

APPENDIX 1

**RED RIVER ALLUVIAL AQUIFER SUMMARY
BASELINE MONITORING PROJECT, EPA FY'98
(July 1997 Through June 1998)**

**PART III
OF
TRIENNIAL SUMMARY REPORT
FOR THE
WATER QUALITY MANAGEMENT DIVISION
OF
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY**

PARTIAL FUNDING PROVIDED THROUGH CWA 106 GRANT

RED RIVER ALLUVIAL AQUIFER SUMMARY

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BACKGROUND

In order to better assess the water quality of a particular aquifer at a given point in time, an attempt was made during the project year to sample all project wells producing from a common aquifer in a narrow time frame. Also, to more conveniently and economically promulgate those data collected, these aquifer summaries will make up the project Triennial Summary Report.

Figure III-1 shows the geographic locations of the Red River Alluvial Aquifer and the associated project wells, whereas Table III-1 lists the wells in the aquifer along with their total depths and the use made of produced waters and the date sampled.

These data show that in November 1997, four project wells were sampled which produce from the Red River Alluvial Aquifer. Of these four wells, three are classified as Irrigation and one is an Industrial well. The wells are located in three parishes from the central part of the state, following the Red River upstream to the northwest area of the state.

PROJECT FIELD AND ANALYTICAL PARAMETERS

The field parameters that are checked at each sampling site and the list of water quality parameters that are analyzed in the laboratory are shown in Table III-2. Those project inorganic (total metals) parameters analyzed in the laboratory are listed in Table III-3. These tables also show the field and analytical results determined for each analyte.

In addition to the analytical parameters mentioned above, a list of project analytical parameters include three other categories of compounds: Volatiles, Semi-volatiles, and Pesticides/PCB's. Due to the large number of analytes of these three categories, tables were not prepared for each well. However, in order for the reader to be aware of the total list of analytes, Tables III-4, III-5, and III-6 were included in this summary. The tables list the project analytes along with their Practical Quantitation Limits (PQLs) used during processing.

DISCUSSION OF WATER QUALITY DATA

FEDERAL PRIMARY DRINKING WATER STANDARDS: Laboratory data show that one project water well of the Red River Alluvial Aquifer that is used for irrigation exceeded the Federal Maximum Contaminant Level for Nickel. Caddo parish well number CD-586 reported 5,197 ppb of Nickel (MCL for Nickel = 100 ppb). This high level of nickel tends to indicate a wear condition with the submersible pump in use for this well rather than nickel contamination of the aquifer at this location.

Those project wells reporting Turbidity levels of >1 NTU, do not exceed the MCL of 1.0, as this primary standard applies to surface water systems only.

FEDERAL SECONDARY DRINKING WATER STANDARDS: Secondary standards are defined as non-enforceable taste, odor or appearance guidelines. Field and laboratory data contained in Tables III-2 and III-3 show that the following Secondary Maximum Contaminant Levels (SMCL) were exceeded by the following wells.

TDS (SMCL=500 ppm) All four wells exceeded this secondary standard with the following reported concentrations: CD-376, 832 ppm; CD-376 duplicate, 832 ppm; CD-586, 930 ppm; G-79, 678 ppm; and NA-47, 526 ppm.

IRON (SMCL=300 ppb) The following three wells exceeded this secondary standard: CD-376, 8,014 ppb; CD-376 duplicate, 7,246 ppb; and G-79, 7,966 ppb.

COPPER (SMCL = 1,000 ppb) Well NA-47 reported copper levels of 4,746 ppb. As with the Caddo parish well with a high level of nickel, this amount of copper tends to indicate bushing wear of the submersible pump or exposure and/or corrosion of the electrical wiring to the pump rather than copper contamination of the Red River Alluvial Aquifer.

SELECTED WATER QUALITY MAPS

For the readers convenience, maps showing the contoured values for pH, TDS, Chloride and Iron are included in this summary report in Figures II-2 through II-5. However, these maps are highly subjective due to the low number of project wells sampled producing waters from this aquifer and to the narrow extent of the Red River Alluvial Aquifer.

SUMMARY AND RECOMMENDATIONS

In summary, the elevated levels of TDS and iron are characteristic of the ground water produced from the Red River Alluvial Aquifer, and the analytical data show the ground water from this aquifer to be of fair to good quality. The incidence of high levels of nickel and copper is considered to be from submersible pump wear and possibly deterioration of copper electrical wiring for the pump.

It is recommended that the four project wells assigned to the Red River Alluvial Aquifer be re-sampled as planned, in approximately three years. In addition, several wells should be added to those currently sampled to increase the well density for this aquifer.

Table III-1 List of Project Wells Sampled

RED RIVER ALLUVIAL AQUIFER PROJECT WELLS							
<i>PROJECT NUMBER</i>	<i>PARISH</i>	<i>PARISH WELL NO.</i>	<i>DATE SAMPLED</i>	<i>WELL OWNER</i>	<i>DEPTH (feet)</i>	<i>WELL USE</i>	<i>AQUIFER</i>
9115	CADDO	CD-376	11/17/1997	G. S. ROOFING	80	INDUSTRIAL	RED RIVER ALLUVIAL
9301	CADDO	CD-586	11/17/1997	LIVE OAK RETIREMENT CENTER	60	IRRIGATION	RED RIVER ALLUVIAL
9501	GRANT	G-79	11/17/1997	PRIVATE OWNER	110	IRRIGATION	RED RIVER ALLUVIAL
9502	NATCHITOCHE	NA-47	11/17/1997	PRIVATE OWNER	80	IRRIGATION	RED RIVER ALLUVIAL

Table III-2 Summary of Water Quality Data

RED RIVER ALLUVIAL AQUIFER WATER QUALITY PARAMETERS																		
FIELD PARAMETERS																		
WELL NUMBER	TEMP °C	pH SU	COND. mmhos/cm	SAL. ppt	TSS ppm	TDS ppm	ALK. ppm	HARD. ppm	TURB. NTU	COND. umhos/cm	COLOR PCU	Cl ppm	SO ₄ ppm	NITRITE-NITRATE (as N) ppm	TOT. P ppm	TKN ppm	TOC ppm	NH ₃ (as N) ppm
CD-376	20.91	6.71	1.270	0.63	18.0	832.0	522.0	657.0	65.0	1,310	5.0	74.90	95.50	<0.05	0.41	1.00	5.4	0.8
CD-376*	20.91	6.71	1.270	0.63	20.0	832.0	522.0	644.0	50.0	1,318	5.0	75.50	96.30	<0.05	0.37	1.06	5.6	0.8
CD-586	19.39	6.72	1.396	0.70	14.0	930.0	514.0	648.0	50.0	1,424	5.0	67.00	189.00	<0.05	0.23	0.43	<4.0	0.3
G-79	19.42	6.64	1.097	0.55	28.0	678.0	578.0	575.0	100.0	1,118	5.0	26.40	25.30	<0.05	0.71	2.21	<4.0	NO DATA
NA-47	19.78	6.81	0.808	0.40	6.0	526.0	446.0	385.0	55.0	834	5.0	14.20	<1.00	<0.05	0.37	1.03	<4.0	1.0

* Denotes Duplicate Sample

Table III-3 Summary of Inorganic Data

RED RIVER ALLUVIAL AQUIFER INORGANIC (TOTAL METALS) PARAMETERS															
<i>WELL NUMBER</i>	<i>ARSENIC</i> ppb	<i>SILVER</i> Ppb	<i>BARIUM</i> ppb	<i>BERYLLIUM</i> ppb	<i>CADMIUM</i> ppb	<i>CHROMIUM</i> ppb	<i>COPPER</i> ppb	<i>IRON</i> ppb	<i>MERCURY</i> ppb	<i>NICKEL</i> ppb	<i>ANTIMONY</i> ppb	<i>SELENIUM</i> ppb	<i>LEAD</i> ppb	<i>THALLIUM</i> ppb	<i>ZINC</i> ppb
CD-376	<5.0	<2.0	153.0	<2.0	<2.0	9.0	50.5	8,014.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	<10.0
CD-376*	<5.0	3.4	130.4	<2.0	<2.0	<5.0	25.3	7,246.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	NO DATA
CD-586	<5.0	<2.0	89.8	<2.0	<2.0	<2.0	<5.0	32.2	<0.05	5197.0	<5.0	<5.0	<10.0	<5.0	<10.0
G-79	<5.0	<2.0	14.3	<2.0	<2.0	<5.0	15.9	7,966.0	<0.05	<5.0	<5.0	<5.0	10.0	<5.0	<10.0
NA-47	<5.0	9.6	239.0	<2.0	<5.0	8.0	4,746.0	<5.0	<0.05	<5.0	<5.0	<5.0	<5.0	<5.0	<10.0

* Denotes Duplicate Sample.

Table III-4 List of VOC Analytical Parameters
BASELINE MONITORING PROJECT

VOLATILE ORGANICS BY EPA METHOD 8260

COMPOUNDS	PQL (ppb)
DICHLOROFLUOROMETHANE	10
CHLOROMETHANE	10
VINYL CHLORIDE	10
BROMOMETHANE	10
CHLOROETHANE	10
TRICHLOROFLUOROMETHANE	10
1,1-DICHLOROETHENE	10
METHYLENE CHLORIDE	10
TRANS-1,2-DICHLOROETHENE	10
1,1-DICHLOROETHANE	10
2,2 DICHLOROPROPANE	10
CIS-1,2 DICHLOROETHENE	10
BROMOCHLOROMETHANE	10
CHLOROFORM	10
1,1,1-TRICHLOROETHANE	10
1,1 DICHLOROPROPENE	10
CARBON TETRACHLORIDE	10
BENZENE	10
1,2-DICHLOROETHANE	10
TRICHLOROETHENE	10
1,2-DICHLOROPROPANE	10
BROMODICHLOROMETHANE	10
DIBROMOMETHANE	10
CIS-1,3-DICHLOROPROPENE	10
TOLUENE	10
TRANS-1,3-DICHLOROPROPENE	10
1,1,2-TRICHLOROETHANE	10
1,3--DICHLOROPROPANE	10
TETRACHLOROETHENE	10
1,2-DIBROMOETHANE	10
DIBROMOCHLOROMETHANE	10
CHLOROBENZENE	10
ETHYLBENZENE	10
1,1,1,2-TETRACHLOROETHANE	10
P&M XYLENE	10
O-XYLENE	10
STYRENE	10
BROMOFORM	10
ISOPROPYLBENZENE	10

Table III-4 (Cont=d)
Volatile Organic (VOC) Parameters

COMPOUNDS	PQL (ppb)
1,1,2,2-TETRACHLOROMETHANE	10
1,2,3,-TRICHLOROPROPANE	10
BROMOBENZENE	10
n-PROPYLBENZENE	10
2-CHLOROTOLUENE	10
4-CHLOROTOLUENE	10
1,3,5-TRIMETHYLBENZENE	10
TERT-BUTYLBENZENE	10
1,2,4-TRIMETHYLBENZENE	10
SEC-BUTYLBENZENE	10
P-ISOPRPLYLTOLUENE	10
1,3-DICHLOROBENZENE	10
1,4-DICHLOROBENZENE	10
n-BUTYLBENZENE	10
1,2-DIBROMO-3-CHLOROPROPANE	10
NAPHTHALENE	10
1,2,4-TRICHLOROBENZENE	10
HEXACHLOROBUTADIENE	10
1,2-DICHLOROBENZENE	10
1,2,3-TRICHLOROBENZENE	10

PQL = Practical Quantitation Limit
ppb = parts per billion

Table III-5 List of Semi-volatile Analytical Parameters
BASELINE MONITORING PROJECT

SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUNDS	PQL (ppb)
N-Nitrosodimethylamine	10
2-Picoline	10
Methyl methanasulfonate	10
Ethyl methanesulfonate	20
Phenol	10
Aniline	10
Bis(2-chloroethyl)ether	10
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl alcohol	20
1,2-Dichlorobenzene	10
2-Methylphenol	10
Bis(2-chloroisopropyl)ether	10
4-Methylphenol	10
N-Nitroso-di-n-propylamine	10
Hexachloroethane	10
Acetophenone	10
Nitrobenzene	10
N-Nitrosopiperidine	20
Isophorone	10
2,4-Dimethylphenol	10
2-Nitrophenol	10
Benzoic acid	50
Bis(2-chloroethoxy)methane	10
2,4-Dichlorophenol	10
a,a-Dimethylphenethylamine	10
1,2,4-trichlorobenzene	10
Benzidine	50
Pyrene	10
p-Dimethylaminoazobenzene	10
Butylbenzylphthalate	10
Bis(2-ethylhexyl)phthalate	10

Table III-5 (Cont=d)
Semivolatile Parameters

COMPOUNDS	PQL (ppb)
3,3'-Dichlorobenzidine	20
Benzo(a)anthracene	10
Chrysene	10
Di-n-octylphthalate	10
7,12-Dimethylbenz(a)anthracene	10
Benzo(b)fluoranthene	20
Benzo(k)fluoranthene	10
Benzo(a)pyrene	10
3-Methylcholanthrene	10
Dibenz(a,j)acridine	10
Indeno(1,2,3-cd)pyrene	10
Dibenz(a,h)anthracene	10
Benzo(g,h,i)perylene	10
Napthalene	10
4-Chloroaniline	10
2,6-Dichlorophenol	10
Hexachlorobutadiene	10
N-Nitrose-di-n-butylamine	10
4-Chloro-3-methylphenol	20
2-Methylnapthalene	10
Hexachlorocyclopentadiene	10
1,2,4,5-Tetrachlorobenzene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	10
2-Chloronapthalene	10
1-Chloronapthalene	10
2-Nitroaniline	50
Dimethylphthalate	10
2,6-Dinitrotoluene	10
Acenaphthylene	10
3-Nitroaniline	50
4-Nitrophenol	50
2,4-Dinitrophenol	50
Acenaphthene	10

Table III-5 (Cont=d)
Semivolatile Parameters

COMPOUNDS	PQL (ppb)
2,4-Dinitrotoluene	10
Pentachlorobenzene	10
Dibenzofuran	10
1-Naphthylamine	10
Diethylphthalate	10
2,3,4,6-Tetrachlorophenol	10
2-Naphthylamine	10
4-Chlorophenyl phenyl ether	10
4-Nitroaniline	50
Fluorene	10
4,6-Dinitro-2-methylphenol	50
4-Aminobiphenyl	20
1,2-Diphenylhydrazine	10
Phenacetin	20
4-Bromophenyl phenyl ether	10
Hexachlorobenzene	10
Pronamide	10
N-Nitrosodiphenylamine/Diphenylamine	10
Pentachlorophenol	50
Pentachloronitrobenzene	20
Phenathrene	10
Anthracene	10
Di-n-butylphthalate	10
Fluoranthene	10

Table III-6 List of Pesticide and PCB Analytical Parameters
BASELINE MONITORING PROJECT

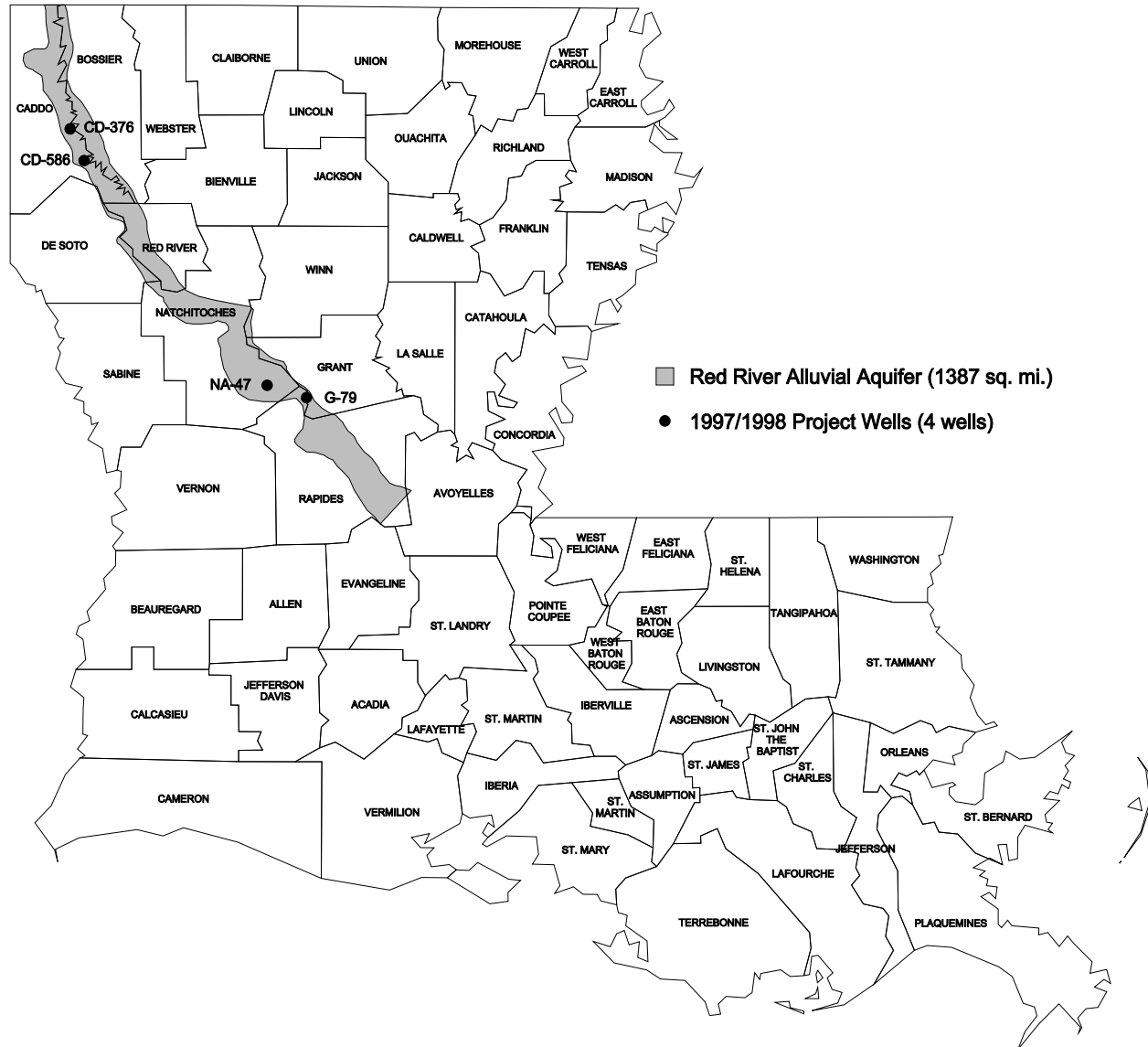
SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUNDS	PQL (ppb)
Alpha BHC	2
Beta BHC	2
Gamma BHC	2
Delta BHC	2
Heptachlor	2
Aldrin	2
Heptachlor epoxide	2
Chlordane	2
Endosulfan I	2
4,4'-DDE	2
Dieldrin	2
4,4'DDD	2
Endrin	2
Toxaphene	75
Endosulfan II	2
Endrin Aldehyde	2
4,4'DDT	2
Endosulfan Sulfate	2
Methoxychlor	2
Endrin Ketone	2

SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUNDS	PQL (ppb)
PCB 1221/ PCB 1232	10
PCB 1016/ PCB1242	10
PCB 1254	10
PCB 1248	10
PCB 1260	10

BASELINE MONITORING PROJECT WELLS OF THE RED RIVER ALLUVIAL AQUIFER



Aquifer boundary digitized from Louisiana Hydrologic Map No. 2: Areal Extent of Freshwater in Major Aquifers of Louisiana, Smoot, 1986; USGS/LDOTD Report 86-4150.

04/27/1998

Figure III-1 Location Plat, Red River Alluvial Aquifer

RED RIVER ALLUVIAL AQUIFER - pH (SU)

**Baseline Monitoring Project
FY97-98**

⊕ CD-376 Project Well Location and Designation

6.71 pH Value (in Standard Units)

Contour Interval = 0.5 SU

Contour map generated using Surfer for Windows v6.04
04/28/1998

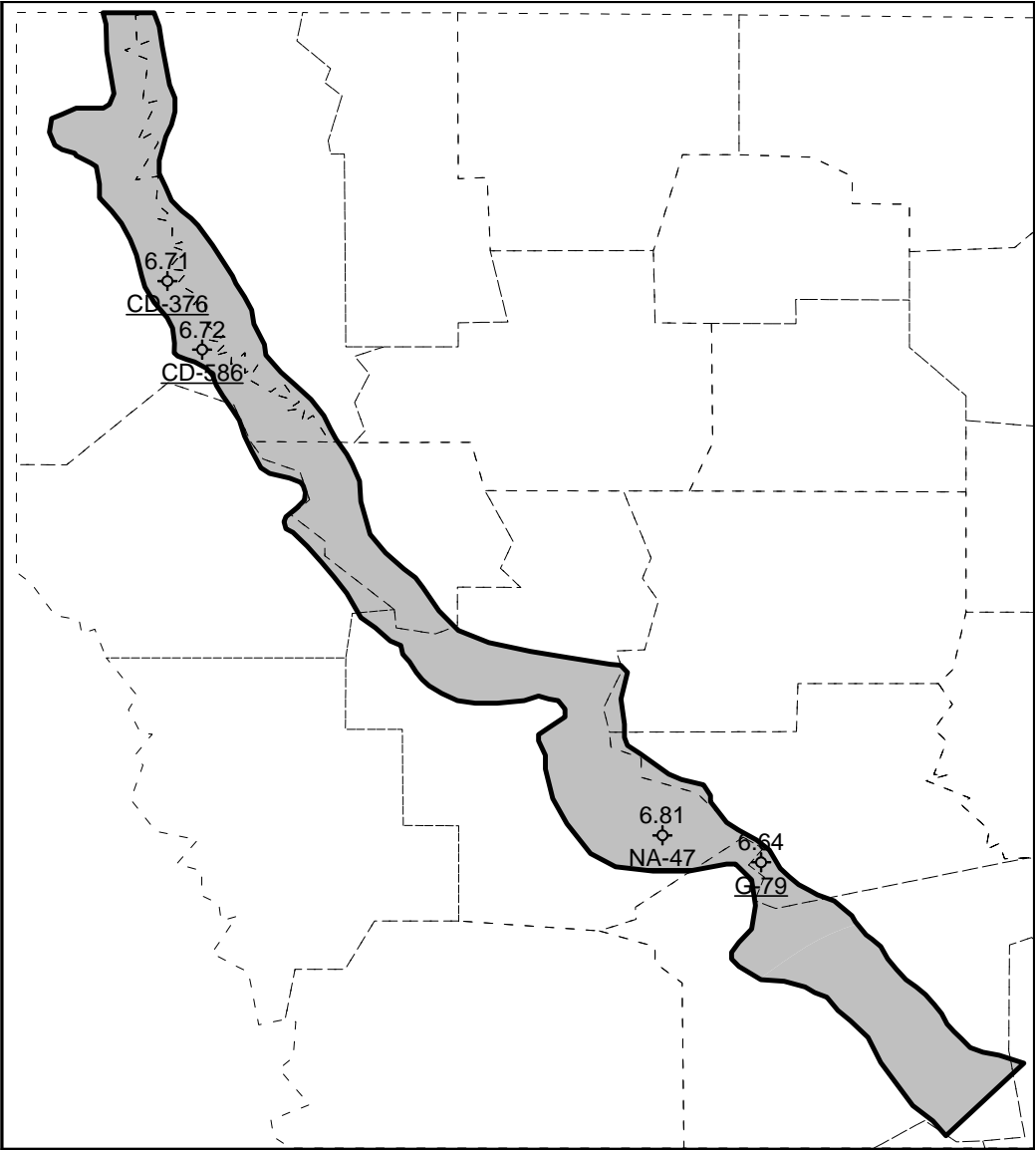
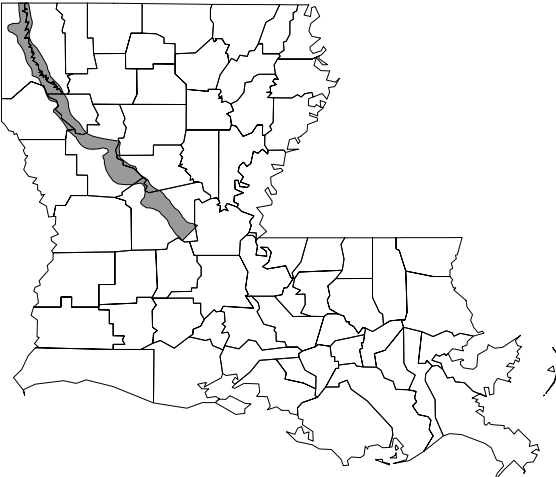


Figure III-2 Map of pH Data

RED RIVER ALLUVIAL AQUIFER - TDS (PPM)

**Baseline Monitoring Project
FY97-98**

- ⊕ CD-376 Project Well Location and Designation
- 832 TDS Value (in Parts Per Million)
- Contour Interval = 100 ppm

Contour map generated using Surfer for Windows v6.04
04/28/1998

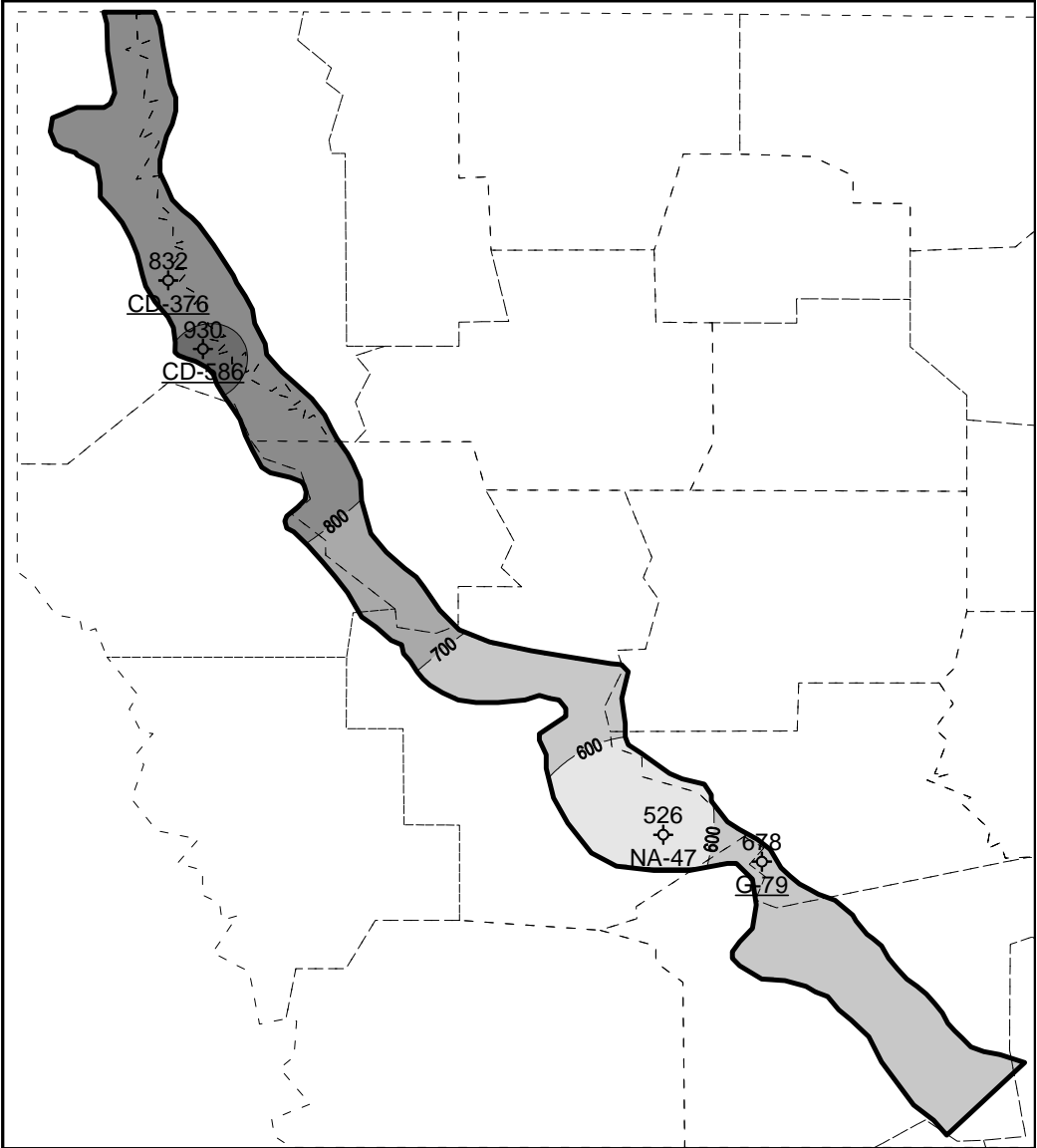
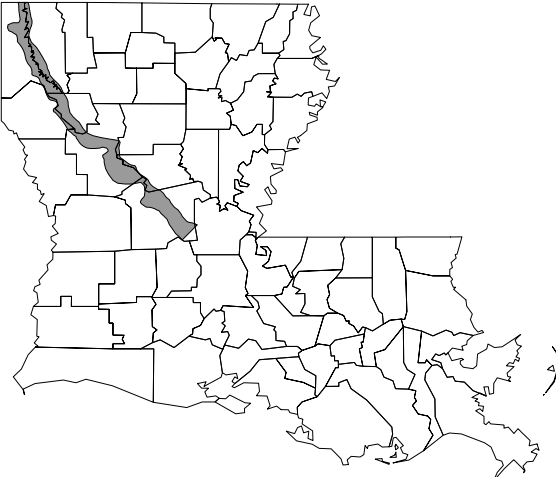


Figure III-3 Map of TDS Data

RED RIVER ALLUVIAL AQUIFER CHLORIDE (PPM)

**Baseline Monitoring Project
FY97-98**

⊕ CD-376 Project Well Location and Designation

74.9 Chloride Value (in Parts Per Million)

Contour Interval = 20 ppm

Contour map generated using Surfer for Windows v6.04
04/28/1998

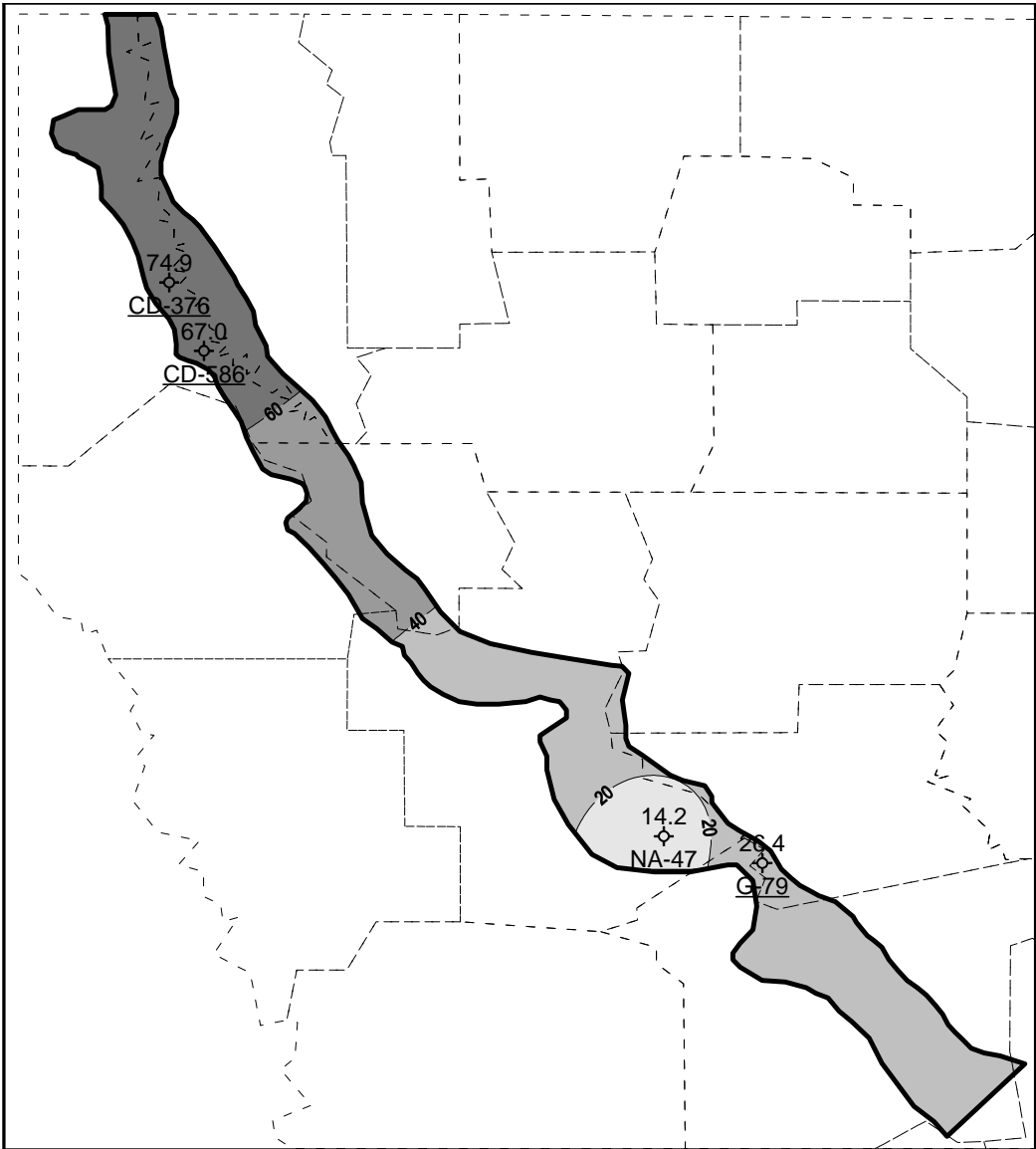
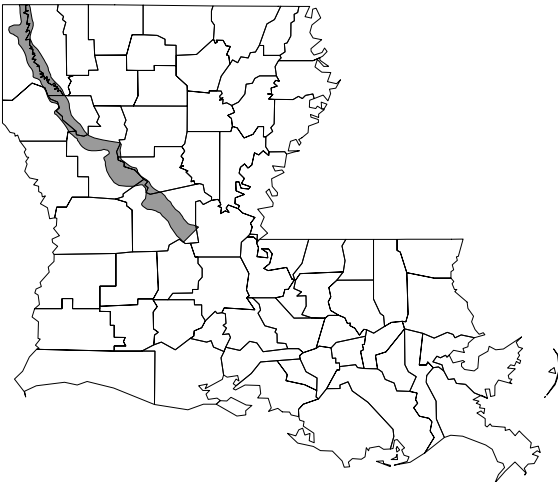


Figure III-4 Map of Chloride Data

RED RIVER ALLUVIAL AQUIFER - IRON (PPM)

Baseline Monitoring Project FY97-98

⊕ CD-376 Project Well Location and Designation

8014.0 Iron Value (in Parts Per Billion)

Contour Interval = 2500 ppb

Contour map generated using Surfer for Windows v6.04
04/28/1998

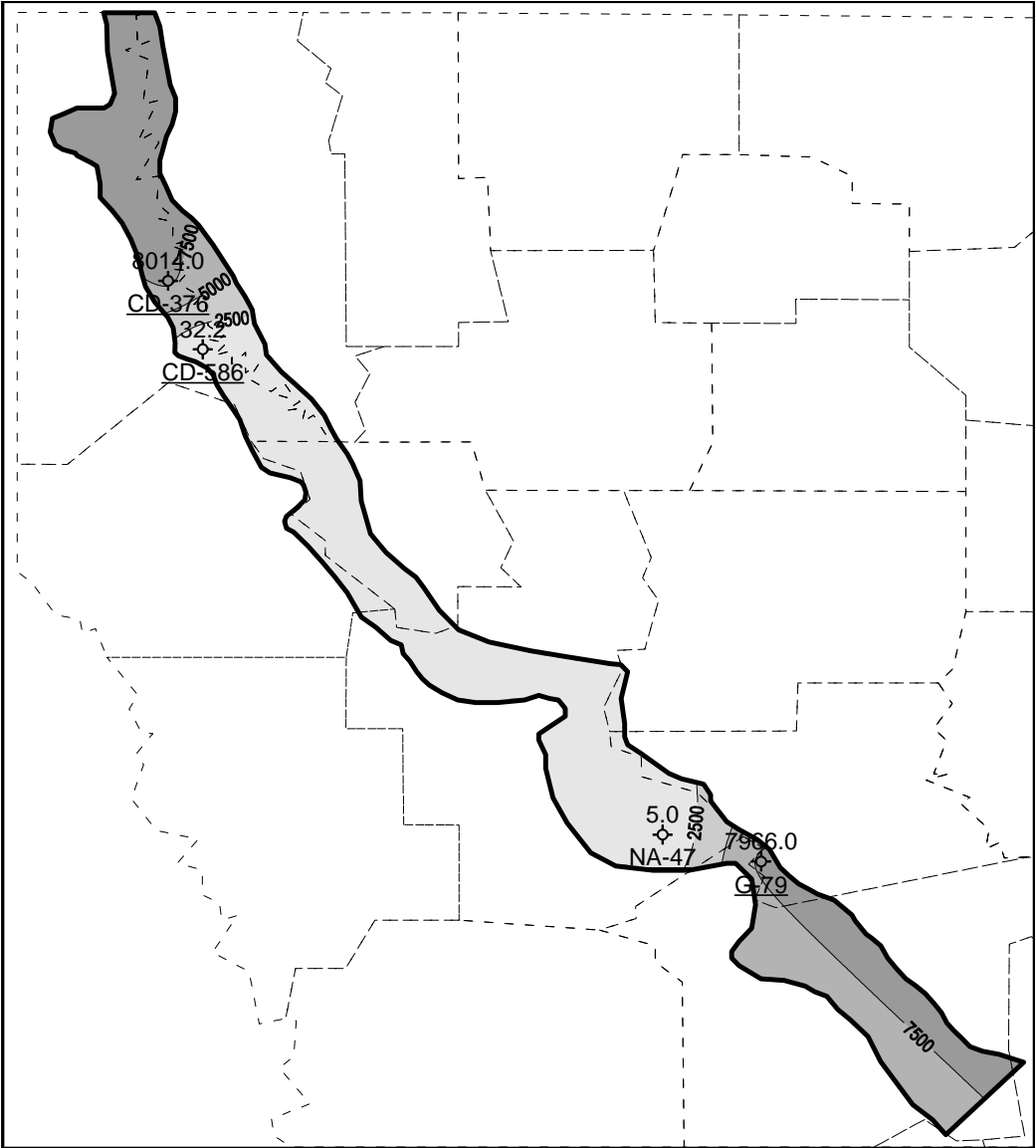
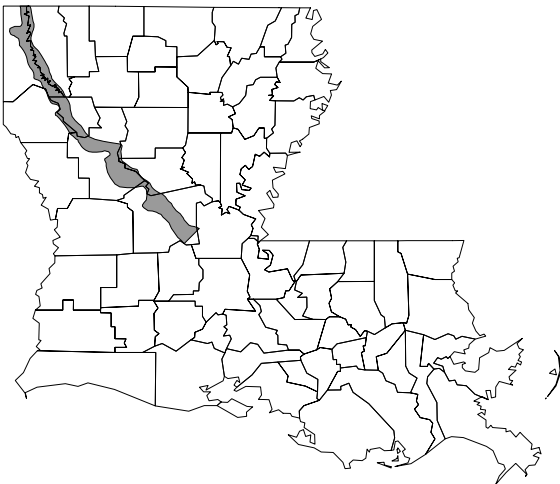


Figure III-5 Map of Iron Data