# JASPER EQUIVALENT AQUIFER SYSTEM SUMMARY, 2009
## AQUIFER SAMPLING AND ASSESSMENT PROGRAM

DEQ
LOUISIANA

## APPENDIX 14 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 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 for 2009.

Analytical and field data contained in this summary were collected from wells producing from the Jasper Equivalent aquifer system during the 2009 state fiscal year (July 1, 2008 - June 30, 2009). This summary will become Appendix 14 of the ASSET Program Triennial Summary Report for 2009.

These data show that between March and June 2009, 14 wells were sampled which produce from the Jasper Equivalent aquifer system. Eleven wells are classified as public supply, and one each of irrigation, industrial and domestic classification. The wells are located in nine parishes in southeast Louisiana.

Figure 14-1 shows the geographic locations of the Jasper Equivalent aquifer system and the associated wells, whereas Table 14-1 lists the wells monitored along with their total depths, use made of produced waters and date sampled.

Well data, including well location and aquifer assignment, for registered water wells were obtained from the Louisiana Department of Transportation and Development's Water Well Registration Data file.

# GEOLOGY

The Jasper Equivalent aquifer system is composed of the Miocene aged aquifers of the Florida Parishes and Pointe Coupee Parish. These Miocene sediments outcrop in southwestern Mississippi. 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 consist of fine to coarse sand and gravel, with grain size increasing and sorting decreasing with depth.

## 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. A zone or ridge of saline water occurs within the Miocene sediments beneath the Mississippi River alluvial valley. Recharge occurs primarily by the direct infiltration of rainfall in interstream, upland outcrop areas, and by the movement of water between aquifers. The hydraulic conductivity varies between 10-200 feet/day.

The maximum depths of occurrence of freshwater in the Jasper Equivalent aquifer system range from 500 to 3,200 feet below sea level. The range of thickness of the fresh water interval in the Jasper Equivalent aquifer system is 1,600 to 2,350 feet. The depths of the wells that were monitored in conjunction with the ASSET Program range from 960 to 2,700 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 14-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 14-3. These tables also show the field and analytical results determined for each analyte. For quality control, duplicate samples were taken for each parameter at LI-229, ST-820, and WF-264.

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 14-6, 14-7 and 14-8 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Multiple laboratory detection limits were used for the Jasper Equivalent aquifer system sampling event. Calculating averages and reporting minimum and maximum values using multiple detection limits would grossly misrepresent the data as there were many non-detects reported for this event. Therefore, tables providing a statistical overview of field and conventional data, and inorganic data for the Jasper Equivalent aquifer system, listing the minimum, maximum, and average results for these parameters collected in the FY 2009 sampling were omitted. However, tables 14-4 and 14-5 compare parameter averages to historical ASSET-derived data for the Jasper Equivalent aquifer system, from fiscal years 1997, 2000, 2003 and 2006.

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 results for a particular analyte are reported as non-detect, then the minimum, maximum, and average values are all reported as less than the DL. One-half the DL is used for contouring purposes, and in the figures and charts referenced below.

Figures 14-2, 14-3, and 14-4, respectively, represent the contoured data for pH, total dissolved solids (TDS), and chloride (Cl). The figure showing contoured data for iron, which is normally included, was omitted from this report because all data was non-detect. Charts 14-1 through 14-16 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 Aquifer Sampling and Assessment Unit uses the MCLs as a benchmark for further evaluation.

EPA has set secondary standards, which are defined as non-enforceable taste, odor, or appearance guidelines. Field and laboratory data contained in Tables 14-2 and 14-3 show that one secondary MCL (SMCL) was exceeded in 11 of the 14 wells sampled in the Jasper Equivalent aquifer system.

## *Field and Conventional Parameters*

Table 14-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 14-4 provides an overview of field and conventional parameter data averages for the Jasper Equivalent aquifer system, including 4 previous sampling event averages.

Federal Primary Drinking Water Standards: A review of the analysis listed in Table 14-2 shows that no primary MCL was exceeded for field or conventional parameters for this reporting period.

Federal Secondary Drinking Water Standards: A review of the analysis listed in Table 14-2 shows that 11 wells exceeded the SMCL for pH. Following is a list of SMCL parameter exceedances with well number and results:

**pH (SMCL = 6.5 – 8.5 Standard Units):**

EB-770 – 8.79 SU
LI-185 – 8.52 SU
PC-275 – 9.08 SU
ST-820 – 8.68 SU (Original and Duplicate)
TA-560 – 8.64 SU
WA-248 – 8.61 SU
EF-272 – 8.72 SU
LI-229 – 8.90 SU (Original and Duplicate)
SH-104 – 9.08 SU
ST-FOLSOM – 8.84 SU
TA-826 – 8.80 SU

## *Inorganic Parameters*

Table 14-3 shows the inorganic (total metals) parameters for which samples are collected at each well and the analytical results for those parameters. Table 14-5 provides an overview of inorganic parameter data averages for the Jasper Equivalent aquifer system, including 4 previous sampling event averages.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 14-3 shows that no primary MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 14-3 shows that no secondary MCLs were exceeded.

## Volatile Organic Compounds

Table 14-6 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 2009 sampling of the Jasper Equivalent aquifer system.

## Semi-Volatile Organic Compounds

Table 14-7 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 2009 sampling of the Jasper Equivalent aquifer system.

## Pesticides and PCBs

Table 14-8 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 2009 sampling of the Jasper Equivalent aquifer system.

# 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 Jasper Equivalent aquifer system 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 14-4 and 14-5, and in Charts 14-1 to 14-16 of this summary. Over the twelve-year period, 6 analytes have shown a general increase in average concentration. These analytes are: pH, ammonia, sulfate, TDS, TKN, and total phosphorus (P). For this same time period, temperature and color have demonstrated a decrease in average concentration, while specific conductance (lab and field), salinity, chloride, and hardness have decreased only slightly. There was an initial increase in average alkalinity concentration in the FY 95-97 period, but has remained consistent since. All other analyte averages have remained consistent or have been non-detect over this time period. The number of secondary exceedances in the Jasper Equivalent aquifer system has increased from the previous sampling in FY 2006 of 12 SMCL exceedances, to 13 in FY 2009.

# 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 2009 monitoring of the Jasper Equivalent aquifer system exceeded a Primary MCL. The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines, with 13 Secondary MCLs exceeded in 11 wells.

Comparison to historical ASSET-derived data shows some change in the quality or characteristics of the Jasper Equivalent aquifer system, with 6 parameters showing consistent increases in average concentrations and 2 parameters decreasing in average concentration with the remainder of the analyte averages staying consistent over the previous twelve year period.

It is recommended that the wells assigned to the Jasper Equivalent aquifer system 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.

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

## *Table 14-1: List of Wells Sampled – FY 2009*
## *Jasper Equivalent Aquifer System*

| DOTD Well Number | Parish | Date | Owner | Depth (Feet) | Well Use |
|---|---|---|---|---|---|
| EB-770 | E BATON ROUGE | 3/16/2009 | CITY OF ZACHARY | 2080 | PUBLIC SUPPLY |
| EF-272 | E FELICIANA | 3/16/2009 | LA. WAR VETS HOME | 1325 | PUBLIC SUPPLY |
| LI-185 | LIVINGSTON | 4/27/2009 | CITY OF DENHAM SPRINGS | 2610 | PUBLIC SUPPLY |
| LI-229 | LIVINGSTON | 4/27/2009 | WARD 2 WATER DISTRICT | 1826 | PUBLIC SUPPLY |
| LI-257 | LIVINGSTON | 4/27/2009 | VILLAGE OF ALBANY | 1842 | PUBLIC SUPPLY |
| PC-275 | POINTE COUPEE | 3/16/2009 | PRIVATE OWNER | 1912 | DOMESTIC |
| SH-104 | ST HELENA | 4/27/2009 | CAL MAINE FOODS | 1652 | INDUSTRIAL |
| ST-820 | ST TAMMANY | 6/1/2009 | SOUTHERN MANOR MHP | 2004 | PUBLIC SUPPLY |
| ST-995 | ST TAMMANY | 3/18/2009 | PRIVATE OWNER | 2290 | IRRIGATION |
| ST-FOLSOM | ST TAMMANY | 3/18/2009 | VILLAGE OF FOLSOM | 2265 | PUBLIC SUPPLY |
| TA-560 | TANGIPAHOA | 4/27/2009 | TOWN OF ROSELAND | 2032 | PUBLIC SUPPLY |
| TA-826 | TANGIPAHOA | 3/18/2009 | CITY OF PONCHATOULA | 2015 | PUBLIC SUPPLY |
| WA-248 | WASHINGTON | 3/18/2009 | TOWN OF FRANKLINTON | 2700 | PUBLIC SUPPLY |
| WF-264 | W FELICIANA | 3/16/2009 | W. FELICIANA PARISH UTILITIES | 960 | PUBLIC SUPPLY |

## *Table 14-2: Summary of Field and Conventional Data – FY 2009*

## *Jasper Equivalent Aquifer System*

| 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 → | | | | | | 2/10 | 1/ 1.25 | 1 | 1/10 | 5 | 4 | 4 | 0.1/ 0.3/ 0.4 | 0.1/ 0.11/1 | 5/10 | 0.01/0.1 | 0.3/0.5 | 0.05/ 0.1 |
| | FIELD PARAMETERS | | | | | LABORATORY PARAMETERS | | | | | | | | | | | | |
| EB-770 | 30.12 | 8.79 | 0.351 | 0.17 | 0.23 | 174 | 2.91 | 5 | 319 | 10.20 | 234 | <4 | <0.4 | 1.120 | <5 | <0.01 | 1.54 | 0.375 |
| EF-272 | 19.99 | 8.72 | 0.324 | 0.16 | 0.21 | 164 | 7.27 | <1 | 296 | 7.67 | 200 | <4 | <0.4 | <1 | <5 | 0.046 | 0.42 | 0.462 |
| LI-185 | 32.44 | 8.52 | 0.264 | 0.12 | 0.17 | 116 | 5.17 | <1 | 235 | 9.16 | 361 | <4 | <0.3 | <1 | † | <0.01 | 2.38 | 0.270 |
| LI-229 | 28.02 | 8.90 | 0.304 | 0.14 | 0.20 | 130 | 3.45 | <1 | 286 | 9.42 | 384 | <4 | <0.3 | <1 | † | <0.01 | 1.12 | 0.270 |
| LI-229* | 28.02 | 8.90 | 0.304 | 0.14 | 0.20 | 156 | 5.17 | <1 | 295 | 7.64 | 391 | <4 | <0.3 | <1 | † | <0.01 | 2.10 | 0.280 |
| LI-257 | 28.94 | 8.24 | 0.234 | 0.11 | 0.15 | 125 | 5.17 | <1 | 196 | 8.74 | 356 | <4 | <0.3 | <1 | † | <0.01 | <0.3 | 0.320 |
| PC-275 | 22.96 | 9.08 | 0.652 | 0.32 | 0.42 | 300 | 29.10 | 8 | 570 | 7.29 | 175 | <4 | <0.4 | 3.360 | <5 | <0.01 | 4.27 | 0.471 |
| SH-104 | 25.87 | 9.08 | 0.393 | 0.19 | 0.26 | 195 | 3.45 | <1 | 368 | 9.42 | 453 | <4 | <0.3 | <1 | † | <0.01 | 0.84 | 0.640 |
| ST-820 | 33.24 | 8.68 | 0.469 | 0.22 | 0.31 | 231 | 6.29 | 4 | 476 | 9.60 | 265 | <4 | 0.28 | 0.952 | <10 | <0.1 | <0.5 | 0.251 |
| ST-820* | 33.24 | 8.68 | 0.469 | 0.22 | 0.31 | 229 | 6.36 | 5 | 472 | 9.40 | 260 | <4 | 0.35 | 0.583 | <10 | <0.1 | 0.56 | 0.296 |
| ST-995 | 26.00 | 8.26 | 0.188 | 0.09 | 0.12 | 90 | 3.01 | <1 | 164 | 10.70 | 185 | <4 | <0.4 | 1.12 | 8 | <0.01 | 1.54 | 0.659 |
| ST-FOLSOM | 29.37 | 8.84 | 0.263 | 0.12 | 0.17 | 134 | 12.00 | <1 | 231 | 10.90 | 142 | <4 | <0.4 | 1.12 | 8 | <0.01 | 2.94 | 0.270 |
| TA-560 | 23.20 | 8.64 | 0.211 | 0.10 | 0.14 | 109 | 3.45 | <1 | 237 | 8.31 | 368 | <4 | <0.3 | <1 | † | <0.01 | 1.26 | 1.010 |
| TA-826 | 30.04 | 8.80 | 0.325 | 0.15 | 0.21 | 162 | 3.01 | <1 | 278 | 12.30 | 167 | <4 | <0.4 | <1 | 10 | <0.01 | 0.98 | 0.314 |
| WA-248 | 30.02 | 8.61 | 0.363 | 0.17 | 0.24 | 174 | 7.52 | 3 | 327 | 11.60 | 200 | <4 | <0.4 | 1.820 | 8 | <0.01 | 3.01 | 0.655 |
| WF-264 | 24.00 | 7.61 | 0.280 | 0.13 | 0.18 | 152 | 2.91 | 2 | 250 | 9.37 | 227 | <4 | <0.4 | <1 | <5 | <0.01 | 1.68 | 0.194 |
| WF-264* | 24.00 | 7.61 | 0.280 | 0.13 | 0.18 | 138 | 2.91 | <1 | 249 | 8.61 | 363 | <4 | <0.4 | <1 | <5 | <0.01 | 1.26 | 0.167 |

*Denotes Duplicate Sample  Shaded cells exceed EPA Secondary Standards  †Sample not analyzed by lab

## *Table 14-3: Summary of Inorganic Data – FY 2009*

## *Jasper Equivalent Aquifer System*

| 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 | 0.1/5 | 0.5/4 | 0.3/5 | 0.2//2 | 0.08/2 | 0.5/4 | 0.5/2 | 50/100 | 0.1/ 1/2 | 0.0002/ 0.2 | 0.5/2/ 5 | 0.5/5 | 0.5/1 | 0.5/2 | 5/6 |
| EB-770 | <5 | <4 | <5 | <2 | <2 | 8.16 | <2 | <100 | <1 | <0.0002 | 40.9 | <5 | <1 | <2 | 9.21 |
| EF-272 | <5 | <4 | <5 | <2 | <2 | <4 | 5.79 | <100 | <1 | <0.0002 | 15.0 | <5 | <1 | <2 | 9.22 |
| LI-185 | <5 | <4 | 24.30 | <2 | <2 | 13.20 | <2 | <100 | <1 | <0.0002 | <2 | <5 | <1 | <2 | 38.6 |
| LI-229 | <5 | <4 | 10.70 | <2 | <2 | 4.64 | <2 | <100 | <1 | <0.0002 | <2 | <5 | <1 | <2 | 19.8 |
| LI-229* | <5 | <4 | 10.90 | <2 | <2 | 5.06 | <2 | <100 | <1 | <0.0002 | <2 | <5 | <1 | <2 | 12.1 |
| LI-257 | <5 | <4 | 6.16 | <2 | <2 | 11.40 | <2 | <100 | <1 | <0.0002 | 39.5 | <5 | <1 | <2 | 39.3 |
| PC-275 | <5 | <4 | 8.84 | <2 | <2 | <4 | <2 | <100 | <1 | <0.0002 | <2 | <5 | <1 | <2 | 6.08 |
| SH-104 | <5 | <4 | <5 | <2 | <2 | <4 | <2 | <100 | <1 | <0.0002 | <2 | <5 | <1 | <2 | <6 |
| ST-820 | <0.1 | <0.5 | 20.4 | <0.2 | <0.08 | <0.5 | <0.5 | <50 | 0.55 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <5 |
| ST-820* | <0.1 | <0.5 | 21.3 | <0.2 | <0.08 | <0.5 | <0.5 | <50 | 0.41 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | 6 |
| ST-995 | <5 | <4 | 8.26 | <2 | <2 | <4 | <2 | <100 | <2 | <0.0002 | <5 | <5 | <1 | <2 | <6 |
| ST-FOLSOM | <5 | <4 | <5 | <2 | <2 | <4 | <2 | <100 | <2 | <0.0002 | <5 | <5 | <1 | <2 | <6 |
| TA-560 | <5 | <4 | <5 | <2 | <2 | <4 | <2 | <100 | <1 | <0.0002 | 9.08 | <5 | <1 | <2 | <6 |
| TA-826 | <5 | <4 | 21.90 | <2 | <2 | <4 | <2 | <100 | <2 | <0.0002 | <5 | <5 | <1 | <2 | 11.8 |
| WA-248 | <5 | <4 | <5 | <2 | <2 | <4 | <2 | <100 | <2 | <0.0002 | <5 | <5 | <1 | <2 | <6 |
| WF-264 | <5 | <4 | 41.90 | <2 | <2 | <4 | <2 | <100 | <1 | <0.0002 | <2 | <5 | <1 | <2 | <6 |
| WF-264* | <5 | <4 | 41.40 | <2 | <2 | <4 | <2 | <100 | <1 | <0.0002 | 11.4 | <5 | <1 | <2 | <6 |

*Denotes Duplicate Sample.

## Table 14-4: Triennial Field and Conventional Statistics, ASSET Wells

| | PARAMETER | FY 1997 AVERAGE | FY 2000 AVERAGE | FY 2003 AVERAGE | FY 2006 AVERAGE | FY 2009 AVERAGE |
|---|---|---|---|---|---|---|
| FIELD | Temperature ($^{O}$C) | 29.00 | 28.84 | 28.13 | 29.16 | 27.62 |
| | pH (SU) | 7.64 | Invalid Data | 8.67 | 8.67 | 8.12 |
| | Specific Conductance (mmhos/cm) | 0.35 | 0.38 | 0.37 | 0.368 | 0.33 |
| | Salinity (Sal.) (ppt) | 0.17 | 0.18 | 0.17 | 0.18 | 0.16 |
| | TDS (Total dissolved solids) (g/L) | - | - | - | 0.18 | 0.17 |
| LABORATORY | Alkalinity (Alk.) (mg/L) | 137.3 | 167.2 | 163.2 | 165.3 | 163.47 |
| | Chloride (Cl) (mg/L) | 12.1 | 17.9 | 14.4 | 24.5 | 6.42 |
| | Color (PCU) | 8.1 | 5.9 | 10.3 | 8.9 | 1.91 |
| | Specific Conductance (umhos/cm) | 335.0 | 393.9 | 343.0 | 396.6 | 308.76 |
| | Sulfate (SO4) ( mg/L) | 8.8 | 7.3 | 8.1 | 8.3 | 9.43 |
| | TDS (Total dissolved solids) (mg/L) | 258.3 | 251.4 | 221.4 | 249.7 | 278.29 |
| | TSS (Total suspended solids) (mg/L) | 4.1 | 8.6 | <4.00 | <4 | <4 |
| | Turbidity (Turb.) (NTU) | <1 | 1.1 | 1.1 | <1 | <0.4 |
| | Ammonia, as N (NH3) (mg/L) | 0.31 | 0.27 | 0.24 | 0.29 | 0.89 |
| | Hardness (mg/L) | 6.9 | 5.89 | 10.8 | 5.8 | 5.14 |
| | Nitrite - Nitrate , as N (mg/L) | <0.05 | <0.02 | 0.06 | <0.05 | <0.01 |
| | TKN (mg/L) | 0.19 | 0.47 | 0.33 | 0.43 | 1.55 |
| | Total Phosphorus (P) (mg/L) | 0.20 | 0.28 | 0.32 | 0.26 | 0.41 |

## Table 14-5: Triennial Inorganic Statistics, ASSET Wells

| PARAMETER | FY 1997 AVERAGE | FY 2000 AVERAGE | FY 2003 AVERAGE | FY 2006 AVERAGE | FY 2009 AVERAGE |
|---|---|---|---|---|---|
| Antimony (ug/L) | 7.78 | <5 | <5 | <50 | <5 |
| Arsenic (ug/L) | <5 | <5 | <5 | <20 | <4 |
| Barium (ug/L) | 24.20 | 11.65 | 22.20 | 14.30 | 13.59 |
| Beryllium (ug/L) | <1 | <1 | <1 | <1 | <2 |
| Cadmium (ug/L) | 1.13 | 1.02 | <1 | <1 | <2 |
| Chromium (ug/L) | <5 | <5 | <5 | <5 | <4 |
| Copper (ug/L) | <5 | 14.01 | <5 | <10 | <2 |
| Iron (ug/L) | 27.46 | 28.25 | 86.47 | 30.9 | <50 |
| Lead (ug/L) | <10 | <10 | <10 | <20 | <1 |
| Mercury (ug/L) | <0.05 | <0.05 | <0.05 | <0.05 | <0.20 |
| Nickel (ug/L) | <5 | <5 | <5 | <5 | 7.79 |
| Selenium (ug/L) | <5 | <5 | <5 | <5 | <5 |
| Silver (ug/L) | <1 | <1 | <1 | <2.5 | <0.5 |
| Thallium (ug/L) | <5 | <5 | <5 | <5 | <2 |
| Zinc (ug/L) | <10 | 22.92 | 56.80 | <10 | 10.33 |

## *Table 14-6: 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 14-7: SVOC Analytical Parameters*

| COMPOUND | METHOD | DETECTION LIMIT (ug/L) |
|---|---|---|
| 1,2-Dichlorobenzene | 625 | 10 |
| 1,2,3-Trichlorobenzene | 625 | 10 |
| 1,2,3,4-Tetrachlorobenzene | 625 | 10 |
| 1,2,4-Trichlorobenzene | 625 | 10 |
| 1,2,4,5-Tetrachlorobenzene | 625 | 10 |
| 1,3-Dichlorobenzene | 625 | 10 |
| 1,3,5-Trichlorobenzene | 625 | 10 |
| 1,4-Dichlorobenzene | 625 | 10 |
| 2-Chloronaphthalene | 625 | 10 |
| 2-Chlorophenol | 625 | 20 |
| 2-Methyl-4,6-dinitrophenol | 625 | 20 |
| 2-Nitrophenol | 625 | 20 |
| 2,4-Dichlorophenol | 625 | 20 |
| 2,4-Dimethylphenol | 625 | 20 |
| 2,4-Dinitrophenol | 625 | 20 |
| 2,4-Dinitrotoluene | 625 | 10 |
| 2,4,6-Trichlorophenol | 625 | 20 |
| 2,6-Dinitrotoluene | 625 | 10 |
| 3,3'-Dichlorobenzidine | 625 | 10 |
| 4-Bromophenyl phenyl ether | 625 | 10 |
| 4-Chloro-3-methylphenol | 625 | 20 |
| 4-Chlorophenyl phenyl ether | 625 | 10 |
| 4-Nitrophenol | 625 | 20 |
| Acenaphthene | 625 | 10 |
| Acenaphthylene | 625 | 10 |
| Anthracene | 625 | 10 |
| Benzidine | 625 | 20 |
| Benzo[a]pyrene | 625 | 10 |
| Benzo[k]fluoranthene | 625 | 10 |
| Benzo[a]anthracene | 625 | 10 |
| Benzo[b]fluoranthene | 625 | 10 |
| Benzo[g,h,i]perylene | 625 | 10 |
| Bis(2-chloroethoxy)methane | 625 | 10 |
| Bis(2-ethylhexyl)phthalate | 625 | 10 |
| Bis(2-chloroethyl)ether | 625 | 10 |
| Bis(2-chloroisopropyl)ether | 625 | 10 |

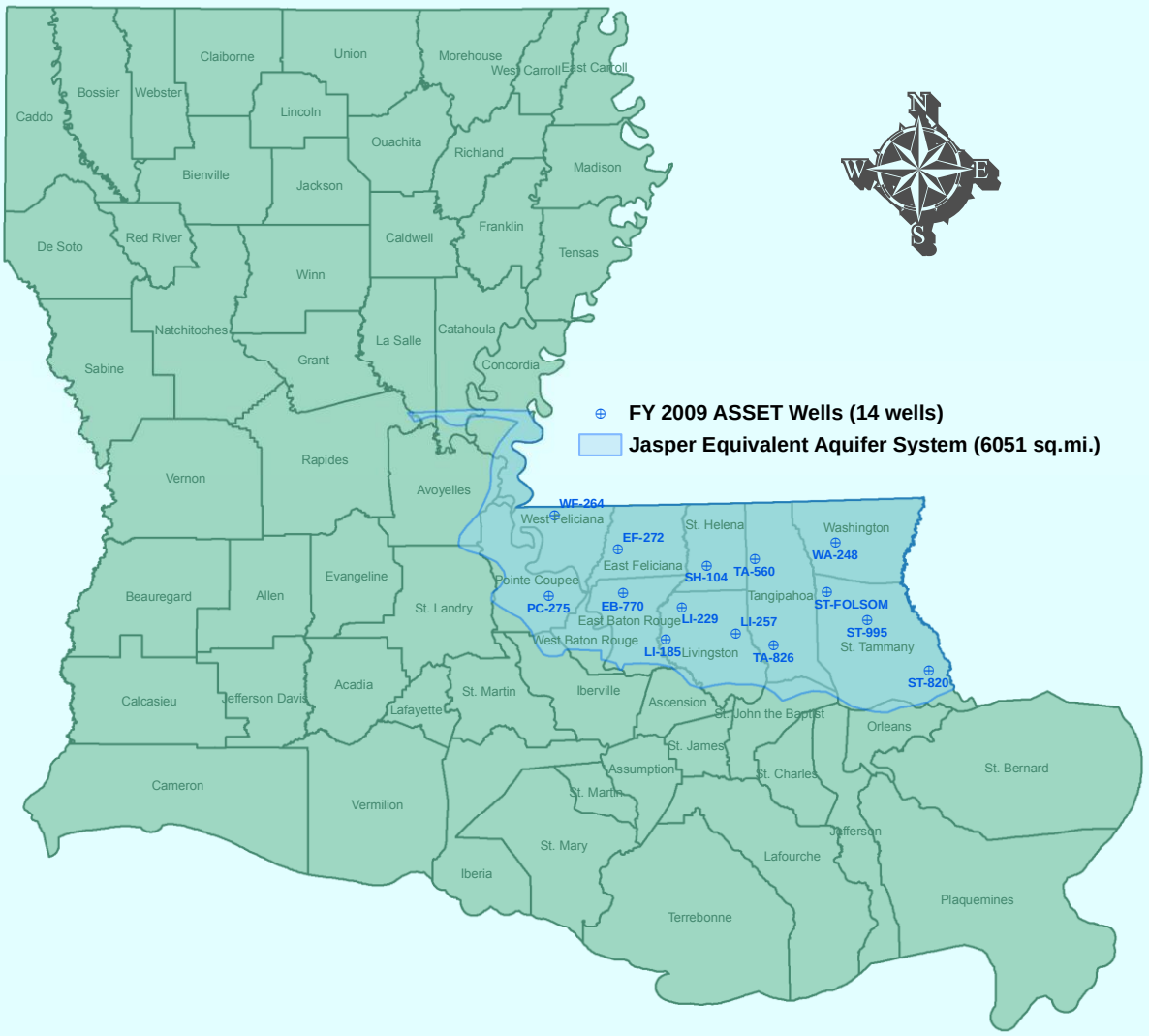
## *Table 14-7: SVOCs (Continued)*

| COMPOUND | METHOD | DETECTION LIMIT (ug/L) |
|---|---|---|
| Butylbenzylphthalate | 625 | 10 |
| Chrysene | 625 | 10 |
| Dibenzo[a,h]anthracene | 625 | 10 |
| Diethylphthalate | 625 | 10 |
| Dimethylphthalate | 625 | 10 |
| Di-n-butylphthalate | 625 | 10 |
| Di-n-octylphthalate | 625 | 10 |
| Fluoranthene | 625 | 10 |
| Fluorene | 625 | 10 |
| Hexachlorobenzene | 625 | 10 |
| Hexachlorobutadiene | 625 | 10 |
| Hexachlorocyclopentadiene | 625 | 10 |
| Hexachloroethane | 625 | 10 |
| Indeno[1,2,3-cd]pyrene | 625 | 10 |
| Isophorone | 625 | 10 |
| Naphthalene | 625 | 10 |
| Nitrobenzene | 625 | 10 |
| N-Nitrosodimethylamine | 625 | 10 |
| N-Nitrosodiphenylamine | 625 | 10 |
| N-nitroso-di-n-propylamine | 625 | 10 |
| Pentachlorobenzene | 625 | 10 |
| Pentachlorophenol | 625 | 20 |
| Phenanthrene | 625 | 10 |
| Phenol | 625 | 20 |
| Pyrene | 625 | 10 |

## *Table 14-8: Pesticides and PCBs*

| COMPOUND | METHOD | DETECTION LIMITS (ug/L) |
|---|---|---|
| 4,4'-DDD | 608 | 0.05 |
| 4,4'-DDE | 608 | 0.05 |
| 4,4'-DDT | 608 | 0.05 |
| Aldrin | 608 | 0.05 |
| Alpha-Chlordane | 608 | 0.05 |
| alpha-BHC | 608 | 0.05 |
| beta-BHC | 608 | 0.05 |
| delta-BHC | 608 | 0.05 |
| gamma-BHC | 608 | 0.05 |
| Chlordane | 608 | 0.2 |
| Dieldrin | 608 | 0.05 |
| Endosulfan I | 608 | 0.05 |
| Endosulfan II | 608 | 0.05 |
| Endosulfan Sulfate | 608 | 0.05 |
| Endrin | 608 | 0.05 |
| Endrin Aldehyde | 608 | 0.05 |
| Endrin Ketone | 608 | 0.05 |
| Heptachlor | 608 | 0.05 |
| Heptachlor Epoxide | 608 | 0.05 |
| Methoxychlor | 608 | 0.05 |
| Toxaphene | 608 | 2 |
| Gamma-Chlordane | 608 | 0.05 |
| PCB-1016 | 608 | 1 |
| PCB-1221 | 608 | 1 |
| PCB-1232 | 608 | 1 |
| PCB-1242 | 608 | 1 |
| PCB-1248 | 608 | 1 |
| PCB-1254 | 608 | 1 |
| PCB-1260 | 608 | 1 |

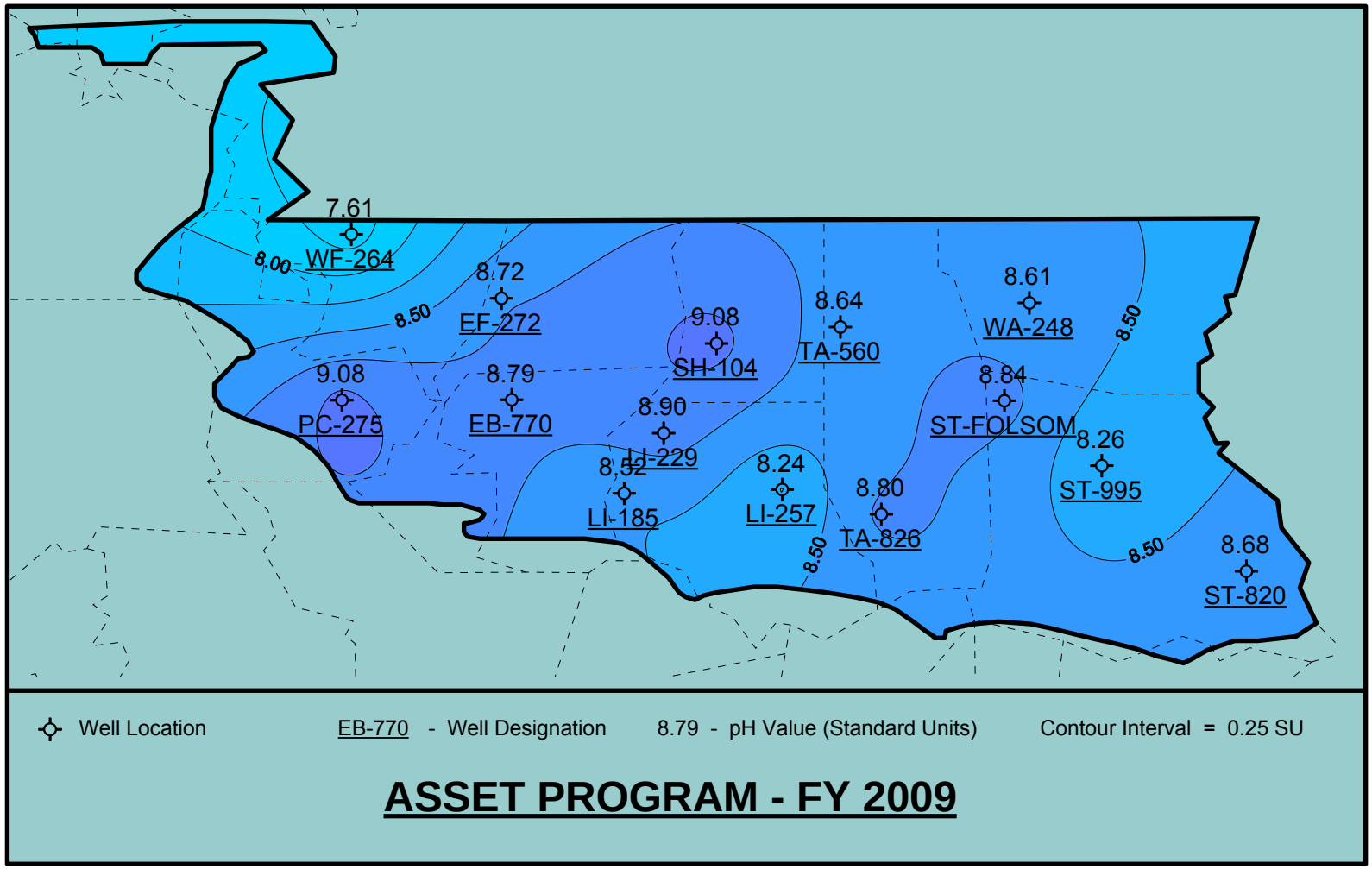
## *Figure 14-1: Location Plat, Jasper Equivalent Aquifer System*




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.

**ASSET PROGRAM, FY 2009**

## *Figure 14-2: Map of pH Data*



## *Figure 14-3: Map of TDS Lab Data*

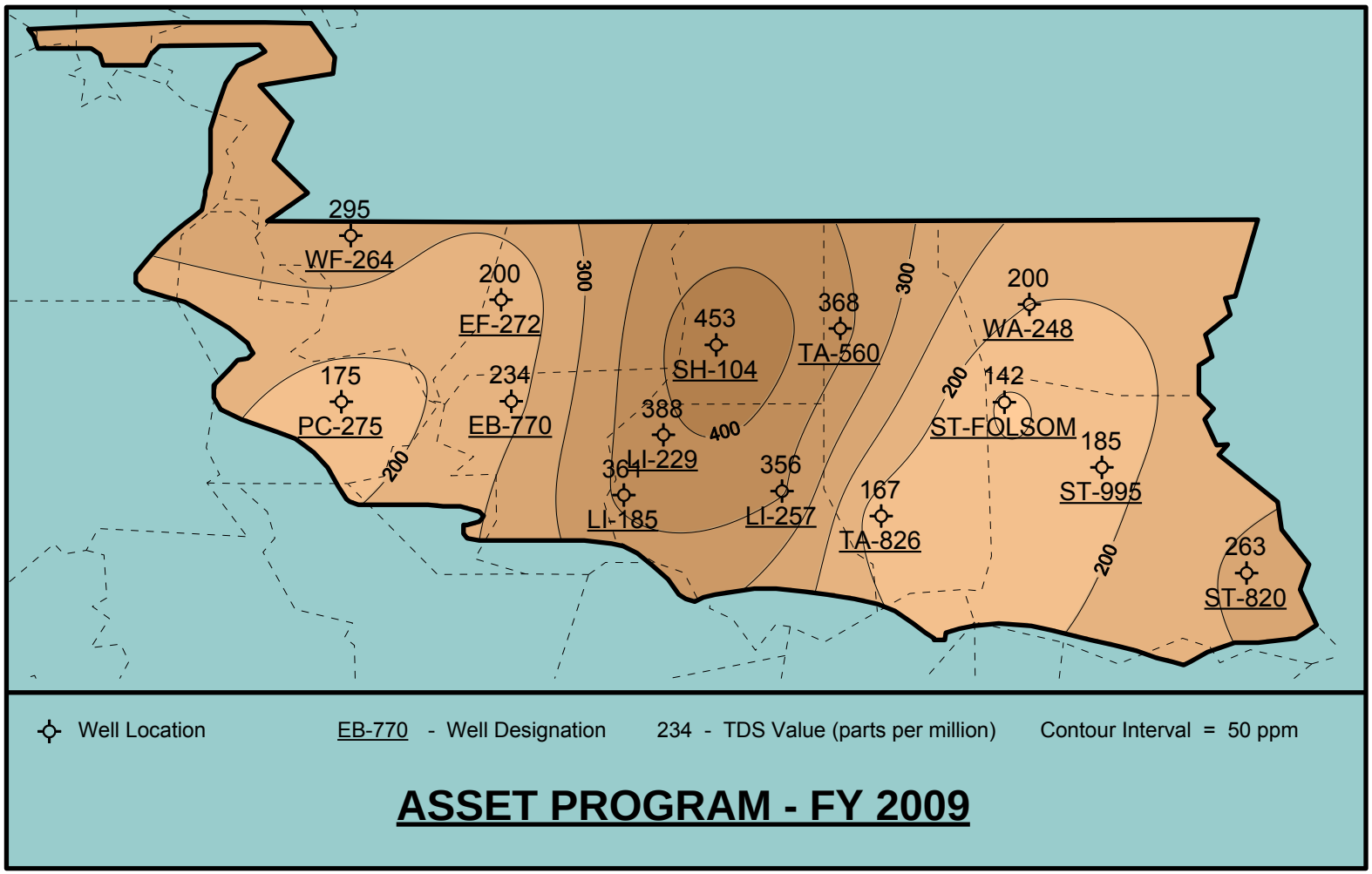
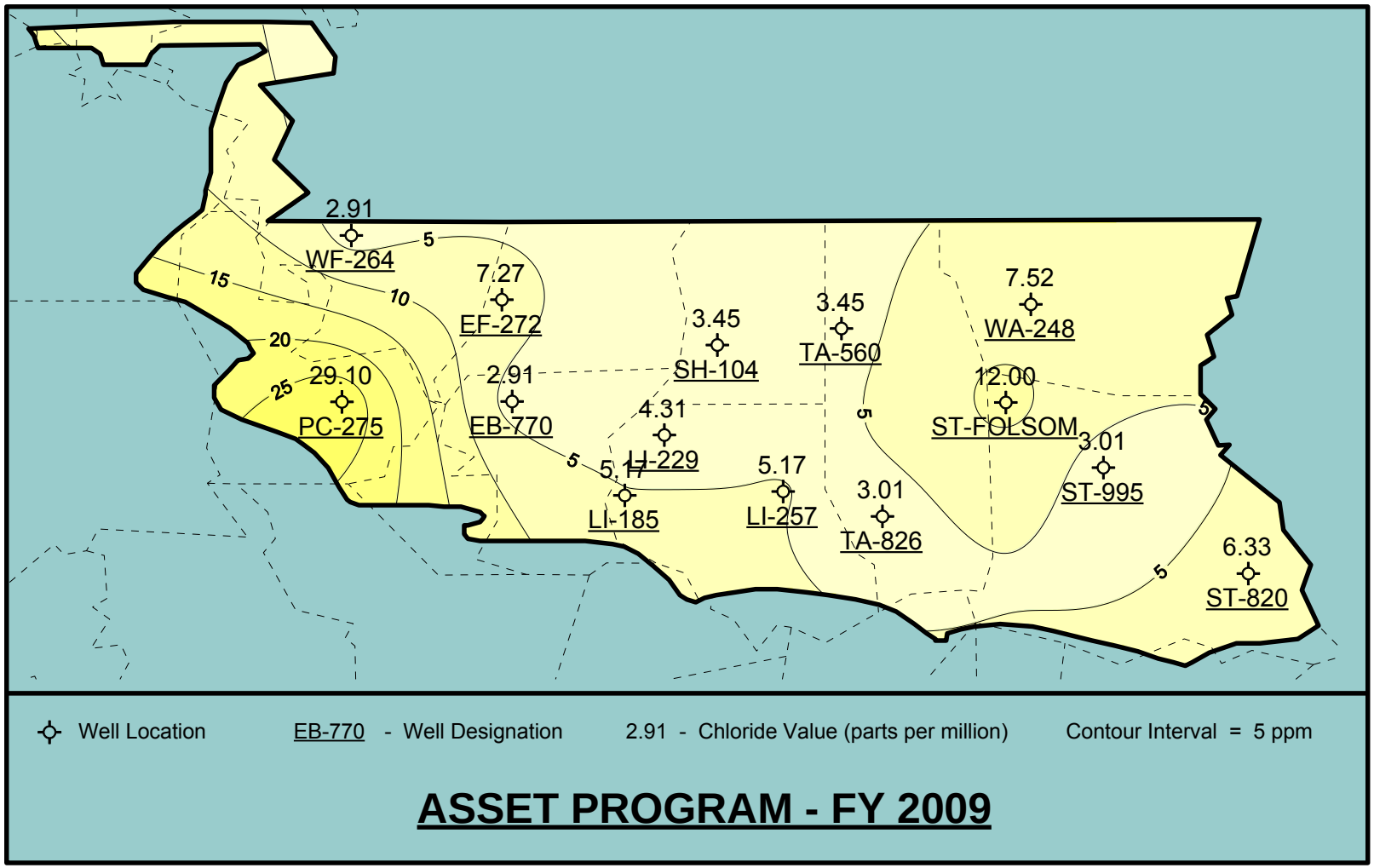
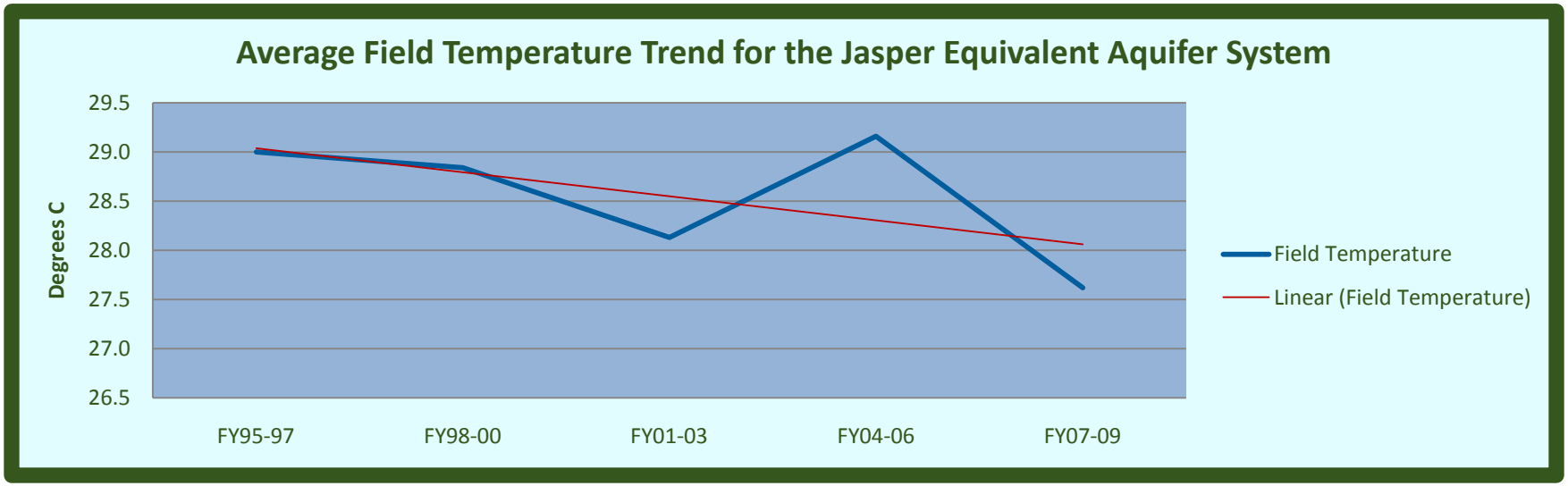


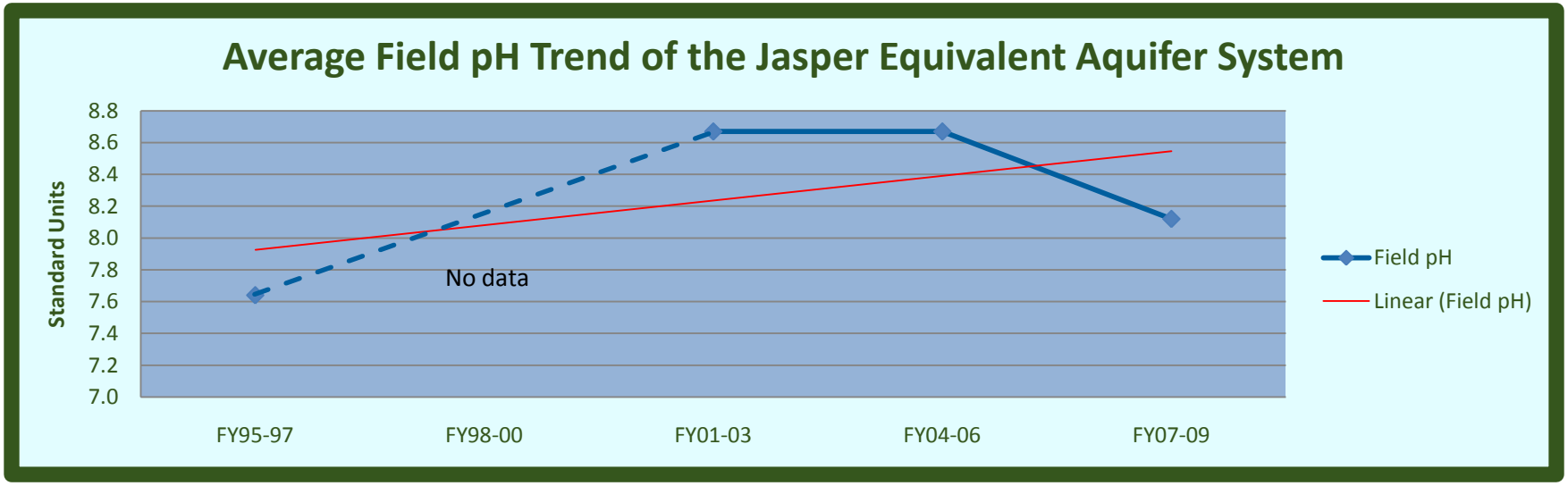
*Figure 14-4: Map of Chloride Data*



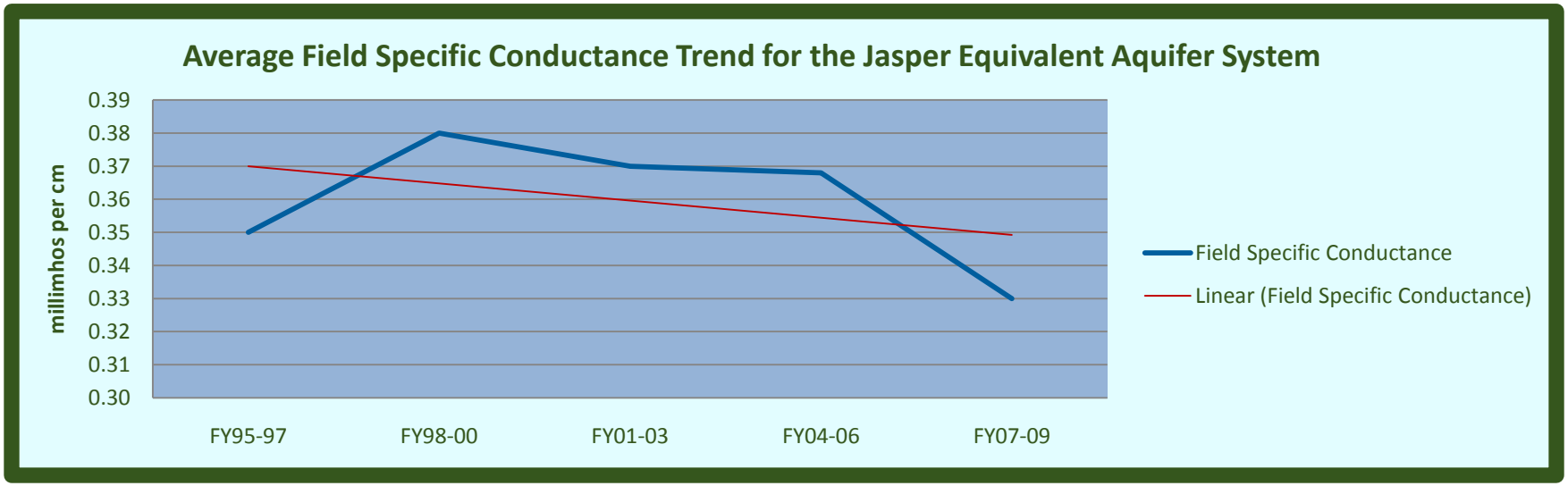
## Chart 14-1: Temperature Trend



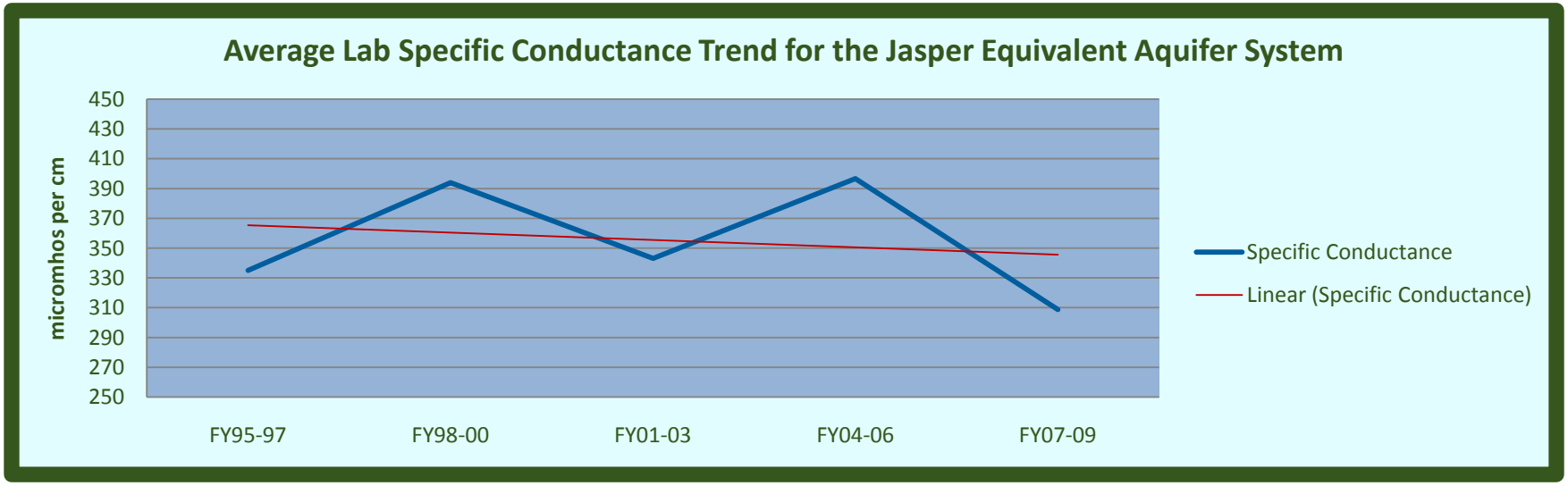

## Chart 14-2: pH Trend



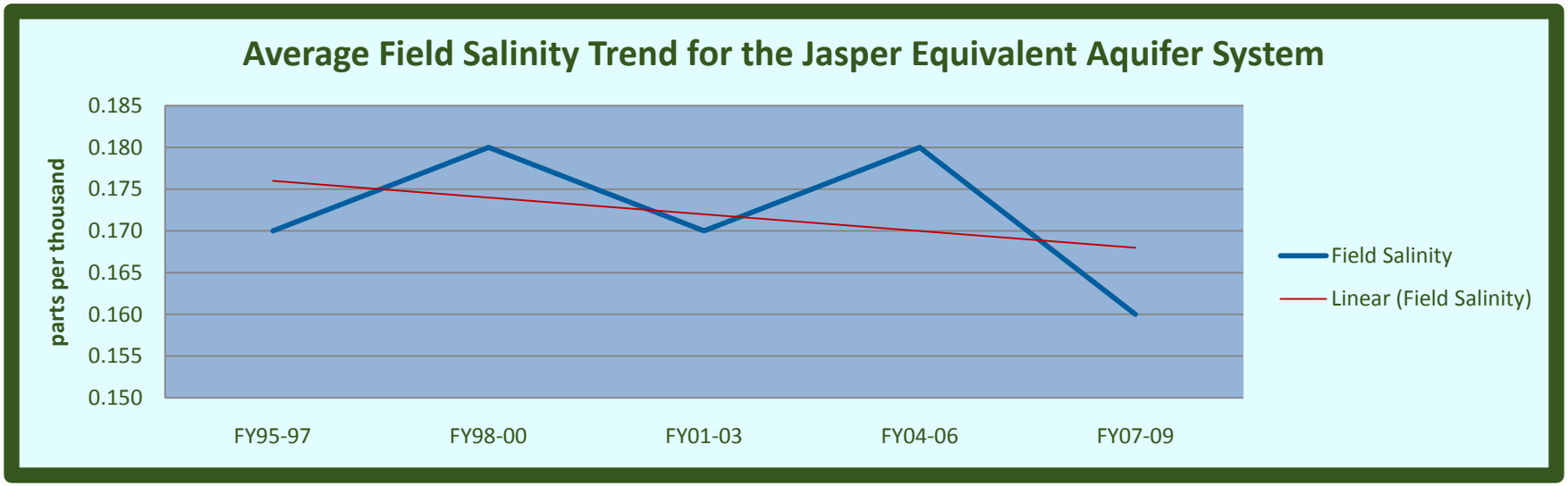
## Chart 14-3: Field Specific Conductance Trend



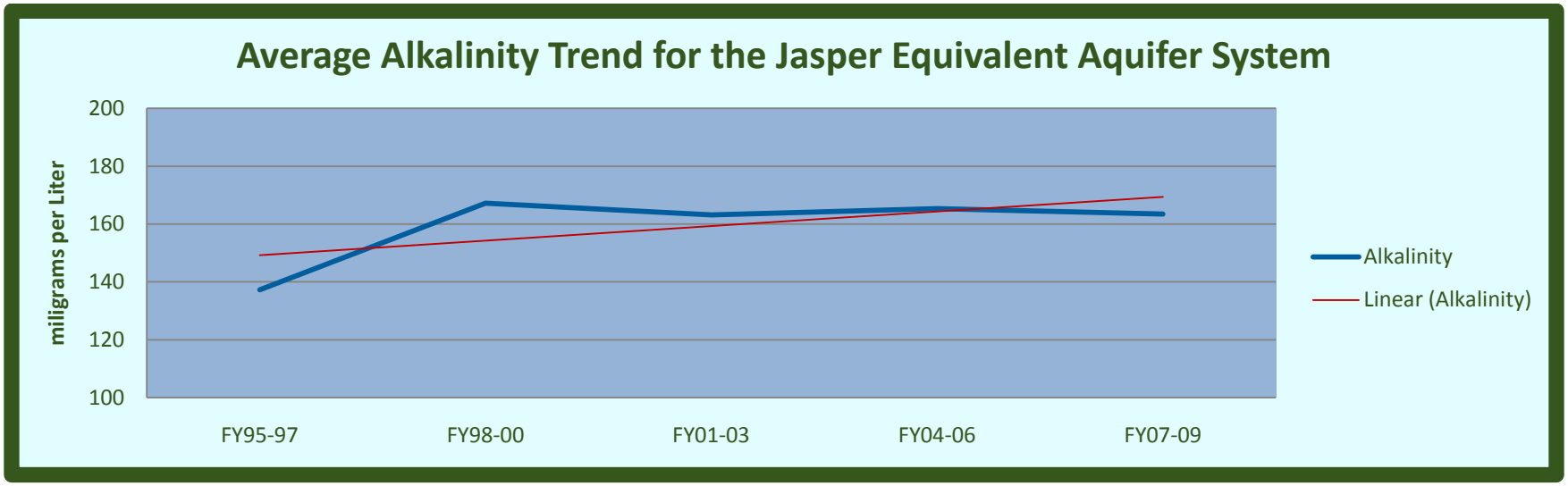

## Chart 14-4: Lab Specific Conductance Trend



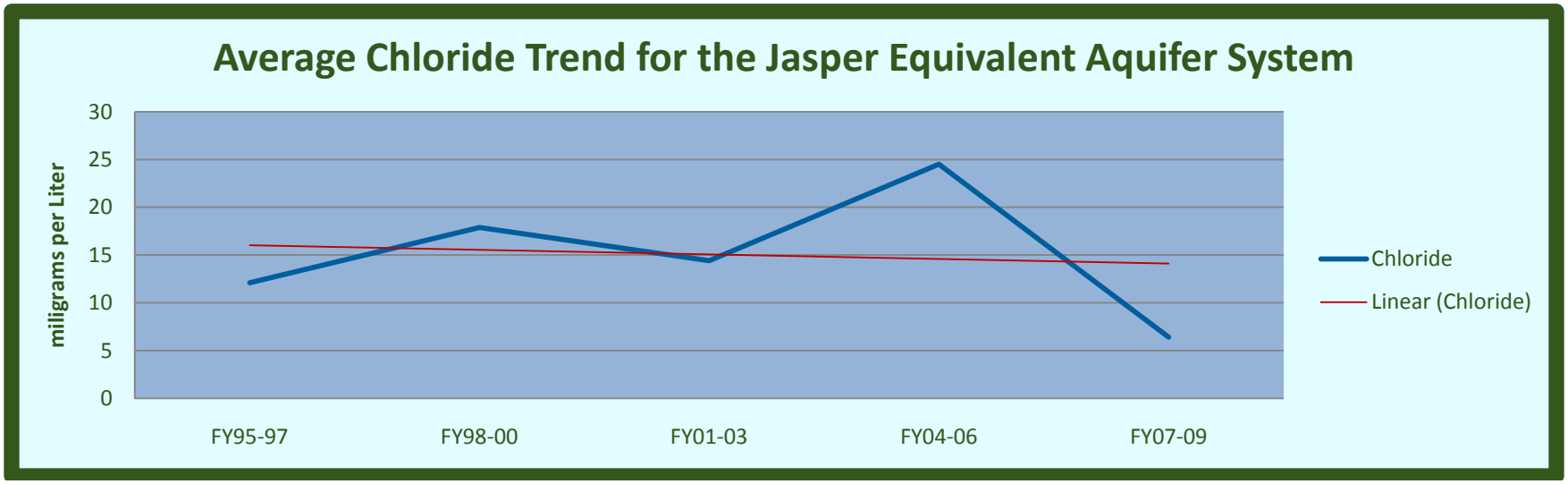
## Chart 14-5: Field Salinity Trend



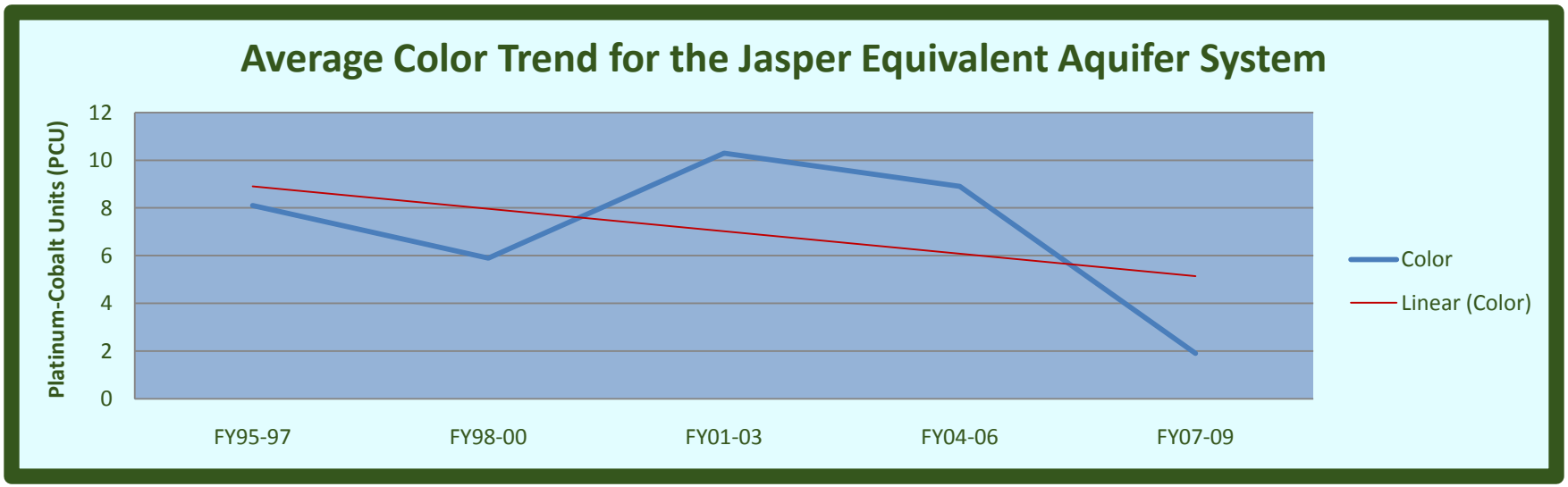

## Chart 14-6: Alkalinity Trend



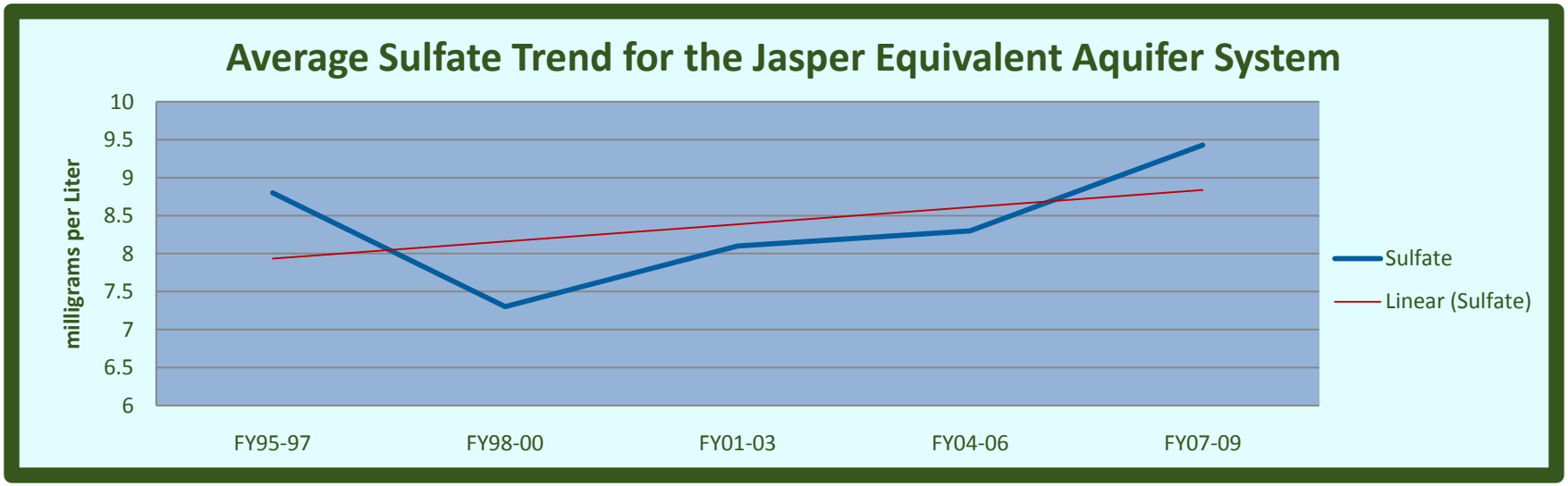
## Chart 14-7: Chloride Trend



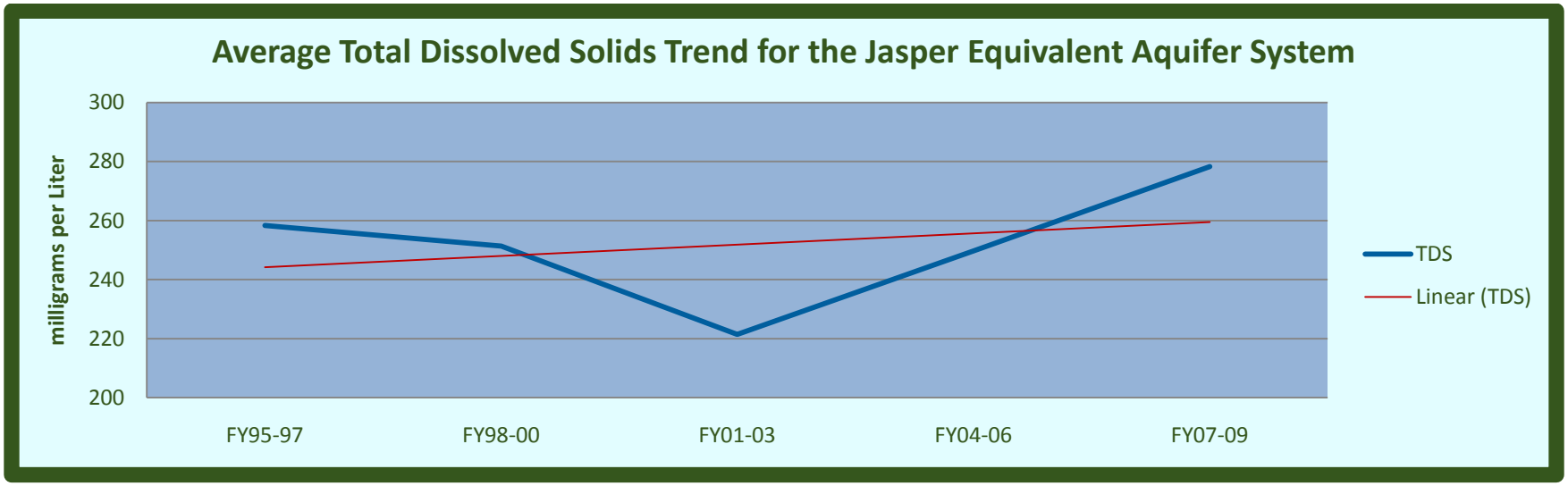

## Chart 14-8: Color Trend



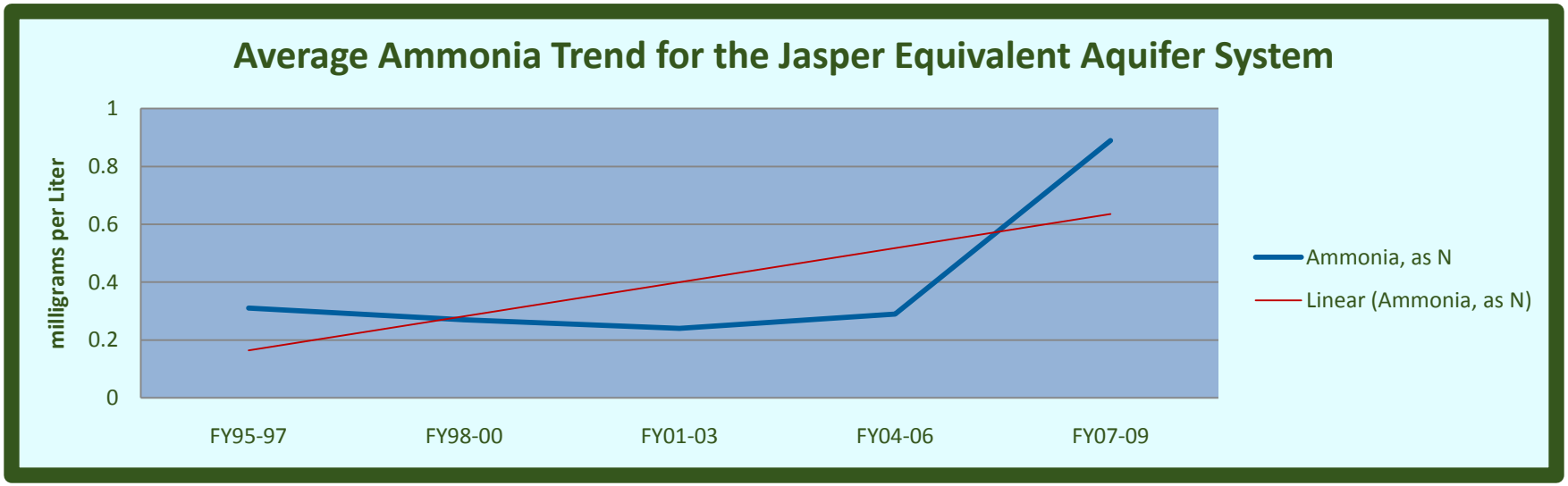
## Chart 14-9: Sulfate (SO4) Trend



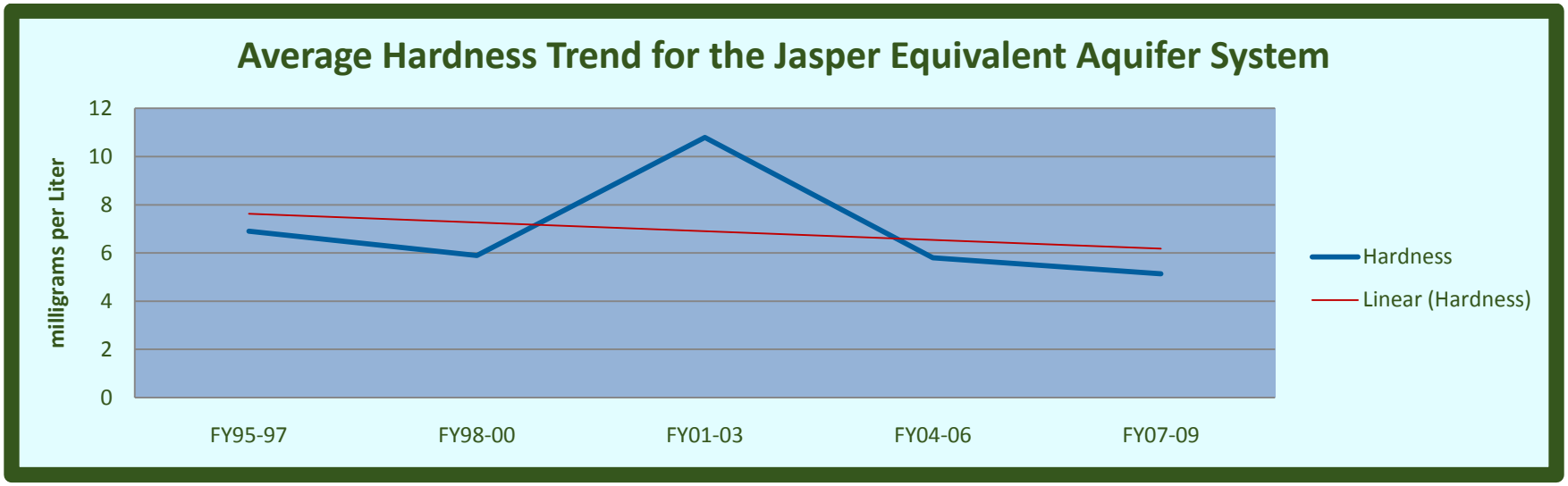

## Chart 14-10: Total Dissolved Solids (TDS) Trend



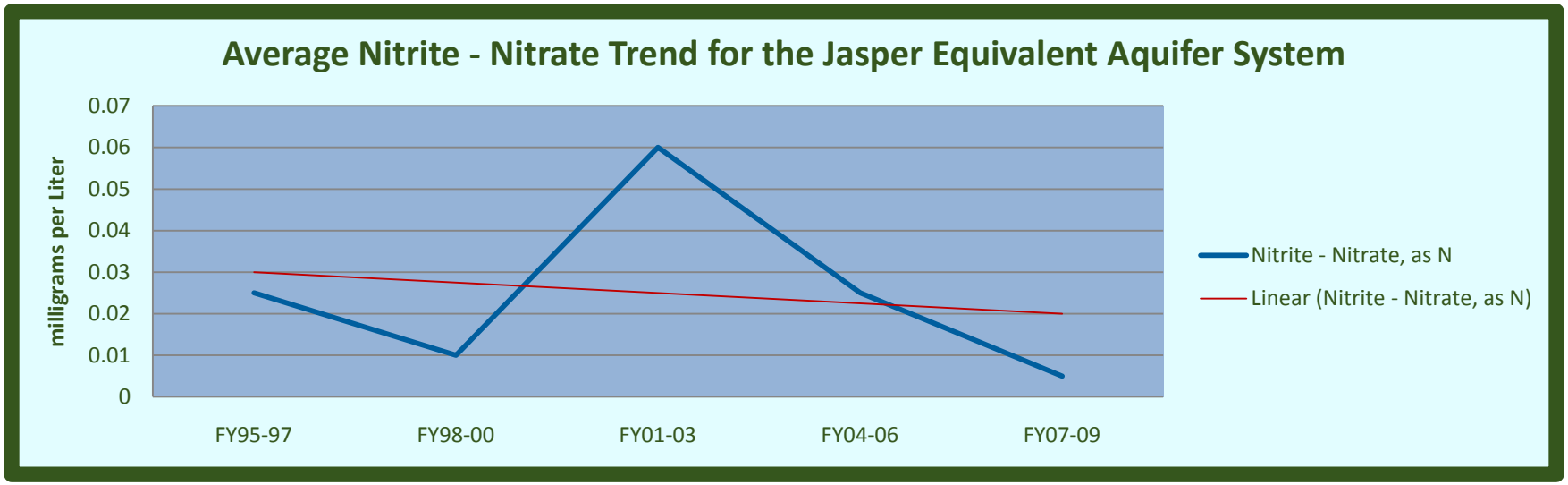
## Chart 14-11: Ammonia (NH3) Trend



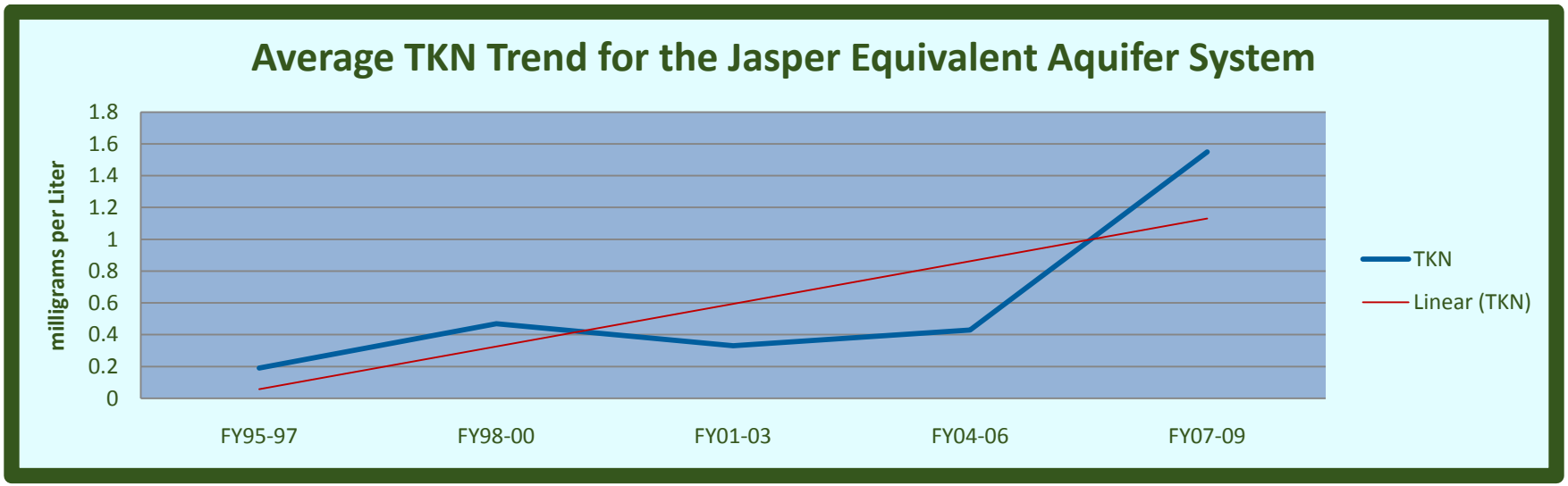

## Chart 14-12: Hardness Trend



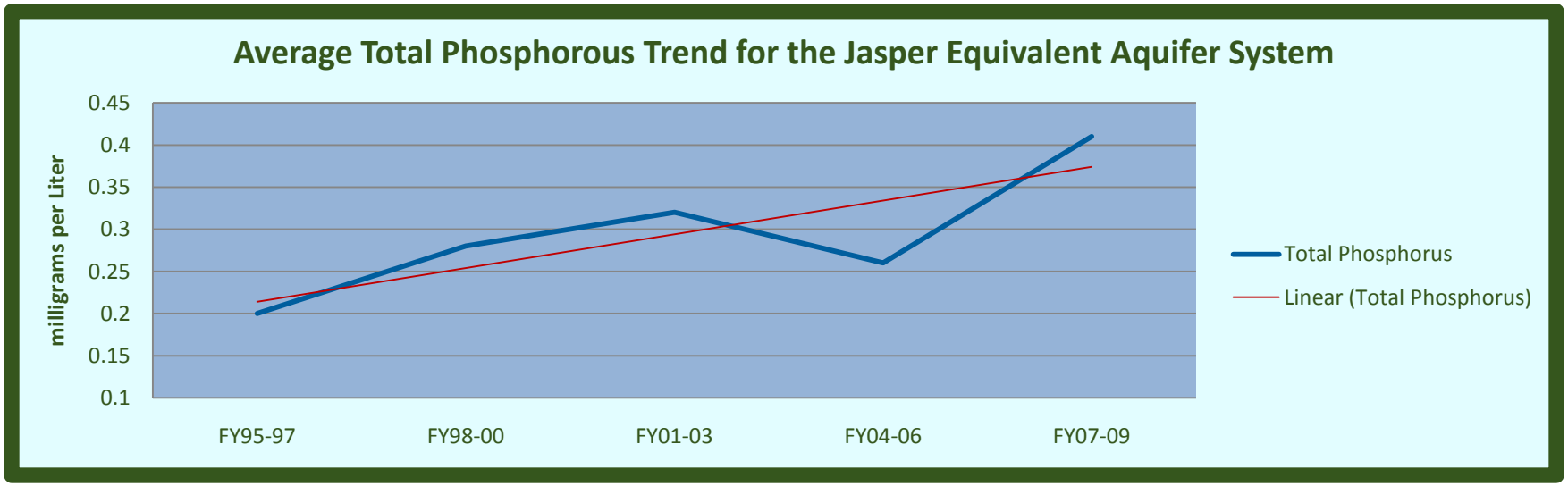
## Chart 14-13: Nitrite – Nitrate Trend




## Chart 14-14: TKN Trend



## Chart 14-15: Total Phosphorus Trend




## Chart 14-16: Iron Trend