CHICOT EQUIVALENT AQUIFER SYSTEM SUMMARY, 2015
AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

APPENDIX 12 TO THE 2015 TRIENNIAL SUMMARY REPORT

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Contents

BACKGROUND

The Louisiana Department of Environmental Quality's (LDEQ) Aquifer Sampling and Assessment (ASSET) Program 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 and associated wells are 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.

Analytical and field data contained in this summary were collected from wells producing from the Chicot Equivalent aquifer system during the 2015 and 2016 state fiscal years (July 1, 2014 - June 30, 2016). This summary will become Appendix 12 of the ASSET Program Triennial Summary Report for 2015.

These data show that between August 2014 and July 2015, 26 wells were sampled which produce from the Chicot Equivalent aquifer system. Ten wells are classified as domestic, nine are classified as industrial, five are classified as public supply, one irrigation well, and one monitoring well. The wells are located in 12 parishes in southeast Louisiana.

Figure 12-1 shows the geographic locations of the Chicot Equivalent aquifer system and the associated wells, whereas Table 12-1 lists the wells monitored 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 Chicot Equivalent aquifer system is composed of the Pleistocene aged aquifers of the New Orleans area, the Baton Rouge area, and St. Tammany, Tangipahoa, and Washington Parishes. The aquifers are in Pleistocene aged alluvial and terrace deposits. 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 are moderately well, to well sorted, and consist of fine sand near the top, grading to coarse sand and gravel in lower parts and are generally confined by silt and clay layers.

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. The Mississippi River Valley is entrenched into the Pleistocene strata in the western part of the system, resulting in water movement between the river, the shallow sands, and the Pleistocene aquifers. Recharge occurs primarily by the direct infiltration of rainfall in interstream, upland outcrop areas, by the movement of water between aquifers, and between the aquifers and the Mississippi River. The hydraulic conductivity varies between 10-200 feet/day.

The maximum depths of occurrence of freshwater in the Chicot Equivalent range from 350 feet above sea level, to 1,100 feet below sea level. The range of thickness of the fresh water interval in the Chicot Equivalent is 50 to 1,100 feet. The depths of the Chicot Equivalent wells that were monitored in conjunction with ASSET range from 90 to 775 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 12-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 12-3. These tables also show the field and analytical results determined for each analyte. For quality control, duplicate samples were taken for each parameter from wells AN-9183Z, EB-8599Z, JF-224, and LI-7945Z.

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 detections (if any), from any of these three categories, can be found in their respective sections. Tables 12-8, 12-9 and 12-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Tables 12-4 and 12-5 provide a statistical overview of field and conventional data, and inorganic data for the Chicot Equivalent aquifer system, listing the minimum, maximum, and average results for these parameters collected in the FY 2015 sampling. Tables 12-6 and 12-7 compare these same parameter averages to historical ASSET-derived data for the Chicot Equivalent aquifer system, 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 12-2, 12-3, 12-4, and 12-5, respectively, represent the contoured data for pH, total dissolved solids, chloride, and iron. Charts 12-1 through 12-16 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 primary 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. Data contained in Tables 12-2 and 12-3 show that one MCL was exceeded in one of the 26 wells sampled in the Chicot Equivalent aquifer system, as discussed in the Inorganics section below.

EPA has also set secondary standards, which are defined as non-enforceable taste, odor, or appearance guidelines. Field and laboratory data contained in Tables 12-2 and 12-3 show that five parameters exceeded secondary MCLs (SMCL) in 19 of the 26 wells sampled in the Chicot Equivalent aquifer system.

Field and Conventional Parameters

Table 12-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 12-6 provides an overview of field and conventional parameter data averages for the Chicot Equivalent aquifer system, including the six previous sampling event averages.

Federal Primary Drinking Water Standards: A review of the data listed in Table 12-2 shows that no primary MCL was exceeded for field or conventional parameters for this reporting period. 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 data listed in Table 12-2 shows that nine wells exceeded the SMCL for pH, three wells exceeded the SMCL for chloride, three wells exceeded the SMCL for color, and seven wells exceeded the SMCL for total dissolved solids. Laboratory results override field results in exceedance determination, thus only laboratory results are counted in determining SMCL exceedance numbers. Following is a list of SMCL parameter exceedances with well number and results:

pH (SMCL = 6.5 – 8.5 Standard Units):

EF-5329Z	5.96 SU	SH-5333Z	6.48 SU
SH-77	6.40 SU	ST-11516Z	8.67 SU
ST-5245Z	5.27 SU	TA-520	5.55 SU
TA-7627Z	6.36 SU	WA-5295Z	5.50 SU
WA5311Z	4.13 SU		

Chloride (SMCL = 250 mg/L):

AN-6297Z	629.0 mg/L	SC-179	346.0 mg/L
SJB-173	307.0 mg/L (Duplicate – 313.0 mg/L)		

Color (SMCL = 15 PCU):

JF-224	100 PCU (Original and Duplicate)	SC-179	35 PCU
SJB-173	30 PCU (Original and Duplicate)		

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

	LAB RESULTS (in mg/L)	FIELD MEASUSRES (in g/L)
AN-316	510 mg/L	0.592 g/L
AN-321	595 mg/L	0.733 g/L
AN-337	565 mg/L	0.663 g/L
AN-6297Z	1,220 mg/L	1.540 g/L
JF-224	805 mg/L (Duplicate – 820 mg/L)	0.931 g/L (Original and Duplicate)
SC-179	1,060 mg/L	1.223 g/L
SJB-173	960 mg/L (Duplicate – 905 mg/L)	1.119 g/L (Original and Duplicate)

Inorganic Parameters

Table 12-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 12-7 provides an overview of inorganic parameter data averages for the Chicot Equivalent aquifer system, including the six previous sampling event averages.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 10-3 shows that one primary MCL was exceeded in one well for total metals. Industrial well SJ-226 reported arsenic at 10.40 µg/L, which is more than the federal maximum contaminant (MCL) level of 10 µg/L. The occurrence of arsenic in this well has been established, as the ASSET Program has consistently detected it in this well at similar levels. Close attention will continue to be given to this well in ongoing ASSET activities.

Federal Secondary Drinking Water Standards: A review of the analysis listed in Table 12-3 shows that six wells exceeded the secondary MCL for iron:

Iron (SMCL = 300 µg/L):

EB-34	8,680 µg/L	EB-8599Z	348 µg/L (Duplicate – 338 µg/L)
JF-224	349 µg/L (Duplicate – 330 µg/L)	SJ-226	1,540 µg/L
SJB-173	547 µg/L (Duplicate – 536 µg/L)	ST-11516Z	334 µg/L

Volatile Organic Compounds

Table 12-8 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.

The volatile organic compound, chloroform (a disinfection by-product and common laboratory contaminant, and has no MCL established for it), was detected in domestic well SH-5333Z at 0.58 µg/L, just above the detection limit of 0.50 µg/L. There were no other confirmed detections

of VOCs at or above their respective detection limits during the FY 2015 sampling of the Chicot Equivalent aquifer system.

Semi-Volatile Organic Compounds

Table 12-9 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 Chicot Equivalent aquifer system.

Pesticides and PCBs

Table 12-10 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 2015 sampling of the Chicot Equivalent aquifer system.

WATER QUALITY TRENDS AND COMPARISON TO HISTORICAL ASSET DATA

Analytical and field data show that the quality and characteristics of groundwater produced from the Chicot Equivalent aquifer system 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 12-6 and 12-7, and in Charts 12-1 to 12-16 of this summary. Over the eighteen-year period, four analytes have shown a general increase in average concentration, (temperature, hardness, total phosphorus, and iron), while eight analytes have shown a general decrease in average concentration, (alkalinity, ammonia, chloride, color, salinity, specific conductance (lab and field), sulfate, and TDS). All other analyte averages have remained consistent or have been non-detect for this period. The number of secondary exceedances in the Chicot Equivalent aquifer system is similar to the previous sampling in FY 2012. In FY 2012 there were 26 SMCL exceedances, FY 2015 there were 25 SMCL exceedances.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the groundwater produced from this aquifer is moderately hard[1] and is of fair quality given that one primary MCL was exceeded in one of the 26 wells sampled in FY 2015. The data also show that this aquifer is of fair quality when considering taste, odor, or appearance guidelines, with 28 Secondary MCLs exceeded in 19 wells.

Comparison to historical ASSET-derived data shows some change in the quality or characteristics of the Chicot Equivalent aquifer system, with four parameters showing consistent increases in average concentrations and eight parameters decreasing in average concentration with the remainder of the analyte averages staying consistent over the previous 18 years.

Close attention will be given to the occurrence of arsenic in well SJ-226, which is well established at a consistent concentration around 10 µg/L. It is recommended that the wells assigned to the Chicot Equivalent aquifer system be re-sampled as planned, in approximately three years. In addition, several wells should be added to the 26 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 12-1: List of Wells Sampled, Chicot Equivalent Aquifer System – FY 2015

Well ID	Parish	Date	Owner	Depth (Feet)	Well Use
AN-266	Ascension	09/23/2014	City of Gonzales	548	Public Supply
AN-316	Ascension	09/25/2014	Westlake Vinyls	478	Industrial
AN-321	Ascension	09/25/2014	Rubicon, Inc.	523	Industrial
AN-337	Ascension	09/25/2014	BASF Corp.	459	Public Supply
AN-500	Ascension	09/25/2014	Lion Copolymer	480	Industrial
AN-6297Z	Ascension	12/12/2014	Oxy Chemical	294	Monitor
AN-9183Z	Ascension	09/23/2014	Private Owner	630	Domestic
EB-1231	East Baton Rouge	08/19/2014	Georgia Pacific Corp.	280	Industrial
EB-34	East Baton Rouge	08/19/2014	ExxonMobil USA	453	Industrial
EB-8599Z	East Baton Rouge	08/21/2014	Private Owner	180	Domestic
EB-991B	East Baton Rouge	08/19/2014	Baton Rouge Water Works	565	Public Supply
EF-5329Z	East Feliciana	08/19/2014	Private Owner	97	Domestic
JF-224	Jefferson	12/15/2014	Entergy	775	Industrial
LI-5477Z	Livingston	12/23/2014	Private Owner	106	Domestic
LI-7945Z	Livingston	12/23/2014	Frenchsettlement Water System	455	Public Supply
SC-179	St. Charles	12/15/2014	Union Carbide	460	Industrial
SH-5333Z	St. Helena	08/21/2014	Private Owner	230	Domestic
SH-77	St. Helena	08/19/2014	Transco	170	Public Supply
SJ-226	St. James	12/15/2014	Noranda Alumina, LLC	248	Industrial
SJB-173	St. John the Baptist	07/20/2015	DuPont	425	Industrial
ST-11516Z	St. Tammany	12/23/2014	Louisiana State Parks	340	Domestic
ST-5245Z	St. Tammany	09/23/2014	Premier Pastures	90	Domestic
TA-520	Tangipahoa	08/21/2014	Private Owner	135	Irrigation
TA-7627Z	Tangipahoa	04/02/2015	Global Wildlife Center	120	Domestic
WA-5295Z	Washington	09/23/2014	Private Owner	100	Domestic
WA-5311Z	Washington	08/21/2014	Private Owner	90	Domestic

Table 12-2: Summary of Field and Conventional Data – FY 2015

Chicot 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. NTU
	LABORATORY DETECTION LIMITS† →					2	1/10	5/20	5	0.05	0.1	0.05	1	1	10	0.1	4	0.1
	FIELD PARAMETERS					LABORATORY PARAMETERS												
AN-266	7.77	0.15	0.323	23.82	0.210	134	14.7	< DL	50	< DL	0.34	0.27	285	4.1	200	0.40	5	0.3
AN-316	7.73	0.45	0.911	23.50	0.592	154	192.0	< DL	78	< DL	0.31	< DL	9	< DL	510	0.44	< DL	0.5
AN-321	7.89	0.56	1.127	22.59	0.733	142	241.0	< DL	70	< DL	0.45	0.20	1,140	< DL	595	0.45	< DL	0.1
AN-337	7.62	0.5	1.020	23.62	0.663	134	200.0	< DL	94	< DL	0.47	0.12	990	1.8	565	0.71	< DL	1.0
AN-500	7.92	0.17	0.363	22.96	0.236	130	26.0	< DL	60	< DL	0.39	0.21	362	2.7	210	0.48	< DL	0.5
AN-6297Z	8.47	No Data	2.400	21.61	1.540	188	629.0	< DL	160	< DL	2.00	0.10	2,380	< DL	1,220	2.10	< DL	0.8
AN-9183Z	7.99	0.2	0.418	24.10	0.272	146	33.5	< DL	6	< DL	< DL	0.22	376	4.0	270	0.43	< DL	0.5
AN-9183Z*	7.99	0.2	0.418	24.10	0.272	150	33.5	< DL	30	< DL	0.12	0.15	362	3.9	270	0.38	< DL	0.4
EB-1231	6.80	0.11	0.242	20.47	0.157	62	29.3	< DL	70	< DL	< DL	0.06	251	3.7	130	< DL	< DL	0.4
EB-34	6.65	0.16	0.329	22.81	0.214	142	9.2	10	64	0.06	0.24	0.46	334	< DL	225	0.27	12	37.7
EB-8599Z	7.18	0.09	0.184	21.45	0.120	66	21.1	< DL	62	< DL	< DL	0.18	192	6.8	220	< DL	< DL	1.8
EB-8599Z*	7.18	0.09	0.184	21.45	0.120	62	12.0	< DL	64	< DL	0.13	0.12	192	4.1	160	< DL	< DL	1.5
EB-991B	7.02	0.12	0.265	23.25	0.172	118	3.0	< DL	24	< DL	0.11	0.19	282	8.9	170	< DL	< DL	0.6
EF-5329Z	5.96	0.02	0.052	21.53	0.034	12	3.7	< DL	16	0.27	< DL	< DL	38	2.0	50	< DL	< DL	0.6
JF-224	8.10	0.72	1.433	22.39	0.931	334	90.7	100	72	< DL	0.57	0.57	1,380	< DL	805	1.40	< DL	0.8
JF-224*	8.10	0.72	1.433	22.39	0.931	360	122.0	100	46	< DL	0.74	0.56	1,480	< DL	820	1.20	< DL	0.6
LI-5477Z	8.13	0.19	0.400	21.14	0.260	189	8.6	10	62	< DL	0.26	0.24	358	< DL	220	0.23	< DL	0.3
LI-7945Z	8.29	0.15	0.319	23.14	0.208	134	14.5	10	26	< DL	0.15	0.29	284	5.9	200	0.29	< DL	0.3
LI-7945Z*	8.29	0.15	0.319	23.14	0.208	134	14.5	10	32	< DL	0.17	0.26	284	5.9	175	0.22	< DL	0.4
SC-179	6.81	0.96	1.882	22.31	1.223	440	346.0	35	92	< DL	1.30	0.39	1,880	< DL	1,060	2.70	< DL	0.3
SH-5333Z	6.48	0.03	0.073	21.49	0.048	20	8.0	< DL	26	< DL	< DL	< DL	73	< DL	30	< DL	5	0.5
SH-77	6.40	0.01	0.030	23.79	0.020	6	3.2	< DL	16	0.21	< DL	< DL	26	< DL	40	< DL	< DL	2.2
SJ-226	Field Data Not Collected					252	128.0	5	680	< DL	1.60	0.46	850	17.1	475	1.60	< DL	5.0
SJB-173	7.69	0.87	1.721	21.63	1.119	429	307.0	30	188	0.06	1.20	0.27	1,420	< DL	960	2.00	< DL	1.0
SJB-173*	7.69	0.87	1.721	21.63	1.119	429	313.0	30	202	< DL	1.50	0.27	1,400	< DL	905	2.00	< DL	1.3

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† →						2	1/10	5/20	5	0.05	0.1	0.05	1	1	10	0.1	4	0.1
	FIELD PARAMETERS					LABORATORY PARAMETERS												
ST-11516Z	8.67	0.14	0.304	20.49	0.197	146	8.8	10	40	0.08	< DL	0.33	267	1.9	155	< DL	< DL	1.1
ST-5245Z	5.27	0.02	0.039	21.03	0.025	4	4.4	< DL	28	0.52	0.11	< DL	31	< DL	25	0.15	< DL	0.6
TA-520	5.55	0.02	0.052	22.05	0.034	6	5.2	< DL	42	1.90	< DL	< DL	49	< DL	20	< DL	< DL	1.6
TA-7627Z	6.36	0.02	0.038	20.71	0.025	6	3.9	5	8	0.05	0.27	< DL	24	< DL	30	1.60	< DL	0.2
WA-5295Z	5.50	0.01	0.035	21.77	0.023	6	2.1	< DL	28	< DL	< DL	< DL	27	< DL	35	0.21	< DL	0.3
WA-5311Z	4.13	0.01	0.032	20.93	0.021	2	3.2	< DL	16	0.70	< DL	< DL	28	< DL	< DL	< DL	< DL	1.0

†Detection limits vary due to dilution factor *Denotes Duplicate Sample Exceed EPA Secondary Standards

Table 12-3: Summary of Inorganic Data – FY 2015

Chicot 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 Detection Limits†	1	1	1	0.5/1	1	1	3	50	1	0.2	1	1	0.5	0.5	5
AN-266	< DL	< DL	112	< DL	< DL	1.1	< DL	132	< DL	< DL	1.00	1.9	0.9	0.9	12.0
AN-316	< DL	< DL	348	< DL	< DL	< DL	< DL	168	< DL	< DL	< DL	2.8	< DL	< DL	< DL
AN-321	< DL	< DL	243	< DL	< DL	< DL	< DL	154	< DL	< DL	< DL	3.5	< DL	< DL	6.3
AN-337	< DL	< DL	331	< DL	< DL	< DL	< DL	235	< DL	< DL	< DL	2.9	< DL	< DL	139.0
AN-500	< DL	< DL	105	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	75.8
AN-6297Z	< DL	< DL	502	< DL	< DL	< DL	< DL	139	< DL	< DL	< DL	< DL	< DL	< DL	< DL
AN-9183Z	< DL	< DL	33	< DL	< DL	1.1	3.3	< DL	< DL	< DL	< DL	1.4	< DL	< DL	7.6
AN-9183Z*	< DL	< DL	36	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	5.8
EB-1231	< DL	< DL	135	< DL	< DL	< DL	< DL	54	< DL	< DL	< DL	2.8	< DL	< DL	8.3
EB-34	< DL	1.50	185	< DL	< DL	< DL	4.5	8,680	< DL	< DL	< DL	< DL	< DL	< DL	8.9
EB-8599Z	< DL	< DL	206	< DL	< DL	< DL	< DL	348	< DL	< DL	< DL	1.7	< DL	< DL	< DL
EB-8599Z*	< DL	< DL	204	< DL	< DL	< DL	< DL	338	< DL	< DL	< DL	< DL	< DL	< DL	< DL
EB-991B	< DL	< DL	26	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	6.0
EF-5329Z	< DL	< DL	22	< DL	< DL	< DL	12.6	< DL	< DL	< DL	< DL	< DL	< DL	< DL	25.8
JF-224	< DL	< DL	130	< DL	< DL	< DL	< DL	349	< DL	< DL	< DL	< DL	< DL	< DL	< DL
JF-224*	< DL	< DL	125	< DL	< DL	1.2	12.3	330	< DL	< DL	< DL	< DL	< DL	< DL	7.2
LI-5477Z	< DL	< DL	92	< DL	< DL	< DL	< DL	69	< DL	< DL	< DL	< DL	< DL	< DL	5.4
LI-7945Z	< DL	< DL	46	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
LI-7945Z*	< DL	< DL	49	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
SC-179	< DL	< DL	99	< DL	< DL	< DL	< DL	265	< DL	< DL	< DL	< DL	< DL	< DL	< DL
SH-5333Z	< DL	< DL	70	< DL	< DL	< DL	44.7	< DL	3.4	< DL	< DL	< DL	< DL	< DL	6.5
SH-77	< DL	< DL	10	< DL	< DL	< DL	18.4	116	< DL	< DL	< DL	< DL	< DL	< DL	137.0
SJ-226	< DL	10.40	354	< DL	< DL	< DL	< DL	1,540	< DL	< DL	< DL	< DL	< DL	< DL	< DL
SJB-173	< DL	< DL	408	< DL	< DL	< DL	< DL	547	< DL	< DL	< DL	< DL	< DL	< DL	7.3

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	1	3	50	1	0.2	1	1	0.5	0.5	5
SJB-173*	< DL	< DL	406	< DL	< DL	< DL	< DL	536	< DL	< DL	< DL	< DL	< DL	< DL	12.5
ST-11516Z	< DL	< DL	59	< DL	< DL	< DL	< DL	334	< DL	< DL	< DL	< DL	< DL	< DL	< DL
ST-5245Z	< DL	< DL	39	< DL	< DL	< DL	20.3	97	2.4	< DL	1.10	< DL	< DL	< DL	18.0
TA-520	< DL	< DL	54	< DL	< DL	< DL	631.0	104	3.4	< DL	7.80	< DL	< DL	< DL	376.0
TA-7627Z	< DL	< DL	12	< DL	< DL	< DL	4.9	< DL	1.5	< DL	1.10	< DL	< DL	< DL	47.7
WA-5295Z	< DL	< DL	64	< DL	< DL	1.2	6.2	< DL	< DL	< DL	< DL	< DL	< DL	< DL	14.2
WA-5311Z	< DL	< DL	13	< DL	< DL	2.0	3.0	< DL	1.1	< DL	< DL	< DL	< DL	< DL	6.9

†Detection limits vary due to dilution factor *Denotes Duplicate Sample Exceed EPA Primary Standards Exceed EPA Secondary Standards

Table 12-4: FY 2015 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	pH (SU)	4.13	8.67	7.18
	Salinity (ppt)	0.01	0.96	0.27
	Specific Conductance (mmhos/cm)	0.030	2.400	0.600
	Temperature (^{O}C)	20.47	24.10	22.24
	TDS (g/L)	0.020	1.540	0.391
LABORATORY	Alkalinity (mg/L)	2	440	146
	Chloride (mg/L)	2.1	629.0	91.3
	Color (PCU)	< DL	100	13
	Hardness (mg/L)	6	680	79
	Nitrite - Nitrate, as N (mg/L)	< DL	1.90	0.14
	Ammonia, as N (mg/L)	< DL	2.00	0.42
	Total Phosphorus (mg/L)	< DL	0.57	0.20
	Specific Conductance (umhos/cm)	9	2,380	550
	Sulfate (mg/L)	< DL	17.1	2.6
	TDS (mg/L)	< DL	1,220	347
	TKN (mg/L)	< DL	2.70	0.64
	TSS (mg/L)	< DL	12	< DL
	Turbidity (NTU)	0.1	37.7	2.1

Table 12-5: FY 2015 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (µg/L)	< DL	< DL	< DL
Arsenic (µg//L)	< DL	10.40	< DL
Barium (µg//L)	10	502	146
Beryllium (µg//L)	< DL	< DL	< DL
Cadmium (µg//L)	< DL	< DL	< DL
Chromium (µg//L)	< DL	2.0	0.6
Copper (µg//L)	< DL	631.0	25.5
Iron (µg//L)	< DL	8,680	478
Lead (µg//L)	< DL	3.4	0.8
Mercury (µg//L)	< DL	< DL	< DL
Nickel (µg//L)	< DL	7.80	0.79
Selenium (µg//L)	< DL	3.5	< DL
Silver (µg//L)	< DL	0.9	< DL
Thallium (µg//L)	< DL	0.9	< DL
Zinc (µg//L)	< DL	376.0	30.9

Table 12-6: Triennial Field and Conventional Statistics, ASSET Wells

	PARAMETER	AVERAGE VALUES BY FISCAL YEAR						
		FY 1997	FY 2003	FY 2002	FY 2006	FY 2009	FY 2012	FY 2015
FIELD	pH (SU)	7.09	7.23	7.16	7.16	7.28	7.21	7.18
	Salinity (Sal.) (ppt)	0.32	0.30	0.33	0.27	0.29	0.24	0.27
	Specific Conductance (mmhos/cm)	0.618	0.692	0.669	0.540	0.590	0.470	0.600
	Temperature (^{O}C)	21.17	21.90	21.86	22.40	21.69	21.15	22.24
	TDS (Total dissolved solids) (g/L)	-	-	-	0.350	0.380	0.320	0.391
LABORATORY	Alkalinity (Alk.) (mg/L)	161	166	158	151	151	134	146
	Chloride (Cl) (mg/L)	108.6	125.3	120.2	104.1	99.0	112.8	91.3
	Color (PCU)	18	22	18	18	17	9	13
	Hardness (mg/L)	46	49	46	45	47	107	79
	Nitrite - Nitrate , as N (mg/L)	0.15	0.15	0.14	0.16	0.12	0.19	0.14
	Ammonia, as N (NH3) (mg/L)	0.58	0.51	0.70	0.58	0.50	0.56	0.42
	Total Phosphorus (P) (mg/L)	0.21	0.22	0.14	0.21	0.21	0.45	0.20
	Specific Conductance (µmhos/cm)	624	712	653	630	582	565	550
	Sulfate (SO4) (mg/L)	3.2	2.7	2.7	2.9	2.5	2.6	2.6
	TDS (Total dissolved solids) (mg/L)	394	416	365	372	334	388	347
	TKN (mg/L)	0.89	0.73	0.94	0.67	0.56	0.78	0.64
	TSS (Total suspended solids) (mg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
	Turbidity (Turb.) (NTU)	< DL	< DL	1.9	2.2	1.6	2.4	2.1

Table 12-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	AVERAGE VALUES BY FISCAL YEAR						
	FY 1997	FY 2003	FY 2002	FY 2006	FY 2009	FY 2012	FY 2015
Antimony (µg/L)	5.3	< DL	< DL	< DL	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL	< DL	< DL	0.97	< DL
Barium (µg/L)	107	141	146	131	123	< DL	146
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	0.7	0.6
Copper (µg/L)	19.6	10.8	15.4	< DL	7.9	17.6	25.5
Iron (µg/L)	230	371	641	849	888	443	478
Lead (µg/L)	< DL	< DL	< DL	< DL	< DL	1.45	0.8
Mercury (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Nickel (µg/L)	< DL	< DL	< DL	< DL	3.8	0.7	0.79
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)	32.2	32.0	37.9	21.3	21.7	37.4	30.9

Table 12-8: VOC Analytical Parameters

COMPOUND	METHOD	DETECTION 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	0.50
CARBON TETRACHLORIDE	624	0.50
CHLOROBENZENE	624	0.50
CHLOROETHANE	624	0.50
CHLOROFORM	624	0.50
CHLOROMETHANE	624	0.50
CIS-1,3-DICHLOROPROPENE	624	0.50
DIBROMOCHLOROMETHANE	624	0.50
ETHYL BENZENE	624	0.50
METHYLENE CHLORIDE	624	0.50
O-XYLENE (1,2-DIMETHYLBENZENE)	624	1.0
STYRENE	624	1.0
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	2.0

Table 12-9: SVOC Analytical Parameters

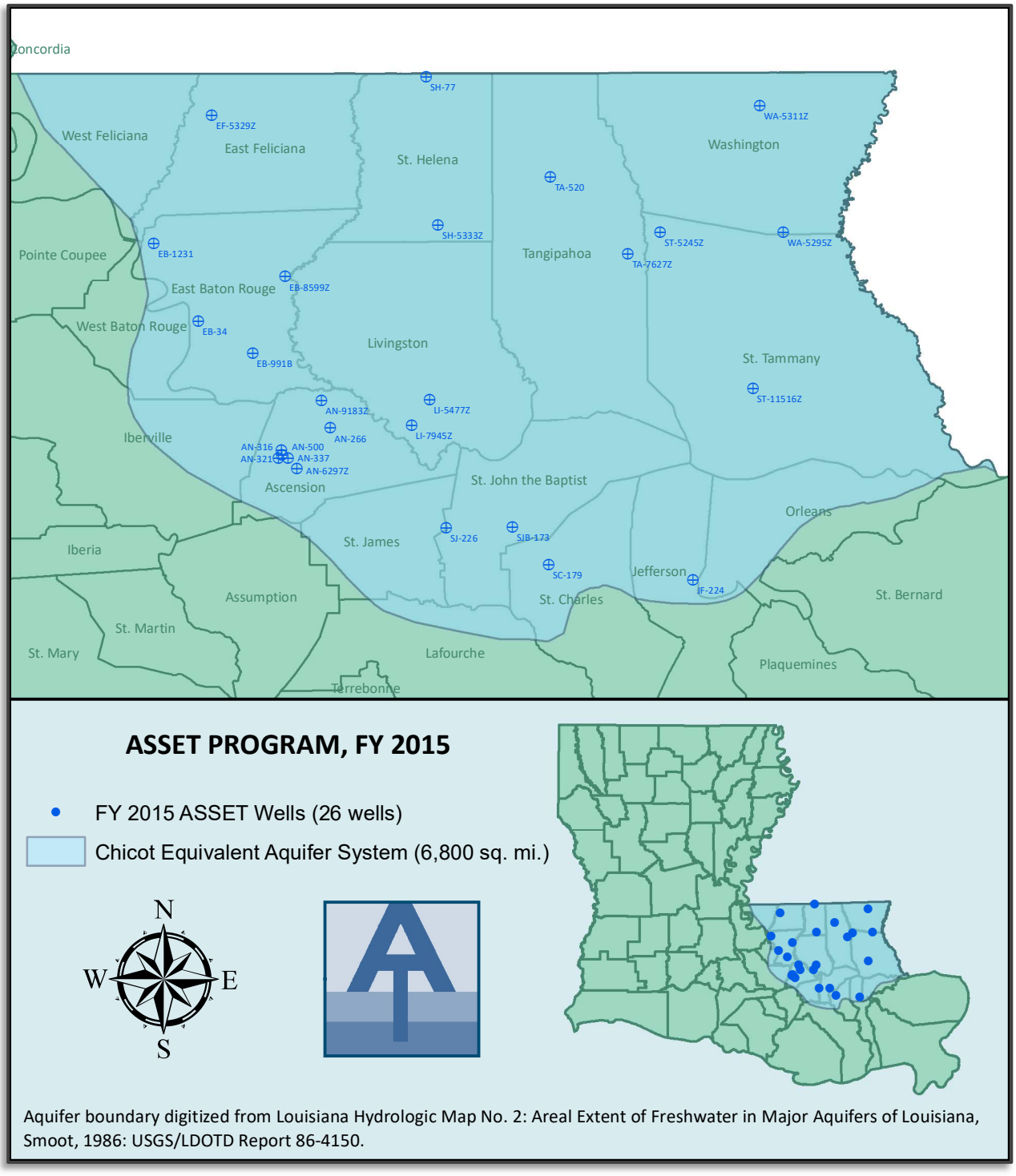
COMPOUND	METHOD	DETECTION LIMIT (µg/L)
1,2,3-TRICHLOROBENZENE	624	1.0
1,2,4-TRICHLOROBENZENE	625	10.0
2,4,6-TRICHLOROPHENOL	625	10.0
2,4-DICHLOROPHENOL	625	10.0
2,4-DIMETHYLPHENOL	625	10.0
2,4-DINITROPHENOL	625	10.0
2,4-DINITROTOLUENE	625	10.0
2,6-DINITROTOLUENE	625	10.0
2-CHLORONAPHTHALENE	625	10.0
2-CHLOROPHENOL	625	10.0
2-NITROPHENOL	625	10.0
3,3'-DICHLOROBENZIDINE	625	20.0
4,6-DINITRO-2-METHYLPHENOL	625	10.0
4-BROMOPHENYL PHENYL ETHER	625	10.0
4-CHLORO-3-METHYLPHENOL	625	10.0
4-CHLOROPHENYL PHENYL ETHER	625	10.0
4-NITROPHENOL	625	10.0
ACENAPHTHENE	625	10.0
ACENAPHTHYLENE	625	10.0
ANTHRACENE	625	10.0
BENZIDINE	625	30.0
BENZO(A)ANTHRACENE	625	10.0
BENZO(A)PYRENE	625	10.0
BENZO(B)FLUORANTHENE	625	10.0
BENZO(G,H,I)PERYLENE	625	10.0
BENZO(K)FLUORANTHENE	625	10.0
BENZYL BUTYL PHTHALATE	625	10.0
BIS(2-CHLOROETHOXY) METHANE	625	10.0
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	625	10.0
BIS(2-CHLOROISOPROPYL) ETHER	625	10.0
BIS(2-ETHYLHEXYL) PHTHALATE	625	10.0
CHRYSENE	625	10.0
DIBENZ(A,H)ANTHRACENE	625	10.0
DIETHYL PHTHALATE	625	10.0
DIMETHYL PHTHALATE	625	10.0
DI-N-BUTYL PHTHALATE	625	10.0
DI-N-OCTYLPHTHALATE	625	10.0
FLUORANTHENE	625	10.0

COMPOUND	METHOD	DETECTION LIMIT (µg/L)
FLUORENE	625	10.0
HEXACHLOROBENZENE	625	10.0
HEXACHLOROBUTADIENE	625	10.0
HEXACHLOROCYCLOPENTADIENE	625	10.0
HEXACHLOROETHANE	625	10.0
INDENO(1,2,3-C,D)PYRENE	625	10.0
ISOPHORONE	625	10.0
NAPHTHALENE	625	10.0
NITROBENZENE	625	10.0
N-NITROSODIMETHYLAMINE	625	10.0
N-NITROSODI-N-PROPYLAMINE	625	10.0
N-NITROSODIPHENYLAMINE	625	10.0
PENTACHLOROPHENOL	625	10.0
PHENANTHRENE	625	10.0
PHENOL	625	10.0
PYRENE	625	10.0

Table 12-10: Pesticides and PCBs

COMPOUND	METHOD	DETECTION LIMITS (µg/L)
ALDRIN	608	0.050
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	608	0.050
ALPHA ENDOSULFAN	608	0.050
ALPHA-CHLORDANE	608	0.050
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	608	0.050
BETA ENDOSULFAN	608	0.10
CHLORDANE	608	0.50
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	608	0.050
DIELDRIN	608	0.10
ENDOSULFAN SULFATE	608	0.10
ENDRIN	608	0.10
ENDRIN ALDEHYDE	608	0.10
ENDRIN KETONE	608	0.10
GAMMA-CHLORDANE	608	0.050
HEPTACHLOR	608	0.050
HEPTACHLOR EPOXIDE	608	0.050
METHOXYCHLOR	608	0.50
P,P'-DDD	608	0.10
P,P'-DDE	608	0.10
P,P'-DDT	608	0.10
PCB-1016 (AROCHLOR 1016)	608	1.0
PCB-1221 (AROCHLOR 1221)	608	1.0
PCB-1232 (AROCHLOR 1232)	608	1.0
PCB-1242 (AROCHLOR 1242)	608	1.0
PCB-1248 (AROCHLOR 1248)	608	1.0
PCB-1254 (AROCHLOR 1254)	608	1.0
PCB-1260 (AROCHLOR 1260)	608	1.0
TOXAPHENE	608	2.0

Figure 12-1: Location Plat, Chicot 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 12-2: Map of pH Data

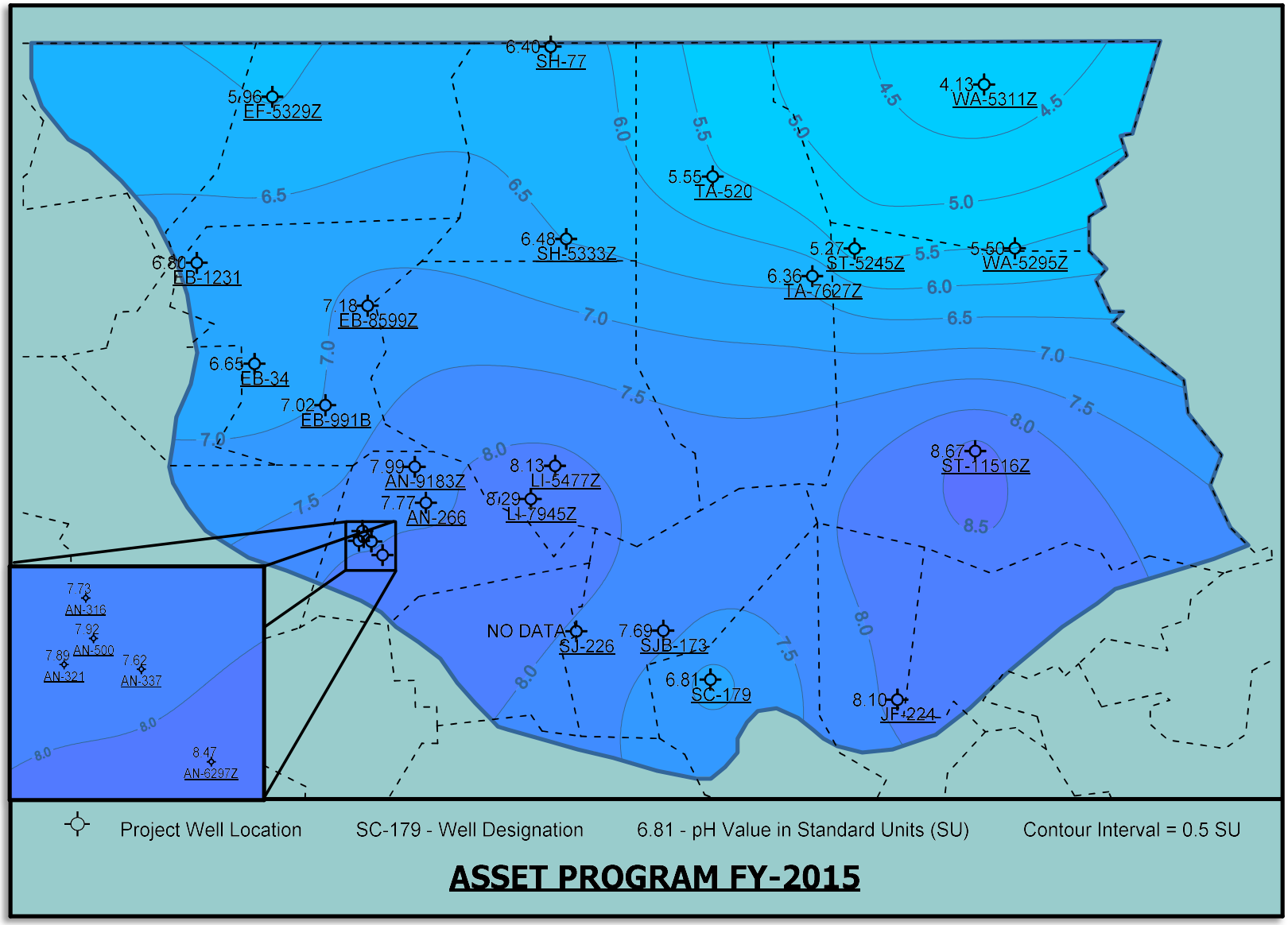


Figure 12-3: Map of TDS Lab Data

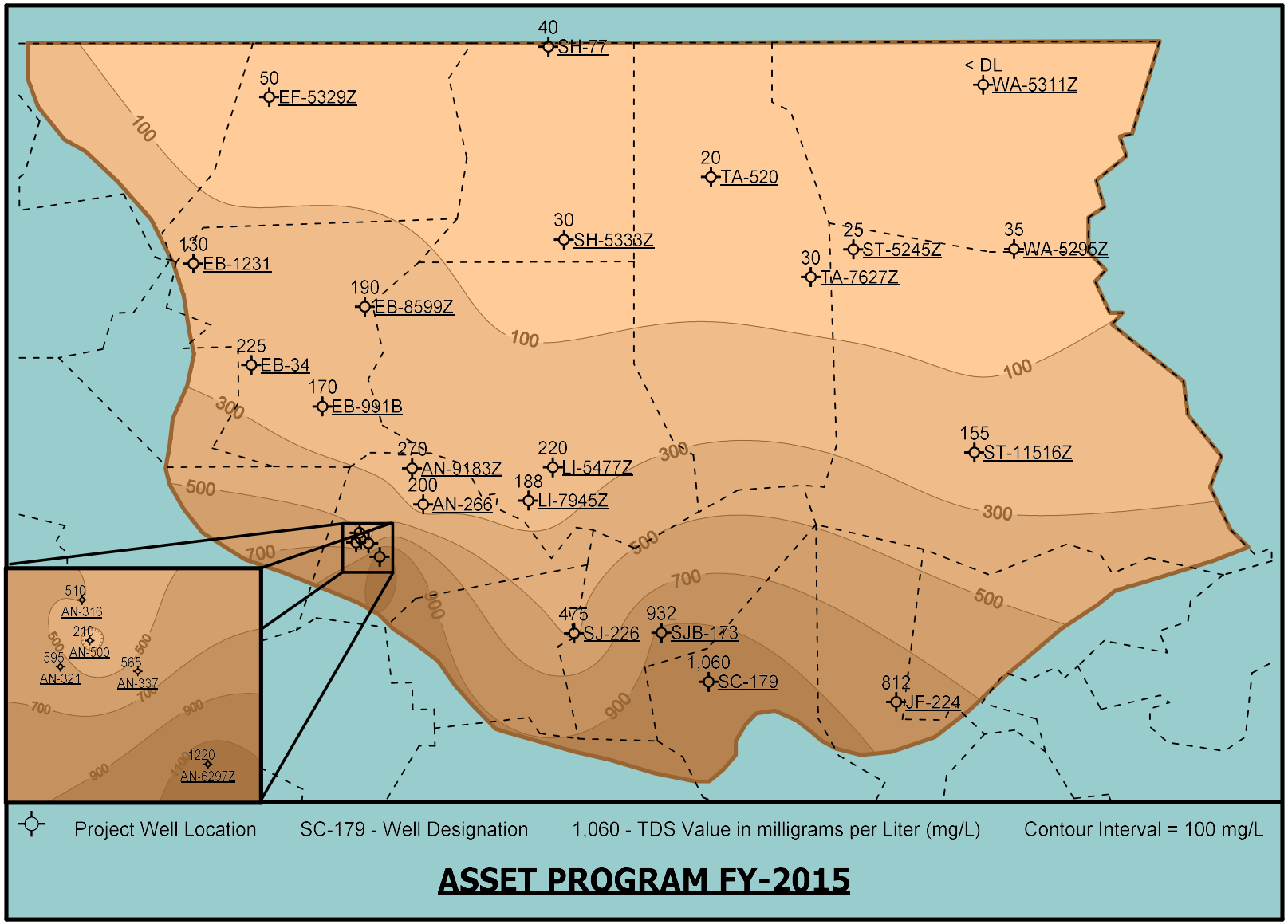


Figure 12-4: Map of Chloride Data

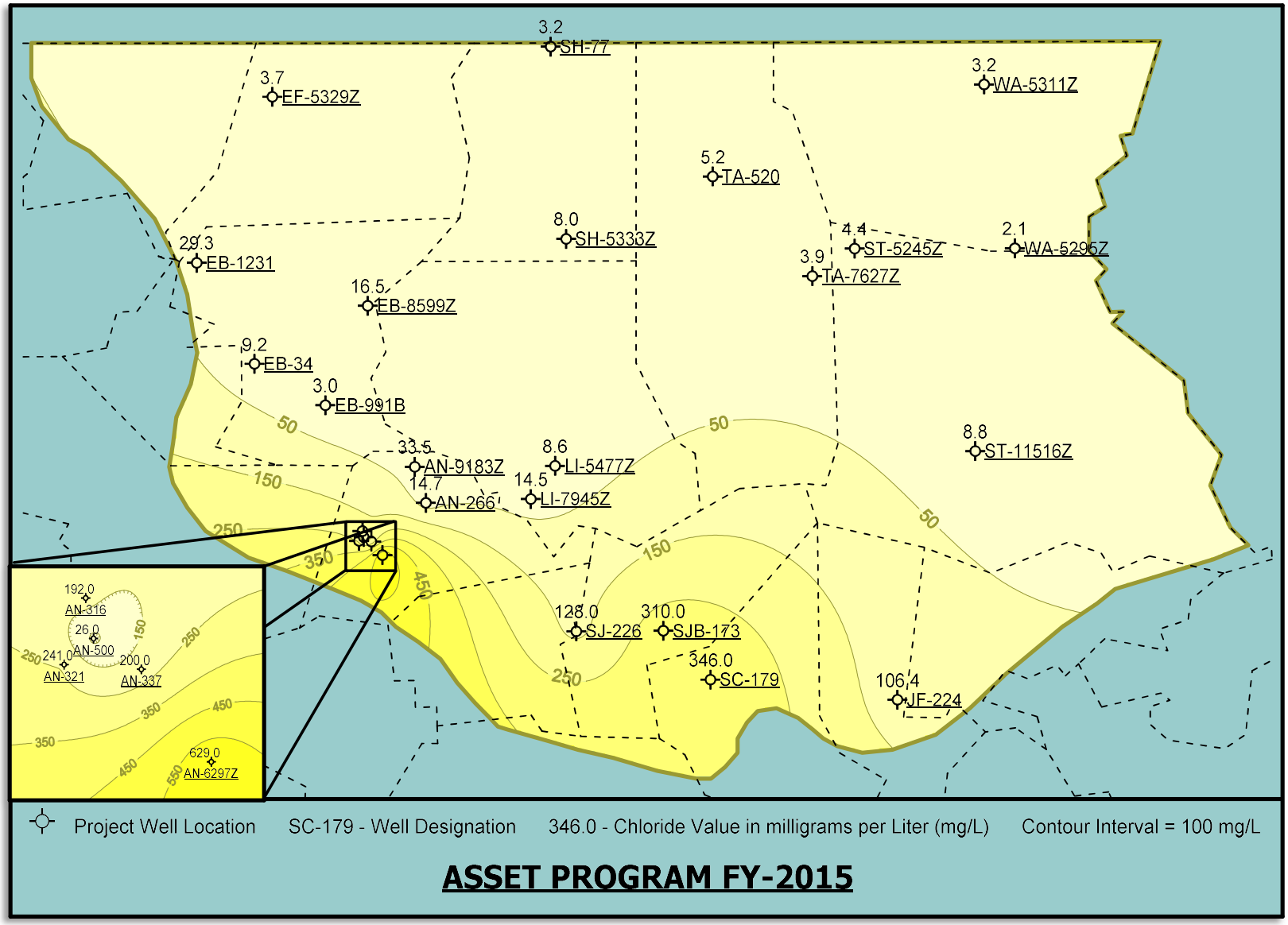


Figure 12-5: Map of Iron Data

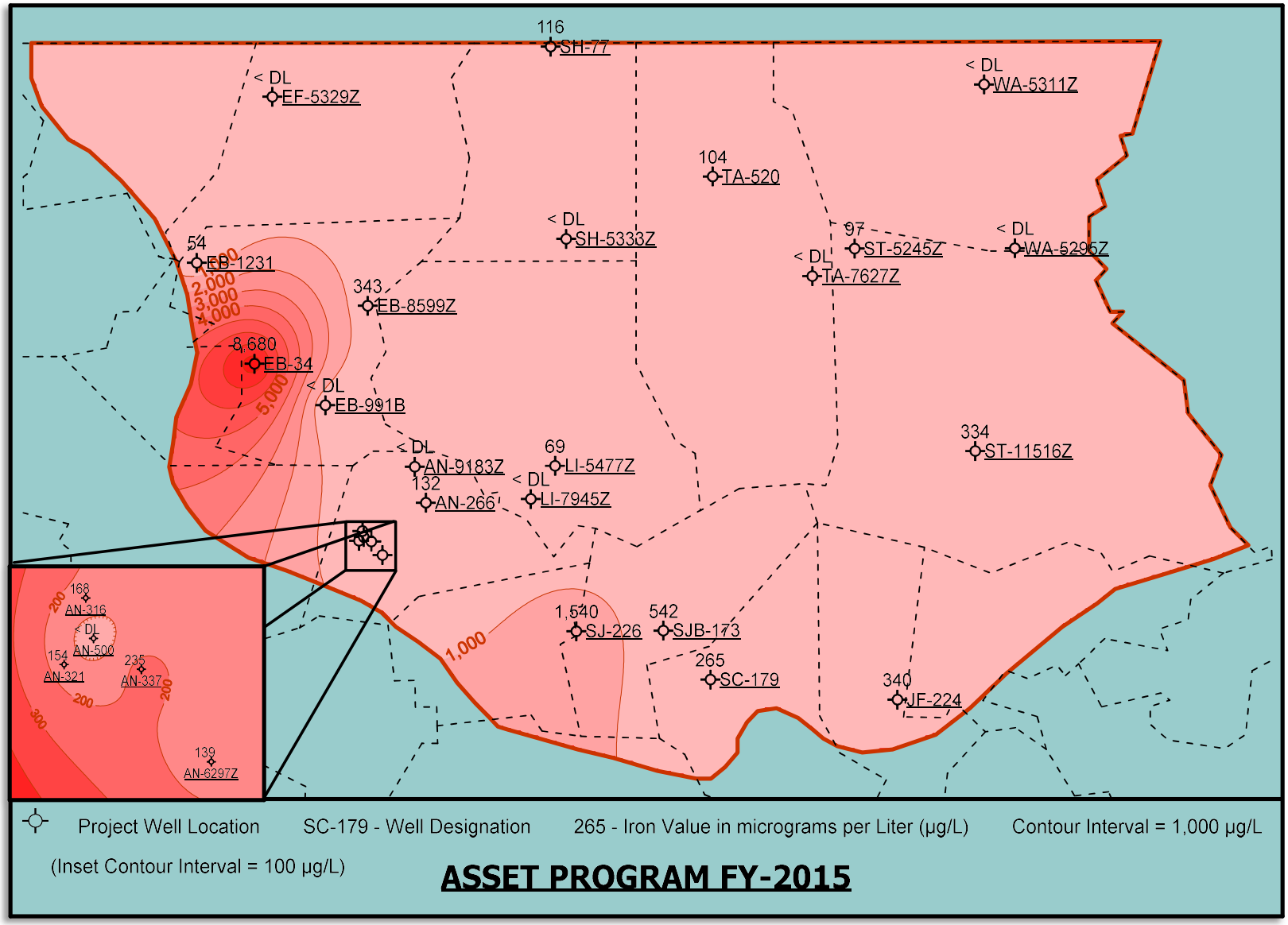


Chart 12-1: Temperature Trend

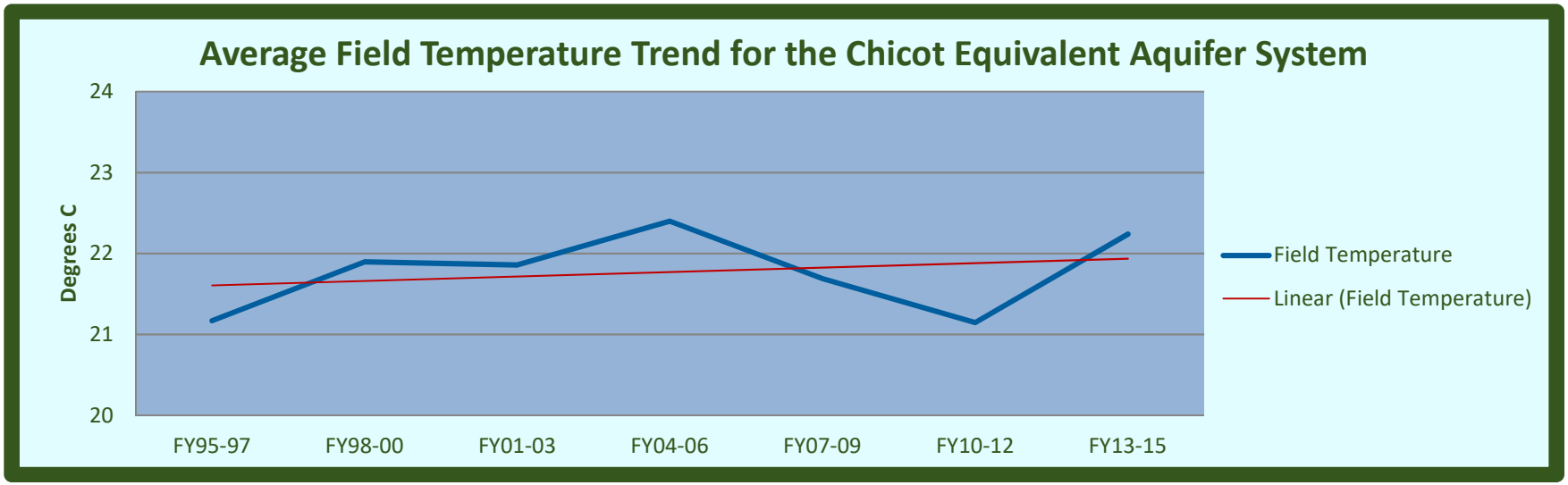


Chart 12-2: pH Trend

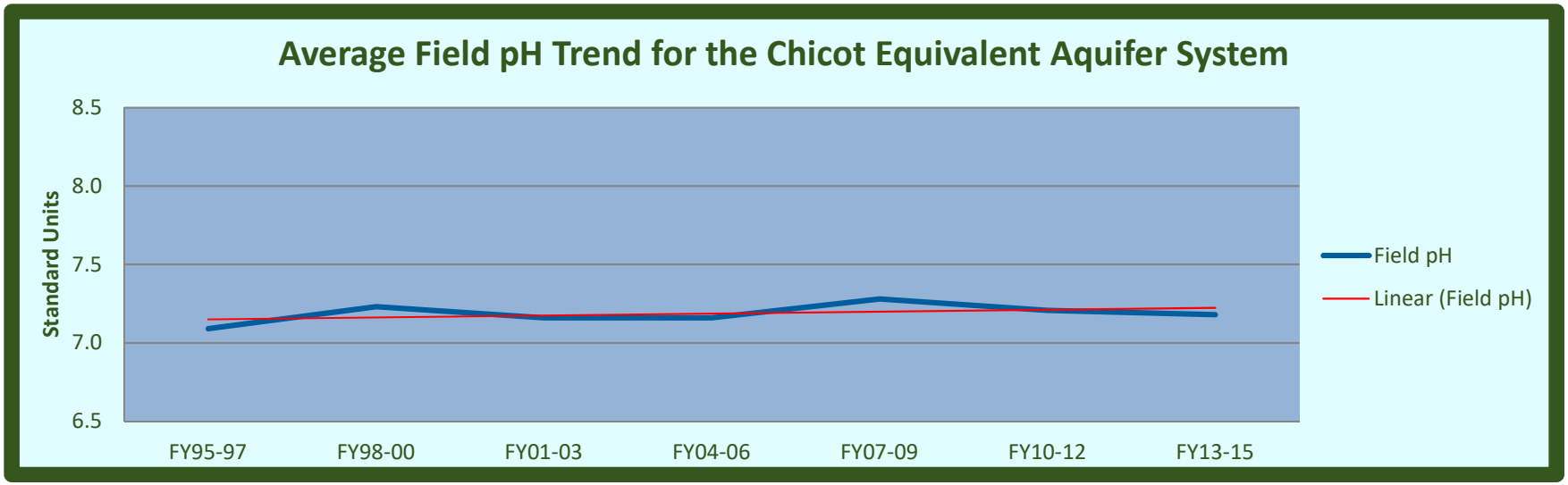


Chart 12-3: Field Specific Conductance Trend

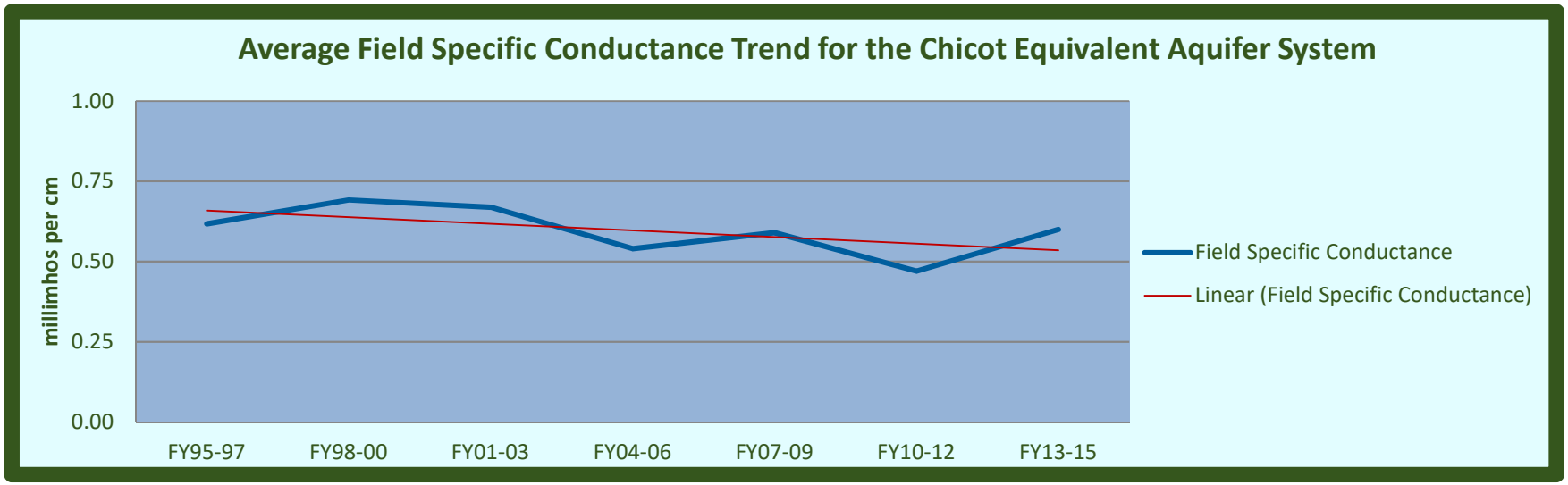


Chart 12-4: Lab Specific Conductance Trend

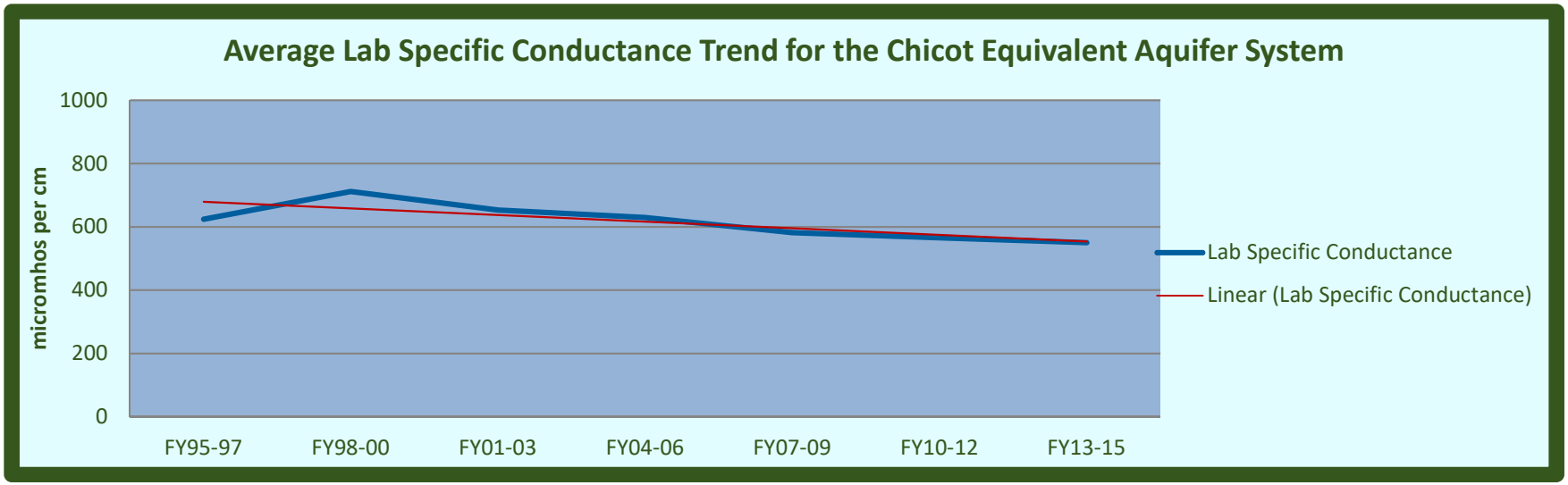


Chart 12-5: Field Salinity Trend

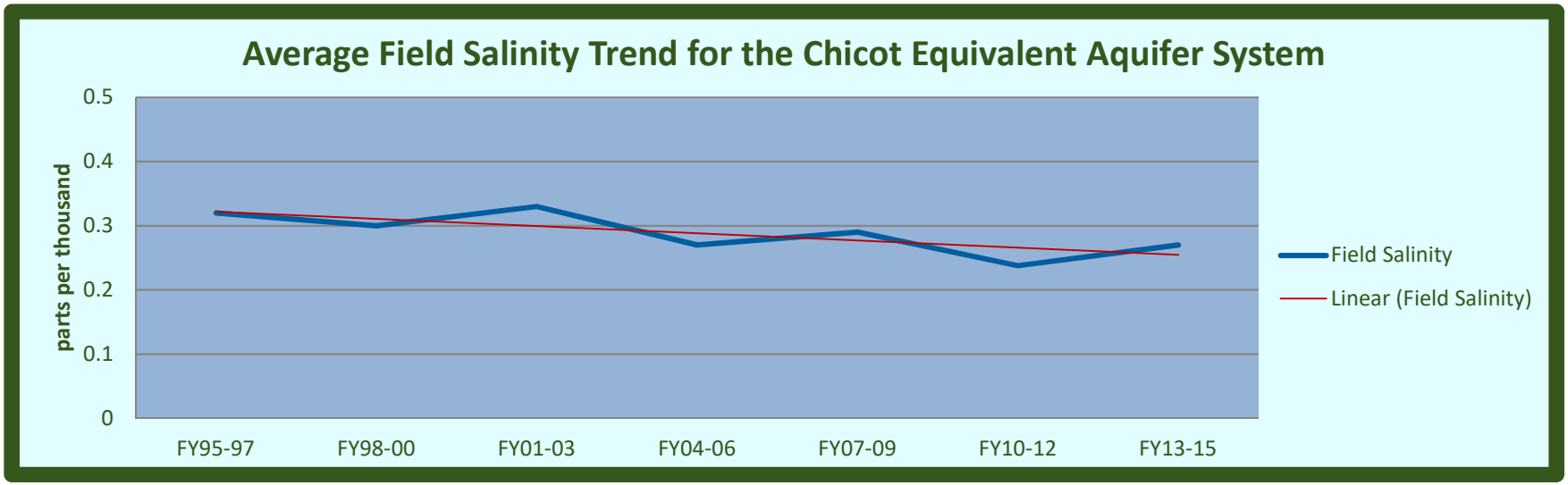


Chart 12-6: Chloride Trend

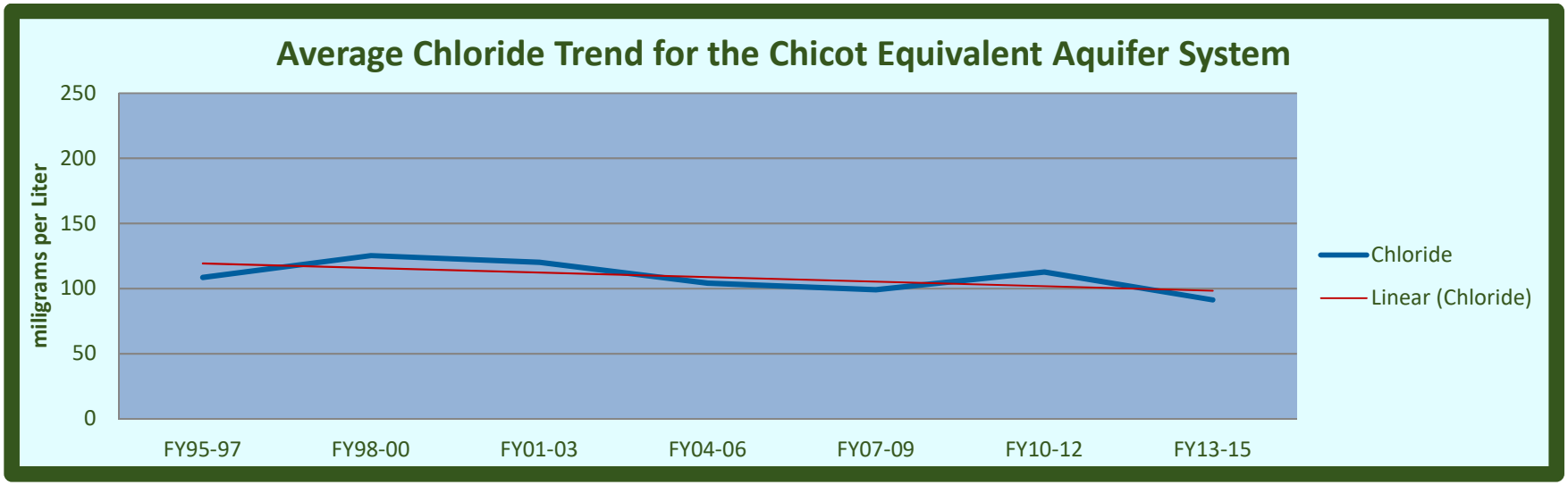


Chart 12-7: Alkalinity Trend

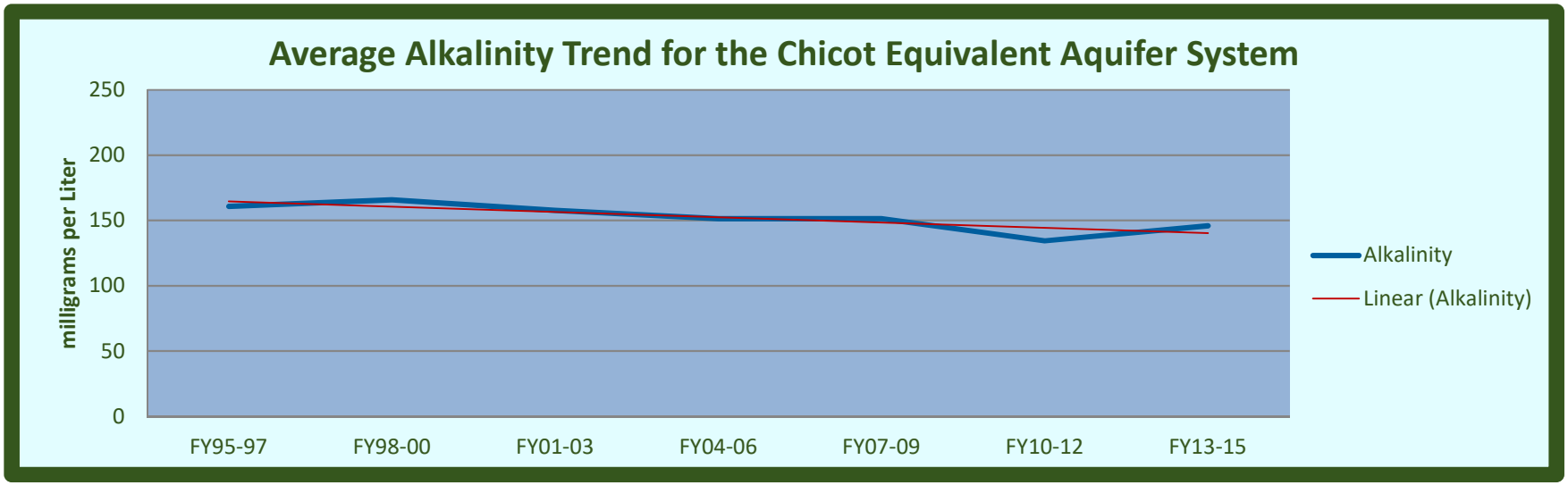


Chart 12-8: Color Trend

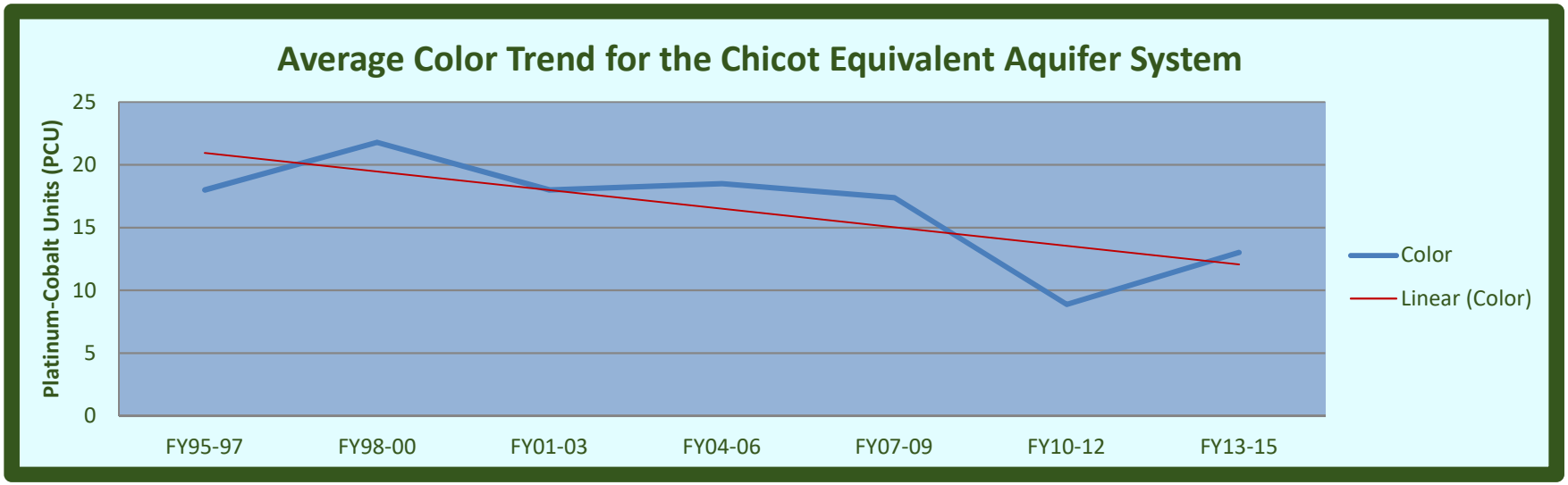


Chart 12-9: Sulfate Trend

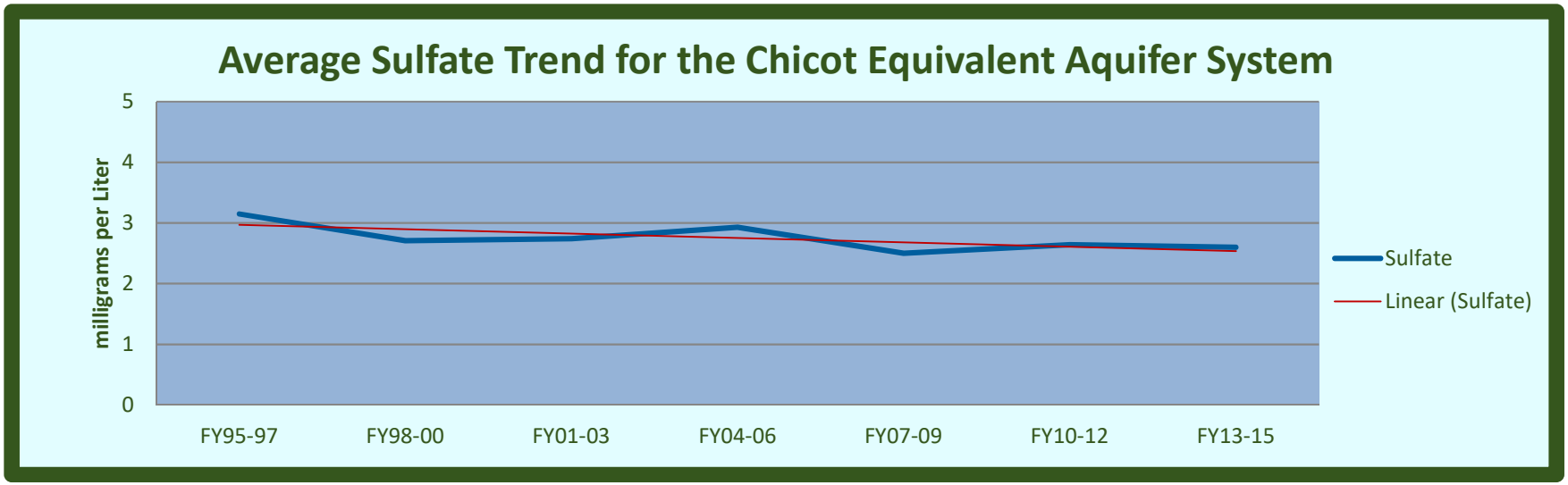


Chart 12-10: Total Dissolved Solids Trend

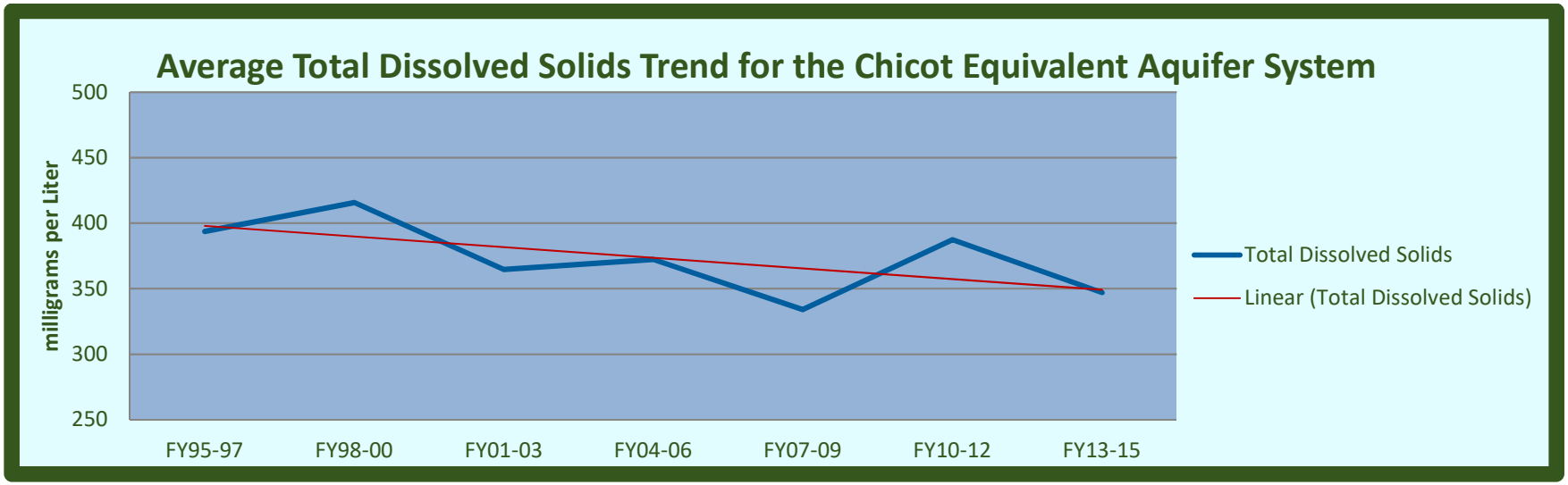


Chart 12-11: Hardness Trend

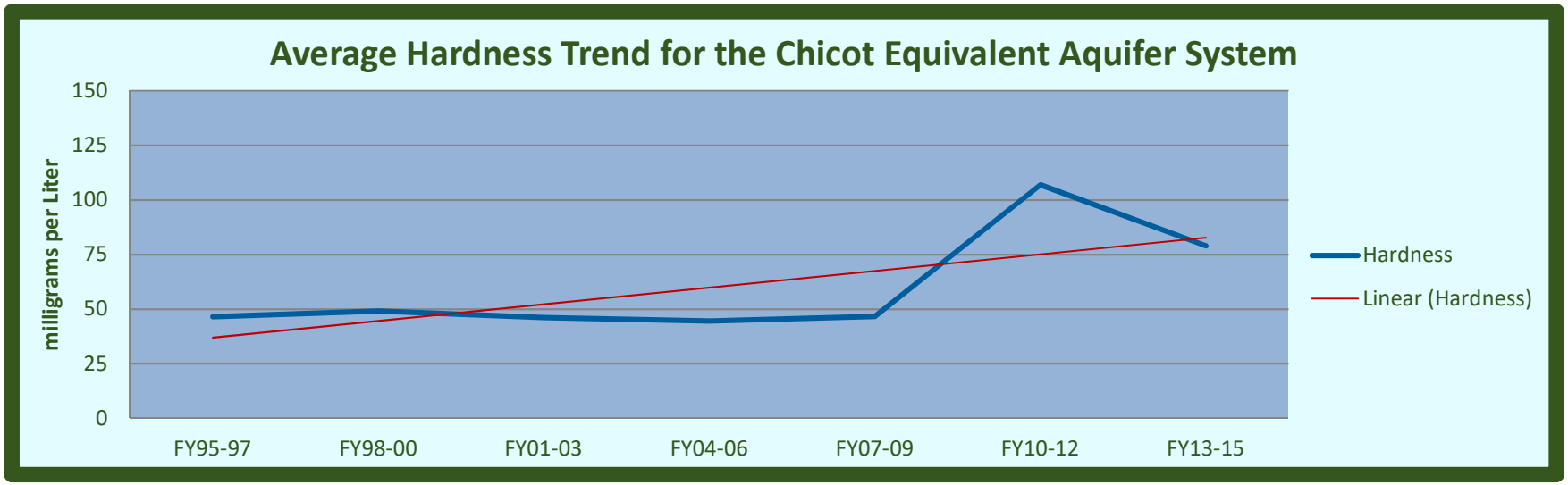


Chart 12-12: Ammonia Trend

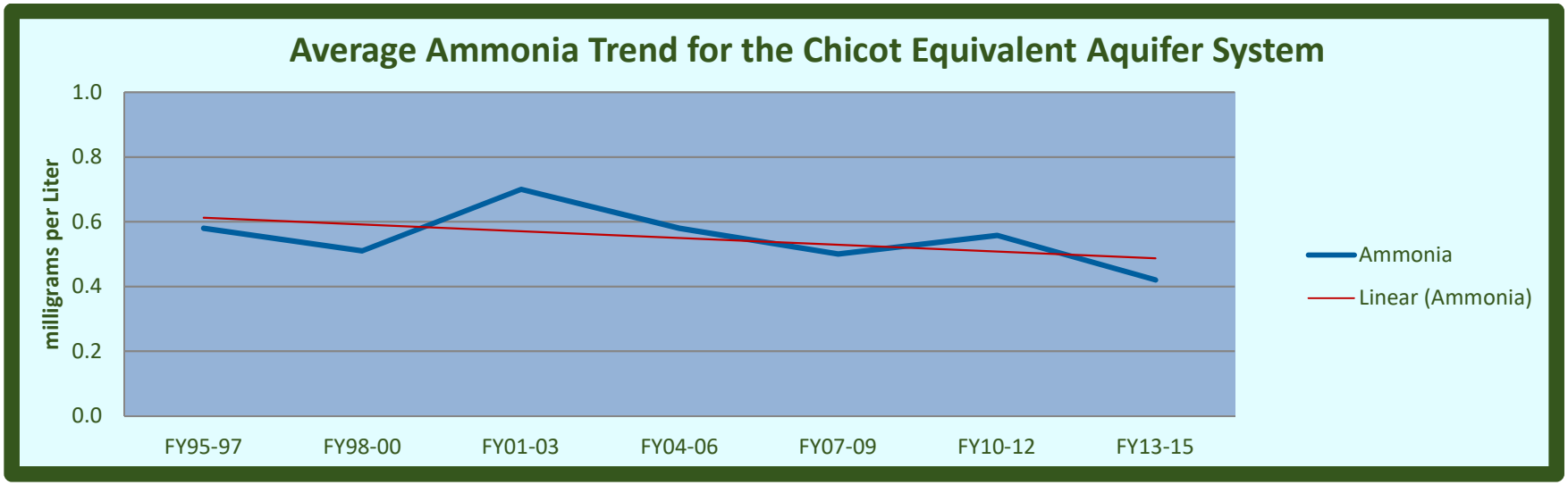


Chart 12-13: Nitrite – Nitrate Trend

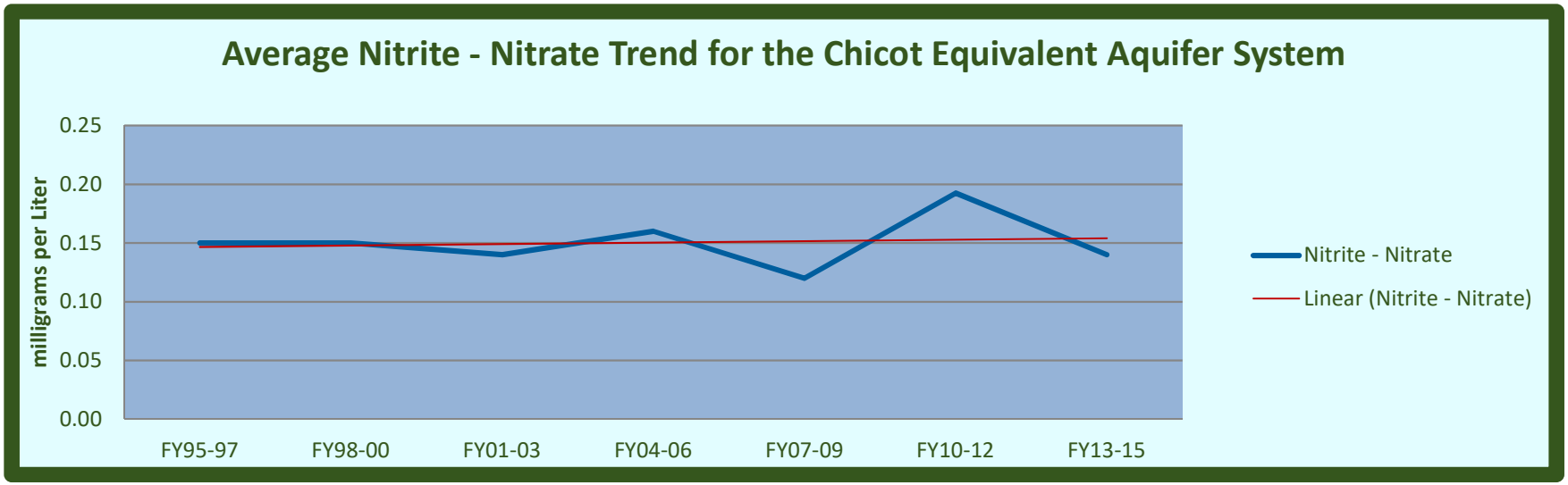


Chart 12-14: TKN Trend

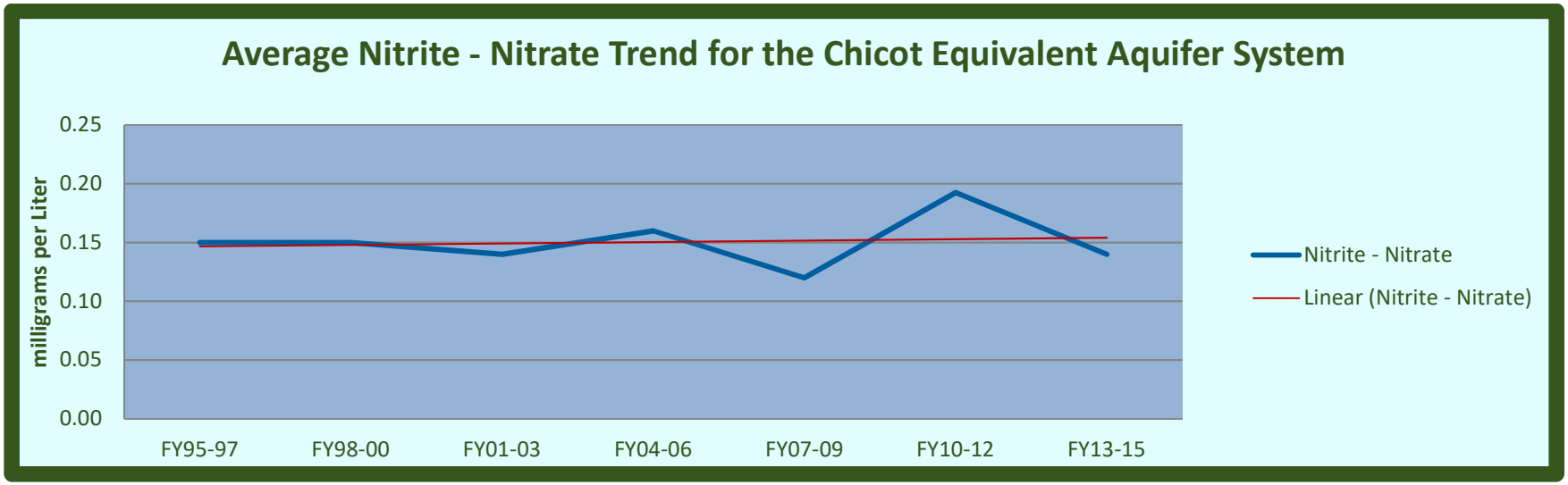


Chart 12-15: Total Phosphorus Trend

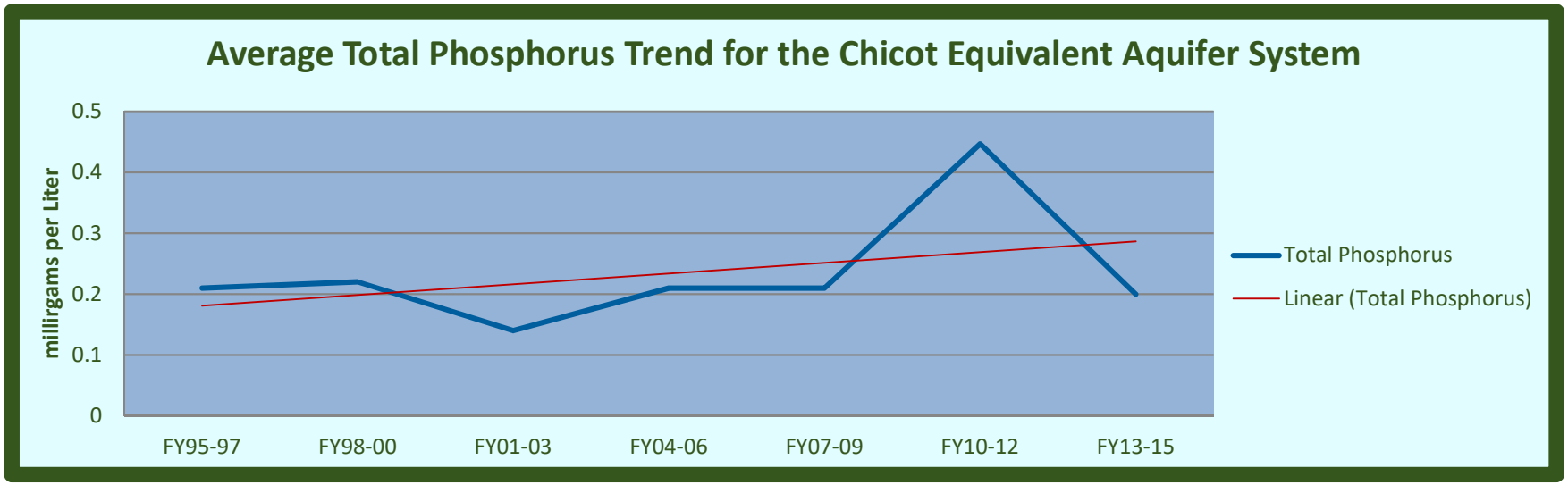


Chart 12-16: Iron Trend