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West Elk Mine
Water Year 2024 Annual Hydrology Report

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WEST ELK MINE
WATER YEAR 2024 ANNUAL HYDROLOGY REPORT

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1.0 INTRODUCTION

This Mountain Coal Company, LLC (MCC) West Elk Mine Water Year 2024 Annual Hydrology Report summarizes Hydrogeology Solutions Inc.'s (HSI's) hydrologic monitoring activities and pertinent data associated with the West Elk Mine mining operations for the Water Year (WY) 2024 (October 1, 2023 through September 30, 2024). The hydrologic monitoring activities were performed in accordance with the Colorado Division of Reclamation, Mining and Safety (CDRMS) Permit C-1980-007.

1.1 OVERVIEW OF MINING OPERATIONS

The West Elk Mine is an underground coal mining operation that produces bituminous coal and conducts other mining activities including surface crushing, washing, conveying, and load-out operations. MCC has utilized two chemicals in their treatment process: aluminum sulfate for flocculation in sedimentation ponds and sodium hypochlorite for drinking water treatment.

During WY 2024, Mining operations were conducted in the E-seam and B-seam. E-Seam Longwall Mining was completed in Panel 15 from crosscut 11 to crosscut 4, Panel 12 from crosscut 20 to crosscut 5 and Panel 16 from crosscut 15 to crosscut 14. E-Seam Pillar Extraction was completed in Sunset Mains South from crosscut 28 to crosscut 12 and Sunset Mains from crosscut 32 to crosscut 22. E-Seam Development mining was completed in E12 Headgate from crosscut 15 to crosscut 21, E West Mains to crosscut 8, E16 Chutes to crosscut 3, E16 Headgate to crosscut 16 and E16 Start-line to crosscut 5. In the B-Seam, development mining was completed in B Southwest Mains from crosscut 5 to crosscut 11, B North Shaft Mains to crosscut 6, B Sub Mains to crosscut 7, B27 Headgate to crosscut 11, LW B27 Chutes to crosscut 4, B Northeast mains to crosscut 21 and B26 Headgate to crosscut 10. (MCC, 2025)

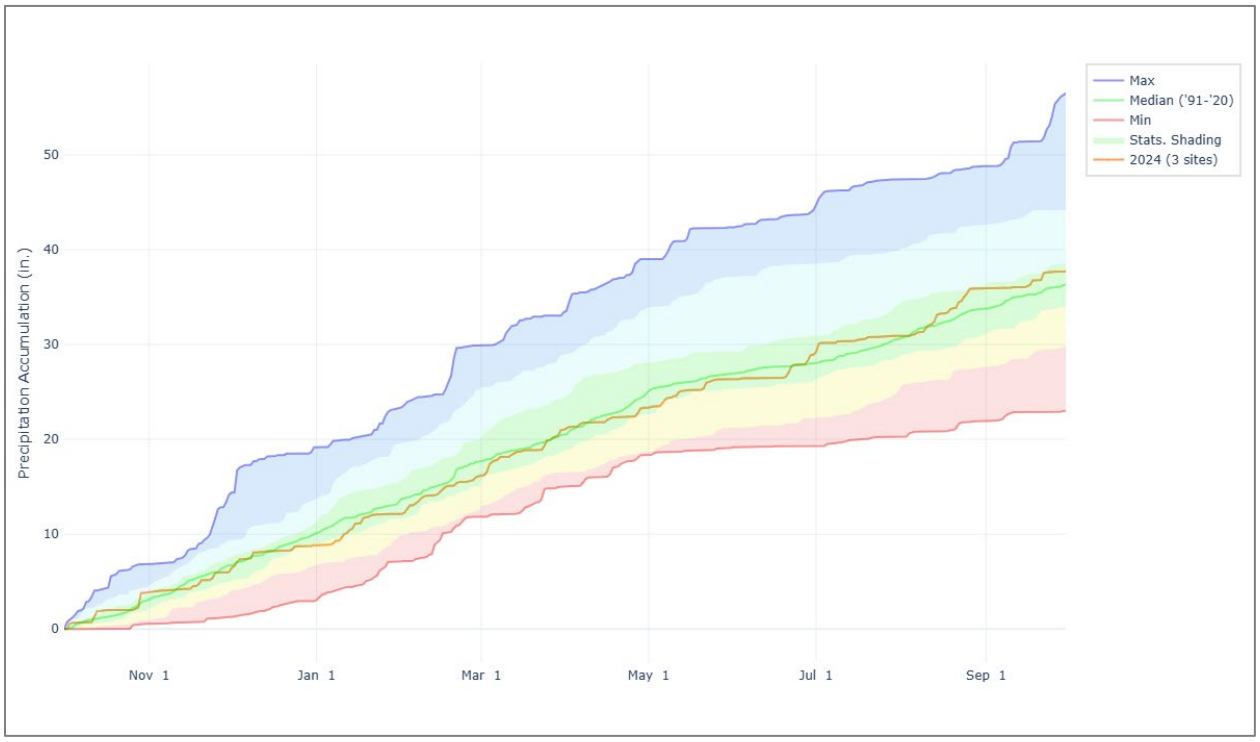
2.0 HYDROLOGIC SUMMARY OF WATER YEAR 2024

During WY 2024, the total annual precipitation and snow water equivalent (SWE) in the North Fork of the Gunnison River (NFG) Basin were calculated with data from the McClure Pass, Overland Reservoir, and Schofield Pass SNOTEL stations. In WY 2024, accumulated precipitation was average, and SWE was below average to near average, following drought years in WYs 2018, 2020, 2021, and 2022, and a wet year in WY 2023. (NIDIS, 2025; NRCS, 2025). As a result, stream and spring flows in the NFG Basin, including the West Elk Mine Monitoring Network were generally below to near average.

2.1 CLIMATOLOGICAL DATA

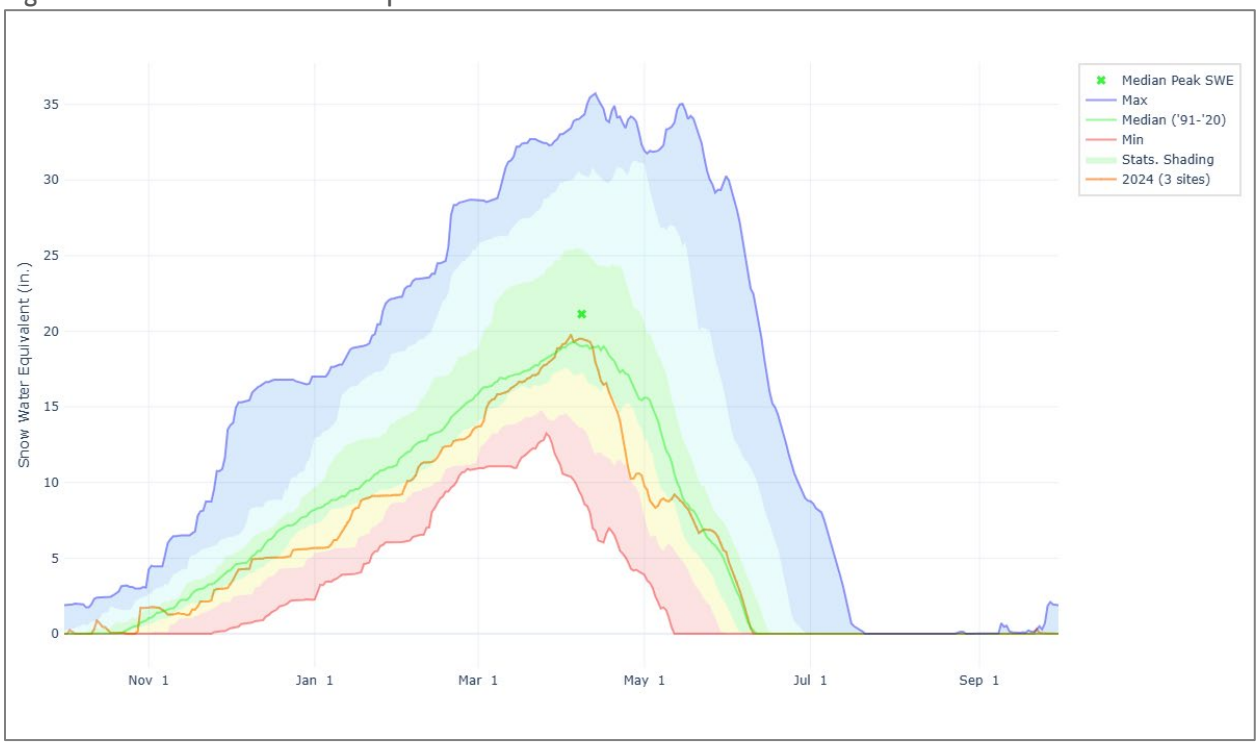
Figure 1 depicts the cumulative precipitation totals at the McClure Pass, Overland Reservoir, and Schofield Pass SNOTEL stations in WY 2024. Total precipitation at the three stations in WY 2024 was 37.7 inches, compared to the 30-year median of 36.3 inches. Figure 2 depicts the SWE totals at the three stations throughout WY 2024. The peak SWE in WY 2024 was 19.8 inches on April 4, 2024, compared to the 30-year median peak SWE of 21.1 inches on April 8.

Figure 1. WY 2024 Accumulated Precipitation in the NFG Basin



Source: NRCS, 2025.

Figure 2. WY 2024 Snow Water Equivalent in the NFG Basin



Source: NRCS, 2025.

2.2 WY 2024 STREAMFLOW

The North Fork of the Gunnison River (North Fork) and Minnesota Creek are the major surface water resources in the MCC permit area. The U.S. Geological Survey (USGS) maintains a gaging station on the North Fork (USGS 09132500). The USGS previously maintained a gaging station at Minnesota Creek (USGS 09134000) from 1986 to 2013. Since 2014, HSI has maintained a gaging station at the same location (Lower Minnesota Creek).

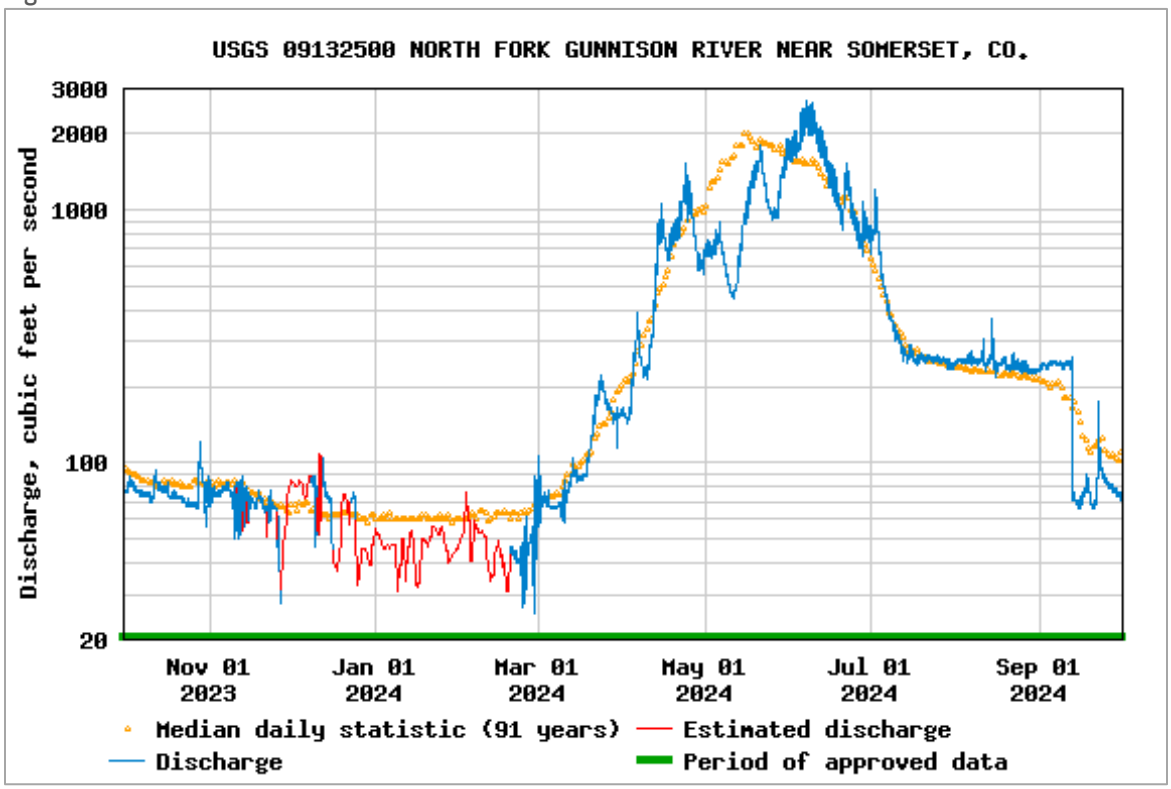
Flows in the North Fork and Minnesota Creek are dominated by snowmelt from upland areas, but are also affected by upstream diversions for irrigation, and by storage and releases from upstream reservoirs. The average annual flow in the in WY 2024 was below the historical average in both the North Fork and Minnesota Creek. The maximum peak flow in the North Fork was slightly higher and later than the historical average. (USGS, 2025)

2.2.1 *FLOWS IN THE NORTH FORK OF THE GUNNISON RIVER*

Average daily flows in the North Fork in WY 2024 ranged from 31.6 cubic feet per second (cfs) (February 18, 2024) to 2,300 cfs (June 7, 2024). The mean annual flow at the North Fork in WY 2024 was about 350 cfs, corresponding to 78% of the historical annual mean of about 447 cfs (1934- 2023). The lowest recorded historical mean annual flow in the North Fork was 114 cfs in 1977 and the highest was 829 cfs in 1984. The maximum-recorded flow in WY 2024 was 2,670 cfs on June 7, 2024. (USGS, 2025)

Flows in the North Fork are influenced by upstream releases and storage in the Overland and Paonia reservoirs (since February 1962), small diversions for irrigation in nearby drainage areas, and irrigation of about 3,000 acres upstream from station 09132500 (USGS, 2025). Figure 3 shows the daily discharge in the North Fork in WY 2024 compared to the historical median.

Figure 3. WY 2024 Streamflow in the North Fork of the Gunnison River



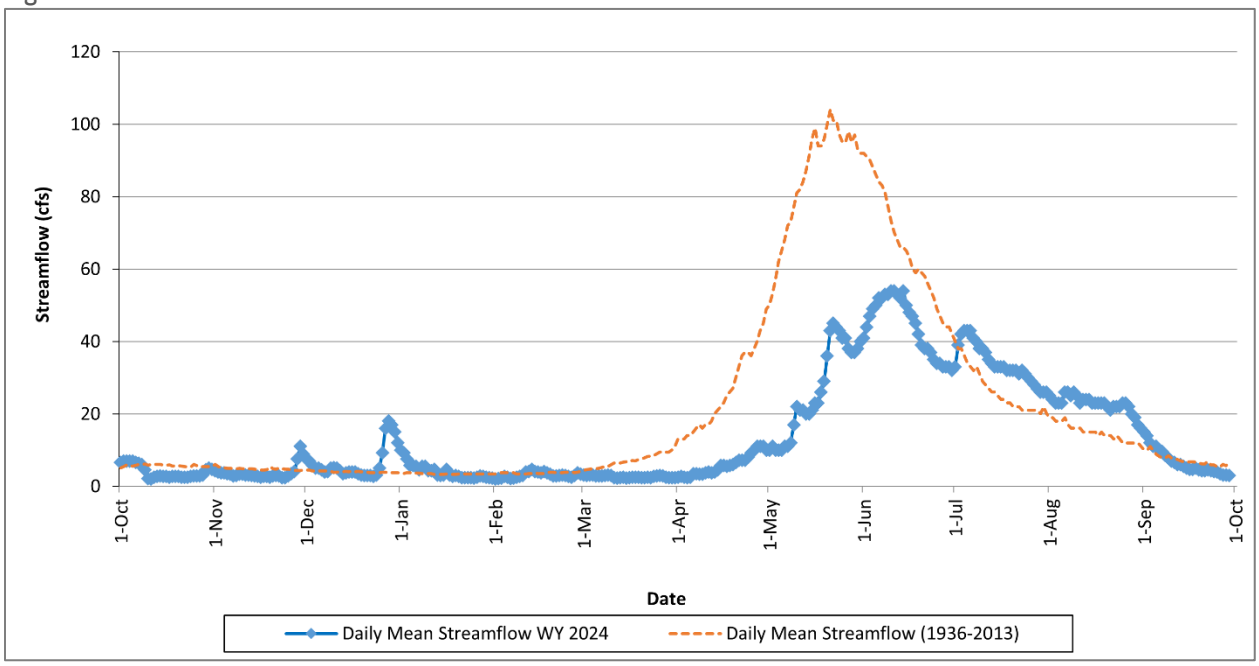
Source: USGS, 2025.

2.2.2 FLOWS IN MINNESOTA CREEK

The USGS gaging station at Minnesota Creek near Paonia (USGS 09134000) was decommissioned in April 2014. From 2014 to present, HSI has maintained a continuous stream depth recorder and gaging station at the same location. Average daily flows for Lower Minnesota Creek for WY 2024 ranged from 2.0 cfs (February 1, 2024) to 54.0 cfs (May 10 and 11, 2024). The mean annual flow at Lower Minnesota Creek in WY 2024 was about 13.6 cfs, corresponding to 64% of the historical annual mean of about 21.3 cfs for WYs 1937 through 2013 (USGS, 2025).

Natural stream flow in Minnesota Creek is affected by two small storage reservoirs (Beaver and Minnesota Reservoirs), trans-basin diversion from Coal Creek into Minnesota Creek, and diversions upstream from the station for irrigation of about 100 acres (USGS, 2025). Figure 4 shows the average daily discharge in Lower Minnesota Creek in WY 2024 compared to the historical mean (1937-2013). Flows were near average from October 2023 through February 2024 and in September 2024, well below average from March 2024 through June 2024, and slightly above average from July 2024 to September 2024.

Figure 4. WY 2023 Streamflow in Lower Minnesota Creek



Source: USGS, 2025.

3.0 HYDROLOGIC MONITORING PLAN

The MCC hydrologic monitoring program is designed to collect the monitoring data needed to assess mining related impacts on hydrologic resources. CDRMS approved a revised hydrologic monitoring plan for the West Elk Mine permit area in June 2006 (CDRMS, 2006), that was implemented from the latter months of WY 2006 through WY 2016. The hydrologic monitoring plan was again revised (Technical Revision No. 139) and approved by CDRMS in October 2016 and was implemented in WYs 2017 to 2024 (CDRMS, 2016). The Sunset Trail hydrology monitoring plan was added with Permit Revision No. PR-15 in 2018 (CDRMS, 2018).

The hydrologic monitoring plan for the permit area includes monitoring surface water resources, springs and seeps, groundwater resources, the coal refuse pile underdrains, and pertinent mine water resources. The locations of these hydrologic resources are shown on Permit Map 34 (CDRMS, 2016). The Sunset Trail monitoring Locations are shown in PR-15 (CDRMS, 2018). The Routine monitoring schedule, that occurs subsequent to the baseline monitoring period, includes collecting field water quality data (pH, electrical conductivity [EC], and temperature) and collecting a sample for independent laboratory analysis annually. Flow or water level measurements are collected three times per year, corresponding with the rising limb period between April 3 and May 13; the peak flow period between April 21 and June 26; and the low flow period between July 10 and October 8, as shown on Table 1. The chemical analyte suite for the first five years of sampling for both groundwater and surface water samples, including one year of baseline sampling, is presented in Table 2.

The current hydrologic monitoring plan for MCC incorporates a separate baseline monitoring schedule for all new monitoring sites for approximately one year prior to the time when mine development operations expand into new potentially affected areas. The baseline monitoring

schedule protocols stipulate collecting monthly field water quality data, flow or water level measurements, and collecting samples for laboratory analysis for the year prior to initiation of mining and potential impacts (Table 2). Site-specific baseline schedules are dependent on-site accessibility and mine development timing. In general, baseline monitoring is conducted for at least six months, usually from April through September, in order to provide adequate data to show seasonal variations in water quality and quantity. Winter access to most sites within the MCC permit area is impractical and not feasible, so baseline monthly monitoring is generally not performed from October through March. A summary of the approved baseline and routine monitoring program frequencies is presented in Table 1.

Table 1. Baseline and Routine Monitoring Frequencies

Routine Monitoring	Baseline Monitoring			
	Month	Flow / Level	Field Parameters	Laboratory
Rising Limb April 3 to May 13	January			
	February			
	March			
Peak Flow April 21 to June 26	April	X	X	X
	May	X	X	X
	June	X	X	X
	July	X	X	X
Low Flow July 10 to October 8	August	X	X	X
	September	X	X	X
	October			
	November			
	December			

Adapted from CDRMS (2006)

After sites have been monitored for five years (including approximately one year of baseline monitoring), the analytical parameter suite list is typically reduced and samples are submitted for laboratory analysis of total suspended solids (TSS), total dissolved solids (TDS), EC, pH, dissolved iron, and total iron. Field parameters (pH, EC, temperature, and flow or water level) are also recorded.

The Upper and Lower North Fork and Middle Sylvester Gulch monitoring sites have expanded analytical parameter suite lists, in order to provide data for the on-going characterization of the North Fork of the Gunnison River (North Fork). The North Fork and Middle Sylvester Gulch lab parameters include those listed in Table 2, plus chromium, nickel, silver (total), cyanide (total), iron (total recoverable), alkalinity (total $CaCO_3$), bicarbonate, carbonate, hydroxide, nitrogen (ammonia), ortho-phosphorus (dissolved), and sodium adsorption ratio (SAR).

Table 2. Laboratory Parameters for First Five Years of Monitoring (including Baseline Period)

Springs/Surface Water[3,4]	
pH (lab and field)[1]	Sodium (Na^{+})
Electrical conductivity at 25^{0} C (lab and field)	Sulfate (SO_{4}-)
Temperature (field)[1]	Aluminum (Al)
Total Dissolved Solids[1] (TDS)	Arsenic (As) (Total Recoverable)
Total Suspended Solids[1] (TSS)	Cadmium (Cd)
Sodium Adsorption Ratio (SAR)	Copper (Cu)
Bicarbonate (HCO_3^-)	Iron (Fe)[1] (Total and Dissolved)
Calcium (Ca^{+2})	Lead (Pb)
Chloride (Cl^-)	Manganese (Mn)[1] (Total and Dissolved)
Hardness[2]	Mercury (Hg) (Total Recoverable)
Magnesium (Mg^{+2})	Molybdenum (Mo)
Nitrate/Nitrite	Selenium (Se) (Total Recoverable)
Phosphate (PO_4^{-3} as P)	Zinc (Zn)
Potassium	Boron (B)
Groundwater[3]	
pH (lab and field)[1]	Nitrate/Nitrite
Electrical conductivity at 25^{0}C (lab and field)[1]	Phosphate (PO_4^{-3} as P)
Temperature (field)[1]	Potassium
Total Dissolved Solids[1]	Turbidity[1]
Sodium Adsorption Ratio (SAR)	Sodium (Na)
Bicarbonate (HCO_3^-)	Sulfate (SO_4^-)
Calcium (Ca^{+2})	Arsenic (As)
Carbonate (CO_3^-)	Cadmium (Cd)
Chloride (Cl^-)	Iron (Fe)[1] (Total and Dissolved)
Hardness[2]	Manganese (Mn)[1] (Total and Dissolved)
Magnesium (Mg^{+2})	Lead (Pb)
Ammonia (NH_3)	Mercury (Hg)
Selenium (Se)	Zinc (Zn)
	Boron (B)

Adapted from CDRMS (2006)

1. Parameters monitored as a result of PR-10
2. Added to baseline analyses in 1996, not for analyses completed prior to 1996.
3. All metals analyzed for their dissolved form unless noted otherwise.
4. North Fork of the Gunnison and Middle Sylvester Gulch expanded parameters include those listed in Table 2 for surface water, plus chromium, nickel, silver (total), cyanide (total), iron (total recoverable), alkalinity (as total $CaCO_3$), bicarbonate, carbonate, hydroxide; nitrogen (ammonia), ortho-phosphorus (dissolved), and sodium adsorption ratio (SAR).

3.1 SURFACE WATER MONITORING PROGRAM

The surface water monitoring program for the permit area includes 27 stations comprised of 11 stream stations with continuous recording devices, 10 stream stations where flow is recorded instantaneously, 3 stream stations where flow is not measured by HSI (North Fork Upper and North Fork Lower), and three ponds. A detailed discussion of monitored surface water stations can be found in the 2014 Annual Hydrology Report (HydroGeo, 2015), and their locations are shown on Permit Map 34 (CDRMS, 2016). A summary of the surface water monitoring program details is presented in Table 3. The surface water flow data and surface water hydrographs for the period of record are presented in Appendix A and B, respectively. The water quality data for the period of record for all of the surface water monitoring stations are presented in Appendix C.

In July 2018, as part of PR-15, four stream monitoring locations, three ponds, and one spring in the Sunset Trail Lease Modification Area of the Minnesota Creek Drainage Basin were added to the monitoring program. These new monitoring stations underwent monthly baseline sampling from July through September 2018, and May through July 2019 (the sites are inaccessible between October and April). Beginning in WY 2020, these sites are sampled at the routine monitoring frequency (Table 1). A detailed description and location map of the Sunset Trail area monitoring sites can be found in the Sunset Trail Lease Area Baseline Monitoring Recommendations Technical Memo (HSI, 2018), and a summary of the Sunset Trail monitoring station location details is presented in Table 4.

There are seven temperature data loggers in Sylvester Gulch and in the North Fork, in order to monitor the effects of mine discharge from Sylvester Gulch on the water temperature of the North Fork of the Gunnison. Details of the temperature monitoring program can be found in the 2014 Annual Hydrology Report (HydroGeo, 2015). The temperature monitoring data and graphs are presented in Appendices I and J, respectively.

Table 3. Summary of the Surface Water Monitoring Program

Monitoring Station [1]	Monitored Area	Flow Measurement	Field WQ (pH, EC, T)	Annual Lab Water Quality	Period of Record
Surface Water Stations Upper North Fork of the Gunnison River Drainage Basin					
Upper Deep Creek	Up-gradient of SE mine panels; down-gradient of SOD mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	1996 to present
Lower Deep Creek	Down-gradient of SE mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	1996 to present
Box Canyon	Down-gradient of Box Canyon mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	1999 to present
North Fork Upper (USGS 09132500)	Up-gradient of mine facilities and mine discharge points	Continuous	3 x Year	Low Flow Period, Peak Irrigation Season [3]	1977 to present
Upper Sylvester Gulch	Up-gradient of mine surface facilities area and NE mine panels	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	1977 to present
Middle Sylvester Gulch	Down-gradient of mine water discharge point and NE mine panels	Continuous	3 x Year	Peak Flow Period [3]	1977 to present
Lower Sylvester Gulch	Down-gradient of mine surface facilities area and NE mine panels	Not Measured	3 x Year	Peak Flow Period [1]	1977 to present
Surface Water Stations Lower North Fork of the Gunnison River Drainage Basin					
North Fork Lower	Down-gradient of mine facilities and mine discharge.	Not Measured	3 x Year	Low Flow Period, Peak Irrigation Season [3]	1935-present
Surface Water Stations Minnesota Creek Drainage Basin					
Lick Creek Flume	Up-gradient of SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	1977 to present
Upper Dry Fork Flume	SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	1977 to present
Middle Dry Fork Flume	SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	1977 to present
Lower Dry Fork Flume	Down-gradient of SW and SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	1977 to present
Minnesota Reservoir Flume	Down-gradient of SW and SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	2006 to present
Deep Creek Ditch Flume	Up-gradient of SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	2006 to present
Poison Gulch	SOD mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	2005 to present
Deer Creek	SOD mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	2005 to present
Horse Gulch	Down-gradient of the SW mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1]	1977 to present
East Gulch, East of Horse Gulch	SOD and SW mine panels area	Instantaneous, 3 x Year	3 x Year	Peak Flow Period [1	1977 to present
Upper Minnesota Creek (USFS)	SOD mine panels area	Continuous	3 x Year	Peak Flow Period [1]	1977 to present
Lower Minnesota Creek (USGS)	Down-gradient of SOD and SW mine panels area	Continuous	3 x Year	Peak Flow Period [1]	1937-1947 and 1985 to April 2, 2014
Lower Minnesota Creek (CDWR)	Down-gradient of SOD and SW mine panels area	Continuous	3 x Year	Peak Flow Period [1]	April 30, 2014 to present
South Prong Creek	Mouth of South Prong Creek	Continuous	6 x Year	Peak Flow Period [2]	July 2018 to Present
North Fork of South Prong Creek	Sunset Trail Area	Instantaneous, 6 x Year	6 x Year	Peak Flow Period [2]	July 2018 to Present
South Fork of South Prong Creek	Sunset Trail Area	Instantaneous, 6 x Year	6 x Year	Peak Flow Period [2]	July 2018 to Present
Stream ST-SW-1	Sunset Trail Area	Instantaneous, 6 x Year	6 x Year	Peak Flow Period [2]	July 2018 to Present
Pond ST-P-1	Sunset Trail Area	Water Level, 6 x Year	6 x Year	Peak Flow Period [2]	August 2018 to Present
Pond ST-P-2	Sunset Trail Area	Water Level, 6 x Year	6 x Year	Peak Flow Period [2]	July 2018 to Present

Table 3. Summary of the Surface Water Monitoring Program (continued)

Pond ST-P-3	Sunset Trail Area	Water Level, 6 x Year	6 x Year	Peak Flow Period [2]	July 2018 to Present

SW mine panels area – southwest B-seam longwall panels; SE mine panels area - southeast B-seam longwall panels
Box Canyon mine panels area - Box Canyon B-seam longwall panels; West Flatiron mine panels area - West Flatiron B-seam longwall panels
SOD mine panels area - South of the Divide E-seam longwall panels

1. For sites with more than 5 years of data, lab parameters include TSS, TDS, EC, pH, and Fe (dissolved & total)
2. For sites with 5 years or less data see Table 2.
3. North Fork of the Gunnison and Middle Sylvester Gulch expanded parameters include those listed in Table 2 for surface water, plus chromium, nickel, silver (total), cyanide (total), iron (total recoverable), nitrate/nitrite (as N), alkalinity (Total CaCO3), bicarbonate, carbonate, hydroxide; nitrogen (ammonia), phosphorous-ortho (dissolved), and sodium adsorption ratio (SAR).

Table 4. Summary of Sunset Trail Area Surface Water Monitoring Stations

Monitoring Station	Location Description	Latitude (NAD 83 dd)	Longitude (NAD 83 dd)
South Prong Creek	Upstream of Confluence with Minnesota Creek	38.839794	-107.451729
North Fork of South Prong Creek	About ½ mile upstream of South Prong Creek Station	38.839970	-107.444520
South Fork of South Prong Creek	About ½ mile upstream of South Prong Creek Station	38.839974	-107.444393
Stream ST-SW-1	Unnamed Tributary to South Prong Creek. About 1.5 miles upstream of So South Prong Creek Station	38.833121	-107.426038
Pond ST-P-1	Headwaters of Unnamed Tributary to Lick Creek	38.848707	-107.424765
Pond ST-P-2	Upland Area to the North of South Prong Creek	38.842051	-107.426975
Pond ST-P-3	Upland Area to the North of South Prong Creek	38.841420	-107.424671
Spring ST-S-1	Located in the N. Fork of South Prong Drainage, about one mile upstream of the NFSPC Station	38.847033	-107.434802

3.2 SPRING AND SEEP MONITORING PROGRAM

The spring monitoring program for the permit area includes 28 spring and seep locations. A detailed discussion of monitored springs and seeps can be found in the 2014 Annual Hydrology Report (HydroGeo, 2015), and their locations are shown on Permit Map 34 (CDRMS, 2016). A summary of the spring and seep monitoring program details is presented in Table 5. Spring hydrographs and water quality data for the period of record are presented in Appendix D and E, respectively.

Table 5. Summary of the Spring and Seep Monitoring Program

Monitoring Station	Monitored Area	Flow Measurement	Field WQ (pH, EC, T)	Annual Lab Water Quality	Period of Record
Springs above the F-seam in the North Fork of the Gunnison River Drainage Basin					
Spring 26-1	Deep Creek, SE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1996 to present
Spring 27-1 (two ponds)	Upper Syl. Gulch, SE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1996 to present
Spring G-7	Upper Syl. Gulch, NE and SW mine panels areas	3 x Year	3 x Year	Peak Flow Period (1)	1977 to present
Spring G-16	Syl. Gulch, east of NE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1979 to present
Spring G-24 (decreed spring #8)	Syl. Gulch, east of NE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1979 to present
Spring G-14 (decreed spring #7)	Syl. Gulch, east of NE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1977 to present
Spring G-22 (decreed spring #3)	Syl. Gulch, north of NE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1977 to present
Spring 35-3	U. Deep Creek, east of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2006 to present
96-2-2 Area Spring	U Deep Creek, SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2007 to present
Deep Creek Spring # 2	U Deep Creek, SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1	2007 to present
Deep Creek Trail Spring	U Deep Creek, south of SE mine panels area and east of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2007 to present
Spring 2012-1	U Deep Creek, south of SE mine panels area and east of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (2)	2013 to present
Spring 2012-2	U Deep Creek, south of SE mine panels area and east of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (2)	2013 to present
Spring 2012-3	U Deep Creek, south of SE mine panels area and east of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (2)	2013 to present
Spring 2012-4	U Deep Creek, south of SE mine panels area and east of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (2)	2013 to present
Springs in or below the F-seam in the North Fork of the Gunnison River Drainage Basin					
Spring 11-2	Unnamed drainage east of Box Canyon, north of Box Canyon mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2000 to present
Spring 10-1	Lower Box Canyon, north of Box Canyon mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1999 to present
Spring E10-2	Unnamed drainage east of Syl. Gulch, north of Box Canyon mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1996 to present
Spring 15-1	Unnamed drainage east of Syl. Gulch, north of Box Canyon mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1996 to present
Spring G-1a	Syl. Gulch, north of NE mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1983 to present
Spring G-20	Middle Syl. Gulch, east of mine facilities	3 x Year	3 x Year	Peak Flow Period (1)	1979 to present
Springs above the E-seam in the Dry Fork Drainage Basin					
Spring J-4	M. Dry Fork, SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	1981 to present
Deer Creek Spring	Deer Creek, SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2006 to present
Spring WCC-24	Lower Dry Fork, west of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2006 to present
Spring J-2	Lick Creek, south of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2006 to present

Table 5. Summary of the Spring and Seep Monitoring Program (continued)

Monitoring Station	Monitored Area	Flow Measurement	Field WQ (pH, EC, T)	Annual Lab Water Quality	Period of Record
Spring J-7	Poison Gulch, SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2006 to present
Spring J-10	Dry Fork, west of SOD mine panels area	3 x Year	3 x Year	Peak Flow Period (1)	2011 to present
Spring ST-S-1	N. Fork of S. Prong Creek area	6 x Year	6 x Year	Peak Flow Period (2)	July 2018 to present

SW mine panels area – southwest B-seam longwall panels; SE mine panels area – southeast B-seam longwall panels
Box Canyon mine panels area – Box Canyon B-seam longwall panels; W. Flatiron mine panels area – West Flatiron B-seam longwall panels
SOD mine panels area – South of the Divide E-seam longwall panels

1. For sites with more than 5 years of data, lab parameters include TSS, TDS, EC, pH, and Fe (dissolved & total).
2. For sites with 5 or less years of data, see Table 2.

3.3 GROUNDWATER MONITORING PROGRAM

In WY 2024, 13 wells were monitored as part of the MCC groundwater monitoring program (Tables 6 and 7).

A detailed discussion of the groundwater monitoring wells can be found in the 2014 Annual Hydrology Report (HydroGeo, 2015), and their locations are shown on Permit Map 34 (CDRMS, 2016). A summary of the groundwater monitoring well characteristics is presented in Table 6, and a summary of the groundwater monitoring program, including mining areas monitored is presented in Table 7. The water level elevation graphs and water quality data for the period of record for all of the groundwater monitoring wells are summarized in Appendix F and G, respectively.

Table 6. Summary of the Groundwater Monitoring Well Characteristics

Monitoring Well	Location	Ground Elevation (Toc, ft.)	Screened Interval Depth (ft)	Total Depth (ft)	Formation of Completion
Facility Area Wells and Alluvial Wells					
GP-3 (MW-8)	T13S, R90W, Sec. 10, SW, SW	6145.5	25-30	33.8	Colluvium
GP-4 (MW-9)	T13S, R90W, Sec. 10, SW, SW	6147.5	25-30	33.0	Colluvium
GP-6	T13S, R90W, Sec. 10, SW, SW	6204.8	78-83	83.0	Alluvium (Syl. Gulch)
GP-7	T13S, R90W, Sec. 15, SW, SW	6205.7	50-55	55	Alluvium (Syl. Gulch)
RPE-1	T13S, R90W, Sec. 10, SW, SE	6187.0	NA	30.0	Colluvium
RPE-7	T13S, R90W, Sec. 10, SE, SW	6116.3	12-32	32.0	Colluvium
Upper Dry Fork Alluvial	T14S, R90W, Sec. 2, SW, NW	8100	24-29	29	Alluvium
Lower Dry Fork Alluvial	T13S, R90W, Sec. 33, NE, NW	7640	17.5-22.5	22.5	Alluvium
Permit Area Wells Completed in the Barren Member above F-Seam					
SOM-80	T13S, R90W, Sec. 21, NW, NE	6854.4	50-90	142.5	Barren Mbr. Mesa Verde Fm.
SOM-45-H1	T13S, R90W, Sec. 29, NE, SW	7703.8	160-260	260.0	Barren Mbr. Mesa Verde Fm.
Permit Area Wells Completed in the F-Seam					
SOM C-76	T13S, R90W, Sec. 33, NW, NE	7579.6	444-457	457.0	F-Seam
Permit Area Wells Completed in the E-Seam					
03-11-1	T13S, R90W, Sec. 11, SE, SE	6281	240-250	250	E-Seam
Permit Area Wells Completed in B-Seam					
01-11-1	T13S, R90W, Sec. 11, SE, NE	6281.3	489-499	509.0	B-Seam

toc – top of casing

Table 7. Summary of the Groundwater Monitoring Program

Monitored Station	Monitored Area	Water Level Measurement	Field WQ (pH, EC, temp)	Annual Lab Water Quality	Period of Record
Facility Area Wells and Alluvial Wells					
GP-3 (MW-8)	Mine facility area	3 x Year	3 x Year	Low Flow Period (1)	1985 to present
GP-4 (MW-9)	Mine facility area	3 x Year	3 x Year	Low Flow Period (1)	1985 to present
GP-6	Mine facility area	3 x Year	3 x Year	Low Flow Period (1)	1997 to present
GP-7	Mine facility area	3 x Year	3 x Year	Low Flow Period (1)	1997 to present
RPE-1	Mine facility area	3 x Year	3 x Year	Low Flow Period (1)	1996 to present
RPE-7	Mine facility area	3 x Year	3 x Year	Low Flow Period (1)	1999 to present
Upper Dry Fork Alluvial (1)	SOD mine panels area	3 x Year	3 x Year	Low Flow Period (1)	2003 to present
Lower Dry Fork Alluvial (1)	SOD mine panels area	3 x Year	3 x Year	Low Flow Period (1)	2003 to present
Wells Completed in the Barren Member above F-Seam					
SOM-80	NE mine panels area	3 x Year	3 x Year	Low Flow Period (1)	1979 to present
SOM-45-H1	SW mine panels area	3 x Year	3 x Year	Low Flow Period (1)	1979 to present
Wells Completed in the F-Seam					
SOM-C-76	SOD mine panels area	3 x Year	3 x Year	Low Flow Period (1)	1978 to present
Wells Completed in the E-Seam					
03-11-1	North of Box Canyon mine panels area	3 x Year	3 x Year	Low Flow Period (1)	2003 to present
Wells Completed in –B-Seam					
01-11-1	North of Box Canyon mine panels area	3 x Year	3 x Year	Low Flow Period (1)	2001 to present

SW mine panels area – southwest B-seam longwall panels
SE mine panels area – southeast B-seam longwall panels
Box Canyon mine panels area – Box Canyon B-seam longwall panels
W. Flatiron mine panels area – West Flatiron B-seam longwall panels
SOD mine panels area – South of the Divide E-seam longwall panels
Shaded cells indicate wells with compromised, blocked, or collapsed casing.

1. For sites with >5 years of data, lab parameters include TSS, TDS, EC, pH, and Fe (dissolved & total).

3.4 UNDERDRAIN AND MINE WATER MONITORING

Two underdrains were monitored in WY 2024. The underdrains are located at the lower refuse pile (LRP) and at the refuse pile expansion (RPE) area. The LRP underdrain is located above the sediment ditch at the base of the pile, east of the stacktube #5 coal stockpile. The RPE underdrain is located just south of the westernmost RPE sediment pond, and drains into the pond.

Mine inflows are monitored and sampled at sites in the mine where discernible flows are greater than 5 gallons per minute (gpm) and/or where flows are present for more than seven consecutive days. If mine inflows are continuous, they are sampled for laboratory analysis at least annually. In WY 2024, no mine inflows met the monitoring and sampling criteria (MCC, 2025). The underdrain monitoring program details are summarized in Table 8 and the underdrain and mine inflow water quality data are presented in Appendix H.

Table 8. Summary of the Underdrain and Mine Inflow Monitoring Program

Monitoring Site	Flow Measurement	Field WQ (pH, EC, temp)	Annual Lab Water Quality
Underdrains			
LRP	3 x Year	3 x Year	Low Flow Period (1)
RPE	3 x Year	3 x Year	Low Flow Period (1)
Mine Inflows (if sampling criteria are met) (2)			

(1) Lab parameters include TDS, EC, pH, Ca, Mg, Na, K, SAR, hardness, bicarbonate, Cl, Nitrite/Nitrate, PO4, SO4, Fe (tot & dissolved), Mn (tot & dissolved), Al, As (tot), Cd, Cu, Pb, Hg (tot), Mb, Se (tot), Bo, Zn.

(2) See Section 3.4 of the WY 2014 AHR (HydroGeo, 2015) for mine inflow sampling criteria.

3.5 US FOREST SERVICE WATER RESOURCES

MCC and the USFS District office in Paonia, Colorado jointly monitor the USFS-appropriated water resources that are located over mined and planned longwall panels and within the angle-of-draw of potential surface impacts from mining operations. Observations are reported in the annual Fall Subsidence Reports submitted to the CDRMS (MCC, 2025). The applicable appropriated water resources are listed in Table 9 and shown on Map 37 in the Mine Permit document.

Table 9. Summary of U.S. Forest Service Water Resources

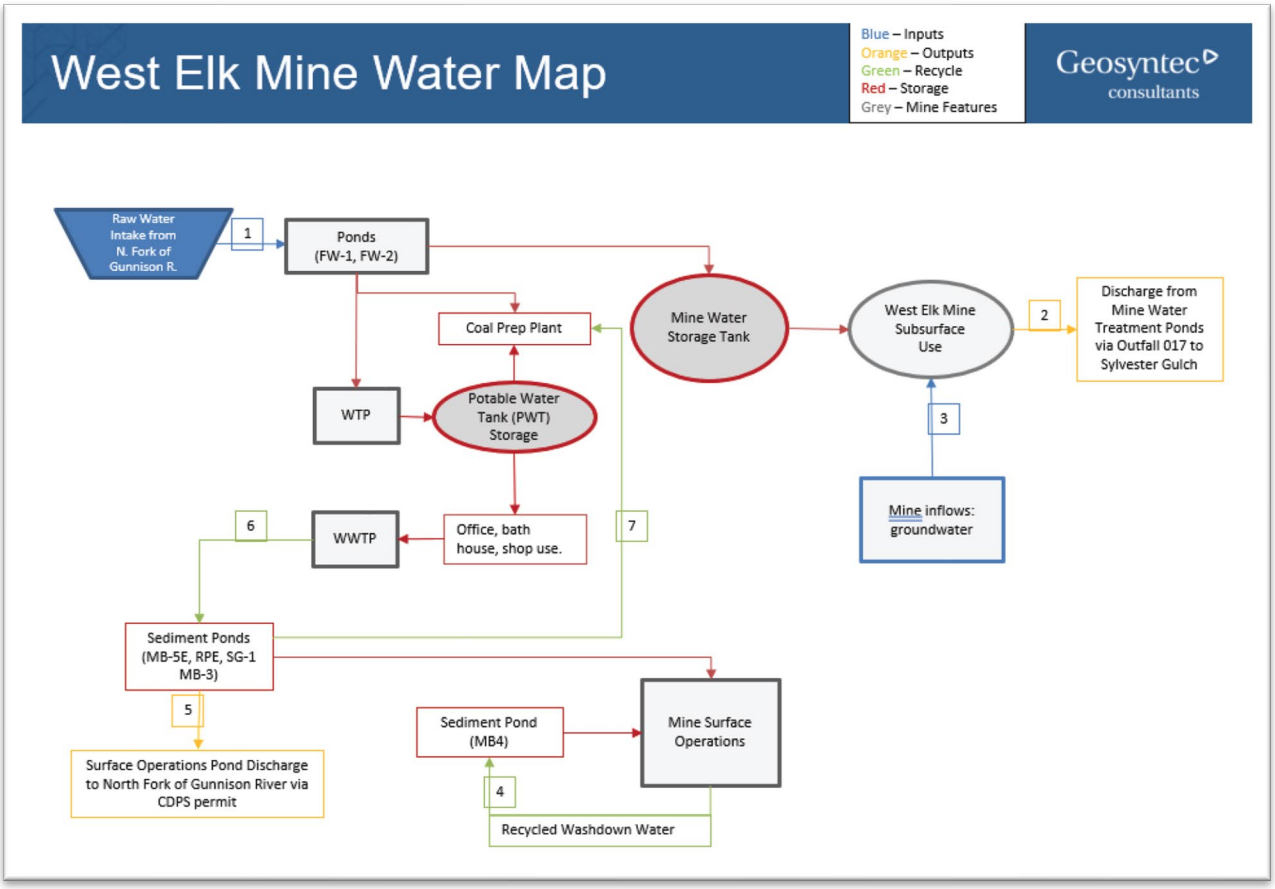
Resource Number	Name	Source	Appropriated Use
131	Dry Fork 44	Gribble Gulch	0.5 a-f
132	Dry Fork 42	Minnesota Creek	0.5 a-f
133	Dry Fork 43	Minnesota Creek	0.5 a-f
134	Dry Fork 41	Minnesota Creek	0.5 a-f
135	Dry Fork 26	Minnesota Creek	0.5 a-f
136	Dry Fork 40	Minnesota Creek	0.5 a-f
137	Dry Fork 13	Minnesota Creek	0.5 a-f
138	Dry Fork 17	Minnesota Creek	0.5 a-f
139	Dry Fork 37	Minnesota Creek	0.5 a-f
140	Dry Fork 16	Minnesota Creek	0.5 a-f
141	Dry Fork 38	Minnesota Creek	0.5 a-f
142	Dry Fork 4	Minnesota Creek	0.5 a-f
143	Dry Fork 39	Minnesota Creek	0.5 a-f
144	Dry Fork 7	Minnesota Creek	0.5 a-f
145	Dry Fork 32	Minnesota Creek	0.5 a-f
146	Dry Fork 8	Sylvester Gulch	0.5 a-f
147	Dry Fork 49	Sylvester Gulch	0.5 a-f
148	Dry Fork 36	Minnesota Creek	0.5 a-f
149	Dry Fork 9	Minnesota Creek	0.5 a-f
150	Dry Fork 22	Minnesota Creek	0.5 a-f
151	Dry Fork 23	Minnesota Creek	0.5 a-f
152	Dry Fork 18	Minnesota Creek	0.5 a-f
153	Dry Fork 28	Minnesota Creek	0.5 a-f
154	Dry Fork 48	Sylvester Gulch	0.5 a-f
155	Dry Fork 47	Deep Creek	0.5 a-f
156	Dry Fork 45	Minnesota Creek	0.5 a-f
157	Dry Fork 46	Deep Creek	0.5 a-f
158	Dry Fork 27	Deep Creek	0.5 a-f
159	Dry Fork 24	Deep Creek	0.5 a-f
179	Cow Camp	Spring	0.001 cfs
180	Dry Fork 84	Raven Gulch	0.1 a-f
181	Dry Fork 82	Raven Gulch	0.5 a-f
182	Dry Fork 83	Deep Creek	0.5 a-f
185	Dry Fork 79	Sylvester Gulch	0.5 a-f
186	Dry Fork 98	Sylvester Gulch	0.5 a-f
187	Dry Fork 78	Sylvester Gulch	0.5 a-f
188	Dry Fork 77	Sylvester Gulch	0.5 a-f
200 (1)	Cowboy	Sylvester Gulch	1.0 a-f
201(1)	Indian	Sylvester Gulch	1.0 a-f
260	Dry Fork 99	Long Draw	0.3 a-f
261	Dry Fork 100	Sylvester Gulch	0.3 a-f
265	n.a	Sylvester Gulch	n.a.
266	n.a.	Sylvester Gulch	n.a.
279	n.a.	Minnesota Creek	n.a.
280	n.a.	Minnesota Creek	n.a.
281	n.a.	n.a.	n.a.
282	n.a.	Sylvester Gulch	n.a.

Source: CDRMS Permit C-1980-007
(1) Future Foreseeable Use
a-f – acre-feet (storage right); cfs – cubic feet per second (flow right); n.a. – Information not available
All resources, except 185 and 186 have a June through October use. Resources 185 and 186 have a May through October use.

4.0 MINE WATER MANAGEMENT ACTIVITIES

The mine water management activities pertain to water flows into and out of the mine and mine site, and include fresh water intake (appropriated diversions) from the North Fork, and discharges of treated sanitary wastewater, sedimentation ponds, and mine water inflows. The individual components associated with water usage at the mine are discussed below, and illustrated in Figure 5, and month-by-month and total flows are shown in Table 10.

Figure 5. West Elk Mine WY 2024 Water Map



Source: MCC, 2024

Table 10. Water Year 2024 Mine Water Inflows, Outflows, and Recycling

Month	1 - N. Fork Gunnison River to Pond FW-1 (gallons)	2 - MWTP to Sylvester Gulch (gallons)	3 - GW Inflows to Mine (gallons)	4 - Recycled Washdown Water (gallons used in washdown)	5 - Surface Ops Ponds to N. Fork Gunnison River (gallons)	6 - WWTP to Sediment Ponds (gallons)	7 - Sediment Ponds to Coal Prep Plant (gallons)
October 2023	7,968,400	0	500,000	196,000	0	258,190	842,316
November 2023	6,762,500	0	500,000	40,000	0	266,890	127,730
December 2023	5,405,700	0	500,000	0	0	288,640	123,676
January 2024	6,539,500	0	500,000	0	0	400,390	249,853
February 2024	6,678,500	0	500,000	0	0	363,160	3
March 2024	7,024,500	0	500,000	0	0	383,990	356,331
April 2024	6,837,200	0	500,000	340,000	0	352,420	1,009,392
May 2024	6,897,500	0	500,000	268,000	0	341,100	1,099,238
June 2024	8,868,200	0	500,000	692,000	0	437,630	720,674
July 2024	6,362,200	0	500,000	292,000	0	342,620	504,169
August 2024	6,317,600	0	500,000	304,000	0	401,880	464,945
September 2024	5,719,500	0	500,000	220,000	0	404,500	421,169
Total gallons WY 2024	**81,381,300**	**0**	**6,000,000**	**2,352,000**	**0**	**4,241,410**	**5,919,496**
Total ac-ft WY 2024	**249.8**	**0.0**	**18.4**	**7.2**	**0.0**	**13.0**	**18.2**

Source: MCC, 2025

4.1 INFLOWS

MCC diverts water from the North Fork via the Mt. Gunnison Pipeline (Structure ID: 1882) water right for surface and in-mine processes and potable uses. In WY 2024, raw water intake from the North Fork of the Gunnison River totaled 249.8 ac-ft. Because the Mt. Gunnison Pipeline is a relatively junior water right, it may be called out of priority during the late summer and early fall. MCC's out-of-priority diversions from the North Fork are augmented using releases from MCC's mine water right to Sylvester Gulch and/or leased water released from East Beckwith Reservoir (a.k.a. Lost Lake Slough). Total Inflows into the mine from faults and coal partings, and the roof and walls in WY 2024 are estimated to be about 18.4 ac-ft. (MCC, 2025)

4.2 SEDIMENTATION AND FRESHWATER PONDS

The sedimentation and treatment ponds (Figure 5) at the mine site are utilized to manage groundwater collected in the mine, storm water runoff, and wastewater treatment effluent. All of the ponds are lined with high-density polyethylene (HDPE) materials, except ponds MB-5E and MB-3 that are clay-lined and pond MB-4 that is a concrete basin. Water from Sediment Ponds MB-5E, RPE, SG-1, and MB-3 is recycled and used in the coal prep plant. In WY 2024, about 18.2 ac-feet of water from the sedimentation ponds was used in the coal prep plant. Two "freshwater" ponds (FW-1 and FW-2) are used to equalize diversions from the North Fork and provide water storage. These ponds serve as the raw fresh water supply for the mine's domestic water use and surface and in-mine water needs.

4.2.1 *PONDS MB-5E, MB-3 AND MB-4*

MCC's sediment ponds are designed to retain water over a period of time so settling of sediment occurs prior to discharge (batch mode). Pond MB-5E collects storm water runoff and effluent from the wastewater treatment pond (WWTP). Pond MB-3 receives stormwater runoff, and Pond MB-4 receives storm water runoff and recycled washdown water. In WY 2024, Pond MB4 received about 7.2 ac-ft. of washdown water. In WY 2024, no water was discharged to the North Fork from ponds MB-3, MB-4, or MB-5E (MCC, 2025).

4.2.2 *PONDS FW-1 AND FW-2*

Freshwater ponds FW-1 and FW-2 store raw fresh water from the North Fork diversion intake gallery. Water from these ponds is pumped to the mine water storage tank and the water treatment plant and potable water storage system. If the ponds overfill, excess water is discharged back to the North Fork.

4.2.3 *RPE POND*

The RPE Pond collects storm water runoff and underdrain flows from the RPE and RPEE refuse pile areas. There was no discharge from the RPE pond in WY 2024. (MCC, 2025).

4.2.4 *POND SG-1*

Pond SG-1 collects storm water runoff from the mine ventilation shaft bench areas. Discharge from pond SG-1 is routed to Sylvester Gulch. In WY 2024 there was no discharge from pond SG-1 to Sylvester Gulch (MCC, 2025).

4.2.5 *MINE WATER TREATMENT PONDS*

Underground fault water (MCC's non-tributary water right) is pumped from the B-seam sumps through the mine water pumping facility (MWPF) and is directed to the mine water treatment ponds for aeration (if needed) and settling prior to discharge. Once treated, the water is discharged to Sylvester Gulch through Outfall 017A. No water was discharged from this outfall in WY 2024 (MCC, 2025).

4.2.6 *WWTP POLISHING*

Effluent from MCC's wastewater treatment plant (WWTP) is further treated (polished) in a buried vault prior to discharge. After retention in the polishing vault, the water is discharged through

Outfall 007A and flows to pond MB-5E. About 13.0 ac-ft of water were discharged from the WWTP to Pond MB-5E in WY 2024 (MCC, 2025).

4.3 CDPS DISCHARGE PERMIT CO-0038776

MCC's Colorado Department of Public Health and Environment, Colorado Discharge Permit System (CDPS) Permit (CO-0038776) was issued in August 2019, and modified in March 2022. The Permit authorization was valid through WY 2024. CDPS Discharge Monitoring Reports are submitted directly by MCC to the State once a month, and annual reports are submitted once a year by March 1.

5.0 ASSESSMENT OF MINE-INDUCED HYDROLOGIC IMPACTS IN WY 2024 AND ANTICIPATED IMPACTS IN WY 2025

5.1 SURFACE WATER

MCC maintains a network of 22 stream flow gauging stations, 3 ponds, and seven temperature monitoring stations throughout the permit and lease areas (Table 3). Daily mean and measured surface water flow summary tables are presented in Appendix A. Surface water flow hydrographs are presented in Appendix B and the field and laboratory surface water quality data are summarized in Appendix C. Tables and graphs of the Sylvester Gulch and North Fork temperature monitoring data are presented in Appendix I and Appendix J, respectively.

5.1.1 *IMPACTS TO AREA SURFACE WATER QUALITY*

Surface water quality data are collected for permit-specified parameters at monitoring stations throughout the permit area, in order to detect potential impacts of mining activities to surface water resources. Potential impacts to water quality in area streams are determined by comparing recent water quality and flow data to baseline values while considering the effects of seasonal variation and climatological factors, such as drought or high precipitation in areas near mining activity. Monitoring sites with values greater than 10 percent over comparable baseline maximums (or outside of 6.0-9.5 standard units for pH) are noted in Table 9. Field pH values are used for comparison when they are available, as the holding time for lab pH is typically exceeded, due to the shipping time required for samples to reach the analytical lab. In general, water quality parameters that are above 10 percent over baseline maximums are likely due to natural variations in climate or flow conditions on the day the sample was collected. Impacts that appear to be directly linked to mining activities are noted. It should also be noted that baseline values are based on limited data and only give a general indication of seasonal variability. The surface water quality data for stream and Pond monitoring stations in WY 2024 are presented in Appendix C.

In WY 2024 none of the tested parameters were elevated 10 percent or more above maximum baseline values at the following surface water monitoring locations: Lower Minnesota Creek, Lower Dry Fork, Lick Creek, Minnesota Reservoir Flume, Stream ST-SW-1, and Pond ST-P-1. Upper Sylvester Gulch, Horse Gulch, East Gulch east of Horse Gulch, Box Canyon, Deer Creek, and Poison Gulch were dry during all three sampling rounds. There are no baseline data for comparison for Upper Minnesota Creek (WWE, 2001).

Surface water monitoring sites where tested parameters were elevated 10 percent or more above maximum baseline values are summarized in Table 9. These exceedances are not likely mining

related, since mining discharges have not and are not occurring in the vicinity of the monitoring sites. The elevated measurements are likely due to natural physical and/or seasonal variations.

Table 11. Summary of Surface Water Quality Parameters Elevated 10 Percent or More above Baseline Maximum Values

Site Name	Sample Date	Parameter	Units	Result	Baseline Maximum
Upper North Fork	9/24/2024	Copper, dissolved	mg/L	0.026	0.01
	9/24/2024	Magnesium, dissolved	mg/L	0.011	0.009
	9/24/2024	Sodium, dissolved	mg/L	6.87	5.7
Lower North Fork	6/11/2024	Iron, dissolved	mg/L	0.365	0.126
				0.321	
Middle Sylvester Gulch	6/11/2024	Bicarbonate as CaCO3	mg/L	496	448
		Chloride	mg/L	66	10
		Conductivity @25C	µmhos/cm	1,170	800
		Residue, Filterable (TDS) @180C	mg/L	734	584
		Sodium Adsorption Ratio (SAR)	calc.	6.2	3.02
		Sulfate	mg/L	155	80
Lower Sylvester Gulch	5/7/2024	Conductivity (Field)	µmhos/cm	1,274	700
Middle Dry Fork Flume	6/7/2024	Conductivity @25C	µmhos/cm	106	76
	6/7/2024	Iron, dissolved	mg/L	0.257	0.11
Upper Dry Fork Flume	6/7/2024	Residue, Non-Filterable (TSS) @105C	mg/L	115.0	88
Upper Deep Creek	9/30/2024	Conductivity (Field)	µmhos/cm	400	310
	6/7/2024	Iron, dissolved	mg/L	0.733	0.04
Lower Deep Creek	9/30/2024	Conductivity (Field)	µmhos/cm	442	380
Deep Creek Ditch	6/7/2024	Iron, dissolved	mg/L	0.155	0.14
	6/7/2024	Residue, Non-Filterable (TSS) @105C	mg/L	89.0	76
South Prong Creek	6/10/2024	Iron, dissolved	mg/L	0.307	0.05
				0.20	
	6/10/2024	Residue, Filterable (TDS) @180C	mg/L	468	128
				320	
S. Fork of South Prong Ck.	6/10/2024	Iron, total	mg/L	0.82	0.62
	6/10/2024	Residue, Non-Filterable (TSS) @105C	mg/L	34.0	17.0
N. Fork of South Prong Ck.	6/10/2024	Conductivity (Field)	µmhos/cm	509	460
	9/26/2024			657	
	6/10/2024	Conductivity @25C	µmhos/cm	503	405
	6/10/2024	Iron, dissolved	mg/L	0.82	<0.03
	6/10/2024	Iron, total	mg/L	6.43	0.65
	6/10/2024	Residue, Non-Filterable (TSS) @105C	mg/L	292.0	23.0
Pond ST-P-2	6/10/2024	Residue, Non-Filterable (TSS) @105C	mg/L	8.0	7.0
Pond ST-P-3	6/10/2024	Conductivity (Field)	µmhos/cm	143.0	124.0
	6/10/2024	Residue, Filterable (TDS) @180C	mg/L	122	110

5.1.2 IMPACTS TO AREA STREAM WATER QUANTITY

Stream flows at the monitoring sites for the Upper North Fork (USGS), Middle Sylvester Gulch, Lower Minnesota Creek, Upper Minnesota Creek Flume (USGS), Upper, Lower and Middle Dry Fork Flume, Lick Creek Flume, Deep Creek Ditch, Minnesota Reservoir Flume, and the South Prong Creek stations are measured with data loggers that collect data continuously. Stream flows of the other monitored streams (Upper Sylvester Gulch, Horse Gulch; East Gulch east of Horse Gulch, Upper and Lower Deep Creek. Box Canyon, Deer Creek, Poison Gulch, South Fork of South Prong Creek, North Fork of South Prong Creek, and ST-SW-1) are measured as

instantaneous flow three times per year, corresponding with rising limb, peak flow, and low flow monitoring periods. No specific flow data are available for the Lower North Fork, although no mining related stream flow impacts are expected. Flow at Lower Sylvester Gulch is not measured, because of its close proximity to the Middle Sylvester Gulch Flume. Water depth is estimated three times per year at the monitored ponds (ST-P-1, ST-P-2, ST-P-3). Potential mining related impacts to stream flows and pond volume are based on dramatic decreases or total loss of stream flow due to subsidence.

Based on the flow monitoring data in WY 2024 (Appendices A and B), there were no mining induced impacts to the water quantity of any of the monitored streams. Most of the monitored streams had below average to average flows in WY 2024 because of low snowpack and precipitation.

5.2 SPRINGS AND SEEPS

MCC currently monitors 28 springs and seeps (Table 5). Hydrographs of the spring and seep flows are presented in Appendix D and spring and seep water quality data are presented in Appendix E.

5.2.1 *IMPACTS TO SPRING AND SEEP WATER QUALITY*

Spring water quality data are collected for permit-specified parameters at monitored springs and seeps throughout the permit area, in order to detect potential impacts of mining activities. Typically, underground coal mining does not impact spring water quality, but it can reduce or eliminate flows due to subsidence or dewatering.

Water quality data from WY 2024 do not indicate significant changes from baseline conditions for most of the monitored springs. However, some of the springs had elevated TDS/TSS, and/or conductivity values that were also noted in WYs 2004 through 2023. These elevated values are generally consistent with trends from previous years, and are likely the result of physical and or seasonal variations and are not related to mining operations.

Potential impacts to area spring and seep water quality are determined by comparing current water quality data at sites hydraulically connected to areas with mining activities to maximum baseline values and climatological conditions (such as drought or high precipitation periods). Field pH values are used for comparison when they are available, as the holding time for the lab pH is typically exceeded due to the shipping time required for samples to reach the analytical lab. The discussion below includes monitoring locations where one or more parameters had values 10 percent or higher than comparable maximum (or outside of 6.0-9.5 standard units for pH) baseline values. Spring water quality parameters that are 10 percent or more above the baseline maximum are typically the result of natural variations in climate or flow conditions the day the sample was collected. It should also be noted that baseline values are derived from limited data and only give a general indication of seasonal variability.

Springs G-16, Deer Creek Spring, WCC-24, 2012-1, 2012-3, 2012-4, and ST-S-1 did not have any parameters elevated 10 percent or more over baseline maximums in WY 2024. Springs G-1A, G-20, J-7 and Deep Creek Spring # 2 were dry, and Spring J-10 was covered by a beaver pond and could not be accessed. There are no baseline water quality data for comparison for springs 11-2, 10-1, and E10-2 (WWE, 2001; HydroGeo, 2015).

Several springs had one or more parameters that were 10 percent or higher than the comparable maximum baseline value in WY 2024. There exceedances are summarized in Table 12.

Table 12. Summary of Spring and Seep Water Quality Parameters Elevated 10 Percent or More above Baseline Maximum Values

Site Name	Sample Date	Parameter	Units	Result	Baseline Maximum
Spring 26-1	5/7/2024	Conductivity (Field)	µmhos/cm	719	640
	6/7/2024			738	
	9/30/2024			909	
	6/7/2024	Conductivity @25C	µmhos/cm	667	548
Spring 27-1	5/7/2024	Conductivity (Field)	µmhos/cm	613	460
	9/30/2024			835	
Spring G-7	6/8/2024	Conductivity @25C	µmhos/cm	567	414
	6/8/2024	Residue, Filterable (TDS) @180C	mg/L	362	230
Spring G-24	6/8/2024	Conductivity @25C	µmhos/cm	790	564
Spring G-14	6/8/2024	Conductivity @25C	µmhos/cm	952	682
Spring G-22	6/11/2024	Conductivity @25C	µmhos/cm	1,140	640
	6/11/2024	Iron, total	mg/L	0.405	0.2
	6/11/2024	Residue, Filterable (TDS) @180C	mg/L	740	516
Spring 15-1	5/8/2024	Conductivity (Field)	µmhos/cm	2,490	1,240
Spring G-1A	6/6/2023	Conductivity @25C	µmhos/cm	1,110	672
	6/6/2023	Residue, Filterable (TDS) @180C	mg/L	696	550
Spring J-4	5/8/2024	Conductivity (Field)	µmhos/cm	683	480
Spring 35-3	6/7/2024	Conductivity @25C	µmhos/cm	502	451
	6/7/2024	Residue, Filterable (TDS) @180C	mg/L	304	250
	9/30/2024	Conductivity (Field)	µmhos/cm	690	560
Spring J-2	6/10/2024	Conductivity (Field)	µmhos/cm	2,330	1,690
	9/26/2024			2,290	
	6/10/2024	Conductivity @25C	µmhos/cm	2,010	1,190
Deep Creek Trail Spring	6/7/2024	Conductivity (Field)	µmhos/cm	527	479
	9/30/2024			549	
96-2-2 Area Spring	5/7/2024	Conductivity (Field)	µmhos/cm	482	430
	6/7/2024			485	
Spring 2012-2	6/7/2024	Iron, dissolved	mg/L	0.14	0.11
	6/7/2024	Iron, total	mg/L	1.3	1.04
	6/7/2024	Residue, Filterable (TDS) @180C	mg/L	124	80
	6/7/2024	Residue, Non-Filterable (TSS) @105C	mg/L	60	< 5

5.2.2 IMPACTS TO SPRING AND SEEP WATER QUANTITY

Routine (post-baseline) monitoring of spring and seep flow is conducted three times per year, corresponding with rising limb, peak flow, and low flow periods. Spring and seep flows are highly variable from year to year. Subsidence associated with coal mining can reduce or eliminate spring flows, or alter the location where a spring daylights due to stratigraphic changes.

The spring flow hydrographs are presented in Appendix D. In general, spring and seep flows in WY 2024 were lower than, or close to long-term averages, due to below average snowpack and average precipitation. Springs G-20 and Deep Creek Spring # 2 have been continuously dry or damp at the time of monitoring for multiple years, including WY 2024, and may have been impacted by mining. Springs J-4 and J-7 have been mostly dry since WY 2020 (with the exception of WY 2023), and may also have been impacted by mining.

5.3 GROUNDWATER

In WY 2024, MCC's groundwater monitoring program included 13 monitoring wells throughout the permit and lease areas. Field water quality and the depth to water are recorded three times annually, corresponding to the rising limb, peak flow, and low flow sampling rounds. The Lower and Upper Dry Fork Alluvial Wells are equipped with continuous water level loggers. Routine monitoring (post-baseline) includes collecting a sample for laboratory analysis one time per year during the low flow monitoring round. The well water elevation and depth to water data are presented in Appendix F and the groundwater quality data are presented in Appendix G.

5.3.1 *IMPACTS TO GROUNDWATER QUALITY*

Groundwater quality data are collected for permit-specified parameters at monitoring wells throughout the permit area, in order to detect potential impacts of mining activities to groundwater resources. Potential impacts to groundwater are determined by comparison to baseline values and consideration of climatic conditions. Field pH values were used for comparison when they were available, as the holding time for the lab pH is typically exceeded, due to the shipping time required for samples to reach the analytical lab. Overall, there were only minor notable water quality changes in a few of the groundwater monitoring wells during WY 2024 (Appendix G, Table 13). These changes are likely the result of natural seasonal variation, and not related to mining.

No water quality data are available in WY 2024 for the following wells because they were dry or did not have enough water to collect samples during the low flow sampling period: GP-3, GP-4, RPE-1, RPE-7, and SOM-C76. Wells GP-6 and GP-7 do not have baseline data for comparison (WWE, 2001). Well SOM-45-H1 could not be sampled because the casing appears to have been damaged by subsidence at about 150 feet deep.

Wells 01-11-1 and Lower Dry Fork Alluvial Well did not have any parameters elevated 10 percent or more over baseline maximums in WY 2024. Wells where tested parameters were elevated 10 percent or more above maximum baseline values are summarized in Table 13.

Table 13. Summary of Well Water Quality Parameters Elevated 10 Percent or More above Baseline Maximum Values

Site Name	Sample Date	Parameter	Units	Result	Baseline Maximum Value
Upper Dry Fork Alluvial Well	9/30/2024	Conductivity @25C	µmhos/cm	783	509
	9/30/2024	Residue, Filterable (TDS) @180C	mg/L	478	390
Well SOM-80	9/30/2024	Conductivity @25C	µmhos/cm	1,210	897
Well 03-11-1	9/24/2024	Conductivity @25C	µmhos/cm	3,080	2,730
	9/24/2024	Iron, total	mg/L	0.71	0.49

5.3.2 *IMPACTS TO GROUNDWATER QUANTITY*

Routine (post-baseline) monitoring of groundwater levels in the monitoring wells is conducted three times per year, corresponding with rising limb, peak flow, and low flow periods. Groundwater level and elevation data for the monitoring wells for the period of record are summarized in Appendix F.

Mining operations appear to have impacted long-term groundwater levels in wells SOM 45-H-1, SOM C-76, and 03-11-1, although the water level in Well 03-11-1 appears to be recovering in the past several years (Appendix F-12). Wells GP-3, GP-4, and RPE-7 have been dry or nearly dry through the period of record due to the intentional up-gradient diversion of surface water runoff.

6.0 ADEQUACY OF THE MONITORING PROGRAM

MCC's hydrologic monitoring program operates in accordance with CDRMS Permit No. C-1980-007, as revised by Permit Revision Nos. PR-10 and PR-15, and Technical Revision No. TR-139. PR-10 included a revised comprehensive hydrologic monitoring plan for the entire permit area including the SOD mine plan area. PR-15 included the monitoring plan for the Sunset Trail mining area. The plan is presented in Exhibits 71 and 71A in the permit document (CDRMS, 2006; CDRMS 2016; CDRMS 2018).

6.1 MINING RELATED HYDROLOGIC IMPACTS

In WY 2024 the West Elk Mine hydrologic monitoring program was conducted in accordance with all permit requirements. The data collected in WY 2024 from sites in the current monitoring program were adequate to assess potential mine-induced impacts to the area's hydrologic system. These potential impacts are summarized in the previous sections.

During WY 2024, MCC operations were in compliance with Permit CO-0038776 hydrologic monitoring requirements (Section 4.6.1). There are no anticipated mining related impacts in WY 2025.

7.0 REFERENCES

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APPENDICES (Attached)

APPENDIX	A	SURFACE WATER - FLOW DATA
APPENDIX	B	SURFACE WATER - HYDROGRAPHS
APPENDIX	C	SURFACE WATER - LABORATORY AND FIELD WATER QUALITY DATA
APPENDIX	D	SPRINGS - HYDROGRAPHS
APPENDIX	E	SPRINGS - LABORATORY AND FIELD WATER QUALITY DATA
APPENDIX	F	WELLS - WATER LEVEL ELEVATION GRAPHS
APPENDIX	G	WELLS - LABORATORY AND FIELD WATER QUALITY DATA
APPENDIX	H	MINE WATER – LABORATORY AND FIELD WATER QUALITY DATA
APPENDIX	I	SURFACE WATER - TEMPERATURE DATA
APPENDIX	J	SURFACE WATER - TEMPERATURE GRAPHS

APPENDIX A

SURFACE WATER - FLOW DATA

Upper North Fork (USGS)
Daily Mean Discharge Values
(cubic feet per second)

Day	Oct-23	Q[1]	Nov-23	Q[1]	Dec-23	Q[1]	Jan-24	Q[1]	Feb-24	Q[1]	Mar-24	Q[1]	Apr-24	Q[1]	May-24	Q[1]	Jun-24	Q[1]	Jul-24	Q[1]	Aug-24	Q[1]	Sep-24	Q[1]
1	76.3	A	77.0	A	84.4	A:e	53.9	A:e	49.3	A:e	71.7	A	156.0	A	691.0	A	1720.0	A	794.0	A	248.0	A	240.0	A
2	79.2	A	75.7	A	81.9	A:e	50.9	A:e	56.5	A:e	70.2	A	149.0	A	697.0	A	1820.0	A	1020.0	A	251.0	A	241.0	A
3	85.3	A	75.5	A	81.3	A:e	47.2	A:e	73.2	A:e	72.2	A	167.0	A	694.0	A	1810.0	A	768.0	A	250.0	A	240.0	A
4	80.1	A	76.3	A	83.9	A:e	46.1	A:e	56.1	A:e	71.9	A	219.0	A	728.0	A	1910.0	A	597.0	A	251.0	A	245.0	A
5	77.7	A	76.5	A	79.6	A:e	47.0	A:e	44.1	A:e	67.3	A	288.0	A	776.0	A	2160.0	A	501.0	A	254.0	A	247.0	A
6	76.6	A	78.8	A	73.4	A:e	46.0	A:e	57.5	A:e	66.8	A	334.0	A	789.0	A	2250.0	A	437.0	A	253.0	A	244.0	A
7	76.2	A	80.0	A	79.1	A:e	47.3	A:e	54.5	A:e	66.9	A	255.0	A	670.0	A	2300.0	A	393.0	A	249.0	A	241.0	A
8	75.3	A	79.2	A	87.9	A:e	44.6	A:e	53.4	A:e	68.5	A	227.0	A	589.0	A	2270.0	A	358.0	A	249.0	A	242.0	A
9	74.4	A	73.8	A	83.0	A	32.4	A:e	53.4	A:e	68.1	A	224.0	A	514.0	A	2240.0	A	326.0	A	251.0	A	241.0	A
10	72.1	A	66.6	A	62.2	A:e	41.4	A:e	49.3	A:e	70.0	A	249.0	A	469.0	A	2090.0	A	314.0	A	260.0	A	244.0	A
11	71.6	A	72.6	A:e	76.3	A:e	47.5	A:e	39.6	A:e	76.0	A	332.0	A	463.0	A	1940.0	A	291.0	A	249.0	A	244.0	A
12	86.8	A	68.7	A	84.2	A:e	36.1	A:e	34.6	A:e	82.9	A	459.0	A	526.0	A	1830.0	A	272.0	A	247.0	A	147.0	A
13	81.0	A	71.5	A:e	81.7	A	47.4	A:e	37.6	A:e	92.8	A	669.0	A	633.0	A	1730.0	A	265.0	A	262.0	A	70.9	A
14	79.9	A	68.4	A	73.9	A	52.3	A:e	45.2	A:e	90.1	A	848.0	A	753.0	A	1570.0	A	264.0	A	278.0	A	69.0	A
15	78.1	A	68.1	A:e	71.1	A	44.9	A:e	48.3	A:e	86.2	A	892.0	A	956.0	A	1380.0	A	275.0	A	235.0	A	69.0	A
16	78.4	A	70.7	A	49.2	A:e	32.8	A:e	42.2	A:e	86.8	A	728.0	A	1040.0	A	1320.0	A	260.0	A	243.0	A	73.7	A
17	75.9	A	69.5	A	38.8	A:e	36.2	A:e	38.0	A:e	88.4	A	690.0	A	1180.0	A	1250.0	A	251.0	A	245.0	A	80.6	A
18	73.0	A	66.4	A	39.2	A:e	50.1	A:e	31.6	A:e	91.4	A	751.0	A	1330.0	A	1130.0	A	259.0	A	251.0	A	79.2	A
19	73.6	A	74.4	A	52.0	A:e	49.2	A:e	39.4	A:e	109.0	A	809.0	A	1430.0	A	972.0	A	261.0	A	244.0	A	69.5	A
20	72.6	A	70.4	A	72.6	A:e	47.6	A:e	44.7	A	133.0	A	843.0	A	1510.0	A	949.0	A	254.0	A	237.0	A	67.1	A
21	72.3	A	66.1	A	72.2	A:e	51.6	A:e	43.2	A	156.0	A	886.0	A	1670.0	A	1280.0	A	258.0	A	248.0	A	83.9	A
22	70.8	A	61.8	A:e	63.5	A:e	55.4	A:e	40.9	A	182.0	A	1030.0	A	1320.0	A	1290.0	A	259.0	A	249.0	A	123.0	A
23	69.8	A	68.3	A	70.8	A	53.5	A:e	40.1	A	202.0	A	1240.0	A	1140.0	A	1040.0	A	254.0	A	241.0	A	91.7	A
24	69.2	A	68.6	A	71.9	A	52.6	A:e	39.9	A	201.0	A	1210.0	A	1020.0	A	925.0	A	255.0	A	240.0	A	86.4	A
25	68.5	A	66.5	A	41.3	A:e	54.7	A:e	42.9	A	178.0	A	1090.0	A	950.0	A	861.0	A	255.0	A	236.0	A	82.8	A
26	68.1	A	54.9	A:e	36.7	A:e	50.3	A:e	46.0	A	166.0	A	927.0	A	963.0	A	784.0	A	250.0	A	242.0	A	79.6	A
27	67.0	A	36.7	A:e	45.4	A:e	44.4	A:e	49.4	A	159.0	A	741.0	A	990.0	A	747.0	A	251.0	A	232.0	A	77.5	A
28	93.0	A	47.6	A:e	45.4	A:e	40.9	A:e	48.2	A	149.0	A	609.0	A	1200.0	A	867.0	A	247.0	A	231.0	A	75.8	A
29	94.9	A	62.5	A:e	42.9	A:e	42.9	A:e	71.3	A	155.0	A	616.0	A	1430.0	A	834.0	A	247.0	A	231.0	A	74.1	A
30	75.3	A	78.4	A:e	40.7	A:e	44.6	A:e	--	--	154.0	A	617.0	A	1590.0	A	763.0	A	239.0	A	232.0	A	72.5	A
31	74.0	A	--	--	48.7	A:e	46.3	A:e	--	--	160.0	A	--	--	1590.0	A	--	--	245.0	A	236.0	A	--	--

Mean	76.4	--	69.1	--	65.0	--	46.4	--	47.3	--	112.7	--	608.5	--	977.5	--	1467.7	--	352.3	--	246.0	--	141.4	--
Min	67.0	--	36.7	--	36.7	--	32.4	--	31.6	--	66.8	--	149.0	--	463.0	--	747.0	--	239.0	--	231.0	--	67.1	--
Max	94.9	--	80.0	--	87.9	--	55.4	--	73.2	--	202.0	--	1240.0	--	1670.0	--	2300.0	--	1020.0	--	278.0	--	247.0	--

[1] USGS Qualifiers: A = Period of approved data, e = Estimated value

Lower Minnesota Creek
Streamflow
(cubic feet per second)

Daily Mean Streamflow (cfs)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	6.6	4.3	**7.5**	**10.0**	**2.0**	3.1	2.5	10.0	41.0	33.0	25.0	15.0
2	6.9	3.9	**6.9**	**9.2**	**2.1**	3.0	2.7	11.0	44.0	39.0	24.0	14.0
3	6.9	3.7	**5.7**	**7.5**	**2.2**	3.1	2.5	10.0	47.0	42.0	23.0	12.0
4	6.9	3.7	**5.0**	**5.7**	**2.7**	3.1	2.4	10.0	49.0	43.0	23.0	11.0
5	6.9	3.5	**5.0**	**5.7**	**2.5**	2.8	2.5	10.0	50.0	43.0	23.0	11.0
6	6.6	3.3	**4.5**	**5.5**	**2.1**	2.8	3.5	11.0	52.0	43.0	26.0	10.0
7	6.3	2.8	**3.9**	**4.5**	**2.2**	2.8	3.5	11.0	52.0	41.0	26.0	9.6
8	6.0	3.0	**4.1**	**5.5**	**2.5**	3.0	3.3	12.0	53.0	40.0	25.0	8.5
9	4.5	3.3	**5.0**	**5.5**	**2.7**	3.1	3.3	17.0	53.0	38.0	26.0	7.8
10	2.1	3.3	**5.2**	**4.3**	**3.0**	3.0	3.7	22.0	54.0	38.0	25.0	6.9
11	2.0	3.1	**5.0**	**4.3**	**3.9**	2.4	3.9	21.0	54.0	37.0	23.0	6.6
12	2.5	3.1	**4.3**	**4.7**	**4.1**	2.2	3.7	21.0	53.0	35.0	24.0	6.0
13	2.7	3.0	**3.5**	**3.1**	**4.7**	2.4	3.9	20.0	52.0	34.0	24.0	6.0
14	2.8	2.8	**3.7**	**3.0**	**4.1**	2.5	4.5	20.0	54.0	33.0	24.0	5.5
15	2.7	2.7	**3.9**	**3.1**	**3.9**	2.2	5.7	21.0	50.0	33.0	23.0	5.0
16	2.7	2.5	**3.9**	**4.7**	**3.7**	2.4	5.7	23.0	48.0	33.0	23.0	4.7
17	2.5	2.7	**3.9**	**3.1**	**4.1**	2.5	5.5	23.0	47.0	33.0	23.0	4.7
18	2.7	2.7	**3.5**	**2.7**	**3.7**	2.5	5.7	26.0	45.0	32.0	23.0	5.0
19	2.7	2.5	**3.1**	**3.0**	**3.3**	2.5	6.0	29.0	42.0	32.0	23.0	4.5
20	2.7	2.8	**3.0**	**2.7**	**2.8**	2.4	6.6	36.0	39.0	32.0	22.0	4.3
21	2.5	3.0	**3.0**	**2.4**	**2.8**	2.4	7.2	43.0	38.0	32.0	21.0	4.3
22	2.5	2.8	**3.0**	**2.4**	**3.0**	2.5	7.2	45.0	38.0	31.0	22.0	4.5
23	2.5	2.4	**2.7**	**2.4**	**3.1**	2.4	7.2	44.0	37.0	32.0	22.0	4.3
24	2.7	2.4	**3.1**	**2.4**	**3.0**	2.7	8.1	43.0	35.0	31.0	22.0	4.1
25	2.8	2.8	**5.0**	**2.2**	**2.7**	2.8	9.2	41.0	34.0	30.0	23.0	3.9
26	2.8	3.5	**9.2**	**2.5**	**2.5**	3.0	10.0	41.0	34.0	29.0	23.0	3.5
27	2.8	4.1	**16.0**	**2.8**	**3.0**	2.8	11.0	38.0	33.0	28.0	22.0	3.1
28	3.1	**7.5**	**18.0**	**2.7**	**3.7**	2.5	11.0	37.0	33.0	27.0	20.0	3.1
29	4.5	**11.0**	**17.0**	**2.5**	3.3	2.4	11.0	37.0	33.0	26.0	19.0	3.0
30	5.0	**8.9**	**15.0**	**2.4**	--	2.4	10.0	38.0	32.0	26.0	17.0	2.8
31	4.7	--	**12.0**	**2.2**	--	2.4	--	40.0	--	26.0	16.0	--
Mean	3.9	3.7	6.1	4.1	3.1	2.7	5.8	25.7	44.2	33.9	22.7	6.5
Min	2.0	2.4	2.7	2.2	2.0	2.2	2.4	10.0	32.0	26.0	16.0	2.8
Max	6.9	11.0	18.0	10.0	4.7	3.1	11.0	45.0	54.0	43.0	26.0	15.0

Measured Streamflow

Date	Streamflow (cfs)
10/9/2023	3.7
11/7/2023	3.7
12/7/2023	**2.8**
1/9/2024	**6.9**
2/5/2024	**6.3**
3/11/2024	2.5
4/10/2024	3.7
5/9/2024	11.0
6/7/2024	53.0
7/23/2024	29.0
8/5/2024	20.0
9/26/2024	2.8

0.01 Stream Likely Ice Affected or Frozen.

Upper Minnesota Creek (USFS)
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	2.59	1.99	**3.86**	**ND**	**ND**	**1.94**	1.54	12.88	44.44	32.80	19.21	1.85
2	2.75	1.87	**3.93**	**ND**	**ND**	**2.16**	1.59	13.12	45.61	37.47	18.84	1.85
3	2.77	1.71	**3.67**	**ND**	**1.42**	**2.39**	1.40	12.87	45.53	30.93	18.47	1.72
4	2.71	1.73	**3.57**	**ND**	**1.70**	**2.38**	1.37	13.34	45.60	27.59	18.10	1.84
5	2.72	1.60	**3.83**	**ND**	**2.25**	**2.15**	1.83	15.02	46.30	24.71	14.47	2.48
6	2.66	1.56	**3.75**	**ND**	**0.56**	**2.10**	3.06	19.23	46.63	23.70	11.13	3.76
7	2.57	2.44	**2.79**	**ND**	**0.66**	**2.14**	2.40	15.97	47.16	22.15	11.11	1.95
8	2.54	3.48	**2.32**	**ND**	**0.78**	**2.28**	1.99	14.67	47.48	21.73	10.78	1.81
9	2.20	3.75	**2.79**	**ND**	**0.81**	**2.46**	1.78	14.26	47.70	21.07	10.82	1.78
10	1.33	3.69	**4.43**	**ND**	**0.99**	**2.31**	3.15	15.09	46.77	20.14	13.94	1.68
11	1.30	3.85	**2.69**	**ND**	**2.67**	1.72	4.39	14.41	47.12	18.02	17.69	1.69
12	1.59	4.01	**2.42**	**ND**	**7.39**	1.54	5.41	15.59	48.04	18.44	17.38	1.65
13	1.55	3.71	**2.16**	**ND**	**4.83**	1.60	7.53	14.46	46.38	21.77	18.19	1.73
14	1.46	3.61	**2.33**	**ND**	**1.98**	1.62	9.22	18.24	44.94	21.12	17.91	1.65
15	1.43	3.46	**2.53**	**ND**	**0.78**	1.45	9.25	23.68	42.37	20.81	16.75	1.60
16	1.34	3.31	**2.75**	**ND**	**0.70**	1.61	7.08	27.28	40.08	20.35	16.88	1.57
17	1.26	3.45	**5.65**	**ND**	**0.87**	1.66	7.21	29.55	38.40	20.06	16.20	1.67
18	1.31	3.33	**6.62**	**ND**	**1.51**	1.67	9.33	36.16	36.36	19.68	16.90	1.67
19	1.24	3.38	**3.00**	**ND**	**1.02**	1.63	10.66	41.79	34.26	19.66	15.36	1.57
20	1.24	3.60	**2.80**	**ND**	**0.74**	1.59	11.40	43.65	36.07	19.09	14.31	1.52
21	1.22	3.86	**2.68**	**ND**	**1.83**	1.60	12.79	44.69	40.96	18.30	15.15	1.61
22	1.19	3.75	**2.68**	**ND**	**1.92**	1.62	14.29	39.82	39.09	18.04	13.82	1.96
23	1.13	3.44	**2.57**	**ND**	**1.99**	1.52	15.89	36.13	37.75	17.39	13.16	1.87
24	1.16	3.38	**2.93**	**ND**	**1.99**	1.68	18.39	33.06	35.39	17.35	12.49	1.82
25	1.14	3.84	**ND**	**ND**	**1.80**	1.78	19.89	31.95	34.11	20.56	11.38	1.77
26	1.17	4.53	**ND**	**ND**	**1.86**	1.78	19.09	30.60	33.32	22.49	8.35	1.81
27	1.17	**9.00**	**ND**	**ND**	**2.47**	1.71	18.27	29.97	33.76	21.66	1.90	2.39
28	3.11	**9.82**	**ND**	**ND**	**3.63**	1.54	15.28	32.72	35.40	21.17	1.86	2.47
29	2.39	**7.48**	**ND**	**ND**	**4.34**	1.42	12.73	36.87	34.10	20.52	1.88	2.41
30	2.41	**5.60**	**ND**	**ND**	--	1.39	11.72	39.41	32.69	20.00	1.91	2.34
31	2.24	--	**ND**	**ND**	--	1.45	--	42.47	--	19.68	1.83	--
Mean	1.84	3.81	3.28	ND	1.98	1.80	8.66	26.09	41.13	21.89	12.84	1.92
Min	1.13	1.56	2.16	ND	0.56	1.39	1.37	12.87	32.69	17.35	1.83	1.52
Max	3.11	9.82	6.62	ND	7.39	2.46	19.89	44.69	48.04	37.47	19.21	3.76

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	1.57
11/7/2023	1.91
12/7/2023	**3.19**
1/9/2024	**2.27**
2/5/2024	**3.33**
3/11/2024	**1.91**
4/10/2024	2.03
5/9/2024	13.08
6/7/2024	flooded
7/23/2024	14.76
8/5/2024	17.02
9/26/2024	1.80

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.
Note: When height of water in flume is above 1.57 feet (32.60 cfs), bypass spillways overflow and flow through flume is less than total flow in stream.

Middle Sylvester Gulch
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	0.02	0.00	**ND**	**ND**	**ND**	**0.01**	0.02	0.04	0.00	ND1	ND1	ND1
2	0.05	0.00	**ND**	**ND**	**ND**	**0.00**	0.02	0.05	0.00	ND1	ND1	ND1
3	0.05	0.00	**ND**	**ND**	**0.01**	**0.00**	0.02	0.04	0.00	ND1	ND1	ND1
4	0.04	0.00	**ND**	**ND**	**0.04**	**0.00**	0.01	0.03	0.00	ND1	ND1	ND1
5	0.05	0.00	**ND**	**ND**	**0.05**	**0.00**	0.01	0.02	0.00	ND1	ND1	ND1
6	0.04	0.00	**ND**	**ND**	**0.00**	0.00	0.07	0.12	0.00	ND1	ND1	ND1
7	0.04	0.00	**ND**	**ND**	**0.00**	0.00	0.07	0.05	0.00	ND1	ND1	ND1
8	0.04	**ND**	**ND**	**ND**	**0.01**	0.00	0.04	0.02	0.00	ND1	ND1	ND1
9	0.02	**ND**	**ND**	**ND**	**0.02**	0.02	0.03	0.00	0.00	ND1	ND1	ND1
10	0.00	**ND**	**ND**	**ND**	**0.03**	0.02	0.05	0.00	0.00	ND1	ND1	ND1
11	0.00	**ND**	**ND**	**ND**	**0.06**	0.13	0.05	0.00	0.00	ND1	ND1	ND1
12	0.00	**ND**	**ND**	**ND**	**0.04**	0.08	0.03	0.02	ND1	ND1	ND1	ND1
13	0.00	**ND**	**ND**	**ND**	**0.03**	0.07	0.03	0.00	ND1	ND1	ND1	ND1
14	0.00	**ND**	**ND**	**ND**	**0.00**	0.02	0.06	0.00	ND1	ND1	ND1	ND1
15	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.08	0.00	ND1	ND1	ND1	ND1
16	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.06	0.00	ND1	ND1	ND1	ND1
17	0.00	**ND**	**ND**	**ND**	**0.01**	0.01	0.05	0.00	ND1	ND1	ND1	ND1
18	0.00	**ND**	**ND**	**ND**	**0.01**	0.01	0.05	0.00	ND1	ND1	ND1	ND1
19	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.05	0.00	ND1	ND1	ND1	ND1
20	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.03	0.00	ND1	ND1	ND1	ND1
21	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.03	0.06	ND1	ND1	ND1	ND1
22	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.02	0.00	ND1	ND1	ND1	ND1
23	0.00	**ND**	**ND**	**ND**	**0.01**	0.01	0.01	0.00	ND1	ND1	ND1	ND1
24	0.00	**ND**	**ND**	**ND**	**0.01**	0.01	0.02	0.00	ND1	ND1	ND1	ND1
25	0.00	**ND**	**ND**	**ND**	**0.00**	0.02	0.02	0.00	ND1	ND1	ND1	ND1
26	0.00	**ND**	**ND**	**ND**	**0.00**	0.02	0.03	0.00	ND1	ND1	ND1	ND1
27	0.00	**ND**	**ND**	**ND**	**0.00**	0.01	0.05	0.00	ND1	ND1	ND1	ND1
28	0.25	**ND**	**ND**	**ND**	**0.05**	0.01	0.05	0.00	ND1	ND1	ND1	ND1
29	0.13	**ND**	**ND**	**ND**	**0.02**	0.00	0.04	0.00	ND1	ND1	ND1	ND1
30	0.05	**ND**	**ND**	**ND**	--	0.01	0.03	0.00	ND1	ND1	ND1	ND1
31	0.02	--	**ND**	**ND**	--	0.01	--	0.00	--	ND1	ND1	--
Mean	0.03	0.00	ND	ND	0.02	0.02	0.04	0.01	0.00	ND1	ND1	ND1
Min	0.00	0.00	ND	ND	0.00	0.00	0.01	0.00	0.00	ND1	ND1	ND1
Max	0.25	0.00	ND	ND	0.06	0.13	0.08	0.12	0.00	ND1	ND1	ND1

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	0.00
11/7/2023	0.00
12/7/2023	**0.00**
1/9/2024	**0.00**
2/9/2024	**0.00**
3/11/2024	0.06
4/10/2024	0.09
5/8/2024	0.09
6/11/2024	0.00
7/8/2024	0.00
8/5/2024	0.00
9/24/2024	0.00

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.
ND1 No Data. Logger Innaccesible for Download.
Note: Water Level in flume below 0.02 feet not connected to stilling well.

Lower Dry Fork
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	1.30	0.61	**0.30**	**0.00**	**0.00**	**0.04**	0.00	0.03	0.00	10.44	11.34	0.80
2	1.48	0.72	**0.29**	**0.00**	**0.00**	**0.00**	0.00	0.05	0.01	8.13	11.21	0.86
3	1.56	0.72	**0.16**	**0.00**	**0.00**	**0.04**	0.00	0.04	0.02	2.94	10.81	0.80
4	1.40	0.75	**0.10**	**0.00**	**0.06**	**0.05**	0.00	0.04	0.02	2.30	10.63	0.78
5	1.38	0.71	**0.11**	**0.00**	**0.04**	**0.00**	0.00	0.04	0.01	2.33	10.25	0.82
6	1.37	0.73	**0.08**	**0.00**	**0.00**	**0.00**	0.01	0.06	0.02	2.48	9.99	0.79
7	1.34	0.65	**0.46**	**0.00**	**0.00**	**0.03**	0.02	0.04	0.01	2.38	9.64	0.87
8	1.28	0.64	**1.28**	**0.00**	**0.02**	**0.08**	0.02	0.05	1.38	1.80	8.91	0.68
9	1.08	0.68	**1.53**	**0.02**	**0.05**	**0.03**	0.02	0.02	3.85	1.61	2.60	0.44
10	0.58	0.37	**1.36**	**0.10**	**0.08**	**0.03**	0.04	0.04	3.96	2.30	1.51	0.60
11	0.60	0.32	**1.10**	**0.13**	**0.18**	**0.01**	0.08	0.17	3.93	2.48	1.53	0.72
12	1.02	0.31	**0.90**	**0.25**	**0.10**	**0.00**	0.05	0.33	3.94	5.52	1.33	0.53
13	0.83	0.30	**0.69**	**0.05**	**0.08**	**0.00**	0.08	0.34	3.87	5.49	1.52	0.54
14	0.68	0.33	**0.75**	**0.03**	**0.02**	**0.00**	0.08	0.41	4.10	5.44	2.18	0.56
15	0.66	0.35	**0.62**	**0.05**	**0.01**	**0.00**	0.11	0.48	3.94	5.95	1.33	0.55
16	0.62	0.50	**0.17**	**0.33**	**0.01**	0.00	0.08	0.49	3.93	5.45	1.01	0.63
17	0.64	0.47	**0.00**	**0.09**	**0.06**	0.00	0.05	0.45	4.00	5.49	0.91	0.92
18	0.66	0.30	**0.00**	**0.02**	**0.04**	0.00	0.06	0.42	4.02	5.47	1.37	0.80
19	0.51	0.21	**0.00**	**0.05**	**0.02**	0.00	0.05	0.41	3.95	5.51	1.01	0.66
20	0.55	0.25	**0.00**	**0.02**	**0.00**	0.00	0.05	0.41	3.94	5.52	0.91	0.66
21	0.53	0.29	**0.00**	**0.00**	**0.03**	0.00	0.04	0.43	10.56	5.49	0.98	0.74
22	0.55	0.23	**0.00**	**0.00**	**0.04**	0.00	0.02	0.37	12.25	5.73	1.20	1.04
23	0.51	**0.16**	**0.00**	**0.01**	**0.05**	0.00	0.02	0.39	11.46	5.67	1.35	0.81
24	0.53	**0.16**	**0.00**	**0.00**	**0.08**	0.00	0.02	0.41	11.15	5.55	1.99	0.71
25	0.54	**0.27**	**0.00**	**0.00**	**0.06**	0.00	0.01	0.39	10.80	5.59	1.64	0.70
26	0.52	**0.43**	**0.00**	**0.02**	**0.16**	0.00	0.00	0.41	10.13	5.57	1.28	0.66
27	0.57	**0.56**	**0.00**	**0.06**	**0.61**	0.00	0.00	0.09	10.26	5.30	1.10	0.64
28	1.30	**0.74**	**0.00**	**0.06**	**0.68**	0.00	0.01	0.00	10.36	7.00	0.96	0.53
29	1.37	**0.59**	**0.00**	**0.03**	**0.37**	0.00	0.01	0.00	9.43	11.89	1.02	0.31
30	0.74	**0.32**	**0.00**	**0.02**	--	0.00	0.02	0.00	7.66	11.58	0.98	0.28
31	0.60	--	**0.00**	**0.01**	--	0.00	--	0.00	--	11.29	0.84	--
Mean	0.88	0.46	0.32	0.04	0.10	0.01	0.03	0.22	5.10	5.47	3.66	0.68
Min	0.51	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.84	0.28
Max	1.56	0.75	1.53	0.33	0.68	0.08	0.11	0.49	12.25	11.89	11.34	1.04

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	0.88
11/7/2023	0.94
12/7/2023	**0.00**
1/9/2024	**0.00**
2/5/2024	**0.00**
3/11/2024	**0.00**
4/10/2024	0.00
5/11/2024	0.00
6/8/2024	0.00
7/8/2024	1.78
8/5/2024	10.16
9/28/2024	0.63

0.01 Flume Likely Ice Affected or Frozen.
Note: Stilling well inlet is 0.10 feet above flume bottom, and flows between 0.00 (dry) and 0.28 cfs are approximate.

Middle Dry Fork
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	1.55	0.82	**0.73**	ND	ND	ND	0.42	2.69	3.00	3.94	1.84	1.30
2	1.53	0.96	**0.70**	ND	ND	ND	0.43	2.67	3.22	4.62	1.77	1.37
3	1.49	1.06	**0.69**	ND	ND	ND	0.54	2.90	3.44	3.54	1.88	1.27
4	1.37	1.07	**0.69**	ND	ND	ND	1.02	3.19	3.74	3.24	1.66	1.15
5	1.38	1.10	**0.76**	ND	ND	ND	1.44	3.45	3.77	3.17	1.65	1.13
6	1.36	1.17	**0.83**	ND	ND	ND	1.05	3.24	4.06	3.16	1.75	1.13
7	1.38	1.13	**0.80**	ND	ND	ND	0.68	2.39	4.21	3.15	1.79	1.13
8	1.39	0.91	**0.68**	ND	ND	**0.40**	0.66	1.66	4.12	3.05	1.69	1.03
9	1.33	0.66	**0.69**	ND	ND	**0.50**	0.68	1.21	4.11	2.96	1.54	1.07
10	1.16	0.61	**0.80**	ND	ND	**0.54**	0.93	1.16	3.90	2.91	1.67	0.98
11	1.11	0.61	**0.77**	ND	ND	**0.55**	1.29	1.22	3.93	2.91	1.79	1.17
12	1.28	0.62	**0.76**	ND	ND	**0.53**	1.59	1.74	4.05	2.76	1.68	1.06
13	1.11	0.72	**0.64**	ND	ND	**0.52**	2.07	2.42	3.97	2.71	1.79	1.21
14	1.07	0.78	**0.62**	ND	ND	**0.48**	2.40	2.96	3.89	2.54	2.61	1.20
15	1.11	**0.78**	**0.62**	ND	ND	0.47	2.13	3.52	3.92	2.59	1.86	1.15
16	1.11	**0.94**	**0.68**	ND	ND	0.54	1.21	3.39	4.00	2.34	1.73	1.21
17	1.21	**0.84**	**0.71**	ND	ND	0.55	1.30	3.31	4.06	2.35	1.61	1.48
18	1.13	**0.75**	**0.69**	ND	ND	0.58	1.95	3.30	3.86	2.25	1.94	1.26
19	1.05	**0.85**	**0.65**	ND	ND	0.59	2.29	3.18	3.84	2.23	1.66	1.19
20	1.14	**0.78**	**0.60**	ND	ND	0.57	2.33	2.96	4.18	2.23	1.67	1.26
21	1.19	**0.56**	**0.55**	ND	ND	0.55	2.21	3.12	4.60	1.99	1.64	1.29
22	1.18	**0.65**	**0.64**	ND	ND	0.57	2.62	2.89	4.19	1.95	1.88	1.38
23	1.15	**0.75**	**0.62**	ND	ND	0.60	2.88	2.82	4.00	2.34	1.68	1.21
24	1.10	**0.82**	**0.55**	ND	ND	0.59	2.96	2.33	3.81	2.46	1.81	1.21
25	1.00	**0.69**	**0.83**	ND	ND	0.50	2.98	2.10	3.82	2.42	1.85	1.21
26	1.01	**0.74**	ND	ND	ND	0.46	2.42	2.05	3.72	2.40	1.65	1.20
27	0.96	**0.79**	ND	ND	ND	0.42	2.19	2.44	3.86	2.28	1.56	1.17
28	1.71	**0.78**	ND	ND	ND	0.48	1.86	2.65	3.99	2.19	1.50	1.15
29	0.76	**0.84**	ND	ND	ND	0.44	1.87	2.80	3.89	2.01	1.41	1.18
30	0.60	**0.74**	ND	ND	--	0.51	2.13	2.80	3.79	1.91	1.38	1.08
31	0.65	--	ND	ND	--	0.47	--	2.85	--	1.83	1.34	--
Mean	1.18	0.82	0.69	ND	ND	0.52	1.68	2.63	3.90	2.66	1.72	1.19
Min	0.60	0.56	0.55	ND	ND	0.40	0.42	1.16	3.00	1.83	1.34	0.98
Max	1.71	1.17	0.83	ND	ND	0.60	2.98	3.52	4.60	4.62	2.61	1.48

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	1.15
11/7/2023	1.15
4/10/2024	0.69
5/8/2024	1.78
6/7/2024	4.39
7/8/2024	2.98
8/5/2024	1.69
9/12/2024	0.88
9/28/2024	0.81

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.

Upper Dry Fork
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	1.56	1.32	**ND**	**ND**	**ND**	**ND**	0.13	2.88	3.69	4.81	2.48	2.17
2	1.51	2.01	**ND**	**ND**	**ND**	**ND**	0.15	2.95	4.01	5.67	2.48	2.19
3	1.29	1.73	**ND**	**ND**	**ND**	**ND**	0.37	3.33	4.26	4.63	2.47	2.18
4	1.20	1.98	**ND**	**ND**	**ND**	**ND**	0.79	3.85	4.60	4.27	2.40	2.02
5	1.20	1.85	**ND**	**ND**	**ND**	**ND**	1.03	3.93	4.76	4.06	2.43	1.93
6	1.25	1.33	**ND**	**ND**	**ND**	**ND**	1.41	3.28	5.25	4.08	2.84	1.98
7	1.27	1.34	**ND**	**ND**	**ND**	**ND**	0.58	2.32	5.17	4.11	2.86	2.02
8	1.26	**1.07**	**ND**	**ND**	**ND**	**ND**	0.71	1.72	5.04	4.03	2.64	1.87
9	1.41	**1.54**	**ND**	**ND**	**ND**	**ND**	0.55	1.53	4.98	3.91	2.50	1.83
10	1.65	**1.75**	**ND**	**ND**	**ND**	**ND**	0.69	1.50	4.85	3.84	2.51	1.84
11	1.67	**1.54**	**ND**	**ND**	**ND**	**ND**	1.19	1.37	4.84	3.84	2.61	1.97
12	1.64	**1.45**	**ND**	**ND**	**ND**	**ND**	1.70	1.90	5.02	3.72	2.57	1.87
13	1.50	**1.68**	**ND**	**ND**	**ND**	**ND**	1.68	2.86	4.96	3.52	2.54	1.60
14	1.46	**1.79**	**ND**	**ND**	**ND**	**ND**	2.97	3.63	4.79	3.35	3.46	1.67
15	1.50	**2.13**	**ND**	**ND**	**ND**	**ND**	1.68	4.12	4.90	3.23	2.72	1.71
16	1.57	**0.87**	**ND**	**ND**	**ND**	**ND**	1.02	3.84	5.11	2.99	2.66	1.75
17	1.74	**1.03**	**ND**	**ND**	**ND**	**ND**	1.40	3.85	5.25	2.99	2.47	1.98
18	1.64	**1.78**	**ND**	**ND**	**ND**	**ND**	1.96	3.74	4.90	3.03	2.73	1.73
19	1.54	**0.77**	**ND**	**ND**	**ND**	ND	2.18	3.55	4.88	2.96	2.56	1.74
20	1.63	**0.80**	**ND**	**ND**	**ND**	0.27	2.21	3.27	5.14	2.87	2.58	1.84
21	1.67	**1.85**	**ND**	**ND**	**ND**	0.26	2.45	3.23	5.33	2.62	2.49	1.84
22	1.64	**2.08**	**ND**	**ND**	**ND**	0.32	2.90	3.05	4.99	2.56	2.54	1.53
23	1.60	**1.54**	**ND**	**ND**	**ND**	0.37	3.30	2.89	4.89	3.10	2.47	1.47
24	1.55	**0.87**	**ND**	**ND**	**ND**	0.47	3.45	2.30	4.78	3.21	2.65	1.47
25	1.32	**0.88**	**ND**	**ND**	**ND**	0.24	3.29	2.10	4.80	3.12	2.51	1.59
26	1.23	**0.94**	**ND**	**ND**	**ND**	0.10	2.40	1.97	4.55	3.07	2.39	1.55
27	1.22	**1.37**	**ND**	**ND**	**ND**	0.04	1.85	2.84	4.72	3.02	2.32	1.51
28	1.20	**ND**	**ND**	**ND**	**ND**	0.09	1.53	3.02	4.63	2.88	2.39	1.52
29	0.52	**ND**	**ND**	**ND**	**ND**	0.08	1.68	3.17	4.66	2.68	2.29	1.53
30	0.85	**ND**	**ND**	**ND**	--	0.20	2.45	3.20	4.62	2.64	2.30	1.51
31	0.95	--	**ND**	**ND**	--	0.17	--	3.30	--	2.53	2.20	--
Mean	1.39	1.45	ND	ND	ND	0.22	1.66	2.92	4.81	3.46	2.55	1.78
Min	0.52	0.77	ND	ND	ND	0.04	0.13	1.37	3.69	2.53	2.20	1.47
Max	1.74	2.13	ND	ND	ND	0.47	3.45	4.12	5.33	5.67	3.46	2.19

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	1.15
5/11/2024	1.61
6/7/2024	5.74
7/23/2024	3.08
8/5/2024	2.40
9/30/2024	1.45

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.

Lick Creek
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	0.14	0.09	**0.10**	**ND**	**ND**	**ND**	0.17	0.36	0.01	0.00	0.01	0.00
2	0.09	0.08	**0.08**	**ND**	**ND**	**ND**	0.16	0.33	0.00	0.00	0.01	0.00
3	0.05	0.09	**0.08**	**ND**	**ND**	**ND**	0.17	0.44	0.00	0.00	0.01	0.00
4	0.04	0.09	**0.07**	**ND**	**ND**	**ND**	0.22	0.47	0.01	0.00	0.01	0.00
5	0.04	0.11	**0.10**	**ND**	**ND**	**ND**	0.25	0.35	0.21	0.00	0.00	0.00
6	0.04	0.14	**0.13**	**ND**	**ND**	**ND**	0.19	0.27	0.18	0.00	0.00	0.00
7	0.05	0.15	**0.11**	**ND**	**ND**	**ND**	0.15	0.24	0.07	0.00	0.00	0.00
8	0.06	**0.06**	**0.08**	**ND**	**ND**	**ND**	0.16	0.18	0.03	0.00	0.00	0.00
9	0.13	**0.04**	**0.08**	**ND**	**ND**	**ND**	0.16	0.03	0.06	0.00	0.00	0.00
10	0.31	**0.04**	**0.11**	**ND**	**ND**	**ND**	0.15	0.01	0.04	0.00	0.00	0.00
11	0.33	**0.04**	**0.10**	**ND**	**ND**	**ND**	0.16	0.00	0.00	0.00	0.00	0.00
12	0.25	**0.03**	**0.11**	**ND**	**ND**	**0.11**	0.17	0.00	0.00	0.00	0.00	0.00
13	0.21	**0.05**	**0.05**	**ND**	**ND**	**0.12**	0.20	0.00	0.00	0.03	0.00	0.00
14	0.20	**0.05**	**0.05**	**ND**	**ND**	**0.11**	0.22	0.01	0.00	0.03	0.00	0.00
15	0.20	**0.04**	**0.05**	**ND**	**ND**	**0.10**	0.20	0.02	0.00	0.00	0.00	0.00
16	0.23	**0.04**	**0.09**	**ND**	**ND**	**0.13**	0.16	0.01	0.00	0.00	0.00	0.00
17	0.27	**0.05**	**0.13**	**ND**	**ND**	**0.12**	0.17	0.03	0.00	0.00	0.00	0.00
18	0.27	**0.04**	ND	**ND**	**ND**	**0.12**	0.21	0.28	0.00	0.02	0.00	0.00
19	0.26	**0.04**	**ND**	**ND**	**ND**	**0.13**	0.22	0.03	0.00	0.03	0.00	0.00
20	0.27	**0.04**	**ND**	**ND**	**ND**	**0.13**	0.29	0.00	0.00	0.00	0.00	0.00
21	0.29	**0.02**	**ND**	**ND**	**ND**	0.14	0.28	0.04	0.00	0.00	0.00	0.00
22	0.31	**0.03**	**ND**	**ND**	**ND**	0.13	0.34	0.02	0.00	0.00	0.00	0.00
23	0.30	**0.04**	**ND**	**ND**	**ND**	0.14	0.44	0.00	0.00	0.01	0.00	0.00
24	0.26	**0.03**	**ND**	**ND**	**ND**	0.17	0.45	0.00	0.00	0.02	0.00	0.00
25	0.24	**0.01**	**ND**	**ND**	**ND**	0.14	0.45	0.00	0.00	0.03	0.00	0.00
26	0.22	**0.03**	**ND**	**ND**	**ND**	0.13	0.32	0.10	0.00	0.04	0.00	0.00
27	0.20	**0.13**	**ND**	**ND**	**ND**	0.17	0.26	0.45	0.00	0.04	0.00	0.00
28	0.17	**0.18**	**ND**	**ND**	**ND**	0.18	0.21	0.33	0.00	0.03	0.00	0.00
29	0.11	**0.21**	**ND**	**ND**	**ND**	0.17	0.22	0.04	0.00	0.01	0.00	0.00
30	0.08	**0.15**	**ND**	**ND**	--	0.21	0.28	0.06	0.00	0.01	0.00	0.00
31	0.09	--	**ND**	**ND**	--	0.21	--	0.08	--	0.01	0.00	--
Mean	0.19	0.07	ND	ND	ND	0.14	0.23	0.14	0.02	0.01	0.00	0.00
Min	0.04	0.01	ND	ND	ND	0.10	0.15	0.00	0.00	0.00	0.00	0.00
Max	0.33	0.21	ND	ND	ND	0.21	0.45	0.47	0.21	0.04	0.01	0.00

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	0.0017
5/9/2024	0.1478
6/10/2024	0.1233
7/23/2024	0.0017
8/5/2024	0.0001
9/26/2024	0.0000

0.01 Flume Likely Ice Affected or Frozen.
ND - No Data. Sitlling well frozen.
Note: Water Level below 0.02 feet not connected to stilling well. Flows below 0.02 cfs are approximate.

Deep Creek Ditch
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	0.47	0.40	0.15	0.18	0.15	0.16	0.09	0.57	1.13	0.92	0.63	0.53
2	0.38	0.28	0.12	0.19	0.15	0.17	0.09	0.52	1.20	1.00	0.65	0.53
3	0.30	0.19	0.14	0.19	0.11	0.12	0.15	0.63	1.25	0.89	0.66	0.53
4	0.29	0.19	0.15	0.16	0.10	0.08	0.25	0.68	1.26	0.83	0.62	0.49
5	0.30	0.26	0.17	0.13	0.13	0.08	0.28	0.74	1.27	0.82	0.59	0.43
6	0.32	0.32	0.22	0.13	0.15	0.10	0.15	0.45	1.36	0.84	0.67	0.45
7	0.34	0.34	0.21	0.14	0.13	0.10	0.11	0.41	1.18	0.86	0.68	0.47
8	0.35	0.22	0.14	0.17	0.10	0.09	0.12	0.31	0.96	0.82	0.62	0.43
9	0.36	0.78	0.12	0.15	0.09	0.08	0.13	0.29	0.97	0.82	0.55	0.42
10	0.33	0.88	0.14	0.15	0.11	0.11	0.14	0.31	0.92	0.82	0.53	0.43
11	0.35	0.73	0.19	0.17	0.11	0.12	0.19	0.31	0.94	0.84	0.57	0.44
12	0.23	0.25	0.21	0.16	0.10	0.11	0.28	0.52	0.99	0.84	0.59	0.44
13	0.23	0.20	0.17	0.12	0.14	0.10	0.37	0.73	0.98	0.80	0.54	0.36
14	0.24	0.24	0.14	0.13	0.10	0.08	0.46	0.93	0.83	0.75	0.67	0.37
15	0.25	0.20	0.13	0.10	0.09	0.09	0.32	0.99	0.88	0.72	0.61	0.38
16	0.31	0.17	0.17	0.21	0.08	0.11	0.22	0.99	0.95	0.67	0.63	0.39
17	0.36	0.21	0.19	0.17	0.08	0.11	0.31	1.01	1.00	0.68	0.59	0.42
18	0.33	0.20	0.20	0.11	0.10	0.11	0.39	0.98	0.87	0.70	0.62	0.34
19	0.32	0.18	0.21	0.13	0.13	0.14	0.45	0.94	0.87	0.67	0.61	0.37
20	0.34	0.16	0.19	0.15	0.10	0.17	0.44	0.89	0.87	0.68	0.64	0.42
21	0.37	0.23	0.15	0.11	0.11	0.17	0.47	0.66	0.86	0.63	0.58	0.35
22	0.37	0.31	0.18	0.11	0.07	0.17	0.58	0.75	0.87	0.63	0.58	0.30
23	0.36	0.23	0.17	0.13	0.08	0.19	0.66	0.75	0.92	0.73	0.54	0.32
24	0.30	0.16	0.10	0.10	0.11	0.18	0.68	0.64	0.95	0.77	0.58	0.34
25	0.27	0.11	0.19	0.10	0.13	0.12	0.61	0.65	0.98	0.76	0.51	0.40
26	0.24	0.13	0.17	0.09	0.14	0.09	0.44	0.73	0.90	0.75	0.53	0.41
27	0.21	0.16	0.20	0.09	0.10	0.07	0.32	0.90	0.92	0.75	0.55	0.40
28	0.10	0.19	0.20	0.11	0.12	0.11	0.27	0.99	0.92	0.71	0.59	0.42
29	0.04	0.22	0.20	0.13	0.16	0.10	0.32	1.03	0.94	0.65	0.56	0.41
30	0.07	0.19	0.21	0.14	--	0.15	0.51	1.03	0.91	0.66	0.54	0.39
31	0.28	--	0.19	0.15	--	0.12	--	1.01	--	0.63	0.54	--
Mean	0.29	0.28	0.17	0.14	0.11	0.12	0.33	0.72	0.99	0.76	0.59	0.41
Min	0.04	0.11	0.10	0.09	0.07	0.07	0.09	0.29	0.83	0.63	0.51	0.30
Max	0.47	0.88	0.22	0.21	0.16	0.19	0.68	1.03	1.36	1.00	0.68	0.53

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	0.35
5/11/2024	0.43
6/7/2024	1.40
7/23/2024	0.69
8/5/2024	0.72
9/30/2024	0.35

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.

Minnesota Reservoir Flume
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	0.58	**0.82**	**0.46**	**0.20**	**ND**	**ND**	0.31	0.64	0.85	1.92	0.66	1.65
2	0.51	**0.60**	**0.41**	**0.21**	**ND**	**ND**	0.31	0.62	1.03	2.35	0.65	1.64
3	0.49	**0.86**	**0.40**	**0.18**	**ND**	**ND**	0.32	0.72	1.34	1.46	0.66	1.63
4	0.49	**0.69**	**0.40**	**0.12**	**ND**	**ND**	0.36	0.88	1.82	1.12	0.64	1.46
5	0.50	**0.84**	**0.47**	**0.13**	**ND**	**ND**	0.38	1.28	1.83	1.03	0.55	1.57
6	0.50	**0.60**	**0.52**	**0.12**	**ND**	**ND**	0.32	0.94	2.12	0.98	0.36	1.66
7	0.50	**0.63**	**0.46**	**0.07**	**ND**	**ND**	0.31	0.57	2.02	1.07	0.42	1.70
8	0.53	**0.51**	**0.39**	**0.08**	**ND**	**ND**	0.32	0.46	1.82	1.05	0.42	1.60
9	0.41	**0.57**	**0.43**	**0.11**	**ND**	**ND**	0.30	0.41	1.72	1.02	0.44	1.49
10	0.12	**0.59**	**0.45**	**0.05**	**ND**	**ND**	0.25	0.44	1.65	1.00	0.91	1.44
11	0.11	**0.59**	**0.41**	**0.05**	**ND**	**ND**	0.25	0.39	1.77	0.96	3.74	1.64
12	0.09	**0.57**	**0.40**	**0.01**	**ND**	**ND**	0.25	0.43	1.84	0.90	2.58	1.65
13	0.10	**0.57**	**0.31**	**0.00**	**ND**	**ND**	0.54	0.53	1.82	0.81	2.01	1.47
14	0.09	**0.54**	**0.30**	**0.01**	**ND**	**ND**	0.71	0.71	1.80	0.70	1.98	1.58
15	0.09	**0.50**	**0.32**	**0.01**	**ND**	**ND**	0.65	1.32	1.78	0.72	1.68	1.48
16	0.10	**0.45**	**0.38**	**0.11**	**ND**	**ND**	0.54	1.27	1.79	0.60	1.67	1.43
17	0.12	**0.47**	**0.36**	**ND**	**ND**	**ND**	0.55	1.18	1.86	0.79	1.59	1.39
18	0.11	**0.45**	**0.33**	**ND**	**ND**	**ND**	0.59	1.17	1.80	0.65	1.53	1.52
19	0.10	**0.44**	**0.31**	**ND**	**ND**	**0.08**	0.60	1.01	1.72	0.62	1.52	1.44
20	0.12	**0.45**	**0.26**	**ND**	**ND**	**0.11**	0.60	0.85	1.87	0.63	1.45	1.42
21	0.14	**0.46**	**0.23**	**ND**	**ND**	**0.12**	0.59	1.17	2.25	0.61	1.53	1.21
22	0.21	**0.50**	**0.26**	**0.03**	**ND**	**0.14**	0.67	0.82	2.04	0.64	1.64	1.63
23	**0.36**	**0.51**	**0.23**	**0.04**	**ND**	0.18	0.86	0.78	1.77	0.91	1.56	1.67
24	**0.64**	**0.47**	**0.23**	**0.01**	**ND**	0.24	1.07	0.53	1.76	0.88	1.62	1.64
25	**0.65**	**0.48**	**0.48**	**0.01**	**ND**	0.21	1.24	0.55	1.79	1.08	1.51	1.61
26	**0.70**	**0.61**	**0.40**	**0.01**	**ND**	0.18	0.84	0.53	1.80	1.03	1.56	1.50
27	**0.58**	**0.66**	**0.40**	**ND**	**ND**	0.15	0.55	0.64	1.83	1.14	1.50	1.59
28	**0.57**	**0.64**	**0.37**	**ND**	**ND**	0.19	0.46	0.74	1.95	0.87	1.53	0.89
29	**0.76**	**0.66**	**0.31**	**ND**	**ND**	0.20	0.48	0.75	1.87	0.75	1.49	0.13
30	**0.94**	**0.54**	**0.27**	**ND**	--	0.33	0.56	0.75	1.69	0.71	1.61	0.09
31	**0.84**	--	**0.18**	**ND**	--	0.33	--	0.70	--	0.67	1.60	--
Mean	0.39	0.58	0.36	0.07	ND	0.19	0.53	0.77	1.77	0.96	1.37	1.43
Min	0.09	0.44	0.18	0.00	ND	0.08	0.25	0.39	0.85	0.60	0.36	0.09
Max	0.94	0.86	0.52	0.21	ND	0.33	1.24	1.32	2.25	2.35	3.74	1.70

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	0.28
11/7/2023	0.69
4/10/2024	0.32
5/11/2024	0.23
6/7/2024	2.21
7/23/2024	0.69
8/5/2024	0.63
9/28/2024	0.20

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.
Note: Stilling well inlet is 0.10 feet above flume bottom, and flows between 0.00 (dry) and 0.28 cfs are approximate.
Note: A portion of total streamflow diverted around flume by beaver activity.

South Prong Creek
Streamflow
(cubic feet per second)

Daily Mean Streamflow (CFS)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	0.78	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
2	0.83	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
3	0.78	**0.54**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
4	0.77	**0.54**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
5	0.78	**0.57**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
6	0.79	**0.64**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
7	0.79	**0.69**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
8	0.81	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
9	0.70	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
10	0.47	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
11	0.46	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
12	0.52	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
13	0.50	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
14	0.48	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
15	0.46	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
16	0.49	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
17	0.51	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
18	0.51	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
19	0.50	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
20	0.52	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
21	0.54	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
22	0.54	**ND**	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1
23	0.52	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
24	0.50	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
25	0.51	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
26	0.50	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
27	0.45	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
28	0.65	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
29	0.53	**ND**	**ND**	**ND**	**ND**	ND1	ND1	ND1	ND1	ND1	ND1	ND1
30	**ND**	**ND**	**ND**	**ND**	--	ND1	ND1	ND1	ND1	ND1	ND1	ND1
31	**ND**	--	**ND**	**ND**	--	ND1	--	ND1	--	ND1	ND1	--
Mean	0.59	0.60	ND	ND	ND	ND	ND1	ND1	ND1	ND1	ND1	ND1
Min	0.45	0.54	ND	ND	ND	ND	ND1	ND1	ND1	ND1	ND1	ND1
Max	0.83	0.69	ND	ND	ND	ND	ND1	ND1	ND1	ND1	ND1	ND1

Measured Streamflow

Date	Streamflow (CFS)
10/9/2023	0.56
11/7/2023	0.73
5/9/2024	1.12
6/10/2024	8.93
7/23/2024	0.87
8/5/2024	0.52
9/26/2024	0.44

0.01 Flume Likely Ice Affected or Frozen.
ND No Data. Stilling Well Frozen.
ND1 No Data. Pressure Transducer Malfunction.
Note: Water Level below 0.02 feet not connected to stilling well. Flows below 0.02 cfs are approximate.
Note: When height of water in flume is above 1.50 feet (11.19 cfs), bypass spillways overflow and flow through flume is less than total flow in stream.

Upper Sylvester Gulch
Measured Flow

Date	GPM	CFS	Comments
4/30/2000	0.00	0.000	Dry
9/19/2000	0.00	0.000	Dry
4/28/2001	0.00	0.000	Dry
6/24/2001	0.00	0.000	Dry
9/28/2001	0.00	0.000	Dry
4/29/2002	0.00	0.000	Dry
6/18/2002	0.00	0.000	Dry
9/9/2002	0.00	0.000	Dry
4/10/2003	0.00	0.000	Dry
6/2/2003	0.00	0.000	Dry
9/18/2003	0.00	0.000	Dry
4/25/2004	0.00	0.000	Dry
5/29/2004	0.00	0.000	Dry
8/31/2004	0.00	0.000	Dry
5/3/2005	0.00	0.000	Dry
6/4/2005	0.00	0.000	No flow
9/20/2005	0.00	0.000	Dry
5/1/2006	0.00	0.000	Dry
5/16/2006	0.00	0.000	Dry
9/12/2006	0.00	0.000	Dry
5/30/2007	0.00	0.000	Dry
8/24/2007	0.00	0.000	Dry
4/25/2007	136	0.303	
5/30/2007	0.00	0.000	Dry
8/24/2007	0.00	0.000	Dry
5/9/2008	887.29	1.977	
6/6/2008	155.22	0.346	
8/20/2008	0.00	0.000	Dry
5/7/2009	155.22	0.346	
5/24/2009	75.62	0.168	
8/10/2009	0.00	0.000	Dry
5/4/2010	0.00	0.000	Dry
6/1/2010	0.00	0.000	Dry
9/1/2010	0.00	0.000	Dry
5/10/2011	365.42	0.814	
6/1/2011	175.44	0.391	
8/10/2011	1.20	0.003	
4/30/2012	0.00	0.000	Dry
5/15/2012	0.00	0.000	Dry
8/20/2012	0.00	0.000	Dry
5/2/2013	0.00	0.000	Dry
5/23/2013	0.00	0.000	Dry
8/20/2013	0.00	0.000	Dry
5/1/2014	0.00		
5/21/2014	18.46	0.041	
9/23/2014	0.00	0.000	Dry
4/24/2015	0.00	0.000	Dry
5/27/2015	2.24	0.005	
8/29/2015	2.24	0.005	
5/5/2016	34.70	0.077	
5/25/2016	23.62	0.053	
9/7/2016	14.12	0.031	
5/12/2017	18.66	0.042	
6/6/2017	3.47	0.008	
9/5/2017	0.00	0.000	Dry
5/12/2018	0.00	0.000	Dry
6/10/2018	0.00	0.000	Dry
9/29/2018	0.00	0.000	Dry
5/7/2019	28.98	0.065	
6/20/2019	1.20	0.003	
9/12/2019	0.00	0.000	Dry
5/11/2020	0.00	0.000	Dry
6/8/2020	0.00	0.000	Dry
9/23/2020	0.00	0.000	Dry
5/6/2021	0.00	0.000	Dry
6/7/2021	0.00	0.000	Dry
9/28/2021	0.00	0.000	Dry
5/4/2022	0.00	0.000	Dry
5/27/2022	0.00	0.000	Dry
9/6/2022	0.00	0.000	Dry
5/10/2023	853.56	1.902	
6/6/2023	34.70	0.077	
9/5/2023	0.00	0.000	Dry
5/7/2024	0.00	0.000	Dry
6/8/2024	0.00	0.000	Dry
9/30/2024	0.00	0.000	Dry

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Horse Gulch
Measured Flow

Date	GPM	CFS	Comments
5/7/2000	0.00	0.000	Dry
6/14/2000	0.00	0.000	Dry
9/17/2000	0.00	0.000	Dry
5/2/2001	0.00	0.000	Dry
6/25/2001	0.00	0.000	Dry
9/26/2001	0.00	0.000	Dry
4/25/2002	0.00	0.000	Dry
6/17/2002	0.00	0.000	Dry
9/10/2002	0.00	0.000	Dry
4/12/2003	0.00	0.000	Dry
6/2/2003	0.00	0.000	Dry
9/18/2003	0.00	0.000	Dry
4/25/2004	0.00	0.000	Dry
5/30/2004	0.00	0.000	Dry
9/2/2004	0.00	0.000	Dry
5/10/2005	0.00	0.000	Dry
6/5/2005	0.00	0.000	Dry
9/13/2005	0.00	0.000	Dry
5/1/2006	0.00	0.000	Dry
5/24/2006	0.00	0.000	Dry
9/6/2006	0.00	0.000	Dry
4/27/2007	0.00	0.000	Dry
5/30/2007	0.00	0.000	Dry
8/24/2007	0.00	0.000	Dry
5/5/2008	275	0.613	
6/7/2008	0.00	0.000	Dry
8/23/2008	0.00	0.000	Dry
5/8/2009	0.00	0.000	Dry
6/2/2009	0.00	0.000	Dry
8/11/2009	0.00	0.000	Dry
5/6/2010	0.00	0.000	Dry
6/2/2010	0.00	0.000	Dry
9/1/2010	0.00	0.000	Dry
5/5/2011	0.00	0.000	Dry
6/1/2011	0.00	0.000	Dry
8/11/2011	0.00	0.000	Dry
4/24/2012	0.00	0.000	Dry
5/15/2012	0.00	0.000	Dry
8/22/2012	0.00	0.000	Dry
5/2/2013	0.00	0.000	Dry
5/21/2013	0.00	0.000	Dry
8/23/2013	0.00	0.000	Dry
4/30/2014	0.00	0.000	Dry
5/21/2014	0.00	0.000	Dry
9/23/2014	0.00	0.000	Dry
4/25/2015	0.00	0.000	Dry
5/25/2015	0.00	0.000	Dry
8/18/2015	0.00	0.000	Dry
5/5/2016	0.00	0.000	Dry
5/24/2016	0.00	0.000	Dry
9/5/2016	0.00	0.000	Dry
5/10/2017	0.00	0.000	Dry
6/8/2017	0.00	0.000	Dry
9/7/2017	0.00	0.000	Dry
5/11/2018	0.00	0.000	Dry
6/11/2018	0.00	0.000	Dry
9/27/2018	0.00	0.000	Dry
5/1/2019	0.00	0.000	Dry
6/20/2019	0.00	0.000	Dry
9/11/2019	0.00	0.000	Dry
5/11/2020	0.00	0.000	Dry
6/8/2020	0.00	0.000	Dry
9/3/2020	0.00	0.000	Dry
5/7/2021	0.00	0.000	Dry
6/10/2021	0.00	0.000	Dry
9/21/2021	0.00	0.000	Dry
5/6/2022	0.00	0.000	Dry
5/26/2022	0.00	0.000	Dry
9/6/2022	0.00	0.000	Dry
5/9/2023	262	0.584	
6/8/2023	0.00	0.000	Dry
9/4/2023	0.00	0.000	Dry
5/11/2024	0.00	0.000	Dry
6/7/2024	0.00	0.000	Dry
9/28/2024	0.00	0.000	Dry

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

East Gulch East of Horse Gulch
Measured Flow

Date	GPM	CFS	Comments
5/7/2000	3.00	0.007	
6/14/2000	2.50	0.006	
9/17/2000	0.00	0.000	Seep
5/2/2001	3.75	0.008	
6/25/2001	3.75	0.008	
9/26/2001	0.00	0.000	Dry
4/25/2002	0.00	0.000	Dry
6/17/2002	0.00	0.000	Dry
9/10/2002	0.00	0.000	Dry
4/12/2003	0.00	0.000	Dry
6/3/2003	0.00	0.000	Dry
9/18/2003	0.00	0.000	Dry
4/25/2004	0.00	0.000	Dry
5/29/2004	0.00	0.000	Dry
9/2/2004	0.00	0.000	Dry
5/1/2005	45	0.100	
6/5/2005	0.68	0.002	
10/2/2005	0.00	0.000	Wet
5/4/2006	0.00	0.000	Dry
5/23/2006	0.00	0.000	Dry
9/6/2006	0.00	0.000	Dry
4/27/2007	0.00	0.000	Dry
5/30/2007	0.00	0.000	Dry
8/24/2007	0.00	0.000	Dry
5/5/2008	0.00	0.000	Dry
6/7/2008	0.00	0.000	Dry
8/23/2008	0.00	0.000	Dry
5/8/2009	0.00	0.000	Dry
6/2/2009	0.00	0.000	Dry
8/11/2009	0.00	0.000	Dry
5/6/2010	0.00	0.000	Dry
6/2/2010	0.10	0.000	Trickle
9/1/2010	0.00	0.000	Dry
5/5/2011	88.42	0.197	
6/3/2011	43.55	0.097	
8/12/2011	0.10	0.000	Trickle
4/30/2012	0.00	0.000	Dry
5/14/2012	0.00	0.000	Dry
8/22/2012	0.00	0.000	Dry
5/1/2013	0.00	0.000	Dry
5/21/2013	0.00	0.000	Dry
8/23/2013	0.00	0.000	Dry
5/2/2014	4.04	0.009	Dry
5/19/2014	0.00	0.000	Wet
9/23/2014	0.00	0.000	Dry
5/28/2015	0.00	0.000	Dry
8/18/2015	0.00	0.000	Dry
4/25/2015	0.00	0.000	Dry
5/2/2016	25.28	0.056	
5/24/2016	2.45	0.005	
9/6/2016	0.00	0.000	Dry
5/10/2017	25.96	0.058	
6/8/2017	0.62	0.001	
9/5/2017	0.00	0.000	Dry
5/11/2018	0.00	0.000	Dry
6/11/2018	0.00	0.000	Dry
9/27/2018	0.00	0.000	Dry
5/1/2019	119	0.265	
6/20/2019	0.00	0.000	Dry
9/11/2019	0.00	0.000	Dry
5/12/2020	0.00	0.000	Dry
6/8/2020	0.00	0.000	Dry
9/4/2020	0.00	0.000	Dry
5/6/2021	0.00	0.000	Dry
6/11/2021	0.00	0.000	Dry
9/21/2021	0.00	0.000	Dry
5/4/2022	0.00	0.000	Dry
5/27/2022	0.00	0.000	Dry
9/6/2022	0.00	0.000	Dry
5/9/2023	412	0.919	
6/7/2023	5.69	0.013	
9/6/2023	0.00	0.000	Dry
5/11/2024	0.00	0.000	Dry
6/7/2024	0.00	0.000	Dry
9/28/2024	0.00	0.000	Dry

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Upper Deep Creek
Measured Flow

Date	GPM	CFS	Comments
5/4/2006	5,251	11.700	
5/24/2006	2,567	5.720	
8/17/2006	1,634	3.640	
4/28/2007	5,332	11.880	
5/29/2007	1,400	3.120	
9/11/2007	353	0.787	
5/11/2008	17,504	39.000	
6/8/2008	7,181	16.000	
8/21/2008	368	0.820	
5/9/2009	5,911	13.170	
6/4/2009	1,445	3.220	
8/9/2009	49.37	0.110	
5/7/2010	2,249	5.010	
6/3/2010	1,014	2.260	
8/31/2010	35.91	0.080	
5/9/2011	8,209	18.290	
6/1/2011	8,824	19.660	
8/11/2011	130	0.290	
4/26/2012	730	1.628	
5/16/2012	321	0.716	
8/22/2012	15.83	0.035	
5/3/2013	1,549	3.454	
5/21/2013	1,582	3.528	
8/21/2013	603	1.345	
5/3/2014	1,773	3.954	
5/20/2014	2,869	6.398	
9/24/2014	147	0.328	
4/23/2015	801	1.786	
5/27/2015	2,568	5.727	
8/19/2015	132	0.295	
5/4/2016	2,720	6.066	
5/24/2016	1,627	3.628	
9/5/2016	113	0.252	
5/11/2017	2,029	4.525	
6/7/2017	1,367	3.048	
9/7/2017	116	0.259	
5/10/2018	643	1.434	
6/11/2018	95	0.212	
9/28/2018	51	0.114	
5/6/2019	3,214	7.167	
6/17/2019	1,585	3.535	
9/11/2019	54	0.120	
5/13/2020	971	2.165	
6/7/2020	179	0.399	
9/25/2020	31.8	0.071	
5/6/2021	650	1.450	
6/10/2021	92	0.205	
9/21/2021	32.7	0.073	
5/6/2022	1,748	3.898	
5/26/2022	1,012	2.257	
9/5/2022	23.9	0.053	
5/16/2023	8,625	19.234	
6/8/2023	6,215	13.859	
9/7/2023	98.9	0.221	
5/7/2024	1,118	2.493	
6/7/2024	1,078	2.404	
9/30/2024	54.19	0.121	

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Lower Deep Creek
Measured Flow

Date	GPM	CFS	Comments
5/4/2006	5,745	12.800	
5/24/2006	2,437	5.430	
8/17/2006	1,557	3.470	
4/28/2007	8,039	17.910	
5/29/2007	2,298	5.120	
9/11/2007	467	1.040	
5/11/2008	16,607	37.000	
6/8/2008	8,079	18.000	
8/21/2008	368	0.820	
5/9/2009	3,793	8.450	
6/4/2009	1,423	3.170	
8/9/2009	53.86	0.120	
5/7/2010	3,039	6.770	
6/3/2010	1,346	3.000	
8/31/2010	67.32	0.150	
5/9/2011	11,800	26.290	
6/1/2011	10,067	22.430	
8/11/2011	171	0.380	
4/28/2012	1,061	2.366	
5/16/2012	437	0.975	
8/22/2012	13.44	0.030	
5/3/2013	2,401	5.354	
5/22/2013	1,547	3.450	
8/21/2013	983	2.192	
5/3/2014	2,933	6.541	
5/20/2014	3,283	7.320	
9/24/2014	157	0.350	
4/23/2015	849	1.893	
5/26/2015	2,456	5.477	
8/19/2015	100	0.223	
5/4/2016	2,846	6.347	
5/25/2016	3,670	8.184	
9/5/2016	143	0.318	
5/11/2017	2,939	6.554	
6/7/2017	1,397	3.115	
9/7/2017	119	0.265	
5/10/2018	1,065	2.375	
6/11/2018	90	0.202	
9/28/2018	53	0.117	
5/6/2019	5,840	13.023	
6/17/2019	2,222	4.955	
9/11/2019	149	0.332	
5/13/2020	708	1.579	
6/7/2020	506	1.128	
9/25/2020	22.6	0.050	
5/6/2021	467	1.041	
6/10/2021	118	0.263	
9/21/2021	19.1	0.043	
5/6/2022	1,812	4.041	
5/26/2022	1,101	2.455	
9/5/2022	38.9	0.087	
5/16/2023	10,480	23.370	
6/8/2023	5,842	13.028	
9/7/2023	129.6	0.289	
5/7/2024	1,257	2.803	
6/7/2024	1,079	2.406	
9/30/2024	106.44	0.237	

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Box Canyon
Measured Flow

Date	GPM	CFS	Comments
5/6/2000	0.00	0.000	Damp
6/12/2000	0.00	0.000	No Flow
9/18/2000	0.00	0.000	Dry
4/28/2001	0.00	0.000	Dry
6/24/2001	0.00	0.000	Dry
9/30/2001	0.00	0.000	Dry
4/23/2002	0.00	0.000	Dry
6/18/2002	0.00	0.000	Dry
9/9/2002	0.00	0.000	Dry
4/10/2003	0.00	0.000	Dry
6/4/2003	0.00	0.000	Dry
9/18/2003	0.00	0.000	Dry
4/25/2004	0.00	0.000	Dry
5/29/2004	0.00	0.000	Dry
8/31/2004	0.00	0.000	Dry
5/2/2005	0.00	0.000	Dry
6/4/2005	0.00	0.000	Dry
9/20/2005	0.00	0.000	Dry
4/29/2006	0.00	0.000	Dry
5/15/2006	0.00	0.000	Dry
9/6/2006	0.00	0.000	Dry
4/26/2007	0.00	0.000	Dry
5/24/2007	0.00	0.000	Dry
8/24/2007	0.00	0.000	Dry
5/6/2008	4.40	0.010	4.40
6/6/2008	9.60	0.021	9.60
8/23/2008	0.00	0.000	Trickle
5/7/2009	5.74	0.013	5.74
5/24/2009	1.08	0.002	1.08
8/10/2009	0.23	0.001	0.23
5/4/2010	0.00	0.000	Dry
6/1/2010	0.00	0.000	Dry
8/29/2010	0.00	0.000	Dry
5/6/2011	0.00	0.000	Dry
6/2/2011	0.00	0.000	Dry
8/12/2011	0.00	0.000	Dry
4/25/2012	0.00	0.000	Dry
5/15/2012	0.00	0.000	Dry
8/19/2012	0.00	0.000	Dry
5/1/2013	0.00	0.000	Dry
5/22/2013	0.00	0.000	Dry
8/23/2013	0.00	0.000	Dry
5/1/2014	0.00	0.000	Dry
5/21/2014		0.000	Dry
9/23/2014	0.00	0.000	Dry
4/26/2015	0.00	0.000	Dry
5/29/2015	0.00	0.000	Dry
8/29/2015	0.00	0.000	Dry
5/3/2016	0.00	0.000	Dry
5/26/2016	0.00	0.000	Dry
9/8/2016	0.00	0.000	Dry
5/12/2017	0.00	0.000	Dry
6/6/2017	0.00	0.000	Dry
9/7/2017	0.00	0.000	Dry
5/12/2018	0.00	0.000	Dry
6/10/2018	0.00	0.000	Dry
9/29/2018	0.00	0.000	Dry
5/2/2019	0.00	0.000	Dry
6/22/2019	0.00	0.000	Dry
9/10/2019	0.00	0.000	Dry
5/12/2020	0.00	0.000	Dry
6/8/2020	0.00	0.000	Dry
9/25/2020	0.00	0.000	Dry
5/5/2021	0.00	0.000	Dry
6/7/2021	0.00	0.000	Dry
9/27/2021	0.00	0.000	Dry
5/4/2022	0.00	0.000	Dry
5/31/2022	0.00	0.000	Dry
9/6/2022	0.00	0.000	Dry
5/10/2023	6.50	0.014	
6/6/2023	4.94	0.011	
9/5/2023	0.00	0.000	Dry
5/6/2024	0.00	0.000	Dry
6/10/2024	0.00	0.000	Dry
9/24/2024	0.00	0.000	Dry

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Deer Creek
Measured Flow

Date	GPM	CFS	Comments
5/3/2005	53	0.118	
5/9/2005	114	0.254	
6/6/2005	11.2	0.025	
7/5/2005	0.72	0.002	
8/4/2005	0.00	0.000	Damp
9/6/2005	0.00	0.000	Dry
10/2/2005	0.00	0.000	Dry
5/1/2006	0.00	0.000	Dry
7/22/2006	0.00	0.000	Dry
8/18/2006	0.00	0.000	Dry
4/27/2007	22.20	0.050	
5/30/2007	46.98	0.105	
8/23/2007	0.00	0.000	Dry
4/27/2007	22.20	0.050	
5/30/2007	46.98	0.105	
8/23/2007	0.00	0.000	Dry
5/5/2008	550	1.227	
6/8/2008	92	0.205	
8/22/2008	0	0.000	Dry
5/8/2009	0.00	0.000	Dry
6/3/2009	25.98	0.058	
8/10/2009	0.00	0.000	Dry
5/6/2010	0.00	0.000	Dry
6/2/2010	0.00	0.000	Dry
8/31/2010	0.00	0.000	Dry
5/5/2011	155	0.346	
6/3/2011	122	0.272	
8/12/2011	0.00	0.000	Dry
4/24/2012	0.00	0.000	Dry
5/17/2012	0.00	0.000	Dry
8/22/2012	0.00	0.000	Dry
5/1/2013	0.00	0.000	Dry
5/21/2013	0.00	0.000	Dry
8/23/2013	0.00	0.000	Dry
5/2/2014	3.66	0.008	
5/19/2014	12.20	0.027	
9/23/2014	0.00	0.000	Dry
4/24/2015	0.00	0.000	Dry
5/25/2015	0.00	0.000	Dry
8/19/2015	0.00	0.000	Dry
5/2/2016	83.48	0.186	
5/24/2016	33.05	0.074	
9/7/2016	0.00	0.000	Dry
5/10/2017	0.00	0.000	Dry
6/8/2017	0.00	0.000	Dry
9/7/2017	0.00	0.000	Dry
5/11/2018	0.00	0.000	Dry
6/12/2018	0.00	0.000	Dry
9/27/2018	0.00	0.000	Dry
5/1/2019	269	0.600	
6/20/2019	0.25	0.001	
9/11/2019	0.00	0.000	Dry
5/12/2020	0.00	0.000	Dry
6/8/2020	0.00	0.000	Dry
9/3/2020	0.00	0.000	Dry
5/6/2021	0.00	0.000	Dry
6/8/2021	0.00	0.000	Dry
9/6/2021	0.00	0.000	Dry
5/6/2022	0.00	0.000	Dry
5/27/2022	0.00	0.000	Dry
9/6/2022	0.00	0.000	Dry
5/9/2023	491	1.095	
6/7/2023	44.04	0.098	
9/4/2023	0.00	0.000	Dry
5/11/2024	0.00	0.000	Dry
6/7/2024	0.00	0.000	Dry
9/28/2024	0.00	0.000	Dry

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Poison Gulch
Measured Flow

Date	GPM	CFS	Comments
5/9/2005	97	0.216	
6/6/2005	12.5	0.028	
7/5/2005	0.00	0.000	Wet
8/4/2005	0.00	0.000	Dry
9/6/2005	0.00	0.000	Dry
10/2/2005	0.00	0.000	Dry
5/1/2006	31.33	0.070	
5/22/2006	4.01	0.009	
8/18/2006	0.00	0.000	Dry
4/27/2007	15	0.033	
5/30/2007	60	0.134	
8/23/2007	0.00	0.000	Dry
4/27/2007	15	0.033	
5/30/2007	60	0.134	
8/23/2007	0.00	0.000	Dry
5/5/2008	530	1.182	
6/8/2008	56	0.125	
8/22/2008	0.1	0.000	Trickle
5/9/2009	65.81	0.147	
6/3/2009	75	0.167	
8/9/2009	0.00	0.000	Dry
5/6/2010	38.89	0.087	
6/2/2010	5.39	0.012	
8/31/2010	0.00	0.000	Damp
5/9/2011	351	0.783	
6/1/2011	145	0.323	
8/11/2011	1.26	0.003	
4/30/2012	5.53	0.012	
5/16/2012	3.24	0.007	
8/22/2012	0.00	0.000	Dry
5/1/2013	22.40	0.050	
5/21/2013	0.78	0.002	
8/23/2013	0.00	0.000	Dry
5/2/2014	12.04	0.027	
5/19/2014	6.71	0.015	
9/24/2014	0.00	0.000	Dry
4/25/2015	0.00	0.000	Seep
5/28/2015	0.00	0.000	Seep
8/19/2015	0.00	0.000	Dry
5/4/2016	27.75	0.062	
5/24/2016	18.75	0.042	
9/5/2016	0.00	0.000	Dry
5/11/2017	16.29	0.036	
6/7/2017	0.80	0.002	
9/7/2017	0.00	0.000	Dry
5/11/2018	0.00	0.000	Dry
6/11/2018	0.00	0.000	Dry
9/27/2018	0.00	0.000	Dry
5/6/2019	45.2	0.101	
6/20/2019	0.00	0.000	Dry
9/11/2019	0.00	0.000	Dry
5/13/2020	0.00	0.000	Dry
6/7/2020	0.00	0.000	Dry
9/4/2020	0.00	0.000	Dry
5/6/2021	0.00	0.000	Dry
6/11/2021	0.00	0.000	Dry
9/21/2021	0.00	0.000	Dry
5/6/2022	0.00	0.000	Dry
5/27/2022	0.00	0.000	Dry
9/6/2022	0.00	0.000	Dry
5/9/2023	413.00	0.921	
6/8/2023	22.80	0.051	
9/7/2023	0.00	0.000	Dry
5/11/2024	0.00	0.000	Dry
6/7/2024	0.00	0.000	Dry
9/28/2024	0.00	0.000	Dry

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

South Fork of South Prong Creek
Measured Flow

Date	GPM	CFS	Comments
7/19/2018	236.9	0.53	
8/30/2018	100.9	0.23	
9/25/2018	117.9	0.26	
5/8/2019	1,603	3.57	
6/19/2019	5,147	11.48	
7/30/2019	1,322	2.95	
9/9/2019	345.5	0.77	
5/14/2020	1,418	3.16	
6/11/2020	1,031	2.30	
9/3/2020	175	0.39	
5/7/2021	436	0.97	
6/8/2021	2,269	5.06	
9/6/2021	172	0.38	
5/9/2022	1,497	3.34	
5/30/2022	2,030	4.53	
9/2/2022	322	0.72	
6/5/2023	5,472	12.20	
9/4/2023	511	1.14	
5/9/2024	564	1.26	
6/10/2024	4,130	9.21	
9/26/2024	156.3	0.35	

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

North Fork of South Prong Creek
Measured Flow

Date	GPM	CFS	Comments
7/19/2018	0.00	0.000	Dry
8/30/2018	0.00	0.000	Dry
9/25/2018	0.00	0.000	Dry
5/8/2019	27.99	0.062	
6/19/2019	134.14	0.299	
7/30/2019	9.95	0.022	
9/9/2019	0.00	0.000	Dry
5/14/2020	21.58	0.048	
6/11/2020	7.64	0.017	
9/3/2020	0.00	0.000	Dry
5/7/2021	0.00	0.000	Dry
6/8/2021	0.00	0.000	Dry
9/6/2021	0.00	0.000	Dry
5/9/2022	78.33	0.175	
5/30/2022	24.26	0.054	
9/2/2022	0.00	0.000	Dry
6/5/2023	169	0.377	
9/4/2023	14.83	0.033	
5/9/2024	95.12	0.212	
6/10/2024	53.94	0.120	
9/26/2024	26.01	0.058	

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

Stream ST-SW-1
Measured Flow

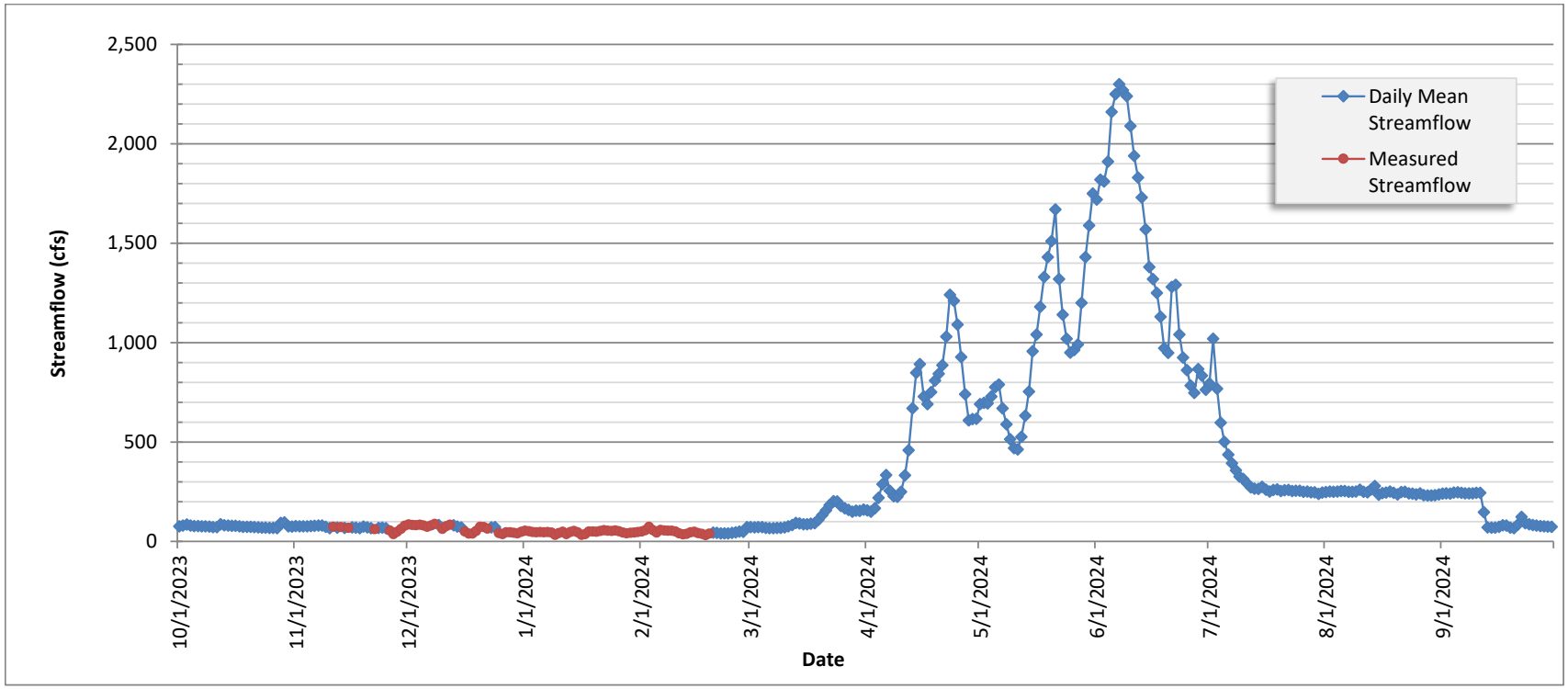
Date	GPM	CFS	Comments
7/18/2018	7.75	0.017	
8/29/2018	8.75	0.020	
9/25/2018	12.98	0.029	
6/19/2019	77.97	0.174	
7/30/2019	174.7	0.390	
9/9/2019	48.87	0.109	
5/14/2020	60.18	0.134	
6/11/2020	35.94	0.080	
9/3/2020	11.03	0.025	
5/7/2021	47.40	0.106	
6/8/2021	16.89	0.038	
9/6/2021	8.90	0.020	
5/9/2022	191.50	0.427	
5/30/2022	56.71	0.126	
9/2/2022	12.97	0.029	
6/5/2023	194.00	0.433	
9/4/2023	10.60	0.024	
5/9/2024	95.7	0.213	
6/10/2024	27.07	0.060	
9/26/2024	7.93	0.018	

Non-data logger site
GPM - gallons per minute
CFS - cubic feet per second

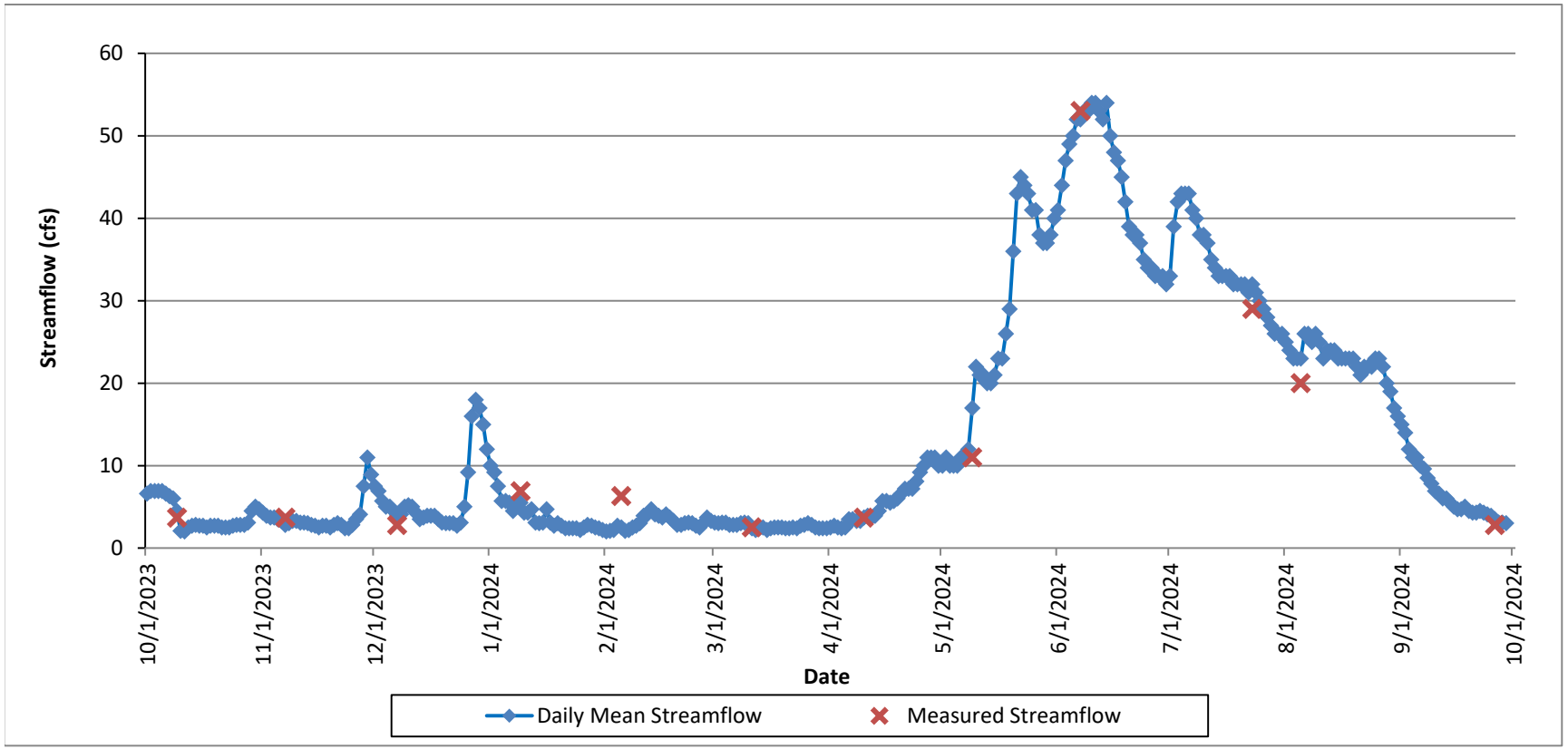
APPENDIX B

SURFACE WATER - HYDROGRAPHS

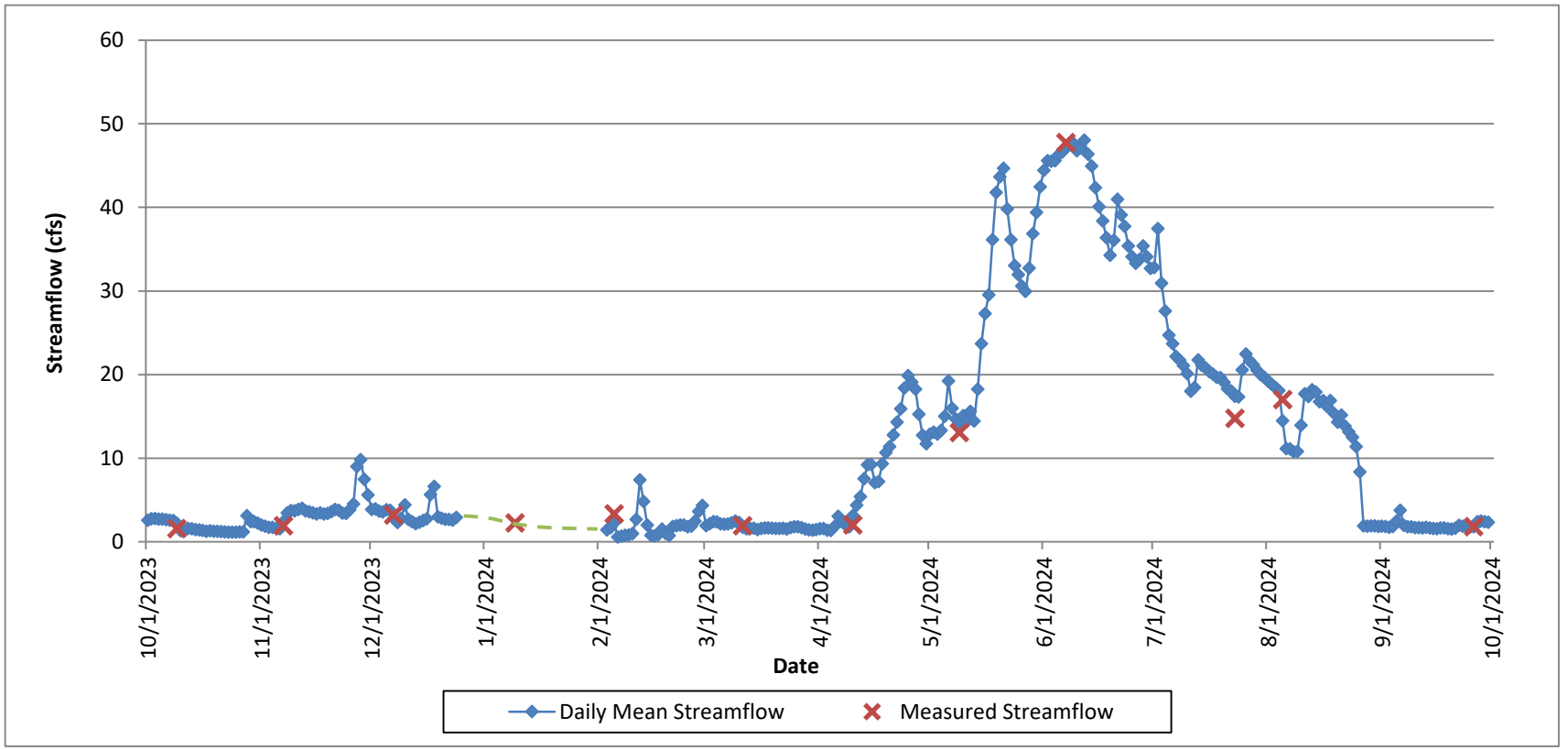
Upper North Fork (USGS) Hydrograph
WY 2024



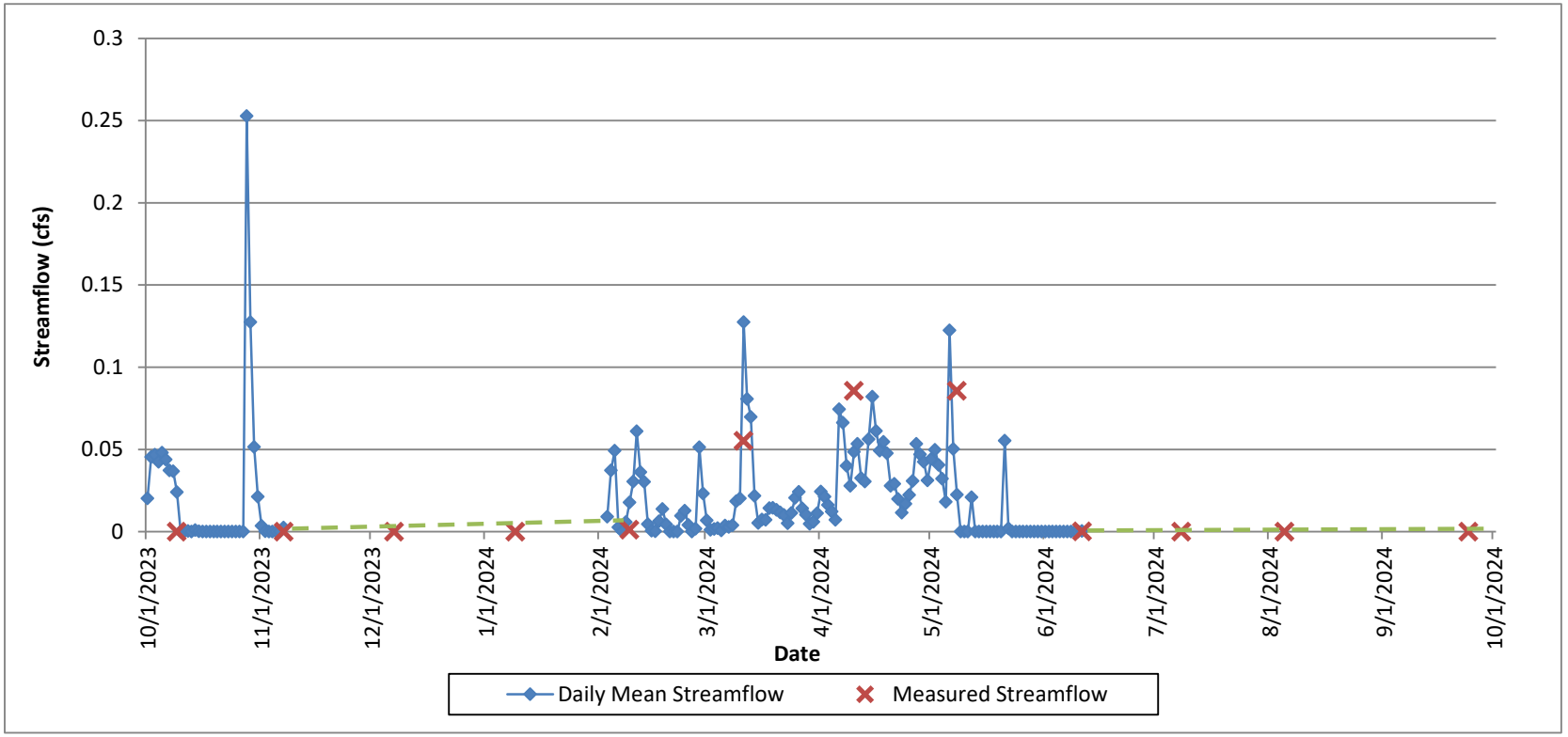
Lower Minnesota Creek Hydrograph
WY 2024



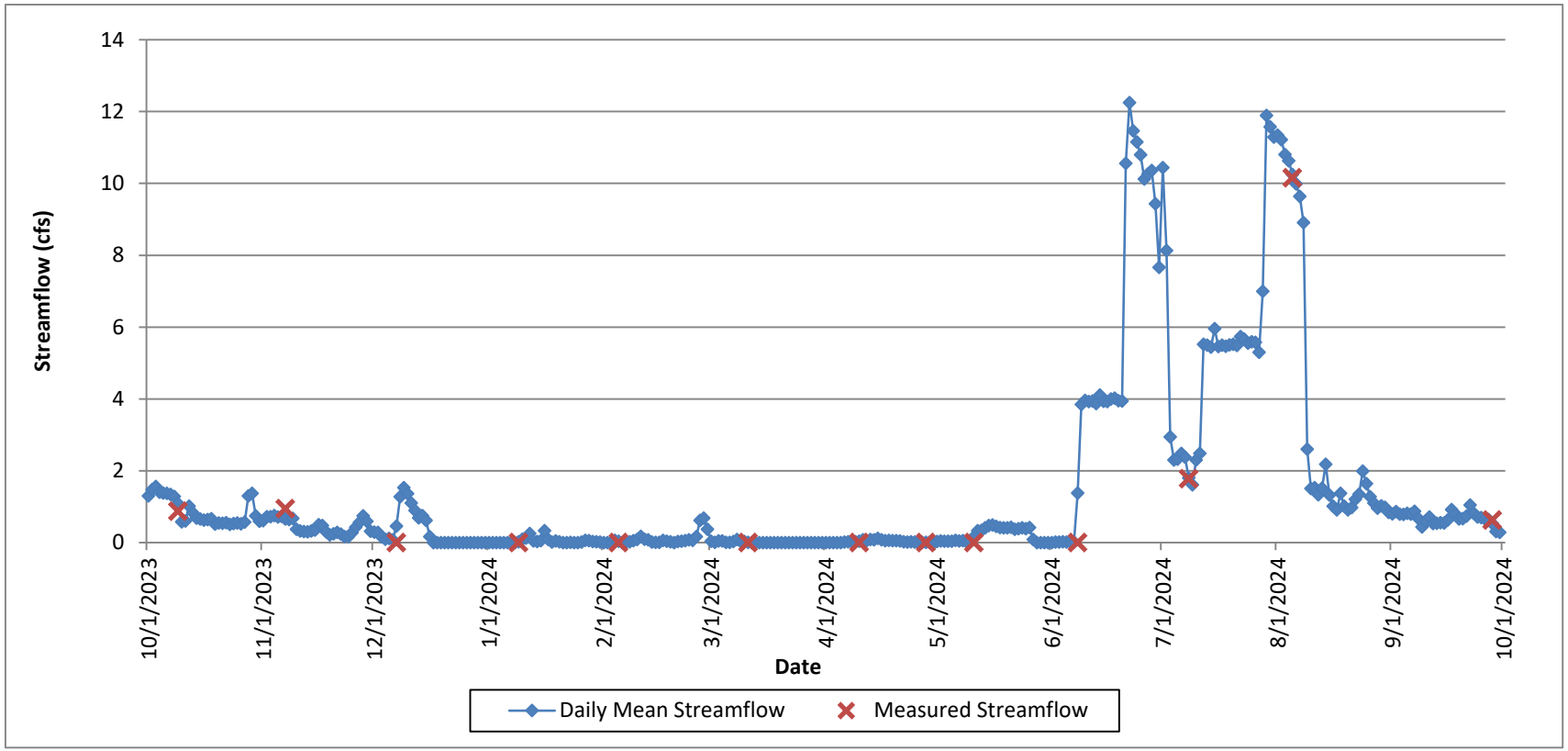
Upper Minnesota Creek Hydrograph
WY 2024



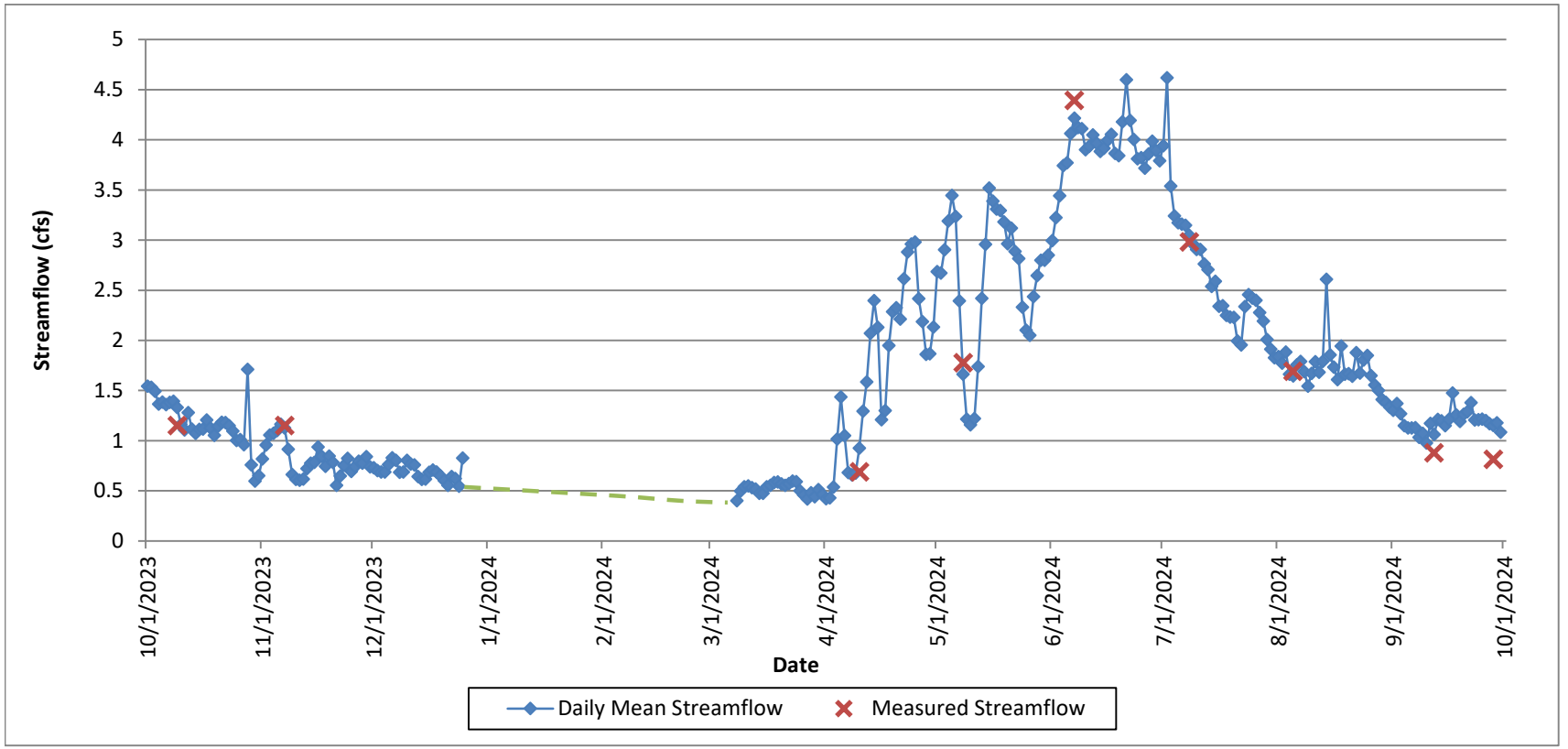
Middle Sylvester Gulch Hydrograph
WY 2024



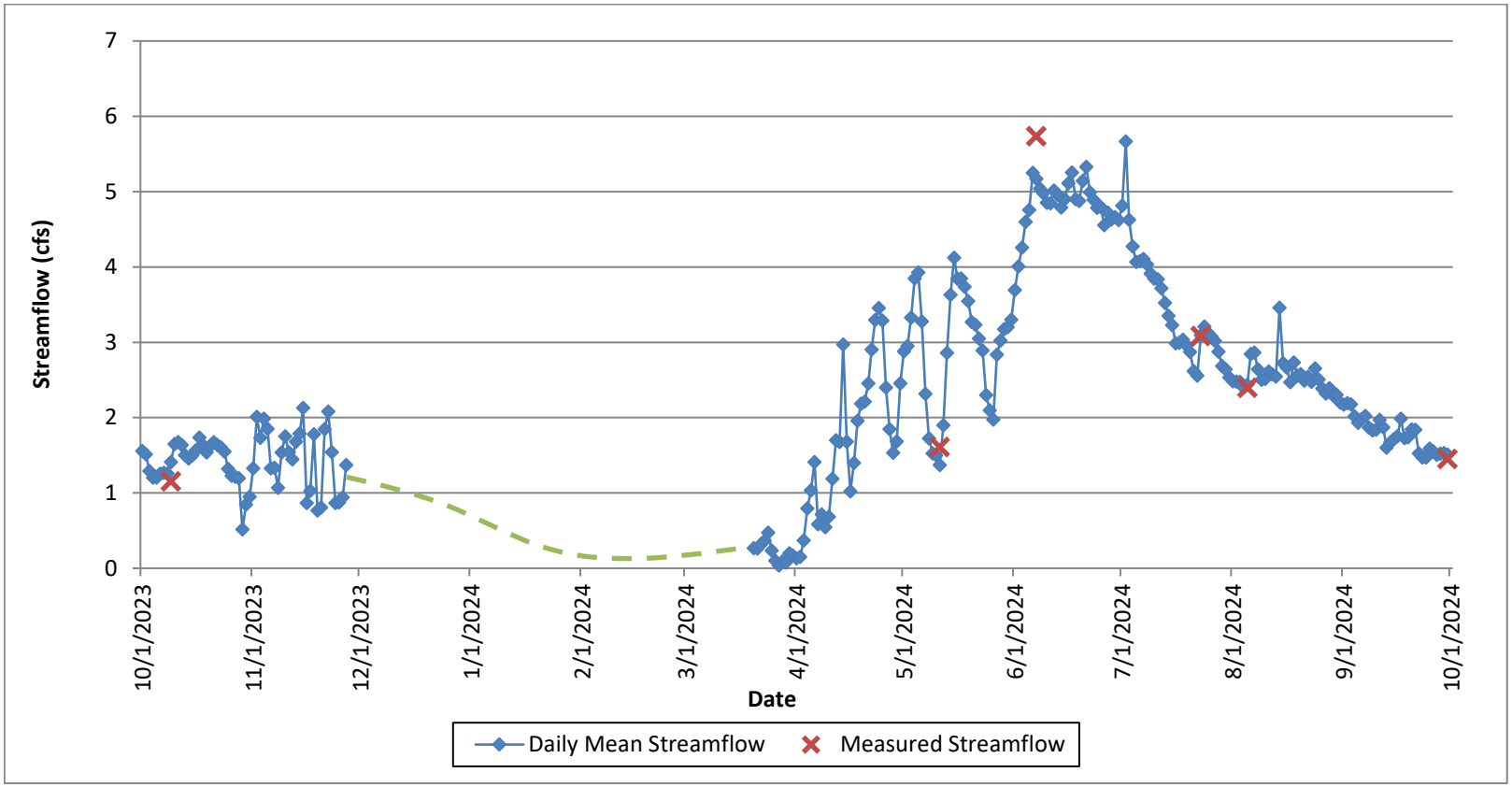
Lower Dry Fork Hydrograph
WY 2024



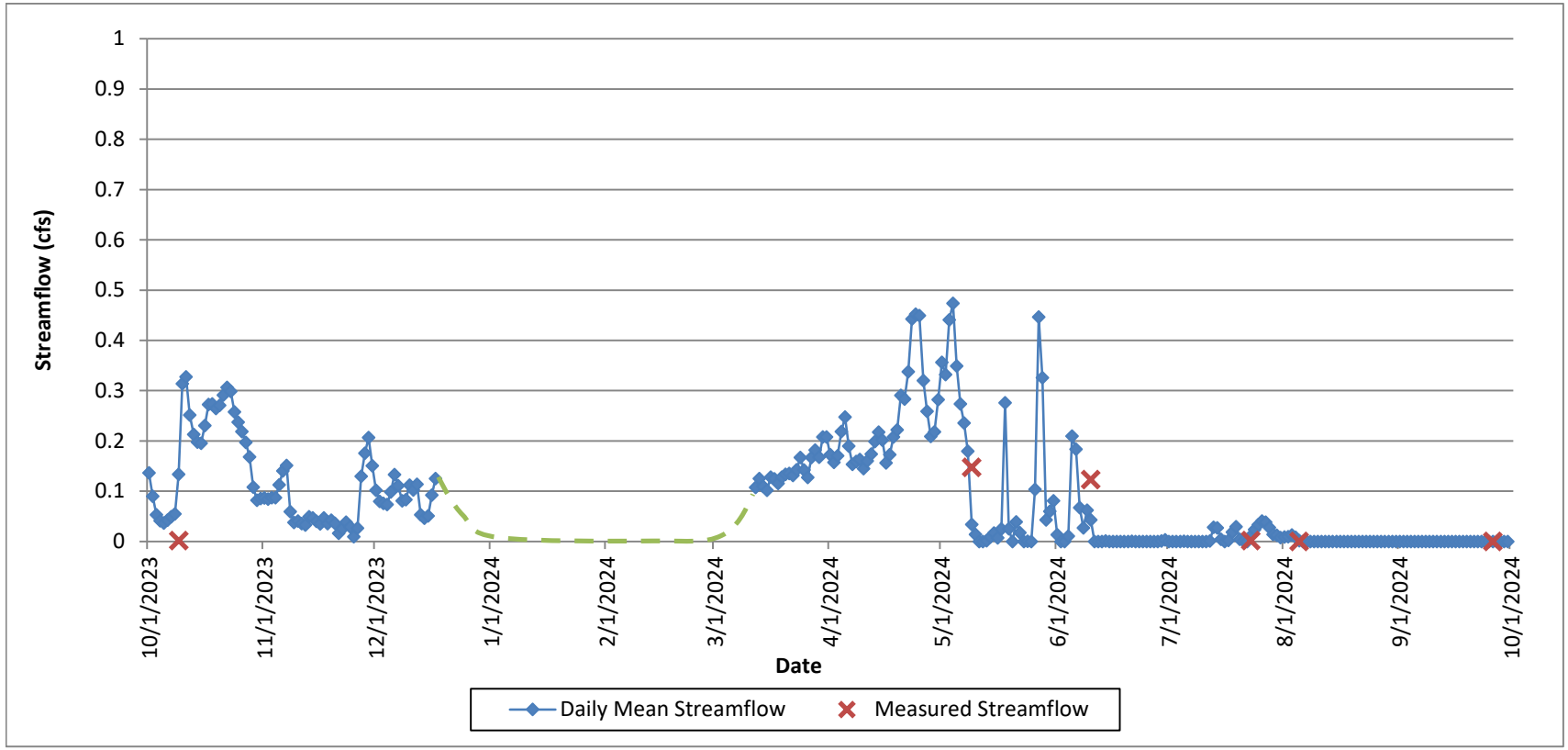
Middle Dry Fork Hydrograph
WY 2024



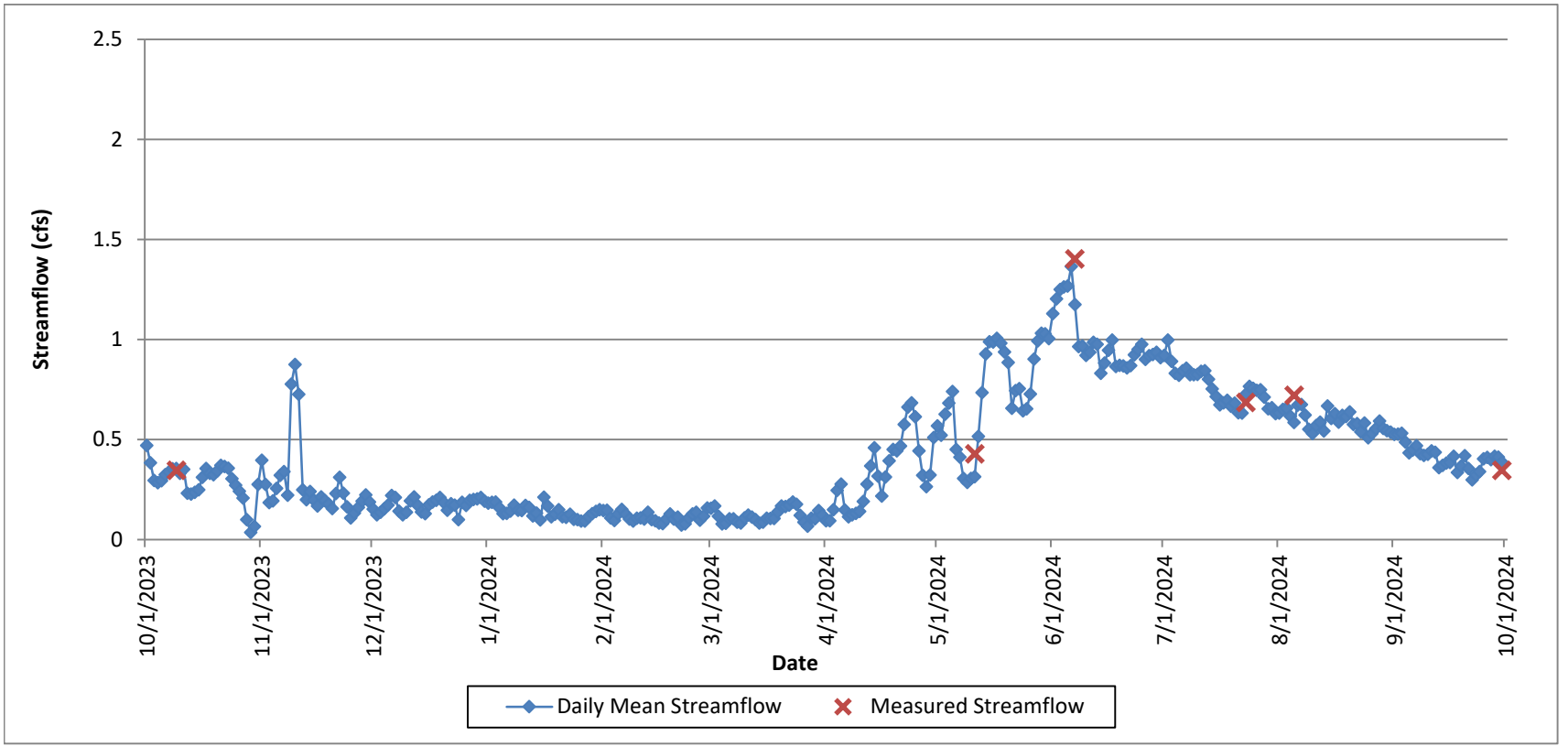
Upper Dry Fork Hydrograph
WY 2024



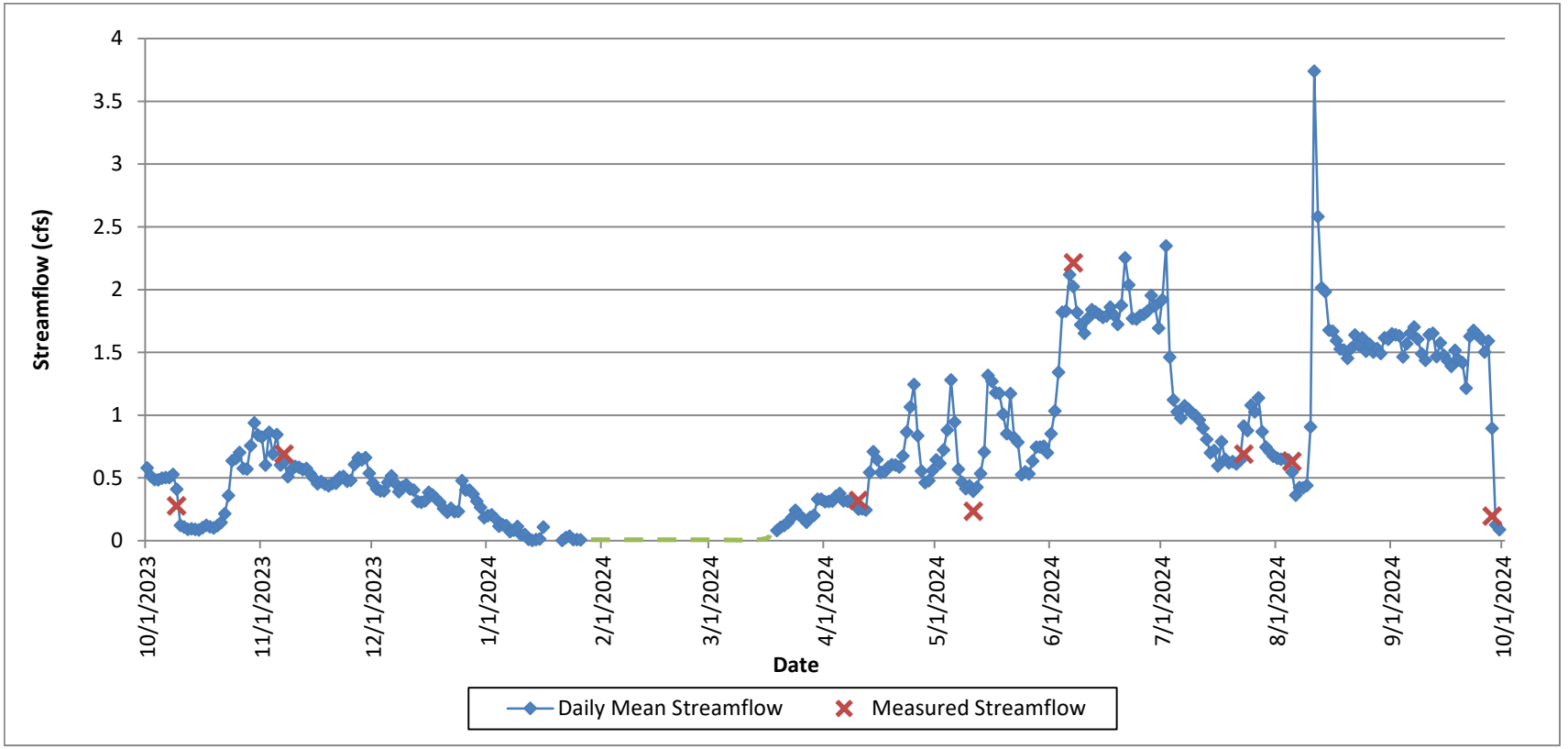
Lick Creek Hydrograph
WY 2024



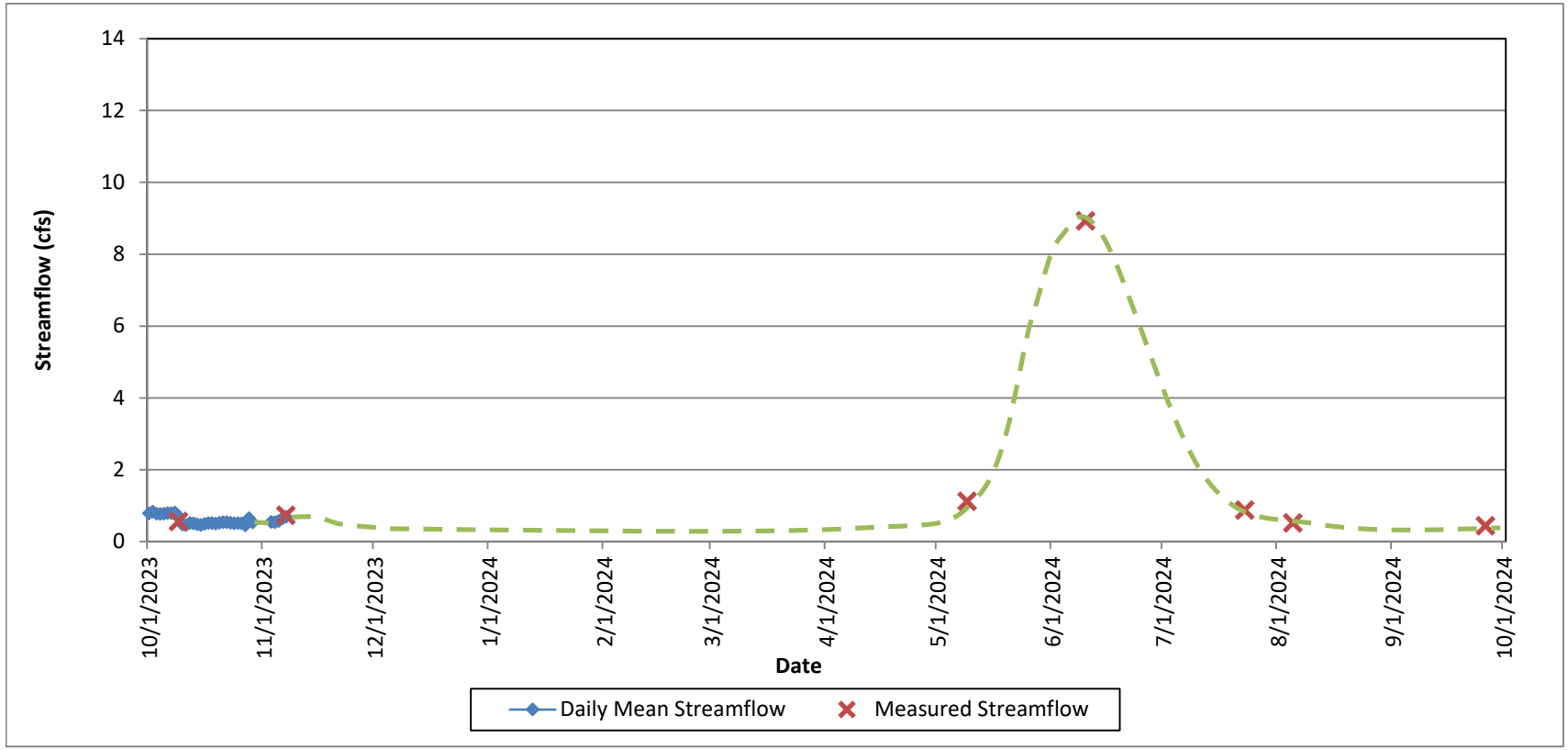
Deep Creek Ditch Hydrograph
WY 2024



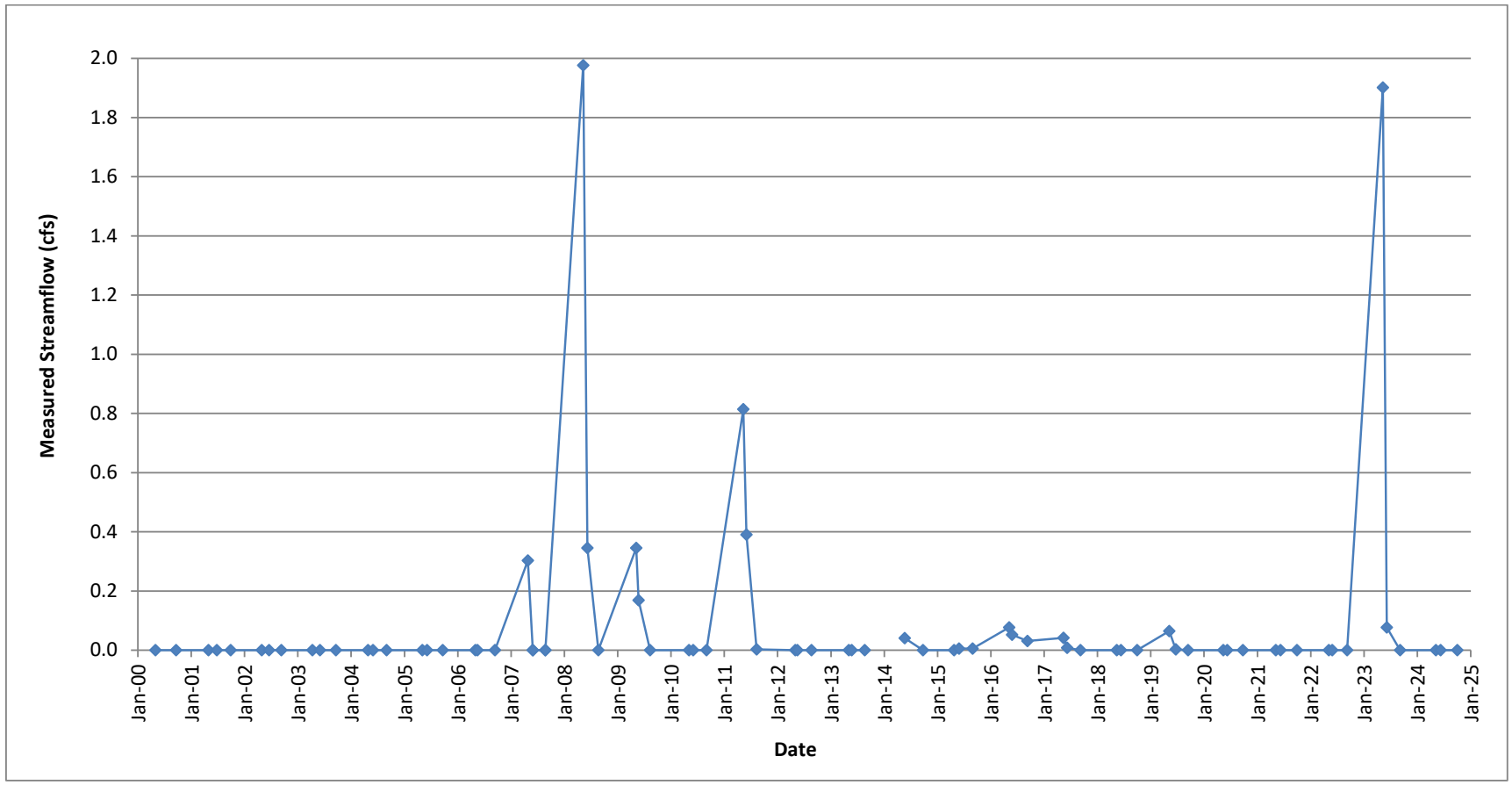
Minnesota Reservoir Flume Hydrograph
WY 2024



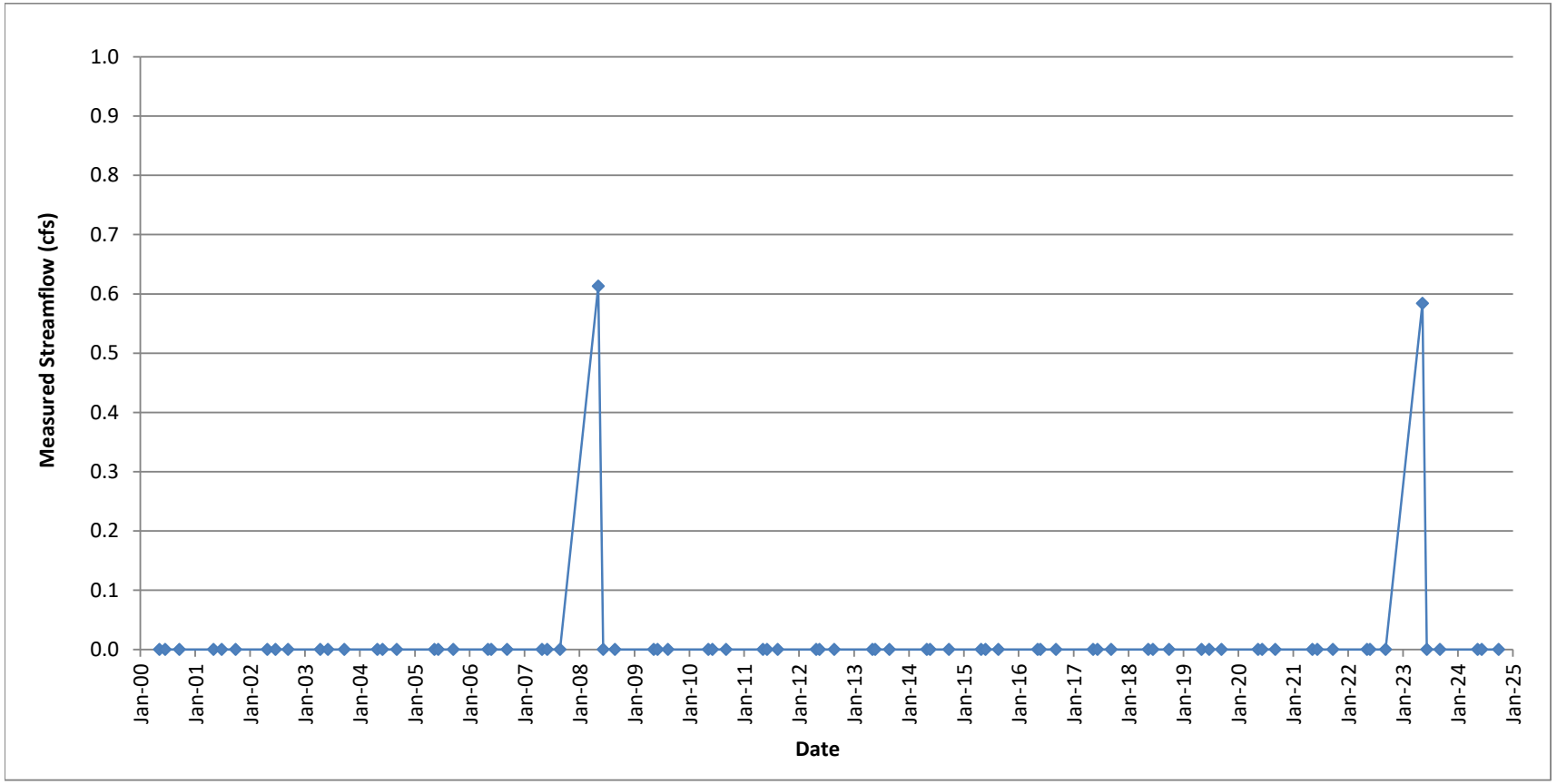
South Prong Creek Hydrograph
WY 2024



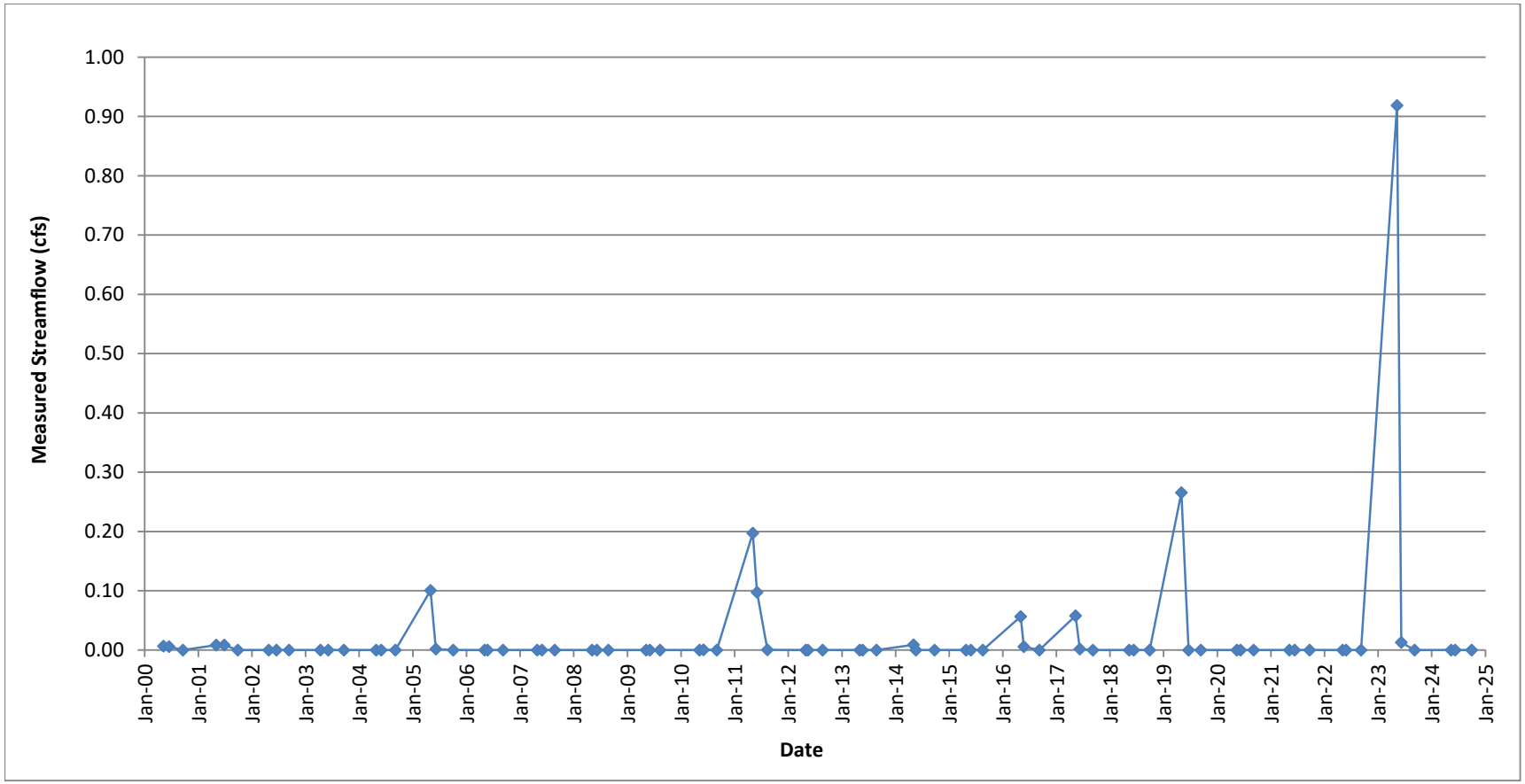
Upper Sylvester Gulch Flume
Hydrograph



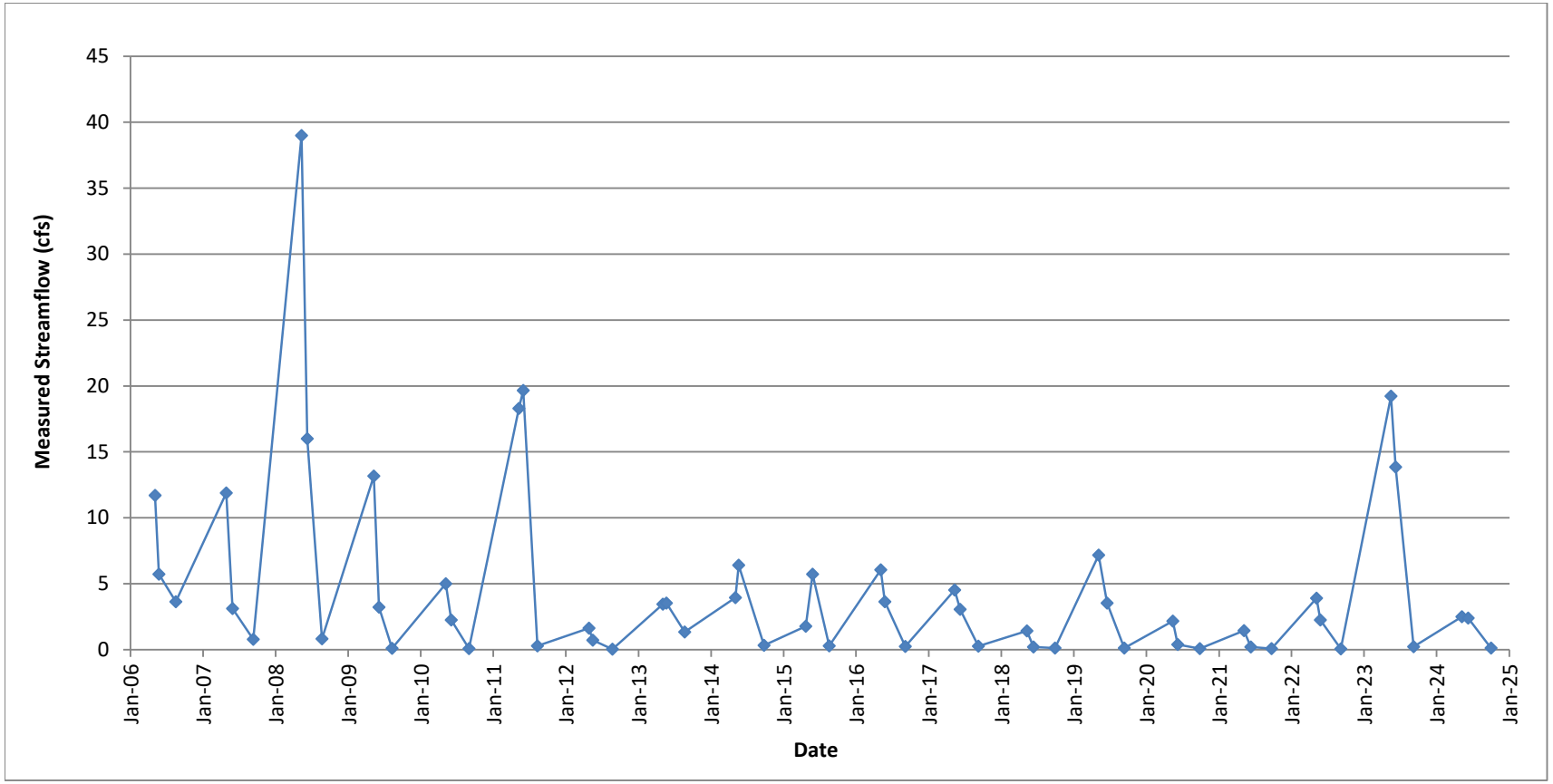
Horse Gulch
Hydrograph



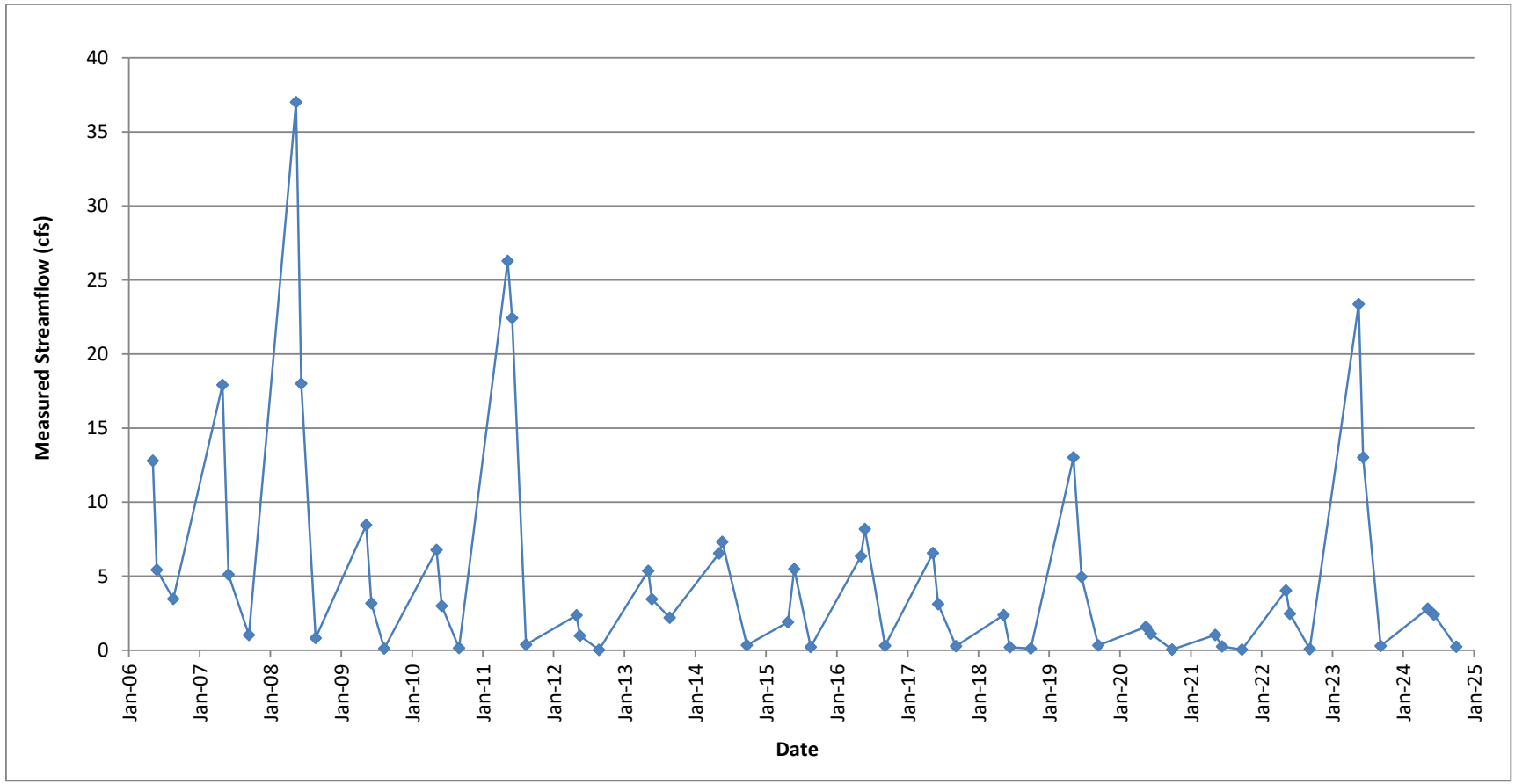
East Gulch east of Horse Gulch
Hydrograph



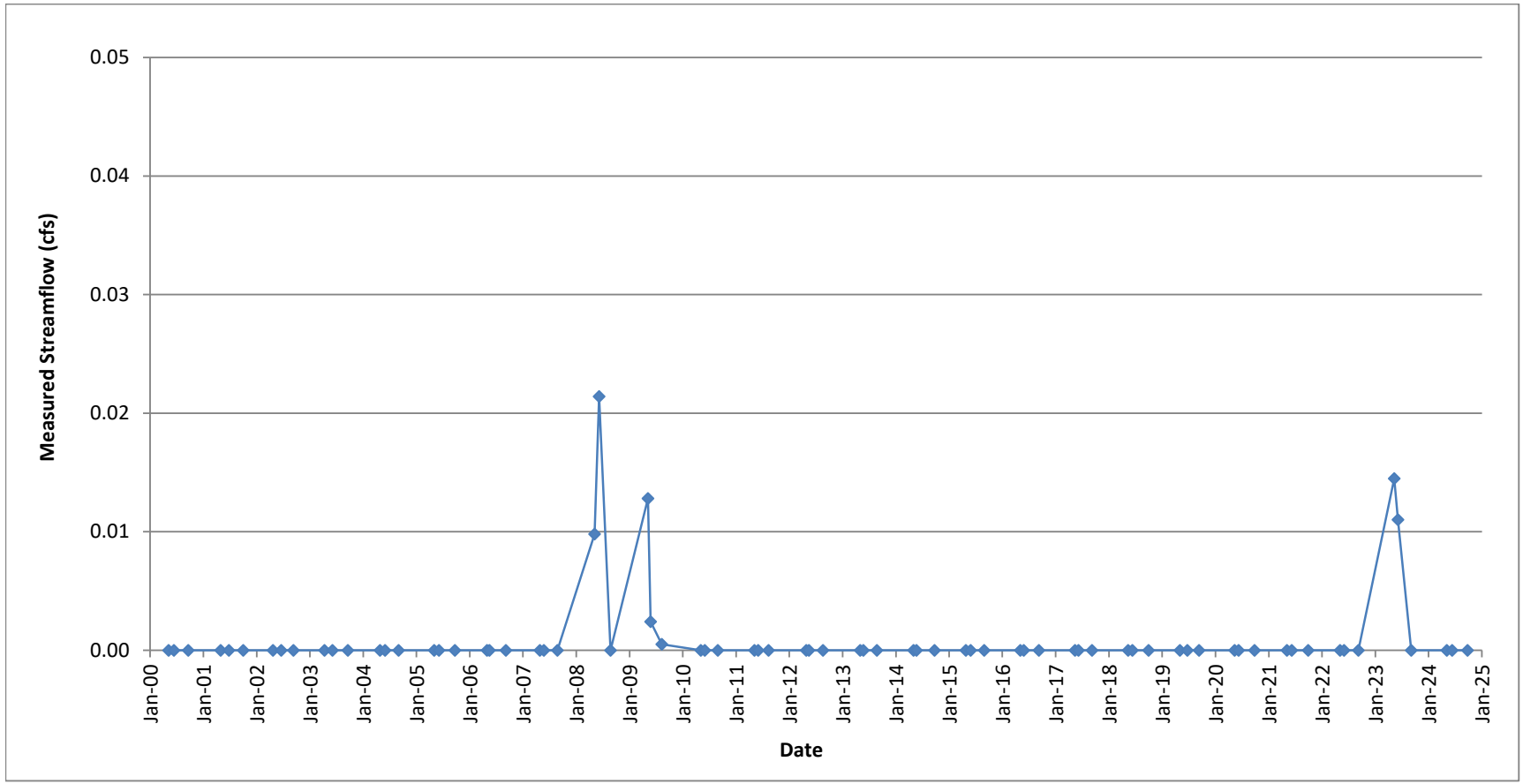
Upper Deep Creek
Hydrograph



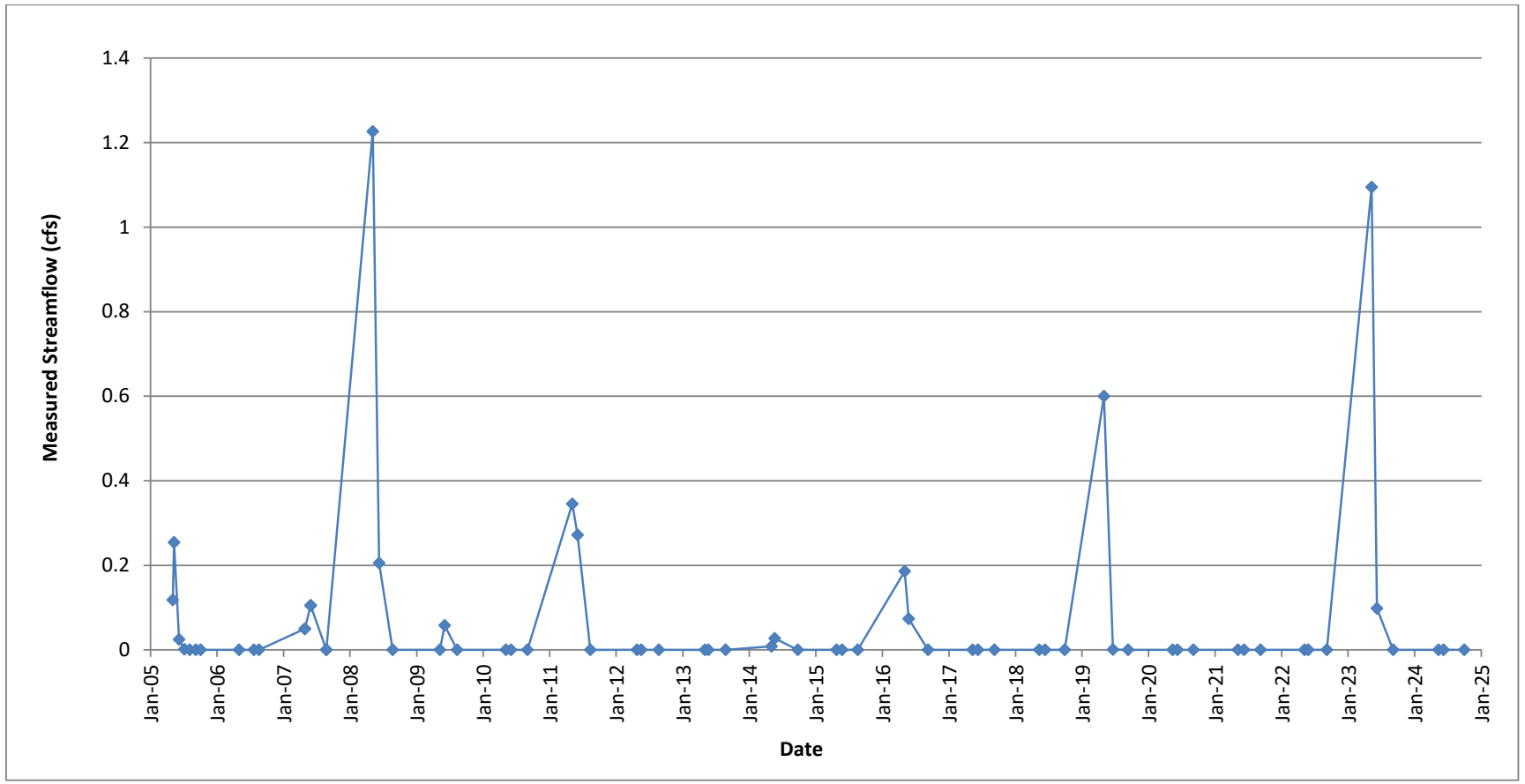
Lower Deep Creek
Hydrograph



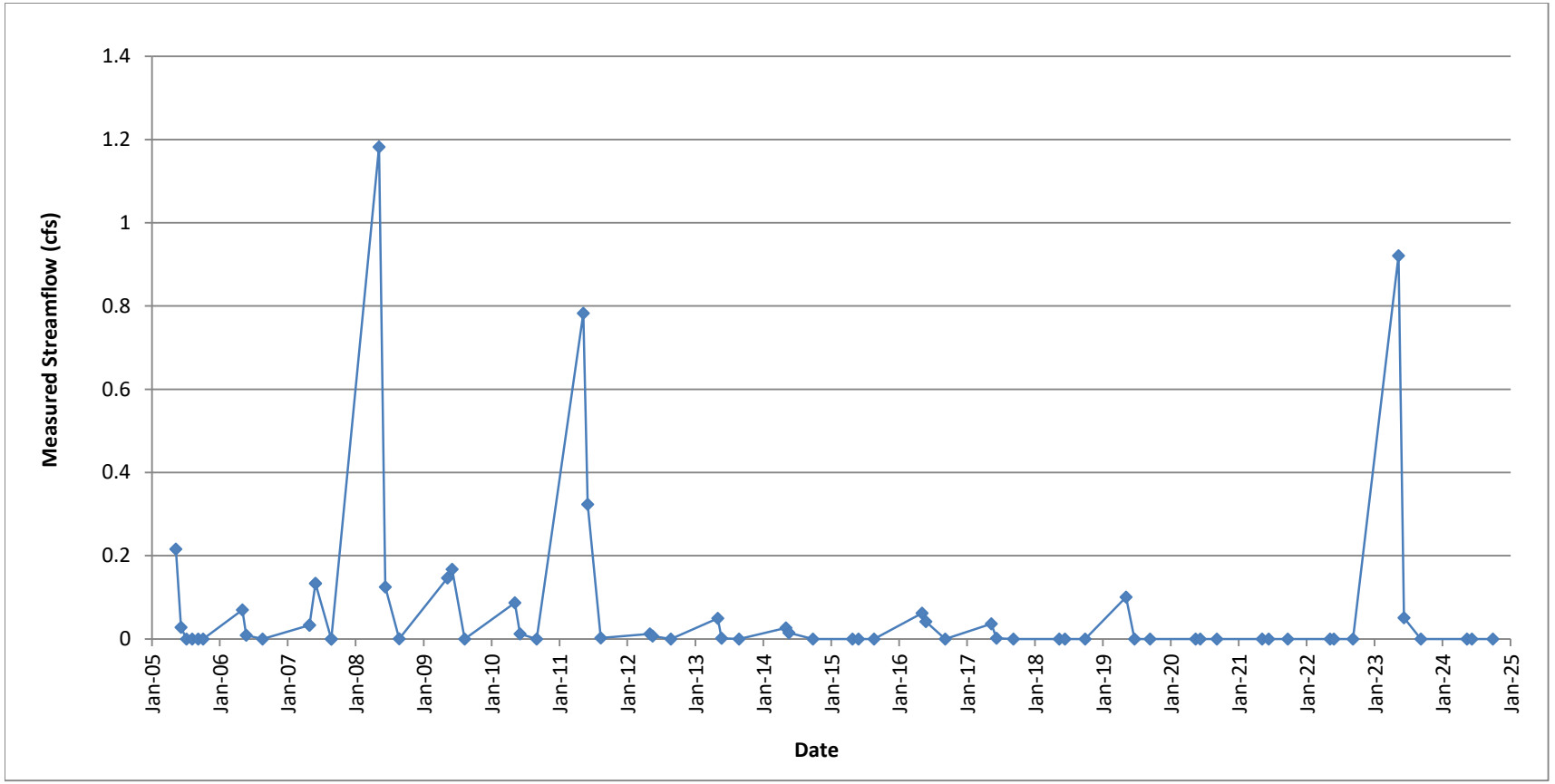
Box Canyon
Hydrograph



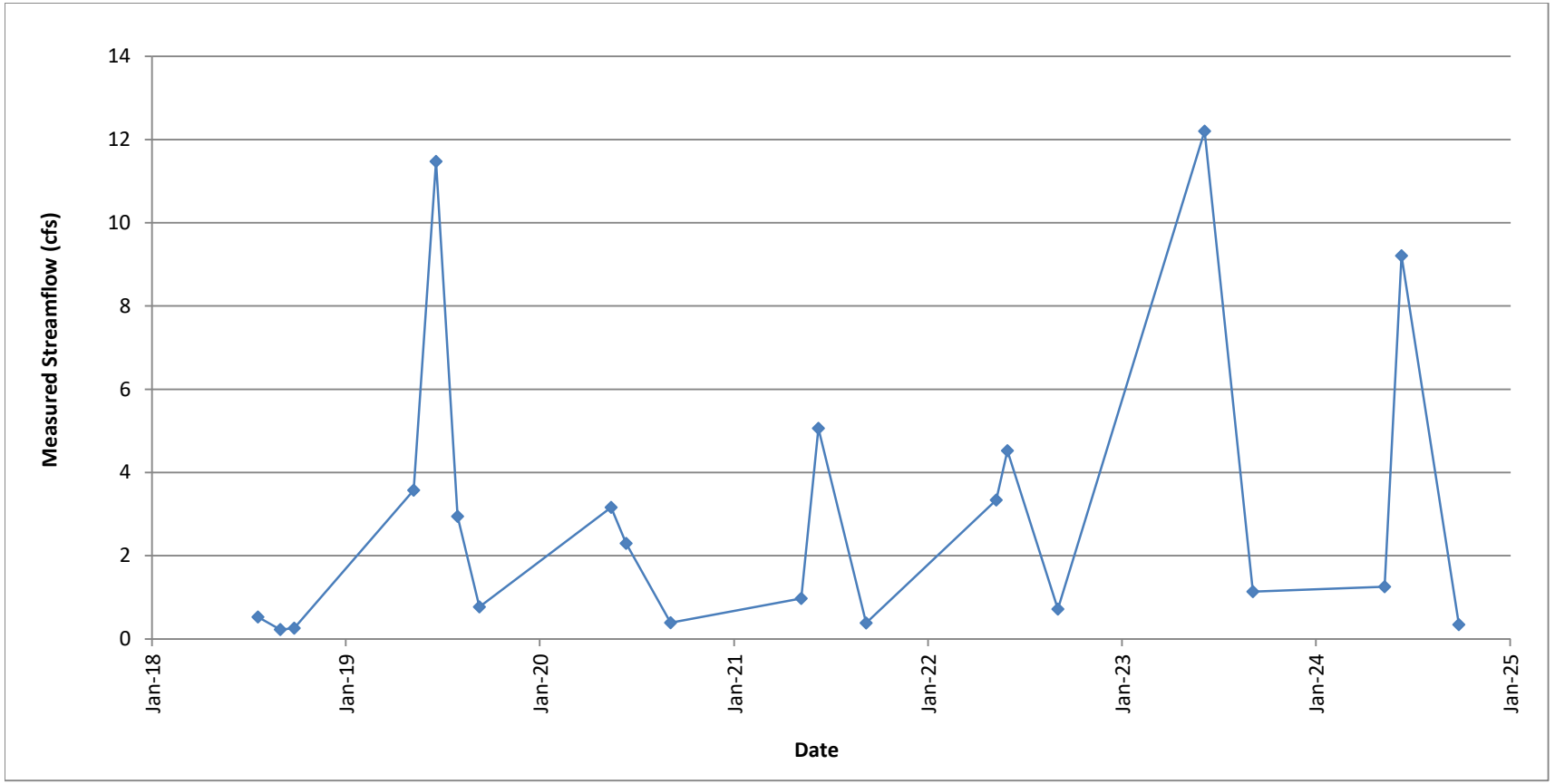
Deer Creek
Hydrograph



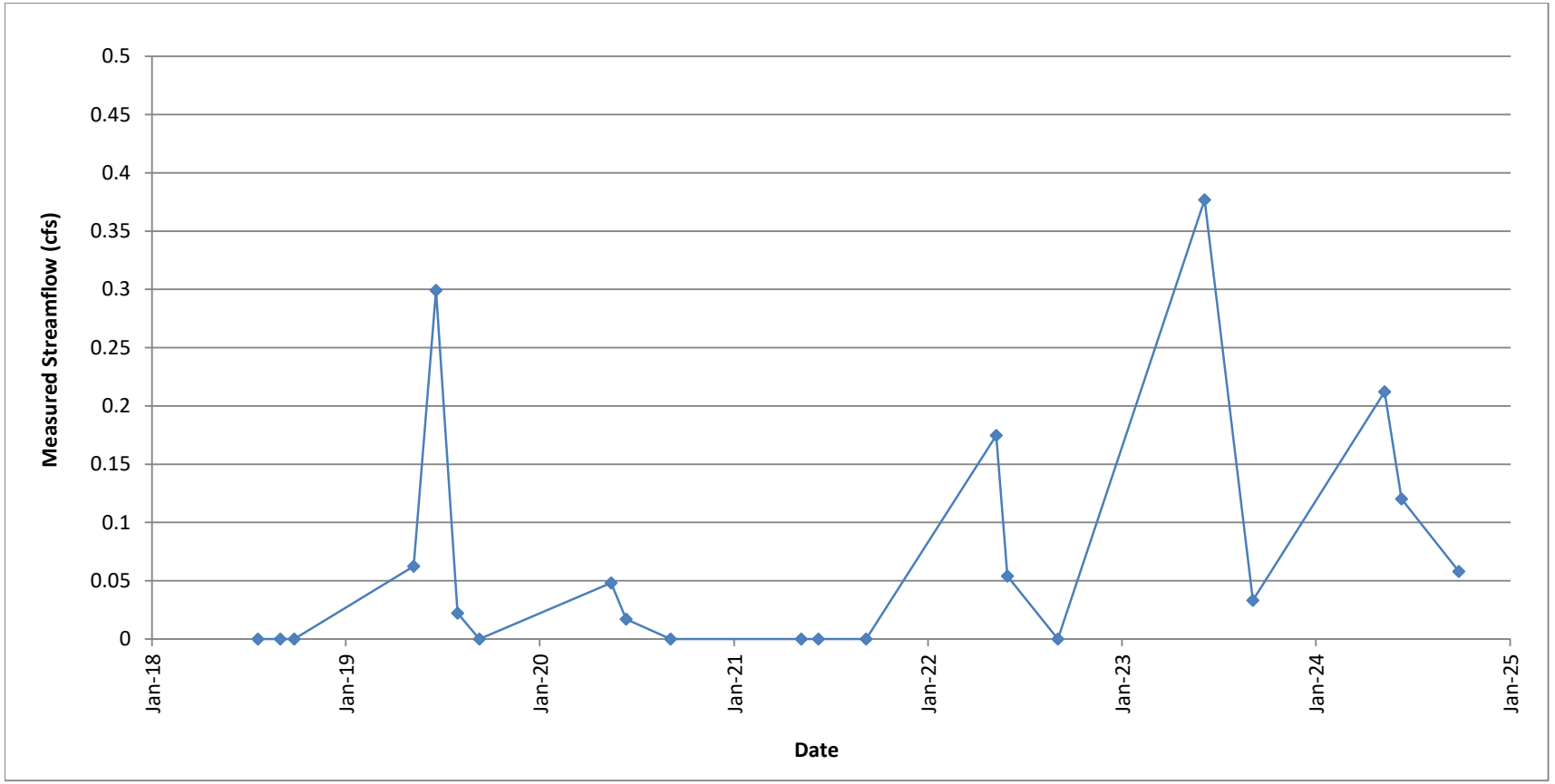
Poison Gulch
Hydrograph



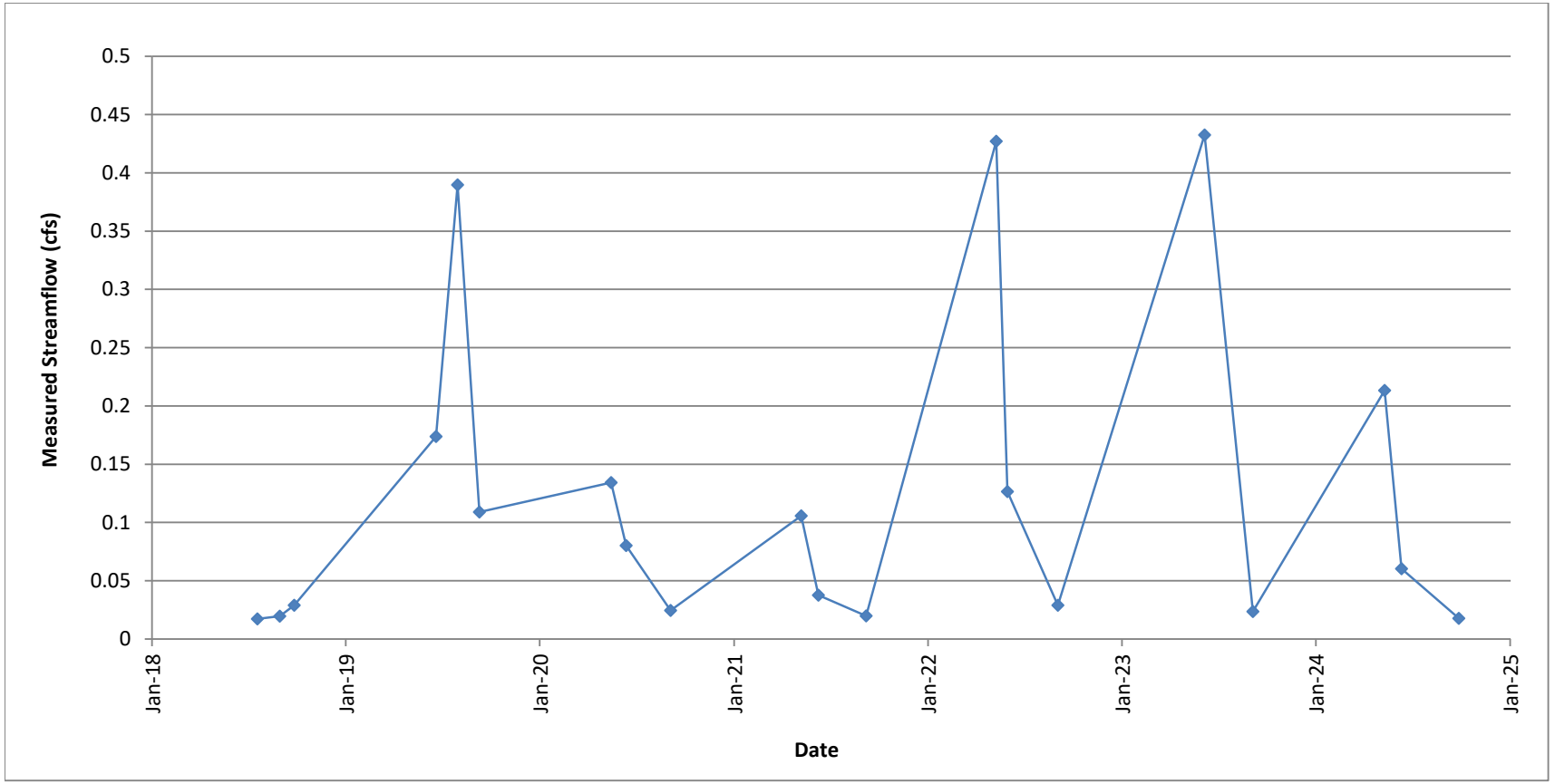
South Fork of South Prong Creek
Hydrograph



North Fork of South Prong Creek
Hydrograph



Stream ST-SW-1
Hydrograph



APPENDIX C

SURFACE WATER - LABORATORY AND FIELD WATER QUALITY DATA

Upper North Fork (USGS)
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024									
Monitoring Location: Upper North Fork (USGS)		**Baseline [1]**			**Water Year 2024**				
Description	Units	Minimum	Maximum	Mean	5/6/2024	6/11/2024	Q[4]	9/24/2024	Q[4]
Field Parameters									
Flow	staff gage				NA	NA		NA	
pH (Field)	SU				7.15	7.13		7.93	
Conductivity (Field)	µmhos/cm				99.3	71.2		162	
Temperature (Field)	°C				4.9	9.4		10.3	
Comment									
Laboratory Parameters [2]									
Name of Certified Lab [3]						ACZ		ACZ	
Lab Reference #						L88288-04		L90504-02	
Sample Date						6/11/2024		9/24/2024	
Lab Test Date						6/13-7/9		9/27-10/14	
Sampled By						PH		PH	
Alkalinity (Total CaCO3)	mg/L					47.2		82.7	
Aluminum, dissolved	mg/L					0.228	B	-0.07	U
Arsenic, dissolved	meq/L					0.00031	B	0.00062	B
Arsenic, total recoverable	mg/L	0.001	0.001	0.001		0.00081	B	0.0009	B
Bicarbonate as CaCO3	mg/L	40.9	167	81.3		47.2		82.7	
Boron, dissolved	mg/L					-0.03	U	-0.03	U
Boron, total	mg/L					-0.03	U	-0.06	U
Cadmium, dissolved	mg/L					-0.008	U	-0.008	U
Cadmium, potentially dissolved	mg/L					-0.008	U	-0.008	U
Calcium, dissolved	mg/L					10.0		21.4	
Carbonate as CaCO3	mg/L					-2	U	-2	U
Cation - Anion Balance	mg/L					-10.6		-5.6	
Chloride	%		10	3		-1	U	1.7	B
Chromium, total	meq/L					-0.02	U	-0.04	U
Conductivity @25C	mg/L	76	241	169		71		172	
Copper, dissolved	mg/L	0.01	0.01	0.01		-0.01	U	0.026	B
Cyanide, total	µmhos/cm					-0.003	U	-0.003	U
Hardness as CaCO3	mg/L	40	107	70		32		68	
Hydroxide as CaCO3	mg/L					-2	U	-2	U
Iron, dissolved	mg/L		0.38	0.09		0.26		0.222	
Iron, total	mg/L		26.3	1.6		1.87		1.63	
Iron, total recoverable	mg/L					2.05		0.613	
Lead, dissolved	mg/L		0.02	0.01		-0.03	U	-0.03	U
Magnesium, dissolved	mg/L	2	3.4	2.9		1.6		3.5	
Manganese, dissolved	mg/L		0.009	0.006		-0.01	U	0.011	B
Manganese, total	mg/L		0.19	0.04		0.043	B	0.048	B
Mercury, total	mg/L					-0.0002	U	-0.0002	U
Molybdenum, dissolved	mg/L					-0.02	U	-0.02	U
Nickel, dissolved or potentially dissolved	mg/L					-0.008	U	-0.008	U
Nickel, total	mg/L					-0.008	U	-0.016	U
Nitrate/Nitrite (as N)	mg/L		0.19	0.06		0.067	B	-0.02	U
Nitrogen, ammonia	mg/L					-0.1	U	-0.1	U
pH	mg/L	6.7	9.0	7.8		6.3	H	6.1	H
Phosphate	mg/L					-0.03	U	0.03	B
Phosphorus, ortho dissolved	SU		1.61	0.12		-0.01	U	0.01	BH
Potassium, dissolved	mg/L					0.68	B	0.87	B
Residue, Filterable (TDS) @180C	mg/L	30	650	109		68	H	108	
Residue, Non-Filterable (TSS) @105C	mg/L		636	55		68.0		21	
Silver, total	mg/L					-0.0001	U	-0.0001	U
Sodium Adsorption Ratio (SAR)	mg/L	0.2	1.62	0.5		0.22		0.37	
Sodium, dissolved	calc.	3.4	5.7	4.6		2.8		6.87	
Sulfate	mg/L		70	10		2.7	B	9	
Sum of Anions	mg/L					1		1.9	
Sum of Cations	mg/L					0.809		1.7	
TDS (calculated)	calc.					47		94.1	
TDS (ratio - measured/calculated)	mg/L					1.45		1.15	
Zinc, dissolved	mg/L					-0.02	U	0.037	B

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Lower North Fork
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024											
Monitoring Location: Lower North Fork		**Baseline [1]**			**Water Year 2024**						
Description	Units	Minimum	Maximum	Mean	5/6/2024	6/11/2024	Q [4]	6/11/2024 (duplicate)	Q [4]	9/24/2024	Q [4]
Field Parameters											
Flow	staff gage				not measured	not measured		not measured		not measured	
pH (Field)	SU				7.47	7.73		--		7.48	
Conductivity (Field)	µmhos/cm				97.7	73.8		--		160.1	
Temperature (Field)	°C				4.4	9.8		--		9.0	
Comment											
Laboratory Parameters 2											
Name of Certified Lab 3						ACZ		ACZ		ACZ	
Lab Reference #						L88288-03		L88288-02		L90504-01	
Sample Date						6/11/2024		9/27/2021		9/27/2021	
Lab Test Date						6/13-7/9		6/13-7/9		9/27-10/14	
Sampled By						PH		PH		PH	
Alkalinity (Total CaCO3)	mg/L					54.9		51.2		86.2	
Aluminum, dissolved	mg/L					0.3		0.276		-0.07	U
Arsenic, dissolved	mg/L					0.00029	B	0.00026	B	0.00062	B
Arsenic, total recoverable	mg/L					0.00079	B	0.00073	B	0.00093	B
Bicarbonate as CaCO3	mg/L	41	138	78		54.9		51.2		86.2	
Boron, dissolved	mg/L					-0.03	U	-0.03	U	-0.03	U
Boron, total	mg/L					-0.03	U	-0.03	U	-0.06	U
Cadmium, dissolved	mg/L					-0.008	U	-0.008	U	-0.008	U
Cadmium, potentially dissolved	mg/L					-0.008	U	-0.008	U	-0.008	U
Calcium, dissolved	mg/L					10		10.4		21.3	
Carbonate as CaCO3	mg/L					-2	U	-2	U	-2	U
Cation - Anion Balance	%					-20.0		-14.5		-8.1	
Chloride	mg/L	1.6	8	3.8		-1	U	-1	U	1.86	B
Chromium, total	mg/L					-0.02	U	-0.02	U	-0.04	U
Conductivity @25C	µmhos/cm					71		72		176	
Copper, dissolved	mg/L					-0.01	U	-0.01	U	-0.01	U
Cyanide, total	mg/L					-0.003	U	-0.003	U	-0.003	U
Hardness as CaCO3	mg/L	39.3	109	68.7		32		33		68	
Hydroxide as CaCO3	mg/L					-2	U	-2	U	-2	U
Iron, dissolved	mg/L		0.126	0.065		0.365		0.321		-0.06	U
Iron, total	mg/L	0.09	3.8	0.92		1.35		1.51		1.69	
Iron, total recoverable	mg/L					1.91		1.79		1.8	
Lead, dissolved	mg/L					-0.03	U	-0.03	U	-0.03	U
Magnesium, dissolved	mg/L					1.61		1.60		3.5	
Manganese, dissolved	mg/L	0.0002	0.05	0.01		0.013	B	0.011	B	-0.01	U
Manganese, total	mg/L					0.038	B	0.038	B	0.051	B
Mercury, total	mg/L					-0.0002	U	-0.0002	U	-0.0002	U
Molybdenum, dissolved	mg/L					-0.02	U	-0.02	U	-0.02	U
Nickel, dissolved or potentially dissolved	mg/L					-0.008	U	-0.008	U	-0.008	U
Nickel, total	mg/L					-0.008	U	-0.008	U	-0.016	U
Nitrate/Nitrite (as N)	mg/L					0.068	B	0.067	B	0.023	B
Nitrogen, ammonia	mg/L					-0.1	U	-0.1	U	-0.1	U
pH	SU	7	8.8	8.1		6.3	H	6.4	H	6.5	H
Phosphate	mg/L					-0.03	U	0.0403	B	0.09	B
Phosphorus, ortho dissolved	mg/L		2.74	0.25		-0.01	U	0.013	B	0.03	BH
Potassium, dissolved	mg/L					-0.5	U	-0.5	U	0.86	B
Residue, Filterable (TDS) @180C	mg/L	36	180	101		54		50		112	
Residue, Non-Filterable (TSS) @105C	mg/L	6.4	107	36		52.0		53.0		30.0	
Selenium, total recoverable	mg/L					0.00019	B	0.00019	B	0.00016	B
Silver, total	mg/L					-0.0001	U	-0.0001	U	-0.0001	U
Sodium Adsorption Ratio (SAR)	calc.					0.20		0.22		0.38	
Sodium, dissolved	mg/L					2.59		2.79		7.1	
Sulfate	mg/L	4	25	12		2.8	B	3.3	B	8.6	
Sum of Anions	meq/L					1.2		1.1		2	
Sum of Cations	meq/L					0.800		0.822		1.7	
TDS (calculated)	calc.					51.2		49.9		95.8	
TDS (ratio - measured/calculated)	mg/L					1.05		1		1.17	
Zinc, dissolved	mg/L					-0.02	U	-0.02	U	-0.02	U

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Upper Sylvester Gulch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Upper Sylvester Gulch		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/8/2024	Q [4]	9/30/2024
Field Parameters								
Flow	staff gage	0.26'	0.64'	0.45'	dry	dry		dry
pH (Field)	SU	8.1	8.3	8.2				
Conductivity (Field)	µmhos/cm	300	380	340				
Temperature (Field)	°C	8.4	9.5	9.0				
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Conductivity @25C	µmhos/cm	462	462	462				
Iron, dissolved	mg/L	0.01	0.01	0.01				
Iron, total	mg/L	0.07	0.07	0.07				
pH	SU							
Residue, Filterable (TDS) @180C	mg/L	250	260	255				
Residue, Non-Filterable (TSS) @105C	mg/L	8	20	14				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Middle Sylvester Gulch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Middle Sylvester Gulch		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	Q[4]	9/24/2024
Field Parameters								
Flow	staff gage				0.08'	0.001'		dry
pH (Field)	SU				7.62	7.67		
Conductivity (Field)	µmhos/cm				1,397	1,241		
Temperature (Field)	°C				3.2	13.1		
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88288-01		
Sample Date						6/11/2024		
Lab Test Date						6/13-7/9		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L					496		
Aluminum, dissolved	mg/L					-0.07	U	
Arsenic, dissolved	mg/L					0.0	B	
Arsenic, total recoverable	mg/L					0.00045	B	
Bicarbonate as CaCO3	mg/L		448	310		496		
Boron, dissolved	mg/L					0.293		
Boron, total	mg/L					0.27		
Cadmium, dissolved	mg/L					-0.008	U	
Cadmium, potentially dissolved	mg/L					-0.008	U	
Calcium, dissolved	mg/L					41.9		
Carbonate as CaCO3	mg/L					-2	U	
Cation - Anion Balance	%					0		
Chloride	mg/L	3	10	5		66		
Chromium, total	mg/L					-0.02	U	
Conductivity @25C	µmhos/cm	480	800	606		1,170		
Copper, dissolved	mg/L					-0.01	U	
Cyanide, total	mg/L					0	U	
Hardness as CaCO3	mg/L	159	234	194		240		
Hydroxide as CaCO3	mg/L					-2	U	
Iron, dissolved	mg/L		0.4	0.1		0.094	B	
Iron, total	mg/L	0.05	10.5	2.0		0.177		
Iron, total recoverable	mg/L					0.233		
Lead, dissolved	mg/L					-0.03	U	
Magnesium, dissolved	mg/L					32.9		
Manganese, dissolved	mg/L					0.018	B	
Manganese, total	mg/L		0.56	0.05		0.026	B	
Mercury, total	mg/L					-0.0002	U	
Molybdenum, dissolved	mg/L					-0.02	U	
Nickel, dissolved or potentially dissolved	mg/L					-0.008	U	
Nickel, total	mg/L					-0.008	U	
Nitrate/Nitrite (as N)	mg/L		0.08	0.02		-0.02	U	
Nitrogen, ammonia	mg/L					-0.1	U	
pH	SU	7.35	8.70	8.08		7.9	H	
Phosphate	mg/L					0.0527	B	
Phosphorus, ortho dissolved	mg/L		0.875	0.110		0.017	B	
Potassium, dissolved	mg/L					4.55		
Residue, Filterable (TDS) @180C	mg/L	3.68	584	381		734		
Residue, Non-Filterable (TSS) @105C	mg/L	4.2	5,740	419		5.0	B	
Selenium, total recoverable	mg/L					0.0001	B	
Silver, total	mg/L					-0.0001	U	
Sodium Adsorption Ratio (SAR)	calc.	2.29	3.02	2.70		6.2		
Sodium, dissolved	mg/L					217		
Sulfate	mg/L	28.2	80	46.1		155		
Sum of Anions	meq/L					15		
Sum of Cations	meq/L					15		
TDS (calculated)	calc.					820		
TDS (ratio - measured/calculated)	mg/L					0.9		
Zinc, dissolved	mg/L					-0.02	U	

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Lower Sylvester Gulch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Lower Sylvester Gulch		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/10/2024	Q[4]	9/24/2024
Field Parameters								
Flow	staff gage	0.07	0.07	0.07	not measured	dry		dry
pH (Field)	SU	8.50	9.70	8.90	7.71			
Conductivity (Field)	µmhos/cm	620	700	653	1,274			
Temperature (Field)	°C	7.9	10.2	9	7.7			
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	323	323	323				
Aluminum, dissolved	mg/L	0.03	0.03	0.03				
Arsenic, total recoverable	mg/L	0.001	0.001	0.001				
Bicarbonate as CaCO3	mg/L	315	315	315				
Cadmium, dissolved	mg/L	0.003	0.003	0.003				
Calcium, dissolved	mg/L	41	41	41				
Carbonate as CaCO3	mg/L	8	8	8				
Cation - Anion Balance	%	-3.2	-3.2	-3.2				
Chloride	mg/L	4	4	4				
Conductivity @25C	µmhos/cm	597	597	597				
Copper, dissolved	mg/L	0.01	0.01	0.01				
Hardness as CaCO3	mg/L	179	179	179				
Hydroxide as CaCO3	mg/L	2	2	2				
Iron, dissolved	mg/L	0.05	0.05	0.05				
Iron, total	mg/L	0.17	0.17	0.17				
Lead, dissolved	mg/L	0.04	0.04	0.04				
Magnesium, dissolved	mg/L	18.7	18.7	18.7				
Manganese, dissolved	mg/L	0.007	0.007	0.007				
Manganese, total	mg/L	0.005	0.005	0.005				
Mercury, total	mg/L	0.0002	0.0002	0.0002				
Molybdenum, dissolved	mg/L	0.01	0.01	0.01				
Nitrate/Nitrite (as N)	mg/L	0.05	0.05	0.05				
pH	SU	8.3	8.3	8.3				
Phosphate	mg/L	0.09	0.09	0.09				
Phosphorus, ortho dissolved	mg/L	0.031	0.031	0.031				
Potassium, dissolved	mg/L	2.2	2.2	2.2				
Residue, Filterable (TDS) @180C	mg/L	400	430	410				
Residue, Non-Filterable (TSS) @105C	mg/L	5	120	74				
Selenium, total recoverable	mg/L	0.04	0.04	0.04				
Sodium Adsorption Ratio (SAR)	calc.	2.89	2.89	2.89				
Sodium, dissolved	mg/L	87.8	87.8	87.8				
Sulfate	mg/L	70	70	70				
Sum of Cations	meq/L	7.5	7.5	7.5				
Zinc, dissolved	mg/L	0.01	0.01	0.01				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Lower Minnesota Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024											
Monitoring Location: Lower Minnesota Creek		**Baseline [1]**			**Water Year 2024**						
Description	Units	Minimum	Maximum	Mean	5/9/2024	6/7/2024	Q[4]	6/7/2024 (Duplicate)	Q[4]	9/26/2024
Field Parameters					0.58'	1.09'		--		0.29'
Flow	staff gage				7.20	6.89		--		7.64
pH (Field)	SU				336	158.8		--		285
Conductivity (Field)	µmhos/cm				3.9	8.5		--		16.7
Temperature (Field)	°C									
Comment										
Laboratory Parameters [2]										
Name of Certified Lab [3]						ACZ		ACZ		
Lab Reference #						L88305-02		L88305-03		
Sample Date						6/7/2024		6/7/2024		
Lab Test Date						6/13-7/3		6/13-7/3		
Sampled By						PH		PH		
Bicarbonate as CaCO3	mg/L	46	75	60						
Calcium, dissolved	mg/L	19.6	19.6	19.6						
Chloride	mg/L		2	1						
Conductivity @25C	µmhos/cm	152	803	350		163		163		
Hardness as CaCO3	mg/L	65	106	82						
Iron, dissolved	mg/L	0.23	0.58	0.41		0.401		0.376		
Iron, total	mg/L	0.45	82	8.9		5.08		6.17		
Magnesium, dissolved	mg/L	6.1	8.7	7.4						
Manganese, dissolved	mg/L	0.013	0.015	0.014						
Manganese, total	mg/L	0.018	1.83	0.188						
pH	SU					7.7	H	7.7	H	
Residue, Filterable (TDS) @180C	mg/L	100	584	231		124		120		
Residue, Non-Filterable (TSS) @105C	mg/L	16	1,300	292		227	H	241	H	
Sodium Adsorption Ratio (SAR)	calc.	0.3	0.5	0.4						
Sodium, dissolved	mg/L	7.7	7.7	7.7						
Sulfate	mg/L	20	50	40						

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Upper Minnesota Creek Flume (USFS)
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: U. Minnesota Ck Flume (USFS)		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/9/2024	6/7/2024	Q[4]	9/26/2024
Field Parameters								
Flow	staff gage				0.88'	flooded		0.25'
pH (Field)	SU				7.27	6.95		7.71
Conductivity (Field)	µmhos/cm				326	153.5		223
Temperature (Field)	°C				7.7	8.5		14.4
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-09		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Conductivity @25C	µmhos/cm					158		
Iron, dissolved	mg/L					0.349		
Iron, total	mg/L					7.08		
pH	SU					7.3	H	
Residue, Filterable (TDS) @180C	mg/L					116		
Residue, Non-Filterable (TSS) @105C	mg/L					161	H	

[1] No baseline data.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Lower Dry Fork Flume
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Lower Dry Fork Flume		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/11/2024	6/8/2024	Q[4]	9/28/2024
Field Parameters								
Flow	staff gage				0.003'	dry		0.17'
pH (Field)	SU				7.41			7.84
Conductivity (Field)	µmhos/cm				1,335			401
Temperature (Field)	°C				10.9			14.6
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Bicarbonate as CaCO3	mg/L	118	324	220				
Calcium, dissolved	mg/L	87.9	87.9	87.9				
Chloride	mg/L		8.4	4.2				
Conductivity @25C	µmhos/cm	207	1,920	755				
Hardness as CaCO3	mg/L	125	726	360				
Iron, dissolved	mg/L		0.178	0.049				
Iron, total	mg/L	0.02	84	5.6				
Magnesium, dissolved	mg/L	9.8	49	29				
Manganese, dissolved	mg/L	0.008	0.013	0.011				
Manganese, total	mg/L		46.4	1.4				
Nitrate/Nitrite (as N)	mg/L	0.1	0.3	0.2				
pH	SU	6.9	9	8.2				
Phosphorus, ortho dissolved	mg/L		0.763	0.048				
Sodium Adsorption Ratio (SAR)	calc.	0.71	1.48	1.11				
Sodium, dissolved	mg/L	69	69	69				
Sulfate	mg/L	35	613	249				
Residue, Filterable (TDS) @180C	mg/L	158	1,388	581				
Residue, Non-Filterable (TSS) @105C	mg/L	1.2	1,098	144				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Middle Dry Fork Flume
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Middle Dry Fork Flume		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	staff gage				0.33'	0.59'		0.20'
pH (Field)	SU	7.80	8.50	8.20	7.78	7.34		7.08
Conductivity (Field)	µmhos/cm	30	480	213	187.6	104.9		174.5
Temperature (Field)	°C	3.6	19.8	12	7.6	12.7		14.3
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-01		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	34	270	142				
Aluminum, dissolved	mg/L	0.07	0.07	0.07				
Arsenic, total recoverable	mg/L	0.002	0.002	0.002				
Bicarbonate as CaCO3	mg/L	34	270	142				
Calcium, dissolved	mg/L	6.6	56.6	31.96				
Cation - Anion Balance	%	-22.2	-22.2	-22.2				
Chloride	mg/L		4	1				
Conductivity @25C	µmhos/cm	76	76	76		106		
Hardness as CaCO3	mg/L	23	208	115				
Iron, dissolved	mg/L	0.11	0.11	0.11		0.257		
Iron, total	mg/L	0.16	14.2	3.14		2.76		
Magnesium, dissolved	mg/L	1.5	17.6	8.7				
Manganese, dissolved	mg/L	0.029	0.029	0.029				
Manganese, total	mg/L	0.01	0.432	0.11				
Nitrate (as N), dissolved	mg/L		0.57	0.10				
Nitrate/Nitrite (as N)	mg/L		0.57	0.12				
Nitrite (as N), dissolved	mg/L		0.1	0.02				
pH	SU	6.7	6.7	6.7		7.9	H	
Phosphate	mg/L	0.33	0.33	0.33				
Phosphorus, ortho dissolved	mg/L		0.166	0.041				
Potassium, dissolved	mg/L	0.5	0.5	0.5				
Residue, Filterable (TDS) @180C	mg/L	50	300	172		88		
Residue, Non-Filterable (TSS) @105C	mg/L		278	72		61.0	H	
Sodium Adsorption Ratio (SAR)	calc.	0.47	1.19	0.78				
Sodium, dissolved	mg/L	5.9	38.8	19.9				
Sulfate	mg/L		50	25				
Sum of Anions	meq/L	1.1	1.1	1.1				
Sum of Cations	meq/L	0.7	0.7	0.7				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

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H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Upper Dry Fork Flume
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Upper Dry Fork Flume		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/11/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	staff gage	0.08'	0.58'	0.28'	0.31'	0.70'		0.29'
pH (Field)	SU	7.01	8.42	7.76	7.42	7.04		7.17
Conductivity (Field)	µmhos/cm	114	699	310	99.7	61.8		63.6
Temperature (Field)	°C	11.9	16.0	13.5	6.9	12.2		11.6
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-08		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	24	100	57				
Aluminum, dissolved	mg/L	0.04	0.34	0.13				
Arsenic, total recoverable	mg/L	0.0005	0.0012	0.0008				
Bicarbonate as CaCO3	mg/L	24	100	57				
Boron, dissolved	mg/L	-0.01	-0.01	-0.01				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	4.6	20.1	11.5				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	%	-11.1	4.3	-5.2				
Chloride	mg/L	1	8	3				
Conductivity @25C	µmhos/cm	47	246	135		63		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	16	67	39				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.06	0.32	0.20		0.279		
Iron, total	mg/L	1.70	3.64	2.75		2.91		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	1.1	4.0	2.4				
Manganese, dissolved	mg/L	0.007	0.035	0.017				
Manganese, total	mg/L	0.047	0.103	0.078				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.15	0.04				
pH	SU	7.8	8.2	8.0		7.6	H	
Phosphate	mg/L	0.06	0.12	0.08				
Phosphorus, ortho dissolved	mg/L	0.02	0.04	0.03				
Potassium, dissolved	mg/L	-0.3	1.1	0.6				
Residue, Filterable (TDS) @180C	mg/L	40	160	105		52		
Residue, Non-Filterable (TSS) @105C	mg/L	24	88	42		115.0	H	
Selenium, total recoverable	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	0.20	1.36	0.80				
Sodium, dissolved	mg/L	1.9	25.2	12.5				
Sulfate	mg/L	-10	20	3				
Sum of Anions	meq/L	0.5	2.2	1.4				
Sum of Cations	meq/L	0.4	2.4	1.3				
TDS (calculated)	calc.	23	123	73				
TDS (ratio - measured/calculated)	mg/L	1.22	1.74	1.52				
Zinc, dissolved	mg/L	0.01	0.02	0.02				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

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H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated ...

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.
Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Lick Creek Flume
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Lick Creek Flume		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Flow	staff gage				0.09'	0.08'		dry
pH (Field)	SU				7.72	7.30		
Conductivity (Field)	µmhos/cm				495	361		
Temperature (Field)	°C				3.7	15.1		
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-09		
Sample Date						6/10/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Aluminum, dissolved	mg/L	0.12	0.12	0.12				
Arsenic, dissolved	mg/L	0.001	0.001	0.001				
Bicarbonate as CaCO3	mg/L	56	229	111				
Calcium, dissolved	mg/L	25.5	25.5	25.5				
Chloride	mg/L		8	4				
Conductivity @25C	µmhos/cm	118	481	238		350		
Hardness as CaCO3	mg/L	45	169	87				
Iron, dissolved	mg/L		0.56	0.13		0.18		
Iron, total	mg/L	0.49	11.3	4.06		1.15		
Magnesium, dissolved	mg/L	5.3	6.9	6.1				
Manganese, dissolved	mg/L	0.007	0.015	0.012				
Manganese, total	mg/L	0.003	0.39	0.11				
Molybdenum, dissolved	mg/L		0.01	0.005				
Nitrate/Nitrite (as N)	mg/L		0.13	0.04				
pH	SU	7.1	8.75	7.85		7.9	H	
Phosphorus, ortho dissolved	mg/L		1.67	0.19				
Residue, Filterable (TDS) @180C	mg/L	90	552	169		234	H	
Residue, Non-Filterable (TSS) @105C	mg/L	4	614	157		48.0		
Sodium Adsorption Ratio (SAR)	calc.	0.59	1.08	0.86				
Sodium, dissolved	mg/L	23.6	23.6	23.6				
Sulfate	mg/L	8.5	47.2	21.03				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

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Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Horse Gulch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Horse Gulch		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/11/2024	6/7/2024	9/28/2024
Field Parameters							
Flow	gpm				dry	dry	dry
pH (Field)	SU	8.2	8.5	8.3			
Conductivity (Field)	µmhos/cm	240	740	542			
Temperature (Field)	°C	5.1	14.7	10.0			
Comment							
Laboratory Parameters [2]							
Name of Certified Lab [3]							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Alkalinity (Total CaCO3)	mg/L	128	332	270			
Aluminum, dissolved	mg/L	0.04	0.04	0.04			
Arsenic, total recoverable	mg/L	0.001	0.001	0.001			
Bicarbonate as CaCO3	mg/L	128	331	268			
Calcium, dissolved	mg/L		0.004	0.000			
Carbonate as CaCO3	mg/L		9	2			
Cation - Anion Balance	%	-4.8	-4.8	-4.8			
Chloride	mg/L	1	5	3			
Conductivity @25C	µmhos/cm	780	780	780			
Hardness as CaCO3	mg/L	89	324	255			
Iron, dissolved	mg/L	0.05	0.05	0.05			
Iron, total	mg/L	0.1	3.09	0.83			
Magnesium, dissolved	mg/L	7	29.4	22.7			
Manganese, dissolved	mg/L	0.007	0.007	0.007			
Manganese, total	mg/L		0.34	0.04			
Nitrate/Nitrite (as N)	mg/L		0.36	0.12			
pH	SU	8.3	8.3	8.30			
Phosphate	mg/L	0.11	0.11	0.11			
Phosphorus, ortho dissolved	mg/L		0.037	0.011			
Potassium, dissolved	mg/L	3.6	3.6	3.6			
Residue, Filterable (TDS) @180C	mg/L	170	440	354			
Residue, Non-Filterable (TSS) @105C	mg/L						
Sodium Adsorption Ratio (SAR)	calc.	0.72	1.35	1.2			
Sodium, dissolved	mg/L	15.5	54	41.1			
Sulfate	mg/L	10	90	66			
Sum of Anions	meq/L	6.5	6.5	6.5			
Sum of Cations	meq/L	5.9	5.9	5.9			

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

East Gulch, East of Horse Gulch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: E. Gulch, E. of Horse Gulch		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm				dry	dry		dry
pH (Field)	SU	7.7	8.4	8.0				
Conductivity (Field)	µmhos/cm	260	480	402				
Temperature (Field)	°C	4.8	14.8	10.0				
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	135	245	202				
Aluminum, dissolved	mg/L	0.03	0.03	0.03				
Bicarbonate as CaCO3	mg/L	135	245	202				
Calcium, dissolved	mg/L	26.8	53.6	42.6				
Carbonate as CaCO3	mg/L		6	0.5				
Chloride	mg/L	1	4	2				
Conductivity @25C	µmhos/cm	453	453	453				
Hardness as CaCO3	mg/L	95	190	156				
Iron, dissolved	mg/L	0.05	0.05	0.05				
Iron, total	mg/L	0.41	3.59	1.07				
Magnesium, dissolved	mg/L	6.9	13.7	11.6				
Manganese, dissolved	mg/L	0.012	0.012	0.012				
Manganese, total	mg/L	0.01	0.094	0.068				
Nitrate/Nitrite (as N)	mg/L	0.04	0.23	0.13				
pH	SU	8	8	8				
Phosphate	mg/L	0.2	0.2	0.2				
Phosphorus, ortho dissolved	mg/L		0.066	0.018				
Potassium, dissolved	mg/L	1.8	1.8	1.8				
Residue, Filterable (TDS) @180C	mg/L	170	290	252				
Residue, Non-Filterable (TSS) @105C	mg/L		50	17				
Sodium Adsorption Ratio (SAR)	calc.	0.94	1.65	1.5				
Sodium, dissolved	mg/L	20.9	47.8	40.2				
Sum of Anions	meq/L	4.9	4.9	4.9				
Sum of Cations	meq/L	4.9	4.9	4.9				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

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Upper Deep Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Upper Deep Creek		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm				1,118	1,078		54.19
pH (Field)	SU	8.10	8.80	8.50	7.09	7.26		7.68
Conductivity (Field)	µmhos/cm	80	310	192	308	197.6		400
Temperature (Field)	°C	0.2	18.6	10.0	6.1	14.9		13.6
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-06		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L		160	103.4				
Bicarbonate as CaCO3	mg/L	53	153	106.3				
Calcium, dissolved	mg/L	14	44.4	28.7				
Carbonate as CaCO3	mg/L		9	1.3				
Cation - Anion Balance	%	-3.4	-2	-2.7				
Chloride	mg/L		2	0.2				
Conductivity @25C	µmhos/cm	139	242	191		177		
Hardness as CaCO3	mg/L	47	138	91				
Iron, dissolved	mg/L	0.02	0.04	0		0.733		
Iron, total	mg/L	0.14	9.43	2.63		3.73		
Magnesium, dissolved	mg/L	2.6	6.6	4.6				
Manganese, dissolved	mg/L		0.007	0.004				
Manganese, total	mg/L	0.005	0.282	0				
Nitrate/Nitrite (as N)	mg/L		0.05	0.01				
pH	SU	6.9	8	7.5		6.9	H	
Phosphate	mg/L	0.12	0.2	0.16				
Phosphorus, ortho dissolved	mg/L		0.065	0.013				
Potassium, dissolved	mg/L	0.7	1.2	1.0				
Residue, Filterable (TDS) @180C	mg/L	60	210	133		144		
Residue, Non-Filterable (TSS) @105C	mg/L					165	H	
Sodium Adsorption Ratio (SAR)	calc.	0.32	0.77	0.6				
Sodium, dissolved	mg/L	7.9	20	13.8				
Sulfate	mg/L		30	10.8				
Sum of Anions	meq/L	1.5	2.6	2.1				
Sum of Cations	meq/L	1.4	2.5	2.0				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

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Lower Deep Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Lower Deep Creek		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm				1,257	1,079		106.44
pH (Field)	SU	8.10	8.80	8.50	7.22	7.36		7.78
Conductivity (Field)	µmhos/cm	120	380	246	321	241		442
Temperature (Field)	°C	0.1	16.4	10.0	6.9	16.7		11.8
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-11		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	61	183	126				
Aluminum, dissolved	mg/L		0.03	0.02				
Bicarbonate as CaCO3	mg/L	65	173	132				
Calcium, dissolved	mg/L	18.6	46.8	31.9				
Carbonate as CaCO3	mg/L		12	2				
Cation - Anion Balance	%	-6.7	-2.9	-4.8				
Chloride	mg/L		2	1				
Conductivity @25C	µmhos/cm	162	270	216		235		
Iron, dissolved	mg/L	0.03	0.43	0.23		0.205		
Iron, total	mg/L	0.11	5.83	1.68		5.19		
Magnesium, dissolved	mg/L	3.1	7.5	5.4				
Manganese, dissolved	mg/L		0.009	0.005				
Manganese, total	mg/L		0.16	0.04				
Nitrate/Nitrite (as N)	mg/L		0.10	0.03				
pH	SU	6.5	8.2	7.4		8.1	H	
Phosphate	mg/L	0.08	0.09	0.09				
Phosphorus, ortho dissolved	mg/L		0.32	0.007				
Potassium, dissolved	mg/L	0.8	1.1	1.0				
Residue, Filterable (TDS) @180C	mg/L	90	250	165		162		
Residue, Non-Filterable (TSS) @105C	mg/L		448	93		210	H	
Sodium Adsorption Ratio (SAR)	calc.	0.59	1.32	0.94				
Sodium, dissolved	mg/L	12.3	31.4	21.6				
Sulfate	mg/L		30	19				
Sum of Anions	meq/L	1.8	3.2	2.5				
Sum of Cations	meq/L	1.7	2.8	2.25				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Box Canyon
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Box Canyon		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/6/2024	6/10/2024	Q[5]	9/24/2024
Field Parameters								
Flow	gpm				dry	dry		dry
pH (Field)	SU	7.9	8.9	8.3				
Conductivity (Field)	µmhos/cm	840	1,020	916				
Temperature (Field)	°C	2.0	15.9	10.0				
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	401	447	427				
Aluminum, dissolved	mg/L	0[(4)]	0.07[(4)]	0.03[(4)]				
Arsenic, dissolved	mg/L	0	0	0				
Arsenic, total recoverable	mg/L	0	0.006	0.001				
Bicarbonate as CaCO3	mg/L	398	447	425				
Cadmium, dissolved	mg/L	0	0.003	0.0008				
Calcium, dissolved	mg/L	40.2	67.9	58.0				
Carbonate as CaCO3	mg/L	0	12	2				
Cation - Anion Balance	%	-4	3.6	0.02				
Chloride	mg/L	2	6	5				
Conductivity @25C	µmhos/cm	868	968	921				
Hardness as CaCO3	mg/L	195	283	255				
Hydroxide as CaCO3	mg/L	0	0	0				
Iron, dissolved	mg/L	0	0.02	0.01				
Iron, total	mg/L	0.02	0.44	0.16				
Magnesium, dissolved	mg/L	23	28	27				
Manganese, total	mg/L	0	0.009	0.002				
Nitrate (as N), dissolved	mg/L	0.13	0.48	0.30				
Nitrate/Nitrite (as N)	mg/L	0.13	0.48	0.30				
pH	SU	8	8.2	8.1				
Phosphate	mg/L	0	0.03	0.01				
Phosphorus, ortho dissolved	mg/L	0	0.007	0.002				
Potassium, dissolved	mg/L	2.6	3.3	3.0				
Residue, Filterable (TDS) @180C	mg/L	540	620	586				
Residue, Non-Filterable (TSS) @105C	mg/L	0	38	19				
Selenium, dissolved	mg/L	0.001	0.002	0.002				
Selenium, total recoverable	mg/L	0	0.003	0.001				
Sodium Adsorption Ratio (SAR)	calc.	3.43	4.26	3.91				
Sodium, dissolved	mg/L	127	154	141				
Sulfate	mg/L	100	140	118				
Sum of Anions	meq/L	10.3	12.1	11.1				
Sum of Cations	meq/L	9.5	12.23	11.1				
Zinc, dissolved	mg/L	0	0.01	0.002				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] Baseline value is for total Aluminum.

[5] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Deer Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Deer Creek		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm	0.72	114	44.7	dry	dry		dry
pH (Field)	SU	8.3	8.4	8.4				
Conductivity (Field)	µmhos/cm	537	796	659				
Temperature (Field)	°C	11.2	16.9	13.1				
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	247	274	263				
Aluminum, dissolved	mg/L	-0.03	-0.03	-0.03				
Arsenic, dissolved	mg/L	-0.0005	-0.0005	-0.0005				
Arsenic, total recoverable	mg/L	-0.0005	0.0009	0.0006				
Bicarbonate as CaCO3	mg/L	218	249	235				
Boron, dissolved	mg/L	0.03	0.03	0.03				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	47.0	64.5	56.5				
Carbonate as CaCO3	mg/L	25	30	28				
Cation - Anion Balance	%	-5.7	4.6	3.7				
Chloride	mg/L	3	3	3				
Conductivity @25C	µmhos/cm	487	547	517				
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	176	245	211				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.09	0.11	0.10				
Iron, total	mg/L	0.36	2.92	1.64				
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	14.3	20.4	18.3				
Manganese, dissolved	mg/L	-0.005	0.009	0.005				
Manganese, total	mg/L	-0.005	0.049	0.026				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	0.88	2.07	1.50				
pH	SU	8.5	8.6	8.6				
Phosphate	mg/L	0.03	0.12	0.08				
Phosphorus, ortho dissolved	mg/L	0.01	0.04	0.03				
Potassium, dissolved	mg/L	3.2	3.6	3.4				
Residue, Filterable (TDS) @180C	mg/L	280	330	310				
Residue, Non-Filterable (TSS) @105C	mg/L	16	68	42				
Selenium, total recoverable	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	1.09	1.21	1.15				
Sodium, dissolved	mg/L	32.8	43.9	39.9				
Sulfate	mg/L	30	50	40				
Sum of Anions	meq/L	5.6	6.2	5.9				
Sum of Cations	meq/L	5.0	6.8	5.9				
TDS (calculated)	calc.	292	346	319				
TDS (ratio - measured/calculated)	mg/L	0.92	0.96	0.94				
Zinc, dissolved	mg/L	-0.01	0.02	0.01				

[1] Baseline 2005.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Poison Gulch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Poison Gulch		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm				dry	dry		dry
pH (Field)	SU	6.56	7.08	6.74				
Conductivity (Field)	µmhos/cm	271	479	383				
Temperature (Field)	°C	10.9	12.9	12.2				
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	119	152	136				
Aluminum, dissolved	mg/L	-0.03	-0.03	-0.03				
Arsenic, total recoverable	mg/L	-0.0005	0.0007	0.0005				
Bicarbonate as CaCO3	mg/L	119	152	136				
Boron, dissolved	mg/L	0.02	0.03	0.03				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	22.0	35.5	28.8				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	%	-2.1	7.7	4.4				
Chloride	mg/L	1	1	1				
Conductivity @25C	µmhos/cm	240	295	268				
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	78	124	101				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.07	0.11	0.09				
Iron, total	mg/L	0.41	0.43	0.42				
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	5.6	8.6	7.1				
Manganese, dissolved	mg/L	-0.005	-0.005	-0.005				
Manganese, total	mg/L	-0.005	0.010	0.006				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
pH	SU	7.8	8.1	8.0				
Phosphate	mg/L	0.21	0.21	0.21				
Phosphorus, ortho dissolved	mg/L	0.07	0.07	0.07				
Potassium, dissolved	mg/L	2.9	2.9	2.9				
Residue, Filterable (TDS) @180C	mg/L	130	170	150				
Residue, Non-Filterable (TSS) @105C	mg/L	-5	28	15				
Selenium, total recoverable	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	0.82	0.92	0.87				
Sodium, dissolved	mg/L	16.6	23.3	20.0				
Sulfate	mg/L	-10	-10	-10				
Sum of Anions	meq/L	2.4	3.0	2.7				
Sum of Cations	meq/L	2.3	3.5	2.9				
TDS (calculated)	calc.	120	163	142				
TDS (ratio - measured/calculated)	mg/L	1.04	1.08	1.06				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline 2005.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Deep Creek Ditch
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Deep Creek Ditch		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm / staff	70	1,527	563	0.24'	0.49'		0.21'
pH (Field)	SU	6.32	8.20	7.27	7.41	6.90		7.34
Conductivity (Field)	µmhos/cm	75.9	131	107	74.3	55.5		52.7
Temperature (Field)	°C	5.0	11.9	9.6	5.6	11.4		8.9
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-05		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	25	60	45				
Aluminum, dissolved	mg/L	0.05	0.15	0.10				
Arsenic, total recoverable	mg/L	-0.0005	0.0006	0.0003				
Bicarbonate as CaCO3	mg/L	25	60	45				
Boron, dissolved	mg/L	-0.01	-0.01	-0.01				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	4.6	13.7	10.1				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	%	-11.1	6.7	-3.0				
Chloride	mg/L	1	9	3				
Conductivity @25C	µmhos/cm	50	113	88		55		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	16	47	35				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.04	0.14	0.09		0.155		
Iron, total	mg/L	1.19	2.59	1.83		2.54		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	1.1	3.1	2.3				
Manganese, dissolved	mg/L	-0.005	0.013	0.005				
Manganese, total	mg/L	0.032	0.090	0.064				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	3.39	0.90				
pH	SU	7.8	8.1	8.0		6.8	H	
Phosphate	mg/L	0.06	0.09	0.08				
Phosphorus, ortho dissolved	mg/L	0.02	0.03	0.03				
Potassium, dissolved	mg/L	-0.3	0.7	0.5				
Residue, Filterable (TDS) @180C	mg/L	40	100	75		48		
Residue, Non-Filterable (TSS) @105C	mg/L	8	76	32		89.0	H	
Selenium, total recoverable	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	0.19	0.33	0.28				
Sodium, dissolved	mg/L	1.8	5.2	3.9				
Sulfate	mg/L	-10	-10	-10				
Sum of Anions	meq/L	0.5	1.4	0.9				
Sum of Cations	meq/L	0.4	1.2	0.9				
TDS (calculated)	calc.	24	68	47				
TDS (ratio - measured/calculated)	mg/L	1.38	2.05	1.64				
Zinc, dissolved	mg/L	-0.01	0.03	0.02				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Minnesota Reservoir Flume
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Minnesota Reservoir Flume		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm / staff	83	3,591	1,364	0.09' [(6)]	0.38' [(6)]		0.08' [(6)]
pH (Field)	SU	7.97	8.75	8.29	7.31	7.27		7.46
Conductivity (Field)	µmhos/cm	114	682	360	252	119.4		219.0
Temperature (Field)	°C	14.8	24.1	18.5	7.3	13.6		14.1
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-13		
Sample Date						6/7/2024		
Lab Test Date						6/14-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	46	230	140				
Aluminum, dissolved	mg/L	-0.03	0.08	0.05				
Arsenic, dissolved	mg/L	-0.001	0.001	0.001				
Bicarbonate as CaCO3	mg/L	46	213	134				
Boron, dissolved	mg/L	-0.01	0.02	0.01				
Cadmium, dissolved	mg/L	-0.01	-0.01	-0.01				
Calcium, dissolved	mg/L	8.9	53.7	31.2				
Carbonate as CaCO3	mg/L	-2	18	8				
Cation - Anion Balance	%	-5.9	2.1	-1.1				
Chloride	mg/L	1.00	3.00	1.86				
Conductivity @25C	µmhos/cm	95	456	295		123		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	31	192	111				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.03	0.26	0.10		0.235		
Iron, total	mg/L	0.36	3.62	1.58		1.61		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	2.1	14.1	8.1				
Manganese, dissolved	mg/L	-0.01	0.09	0.03				
Manganese, total	mg/L	0.031	0.397	0.136				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate (as N), dissolved	mg/L	-0.02	0.64	0.22				
pH	SU	8.0	8.5	8.3		8.1	H	
Phosphate	mg/L	-0.03	0.40	0.12				
Phosphorus, ortho dissolved	mg/L	-0.01	0.13	0.04				
Potassium, dissolved	mg/L	0.6	2.0	1.3				
Residue, Filterable (TDS) @180C	mg/L	70	250	176		90		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	60	26		25.0	H	
Selenium, dissolved	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	0.38	1.16	0.72				
Sodium, dissolved	mg/L	4.8	32.4	17.3				
Sulfate	mg/L	-10	30	6				
Sum of Anions	meq/L	0.90	4.80	3.06				
Sum of Cations	meq/L	0.8	4.7	3.0				
TDS (calculated)	calc.	46	244	158				
TDS (ratio - measured/calculated)	mg/L	0.99	1.74	1.24				
Zinc, dissolved	mg/L	-0.01	0.02	0.01				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

[6] Flow is partially diverted around flume by beaver activity.

South Prong Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024										
Monitoring Location: South Prong Creek		**Baseline [1]**			**Water Year 2024**					
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	6/10/2024 (Duplicate)	Q[4]	9/26/2024
Field Parameters										
Flow	staff	--	--	--	0.33'	1.27'		--		0.18'
pH (Field)	SU	7.5	9	8.5	7.58	7.95		--		7.64
Conductivity (Field)	µmhos/cm	64.9	178.0	109.2	194.5	55.9		--		138.6
Temperature (Field)	°C	4.9	16.1	10.6	2.5	7.0		--		11.4
Comment										
Laboratory Parameters [2]										
Name of Certified Lab [3]						ACZ		ACZ		
Lab Reference #						L88299-13		L88299-11		
Sample Date						6/10/2024		6/10/2024		
Lab Test Date						6/13-6/30		6/13-6/30		
Sampled By						PH		PH		
Alkalinity (Total CaCO3)	mg/L	31.9	64.6	50.4						
Aluminum, dissolved	mg/L	-0.05	0.04	0.03						
Arsenic, total recoverable	mg/L	0.0003	0.0011	0.0005						
Bicarbonate as CaCO3	mg/L	31.9	63.6	50.3						
Boron, dissolved	mg/L	-0.02	0.01	0.01						
Cadmium, dissolved	mg/L	-0.008	-0.005	-0.005						
Calcium, dissolved	mg/L	7.7	14.4	11.5						
Carbonate as CaCO3	mg/L	-10	-2	-2						
Cation-Anion Balance	calc.	-4.8	0.0	-2.7						
Chloride	mg/L	-0.5	1.0	0.4						
Conductivity @25C	umhos/cm	66	146	103		53		55		
Copper, dissolved	mg/L	-0.01	0.03	0.01						
Hardness as CaCO3 (dissolved)	mg/L	25	50	39						
Hydroxide as CaCO3	mg/L	-10	-2	-2.0						
Iron, dissolved	mg/L	-0.03	0.05	0.03		0.307		0.20		
Iron, total	mg/L	0.60	4.01	1.64		1.48		1.31		
Lead, dissolved	mg/L	-0.03	0.04	0.02						
Magnesium, dissolved	mg/L	1.5	3.5	2.6						
Manganese, dissolved	mg/L	-0.01	0.01	0.00						
Manganese, total	mg/L	0.02	0.08	0.04						
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002						
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02						
Nitrate/Nitrite as N	mg/L	-0.02	0.15	0.04						
pH	units	7.8	8.3	8.1		8.2	H	8.2	H	
Phosphate	mg/L	-0.06	0.12	0.08						
Phosphorus, ortho dissolved	mg/L	-0.02	0.04	0.03						
Potassium, dissolved	mg/L	0.2	0.9	0.5						
Residue, Filterable (TDS) @180C	mg/L	52	128	82		468		320		
Residue, Non-Filterable (TSS) @105C	mg/L	18.0	140.0	57.5		54.0		51.0		
Selenium, total recoverable	mg/L	-0.0001	0.0003	0.0001						
Sodium Adsorption Ratio in Water	calc.	0.26	0.58	0.32						
Sodium, dissolved	mg/L	3.3	9.4	4.6						
Sulfate	mg/L	-1	7.7	2.0						
Sum of Anions	meq/L	0.7	1.5	1.059						
Sum of Cations	meq/L	0.658	1.4	1.006						
TDS (calculated)	mg/L	34.0	75.4	52.0						
TDS (ratio - measured/calculated)	calc.	1.36	1.78	1.57						
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01						

[1] Baseline period is July 2018 through July 2019.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated ...

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

South Fork of South Prong Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: South Fork of South Prong Creek		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Flow	gpm	--	--	--	564	4,130		156.3
pH (Field)	SU	7.50	8.40	8.01	7.79	7.65		7.67
Conductivity (Field)	µmhos/cm	55.9	144.0	96.7	146.1	50.9		110.6
Temperature (Field)	°C	4.5	13.0	9.8	3.9	8.0		10.6
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-08		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	28.9	56.1	45.5				
Aluminum, dissolved	mg/L	-0.05	-0.03	-0.03				
Arsenic, total recoverable	mg/L	0.0002	0.0003	0.0002				
Bicarbonate as CaCO3	mg/L	28.9	56.1	45.5				
Boron, dissolved	mg/L	-0.02	0.01	0.01				
Cadmium, dissolved	mg/L	-0.008	-0.005	-0.005				
Calcium, dissolved	mg/L	6.6	14.1	10.6				
Carbonate as CaCO3	mg/L	-10	-2	-2				
Cation-Anion Balance	calc.	-10.8	9.1	-2.1				
Chloride	mg/L	-0.5	0.6	0.4				
Conductivity @25C	umhos/cm	58	120	90		41		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3 (dissolved)	mg/L	22	47	37				
Hydroxide as CaCO3	mg/L	-10	-2	-2				
Iron, dissolved	mg/L	-0.03	0.04	0.03		-0.06	U	
Iron, total	mg/L	0.33	0.62	0.49		0.82		
Lead, dissolved	mg/L	-0.03	0.03	0.02				
Magnesium, dissolved	mg/L	1.3	3.0	2.4				
Manganese, dissolved	mg/L	-0.01	0.01	0.004				
Manganese, total	mg/L	0.01	0.02	0.02				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite as N	mg/L	-0.02	0.14	0.05				
pH	units	7.6	8.2	8.0		6.1	H	
Phosphate	mg/L	-0.06	0.06	0.05				
Phosphorus, ortho dissolved	mg/L	-0.02	0.02	0.02				
Potassium, dissolved	mg/L	-0.2	0.7	0.4				
Residue, Filterable (TDS) @180C	mg/L	46	104	69		42		
Residue, Non-Filterable (TSS) @105C	mg/L	8.0	17.0	14.2		34.0		
Selenium, total recoverable	mg/L	-0.0001	0.0002	0.0001				
Sodium Adsorption Ratio in Water	calc.	0.24	0.45	0.30				
Sodium, dissolved	mg/L	2.6	6.7	4.1				
Sulfate	mg/L	-1.0	5.2	2.0				
Sum of Anions	meq/L	0.685	1.2	0.946				
Sum of Cations	meq/L	0.551	1.2	0.926				
TDS (calculated)	mg/L	33.0	62.0	47.1				
TDS (ratio - measured/calculated)	calc.	1.23	1.68	1.44				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline period is July 2018 through July 2019.

[2] Negative values denote readings below lab detection levels.

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H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

North Fork of South Prong Creek
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: North Fork of South Prong Creek		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Flow	gpm	--	--	--	95.12	53.94		26.01
pH (Field)	SU	7.50	8.88	8.20	7.58	7.62		7.94
Conductivity (Field)	µmhos/cm	301	460	356	483	509		657
Temperature (Field)	°C	5.7	15.5	11.5	6.4	13.6		13.7
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-12		
Sample Date						6/10/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	120	199	152				
Aluminum, dissolved	mg/L	-0.05	-0.05	-0.05				
Arsenic, total recoverable	mg/L	0.0003	0.0004	0.0004				
Bicarbonate as CaCO3	mg/L	115	187	144				
Boron, dissolved	mg/L	-0.02	0.04	0.02				
Cadmium, dissolved	mg/L	-0.008	-0.008	-0.008				
Calcium, dissolved	mg/L	23.1	40.5	29.5				
Carbonate as CaCO3	mg/L	-10	11.7	7.2				
Cation-Anion Balance	calc.	0.0	1.6	0.9				
Chloride	mg/L	1.7	2.3	2.1				
Conductivity @25C	umhos/cm	282	405	328		503		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3 (dissolved)	mg/L	82	145	105				
Hydroxide as CaCO3	mg/L	-10	-2	4				
Iron, dissolved	mg/L	-0.03	-0.03	-0.03		0.82		
Iron, total	mg/L	0.33	0.65	0.47		6.43		
Lead, dissolved	mg/L	-0.03	-0.03	-0.03				
Magnesium, dissolved	mg/L	6.0	10.6	7.6				
Manganese, dissolved	mg/L	-0.01	-0.01	-0.01				
Manganese, total	mg/L	-0.01	-0.01	-0.01				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	0.01				
Nitrate/Nitrite as N	mg/L	-0.02	0.18	0.07				
pH	units	8.4	8.4	8.4		8.3	H	
Phosphate	mg/L	0.12	0.12	0.12				
Phosphorus, ortho dissolved	mg/L	0.04	0.04	0.04				
Potassium, dissolved	mg/L	1.2	1.8	1.4				
Residue, Filterable (TDS) @180C	mg/L	174	254	207		36	B	
Residue, Non-Filterable (TSS) @105C	mg/L	10.0	23.0	15.0		292.0		
Selenium, total recoverable	mg/L	0.0002	0.0005	0.0003				
Sodium Adsorption Ratio in Water	calc.	1.3	1.5	1.4				
Sodium, dissolved	mg/L	27.2	41.1	32.6				
Sulfate	mg/L	19.6	30.9	24.8				
Sum of Anions	meq/L	2.9	4.7	3.5				
Sum of Cations	meq/L	2.9	4.8	3.6				
TDS (calculated)	mg/L	154	248	188				
TDS (ratio - measured/calculated)	calc.	1.02	1.26	1.12				
Zinc, dissolved	mg/L	-0.01	0.01	0.01				

[1] Baseline period is July 2018 through July 2019.

[2] Negative values denote readings below lab detection levels.

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B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.
Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Stream ST-SW-1
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Stream ST-SW-1		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Flow	gpm	--	--	--	95.7	27.07		7.93
pH (Field)	SU	7.99	8.75	8.42	7.35	7.01		7.73
Conductivity (Field)	µmhos/cm	97.6	118.1	108.4	101.3	107.0		105.8
Temperature (Field)	°C	7.3	14.1	10.8	4.1	9.6		11.3
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-07		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	45.8	53.4	49.2				
Aluminum, dissolved	mg/L	-0.05	-0.03	-0.04				
Arsenic, total recoverable	mg/L	0.0002	0.0005	0.0003				
Bicarbonate as CaCO3	mg/L	45.8	53.4	49.2				
Boron, dissolved	mg/L	-0.02	0.02	0.01				
Cadmium, dissolved	mg/L	-0.008	-0.005	-0.006				
Calcium, dissolved	mg/L	10.9	12.6	11.6				
Carbonate as CaCO3	mg/L	-10.0	-2.0	-3.6				
Cation-Anion Balance	calc.	-12.0	24.6	0.2				
Chloride	mg/L	-0.5	0.9	0.5				
Conductivity @25C	umhos/cm	98	111	104		121		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3 (dissolved)	mg/L	38	61	44				
Hydroxide as CaCO3	mg/L	-10	-2	-2				
Iron, dissolved	mg/L	-0.03	0.07	0.04		0.07	B	
Iron, total	mg/L	0.64	2.71	1.29		1.03		
Lead, dissolved	mg/L	-0.03	0.03	0.01				
Magnesium, dissolved	mg/L	2.4	8.1	3.6				
Manganese, dissolved	mg/L	-0.010	-0.005	-0.005				
Manganese, total	mg/L	0.02	0.08	0.04				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite as N	mg/L	-0.02	0.11	0.05				
pH	units	7.9	8.1	8.0		7.9	H	
Phosphate	mg/L	0.06	0.16	0.09				
Phosphorus, ortho dissolved	mg/L	0.02	0.05	0.03				
Potassium, dissolved	mg/L	0.4	1.0	0.6				
Residue, Filterable (TDS) @180C	mg/L	70	86	79		86		
Residue, Non-Filterable (TSS) @105C	mg/L	13.0	72.0	31.8		31.0		
Selenium, total recoverable	mg/L	-0.0001	0.0001	0.0001				
Sodium Adsorption Ratio in Water	calc.	0.32	0.41	0.36				
Sodium, dissolved	mg/L	4.5	7.3	5.5				
Sulfate	mg/L	-1.0	15.7	5.8				
Sum of Anions	meq/L	1.0	1.4	1.1				
Sum of Cations	meq/L	0.964	1.6	1.1				
TDS (calculated)	mg/L	51.1	70.5	57.9				
TDS (ratio - measured/calculated)	calc.	1.22	1.57	1.37				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline period is July 2018 through August 2019.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

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H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Pond ST-P-1
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Pond ST-P-1		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Water Depth	feet	--	--	--	1	dry		dry
pH (Field)	SU	7.88	8.99	8.27	8.46			
Conductivity (Field)	µmhos/cm	164.3	314	222	195.6			
Temperature (Field)	°C	9.8	22.3	18.0	12.7			
Comment					estimated depth			
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	47.9	103	81				
Aluminum, dissolved	mg/L	-0.05	0.12	0.05				
Arsenic, total recoverable	mg/L	0.0003	0.0080	0.0037				
Bicarbonate as CaCO3	mg/L	47.9	103	81				
Boron, dissolved	mg/L	-0.02	0.06	0.03				
Cadmium, dissolved	mg/L	-0.008	-0.005	-0.005				
Calcium, dissolved	mg/L	9.8	22.3	16.0				
Carbonate as CaCO3	mg/L	-10	-2	-2				
Cation-Anion Balance	calc.	-2.2	12.0	3.4				
Chloride	mg/L	1.7	17.4	6.9				
Conductivity @25C	umhos/cm	148	217	187				
Copper, dissolved	mg/L	-0.01	0.02	0.01				
Hardness as CaCO3 (dissolved)	mg/L	38	74	53				
Hydroxide as CaCO3	mg/L	-10	-2	-2				
Iron, dissolved	mg/L	0.04	1.52	0.65				
Iron, total	mg/L	0.18	13.6	4.5				
Lead, dissolved	mg/L	-0.03	-0.03	-0.03				
Magnesium, dissolved	mg/L	2.4	4.4	3.2				
Manganese, dissolved	mg/L	-0.01	0.32	0.16				
Manganese, total	mg/L	-0.01	0.65	0.30				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite as N	mg/L	-0.02	3.85	0.78				
pH	units	7.8	8.1	7.9				
Phosphate	mg/L	-0.06	0.22	0.13				
Phosphorus, ortho dissolved	mg/L	-0.02	0.07	0.04				
Potassium, dissolved	mg/L	3.6	7.1	5.5				
Residue, Filterable (TDS) @180C	mg/L	122	420	200				
Residue, Non-Filterable (TSS) @105C	mg/L	5.0	300.0	78.8				
Selenium, total recoverable	mg/L	0.0002	0.0007	0.0004				
Sodium Adsorption Ratio in Water	calc.	0.49	1.90	1.03				
Sodium, dissolved	mg/L	7.5	26.7	16.0				
Sulfate	mg/L	-1	6.1	3.1				
Sum of Anions	meq/L	1.1	2.3	1.9				
Sum of Cations	meq/L	1.4	2.3	2.0				
TDS (calculated)	mg/L	66	121	101				
TDS (ratio - measured/calculated)	calc.	1.15	3.96	1.98				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline period is August 2018 through August 2019.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Pond ST-P-2
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Pond ST-P-2		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Water Depth	feet	--	--	--	1	full		dry
pH (Field)	SU	6.55	8.27	7.45	7.64	7.06		
Conductivity (Field)	µmhos/cm	111.0	190.8	138.1	84.4	193.8		
Temperature (Field)	°C	7.5	22.7	15.6	11.1	22.7		
Comment					estimated depth	outlet flowing about 0.5 gpm		
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-01		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	42.6	91.8	64.6				
Aluminum, dissolved	mg/L	-0.05	0.19	0.08				
Arsenic, total recoverable	mg/L	0.000	0.001	0.000				
Bicarbonate as CaCO3	mg/L	42.6	91.8	64.6				
Boron, dissolved	mg/L	-0.02	-0.02	-0.02				
Cadmium, dissolved	mg/L	-0.008	-0.008	-0.008				
Calcium, dissolved	mg/L	10.2	25.8	17.1				
Carbonate as CaCO3	mg/L	-10	-2	-2				
Cation-Anion Balance	calc.	2.1	4.8	3.6				
Chloride	mg/L	1.0	4.9	2.4				
Conductivity @25C	umhos/cm	90	201	136		104		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3 (dissolved)	mg/L	36	89	59				
Hydroxide as CaCO3	mg/L	-10	-2	-2				
Iron, dissolved	mg/L	0.05	0.85	0.35		-0.06	U	
Iron, total	mg/L	0.13	1.68	0.72		0.138	B	
Lead, dissolved	mg/L	-0.03	-0.03	-0.03				
Magnesium, dissolved	mg/L	2.6	5.9	4.0				
Manganese, dissolved	mg/L	-0.01	0.04	0.02				
Manganese, total	mg/L	-0.01	0.11	0.04				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite as N	mg/L	-0.02	-0.02	-0.02				
pH	units	7.7	7.9	7.8		6.6	H	
Phosphate	mg/L	0.06	2.23	0.83				
Phosphorus, ortho dissolved	mg/L	0.02	0.72	0.27				
Potassium, dissolved	mg/L	0.6	7.0	2.9				
Residue, Filterable (TDS) @180C	mg/L	88	172	121		88		
Residue, Non-Filterable (TSS) @105C	mg/L	-2	7.0	5.7		8.0	B	
Selenium, total recoverable	mg/L	-0.0001	0.0006	0.0003				
Sodium Adsorption Ratio in Water	calc.	0.22	0.24	0.23				
Sodium, dissolved	mg/L	3.3	4.7	4.0				
Sulfate	mg/L	-1	-1	-1				
Sum of Anions	meq/L	0.9	2.0	1.4				
Sum of Cations	meq/L	0.9	2.2	1.5				
TDS (calculated)	mg/L	45	105	70				
TDS (ratio - measured/calculated)	calc.	1.64	1.96	1.77				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline period is August 2018 through August 2019.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Pond ST-P-3
Surface Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Pond ST-P-3		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Water Depth	feet	--	--	--	1.5	nearly full		dry
pH (Field)	SU	7.19	7.29	7.24	6.88	6.47		
Conductivity (Field)	µmhos/cm	95.0	124.0	111.8	105.6	143.0		
Temperature (Field)	°C	7.3	20.4	15.6	9	19.4		
Comment					estimated depth	about 0.25 feet below full		
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-02		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	38.9	64.1	54.4				
Aluminum, dissolved	mg/L	-0.05	0.19	0.07				
Arsenic, total recoverable	mg/L	-0.0002	0.0004	0.0003				
Bicarbonate as CaCO3	mg/L	38.9	64.1	54.4				
Boron, dissolved	mg/L	-0.02	-0.02	-0.02				
Cadmium, dissolved	mg/L	-0.008	-0.008	-0.008				
Calcium, dissolved	mg/L	8.9	15.1	12.7				
Carbonate as CaCO3	mg/L	-10	-2	-2				
Cation-Anion Balance	calc.	0.8	4.0	2.8				
Chloride	mg/L	1.0	1.0	1.0				
Conductivity @25C	umhos/cm	80	133	112		119		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3 (dissolved)	mg/L	32	56	47				
Hydroxide as CaCO3	mg/L	-10	-2	-2				
Iron, dissolved	mg/L	0.13	0.84	0.37		0.426		
Iron, total	mg/L	0.43	1.33	0.73		0.687		
Lead, dissolved	mg/L	-0.03	-0.03	-0.03				
Magnesium, dissolved	mg/L	2.4	5.0	3.7				
Manganese, dissolved	mg/L	-0.01	0.04	0.02				
Manganese, total	mg/L	-0.01	0.07	0.04				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite as N	mg/L	-0.02	-0.02	-0.02				
pH	units	7.4	7.9	7.7		6.8	H	
Phosphate	mg/L	0.12	0.40	0.28				
Phosphorus, ortho dissolved	mg/L	0.04	0.13	0.09				
Potassium, dissolved	mg/L	0.8	1.4	1.1				
Residue, Filterable (TDS) @180C	mg/L	94	110	102		122		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	15.0	6		6	B	
Selenium, total recoverable	mg/L	0.0001	0.0003	0.0002				
Sodium Adsorption Ratio in Water	calc.	0.23	0.27	0.25				
Sodium, dissolved	mg/L	2.9	4.5	3.8				
Sulfate	mg/L	-1	-1	-1				
Sum of Anions	meq/L	0.8	1.3	1.1				
Sum of Cations	meq/L	0.8	1.4	1.2				
TDS (calculated)	mg/L	40	66	56				
TDS (ratio - measured/calculated)	calc.	1.65	2.34	1.89				
Zinc, dissolved	mg/L	-0.01	0.01	0.01				

[1] Baseline period is August 2018 through August 2019.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

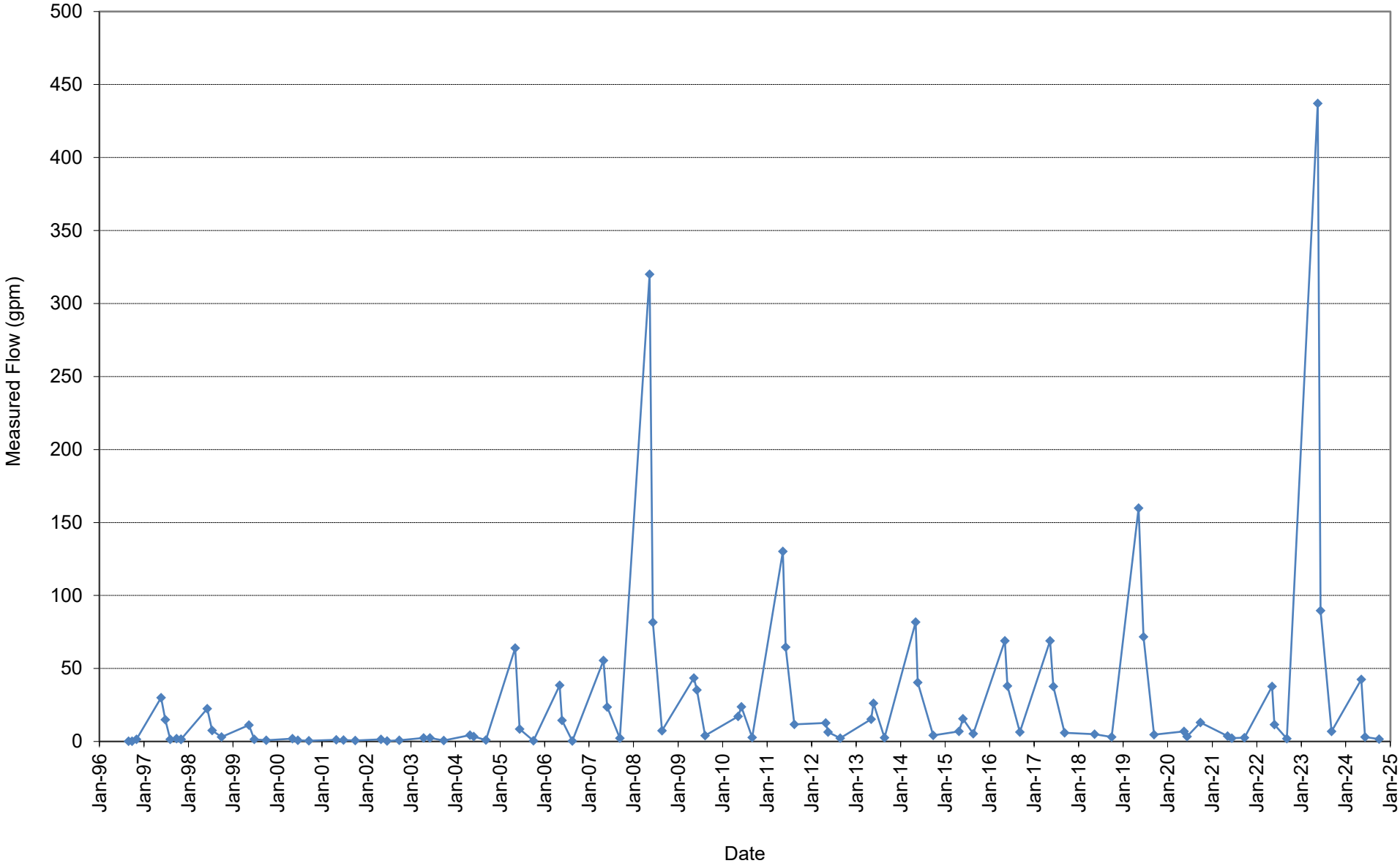
[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

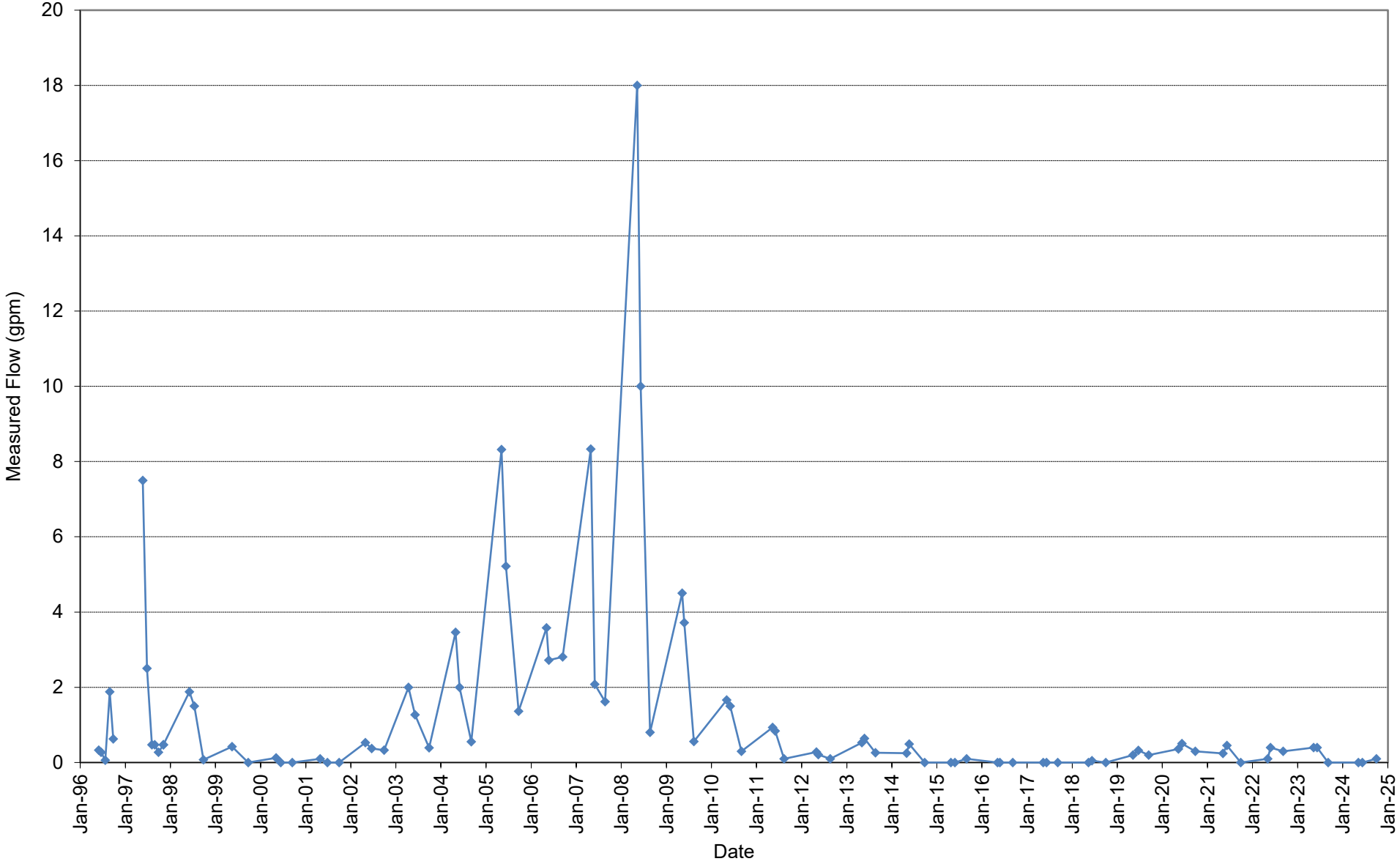
APPENDIX D

SPRINGS - HYDROGRAPHS

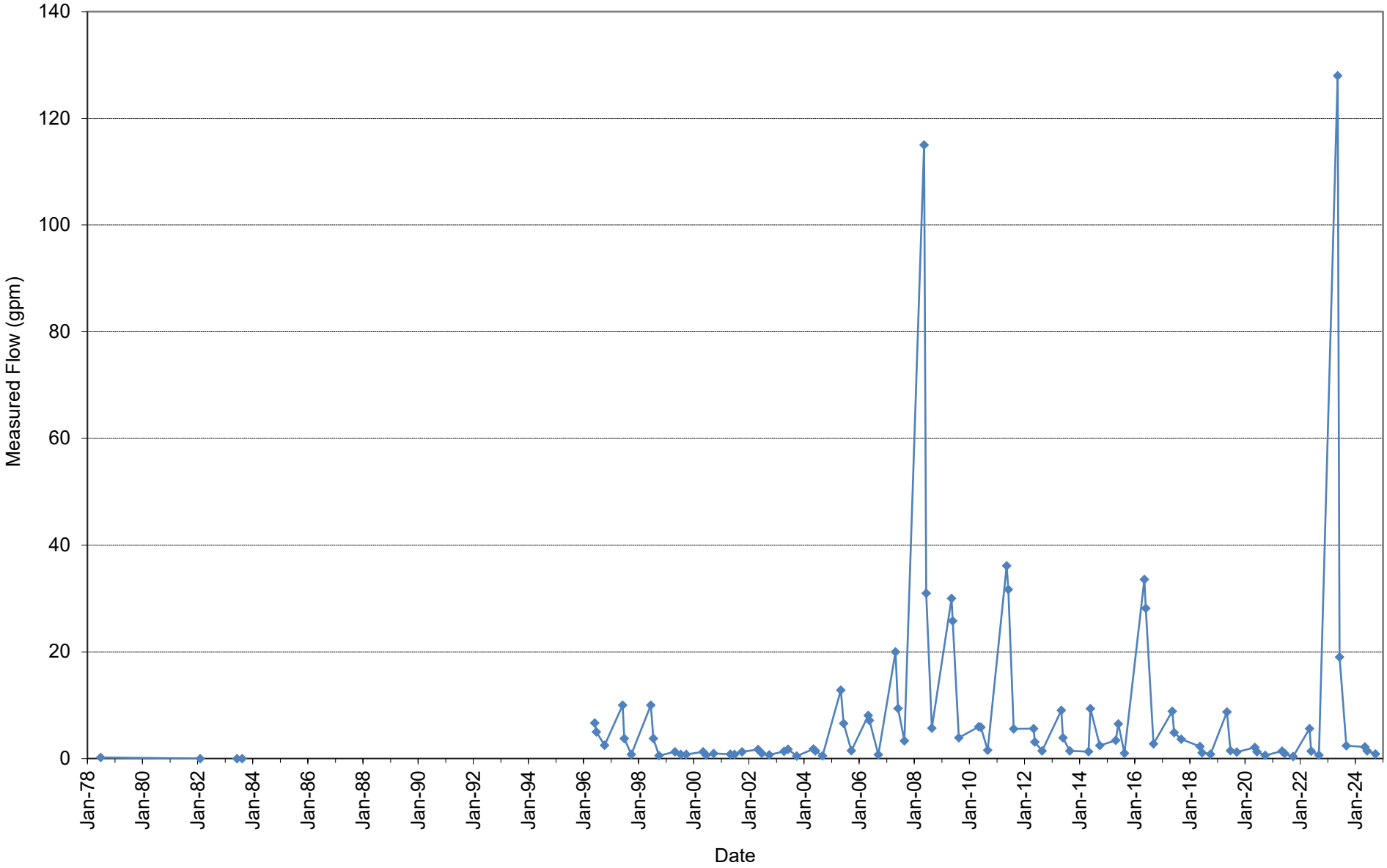
Spring 26-1
Source: Above F-Seam



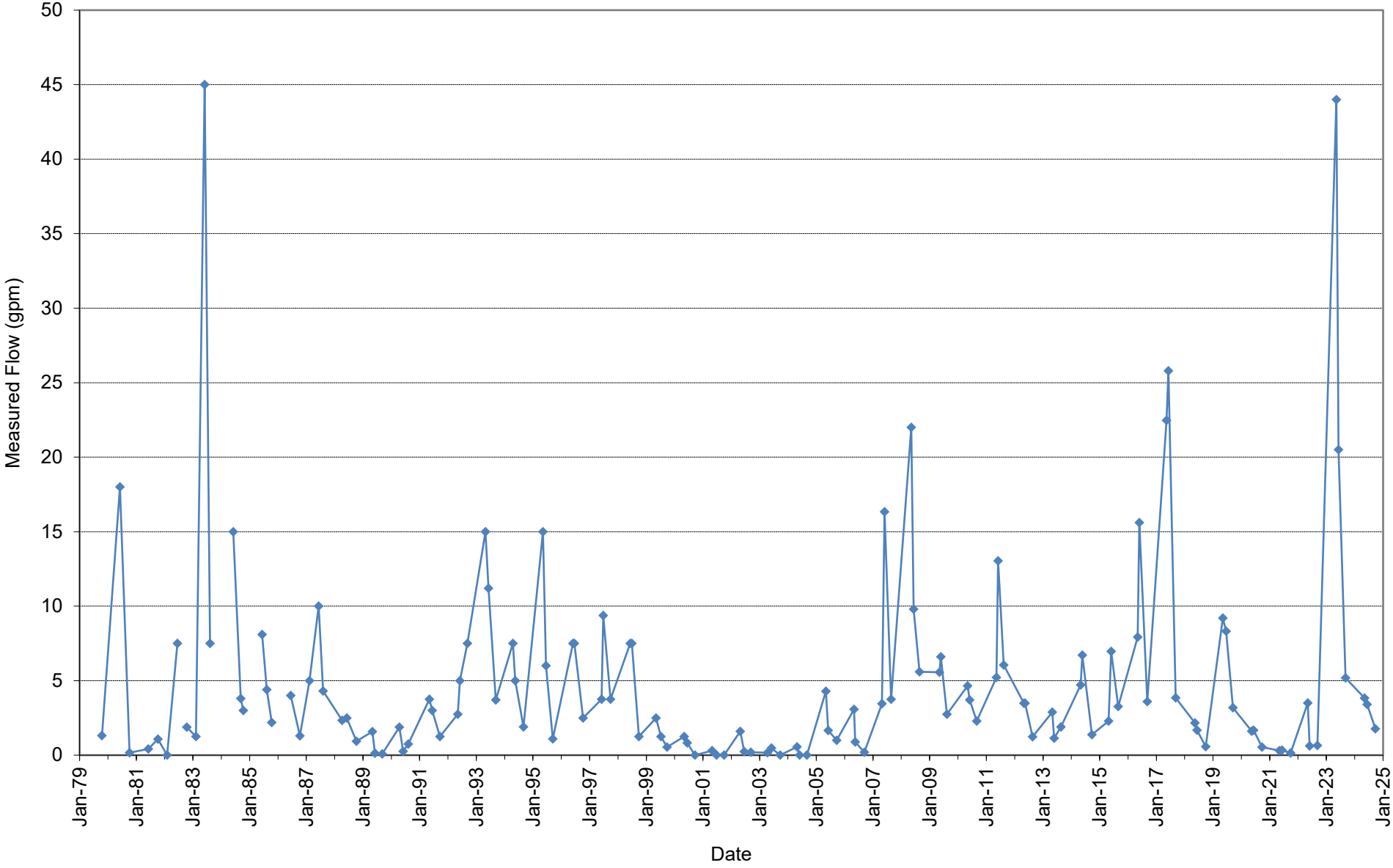
Spring 27-1
Source: Above F-Seam



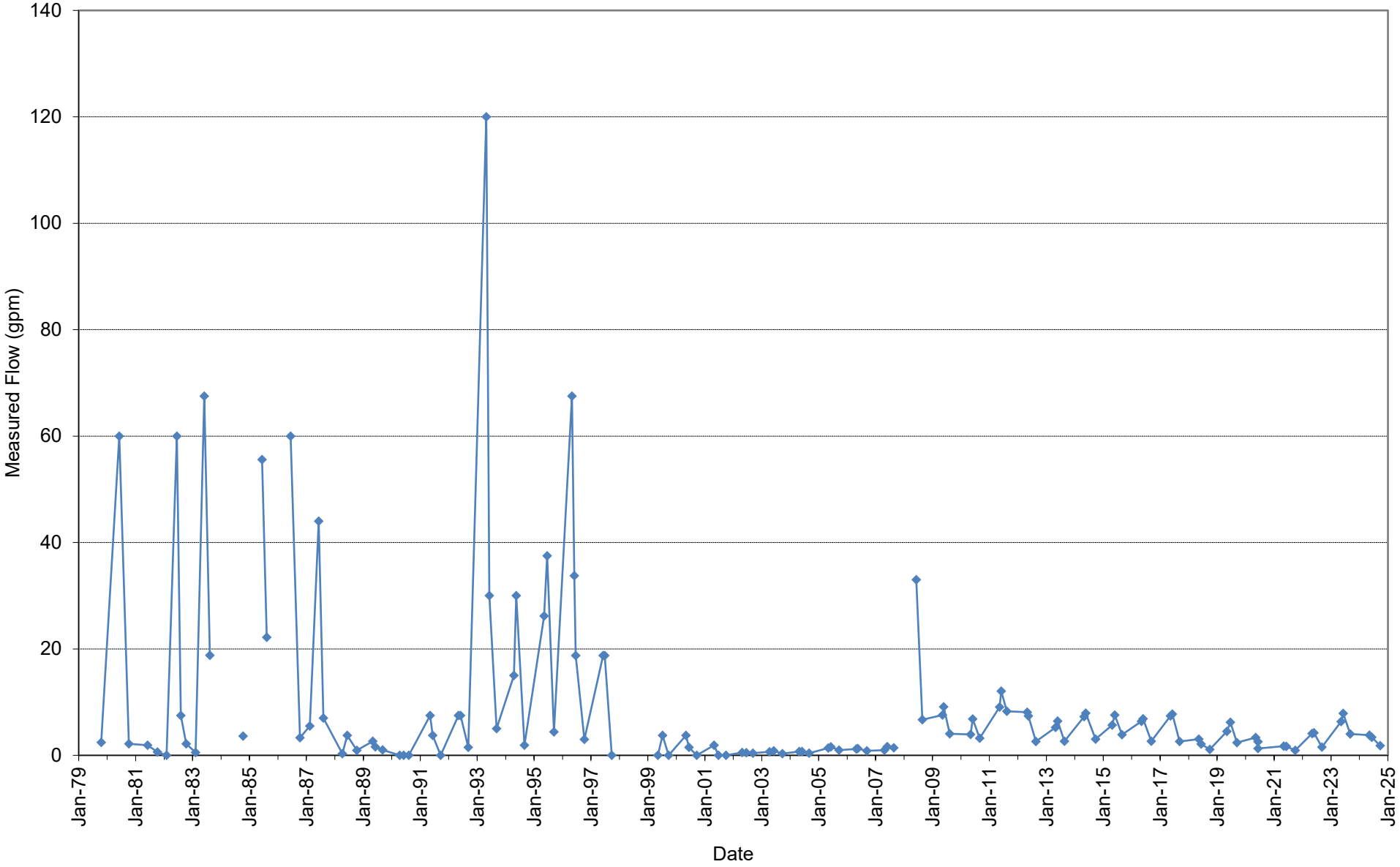
Spring G-7
Source: Above F-Seam



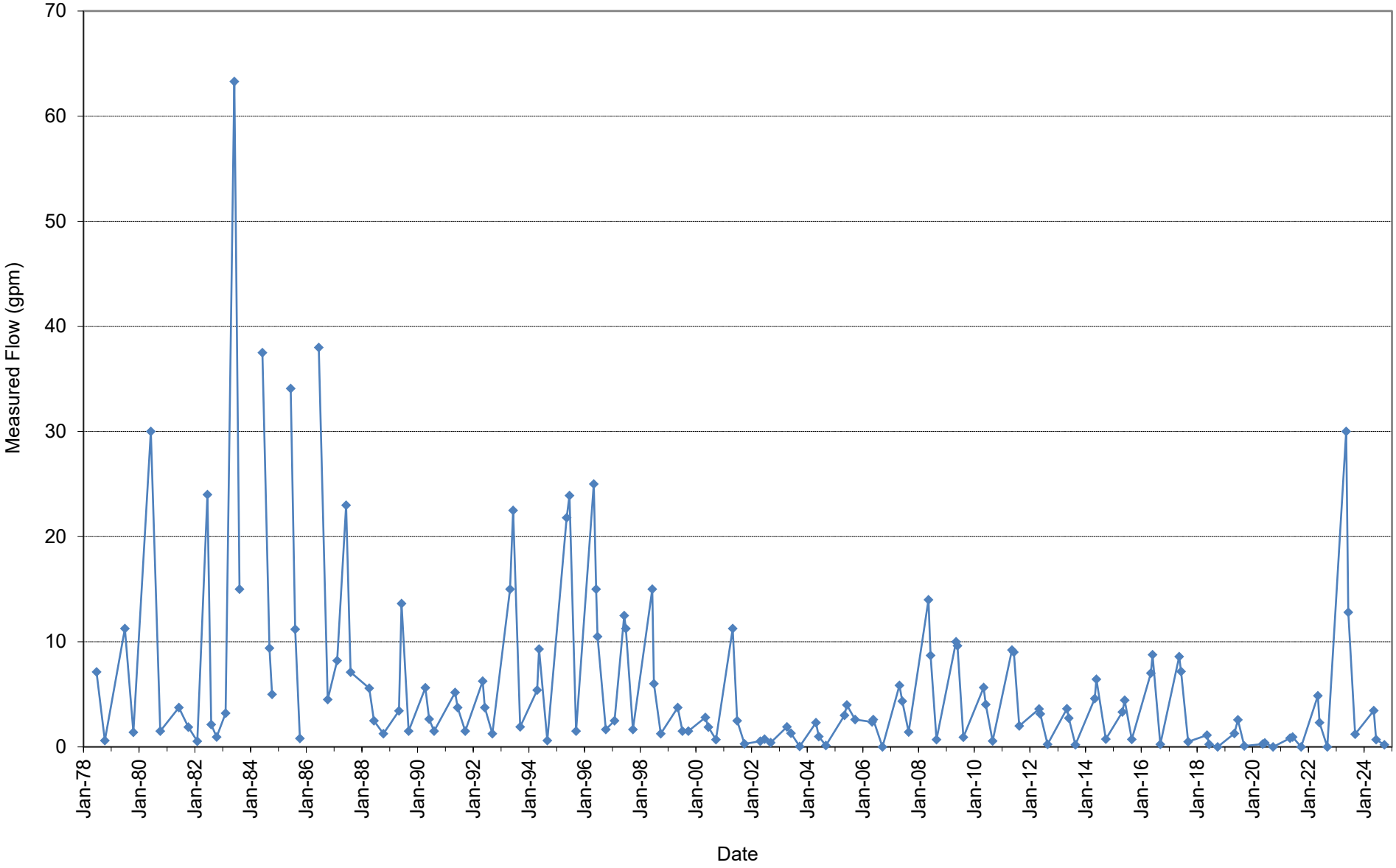
Spring G-16
Source: Above F-Seam



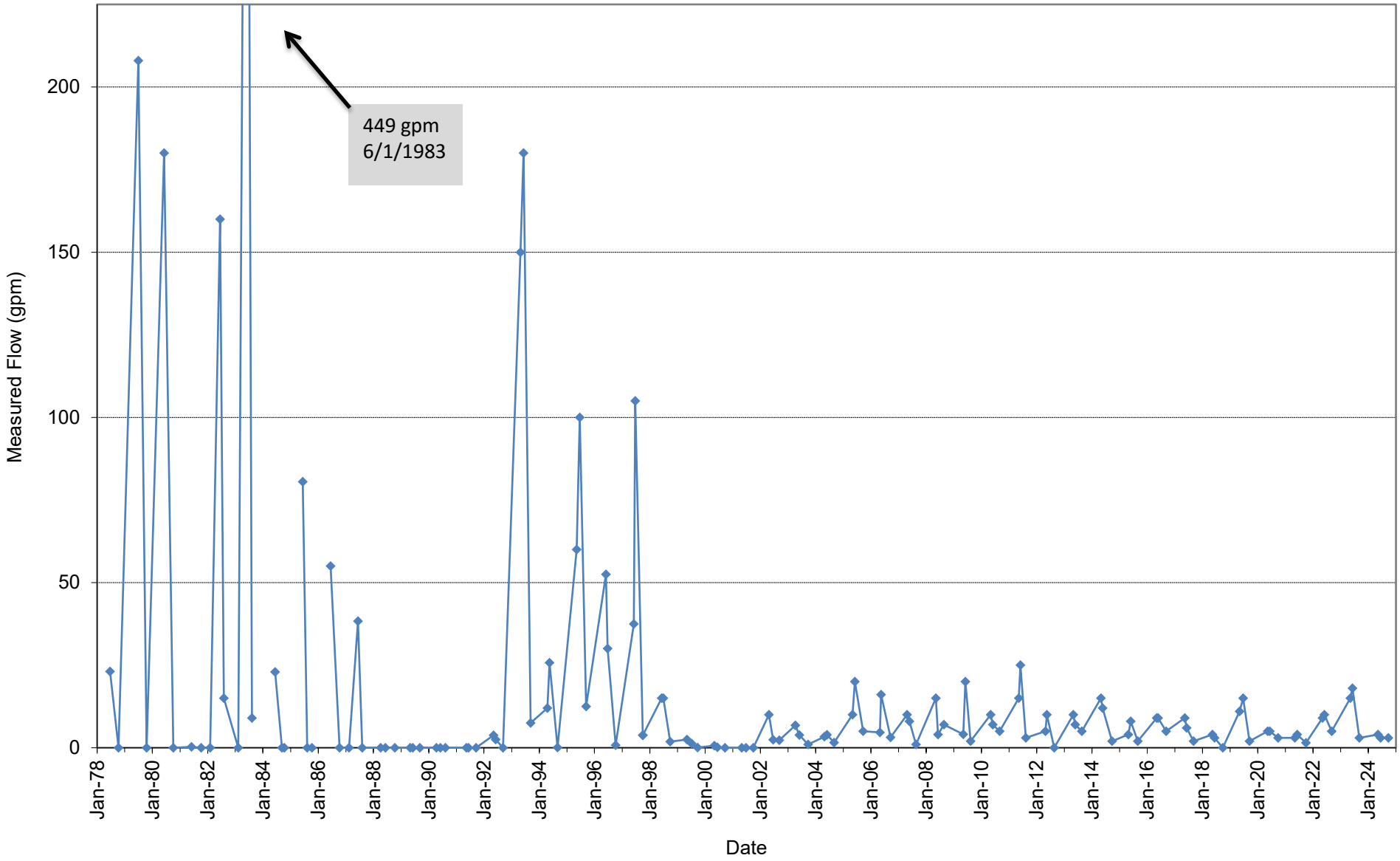
Spring G-24
Source: Above F-Seam



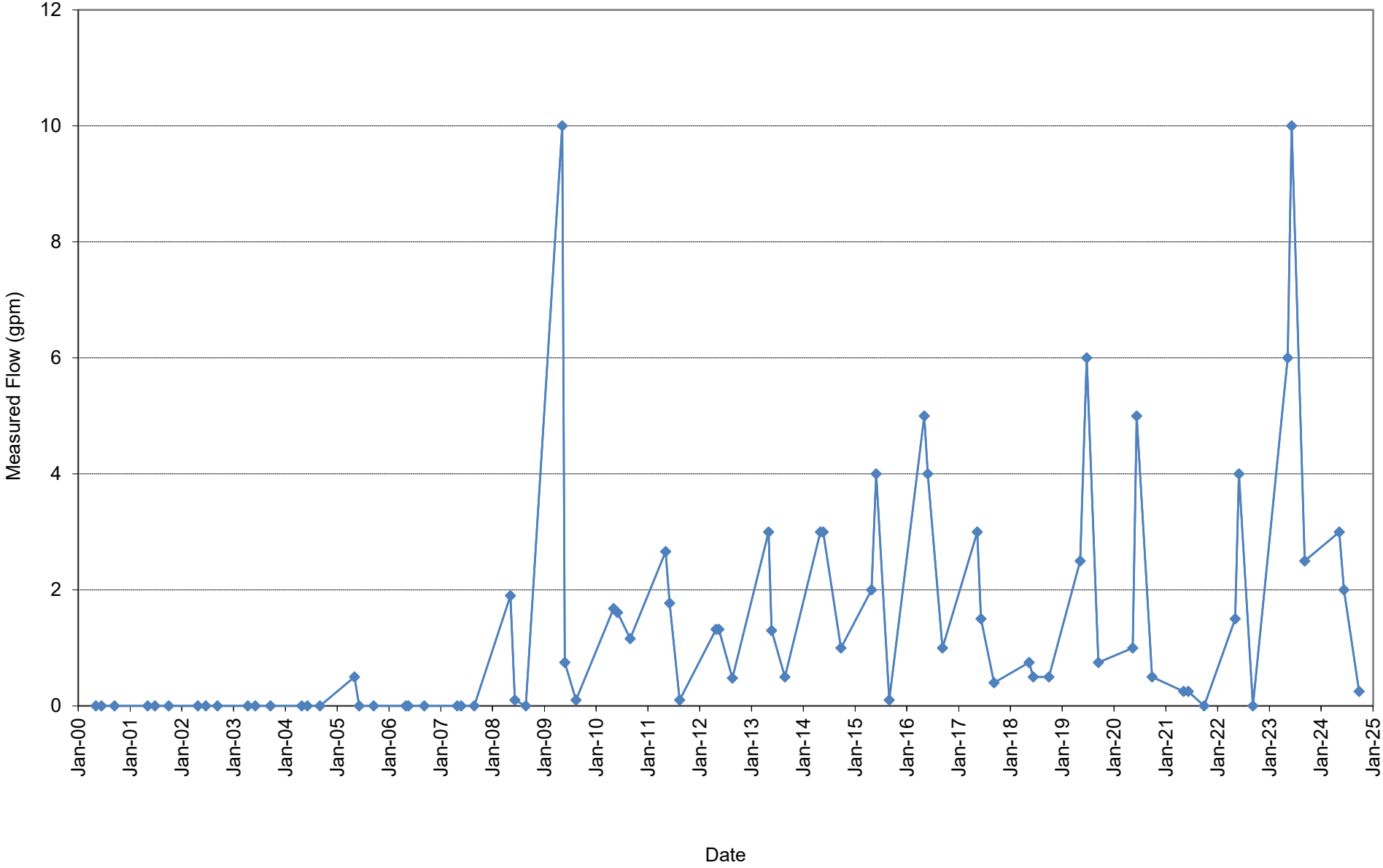
Spring G-14
Source: Above F-Seam



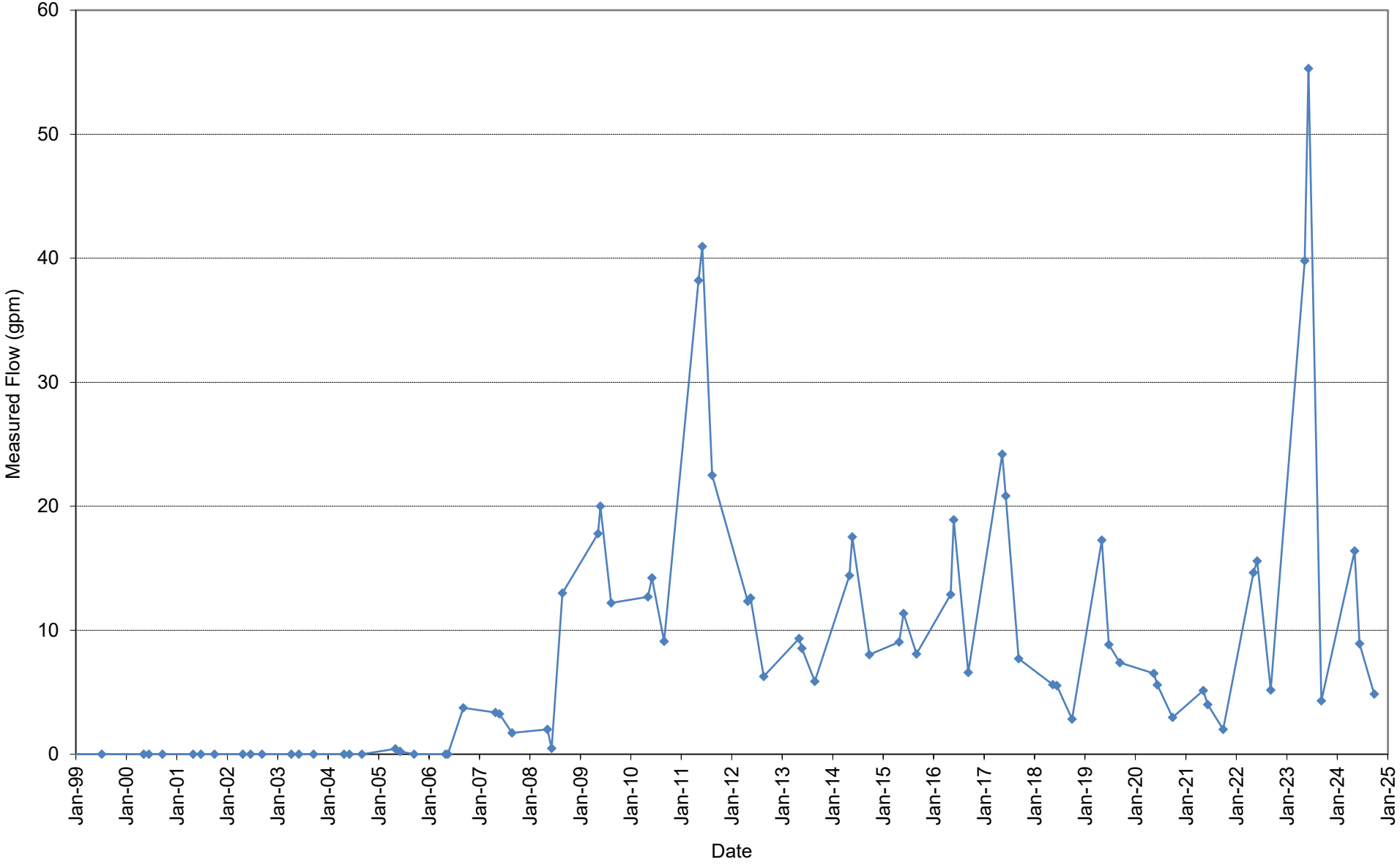
Spring G-22
Source: Above F-Seam



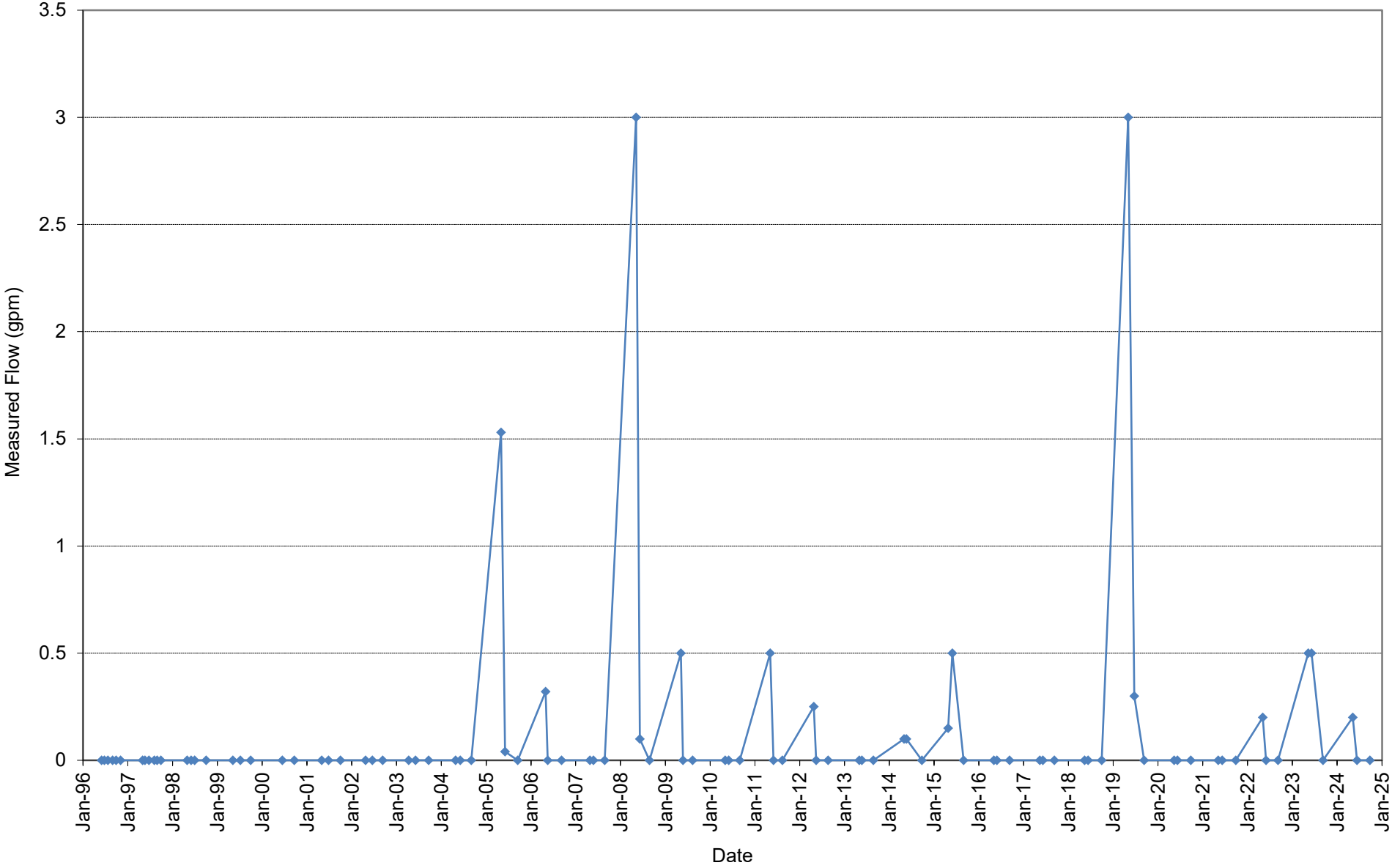
Spring 11-2
Source: Below F-Seam



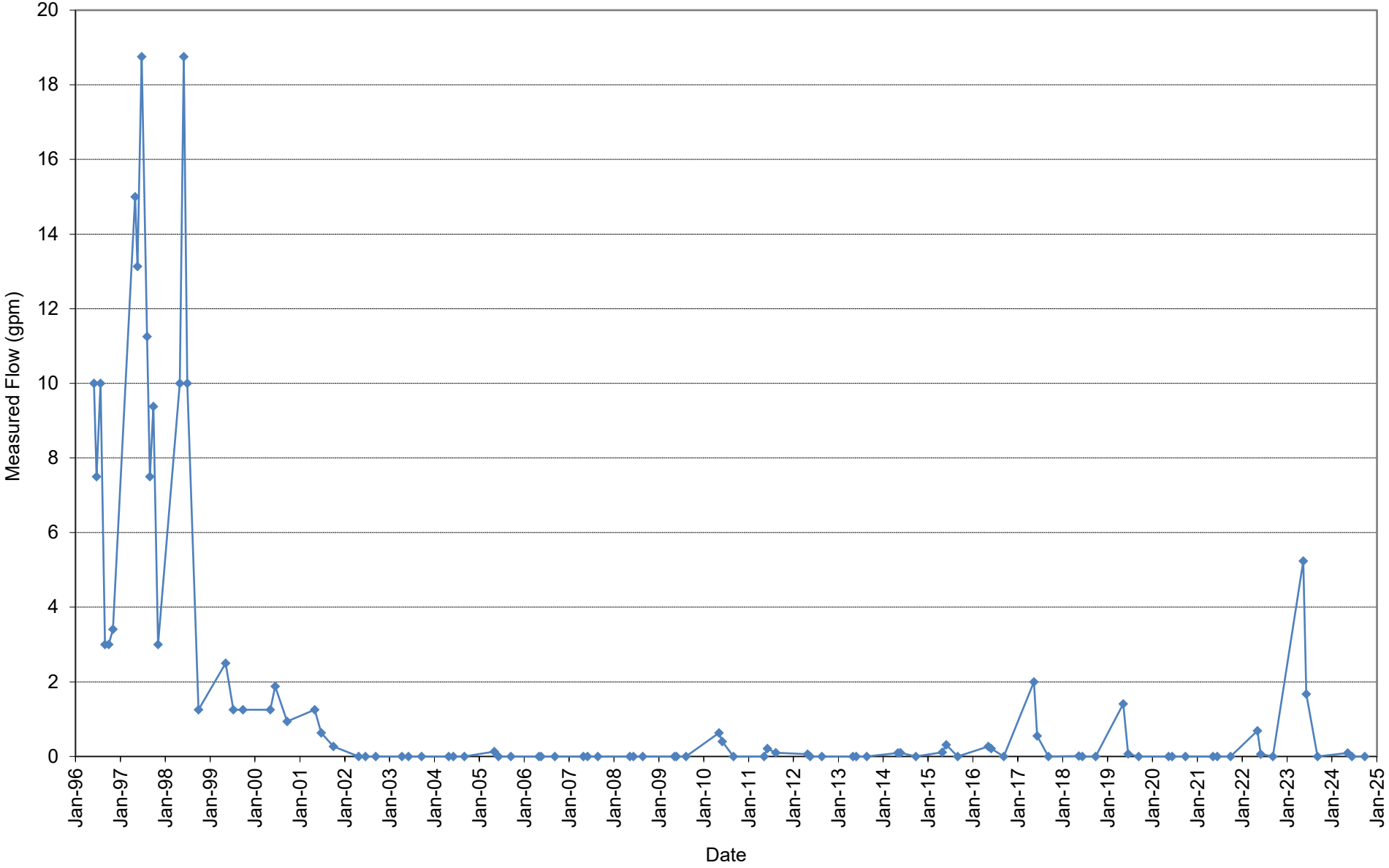
Spring 10-1
Source: Below F-Seam



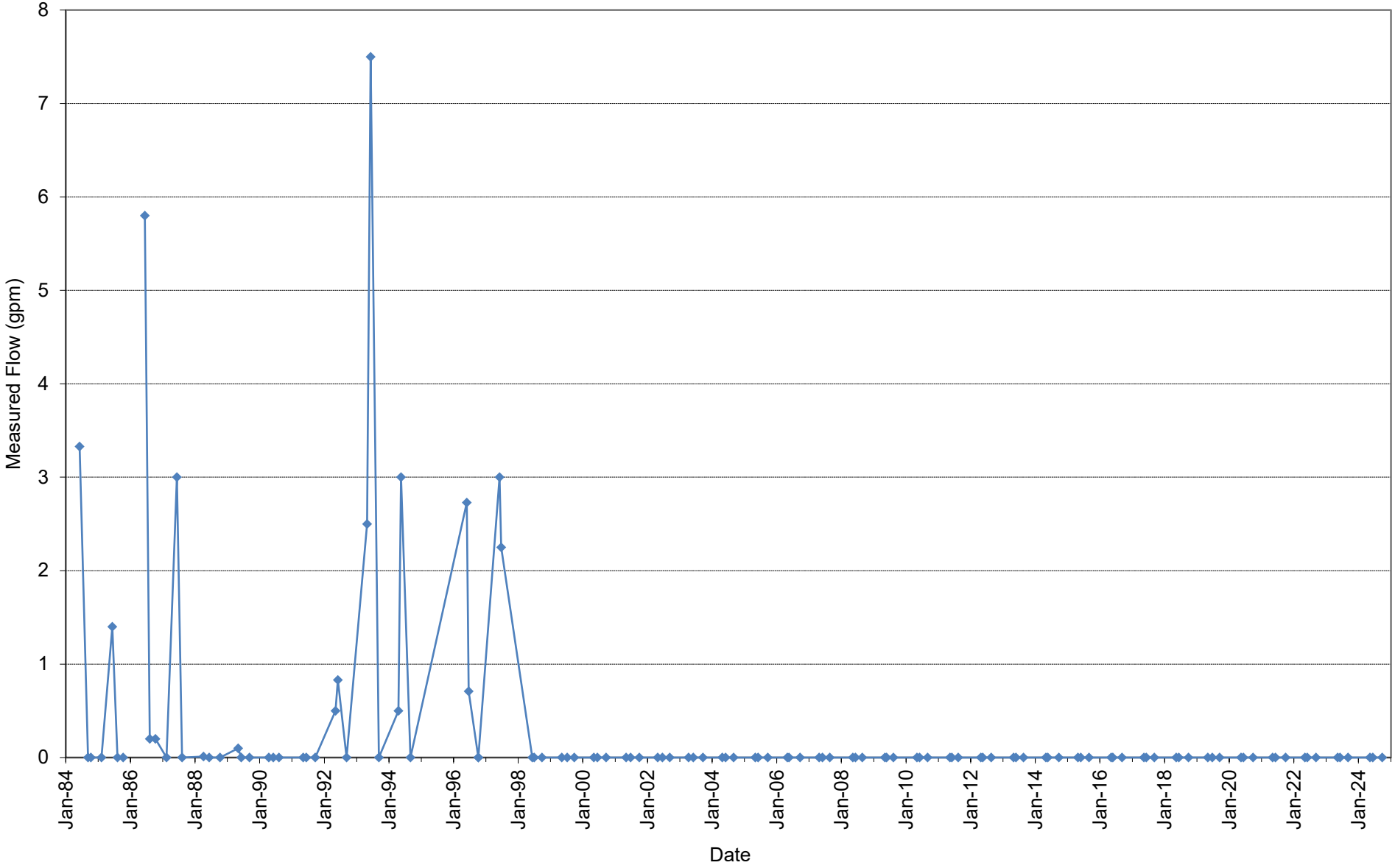
Spring E10-2
Source: Below F-Seam



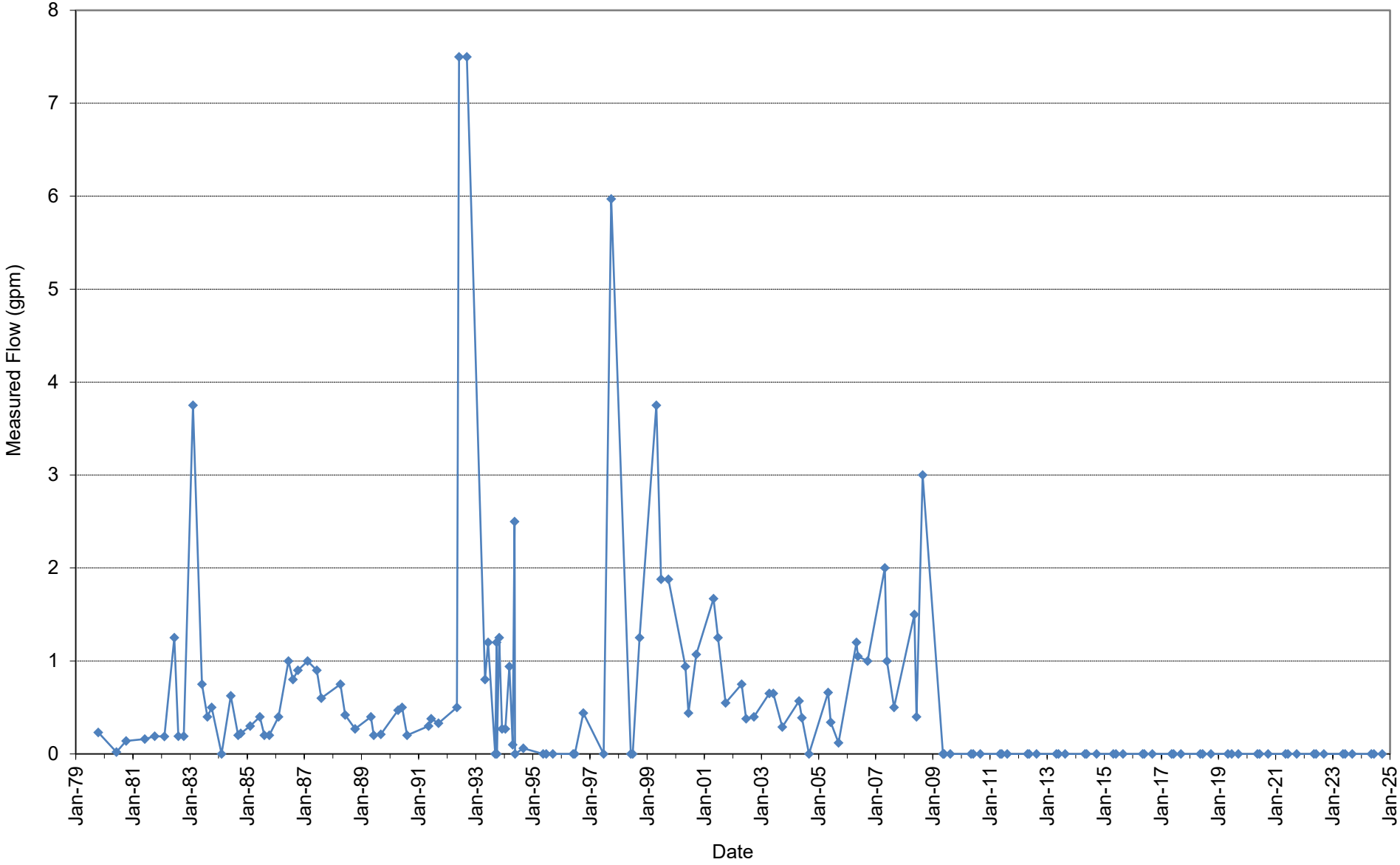
Spring 15-1
Source: Below F-Seam



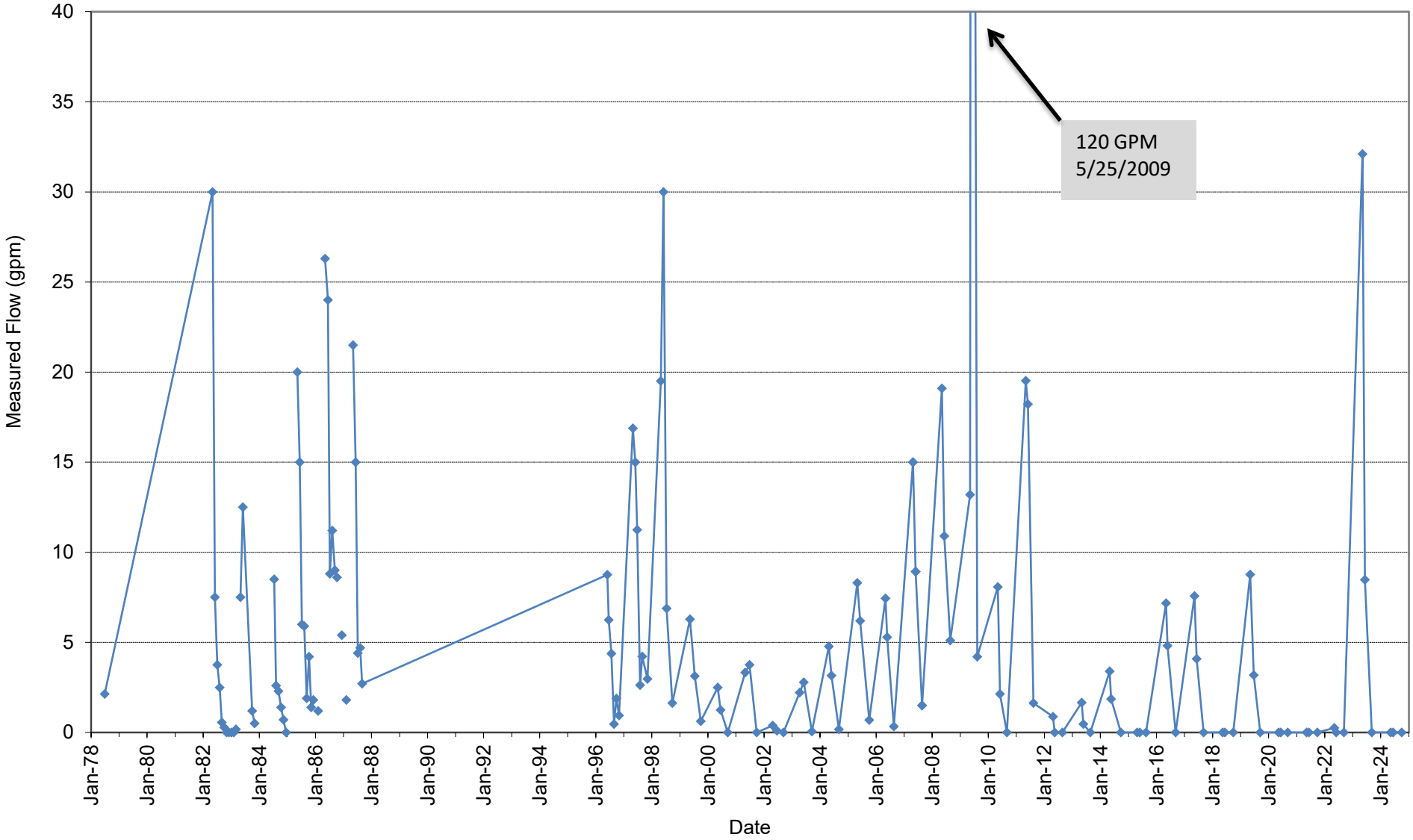
Spring G-1a
Source: Below F-Seam



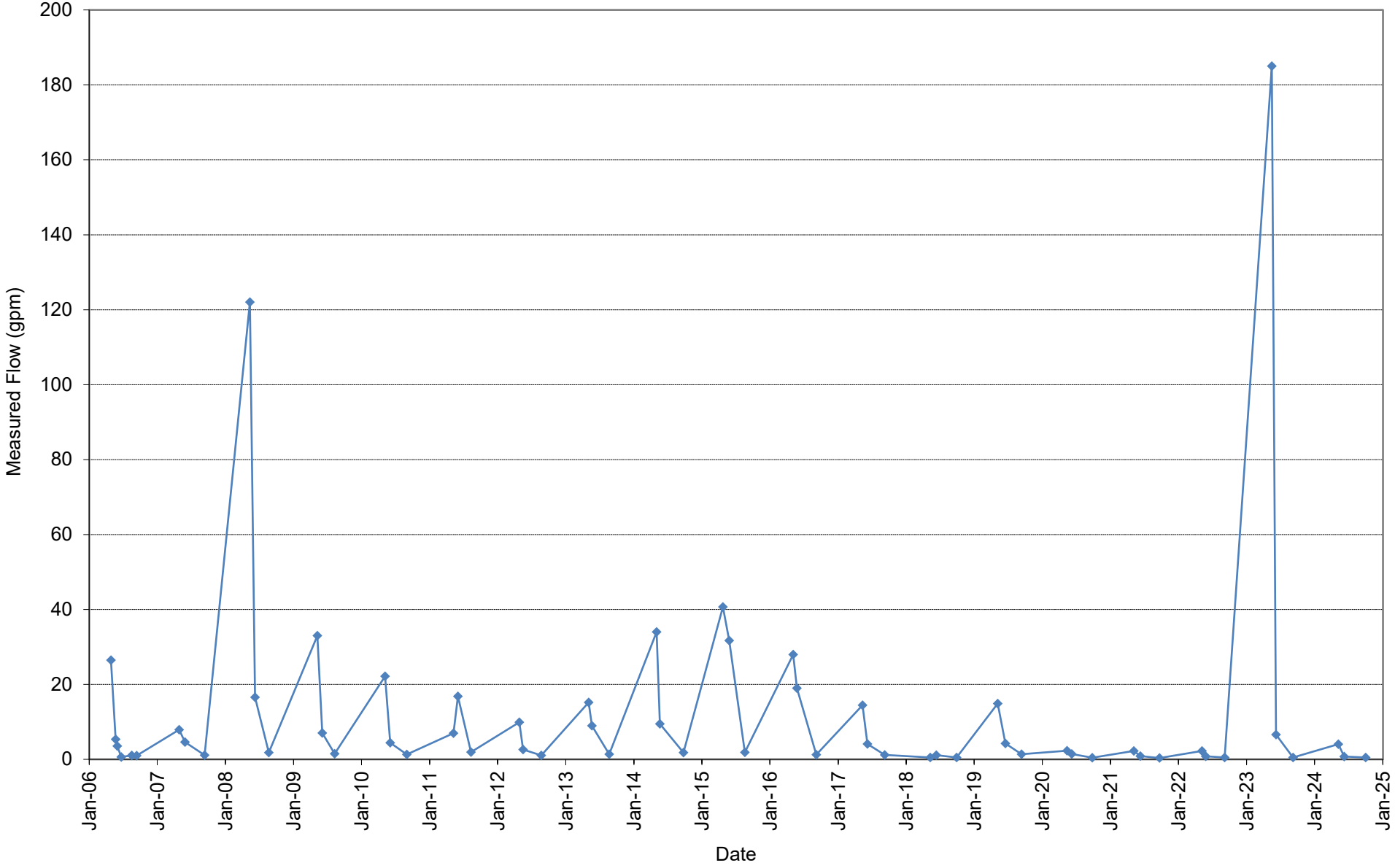
Spring G-20
Source: Below F-Seam



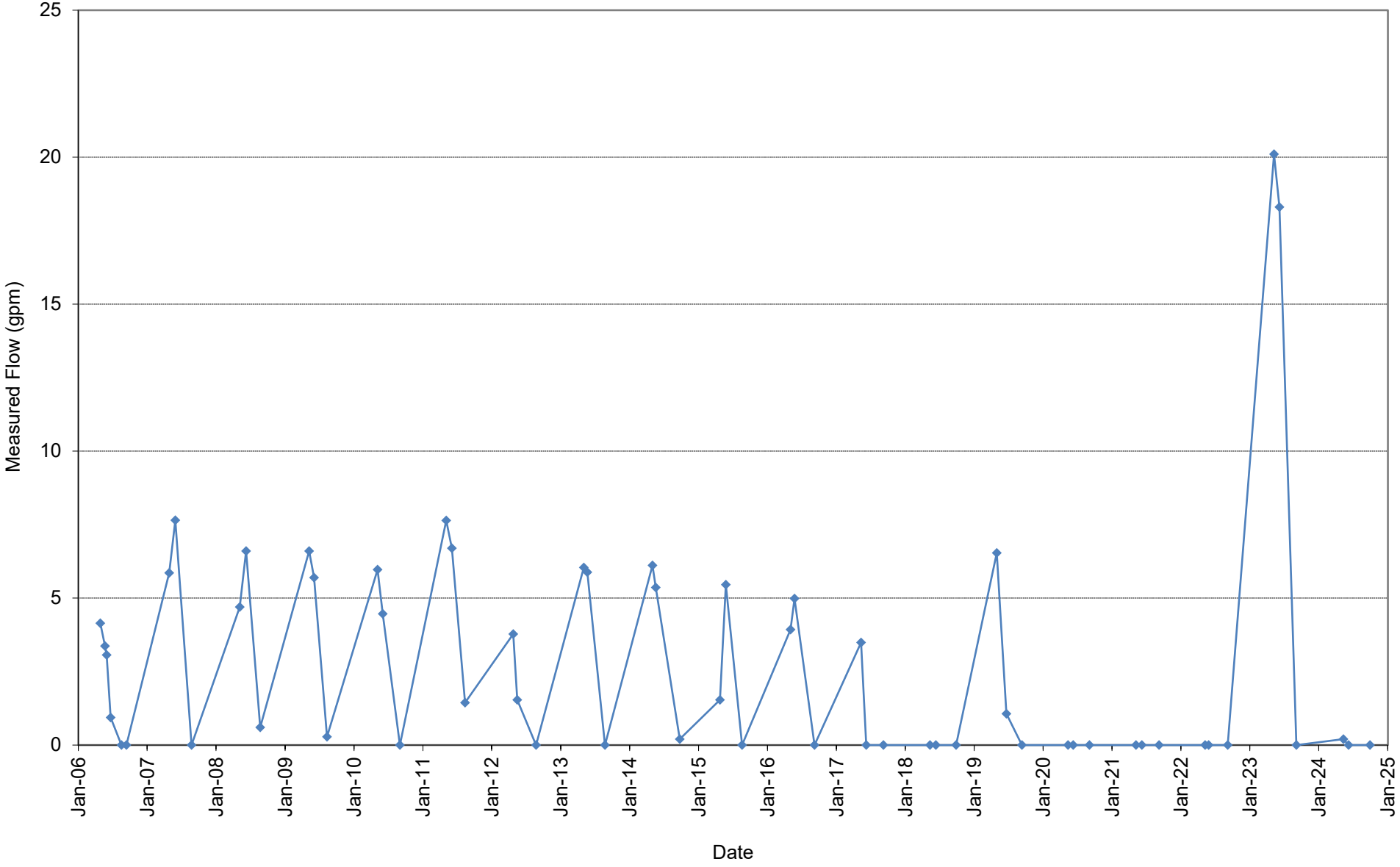
Spring J-4
Source: Above E-Seam



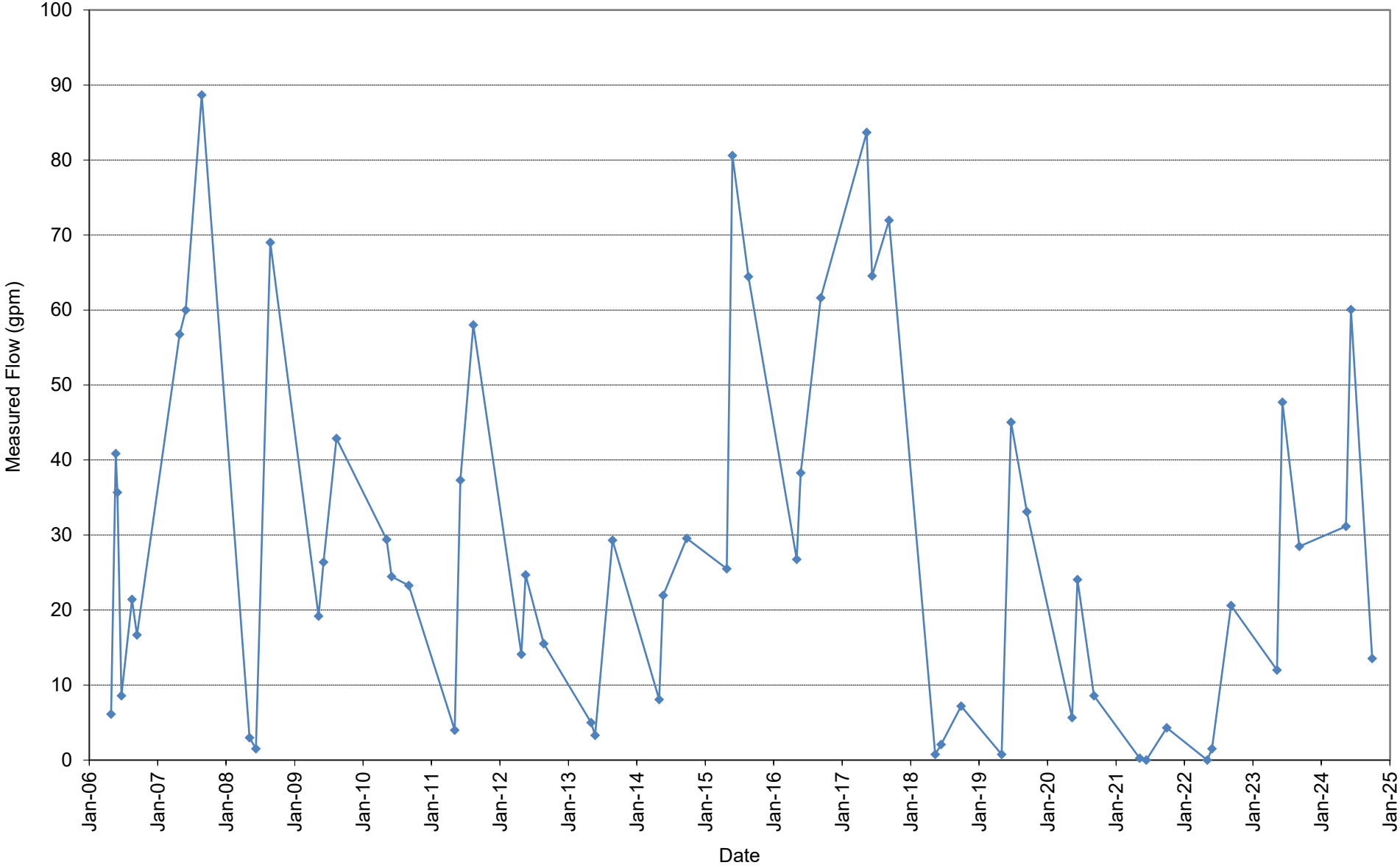
Spring 35-3
Source: Above F-Seam



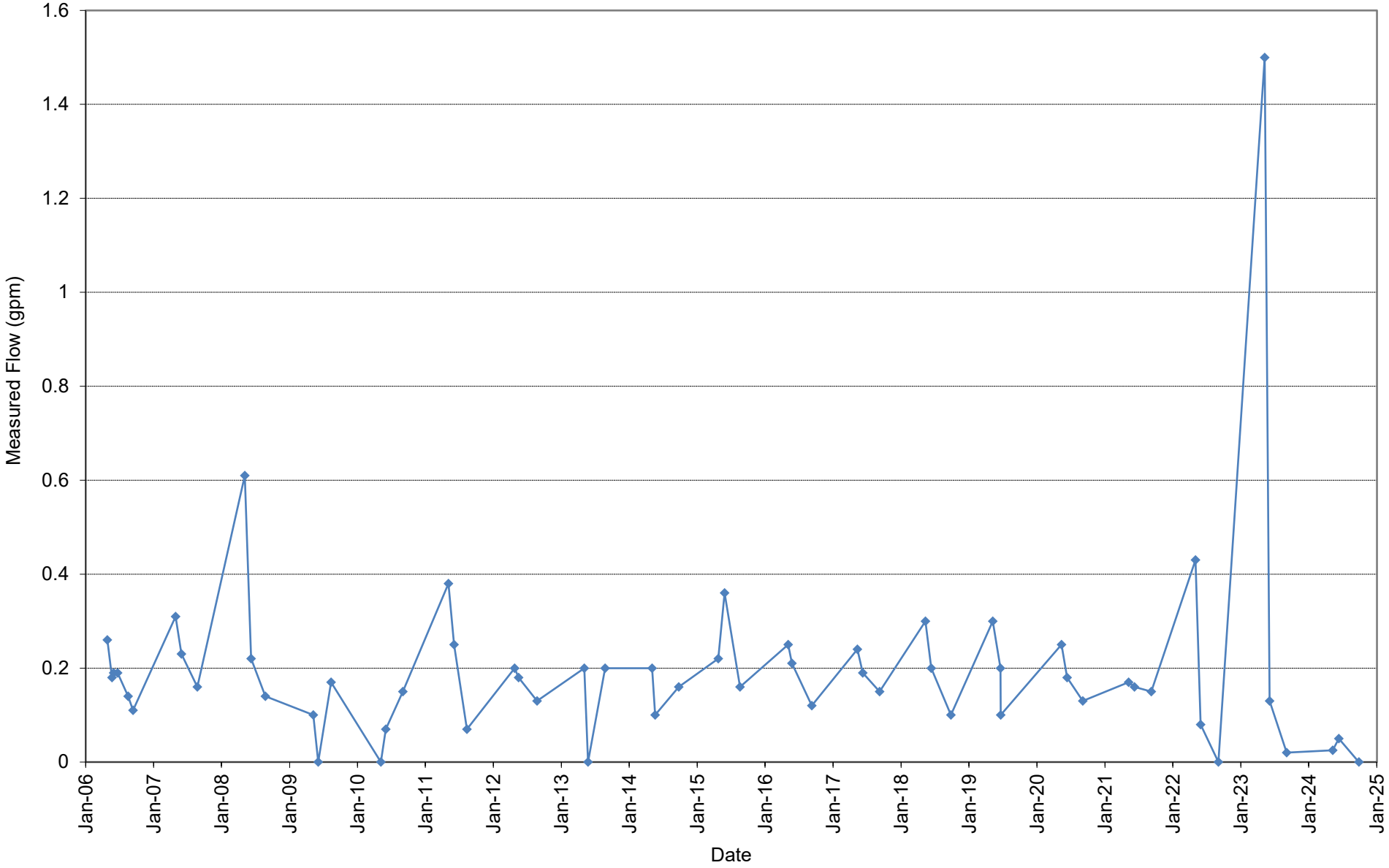
Deer Creek Spring
Source: Above E-Seam



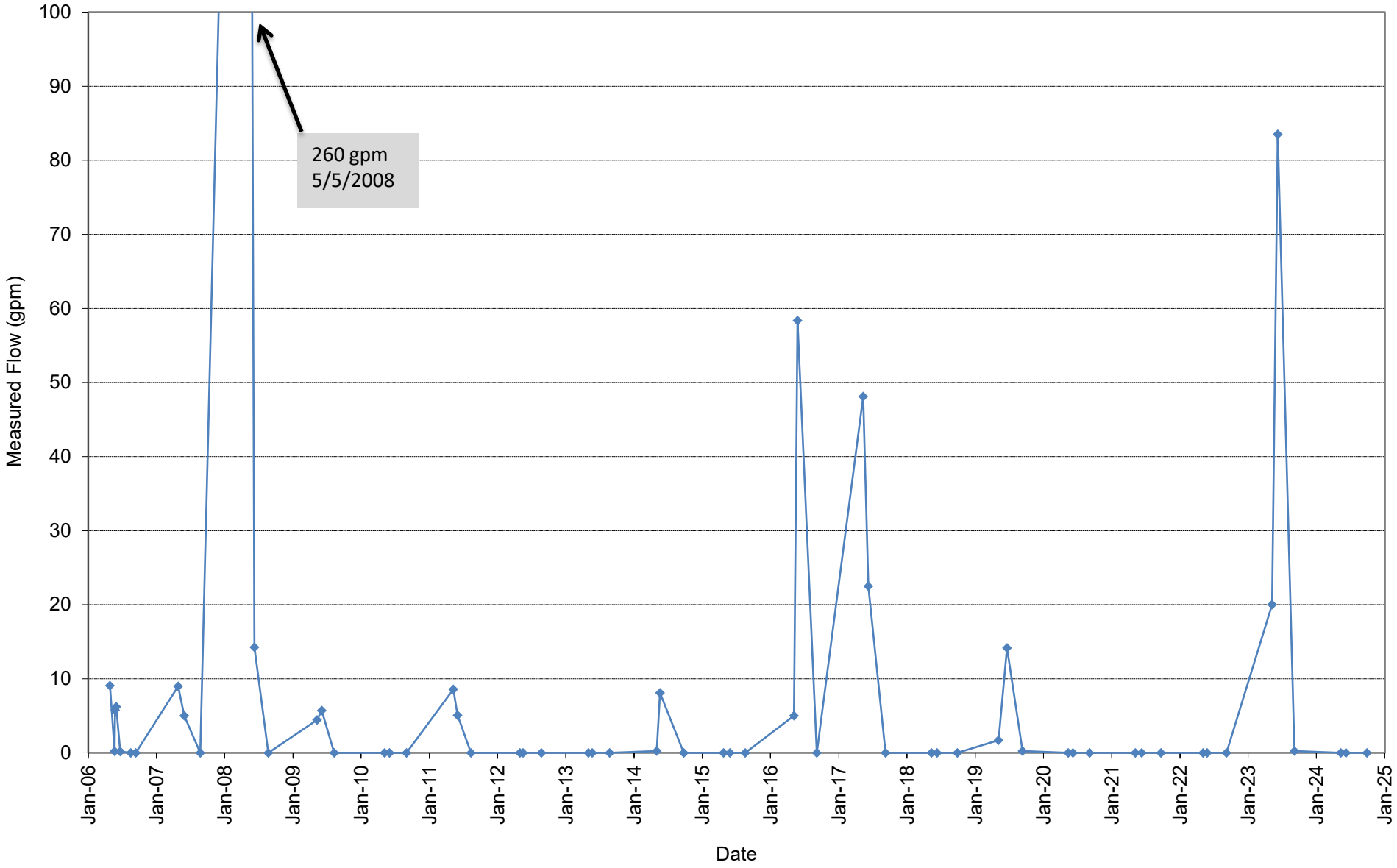
Spring WCC-24
Source: Above E-Seam



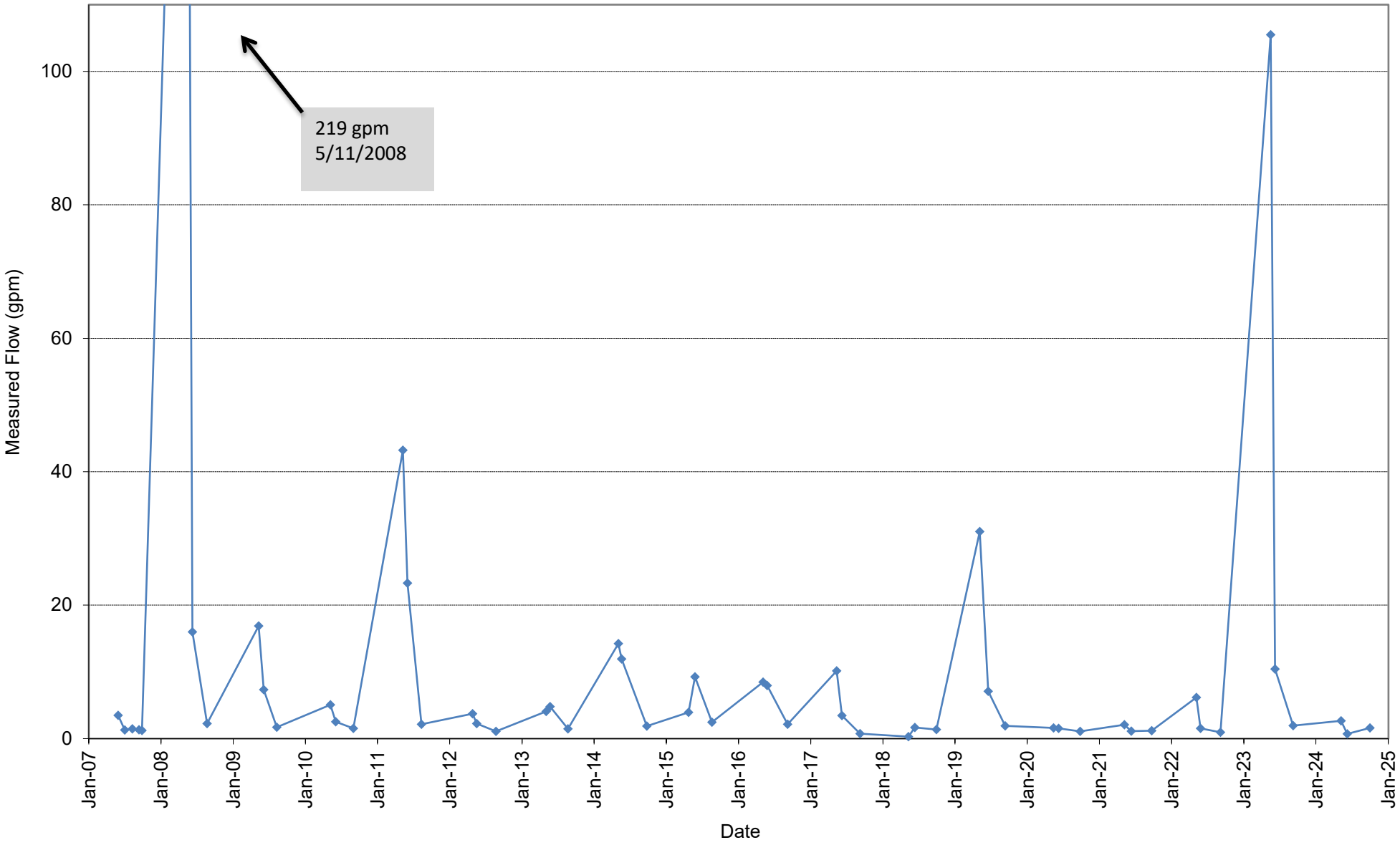
Spring J-2
Source: Above E-Seam



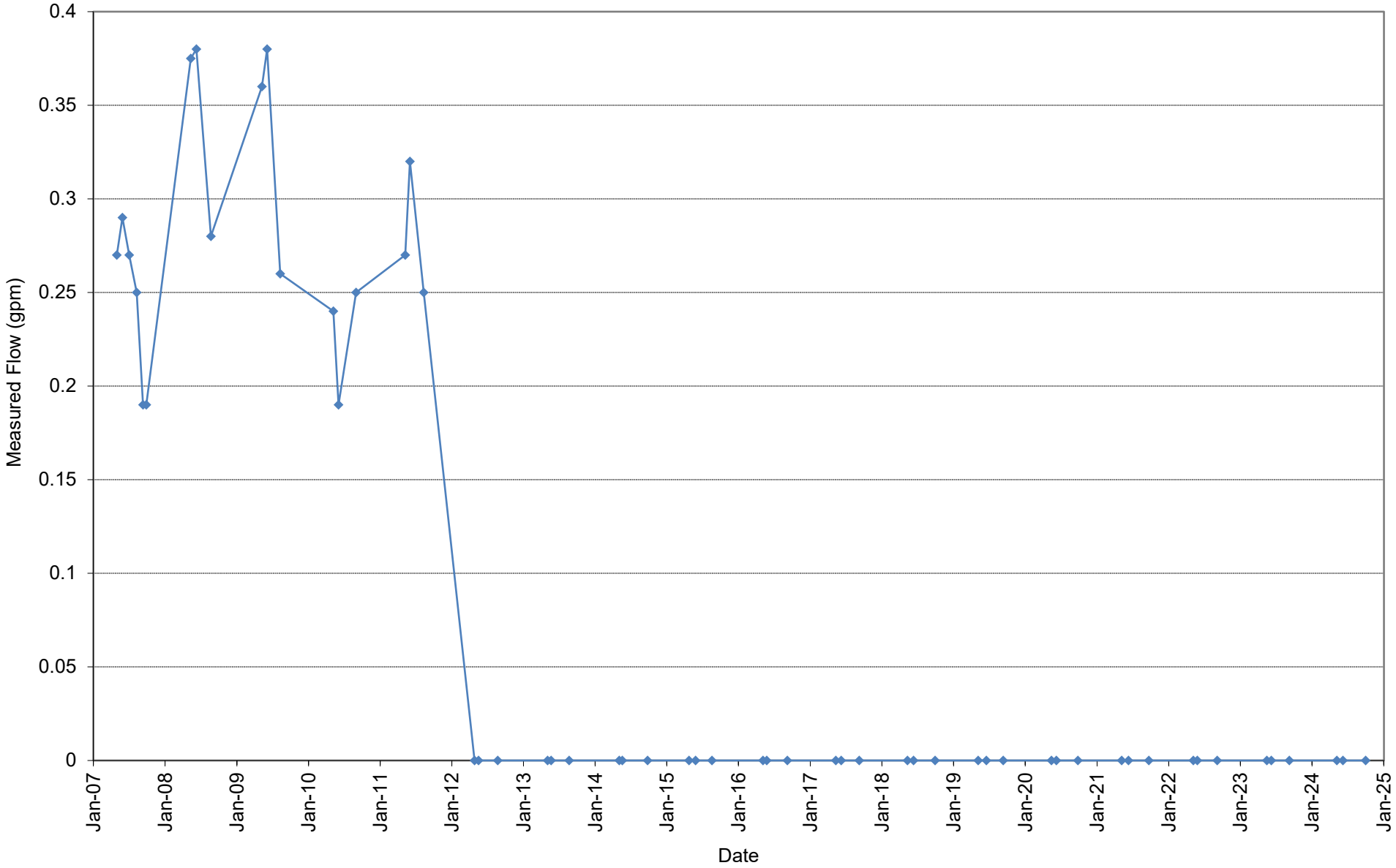
Spring J-7
Source: Above E-Seam



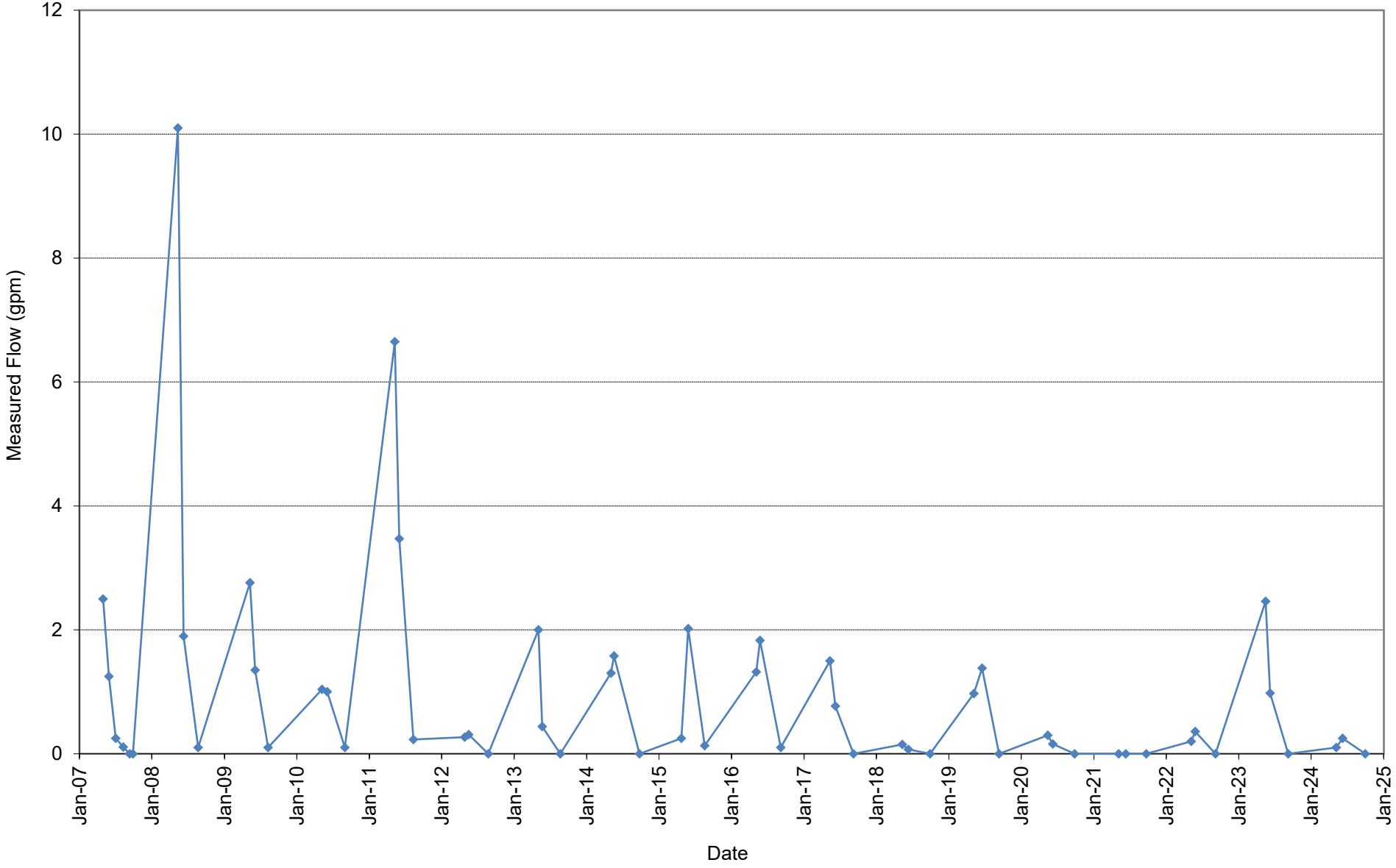
Deep Creek Trail Spring
Source: Above F-Seam



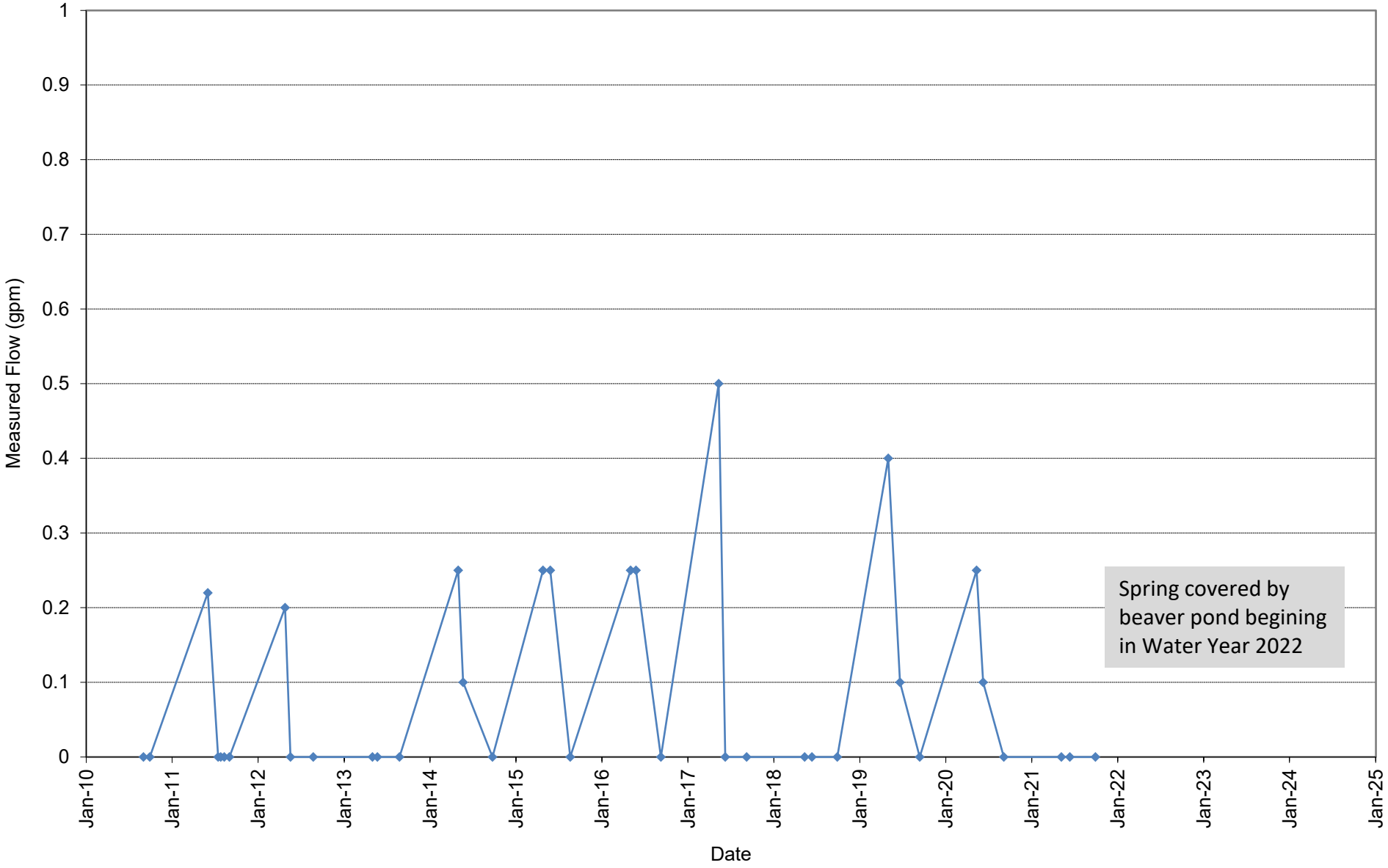
Deep Creek Spring #2
Source: Above F-Seam



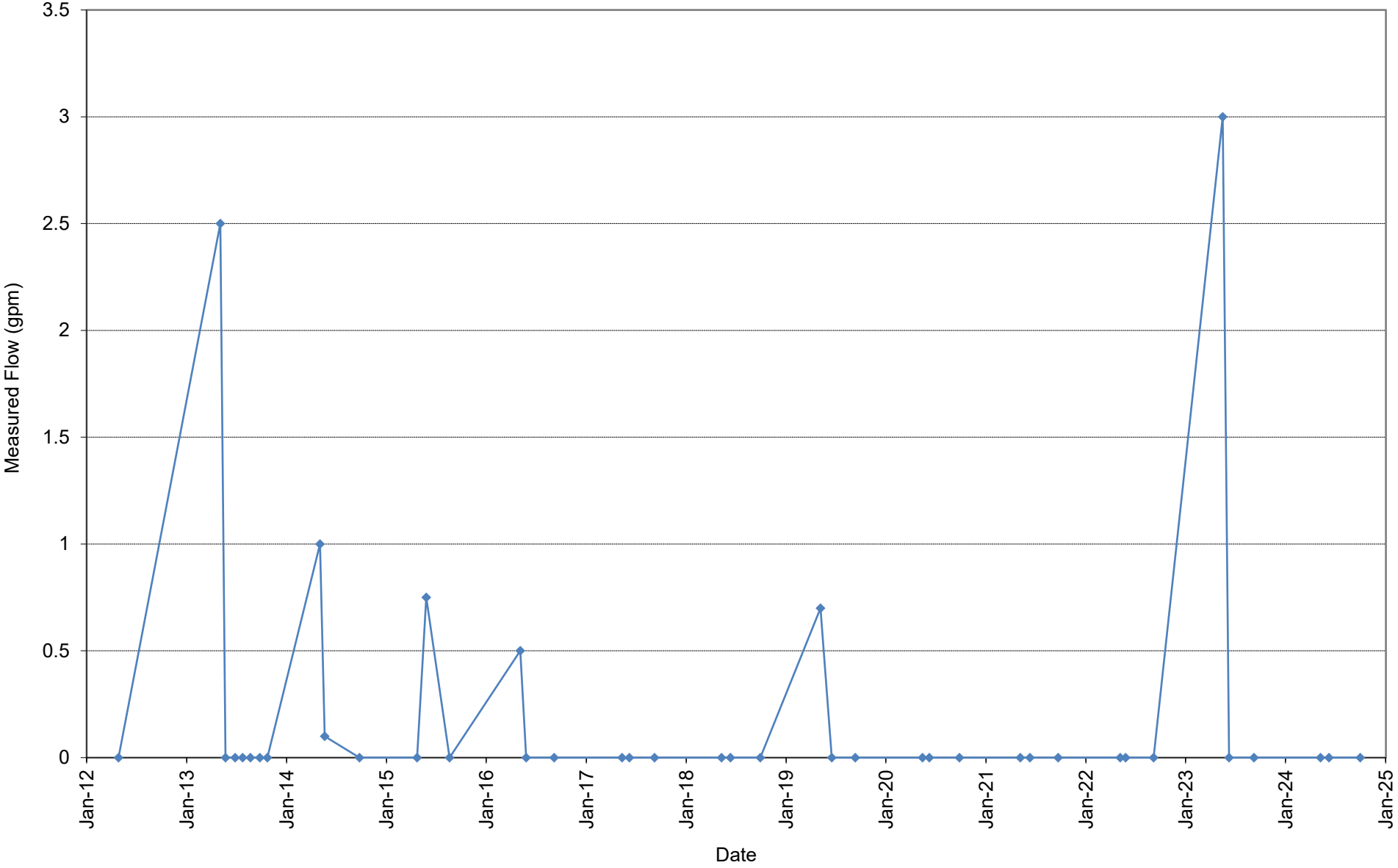
96-2-2 Area Spring
Source: Above F-Seam



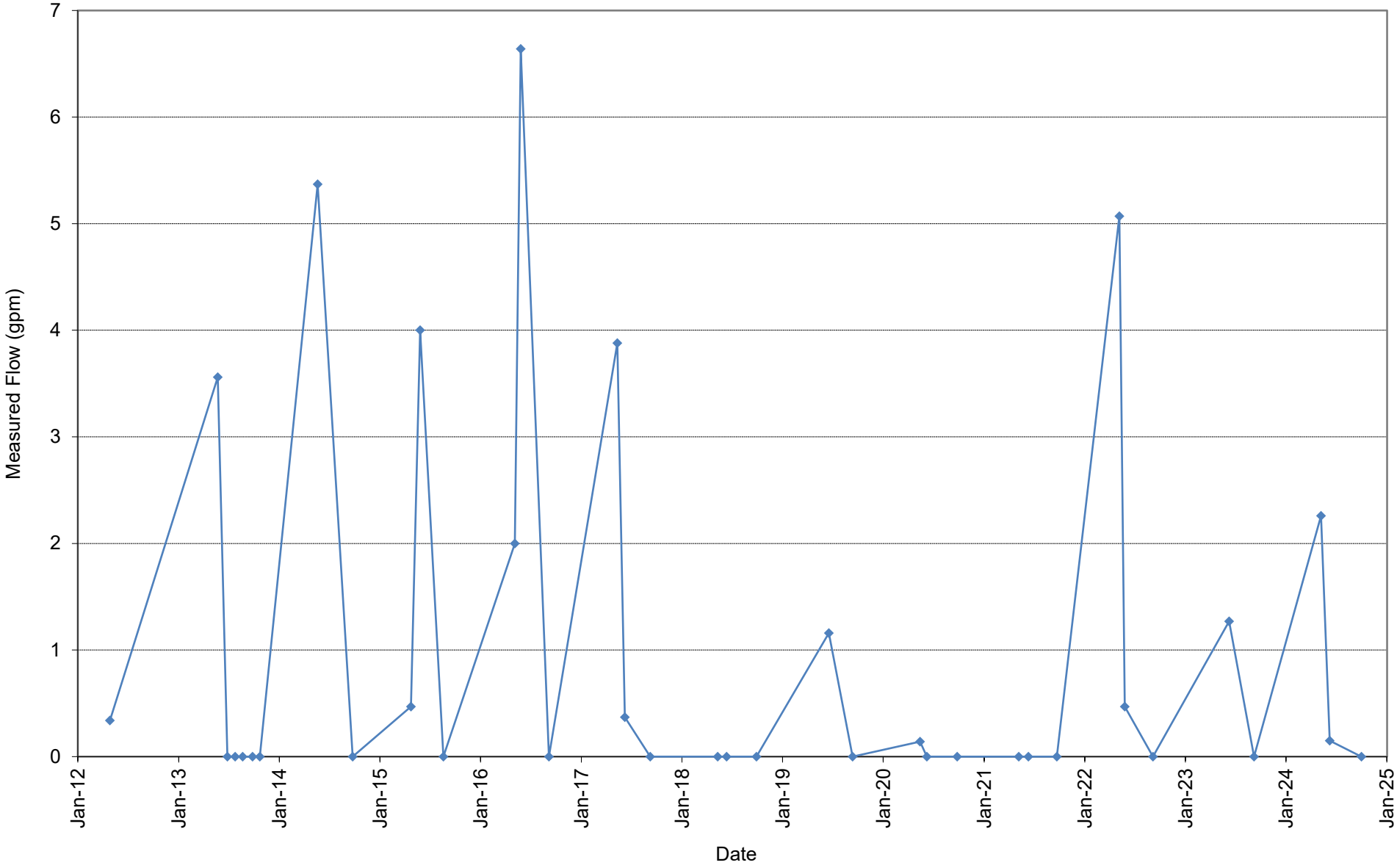
Spring J-10
Source: Above E-Seam



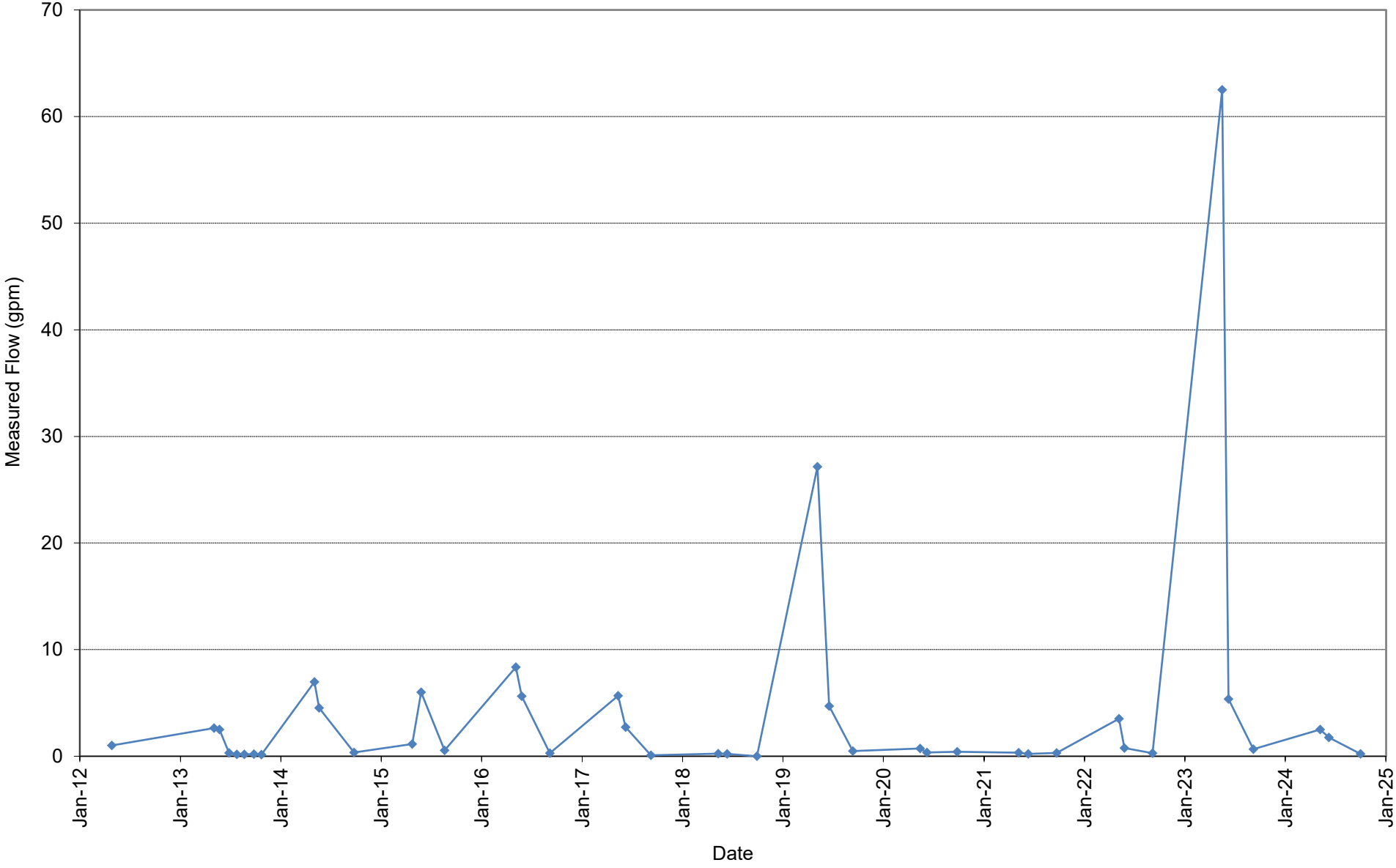
Spring 2012-1
Source: Above F-Seam

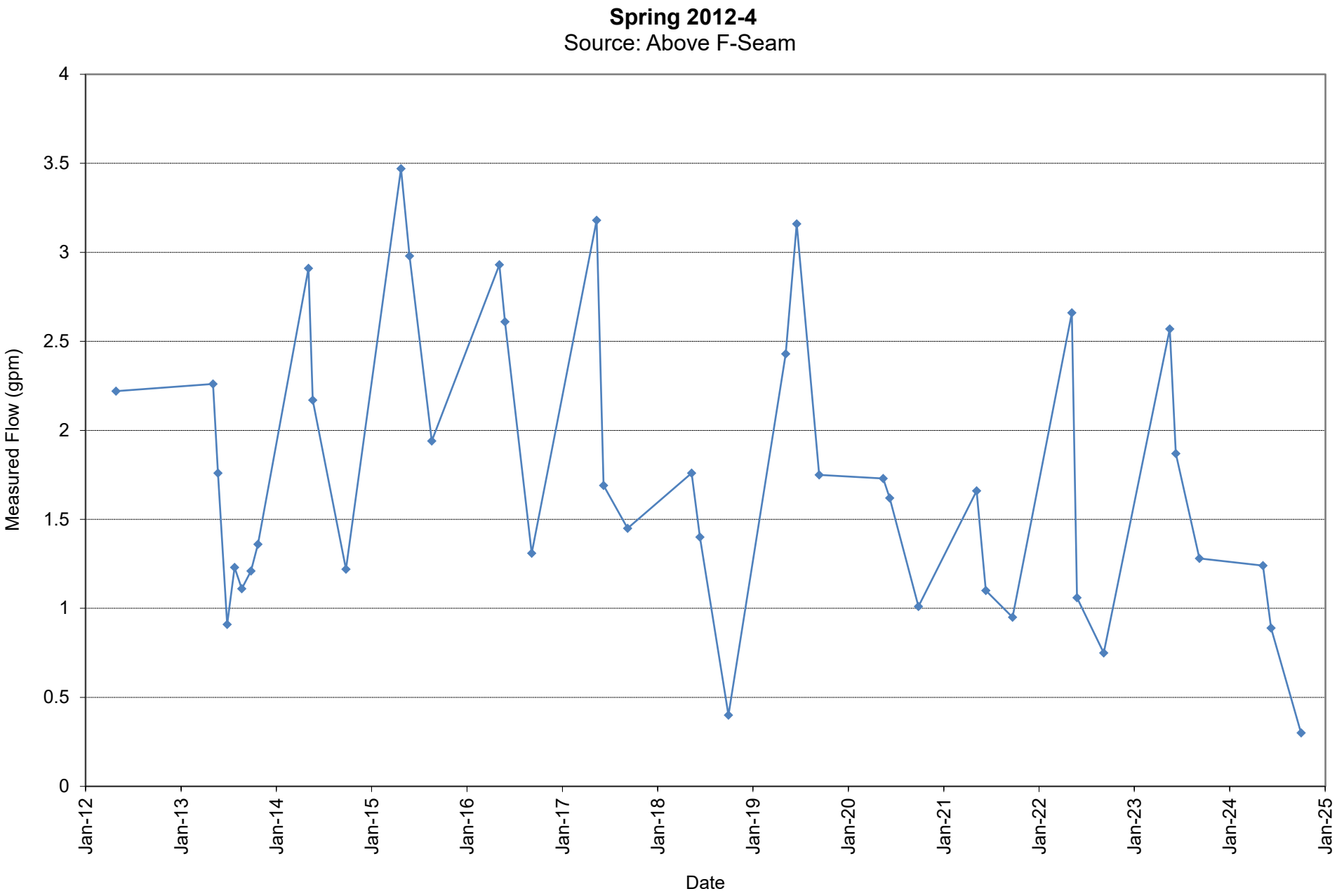


Spring 2012-2
Source: Above F-Seam

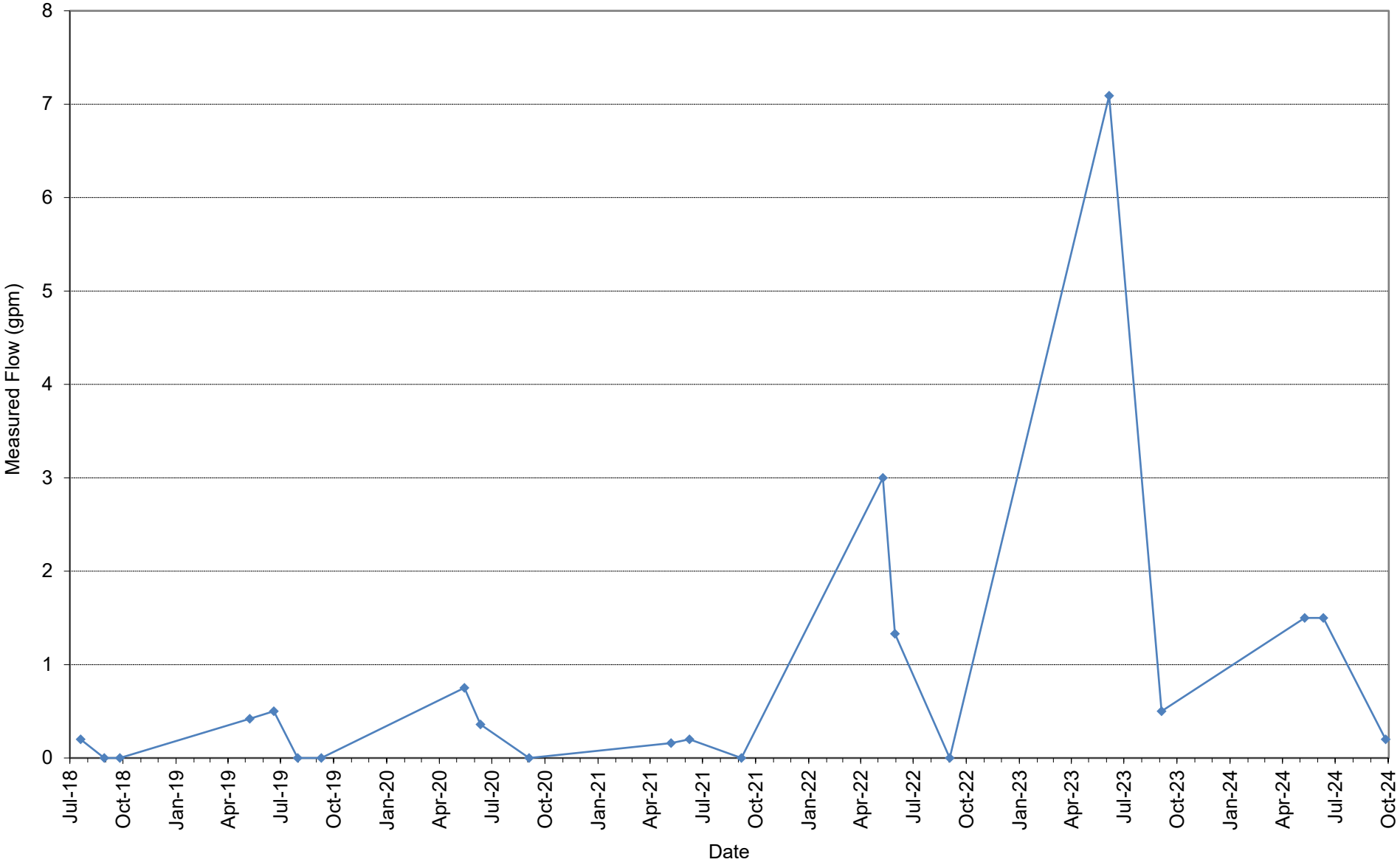


Spring 2012-3
Source: Above F-Seam




Spring 2012-4
Source: Above F-Seam
Measured Flow (gpm)
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Jan-24
Jan-25
Date

Spring ST-S-1
Source: Above E-Seam



APPENDIX E

SPRINGS - LABORATORY AND FIELD WATER QUALITY DATA

Spring 26-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 26-1		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm				42.57	3.08		1.60
pH (Field)	SU	7.3	8.1	7.7	6.95	6.86		7.53
Conductivity (Field)	µmhos/cm	240	640	482	719	738		909
Temperature (Field)	°C				7.4	7.2		8.9
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-07		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	151	284	222				
Bicarbonate as CaCO3	mg/L	151	284	222				
Calcium, dissolved	mg/L	24	37.2	31.5				
Cation - Anion Balance	mg/L	1	3.3	2.15				
Chloride	mg/L	2	6	4.4				
Conductivity @25C	µmhos/cm	480	548	514		667		
Hardness as CaCO3	mg/L	81	126	105				
Iron, dissolved	mg/L					-0.06	U	
Iron, total	mg/L		1.45	0.24		-0.06	U	
Magnesium, dissolved	mg/L	5.1	8	6.7				
Manganese, total	mg/L		0.028	0.004				
Nitrate/Nitrite (as N)	mg/L	0.14	0.31	0.19				
pH	SU	7.1	7.7	7.4		7.4	H	
Phosphorus, ortho dissolved	mg/L		0.007	0.001				
Potassium, dissolved	mg/L	1.2	1.4	1.3				
Residue, Filterable (TDS) @180C	mg/L	220	410	327		430		
Residue, Non-Filterable (TSS) @105C	mg/L		16	4		-5	UH	
Selenium, total	mg/L		0.001	0.001				
Sodium Adsorption Ratio (SAR)	calc.	2.8	4.96	3.96				
Sodium, dissolved	mg/L	57.2	125	94.5				
Sulfate	mg/L	40	80	63.1				
Sum of Anions	meq/L	5.1	5.9	5.5				
Sum of Cations	meq/L	5.2	6.3	5.75				
Zinc, dissolved	mg/L		0.02	0.01				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring 27-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 27-1		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/8/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm				seep	damp soil		0.1
pH (Field)	SU	7.9	8.6	8.2	6.98			7.17
Conductivity (Field)	µmhos/cm	290	460	364	613			835
Temperature (Field)	°C				7.2			13.4
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	136	290	169				
Bicarbonate as CaCO3	mg/L	136	290	168				
Calcium, dissolved	mg/L	19.9	29.4	24.4				
Carbonate as CaCO3	mg/L		7	0.9				
Cation - Anion Balance	mg/L	1.3	4.3	2.8				
Chloride	mg/L	2	6	3				
Conductivity @25C	µmhos/cm	368	437	403				
Hardness as CaCO3	mg/L	64	122	85				
Iron, dissolved	mg/L		0.02	0.01				
Iron, total	mg/L	0.16	9.15	1.68				
Magnesium, dissolved	mg/L	4.5	7.8	5.77				
Manganese, total	mg/L		0.192	0.037				
Nitrate (as N), dissolved	mg/L		0.4	0.08				
Nitrate/Nitrite (as N)	mg/L		0.4	0.08				
pH	SU	7.6	8.2	7.9				
Phosphorus, ortho dissolved	mg/L		0.022	0.003				
Potassium, dissolved	mg/L	1	1.2	1.1				
Residue, Filterable (TDS) @180C	mg/L	210	300	252				
Residue, Non-Filterable (TSS) @105C	mg/L		96	42				
Sodium Adsorption Ratio (SAR)	calc.	2.91	4.98	3.4				
Sodium, dissolved	mg/L	57.2	74.5	66.1				
Sulfate	mg/L	30	80	57				
Sum of Anions	meq/L	3.9	4.5	4.2				
Sum of Cations	meq/L	4	4.9	4.45				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-7
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring G-7		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				2.19	1.41		0.88
pH (Field)	SU				7.31	7.45		7.29
Conductivity (Field)	µmhos/cm				612	631		674
Temperature (Field)	°C				6.7	8.2		8.2
Comment								
Laboratory Parameters[2]								
Name of Certified Lab[3]						ACZ		
Lab Reference #						L88299-06		
Sample Date						6/8/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Aluminum, dissolved	mg/L	0.05	0.05	0.05				
Bicarbonate as CaCO3	mg/L	177	184	180.5				
Calcium, dissolved	mg/L	41.8	41.8	41.8				
Chloride	mg/L		1	0.5				
Conductivity @25C	µmhos/cm	387	414	400.5		567		
Hardness as CaCO3	mg/L	134	142	138				
Iron, dissolved	mg/L	0.04	0.07	0		-0.06	U	
Iron, total	mg/L	0.35	0.4	0.375		-0.06	U	
Lead, dissolved	mg/L		0.02	0.01				
Magnesium, dissolved	mg/L	6.8	7.2	7				
Manganese, total	mg/L	0.005	0.006	0				
Nitrate/Nitrite (as N)	mg/L	0.08	0.1	0.09				
pH	SU	7.8	8.1	7.95		7.9	H	
Phosphorus, ortho dissolved	mg/L		0.014	0.007				
Residue, Filterable (TDS) @180C	mg/L	230	230	230		362		
Residue, Non-Filterable (TSS) @105C	mg/L	10	30	20		-5	U	
Sodium Adsorption Ratio (SAR)	calc.	1.54	1.63	1.6				
Sodium, dissolved	mg/L	42.8	42.8	42.8				
Sulfate	mg/L	40	50	45				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-16
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring G-16		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				3.83	3.41		1.77
pH (Field)	SU				7.31	7.59		7.78
Conductivity (Field)	µmhos/cm				737	757		744
Temperature (Field)	°C				6.9	9.6		9.1
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-05		
Sample Date						6/8/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Bicarbonate as CaCO3	mg/L	241	441	307				
Calcium, dissolved	mg/L	55.2	55.9	55.6				
Chloride	mg/L	2	12	5				
Conductivity @25C	µmhos/cm	529	1,120	691		692		
Hardness as CaCO3	mg/L	160	453	220				
Iron, dissolved	mg/L		0.08	0.01		-0.06	U	
Iron, total	mg/L		4.63	0.56		0.08	B	
Magnesium, dissolved	mg/L	15.1	15.8	15.3				
Manganese, total	mg/L		0.07	0.01				
Nitrate/Nitrite (as N)	mg/L	0.07	0.16	0.1				
pH	SU	7.1	8.2	7.7		8.0	H	
Phosphorus, ortho dissolved	mg/L		0.19	0.04				
Residue, Filterable (TDS) @180C	mg/L	274	700	349		434		
Residue, Non-Filterable (TSS) @105C	mg/L		194	21		6	B	
Sodium Adsorption Ratio (SAR)	calc.	1.4	2	1.8				
Sodium, dissolved	mg/L	58.1	64.5	61.3				
Sulfate	mg/L	18.2	200	51.6				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-24
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring G-24		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				3.80	3.40		1.81
pH (Field)	SU				6.74	7.03		7.01
Conductivity (Field)	µmhos/cm				866	850		892
Temperature (Field)	°C				8.8	9.1		10.2
Comment		Decreed Spring #8						
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-08		
Sample Date						6/8/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Aluminum, dissolved	mg/L		0.08	0.04				
Arsenic, total	mg/L	0.001	0.001	0.001				
Bicarbonate as CaCO3	mg/L	267	376	307				
Calcium, dissolved	mg/L	56.4	56.4	56.4				
Chloride	mg/L	1.2	10	4.4				
Conductivity @25C	µmhos/cm	550	564	557		790		
Hardness as CaCO3	mg/L	176	233	203				
Iron, dissolved	mg/L		0.1	0.03		-0.06	U	
Iron, total	mg/L		2.28	0.45		-0.06	U	
Magnesium, dissolved	mg/L	15.9	16.5	16.2				
Manganese, dissolved	mg/L		0.006	0.002				
Manganese, total	mg/L		0.048	0.005				
Nitrate/Nitrite (as N)	mg/L	0.05	0.1	0.08				
pH	SU	7.2	8.3	7.9		7.5	H	
Phosphorus, ortho dissolved	mg/L		0.105	0.027				
Residue, Filterable (TDS) @180C	mg/L	214	520	362		480		
Residue, Non-Filterable (TSS) @105C	mg/L		102	21		-5	U	
Sodium Adsorption Ratio (SAR)	calc.	1.8	1.8	1.8				
Sodium, dissolved	mg/L	58.9	58.9	58.9				
Sulfate	mg/L	21.2	70	30.5				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-14
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring G-14		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				3.46	0.69		0.2
pH (Field)	SU				7.09	7.56		7.38
Conductivity (Field)	µmhos/cm				1,066	1,014		1,123
Temperature (Field)	°C				7.0	18.2		14.1
Comment		Decreed Spring #7						estimated flow
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-07		
Sample Date						6/8/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Arsenic, total	mg/L	0.001	0.001	0.001				
Bicarbonate as CaCO3	mg/L	325	484	406				
Calcium, dissolved	mg/L	54.9	61.4	58.2				
Chloride	mg/L	2	14	6				
Conductivity @25C	µmhos/cm	553	682	637		952		
Hardness as CaCO3	mg/L	215	307	257				
Iron, dissolved	mg/L		0.11	0.02		-0.06	U	
Iron, total	mg/L		3	0.1		0.09	B	
Magnesium, dissolved	mg/L	21.5	29.8	24.6				
Manganese, total	mg/L		0.03	0.003				
Nitrate/Nitrite (as N)	mg/L	0.12	0.21	0.16				
pH	SU	7.1	8.2	7.7		7.8	H	
Phosphorus, ortho dissolved	mg/L		2.08	0.15				
Residue, Filterable (TDS) @180C	mg/L	324	708	499		622		
Residue, Non-Filterable (TSS) @105C	mg/L		107	5		9	B	
Selenium, total	mg/L	0.001	0.001	0.001				
Sodium Adsorption Ratio (SAR)	calc.	2.22	3.11	2.53				
Sodium, dissolved	mg/L	81.3	114	97.7				
Sulfate	mg/L	40	150	88				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-22
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring G-22		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	Q[4]	9/24/2024
Field Parameters								
Flow[5]	gpm				4	3		3
pH (Field)	SU				6.87	6.55		6.56
Conductivity (Field)	µmhos/cm				1,232	1,241		1,261
Temperature (Field)	°C				8.3	8.4		15.9
Comment		Decreed Spring #3			flow dispersed, estimated			
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-05		
Sample Date						6/11/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Bicarbonate as CaCO3	mg/L	287	359	332				
Calcium, dissolved	mg/L	64.9	64.9	64.9				
Chloride	mg/L	3	18	7				
Conductivity @25C	µmhos/cm	633	640	637		1,140		
Hardness as CaCO3	mg/L	180	270	234				
Iron, dissolved	mg/L		0.05	0.01		-0.06	U	
Iron, total	mg/L		0.2	0.08		0.405		
Lead, dissolved	mg/L	0.02	0.02	0.02				
Magnesium, dissolved	mg/L	19	19.9	19.5				
Manganese, total	mg/L		0.85	0.11				
Nitrate/Nitrite (as N)	mg/L	0.08	0.08	0.08				
pH	SU	7	7.9	7.6		7.7	H	
Phosphorus, ortho dissolved	mg/L		0.044	0.019				
Residue, Filterable (TDS) @180C	mg/L	300	516	388		740		
Residue, Non-Filterable (TSS) @105C	mg/L		24	5		25.0		
Sodium Adsorption Ratio (SAR)	calc.	1.78	1.92	1.85				
Sodium, dissolved	mg/L	66.1	66.1	66.1				
Sulfate	mg/L	24	80	41				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Visual flow estimate.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring 11-2
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 11-2		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/10/2024	Q[4]	9/24/2024
Field Parameters								
Flow[5]	gpm				3	2		0.25
pH (Field)	SU				7.63	7.76		8.25
Conductivity (Field)	µmhos/cm				2,370	2,380		3,710
Temperature (Field)	°C				9.2	23.9		7.9
Comment					flow dispersed, estimated			
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-04		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Conductivity @25C	µmhos/cm					2,090		
Iron, dissolved	mg/L					-0.06	U	
Iron, total	mg/L					0.26		
pH	SU					8.3	H	
Residue, Filterable (TDS) @180C	mg/L					1,420		
Residue, Non-Filterable (TSS) @105C	mg/L					30.0		

[1] Insufficient flows for baseline measurements and sampling.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Visual flow estimate.

Spring 10-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 10-1		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/6/2024	6/10/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				16.39	8.91		4.86
pH (Field)	SU				7.38	7.33		7.77
Conductivity (Field)	µmhos/cm				1,698	1,719		1,721
Temperature (Field)	°C				9.5	11.4		9.8
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-06		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Conductivity @25C	µmhos/cm					1,540		
Iron, dissolved	mg/L					-0.06	U	
Iron, total	mg/L					-0.06	U	
pH	SU					8.0	H	
Residue, Filterable (TDS) @180C	mg/L					1,060		
Residue, Non-Filterable (TSS) @105C	mg/L					9	B	

[1] Insufficient flows for baseline measurements and sampling.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Spring E10-2
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring E10-2		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/7/2024	6/10/2024	Q[4]	9/24/2024
Field Parameters								
Flow [5]	gpm				0.2	dry		dry
pH (Field)	SU				7.41			
Conductivity (Field)	µmhos/cm				1,874			
Temperature (Field)	°C				13.2			
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Conductivity @25C	µmhos/cm							
Iron, dissolved	mg/L							
Iron, total	mg/L							
pH	SU							
Residue, Filterable (TDS) @180C	mg/L							
Residue, Non-Filterable (TSS) @105C	mg/L							

[1] Insufficient flows for baseline measurements and sampling.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Visual estimate of flow.

Spring 15-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 15-1		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				0.09	damp soil		dry
pH (Field)	SU	7.4	8.6	8.2	7.25			
Conductivity (Field)	µmhos/cm	1,060	1,240	1,137	2,490			
Temperature (Field)	°C	1.1	12.8	8	10.6			
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	375	520	480				
Arsenic, total	mg/L		0.001	0.001				
Bicarbonate as CaCO3	mg/L	364	520	477				
Cadmium, dissolved	mg/L		0.004	0.0005				
Calcium, dissolved	mg/L	44.9	67.8	58.3				
Carbonate as CaCO3	mg/L		12	2.2				
Cation - Anion Balance	mg/L	-5.8	3.8	-1				
Chloride	mg/L	4	9	6.3				
Conductivity @25C	µmhos/cm	1,080	1,120	1,100				
Copper, dissolved	mg/L		0.01	0.01				
Hardness as CaCO3	mg/L	222	307	271				
Iron, dissolved	mg/L		0.01	0.01				
Iron, total	mg/L	0.01	0.73	0.12				
Magnesium, dissolved	mg/L	25.8	33.4	30				
Manganese, total	mg/L		0.022	0.001				
Nitrate/Nitrite (as N)	mg/L	0.08	0.18	0.11				
pH	SU	7.9	8.2	8.1				
Phosphorus, ortho dissolved	mg/L		0.009	0.001				
Potassium, dissolved	mg/L	2.8	3.2	3				
Residue, Filterable (TDS) @180C	mg/L	660	730	701				
Residue, Non-Filterable (TSS) @105C	mg/L		26	9				
Selenium, total	mg/L		0.002	0.001				
Sodium Adsorption Ratio (SAR)	calc.	4.61	5.39	4.99				
Sodium, dissolved	mg/L	163	200	185				
Sulfate	mg/L	140	180	151				
Sum of Anions	meq/L		0.5	0.09				
Sum of Cations	meq/L	12.1	14.4	13.3				
Zinc, dissolved	mg/L		0.01	0.01				
Zinc, total	mg/L		0.05	0.02				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-1A
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring G-1A		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	Q[4]	9/24/2024
Field Parameters								
Flow	gpm				dry	dry		dry
pH (Field)	SU							
Conductivity (Field)	µmhos/cm							
Temperature (Field)	°C							
Comment								
Laboratory Parameters[2]								
Name of Certified Lab[3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Bicarbonate as CaCO3	mg/L	288	501	342				
Calcium, dissolved	mg/L	69.4	69.4	69.4				
Chloride	mg/L	4	17	8				
Conductivity @25C	µmhos/cm	570	672	621				
Hardness as CaCO3	mg/L	266	271	269				
Iron, dissolved	mg/L							
Iron, total	mg/L		1.18	0.2				
Magnesium, dissolved	mg/L	23.7	25.9	24.8				
Manganese, dissolved	mg/L	0.005	0.005	0.005				
Manganese, total	mg/L		0.03	0.004				
Nitrate/Nitrite (as N)	mg/L		0.23	0.08				
pH	SU	7.9	8.5	8.17				
Phosphorus, ortho dissolved	mg/L		0.04	0.01				
Residue, Filterable (TDS) @180C	mg/L	312	550	396				
Residue, Non-Filterable (TSS) @105C	mg/L		66	10				
Sodium Adsorption Ratio (SAR)	calc.	1.22	1.61	1.37				
Sodium, dissolved	mg/L	50.4	50.4	50.4				
Sulfate	mg/L	40	207	83				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring G-20
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Spring G-20		**Baseline[1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024
Field Parameters							
Flow	gpm				dry	dry	dry
pH (Field)	SU						
Conductivity (Field)	µmhos/cm						
Temperature (Field)	°C						
Comment							
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Bicarbonate as CaCO3	mg/L	452	657	539			
Calcium, dissolved	mg/L	81	81	81			
Chloride	mg/L	1.2	10	5.3			
Conductivity @25C	µmhos/cm	970	1,090	1,023			
Hardness as CaCO3	mg/L	193	416	318			
Iron, dissolved	mg/L		0.05	0.01			
Iron, total	mg/L		0.32	0.05			
Magnesium, dissolved	mg/L	33.3	33.3	33.3			
Manganese, dissolved	mg/L	0.002	0.002	0.002			
Manganese, total	mg/L		0.06	0.005			
Nitrate/Nitrite (as N)	mg/L	0.01	0.05	0.03			
pH	SU	7	8.1	7.7			
Phosphorus, ortho dissolved	mg/L		0.15	0.02			
Residue, Filterable (TDS) @180C	mg/L	502	686	598			
Residue, Non-Filterable (TSS) @105C	mg/L		19.6	3.5			
Sodium Adsorption Ratio (SAR)	calc.	2.31	2.73	2.52			
Sodium, dissolved	mg/L	102	102	102			
Sulfate	mg/L	16	117	81			

[1] Baseline pre -2000 data, adapted from WWE (2001).

Spring J-4
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring J-4		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm				seep	dry		dry
pH (Field)	SU	7.5	8.2	7.8	6.65			
Conductivity (Field)	µmhos/cm	340	480	392	683			
Temperature (Field)	°C				10.2			
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	109	262	195				
Aluminum, dissolved	mg/L		0.05	0.02				
Arsenic, dissolved	mg/L		0.001	0				
Bicarbonate as CaCO3	mg/L	169	262	195				
Calcium, dissolved	mg/L	34.2	54.4	43				
Cation - Anion Balance	mg/L	1.1	3.2	2.3				
Chloride	mg/L		3	1.9				
Conductivity @25C	µmhos/cm	412	429	423				
Copper, dissolved	mg/L		0.01	0				
Hardness as CaCO3	mg/L	125	191	156				
Iron, dissolved	mg/L		0.06	0.02				
Iron, total	mg/L	0.03	6.75	0.82				
Magnesium, dissolved	mg/L	9.6	13.4	11.4				
Manganese, total	mg/L		0.066	0.009				
Nitrate (as N), dissolved	mg/L	0.02	0.37	0.14				
Nitrate/Nitrite (as N)	mg/L	0.05	0.37	0.13				
Nitrite (as N), dissolved	mg/L		0.03	0.003				
pH	SU	7.1	8.1	7.5				
Phosphorus, ortho dissolved	mg/L		0.025	0.005				
Potassium, dissolved	mg/L	1.3	1.3	1.3				
Residue, Filterable (TDS) @180C	mg/L	230	300	254				
Residue, Non-Filterable (TSS) @105C	mg/L		26	6				
Selenium, total	mg/L		0.002	0				
Sodium Adsorption Ratio (SAR)	calc.	1.08	1.8	1.3				
Sodium, dissolved	mg/L	29.6	51.5	36.7				
Sulfate	mg/L	30	60	45				
Sum of Anions	meq/L	4.5	4.7	4.6				
Sum of Cations	meq/L	4.6	4.91	4.8				
Zinc, dissolved	mg/L		0.01	0				

[1] Baseline pre -2000 data, adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring 35-3
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 35-3		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm	0.63	26.5	6.3	4.06	0.75		0.47
pH (Field)	SU	6.53	8.74	7.48	6.93	6.75		7.03
Conductivity (Field)	µmhos/cm	223	560	428	511	532		690
Temperature (Field)	°C	5.9	12.1	8.9	5.8	7.3		8.8
Comment						estimated flow		
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-01		
Sample Date						6/7/2024		
Lab Test Date						6/13-6/28		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	102	217	170				
Aluminum, dissolved	mg/L	-0.03	0.09	0.04				
Arsenic, total	mg/L	0.0009	0.0130	0.0039				
Bicarbonate as CaCO3	mg/L	102	212	169				
Boron, dissolved	mg/L	-0.01	-0.01	-0.01				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	18.2	47.2	34.3				
Carbonate as CaCO3	mg/L	-2	4	2				
Cation - Anion Balance	mg/L	-8.6	-2.1	-4.4				
Chloride	mg/L	1	11	3				
Conductivity @25C	µmhos/cm	216	451	351		502		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	59	142	105				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.02	0.12	0.06		-0.06	U	
Iron, total	mg/L	0.19	42.50	9.14		0.063	B	
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	3.3	5.8	4.8				
Manganese, dissolved	mg/L	-0.005	0.272	0.055				
Manganese, total	mg/L	0.021	1.280	0.325				
Mercury, total	mg/L	-0.0002	0.0003	0.0001				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.17	0.08				
pH	SU	7.8	8.3	8.2		6.7	H	
Phosphate	mg/L	-0.03	0.15	0.07				
Phosphorus, ortho dissolved	mg/L	-0.01	0.05	0.02				
Potassium, dissolved	mg/L	0.7	1.4	0.9				
Residue, Filterable (TDS) @180C	mg/L	160	250	210		304		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	510	133		5	BH	
Selenium, total	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	1.27	1.60	1.45				
Sodium, dissolved	mg/L	25.7	42.5	33.4				
Sulfate	mg/L	10	30	20				
Sum of Anions	meq/L	2.5	4.8	3.9				
Sum of Cations	meq/L	2.3	4.6	3.6				
TDS (calculated)	mg/L	131	248	199				
TDS (ratio - measured/calculated)	calc.	0.09	1.22	0.93				
Zinc, dissolved	mg/L	-0.01	0.02	0.01				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Deer Creek Spring
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Deer Creek Spring		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm	0.94	4.15	2.88	0.2	dry		dry
pH (Field)	SU	6.72	7.77	7.10	7.67			
Conductivity (Field)	µmhos/cm	574	889	735	876			
Temperature (Field)	°C	7.1	17.4	10.9	10.9			
Comment					estimated flow			
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	294	302	298				
Aluminum, dissolved	mg/L	-0.03	-0.03	-0.03				
Arsenic, total	mg/L	-0.005	-0.005	-0.005				
Bicarbonate as CaCO3	mg/L	294	302	298				
Boron, dissolved	mg/L	-0.01	-0.01	-0.01				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	64.8	68.6	66.8				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	mg/L	-5.3	0.0	-2.1				
Chloride	mg/L	3	4	3				
Conductivity @25C	µmhos/cm	587	660	611				
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	241	255	249				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.02	-0.02	-0.02				
Iron, total	mg/L	-0.02	0.20	0.10				
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	19.1	20.4	20.0				
Manganese, dissolved	mg/L	-0.005	-0.005	-0.005				
Manganese, total	mg/L	-0.005	0.005	0.003				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	1.92	2.33	2.16				
pH	SU	7.9	8.2	8.1				
Phosphate	mg/L	-0.03	0.03	0.02				
Phosphorus, ortho dissolved	mg/L	-0.01	0.01	0.02				
Potassium, dissolved	mg/L	1.9	2.1	2.0				
Residue, Filterable (TDS) @180C	mg/L	320	360	343				
Residue, Non-Filterable (TSS) @105C	mg/L	-5	14	5				
Selenium, total	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	0.87	0.95	0.92				
Sodium, dissolved	mg/L	31.1	34.7	33.0				
Sulfate	mg/L	30	40	33				
Sum of Anions	meq/L	6.6	6.9	6.7				
Sum of Cations	meq/L	6.2	6.6	6.425				
TDS (calculated)	mg/L	329	341	336				
TDS (ratio - measured/calculated)	calc.	0.95	1.06	1.02				
Zinc, dissolved	mg/L	0.02	0.02	0.02				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

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H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring WCC-24
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring WCC-24		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm	6.12	40.85	23.36	31.17	60.06		13.55
pH (Field)	SU	7.30	8.64	8.05	7.34	7.27		7.71
Conductivity (Field)	µmhos/cm	1,778	3,240	2,319	1,736	1,729		1,582
Temperature (Field)	°C	11.4	19.0	13.1	9.1	11.6		11.9
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-10		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	323	406	368				
Aluminum, dissolved	mg/L	-0.03	0.04	0.02				
Arsenic, total	mg/L	0.00079	0.0086	0.0070				
Bicarbonate as CaCO3	mg/L	321	406	364				
Boron, dissolved	mg/L	0.74	0.86	0.79				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	165	197	180				
Carbonate as CaCO3	mg/L	-2	16	4				
Cation - Anion Balance	mg/L	-2	2	-0.2				
Chloride	mg/L	2	4	3				
Conductivity @25C	µmhos/cm	1,710	2,070	1,925		1,620		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	856	969	905				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.02	0.07	0.03		-0.06	U	
Iron, total	mg/L	-0.02	0.53	0.20		0.071	B	
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	106	116	111				
Manganese, dissolved	mg/L	-0.005	0.009	0.003				
Manganese, total	mg/L	-0.005	0.053	0.012				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	0.02	0.01				
Nitrate/Nitrite (as N)	mg/L	2.39	2.97	2.62				
pH	SU	8.1	8.4	8.2		8.1	H	
Phosphate	mg/L	0.12	0.34	0.24				
Phosphorus, ortho dissolved	mg/L	0.04	0.11	0.08				
Potassium, dissolved	mg/L	22.9	26.9	25.0				
Residue, Filterable (TDS) @180C	mg/L	1,460	1,630	1,561		1,320		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	48	12		7	BH	
Selenium, total	mg/L	0.014	0.019	0.016				
Sodium Adsorption Ratio (SAR)	calc.	1.71	1.85	1.81				
Sodium, dissolved	mg/L	116	131	123				
Sulfate	mg/L	760	820	800				
Sum of Anions	meq/L	22.5	25.3	24.2				
Sum of Cations	meq/L	23.2	25.8	24.2				
TDS (calculated)	mg/L	1,380	1,530	1,465				
TDS (ratio - measured/calculated)	calc.	1.04	1.11	1.07				
Zinc, dissolved	mg/L	-0.01	0.03	0.02				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

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H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.
Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring J-2
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring J-2		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Flow	gpm	0.11	0.26	0.18	0.025	0.05		seep
pH (Field)	SU	8.26	9.10	8.59	7.57	7.21		7.73
Conductivity (Field)	µmhos/cm	975	1,690	1,281	1,654	2,330		2,290
Temperature (Field)	°C	9.6	19.6	14.4	3.8	17.4		12.8
Comment						estimated flow		
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-10		
Sample Date						6/10/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	605	650	637				
Aluminum, dissolved	mg/L	-0.03	0.20	0.12				
Arsenic, total	mg/L	-0.005	0.010	0.003				
Bicarbonate as CaCO3	mg/L	557	614	584				
Boron, dissolved	mg/L	0.45	0.59	0.54				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	4.2	10.9	5.8				
Carbonate as CaCO3	mg/L	36	72	53				
Cation - Anion Balance	mg/L	-8.6	0.7	-4.6				
Chloride	mg/L	4	12	6				
Conductivity @25C	µmhos/cm	1,090	1,190	1,145		2,010		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	21	47	28				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.05	1.80	0.44		1.24		
Iron, total	mg/L	1.36	37.70	8.42		11.00		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	2.4	4.7	3.2				
Manganese, dissolved	mg/L	0.012	0.18	0.05				
Manganese, total	mg/L	0.046	0.872	0.204				
Mercury, total	mg/L	-0.0002	0.0003	0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	1.14	0.24				
pH	SU	8.4	8.8	8.6		8.4	H	
Phosphate	mg/L	0.46	1.36	0.72				
Phosphorus, ortho dissolved	mg/L	0.15	0.44	0.23				
Potassium, dissolved	mg/L	1.4	5.0	2.1				
Residue, Filterable (TDS) @180C	mg/L	650	910	742		190	B	
Residue, Non-Filterable (TSS) @105C	mg/L	20	754	192		92.0		
Selenium, total	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	16.30	27.60	23.03				
Sodium, dissolved	mg/L	248	295	266				
Sulfate	mg/L	-10	60	27				
Sum of Anions	meq/L	12.7	14.6	13.5				
Sum of Cations	meq/L	11.4	13.5	12.3				
TDS (calculated)	mg/L	664	752	715				
TDS (ratio - measured/calculated)	calc.	0.96	1.21	1.04				
Zinc, dissolved	mg/L	-0.01	0.19	0.04				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring J-7
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring J-7		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm	0.19	9.09	4.29	dry	dry		dry
pH (Field)	SU	6.55	8.25	7.60				
Conductivity (Field)	µmhos/cm	242	496	376				
Temperature (Field)	°C	9.7	21.0	15.4				
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	121	188	142				
Aluminum, dissolved	mg/L	-0.03	0.05	0.03				
Sum of Anions	meq/L	2.7	4.4	3.8				
Arsenic, total	mg/L	-0.005	0.0008	0.002				
Bicarbonate as CaCO3	mg/L	116	188	140				
Boron, dissolved	mg/L	-0.01	0.02					
Cadmium, dissolved	mg/L	-0.005	-0.005					
Calcium, dissolved	mg/L	21.1	33.9	30.3				
Carbonate as CaCO3	mg/L	-2	7	1				
Cation - Anion Balance	mg/L	-7.3	0	-2.60				
Sum of Cations	meq/L	2.6	4.3	3.6				
Chloride	mg/L	2	4	3				
Conductivity @25C	µmhos/cm	250	426	354				
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	79	125	107				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.02	0.11	0.05				
Iron, total	mg/L	0.53	1.96	1.02				
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	6.3	9.9	7.5				
Manganese, dissolved	mg/L	-0.005	-0.005	-0.005				
Manganese, total	mg/L	-0.005	0.037	0.019				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.33	0.16				
pH	SU	7.6	8.4	8.2				
Phosphate	mg/L	-0.03	0.24	0.09				
Phosphorus, ortho dissolved	mg/L	-0.01	0.08	0.03				
Potassium, dissolved	mg/L	1.2	2.2	1.62				
Selenium, total	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	1.19	1.61	1.41				
Sodium, dissolved	mg/L	23.9	41	33.2				
Sulfate	mg/L	10	60	44				
TDS (ratio - measured/calculated)	calc.	0.99	1.38	1.14				
TDS (calculated)	mg/L	138	234	205				
Residue, Filterable (TDS) @180C	mg/L	190	270	230				
Residue, Non-Filterable (TSS) @105C	mg/L	-5	24	10				
Zinc, dissolved	mg/L	-0.01	0.03	0				

[1] Baseline 2006.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Deep Creek Trail Spring
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Deep Creek Trail Spring		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm	1.24	3.51	1.77	2.67	0.70		1.60
pH (Field)	SU	7.72	8.07	7.90	7.42	7.02		7.21
Conductivity (Field)	µmhos/cm	400	479	455	509	527		549
Temperature (Field)	°C	5.8	11.8	8.74	5.5	7.4		8.2
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-04		
Sample Date						6/7/2024		
Lab Test Date						6/13-6/30		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	161	236	211				
Aluminum, dissolved	mg/L	-0.03	0.11	0.04				
Arsenic, total	mg/L	-0.0005	-0.0005	-0.0005				
Bicarbonate as CaCO3	mg/L	156	232	208				
Boron, dissolved	mg/L	0.02	0.02	0.02				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	29.4	40.3	37.4				
Carbonate as CaCO3	mg/L	-2	7	4				
Cation - Anion Balance	mg/L	-1.1	9.5	1.9				
Chloride	mg/L	1	2	2				
Conductivity @25C	µmhos/cm	357	463	440		500		
Copper, dissolved	mg/L	-0.01	0.02	0.01				
Hardness as CaCO3	mg/L	96	123	116				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.02	0.14	0.05		-0.06	U	
Iron, total	mg/L	0.14	1.63	0.79		0.06	B	
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	5.2	6.0	5.6				
Manganese, dissolved	mg/L	-0.005	-0.005	-0.005				
Manganese, total	mg/L	-0.005	0.024	0.012				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	1.51	0.66				
pH	SU	8.3	8.4	8.4		7.6	H	
Phosphate	mg/L	-0.03	0.15	0.05				
Phosphorus, ortho dissolved	mg/L	-0.01	0.05	0.02				
Potassium, dissolved	mg/L	1.0	1.1	1.0				
Residue, Filterable (TDS) @180C	mg/L	230	270	253		294		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	60	20		-5	UH	
Selenium, total	mg/L	-0.001	-0.001	-0.001				
Sodium Adsorption Ratio (SAR)	calc.	1.85	2.47	2.22				
Sodium, dissolved	mg/L	41.2	62.0	54.6				
Sulfate	mg/L	10	20	14				
Sum of Anions	meq/L	3.7	4.9	5				
Sum of Cations	meq/L	3.7	5.2	4.7				
TDS (calculated)	mg/L	198	262	243				
TDS (ratio - measured/calculated)	calc.	0.98	1.16	1.05				
Zinc, dissolved	mg/L	-0.01	0.02	0				

[1] Baseline 2007.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Deep Creek Spring # 2
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Deep Creek Spring #2		**Baseline[1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean [2]	5/7/2024	6/7/2024	9/30/2024
Field Parameters							
Flow	gpm	0.19	0.29	0.24	dry	dry	dry
pH (Field)	SU	7.97	8.19	8.09			
Conductivity (Field)	µmhos/cm	396	453	433			
Temperature (Field)	°C	7.1	13.4	10.4			
Comment							
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Alkalinity (Total CaCO3)	mg/L	167	219	195			
Aluminum, dissolved	mg/L	-0.03	0.09	0.06			
Arsenic, total	mg/L	-0.0005	0.0012	0.0006			
Bicarbonate as CaCO3	mg/L	159	211	185			
Boron, dissolved	mg/L	0.01	0.02	0.01			
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005			
Calcium, dissolved	mg/L	41.6	47.8	44.2			
Carbonate as CaCO3	mg/L	6	14	9			
Cation - Anion Balance	mg/L	0	4.9	1.8			
Chloride	mg/L	2	3	2			
Conductivity @25C	µmhos/cm	393	440	422			
Copper, dissolved	mg/L	-0.01	0.03	0.01			
Hardness as CaCO3	mg/L	127	147	136			
Hydroxide as CaCO3	mg/L	-2	-2	-2			
Iron, dissolved	mg/L	0.02	0.08	0.05			
Iron, total	mg/L	1.07	9.71	3.70			
Lead, dissolved	mg/L	-0.04	-0.04	-0.04			
Magnesium, dissolved	mg/L	5.7	6.7	6.3			
Manganese, dissolved	mg/L	-0.005	0.008	0.003			
Manganese, total	mg/L	0.018	0.146	0.057			
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002			
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01			
Nitrate/Nitrite (as N)	mg/L	-0.02	0.25	0.08			
pH	SU	8.4	8.5	8.4			
Phosphate	mg/L	-0.03	0.18	0.05			
Phosphorus, ortho dissolved	mg/L	-0.01	0.06	0.02			
Potassium, dissolved	mg/L	0.9	1.4	1.2			
Residue, Filterable (TDS) @180C	mg/L	230	260	247			
Residue, Non-Filterable (TSS) @105C	mg/L	6	302	136			
Selenium, total	mg/L	-0.001	-0.001	-0.001			
Sodium Adsorption Ratio (SAR)	calc.	1.37	1.63	1.49			
Sodium, dissolved	mg/L	35.1	44.8	39.5			
Sulfate	mg/L	20	20	20			
Sum of Anions	meq/L	3.8	4.8	4.3			
Sum of Cations	meq/L	4.1	4.9	4.5			
TDS (calculated)	mg/L	209	257	234			
TDS (ratio - measured/calculated)	calc.	1.01	1.16	1.06			
Zinc, dissolved	mg/L	-0.01	0.03	0.01			

[1] Baseline 2007.

[2] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

96-2-2 Area Spring
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: 96-2-2 Area Spring		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm	0.11	2.5	0.75	0.1	0.25		dry
pH (Field)	SU	7.78	8.18	7.88	7.22	6.81		
Conductivity (Field)	µmhos/cm	348	430	399	482	485		
Temperature (Field)	°C	6.9	12.3	10.6	5.7	8.8		
Comment					estimated flow			
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-04		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	129	172	156				
Aluminum, dissolved	mg/L	-0.03	0.21	0.09				
Arsenic, total	mg/L	-0.0005	0.0012	0.0007				
Bicarbonate as CaCO3	mg/L	129	171	154				
Boron, dissolved	mg/L	0.01	0.02	0.02				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	11.8	18.3	16.2				
Carbonate as CaCO3	mg/L	-2	10	4				
Cation - Anion Balance	mg/L	0.0	5.6	2.2				
Chloride	mg/L	2	3	2				
Conductivity @25C	µmhos/cm	332	421	387		436		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	38	59	52				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.05	0.30	0.13		-0.06	U	
Iron, total	mg/L	0.84	9.08	4.55		0.35		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	2.1	3.3	2.9				
Manganese, dissolved	mg/L	-0.005	0.177	0.045				
Manganese, total	mg/L	0.013	0.153	0.075				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	0.01	0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.04	0.03				
pH	SU	8.2	8.5	8.4		6.7	H	
Phosphate	mg/L	0.03	0.18	0.08				
Phosphorus, ortho dissolved	mg/L	0.01	0.06	0.03				
Potassium, dissolved	mg/L	0.7	1.4	1.2				
Residue, Filterable (TDS) @180C	mg/L	190	240	220		272		
Residue, Non-Filterable (TSS) @105C	mg/L	22	510	175		-5	UH	
Selenium, total	mg/L	-0.001	0.002	0.0008				
Sodium Adsorption Ratio (SAR)	calc.	3.93	4.17	4.09				
Sodium, dissolved	mg/L	58.5	70.8	67.0				
Sulfate	mg/L	30	30	30				
Sum of Anions	meq/L	3.2	4	3.8				
Sum of Cations	meq/L	3.3	4.3	4.0				
TDS (calculated)	mg/L	183	231	216				
TDS (ratio - measured/calculated)	calc.	0.97	1.04	1.02				
Zinc, dissolved	mg/L	-0.01	0.11	0.03				

[1] Baseline 2007.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte concentrationentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring J-10
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring J-10		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/11/2024	6/7/2024	Q[4]	9/28/2024
Field Parameters								
Flow	gpm	dry	0.22	seep				
pH (Field)	SU	7.14	7.92	7.42				
Conductivity (Field)	µmhos/cm	770	982	879				
Temperature (Field)	°C	5.9	19.5	12.8				
Comment					spring covered by beaver pond			
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	299	463	377				
Aluminum, dissolved	mg/L	-0.03	-0.03	-0.03				
Arsenic, total recoverable	mg/L	-0.0005	0.0055	0.0018				
Bicarbonate as CaCO3	mg/L	294	463	375				
Boron, dissolved	mg/L	0.02	0.06	0.05				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	70	118	92.8				
Carbonate as CaCO3	mg/L	-2	15	3				
Cation - Anion Balance	mg/L	-7.4	4.7	-1.3				
Chloride	mg/L	10	19	14				
Conductivity @25C	µmhos/cm	721	927	822				
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	273	447	360				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.02	0.68	0.18				
Iron, total	mg/L	0.44	10.9	3.45				
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	23.5	36.9	31.0				
Manganese, dissolved	mg/L	0.011	1.06	0.287				
Manganese, total	mg/L	0.043	1.85	0.587				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.01	-0.01	-0.01				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.04	0.02				
pH	SU	8.2	8.3	8.2				
Phosphate	mg/L	-0.03	0.06	-0.03				
Phosphorus, ortho dissolved	mg/L	-0.01	0.02	-0.01				
Potassium, dissolved	mg/L	1.7	2.5	2.0				
Residue, Filterable (TDS) @180C	mg/L	450	600	512				
Residue, Non-Filterable (TSS) @105C	mg/L	15	157	53				
Selenium, total recoverable	mg/L	0.0002	0.0011	0.0005				
Sodium Adsorption Ratio (SAR)	calc.	0.84	1.05	0.92				
Sodium, dissolved	mg/L	31.9	47.6	39.8				
Sulfate	mg/L	30	71	57				
Sum of Anions	meq/L	8.0	10.4	9.2				
Sum of Cations	meq/L	6.9	11.1	9.0				
TDS (calculated)	mg/L	397	522	466				
TDS (ratio - measured/calculated)	calc.	1.02	1.15	1.10				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline Monitoring WY 2011.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring 2012-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Spring 2012-1		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean[5]	5/7/2024	6/7/2024	9/30/2024
Field Parameters							
Flow	gpm	dry	2.5	NA	seep	dry	dry
pH (Field)	SU	7.79	7.79	7.79	7.28		
Conductivity (Field)	µmhos/cm	123	123	123	82.1		
Temperature (Field)	°C	7.3	7.3	7.3	8.3		
Comment							
Laboratory Parameters[2]							
Name of Certified Lab[3]							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Alkalinity (Total CaCO3)	mg/L						
Aluminum, dissolved	mg/L						
Arsenic, total recoverable	mg/L						
Bicarbonate as CaCO3	mg/L						
Boron, dissolved	mg/L						
Cadmium, dissolved	mg/L						
Calcium, dissolved	mg/L						
Carbonate as CaCO3	mg/L						
Cation - Anion Balance	mg/L						
Chloride	mg/L						
Conductivity @25C	µmhos/cm						
Copper, dissolved	mg/L						
Hardness as CaCO3	mg/L						
Hydroxide as CaCO3	mg/L						
Iron, dissolved	mg/L						
Iron, total	mg/L						
Lead, dissolved	mg/L						
Magnesium, dissolved	mg/L						
Manganese, dissolved	mg/L						
Manganese, total	mg/L						
Mercury, total	mg/L						
Molybdenum, dissolved	mg/L						
Nitrate/Nitrite (as N)	mg/L						
pH	SU						
Phosphate	mg/L						
Phosphorus, ortho dissolved	mg/L						
Potassium, dissolved	mg/L						
Residue, Filterable (TDS) @180C	mg/L						
Residue, Non-Filterable (TSS) @105C	mg/L						
Selenium, total recoverable	mg/L						
Sodium Adsorption Ratio (SAR)	calc.						
Sodium, dissolved	mg/L						
Sulfate	mg/L						
Sum of Anions	meq/L						
Sum of Cations	meq/L						
TDS (calculated)	mg/L						
TDS (ratio - measured/calculated)	calc.						
Zinc, dissolved	mg/L						

[1] Baseline Monitoring May Through October 2013. Insufficient flow for lab samples. Field measurments only.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

Spring 2012-2
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 2012-2		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm	dry	3.56	0.59	2.26	0.15		dry
pH (Field)	SU	8.00	8.32	8.16	6.67	6.81		
Conductivity (Field)	µmhos/cm	91	114	103	84.3	96.5		
Temperature (Field)	°C	4.8	6.6	5.7	7.6	21.1		
Comment						estimated flow		
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-03		
Sample Date						6/7/2024		
Lab Test Date						6/13-6/28		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	38.0	38.0	38.0				
Aluminum, dissolved	mg/L	0.05	0.05	0.05				
Arsenic, total recoverable	mg/L	-0.0002	-0.0002	-0.0002				
Bicarbonate as CaCO3	mg/L	38.0	38.0	38.0				
Boron, dissolved	mg/L	-0.01	-0.01	-0.01				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	7.5	7.5	7.5				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	mg/L	6.3	6.3	6.3				
Chloride	mg/L	2	2	2				
Conductivity @25C	µmhos/cm	99	99	99		99		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	25	25	25				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.11	0.11	0.11		0.14	B	
Iron, total	mg/L	1.04	1.04	1.04		1.3		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	1.6	1.6	1.6				
Manganese, dissolved	mg/L	-0.005	-0.005	-0.005				
Manganese, total	mg/L	0.009	0.009	0.009				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite (as N)	mg/L	0.41	0.41	0.41				
pH	SU	7.9	7.9	7.9		7.5	H	
Phosphate	mg/L	-0.03	-0.03	-0.03				
Phosphorus, ortho dissolved	mg/L	-0.01	-0.01	-0.01				
Potassium, dissolved	mg/L	0.7	0.7	0.7				
Residue, Filterable (TDS) @180C	mg/L	80	80	80		124		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	-5	-5		60	H	
Selenium, total recoverable	mg/L	0.0002	0.0002	0.0002				
Sodium Adsorption Ratio (SAR)	calc.	0.82	0.82	0.82				
Sodium, dissolved	mg/L	9.4	9.4	9.4				
Sulfate	mg/L	1	1	1				
Sum of Anions	meq/L	0.837	0.837	0.837				
Sum of Cations	meq/L	0.949	0.949	0.949				
TDS (calculated)	mg/L	45	45	45				
TDS (ratio - measured/calculated)	calc.	1.78	1.78	1.78				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline Monitoring May Through October 2013. Only one laboratory sample was collected during the baseline period in May 2013. The spring was dry from June through October 2013.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring 2012-3
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 2012-3		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm	0.16	2.63	0.88	2.51	1.75		0.23
pH (Field)	SU	7.51	8.63	8.13	6.98	7.08		6.98
Conductivity (Field)	µmhos/cm	396	525	471	482	505		573
Temperature (Field)	°C	2.0	9.1	6.2	5.1	8.4		10.4
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88299-02		
Sample Date						6/7/2024		
Lab Test Date						6/13-6/28		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	169	201	183				
Aluminum, dissolved	mg/L	-0.03	0.05	0.02				
Arsenic, total recoverable	mg/L	-0.0002	0.0013	0.0005				
Bicarbonate as CaCO3	mg/L	163	191	173				
Boron, dissolved	mg/L	-0.01	0.02	0.01				
Cadmium, dissolved	mg/L	-0.005	-0.005	0.003				
Calcium, dissolved	mg/L	29.3	39.7	37.2				
Carbonate as CaCO3	mg/L	6	17	11				
Cation - Anion Balance	mg/L	-4.2	2.3	1.5				
Chloride	mg/L	1	2	2				
Conductivity @25C	µmhos/cm	373	475	436		471		
Copper, dissolved	mg/L	-0.01	-0.01	0.01				
Hardness as CaCO3	mg/L	97	130	122				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.02	0.27	0.07		-0.06	U	
Iron, total	mg/L	0.49	5.24	1.77		-0.06	U	
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	5.7	7.5	7.1				
Manganese, dissolved	mg/L	-0.005	0.032	0.010				
Manganese, total	mg/L	0.017	0.124	0.052				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite (as N)	mg/L	0.04	0.16	0.09				
pH	SU	8.3	8.5	8.4		7.4	H	
Phosphate	mg/L	-0.03	0.16	0.07				
Phosphorus, ortho dissolved	mg/L	-0.01	0.05	0.02				
Potassium, dissolved	mg/L	1.2	1.8	1.5				
Residue, Filterable (TDS) @180C	mg/L	210	280	260		280		
Residue, Non-Filterable (TSS) @105C	mg/L	13	245	72		-5.0	UH	
Selenium, total recoverable	mg/L	0.0003	0.0005	0.0004				
Sodium Adsorption Ratio (SAR)	calc.	1.82	1.86	1.84				
Sodium, dissolved	mg/L	41.5	48.2	46.2				
Sulfate	mg/L	33	51.5	42				
Sum of Anions	meq/L	4.1	5.0	4.6				
Sum of Cations	meq/L	3.8	4.8	4.5				
TDS (calculated)	mg/L	214	265	246				
TDS (ratio - measured/calculated)	calc.	0.98	1.11	1.05				
Zinc, dissolved	mg/L	-0.01	-0.01	-0.01				

[1] Baseline Monitoring May Through October 2013.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring 2012-4
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring 2012-4		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/7/2024	6/7/2024	Q[4]	9/30/2024
Field Parameters								
Flow	gpm	0.91	2.26	1.41	1.24	0.89		0.30
pH (Field)	SU	7.02	8.24	7.93	7.37	7.17		6.85
Conductivity (Field)	µmhos/cm	444	538	507	516	524		563
Temperature (Field)	°C	4.7	6.2	5.4	5.1	7.2		10.6
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88305-12		
Sample Date						6/7/2024		
Lab Test Date						6/13-7/3		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	173	209	196				
Aluminum, dissolved	mg/L	-0.03	0.07	0.03				
Arsenic, total recoverable	mg/L	-0.0002	0.0008	0.0003				
Bicarbonate as CaCO3	mg/L	169	204	189				
Boron, dissolved	mg/L	0.01	0.02	0.02				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	34.8	41.1	39.5				
Carbonate as CaCO3	mg/L	-2	13	7				
Cation - Anion Balance	mg/L	-1.1	2.1	1.0				
Chloride	mg/L	1	2	2				
Conductivity @25C	µmhos/cm	422	496	469		504		
Copper, dissolved	mg/L	-0.01	-0.01	-0.01				
Hardness as CaCO3	mg/L	113	134	128				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.02	0.45	0.11		-0.06	U	
Iron, total	mg/L	0.09	2.99	0.92		0.153		
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	6.4	7.5	7.2				
Manganese, dissolved	mg/L	-0.005	0.013	0.004				
Manganese, total	mg/L	-0.005	0.05	0.02				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.03	0.02				
pH	SU	8.2	8.5	8.4		8.1	H	
Phosphate	mg/L	-0.03	0.09	0.05				
Phosphorus, ortho dissolved	mg/L	-0.01	0.03	0.02				
Potassium, dissolved	mg/L	0.9	1.6	1.2				
Residue, Filterable (TDS) @180C	mg/L	240	298	274		288		
Residue, Non-Filterable (TSS) @105C	mg/L	-5	112	34		6.0	BH	
Selenium, total recoverable	mg/L	0.0003	0.0004	0.0003				
Sodium Adsorption Ratio (SAR)	calc.	1.93	2.03	2.01				
Sodium, dissolved	mg/L	46.6	53.1	51.6				
Sulfate	mg/L	37	45	40				
Sum of Anions	meq/L	4.4	5.0	4.8				
Sum of Cations	meq/L	4.3	5.06	4.9				
TDS (calculated)	mg/L	234	268	259				
TDS (ratio - measured/calculated)	calc.	1.03	1.12	1.06				
Zinc, dissolved	mg/L	-0.01	0.16	0.02				

[1] Baseline Monitoring May Through October 2013.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Spring ST-S-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Spring ST-S-1		**Baseline[1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean[5]	5/9/2024	6/10/2024	Q[4]	9/26/2024
Field Parameters								
Flow	gpm	--	--	--	1.5	1.5		0.2
pH (Field)	SU	6.85	8.73	8.01	7.83	7.85		7.69
Conductivity (Field)	µmhos/cm	357	596	468	410	419		449
Temperature (Field)	°C	8.5	19.6	14.5	8.5	14.1		16.5
Comment					estimated, dispersed flow			
Laboratory Parameters [2]								
Name of Certified Lab [3]						ACZ		
Lab Reference #						L88349-03		
Sample Date						6/10/2024		
Lab Test Date						6/14-7/2		
Sampled By						PH		
Alkalinity (Total CaCO3)	mg/L	163	266	206				
Aluminum, dissolved	mg/L	-0.05	0.21	0.09				
Arsenic, total recoverable	mg/L	0.0004	0.0045	0.0022				
Bicarbonate as CaCO3	mg/L	161	266	203				
Boron, dissolved	mg/L	-0.02	0.04	0.03				
Cadmium, dissolved	mg/L	-0.008	-0.005	-0.005				
Calcium, dissolved	mg/L	2.6	21.9	12.7				
Carbonate as CaCO3	mg/L	-10	7	4				
Cation-Anion Balance	%	-5.8	3.7	-1.3				
Chloride	mg/L	1.6	7.2	3.3				
Conductivity @25C	umhos/cm	374	526	430		356		
Copper, dissolved	mg/L	-0.01	0.01	0.01				
Hardness as CaCO3 (dissolved)	mg/L	9	82	47				
Hydroxide as CaCO3	mg/L	-10	-2	-2				
Iron, dissolved	mg/L	-0.03	0.52	0.18		0.32		
Iron, total	mg/L	0.63	18.10	8.82		3.64		
Lead, dissolved	mg/L	-0.03	-0.03	-0.03				
Magnesium, dissolved	mg/L	0.7	6.5	3.8				
Manganese, dissolved	mg/L	-0.01	0.08	0.03				
Manganese, total	mg/L	-0.01	0.35	0.15				
Mercury, total	mg/L	-0.0002	-0.0002	-0.0002				
Molybdenum, dissolved	mg/L	-0.02	-0.02	-0.02				
Nitrate/Nitrite as N	mg/L	-0.02	0.77	0.17				
pH	units	7.3	8.4	8.1		7.6	H	
Phosphate	mg/L	0.06	0.19	0.11				
Phosphorus, ortho dissolved	mg/L	0.02	0.06	0.04				
Potassium, dissolved	mg/L	0.6	1.7	1.0				
Residue, Filterable (TDS) @180C	mg/L	260	760	381		292		
Residue, Non-Filterable (TSS) @105C	mg/L	14.0	312.0	154.6		203.0		
Selenium, total recoverable	mg/L	-0.0001	0.003	0.001				
Sodium Adsorption Ratio in Water	calc.	3.5	13.0	7.0				
Sodium, dissolved	mg/L	64.5	102.0	79.0				
Sulfate	mg/L	-1	38.9	21.1				
Sum of Anions	meq/L	3.9	5.5	4.6				
Sum of Cations	meq/L	4.1	5.0	4.5				
TDS (calculated)	mg/L	213	280	246				
TDS (ratio - measured/calculated)	calc.	1.12	2.71	1.50				
Zinc, dissolved	mg/L	-0.01	0.01	0.01				

[1] Baseline period is July 2018 through July 2019.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.

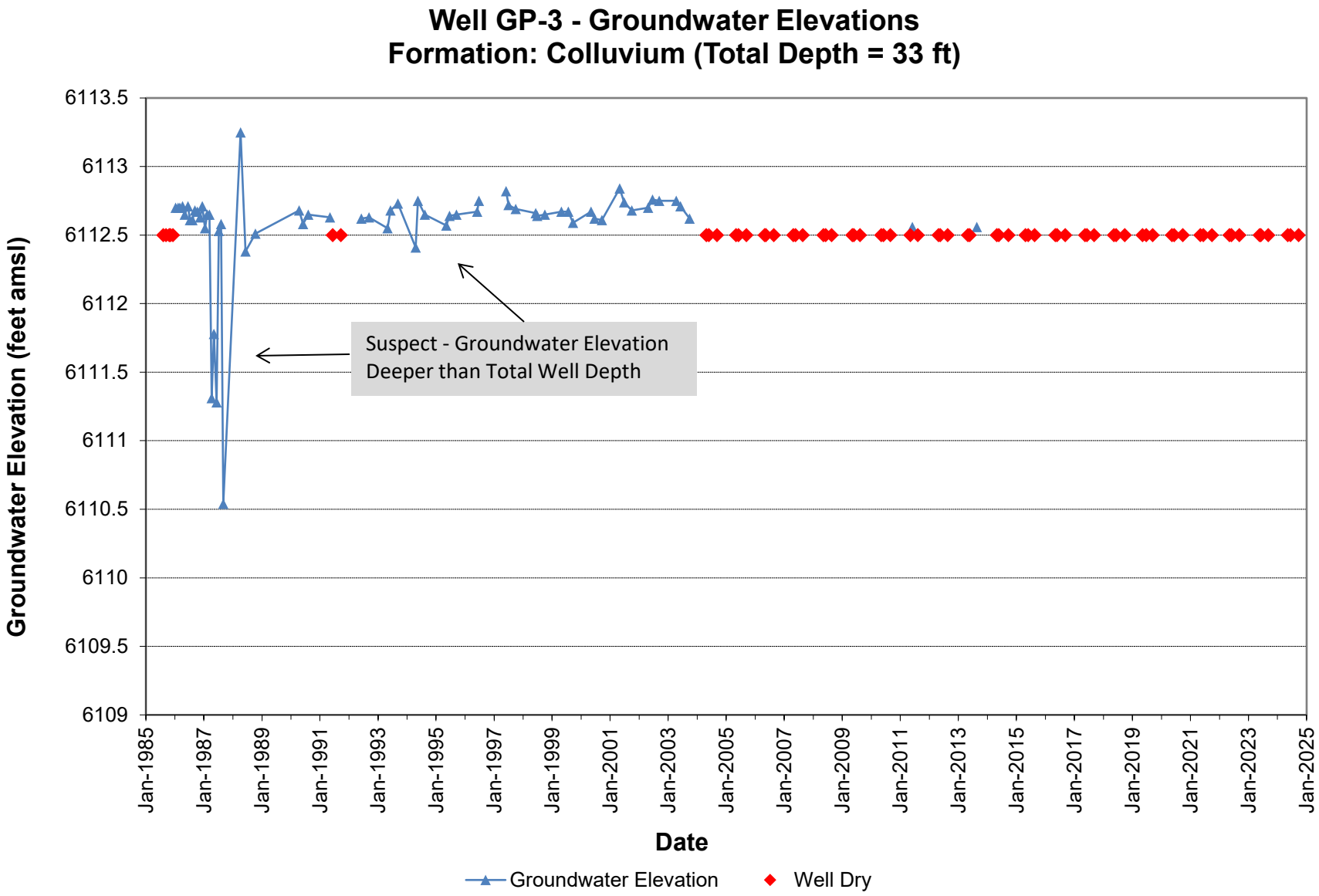
B - Analyte concentration detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

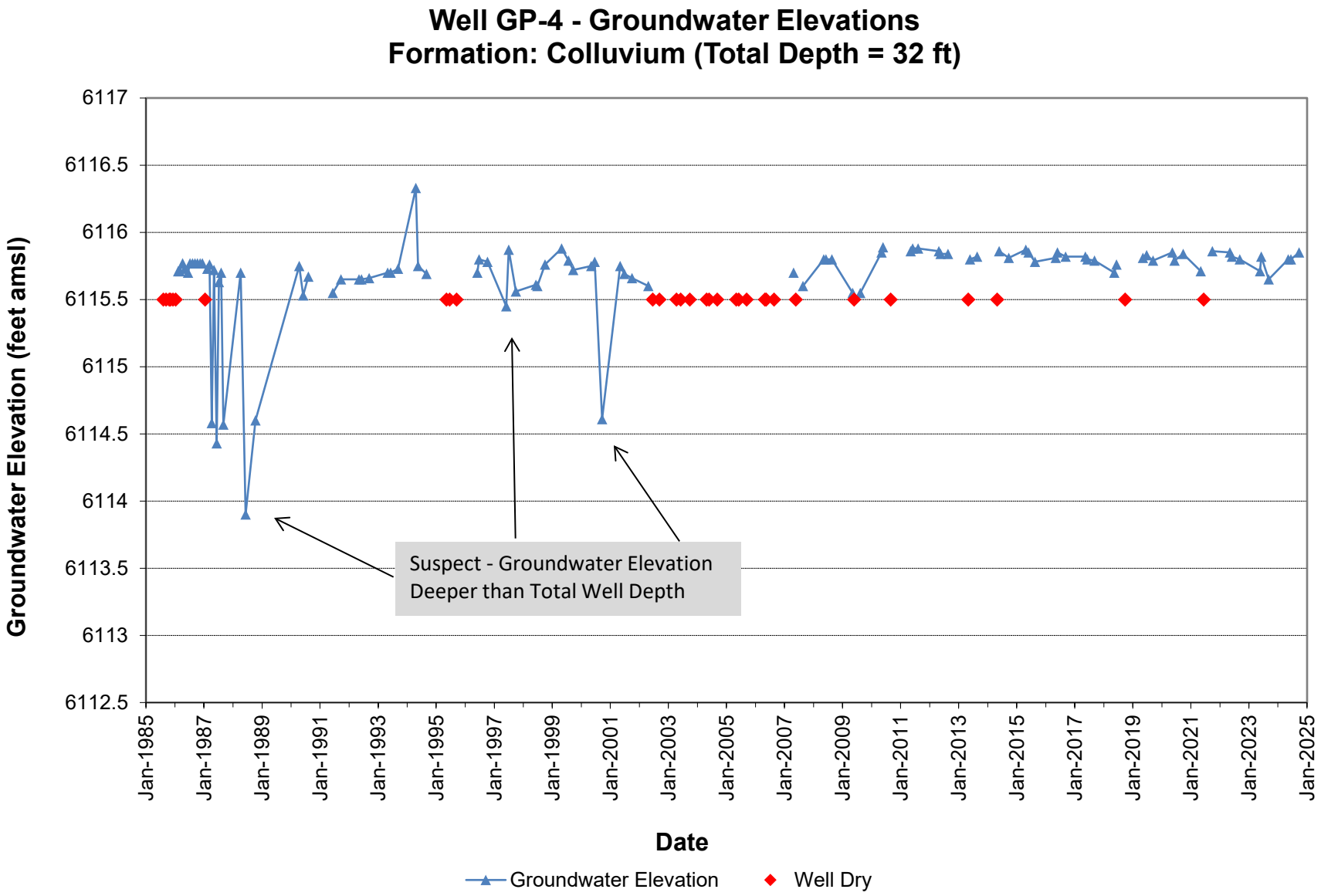
[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

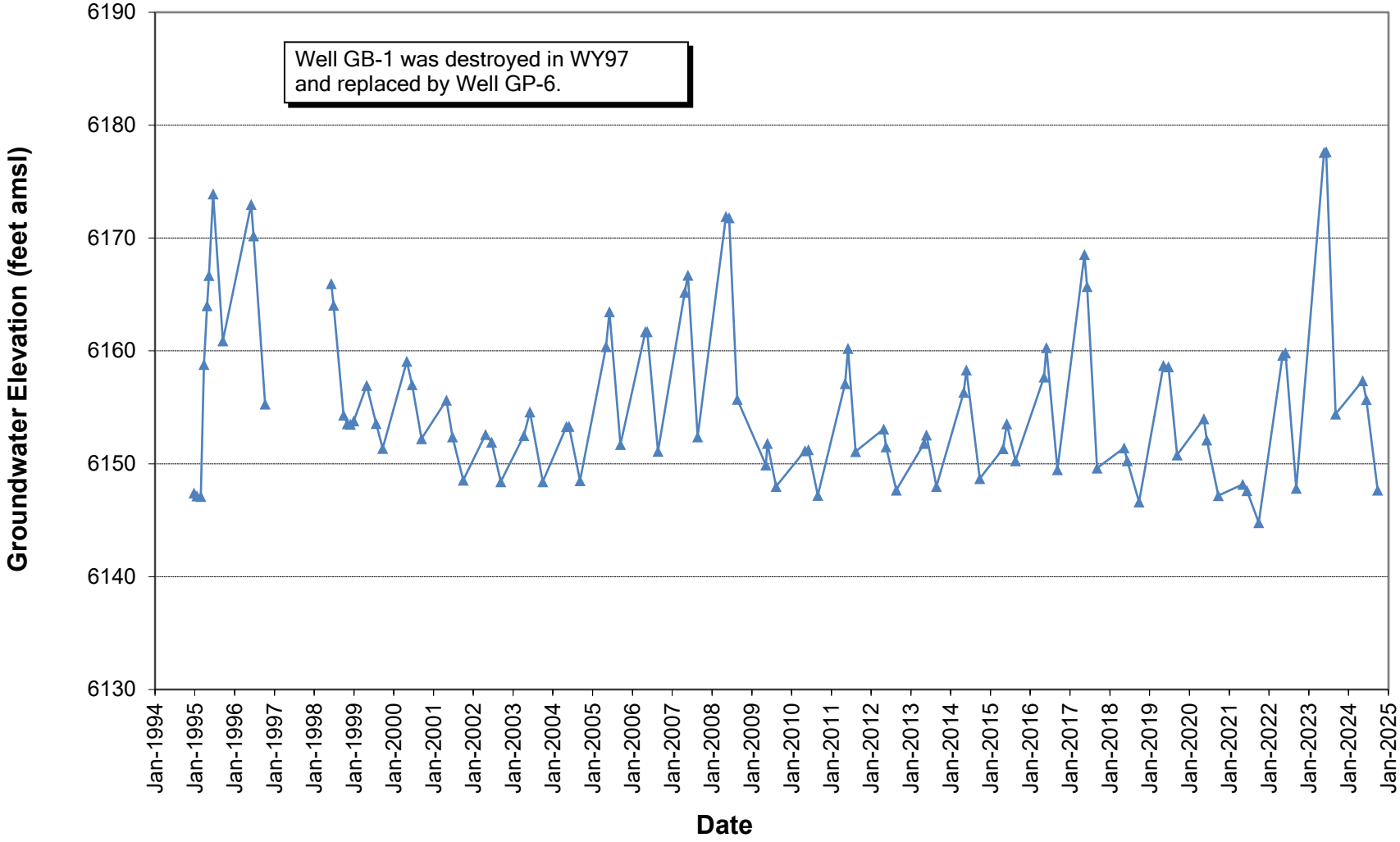
APPENDIX F

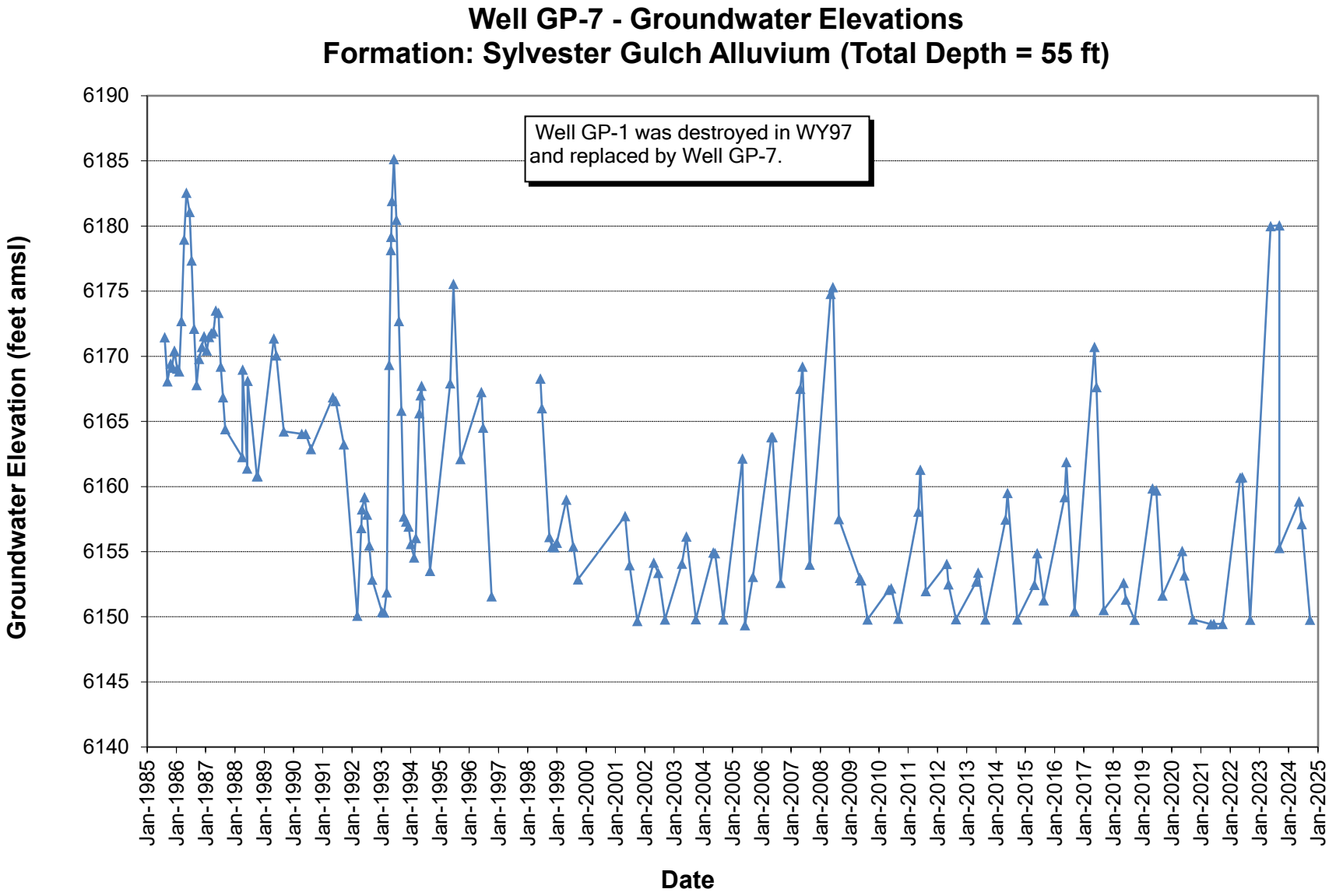
WELLS - WATER LEVEL ELEVATION GRAPHS

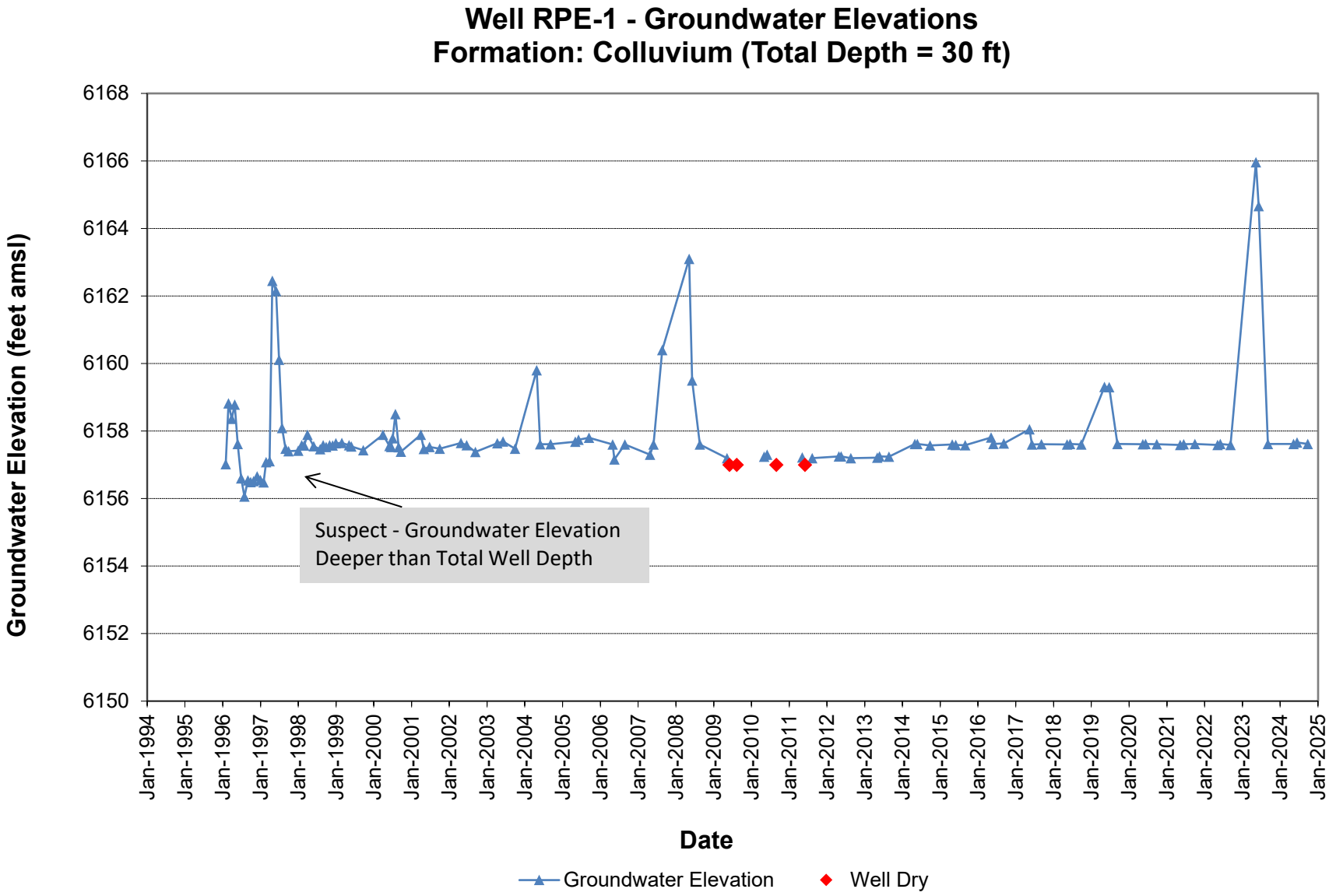

Well GP-3 - Groundwater Elevations
Formation: Colluvium (Total Depth = 33 ft)
Groundwater Elevation (feet amsl)
6113.5
6113
6112.5
6112
6111.5
6111
6110.5
6110
6109.5
6109
Jan-1985
Jan-1987
Jan-1989
Jan-1991
Jan-1993
Jan-1995
Jan-1997
Jan-1999
Jan-2001
Jan-2003
Jan-2005
Jan-2007
Jan-2009
Jan-2011
Jan-2013
Jan-2015
Jan-2017
Jan-2019
Jan-2021
Jan-2023
Jan-2025
Date
Suspect - Groundwater Elevation
Deeper than Total Well Depth
Groundwater Elevation
Well Dry

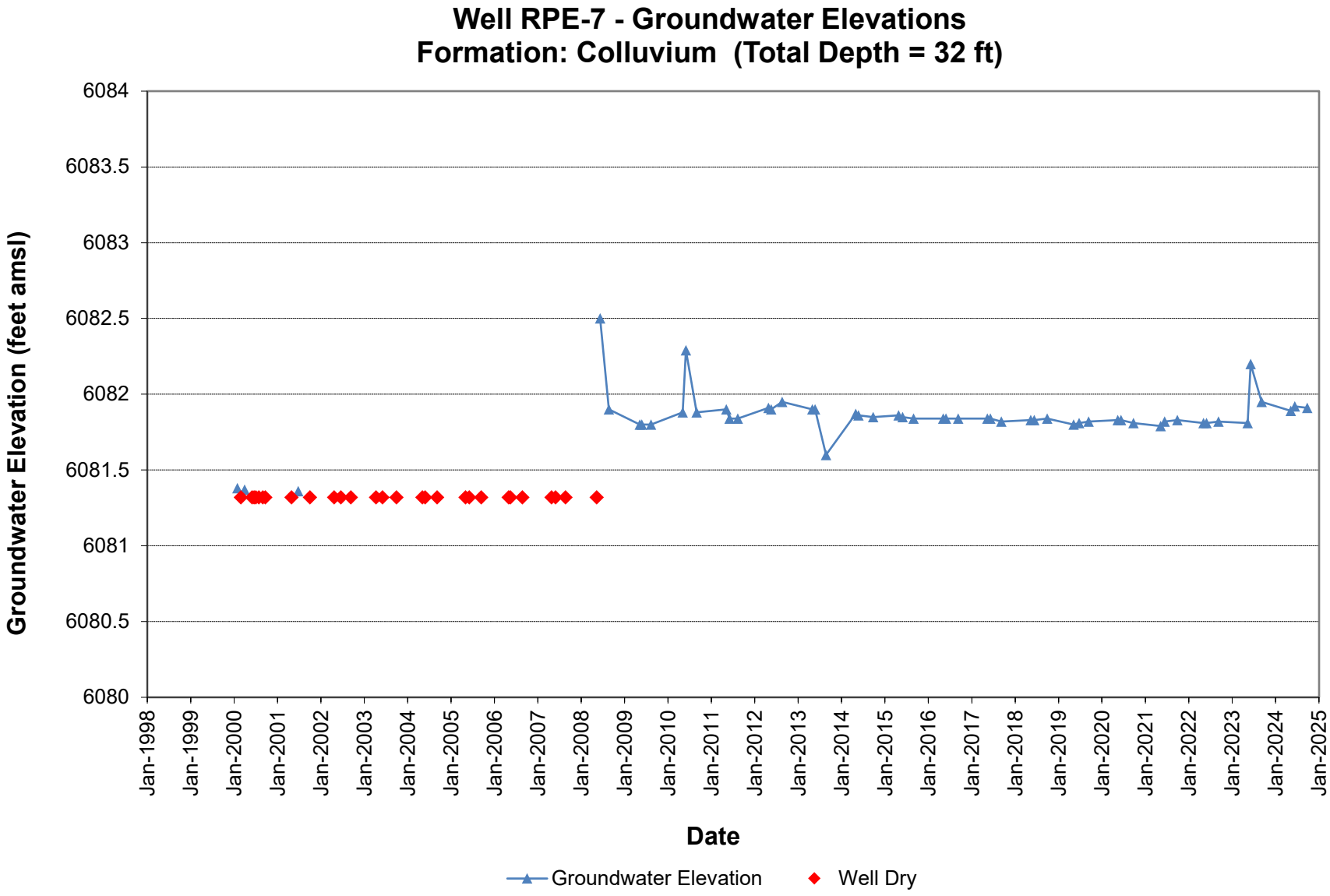

Well GP-4 - Groundwater Elevations
Formation: Colluvium (Total Depth = 32 ft)
Groundwater Elevation (feet amsl)
6117
6116.5
6116
6115.5
6115
6114.5
6114
6113.5
6113
6112.5
Jan-1985
Jan-1987
Jan-1989
Jan-1991
Jan-1993
Jan-1995
Jan-1997
Jan-1999
Jan-2001
Jan-2003
Jan-2005
Jan-2007
Jan-2009
Jan-2011
Jan-2013
Jan-2015
Jan-2017
Jan-2019
Jan-2021
Jan-2023
Jan-2025
Date
Suspect - Groundwater Elevation
Deeper than Total Well Depth
Groundwater Elevation
Well Dry

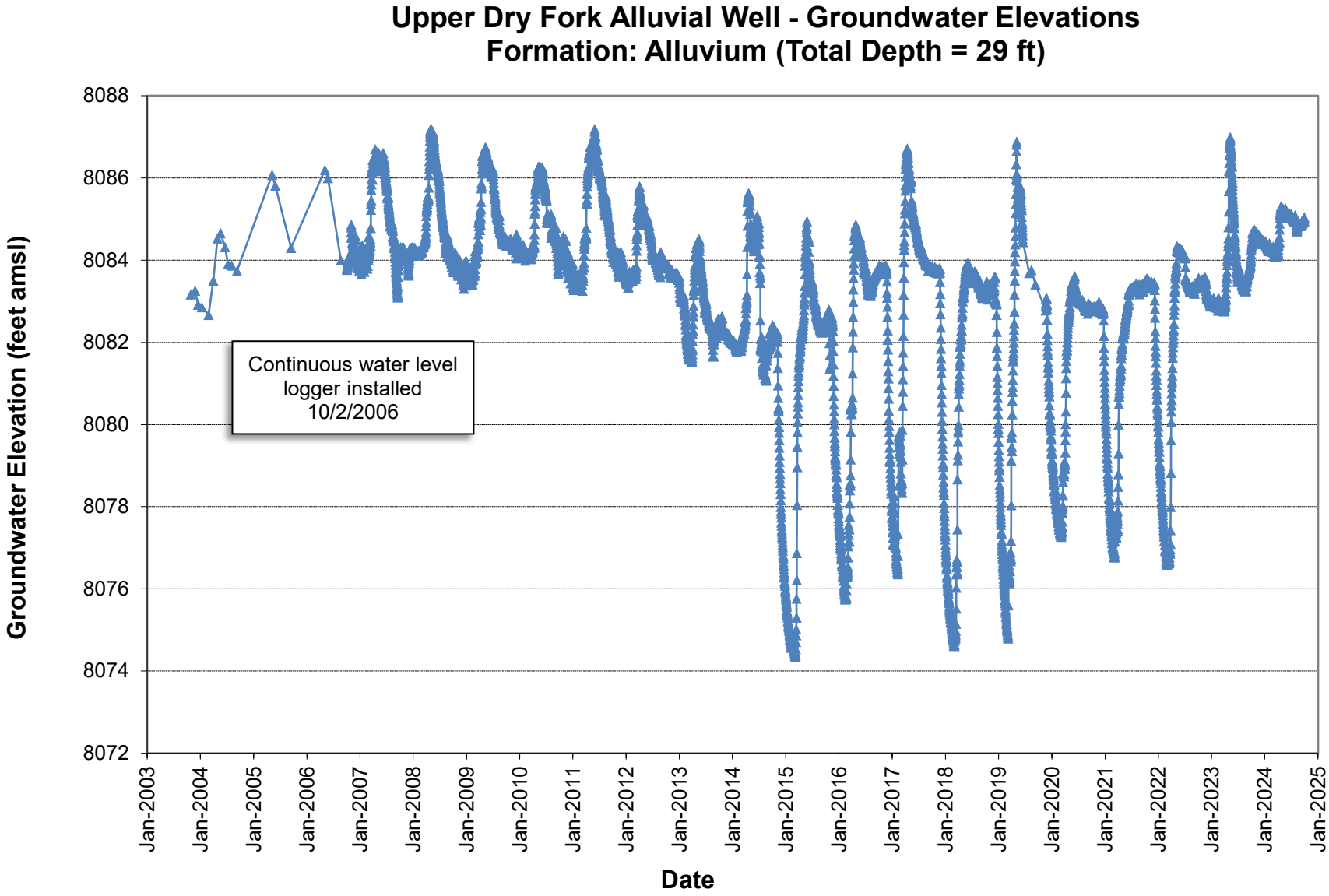
Well GP-6 - Groundwater Elevations
Formation: Sylvester Gulch Alluvium (Total Depth = 83 ft)

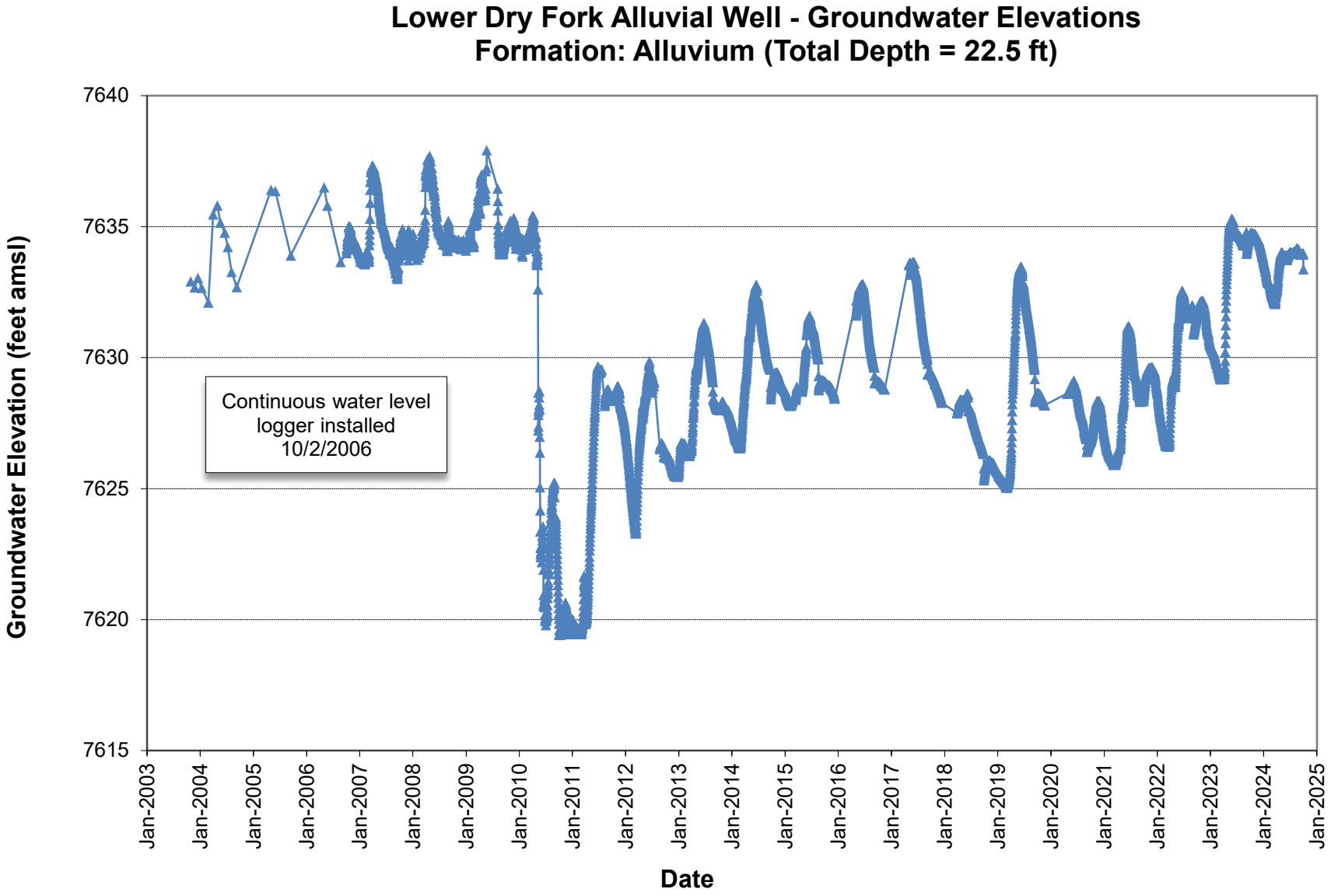


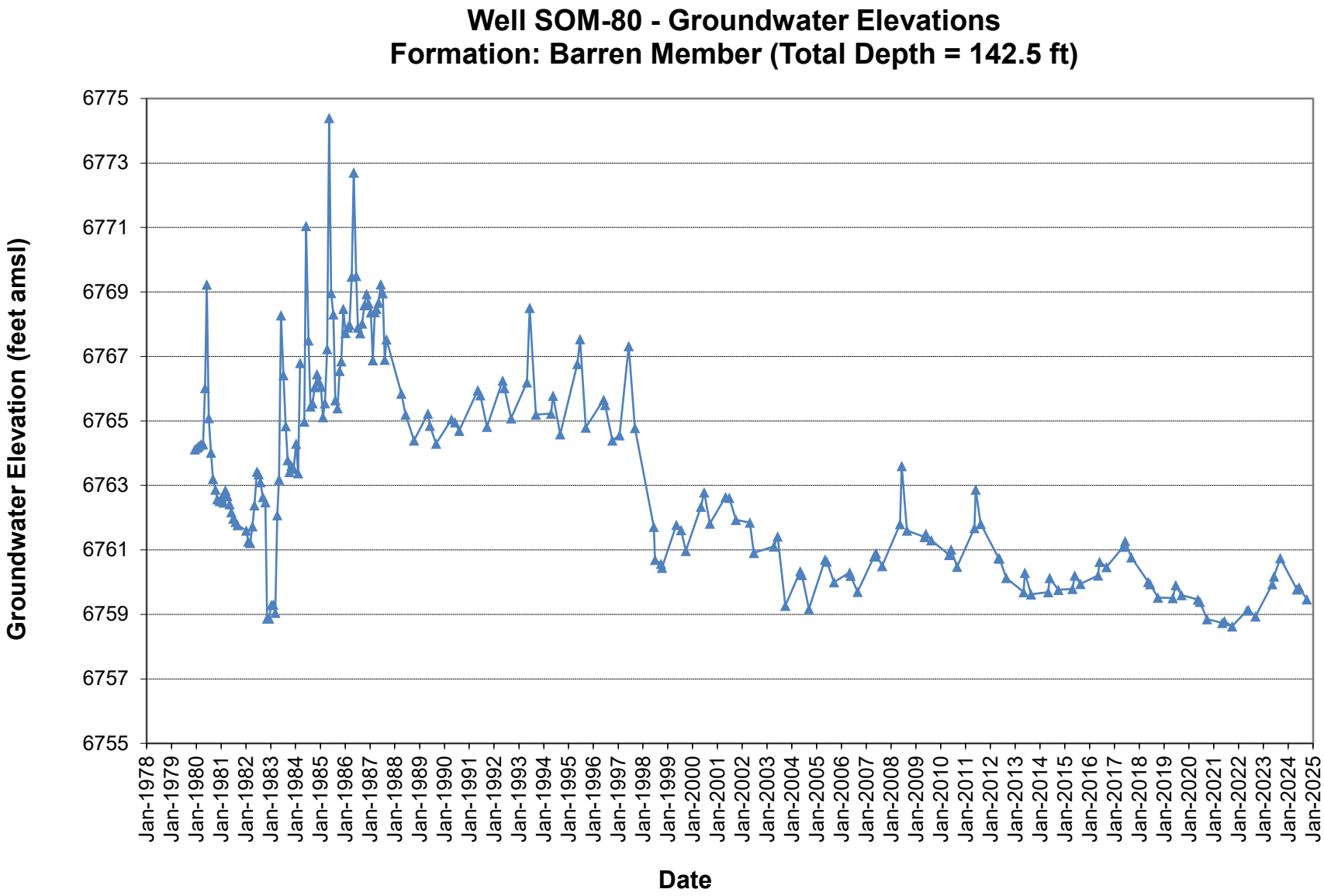

Well GP-7 - Groundwater Elevations
Formation: Sylvester Gulch Alluvium (Total Depth = 55 ft)
Well GP-1 was destroyed in WY97 and replaced by Well GP-7.
Groundwater Elevation (feet amsl)
6190
6185
6180
6175
6170
6165
6160
6155
6150
6145
6140
Jan-1985
Jan-1986
Jan-1987
Jan-1988
Jan-1989
Jan-1990
Jan-1991
Jan-1992
Jan-1993
Jan-1994
Jan-1995
Jan-1996
Jan-1997
Jan-1998
Jan-1999
Jan-2000
Jan-2001
Jan-2002
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date


Well RPE-1 - Groundwater Elevations
Formation: Colluvium (Total Depth = 30 ft)
Groundwater Elevation (feet amsl)
6168
6166
6164
6162
6160
6158
6156
6154
6152
6150
Jan-1994
Jan-1995
Jan-1996
Jan-1997
Jan-1998
Jan-1999
Jan-2000
Jan-2001
Jan-2002
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Suspect - Groundwater Elevation
Deeper than Total Well Depth
Date
Groundwater Elevation
Well Dry

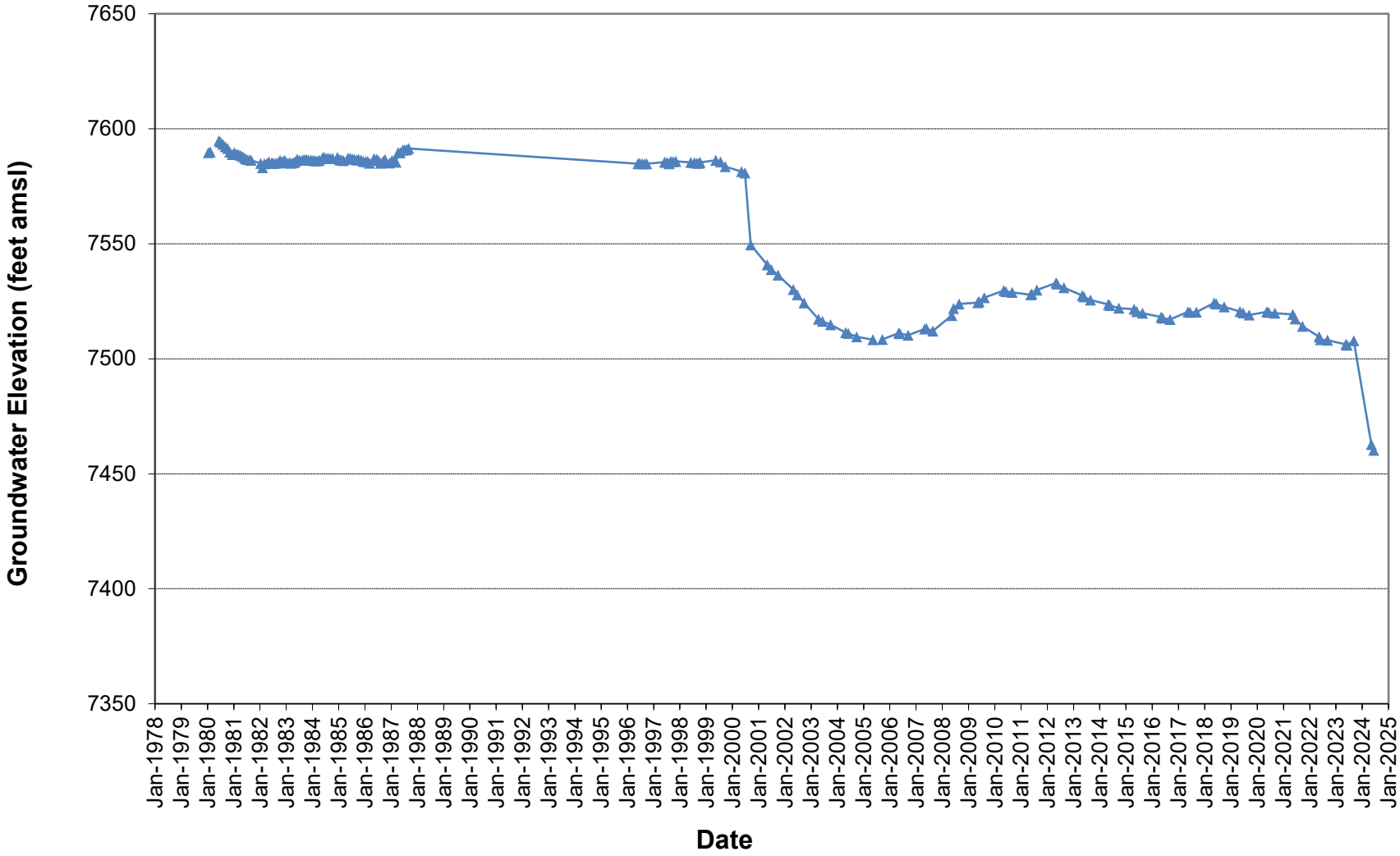

Well RPE-7 - Groundwater Elevations
Formation: Colluvium (Total Depth = 32 ft)
Groundwater Elevation (feet amsl)
6084
6083.5
6083
6082.5
6082
6081.5
6081
6080.5
6080
Jan-1998
Jan-1999
Jan-2000
Jan-2001
Jan-2002
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date
Groundwater Elevation
Well Dry

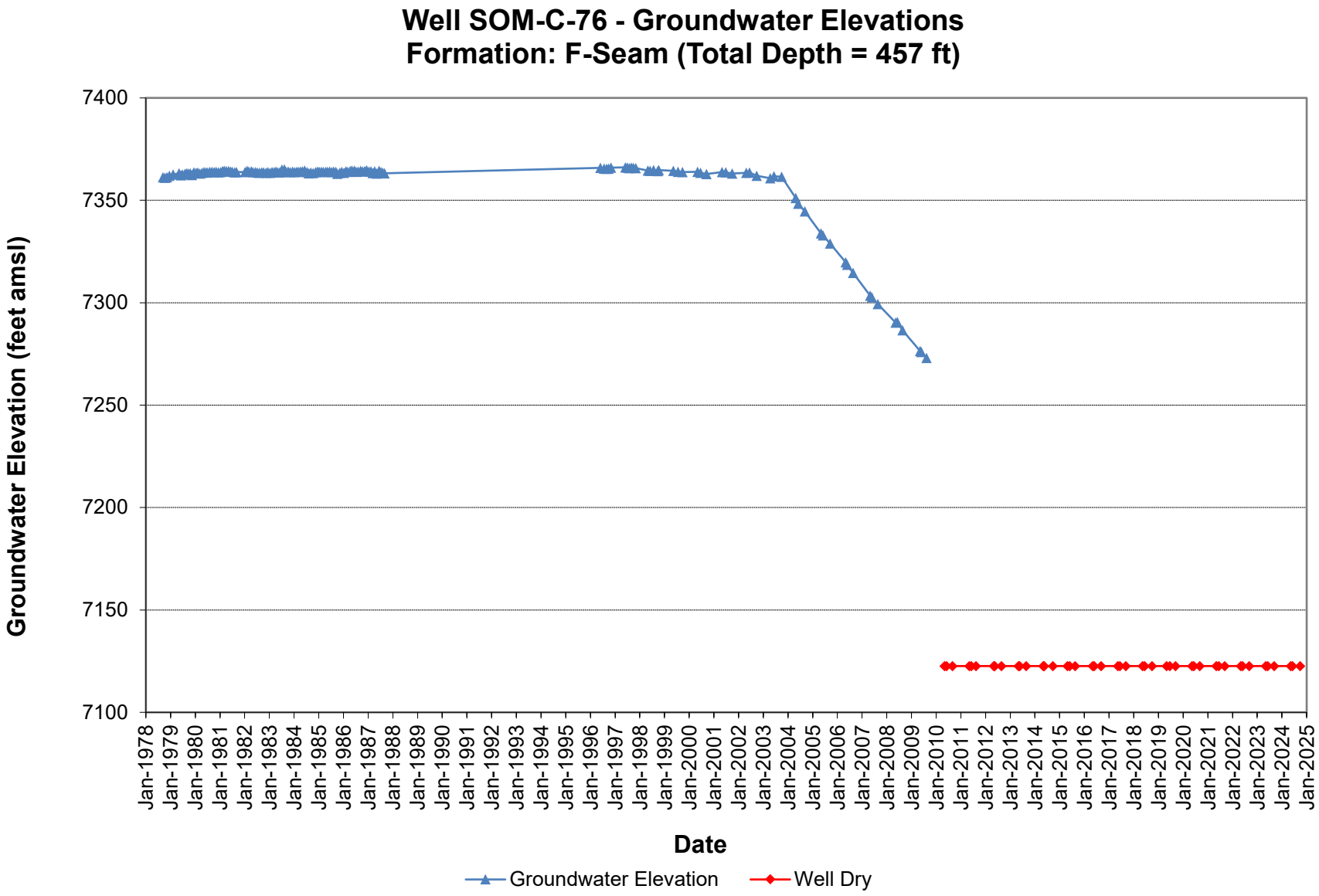

Upper Dry Fork Alluvial Well - Groundwater Elevations
Formation: Alluvium (Total Depth = 29 ft)
Groundwater Elevation (feet amsl)
8088
8086
8084
8082
8080
8078
8076
8074
8072
Continuous water level logger installed 10/2/2006
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date

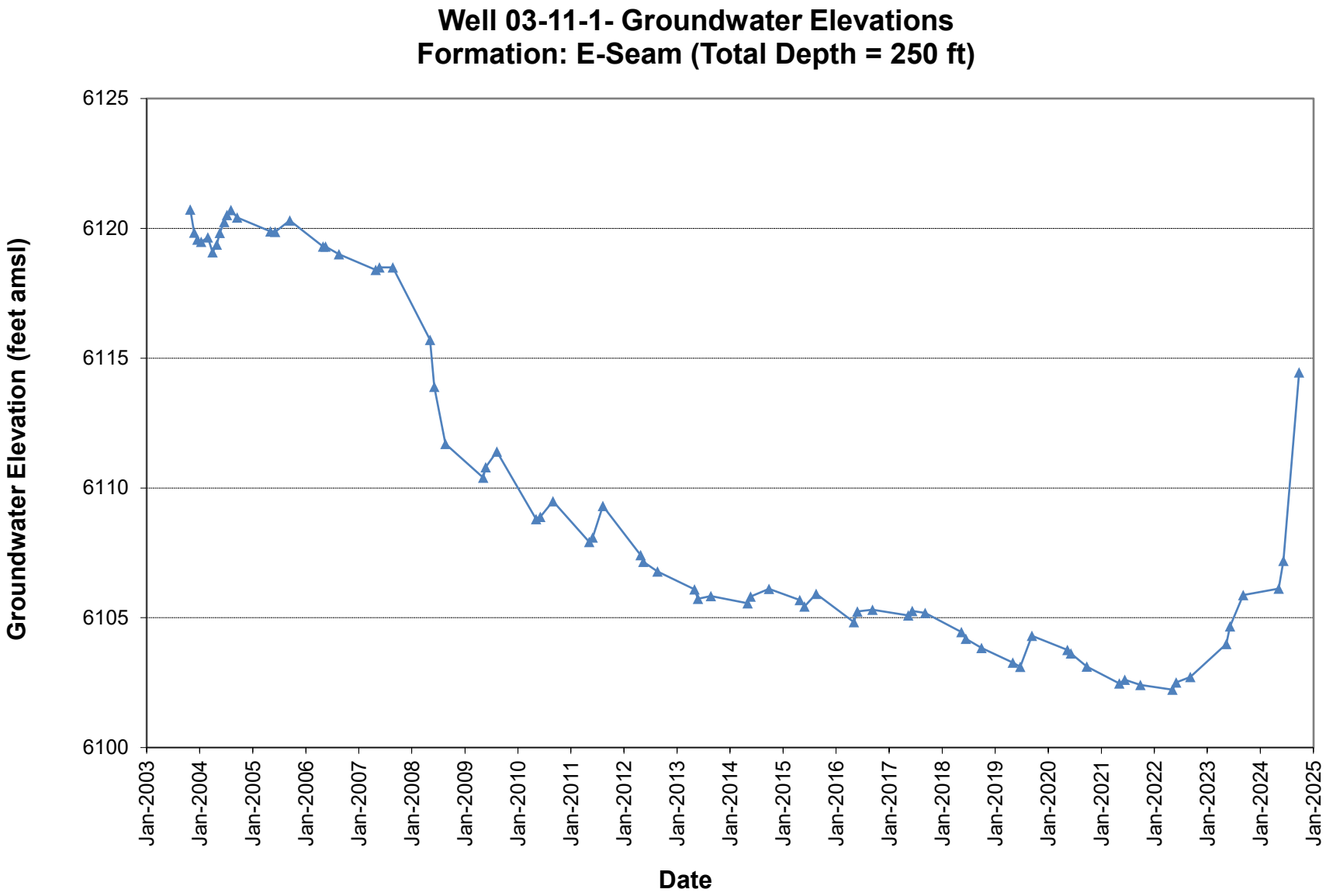

Lower Dry Fork Alluvial Well - Groundwater Elevations
Formation: Alluvium (Total Depth = 22.5 ft)
Groundwater Elevation (feet amsl)
7640
7635
7630
7625
7620
7615
Continuous water level logger installed 10/2/2006
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date


Well SOM-80 - Groundwater Elevations
Formation: Barren Member (Total Depth = 142.5 ft)
Groundwater Elevation (feet amsl)
6775
6773
6771
6769
6767
6765
6763
6761
6759
6757
6755
Jan-1978
Jan-1979
Jan-1980
Jan-1981
Jan-1982
Jan-1983
Jan-1984
Jan-1985
Jan-1986
Jan-1987
Jan-1988
Jan-1989
Jan-1990
Jan-1991
Jan-1992
Jan-1993
Jan-1994
Jan-1995
Jan-1996
Jan-1997
Jan-1998
Jan-1999
Jan-2000
Jan-2001
Jan-2002
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date

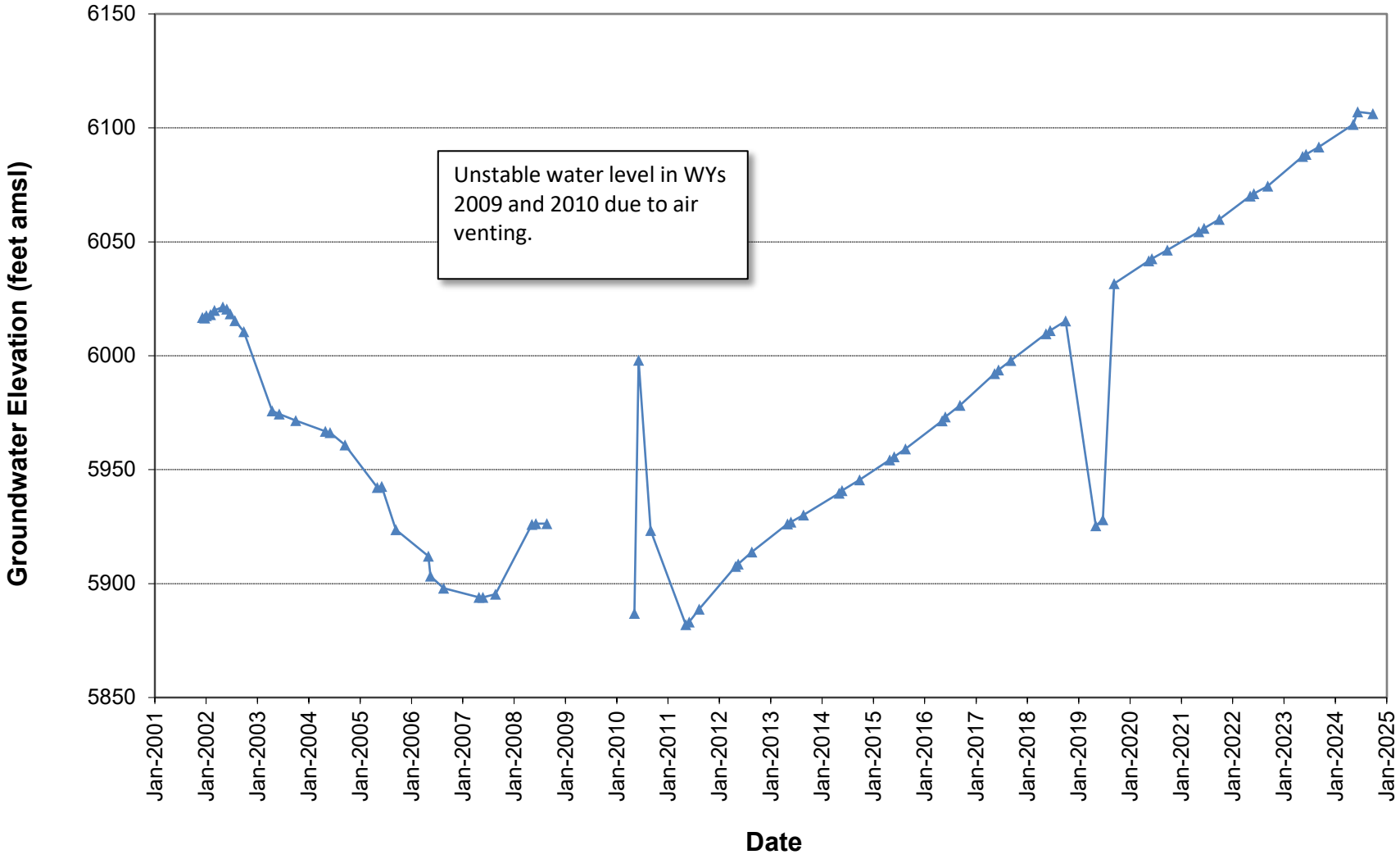
Well SOM-45-H-1 - Groundwater Elevations
Formation: Barren Member (Total Depth = 260 ft)




Well SOM-C-76 - Groundwater Elevations
Formation: F-Seam (Total Depth = 457 ft)
Groundwater Elevation (feet amsl)
7400
7350
7300
7250
7200
7150
7100
Jan-1978
Jan-1979
Jan-1980
Jan-1981
Jan-1982
Jan-1983
Jan-1984
Jan-1985
Jan-1986
Jan-1987
Jan-1988
Jan-1989
Jan-1990
Jan-1991
Jan-1992
Jan-1993
Jan-1994
Jan-1995
Jan-1996
Jan-1997
Jan-1998
Jan-1999
Jan-2000
Jan-2001
Jan-2002
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date
Groundwater Elevation
Well Dry


Well 03-11-1- Groundwater Elevations
Formation: E-Seam (Total Depth = 250 ft)
Groundwater Elevation (feet amsl)
6125
6120
6115
6110
6105
6100
Jan-2003
Jan-2004
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Jan-2022
Jan-2023
Jan-2024
Jan-2025
Date

Well 01-11-1 - Groundwater Elevations
Formation: B-Seam (Total Depth = 638 ft)



APPENDIX G

WELLS - LABORATORY AND FIELD WATER QUALITY DATA

Well GP-3
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Well GP-3		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024
Field Parameters							
Water Level Depth	feet				dry	dry	dry
pH (Field)	SU						
Conductivity (Field)	µmhos/cm						
Temperature (Field- F)	°F						
Temperature (Field)	°C						
Comment							
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Conductivity @25C	µmhos/cm						
Iron, dissolved	mg/L						
Iron, total	mg/L						
pH	SU						
Residue, Filterable (TDS) @180C	mg/L						
Residue, Non-Filterable (TSS) @105C	mg/L						

[1] No baseline data.

Well GP-4
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Well GP-4		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024
Field Parameters							
Water Level Depth	feet				31.70	31.70	31.65
pH (Field)	SU						
Conductivity (Field)	µmhos/cm						
Temperature (Field- F)	°F						
Temperature (Field)	°C						
Comment					Not enough water for sample.	Not enough water for sample.	Not enough water for sample.
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Conductivity @25C	µmhos/cm						
Iron, dissolved	mg/L						
Iron, total	mg/L						
pH	SU						
Residue, Filterable (TDS) @180C	mg/L						
Residue, Non-Filterable (TSS) @105C	mg/L						

[1] No baseline data.

Well GP-6
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024										
Monitoring Location Well GP-6		**Baseline [1]**			**Water Year 2024**					
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024	Q[4]	9/24/2024 (Duplicate)	Q[4]
Field Parameters										
Water Level Depth	feet				47.45	49.12	57.13		--	
pH (Field)	SU				6.82	6.70	7.06		--	
Conductivity (Field)	µmhos/cm				1,236	1,249	1,264		--	
Temperature (Field)	°C				10.6	13.5	12.9		--	
Comment										
Laboratory Parameters [2]										
Name of Certified Lab [3]							ACZ		ACZ	
Lab Reference #							L90504-06		L90504-05	
Sample Date							9/24/2024		9/24/2024	
Lab Test Date							9/27-10/8		9/27-10/8	
Sampled By							PH		PH	
Conductivity @25C	µmhos/cm						1,230		1,230	
Iron, dissolved	mg/L						-0.06	U	-0.06	U
Iron, total	mg/L						0.357		0.379	
pH	SU						7.4	H	7.3	H
Residue, Filterable (TDS) @180C	mg/L						732		720	
Residue, Non-Filterable (TSS) @105C	mg/L						7	B	8	B

[1] No baseline data.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Well GP-7
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Well GP-7		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024	Q[4]
Field Parameters								
Water Level Depth	feet				46.83	48.58	55.92	
pH (Field)	SU				6.44	6.27	--	
Conductivity (Field)	µmhos/cm				1,581	1,602	--	
Temperature (Field)	°C				10.4	12.3	--	
Comment							Not enough water for sample.	
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Conductivity @25C	µmhos/cm							
Iron, dissolved	mg/L							
Iron, total	mg/L							
pH	SU							
Residue, Filterable (TDS) @180C	mg/L							
Residue, Non-Filterable (TSS) @105C	mg/L							

[1] No baseline data.

[2] ACZ Laboratory, Steamboat Springs, CO.

[3] Negative values denote readings below lab detection levels.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Well RPE-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Well RPE-1		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024
Field Parameters							
Water Level Depth	feet				29.38	29.34	29.38
pH (Field)	SU						
Conductivity (Field)	µmhos/cm						
Temperature (Field)	°C						
Comment					Not enough water for sample.	Not enough water for sample.	Not enough water for sample.
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Conductivity @25C	µmhos/cm						
Iron, dissolved	mg/L						
Iron, total	mg/L						
pH	SU						
Residue, Filterable (TDS) @180C	mg/L						
Residue, Non-Filterable (TSS) @105C	mg/L						

[1] No baseline data.

Well RPE-7
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Well RPE-7		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024
Field Parameters							
Water Level Depth	feet				34.41	34.38	34.39
pH (Field)	SU						
Conductivity (Field)	µmhos/cm						
Temperature (Field)	°C						
Comment					Not enough water for sample.	Not enough water for sample.	Not enough water for sample.
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Conductivity @25C	µmhos/cm						
Iron, dissolved	mg/L						
Iron, total	mg/L						
pH	SU						
Residue, Filterable (TDS) @180C	mg/L						
Residue, Non-Filterable (TSS) @105C	mg/L						

[1] No baseline data.

Upper Dry Fork Alluvial Well
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Upper Dry Fk Alluvial Well		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	9/30/2024	Q[4]
Field Parameters								
Water Level Depth	feet				14.96	14.96	14.86	
pH (Field)	SU				7.28	6.71	7.29	
Conductivity (Field)	µmhos/cm				779	816	815	
Temperature (Field)	°C				10.5	10.4	10.7	
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]							ACZ	
Lab Reference #							L90651-01	
Sample Date							9/30/2024	
Lab Test Date							10/4-10/11	
Sampled By							PH	
Alkalinity (Total CaCO3)	mg/L	227	266	248				
Arsenic, dissolved	mg/L	-0.0005	0.0006	0.0002				
Bicarbonate as CaCO3	mg/L	227	266	248				
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005				
Calcium, dissolved	mg/L	3.2	5.1	3.7				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	%	0.9	3.9	1.9				
Chloride	mg/L	-1	6	4				
Conductivity @25C	µmhos/cm	493	509	503			783	
Hardness as CaCO3	mg/L	10	16	12				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.03	0.49	0.19			-0.06	U
Iron, total	mg/L	1.3	25.9	13.6			0.221	
Lead, dissolved	mg/L	-0.04	-0.04	-0.04				
Magnesium, dissolved	mg/L	-0.2	0.7	0.4				
Manganese, dissolved	mg/L	0.067	0.101	0.081				
Manganese, total	mg/L	0.109	0.349	0.229				
Mercury, dissolved	mg/L	-0.0002	0.0015	0.0002				
Nitrate/Nitrite (as N)	mg/L	0.04	0.87	0.16				
Nitrogen, ammonia	mg/L	-0.05	0.20	0.10				
pH	SU	8.0	8.1	8.0			6.7	H
Phosphate	mg/L	0.1	0.4	0.2				
Phosphorus, ortho dissolved	mg/L	0.03	0.13	0.06				
Potassium, dissolved	mg/L	0.9	2.7	1.8				
Residue, Filterable (TDS) @180C	mg/L	290	390	326			478	
Residue, Non-Filterable (TSS) @105C	mg/L						-5	U
Selenium, dissolved	mg/L	-0.0010	0.0003	0.0003				
Sodium Absorption Ratio (SAR)	calc.	16	17	17				
Sodium, dissolved	mg/L	113	144	126				
Sulfate	mg/L	30	50	35				
Sum of Anions	meq/L	5.6	6.2	5.8				
Sum of Cations	meq/L	5.7	6.7	6.0				
TDS (calculated)	calc.	313	313	313				
TDS (ratio - measured/calculated)	mg/L	1	1	1				
Zinc, dissolved	mg/L	-0.01	0.04	0.02				

[1] Baseline 2004.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Lower Dry Fork Alluvial Well
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024										
Monitoring Location: Lower Dry Fk Alluvial Well		**Baseline [1]**			**Water Year 2024**					
Description	Units	Minimum	Maximum	Mean [5]	5/11/2024	6/7/2024	9/30/2024	Q[4]	9/30/2024 (Duplicate)	Q[4]
Field Parameters										
Water Level Depth	feet	4.19	7.90	6.27	4.05	6.10	6.02		--	
pH (Field)	SU	6.60	7.10	6.87	7.23	6.94	6.99		--	
Conductivity (Field)	µmhos/cm	575	693	626	547	529	538		--	
Temperature (Field)	°C	6.4	16.4	10.3	8.1	11.0	14.9		--	
Comment										
Laboratory Parameters [2]										
Name of Certified Lab [3]							ACZ		ACZ	
Lab Reference #							L90651-02		L90651-03	
Sample Date							9/30/2024		9/30/2024	
Lab Test Date							10/4-10/11		10/4-10/11	
Sampled By							PH		PH	
Alkalinity (Total CaCO3)	mg/L	260	300	272						
Arsenic, dissolved	mg/L	-0.0005	0.0004	0.0003						
Bicarbonate as CaCO3	mg/L	260	300	272						
Cadmium, dissolved	mg/L	-0.005	-0.005	-0.005						
Calcium, dissolved	mg/L	38.5	62.6	53.4						
Carbonate as CaCO3	mg/L	-2	-2	-2						
Cation - Anion Balance	%	0.9	3.3	1.7						
Chloride	mg/L	-1	3	2						
Conductivity @25C	µmhos/cm	459	497	482			514		514	
Hardness as CaCO3	mg/L	186	208	200						
Hydroxide as CaCO3	mg/L	-2	-2	-2						
Iron, dissolved	mg/L	-0.01	0.83	0.15			-0.06	U	-0.06	U
Iron, total	mg/L	0.08	0.51	0.26			0.102	B	0.078	B
Lead, dissolved	mg/L	-0.04	-0.04	-0.04						
Magnesium, dissolved	mg/L	10.2	16.0	13.8						
Manganese, dissolved	mg/L	-0.01	1.96	0.37						
Manganese, total	mg/L	1.13	2.48	1.72						
Mercury, dissolved	mg/L	-0.0002	0.0014	0.0002						
Nitrate/Nitrite (as N)	mg/L	-0.02	0.71	0.13						
Nitrogen, ammonia	mg/L	-0.05	0.09	0.044						
pH	SU	7.8	8.0	7.9			6.9	H	7.2	H
Phosphate	mg/L	-0.030	0.030	0.02						
Phosphorus, ortho dissolved	mg/L	-0.05	0.01	0.01						
Potassium, dissolved	mg/L	2.0	3.1	2.5						
Residue, Filterable (TDS) @180C	mg/L	250	310	297			288		298	
Residue, Non-Filterable (TSS) @105C	mg/L						9.0	B	6.0	B
Selenium, dissolved	mg/L	-0.0010	0.0001	0.0003						
Sodium Absorption Ratio (SAR)	calc.	1.18	1.45	1.32						
Sodium, dissolved	mg/L	35	46	41						
Sulfate	mg/L	20	20	20						
Sum of Anions	meq/L	5.8	5.8	5.8						
Sum of Cations	meq/L	5.9	6.2	6.0						
Zinc, dissolved	mg/L	-0.01	0.03	0.02						

[1] Baseline 2004.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated ...

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Well SOM-80
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Well SOM-80		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	9/30/2024	Q[4]
Field Parameters								
Water Level Depth	feet				94.62	94.56	94.93	
pH (Field)	SU				6.69	7.12	7.03	
Conductivity (Field)	µmhos/cm				1,177	1,190	1,219	
Temperature (Field)	°C				10.5	11.2	10.9	
Comment								
Laboratory Parameters [2]					.			
Name of Certified Lab [3]							ACZ	
Lab Reference #							L90651-04	
Sample Date							9/30/2024	
Lab Test Date							10/4-10/11	
Sampled By							PH	
Ammonia	mg/L	0	1.73	0.51				
Arsenic, dissolved	mg/L	0	0	0				
Bicarbonate as CaCO3	mg/L	213	641	443				
Cadmium, dissolved	mg/L	0	0	0				
Calcium, dissolved	mg/L	60.2	60.2	60.2				
Chloride	mg/L	3	17	7				
Conductivity @25C	µmhos/cm	886	897	892			1,210	
Hardness as CaCO3	mg/L	45	754	389				
Iron, dissolved	mg/L	0	0.82	0.15			-0.06	U
Iron, total	mg/L	0	6.8	0.71			0.956	
Lead, dissolved	mg/L	0	0	0				
Magnesium, dissolved	mg/L	17.6	17.6	17.6				
Manganese, dissolved	mg/L	0.005	0.01	0.008				
Manganese, total	mg/L	0	0.557	0.066				
Mercury, dissolved	mg/L	0	0	0				
Nitrate/Nitrite (as N)	mg/L	0.24	0.49	0.33				
pH	SU	6.7	8.1	7.4			7.4	H
Phosphorus, ortho dissolved	mg/L	0	0.3	0.049				
Residue, Filterable (TDS) @180C	mg/L	26.8	1,888	868			742	
Residue, Non-Filterable (TSS) @105C	mg/L						31.0	
Selenium, dissolved	mg/L	0	0	0				
Sodium Absorption Ratio (SAR)	calc.	1.94	5.22	2.91				
Sodium, dissolved	mg/L	129	129	129				
Sulfate	mg/L	70	984	515				
Zinc, dissolved	mg/L	0.02	0.02	0.02				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Well SOM-45-H-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Well SOM-45-H-1		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/8/2024	9/28/2024	Q[4]
Field Parameters								
Water Level Depth	feet				241.01	243.52	--	
pH (Field)	SU	6.4	8.6	7.7	7.38	--	--	
Conductivity (Field)	µmhos/cm	1,073	1,626	1,285	1,148	--	--	
Temperature (Field)	°C				11.3	--	--	
Comment						Bailer stuck at 150 ft. Casing Damage?	Sounder stuck at 150 ft. Casing Damage?	
Laboratory Parameters [2]								
Name of Certified Lab [3]								
Lab Reference #								
Sample Date								
Lab Test Date								
Sampled By								
Alkalinity (Total CaCO3)	mg/L	286	955	635				
Ammonia	mg/L	0.03	2.35	0.69				
Arsenic, dissolved	mg/L	0	0.002	0.001				
Bicarbonate as CaCO3	mg/L	0	1156	455				
Cadmium, dissolved	mg/L	0	0	0				
Calcium, dissolved	mg/L	4	6.9	5.6				
Carbonate as CaCO3	mg/L	0	218	17				
Cation - Anion Balance	%	-5.4	3.8	-0.2				
Chloride	mg/L	2	10	8				
Conductivity @25C	µmhos/cm	1,310	1,390	1,350				
Hardness as CaCO3	mg/L	15	882	215				
Hydroxide as CaCO3	mg/L	0	0	0				
Iron, dissolved	mg/L	0	0.86	0.25				
Iron, total	mg/L	0.35	6.15	1.96				
Lead, dissolved	mg/L	0	0	0				
Magnesium, dissolved	mg/L	1.3	5	2.1				
Manganese, dissolved	mg/L	0.034	0.064	0.048				
Manganese, total	mg/L	0.014	0.39	0.131				
Mercury, dissolved	mg/L	0	0	0				
Nitrate/Nitrite (as N)	mg/L	0	0.04	0.01				
Nitrogen, ammonia	mg/L	0.1	1.04	0.61				
pH	SU	7	8.2	7.6				
Phosphate	mg/L	0.39	0.42	0.41				
Phosphorus, ortho dissolved	mg/L	0	0.535	0.074				
Potassium, dissolved	mg/L	2	2.5	2.3				
Residue, Filterable (TDS) @180C	mg/L							
Residue, Non-Filterable (TSS) @105C	mg/L							
Selenium, dissolved	mg/L	0	0	0				
Sodium Absorption Ratio (SAR)	calc.	14.9	37.9	32				
Sodium, dissolved	mg/L	308	385	352				
Sulfate	mg/L	20	526	161				
Sum of Anions	meq/L	15	15.5	15.3				
Sum of Cations	meq/L	13.9	16.4	15.3				
Zinc, dissolved	mg/L	0	0.02	0.01				

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Well SOM-C-76
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: Well SOM-C-76		**Baseline [1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean [2]	5/11/2024	6/7/2024	9/28/2024
Field Parameters							
Water Level Depth	feet				dry	dry	dry
pH (Field)	SU	5.2	8.2	9.3			
Conductivity (Field)	µmhos/cm	1,910	2,500	2,970			
Temperature (Field)	°C						
Comment							
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Alkalinity (Total CaCO3)	mg/L	1,294	1,503	1,860			
Ammonia	mg/L	0.00	0.64	1.36			
Arsenic, dissolved	mg/L	0.000	0.000	0.001			
Bicarbonate as CaCO3	mg/L	41	1,181	1,894			
Cadmium, dissolved	mg/L	0.000	0.000	0.000			
Calcium, dissolved	mg/L	1.6	2.0	2.3			
Carbonate as CaCO3	mg/L	0	30	186			
Cation - Anion Balance	%	-3.3	-0.45	3.0			
Chloride	mg/L	0	4	17			
Conductivity @25C	µmhos/cm	2,300	2,487	2,650			
Hardness as CaCO3	mg/L	6	15	43			
Hydroxide as CaCO3	mg/L	0	0	0			
Iron, dissolved	mg/L	0.00	0.13	1.00			
Iron, total	mg/L	0.00	5.01	18.00			
Lead, dissolved	mg/L	0.00	0.00	0.00			
Magnesium, dissolved	mg/L	0.6	0.8	1.5			
Manganese, dissolved	mg/L	0.000	0.005	0.016			
Manganese, total	mg/L	0.000	0.017	0.145			
Mercury, dissolved	mg/L	0.0000	0.0000	0.0000			
Nitrate/Nitrite (as N)	mg/L	0.00	0.16	2.16			
Nitrogen, ammonia	mg/L	0.57	0.65	0.73			
pH	SU	7.9	8.4	9.3			
Phosphate	mg/L	0.06	0.06	0.06			
Phosphorus, ortho dissolved	mg/L	0.000	0.068	1.26			
Potassium, dissolved	mg/L	3.6	3.9	4.2			
Residue, Filterable (TDS) @180C	mg/L	1,530	1,642	2,590			
Residue, Non-Filterable (TSS) @105C	mg/L	7	37	226			
Selenium, dissolved	mg/L	0.000	0.000	0.000			
Sodium Absorption Ratio (SAR)	calc.	46.1	102.7	128.6			
Sodium, dissolved	mg/L	658	700	756			
Sulfate	mg/L	0	9	180			
Sum of Anions	meq/L	29.6	30.88	32.71			
Sum of Cations	meq/L	29.30	30.53	31.50			
Zinc, dissolved	mg/L	0.00	0.00	0.01			

[1] Baseline and WY 2000 data adapted from WWE (2001).

[2] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

Well 03-11-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Well 03-11-1		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/7/2024	6/8/2024	9/24/2024	Q[4]
Field Parameters								
Water Level Depth	feet				174.88	173.81	166.55	
pH (Field)	SU				7.21	7.62	6.98	
Conductivity (Field)	µmhos/cm				3,350	3,180	3,280	
Temperature (Field)	°C				14.2	14.9	12.5	
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]							ACZ	
Lab Reference #							L90504-04	
Sample Date							9/24/2024	
Lab Test Date							9/27-10/8	
Sampled By							PH	
Alkalinity (Total CaCO3)	mg/L	1,620	1,950	1,802				
Arsenic, dissolved	mg/L	-0.0030	0.0010	-0.0007				
Bicarbonate as CaCO3	mg/L	1,620	1,950	1,802				
Cadmium, dissolved	mg/L	-0.010	-0.005	-0.008				
Calcium, dissolved	mg/L	5.3	12.5	8.1				
Carbonate as CaCO3	mg/L	-2	-2	-2				
Cation - Anion Balance	%	-3.8	-2.5	-3.2				
Chloride	mg/L	66	177	89				
Conductivity @25C	µmhos/cm	2,660	2,730	2,695			3,080	
Hardness as CaCO3	mg/L	35	38	37				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	0.02	0.82	0.31			0.304	
Iron, total	mg/L	0.30	0.49	0.40			0.71	
Magnesium, dissolved	mg/L	1.2	3.0	1.8				
Manganese, dissolved	mg/L	0.03	0.14	0.07				
Manganese, total	mg/L	0.14	0.15	0.15				
Mercury, dissolved	mg/L	-0.0002	0.0006	0.0002				
Nitrate (as N), dissolved	mg/L	0.03	0.21	0.10				
Nitrate/Nitrite (as N)	mg/L	-0.02	0.21	0.07				
Nitrite (as N), dissolved	mg/L	0.06	0.06	0.06				
Nitrogen, ammonia	mg/L	0.73	0.92	0.82				
pH	SU	8.1	8.3	8.2			7.7	H
Phosphate	mg/L	-0.03	0.09	0.01				
Phosphorus, ortho dissolved	mg/L	-0.01	0.03	-0.01				
Potassium, dissolved	mg/L	4.0	4.1	4.1				
Residue, Filterable (TDS) @180C	mg/L	1,850	2,130	2,044			1,950	
Residue, Non-Filterable (TSS) @105C	mg/L						14.0	B
Selenium, dissolved	mg/L	-0.0050	0.0030	-0.0010				
Sodium Absorption Ratio (SAR)	calc.	52.6	54.5	53.6				
Sodium, dissolved	mg/L	723	1,780	878				
Sulfate	mg/L	-10	40	1				
Sum of Anions	meq/L	35	36	35				
Sum of Cations	meq/L	33.0	33.4	33.2				
Zinc, dissolved	mg/L	-0.02	0.21	0.05				

[1] Baseline 2004.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.

H - Holding time exceeded; pH is a field test with an immediate hold time.

B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

˜ Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit

Shaded cells indicate parameters elevated greater than ten percent above the maximum baseline value.

Well 01-11-1
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: Well 01-11-1		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean [5]	5/7/2024	6/8/2024	9/24/2024	Q[4]
Field Parameters								
Water Level Depth	feet	259.85	295.39	268.40	179.84	174.27	175.04	
pH (Field)	SU	9.10	9.71	9.37	7.62	7.48	7.19	
Conductivity (Field)	µmhos/cm	5,010	6,820	5,880	4,210	4,110	4,260	
Temperature (Field)	°C	9.8	20.2	15.6	15.9	15.4	13.3	
Comment								
Laboratory Parameters [2]								
Name of Certified Lab [3]							ACZ	
Lab Reference #							L90504-07	
Sample Date							9/24/2024	
Lab Test Date							9/27-10/8	
Sampled By							PH	
Alkalinity (Total CaCO3)	mg/L	629	1,880	1,602				
Ammonia	mg/L	0.79	1.56	1.08				
Arsenic, dissolved	mg/L	-0.005	0.003	-0.001				
Bicarbonate as CaCO3	mg/L	522	1300	768				
Boron, dissolved	mg/L	1.11	1.25	1.18				
Cadmium, dissolved	mg/L	-0.0100	-0.0002	-0.0055				
Calcium, dissolved	mg/L	1.3	6.3	3.3				
Carbonate as CaCO3	mg/L	389	1360	1075				
Cation - Anion Balance	%	-10.4	1.7	-4.6				
Chloride	mg/L	527	640	603				
Conductivity @25C	µmhos/cm	4,060	5,740	5,115			4,010	
Hardness as CaCO3	mg/L	3	32	12				
Hydroxide as CaCO3	mg/L	-2	-2	-2				
Iron, dissolved	mg/L	-0.05	0.23	0.09			-0.12	U
Iron, total	mg/L	0.16	0.99	0.57			0.154	B
Lead, dissolved	mg/L	-0.080	0.081	-0.040				
Magnesium, dissolved	mg/L	-0.4	4.1	0.8				
Manganese, dissolved	mg/L	-0.01	0.05	0.01				
Manganese, total	mg/L	-0.010	0.030	0.003				
Mercury, total	mg/L	-0.00020	0.00040	-0.00003				
Nitrate/Nitrite (as N)	mg/L	-0.02	2.78	0.53				
Nitrogen, ammonia	mg/L	2.21	4.09	3.17				
pH	SU	9.4	10.1	9.8			7.9	H
Phosphate	mg/L	-0.03	0.16	0.09				
Phosphorus, ortho dissolved	mg/L	0.009	0.052	0.034				
Potassium, dissolved	mg/L	159	291	217				
Residue, Filterable (TDS) @180C	mg/L	2,910	3,300	3,180			2,560	
Residue, Non-Filterable (TSS) @105C	mg/L						-5.0	U
Selenium, dissolved	mg/L	-0.001	0.002	-0.001				
Sodium Absorption Ratio (SAR)	calc.	72.6	212.0	150.5				
Sodium, dissolved	mg/L	816	1,080	942				
Sulfate	mg/L	40	50	48				
Sum of Anions	meq/L	51.1	56.6	53.7				
Sum of Cations	meq/L	43.4	54.0	47.7				
TDS (calculated)	calc.	2,900	3,430	3,165				
TDS (ratio - measured/calculated)	mg/L	0.91	1.00	0.96				
Zinc, dissolved	mg/L	0.18	8.89	1.78				

[1] Baseline WY 2004.

[2] Negative values denote readings below lab detection levels.

[3] ACZ Laboratory, Steamboat Springs, CO.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Average (mean) value calc using 1/2 of detection limit for readings below lab detection limits unless all readings are below lab detection limit.

APPENDIX H

MINE WATER – LABORATORY AND FIELD WATER QUALITY DATA

LRP Underdrain
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024							
Monitoring Location: LRP Underdrain		**Baseline[1]**			**Water Year 2024**		
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024
Field Parameters							
Flow	gpm				dry	dry	dry
Electrical Conductivity	mmhos/cm						
pH	SU						
Temperature (°C)	°C						
Comment							
Laboratory Parameters							
Name of Certified Lab							
Lab Reference #							
Sample Date							
Lab Test Date							
Sampled By							
Alkalinity (Total CaCO3)	mg/l						
Aluminum, dissolved	mg/l						
Arsenic, total	mg/l						
Bicarbonate as CaCO3	mg/l						
Boron, dissolved	mg/l						
Calcium, dissolved	mg/l						
Carbonate as CaCO3	mg/l						
Cation - Anion Balance	%						
Chloride	mg/l						
Conductivity @25C	µmhos/cm						
Copper, dissolved	mg/l						
Hardness as CaCO3	mg/l						
Hydroxide as CaCO3	mg/l						
Iron, dissolved	mg/l						
Iron, total	mg/l						
Lead, dissolved	mg/l						
Magnesium, dissolved	mg/l						
Manganese, dissolved	mg/l						
Manganese, total	mg/l						
Mercury, total	mg/l						
Molybdenum, dissolved	mg/l						
Nitrate/Nitrite (as N)	mg/l						
pH	SU						
Phosphate	mg/l						
Phosphorus, ortho dissolved	mg/l						
Potassium, dissolved	mg/l						
Residue, Filterable (TDS) @180C	mg/l						
Selenium, total	mg/l						
Sodium Absorption Ratio (SAR)	calc.						
Sodium, dissolved	mg/l						
Sulfate	mg/l						
Sum of Anions	meq/l						
Sum of Cations	meq/l						
TDS (calculated)	calc.						
TDS (ratio - measured/calculated)	mg/l						
Zinc, dissolved	mg/l						

[1] No baseline data.

RPE Grate
Water Quality and Field Parameters

Mountain Coal West Elk Mine - Water Year 2024								
Monitoring Location: RPE Underdrain		**Baseline [1]**			**Water Year 2024**			
Description	Units	Minimum	Maximum	Mean	5/8/2024	6/11/2024	9/24/2024	Q[4]
Field Parameters								
Flow [5]	gpm				0.3	0.5	0.5	
pH (Field)	SU				7.45	7.34	7.12	
Conductivity (Field)	µmhos/cm				5,300	5,340	5,720	
Temperature (Field)	°C				7.3	17.2	14.3	
Comment								
Laboratory Parameters [3]								
Name of Certified Lab [2]							ACZ	
Lab Reference #							L90504-03	
Sample Date							9/24/2024	
Lab Test Date							9/27-10/14	
Sampled By							PH	
Alkalinity (Total CaCO3)	mg/L						448	
Aluminum, dissolved	mg/L						-0.14	U
Arsenic, total	mg/L						0.00167	B
Bicarbonate as CaCO3	mg/L						448	
Boron, dissolved	mg/L						0.908	
Cadmium, dissolved	mg/L						-0.016	U
Calcium, dissolved	mg/L						105	
Carbonate as CaCO3	mg/L						-2	U
Cation-Anion Balance	%						-1.8	
Chloride	mg/L						989	
Conductivity @25C	umhos/cm						5,340	
Copper, dissolved	mg/L						-0.02	U
Hardness as CaCO3 (dissolved)	mg/L						398	
Hydroxide as CaCO3	mg/L						-2	U
Iron, dissolved	mg/L						-0.12	U
Iron, total	mg/L						-0.12	U
Lead, dissolved	mg/L						-0.06	U
Magnesium, dissolved	mg/L						32.9	
Manganese, dissolved	mg/L						-0.02	U
Manganese, total	mg/L						-0.02	U
Mercury, total	mg/L						-0.0002	U
Molybdenum, dissolved	mg/L						0.064	B
Nitrate/Nitrite as N	mg/L						2.3	
pH	units						7	H
Phosphate	mg/L						0.0558	B
Phosphorus, ortho dissolved	mg/L						0.018	BH
Potassium, dissolved	mg/L						15.8	
Residue, Filterable (TDS) @180C	mg/L						3,400	
Selenium, total	mg/L						0.00511	
Sodium Adsorption Ratio in Water	calc.						23	
Sodium, dissolved	mg/L						1,030	
Sulfate	mg/L						902	
Sum of Anions	meq/L						56	
Sum of Cations	meq/L						54	
TDS (calculated)	mg/L						3,350	
TDS (ratio - measured/calculated)	calc.						1.01	
Zinc, dissolved	mg/L						0.094	B

[1] No baseline data.

[2] ACZ Laboratory, Steamboat Springs, CO.

[3] Negative values denote readings below lab detection levels.

[4] ACZ Lab Qualifiers: U - Analyte was analyzed for but not detected at the indicated MDL.
H - Holding time exceeded; pH is a field test with an immediate hold time.
B - Analyte conc detected at a value between method detection limit (MDL) and practical quantitation limit (PQL). The associated value is an estimated quantity.

[5] Estimated flow.

APPENDIX I

SURFACE WATER - TEMPERATURE DATA

NFG-1
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	12.23	1.86	0.07	0.06	0.07	1.07	5.03	6.52	9.25	14.52	12.80	17.19
2	11.40	2.42	0.07	0.07	0.08	1.71	5.72	6.90	9.14	14.60	13.31	17.14
3	10.24	3.18	0.07	0.06	0.08	1.40	6.13	6.78	8.93	14.15	13.45	17.31
4	10.23	3.40	0.07	0.06	0.08	1.29	6.12	7.25	9.88	14.05	13.87	16.98
5	9.60	3.41	0.07	0.06	0.08	2.50	6.24	6.67	9.67	13.98	14.08	17.10
6	9.55	4.00	0.07	0.07	0.08	2.72	3.85	5.10	9.98	14.07	14.52	16.88
7	9.62	3.93	0.07	0.07	0.08	2.79	4.05	5.36	9.86	14.37	14.07	16.72
8	9.27	3.84	0.07	0.06	0.08	2.77	4.46	5.20	10.24	15.26	13.77	16.72
9	9.16	1.96	0.07	0.06	0.08	2.37	5.37	5.57	10.27	15.49	13.86	16.67
10	8.80	0.90	0.06	0.07	0.08	2.38	5.83	6.84	10.31	15.37	13.55	16.61
11	8.54	0.66	0.07	0.07	0.08	2.45	5.93	6.22	10.72	15.29	14.45	16.13
12	7.83	0.52	0.07	0.07	0.08	3.75	5.89	7.09	10.85	15.60	14.44	16.29
13	7.68	0.63	0.37	0.06	0.07	2.87	6.64	8.08	10.85	14.42	13.57	14.88
14	6.43	0.88	0.91	0.07	0.07	3.12	5.99	8.32	10.39	14.92	14.71	13.55
15	6.63	1.24	0.55	0.07	0.08	4.04	4.75	8.23	10.89	14.62	15.07	11.81
16	7.20	2.52	0.07	0.07	0.10	3.66	5.56	8.03	11.12	14.46	15.15	12.62
17	7.72	3.19	0.06	0.06	0.10	4.20	6.47	7.99	10.96	14.30	14.84	13.05
18	7.68	1.85	0.06	0.07	0.08	4.60	6.56	7.92	11.00	13.93	16.32	12.01
19	7.77	3.45	0.07	0.07	0.08	4.74	6.66	8.03	10.35	13.96	16.75	11.96
20	7.30	3.37	0.07	0.06	0.11	4.62	6.60	7.54	11.49	14.58	17.36	12.73
21	6.88	1.88	0.08	0.06	0.67	4.84	6.81	6.64	11.05	14.19	17.39	10.81
22	6.96	0.93	0.08	0.07	1.81	5.43	6.27	7.39	12.15	13.89	17.17	11.46
23	6.54	0.87	0.76	0.07	1.16	4.67	7.13	7.84	12.88	13.69	17.35	11.81
24	6.48	2.38	0.21	0.07	0.82	3.99	7.10	7.91	13.47	13.48	17.59	12.12
25	6.81	1.36	0.06	0.07	1.10	3.42	6.11	8.43	14.13	13.90	16.70	12.63
26	5.80	0.09	0.07	0.07	2.47	2.95	5.61	8.97	13.06	13.95	17.06	12.95
27	7.07	0.09	0.06	0.07	1.51	3.90	4.78	9.33	13.37	13.98	17.11	12.94
28	5.90	0.10	0.06	0.07	0.09	3.95	5.70	9.65	13.59	13.78	17.11	13.37
29	4.40	0.09	0.06	0.07	0.34	4.41	6.59	9.08	14.69	13.04	17.18	13.44
30	2.08	0.08	0.07	0.06	--	4.92	7.85	9.08	14.85	12.97	17.02	13.64
31	1.41	--	0.06	0.06	--	4.60	--	8.68	--	12.93	17.08	--

Mean	7.59	1.84	0.15	0.07	0.40	3.42	5.93	7.50	11.31	14.25	15.44	14.32
Min	1.41	0.08	0.06	0.06	0.07	1.07	3.85	5.10	8.93	12.93	12.80	10.81
Max	12.23	4.00	0.91	0.07	2.47	5.43	7.85	9.65	14.85	15.60	17.59	17.31

NFG-2
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	12.21	1.96	0.02	0.01	0.02	1.21	4.98	6.46	9.18	14.46	12.72	17.15
2	11.36	2.51	0.02	0.02	0.03	1.81	5.67	6.84	9.08	14.54	13.24	17.11
3	10.23	3.23	0.02	0.01	0.02	1.43	6.08	6.73	8.87	14.10	13.39	17.27
4	10.26	3.49	0.03	0.02	0.03	1.35	6.06	7.19	9.81	14.01	13.80	16.93
5	9.66	3.45	0.02	0.02	0.01	2.62	6.20	6.61	9.62	13.94	14.01	17.07
6	9.61	4.00	0.02	0.02	0.02	2.84	3.79	5.06	9.92	14.03	14.47	16.85
7	9.68	3.93	0.03	0.02	0.04	2.89	4.00	5.30	9.81	14.34	14.04	16.68
8	9.33	3.82	0.12	0.01	0.05	2.88	4.41	5.14	10.18	15.21	13.73	16.69
9	9.23	2.08	0.06	0.01	0.03	2.57	5.32	5.50	10.22	15.44	13.81	16.64
10	8.84	1.05	0.05	0.01	0.04	2.56	5.78	6.77	10.25	15.30	13.49	16.57
11	8.49	0.80	0.03	0.01	0.05	2.52	5.87	6.16	10.67	15.22	14.39	16.10
12	7.79	0.67	0.03	0.01	0.07	3.76	5.85	7.01	10.79	15.53	14.39	16.27
13	7.71	0.76	0.68	0.01	0.08	2.82	6.58	8.00	10.80	14.36	13.51	14.89
14	6.47	1.00	0.93	0.01	0.07	3.07	5.94	8.24	10.34	14.85	14.66	13.57
15	6.70	1.31	0.61	0.01	0.05	3.99	4.70	8.15	10.84	14.55	15.02	11.78
16	7.27	2.47	0.07	0.01	0.12	3.59	5.49	7.96	11.08	14.38	15.10	12.57
17	7.79	3.27	0.06	0.01	0.21	4.15	6.41	7.92	10.91	14.23	14.79	13.02
18	7.75	1.82	0.05	0.01	0.07	4.58	6.49	7.85	10.96	13.87	16.28	12.03
19	7.86	3.42	0.03	0.01	0.16	4.71	6.60	7.96	10.29	13.90	16.69	11.99
20	7.40	3.39	0.02	0.01	0.16	4.57	6.54	7.49	11.46	14.51	17.32	12.75
21	6.97	1.98	0.20	0.01	1.09	4.80	6.75	6.57	11.00	14.11	17.34	10.80
22	7.04	1.08	0.11	0.01	2.09	5.38	6.22	7.34	12.10	13.80	17.12	11.43
23	6.61	0.84	0.86	0.01	1.38	4.60	7.09	7.78	12.84	13.62	17.31	11.80
24	6.50	2.34	0.21	0.01	1.09	3.93	7.05	7.85	13.44	13.41	17.55	12.14
25	6.91	1.33	0.06	0.01	1.31	3.35	6.06	8.37	14.11	13.83	16.64	12.66
26	5.80	0.14	0.05	0.01	2.71	2.89	5.56	8.89	13.00	13.87	17.02	12.99
27	7.08	0.07	0.06	0.01	1.55	3.84	4.72	9.27	13.34	13.91	17.07	12.97
28	5.87	0.04	0.06	0.01	0.51	3.90	5.64	9.59	13.54	13.70	17.07	13.40
29	4.40	0.03	0.04	0.02	0.63	4.34	6.52	9.01	14.63	12.97	17.13	13.49
30	2.21	0.03	0.03	0.02	--	4.85	7.78	9.02	14.81	12.89	16.98	13.69
31	1.59	--	0.02	0.02	--	4.54	--	8.62	--	12.86	17.06	--

Mean	7.63	1.88	0.15	0.01	0.47	3.43	5.87	7.44	11.26	14.19	15.39	14.31
Min	1.59	0.03	0.02	0.01	0.01	1.21	3.79	5.06	8.87	12.86	12.72	10.80
Max	12.21	4.00	0.93	0.02	2.71	5.38	7.78	9.59	14.81	15.53	17.55	17.27

NFG-3
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	15.44	ND	0.03	0.02	0.06	1.32	5.09	6.57	9.28	14.59	12.99	17.22
2	10.92	ND	0.04	0.02	0.07	1.90	5.81	6.95	9.18	14.67	13.54	17.16
3	10.82	ND	0.04	0.02	0.04	1.57	6.25	6.84	8.96	14.19	13.66	17.32
4	11.85	ND	0.09	0.02	0.09	1.37	6.25	7.31	9.92	14.13	14.12	16.96
5	11.91	ND	0.07	0.02	0.03	2.70	6.37	6.70	9.70	14.06	14.36	17.13
6	12.59	ND	0.07	0.02	0.05	2.99	3.92	5.12	10.01	14.15	14.78	16.89
7	13.37	5.23	0.06	0.03	0.07	2.95	4.05	5.37	9.87	14.45	14.34	16.72
8	13.10	3.91	0.05	0.02	0.11	3.14	4.51	5.22	10.28	15.35	13.99	16.68
9	8.45	2.15	0.04	0.02	0.10	2.70	5.42	5.57	10.30	15.57	14.07	16.64
10	ND	1.08	0.03	0.02	0.13	2.68	5.90	6.86	10.34	15.53	13.74	16.59
11	ND	0.87	0.03	0.02	0.12	2.61	6.02	6.24	10.75	15.42	14.62	16.10
12	ND	0.74	0.03	0.02	0.11	3.94	5.98	7.13	10.89	15.77	14.69	16.32
13	ND	0.85	0.11	0.02	0.15	3.01	6.76	8.10	10.89	14.57	13.67	15.10
14	ND	1.08	0.73	0.02	0.11	3.16	6.06	8.38	10.43	15.10	14.84	13.71
15	ND	1.35	0.59	0.02	0.06	4.18	4.76	8.28	10.94	14.78	15.25	11.84
16	ND	2.53	0.05	0.02	0.14	3.79	5.56	8.06	11.18	14.62	15.31	12.65
17	ND	3.45	0.03	0.02	0.26	4.33	6.51	8.03	11.02	14.46	14.91	13.16
18	ND	1.86	0.03	0.02	0.03	4.82	6.61	7.96	11.06	14.09	16.48	12.21
19	ND	3.49	0.03	0.03	0.21	4.94	6.72	8.07	10.39	14.13	16.83	12.14
20	ND	3.33	0.03	0.03	0.18	4.82	6.65	7.58	11.53	14.80	17.48	12.94
21	ND	2.09	0.07	0.04	0.28	5.01	6.87	6.65	11.08	14.42	17.44	10.96
22	ND	1.13	0.06	0.04	1.90	5.59	6.30	7.39	12.19	14.06	17.18	11.51
23	ND	0.83	0.71	0.04	1.42	4.74	7.21	7.85	12.94	13.90	17.37	11.99
24	ND	2.35	0.16	0.05	1.19	4.07	7.17	7.92	13.54	13.67	17.62	12.31
25	ND	1.37	0.03	0.04	1.37	3.41	6.17	8.45	14.22	14.11	16.67	12.85
26	ND	0.13	0.03	0.04	2.87	2.94	5.64	8.99	13.14	14.16	17.10	13.17
27	ND	0.05	0.03	0.04	1.77	3.94	4.79	9.37	13.43	14.21	17.15	13.11
28	ND	0.04	0.03	0.05	0.44	3.99	5.73	9.69	13.67	14.00	17.10	13.63
29	ND	0.03	0.03	0.05	0.72	4.44	6.61	9.13	14.77	13.24	17.17	13.64
30	ND	0.04	0.03	0.06	--	4.94	7.91	9.11	14.96	13.16	16.99	13.88
31	ND	--	0.03	0.07	--	4.60	--	8.71	--	13.14	17.06	--

Mean	12.05	1.67	0.11	0.03	0.49	3.57	5.99	7.54	11.36	14.40	15.57	14.42
Min	8.45	0.03	0.03	0.02	0.03	1.32	3.92	5.12	8.96	13.14	12.99	10.96
Max	15.44	5.23	0.73	0.07	2.87	5.59	7.91	9.69	14.96	15.77	17.62	17.32

ND: No Data. Dead Logger Battery.

MCSG-2
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	9.50	ND	0.81	0.58	0.74	0.82	3.16	7.69	11.95	17.67	15.79	14.43
2	9.82	ND	0.96	0.50	0.56	1.16	3.24	7.57	12.03	17.66	16.36	14.22
3	9.34	ND	0.86	0.46	0.32	1.06	3.58	7.51	12.47	16.31	17.00	14.11
4	9.00	ND	0.85	0.61	0.43	0.91	4.07	7.93	13.40	15.86	17.64	13.99
5	8.56	ND	0.79	0.63	0.59	1.42	5.01	7.96	13.33	15.47	18.13	14.09
6	8.21	ND	0.85	0.63	0.60	2.05	3.58	6.94	13.88	15.22	18.33	13.70
7	7.86	4.64	0.97	0.69	0.54	1.95	3.11	6.72	13.67	15.30	17.89	13.13
8	7.86	3.34	1.15	0.70	0.54	2.03	2.84	6.12	14.46	15.56	17.53	12.91
9	8.24	1.58	1.08	0.52	0.59	1.32	3.39	6.14	14.54	15.70	17.88	12.95
10	ND	1.10	0.91	0.63	0.60	1.11	4.02	7.09	14.73	16.41	16.80	13.11
11	ND	1.22	1.06	0.69	0.58	1.25	4.23	6.63	15.06	16.93	17.49	13.09
12	ND	0.95	1.13	0.60	0.60	1.63	4.92	7.36	15.00	17.31	17.69	12.55
13	ND	1.18	1.32	0.67	0.59	1.94	6.33	7.90	15.06	16.32	16.35	12.01
14	ND	1.08	1.32	0.69	0.71	1.92	6.08	8.77	14.80	17.39	16.92	11.14
15	ND	1.02	0.97	0.71	0.83	1.79	5.02	9.19	14.70	17.70	16.29	10.84
16	ND	1.21	0.59	0.75	0.80	1.88	5.58	9.13	14.74	17.03	16.21	11.39
17	ND	1.21	0.51	0.74	0.68	1.98	6.11	9.53	14.48	16.70	15.87	11.77
18	ND	1.32	0.50	0.73	0.76	1.85	7.16	10.14	14.47	16.58	17.07	10.28
19	ND	2.37	0.56	0.72	0.70	1.97	7.52	10.55	14.03	16.85	17.44	9.84
20	ND	1.95	0.79	0.66	0.84	2.11	7.61	10.18	15.02	17.24	17.40	10.59
21	ND	1.08	0.91	0.55	0.85	2.35	7.62	9.71	15.22	17.75	17.86	9.73
22	ND	0.84	0.64	0.54	0.94	2.66	7.58	8.81	15.22	17.40	17.31	10.31
23	ND	1.09	0.86	0.60	0.84	2.99	8.79	8.87	15.32	17.33	16.45	9.99
24	ND	1.41	0.89	0.66	0.75	2.57	9.03	8.75	16.28	17.37	16.11	9.90
25	ND	1.23	0.74	0.68	0.97	2.29	8.85	9.23	16.76	18.02	15.14	10.15
26	ND	0.68	0.71	0.76	1.46	1.72	8.36	9.38	15.58	18.12	15.32	10.41
27	ND	0.41	0.63	0.75	1.09	2.45	7.30	9.89	16.25	18.19	15.04	10.65
28	ND	0.29	0.56	0.75	0.38	2.32	7.50	10.77	16.70	17.29	14.86	10.94
29	ND	0.25	0.54	0.72	0.38	3.28	7.42	11.00	17.13	16.23	14.66	10.90
30	ND	0.47	0.53	0.70	--	3.54	8.12	11.29	17.80	15.94	13.70	10.85
31	ND	--	0.66	0.70	--	3.19	--	11.29	--	15.88	13.63	--

Mean	8.71	1.33	0.83	0.66	0.70	1.98	5.90	8.71	14.80	16.80	16.52	11.80
Min	7.86	0.25	0.50	0.46	0.32	0.82	2.84	6.12	11.95	15.22	13.63	9.73
Max	9.82	4.64	1.32	0.76	1.46	3.54	9.03	11.29	17.80	18.19	18.33	14.43

ND: No Data. Dead Logger Battery.

MCSG-3
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	10.23	2.11	1.18	-0.83	1.58	1.06	4.12	7.86	12.45	16.23	13.40	ND
2	9.65	2.37	1.26	-0.83	1.79	1.50	4.47	8.15	12.11	15.90	14.26	ND
3	8.61	3.07	1.52	-0.87	1.52	1.19	4.98	8.10	12.44	14.68	14.57	ND
4	8.34	3.01	1.67	0.03	1.16	1.11	5.67	8.93	13.65	13.94	15.56	ND
5	7.64	3.36	0.92	0.60	0.79	1.66	6.76	8.24	13.24	13.49	15.50	ND
6	7.69	3.90	0.77	0.56	1.65	1.85	3.80	6.16	13.71	13.26	ND	ND
7	7.68	4.02	1.09	0.73	1.84	1.93	3.91	6.88	13.25	13.36	ND	ND
8	7.39	3.78	1.47	0.52	1.52	1.98	3.44	5.98	14.13	13.68	ND	ND
9	7.29	1.75	0.75	0.10	1.21	1.35	4.44	6.45	14.19	13.71	ND	ND
10	7.13	1.02	0.20	0.49	0.96	1.29	5.49	7.73	14.24	14.21	ND	ND
11	7.96	0.91	0.76	0.63	0.26	1.56	5.51	6.90	14.86	14.68	ND	ND
12	6.93	0.82	0.96	0.19	0.34	2.06	6.53	8.10	14.74	15.04	ND	ND
13	6.45	1.05	1.78	0.75	0.33	1.71	8.26	9.02	14.68	14.49	ND	ND
14	5.47	1.13	1.84	0.96	0.98	2.05	7.34	10.25	14.32	15.13	ND	ND
15	5.64	1.50	1.19	1.12	1.26	2.24	4.95	10.49	14.24	15.02	ND	ND
16	6.21	2.31	0.27	0.23	1.61	2.39	6.49	10.10	14.18	15.09	ND	ND
17	6.53	2.37	0.12	0.38	1.12	2.70	7.35	10.49	13.83	14.64	ND	ND
18	6.47	2.11	0.14	1.14	0.68	2.66	8.79	11.10	13.88	14.60	ND	ND
19	6.52	2.72	0.47	1.01	1.07	2.97	8.93	11.58	13.32	15.03	ND	ND
20	6.14	2.71	1.28	1.20	1.82	3.30	8.29	10.76	13.86	15.12	ND	ND
21	5.90	1.58	1.63	1.50	1.90	3.69	8.20	8.66	13.69	15.11	ND	ND
22	5.93	1.11	0.95	1.72	1.84	4.23	8.11	8.76	14.40	14.61	ND	ND
23	5.88	1.45	1.71	1.55	1.06	4.39	10.25	8.89	14.71	14.56	ND	ND
24	5.96	1.96	1.17	1.83	0.90	3.49	9.98	8.52	15.40	14.67	ND	ND
25	5.63	1.56	0.13	2.10	1.22	2.98	9.04	9.31	15.79	15.36	ND	ND
26	5.20	0.38	0.07	1.59	1.97	2.44	8.16	9.71	14.54	15.73	ND	ND
27	6.10	0.16	-0.05	0.90	1.22	3.71	6.72	10.47	15.13	15.61	ND	ND
28	5.35	0.11	-0.26	0.76	0.27	3.45	7.77	11.50	15.61	14.75	ND	ND
29	4.29	0.07	-0.70	1.04	0.54	4.15	8.04	11.39	16.41	13.65	ND	ND
30	2.09	0.41	-0.86	1.15	--	4.90	9.33	11.54	16.83	13.49	ND	ND
31	1.63	--	-0.61	1.14	--	4.08	--	11.46	--	13.39	ND	--

Mean	6.45	1.83	0.74	0.75	1.19	2.58	6.84	9.15	14.26	14.59	14.66	ND
Min	1.63	0.07	-0.86	-0.87	0.26	1.06	3.44	5.98	12.11	13.26	13.40	ND
Max	10.23	4.02	1.84	2.10	1.97	4.90	10.25	11.58	16.83	16.23	15.56	ND

ND: Logger Malfunction.

MCSG-4
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	10.32	1.94	0.22	-0.92	1.23	0.94	3.98	7.94	13.01	17.03	14.73	14.27
2	9.76	2.22	1.02	-1.40	1.27	1.41	4.45	8.22	12.70	16.96	15.69	13.98
3	8.75	2.91	1.27	-1.05	1.07	1.08	4.98	8.14	13.18	15.40	15.73	13.90
4	8.49	2.87	1.37	-0.52	0.82	0.98	5.68	8.94	14.44	14.69	17.03	13.62
5	7.67	3.17	0.65	-0.63	0.54	1.60	6.79	8.26	14.14	14.21	17.17	13.96
6	7.71	3.78	0.54	-0.46	1.34	1.90	3.69	6.49	14.68	14.03	17.59	13.52
7	7.78	3.93	0.78	-0.23	1.45	1.92	3.87	6.93	14.13	14.18	16.84	13.63
8	7.45	3.59	1.27	-0.06	1.12	2.04	3.36	6.21	15.18	14.51	16.42	12.88
9	7.42	1.45	0.59	-0.17	0.81	1.32	4.47	6.50	15.08	14.58	16.99	13.27
10	7.18	0.71	-0.06	-0.09	0.67	1.21	5.54	7.80	15.11	15.19	15.63	13.47
11	7.91	0.62	0.16	0.37	-0.18	1.52	5.58	6.92	15.33	15.64	16.74	12.64
12	7.02	0.55	0.79	0.16	-0.71	2.06	6.50	8.21	15.25	16.05	16.33	13.37
13	6.56	0.77	1.59	0.63	-1.17	1.80	8.27	9.11	15.25	15.24	15.18	12.24
14	5.47	0.85	1.65	0.81	-0.54	2.07	7.38	10.41	14.68	16.06	15.83	11.48
15	5.58	1.30	0.93	0.99	0.93	2.27	5.12	10.68	14.72	15.99	15.72	10.36
16	6.13	2.26	0.05	0.23	1.40	2.40	6.44	10.31	14.70	15.90	15.71	11.57
17	6.47	2.13	0.00	0.32	0.85	2.69	7.34	10.71	14.38	15.50	15.22	11.50
18	6.42	1.92	-0.13	0.97	0.33	2.62	8.77	11.35	14.40	15.44	16.68	9.91
19	6.46	2.65	-0.17	0.87	0.77	2.92	8.96	11.82	13.74	15.91	16.91	10.13
20	6.09	2.47	0.83	1.00	1.58	3.22	8.33	10.98	14.41	16.06	16.70	11.06
21	5.82	1.22	1.44	1.17	1.70	3.61	8.34	9.17	14.26	16.14	16.76	9.21
22	5.87	0.75	0.73	1.35	1.57	4.12	8.16	9.12	14.91	15.64	16.11	10.45
23	5.80	1.25	1.47	1.22	0.82	4.27	10.34	9.09	15.22	15.60	15.76	10.42
24	5.87	1.80	0.98	1.48	0.60	3.34	10.11	8.80	16.00	15.71	15.78	10.55
25	5.57	1.34	0.10	1.73	1.03	2.89	9.17	9.54	16.37	16.43	14.22	10.96
26	5.00	0.14	0.07	1.31	1.86	2.33	8.26	9.99	14.92	16.88	15.38	11.30
27	6.06	0.05	0.06	0.66	1.12	3.63	6.82	10.91	15.69	16.71	14.71	11.48
28	5.51	-0.04	0.01	0.53	0.08	3.37	7.81	11.99	16.38	15.93	14.85	11.70
29	4.33	-0.23	-0.31	0.75	0.34	4.01	8.05	11.83	17.09	14.80	14.05	11.70
30	2.07	-0.32	-0.58	0.82	--	4.76	9.35	12.09	17.69	14.68	13.88	11.72
31	1.48	--	-0.47	0.82	--	3.92	--	12.02	--	14.63	13.88	--

Mean	6.45	1.60	0.54	0.41	0.78	2.52	6.86	9.37	14.90	15.54	15.81	12.01
Min	1.48	-0.32	-0.58	-1.40	-1.17	0.94	3.36	6.21	12.70	14.03	13.88	9.21
Max	10.32	3.93	1.65	1.73	1.86	4.76	10.34	12.09	17.69	17.03	17.59	14.27

MCSG-5
Daily Mean Temperature Values
(Degrees Celsius)

Day	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
1	14.10	0.91	-0.30	-2.25	0.02	0.08	3.15	7.46	12.96	17.55	19.46	14.96
2	11.92	1.31	-0.46	-2.73	0.00	0.33	3.30	7.46	12.86	16.76	20.53	14.76
3	9.72	2.77	-0.26	-2.83	0.00	0.24	3.75	7.59	13.32	15.59	20.94	15.19
4	9.84	3.06	-0.04	-0.93	0.01	0.09	4.55	8.55	14.64	14.58	21.36	14.97
5	9.33	3.58	-0.34	-1.56	0.05	0.59	5.41	8.46	14.19	14.21	21.56	15.41
6	9.75	4.15	-0.48	-2.38	0.10	0.93	3.14	5.80	14.73	13.88	22.00	15.32
7	10.03	4.52	-0.51	-1.84	0.12	1.08	2.30	5.86	13.94	14.11	21.42	15.49
8	9.96	3.80	-0.07	-2.82	0.17	1.39	2.37	5.27	15.24	14.93	20.81	15.89
9	10.22	0.90	-0.58	-4.49	0.13	0.62	3.05	0.91	15.23	15.62	20.87	15.95
10	10.04	0.04	-1.85	-2.42	0.12	0.54	4.27	7.47	15.10	16.86	18.37	16.17
11	9.39	0.26	-0.88	-2.56	0.10	1.00	4.34	6.54	15.65	17.59	16.95	15.36
12	6.85	0.70	-0.78	-4.80	0.08	1.84	5.29	7.30	16.18	18.18	17.10	15.09
13	6.10	1.58	0.05	-1.57	0.09	1.13	7.19	8.58	16.74	18.47	16.28	14.02
14	4.91	2.11	0.36	-0.74	0.18	1.34	6.14	9.95	15.66	19.00	15.81	13.79
15	5.58	2.58	0.01	-1.04	0.36	2.14	4.22	10.49	16.23	18.44	15.76	13.12
16	7.02	3.67	-0.83	-5.03	0.40	2.11	5.62	10.23	16.89	16.89	15.64	13.74
17	7.82	3.62	-1.08	-4.11	0.28	2.28	6.18	10.70	17.21	16.76	15.46	12.66
18	7.60	2.30	-1.04	-0.93	0.11	2.00	7.53	11.53	16.91	16.31	17.05	9.83
19	8.11	2.22	-0.62	-0.58	0.17	2.23	7.91	12.15	15.81	16.78	16.56	10.02
20	7.70	2.07	0.17	-0.59	0.31	0.91	7.82	11.01	16.29	17.09	16.78	11.12
21	7.80	0.73	0.76	-0.06	0.43	2.93	7.46	8.58	14.36	16.45	16.90	9.95
22	8.04	0.24	0.03	0.09	0.40	3.47	7.21	8.03	15.72	15.92	16.55	10.59
23	7.89	0.57	1.23	-0.12	0.14	3.73	9.68	8.52	16.65	15.80	15.89	10.30
24	8.14	1.71	0.55	-0.06	0.11	2.85	9.47	8.33	17.15	16.26	15.63	10.32
25	7.80	0.59	-2.10	0.05	0.12	2.15	8.85	9.07	17.48	17.85	14.79	11.01
26	6.74	-0.94	-3.65	0.00	0.67	1.18	8.09	9.58	16.59	17.91	14.99	11.31
27	7.63	-2.36	-3.82	0.00	0.59	2.08	6.41	10.38	16.75	18.94	14.43	11.61
28	5.29	-2.60	-4.17	-0.01	0.10	2.21	7.15	11.63	16.67	19.17	14.20	12.20
29	3.33	-2.41	-3.83	0.00	0.09	3.31	7.22	12.02	17.91	18.88	14.46	12.56
30	0.92	-1.26	-3.11	0.01	--	4.04	8.53	12.05	18.63	19.06	13.73	12.81
31	0.77	--	-1.49	0.02	--	3.54	--	11.95	--	19.15	13.67	--

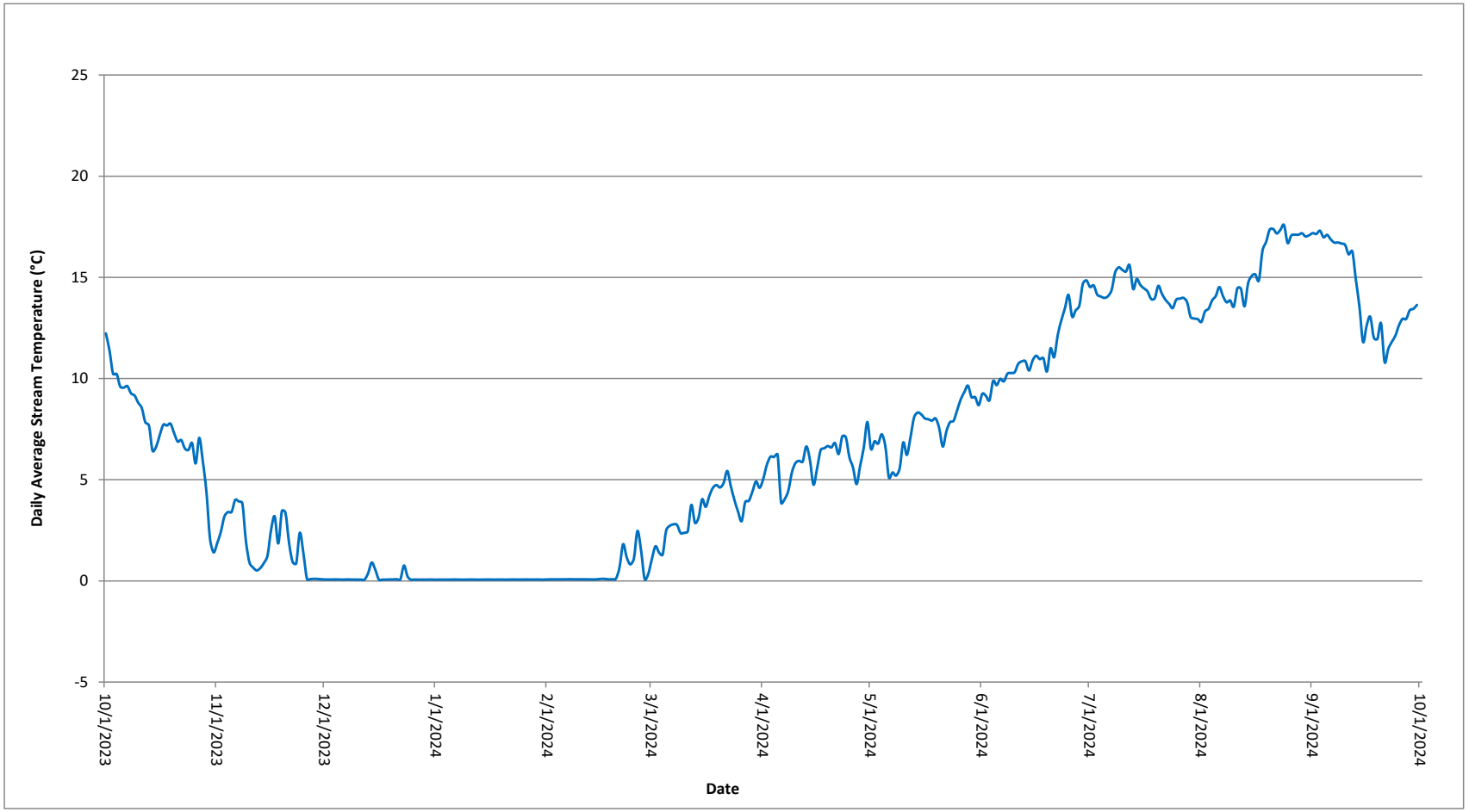
Mean	7.75	1.35	-0.94	-1.49	0.19	1.75	5.92	8.82	15.79	16.93	17.29	13.18
Min	0.77	-2.60	-4.17	-5.03	0.00	0.08	2.30	0.91	12.86	13.88	13.67	9.83
Max	14.10	4.52	1.23	0.09	0.67	4.04	9.68	12.15	18.63	19.17	22.00	16.17

Red - Air/Soil Temp. (Stream Likely Dry)

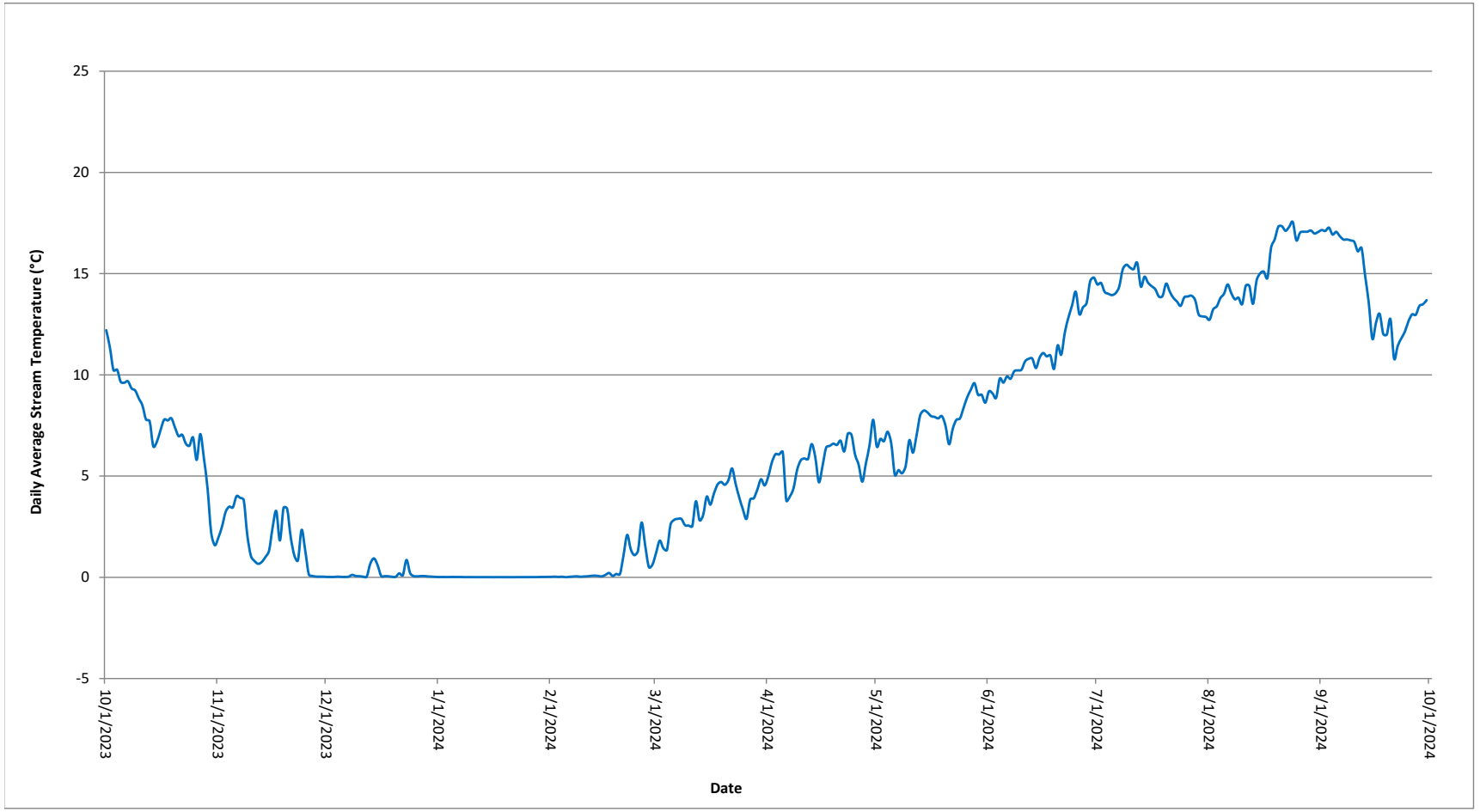
APPENDIX J

SURFACE WATER - TEMPERATURE GRAPHS

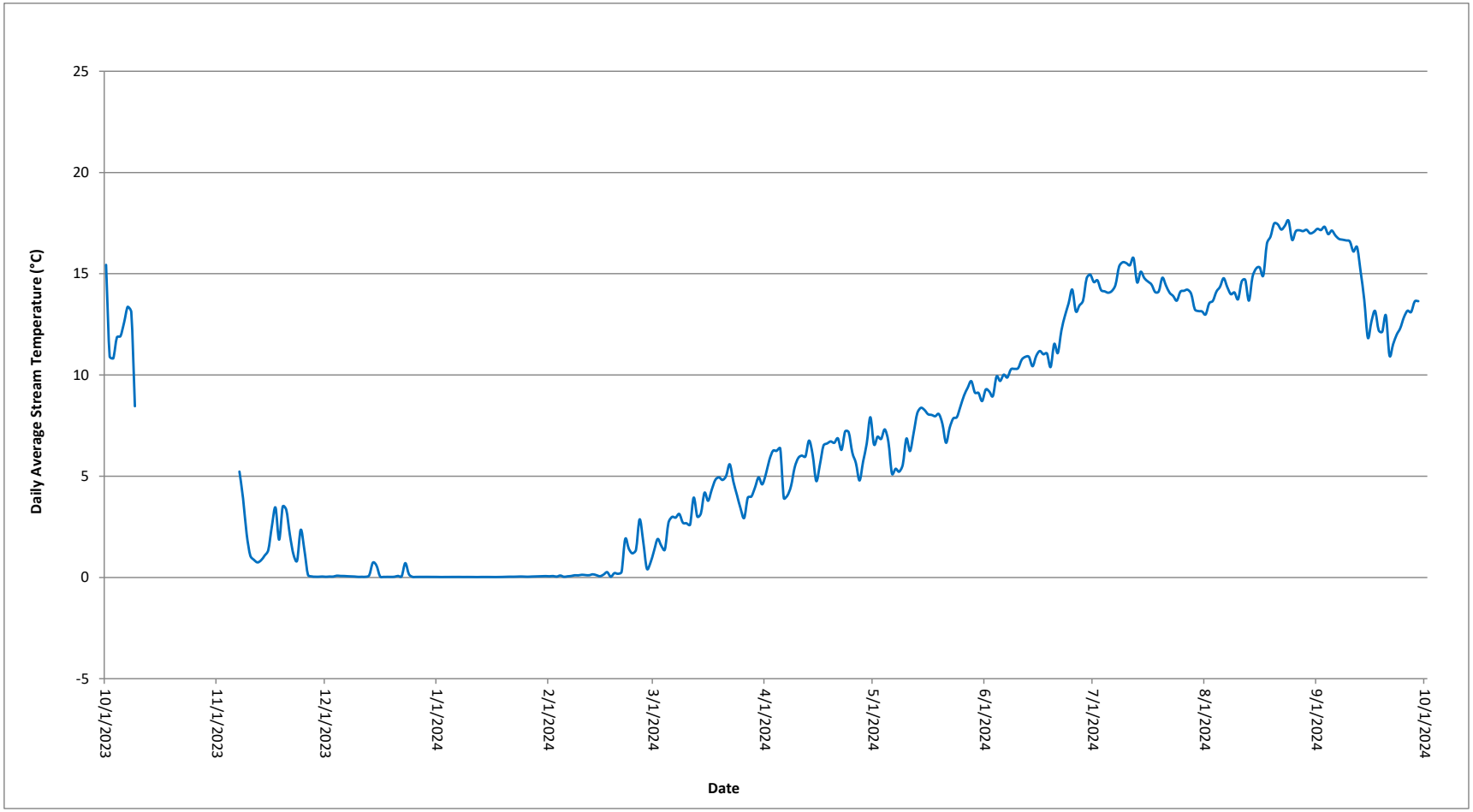
NFG-1
Daily Mean Temperature Graph



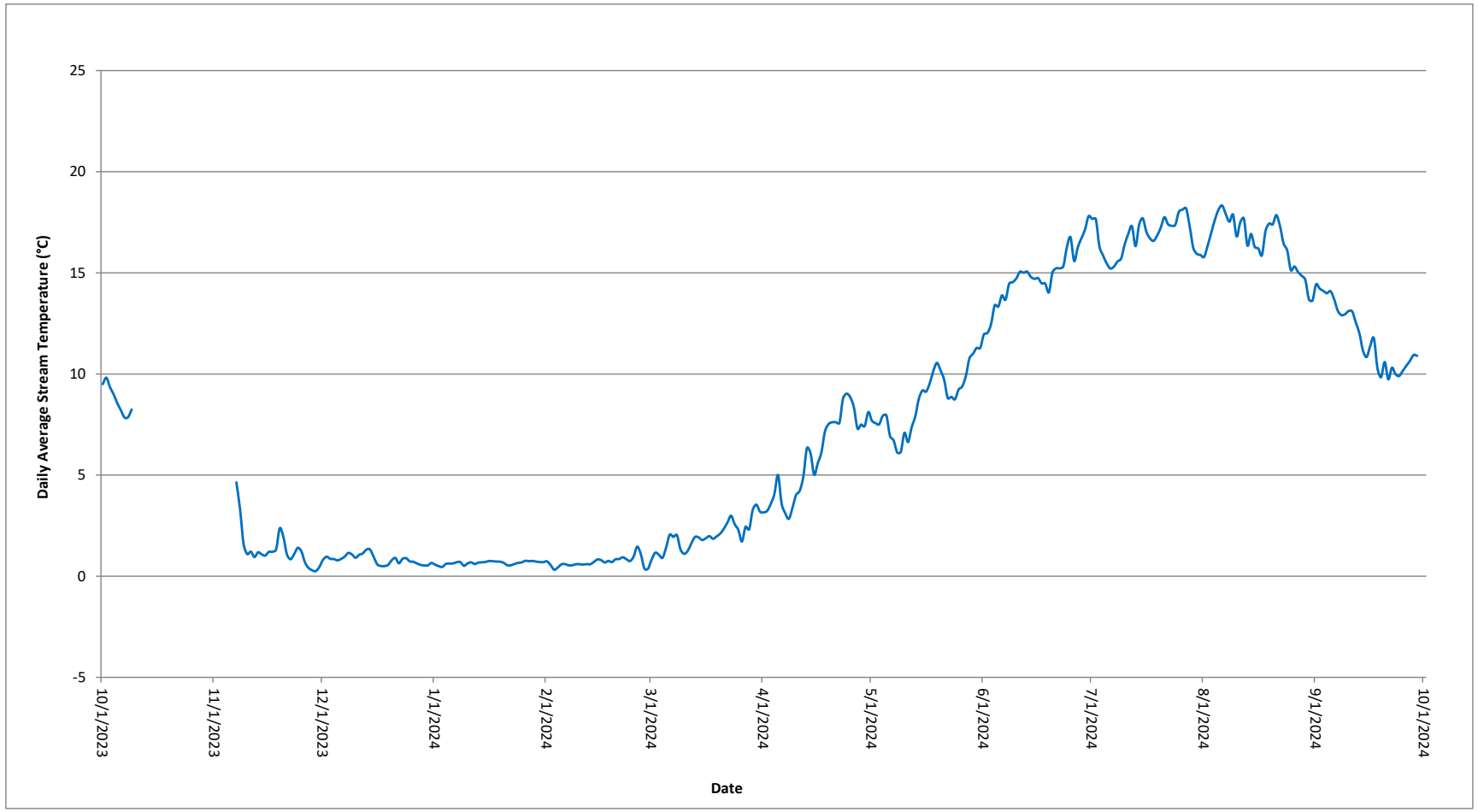
NFG-2
Daily Mean Temperature Graph



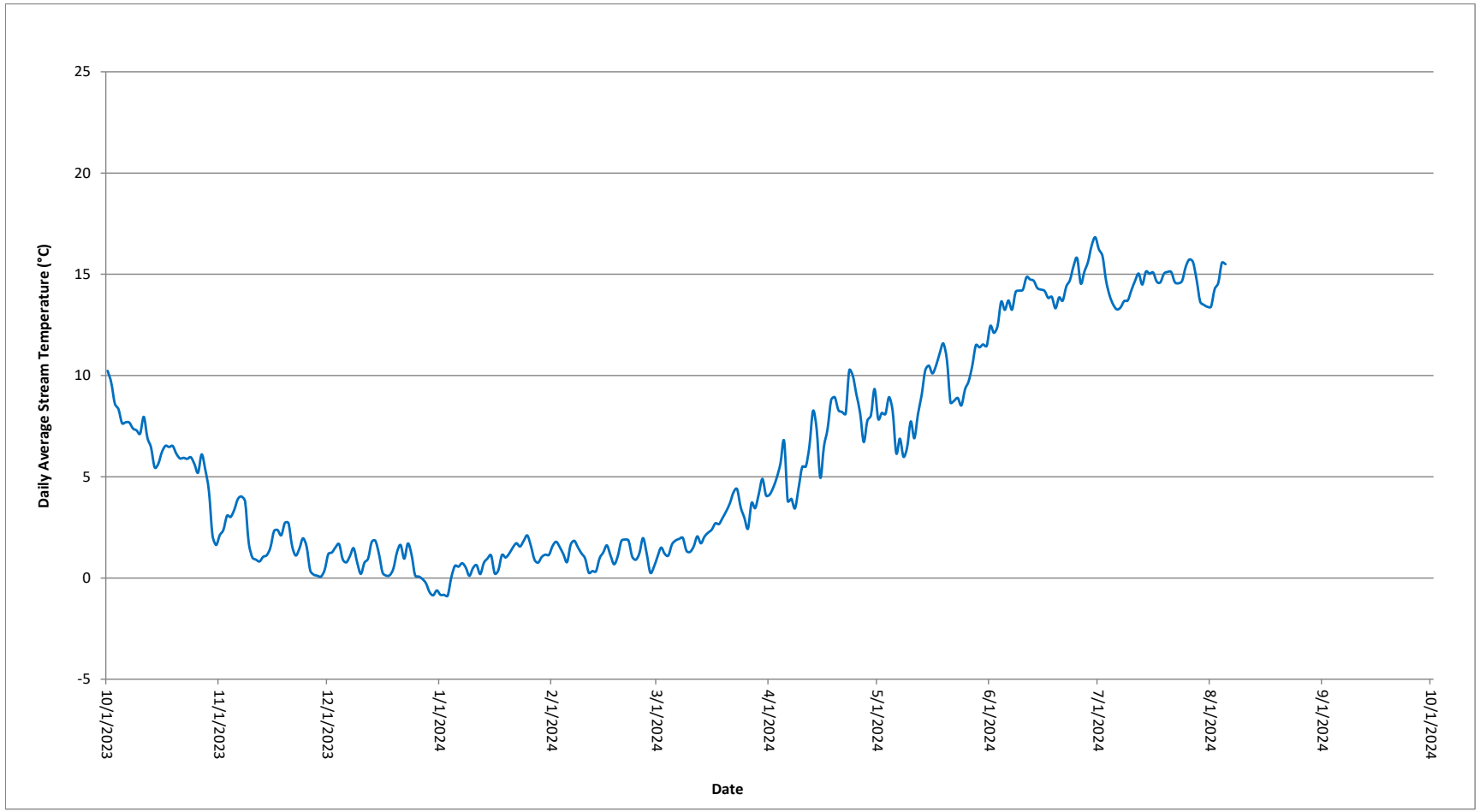
NFG-3
Daily Mean Temperature Graph



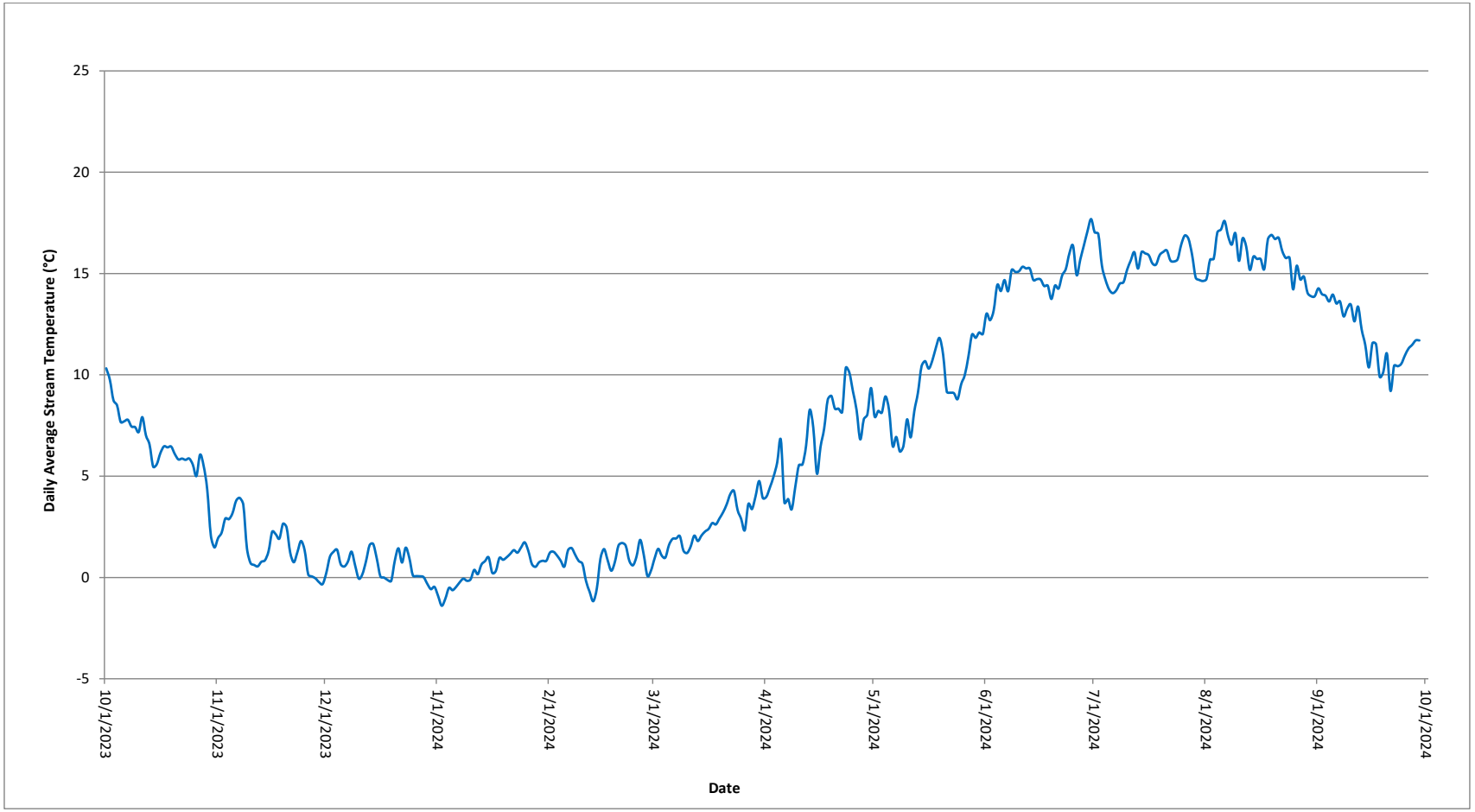
MCSG-2
Daily Mean Temperature Graph



MCSG-3
Daily Mean Temperature Graph



MCSG-4
Daily Mean Temperature Graph



MCSG-5
Daily Mean Temperature Graph