopsyche	6.6	FIL	Y	0	0	1	0	0	0	0	6	0	0	0	1
Chauliodes	8.5	PRE	N	0	0	0	0	0	1	0	0	0	0	0	0
Agabetes	5	PRE	N	0	0	0	0	0	1	0	0	0	0	0	0
Laccophilus	10	PRE	N	2	1	0	2	0	1	0	0	0	0	6	0
Coptotumus	9	PRE	N	1	0	0	0	0	1	0	0	0	0	0	0
Copelatus	9.1	PRE	N	0	0	0	0	0	1	0	0	0	0	0	0
Eretes	4	PRE	N	0	0	0	0	0	0	0	1	0	0	0	0
Hydroporus (A)	5	PRE	N	1	0	0	0	1	2	0	0	1	0	0	5
Hydroporus (L)	8.9	PRE	N	0	0	0	0	0	0	0	0	3	4	0	3
Hydrovatus	5	PRE	N/A	0	0	0	0	0	0	0	0	0	0	0	0
Oreodytes (A)	5	PRE	N	0	0	0	0	0	0	0	1	0	0	0	0
Oreodytes (L)	5	PRE	N	4	0	5	0	0	0	0	0	0	0	0	0
Thermonectus (A)	3	PRE	N	0	0	0	0	0	1	0	0	0	0	0	0
Thermonectus (L)	3	PRE	N	0	0	0	0	0	1	0	0	0	0	0	0
Uvarus (A) #1	5	PRE	N	0	0	3	0	0	0	0	1	0	0	0	0
Uvarus (A) #2	5	PRE	N	0	0	6	0	0	0	0	0	0	0	0	0
Uvarus (A) #3	5	PRE	N	0	0	3	0	0	0	0	0	0	0	0	0
Dubiraphia (L)	6.4	COL	N	0	0	0	0	0	0	0	0	0	0	0	0
Stenelmis (L)	5.4	SCR	N	0	0	0	0	3	0	1	9	0	6	1	0
Stenelmis (A)	5.4	SCR	N	1	0	1	0	1	0	0	5	0	0	1	0
Dineutus (A)	5.5	PRE	N	1	0	0	1	0	0	0	0	0	3	1	0
Dineutus (L)	5.5	PRE	N	3	0	0	0	1	0	0	0	2	1	1	0
Gyrinus	4.9	PRE	N	0	0	1	0	1	0	0	0	0	3	0	0

Aquatic Macroinvertebrate Summary Results
Spring 2000

TAXA	HBI	GRP	EPT	B. Bart OUA0143	Harding OUA0145	Nevins OUA0144	B. Imbeau OUA0147	B. Bart. OUA0033	Meltons OUA0160	Deep B. OUA0151	B. Bart BYB03	U. Ables OUA158	L. Ables OUA158	U. Cut-Off COC02	Bearhouse OUA0157
Gyretes (L)	4.9	PRE	N	0	0	0	0	0	0	0	0	0	0	0	0
Peltodytes (A)	8.5	SHR	N	0	6	0	14	1	1	32	4	0	2	1	0
Peltodytes (L)	8.5	PIE	N	0	1	0	0	0	0	0	0	0	0	0	0
Haliplus (A)	N/A	N/A	N/A	0	9	0	0	0	0	0	0	0	0	0	0
Haliplus (L)	4	PRE	N	0	0	0	0	0	0	0	0	0	0	0	0
Leptophlebiidae	6.4	COL	Y	0	0	0	0	0	0	0	0	0	1	0	0
Tropisternus (A)	9.8	COL	N	0	0	0	0	0	0	0	0	0	0	0	0
Tropisternus (L)	9.8	COL	N	3	0	0	0	0	2	0	0	0	0	0	0
Berosus (L)	N/A	N/A	N/A	1	0	0	0	0	0	0	0	0	0	0	0
Scirtidae	7	COL	N	0	0	1	0	0	0	0	0	0	0	0	0
Ceratopogonidae (L)	5.7	PRE	N	0	1	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae (P)	5.7	PRE	N	0	0	0	0	0	0	0	0	0	0	1	0
Palpomyia	N/A	N/A	N/A	0	1	0	0	0	0	0	0	7	0	0	0
Ceratopogon (L)	6	PRE	N	0	0	0	0	0	0	0	0	0	0	1	0
Chaoborus	8.5	PRE	N	1	0	0	0	0	0	0	0	1	0	0	0
Chironomid #1 (L)	N/A	N/A	N/A	11	1	27	7	3	68	1	2	21	6	2	3
Chironomid #2 (p)	N/A	N/A	N/A	0	0	6	0	1	1	1	1	0	1	0	0
Anopheles	9.1	COL	N	1	0	1	0	0	0	0	0	0	0	0	0
Simulium	4.4	COL	N	0	0	0	0	0	0	0	0	0	0	0	0
Caloparyphus (L)	7	COL	N	0	0	0	0	0	0	0	0	0	0	0	1
Chrysops	7.3	COL	N	0	0	0	0	0	0	0	0	1	0	0	0
Oligochaeta	3.5	COL	N	0	0	0	0	0	0	0	0	3	1	0	0
Stenonema	3.3	SCR	Y	0	0	0	0	0	0	0	0	3	0	0	0
Viviparidae	4	SCR	N	0	0	0	0	0	0	0	0	0	8	0	0
				98	107	108	146	128	104	108	110	89	125	107	145

APPENDIX 9

FISH COMMUNITY DATA

Site Habitat Analysis

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Bayou Bartholomew OUA0143	Oakwood Rd. in Pine Bluff								
		Pool							
			1	120	4	38	2	44	
			3	100	6	49	4	59	
			4	50	5	38	4	47	
			7	65	6	20	4	30	
			8	60	8	38	5	51	
			Sum/Avg.	**395.0**	**5.8**	**36.6**	**3.8**	**46.2**	**182.5**
		Run							
			2	35	5	6	10	21	
			4	60	6	40	6	52	
			6	10	6	10	12	28	
			Sum/Avg.	**105.0**	**5.7**	**18.7**	**9.3**	**33.7**	**35.4**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Nevins Creek OUA0144	Good Faith Rd. in Pine Bluff								
		Pool							
			1	200	5	54	4	63	
			3	100	5	32	4	41	
			6	60	2	20	4	26	
			7	300	5	50	4	59	
			Sum/Avg.	**660.0**	**4.3**	**39.0**	**4.0**	**47.3**	**311.9**
		Riffle							
			2	15	15	2	4	21	
			4	25	10	6	10	26	
			Sum/Avg.	**40.0**	**12.5**	**4.0**	**7.0**	**23.5**	**9.4**
		Run							
			5	200	7	46	6	59	
			Sum/Avg.	**200.0**	**7.0**	**46.0**	**6.0**	**59.0**	**118.0**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Harding Creek OUA0145	west 34th street in pine bluff								
		Pool							
			1	700	9	22	10	41	
			Sum/Avg.	**700.0**	**9.0**	**22.0**	**10.0**	**41.0**	**287.0**
		Run							
			2	2400	8	26	6	40	
			Sum/Avg.	**2400.0**	**8.0**	**26.0**	**6.0**	**40.0**	**960.0**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Bayou Imbeau OUA0147	38thst off hwy 15, south ofUS 65								
		Pool							
			1	250	2	26	4	32	
			3	280	1	14	4	19	
			5	340	1	16	4	21	
			7	100	1	8	4	13	
			Sum/Avg.	**970.0**	**1.3**	**16.0**	**4.0**	**21.3**	**206.1**
		Run							
			2	40	1	20	4	25	
			4	60	1	14	4	19	
			6	50	1	16	4	21	
			8	40	1	8	4	13	
			Sum/Avg.	**190.0**	**1.0**	**14.5**	**4.0**	**19.5**	**37.1**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	IHI
Bayou Bartholomew OUA033	2mi. South of Ladd off hwy 425								
		Pool							
			1	160	2	20	2	24	
			3	180	2	18	2	22	
			6	300	2	46	4	52	
			9	300	2	40	4	46	
			Sum/Avg.	**940.0**	**2.0**	**31.0**	**3.0**	**36.0**	**338.4**
		Riffle							
			5	60	2	20	8	30	
			8	20	1	20	8	29	
			Sum/Avg.	**80.0**	**1.5**	**20.0**	**8.0**	**29.5**	**23.6**
		Run							
			2	80	3	20	8	31	
			4	70	2	22	10	34	
			7	250	2	38	8	48	
			Sum/Avg.	**400.0**	**2.3**	**26.7**	**8.7**	**37.7**	**150.7**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Cousart Bayou OUA0149	Co. Rd. 2 mi. south of Tamo off U.S.65								
		Run							
			1	1600	4	38	2	44	
			Sum/Avg.	**1600.0**	**4.0**	**38.0**	**2.0**	**44.0**	**704.0**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Jacks Bayou OUA0150	Co. Rd 1. mi south of Tamo off U.S. 65								
		Riffle							
			2	40	6	28	8	42	
			Sum/Avg.	**40.0**	**6.0**	**28.0**	**8.0**	**42.0**	**16.8**
		Run							
			1	600	4	34	3	41	
			3	60	4	29	3	36	
			Sum/Avg.	**660.0**	**4.0**	**31.5**	**3.0**	**38.5**	**254.1**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Deep Bayou OUA0151	hwy 11, 3mi. South of Grady								
		Pool							
			1	200	3	34	4	41	
			3	200	2	30	4	36	
			5	140	6	22	4	32	
			7	270	4	36	8	48	
			9	320	6	32	8	46	
			11	70	4	30	8	42	
			Sum/Avg.	**1200.0**	**4.2**	**30.7**	**6.0**	**40.8**	**490.0**
		Riffle							
			8	60	7	14	8	29	
			10	30	6	22	8	36	
			Sum/Avg.	**90.0**	**6.5**	**18.0**	**8.0**	**32.5**	**29.3**
		Run							
			2	40	4	12	8	24	
			4	40	5	22	4	31	
			6	30	4	18	6	28	
			Sum/Avg.	**110.0**	**4.3**	**17.3**	**6.0**	**27.7**	**30.4**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Able's Creek OUA0158	Hwy 138 north of Selma								
		Pool							
			3	180	1	28	2	31	
			6	80	2	26	5	33	
			8	140	1	28	4	33	
			Sum/Avg.	**400.0**	**1.3**	**27.3**	**3.7**	**32.3**	**129.3**
		Riffle							
			1	15	1	22	8	31	
			4	20	4	18	8	30	
			Sum/Avg.	**35.0**	**2.5**	**20.0**	**8.0**	**30.5**	**10.7**
		Run							
			2	50	2	20	8	30	
			5	60	3	28	6	37	
			7	70	3	34	6	43	
			Sum/Avg.	**180.0**	**2.7**	**27.3**	**6.7**	**36.7**	**66.0**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Cut-Off Creek UWCOC01	Co. Rd. northeast of Boydell off US 165								
		Pool							
			1	100	1	36	4	41	
			3	150	1	50	4	55	
			5	70	1	38	4	43	
			Sum/Avg.	**320.0**	**1.0**	**41.3**	**4.0**	**46.3**	**148.3**
		Riffle							
			4	50	4	26	6	36	
			Sum/Avg.	**50.0**	**4.0**	**26.0**	**6.0**	**36.0**	**18.0**
		Run							
			2	20	2	36	4	42	
			Sum/Avg.	**20.0**	**2.0**	**36.0**	**4.0**	**42.0**	**8.4**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	I H I
Cut-Off Creek UWCOC02	Hwy 4 14 miles east of Monticello								
		Pool							
			2	100	2	34	6	42	
			4	50	2	44	6	52	
			6	40	1	28	6	35	
			8	60	6	6	10	22	
			10	150	2	50	8	60	
			Sum/Avg.	**400.0**	**2.6**	**32.4**	**7.2**	**42.2**	**168.8**
		Run							
			1	200	2	40	6	48	
			3	80	2	36	6	44	
			5	100	1	24	6	31	
			7	30	1	24	6	31	
			9	30	2	18	10	30	
			Sum/Avg.	**440.0**	**1.6**	**28.4**	**6.8**	**36.8**	**161.9**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	IHI
Bayou Bartholomew near Boydell	County Road near Boydell								
		Pool							
			1	800	2	34	8	44	
			3	400	2	26	10	38	
			5	700	2	30	10	42	
			Sum/Avg.	**1900.0**	**2.0**	**30.0**	**9.3**	**41.3**	**785.3**
		Run							
			2	100	2	20	10	32	
			4	120	2	28	10	40	
			6	150	2	30	10	42	
			Sum/Avg.	**370.0**	**2.0**	**26.0**	**10.0**	**38.0**	**140.6**

Fish Habitat Summary Report

Stream Name	Location	Habitat Type	Habitat Number	Length (FT.)	Substrate Score	Instream Habitat Score	Embed-deness	Habitat Score	IHI
Bayou Bartholomew OUA013	LA 834 off US 165 west of Jones, LA								
		Pool							
			1	1000	4	38	6	48	
			3	60	2	36	10	48	
			5	100	2	36	10	48	
			Sum/Avg.	**1160.0**	**2.7**	**36.7**	**8.7**	**48.0**	**556.8**
		Run							
			2	100	2	26	10	38	
			4	80	2	32	10	44	
			Sum/Avg.	**180.0**	**2.0**	**29.0**	**10.0**	**41.0**	**73.8**

APPENDIX 10

FISH COMMUNITY DATA

Taxa List

Fish Collection Report

Stream Name: Bayou Bartholomew OUA0143 **Sample Location:** Oakwood Rd. in Pine Bluff **Collection Date:**

Family_Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				1	0.25%
		Totals for Amiidae			**1**	**0.25%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				3	0.75%
		Totals for Aphredoderidae			**3**	**0.75%**
Centrarchidae						
Centrarchus macropterus	Flier	TGC			13	3.23%
Lepomis cyanellus	Green sunfish	CAD			4	1.00%
Lepomis gulosus	Warmouth				18	4.48%
Lepomis macrochirus	Bluegill	LDD			154	38.31%
Lepomis marginatus	Dollar sunfish				100	24.88%
Lepomis microlophus	Redear				7	1.74%
Lepomis punctatus	Spotted sunfish				8	1.99%
Micropterus salmoides	Largemouth bass	LDD			26	6.47%
Pomoxis nigromaculatus	Black crappie				5	1.24%
		Totals for Centrarchidae			**335**	**83.33%**
Cyprinidae						
Notemigonus crysoleucas	Golden shiner			P	16	3.98%
Notropis maculatus	Taillight shiner				17	4.23%
		Totals for Cyprinidae			**33**	**8.21%**
Cyprinodontidae						
Fundulus olivaceus	Blackspotted topminnow				3	0.75%
		Totals for Cyprinodontidae			**3**	**0.75%**
Esocidae						
Esox americanus	Grass pickerel				17	4.23%
		Totals for Esocidae			**17**	**4.23%**
Ictaluridae						
Ameiurus melas	Black bullhead				2	0.50%
Ameiurus natalis	Yellow bullhead	A/T/L			4	1.00%
		Totals for Ictaluridae			**6**	**1.49%**
Percidae						
Etheostoma gracile	Slough darter	TGC			1	0.25%
		Totals for Percidae			**1**	**0.25%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Poeciliidae						
Gambusia affinis	Mosquitofish				3	0.75%
			Totals for Poeciliidae		**3**	**0.75%**

Total Numbers	**402**
Total Species	19
Level of Effort (sec)	2439
Catch/Effort (No./min.)	9.89

Fish Collection Report

Stream Name: Nevins Creek **Sample Location:** Good Faith Rd. in Pine Bluff **Collection Date:** 7/6/1999
OUA0144

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				9	3.73%
		Totals for Aphredoderidae			**9**	**3.73%**
Atherinidae						
Labidesthes sicculus	Brook silversides				2	0.83%
		Totals for Atherinidae			**2**	**0.83%**
Catostomidae						
Erimyzon oblongus	Creek chubsucker				9	3.73%
Minytrema melanops	Spotted sucker	TGC			2	0.83%
		Totals for Catostomidae			**11**	**4.56%**
Centrarchidae						
Lepomis gulosus	Warmouth				14	5.81%
Lepomis macrochirus	Bluegill	LDD			137	56.85%
Lepomis marginatus	Dollar sunfish				16	6.64%
Lepomis megalotis	Longear	B/A/O/S			6	2.49%
Lepomis microlophus	Redear				2	0.83%
Micropterus salmoides	Largemouth bass	LDD			7	2.90%
		Totals for Centrarchidae			**182**	**75.52%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	5	2.07%
		Totals for Clupeidae			**5**	**2.07%**
Cyprinodontidae						
Fundulus olivaceus	Blackspotted topminnow				14	5.81%
		Totals for Cyprinodontidae			**14**	**5.81%**
Esocidae						
Esox americanus	Grass pickerel				10	4.15%
		Totals for Esocidae			**10**	**4.15%**
Percidae						
Etheostoma proeliare	Cypress darter				5	2.07%
Etheostoma whipplei	Redfin darter	ARV			3	1.24%
		Totals for Percidae			**8**	**3.32%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
	Total Numbers			**241**		
	Total Species			15		
	Level of Effort (sec)			3327		
	Catch/Effort (No./min.)			4.35		

Fish Collection Report

Stream Name: Harding Creek OUA0145 **Sample Location:** west 34th street in pine bluff **Collection Date:** 9/2/1999

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			242	40.13%
Lepomis megalotis	Longear	B/A/O/S			12	1.99%
		Totals for Centrarchidae			**254**	**42.12%**
Cyprinidae						
Notemigonus crysoleucas	Golden shiner			P	1	0.17%
		Totals for Cyprinidae			**1**	**0.17%**
Poeciliidae						
Gambusia affinis	Mosquitofish				348	57.71%
		Totals for Poeciliidae			**348**	**57.71%**

Total Numbers	**603**
Total Species	4
Level of Effort (sec)	2903
Catch/Effort (No./min.)	12.46

Fish Collection Report

Stream Name: Bayou Imbeau OUA0147 **Sample Location:** 38thst off hwy 15, south ofUS 65 **Collection Date:** 10/14/1999

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				1	0.05%
		Totals for Amiidae			**1**	**0.05%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				6	0.31%
		Totals for Aphredoderidae			**6**	**0.31%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			20	1.04%
Lepomis gulosus	Warmouth				14	0.73%
Lepomis macrochirus	Bluegill	LDD			1	0.05%
Lepomis megalotis	Longear	B/A/O/S			2	0.10%
Lepomis punctatus	Spotted sunfish				6	0.31%
Lepomis symmetricus	Bantam sunfish				61	3.18%
		Totals for Centrarchidae			**104**	**5.42%**
Cyprinidae						
Notemigonus crysoleucas	Golden shiner			P	7	0.36%
		Totals for Cyprinidae			**7**	**0.36%**
Cyprinodontidae						
Fundulus chrysotus	Golden topminnow				142	7.40%
		Totals for Cyprinodontidae			**142**	**7.40%**
Elassomatidae						
Elassoma zonatum	Banded pygmy sunfish				16	0.83%
		Totals for Elassomatidae			**16**	**0.83%**
Ictaluridae						
Ameiurus melas	Black bullhead				1	0.05%
Ameiurus natalis	Yellow bullhead	A/T/L			1	0.05%
		Totals for Ictaluridae			**2**	**0.10%**
Poeciliidae						
Gambusia affinis	Mosquitofish				1640	85.51%
		Totals for Poeciliidae			**1640**	**85.51%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
	Total Numbers			1918		
	Total Species			14		
	Level of Effort (sec)			2400		
	Catch/Effort (No./min.)			47.95		

Fish Collection Report

Stream Name: Bayou Bartholomew OUA33 **Sample Location:** 2mi. South of Ladd off hwy 425 **Collection Date:** 9/2/1999

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				1	0.44%
		Totals for Aphredoderidae			**1**	**0.44%**
Atherinidae						
Labidesthes sicculus	Brook silversides				8	3.49%
		Totals for Atherinidae			**8**	**3.49%**
Catostomidae						
Minytrema melanops	Spotted sucker	TGC			8	3.49%
		Totals for Catostomidae			**8**	**3.49%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			10	4.37%
Lepomis gulosus	Warmouth				19	8.30%
Lepomis macrochirus	Bluegill	LDD			53	23.14%
Lepomis megalotis	Longear	B/A/O/S			37	16.16%
Lepomis punctatus	Spotted sunfish				19	8.30%
Micropterus salmoides	Largemouth bass	LDD			6	2.62%
Pomoxis nigromaculatus	Black crappie				1	0.44%
		Totals for Centrarchidae			**145**	**63.32%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	14	6.11%
		Totals for Clupeidae			**14**	**6.11%**
Cyprinidae						
Ctenopharyngodon idella	Grass carp				1	0.44%
Hybopsis amnis	Pallid shiner		S		1	0.44%
Lythrurus fumeus	Ribbon shiner	LDD			3	1.31%
Notemigonus crysoleucas	Golden shiner			P	1	0.44%
Notropis maculatus	Taillight shiner				1	0.44%
Opsopoeodus emiliae	Pugnose minnow				2	0.87%
Pimephales vigilax	Bullhead minnow				11	4.80%
		Totals for Cyprinidae			**20**	**8.73%**
Cyprinodontidae						
Fundulus olivaceus	Blackspotted topminnow				9	3.93%
		Totals for Cyprinodontidae			**9**	**3.93%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			2	0.87%
Ictalurus punctatus	Channel catfish	CAD			1	0.44%
		Totals for Ictaluridae			**3**	**1.31%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			10	4.37%
		Totals for Lepisosteidae			**10**	**4.37%**
Percidae						
Percina maculata	Blackside darter		S		1	0.44%
		Totals for Percidae			**1**	**0.44%**
Poeciliidae						
Gambusia affinis	Mosquitofish				10	4.37%
		Totals for Poeciliidae			**10**	**4.37%**

Total Numbers	**229**
Total Species	24
Level of Effort (sec)	3576
Catch/Effort (No./min.)	3.84

Fish Collection Report

Stream Name: Cousart Bayou OUA0149 **Sample Location:** Co. Rd. 2 mi. south of Tamo off U.S.65 **Collection Date:** 9/1/1999

Family_Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			25	24.51%
Lepomis gulosus	Warmouth				3	2.94%
Lepomis humilis	Orangespotted sunfish				1	0.98%
Lepomis macrochirus	Bluegill	LDD			1	0.98%
Lepomis megalotis	Longear	B/A/O/S			23	22.55%
Lepomis punctatus	Spotted sunfish				6	5.88%
		Totals for Centrarchidae			**59**	**57.84%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	15	14.71%
		Totals for Clupeidae			**15**	**14.71%**
Cyprinidae						
Cyprinella lutrensis	Red shiner				2	1.96%
Cyprinella venusta	Blacktail shiner	CAD			6	5.88%
		Totals for Cyprinidae			**8**	**7.84%**
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			1	0.98%
Ictalurus punctatus	Channel catfish	CAD			4	3.92%
		Totals for Ictaluridae			**5**	**4.90%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			10	9.80%
		Totals for Lepisosteidae			**10**	**9.80%**
Poeciliidae						
Gambusia affinis	Mosquitofish				5	4.90%
		Totals for Poeciliidae			**5**	**4.90%**

Total Numbers	**102**
Total Species	13
Level of Effort (sec)	2186
Catch/Effort (No./min.)	2.80

Fish Collection Report

Stream Name: Jacks Bayou OUA0150 **Sample Location:** Co. Rd 1. mi south of Tamo off U.S. 65 **Collection Date:** 9/1/1999

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			44	16.00%
Lepomis gulosus	Warmouth				5	1.82%
Lepomis macrochirus	Bluegill	LDD			5	1.82%
Lepomis marginatus	Dollar sunfish				15	5.45%
Lepomis megalotis	Longear	B/A/O/S			4	1.45%
Lepomis symmetricus	Bantam sunfish				1	0.36%
		Totals for Centrarchidae			**74**	**26.91%**
Cyprinidae						
Cyprinella lutrensis	Red shiner				11	4.00%
Cyprinella venusta	Blacktail shiner	CAD			4	1.45%
Lythrurus fumeus	Ribbon shiner	LDD			5	1.82%
Notemigonus crysoleucas	Golden shiner			P	1	0.36%
Opsopoeodus emiliae	Pugnose minnow				1	0.36%
		Totals for Cyprinidae			**22**	**8.00%**
Cyprinodontidae						
Fundulus chrysotus	Golden topminnow				1	0.36%
Fundulus olivaceus	Blackspotted topminnow				1	0.36%
		Totals for Cyprinodontidae			**2**	**0.73%**
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			4	1.45%
Ictalurus punctatus	Channel catfish	CAD			88	32.00%
Noturus gyrinus	Tadpole madtom				14	5.09%
		Totals for Ictaluridae			**106**	**38.55%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			5	1.82%
		Totals for Lepisosteidae			**5**	**1.82%**
Poeciliidae						
Gambusia affinis	Mosquitofish				66	24.00%
		Totals for Poeciliidae			**66**	**24.00%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
	Total Numbers			275		
	Total Species			18		
	Level of Effort (sec)			1864		
	Catch/Effort (No./min.)			8.85		

Fish Collection Report

Stream Name: Deep Bayou OUA0151 **Sample Location:** hwy 11, 3mi. South of Grady **Collection Date:** 10/14/1999

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				1	0.12%
			Totals for Amiidae		**1**	**0.12%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				3	0.36%
			Totals for Aphredoderidae		**3**	**0.36%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			156	18.91%
Lepomis gulosus	Warmouth				10	1.21%
Lepomis macrochirus	Bluegill	LDD			20	2.42%
Lepomis megalotis	Longear	B/A/O/S			170	20.61%
Lepomis symmetricus	Bantam sunfish				3	0.36%
Micropterus salmoides	Largemouth bass	LDD			2	0.24%
Pomoxis annularis	White crappie				5	0.61%
Pomoxis nigromaculatus	Black crappie				3	0.36%
			Totals for Centrarchidae		**369**	**44.73%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	28	3.39%
Dorsoma petenense	Threadfin shad				2	0.24%
			Totals for Clupeidae		**30**	**3.64%**
Cyprinidae						
Cyprinella lutrensis	Red shiner				53	6.42%
Cyprinella venusta	Blacktail shiner	CAD			8	0.97%
Cyprinus carpio	Common carp	CAD		P	1	0.12%
Lythrurus fumeus	Ribbon shiner	LDD			9	1.09%
Notropis volucellus	Mimic shiner				14	1.70%
Pimephales vigilax	Bullhead minnow				49	5.94%
			Totals for Cyprinidae		**134**	**16.24%**
Cyprinodontidae						
Fundulus olivaceus	Blackspotted topminnow				5	0.61%
			Totals for Cyprinodontidae		**5**	**0.61%**
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			2	0.24%
Ictalurus punctatus	Channel catfish	CAD			79	9.58%

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Noturus gyrinus	Tadpole madtom				5	0.61%
		Totals for Ictaluridae			**86**	**10.42%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			17	2.06%
Lepisosteus platostomus	Shortnose gar				1	0.12%
		Totals for Lepisosteidae			**18**	**2.18%**
Percidae						
Etheostoma asprigene	Mud darter				11	1.33%
		Totals for Percidae			**11**	**1.33%**
Poeciliidae						
Gambusia affinis	Mosquitofish				159	19.27%
		Totals for Poeciliidae			**159**	**19.27%**
Sciaenidae						
Aplodinotus grunniens	Freshwater drum	CAD			9	1.09%
		Totals for Sciaenidae			**9**	**1.09%**

Total Numbers	**825**
Total Species	27
Level of Effort (sec)	4400
Catch/Effort (No./min.)	11.25

Fish Collection Report

Stream Name: Able's Creek OUA0158 **Sample Location:** Hwy 138 north of Selma **Collection Date:** 9/7/2000

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				6	2.14%
			Totals for Amiidae		**6**	**2.14%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				6	2.14%
			Totals for Aphredoderidae		**6**	**2.14%**
Catostomidae						
Erimyzon oblongus	Creek chubsucker				1	0.36%
Minytrema melanops	Spotted sucker	TGC			4	1.42%
			Totals for Catostomidae		**5**	**1.78%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			19	6.76%
Lepomis gulosus	Warmouth				13	4.63%
Lepomis macrochirus	Bluegill	LDD			16	5.69%
Lepomis marginatus	Dollar sunfish				1	0.36%
Lepomis megalotis	Longear	B/A/O/S			43	15.30%
Lepomis punctatus	Spotted sunfish				4	1.42%
Micropterus punctulatus	Spotted bass	ARV			2	0.71%
Pomoxis nigromaculatus	Black crappie				2	0.71%
			Totals for Centrarchidae		**100**	**35.59%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	16	5.69%
			Totals for Clupeidae		**16**	**5.69%**
Cyprinidae						
Cyprinella venusta	Blacktail shiner	CAD			9	3.20%
Hybognathus nuchalis	Silvery minnow			P	30	10.68%
Hybopsis amnis	Pallid shiner		S		3	1.07%
Lythrurus fumeus	Ribbon shiner	LDD			8	2.85%
Opsopoeodus emiliae	Pugnose minnow				2	0.71%
Pimephales vigilax	Bullhead minnow				9	3.20%
			Totals for Cyprinidae		**61**	**21.71%**
Cyprinodontidae						
Fundulus notatus	Blackstripe topminnow				2	0.71%
			Totals for Cyprinodontidae		**2**	**0.71%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			4	1.42%
Ictalurus punctatus	Channel catfish	CAD			2	0.71%
Noturus gyrinus	Tadpole madtom				2	0.71%
Noturus nocturnus	Freckled madtom				5	1.78%
		Totals for Ictaluridae			**13**	**4.63%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			11	3.91%
		Totals for Lepisosteidae			**11**	**3.91%**
Percidae						
Etheostoma gracile	Slough darter	TGC			4	1.42%
Etheostoma whipplei	Redfin darter	ARV			5	1.78%
Percina maculata	Blackside darter		S		1	0.36%
Percina sciera	Dusky darter		S		2	0.71%
		Totals for Percidae			**12**	**4.27%**
Poeciliidae						
Gambusia affinis	Mosquitofish				47	16.73%
		Totals for Poeciliidae			**47**	**16.73%**
Sciaenidae						
Aplodinotus grunniens	Freshwater drum	CAD			2	0.71%
		Totals for Sciaenidae			**2**	**0.71%**

Total Numbers	**281**
Total Species	31
Level of Effort (sec)	2983
Catch/Effort (No./min.)	5.65

Fish Collection Report

Stream Name: Cut-off Creek UWCOC02 **Sample Location:** Hwy 4 14 miles east of Monticello **Collection Date:** 9/7/2000

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				1	0.25%
			Totals for Amiidae		**1**	**0.25%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				11	2.76%
			Totals for Aphredoderidae		**11**	**2.76%**
Atherinidae						
Labidesthes sicculus	Brook silversides				1	0.25%
			Totals for Atherinidae		**1**	**0.25%**
Catostomidae						
Erimyzon oblongus	Creek chubsucker				1	0.25%
Minytrema melanops	Spotted sucker	TGC			6	1.51%
			Totals for Catostomidae		**7**	**1.76%**
Centrarchidae						
Centrarchus macropterus	Flier	TGC			2	0.50%
Lepomis cyanellus	Green sunfish	CAD			8	2.01%
Lepomis gulosus	Warmouth				7	1.76%
Lepomis macrochirus	Bluegill	LDD			18	4.52%
Lepomis megalotis	Longear	B/A/O/S			43	10.80%
Lepomis punctatus	Spotted sunfish				35	8.79%
Micropterus salmoides	Largemouth bass	LDD			4	1.01%
Pomoxis nigromaculatus	Black crappie				1	0.25%
			Totals for Centrarchidae		**118**	**29.65%**
Cyprinidae						
Lythrurus fumeus	Ribbon shiner	LDD			22	5.53%
Lythrurus umbratilis	Redfin shiner				8	2.01%
Notemigonus crysoleucas	Golden shiner			P	5	1.26%
Pteronotropis hubbsi	Bluehead shiner				10	2.51%
			Totals for Cyprinidae		**45**	**11.31%**
Cyprinodontidae						
Fundulus chrysotus	Golden topminnow				1	0.25%
Fundulus dispar	Northern starhead topmin				4	1.01%
Fundulus notatus	Blackstripe topminnow				19	4.77%
Fundulus olivaceus	Blackspotted topminnow				116	29.15%
			Totals for Cyprinodontidae		**140**	**35.18%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Esocidae						
Esox americanus	Grass pickerel				4	1.01%
			Totals for Esocidae		**4**	**1.01%**
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			5	1.26%
Noturus gyrinus	Tadpole madtom				1	0.25%
			Totals for Ictaluridae		**6**	**1.51%**
Percidae						
Etheostoma gracile	Slough darter	TGC			1	0.25%
Etheostoma proeliare	Cypress darter				2	0.50%
Etheostoma whipplei	Redfin darter	ARV			23	5.78%
Percina maculata	Blackside darter		S		1	0.25%
Percina sciera	Dusky darter		S		2	0.50%
			Totals for Percidae		**29**	**7.29%**
Poeciliidae						
Gambusia affinis	Mosquitofish				36	9.05%
			Totals for Poeciliidae		**36**	**9.05%**

Total Numbers	**398**
Total Species	30
Level of Effort (sec)	3695
Catch/Effort (No./min.)	6.46

Fish Collection Report

Stream Name: Cut-Off Creek UWCOC01 **Sample Location:** Co. Rd. northeast of Boydell off US 165 **Collection Date:** 10/14/1999

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				9	5.84%
		Totals for Aphredoderidae			**9**	**5.84%**
Atherinidae						
Labidesthes sicculus	Brook silversides				1	0.65%
		Totals for Atherinidae			**1**	**0.65%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			6	3.90%
Lepomis gulosus	Warmouth				5	3.25%
Lepomis humilis	Orangespotted sunfish				2	1.30%
Lepomis marginatus	Dollar sunfish				17	11.04%
Lepomis megalotis	Longear	B/A/O/S			11	7.14%
Lepomis punctatus	Spotted sunfish				5	3.25%
Micropterus punctulatus	Spotted bass	ARV			3	1.95%
		Totals for Centrarchidae			**49**	**31.82%**
Cyprinidae						
Hybognathus nuchalis	Silvery minnow			P	8	5.19%
Lythrurus fumeus	Ribbon shiner	LDD			7	4.55%
Notropis volucellus	Mimic shiner				7	4.55%
Opsopoeodus emiliae	Pugnose minnow				2	1.30%
Pimephales vigilax	Bullhead minnow				15	9.74%
		Totals for Cyprinidae			**39**	**25.32%**
Cyprinodontidae						
Fundulus chrysotus	Golden topminnow				1	0.65%
Fundulus olivaceus	Blackspotted topminnow				9	5.84%
		Totals for Cyprinodontidae			**10**	**6.49%**
Ictaluridae						
Ameiurus natalis	Yellow bullhead	A/T/L			1	0.65%
Ictalurus punctatus	Channel catfish	CAD			1	0.65%
Noturus gyrinus	Tadpole madtom				1	0.65%
Noturus nocturnus	Freckled madtom				8	5.19%
		Totals for Ictaluridae			**11**	**7.14%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			1	0.65%
		Totals for Lepisosteidae			**1**	**0.65%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Percidae						
Etheostoma asprigene	Mud darter				9	5.84%
Etheostoma gracile	Slough darter	TGC			1	0.65%
Etheostoma proeliare	Cypress darter				6	3.90%
Percina maculata	Blackside darter		S		1	0.65%
			Totals for Percidae		**17**	**11.04%**
Poeciliidae						
Gambusia affinis	Mosquitofish				17	11.04%
			Totals for Poeciliidae		**17**	**11.04%**

Total Numbers	**154**
Total Species	26
Level of Effort (sec)	3000
Catch/Effort (No./min.)	3.08

Fish Collection Report

Stream Name: Bayou Bartholomew "Bayou" **Sample Location:** County Road near Boydell **Collection Date:** 10/16/2000

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				1	0.04%
			Totals for Amiidae		**1**	**0.04%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				54	1.95%
			Totals for Aphredoderidae		**54**	**1.95%**
Catostomidae						
Ictiobus bubalus	Smallmouth buffalo	LDD		P	2	0.07%
Minytrema melanops	Spotted sucker	TGC			8	0.29%
			Totals for Catostomidae		**10**	**0.36%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			8	0.29%
Lepomis gulosus	Warmouth				24	0.86%
Lepomis humilis	Orangespotted sunfish				18	0.65%
Lepomis macrochirus	Bluegill	LDD			154	5.55%
Lepomis megalotis	Longear	B/A/O/S			574	20.68%
Lepomis microlophus	Redear				1	0.04%
Lepomis punctatus	Spotted sunfish				4	0.14%
Micropterus punctulatus	Spotted bass	ARV			102	3.67%
Micropterus salmoides	Largemouth bass	LDD			14	0.50%
Pomoxis annularis	White crappie				6	0.22%
Pomoxis nigromaculatus	Black crappie				3	0.11%
			Totals for Centrarchidae		**908**	**32.71%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	36	1.30%
			Totals for Clupeidae		**36**	**1.30%**
Cyprinidae						
Cyprinella venusta	Blacktail shiner	CAD			40	1.44%
Cyprinus carpio	Common carp	CAD		P	8	0.29%
Hybognathus nuchalis	Silvery minnow			P	1047	37.72%
Lythrurus fumeus	Ribbon shiner	LDD			94	3.39%
Notropis atherinoides	Emerald shiner				63	2.27%
Notropis texanus	Weed shiner				4	0.14%
Opsopoeodus emiliae	Pugnose minnow				1	0.04%
Pimephales vigilax	Bullhead minnow				258	9.29%
			Totals for Cyprinidae		**1515**	**54.57%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Cyprinodontidae						
Fundulus notatus	Blackstripe topminnow				7	0.25%
Fundulus olivaceus	Blackspotted topminnow				2	0.07%
		Totals for Cyprinodontidae			**9**	**0.32%**
Ictaluridae						
Ictalurus punctatus	Channel catfish	CAD			19	0.68%
Noturus gyrinus	Tadpole madtom				3	0.11%
Pylodictis olivaris	Flathead catfish				3	0.11%
		Totals for Ictaluridae			**25**	**0.90%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			74	2.67%
Lepisosteus platostomus	Shortnose gar				2	0.07%
		Totals for Lepisosteidae			**76**	**2.74%**
Percidae						
Etheostoma asprigene	Mud darter				6	0.22%
Etheostoma chlorosomum	Bluntnose darter	LDD			14	0.50%
Etheostoma gracile	Slough darter	TGC			1	0.04%
Etheostoma proeliare	Cypress darter				7	0.25%
Percina caprodes	Logperch				2	0.07%
Percina maculata	Blackside darter		S		18	0.65%
Percina sciera	Dusky darter		S		40	1.44%
Percina shumardi	River darter				2	0.07%
		Totals for Percidae			**90**	**3.24%**
Poeciliidae						
Gambusia affinis	Mosquitofish				41	1.48%
		Totals for Poeciliidae			**41**	**1.48%**
Sciaenidae						
Aplodinotus grunniens	Freshwater drum	CAD			11	0.40%
		Totals for Sciaenidae			**11**	**0.40%**

Total Numbers	**2776**
Total Species	41
Level of Effort (sec)	5548
Catch/Effort (No./min.)	30.02

Fish Collection Report

Stream Name: Bayou Bartholomew OUA33 **Sample Location:** LA 834 off US 165 west of Jones, LA **Collection Date:** 10/16/2000

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Amiidae						
Amia calva	Bowfin				4	0.27%
		Totals for Amiidae			**4**	**0.27%**
Aphredoderidae						
Aphredoderus sayanus	Pirate perch				11	0.74%
		Totals for Aphredoderidae			**11**	**0.74%**
Catostomidae						
Ictiobus cyprinellus	Bigmouth buffalo			P	15	1.00%
Moxostoma carinatum	River Redhorse		S		1	0.07%
		Totals for Catostomidae			**16**	**1.07%**
Centrarchidae						
Lepomis cyanellus	Green sunfish	CAD			6	0.40%
Lepomis gulosus	Warmouth				1	0.07%
Lepomis humilis	Orangespotted sunfish				1	0.07%
Lepomis macrochirus	Bluegill	LDD			12	0.80%
Lepomis megalotis	Longear	B/A/O/S			344	23.01%
Lepomis punctatus	Spotted sunfish				2	0.13%
Micropterus punctulatus	Spotted bass	ARV			23	1.54%
Micropterus salmoides	Largemouth bass	LDD			8	0.54%
Pomoxis annularis	White crappie				1	0.07%
Pomoxis nigromaculatus	Black crappie				1	0.07%
		Totals for Centrarchidae			**399**	**26.69%**
Clupeidae						
Dorosoma cepedianum	Gizzard shad			P	36	2.41%
		Totals for Clupeidae			**36**	**2.41%**
Cyprinidae						
Cyprinella venusta	Blacktail shiner	CAD			171	11.44%
Cyprinus carpio	Common carp	CAD		P	20	1.34%
Hybognathus nuchalis	Silvery minnow			P	187	12.51%
Lythrurus fumeus	Ribbon shiner	LDD			10	0.67%
Notropis atherinoides	Emerald shiner				89	5.95%
Notropis texanus	Weed shiner				10	0.67%
Opsopoeodus emiliae	Pugnose minnow				1	0.07%
Pimephales vigilax	Bullhead minnow				402	26.89%
		Totals for Cyprinidae			**890**	**59.53%**

Family Species	Common Name	Key	Sen.	T.F.L.	#	% Com
Cyprinodontidae						
Fundulus notatus	Blackstripe topminnow				8	0.54%
Fundulus olivaceus	Blackspotted topminnow				17	1.14%
		Totals for Cyprinodontidae			**25**	**1.67%**
Ictaluridae						
Ictalurus furcatus	Blue catfish				1	0.07%
Ictalurus punctatus	Channel catfish	CAD			13	0.87%
Noturus gyrinus	Tadpole madtom				3	0.20%
Noturus nocturnus	Freckled madtom				4	0.27%
Pylodictis olivaris	Flathead catfish				1	0.07%
		Totals for Ictaluridae			**22**	**1.47%**
Lepisosteidae						
Lepisosteus oculatus	Spotted gar	CAD			32	2.14%
Lepisosteus platostomus	Shortnose gar				1	0.07%
		Totals for Lepisosteidae			**33**	**2.21%**
Percidae						
Etheostoma asprigene	Mud darter				4	0.27%
Etheostoma proeliare	Cypress darter				1	0.07%
Percina caprodes	Logperch				1	0.07%
Percina maculata	Blackside darter		S		2	0.13%
Percina sciera	Dusky darter		S		23	1.54%
Percina shumardi	River darter				1	0.07%
		Totals for Percidae			**32**	**2.14%**
Poeciliidae						
Gambusia affinis	Mosquitofish				16	1.07%
		Totals for Poeciliidae			**16**	**1.07%**
Sciaenidae						
Aplodinotus grunniens	Freshwater drum	CAD			11	0.74%
		Totals for Sciaenidae			**11**	**0.74%**

Total Numbers	**1495**
Total Species	40
Level of Effort (sec)	5090
Catch/Effort (No./min.)	17.62