LMS/GJO/S26507

2019 Annual Inspection and Monitoring Report for the Grand Junction, Colorado, Site

October 2019

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

AS&T	Applied Studies and Technology
DOE	U.S. Department of Energy
GEMS	Geospatial Environmental Mapping System
LM	Office of Legacy Management
LTS&M	long-term surveillance and maintenance
LTS&MP	*Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site*
PL	photograph location
RTC	Riverview Technology Corporation

Executive Summary

Physical and institutional controls enacted at the Grand Junction, Colorado, Site continue to be effective in preventing exposure to contamination remaining on the property. One maintenance need was identified; however, no follow-up inspection is required.

Annual groundwater and surface-water sampling was conducted in 2019 as specified in the *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site*. Results of the sampling are summarized in this report and displayed in Appendixes A–D.

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1.0 Introduction

The *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site* (DOE 2006) (LTS&MP) requires a report to document the results of the annual site inspection and address monitoring results from annual groundwater and surface-water monitoring. This report documents the results of the annual inspection conducted on March 14, 2019, and presents the results of the annual groundwater and surface-water sampling event conducted February 4–7, and March 5, 2019.

2.0 Site History

The Grand Junction, Colorado, Site (site) was contaminated during uranium milling and uranium oxide procurement activities conducted by the federal government between 1943 and 1974. The U.S. Department of Energy (DOE) remediated the property between 1986 and 2014. Removal of uranium mill tailings and contaminated soil began in late 1989, and most of the contaminated soil was removed by 1994. Additional small deposits of contaminated soil and material were removed during remedial action conducted from 1998 through 2014. Remediation involved decontaminating or demolishing contaminated buildings and removing contaminated soil. Contaminated materials were disposed of at the Uranium Mill Tailings Radiation Control Act Title I Grand Junction, Colorado, Disposal Site south of Grand Junction. Some contaminated materials were left in place and later remediated under a state-approved covenant for deferred remediation.

DOE transferred approximately 8 acres of the site in 2001 to the U.S. Department of the Army (occupied by an engineering unit of the U.S. Army Reserve). The remainder of the facility was transferred to the nonprofit Riverview Technology Corporation (RTC) in 2001, following approval of the covenant for deferred remediation. RTC leases several buildings to DOE so the agency can conduct ongoing operations. In 2018, the U.S. Army Reserve transferred ownership of Building 7 to DOE via the General Services Administration.

DOE remains responsible for ensuring that contamination left on its former property is controlled to prevent exposure to the public and the environment. Two types of contamination remain:

- In groundwater and surface water within the site perimeter
- As radium foil sealed below ground in a decommissioned calibration borehole

The site transfer agreement between DOE and RTC stipulated that contamination beneath Building 12A (the former computer and storage facility) and Building 20 (the analytical chemistry laboratory) would be remediated when DOE vacated and demolished those buildings. Demolition of 12A and associated remediation of the concrete slab and soil beneath the building were completed in 2014, and this area of the site is no longer part of the annual inspection requirements. DOE concluded operations in the laboratory in December 2003, and demolition of the building and remediation of underlying contaminated materials occurred in 2006. Groundwater and surface water are being remediated by natural flushing of the alluvial aquifer. DOE will provide stewardship oversight of the decommissioned calibration borehole in perpetuity.

3.0 Site Inspection

3.1 Inspection Requirements

Requirements for the long-term surveillance and maintenance (LTS&M) of the site are specified in the *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site* (DOE 2006).

3.2 Institutional Controls

Institutional controls at the site consist of warning signs around the surface-water locations (North Pond, South Pond, and wetlands) to prevent use, an information/warning plaque over the decommissioned borehole that contains radium foil, locks on groundwater monitoring wells, and deed restrictions that prohibit unauthorized excavations that could expose contaminated groundwater under the former DOE facility. Verification of these institutional controls is part of the annual inspection, and the results are included in this report.

3.3 Inspection Results

This report presents the results of the annual DOE Office of Legacy Management (LM) inspection of the Grand Junction site. S. Woods of Navarro Research and Engineering, Inc. (Navarro), the Legacy Management Support contractor, conducted the inspection. W. Frazier, G. Cummings, and B. Akers of LM, J. Doebele of the Colorado Department of Public Health and Environment, and S. Campbell, S. Ficklin, and H. Petrie of Navarro attended the inspection.

The purposes of the annual inspection are to confirm the integrity of visible features at the site, identify changes in conditions that might affect site protectiveness, and determine the need, if any, for maintenance, additional inspections, or monitoring.

The annual inspection addresses only those portions of the site with remaining contaminated media that must be monitored and maintained to ensure continued protection of human health and the environment. Features discussed in this report are shown in the attached drawing. Photographs to support specific observations are identified in the text and on the drawing by photograph location (PL) numbers.

3.3.1 Site Surveillance Features

Figure 1 shows the locations of site surveillance features. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections.

3.3.2 Monument

A U.S. Coast and Geodetic Survey monument near the former north gate establishes elevation control for the site (PL-1). No maintenance needs were identified.

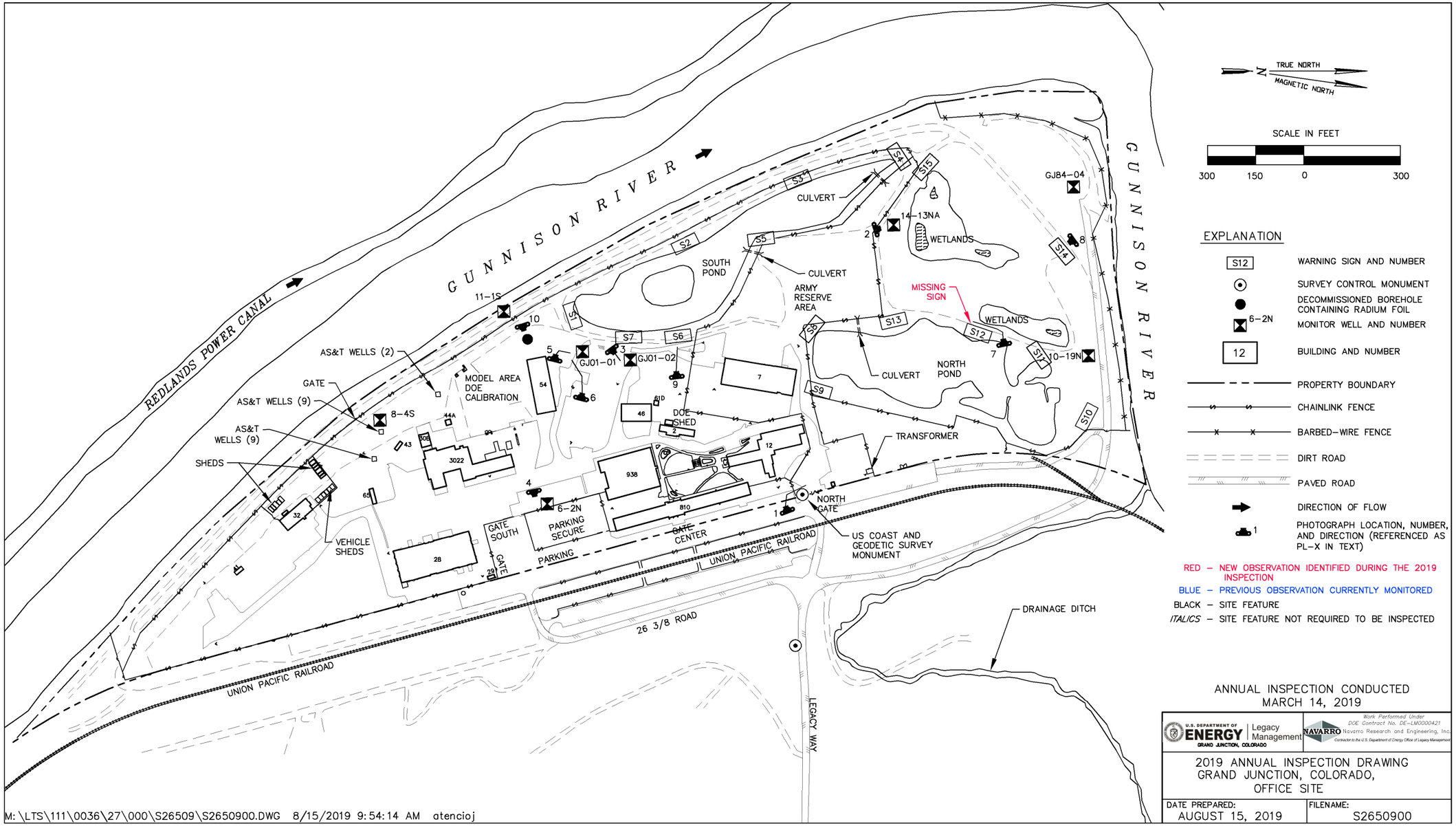

Figure 1. 2019 Annual Inspection Drawing for the Grand Junction, Colorado, Site

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3.3.3 Monitoring Wells

DOE owns eight monitoring wells on the property that are used to monitor the progress of natural flushing of contaminants from the alluvial aquifer. Wells 10-19N, 11-1S, 14-13NA (PL-2), GJ01-02 (PL-3), and GJ84-04 are flush mounted and protected with standard monitoring well metal caps or manhole covers; well GJ84-04 is also protected by steel bollards. Wells 6-2N (PL-4), 8-4S, and GJ01-01 (PL-5 and PL-6) have aboveground steel well casing protectors; steel bollards are in place as further protection for wells 6-2N and 8-4S. Twenty additional monitoring wells were recently installed as part of a tracer project in association with the Applied Studies and Technology (AS&T) group. These wells were inspected, and no issues were identified. No maintenance needs were identified.

3.3.4 Warning Signs

Fifteen warning signs installed on steel posts are positioned around the surface-water areas so the warning will be visible to a person approaching from any direction of reasonable access. Warning sign S12 (PL-7) was missing during the inspection. All other signs were undamaged and legible (PL-8 and PL-9). Additionally, it was noted during the inspection that all warning signs had outdated information posted.

3.3.5 Radium Foil Borehole

In the 1980s, DOE installed a 300-foot-deep cased borehole to calibrate depth measurement systems on borehole geophysical logging trucks. Two strips of radium-226 foil were placed around the casing at depths of 81 feet (29 picocuries activity) and 181 feet (3 picocuries activity). During calibration, the instruments in the trucks would detect the gamma radiation signal from the radium.

The borehole was decommissioned in place in 2000. DOE perforated the casing above and below each strip of foil and pressure-grouted the annulus with Portland cement to seal the foil in place. The borehole was filled with grout, and a metal plaque was mounted in concrete at ground level over the well. The metal plaque includes the borehole information and an engraved warning (PL-10). No maintenance needs were identified.

3.3.6 Inspection Areas

To ensure a thorough and efficient inspection, the site is divided into two areas referred to as transects: (1) the area within the former DOE property boundary that is addressed in the LTS&MP, and (2) the outlying area.

Specific site surveillance features, such as survey markers, warning signs, and monitoring wells, were observed within each transect. Each transect was inspected for evidence of erosion, excavation, vandalism, or other phenomenon that might indicate a loss of institutional control or diminished protectiveness.

3.3.7 Interior Portions of the Site

This transect includes the surface-water areas and other site surveillance features within the former DOE property boundary.

Most of the site surveillance features and surface-water features are in areas not easily accessible by the public due to fencing. There were no signs of activity, development, or land use change (e.g., well installations or excavations that could expose groundwater) on the site that might degrade protectiveness.

3.3.8 Outlying Area

There were no signs of activity, development, or land use change in other areas adjacent to the site that might expose contaminated groundwater or impact the natural flushing of the aquifer.

3.4 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) the annual inspection or other site visit reveals a condition that requires a return to the site to further evaluate the condition or (2) a citizen or outside agency notifies DOE that conditions at or near the site are substantially changed.

No need for a follow-up inspection was identified.

3.5 Maintenance and Repairs

All existing warning signs and the missing warning sign were replaced with new signs containing updated contact information.

3.6 Corrective Action

No corrective action was required in 2019.

3.7 Photographs

Photograph Location Number	Azimuth	Photograph Description
1	250	U.S. Coast and Geodetic Survey Monument
2	345	Monitoring Well 14-13NA
3	55	Monitoring Well GJ01-02
4	80	Monitoring Well 6-2N
5	285	Monitoring Well GJ01-01
6	285	Top of Monitoring Well GJ01-01
7	260	Location of Missing Warning Sign S12
8	145	Warning Sign S14
9	265	Warning Sign S6
10	75	Plaque at Decommissioned Borehole Containing Radium Foil

PL–1. U.S. Coast and Geodetic Survey Monument

PL–2. Monitoring Well 14-13NA

PL–3. Monitoring Well GJ01-02

PL–4. Monitoring Well 6-2N

PL–5. Monitoring Well GJ01-01

PL–6. Top of Monitoring Well GJ01-01

PL–7. Location of Missing Warning Sign S12

PL–8. Warning Sign S14

PL–9. Warning Sign S6

PL–10. Plaque at Decommissioned Borehole Containing Radium Foil

4.0 Environmental Monitoring

In accordance with the Record of Decision (DOE 1989), the compliance strategy for groundwater remediation at the Grand Junction site is natural flushing of the alluvial aquifer. Groundwater modeling predicted groundwater remediation is expected to be completed in 50–80 years after remediation of contaminated soils.

4.1 2019 Monitoring Results

The LTS&MP requires annual groundwater and surface-water monitoring. Sampling was conducted from February 4 through 7, 2019, for most locations. The North Pond was sampled on March 5, 2019, after the winter ice had melted and the sampling location was accessible. In accordance with the LTS&MP, the 2019 monitoring program at the Grand Junctions site consisted of the sampling of seven monitoring wells and six surface-water locations, as shown in Figure 2. Samples were collected according to procedures specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351), and samples were analyzed for manganese (groundwater only), molybdenum, selenium, sulfate, and uranium along with field measurements of total alkalinity, pH, specific conductance, temperature, and turbidity. In addition, groundwater levels were measured at each monitoring well.

Groundwater and surface-water monitoring results are summarized in Table 1. Time versus concentration graphs for each analyte for all monitoring wells and surface-water locations in the long-term monitoring network are displayed in Appendix A. A complete set of groundwater, surface water, and static water level data are displayed in Appendixes B, C, and D, respectively.

All water quality data for the Grand Junction site are archived in the environmental database at the LM office in Grand Junction, Colorado. Water quality data also are available for viewing with dynamic mapping via the Geospatial Environmental Mapping System (GEMS) website at https://gems.lm.doe.gov/#&site=GJO.

Figure 2. 2019 Sampling Locations at the Grand Junction Site

Table 1. Summary of Historical and 2019 Grand Junction Site Groundwater and Surface-Water Monitoring Results[a]

Location	Analyte									
	Manganese		Molybdenum		Selenium		Sulfate		Uranium	
	Historical Maximum	2019 Result	Historical Maximum	2019 Result	Historical Maximum	2019 Result	Historical Maximum	2019 Result	Historical Maximum	2019 Result
Groundwater[b]										
10-19N	10	0.35	0.541	0.039	0.03	0.0059	5710	1700	1.43	0.17
11-1S	2.4	2.4	0.552	0.015	0.0504	0.00065	2800	220	2.2	0.03
14-13NA	6.24	2.7	0.57	0.061	0.0572	0.01	2270	1200	1.7	0.22
6-2N	1.9	1.1	0.15	0.019	0.14	0.031	1480	1400	1.1	0.065
8-4S	3.28	1.5	2.65	0.11	0.685	0.019	2200	730	4.8	0.46
GJ01-01	0.71	0.71	0.162	0.054	0.0634	0.0015	762	610	0.507	0.28
GJ84-04	4.8	2.6	0.413	0.052	0.015	0.00065	3100	1100	1.5	0.16
Surface Water[c]										
North Pond			0.134	0.017	0.015	0.011	7300	1500	0.993	0.42
South Pond			1.39	0.042	0.064	0.001	5060	800	0.55	0.26
Wetland Area			1.6	1.6	0.0231	0.001	45,200	7000	10	10
Upper Gunnison			0.09	0.003	0.015	0.0028	513	290	0.012	0.0058
Upper Mid Gunnison			0.031	0.003	0.016	0.0031	511	330	0.013	0.007
Lower Gunnison			0.05	0.0047	0.017	0.0031	541	420	0.034	0.022

Notes:

[a] Historical maximums from 1984 to 2019. All units are in mg/L.

[b] Results in red exceed standards from Regulation 41, "The Basic Standards for Ground Water" (5 CCR 1002-41), https://www.colorado.gov/pacific/sites/default/files/41_2016%2812%29.pdf, or background (for manganese and sulfate). Standards are molybdenum 0.21 mg/L, selenium 0.05 mg/L, and uranium = 0.03 mg/L. Background concentrations of manganese (0.72 mg/L) and sulfate (1150 mg/L) are the maximum concentration observed in upgradient monitoring wells GJ84-09 and GJ84-10.

[c] For the pond locations (North Pond, South Pond, and Wetland Area), results in red exceed the groundwater benchmarks listed above. For Gunnison River locations, results in red exceed the Standards from Regulation 35, "Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins" (5 CCR 1002-35), https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8117&fileName=5%20CCR%201002-35. Standards are molybdenum 0.16 mg/L, selenium 0.0046 mg/L, and uranium 0.03 mg/L.

5.0 References

5 CCR 1002-41. Colorado Department of Public Health and Environment, Water Quality Control Commission, "The Basic Standards for Ground Water," *Code of Colorado Regulations*, https://www.colorado.gov/pacific/sites/default/files/41_2016%2812%29.pdf .

5 CCR 1002-35. Colorado Department of Public Health and Environment, Water Quality Control Commission, "Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins," https://www.sos.state.co.us/CCR...Id=8117&fileName=5%20CCR%201002-35.

DOE (U.S. Department of Energy), 1989. *Declaration for the Record of Decision and Record of Decision Summary*, Grand Junction Projects Office, Grand Junction, Colorado.

DOE (U.S. Department of Energy), 2006. *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site*, DOE-LM/GJ1164-2006, June.

Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites, LMS/PRO/S04351, continually updated, prepared by Navarro Research and Engineering, Inc., for the U.S. Department of Energy Office of Legacy Management.

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Appendix A

Time Versus Concentration Graphs

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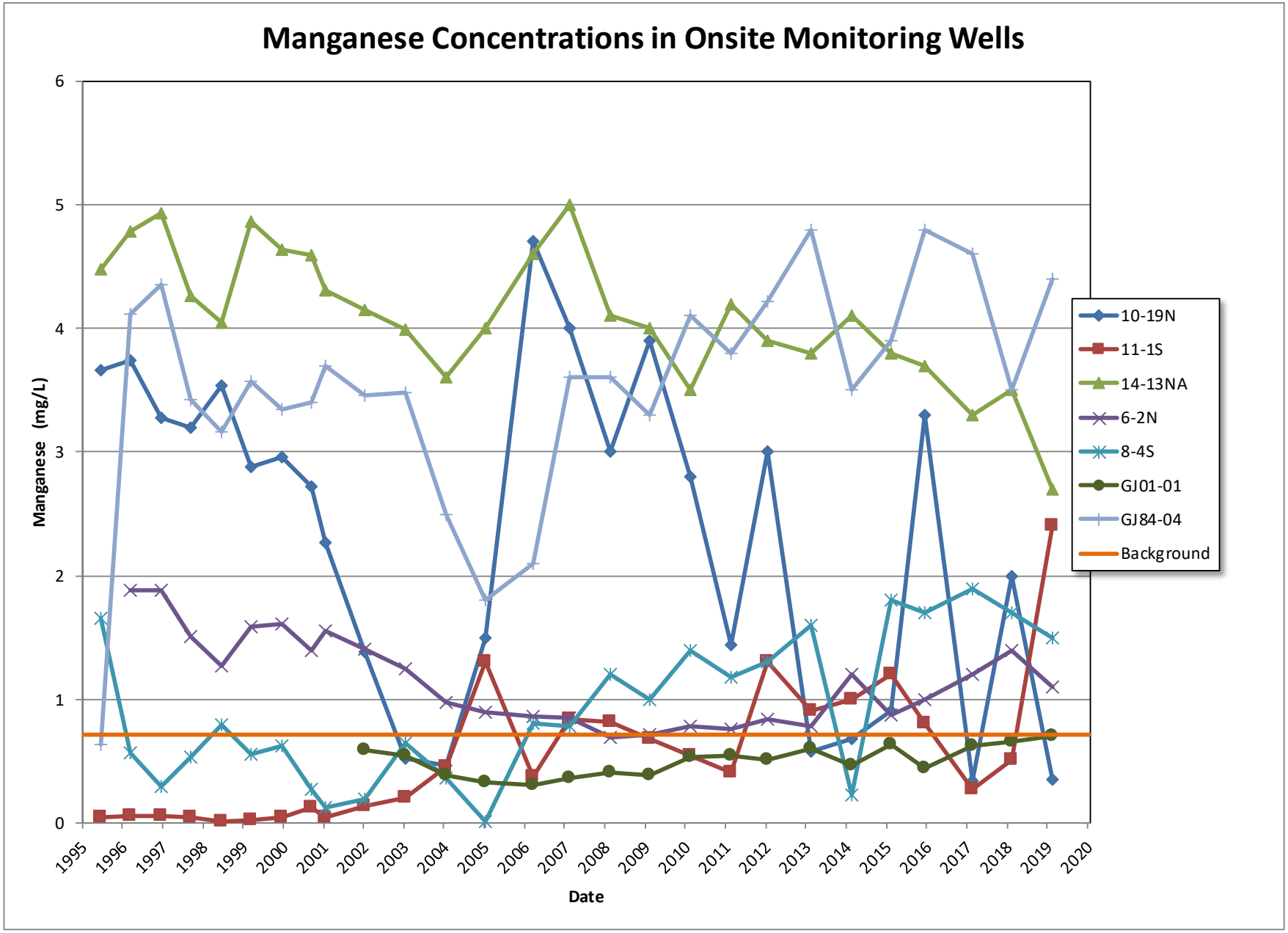
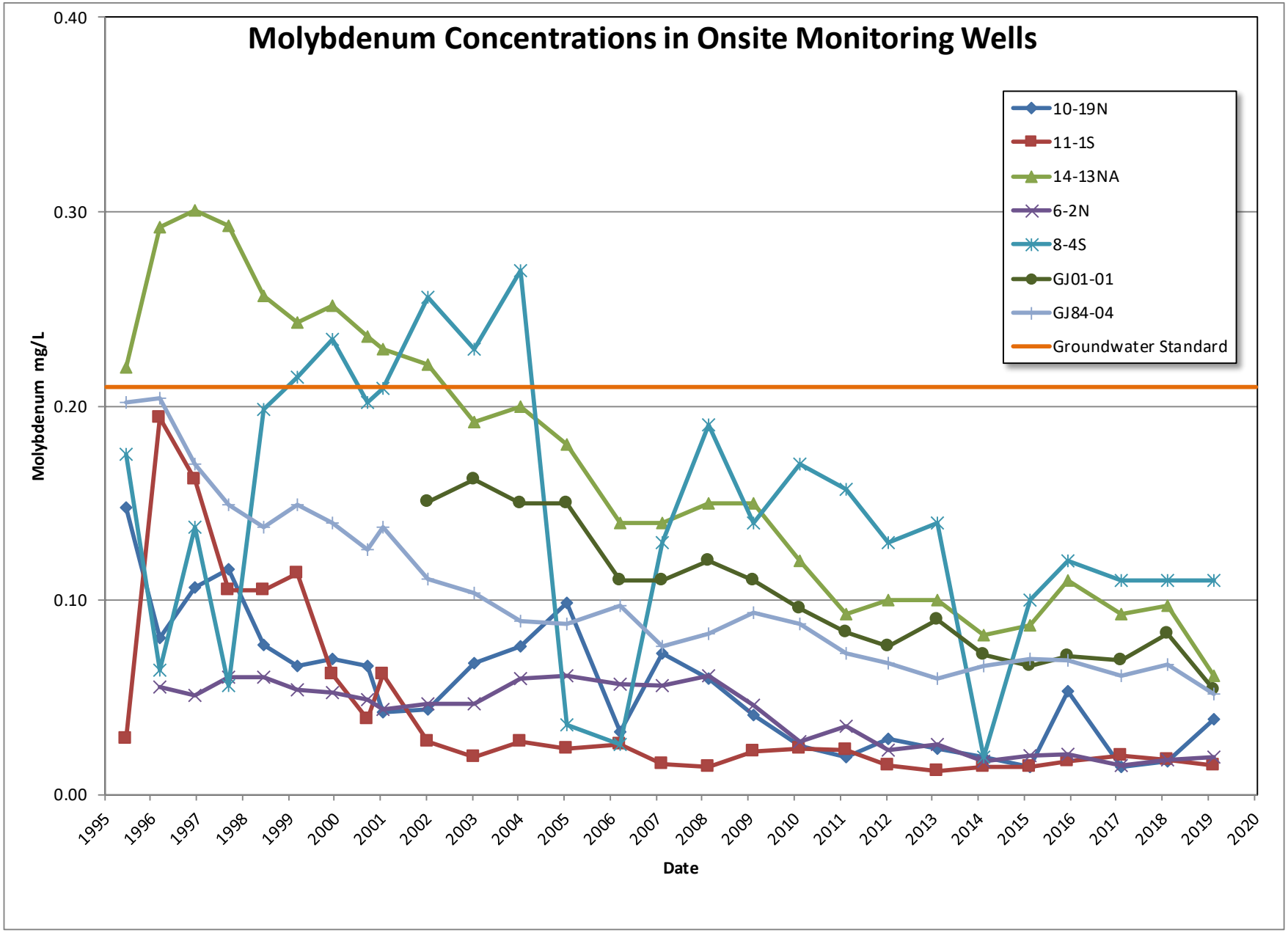
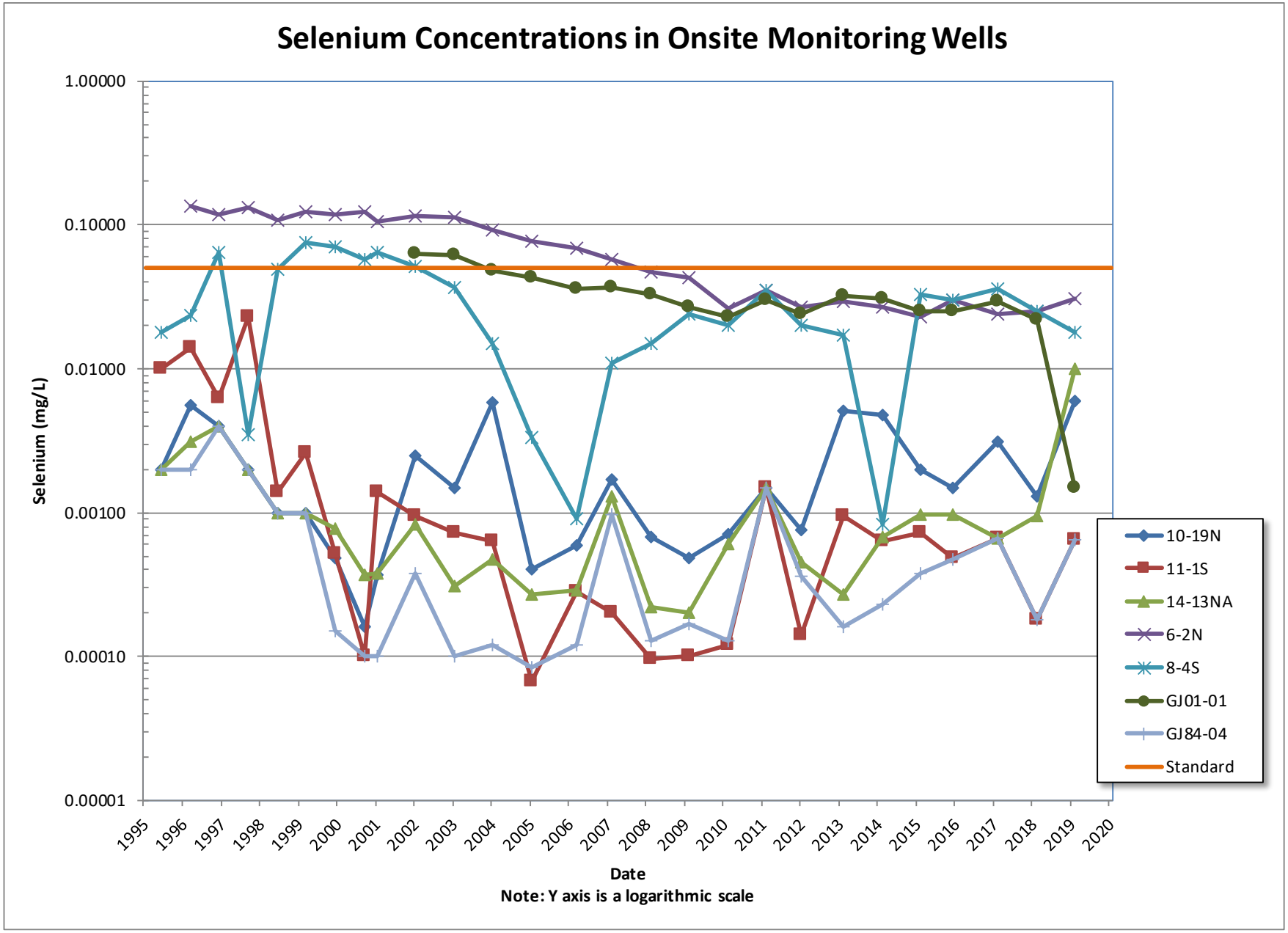
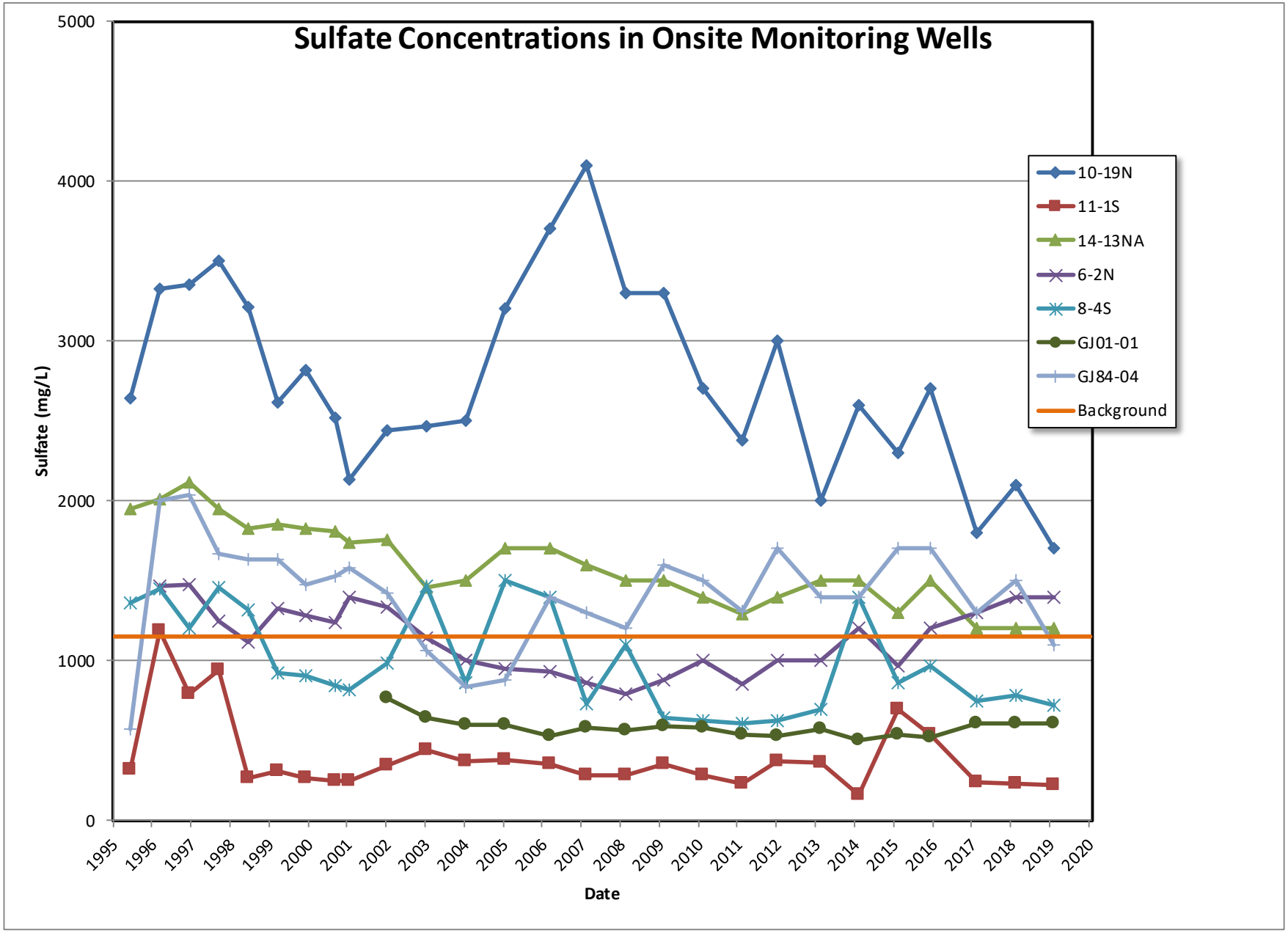
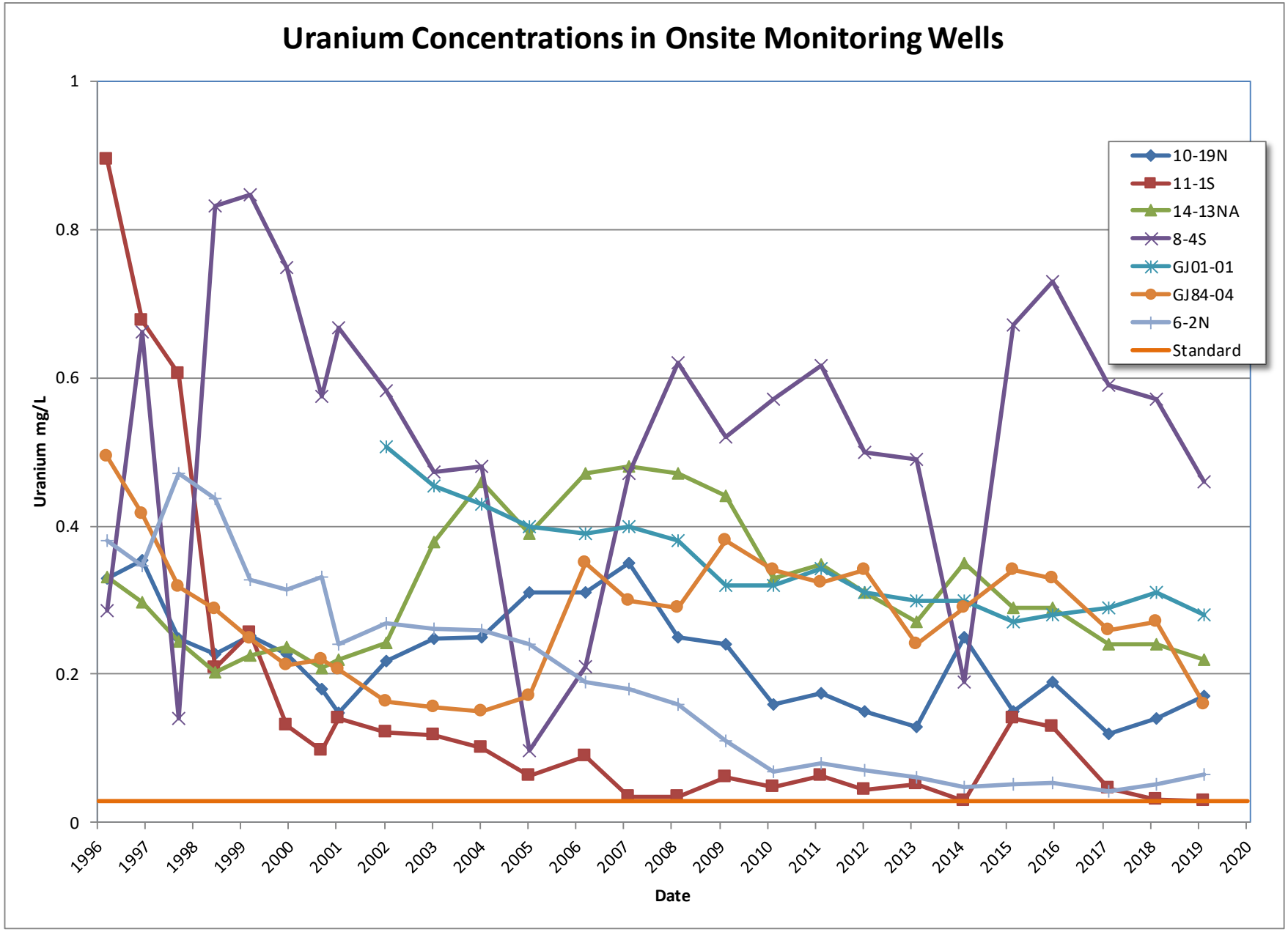
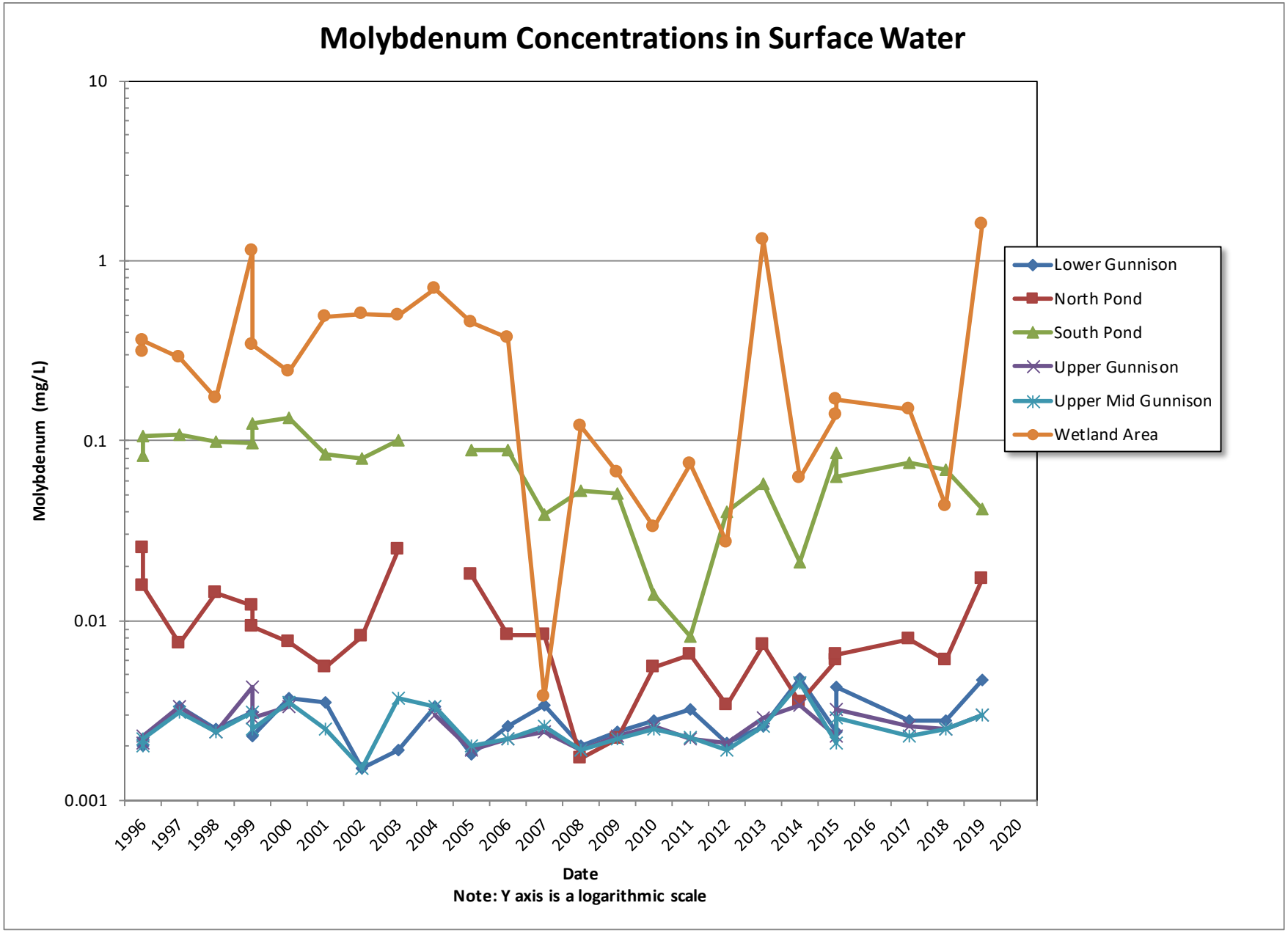

Manganese Concentrations in Onsite Monitoring Wells
Manganese (mg/L)
0
1
2
3
4
5
6
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Background

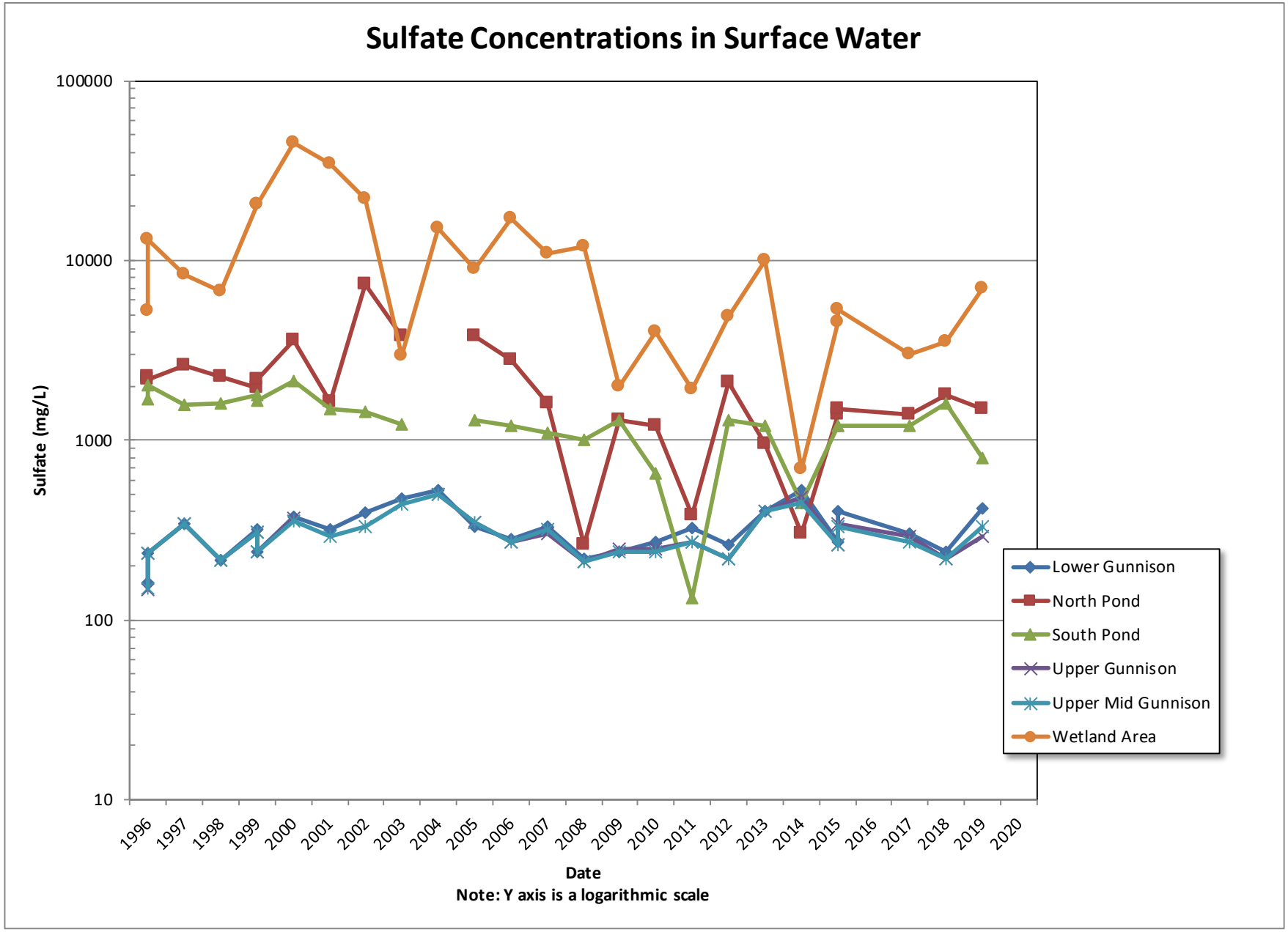

Molybdenum Concentrations in Onsite Monitoring Wells
Molybdenum mg/L
0.40
0.30
0.20
0.10
0.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Groundwater Standard

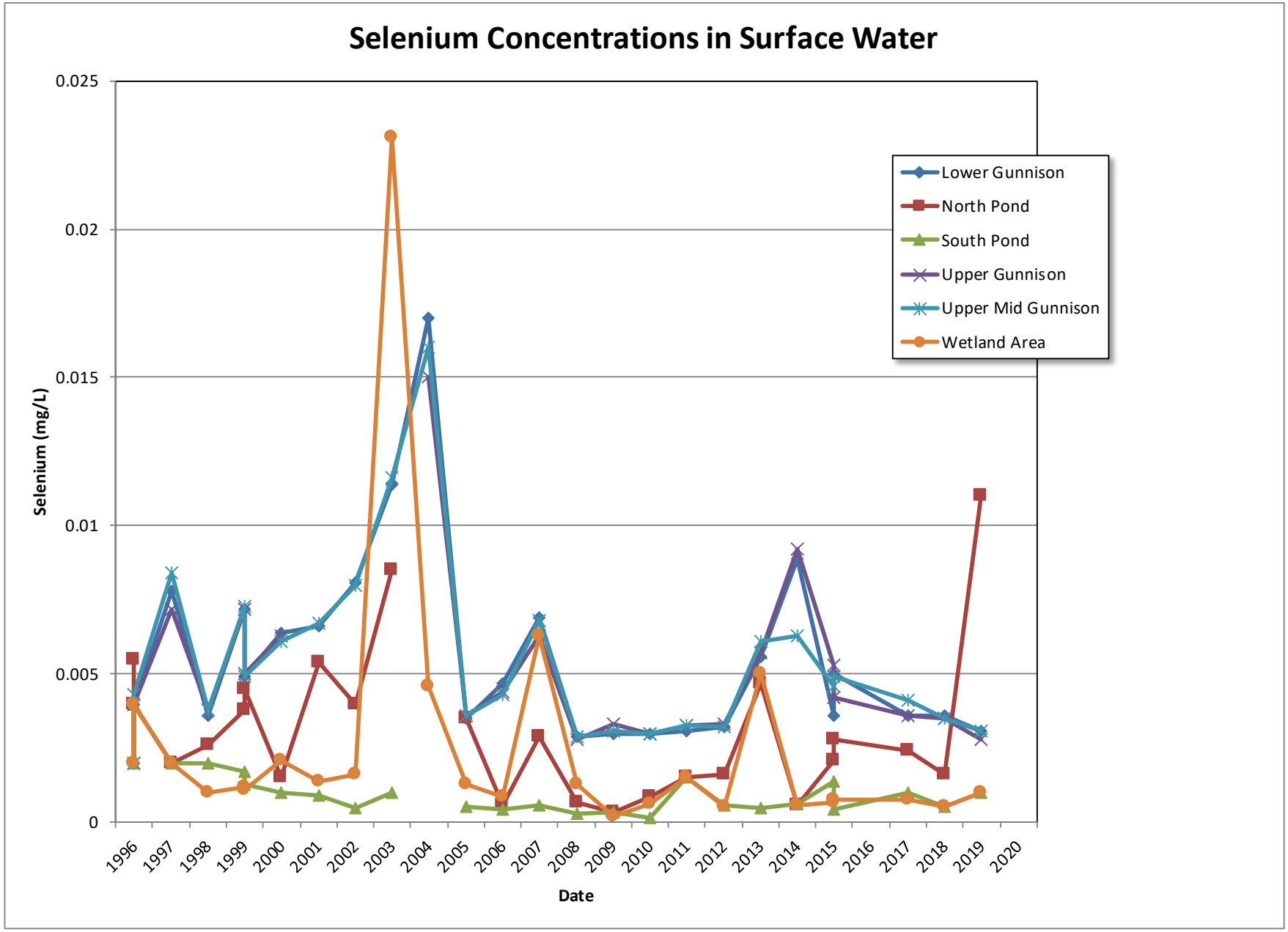

Selenium Concentrations in Onsite Monitoring Wells
Selenium (mg/L)
1.00000
0.10000
0.01000
0.00100
0.00010
0.00001
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
Note: Y axis is a logarithmic scale
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Standard

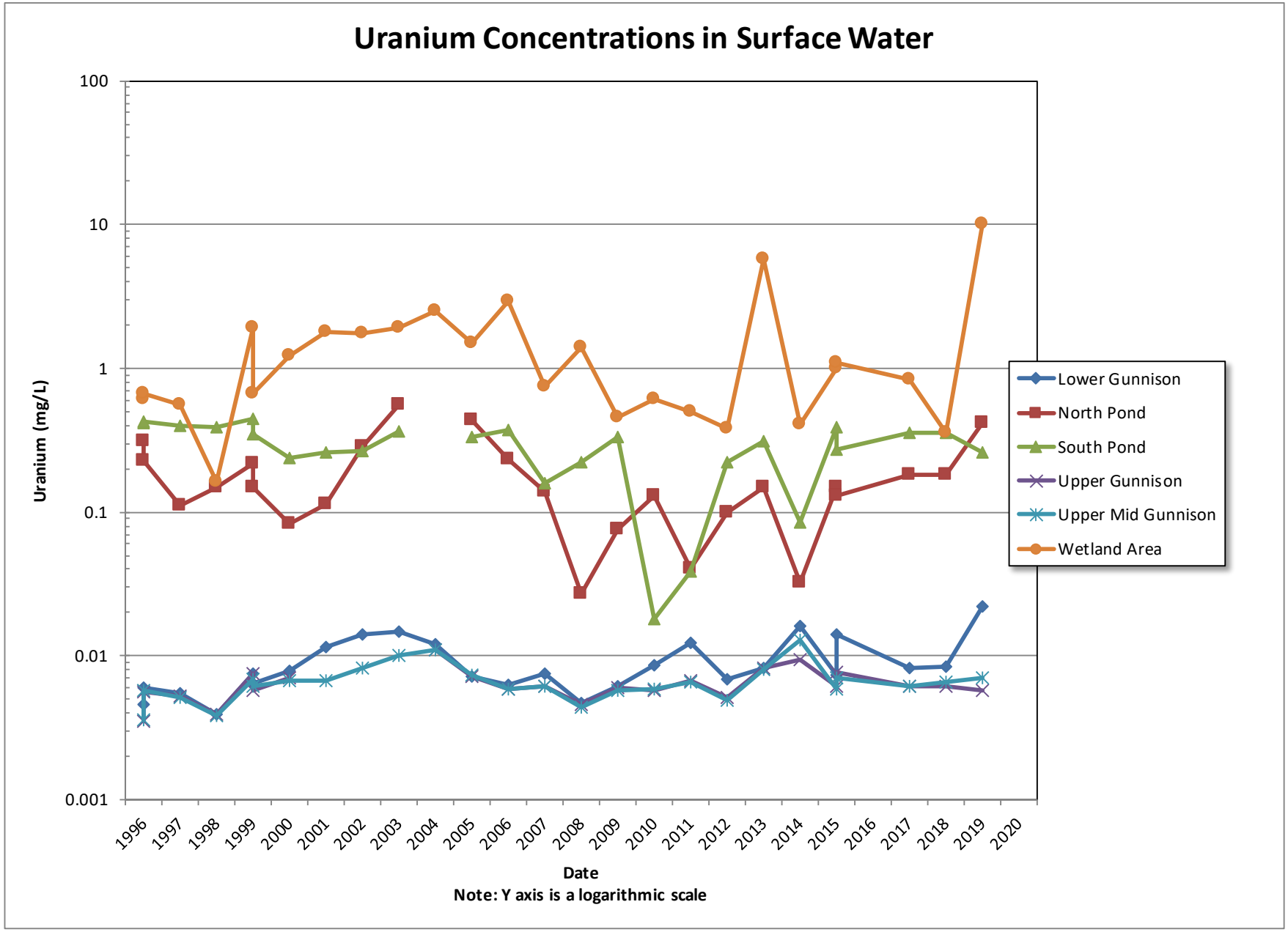

Sulfate Concentrations in Onsite Monitoring Wells
Sulfate (mg/L)
5000
4000
3000
2000
1000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Background


Uranium Concentrations in Onsite Monitoring Wells
Uranium mg/L
Date
0
0.2
0.4
0.6
0.8
1
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
10-19N
11-1S
14-13NA
8-4S
GJ01-01
GJ84-04
6-2N
Standard


Molybdenum Concentrations in Surface Water
Molybdenum (mg/L)
10
1
0.1
0.01
0.001
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
Note: Y axis is a logarithmic scale
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area


Sulfate Concentrations in Surface Water
Sulfate (mg/L)
100000
10000
1000
100
10
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
Note: Y axis is a logarithmic scale
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area


Selenium Concentrations in Surface Water
Selenium (mg/L)
0.025
0.02
0.015
0.01
0.005
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area


Uranium Concentrations in Surface Water
Uranium (mg/L)
100
10
1
0.1
0.01
0.001
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Date
Note: Y axis is a logarithmic scale
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area

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Appendix B

Groundwater Data

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GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:46:32 PM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Alkalinity, Total (As CaCO3)													
Alkalinity, Total (As CaCO3)	10-19N	WL	2/5/2019	(N)F	AL	O	165	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	11-1S	WL	2/4/2019	(N)F	AL	O	106	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	14-13NA	WL	2/5/2019	(N)F	AL	O	221	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	6-2N	WL	2/7/2019	(N)F	AL	O	182	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	8-4S	WL	2/4/2019	(N)F	AL	O	187	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	GJ01-01	WL	2/5/2019	(N)F	AL		231	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	GJ84-04	WL	2/4/2019	(N)F	AL	D	196	mg/L		F	#	-	-
Manganese													
Manganese	10-19N	WL	2/5/2019	(T)F	AL	O	0.35	mg/L		F	#	0.00036	-
Manganese	11-1S	WL	2/4/2019	(T)F	AL	O	2.4	mg/L		F	#	0.00036	-
Manganese	14-13NA	WL	2/5/2019	(T)F	AL	O	2.7	mg/L		F	#	0.00036	-
Manganese	6-2N	WL	2/7/2019	(T)F	AL	O	1.1	mg/L		F	#	0.00036	-
Manganese	8-4S	WL	2/4/2019	(T)D	AL	O	1.5	mg/L		F	#	0.00036	-
Manganese	8-4S	WL	2/4/2019	(T)F	AL	O	1.5	mg/L		F	#	0.00036	-
Manganese	GJ01-01	WL	2/5/2019	(T)F	AL		0.71	mg/L		F	#	0.00036	-
Manganese	GJ84-04	WL	2/4/2019	(T)F	AL	D	2.6	mg/L		F	#	0.00036	-
Molybdenum													
Molybdenum	10-19N	WL	2/5/2019	(T)F	AL	O	0.039	mg/L		F	#	0.000079	-
Molybdenum	11-1S	WL	2/4/2019	(T)F	AL	O	0.015	mg/L		F	#	0.000079	-
Molybdenum	14-13NA	WL	2/5/2019	(T)F	AL	O	0.061	mg/L		F	#	0.000079	-
Molybdenum	6-2N	WL	2/7/2019	(T)F	AL	O	0.019	mg/L		F	#	0.000079	-
Molybdenum	8-4S	WL	2/4/2019	(T)D	AL	O	0.11	mg/L		F	#	0.000079	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:46:32 PM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Molybdenum	8-4S	WL	2/4/2019	(T)F	AL	O	0.11	mg/L		F	#	0.000079	-
Molybdenum	GJ01-01	WL	2/5/2019	(T)F	AL		0.054	mg/L		F	#	0.000079	-
Molybdenum	GJ84-04	WL	2/4/2019	(T)F	AL	D	0.052	mg/L		F	#	0.000079	-
pH													
pH	10-19N	WL	2/5/2019	(N)F	AL	O	7.36	s.u.		F	#	-	-
pH	11-1S	WL	2/4/2019	(N)F	AL	O	7.05	s.u.		F	#	-	-
pH	14-13NA	WL	2/5/2019	(N)F	AL	O	7.07	s.u.		F	#	-	-
pH	6-2N	WL	2/7/2019	(N)F	AL	O	7.34	s.u.		F	#	-	-
pH	8-4S	WL	2/4/2019	(N)F	AL	O	6.94	s.u.		F	#	-	-
pH	GJ01-01	WL	2/5/2019	(N)F	AL		7.43	s.u.		F	#	-	-
pH	GJ84-04	WL	2/4/2019	(N)F	AL	D	6.96	s.u.		F	#	-	-
Selenium													
Selenium	10-19N	WL	2/5/2019	(T)F	AL	O	0.0059	mg/L	J	F	#	0.00065	-
Selenium	11-1S	WL	2/4/2019	(T)F	AL	O	0.00065	mg/L	U	F	#	0.00065	-
Selenium	14-13NA	WL	2/5/2019	(T)F	AL	O	0.01	mg/L		F	#	0.00065	-
Selenium	6-2N	WL	2/7/2019	(T)F	AL	O	0.031	mg/L		F	#	0.00065	-
Selenium	8-4S	WL	2/4/2019	(T)D	AL	O	0.018	mg/L		F	#	0.00065	-
Selenium	8-4S	WL	2/4/2019	(T)F	AL	O	0.019	mg/L		F	#	0.00065	-
Selenium	GJ01-01	WL	2/5/2019	(T)F	AL		0.0015	mg/L	J	F	#	0.00065	-
Selenium	GJ84-04	WL	2/4/2019	(T)F	AL	D	0.00065	mg/L	U	F	#	0.00065	-
Specific Conductance													
Specific Conductance	10-19N	WL	2/5/2019	(N)F	AL	O	3075	umhos/cm		F	#	-	-
Specific Conductance	11-1S	WL	2/4/2019	(N)F	AL	O	691	umhos/cm		F	#	-	-
Specific Conductance	14-13NA	WL	2/5/2019	(N)F	AL	O	2878	umhos/cm		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:46:32 PM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Specific Conductance	6-2N	WL	2/7/2019	(N)F	AL	O	2979	umhos/cm		F	#	-	-
Specific Conductance	8-4S	WL	2/4/2019	(N)F	AL	O	1806	umhos/cm		F	#	-	-
Specific Conductance	GJ01-01	WL	2/5/2019	(N)F	AL		1756	umhos/cm		F	#	-	-
Specific Conductance	GJ84-04	WL	2/4/2019	(N)F	AL	D	2525	umhos/cm		F	#	-	-
Sulfate													
Sulfate	10-19N	WL	2/5/2019	(N)F	AL	O	1700	mg/L		F	#	15	-
Sulfate	11-1S	WL	2/4/2019	(N)F	AL	O	220	mg/L		F	#	3	-
Sulfate	14-13NA	WL	2/5/2019	(N)F	AL	O	1200	mg/L		F	#	15	-
Sulfate	6-2N	WL	2/7/2019	(N)F	AL	O	1400	mg/L		F	#	15	-
Sulfate	8-4S	WL	2/4/2019	(N)D	AL	O	720	mg/L		F	#	6	-
Sulfate	8-4S	WL	2/4/2019	(N)F	AL	O	730	mg/L		F	#	6	-
Sulfate	GJ01-01	WL	2/5/2019	(N)F	AL		610	mg/L		F	#	6	-
Sulfate	GJ84-04	WL	2/4/2019	(N)F	AL	D	1100	mg/L		F	#	15	-
Temperature													
Temperature	10-19N	WL	2/5/2019	(N)F	AL	O	10.09	C		F	#	-	-
Temperature	11-1S	WL	2/4/2019	(N)F	AL	O	12.91	C		F	#	-	-
Temperature	14-13NA	WL	2/5/2019	(N)F	AL	O	14.14	C		F	#	-	-
Temperature	6-2N	WL	2/7/2019	(N)F	AL	O	16.81	C		F	#	-	-
Temperature	8-4S	WL	2/4/2019	(N)F	AL	O	13.56	C		F	#	-	-
Temperature	GJ01-01	WL	2/5/2019	(N)F	AL		14.52	C		F	#	-	-
Temperature	GJ84-04	WL	2/4/2019	(N)F	AL	D	12.29	C		F	#	-	-
Turbidity													
Turbidity	10-19N	WL	2/5/2019	(N)F	AL	O	3.23	NTU		F	#	-	-
Turbidity	11-1S	WL	2/4/2019	(N)F	AL	O	3.26	NTU		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:46:33 PM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Turbidity	14-13NA	WL	2/5/2019	(N)F	AL	O	1.04	NTU		F	#	-	-
Turbidity	6-2N	WL	2/7/2019	(N)F	AL	O	1.5	NTU		F	#	-	-
Turbidity	8-4S	WL	2/4/2019	(N)F	AL	O	0.77	NTU		F	#	-	-
Turbidity	GJ01-01	WL	2/5/2019	(N)F	AL		1.61	NTU		F	#	-	-
Turbidity	GJ84-04	WL	2/4/2019	(N)F	AL	D	3.49	NTU		F	#	-	-
Uranium													
Uranium	10-19N	WL	2/5/2019	(T)F	AL	O	0.17	mg/L		F	#	0.0000049	-
Uranium	11-1S	WL	2/4/2019	(T)F	AL	O	0.03	mg/L		F	#	0.0000049	-
Uranium	14-13NA	WL	2/5/2019	(T)F	AL	O	0.22	mg/L		F	#	0.0000049	-
Uranium	6-2N	WL	2/7/2019	(T)F	AL	O	0.065	mg/L		F	#	0.0000049	-
Uranium	8-4S	WL	2/4/2019	(T)D	AL	O	0.46	mg/L		F	#	0.0000049	-
Uranium	8-4S	WL	2/4/2019	(T)F	AL	O	0.46	mg/L		F	#	0.0000049	-
Uranium	GJ01-01	WL	2/5/2019	(T)F	AL		0.28	mg/L		F	#	0.0000049	-
Uranium	GJ84-04	WL	2/4/2019	(T)F	AL	D	0.16	mg/L		F	#	0.0000049	-

ZONES OF COMPLETION:

AL ALLUVIUM

LOCATION TYPE:

WL WELL

DATA QUALIFIERS:

F Low flow sampling method used.
G Possible grout contamination, pH > 9.
J Estimated Value.
L Less than 3 bore volumes purged prior to sampling.
N Tentatively identified compund (TIC).
Q Qualitative result due to sampling technique
R Unusable result.

U	Parameter analyzed for but was not detected.
X	Location is undefined.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
D	Analyte determined in diluted sample.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
J	Estimated Value.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
S	Result determined by method of standard addition (MSA).
U	Parameter analyzed for but was not detected.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X	Laboratory defined qualifier, see case narrative.
Y	Laboratory defined qualifier, see case narrative.
Z	Laboratory defined qualifier, see case narrative.

SAMPLE TYPES:

Fraction:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

Type Codes:
F-Field Sample R-Replicate FR-Field Sample with Replicates
D-Duplicate N-Not Known S-Split Sample

FLOW CODES:

B	BACKGROUND	C	CROSS GRADIENT	D	DOWN GRADIENT
F	OFF-SITE	N	UNKNOWN	O	ON-SITE

U UPGRADIENT

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix C

Surface Water Data

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SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:48:16 PM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Alkalinity, Total (As CaCO3)										
Alkalinity, Total (As CaCO3)	Lower Gunnison	2/5/2019	(N)F	77	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	North Pond	3/5/2019	(N)F	190	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	South Pond	2/5/2019	(D)F	55	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	Upper Gunnison	2/5/2019	(N)F	100	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	Upper Mid Gunnison	2/4/2019	(N)F	90	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	Wetland Area	2/5/2019	(D)F	218	mg/L			#	-	-
Molybdenum										
Molybdenum	Lower Gunnison	2/5/2019	(T)F	0.0047	mg/L			#	0.000079	-
Molybdenum	North Pond	3/5/2019	(D)F	0.017	mg/L			#	0.000079	-
Molybdenum	South Pond	2/5/2019	(D)F	0.042	mg/L			#	0.000079	-
Molybdenum	Upper Gunnison	2/5/2019	(T)F	0.003	mg/L			#	0.000079	-
Molybdenum	Upper Mid Gunnison	2/4/2019	(T)F	0.003	mg/L			#	0.000079	-
Molybdenum	Wetland Area	2/5/2019	(D)F	1.6	mg/L			#	0.000079	-
pH										
pH	Lower Gunnison	2/5/2019	(N)F	8.03	s.u.			#	-	-
pH	North Pond	3/5/2019	(N)F	7.49	s.u.			#	-	-
pH	South Pond	2/5/2019	(N)F	8.25	s.u.			#	-	-
pH	Upper Gunnison	2/5/2019	(N)F	7.6	s.u.			#	-	-
pH	Upper Mid Gunnison	2/4/2019	(N)F	7.91	s.u.			#	-	-
pH	Wetland Area	2/5/2019	(N)F	8.29	s.u.			#	-	-
Selenium										
Selenium	Lower Gunnison	2/5/2019	(T)F	0.0031	mg/L	J		#	0.00065	-
Selenium	North Pond	3/5/2019	(D)F	0.011	mg/L			#	0.00065	-
Selenium	South Pond	2/5/2019	(D)F	0.001	mg/L	J		#	0.00065	-
Selenium	Upper Gunnison	2/5/2019	(T)F	0.0028	mg/L	J		#	0.00065	-
Selenium	Upper Mid Gunnison	2/4/2019	(T)F	0.0031	mg/L	J		#	0.00065	-
Selenium	Wetland Area	2/5/2019	(D)F	0.001	mg/L	J		#	0.00065	-
Specific Conductance										
Specific Conductance	Lower Gunnison	2/5/2019	(N)F	1011	umhos/cm			#	-	-
Specific Conductance	North Pond	3/5/2019	(N)F	2993	umhos/cm			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:48:16 PM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Specific Conductance	South Pond	2/5/2019	(N)F	1875	umhos/cm			#	-	-
Specific Conductance	Upper Gunnison	2/5/2019	(N)F	988	umhos/cm			#	-	-
Specific Conductance	Upper Mid Gunnison	2/4/2019	(N)F	890	umhos/cm			#	-	-
Specific Conductance	Wetland Area	2/5/2019	(N)F	12795	umhos/cm			#	-	-
Sulfate										
Sulfate	Lower Gunnison	2/5/2019	(N)F	420	mg/L			#	6	-
Sulfate	North Pond	3/5/2019	(N)F	1500	mg/L			#	6	-
Sulfate	South Pond	2/5/2019	(N)F	800	mg/L			#	6	-
Sulfate	Upper Gunnison	2/5/2019	(N)F	290	mg/L			#	3	-
Sulfate	Upper Mid Gunnison	2/4/2019	(N)F	330	mg/L			#	3	-
Sulfate	Wetland Area	2/5/2019	(N)F	7000	mg/L			#	30	-
Temperature										
Temperature	Lower Gunnison	2/5/2019	(N)F	5.91	C			#	-	-
Temperature	North Pond	3/5/2019	(N)F	13.27	C			#	-	-
Temperature	South Pond	2/5/2019	(N)F	5.18	C			#	-	-
Temperature	Upper Gunnison	2/5/2019	(N)F	5.8	C			#	-	-
Temperature	Upper Mid Gunnison	2/4/2019	(N)F	6.56	C			#	-	-
Temperature	Wetland Area	2/5/2019	(N)F	8.47	C			#	-	-
Turbidity										
Turbidity	Lower Gunnison	2/5/2019	(N)F	8.85	NTU			#	-	-
Turbidity	North Pond	3/5/2019	(N)F	93.3	NTU			#	-	-
Turbidity	South Pond	2/5/2019	(N)F	13.5	NTU			#	-	-
Turbidity	Upper Gunnison	2/5/2019	(N)F	9.15	NTU			#	-	-
Turbidity	Upper Mid Gunnison	2/4/2019	(N)F	5.52	NTU			#	-	-
Turbidity	Wetland Area	2/5/2019	(N)F	12.5	NTU			#	-	-
Uranium										
Uranium	Lower Gunnison	2/5/2019	(T)F	0.022	mg/L			#	0.0000049	-
Uranium	North Pond	3/5/2019	(D)F	0.42	mg/L			#	0.0000049	-
Uranium	South Pond	2/5/2019	(D)F	0.26	mg/L			#	0.0000049	-
Uranium	Upper Gunnison	2/5/2019	(T)F	0.0058	mg/L			#	0.0000049	-
Uranium	Upper Mid Gunnison	2/4/2019	(T)F	0.007	mg/L			#	0.0000049	-
Uranium	Wetland Area	2/5/2019	(D)F	10	mg/L			#	0.000049	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/8/2019 2:48:16 PM

DATA QUALIFIERS:

F	Low flow sampling method used.
G	Possible grout contamination, pH > 9.
J	Estimated Value.
L	Less than 3 bore volumes purged prior to sampling.
N	Tentatively identified compund (TIC).
Q	Qualitative result due to sampling technique
R	Unusable result.
U	Parameter analyzed for but was not detected.
X	Location is undefined.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
D	Analyte determined in diluted sample.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
J	Estimated Value.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
S	Result determined by method of standard addition (MSA).
U	Parameter analyzed for but was not detected.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X	Laboratory defined qualifier, see case narrative.
Y	Laboratory defined qualifier, see case narrative.
Z	Laboratory defined qualifier, see case narrative.

SAMPLE TYPES:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

Type Codes: F-Field Sample R-Replicate FR-Field Sample with Replicates
D-Duplicate N-Not Known S-Split Sample

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

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Appendix D

Static Water Level Data

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STATIC WATER LEVELS (EQuIS700) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 8/13/2019 1:18:20 PM

LOCATION CODE	MEASUREMENT DATE/TIME	TOP OF CASING ELEVATION (FT)	DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
10-19N	02/05/2019 10:40	4569.95	14.22	4555.73	
11-1S	02/04/2019 14:38	4576.08	17.60	4558.48	
14-13NA	02/05/2019 11:28	4563.95	7.12	4556.83	
6-2N	02/07/2019 14:08	4574.14	14.87	4559.27	
8-4S	02/04/2019 13:55	4571.99	13.32	4558.67	
GJ01-01	02/05/2019 12:33	4574.49	15.89	4558.60	
GJ84-04	02/04/2019 15:35	4566.54	10.93	4555.61	

FLOW CODES:	B	BACKGROUND	C	CROSS GRADIENT	D	DOWN GRADIENT
	F	OFF-SITE	N	UNKNOWN	O	ON-SITE
	U	UPGRADIENT				
WATER LEVEL FLAGS:	B	Water level is below the top of the pump	D	Dry		
	E	Water elevation may not be comparable to other water elevations at this site	F	Flowing		
	I	Inaccessible				

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