EVANGELINE AQUIFER SUMMARY, 2007

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

APPENDIX 4 TO THE 2009 TRIENNIAL SUMMARY REPORT

PARTIAL FUNDING PROVIDED BY THE CWA

ASSET
AQUIFER SAMPLING AND ASSESSMENT PROGRAM

Contents

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 ground water produced from Louisiana's major freshwater 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 fourteen aquifers and aquifer systems are monitored on a rotating basis, within a three-year period 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's Triennial Summary Report for 2009.

Analytical and field data contained in this summary were collected from wells producing from the Evangeline aquifer, during the 2007 state fiscal year (July 1, 2006 - June 30, 2007). This summary will become Appendix 4 of ASSET Program Triennial Summary Report for 2009.

These data show that in January and February of 2007, and in May 2008, 12 wells were sampled which produce from the Evangeline aquifer. Eight of these 12 are classified as public supply, while there are one each classified by the Louisiana Department of Transportation and Development (LDOTD) as irrigation, industrial, domestic and other. The wells are located in 7 parishes from the central and southwest areas of the state.

Figure 4-1 shows the geographic locations of the Evangeline aquifer and the associated wells, whereas Table 4-1 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 Evangeline aquifer is comprised of unnamed Pliocene sands and the Pliocene-Miocene Blounts Creek member of the Fleming formation. The Blounts Creek consists of sands, silts, and silty clays, with some gravel and lignite. The sands of the aquifer are moderately well to well sorted and fine to medium grained with interbedded coarse sand, silt, and clay. The mapped outcrop corresponds to the outcrop of the Blounts Creek member, but downdip, the aquifer thickens and includes Pliocene sand beds that do not outcrop. The confining clays of the Castor Creek member (Burkeville aquiclude) retard the movement of water between the Evangeline and the underlying Miocene aquifer systems. The Evangeline is separated in most areas from the overlying Chicot aquifer by clay beds; in some areas the clays are missing and the upper sands of the Evangeline are in direct contact with the lower sands and gravels of the Chicot.

HYDROGEOLOGY

Recharge to the Evangeline aquifer occurs by the direct infiltration of rainfall in interstream, upland outcrop areas and the movement of water through overlying terrace deposits, as well as leakage from other aquifers. Fresh water in the Evangeline is separated from water in stratigraphically equivalent deposits in southeast Louisiana by a saltwater ridge in the Mississippi River valley. The hydraulic conductivity of the Evangeline varies between 20 and 100 feet/day.

The maximum depths of occurrence of freshwater in the Evangeline range from 150 feet above sea level, to 2,250 feet below sea level. The range of thickness of the fresh water interval in the Evangeline is 50 to 1,900 feet. The depths of the Evangeline wells that were monitored in conjunction with the BMP range from 170 to 1,715 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 4-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 4-3. These tables also show the field and analytical results determined for each analyte. For quality control, duplicate samples were taken for each parameter at wells CU-1362 and EV-858.

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 4-8, 4-9 and 4-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

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

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 4-2, 4-3, 4-4, and 4-5, respectively, represent the contoured data for pH, total dissolved solids (TDS), chloride (Cl) and iron. Charts 4-1 through 4-16 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 Office of Environmental Assessment does use the 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 4-2 and 4-3 show that one secondary MCL (SMCL) was exceeded in 7 of the 12 wells sampled in the Evangeline aquifer.

Field and Conventional Parameters

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

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 4-2 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 4-2 shows that four wells exceeded the SMCL for pH, and two wells exceeded the SMCL for total dissolved solids. Laboratory results override field results in exceedance determinations, thus only lab results will be counted in determining SMCL exceedance numbers for TDS. Following is a list of SMCL parameter exceedances with well number and results:

pH (SMCL = 6.5 – 8.5 Standard Units):

AL-120 – 8.68 SU
AL-363 –9.20 SU
BE-512 – 8.96 SU
V-668 – 8.73 SU

Total Dissolved Solids (SMCL = 500 mg/L or 0.5 g/L):

	LAB RESULTS (in mg/L)	FIELD MEASURES (in g/L)
AV-441	730 mg/L	0.68 g/L
EV-858	738 mg/L, Duplicate – 724 mg/L	0.76 g/L (Original and Duplicate)

Inorganic Parameters

Table 4-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 4-5 provides an overview of inorganic data for the Evangeline aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 4-3 shows that no primary MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 4-3 shows that one well exceeded the secondary MCL for iron:

Iron (SMCL = 300 ug/L):

CU-1362 – 367 ug/L, Duplicate – 363 ug/L

Volatile Organic Compounds

Table 4-8 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.

Chloroform was detected in well AL-373 at 2.06 ug/L, which is just over the laboratory detection limit of 2 ug/L for this compound. Because chloroform was detected at this low concentration, and due to there being no MCL established for this compound, and because chloroform is a common lab contaminant, the well was not resampled to confirm the occurrence of chloroform. The well owner was given a report of these results and close attention will be given to this well in upcoming regular sampling activities. No other VOC was detected at or above its respective detection limit during the FY 2007 sampling of the Evangeline aquifer.

Semi-Volatile Organic Compounds

Table 4-9 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.

There were no confirmed detections of a SVOC at or above its detection limit during the FY 2007 sampling of the Evangeline aquifer.

Pesticides and PCBs

Table 4-10 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.

There were no confirmed detections of a pesticide or PCB at or above its detection limit during the FY 2007 sampling of the Evangeline aquifer.

WATER QUALITY TRENDS AND COMPARISON TO HISTORICAL ASSET DATA

Analytical and field data show that the quality and characteristics of ground water produced from the Evangeline aquifer exhibit some changes when comparing current data to that of the four previous sampling rotations (three, six, nine and twelve years prior). These comparisons can be found in Tables 4-6 and 4-7, and in Charts 4-1 to 4-16 of this summary. Over the twelve-year period data averages show that 6 analytes have shown a general increase in concentration. These analytes are: pH, chloride, sulfate, hardness, barium, and iron. For this same time period, the average concentrations for 8 analytes have demonstrated a decrease. These are: temperature, specific conductance (field and lab), salinity, total dissolved solids, TKN, total phosphorus, copper, and zinc. The average ammonia concentration has been consistent for this time period while the average for nitrite-nitrate has been consistently below its detection limit for each reporting period.

The current number of wells with secondary MCL exceedances is the same as the previous sampling event in FY 2004, with 7 wells reporting at least one exceedance each. However, for the FY 2007 reporting period, there were fewer total SMCLs exceeded, with 7 exceedances in FY 2007 and 10 exceedances in FY 2004.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the ground water produced from this aquifer is generally soft[1] and is of good quality when considering short-term or long-term health risk guidelines. Laboratory data show that no well that was sampled for this reporting period exceeded a primary MCL. The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines. A comparison to historical ASSET data show that 6 analytes have increased in their average concentrations, 8 have decreased, and 2 have remained constant or below its detection limit.

It is recommended that the ASSET wells assigned to the Evangeline aquifer be re-sampled as planned in approximately three years. In addition, several wells should be added to the 11 currently in place to increase the well density for this aquifer.

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

Table 4-1: List of Wells Sampled, Evangeline Aquifer–FY 2007

DOTD Well Number	Parish	Date	Owner	Depth (Feet)	Well Use
AL-120	ALLEN	1/30/2007	CITY OF OAKDALE	910	PUBLIC SUPPLY
AL-363	ALLEN	1/29/2007	WEST ALLEN PARISH WATER DIST.	1715	PUBLIC SUPPLY
AL-373	ALLEN	5/19/2008	TOWN OF OBERLIN	747	PUBLIC SUPPLY
AL-391	ALLEN	1/30/2007	FAIRVIEW WATER SYSTEM	800	PUBLIC SUPPLY
AV-441	AVOYELLES	1/30/2007	TOWN OF EVERGREEN	319	PUBLIC SUPPLY
BE-410	BEAUREGARD	1/29/2007	BOISE CASCADE	474	INDUSTRIAL
BE-512	BEAUREGARD	1/29/2007	SINGER WATER DISTRICT	918	PUBLIC SUPPLY
CU-1362	CALCASIEU	2/14/2007	LA WATER CO	635	PUBLIC SUPPLY
EV-858	EVANGELINE	1/29/2007	SAVOY SWORDS WATER SYSTEM	472	PUBLIC SUPPLY
R-1350	RAPIDES	1/30/2007	PRIVATE OWNER	180	IRRIGATION
V-5065Z	VERNON	1/30/2007	PRIVATE OWNER	170	DOMESTIC
V-668	VERNON	1/30/2007	LDWF/FORT POLK WMA HQ	280	OTHER

Table 4-2: Summary of Field and Conventional Data, Evangeline Aquifer–FY 2007

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	1.3	5	10	1.25/1.3	4	4	1	0.1	5.0	0.05	0.10	0.05
	FIELD PARAMETERS					LABORATORY PARAMETERS												
AL-120	23.17	8.68	0.337	0.16	0.22	157	3.4	Not Analyzed by Lab	309	6.2	205	<4	<1	<0.1	<5	<0.05	<0.1	0.13
AL-363	26.85	9.20	0.516	0.25	0.34	265	2.9		492	1.9	304	<4	<1	0.13	<5	<0.05	0.14	0.28
AL-373	23.40	7.82	0.323	0.15	0.21	157	10		324	2.1	213	<4	1	<0.1	<5	0.06	0.14	0.33
AL-391	22.12	8.29	0.275	0.13	0.18	118	4		235	5.4	160	<4	<1	0.2	36	<0.05	0.27	0.09
AV-441	20.16	8.07	1.048	0.52	0.68	428	92.9		1,144	39.8	730	<4	<1	0.44	13.2	<0.05	0.65	0.14
BE-410	21.45	8.06	0.211	0.10	0.14	85.8	4.8		182	2.6	131	<4	<1	<0.1	60.9	0.06	<0.1	<0.05
BE-512	24.11	8.96	0.35	0.17	0.23	166	4.3		322	5.8	204	<4	<1	<0.1	5	<0.05	<0.1	0.1
CU-1362	22.71	6.87	0.323	0.15	0.21	122	14		271	2	201	<4	<1	0.12	35.7	<0.05	0.16	0.25
CU-1362*	22.71	6.87	0.323	0.15	0.21	122	14.3		272	2	200	<4	<1	0.1	35.8	<0.05	0.1	0.25
EV-858	21.35	7.73	1.176	0.59	0.76	388	‡181		1,252	<1.3	738	<4	<1	0.74	83.3	<0.05	0.82	0.22
EV-858*	21.35	7.73	1.176	0.59	0.76	390	‡180		1,260	<1.3	724	<4	<1	0.71	81.9	<0.05	0.83	0.23
R-1350	19.87	7.92	0.12	0.06	0.08	22.5	3.4		68.8	‡5.6	95.3	<4	2	<0.1	8.2	<0.05	<0.1	0.06
V-5065Z	13.82	7.87	0.128	0.06	0.08	29.1	4.7		73	<1.3	79.3	<4	<1	<0.1	15.5	<0.05	0.12	0.06
V-668	9.79	8.73	0.089	0.04	0.06	10.5	3		34.7	<1.3	50	<4	1.1	<0.1	8.3	<0.05	<0.1	<0.05

*Denotes Duplicate Sample ‡Reported from a Dilution Shaded cells exceed EPA Secondary Standards

Table 4-3: Summary of Inorganic Data, Evangeline Aquifer–FY 2007

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	1	3	2	1	0.5	5	3	20	3	0.05	3	4	0.5	1	10
AL-120	<1	3.1	9.1	<1	<0.5	<3	<3	20.8	<3	<0.05	<3	<4	<0.5	<1	<10
AL-363	<1	3	9.1	<1	<0.5	<3	<3	24.8	<3	<0.05	<3	<4	<0.5	<1	<10
AL-373	<1	<3	11.8	<1	<0.5	<3	9.3	237	<3	*0.09	<3	<4	<0.5	<1	60.2
AL-391	<1	<3	124	<1	<0.5	<3	<3	50.5	<3	<0.05	<3	<4	<0.5	<1	<10
AV-441	<1	<3	71.5	<1	<0.5	<3	<3	232	<3	<0.05	<3	<4	0.6	<1	<10
BE-410	<1	3.5	150	<1	<0.5	<3	<3	<20	<3	<0.05	<3	<4	<0.5	<1	<10
BE-512	<1	3.3	15.7	<1	<0.5	<3	<3	<20	<3	<0.05	<3	<4	<0.5	<1	<10
CU-1362	<1	R	183	<1	<0.5	<3	3.4	367	<3	<0.05	<3	<4	<0.5	<1	12.6
CU-1362*	<1	R	181	<1	<0.5	<3	3.1	363	<3	<0.05	<3	<4	<0.5	<1	10.8
EV-858	<1	<3	455	<1	<0.5	<3	<3	165	<3	<0.05	<3	<4	<0.5	<1	<10
EV-858*	<1	<3	451	<1	<0.5	<3	<3	161	<3	<0.05	<3	<4	<0.5	<1	<10
R-1350	<1	<3	14.4	<1	<0.5	<3	<3	752	<3	<0.05	<3	<4	<0.5	<1	56.8
V-5065Z	<1	<3	73.8	<1	<0.5	<3	5.9	<20	<3	<0.05	<3	<4	<0.5	<1	17.8
V-668	<1	<3	41.6	<1	<0.5	<3	12.7	88.3	<3	<0.05	<3	<4	<0.5	<1	18.2

*Denotes Duplicate Sample. “R” = Data rejected, arsenic detected in Field Blank Shaded cells exceed EPA Secondary Standards

Table 4-4: FY 2007 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	Temperature (°C)	19.87	26.85	22.44
	pH (SU)	6.87	9.20	8.06
	Specific Conductance (mmhos/cm)	0.089	1.176	0.460
	Salinity (ppt)	0.04	0.59	0.22
	TDS (g/L)	0.058	0.764	0.300
LABORATORY	Alkalinity (mg/L)	10.5	428.0	175.8
	Chloride (mg/L)	2.9	181.0	37.3
	Specific Conductance (umhos/cm)	34.7	1,260.0	445.7
	Sulfate (mg/L)	<1.3	39.8	5.4
	TDS (mg/L)	50	738	289
	TSS (mg/L)	<4	<4	<4
	Turbidity (NTU)	<1	2	<1
	Ammonia, as N (mg/L)	<0.1	0.74	0.20
	Hardness (mg/L)	<5	83.3	27.9
	Nitrite - Nitrate, as N (mg/L)	<0.05	0.06	<0.05
	TKN (mg/L)	<0.1	0.83	0.25
	Total Phosphorus (mg/L)	<0.05	0.33	0.16

Table 4-5: FY 2007 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ug/L)	<1	<1	<1
Arsenic (ug/L)	<3	3.5	<3
Barium (ug/L)	9.1	455.0	127.9
Beryllium (ug/L)	<1	<1	<1
Cadmium (ug/L)	<0.5	<0.5	<0.5
Chromium (ug/L)	<3	<3	<3
Copper (ug/L)	<3	12.7	3.4
Iron (ug/L)	<20	752	178
Lead (ug/L)	<3	<3	<3
Mercury (ug/L)	<0.05	<0.05	<0.05
Nickel (ug/L)	<3	<3	<3
Selenium (ug/L)	<4	<4	<4
Silver (ug/L)	<0.5	0.6	<0.5
Thallium (ug/L)	<1	<1	<1
Zinc (ug/L)	<10	60.2	15.5

Table 4-6: Triennial Field and Conventional Statistics, ASSET Wells

	PARAMETER	FY 1995 AVERAGE	FY 1998 AVERAGE	FY 2001 AVERAGE	FY 2004 AVVERAGE	FY 2007 AVERAGE
FIELD	Temperature (^{O}C)	23.71	22.87	21.33	22.69	22.44
	pH (SU)	7.14	7.08	7.05	7.54	8.06
	Specific Conductance (mmhos/cm)	0.50	0.50	0.30	0.32	0.46
	Salinity (ppt)	0.22	0.21	0.14	0.15	0.22
	TDS (g/L)	-	-	-	0.21	0.30
LABORATORY	Alkalinity (mg/L)	205.8	192.8	176.7	137.2	175.8
	Chloride (mg/L)	15.2	27.0	38.3	18.1	37.3
	Color (PCU)	23.3	6.7	8.2	7.5	-
	Specific Conductance (umhos/cm)	489.6	453.8	446.1	322.3	445.7
	Sulfate (mg/L)	4.71	4.40	5.73	5.43	5.4
	TDS (mg/L)	308.4	324.8	263.7	209.4	289
	TSS (mg/L)	<4	<4	<4	<4	<4
	Turbidity (NTU)	<1	<1	<1	1.04	<1
	Ammonia, as N (mg/L)	0.20	0.16	0.22	0.15	0.20
	Hardness (mg/L)	16.1	11.1	31.9	22.6	27.9
	Nitrite - Nitrate , as N (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
	TKN (mg/L)	0.72	0.16	0.69	0.28	0.25
	Total Phosphorus (mg/L)	0.16	0.15	0.17	0.10	0.16

Table 4-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	FY 1995 AVERAGE	FY 1998 AVERAGE	FY 2001 AVERAGE	FY 2004 AVERAGE	FY 2007 AVERAGE
Antimony (ug/L)	<5	-	<5	<5	<1
Arsenic (ug/L)	<5	<5	<5	<5	<3
Barium (ug/L)	62.7	41.4	127.0	85.4	127.9
Beryllium (ug/L)	<2	<2	<2	<1	<1
Cadmium (ug/L)	<2	<2	<2	<1	<0.5
Chromium (ug/L)	<5	<5	<5	<5	<3
Copper (ug/L)	25.1	48.6	7.9	6.6	3.4
Iron (ug/L)	203.1	104.5	160.7	267.4	178.0
Lead (ug/L)	<10	<10	<10	<10	<3
Mercury (ug/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (ug/L)	8.1	<5	<5	<5	<3
Selenium (ug/L)	<5	<5	<5	<5	<4
Silver (ug/L)	<1	1.19	<1	<1	<0.5
Thallium (ug/L)	<5	<5	<5	<5	<1
Zinc (ug/L)	134.2	106.6	15.2	26.8	15.5

Table 4-8: VOC Analytical Parameters

COMPOUND	METHOD	DETECTION LIMIT (ug/L)
1,1-Dichloroethane	624	2
1,1- Dichloroethene	624	2
1,1,1-Trichloroethane	624	2
1,1,2- Trichloroethane	624	2
1,1,2,2-Tetrachloroethane	624	2
1,2-Dichlorobenzene	624	2
1,2-Dichloroethane	624	2
1,2-Dichloropropane	624	2
1,3- Dichlorobenzene	624	2
1,4-Dichlorobenzene	624	2
Benzene	624	2
Bromoform	624	2
Carbon Tetrachloride	624	2
Chlorobenzene	624	2
Dibromochloromethane	624	2
Chloroethane	624	2
trans-1,2-Dichloroethene	624	2
cis-1,3-Dichloropropene	624	2
Bromodichloromethane	624	2
Methylene Chloride	624	2
Ethyl Benzene	624	2
Bromomethane	624	2
Chloromethane	624	2
o-Xylene	624	2
Styrene	624	2
Methyl-t-Butyl Ether	624	2
Tetrachloroethene	624	2
Toluene	624	2
trans-1,3-Dichloropropene	624	2
Trichloroethene	624	2
Trichlorofluoromethane	624	2
Chloroform	624	2
Vinyl Chloride	624	2
Xylenes, m & p	624	4

Table 4-9: SVOC Analytical Parameters

COMPOUND	METHODS*	DETECTION LIMITS* (ug/L)
1,2-Dichlorobenzene	625/8270	10
1,2,3-Trichlorobenzene	625	10
1,2,3,4-Tetrachlorobenzene	625	10
1,2,4,5-Tetrachlorobenzene	625	10
1,2,4-Trichlorobenzene	625/8270	10
1,3-Dichlorobenzene	625/8270	10
1,3,5-Trichlorobenzene	625	10
1,4-Dichlorobenzene	625/8270	10
2-Chloronaphthalene	625/8270	10
2-Chlorophenol	625/8270	20/10
4,6-Dinitro-2-methylphenol	625/8270	20/10
2-Methylphenol	8270	10
2-Methylnaphthalene	8270	10
2-Nitroaniline	8270	10
2-Nitrophenol	625/8270	20/10
2,4-Dichlorophenol	625/8270	20/10
2,4-Dimethylphenol	625/8270	20/10
2,4-Dinitrophenol	625/8270	20/10
2,4-Dinitrotoluene	625/8270	20/10
2,4,5-Trichlorophenol	8270	10
2,4,6-Trichlorophenol	625/8270	20/10
2,6-Dinitrotoluene	625/8270	10
3,3'-Dichlorobenzidine	625/8270	10
3-Nitroaniline	8270	10
4-Bromophenylphenyl ether	625/8270	10
4-Chloro-3-methylphenol	625/8270	20/10
4-Chloroaniline	8270	10
4-Chlorophenylphenyl ether	625/8270	10
4-Methylphenol	8270	10
4-Nitroaniline	8270	10
4-Nitrophenol	625/8270	20/10
Acenaphthene	625/8270	10
Acenaphthylene	625/8270	10
Anthracene	625/8270	10
Benzo(a)pyrene	625/8270	10
Benzo(k)fluoranthene	625/8270	10
Benzo(a)anthracene	625/8270	10

Table 4-9: SVOCs (Continued)

COMPOUND	METHODS*	DETECTION LIMITS* (ug/L)
Benzo(b)fluoranthene	625/8270	10
Benzo(g,h,i)perylene	625/8270	10
Benzoic acid	8270	10
Benzyl alcohol	8270	10
2,2'-Oxybis(1-chloropropane)	8270	10
Butylbenzylphthalate	625/8270	10
Chrysene	625/8270	10
Dibenz(a,h)anthracene	625/8270	10
Dibenzofuran	8270	10
Diethylphthalate	625/8270	10
Dimethylphthalate	625/8270	10
Di-n-butylphthalate	625/8270	10
Di-n-octylphthalate	625/8270	10
Fluoranthene	625/8270	10
Fluorene	625/8270	10
Hexachlorobenzene	625/8270	10/1
Hexachloro-1,3-butadiene	8270	10
Hexachlorocyclopentadiene	625/8270	10
Hexachloroethane	625/8270	10
Indeno(1,2,3-cd)pyrene	625/8270	10
Isophorone	625/8270	10
Naphthalene	625/8270	10
Nitrobenzene	625/8270	10
N-Nitrosodimethylamine	625	10
N-Nitrosodiphenylamine	625/8270	10
N-Nitroso-di-n-propylamine	625/8270	10
Pentachlorophenol	625/8270	10/1
Pentachlorophenol	625	20
Phenanthrene	625/8270	10
Phenol	625/8270	20/10
Pyrene	625/8270	10

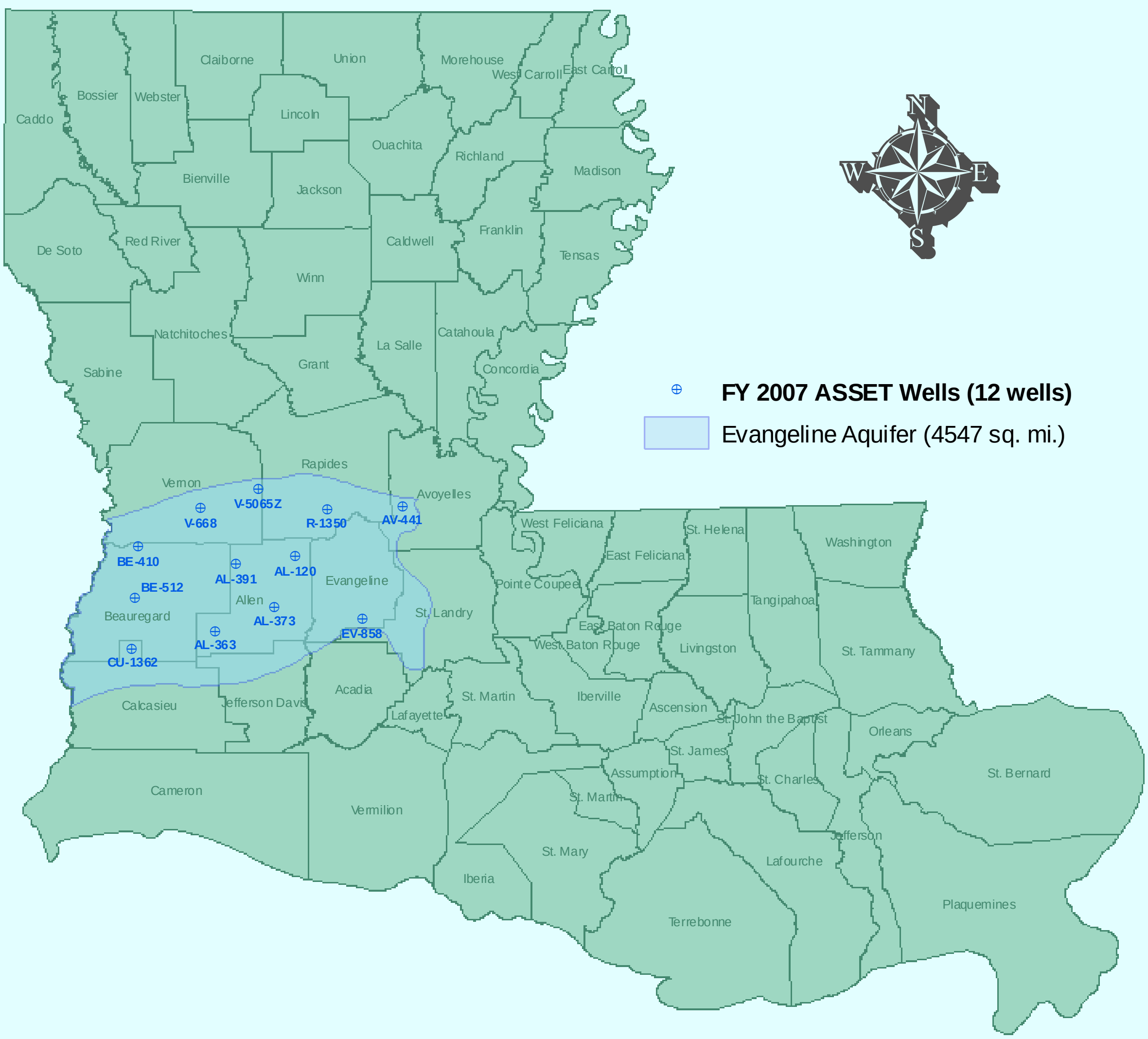
*Multiple methods/detection limits due to multiple labs performing analyses.

Table 4-10: Pesticides and PCBs

COMPOUND	METHODS*	DETECTION LIMITS* (ug/L)
4,4'-DDD	608 / 8081	0.05 / 0.1
4,4'-DDE	608 / 8081	0.05 / 0.1
4,4'-DDT	608 / 8081	0.05 / 0.1
Aldrin	608 / 8081	0.05 / 0.05
alpha-Chlordane	608 / 8081	0.05 / 0.05
alpha-BHC	608 / 8081	0.05 / 0.05
beta-BHC	608 / 8081	0.05 / 0.05
delta-BHC	608 / 8081	0.05 / 0.05
gamma-BHC	608 / 8081	0.05 / 0.05
Chlordane	608	0.2
Dieldrin	608 / 8081	0.05 / 0.1
Endosulfan I	608 / 8081	0.05 / 0.05
Endosulfan II	608 / 8081	0.05 / 0.1
Endosulfan sulfate	608 / 8081	0.05 / 0.1
Endrin	608 / 8081	0.05 / 0.1
Endrin aldehyde	608 / 8081	0.05 / 0.1
Endrin Ketone	608 / 8081	0.05 / 0.1
Heptachlor	608 / 8081	0.05 / 0.05
Heptachlor epoxide	608 / 8081	0.05 / 0.05
Methoxychlor	608 / 8081	0.05 / 0.5
Toxaphene	608 / 8081	2 / 2
gamma- Chlordane	608 / 8081	0.05 / 0.05
Aroclor 1016	608 / 8081	1 / 1
Aroclor 1221	608 / 8081	1 / 1
Aroclor 1232	608 / 8081	1 / 1
Aroclor 1242	608 / 8081	1 / 1
Aroclor 1248	608 / 8081	1 / 1
Aroclor 1254	608 / 8081	1 / 1
Aroclor 1260	608 / 8081	1 / 1

*Multiple methods/detection limits due to multiple labs performing analyses.

Figure 4-1: Location Plat, Evangeline 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.

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Figure 4-2: Map of pH Data

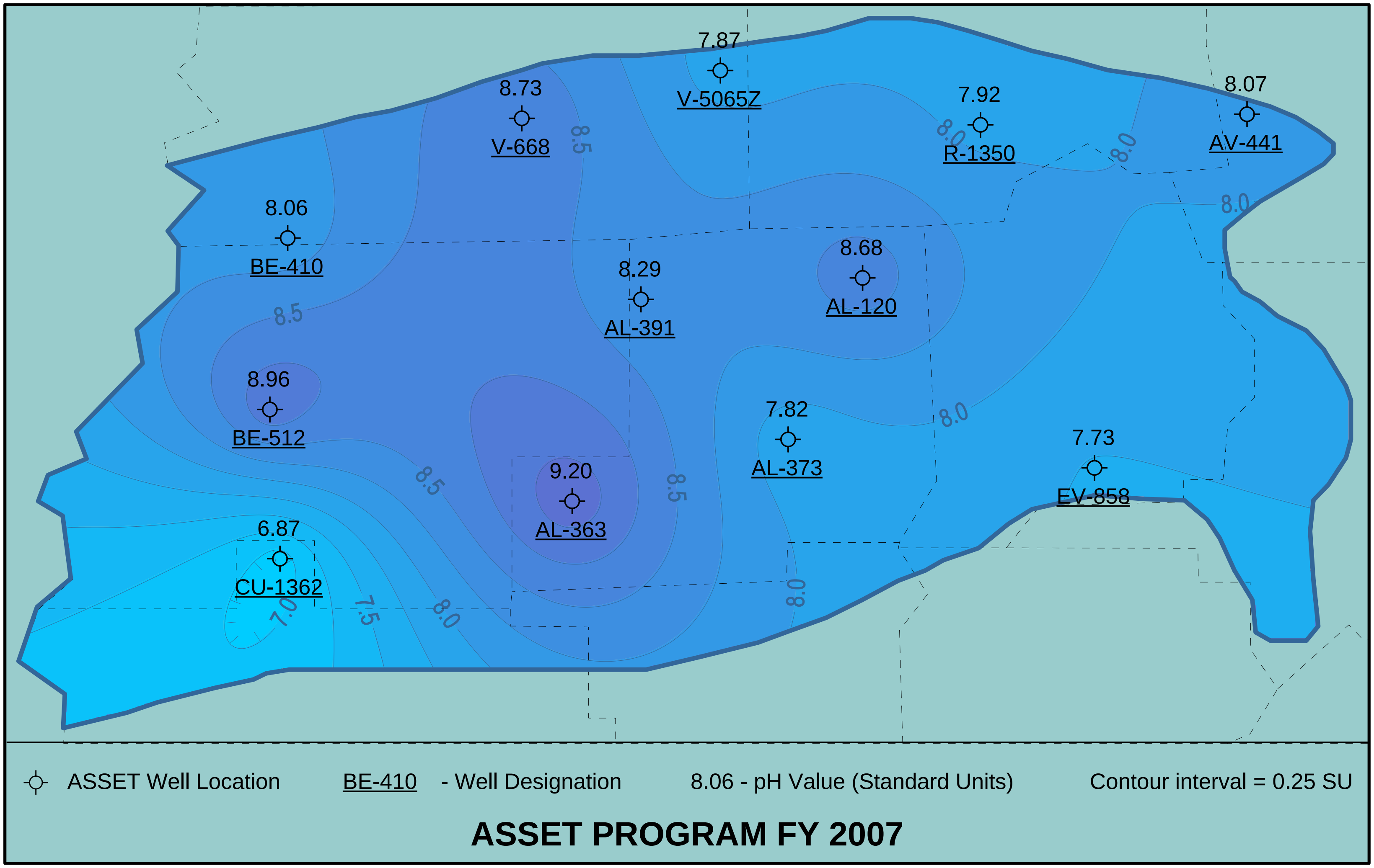

Figure 4-3: Map of TDS Lab Data

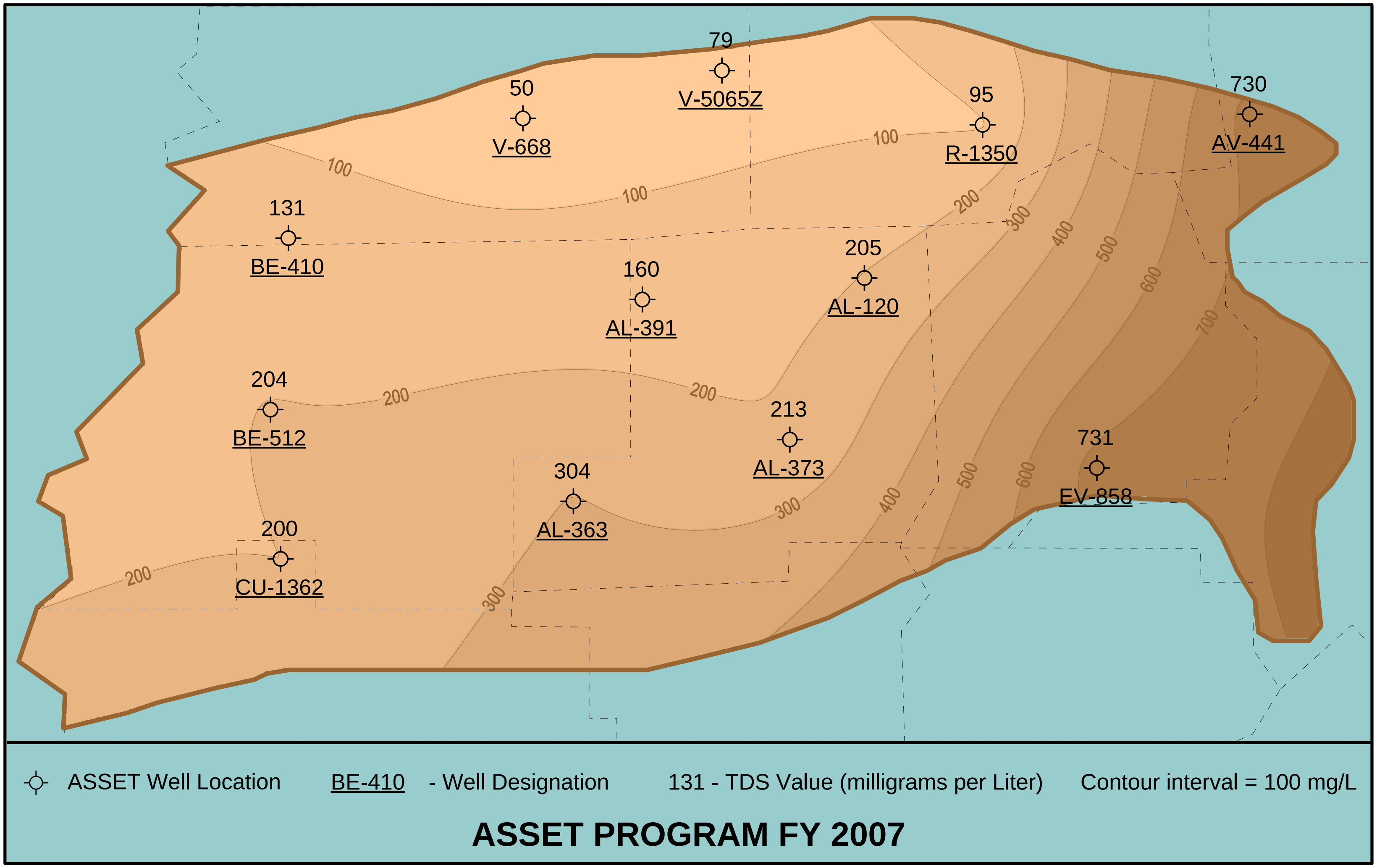

Figure 4-4: Map of Chloride Data

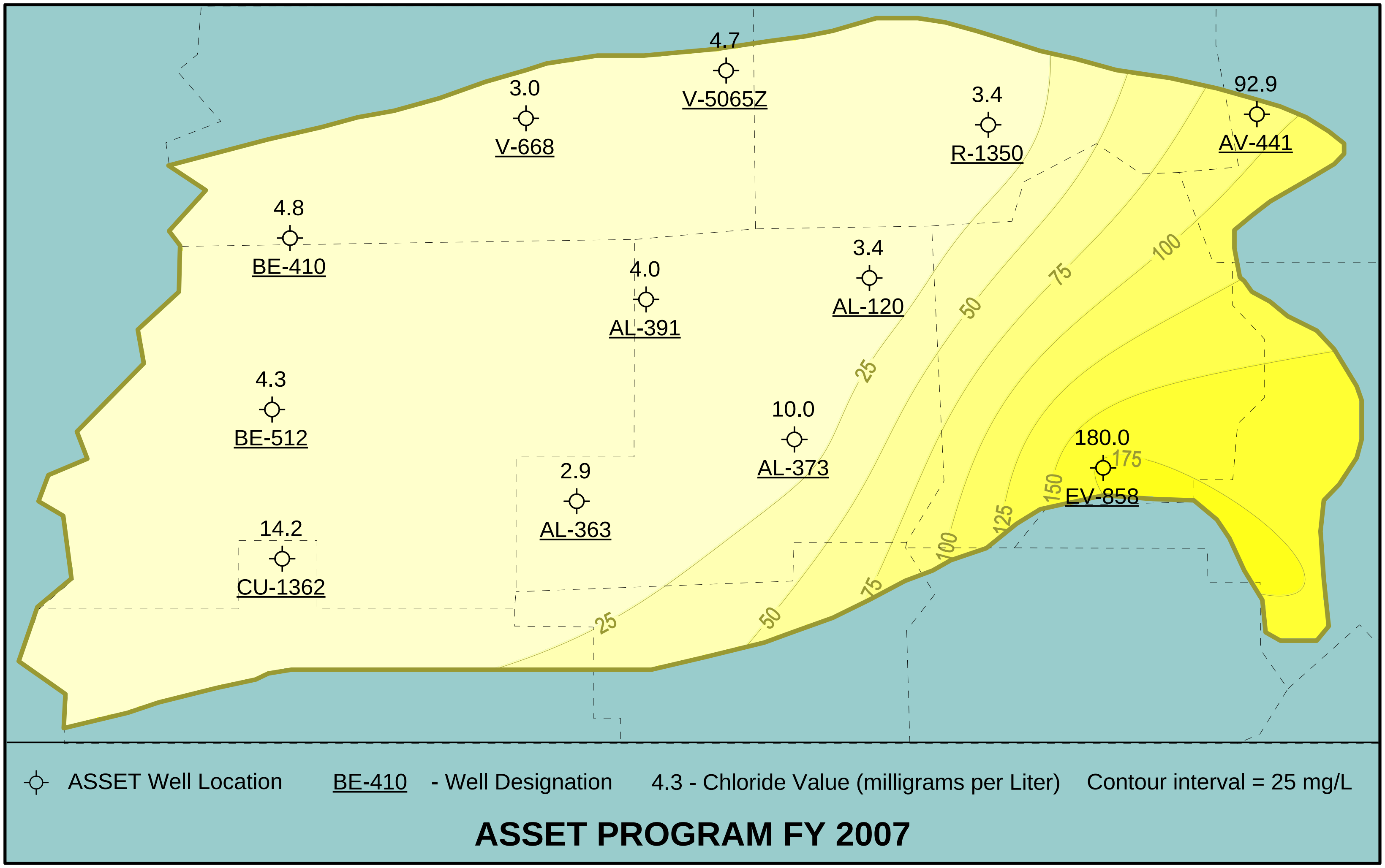

Figure 4-5: Map of Iron Data

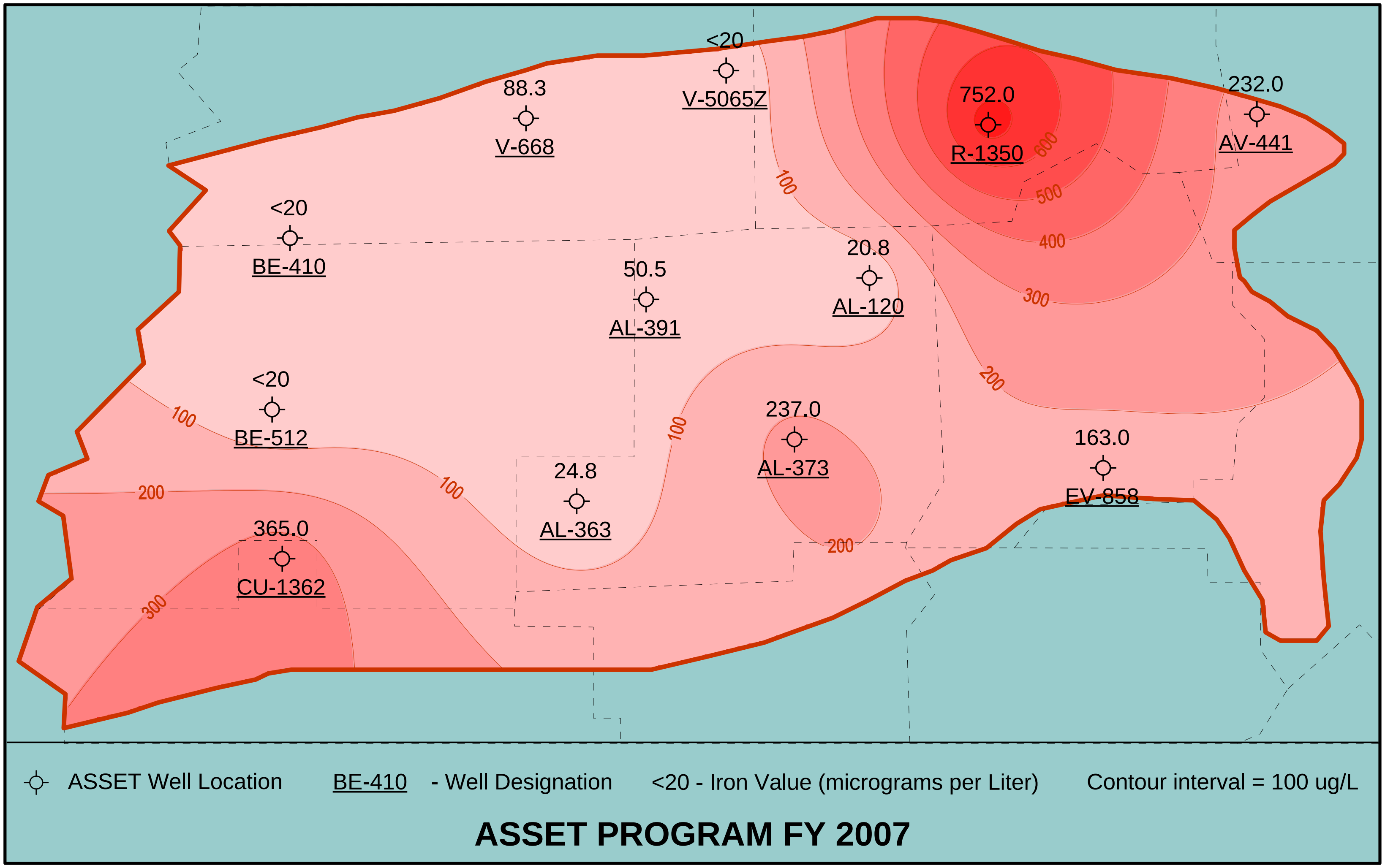

Chart 4-1: Temperature Trend

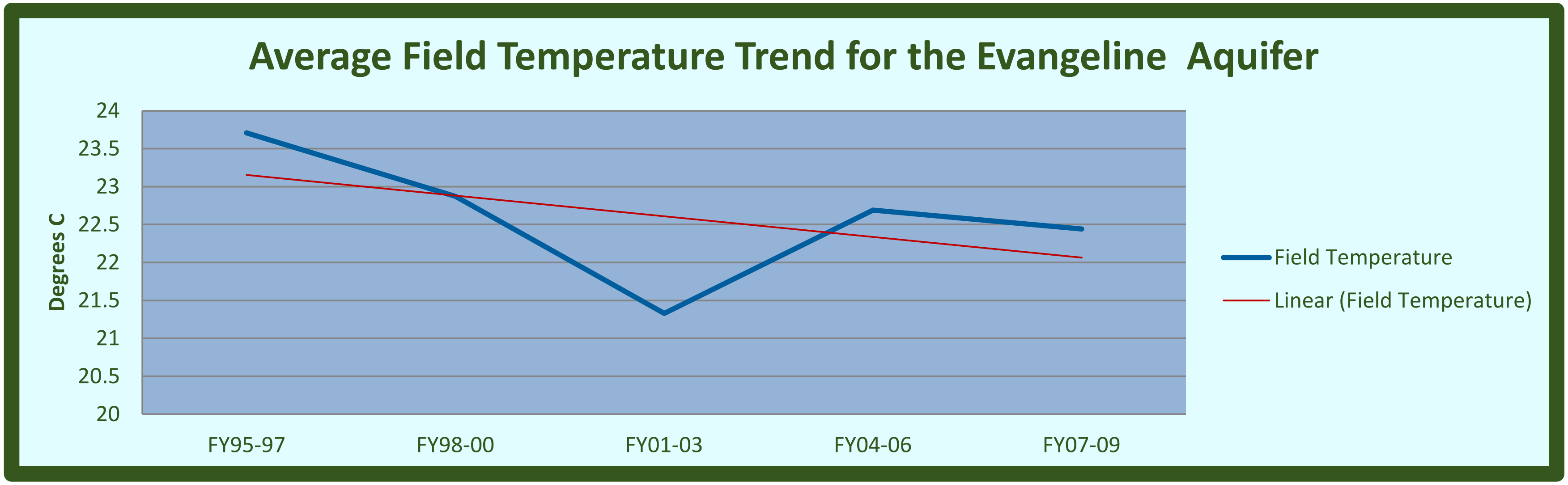

Chart 4-2: pH Trend

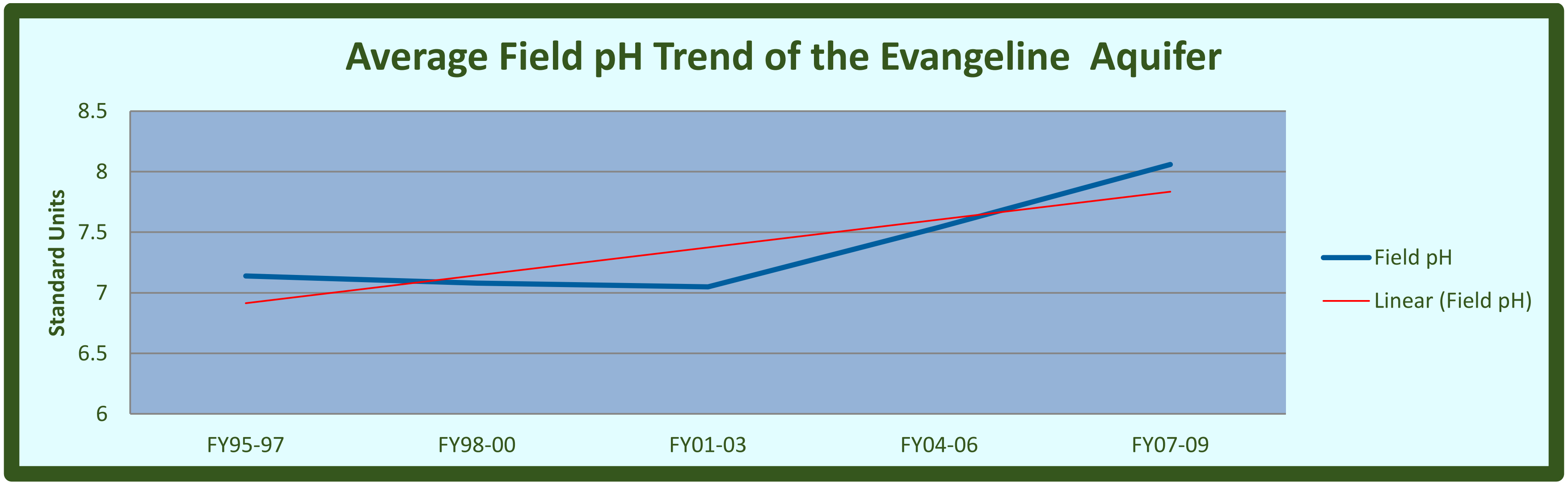

Chart 4-3: Field Specific Conductance Trend

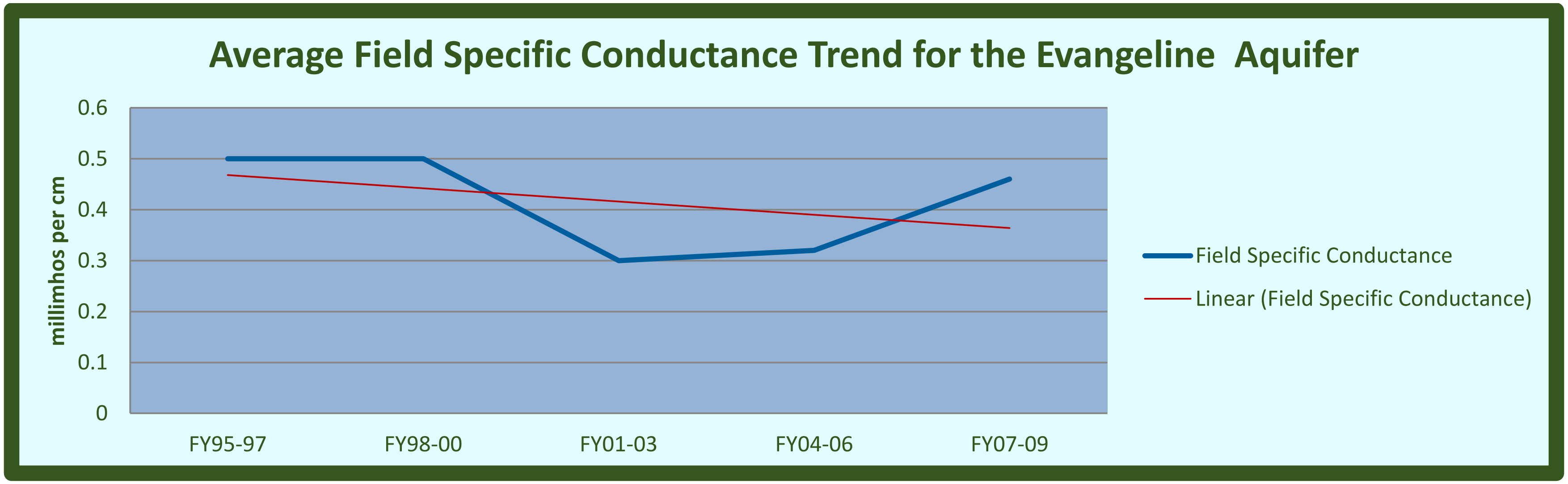

Chart 4-4: Lab Specific Conductance Trend

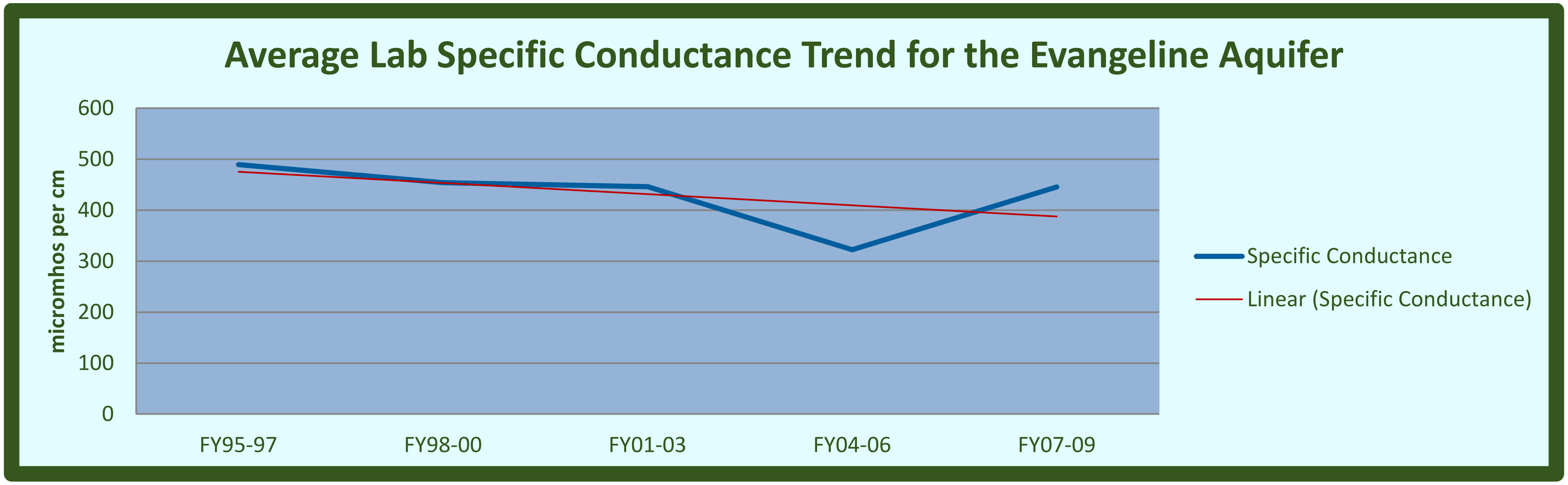

Chart 4-5: Field Salinity Trend

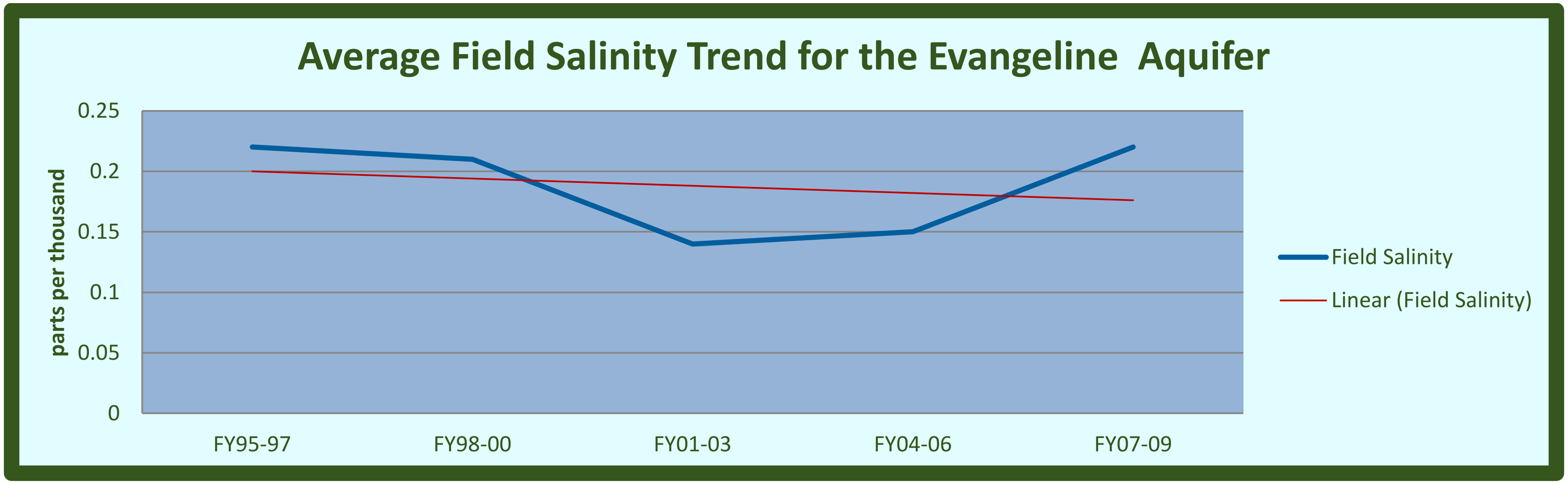

Chart 4-6: Alkalinity Trend

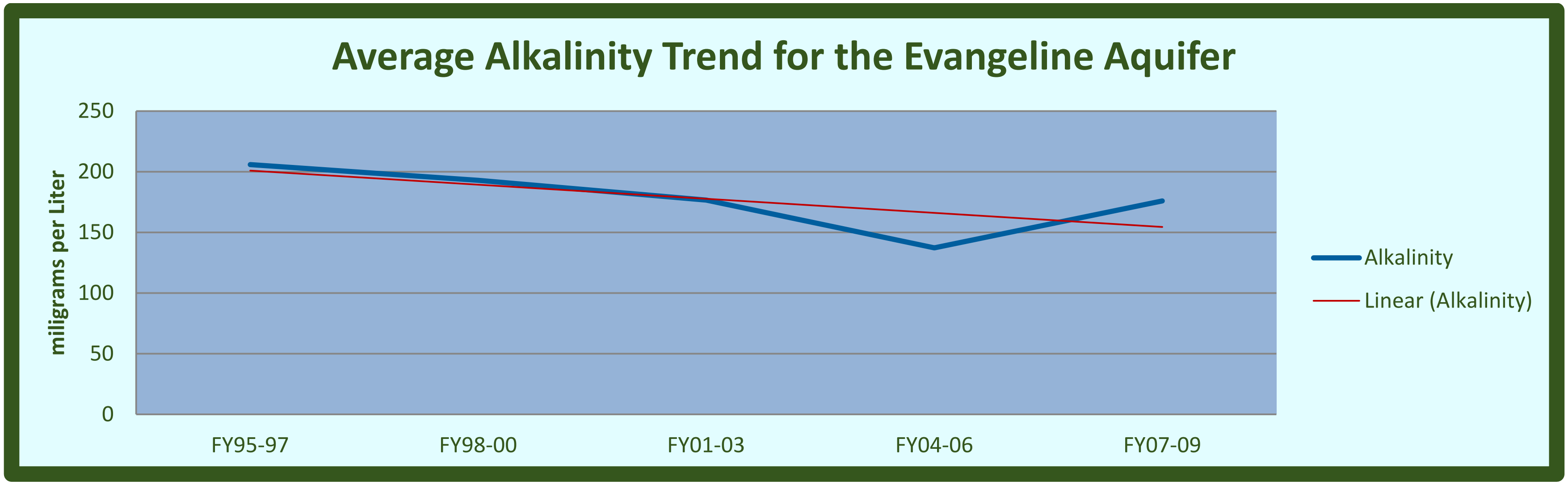

Chart 4-7: Chloride Trend

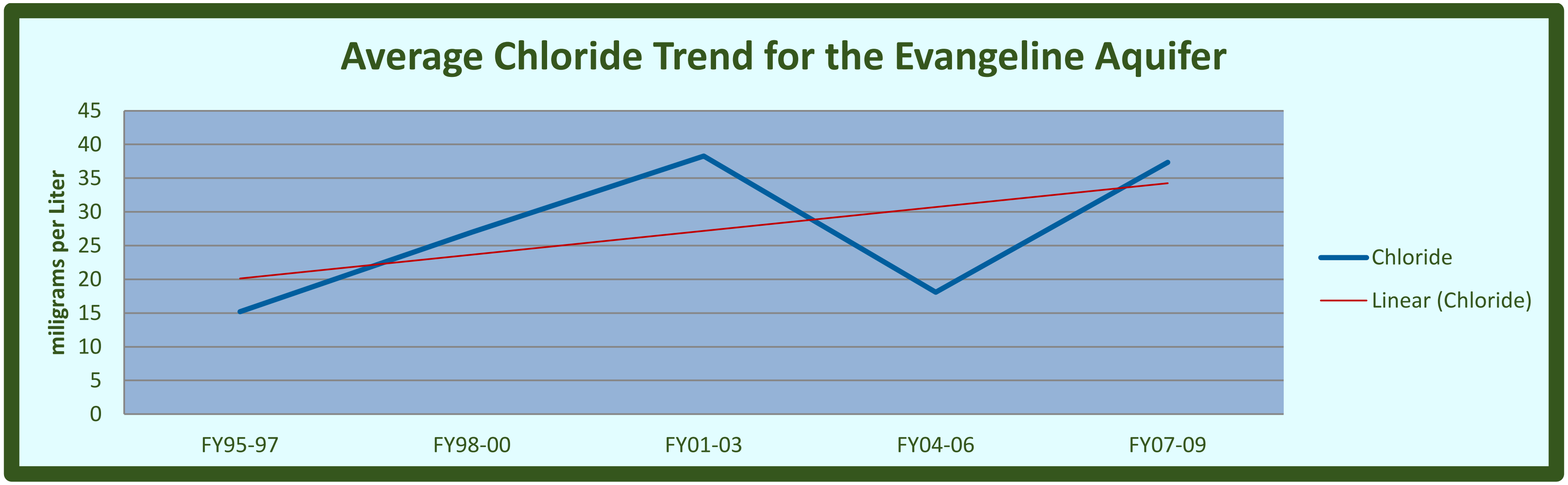

Chart 4-8: Color Trend

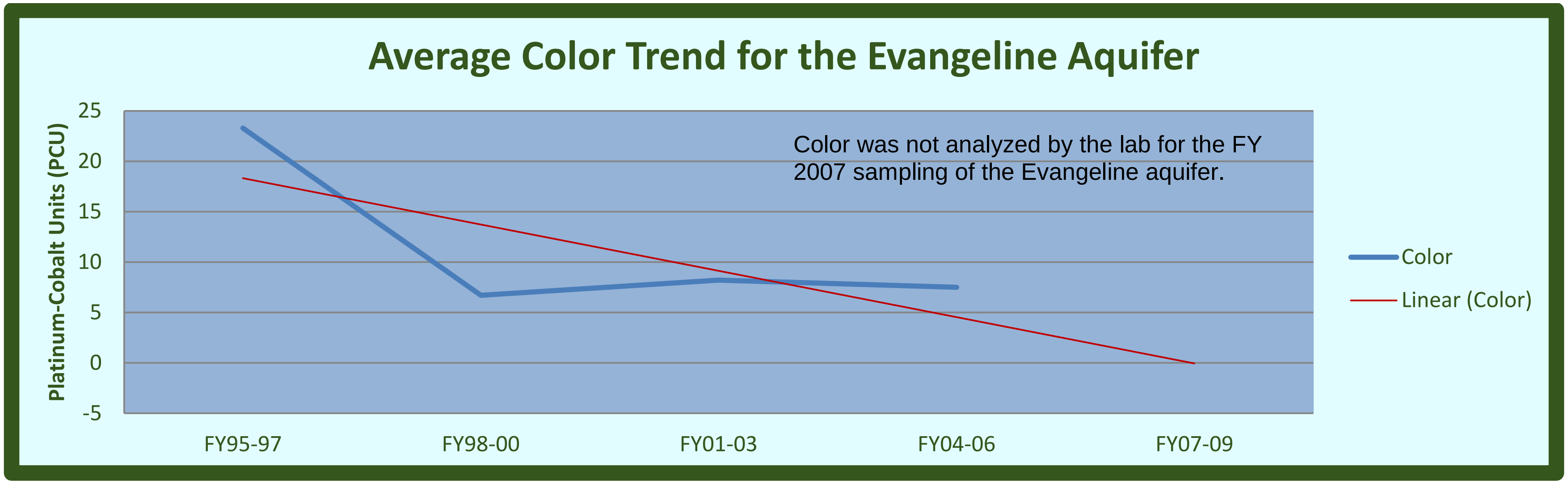

Chart 4-9: Sulfate (SO4) Trend

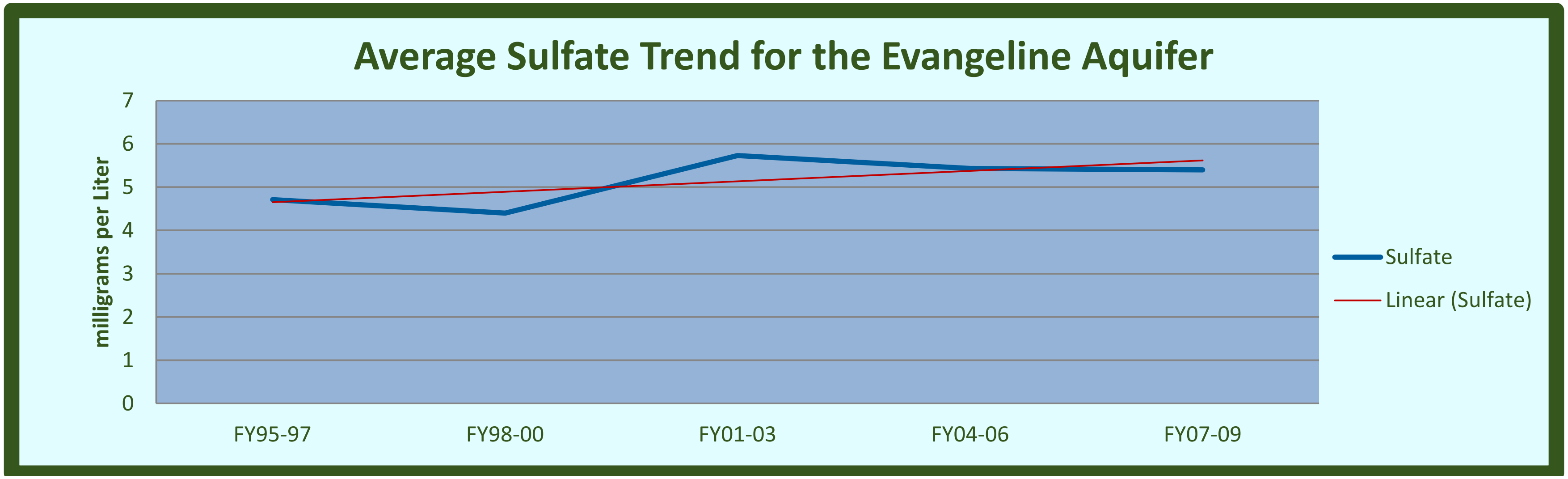

Chart 4-10: Total Dissolved Solids (TDS) Trend

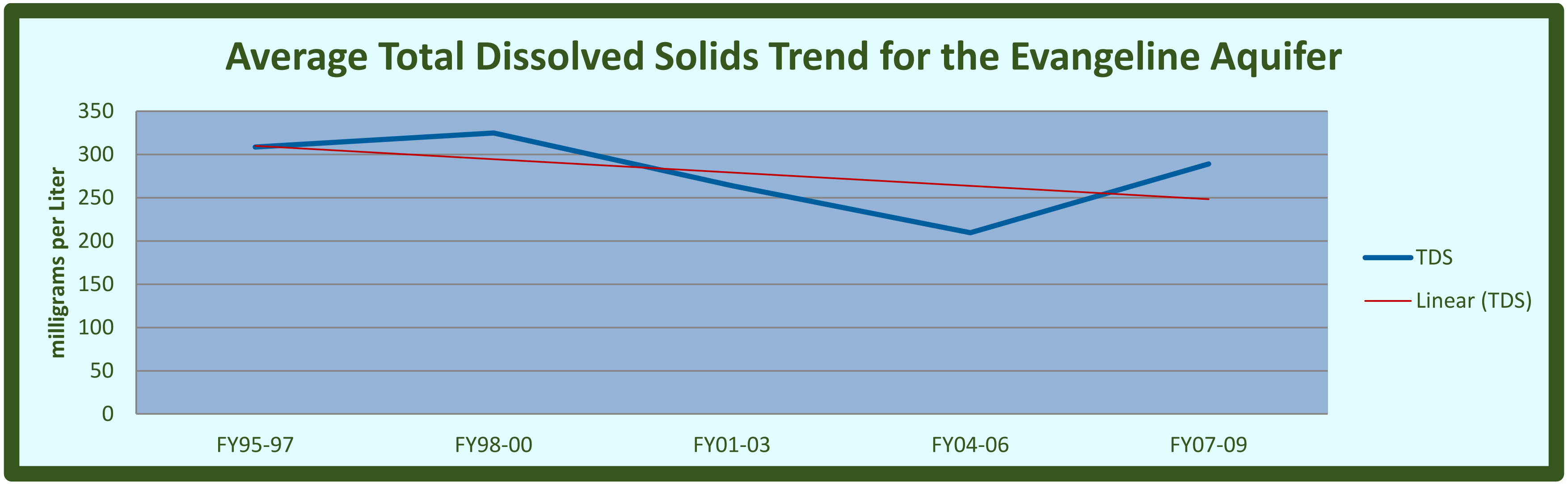

Chart 4-11: Ammonia (NH4) Trend

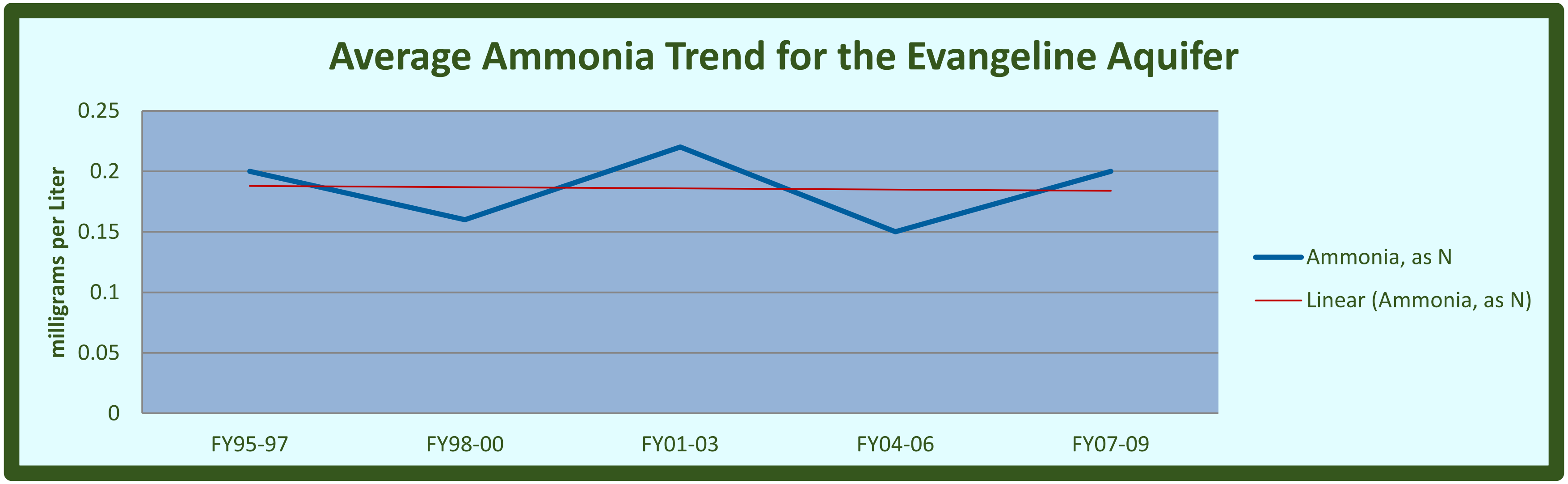

Chart 4-12: Hardness Trend

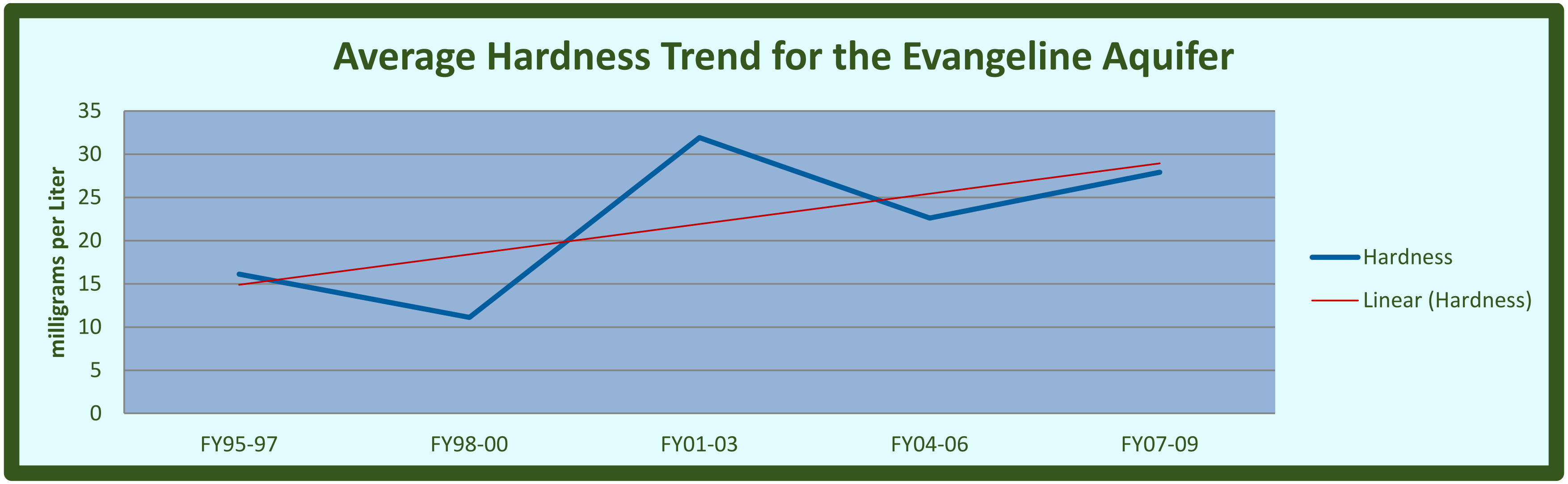

Chart 4-13: Nitrite – Nitrate Trend

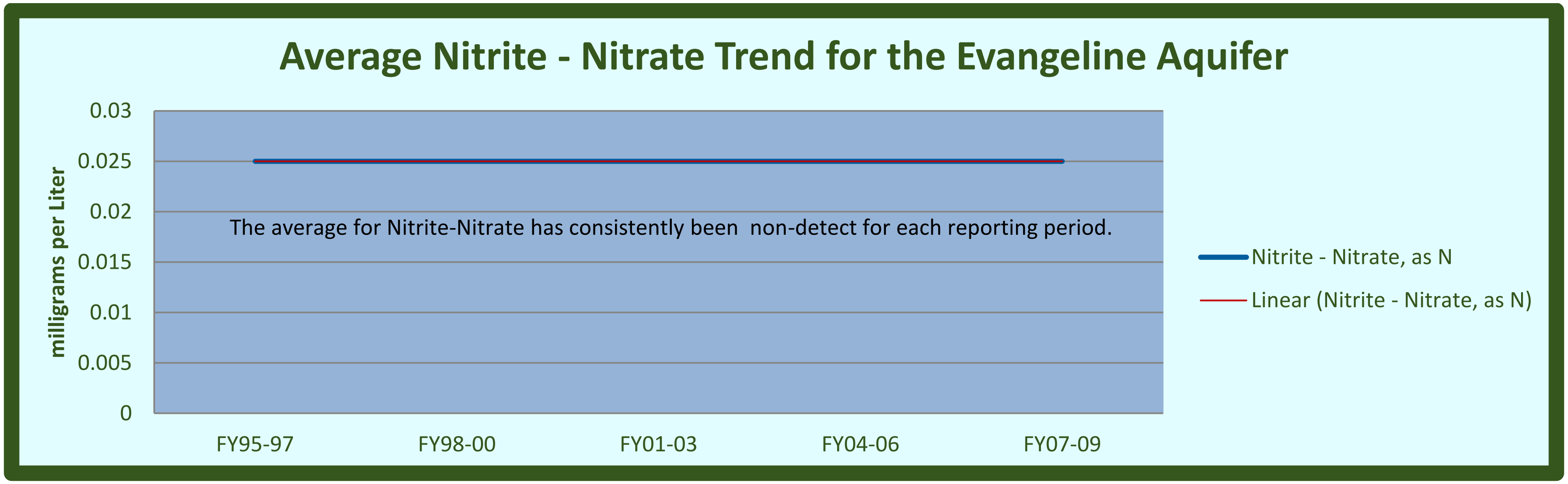

Chart 4-14: TKN Trend

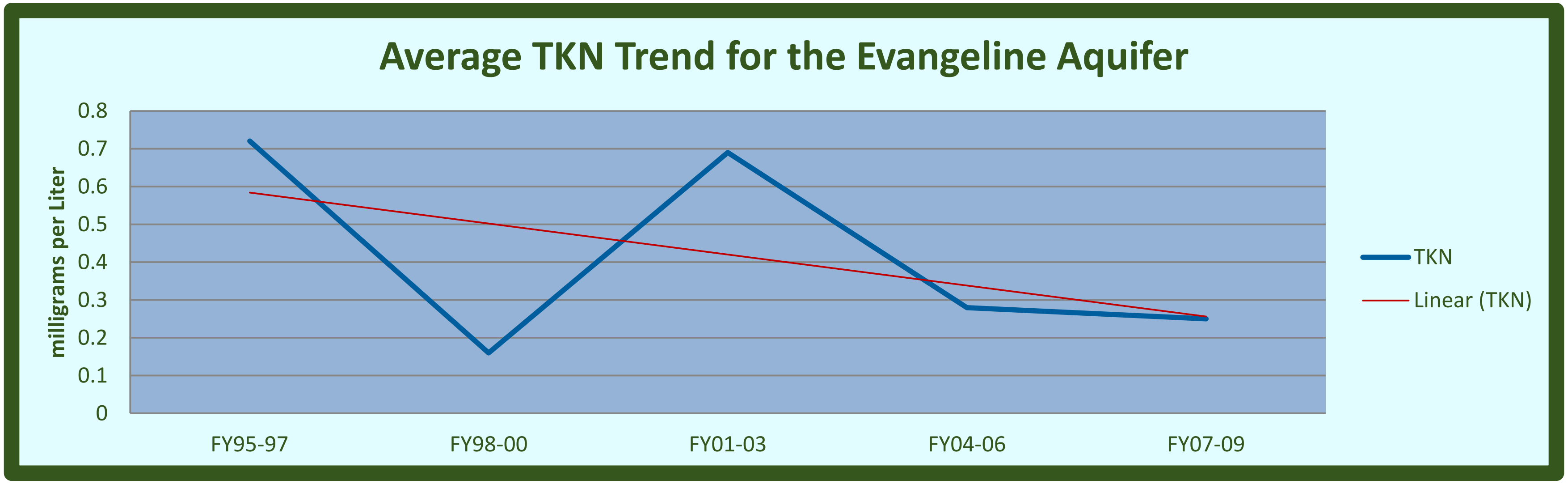

Chart 4-15: Total Phosphorus Trend

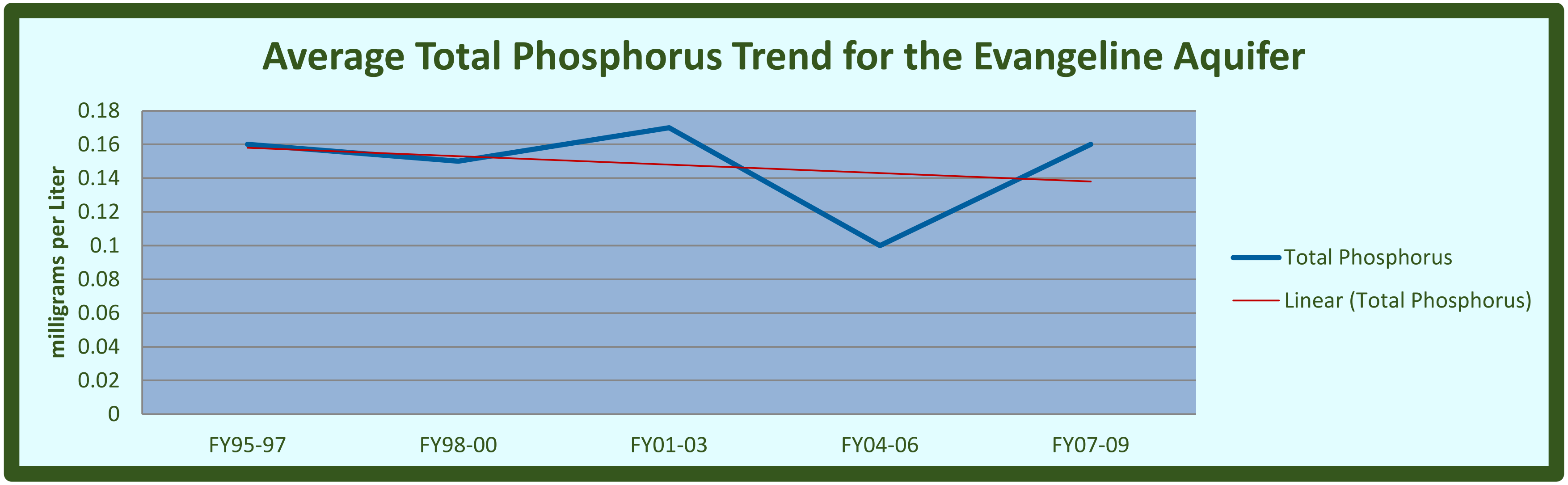

Chart 4-16: Iron Trend