CARNAHAN BAYOU AQUIFER SUMMARY, FY16-17

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

APPENDIX 7 TO THE 2018 TRIENNIAL SUMMARY REPORT

PARTIAL FUNDING PROVIDED BY THE CWA

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 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 Carnahan Bayou aquifer, during the 2016 and 2017 state fiscal years (July 1, 2015 - June 30, 2017). This summary will become Appendix 7 of ASSET Program Triennial Summary Report for 2018.

These data show that from May through July of 2016, nine wells were sampled which produce from the Carnahan Bayou aquifer. Six of the nine are classified as public supply, and one each is classified as industrial, power generation, and domestic use well. The wells are located in five parishes across the central area of the state.

Figure 7-1 shows the geographic locations of the Carnahan Bayou aquifer and the associated wells, whereas Table 7-1 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 Natural Resources water well registration data file.

GEOLOGY

The Carnahan Bayou member consists of sands, silts, and clays, with some gravel. The Carnahan Bayou member, along with the Williamson Creek and Dough Hills, is 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 the 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 Carnahan Bayou aquifer varies between 20 and 260 feet/day.

The maximum depths of occurrence of freshwater in the Carnahan Bayou aquifer range from 250 feet above sea level to 3,300 feet below sea level. The range of thickness of the fresh water interval in the Carnahan Bayou aquifer is 100 to 1,100 feet. The depths of the Carnahan Bayou aquifer wells that were monitored in conjunction with the ASSET Program range from 143 to 2,036 feet below land surface.

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 7-2. The inorganic parameters analyzed in the laboratory are listed in Table 7-3. 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 R-1001 and V-656.

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 7-8, 7-9, and 7-10 list the target analytes for volatiles, semi-volatiles, and pesticides/PCBs, respectively.

Tables 7-4 and 7-5 provide a statistical overview of field, conventional, and inorganic data for the Carnahan Bayou aquifer, listing the minimum, maximum, and average results for these parameters collected in the FY 2016-2017 (FY16-17) sampling. Tables 7-6 and 7-7 compare these same parameter averages to historical ASSET-derived data for the Carnahan Bayou aquifer, from fiscal years 1995, 1998, 2001, 2004, 2007, 2010, and 2014

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.

Charts 7-1 through 7-18 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 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 7-2 and 7-3 show that one or more secondary MCLs (SMCLs) were exceeded in four of the nine wells sampled in the Carnahan Bayou aquifer, with a total of five SMCLs being exceeded.

Field and Conventional Parameters

Table 7-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 7-4 provides an overview of this data for the Carnahan Bayou aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 7-2 shows that no 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 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 7-2 shows that two wells exceeded the SMCL for pH. Laboratory results override field results in exceedance determinations, thus only laboratory 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):

G-5178Z	6.46 SU
V-566	6.31 SU

Inorganic Parameters

Table 7-3 shows the inorganic parameters for which samples are collected at each well and the analytical results for those parameters. Table 7-5 provides an overview of inorganic data for the Carnahan Bayou aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 7-3 shows that no MCL was exceeded for inorganics.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 7-3 shows that three wells exceeded the SMCL for iron:

Iron (SMCL = 300 µg/L):

CO-47	1840 µg/L
R-1210	387 µg/L
V-566	557 µg/L

Volatile Organic Compounds

Table 7-8 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 was no confirmed detection of a VOC at or above its detection limit during the FY16-17 sampling of the Carnahan Bayou aquifer.

Semi-Volatile Organic Compounds

Table 7-9 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 was no confirmed detection of a SVOC at or above its detection limit during the FY16-17 sampling of the Carnahan Bayou aquifer.

Pesticides and PCBs

Table 7-10 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 was no confirmed detection of a pesticide or PCB at or above its detection limit during the FY16-17 sampling of the Carnahan Bayou 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 Carnahan Bayou aquifer exhibit some changes when comparing current data to that of the seven previous sampling rotations. These comparisons can be found in Tables 7-6 and 7-7, and in Charts 7-1 to 7-18 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, four analytes have shown a general increase in average concentration. These analytes are: pH, laboratory derived total dissolved solids, total Kjeldahl nitrogen, and copper. For this same period, 11 analytes have demonstrated a decrease in average concentration. These are; temperature, lab derived specific conductance, alkalinity, color, hardness, nitrite-nitrate, total phosphorus, field measured total dissolved solids, barium, iron, and zinc. The remaining analytes have shown no consistent change or have stayed at or below their respective detection limits.

In FY 2014, six wells reported eight SMCL exceedances. For FY16-17, four wells reported five SMCL exceedances.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the groundwater produced from this aquifer is soft[1]. The data also show that the groundwater 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 FY16-17 monitoring of the Carnahan Bayou aquifer exceeded an MCL. The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines, with only five SMCLs exceeded in four wells.

Comparison to historical ASSET-derived data shows some change in the quality or characteristics of the Carnahan Bayou aquifer, with four parameters showing consistent increases in concentration, 11 parameters decreasing in concentration, with the remaining parameters showing no consistent change over the previous 21 years.

It is recommended that the wells assigned to the Carnahan Bayou aquifer be re-sampled as planned, in approximately three years. In addition, several wells should be added to the nine 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 7-1: List of Wells Sampled, Carnahan Bayou Aquifer–FY16-17

Well ID	Parish	Date	Owner	Depth (Feet)	Well Use
BE-405	Beauregard	6/15/2016	Boise	1,016	Industrial
CO-47	Concordia	5/19/2016	City of Vidalia	310	Public Supply
G-5178Z	Grant	7/6/2016	Private Owner	165	Domestic
R-1001	Rapides	6/16/2016	Gardner Water System	1,080	Public Supply
R-1172	Rapides	6/16/2016	Cleco-Rodemacher	298	Power Generation
R-1210	Rapides	6/16/2016	City of Alexandria	2,036	Public Supply
V-496	Vernon	6/15/2016	U.S. Army/Fort Polk	1,415	Public Supply
V-566	Vernon	7/5/2016	Alco-Hutton VFD	143	Public Supply
V-656	Vernon	7/5/2016	East Central Vernon Water System	1,477	Public Supply

Table 7-2: Summary of Field and Conventional Data, Carnahan Bayou Aquifer–FY16-17

Well ID	pH SU	Sal. ppt	Sp. Cond. mmhos per 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. µmmhos per cm	SO4 mg/L	TDS mg/L	TKN mg/l	TSS mg/L	Turb. NTU
LABORATORY DETECTION LIMITS →						2	1	5	5	0.05	0.01	0.05	1	1	10	0.1	4	0.1
	FIELD PARAMETERS					LABORATORY PARAMETERS												
BE-405	7.90	0.18	0.383	22.00	0.249	186	6.9	< DL	32	< DL	0.28	0.07	389	9.0	280	0.53	< DL	0.31
CO-47	7.13	0.24	0.491	14.23	0.319	185	19.8	10	192	< DL	0.63	0.20	489	38.7	292	0.61	< DL	6.90
G-5178Z	6.46	0.05	0.101	18.46	0.066	20	6.3	10	12	< DL	< DL	< DL	96	6.4	80	0.13	< DL	0.55
R-1001	8.29	0.22	0.451	22.17	0.293	206	10.5	< DL	16	< DL	0.28	0.32	451	14.8	350	0.63	< DL	0.42
R-1001*	8.29	0.22	0.451	22.17	0.293	206	10.5	< DL	14	< DL	0.32	0.31	448	15.0	330	0.56	< DL	0.26
R-1172	7.67	0.16	0.334	17.02	0.217	129	13.1	< DL	16	< DL	0.41	0.18	333	18.7	260	0.60	< DL	0.24
R-1210	7.99	0.20	0.421	24.82	0.273	190	15.0	< DL	20	0.13	< DL	0.13	416	6.8	275	0.30	< DL	1.50
V-496	7.75	0.20	0.418	24.36	0.272	180	19.3	< DL	100	< DL	0.43	< DL	417	7.2	320	0.74	< DL	0.87
V-566	6.31	0.10	0.220	17.94	0.143	48	17.9	10	28	< DL	0.32	0.47	216	14.1	190	0.25	< DL	1.70
V-656	7.98	0.15	0.321	25.64	0.208	147	9.2	15	< DL	< DL	0.21	0.36	333	< DL	235	0.33	< DL	2.20
V-656*	7.98	0.15	0.321	25.64	0.208	147	9.5	15	< DL	< DL	0.49	0.31	326	< DL	190	0.32	< DL	2.40

*Denotes Duplicate Sample Shaded cells exceed EPA Secondary Standards

Table 7-3: Summary of Inorganic Data, Carnahan Bayou Aquifer–FY 16-17

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	1	1	1	0.5	1	1	3	50	1	0.2	1	1	0.5	0.5	5
BE-405	< DL	< DL	48.6	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
CO-47	< DL	< DL	289.0	< DL	< DL	< DL	< DL	1840	< DL	< DL	< DL	< DL	< DL	< DL	< DL
G-5178Z	< DL	< DL	14.3	< DL	< DL	< DL	< DL	80	< DL	< DL	< DL	< DL	< DL	< DL	5.5
R-1001	< DL	< DL	10.6	< DL	< DL	< DL	< DL	53	< DL	< DL	< DL	< DL	< DL	< DL	< DL
R-1001*	< DL	< DL	10.5	< DL	< DL	< DL	< DL	61	< DL	< DL	< DL	< DL	< DL	< DL	< DL
R-1172	< DL	< DL	15.5	< DL	< DL	< DL	< DL	< DL	1.2	< DL	< DL	< DL	< DL	< DL	< DL
R-1210	< DL	< DL	28.8	< DL	< DL	< DL	75.6	387	8.2	< DL	< DL	< DL	< DL	< DL	14.8
V-496	< DL	< DL	114.0	< DL	< DL	< DL	23.3	143	< DL	< DL	< DL	< DL	< DL	< DL	< DL
V-566	< DL	1.4	69.8	< DL	< DL	1.0	6.8	557	< DL	< DL	< DL	< DL	< DL	< DL	< DL
V-656	< DL	< DL	1.5	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
V-656*	< DL	< DL	1.4	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL

*Denotes Duplicate Sample. Shaded cells exceed EPA Secondary Standards

Table 7-4: FY16-17 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	pH (SU)	6.31	8.29	7.61
	Salinity (ppt)	0.05	0.24	0.17
	Specific Conductance (mmhos/cm)	0.101	0.491	0.356
	Temperature (^{O}C)	14.23	25.64	21.31
	Total Dissolved Solids (g/L)	0.066	0.319	0.231
LABORATORY	Alkalinity (mg/L)	20	203	150
	Chloride (mg/L)	6.3	19.8	12.6
	Color (PCU)	< DL	15	7
	Hardness (mg/L)	< DL	192	40
	Nitrite - Nitrate, as N (mg/L)	< DL	0.13	< DL
	Ammonia, as N (mg/L)	< DL	0.63	0.32
	Total Phosphorus (mg/L)	< DL	0.47	0.22
	Specific Conductance (µmhos/cm)	96	489	356
	Sulfate (mg/L)	< DL	38.7	12.0
	Total Dissolved Solids (mg/L)	80	350	255
	Total Kjeldahl Nitrogen (mg/L)	0.13	0.74	0.46
	Total Suspended Solids (mg/L)	< DL	< DL	< DL
	Turbidity (NTU)	0.24	6.90	1.58

Table 7-5: FY16-17 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (µg/L)	< DL	< DL	< DL
Arsenic (µg/L)	< DL	1.4	< DL
Barium (µg/L)	1.4	289.0	54.9
Beryllium (µg/L)	< DL	< DL	< DL
Cadmium (µg/L)	< DL	< DL	< DL
Chromium (µg/L)	< DL	1.0	0.5
Copper (µg/L)	< DL	75.6	10.7
Iron (µg/L)	< DL	1840	293
Lead (µg/L)	< DL	8.2	1.3
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	14.8	< DL

Table 7-6: 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 16-17
FIELD	pH (SU)	6.90	7.11	7.66	7.57	7.61	7.61	7.82	7.61
	Salinity (ppt)	0.21	0.19	0.17	.23	0.23	0.22	0.21	0.17
	Specific Conductance (mmhos/cm)	0.468	0.389	0.346	0.480	0.480	0.463	0.425	0.356
	Temperature (^{O}C)	27.54	24.53	23.58	23.76	25.99	23.61	25.46	21.31
	Total Dissolved Solids (g/L)	-	-	-	0.310	0.310	0.300	0.277	0.231
LABORATORY	Alkalinity (mg/L)	203	186	176	202	174	124	139	150
	Chloride (mg/L)	41.5	13.0	33.9	27.1	42.3	43.4	37.9	12.6
	Color (PCU)	16	9	5	7	Data Invalid	4	3	7
	Hardness (mg/L)	63	70	48	67	51	15	56	40
	Nitrite - Nitrate, as N (mg/L)	< DL	0.11	< DL	0.06	< DL	0.01	< DL	< DL
	Ammonia, as N (mg/L)	0.41	0.38	0.32	0.43	0.33	0.37	0.51	0.32
	Total Phosphorus (mg/L)	0.27	0.33	0.36	0.25	0.32	< DL	0.34	0.22
	Specific Conductance (µmhos/cm)	492	406	443	471	478	384	434	356
	Sulfate (mg/L)	12.8	10.2	8.6	12.4	11.8	10.0	11.1	12.0
	Total Dissolved Solids (mg/L)	327	247	326	303	312	359	390	255
	Total Kjeldahl Nitrogen (mg/L)	0.29	0.65	0.50	0.63	0.40	0.50	0.68	0.46
	Total Suspended Solids (mg/L)	5.1	< DL	< DL	< DL	5.3	< DL	< DL	< DL
	Turbidity (NTU)	203	186	176	202	174	124	139	1.58

Table 7-7: 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	FY16-17
Antimony (µg/L)	< DL	< DL	< DL	No inorganic statistics for this period. Program QC limits were exceeded	< DL	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL		< DL	< DL	< DL	< DL
Barium (µg/L)	110.9	197.1	80.9		105.6	64.8	89.2	54.9
Beryllium (µg/L)	< DL	< DL	< DL		< DL	< DL	< DL	< DL
Cadmium (µg/L)	< DL	< DL	< DL		< DL	< DL	< DL	< DL
Chromium (µg/L)	< DL	< DL	< DL		< DL	< DL	< DL	0.5
Copper (µg/L)	5.5	7.5	5.7		5.9	15.5	4.5	10.7
Iron (µg/L)	1068	1542	532		960	226	709	293
Lead (µg/L)	< DL	< DL	< DL		< DL	< DL	< DL	1.3
Mercury (µg/L)	< DL	< DL	< DL		< DL	< DL	< DL	< DL
Nickel (µg/L)	< DL	< 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)	560.6	607.8	26.5		79.3	17.2	9.0	< DL

Table 7-8: 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 7-9: Semi-Volatile Organic Compound List

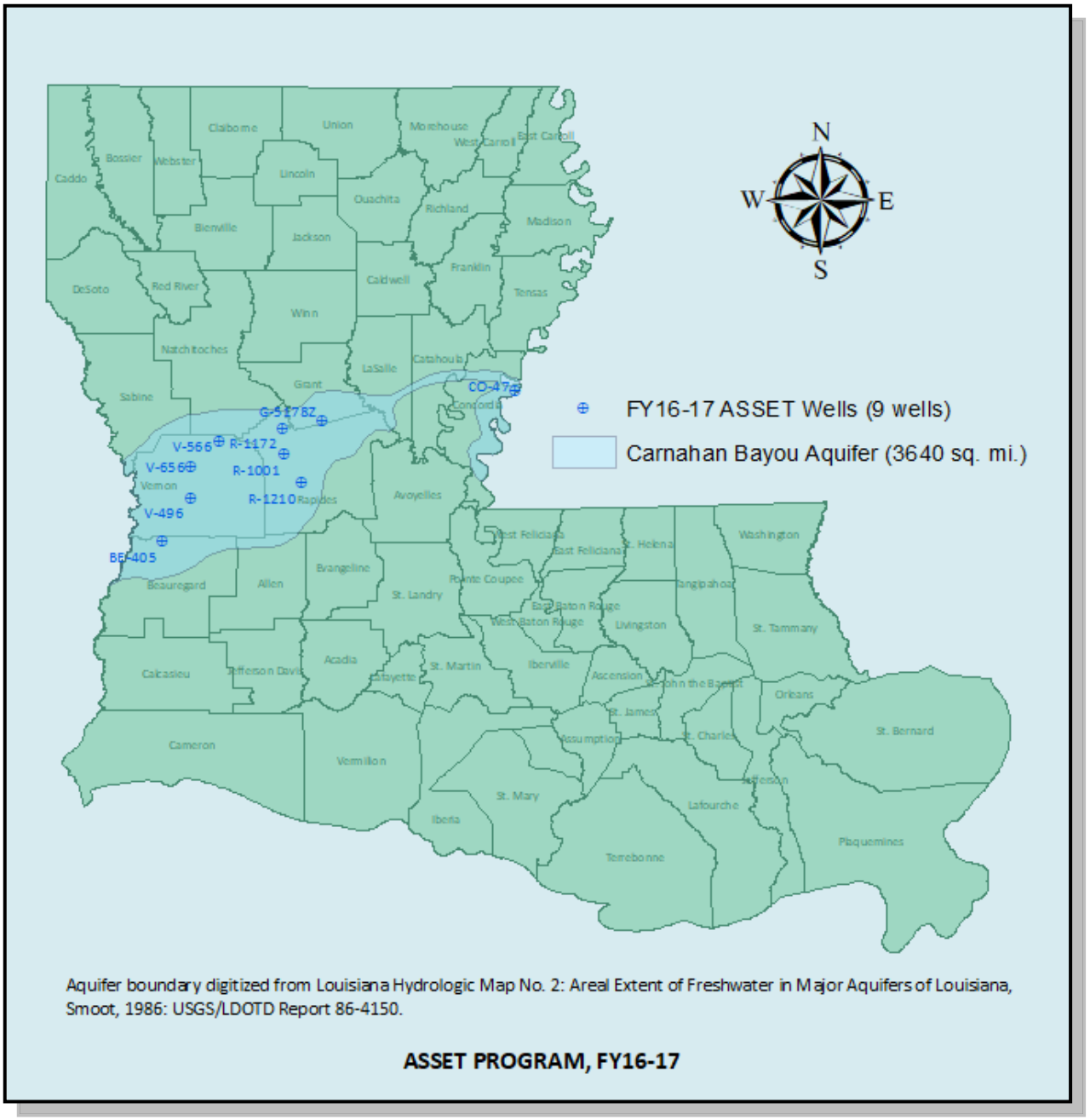
SVOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
1,2,4-TRICHLOROBENZENE	625	5.0
2,4,6-TRICHLOROPHENOL	625	5.0
2,4-DICHLOROPHENOL	625	5.0
2,4-DIMETHYLPHENOL	625	5.0
2,4-DINITROPHENOL	625	20.0
2,4-DINITROTOLUENE	625	5.0
2,6-DINITROTOLUENE	625	5.0
2-CHLORONAPHTHALENE	625	5.0
2-CHLOROPHENOL	625	5.0
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

Table 7-10: 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 7-1: Location Plat, Carnahan Bayou 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, FY16-17

Chart 7-1: Temperature Trend

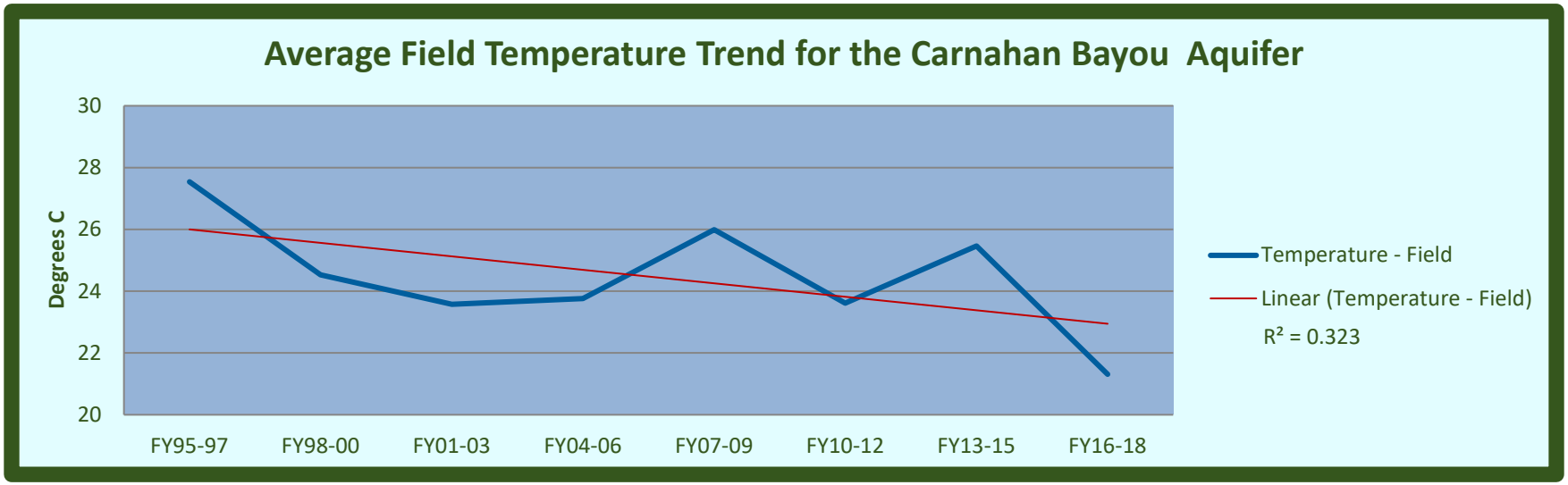


Chart 7-2: pH Trend

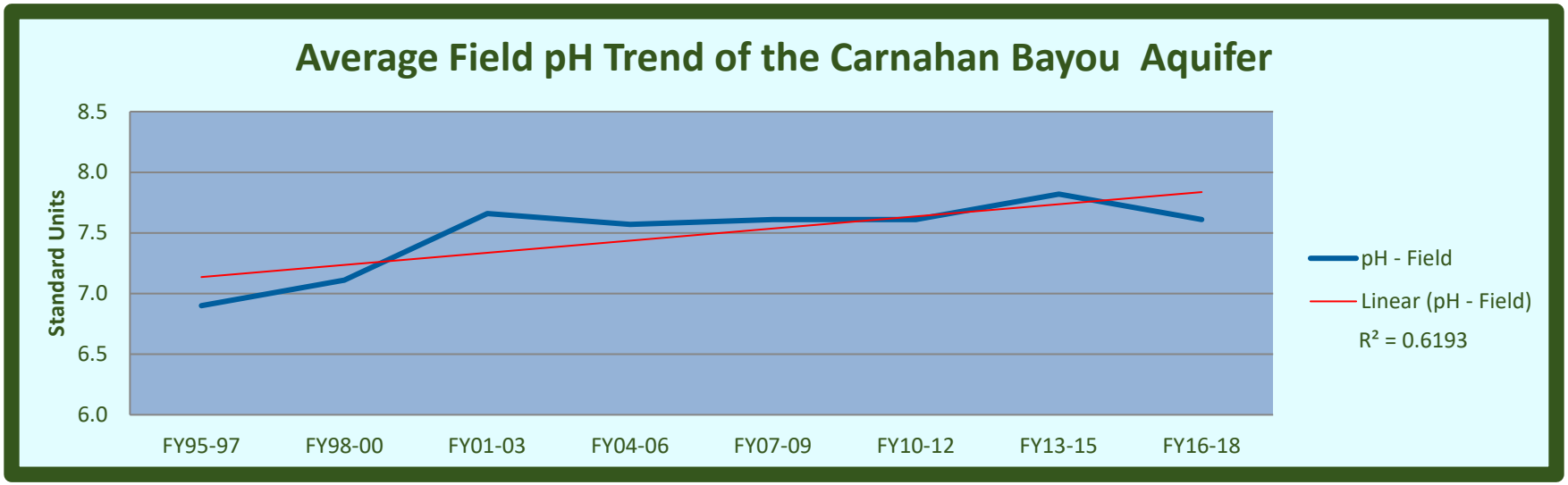


Chart 7-3: Specific Conductance Trend

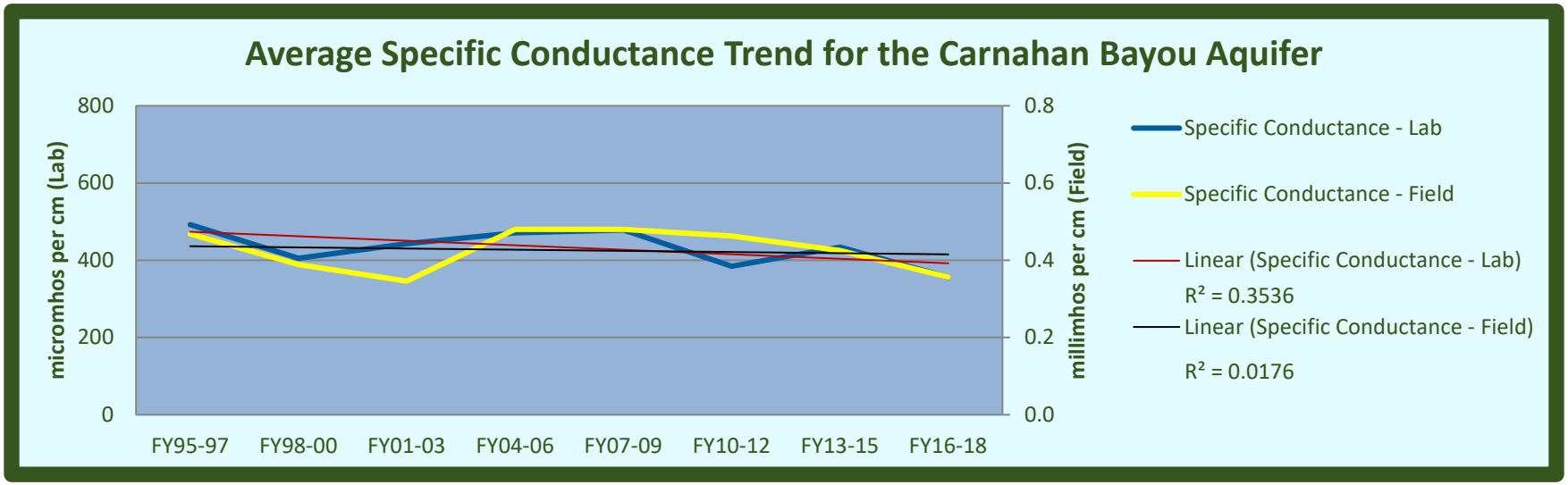


Chart 7-4: Field Salinity Trend

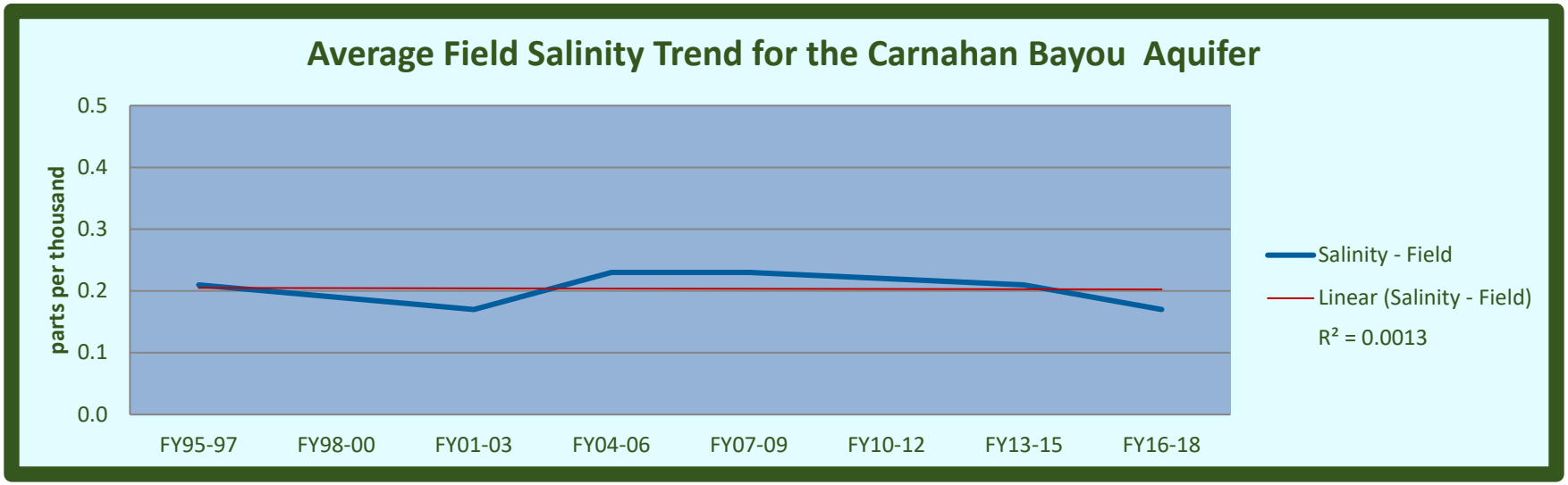


Chart 7-5: Chloride Trend

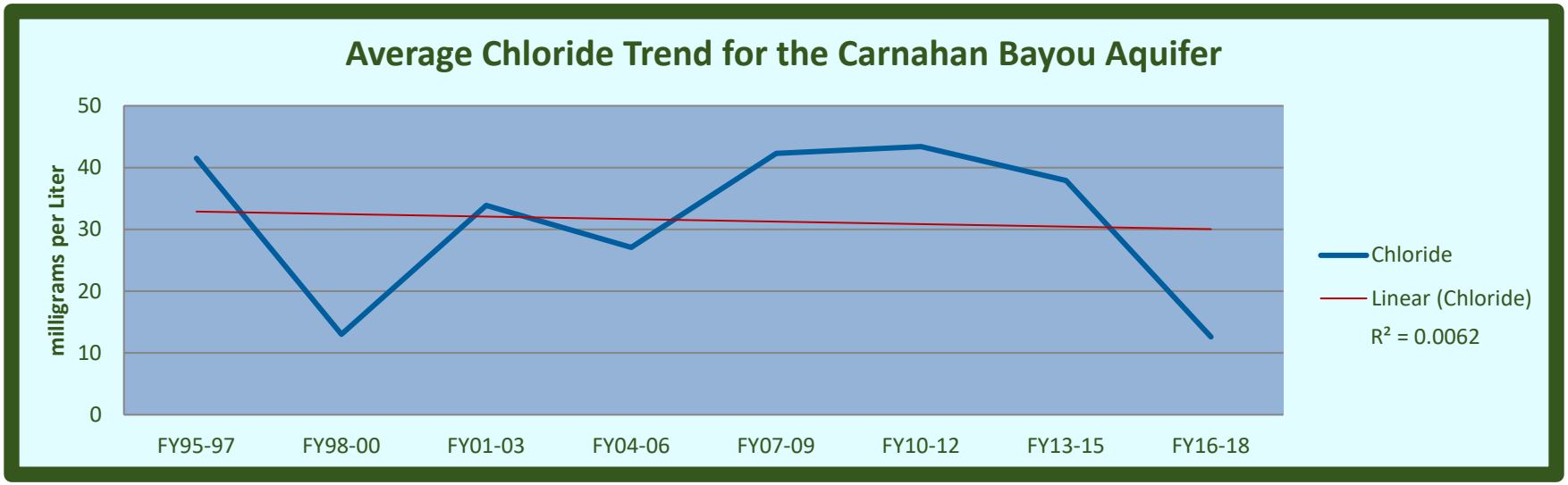


Chart 7-6: Total Dissolved Solids Trend

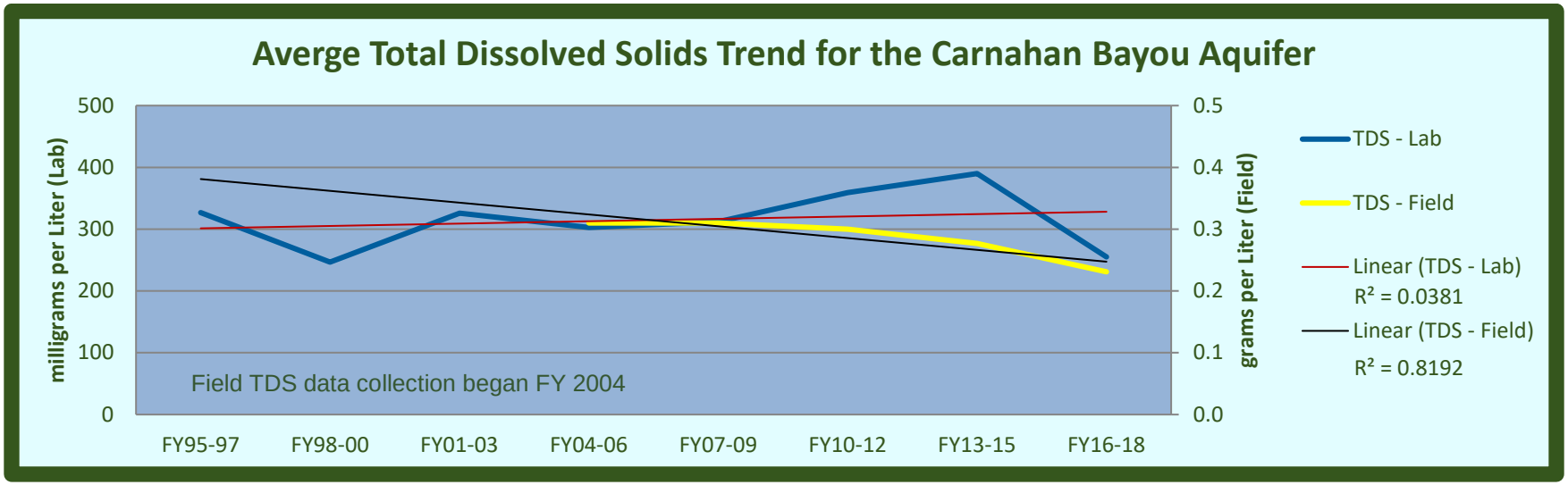


Chart 7-7: Alkalinity Trend

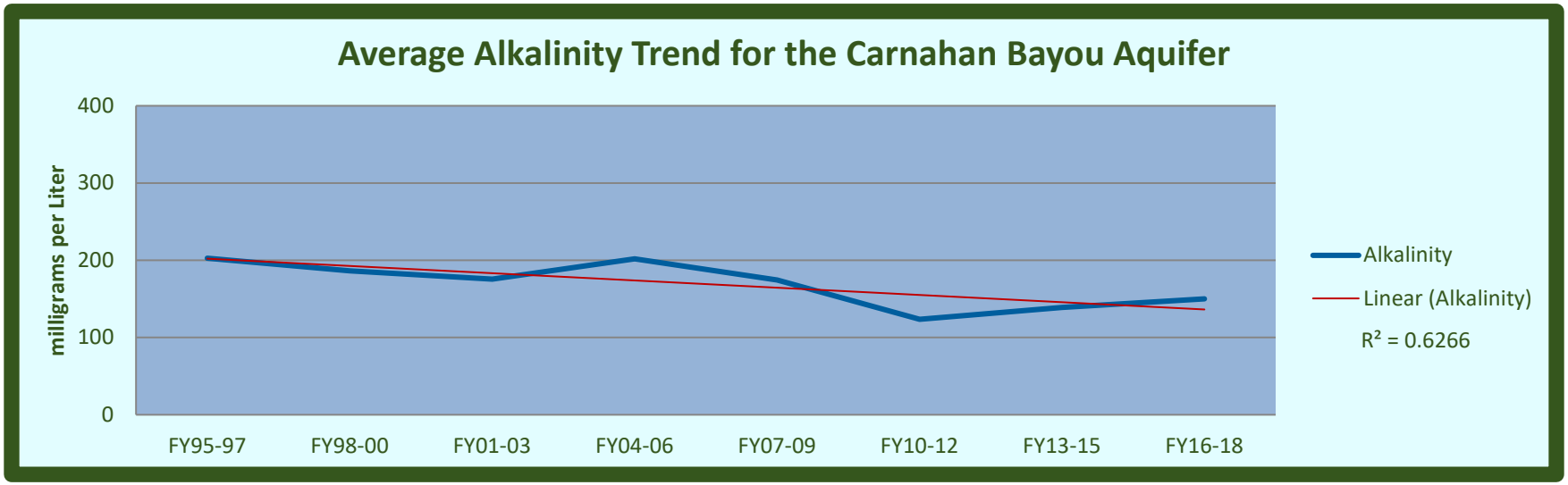


Chart 7-8: Hardness Trend

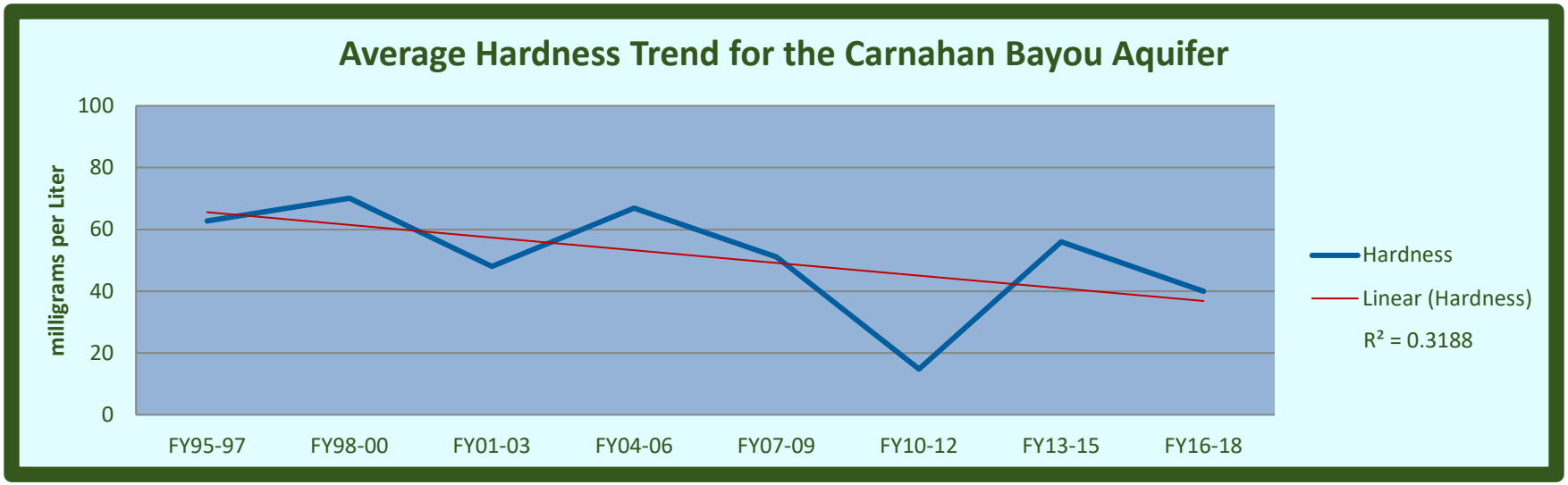


Chart 7-9: Sulfate Trend

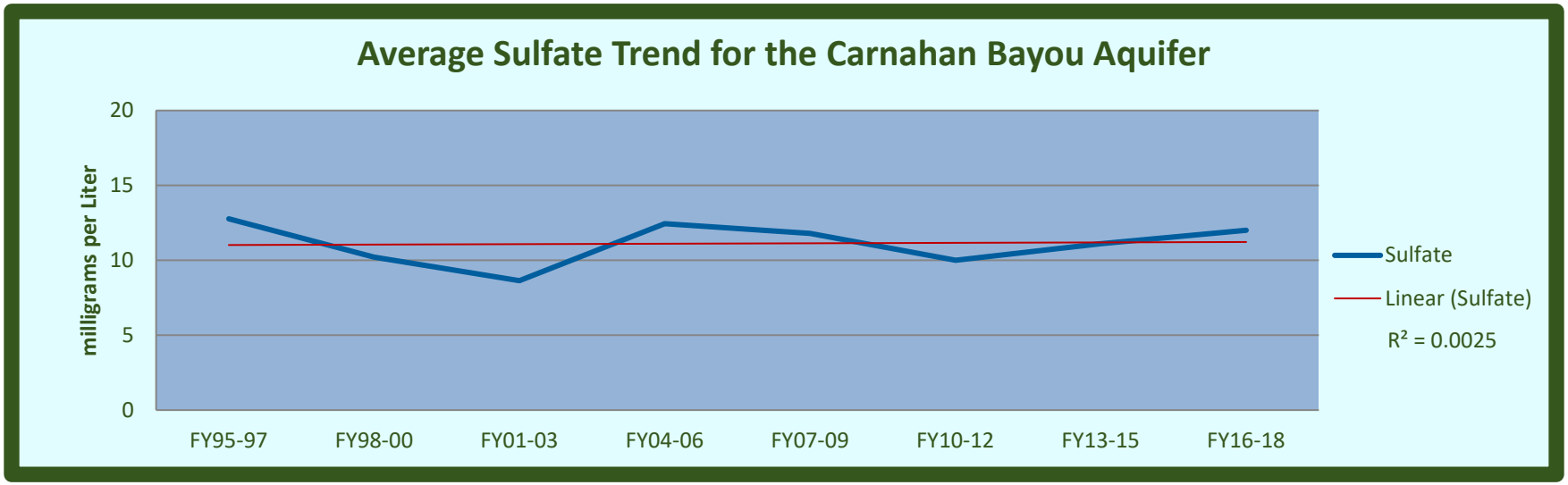


Chart 7-10: Color Trend

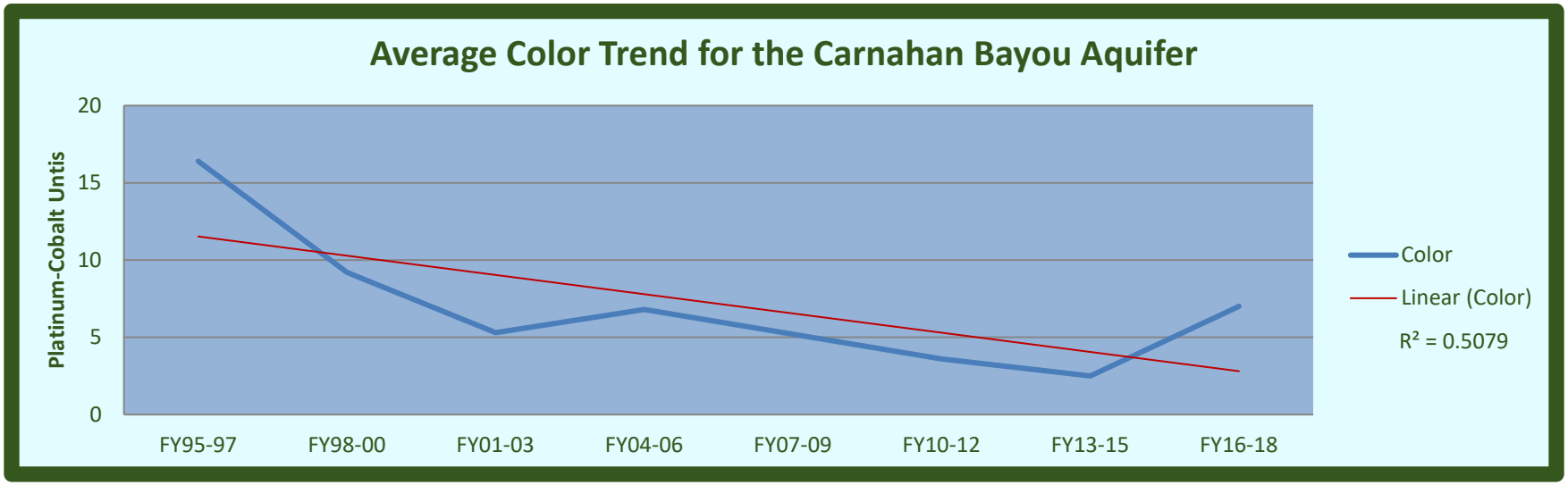


Chart 7-11: Ammonia Trend

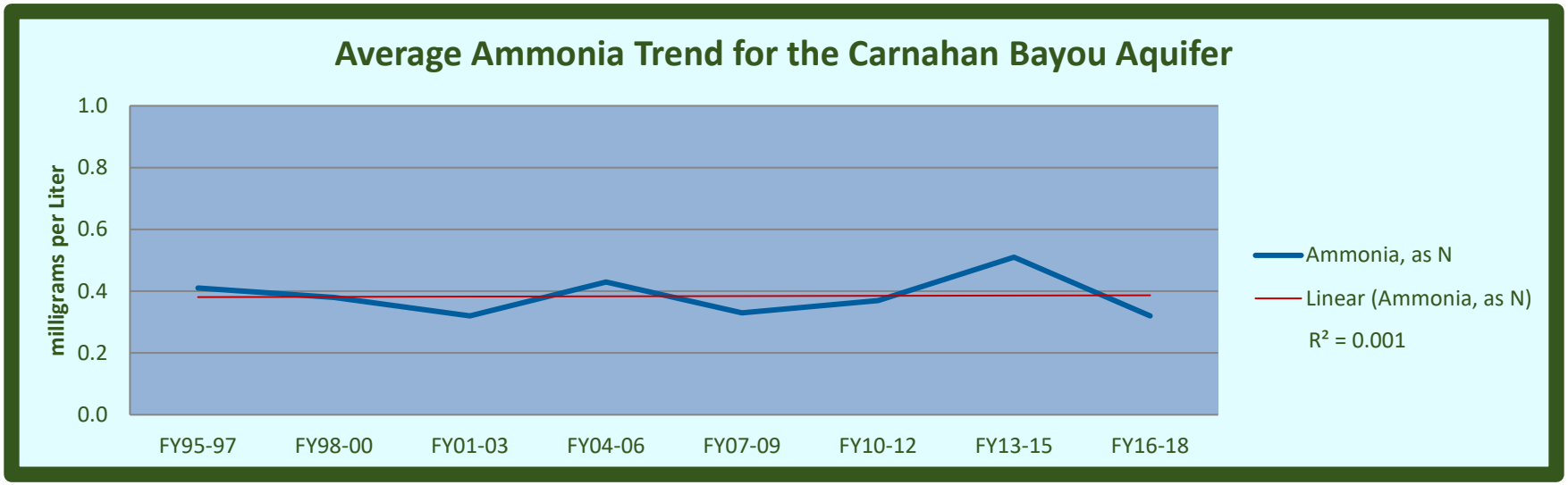


Chart 7-12: Nitrite – Nitrate Trend

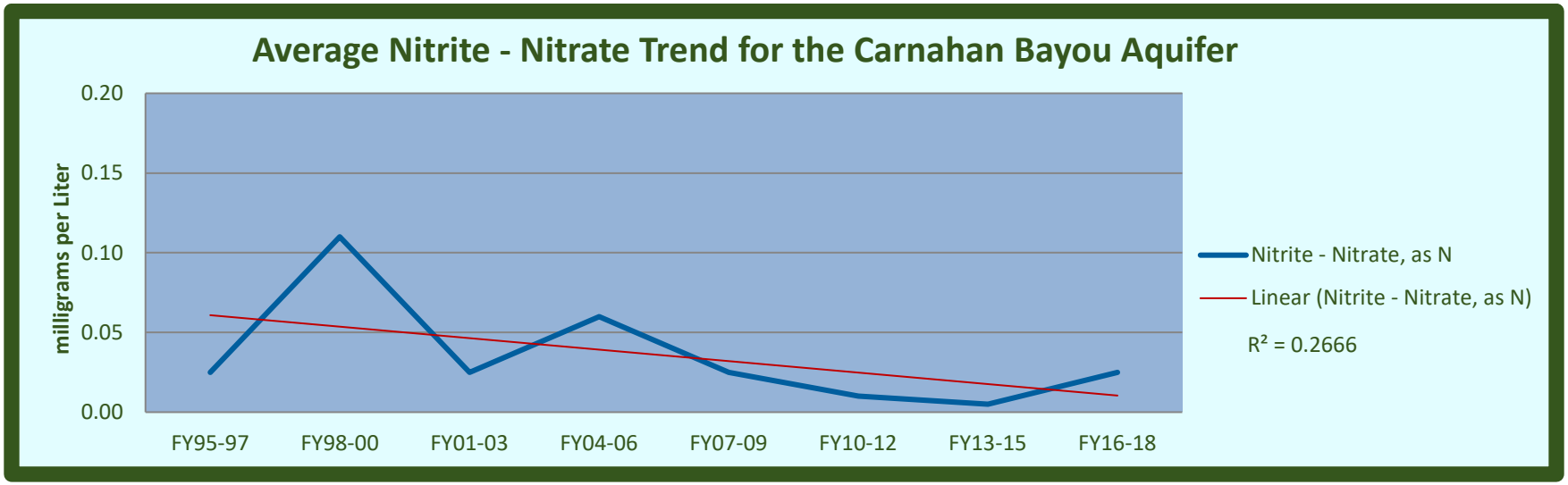


Chart 7-13: Total Kjeldahl Nitrogen Trend

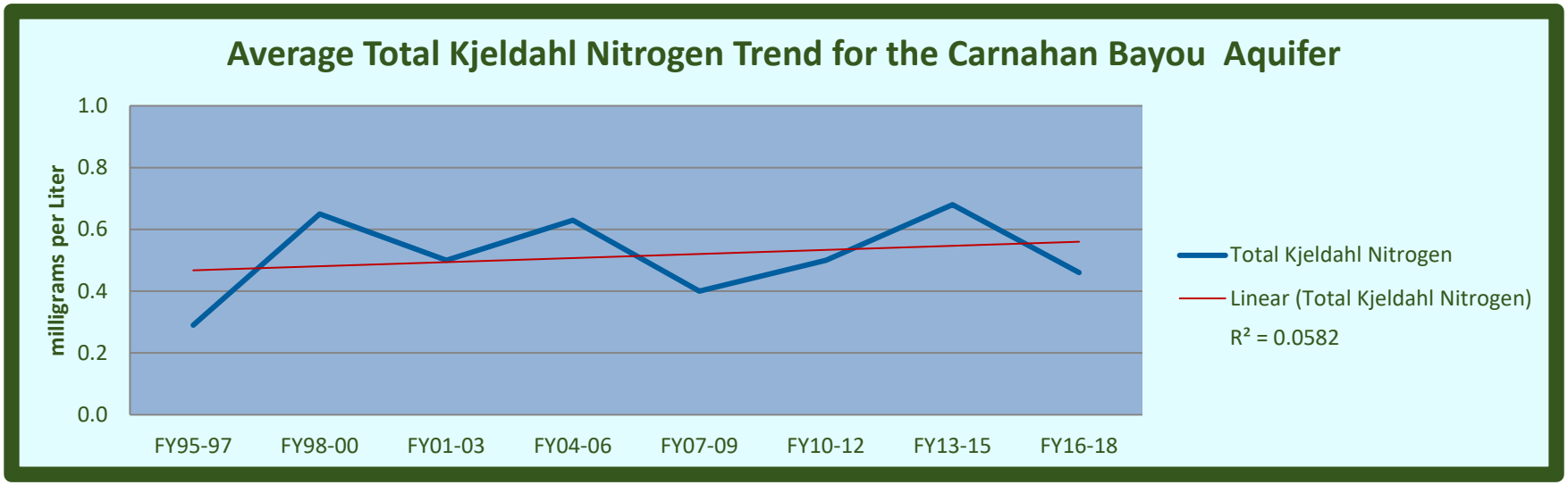


Chart 7-14: Total Phosphorus Trend

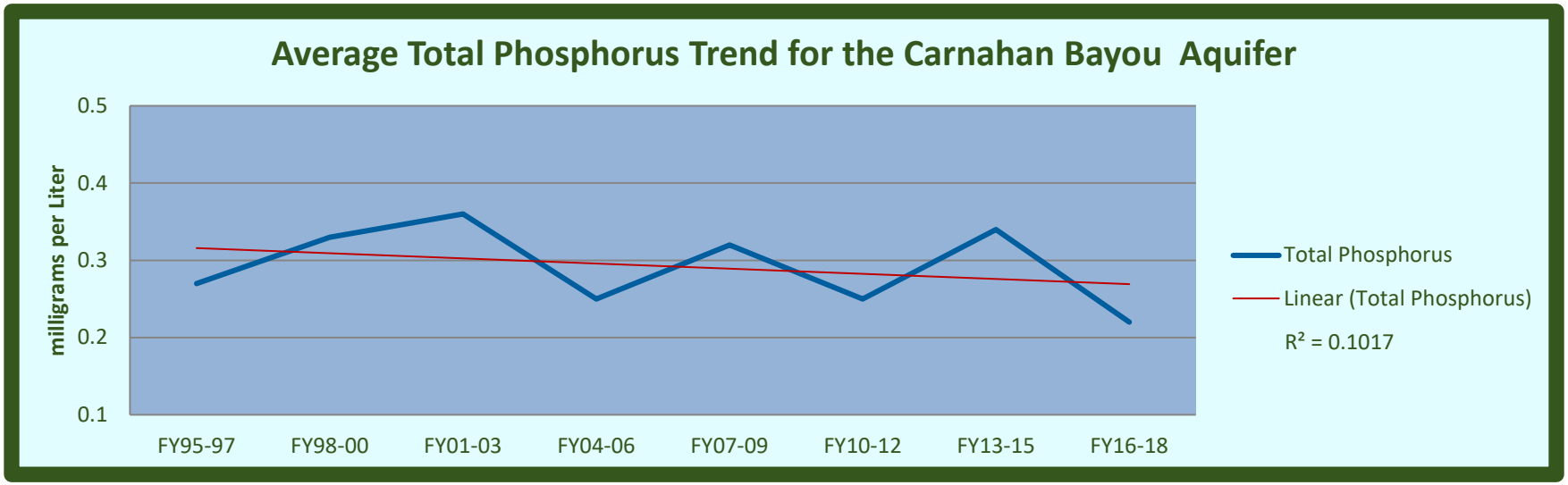


Chart 7-15: Barium Trend

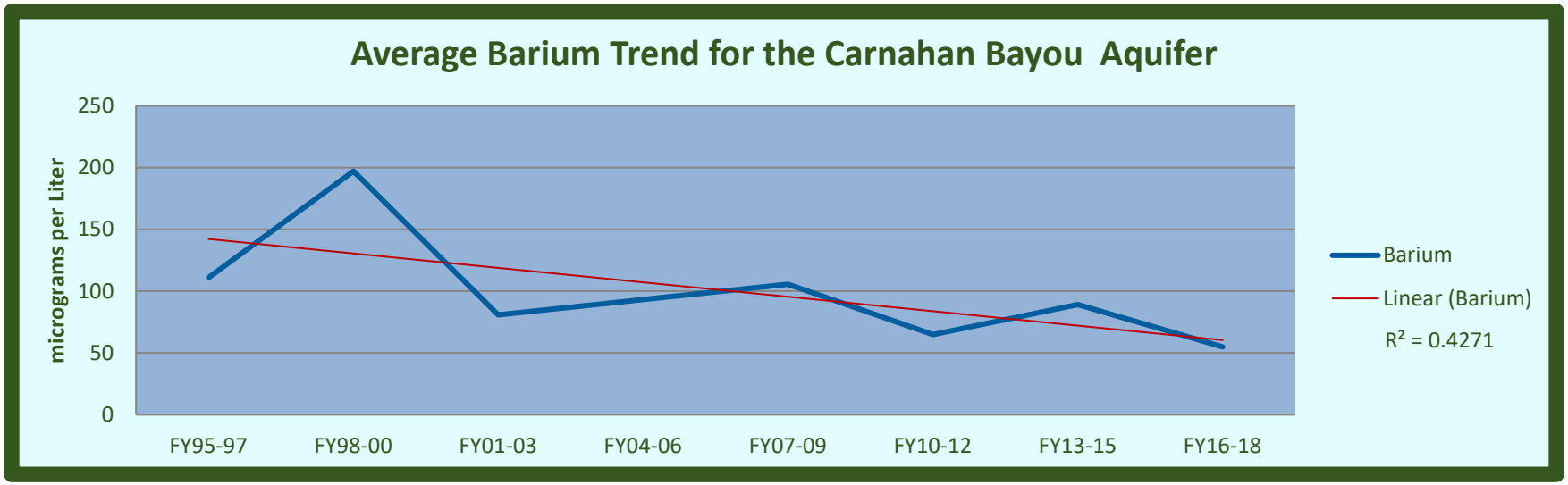


Chart 7-16: Copper Trend

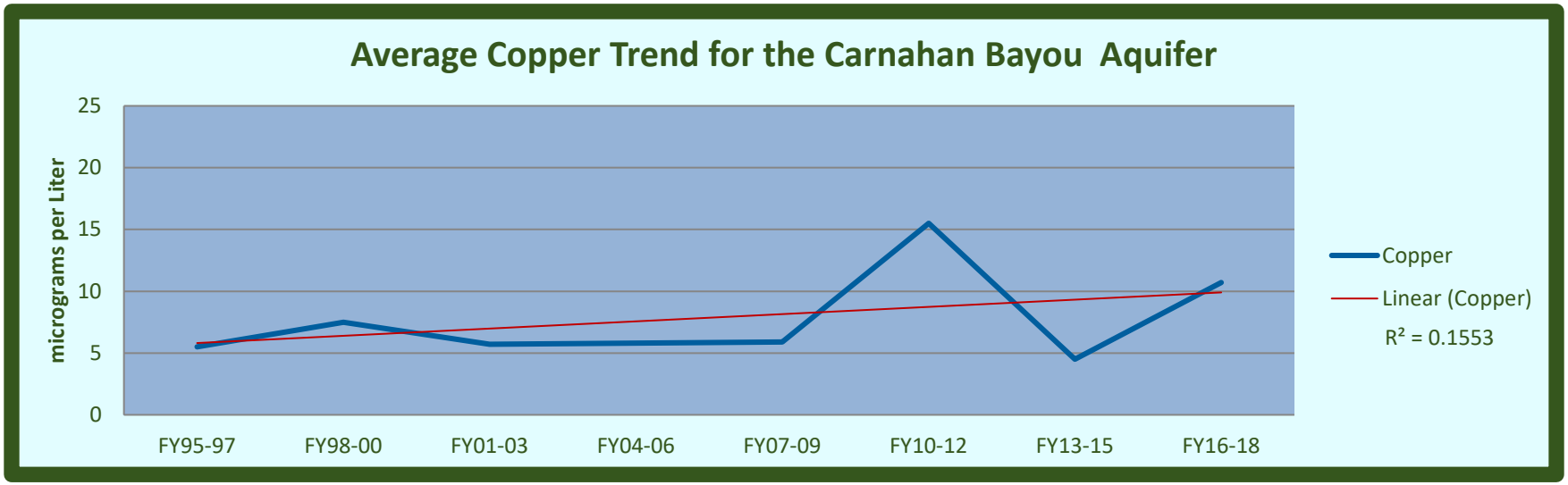


Chart 7-17: Iron Trend

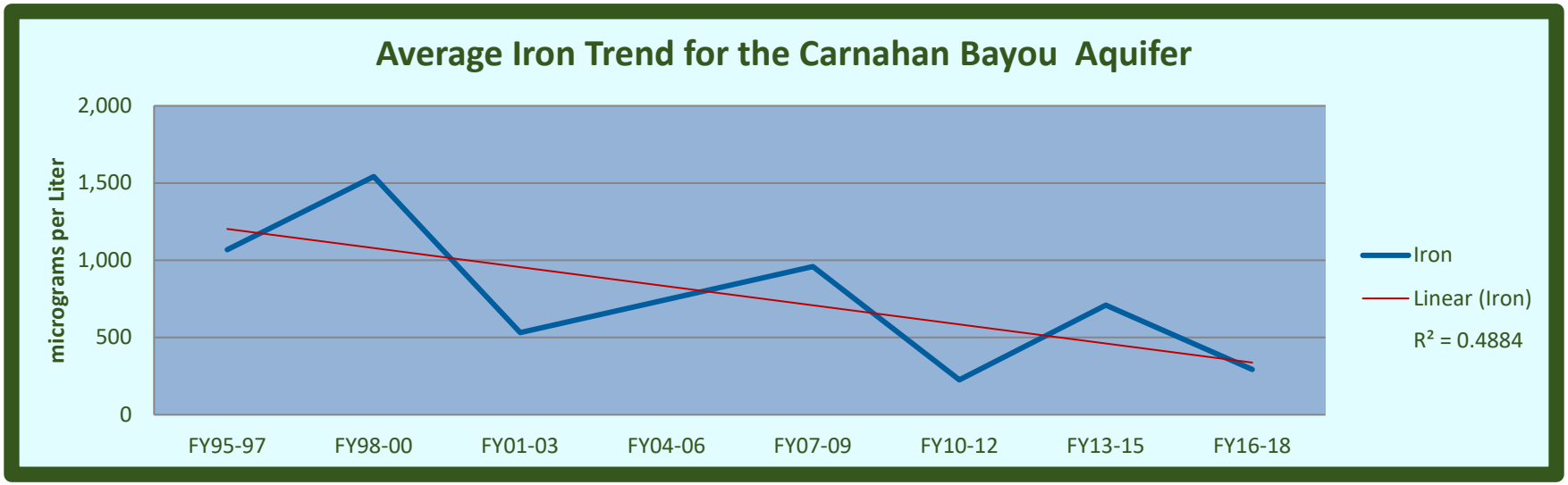


Chart 7-18: Zinc Trend