EVANGELINE EQUIVALENT AQUIFER SYSTEM SUMMARY, 2012

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

APPENDIX 13 TO THE 2012 TRIENNIAL SUMMARY REPORT

PARTIAL FUNDING PROVIDED BY THE CWA

ASSET
AQUIFER SAMPLING AND ASSESSMEN 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 groundwater 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 14 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 2012.

Analytical and field data contained in this summary were collected from wells producing from the Evangeline Equivalent aquifer system during the 2012 state fiscal year (July 1, 2011 - June 30, 2012). This summary will become Appendix 13 to the ASSET Program Triennial Summary Report for 2012.

These data show that between February and May 2012, 16 wells were sampled which produce from the Evangeline Equivalent aquifer system. Seven of the wells are classified as public supply, while five are classified as domestic. Three wells are classified as industrial and one classified as irrigation. The wells are located in eleven parishes in southeast and south central Louisiana.

Figure 13-1 shows the geographic locations of the Evangeline Equivalent aquifer system and the associated wells, whereas Table 13-1 lists the wells in the aquifer along with their total depths, use made of produced waters and date sampled.

Well data, including well location, aquifer assignment, and well use classification for registered water wells were obtained from the Louisiana Department of Natural Resources' Water Well Registration Data file.

GEOLOGY

The Evangeline Equivalent aquifer system is composed of the Pliocene aged aquifers of the Baton Rouge area and St. Tammany, Tangipahoa, and Washington Parishes. These Pliocene sediments outcrop in southwestern Mississippi. The sedimentary sequences that make up the aquifer system are subdivided into several aquifer units separated by confining beds.

Northward within southeast Louisiana, fewer units are recognized because some younger units pinch out updip and some clay layers present to the south disappear. Where clay layers are discontinuous or disappear, aquifer units coalesce. The aquifers consist of moderately to well sorted, fine to medium grained sands, with interbedded coarse sand, silt, and clay.

HYDROGEOLOGY

The deposits that constitute the individual aquifers are not readily differentiated at the surface and act as one hydraulic system that can be subdivided into several hydrologic zones in the subsurface. A zone or ridge of saline water occurs within the Pliocene sediments beneath the Mississippi River alluvial valley. Recharge occurs primarily by the direct infiltration of rainfall in interstream, upland outcrop areas, and by the movement of water between aquifers.

The hydraulic conductivity varies between 10-200 feet/day. The maximum depths of occurrence of freshwater in the Evangeline Equivalent range from 0 to 2,500 feet below sea level. The range of thickness of the fresh water interval in the Evangeline Equivalent is 50 to 1,500 feet. The depths of the Evangeline Equivalent wells that were monitored in conjunction with the ASSET Program range from 185 to 2,004 feet below ground surface.

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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 13-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 13-3. These tables also show the field and analytical results determined for each analyte. For quality control, duplicate samples were taken for each parameter at AV-680, EB-1003, EF-MILEY, and TA-286.

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 13-8, 13-9 and 13-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Tables 13-4 and 13-5 provide a statistical overview of field and conventional data, and inorganic data for the Evangeline Equivalent aquifer system, listing the minimum, maximum, and average results for these parameters collected in the FY 2012 sampling. Tables 13-6 and 13-7 compare these same parameter averages to historical ASSET-derived data for the Evangeline Equivalent aquifer system, from fiscal years 1997, 2000, 2003, 2006, and 2009.

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. One-half the DL is also used for non-detects in the figures and charts referenced below.

Figures 13-2, 13-3, 13-4, and 13-5, respectively, represent the contoured data for pH, total dissolved solids, chloride and iron. Charts 13-1 through 13-16 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 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 13-2 and 13-3 show that one or two secondary MCLs (SMCL) were exceeded in all but one of the wells sampled in the Evangeline Equivalent aquifer.

Field and Conventional Parameters

Table 13-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 13-4 provides an overview of this data for the Evangeline Equivalent aquifer system, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 13-2 shows that no MCL was exceeded for field or conventional parameters for this reporting period. The ASSET wells reporting turbidity level greater than 1.0 NTU does not exceed the 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 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 13-2 shows that 14 wells exceeded the SMCL for pH. For total dissolved solids (TDS) exceedance determinations, laboratory results override field results, thus only laboratory results will be counted in determining SMCL exceedance numbers for TDS. Following is a list of SMCL exceedances with well number and results:

pH (SMCL = 6.5 – 8.5 Standard Units):

AV-680 – 8.62 SU (Original and Duplicate)
EF-MILEY – 5.81 SU (Original and Duplicate)
PC-325 – 8.63 SU
ST-532 – 9.14 SU
ST-820 – 8.80
TA-286 – 6.02 SU (Original and Duplicate)
WBR-181 – 9.16 SU
EB-1003 – 8.67 SU (Original and Duplicate)
LI-299 – 8.73 SU
SL-679 – 9.06 SU
ST-6711Z – 8.92 SU
TA-284 – 8.53 SU
WA-241 – 6.09 SU
WF-DELEE – 6.12 SU

Inorganic Parameters

Table 13-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 13-5 provides an overview of inorganic data for the Evangeline Equivalent aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 13-3 shows that no MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 13-3 shows that 2 wells exceeded the SMCL for iron:

Iron (SMCL = 300 µg/L):

WA-241 – 1,640 µg/L

WA-5210Z – 390 µg/L

Volatile Organic Compounds

Table 13-8 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.

No VOCs were detected at or above their respective detection limits during the FY 2012 sampling of the Evangeline Equivalent aquifer.

Semi-Volatile Organic Compounds

Table 13-9 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 SVOC detections at or above its detection limit during the FY 2012 sampling of the Evangeline Equivalent aquifer.

Pesticides and PCBs

Table 13-10 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 2012 sampling of the Evangeline Equivalent 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 Evangeline Equivalent 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 13-6 and 13-7, and in Charts 13-1 to 13-16 of this summary. Over the fifteen-year period four analytes, ammonia, pH, sulfate, and total phosphorus, have shown a general increase in average concentration. For this same time period, eleven analytes have demonstrated a decrease in average concentration, they are: alkalinity, chloride, color, copper, iron, salinity, specific conductance (field and Lab), temperature, total dissolved solids, TKN, and zinc. The remaining analytes were non-detect, or have been consistent with only minor fluctuations over the fifteen year period. The number of secondary exceedances in the Evangeline Equivalent aquifer system has increased from the previous sampling in FY 2009 of 12 SMCL exceedances, to 16 exceedances in FY 2012.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the groundwater produced from this aquifer is soft[1] 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 2012 monitoring of the Evangeline Equivalent aquifer system exceeded an MCL. The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines, with only one or two SMCLs exceeded in 15 wells.

Comparison to historical ASSET-derived data shows only slight change in the quality or characteristics of the Evangeline Equivalent aquifer system, with four parameters showing consistent increases in concentration and 11 decreasing in concentration over the previous 15 years.

It is recommended that the wells assigned to the Evangeline Equivalent aquifer system be re-sampled as planned, in approximately three years. In addition, several wells should be added to the 15 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 13-1: List of Wells Sampled–FY 2012
Evangeline Equivalent Aquifer System

Well ID	Parish	Date	Owner	Depth (Feet)	Well Use
3911 / AV-680	Avoyelles	2/14/2012	Avoyelles Water Commission	553	Public Supply
1707 / EB-1003	East Baton Rouge	3/15/2012	Baton Rouge Water Works	1430	Public Supply
4303 / EF-MILEY	East Feliciana	5/24/2012	Private Owner	185	Domestic
1911 / LI-299	Livingston	3/15/2012	Ward 2 Water District	1417	Public Supply
1907 / PC-325	Pointe Coupee	2/14/2012	Alma Plantation LTD	1252	Industrial
1909 / SL-679	St. Landry	2/14/2012	Alon USA	1152	Industrial
1732 / ST-532	St. Tammany	3/26/2012	Northlake Hospital	1520	Public Supply
1902 / ST-6711Z	St. Tammany	3/26/2012	Private Owner	860	Domestic
3918 / ST-820	St. Tammany	3/26/2012	Southern Manor MHP	2004	Public Supply
1827 / TA-284	Tangipahoa	3/15/2012	City of Ponchatoula	608	Public Supply
1714 / TA-286	Tangipahoa	3/23/2012	Town of Kentwood	640	Public Supply
1904 / TA-6677Z	Tangipahoa	3/15/2012	Private Owner	495	Domestic
1889 / WA-241	Washington	3/23/2012	Private Owner	400	Irrigation
1903 / WA-5210Z	Washington	3/26/2012	Private Owner	752	Domestic
1905 / WBR-181	West Baton Rouge	2/14/2012	Port of Greater Baton Rouge	1900	Industrial
1910 / WF-DELEE	West Feliciana	3/23/2012	Private Owner	240	Domestic

Table 13-2: Summary of Field and Conventional Data–FY 2012
Evangeline Equivalent Aquifer System

Well ID	pH SU	Sal. ppt	Sp. Cond. mmhos/cm	Temp Deg. C	TDS g/L	Alk mg/L	Cl mg/L	Color PCU	Hard. mg/L	Nitrite-Nitrate (as N) mg/L	NH3 mg/L	Tot. P mg/L	Sp. Cond. umhos/cm	SO4 mg/L	TDS mg/L	TKN mg/L	TSS mg/L	Turb. mg/L
	LABORATORY REPORTING LIMITS →					2	1.25	5	5	0.05	0.1	0.05	10	1	10	0.5	4	0.1
	FIELD PARAMETERS					LABORATORY PARAMETERS												
AV-680	8.62	0.20	0.418	20.02	0.272	188	16.8	10	18	< 0.05	0.47	0.40	449	6.11	252	< 0.5	< 4	0.34
AV-680*	8.62	0.20	0.418	20.02	0.272	192	16.7	5	20	< 0.05	0.26	0.39	448	6.29	225	< 0.5	< 4	0.19
EB-1003	8.67	0.14	0.288	25.69	0.187	136	3.5	< 5	10	< 0.05	0.23	0.24	313	9.14	232	< 0.5	< 4	0.11
EB-1003*	8.67	0.14	0.288	25.69	0.187	134	3.8	< 5	10	< 0.05	< 0.1	0.17	257	9.11	150	< 0.5	< 4	0.17
EF-MILEY	5.81	0.02	0.053	19.68	0.034	7	3.5	< 5	14	< 0.05	< 0.1	0.08	65	< 1	15	< 0.5	< 4	0.35
EF-MILEY*	5.81	0.02	0.053	19.68	0.034	5	3.6	< 5	14	< 0.05	< 0.1	0.07	64	< 1	10	< 0.5	< 4	< 0.1
LI-299	8.73	0.13	0.270	23.41	0.176	126	3.8	< 5	< 5	< 0.05	0.11	0.60	294	7.6	140	< 0.5	< 4	0.54
PC-325	8.63	0.13	0.281	23.16	0.183	134	3.5	5	10	< 0.05	0.21	0.50	302	9.24	228	< 0.5	< 4	0.25
SL-679	9.06	0.17	0.359	24.00	0.234	170	4.0	5	10	< 0.05	0.14	0.49	385	10.90	218	< 0.5	< 4	0.35
ST-532	9.14	0.16	0.341	27.14	0.222	154	3.3	< 5	< 5	< 0.05	< 0.1	‡	293	11.10	210	< 0.5	< 4	0.14
ST-6711Z	8.92	0.33	0.667	19.04	0.433	323	16.2	15	< 5	< 0.05	0.34	‡	584	1.75	435	0.90	< 4	0.17
ST-820	8.80	0.23	0.474	30.01	0.308	225	6.5	10	6	< 0.05	0.36	‡	412	8.92	285	1.46	< 4	0.13
TA-284	8.53	0.13	0.273	22.32	0.177	128	3.3	< 5	6	< 0.05	0.29	0.26	304	9.31	152	< 0.5	< 4	< 0.1
TA-286	6.02	0.02	0.050	20.11	0.032	16	4.6	< 5	12	< 0.05	< 0.1	< 0.05	47	3.50	47.5	< 0.5	< 4	< 0.1
TA-286*	6.02	0.02	0.050	20.11	0.032	16	3.8	< 5	12	< 0.05	< 0.1	< 0.05	47	3.52	57.5	< 0.5	< 4	< 0.1
TA-6677Z	6.75	0.05	0.105	20.01	0.068	43	4.1	< 5	18	< 0.05	0.16	< 0.05	113	1.98	75	< 0.5	< 4	0.26
WA-241	6.09	0.04	0.082	18.24	0.053	21	3.4	< 5	20	< 0.05	< 0.1	< 0.05	75	9.65	105	< 0.5	< 4	< 0.1
WA-5210Z	7.19	0.07	0.151	19.99	0.098	56	3.3	< 5	36	< 0.05	0.13	‡	141	9.30	137	< 0.5	5.5	0.23
WBR-181	9.16	0.14	0.301	27.66	0.196	142	3.1	< 5	8	< 0.05	0.31	0.58	311	9.24	172	< 0.5	< 4	0.27
WF-DELEE	6.12	0.05	0.115	17.48	0.074	21	25.2	< 5	16	0.968	< 0.1	< 0.05	74	< 1	108	< 0.5	< 4	0.47

*Denotes Duplicate Sample ‡ Data Not Reported from Lab Shaded cells exceed EPA Secondary Standards

Table 13-3: Summary of Inorganic Data–FY 2012
Evangeline Equivalent Aquifer System

Well ID	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Cadmium µg/L	Chromium µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Mercury µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Thallium µg/L	Zinc µg/L
Laboratory Reporting Limits	1	1	1	1	1	1	5	100	1	0.05	1	1	1	1	5
AV-680	< 1	< 1	43.5	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
AV-680*	< 1	< 1	86.6	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
EB-1003	< 1	< 1	15.7	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
EB-1003*	< 1	< 1	15.8	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
EF-MILEY	< 1	< 1	83.2	< 1	< 1	< 1	41.6	< 100	3.51	< 0.05	1.38	< 1	< 1	< 1	27.0
EF-MILEY*	< 1	< 1	84.5	< 1	< 1	< 1	37.2	< 100	1.72	< 0.05	< 1	< 1	< 1	< 1	16.0
LI-299	< 1	< 1	4.1	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
PC-325	< 1	< 1	7.2	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
SL-679	< 1	< 1	8.6	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
ST-532	< 1	< 1	5.8	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
ST-6711Z	< 1	< 1	11.8	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
ST-820	< 1	< 1	20.2	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
TA-284	< 1	< 1	15.8	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
TA-286	< 1	< 1	62.2	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
TA-286*	< 1	< 1	60.0	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
TA-6677Z	< 1	< 1	101.0	< 1	< 1	1.2	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	15.5
WA-241	< 1	< 1	82.0	< 1	< 1	< 1	< 5	1,640	< 1	< 0.05	2.96	< 1	< 1	< 1	9.6
WA-5210Z	< 1	< 1	65.4	< 1	< 1	< 1	< 5	390	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
WBR-181	< 1	< 1	1.6	< 1	< 1	< 1	< 5	< 100	< 1	< 0.05	< 1	< 1	< 1	< 1	< 5
WF-DELEE	< 1	< 1	41.8	< 1	< 1	< 1	< 5	168	< 1	< 0.05	1.34	< 1	< 1	< 1	15.2

*Denotes Duplicate Sample

Shaded cells exceed EPA Secondary Standards

Table 13-4: FY 2012 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	Temperature (^{O}C)	17.48	30.01	22.17
	pH (SU)	5.81	9.16	7.77
	Specific Conductance (mmhos/cm)	0.050	0.667	0.252
	Salinity (ppt)	0.02	0.33	0.12
	TDS (g/L)	0.032	0.433	0.164
LABORATORY	Alkalinity (mg/L)	5	323	112
	Chloride (mg/L)	3.1	25.2	6.8
	Color (PCU)	< 5	15	< 5
	Specific Conductance (µmhos/cm)	47	584	249
	Sulfate (mg/L)	< 1	11.10	6.41
	TDS (mg/L)	10	435	163
	TSS (mg/L)	< 4	5.5	< 4
	Turbidity (NTU)	< 0.1	0.54	0.21
	Ammonia, as N (mg/L)	< 0.1	0.47	0.17
	Hardness (mg/L)	< 5	36	12
	Nitrite - Nitrate, as N (mg/L)	< 0.05	0.968	0.072
	TKN (mg/L)	< 0.5	1.46	< 0.5
	Total Phosphorus (mg/L)	< 0.05	0.60	0.24

Table 13-5: FY 2012 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (µg/L)	< 1	< 1	< 1
Arsenic (µg/L)	< 1	< 1	< 1
Barium (µg/L)	1.6	101.0	40.8
Beryllium (µg/L)	< 1	< 1	< 1
Cadmium (µg/L)	< 1	< 1	< 1
Chromium (µg/L)	< 1	1.2	< 1
Copper (µg/L)	< 5	41.6	6.2
Iron (µg/L)	< 100	1,640	152
Lead (µg/L)	< 1	3.51	< 1
Mercury (µg/L)	< 0.05	< 0.05	< 0.05
Nickel (µg/L)	< 1	2.96	< 1
Selenium (µg/L)	< 1	< 1	< 1
Silver (µg/L)	< 1	< 1	< 1
Thallium (µg/L)	< 1	< 1	< 1
Zinc (µg/L)	< 5	27.0	6.0

Table 13-6: Triennial Field and Conventional Statistics, ASSET Wells

	PARAMETER	AVERAGE VALUES BY FISCAL YEAR					
		FY 1997	FY 2000	FY 2003	FY 2006	FY 2009	FY 2012
FIELD	Temperature (^{O}C)	25.17	22.73	22.74	22.59	22.88	22.17
FIELD	pH (SU)	7.45	8.02	8.41	7.88	8.12	7.77
FIELD	Specific Conductance (mmhos/cm)	0.33	0.24	0.27	0.28	0.26	0.25
FIELD	Salinity (ppt)	0.14	0.12	0.12	0.13	0.12	0.12
FIELD	Total dissolved solids (g/L)	-	-	-	0.18	0.17	0.16
LABORATORY	Alkalinity (mg/L)	125	110	118	120	126	112
LABORATORY	Chloride (mg/L)	13.7	8.3	7.3	11.8	8.4	6.8
LABORATORY	Color (PCU)	14.3	7.7	7.9	13.6	< 5.0	< 5.0
LABORATORY	Specific Conductance (umhos/cm)	277	250	237	269	248	249
LABORATORY	Sulfate (mg/L)	5.8	6.5	7.6	7.4	6.3	6.4
LABORATORY	Total dissolved solids (mg/L)	233	163	170	198	185	163
LABORATORY	Total suspended solids (mg/L)	< 4	4.7	< 4	< 4	< 4	< 4
LABORATORY	Turbidity (NTU)	1.6	2.0	1.3	<1.0	<1.0	0.2
LABORATORY	Ammonia, as N (mg/L)	0.30	0.13	0.15	0.17	<1.00	0.17
LABORATORY	Hardness (mg/L)	10	13	11	11	7	12
LABORATORY	Nitrite - Nitrate , as N (mg/L)	0.04	0.10	0.17	0.07	0.06	0.07
LABORATORY	TKN (mg/L)	1.14	0.27	0.24	0.23	0.35	< 0.5
LABORATORY	Total Phosphorus (mg/L)	0.19	0.27	0.22	0.21	0.27	0.24

Table 13-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	AVERAGE VALUES BY FISCAL YEAR					
	FY 1997	FY 2000	FY 2003	FY 2006	FY 2009	FY 2012
Antimony (µg/L)	11.5	<5	<5	<50	<5	<1
Arsenic (µg/L)	<5	<5	<5	<20	<4	<1
Barium (µg/L)	29.1	41.0	39.9	47.8	39.3	40.8
Beryllium (µg/L)	<1	<1	<1	<1	<2	<1
Cadmium (µg/L)	<2	<2	<1	<1	<2	<1
Chromium (µg/L)	<5	<5	<5	<5	<4	<1
Copper (µg/L)	12.9	9.0	6.7	<10	<3	6.2
Iron (µg/L)	331	943	204	265	174	152
Lead (µg/L)	<10	<10	<10	<20	<3	<1
Mercury (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (µg/L)	<5	<5	<5	<5	<3	<1
Selenium (µg/L)	<5	<5	<5	<5	<5	<1
Silver (µg/L)	<2	<1	<1	<2.5	<1	<1
Thallium (µg/L)	<2	<5	<5	<5	<2	<1
Zinc (µg/L)	141.6	178.0	11.8	<10.0	<10.0	6.0

Table 13-8: VOC Analytical Parameters

COMPOUND	METHOD	DETECTION LIMIT (µg/L)
1,1,1-TRICHLOROETHANE	624	0.5
1,1,2,2-TETRACHLOROETHANE	624	0.5
1,1,2-TRICHLOROETHANE	624	0.5
1,1-DICHLOROETHANE	624	0.5
1,1-DICHLOROETHENE	624	0.5
1,2,3-TRICHLOROBENZENE	624	1
1,2-DICHLOROBENZENE	624	0.5
1,2-DICHLOROETHANE	624	0.5
1,2-DICHLOROPROPANE	624	0.5
1,3-DICHLOROBENZENE	624	0.5
1,4-DICHLOROBENZENE	624	0.5
BENZENE	624	0.5
BROMODICHLOROMETHANE	624	0.5
BROMOFORM	624	0.5
BROMOMETHANE	624	0.5
CARBON TETRACHLORIDE	624	0.5
CHLOROBENZENE	624	0.5
CHLOROETHANE	624	0.5
CHLOROFORM	624	0.5
CHLOROMETHANE	624	0.5
CIS-1,3-DICHLOROPROPENE	624	0.5
DIBROMOCHLOROMETHANE	624	0.5
ETHYL BENZENE	624	0.5
METHYLENE CHLORIDE	624	0.5
O-XYLENE	624	1
STYRENE	624	1
TERT-BUTYL METHYL ETHER	624	0.5
TETRACHLOROETHYLENE	624	0.5
TOLUENE	624	0.5
TRANS-1,2-DICHLOROETHENE	624	0.5
TRANS-1,3-DICHLOROPROPENE	624	0.5
TRICHLOROETHYLENE	624	0.5
TRICHLOROFLUOROMETHANE	624	0.5
VINYL CHLORIDE	624	0.5
XYLENES, M & P	624	1

Table 13-9: SVOC Analytical Parameters

COMPOUND	METHOD	DETECTION LIMIT (µg/L)
1,2,4,5-TETRACHLOROBENZENE	625	10
1,2,4-TRICHLOROBENZENE	625	10
2,4,6-TRICHLOROPHENOL	625	10
2,4-DICHLOROPHENOL	625	10
2,4-DIMETHYLPHENOL	625	10
2,4-DINITROPHENOL	625	10
2,4-DINITROTOLUENE	625	10
2,6-DINITROTOLUENE	625	10
2-CHLORONAPHTHALENE	625	10
2-CHLOROPHENOL	625	10
2-NITROPHENOL	625	10
3,3'-DICHLOROBENZIDINE	625	20
4,6-DINITRO-2-METHYLPHENOL	625	10
4-BROMOPHENYL PHENYL ETHER	625	10
4-CHLORO-3-METHYLPHENOL	625	10
4-CHLOROPHENYL PHENYL ETHER	625	10
4-NITROPHENOL	625	10
ACENAPHTHENE	625	10
ACENAPHTHYLENE	625	10
ANTHRACENE	625	10
BENZIDINE	625	30
BENZO(A)ANTHRACENE	625	10
BENZO(A)PYRENE	625	10
BENZO(B)FLUORANTHENE	625	10
BENZO(G,H,I)PERYLENE	625	10
BENZO(K)FLUORANTHENE	625	10
BENZYL BUTYL PHTHALATE	625	10
BIS(2-CHLOROETHOXY) METHANE	625	10
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	625	10
BIS(2-CHLOROISOPROPYL) ETHER	625	10
BIS(2-ETHYLHEXYL) PHTHALATE	625	10
CHRYSENE	625	10
DIBENZ(A,H)ANTHRACENE	625	10
DIETHYL PHTHALATE	625	10
DIMETHYL PHTHALATE	625	10
DI-N-BUTYL PHTHALATE	625	10

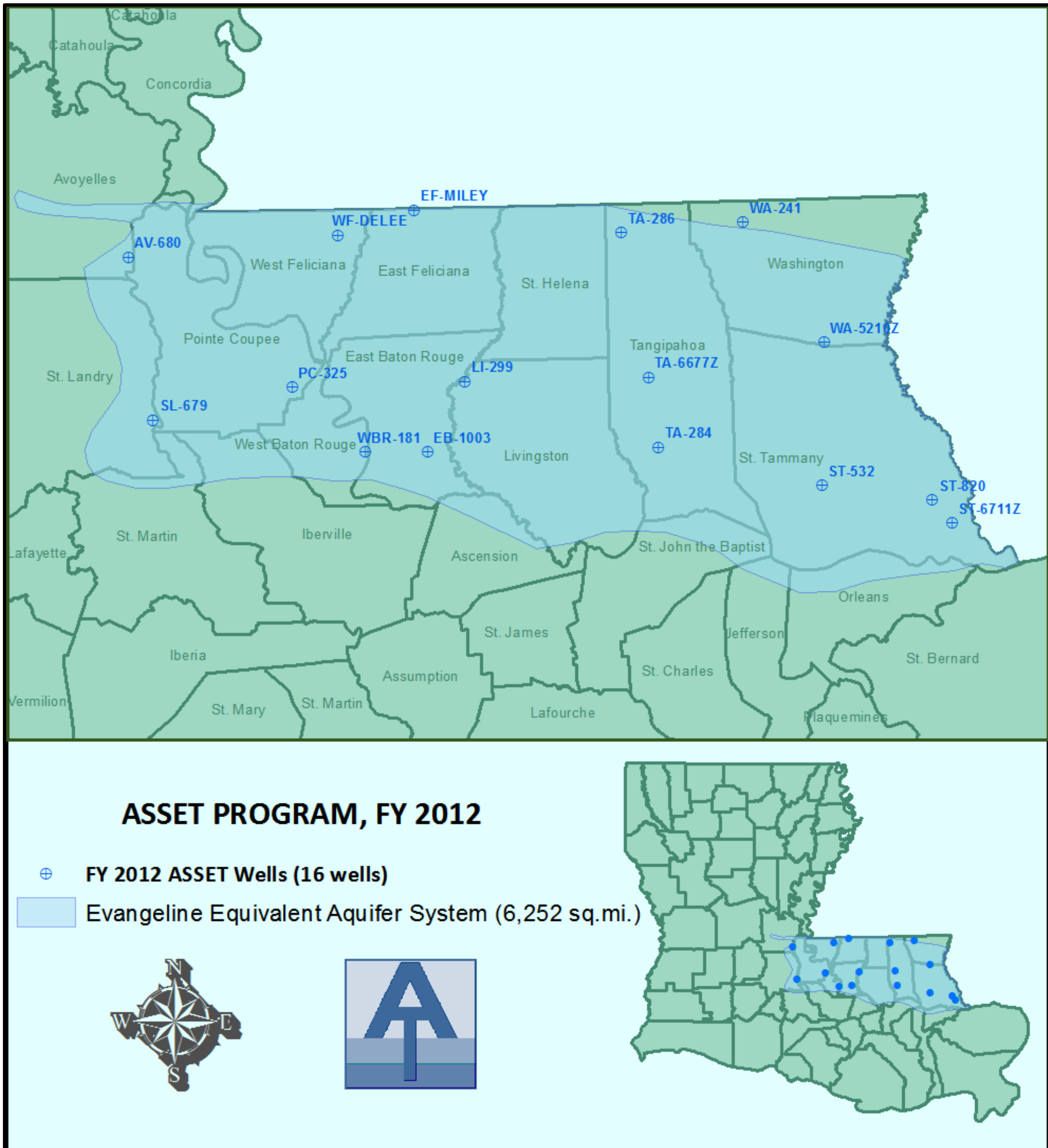
Table 13-9: SVOCs (Continued)

COMPOUND	METHOD	DETECTION LIMIT (µg/L)
DI-N-OCTYLPHTHALATE	625	10
FLUORANTHENE	625	10
FLUORENE	625	10
HEXACHLOROBENZENE	625	10
HEXACHLOROBUTADIENE	625	10
HEXACHLOROCYCLOPENTADIENE	625	10
HEXACHLOROETHANE	625	10
INDENO(1,2,3-C,D)PYRENE	625	10
ISOPHORONE	625	10
NAPHTHALENE	625	10
NITROBENZENE	625	10
N-NITROSODIMETHYLAMINE	625	10
N-NITROSODI-N-PROPYLAMINE	625	10
N-NITROSODIPHENYLAMINE	625	10
PENTACHLOROBENZENE	625	10
PENTACHLOROPHENOL	625	10
PHENANTHRENE	625	10
PHENOL	625	10
PYRENE	625	10

Table 13-10: Pesticides and PCBs

COMPOUND	METHOD	DETECTION LIMITS (µg/L)
ALDRIN	608	0.05
ALPHA BHC	608	0.05
ALPHA ENDOSULFAN	608	0.05
ALPHA-CHLORDANE	608	0.05
BETA BHC	608	0.05
BETA ENDOSULFAN	608	0.1
CHLORDANE	608	0.5
DELTA BHC	608	0.05
DIELDRIN	608	0.1
ENDOSULFAN SULFATE	608	0.1
ENDRIN	608	0.1
ENDRIN ALDEHYDE	608	0.1
ENDRIN KETONE	608	0.1
GAMMA BHC (LINDANE)	608	0.05
GAMMA-CHLORDANE	608	0.05
HEPTACHLOR	608	0.05
HEPTACHLOR EPOXIDE	608	0.05
METHOXYCHLOR	608	0.5
P,P'-DDD	608	0.1
P,P'-DDE	608	0.1
P,P'-DDT	608	0.1
PCB-1016 (AROCHLOR 1016)	608	1
PCB-1221 (AROCHLOR 1221)	608	1
PCB-1232 (AROCHLOR 1232)	608	1
PCB-1242 (AROCHLOR 1242)	608	1
PCB-1248 (AROCHLOR 1248)	608	1
PCB-1254 (AROCHLOR 1254)	608	1
PCB-1260 (AROCHLOR 1260)	608	1
TOXAPHENE	608	2

Figure 13-1: Location Plat, Evangeline Equivalent Aquifer System



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.

Figure 13-2: Map of pH Data

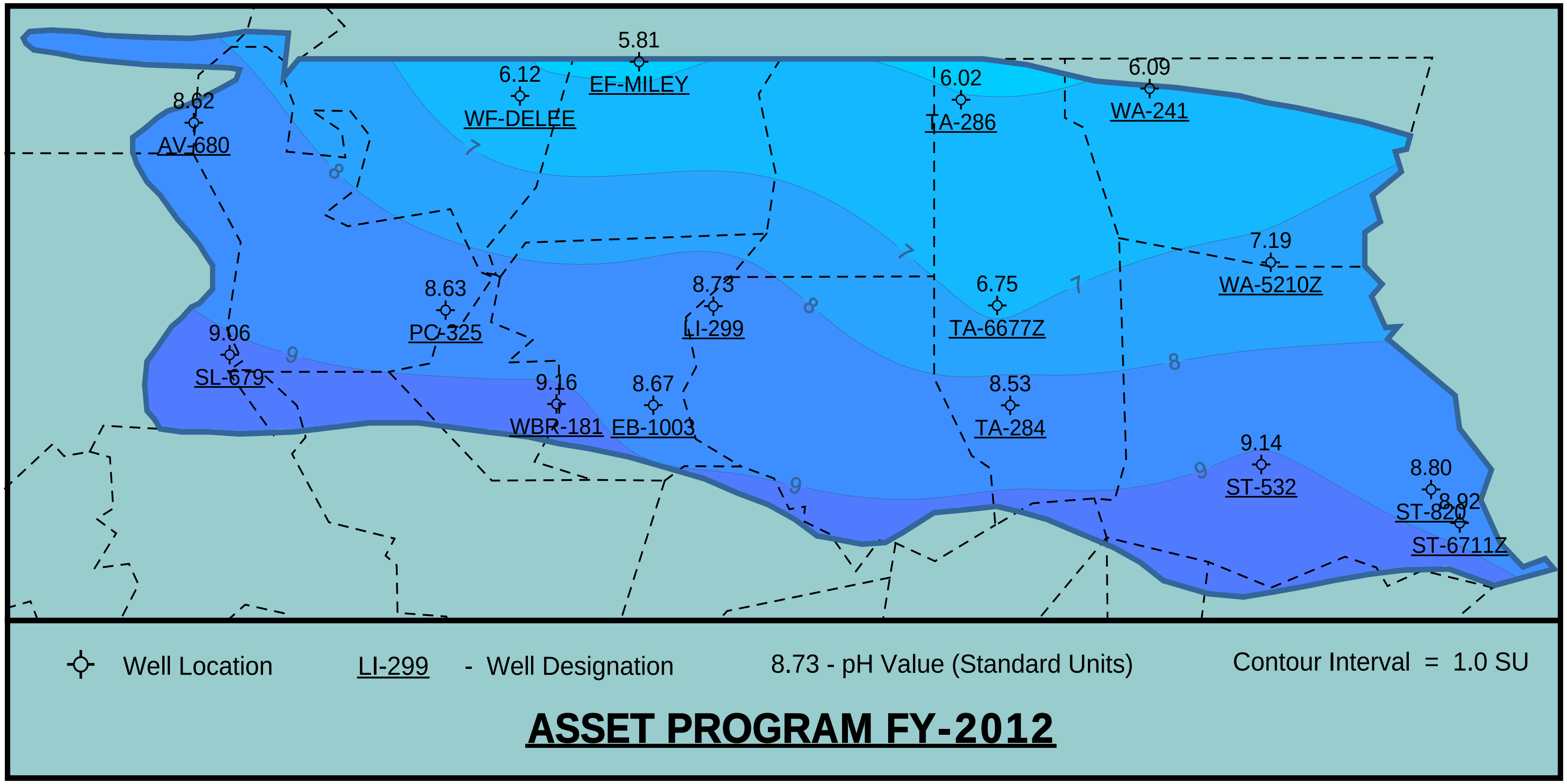


Figure 13-3: Map of TDS Lab Data

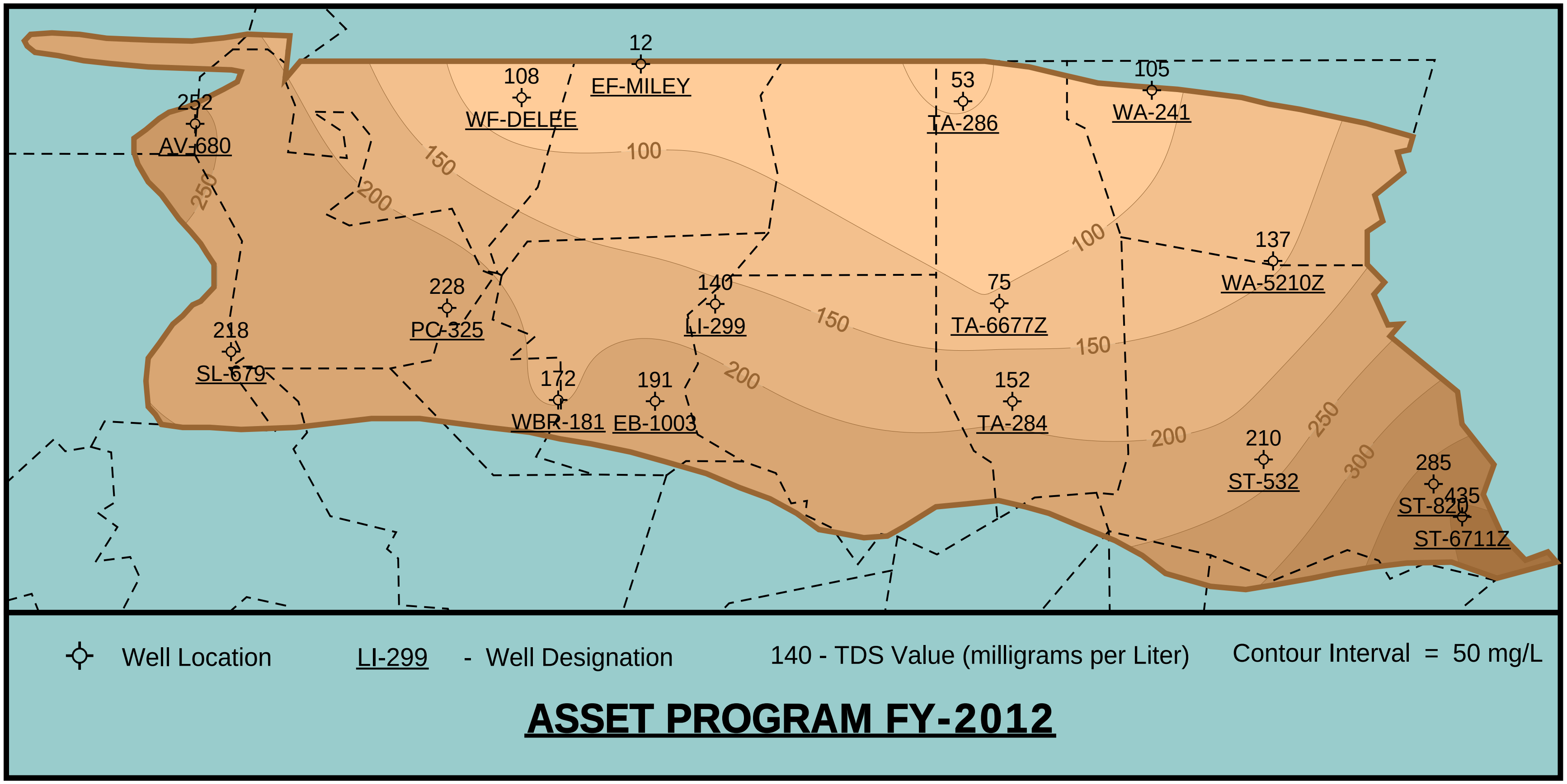


Figure 13-4: Map of Chloride Data

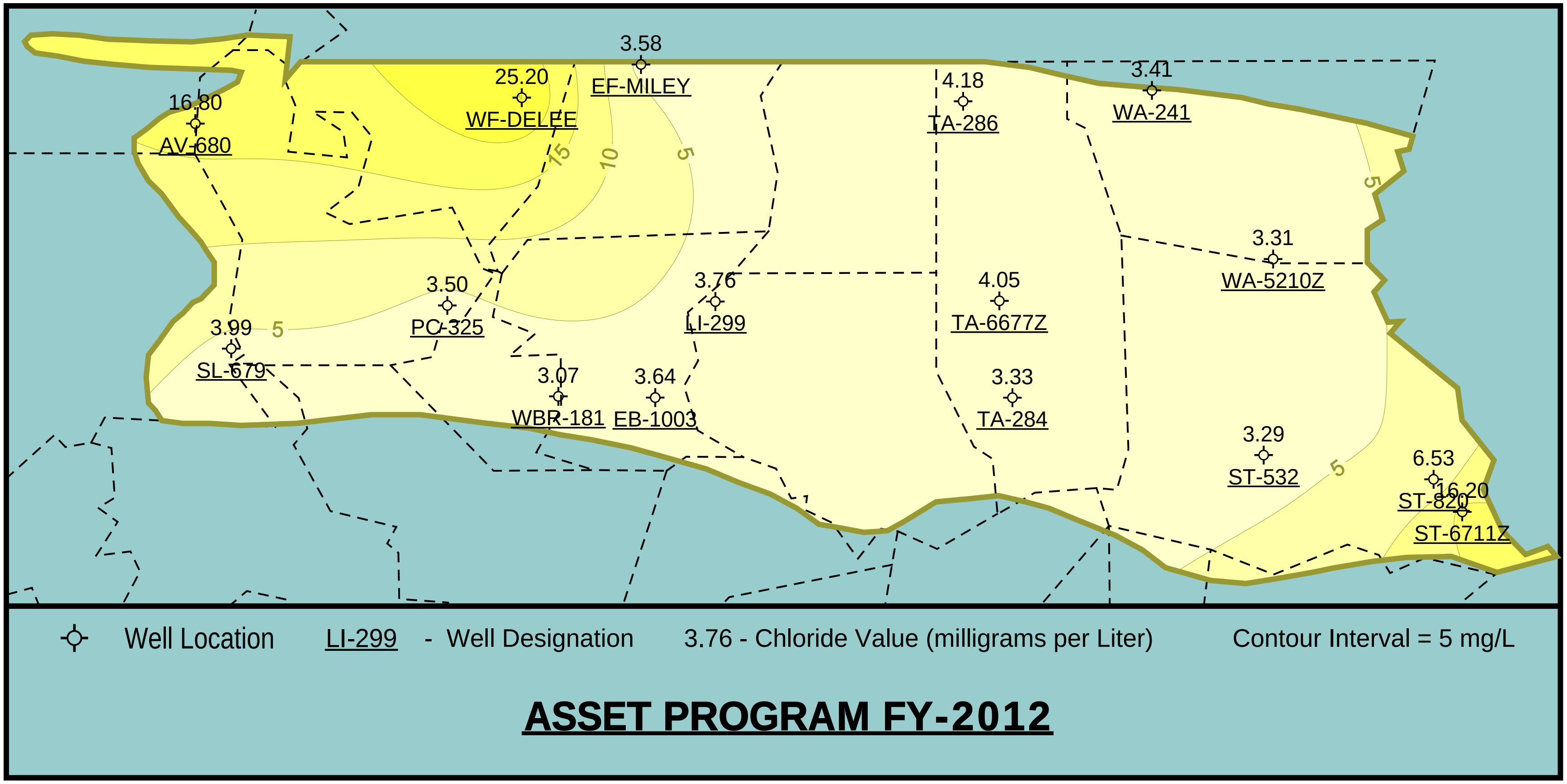


Figure 13-5: Map of Iron Data

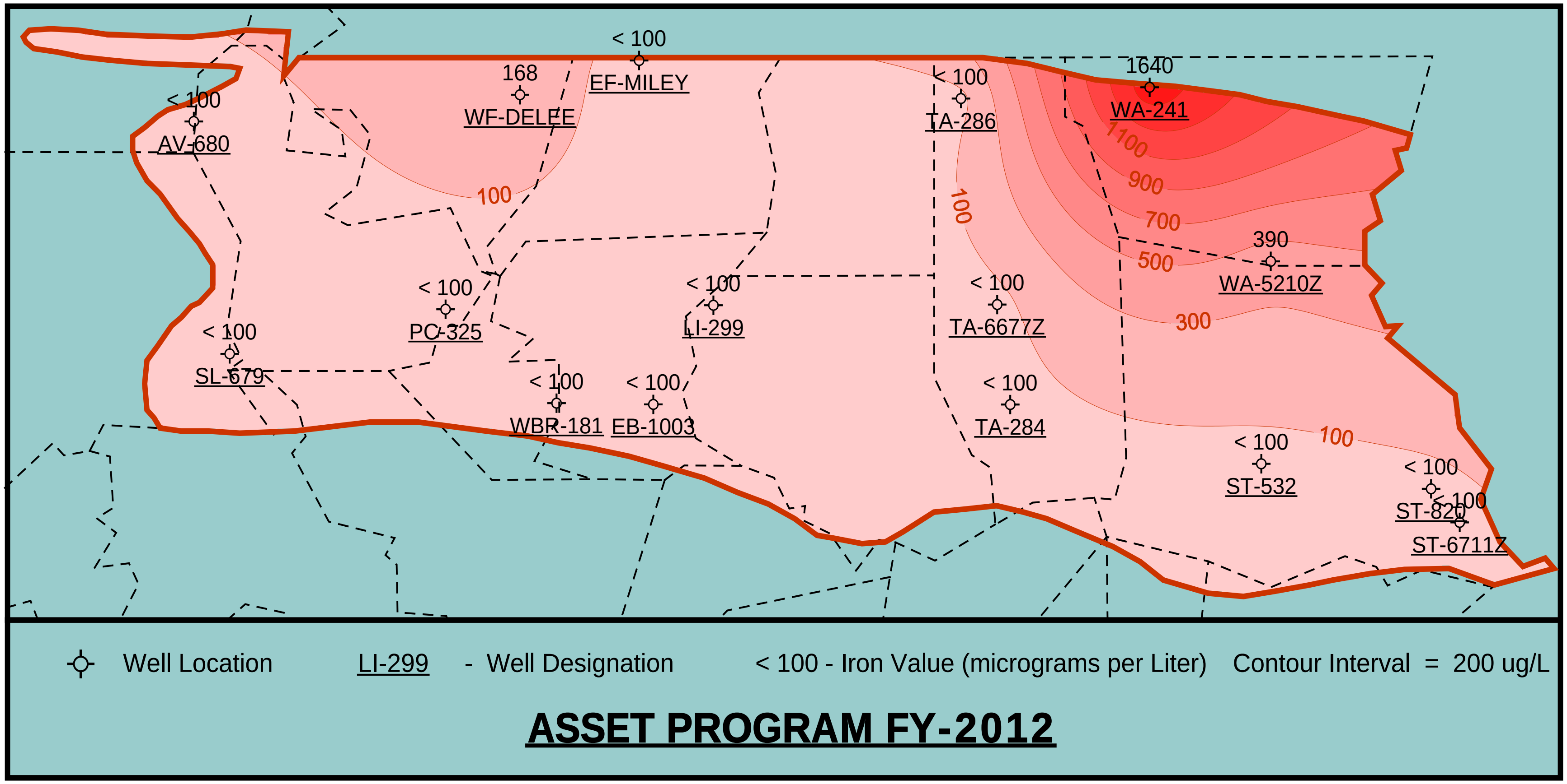


Chart 13-1: Temperature Trend

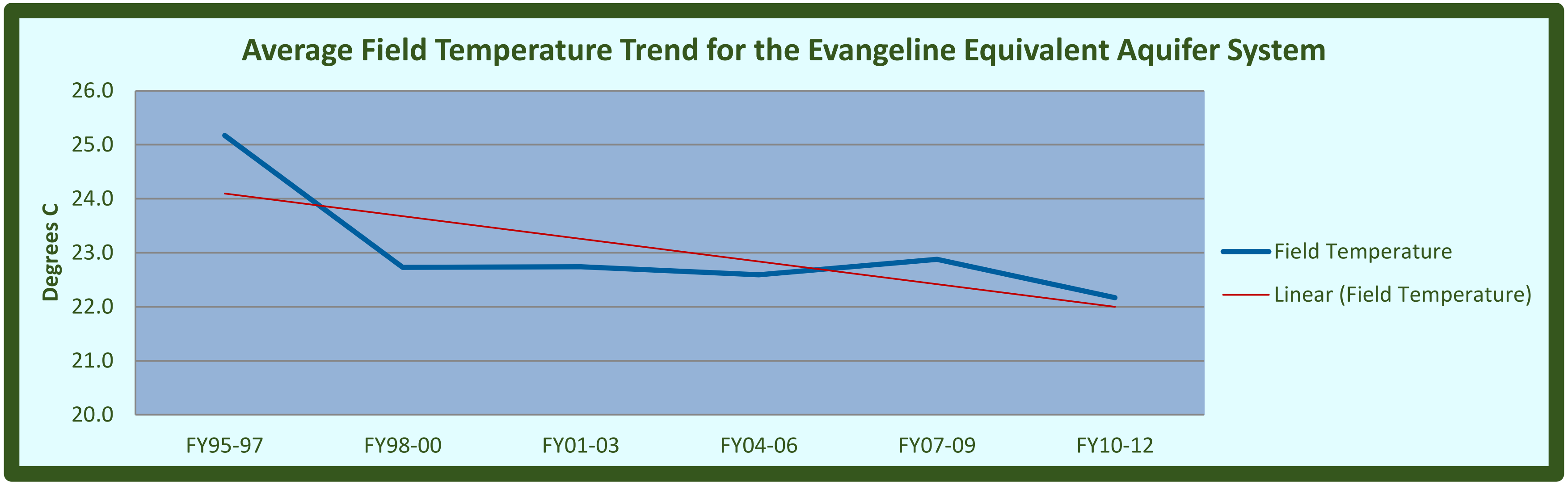


Chart 13-2: pH Trend

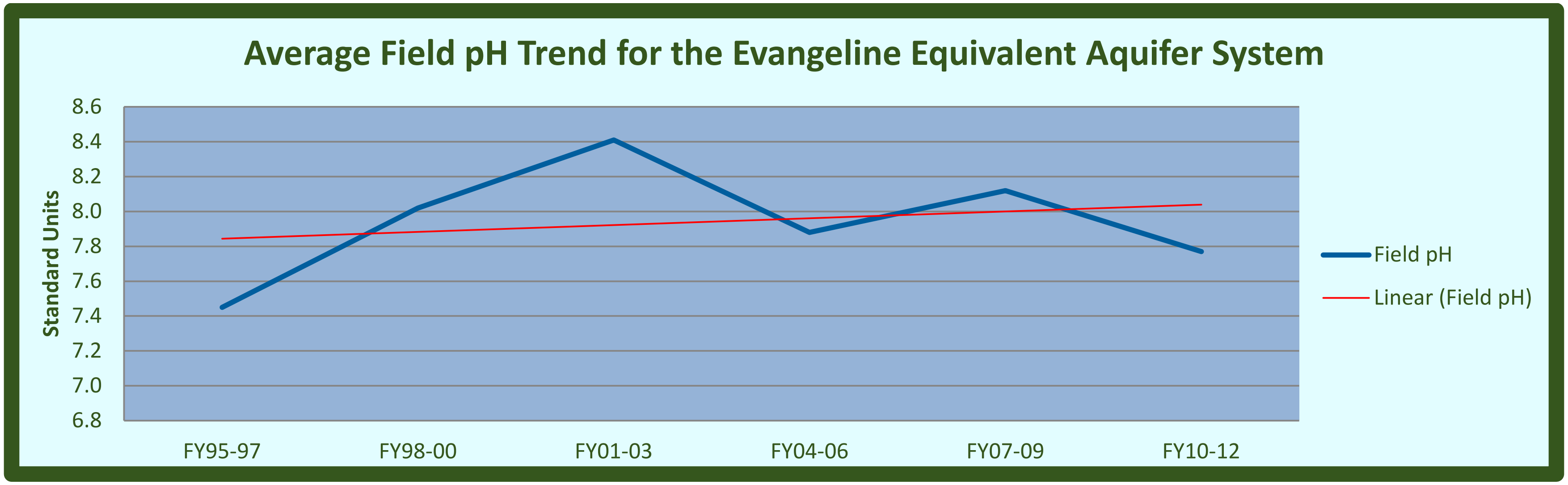


Chart 13-3: Field Specific Conductance Trend

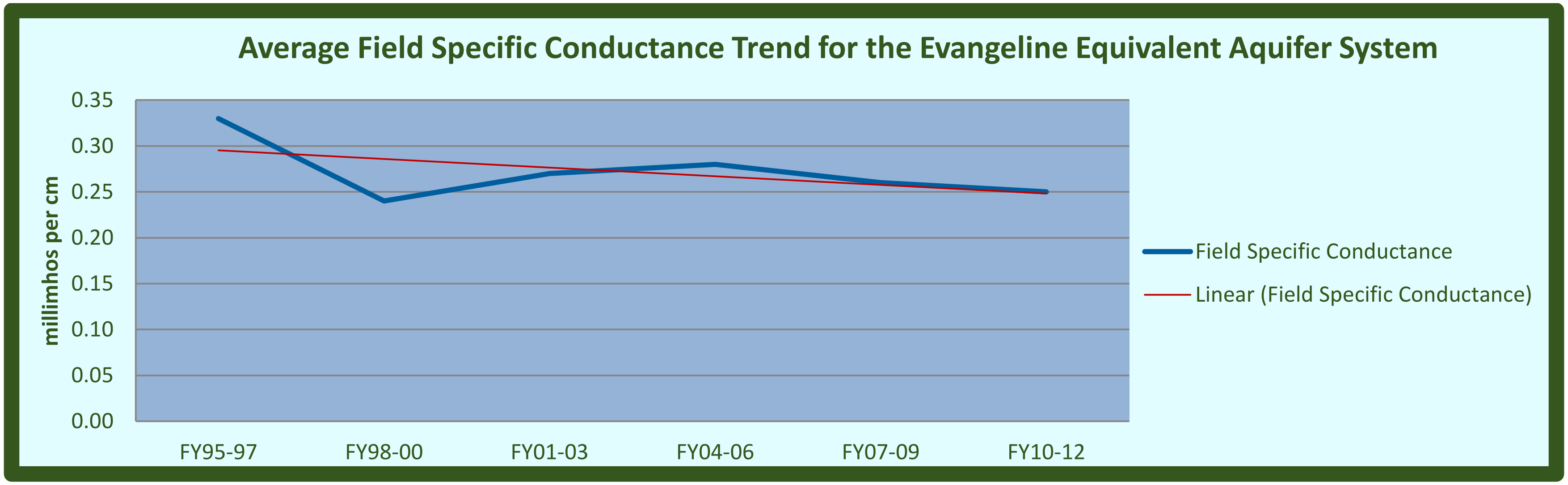


Chart 13-4: Lab Specific Conductance Trend

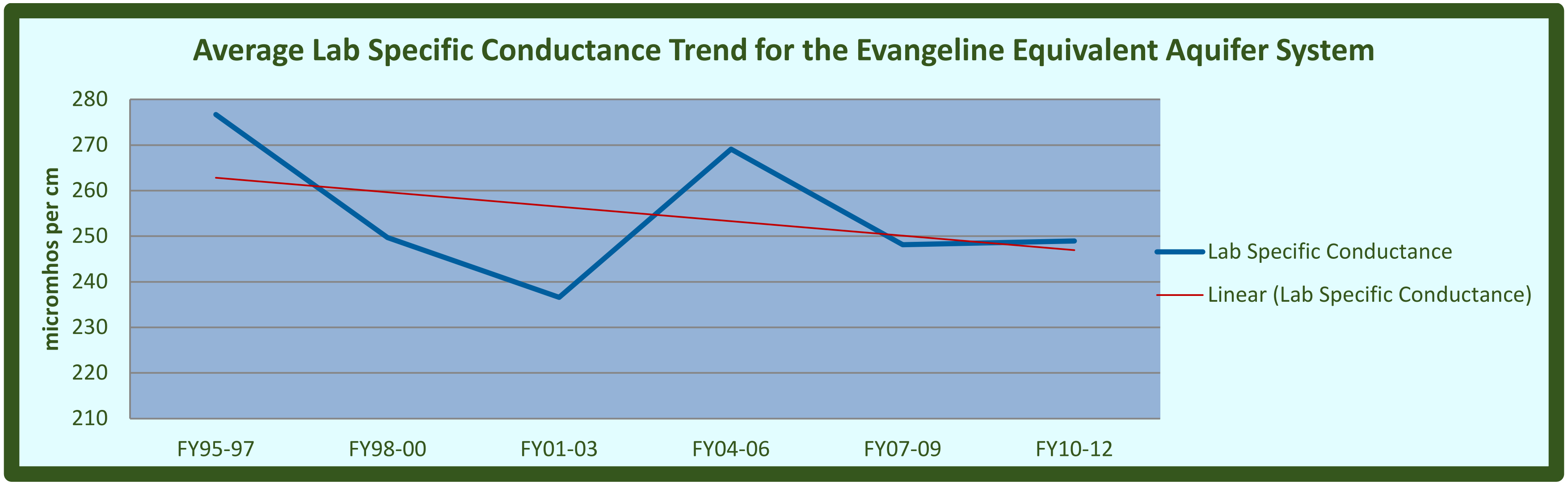


Chart 13-5: Field Salinity Trend

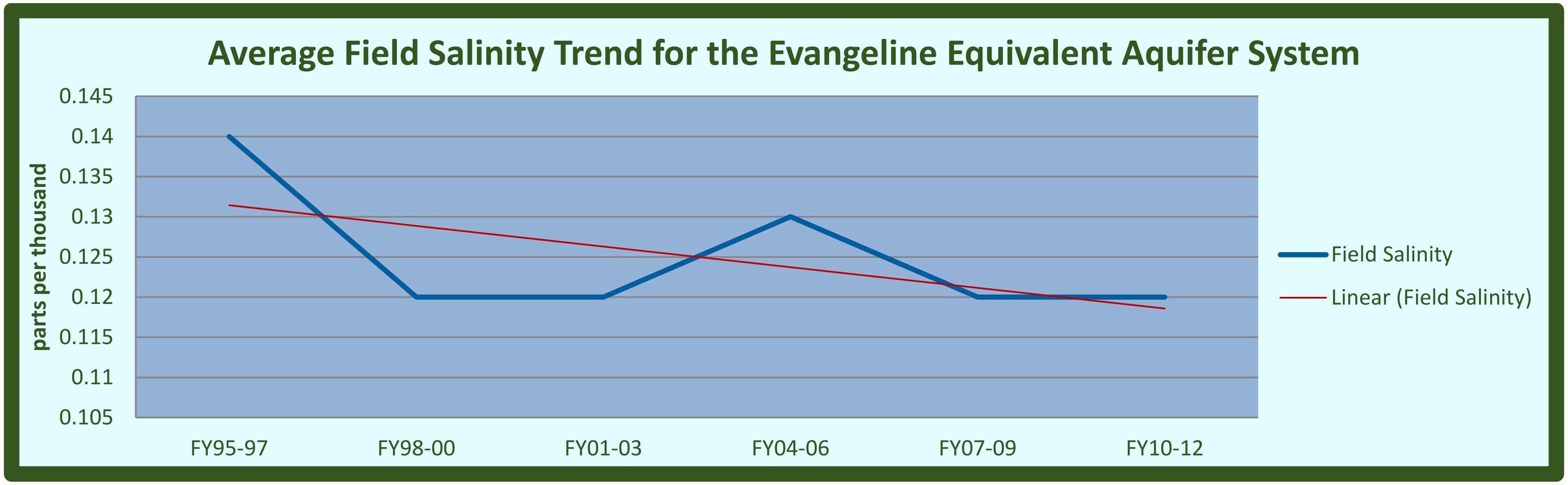


Chart 13-6: Chloride Trend

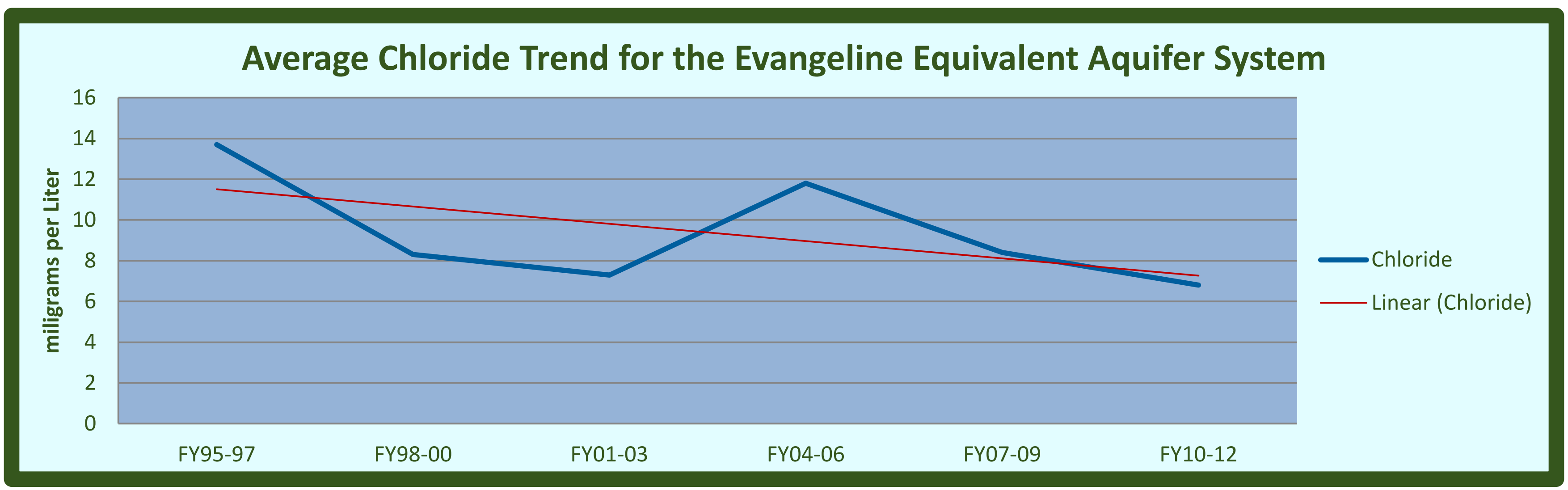


Chart 13-7: Alkalinity Trend

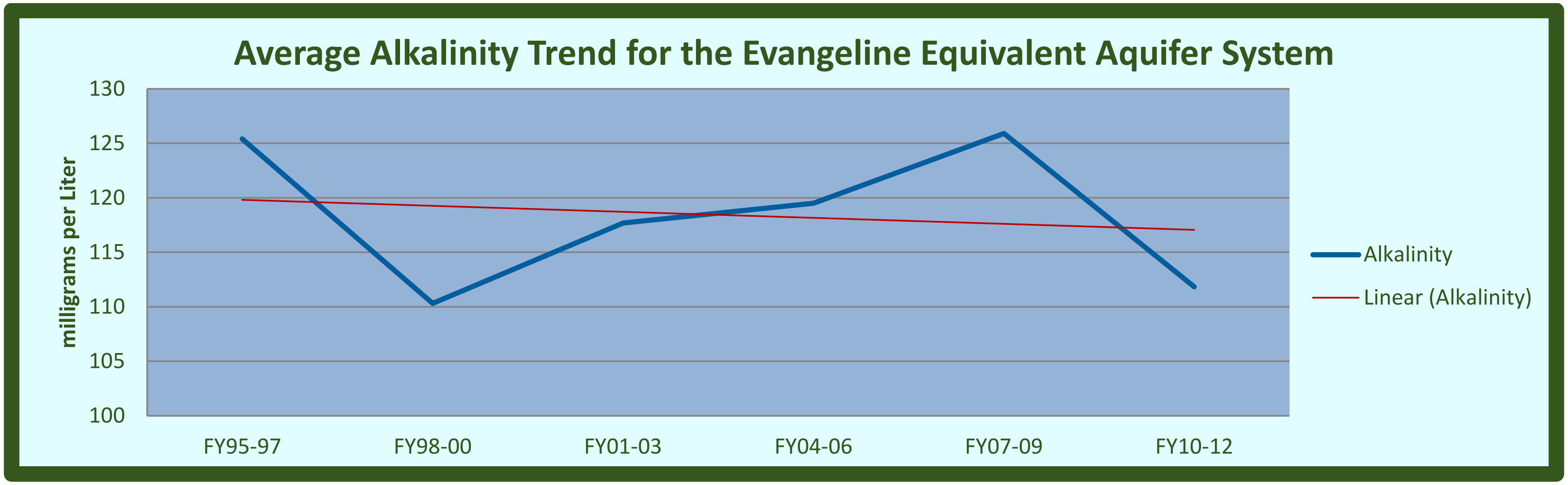


Chart 13-8: Color Trend

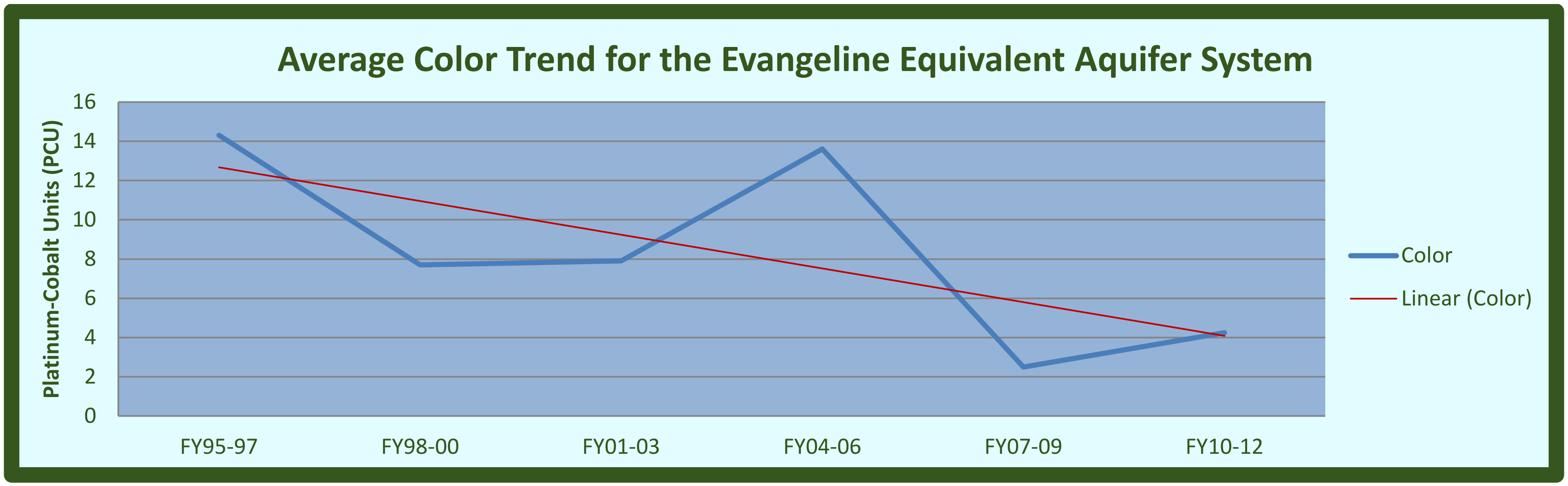


Chart 13-9: Sulfate Trend

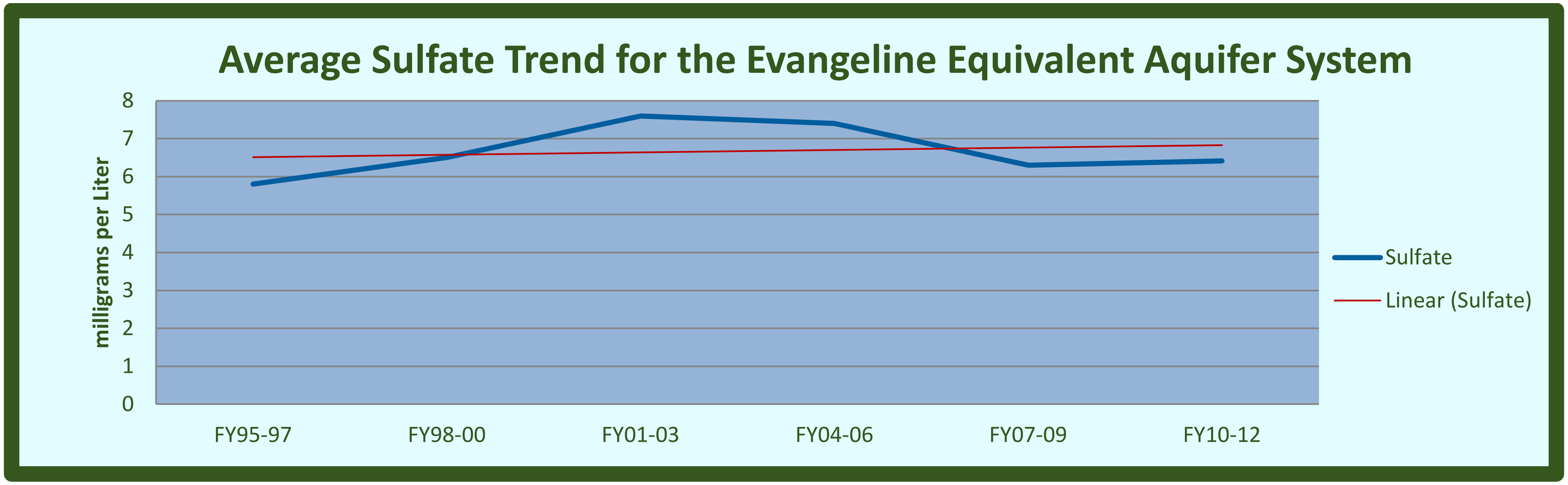


Chart 13-10: Total Dissolved Solids Trend

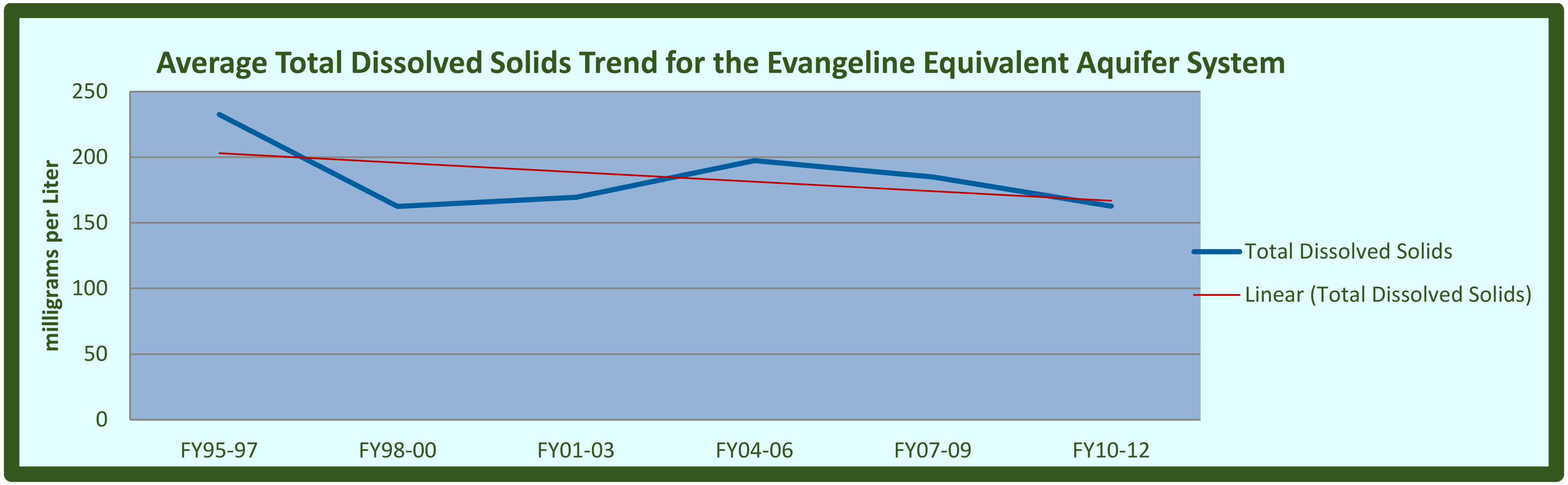


Chart 13-11: Ammonia Trend

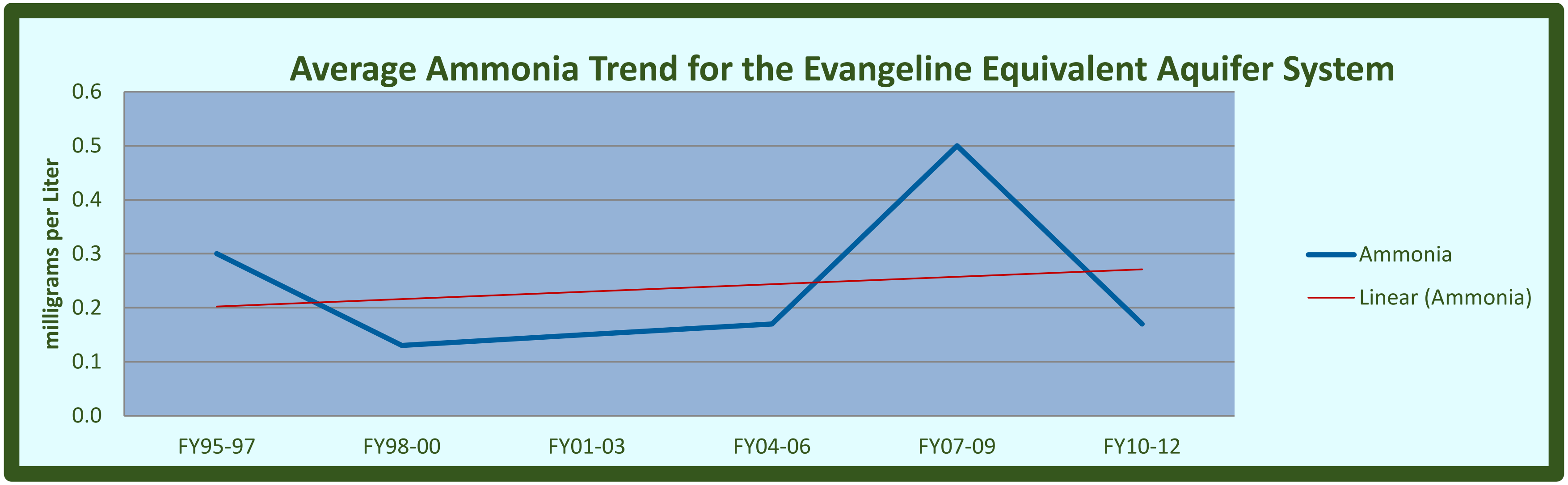


Chart 13-12: Hardness Trend

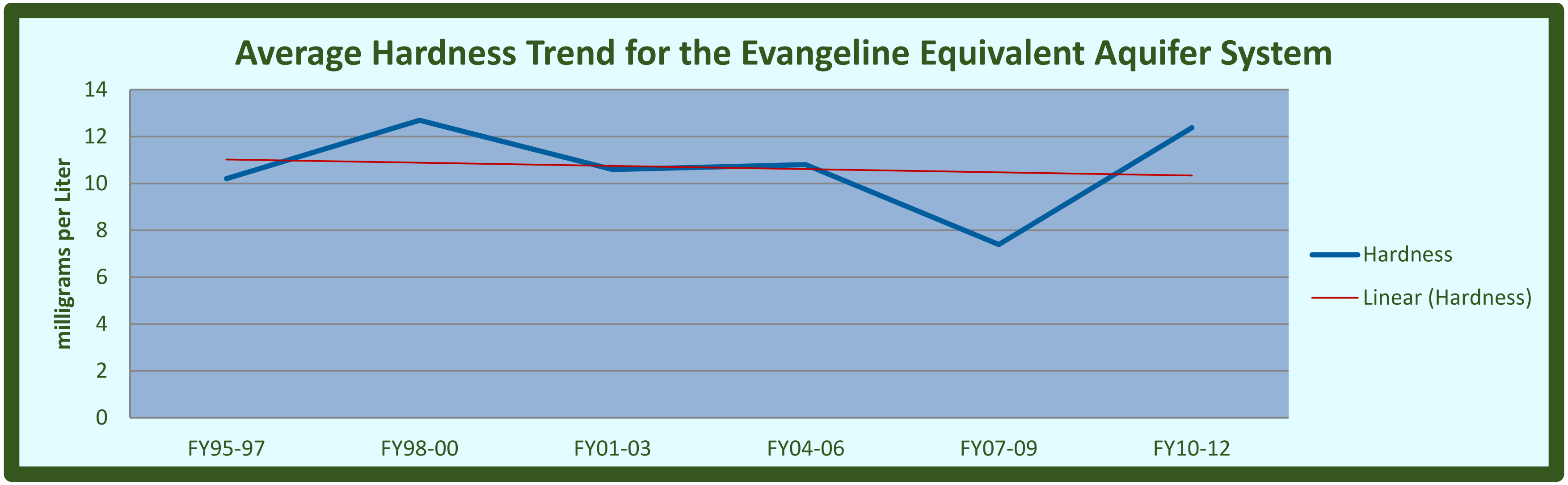


Chart 13-13: Nitrite – Nitrate Trend

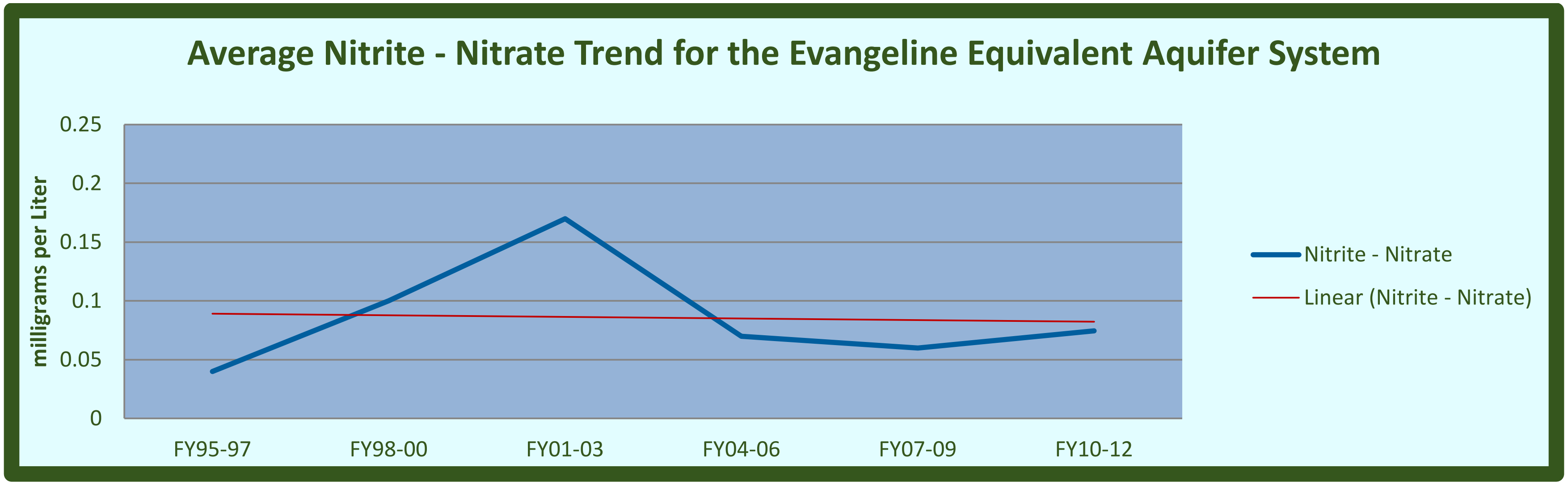


Chart 13-14: TKN Trend

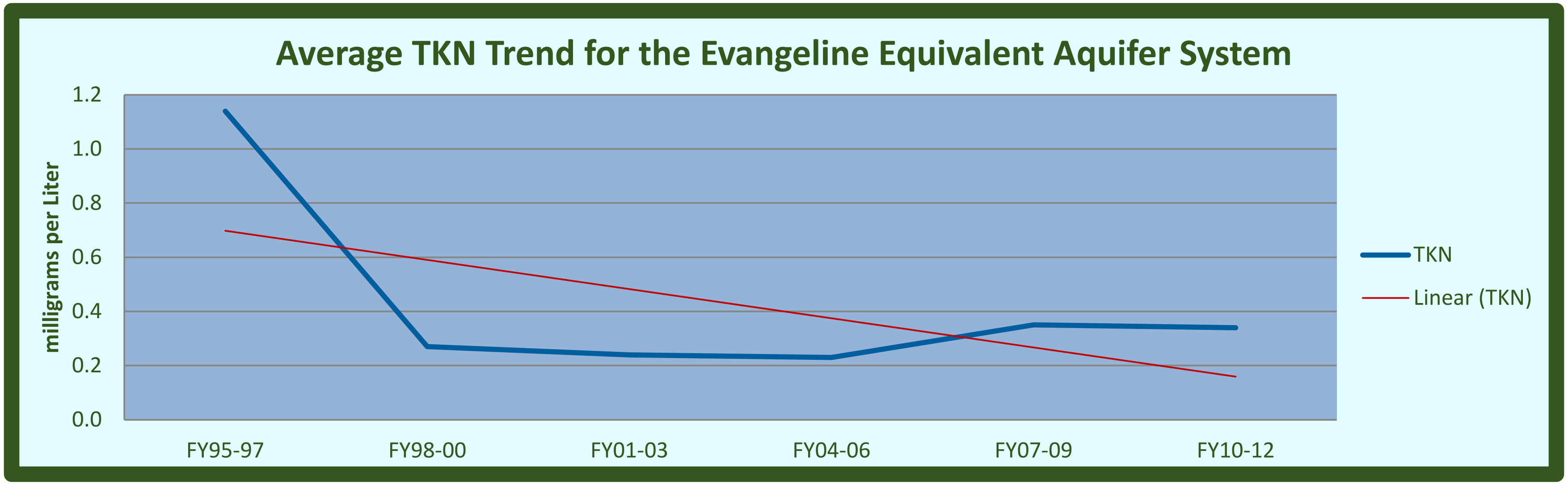


Chart 13-15: Total Phosphorus Trend

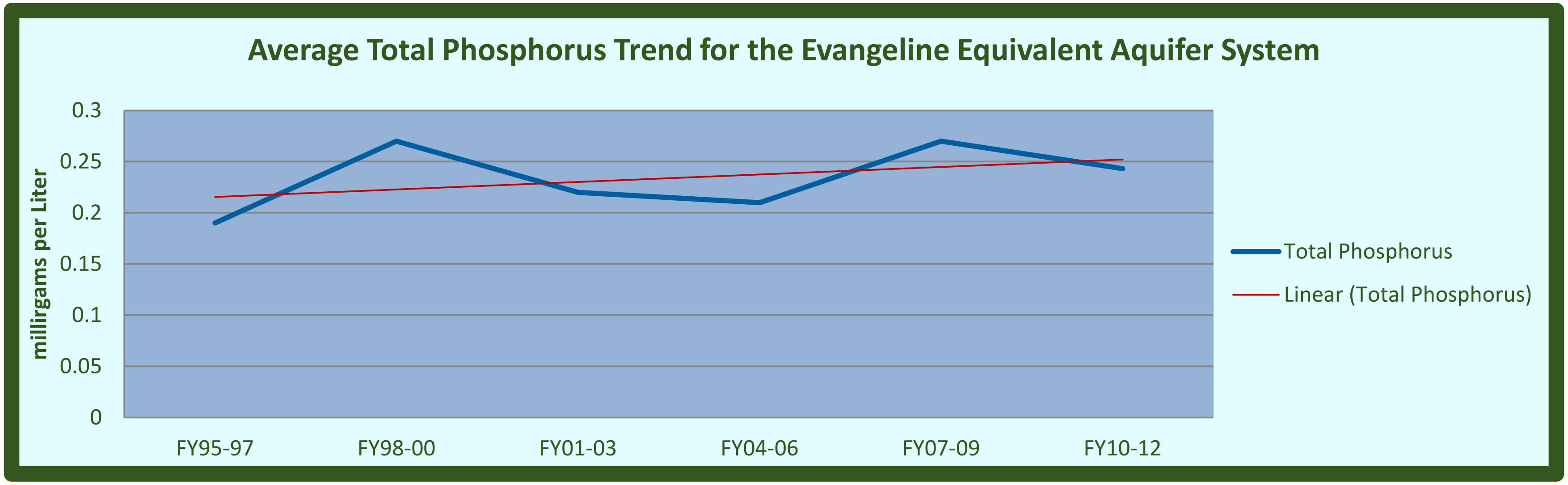


Chart 13-16: Iron Trend