2020 ANNUAL HYDROLOGY REPORT

YOAST MINE

PERMIT C-94-082

February 2021

Submitted To: Colorado Division of Reclamation, Mining and Safety
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SENECA Coal Company

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1.0 INTRODUCTION

This Annual Hydrology Report presents the hydrologic monitoring data collected during the 2020 water year (October 2019 – September 2020) at the Seneca Coal Company's (SCC) Yoast Mine (Yoast). The AHR fulfills the reporting requirements under the Colorado Division of Reclamation, Mining, and Safety (CDRMS) Permit No. C-1994-082.

1.1 BACKGROUND

Yoast is a surface coal mine located in Routt County, approximately 25 miles west of Steamboat Springs, Colorado (Figure 1). The Yoast permit went into effect on August 8, 1995. Overburden removal began in 1996 in the Grassy Creek basin and in 2000 in the Sage Creek basin. The last of the coal at Yoast was removed in February 2006.
The mine has been reclaimed and vegetated for many years and SCC is actively pursuing bond release.

2.0 METEOROLOGICAL

Meteorological data for the 2020 water year is presented in Appendix A. The 2020 data was obtained from NOAA weather station USC00053867 located in Hayden, Colorado (www.ncdc.noaaa.gov/cdo-wb/). A total of 18.19 inches of precipitation was measured in 2020, which is 0.8 inches less than the 1981-2020 average of 18.27 inches. January through March were wetter than normal, but the remaining months were drier than average. Snowpack runoff, as estimated by totaling November through March precipitation, was 10.57 inches, which was 3.02 inches above the 1981-2020 average of 7.55 inches.

3.0 GROUNDWATER

The Yoast groundwater monitoring program includes 10 monitoring wells. The following table includes the wells monitored, the water bearing unit they are screened in, the frequency of monitoring, and the required parameter list. The monitoring well locations are shown on Figure 1. Groundwater monitoring was completed by experienced personnel and samples were collected following the monitoring practices described in Tab 15 of Permit C-1994-082. All samples were analyzed by ACZ Laboratories.

Site	Unit	Monitoring Frequency		Parameter List
		Water Level	Water Quality	
YAAL14	Annand Draw Alluvium	A	A	GW Long
YGAL16	Grassy Creek Alluvium	A	A	GW Long
SGAL70	Grassy Creek Alluvium	A	A	GW Long
YSAL1	Sage Creek Alluvium	A	A	GW Long
YSAL3	Sage Creek Alluvium	A	A	GW Long
YOV30	Wadge Overburden	A	A	GW Long
YW30	Wadge Coal	A	A	GW Long
YWU30	Wadge Underburden	A	A	GW Long
YWC33	Wolf Creek Coal	A	A	GW Short
YWCU33	Wolf Creek Underburden	A	A	GW Short

Note
A: Annual
GW Long: Field conductivity, field pH, field temperature, fluoride, dissolved iron, dissolved manganese, nitrate, nitrite, dissolved selenium, sulfate, total dissolved solids
GW Short: Field conductivity, field pH, field temperature, dissolved iron, dissolved manganese, total dissolved solids

3.1 WATER LEVELS

The static water levels measured during the 2020 water year are included with the groundwater quality data in Appendix B. Water level hydrographs for each of the wells are also provided in Appendix C. The static water levels were measured at all wells except for YWC33, where the well casing was damaged and a measurement

could not be made. The water levels measured at all wells this year were within their respective historic range. Water levels in most of the water bearing units at Yoast exhibit seasonal fluctuations. The water table in the shallow alluvial wells fluctuates in response to seasonal precipitation events, with the water table typically at its highest during the spring snowmelt seasons and then declining through late summer/early fall in response to the dry conditions. The water levels in the bedrock overburden and coal seams also fluctuate in response to recharge from seasonal precipitation but are partially influenced by interactions with groundwater in the reclaimed mine spoil.

3.2 GROUNDWATER QUALITY

The Yoast Mine Groundwater Points of Compliance (GWPOC) were established in Technical Revision 39 (TR-39) (see Attachment 15-1 of Permit C-1994-082). The two GWPOC monitoring wells are YSAL3 which is screened within the Sage Creek Alluvium and SGAL70 which is screened within the Grassy Creek Alluvium (Figure 1). SGAL70 is located downgradient of both the Yoast Mine and the adjacent Sage Creek Mine. Bedrock GWPOC wells were deemed unnecessary in TR-39 due to the limited potential for the mine to negatively impact the quality of bedrock groundwater. The Wadge and Wolf Creek Coal exhibit low hydraulic conductivity (Wadge Coal: 2.45E-7 to 3.5E-7 cm/sec; Wolf Creek Coal: 4.55E-6 cm/sec) which will impede the migration of mine-impacted groundwater through these units. Attenuation and dilution should further limit water quality impacts. Aquifers of regional significance include the Trout Creek Sandstone and the Twentymile Sandstone. The Twentymile Sandstone is located approximately 500 ft above the Wadge Coal seam and is not found within the Yoast permit boundary. Low permeability confining layers of the Williams Fork Formation isolate the Trout Creek Sandstone from the mine. The Trout Creek Sandstone lies approximately 300 to 400 feet below the Wadge Coal seam and approximately 60 to 100 feet below the Wolf Creek Coal Seam. The groundwater in the Trout Creek Sandstone is under confined conditions and exhibits an upward hydraulic head that further limits the potential for mine affected groundwater to infiltrate into this unit. See TR-39 located in the Appendix 15-1 of the Yoast Mine permit package for additional justification for the Groundwater Points of Compliance.

Tables B.1 and B.2 in Appendix B include the analytical results for samples collected from wells SGAL70 and YSAL3 in 2020 and provide a comparison to the Grassy Creek and Sage Creek Alluvial GWPOC water quality standards established in TR-39. Table B.3 includes the analytical results for the remaining monitoring wells however no comparison to water quality standards were made as these wells are not GWPOC. The groundwater quality at SGAL70 meets the TR-39 water quality standards for all parameters except for dissolved cadmium. This exceedance is not associated with a measurable value of cadmium as the lab detection limit exceeded the cadmium water quality standard. Water quality samples at commercial labs are often run in groups that include samples from unrelated locations and the detection limit for the batch of samples can be increased above the normal detection as a result of elevated concentrations in one or more samples within the batch or from unrelated instrument interference. The fact that cadmium has not historically been an issue at this well suggests that that the elevated detection limit is unlikely to be censoring a measured value above the water quality standard. There were no exceedances of the GWPOC standards at YSAL3 in 2020.

Predictions for the potential TDS increases at several of the Yoast monitoring wells were made in the Probable Hydrologic Consequences (PHC, Tab 17) section of Permit C-1994-082. The following table outlines these predictions along with this year's observed value.

Well	Predicted TDS (mg/L)	This Years TDS (mg/L)
YAAL14	2036	2280*
YGAL16	1296	1590*
YSAL1	798	1280*
YSAL3	798	1010*
YOV30	3201	4100*
YW30	2570	6740*
YWC33**	2721	-

Note
*Indicates value above prediction
** YWC33 well casing broken. Sample could not be collected.

In 2020, the TDS at six of the seven wells exceeded the predicted value. Although the predicted TDS values for the Grassy Creek (YAAL14, YGAL16) and Sage Creek

(YSAL1, YSAL3) alluvial wells were exceeded its important to acknowledge that the 2020 values remain within the range of ambient, pre-mine, TDS measured in alluvial monitoring wells in these same drainages. Overburden removal in the Grassy Creek basin began in 1996. The pre-mine (1/1/1980 – 1/31/1994) TDS measured in Grassy Creek alluvial wells YGAL15, YGAL16, YGAL17 and YGAL18 ranged from 546 – 4030 mg/L (mean:1603 mg/L) (see Table 6 TR-39). The pre-mine (1/1/1980 – 12/31/1999) TDS measured in Sage Creek alluvial wells YSAL1, YSAL12, YSAL3, and YSAL8 ranged from 230 – 2140 mg/L (see Table 2 TR-39). This suggests that the slightly elevated TDS concentrations could be from non-mine related sources such as bedrock groundwater contributions from the underlying Lewis Shale or agriculture, which can concentrate dissolved salts, which weren't considered as part of the post mine predictions.

The TDS measured in 2020 at bedrock well YOV30 and YW30 also exceeded their predicted values. As described above the low hydraulic conductivity of these units will inhibit groundwater from migrating away from the mine. Groundwater from the Wadge Coal and its overburden have not historically been used because groundwater yields from these units are insufficient for irrigation or domestic use. Low permeable confining layers separating the mine from usable aquifers will continue to isolate the mine water from these systems.

4.0 SURFACE WATER

The Yoast Mine lies within the headwaters of Grassy Creek and Sage Creek watershed. The southwest portion of the permit drains to the west towards Sage Creek, which ultimately flows to the north-northeast towards the Yampa River. A small area on the southeastern end of the permit drains southeast towards Grassy Creek, which flows to the northeast near the southern end of the permit area before bending to the north towards the Yampa River. The remainder of the permit area drains to the north-northeast towards Annand Draw, which drains north to Scotchmans Gulch, before eventually flowing to the east-northeast to Grassy Creek. The following table includes the Yoast surface water monitoring points, the watershed they are located in, the frequency of monitoring, and the required parameter list. See Figure 1 for the location of the surface water monitoring points. Surface water monitoring was completed by experienced personnel and samples were collected following the monitoring practices described in Tab 15 of Permit C-1994-082. All samples were analyzed by ACZ Laboratories.

Site	Type	Watershed	Monitoring Frequency		Parameter List
			Flow	Water Quality	
NPDES11	NPDES	Grassy Creek	M	M	NPDES
YSGF5	Surface Water	Grassy Creek	SA	SA	SW Long
NPDES10	NPDES	Grassy Creek	M	M	NPDES
YSG5	Surface Water	Grassy Creek	SA	SA	SW Long
YSSF3	Surface Water	Sage Creek	SA	SA	SW Short
NPDES14	NPDES	Sage Creek	M	M	NPDES
NPDES13	NPDES	Sage Creek	M	M	NPDES
NPDES12	NPDES	Sage Creek	M	M	NPDES
YSS2	Surface Water	Sage Creek	SA	SA	SW Long

Note

SA: Semiannual during spring snowmelt and summer baseflow

M: Monthly

SW Long: Field conductivity, field pH, field temperature, total recoverable iron, dissolved manganese, total mercury, ammonia, nitrate, nitrite, dissolved selenium, sulfate, sulfide, total dissolved solids, total suspended solids

SW Short: Field conductivity, field pH, field temperature, total recoverable iron, dissolved manganese, total suspended solids, total dissolved solids

NPDES: See NPDES permit CO-0000221

The Colorado Water Quality Control Commission (CWQCC) has established segment specific aquatic life water quality standards for Grassy Creek (Segment 13i and 13j) and Sage Creek (Segment 13e) of the Yampa River. The water quality standards for these segments are included in CWQCC Regulation 33. Therefore, the following surface water quality discussion has been organized by drainage basin. The 2020 Water Year surface water quality data is provided in Appendix D. Samples from this year's stream points are compared to both the Colorado Department of Public Health & Environment (CDPHE) surface water agricultural use standards (CDPHE, Reg. 31) and the appropriate segment specific aquatic life water quality standards. Samples from NPDES outfalls are compared to NPDES discharge limits as well as the segment specific aquatic life standards. Additional discussion of the water quality in each stream segment follows.

4.1 Grassy Creek

Analytical results for the 2020 surface water monitoring conducted at upper Grassy Creek Segment 13i stream point YSGF5 and NPDES Outfall 011 are provided in Tables D.1 and D.2 of Appendix D. Analytical results for lower Grassy Creek stream point YSG5 and NPDES Outfall 010 are provided in Table D.3 and D.4. As described in CWQCC Regulation 33, a temporary modification of the chronic total recoverable iron standard is in place for Yampa Segment 13i which includes Grassy Creek from its headwaters to immediately above the confluence with Scotchmans Gulch. WQCC intends to extend this modification until Phase II bond release has been obtained for all mines within the watershed and post-mine iron conditions can be adequately characterized. The iron temporary modification is applicable to stream point YSGF5 and Outfall 011. The 1 mg/L total recoverable iron chronic standard for Yampa Segment 13j is applicable to YSG5 and Outfall 010.

There were no exceedances of NPDES permit limits or instream water quality standards at water quality standard at Outfalls 010 or 011. An exceedance of the Segment 13j total recoverable chronic iron standard (1 mg/L) occurred at YSG5 on June 2nd. Although YSG5 receives drainage from both Outfalls 010 and 011 the total recoverable iron measured at these outfalls on June 2nd was <0.1 and <0.06 mg/L.

Synoptic watershed monitoring conducted during the April 21st, July 20th, and September 1st event also demonstrate that the outfall concentrations are both in compliance and significantly less than those measured in stream. Pre-mine monitoring was not conducted at YSG5, however the baseline monitoring completed at YSGF5 between 1991 and 1993 indicates iron was routinely above (mean: 1.34 mg/L; range: 0.15 – 9.9 mg/L; n:19) the 1 mg/L Segment 13j iron standard. Total recoverable iron at the Grassy Creek stream points is strongly correlated (r^2: 0.67 – 0.91) with suspended solids which become naturally elevated during rain and snow melt runoff events (Figure D.1). This further supports that the elevated iron in Grassy Creek is unrelated to the runoff from the reclaimed mine and is likely the result of natural erosional processes that are occurring within the unmined portions of the watershed.

The method detection limit for the sulfide analysis (MDL: 0.02 mg/L) conducted by SCC's lab exceeds the CDPHE Yampa Segment 13d water quality standard for un-ionized sulfide (H_2S) of 0.002 mg/L. All but one of the six sulfide samples analyzed were non-detect. This analytical method detects both dissolved sulfides and acid-soluble metallic sulfides that are present in suspended matter and provides a single cumulative concentration. The single detection was measured in the June 2nd YSGF5 sample also had high TSS (52 mg/L). Its expected that the detection was resultant of the acid-soluble metallic sulfides present on suspended matter and not dissolved sulfide as any dissolved sulfide present in oxygenated surface waters is expected to be oxidized to sulfate quickly. Furthermore, dissolved sulfide includes both the ionized (HS^-) and un-ionized forms of hydrogen sulfide (H_2S). The distribution of sulfide between the un-ionized hydrogen sulfide and ionized form is dependent on the temperature and pH. At low pH most of the dissolved sulfide exists as the toxic un-ionized hydrogen sulfide. In alkaline waters, like those present at Yoast, most of the dissolved sulfide is present as non-toxic ionized sulfide. The pH at YSGF5 during the June 2nd event was 7.51 standard units.

The method detection limit for mercury (0.02 μg/L) used by SCC's lab is above the 0.01 μg/L aquatic life standard. None of the samples collected during 2020 exceeded the labs method detection limit. The CDPHE previously performed a reasonable potential analysis for Outfall 010 and determined that there was no reasonable potential for discharges from this outfall to exceed the mercury limit and the monitoring requirement was dropped from the NPDES permit. Total mercury

measured at Outfall 011 during 2020 was less than the 0.01 μg/L standard (Table D.2) and there is no reason to believe total mercury in Grassy Creek exceeds the aquatic life standard

CWQCC Regulation 31 specifies that the manganese agricultural use standard of 0.2 mg/L standard is only applicable when irrigation water is applied to soils with pH lower than 6.0. The soils at Yoast Mine are alkaline and the 0.2 mg/L standard is therefore not applicable. Dissolved manganese at YSGF5 and YSG5 are significantly lower than the CHPHE Yampa Segment 13i acute and chronic manganese standards.

4.2 Sage Creek

Analytical results for the 2020 surface water monitoring conducted at Sage Creek stream points YSSF3 and YSS2 are provided in Table D.5 of Appendix D and the analytical results for Outfalls 012, 013, and 014 that report to Sage Creek are included in Table D.6 through D.8. There was one exceedance of the Segment 13e total recoverable iron standard at downstream point YSS2. This exceedance occurred on 6/2/2020. Although samples were not collected from the outfalls on June 2nd they were monitored the day prior. A trace amount of precipitation occurred on June 1st but it was not of a suitable volume to expect appreciable changes to the discharge conditions. On June 1st, Outfalls 013 and 014 were not discharging and the total recoverable iron measured at Outfall 012 was <0.1 mg/L. A statistical comparison of the total suspended solids and total recoverable iron concentrations at YSS2 indicate that they are strongly correlated (r^2: 0.79) (Figure D.2). This suggests that the elevated iron at Sage Creek YSS2 was unrelated to the runoff from the reclaimed mine and is more likely the result of elevated suspended solids that were from natural erosional processes that are occurring within the unmined portions of the watershed. As discussed in Section 4.1, the lab used by SCC has a method detection limit for mercury and sulfide that are above the Segment 13e water quality standard. None of the samples collected from YSS2 in 2020 exceed the labs mercury or sulfide method detection limit. All other parameters sampled at Sage Creek stream points YSS2 and YSSF3 were within the applicable water quality standards.

There were no exceedances of the Yampa Segment 13e aquatic life standards or Agricultural Use standards at Outfalls 013 and 014. There was a single exceedance of potentially dissolved selenium monthly average selenium limit at Outfall 012. The sample collected on July 21, 2020 had a potentially dissolved selenium of 16.5 µg/L. However, the total recoverable selenium for this sample was 0.4 µg/L. The total recoverable selenium analysis includes a measurement of both the metals that are dissolved in the water and the metals that are present in the particulates in the water after its been treated with acid preservative. The potentially dissolved metals analysis measures the metals present in the filtrate of the water that was first treated with acid preservative and allowed to stand for several hours before being filtered through a membrane filter. The potentially dissolved selenium can not be greater than the total recoverable selenium as the potentially dissolved form is a subset of the selenium that is measured as a part of the total recoverable analysis. This suggests the elevated potentially dissolved selenium results may have been the result of an ICP-MS matrix interference which can result in overestimation of selenium concentrations (Smith and Compton, 2004). There were no other exceedances of the NPDES limits or water quality standards at Outfall 012 in 2020.

In the Probable Hydrological Consequences Probable Hydrologic Consequences (PHC, Tab 17) section of Permit C-1994-082, predictions were made for the expected TDS increases to be observed at several stream points. The following table outlines these predictions along with 2020's average concentration.

Stream Point	Predicted TDS (mg/L)	Mean TDS (mg/L)*
NPDES10	3938	2642
YSGF5	1337	1012
NPDES12	4291	3060
WSSF3**	2118	945

* Duplicates removed from average calculation

** WSSF3 is a Seneca II-W stream point located in Sage Creek, downstream of the Yoast outfalls.

The annual average TDS measured at each of the four monitoring locations was less than the predicted value.

5.0 SPRINGS

The Yoast monitoring program includes four spring sites. The following table includes the list of springs monitored, the frequency of monitoring, and the parameter list. See Figure 1 for the location of the spring points. Spring monitoring was completed by experienced personnel and samples were collected following the monitoring practices described in Tab 15 of Permit C-1994-082. All samples were analyzed by ACZ Laboratories.

Site	Type	Unit	Monitoring Frequency		Parameter List
			Discharge	Water Quality	
YSSPG1	Spring	Spoils	A	A	SW Long
YSSPG2	Spring	Spoils	A	A	SW Short
YSSPG3	Spring	Spoils	A	A	SW Short
YSSPG4	Spring	Spoils	A	A	SW Short

Note
A: Annual
SW Long: Field conductivity, field pH, field temperature, total recoverable iron, dissolved manganese, total mercury, ammonia, nitrate, nitrite, dissolved selenium, sulfate, sulfide, total dissolved solids, total suspended solids
SW Short: Field conductivity, field pH, field temperature, total recoverable iron, dissolved manganese, total suspended solids, total dissolved solids

Table E.1 in Appendix E includes the analytical results for samples collected from the four spoil springs in 2020. The primary post-mine land use in this area is livestock grazing and wildlife habitat. Therefore, the water quality collected from the spoil springs is compared to the CWQCC Agricultural Use standards established in CDPHE Regulation 31. There were no exceedances of the Agricultural Use surface water quality standards at the springs in 2020. As previously noted, the 0.2 mg/L Manganese Agricultural Use Standard is only applicable when irrigation water is applied to acidic soils (<6.0 pH). For alkaline soils, as are found at Yoast, a more appropriate standard would be 10 mg/L (EPA, 1976). Therefore, none of the manganese results above 0.2 mg/L are considered exceedances of the standard.

6.0 SUMMARY

No significant hydrologic impacts, attributable to activities at Yoast, were noted during 2020. Groundwater levels in all monitoring wells were within the historic range observed at these locations. No exceedances of the groundwater quality standards were observed at the GWPOC. Exceedances of the total recoverable iron chronic aquatic life standards occurred once at downstream stream monitoring point YSG5 and once at YSS2 however synoptic monitoring during this event confirmed that iron was unrelated to discharge from Yoast's outfalls and is likely the result of natural erosional processes that are occurring within the unmined portions of the watershed.

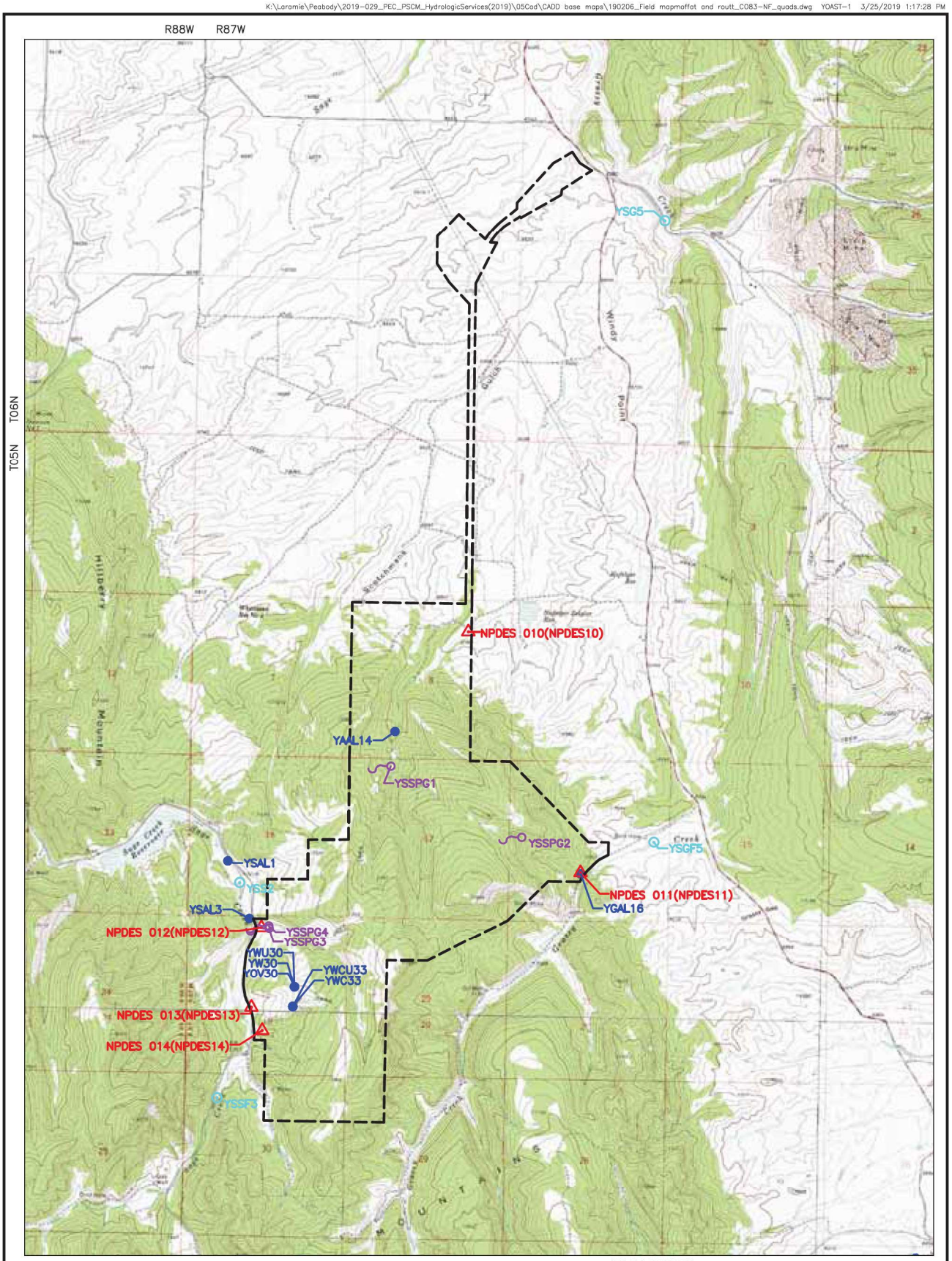

IMAGE SOURCE:
DIGITAL RASTER GRAPHIC COUNTY MOSAIC BY NRCS OF ROUTT COUNTY, COLORADO FROM GEOSPATIAL DATA GATEWAY (HTTPS://GDG.SC.EGOV.USDA.GOV) DOWNLOADED 10/16

DESIGNED BY: JAH	FIGURE 1 MONITORING SITE LOCATIONS
DRAWN BY: SDG	
CHECKED BY: TNS	YOAST MINE PEABODY SAGE CREEK MINING, LLC PEABODY ENERGY
DATE: 2019	WWC ENGINEERING

APPENDIX A

METEOROLOGICAL DATA

PERIOD OF RECORD PRECIPITATION SUMMARY													
Water Year	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**TOTAL**
2020	1.90	1.37	2.60	2.53	2.40	1.67	1.75	1.63	0.77	0.71	0.43	0.43	18.19
2019	2.14	1.81	1.62	2.45	1.46	2.89	1.66	1.88	3.57	0.38	0.44	1.53	21.83
2018	2.45	1.31	1.36	1.65	1.92	1.90	2.95	0.85	0.15	0.15	1.33	0.17	16.19
2017	1.29	0.91	2.06	2.70	1.47	0.84	2.06	1.85	0.13	1.68	0.46	1.74	17.19
2016	1.39	1.90	2.55	2.65	1.16	1.40	3.02	1.94	0.40	0.81	0.19	1.02	18.43
2015	1.60	2.10	1.84	0.55	1.02	1.30	1.60	4.36	0.61	2.36	1.53	0.90	19.77
2014	2.69	1.75	1.42	2.02	0.78	1.96	1.19	2.58	0.72	1.50	3.77	0.87	21.25
2013	0.86	0.46	3.21	1.02	0.73	1.29	3.58	1.67	0.06	0.46	1.48	2.76	17.58
2012	1.41	1.65	0.36	0.87	1.97	0.50	1.13	0.22	0.15	2.43	0.55	1.56	12.80
2011	2.18	1.91	2.98	1.59	2.09	2.52	4.50	3.56	0.85	1.82	0.65	1.14	25.79
2010	1.22	0.77	1.24	0.75	0.90	0.73	1.98	2.80	1.34	1.19	1.56	0.62	15.10
2009	0.53	1.16	1.38	2.80	0.60	1.32	1.40	1.89	2.08	0.51	1.04	0.48	15.19
2008	1.41	0.13	3.36	2.51	1.70	1.64	0.94	1.68	0.37	0.57	0.75	0.91	15.97
2007	2.64	0.76	0.86	1.04	1.34	1.46	0.62	0.87	0.33	0.52	1.12	2.72	14.28
2006	2.27	2.04	2.01	1.78	0.58	1.06	0.95	0.93	0.24	1.48	2.71	2.75	18.80
2005	1.34	1.68	0.50	1.49	0.84	0.99	1.97	1.41	3.36	0.57	1.57	1.30	17.02
2004	0.44	2.90	1.58	0.74	1.64	0.40	1.57	1.26	0.86	1.00	1.44	2.76	16.59
2003	1.88	1.09	1.28	0.74	1.95	0.99	2.57	1.15	1.33	0.47	0.62	1.83	15.90
2002	1.14	1.17	0.54	0.88	0.92	1.06	1.39	0.40	0.37	0.78	1.26	1.94	11.85
2001	0.67	1.60	1.16	0.96	1.41	1.07	1.28	1.15	0.85	1.11	2.06	1.66	14.98
2000	0.43	0.61	1.66	1.66	1.68	1.46	1.84	1.94	0.54	0.75	2.38	2.00	16.95
1999	1.85	0.81	1.13	2.13	0.99	0.57	3.21	2.00	1.39	2.10	1.85	0.78	18.81
1998	2.37	1.08	0.95	1.34	1.93	1.77	1.77	0.62	2.51	1.50	0.48	1.50	17.82
1997	1.79	2.39	1.69	2.88	0.97	0.48	3.19	2.75	1.60	1.05	3.57	5.48	27.84
1996	1.32	2.20	1.26	3.60	2.19	0.99	1.34	2.10	1.00	1.33	0.35	1.37	19.05
1995	0.95	2.09	0.68	1.47	0.97	0.82	3.36	4.48	1.54	1.23	0.73	2.69	21.01
1994	3.02	1.61	1.16	0.69	1.13	0.56	1.85	1.07	0.43	0.24	0.98	0.72	13.46
1993	1.46	1.48	1.33	2.28	1.66	1.53	2.55	1.14	1.29	0.65	1.37	1.39	18.13
1992	1.18	2.79	0.85	0.88	1.16	1.20	1.66	3.08	1.15	4.38	0.95	0.98	20.26
1991	3.20	1.71	1.18	1.75	0.86	2.42	1.09	0.96	1.74	1.59	2.00	1.32	19.82
1990	0.77	1.38	2.08	0.65	1.64	1.54	1.36	1.12	1.38	1.14	0.51	1.22	14.79
1989	0.13	2.79	1.13	1.02	2.50	1.38	0.45	1.39	0.53	1.82	1.33	1.52	15.99
1988	1.27	1.22	2.32	2.80	0.70	1.31	0.83	1.85	1.93	0.60	1.03	2.31	18.17
1987	2.65	1.00	0.56	1.28	1.35	1.50	1.60	1.92	0.64	1.78	1.35	0.46	16.09
1986	3.51	4.19	1.34	0.79	3.01	1.59	2.70	0.99	1.00	1.65	1.96	2.12	24.85
1985	2.61	1.68	1.80	2.40	1.01	2.40	3.77	1.40	0.68	1.28	0.64	1.17	20.84
1984	2.16	2.82	5.03	0.59	0.43	2.31	2.68	1.33	2.36	1.84	2.61	1.31	25.47
1983	1.64	1.52	1.03	1.10	1.66	2.17	2.28	1.57	2.76	1.88	1.08	0.79	19.48
1982	3.76	0.78	2.51	1.71	0.62	2.64	1.92	0.97	0.46	1.60	1.19	2.64	20.80
1981	1.09	0.33	0.43	0.53	0.45	2.50	0.69	3.97	1.65	2.24	1.12	1.33	16.33
AVG	1.72	1.57	1.60	1.58	1.34	1.45	1.96	1.77	1.13	1.28	1.31	1.55	18.27

Note

Data from October 1980 to February 1982, and 2011 Water Year and later, from U.S. Department of Commerce - NOAA - Hayden Station. All other data from Seneca II Mine Meteorological Station with Belfort Weighing Bucket Rain Gage. Site relocated to USGS site on August 31, 1991. Precipitation recorded in inches.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2019	10	01	72	27	67	0.00		0.0		0.0								
2019	10	02	67	28	52	0.00		0.0		0.0								
2019	10	03	75	25	69	0.00		0.0		0.0								
2019	10	04	73	33	65	0.00		0.0		0.0								
2019	10	05	66	22	54	0.00		0.0		0.0								
2019	10	06	58	28	50	0.00		0.0		0.0								
2019	10	07	69	23	61	0.00		0.0		0.0								
2019	10	08	71	23	66	0.00		0.0		0.0								
2019	10	09	72	34	46	0.00		0.0		0.0								
2019	10	10	46	20	25	0.09		1.5		0.0								
2019	10	11	44	6	39	0.00		0.0		0.0								
2019	10	12	59	16	52	0.00		0.0		0.0								
2019	10	13	65	18	57	0.00		0.0		0.0								
2019	10	14	65	23	56	0.00		0.0		0.0								
2019	10	15	64	21	58	0.00		0.0		0.0								
2019	10	16	71	28	64	0.00		0.0		0.0								
2019	10	17	72	29	64	0.00		0.0		0.0								
2019	10	18	64	29	43	0.21		2.0		0.0								
2019	10	19	54	22	47	0.00		0.0		0.0								
2019	10	20	48	25	32	0.27		2.0		2.0								
2019	10	21	37	25	35	0.40		4.0		4.0								
2019	10	22	38	23	34	0.00		0.0		2.0								
2019	10	23	44	28	35	0.08		T		2.0								
2019	10	24	37	16	32	0.10		1.0		1.0								
2019	10	25	49	19	43	0.00		0.0		0.0								
2019	10	26	64	24	54	0.00		0.0		0.0								
2019	10	27	54	18	18	0.30		6.0		6.0								
2019	10	28	19	5	17	0.13		2.0		6.0								
2019	10	29	21	8	8	0.27		2.5		6.0								
2019	10	30	12	-6	6	0.05		0.5		6.0								
2019	10	31	30	-4	24	0.00		0.0		6.0								
Summary			54	21		1.90		21.5										

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2019	11	01	35	12	25	0.00		0.0		6.0								
2019	11	02	41	10	32	0.00		0.0		4.0								
2019	11	03	45	18	37	0.00		0.0		3.0								
2019	11	04	49	30	40	0.00		0.0		2.0								
2019	11	05	51	20	37	0.00		0.0		1.0								
2019	11	06	54	21	40	0.00		0.0		0.0								
2019	11	07	51	17	36	0.00		0.0		0.0								
2019	11	08	65	36	57	0.00		0.0		0.0								
2019	11	09	61	24	42	0.00		0.0		0.0								
2019	11	10	58	22	37	0.00		0.0		0.0								
2019	11	11	41	20	25	0.00		0.0		0.0								
2019	11	12	50	13	36	0.00		0.0		0.0								
2019	11	13	52	23	40	0.00		0.0		0.0								
2019	11	14	53	19	37	0.00		0.0		0.0								
2019	11	15	59	22	47	0.00		0.0		0.0								
2019	11	16	49	25	39	0.00		0.0		0.0								
2019	11	17	51	18	36	0.00		0.0		0.0								
2019	11	18	52	28	40	0.00		0.0		0.0								
2019	11	19	62	23	50	0.00		0.0		0.0								
2019	11	20	50	34	39	0.14		0.0		0.0								
2019	11	21	39	27	29	0.16		1.5		1.0								
2019	11	22	29	23	28	0.18		3.0		3.0								
2019	11	23	39	18	29	0.00		0.0		2.0								
2019	11	24	43	15	33	0.00		0.0		2.0								
2019	11	25	38	23	31	0.05		0.5		2.0								
2019	11	26	38	17	17	0.45		5.0		7.0								
2019	11	27	35	2	25	0.00		0.0		7.0								
2019	11	28	45	22	35	0.00		0.0		5.0								
2019	11	29	51	23	30	0.05		0.5		2.0								
2019	11	30	30	19	19	0.34		4.5		6.0								
		Summary	47	21		1.37		15.0										

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2019	12	01	30	5	20	0.00		0.0		5.0								
2019	12	02	39	10	29	0.00		0.0		4.0								
2019	12	03	43	25	27	0.00		0.0		3.0								
2019	12	04	41	21	29	0.00		0.0		2.0								
2019	12	05	34	26	32	0.65		7.0		9.0								
2019	12	06	38	28	30	0.00		0.0		8.0								
2019	12	07	37	12	32	0.00		0.0		7.0								
2019	12	08	37	28	29	0.25		1.0		8.0								
2019	12	09	32	27	27	T		0.5		8.0								
2019	12	10	34	19	27	0.00		0.0		8.0								
2019	12	11	29	10	25	T		T		8.0								
2019	12	12	33	16	30	0.15		2.0		10.0								
2019	12	13	36	28	28	0.32		3.0		12.0								
2019	12	14	31	24	26	0.55		8.5		19.0								
2019	12	15	26	0	5	0.02		0.5		19.0								
2019	12	16	15	-6	4	0.00		0.0		19.0								
2019	12	17	18	-8	11	0.00		0.0		19.0								
2019	12	18	22	2	16	0.00		0.0		19.0								
2019	12	19	21	2	13	0.00		0.0		16.0								
2019	12	20	28	4	20	0.00		0.0		15.0								
2019	12	21	32	11	26	0.00		0.0		14.0								
2019	12	22	33	15	24	0.00		0.0		14.0								
2019	12	23	28	14	26	0.00		0.0		14.0								
2019	12	24	38	16	26	0.00		0.0		13.0								
2019	12	25	37	24	29	0.24		2.5		15.0								
2019	12	26	29	16	16	T		0.5		15.0								
2019	12	27	16	3	8	0.00		0.0		15.0								
2019	12	28	19	7	12	0.38		4.5		19.0								
2019	12	29	14	0	0	0.04		0.8		19.0								
2019	12	30	20	0	12	0.00		0.0		19.0								
2019	12	31	18	-1	14	0.00		0.0		19.0								
Summary			29	12		2.60		30.8										

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	01	01	26	14	22	0.35		4.5		22.0								
2020	01	02	29	18	19	0.16		2.5		23.0								
2020	01	03	27	16	24	0.00		0.0		23.0								
2020	01	04	31	9	18	0.00		0.0		20.0								
2020	01	05	28	5	20	0.00		0.0		19.0								
2020	01	06	31	10	12	0.05		0.5		19.0								
2020	01	07	33	12	16	0.00		0.0		18.0								
2020	01	08	28	8	27	0.00		0.0		18.0								
2020	01	09	28	19	23	0.31		3.0		21.0								
2020	01	10	23	3	3	0.12		2.0		22.0								
2020	01	11	15	-7	13	0.06		1.0		22.0								
2020	01	12	23	13	19	0.10		2.0		23.0								
2020	01	13	28	12	24	0.06		1.0		21.0								
2020	01	14	38	7	28	0.00		0.0		20.0								
2020	01	15	28	9	11	0.20		5.0		24.0								
2020	01	16	30	9	17	0.00		0.0		22.0								
2020	01	17	36	10	21	0.17		1.5		23.0								
2020	01	18	22	-1	15	0.00		0.0		22.0								
2020	01	19	26	3	13	0.00		0.0		21.0								
2020	01	20	28	3	18	0.00		0.0		21.0								
2020	01	21	36	16	29	0.06		T		21.0								
2020	01	22	34	26	28	0.20		3.0		22.0								
2020	01	23	28	20	26	0.21		3.0		23.0								
2020	01	24	30	13	25	0.00		0.0		22.0								
2020	01	25	35	23	24	0.07		1.0		21.0								
2020	01	26	38	17	30	0.00		0.0		20.0								
2020	01	27	31	22	26	0.25		2.0		22.0								
2020	01	28	34	13	18	0.00		0.0		22.0								
2020	01	29	29	17	26	0.00		0.0		21.0								
2020	01	30	27	17	17	0.16		3.0		23.0								
2020	01	31	25	5	20	0.00		0.0		23.0								
Summary			29	12		2.53		35.0										

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	02	01	32	14	25	0.00		0.0		22.0								
2020	02	02	33	6	23	0.00		0.0		22.0								
2020	02	03	38	14	14	0.07		0.5		22.0								
2020	02	04	14	1	1	0.00		0.0		22.0								
2020	02	05	12	-10	9	T		T		22.0								
2020	02	06	21	8	21	0.67		10.5		31.0								
2020	02	07	36	8	35	0.67		4.0		33.0								
2020	02	08	44	29	29	0.00		0.0		29.0								
2020	02	09	29	14	14	0.17		2.0		31.0								
2020	02	10	29	-4	10	0.00		0.0		31.0								
2020	02	11	10	-13	3	0.00		0.0		31.0								
2020	02	12	26	1	11	0.00		0.0		29.0								
2020	02	13	34	6	19	0.07		1.5		29.0								
2020	02	14	31	1	26	0.00		0.0		28.0								
2020	02	15	31	10	25	0.00		0.0		28.0								
2020	02	16	32	21	29	0.20		4.0		32.0								
2020	02	17	30	19	19	0.23		3.0		32.0								
2020	02	18	19	-8	8	0.00		0.0		32.0								
2020	02	19	18	-1	5	0.00		0.0		32.0								
2020	02	20		-20		0.00		0.0		32.0								
2020	02	21	31	-17	16	0.00		0.0		29.0								
2020	02	22	33	2	26	0.00		0.0		29.0								
2020	02	23	34	22	25	0.23		2.5		30.0								
2020	02	24	26	9	20	0.09		1.5		29.0								
2020	02	25	20	4	11	T		T		29.0								
2020	02	26	24	-6	20	0.00		0.0		28.0								
2020	02	27	32	9	25	0.00		0.0		28.0								
2020	02	28	34	5	24	0.00		0.0		28.0								
2020	02	29	39	6	30	0.00		0.0		28.0								
		Summary	28	4		2.40		29.5										

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National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	03	01	41	15	32	T		T		27.0								
2020	03	02	32	19	23	0.02		0.3		26.0								
2020	03	03	33	4	27	0.00		0.0		26.0								
2020	03	04	34	11	28	0.00		0.0		26.0								
2020	03	05	40	12	32	0.00		0.0		26.0								
2020	03	06	42	21	34	0.00		0.0		25.0								
2020	03	07	51	22	42	0.00		0.0		24.0								
2020	03	08	45	32	33	0.15		0.0		21.0								
2020	03	09	40	30	35	0.15		0.5		21.0								
2020	03	10	43	29	36	T		0.0		19.0								
2020	03	11	43	24	40	0.01		0.0		18.0								
2020	03	12	48	29	39	0.11		0.0		16.0								
2020	03	13	43	25	38	0.07		0.5		15.0								
2020	03	14	45	33	44	0.03		0.0		14.0								
2020	03	15	52	27	47	0.00		0.0		13.0								
2020	03	16	52	23	42	0.00		0.0		12.0								
2020	03	17	54	29	51	0.00		0.0		11.0								
2020	03	18	51	26	39	0.00		0.0		9.0								
2020	03	19	39	29	32	0.17		T		8.0								
2020	03	20	40	25	32	0.29		3.0		7.0								
2020	03	21	45	21	39	0.00		0.0		6.0								
2020	03	22	43	28	38	0.45		4.0		10.0								
2020	03	23	43	23	32	0.19		1.5		9.0								
2020	03	24	48	29	46	T		T		6.0								
2020	03	25	46	32	41	0.00		0.0		5.0								
2020	03	26	52	24	42	0.00		0.0		3.0								
2020	03	27	42	26	33	0.03		T		3.0								
2020	03	28	39	21	35	T		T		2.0								
2020	03	29	45	24	39	0.00		0.0		T								
2020	03	30	49	26	47	0.00		0.0		0.0								
2020	03	31	57	31	52	0.00		0.0		0.0								
Summary			44	24		1.67		9.8										

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

These data are quality controlled and may not be identical to the original observations.

Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	04	01	62	33	54	0.00		0.0		0.0								
2020	04	02	54	23	26	0.32		4.0		4.0								
2020	04	03	39	6	37	0.00		0.0		0.0								
2020	04	04	54	20	50	0.00		0.0		0.0								
2020	04	05	60	32	56	0.00		0.0		0.0								
2020	04	06	63	30	57	0.00		0.0		0.0								
2020	04	07	63	29	58	0.00		0.0		0.0								
2020	04	08	63	27	59	0.00		0.0		0.0								
2020	04	09	69	32	66	0.00		0.0		0.0								
2020	04	10	66	34	55	0.00		0.0		0.0								
2020	04	11	62	26	52	0.00		0.0		0.0								
2020	04	12	52	21	31	0.31		1.0		0.0								
2020	04	13	31	15	27	T		T		0.0								
2020	04	14	40	10	38	0.00		0.0		0.0								
2020	04	15	42	28	35	0.04		T		0.0								
2020	04	16	35	25	29	0.42		4.0		2.0								
2020	04	17	44	8	42	0.00		0.0		0.0								
2020	04	18	51	28	40	0.07		0.0		0.0								
2020	04	19	56	28	42	0.02		0.0		0.0								
2020	04	20	59	29	56	0.00		0.0		0.0								
2020	04	21	64	29	56	0.00		0.0		0.0								
2020	04	22	62	28	58	0.00		0.0		0.0								
2020	04	23	59	34	44	0.10		0.0		0.0								
2020	04	24	55	36	53	0.25		0.5		0.0								
2020	04	25	61	34	58	0.00		0.0		0.0								
2020	04	26	58	34	54	0.06		0.0		0.0								
2020	04	27	71	36	67	0.16		0.0		0.0								
2020	04	28	67	43	64	T		0.0		0.0								
2020	04	29	73	40	73	0.00		0.0		0.0								
2020	04	30	77	41	72	0.00		0.0		0.0								
Summary			57	28		1.75		9.5										

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

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Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	05	01	74	43	70	0.08		0.0		0.0								
2020	05	02	70	42	54	0.14		0.0		0.0								
2020	05	03	68	40	61	0.01		0.0		0.0								
2020	05	04	61	33	54	0.30		T		0.0								
2020	05	05	64	26	61	0.00		0.0		0.0								
2020	05	06	72	34	69	0.00		0.0		0.0								
2020	05	07	69	36	54	0.00		0.0		0.0								
2020	05	08	63	27	59	0.00		0.0		0.0								
2020	05	09	63	29	59	0.00		0.0		0.0								
2020	05	10	70	27	65	0.00		0.0		0.0								
2020	05	11	65	41	52	0.55		0.5		0.0								
2020	05	12	71	41	67	0.00		0.0		0.0								
2020	05	13	67	41	57	0.00		0.0		0.0								
2020	05	14	63	40	55	0.17		0.0		0.0								
2020	05	15	62	42	45	0.24		0.0		0.0								
2020	05	16	62	38	60	0.00		0.0		0.0								
2020	05	17	77	39	74	0.00		0.0		0.0								
2020	05	18	81	45	79	0.00		0.0		0.0								
2020	05	19	79	39	74	0.00		0.0		0.0								
2020	05	20	74	51	61	0.00		0.0		0.0								
2020	05	21	65	30	64	0.00		0.0		0.0								
2020	05	22	73	36	71	0.00		0.0		0.0								
2020	05	23	71	37	52	0.03		0.0		0.0								
2020	05	24	57	33	53	0.10		T		0.0								
2020	05	25	63	29	62	0.00		0.0		0.0								
2020	05	26	73	31	68	0.00		0.0		0.0								
2020	05	27	76	41	70	0.00		0.0		0.0								
2020	05	28	80	43	78	0.00		0.0		0.0								
2020	05	29	85	46	80	0.00		0.0		0.0								
2020	05	30	80	48	63	0.00		0.0		0.0								
2020	05	31	79	47	77	0.01		0.0		0.0								
Summary			70	38		1.63		0.5										

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

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Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	06	01	85	52	83	T		0.0		0.0								
2020	06	02	83	45	81	0.00		0.0		0.0								
2020	06	03	81	42	75	0.00		0.0		0.0								
2020	06	04	83	47	73	0.00		0.0		0.0								
2020	06	05	89	47	84	0.00		0.0		0.0								
2020	06	06	84	49	61	0.17		0.0		0.0								
2020	06	07	74	42	69	0.00		0.0		0.0								
2020	06	08	69	39	43	0.00		0.0		0.0								
2020	06	09	60	36	57	0.53		0.0		0.0								
2020	06	10	70	35	68	0.00		0.0		0.0								
2020	06	11	76	40	73	0.00		0.0		0.0								
2020	06	12	84	43	81	0.00		0.0		0.0								
2020	06	13	82	56	71	0.00		0.0		0.0								
2020	06	14	79	49	78	0.00		0.0		0.0								
2020	06	15	84	39	81	0.00		0.0		0.0								
2020	06	16	83	45	80	0.00		0.0		0.0								
2020	06	17	80	36	68	0.00		0.0		0.0								
2020	06	18	71	34	70	0.00		0.0		0.0								
2020	06	19	74	43	71	0.00		0.0		0.0								
2020	06	20	76	36	71	0.00		0.0		0.0								
2020	06	21	77	42	70	0.00		0.0		0.0								
2020	06	22	81	43	78	0.00		0.0		0.0								
2020	06	23	83	47	82	0.00		0.0		0.0								
2020	06	24	87	49	86	0.00		0.0		0.0								
2020	06	25	86	50	69	0.00		0.0		0.0								
2020	06	26	81	45	69	0.00		0.0		0.0								
2020	06	27	84	45	82	0.03		0.0		0.0								
2020	06	28	84	48	81	0.00		0.0		0.0								
2020	06	29	81	54	67	0.00		0.0		0.0								
2020	06	30	67	40	64	0.04		0.0		0.0								
		Summary	79	44		0.77		0.0										

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

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Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	07	01	80	39	80	T		0.0		0.0								
2020	07	02	85	44	82	0.00		0.0		0.0								
2020	07	03	88	48	82	0.00		0.0		0.0								
2020	07	04	89	51	79	0.00		0.0		0.0								
2020	07	05	90	53	84	0.00		0.0		0.0								
2020	07	06	88	44	84	0.00		0.0		0.0								
2020	07	07	90	50	87	0.00		0.0		0.0								
2020	07	08	87	43	86	0.00		0.0		0.0								
2020	07	09	89	44	86	0.00		0.0		0.0								
2020	07	10	91	45	87	0.00		0.0		0.0								
2020	07	11	92	46	87	0.00		0.0		0.0								
2020	07	12	87	47	66	0.19		0.0		0.0								
2020	07	13	87	55	70	0.08		0.0		0.0								
2020	07	14	88	52	82	0.00		0.0		0.0								
2020	07	15	87	47	83	0.00		0.0		0.0								
2020	07	16	87	47	73	0.00		0.0		0.0								
2020	07	17	84	52	77	0.00		0.0		0.0								
2020	07	18	90	52	80	0.00		0.0		0.0								
2020	07	19	88	55	78	0.00		0.0		0.0								
2020	07	20	88	45	85	0.00		0.0		0.0								
2020	07	21	88	46	87	0.00		0.0		0.0								
2020	07	22	87	50	63	0.03		0.0		0.0								
2020	07	23	79	50	77	0.04		0.0		0.0								
2020	07	24	77	53	75	0.05		0.0		0.0								
2020	07	25	75	54	70	0.01		0.0		0.0								
2020	07	26	87	50	84	0.00		0.0		0.0								
2020	07	27	89	53	87	0.00		0.0		0.0								
2020	07	28	87	56	64	0.31		0.0		0.0								
2020	07	29	84	49	81	0.00		0.0		0.0								
2020	07	30	83	46	82	0.00		0.0		0.0								
2020	07	31	89	50	86	0.00		0.0		0.0								
Summary			86	49		0.71		0.0										

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
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Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
Station: **HAYDEN, CO US USC00053867**

Record of Climatological Observations

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Generated on 02/02/2021

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	08	01	91	53	81	0.00		0.0		0.0								
2020	08	02	91	55	86	0.00		0.0		0.0								
2020	08	03	93	57	89	0.00		0.0		0.0								
2020	08	04	91	55	82	0.00		0.0		0.0								
2020	08	05	89	57	83	0.00		0.0		0.0								
2020	08	06	90	56	86	0.00		0.0		0.0								
2020	08	07	88	46	83	0.00		0.0		0.0								
2020	08	08	88	43	82	0.00		0.0		0.0								
2020	08	09	88	44	85	0.00		0.0		0.0								
2020	08	10	89	45	87	0.00		0.0		0.0								
2020	08	11	89	52	84	0.00		0.0		0.0								
2020	08	12	87	48	81	0.00		0.0		0.0								
2020	08	13	89	50	87	0.00		0.0		0.0								
2020	08	14	88	44	86	0.00		0.0		0.0								
2020	08	15	87	42	84	0.00		0.0		0.0								
2020	08	16	90	45	89	0.00		0.0		0.0								
2020	08	17	92	50	89	0.00		0.0		0.0								
2020	08	18	94	50	89	0.00		0.0		0.0								
2020	08	19	91	54	82	0.00		0.0		0.0								
2020	08	20	87	50	75	0.00		0.0		0.0								
2020	08	21	88	52	85	0.00		0.0		0.0								
2020	08	22	91	48	87	0.00		0.0		0.0								
2020	08	23	93	52	83	0.00		0.0		0.0								
2020	08	24	91	54	82	0.00		0.0		0.0								
2020	08	25	91	56	84	0.00		0.0		0.0								
2020	08	26	90	57	88	0.00		0.0		0.0								
2020	08	27	88	55	84	0.00		0.0		0.0								
2020	08	28	85	53	81	0.00		0.0		0.0								
2020	08	29	81	52	58	0.30		0.0		0.0								
2020	08	30	83	46	76	0.13		0.0		0.0								
2020	08	31	76	41	66	0.00		0.0		0.0								
Summary			89	50		0.43		0.0										

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Current Location: Elev: 6467 ft. Lat: 40.4926° N Lon: -107.2548° W
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National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: 1800 Observation Time Precipitation: 1800

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2020	09	01	70	41	69	0.06		0.0		0.0								
2020	09	02	80	38	78	0.00		0.0		0.0								
2020	09	03	85	41	81	0.00		0.0		0.0								
2020	09	04	88	43	84	0.00		0.0		0.0								
2020	09	05	92	47	87	0.00		0.0		0.0								
2020	09	06	90	44	85	0.00		0.0		0.0								
2020	09	07	85	41	78	0.00		0.0		0.0								
2020	09	08	78	31	40	0.28		0.5		0.0								
2020	09	09	51	31	44	0.00		0.0		0.0								
2020	09	10	46	30	43	0.04		T		0.0								
2020	09	11	64	36	62	0.02		0.0		0.0								
2020	09	12	75	34	72	0.00		0.0		0.0								
2020	09	13	78	37	73	0.00		0.0		0.0								
2020	09	14	79	43	74	0.00		0.0		0.0								
2020	09	15	80	39	75	0.00		0.0		0.0								
2020	09	16	80	40	75	0.00		0.0		0.0								
2020	09	17	81	39	76	0.00		0.0		0.0								
2020	09	18	82	40	75	0.00		0.0		0.0								
2020	09	19	79	50	64	0.00		0.0		0.0								
2020	09	20	73	41	70	0.02		0.0		0.0								
2020	09	21	80	43	75	0.00		0.0		0.0								
2020	09	22	78	42	64	0.01		0.0		0.0								
2020	09	23	77	43	71	0.00		0.0		0.0								
2020	09	24	82	41	78	0.00		0.0		0.0								
2020	09	25	82	40	74	0.00		0.0		0.0								
2020	09	26	74	39	70	0.00		0.0		0.0								
2020	09	27	70	44	53	0.00		0.0		0.0								
2020	09	28	70		50	0.00		0.0		0.0								
2020	09	29	72	28	69	0.00		0.0		0.0								
2020	09	30	75	29	68	0.00		0.0		0.0								
Summary			77	39		0.43		0.5										

Empty, or blank, cells indicate that a data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

APPENDIX B

GROUNDWATER QULITY DATA

Table B.1. Groundwater analytical results for Point of Compliance (POC) well YSAL3 during water year 2020.

Location	Date	Static Water Level FT BTOC	SPC, Field N UMHOS/CM	pH, Field N S.U.	Temp., Field N DEG-C	Fluoride N MG/L	Iron D MG/L	Manganese D MG/L	Nitrate N. N MG/L	Nitrite N. N MG/L	Selenium D UG/L	Sulfates N MG/L	TDS, Lab N MG/L
YSAL3	5/20/2020	4.48	1530	7.8	8.9	0.3	0.54	0.03	1.03	< 0.01	< 2	480	1010
Sage Creek TR39 GWPOC Standards*			-	6.5 - 8.5	-	2	4.91	0.76	10	1	20	1200	2675

Notes

* See Yoast Mine Technical Revision 39 (TR-39) for GWPOC standards

Bold Exceeds groundwater quality standard

Table B.2. Groundwater analytical results for Point of Compliance (POC) well SGAL70 during water year 2020.

Well	Date	Depth to Water ft btoc	pH, Field N S.U.	Temp., Field N DEG-C	SPC, Field N UMHOS/CM	Aluminum D MG/L	Arsenic D UG/L	Boron D UG/L	Cadmium D UG/L	Chloride N MG/L	Chromium D UG/L	Copper D UG/L	Fluoride N MG/L
SGAL70	5/19/2020	9.78	7.22	9	3930	< 0.1	< 0.4	90	**< 20**	37.2	< 20	< 20	0.3
SGAL70	9/19/2020	10.62	7.3	10.5	3610								0.1
Grassy Creek TR39 GWPOC Standard*			6.5 - 8.5	-	-	**5**	**50**	**750**	**5**	**250**	**100**	**200**	**2**

Well	Date	Iron D MG/L	Lead D UG/L	Manganese D MG/L	Mercury D UG/L	Nickel D UG/L	Nitrate N. N MG/L	Nitrite N. N MG/L	Selenium D UG/L	Sulfates N MG/L	Sulfide N MG/L	TDS, Lab N MG/L	Zinc D MG/L
SGAL70	5/19/2020	< 0.1	< 60	0.15	< 0.2	< 20	< 0.02	< 0.01	< 2	2250	< 0.02	3660	< 0.04
SGAL70	9/19/2020	< 0.1		0.26			0.03	< 0.01	< 2	2200		3600	
TR-39 GWPOC Standards*		**14.1**	**70**	**2.44**	**2**	**100**	**10**	**1**	**20**	**2517**	-	**5038**	**5**

Well	Date	Alk. as CaCO3, @ pH 4.5 N MG/L	Calcium D MG/L	SPC, Lab N UMS/CM	Hardness N MG/L	Magnesium D MG/L	Potassium D MG/L	Sodium D MG/L	SAR N NONE	Cation / Anion Balance N %
SGAL70	5/19/2020	405	413	3760	2200	283	5.9	202	1.9	-2.8
SGAL70	9/19/2020									
TR-39 GWPOC Standards*		-	-	-	-	-	-	-	-	-

Notes

* See Yoast Mine Technical Revision 39 (TR-39) for GWPOC standards

Bold Analyte exceeds the TR-39 GWPOC Standard

Table B.3. Groundwater analytical results for Non-Point of Compliance wells during water year 2020.

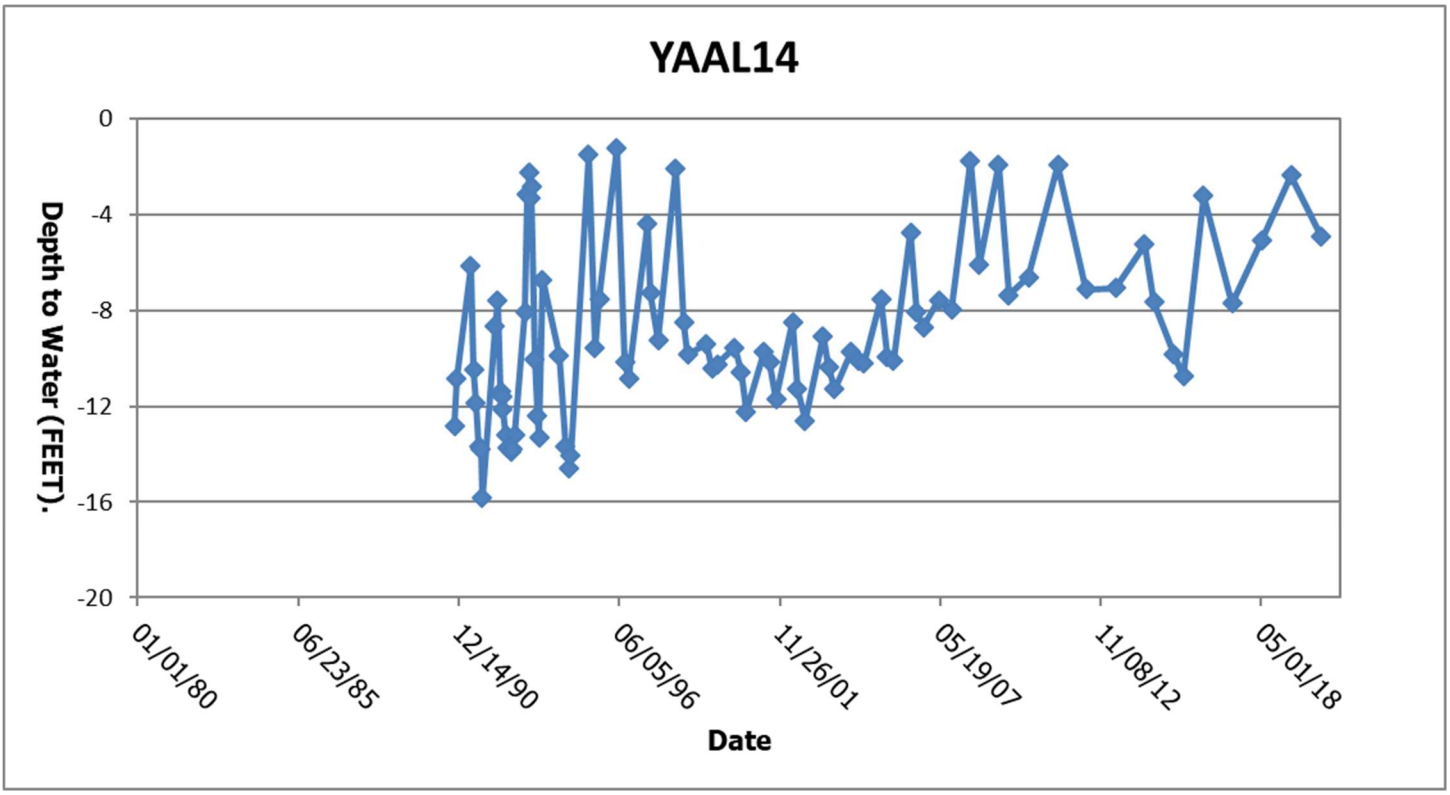
Location	Date	Static Water Level FT BTOC	SPC, Field N UMHOS/CM	pH, Field N S.U.	Temp., Field N DEG-C	Fluoride N MG/L	Iron D MG/L	Manganese D MG/L	Nitrate N. N MG/L	Nitrite N. N MG/L	Selenium D UG/L	Sulfates N MG/L	TDS, Lab N MG/L
YAAL14	5/19/2020	4.94	2940	7.03	8.9	0.2	< 0.1	0.22	0.59	< 0.01	< 2	1310	2280
YGAL16	5/19/2020	6.59	2010	7.14	11.4	0.2	< 0.06	0.01	0.02	< 0.01	< 2	910	1590
YSAL1	5/20/2020	5.23	1640	7.55	9.8	0.3	< 0.06	< 0.01	0.48	< 0.01	2.9	650	1280
YOV30	5/20/2020	132.97	3070	7.57	10.8	1.2	0.4	< 0.05	< 0.02	< 0.01	< 2	1090	4100
YW30	5/20/2020	155.04	8050	7.52	9.7	0.9	0.6	< 0.05	4.81	0.04	< 2	4000	6740
YWU30	5/20/2020	210.73	900	7.61	10.4	0.2	0.13	0.08	3.55	0.01	< 2	40	548
YWC33*	5/20/2020												
YWCU33	5/20/2020	249.31	1470	8.63	10.9		0.39	< 0.01					896

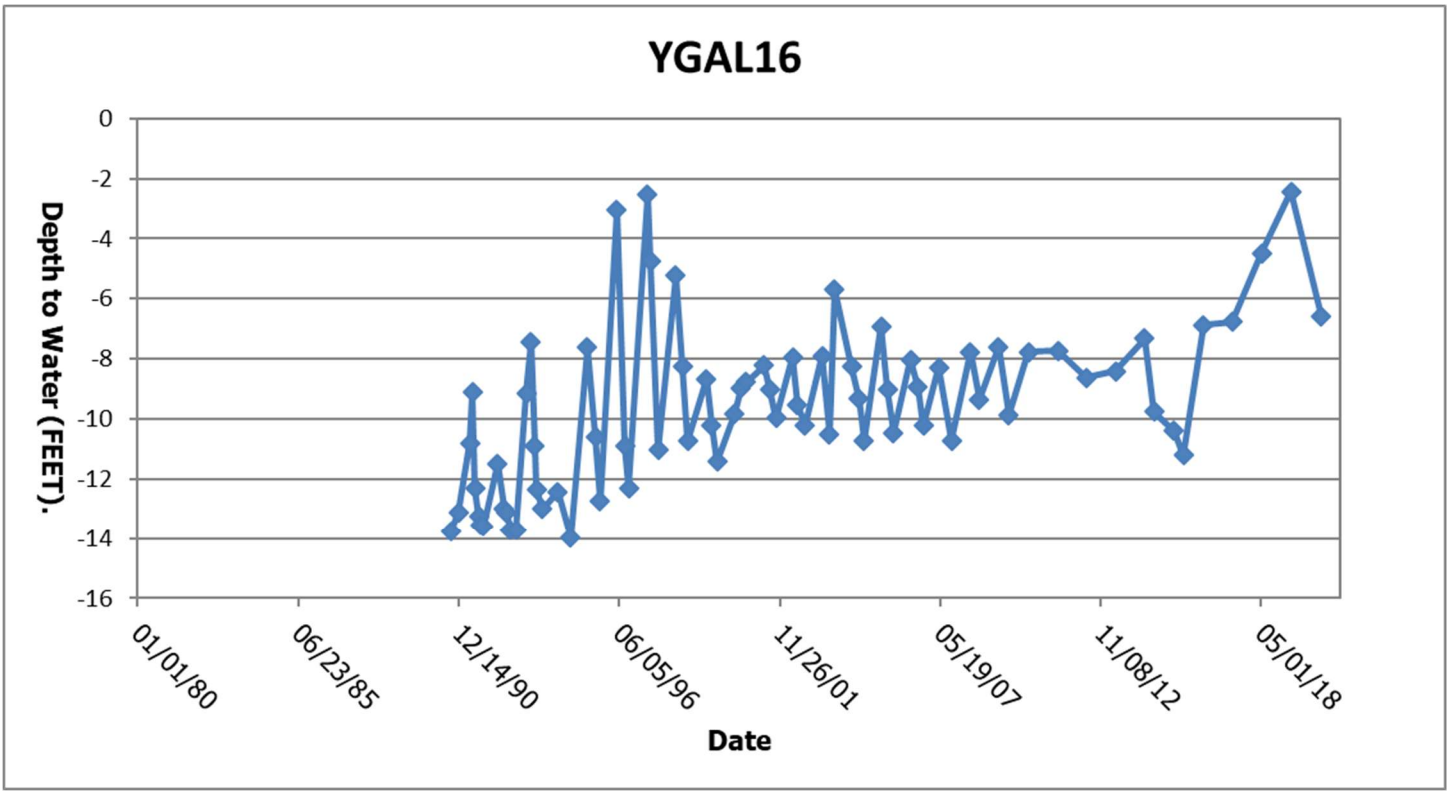
Notes

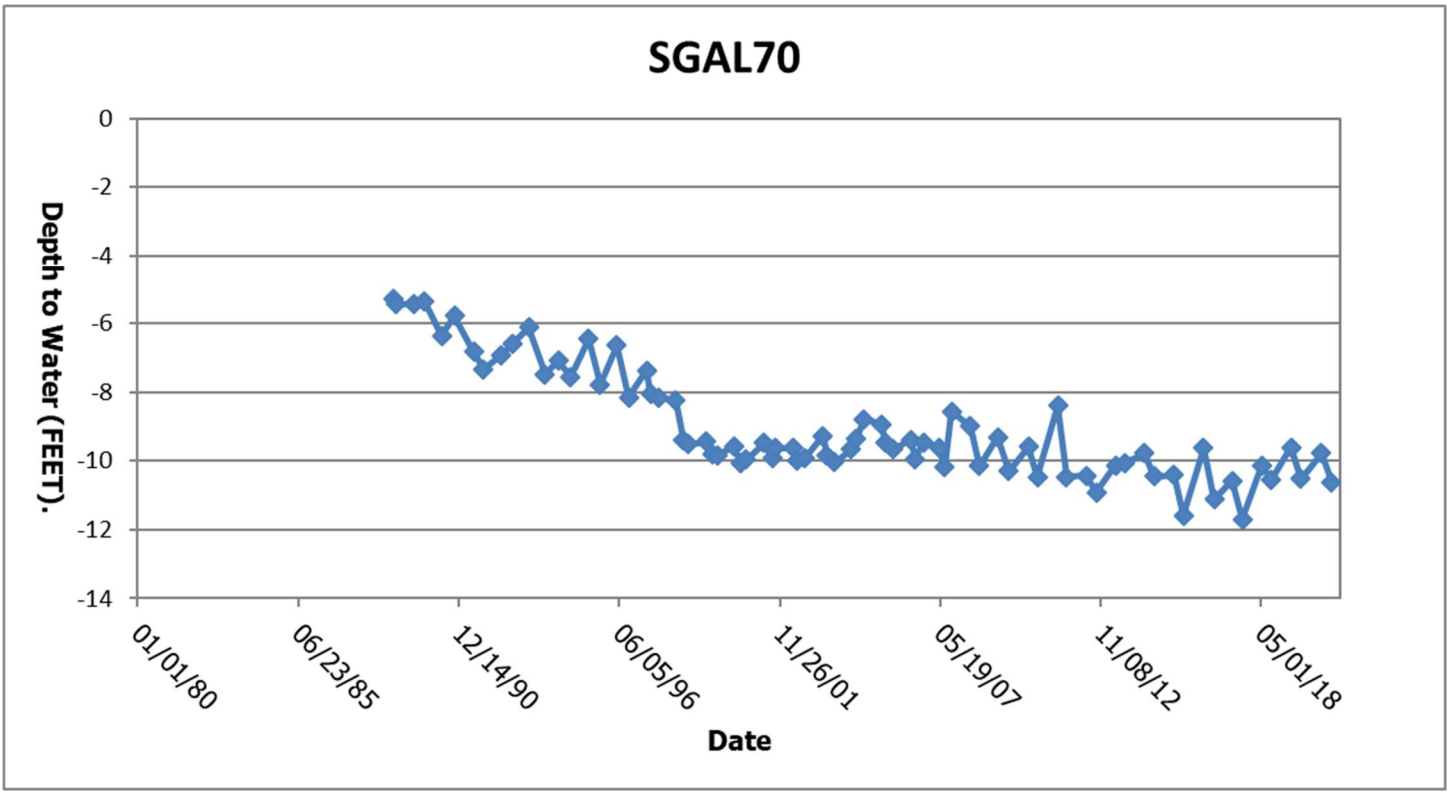
*YWC33 well casing broken. Water level could not be measured and a sample could not be collected.

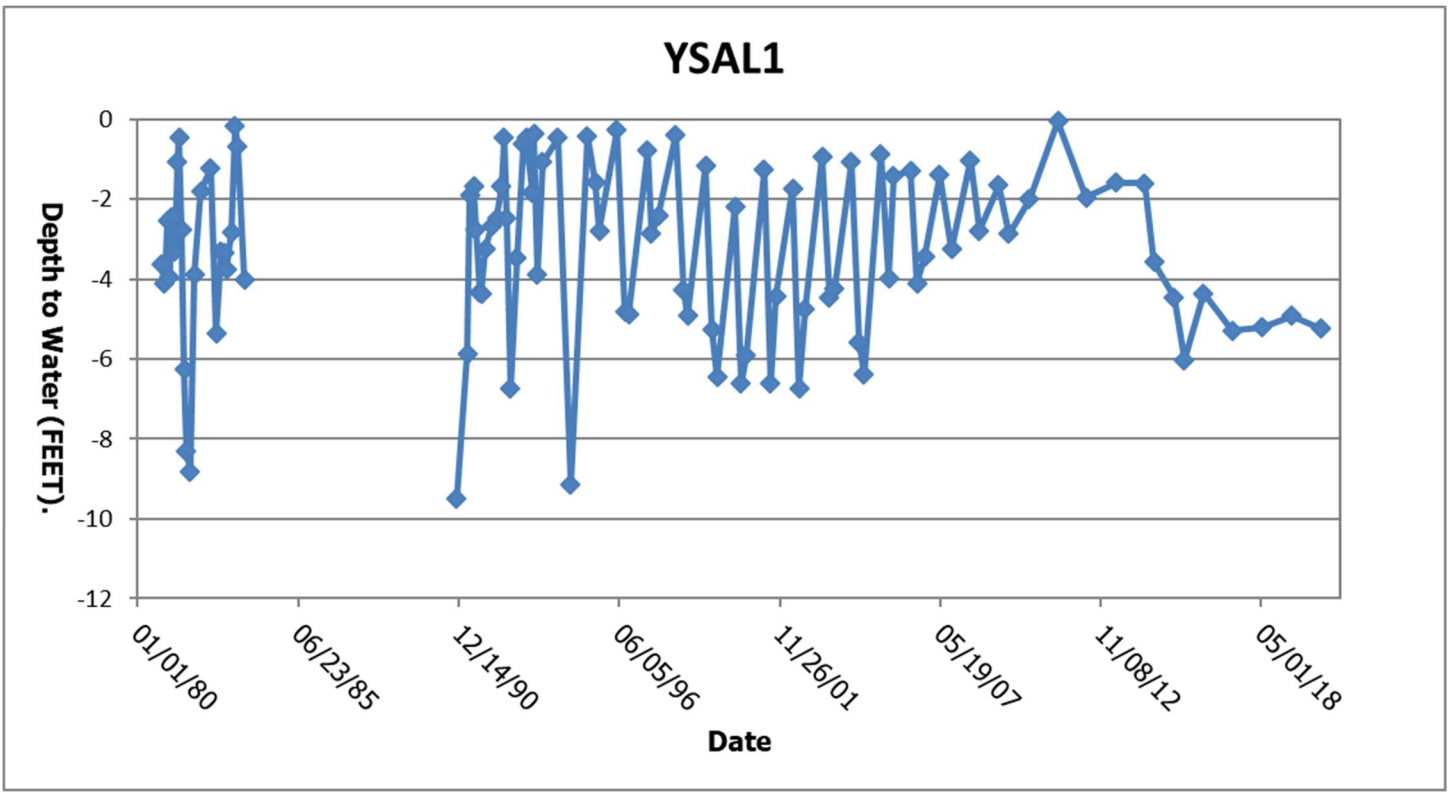
APPENDIX C

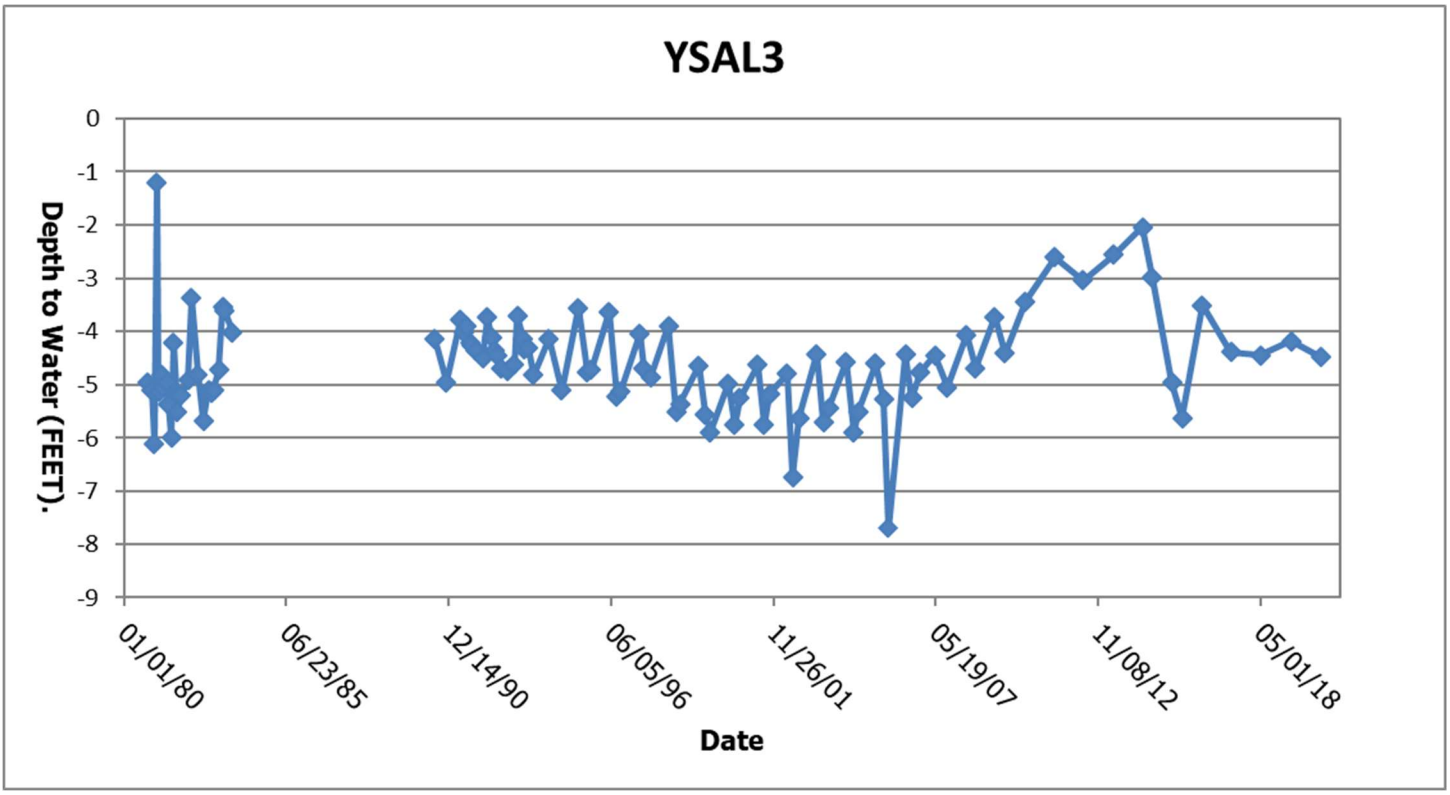
GROUNDWATER HYDROGRAPHS

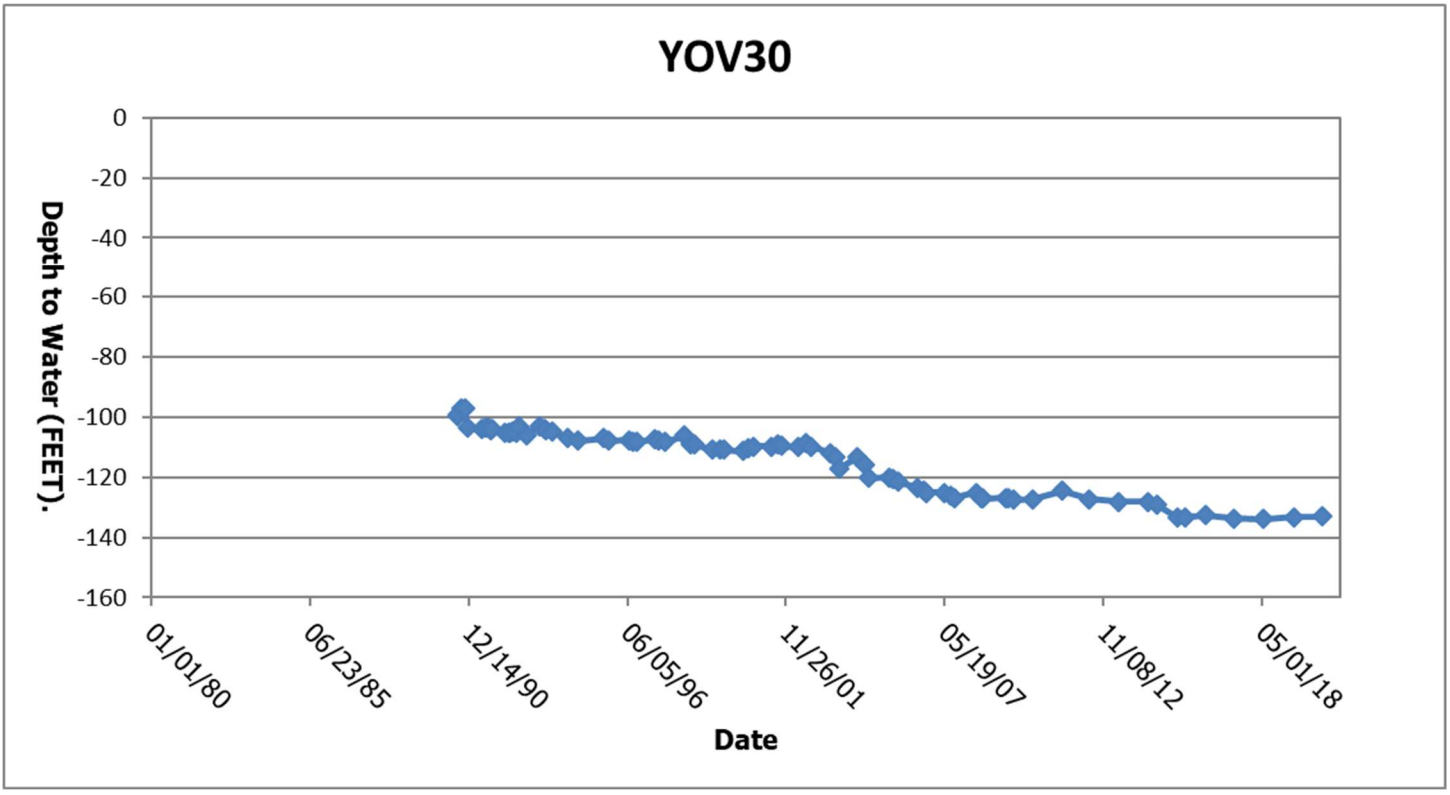

YAAL14
Depth to Water (FEET).
0
-4
-8
-12
-16
-20
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date

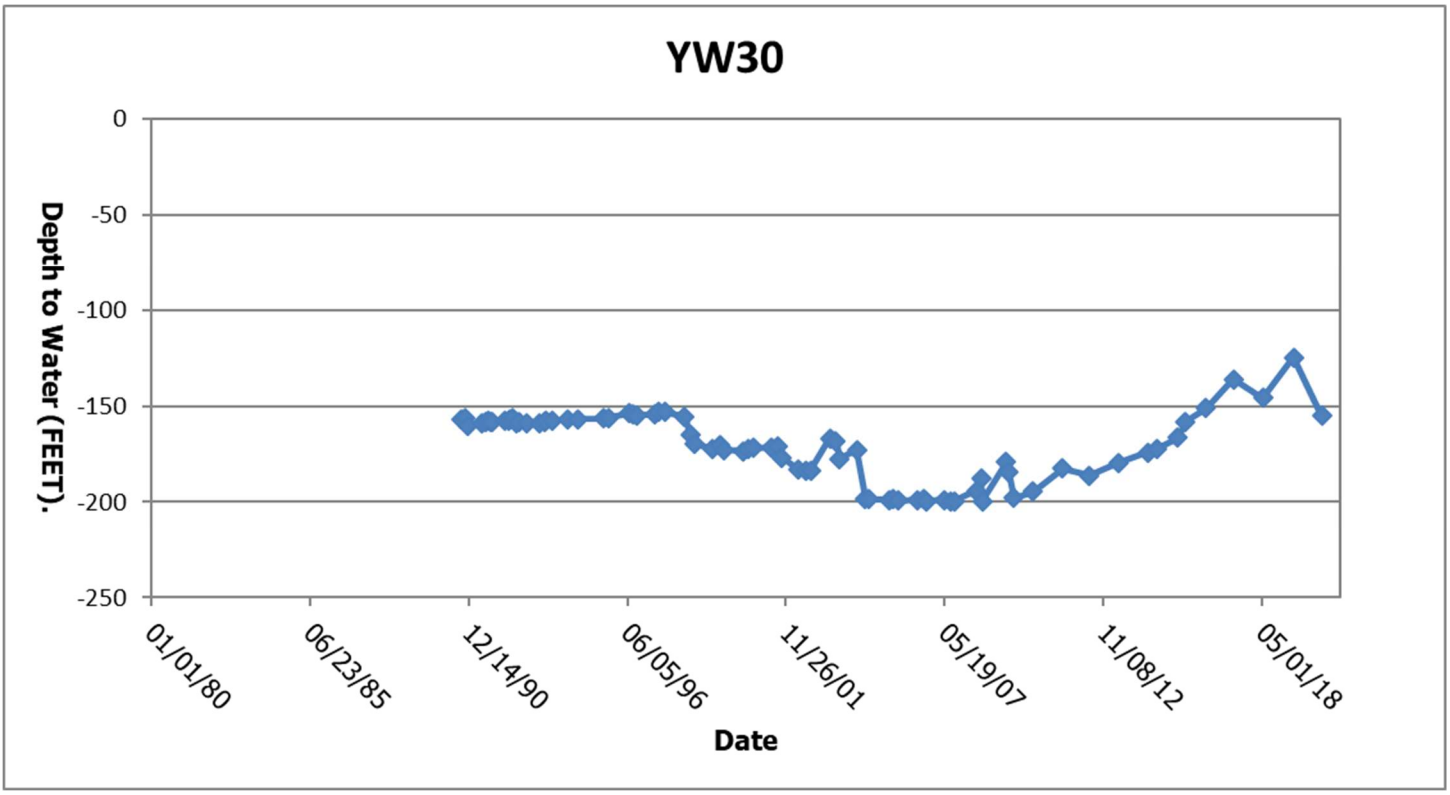

YGAL16
Depth to Water (FEET).
0
-2
-4
-6
-8
-10
-12
-14
-16
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date

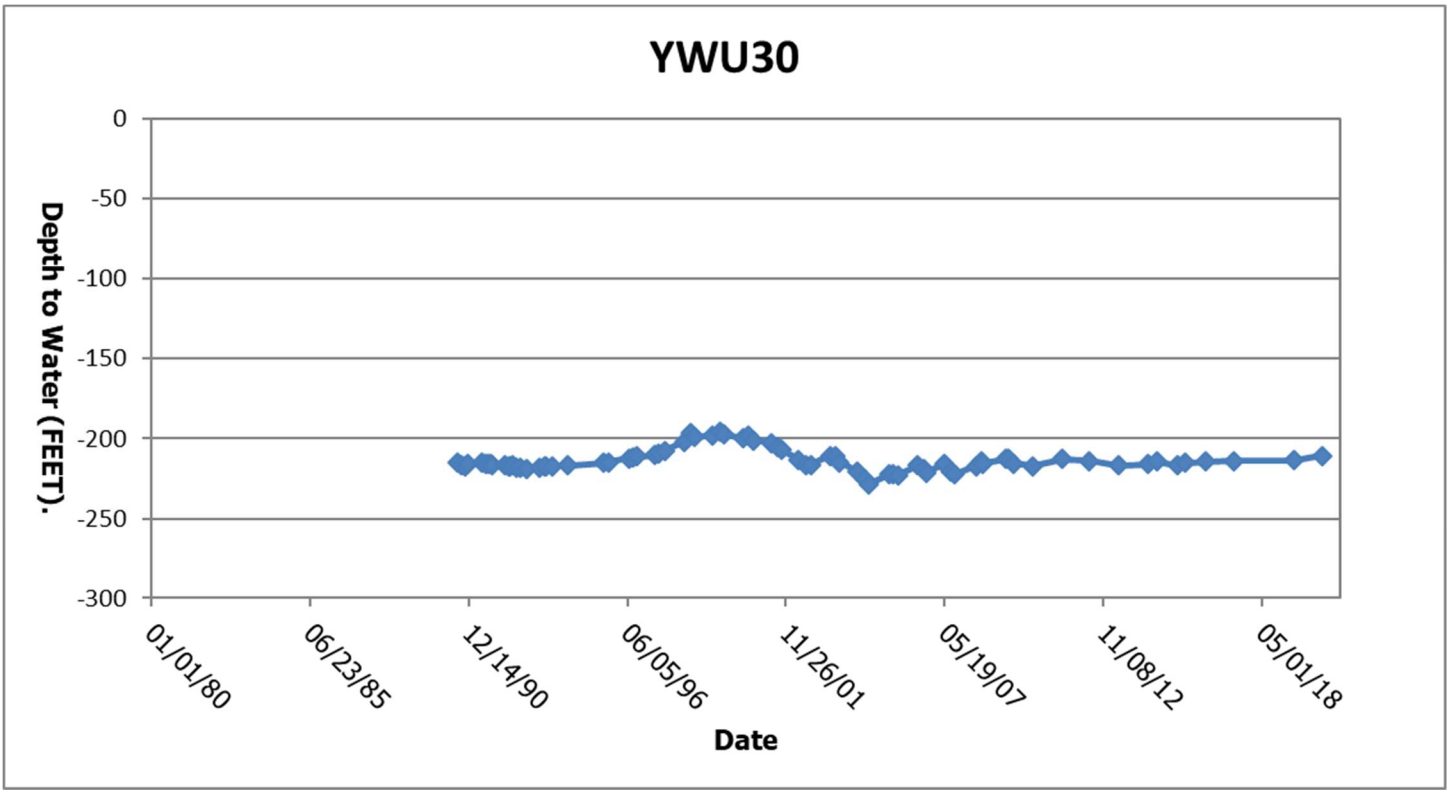

SGAL70
Depth to Water (FEET).
0
-2
-4
-6
-8
-10
-12
-14
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date

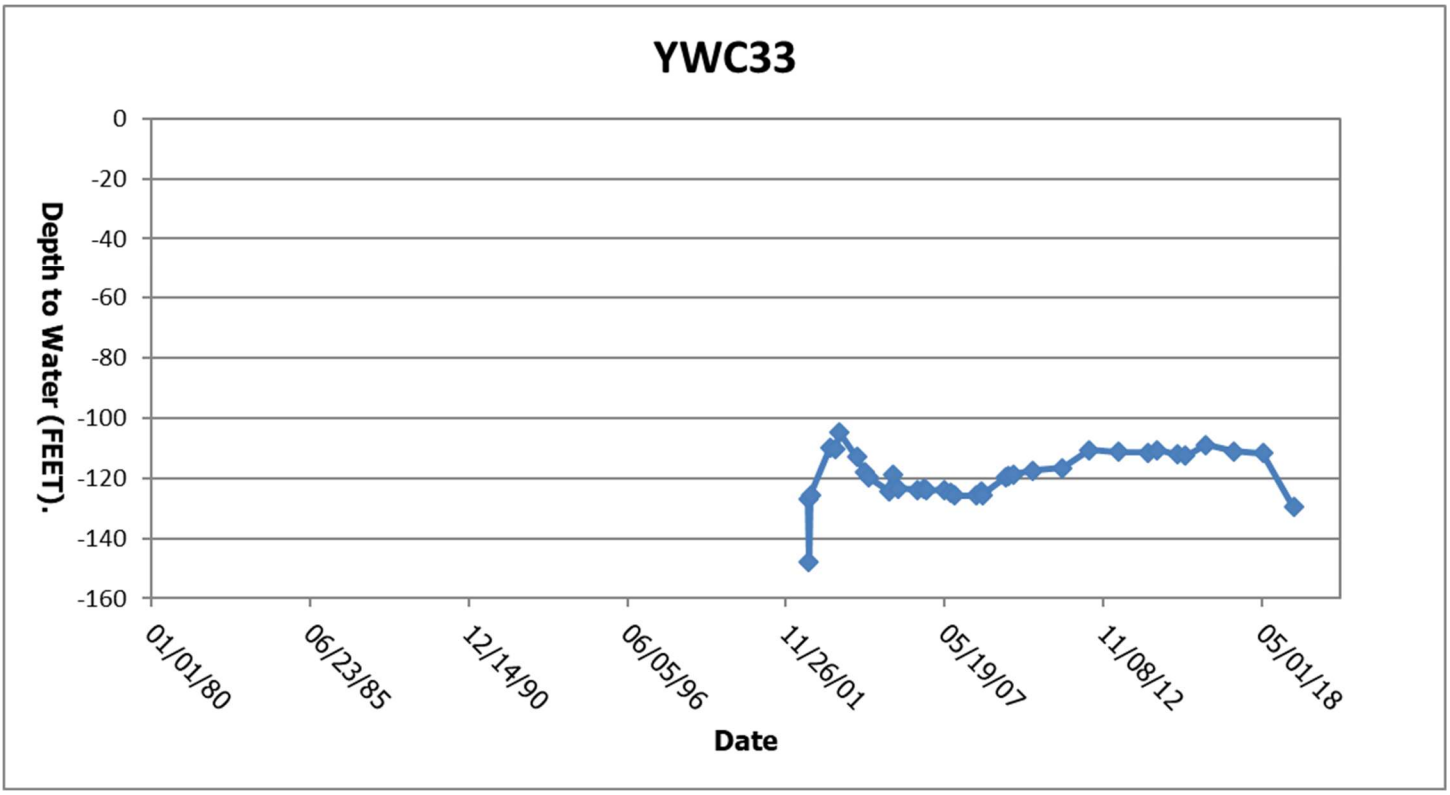

YSAL1
Depth to Water (FEET).
0
-2
-4
-6
-8
-10
-12
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date

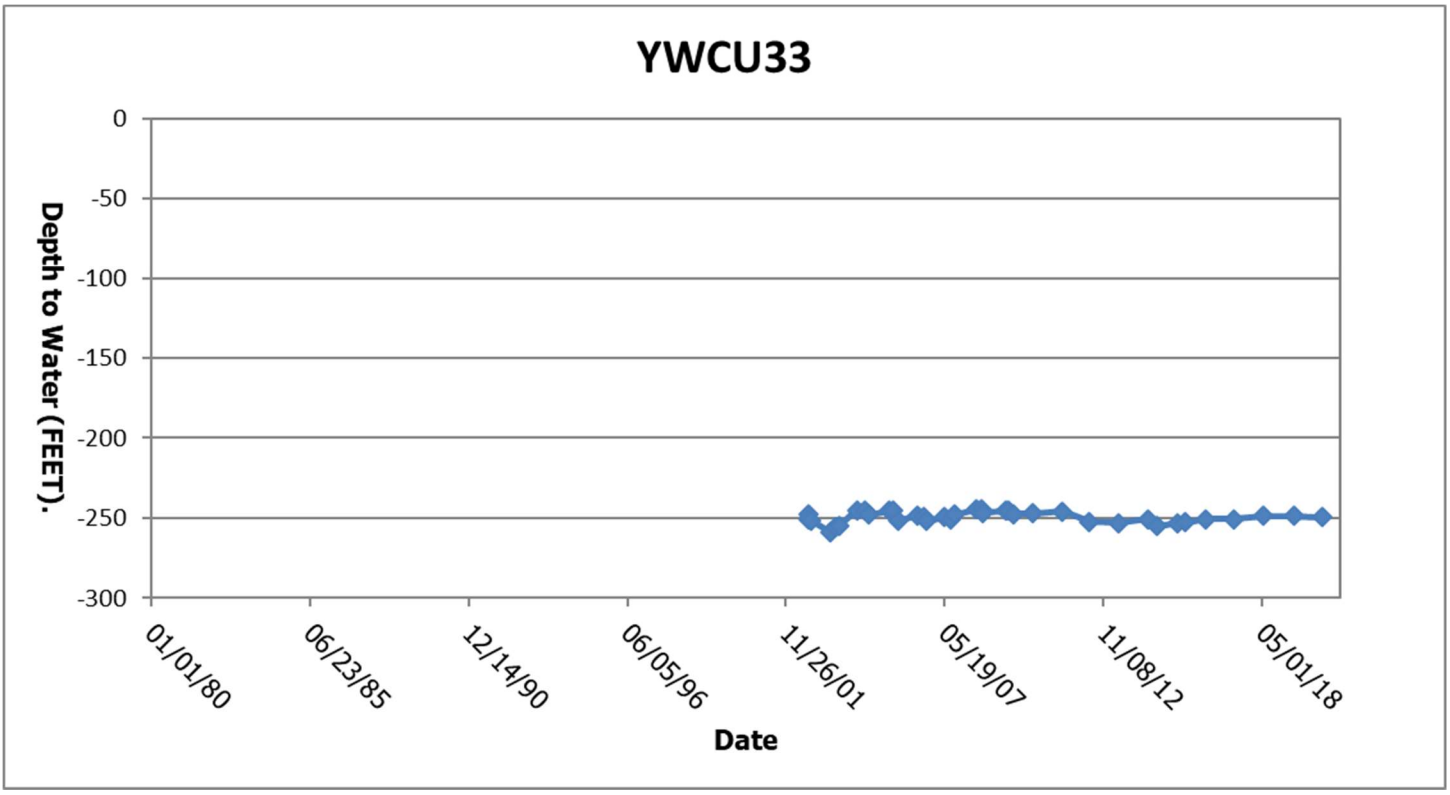

YSAL3
Depth to Water (FEET).
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date


YOV30
Depth to Water (FEET).
0
-20
-40
-60
-80
-100
-120
-140
-160
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date


YW30
0
-50
-100
-150
-200
-250
Depth to Water (FEET).
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date


YWU30
0
-50
-100
-150
-200
-250
-300
Depth to Water (FEET).
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date


YWC33
0
-20
-40
-60
-80
-100
-120
-140
-160
Depth to Water (FEET).
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date


YWCU33
0
-50
-100
-150
-200
-250
-300
Depth to Water (FEET).
01/01/80
06/23/85
12/14/90
06/05/96
11/26/01
05/19/07
11/08/12
05/01/18
Date

APPENDIX D

SURFACE WATER QUALITY DATA

Table D.1 Upper Grassy Creek Yampa Segment 13i stream point analytical data for water year 2020.

Location	Date	Flow N GPM	SPC, Field N UMHOS/CM	pH, Field N S.U.	Temp., Field N C	Iron D MG/L	Iron PD MG/L	Iron TR MG/L	Manganese D MG/L	Mercury T UG/L	Ammonia N. N MG/L	Nitrate N. N MG/L	Nitrite N. N MG/L	Selenium D UG/L
YSGF5	4/21/2020	3217	1245	6.93	10.4	< 0.06	0.29	0.79						
YSGF5	4/21/2020	3217	1245	6.93	10.4			0.75	0.113	**< 0.2**	< 0.05	0.02	< 0.01	0.7
YSGF5	6/2/2020	366	1011	7.51	14.1			1.56	0.0686	**< 0.2**	0.08	< 0.02	0.01	0.5
YSGF5	7/20/2020	143	1337	8.44	25	< 0.06	0.48	1.06						
YSGF5	9/1/2020	1	1225	8.46	16.3			0.45	0.224	**< 0.2**	< 0.05	< 0.02	< 0.01	0.2
Yampa Segment 13i Standards - Acute		-	-	6.5 - 9.0	-	-	-	-	4.738	0.01	0.05	100	0.05	18.4
Yampa Segment 13i Standards - Chronic		-	-	-	-	-	-	TM*	2.618	-	-	-	-	TM*
Agricultural Use Standards		-	-	-	-	-	-	-	0.2**	-	-	100	10	20

Location	Date	Selenium PD UG/L	Selenium TR UG/L	Sulfates N MG/L	Sulfide N MG/L	TDS, Lab N MG/L	TSS N MG/L
YSGF5	4/21/2020					938	23
YSGF5	4/21/2020	0.7	0.6	463	**< 0.02**	946	18
YSGF5	6/2/2020	0.4	0.5	429	**0.02**	924	52
YSGF5	7/20/2020					1020	38
YSGF5	9/1/2020	0.2	0.2	496	**< 0.02**	1160	13
Yampa Segment 13i Standards - Acute		-	-	-	0.002***	-	-
Yampa Segment 13i Standards - Chronic		-	-	-	-	-	-
Agricultural Use Standards		-	-	-	-	-	-

Notes

* A current conditions temporary modification is in place for the Segment 13i chronic iron and selenium standard.
** The manganese agricultural use standard is only applicable for areas with acidic soils. This areas soils are alkaline.
*** Detection limit is an order of magnitude lower than 0.002 mg/L standard for un-ionized sulfide.
Bold Analyte exceeds the Yampa Segment 13i or Agricultural Use Standards

Table D.2. Upper Grassy Creek Segment 13i NPDES Outfall 011 analytical data for water year 2020.

Location	Date	Flow N GPM	pH, Field N S.U.	Oil & Grease Y / N	Iron TR MG/L	TDS, Lab N MG/L	Cadmium PD UG/L	Chromium PD UG/L	Copper PD UG/L	Lead PD UG/L	Mercury T UG/L	Nickel PD UG/L
NPDES11	10/24/2019	0										
NPDES11	11/12/2019	0										
NPDES11	12/4/2019	0										
NPDES11	1/9/2020	0										
NPDES11	2/4/2020	0										
NPDES11	3/2/2020	0										
NPDES11	4/21/2020	0										
NPDES11	5/5/2020	48.7	6.82	N	< 0.06	1340	< 0.05	< 0.5	< 0.8	< 0.1	0.0009	< 8
NPDES11	6/2/2020	32.7	7.68	N	< 0.06	1590						
NPDES11	7/20/2020	0										
NPDES11	8/4/2020	0										
NPDES11	9/1/2020	0										
NPDES Limit	Daily Max		6.5 - 9.0	10	Report	Report	Report	Report	Report	Report	Report	Report
	Monthly Avg.		NA	NA	1	Report	Report	Report	Report	Report	Report	Report
Yampa Segment 13i Standards - Acute			6.5 - 9.0	-	-	-	9.2	1773	50	281	0.01	1513
Yampa Segment 13i Standards - Chronic			-	-	TM**	-	1.2	231	29	11	-	168
Agricultural Use Standards			-	-	-	-	10	100	200	100	-	200

Location	Date	Selenium PD UG/L	Selenium* TR UG/L	Silver PD UG/L	Zinc PD MG/L
NPDES11	10/24/2019				
NPDES11	11/12/2019				
NPDES11	12/4/2019				
NPDES11	1/9/2020				
NPDES11	2/4/2020				
NPDES11	3/2/2020				
NPDES11	4/21/2020				
NPDES11	5/5/2020	0.4	0.3	< 0.1	< 0.02
NPDES11	6/2/2020				
NPDES11	7/20/2020				
NPDES11	8/4/2020				
NPDES11	9/1/2020				
NPDES Limit	Daily Max	Report	-	Report	Report
	Monthly Avg.	Report	-	Report	Report
Segment 13i Standards - Acute		18.4	-	22	0.565
Segment 13i Standards - Chronic		TM**	-	3.5	0.428
Agricultural Use Standards		-	20	-	2

Note

*NPDES11 does not have a Total Recoverable Selenium NPDES monitoring requirement.

** A current conditions temporary modification is in place for the Segment 13i chronic iron and selenium standard.

Bold Analyte exceeds the NPDES limit, Segment 13i aquatic life standard, or Agricultural Use standard

Table D.3 Lower Grassy Creek Yampa Segment 13j stream point analytical data for water year 2020.

Location	Date	Flow N GPM	SPC, Field N UMHOS/CM	pH, Field N S.U.	Temp., Field N C	Iron D MG/L	Iron PD MG/L	Iron TR MG/L	Manganese D MG/L	Mercury T UG/L	Ammonia N. N MG/L	Nitrate N. N MG/L	Nitrite N. N MG/L	Selenium D UG/L
YSG5	4/21/2020	4112	2388	7.87	15.2									4
YSG5	4/21/2020	4112	2388	7.87	15.2			0.9	0.06	**< 0.2**	< 0.05	1.1	0.01	4.2
YSG5	6/2/2020	422	2460	7.96	19.4			**2.2**	0.47	**< 0.2**	0.07	0.19	0.03	1.3
YSG5	7/20/2020	176	3254	8	17.3									1
YSG5	9/1/2020	11.7	2868	7.93	17.3			0.6	0.23	**< 0.2**	< 0.05	< 0.02	< 0.01	0.7
Yampa Segment 13j Standards - Acute		-	-	6.5 - 9.0	-	-	-	-	4.738	0.01	0.05	100	0.05	18.4
Yampa Segment 13j Standards - Chronic		-	-	-	-	-	-	1	2.618	-	-	-	-	TM*
Agricultural Use Standards		-	-	-	-	-	-	-	0.2**	-	-	100	10	20

Location	Date	Selenium PD UG/L	Selenium TR UG/L	Sulfates N MG/L	Sulfide N MG/L	TDS, Lab N MG/L	TSS N MG/L
YSG5	4/21/2020		4.5	1150		2020	
YSG5	4/21/2020		4.5	1140	**< 0.02**	2020	20
YSG5	6/2/2020		1.6	1400		2470	64
YSG5	7/20/2020		1.4	1790		3010	
YSG5	9/1/2020		0.6	1920	**< 0.02**	3320	14
Yampa Segment 13j Standards - Acute		-	-	-	0.002***	-	-
Yampa Segment 13j Standards - Chronic		-	-	-	-	-	-
Agricultural Use Standards		-	-	-	-	-	-

Notes

* A current conditions temporary modification is in place for the Segment 13j chronic selenium standard.
** The manganese agricultural use standard is only applicable for areas with acidic soils. This areas soils are alkaline.
*** Detection limit is an order of magnitude lower than 0.002 mg/L standard for un-ionized sulfide.
Bold Analyte exceeds the Yampa Segment 13j or Agricultural Use Standards

Table D.4. Lower Grassy Creek Segment 13j NPDES Outfall 010 analytical data for water year 2020.

Location	Date	Flow N GPM	pH, Field N S.U.	Oil & Grease Y / N	Iron TR MG/L	TDS, Lab N MG/L	Copper PD UG/L	Selenium* D UG/L	Selenium PD UG/L	Selenium* TR UG/L
NPDES10	10/23/2019	7.2	8.71	N	0.15	2810	< 2		0.3	0.3
NPDES10	11/11/2019	6.7	8.62	N	0.07	2680	< 2		0.4	0.4
NPDES10	12/3/2019	5.8	8.14	N	0.06	2770	< 2		0.4	0.3
NPDES10	1/8/2020	5.7	7.8	N	0.14	2740	< 2		0.5	0.5
NPDES10	2/3/2020	1.8	7.77	N	0.07	2780	< 0.8		6.3	0.4
NPDES10	3/2/2020	2.3	7.75	N	0.07	2640	< 20		14	0.9
NPDES10	4/21/2020	216.8	8.29	N		2160		0.5		0.4
NPDES10	4/21/2020	216.8	8.29	N	< 0.1	2140	< 2		0.4	0.5
NPDES10	5/5/2020	207.4	7.18	N	< 0.06	2270	< 0.8		0.6	0.4
NPDES10	6/2/2020	167.6	8.25	N	< 0.1	2280	< 2		0.4	0.4
NPDES10	7/20/2020	12.8	7.93	N	< 0.1	2620	< 2		0.5	0.5
NPDES10	7/20/2020	12.8	7.93	N		2570		0.4		0.6
NPDES10	8/3/2020	8.6	7.92	N	0.07	2850	< 0.8		0.3	0.3
NPDES10	9/1/2020	7.1	8.12	N	0.15	3140	< 2		0.2	0.3
NPDES Limit	Daily Max		6.5 - 9.0	10	Report	Report	Report	-	Report	-
	Monthly Avg.		NA	NA	1	Report	Report	-	Report	-
Yampa Segment 13j Standards - Acute			6.5 - 9.0	-	-	-	50	18.4	-	-
Yampa Segment 13j Standards - Chronic			-	-	1	-	29	TM**	-	-
Agricultural Use Standards			-	-	-	-	200	-	-	20

Note

*NPDES10 does not have a Dissolved or Total Recoverable Selenium NPDES monitoring requirement.

** A current conditions temporary modification is in place for the Segment 13j chronic selenium standard.

Bold Analyte exceeds the NPDES limit, Segment 13j aquatic life standard, or Agricultural Use standard

Table D.5. Sage Creek Segment 13e stream point analytical data for water year 2020.

Location	Date	Flow N GPM	SPC, Field N UMHOS/CM	pH, Field N S.U.	Temp., Field N C	Iron D MG/L	Iron PD MG/L	Iron TR MG/L	Manganese D MG/L	Mercury T UG/L	Ammonia N, N MG/L	Nitrate N. N MG/L	Nitrite N. N MG/L	Selenium D UG/L
YSSF3	4/22/2020	1764	555	7.26	4			0.51	0.0117					0.4
YSSF3	6/2/2020	869	478	7.74	11.3			0.67	0.0089					< 0.1
YSS2	4/22/2020	6476	1146	7.34	3.4			0.8	0.0342	**< 0.2**	< 0.05	0.21	< 0.01	0.8
YSS2	6/2/2020	986	1001	8.03	12.3			**1.82**	0.0247	**< 0.2**	< 0.05	0.06	< 0.01	0.3
YSS2	9/1/2020	10.6	2686	8.31	18.6			0.33	0.082					0.4
Yampa Segment 13e Standards - Acute		-	-	6.5 - 9.0	-	-	-	-	4.738	0.01	0.05	100	0.05	18.4
Yampa Segment 13e Standards - Chronic		-	-	-	-	-	-	1.25	2.618	-	-	-	-	TM**
Agricultural Use Standards		-	-	-	-	-	-	-	0.2*	-	-	100	10	20

Location	Date	Selenium PD UG/L	Selenium TR UG/L	Sulfates N MG/L	Sulfide N MG/L	TDS, Lab N MG/L	TSS N MG/L
YSSF3	4/22/2020	0.4	0.4			290	8
YSSF3	6/2/2020	0.1	0.1			290	11
YSS2	4/22/2020	0.8	0.7	397	**< 0.02**	800	12
YSS2	6/2/2020	0.3	0.3	494	**< 0.02**	1020	54
YSS2	9/1/2020	0.3	0.4			2990	11
Yampa Segment 13e Standards - Acute		-	-	-	0.002***	-	-
Yampa Segment 13e Standards - Chronic		-	-	-	-	-	-
Agricultural Use Standards		-	-	-	-	-	-

Notes

* The manganese agricultural use standard is only applicable for areas with acidic soils. This areas soils are alkaline.

** A current conditions temporary modification is in place for the Segment 13e chronic selenium standard.

*** Detection limit is an order of magnitude lower than 0.002 mg/L standard for un-ionized sulfide.

Bold

Table D.6. Sage Creek Segment 13e NPDES Outfall 014 analytical data for water year 2020.

Location	Date	Flow N GPM	pH, Field N S.U.	Oil & Grease Y / N	TDS N MG/L	Selenium* D UG/L	Selenium* TR UG/L
NPDES14	10/23/2019	0					
NPDES14	11/11/2019	0					
NPDES14	12/3/2019	0					
NPDES14	1/8/2020	0					
NPDES14	2/3/2020	0					
NPDES14	3/2/2020	0					
NPDES14	4/22/2020	67.7	7.78	N	1370	0.5	0.5
NPDES14	4/22/2020	67.7	7.78	N	1380		
NPDES14	5/5/2020	71.4	7.36	N	1920		
NPDES14	6/1/2020	0					
NPDES14	7/21/2020	0					
NPDES14	8/3/2020	0					
NPDES14	9/1/2020	0					
NPDES Limit	Daily Max		6.5 - 9.0	10	Report	-	-
	Monthly Avg.		NA	NA	Report	-	-
Yampa Segment 13e Standards - Acute			6.5 - 9.0	-	-	18.4	-
Yampa Segment 13e Standards - Chronic			-	-	-	TM**	-
Agricultural Use Standards			-	-	-	-	20

Note

*NPDES14 does not have a Dissolved or Total Recoverable Selenium NPDES monitoring requirement.

Bold Analyte exceeds the NPDES limit or Agricultural Use standard

Table D.7. Sage Creek Segment 13e NPDES Outfall 013 analytical data for water year 2020.

Location	Date	Flow N GPM	pH, Field N S.U.	Oil & Grease Y / N	TDS, Lab N MG/L	Arsenic TR UG/L	Cadmium PD UG/L	Chromium PD UG/L	Copper PD UG/L	Iron TR MG/L	Lead PD UG/L	Manganese PD MG/L	Mercury T UG/L	Nickel PD UG/L
NPDES13	10/23/2019	0												
NPDES13	11/11/2019	0												
NPDES13	12/3/2019	0												
NPDES13	1/8/2020	0												
NPDES13	2/3/2020	0												
NPDES13	3/2/2020	0												
NPDES13	4/22/2020	87.8	7.25	N	2720									
NPDES13	4/22/2020	87.8	7.25	N	2680	0.8	< 0.1	< 1	< 2	0.2	< 0.2	< 0.01	0.0028	< 8
NPDES13	5/5/2020	74.3	7.53	N	5630					< 0.06				
NPDES13	6/1/2020	0												
NPDES13	7/21/2020	0												
NPDES13	8/3/2020	0												
NPDES13	9/1/2020	0												
NPDES Limit	Daily Max		6.5 - 9.0	10	Report	Report	Report	Report	Report	Report	Report	Report	Report	Report
	Monthly Avg.		NA	NA	Report	Report	Report	Report	Report	Report	Report	Report	Report	Report
Yampa Segment 13e Standards - Acute			6.5 - 9.0	-	-	340	9.2	1773	50	1.25	281	4.738	0.01	1513
Yampa Segment 13e Standards - Chronic			-	-	-	100	1.2	231	29	-	11	2.618	-	168
Agricultural Use Standards			-	-	-	100	10	100	200	-	100	0.2***	-	200

Location	Date	Selenium D UG/L	Selenium PD UG/L	Zinc PD MG/L	TSS N MG/L
NPDES13	10/23/2019				
NPDES13	11/11/2019				
NPDES13	12/3/2019				
NPDES13	1/8/2020				
NPDES13	2/3/2020				
NPDES13	3/2/2020				
NPDES13	4/22/2020	13.7			
NPDES13	4/22/2020		15	< 0.02	5
NPDES13	5/5/2020				
NPDES13	6/1/2020				
NPDES13	7/21/2020				
NPDES13	8/3/2020				
NPDES13	9/1/2020				
NPDES Limit	Daily Max	-	Report	Report	-
	Monthly Avg.	-	Report	Report	-
Segment 13e Standards - Acute		18.4	-	0.565	-
Segment 13e Standards - Chronic		TM**	-	0.428	-
Agricultural Use Standards		-	-	2	-

Note

*TSS is not an NPDES monitoring requirement at this outfall

** A current condtions temporary modification is in place for the Segment 13e chronic selenium standard.

*** The agricultural use manganese standard is only applicable to areas with acidic soils. These are not present at Yoast Mine.

**** The agricultural use standard is applied to total recoverable selenium

Bold Analyte exceeds the NPDES limit, Segment 13e aquatic life standard, or Agricultural Use standard

Table D.8. Sage Creek Segment 13e NPDES Outfall 012 analytical data for water year 2020.

Location	Date	Flow N GPM	pH, Field N S.U.	Oil & Grease Y / N	Iron TR MG/L	TDS N MG/L	Manganese PD MG/L	Selenium* D UG/L	Selenium PD UG/L	Selenium* TR UG/L
NPDES12	10/23/2019	77.3	8.43	N	0.2	3200	0.44		0.5	0.3
NPDES12	11/11/2019	74.2	8.41	N	0.21	3410			0.9	0.5
NPDES12	12/3/2019	65.6	7.77	N	0.08	3260			1.6	0.4
NPDES12	1/8/2020	53.4	7.71	N	0.07	3360	0.29		0.9	0.5
NPDES12	2/3/2020	52.7	7.73	N	0.07	3280			1.3	0.4
NPDES12	3/2/2020	53.8	7.75	N	0.09	3310			2.5	0.7
NPDES12	4/22/2020	262.7	7.06	N	< 0.1	2280			0.9	0.9
NPDES12	4/22/2020	262.7	7.06	N		2290		0.8		1
NPDES12	5/5/2020	247.6	7.54	N	< 0.06	2610	0.04		1.7	1.1
NPDES12	6/1/2020	198.7	7.65	N	< 0.1	2740			0.5	0.6
NPDES12	7/21/2020	104.2	7.82	N	0.1	2930			**16.5**	0.4
NPDES12	7/21/2020	104.2	7.82	N		2950		0.6		0.4
NPDES12	8/3/2020	87.6	7.93	N	0.15	3090	0.22		0.4	0.4
NPDES12	9/1/2020	78.7	8.03	N	0.13	3240			0.3	0.3
NPDES Limit	Daily Max		6.5 - 9.0	10	Report	Report	Report	-	18	-
	Monthly Avg.		NA	NA	1	Report	Report	-	4.6	-
Yampa Segment 13e Standards - Acute			6.5 - 9.0	-	1	-	4.738	18.4	-	-
Yampa Segment 13e Standards - Chronic			-	-	-	-	2.618	TM**	-	-
Agricultural Use Standards			-	-	-	-	0.2***	-	-	20

Note

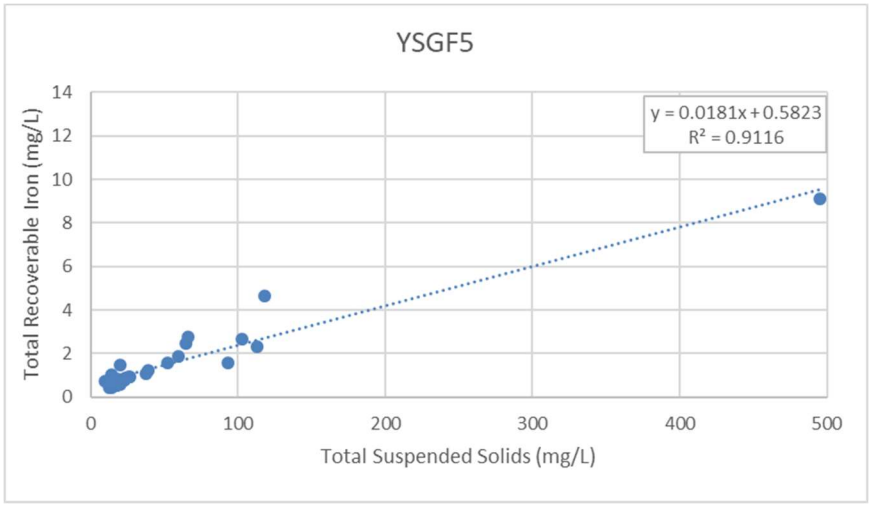
*NPDES12 does not have a Dissolved or Total Recoverable Selenium NPDES monitoring requirement.

** A current condtions temporary modification is in place for the Segment 13e chronic selenium standard.

*** The manganese agricultural use standard is only applicable to areas with acidic soils. These are not present at Yoast Mine.

Bold Analyte exceeds the NPDES limit, Segment 13e aquatic life standard, or Agricultural Use standard

Figure D.1. Suspended solids vs total recoverable iron at Grassy Creek stream points YSGF5 and YSG5 collected between January 1, 2014 and September 30, 2020.



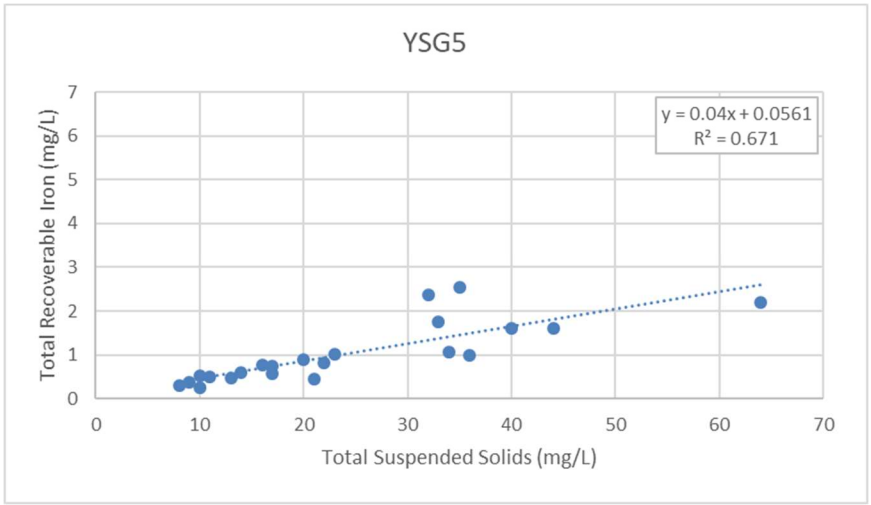
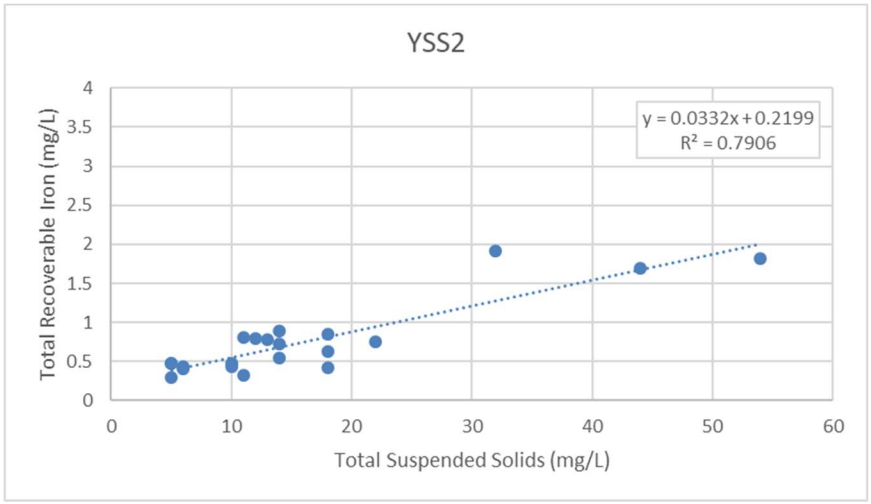


Figure D.2. Suspended solids vs total recoverable iron at Sage Creek stream points YSS2 collected between January 1, 2014 and September 30, 2020.



APPENDIX E

SPRING WATER QUALITY DATA

Table E.1. Analytical data for springs sampled during the 2020 water year.

Location	Date	Flow N GPM	SPC, Field N UMHOS/CM	pH, Field N S.U.	Temp., Field N C	Iron TR MG/L	Manganese D MG/L	Mercury T UG/L	Ammonia N. N MG/L	Nitrate N. N MG/L	Nitrite N. N MG/L
YSSPG1	6/2/2020	168.9	2537	7.85	21.7	1.4	0.384	< 0.2	< 0.05	0.1	< 0.01
YSSPG2	6/2/2020	7.3	2221	6.64	13.9	< 0.1	0.131				
YSSPG3	6/3/2020	2.4	1417	7.91	13.6	0.31	0.366				
YSSPG4	6/3/2020	106.4	1990	6.48	11.8	< 0.1	1.5				
Agricultural Use Standards		-	-	-	-	-	0.2*	-	-	100	10

Location	Date	Selenium D UG/L	Selenium PD UG/L	Selenium TR UG/L	Sulfates N MG/L	Sulfide N MG/L	TDS, Lab N MG/L	TSS N MG/L
YSSPG1	6/2/2020	< 0.2	< 0.2	< 0.2	1300	< 0.02	2470	44
YSSPG2	6/2/2020	< 0.2	< 0.2	< 0.2			2500	< 5
YSSPG3	6/3/2020	0.2	0.2	0.3			1510	< 5
YSSPG4	6/3/2020	0.4	0.4	0.4			2450	< 5
Agricultural Use Standards		20	-	-	-	-	-	-

Notes

* The manganese agricultural use standard is only applicable for areas with acidic soils. This areas soils are alkaline.

Bold Analyte exceeds the Agricultural Use Standards