SPARTA AQUIFER SUMMARY, 2007

AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

APPENDIX 1 TO THE 2009 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 ground water 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 fourteen aquifers and aquifer systems are monitored on a rotating basis, within a three-year period so that each well is monitored every three years.

In order to better assess the water quality of a particular aquifer, an attempt is made to sample all ASSET Program wells producing from it in a narrow time frame. To more conveniently and economically promulgate those data collected, a summary report on each aquifer is prepared separately. Collectively, these aquifer summaries will make up, in part, the ASSET Program's Triennial Summary Report for 2009.

Analytical and field data contained in this summary were collected from wells producing from the Sparta aquifer, during the 2007 state fiscal year (July 1, 2006 - June 30, 2007). This summary will become Appendix I of ASSET Program Triennial Summary Report for 2009.

These data show that in July and August 2006, fourteen wells were sampled which produce from the Sparta aquifer. Eleven of these fourteen are classified as public supply, while the remaining three wells are classified as industrial use. The wells are located in ten parishes in the north-central area of the state.

Figure 1-1 shows the geographic locations of the Sparta aquifer and the associated wells, whereas Table 1-1 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 Transportation and Development's Water Well Registration Data file.

GEOLOGY

The Sparta aquifer system is within the Eocene Sparta formation of the Claiborne group. The aquifer units consist of fine to medium sand with interbedded coarse sand, silty clay and lignite. Interconnected sands become more massive and coarsen slightly with depth and are laterally discontinuous. The Sparta aquifer is confined downdip by the clays of the overlying Cook Mountain formation and the clays and silty clays of the Cane River formation.

HYDROGEOLOGY

The Sparta aquifer is recharged through direct infiltration of rainfall, the movement of water through overlying terrace and alluvial deposits, and leakage from the Cockfield and Carrizo-Wilcox aquifers. The Sparta is pumped in a large area of north-central Louisiana and in a narrow band through Natchitoches and Sabine Parishes. The two areas are separated by a

saltwater ridge below the Red River valley. Ground water movement is eastward toward the Mississippi River Valley and southward toward the Gulf of Mexico, except when altered by heavy pumping, and the hydraulic conductivity varies between 25 and 100 feet/day.

The maximum depths of occurrence of freshwater in the Sparta range from 200 feet above sea level to 1,700 feet below sea level. The range of thickness of the fresh water interval in the Sparta is 50 to 700 feet. The depths of the Sparta wells that were monitored in conjunction with the ASSET Program range from 153 to 773 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 1-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 1-3. 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 CL-203, MO-253, and UN-205.

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 1-8, 1-9 and 1-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Tables 1-4 and 1-5 provide a statistical overview of field and conventional data, and inorganic data for the Sparta aquifer, listing the minimum, maximum, and average results for these parameters collected in the FY 2007 sampling. Tables 1-6 and 1-7 compare these same parameter averages to historical ASSET-derived data for the Sparta aquifer, from fiscal years 1995, 1998, 2001 and 2004.

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

Figures 1-2, 1-3, 1-4, and 1-5, respectively, represent the contoured data for pH, total dissolved solids (TDS), chloride (Cl) and iron. Charts 1-1 through 1-16 represent the trend of the graphed parameter, based on the averaged value of that parameter for each three-year reporting period. Discussion of historical data and related trends is found in the **Water Quality Trends and Comparison to Historical ASSET Data** section.

INTERPRETATION OF DATA

Under the Federal Safe Drinking Water Act, EPA has established maximum contaminant levels (MCLs) for pollutants that may pose a health risk in public drinking water. An MCL is the highest level of a contaminant that EPA allows in public drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. While not all wells sampled were public supply wells, the Office of Environmental Assessment does use 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 1-2 and 1-3 show that one or more secondary MCLs (SMCLs) were exceeded in 10 of the 14 wells sampled in the Sparta aquifer, with a total of 20 SMCLs being exceeded.

Field and Conventional Parameters

Table 1-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 1-4 provides an overview of this data for the Sparta aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 1-2 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 and Hospitals 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 1-2 shows that 8 wells exceeded the SMCL for pH, 5 wells exceeded the SMCL for total dissolved solids, 3 exceeded the SMCL for chloride and one exceeded the SMCL for color. Laboratory results override field results in exceedance determination, 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):

CA-105 – 8.92 SU
L-32 – 8.70 SU
OU-506 – 9.03 SU
UN-205 – 8.81 SU (Original and Duplicate)
CL-203 –6.48 SU (Original and Duplicate)
MO-253 – 8.81 SU (Original and Duplicate)
OU-597 – 8.77 SU
W-165 – 8.68 SU

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

	LAB RESULTS (in mg/L)	FIELD MEASURES (in g/L)
CA-105	662 mg/L	0.72 g/L
MO-253	1,090 mg/L, Duplicate – 1,052 mg/L	1.29 g/L (Original and Duplicate)
OU-506	538 mg/L	0.59 g/L
OU-597	1,112 mg/L	1.32 g/L
UN-205	740 mg/L, Duplicate – 772 mg/L	1.07 g/L (Original and Duplicate)
W-165	< SMCL	0.54 g/L

Chloride (SMCL = 250 mg/L):

MO-253 – 373 mg/L, Duplicate – 375 mg/L
OU-597 – 419 mg/L
UN-205 – 351 mg/L, Duplicate – 354 mg/L

Color (SMCL = 15 color units (PCU)):

W-165 – 60 PCU (Several wells did not report a result for Color.)

Inorganic Parameters

Table 1-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 1-5 provides an overview of inorganic data for the Sparta aquifer, listing the minimum, maximum, and average results for these parameters.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 1-3 shows that no primary MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 1-3 shows that 3 wells exceeded the secondary MCL for iron:

Iron (SMCL = 300 ug/L):

BI-212 – 2,170 ug/L
CL-203 – 1,380 ug/L (Original and Duplicate)
SA-534 – 1,490 ug/L

Volatile Organic Compounds

Table 1-8 shows the volatile organic compound (VOC) parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however, any detection of a VOC would be discussed in this section.

No VOCs were detected at or above their respective detection limits during the FY 2007 sampling of the Sparta aquifer.

Semi-Volatile Organic Compounds

Table 1-9 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.

No SVOC was detected at or above its detection limit during the FY 2007 sampling of the Sparta aquifer.

Pesticides and PCBs

Table 1-10 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 2007 sampling of the Sparta aquifer.

WATER QUALITY TRENDS AND COMPARISON TO HISTORICAL ASSET DATA

Analytical and field data show that the quality and characteristics of ground water produced from the Sparta aquifer exhibit some changes when comparing current data to that of the four previous sampling rotations (three, six, nine and twelve years prior). These comparisons can be found in Tables 1-6 and 1-7, and in Charts 1-1 to 1-16 of this summary. Over the twelve-year period, 9 analytes have shown a general increase in average concentration. These analytes are: pH, temperature, specific conductance (field and lab), salinity, chloride (Cl), total dissolved solids (TDS), ammonia (NH3), iron, and barium. For this same time period, 7 analytes have demonstrated a decrease in average concentration: color, hardness, nitrite-nitrate, zinc, copper, and to a lesser degree, TKN and total phosphorus (P). Sulfate (SO4) has remained consistent for this time period.

The current number of wells with secondary MCL exceedances and the current total number of secondary exceedances are practically the same as the previous sampling event in FY 2004. Current sample results show that 10 wells reported one or more secondary exceedances with a total of 20 SMCL exceedances. The FY 2004 sampling of the Sparta aquifer shows that 10 wells reported one or more SMCL exceedances with a total of 22 exceedances.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the ground water produced from this aquifer is soft[1] and is of good quality when considering short-term or long-term health risk guidelines. Laboratory data show that no ASSET well that was sampled during the Fiscal Year 2007 monitoring of the Sparta aquifer exceeded a Primary MCL. The data also show that this aquifer is of fair quality when considering taste, odor, or appearance guidelines, with 20 Secondary MCLs exceeded in 10 wells.

Comparison to historical ASSET-derived data shows some change in the quality or characteristics of the Sparta aquifer, with 9 parameters showing consistent increases in concentration, 7 parameters decreasing in concentration, and one parameter showing no consistent change over the previous twelve years.

It is recommended that the wells assigned to the Sparta aquifer be re-sampled as planned, in approximately three years. In addition, several wells should be added to the 14 currently in place to increase the well density for this aquifer.

---

[1] Classification based on hardness scale from: Peavy, H. S. et al. *Environmental Engineering*. New York: McGraw-Hill, 1985.

Table 1-1: List of Wells Sampled, Sparta Aquifer–FY 2007

DOTD Well Number	Parish	Date	Owner	Depth (Feet)	Well Use
BI-192	BIENVILLE	8/22/2006	LUCKY WATER SYSTEM	153	PUBLIC SUPPLY
BI-212	BIENVILLE	8/22/2006	STONE CONTAINER CORP.	490	INDUSTRIAL
CA-105	CALDWELL	7/11/2006	VIXEN WATER SYSTEM	525	PUBLIC SUPPLY
CL-203	CLAIBORNE	7/18/2006	TOWN OF HOMER	460	PUBLIC SUPPLY
L-31	LINCOLN	7/10/2006	CITY OF RUSTON	636	PUBLIC SUPPLY
L-32	LINCOLN	7/10/2006	CITY OF RUSTON	652	PUBLIC SUPPLY
MO-253	MOREHOUSE	7/11/2006	VILLAGE OF COLLINSTON	773	PUBLIC SUPPLY
OU-506	OUACHITA	7/11/2006	ANGUS CHEMICAL	506	INDUSTRIAL
OU-597	OUACHITA	7/11/2006	GRAPHIC PACKAGING INT'L INC.	710	INDUSTRIAL
SA-534	SABINE	7/10/2006	BOISE CASCADE	543	PUBLIC SUPPLY
UN-205	UNION	8/21/2006	D'ARBONNE WATER SYSTEM	725	PUBLIC SUPPLY
W-165	WINN	8/22/2006	TOWN OF WINNFIELD	456	PUBLIC SUPPLY
WB-241	WEBSTER	8/21/2006	TOWN OF SPRINGHILL	408	PUBLIC SUPPLY
WB-269	WEBSTER	8/22/2006	CITY OF MINDEN	280	PUBLIC SUPPLY

Table 1-2: Summary of Field and Conventional Data, Sparta Aquifer–FY 2007

DOTD Well Number	Temp Deg. C	pH SU	Sp. Cond. mmhos/cm	Sal. ppt	TDS g/L	Alk mg/L	Cl mg/L	Color PCU	Sp. Cond. umhos/cm	SO4 mg/L	TDS mg/L	TSS mg/L	Turb. NTU	NH3 mg/L	Hard. mg/L	Nitrite-Nitrate (as N) mg/L	TKN mg/L	Tot. P mg/L
LABORATORY DETECTION LIMITS →						2.0	1.3	5	10	1.25/1.3	4	4	1	0.1	5.0	0.05	0.10	0.05
	FIELD PARAMETERS					LABORATORY PARAMETERS												
BI-192	20.20	6.97	0.204	0.10	0.13	3.2	1.8	<5	26.1	<1.3	29	<4	<1	<0.20	6.6	1.21	<0.10	<0.05
BI-212	21.32	6.69	0.363	0.17	0.24	87.7	6.7	15	199	9	181	<4	1.1	0.26	27.9	<0.05	0.30	0.15
CA-105	25.60	8.92	1.102	0.54	0.72	582.0	17.7	NOT ANALYZED	1048	<1.3	662	<4	1.3	0.67	<5.0	<0.05	0.90	0.78
CL-203	22.05	6.48	0.145	0.07	0.09	51.7	‡5.8		130	‡7.8	114	<4	<1	<0.10	20.0	<0.05	0.18	0.08
CL-203*	22.05	6.48	0.145	0.07	0.09	51.6	4.9		129	7.4	117	<4	<1	<0.10	20.1	<0.05	0.14	0.08
L-31	24.40	7.9	0.398	0.19	0.26	147.0	21		356	11.2	232	<4	<1	<0.10	6.8	<0.05	<0.10	0.29
L-32	24.90	8.7	0.366	0.17	0.24	150.0	8.3		329	13.5	215	<4	1.5	†0.16	<5.0	<0.05	†0.20	0.30
MO-253	25.69	8.81	1.978	1.00	1.29	418.0	‡373.0		2000	<1.3	1,090	<4	<1	0.86	6.2	<0.05	0.95	0.48
MO-253*	25.69	8.81	1.978	1.00	1.29	420.0	‡375.0		2000	<1.25	1,052	<4	<1	0.86	6.1	<0.05	0.87	0.47
OU-506	23.07	9.03	0.906	0.45	0.59	299.0	108		895	<1.3	538	<4	<1	0.57	<5.0	<0.05	0.64	0.48
OU-597	25.48	8.77	2.034	1.04	1.32	348.0	‡419.0		2040	<1.25	1,112	<4	<1	0.84	9.6	<0.05	0.92	0.52
SA-534	24.46	7.12	0.205	0.10	0.13	53.9	11.7		184	19.9	188	<4	<1	†0.16	21.0	<0.05	†0.20	0.07
UN-205	25.75	8.81	1.64	0.82	1.07	168.0	‡351.0	10	1467	<1.25	740	<4	<1	0.93	16.1	<0.05	1.00	0.18
UN-205*	25.75	8.81	1.64	0.82	1.07	167.0	‡354.0	10	1448	<1.25	772	<4	<1	0.95	15.6	<0.05	1.16	0.18
W-165	23.24	8.68	0.825	0.40	0.54	293.0	44.4	60	665	4.6	418	<4	<1	0.36	<5.0	<0.05	0.39	0.61
WB-241	24.08	7.89	0.725	0.35	0.47	157.0	20.5	<5	363	10.4	238	<4	<1	0.43	32.4	0.07	0.50	0.10
WB-269	20.47	7.53	0.401	0.19	0.26	46.4	28	<5	227	16.8	146	<4	<1	0.15		1.2	<0.10	0.06

*Denotes Duplicate Sample †Estimated Value ‡Reported from a Dilution Shaded cells exceed EPA Secondary Standards

Table 1-3: Summary of Inorganic Data, Sparta Aquifer–FY 2007

DOTD Well Number	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	3	2	1	0.5	3	3	20	3	0.05	3	4	0.5	1	10
BI-192	<1	<3	23.7	<1	<0.5	<3	<3	169	<3	<0.05	<3	<4	<0.5	<1	15
BI-212	<1	<3	74	<1	<0.5	<3	<3	2,170	<3	<0.05	<3	<4	<0.5	<1	<10
CA-105	<1	<3	16	<1	<0.5	<3	<3	37.9	<3	<0.05	<3	<4	<0.5	<1	10.4
CL-203	<1	<3	70.7	<1	<0.5	<3	4.8	1,380	<3	<0.05	<3	<4	<0.5	<1	<10
CL-203*	<1	<3	71.2	<1	<0.5	<3	<3	1,380	<3	<0.05	<3	<4	<0.5	<1	<10
L-31‡	<5	<15	<10	<1	<2	<15	<15	43.1	<15	<0.05	<15	<20	<2	<5	<50
L-32	<1	<3	3.1	<1	<0.5	<3	<3	24.6	<3	<0.05	<3	<4	<0.5	<1	<10
MO-253	<1	<3	23.7	<1	<0.5	<3	<3	51.6	<3	<0.05	<3	<4	<0.5	<1	<10
MO-253*	<1	<3	23.8	<1	<0.5	<3	<3	54.9	<3	<0.05	<3	<4	<0.5	<1	22.7
OU-506	<1	<3	7.7	<1	<0.5	<3	<3	21.9	<3	<0.05	<3	<4	<0.5	<1	<10
OU-597	<1	<3	58.5	<1	<0.5	<3	3.2	<20	<3	<0.05	<3	<4	<0.5	<1	<10
SA-534	<1	<3	80.1	<1	<0.5	<3	<3	1,490	<3	<0.05	<3	<4	<0.5	<1	<10
UN-205	<1	<3	38.2	<1	<0.5	<3	8.6	29.3	<3	<0.05	<3	<4	<0.5	<1	<10
UN-205*	<1	<3	38.2	<1	<0.5	<3	<3	<20	<3	<0.05	<3	<4	<0.5	<1	<10
W-165	<1	<3	15.4	<1	<0.5	<3	5.7	27	<3	<0.05	<3	<4	<0.5	<1	<10
WB-241	<1	<3	99.7	<1	<0.5	<3	4.9	63	<3	<0.05	<3	<4	<0.5	<1	<10
WB-269	<1	<3	106	<1	<0.5	<3	8.1	<20	3.9	0.1	5.8	<4	<0.5	<1	25.7

*Denotes Duplicate Sample. Shaded cells exceed EPA Secondary Standards

‡Results for L-31 reported from a five-time dilution (excluding Hg) due to matrix interference, and were not used for statistical determinations and are not reported in tables 1-5 and 1-7.

Table 1-4: FY 2007 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	Temperature (^{O}C)	20.20	25.75	23.78
	pH (SU)	6.48	9.03	8.02
	Specific Conductance (mmhos/cm)	0.145	2.034	0.89
	Salinity (ppt)	0.07	1.04	0.44
	TDS (g/L)	0.094	1.322	0.580
LABORATORY	Alkalinity (mg/L)	3.2	582.0	202.6
	Chloride (mg/L)	1.8	419.0	126.5
	Color (PCU)	<5	60	14.6
	Specific Conductance (umhos/cm)	26.1	2,040	794.5
	Sulfate (mg/L)	<1.25	19.9	6.2
	TDS (mg/L)	29	1,112	461
	TSS (mg/L)	<4	<4	<4
	Turbidity (NTU)	<1	1.5	<1
	Ammonia, as N (mg/L)	<0.1	0.95	0.44
	Hardness (mg/L)	<5.0	32.4	13.2
	Nitrite - Nitrate, as N (mg/L)	<0.05	1.21	0.17
	TKN (mg/L)	<0.10	1.16	0.50
	Total Phosphorus (mg/L)	<0.05	0.78	0.29

Table 1-5: FY 2007 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ug/L)	<1	<1	<1
Arsenic (ug/L)	<3	<3	<3
Barium (ug/L)	3.1	106	46.9
Beryllium (ug/L)	<1	<1	<1
Cadmium (ug/L)	<0.5	<0.5	<0.5
Chromium (ug/L)	<3	<3	<3
Copper (ug/L)	<3	8.6	3.1
Iron (ug/L)	<20	2,170	410
Lead (ug/L)	<3	3.9	<3
Mercury (ug/L)	<0.05	0.1	<0.05
Nickel (ug/L)	<3	5.8	<3
Selenium (ug/L)	<4	<4	<4
Silver (ug/L)	<0.5	<0.5	<0.5
Thallium (ug/L)	<1	<1	<1
Zinc (ug/L)	<10	25.7	<10

Table 1-6: Triennial Field and Conventional Statistics, ASSET Wells

	PARAMETER	FY 1995 AVERAGE	FY 1998 AVERAGE	FY 2001 AVERAGE	FY 2004 AVVERAGE	FY 2007 AVERAGE
FIELD	Temperature (^{O}C)	23.10	23.65	23.49	23.50	23.78
	pH (SU)	7.23	7.76	7.86	7.45	8.02
	Specific Conductance (mmhos/cm)	0.646	0.654	0.654	0.65	0.89
	Salinity (Sal.) (ppt)	0.30	0.32	0.32	0.32	0.44
	TDS (Total dissolved solids) (g/L)	-	-	-	0.420	0.580
LABORATORY	Alkalinity (Alk.) (mg/L)	185.5	203.2	178.3	185.54	202.6
	Chloride (Cl) (mg/L)	85.8	89.0	90.0	94.2	126.5
	Color (PCU)	25.9	21.7	17.7	16.1	14.6
	Specific Conductance (umhos/cm)	619.1	687.7	660.0	646.9	794.5
	Sulfate (SO4) (mg/L)	6.55	8.21	7.42	9.30	6.22
	TDS (Total dissolved solids) (mg/L)	356.5	442.7	391.1	405.7	461.4
	TSS (Total suspended solids) (mg/L)	<4	<4	<4	<4	<4
	Turbidity (Turb.) (NTU)	1.32	2.21	1.45	1.18	<1
	Ammonia, as N (NH3) (mg/L)	0.34	0.46	0.33	0.48	0.44
	Hardness (mg/L)	21.7	10.0	13.6	15.9	13.2
	Nitrite - Nitrate , as N (mg/L)	0.28	0.32	0.30	0.31	0.17
	TKN (mg/L)	0.58	0.52	0.45	0.59	0.50
	Total Phosphorus (P) (mg/L)	0.36	0.31	0.31	0.35	0.29

Table 1-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	FY 1995 AVERAGE	FY 1998 AVERAGE	FY 2001 AVERAGE	FY 2004 AVERAGE	FY 2007 AVERAGE
Antimony (ug/L)	<5	<5	<5	Invalid Data	<1
Arsenic (ug/L)	<5	<5	<5	<5	<3
Barium (ug/L)	36.5	30.7	50.4	61.8	46.9
Beryllium (ug/L)	<1	<1	<1	<1	<1
Cadmium (ug/L)	<1	1.00	<1	<1	<0.5
Chromium (ug/L)	<5	<5	<5	<5	<3
Copper (ug/L)	10.2	10.2	<5	5.82	3.1
Iron (ug/L)	212.5	283.7	517.4	405.8	410.1
Lead (ug/L)	<10	<10	<10	<10	<3
Mercury (ug/L)	<0.05	<0.05	<0.05	0.06	<0.05
Nickel (ug/L)	5.1	<5	<5	5.40	<3
Selenium (ug/L)	<5	<5	<5	<5, <30	<4
Silver (ug/L)	<1	1.2	<1	<1	<0.5
Thallium (ug/L)	<5	<5	<5	<5, <30	<1
Zinc (ug/L)	16.2	20.8	14.2	16.5	<10

Table 1-8: VOC Analytical Parameters

COMPOUND	METHOD	DETECTION LIMIT (ug/L)
1,1-Dichloroethane	624	2
1,1-Dichloroethene	624	2
1,1,1-Trichloroethane	624	2
1,1,2-Trichloroethane	624	2
1,1,2,2-Tetrachloroethane	624	2
1,2-Dichlorobenzene	624	2
1,2-Dichloroethane	624	2
1,2-Dichloropropane	624	2
1,3- Dichlorobenzene	624	2
1,4-Dichlorobenzene	624	2
Benzene	624	2
Bromoform	624	2
Carbon tetrachloride	624	2
Chlorobenzene	624	2
Dibromochloromethane	624	2
Chloroethane	624	2
trans-1,2-Dichloroethene	624	2
cis-1,3-Dichloropropene	624	2
Bromodichloromethane	624	2
Methylene chloride	624	2
Ethyl benzene	624	2
Bromomethane	624	2
Chloromethane	624	2
o-Xylene	624	2
Styrene	624	2
Methylt-butyl ether	624	2
Tetrachloroethene	624	2
Toluene	624	2
trans-1,3-Dichloropropene	624	2
Trichloroethene	624	2
Trichlorofluoromethane	624	2
Chloroform	624	2
Vinyl chloride	624	2
Xylenes, m & p	624	4

Table 1-9: SVOC Analytical Parameters

COMPOUND	METHOD	DETECTION LIMIT (ug/L)
1,2-Dichlorobenzene	8270	10
1,2,4-Trichlorobenzene	8270	10
1,3-Dichlorobenzene	8270	10
1,4-Dichlorobenzene	8270	10
2-Chloronaphthalene	8270	10
2-Chlorophenol	8270	10
4,6-Dinitro-2-methylphenol	8270	10
2-Methylphenol	8270	10
2-Methylnaphthalene	8270	10
2-Nitroaniline	8270	10
2-Nitrophenol	8270	10
2,4-Dichlorophenol	8270	10
2,4-Dimethylphenol	8270	10
2,4-Dinitrophenol	8270	10
2,4-Dinitrotoluene	8270	10
2,4,5-Trichlorophenol	8270	10
2,4,6-Trichlorophenol	8270	10
2,6-Dinitrotoluene	8270	10
3,3'-Dichlorobenzidine	8270	10
3-Nitroaniline	8270	10
4-Bromophenylphenyl ether	8270	10
4-Chloro-3-methylphenol	8270	10
4-Chloroaniline	8270	10
4-Chlorophenylphenyl ether	8270	10
4-Methylphenol	8270	10
4-Nitroaniline	8270	10
4-Nitrophenol	8270	10
Acenaphthene	8270	10
Acenaphthylene	8270	10
Anthracene	8270	10
Benzo(a)pyrene	8270	10
Benzo(k)fluoranthene	8270	10
Benzo(a)anthracene	8270	10
Benzo(b)fluoranthene	8270	10
Benzo(ghi)perylene	8270	10
Benzoic acid	8270	10
Benzyl alcohol	8270	10

Table 1-9: SVOCs (Continued)

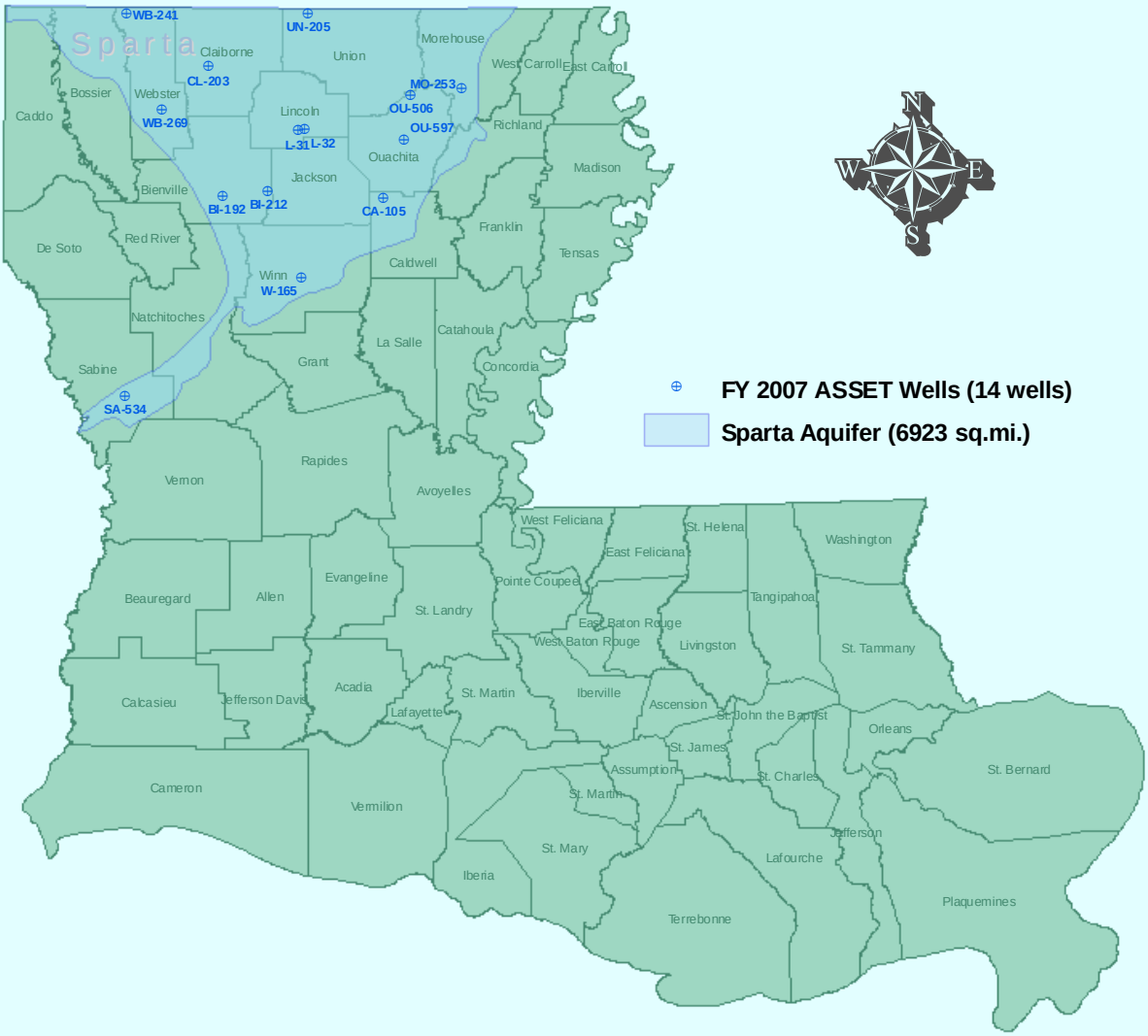
COMPOUND	METHOD	DETECTION LIMIT (ug/L)
Bis(2-chloroethoxy)methane	8270	10
Bis(2-ethylhexyl)phthalate	8270	6
Bis(2-chloroethyl) ether	8270	10
2,2'-Oxybis(1-chloropropane)	8270	10
Butylbenzylphthalate	8270	10
Chrysene	8270	10
Dibenz(a,h)anthracene	8270	10
Dibenzofuran	8270	10
Diethylphthalate	8270	10
Dimethylphthalate	8270	10
Di-n-butylphthalate	8270	10
Di-n-octylphthalate	8270	10
Fluoranthene	8270	10
Fluorene	8270	10
Hexachlorobenzene	8270	1
Hexachloro-1,3-butadiene	8270	10
Hexachlorocyclopentadiene	8270	10
Hexachloroethane	8270	10
Indeno(1,2,3-cd)pyrene	8270	10
Isophorone	8270	10
Naphthalene	8270	10
Nitrobenzene	8270	10
N-Nitrosodiphenylamine	8270	10
N-Nitroso-di-n-propylamine	8270	10
Pentachlorophenol	8270	1
Phenanthrene	8270	10
Phenol	8270	10
Pyrene	8270	10

Table 1-10: Pesticides and PCBs

COMPOUND	METHODS*	DETECTION LIMITS (ug/L)
4,4'-DDD	608 / 8081	0.05 / 0.1
4,4'-DDE	608 / 8081	0.05 / 0.1
4,4'-DDT	608 / 8081	0.05 / 0.1
Aldrin	608 / 8081	0.05 / 0.05
alpha-Chlordane	608 / 8081	0.05 / 0.05
alpha-BHC	608 / 8081	0.05 / 0.05
beta-BHC	608 / 8081	0.05 / 0.05
delta-BHC	608 / 8081	0.05 / 0.05
gamma-BHC	608 / 8081	0.05 / 0.05
Chlordane	608	0.2
Dieldrin	608 / 8081	0.05 / 0.1
Endosulfan I	608 / 8081	0.05 / 0.05
Endosulfan II	608 / 8081	0.05 / 0.1
Endosulfan sulfate	608 / 8081	0.05 / 0.1
Endrin	608 / 8081	0.05 / 0.1
Endrin aldehyde	608 / 8081	0.05 / 0.1
Endrin ketone	608 / 8081	0.05 / 0.1
Heptachlor	608 / 8081	0.05 / 0.05
Heptachlor epoxide	608 / 8081	0.05 / 0.05
Methoxychlor	608 / 8081	0.05 / 0.5
Toxaphene	608 / 8081	2 / 2
gamma-Chlordane	608 / 8081	0.05 / 0.05
Aroclor 1016	608 / 8081	1 / 1
Aroclor 1221	608 / 8081	1 / 1
Aroclor 1232	608 / 8081	1 / 1
Aroclor 1242	608 / 8081	1 / 1
Aroclor 1248	608 / 8081	1 / 1
Aroclor 1254	608 / 8081	1 / 1
Aroclor 1260	608 / 8081	1 / 1

*Multiple methods/detection limits due to multiple labs performing analyses.

Figure 1-1: Location Plat, Sparta 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 2007

Figure 1-2: Map of pH Data

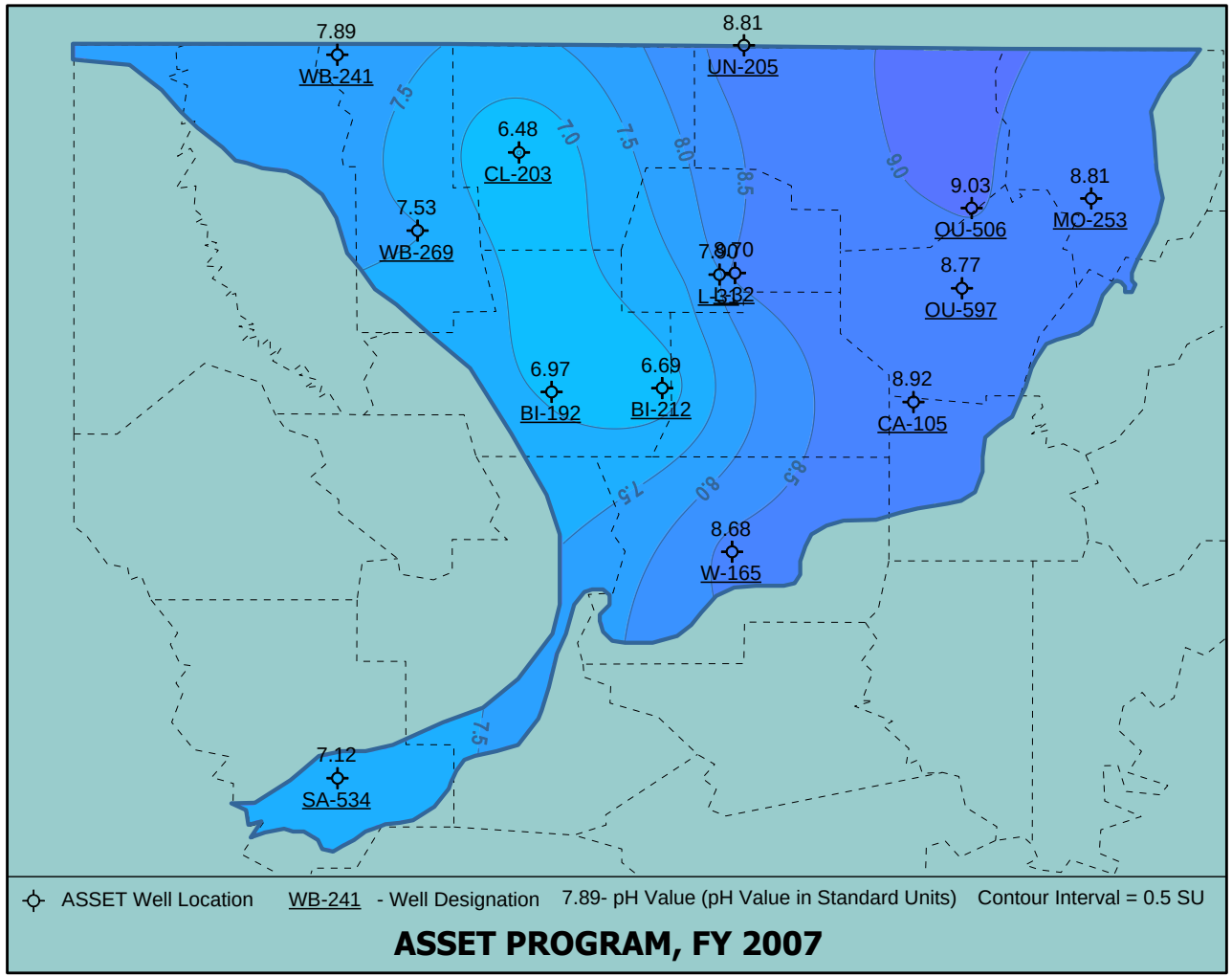


Figure 1-3: Map of TDS Lab Data

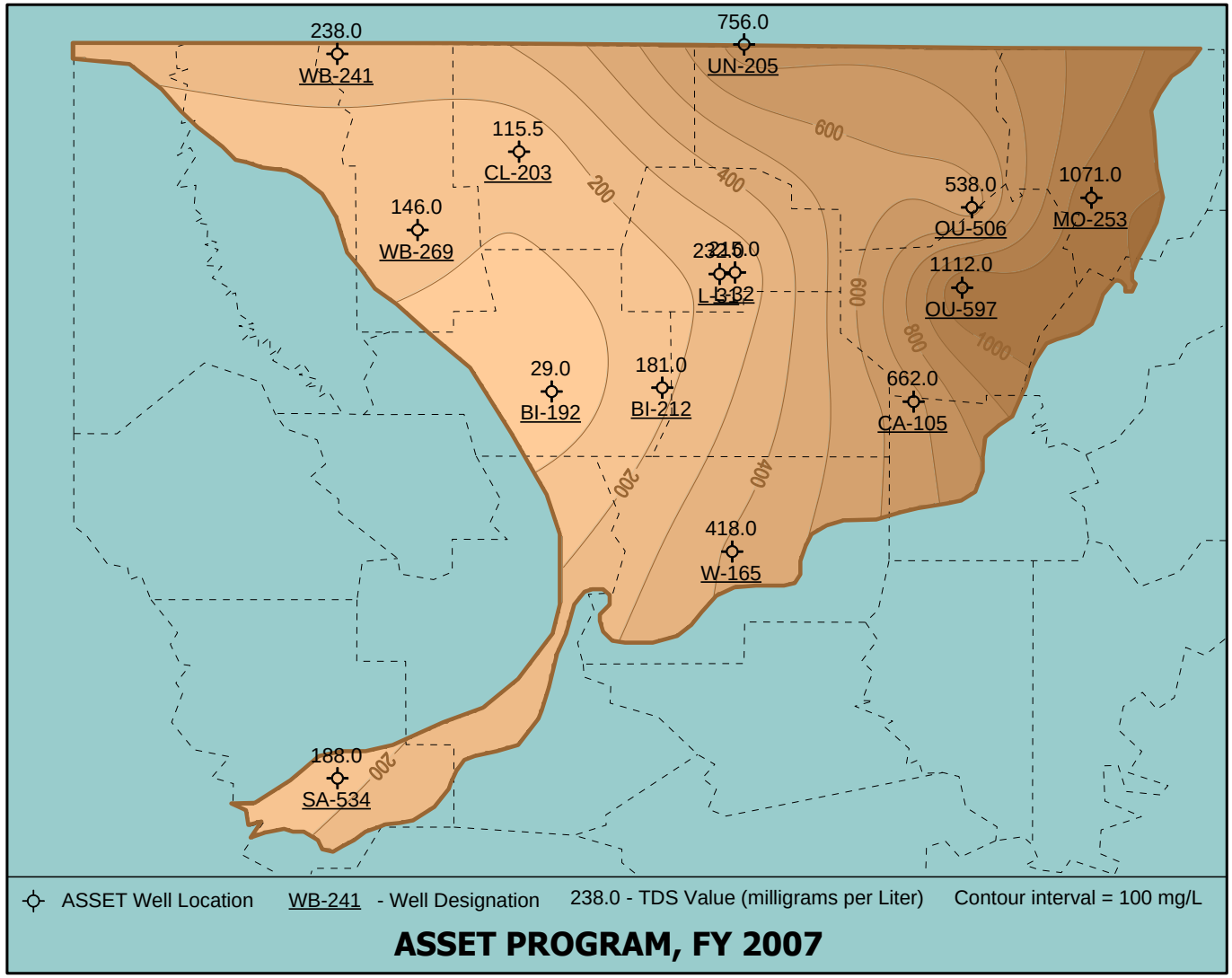


Figure 1-4: Map of Chloride Data

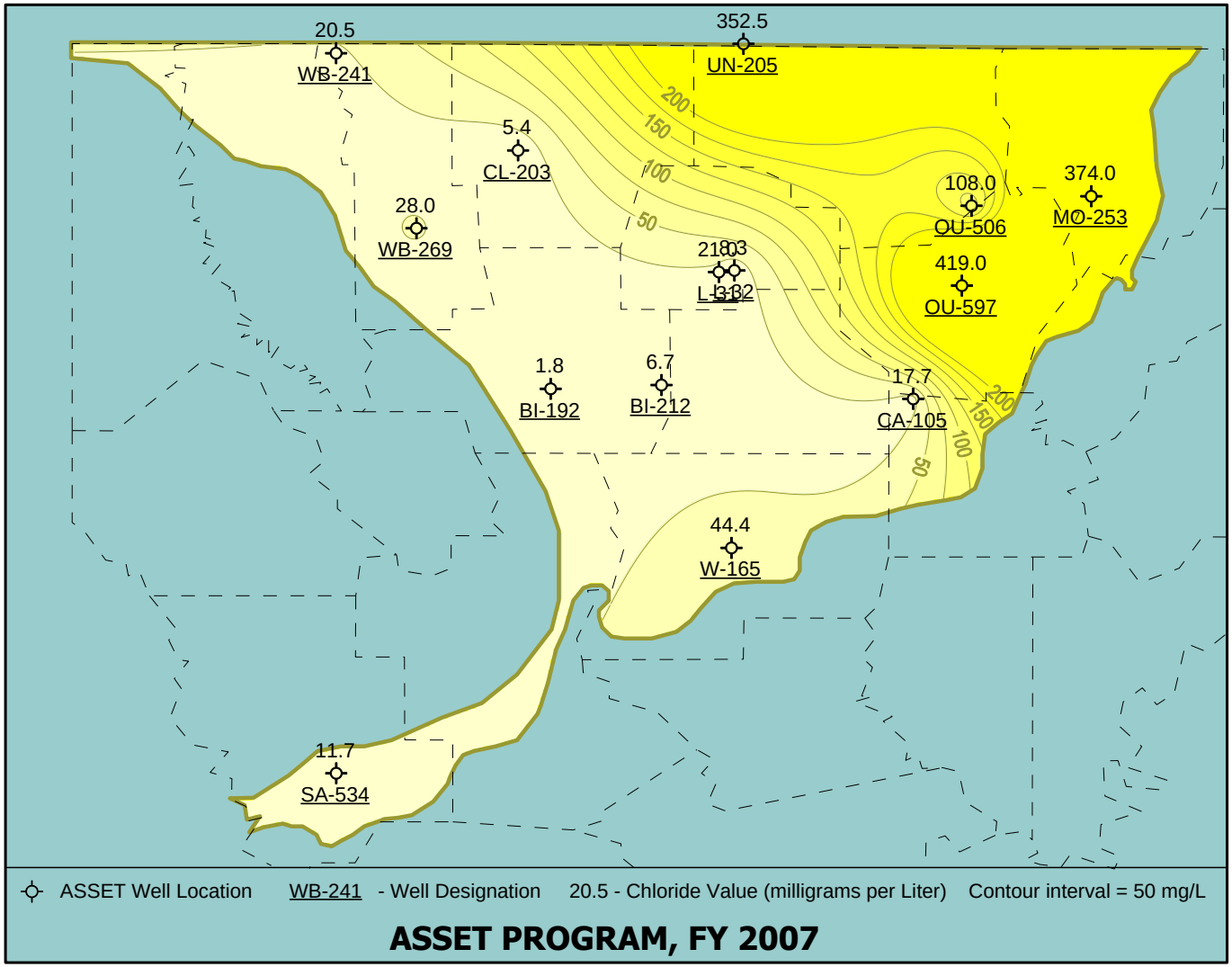


Figure 1-5: Map of Iron Data

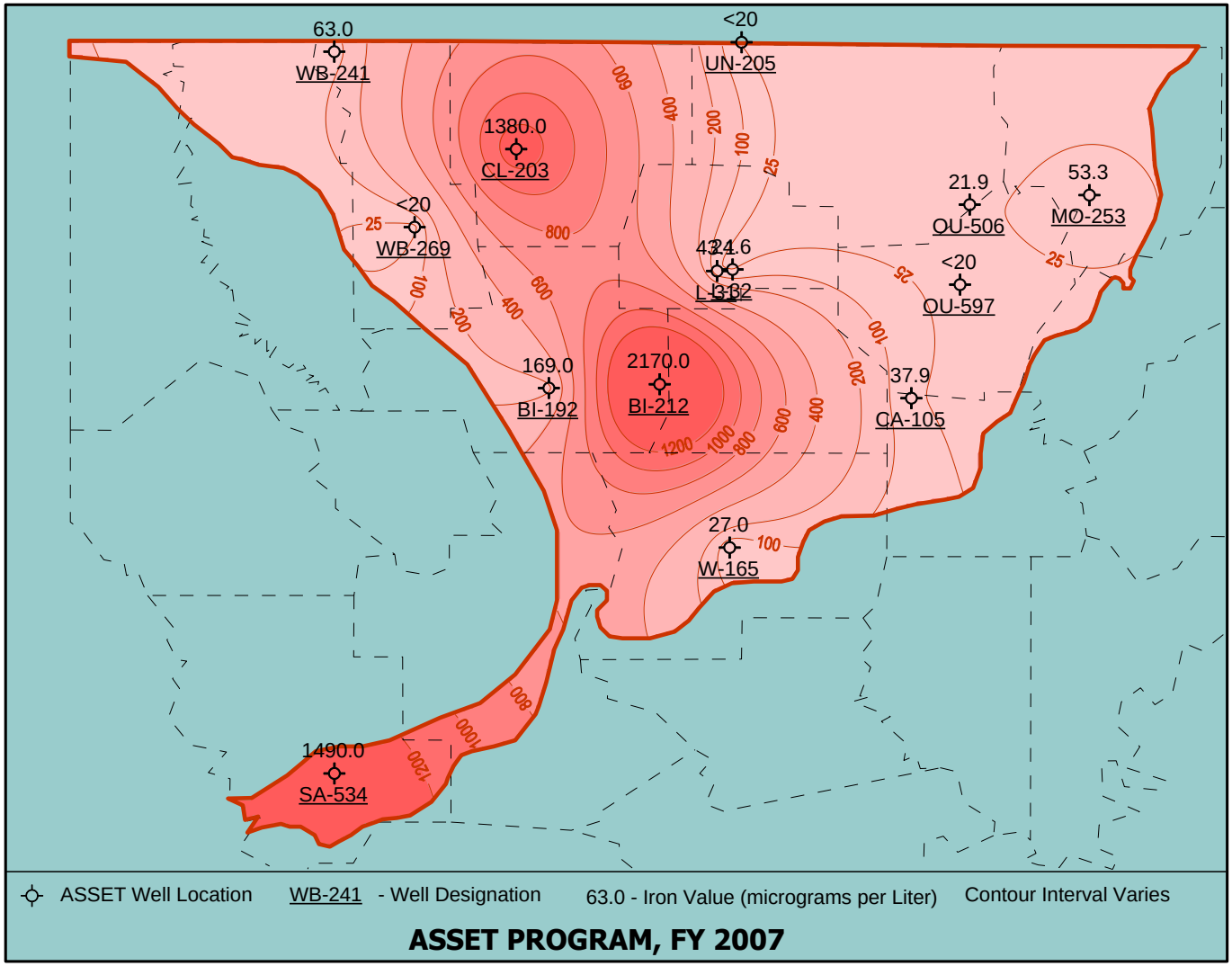


Chart 1-1: Temperature Trend

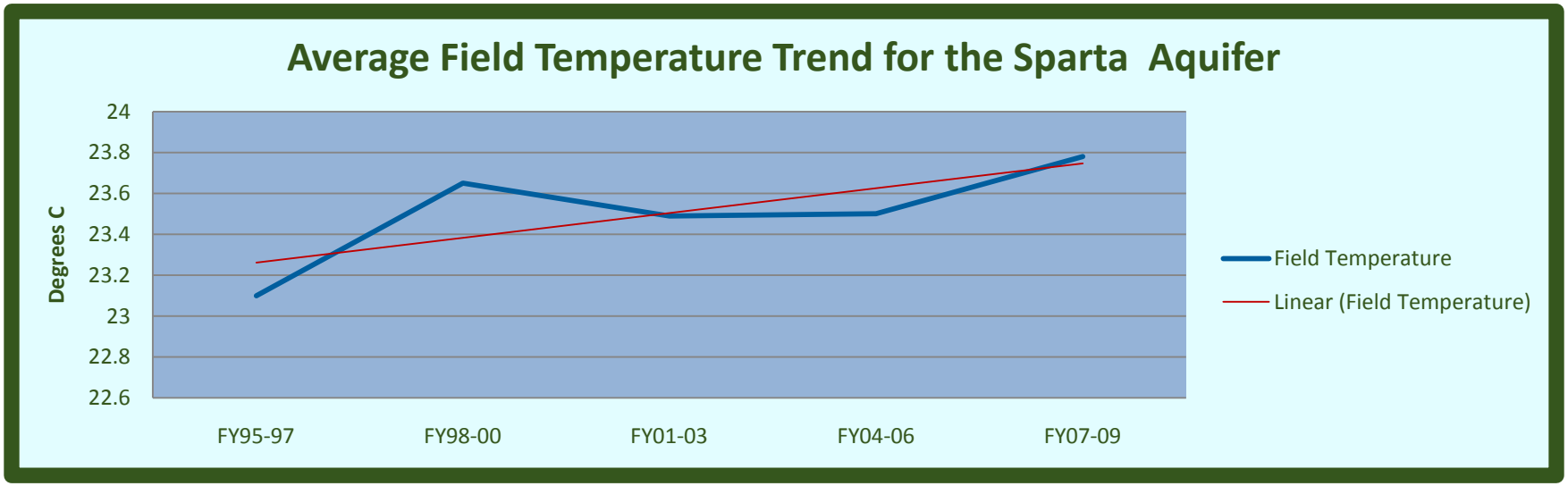


Chart 1-2: pH Trend

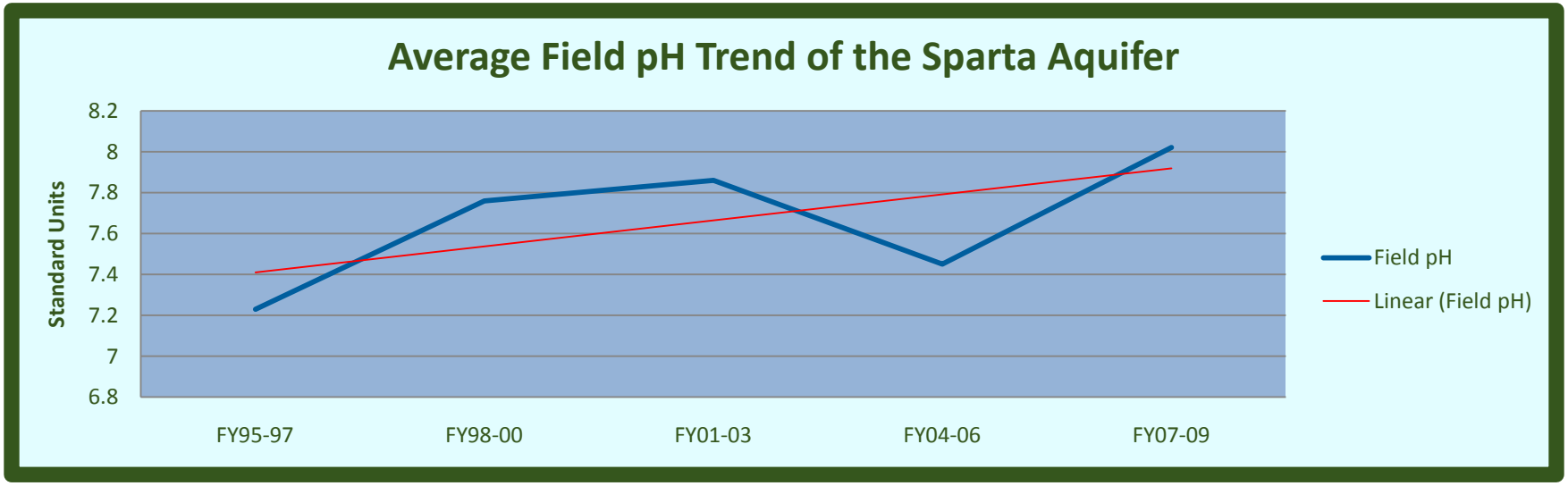


Chart 1-3: Field Specific Conductance Trend

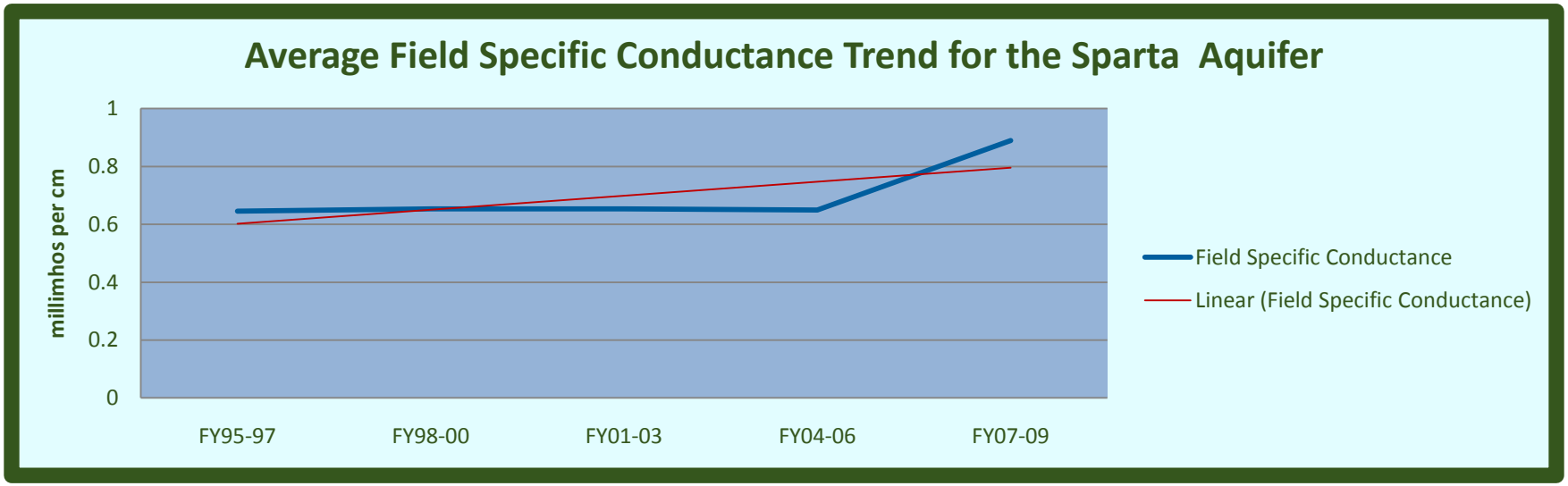


Chart 1-4: Lab Specific Conductance Trend

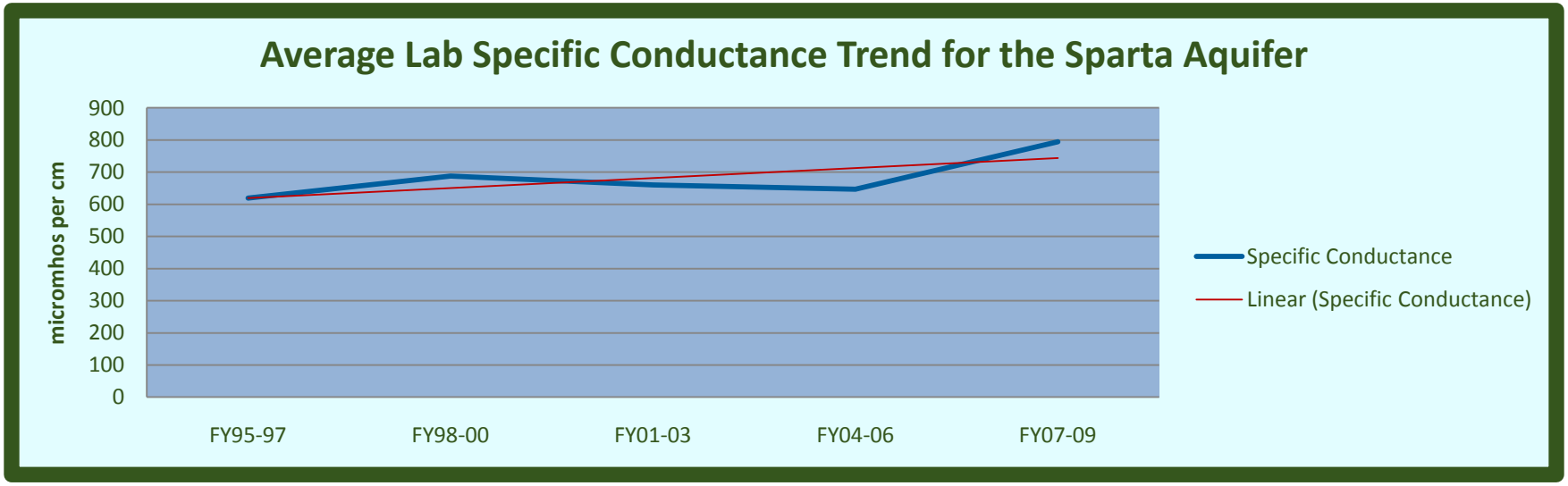


Chart 1-5: Field Salinity Trend

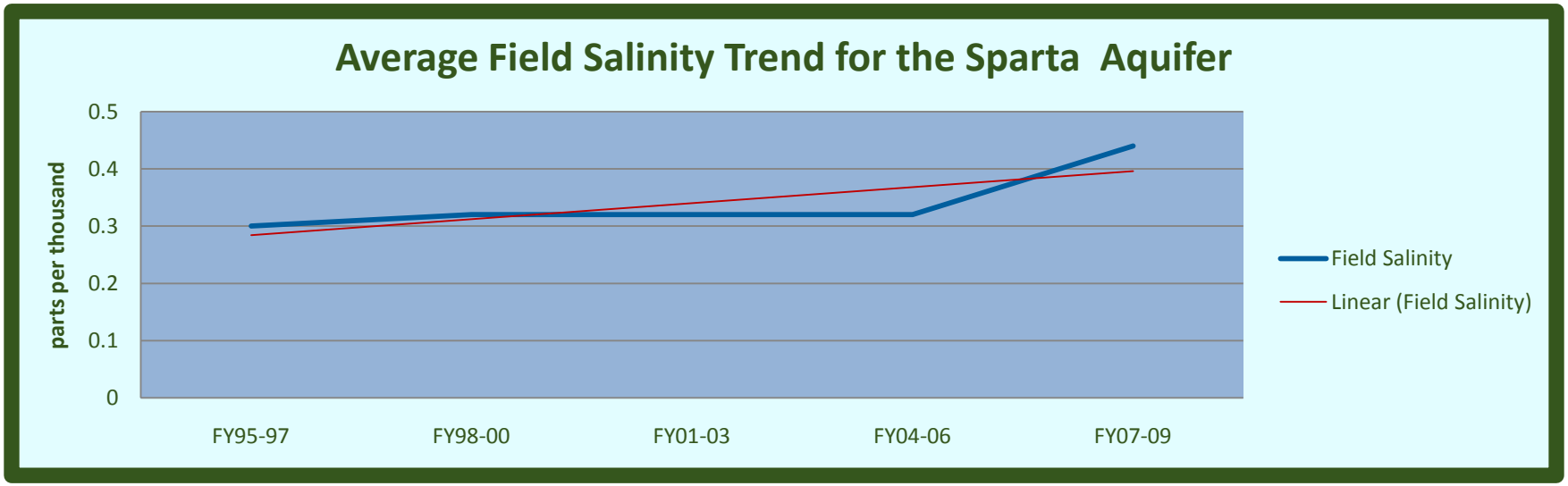


Chart 1-6: Alkalinity Trend

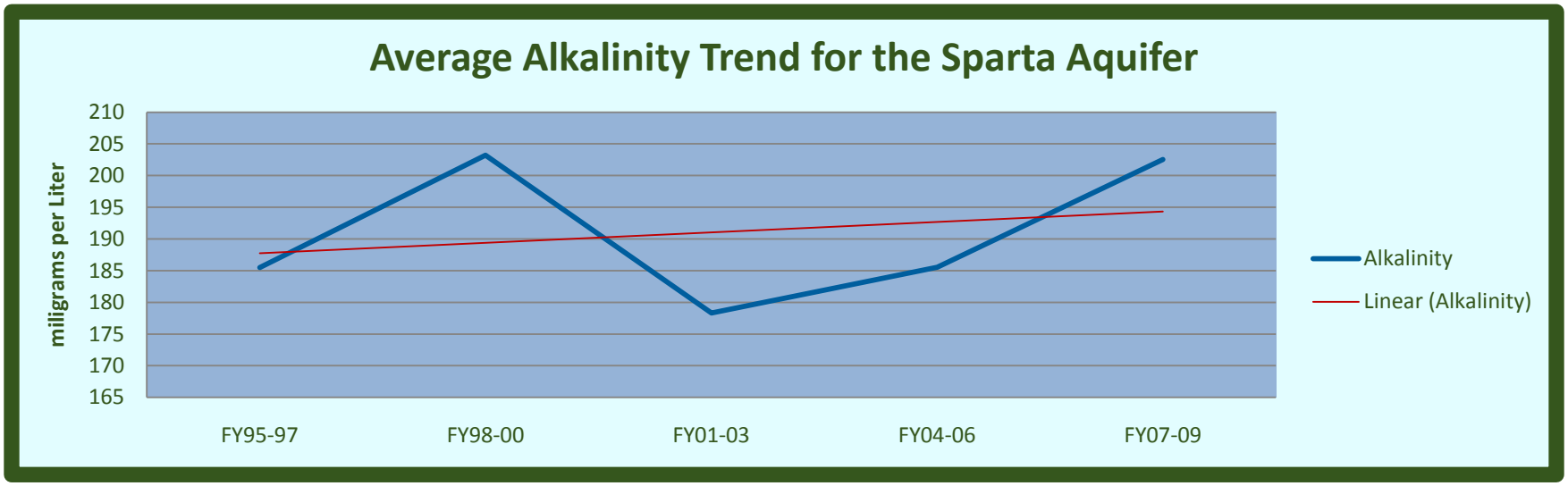


Chart 1-7: Chloride Trend

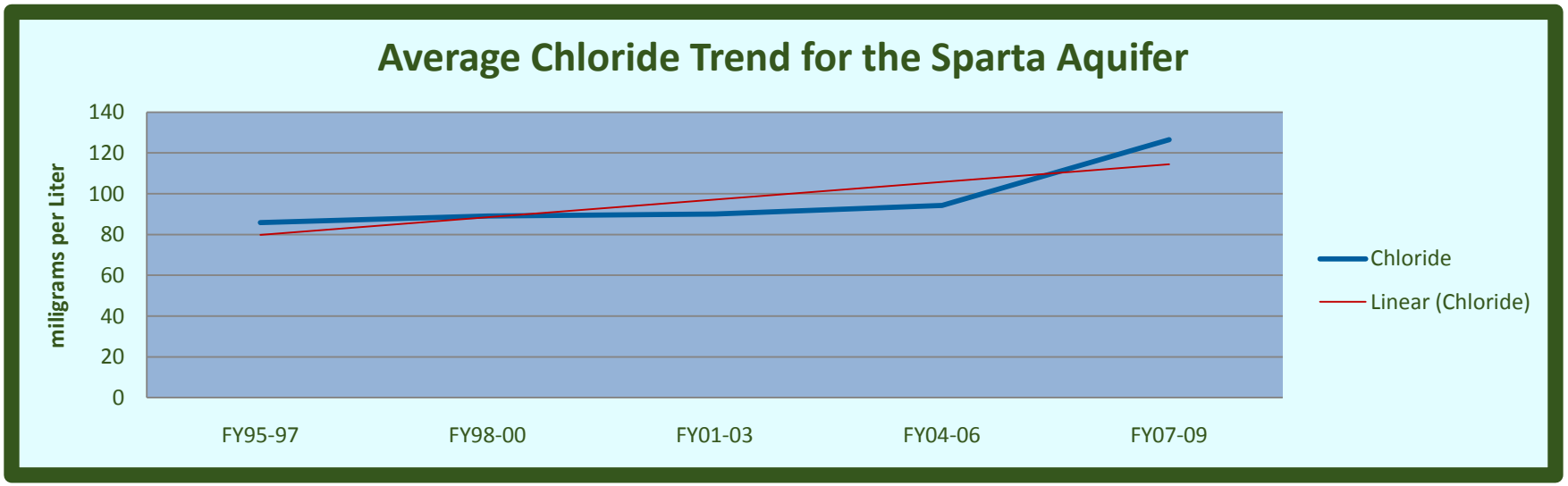


Chart 1-8: Color Trend

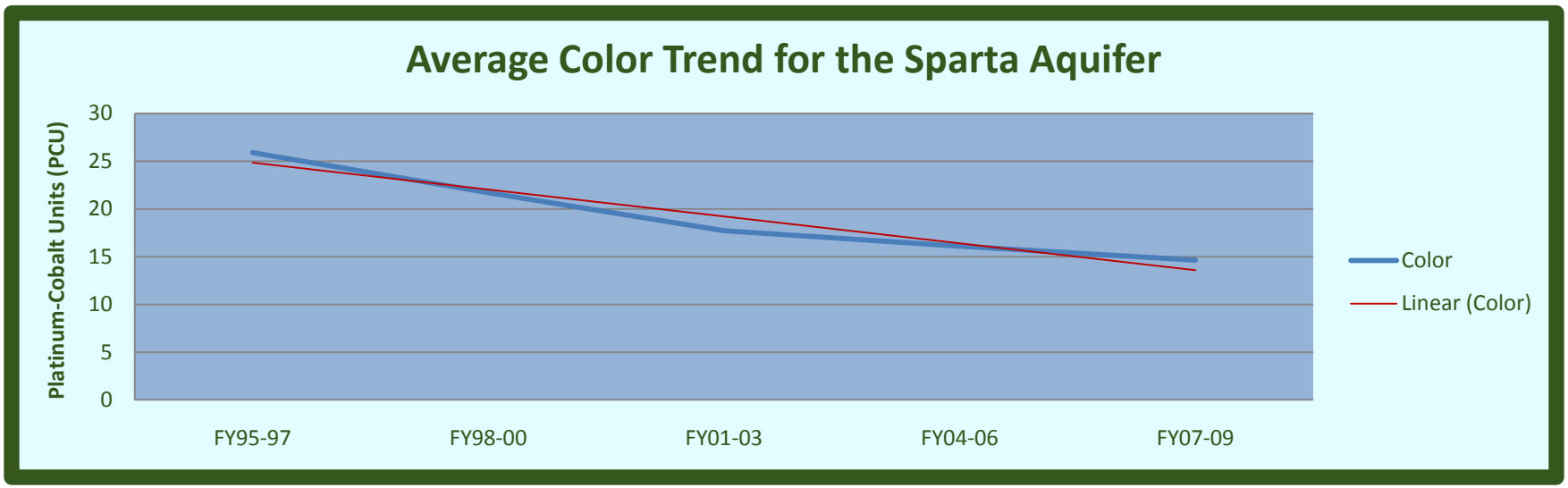


Chart 1-9: Sulfate (SO4) Trend

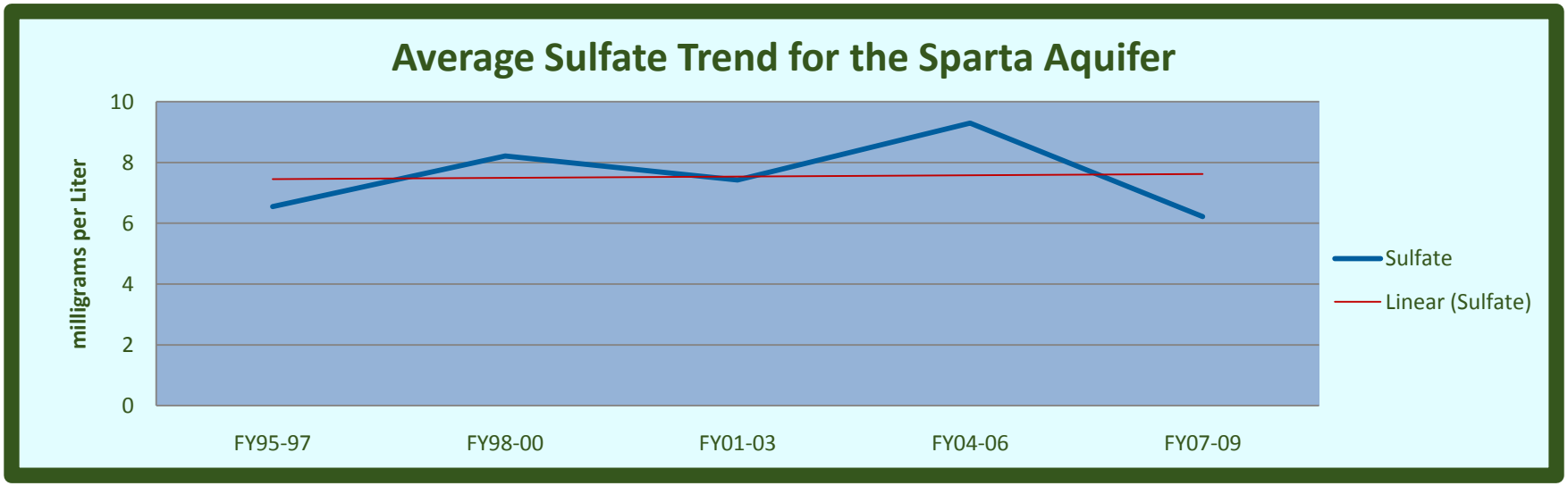


Chart 1-10: Total Dissolved Solids (TDS) Trend

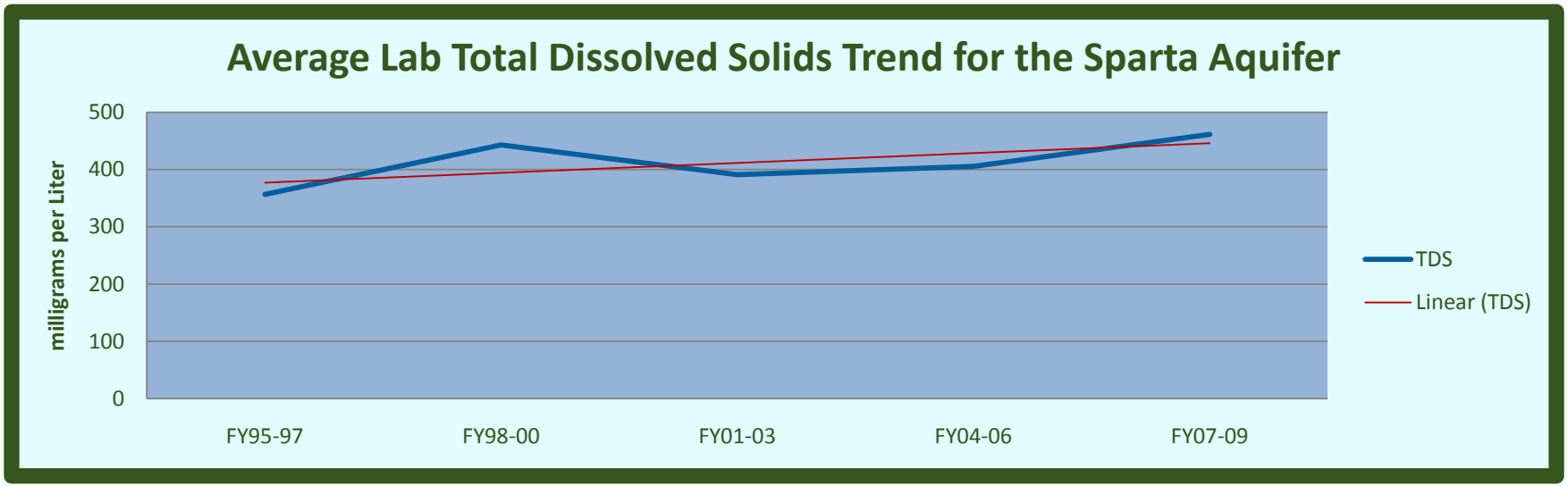


Chart 1-11: Ammonia (NH3) Trend

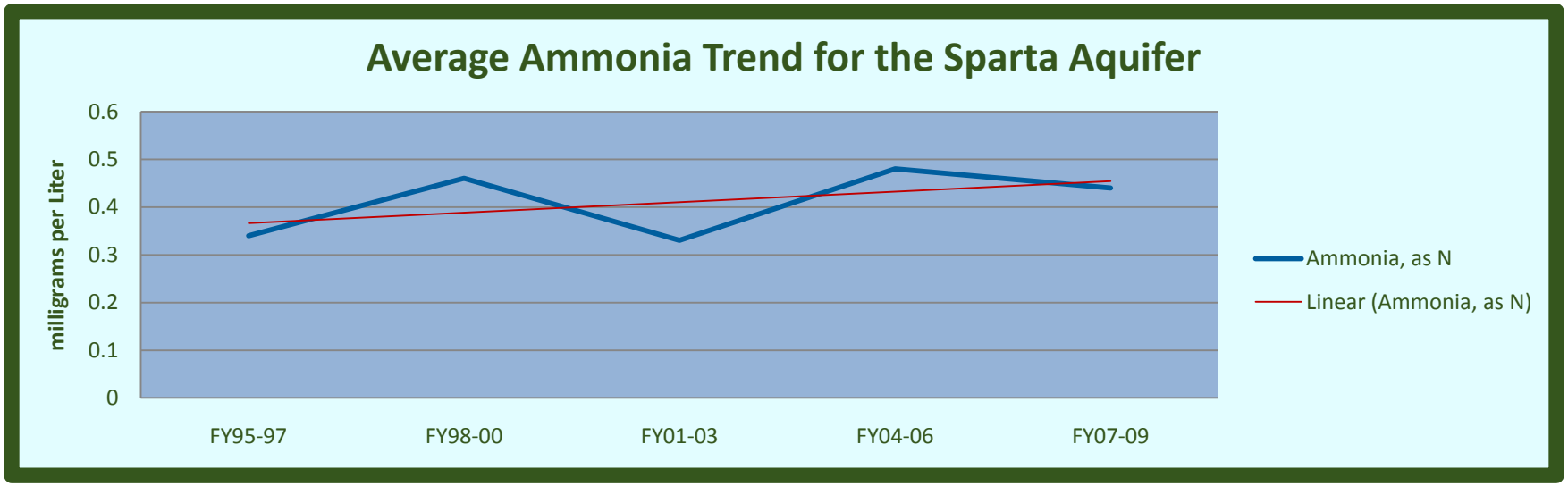


Chart 1-12: Hardness Trend

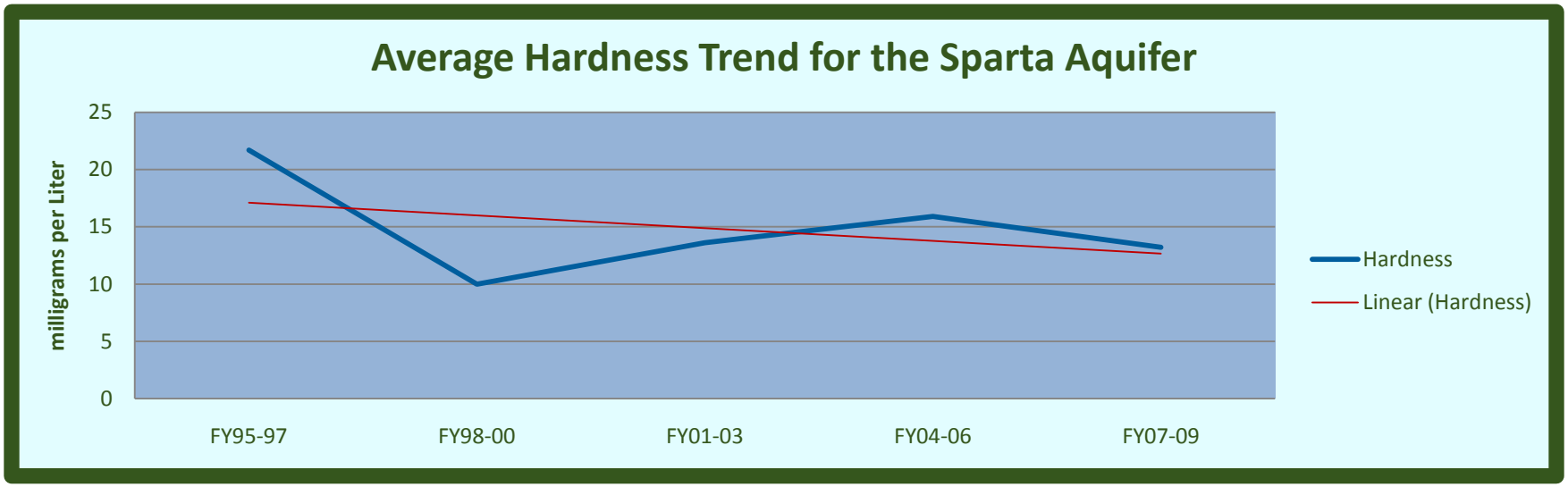


Chart 1-13: Nitrite – Nitrate Trend

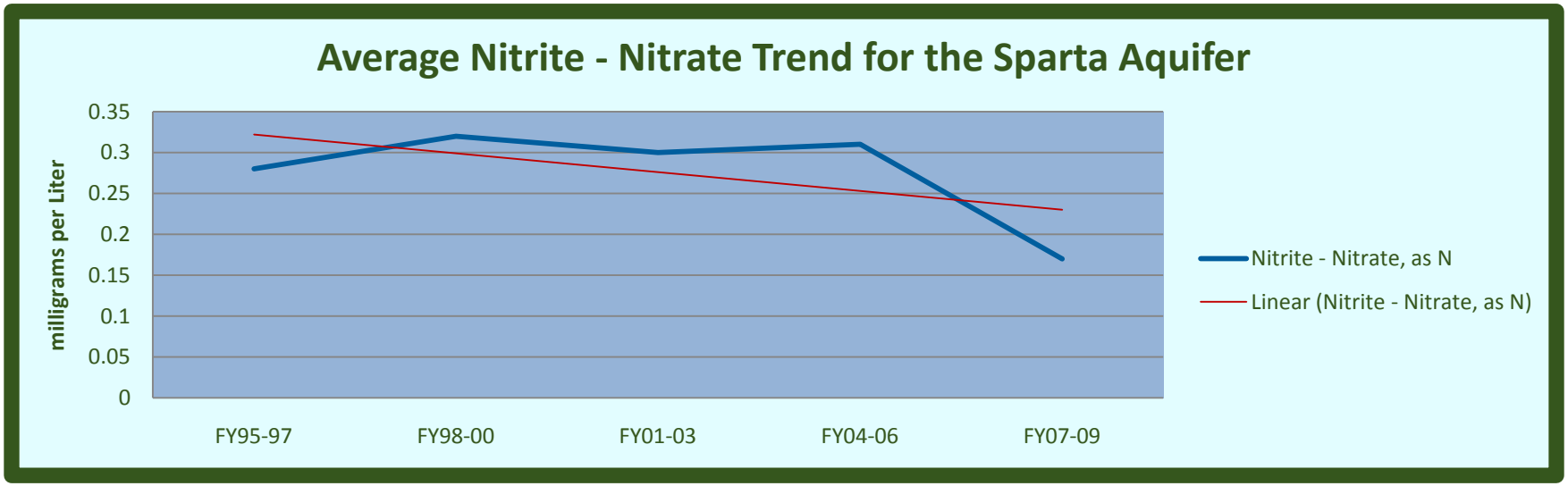


Chart 1-14: TKN Trend

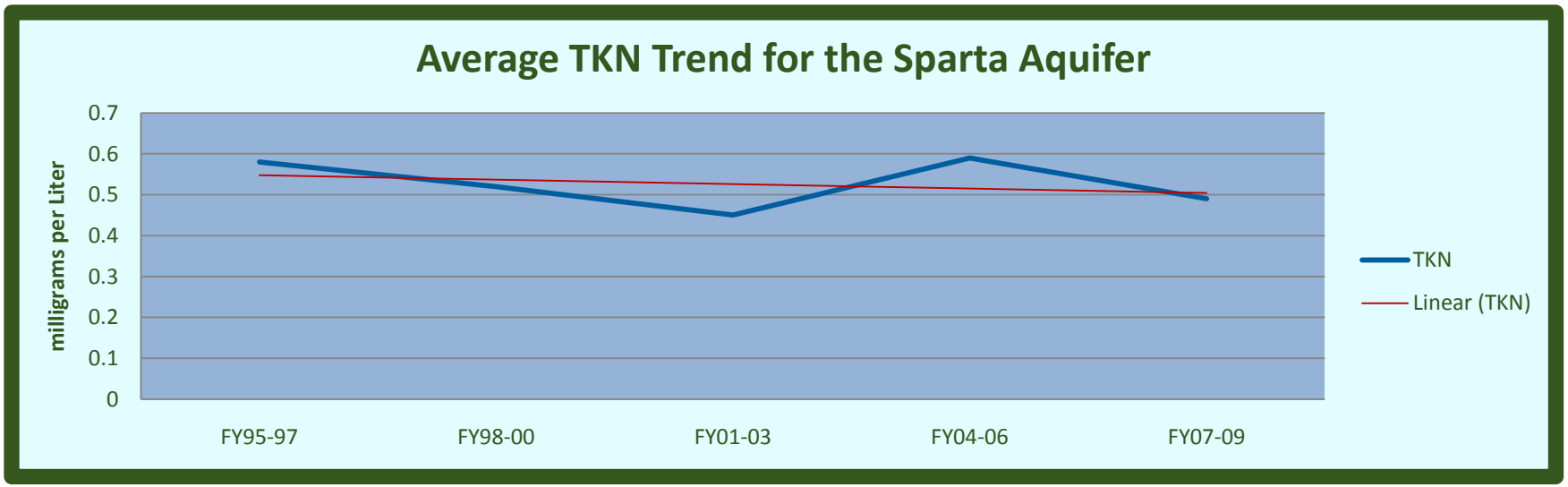


Chart 1-15: Total Phosphorus Trend

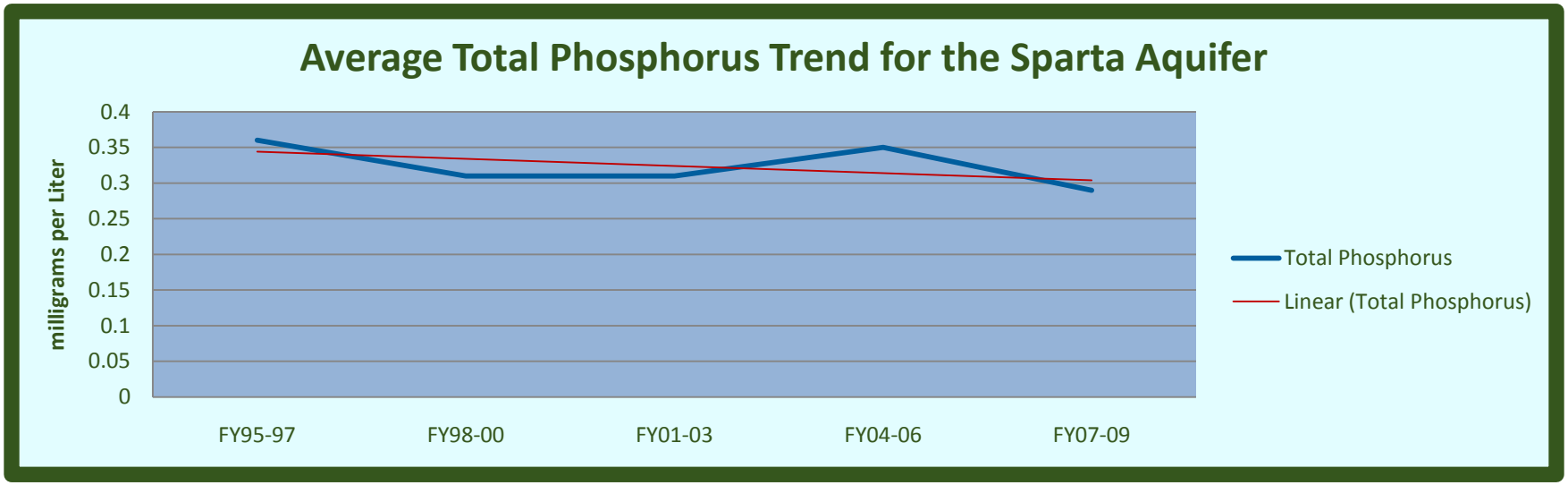


Chart 1-16: Iron Trend