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December 9, 2015

Sent VIA E-MAIL AND OVERNIGHT DELIVERY

Mr. Scott Anderson
Director of Waste Management and Radiation Control
Utah Department of Environmental Quality
195 North 1950 West
P.O. Box 144880
Salt Lake City, UT 84114-4880

Re: Transmittal of Source Assessment Report for Sulfate, Selenium, Total Dissolved Solids, and pH in MW-31 White Mesa Mill Groundwater Discharge Permit UGW370004

Dear Mr. Anderson:

Enclosed are two copies of Energy Fuels Resource (USA) Inc.'s ("EFRI's") Source Assessment Report ("SAR") Sulfate, Selenium, Total Dissolved Solids ("TDS"), and pH in MW-31 at the White Mesa Mill. This SAR voluntarily addresses the constituents that were identified as exceeding the previously revised GWCLs in the 1st Quarter 2015 as described in the Division of Waste Management and Radiation Control ("DWMRC")-approved Q1 2015 Plan and Time Schedule. EFRI submitted the Plan and Time Schedule for the voluntary assessment of MW-31 on May 19, 2015. DWMRC approval of the Plan and Time Schedule was received by EFRI on August 11, 2015. Pursuant to the Plan and Time Schedule EFRI has prepared this SAR.

This transmittal also includes two CDs each containing a word searchable electronic copy of the report.

If you should have any questions regarding this report please contact me.

Yours very truly,

Kathy Weinel

ENERGY FUELS RESOURCES (USA) INC.
Kathy Weinel
Quality Assurance Manager

CC: David C. Frydenlund
Harold R. Roberts
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SOURCE ASSESSMENT REPORT FOR MW-31 WHITE MESA URANIUM MILL

Blanding, Utah

Prepared for:

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Prepared by:

INTERA
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December 9, 2015

EXECUTIVE SUMMARY

This Source Assessment Report ("SAR") is an assessment of the sources, extent, and potential dispersion of selenium, sulfate, total dissolved solids ("TDS"), and pH in MW-31 at the White Mesa Mill ("the Mill") as required under State of Utah Groundwater Discharge Permit UGW370004 (the "GWDP") Part I.G.4 relating to violations of Part I.G.2 of the GWDP. Each of these four constituents have exhibited exceedances of the applicable Groundwater Compliance Limits ("GWCLs").

MW-31 has been included in multiple recent investigations and reports including the new wells background report (INTERA, 2008), an isotopic investigation (Hurst and Solomon, 2008), and two SAR reports (INTERA, 2012a, 2013). Sulfate and TDS exceedances in MW-31 were assessed and included in the October 2012 SAR. The SAR concluded that increasing concentrations of sulfate and TDS were most likely due to the proximity of MW-31 to the nitrate/chloride plume, which was and still is under remedial action. The SAR and revised GWCLs were approved by the State of Utah Division of Waste Management and Radiation Control ("DWMRC")[1] in April of 2013. An additional SAR investigating selenium in MW-31 was submitted in August of 2013; it concluded that selenium in MW-31 is likely increasing due to the naturally occurring site-wide decline of pH related to pyrite oxidation. Revision of the GWCL for selenium in MW-31 was recommended and was approved by the DWMRC in September of 2013. This SAR is being voluntarily submitted to address exceedances of the revised GWCLs that occurred during the first quarter of 2015.

As the results of this analysis will demonstrate, concentrations of selenium, sulfate, pH, and TDS in MW-31 are within the range of site-wide background. Mass balance calculations demonstrate that concentrations in MW-31 are not consistent with impacts from potential tailings system seepage. The exceedances of selenium, sulfate, TDS, and pH in MW-31 can be attributed to natural background and site-wide influences (oxidation of pyrite and decreasing pH) or to impacts at the Mill site that are already being addressed with an existing corrective action (nitrate/chloride plume capture). The conclusions of this analysis are consistent with conclusions presented in the Background Report and other recent analyses.

Analytical results for constituents included in this SAR exhibit increases in concentration over time, which may be due to the proximity of this well to the nitrate/chloride plume, the result of oxidation of pyrite in the formation around and upgradient of this well, increasing water levels over time, increased frequency of sampling, well redevelopment, and change in analytical methods and/or analytical laboratory. Although the results show an overall increasing trend in

[1] Formerly referred to as the State of Utah Division of Radiation Control.

concentrations for each constituent, a visual and measurable change in behavior is present in the data from around 2013 to the present. Concentrations appear more stable after this date, and since the previously approved SARs. This change in behavior is likely due to a combination of factors resulting from well redevelopment, analytical method changes for some of the constituents, increased sampling frequency, and changes in groundwater elevation.

In accordance with the DWMRC-approved Flowsheet, increasing trends necessitate a modified approach for calculation of GWCLs. The modification in this approach uses more recent, more stable data (collected after October 2012) to determine representative and appropriate GWCLs for trending constituents. Regular revisions to GWCLs for constituents in wells with significantly increasing trends over time due to background is consistent with the United States Environmental Protection Agency's Unified Guidance (USEPA, 2009). Such revisions account for the trends and minimize unwarranted out-of-compliance status in such wells.

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ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter
AWAL	American West Analytical Laboratory
CAP	Corrective Action Plan
CFCs	chlorofluorocarbons
CIR	Contaminant Investigation Report
Director	Director of the Division of Waste Management and Radiation Control
DWMRC	State of Utah Division of Waste Management and Radiation Control
EFRI	Energy Fuels Resources (USA) Inc.
GWCL	Groundwater Compliance Limit
GWDP	State of Utah Ground Water Discharge Permit UGW370004
GWQS	Groundwater Quality Standard
INTERA	INTERA Incorporated
mg/L	milligrams per liter
Mill	White Mesa Uranium Mill
Notice	Notice of Violation and Compliance Order, Docket No.UGWll-02
SAR	Source Assessment Report
SD	standard deviation
TDS	Total Dissolved Solids
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Energy Fuels Resources (USA) Inc. ("EFRI") operates the White Mesa Uranium Mill (the "Mill"), located near Blanding, Utah (**Figure 1**). Groundwater is regulated under the State of Utah Groundwater Discharge Permit UGW370004 (the "GWDP"). This is the Source Assessment Report ("SAR") required under Part I.G.4 of the GWDP relating to Part I.G.2 of the GWDP with respect to selenium, sulfate, total dissolved solids ("TDS"), and pH in groundwater compliance monitoring well MW-31 (**Figure 2**).

Part I.G.2 of the GWDP provides that an out-of-compliance status exists when the concentration of a constituent in two consecutive samples from a compliance monitoring point exceeds a groundwater compliance limit ("GWCL") in Table 2 of the GWDP. The GWDP was originally issued in March 2005, at which time GWCLs were set on an interim basis, based on fractions of State of Utah Ground Water Quality Standards ("GWQSs") or the equivalent, without reference to natural background at the Mill. The GWDP also required that EFRI prepare a background groundwater quality report to evaluate all historical data for the purposes of establishing background groundwater quality at the Mill site and developing GWCLs under the GWDP. As required by then Part I.H.3 of the GWDP, EFRI submitted the following to the Director (the "Director") of the State of Utah Division of Waste Management and Radiation Control ("DWMRC")[2] (the Director was formerly the Executive Secretary of the Utah Radiation Control Board and the Co-Executive Secretary of the Utah Water Quality Board):

- A Revised Background Groundwater Quality Report: *Existing Wells for Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah,* October 2007, prepared by INTERA Incorporated (INTERA) (the "Existing Wells Background Report").
- A Revised Addendum: *Evaluation of Available Pre-Operational and Regional Background Data, Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah,* November 16, 2007, prepared by INTERA (the "Regional Background Report").
- A Revised Addendum: *Background Groundwater Quality Report: New Wells for Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah,* April 30, 2008, prepared by INTERA (the "New Wells Background Report," and together with the "Existing Wells Background Report" and the "Regional Background Report," the "Background Reports").

[2] Formerly referred to as the State of Utah Division of Radiation Control.

Based on a review of the Background Reports and other information and analyses, the Director re-opened the GWDP and modified the GWCLs to be equal to the mean concentration plus two standard deviations or the equivalent. The modified GWCLs became effective on January 20, 2010.

The SARs for White Mesa Uranium Mill are summarized in **Table 1:**

Table 1
White Mesa Uranium Mill SARs

Plan and Time Schedule Date	Monitoring Periods Covered	DWMRC Plan and Time Schedule Approval Date	SAR Date	SAR Approval Date	Constituents
6/13/2011	Q1, Q2, Q3, Q4 of 2010, Q1 of 2011	7/12/2012	10/10/2012	4/25/2013	Multiple
9/7/2011	Q2 2011	7/12/2012	10/10/2012	4/25/2013	Multiple
4/13/2012	Multiple	7/12/2012	pH report - 11/9/12 Pyrite Report - 12/7/12	4/25/2013	pH - multiple wells
12/13/2012	Q3 2012	2/4/2013	5/8/2013	7/23/2013	TDS - MW-29
3/15/2013	Q4 2012	5/30/2013	8/30/2013	9/17/2013	Selenium - MW-31
8/28/2013	Q1 2013	9/17/2013	12/17/2013	1/7/2014	Tetrahydrofuran - MW-01
9/20/2013	Q2 2013	10/16/2013	1/13/2014	3/10/2014	Gross Alpha - MW-32
12/5/2013	Q3 2013	12/18/2013	3/19/2014	6/5/2014	Sulfate - MW-01; TDS - MW-03A
12/4/2014	Q3 2014	1/8/2015	No SAR - OOC due to well damage	No SAR - OOC due to well damage	Uranium - MW-28
5/19/2015	Q1 2015	8/11/2015	Due 12/9/15*		Selenium, Sulfate, TDS, pH - MW-31
9/10/2015	Q2 2015	11/10/2015	No SAR - install packer		Cadmium, Zinc, Beryllium, Nickel - MW-03

Notes:
*30-day extension for SAR
OOC = out of compliance

On May 6, 2015, EFRI submitted a notice (the "1st Quarter 2015 Exceedance Notice") to the Director under Part I.G.1(a) of the GWDP providing notice that the concentrations of specific constituents in the monitoring wells at the Mill exceeded their respective GWCLs for the first quarter of 2015 and indicating which of those constituents had two consecutive exceedances as of that quarter. A voluntary plan and time schedule for MW-31 for the first quarter of 2015 ("Q1 2015 Plan and Time Schedule") covers the constituents that were identified as exceeding the revised

GWCLs that were previously approved by the DWMRC. The voluntary MW-31 Plan and Time Schedule was submitted on May 19, 2015, and was approved by the DWMRC in correspondence dated August 11, 2015.

This SAR addresses the constituents that were identified as exceeding the previously revised GWCLs in the first quarter of 2015 as described in the DWMRC-approved Q1 2015 Plan and Time Schedule.

1.1 Source Assessment Report Organization

A description of the approach used for analysis is provided in Section 2.0, and the results of the analysis are presented in Section 3.0. The calculation of groundwater compliance limits is discussed in Section 4.0, and conclusions and recommendations are reviewed in Section 5.0. Section 6.0 provides a list of references cited in the SAR.

The appendices comprise the analyses performed for this Report and are organized in the following manner: **Appendix A** contains a table showing exceedances. **Appendix B** contains the geochemical analysis performed on selenium, sulfate, and TDS in MW-31. **Appendix C** contains the indicator parameter analysis performed on MW-31. **Appendix D** contains the pH analysis performed on MW-31. **Appendix E** contains data plots for SAR constituents in MW-31 using all available data to date compared to the data plots from the Background Reports, as well as current data plots of all indicator parameters and plots of indicator parameters from the Background Reports. **Appendix F** contains mass balance calculations. **Appendix G** contains site-wide time series plots for SAR parameters. **Appendix H** contains analysis of a modified data set to address revising GWCLs for constituents with increasing trends. **Appendix I** contains the *Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site, San Juan County, Utah* ("Flowsheet") that was developed based on the United States Environmental Protection Agency's ("USEPA") *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009), which was approved by DWMRC prior to completion of the Background Reports. **Appendix J** is included on the compact disc that accompanies this SAR and contains the electronic input and output files used for statistical analysis.

Statistical analysis was performed using the software package "R" during this assessment. R is a free statistical package that allows the analyst to perform statistical analysis and format and output graphs more effectively than the Statistica software package. The Flowsheet process was performed in the same manner, and a test case was performed to ensure that both software packages would achieve the same results. Input and output files included in **Appendix I** can be imported into either R or Statistica to recreate the results presented in this Report.

2.0 CATEGORIES AND APPROACH FOR ANALYSIS

Generally, out-of-compliance constituents and wells can be grouped into five categories:

1. Constituents in wells with previously identified rising trends.
2. Constituents in pumping wells.
3. Constituents potentially impacted by decreasing trends in pH across the Mill site.
4. Newly installed wells with interim GWCLs.
5. Other constituents and wells.

This SAR addresses four constituents in one well (selenium, sulfate, TDS, and pH in MW-31). These four constituents fall into categories three and five. The mobility of selenium in groundwater is sensitive to decreases in pH, and selenium readily substitutes for sulfur in pyrite, entering solution as pyrite is oxidized (Williams and Byers, 1934). Sulfate, and by extension TDS, are expected at increased concentrations due to the proximity of the nitrate/chloride plume. The pH is decreasing site-wide, likely due to oxidation of pyrite (HGC, 2012a).

2.1 Approach for Analysis

The first step in the analysis is to perform an assessment of the potential sources for the exceedances to determine whether they are due to background influences or Mill activities. If the exceedances are determined to be caused by background influences, then it is not necessary to perform any further evaluations on the extent and potential dispersion of the contamination or to perform an evaluation of potential remedial actions. Monitoring will continue, and where appropriate, a revised GWCL is proposed to reflect changes in background conditions at the Mill site.

Assessments for potential sources of selenium, sulfate, and TDS in MW-31 have been performed in SARs produced in 2012 and 2013 (INTERA, 2012a, 2013). Assessment of the site-wide pH trend has been performed in the pH reports (INTERA, 2012b; HGC, 2012a). The analysis performed in this SAR considers all available data to date to evaluate the behavior of the constituents in the well. Analysis will help to determine if there have been any changes in the behavior of potential tailings system seepage indicator parameters (e.g., chloride, sulfate, fluoride, and uranium) since the date of the Background Report and the approved SARs that may suggest a change in the behavior of the groundwater in that well.

As discussed in detail in Section 9.0 of the Existing Wells Background Report (INTERA, 2008), chloride is the best indicator of potential tailings system seepage, followed by fluoride and then sulfate due to their high mobility and concentration in tailings system porewater relative to common metals. Uranium is probably the most mobile of trace (metal) elements and is the best indicator parameter for metals and radionuclides. Any potential seepage from the tailings system would be expected to exhibit increasing concentrations of chloride, followed by fluoride, sulfate, and uranium. While uranium may be the most mobile of trace (metal) elements, it is typically retarded behind chloride, fluoride, and sulfate and would likely not be expressed in groundwater until sometime after chloride, fluoride, and sulfate concentrations had begun to rise (INTERA, 2007). This is because uranium is prone to oxidation and transport at low pH, as well as precipitation or sorption near neutral pH. It is important to note, however, that while the absence of a rising trend in chloride concentration would indicate that there has been no impact from the tailings system, a rising trend in chloride concentration, as well as in other indicator parameters, could also be due to natural influences (see Section 12.0 of the Existing Wells Background Report). Therefore, in situations where there is a significant rising trend in concentrations of chloride or in other indicator parameters, other evaluations would need to be performed. The additional evaluations would assess the behavior of the other indicator parameters and whether or not the concentrations, mass balance, and other factors indicate a potential tailings system leak.

The geochemical analysis of selenium, sulfate, TDS, pH, and the indicator parameters in MW-31 was supported by a statistical analysis that followed the process outlined in the Flowsheet (INTERA, 2007), a copy of which is attached as **Appendix I.** The Flowsheet was designed based on USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009), and was approved by DWMRC prior to completion of the Background Reports.

2.1.1 Other Constituents and Wells

Sulfate, pH, and TDS fall into the "other constituents and wells" category as defined in the 2012 SAR (INTERA, 2012a). To assess constituents that fall into this category, all available data were used to determine whether or not there is any new information that would suggest that the conclusions from previous analyses conducted in the Background Reports and approved SARs may have changed since the time of those reports.

Recent analysis in previous SARs has demonstrated that sulfate and TDS can be attributed to the proximity of MW-31 to the nitrate/chloride plume. Trends in pH observed across the Mill site have been the subject of recent investigations (INTERA, 2012b, HGC, 2012a) concluding that pyrite oxidation is the most likely contributor to decreasing pH in MW-31 and across the Mill site.

Because MW-31 is located inside the nitrate/chloride plume at the Mill and has been affected by changes to groundwater related to the elevated nitrate and chloride concentrations associated with that plume, chloride and sulfate are not considered appropriate indicator parameters of potential tailings system seepage (see Section 3.2 of this SAR). A mass balance analysis was therefore performed for SAR parameters using fluoride, which is considered to be the best available indicator parameter for the conditions in this well. Mass balance calculations for nitrate concentrations in the tailings system cells relative to nitrate concentrations found in the nitrate/chloride plume were performed to further evaluate the potential for tailings system seepage. A site-wide comparison of parameters in MW-31 and upgradient and downgradient wells is presented in **Appendix B-7** and **B-8**. Since MW-31 is adjacent to the Mill's tailing cells, a hydrogeological analysis was not performed to determine the plausibility of impact from the Mill's tailings system.

Additional factors that may have contributed to a potential change in behavior of groundwater conditions in MW-31 include the 2011 well redevelopment project, which took place in April and May of 2011 (HGC, 2011); the change in analytical laboratory in 2012; increasing groundwater levels, which peaked in elevation in 2013; and the addition of several pumping wells to the nitrate/chloride and chloroform CAP in 2013, 2014, and 2015. A more detailed discussion of these variables is presented in Section 3.1 of this SAR.

2.1.2 Constituents Potentially Impacted by Decreasing pH Trends Across the Mill Site

A decreasing trend in pH has been observed in almost every groundwater monitoring well across the Mill site, including upgradient and far downgradient monitoring wells. This is also observed in MW-31, where decreasing pH may be resulting from oxidation of pyrite, which can release selenium and sulfate into solution.

The report, *Investigation of Pyrite in the Perched Zone, White Mesa Uranium Mill Site, Blanding, Utah* (HGC, 2012a), attributes the decline in pH across the Mill site to the site-wide, apparently ubiquitous existence of pyrite in the perched zone at the site. Additionally, nitrate can act as an oxidizer in anaerobic environments with the presence of microbes and/or organic matter (Hayakawa et al., 2013). It is possible that groundwater in MW-31 is affected by mixing and geochemical reactions that occur within the nitrate/chloride plume as the waters travel through the pyrite-bearing formation before reaching MW-31. Since selenium will dissolve as pH decreases, a pH analysis was performed for MW-31 to determine the characteristics of pH in that well.

2.2 Approach for Setting Revised GWCLs

If the preceding approach resulted in the conclusion that the previous analysis in the Background Reports or most recently approved SARs has not changed, or that the out-of-compliance status of selenium, sulfate, TDS, and/or pH in MW-31 is due to natural or other site-wide influences that are already being addressed by corrective action, then new GWCLs may be proposed for the constituents. In proposing revised GWCLs, INTERA has adopted the approach in the DWMRC-approved Flowsheet, including the last decision of the process that directs the analyst to consider a modified approach to determining a GWCL if an increasing trend is present.

As will be discussed in detail in Section 3.0, and as demonstrated in **Appendices B** and **C,** all of the constituents included in this SAR have significantly increasing (or decreasing in the case of pH) trends that are clearly related to background conditions, including naturally occurring constituent variability, oxidation of pyrite in the aquifer, and the proximity of this well in relation to the nitrate/chloride plume that is already being addressed by corrective action. Because of the existing corrective action, alternative approaches to GWCLs have been considered. A discussion of potential alternative approaches is presented in Section 4.1.

Appendix B-1 summarizes the geochemical analysis for SAR parameters in MW-31 and presents the revised GWCLs for selenium, sulfate, TDS, and pH in MW-31 based on the Flowsheet using all data to date and a modified approach using data collected after October 2012 that appear more stable and are subsequent to the latest approved SARs. The modified approach is being proposed to address issues with revising GWCLs in constituents with significantly increasing trends.

2.3 University of Utah Study

At the request of the DWMRC, T. Grant Hurst and D. Kip Solomon of the Department of Geology and Geophysics of the University of Utah performed a groundwater study (the “University of Utah Study”) at the Mill site in July 2007 (Hurst and Solomon, 2008). The purpose of this study was to characterize groundwater flow, chemical composition, noble gas composition, and age to evaluate whether or not the increasing and elevated trace metal concentrations in monitoring wells at the Mill, all of which were identified in the Background Reports, may indicate that potential seepage from the tailings system is occurring.

To evaluate sources of solute concentrations at the Mill, low-flow groundwater sampling was used as a method for collecting groundwater quality samples from 15 monitoring wells. In addition, surface water samples were collected from cells 1, 3, and 4A, and two wildlife ponds. Passive diffusion samplers were also deployed and collected to characterize the dissolved gas composition of groundwater at different depths within the wells. Samples were collected and analyzed for the following constituents: tritium, nitrate, sulfate, deuterium and oxygen-18 of water, sulfur-34 and oxygen-18 of sulfate, trace metals (uranium, manganese, and selenium), and chlorofluorocarbons (“CFCs”). The 15 wells sampled included MW-31.

Hurst and Solomon (2008, page iii) concluded generally that,

> *[t]he data show that groundwater at the Mill is largely older than 50 years, based on apparent recharge dates from chlorofluorocarbons and tritium concentrations. Wells exhibiting groundwater that has recharged within the last 50 years appears*

to be a result of recharge from wildlife ponds near the site. Stable isotope fingerprints do not suggest contamination of groundwater by tailings cell leakage, evidence that is corroborated by trace metal concentrations similar to historically-observed observations.

With respect to CFC age dating, MW-31 was found to exhibit CFC recharge dates of the 1960s and 1970s, indicating that the water in that well predated construction of the Mill in 1980. Tritium concentrations in MW-31 were not detected in the analysis, indicating that impacts from wide-scale atmospheric injection of tritium during aboveground thermonuclear weapons testing in the 1950s and 1960s, expected to be found in surface waters such as solutions in the Mill's tailings system, were not observed in that well.

Hurst and Solomon (2008) conclude that,

> *[i]n general, the data collected in this study do not provide evidence that tailings cell leakage is leading to contamination of groundwater in the area around the White Mesa Mill. Evidence of old water in the majority of wells, and significantly different isotopic fingerprints between wells with the highest concentrations of trace metals and surface water sites, supports this conclusion. The only evidence linking surface waters to recharging groundwater is seen in MW-27 and MW-19. Measurable tritium and CFC concentrations indicate relatively young water, with low concentrations of selenium, manganese, and uranium. Furthermore, stable isotope fingerprints of ðD and ð^{18}O suggest mixing between wildlife pond recharge and older groundwater in MW-19 and MW-27. D^{34}S-SO_4 and ð^{18}O-SO_4 fingerprints closely relate MW-27 to wildlife pond water, while the exceptionally low concentration of sulfate in MW-27, the only groundwater site to exhibit sulfate levels below 100 mg/L, suggest no leachate from the tailings cells has reached the well.*

It should be further noted that, subsequent to the University of Utah Study, EFRI submitted a *Contaminant Investigation Report, White Mesa Uranium Mill Site, Blanding Utah,* dated December 30, 2009 (INTERA, 2009) ("CIR"), in connection with the nitrate/chloride plume at the Mill site. The CIR discusses the presence of a historical pond that existed for many years at a location upgradient from MW-27, which was much closer to MW-27 than the wildlife ponds. This historical pond may have been a contributor of surface water to MW-27.

It is important to note that at the time of the University of Utah Study, the trend analysis for the Background Report identified rising trends in a number of constituents at the Mill, including statistically significant rising trends in selenium in upgradient wells MW-1 and MW-19, as well as site wells MW-12, MW-14, MW-15, and MW-17. Hurst and Solomon (2008) conclude that there is no evidence that the tailings system is leaking, despite these rising trends, which is further evidence that there are background influences at work at the site that are causing rising trends in a number of constituents, including selenium.

3.0 RESULTS OF ANALYSIS

This section describes the results of the analysis, summaries of which are provided in **Appendix B-1, Appendix C-1**, **Appendix D-1**, and **Appendix H-1.** Supporting analyses are presented in **Appendix E**, **Appendix F,** and **Appendix G.**

3.1 Changes in Groundwater in MW-31

The following sections describe changes, events, and other factors that may be influencing the behavior of constituents in this well.

3.1.1 Sampling Frequency

In 2010, in response to dual exceedances and in accordance with the GWDP, EFRI implemented monthly monitoring for nitrate. In 2011, in response to dual exceedances, chloride, sulfate, and TDS were added to the list of monthly monitoring parameters. In 2013, selenium was added to the list of monthly monitoring parameters in MW-31. An initial inflection, or apparent shift, is observed in most constituents, which can be related to the increased sampling frequency beginning in February 2010. **Appendices B-11** and **C-10** show time series plots with vertical lines indicating events that may have influenced groundwater behavior in the well. The black line indicates the initial increased sampling frequency from quarterly to monthly. This black line is shown on all the graphs because, although nitrate was the only parameter analyzed, constituents in this well may be affected by the increased disturbance, purging, and introduction of oxygen to the system. Note that this increase in sampling frequency occurred before the well was redeveloped in 2011. Constituents that have a visual correlation to increased sample frequency are chloride, nitrate, and field pH.

3.1.2 Well Redevelopment

Well redevelopment, including surging and over-pumping of certain existing wells that exceeded 5 NTU turbidity during purging and sampling, was performed in several site wells in 2010 and 2011. Redevelopment was required by DWMRC to provide evidence that traditional well development techniques for these wells had been exhausted prior to obtaining a variance in turbidity monitoring requirements. The aggressive well redevelopment activities appeared to have irreversibly disturbed the formation and did not result in improvement of groundwater turbidity across the site (HGC, 2011). Surging and bailing was performed on MW-31 on April 13, 2011. MW-31 was over-pumped on May 3, 2011. **Appendices B-11** and **C-10** contain time series plots with detected constituents in MW-31 with events depicted as vertical lines on the graphs. The purple line that is placed before 2012 identifies the date of redevelopment. Constituents that have a visual correlation to well redevelopment are sulfate, TDS, and uranium.

3.1.3 Hydrologic Influences

Monitoring wells at the Mill are completed in the Dakota Sandstone and Burro Canyon Formation. Water quality in the Dakota Sandstone and Burro Canyon Formation is generally poor due to high TDS in the range of 1,100 to 7,900 milligrams per liter ("mg/L") (HGC, 2014). Groundwater elevations observed in MW-31 (**Figure 3**) have increased by more than 5 feet since 2005. Groundwater elevation in MW-31 peaked in September of 2013 and has since decreased by 1.25 feet. Such variations in water levels are plausible given the changes in groundwater recharge and discharge that influence the hydrologic system and have occurred near MW-31 during this period (HGC, 2015).

Artificial recharge of the groundwater system can cause an increase in groundwater levels. For example, filling the unlined wildlife ponds has contributed to groundwater recharge, as the wildlife ponds behave as infiltration basins (HGC, 2015). The wildlife ponds were used until March 2012, when EFRI stopped filling the basins. During operation of the ponds, recharge from infiltrating water caused groundwater mounding in the area of the basin and has helped limit many constituent concentrations within the plumes by dilution while the associated groundwater mounding has increased hydraulic gradients and contributed to plume migration (HGC, 2015). In other cases, depending on the characteristics of the host rock, increased groundwater levels have likely increased concentrations of some constituents (INTERA 2007). The cessation of water delivery to the northern ponds, which are generally upgradient of the nitrate and chloroform plumes at the Mill, would explain the decay in groundwater mounding in the area of the ponds along with a resulting decrease in groundwater levels and migration rates of constituents within the plume (HGC, 2015).

Although MW-31 is not located in the capture zone of the nitrate or chloroform corrective action plans ("CAPs") (HGC, 2015), the observed change in groundwater elevation in MW-31 is likely due to overall system changes related to discontinued recharge of the wildlife ponds and the increased number of pumping wells associated with the nitrate/chloride and chloroform CAPs.

3.1.4 Geochemical Influences

MW-31 is located at the margin of the nitrate/chloride plume (**Figure 2**) on the eastern portion of the Mill, which is also near the chloroform plume. MW-31 was included in the October 2012 SAR for exceedances in sulfate and TDS. The October 2012 SAR concluded that the increasing concentrations of TDS and sulfate, as well as chloride, in MW-31 were due to the proximity of that well to the nitrate/chloride plume. The nitrate/chloride plume has been studied and described in detail in the following reports:

- Nitrate Contamination Investigation Report (INTERA, 2009)
- Quarterly Nitrate Reports (EFRI, 2009–2015)

Increases in selenium concentrations were addressed in the 2013 SAR, which concluded that increasing selenium concentrations may be related to decreasing pH caused by the oxidation of pyrite, which is releasing selenium into solution. As noted in **Appendix H,** statistically significant trends in selenium and sulfate have not been observed in MW-31 since the 2013 SAR, which indicates that the conclusions of the SAR (INTERA, 2013) remain valid. This shows that selenium concentrations appear more stable since the 2013 SAR, but, as discussed below, although they are stable, these concentrations are elevated relative to historical concentrations, and therefore, when combined with historical data, may make a previously insignificant historical trend significant. However, the fact that the rising trend in selenium in MW-31 is now statistically significant is tempered by the stable results obtained since the last SAR, which indicate that the rising trend does not appear to be continuing.

In addition to other variables discussed thus far and to conclusions presented in previous reports, observed trends among solute concentrations in groundwater samples from well MW-31 could be affected by mixing and geochemical reactions that occur before the groundwater is sampled. Time-series plots show that chloride concentrations in samples from this well tend to increase with time, possibly as a result of mixing with solutions from the nitrate/chloride plume. Similar plots for selenium, sulfate, TDS, and uranium indicate that the concentrations of these parameters also tend to increase with time, and are correlative with increasing chloride concentrations. Conversely, plots involving nitrate and pH show that the values of these parameters tend to decrease with time. Because the nitrate/chloride plume migrates through the Dakota Sandstone and the Burro Canyon Formation, these correlations among solute concentrations may be indicative of reactions involving the plume waters and minerals in this formation that occur before groundwater is sampled at MW-31.

One such reaction could involve the anaerobic oxidation of pyrite (FeS_2) (which appears to be ubiquitous in the perched zone of the Dakota Formation [HGC, 2012a]) by nitrate with the involvement of bacteria (e.g., *Thiobacillus denitrificans*) to catalyze nitrate reduction (e.g., Hayakawa et al., 2013):

$$5FeS_2 + 15NO_3^- + 10H_2O(l) \rightarrow 15/2N_2(aq) + 10SO_4^{2-} + 5Fe(OH)_3 + 5H^+$$

This reaction is consistent with the solute trends noted above. As the reaction proceeds, causing an increase in the amount of pyrite oxidized, NO_3^- concentrations and pH would decrease, and SO_4^{2-} concentrations (and hence TDS) would increase. Selenium concentrations could also increase because selenium readily substitutes for sulfur in the pyrite lattice and can be released to solution as pyrite is oxidized. A similar mechanism involving the oxidation of uraninite by nitrate has been proposed (Nolan and Weber, 2015) and could explain why uranium concentration trends have paralleled those of selenium, sulfate, and TDS in MW-31 groundwater. Predicting future trends in solute concentrations based on such reactions is difficult because the trends are controlled by a microbially mediated reaction rate, by the extent of mixing of plume waters and background groundwater, and by a time-varying source term for key reactants (e.g., NO_3^- from the Cl-NO_3 plume).

3.1.5 Analytical

In fourth quarter 2012, EFRI switched analytical laboratories from Energy Laboratory to American West Analytical Laboratory ("AWAL"). This change in laboratory coincides with the appearance of variability in concentrations of certain constituents. For example, **Appendices B-11** and **C-10** show constituents in MW-31 over time with vertical lines representing events. The red line on these graphs indicates a laboratory change in the fourth quarter of 2012. Changes in data set characteristics related to nitrate, TDS, and selenium appear to coincide with the change to a different laboratory. Sulfate shows some change associated with the lab change; however, an increase in sulfate concentrations occurs in December 2013, after the lab change in October.

Although a change in the levels of constituents is evident around the time a switch was made to a new laboratory, this change may not be solely attributed to the use of a new laboratory. With increased sample frequency and consistent laboratory practices since the laboratory change, there are sufficient data for robust statistical analysis. The data collected subsequent to the latest SAR for MW-31 are representative of groundwater behavior since the last approved SAR.

3.2 Indicator Parameter Analysis

Concentrations of parameters monitored in well MW-31 vary from concentrations observed at the time of the Background Reports. The changes in concentrations are most likely attributable to a combination of the influences discussed in Section 3.1 of this report: the proximity to the chloride/nitrate plume and changing hydrologic and geochemical conditions due to pumping wells, increased sample frequency, removal of recharge from the wildlife ponds, well rehabilitation, and the oxidation of pyrite leading to decreasing pH and increasing sulfate. For these reasons, the typical suite of indicator parameters may not function as indicators of potential tailings system seepage in this well at this time. A summary of geochemical analysis of indicator parameters is included in **Appendix C-1**. **Appendix C-2** presents a descriptive statistics comparison for indicator parameters from the Background Report and the 2013 SAR. Data used in the analysis and data removed prior to analysis are presented in **Appendices C-3** and **C-4**, respectively.

The distribution and identification of outliers and extreme outliers in indicator parameter concentration data sets are demonstrated in the box plots included in **Appendix C-5.** Data from upgradient wells MW-1, MW-18, and MW-19, and data from downgradient wells MW-20, MW-22, MW-3, and MW-3A were grouped into "upgradient" and "downgradient" data sets, respectively, and plotted alongside indicator parameter data from MW-31. This comparison is presented in **Appendix C-6** and illustrates that fluoride, sulfate, and uranium concentrations in MW-31 are well within the range of site-wide background concentrations. Chloride concentrations are above the range for site-wide background, consistent with the proximity of MW-31 to the nitrate/chloride plume. As the mass balance calculations demonstrate (see Section 3.4), the concentrations of constituents that are increasing in concentration and/or exceeding GWCLs in MW-31 are not the result of potential tailings system seepage. A Piper diagram, which can be used to distinguish between different waters, is presented in **Appendix C-7.** The oldest and the most recent data records for MW-31, MW-1, MW-3, MW-3A, MW-18, and Cell 1 are plotted on the Piper diagram. The diagram illustrates that the relationship of the cations and anions in water differs between MW-31 and Cell 1.

Chloride concentrations in MW-31 are exhibiting statistically significant increasing trends (see **Appendix C-9** for indicator parameter plots). Fluoride concentrations are showing a decreasing trend in MW-31. Sulfate concentrations are relatively low for the Mill site (**Appendix C-6**), but are showing a significantly increasing overall trend at the time of this SAR. However, sulfate concentrations have not shown a statistically significant trend since the 2013 SAR (**Appendix C-11**). Uranium concentrations in MW-31 are exhibiting a significantly increasing overall trend. However, uranium concentrations have not shown a statistically significant trend since the 2013 SAR (**Appendix C-11**). Taking into account changes in groundwater as described in Section 3.1, time series plots with vertical lines to indicate events that may have contributed to observed changes in indicator parameters are included in **Appendix C-10**. This analysis shows that although, overall, there are significantly increasing trends in the complete data sets for indicator parameters in MW-31, when looking at more recent data after October 2012, most significant trends change to appear more stable. The exceptions are chloride and TDS, which both have significantly increasing trends in recent data. These trends are expected and are related to the nitrate/chloride plume. In MW-31, chloride is not a good indicator of potential tailings system seepage because MW-31 is directly impacted by the nitrate/chloride plume. As noted above, the fact that the rising trends in selenium, sulfate, and uranium in MW-31 are now statistically significant is tempered by the stable results obtained since the last SAR, which indicate that the rising trends do not appear to be continuing.

Current sulfate concentrations in MW-31 are among the lowest at the Mill site. A box plot showing sulfate concentrations in all monitoring wells at the Mill site is included in **Appendix B-8**. Other monitor wells show sulfate concentrations that are three to seven times higher than those in MW-31 (see Table 7 of the October 2012 SAR). Sulfate is also significantly increasing in a number of wells at the Mill Site, including upgradient and far downgradient wells. See, for example, the indicator parameter analyses for MW-18 and MW-3 included in the October 2012 SAR (INTERA, 2012a), which show significantly increasing trends in sulfate and suggest that there are natural influences at the site that can influence sulfate concentrations. The widespread occurrence of pyrite in the Burro Canyon Formation and the Dakota Sandstone can contribute to decreasing pH and increasing sulfate in wells at the Mill site (HGC, 2012a). For these reasons, sulfate is not a reliable indicator parameter for potential tailings system seepage in MW-31. Increased concentrations of sulfate, as well as chloride and TDS, are expected considering the proximity of MW-31 to the nitrate/chloride plume. Further, as is evident from **Appendix B,** a statistically significant trend in sulfate has not been observed in MW-31 since the 2013 SAR, indicating that the conclusions in the SAR remain valid. This shows that sulfate concentrations have been more stable since the 2013 SAR, but since these stable results are elevated relative to historical concentrations, they are expected to eventually make a previously insignificant historical trend significant, as more of these stable results are added to the historical data set. However, the fact that the rising trend in sulfate in MW-31 is now statistically significant is tempered by the stable results obtained since the last SAR, which indicate that the rising trend does not appear to be continuing.

Uranium concentration trends are highly variable site-wide. Seven groundwater monitoring wells, including upgradient well MW-18, far downgradient well MW-03, and neighboring well MW-30 are exhibiting significantly increasing trends. Increasing trends in uranium concentrations correspond to decreasing pH trends in the same wells. Six wells, including upgradient well MW-19, downgradient wells MW-20 and MW-22, and neighboring well MW-32 are exhibiting significantly decreasing trends. Uranium concentrations in MW-31 are low for the site, in the 6 to 9 micrograms per liter ("µg/L") range, and are exhibiting a statistically significant upward trend. However, as with selenium and sulfate, uranium has not shown a significantly increasing trend since the 2013 SAR, indicating that uranium concentrations in MW-31 appear more stable relative to concentration trends prior to 2013. Box plots of uranium concentrations in MW-31 are plotted alongside upgradient and downgradient concentrations of uranium in **Appendix C-6.** These box plots illustrate that uranium concentrations in MW-31 are low for the Mill site and are within the range of natural background concentrations. At the time of the background report, ten uranium results were available, and those concentrations did not exhibit any trend. Following well rehabilitation in 2011, uranium concentrations appear to increase and remain relatively stable between 7.5-9 µg/L (**Appendices C-10** and **C-11**). As discussed above, the addition of more stable results in this range will cause the overall historical trend to become statistically significant; however, additional factors must be considered to understand the increasing trend in uranium concentration. Uranium mobility can be influenced by decreasing pH, and nitrate may alter uranium solubility by oxidative dissolution of reduced U (IV) minerals (Nolan and Weber, 2015). The GWCL for uranium was calculated using the initial ten data records. There are now 42 data records available, and as the increasing concentrations approach the GWCL, consideration should be given to recalculating the GWCL for uranium using a more recent and representative data set.

Based on the proximity to the chloride/nitrate plume and pyrite oxidation occurring in the aquifer (HGC, 2012a), the best indicator parameter available for MW-31 is fluoride. Fluoride is the fastest-moving available indicator of potential tailings system seepage. Fluoride would be expected to travel at least as fast in the subsurface as selenium. Current levels of selenium in samples of groundwater from MW-31 are as high as 85 µg/L, while the average concentration of selenium in Cell 1 is 8,517 µg/L. Thus, the current concentrations of selenium in samples of groundwater from MW-31 are 0.09 percent of the average concentration in Cell 1. The average concentration of fluoride in Cell 1 is about 1,000 mg/L. Since fluoride travels at least as fast as selenium, we would expect at least 0.01 percent of the average fluoride concentration in Cell 1 to have arrived in MW-31 if the selenium in that well were from potential tailings system seepage. However, recent fluoride concentrations in samples of groundwater from MW-31 are as low as 0.73 mg/L and declining, and not the 9 mg/L that would be expected if selenium concentrations were the result of potential tailings system seepage.

With the exception of chloride, and despite any increasing trends, indicator parameters in MW-31 remain amongst the lowest at the Mill site (**Appendix C-6**) and are not present in concentrations and/or ratios that would be expected if they were due to potential tailings system seepage (**Appendix F** and Section 3.4). Since the 2013 SAR, concentrations of these constituents appear relatively stable, albeit at relatively elevated levels compared to historical results, and have not demonstrated significantly increasing trends (except for TDS and chloride). The recently observed statistically significant upward trends in selenium, sulfate, and uranium are due to the addition of more sample results in these stable ranges; laboratory results obtained since the last SAR indicate that these rising trends do not appear to be continuing.

3.3 pH Analysis

A pH analysis was performed in addition to the geochemical analysis for MW-31 (see **Appendix D**). The pH analysis included using box plots to identify and omit extreme outliers, performing the Shapiro-Wilk test of normality (Shapiro and Wilk, 1965), and then testing for trends using either the least squares regression or the Mann-Kendall method (see **Appendices D-3** through **D-6**). Selenium, sulfate, and uranium concentrations in MW-31 may be impacted by decreasing trends in pH. The results of the pH analysis in MW-31 show a significantly decreasing trend in pH. The data appear to show more variance in 2010 (**Appendix B-11**), correlating with the increase to monthly sampling frequency implemented that year. Native selenium is stable in mildly oxidizing to extremely reducing conditions, while uranium oxides are stable mineral phases at mild to strongly reducing conditions such as those found at White Mesa (Brookins, 1988). Oxidation of pyrite can release selenium into solution and decrease pH. Decreasing pH can increase the solubility of naturally occurring selenium and uranium, which could be the cause of, or could contribute to, the increasing trends in selenium and uranium in MW-31 over time.

Selenium concentrations are exhibiting increasing trends in several wells site-wide. **Appendix G** contains time series plots of selenium concentrations in each groundwater monitoring well. At the time of the Background Report, significantly increasing trends in selenium and uranium were observed in upgradient and far downgradient wells (Table 7.1-1 in INTERA [2007] contains an annotated summary table of selenium trend tests for each groundwater monitoring well). Out of the 13 wells with significantly increasing selenium concentrations, ten have corresponding significantly decreasing pH trends. Selenium concentrations are significantly increasing in far downgradient wells MW-3 and MW-3A, which further demonstrates that the long-term increasing trend in selenium is a site-wide occurrence that is not related to potential tailings system seepage.

3.4 Mass Balance Analyses

Appendix F-1 presents calculations of expected concentrations of fluoride as the most reliable indicator parameter in this well, assuming a hypothetical scenario where concentrations of uranium, chloride, sulfate, and selenium in MW-31 are attributed to potential Cell 1 seepage. The fluoride model is based on current concentrations of fluoride, uranium, chloride, sulfate, and selenium in MW-31 and mean concentrations of the same constituents in Cell 1 water. The mean concentrations in Cell 1 were based on data collected between 2003 and 2014 (EFRI, 2014). In this analysis, modelled fluoride concentrations higher than observed MW-31 fluoride concentrations indicate that potential tailings system water seepage is an unlikely contributor of fluoride or the other parameters.

The observed range in fluoride concentrations in Cell 1 water ranges from 300 µg/l to more than 3,000,000 µg/l. Therefore, care was taken in the selection of an appropriate Cell 1 water fluoride concentration. As described in **Appendix F-1**, some annual fluoride concentrations measured in Cell 1 are even lower than the fluoride concentrations measured in MW-31, making Cell 1 an unlikely contributor of fluoride concentrations in MW-31. Both the earliest observed and mean fluoride concentrations appear to be practical selections for representing tailings system water. The mean concentration of Cell 1 fluoride was selected as it was the more conservative choice.

Concentrations of uranium, sulfate, selenium, and chloride are used to calculate a dilution factor for each constituent, assuming that the difference in concentration between Cell 1 and MW-31 is strictly a function of dilution during outflow of the hypothetical tailings system seepage. The dilution factor calculated for each constituent is then multiplied by the concentration of fluoride in Cell 1 to calculate a minimum expected concentration of fluoride expected if each constituent in MW-31 was attributable to hypothetical tailings system seepage.

Three notable results of this analysis are:

1. Modelled fluoride concentrations in MW-31 differ significantly from observed concentrations of fluoride in MW-31.
2. Modelled fluoride concentrations based on the ratio of each parameter vary by several orders of magnitude.
3. Modelled MW-31 fluoride concentrations based on chloride, sulfate, and selenium concentrations drastically overestimate the observed MW-31 fluoride values by around 10 times.

This analysis indicates that tailing seepage is not a source of fluoride, chloride, sulfate, selenium, or uranium. With regard to chloride, sulfate, and selenium, observed fluoride concentrations are much too low to be attributed to a diluted seepage water source at MW-31. In addition, the results of the uranium-based model indicate that MW-31 water would contain less fluoride than observed, conflicting with the chloride, sulfate, and selenium analyses. We would expect to see similar ratios for metals that may sorb or precipitate (uranium and selenium) and similar ratios for mobile anions (chloride and sulfate) because they do not readily attenuate. However, the variability in all parameters suggest that the observed concentrations in MW-31 are not consistent with a tailings system source.

A mass balance for nitrate was also performed and presented in the December 2009 CIR (INTERA, 2009), where it was suggested that groundwater mounding would occur underneath the tailings system if the nitrate/chloride plume was caused by hypothetical tailings system seepage. The nitrate/chloride plume with associated sulfate in groundwater is the cause of the increase in chloride, sulfate, and TDS observed in MW-31 located at the margins of the plume in areas where increases would be expected. The results of this analysis indicated that a 5-foot groundwater mound would be expected if the nitrate/chloride plume was caused by tailings system seepage.

Appendix F-2 presents an updated version of the 2009 calculations with hypothetical mixing scenarios that consider varying concentrations of nitrate observed in Cell 1 mixing with both upgradient water from MW-1 and water in MW-31 as observed at the time of the Background Reports.

The updated calculation suggests that on the order of 7.5 percent tailings system solution (assuming the highest recently observed nitrate concentration in the tailings system solutions of 269 mg/L) would have to mix with un-impacted groundwater (assuming 0.144 mg/L) to account for the observed mass of nitrate in groundwater, assuming an average nitrate concentration in the plume above the 20 mg/L isopleth of 30 mg/L.

The size of the nitrate plume above 20 mg/L is approximately 40 acres, or 1,800,000 square feet in map area. Assuming 45 feet of saturation (INTERA, 2009) and a porosity of 0.2, there are 16,200,000 cubic feet or 121,176,000 gallons of groundwater in that area. If concentrations in the nitrate plume were the result of potential tailings system seepage, the volume of tailings system solution would have to be 7.5 to 12.6 percent of the volume of un-impacted groundwater in the mixture; 7.5 percent is 9,088,200 gallons (approximately 27.9 acre feet), which is a conservative estimate of the volume of tailings system solution that would have to be mixed with groundwater to account for the mass of nitrate in the portion of the plume above 20 mg/L nitrate.

Assume:

- Nitrate concentration in tailings system solution 269 mg/L
- Nitrate concentration in un-impacted groundwater 0.144 mg/L
- Average plume concentration 19 mg/L

Mixing equation: $C_t*V_t + C_g*V_g = C_m*V_m$ (eq 1)

Where: C_t = Concentration of nitrate in tailings system solutions

V_t = Volume of tailings system solutions

C_g = Concentration of nitrate in un-impacted groundwater

V_g = Volume of un-impacted groundwater

C_m = Concentration of nitrate in mixture of groundwater and tailings system solutions

V_m = Volume of mixture of groundwater and tailings system solutions

Another equation: $V_t + V_g = V_m$ (eq 2)

Substituting eq2 in eq1: $C_t*V_t + C_g*V_g = C_m* (V_t + V_g)$ (eq 3)

Substitute nitrate concentrations in eq 3:

$269*Vt + 0.144*V_g = 19*(V_t + V_g)$

$269*V_t + 0.144*V_g = 19*V_t + 19*V_g$

$250*V_t = 18.856*V_g$

$V_t = 18.856/260*V_g = 0.075*V_g$

The volume of tailings system solution would have to be 7.5 percent of the volume of un-impacted groundwater in the mixture.

That theoretical volume of potential seepage from the tailings system would certainly generate a detectable groundwater mound. Such a mound would have to be on the order of 3.5 to 6.8 feet on average over the entire 40 acres, but would likely be much higher than that at the centroid of the theoretical plume (beneath the tailings system) and would taper off toward the edges of the plume. However, review of groundwater elevation contour maps (HGC, 2015) show no such mounding under the tailings system. While groundwater mounding can be observed toward the eastern portion of the site, cross and upgradient from the tailings system, it is clearly related to the wildlife ponds and not the tailings system. Equally as important, if the concentration of nitrate in the tailings system documented in the Statement of Basis for the 2005 GWDP (24 mg/L), or as documented in the annual tailings system sampling and analysis, were used in the calculation, no amount of tailings system solution could bring the plume concentration to 30 mg/L.

The mass balance and mixing calculations demonstrate that neither the concentrations of SAR constituents and indicator parameters present in MW-31, nor the ratios at which they are present in MW-31 and Cell 1, are consistent with potential tailings system seepage impacts. This conclusion is consistent with the previous work by Hurst and Solomon (2008) using results from MW-31 and other wells as part of the University of Utah study to evaluate whether seepage from the tailings system was affecting groundwater conditions. As discussed in Section 2.3 of this report, Hurst and Solomon (2008) found that "stable isotope fingerprints do not suggest contamination of groundwater by tailings cell seepage, evidence that is corroborated by trace metal concentrations similar to historically-observed concentrations."

4.0 CALCULATION OF GROUNDWATER COMPLIANCE LIMITS

The findings of analyses discussed above support the conclusions that (1) MW-31 is not being impacted by any potential tailings system seepage; (2) increasing concentrations of constituents in MW-31 are the result of background and/or site-wide influences, such as a site-wide decline in pH and the nitrate/chloride plume; and (3) most concentrations in MW-31 that are currently exhibiting significantly increasing overall trends appear to be stabilizing based on data collected from approximately October 2012 to the present. The recent data do not exhibit significantly increasing trends, and represent stable results since the 2013 SAR.

4.1 Evaluation of Modified Approaches to Calculation of GWCLs for Trending Constituents

According to the DWMRC-approved Flowsheet, if an increasing trend is present, a modified approach should be considered for determining GWCLs. All of the constituents included in this SAR are exhibiting significantly increasing trends that can be attributed to one or more of the following: (1) natural background conditions; (2) pyrite oxidation in the aquifer, which can decrease pH and increase mobility of metals and sulfate; (3) the proximity of this well to the nitrate/chloride plume, which is actively being remediated according to the Corrective Action Plan (HGC, 2012b); and/or (4) effects of recent events on groundwater in MW-31 such as well redevelopment, increased sampling frequency, change in water levels, and analytical method/laboratory change, as described in Section 3.1 of this SAR. Further, as discussed above, the insignificant trends in these constituents have become significant at this time due to the addition of more stable, albeit relatively high (compared to historical results) data points. Consequently, the fact that these constituents have exhibited significant trends must be considered together with more recent stable data that show the trends are not continuing.

Therefore, the following alternative approaches to calculating GWCLs have been considered for constituents in MW-31:

1. 1.5 times background concentration as defined in UAC R317-6-4.3

The UAC R317-6-4.3 recognizes that “contaminants” may be present as part of naturally occurring background conditions:

> *When a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed the greater of 1.5 times the background concentration or 0.5 times the ground water quality standard or background plus two standard deviations…*

In this rule, background concentration is defined as the "concentration of a pollutant in ground water upgradient or lateral hydraulically equivalent point from a facility, practice or activity which has not been effected by that facility, practice or activity." Background at the Mill has been determined on an intra-well basis, as defined in the Background Reports. Therefore, to be conservative, the mean concentration could be used as background for the purposes of this calculation. The mean concentration would assume all data to date, after following the data quality steps of the Flowsheet.

Multiplying the mean concentration by 1.5 would likely produce a GWCL that is greater than a GWCL determined using the Flowsheet; however, this approach does not take into account increasing trends and does not follow the Flowsheet. This method maintains the intra-well approach that has been established for compliance at the Mill.

2. Using recent data to calculate GWCLs

This approach follows the DWMRC-approved Flowsheet by taking into account increasing trends and processing the data consistently with previously determined GWCLs. In this approach, the complete data set, which exhibits an increasing trend over the history of the well record, is divided into subsets of data based on identification of a point of inflection where the results appear more stable. This approach is appropriate in wells that have been thoroughly investigated and where the causes of increasing trends are not due to potential tailings system seepage or other Mill-related impacts that are not already being addressed. It is also appropriate to look at the behavior of constituents since the last approved SAR. If the constituents are stable since the last SAR, then the conclusions of the SAR are confirmed, and new corrective actions are not required. Concentrations of sulfate, selenium, and uranium in MW-31 have been relatively stable since the last SAR, albeit at relatively high levels compared to historical results. The addition of more data points at these stable, relatively high levels is expected to eventually change a previously insignificant long-term trend into a significant trend. The fact that sulfate, selenium, and uranium now exhibit significant long-term trends in MW-31 is not a complete representation of conditions in this well; such long-term trends do not indicate current trends. As a result, it is more appropriate to focus on the recent stable results and to recalculate GWCLs for those constituents based on that data.

EPA unified guidance (2009) does not address updates to intra-well background when trends are present; however, the following statement is made for inter-well comparisons: "If a change is evident, it may be necessary to delete some of the earlier background values from the updated background sample, so as to ensure that compliance testing is based on current groundwater conditions and not on outdated measures of groundwater quality." Since the changes observed in groundwater in MW-31 are not related to potential tailings system seepage, it is appropriate to revise background in this well to reflect the current groundwater conditions in this well.

4.2 Proposed Revised GWCLs

In accordance with the Flowsheet, the increasing trends identified for selenium, sulfate, and TDS, and the decreasing trend identified for pH, warrant a modified approach to the calculation of GWCLs. As discussed detail in Section 3.0, and demonstrated in **Appendices B-11**, **B-12,** and **C-10**, the changes observed in groundwater at MW-31 are attributable to many factors and events, several which occur around the same point in time and visually correspond to a laboratory change in 2012.

Increasing trends in MW-31 over time are not related to potential tailings system seepage. Chloride, sulfate, and TDS trends present in MW-31 are likely from the nitrate/chloride plume, which is already being addressed under a separate CAP. Oxidation of pyrite can contribute to increasing sulfate and selenium concentrations while decreasing the pH, which can also mobilize uranium and selenium.

Since the laboratory change in the fourth quarter of 2012, analytical methods and procedures have been performed consistent with the Quality Assurance Plan. All parameters included in this SAR have been monitored monthly, resulting in a robust data set (over 30 N per data set since October 2012). Data sets were divided into subsets based on inflection points and analyzed for trends (**Appendices B-12, C-11** and **Appendix H**). In most cases, constituents identified as significantly increasing appear to become more stable after the fourth quarter of 2012. For this reason, the approach to calculation of GWCLs has been modified by using only data collected commencing with the fourth quarter of 2012. Flowsheet analysis has been performed for these data subsets and is summarized in **Appendix H-1.**

GWCLs determined according to the Flowsheet using all data to date and data after October 2012 are presented in **Table 2.** Based on this analysis, the proposed GWCLs for selenium, sulfate, TDS, and pH are presented in the column titled “Modified Approach GWCL.”

Table 2
Proposed GWCLs

Parameter	GWCL[a]	DWMRC-Approved GWCL[b]	Flowsheet Revised GWCL[c]	Rationale	Modified Approach GWCL[d]	Modified Approach Rationale
Selenium (µg/L)	71	79	85.4	HHV	84	Mean + 2σ
Sulfate (mg/L)	532	552	691	HHV	691	HHV
TDS (mg/L)	1320	1410.57	1613.8	Mean + 2σ	1674	Mean + 2σ
pH (s.u.)	6.5-8.5	6.57-8.5	6.40	Mean - 2σ	6.19	Mean - 2σ

Notes:
HHV = highest historical value
SD = standard deviation
a = 2011 GWDP
b = DWMRC-Approved revised GWCLs presented in SARs (INTERA, 2012a, 2013)
c = GWCL calculated using complete historic data set
d = Modified Approach calculated in accordance with the Flowsheet using more stable recent data (10/2012-8/2015)

5.0 CONCLUSIONS AND RECOMMENDATIONS

Background at the Mill site was recently thoroughly studied in the Background Reports (INTERA, 2007, 2008) and in the University of Utah Study (Hurst and Solomon, 2008). Conditions in MW-31 have been studied more recently in the 2012 and 2013 SARs (INTERA, 2012a, 2013). The Background Reports and the University of Utah Study concluded that groundwater at the Mill site has not been impacted by Mill operations. Both of those studies also acknowledged that there are natural influences at play at the Mill site that have given rise to increasing trends and general variability of background groundwater at the Mill site. The conclusion of the 2012 and 2013 SARs, that groundwater in MW-31 is not impacted by potential tailings system seepage, is consistent with the conclusions of the Background Reports and the University of Utah Study. MW-31 is located within the nitrate/chloride plume that was identified in 2009, and is currently being addressed under a separate corrective action (HGC, 2012b). Mass balance calculations have demonstrated that concentrations of nitrate, chloride, fluoride, sulfate, uranium, and selenium in MW-31 are not consistent with concentrations that would be present due to potential tailings system seepage.

The focus of this SAR was therefore to identify any changes in the circumstances identified in those studies. A change in concentrations of parameters in MW-31 can be observed after monthly monitoring started in 2010, after the well redevelopment effort in 2011, after analytical changes in 2012, and after the groundwater elevation peak in 2013. A geochemical analysis for the indicator parameters in MW-31 was performed. The results of the analyses show that the increasing concentrations of selenium, sulfate, and TDS, as well as the decrease in pH, in MW-31 are not due to potential tailings system seepage. This is evident from the behavior of fluoride in MW-31, which is trending downward, and from mass balance calculations performed for fluoride and nitrate which also indicate that potential tailings system seepage is not impacting groundwater at MW-31.

Since the most recent SARs, concentrations of sulfate, selenium, and uranium in MW-31 have been relatively stable, which confirms the conclusions in the previous SARs that concentrations of those constituents in MW-31 are due to natural background influences and not potential tailings system seepage. In these circumstances, revised GWCLs for those constituents based on the stable data since the last SARs are appropriate.

A site-wide comparison of concentrations in MW-31 shows that even with significantly increasing long-term trends, many of the constituents are present in concentrations less than or within the range of site-wide background concentrations. Thus, INTERA believes that increasing selenium, sulfate, and TDS concentrations, and decreasing pH concentrations, in MW-31 over time are due to background influences, including the natural decreasing trend in pH across the Mill site and the proximity of this well to the existing nitrate/chloride plume, and not to any potential tailings system seepage.

Table 3
Summary of Findings

Well	Out-of-Compliance Constituent	Summary	Path Forward
MW-31	Selenium	MW-31 is located at the margin of the nitrate/chloride plume; selenium concentrations may be influenced by decreasing pH and oxidizing pyrite. Chloride is significantly increasing, but is not an appropriate indicator parameter at this well. Fluoride is significantly decreasing. Uranium is significantly increasing. Increasing concentrations in this well are already being addressed by the corrective action for the nitrate/chloride plume. Selenium and indicator parameters (except chloride) are not significantly increasing when using data from 10/2012 through 8/2015.	Modified approach GWCL; continue remedial action on the nitrate/chloride plume.
	Sulfate	Sulfate concentrations are likely due to a combination of the oxidation of pyrite, which releases sulfate, and the proximity of MW-31 to the nitrate/chloride plume. Sulfate is significantly increasing, but is not an appropriate indicator parameter at this well. Sulfate concentrations in MW-31 are among the lowest at the Mill site and are not significantly increasing in data collected after 10/2012.	Modified approach GWCL; continue remedial action on the nitrate/chloride plume.
	TDS	TDS concentrations are impacted by the nitrate/chloride plume and increasing sulfates from pyrite oxidation. TDS concentrations in MW-31 are among the lowest at the Mill site.	Modified approach GWCL; continue remedial action on the nitrate/chloride plume.
	pH	pH is significantly decreasing.	Modified approach GWCL.

MW-31 is located at the margin of the nitrate/chloride plume and is likely being affected by the plume, as is evidenced by the increasing trend in TDS, chloride, and sulfate. Any potential increases in concentrations in this well are already being addressed by the corrective action being implemented for the nitrate/chloride plume.

INTERA recommends adopting the revised GWCLs for MW-31 based on the modified approach to address constituents with increasing trends in accordance with the Flowsheet. Regular revisions to GWCLs for constituents in wells with significantly increasing trends due to background is consistent with the USEPA's Unified Guidance (USEPA, 2009). Such revisions account for the trends and minimize unwarranted out-of-compliance status in such wells.

6.0 REFERENCES

Brookins, D.G., 1988. *Eh-pH Diagrams for Geochemistry*. New York: Springer-Verlag, 176 pp.

Energy Fuels Resources (USA) Inc. (EFRI), 2010-2013. White Mesa Uranium Mill Groundwater Monitoring Reports

———. 2009-2015. White Mesa Uranium Mill Nitrate Monitoring Reports.

———.2014 White Mesa Uranium Mill Annual Tailings System Wastewater Monitoring Report.

Hayakawa, A., Hatakeyama, M., Asano, R., Ishikawa, Y., and Hidaka, S. 2013. Nitrate reduction coupled with pyrite oxidation in the surface sediments of a sulfide-rich ecosystem. *Journal of Geophysical Research: Biogeosciences*, 118, 639-649.

Hurst, T.G., and Solomon, D.K., 2008. *Summary of Work Completed, Data Results, Interpretations and Recommendations for the July 2007 Sampling Event at the Denison Mines, USA, White Mesa Uranium Mill Near Blanding Utah*. Prepared by Department of Geology and Geophysics, University of Utah.

Hydro Geo Chem (HGC), 2011. *Redevelopment of Existing Perched Monitoring Wells White Mesa Uranium Mill Near Blanding, Utah*

———. 2012a. *Investigation of Pyrite in the Perched Zone, White Mesa Uranium Mill Site, Blanding, Utah.*

———. 2012b. Corrective Action Plan for Nitrate White Mesa Uranium Mill, Near Blanding, Utah.

———.2014 Hydrogeology Report for the White Mesa Uranium Mill, Blanding Utah

———.2015 White Mesa Uranium Mill Chloroform Monitoring Report Third Quarter 2015

INTERA Incorporated, 2007. *Revised Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s White Mesa Uranium Mill Site, San Juan County, Utah.*

———. 2008. *Revised Background Groundwater Quality Report: New Wells for Denison Mines (USA) Corp.'s White Mesa Uranium Mill Site, San Juan County, Utah.*

———. 2009. *Nitrate Contamination Investigation Report White Mesa Uranium Mill Site, Blanding, Utah.*

———. 2012a. *Source Assessment Report White Mesa Uranium Mill Blanding, Utah.*

———. 2012b. *PH Report White Mesa Uranium Mill, Blanding, Utah.*

———. 2013. *Source Assessment Report for Selenium in MW-31 White Mesa Uranium Mill, Blanding, Utah.*

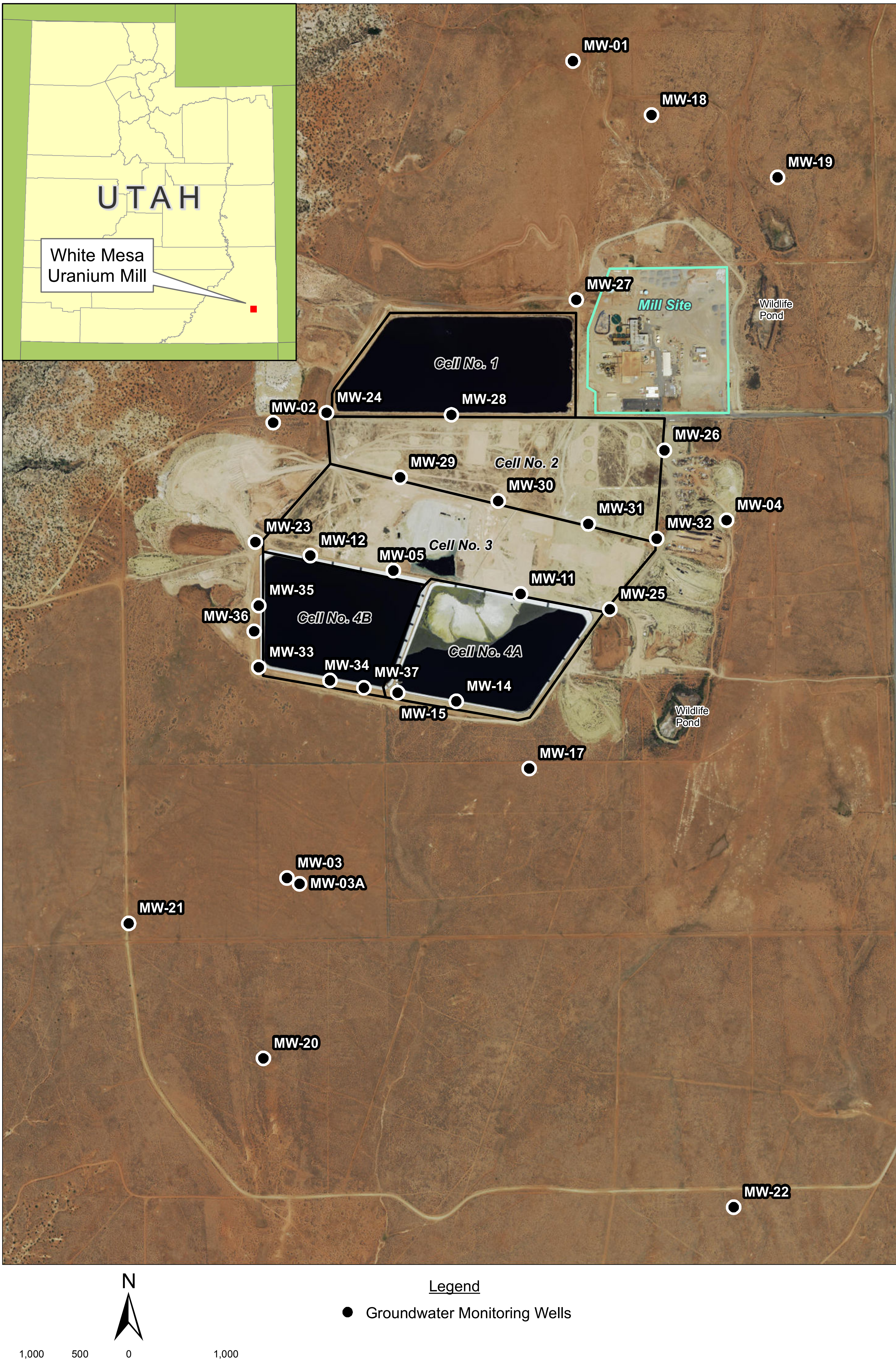
Nolan and Weber, 2015. *Natural Uranium Contamination in Major U.S. Aquifers Linked to Nitrate.* Environmental Science and Technology Letters. http://pubs.acs.org/journal/estlcu

Shapiro, S.S., and Wilk, M.B., 1965. An Analysis of Variance Test for Normality (Complete Samples). *Biometrika* 52:591-611.

United States Environmental Protection Agency (USEPA), 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530/ R-09-007.*

Williams and Byers, 1934. Occurrence of Selenium in Pyrites, *Ind. Eng. Chem. Anal. Ed*, Vol. 6, pp 296-297. http://pubs.acs.org/doi/abs/10.1021/ac50090a032?journalCode=iecac0

FIGURES



Legend

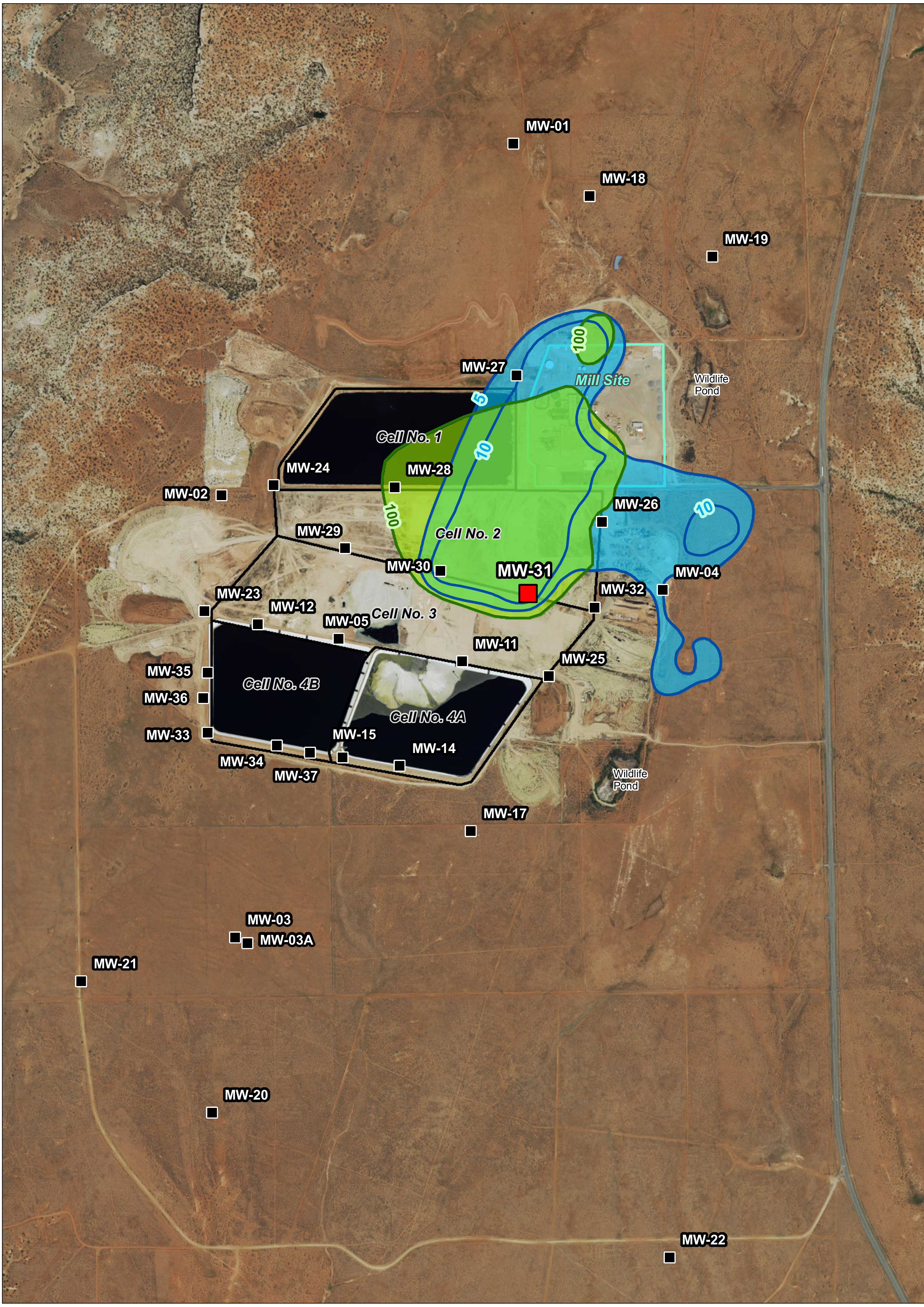
● Groundwater Monitoring Wells

INTERA

Source(s): Aerial – ESRI ArcGIS online, dated 2014;
Wells – HGC, Inc., May 2008 report.

Figure 1
Location of White Mesa
Mill Site
White Mesa Uranium Mill

S:\Projects\IUC-001-01-001 Denison Mines\GIS\mapdocs\2015_SARs\MW-31\Fig01_LocationMap.mxd Date: 10/16/2015



N

1,000 500 0 1,000
Feet

Legend

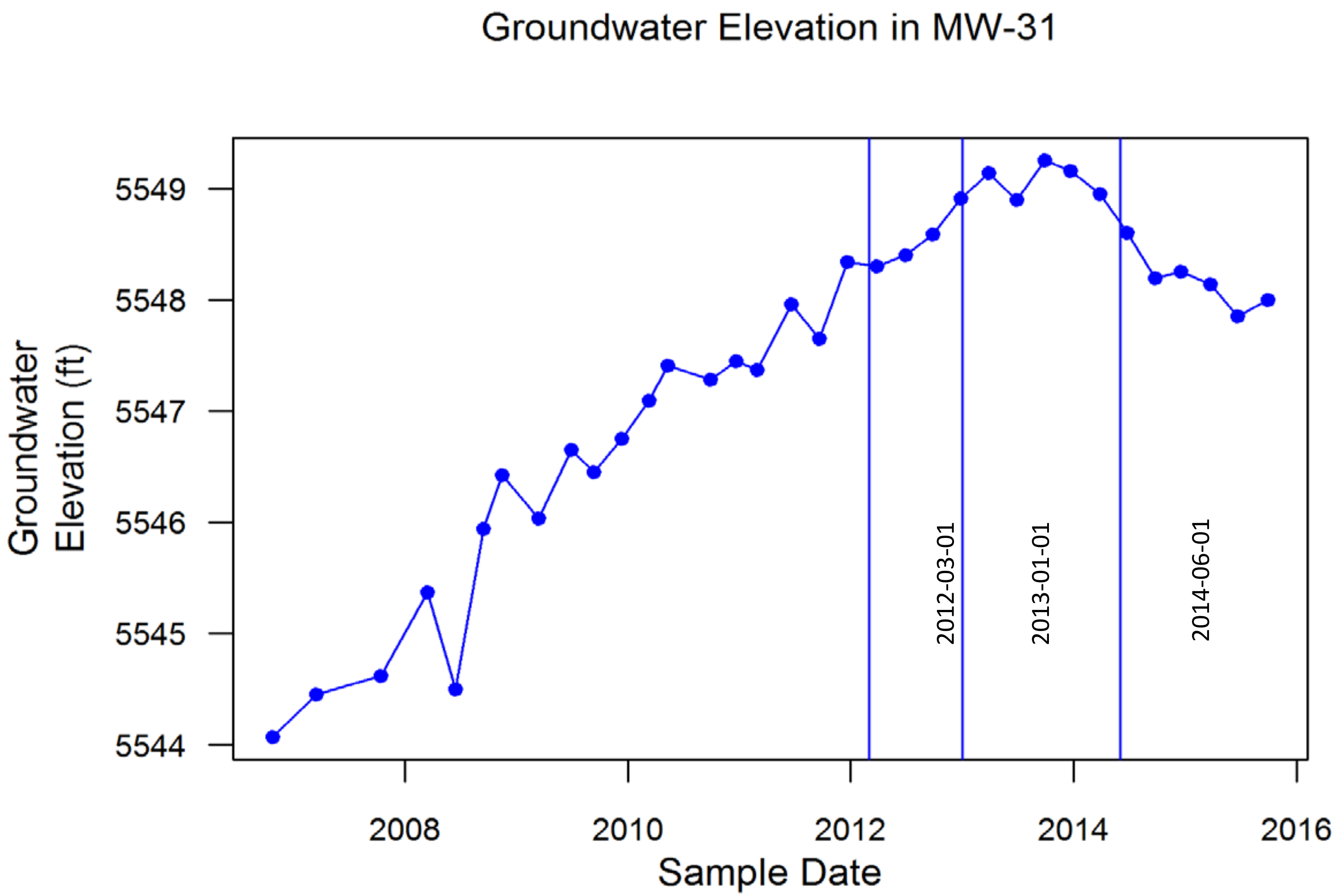
- Monitoring Well
- Monitoring Well Exceeds; Chloride, Nitrate, pH, Selenium, Sulfate, & TDS
- Nitrate 5 mg/L
- Chloride 100 mg/L

INTERA

Source(s): Aerial – ESRI ArcGIS online, dated 2014;
Wells – HGC, Inc., May 2008 report;
Nitrate and chloride data collected Q4, 2014.

Figure 2
Exceedances and Proximity of MW-31 to Nitrate/Chloride Plume
White Mesa Uranium Mill

S:\Projects\IUC-001-01-001 Denison Mines\GIS\mapdocs\2014_SARs\MW-31\Fig02_MW31exceeds.mxd Date: 10/19/2015



3/1/2012 Stopped filling upper Wildlife pond
1/1/2013 Four nitrate CAP pumping wells brought online
6/1/2014 Five new chloroform CAP pumping wells brought online

INTERA

Figure 3
Groundwater Elevation Over Time
White Mesa Uranium Mill

\\abq-jasper\data\Projects\IUC-001-01-001 Denison Mines\2015\MW-31SAR\Figures\Fig03_GroundwaterElevation_Rev1.xls

APPENDIX A

GWCL Exceedances for First Quarter 2015
Under the August 24, 2012, GWDP

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

Q1 2010 Results					Q2 2010 Results						Q3 2010 Results						Q4 2010 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	Q1 2010 Sample Date	Q1 2010 Result	Q2 2010 Sample Date	Q2 2010 Result	May 2010 Monthly Sample Date	May 2010 Monthly Result	June 2010 Monthly Sample Date	June 2010 Monthly Result	July 2010 Monthly Sample Date	July 2010 Monthly Result	August 2010 Monthly Sample Date	August 2010 Monthly Result	Q3 2010 Sample Date	Q3 2010 Result	October 2010 Monthly Sample Date	October 2010 Monthly Result	Q4 2010 Sample Date	Q4 2010 Result	December 2010 Monthly Sample Date	December 2010 Monthly Result
Required Quarterly Sampling Wells																						
MW-11 (Class II)	Manganese (ug/L)	131.29	2/10/2010	***134***	4/28/2010	***137***	5/24/2010	122	6/16/2010	99	7/20/2010	123	8/25/2010	***138***	9/8/2010	128	10/20/2010	***141***	11/11/2010	***133***	12/15/10	***158***
MW-14 (Class III)	Field pH (S.U.)	6.5 - 8.5	2/2/2010	***6.45***	4/21/2010	***6.29***	5/21/2010	***6.36***	6/16/2010	***6.45***	7/20/2010	7.19	8/25/2010	***6.48***	9/8/2010	6.51	10/20/2010	6.60	11/10/2010	***6.37***	12/15/2010	***6.47***
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	2/3/2010	6.53	4/28/2010	7.2	NS	NA	NS	NA	NS	NA		NA	9/8/2010	6.58	NS	NA	11/10/2010	***6.36***	NS	NA
	Cadmium (ug/L)	1.5		1.26		1.44		NA		NA		NA		NA		1.4		NA		1.26		NA
	Uranium (ug/L)	6.5		5.93		6.43		NA		NA		NA		NA		***6.57***		NA		5.89		NA
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	2/2/2010	***1.3***	4/22/2010	***2***	5/21/2010	0.3	6/16/2010	0.4	7/21/2010	0.6	8/16/2010	0.6	9/26/2010	***0.7***	10/20/2010	0.4	11/15/2010	0.2	12/15/2010	0.4
	Uranium (ug/L)	41.8		***58.7***		***66.7***		37.4		36.6		34.4		***71.8***		***72.7***		37.5		30.4		29.6
	Chloroform (ug/L)	70		***700***		***1700***		***800***		***940***		***900***		***2800***		***2100***		***1000***		***1900***		***1400***
	Chloride (mg/L)	58.31		***72***		57		***80***		47		52		49		***64***		52		48		52
	Carbon Tetrachloride (ug/L)	5		<1.0		<1.0		NA		<1.0		NA		NA		<1.0		NA		<1.0		NA
	Field pH (S.U.)	6.74 - 8.5		***6.59***		7.18		***6.36***		6.98		***6.45***		***6.39***		***6.60***		***6.61***		***6.49***		***6.45***
	Dichloromethane (Methylene Chloride) (ug/L)	5		1		***9.9***		NR		2.2		***12***		***24***		***45***		***5.5***		***16***		1.2
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	2/9/2010	***16.1***	4/27/2010	***15.8***	5/21/2010	***17***	6/15/2010	***15.3***	7/21/2010	***16***	8/24/2010	***16***	9/14/2010 9/21/2010	***15***	10/19/2010	***15***	11/9/2010	***15***	12/14/2010	***16***
	Chloride (mg/L)	128		127		97		NA		NA	NS	NA	NS	NA		111		NA		126		NA
	Uranium (ug/L)	8.32		6.82		6.82		NA		NA	NS	NA	NS	NA		7.10		NA		6.64		NA
	Field pH (S.U.)	6.50		6.81		6.55		6.62		7.47	7/21/2010 7/27/2010	6.80 (6.82)	8/24/2010	6.73		6.80 (6.84)		6.77		6.75		6.65
	Ammonia (mg/L)	0.14		<0.05		<0.05		NA		NA	NS	NA	NS	NA		<0.05		NA		0.05		NA
	Selenium (ug/L)	34		32		***35.3***		NA		NA	7/27/2010	33.5	8/24/2010	***35.6***		32.6		32.4		32.2		30.5
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	2/9/2010	***21.7***	4/20/2010	***22.5***	5/21/2010	***23***	6/15/2010	***21.1***	7/21/2010	***20***	8/24/2010	***22***	9/13/2010 (9/21/10)	***21***	10/19/2010	***20***	11/9/2010	***20***	12/14/2010	***20***
	TDS (mg/L)	1320		1150		1220	NS	NA	NS	NA	NS	NA	NS	NA		***1330***	NS	NA		1320		NS
	Chloride (mg/L)	143		128		128	NS	NA	NS	NA	NS	NA	NS	NA		139	NS	NA		138		NS
	Selenium (ug/L)	71		60.8		59.6	NS	NA	NS	NA	NS	NA	NS	NA		64.4	NS	NA		60		NS
	Field pH (S.U.)	6.5 - 8.5		6.96		7.38	5/21/2010	6.95	6/15/2010	7.01	7/21/2010	7.80	8/24/2010	7.10		7.66 (7.13)	10/19/2010	6.92		6.98		6.95
	Sulfate (mg/L)	532		507		522	NS	NA	NS	NA	NS	NA	NS	NA		527	NS	NA		***539***		NS
MW-35 (Class II)	Manganese (ug/L)	200	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/30/2010	***698***	NS	NA
	Thallium (ug/l)	0.5		NA		NA		NA		NA		NA		NA		NA		NA		***1.14***		NA
	Gross Alpha minus Rn & U (pCi/L)	3.75		NA		NA		NA		NA		NA		NA		NA		NA		2.6		NA
	Field pH (S.U.)	6.5 - 8.5		NA		NA		NA		NA		NA		NA		NA		NA		7.46		NA
	Selenium (ug/L)	12.5		NA		NA		NA		NA		NA		NA		NA		NA		ND		NA
	Uranium (ug/L)	7.5		NA		NA		NA		NA		NA		NA		NA		NA		***27.2***		NA
Required Semi-Annual Sampling Wells																						
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	5/5/2010	212	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/18/2010	275	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		7.8		NA		NA		NA		NA		NA		NA		10.7		NA
	Field pH (S.U.)	6.77 - 8.5		NA		7.86 (6.87)		NA		NA		NA		NA		NA		NA		6.96		NA
	Sulfate (mg/L)	838		NA		805		NA		NA		NA		NA		NA		NA		792		NA
MW-03 (Class II)	Selenium (ug/L)	37	NS	NA	5/3/2010	***37.2***	NS	NA	NS	NA	NS	NA	NS	NA	9/20/2010	35.5	NS	NA	11/19/2010	***38.8***	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.14 (6.25)***		NA		NA		NA		NA		***6.39***		NA		***6.35***		NA
	Sulfate (mg/L)	3663		NA		3490		NA		NA		NA		NA		NA		NA		3430		NA
	Nitrate + Nitrite (as N) (mg/L)	0.73		NA		0.3		NA		NA		NA		NA		NA		NA		0.4		NA
	Fluoride (Mg/L)	0.68		NA		***0.71***		NA		NA		NA		NA		0.63		NA		***0.77***		NA
MW-3A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	5/4/2010	***6.23 (6.24)***	NS	NA	NS	NA	NS	NA	NS	NA	9/21/2010	***6.42***	NS	NA	11/22/2010	***6.21***	NS	NA
	Sulfate (mg/L)	3640		NA		***3680***		NA		NA		NA		NA		3630		NA		***3850***		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		1.0		NA		NA		NA		NA		NA		NA		1.2		NA
	TDS (mg/L)	5805		NA		***5860***		NA		NA		NA		NA		5470		NA		5330		NA
	Selenium (ug/L)	89		NA		81.4		NA		NA		NA		NA		NS		NA		***94.8***		NA
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	4/26/2010	0.39	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/11/2010	***11.6***	NS	NA
MW-12 (Class III)	Selenium (ug/L)	25	NS	NA	4/27/2010	***25.7***	NS	NA	NS	NA	NS	NA	NS	NA	9/20/2010	***31.9***	NS	NA	11/19/2010	***27.6***	NS	NA
	Field pH (S.U.)	6.5 - 8.5	NS	NA		7.16		NA		NA		NA		NA		6.62		NA		***6.47***		NA

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

			Q1 2010 Results		Q2 2010 Results						Q3 2010 Results						Q4 2010 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in Current GWDP	Q1 Sample Date	Q1 Result	Q2 Sample Date	Q2 Result	May Monthly Sample Date	May Monthly Result	June Monthly Sample Date	June Monthly Result	July Monthly Sample Date	July Monthly Result	August Monthly Sample Date	August Monthly Result	Q3 Sample Date	Q3 Result	October Monthly Sample Date	October Monthly Result	Q4 Sample Date	Q4 Result	December Monthly Sample Date	December Monthly Result
Required Semi-Annual Sampling Wells, continued																						
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	4/21/2010	100	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/11/2010	99.5	NS	NA
	Field pH (S.U.)	6.62 - 8.5		NA		6.98		NA		NA		NA		NA		NA		NA		6.57		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	5/4/2010	***3.73***	NS	NA	NS	NA	NS	NA	NS	NA	9/15/2010	***3.64***	NS	NA	11/18/2010	***3.57***	NS	NA
	Sulfate (mg/L)	1938.9		NA		***1950***		NA		NA		NA		NA		1930		NA		1910		NA
	Field pH (S.U.)	6.25-8.5		NA		***6.2***		NA		NA		NA		NA		7.23		NA		6.37		NA
	TDS (mg/L)	3198.77		NA		***3280***		NA		NA		NA		NA		3190		NA		3030		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	5/4/2010	***6.61 (6.66)***	NS	NA	NS	NA	NS	NA	NS	NA	9/15/2010	6.93	NS	NA	11/18/2010	6.8	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		0.9		NA		NA		NA		NA		NA		NA		1.2		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		2.6		NA		NA		NA		NA		NA		NA		2.4		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	4/22/2010	***6.18***	NS	NA	NS	NA	NS	NA	NS	NA	9/14/2010	7.05	NS	NA	11/22/2010	***6.44***	NS	NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	5/6/2010	***4.28***	NS	NA	NS	NA	NS	NA	NS	NA	9/21/2010	***5.06***	NS	NA	11/17/2010	***3.22***	NS	NA
	Fluoride (mg/L)	0.36		NA		0.14		NA		NA		NA		NA		NA		NA		0.18		NA
	Sulfate (mg/L)	2903		NA		2560		NA		NA		NA		NA		NA		NA		2760		NA
	Thallium (ug/L)	1		NA		***1.3***		NA		NA		NA		NA		***1.57***		NA		***1.09***		NA
	Field pH (S.U.)	6.5 - 8.5		NA		***5.91 (5.78)***		NA		NA		NA		NA		6.64		NA		***6.1***		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	5/3/2010	***5.8***	NS	NA	NS	NA	NS	NA	NS	NA	9/14/2010	***5.9***	NS	NA	11/12/2010	***5.7***	NS	NA
	Chloride (mg/L)	38		NA		***42***		NA		NA		NA		NA		***42***		NA		***45***		NA
	Sulfate (mg/L)	462		NA		***469***		NA		NA		NA		NA		461		NA		452		NA
	TDS (mg/L)	1075		NA		***1160***		NA		NA		NA		NA		1060		NA		***1110***		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		1.6		NA		NA		NA		NA		NA		NA		***2.4***		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	4/19/2010	***108***	NS	NA	NS	NA	NS	NA	NS	NA	9/14/2010	***106***	NS	NA	11/12/2010	***107***	NS	NA
	Cadmium (ug/L)	5.2		NA		4.20		NA		NA		NA		NA		NA		NA		4.11		NA
	Uranium (ug/L)	4.9		NA		3.36		NA		NA		NA		NA		NA		NA		3.45		NA
	Vanadium (ug/L)	30		NA		<15.0		NA		NA		NA		NA		NA		NA		<15.0		NA
	Field pH (S.U.)	6.1 - 8.5		NA		***5.67***		NA		NA		NA		NA		***5.91***		NA		***5.72***		NA
MW-29 (Class III)	TDS (mg/L)	4400	NS	NA	4/27/2010	4400	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/9/2010	4390	NS	NA
	Field pH (S.U.)	6.46 - 8.5		NA		6.82		NA		NA		NA		NA		NA		NA		***6.17***		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	4/20/2010	***4.5***	NS	NA	NS	NA	NS	NA	NS	NA	9/13/2010	2.9	NS	NA	11/10/2010	***8.8***	NS	NA
	Chloride (mg/L)	35.39		NA		30		NA		NA		NA		NA		NA		NA		35		NA
	Field pH (S.U.)	6.4 - 8.5		NA		***6.03***		NA		NA		NA		NA		***6.33***		NA		***6.05***		NA

Notes:

GWCL values are taken from August 24, 2012 version of GWDP.

NS = Not Required and Not Sampled

NR = Required
NA = Not
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

			Q1 2011 Results						Q2 2011 Results						Q3 2011 Results						Q4 2011 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2011 Monthly Sample Date	January 2011 Monthly Sample Result	Q1 2011 Sample Date	Q1 2011 Result	March 2011 Monthly Sample Date	March 2011 Monthly Result	Q2 2011 Sample Date	Q2 2011 Result	May 2011 Monthly Sample Date	May 2011 Monthly Result	June 2011 Monthly Sample Date	June 2011 Monthly Result	July 2011 Monthly Sample Date	July 2011 Monthly Result	Q3 2011 Sample Date	Q3 2011 Result	September 2011 Monthly Sample Date	September 2011 Monthly Result	Q4 2011 Sample Date	Q4 2011 Result	November 2011 Monthly Sample Date	November 2011 Monthly Result	December 2011 Monthly Sample Date	December 2011 Monthly Result
Required Quarterly Sampling Wells																										
MW-11 (Class II)	Manganese (ug/L)	131.29	1/11/2011	121	2/2/2011	***145***	3/15/2011	68	4/4/2011	***148***	5/10/2011	***170***	6/15/2011	121	7/6/2011	***151***		118	9/7/2011	106	10/4/2011	112	11/9/2011	105	12/14/2011	100
MW-14 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/11/2011	***6.37***	2/7/2011	***6.22***	3/14/2011	6.76	4/4/2011	6.63	5/10/2011	***6.37***	6/15/2011	***5.83***	7/5/2011	***6.4***	8/3/2011	***6.23 (6.41)***	9/8/2011	6.50	10/4/2011	6.71 (6.82)	11/9/2011	6.63	12/12/2011	6.84
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/11/2011	***6.44***	2/2/2011	6.66	3/15/2011	6.79	4/4/2011	6.7	5/11/2011	***6.1***	6/20/2011	***5.77***	7/6/2011	***6.29***	8/3/2011 8/30/11	***6.42 (6.54)***	9/7/2011	6.54	10/4/2011	6.6	11/9/2011	6.51	12/12/2011	6.87
	Cadmium (ug/L)	1.5		NA		1.34		NA		1.27		NA		NA		NA	8/30/2012	1.19		NA		1.27		NA		NA
	Uranium (ug/L)	6.5		***7.02***		4.77		***6.8***		5.56		***6.72***		***7.06***		***6.74***		6.37		5.96		5.27		***6.56***		6.1
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/12/2011	0.2	2/16/2011	0.25	3/15/2011	0.6	4/1/2011	***0.8***	5/10/2011	0.4	6/20/2011	0.3	7/6/2011	***0.9***	8/3/2011 8/30/11	0.6	9/7/2011	***2.4***	10/12/2011	***0.9***	11/9/2011	***1.3***	12/14/2011	***2.3***
	Uranium (ug/L)	41.8		32		***69.3***		31.8		***60.2***		***57.4***		18.5		***57.1***		19.0		***56.1***		***58.9***		***55.6***		***57***
	Chloroform (ug/L)	70		***800***		***730***		***1200***		***390***		***1900***		***730***		***300***		***1000***		***1300***		***440***		***1200***		***1400***
	Chloride (mg/L)	58.31		52		***59***		***64***		***64***		54		39		***64***		***60***		***66***		***61***		55		***62***
	Carbon Tetrachloride (ug/L)	5		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0
	Field pH (S.U.)	6.74 - 8.5		6.83		***6.06***		6.89		***6.22***		***6.43***		***6.52***		***6.35***		***6.07 (6.58)***		***6.71***		6.82		6.75		7.1
	Dichloromethane (Methylene Chloride) (ug/L)	5		<1.0		***10***		***14***		3.1		***20***		***7***		2.4		***10***		***7.9***		2.6		***8.9***		***11***
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/10/2011	***15***	2/1/2011	***16***	3/14/2011	***17***	4/11/2011	***16***	5/10/2011	***16***	6/20/2011	***17***	7/5/2011	***17***	8/3/2011	***14***	9/7/2011	***16***	10/4/2011 11/29/2011	***16***	11/8/2011	***16***	12/12/2011	***16***
	Chloride (mg/L)	128		NA		***134***		NA		***134***		128		127		127		126		***145***		***129***		122		124
	Uranium (ug/L)	8.32		NA		5.97		NA		6.49		NA		NA		NA		8		NA		***9.83***		NA		NA
	Field pH (S.U.)	6.50		6.65		6.96		7.10		6.83		6.70		***5.66***		6.65		6.61		6.80		6.96 (6.73)		6.83		7.14
	Ammonia (mg/L)	0.14		NA		0.05		NA		<0.05		NA		NA		NA		<0.05		NA		<0.05		NA		NA
	Selenium (ug/L)	34		***36.2***		***34.7***		***34***		***44.4***		***38.3***		***38.7***		32.4		***39.7***		32.4		***36.6***		***36.8***		***38***
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/10/2011	***19***	2/1/2011	***21***	3/14/2011	***22***	4/1/2011	***21***	5/10/2011	***20***	6/20/2011	***22***	7/5/2011	***22***	8/2/2011	***20***	9/6/2011	***21***	10/3/2011	***21***	11/8/2011 (11/29/12)	***21***	12/12/2011	***21***
	TDS (mg/L)	1320		1240		1220		1250		***1370***		1290		***1330***		1280		1300		1300		1320		1290		***1330***
	Chloride (mg/L)	143		NS		***145***		NA		143		143		***145***		***148***		***148***		***148***		***145***		***145***		***148***
	Selenium (ug/L)	71		NS		64.6		NA		65.2		NS		NS		NS		66.2		NS		68.8		NS		NS
	Field pH (S.U.)	6.5 - 8.5		6.65		7.21		7.43		7.01		6.73		***6.16!***		6.64		6.67		7.03		7.28		7.01 (7.34)		7.46
	Sulfate (mg/L)	532		NS		***538***		531		503		512		***540***		532		***537***		***541***		***539***		***552***		530
MW-35 (Class II)	Manganese (ug/L)	200	NS	NA	2/15/2011	***248***	NS	NA	6/7/2011	***369***	NS	NA	NS	NA	7/20/11	***348***	8/30/2011	***267***	9/7/11	***270***	10/3/11	***271***	11/8/2011	***283***	12/14/11	***247***
	Thallium (ug/l)	0.5		NA		< 0.50		NA		< 0.50		NA		NA		NA		***0.52***		NA		***0.57***		< 0.50		***0.63***
	Gross Alpha minus Rn & U (pCi/L)	3.75		NA		2.6		NA		3.7		NA		NA		NA		***4.5***		NA		***4.4***		***4.7***		***4.2***
	Field pH (S.U.)	6.5 - 8.5		NA		7.17		NA		7.31		NA		NA		***6.49***		***6.40***		***6.47***		6.59		6.51		6.90
	Selenium (ug/L)	12.5		NA		ND		NA		ND		NA		NA		NA		9.3		NA		10.5		NA		NA
	Uranium (ug/L)	7.5		NA		***12.7***		NA		***21.7***		NA		NA		***24.2***		***18.3***		***22.3***		***20.1***		***24***		***23.6***
Required Semi-Annual Sampling Wells																										
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	NS	NA	NS	NA	4/11/2011	218	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	10/11/2011	206	NS	NA	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		NA		NA	4/19/2011	10.7		NA		NA		NA		NA		NA		7.82		NA		NA
	Field pH (S.U.)	6.77 - 8.5		NA		NA		NA	4/11/2011	7.06 (7.67)		NA		NA		NA		NA		NA		7.08 (7.51)		NA		NA
	Sulfate (mg/L)	838		NA		NA		NA	4/11/2011	704		NA		NA		NA		NA		NA		713		NA		NA
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	2/15/2011	***40.5***	NS	NA	4/13/2011	***45.4***	NS	NA	NS	NA	NS	NA	8/10/2011	***46***	NS	NA	10/10/2011	***46.7***	NS	NA	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.09***		NA		***6.46***		NA		NA		NA		***6.32***		NA		6.53 (6.83)		NA		NA
	Sulfate (mg/L)	3663		NA		NA		NA		3060		NA		NA		NA		NA		NA		3470		NA		NA
	Nitrate + Nitrite (as N) (mg/L)	0.73		NA		NA		NA		0.3		NA		NA		NA		NA		NA		0.3		NA		NA
	Fluoride (Mg/L)	0.68		NA		***0.69***		NA		0.68		NA		NA		NA		***0.96***		NA		***0.91***		NA		NA
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/16/2011	***6.05***	NS	NA	4/13/2011	6.58	NS	NA	NS	NA	NS	NA	8/11/2011	***6.19***	NS	NA	10/11/2011	6.5 (6.92)	NS	NA	NS	NA
	Sulfate (mg/L)	3640		NA		***3730***		NA		3350		NA		NA		NA		3560		NA		***3750***		NA		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		NA		NA		1.2		NA		NA		NA		NA		NA		1.1		NA		NA
	TDS (mg/L)	5805		NA		5770		NA		5720		NA		NA		NA		***5810***		NA		5630		NA		NA
	Selenium (ug/L)	89		NA		***99***		NA		85.8		NA		NA		NA		88.5		NA		***95***		NA		NA
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	2/14/2011	***29.5***	NS	NA	4/12/2011	7.16	NS	NA	NS	NA	NS	NA	8/9/2011	0.5	NS	NA	10/10/2011	4.52	NS	NA	NS	NA
MW-12 (Class III)	Selenium (ug/L)	25	NS	NA	2/15/2011	***39.0***	NS	NA	4/5/2011	21.7	NS	NA	NS	NA	NS	NA	8/9/2011	***25.4***	NS	NA	10/6/2011	***35.4***	NS	NA	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.43***		NA		6.67		NA		NA		NA		***6.13***		NA		6.7 (6.97)		NA		NA

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

			Q1 2011 Results						Q2 2011 Results						Q3 2011 Results						Q4 2011 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in Current GWDP	January 2011 Monthly Sample Date	January 2011 Monthly Sample Result	Q1 2011 Sample Date	Q1 2011 Result	March 2011 Monthly Sample Date	March 2011 Monthly Result	Q2 2011 Sample Date	Q2 2011 Result	May 2011 Monthly Sample Date	May 2011 Monthly Result	June 2011 Monthly Sample Date	June 2011 Monthly Result	July 2011 Monthly Sample Date	July 2011 Monthly Result	Q3 2011 Sample Date	Q3 2011 Result	September 2011 Monthly Sample Date	September 2011 Monthly Result	Q4 2011 Sample Date	Q4 2011 Result	November 2011 Monthly Sample Date	November 2011 Monthly Result	December 2011 Monthly Sample Date	December 2011 Monthly Result
Required Semi-Annual Sampling Wells, continued																										
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	NS	NA	NS	NA	4/12/2011	116	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	10/10/2011	112	NS	NA	NS	NA
	Field pH (S.U.)	6.62 - 8.5		NA		NA		NA		6.88		NA		NA		NA		NA		NA		6.70		NA		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/15/2011	**3.49**	NS	NA	4/6/2011	**3.74**	NS	NA	NS	NA	NS	NA	8/10/2011 9/21/11	**4.0 3.39**	NS	NA	10/11/2011	**3.83**	NS	NA	NS	NA
	Sulfate (mg/L)	1938.9		NA		1770		NA		1780		NA		NA		NA		1910		NA		**2020**		NA		NA
	Field pH (S.U.)	6.25-8.5		NA		6.27		NA		6.71		NA		NA		NA		**5.95 (6.30)**		NA		6.55 (6.63)		NA		NA
	TDS (mg/L)	3198.77		NA		**3250**		NA		**3250**		NA		NA		NA		3190		NA		**3220**		NA		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	2/21/2011	6.78	NS	NA	4/5/2011	7.03	NS	NA	NS	NA	NS	NA	7/20/3011	**6.65**	NS	NA	10/12/2011	6.88 (7.02)	NS	NA	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		NA		NA		0.5		NA		NA		NA		NA		NA		0.6		NA		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		NS		NA		2.6		NA		NA		NA		NS		NA		**4.0**		NA		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/9/2011	**6.13**	NS	NA	4/5/2011	7.14	NS	NA	NS	NA	NS	NA	8/4/2011	**6.38**	NS	NA	10/6/2011	6.56 (6.77)	NS	NA	NS	NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	2/10/2011	**2.78**	NS	NA	4/5/2011	**2.61**	NS	NA	NS	NA	NS	NA	8/4/2011	1.46	NS	NA	10/11/2011	1.78	NS	NA	NS	NA
	Fluoride (mg/L)	0.36		NA		NA		NA		0.19		NA		NA		NA		NA		NA		0.36		NA		NA
	Sulfate (mg/L)	2903		NA		NA		NA		2560		NA		NA		NA		NA		NA		2500		NA		NA
	Thallium (ug/L)	1		NA		**1.42**		NA		**1.07**		NA		NA		NA		<0.50		NA		0.62		NA		NA
	Field pH (S.U.)	6.5 - 8.5		NA		**5.73**		NA		**6.12**		NA		NA		NA		**6.45**		NA		**6.44**		NA		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/9/2011	**6**	NS	NA	4/5/2011	**6.4**	NS	NA	NS	NA	NS	NA	8/8/2011	**6**	NS	NA	10/5/2011	**6.3**	NS	NA	NS	NA
	Chloride (mg/L)	38		NA		**46**		NA		**43**		NA		NA		NA		**43**		NA		**44**		NA		NA
	Sulfate (mg/L)	462		NA		455		NA		442		NA		NA		NA		424		NA		456		NA		NA
	TDS (mg/L)	1075		NA		**1090**		NA		**1190**		NA		NA		NA		**1090**		NA		**1110**		NA		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		0.7		NA		1.1		NA		NA		NA		0.8		NA		1.5		NA		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	2/14/2011	**114**	NS	NA	4/11/2011	**109**	NS	NA	NS	NA	NS	NA	8/8/2011	105	NS	NA	10/5/2011	**143**	NS	NA	NS	NA
	Cadmium (ug/L)	5.2		NA		NA		NA		4.13		NA		NA		NA		NA		NA		3.99		NA		NA
	Uranium (ug/L)	4.9		NA		NA		NA		3.29		NA		NA		NA		NA		NA		3.19		NA		NA
	Vanadium (ug/L)	30		NA		NA		NA		<15.0		NA		NA		NA		NA		NA		<15.0		NA		NA
	Field pH (S.U.)	6.1 - 8.5		NA		**5.69**		NA		**6.01**		NA		NA		NA		**5.78**		NA		**6.07** (6.11)		NA		NA
MW-29 (Class III)	TDS (mg/L)	4400	NS	NA	NS	NA	NS	NA	4/18/2011	4080	NS	NA	NS	NA	NS	NA	8/9/2011	NA	NS	NA	10/5/2011	4280	NS	NA	NS	NA
	Field pH (S.U.)	6.46 - 8.5		NA	NS	NA		NA		**6.45**		NA		NA		NA		**6.20**		NA		6.52		NA		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/9/2011	1.5	NS	NA	4/1/2011	**4.6**	NS	NA	NS	NA	NS	NA	8/2/2011 8/30/11	1.9	NS	NA	10/3/2011	**3.7**	NS	NA	NS	NA
	Chloride (mg/L)	35.39		NA		NA		NA		33		NA		NA		NA		NA		NA		34		NA		NA
	Field pH (S.U.)	6.4 - 8.5		NA		**5.99**		NA		**6.14**		NA		NA		NA		**6.10 (6.20)**		NA		**6.35**		NA		NA

Notes:

GWCL values are taken from August 24, 2012 version of GWDP.

NS = Not Required and Not Sampled

NR =

NA = Not

Exceedances are shown in yellow

Values in () parentheses are the field pH measurements for the resampled analyses.

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

			Q1 2012 Results						Q2 2012 Results						Q3 2012 Results						Q4 2012 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2012 Monthly Sample Date	January 2012 Monthly Result	Q1 2012 Sample Date	Q1 2012 Result	March 2012 Monthly Sample Date	March 2012 Monthly Result	April 2012 Monthly Sample Date	April 2012 Monthly Result	Q2 2012 Sample Date	Q2 2012 Result	June 2012 Monthly Sample Date	June 2012 Monthly Result	Q3 2012 Sample Date	Q3 2012 Result	August 2012 Monthly Sample Date	August 2012 Monthly Result	September 2012 Monthly Sample Date	September 2012 Monthly Result	October 2012 Monthly Sample Date	October 2012 Monthly Result	Q4 2012 Sample Date	Q4 2012 Result	December 2012 Monthly Sample Date	December 2012 Monthly Result
Required Quarterly Sampling Wells																										
MW-11 (Class II)	Manganese (ug/L)	131.29	1/26/2012	102	2/13/2012	***154***	3/13/2012	121	4/10/2012	***132***	5/8/2012	127	6/19/2012	122	7/11/2012	***135***	8/7/2012	***166***	9/19/2012	130	10/23/2012	***161***	11/12/2012	***138***	12/24/2012	***137***
MW-14 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/24/2012	***6.36***	2/21/2012	6.57	3/14/2012	6.51	4/12/2012	6.97	5/9/2012	6.73	6/19/2012	6.90	7/11/2012	6.89	8/7/2012	6.58	9/18/2012	7.08	10/23/2012	6.83	11/27/2012	6.52	12/18/2012	6.60
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/25/2012	6.63	2/14/2012	6.83	3/14/2012	6.55	4/9/2012	6.58	5/2/2012	6.73	6/18/2012	6.99	7/10/2012	6.88	8/6/2012	6.55	9/18/2012	6.54	10/22/2012	6.54	11/12/2012	***6.47***	12/24/2012	6.62
	Cadmium (ug/L)	1.5		NA		1.31		NA		NA		1.33		NA		1.24		NA		NA		NA		***1.56***		NA
	Uranium (ug/L)	6.5		***6.6***		6.5		***6.93***		***6.52***		5.90		***7.6***		6.45		***6.72***		6.01		6.37		***6.61***		4.83
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/25/2012	***1.9***	2/15/2012	***1.2***	3/14/2012	***3***	4/11/2012	***3.4***	5/7/2012 6/26/2012	***2.9***	6/19/2012	***2.3***	7/11/2012	***1.9***	8/8/2012	***1.6***	9/19/2012	***1.8***	10/24/2012	***3.5***	11/15/2012	0.55	12/24/2012	***1.46***
	Uranium (ug/L)	41.8		***64.6***	2/21/2012	***59.4***		31.2		***42.2***		18.2		***66.0***		28.4		***67.4***		***64.9***		26.9		***56.8***		***51.3***
	Chloroform (ug/L)	70		***1900***	2/15/2012	***3300***		***2900***		***2900***		***1700***		***2400***	8/16/2012	***970***		***2200***		***2300***		***4720***		***4020***		***1250***
	Chloride (mg/L)	58.31		***68***		40		***74***		***82***		***74***		***85***	7/11/2012	***78***		***78***		***67***		2.62		52.9		***65.9***
	Carbon Tetrachloride (ug/L)	5		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	8/16/2012	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0
	Field pH (S.U.)	6.74 - 8.5		***6.59***	2/15/2012 2/21/2012 3/8/2012	***6.72*** (6.91) ***(6.71)***		***6.39***		6.88		7.00 (7.01)		7.00	7/11/2012 8/16/2012	7.10 (6.80)		***6.60***		7.40		***6.63***		***6.60***		6.78
	Dichloromethane (Methylene Chloride) (ug/L)	5		***13***	2/15/2012	***24***		***27***		***20***		***10***		***16***	8/16/2012	4.9		***17***		***9.8***		***15.0***		***34.6***		***5.5***
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/24/2012	***17***	2/14/2012	***17***	3/14/2012	***18***	4/10/2012	***17***	5/2/2012	***16***	6/18/2012	***15***	7/10/2012	***17***	8/7/2012	***18***	9/19/2012	***16***	10/23/2012	***16.2***	11/13/2012	***18.5***	12/26/2012	***17.2***
	Chloride (mg/L)	128		124		126		128		128		124		***131***		128		***139***		***130***		***135***		114		122
	Uranium (ug/L)	8.32	NS	NA		7.42		***8.38***		7.84		6.81		7.8		7.64		8.04		7.67		7.86		7.03		5.80
	Field pH (S.U.)	6.50	1/24/2012	6.52		7.12		6.86		7.05		6.95		7.10		7.25		6.95		7.85		6.80		6.67		6.95
	Ammonia (mg/L)	0.14	NS	NA		<0.05		NA		NA		<0.05		NA		<0.05		NA		NA		NA		<0.05		NA
	Selenium (ug/L)	34	1/24/2012	33.3		***35***		***39.5***		***39.1***		32.3		***37***		***38.5***		***38.4***		***41.9***		***45.2***		***36***		31.6
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/24/2012	***21***	2/13/2012	***21***	3/13/2012	***22***	4/9/2012	***21***	5/2/2012	***20***	6/18/2012 6/29/2012	***21.6***	7/9/2012	***21***	8/6/2012	***21***	9/18/2012	***21***	10/22/2012	***18***	11/6/2012	***23.6***	12/18/2012	***22.2***
	TDS (mg/L)	1320		***1360***		1240		***1400***		***1380***		***1410***		***1460***		***1400***		***1400***		***1460***		1320		1230		1270
	Chloride (mg/L)	143		***155***		***150***		***152***		***160***		***151***		138		***161***		***175***		***172***		***157***		***189***		***170***
	Selenium (ug/L)	71		***NS***		67.8		NS		NS		70.2		NA		***74***		NA		NA		NA		***76.9***		NA
	Field pH (S.U.)	6.5 - 8.5		6.78		7.37		7.13		7.14		7.19		7.28 (7.63)		7.53		6.96		7.1		7.05		7.04		7.10
	Sulfate (mg/L)	532		***539***		***538***		517		***547***		532		497		529		***571***		***561***		***545***		***557***		***664***
MW-35 (Class II)	Manganese (ug/L)	200	1/24/2012	***264***	2/14/2012	***253***	3/13/2012	***269***	4/10/2012	***277***	5/2/2012	***258***	6/19/2012	***304***	7/10/2012	***272***	8/8/2012	***273***	9/19/2012	***283***	10/23/2012	***253***	11/13/2012	***241***	12/18/2012	***240***
	Thallium (ug/l)	0.5		< 0.50		***0.65***		***0.71***		***0.59***		***0.66***		< 0.50		***0.57***		***0.61***		***0.54***		***0.517***		***0.554***		0.5
	Gross Alpha minus Rn & U (pCi/L)	3.75		***6.5***		***4.1***		***6.2***		***4.1***		***4.5***		***4.9***		3.5		***4.2***		***5.4***		***4.31***		***4.23***		***6.5***
	Field pH (S.U.)	6.5 - 8.5		***6.35***		6.67		***6.48***		6.84		6.61		6.90		6.87		6.74		6.81		***6.43***		6.50		6.60
	Selenium (ug/L)	12.5		NA		***19.7***		NA		NA		11.4		7.0		***15.9***		***18.8***		8.2		***19.0***		***15.4***		12.1
	Uranium (ug/L)	7.5		***16.1***		***24.7***		***24.9***		***22.4***		***22.2***		***22.5***		***24.5***		***26.2***		***22.9***		***22.4***		***21.8***		***21***
Required Semi-Annual Sampling Wells																										
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	NS	NA	NS	NA	NS	NA	5/1/2012	176	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/27/2012	***315***	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		NA		NA		NA		10.3		NA		NA		NA		NA		NA		***21.8***		NA
	Field pH (S.U.)	6.77 - 8.5		NA		NA				NA		7.19		NA		NA		NA		NA		NA		6.98		NA
	Sulfate (mg/L)	838		NA		NA		NA		NA		659		NA		NA		NA		NA		NA		***846***		NA
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	2/29/2012	***43.1***	NS	NA	NS	NA	5/14/2012	***52.8***	NS	NA	7/18/2012	***51.1***	NS	NA	NS	NA	NS	NA	11/28/2012	***58.9***	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		6.63		NA		NA		6.67		NA		6.99		NA		NA		NA		6.55		NA
	Sulfate (mg/L)	3663		NA		NA		NA		NA		3140		NA		NA		NA		NA		NA		2340		NA
	Nitrate + Nitrite (as N) (mg/L)	0.73		NA		NA		NA		NA		0.4		NA		NA		NA		NA		NA		0.419		NA
	Fluoride (Mg/L)	0.68		NA		***0.86***		NA		NA		***1.04***		NA		***0.96***		NA		NA		NA		***1.26***		NA
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/1/2012	***6.46***	NS	NA	NS	NA	5/15/2012	6.68	NS	NA	7/19/2012	7.01	NS	NA	NS	NA	NS	NA	11/29/2012	***6.35***	NS	NA
	Sulfate (mg/L)	3640		NA		3020		NA		NA		3220		NA		***3700***		NA		NA		NA		2780		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		NA		NA		NA		1.1		NA		NA		NA		NA		NA		***1.31***		NA
	TDS (mg/L)	5805		NA		5690		NA		NA		5730		NA		5720		NA		NA		NA		5610		NA
	Selenium (ug/L)	89		NA		65.8		NA		NA		85.1		NA		***99.3***		NA		NA		NA		***111***		NA
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	2/28/2012	***18.6***	NS	NA	NS	NA	5/9/2012	1.23	NS	NA	7/16/2012	0.75	NS	NA	NS	NA	NS	NA	11/27/2012	0.402	NS	NA
MW-12 (Class III)	Selenium (ug/L)	25	NS	NA	2/29/2012	NA	NS	NA	NS	NA	5/10/2012	19.6	NS	NA	7/17/2012	20.7	NS	NA	NS	NA	NS	NA	11/27/2012	23.0	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		6.81		NA		NA		6.91		NA		6.98		NA		NA		NA		6.54		NA

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

Q1 2012 Results									Q2 2012 Results						Q3 2012 Results						Q4 2012 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in Current GWDP	January 2012 Monthly Sample Date	January 2012 Monthly Result	Q1 2012 Sample Date	Q1 2012 Result	March 2012 Monthly Sample Date	March 2012 Monthly Result	April 2012 Monthly Sample Date	April 2012 Monthly Result	Q2 2012 Sample Date	Q2 2012 Result	June 2012 Monthly Sample Date	June 2012 Monthly Result	Q3 2012 Sample Date	Q3 2012 Result	August 2012 Monthly Sample Date	August 2012 Monthly Result	September 2012 Monthly Sample Date	September 2012 Monthly Result	October 2012 Monthly Sample Date	October 2012 Monthly Result	Q4 2012 Sample Date	Q4 2012 Result	December 2012 Monthly Sample Date	December 2012 Monthly Result
Required Semi-Annual Sampling Wells, continued																										
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	2/22/2012	NA	NS	NA	NS	NA	5/9/2012	***152***	NS	NA	7/17/2012	120	NS	NA	NS	NA	NS	NA	11/14/2012	117	NS	NA
	Field pH (S.U.)	6.62 - 8.5		NA		6.84		NA		NA		6.63		NA		7.05		NA		NA		NA		6.86		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/27/2012	***3.63***	NS	NA	NS	NA	4/30/2012	***3.51***	NS	NA	7/18/2012	***3.73***	NS	NA	NS	NA	NS	NA	11/26/2012	***3.2***	NS	NA
	Sulfate (mg/L)	1938.9		NA		1920		NA		NA		1790		NA		1900		NA		NA		NA		1210		NA
	Field pH (S.U.)	6.25-8.5		NA		6.6		NA		NA		6.59		NA		6.64		NA		NA		NA		6.51		NA
	TDS (mg/L)	3198.77		NA		***3230***		NA		NA		***3280***		NA		***3220***		NA		NA		NA		3160		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	2/28/2012	6.83	NS	NA	NS	NA	5/16/2012	6.86	NS	NA	7/19/2012	7.21	NS	NA	NS	NA	NS	NA	12/13/2012	***6.71***	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		NA		NA		NA		0.9		NA		NA		NA		NA		NA		***4.86***		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		***3.9***		NA		NA		***3.7***		NA		***4***		NA		NA		NA		***3.96***		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/20/2012	6.61	NS	NA	NS	NA	5/16/2012	6.74	NS	NA	7/17/2012	7.10	NS	NA	NS	NA	NS	NA	12/5/2012	6.61	NS	NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	2/23/2012	2.25	NS	NA	NS	NA	5/10/2012	2.01	NS	NA	7/18/2012	***4.7***	NS	NA	NS	NA	NS	NA	11/29/2012	1.35	NS	NA
	Fluoride (mg/L)	0.36		NA		NA		NA		NA		0.14		NA		NA		NA		NA		NA		***0.558***		NA
	Sulfate (mg/L)	2903		NA		NA		NA		NA		2490		NA		NA		NA		NA		NA		2310		NA
	Thallium (ug/L)	1		NA		0.96		NA		NA		0.74		NA		***1.36***		NA		NA		NA		0.666		NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.03***		NA		NA		***6.21***		NA		***6.45***		NA		NA		NA		***6.01***		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/28/2012	***6.4***	NS	NA	NS	NA	5/1/2012	***6.2***	NS	NA	7/16/2012	***6.7***	NS	NA	NS	NA	NS	NA	11/13/2012	***6.9***	NS	NA
	Chloride (mg/L)	38		NA		***45***		NA		NA		***46***		NA		***47***		NA		NA		NA		***44.2***		NA
	Sulfate (mg/L)	462		NA		451		NA		NA		446		NA		453		NA		NA		NA		451		NA
	TDS (mg/L)	1075		NA		***1140***		NA		NA		***1170***		NA		***1150***		NA		NA		NA		1070		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		***2.3***		NA		NA		0.8		NA		1.2		NA		NA		NA		1.33		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	2/28/2012	***109***	NS	NA	NS	NA	5/8/2012	***114***	NS	NA	7/16/2012 8/1/2012	105	NS	NA	NS	NA	NS	NA	11/14/2012	***115***	NS	NA
	Cadmium (ug/L)	5.2		NA		NA		NA		NA		3.85		NA	NS	NA		NA		NA		NA		4.37		NA
	Uranium (ug/L)	4.9		NA		NA		NA		NA		3.44		NA	NS	NA		NA		NA		NA		3.45		NA
	Vanadium (ug/L)	30		NA		NA		NA		NA		<15.0		NA	NS	NA		NA		NA		NA		<15.0		NA
	Field pH (S.U.)	6.1 - 8.5		NA		6.22		NA		NA		6.15		NA	7/16/2012 8/1/2012	***6.38 (5.81)***		NA		NA		NA		***5.98***		NA
MW-29 (Class III)	TDS (mg/L)	4400	NS	NA	2/22/2012	NA	NS	NA	NS	NA	5/8/2012	***4600***	NS	NA	8/1/2012	***4420***	NS	NA	NS	NA	NS	NA	11/14/2012	***4430***	NS	NA
	Field pH (S.U.)	6.46 - 8.5		NA		7.12		NA		NA		6.47		NA	7/16/2012 8/1/2012	***6.68 (6.45)***		NA		NA		NA		6.48		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/21/2012	1.8	NS	NA	NS	NA	4/30/2012	2.4	NS	NA	7/9/2012	1.4	NS	NA	NS	NA	NS	NA	11/6/2012	2.97	NS	NA
	Chloride (mg/L)	35.39		NA		NA		NA		NA		33		NA		1.4		NA		NA		NA		32.1		NA
	Field pH (S.U.)	6.4 - 8.5		NA		6.57		NA		NA		6.40		NA		6.72		NA		NA		NA		***6.23***		NA

Notes:

GWCL values are taken from August 24, 2012 version of GWDP.

NS = Not Required and Not Sampled

NR = Required and

NA = Not

Exceedances are shown in yellow

Values in () parentheses are the field pH measurements for the resampled analyses.

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

			Q1 2013 Results						Q2 2013 Results						Q3 2013 Results						Q4 2013 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2013 Monthly Sample Date	January 2013 Monthly Result	Q1 2013 Sample Date	Q1 2013 Result	March 2013 Monthly Sample Date	March 2013 Monthly Result	April 2013 Monthly Sample Date	April 2013 Monthly Result	Q2 2013 Sample Date	Q2 2013 Result	June 2013 Monthly Sample Date	June 2013 Monthly Result	Q3 2013 Sample Date	Q3 2013 Result	August 2013 Monthly Sample Date	August 2013 Monthly Result	September 2013 Monthly Sample Date	September 2013 Monthly Result	October 2013 Monthly Sample Date	October 2013 Monthly Result	Q4 2013 Sample Date	Q4 2013 Result	December 2013 Monthly Sample Date	December 2013 Monthly Result
Required Quarterly Sampling Wells																										
MW-11 (Class II)	Manganese (ug/L)	131.29	1/23/2013	115	2/20/2013	**139**	3/20/2013	**164**	4/16/2013	**181**	5/14/2013	**144**	6/25/2013	**135**	7/10/2013	**138**	8/20/2013	**158**	9/18/2013	**134**	10/22/2013	129	11/19/2013	**152**	12/18/2013	**196**
MW-14 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/23/2013	**6.48**	2/26/2013	6.52	3/20/2013	**6.48**	4/16/2013	7.58	5/14/2013	7.39	6/25/2013	6.54	7/11/2013	**6.47**	8/20/2013	6.86	9/19/2013	**6.48**	10/22/2013	6.77	11/20/2013	6.51	12/18/2013	6.74
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/22/2013	6.65	2/20/2013	6.62	3/19/2013	**6.41**	4/17/2013	7.00	5/14/2013	7.19	6/24/2013	6.61	7/10/2013	**6.32**	8/19/2013	6.74	9/17/2013	6.54	10/22/2013	6.81	11/19/2013	6.62	12/17/2013	6.73
	Cadmium (ug/L)	1.5		NA		1.35		1.40		1.36		**1.52**		1.31		1.41		**1.57**		1.31		1.50		1.35		1.23
	Uranium (ug/L)	6.5		5.97		5.39		5.68		5.56		5.88		5.35		6.22		6.42		5.99		5.94		**7.13**		NA
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/24/2013	**1.66**	2/20/2013	**1.38**	3/20/2013	**1.61**	4/17/2013	**1.73**	5/23/2013	**2.01**	6/5/2013 6/25/2013	**3.04 2.11***	7/11/2013	**1.98**	8/20/2013	**1.77**	9/18/2013	**3.60**	10/23/2013	**4.10**	11/20/2013	**1.38**	12/18/2013	**2.56**
	Uranium (ug/L)	41.8		**65.7**		**57.8**		**69**		**58.8**		**64.3**		**71.3**		**70**		**72.3**		19.9		**58.8**		**75.8**		**70.4**
	Chloroform (ug/L)	70		**1270**		**1500**		**1340**		**1680**		**1210**		**4030***		**2410**		**2110**		**4170**		**3420**		**1220**		**1680**
	Chloride (mg/L)	58.31		**63.5**		**77**		**73.6**		**70.4**		**63.1**		**87.8 77.9***		**72.1**		**70.8**		**77.3**		**63.8**		**62.3**		**65.7**
	Carbon Tetrachloride (ug/L)	5		NA		3.15		NA		NA		<1.0		<1.0		<1.0		NA		NA		NA		<1.0		NA
	Field pH (S.U.)	6.74 - 8.5		**6.51**		**6.71**		**6.70**		6.96		7.31		6.85		**6.43**		7.41		**6.71**		6.82		6.83		6.93
	Dichloromethane (Methylene Chloride) (ug/L)	5		**6.49**		**5.53**		**8.31**		**10.2**		4.07		**52.4* [12.1]**		**14.2**		**14.6**		**42.4**		**29.8**		**7.64**		**7.48**
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/23/2013	**19.2**	2/26/2013	**21.4**	3/20/2013	**14.3**	4/17/2013	**16.8**	5/15/2013	**18.8**	6/25/2013	**16.1**	7/10/2013	**17.6**	8/20/2013	**16.4**	9/18/2013	**16.9**	10/22/2013	**19.7**	11/20/2013	**19.5**	12/18/2013	**20.7**
	Chloride (mg/L)	128		128		**129**		126		117		119		127		**130**		126		**131**		**128**		124		**134**
	Uranium (ug/L)	8.32		**8.36**		7.4		6.85		7.08		6.31		8.22		7.48		7.07		7.00		6.91		**8.57**		NA
	Field pH (S.U.)	6.50		6.88		6.93		6.91		7.42		7.54		6.93		6.87		7.06		6.78		6.96		6.84		7.10
	Ammonia (mg/L)	0.14		NA		<0.05		NA		NA		<0.05		NA		<0.05		NA		NA		NA		<0.05		NA
	Selenium (ug/L)	34		**37.2**		**42.3**		**39**		**37.3**		**39.4**		32.1		**36.5**		**36.3**		**35.2**		**39.5**		**36.6**		**35.1**
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/22/2013	**22.8**	2/19/2013	**19.3**	3/19/2013	**19.1**	4/16/2013	**18.8**	5/13/2013	**23.8**	6/24/2013	**20.0**	7/9/2013	**21.7**	8/19/2013	**16.0**	9/17/2013	**21.2**	10/23/2013	**21.2**	11/18/2013	**23.9**	12/17/2013	**24.2**
	TDS (mg/L)	1320		1270		**1390**		**1420**		1260		**1540**		**1380**		**1510**		**1440**		**1500**		**1460**		1320		**1500**
	Chloride (mg/L)	143		**176**		**174**		**168**		**171**		**169**		**179**		**182**		**183**		**193**		**188**		**174**		**203**
	Selenium (ug/L)	71		NS		**74.1**		**81.8**		**72.9**		**75.9**		**73.7**		**75.7**		**73.2**		**72.6**		**80.7**		**74.5**		**79.8**
	Field pH (S.U.)	6.5 - 8.5		6.94		7.32		7.28		**6.37**		7.92		7.10		6.98		7.36		7.06		7.35		6.99		7.23
	Sulfate (mg/L)	532		**611**		**644**		**611**		**668**		**630**		**659**		**659**		**656**		**666**		**637**		**609**		**656**
MW-35 (Class II)	Manganese (ug/L)	200	1/23/2013	**247**	2/26/2013	**272**	3/19/13	**246**	4/17/2013	**243**	5/13/2013	**252**	6/24/2013	**243**	7/9/2013	**250**	8/19/2013	**262**	9/17/2013	**257**	10/23/2013	**240**	11/19/2013	**251**	12/17/2013	**260**
	Thallium (ug/l)	0.5		<0.5		<0.5		**0.505**		<0.5		**0.715**		**0.946**		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5
	Gross Alpha minus Rn & U (pCi/L)	3.75		**6.62**		**5.09**		**9.51**		**4.75**		**4.92**		3.24		**5.70**		**3.92**		**5.10**		3.73		**5.39**		**4.74**
	Field pH (S.U.)	6.5 - 8.5		6.54		6.68		**6.43**		6.96		7.33		6.70		6.51		7.02		6.50		6.83		6.52		6.73
	Selenium (ug/L)	12.5		11.0		10.8		**22.6**		11.8		**16.1**		**13.6**		8.01		<5		<5		**19.8**		<5		<5
	Uranium (ug/L)	7.5		**23.6**		**21.3**		**22.1**		**20.0**		**22.0**		**19.3**		**23.0**		**21.4**		**20.2**		**21.8**		**24.1**		**20**
Required Semi-Annual Sampling Wells																										
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	3/12/2013	173	NS	NA	NS	NA	5/21/2013	127	NS	NA	7/23/2013	83.9	NS	NA	NS	NA	NS	NA	12/4/2013	113	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		**12.6**		NA		NA		3.26		NA		1.86		NA		NA		NA		5.51		NA
	Field pH (S.U.)	6.77 - 8.5		NA		6.77		NA		NA		7.57		NA		7.04		NA		NA		NA		7.04		NA
	Sulfate (mg/L)	838		NA		761		NA		NA		**839**		NA		**911**		NA		NA		NA		**930**		NA
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	3/12/2013	**51.8**	NS	NA	NS	NA	5/22/2013	**46.3**	NS	NA	7/18/2013	**52.0**	NS	NA	NS	NA	NS	NA	12/11/2013	32.8	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		**6.20**		NA		NA		7.14		NA		**6.46**		NA		NA		NA		6.78		NA
	Sulfate (mg/L)	3663		NA		NA		NA		NA		2180		NA		NA		NA		NA		NA		**3760**		NA
	Nitrate + Nitrite (as N) (mg/L)	0.73		NA		NA		NA		NA		0.456		NA		NA		NA		NA		NA		**1.21**		NA
	Fluoride (Mg/L)	0.68		NA		**0.902**		NA		NA		**0.994**		NA		**1.18**		NA		NA		NA		**1.28**		NA
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/13/2013	6.84	NS	NA	NS	NA	5/23/2013	7.10	NS	NA	7/19/2013	6.50	NS	NA	NS	NA	NS	NA	12/11/2013	6.98	NS	NA
	Sulfate (mg/L)	3640		NA		3480		NA		NA		3120		NA		**3670**		NA		NA		NA		3360		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		1.22		NA		NA		1.11		NA		1.09		NA		NA		NA		**1.52**		NA
	TDS (mg/L)	5805		NA		5750		NA		NA		**6020**		NA		**5860**		NA		NA		NA		**5940**		NA
	Selenium (ug/L)	89		NA		88.7		NA		NA		75.6		NA		79.7		NA		NA		NA		77.9		NA
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	3/11/2013	**36**	NS	NA	NS	NA	5/14/2013	1.33	NS	NA	7/18/2013	0.574	NS	NA	NS	NA	NS	NA	12/4/2013	**20.1**	NS	NA
MW-12 (Class III)	Selenium (ug/L)	25	NS	NA	3/6/2013	19.6	NS	NA	NS	NA	5/15/2013	19	NS	NA	7/17/2013	20.5	NS	NA	NS	NA	NS	NA	12/9/2013	21.7	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		6.56		NA		NA		7.19		NA		6.60		NA		NA		NA		6.69		NA

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

Q1 2013 Results									Q2 2013 Results						Q3 2013 Results						Q4 2013 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in Current GWDP	January 2013 Monthly Sample Date	January 2013 Monthly Result	Q1 2013 Sample Date	Q1 2013 Result	March 2013 Monthly Sample Date	March 2013 Monthly Result	April 2013 Monthly Sample Date	April 2013 Monthly Result	Q2 2013 Sample Date	Q2 2013 Result	June 2013 Monthly Sample Date	June 2013 Monthly Result	Q3 2013 Sample Date	Q3 2013 Result	August 2013 Monthly Sample Date	August 2013 Monthly Result	September 2013 Monthly Sample Date	September 2013 Monthly Result	October 2013 Monthly Sample Date	October 2013 Monthly Result	Q4 2013 Sample Date	Q4 2013 Result	December 2013 Monthly Sample Date	December 2013 Monthly Result
Required Semi-Annual Sampling Wells, continued																										
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	3/5/2013	***137***	NS	NA	NS	NA	5/15/2013	120	NS	NA	7/18/2013	100	NS	NA	NS	NA	NS	NA	11/20/2013	106	NS	NA
	Field pH (S.U.)	6.62 - 8.5		NA		6.75		NA		NA		7.27		NA		6.68		NA		NA		NA		***6.61***		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/25/2013	***3.26***	NS	NA	NS	NA	5/20/2013	***2.81***	NS	NA	7/15/2013	***3.32***	NS	NA	NS	NA	NS	NA	12/3/2013	***3.06***	NS	NA
	Sulfate (mg/L)	1938.9		NA		1270		NA		NA		1860		NA		1860		NA		NA		NA		***2000***		NA
	Field pH (S.U.)	6.25-8.5		NA		6.35		NA		NA		6.97		NA		6.45		NA		NA		NA		6.38		NA
	TDS (mg/L)	3198.77		NA		***3350***		NA		NA		3160		NA		3170		NA		NA		NA		***3240***		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	3/13/2013	***6.50***	NS	NA	NS	NA	5/20/2013	7.16	NS	NA	7/15/2013	6.91	NS	NA	NS	NA	NS	NA	12/3/2013	***6.58***	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		1.11		NA		NA		1.19		NA		<1.00		NA		NA		NA		<1.00		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		***3.61***		NA		NA		***4.21***		NA		***3.66***		NA		NA		NA		***3.70***		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/11/2013	***6.37***	NS	NA	NS	NA	5/23/2013	7.23	NS	NA	7/18/2013	6.61	NS	NA	NS	NA	NS	NA	12/18/2013	7.21	NS	NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	3/13/2013	2.0	NS	NA	NS	NA	5/22/2013	1.32	NS	NA	7/19/2013	***6.72***	NS	NA	NS	NA	NS	NA	12/12/2013	1.15	NS	NA
	Fluoride (mg/L)	0.36		NA		0.355		NA		NA		0.211		NA		0.288		NA		NA		NA		0.310		NA
	Sulfate (mg/L)	2903		NA		NA		NA		NA		2070		NA		NA		NA		NA		NA		2490		NA
	Thallium (ug/L)	1		NA		0.88		NA		NA		0.618		NA		***1.64***		NA		NA		NA		0.707		NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.29***		NA		NA		6.77		NA		***5.80***		NA		NA		NA		***6.08***		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/25/2013	***7.94***	NS	NA	NS	NA	5/21/2013	***7.09***	NS	NA	7/17/2013	***6.97***	NS	NA	NS	NA	NS	NA	12/4/2013	***7.89***	NS	NA
	Chloride (mg/L)	38		NA		***50.3***		NA		NA		***44.3***		NA		***44.2***		NA		NA		NA		***45.0***		NA
	Sulfate (mg/L)	462		NA		431		NA		NA		***497***		NA		NA		NA		NA		NA		442		NA
	TDS (mg/L)	1075		NA		***1140***		NA		NA		***1110***		NA		***1110***		NA		NA		NA		***1100***		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		<1.0		NA		NA		1.57		NA		<1.00		NA		NA		NA		1.28		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	3/5/2013	***110***	NS	NA	NS	NA	5/15/2013	102	NS	NA	7/17/2013	***107***	NS	NA	NS	NA	NS	NA	12/4/2013	***109***	NS	NA
	Cadmium (ug/L)	5.2		NA		NA		NA		NA		4.61		NA		NA		NA		NA		NA		4.74		NA
	Uranium (ug/L)	4.9		NA		NA		NA		NA		3.58		NA		NA		NA		NA		NA		3.34		NA
	Vanadium (ug/L)	30		NA		NA		NA		NA		<15.0		NA		NA		NA		NA		NA		<15.0		NA
	Field pH (S.U.)	6.1 - 8.5		NA		***6.00***		NA		NA		6.63		NA		***5.97***		NA		NA		NA		6.10		NA
MW-29 (Class III)	TDS (mg/L)	4400	NS	NA	3/6/2013	***4500***	NS	NA	NS	NA	5/23/2013	4340	NS	NA	7/17/2013	4270	NS	NA	NS	NA	NS	NA	11/20/2013	4370	NS	NA
	Field pH (S.U.)	6.46 - 8.5		NA		***6.36***		NA		NA		6.88		NA		***6.37***		NA		NA		NA		***6.35***		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/19/2013	***5.02***	NS	NA	NS	NA	5/13/2013	***3.72***	NS	NA	7/9/2013	***6.46***	NS	NA	NS	NA	NS	NA	11/18/2013	1.86	NS	NA
	Chloride (mg/L)	35.39		NA		NA		NA		NA		32.3		NA		NA		NA		NA		NA		33.7		NA
	Field pH (S.U.)	6.4 - 8.5		NA		6.52		NA		NA		7.10		NA		***6.39***		NA		NA		NA		***6.29***		NA

Notes:

GWCL values are taken from August 24, 2012 version of GWDP.

NS = Not Required and Not Sampled

NR = Required
NA = Not
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

			Q1 2014 Results						Q2 2014 Results						Q3 2014 Results						Q4 2014 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2014 Monthly Sample Date	January 2014 Monthly Result	February 2014 Monthly Sample Date	February 2014 Monthly Result	Q1 2014 Sample Date	Q1 2014 Result	April 2014 Monthly Sample Date	April 2014 Monthly Result	May 2014 Monthly Sample Date	May 2014 Monthly Result	Q2 2014 Sample Date	Q2 2014 Result	July 2014 Monthly Sample Date	July 2014 Monthly Result	August 2014 Monthly Sample Date	August 2014 Monthly Result	Q3 2014 Sample Date	Q3 2014 Result	October 2014 Monthly Sample Date	October 2014 Monthly Result	Q4 2014 Sample Date	Q4 2014 Result	December 2014 Monthly Sample Date	December 2014 Monthly Result
Required Quarterly Sampling Wells																										
MW-11 (Class II)	Manganese (ug/L)	131.29	1/8/2014	141	2/24/2014	163	3/11/2014	134	4/25/2014	136	5/14/2014	128	6/3/2014	166	7/29/2014	139	8/20/2014	139	9/8/2014	74.0	10/6/2014	157	11/17/2014	125	12/10/2014	186
MW-14 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/8/2014	6.60	2/24/2014	6.16	3/11/2014	6.33	4/23/2014	6.84	5/13/2014	6.60	6/3/2014	7.63	7/28/2014	6.44	8/20/2014	7.07	9/2/2014	6.41	10/7/2014	6.46	11/12/2014	6.25	12/10/2014	6.40
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/7/2014	6.37	2/13/2014	6.10	3/10/2014	6.27	4/28/2014	7.18	5/13/2014	6.80	6/2/2014	6.74	7/28/2014	6.36	8/18/2014	7.17	9/3/2014	6.50	10/6/2014	6.49	11/4/2014	6.31	12/9/2014	6.36
	Cadmium (ug/L)	1.5		1.39		1.29		1.29		1.51		1.34		1.24		1.30		1.30		1.30		1.41		1.57		1.27
	Uranium (ug/L)	6.5		NA		5.83		6.26		10.6		7.43		6.07		5.9		6.1		6.0		6.67		6.04		5.75
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/8/2014	2.42	2/24/2014	2.12	3/12/2014	1.30	4/30/2014	1.20	5/14/2014	1.64	6/5/2014	1.42	7/29/2014	2.0	8/20/2014	1.00	9/4/2014	1.10	10/7/2014	0.704	11/18/2014	1.09	12/10/14 12/15/14	<0.100
	Uranium (ug/L)	41.8		81.7		72.2		51.8		96.0		90.6		75.0		86.5		74.4		48.4		75.4		66.0		42.5
	Chloroform (ug/L)	70		1580		2810		2800		1310		1580		1450		2330		2200		1580		894		1520		2280
	Chloride (mg/L)	58.31		69.7		70.4		61.0		62.1		61.0		63.2		80.0		59.0		68.0		57.7		54.2		65.5
	Carbon Tetrachloride (ug/L)	5		NA		NA		6.86		NA		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0
	Field pH (S.U.)	6.74 - 8.5		6.80		6.78		6.50		7.19		7.13		6.78		6.60		7.28		6.67		6.85		6.09		6.25 (6.44)
	Dichloromethane (Methylene Chloride) (ug/L)	5		6.52		25.8		15.5		5.54		10.2		6.73		9.6		43.3		10.9		3.78		7.34		28.4
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/8/2014	20.3	2/25/2014	18.4	3/11/2014	21.3	4/23/2014	18.3	5/14/2014	17.9	6/3/2014	19.4	7/29/2014	15.6	8/20/2014	13.8	9/9/2014	16.8	10/7/2014	11.0	11/10/2014	16.2	12/10/2014	17.1
	Chloride (mg/L)	128		131		135		144		154		128		128		140		139		136		136		154		138
	Uranium (ug/L)	8.32		NA		6.83		7.84		6.84		9.82		7.35		7.40		7.60		7.70		7.76		7.65		7.67
	Field pH (S.U.)	6.50		6.74		6.80		6.56		7.06		6.88		6.89		6.76		7.51		6.82		6.92		6.22		6.77
	Ammonia (mg/L)	0.14		NA		NA		<0.05		NA		NA		<0.05		NA		NA		<0.05		NA		0.30		NA
	Selenium (ug/L)	34		35.6		35.8		38.0		32.8		37.0		35.4		42.9		48.5		53.6		38.9		36.8		37.5
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/7/2014	24.0	2/17/2014	20.6	3/10/2014	26.2	4/28/2014	19.1	5/13/2014	23.3	6/2/2014	23.1	7/28/2014	19.0	8/18/2014	15.2	9/3/2014	18.9	10/6/2014	15.9	11/14/2014	20.9	12/9/2014	17.0
	TDS (mg/L)	1320		1510		1460		1490		1440		1510		1520		1400		1410		1460		1420		1520		1450
	Chloride (mg/L)	143		194		197		230		230		200		173		200		210		210		205		204		215
	Selenium (ug/L)	71		74.4		75.8		77.2		85.4		74.5		69.4		77.9		82.8		81.5		78.9		73.0		71.1
	Field pH (S.U.)	6.5 - 8.5		7.13		6.45		6.53		7.45		6.83		8.23		6.88		7.60		6.94		6.97		6.69		6.73
	Sulfate (mg/L)	532		558		480		681		527		639		555		600		620		560		606		639		687
MW-35 (Class II)	Manganese (ug/L)	200	1/8/2014	252	2/11/2014	247	3/11/14	204	4/25/2014	194	5/14/2014	249	6/4/2014	202	7/29/2014	212	8/20/2014	191	9/3/2014	177	10/6/2014	228	11/12/2014	222	12/9/2014	232
	Thallium (ug/l)	0.5		0.535		<0.5		<0.5		0.582		0.521		<0.5		<0.5		<0.5		0.6		<0.5		<0.5		<0.5
	Gross Alpha minus Rn & U (pCi/L)	3.75		4.12		3.98		4.33		2.95		3.67		3.36		3.09		4.70		3.93		4.14		3.92		4.54
	Field pH (S.U.)	6.5 - 8.5		6.54		6.07		6.32		6.79		7.10		6.83		6.55		7.07		6.46		6.54		6.35		6.25
	Selenium (ug/L)	12.5		8.95		12.3		14.1		18.6		17.0		13.9		13.2		28.9		31.4		15.5		10.1		7.5
	Uranium (ug/L)	7.5		20.8		20.6		21.5		30.6		26.9		21.9		26.5		20.3		23.6		23.9		19.6		20.3
Required Semi-Annual Sampling Wells																										
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	NS	NA	2/20/2014	76.8	NS	NA	NS	NA	5/28/2014	82.3	NS	NA	NS	NA	9/10/2014	80.0	NS	NA	11/17/2014	59.2	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		NA		3.25		NA		NA		3.39		NA		NA		<1.0		NA		<1.0		NA
	Field pH (S.U.)	6.77 - 8.5		NA		NA		6.61		NA		NA		7.11		NA		NA		6.75		NA		6.87		NA
	Sulfate (mg/L)	838		NA		NA		836		NA		NA		909		NA		NA		810		NA		920		NA
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	NS	NA	2/26/2014	37.0	NS	NA	NS	NA	5/30/2014	69.5	NS	NA	NS	NA	9/16/2014	94.0	NS	NA	11/17/2014	62.4	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		NA		6.23		NA		NA		6.56		NA		NA		6.13		NA		6.37		NA
	Sulfate (mg/L)	3663		NA		NA		NA		NA		NA		3460		NA		NA		3120		NA		3800		NA
	Nitrate + Nitrite (as N) (mg/L)	0.73		NA		NA		NA		NA		NA		0.573		NA		NA		0.6		NA		0.330		NA
	Fluoride (Mg/L)	0.68		NA		NA		0.771		NA		NA		1.02		NA		NA		1.0		NA		1.08		NA
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	NS	NA	3/5/2014	6.58	NS	NA	NS	NA	5/30/2014	6.60	NS	NA	NS	NA	9/17/2014	6.40	NS	NA	11/12/2014	6.41	NS	NA
	Sulfate (mg/L)	3640		NA		NA		3100		NA		NA		3830		NA		NA		3350		NA		3770		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		NA		0.849		NA		NA		0.97		NA		NA		1.0		NA		1.11		NA
	TDS (mg/L)	5805		NA		NA		5600		NA		NA		5790		NA		NA		5460		NA		5370		NA
	Selenium (ug/L)	89		NA		NA		92.1		NA		NA		104		NA		NA		129		NA		88.5		NA
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	NS	NA	2/12/2014	22.0	NS	NA	NS	NA	6/4/2014	2.42	NS	NA	NS	NA	9/11/2014	0.90	NS	NA	11/12/2014	36.20	NS	NA
MW-12 (Class III)	Selenium (ug/L)	25	NS	NA	NS	NA	2/12/2014	23.7	NS	NA	NS	NA	6/4/2014	17.20	NS	NA	NS	NA	9/16/2014	NA	NS	NA	11/11/2014	33.30	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		NA		6.13		NA		NA		7.10		NA		NA		6.47		NA		6.25		NA

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

Q1 2014 Results									Q2 2014 Results						Q3 2014 Results						Q4 2014 Results					
Monitoring Well (Water Class)	**Constituent Exceeding GWCL**	**GWCL in Current GWDP**	**January 2014 Monthly Sample Date**	**January 2014 Monthly Result**	**February 2014 Monthly Sample Date**	**February 2014 Monthly Result**	**Q1 2014 Sample Date**	**Q1 2014 Result**	**April 2014 Monthly Sample Date**	**April 2014 Monthly Result**	**May 2014 Monthly Sample Date**	**May 2014 Monthly Result**	**Q2 2014 Sample Date**	**Q2 2014 Result**	**April 2014 Monthly Sample Date**	**April 2014 Monthly Result**	**May 2014 Monthly Sample Date**	**May 2014 Monthly Result**	**Q3 2014 Sample Date**	**Q3 2014 Result**	**October 2014 Monthly Sample Date**	**October 2014 Monthly Result**	**Q4 2014 Sample Date**	**Q4 2014 Result**	**December 2014 Monthly Sample Date**	**December 2014 Monthly Result**
Required Semi-Annual Sampling Wells, continued																										
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	NS	NA	2/25/2014	110	NS	NA	NS	NA	6/4/2014	105	NS	NA	NS	NA	9/2/2014	***273***	NS	NA	11/12/2014	106	NS	NA
	Field pH (S.U.)	6.62 - 8.5		NA		NA		***6.51***		NA		NA		6.91		NA		NA		***6.38***		NA		***6.41***		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	NS	NA	2/19/2014	***2.77***	NS	NA	NS	NA	5/27/2014	***2.42***	NS	NA	NS	NA	9/9/2014	***2.7***	NS	NA	11/10/2014	***2.88***	NS	NA
	Sulfate (mg/L)	1938.9		NA		NA		1650		NA		NA		***2020***		NA		NA		1760		NA		1810		NA
	Field pH (S.U.)	6.25-8.5		NA		NA		***6.16***		NA		NA		7.04		NA		NA		6.40		NA		***6.10***		NA
	TDS (mg/L)	3198.77		NA		NA		3080		NA		NA		***3260***		NA		NA		3180		NA		2960		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	NS	NA	2/18/2014	***6.29***	NS	NA	NS	NA	5/27/2014	7.38	NS	NA	NS	NA	9/11/2014	***6.46***	NS	NA	11/11/2014	***6.33***	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		NA		<1.0		NA		NA		2.24		NA		NA		<1.0		NA		<1.0		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		NA		***3.82***		NA		NA		***3.68***		NA		NA		0.4		NA		***2.91***		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	NS	NA	3/5/2014	6.52	NS	NA	NS	NA	6/11/2014	6.67	NS	NA	NS	NA	9/4/2014	6.56	NS	NA	11/19/2014	6.69	NS	NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	NS	NA	3/6/2014	***5.92***	NS	NA	NS	NA	5/30/2014	***2.91***	NS	NA	NS	NA	9/17/2014	1.5	NS	NA	11/19/2014	1.17	NS	NA
	Fluoride (mg/L)	0.36		NA		NA		0.234		NA		NA		0.337		NA		NA		***0.4***		NA		0.109		NA
	Sulfate (mg/L)	2903		NA		NA		NA		NA		NA		2450		NA		NA		NA		NA		***3120***		NA
	Thallium (ug/L)	1		NA		NA		***1.85***		NA		NA		***1.23***		NA		NA		0.6		NA		0.821		NA
	Field pH (S.U.)	6.5 - 8.5		NA		NA		***5.89***		NA		NA		***6.07***		NA		NA		***5.09***		NA		***5.69***		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	NS	NA	2/25/2014	***7.98***	NS	NA	NS	NA	5/28/2014	***7.35***	NS	NA	NS	NA	9/8/2014	***6.30***	NS	NA	11/5/2014	***7.70***	NS	NA
	Chloride (mg/L)	38		NA		NA		***47.0***		NA		NA		***45.9***		NA		NA		***46.0***		NA		***42.6***		NA
	Sulfate (mg/L)	462		NA		NA		411		NA		NA		***484***		NA		NA		414		NA		419		NA
	TDS (mg/L)	1075		NA		NA		1040		NA		NA		1040		NA		NA		1020		NA		***1090***		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		NA		1.08		NA		NA		***2.33***		NA		NA		1.16		NA		<1.0		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	NS	NA	2/26/2014	***113***	NS	NA	NS	NA	6/18/2014	***114***	NS	NA	NS	NA	9/16/2014	***112***	NS	NA	11/5/2014	***117***	NS	NA
	Cadmium (ug/L)	5.2		NA		NA		NA		NA		NA		***5.41***		NA		NA		4.7		NA		4.15		NA
	Uranium (ug/L)	4.9		NA		NA		NA		NA		NA		***61.3***		NA		NA		***10.6***		NA		***21.2***		NA
	Vanadium (ug/L)	30		NA		NA		NA		NA		NA		***109***		NA		NA		18.5		NA		29.3		NA
	Field pH (S.U.)	6.1 - 8.5		NA		NA		***6.01***		NA		NA		6.78		NA		NA		***5.79***		NA		***5.72***		NA
MW-29 (Class III)	TDS (mg/L)	4400	NS	NA	NS	NA	2/25/2014	***4500***	NS	NA	NS	NA	6/3/2014	4200	NS	NA	NS	NA	9/10/2014	4280	NS	NA	11/10/2014	4210	NS	NA
	Field pH (S.U.)	6.46 - 8.5		NA		NA		6.78		NA		NA		7.98		NA		NA		***6.10***		NA		***6.11***		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	NS	NA	2/11/2014	1.94	NS	NA	NS	NA	5/23/2014	***4.35***	NS	NA	NS	NA	9/2/2014	***3.69***	NS	NA	11/5/2014	2.56	NS	NA
	Chloride (mg/L)	35.39		NA		NA		NA		NA		NA		***35.6***		NA		NA	8/26/2014	34		NA		33.3		NA
	Field pH (S.U.)	6.4 - 8.5		NA		NA		***6.15***		NA		NA		6.64		NA		NA	41884	***6.17***		NA		***6.08***		NA

Notes:

GWCL values are taken from August 24, 2012 version of GWDP.

NS = Not Required and Not Sampled

NR = Required and Not Reported
NA = Not Applicable
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.
Reported from the quarterly chloroform sample

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2015 Monthly Sample Date	January 2015 Monthly Result	Q1 2015 Sample Date	Q1 2015 Result	March 2015 Monthly Sample Date	March 2015 Monthly Result	Sample Frequency
			Q1 2015 Results						
Required Quarterly Sampling Wells									
MW-11 (Class II)	Manganese (ug/L)	131.29	1/21/2015	***177***	2/3/2015	***138***	3/3/2015	***149***	Quarterly
MW-14 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/21/2015	***6.49***	2/3/2015	***6.44***	3/5/2015	***6.05***	Quarterly
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/20/2015	***6.19***	2/4/2015	***6.46***	3/4/2015	***6.32***	Quarterly
	Cadmium (ug/L)	1.5		1.44		1.33		1.37	Quarterly
	Uranium (ug/L)	6.5		***6.54***		***6.81***		6.43	Quarterly
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/21/2015	0.30	2/11/2015	***2.68***	3/4/2015	***0.965***	Quarterly
	Uranium (ug/L)	41.8		2.96		***78.1***		***72.6***	Quarterly
	Chloroform (ug/L)	70		***3570***		***1190***		***1020***	Quarterly
	Chloride (mg/L)	58.31		***59.9***		***77.2***		***67.2***	Quarterly
	Carbon Tetrachloride (ug/L)	5		<1.0		<1.0		<1.0	Quarterly
	Field pH (S.U.)	6.74 - 8.5		***6.25***		***6.20***		***6.23***	Quarterly
	Dichloromethane (Methylene Chloride) (ug/L)	5		***6.42***		***5.89***		***6.95***	Quarterly
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/21/2015	***19.5***	2/4/2015	***14.9***	3/3/2015	***17.3***	Quarterly
	Chloride (mg/L)	128		***144***		***136***		***132***	Quarterly
	Uranium (ug/L)	8.32		8.06		8.23		***8.35***	Quarterly
	Field pH (S.U.)	6.50		***6.41***		6.59		***6.32***	Quarterly
	Ammonia (mg/L)	0.14		NS		<0.05		<0.05	Quarterly
	Selenium (ug/L)	34		***37.2***		***40.9***		***38.0***	Quarterly
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/20/2015	***20.9***	2/2/2015	***18.7***	3/3/2015	***19.8***	Quarterly
	TDS (mg/L)	1320		***1540***		***1520***		***1530***	Quarterly
	Chloride (mg/L)	143		***226***		***211***		***209***	Quarterly
	Selenium (ug/L)	71		***75.6***		***79.2***		***76.2***	Quarterly
	Field pH (S.U.)	6.5 - 8.5		***6.49***		***6.42***		***6.40***	Quarterly
	Sulfate (mg/L)	532		***669***		***623***		***616***	Quarterly
MW-35 (Class II)	Manganese (ug/L)	200	1/20/2015	***228***	2/5/2015	***223***	3/4/2015	190	Quarterly
	Thallium (ug/l)	0.5		<0.5		<0.5		<0.5	Quarterly
	Gross Alpha minus Rn & U (pCi/L)	3.75		***6.86***		***5.61***		***3.81***	Quarterly
	Field pH (S.U.)	6.5 - 8.5		***6.22***		6.53		***6.26***	
	Selenium (ug/L)	12.5		8.21		***14.2***		***26.6***	Quarterly
	Uranium (ug/L)	7.5		***21.8***		***20.6***		***24.4***	Quarterly
Required Semi-Annual Sampling Wells									
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	2/10/2015	56.9	NS	NA	Semi-Annually
	Tetrahydrofuran (ug/L)	11.5		NA		1.63		NA	Semi-Annually
	Field pH (S.U.)	6.77 - 8.5		NA		***6.66***		NA	Semi-Annually
	Sulfate (mg/L)	838		NA		813		NA	Semi-Annually
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	2/11/2015	***61.1***	NS	NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		***6.12***		NA	Semi-Annually
	Sulfate (mg/L)	3663		NA		3260		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	0.73		NA		0.638		NA	Semi-Annually
	Fluoride (Mg/L)	0.68		NA		***1.08***		NA	Semi-Annually
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/12/2015	***6.15***	NS	NA	Semi-Annually
	Sulfate (mg/L)	3640		NA		3450		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		1.05		NA	Semi-Annually
	TDS (mg/L)	5805		NA		5470		NA	Semi-Annually
	Selenium (ug/L)	89		NA		***94.1***		NA	Semi-Annually
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	2/10/2015	2.94	NS	NA	Semi-Annually
MW-12 (Class III)	Selenium (ug/L)	25	NS	NA	2/9/2015	***30.0***	NS	NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		***6.33***		NA	Semi-Annually

Table 1 – GWCL Exceedances for First Quarter 2015 under the August 24, 2012 GWDP

Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2015 Monthly Sample Date	January 2015 Monthly Result	Q1 2015 Sample Date	Q1 2015 Result	March 2015 Monthly Sample Date	March 2015 Monthly Result	Sample Frequency
				Q1 2015 Results					
Required Semi-Annual Sampling Wells, continued									
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	2/4/2015	125	NS	NA	Semi-Annually
	Field pH (S.U.)	6.62 - 8.5		NA		***6.50***		NA	Semi-Annually
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/3/2015	***2.89***	NS	NA	Semi-Annually
	Sulfate (mg/L)	1938.9		NA		1810		NA	Semi-Annually
	Field pH (S.U.)	6.25-8.5		NA		6.27		NA	Semi-Annually
	TDS (mg/L)	3198.77		NA		***3240***		NA	Semi-Annually
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	2/2/2015	***6.45***	NS	NA	Semi-Annually
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		0.312		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		***2.91***		NA	Semi-Annually
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/10/2015	6.53	NS	NA	Semi-Annually
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	2/12/2015	***3.31***	NS	NA	Semi-Annually
	Fluoride (mg/L)	0.36		NA		***0.397***		NA	Semi-Annually
	Sulfate (mg/L)	2903		NA		2620		NA	Semi-Annually
	Thallium (ug/L)	1		NA		***1.27***		NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		***6.21***		NA	Semi-Annually
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/9/2015	3.15	NS	NA	Semi-Annually
	Chloride (mg/L)	38		NA		***44.2***		NA	Semi-Annually
	Sulfate (mg/L)	462		NA		402		NA	Semi-Annually
	TDS (mg/L)	1075		NA		996		NA	Semi-Annually
	Gross Alpha minus Rn & U (pCi/L)	2		NA		<1.0		NA	Semi-Annually
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	2/9/2015	***130***	NS	NA	Semi-Annually
	Cadmium (ug/L)	5.2		NA		4.83		NA	Semi-Annually
	Uranium (ug/L)	4.9		NA		4.48		NA	Semi-Annually
	Vanadium (ug/L)	30		NA		<15.0		NA	Semi-Annually
	Field pH (S.U.)	6.1 - 8.5		NA		***5.86***		NA	Semi-Annually
MW-29 (Class III)	TDS (mg/L)	4400	NS	NA	2/10/2015	***4430***	NS	NA	Semi-Annually
	Field pH (S.U.)	6.46 - 8.5		NA		***6.42***		NA	Semi-Annually
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/9/2015	2.19	NS	NA	Semi-Annually
	Chloride (mg/L)	35.39		NA	3/17/2015	***36.3***		NA	Semi-Annually
	Field pH (S.U.)	6.4 - 8.5		NA	2/9/2015	***6.29***		NA	Semi-Annually

Notes:

GWCL values are taken from August 24, 2012 version of GWDP.

NS = Not Required and Not Sampled

NR = Required and Not Reported

NA = Not Applicable

Exceedances are shown in yellow

Values in () parentheses are the field pH measurements for the resampled analyses.

Reported from the quarterly chloroform sample

Pursuant to the DRC letter of March 25, 2015, these constituents will no longer be monitored on an accelerated schedule. These constituents will be dropped from this report after this quarter.

APPENDIX B

Geochemical Analysis for MW-31 SAR Constituents

Appendix B-1: Summary of Geochemical Analysis for Out of Compliance Constituents in MW-31

Well	Constituent	N	% Non-Detected Values	Mean	Standard Deviation	Shapiro-Wilk Test for Normality		Normally or Lognormally distributed?	Mann Kendall Trend Analysis		Significant Trend	Previously Identified Increasing Trend?	Highest Historical Value (HHV)	Mean + 2σ	2008 BKG Rpt Proposed GWCL	Current GWCL	Flowsheet GWCL	Flowsheet GWCL Rationale	Modified Approach*
						W	p		S	p									
MW-31	Selenium	61	0	69.559	8.6232	0.9383	0.0041	No	1040	5.03E-11	Yes	Yes	85.4	86.81	71	79	85.4	HHV	84.00
MW-31	Sulfate	77	0	567.45	65.0742	0.9336	0.0006	No	1787	0	Yes	No	691.0	697.60	532	552	691	HHV	691.00
MW-31	pH	85	0	7.086	0.3422	0.9739	0.0817	Yes	0.0640	0.0195	Yes (Dec)	No	8.23	6.40	6.5-8.5	6.57-8.5	6.40	Mean - 2σ	6.19
MW-31	Total Dissolved Solids	78	0	1363.59	125.0971	0.9703	0.0652	Yes	0.5435	1.4E-14	Yes	No	1700	1613.78	1320	1410.57	1613.78	Mean + 2σ	1674.73

Notes:

σ = sigma
%ND = percent of non-detected values
µg/L = micrograms per liter
mg/L = milligrams per liter
N = number of valid data points
p = probability
W = Shapiro Wilk test value
r^2 = The measure of how well the trendline fits the data where r^2=1 represents a perfect fit.
S = Mann-Kendall statistic

Distribution = Distribution as determined by the Shapiro-Wilk distribution test for constituents with % Detect > 50% and N>8

Mean = The arithmatic mean as determined for normally or log-normally distributed constituents with % Detect > 50%

Standard Deviation = The standard deviation as determined for normally or log-normally distributed constituents with % Detect > 85%

Highest Historical Value = The highest observed value for constituents with % Detect < 50%

* = Using data collected from 10/2012 through 8/2015

Appendix B-2: Comparison of Calculated and Measured TDS in MW-31

Date Sampled	Alkalinity (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)	Measured TDS (mg/L)	Calculated TDS (mg/L)	Ratio
6/22/2005	169	156	139	5.6	78.6	90.3	504	1290	1143	88.57%
3/19/2008	212	161	124	6.2	78.2	91	521	1220	1193	97.82%
6/3/2008	197	163	128	5.96	80.8	93.7	514	1180	1182	100.21%
8/4/2008	210	180	124	6.07	88.3	94.4	499	1240	1202	96.92%
11/11/2008	205	180	119	6.2	84.9	97	541	1220	1233	101.07%
2/3/2009	205	169	115	5.4	80.1	82.8	488	1210	1145	94.65%
5/13/2009	209	146	124	5.1	72.7	84	493	1230	1134	92.18%
8/24/2009	215	169	122	6	79.4	92.7	460	1230	1144	93.02%
10/14/2009	214	170	138	6.09	78.5	93.6	497	1160	1197	103.21%
2/9/2010	224	170	128	6.2	80.2	92.2	507	1150	1208	105.01%
4/20/2010	220	162	128	5.8	79.4	91.3	522	1220	1209	99.06%
9/13/2010	226	164	139	5.74	78.1	91	527	1330	1231	92.54%
11/9/2010	216	166	138	5.9	77.8	85.4	539	1320	1228	93.04%
2/1/2011	211	168	145	5.75	79.6	91.6	538	1220	1239	101.55%
4/1/2011	213	172	143	6.1	80.1	95	503	1370	1212	88.48%
8/2/2011	199	172	148	5.7	81.2	95.3	537	1300	1238	95.25%
10/3/2011	202	177	145	5.9	83.3	85.5	539	1320	1238	93.77%
2/13/2012	203	190	150	6	87.9	97.2	538	1240	1272	102.59%
5/2/2012	208	187	151	7	88	87.9	532	1410	1261	89.43%
7/9/2012	202	189	161	6	90.1	98	529	1400	1275	91.08%
11/6/2012	172	182	189	5.65	86.5	92.6	557	1230	1285	104.45%
2/19/2013	178	200	174	6.37	91.6	98.6	**644**	1390	1393	100.18%
5/13/2013	174	191	169	5.52	90.9	99.2	630	1540	1360	88.29%
7/9/2013	174	199	182	6.05	94.7	105	659	1510	1420	94.02%
11/18/2013	175	194	174	6	89.4	94.2	609	1320	1342	101.64%
3/10/2014	166	195	230	5.83	93.9	94.1	681	1490	1466	98.38%
6/2/2014	172	202	173	6.15	101	93.1	555	1520	1302	85.67%
9/3/2014	183	189	210	6	95.8	96.5	560	1460	1340	91.80%
11/4/2014	165	201	204	6.22	95.8	93.1	639	1520	1404	92.38%
2/2/2015	176	194	211	6.37	95.4	95	623	1520	1401	92.16%
4/7/2015	168	207	211	6.07	97.6	103	642	1680	1435	85.40%
8/10/2015	194	221	264	6.52	102	99.5	640	1530	1527	99.81%

Appendix B-3: Charge Balance Calculations for Major Cations and Anions in MW-31

Well	Date	Calcium (meq/L)	Sodium (meq/L)	Magnesium (meq/L)	Potassium (meq/L)	Total Cation Charge (meq/L)	HCO_3 (meq/L)	Chloride (meq/L)	SO_4 (meq/L)	Total Anion Charge (meq/L)	Percent Difference
MW-31	6/22/2005	7.78	3.93	6.47	0.14	**18.32**	-2.77	-3.92	-10.49	**-17.18**	6.21%
MW-31	3/19/2008	8.03	3.96	6.43	0.16	**18.58**	-3.47	-3.50	-10.85	**-17.82**	4.12%
MW-31	6/3/2008	8.13	4.08	6.65	0.15	**19.01**	-3.23	-3.61	-10.70	**-17.54**	7.73%
MW-31	8/4/2008	8.98	4.11	7.26	0.16	**20.51**	-3.44	-3.50	-10.39	**-17.33**	15.50%
MW-31	11/11/2008	8.98	4.22	6.98	0.16	**20.34**	-3.36	-3.36	-11.26	**-17.98**	11.62%
MW-31	2/3/2009	8.43	3.60	6.59	0.14	**18.76**	-3.36	-3.24	-10.16	**-16.76**	10.65%
MW-31	5/13/2009	7.29	3.65	5.98	0.13	**17.05**	-3.43	-3.50	-10.26	**-17.19**	-0.80%
MW-31	8/24/2009	8.43	4.03	6.53	0.15	**19.15**	-3.52	-3.44	-9.58	**-16.54**	13.62%
MW-31	10/14/2009	8.48	4.07	6.46	0.16	**19.17**	-3.51	-3.89	-10.35	**-17.75**	7.41%
MW-31	2/9/2010	8.48	4.01	6.60	0.16	**19.25**	-3.67	-3.61	-10.56	**-17.84**	7.34%
MW-31	4/20/2010	8.08	3.97	6.53	0.15	**18.74**	-3.61	-3.61	-10.87	**-18.08**	3.48%
MW-31	9/13/2010	8.18	3.96	6.43	0.15	**18.71**	-3.70	-3.92	-10.97	**-18.60**	0.63%
MW-31	11/9/2010	8.28	3.71	6.40	0.15	**18.55**	-3.54	-3.89	-11.22	**-18.65**	-0.57%
MW-31	2/1/2011	8.38	3.98	6.55	0.15	**19.06**	-3.46	-4.09	-11.20	**-18.75**	1.65%
MW-31	4/1/2011	8.58	4.13	6.59	0.16	**19.46**	-3.49	-4.03	-10.47	**-18.00**	7.52%
MW-31	8/2/2011	8.58	4.15	6.68	0.15	**19.55**	-3.26	-4.17	-11.18	**-18.62**	4.80%
MW-31	10/3/2011	8.83	3.72	6.85	0.15	**19.56**	-3.31	-4.09	-11.22	**-18.62**	4.77%
MW-31	2/13/2012	9.48	4.23	7.23	0.15	**21.09**	-3.33	-4.23	-11.20	**-18.76**	11.07%
MW-31	5/2/2012	9.33	3.82	7.24	0.18	**20.57**	-3.41	-4.26	-11.08	**-18.74**	8.89%
MW-31	7/9/2012	9.43	4.26	7.41	0.15	**21.26**	-3.31	-4.54	-11.01	**-18.87**	11.26%
MW-31	11/6/2012	9.08	4.03	7.12	0.14	**20.37**	-2.82	-5.33	-11.60	**-19.75**	3.06%
MW-31	2/19/2013	9.98	4.29	7.54	0.16	**21.97**	-2.92	-4.91	-13.41	**-21.23**	3.34%
MW-31	5/13/2013	9.53	4.31	7.48	0.14	**21.47**	-2.85	-4.77	-13.12	**-20.74**	3.40%
MW-31	7/9/2013	9.93	4.57	7.79	0.15	**22.44**	-2.85	-5.13	-13.72	**-21.71**	3.28%
MW-31	11/18/2013	9.68	4.10	7.35	0.15	**21.29**	-2.87	-4.91	-12.68	**-20.46**	3.90%
MW-31	3/10/2014	9.73	4.09	7.73	0.15	**21.70**	-2.72	-6.49	-14.18	**-23.39**	-7.78%
MW-31	6/2/2014	10.08	4.05	8.31	0.16	**22.60**	-2.82	-4.88	-11.56	**-19.25**	14.79%
MW-31	9/3/2014	9.43	4.20	7.88	0.15	**21.66**	-3.00	-5.92	-11.66	**-20.58**	4.99%
MW-31	11/4/2014	10.03	4.05	7.88	0.16	**22.12**	-2.70	-5.75	-13.30	**-21.76**	1.62%

Appendix B-3: Charge Balance Calculations for Major Cations and Anions in MW-31

Well	Date	Calcium (meq/L)	Sodium (meq/L)	Magnesium (meq/L)	Potassium (meq/L)	Total Cation Charge (meq/L)	HCO_3 (meq/L)	Chloride (meq/L)	SO_4 (meq/L)	Total Anion Charge (meq/L)	Percent Difference
MW-31	2/2/2015	9.68	4.13	7.85	0.16	**21.82**	-2.88	-5.95	-12.97	**-21.81**	0.08%
MW-31	4/7/2015	10.33	4.48	8.03	0.16	**22.99**	-2.75	-5.95	-13.37	**-22.07**	4.01%
MW-31	8/10/2015	11.03	4.33	8.39	0.17	**23.91**	-3.18	-7.45	-13.33	**-23.95**	-0.16%

Notes:

meq/L= milliequivalent per liter

HCO_3 = Bicarbonate

SO_4 = Sulfate

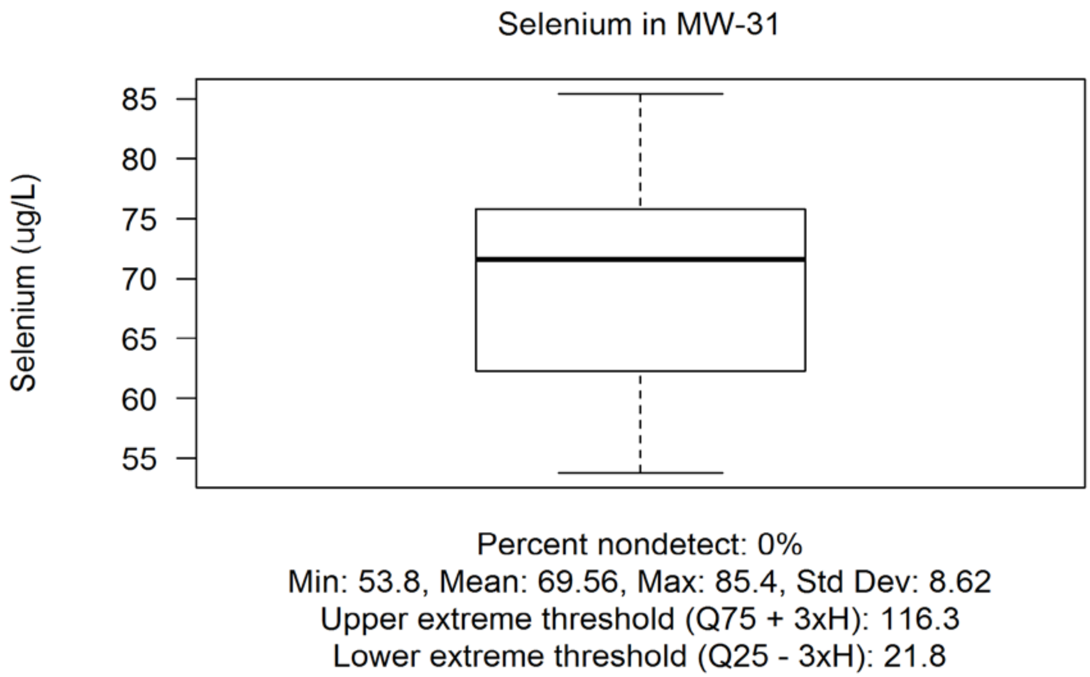
Appendix B-4: Descriptive Statistics for Out of Compliance Constituents in MW-31

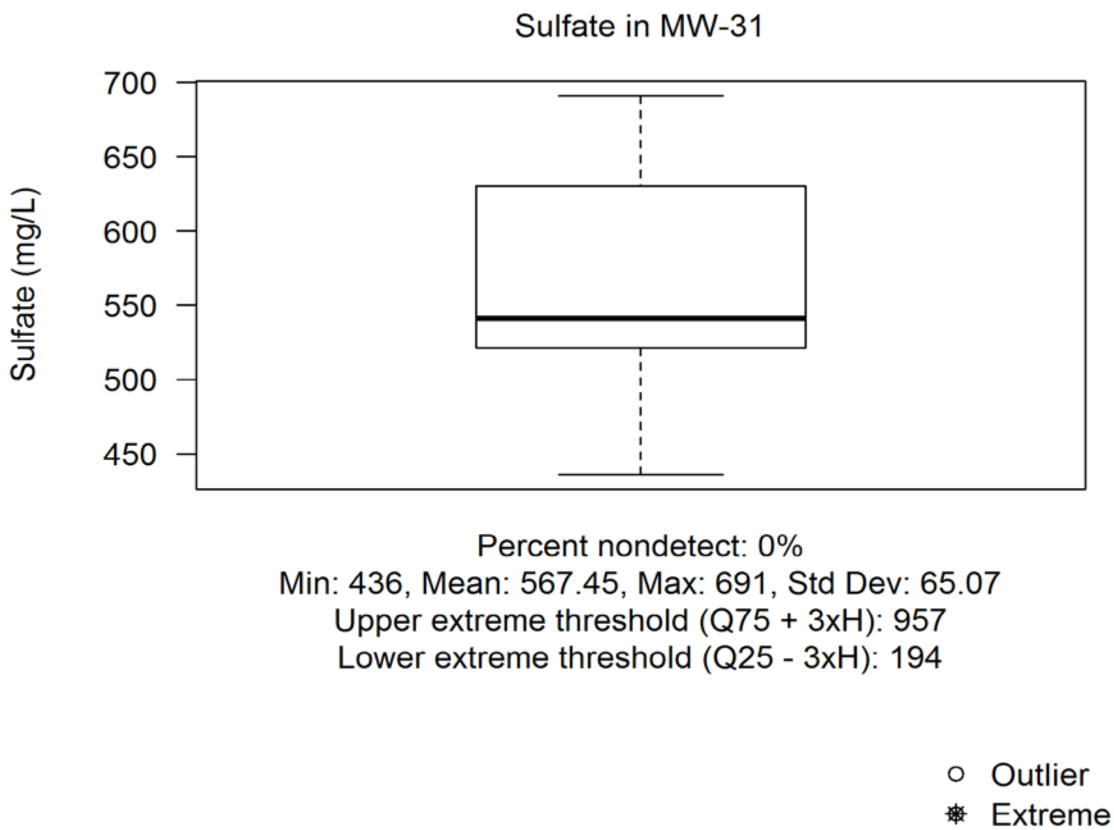
Data Set	2015 SAR	2013 SAR	2008 Background Report	2015 SAR	2012 SAR	2008 Background Report	2015 SAR	2012 SAR	2008 Background Report	2015 SAR	2012 SAR	2008 Background Report
Analyte	Selenium	Selenium	Selenium	Sulfate	Sulfate	Sulfate	pH	pH	pH	Total Dissolved Solids	Total Dissolved Solids	Total Dissolved Solids
Units	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	s.u.	s.u.	s.u.	mg/L	mg/L	mg/L
% Non-Detects	0	0	0	0	0	0	0	0	0	0	0	0
N	61	34	10	77	39	10	85	48	9	78	51	10
Distribution	Not normal or lognormal	normal or lognormal	normal or lognormal	Not normal or lognormal	Not normal or lognormal	Not normal or lognormal	normal or lognormal	normal or lognormal	normal or lognormal	normal or lognormal	normal or lognormal	Not normal or lognormal
Mean	69.6	64.1	62.6	567.5	517.3	504.3	7.09	7.13	7.50	1363.6	1257.7	1265.0
Min. Conc.	53.8	53.8	56.6	436.0	436.0	436.0	6.16	6.16	6.80	1150.0	1110.0	1150.0
Max. Conc.	85.4	81.8	70.1	691.0	552.0	532.0	8.23	7.80	7.90	1700.0	1460.0	1320.0
Std. Dev.	8.6	7.3	4.2	65.1	24.2	27.8	0.34	0.28	0.40	125.1	76.5	49.5
Range	31.6	28.0	13.5	255.0	116.0	96.0	2.07	1.64	1.10	550.0	350.0	170.0
Geometric Mean	69.0	63.7	62.5	563.8	516.8	503.6	7.08	7.12	7.50	1358.0	1255.4	1264.1
Skewness	-0.25	0.61	0.5	0.4	-1.3	-1.9	0.1	-0.7	-1.1	0.5	0.3	-1.6
Q25	62.3	58.4	59.2	521.0	503.0	497.0	6.95	6.98	7.30	1270.0	1210.0	1240.0
Median	71.6	62.6	62.4	541.0	522.0	512.5	7.10	7.16	7.60	1330.0	1240.0	1280.0
Q75	75.8	68.8	65.8	630.0	538.0	522.0	7.30	7.31	7.70	1460.0	1300.0	1290.0

Appendix B-5: MW-31 Data Used for Analysis

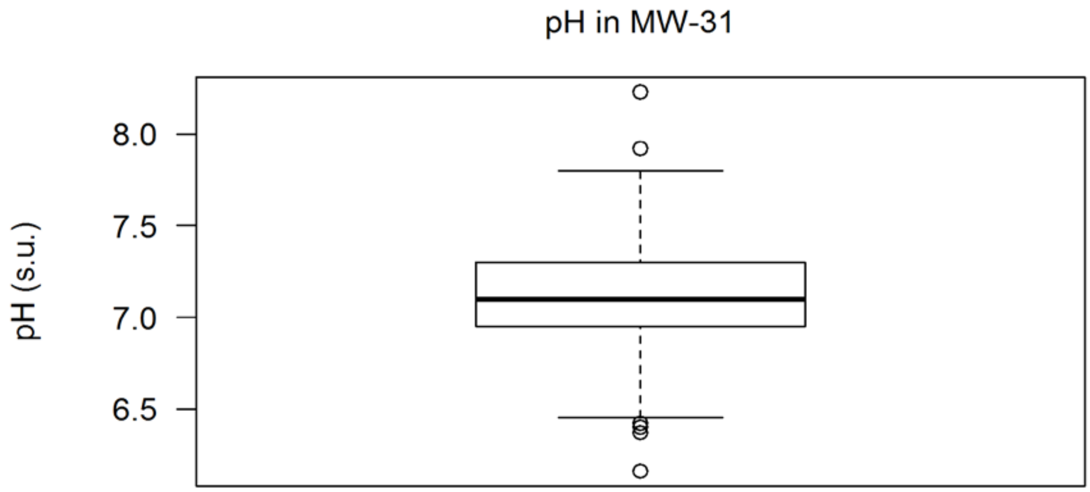
Field Sample ID	Location ID	Date Sampled	Parameter Name	Report Result	Report Units	Lab Qualifier	Detected	Sample Matrix	Sample Purpose	Sample Type
MW-31_06222005	MW-31	06/22/2005	Selenium	68	ug/L		Y	Water	REG	GW
MW-31_09222005	MW-31	09/22/2005	Selenium	58.6	ug/L		Y	Water	REG	GW
MW-31_12142005	MW-31	12/14/2005	Selenium	62.6	ug/L		Y	Water	REG	GW
MW-31_03222006	MW-31	03/22/2006	Selenium	62.5	ug/L		Y	Water	REG	GW
MW-31_06212006	MW-31	06/21/2006	Selenium	70.1	ug/L		Y	Water	REG	GW
MW-31_09132006	MW-31	09/13/2006	Selenium	65.8	ug/L		Y	Water	REG	GW
MW-31_10252006	MW-31	10/25/2006	Selenium	62.3	ug/L		Y	Water	REG	GW
MW-31_03152007	MW-31	03/15/2007	Selenium	59.2	ug/L		Y	Water	REG	GW
MW-31_08272007	MW-31	08/27/2007	Selenium	60.8	ug/L		Y	Water	REG	GW
MW-31_10242007	MW-31	10/24/2007	Selenium	56.6	ug/L		Y	Water	REG	GW
MW 31_03192008	MW-31	03/19/2008	Selenium	54.4	ug/L		Y	WATER	REG	GW
MW 31_06032008	MW-31	06/03/2008	Selenium	55.3	ug/L		Y	WATER	REG	GW
MW 31_08042008	MW-31	08/04/2008	Selenium	56.4	ug/L		Y	WATER	REG	GW
MW 31_11112008	MW-31	11/11/2008	Selenium	53.8	ug/L		Y	WATER	REG	GW
MW 31_02032009	MW-31	02/03/2009	Selenium	55.6	ug/L		Y	WATER	REG	GW
MW 31_05132009	MW-31	05/13/2009	Selenium	56.1	ug/L		Y	WATER	REG	GW
MW 31_08242009	MW-31	08/24/2009	Selenium	58.2	ug/L		Y	WATER	REG	GW
MW 31_10142009	MW-31	10/14/2009	Selenium	58.4	ug/L		Y	WATER	REG	GW
MW-31_02092010	MW-31	02/09/2010	Selenium	60.8	ug/L		Y	WATER	REG	GW
MW 31_04202010	MW-31	04/20/2010	Selenium	59.6	ug/L		Y	WATER	REG	GW
MW 31_09132010	MW-31	09/13/2010	Selenium	64.4	ug/L		Y	WATER	REG	GW
MW 31_11092010	MW-31	11/09/2010	Selenium	60.0	ug/L		Y	WATER	REG	GW
MW-31_02012011	MW-31	02/01/2011	Selenium	64.6	ug/L		Y	WATER	REG	GW
MW-31_04012011	MW-31	04/01/2011	Selenium	65.2	ug/L		Y	WATER	REG	GW
MW-31_08022011	MW-31	08/02/2011	Selenium	66.2	ug/L		Y	WATER	REG	GW
MW-31_10032011	MW-31	10/03/2011	Selenium	68.8	ug/L		Y	WATER	REG	GW
MW-31_02132012	MW-31	02/13/2012	Selenium	67.8	ug/L		Y	Water	REG	GW
MW-31_05022012	MW-31	05/02/2012	Selenium	70.2	ug/L		Y	WATER	REG	GW
MW-31_07092012	MW-31	07/09/2012	Selenium	74.0	ug/L		Y	WATER	REG	GW
MW-31_11062012	MW-31	11/06/2012	Selenium	76.9	ug/L		Y	WATER	REG	GW
MW-31_02192013	MW-31	02/19/2013	Selenium	74.1	ug/L		Y	WATER	REG	GW
MW-31_03192013	MW-31	03/19/2013	Selenium	81.8	ug/L		Y	WATER	REG	GW
MW-31_04162013	MW-31	04/16/2013	Selenium	72.9	ug/L		Y	WATER	REG	GW
MW-31_05132013	MW-31	05/13/2013	Selenium	75.9	ug/L		Y	WATER	REG	GW

Appendix B-6: Box Plots

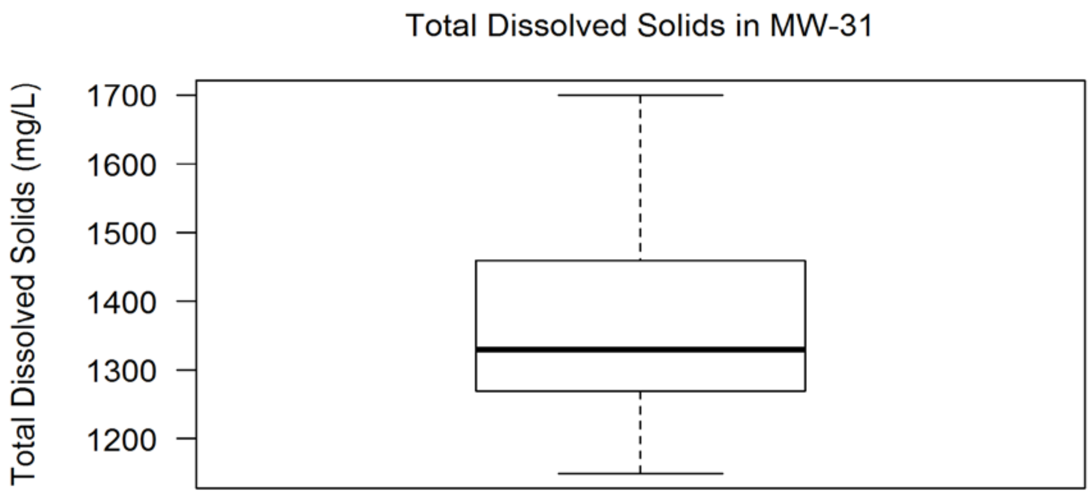




Appendix B-6: Box Plots



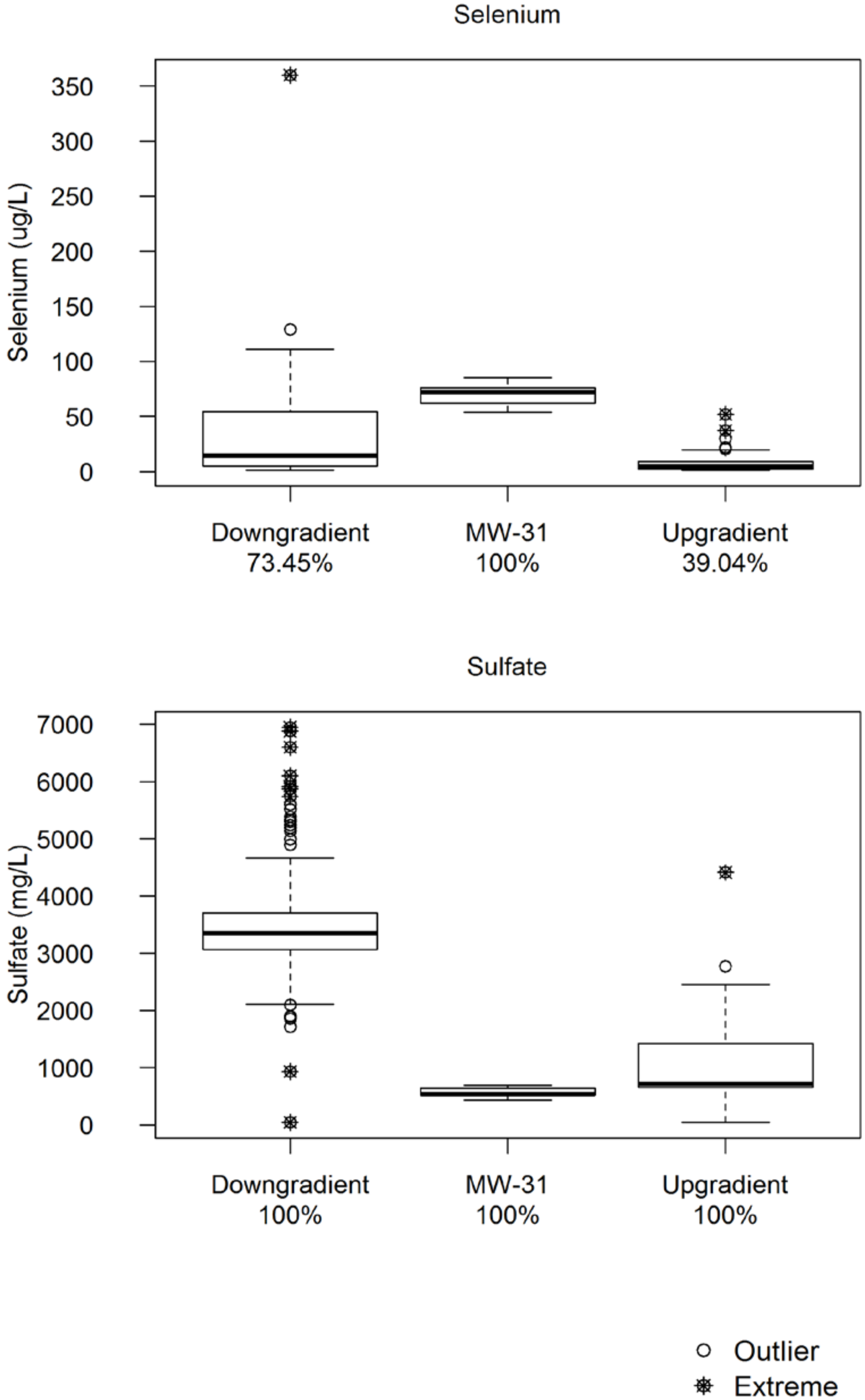
Percent nondetect: 0%
Min: 6.16, Mean: 7.09, Max: 8.23, Std Dev: 0.34
Upper extreme threshold (Q75 + 3xH): 8.35
Lower extreme threshold (Q25 - 3xH): 5.9



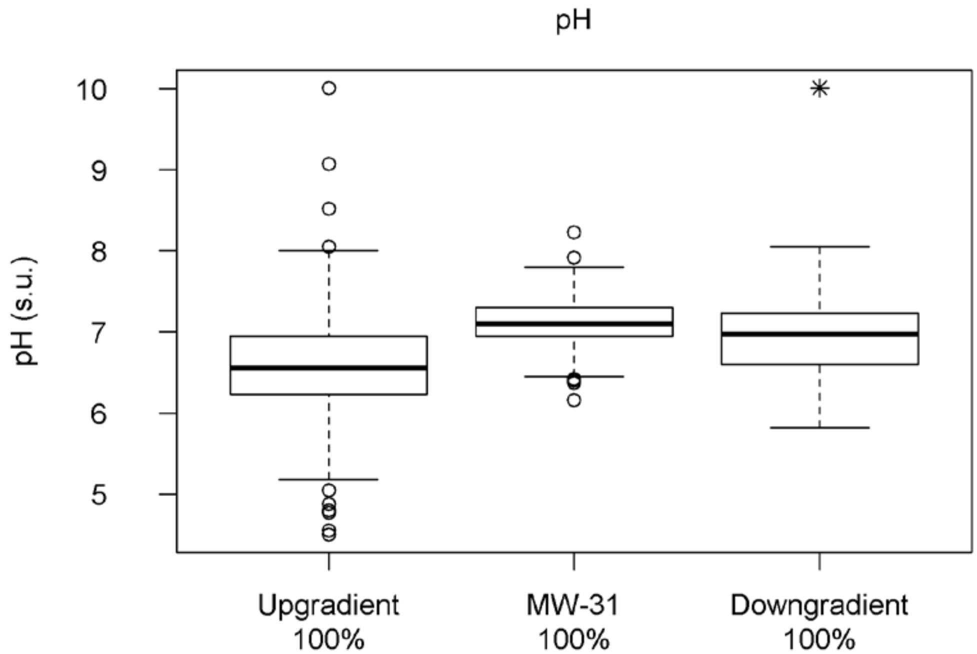
Percent nondetect: 0%
Min: 1150, Mean: 1363.59, Max: 1700, Std Dev: 125.1
Upper extreme threshold (Q75 + 3xH): 2030
Lower extreme threshold (Q25 - 3xH): 700

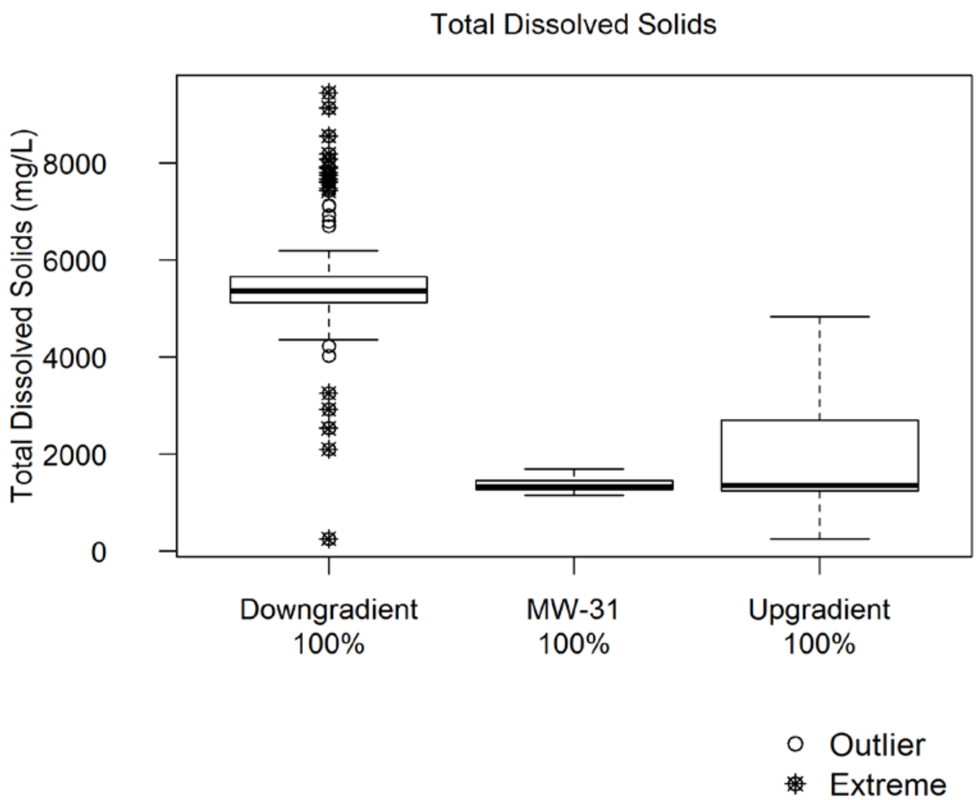
○ Outlier
✵ Extreme

Appendix B-7: Box Plots for MW-31 and Upgradient and Downgradient Wells

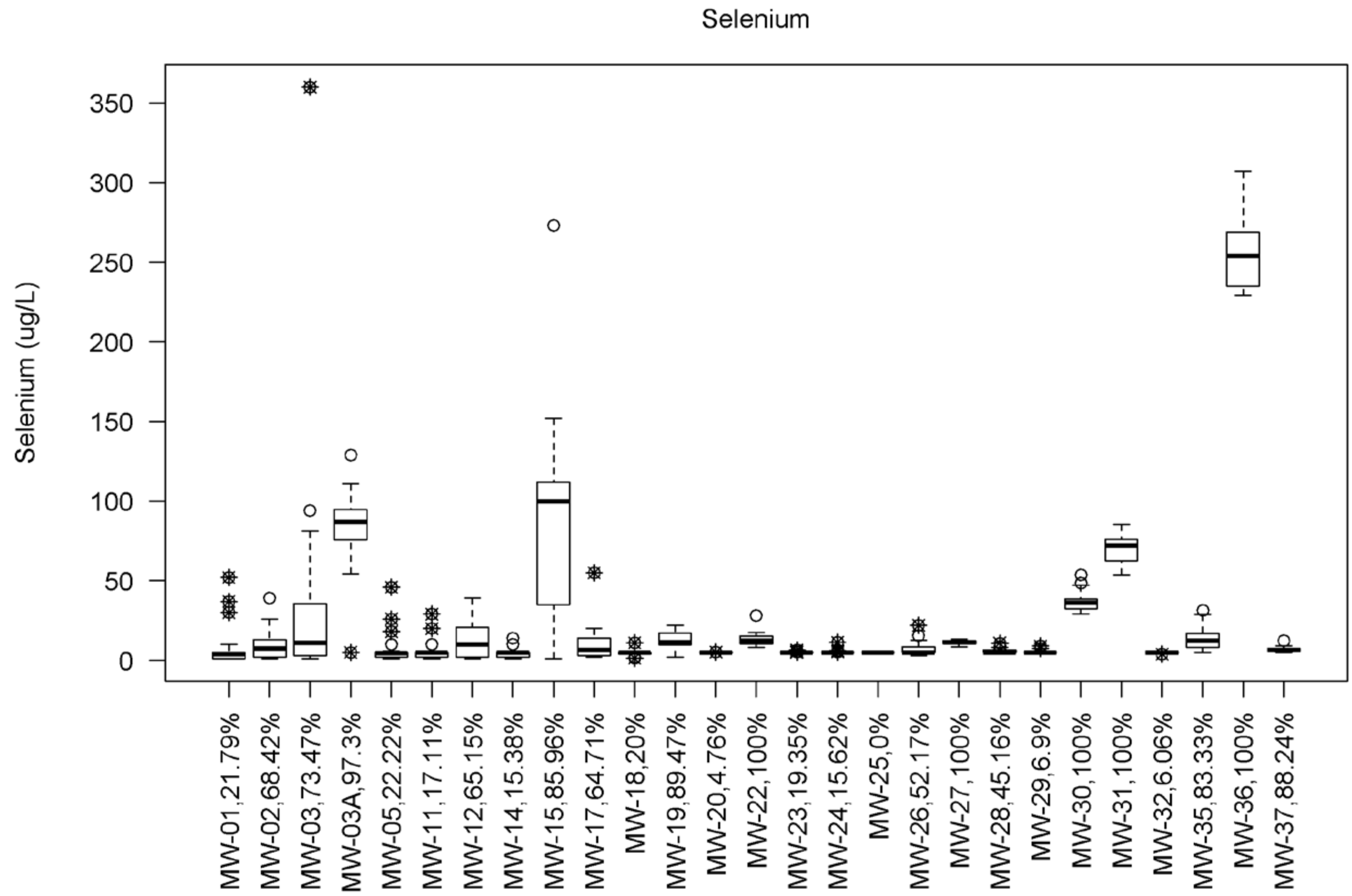


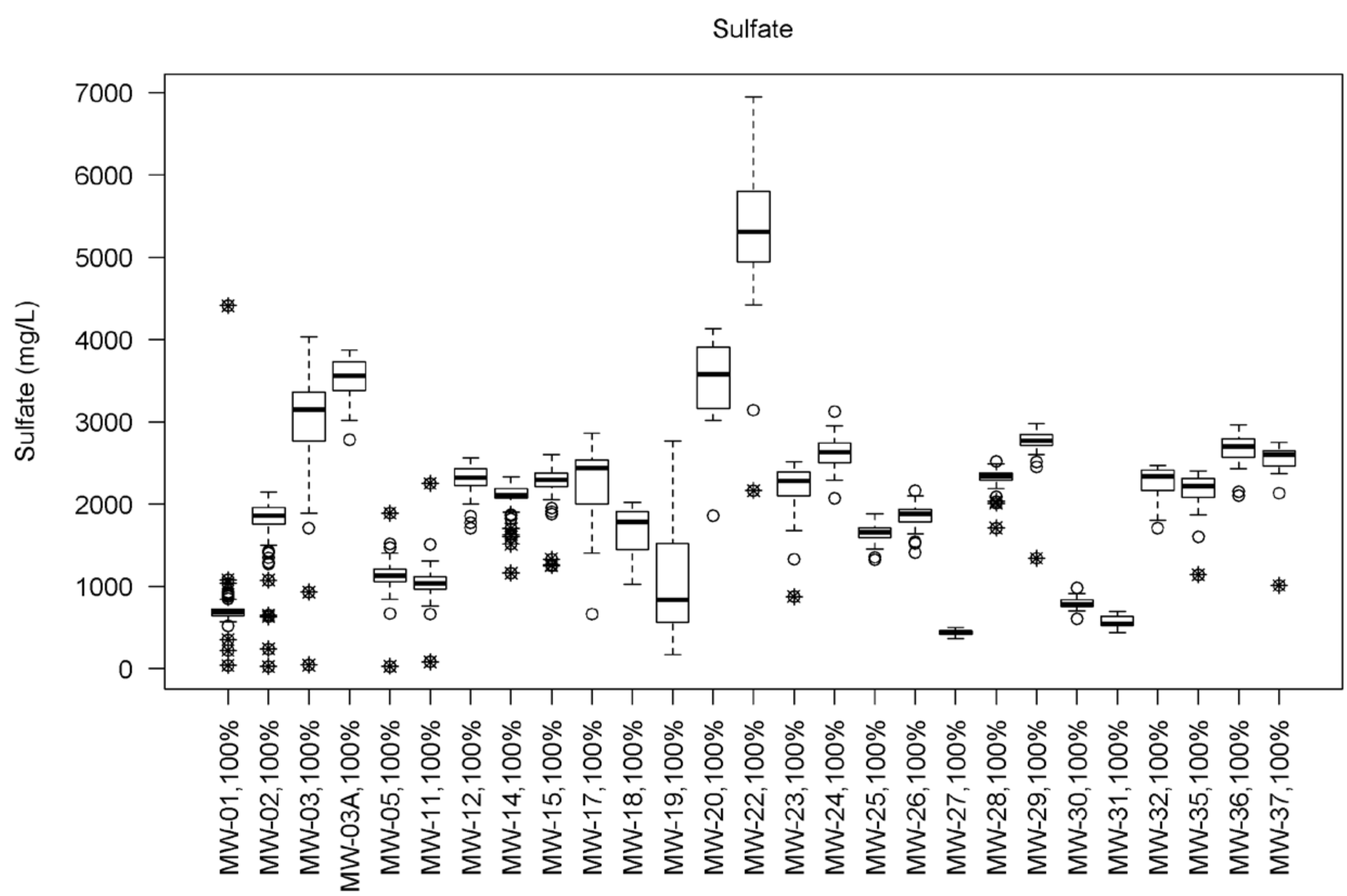
Appendix B-7: Box Plots for MW-31 and Upgradient and Downgradient Wells



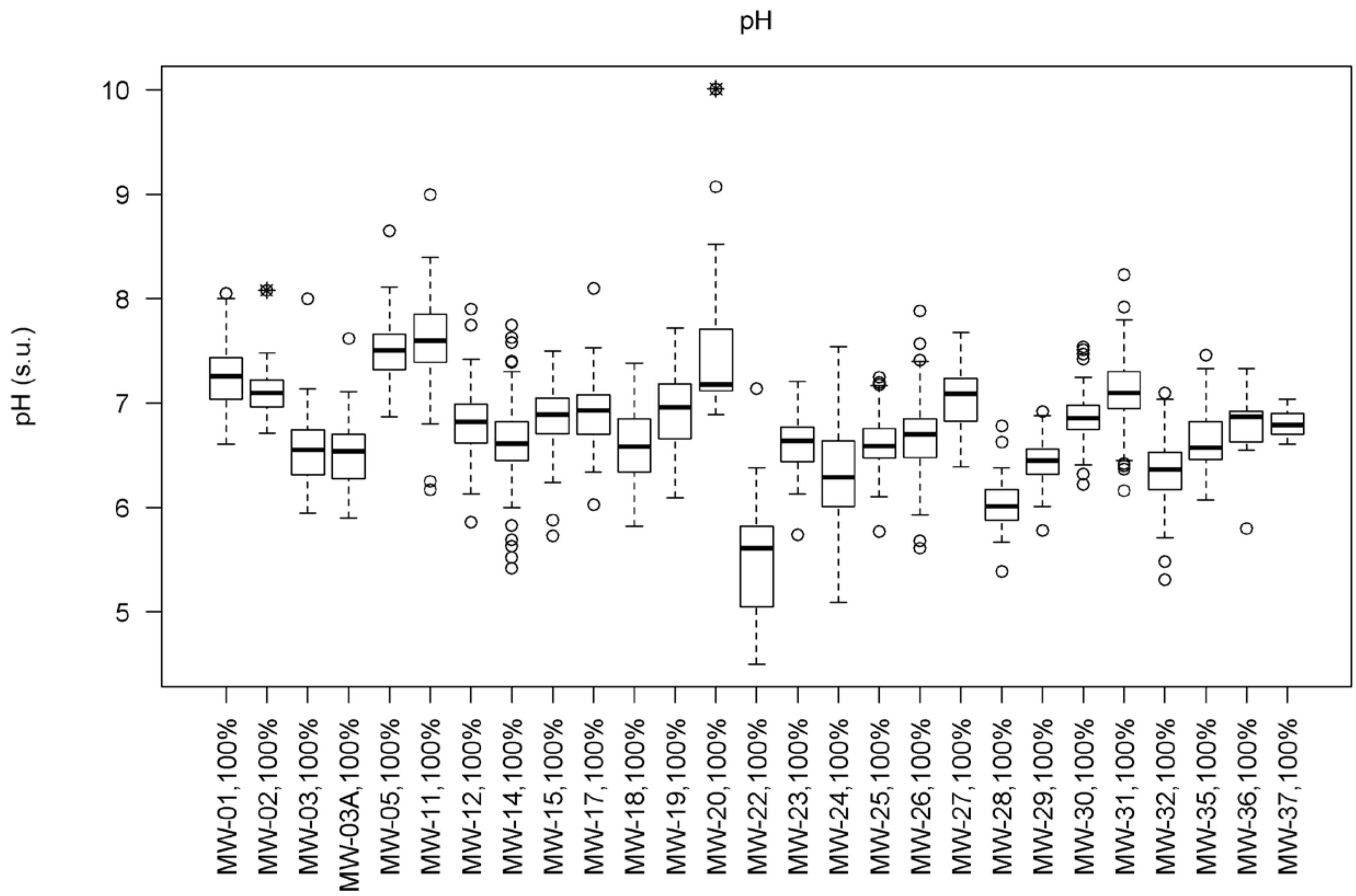


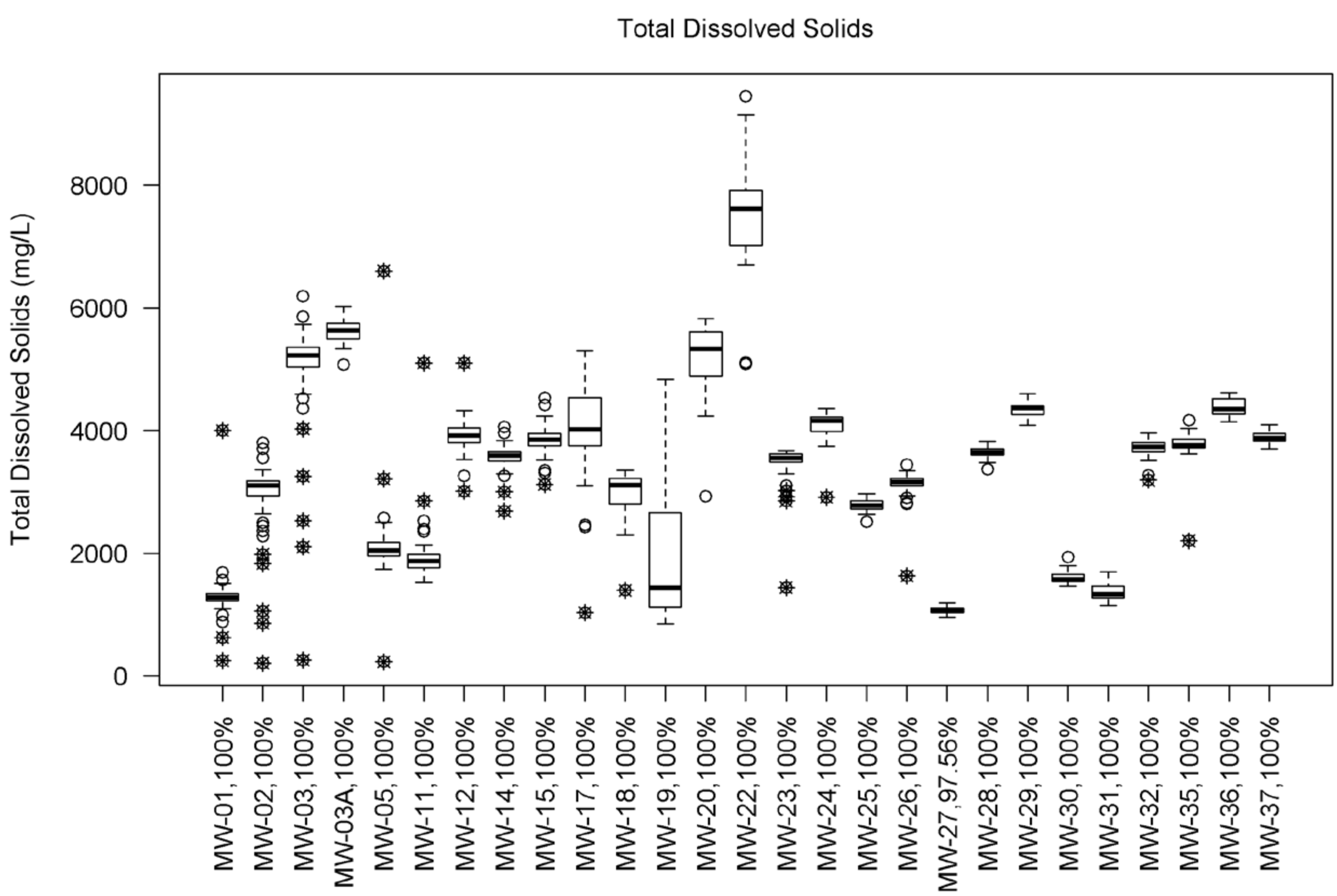
Appendix B-8: Box Plots for SAR Parameters in Groundwater Monitoring Wells



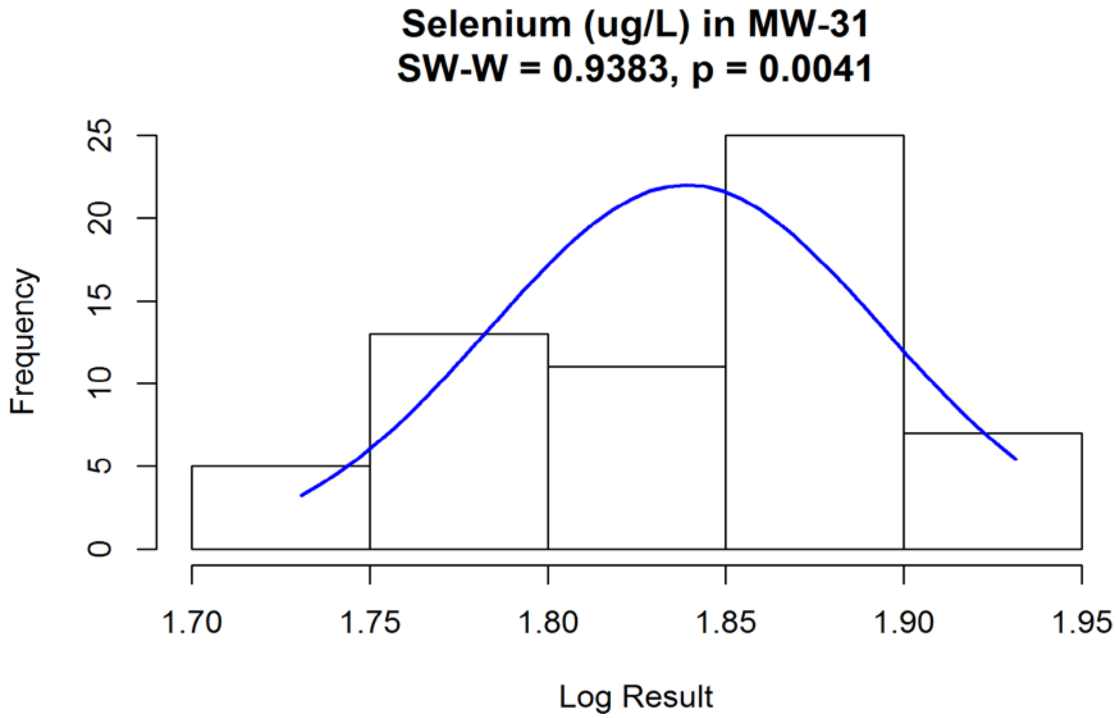


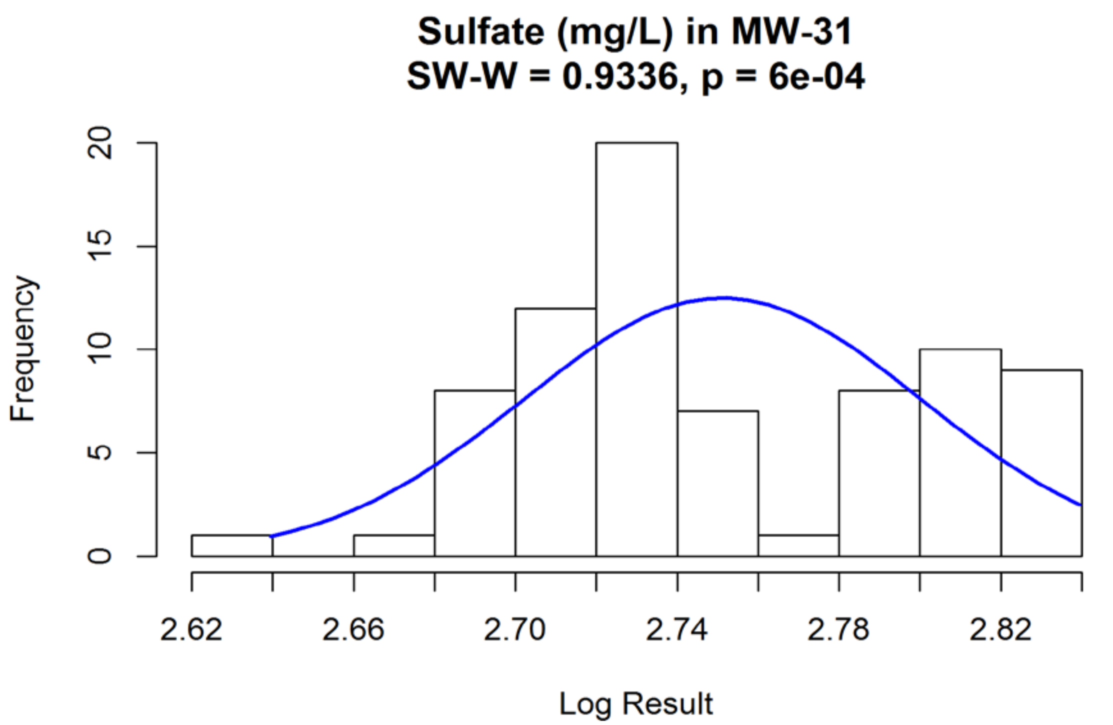
Appendix B-8: Box Plots for SAR Parameters in Groundwater Monitoring Wells



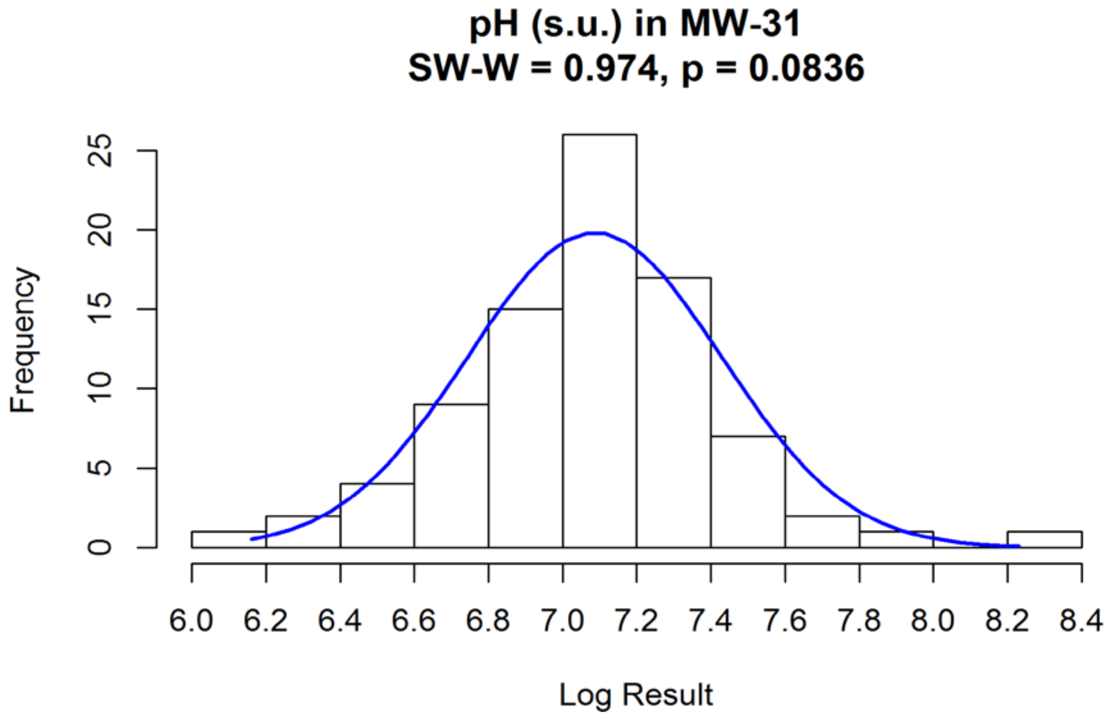


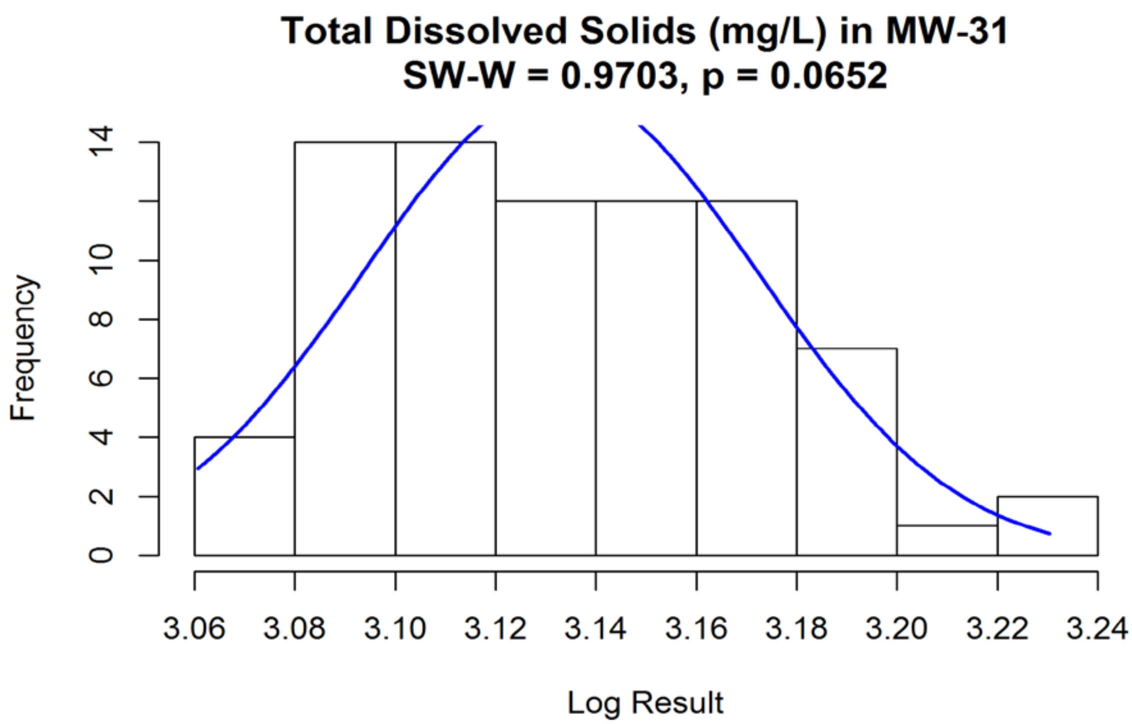
Appendix B-9: Histograms



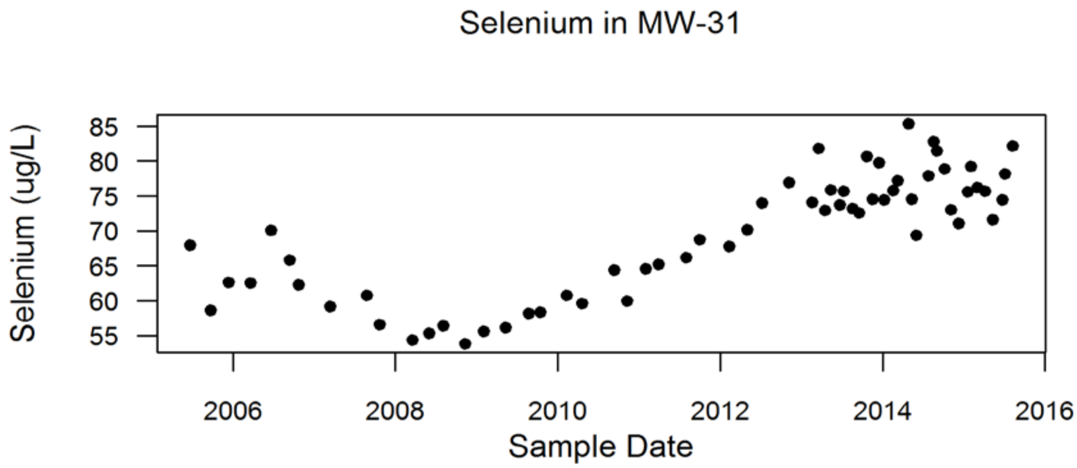


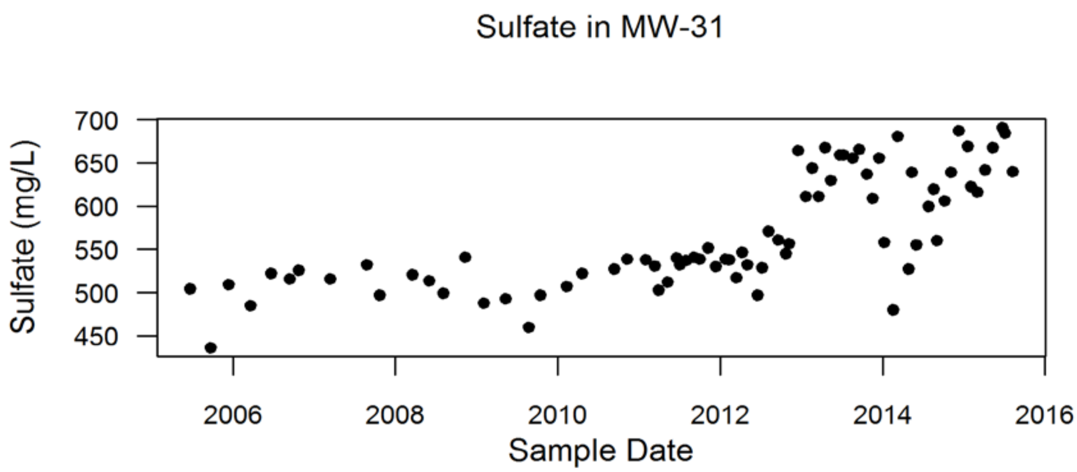
Appendix B-9: Histograms



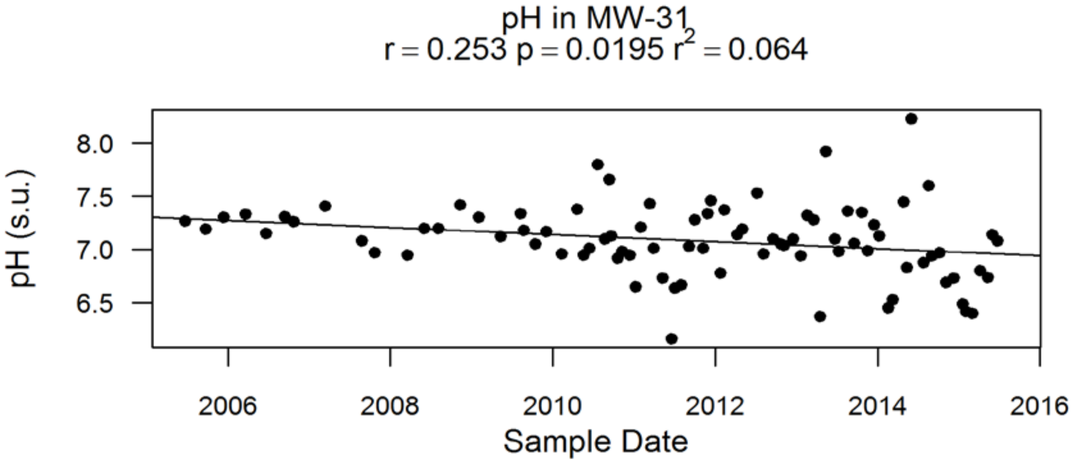


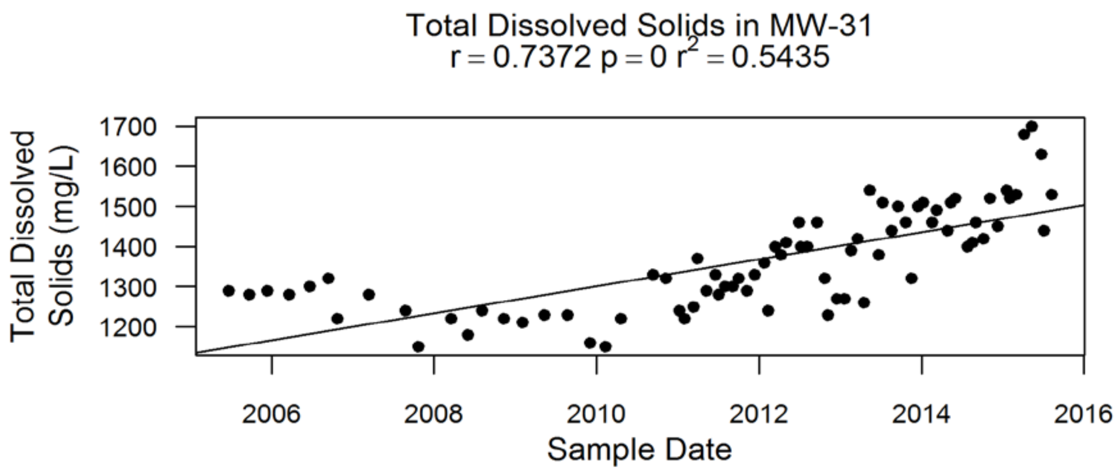
Appendix B-10: Timeseries Plots



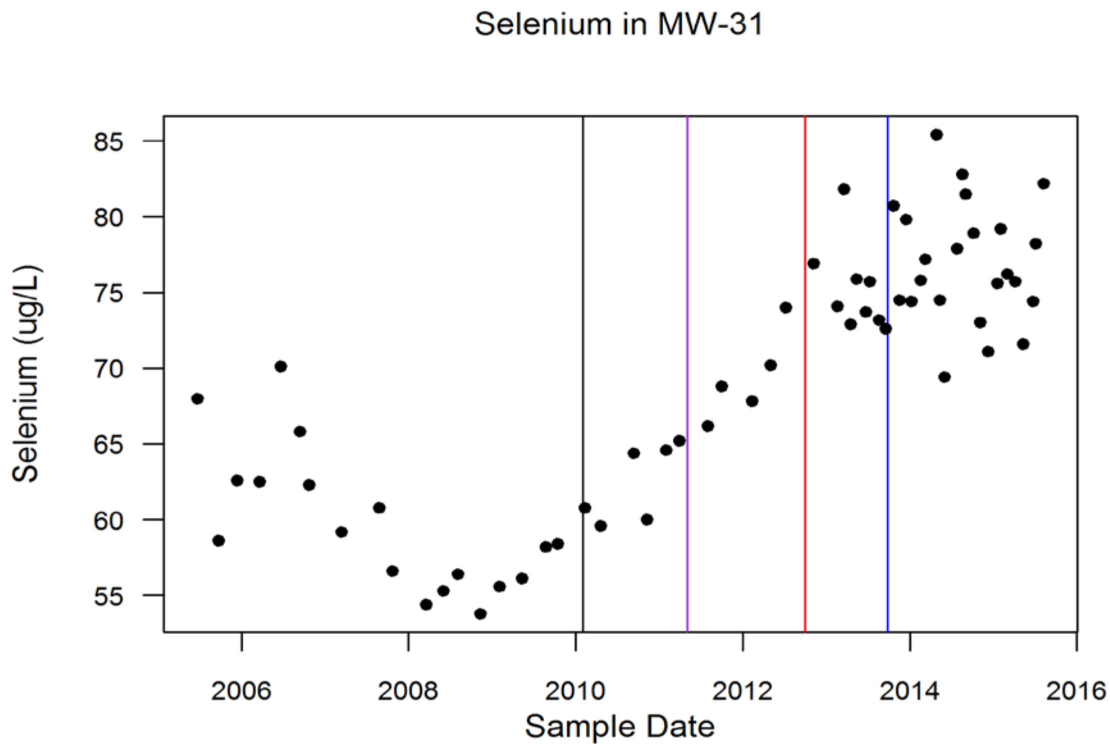


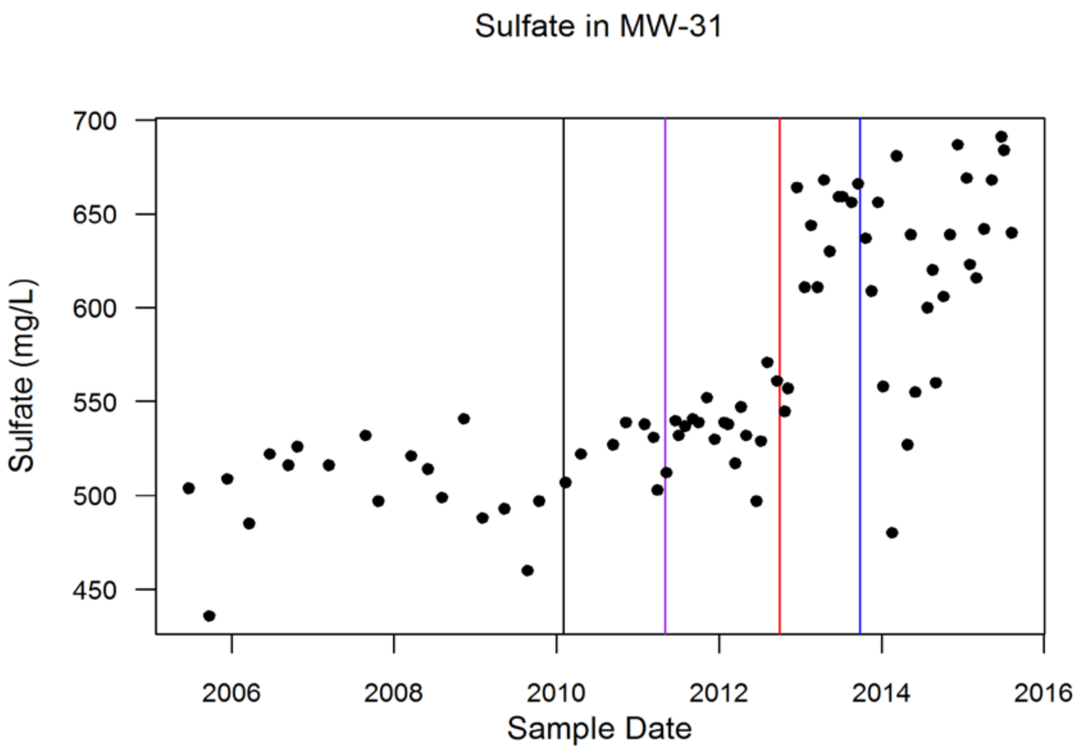
Appendix B-10: Timeseries Plots





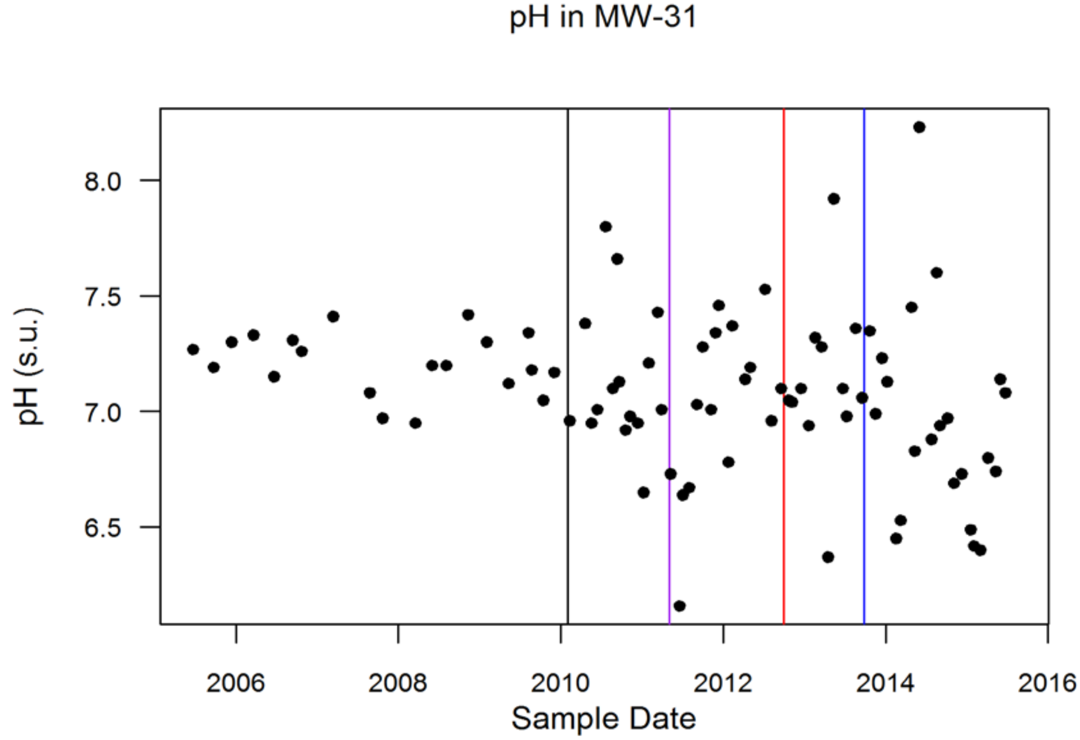
Appendix B-11: Timeseries Plots with Events

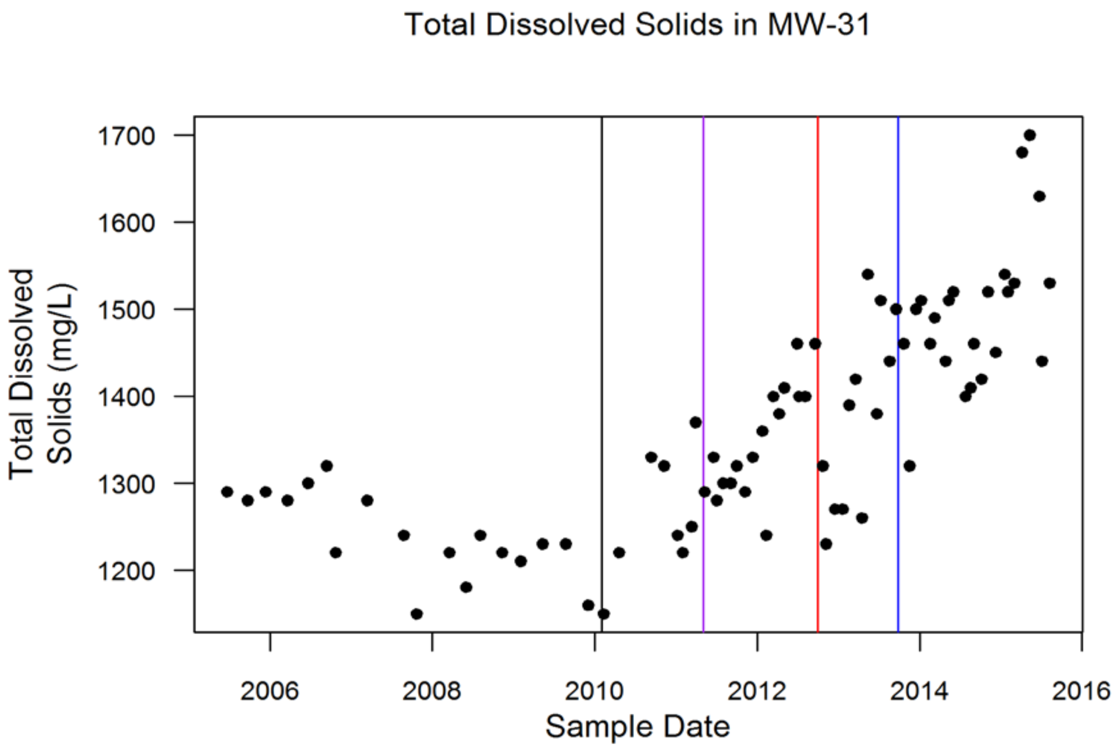




| 2010-02-01 Monthly sampling
| 2011-05-03 Well redevelopment
| 2012-10-01 Lab change
| 2013-09-27 Peak groundwater elevation

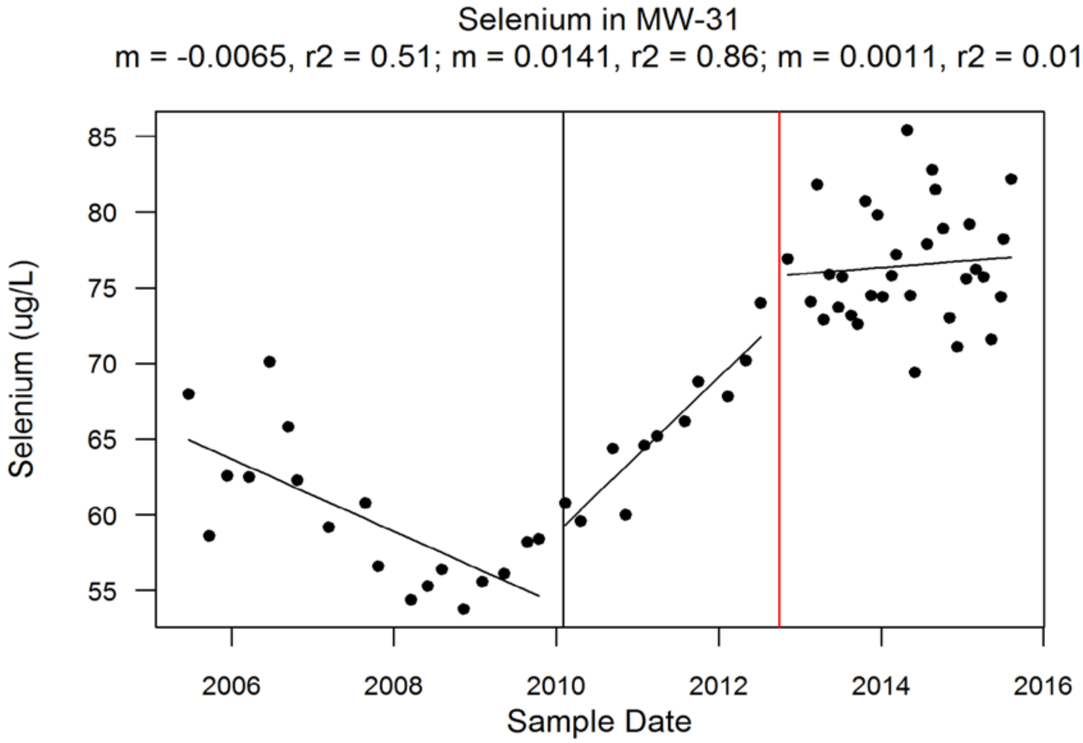
Appendix B-11: Timeseries Plots with Events

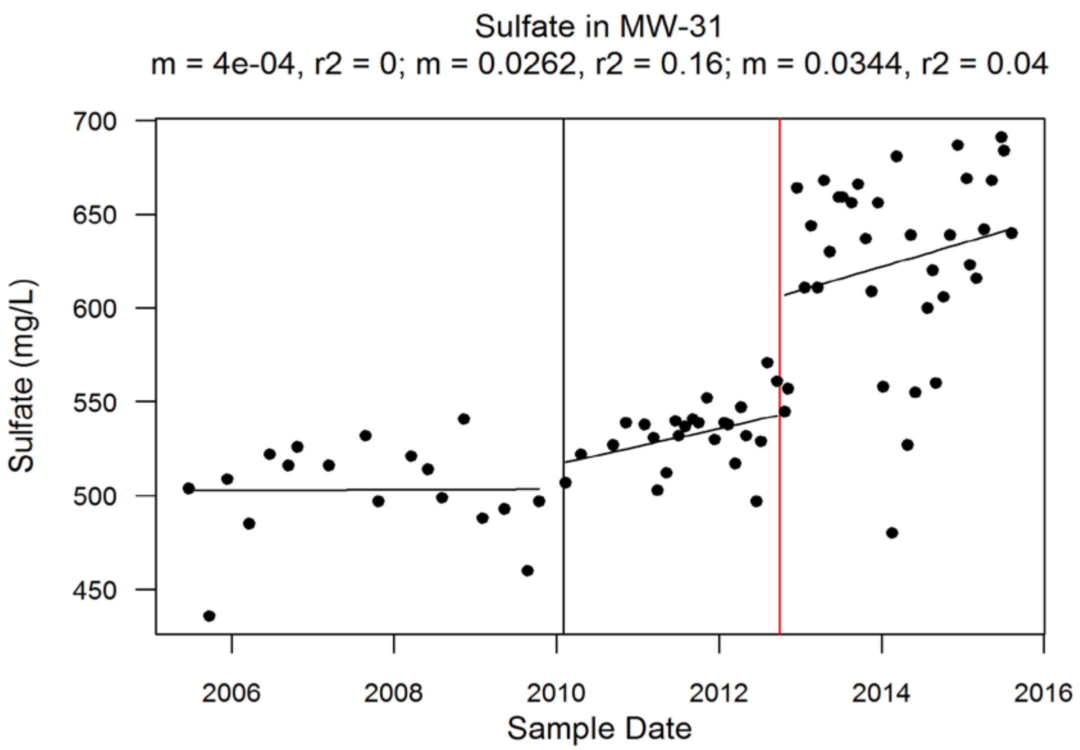




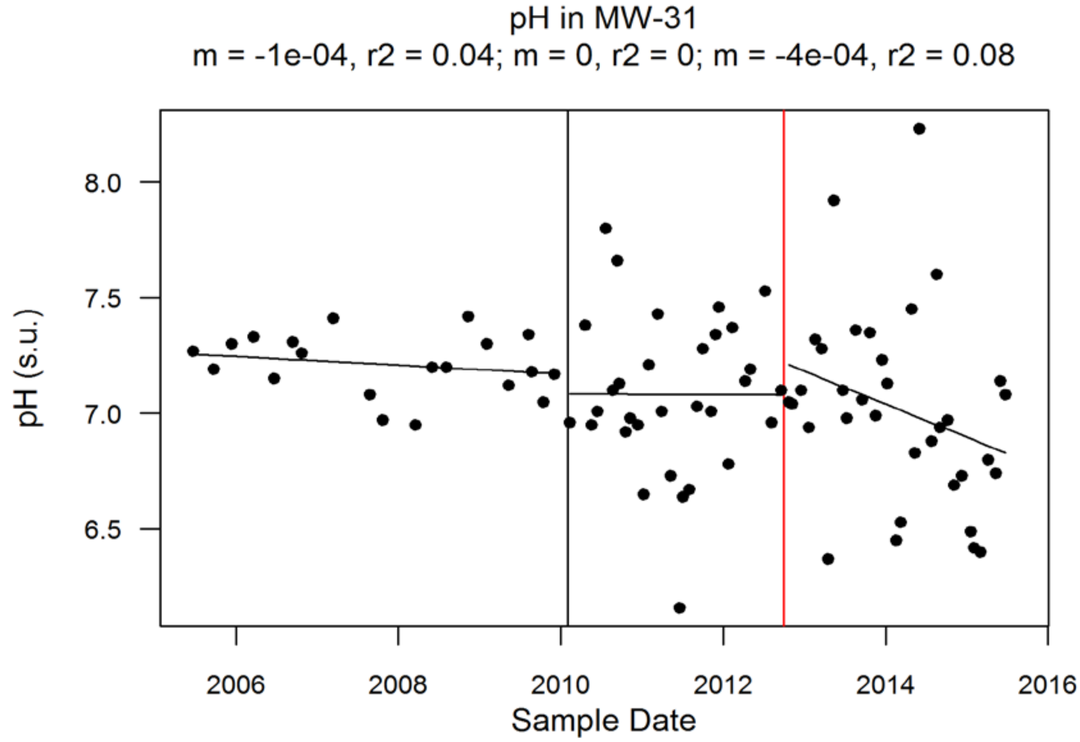
| 2010-02-01 Monthly sampling
| 2011-05-03 Well redevelopment
| 2012-10-01 Lab change
| 2013-09-27 Peak groundwater elevation

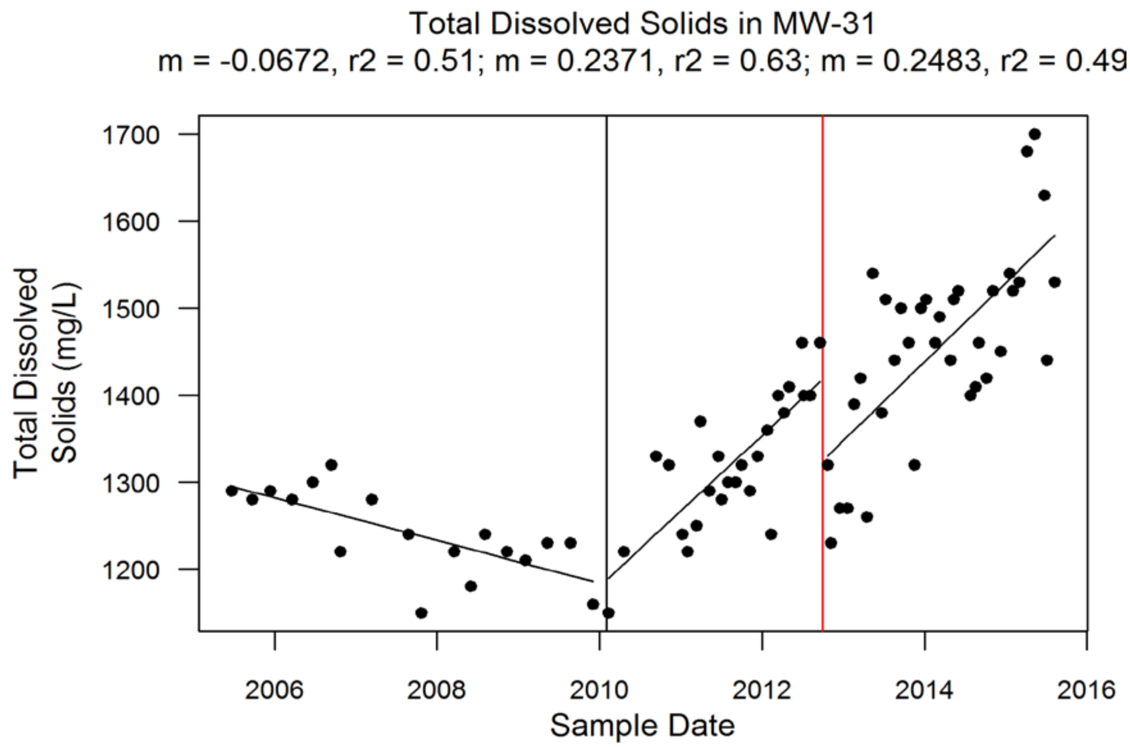
Appendix B-12: Inflection Analysis





Appendix B-12: Inflection Analysis





APPENDIX C

Geochemical Analysis for Indicator Parameters in MW-31

Appendix C-1: Summary of Geochemical Analysis for Indicator Parameters in MW-31

Well	Constituent	N	% Non-Detected Values	Mean	Standard Deviation	Shapiro-Wilk Test for Normality		Normally or Lognormally distributed?	Least Squares Regression Trend Analysis[a]		Mann-Kendall Trend Analysis[b]		2013 SAR Significant Trends?	Background Report Significant Trend?	2015 Significant Trend?
						W	p		r^2	p	S	p			
MW-31	Chloride (mg/L)	76	0	166.68	34.83	0.95671	0.01108	Not normal			2275	0	Increasing	No	Increasing
MW-31	Fluoride (mg/L)	41	0	0.84	0.09	0.94277	0.03914	Not normal			-522	2.32E-09	Decreasing	No	Decreasing
MW-31	Sulfate (mg/L)	77	0	567.45	65.07	0.93357	0.00058	Not normal			1787	0	Increasing	No	Increasing
MW-31	Uranium (µg/L)	42	0	7.53	0.76	0.98420	0.81949	Normal	0.1292495	0.019367469			None	No	Increasing

Notes:

σ = sigma
%ND = percent of non-detected values
µg/L = micrograms per liter
mg/L = milligrams per liter

N = number of valid data points
p = probability
W = Shapiro-Wilk test value
r2 = The measure of how well the trendline fits the data where r2=1 represents a perfect fit.

S = Mann-Kendall statistic

a = A regression test was performed on data that was determined to have normal or log-normal distribution
b = The Mann-Kendall test was performed on data that are not normally or lognormally distributed

Appendix C-2: Descriptive Statistics for Indicator Parameters in MW-31

Data Set	2015 SAR				2013 SAR				2008 Background Report			
Analyte	Chloride	Fluoride	Sulfate	Uranium	Chloride	Fluoride	Sulfate	Uranium	Chloride	Fluoride	Sulfate	Uranium
Units	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L
% Non-Detects	0	0	0	0	0	0	0	0	0	0	0	0
N	76	41	77	42	50	31	47	32	10	10	10	10
Normally or Lognormally Distributed?	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes
Mean	166.7	0.8	567.5	7.5	145.6	0.9	527.5	7.3	132.9	0.9	504.3	7.6
Min. Conc.	115.0	0.6	436.0	5.8	115.0	0.7	436.0	5.8	122.0	0.8	436.0	6.6
Max. Conc.	264.0	1.2	691.0	9.3	189.0	1.0	630.0	9.3	139.0	1.2	532.0	9.3
Std. Dev.	34.8	0.1	65.1	0.8	18.1	0.1	34.5	0.7	5.2	0.1	27.8	0.7
Range	149.0	0.6	255.0	3.6	74.0	0.3	194.0	3.6	17.0	0.4	96.0	2.8
Geometric Mean	163.2	0.8	563.8	7.5	144.6	0.9	526.4	7.3	132.8	0.9	503.6	7.6
Skewness	0.56	0.96	0.40	0.31	0.50	-0.17	0.56	0.73	-1.1	1.9	-1.9	1.2
Q25	138.0	0.8	521.0	7.0	132.0	0.8	507.0	6.9	131.0	0.9	497.0	7.2
Median	158.5	0.8	541.0	7.5	144.0	0.9	529.0	7.2	134.0	0.9	512.5	7.4
Q75	194.8	0.9	630.0	8.0	157.0	0.9	540.0	7.7	136.0	0.9	522.0	8.0

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	Sample Date	Parameter	Result	Units	QUAL
MW-31	06/22/2005	Chloride	139	mg/L	
MW-31	09/22/2005	Chloride	136	mg/L	
MW-31	12/14/2005	Chloride	135	mg/L	
MW-31	03/22/2006	Chloride	133	mg/L	
MW-31	06/21/2006	Chloride	138	mg/L	
MW-31	09/13/2006	Chloride	131	mg/L	
MW-31	10/25/2006	Chloride	127	mg/L	
MW-31	03/15/2007	Chloride	132	mg/L	
MW-31	08/27/2007	Chloride	136	mg/L	
MW-31	10/24/2007	Chloride	122	mg/L	
MW-31	03/19/2008	Chloride	124	mg/L	
MW-31	06/03/2008	Chloride	128	mg/L	
MW-31	08/04/2008	Chloride	124	mg/L	
MW-31	11/11/2008	Chloride	119	mg/L	
MW-31	02/03/2009	Chloride	115	mg/L	
MW-31	05/13/2009	Chloride	124	mg/L	
MW-31	08/24/2009	Chloride	122	mg/L	
MW-31	10/14/2009	Chloride	138	mg/L	
MW-31	02/09/2010	Chloride	128	mg/L	
MW-31	04/20/2010	Chloride	128	mg/L	
MW-31	09/13/2010	Chloride	139	mg/L	
MW-31	11/09/2010	Chloride	138	mg/L	
MW-31	02/01/2011	Chloride	145	mg/L	
MW-31	04/01/2011	Chloride	143	mg/L	
MW-31	05/10/2011	Chloride	143	mg/L	
MW-31	06/20/2011	Chloride	145	mg/L	
MW-31	07/05/2011	Chloride	148	mg/L	
MW-31	08/02/2011	Chloride	148	mg/L	
MW-31	09/06/2011	Chloride	148	mg/L	
MW-31	10/03/2011	Chloride	145	mg/L	
MW-31	11/08/2011	Chloride	145	mg/L	
MW-31	12/12/2011	Chloride	148	mg/L	
MW-31	01/24/2012	Chloride	155	mg/L	
MW-31	02/13/2012	Chloride	150	mg/L	
MW-31	03/13/2012	Chloride	152	mg/L	
MW-31	04/09/2012	Chloride	160	mg/L	
MW-31	05/02/2012	Chloride	151	mg/L	
MW-31	06/18/2012	Chloride	138	mg/L	
MW-31	07/09/2012	Chloride	161	mg/L	
MW-31	08/06/2012	Chloride	175	mg/L	
MW-31	09/18/2012	Chloride	172	mg/L	
MW-31	10/22/2012	Chloride	157	mg/L	
MW-31	11/06/2012	Chloride	189	mg/L	
MW-31	12/18/2012	Chloride	170	mg/L	
MW-31	01/22/2013	Chloride	176	mg/L	

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	Sample Date	Parameter	Result	Units	QUAL
MW-31	02/19/2013	Chloride	174	mg/L	
MW-31	03/19/2013	Chloride	168	mg/L	
MW-31	04/16/2013	Chloride	171	mg/L	
MW-31	05/13/2013	Chloride	169	mg/L	
MW-31	06/24/2013	Chloride	179	mg/L	
MW-31	07/09/2013	Chloride	182	mg/L	
MW-31	08/19/2013	Chloride	183	mg/L	
MW-31	09/17/2013	Chloride	193	mg/L	
MW-31	10/23/2013	Chloride	188	mg/L	
MW-31	11/18/2013	Chloride	174	mg/L	
MW-31	12/17/2013	Chloride	203	mg/L	
MW-31	01/07/2014	Chloride	194	mg/L	
MW-31	02/17/2014	Chloride	197	mg/L	
MW-31	03/10/2014	Chloride	230	mg/L	
MW-31	04/28/2014	Chloride	230	mg/L	
MW-31	05/13/2014	Chloride	200	mg/L	
MW-31	06/02/2014	Chloride	173	mg/L	
MW-31	07/28/2014	Chloride	200	mg/L	
MW-31	08/18/2014	Chloride	210	mg/L	
MW-31	09/03/2014	Chloride	210	mg/L	
MW-31	10/06/2014	Chloride	205	mg/L	
MW-31	11/04/2014	Chloride	204	mg/L	
MW-31	12/09/2014	Chloride	215	mg/L	
MW-31	01/20/2015	Chloride	226	mg/L	
MW-31	02/02/2015	Chloride	211	mg/L	
MW-31	03/03/2015	Chloride	209	mg/L	
MW-31	04/07/2015	Chloride	211	mg/L	
MW-31	05/11/2015	Chloride	225	mg/L	
MW-31	06/23/2015	Chloride	228	mg/L	
MW-31	07/06/2015	Chloride	222	mg/L	
MW-31	08/10/2015	Chloride	264	mg/L	
MW-31	06/22/2005	Fluoride	0.83	mg/L	
MW-31	09/22/2005	Fluoride	0.91	mg/L	
MW-31	12/14/2005	Fluoride	0.85	mg/L	
MW-31	03/22/2006	Fluoride	0.9	mg/L	
MW-31	06/21/2006	Fluoride	0.86	mg/L	
MW-31	09/13/2006	Fluoride	0.943913244	mg/L	
MW-31	10/25/2006	Fluoride	1.2	mg/L	
MW-31	03/15/2007	Fluoride	0.94193656	mg/L	
MW-31	08/27/2007	Fluoride	0.988639624	mg/L	
MW-31	10/24/2007	Fluoride	0.85	mg/L	
MW-31	03/19/2008	Fluoride	0.92	mg/L	
MW-31	06/03/2008	Fluoride	0.94	mg/L	
MW-31	08/04/2008	Fluoride	0.85	mg/L	
MW-31	02/03/2009	Fluoride	0.91	mg/L	

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	Sample Date	Parameter	Result	Units	QUAL
MW-31	05/13/2009	Fluoride	0.9	mg/L	
MW-31	08/24/2009	Fluoride	0.89	mg/L	
MW-31	10/14/2009	Fluoride	0.9	mg/L	
MW-31	02/09/2010	Fluoride	0.88	mg/L	
MW-31	04/20/2010	Fluoride	0.84	mg/L	
MW-31	09/13/2010	Fluoride	0.89	mg/L	
MW-31	11/09/2010	Fluoride	0.84	mg/L	
MW-31	02/01/2011	Fluoride	0.83	mg/L	
MW-31	04/01/2011	Fluoride	0.83	mg/L	
MW-31	08/02/2011	Fluoride	0.8	mg/L	
MW-31	10/03/2011	Fluoride	0.84	mg/L	
MW-31	02/13/2012	Fluoride	0.86	mg/L	
MW-31	05/02/2012	Fluoride	0.78	mg/L	
MW-31	07/09/2012	Fluoride	0.78	mg/L	
MW-31	11/06/2012	Fluoride	0.763	mg/L	
MW-31	02/19/2013	Fluoride	0.733	mg/L	
MW-31	05/13/2013	Fluoride	0.764	mg/L	
MW-31	07/09/2013	Fluoride	0.844	mg/L	
MW-31	11/18/2013	Fluoride	0.764	mg/L	
MW-31	02/17/2014	Fluoride	0.811	mg/L	
MW-31	03/10/2014	Fluoride	0.824	mg/L	
MW-31	06/02/2014	Fluoride	0.737	mg/L	
MW-31	09/03/2014	Fluoride	0.8	mg/L	
MW-31	11/04/2014	Fluoride	0.605	mg/L	
MW-31	02/02/2015	Fluoride	0.76	mg/L	
MW-31	04/07/2015	Fluoride	0.745	mg/L	
MW-31	08/10/2015	Fluoride	0.724	mg/L	
MW-31	06/22/2005	Sulfate	504	mg/L	
MW-31	09/22/2005	Sulfate	436	mg/L	D
MW-31	12/14/2005	Sulfate	509	mg/L	D
MW-31	03/22/2006	Sulfate	485	mg/L	D
MW-31	06/21/2006	Sulfate	522	mg/L	D
MW-31	09/13/2006	Sulfate	516	mg/L	D
MW-31	10/25/2006	Sulfate	526	mg/L	D
MW-31	03/15/2007	Sulfate	516	mg/L	D
MW-31	08/27/2007	Sulfate	532	mg/L	D
MW-31	10/24/2007	Sulfate	497	mg/L	D
MW-31	03/19/2008	Sulfate	521	mg/L	D
MW-31	06/03/2008	Sulfate	514	mg/L	D
MW-31	08/04/2008	Sulfate	499	mg/L	D
MW-31	11/11/2008	Sulfate	541	mg/L	D
MW-31	02/03/2009	Sulfate	488	mg/L	D
MW-31	05/13/2009	Sulfate	493	mg/L	D
MW-31	08/24/2009	Sulfate	460	mg/L	D
MW-31	10/14/2009	Sulfate	497	mg/L	D

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	Sample Date	Parameter	Result	Units	QUAL
MW-31	02/09/2010	Sulfate	507	mg/L	D
MW-31	04/20/2010	Sulfate	522	mg/L	D
MW-31	09/13/2010	Sulfate	527	mg/L	D
MW-31	11/09/2010	Sulfate	539	mg/L	D
MW-31	02/01/2011	Sulfate	538	mg/L	D
MW-31	03/14/2011	Sulfate	531	mg/L	D
MW-31	04/01/2011	Sulfate	503	mg/L	D
MW-31	05/10/2011	Sulfate	512	mg/L	D
MW-31	06/20/2011	Sulfate	540	mg/L	D
MW-31	07/05/2011	Sulfate	532	mg/L	D
MW-31	08/02/2011	Sulfate	537	mg/L	D
MW-31	09/06/2011	Sulfate	541	mg/L	D
MW-31	10/03/2011	Sulfate	539	mg/L	D
MW-31	11/08/2011	Sulfate	552	mg/L	D
MW-31	12/12/2011	Sulfate	530	mg/L	D
MW-31	01/24/2012	Sulfate	539	mg/L	D
MW-31	02/13/2012	Sulfate	538	mg/L	D
MW-31	03/13/2012	Sulfate	517	mg/L	D
MW-31	04/09/2012	Sulfate	547	mg/L	D
MW-31	05/02/2012	Sulfate	532	mg/L	D
MW-31	06/18/2012	Sulfate	497	mg/L	D
MW-31	07/09/2012	Sulfate	529	mg/L	D
MW-31	08/06/2012	Sulfate	571	mg/L	D
MW-31	09/18/2012	Sulfate	561	mg/L	D
MW-31	10/22/2012	Sulfate	545	mg/L	
MW-31	11/06/2012	Sulfate	557	mg/L	
MW-31	12/18/2012	Sulfate	664	mg/L	
MW-31	01/22/2013	Sulfate	611	mg/L	
MW-31	02/19/2013	Sulfate	644	mg/L	
MW-31	03/19/2013	Sulfate	611	mg/L	
MW-31	04/16/2013	Sulfate	668	mg/L	
MW-31	05/13/2013	Sulfate	630	mg/L	
MW-31	06/24/2013	Sulfate	659	mg/L	
MW-31	07/09/2013	Sulfate	659	mg/L	
MW-31	08/19/2013	Sulfate	656	mg/L	
MW-31	09/17/2013	Sulfate	666	mg/L	
MW-31	10/23/2013	Sulfate	637	mg/L	
MW-31	11/18/2013	Sulfate	609	mg/L	
MW-31	12/17/2013	Sulfate	656	mg/L	
MW-31	01/07/2014	Sulfate	558	mg/L	
MW-31	02/17/2014	Sulfate	480	mg/L	
MW-31	03/10/2014	Sulfate	681	mg/L	
MW-31	04/28/2014	Sulfate	527	mg/L	
MW-31	05/13/2014	Sulfate	639	mg/L	
MW-31	06/02/2014	Sulfate	555	mg/L	

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	Sample Date	Parameter	Result	Units	QUAL
MW-31	07/28/2014	Sulfate	600	mg/L	
MW-31	08/18/2014	Sulfate	620	mg/L	
MW-31	09/03/2014	Sulfate	560	mg/L	
MW-31	10/06/2014	Sulfate	606	mg/L	
MW-31	11/04/2014	Sulfate	639	mg/L	
MW-31	12/09/2014	Sulfate	687	mg/L	
MW-31	01/20/2015	Sulfate	669	mg/L	
MW-31	02/02/2015	Sulfate	623	mg/L	
MW-31	03/03/2015	Sulfate	616	mg/L	
MW-31	04/07/2015	Sulfate	642	mg/L	
MW-31	05/11/2015	Sulfate	668	mg/L	
MW-31	06/23/2015	Sulfate	691	mg/L	
MW-31	07/06/2015	Sulfate	684	mg/L	
MW-31	08/10/2015	Sulfate	640	mg/L	
MW-31	06/22/2005	Uranium	6.56	ug/L	
MW-31	09/22/2005	Uranium	7.25	ug/L	
MW-31	12/14/2005	Uranium	7.27	ug/L	
MW-31	03/22/2006	Uranium	8.04	ug/L	
MW-31	06/21/2006	Uranium	9.32	ug/L	
MW-31	09/13/2006	Uranium	8.03	ug/L	
MW-31	10/25/2006	Uranium	7.71	ug/L	
MW-31	03/15/2007	Uranium	7.6	ug/L	
MW-31	08/27/2007	Uranium	7.18	ug/L	
MW-31	10/24/2007	Uranium	7.2	ug/L	
MW-31	03/19/2008	Uranium	7.02	ug/L	
MW-31	06/03/2008	Uranium	6.95	ug/L	
MW-31	08/04/2008	Uranium	6.77	ug/L	
MW-31	11/11/2008	Uranium	6.35	ug/L	
MW-31	02/03/2009	Uranium	7.08	ug/L	
MW-31	05/13/2009	Uranium	6.76	ug/L	
MW-31	08/24/2009	Uranium	6.97	ug/L	
MW-31	10/14/2009	Uranium	6.97	ug/L	
MW-31	02/09/2010	Uranium	7.12	ug/L	
MW-31	04/20/2010	Uranium	6.74	ug/L	
MW-31	09/13/2010	Uranium	7.23	ug/L	
MW-31	11/09/2010	Uranium	6.72	ug/L	
MW-31	02/01/2011	Uranium	5.77	ug/L	
MW-31	04/01/2011	Uranium	6.81	ug/L	
MW-31	08/02/2011	Uranium	7.68	ug/L	
MW-31	10/03/2011	Uranium	8.87	ug/L	
MW-31	02/13/2012	Uranium	7.96	ug/L	
MW-31	05/02/2012	Uranium	7.34	ug/L	
MW-31	07/09/2012	Uranium	8.17	ug/L	
MW-31	11/06/2012	Uranium	8.73	ug/L	
MW-31	02/19/2013	Uranium	7.33	ug/L	

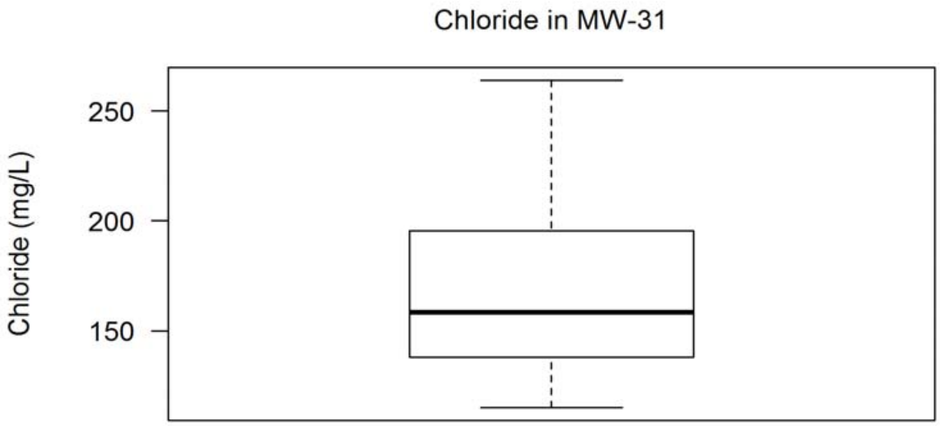
Appendix C-3: Indicator Parameter Data Used in Analysis

Well	Sample Date	Parameter	Result	Units	QUAL
MW-31	05/13/2013	Uranium	7.63	ug/L	
MW-31	07/09/2013	Uranium	7.9	ug/L	
MW-31	11/18/2013	Uranium	9.03	ug/L	
MW-31	02/17/2014	Uranium	7.65	ug/L	
MW-31	03/10/2014	Uranium	7.96	ug/L	
MW-31	06/02/2014	Uranium	7.72	ug/L	
MW-31	09/03/2014	Uranium	8.4	ug/L	
MW-31	11/04/2014	Uranium	7.71	ug/L	
MW-31	02/02/2015	Uranium	8	ug/L	
MW-31	04/07/2015	Uranium	8.07	ug/L	
MW-31	08/10/2015	Uranium	8.76	ug/L	

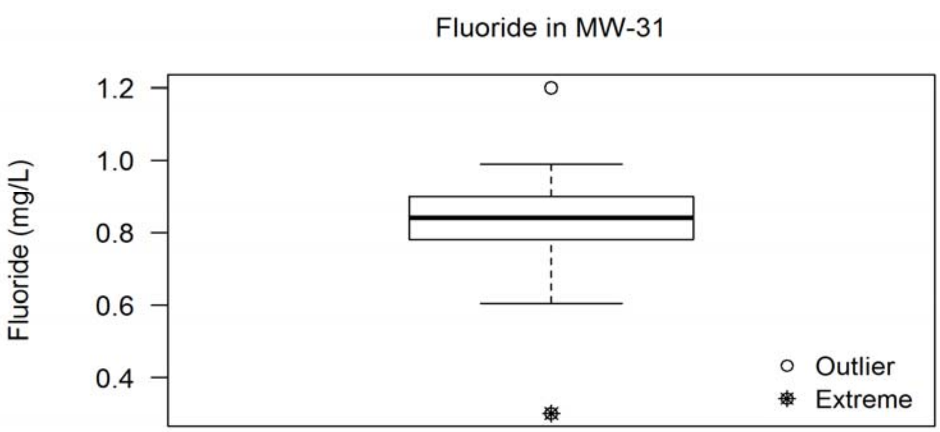
Appendix C-4: Indicator Parameter Data Removed from Analysis

Reason	Location ID	Date Sampled	Parameter Name	Report Result	Report Units	Lab Qualifier
Field Duplicate	MW-31	03/15/2007	Chloride	132	mg/L	
Field Duplicate	MW-31	02/09/2010	Chloride	130	mg/L	
Field Duplicate	MW-31	09/13/2010	Chloride	132	mg/L	
Field Duplicate	MW-31	07/05/2011	Chloride	145	mg/L	
Field Duplicate	MW-31	10/23/2013	Chloride	184	mg/L	
Field Duplicate	MW-31	03/15/2007	Fluoride	1	mg/L	
Extreme (Low)	MW-31	11/11/2008	Fluoride	0.3	mg/L	
Field Duplicate	MW-31	02/09/2010	Fluoride	0.85	mg/L	
Field Duplicate	MW-31	09/13/2010	Fluoride	0.89	mg/L	
Field Duplicate	MW-31	03/15/2007	Sulfate	514	mg/L	D
Field Duplicate	MW-31	02/09/2010	Sulfate	507	mg/L	D
Field Duplicate	MW-31	09/13/2010	Sulfate	540	mg/L	D
Field Duplicate	MW-31	07/05/2011	Sulfate	536	mg/L	D
Field Duplicate	MW-31	10/23/2013	Sulfate	631	mg/L	
Field Duplicate	MW-31	02/09/2010	Uranium	7.07	ug/L	
Field Duplicate	MW-31	09/13/2010	Uranium	7.14	ug/L	

Appendix C-5: Box Plots for Indicator Parameters in MW-31

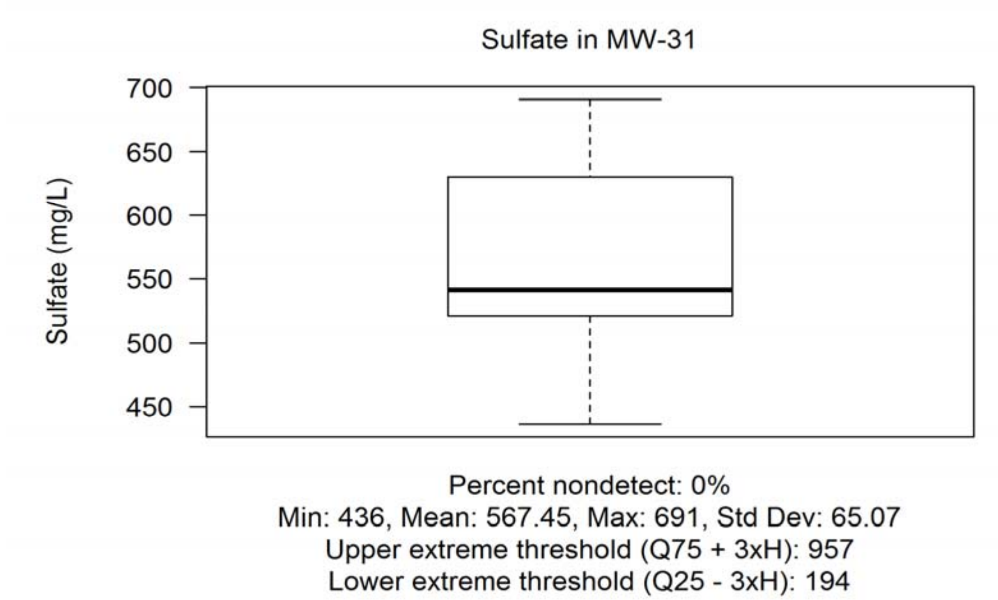


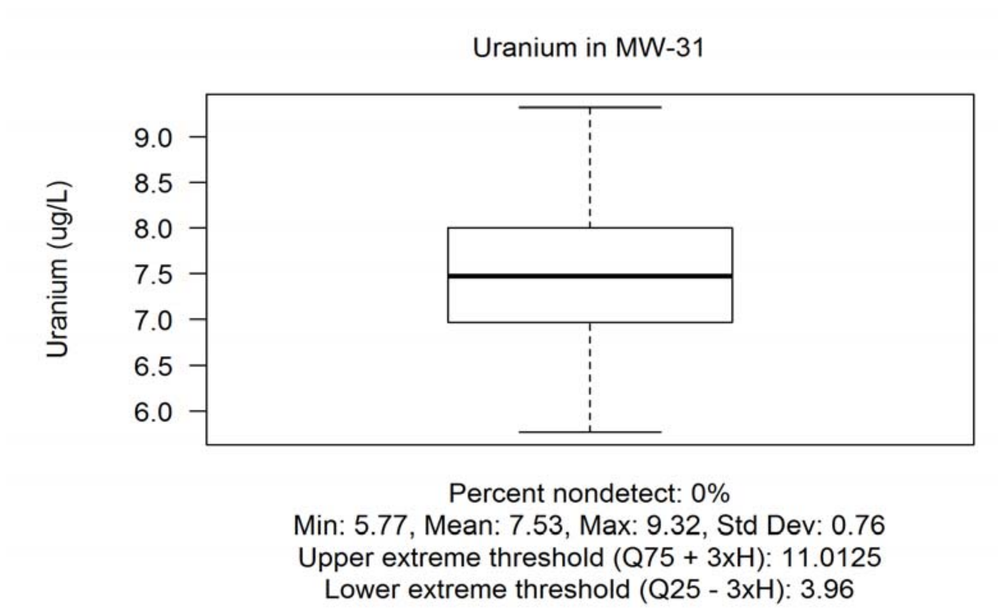
Percent nondetect: 0%
Min: 115, Mean: 166.68, Max: 264, Std Dev: 34.83
Upper extreme threshold (Q75 + 3xH): 365
Lower extreme threshold (Q25 - 3xH): -32.25



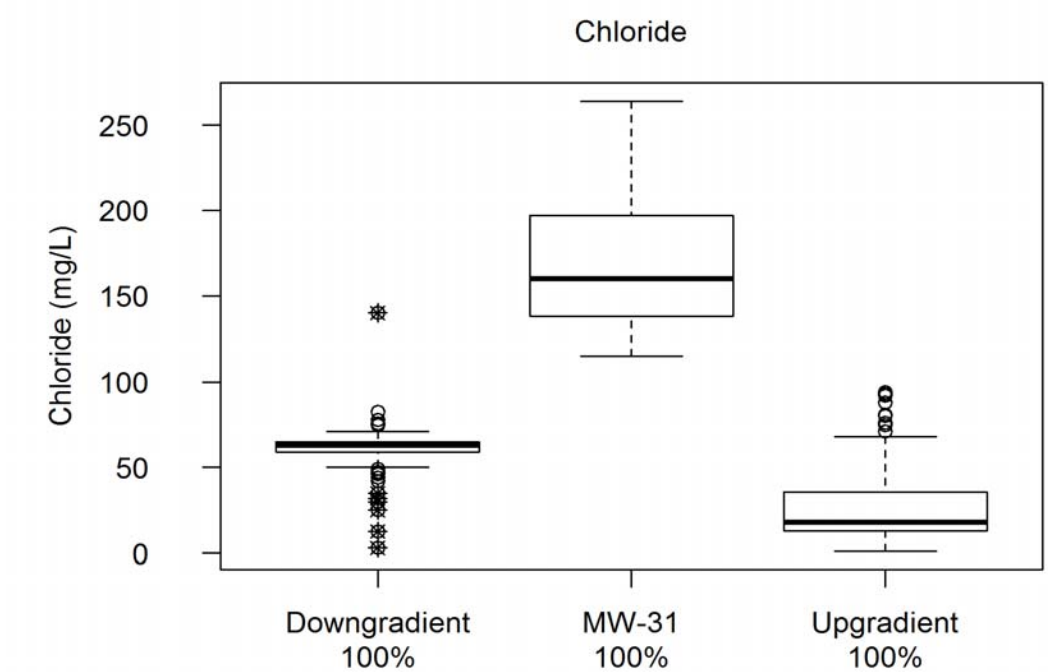
Percent nondetect: 0%
Min: 0.3, Mean: 0.83, Max: 1.2, Std Dev: 0.13
Upper extreme threshold (Q75 + 3xH): 1.25
Lower extreme threshold (Q25 - 3xH): 0.4275

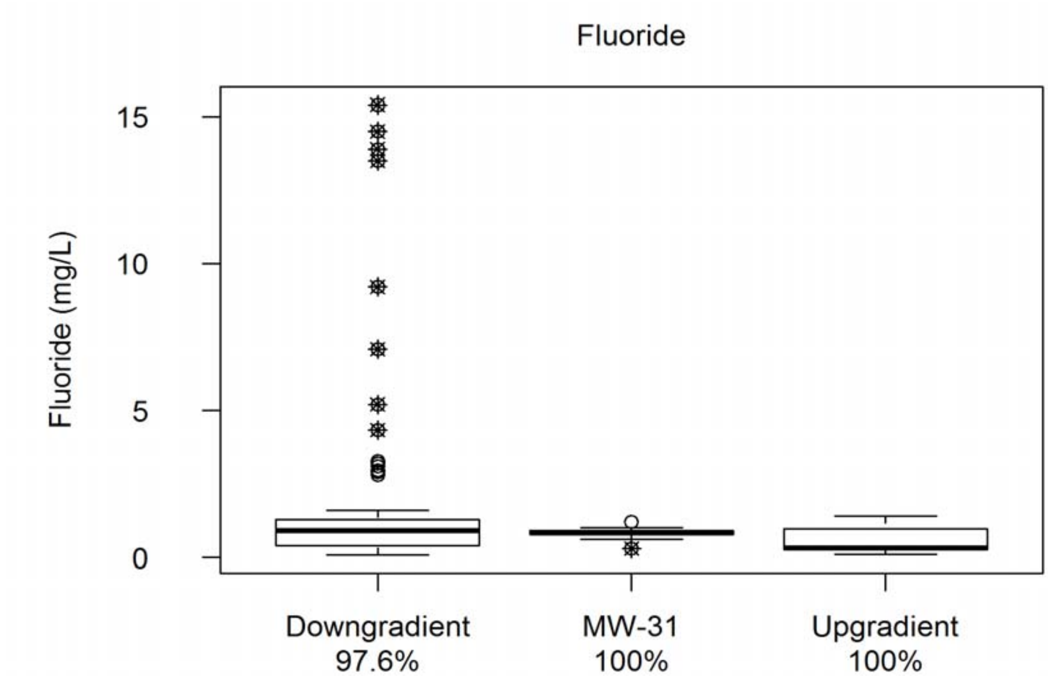
Appendix C-5: Box Plots for Indicator Parameters in MW-31





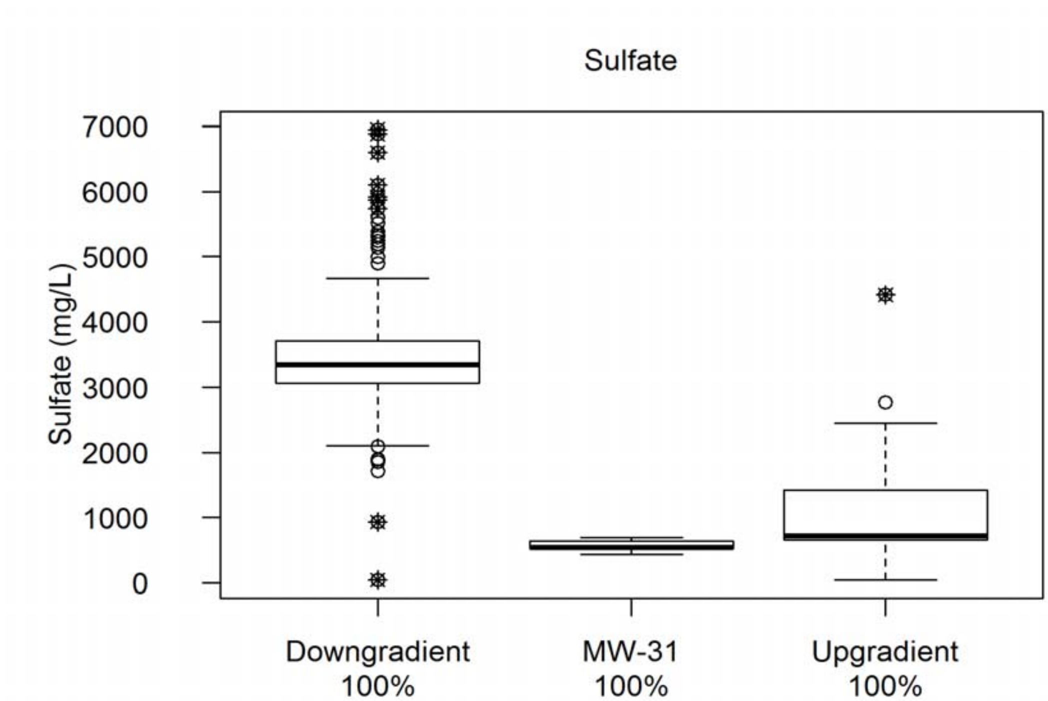
Appendix C-6: Box Plots for Indicator Parameters in MW-31 and Upgradient and Downgradient Wells

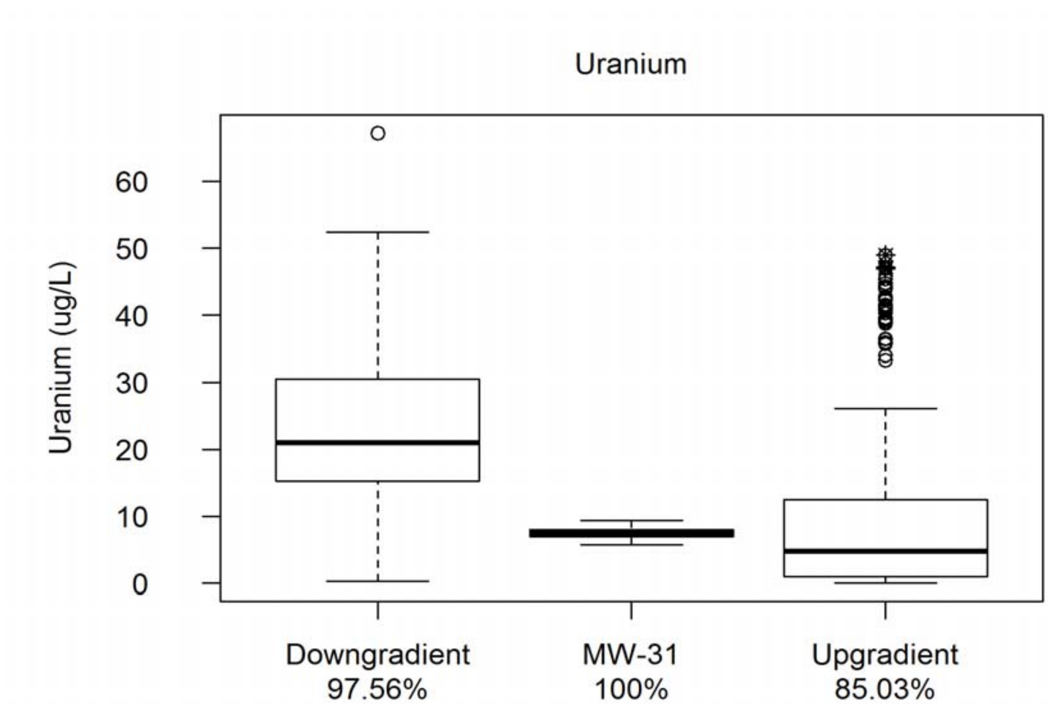




Downgradient wells: MW-20 and MW-22. Upgradient wells: MW-1, MW-18, and MW-19

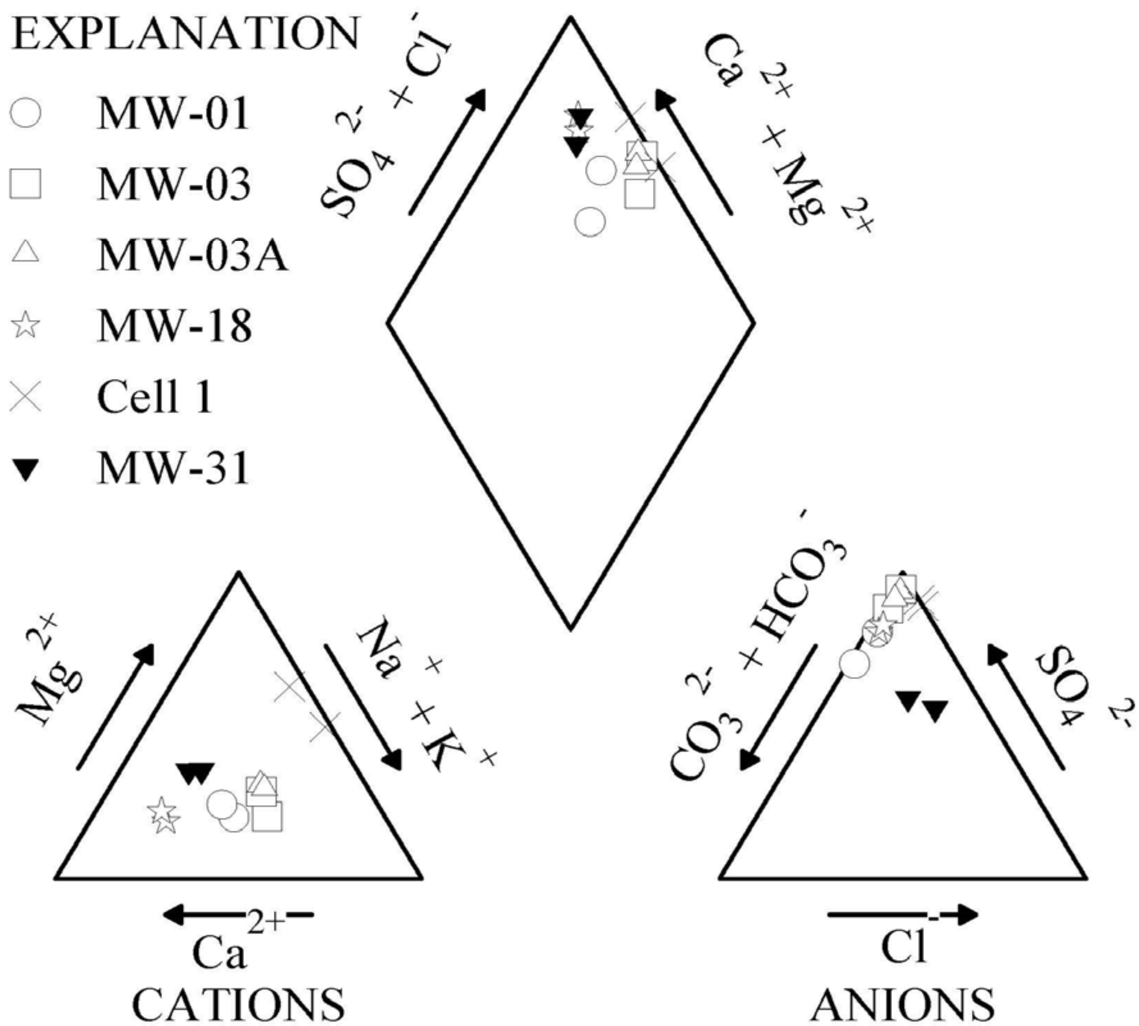
Appendix C-6: Box Plots for Indicator Parameters in MW-31 and Upgradient and Downgradient Wells



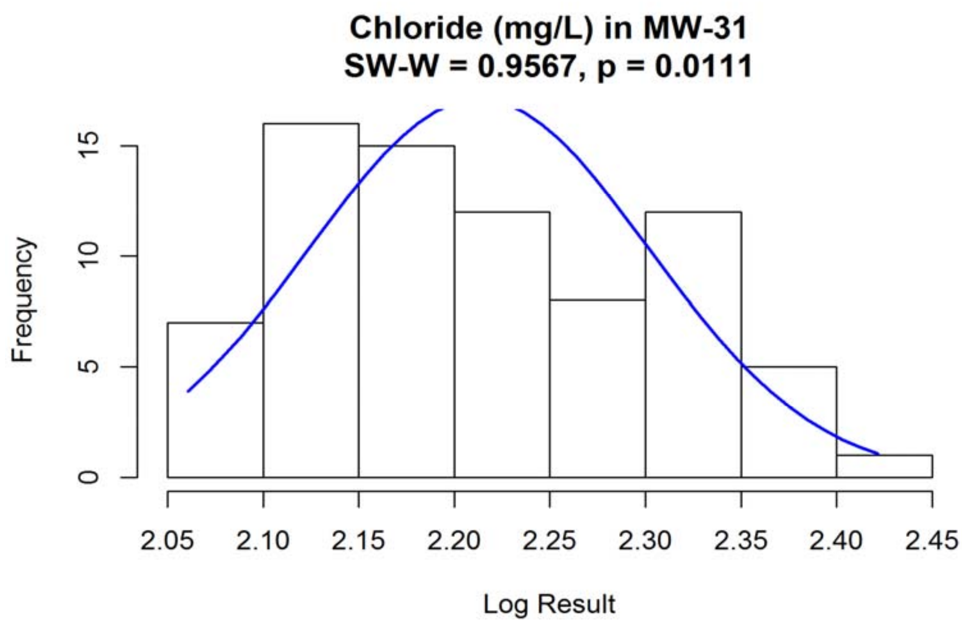


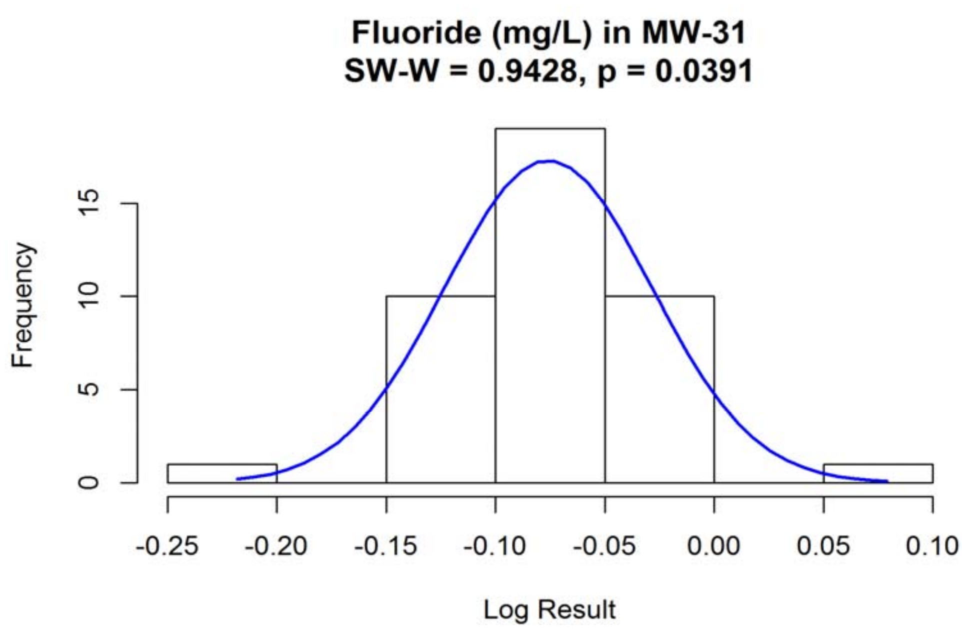
Downgradient wells: MW-20 and MW-22. Upgradient wells: MW-1, MW-18, and MW-19

Appendix C-7: Piper Diagram for MW-31 and Upgradient and Downgradient Wells

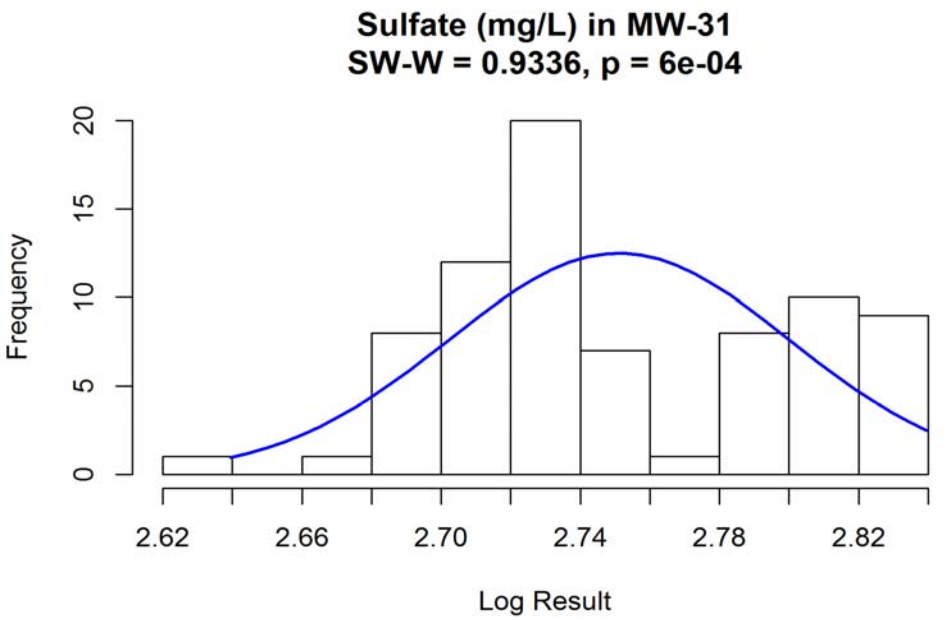


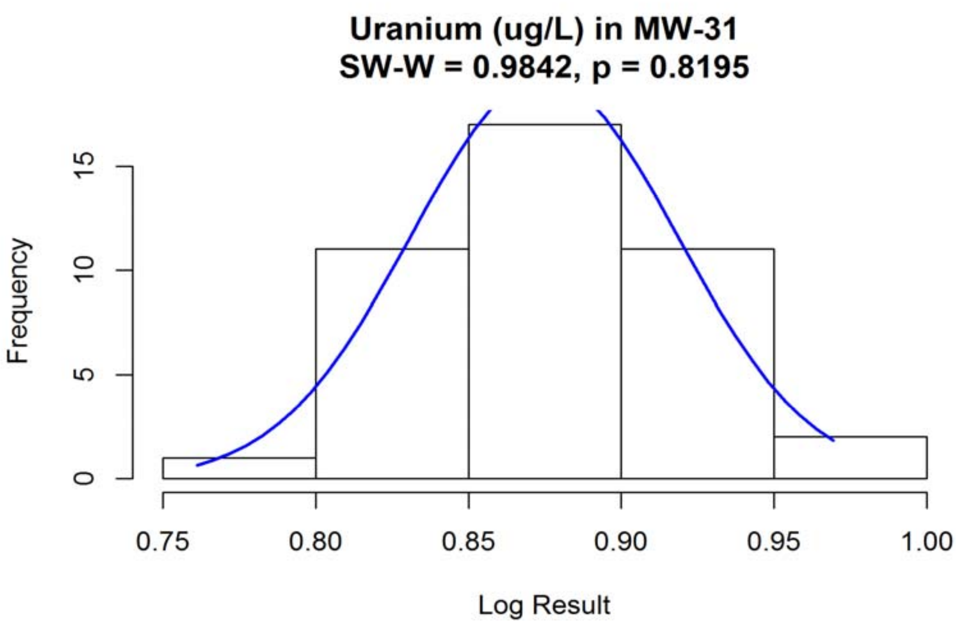
Appendix C-8: Histograms for Indicator Parameters in MW-31



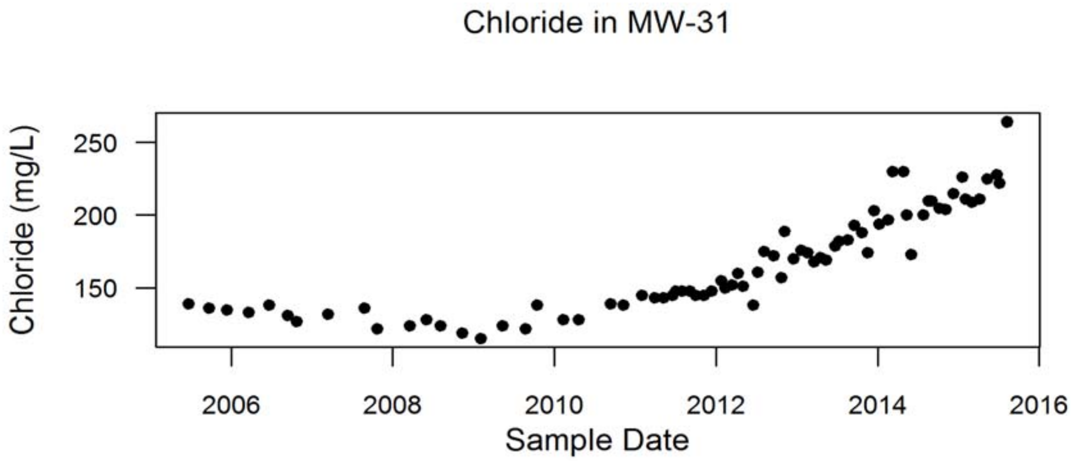


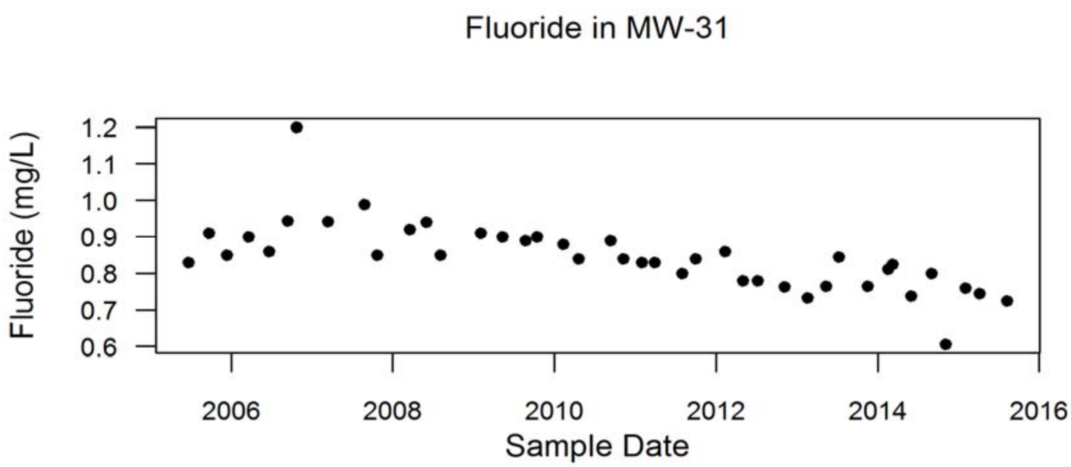
Appendix C-8: Histograms for Indicator Parameters in MW-31



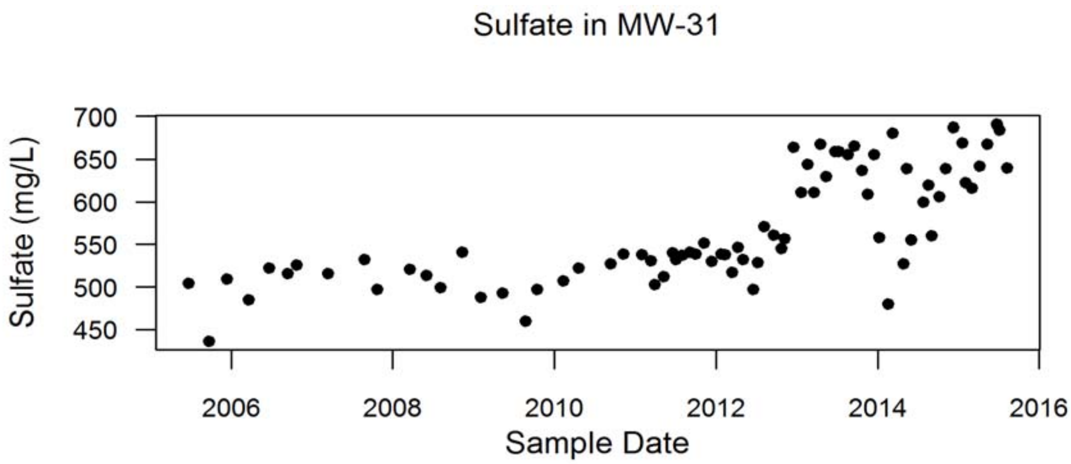


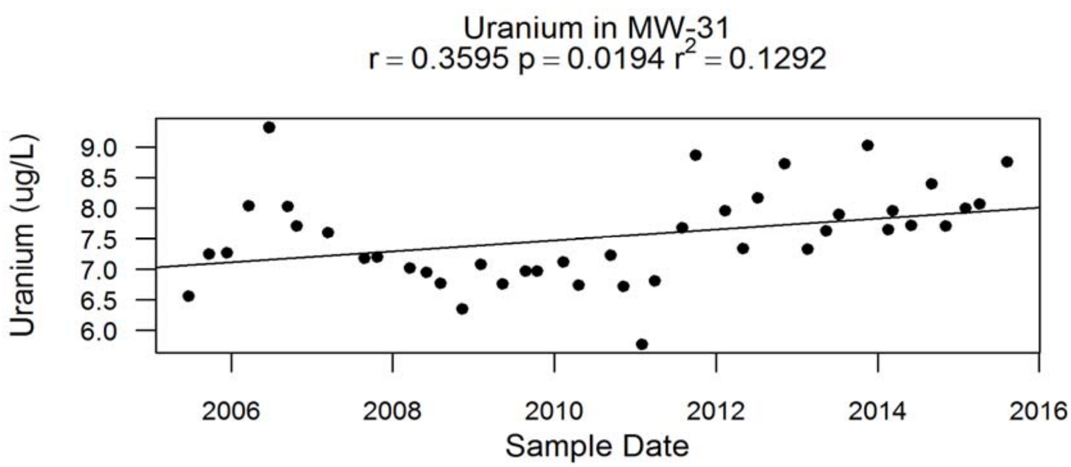
Appendix C-9: Linear Regressions for Indicator Parameters in MW-31



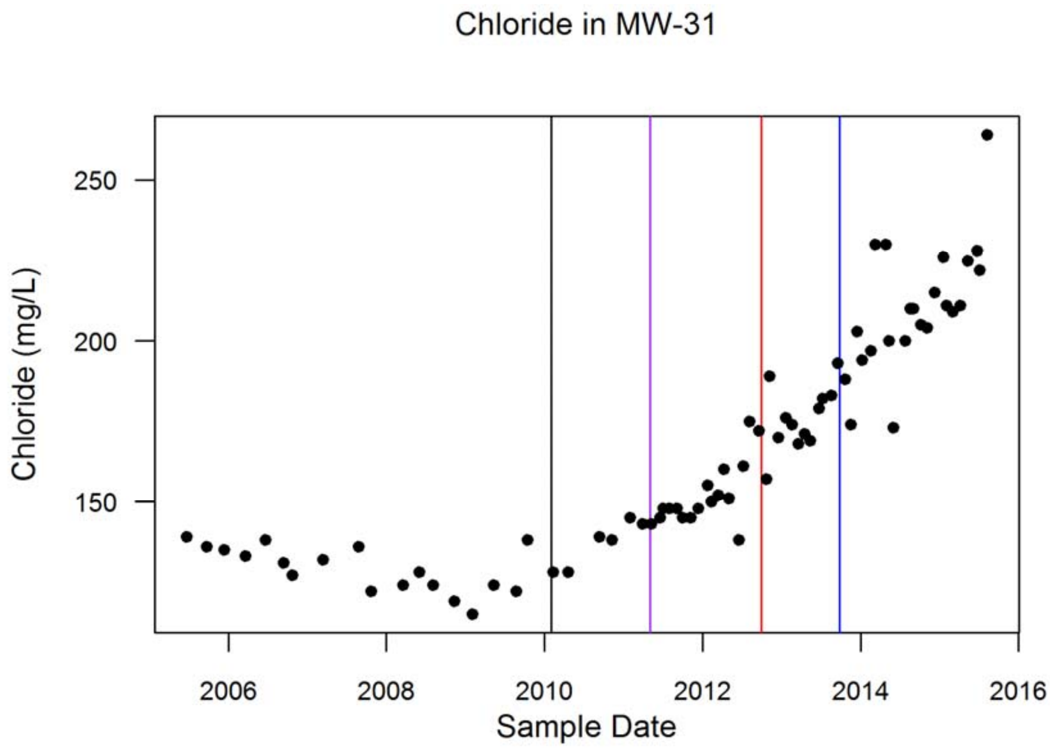


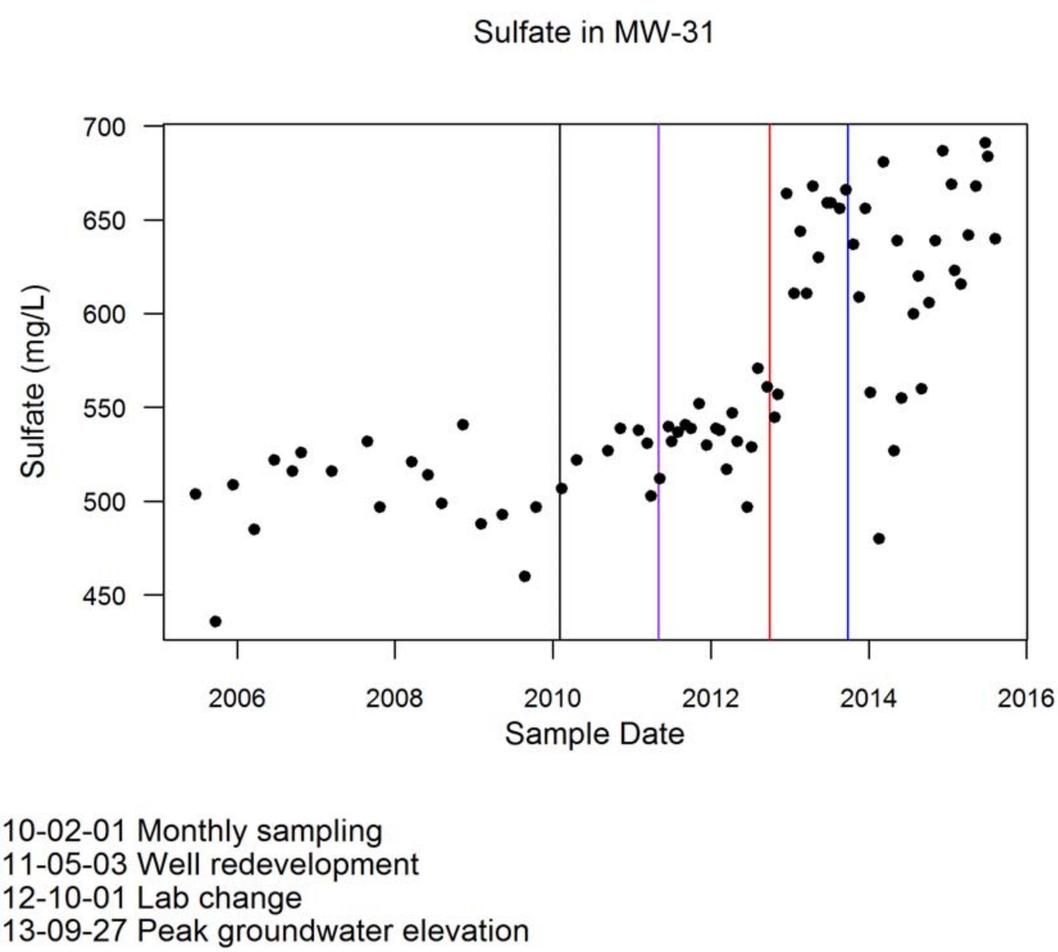
Appendix C-9: Linear Regressions for Indicator Parameters in MW-31



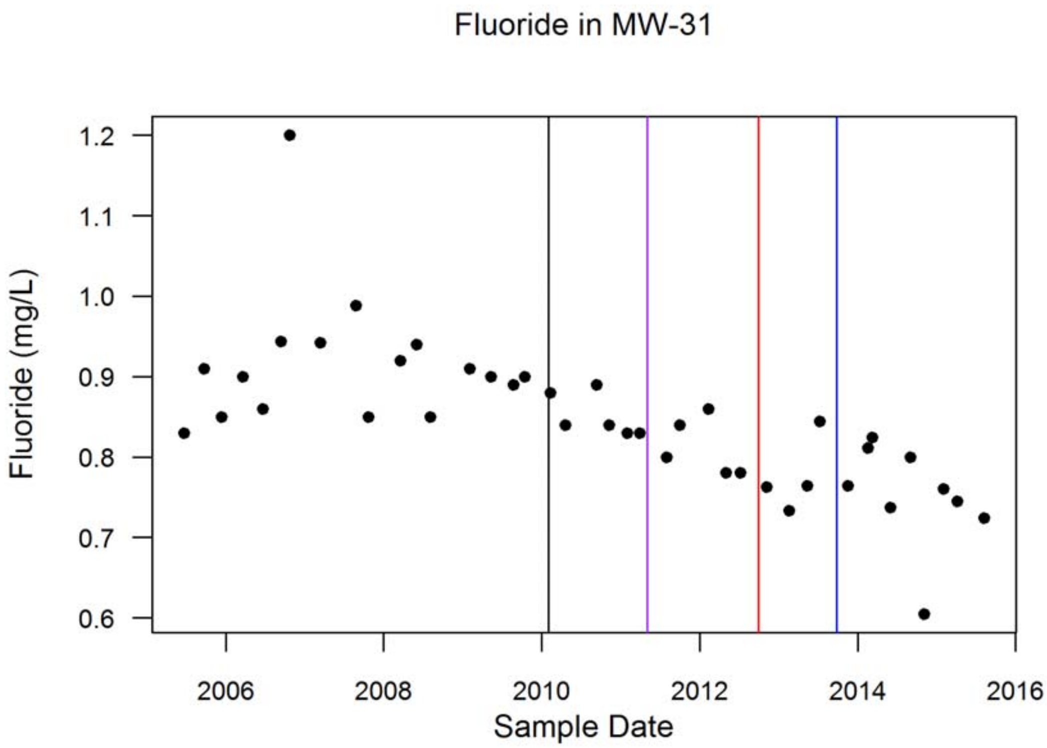


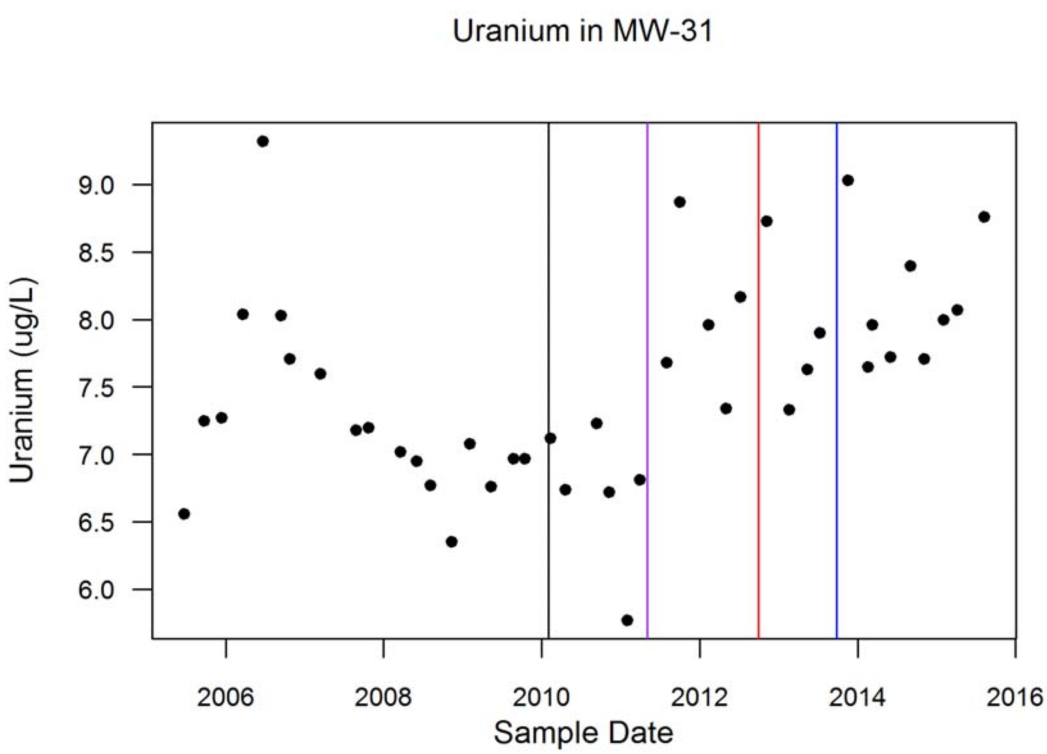
Appendix C-10: Timeseries Plots with Events





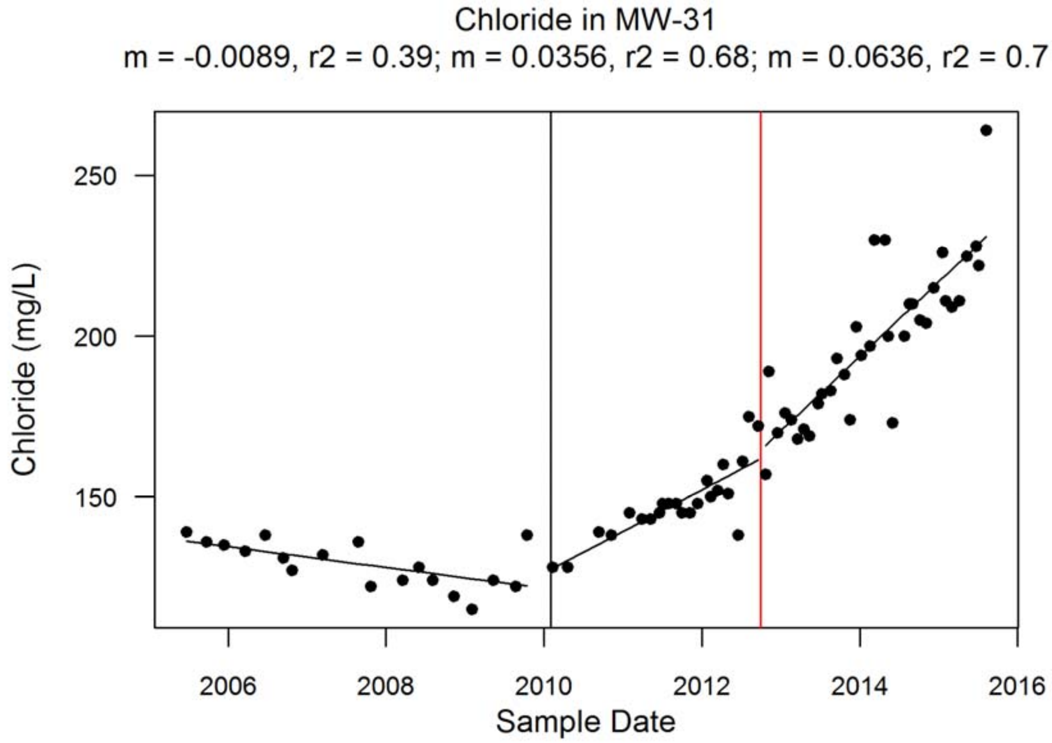
Appendix C-10: Timeseries Plots with Events

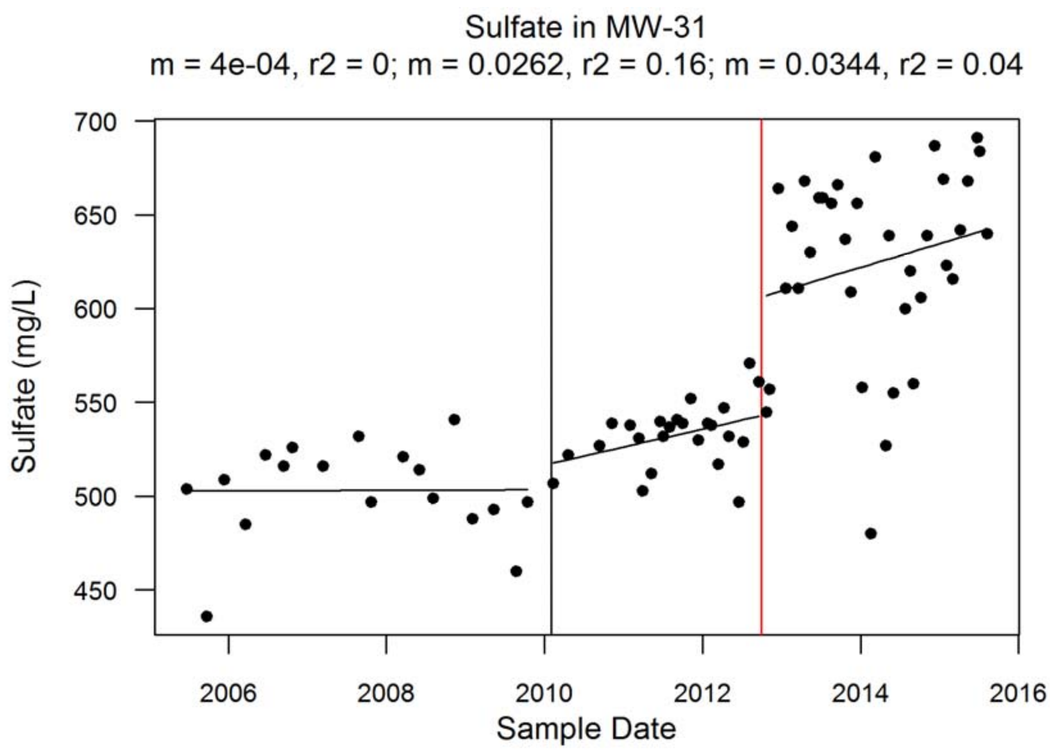




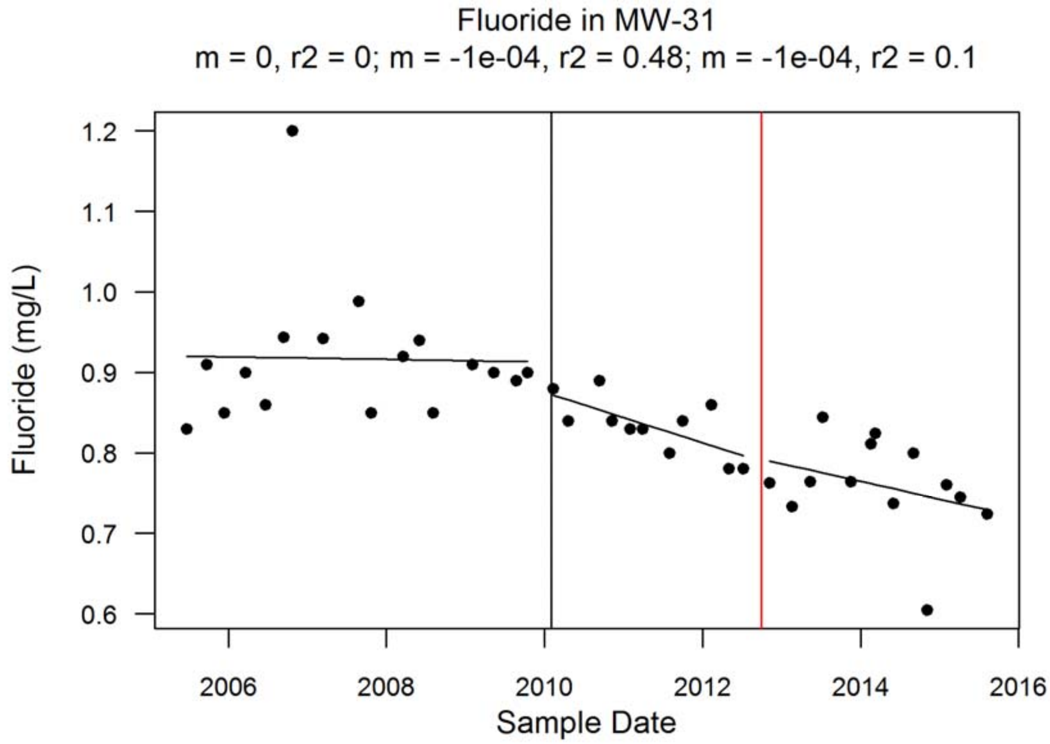
| 2010-02-01 Monthly sampling
| 2011-05-03 Well redevelopment
| 2012-10-01 Lab change
| 2013-09-27 Peak groundwater elevation

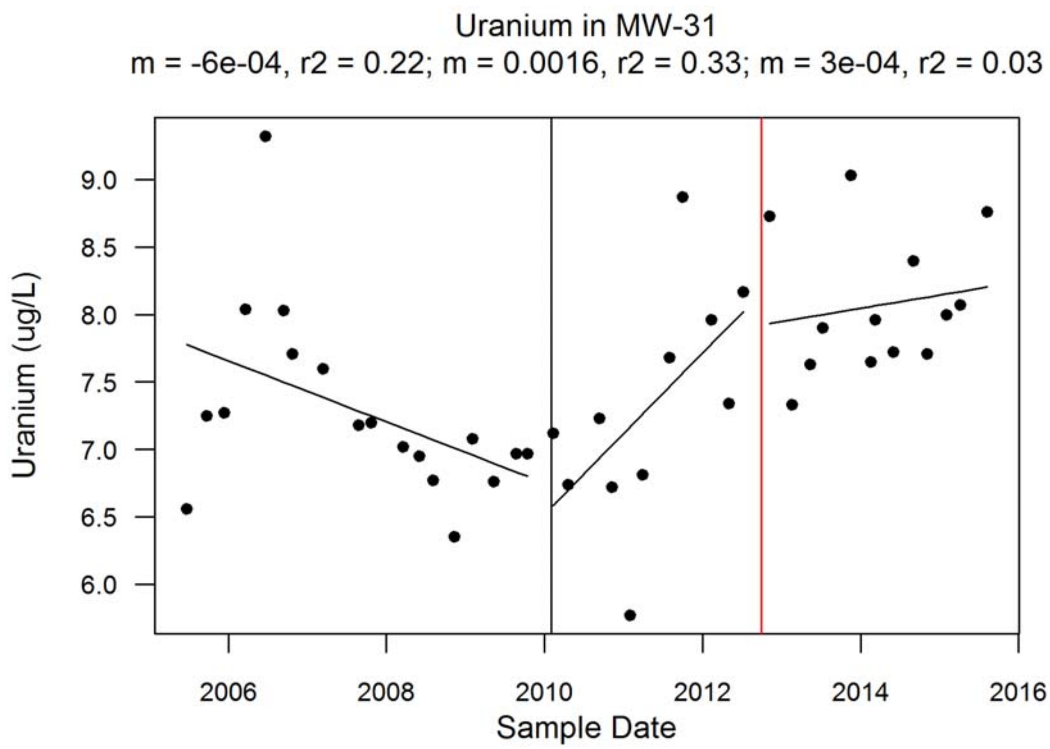
Appendix C-11: Inflection Analysis





Appendix C-11: Inflection Analysis





APPENDIX D

pH Analysis

Appendix D-1: pH Analysis Summary Table

Well	Constituent	N	% Non-Detected Values	Mean	Minimum	Maximum	Standard Deviation	Shapiro-Wilk Test for Normality			Least Squares Regression Trend Analysis			Significant Trend
								W	p	Normally or Lognormally distributed?	r^2	p	Trend	
MW-31	pH	85	0	7.08612	6.16	8.23	0.34	0.9739	0.0817	Yes	0	0.0195	Decreasing	Yes

Notes:

N = number of valid data points

W = Shapiro Wilk test value

p = probability

r^2 = The measure of how well the trendline fits the data where r^2=1 represents a perfect fit.

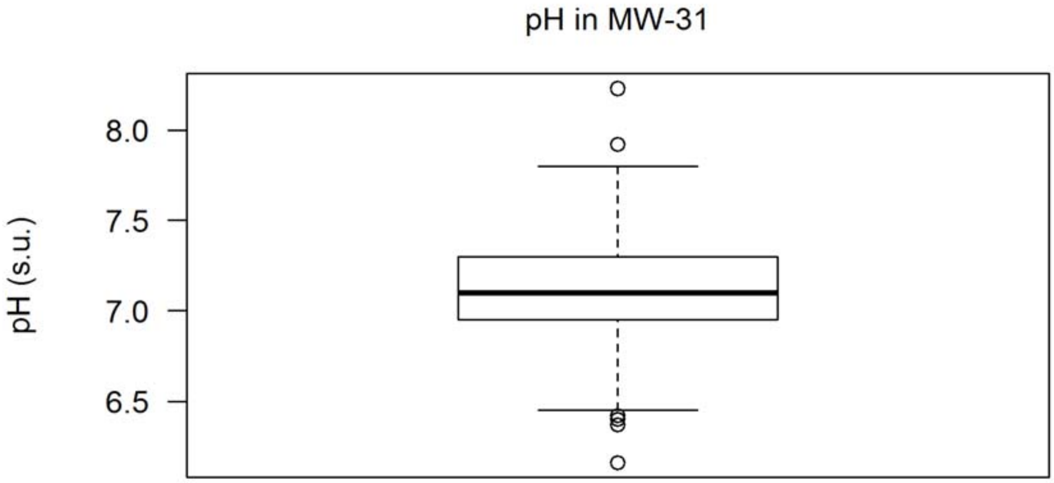
Appendix D-2: Field pH Measurements Used for pH Analysis

Location ID	Field Parameter	Date Measured	Field Measurement
MW-31	pH	6/22/2005	7.27
MW-31	pH	9/22/2005	7.19
MW-31	pH	12/14/2005	7.3
MW-31	pH	3/22/2006	7.33
MW-31	pH	6/21/2006	7.15
MW-31	pH	9/13/2006	7.31
MW-31	pH	10/25/2006	7.26
MW-31	pH	3/15/2007	7.41
MW-31	pH	8/27/2007	7.08
MW-31	pH	10/24/2007	6.97
MW-31	pH	3/19/2008	6.95
MW-31	pH	6/3/2008	7.2
MW-31	pH	8/4/2008	7.2
MW-31	pH	11/10/2008	7.42
MW-31	pH	2/3/2009	7.3
MW-31	pH	5/13/2009	7.12
MW-31	pH	8/10/2009	7.34
MW-31	pH	8/24/2009	7.18
MW-31	pH	10/14/2009	7.05
MW-31	pH	12/2/2009	7.17
MW-31	pH	2/9/2010	6.96
MW-31	pH	4/20/2010	7.38
MW-31	pH	5/21/2010	6.95
MW-31	pH	6/15/2010	7.01
MW-31	pH	7/21/2010	7.8
MW-31	pH	8/24/2010	7.1
MW-31	pH	9/13/2010	7.66
MW-31	pH	9/21/2010	7.13
MW-31	pH	10/19/2010	6.92
MW-31	pH	11/9/2010	6.98
MW-31	pH	12/14/2010	6.95
MW-31	pH	1/10/2011	6.65
MW-31	pH	2/1/2011	7.21
MW-31	pH	3/14/2011	7.43
MW-31	pH	4/1/2011	7.01
MW-31	pH	5/10/2011	6.73
MW-31	pH	6/20/2011	6.16
MW-31	pH	7/5/2011	6.64
MW-31	pH	8/2/2011	6.67
MW-31	pH	9/6/2011	7.03
MW-31	pH	10/3/2011	7.28
MW-31	pH	11/8/2011	7.01
MW-31	pH	11/29/2011	7.34
MW-31	pH	12/12/2011	7.46

Appendix D-2: Field pH Measurements Used for pH Analysis

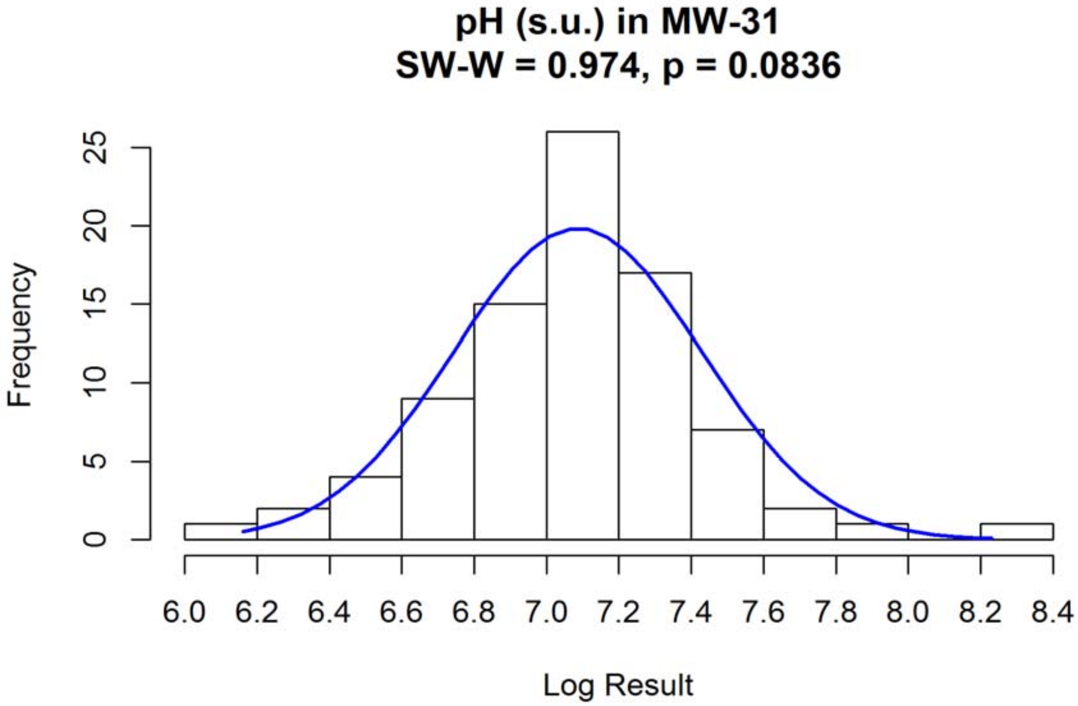
Location ID	Field Parameter	Date Measured	Field Measurement
MW-31	pH	1/24/2012	6.78
MW-31	pH	2/13/2012	7.37
MW-31	pH	4/9/2012	7.14
MW-31	pH	5/2/2012	7.19
MW-31	pH	7/9/2012	7.53
MW-31	pH	8/6/2012	6.96
MW-31	pH	9/18/2012	7.1
MW-31	pH	10/22/2012	7.05
MW-31	pH	11/6/2012	7.04
MW-31	ph	12/18/2012	7.1
MW-31	pH	1/22/2013	6.94
MW-31	pH	2/19/2013	7.32
MW-31	pH	3/19/2013	7.28
MW-31	pH	4/16/2013	6.37
MW-31	pH	5/13/2013	7.92
MW-31	pH	6/24/2013	7.1
MW-31	pH	7/9/2013	6.98
MW-31	pH	8/19/2013	7.36
MW-31	pH	9/17/2013	7.06
MW-31	pH	10/23/2013	7.35
MW-31	pH	11/18/2013	6.99
MW-31	pH	12/17/2013	7.23
MW-31	pH	1/7/2014	7.13
MW-31	pH	2/17/2014	6.45
MW-31	pH	3/10/2014	6.53
MW-31	pH	4/28/2014	7.45
MW-31	pH	5/13/2014	6.83
MW-31	pH	6/2/2014	8.23
MW-31	pH	7/28/2014	6.88
MW-31	pH	8/18/2014	7.6
MW-31	pH	9/3/2014	6.94
MW-31	pH	10/6/2014	6.97
MW-31	pH	11/4/2014	6.69
MW-31	pH	12/9/2014	6.73
MW-31	pH	1/20/2015	6.49
MW-31	pH	2/2/2015	6.42
MW-31	pH	3/3/2015	6.4
MW-31	pH	4/7/2015	6.8
MW-31	pH	5/11/2015	6.74
MW-31	pH	6/1/2015	7.14
MW-31	pH	6/23/2015	7.08

Appendix D-3: Box Plots for pH

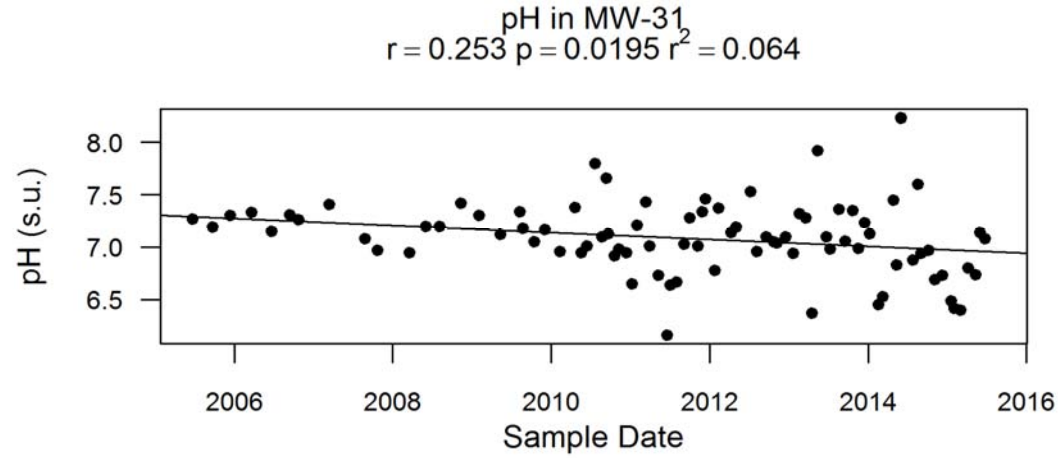


Percent nondetect: 0%
Min: 6.16, Mean: 7.09, Max: 8.23, Std Dev: 0.34
Upper extreme threshold (Q75 + 3xH): 8.35
Lower extreme threshold (Q25 - 3xH): 5.9

Appendix D-4: Histograms for pH



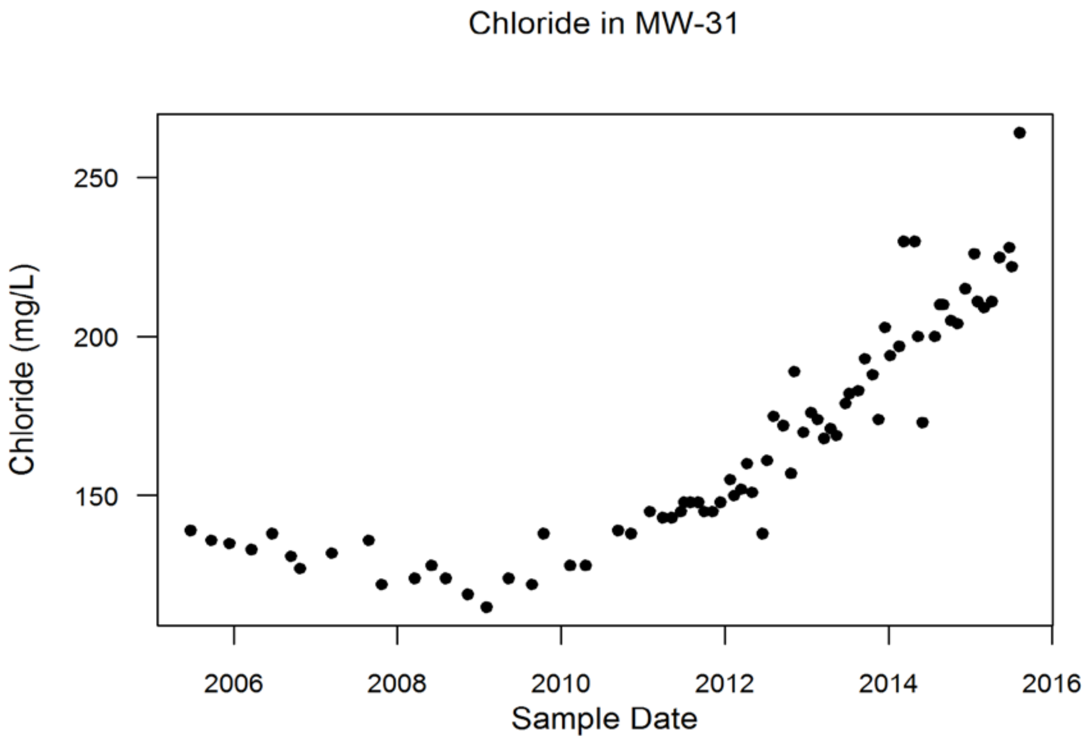
Appendix D-5: Linear Regressions for pH

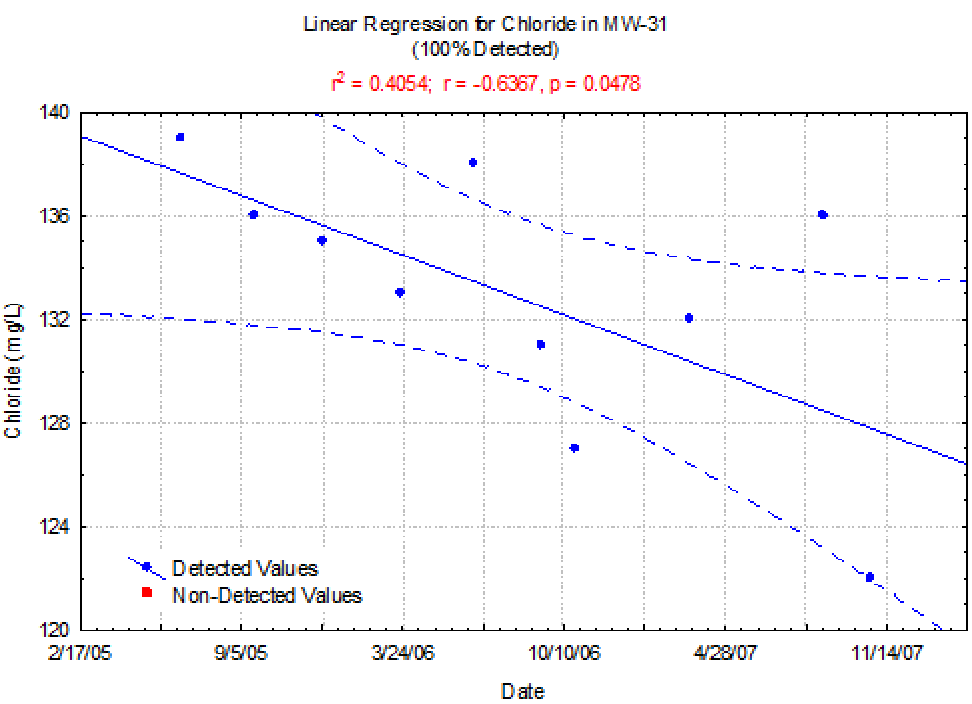


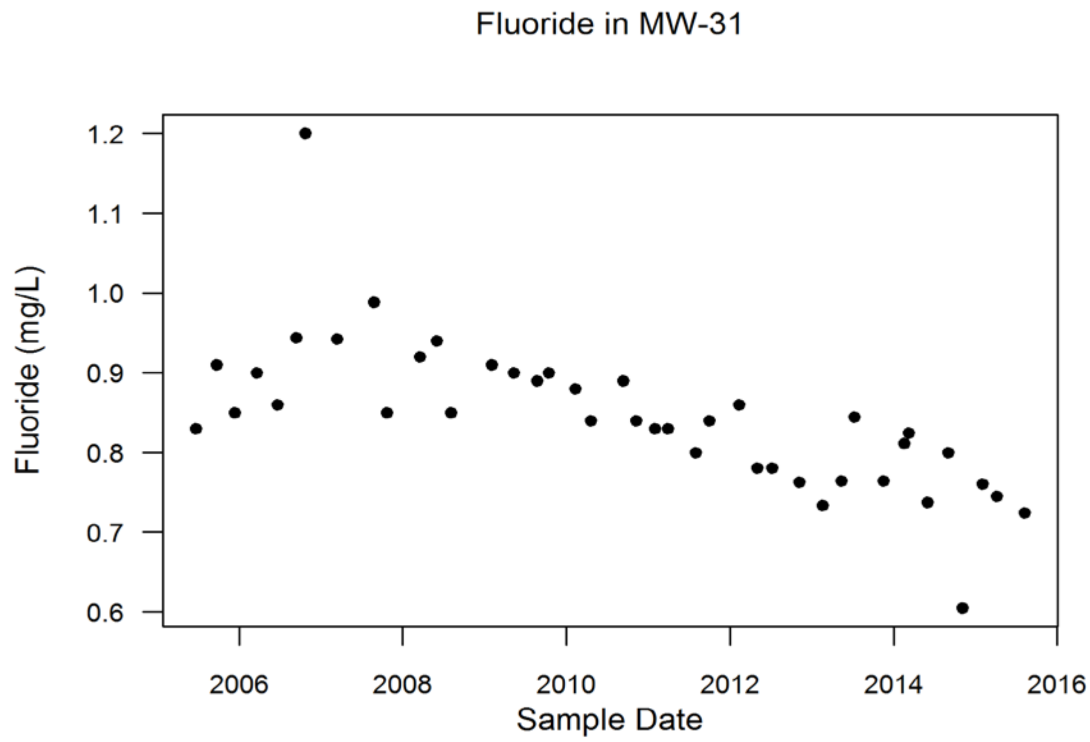
APPENDIX E

Time Concentration Plots Compared to Background Report Plots

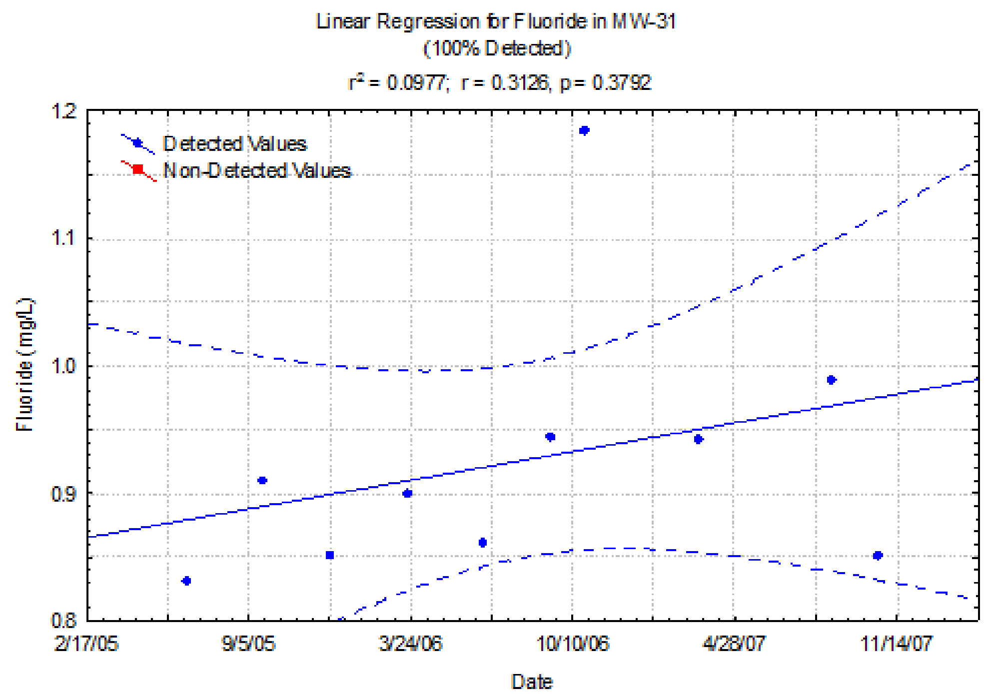
Appendix E: Time Concentration Plots Compared to Background Report Plots



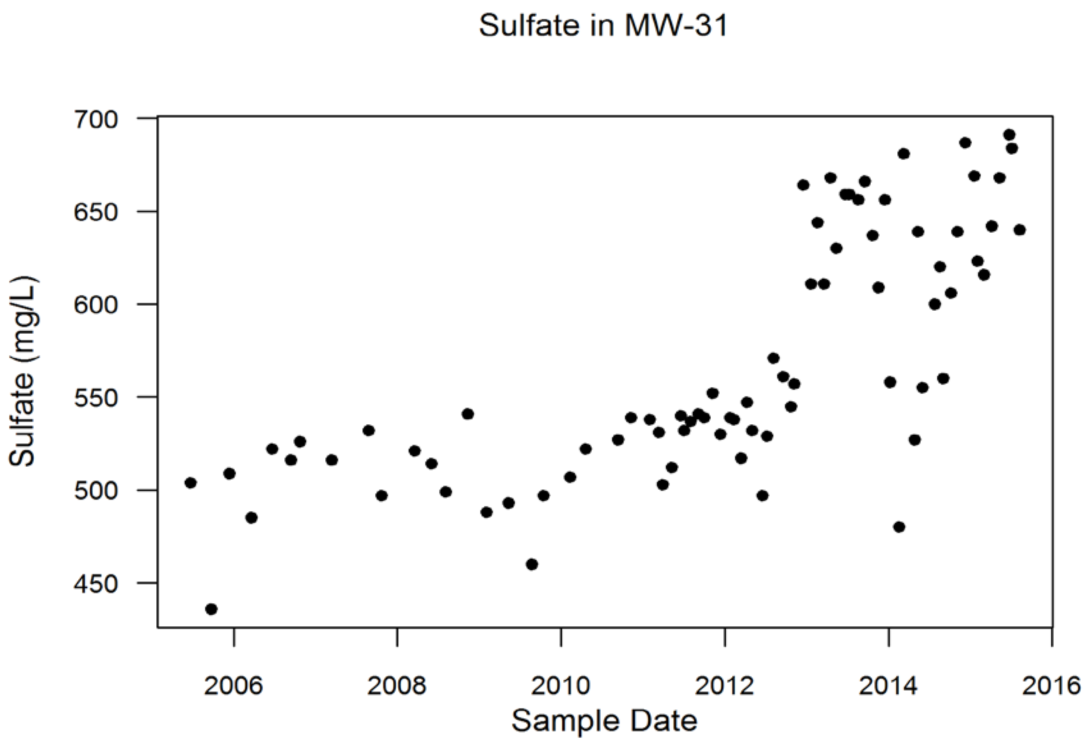




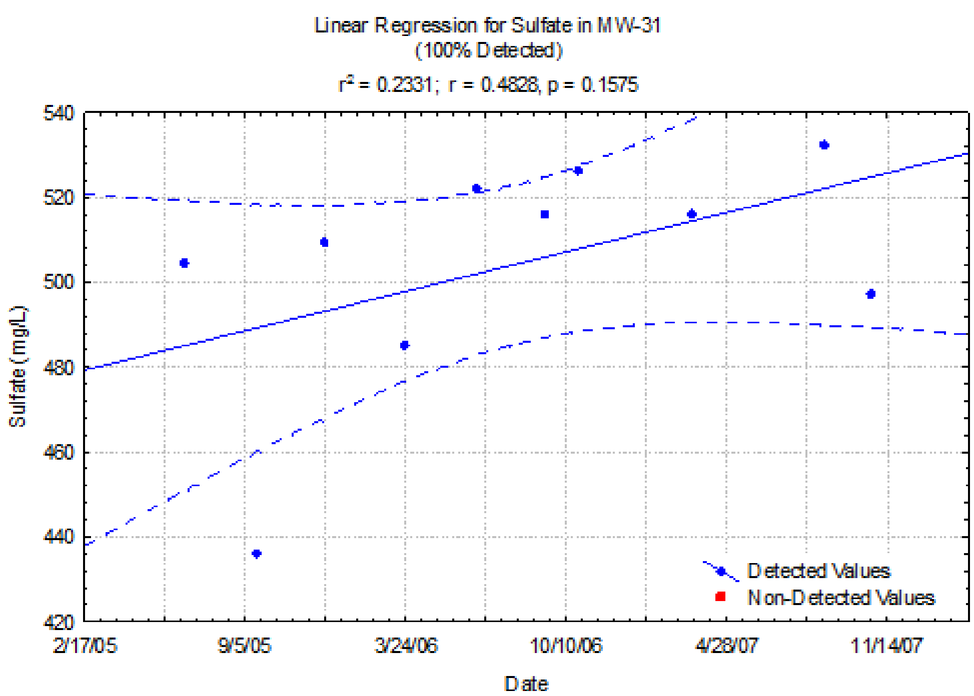
Fluoride in MW-31
Fluoride (mg/L)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
2006
2008
2010
2012
2014
2016
Sample Date



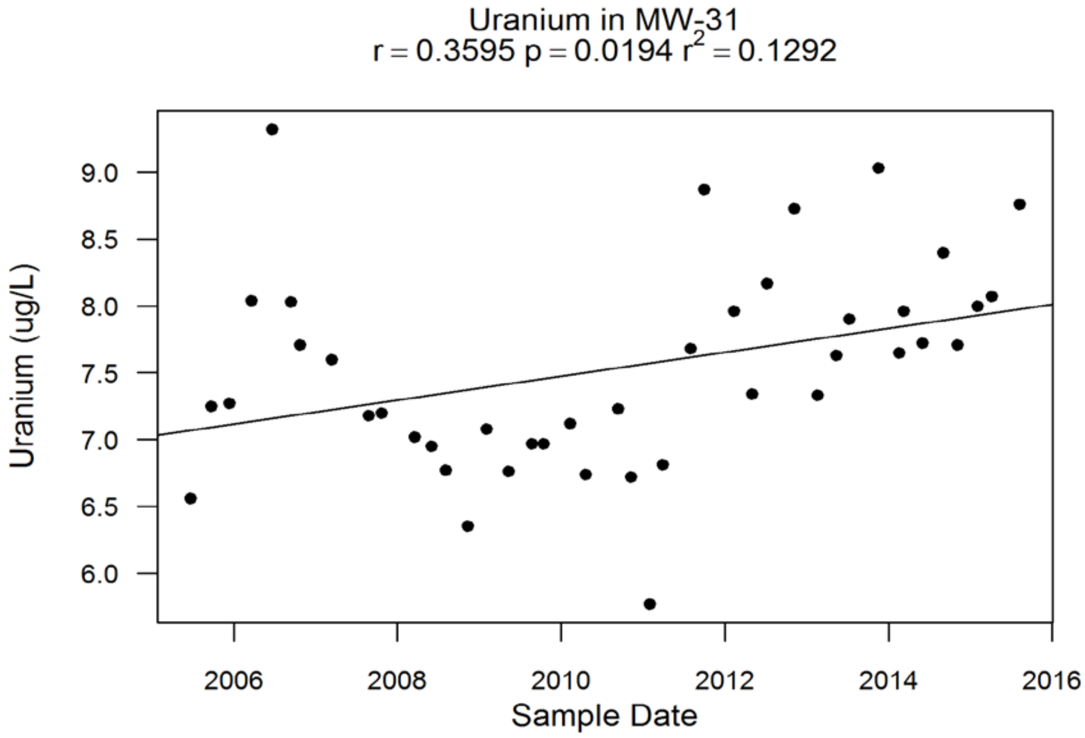
Linear Regression for Fluoride in MW-31
(100% Detected)
r² = 0.0977; r = 0.3126, p = 0.3792
Detected Values
Non-Detected Values
Fluoride (mg/L)
1.2
1.1
1.0
0.9
0.8
2/17/05
9/5/05
3/24/06
10/10/06
4/28/07
11/14/07
Date

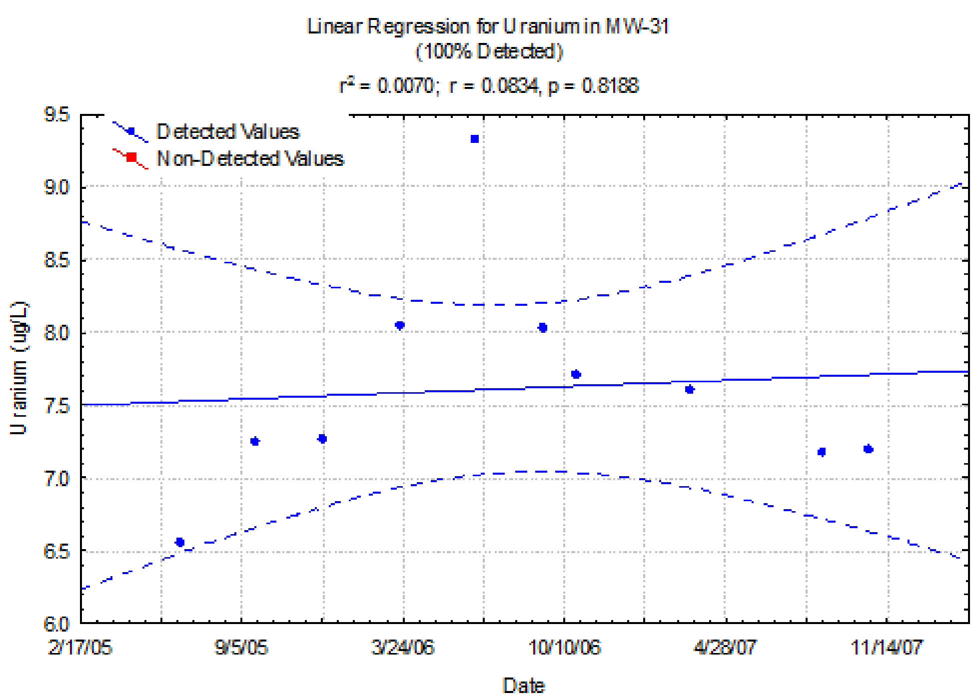


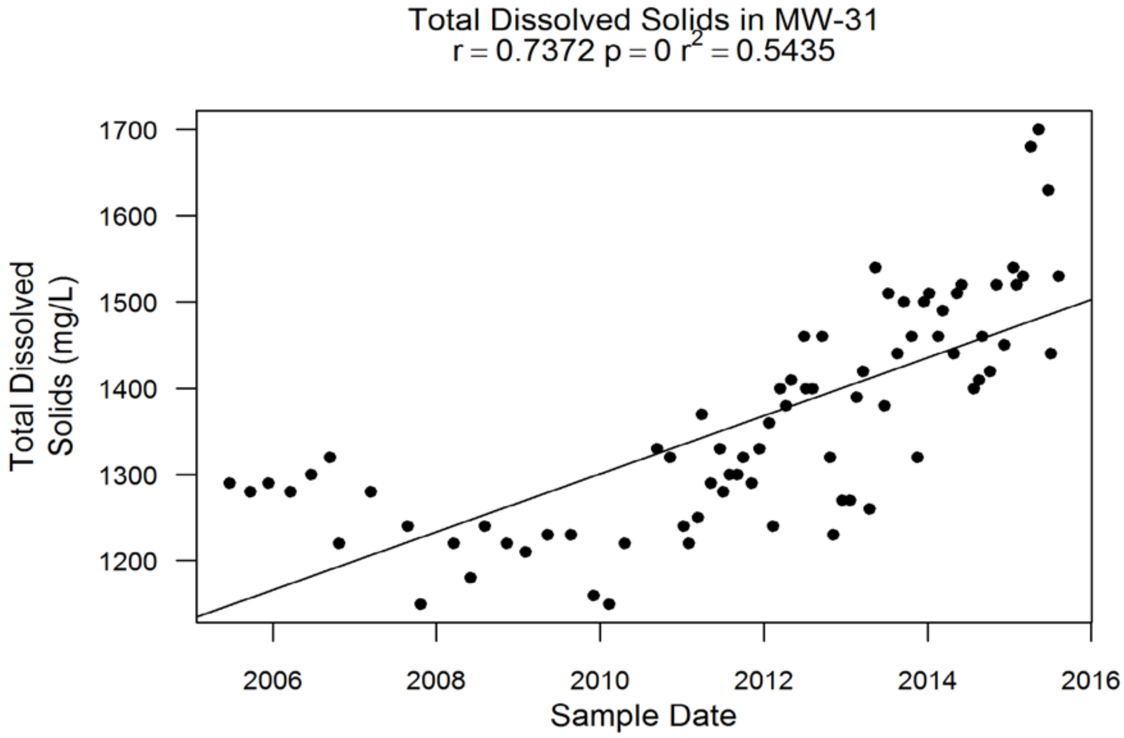
Sulfate in MW-31
700
650
600
550
500
450
Sulfate (mg/L)
2006
2008
2010
2012
2014
2016
Sample Date



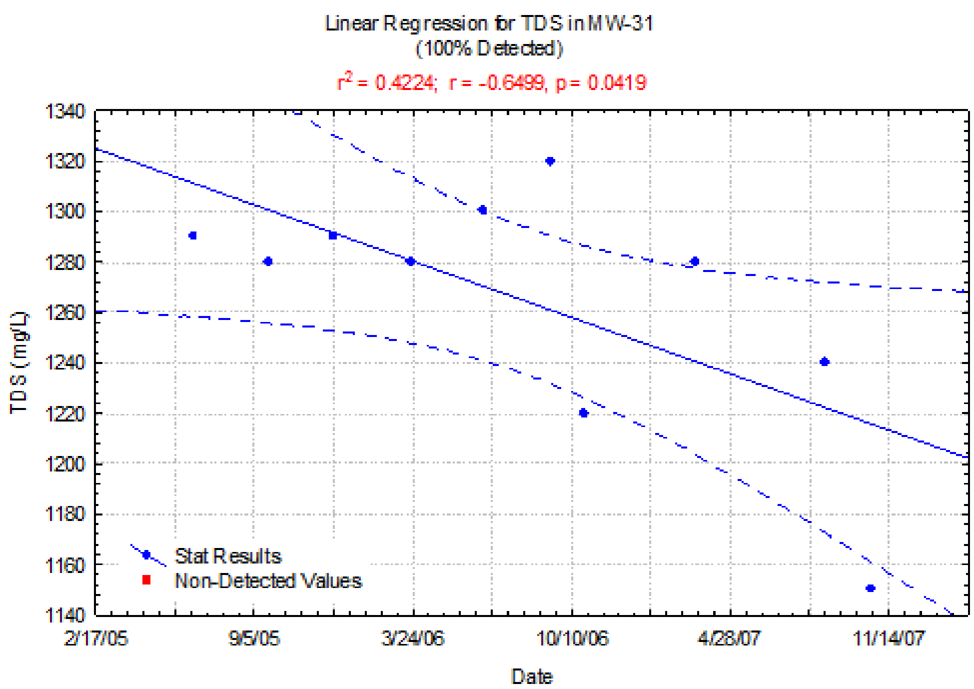
Linear Regression for Sulfate in MW-31
(100% Detected)
r² = 0.2331; r = 0.4828, p = 0.1575
540
520
500
480
460
440
420
Sulfate (mg/L)
2/17/05
9/5/05
3/24/06
10/10/06
4/28/07
11/14/07
Date
Detected Values
Non-Detected Values


Uranium in MW-31
r = 0.3595 p = 0.0194 r2 = 0.1292
Uranium (ug/L)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
2006
2008
2010
2012
2014
2016
Sample Date

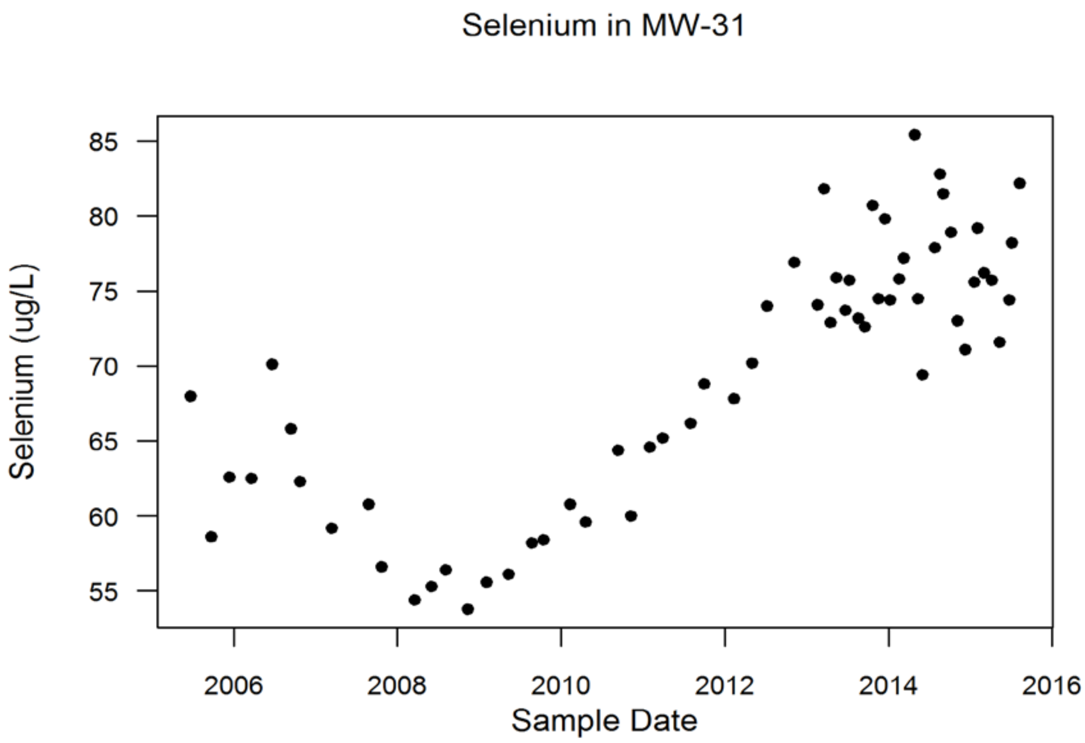

Linear Regression for Uranium in MW-31
(100% Detected)
r2 = 0.0070; r = 0.0834, p = 0.8188
Detected Values
Non-Detected Values
Uranium (ug/L)
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
2/17/05
9/5/05
3/24/06
10/10/06
4/28/07
11/14/07
Date

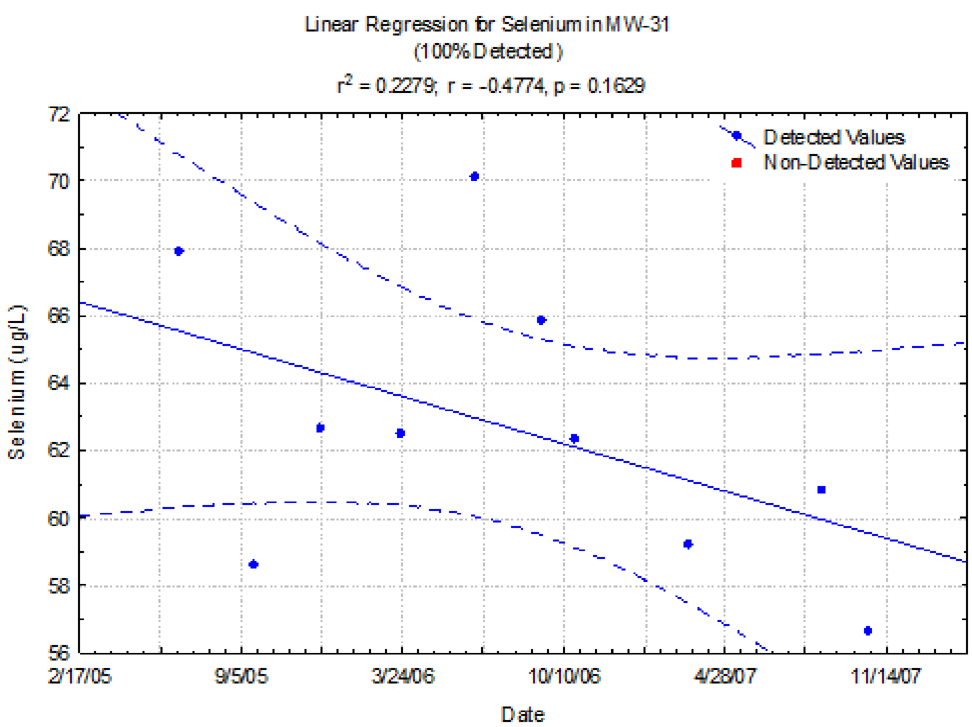


Total Dissolved Solids in MW-31
r = 0.7372 p = 0 r2 = 0.5435
Total Dissolved Solids (mg/L)
1700
1600
1500
1400
1300
1200
2006
2008
2010
2012
2014
2016
Sample Date



Linear Regression for TDS in MW-31
(100% Detected)
r2 = 0.4224; r = -0.6499, p = 0.0419
TDS (mg/L)
1340
1320
1300
1280
1260
1240
1220
1200
1180
1160
1140
Stat Results
Non-Detected Values
2/17/05
9/5/05
3/24/06
10/10/06
4/28/07
11/14/07
Date


Selenium in MW-31
Selenium (ug/L)
85
80
75
70
65
60
55
2006
2008
2010
2012
2014
2016
Sample Date


Linear Regression for Selenium in MW-31
(100% Detected)
r2 = 0.2279; r = -0.4774, p = 0.1629
Detected Values
Non-Detected Values
Selenium (ug/L)
72
70
68
66
64
62
60
58
56
2/17/05
9/5/05
3/24/06
10/10/06
4/28/07
11/14/07
Date

APPENDIX F

Mass Balance Calculations

Table F1: Cell 1 Fluoride Model

	Source	Units	F	Mean Cell 1 Analyses U	Cl	SO4	Se
MW-31 Concentration (Most Recent)	Locus Query, 10/15	ug/l	724	8.76	264000	640000	82.2
Cell 1 Concentration (Average)	EFRI, 2014	ug/l	1069000	474612	22333800	156226700	8517
Dilution Factor	$\frac{MW-31\ Concentration}{Cell\ 1\ Concentration}$	-	-	0.00002	0.01182	0.00410	0.00965
Predicted Diluted Fluoride	$Cell\ 1\ F\ Concentration \times Dilution\ Factor$	ug/l	-	20	12636	4379	10317
Relative Percent Difference	$\frac{Calc.F\ Conc. - Meas.F\ Conc.}{Measured\ F\ Conc.}$	-	-	97%	1645%	505%	1325%
Ratio of Measured to Predicted Fluoride Concentrations	$\frac{Measured\ F\ Conc.}{Predicted\ F\ Conc.}$	-	-	2.73%	1745.34%	604.87%	1425.05%

Table F1: Calculates estimated fluoride contributions to MW-31 groundwater from hypothetical tailings system seepage based on observed concentrations of four other analytes. These calculations model a situation where tailings system seepage has entered the groundwater and has become diluted during transport before reaching MW-31, essentially assuming that changes in concentration in MW-31 are directly due to tailings system seepage and then testing that assumption. F and Cl are conservative tracers and not prone to attenuation during transport, however U, SO4, or Se may potentially attenuate. Therefore, we would expect that the amount of fluoride in MW-31 is at least proportional to the concentration of U, Cl, SO4, or Se in the tailings system pore water. This is only the case for U; all other parameters are overestimated by this calculation by several times.

This model assumes that tailings system seepage must have occurred far enough in the past to potentially reach MW-31 in the present day. Therefore, the most recent analyses of MW-31 groundwater were selected to represent modern MW-31 water. Samples of tailings system water have produced widely variable results between 1987 and the present day, so average concentrations were used to describe the tailings system water. Fluoride may be the most variable, with the lowest results of 300 and 400 ug/l measured in 2008 and 2009, respectively. These low F concentrations are below even the lowest measured fluoride concentration in MW-31 (605 ug/l) and could not possibly create the fluoride concentrations observed today. In addition, the oldest detected fluoride value in Cell 1 is 3,005,000 ug/l. The average of 1,069,000 ug/l is even lower then the oldest detected fluoride that could potentially be expected to have arrived at MW-31, making this calculation a slightly more conservative estimate of fluoride transport.

Table F-2: Nitrate Mixing Model

		Nitrate + Nitrite		
		Oldest Cell 1 Water (2007)	Average, Cell 1 (2003 - 2014)	2014 NO_3
Concentration in Cell 1 (C_t)	mg/l	269	169	53
Concentration in background groundwater (C_g) (MW-1 2005)	mg/l	0.144	0.144	0.144
Concentration in mixed water (C_m) (MW-31, 10/2015)	mg/l	19	19	19
Ratio: Parts Cell 1 water per 1 part groundwater	$V_t = \left[\frac{C_m - Cg}{C_t - Cm}\right] \times V_g$	7.5%	12.6%	55.5%
Average Mound Height	ft	3.5	5.8	25.8

Table F2: This table shows the results of an expanded mass balance calculation first presented in 2009 (2009 CIR; 2013 SAR). This simple model calculates the quantity of tailings system pore water required to mix with "background" water in order to create the NO_3/NO_2 concentrations observed in recent analyses of groundwater samples from MW-31, referenced above as the "mixed water". Finally, the height of a hypothetical groundwater mound over the nitrate plume is calculated based on the size of the tailings system water contribution.

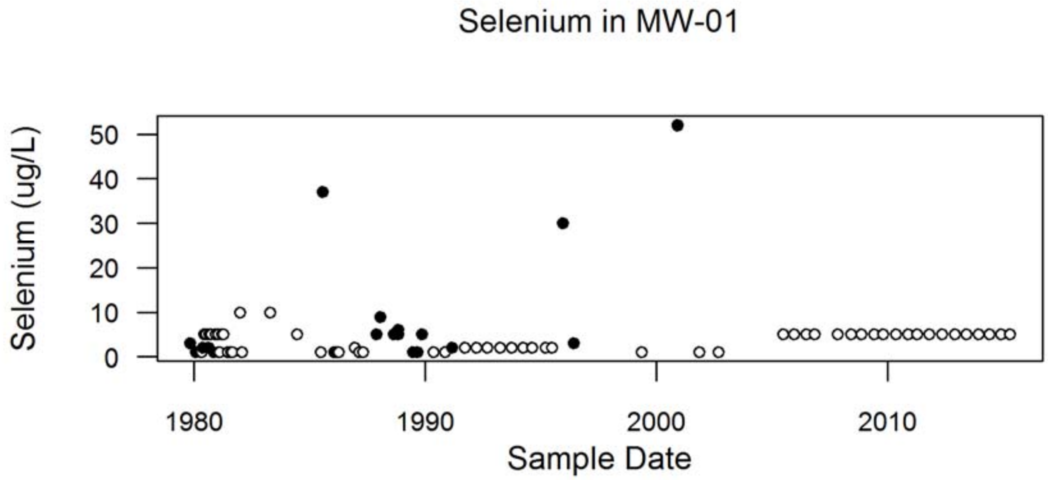
These calculations hyptothetically assume that liquids from Cell 1 are seeping into groundwater and mixing with unimpacted groundwater. Three scenarios were used to perform this evaluation. Concentrations in MW-1 in 2005 were used to simulate mixing with upgradient background water. Due to the wide range of observed concentrations in tailings system pore water, the earliest measured (2007 mean), mean (2003 - 2014), and most recently measured (2014) concentrations of NO_3/NO_2. Note that the earliest measured NO_3/NO_2 result is the average value from 2003, 41.8 mg/l; however, this value is so low that no amount of tailings system water can mix with unimpacted water to create the concentrations observed in MW-31. Instead, we have selected the second-earliest measurement from 2007 in order to be conservative, 269 mg/l. Note that a third test using the most recent measurements of tailings NO_3/NO_2 is included as an example of a less conservative model. The last two rows contain the results of our simple model calculations. The "Ratio" row contains the proportion of tailings system water required to mix with MW-31 water to result in the concentrations of NO_3/NO_2 in MW-31. The "Average Mound Height" contains the average mound height that may be expected from that tailings system water contribution. NO_3/NO_2 concentrations in MW-31 have been decreasing for years, additionally suggesting that the observed concentrations are not from the tailings system.

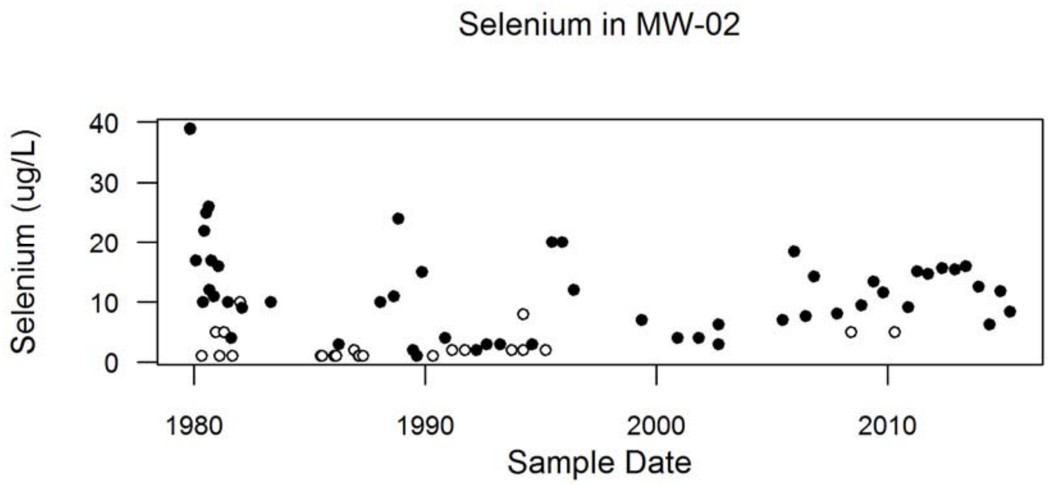
Please see Section 3.5 of this Report for additional discussion and Mixing Equations

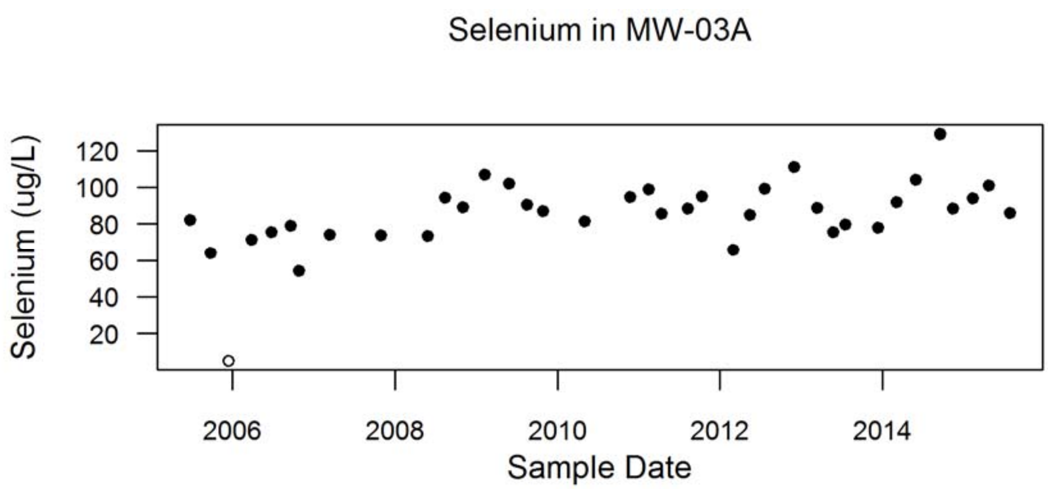
APPENDIX G

Time Series Plots for MW-31 SAR Parameters in All Groundwater Monitoring Wells

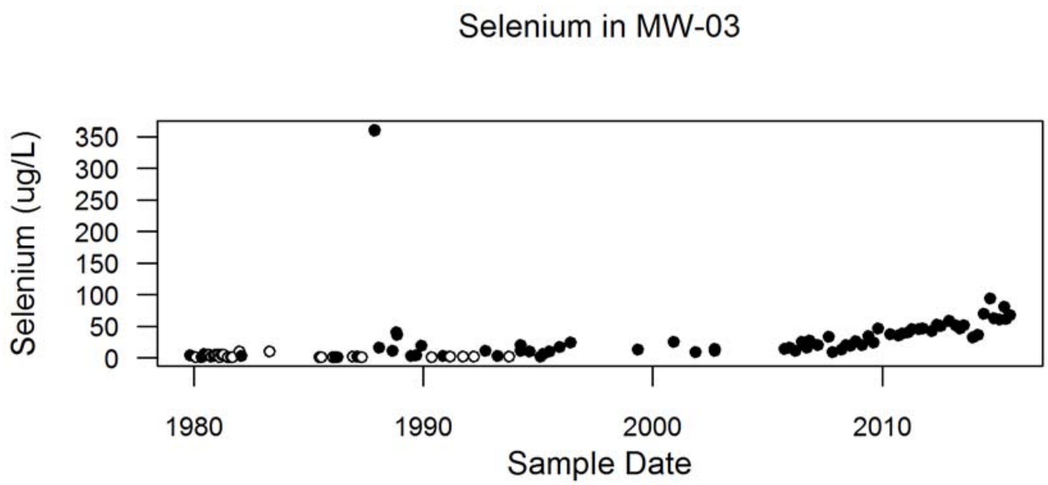
Appendix G-2: Timeseries

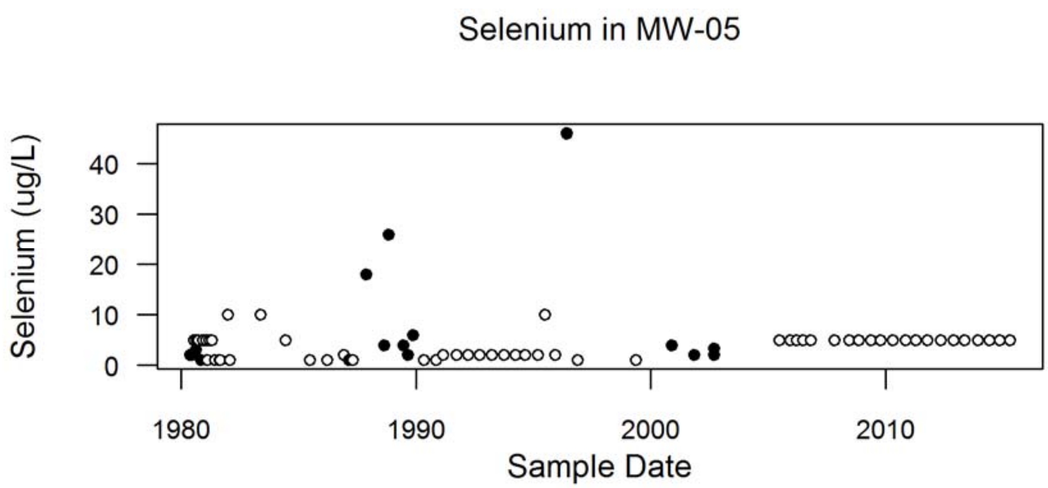


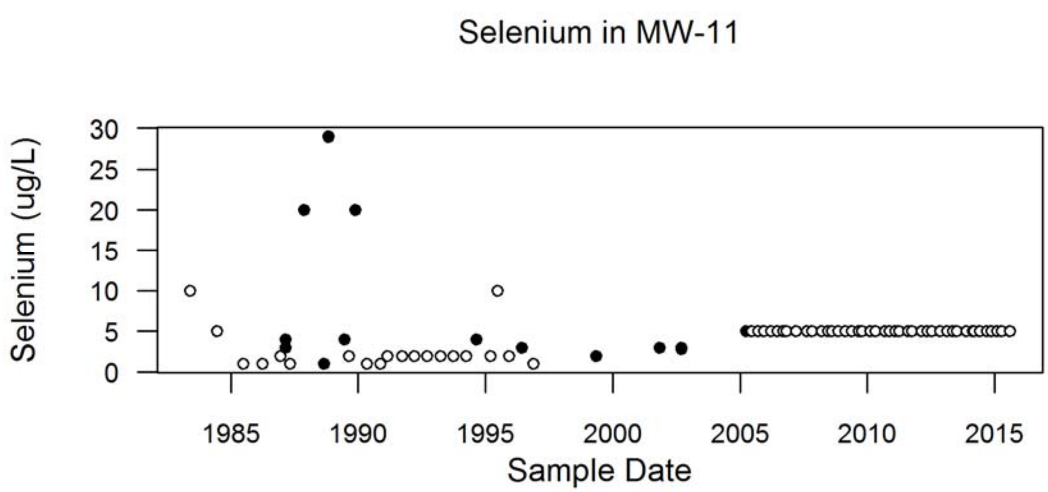




Appendix G-2: Timeseries







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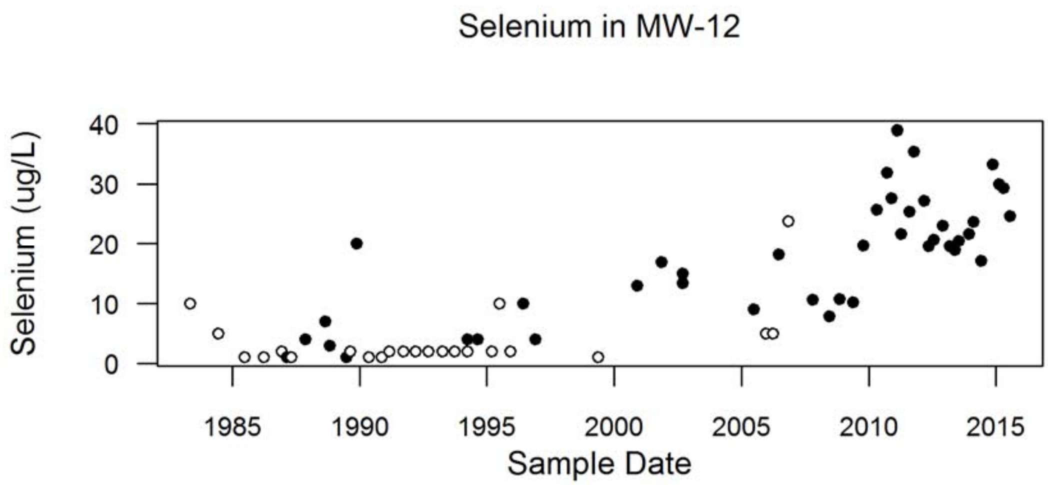

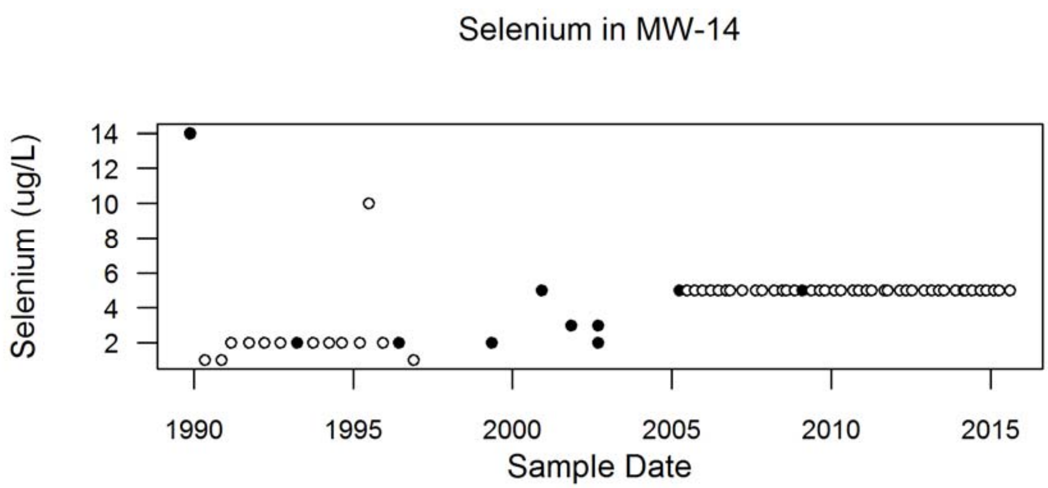

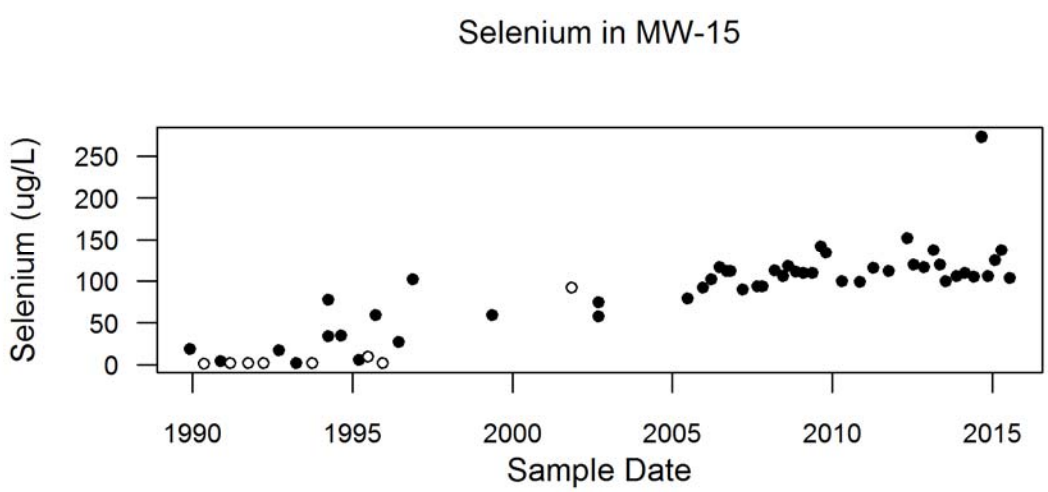

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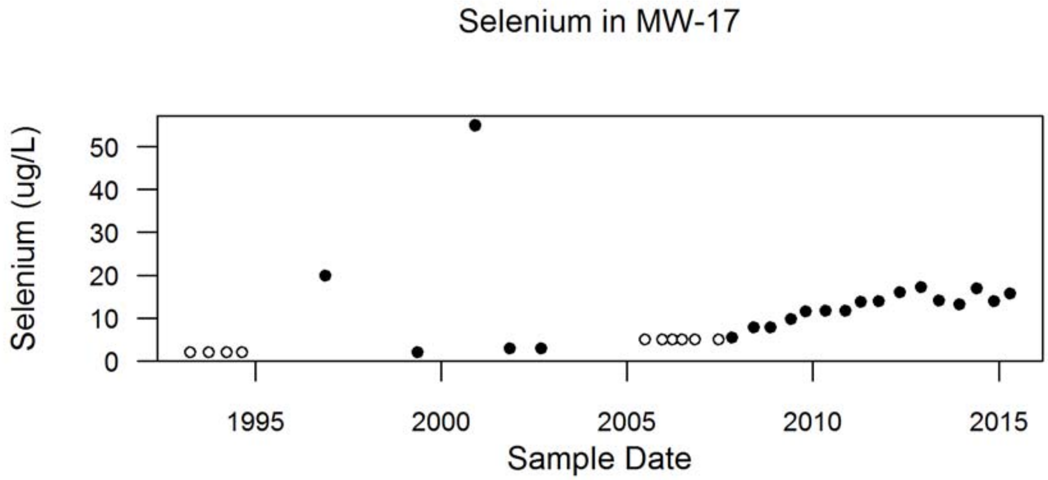

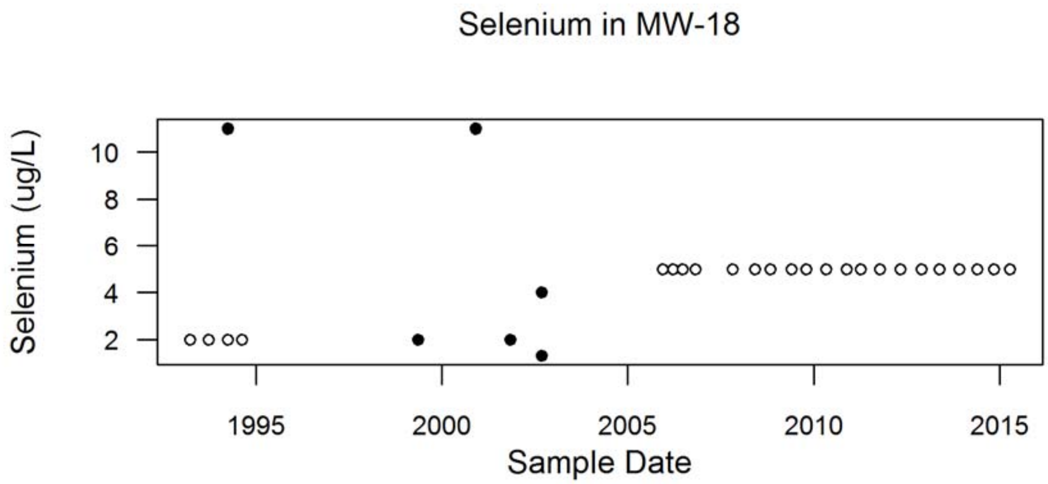

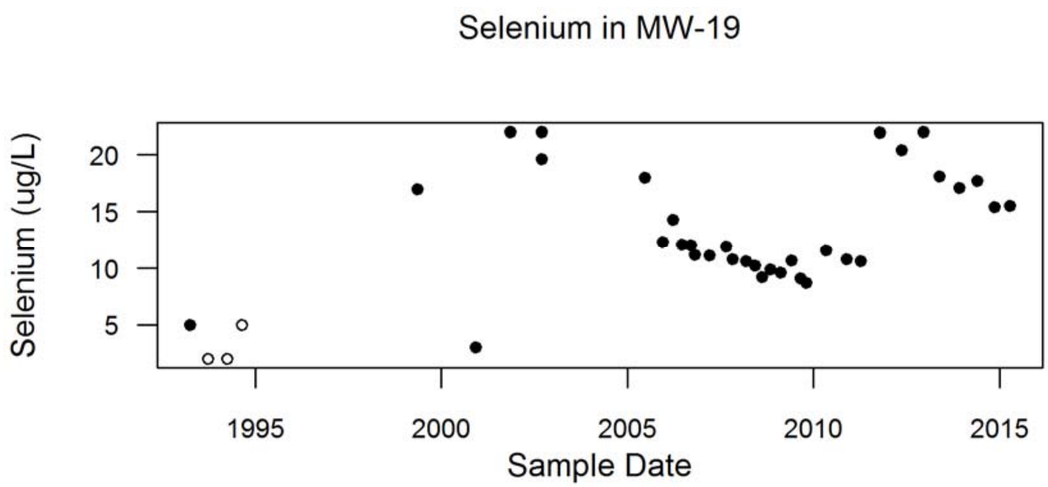

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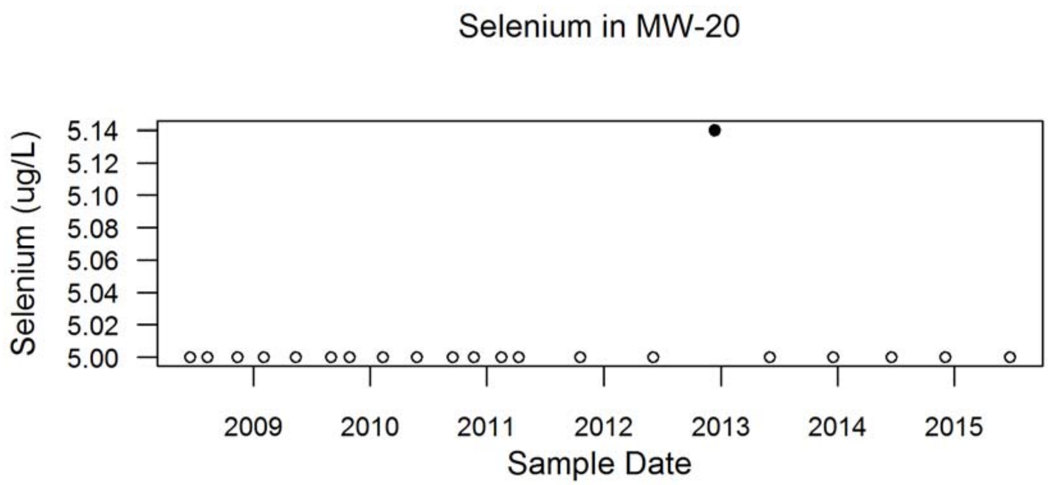

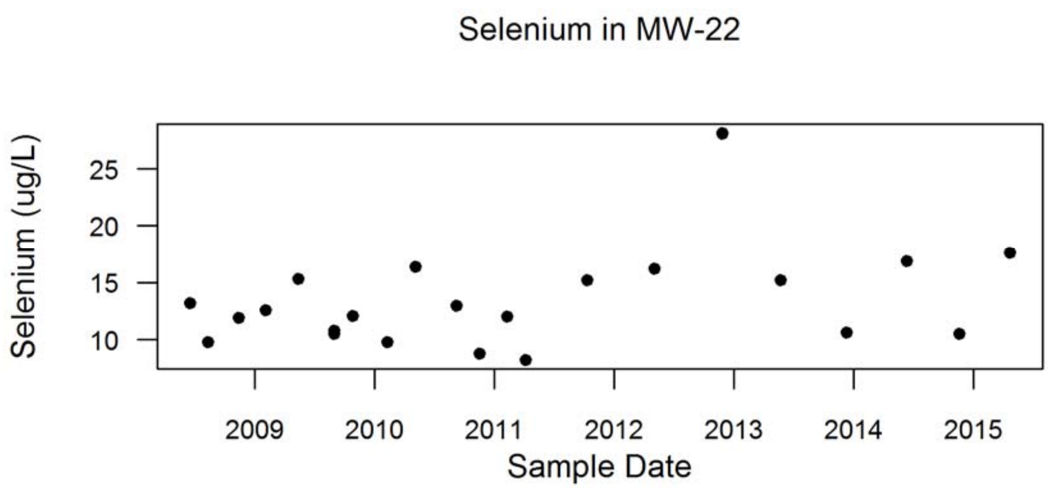

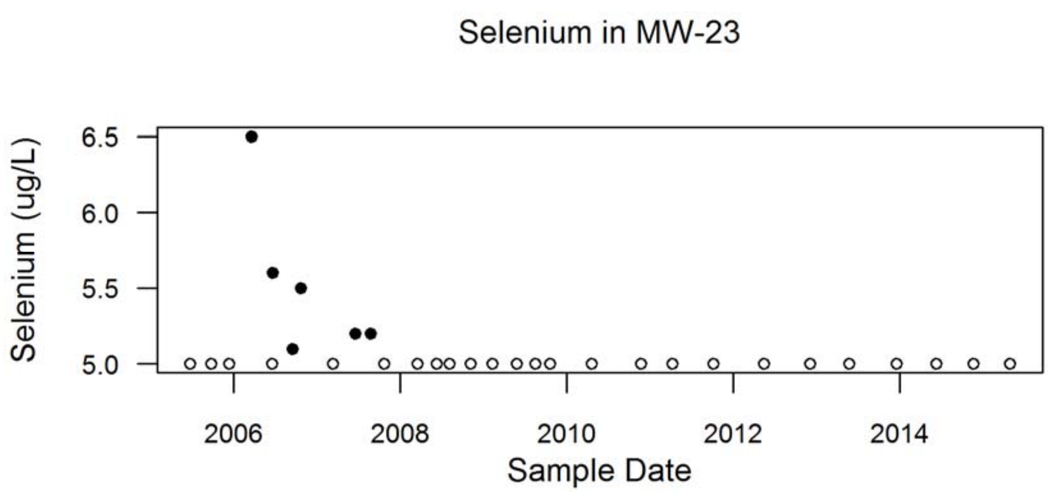

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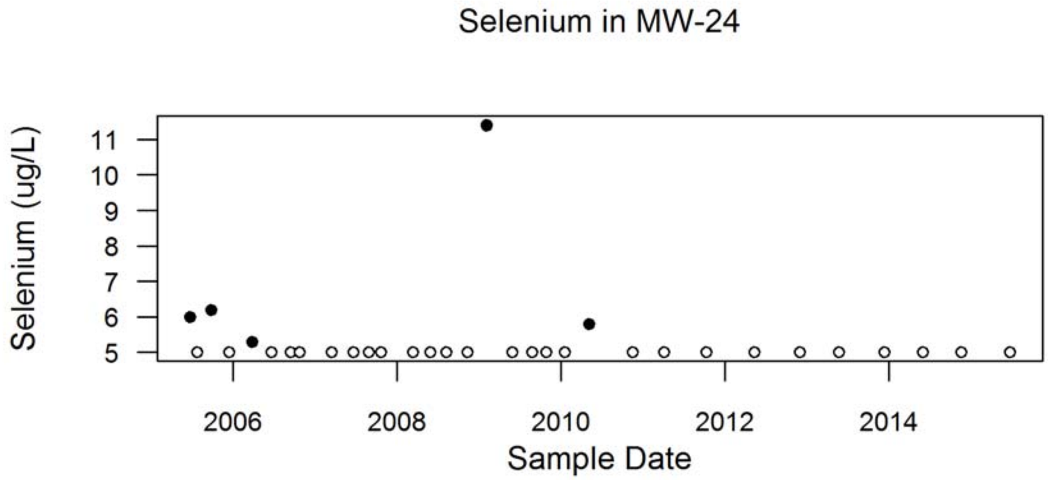

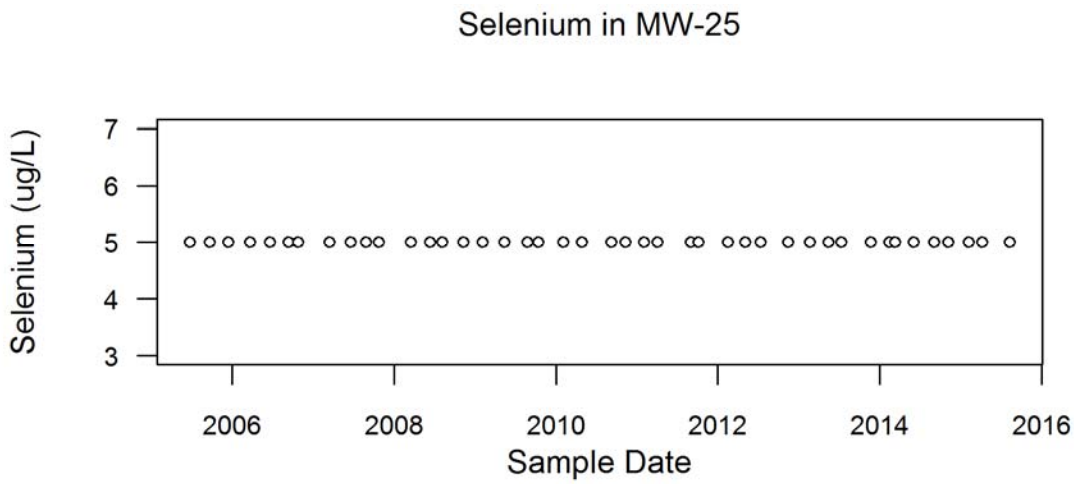

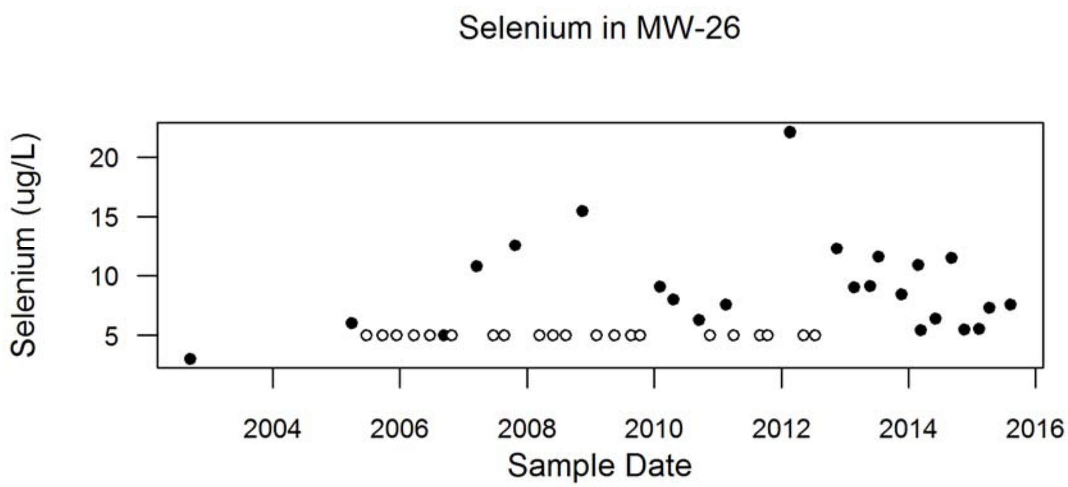

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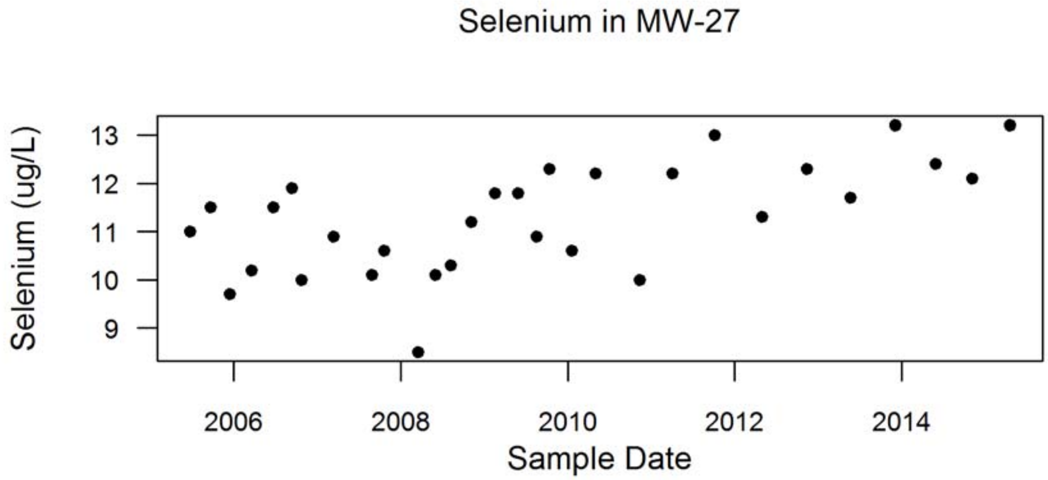

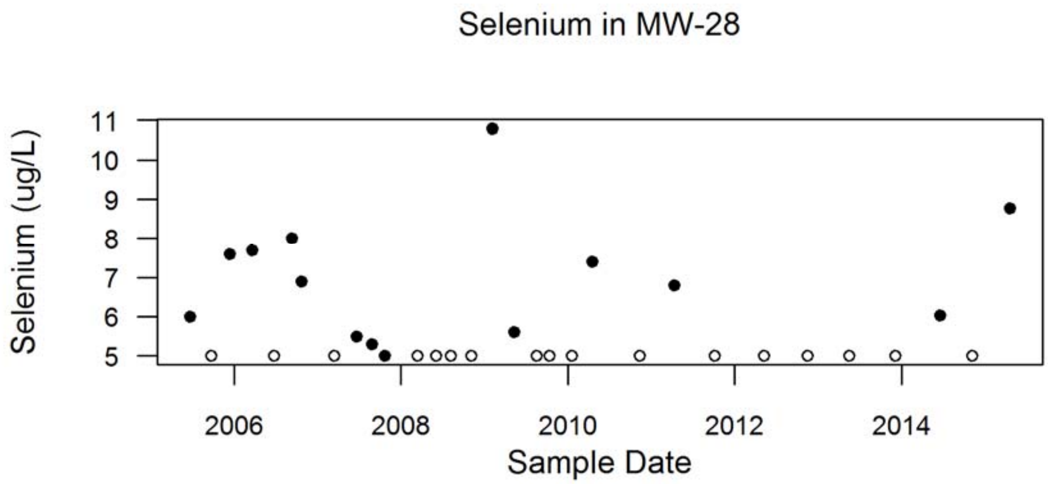

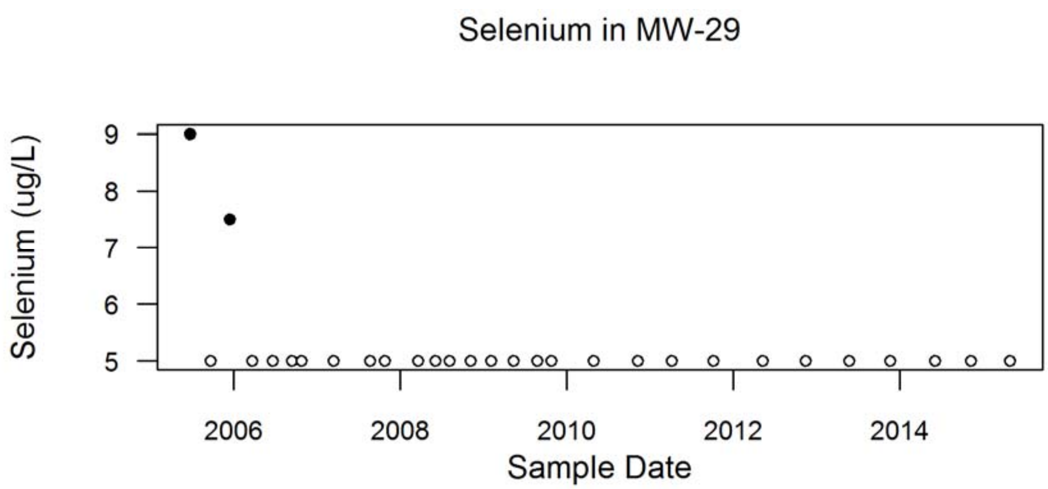

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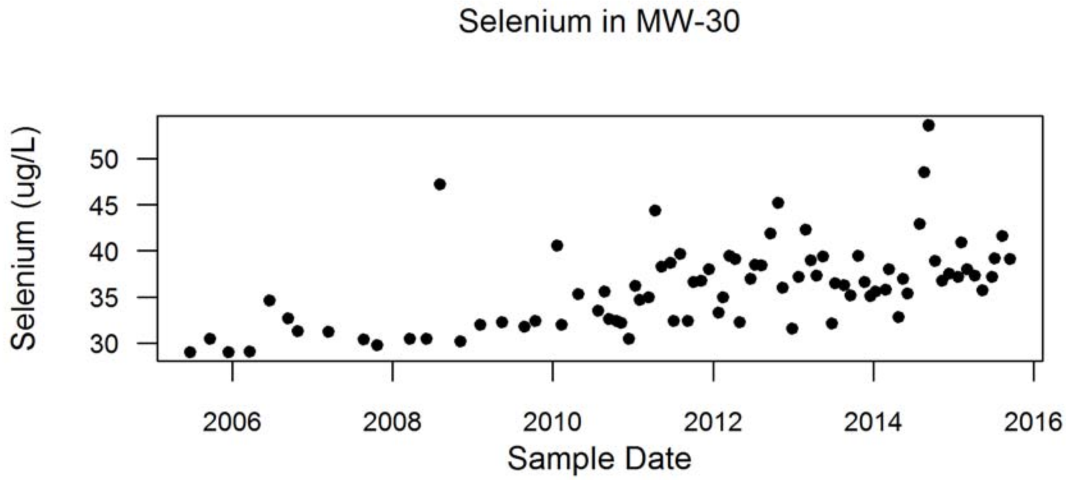

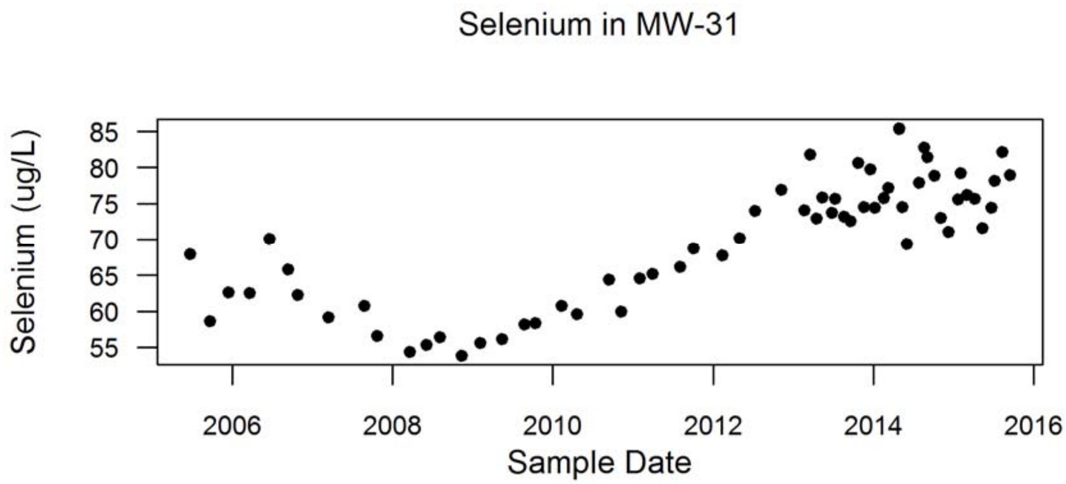

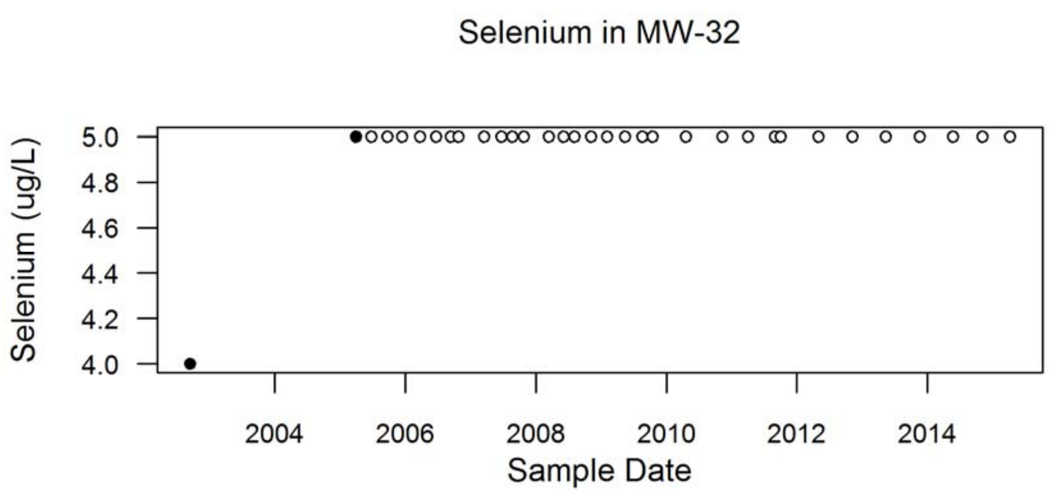

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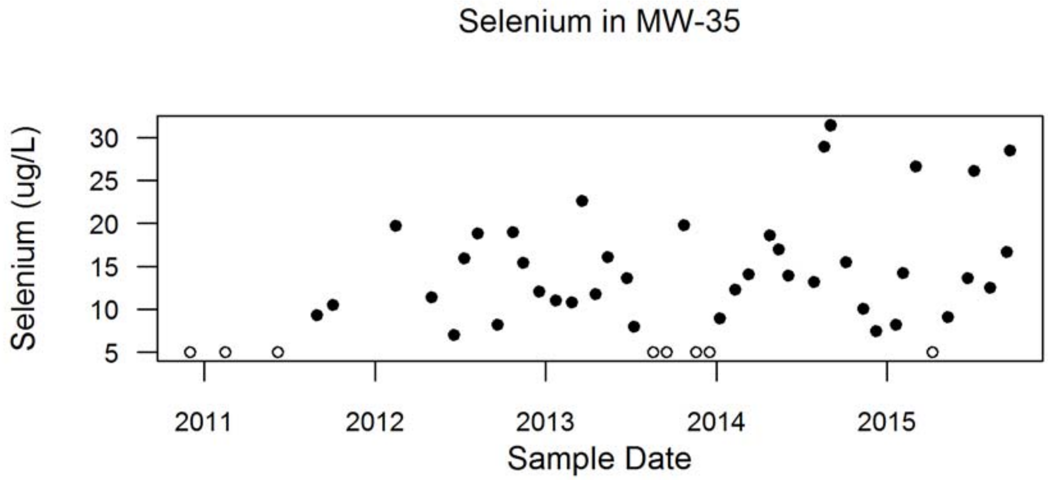

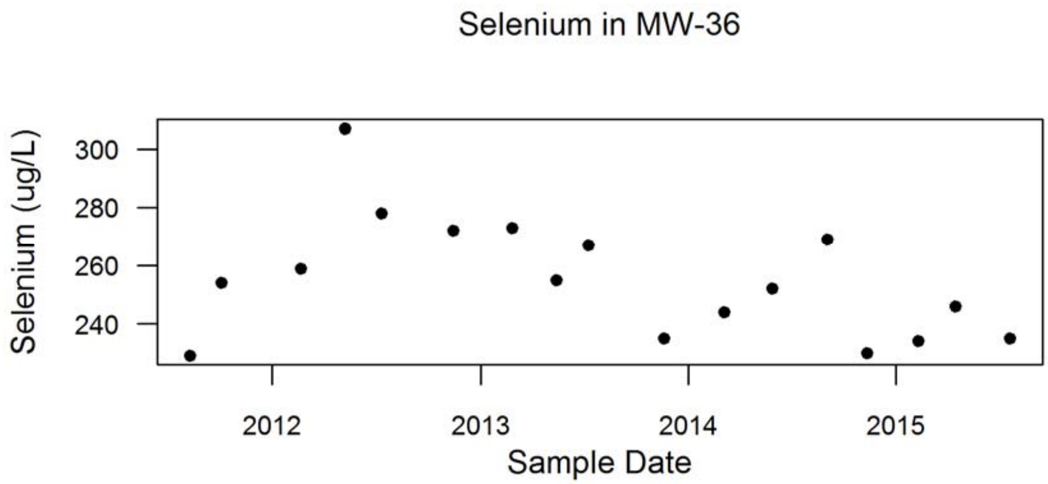

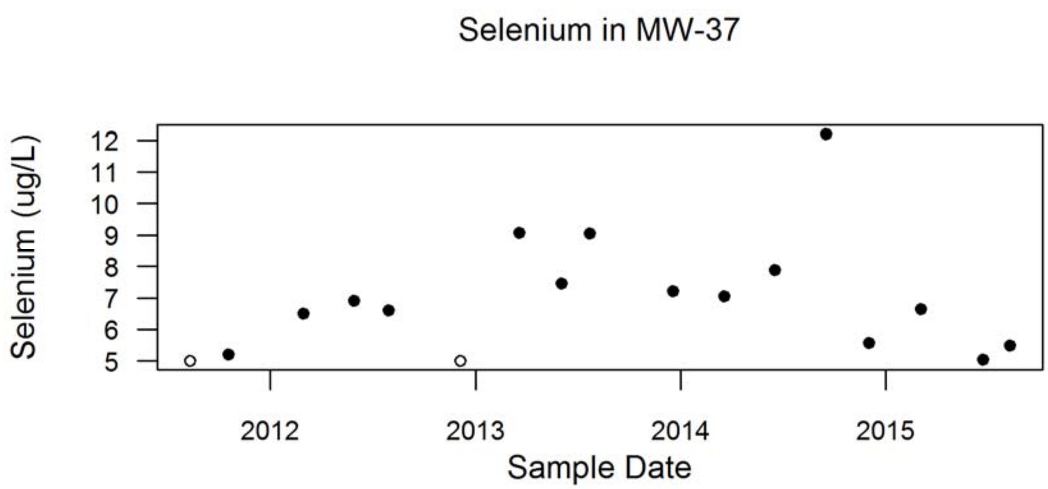

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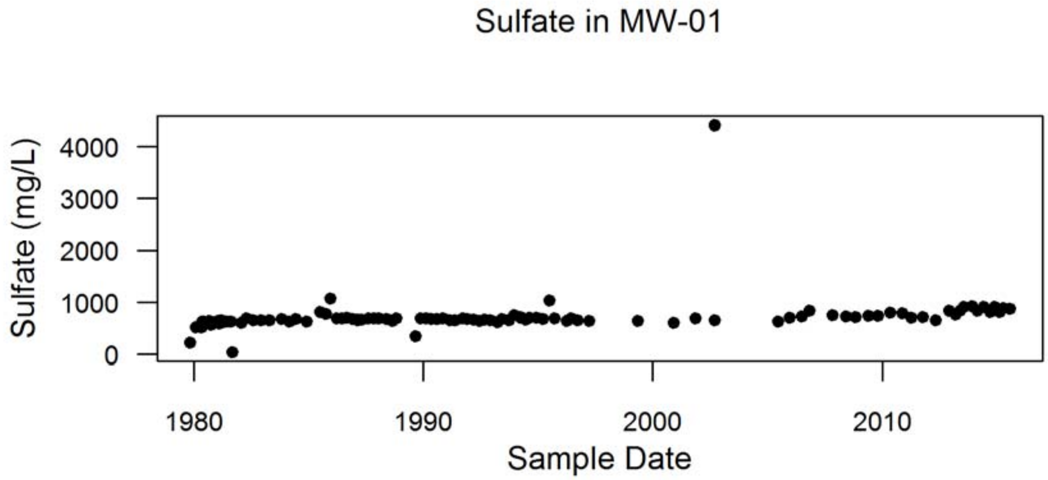

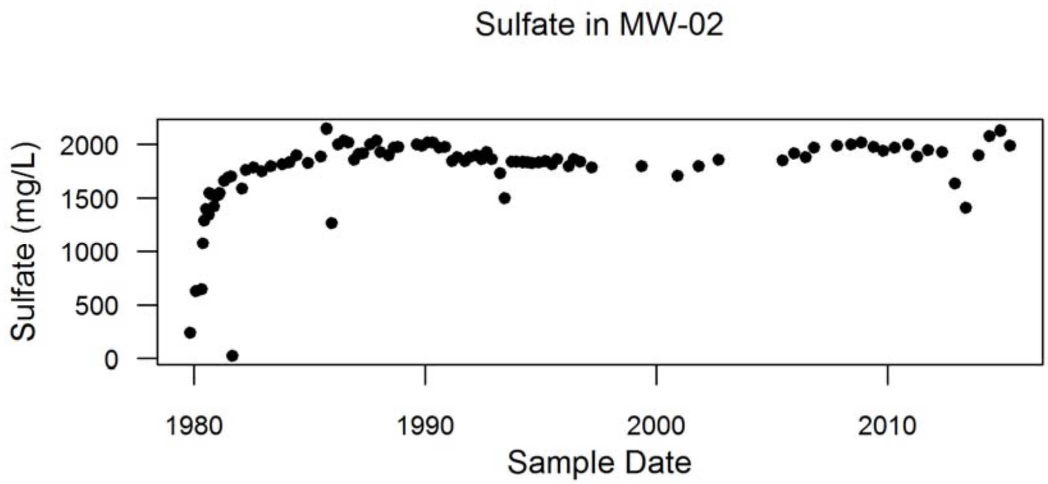

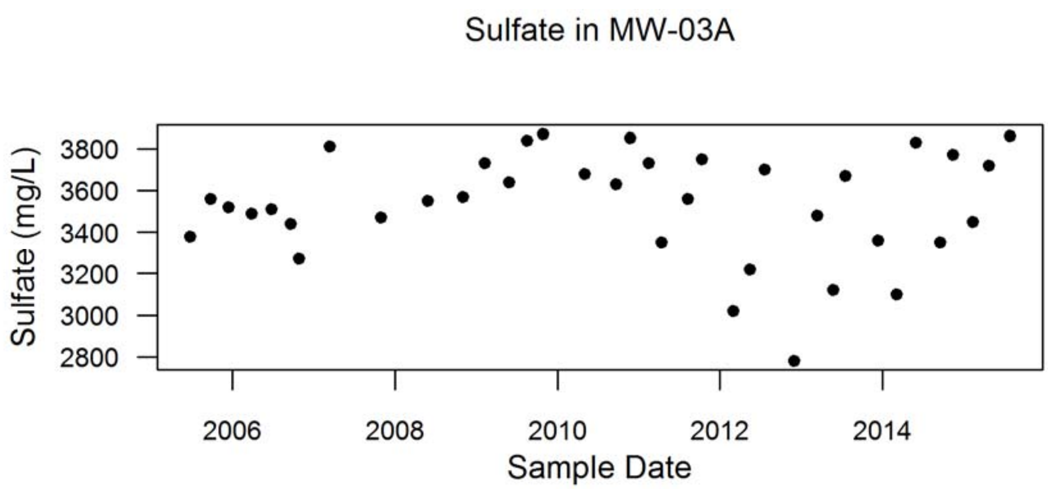

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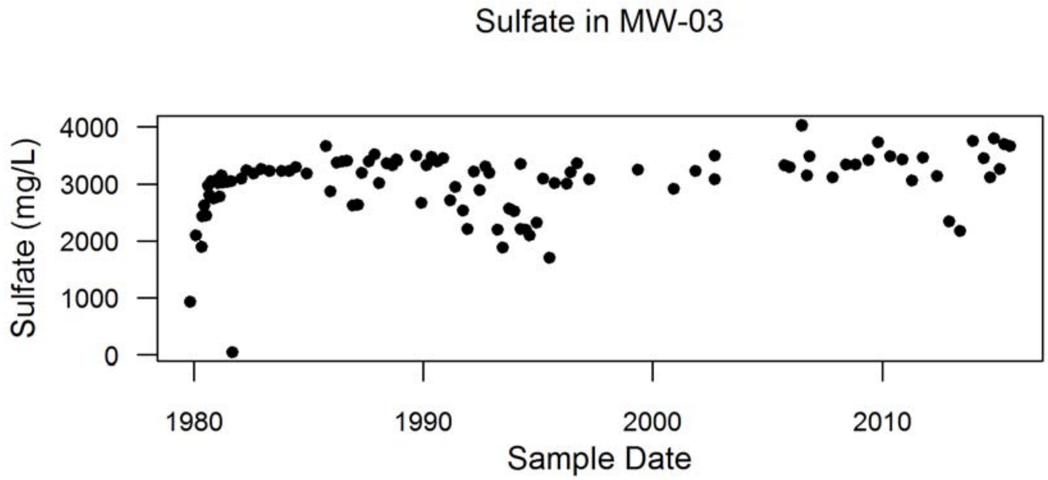

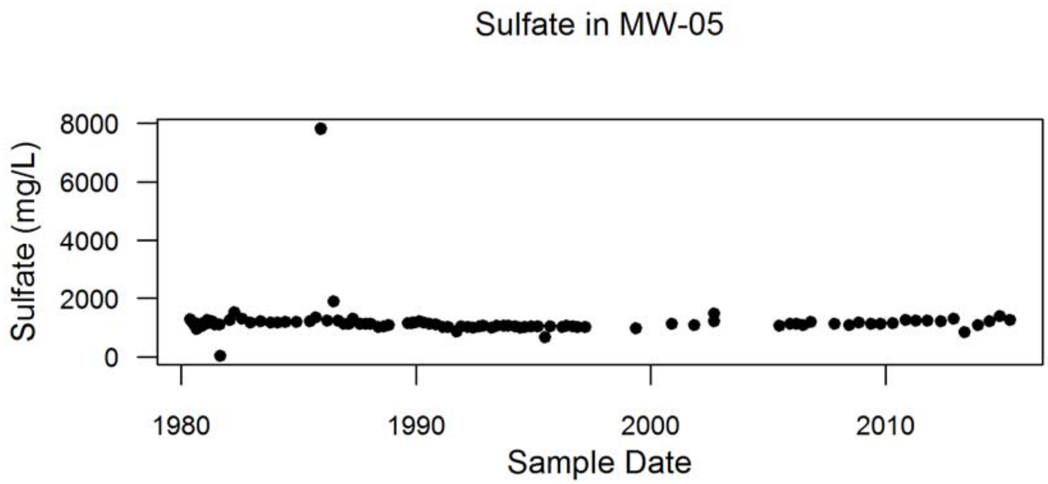

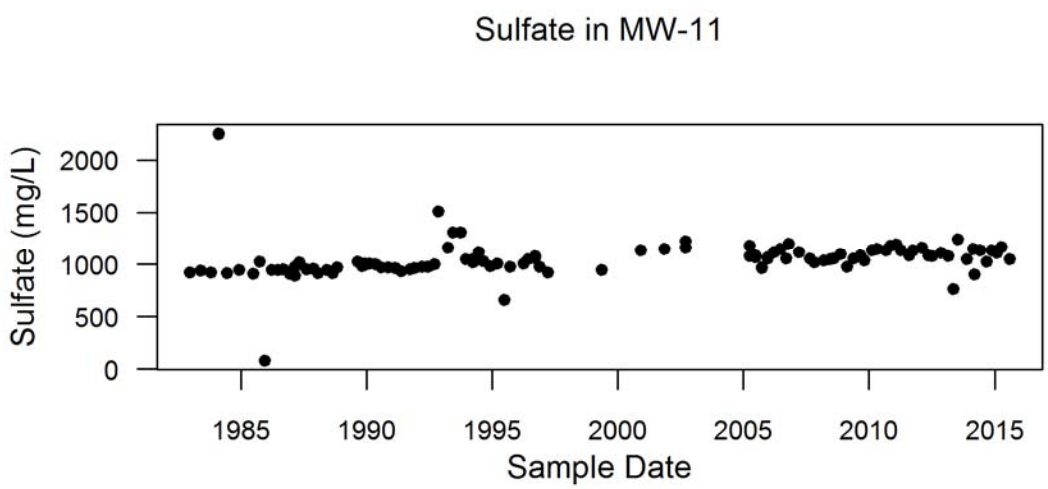

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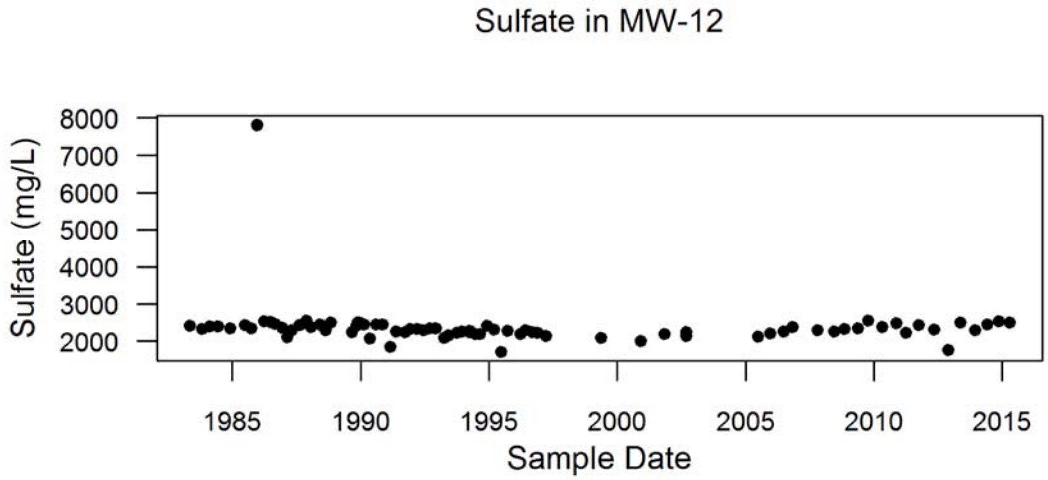

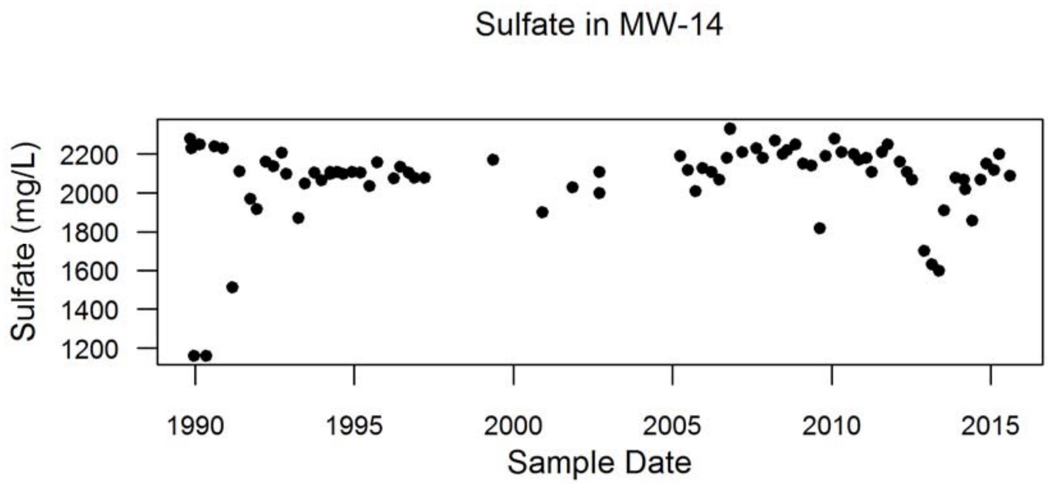

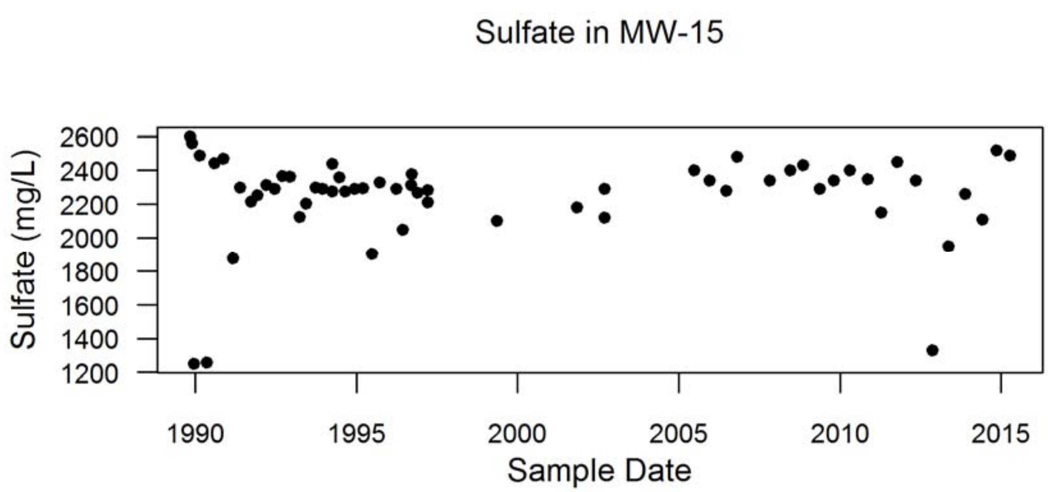

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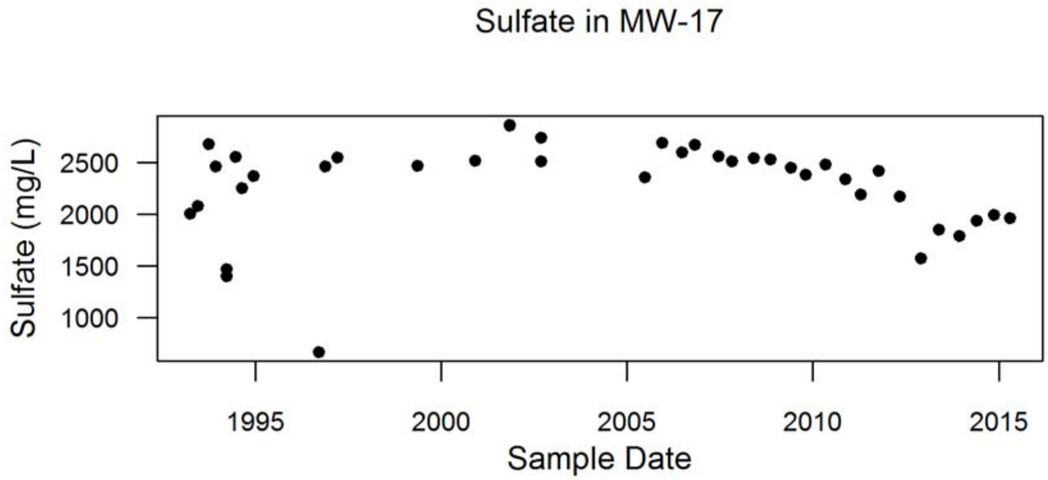

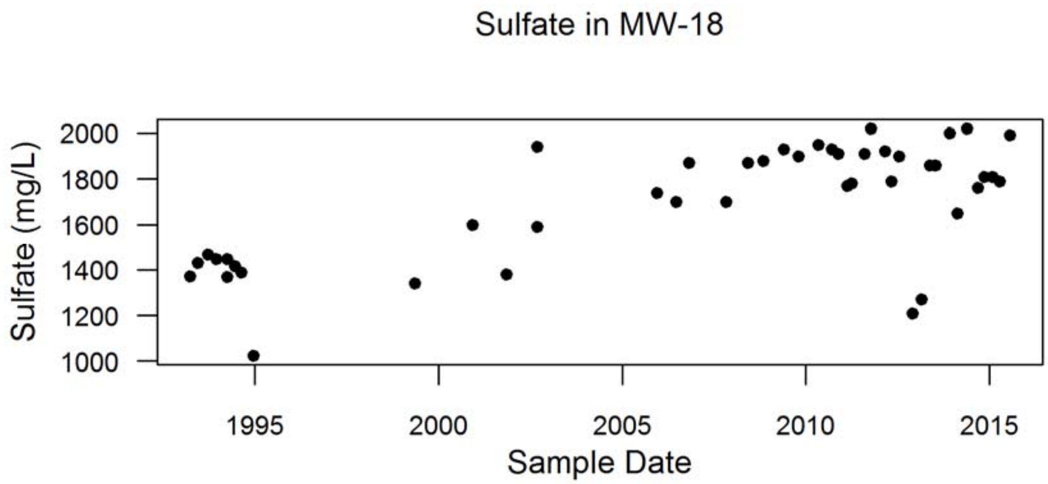

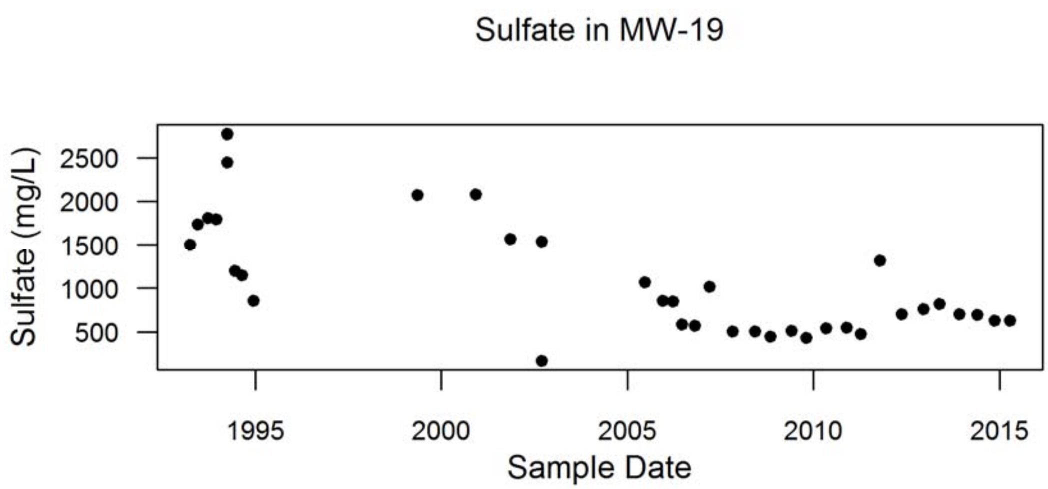

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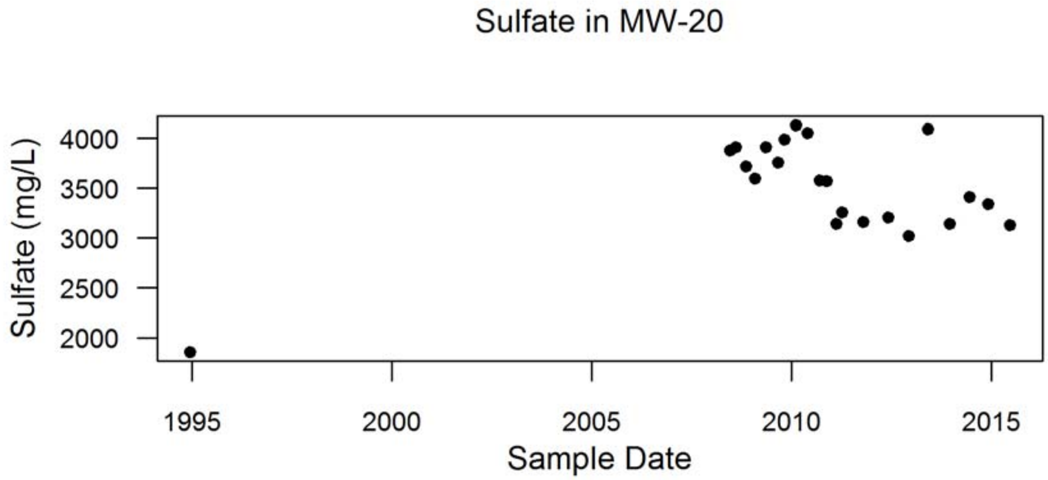

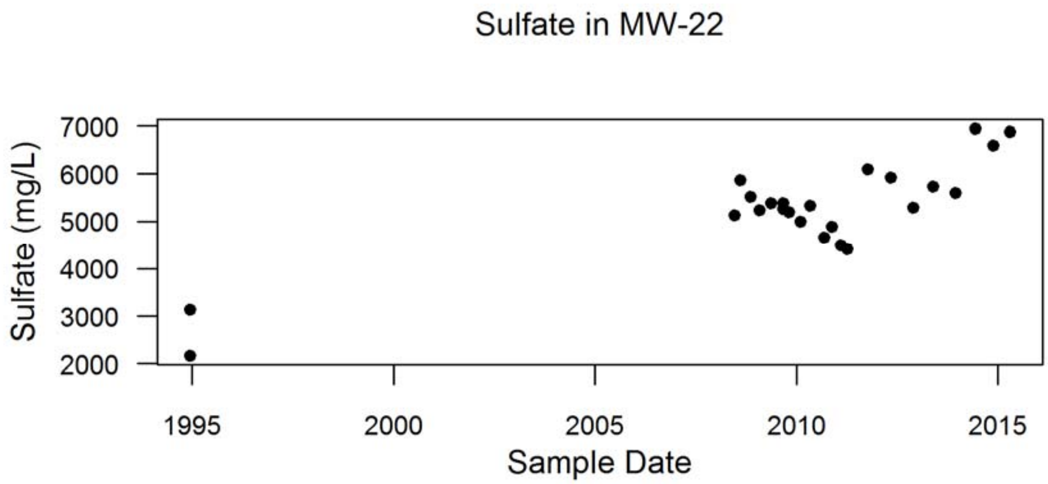

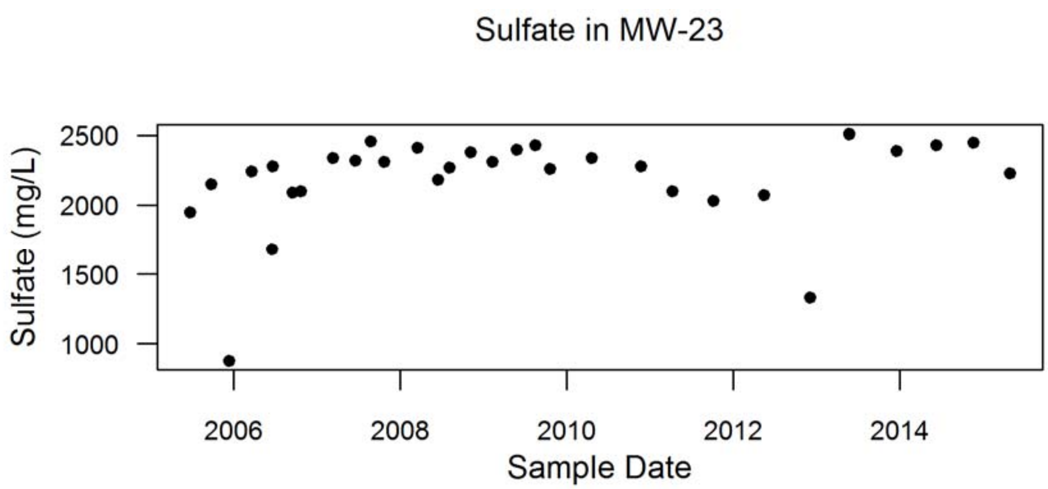

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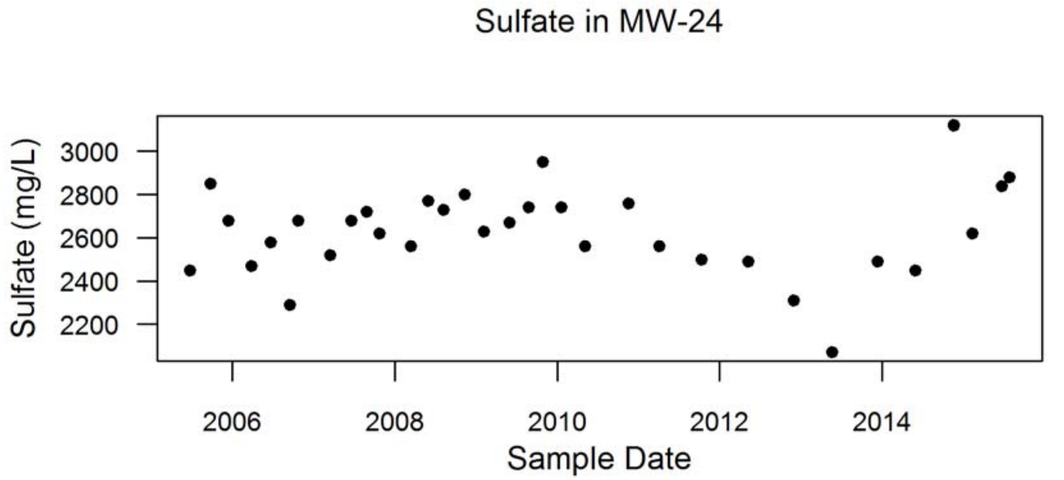

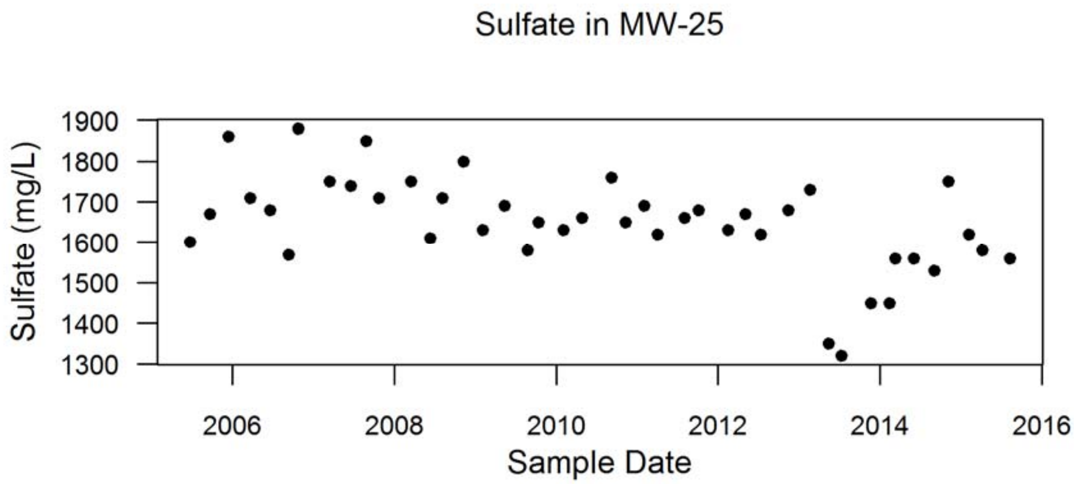

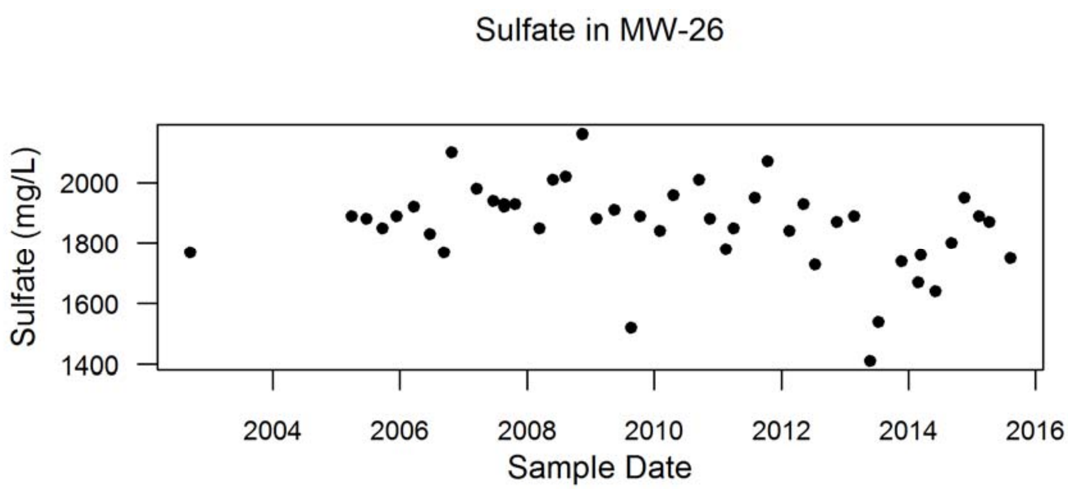

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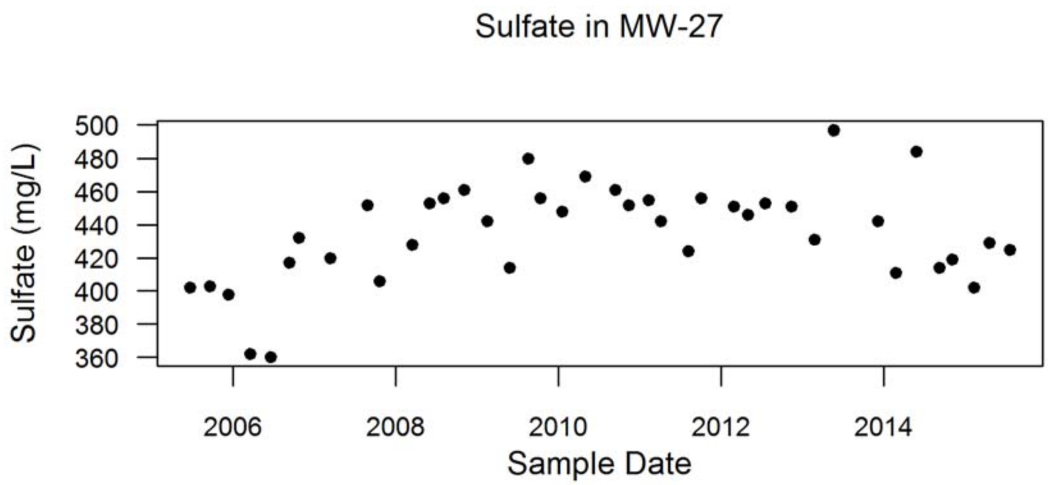
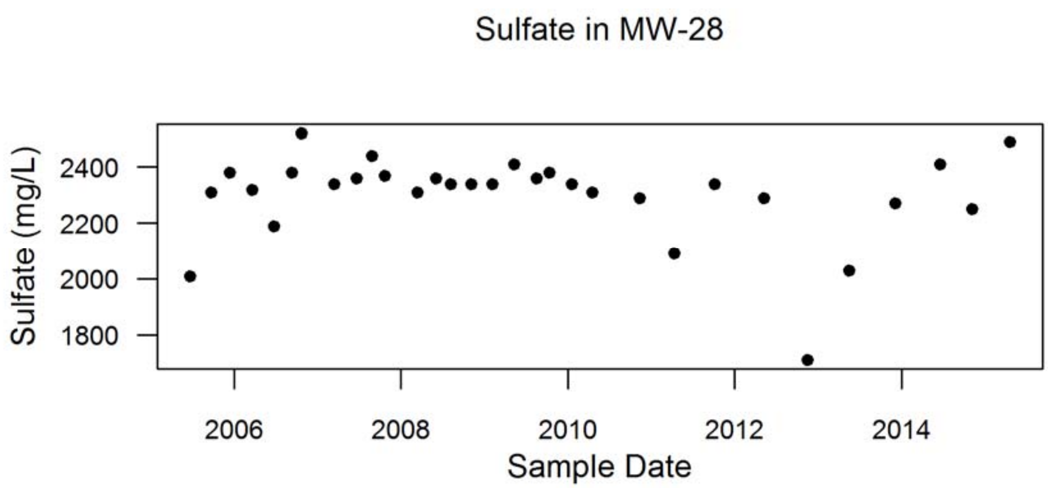
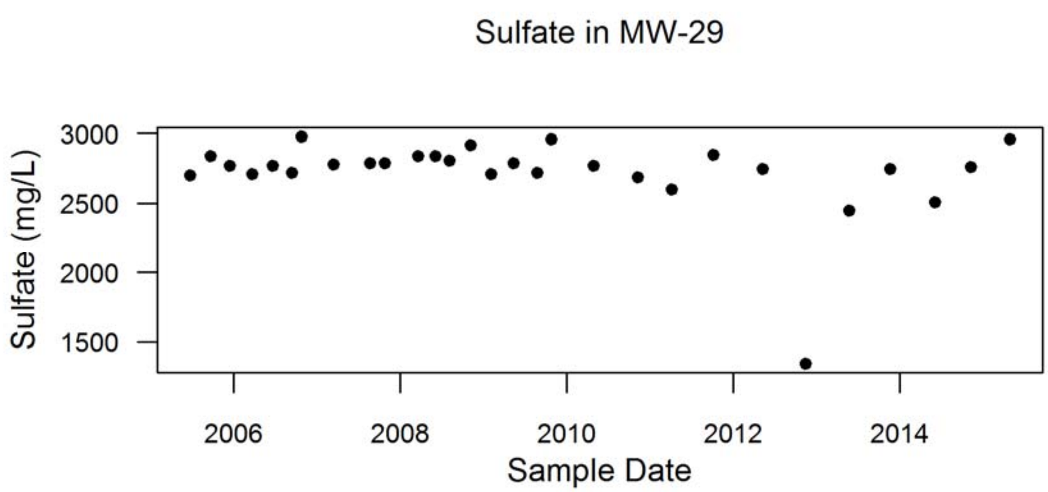
Appendix G-2: Timeseries







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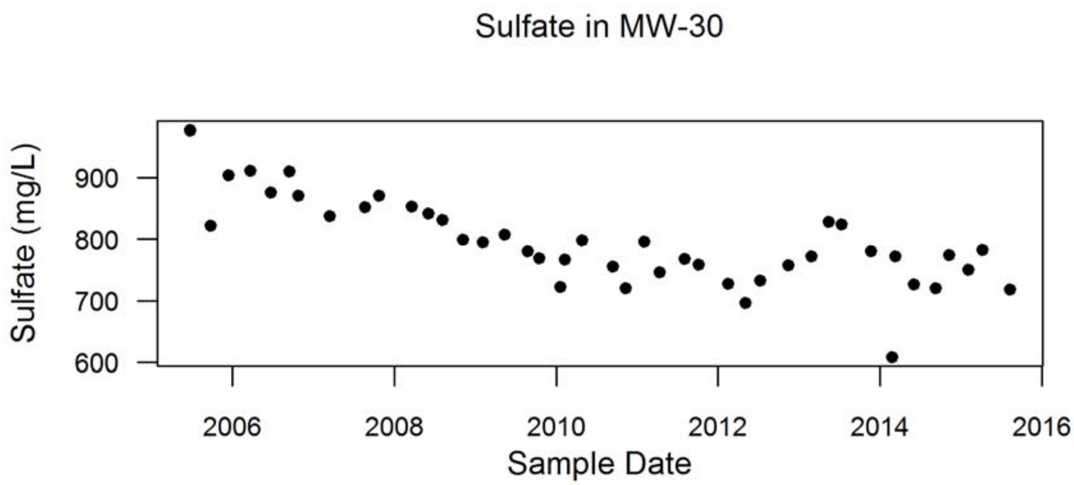

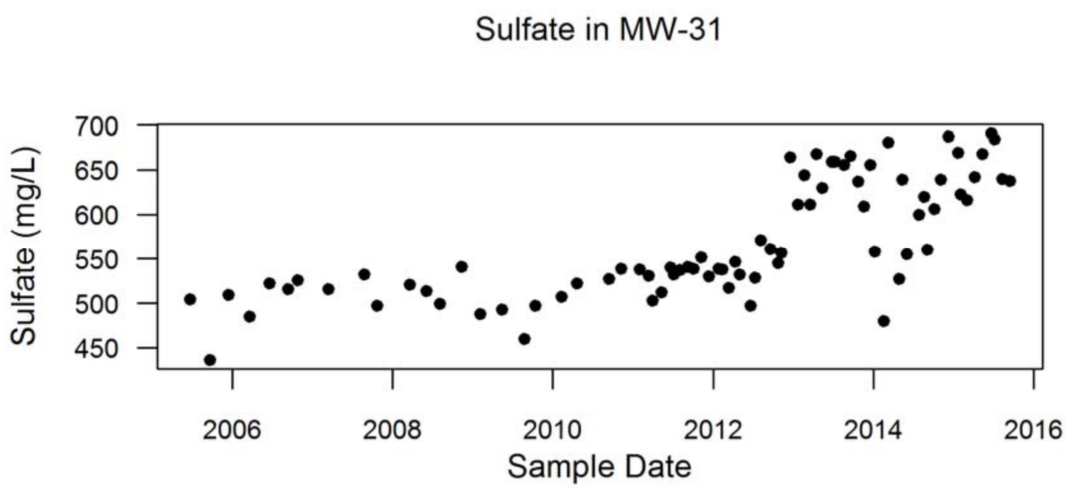

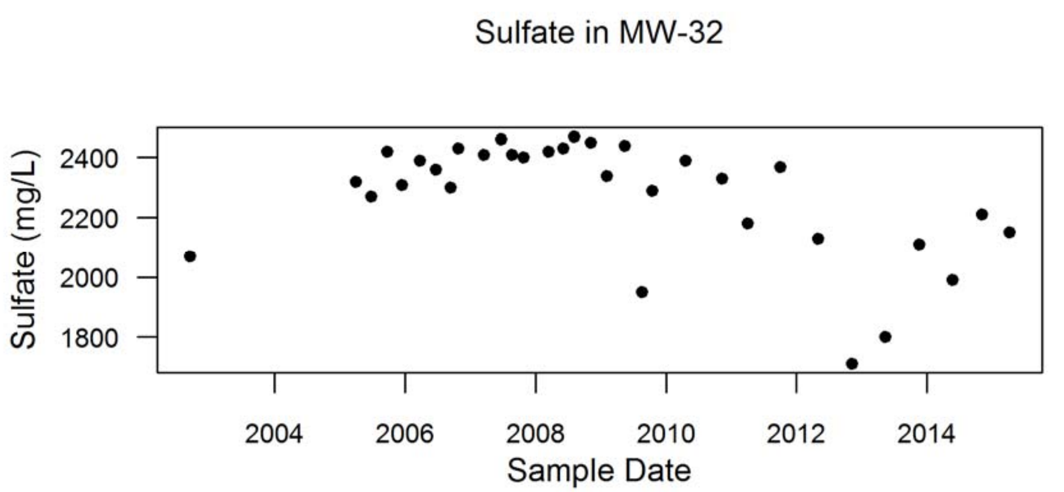

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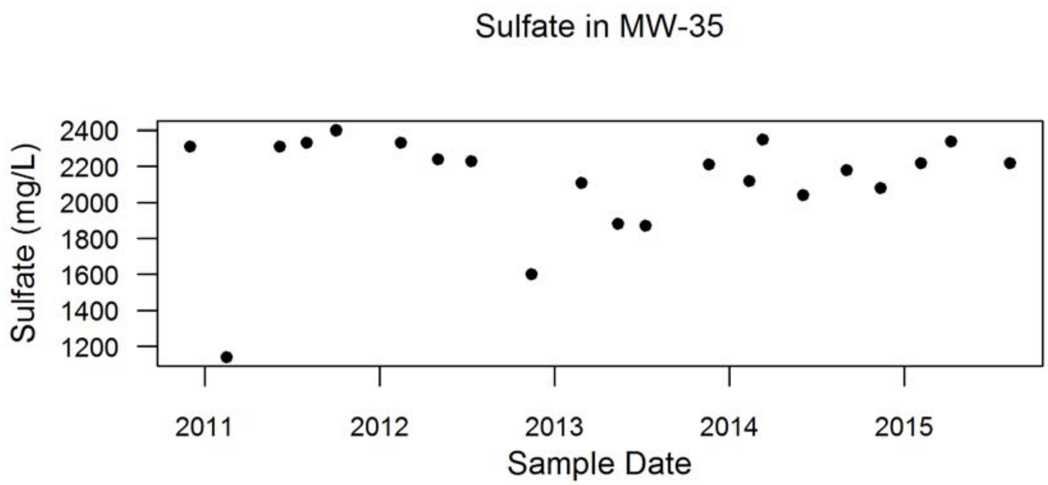

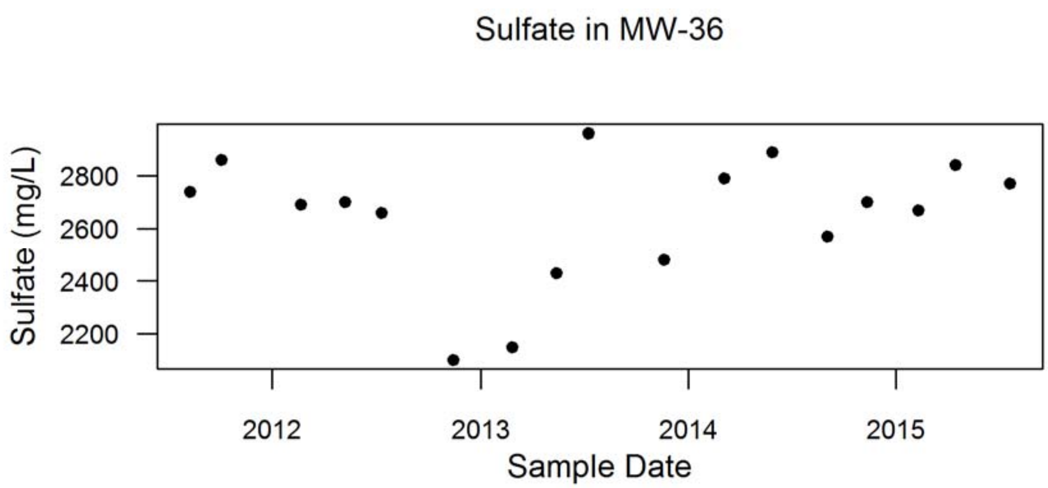

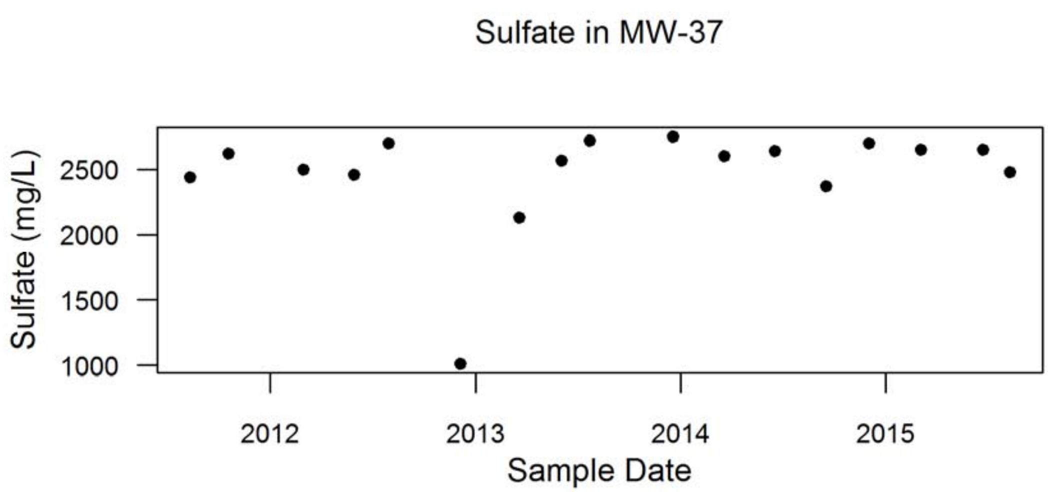

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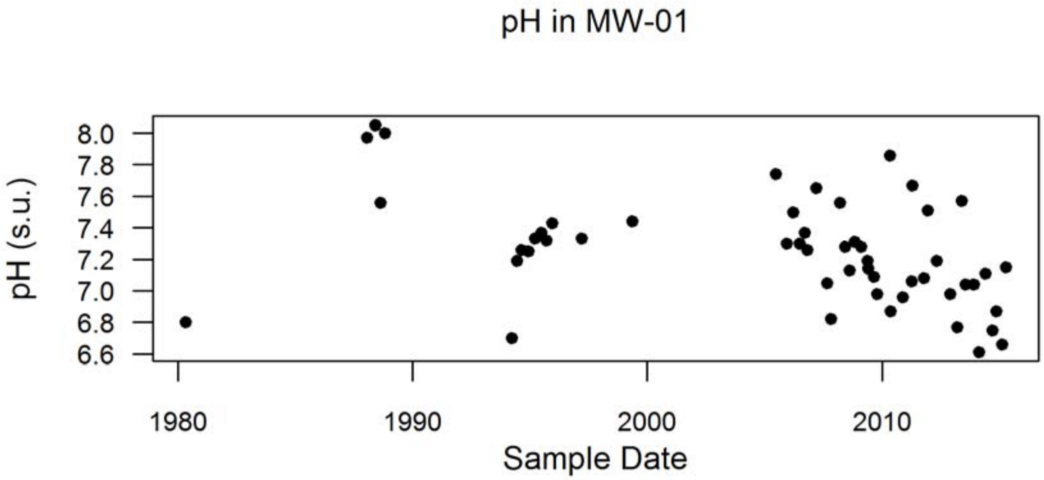

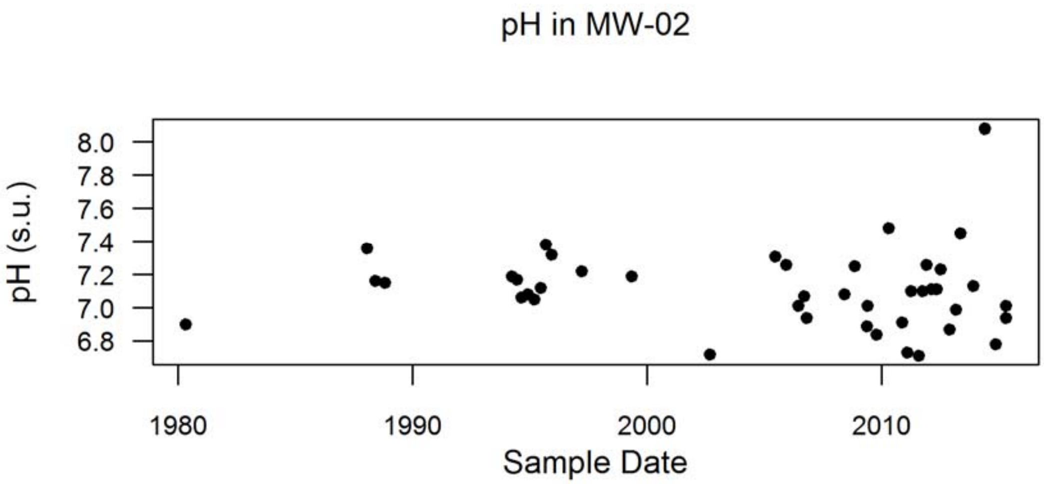

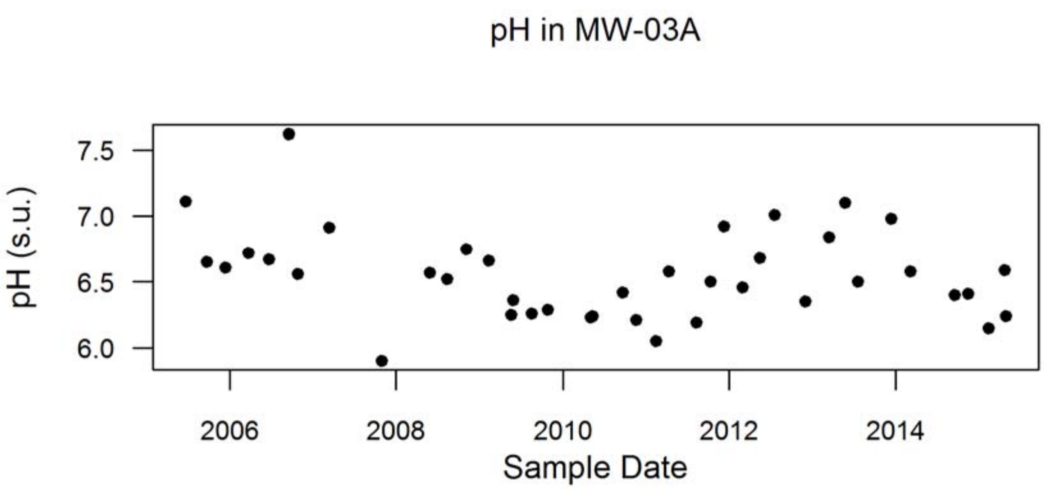

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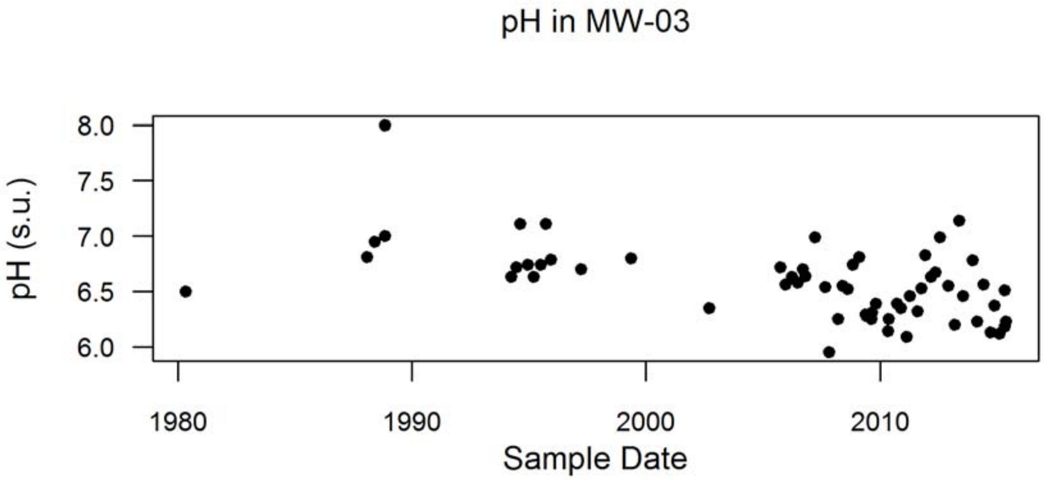

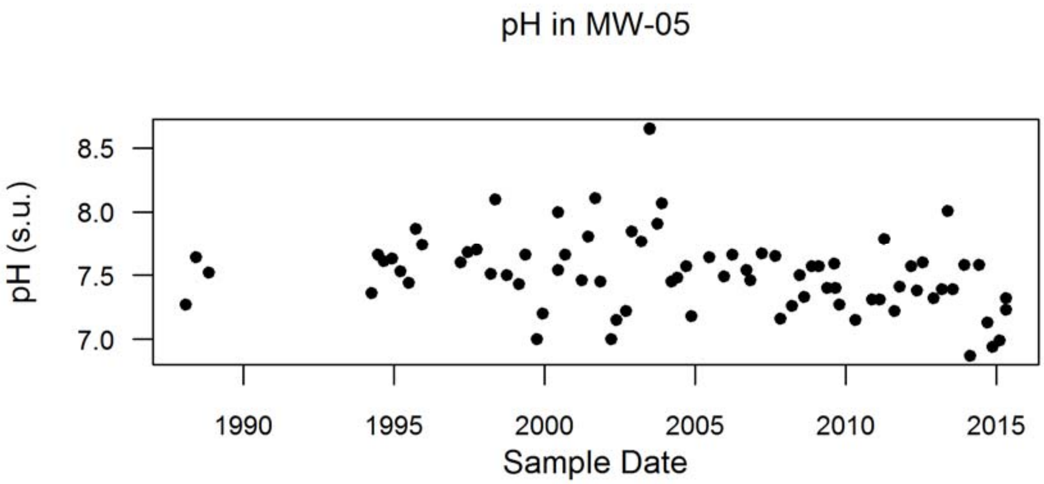

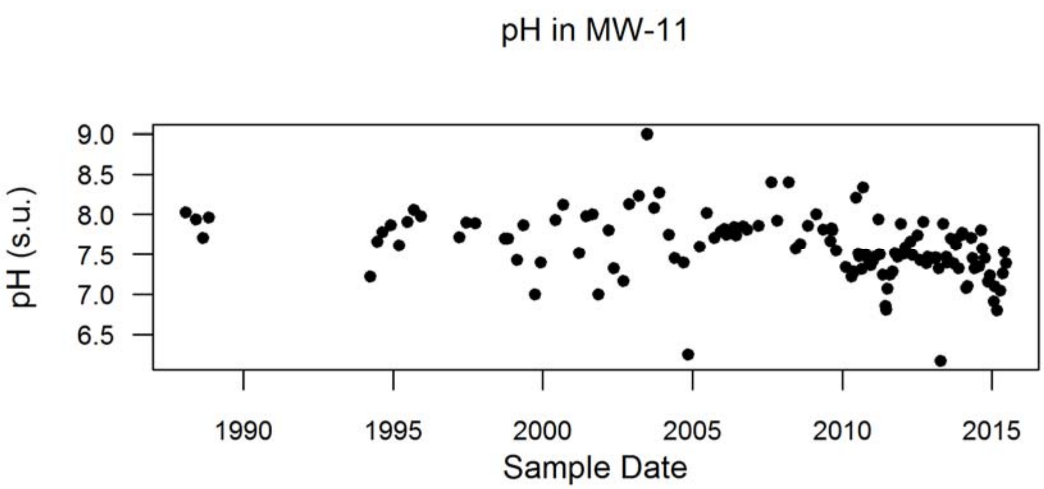

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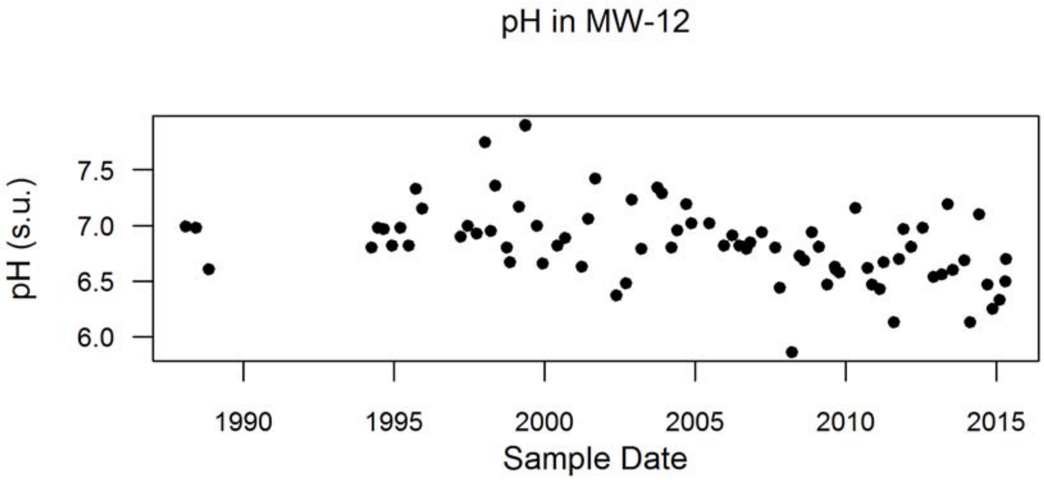

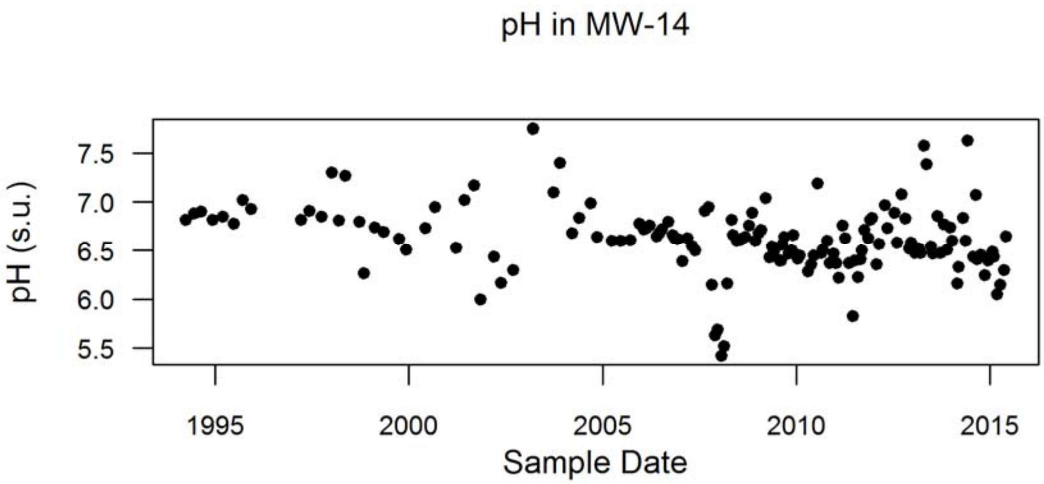

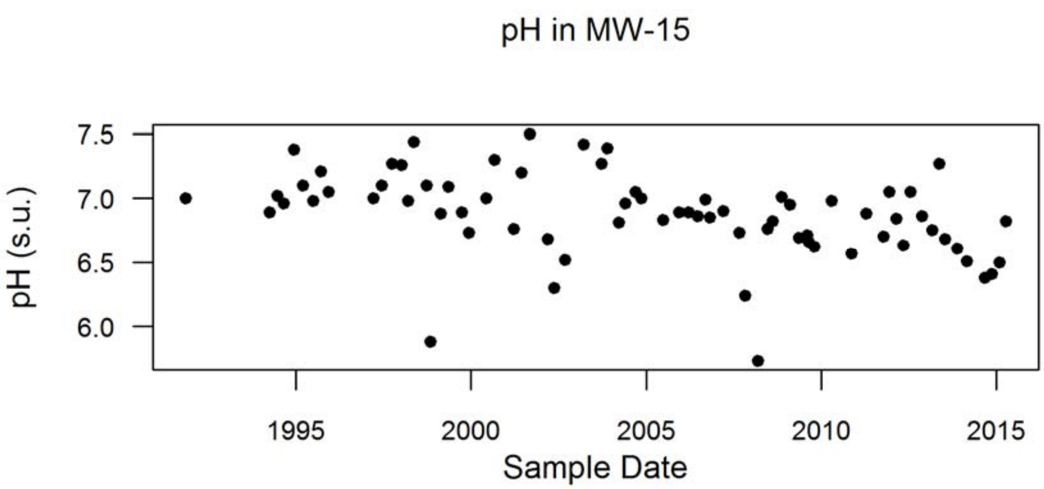

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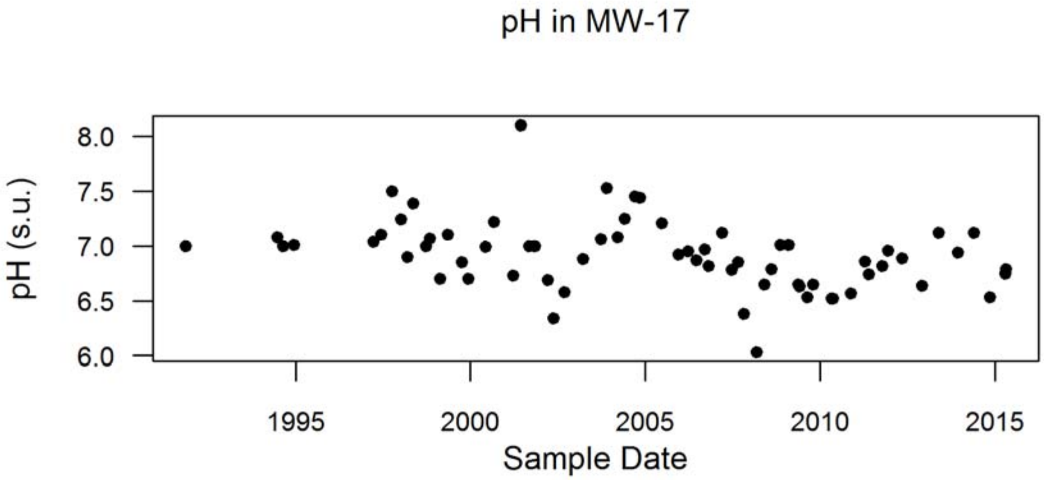

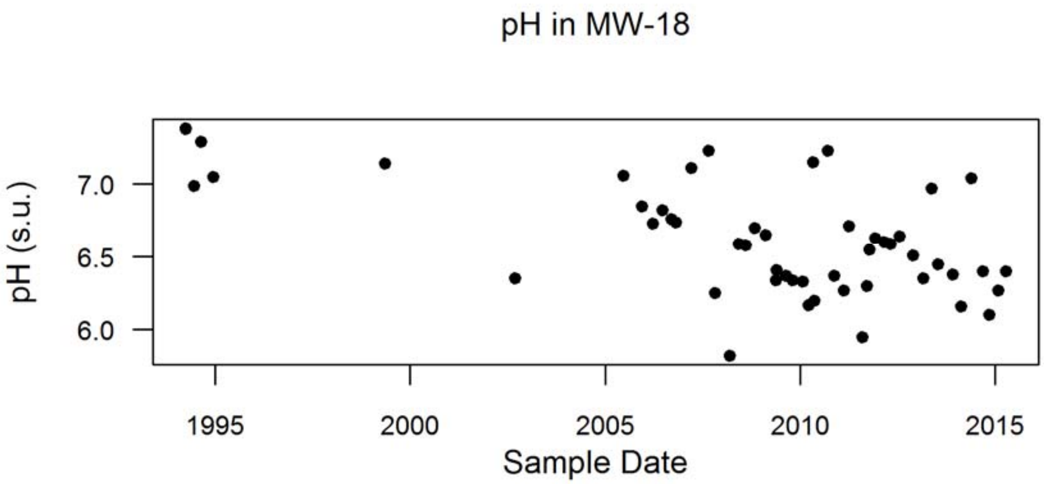

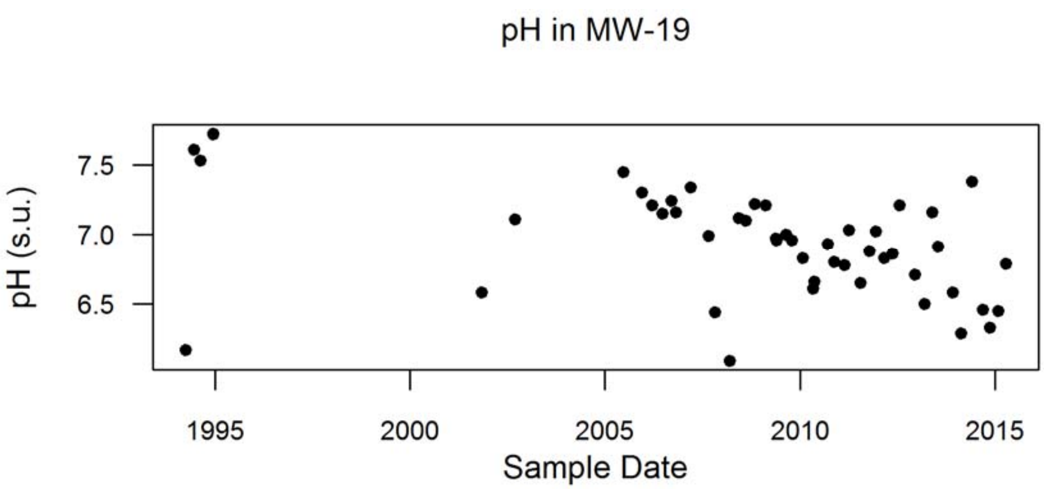

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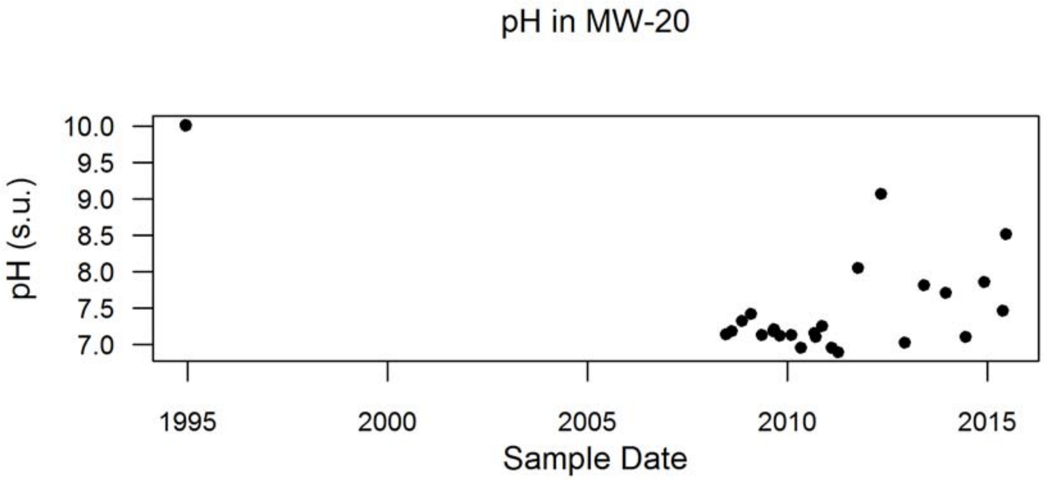

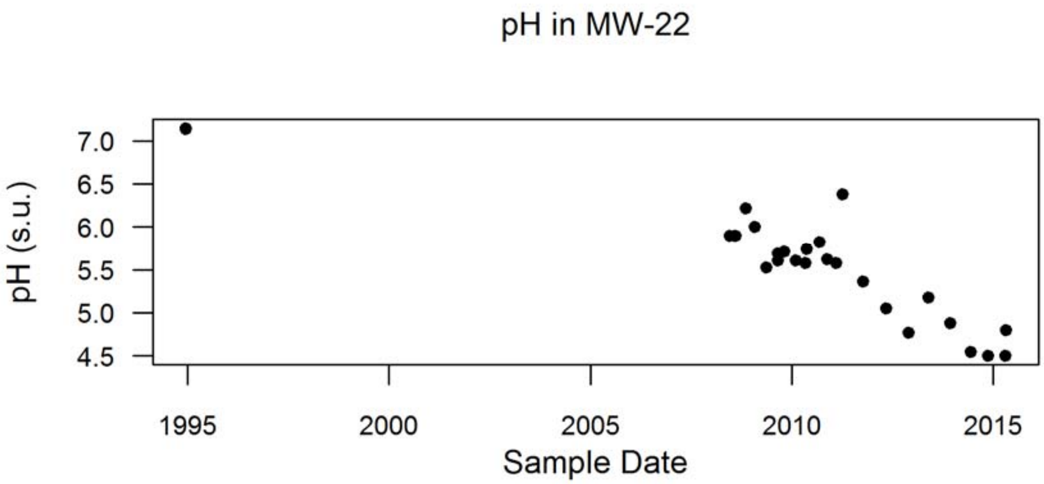

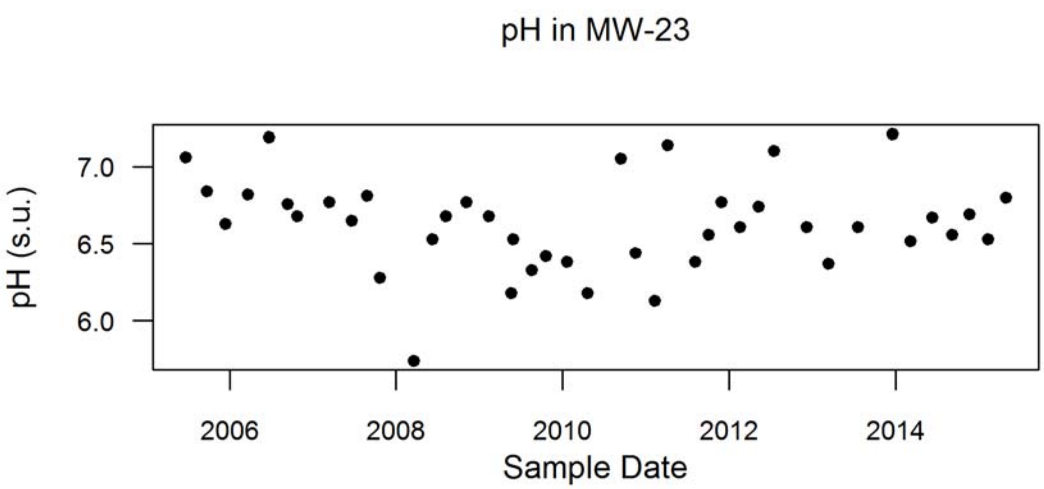

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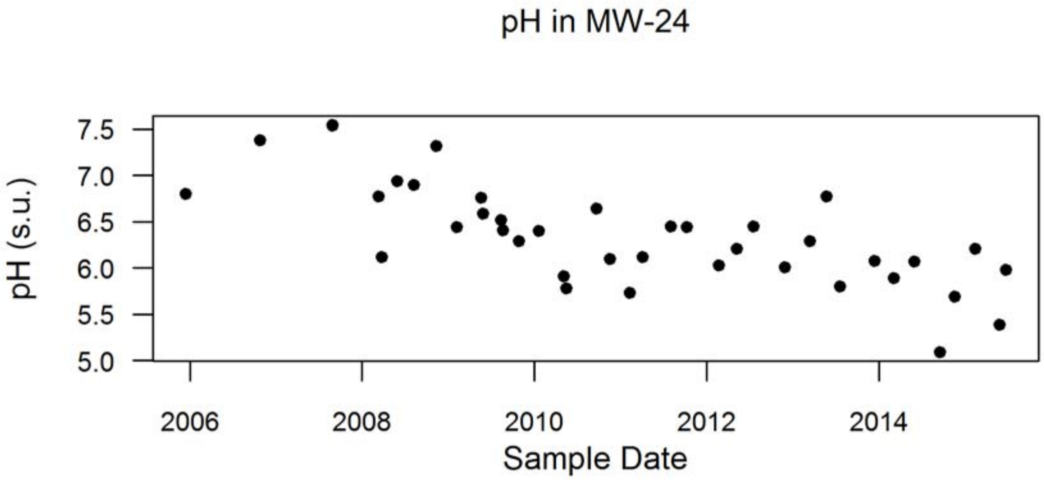

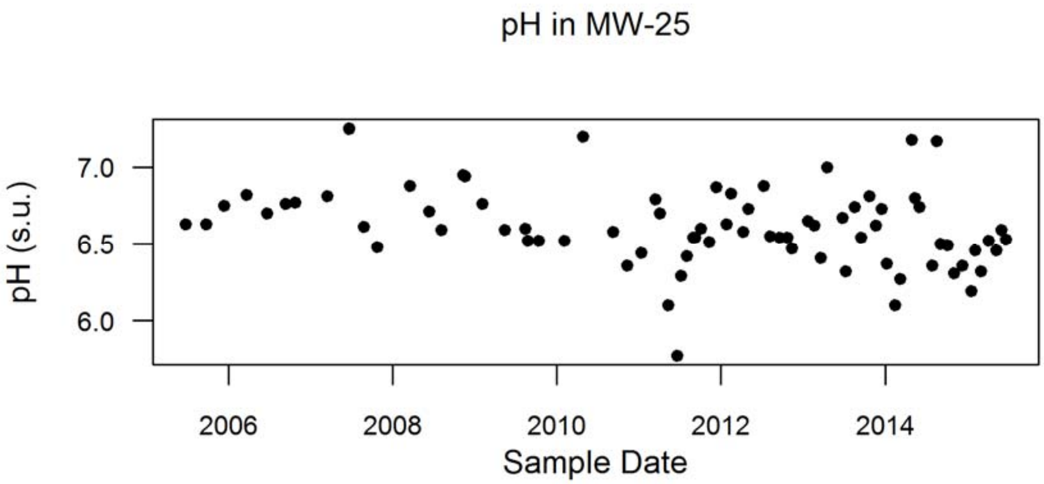

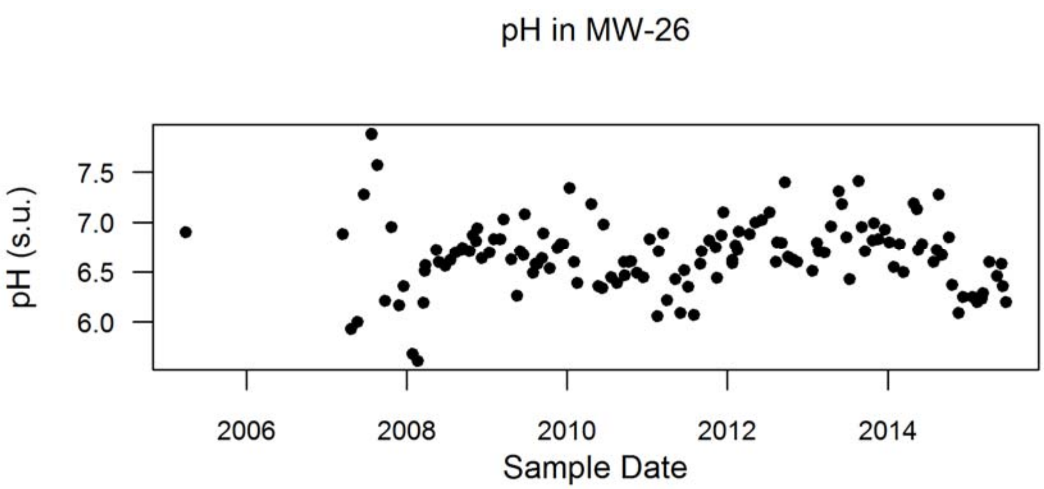

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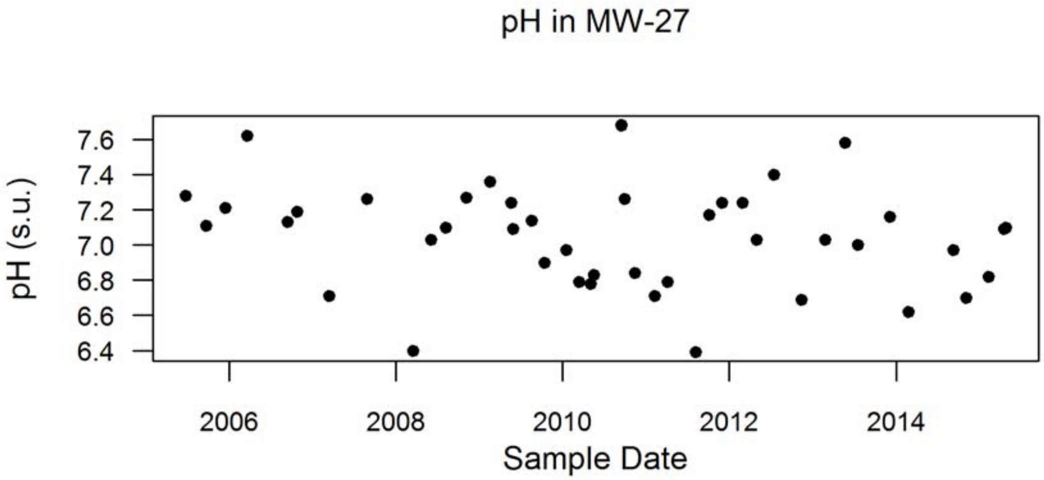

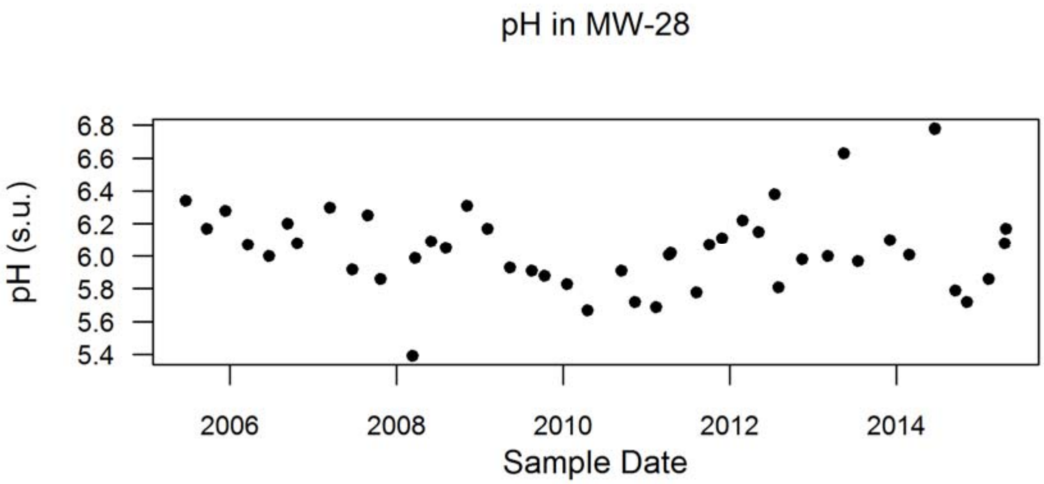

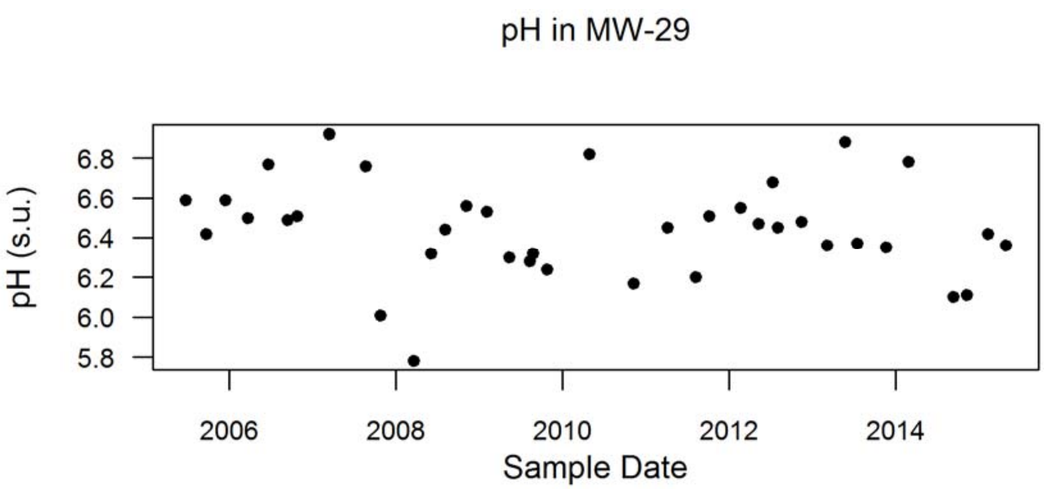

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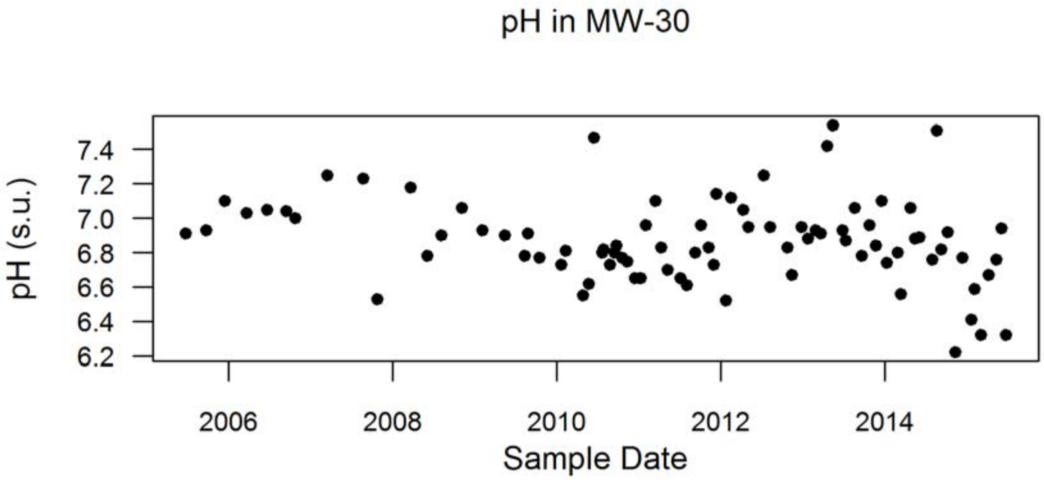
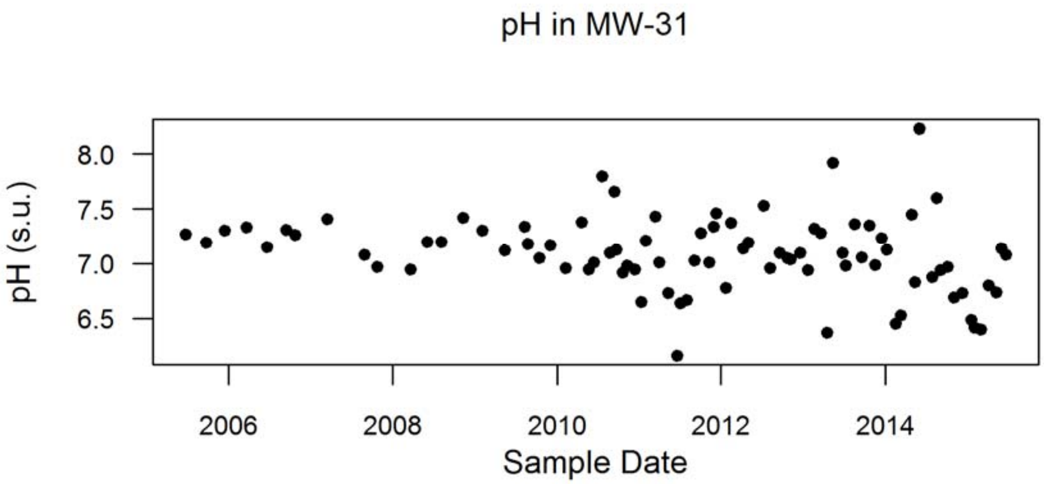
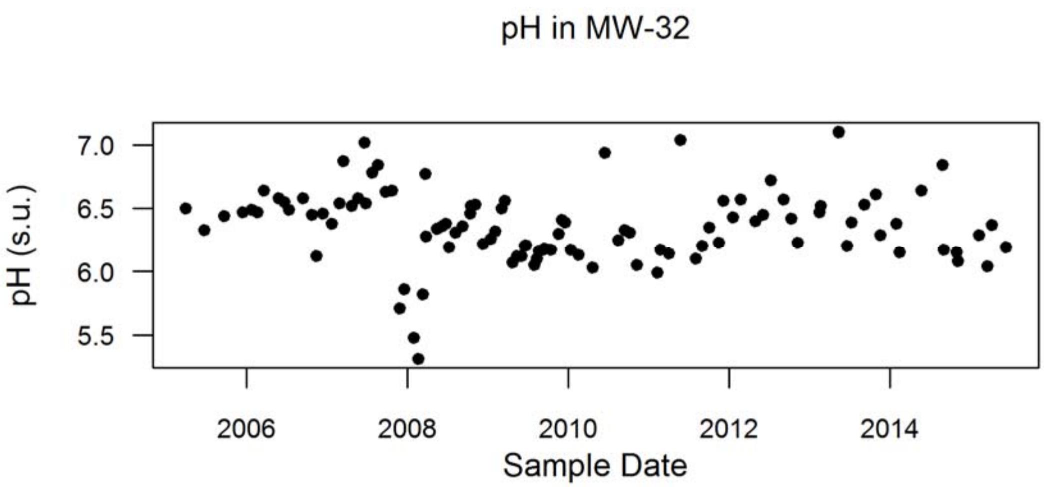
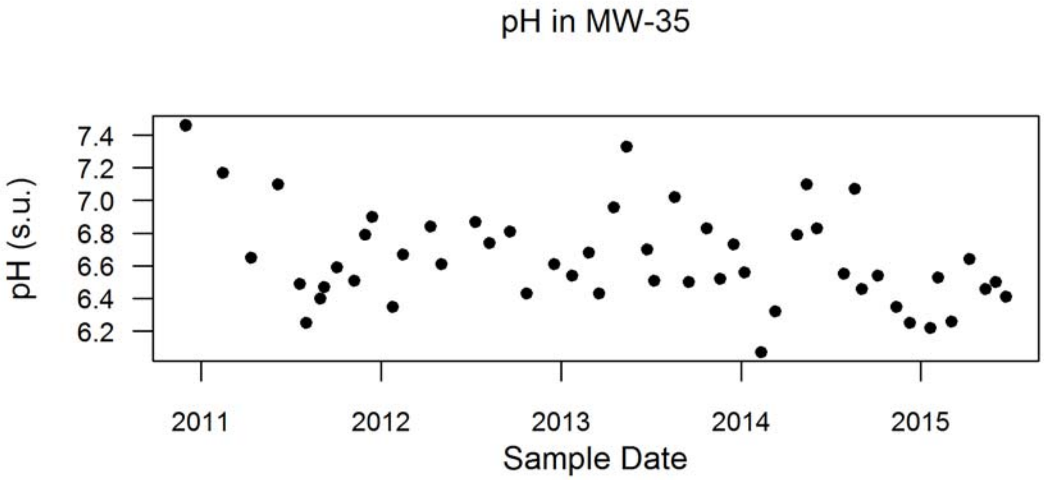
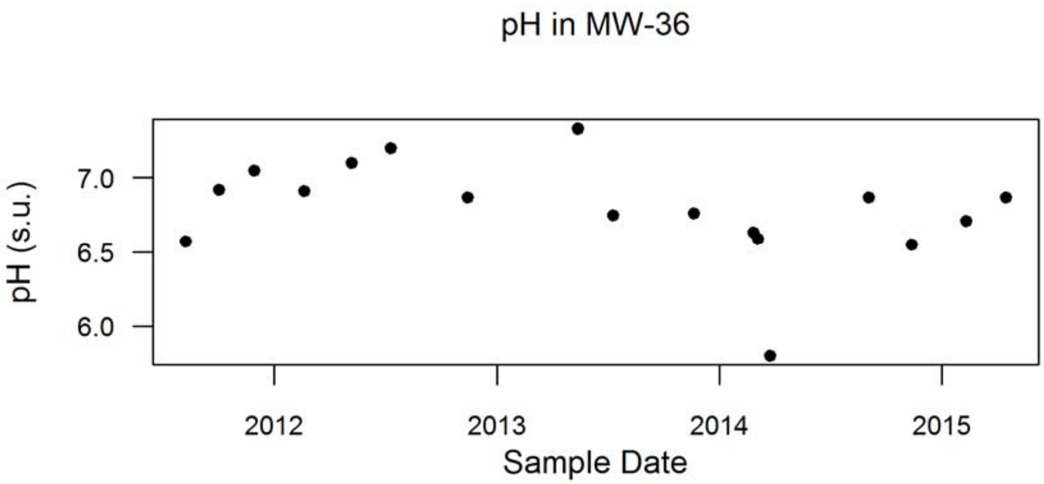


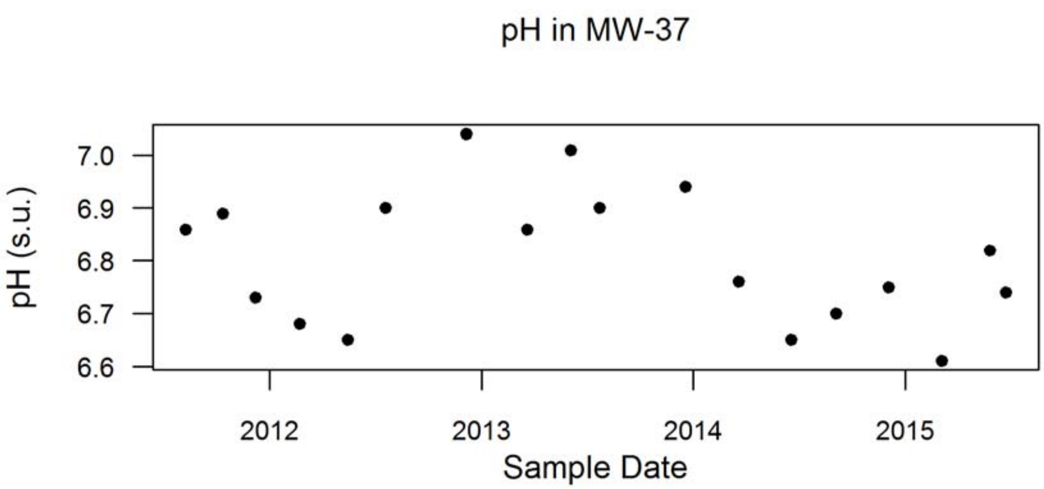




Appendix G-2: Timeseries

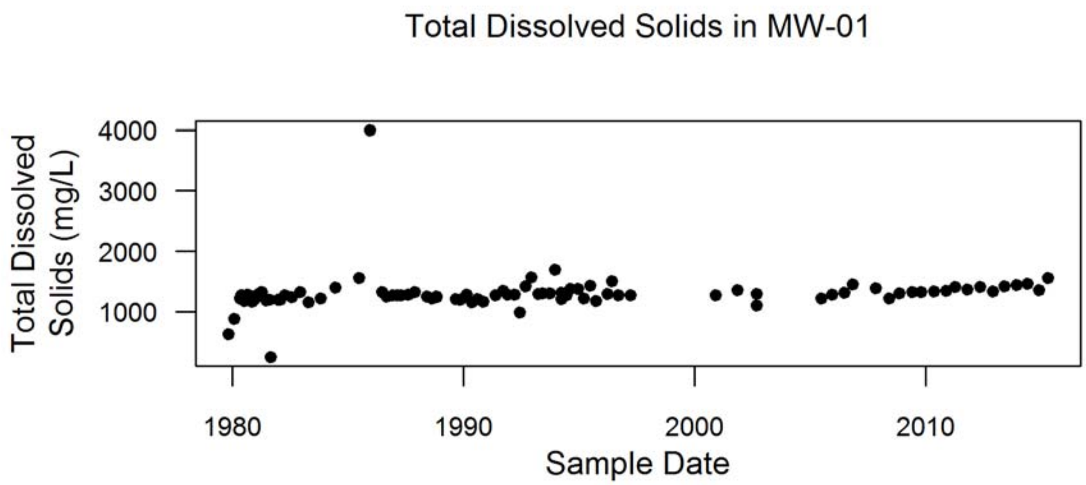


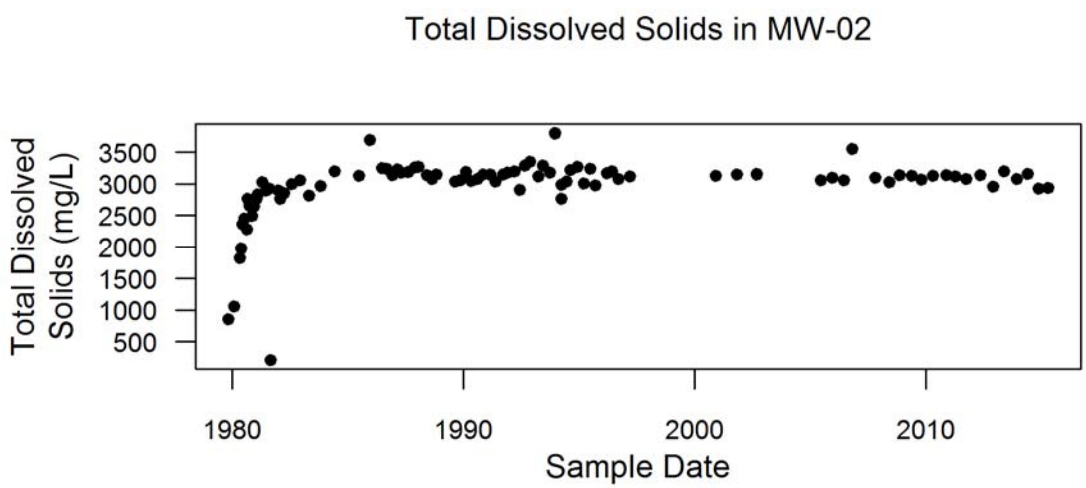


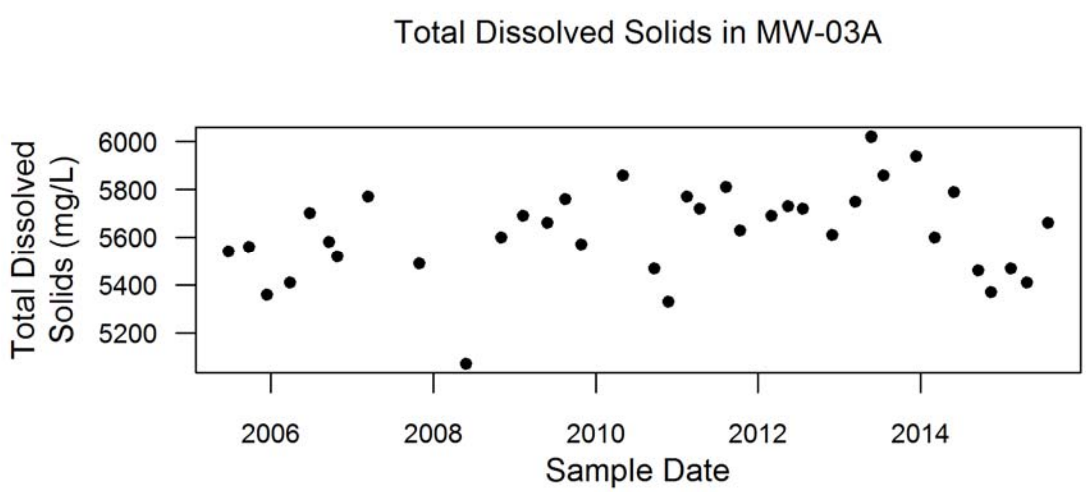


INTERA

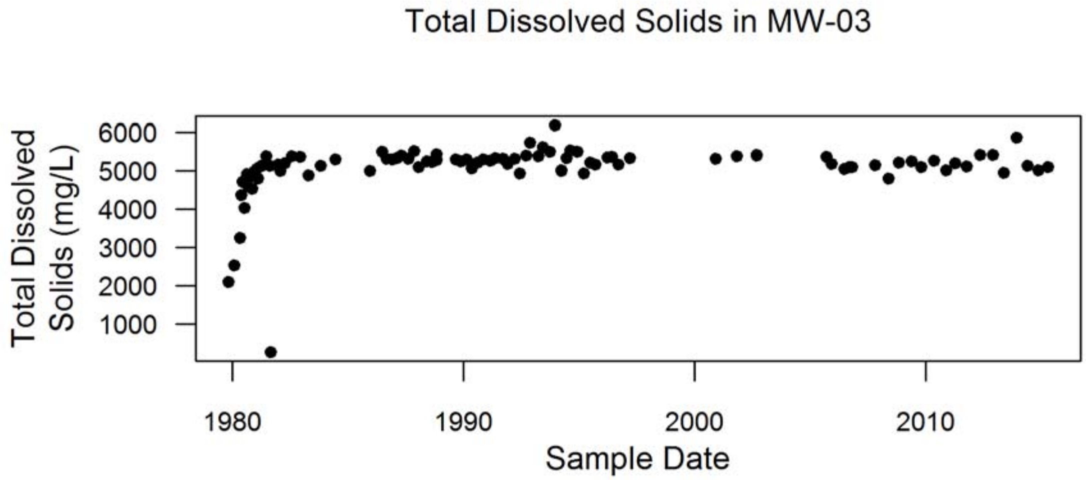
Appendix G-2: Timeseries

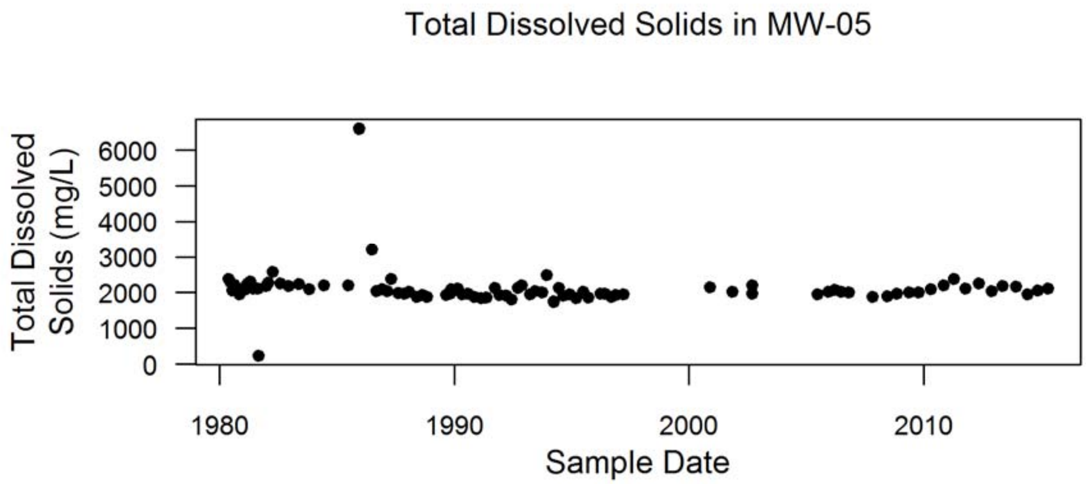


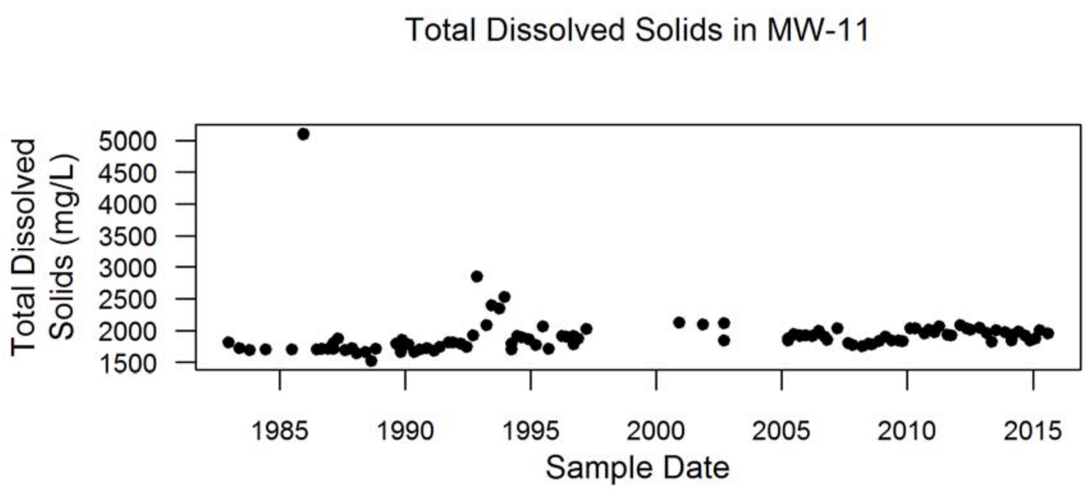




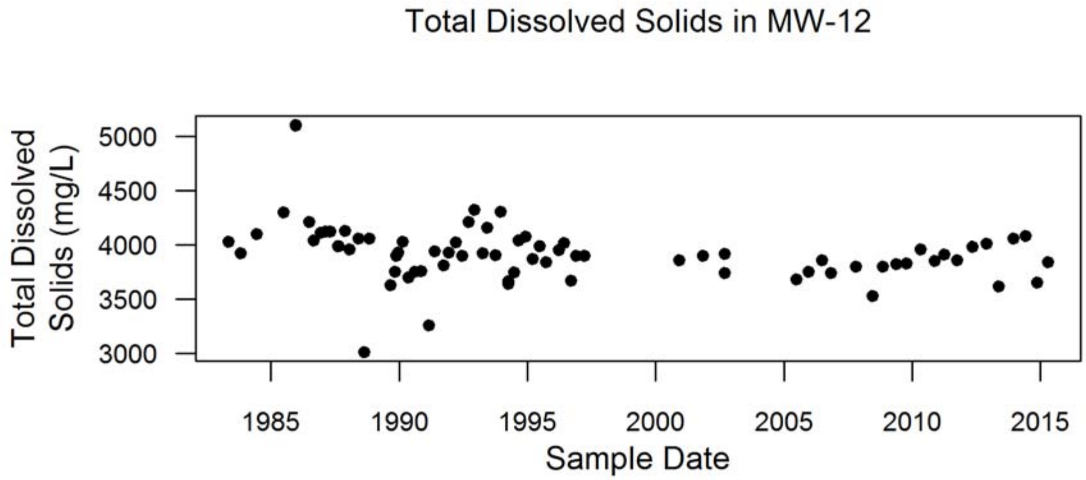
Appendix G-2: Timeseries

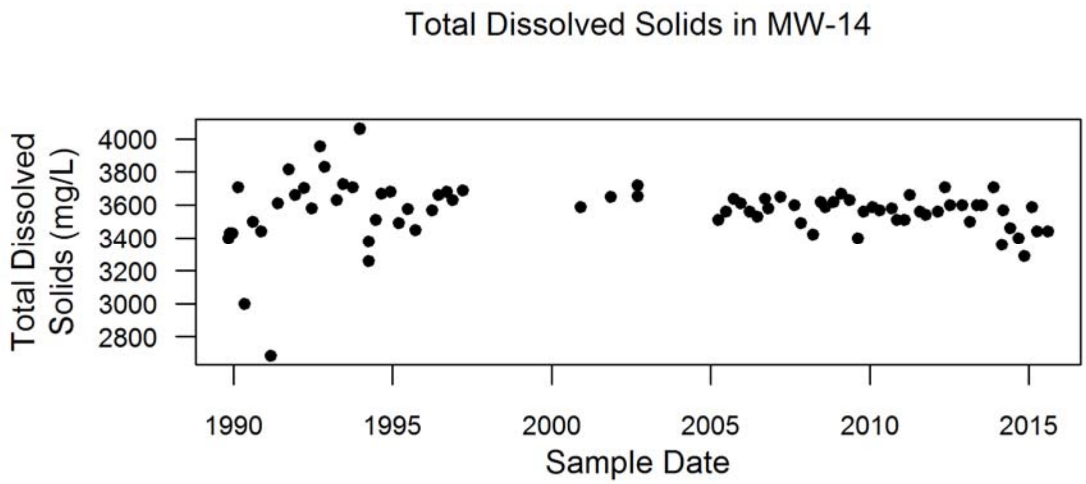


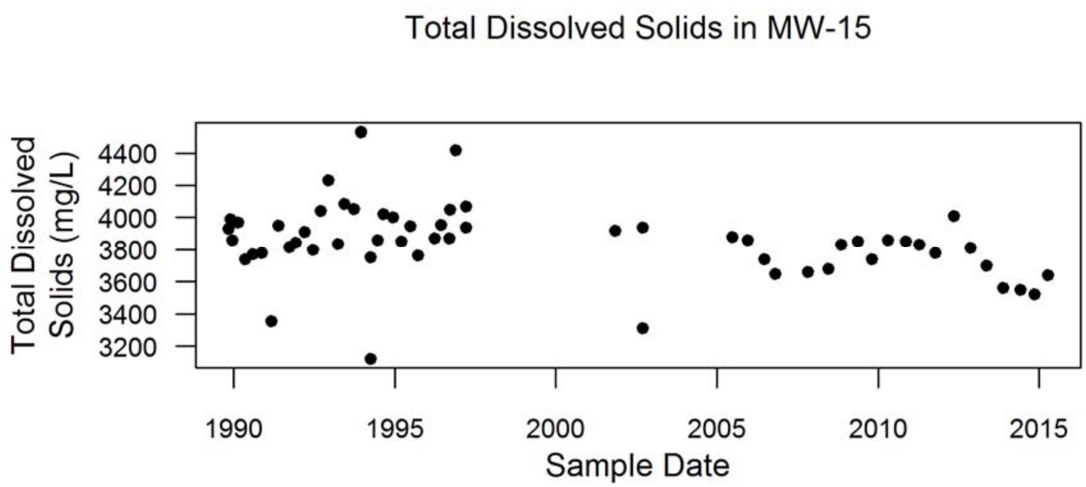




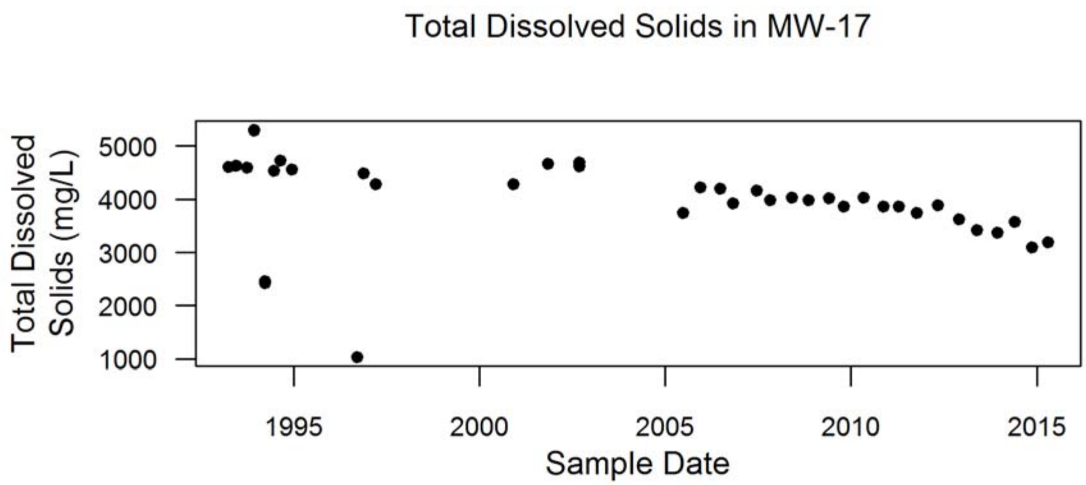
Appendix G-2: Timeseries

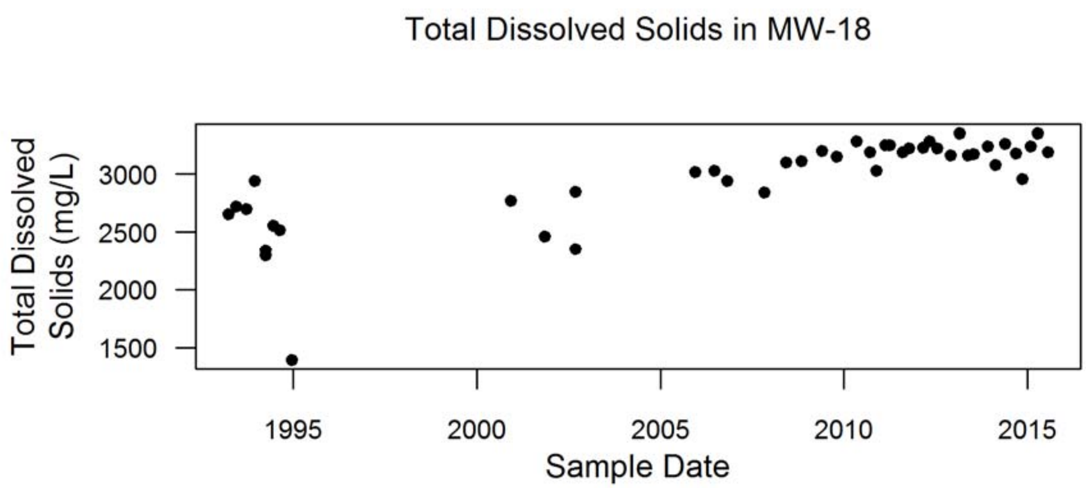


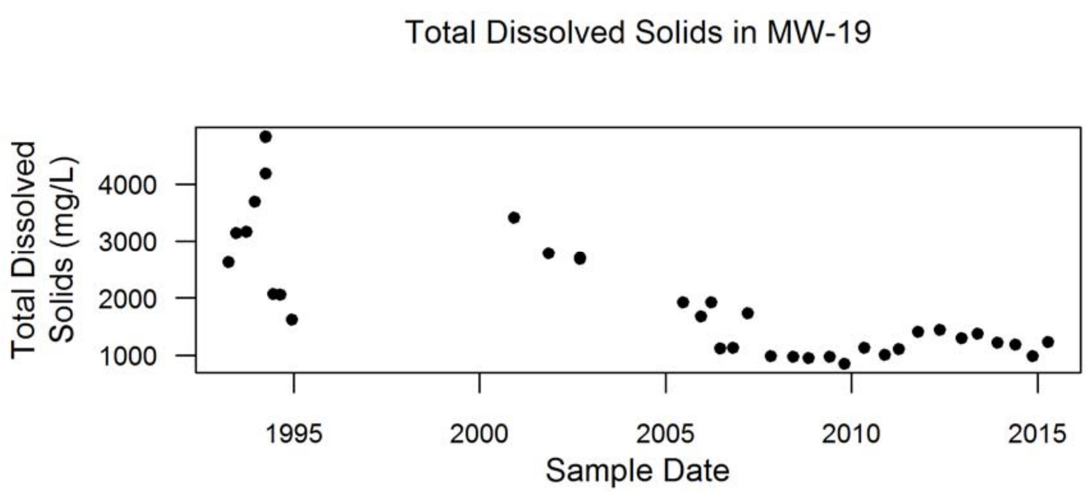




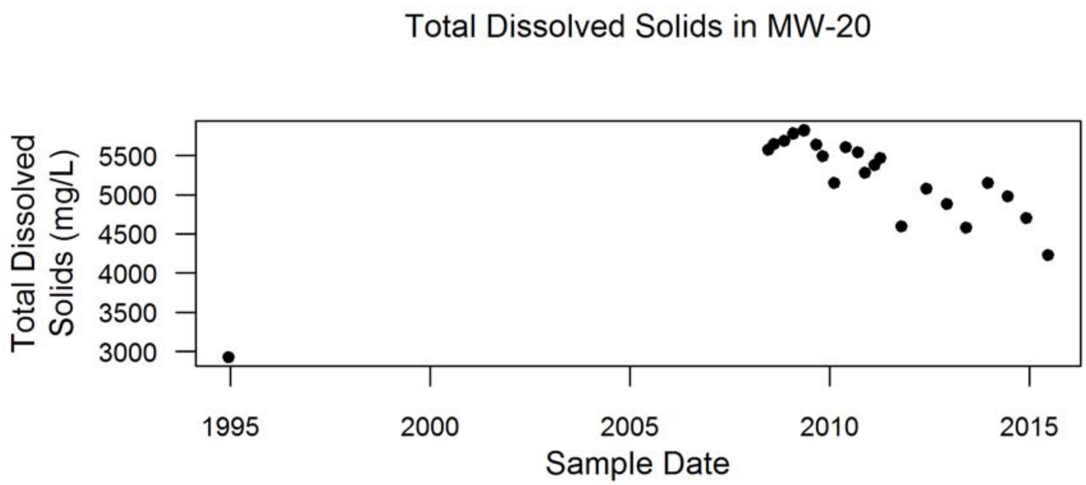
Appendix G-2: Timeseries

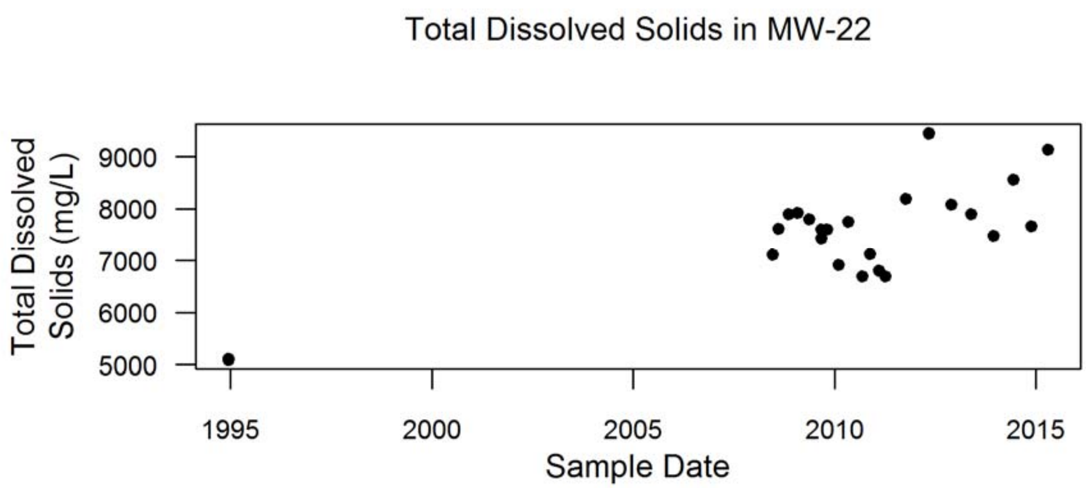


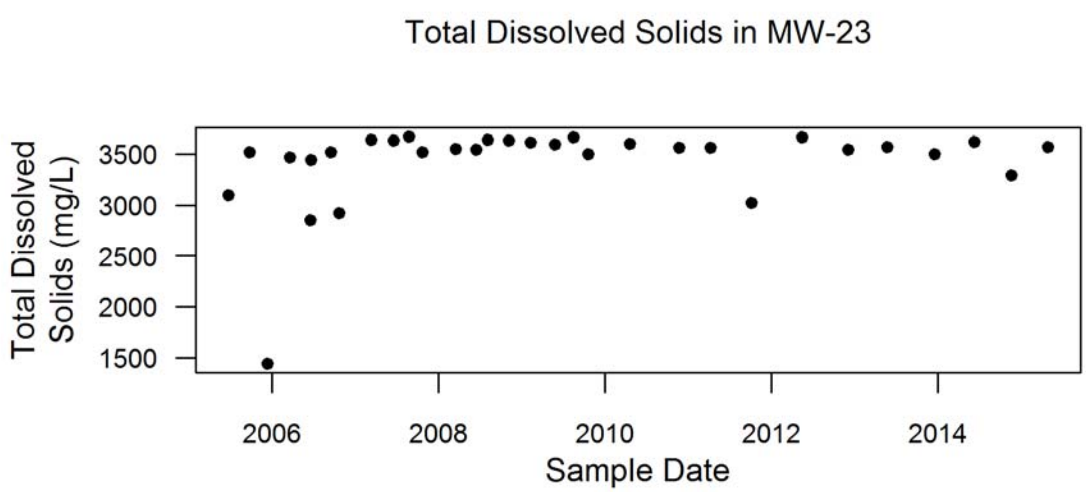




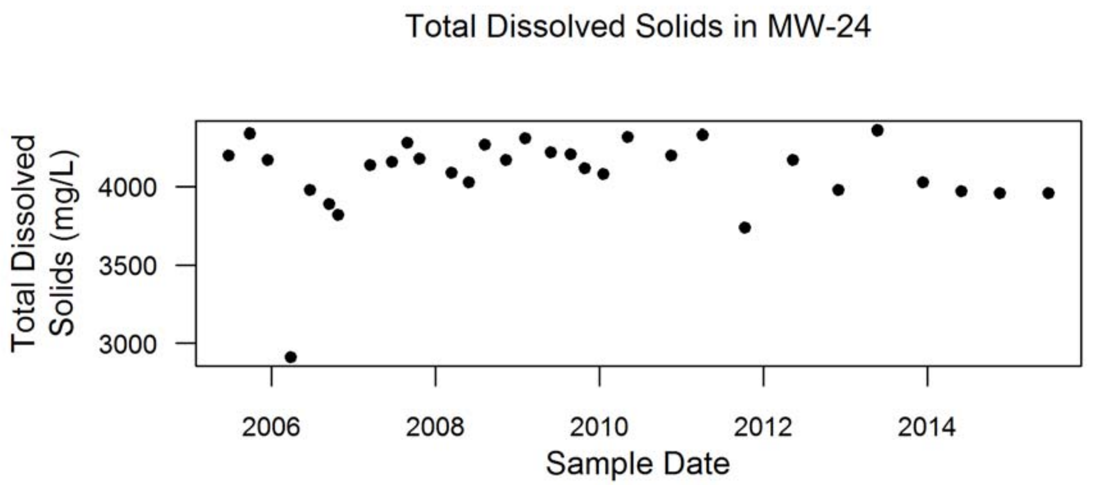
Appendix G-2: Timeseries

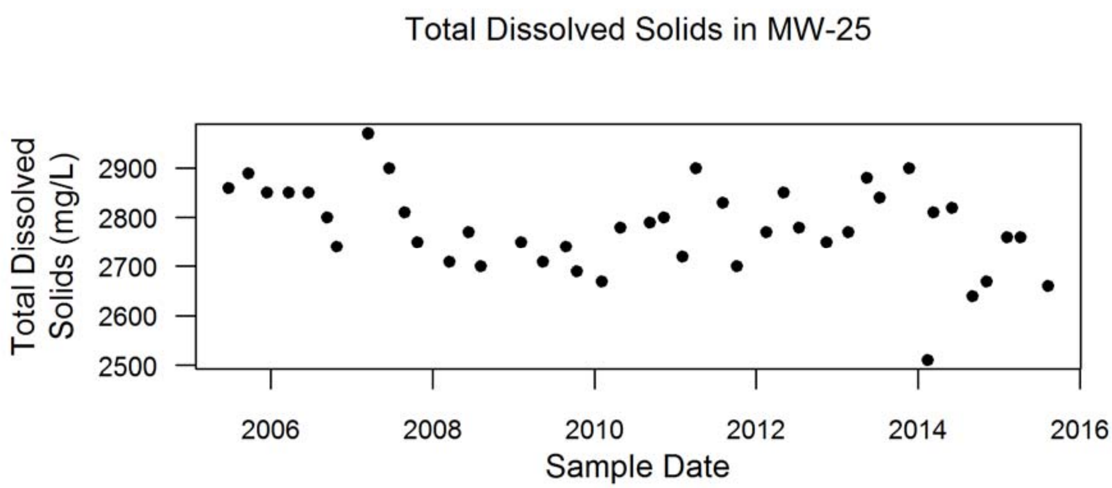


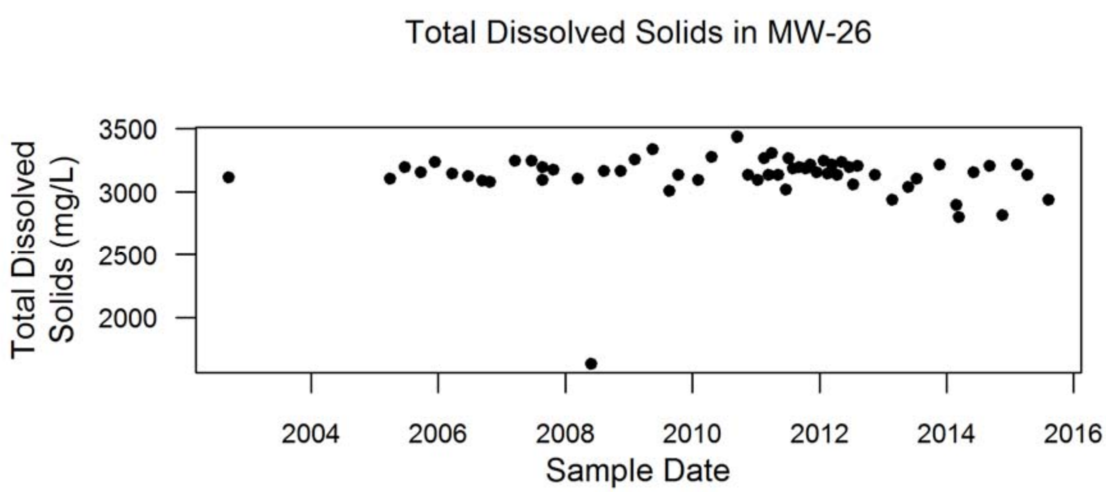




Appendix G-2: Timeseries

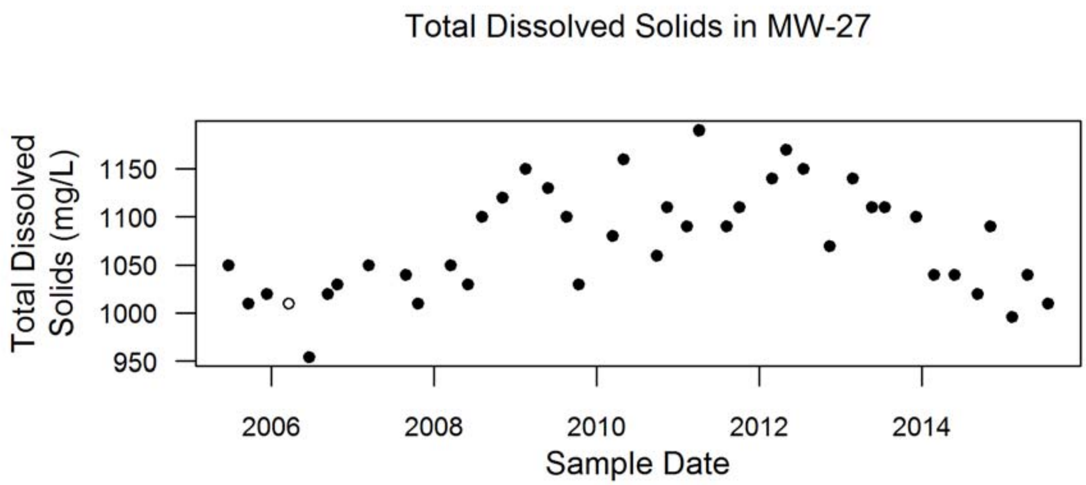


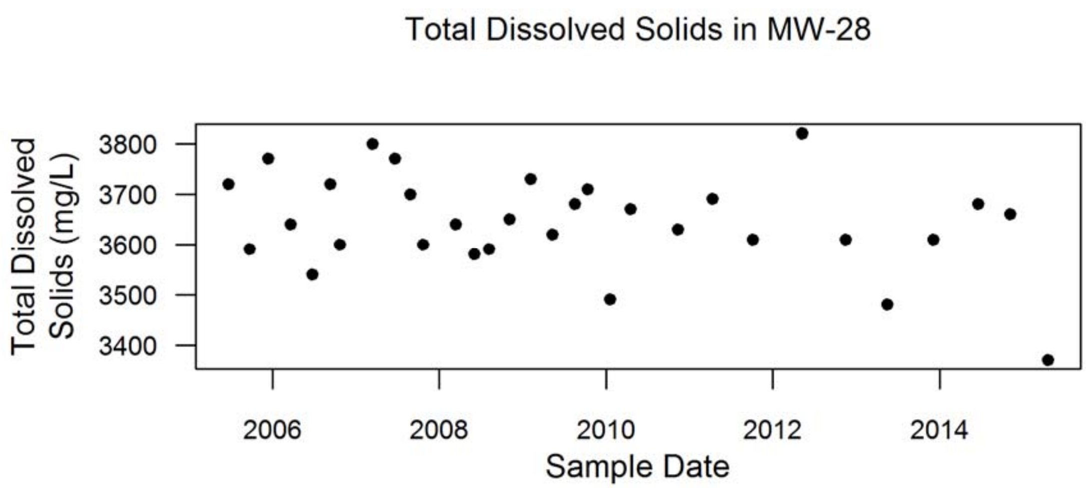


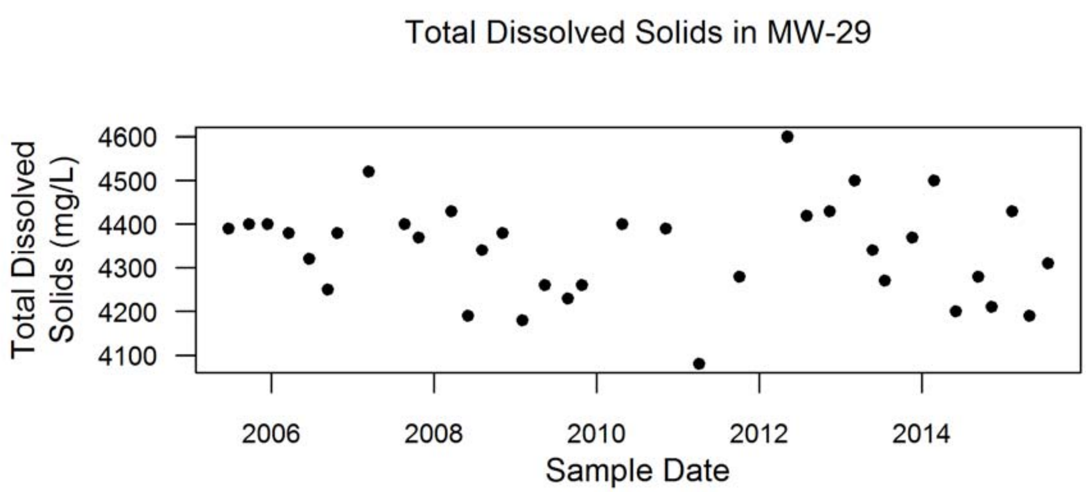


INTERA

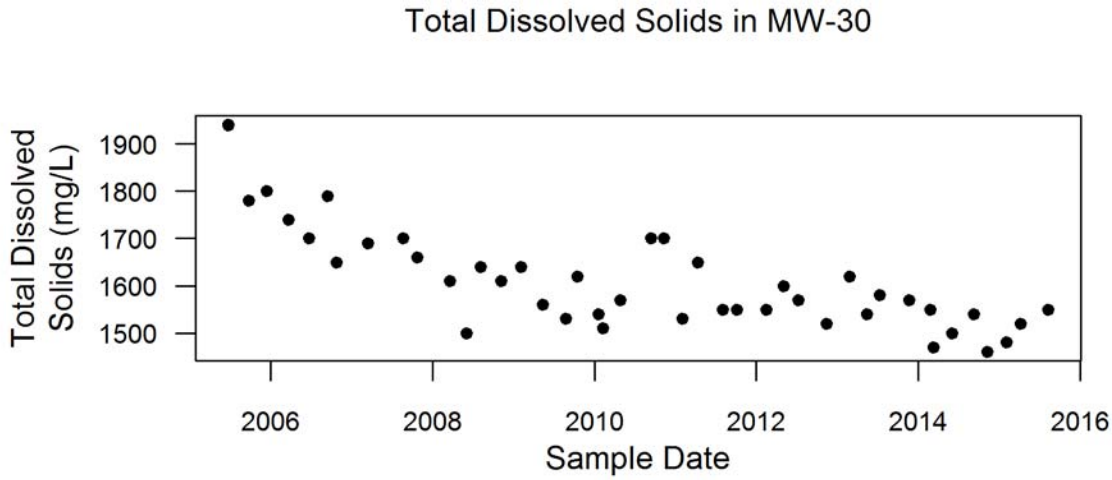
Appendix G-2: Timeseries

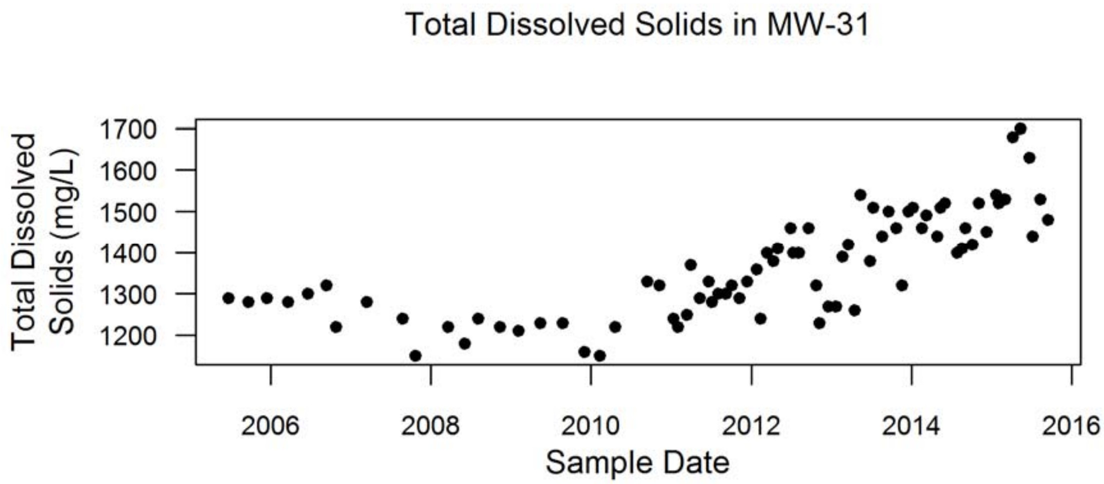


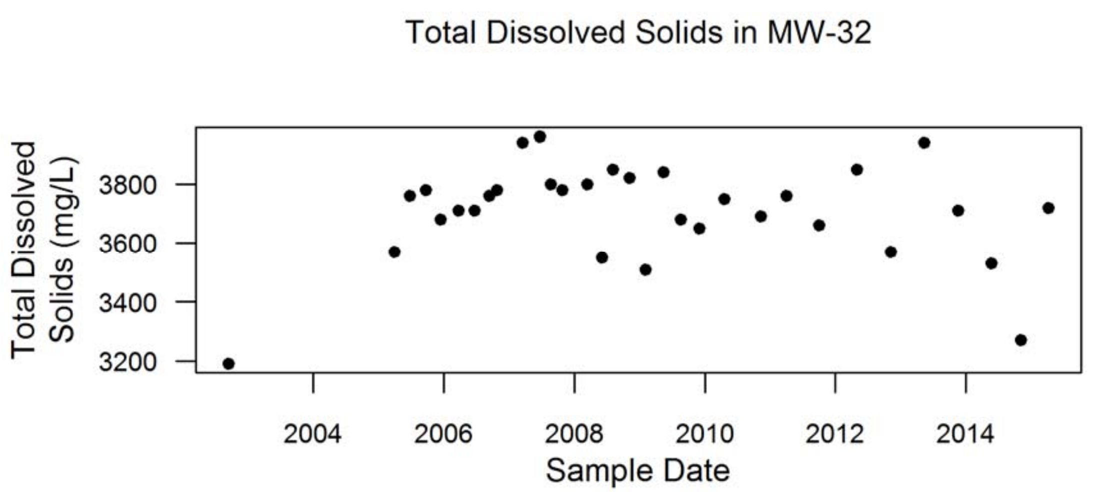




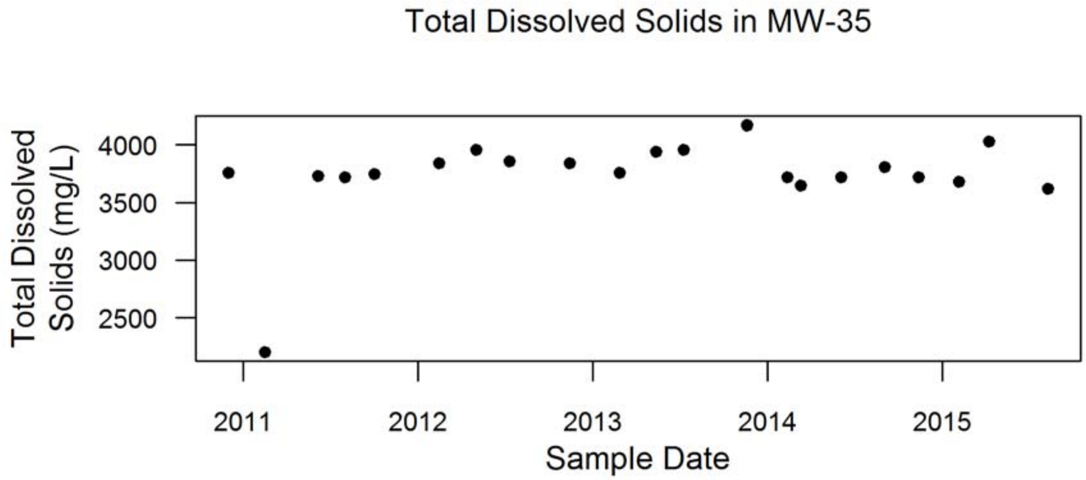
Appendix G-2: Timeseries

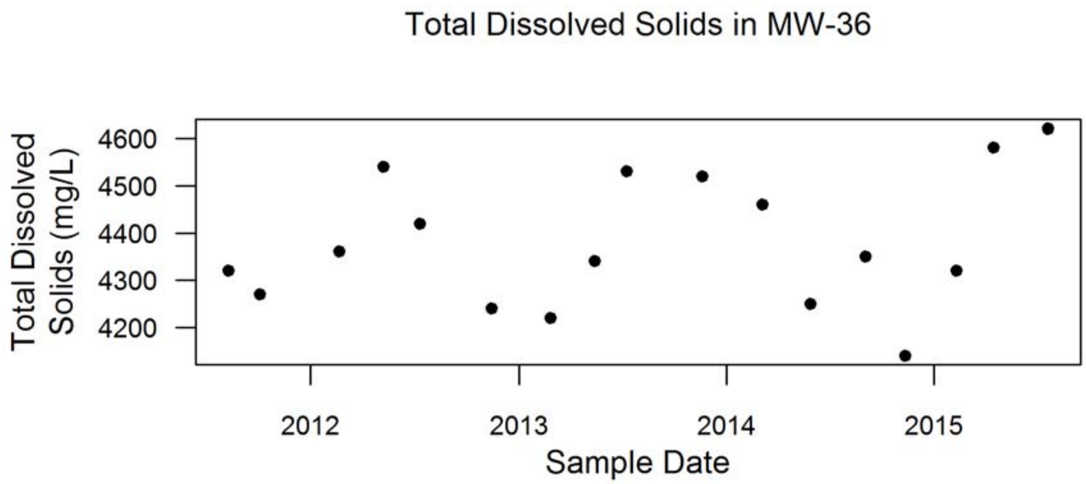


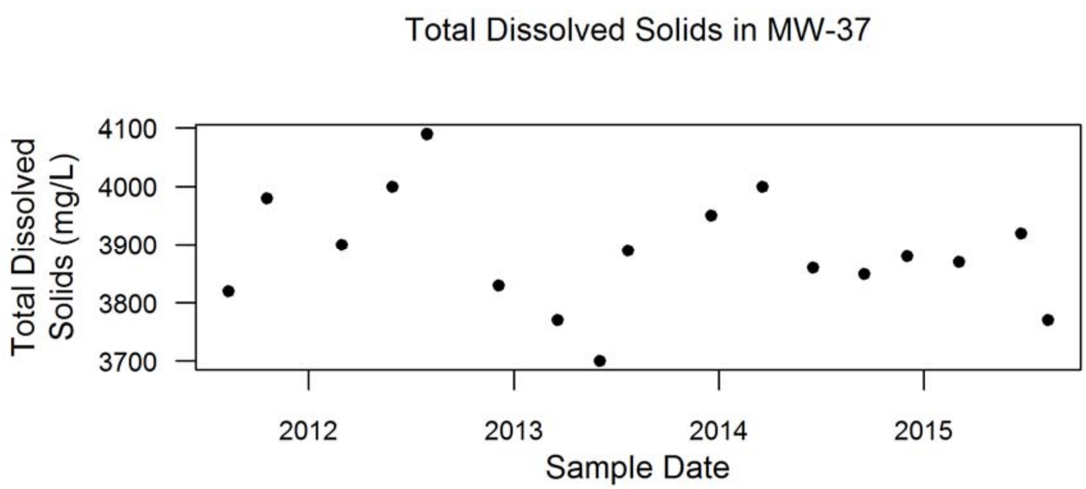




Appendix G-2: Timeseries







APPENDIX H

Flowsheet Analysis for Post-Inflection Data (Modified Approach) for Purposes of Calculating GWCLs

Appendix H-1: Summary of Flowsheet Analysis for Out of Compliance Constituents in MW-31 Using Modified Data Set to Address Trends

Well	Constituent	N	% Non-Detected Values	Mean	Standard Deviation	Shapiro-Wilk Test for Normality		Normally or Lognormally distributed?	Mann Kendall Trend Analysis		Significant Trend	Highest Historical Value (HHV)	Mean + 2σ	Current GWCL	Flowsheet GWCL	Flowsheet GWCL Rationale
						W	p		S	p						
MW-31	Sulfate	35	0	624.49	50.3881	0.8899	0.0021	No	4953	0.0798	No	691.0	725.26	552	691	HHV
MW-31	pH	34	0	7.017	0.4146	0.9585	0.2199	Yes	0.0788	0.1078	No	8.23	6.19	6.57-8.5	6.19	Mean - 2σ
MW-31	Selenium	32	0	76.463	3.7668	0.9787	0.7621	Yes	0.0076	0.6352	No	85.4	84.00	79	84.00	Mean + 2σ
MW-31	Total Dissolved Solids	35	0	1456.29	109.2242	0.9519	0.1294	Yes	0.4922	0.0000	Yes	1700	1674.73	1410.57	1674.73	Mean + 2σ

Notes:

σ = sigma
%ND = percent of non-detected values
μg/L = micrograms per liter
mg/L = milligrams per liter

N = number of valid data points
p = probability
W = Shapiro Wilk test value
r^2 = The measure of how well the trendline fits the data where r^2=1 represents a perfect fit.

S = Mann-Kendall statistic

Analysis performed on data collected October 2012 through August 2015
Distribution = Distribution as determined by the Shapiro-Wilk distribution test for constituents with % Detect > 50% and N>8
Mean = The arithmatic mean as determined for normally or log-normally distributed constituents with % Detect > 50%
Standard Deviation = The standard deviation as determined for normally or log-normally distributed constituents with % Detect > 85%
Highest Historical Value = The highest observed value for constituents with % Detect < 50%

Appendix H-2: Descriptive Statistics for Modified GWCL Data Set and All Data

Data Set	GWCL Subset	ALL 2015 SAR Data		GWCL Subset	ALL 2015 SAR Data		GWCL Subset	ALL 2015 SAR Data		GWCL Subset	ALL 2015 SAR Data
Analyte	**Selenium**	**Selenium**		**Sulfate**	**Sulfate**		**pH**	**pH**		**Total Dissolved Solids**	**Total Dissolved Solids**
Units	µg/L	µg/L		mg/L	mg/L		s.u.	s.u.		mg/L	mg/L
% Non-Detects	0	0		0	0		0	0		0	0
N	32	61		35	77		34	85		35	78
Distribution	normal or lognormal	Not normal or lognormal		Not normal or lognormal	Not normal or lognormal		normal or lognormal	normal or lognormal		normal or lognormal	normal or lognormal
Mean	76.5	69.6		624.5	567.5		7.02	7.09		1456.3	1363.6
Min. Conc.	69.4	53.8		480.0	436.0		6.37	6.16		1230.0	1150.0
Max. Conc.	85.4	85.4		691.0	691.0		8.23	8.23		1700.0	1700.0
Std. Dev.	3.8	8.6		50.4	65.1		0.41	0.34		109.2	125.1
Range	16.0	31.6		211.0	255.0		1.86	2.07		470.0	550.0
Geometric Mean	76.4	69.0		622.4	563.8		7.01	7.08		1452.3	1358.0
Skewness	0.47	-0.25		-1.0	0.4		0.8	0.1		-0.1	0.5
Q25	74.0	62.3		607.5	521.0		6.76	6.95		1405.0	1270.0
Median	75.8	71.6		639.0	541.0		7.02	7.10		1460.0	1330.0
Q75	79.0	75.8		661.5	630.0		7.21	7.30		1520.0	1460.0

GWCL Subset = Data collected October 2012 through August 2015

Appendix H-3: MW-31 Data Used for Analysis

Field Sample ID	Location ID	Date Sampled	Parameter Name	Report Result	Report Units	Lab Qualifier	Detected	Sample Matrix	Sample Purpose	Sample Type
MW-31_11062012	MW-31	11/06/2012	Selenium	76.9	ug/L		Y	WATER	REG	GW
MW-31_02192013	MW-31	02/19/2013	Selenium	74.1	ug/L		Y	WATER	REG	GW
MW-31_03192013	MW-31	03/19/2013	Selenium	81.8	ug/L		Y	WATER	REG	GW
MW-31_04162013	MW-31	04/16/2013	Selenium	72.9	ug/L		Y	WATER	REG	GW
MW-31_05132013	MW-31	05/13/2013	Selenium	75.9	ug/L		Y	WATER	REG	GW
MW-31_06242013	MW-31	06/24/2013	Selenium	73.7	ug/L		Y	WATER	REG	GW
MW-31_07092013	MW-31	07/09/2013	Selenium	75.7	ug/L		Y	WATER	REG	GW
MW-31_08192013	MW-31	08/19/2013	Selenium	73.2	ug/L		Y	WATER	REG	GW
MW-31_09172013	MW-31	09/17/2013	Selenium	72.6	ug/L		Y	WATER	REG	GW
MW-31_10232013	MW-31	10/23/2013	Selenium	80.7	ug/L		Y	WATER	REG	GW
MW-31_11182013	MW-31	11/18/2013	Selenium	74.5	ug/L		Y	WATER	REG	GW
MW-31_12172013	MW-31	12/17/2013	Selenium	79.8	ug/L		Y	WATER	REG	GW
MW-31_01072014	MW-31	01/07/2014	Selenium	74.4	ug/L		Y	WATER	REG	GW
MW-31_02172014	MW-31	02/17/2014	Selenium	75.8	ug/L		Y	WATER	REG	GW
MW-31_03102014	MW-31	03/10/2014	Selenium	77.2	ug/L		Y	WATER	REG	GW
MW-31_04282014	MW-31	04/28/2014	Selenium	85.4	ug/L		Y	WATER	REG	GW
MW-31_05132014	MW-31	05/13/2014	Selenium	74.5	ug/L		Y	WATER	REG	GW
MW-31_06022014	MW-31	06/02/2014	Selenium	69.4	ug/L		Y	WATER	REG	GW
MW-31_07282014	MW-31	07/28/2014	Selenium	77.9	ug/L		Y	WATER	REG	GW
MW-31_08182014	MW-31	08/18/2014	Selenium	82.8	ug/L		Y	WATER	REG	GW
MW-31_09032014	MW-31	09/03/2014	Selenium	81.5	ug/L		Y	WATER	REG	GW
MW-31_10062014	MW-31	10/06/2014	Selenium	78.9	ug/L		Y	WATER	REG	GW
MW-31_11042014	MW-31	11/04/2014	Selenium	73	ug/L		Y	WATER	REG	GW
MW-31_12092014	MW-31	12/09/2014	Selenium	71.1	ug/L		Y	WATER	REG	GW
MW-31_01202015	MW-31	01/20/2015	Selenium	75.6	ug/L		Y	WATER	REG	GW
MW-31_02022015	MW-31	02/02/2015	Selenium	79.2	ug/L		Y	WATER	REG	GW
MW-31_03032015	MW-31	03/03/2015	Selenium	76.2	ug/L		Y	WATER	REG	GW
MW-31_04072015	MW-31	04/07/2015	Selenium	75.7	ug/L		Y	WATER	REG	GW
MW-31_05112015	MW-31	05/11/2015	Selenium	71.6	ug/L		Y	WATER	REG	GW
MW-31_06232015	MW-31	06/23/2015	Selenium	74.4	ug/L		Y	WATER	REG	GW
MW-31_07062015	MW-31	07/06/2015	Selenium	78.2	ug/L		Y	WATER	REG	GW
MW-31_08102015	MW-31	08/10/2015	Selenium	82.2	ug/L		Y	WATER	REG	GW
MW-31_10222012	MW-31	10/22/2012	Sulfate	545	mg/L		Y	WATER	REG	GW
MW-31_11062012	MW-31	11/06/2012	Sulfate	557	mg/L		Y	WATER	REG	GW
MW-31_12182012	MW-31	12/18/2012	Sulfate	664	mg/L		Y	WATER	REG	GW
MW-31_01222013	MW-31	01/22/2013	Sulfate	611	mg/L		Y	WATER	REG	GW

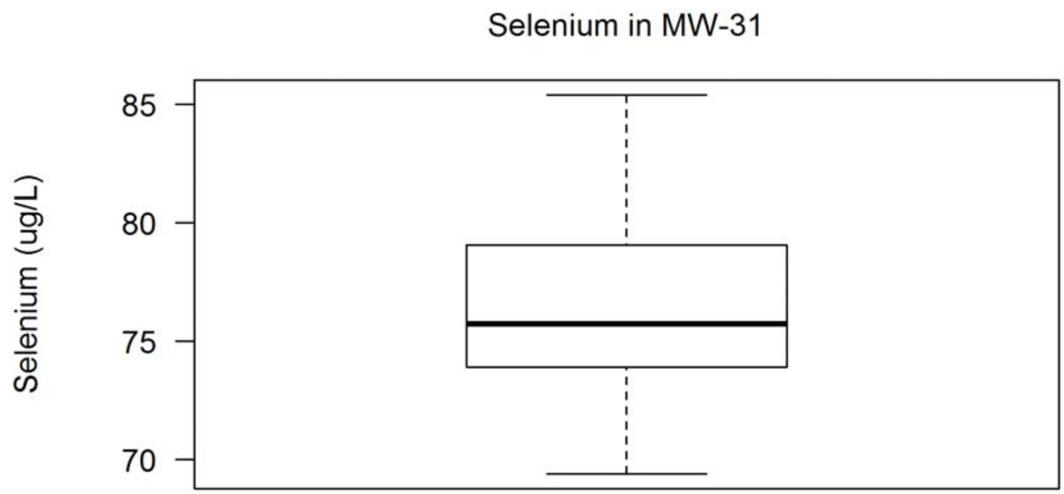
Appendix H-3: MW-31 Data Used for Analysis

Field Sample ID	Location ID	Date Sampled	Parameter Name	Report Result	Report Units	Lab Qualifier	Detected	Sample Matrix	Sample Purpose	Sample Type
MW-31_02192013	MW-31	02/19/2013	Sulfate	644	mg/L		Y	WATER	REG	GW
MW-31_03192013	MW-31	03/19/2013	Sulfate	611	mg/L		Y	WATER	REG	GW
MW-31_04162013	MW-31	04/16/2013	Sulfate	668	mg/L		Y	WATER	REG	GW
MW-31_05132013	MW-31	05/13/2013	Sulfate	630	mg/L		Y	WATER	REG	GW
MW-31_06242013	MW-31	06/24/2013	Sulfate	659	mg/L		Y	WATER	REG	GW
MW-31_07092013	MW-31	07/09/2013	Sulfate	659	mg/L		Y	WATER	REG	GW
MW-31_08192013	MW-31	08/19/2013	Sulfate	656	mg/L		Y	WATER	REG	GW
MW-31_09172013	MW-31	09/17/2013	Sulfate	666	mg/L		Y	WATER	REG	GW
MW-31_10232013	MW-31	10/23/2013	Sulfate	637	mg/L		Y	WATER	REG	GW
MW-31_11182013	MW-31	11/18/2013	Sulfate	609	mg/L		Y	WATER	REG	GW
MW-31_12172013	MW-31	12/17/2013	Sulfate	656	mg/L		Y	WATER	REG	GW
MW-31_01072014	MW-31	01/07/2014	Sulfate	558	mg/L		Y	WATER	REG	GW
MW-31_02172014	MW-31	02/17/2014	Sulfate	480	mg/L		Y	WATER	REG	GW
MW-31_03102014	MW-31	03/10/2014	Sulfate	681	mg/L		Y	WATER	REG	GW
MW-31_04282014	MW-31	04/28/2014	Sulfate	527	mg/L		Y	WATER	REG	GW
MW-31_05132014	MW-31	05/13/2014	Sulfate	639	mg/L		Y	WATER	REG	GW
MW-31_06022014	MW-31	06/02/2014	Sulfate	555	mg/L		Y	WATER	REG	GW
MW-31_07282014	MW-31	07/28/2014	Sulfate	600	mg/L		Y	WATER	REG	GW
MW-31_08182014	MW-31	08/18/2014	Sulfate	620	mg/L		Y	WATER	REG	GW
MW-31_09032014	MW-31	09/03/2014	Sulfate	560	mg/L		Y	WATER	REG	GW
MW-31_10062014	MW-31	10/06/2014	Sulfate	606	mg/L		Y	WATER	REG	GW
MW-31_11042014	MW-31	11/04/2014	Sulfate	639	mg/L		Y	WATER	REG	GW
MW-31_12092014	MW-31	12/09/2014	Sulfate	687	mg/L		Y	WATER	REG	GW
MW-31_01202015	MW-31	01/20/2015	Sulfate	669	mg/L		Y	WATER	REG	GW
MW-31_02022015	MW-31	02/02/2015	Sulfate	623	mg/L		Y	WATER	REG	GW
MW-31_03032015	MW-31	03/03/2015	Sulfate	616	mg/L		Y	WATER	REG	GW
MW-31_04072015	MW-31	04/07/2015	Sulfate	642	mg/L		Y	WATER	REG	GW
MW-31_05112015	MW-31	05/11/2015	Sulfate	668	mg/L		Y	WATER	REG	GW
MW-31_06232015	MW-31	06/23/2015	Sulfate	691	mg/L		Y	WATER	REG	GW
MW-31_07062015	MW-31	07/06/2015	Sulfate	684	mg/L		Y	WATER	REG	GW
MW-31_08102015	MW-31	08/10/2015	Sulfate	640	mg/L		Y	WATER	REG	GW
MW-31_10222012	MW-31	10/22/2012	Total Dissolved Solids	1320	MG/L		Y	WATER	REG	GW
MW-31_11062012	MW-31	11/06/2012	Total Dissolved Solids	1230	MG/L		Y	WATER	REG	GW
MW-31_12182012	MW-31	12/18/2012	Total Dissolved Solids	1270	MG/L		Y	WATER	REG	GW
MW-31_01222013	MW-31	01/22/2013	Total Dissolved Solids	1270	MG/L		Y	WATER	REG	GW
MW-31_02192013	MW-31	02/19/2013	Total Dissolved Solids	1390	MG/L		Y	WATER	REG	GW
MW-31_03192013	MW-31	03/19/2013	Total Dissolved Solids	1420	MG/L		Y	WATER	REG	GW

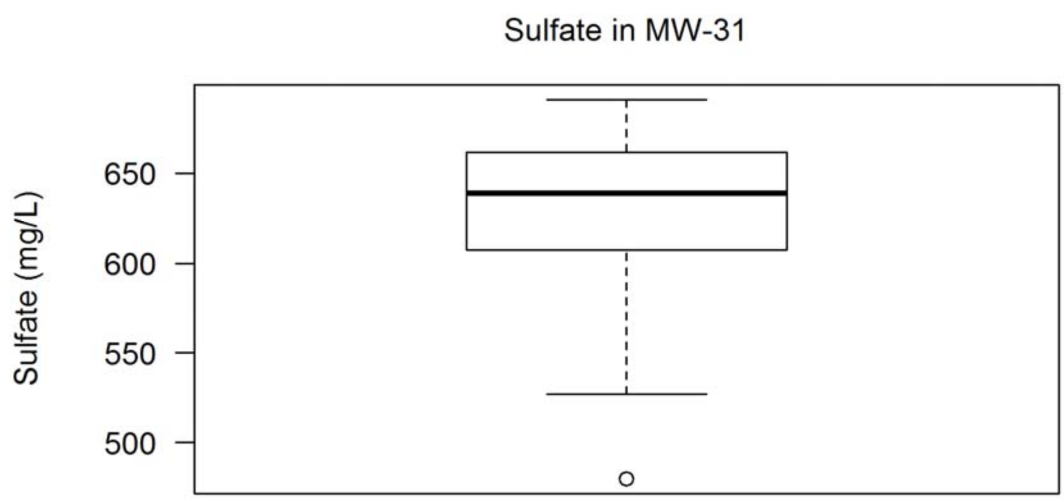
Appendix H-3: MW-31 Data Used for Analysis

Field Sample ID	Location ID	Date Sampled	Parameter Name	Report Result	Report Units	Lab Qualifier	Detected	Sample Matrix	Sample Purpose	Sample Type
MW-31_04162013	MW-31	04/16/2013	Total Dissolved Solids	1260	MG/L		Y	WATER	REG	GW
MW-31_05132013	MW-31	05/13/2013	Total Dissolved Solids	1540	MG/L		Y	WATER	REG	GW
MW-31_06242013	MW-31	06/24/2013	Total Dissolved Solids	1380	MG/L		Y	WATER	REG	GW
MW-31_07092013	MW-31	07/09/2013	Total Dissolved Solids	1510	MG/L		Y	WATER	REG	GW
MW-31_08192013	MW-31	08/19/2013	Total Dissolved Solids	1440	MG/L		Y	WATER	REG	GW
MW-31_09172013	MW-31	09/17/2013	Total Dissolved Solids	1500	MG/L		Y	WATER	REG	GW
MW-31_10232013	MW-31	10/23/2013	Total Dissolved Solids	1460	MG/L		Y	WATER	REG	GW
MW-31_11182013	MW-31	11/18/2013	Total Dissolved Solids	1320	MG/L		Y	WATER	REG	GW
MW-31_12172013	MW-31	12/17/2013	Total Dissolved Solids	1500	MG/L		Y	WATER	REG	GW
MW-31_01072014	MW-31	01/07/2014	Total Dissolved Solids	1510	MG/L		Y	WATER	REG	GW
MW-31_02172014	MW-31	02/17/2014	Total Dissolved Solids	1460	MG/L		Y	WATER	REG	GW
MW-31_03102014	MW-31	03/10/2014	Total Dissolved Solids	1490	MG/L		Y	WATER	REG	GW
MW-31_04282014	MW-31	04/28/2014	Total Dissolved Solids	1440	MG/L		Y	WATER	REG	GW
MW-31_05132014	MW-31	05/13/2014	Total Dissolved Solids	1510	MG/L		Y	WATER	REG	GW
MW-31_06022014	MW-31	06/02/2014	Total Dissolved Solids	1520	MG/L		Y	WATER	REG	GW
MW-31_07282014	MW-31	07/28/2014	Total Dissolved Solids	1400	MG/L		Y	WATER	REG	GW
MW-31_08182014	MW-31	08/18/2014	Total Dissolved Solids	1410	MG/L		Y	WATER	REG	GW
MW-31_09032014	MW-31	09/03/2014	Total Dissolved Solids	1460	MG/L		Y	WATER	REG	GW
MW-31_10062014	MW-31	10/06/2014	Total Dissolved Solids	1420	MG/L		Y	WATER	REG	GW
MW-31_11042014	MW-31	11/04/2014	Total Dissolved Solids	1520	MG/L		Y	WATER	REG	GW
MW-31_12092014	MW-31	12/09/2014	Total Dissolved Solids	1450	MG/L		Y	WATER	REG	GW
MW-31_01202015	MW-31	01/20/2015	Total Dissolved Solids	1540	MG/L		Y	WATER	REG	GW
MW-31_02022015	MW-31	02/02/2015	Total Dissolved Solids	1520	MG/L		Y	WATER	REG	GW
MW-31_03032015	MW-31	03/03/2015	Total Dissolved Solids	1530	MG/L		Y	WATER	REG	GW
MW-31_04072015	MW-31	04/07/2015	Total Dissolved Solids	1680	MG/L		Y	WATER	REG	GW
MW-31_05112015	MW-31	05/11/2015	Total Dissolved Solids	1700	MG/L		Y	WATER	REG	GW
MW-31_06232015	MW-31	06/23/2015	Total Dissolved Solids	1630	MG/L		Y	WATER	REG	GW
MW-31_07062015	MW-31	07/06/2015	Total Dissolved Solids	1440	MG/L		Y	WATER	REG	GW
MW-31_08102015	MW-31	08/10/2015	Total Dissolved Solids	1530	MG/L		Y	WATER	REG	GW

Appendix H-4: Box Plots



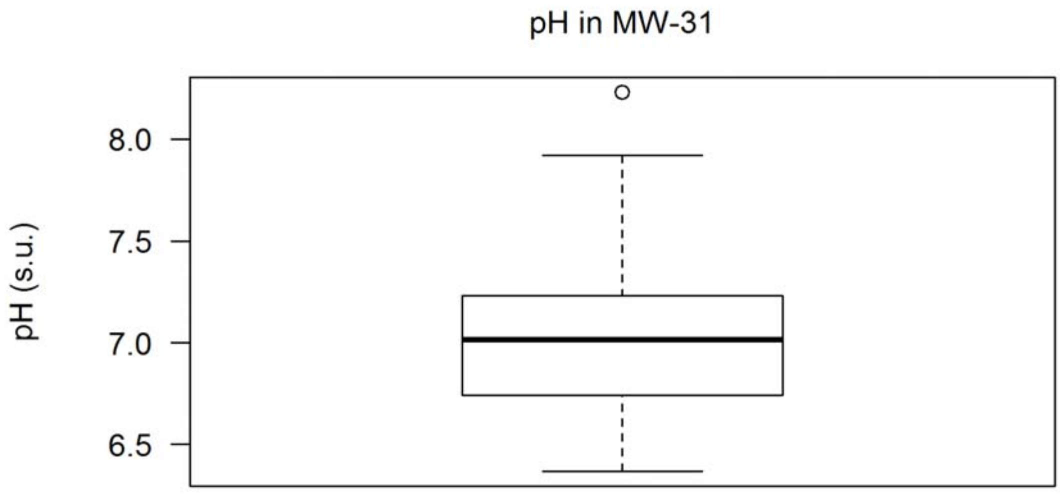
Percent nondetect: 0%
Min: 69.4, Mean: 76.46, Max: 85.4, Std Dev: 3.77
Upper extreme threshold (Q75 + 3xH): 93.9
Lower extreme threshold (Q25 - 3xH): 59.075



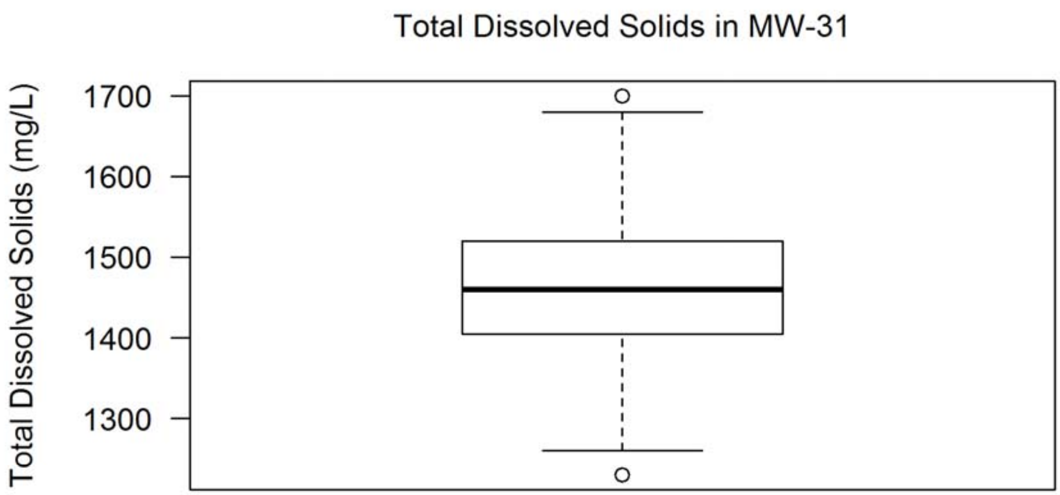
Percent nondetect: 0%
Min: 480, Mean: 624.49, Max: 691, Std Dev: 50.39
Upper extreme threshold (Q75 + 3xH): 823.5
Lower extreme threshold (Q25 - 3xH): 445.5

○ Outlier
✱ Extreme

Appendix H-4: Box Plots



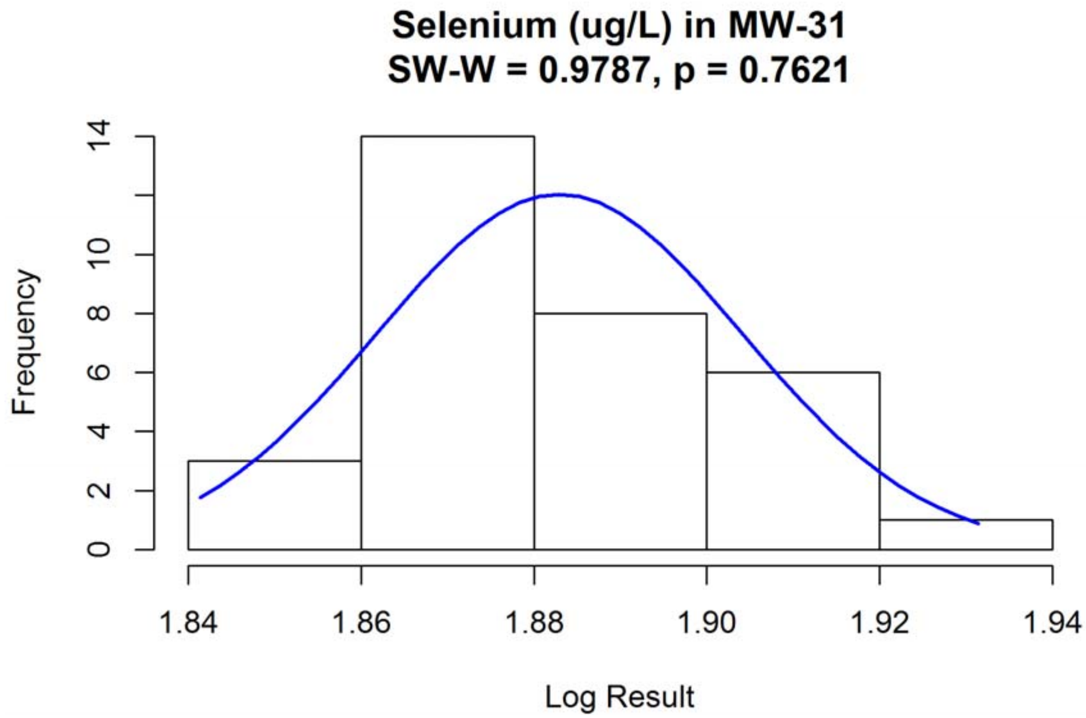
Percent nondetect: 0%
Min: 6.37, Mean: 7.02, Max: 8.23, Std Dev: 0.41
Upper extreme threshold (Q75 + 3xH): 8.565
Lower extreme threshold (Q25 - 3xH): 5.3975

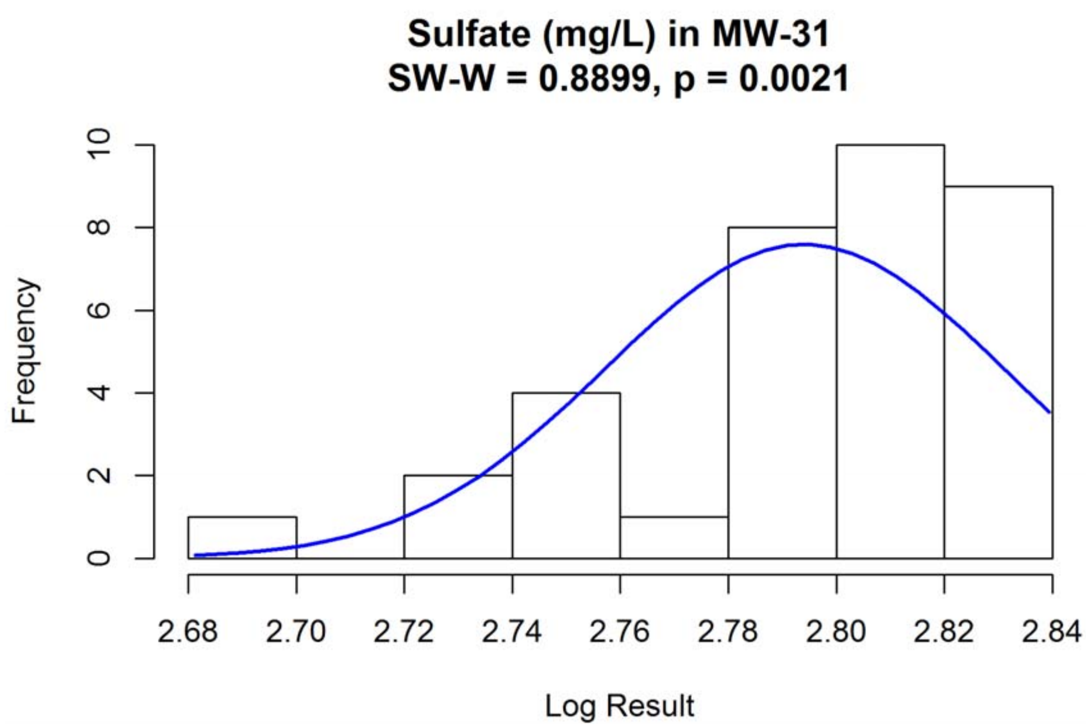


Percent nondetect: 0%
Min: 1230, Mean: 1456.29, Max: 1700, Std Dev: 109.22
Upper extreme threshold (Q75 + 3xH): 1865
Lower extreme threshold (Q25 - 3xH): 1060

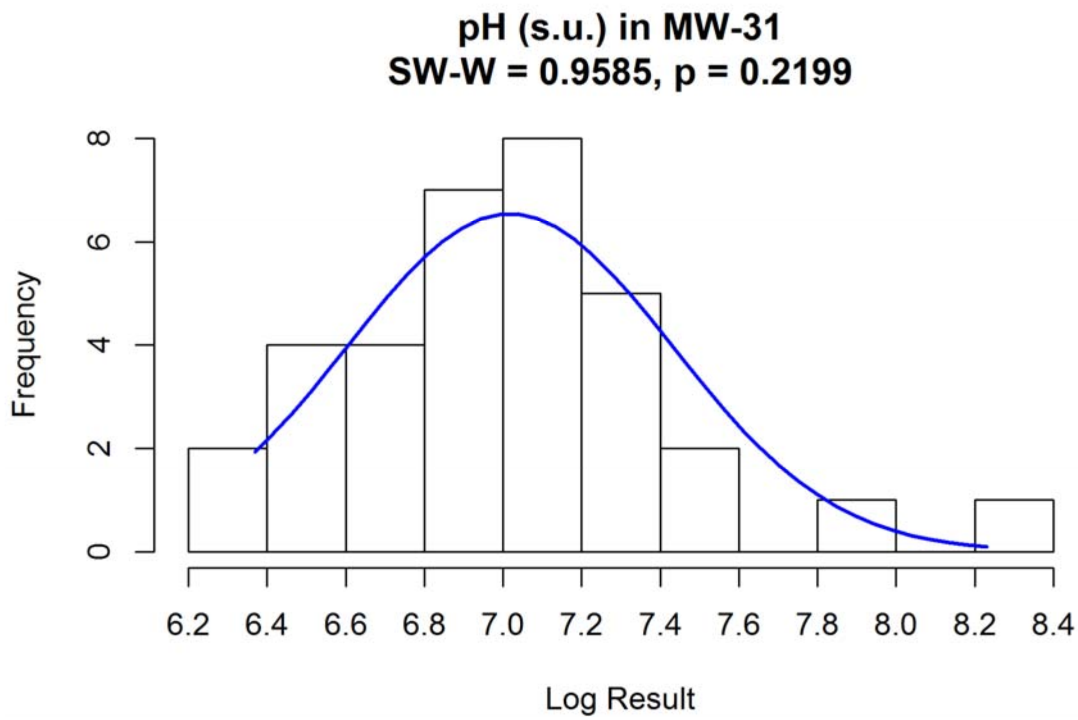
○ Outlier
✵ Extreme

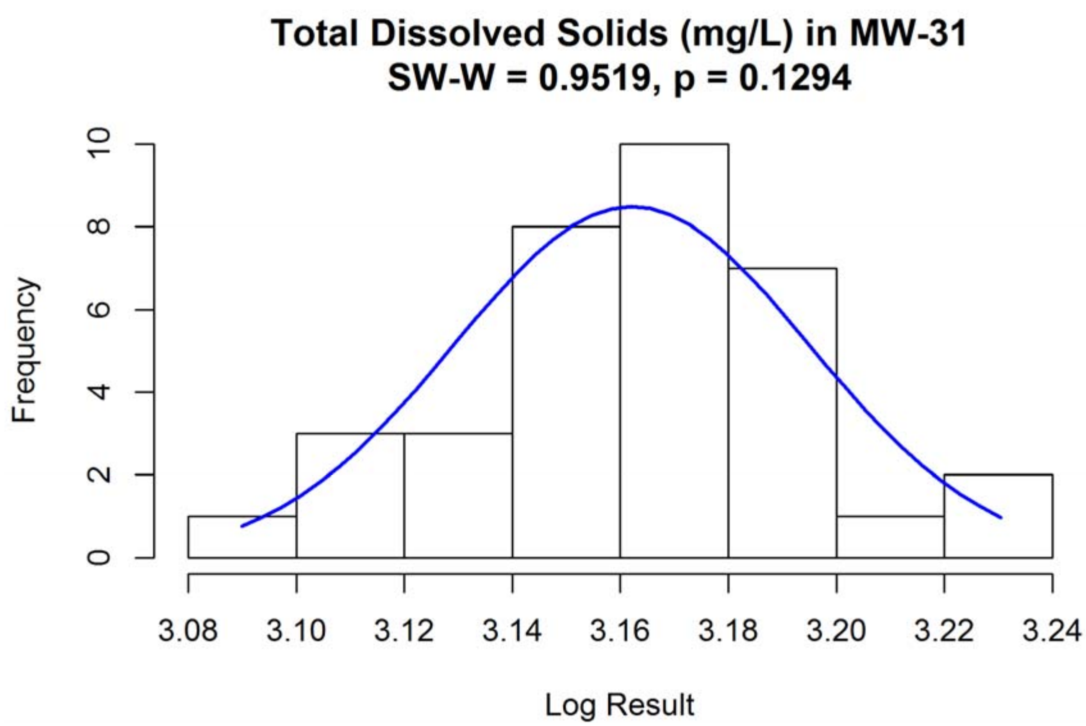
Appendix H-5: Histograms



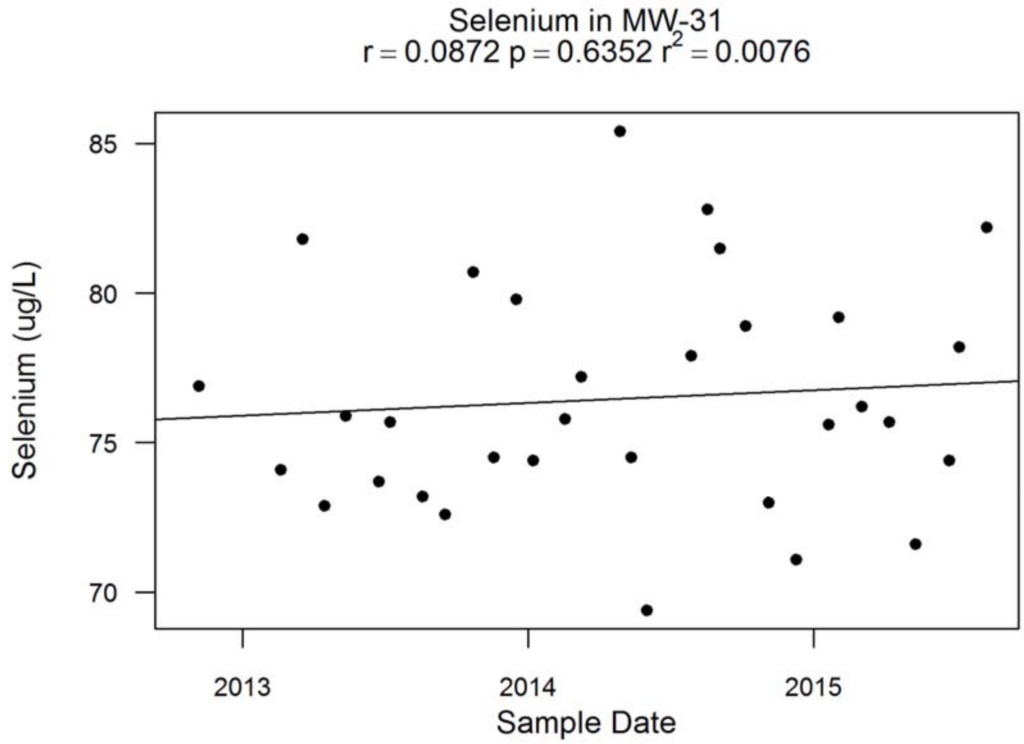


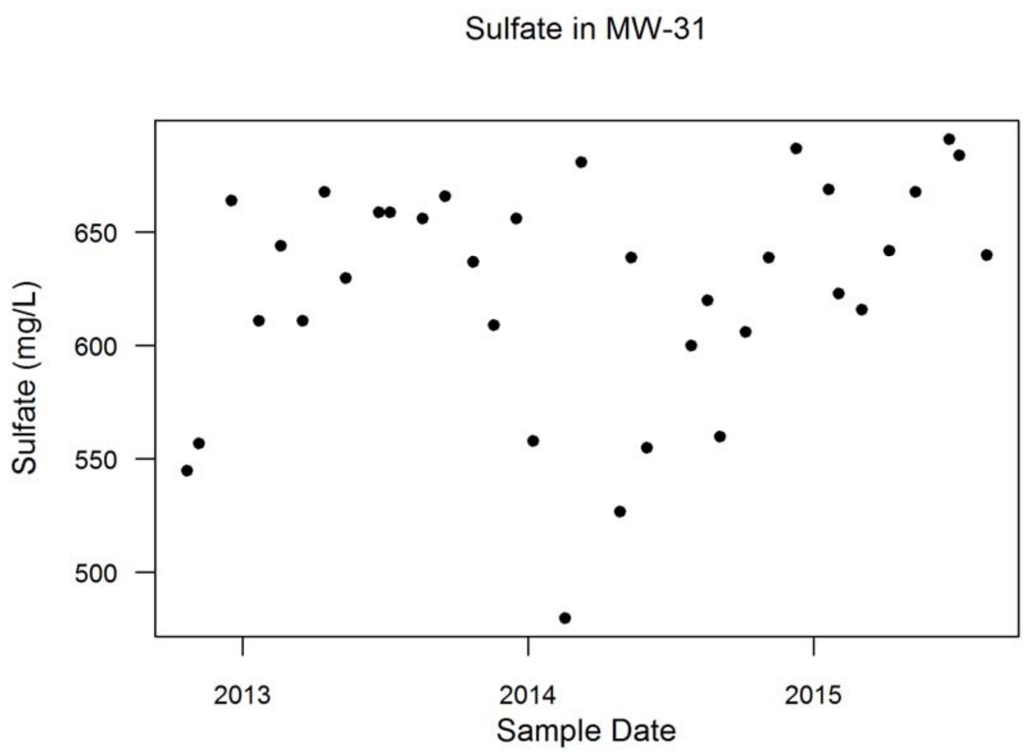
Appendix H-5: Histograms



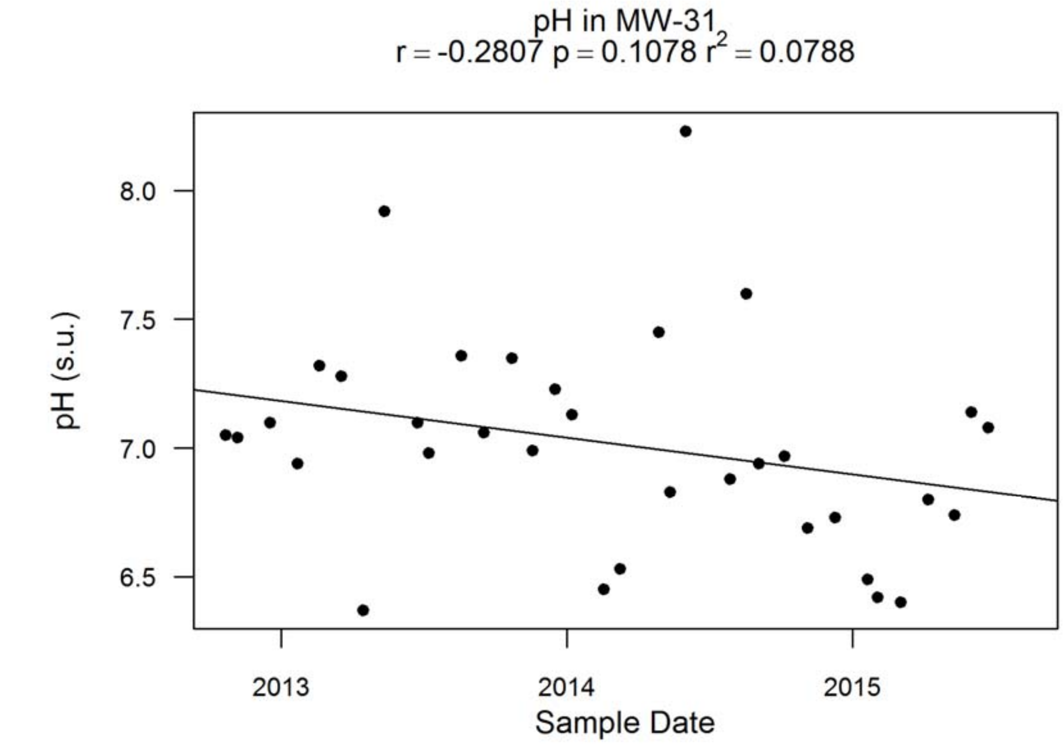


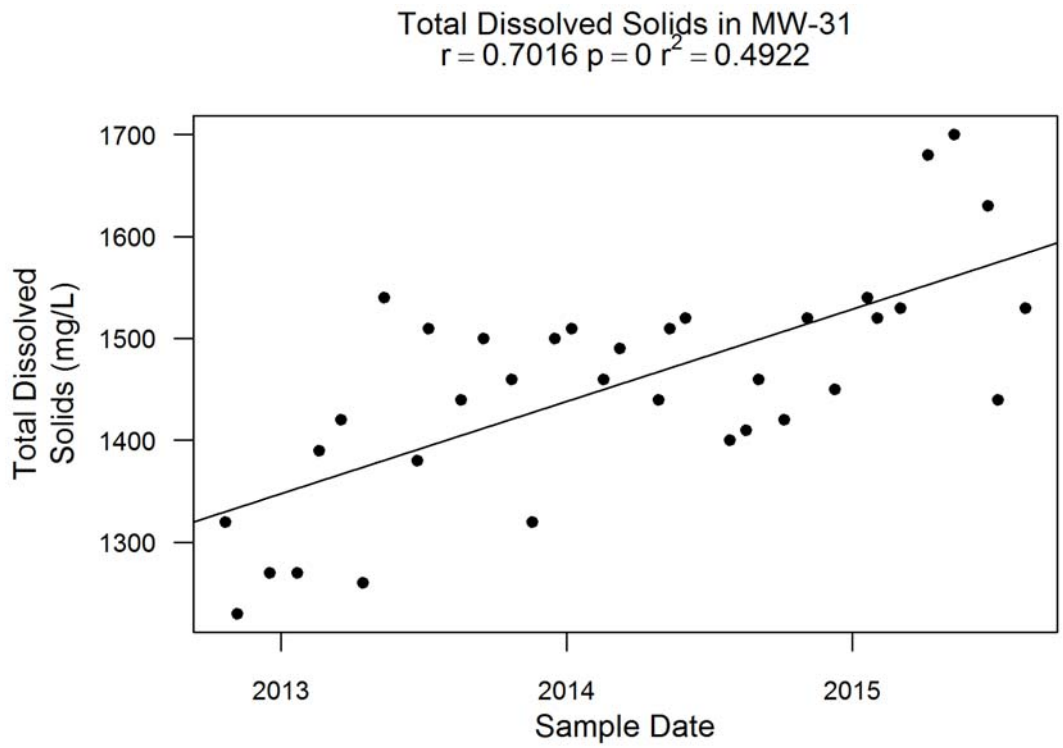
Appendix H-6: Linear Regression Analysis





Appendix H-6: Linear Regression Analysis

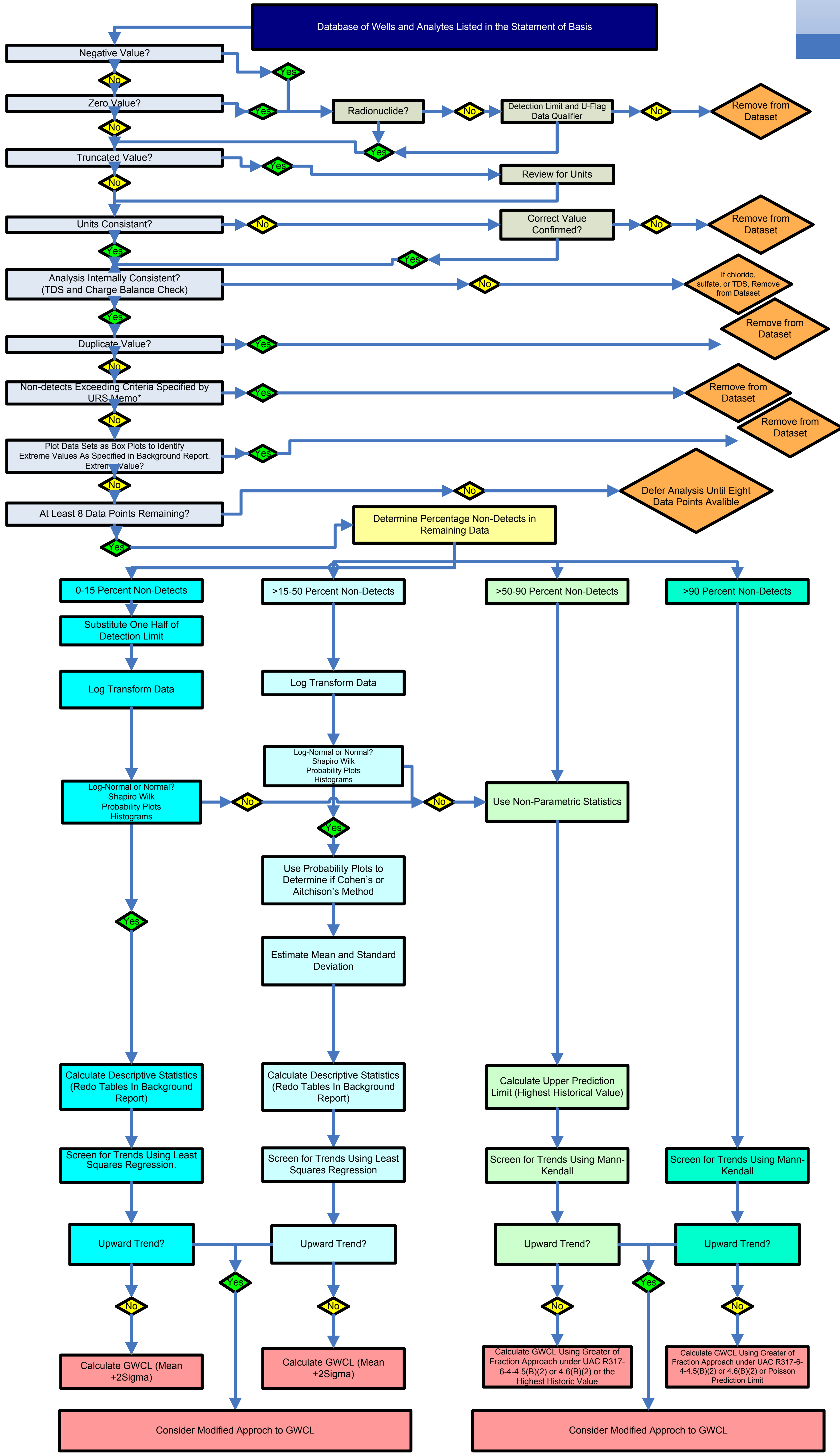




APPENDIX I

Flowsheet
(Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site (INTERA, 2007))

Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site, San Juan County, Utah



*A non-detect considered "insensitive" will be the maximum reporting limit in a dataset and will exceed other non-detects by, for example, an order of magnitude (e.g., <10 versus <1.0 µg/L). In some cases, insensitive non-detects may also exceed detectable values in a dataset (e.g., <10 versus 3.5 µg/L).

APPENDIX J

Input and Output Files (Electronic Only)