EVANGELINE AQUIFER SUMMARY, 2016

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

LOUISIANA DEQ

APPENDIX 4 TO THE 2018 TRIENNIAL SUMMARY REPORT

PARTIAL FUNDING PROVIDED BY THE CWA

ASSET

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

Contents

BACKGROUND 4
GEOLOGY 4
HYDROGEOLOGY 4
PROGRAM PARAMETERS 5
INTERPRETATION OF DATA 6
Field and Conventional Parameters 6
Inorganic Parameters 7
Volatile Organic Compounds 7
Semi-Volatile Organic Compounds 7
Pesticides and PCBs 7
WATER QUALITY TRENDS AND COMPARISON TO HISTORICAL ASSET DATA 8
SUMMARY AND RECOMMENDATIONS 8
Table 4-1: List of Wells Sampled, Evangeline Aquifer–FY 2016 9
Table 4-2: Summary of Field and Conventional Data, Evangeline Aquifer–FY 2016 10
Table 4-3: Summary of Inorganic Data, Evangeline Aquifer–FY 2016 11
Table 4-4: FY 2016 Field and Conventional Statistics, ASSET Wells 12
Table 4-5: FY 2016 Inorganic Statistics, ASSET Wells 12
Table 4-6: Triennial Field and Conventional Statistics, ASSET Wells 13
Table 4-7: Triennial Inorganic Statistics, ASSET Wells 13
Table 4-8: Volatile Organic Compound List 14
Table 4-9: Semi-Volatile Organic Compound List 15
Table 4-10: Pesticide and PCB List 17
Figure 4-1: Location Plat, Evangeline Aquifer 18
Chart 4-1: Temperature Trend 19
Chart 4-2: pH Trend 19
Chart 4-3: Specific Conductance Trend 20
Chart 4-4: Field Salinity Trend 20
Chart 4-5: Chloride Trend 21
Chart 4-6: Alkalinity Trend 21
Chart 4-7: Color Trend 22
Chart 4-8: Sulfate Trend 22

Chart 4-9: Total Dissolved Solids Trend..23
Chart 4-10: Hardness Trend...23
Chart 4-11: Ammonia (NH3) Trend 24
Chart 4-12: Nitrite – Nitrate Trend 24
Chart 4-13: TKN Trend..25
Chart 4-14: Total Phosphorus Trend 25
Chart 4-15: Barium Trend 26
Chart 4-16: Copper Trend 26
Chart 4-17: Iron Trend...27
Chart 4-18: Zinc Trend 27

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 across the state. The sampling process is designed so that all 14 aquifers 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 Evangeline aquifer, during the 2016 state fiscal year (July 1, 2015 - June 30, 2016). This summary will become Appendix 4 of ASSET Program Triennial Summary Report for 2018.

These data show that 12 Evangeline aquifer wells were sampled in February and March of 2016. Eight of these 12 are classified as public supply, while there are one each classified by the Louisiana Department of Natural Resources as irrigation, industrial, domestic, and other. The wells are located in seven 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 sampled 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 Natural Resources 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 fresh water in the Evangeline range from 150 feet above sea level, to 2,250 feet below sea level. The range of thickness of the freshwater interval in the Evangeline is 50 to 1,900 feet. The depths of the Evangeline wells that were monitored in conjunction with the ASSET Program 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 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 AL-391 and BE-512.

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, conventional, and inorganic data for the Evangeline aquifer, listing the minimum, maximum, and average results for these parameters collected in the FY 2016 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, 2004, 2007, 2010, and 2013.

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, 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.

Charts 4-1 through 4-18 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 4-2 and 4-3 show that at least one secondary MCL (SMCL) was exceeded in six 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 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 one well exceeded the SMCL for pH, two wells exceeded the SMCL for color, 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-363	9.10 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	0.801 g/L
EV-858	640 mg/L	0.674 g/L

Color (SMCL = 15 PCU):

AL-363	35 PCU
EV-858	30 PCU

Inorganic Parameters

Table 4-3 shows the inorganic 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 inorganics.

Federal Secondary Drinking Water Standards: A review of the analyses listed on Table 4-3 shows that four wells exceeded SMCL for iron.

Iron (SMCL = 300 µg/L):

AL-391	1950 µg/L (Duplicate 2020 µg/L)
AV-441	469 µg/L
CU-1362	371 µg/L
R-1350	478 µg/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.

There were no confirmed detections of a VOC at or above its detection limit during the FY 2016 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 2016 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 2016 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 groundwater produced from the Evangeline aquifer show the same trends when comparing current data to that of the seven previous sampling. These comparisons can be found in Tables 4-6 and 4-7, and in Charts 4-1 to 4-18 of this summary. Increasing or decreasing trend statements made here are based on an R-square value (slope) of 0.03 or greater. An R-square value of less than 0.03 is considered to have only a slight or no change.

Over the 21-year period data averages show that eight analytes have shown a general increase in concentration. These analytes are: pH, chloride, alkalinity, sulfate, total phosphorus, barium, iron, and zinc. For this same time period, the average concentrations for five analytes have demonstrated a decrease. These are: temperature, specific conductance (field and lab), color, total Kjeldahl nitrogen, and copper. The remaining parameters show no consistent change or are non-detect.

The current number of wells with SMCL exceedances has decreased from the previous sampling event in FY 2013. In FY 2013, eight wells reported at least one SMCL exceedance with a total of 11 exceedances. In FY 2016, six wells reported at least one exceedance with a total of nine exceedances.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the groundwater 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 eight analytes have increased in their average concentrations and five have decreased while all other analytes show no consistent change or have remained non-detect.

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 12 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 2016

Well ID	Parish	Date	Owner	Depth (Feet)	Well Use
AL-120	ALLEN	2/25/2016	CITY OF OAKDALE	910	PUBLIC SUPPLY
AL-363	ALLEN	2/24/2016	WEST ALLEN PARISH WATER DIST.	1715	PUBLIC SUPPLY
AL-373	ALLEN	2/25/2016	TOWN OF OBERLIN	747	PUBLIC SUPPLY
AL-391	ALLEN	3/28/2016	FAIRVIEW WATER SYSTEM	800	PUBLIC SUPPLY
AV-441	AVOYELLES	3/29/2016	TOWN OF EVERGREEN	319	PUBLIC SUPPLY
BE-410	BEAUREGARD	3/28/2016	BOISE CASCADE	474	INDUSTRIAL
BE-512	BEAUREGARD	2/24/2016	SINGER WATER DISTRICT	918	PUBLIC SUPPLY
CU-1362	CALCASIEU	2/24/2016	LA WATER CO	635	PUBLIC SUPPLY
EV-858	EVANGELINE	2/25/2016	SAVOY SWORDS WATER SYSTEM	472	PUBLIC SUPPLY
R-1350	RAPIDES	3/29/2016	PRIVATE OWNER	180	IRRIGATION
V-5065Z	VERNON	3/29/2016	PRIVATE OWNER	170	DOMESTIC
V-668	VERNON	3/28/2016	LDWF/FORT POLK WMA HQ	280	OTHER

Table 4-2: Summary of Field and Conventional Data, Evangeline Aquifer–FY 2016

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 µmhos/cm	SO4 mg/L	TDS mg/L	TKN mg/L	TSS mg/L	Turb NTU
	Laboratory Reporting Limits →					2	1	5	5	0.05	0.1	0.05	1	1	10	0.1	4	0.1
	Field Parameters					Laboratory Parameters												
AL-120	8.44	0.16	0.327	19.84	0.212	159	5.3	< DL	12	< DL	0.16	0.08	224	6.3	165	0.19	< DL	0.52
AL-363	9.10	0.25	0.513	24.25	0.333	258	4.4	35	20	< DL	0.29	0.27	367	1.9	255	0.34	< DL	0.27
AL-373	8.10	0.16	0.339	20.44	0.220	173	9.0	10	< DL	< DL	0.29	0.29	231	< DL	220	0.34	< DL	0.27
AL-391	6.85	0.11	0.228	19.68	0.148	101	7.1	30	52	< DL	0.18	0.18	212	345.0	135	0.45	< DL	6.70
AL-391*	6.85	0.11	0.228	19.68	0.148	96	7.4	20	52	< DL	0.14	0.15	208	3.4	120	0.36	6	6.60
AV-441	7.75	0.62	1.232	17.31	0.801	407	113.0	< DL	50	< DL	0.52	0.20	1250	72.6	730	0.84	< DL	0.76
BE-410	6.93	0.09	0.194	18.85	0.126	85	5.6	< DL	58	0.07	< DL	0.05	183	2.8	105	0.24	< DL	0.15
BE-512	8.29	0.16	0.343	21.07	0.223	175	5.2	< DL	6	< DL	0.28	< DL	238	6.6	195	0.24	< DL	0.30
BE-512*	8.29	0.16	0.343	21.07	0.223	173	5.5	< DL	6	< DL	0.29	0.07	235	6.3	170	0.39	< DL	0.36
CU-1362	7.29	0.14	0.287	20.14	0.186	125	14.5	5	38	< DL	0.46	0.19	193	2.2	170	0.68	5	0.19
EV-858	7.90	0.52	1.037	18.62	0.674	371	117.0	30	46	< DL	0.68	0.33	799	< DL	640	0.75	< DL	0.63
R-1350	6.85	0.04	0.086	17.00	0.056	25	3.7	< DL	20	< DL	< DL	< DL	75	6.2	40	0.24	4	0.61
V-5065Z	7.13	0.04	0.092	13.73	0.060	35	5.8	< DL	18	0.07	0.15	0.07	81	< DL	85	0.23	< DL	0.18
V-668	6.50	0.02	0.046	16.34	0.030	12	4.2	< DL	20	< DL	< DL	< DL	36	< DL	30	0.37	4	0.55

*Denotes Duplicate Sample

Shaded cells exceed EPA Secondary Standards

Table 4-3: Summary of Inorganic Data, Evangeline Aquifer–FY 2016

Well ID	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	1	1	0.5	1	1	3	50	1	0.2	1	1	0.5	0.5	5
AL-120	< DL	< DL	9.0	< DL	< DL	< DL	10.7	69	1.1	< DL	< DL	< DL	< DL	< DL	< DL
AL-363	< DL	< DL	9.4	< DL	< DL	< DL	< DL	< DL	1.2	< DL	< DL	< DL	< DL	< DL	< DL
AL-373	< DL	4.8	10.8	< DL	< DL	< DL	12.4	107	< DL	< DL	< DL	< DL	< DL	< DL	< DL
AL-391	< DL	< DL	178.0	< DL	< DL	< DL	< DL	1950	< DL	< DL	< DL	< DL	< DL	< DL	< DL
AL-391*	< DL	< DL	177.0	< DL	< DL	< DL	< DL	2020	< DL	< DL	< DL	< DL	< DL	< DL	< DL
AV-441	< DL	< DL	77.3	< DL	< DL	< DL	< DL	469	< DL	< DL	< DL	< DL	< DL	< DL	< DL
BE-410	< DL	1.4	146.0	< DL	< DL	< DL	3.4	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
BE-512	< DL	1.3	14.8	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
BE-512*	< DL	1.3	14.8	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
CU-1362	< DL	1.1	161.0	< DL	< DL	< DL	< DL	371	< DL	< DL	< DL	< DL	< DL	< DL	14.4
EV-858	< DL	< DL	218.0	< DL	< DL	< DL	4.8	68	< DL	< DL	< DL	< DL	< DL	< DL	< DL
R-1350	< DL	< DL	16.0	< DL	< DL	< DL	< DL	478	< DL	< DL	< DL	< DL	< DL	< DL	< DL
V-5065Z	< DL	< DL	75.7	< DL	< DL	< DL	12.7	< DL	< DL	< DL	< DL	< DL	< DL	< DL	5
V-668	< DL	< DL	40.1	< DL	< DL	< DL	15.7	< DL	< DL	< DL	< DL	< DL	< DL	< DL	7.2

*Denotes Duplicate Sample

Shaded cells exceed EPA Secondary Standards

Table 4-4: FY 2016 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	pH (SU)	6.50	9.10	7.59
	Salinity (ppt)	0.02	0.62	0.18
	Specific Conductance (mmhos/cm)	0.046	1.232	0.378
	Temperature (^{O}C)	13.73	24.25	19.14
	Total Dissolved Solids (g/L)	0.03	0.801	0.246
LABORATORY	Alkalinity (mg/L)	12	407	157
	Chloride (mg/L)	3.7	117.0	22.0
	Color (PCU)	< DL	3	11
	Hardness (mg/L)	< DL	58	29
	Nitrite - Nitrate, as N (mg/L)	< DL	0.07	< DL
	Ammonia, as N (mg/L)	< DL	0.68	0.26
	Total Phosphorus (mg/L)	< DL	0.33	0.14
	Specific Conductance (μmhos/cm)	36	1250	309
	Sulfate (mg/L)	< DL	345.0	32.5
	Total Dissolved Solids (mg/L)	30	730	219
	Total Kjeldahl Nitrogen (mg/L)	0.19	0.84	0.40
	Total Suspended Solids (mg/L)	< DL	6	3
	Turbidity (NTU)	0.15	6.70	1.29

Table 4-5: FY 2016 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (μg/L)	< DL	< DL	< DL
Arsenic (μg/L)	< DL	4.8	1.0
Barium (μg/L)	9.0	218.0	81.9
Beryllium (μg/L)	< DL	< DL	< DL
Cadmium (μg/L)	< DL	< DL	< DL
Chromium (μg/L)	< DL	< DL	< DL
Copper (μg/L)	< DL	15.7	5.1
Iron (μg/L)	< DL	2020	406
Lead (μg/L)	< DL	1.2	< DL
Mercury (μg/L)	< DL	< DL	< DL
Nickel (μg/L)	< DL	< DL	< DL
Selenium (μg/L)	< DL	< DL	< DL
Silver (μg/L)	< DL	< DL	< DL
Thallium (μg/L)	< DL	< DL	< DL
Zinc (μg/L)	< DL	14.4	< DL

Table 4-6: 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	FY 2013	FY 2016
FIELD	pH (SU)	7.14	7.08	7.05	7.54	8.06	7.98	8.03	7.59
	Salinity (ppt)	0.22	0.21	0.14	0.15	0.22	0.24	0.20	0.18
	Specific Conductance (mmhos/cm)	0.500	0.500	0.300	0.320	0.460	0.480	0.402	0.378
	Temperature (^{O}C)	23.71	22.87	21.33	22.69	22.44	21.43	21.38	19.14
	Total Dissolved Solids (g/L)	-	-	-	0.210	0.300	0.310	0.260	0.246
LABORATORY	Alkalinity (mg/L)	206	193	177	137	176	179	150	157
	Chloride (mg/L)	15.2	27.0	38.3	18.1	37.3	41.8	30.8	22.0
	Color (PCU)	23	7	8	8	-	8	8	11
	Hardness (mg/L)	16	11	32	23	28	< DL	< DL	29
	Nitrite - Nitrate, as N (mg/L)	< DL	< DL	< DL	< DL	< DL	0.01	0.01	< DL
	Ammonia, as N (mg/L)	0.20	0.16	0.22	0.15	0.20	< DL	< DL	0.26
	Total Phosphorus (mg/L)	0.16	0.15	0.17	0.10	0.16	0.21	0.21	0.14
	Specific Conductance (µmhos/cm)	490	454	446	322	446	470	423	309
	Sulfate (mg/L)	4.7	4.4	5.7	5.4	5.4	8.2	5.5	32.5
	Total Dissolved Solids (mg/L)	308	323	264	209	289	461	334	219
	Total Kjeldahl Nitrogen (mg/L)	0.72	0.16	0.69	0.28	0.25	< DL	< DL	0.40
	Total Suspended Solids (mg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	3
	Turbidity (NTU)	< DL	< DL	< DL	1.04	< DL	< DL	< DL	1.29

Table 4-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	AVERAGE VALUES BY FISCAL YEAR							
	FY 1995	FY 1998	FY 2001	FY 2004	FY 2007	FY 2010	FY 2013	FY 2016
Antimony (µg/L)	< DL	-	< DL	< DL	< DL	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	1.0
Barium (µg/L)	62.7	41.4	127.0	85.4	127.9	110.0	94.3	81.9
Beryllium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Cadmium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Chromium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Copper (µg/L)	25	49	7.9	6.6	3.4	4.3	3.43	5.1
Iron (µg/L)	203	105	161	267	178	107	144	406
Lead (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Mercury (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Nickel (µg/L)	8.1	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Selenium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Silver (µg/L)	< DL	1.19	< DL	< DL	< DL	< DL	< DL	< DL
Thallium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Zinc (µg/L)	134.2	106.6	15.2	26.8	15.5	< DL	< DL	< DL

Table 4-8: Volatile Organic Compound List

VOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
1,1,1-TRICHLOROETHANE	624	0.50
1,1,2,2-TETRACHLOROETHANE	624	0.50
1,1,2-TRICHLOROETHANE	624	0.50
1,1-DICHLOROETHANE	624	0.50
1,1-DICHLOROETHENE	624	0.50
1,2-DICHLOROBENZENE	624	0.50
1,2-DICHLOROETHANE	624	0.50
1,2-DICHLOROPROPANE	624	0.50
1,3-DICHLOROBENZENE	624	0.50
1,4-DICHLOROBENZENE	624	0.50
BENZENE	624	0.50
BROMODICHLOROMETHANE	624	0.50
BROMOFORM	624	0.50
BROMOMETHANE	624	1.0
CARBON TETRACHLORIDE	624	0.50
CHLOROBENZENE	624	0.50
CHLOROETHANE	624	0.50
CHLOROFORM	624	0.50
CHLOROMETHANE	624	1.0
CIS-1,3-DICHLOROPROPENE	624	1.0
DIBROMOCHLOROMETHANE	624	0.50
ETHYL BENZENE	624	0.50
METHYLENE CHLORIDE	624	1.0
O-XYLENE (1,2-DIMETHYLBENZENE)	624	0.50
STYRENE	624	0.50
TERT-BUTYL METHYL ETHER	624	0.50
TETRACHLOROETHYLENE (PCE)	624	0.50
TOLUENE	624	0.50
TRANS-1,2-DICHLOROETHENE	624	0.50
TRANS-1,3-DICHLOROPROPENE	624	0.50
TRICHLOROETHYLENE (TCE)	624	0.50
TRICHLOROFLUOROMETHANE (FREON-11)	624	0.50
VINYL CHLORIDE	624	0.50
XYLENES, M & P	624	1.0

Table 4-9: Semi-Volatile Organic Compound List

SVOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
1,2,4-TRICHLOROBENZENE	625	5.0
2,4,6-TRICHLOROPHENOL	625	5.0
2,4-DICHLOROPHENOL	625	5.0
2,4-DIMETHYLPHENOL	625	5.0
2,4-DINITROPHENOL	625	20.0
2,4-DINITROTOLUENE	625	5.0
2,6-DINITROTOLUENE	625	5.0
2-CHLORONAPHTHALENE	625	5.0
2-CHLOROPHENOL	625	5.0
2-NITROPHENOL	625	5.0
3,3'-DICHLOROBENZIDINE	625	5.0
4,6-DINITRO-2-METHYLPHENOL	625	10.0
4-BROMOPHENYL PHENYL ETHER	625	5.0
4-CHLORO-3-METHYLPHENOL	625	5.0
4-CHLOROPHENYL PHENYL ETHER	625	5.0
4-NITROPHENOL	625	20.0
ACENAPHTHENE	625	0.20
ACENAPHTHYLENE	625	0.20
ANTHRACENE	625	0.20
BENZIDINE	625	20.0
BENZO(A)ANTHRACENE	625	0.20
BENZO(A)PYRENE	625	0.20
BENZO(B)FLUORANTHENE	625	0.20
BENZO(G,H,I)PERYLENE	625	0.20
BENZO(K)FLUORANTHENE	625	0.20
BENZYL BUTYL PHTHALATE	625	5.0
BIS(2-CHLOROETHOXY) METHANE	625	5.0
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	625	5.0
BIS(2-ETHYLHEXYL) PHTHALATE	625	5.0
CHRYSENE	625	0.20
DIBENZ(A,H)ANTHRACENE	625	0.20
DIETHYL PHTHALATE	625	5.0
DIMETHYL PHTHALATE	625	5.0
DI-N-BUTYL PHTHALATE	625	5.0
DI-N-OCTYLPHTHALATE	625	5.0
FLUORANTHENE	625	0.20
FLUORENE	625	0.20

SVOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
HEXACHLOROBENZENE	625	5.0
HEXACHLOROBUTADIENE	625	5.0
HEXACHLOROCYCLOPENTADIENE	625	10.0
HEXACHLOROETHANE	625	5.0
INDENO(1,2,3-C,D)PYRENE	625	0.20
ISOPHORONE	625	5.0
NAPHTHALENE	625	0.20
NITROBENZENE	625	5.0
N-NITROSODIMETHYLAMINE	625	5.0
N-NITROSODI-N-PROPYLAMINE	625	5.0
N-NITROSODIPHENYLAMINE	625	5.0
PENTACHLOROPHENOL	625	5.00
PHENANTHRENE	625	0.20
PHENOL	625	5.0
PYRENE	625	0.20

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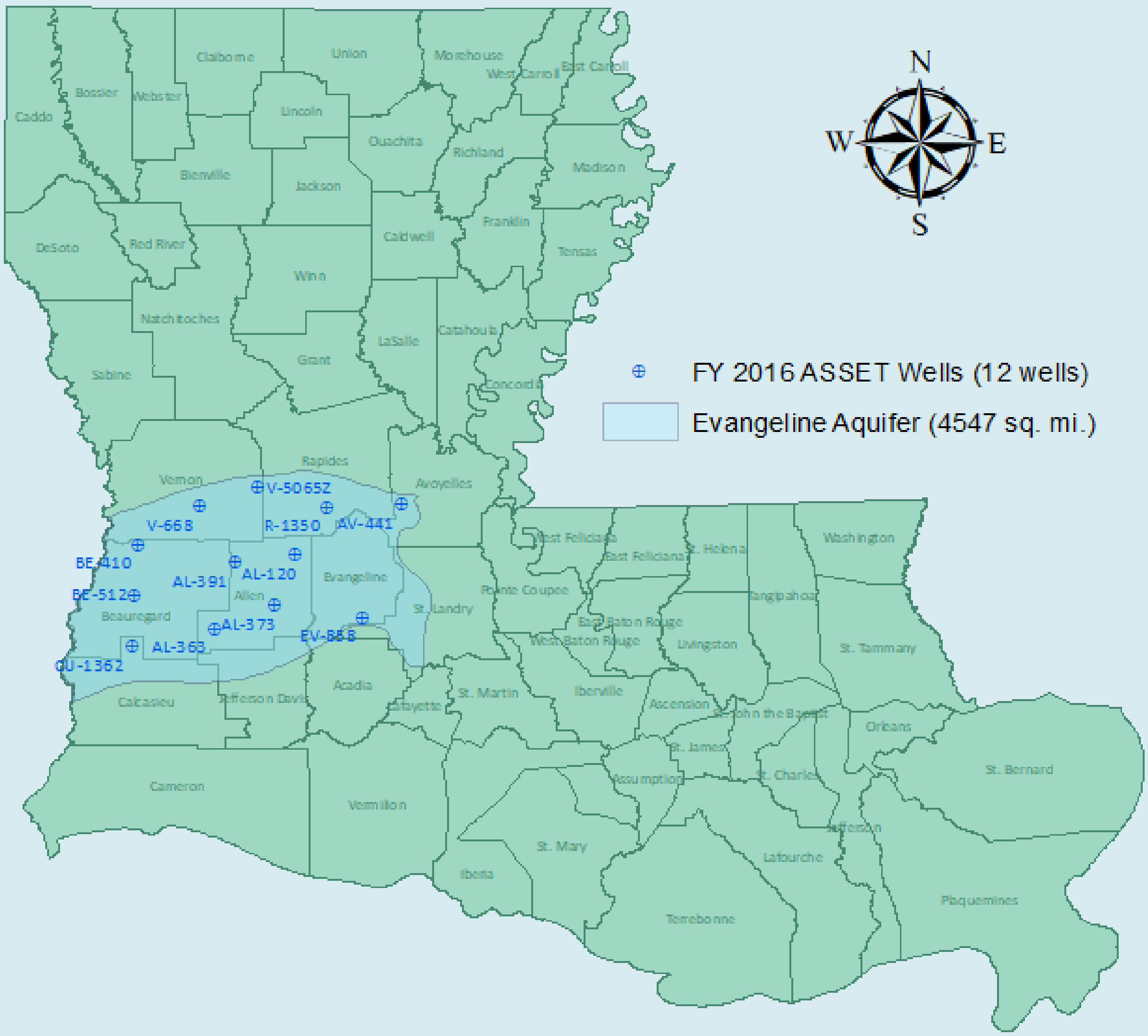
Table 4-10: Pesticide and PCB List

Pest/PCB Analytical Parameters	METHOD	REPORTING LIMIT (µg/L)
ALDRIN	608	0.025
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	608	0.025
ALPHA ENDOSULFAN	608	0.025
ALPHA-CHLORDANE	608	0.025
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	608	0.025
BETA ENDOSULFAN	608	0.025
CHLORDANE	608	0.20
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	608	0.025
DIELDRIN	608	0.025
ENDOSULFAN SULFATE	608	0.025
ENDRIN	608	0.025
ENDRIN ALDEHYDE	608	0.025
ENDRIN KETONE	608	0.025
GAMMA-CHLORDANE	608	0.025
HEPTACHLOR	608	0.025
HEPTACHLOR EPOXIDE	608	0.025
METHOXYCHLOR	608	0.25
P,P'-DDD	608	0.025
P,P'-DDE	608	0.025
P,P'-DDT	608	0.025
PCB-1016 (AROCHLOR 1016)	608	0.80
PCB-1221 (AROCHLOR 1221)	608	0.80
PCB-1232 (AROCHLOR 1232)	608	0.80
PCB-1242 (AROCHLOR 1242)	608	0.80
PCB-1248 (AROCHLOR 1248)	608	0.80
PCB-1254 (AROCHLOR 1254)	608	0.80
PCB-1260 (AROCHLOR 1260)	608	0.80
TOXAPHENE	608	1.0

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.

ASSET PROGRAM, FY 2016

Chart 4-1: Temperature Trend

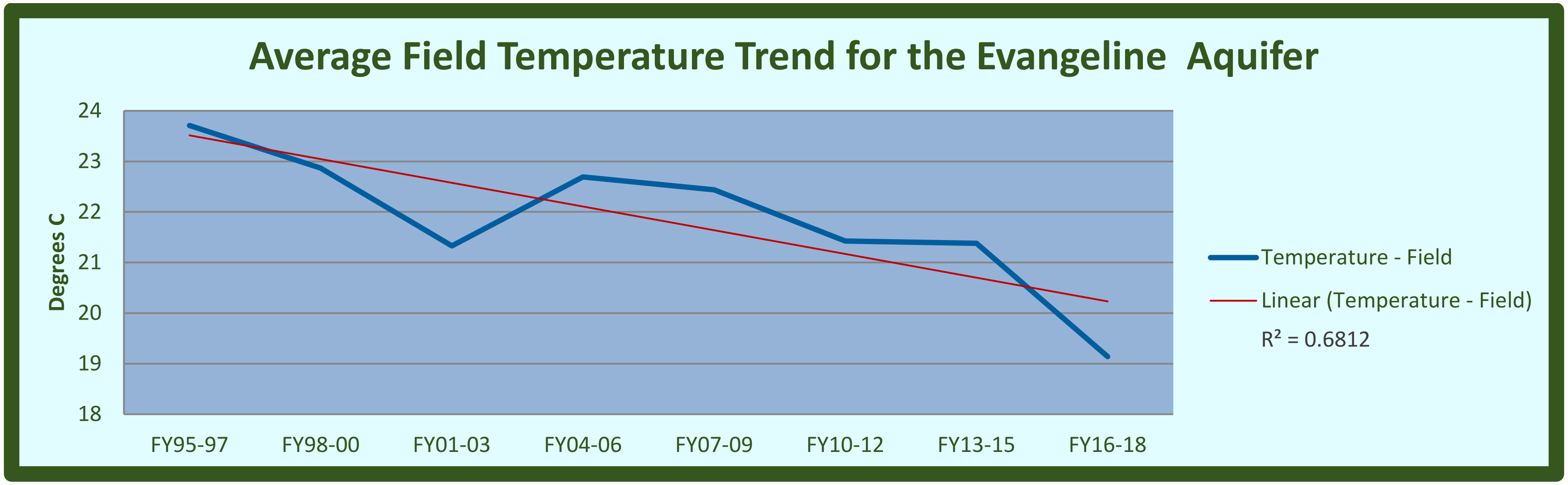


Chart 4-2: pH Trend

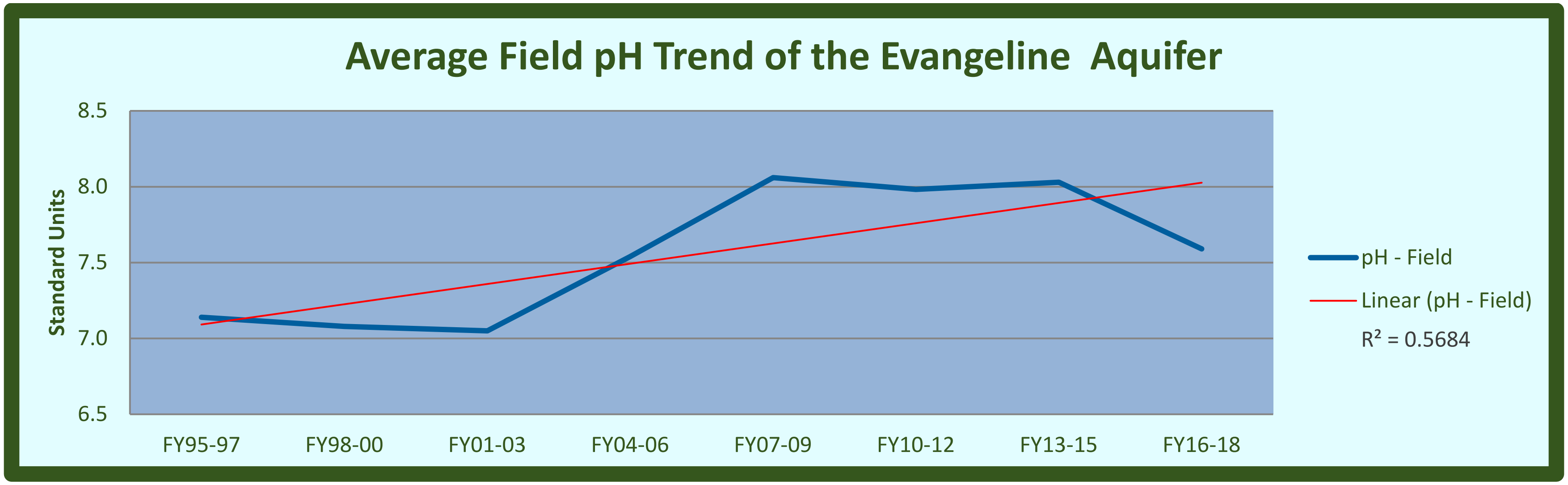


Chart 4-3: Specific Conductance Trend

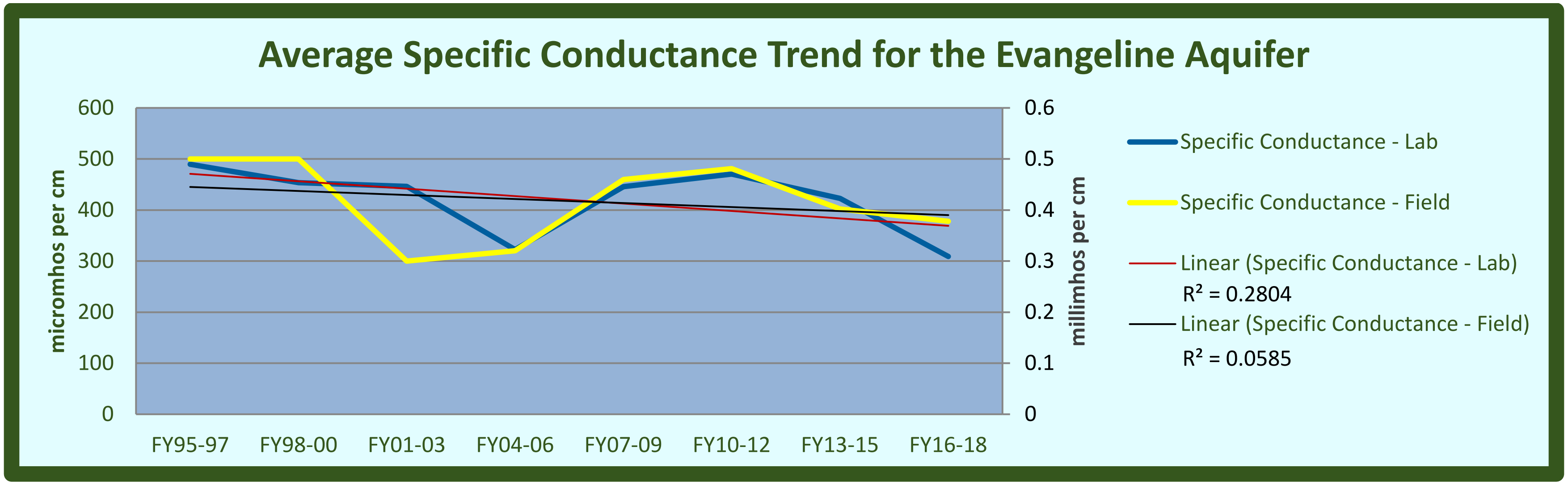


Chart 4-4: Field Salinity Trend

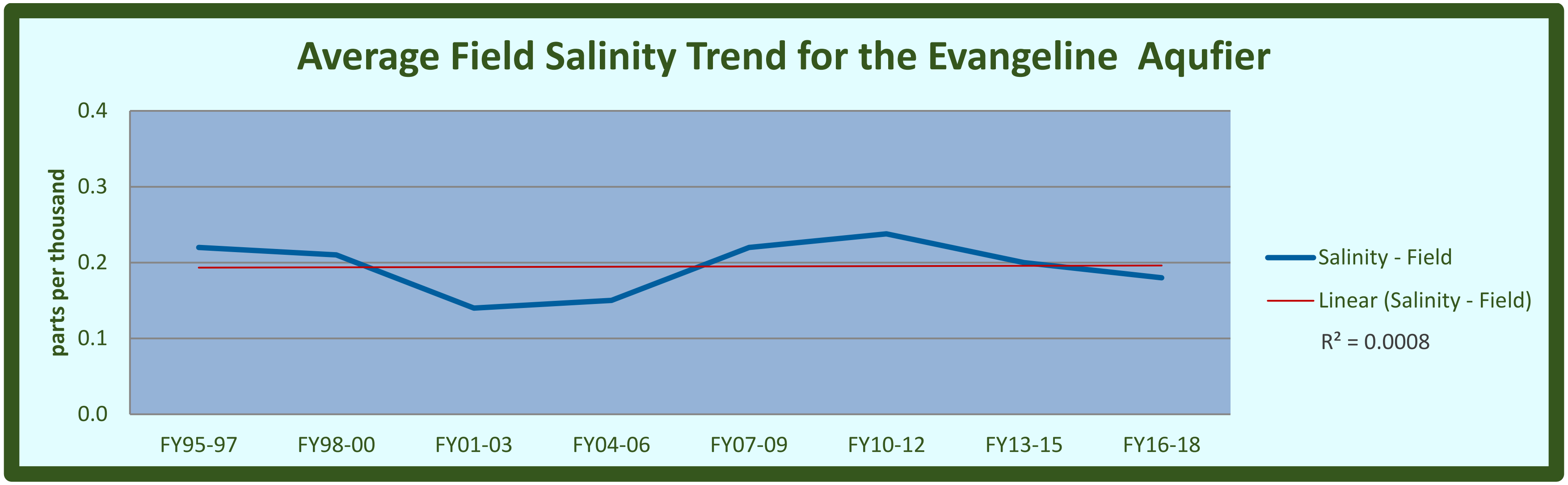


Chart 4-5: Chloride Trend

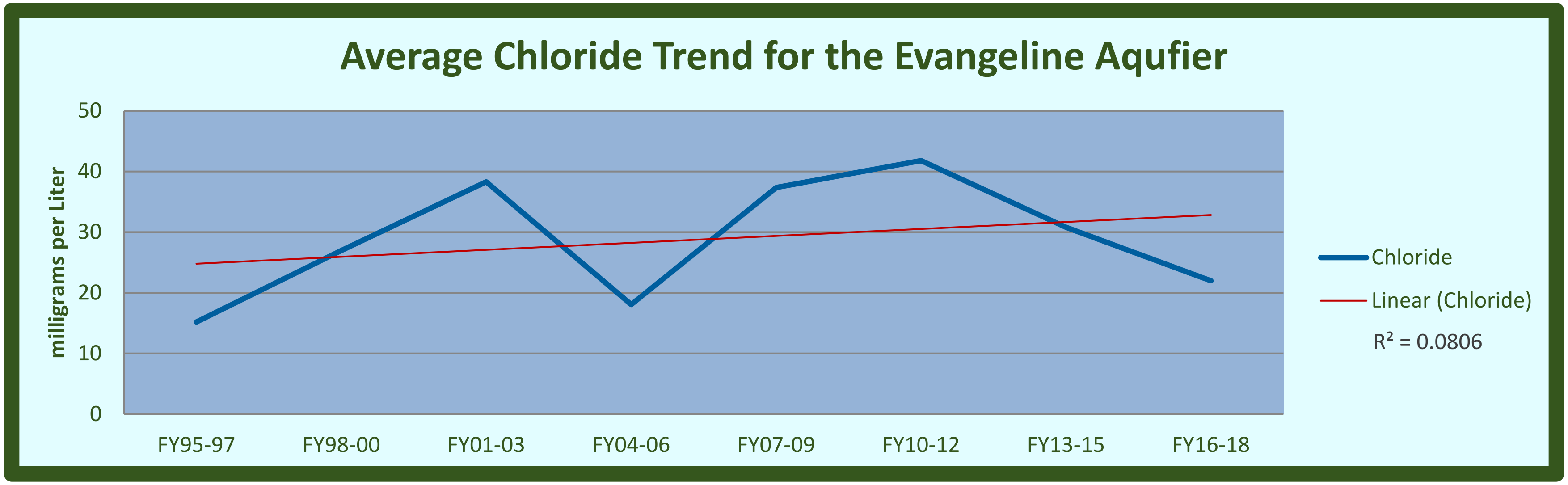


Chart 4-6: Alkalinity Trend

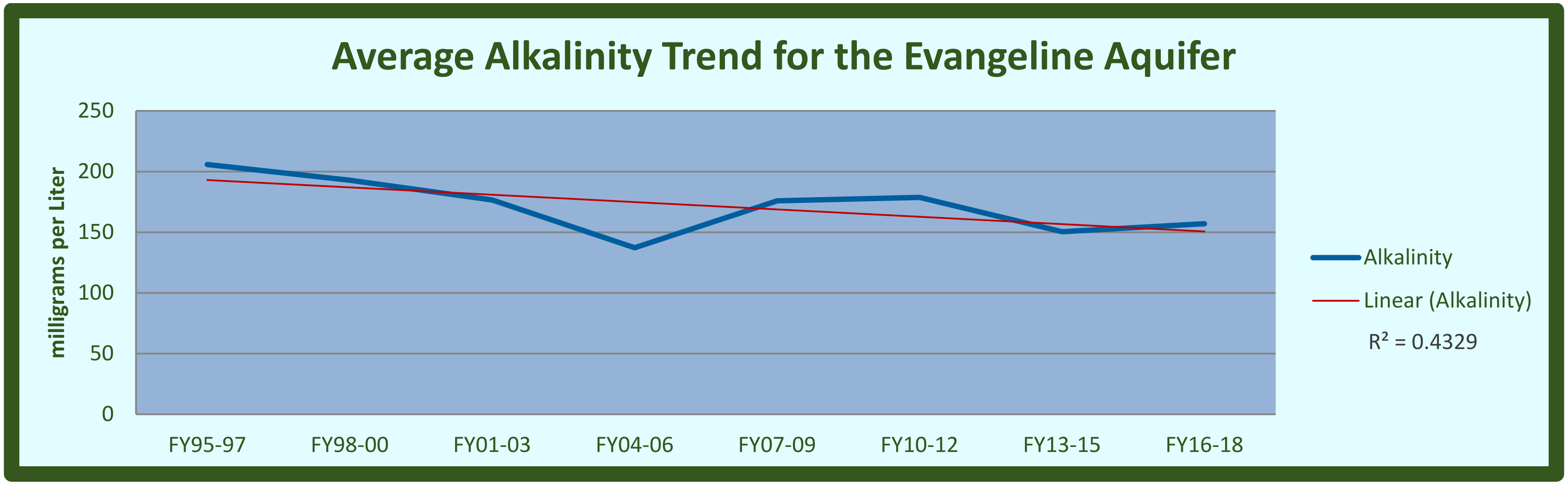


Chart 4-7: Color Trend

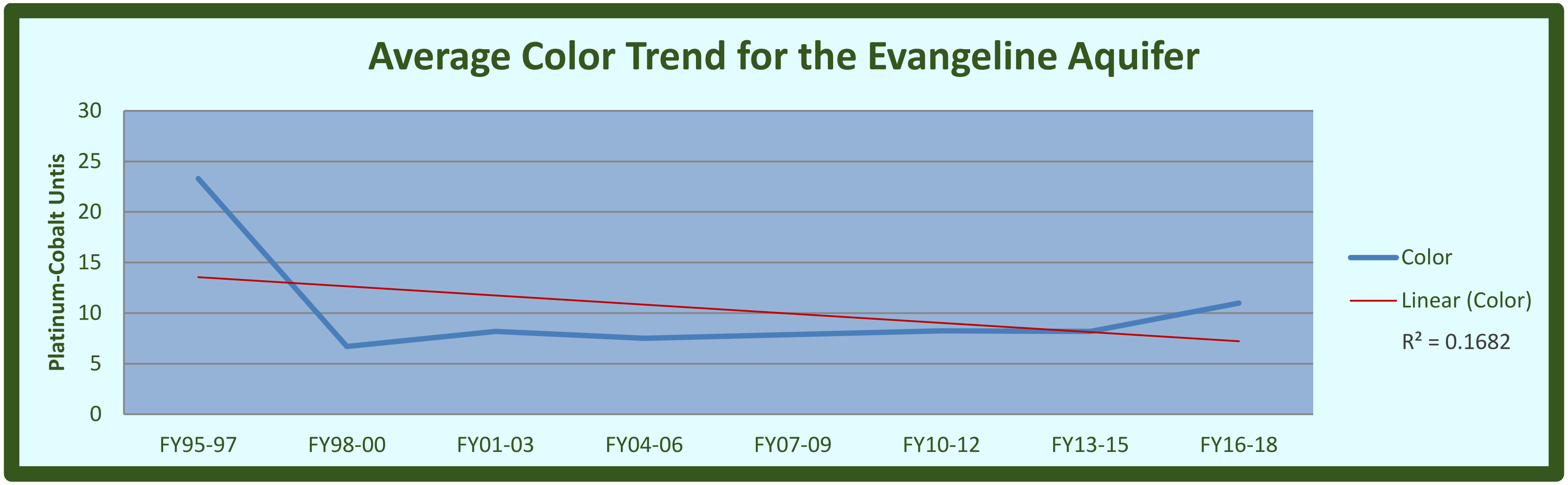


Chart 4-8: Sulfate Trend

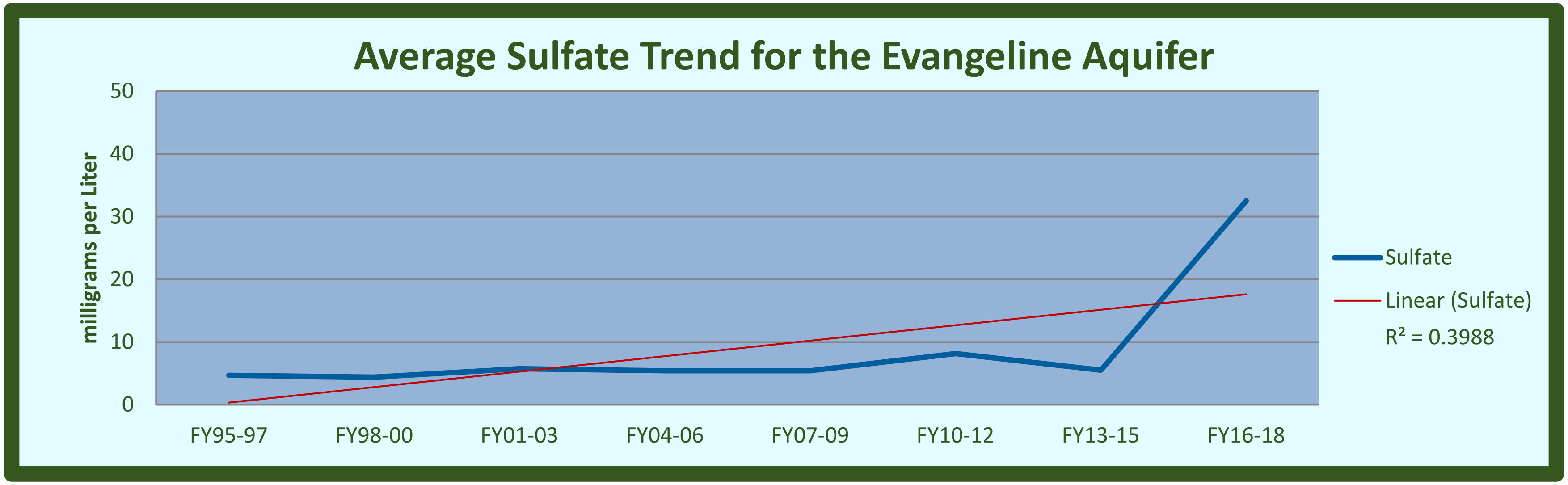


Chart 4-9: Total Dissolved Solids Trend

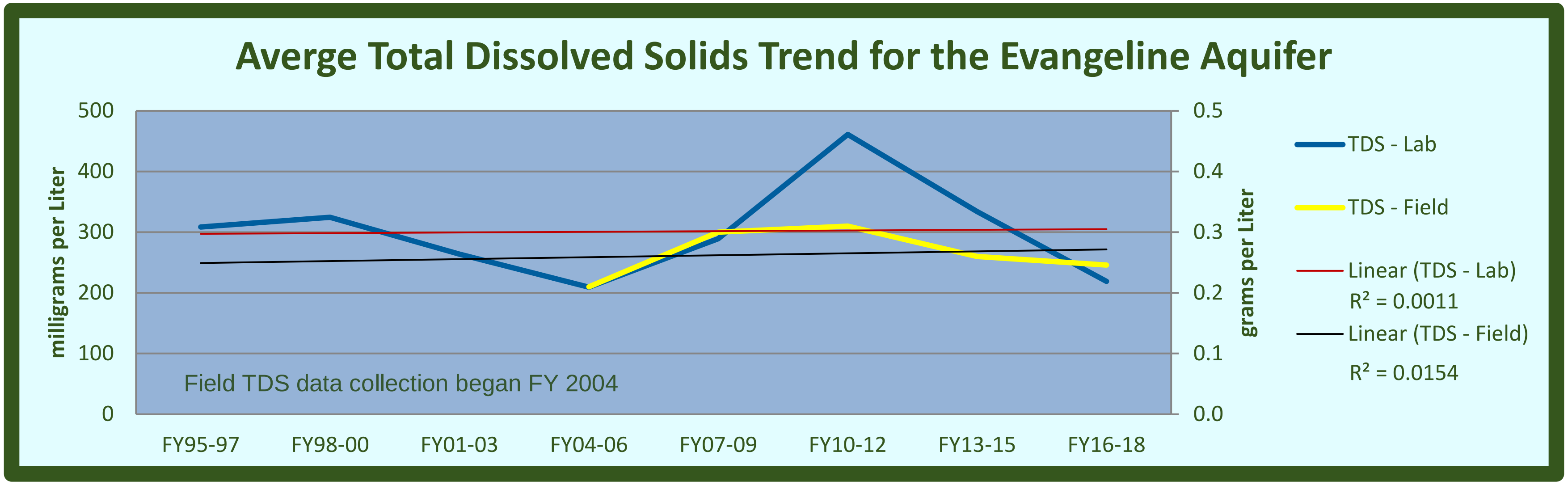


Chart 4-10: Hardness Trend

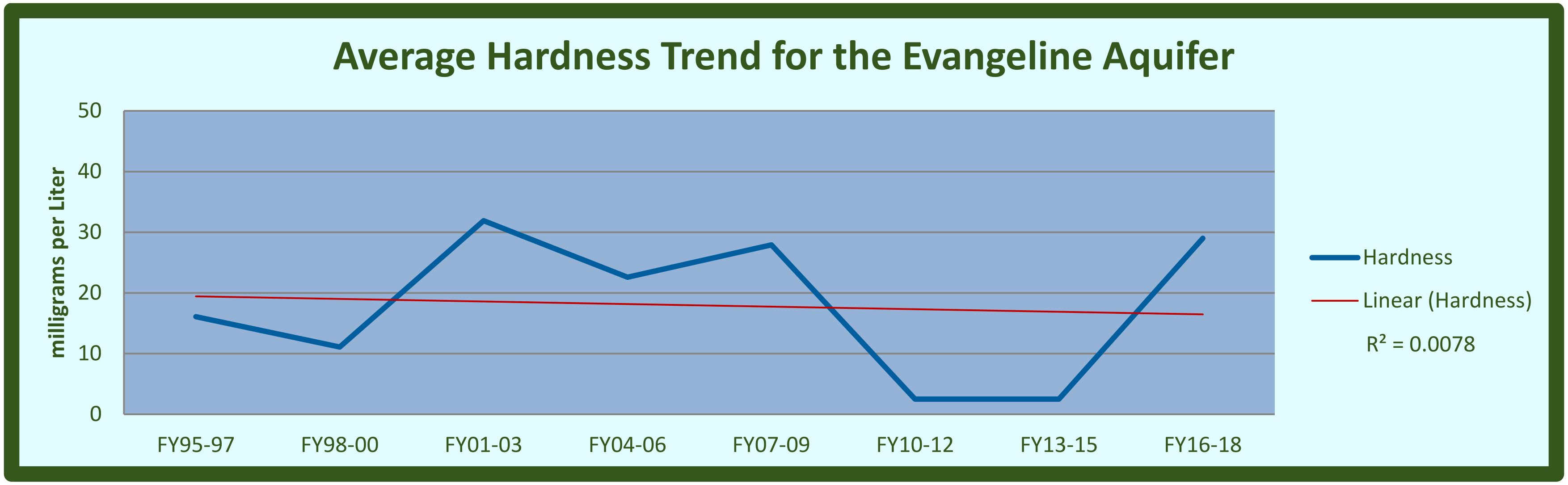


Chart 4-11: Ammonia (NH3) Trend

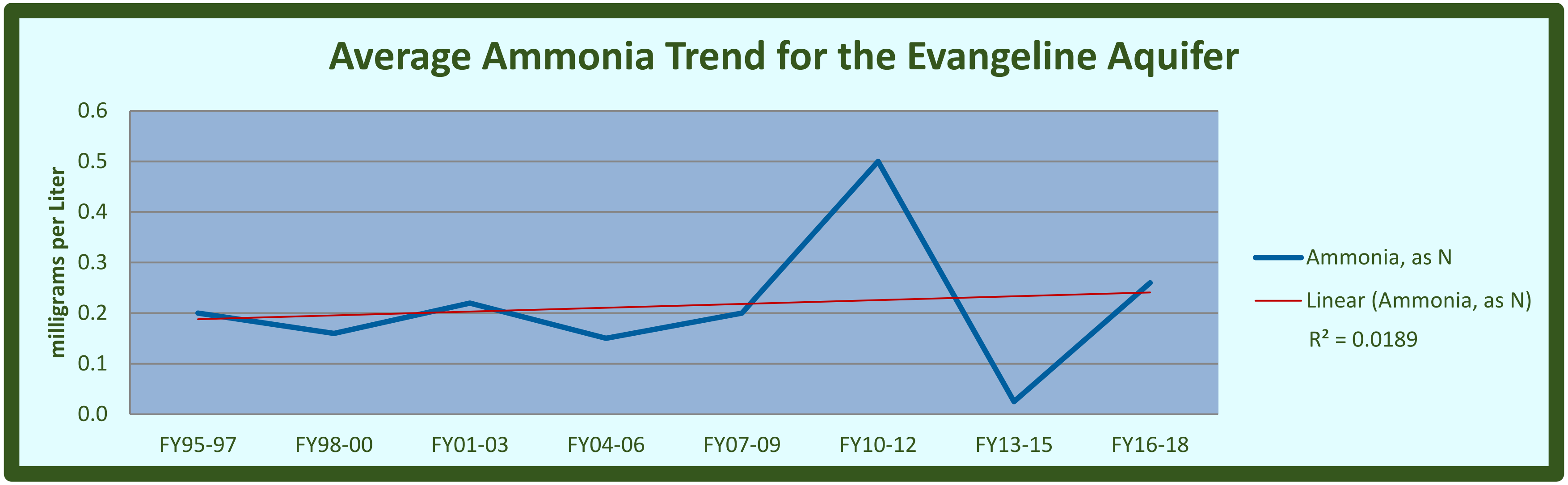


Chart 4-12: Nitrite – Nitrate Trend

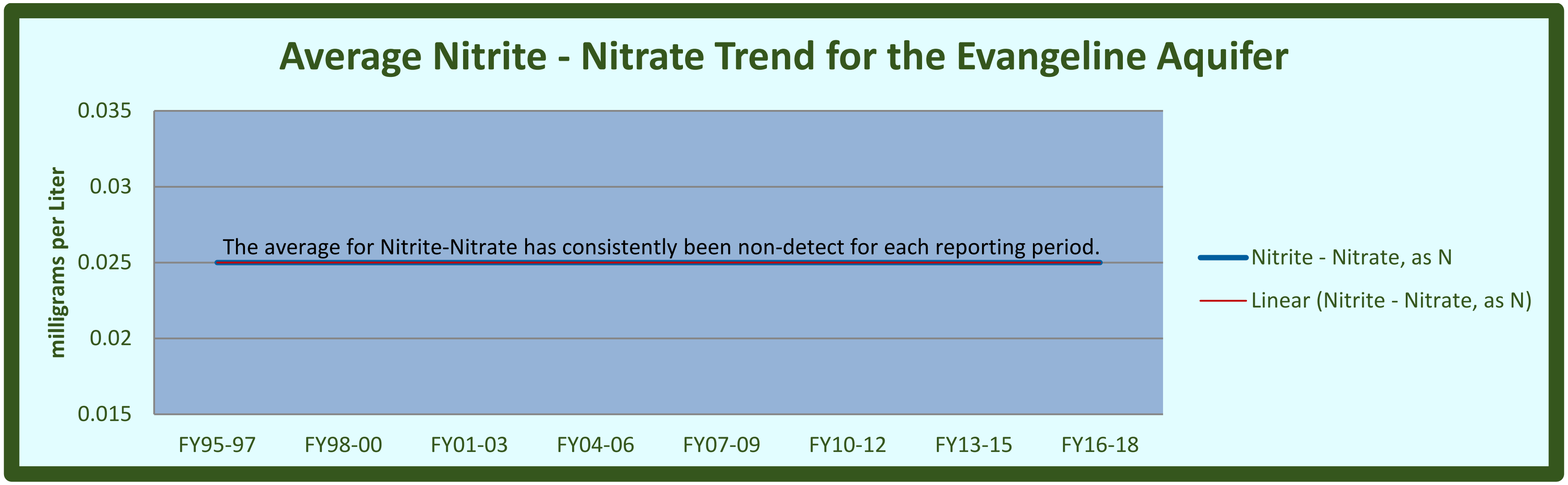


Chart 4-13: TKN Trend

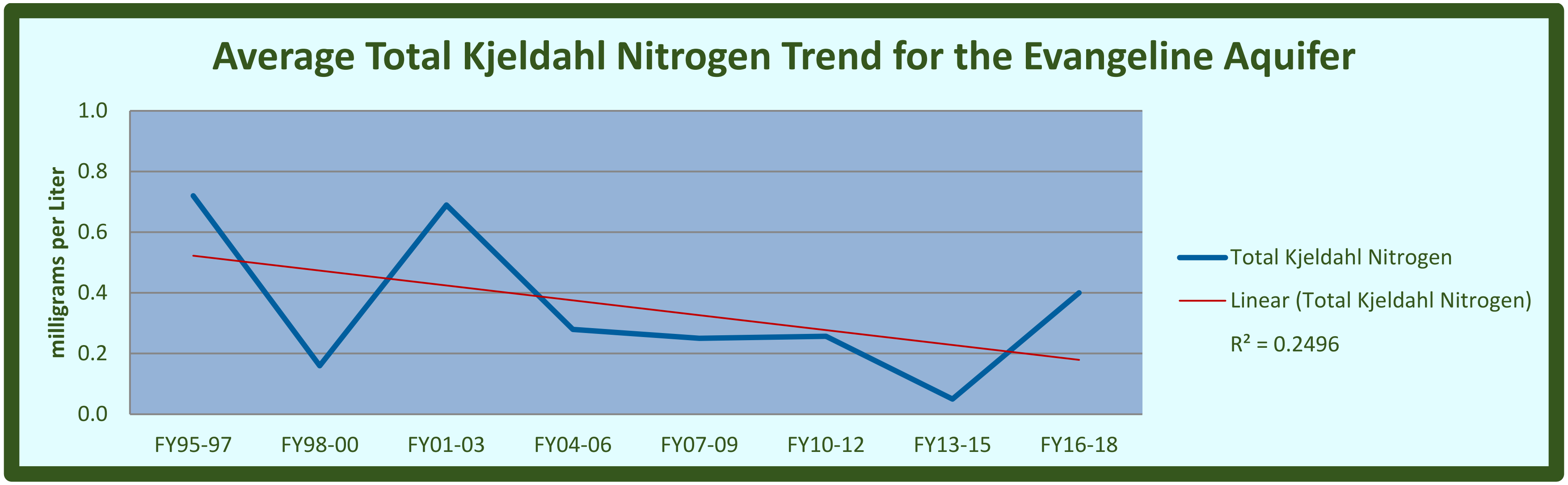


Chart 4-14: Total Phosphorus Trend

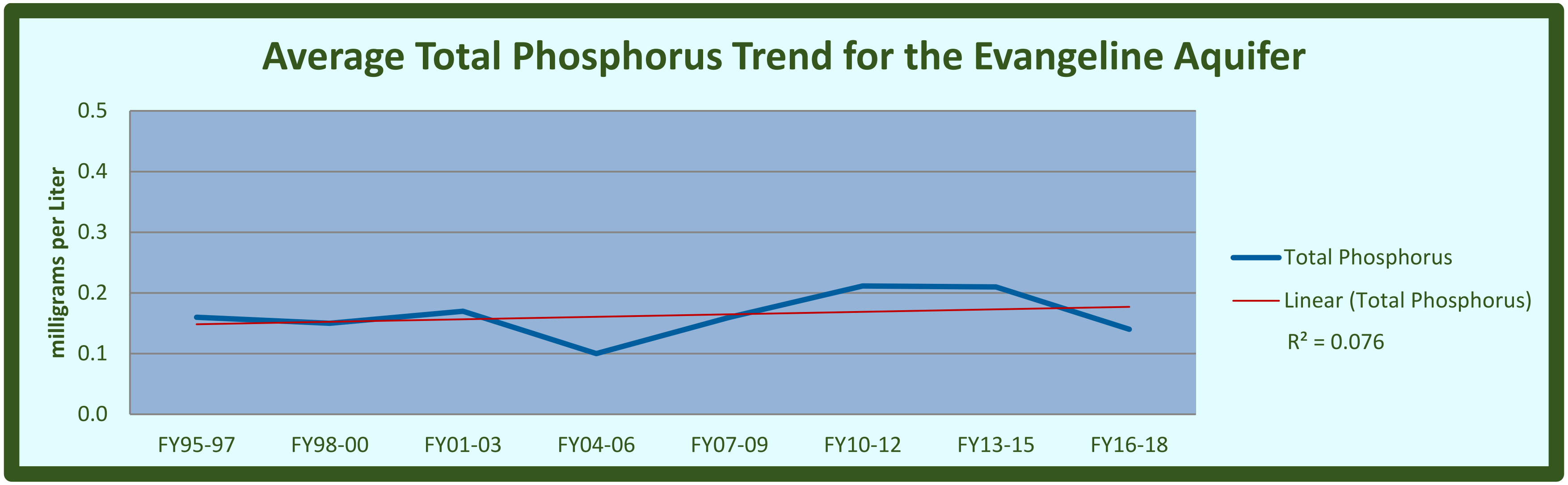


Chart 4-15: Barium Trend

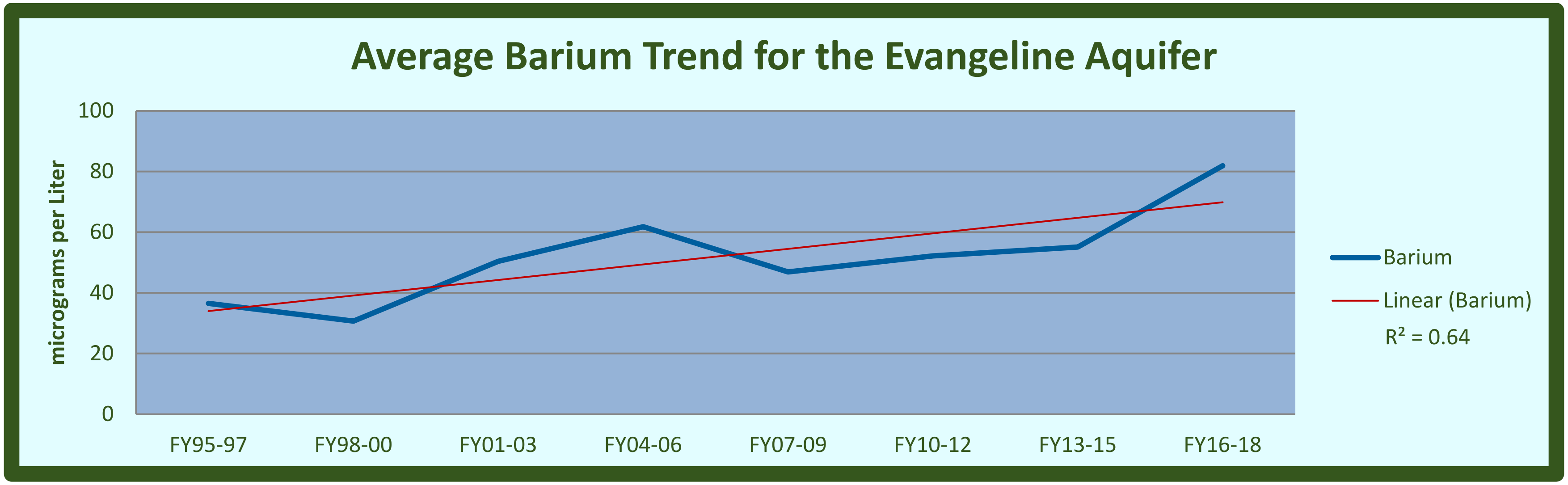


Chart 4-16: Copper Trend

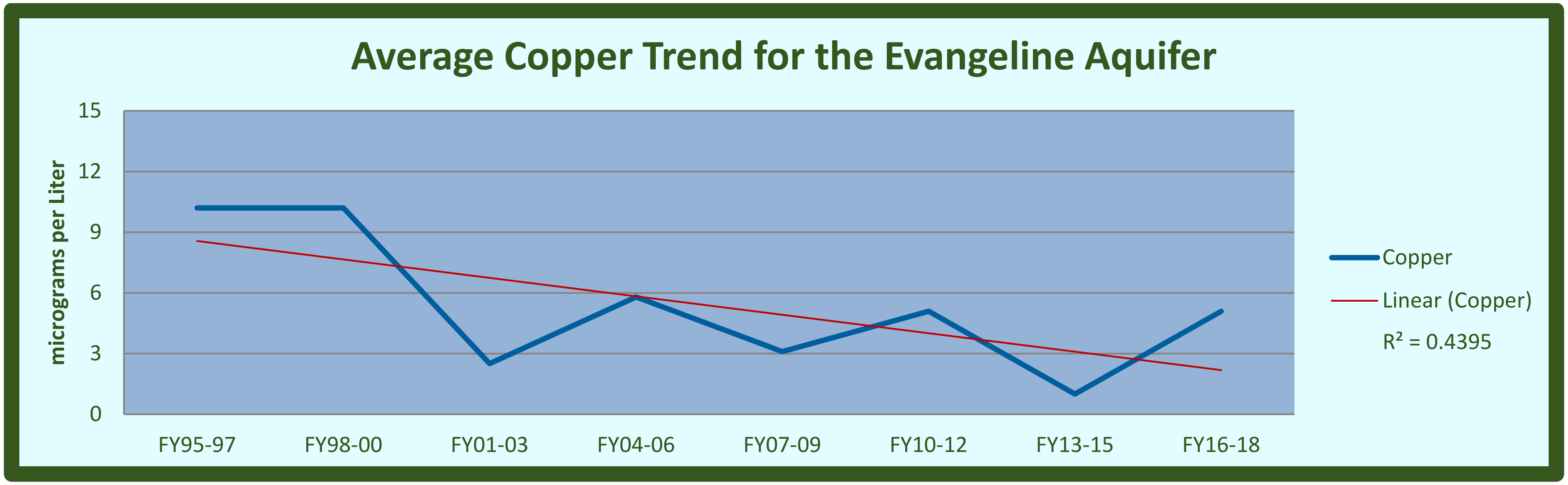


Chart 4-17: Iron Trend

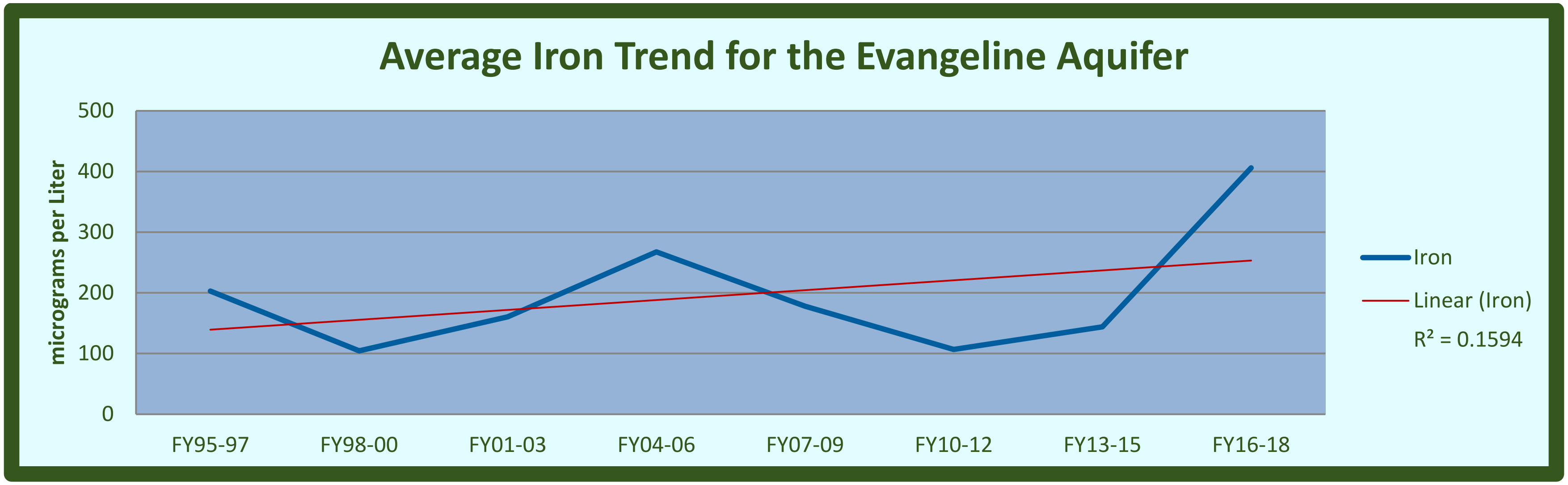


Chart 4-18: Zinc Trend