

# **CATAHOULA AQUIFER SUMMARY, 2010**

## **AQUIFER SAMPLING AND ASSESSMENT PROGRAM**



**APPENDIX 5 TO THE 2012 TRIENNIAL SUMMARY REPORT**  
**PARTIAL FUNDING PROVIDED BY THE CWA**



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## BACKGROUND

The Louisiana Department of Environmental Quality's (LDEQ) Aquifer Sampling and Assessment Program (ASSET) is an ambient monitoring program established to determine and monitor the quality of groundwater produced from Louisiana's major fresh water aquifers. The ASSET Program samples approximately 200 water wells located in 14 aquifers and aquifer systems across the state. The sampling process is designed so that all 14 aquifers and aquifer systems are monitored on a rotating basis, so that each well is monitored every three years.

In order to better assess the water quality of a particular aquifer, an attempt is made to sample all ASSET Program wells producing from it in a narrow time frame. To more conveniently and economically promulgate those data collected, a summary report on each aquifer is prepared separately. Collectively, these aquifer summaries will make up, in part, the ASSET Program Triennial Summary Report for 2012.

Analytical and field data contained in this summary were collected from wells producing from the Catahoula aquifer, during the 2010 state fiscal year (July 1, 2009 - June 30, 2010). This summary will become Appendix 5 of ASSET Program Triennial Summary Report for 2012.

These data show that in February and March of 2010, five wells were sampled which produce from the Catahoula aquifer. All five wells are public supply wells are located in four parishes across the central area of the state.

Figure 5-1 shows the geographic locations of the Catahoula aquifer and the associated wells, whereas Table 5-1 lists the wells in the aquifer along with their total depths, use made of produced waters, and date sampled.

Well data for registered water wells were obtained from the Louisiana Department of Transportation and Development's Water Well Registration Data file.

## GEOLOGY

The Catahoula formation consists primarily of sands with some silty to sandy clays and overlies the regional confining clays of the Vicksburg and Jackson groups. Within the Catahoula, fine to coarse sands are discontinuous and interbedded with silt and clay.

## HYDROGEOLOGY

Recharge takes place primarily as a result of the direct infiltration of rainfall in interstream, upland outcrop area, movement of water through overlying terrace deposits, and leakage from other aquifers. Salt water ridges under the Red River and Little River valleys in central Louisiana divide the Catahoula aquifer. The hydraulic conductivity of the Catahoula varies between 20 and 260 feet/day.

The maximum depths of occurrence of fresh water in the Catahoula range from 250 feet above sea level, to 2,200 feet below sea level. The range of thickness of the fresh water interval in the

Catahoula is 50 to 450 feet. The depths of the Catahoula wells that were monitored in conjunction with the ASSET Program range from 352 to 910 feet.

## PROGRAM PARAMETERS

The field parameters checked at each ASSET well sampling site and the list of conventional parameters analyzed in the laboratory are shown in Table 5-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 5-3. These tables also show the field and analytical results determined for each analyte. For quality control, a duplicate sample was taken for each parameter at well R-1311.

In addition to the field, conventional and inorganic analytical parameters, the target analyte list includes three other categories of compounds: volatiles, semi-volatiles, and pesticides/PCBs. Due to the large number of analytes in these categories, tables were not prepared showing the analytical results for these compounds. A discussion of any detections from any of these three categories, if necessary, can be found in their respective sections. Tables 5-8, 5-9 and 5-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Tables 5-4 and 5-5 provide a statistical overview of field and conventional data, and inorganic (total metals) data for the Catahoula aquifer, listing the minimum, maximum, and average results for these parameters collected in the FY 2010 sampling. Tables 5-6 and 5-7 compare these same parameter averages to historical ASSET-derived data for the Catahoula aquifer, from fiscal years 1995, 1998, 2001, 2004, 2007, and 2010.

The average values listed in the above referenced tables are determined using all valid, reported results, including non-detects. Per Departmental policy concerning statistical analysis, one-half of the detection limit (DL) is used in place of zero when non-detects are encountered. However, the minimum value is reported as less than the DL, not one-half the DL. If all values for a particular analyte are reported as non-detect, then the minimum, maximum, and average values are all reported as less than the DL. For contouring purposes, one-half the DL is also used for non-detects in the figures and charts referenced below.

Figures 5-2, 5-3, 5-4, and 5-5 respectively, represent the contoured values for pH, total dissolved solids, chloride, and iron. It should be noted that the contoured data represented in Figures 5-2 through 5-5 is very general due to the limited number of data points (wells) available to produce these maps. Charts 5-1 through 5-16 represent the trend of the graphed parameter, based on the averaged value of that parameter for each three-year reporting period. Discussion of historical data and related trends is found in the **Water Quality Trends and Comparison to Historical ASSET Data** section.

## INTERPRETATION OF DATA

Under the Federal Safe Drinking Water Act, EPA has established maximum contaminant levels (MCLs) for pollutants that may pose a health risk in public drinking water. An MCL is the highest level of a contaminant that EPA allows in public drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. While not all wells

sampled were public supply wells, the ASSET Program uses MCLs as a benchmark for further evaluation.

EPA has set secondary standards, which are defined as non-enforceable taste, odor, or appearance guidelines. Field and laboratory data contained in Tables 5-2 and 5-3 show that only one secondary MCL (SMCL) was exceeded in one of the five wells sampled in the Catahoula aquifer.

### ***Field and Conventional Parameters***

Table 5-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 5-4 provides an overview of this data for the Catahoula aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 5-2 shows that no primary MCL was exceeded for field or conventional parameters for this reporting period. Those ASSET wells reporting turbidity levels greater than 1.0 NTU do not exceed the primary MCL of 1.0, as this standard applies to public supply water wells that are under the direct influence of surface water. The Louisiana Department of Health and Hospitals has determined that no public water supply well in Louisiana was in this category.

Federal Secondary Drinking Water Standards: A review of the analysis listed in Table 5-2 shows that no secondary MCL was exceeded in this group of analytes.

### ***Inorganic Parameters***

Table 5-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 5-5 provides an overview of inorganic data for the Catahoula aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analyses listed in Table 5-3 shows that no primary MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 5-3 shows that one well exceeded the SMCL for iron:

**Iron (SMCL = 300 ug/L):**

LS-278 – 312 ug/L

### ***Volatile Organic Compounds***

Table 5-8 shows the volatile organic compound (VOC) parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however any detection of a VOC would be discussed in this section.

Chloromethane was detected in three of the five wells sampled, and was also detected in the field blank. Because chloromethane was detected in the field blank and that chloromethane is a common lab contaminant, it is determined that these detections are due to lab contamination

and not due to contamination of the wells. There were no other detections of VOCs during the FY 2010 sampling of the Catahoula aquifer.

### ***Semi-Volatile Organic Compounds***

Table 5-9 shows the semi-volatile organic compound (SVOC) parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however any detection of a SVOC would be discussed in this section.

No SVOC was detected at or above its detection limit during the FY 2010 sampling of the Catahoula aquifer.

### ***Pesticides and PCBs***

Table 5-10 shows the pesticide and PCB parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however any detection of a pesticide or PCB would be discussed in this section.

No pesticide or PCB was detected at or above its detection limit during the FY 2010 sampling of the Catahoula aquifer.

## **WATER QUALITY TRENDS AND COMPARISON TO HISTORICAL ASSET DATA**

Analytical and field data show that the quality and characteristics of groundwater produced from the Catahoula aquifer exhibit some changes when comparing current data to that of the five previous sampling rotations (three, six, nine, twelve, and fifteen years prior). These comparisons can be found in Tables 5-6 and 5-7, and in Charts 5-1 to 5-16 of this summary. Over the fifteen year period, six analytes have shown a general increase in their average concentrations. These analytes are: ammonia, chloride, hardness, sulfate, TKN, and total phosphorus. For this same time period, three analytes have demonstrated a decrease in their average concentrations, which are: copper, iron, and TDS. All other analytes have remained stable or below their respective detection limits.

The current number of wells with SMCL exceedances, and the current total number of SMCL exceedances are the same as the previous sampling event in FY 2007. Historical data show that in the FY 2007 sampling of the Catahoula aquifer there was only one SMCL exceedance for iron in one well. The FY 2010 data also show that iron was the only exceedance in a single well.

## SUMMARY AND RECOMMENDATIONS

In summary, the data show that the groundwater produced from this aquifer is soft<sup>1</sup> and is of good quality when considering short-term or long-term health risk guidelines. Laboratory data show that no ASSET well that was sampled during the Fiscal Year 2010 monitoring of the Catahoula aquifer exceeded an MCL. The data also show that this aquifer is of good quality when considering taste, odor or appearance guidelines, with only one SMCL exceeded in one well.

Comparison to historical ASSET-derived data show only some change in the quality or characteristics of the Catahoula aquifer with six parameters showing consistent increases in average concentration and three parameters decreasing in average concentration. Remaining parameters exhibited stable concentrations or remained below detection limits.

It is recommended that the wells assigned to the Catahoula aquifer be re-sampled as planned, in approximately three years. In addition, several wells should be added to the five currently in place to increase the well density for this aquifer.

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<sup>1</sup> Classification based on hardness scale from: Peavy, H. S. et al. *Environmental Engineering*. New York: McGraw-Hill. 1985.



***Table 5-1: List of Wells Sampled, Catahoula Aquifer–FY 2010***

<b>DOTD Well Number</b>	<b>Parish</b>	<b>Date</b>	<b>Owner</b>	<b>Depth (Feet)</b>	<b>Well Use</b>
CT-118	Catahoula	2/22/2010	City of Jonesville	762	Public Supply
LS-278	La Salle	2/22/2010	Rogers Water System	352	Public Supply
R-1113	Rapides	2/22/2010	Pollock Area Water System	852	Public Supply
R-1311	Rapides	3/17/2010	Lena Water System, Inc.	514	Public Supply
V-434	Vernon	3/17/2010	Town of Anacoco	910	Public Supply

**Table 5-2: Summary of Field and Conventional Data, Catahoula Aquifer–FY 2010**

DOTD Well Number	Temp Deg. C	pH SU	Sp. Cond. mmhos/cm	Sal. ppt	TDS g/L	Alk mg/L	Cl mg/L	Color PCU	Sp. Cond. umhos/cm	SO4 mg/L	TDS mg/L	TSS mg/L	Turb. NTU	NH3 mg/L	Hard. mg/L	Nitrite-Nitrate (as N) mg/L	TKN mg/L	Tot. P mg/L
	LABORATORY DETECTION LIMITS →					2	0.25	1	10	0.25	10	4	0.3	0.05	5	0.01	0.3	0.05
	FIELD PARAMETERS					LABORATORY PARAMETERS												
CT-118	22.41	7.12	0.296	0.14	0.192	122	19.7	3.0	290	8.7	256	< 4	< 0.3	0.22	< 5	< 0.01	0.34	0.1
LS-278	20.27	7.36	0.197	0.09	0.128	96	3.56	12.0	195	4.5	139	< 4	< 0.3	0.21	< 5	< 0.01	0.32	0.5
R-1113	24.57	8.08	0.360	0.17	0.234	138	32.8	6.0	349	0.3	319	< 4	< 0.3	0.30	< 5	< 0.01	< 0.3	0.4
R-1311	22.66	7.44	0.297	0.14	0.193	112	11.7	8.0	278	16.2	226	< 4	< 0.3	0.22	< 5	< 0.01	0.65	1.0
R-1311*	22.66	7.44	0.297	0.14	0.193	108	11.7	8.0	281	16.2	229	< 4	< 0.3	0.34	< 5	< 0.01	0.59	1.0
V-434	25.33	8.21	0.307	0.15	0.200	130	7.88	5.0	288	7.8	247	< 4	0.752	0.21	< 5	< 0.01	0.39	0.1

\*Denotes Duplicate Sample

**Table 5-3: Summary of Inorganic (Total Metals) Data, Catahoula Aquifer–FY 2010**

DOTD Well Number	Antimony ug/L	Arsenic ug/L	Barium ug/L	Beryllium ug/L	Cadmium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Selenium ug/L	Silver ug/L	Thallium ug/L	Zinc ug/L
Laboratory Detection Limits	5	4	5	2	2	4	2	100	1	0.0002	3	5	1	2	6
CT-118	<5	< 4	7.32	< 2	< 2	< 4	14	< 100	2.34	< 0.0002	<3	< 5	< 1	< 2	< 6
LS-278	<5	< 4	< 5	< 2	< 2	< 4	< 2	312	< 1	< 0.0002	<3	< 5	< 1	< 2	< 6
R-1113	<5	< 4	< 5	< 2	< 2	< 4	< 2	< 100	1.43	< 0.0002	<3	< 5	< 1	< 2	11.5
R-1311	<5	< 4	14.7	< 2	< 2	< 4	< 2	< 100	< 1	< 0.0002	<3	< 5	< 1	< 2	48
R-1311*	<5	< 4	14.6	< 2	< 2	< 4	< 2	< 100	< 1	< 0.0002	<3	< 5	< 1	< 2	49
V-434	<5	< 4	< 5	< 2	< 2	4.09	< 2	< 100	< 1	< 0.0002	17.9	< 5	< 1	< 2	7.03

\*Denotes Duplicate Sample.

Shaded cell exceed EPA Secondary Standards

**Table 5-4: FY 2010 Field and Conventional Statistics, ASSET Wells**

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	Temperature (°C)	20.27	25.33	22.98
	pH (SU)	7.12	8.21	7.61
	Specific Conductance (mmhos/cm)	0.197	0.360	0.292
	Salinity (ppt)	0.09	0.17	0.14
	TDS (g/L)	0.128	0.234	0.19
LABORATORY	Alkalinity (mg/L)	96	138	118
	Chloride (mg/L)	3.6	32.8	14.6
	Color (PCU)	3.0	12.0	7.0
	Specific Conductance (umhos/cm)	195	349	280
	Sulfate (mg/L)	0.3	16.2	8.9
	TDS (mg/L)	139	319	236
	TSS (mg/L)	< 4	< 4	< 4
	Turbidity (NTU)	< 0.3	0.8	< 0.3
	Ammonia, as N (mg/L)	0.21	0.34	0.25
	Hardness (mg/L)	< 5	< 5	< 5
	Nitrite - Nitrate, as N (mg/L)	< 0.01	< 0.01	< 0.01
	TKN (mg/L)	< 0.3	0.41	0.65
	Total Phosphorus (mg/L)	0.10	0.98	0.50

**Table 5-5: FY 2010 Inorganic (Total Metals) Statistics, ASSET Wells**

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ug/L)	< 5	< 5	< 5
Arsenic (ug/L)	< 4	< 4	< 4
Barium (ug/L)	< 5	15	7
Beryllium (ug/L)	< 2	< 2	< 2
Cadmium (ug/L)	< 2	< 2	< 2
Chromium (ug/L)	< 4	4.09	< 4
Copper (ug/L)	< 2	14.0	3.2
Iron (ug/L)	<100	312	<100
Lead (ug/L)	< 1	2.34	< 1
Mercury (ug/L)	< 0.0002	< 0.0002	< 0.0002
Nickel (ug/L)	< 3	17.9	4.2
Selenium (ug/L)	< 5	< 5	< 5
Silver (ug/L)	< 1	< 1	< 1
Thallium (ug/L)	< 2	< 2	< 2
Zinc (ug/L)	< 6	49.0	20.3

**Table 5-6: Triennial Field and Conventional Statistics, ASSET Wells**

PARAMETER		AVERAGE VALUES BY FISCAL YEAR					
		FY 1995	FY 1998	FY 2001	FY 2004	FY 2007	FY 2010
FIELD	Temperature (°C)	23.71	22.45	22.47	23.46	24.58	22.98
	pH (SU)	8.03	6.31	7.78	7.59	7.93	7.61
	Specific Conductance (mmhos/cm)	0.37	0.23	0.28	0.25	0.430	0.292
	Salinity (Sal.) (ppt)	0.16	0.11	0.18	0.12	0.20	0.14
	TDS (Total dissolved solids) (g/L)	-	-	-	0.16	0.28	0.19
LABORATORY	Alkalinity (Alk.) (mg/L)	122.76	109.64	135.55	131.80	134	118
	Chloride (Cl) (mg/L)	13.86	14.70	10.88	12.80	22.8	14.6
	Color (PCU)	6.6	5.0	6.2	5.5	<5	7.0
	Specific Conductance (umhos/cm)	289	269	302	291	334	280
	Sulfate (SO4) (mg/L)	8.66	4.56	4.55	6.23	9.50	8.95
	TDS (Total dissolved solids) (mg/L)	245	265	258	195	240	236
	TSS (Total suspended solids) (mg/L)	<4	5.7	<4	<4	<4	< 4
	Turbidity (Turb.) (NTU)	6.4	<1	1.7	1.5	1.1	< 0.3
	Ammonia, as N (NH3) (mg/L)	0.22	0.16	0.20	0.27	0.16	0.25
	Hardness (mg/L)	<5	<5	<5	<5	<5	<5
	Nitrite - Nitrate, as N (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.01
	TKN (mg/L)	0.50	0.18	0.38	0.41	0.22	0.65
	Total Phosphorus (P) (mg/L)	0.25	0.22	0.37	0.55	0.33	0.50

**Table 5-7: Triennial Inorganic (Total Metals) Statistics, ASSET Wells**

PARAMETER		AVERAGE VALUES BY FISCAL YEAR					
		FY 1995	FY 1998	FY 2001	FY 2004	FY 2007	FY 2010
Antimony (ug/L)		<5	<5	<5	<30	<1	< 5
Arsenic (ug/L)		<5	<5	<5	<10	<3	< 4
Barium (ug/L)		8.1	63.6	4.6	<200	29.0	7.0
Beryllium (ug/L)		<5	<5	<5	<5	<1	< 2
Cadmium (ug/L)		<5	<5	<5	<5	<0.5	< 2
Chromium (ug/L)		<5	<5	<5	<10	<3	< 4
Copper (ug/L)		84.1	<5	5.5	<10	3.3	3.2
Iron (ug/L)		1,076	413	232	268	327	<100
Lead (ug/L)		23.2	<5	46.7	<3	<3	< 1
Mercury (ug/L)		<0.05	<0.05	<0.05	<0.2	<0.05	< 0.0002
Nickel (ug/L)		6.1	<5	6.9	<40	<3	4.2
Selenium (ug/L)		<5	<5	<5	<10	<4	< 5
Silver (ug/L)		<5	<5	<5	-	<0.5	< 1
Thallium (ug/L)		<5	<5	<5	<10	<1	< 2
Zinc (ug/L)		177.4	42.2	64.9	<20	329.5	20.3

**Table 5-8: VOC Analytical Parameters**

COMPOUND	METHOD	DETECTION LIMIT (ug/L)
ETHYL BENZENE	624	0.5
CIS-1,3-DICHLOROPROPENE	624	0.5
TRANS-1,3-DICHLOROPROPENE	624	0.5
1,4-DICHLOROBENZENE	624	0.5
1,2-DICHLOROETHANE	624	0.5
TOLUENE	624	0.5
CHLOROBENZENE	624	0.5
DIBROMOCHLOROMETHANE	624	0.5
TETRACHLOROETHYLENE (PCE)	624	0.5
TRANS-1,2-DICHLOROETHENE	624	0.5
TERT-BUTYL METHYL ETHER	624	0.5
1,3-DICHLOROBENZENE	624	0.5
CARBON TETRACHLORIDE	624	0.5
CHLOROFORM	624	0.5
BENZENE	624	0.5
1,1,1-TRICHLOROETHANE	624	0.5
BROMOMETHANE	624	0.5
CHLOROMETHANE	624	0.5
CHLOROETHANE	624	0.5
VINYL CHLORIDE	624	0.5
METHYLENE CHLORIDE	624	0.5
BROMOFORM	624	0.5
BROMODICHLOROMETHANE	624	0.5
1,1-DICHLOROETHANE	624	0.5
1,1-DICHLOROETHENE	624	0.5
TRICHLOROFLUOROMETHANE (FREON-11)	624	0.5
1,2-DICHLOROPROPANE	624	0.5
1,1,2-TRICHLOROETHANE	624	0.5
TRICHLOROETHYLENE (TCE)	624	0.5
1,1,2,2-TETRACHLOROETHANE	624	0.5
1,2,3-TRICHLOROBENZENE	624	0.5
1,2-DICHLOROBENZENE	624	0.5
ETHYL BENZENE	624	0.5
CIS-1,3-DICHLOROPROPENE	624	0.5

**Table 5-9: SVOC Analytical Parameters**

COMPOUND	METHOD	DETECTION LIMIT (ug/L)
1,2,4-TRICHLOROBENZENE	625	5
2,4,6-TRICHLOROPHENOL	625	5
2,4-DICHLOROPHENOL	625	5
2,4-DIMETHYLPHENOL	625	5
2,4-DINITROPHENOL	625	20
2,4-DINITROTOLUENE	625	5
2,6-DINITROTOLUENE	625	5
2-CHLORONAPHTHALENE	625	5
2-CHLOROPHENOL	625	5
2-NITROPHENOL	625	10
3,3'-DICHLOROBENZIDINE	625	5
4,6-DINITRO-2-METHYLPHENOL	625	10
4-BROMOPHENYL PHENYL ETHER	625	5
4-CHLORO-3-METHYLPHENOL	625	5
4-CHLOROPHENYL PHENYL ETHER	625	5
4-NITROPHENOL	625	20
ACENAPHTHENE	625	5
ACENAPHTHYLENE	625	5
ANTHRACENE	625	5
BENZIDINE	625	20
BENZO(A)ANTHRACENE	625	5
BENZO(A)PYRENE	625	5
BENZO(B)FLUORANTHENE	625	5
BENZO(G,H,I)PERYLENE	625	5
BENZO(K)FLUORANTHENE	625	5
BENZYL BUTYL PHTHALATE	625	5
BIS(2-CHLOROETHOXY) METHANE	625	5
HEXACHLOROCYCLOPENTADIENE	625	5
HEXACHLOROETHANE	625	5
INDENO(1,2,3-C,D)PYRENE	625	5
ISOPHORONE	625	5
NAPHTHALENE	625	5
NITROBENZENE	625	5
N-NITROSODIMETHYLAMINE	625	5
N-NITROSODI-N-PROPYLAMINE	625	5
N-NITROSODIPHENYLAMINE	625	5

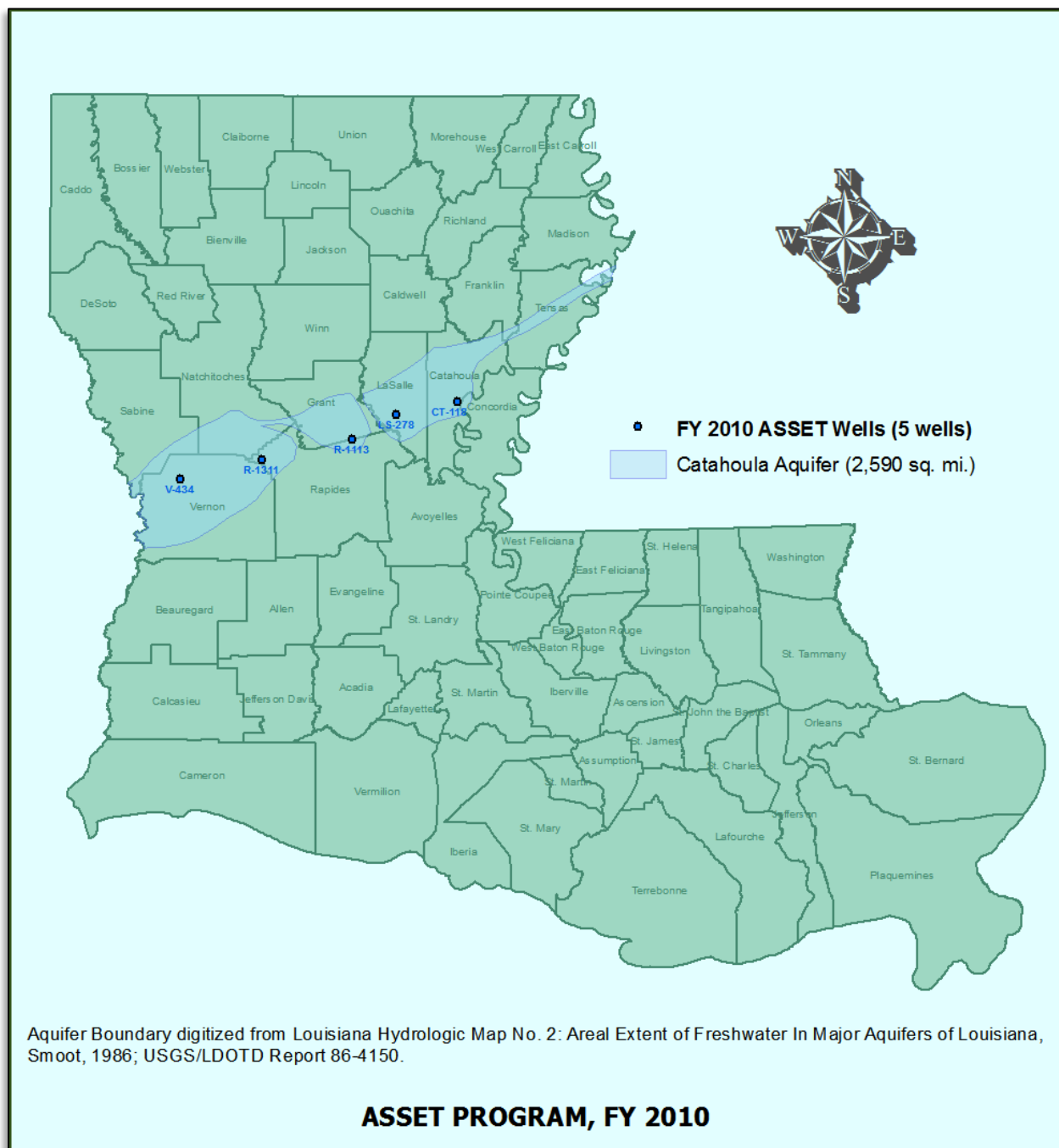
**Table 5-9: SVOCs (Continued)**

COMPOUND	METHOD	DETECTION LIMIT (ug/L)
PENTACHLOROBENZENE	625	5
PENTACHLOROPHENOL	625	10
PHENANTHRENE	625	5
PHENOL	625	5
PYRENE	625	5
TETRACHLOROBENZENE(S), TOTAL	625	10

**Table 5-10: Pesticides and PCBs**

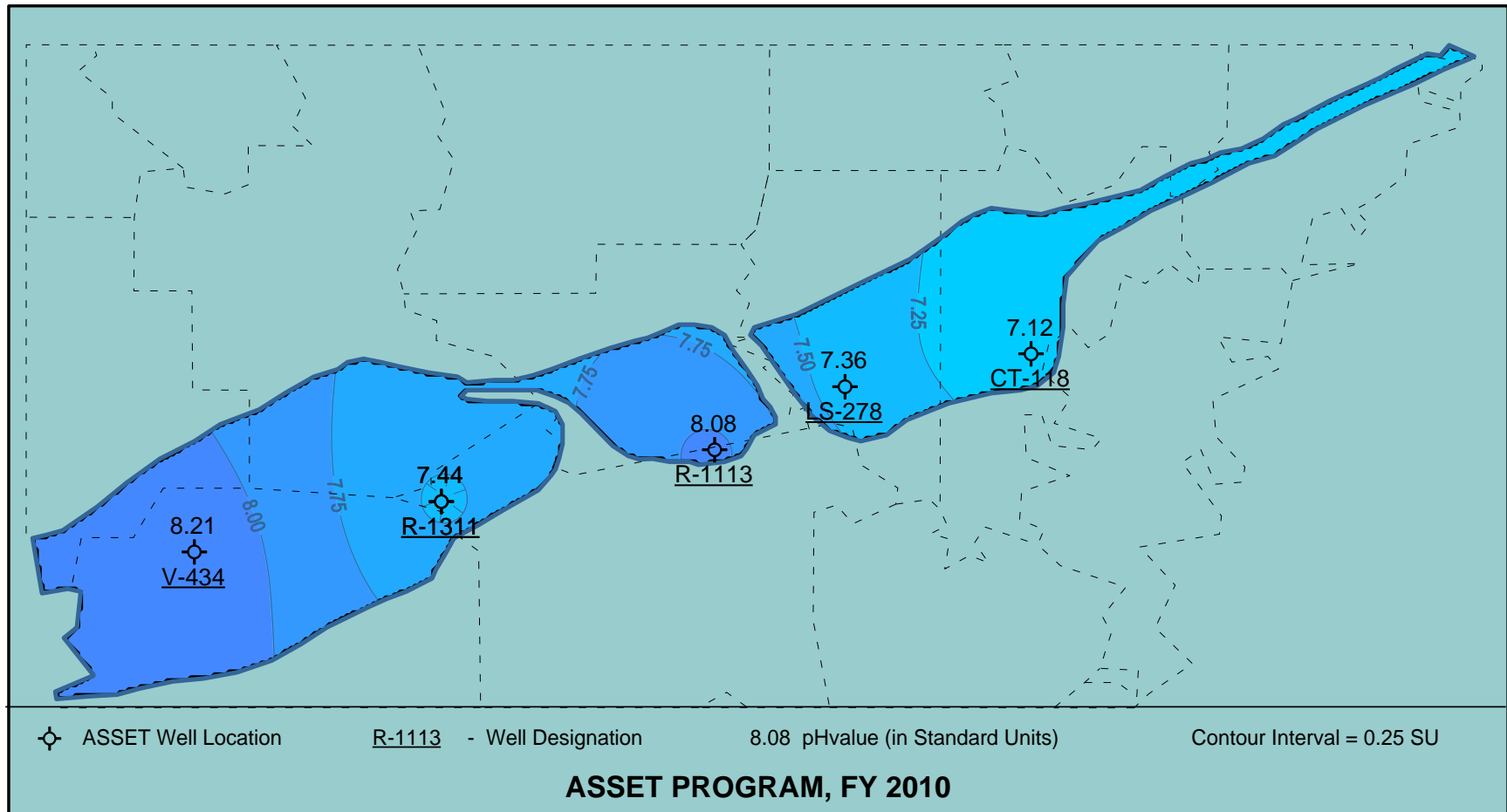
COMPOUND	METHOD	DETECTION LIMITS (ug/L)
4,4'-DDD	8081	0.1
4,4'-DDE	8081	0.1
4,4'-DDT	8081	0.1
Aldrin	8081	0.05
Alpha-Chlordane	8081	0.05
alpha-BHC	8081	0.05
beta-BHC	8081	0.05
delta-BHC	8081	0.05
gamma-BHC	8081	0.05
Dieldrin	8081	0.1
Endosulfan I	8081	0.05
Endosulfan II	8081	0.1
Endosulfan Sulfate	8081	0.1
Endrin	8081	0.1
Endrin Aldehyde	8081	0.1
Endrin Ketone	8081	0.1
Heptachlor	8081	0.05
Heptachlor Epoxide	8081	0.05
Methoxychlor	8081	0.5
Toxaphene	8081	2
Gamma-Chlordane	8081	0.05
PCB-1016	8082	1
PCB-1221	8082	1
PCB-1232	8082	1
PCB-1242	8082	1
PCB-1248	8082	1
PCB-1254	8082	1
PCB-1260	8082	1

**Figure 5-1: Location Plat, Catahoula Aquifer**

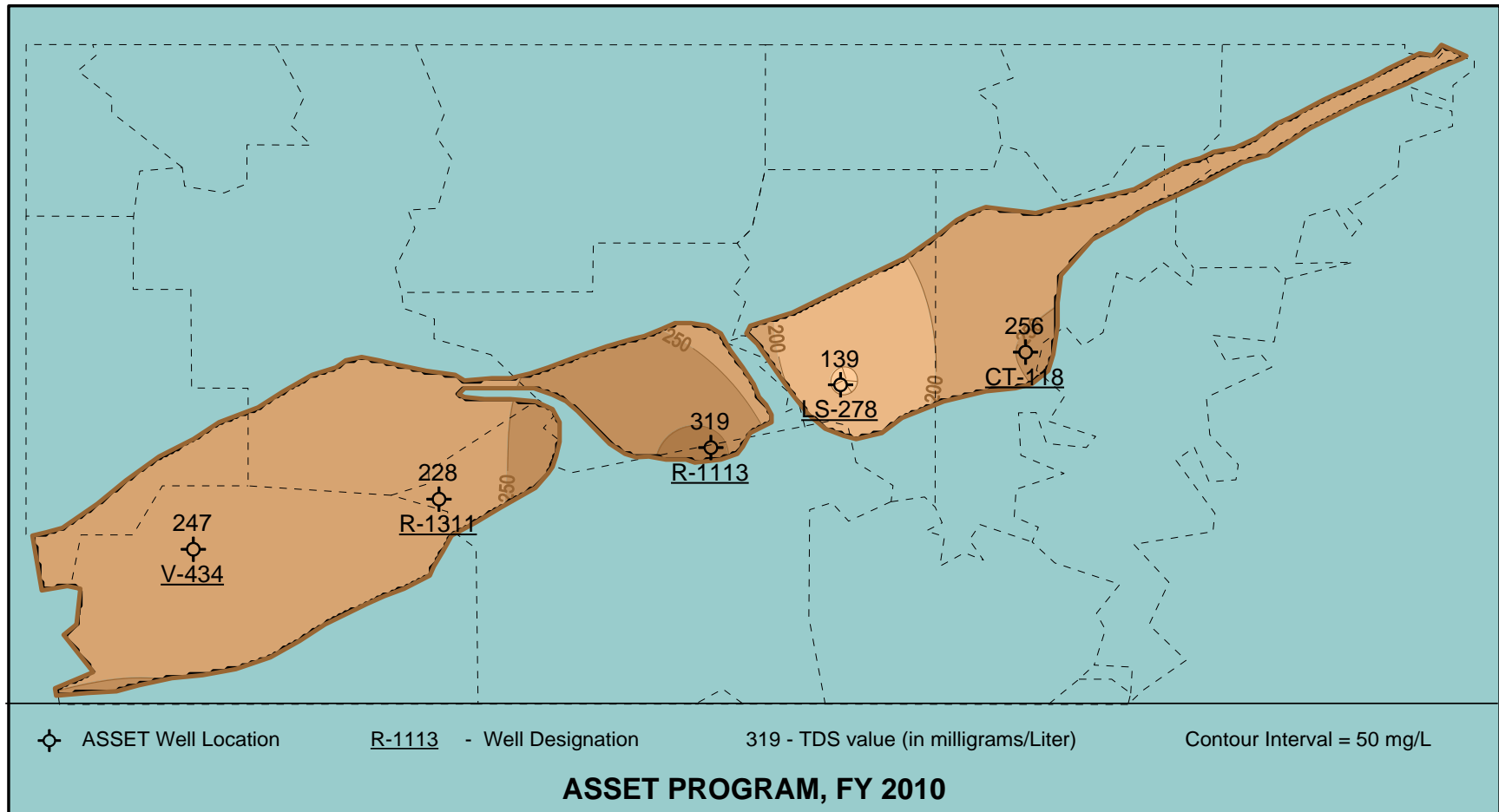




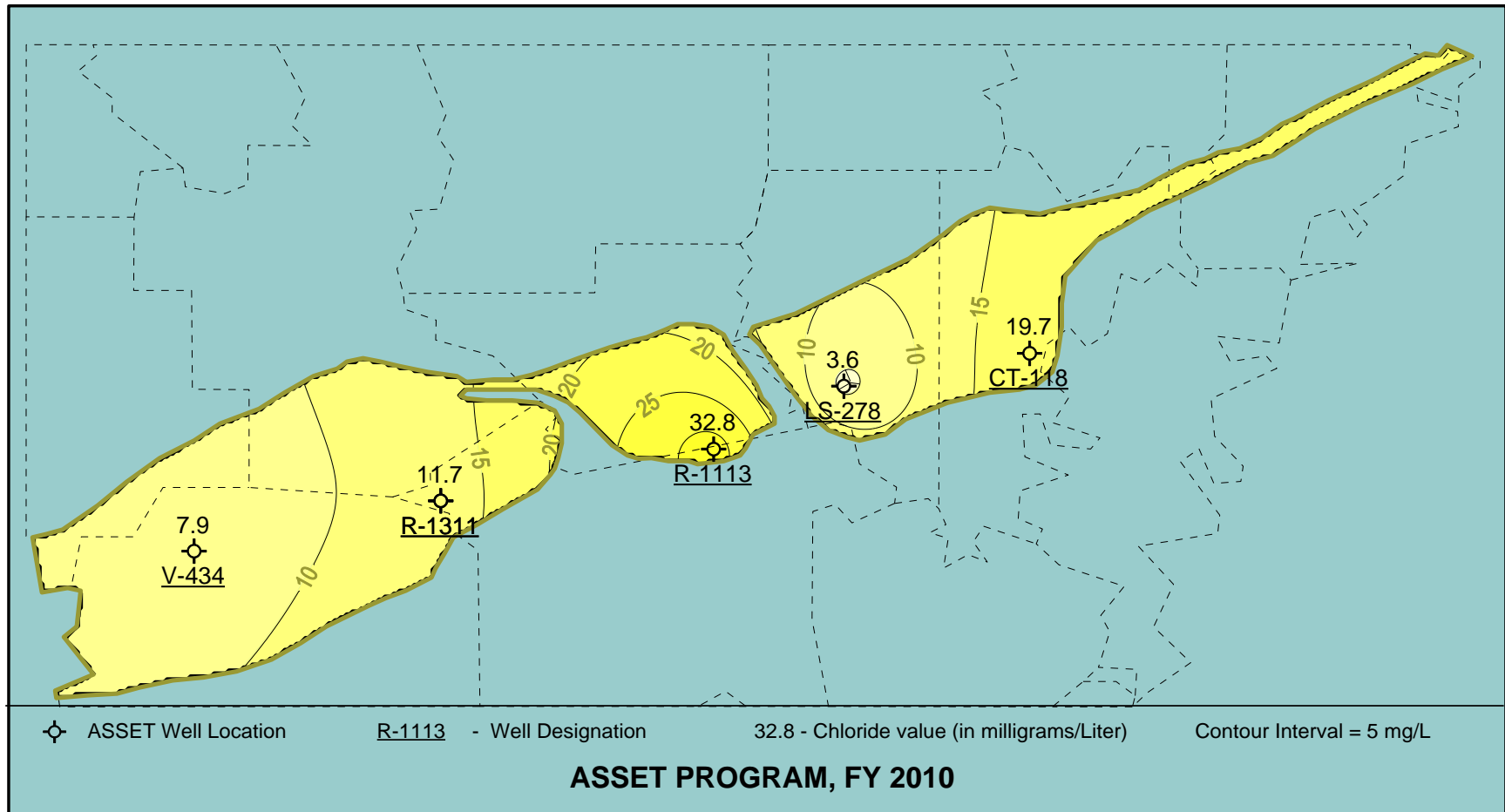
**Figure 5-2: Map of pH Data**



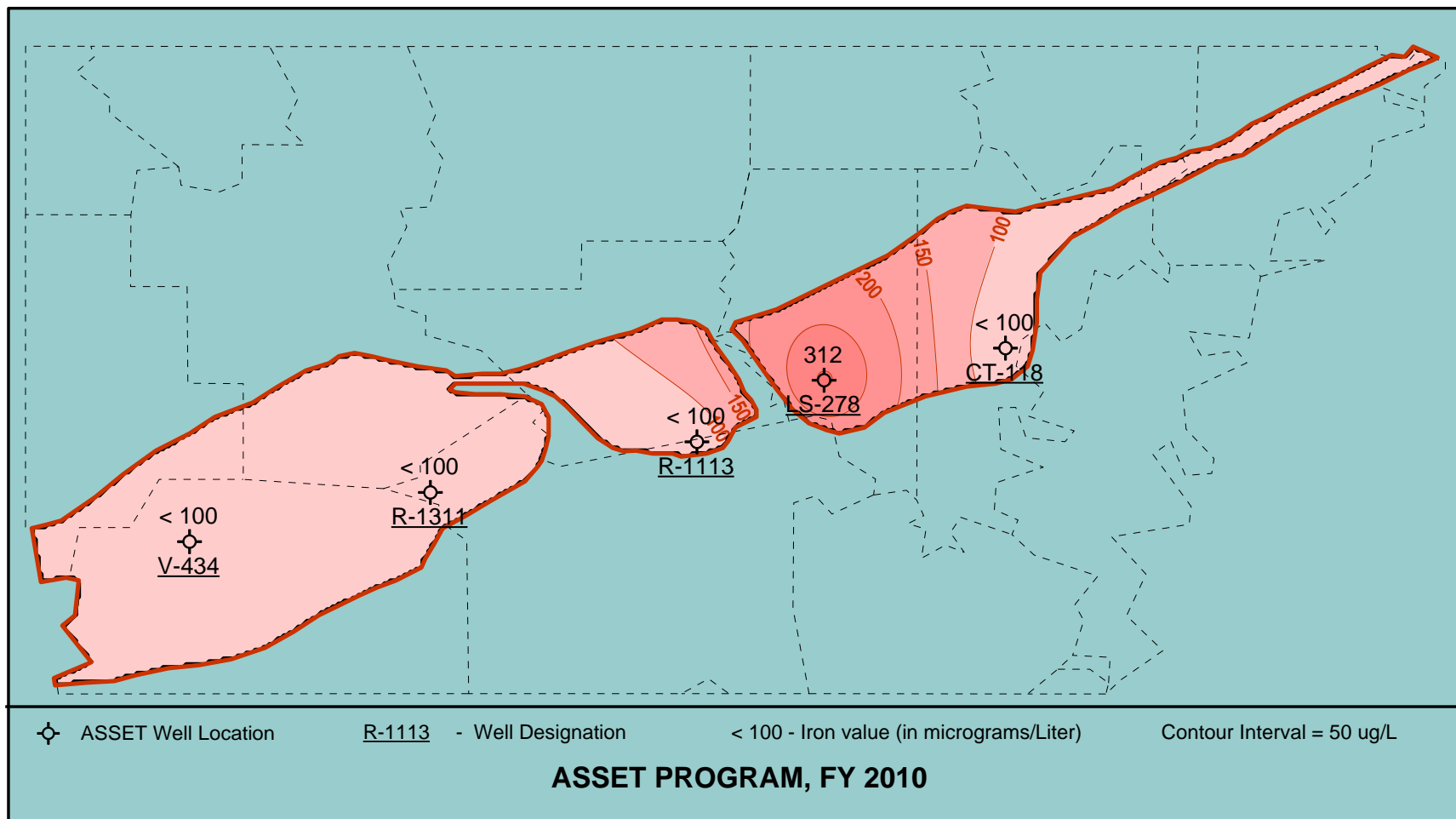
**Figure 5-3: Map of TDS Lab Data**



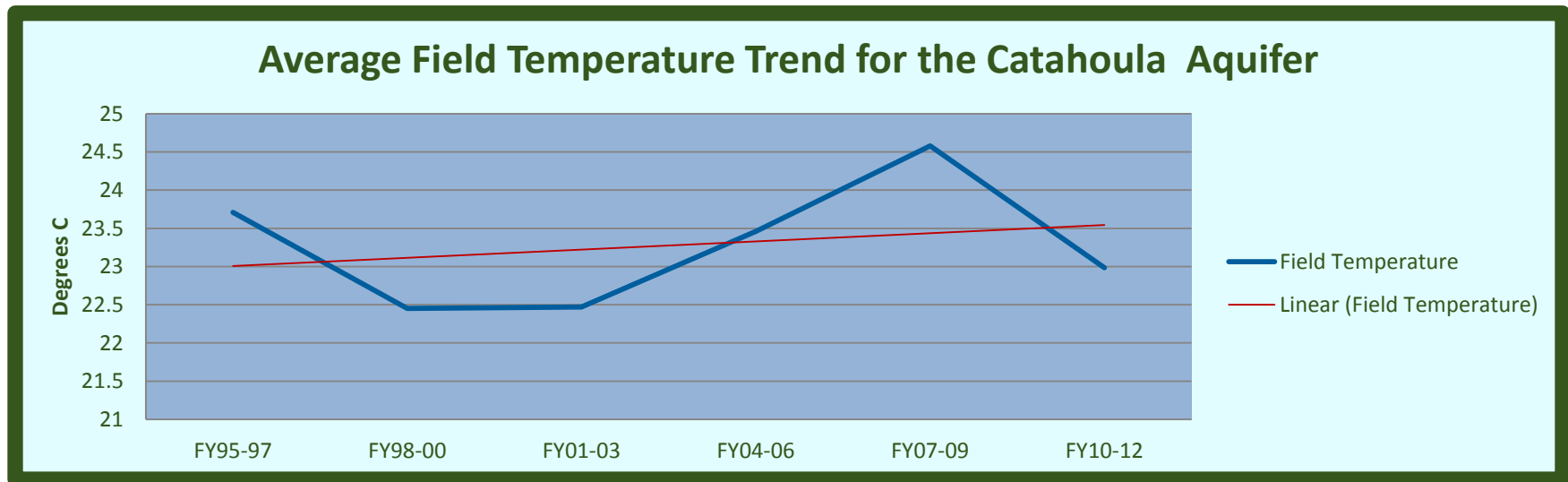
**Figure 5-4: Map of Chloride Data**



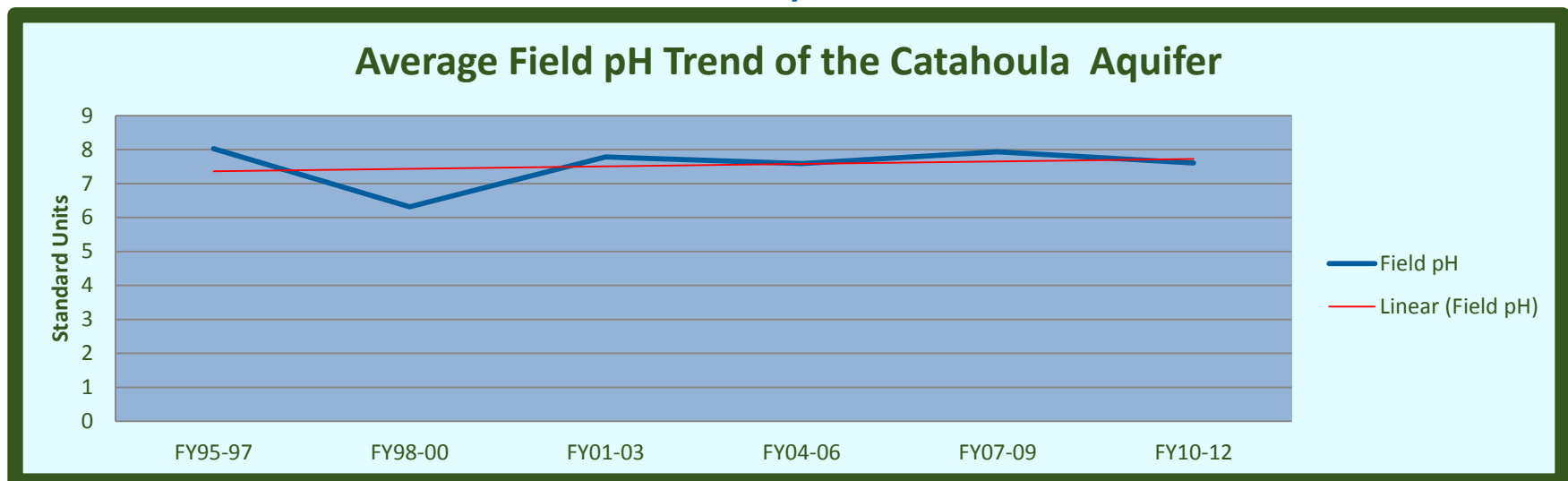
**Figure 5-5: Map of Iron Data**



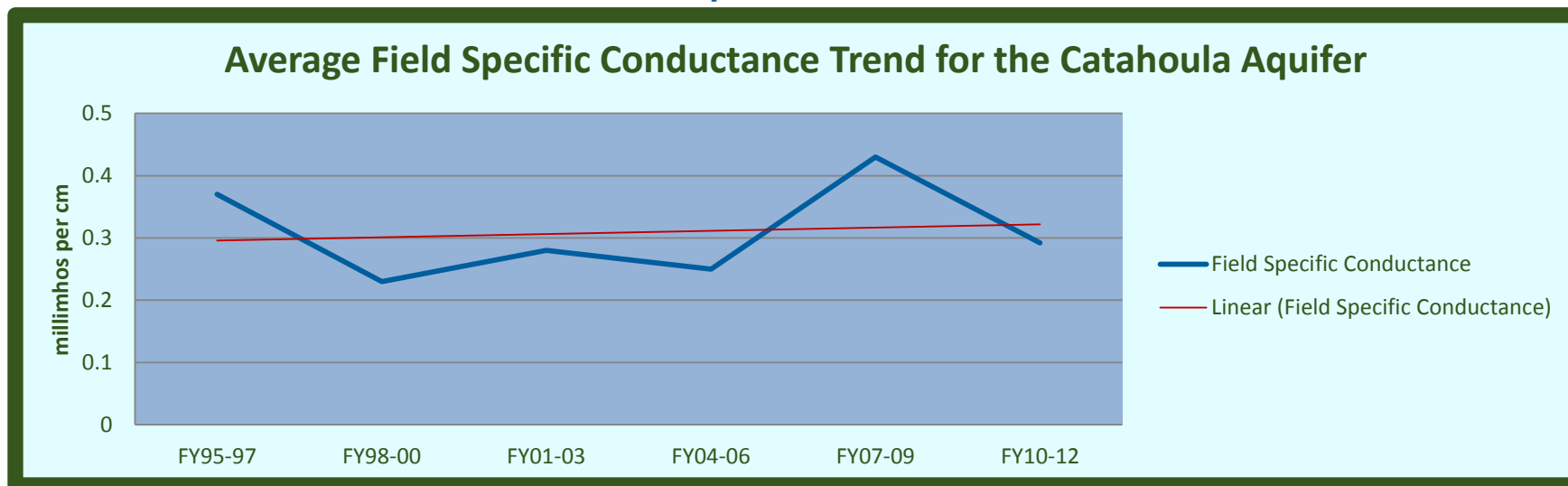
**Chart 5-1: Temperature Trend**



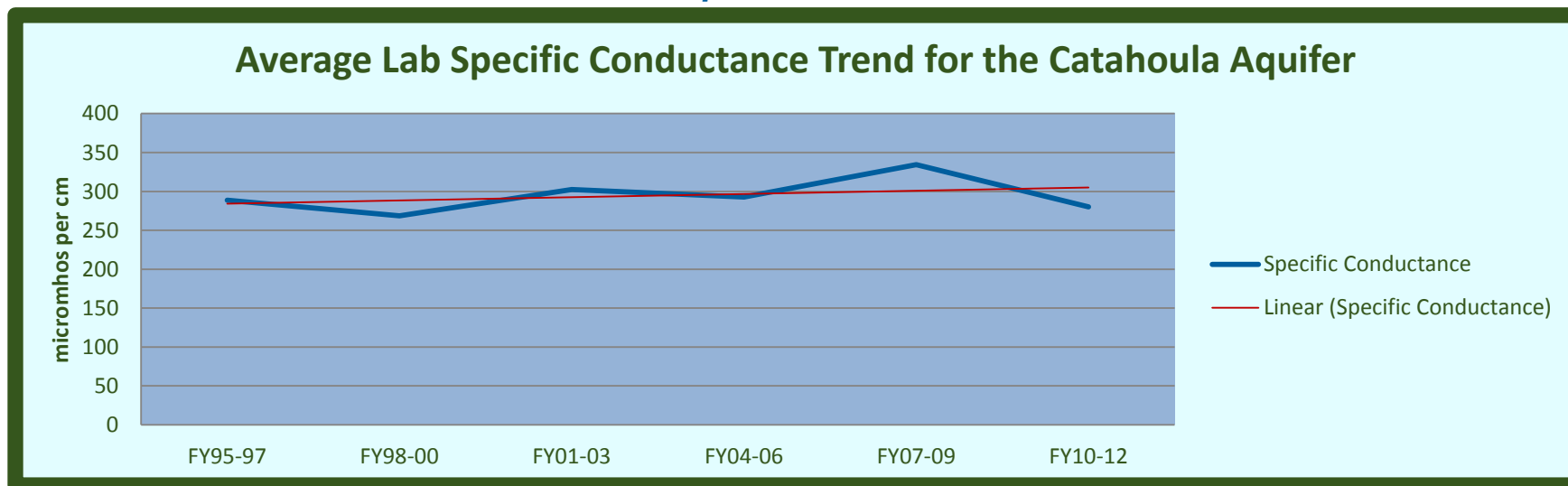
**Chart 5-2: pH Trend**



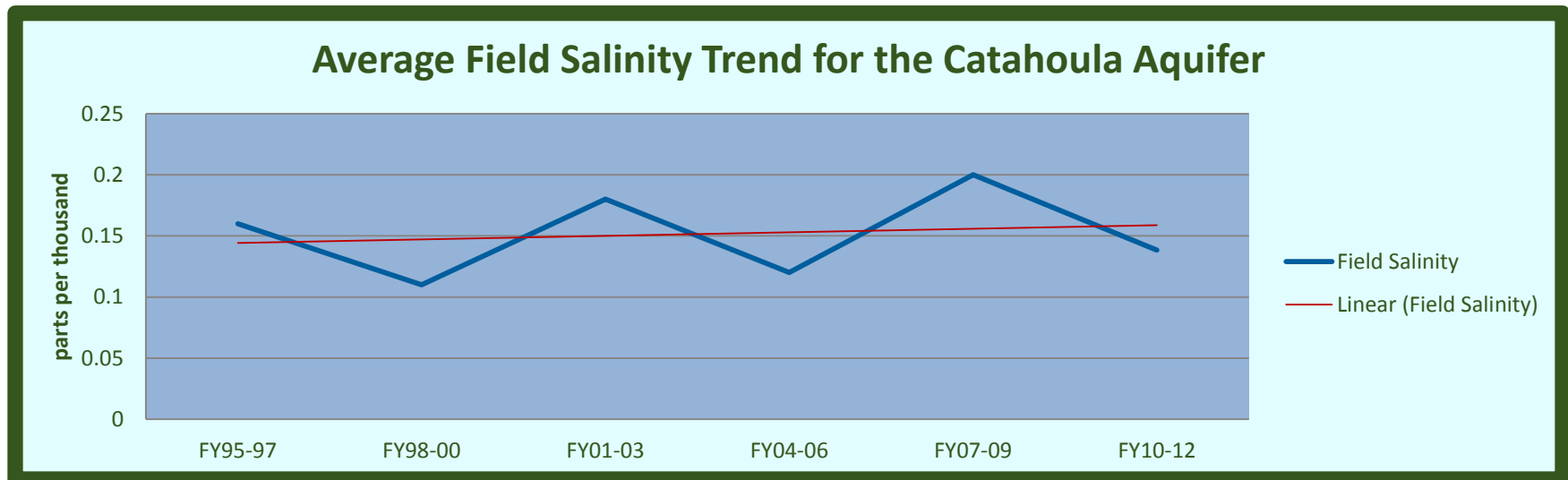
**Chart 5-3: Field Specific Conductance Trend**



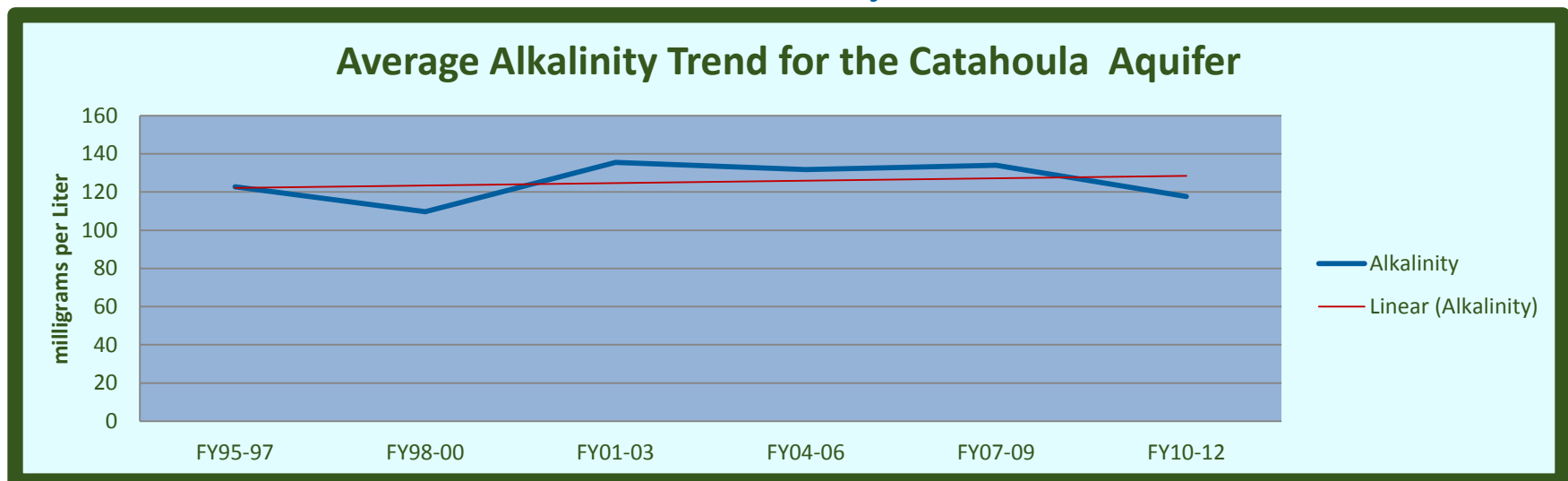
**Chart 5-4: Lab Specific Conductance Trend**



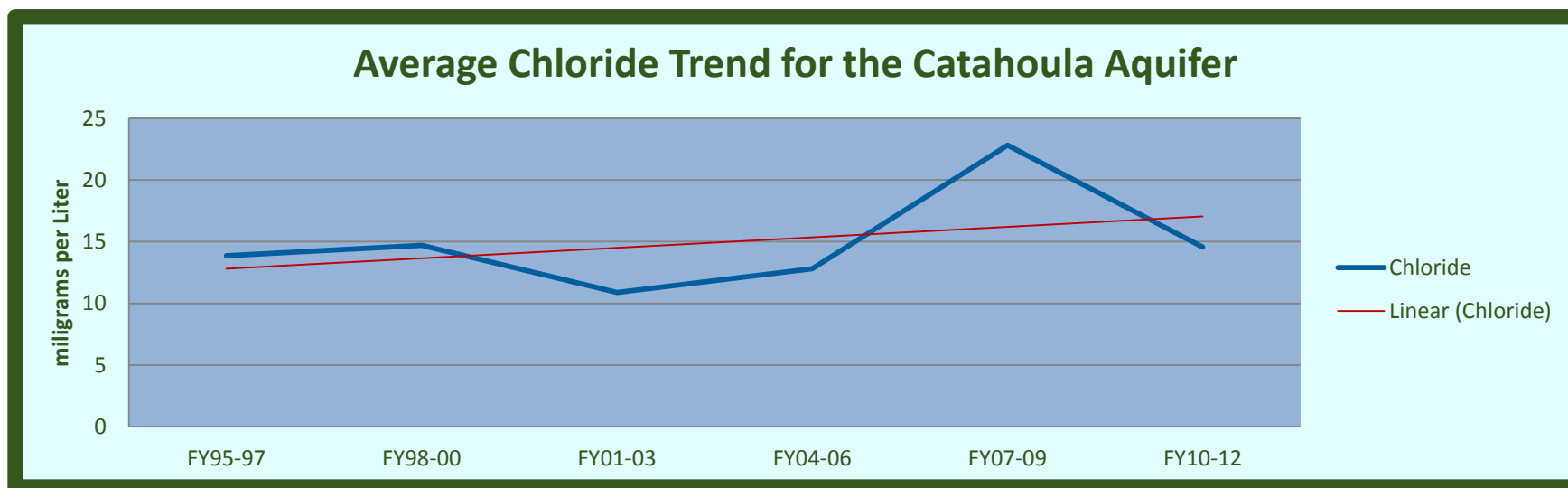
**Chart 5-5: Field Salinity Trend**



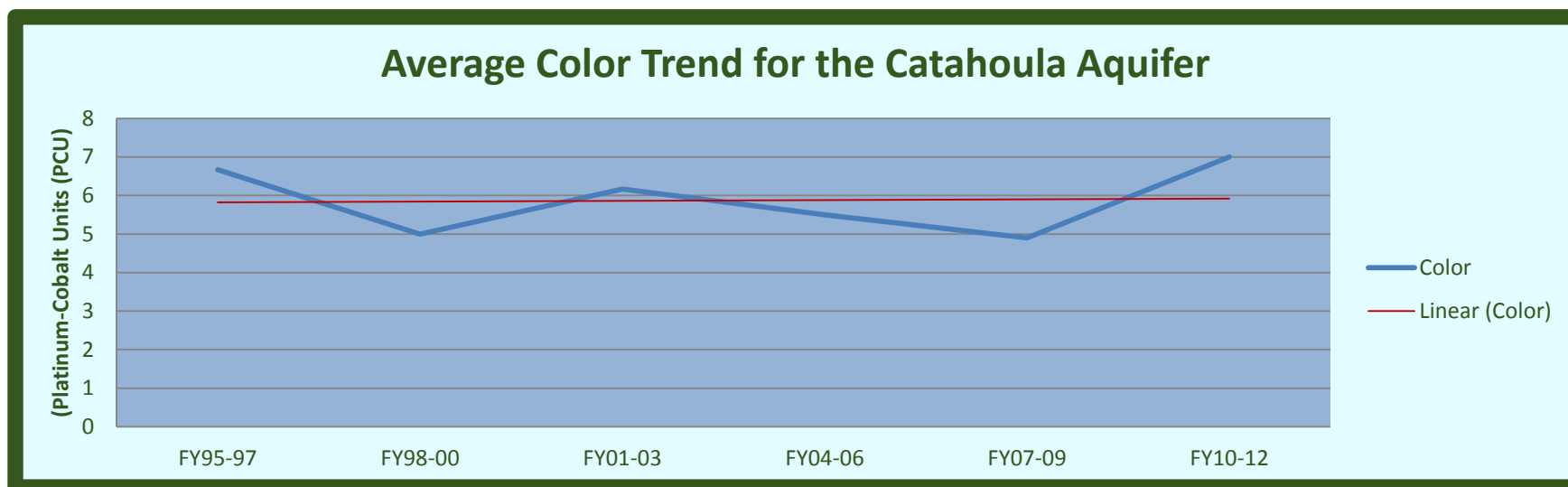
**Chart 5-6: Alkalinity Trend**



**Chart 5-7: Chloride Trend**

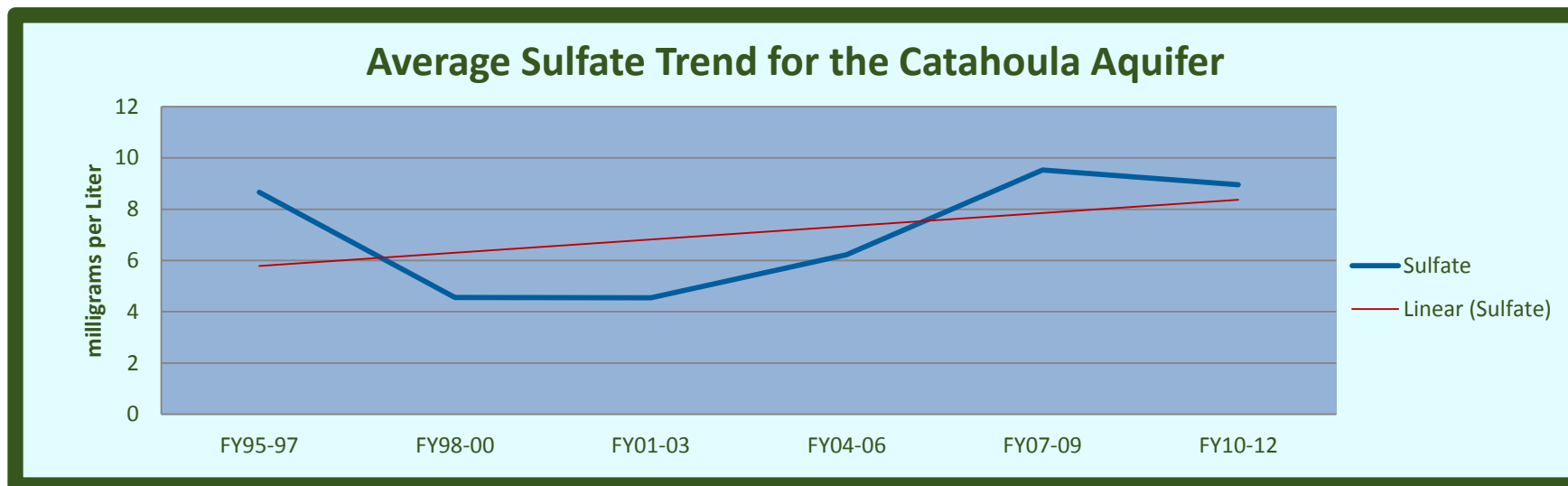


**Chart 5-8: Color Trend**

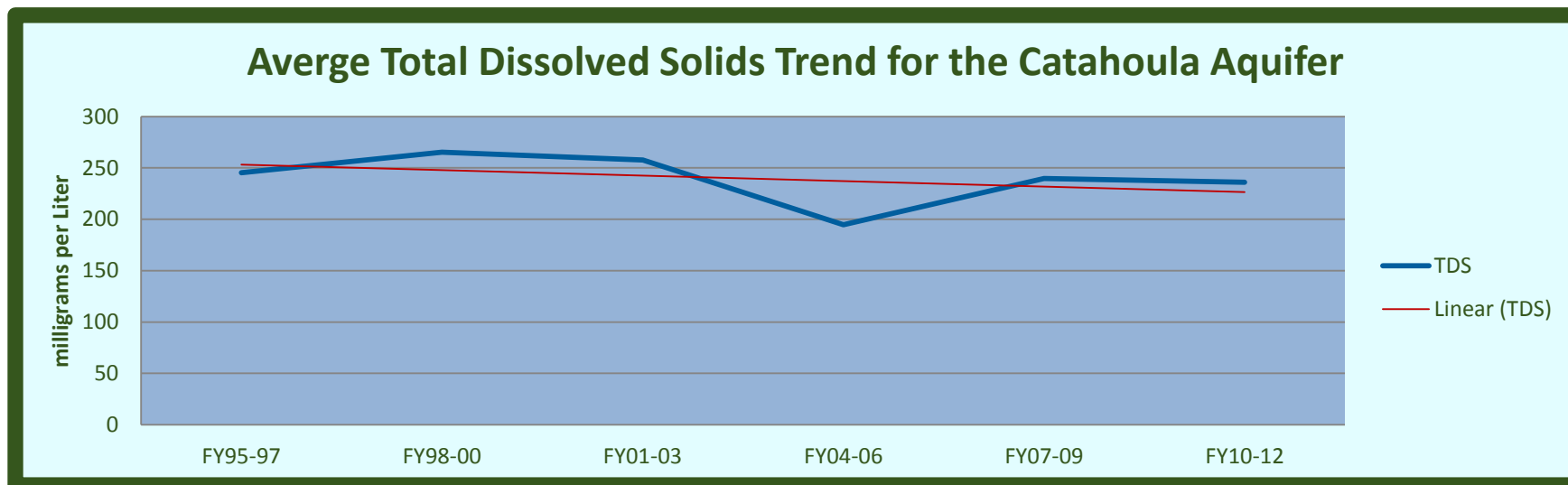




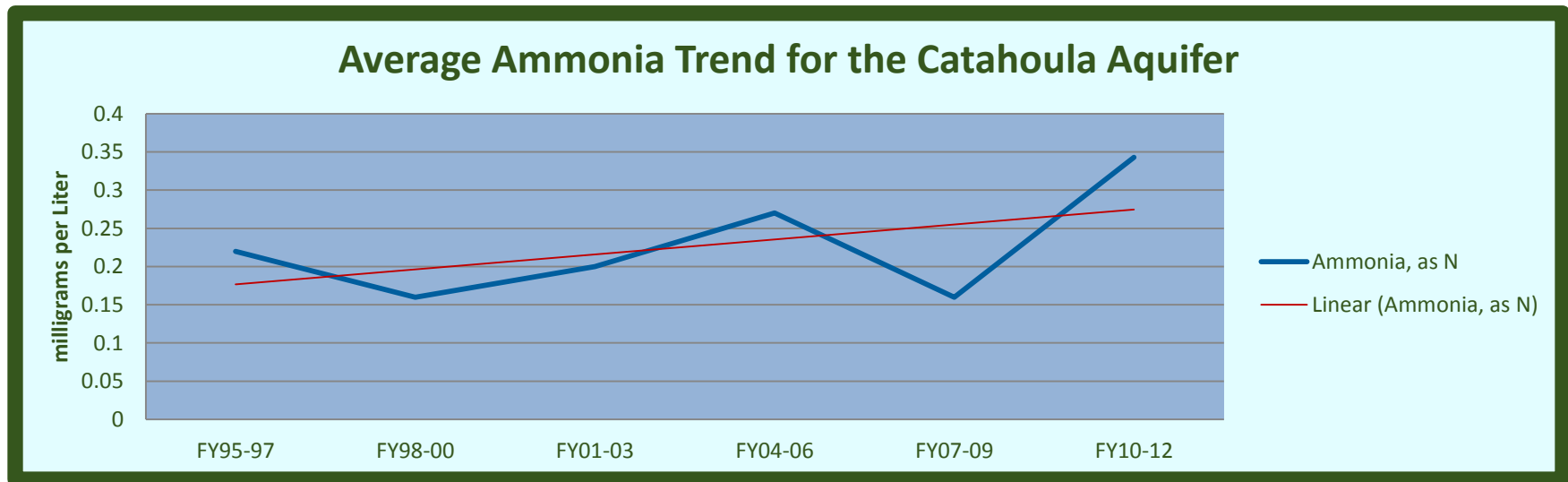
**Chart 5-9: Sulfate Trend**



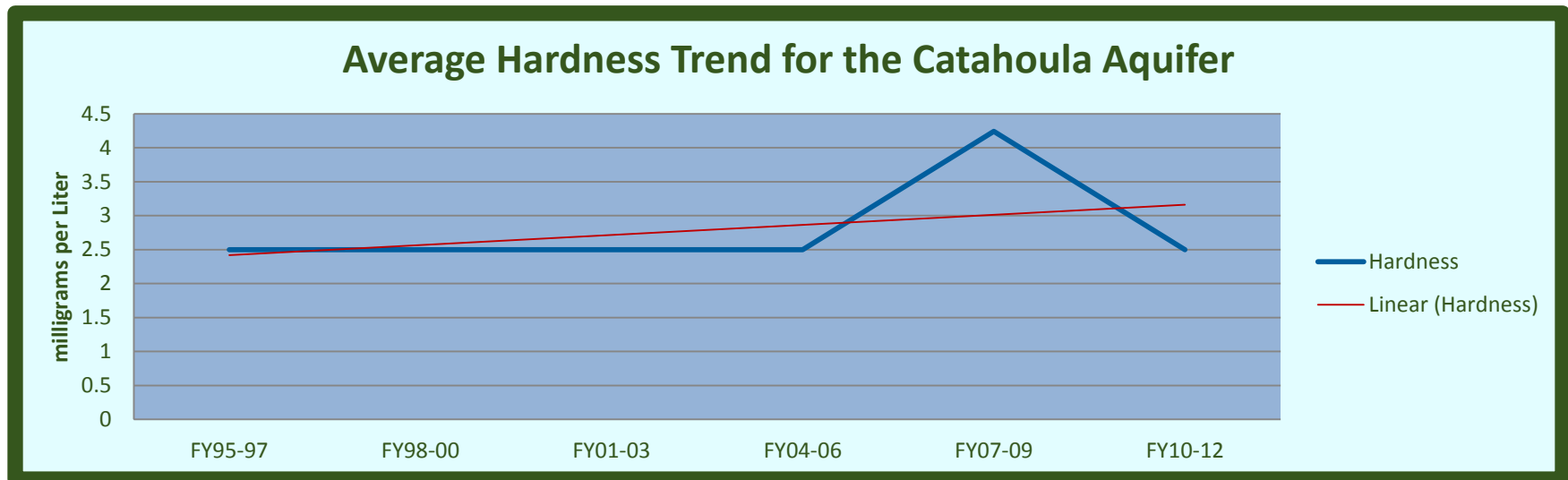
**Chart 5-10: Total Dissolved Solids Trend**



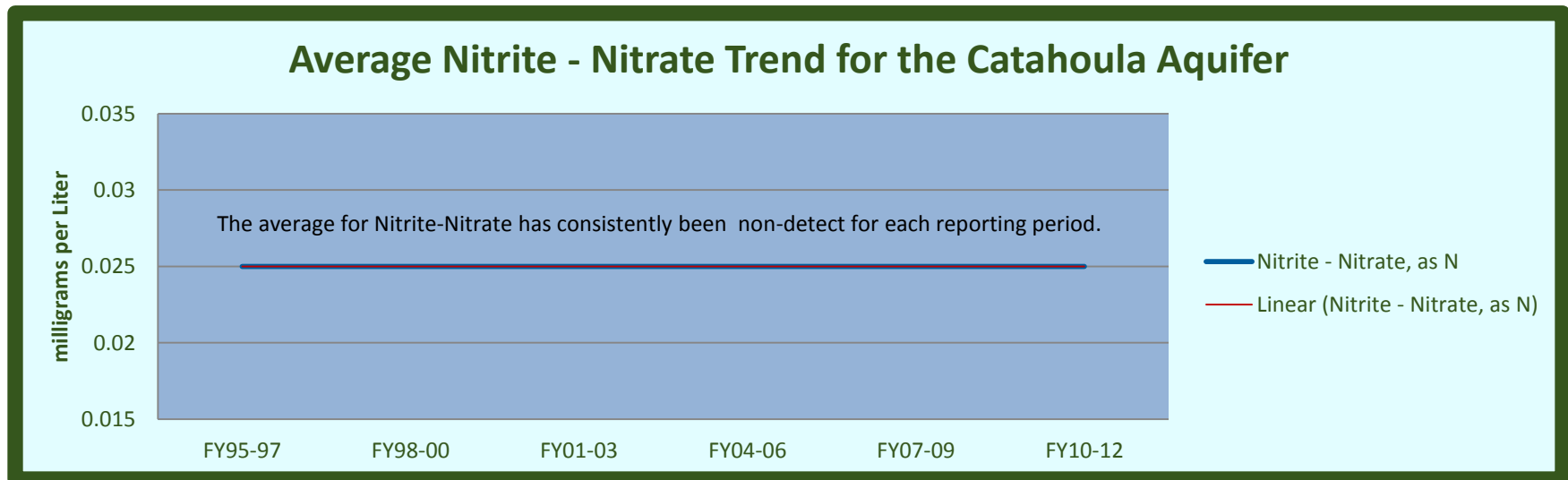
**Chart 5-11: Ammonia Trend**



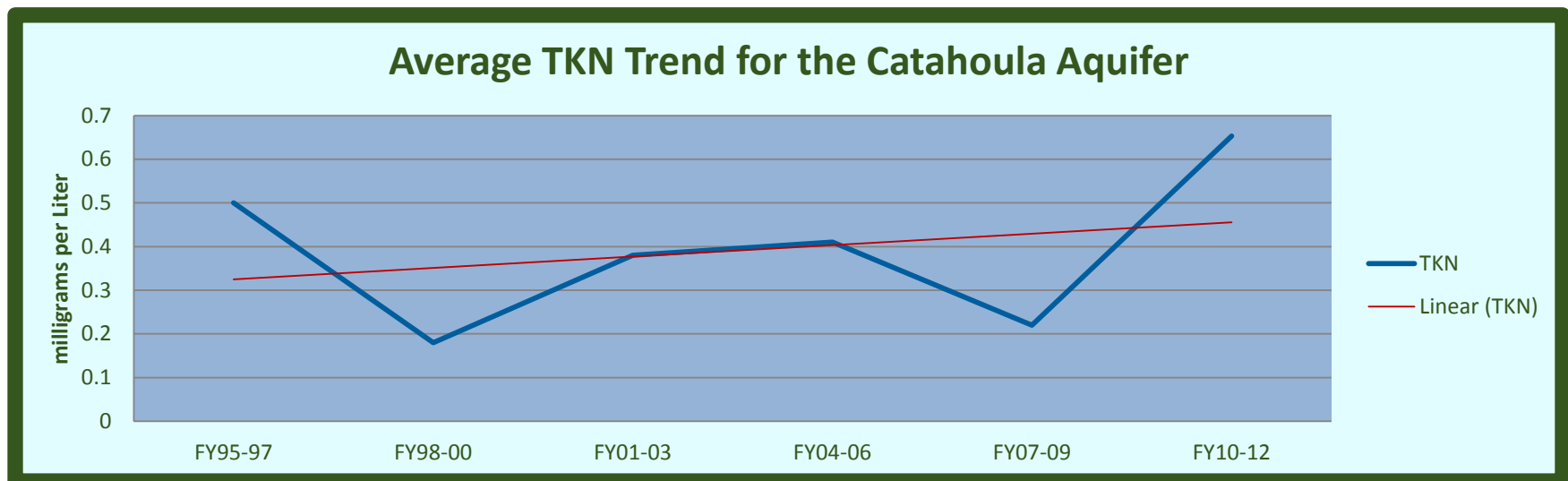
**Chart 5-12: Hardness Trend**



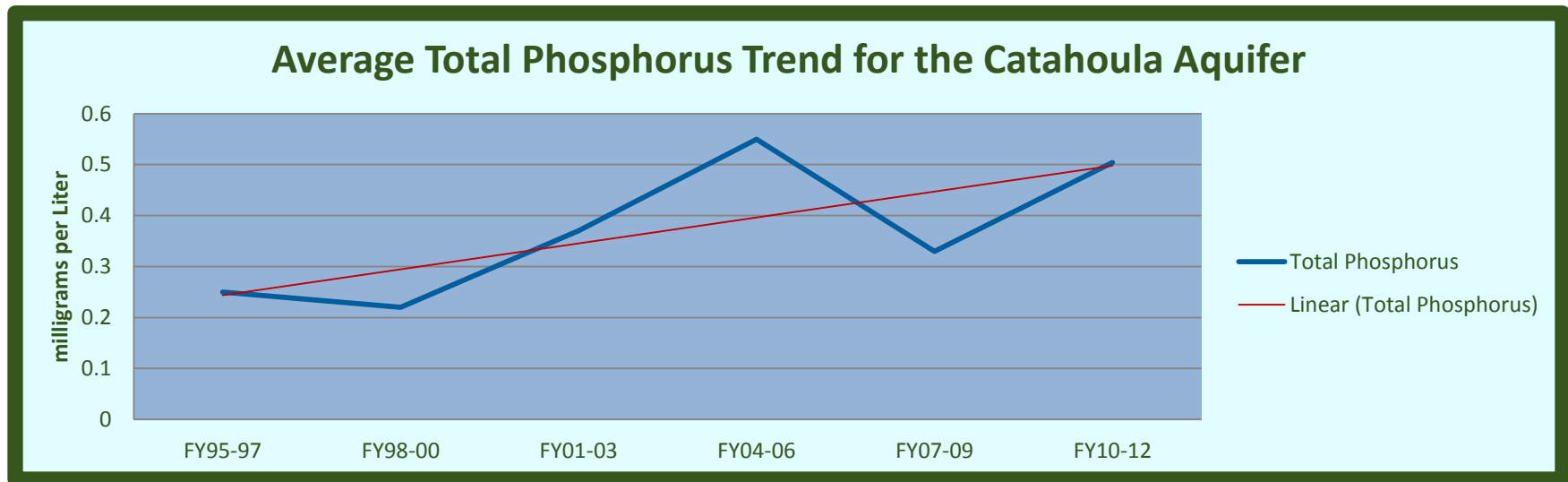
**Chart 5-13: Nitrite – Nitrate Trend**



**Chart 5-14: TKN Trend**



**Chart 5-15: Total Phosphorus Trend**



**Chart 5-16: Iron Trend**

