WILLIAMSON CREEK AQUIFER SUMMARY, 2015

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

APPENDIX 11 TO THE 2015 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 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 make up, in part, the ASSET Program's Triennial Summary Report.

Analytical and field data contained in this summary were collected from wells producing from the Williamson Creek aquifer during the 2015 state fiscal year (July 1, 2014 - June 30, 2015). This summary will become Appendix II of ASSET Program Triennial Summary Report for 2015.

These data show that in July 2014, seven wells were sampled which produce from the Williamson Creek aquifer. Three of these seven are classified as public supply, while two are classified as domestic and two are industrial. The wells are located in four parishes in central and southwest areas of the state.

Figure 11-1 shows the geographic locations of the Williamson Creek aquifer and the associated wells, whereas Table 11-1 lists the wells in the aquifer along with their total depths, use made of produced waters and date sampled.

Well data, including well location and aquifer assignment, for registered water wells were obtained from the Louisiana Department of Natural Resources water well registration data file.

GEOLOGY

The Williamson Creek member consists of sands, silts, silty clays, and some gravel. The Williamson Creek member, along with the Carnahan Bayou and Dough Hills, are grouped into the Jasper aquifer. The aquifer unit consists of fine to coarse sand, which may grade laterally and vertically to silt and clay.

HYDROGEOLOGY

Recharge takes place primarily as a result of direct infiltration of rainfall in interstream, upland outcrop areas, movement of water through overlying terrace deposits, and leakage from other aquifers. The hydraulic conductivity of the Williamson Creek varies between 20-260 feet/day.

The maximum depths of occurrence of freshwater in the Williamson Creek range from 175 feet above sea level, to 2,450 feet below sea level. The range of thickness of the fresh water interval in the Williamson Creek is 50 to 1,250 feet. The depths of the Williamson Creek wells monitored in conjunction with the ASSET Program range from 190 to 1,657 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 11-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 11-3. These tables also show the field and analytical results determined for each analyte. For quality control, duplicate samples were taken for each parameter at CO-163.

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 11-8, 11-9 and 11-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Tables 11-4 and 11-5 provide a statistical overview of field and conventional data, and inorganic data for the Williamson Creek aquifer, listing the minimum, maximum, and average results for these parameters collected in the FY 2015 sampling. Tables 11-6 and 11-7 compare these same parameter averages to historical ASSET-derived data for the Williamson Creek aquifer, from fiscal years 1997, 2000, 2003, 2006, 2009 and 2012.

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

Due to the variability in the laboratory's reporting detection limits caused by dilution factors, whenever an analyte in question is not detected, the standard reporting detection limit value for each analytical method is used as the DL when performing statistical calculations.

Figures 11-2, 11-3, 11-4, and 11-5, respectively, represent the contoured data for pH, total dissolved solids (TDS), chloride and iron. Charts 11-1 through 11-16 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 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 non-enforceable taste, odor, or appearance guidelines. Field and laboratory data contained in Tables 11-2 and 11-3 show that only three secondary MCLs (SMCLs) were exceeded in three of the seven wells sampled in the Williamson Creek aquifer.

Field and Conventional Parameters

Table 11-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 11-4 provides an overview of this data for the Williamson Creek aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 11-2 shows that no primary MCL was exceeded for field or conventional parameters for this reporting period. The ASSET well reporting turbidity level greater than 1.0 NTU does 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 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 11-2 shows that one well exceeded the SMCL for pH:

pH (SMCL = 6.5 – 8.5 Standard Units):

V-420 – 5.90 SU

Inorganic Parameters

Table 11-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 11-5 provides an overview of inorganic data for the Williamson Creek aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 11-3 shows that no primary MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 11-3 shows that 2 wells exceeded the secondary MCL for iron:

Iron (SMCL = 300 ug/L):

CO-163 – 484 µg/L, Duplicate – 496 µg/L

R-932 – 303 µg/L

Volatile Organic Compounds

Table 11-8 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.

There were no confirmed VOC detections at or above their respective detection limits during the FY 2015 sampling of the Williamson Creek aquifer.

Semi-Volatile Organic Compounds

Table 11-9 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 2015 sampling of the Williamson Creek aquifer.

Pesticides and PCBs

Table 11-10 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 pesticide or PCB detections at or above its detection limit during the FY 2015 sampling of the Williamson Creek 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 Williamson Creek aquifer exhibit some changes when comparing current data to that of the six previous sampling rotations (three, six, nine, twelve, fifteen, and eighteen years prior). These comparisons can be found in Tables 11-6 and 11-7, and in Charts 11-1 to 11-16 of this summary. Over the eighteen-year period, seven analytes have shown a general increase in average concentration. These analytes are: chloride, nitrite-nitrate, pH, specific conductance (field and lab), temperature, TKN, and TDS. For this same period, five analytes have demonstrated a decrease in average concentration: alkalinity, color, iron, total phosphorus, and zinc. All other analyte averages have remained consistent, or have been non-detect for this period. The number of secondary exceedances in the Williamson Creek aquifer continue to remain low. The previous sampling in FY 2012 showed three SMCL exceedances, which is the same as the FY 2015 sampling.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the ground water 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 2015 monitoring of the Williamson Creek aquifer exceeded a Primary MCL. The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines, with only three Secondary MCL exceedances.

Comparison to historical ASSET-derived data shows some change in the quality or characteristics of the Williamson Creek aquifer, with seven parameters showing consistent increases in concentration, five parameters decreasing in concentration, and the remaining parameters showing no consistent change over the previous eighteen years.

It is recommended that the wells assigned to the Williamson Creek aquifer be re-sampled as planned, in approximately three years. In addition, several wells should be added to the seven 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 11-1: List of Wells Sampled, Williamson Creek Aquifer – FY 2015

Well ID	Parish	Date	Owner	Depth (Feet)	Well Use
BE-407	Beauregard	07/28/2014	BOISE	1,657	INDUSTRIAL
CO-163	Concordia	07/31/2014	U. S. ARMY CORPS OF ENG.	513	PUBLIC SUPPLY
R-932	Rapides	07/29/2014	CITY OF ALEXANDRIA	466	PUBLIC SUPPLY
R-1362	Rapides	07/29/2014	INTERNATIONAL PAPER CO.	402	INDUSTRIAL
V-420	Vernon	07/28/2014	U.S. ARMY/FORT POLK	920	PUBLIC SUPPLY
V-5858Z	Vernon	07/28/2014	PRIVATE OWNER	248	DOMESTIC
V-8681Z	Vernon	07/28/2014	PRIVATE OWNER	190	DOMESTIC

Table 11-2: Summary of Field and Conventional Data, Williamson Creek Aquifer – FY 2015

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. NTU
	LABORATORY DETECTION LIMITS† →					5	1.25/2.5	1	5	0.01	0.05	0.05	10	1.25/2.5	10	0.1	4	0.3
	FIELD PARAMETERS					LABORATORY PARAMETERS												
BE-407	8.38	0.20	0.417	31.47	0.271	174	7.1	5	40	0.23	0.45	0.20	401	8.6	276	0.48	< DL	< DL
CO-163	7.81	0.29	0.591	21.54	0.384	122	93.4	8	44	0.22	0.49	0.15	592	< DL	244	0.60	< DL	< DL
CO-163*	7.81	0.29	0.591	21.54	0.384	126	94.0	8	28	0.48	0.51	0.18	588	< DL	268	1.35	< DL	< DL
R-932	7.17	0.27	0.567	22.30	0.368	88	81.3	5	12	0.46	0.27	0.05	562	34.3	372	0.28	< DL	< DL
R-1362	7.94	0.22	0.451	23.32	0.293	204	12.1	8	16	0.28	< DL	0.12	445	3.2	312	< DL	< DL	< DL
V-420	5.90	0.12	0.247	25.85	0.160	84	18.3	< DL	16	0.12	0.29	0.20	239	4.9	188	0.59	< DL	< DL
V-5858Z	7.41	0.22	0.470	26.56	0.305	114	54.0	8	136	0.45	< DL	< DL	459	4.5	292	0.26	< DL	< DL
V-8681Z	6.80	0.07	0.144	22.47	0.094	44	5.5	< DL	32	0.25	0.17	0.52	139	4.8	180	0.25	< DL	2.1

†Detection limits vary due to dilution factor   *Denotes Duplicate Sample   Shaded cells exceed EPA Secondary Standards

Table 11-3: Summary of Inorganic Data, Williamson Creek Aquifer – FY 2015

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 Detection Limits	5	4	5	2	2	4	2	100	1	0.0002	3	5	1	2	6
BE-407	< DL	< DL	38	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
CO-163	< DL	< DL	94	< DL	< DL	< DL	< DL	484	1.9	< DL	< DL	< DL	< DL	< DL	945.0
CO-163*	R	< DL	92	< DL	< DL	< DL	< DL	496	1.5	< DL	< DL	< DL	< DL	< DL	726.0
R-932	< DL	< DL	63	< DL	< DL	< DL	< DL	303	< DL	< DL	3.04	< DL	< DL	< DL	7.1
R-1362	< DL	< DL	50	< DL	< DL	< DL	2.5	< DL	< DL	< DL	< DL	< DL	< DL	< DL	8.4
V-420	< DL	< DL	54	< DL	< DL	< DL	2.2	128	< DL	< DL	< DL	< DL	< DL	< DL	< DL
V-5858Z	< DL	< DL	350	< DL	< DL	< DL	< DL	250	< DL	< DL	< DL	< DL	< DL	< DL	< DL
V-8681Z	< DL	< DL	43	< DL	< DL	< DL	2.3	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL

*Denotes Duplicate Sample R – Rejected data Shaded cells exceed EPA Secondary Standards

The duplicate antimony sample results for well CO-163 was determined to be invalid due to the original and duplicate sample not supporting a detection and because antimony has never detected in this well by the ASSET Program.

Table 11-4: FY 2015 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	pH (SU)	5.90	8.38	7.40
	Salinity (ppt)	0.07	0.29	0.21
	Specific Conductance (mmhos/cm)	0.144	0.591	0.435
	Temperature (^{O}C)	21.54	31.47	24.38
	TDS (g/L)	0.094	0.384	0.282
LABORATORY	Alkalinity (mg/L)	44	204	120
	Chloride (mg/L)	5.5	94.0	45.7
	Color (PCU)	< DL	8	5
	Hardness (mg/L)	12	136	40
	Nitrite - Nitrate, as N (mg/L)	0.12	0.48	0.31
	Ammonia, as N (mg/L)	< DL	0.51	0.28
	Total Phosphorus (mg/L)	< DL	0.52	0.18
	Specific Conductance (umhos/cm)	139	592	428
	Sulfate (mg/L)	< DL	34.3	7.6
	TDS (mg/L)	180	372	266
	TKN (mg/L)	< DL	1.35	0.48
	TSS (mg/L)	< DL	< DL	< DL
	Turbidity (NTU)	< DL	2.1	0.4

Table 11-5: FY 2015 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (µg/L)	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL
Barium (µg/L)	38	350	98
Beryllium (µg/L)	< DL	< DL	< DL
Cadmium (µg/L)	< DL	< DL	< DL
Chromium (µg/L)	< DL	< DL	< DL
Copper (µg/L)	< DL	2.5	< DL
Iron (µg/L)	< DL	496	226
Lead (µg/L)	< DL	1.9	< DL
Mercury (µg/L)	< DL	< DL	< DL
Nickel (µg/L)	< DL	3.04	< DL
Selenium (µg/L)	< DL	< DL	< DL
Silver (µg/L)	< DL	< DL	< DL
Thallium (µg/L)	< DL	< DL	< DL
Zinc (µg/L)	< DL	945.0	212.3

Table 11-6: 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	FY 2015
FIELD	pH (SU)	6.86	7.83	7.54	No Data	7.68	7.58	7.40
	Salinity (Sal.) (ppt)	0.18	0.20	0.18	0.21	0.18	0.20	0.21
	Specific Conductance (mmhos/cm)	0.369	0.424	0.384	0.440	0.380	0.420	0.435
	Temperature (OC)	23.82	23.12	24.00	25.27	24.19	22.84	24.38
	TDS (Total dissolved solids) (g/L)	-	-	-	-	0.250	0.280	0.282
LABORATORY	Alkalinity (Alk.) (mg/L)	136	150	140	154	158	143	120
	Chloride (Cl) (mg/L)	38.7	37.0	32.3	41.5	36.0	44.1	45.7
	Color (PCU)	12	< DL	< DL	15	< DL	3	5
	Hardness (mg/L)	31	40	35	34	39	31	40
	Nitrite - Nitrate , as N (mg/L)	< DL	0.15	< DL	< DL	< DL	0.02	0.31
	Ammonia, as N (NH3) (mg/L)	0.36	0.19	0.25	0.33	0.31	0.32	0.28
	Total Phosphorus (P) (mg/L)	0.30	0.20	0.18	0.15	0.15	0.18	0.18
	Specific Conductance (umhos/cm)	386	399	370	441	411	505	428
	Sulfate (SO4) (mg/L)	7.2	4.6	4.6	8.0	6.6	3.7	7.6
	TDS (Total dissolved solids) (mg/L)	211	273	236	285	260	256	266
	TKN (mg/L)	0.32	0.40	0.39	0.70	0.30	0.43	0.48
	TSS (Total suspended solids) (mg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
	Turbidity (Turb.) (NTU)	1.2	6.0	1.2	2.6	< DL	2.8	0.4

Table 11-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	AVERAGE VALUES BY FISCAL YEAR						
	FY 1997	FY 2000	FY 2003	FY 2006	FY 2009	FY 2012	FY 2015
Antimony (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Barium (µg/L)	48	112	90	92	90	98	98
Beryllium (ug/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Cadmium (ug/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Chromium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Copper (µg/L)	9.70	< DL	< DL	< DL	< DL	< DL	< DL
Iron (µg/L)	466	115	380	642	162	364	226
Lead (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Mercury (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Nickel (µg/L)	9.2	< DL	< DL	< DL	< DL	< DL	< DL
Selenium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Silver (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Thallium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Zinc (µg/L)	298.0	245.2	107.2	114.1	63.7	43.5	212.3

Table 11-8: VOC Analytical Parameters

VOLATILE ORGANIC 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	0.5
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 (1,2-DIMETHYLBENZENE)	624	0.5
STYRENE	624	0.5
TERT-BUTYL METHYL ETHER	624	0.5
TETRACHLOROETHYLENE (PCE)	624	0.5
TOLUENE	624	0.5
TRANS-1,2-DICHLOROETHENE	624	0.5
TRANS-1,3-DICHLOROPROPENE	624	0.5
TRICHLOROETHYLENE (TCE)	624	0.5
TRICHLOROFLUOROMETHANE (FREON-11)	624	0.5
VINYL CHLORIDE	624	0.5
XYLENES, M & P	624	1

Table 11-9: SVOC Analytical Parameters

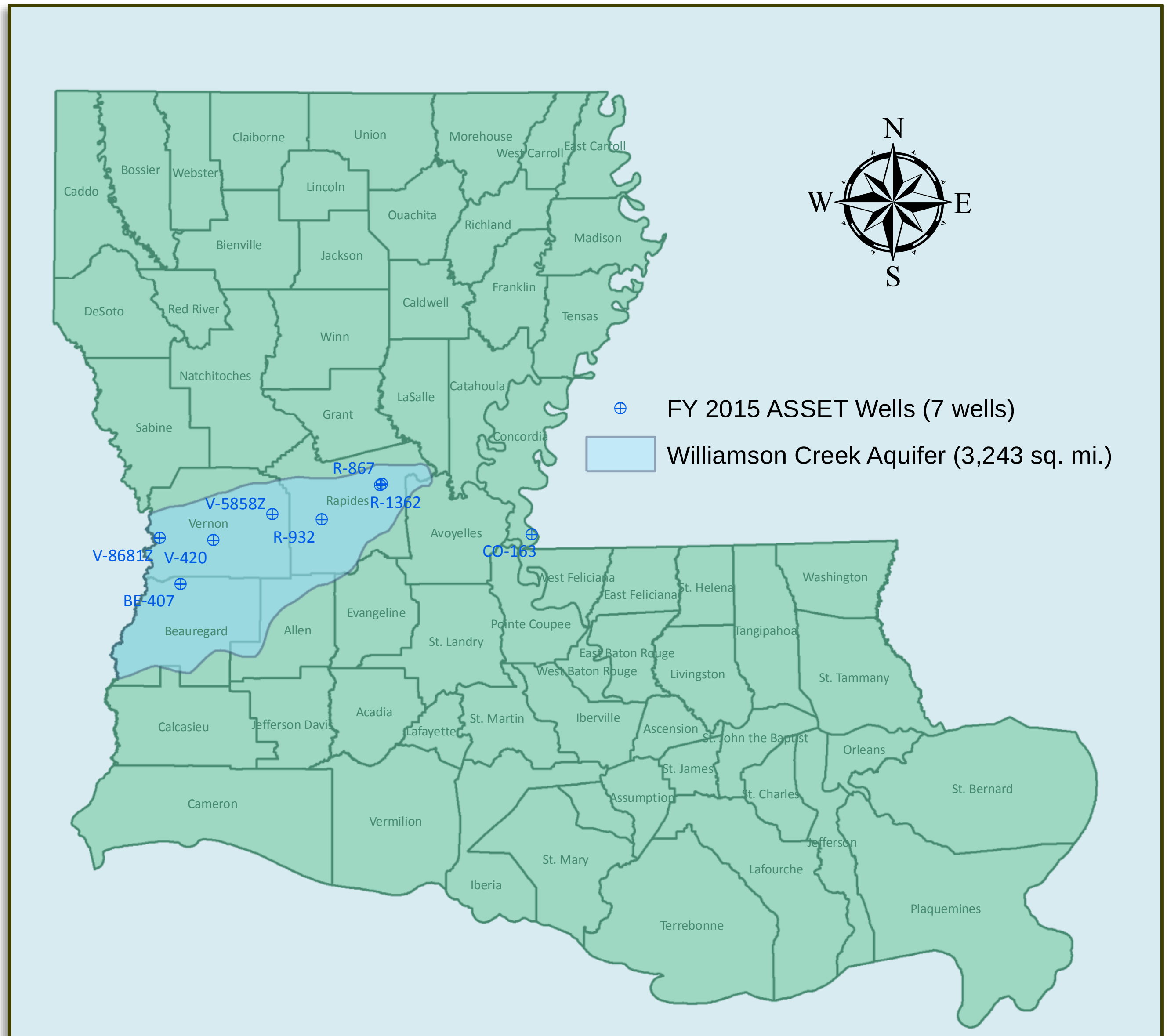
COMPOUND (SVOC)	METHOD	DETECTION LIMIT (µg/L)
1,2,3-TRICHLOROBENZENE	625	0.5
1,2,4-TRICHLOROBENZENE	625	5.1
2,4,6-TRICHLOROPHENOL	625	5.1
2,4-DICHLOROPHENOL	625	5.1
2,4-DIMETHYLPHENOL	625	5.1
2,4-DINITROPHENOL	625	20
2,4-DINITROTOLUENE	625	5.1
2,6-DINITROTOLUENE	625	5.1
2-CHLORONAPHTHALENE	625	5.1
2-CHLOROPHENOL	625	5.1
2-NITROPHENOL	625	10
3,3'-DICHLOROBENZIDINE	625	5.1
4,6-DINITRO-2-METHYLPHENOL	625	10
4-BROMOPHENYL PHENYL ETHER	625	5.1
4-CHLORO-3-METHYLPHENOL	625	5.1
4-CHLOROPHENYL PHENYL ETHER	625	5.1
4-NITROPHENOL	625	20
ACENAPHTHENE	625	5.1
ACENAPHTHYLENE	625	5.1
ANTHRACENE	625	5.1
BENZIDINE	625	20
BENZO(A)ANTHRACENE	625	5.1
BENZO(A)PYRENE	625	5.1
BENZO(B)FLUORANTHENE	625	5.1
BENZO(G,H,I)PERYLENE	625	5.1
BENZO(K)FLUORANTHENE	625	5.1
BENZYL BUTYL PHTHALATE	625	5.1
BIS(2-CHLOROETHOXY) METHANE	625	5.1
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	625	5.1
BIS(2-CHLOROISOPROPYL) ETHER	625	5.1
BIS(2-ETHYLHEXYL) PHTHALATE	625	5.1
CHRYSENE	625	5.1
DIBENZ(A,H)ANTHRACENE	625	5.1
DIETHYL PHTHALATE	625	5.1
DIMETHYL PHTHALATE	625	5.1
DI-N-BUTYL PHTHALATE	625	5.1
DI-N-OCTYLPHTHALATE	625	5.1
FLUORANTHENE	625	5.1

COMPOUND (SVOC)	METHOD	DETECTION LIMIT (µg/L)
FLUORENE	625	5.1
HEXACHLOROBENZENE	625	5.1
HEXACHLOROBUTADIENE	625	5.1
HEXACHLOROCYCLOPENTADIENE	625	10
HEXACHLOROETHANE	625	5.1
INDENO(1,2,3-C,D)PYRENE	625	5.1
ISOPHORONE	625	5.1
NAPHTHALENE	625	5.1
NITROBENZENE	625	5.1
N-NITROSODIMETHYLAMINE	625	5.1
N-NITROSODI-N-PROPYLAMINE	625	10
N-NITROSODIPHENYLAMINE	625	5.1
PENTACHLOROPHENOL	625	10
PHENANTHRENE	625	5.1
PHENOL	625	5.1

Table 11-10: Pesticides and PCBs

COMPOUND	METHOD	DETECTION LIMITS (µg/L)
ALDRIN	608	0.051
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	608	0.051
ALPHA ENDOSULFAN	608	0.051
ALPHA-CHLORDANE	608	0.051
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	608	0.051
BETA ENDOSULFAN	608	0.051
CHLORDANE	608	0.2
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	608	0.051
DIELDRIN	608	0.051
ENDOSULFAN SULFATE	608	0.051
ENDRIN	608	0.051
ENDRIN ALDEHYDE	608	0.051
ENDRIN KETONE	608	0.051
HEPTACHLOR	608	0.051
HEPTACHLOR EPOXIDE	608	0.051
METHOXYCHLOR	608	0.051
P,P'-DDD	608	0.051
P,P'-DDE	608	0.051
P,P'-DDT	608	0.051
PCB-1016 (AROCHLOR 1016)	608	0.51
PCB-1221 (AROCHLOR 1221)	608	0.51
PCB-1232 (AROCHLOR 1232)	608	0.51
PCB-1242 (AROCHLOR 1242)	608	0.51
PCB-1248 (AROCHLOR 1248)	608	0.51
PCB-1254 (AROCHLOR 1254)	608	0.51
PCB-1260 (AROCHLOR 1260)	608	0.51
TOXAPHENE	608	3.1

Figure 11-1: Location Plat, Williamson Creek 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 11-2: Map of pH Data

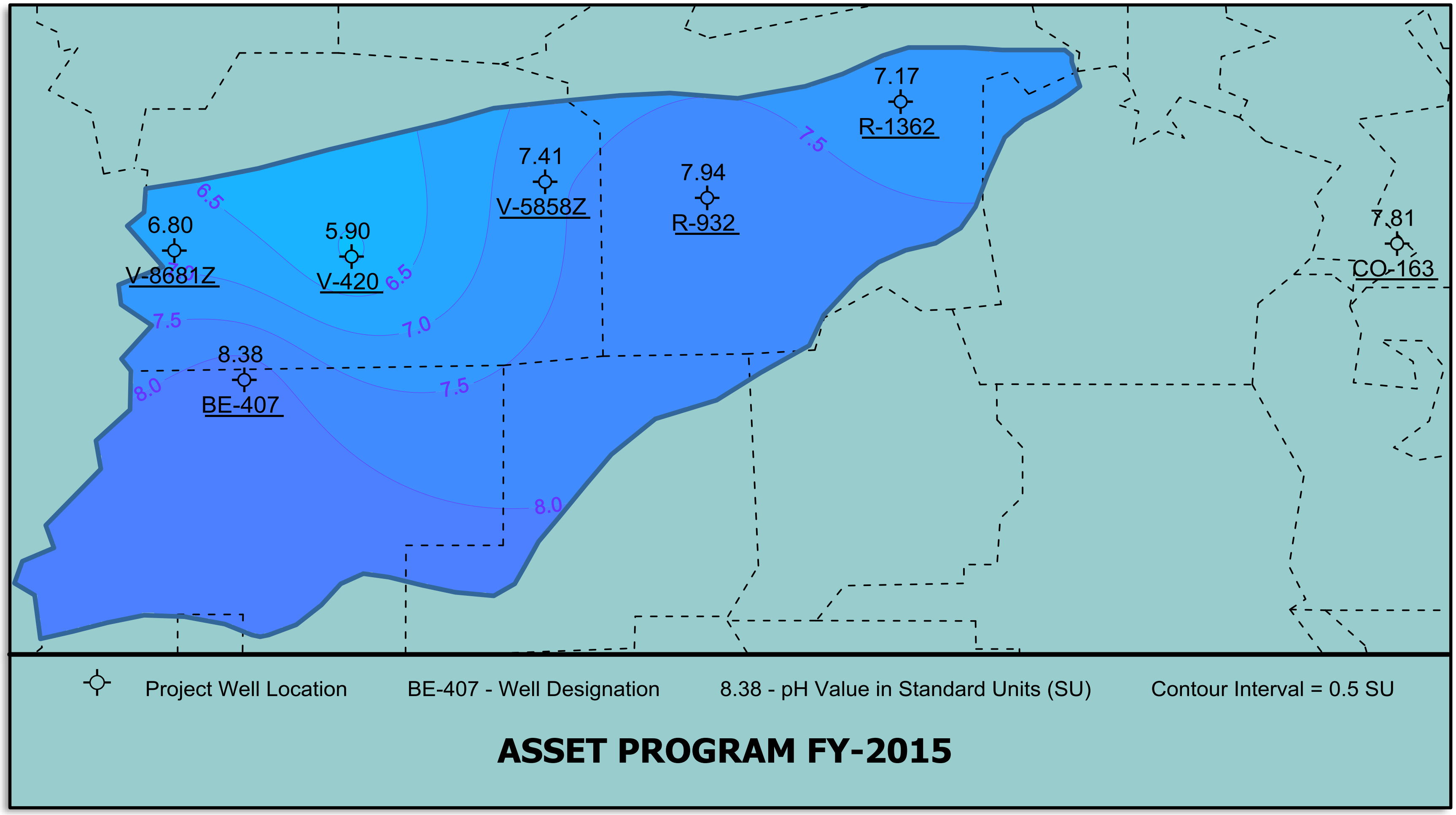

Figure 11-3: Map of TDS Lab Data

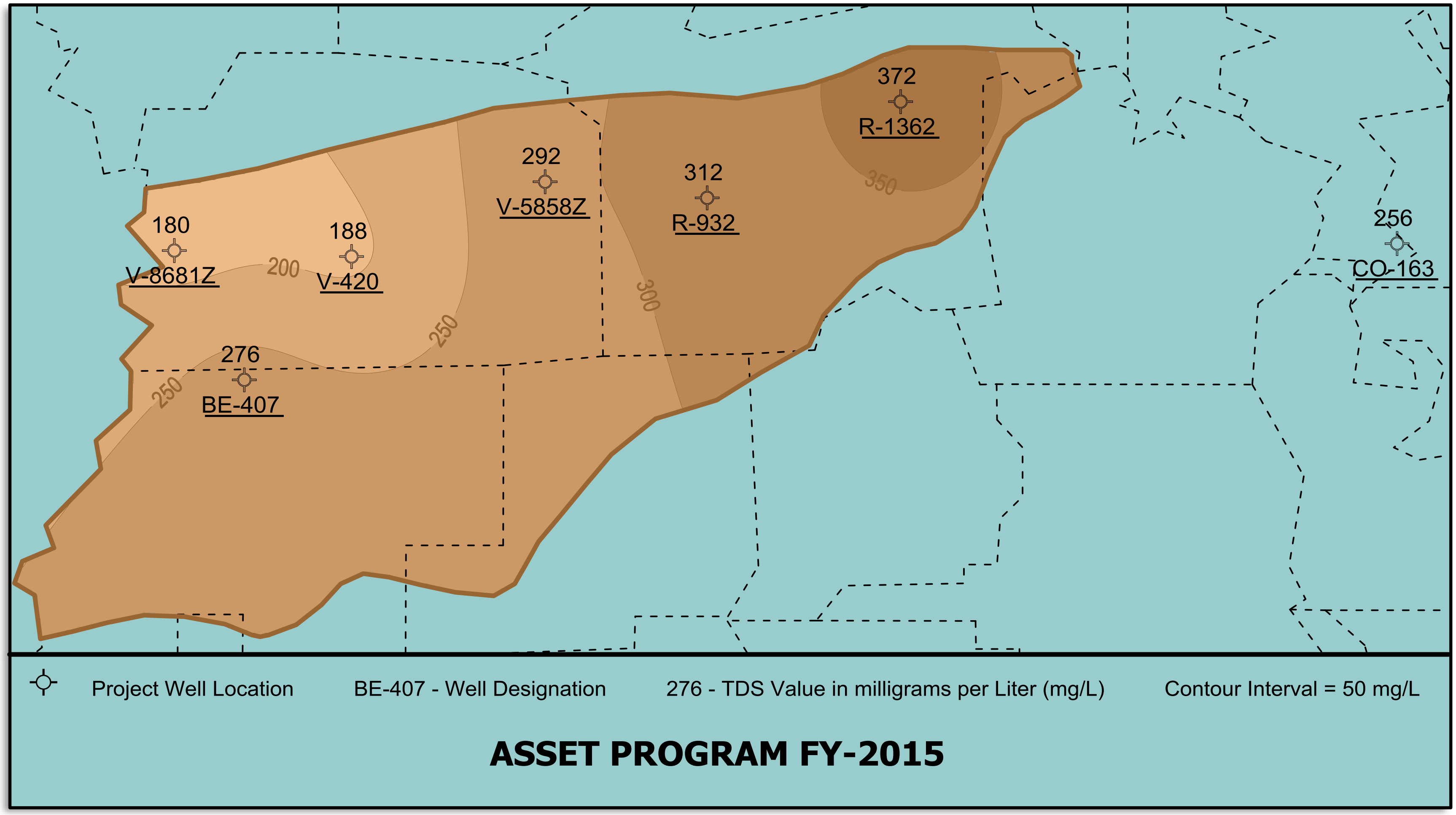

Figure 11-4: Map of Chloride Lab Data

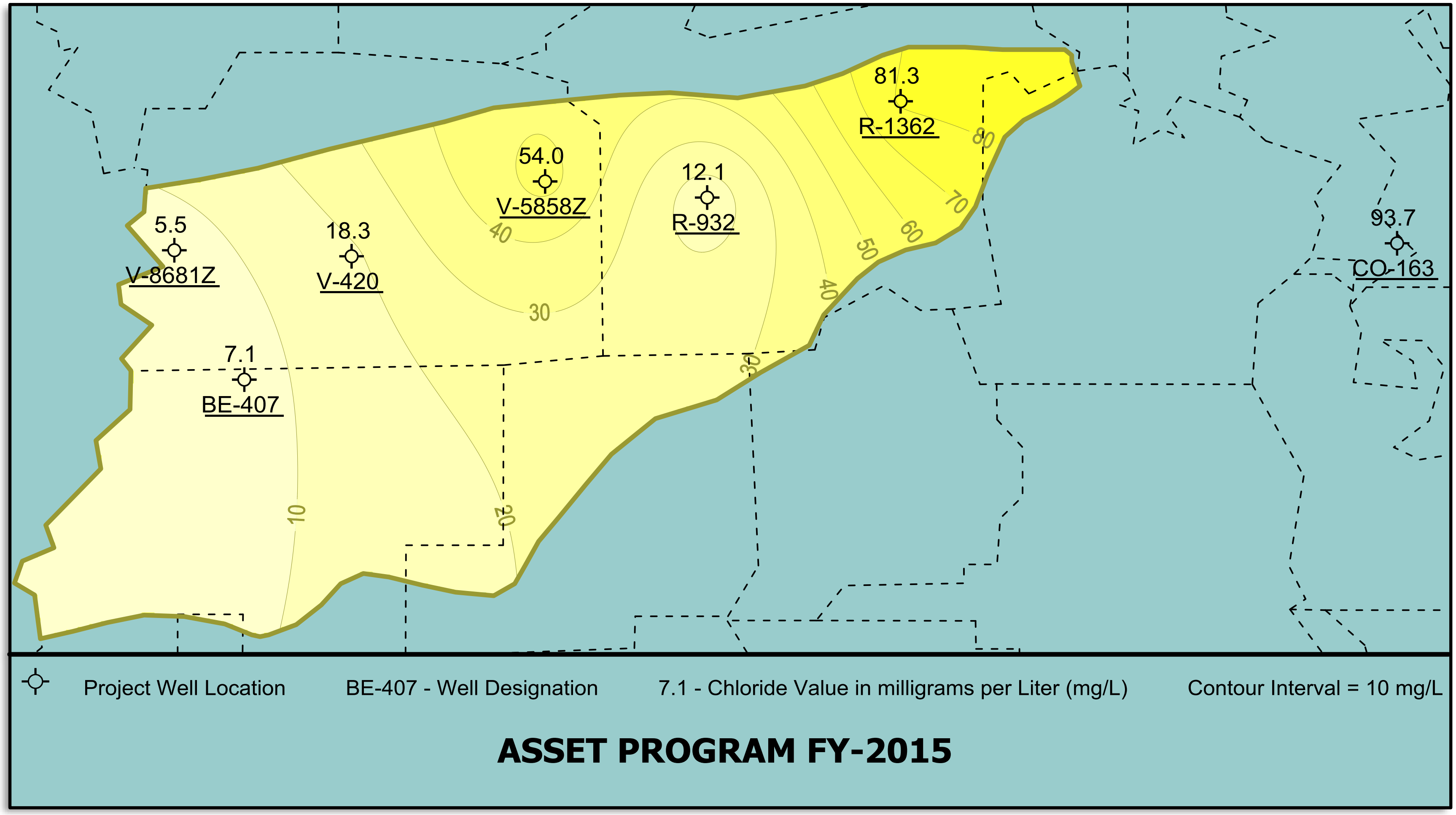

Figure 11-5: Map of Iron Data

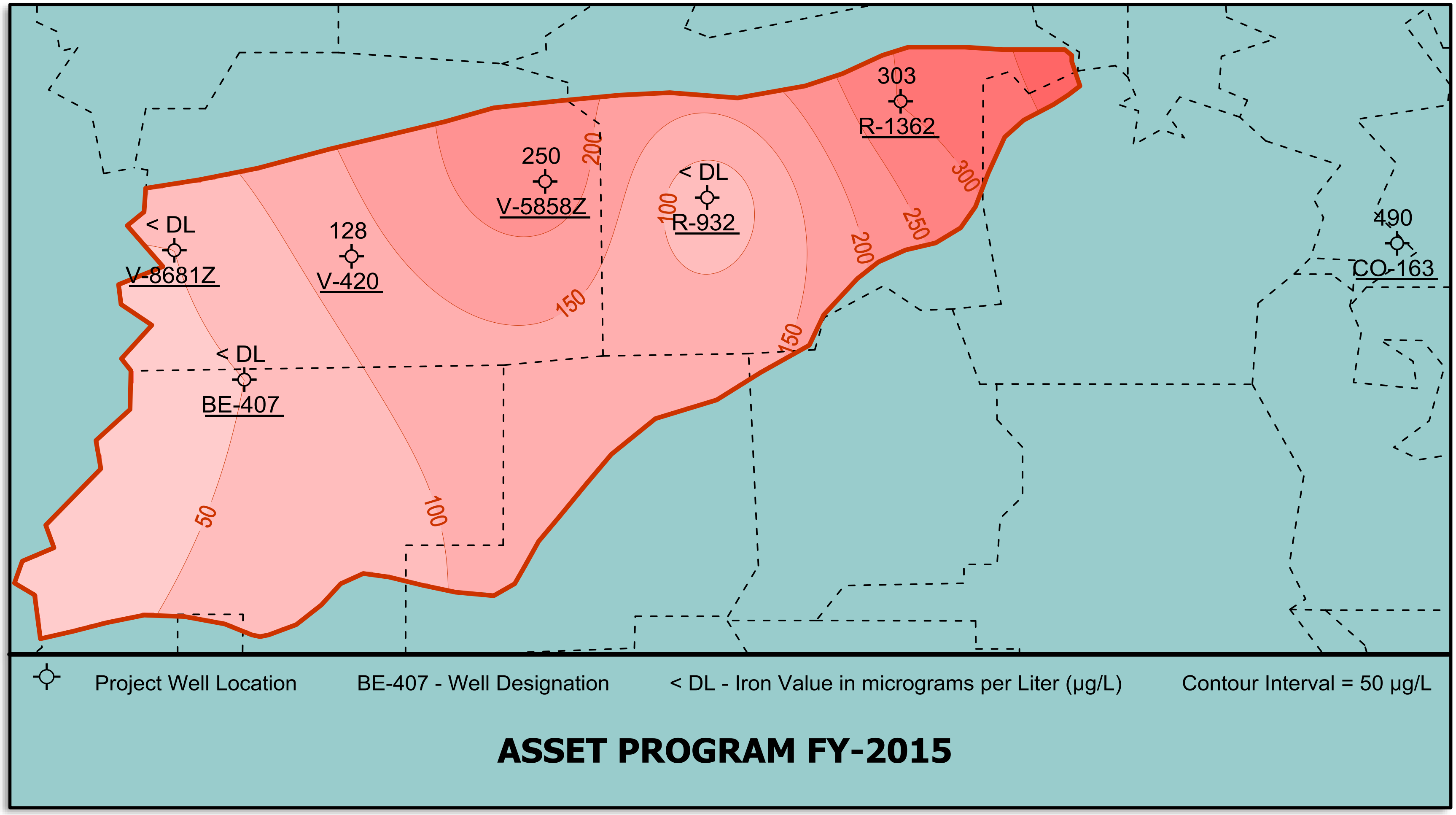

Chart 11-1: Field Temperature Trend

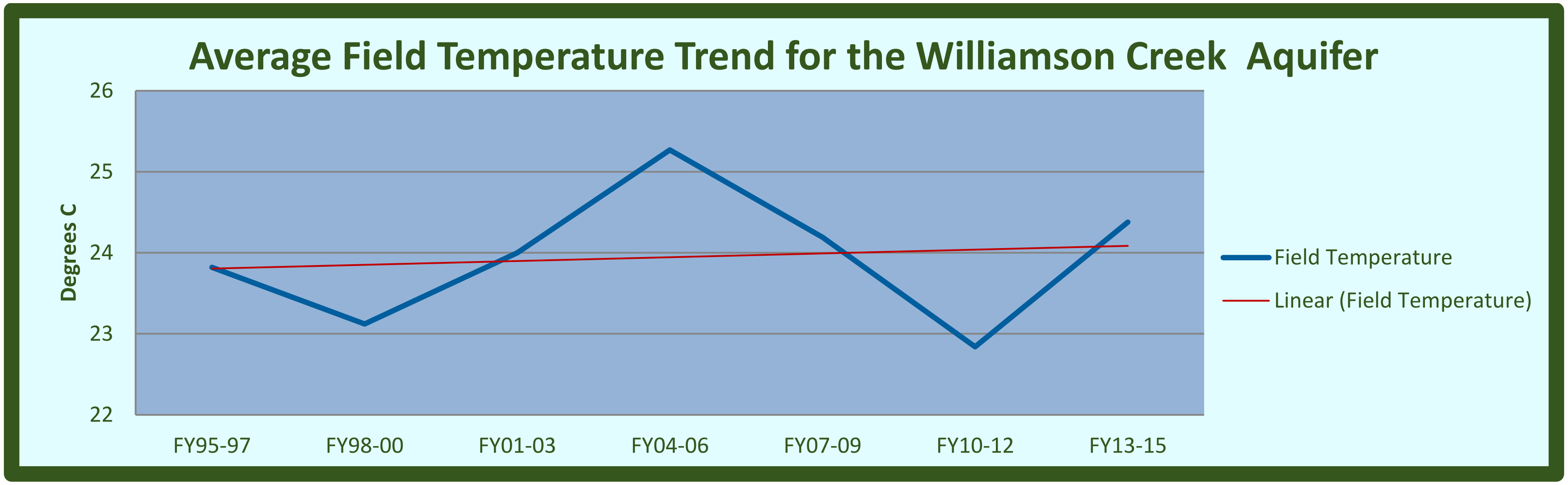

Chart 11-2: Field pH Trend

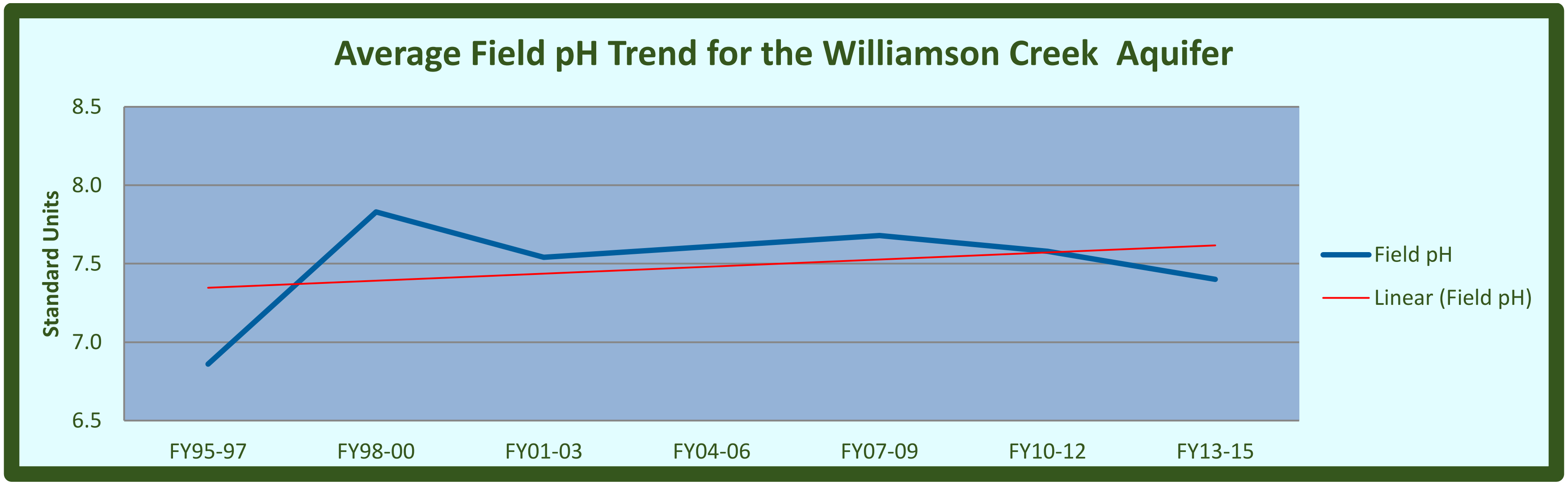

Chart 11-3: Field Specific Conductance Trend

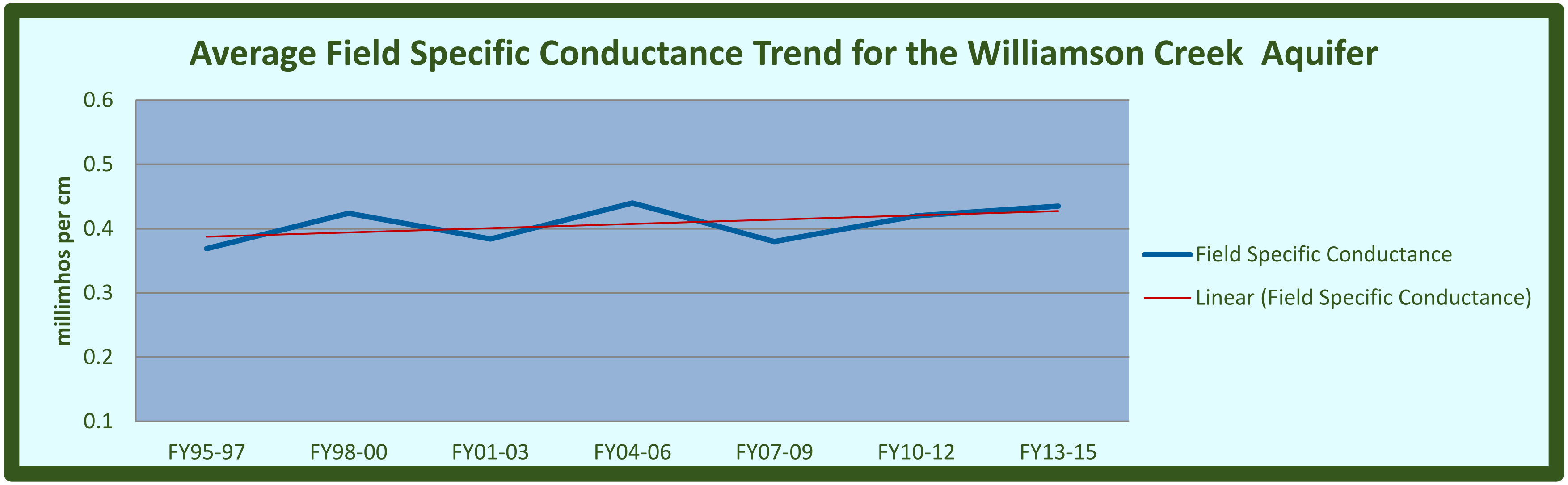

Chart 11-4: Lab Specific Conductance Trend

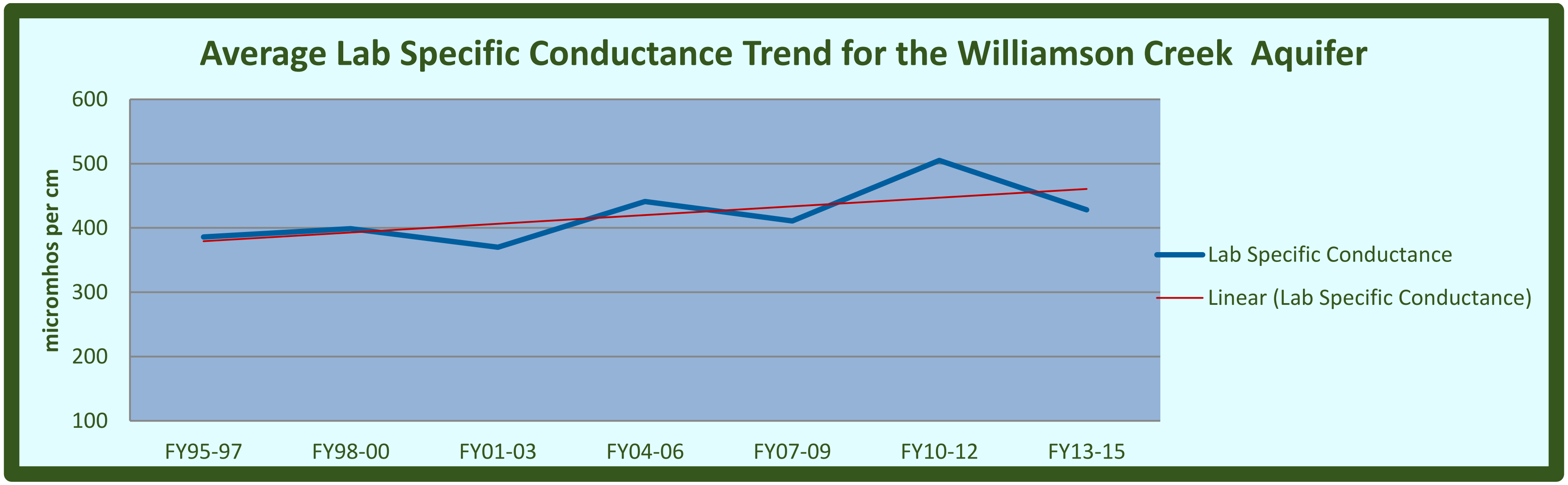

Chart 11-5: Field Salinity Trend

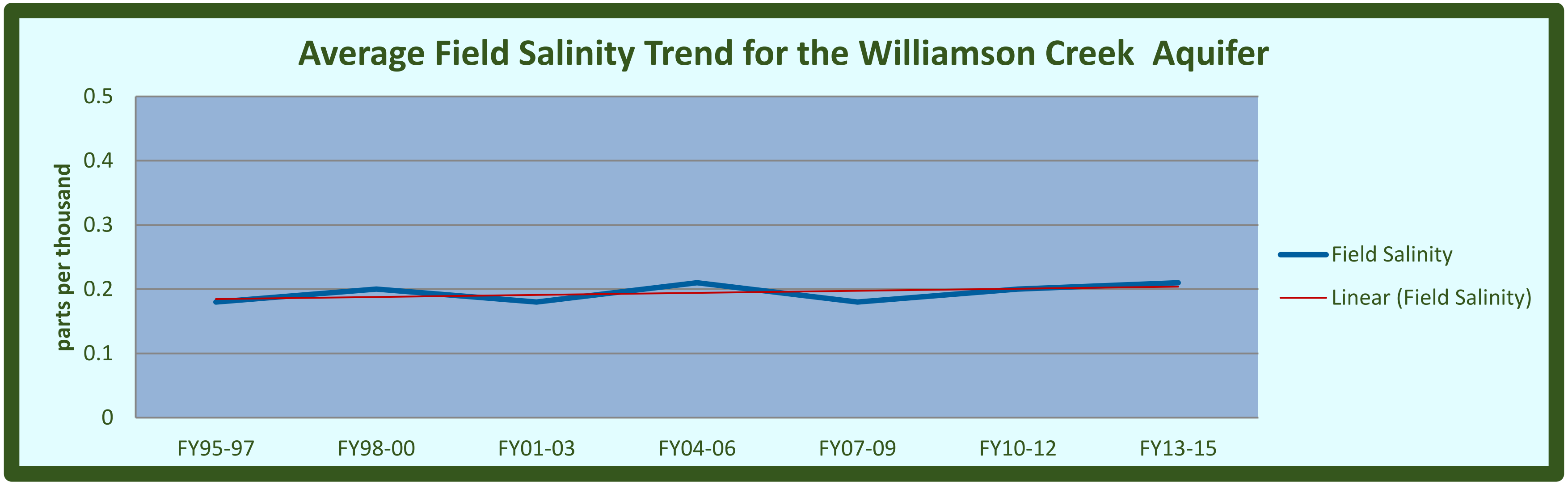

Chart 11-6: Chloride Trend

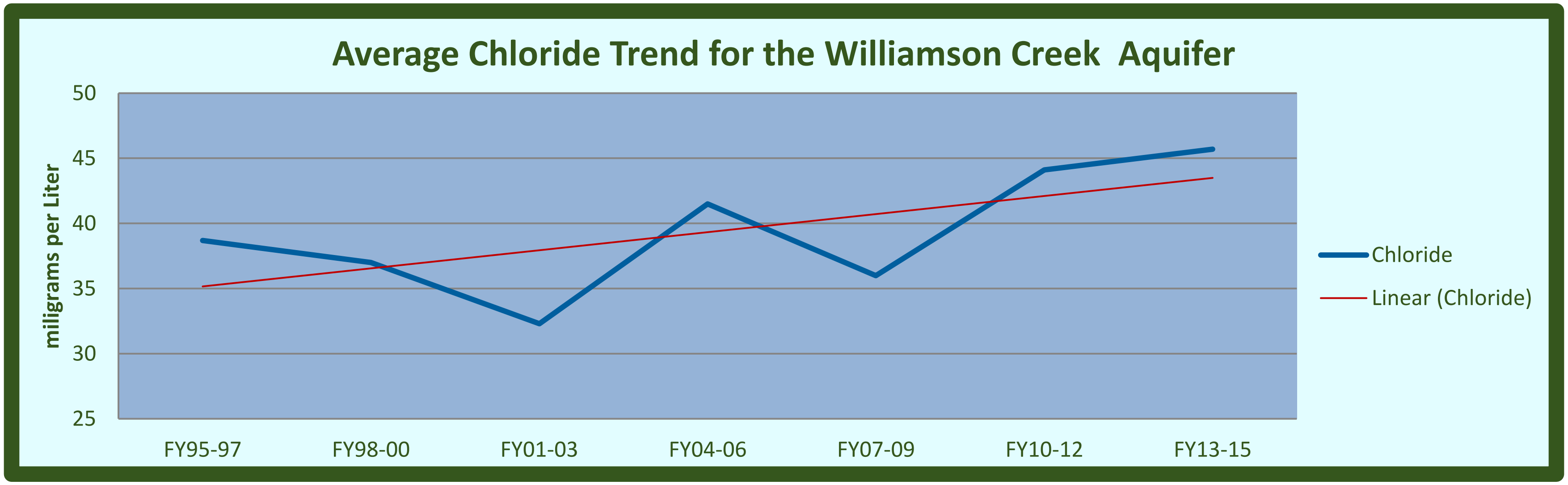

Chart 11-7: Alkalinity Trend

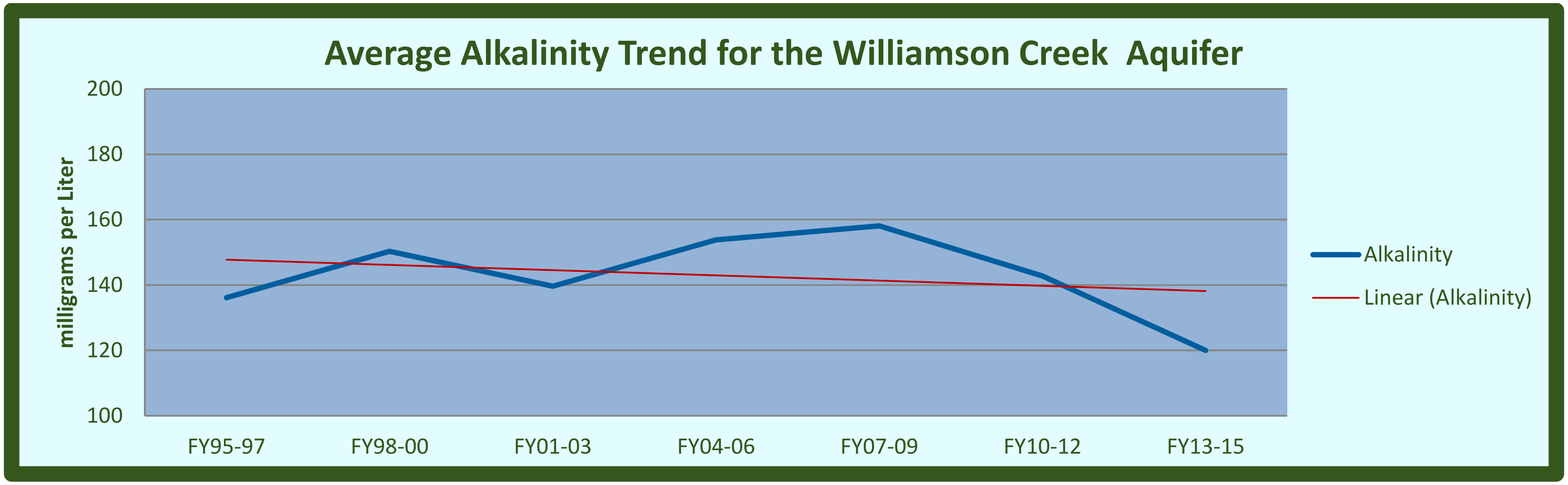

Chart 11-8: Color Trend

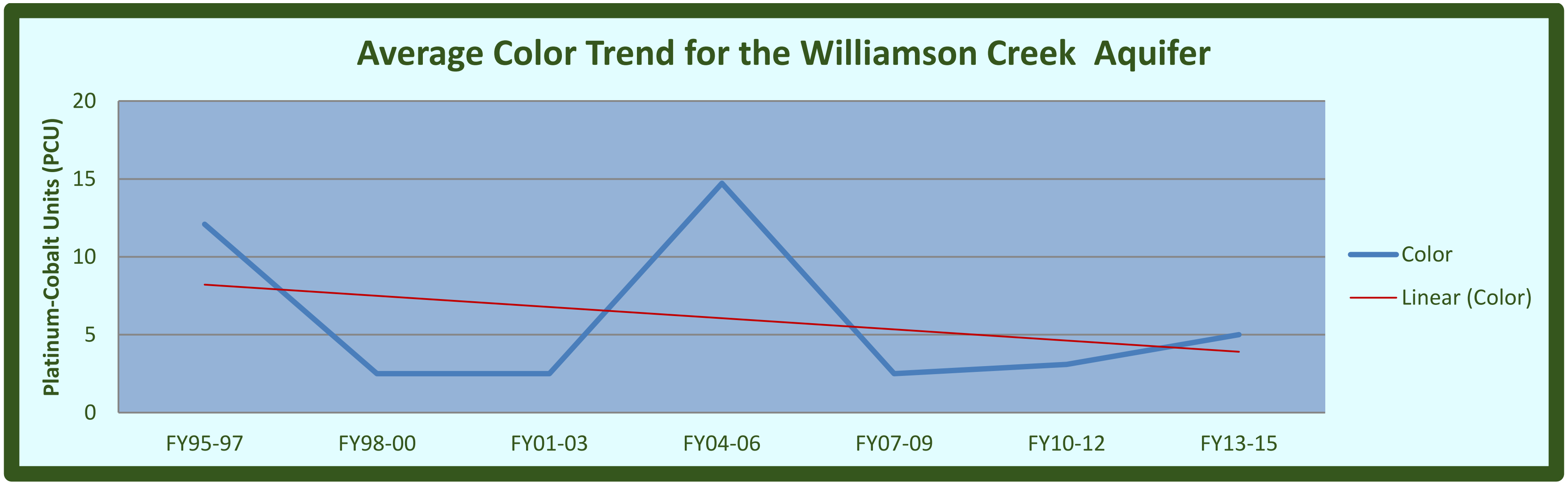

Chart 11-9: Sulfate Trend

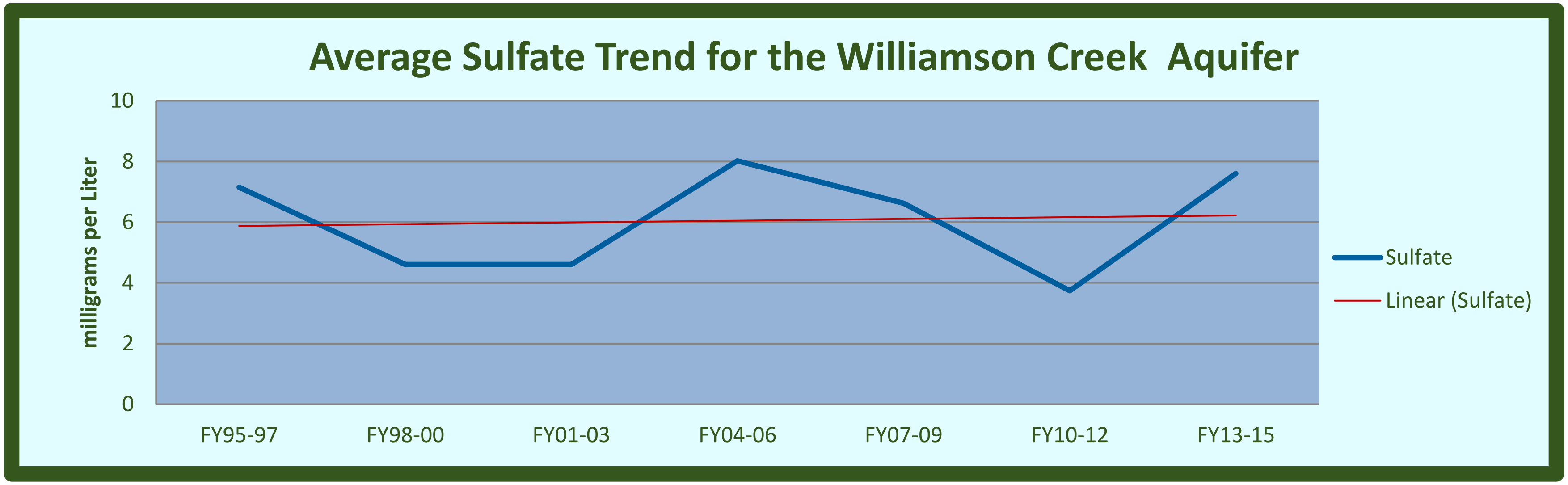

Chart 11-10: Total Dissolved Solids Trend

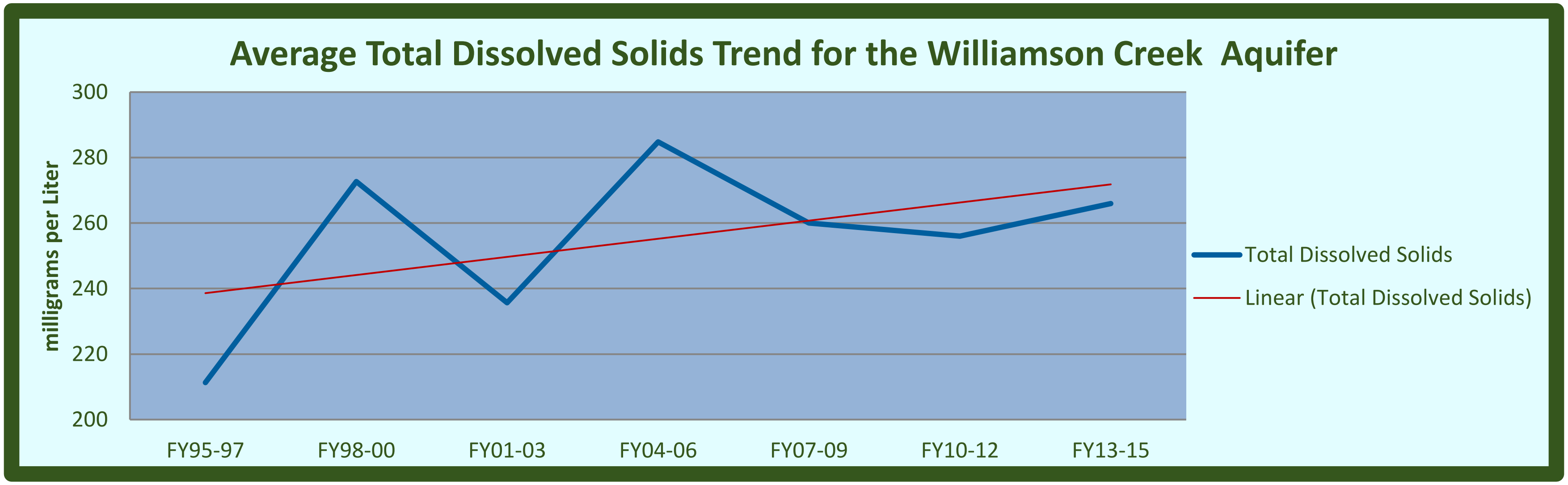

Chart 11-11: Hardness Trend

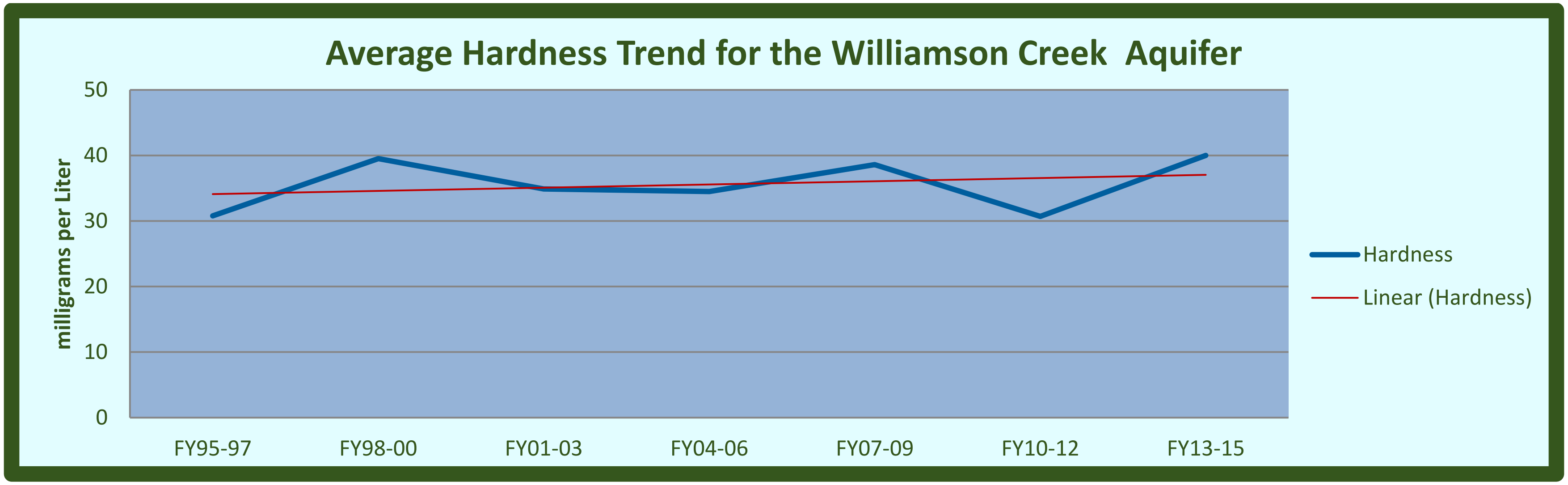

Chart 11-12: Ammonia Trend

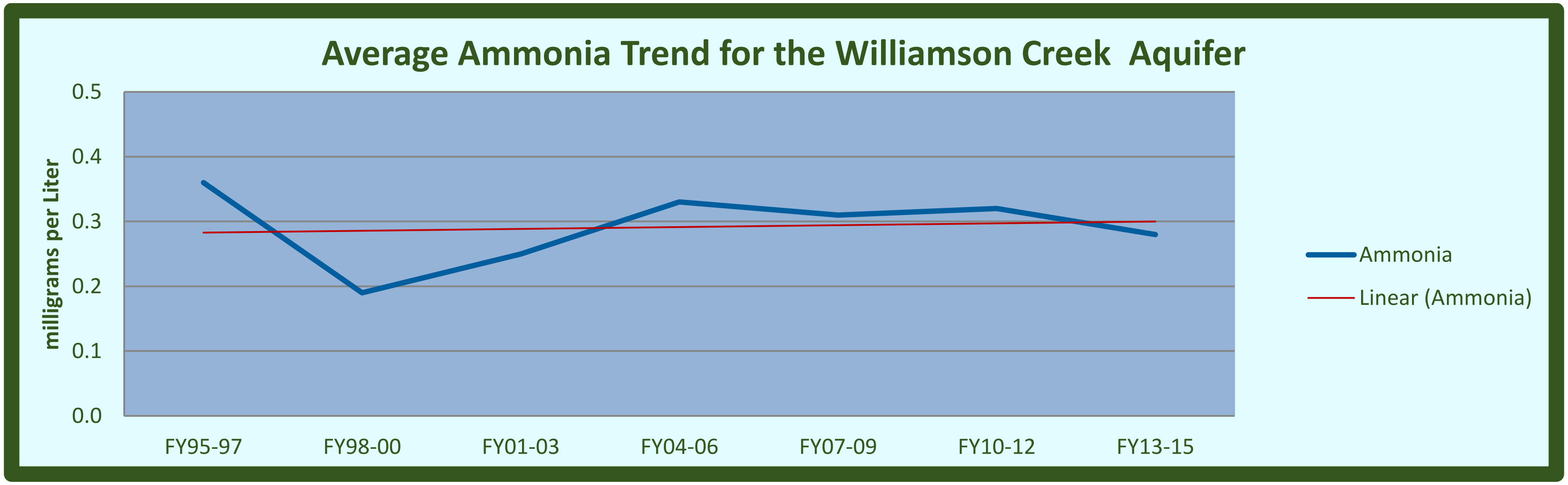

Chart 11-13: Nitrite – Nitrate Trend

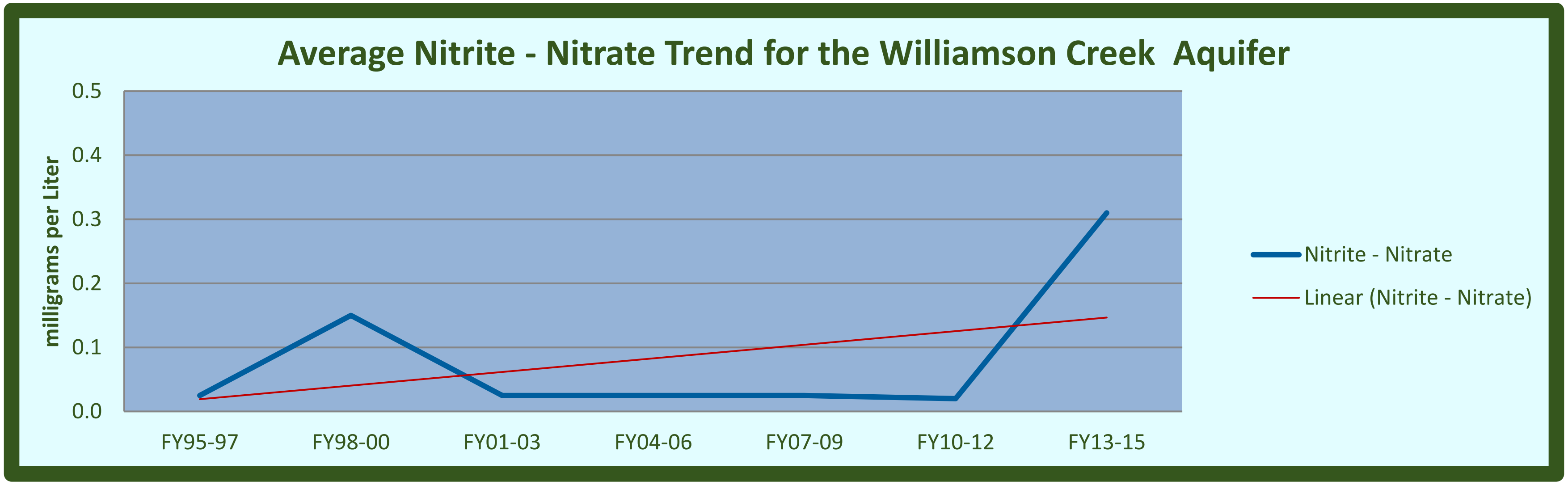

Chart 11-14: TKN Trend

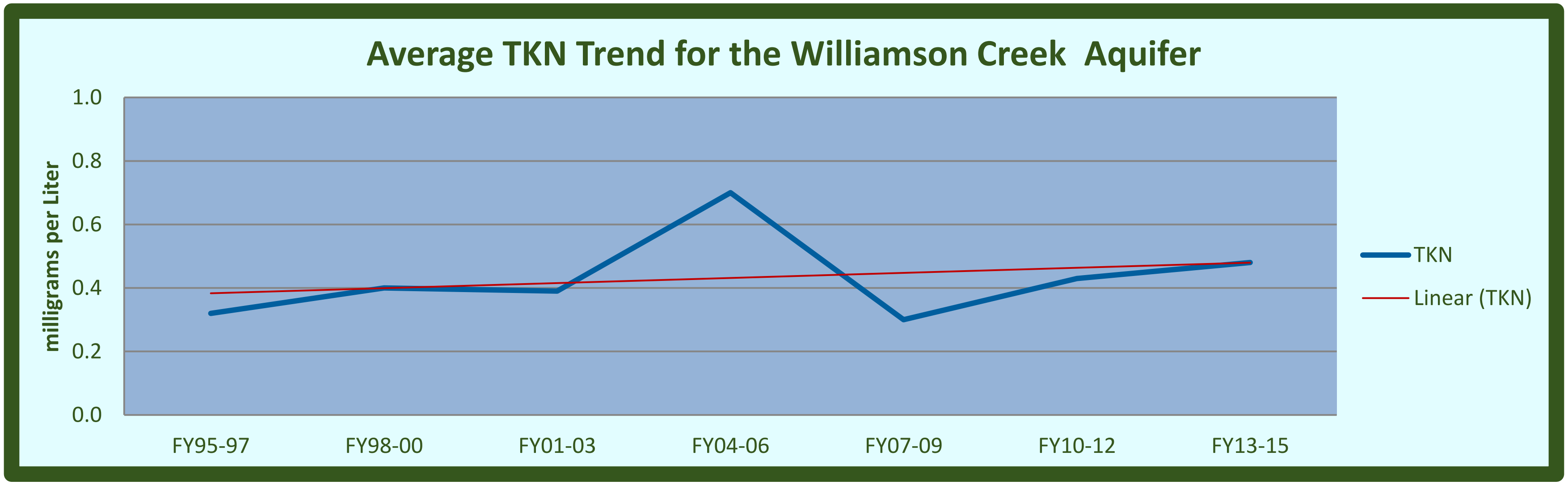

Chart 11-15: Total Phosphorus Trend

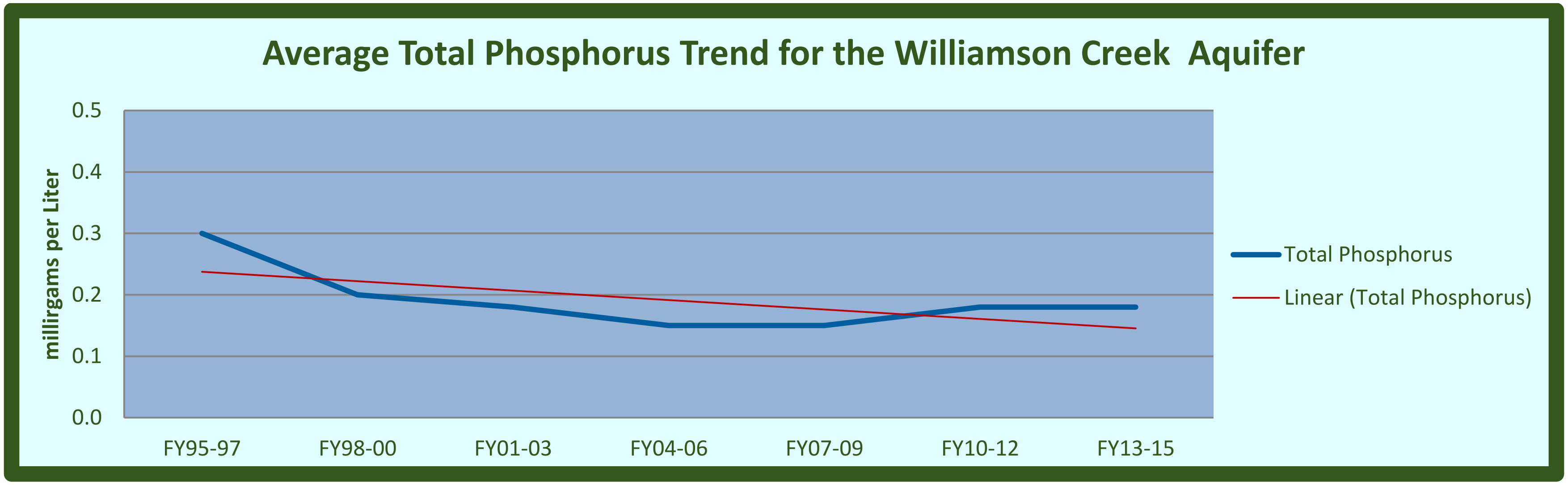

Chart 11-16: Iron Trend