LMS/GJO/S00215

Data Validation Package

February 2015
Groundwater and Surface Water Sampling at the Grand Junction, Colorado, Site

April 2015

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Grand Junction, Colorado, Site

Sampling Period: February 25–27, 2015

This event consisted of sampling seven monitoring wells and six surface water locations at the Grand Junction, Colorado, Site (Grand Junction site). Long-term monitoring at the Grand Junction site is prescribed in the 2006 *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site*. Groundwater and surface water samples were analyzed for manganese (groundwater only), molybdenum, selenium, sulfate, and uranium. These constituents were selected on the basis of historical data and consideration of groundwater standards (molybdenum, selenium, and uranium), secondary drinking water standards (sulfate and manganese), human health risk (manganese), and Colorado Department of Public Health and the Environment input. Per DOE direction, groundwater and surface water samples were also analyzed for calcium, chloride, iron, magnesium, nitrate + nitrite as N, potassium, and sodium to provide additional water quality data.

Although groundwater quality at the Grand Junction site has improved, analyte concentrations in the alluvial aquifer still exceed U.S. Environmental Protection Agency (EPA) groundwater standards (40 CFR 192), with the uranium standard exceeded in six of the seven wells in the monitoring network (Table 1).

Table 1. Locations with Samples that Equaled or Exceeded EPA Groundwater Standards in February 2014

Analyte	Standard[a]	Groundwater		Surface Water	
		Location	Concentration	Location	Concentration
Selenium	0.01	6-2N 8-4S GJ01-01	0.023 0.033 0.025	-------	-------
Uranium	0.044	10-19N 11-1S 14-13NA 6-2N 8-4S GJ01-01 GJ84-04	0.15 0.14 0.29 0.051 0.67 0.27 0.34	North Pond South Pond Wetland Area	0.15 0.39 1.0

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; concentrations are in milligrams per liter (mg/L).

Surface water features located at the Grand Junction site, which include the North Pond, the South Pond, and the Wetland Area, receive discharge of contaminated alluvial groundwater; therefore, elevated concentrations of groundwater contaminants are expected in the these ponds. Because these locations are recharged by groundwater, results from these locations were evaluated by comparing them to groundwater standards. Surface water locations with sample concentrations that exceeded groundwater standards are listed in Table 1.

Surface water results from Gunnison River locations adjacent to and downstream of the site were compared to statistical background threshold values derived using historical data from the Upper Gunnison sampling location, which is located upstream of the site on the Gunnison River. As shown in Table 2, none of the background threshold values were exceeded during this event.

Table 2. Comparison of 2015 Gunnison River Concentrations to Benchmarks

Analyte	Background Threshold Value[a]	Upper Gunnison (Benchmark Location)	Upper Mid Gunnison	Lower Gunnison
Molybdenum	0.0042	0.0023	0.0021	0.0024
Selenium	0.0096	0.0053	0.0046	0.0036
Sulfate	533	260	260	270
Uranium	0.0111	0.0062	0.0059	0.0073

[a] Results from 1996–present were used to calculate background threshold values; concentrations are in milligrams per liter (mg/L).

Sam Campbell
Site Lead, Stoller Newport News Nuclear, Inc.,
a wholly owned subsidiary of
Huntington Ingalls Industries, Inc.

4/27/2015
Date

Grand Junction, Colorado, Site Sample-Location Map

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Grand Junction, Colorado	**Date(s) of Water Sampling**	February 25–27, 2015
Date(s) of Verification	March 31, 2015	**Name of Verifier**	Stephen Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Work Order letter dated January 22, 2015.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Were calibrations conducted as specified in the above-named documents?	Yes	
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	All wells were Category I.
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	NA	All wells were Category I.
Was one pump/tubing volume removed prior to sampling?		
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from location 14-13NA.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	One equipment blank was collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	15026795
Sample Event:	February 25–27, 2015
Site(s):	Grand Junction Office, Colorado
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1503040
Analysis:	Metals and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	March 30, 2015

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/POL/S04325, continually updated) "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Chloride	MIS-A-045	SW-846 9056	SW-846 9056
Metals: Ca, Fe, K, Mg, Mn, Na	LMM-01	SW-846 3005A	SW-846 6010B
Metals: Mo, Se, U	LMM-02	SW-846 3005A	SW-846 6020A
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Sulfate	MIS-A-045	SW-846 9056	SW-846 9056

Data Qualifier Summary

Analytical results were qualified as listed in Table 4. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 4. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1503040-1	10-19N	Molybdenum	J	Interference check result
1503040-1	10-19N	Selenium	J	Interference check result
1503040-1	10-19N	Uranium	J	Interference check result
1503040-2	11-1S	Selenium	J	PQL check result
1503040-3	14-13NA	Selenium	J	PQL check result
1503040-4	14-13NA Duplicate	Selenium	J	PQL check result
1503040-5	Equipment Blank	Calcium	U	Less than 5 times the calibration blank
1503040-9	GJ84-04	Selenium	J	PQL check result
1503040-10	Lower Gunnison	Selenium	J	PQL check result
1503040-11	North Pond	Selenium	J	PQL check result
1503040-12	South Pond	Selenium	J	PQL check result
1503040-13	Upper Gunnison	Selenium	J	PQL check result
1503040-14	Upper Mid Gunnison	Selenium	J	PQL check result
1503040-15	Wetland Area	Selenium	J	PQL check result

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 15 water samples on March 4, 2015, accompanied by a Chain of Custody (COC) form. A copy of the air bill was included in the receiving documentation. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature in the iced cooler at 4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

The reported MDLs for all analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Method EPA 353.2, Nitrate + Nitrite as N
Calibrations were performed on March 12, 2015, using seven calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria.

Method SW-846 6010B, Metals: Ca, Fe, K, Mg, Mn, Na
Calibrations were performed on March 9 and 10, 2015, using three calibration standards. The correlation coefficient value was greater than 0.995. The absolute value of the intercept was slightly above 3 times the MDL, which is acceptable. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 6020A, Metals: Mo, Se, U
Calibrations were performed on March 9, 2015, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks associated with the samples meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range with the exception of selenium. Sample selenium results that are greater than the MDL but less than 5 times the PQL are qualified with a "J" flag as estimated values. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056, Chloride, Sulfate
Calibrations were performed on February 12, 2015, using five calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All blank results associated with the samples were below the PQLs for all analytes.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB were analyzed at the required frequency to verify the instrumental interelement and background correction factors. The interference check results for molybdenum, selenium, and uranium did not meet the acceptance criteria. The associated sample molybdenum, selenium, and uranium results are qualified with a "J" flag as estimated values.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria, demonstrating acceptable laboratory precision.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution results were acceptable.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Chromatography Peak Integration

The integration of analytes peaks was reviewed for all chloride and sulfate data. There were no manual integrations performed and all peak integrations were satisfactory.

Electronic Data Deliverable (EDD) File

The EDD file arrived on March 13, 2015. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter. Table 5 shows the total anion and cation results in the samples from this event and the charge balance, which is a relative percent difference (RPD) calculation. Typically, a charge balance RPD of less than10 percent is considered acceptable.

Table 5. Comparison of Major Anions and Cations

Location	Location Type	Cations (meq/L)	Anions (meq/L)	Charge Balance (RPD)
10-19N	Groundwater	59.65	61.15	1.24
11-1S	Groundwater	20.50	19.83	1.67
14-13NA	Groundwater	37.90	37.33	0.75
6-2N	Groundwater	26.52	27.28	1.41
8-4S	Groundwater	27.30	26.62	1.26
GJ01-01	Groundwater	18.93	18.64	0.77
GJ84-04	Groundwater	45.11	46.89	1.94
Lower Gunnison	Surface Water	8.64	8.39	1.47
North Pond	Surface Water	39.41	38.98	0.55
South Pond	Surface Water	27.94	29.80	3.23
Upper Gunnison	Surface Water	8.41	8.38	0.13
Upper Middle Gunnison	Surface Water	8.44	8.07	2.27
Wetland Area	Surface Water	107.58	114.49	3.11

meq/L = milliequivalents per liter

The charge balance RPD was below 10 percent indicating that there are no significant errors associated with the measurement of major ion concentrations for all locations.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 15026795 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 03/30/2015

Project: Grand Junction Office(GJO) **Analysis Type:** ☑ Metals ☑ General Chem ☐ Rad ☐ Organics

# of Samples: 15 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 15026795 **Lab Code:** PAR **Date Due:** 04/01/2015

Matrix: Water **Site Code:** GJO01 **Date Completed:** 03/17/2015

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	03/09/2015	0.0000	1.0000	OK	OK	OK	98.0				101.0	3.0	86.0
Calcium	ICP/ES	03/10/2015	0.0000	1.0000	OK	OK			119.0	119.0	0.0	103.0		80.0
Iron	ICP/ES	03/09/2015	0.0000	1.0000	OK	OK	OK	115.0				100.0		121.0
Iron	ICP/ES	03/10/2015	0.0000	1.0000	OK	OK			99.0	101.0	3.0	99.0		101.0
Magnesium	ICP/ES	03/09/2015	0.0000	1.0000	OK	OK	OK	98.0				107.0	1.0	91.0
Magnesium	ICP/ES	03/10/2015	0.0000	1.0000	OK	OK			112.0	92.0	3.0	107.0		89.0
Manganese	ICP/ES	03/10/2015	0.0000	1.0000	OK	OK	OK		103.0	94.0	3.0	101.0	1.0	94.0
Molybdenum	ICP/MS	03/09/2015	0.0000	1.0000	OK	OK	OK	95.0	101.0	104.0	2.0	17.0		101.0
Potassium	ICP/ES	03/09/2015	0.0000	1.0000	OK	OK	OK	98.0					9.0	89.0
Potassium	ICP/ES	03/10/2015	0.0000	1.0000	OK	OK			104.0	100.0	3.0			98.0
Selenium	ICP/MS	03/09/2015	0.0000	1.0000	OK	OK	OK	106.0	110.0	110.0	0.0	1.0		132.0
Sodium	ICP/ES	03/09/2015	0.0000	1.0000	OK	OK	OK	101.0			2.0		2.0	85.0
Sodium	ICP/ES	03/10/2015	0.0000	1.0000	OK	OK								110.0
Uranium	ICP/MS	03/09/2015	0.0000	1.0000	OK	OK	OK	100.0	110.0	84.0	2.0	1.0	5.0	90.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15026795 **Lab Code:** PAR **Date Due:** 04/01/2015

Matrix: Water **Site Code:** GJO01 **Date Completed:** 03/17/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
CHLORIDE	03/05/2015	0.000	1.0000	OK	OK	OK	99.00	98.0	99.0	1.00	
Nitrate+Nitrite as N	03/12/2015	0.000	1.0000	OK	OK	OK	99.00	107.0	109.0	2.00	
SULFATE	03/05/2015	0.000	1.0000	OK	OK	OK	97.00	101.0	102.0	1.00	

Sampling Quality Control Assessment

The following information summarizes and assesses quality control for this sampling event.

Sampling Protocol

All monitoring wells met the Category I low-flow sampling criteria. Sample results for these wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Surface water locations were sampled using a peristaltic pump and tubing reel.

Equipment Blank

An equipment blank (field ID 2688) was collected after decontamination of the hose reel used to collect the surface water samples. Iron, manganese, sodium, sulfate, and uranium were detected in this blank at concentrations below the PQLs. The associated sample results for uranium were greater than 10 times the blank concentration, not requiring qualification. The equipment blank results indicate adequate decontamination of the sampling equipment.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from location 14-13NA (field duplicate ID 2687). The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 15026795 **Lab Code:** PAR **Project:** Grand Junction Office(GJO) **Validation Date:** 03/30/2015

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1503040-5	SW6010	Iron	34	J	6.7	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1503040-10	NDR 382	Lower Gunnison	160	1		J
1503040-11	NDR 383	North Pond	220	1		
1503040-12	NDR 384	South Pond	270	1		
1503040-13	NDR 380	Upper Gunnison	170	1		
1503040-14	NDR 381	Upper Mid Gunnison	520	1		
1503040-15	NDR 385	Wetland Area	670	100	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1503040-5	SW6010	Manganese	1.2	J	0.24	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1503040-5	SW6010	Sodium	200	J	47	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1503040-10	NDR 382	Lower Gunnison	49000	1		
1503040-11	NDR 383	North Pond	410000	1		
1503040-12	NDR 384	South Pond	320000	1		
1503040-13	NDR 380	Upper Gunnison	46000	1		
1503040-14	NDR 381	Upper Mid Gunnison	48000	1		
1503040-15	NDR 385	Wetland Area	1600000	100		

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1503040-5	SW6020	Uranium	0.59		0.029	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1503040-10	NDR 382	Lower Gunnison	7.3	10		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 15026795 **Lab Code:** PAR **Project:** Grand Junction Office(GJO) **Validation Date:** 03/30/2015

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1503040-5		Uranium				

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1503040-11	NDR 383	North Pond	150	10		
1503040-12	NDR 384	South Pond	390	10		
1503040-13	NDR 380	Upper Gunnison	6.2	10		
1503040-14	NDR 381	Upper Mid Gunnison	5.9	10		
1503040-15	NDR 385	Wetland Area	1000	10		

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1503040-5	SW9056	SULFATE	0.56		0.5	MG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1503040-10	NDR 382	Lower Gunnison	270	10		
1503040-11	NDR 383	North Pond	1400	50		
1503040-12	NDR 384	South Pond	1200	25		
1503040-13	NDR 380	Upper Gunnison	260	10		
1503040-14	NDR 381	Upper Mid Gunnison	260	10		
1503040-15	NDR 385	Wetland Area	4500	100		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 15026795 **Lab Code:** PAR **Project:** Grand Junction Office(GJO) **Validation Date:** 03/30/2015

Duplicate: 2687 **Sample:** 14-13NA

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Calcium	290000			1	290000			1	0		UG/L
CHLORIDE	110			50	110			50	0		MG/L
Iron	70	J		1	58	J		1	18.75		UG/L
Magnesium	73000			1	72000			1	1.38		UG/L
Manganese	3900			1	3800			1	2.60		UG/L
Molybdenum	87			10	87			10	0		UG/L
Nitrate+Nitrite as N	0.034			1	0.028			1			MG/L
Potassium	18000			1	18000			1	0		UG/L
Selenium	0.74	J		10	0.98	J		10			UG/L
Sodium	390000			1	390000			1	0		UG/L
SULFATE	1300			50	1300			50	0		MG/L
Uranium	290			10	300			10	3.39		UG/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Stephen Donivan — Stephen Donivan — 4-23-2015 — Date

Data Validation Lead: Stephen Donivan — Stephen Donivan — 4-23-2015 — Date

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers can result from transcription errors, data-coding errors, or measurement system problems. However, outliers can also represent true extreme values of a distribution and can indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. **Identify extreme values that may be potential outliers.** Do this by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made as to whether the data are normally distributed using the Shapiro-Wilk Test.
2. **Apply the appropriate statistical test.** Dixon's Test for extreme values is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. **Scientifically review statistical outliers and decide on their disposition.** The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

The sulfate result for location 11-1S was identified as a potential outlier. There were no errors apparent in the analysis of this sample and the cation/anion balance for this location confirms the reported value. The data for this sampling event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2004
Laboratory: ALS Laboratory Group
RIN: 15026795
Report Date: 04/13/2015

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
GJO01	10-19N	N001	02/27/2015	Molybdenum	0.0140		FJ	0.0990		F	0.0190		F	12	0	No
GJO01	11-1S	N001	02/26/2015	Sulfate	700		F	380		F	160		F	11	0	Yes
GJO01	11-1S	N001	02/26/2015	Uranium	0.140		F	0.1000		F	0.0300		F	11	0	No
GJO01	6-2N	N001	02/25/2015	Selenium	0.0230		F	0.0920		JF	0.0260		F	11	0	No
GJO01	8-4S	N001	02/26/2015	Manganese	1.80		F	1.60		F	0.00980		F	14	0	No
GJO01	8-4S	N001	02/26/2015	Uranium	0.670		F	0.620		F	0.0970		F	14	0	No
GJO01	GJ01-01	N001	02/26/2015	Manganese	0.640		F	0.600		F	0.310		F	13	0	No
GJO01	GJ01-01	N001	02/26/2015	Molybdenum	0.0660		F	0.150		F	0.0720		F	13	0	No
GJO01	GJ01-01	N001	02/26/2015	Uranium	0.270		F	0.430		F	0.300		F	13	0	No
GJO01	South Pond	0001	02/25/2015	Uranium	0.390			0.370			0.0180			11	0	No

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: 10-19N WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/27/2015	N001	-	338		F	#		
Calcium	mg/L	02/27/2015	N001	-	370		F	#	0.12	
Chloride	mg/L	02/27/2015	N001	-	230		F	#	10	
Dissolved Oxygen	mg/L	02/27/2015	N001	-	1.82		F	#		
Iron	mg/L	02/27/2015	N001	-	0.092	J	F	#	0.033	
Magnesium	mg/L	02/27/2015	N001	-	200		F	#	0.15	
Manganese	mg/L	02/27/2015	N001	-	0.91		F	#	0.0012	
Molybdenum	mg/L	02/27/2015	N001	-	0.014		FJ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/27/2015	N001	-	0.22		F	#	0.01	
Oxidation Reduction Potential	mV	02/27/2015	N001	-	217.2		F	#		
pH	s.u.	02/27/2015	N001	-	7.03		F	#		
Potassium	mg/L	02/27/2015	N001	-	15		F	#	0.26	
Selenium	mg/L	02/27/2015	N001	-	0.002		FJ	#	0.00032	
Sodium	mg/L	02/27/2015	N001	-	560		F	#	0.23	
Specific Conductance	umhos /cm	02/27/2015	N001	-	4793		F	#		
Sulfate	mg/L	02/27/2015	N001	-	2300		F	#	25	
Temperature	C	02/27/2015	N001	-	9.65		F	#		
Turbidity	NTU	02/27/2015	N001	-	2		F	#		
Uranium	mg/L	02/27/2015	N001	-	0.15		FJ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: 11-1S WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/26/2015	N001	-	240		F	#		
Calcium	mg/L	02/26/2015	N001	-	220		F	#	0.024	
Chloride	mg/L	02/26/2015	N001	-	16		F	#	4	
Dissolved Oxygen	mg/L	02/26/2015	N001	-	0.46		F	#		
Iron	mg/L	02/26/2015	N001	-	0.21		F	#	0.0067	
Magnesium	mg/L	02/26/2015	N001	-	72		F	#	0.03	
Manganese	mg/L	02/26/2015	N001	-	1.2		F	#	0.00024	
Molybdenum	mg/L	02/26/2015	N001	-	0.014		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/26/2015	N001	-	0.051		F	#	0.01	
Oxidation Reduction Potential	mV	02/26/2015	N001	-	-8.9		F	#		
pH	s.u.	02/26/2015	N001	-	7.21		F	#		
Potassium	mg/L	02/26/2015	N001	-	4.8		F	#	0.052	
Selenium	mg/L	02/26/2015	N001	-	0.00073	J	FJ	#	0.00032	
Sodium	mg/L	02/26/2015	N001	-	80		F	#	0.047	
Specific Conductance	umhos /cm	02/26/2015	N001	-	1683		F	#		
Sulfate	mg/L	02/26/2015	N001	-	700		F	#	10	
Temperature	C	02/26/2015	N001	-	12.75		F	#		
Turbidity	NTU	02/26/2015	N001	-	1.56		F	#		
Uranium	mg/L	02/26/2015	N001	-	0.14		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: 14-13NA WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/27/2015	N001	-	358		F	#		
Calcium	mg/L	02/27/2015	N001	-	290		F	#	0.024	
Calcium	mg/L	02/27/2015	N002	-	290		F	#	0.024	
Chloride	mg/L	02/27/2015	N001	-	110		F	#	10	
Chloride	mg/L	02/27/2015	N002	-	110		F	#	10	
Dissolved Oxygen	mg/L	02/27/2015	N001	-	0.68		F	#		
Iron	mg/L	02/27/2015	N001	-	0.07	J	F	#	0.0067	
Iron	mg/L	02/27/2015	N002	-	0.058	J	F	#	0.0067	
Magnesium	mg/L	02/27/2015	N001	-	73		F	#	0.03	
Magnesium	mg/L	02/27/2015	N002	-	72		F	#	0.03	
Manganese	mg/L	02/27/2015	N001	-	3.9		F	#	0.00024	
Manganese	mg/L	02/27/2015	N002	-	3.8		F	#	0.00024	
Molybdenum	mg/L	02/27/2015	N001	-	0.087		F	#	0.00032	
Molybdenum	mg/L	02/27/2015	N002	-	0.087		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/27/2015	N001	-	0.034		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	02/27/2015	N002	-	0.028		F	#	0.01	
Oxidation Reduction Potential	mV	02/27/2015	N001	-	268.5		F	#		
pH	s.u.	02/27/2015	N001	-	7.07		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: 14-13NA WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Potassium	mg/L	02/27/2015	N001	-	18		F	#	0.052	
Potassium	mg/L	02/27/2015	N002	-	18		F	#	0.052	
Selenium	mg/L	02/27/2015	N001	-	0.00074	J	FJ	#	0.00032	
Selenium	mg/L	02/27/2015	N002	-	0.00098	J	FJ	#	0.00032	
Sodium	mg/L	02/27/2015	N001	-	390		F	#	0.047	
Sodium	mg/L	02/27/2015	N002	-	390		F	#	0.047	
Specific Conductance	umhos /cm	02/27/2015	N001	-	3258		F	#		
Sulfate	mg/L	02/27/2015	N001	-	1300		F	#	25	
Sulfate	mg/L	02/27/2015	N002	-	1300		F	#	25	
Temperature	C	02/27/2015	N001	-	11.86		F	#		
Turbidity	NTU	02/27/2015	N001	-	1.06		F	#		
Uranium	mg/L	02/27/2015	N001	-	0.29		F	#	0.000029	
Uranium	mg/L	02/27/2015	N002	-	0.3		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: 6-2N WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/25/2015	N001	-	221		F	#		
Calcium	mg/L	02/25/2015	N001	-	140		F	#	0.024	
Chloride	mg/L	02/25/2015	N001	-	92		F	#	5	
Dissolved Oxygen	mg/L	02/25/2015	N001	-	0.45		F	#		
Iron	mg/L	02/25/2015	N001	-	0.013	J	F	#	0.0067	
Magnesium	mg/L	02/25/2015	N001	-	39		F	#	0.03	
Manganese	mg/L	02/25/2015	N001	-	0.88		F	#	0.00024	
Molybdenum	mg/L	02/25/2015	N001	-	0.02		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/25/2015	N001	-	0.91		F	#	0.05	
Oxidation Reduction Potential	mV	02/25/2015	N001	-	185.1		F	#		
pH	s.u.	02/25/2015	N001	-	7.58		F	#		
Potassium	mg/L	02/25/2015	N001	-	9		F	#	0.052	
Selenium	mg/L	02/25/2015	N001	-	0.023		F	#	0.00032	
Sodium	mg/L	02/25/2015	N001	-	370		F	#	0.047	
Specific Conductance	umhos /cm	02/25/2015	N001	-	2527		F	#		
Sulfate	mg/L	02/25/2015	N001	-	970		F	#	12	
Temperature	C	02/25/2015	N001	-	18.1		F	#		
Turbidity	NTU	02/25/2015	N001	-	1.12		F	#		
Uranium	mg/L	02/25/2015	N001	-	0.051		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: 8-4S WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/26/2015	N001	-	343		F	#		
Calcium	mg/L	02/26/2015	N001	-	210		F	#	0.024	
Chloride	mg/L	02/26/2015	N001	-	62		F	#	4	
Dissolved Oxygen	mg/L	02/26/2015	N001	-	0.54		F	#		
Iron	mg/L	02/26/2015	N001	-	0.037	J	F	#	0.0067	
Magnesium	mg/L	02/26/2015	N001	-	75		F	#	0.03	
Manganese	mg/L	02/26/2015	N001	-	1.8		F	#	0.00024	
Molybdenum	mg/L	02/26/2015	N001	-	0.1		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/26/2015	N001	-	1.5		F	#	0.05	
Oxidation Reduction Potential	mV	02/26/2015	N001	-	157.9		F	#		
pH	s.u.	02/26/2015	N001	-	7.15		F	#		
Potassium	mg/L	02/26/2015	N001	-	8.5		F	#	0.052	
Selenium	mg/L	02/26/2015	N001	-	0.033		F	#	0.00032	
Sodium	mg/L	02/26/2015	N001	-	240		F	#	0.047	
Specific Conductance	umhos /cm	02/26/2015	N001	-	2364		F	#		
Sulfate	mg/L	02/26/2015	N001	-	860		F	#	10	
Temperature	C	02/26/2015	N001	-	13.08		F	#		
Turbidity	NTU	02/26/2015	N001	-	0.53		F	#		
Uranium	mg/L	02/26/2015	N001	-	0.67		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: GJ01-01 WELL South of Building 20

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/26/2015	N001	15.5 - 25.5	277		F	#		
Calcium	mg/L	02/26/2015	N001	15.5 - 25.5	130		F	#	0.024	
Chloride	mg/L	02/26/2015	N001	15.5 - 25.5	58		F	#	4	
Dissolved Oxygen	mg/L	02/26/2015	N001	15.5 - 25.5	0.72		F	#		
Iron	mg/L	02/26/2015	N001	15.5 - 25.5	0.015	J	F	#	0.0067	
Magnesium	mg/L	02/26/2015	N001	15.5 - 25.5	54		F	#	0.03	
Manganese	mg/L	02/26/2015	N001	15.5 - 25.5	0.64		F	#	0.00024	
Molybdenum	mg/L	02/26/2015	N001	15.5 - 25.5	0.066		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/26/2015	N001	15.5 - 25.5	3.1		F	#	0.05	
Oxidation Reduction Potential	mV	02/26/2015	N001	15.5 - 25.5	177.7		F	#		
pH	s.u.	02/26/2015	N001	15.5 - 25.5	7.32		F	#		
Potassium	mg/L	02/26/2015	N001	15.5 - 25.5	6.8		F	#	0.052	
Selenium	mg/L	02/26/2015	N001	15.5 - 25.5	0.025		F	#	0.00032	
Sodium	mg/L	02/26/2015	N001	15.5 - 25.5	180		F	#	0.047	
Specific Conductance	umhos /cm	02/26/2015	N001	15.5 - 25.5	1725		F	#		
Sulfate	mg/L	02/26/2015	N001	15.5 - 25.5	540		F	#	10	
Temperature	C	02/26/2015	N001	15.5 - 25.5	13.43		F	#		
Turbidity	NTU	02/26/2015	N001	15.5 - 25.5	1.7		F	#		
Uranium	mg/L	02/26/2015	N001	15.5 - 25.5	0.27		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: GJ84-04 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/27/2015	N001	-	363		F	#		
Calcium	mg/L	02/27/2015	N001	-	330		F	#	0.024	
Chloride	mg/L	02/27/2015	N001	-	150		F	#	10	
Dissolved Oxygen	mg/L	02/27/2015	N001	-	0.96		F	#		
Iron	mg/L	02/27/2015	N001	-	0.22		F	#	0.0067	
Magnesium	mg/L	02/27/2015	N001	-	90		F	#	0.03	
Manganese	mg/L	02/27/2015	N001	-	4.8		F	#	0.00024	
Molybdenum	mg/L	02/27/2015	N001	-	0.07		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/27/2015	N001	-	0.024		F	#	0.01	
Oxidation Reduction Potential	mV	02/27/2015	N001	-	63.2		F	#		
pH	s.u.	02/27/2015	N001	-	7.09		F	#		
Potassium	mg/L	02/27/2015	N001	-	14		F	#	0.052	
Selenium	mg/L	02/27/2015	N001	-	0.00038	J	FJ	#	0.00032	
Sodium	mg/L	02/27/2015	N001	-	480		F	#	0.047	
Specific Conductance	umhos /cm	02/27/2015	N001	-	3815		F	#		
Sulfate	mg/L	02/27/2015	N001	-	1700		F	#	25	
Temperature	C	02/27/2015	N001	-	11.07		F	#		
Turbidity	NTU	02/27/2015	N001	-	0.85		F	#		
Uranium	mg/L	02/27/2015	N001	-	0.34		F	#	0.000029	

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: 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
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z	Laboratory defined qualifier, see case narrative.

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.	Q	Qualitative result due to sampling technique.	R	Unusable result.
U	Parameter analyzed for but was not detected.	X	Location is undefined.		

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

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Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015
Location: Lower Gunnison SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/26/2015	N001	121			#		
Calcium	mg/L	02/26/2015	N001	81			#	0.024	
Chloride	mg/L	02/26/2015	N001	11			#	2	
Dissolved Oxygen	mg/L	02/26/2015	N001	11.88			#		
Iron	mg/L	02/26/2015	N001	0.16			#	0.0067	
Magnesium	mg/L	02/26/2015	N001	29			#	0.03	
Molybdenum	mg/L	02/26/2015	N001	0.0024			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/26/2015	N001	0.48			#	0.01	
Oxidation Reduction Potential	mV	02/26/2015	N001	87			#		
pH	s.u.	02/26/2015	N001	8.58			#		
Potassium	mg/L	02/26/2015	N001	3			#	0.052	
Selenium	mg/L	02/26/2015	N001	0.0036		J	#	0.00032	
Sodium	mg/L	02/26/2015	N001	49			#	0.047	
Specific Conductance	umhos/cm	02/26/2015	N001	811			#		
Sulfate	mg/L	02/26/2015	N001	270			#	5	
Temperature	C	02/26/2015	N001	5.91			#		
Turbidity	NTU	02/26/2015	N001	6.47			#		
Uranium	mg/L	02/26/2015	N001	0.0073			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 04/13/2015

Location: North Pond SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/27/2015	N001	280			#		
Calcium	mg/L	02/27/2015	N001	210			#	0.024	
Chloride	mg/L	02/27/2015	N001	150			#	10	
Dissolved Oxygen	mg/L	02/27/2015	N001	6.71			#		
Iron	mg/L	02/27/2015	N001	0.22			#	0.0067	
Magnesium	mg/L	02/27/2015	N001	130			#	0.03	
Molybdenum	mg/L	02/27/2015	N001	0.006			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/27/2015	N001	0.051			#	0.01	
Oxidation Reduction Potential	mV	02/27/2015	N001	-105.6			#		
pH	s.u.	02/27/2015	N001	7.77			#		
Potassium	mg/L	02/27/2015	N001	16			#	0.052	
Selenium	mg/L	02/27/2015	N001	0.0021		J	#	0.00032	
Sodium	mg/L	02/27/2015	N001	410			#	0.047	
Specific Conductance	umhos/cm	02/27/2015	N001	3281			#		
Sulfate	mg/L	02/27/2015	N001	1400			#	25	
Temperature	C	02/27/2015	N001	5.33			#		
Turbidity	NTU	02/27/2015	N001	6.4			#		
Uranium	mg/L	02/27/2015	N001	0.15			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 04/13/2015

Location: South Pond SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/25/2015	0001	135			#		
Calcium	mg/L	02/25/2015	0001	130			#	0.024	
Chloride	mg/L	02/25/2015	0001	75			#	5	
Dissolved Oxygen	mg/L	02/25/2015	N001	10.95			#		
Iron	mg/L	02/25/2015	0001	0.27			#	0.0067	
Magnesium	mg/L	02/25/2015	0001	86			#	0.03	
Molybdenum	mg/L	02/25/2015	0001	0.086			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/25/2015	0001	0.027			#	0.01	
Oxidation Reduction Potential	mV	02/25/2015	N001	10.1			#		
pH	s.u.	02/25/2015	N001	8.43			#		
Potassium	mg/L	02/25/2015	0001	18			#	0.052	
Selenium	mg/L	02/25/2015	0001	0.0014		J	#	0.00032	
Sodium	mg/L	02/25/2015	0001	320			#	0.047	
Specific Conductance	umhos/cm	02/25/2015	N001	2550			#		
Sulfate	mg/L	02/25/2015	0001	1200			#	12	
Temperature	C	02/25/2015	N001	7.31			#		
Turbidity	NTU	02/25/2015	N001	75.5			#		
Uranium	mg/L	02/25/2015	0001	0.39			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 04/13/2015

Location: Upper Gunnison SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/26/2015	N001	134			#		
Calcium	mg/L	02/26/2015	N001	79			#	0.024	
Chloride	mg/L	02/26/2015	N001	9.1			#	2	
Dissolved Oxygen	mg/L	02/26/2015	N001	11.4			#		
Iron	mg/L	02/26/2015	N001	0.17			#	0.0067	
Magnesium	mg/L	02/26/2015	N001	29			#	0.03	
Molybdenum	mg/L	02/26/2015	N001	0.0023			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/26/2015	N001	0.48			#	0.01	
Oxidation Reduction Potential	mV	02/26/2015	N001	74.4			#		
pH	s.u.	02/26/2015	N001	8.48			#		
Potassium	mg/L	02/26/2015	N001	3			#	0.052	
Selenium	mg/L	02/26/2015	N001	0.0053		J	#	0.00032	
Sodium	mg/L	02/26/2015	N001	46			#	0.047	
Specific Conductance	umhos/cm	02/26/2015	N001	788			#		
Sulfate	mg/L	02/26/2015	N001	260			#	5	
Temperature	C	02/26/2015	N001	5.95			#		
Turbidity	NTU	02/26/2015	N001	6.47			#		
Uranium	mg/L	02/26/2015	N001	0.0062			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 04/13/2015

Location: Upper Mid Gunnison SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/26/2015	N001	118			#		
Calcium	mg/L	02/26/2015	N001	78			#	0.024	
Chloride	mg/L	02/26/2015	N001	9.2			#	2	
Dissolved Oxygen	mg/L	02/26/2015	N001	12.61			#		
Iron	mg/L	02/26/2015	N001	0.52			#	0.0067	
Magnesium	mg/L	02/26/2015	N001	29			#	0.03	
Molybdenum	mg/L	02/26/2015	N001	0.0021			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/26/2015	N001	0.47			#	0.01	
Oxidation Reduction Potential	mV	02/26/2015	N001	45.1			#		
pH	s.u.	02/26/2015	N001	8.57			#		
Potassium	mg/L	02/26/2015	N001	3			#	0.052	
Selenium	mg/L	02/26/2015	N001	0.0046		J	#	0.00032	
Sodium	mg/L	02/26/2015	N001	48			#	0.047	
Specific Conductance	umhos/cm	02/26/2015	N001	782			#		
Sulfate	mg/L	02/26/2015	N001	260			#	5	
Temperature	C	02/26/2015	N001	7.35			#		
Turbidity	NTU	02/26/2015	N001	5.8			#		
Uranium	mg/L	02/26/2015	N001	0.0059			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 04/13/2015

Location: Wetland Area SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	02/27/2015	N001	405			#		
Calcium	mg/L	02/27/2015	0001	340			#	2.4	
Chloride	mg/L	02/27/2015	0001	450			#	20	
Dissolved Oxygen	mg/L	02/27/2015	N001	1.11			#		
Iron	mg/L	02/27/2015	0001	0.67	U		#	0.67	
Magnesium	mg/L	02/27/2015	0001	240			#	3	
Molybdenum	mg/L	02/27/2015	0001	0.14			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	02/27/2015	0001	0.029			#	0.01	
Oxidation Reduction Potential	mV	02/27/2015	N001	-142.8			#		
pH	s.u.	02/27/2015	N001	7.54			#		
Potassium	mg/L	02/27/2015	0001	50	J		#	5.2	
Selenium	mg/L	02/27/2015	0001	0.00065	J	J	#	0.00032	
Sodium	mg/L	02/27/2015	0001	1600			#	4.7	
Specific Conductance	umhos/cm	02/27/2015	N001	8863			#		
Sulfate	mg/L	02/27/2015	0001	4500			#	50	
Temperature	C	02/27/2015	N001	7.14			#		
Turbidity	NTU	02/27/2015	N001	36.6			#		
Uranium	mg/L	02/27/2015	0001	1			#	0.000029	

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: 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
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z	Laboratory defined qualifier, see case narrative.

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.	Q	Qualitative result due to sampling technique.	R	Unusable result.
U	Parameter analyzed for but was not detected.	X	Location is undefined.		

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

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Equipment Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 15026795
Report Date: 04/13/2015

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Calcium	GJO01	0999	02/27/2015	N001	mg/L	0.14	J	U	0.024		E
Chloride	GJO01	0999	02/27/2015	N001	mg/L	0.2	U		0.2		E
Iron	GJO01	0999	02/27/2015	N001	mg/L	0.034	J		0.0067		E
Magnesium	GJO01	0999	02/27/2015	N001	mg/L	0.03	U		0.03		E
Manganese	GJO01	0999	02/27/2015	N001	mg/L	0.0012	J		0.00024		E
Molybdenum	GJO01	0999	02/27/2015	N001	mg/L	0.00032	U		0.00032		E
Nitrate + Nitrite as Nitrogen	GJO01	0999	02/27/2015	N001	mg/L	0.01	U		0.01		E
Potassium	GJO01	0999	02/27/2015	N001	mg/L	0.052	U		0.052		E
Selenium	GJO01	0999	02/27/2015	N001	mg/L	0.00032	U		0.00032		E
Sodium	GJO01	0999	02/27/2015	N001	mg/L	0.2	J		0.047		E
Sulfate	GJO01	0999	02/27/2015	N001	mg/L	0.56			0.5		E
Uranium	GJO01	0999	02/27/2015	N001	mg/L	0.00059			0.000029		E

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: 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

N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z	Laboratory defined qualifier, see case narrative.

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.	Q	Qualitative result due to sampling technique.	R	Unusable result.
U	Parameter analyzed for but was not detected.	X	Location is undefined.		

SAMPLE TYPES:

E	Equipment Blank.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE GJO01, Grand Junction Site
REPORT DATE: 04/13/2015

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
10-19N	O	4566.62	02/27/2015	10:05:01	13.87	4552.75
11-1S	O	4572.83	02/26/2015	14:10:51	16.82	4556.01
14-13NA	O	4560.58	02/27/2015	09:15:11	6.5	4554.08
6-2N	O	4569.89	02/25/2015	11:40:52	14.02	4555.87
8-4S	O	4568.59	02/26/2015	12:35:46	12.2	4556.39
GJ01-01		4571.37	02/26/2015	11:55:26	15.39	4555.98
GJ84-04	D	4563.24	02/27/2015	10:30:00	9.95	4553.29

FLOW CODES: B BACKGROUND C CROSSGRADIENT D DOWNGRADIENT F OFFSITE
N UNKNOWN O ONSITE U UPGRADIENT

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Time-Concentration Graphs
Groundwater Locations

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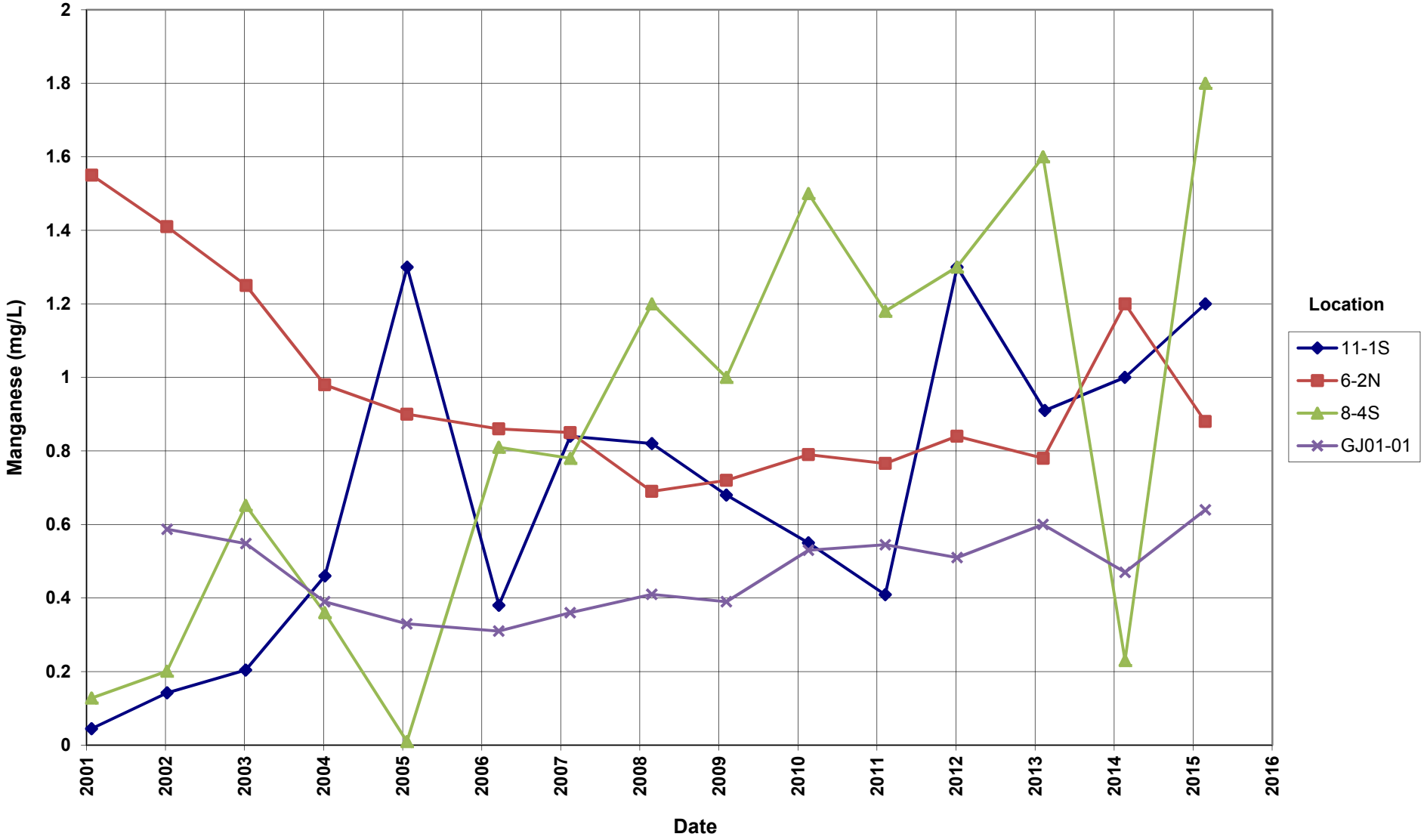
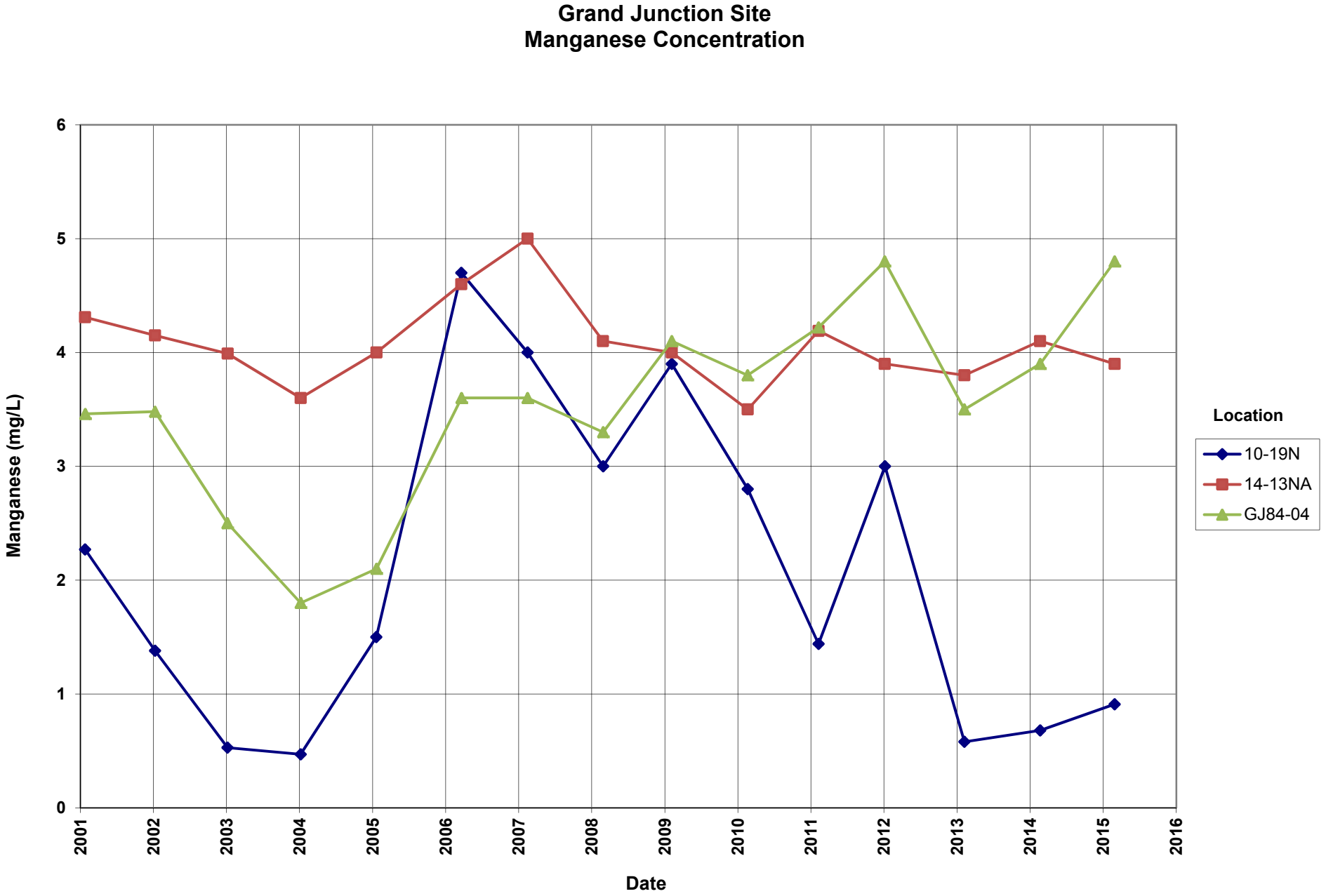
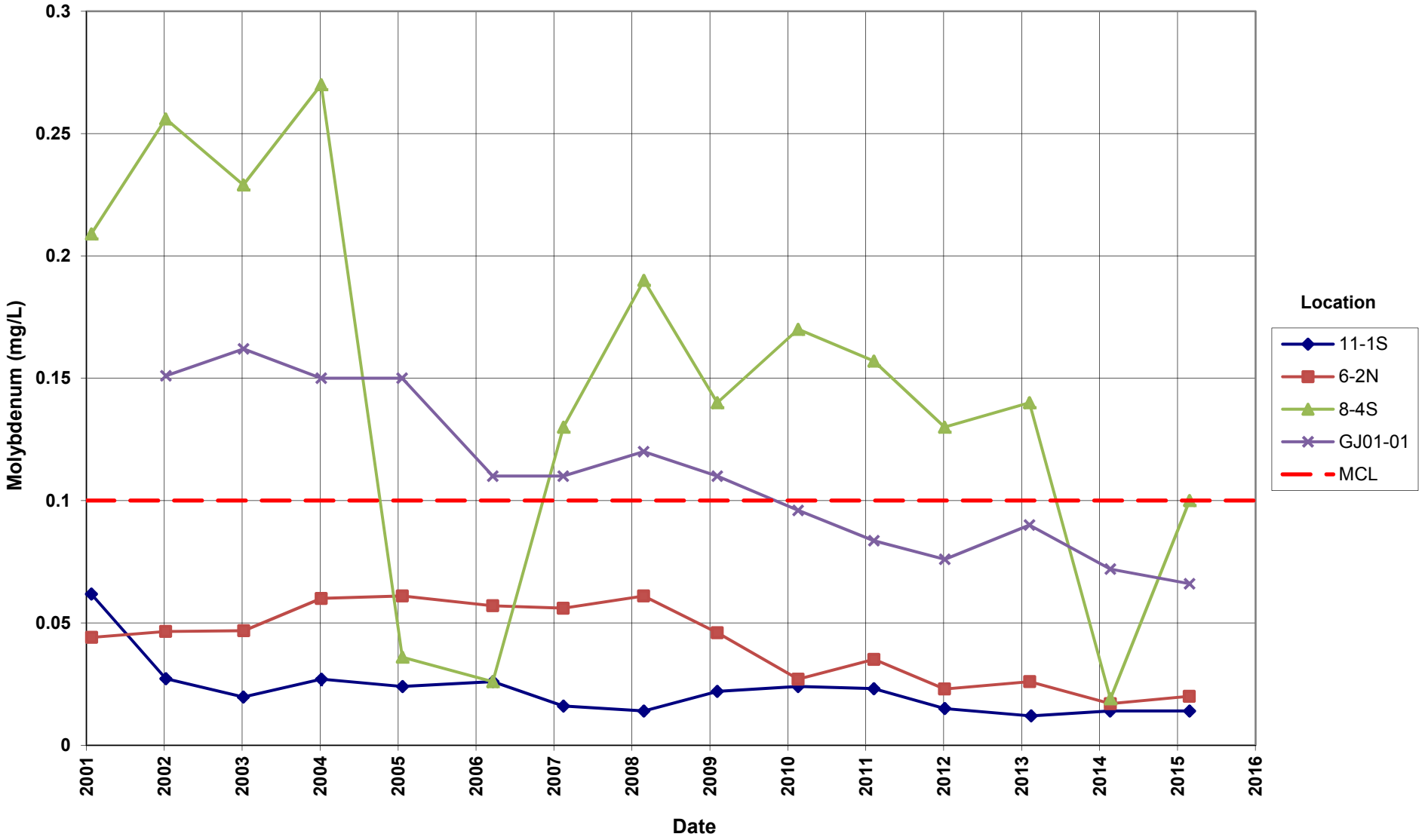
Grand Junction Site
Manganese Concentration

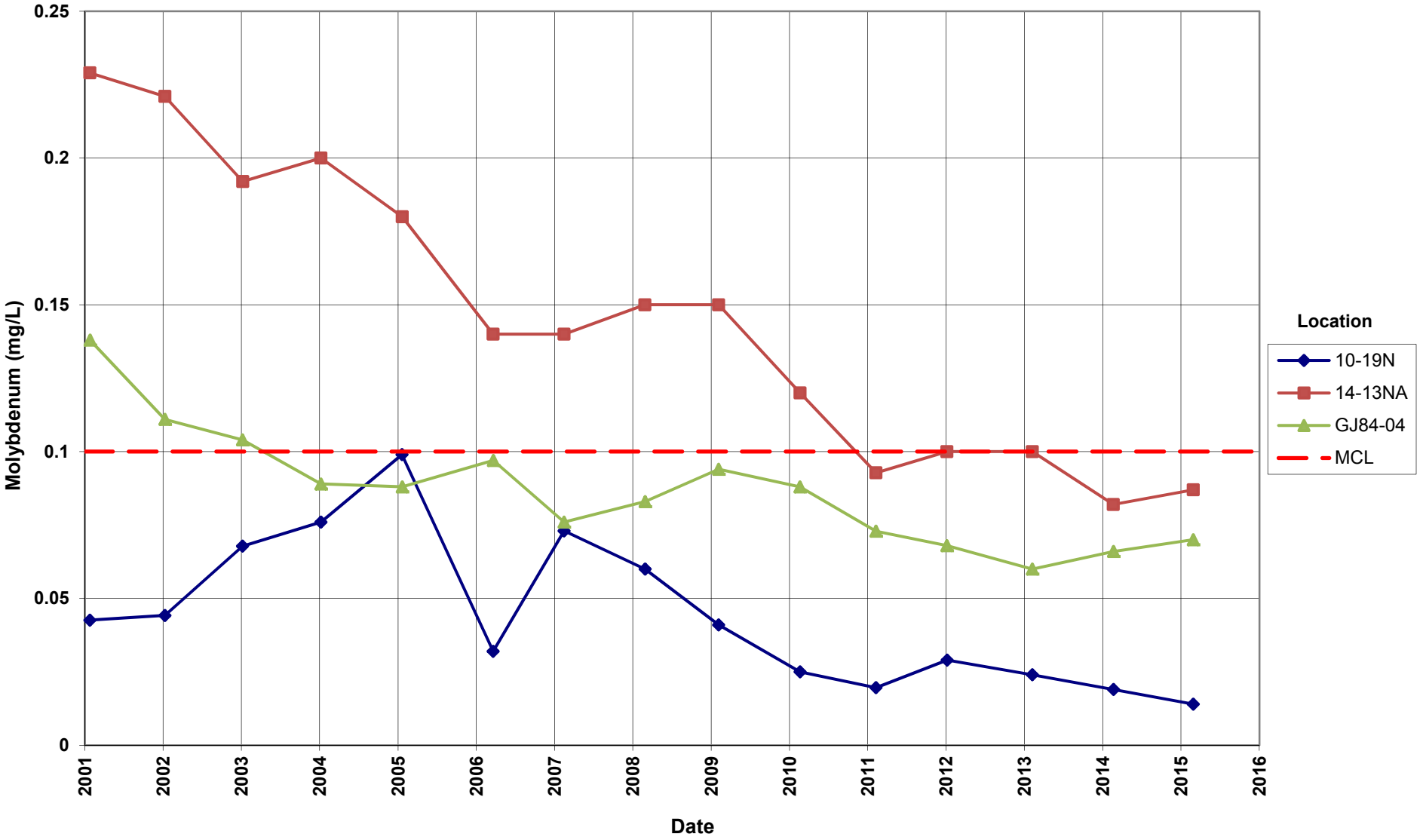



Grand Junction Site
Manganese Concentration
Manganese (mg/L)
0
1
2
3
4
5
6
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
10-19N
14-13NA
GJ84-04

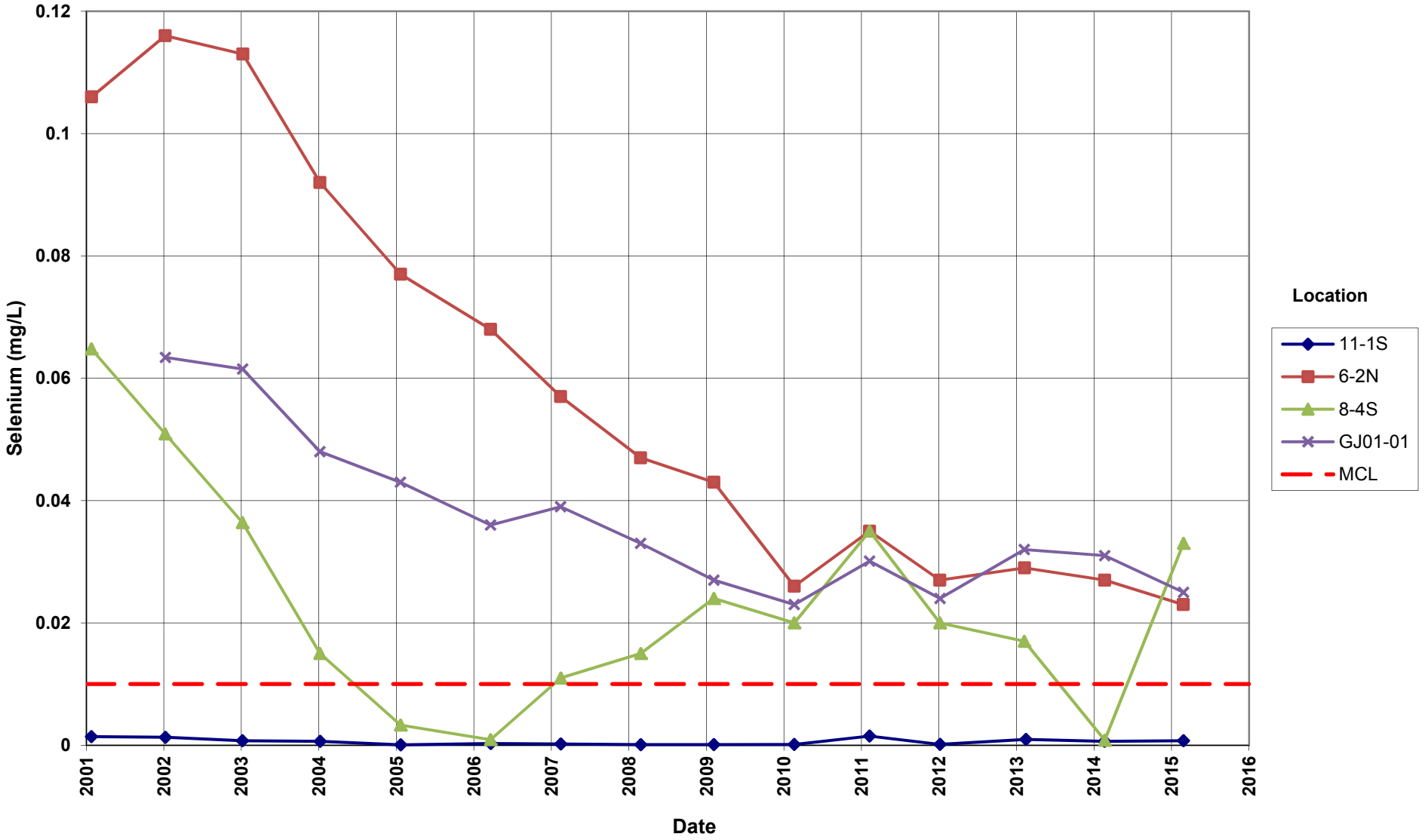
Grand Junction Site
Molybdenum Concentration
Maximum Concentration Limit (MCL) = 0.1 mg/L



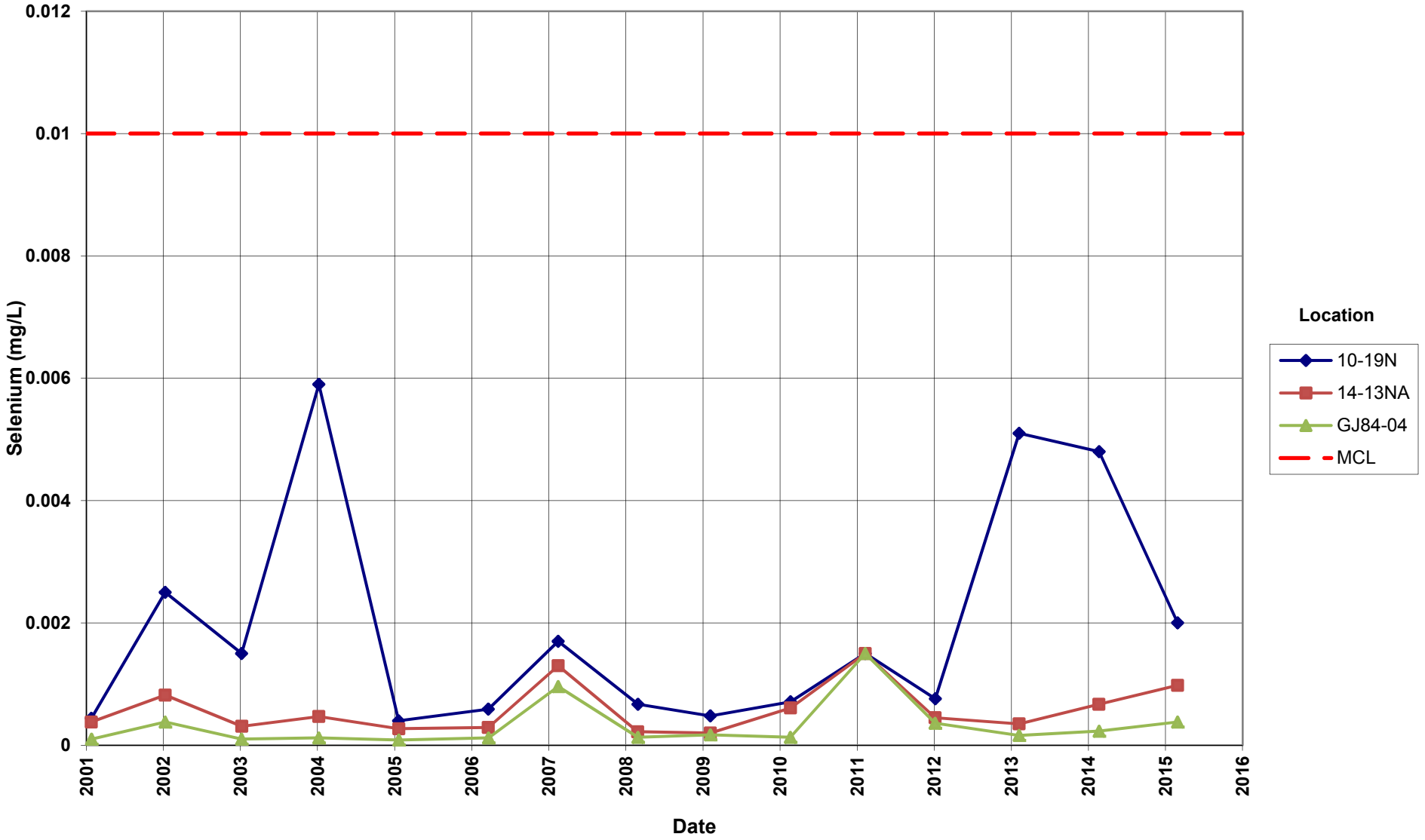
Grand Junction Site
Molybdenum Concentration
Maximum Concentration Limit (MCL) = 0.1 mg/L



Grand Junction Site
Selenium Concentration
Maximum Concentration Limit (MCL) = 0.01 mg/L

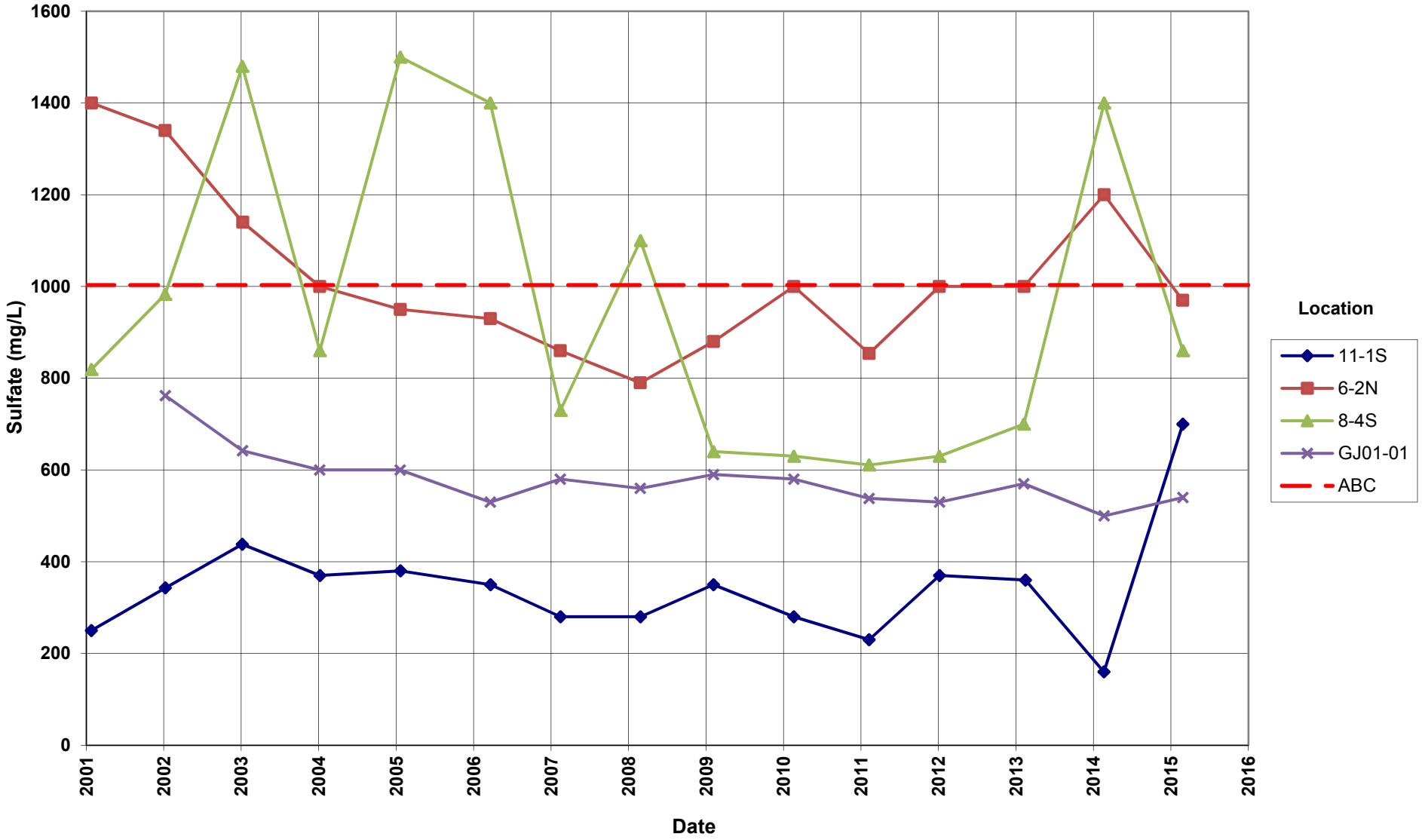


Grand Junction Site
Selenium Concentration
Maximum Concentration Limit (MCL) = 0.01 mg/L



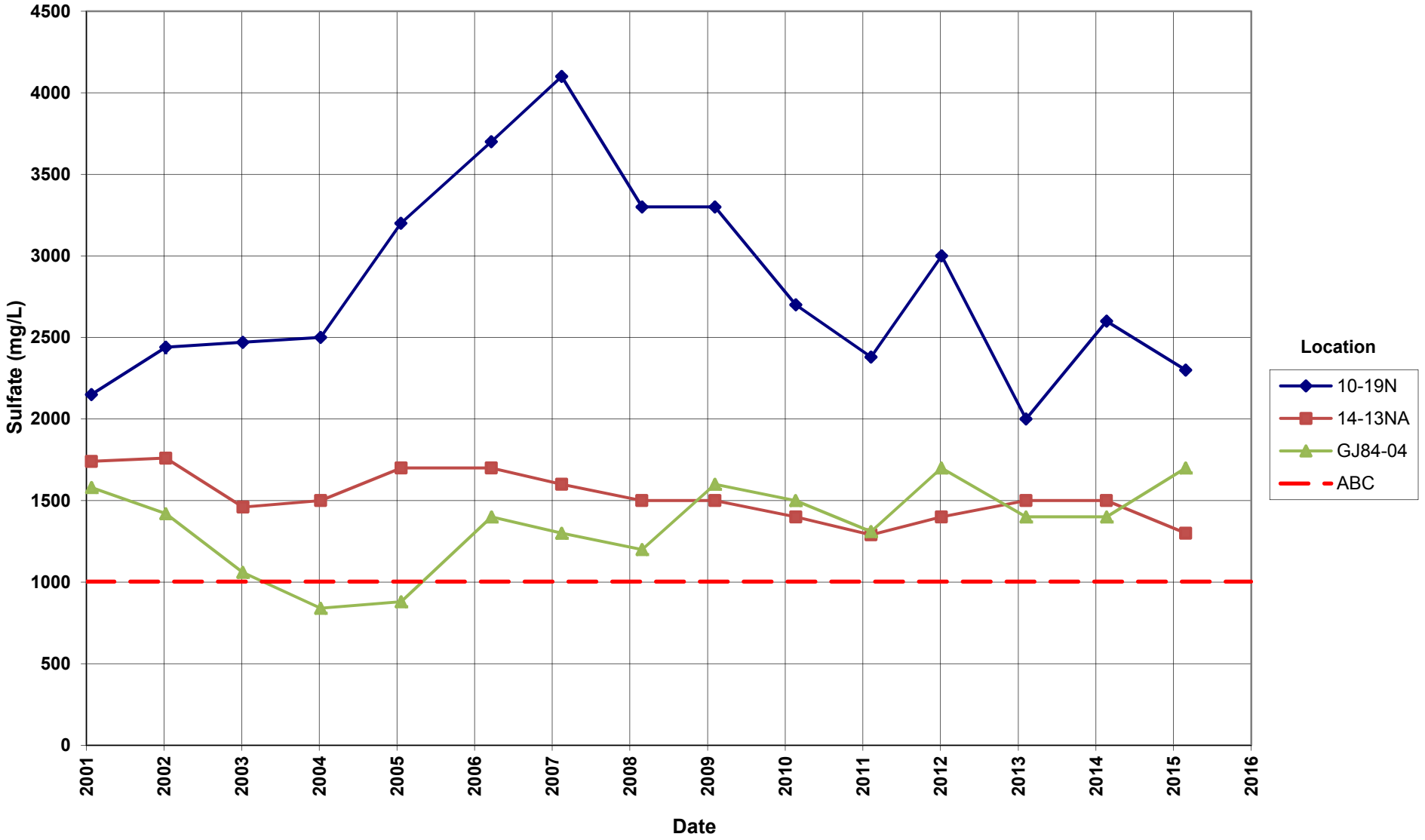
Grand Junction Site
Sulfate Concentration

Average Background Concentration (ABC) in Background Wells = 1003 mg/L
(The ABC is the average sulfate result from background wells GJ84-09 and GJ84-10 from 1990 through 1995)

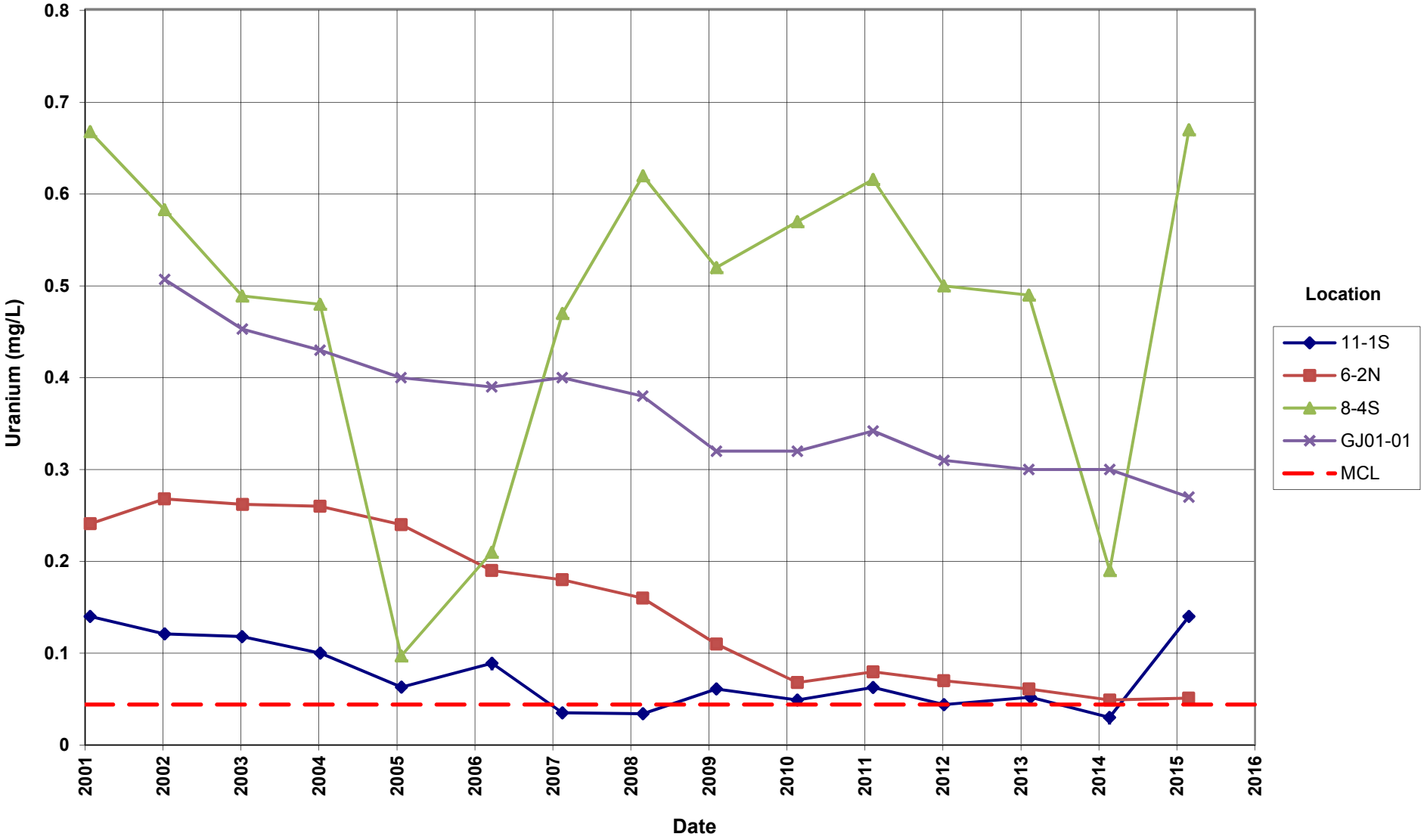


Grand Junction Site
Sulfate Concentration

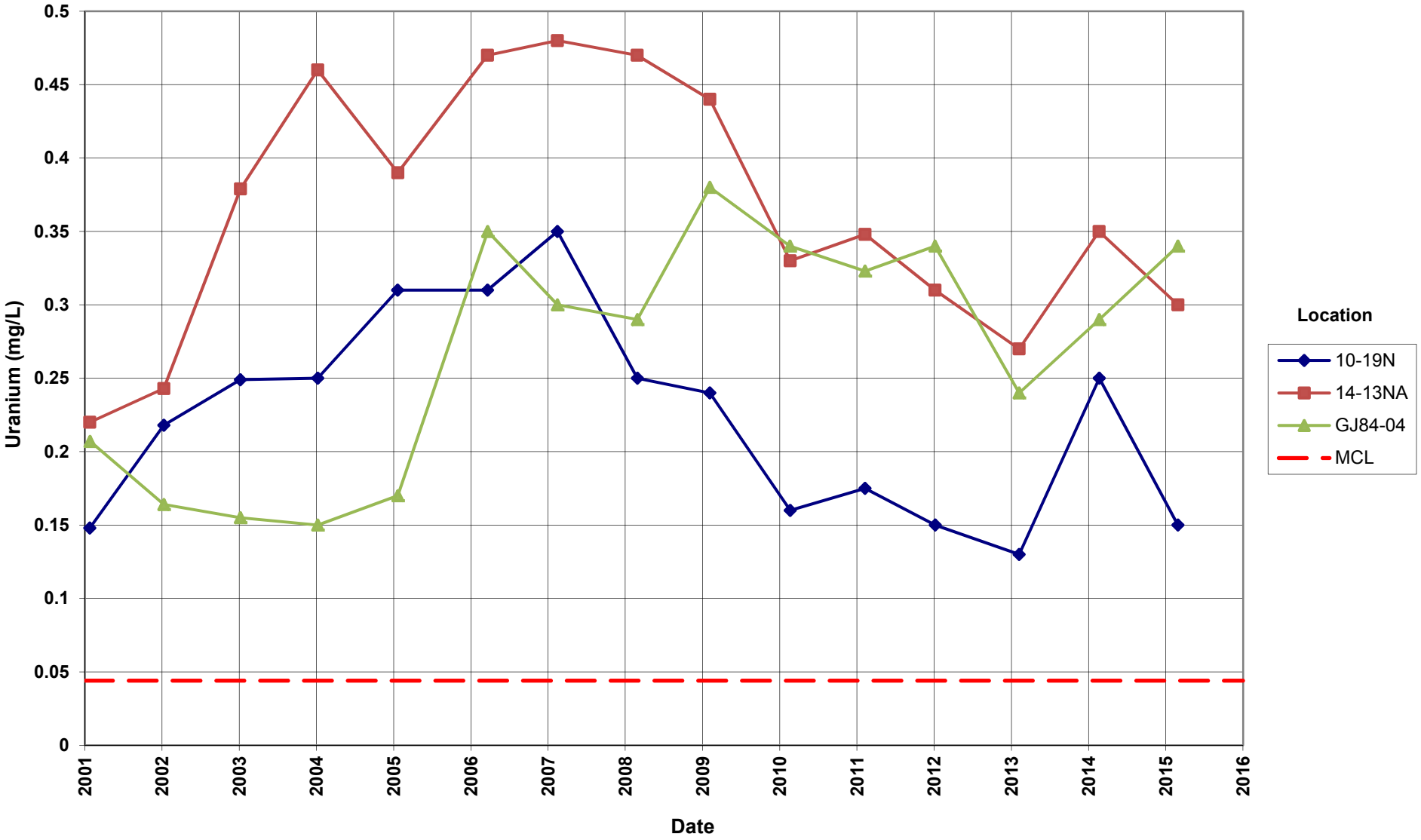
Average Background Concentration (ABC) in Background Wells = 1003 mg/L
(The ABC is the average sulfate result from background wells GJ84-09 and GJ84-10 from 1990 through 1995)



Grand Junction Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L



Grand Junction Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L



Time-Concentration Graphs
Surface Water Locations

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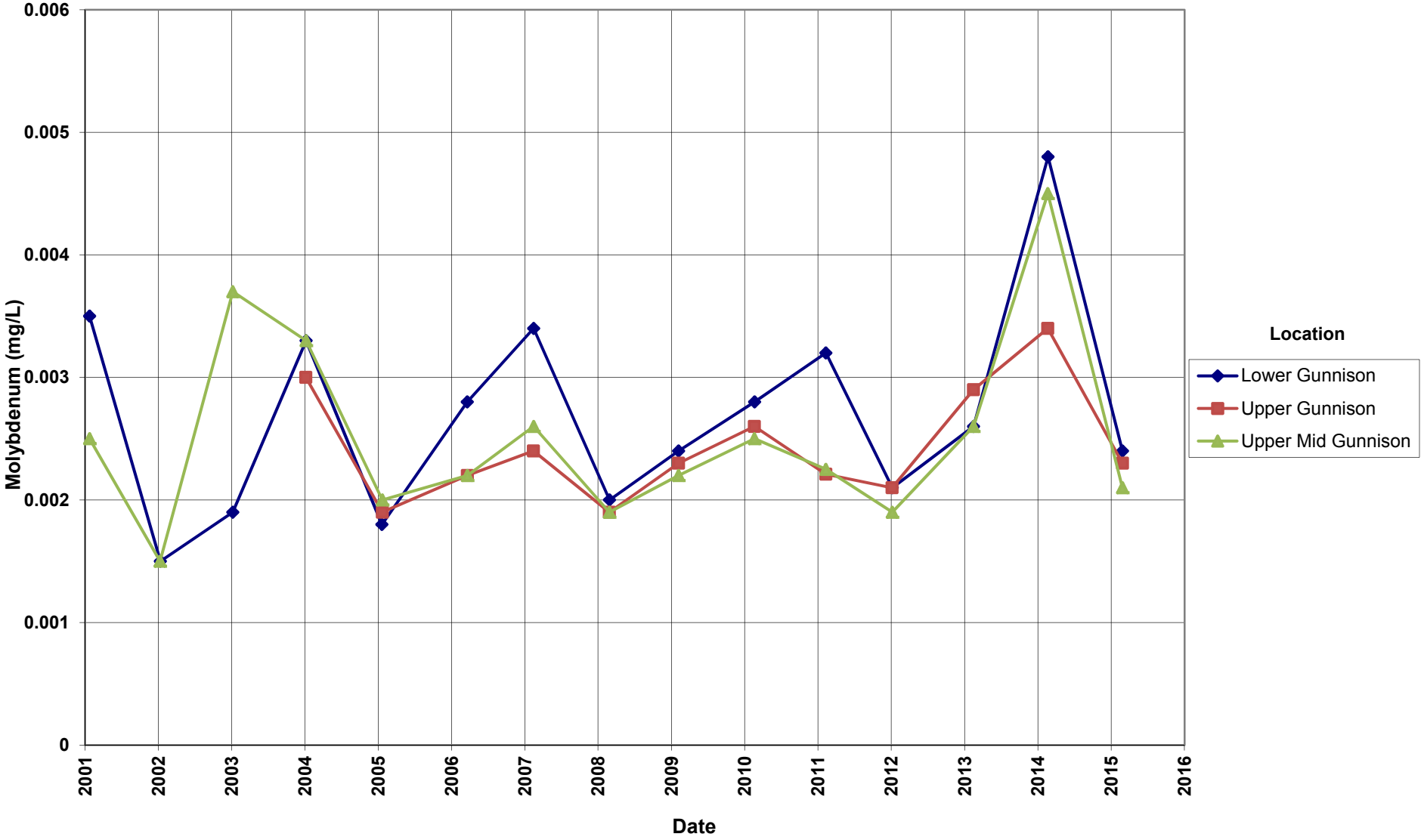
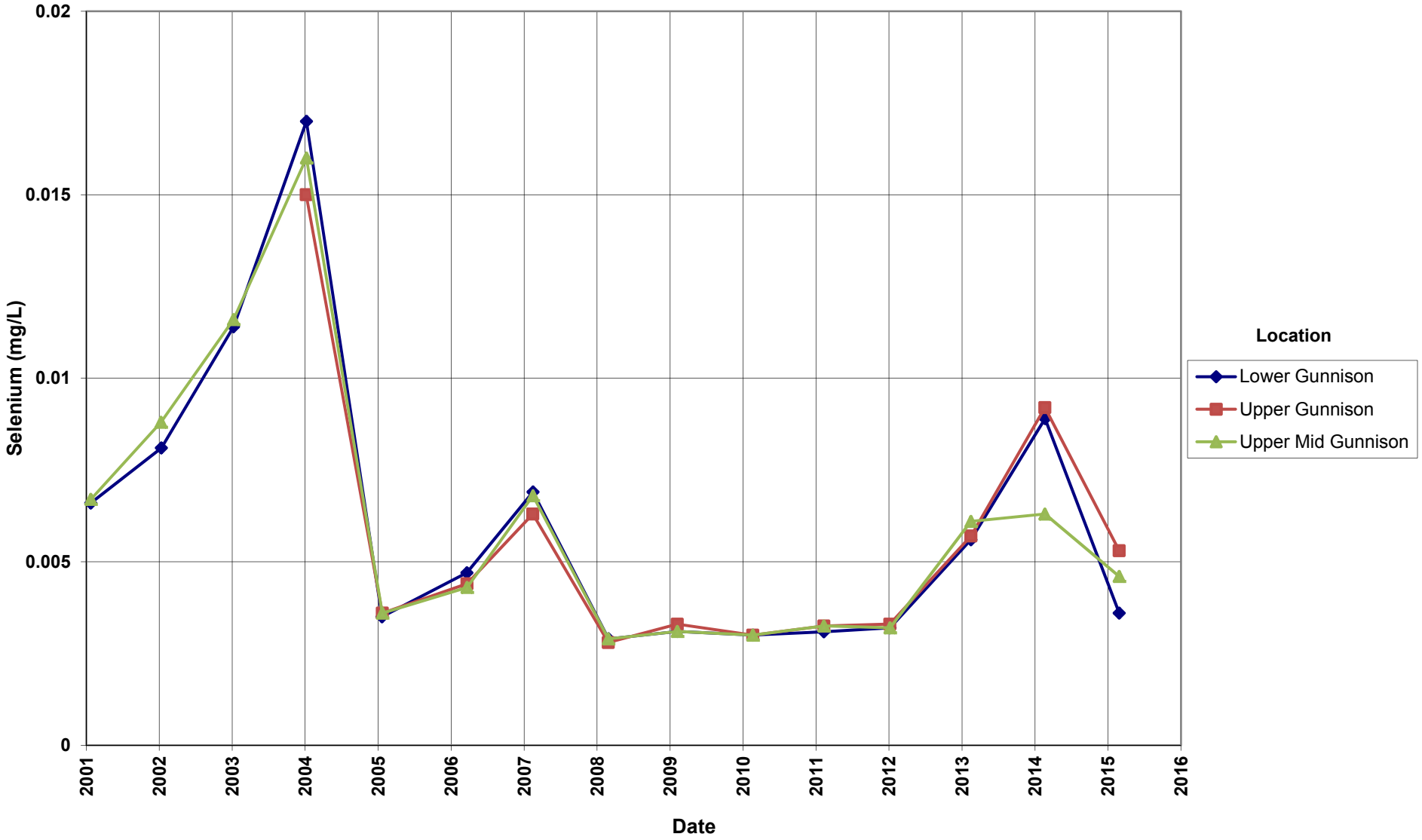
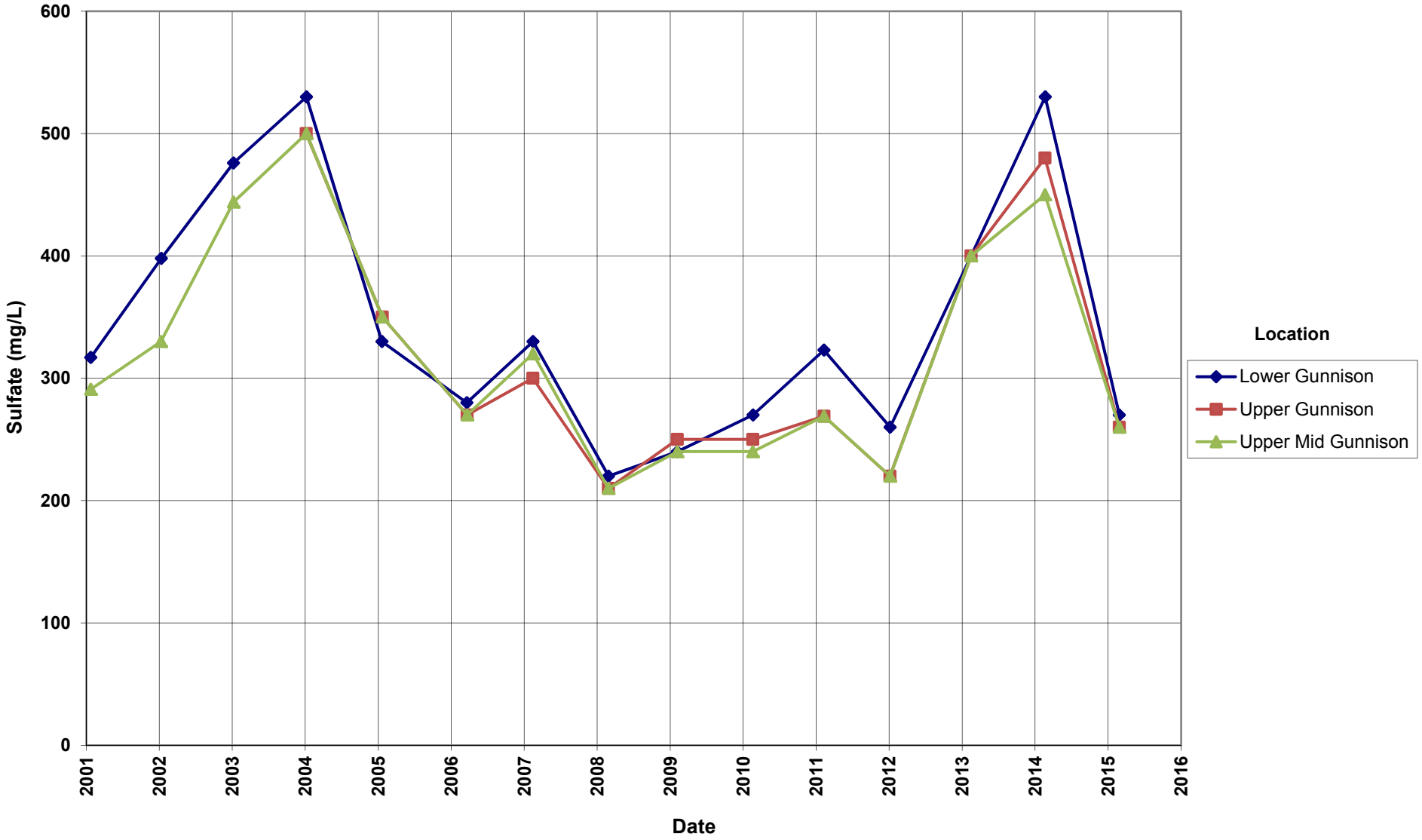
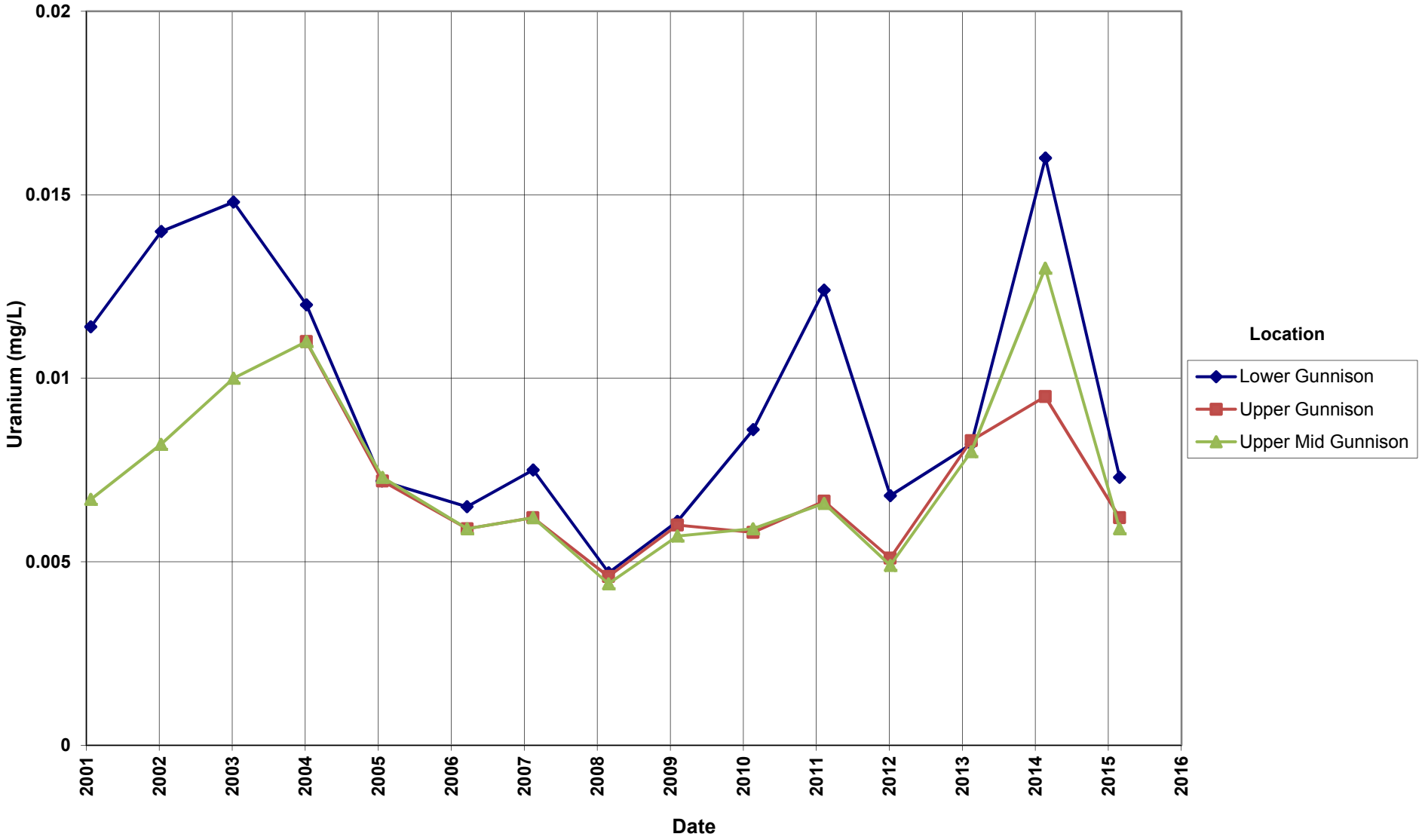
Grand Junction Site
Molybdenum Concentration
River Locations



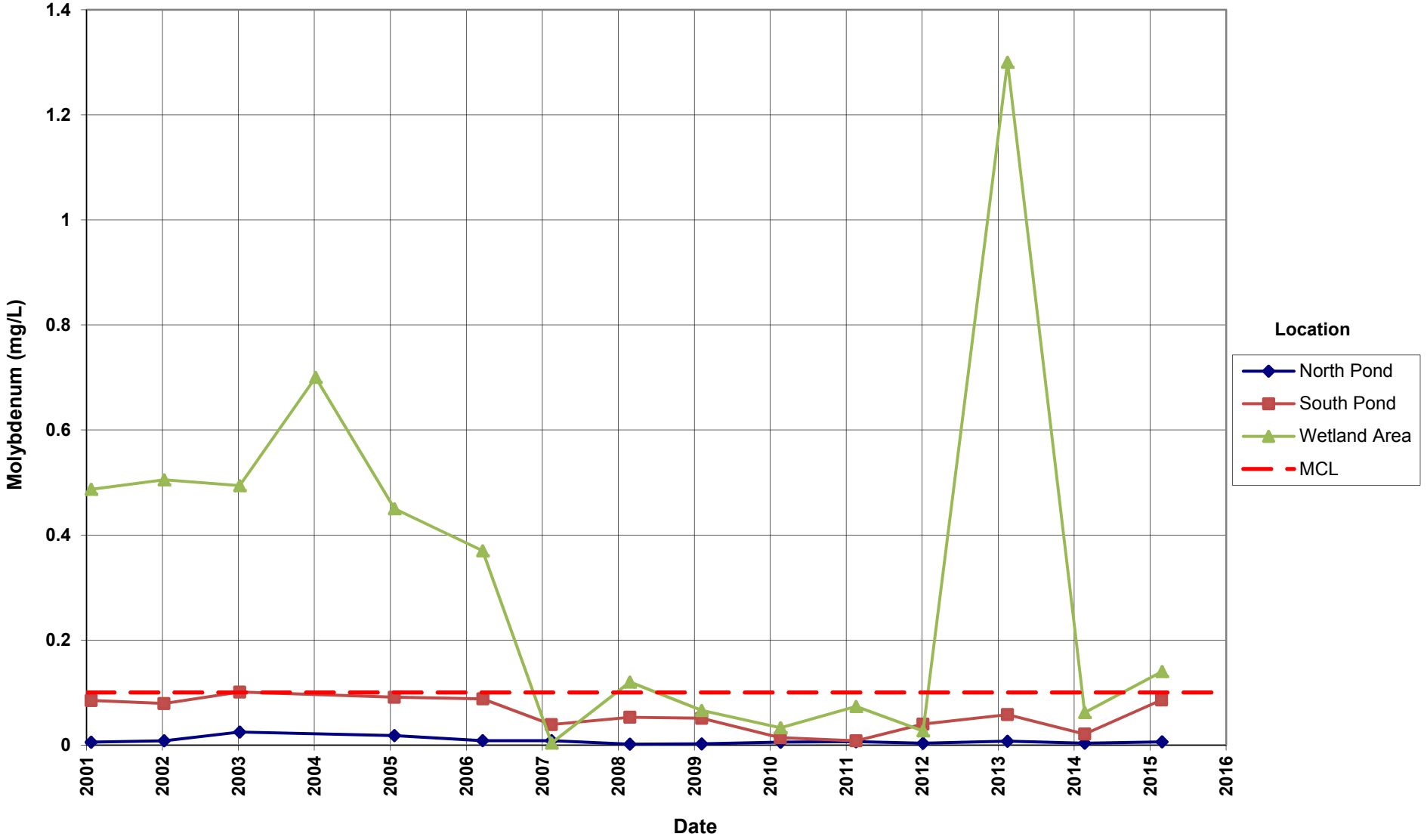

Grand Junction Site
Selenium Concentration
River Locations
Selenium (mg/L)
0.02
0.015
0.01
0.005
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
Lower Gunnison
Upper Gunnison
Upper Mid Gunnison

Grand Junction Site
Sulfate Concentration
River Locations

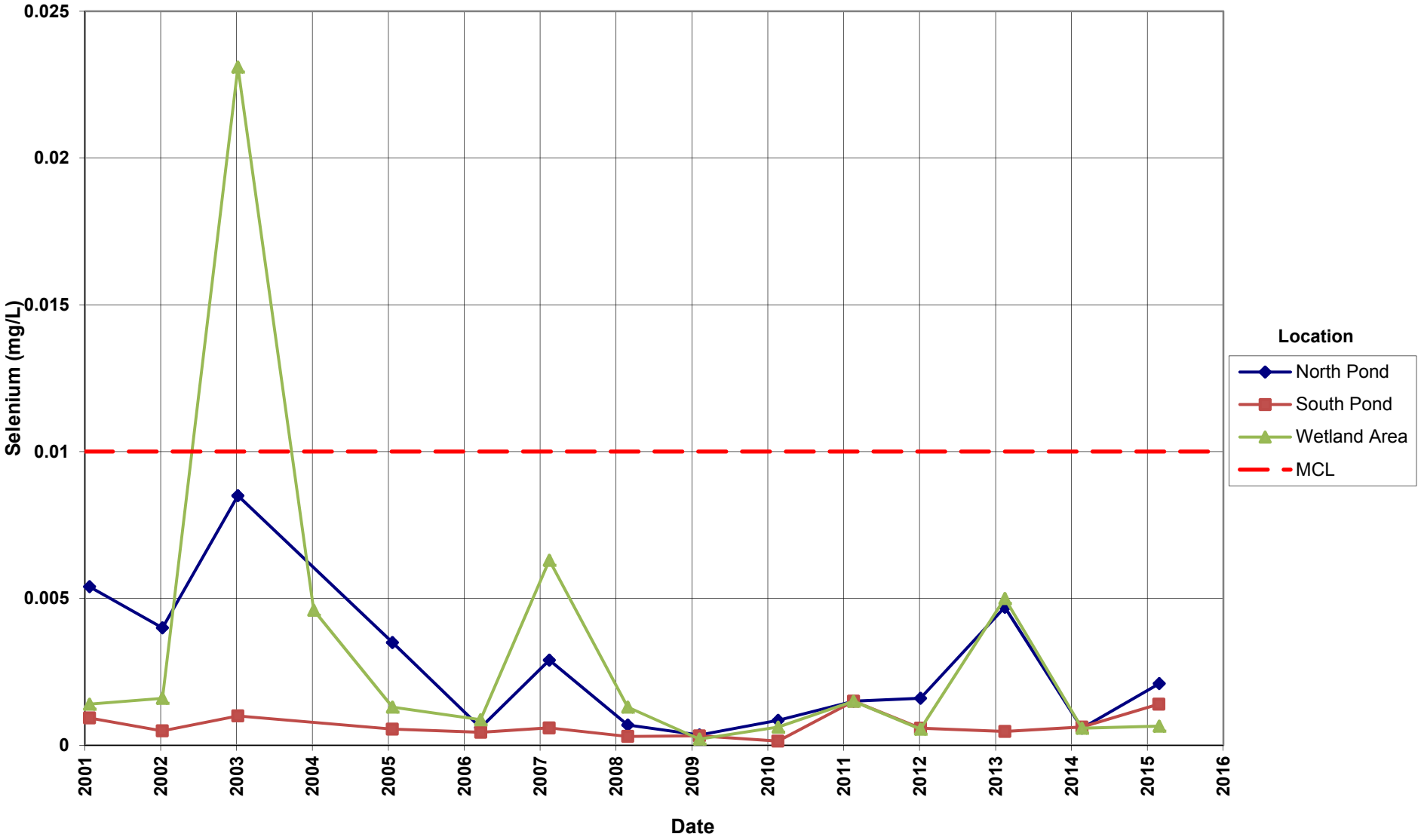



Grand Junction Site
Uranium Concentration
River Locations
0.02
0.015
0.01
0.005
0
Uranium (mg/L)
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
Lower Gunnison
Upper Gunnison
Upper Mid Gunnison

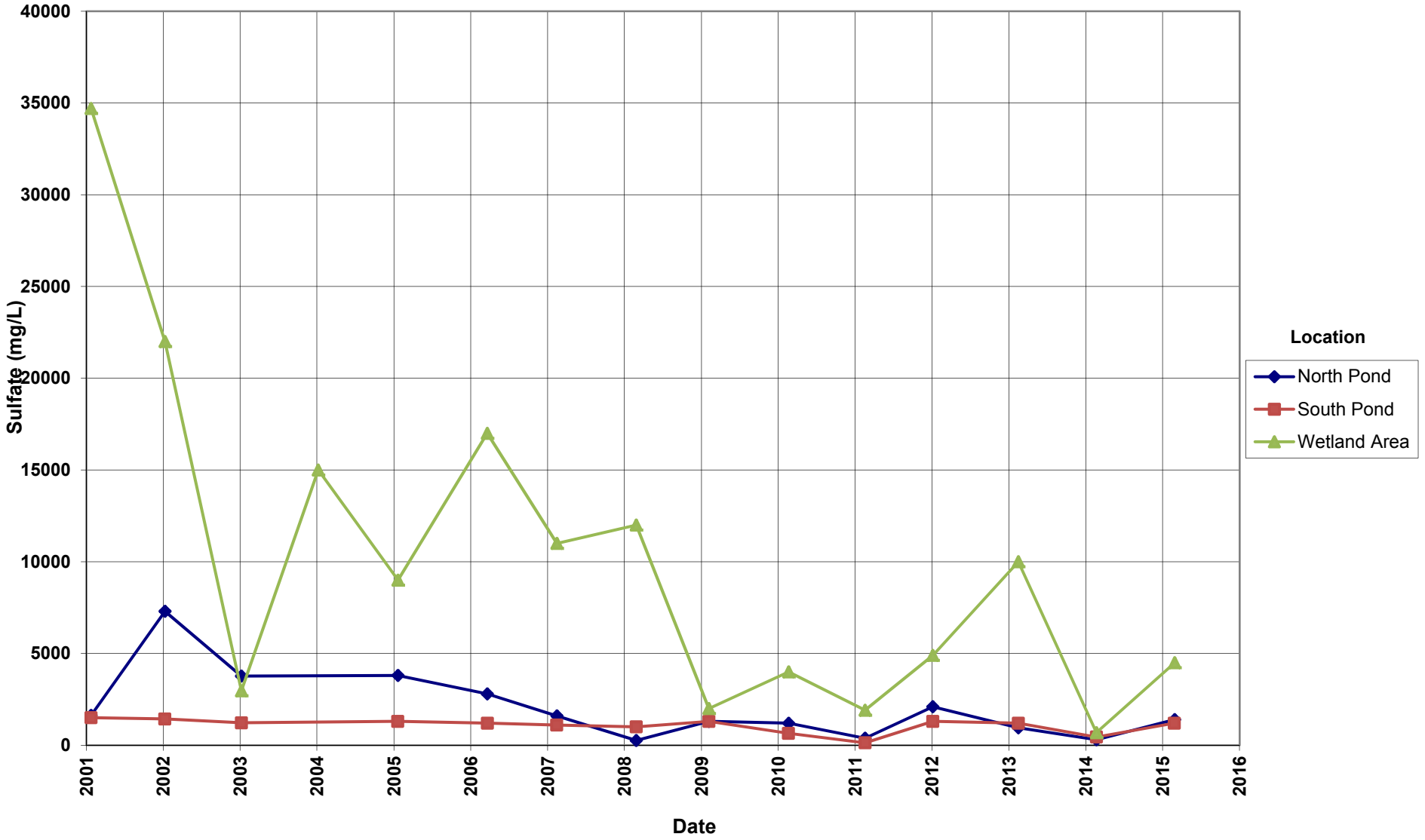
Grand Junction Site
Molybdenum Concentration
Pond and Wetland Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L

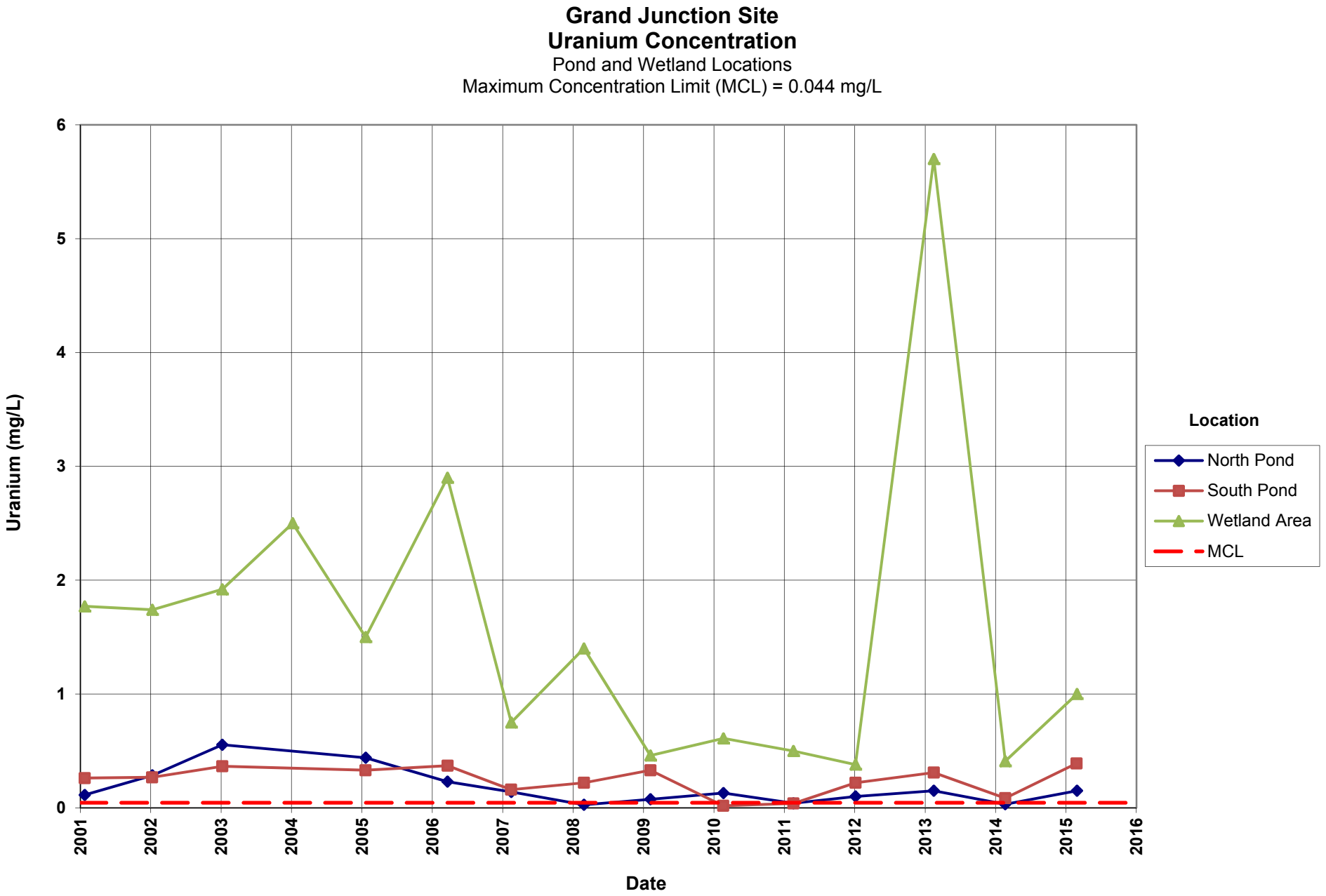


Grand Junction Site
Selenium Concentration
Pond and Wetland Locations
Maximum Concentration Limit (MCL) = 0.01 mg/L



Grand Junction Site
Sulfate Concentration
Pond and Wetland Locations




Grand Junction Site
Uranium Concentration
Pond and Wetland Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0
1
2
3
4
5
6
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
North Pond
South Pond
Wetland Area
MCL

Attachment 3
Sampling and Analysis Work Order

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Stoller

January 22, 2015

Task Assignment 103
Control Number 15-0293

U.S. Department of Energy
Office of Legacy Management
ATTN: William Dam
Site Manager
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: Contract No. DE-LM0000415, The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries (Stoller)
Task Assignment 103 LTS&M - UMTRCA TI & TII, D&D, Others, and AS&T
February 2015 Environmental Sampling at the Grand Junction, Colorado, Site

REFERENCE: Task Assignment 103, 3-103-1-04-302-402, Grand Junction Site

Dear Mr. Dam:

The purpose of this letter is to inform you of the upcoming sampling event at the Grand Junction, Colorado, site. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring at the Grand Junction site. Water quality data will be collected from this site as part of the environmental sampling currently scheduled to begin the week of February 23, 2015.

The following lists show the monitoring wells (with zone of completion) and surface locations scheduled to be sampled during this event.

Monitoring Wells

8-4S Al	6-2N Al	14-13NA Al	GJ84-04 Al	GJ01-01 Al	10-19N Al
11-1S Al					

*NOTE: Al = Alluvium

Surface Locations

Upper Gunnison	Upper Middle Gunnison	Lower Gunnison
North Pond	South Pond	Wetland Area

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. The Access Agreement for the site is in place, which will allow access to all monitoring locations.

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

Please contact me at (970) 248-6654 if you have any questions.

Sincerely,

Sam Campbell

Sam Campbell
Site Lead

SC/lcg/bb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Sam Campbell, Stoller
Steve Donivan, Stoller
Lauren Goodknight, Stoller
EDD Delivery
rc-grand.junction
File: GJO 410.02

Sampling Frequencies for Locations at Grand Junction Office Site, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
8-4S			X			
11-1S			X			
6-2N			X			
14-13NA			X			
GJ84-04			X			
GJ01-01			X			
10-19N			X			
Surface Locations						
Upper Gunnison			X			
Upper Middle Gunnison			X			
Lower Gunnison			X			
South Pond			X			
North Pond			X			
Wetland Area			X			

Sampling conducted in February

Constituent Sampling Breakdown

Site	Grand Junction Office Facility				
Analyte	**Groundwater**	**Surface Water**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	7	6			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen	X	X			
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH_3-N)					
Calcium	X	X	5	SW-846 6010	LMM-01
Chloride	X	X	0.5	SW-846 9056	WCH-A-039
Chromium					
Gross Alpha					
Gross Beta					
Iron	X	X	0.1	SW-846 6020	LMM-01
Lead					
Magnesium	X	X	5	SW-846 6010	LMM-01
Manganese	X		0.005	SW-846 6010	LMM-01
Molybdenum	X	X	0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO_3+NO_2)-N	X	X	0.05	EPA 353.1	WCH-A-022
Potassium	X	X	1	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium	X	X	0.0001	SW-846 6020	LMM-02
Silica					
Sodium	X	X	1	SW-846 6010	LMM-01
Strontium					
Sulfate	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	12	11			

Note: All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

Attachment 4
Trip Report

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Stoller Newport News Nuclear

Memorandum

DATE: March 5, 2015

TO: Sam Campbell

FROM: Gretchen Baer

SUBJECT: Sampling Trip Report

Site: Grand Junction Office

Dates of Sampling Event: February 25–27, 2015

Team Members: Gretchen Baer, David Atkinson, Alison Kuhlman

Number of Locations Sampled: Samples were collected from 7 monitoring well locations and 6 surface water locations identified on the sampling notification letter.

Samples collected will be analyzed for metals (calcium, iron, magnesium, manganese, molybdenum, potassium, selenium, sodium, and uranium), chloride, sulfate, and nitrate + nitrite as nitrogen. Field measurements for alkalinity, dissolved oxygen, oxidation/reduction potential, specific conductance, temperature, and turbidity were also collected.

Locations Not Sampled/Reason: All scheduled locations were sampled.

Location Specific Information:

Location IDs	Comments
North Pond Wetland Area	The water at these surface water locations had a sulfurous odor. The ORP values were negative.
South Pond Wetland Area	The samples collected at these surface water locations were filtered per the SAP because the turbidity measurements were > 10 NTU.
6-2N South Pond	At these locations, the Earthsoft field application EDGE (version 6.3.0) was field-tested with two Earthsoft representatives in attendance. The data collected with EDGE were for testing only and the data were not entered into the environmental database.

Quality Control Sample Cross Reference: The following are the false identifications assigned to the quality control samples.

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2687	NDR 386	14-13NA	Duplicate	Groundwater
2688	NDR 387	Associated with all surface water locations. The DI water used was taken directly from the DI system in bldg. 32.	Equipment Blank	Water

Duplicates were collected by filling all bottles labeled with the location number first, then filling all bottles labeled with the false ID second.

RIN Number Assigned: Samples were assigned to RIN 15026795. Field data sheets can be found in Crow\sms\15026795 in the FieldData folder.

Sample Shipment: Samples were shipped overnight via FedEx to ALS Laboratory Group, Fort Collins, CO, from Grand Junction, CO, on Monday, March 2, 2015.

Water Level Measurements: Water levels were measured in all sampled wells.

Well Inspection Summary: No issues were identified. Monitoring well GJ01-01 was labeled on the inside of the outer casing. During this event, the well ID was added to the outside of the outer casing.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

Field Variance: None.

Equipment: All equipment functioned properly. Wells were sampled with a peristaltic pump and dedicated tubing. Surface waters were sampled using a peristaltic pump and a tubing reel. An equipment blank was collected after decontamination of the tubing reel.

Institutional Controls:

Fences, Gates, Locks: All appeared to be in working condition.
Signs: No issues identified.
Trespassing/Site Disturbances: No issues identified.

Site Issues:

Disposal Cell/Drainage Structure Integrity: Not applicable.
Vegetation/Noxious Weed Concerns: None. The vegetation on the road to South Pond and around 14-13NA has been recently trimmed back.
Maintenance Requirements: None.
Safety Issues: None identified.
Access Issues: None

Corrective Action Taken: None.

cc: (electronic)
Rich Bush, DOE
Sam Campbell, Stoller
Steve Donivan, Stoller
EDD Delivery