EAGLE MINE ANNUAL REPORT – 2013

EAGLE MINE SITE
MINTURN, COLORADO

Prepared for:
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1.0 INTRODUCTION

This Annual Site Monitoring and Activity Report (Annual Report) was prepared by NewFields on behalf of CBS Operations Inc. (CBS) and provides a summary of environmental data collected during the 2013 calendar year at the Eagle Mine (Site) near Minturn, Colorado. The Site location and vicinity are shown on Figure 1-1. The Annual Report also summarizes design, construction, inspection, operation and maintenance, and community relation activities conducted in 2013 in connection with the Site.

This Annual Report is a deliverable listed in Table A of the Final Statement of Work - Part A (Appendix B) for the Operable Unit No. 1 Partial Consent Decree, Civil Action No. 95-N-2360 (D. Colorado) (CD/SOW). This Annual Report also satisfies the requirement for an annual monitoring report specified in the Consent Decree, Order, Judgment and Reference to the Special Master for Civil Action No. 83-C-2387 (D. Colorado), Remedial Action Plan, as amended (CD/RAP).

Monitoring activities, data summaries, interpretation and analysis of selected data, and summaries of Site activities are provided in the following sections:

- Section 2 Surface Water Monitoring and Data Summary
- Section 3 Eagle Mine Water Monitoring and Data Summary
- Section 4 Groundwater Monitoring and Data Summary
- Section 5 Summary of Site Activities.

Figures and tables are presented at the end of each section.

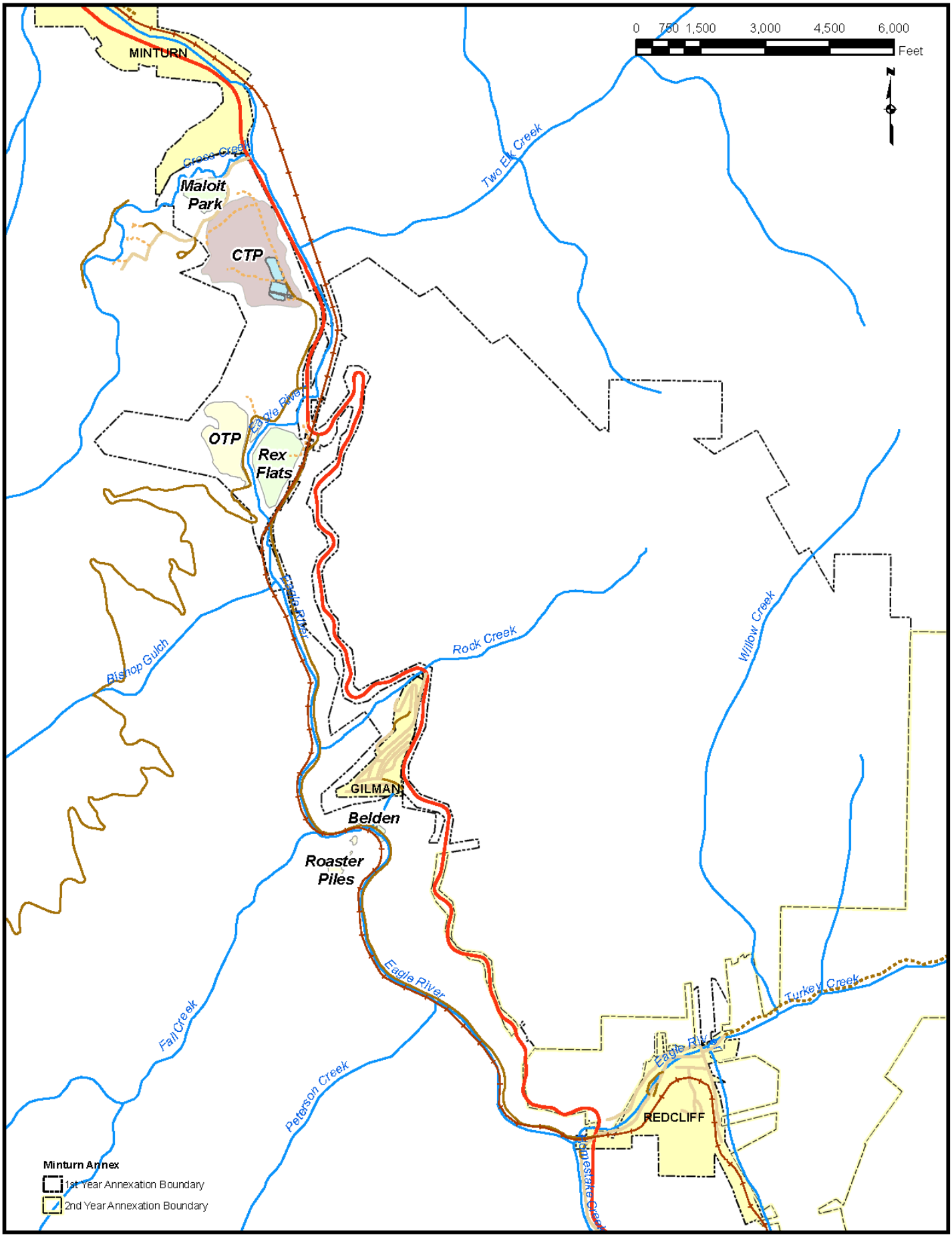


Figure 1-1 Eagle Mine Site

2.0 SURFACE WATER MONITORING AND DATA SUMMARY

Surface water monitoring was originally conducted in accordance with the requirements of the Surface Water Sampling and Analysis Plan (SWSAP, Dames & Moore 1996). The scope of the monitoring activities has changed over the years. The 2013 surface water monitoring scope was finalized with Colorado Department of Public Health and Environment (CDPHE) and US Environmental Protection Agency (EPA) on January 11, 2013. This section provides a summary of surface water monitoring activities at the Site for the reporting period, Fall 2012 through Fall 2013 (fall monitoring occurs in either September or October).

2.1 Monitoring Stations and Scope

Surface water monitoring stations (Figure 2-1) for the Site were established in 1985 at the outset of the remedial investigation, corresponding closely with locations used by the US Geological Survey (USGS) in studies prior to 1985. The Colorado Water Quality Control Commission (WQCC) has established water quality standards for Segment 5 of the Eagle River and Segment 7 (Cross Creek). Segment 5, the mainstem of the Eagle River, is divided into the following three segments:

- 5a – Mainstem of the Eagle River from the compressor house bridge at Belden to the Highway 24 Bridge near Tigiwon Road
- 5b – Mainstem of the Eagle River from Highway 24 Bridge near Tigiwon Road to the confluence with Martin Creek
- 5c – Mainstem of the Eagle River from the confluence with Martin Creek to the confluence with Gore Creek.

Additionally Segment 7, Cross Creek, was subdivided into the following two segments:

- 7a – Cross Creek mainstem to the Minturn Middle School
- 7b – Cross Creek from the Minturn Middle School to the confluence with the Eagle River.

The monitoring scope for 2013 was focused on assessing the water quality of Segment 5a of the Eagle River and the potential heavy metal loading sources. Additional monitoring of most downstream portions of Segment 2 (upstream of or background to Segment 5a), Segment 5b, Segment 5c, and Segment 7b (Cross Creek) was also conducted in 2013.

The following Eagle River stations were monitored at least once during the reporting period:

- E-3 Eagle River above Belden (background location – Segment 2)
- E-10 Eagle River above Rock Creek (Segment 5a)
- E-12A Eagle River below Old Tailings Pile/Rex Flats (Segment 5a)
- E-15 Eagle River below Cross Creek (Segment 5b)
- E-22 Eagle River above Dowds Junction (Segment 5c).

The following two tributaries to the Eagle River at the Site were monitored:

- T-10 Rock Creek at mouth (tributary to Segment 5a)
- T-18 Cross Creek near mouth (Segment 7b; tributary to Segment 5b).

Other Eagle River tributaries at the Site are, in downstream order, Roaster Pile drainage, Fall Creek, Bishop Gulch, and Two Elk Creek. These tributaries enter the Eagle River between Red Cliff and Minturn but are no longer monitored for water quality or stream flow. Years of sampling data confirm that these tributaries are not metal loading sources to the Eagle River.

Eagle River and tributary water quality samples were collected in the reporting period pursuant to the methods in the SWSAP. Surface water quality samples were collected in March, April, and September and were analyzed for dissolved cadmium, copper, and zinc, as well as for calcium and magnesium for hardness calculations. Additionally total arsenic was measured at all monitoring locations. Field measurements consisted of pH, temperature, and specific conductance.

Stream flow in the Eagle River was monitored using the USGS gage at E-12A (09064600). Stream flow at non-E-12A stations are calculated using historical relationships developed over many years. These historical flow relationships were established between each station and the flow measurement recorded at the E-12A gage. Flow in Rock Creek was manually estimated. For Cross Creek, the USGS stream gage “Cross Creek near Minturn” (09065100) discharge rating data are used to estimate flow for Station T-18.

Water quality data and measured or estimated stream flow are presented with the associated water quality data in Appendix A-1. Equations for the estimated flow rates for non-measured stations based on the E-12A measured flow (USGS gage 09064600) are included in Appendix A-2.

2.2 Hydrology

Included in this section are background information on the hydrologic monitoring program, a comparison of 2012 and 2013 stream flows to historical conditions, and a discussion of stream flow during water quality sampling events.

The Eagle River and its tributaries at the Site exhibit a large seasonal fluctuation in stream flow each year that is typical of most high-elevation watersheds in the central Rocky Mountains. Eagle River stream flow at the Site is illustrated in the hydrograph shown in Figure 2-2.

Eagle River watershed topographic elevation ranges from 8000 ft mean sea level (MSL) at the Site to over 14,000 ft MSL at the headwaters of the Eagle River, with precipitation greater in the higher elevations. From November through April each year, a seasonal snowpack accumulates in the watershed with greater snow accumulation at higher elevations. During the winter, mean daily temperatures are typically below freezing and stream flow in the Eagle River and its tributaries is at a minimum. The Eagle River winter base flow period at the Site extends from November to March each year and stream flow typically ranges from about 30 to 40 cubic feet per second (cfs). Small fluctuations in Eagle River stream flow occur during winter because of ice freezing and thawing on the river channel bed and banks.

Site snowpack begins to melt in March and April, followed by snowmelt from progressively higher elevations in the watershed through June each year. In May, Eagle River flow is usually dominated by high-elevation basin-wide snowmelt upstream from the Site. Large diurnal flow fluctuations occur because of daily snowmelt during this period. Peak flows in excess of 800 cfs are common in the Eagle River at the Site during the spring runoff period. Stream flow recedes from July through October each year, with periodic flow increases resulting from summer rainfall-runoff events.

2.2.1 Eagle River

USGS records continuous stage height readings at a stream gage located at E-12A (see Figure 2-1). The gage is at an elevation of 8080 ft MSL and represents a drainage area of 186 square miles.

The gage is operational during ice-free periods (eight months each year) from about March 15 to November 15 and collects estimated measurements during the ice periods. The channel at the gage typically becomes ice-covered in November and ice on the controls affects the stage height readings throughout the winter months. According to USGS criteria, the gage records are considered good (90 percent of the daily discharges are within 10 percent of their true value) except for records estimated during ice periods, which are fair

(within 15 percent). Discharge during ice periods is estimated from direct stream flow measurements and stage height measurements that are corrected for ice effect.

A preliminary discharge rating has been developed for the Eagle River at the E-12A stream gage and its accuracy is evaluated regularly using current discharge measurements. The USGS is involved in the operation and maintenance of the gage through a cooperative agreement with Eagle County and CBS. The USGS publishes mean daily discharge data on a real-time basis on their website http://waterdata.usgs.gov/co/nwis for USGS station 09064600.

Figure 2-3 presents the 2012-2013 flow year divided into three flow periods: 2012-2013 winter low flow, 2013 spring/summer high flow, and 2013 fall low flow. The dates when CBS samples were collected during these periods are labeled on Figure 2-3 with an "S" when all stations were monitored and with an "s" when stations E-12A and E-15 were monitored by the Eagle River Watershed Council or Eagle River Water and Sanitation.

Eagle River stream flow at the Site was below average during the peak flow period in 2013 (see Figure 2-2). Stream flow was well below normal (18 to 27 cfs) through the winter of 2012-2013 (see Figure 2-3). Flows levels rose slightly above the winter base flow levels beginning in late March 2013 and continued with below average flows into April 2013. On April 30, 2013, the Upper Colorado River Basin snowpack, as estimated by the Natural Resources Conservation Service (NRCS), was 77 percent of normal compared to 47 percent in 2012 (NRCS 2012, 2013). The river began its spring rise in late April with river flows approximately half of average. By mid-May, the river flows were approximately average though flow rates were highly variable. The highest river flow recorded for the season was on June 10, 2013 at 684 cfs at station E-12A. By July 1, 2013, the daily average flows were below 150 cfs, approximately 20 days earlier than average. High flows were observed within a 60-day high flow season rather than the typical 90-day high flow. Stream flow continued well below average until mid-August when fall rains raised the river flow back up into early spring flow rates (above 100 cfs), higher than average for fall river flows. These higher rates continued through October.

2.2.2 Tributaries

Rock Creek is a perennial tributary entering the Eagle River between stations E-10 and E-11 (see Figure 2-1), draining approximately 1.5 square miles. Flow measurements are made visually or with a bucket and stopwatch in the 48-inch diameter culvert at the base of Rock Creek (T-10) at the confluence with the Eagle River. Rock Creek flows typically increase from snowmelt beginning in March or April with peak flows occurring in May or June. In 2013, Rock Creek flow contributed typically less than 1 percent of the Eagle River flow, with measured flows (versus estimated) ranging from 0.3 to 1.4 percent.

Cross Creek is a perennial tributary entering the Eagle River between stations E-13B and E-15 (see Figure 2-1) draining approximately 34.2 square miles. Stream flow (measured at USGS station 09065100 or T-18) ranges from less than 5 cfs during the winter season to peak flows between 150 and 200 cfs in May and early June. In 2013, the Cross Creek high flows were higher than average (maximum flow of 415 cfs on June 11, 2013); however, similar to the Eagle River the period of high flows did not last as long as average. Flows had dropped below average by mid June 2013 but, again similar to the Eagle River, flows responded to the fall rains with higher than average fall flows (see Figure 2-4). In 2013, Cross Creek flow contributed approximately 20 percent of the Eagle River flow during the spring, 46 percent during high flow, and approximately 31 to 38 percent during low flow.

2.3 Water Quality Trends

Through a cooperative process involving all major stakeholders, water quality standards (WQS) were developed for the Colorado Water Quality Control Division (the Commission) that are protective of the aquatic community (macroinvertebrates and brown trout) expected in Segment 5 of the Eagle River and Cross Creek. The WQS were put in place on January 1, 2009, replacing the Temporary Modifications to the table value standards (TVS) provided in Regulation No. 33. The following sections discuss water quality data at the monitored stations focusing on dissolved levels of zinc, cadmium, and copper.

2.3.1 Eagle River Water Quality

Table 2-1 through Table 2-3 present the dissolved concentrations for cadmium, copper, and zinc, respectively, for the past five years, 2009 to 2013. These tables present the concentrations for the selected Eagle River monitoring stations E-3, E-10, E-12A, E-15, and E-22. The tables also present the associated load for the CBS measured concentrations by monitoring station (see Section 2.4 for discussion of load within the river). Flow and chemical results for 2013 are provided in Appendix A.

Dissolved zinc concentrations for the Eagle River are plotted in Figure 2-5 for the reporting period October 2012 to October 2013. The WQS by segment of the Eagle River are plotted on Figure 2-6 and are compared to the monitoring station dissolved zinc concentrations. RiverWatch and Eagle River Water and Sanitation District (ERWSD) also collect surface water samples monthly at E-12A (Station 950) and E-15 (Station 3291). These data were used to supplement Figures 2-5 and 2-6 in the months for which CBS had not collected samples as well as providing additional data for the Spring months (RiverWatch data has primacy when both results are reported due to lower detection limits).

Higher dissolved zinc concentrations are observed in the river during snowmelt periods in March and April and may extend into May. Generally by May each year, warm temperatures generate snowmelt in the upper Eagle River basin above the Site and a large increase in stream flow occurs, with peak flows typically occurring in May or June. The increased stream flow results in lower metal concentrations.

Graphical representation of concentration data for dissolved zinc, cadmium, and copper is provided in Figure 2-7. These plots show concentrations for the Eagle River stations over the 2013 period. Dissolved cadmium concentrations, shown in Figure 2-7, are below the standards for the high metal season for the Site locations but above on May 3, 2013 in Segment 2 (upstream). Copper concentrations, shown in Figure 2-7, were also below standards at all stations within the Site. Copper concentrations in E-22 on April 19, 2013 indicate a potential source of copper below the Site in Segment 5c.

As discussed in previous years and in Section 4.1, the source of increased zinc concentrations in the Spring is believed to be from a groundwater surge in the Belden area. This typical Spring increase can be seen in the Segment 5 stations, depicted on Figure 2-6, and are generally below the WQS. The dissolved zinc concentrations at station E-12A from late April through early May 2013 rose above the WQS when calculated using the station's average hardness (Figure 2-7) and the sample specific hardness (Figure 2-6,). Dissolved zinc concentrations rose in the other stations but were at or below the applicable standards using the station's average hardness, with the exception of E-3 in Segment 2 in May, which was above (see Figure 2-7). Hardness concentrations dropped with the increase in river flow in early May and zinc concentrations were above the WQS on May 3, 2013 using the sample specific hardness for all stations. As the higher zinc concentrations in late April and early May were found at E-12A rather than E-10, the source of the increased zinc concentration is believed to be from groundwater in Rock Creek alluvium.

2.3.2 Tributary Water Quality

Trends in dissolved zinc concentrations for Rock Creek and Cross Creek are discussed in the following sections. Table 2-4 and Table 2-5 present the dissolved concentrations for cadmium, copper, and zinc for the past five years, 2009 to 2013, in Rock Creek (T-10) and Cross Creek (T-18), respectively. The tables also present the associated load for the measured concentrations by monitoring station (see Section 2.4 for discussion of load within the river). Flow and chemical results for the reporting period are provided in Appendix A.

Rock Creek

Water samples have been collected routinely from the mouth of Rock Creek (T-10) since March 1989. Dissolved zinc results for T-10 from March 1989 to September 2013 are presented in Figure 2-8.

Water quality in Rock Creek is influenced by large seasonal fluctuations in stream flow, seepage from the Eagle Mine, and waste-rock pile runoff. Metal concentrations typically increase in April during early spring snowmelt runoff and decrease rapidly in May and June as basin-wide stream flow increases. Concentrations typically remain low during the summer months except during rainfall-runoff events. Concentrations increase in fall and winter under reduced stream flow conditions.

Significant improvements in Rock Creek water quality have occurred since 1989. Factors contributing to a continued decrease in metals concentrations in Rock Creek include lowering the mine pool elevation, collection and treatment of mine seepage and groundwater in lower Rock Creek at the RX-3 well, and the diversion and treatment of runoff/seepage from the hillside below Waste Rock Pile No. 8.

Cross Creek

Dissolved metal concentrations have been routinely measured near the mouth of Cross Creek (T-18, see Figure 2-9) since September 1990. The zinc concentration at T-18 dropped significantly in 1996 following the remediation of the Maloit Park wetlands. As seen in Figure 2-10, all detected metal concentrations are below WQS for Segment 7b with the exception of the May 3, 2013 sample for which the drop in hardness concurrent with rising flows.

2.4 Load Source Evaluation

In this section, dissolved zinc load in the river is used to quantify the contribution from point and non-point metal sources. Dissolved zinc load is calculated by multiplying the dissolved zinc concentration (in mg/L) by the flow (in cfs), and converting the units into pounds per day (lbs/day) using a conversion factor of 5.4. In this manner, the dissolved zinc load was calculated for each of the monitoring stations for which flow can be measured or estimated (Table 2-3 through Table 2-5).

Inherent in each computation of load is the calculated error associated with the measurement of metal concentration and stream flow (up to ±25 percent analytical error and ±10 percent flow error). In the analysis of loading by stream segment, it is assumed the computed load incorporates these errors and, as such, retains a compounded error of at least ±20 percent.

Sampling stations are located on the Eagle River to bracket, upstream and downstream, potential metal sources. These sources include tributary inflows from Rock Creek and Cross Creek, in addition to predominately groundwater inflow from the Belden, Old Tailings Pile (OTP)/Rex Flats, and Consolidated Tailings Pile (CTP) areas. Using discrete river segments, the difference in metal load between two stations can be calculated. The amount of load contributed by measured or "accounted" tributary inflows is known. After subtracting the accounted load, the load difference is referred to as the "unaccounted" load. A positive unaccounted load (load increase) includes groundwater and/or diffuse surface-water inflow that are not measured. These are sometimes referred to as non-point source loads. A negative unaccounted load (load decrease) can result from losses of flow to groundwater, or from decreases in metal concentration through attenuation processes such as chemical precipitation or adsorption.

Table 2-6 provides a data summary of the dissolved zinc loading by Eagle River segment for a five-year period of 2009 through 2013. A discussion of peak spring (March-April) Eagle River zinc loading by river segment (April 5, 2013) is provided below, using Figure 2-11 presenting yearly peak Spring loads for reference.

Background (E-3)

The calculated dissolved zinc load at E-3 (19 lbs/day) represents the background zinc load entering Segment 5a from Segment 2. The source of the background zinc in Segment 2 is thought to be runoff from the numerous smaller mines and associated waste rock piles located along the Eagle River between Red Cliff and Belden. These mines and piles are not associated with the Eagle Mine Site.

Belden (E-3 to E-10)

The Belden segment extends downstream from Segment 2 (station E-3) to station E-10 above Rock Creek. This segment had a dissolved zinc load of 30 lbs/day. Investigations in Belden indicate that the primary source of the zinc load is seepage from the Ben Butler, Tip Top, and Eagle mines and groundwater perched in the waste rock and railroad ballast. Runoff from the waste rock may contribute to periodic metal loads during spring and summer.

Fall Creek contributes on the order of 10 to 20 percent of the Eagle River flow in this segment. Past studies document that Fall Creek does not contribute significant quantities of metals, and this tributary metal load is assumed to be zero for purposes of load accounting (Dames & Moore 1998).

Rock Creek (E-10 to E-12A)

The Rock Creek segment receives tributary inflow from Rock Creek and Bishop Gulch and groundwater from the OTP/Rex Flats area. Historical data shows that Bishop Gulch does not contribute significant zinc load to the Eagle River.

The calculated dissolved zinc load increased by 9.1 lbs/day, after subtracting Rock Creek, which contributed 0.5 lbs/day. This segment typically shows a small increase in zinc load relative to the Belden segment. The source of the zinc is thought to be primarily groundwater baseflow from Rock Creek alluvium, residual groundwater baseflow from Belden segment alluvium, and groundwater seepage from the OTP/Rex Flats area.

Table 2-6 indicates the load in this section was higher than typical at the end of April into early May. These loads appeared to be related to plugged seep and runoff collection systems. All associated lines and collection basins were jetted during the Summer of 2013.

CTP (E-12A to E-15)

This segment brackets the CTP and receives flow from Cross Creek, the largest tributary within the Site. Two Elk Creek, a perennial tributary, and discharge from the WTP also flow to the Eagle River in this segment; however, historical data show that the dissolved zinc load contributed by these sources is negligible. The calculated dissolved zinc load increased by 10 lbs/day, after subtracting Cross Creek, which contributed 2.7 lbs/day. The source of the zinc is thought to be primarily groundwater baseflow from Rex Flats and the CTP.

Summary

Note in Table 2-6 that the loading in the river for 2013 did not increase from background levels until April and thus was delayed relative to the typical mid to late March spring rise. As shown on the table on Figure 2-11 and in Table 2-6, the background load increase was identified in the river samples before the onsite locations saw their typical elevated Spring loads.

Table 2-1
Eagle River Cadmium Concentrations and Loads
2009 - 2013

Date	Dissolved Cadmium Concentration [1] (mg/L)					Eagle River Flow (cfs) at	Cadmium Load [1,2] (lbs/day)				
	E- 3	E-10	E-12A	E-15	E-22	E-12A	E- 3	E-10	E-12A	E-15	E-22
1/8/09 [3]		0.00049	0.00048			32		0.089	0.083		
2/19/09	0.00025 **	0.00025 **	0.00025 **	0.00025 **	0.00020	23	0.027 **	0.033 **	0.031 **	0.039 **	0.03
3/11/09	0.00067	0.00077	0.00077	0.00056	0.00040	25	0.080	0.11	0.10	0.098	0.07
3/20/09	0.00040	0.00096	0.00094		0.00030	40	0.076	0.22	0.20		0.09
3/25/09	0.00025 **	0.00100	0.00082	0.00076	0.00060	47	0.056 **	0.26	0.21	0.29	0.23
4/8/09	0.00025 **	0.00058	0.00096	0.00044	0.00050	54	0.064 **	0.17	0.28	0.19	0.22
4/20/09	0.00062	0.00107	0.00138	0.00122	0.00030	91	0.27	0.53	0.68	0.97	0.24
9/23/09	0.00025	0.00025	0.00025	0.00025	0.00010	47	0.06	0.07	0.06	0.10	0.04
3/6/10 [3]		0.00041	0.00033	0.00020	0.00030	18		0.04	0.03	0.02	0.03
3/17/10 [3]		0.00110	0.00037	0.00016	0.00020	23		0.15	0.05	0.03	0.03
4/2/10 [3]		0.00031	0.00050	0.00030	0.00030	31		0.05	0.08	0.07	0.07
4/15/10	0.00012	0.00041	0.00065	0.00053	0.00050	*123*	*0.07*	*0.28*	*0.43*	*0.58*	0.55
9/24/10	0.00005 **	0.00016	0.00019	0.00039	0.00010	41	0.01 **	0.04	0.04	0.13	0.03
3/7/11 [3]		0.00042	0.00045	0.00031	0.00010	32		0.08	0.08	0.07	0.02
3/21/11	0.00040	0.00140	0.00130	0.00092	0.00080	43	0.08	0.34	0.30	0.32	0.27
4/4/11	0.00033	0.00097	0.00190	0.00150	0.00090	66	0.10	0.35	0.68	0.84	0.50
4/18/11	0.00022	0.00078	0.00100	0.00078	0.00080	*119*	*0.13*	*0.51*	*0.64*	*0.82*	0.84
5/4/11	0.00550	0.00110	0.00150	0.00074	0.00090	96	2.52	0.58	0.78	0.62	0.76
10/11/11	0.00005 **	0.00016	0.00025	0.00021		51	0.01 **	0.05	0.07	0.09	
3/12/12	0.00005 **	0.00049	0.00061			25	0.01 **	0.07	0.08		
3/19/12			0.00045			36			0.09		
3/26/12	0.00005 **	0.00035	0.00044	0.00027		85	0.02 **	0.16	0.20	0.20	
4/3/12			0.00036			*116*			*0.23*		
4/10/12	0.00005 **	0.00010	0.00014	0.00005 **		*144*	*0.03* **	*0.08*	*0.11*	*0.064* **	
4/17/12			0.00022			*103*			*0.12*		
10/18/12	0.00005 **	0.00014	0.00018	0.00015	0.00017	28	*0.01* **	0.02	0.03	0.03	0.03
3/12/13 [3]		0.00026	0.00028	0.00015	0.00016	9		0.02	0.01	0.00	0.00
3/22/13	0.00010 **	0.00030	0.00032	0.00021	0.00023	12	*0.01* **	0.02	0.02	0.01	0.01
4/5/13	0.00035	0.00074	0.00074	0.00055	0.00043	38	0.06	0.16	0.15	0.16	0.13
4/19/13	0.00024	0.00066	0.00100	0.00053	0.00044	33	0.04	0.12	0.18	0.13	0.11
5/3/13	0.00045	0.00074	0.00110	0.00064	0.00053	*130*	*0.28*	*0.53*	*0.77*	*0.74*	*0.61*
9/30/13	0.00005 **	0.00005 **	0.00005 **	0.00005 **	0.00005 **	86	*0.02* **	0.02 **	0.02 **	0.04 **	0.04 **

Notes:

Concentrations marked with ** were not detected and reported concentration is estimated and reported at 1/2 the detection limit. Load is calculated using this concentration.

1) Blanks indicate station was not sampled on designated date.
2) Load was calculated using the flow for the designated station and the flow relationship to the E-12A gage (see Appendix A). Loads calculated with flows greater than 100 cfs are flow driven and are italicized
3) Samples were not collected at E-3 due to unsafe ice/river access conditions.

Table 2-2
Eagle River Copper Concentrations and Loads
2009 - 2013

Date	Dissolved Copper Concentration [1] (mg/L)					Eagle River Flow (cfs) at	Copper Load [1,2] (lbs/day)				
	E- 3	E-10	E-12A	E-15	E-22	E-12A	E- 3	E-10	E-12A	E-15	E-22
1/8/09 [3]		0.0018	0.0013			32		0.33	0.23		
2/19/2009	0.0012	0.0026	0.0016	0.0015	0.0015	23	0.13	0.35	0.20	0.24	0.00
3/11/2009	0.0034	0.0070	0.0043	0.0025	0.0025	25	0.41	1.01	0.58	0.44	0.39
3/20/2009	0.0080	0.0078	0.0057			40	1.5	1.8	1.2		0.9
3/25/2009	0.0053	0.0070	0.0063	0.0052	0.0052	47	1.2	1.8	1.6	2.0	2.0
4/8/2009	0.0064	0.0075	0.0076	0.0053	0.0053	54	1.7	2.3	2.2	2.4	2.9
4/20/2009	0.0061	0.0089	0.0086	0.0061	0.0061	91	2.6	4.4	4.2	4.9	3.9
9/23/2009	0.0011	0.0029	0.0028	0.0021	0.0021	47	0.3	0.8	0.7	0.8	0.7
3/6/10 [3]		0.0040	0.0031	0.0021	0.0021	18		0.4	0.3	0.2	0.6
3/17/10 [3]		0.0034	0.0025	0.0010	0.0010	23		0.5	0.3	0.2	0.5
4/2/10 [3]		0.0042	0.0036	0.0023	0.0023	31		0.7	0.6	0.5	0.9
4/15/2010	0.0057	0.0074	0.0072	0.0055	0.0055	*123*	*3.3*	*5.0*	*4.8*	*6.0*	*5.8*
9/24/2010	0.0010	0.0031	0.0023	0.0022	0.0022	41	0.2	0.7	0.5	0.7	1.1
3/7/11 [3]		0.0031	0.0032	0.0072	0.0072	32		0.6	0.6	1.7	1.1
3/21/2011	0.0084	0.0085	0.0068	0.0059	0.0059	43	1.7	2.0	1.6	2.0	2.7
4/4/2011	0.0074	0.0082	0.0084	0.0123	0.0123	66	2.3	3.0	3.0	6.9	4.6
4/18/2011	0.0050	0.0076	0.0106	0.0068	0.0068	*119*	*2.8*	*4.9*	*6.8*	*7.2*	*10.5*
5/4/2011	0.0095	0.0091	0.0093	0.0060	0.0060	96	4.4	4.8	4.8	5.0	8.3
10/11/2011	0.001 **	0.0020	0.001 **	0.001 **	0.001 **	51	0.24 **	0.6	0.28 **	0.42 **	
3/12/12	0.0025	0.0033	0.0026			25	0.3	0.5	0.4		
3/19/12			0.0036			36			0.7		
3/26/12	0.0026	0.0033	0.0041	0.0031		85	1.1	1.5	1.9	2.3	
4/3/12			0.0043			*116*			*2.7*		
4/10/12	0.0027	0.0029	0.0028	0.0027		*144*	*1.9*	*2.3*	*2.2*	*3.5*	
4/17/12			0.0034			*103*			*1.9*		
10/18/12	0.001 **	0.001 **	0.001 **	0.001 **	0.001 **	28	0.13 **	0.16 **	0.15 **	0.20 **	0.20 **
3/12/13 [3]		0.0026	0.001 **	0.001 **	0.001 **	9		0.2	0.05 **	0.03 **	0.03 **
3/22/13	0.002 **	0.002 **	0.002 **	0.002 **	0.002 **	12	0.11 **	0.15 **	0.13 **	0.11 **	0.11 **
4/5/13	0.0078	0.0080	0.0052	0.0039	0.0039	38	1.4	1.7	1.1	1.2	1.2
4/19/13	0.0064	0.0078	0.0085	0.0042	0.0228	33	1.0	1.5	1.5	1.0	5.7
5/3/13	0.0069	0.0089	0.0114	0.0092	0.0074	*130*	*4.3*	*6.3*	*8.0*	*10.7*	*8.6*
9/30/13	0.001 **	0.001 **	0.001 **	0.0021	0.0025	86	0.41 **	0.47 **	0.46 **	1.6	1.9

Notes:

Concentrations marked with ** were not detected and reported concentration is estimated and reported at 1/2 the detection limit. Load is calculated using this concentration.

1) Blanks indicate station was not sampled on designated date.
2) Load was calculated using the flow for the designated station and the flow relationship to the E-12A gage (see Appendix A). Loads calculated with flows greater than 100 cfs are flow driven and are italicized
3) Samples were not collected at E-3 due to unsafe ice/river access conditions.

Table 2-3
Eagle River Zinc Concentrations and Loads
2009 - 2013

Date	Dissolved Zinc Concentration [1] (mg/L)					Eagle River Flow (cfs) at E-12A	Zinc Load [1,2] (lbs/day)				
	E- 3	E-10	E-12A	E-15	E-22		E- 3	E-10	E-12A	E-15	E-22
1/8/09 [3]		0.063	0.100		0.080	32		11	17		19
2/19/2009	0.010	0.140	0.209	0.183	0.130	23	1.1	19	26	29	20
3/11/2009	0.036	0.292	0.417	0.308	0.180	25	4.3	42	56	54	32
3/20/2009	0.083	0.304	0.346		0.159	40	16	68	75		50
3/25/2009	0.093	0.349	0.369	0.287	0.269	47	21	92	94	109	102
4/8/2009	0.127	0.328	0.432	0.317	0.231	54	33	98	126	142	103
4/20/2009	0.089	0.299	0.325	0.249	0.131	91	39	149	160	197	104
9/23/2009	0.009	0.066	0.102	0.066	0.061	47	1.9	17	26	25	23
3/6/10 [3]		0.167	0.198	0.169	0.168	18		18	19	19	18
3/17/10 [3]		0.405	0.243	0.178	0.188	23		54	30	28	29
4/2/10 [3]		0.132	0.248	0.195	0.224	31		23	42	45	52
4/15/2010	0.043	0.186	0.281	0.187	0.188	*123*	*25*	*125*	*187*	*204*	*205*
9/24/2010	0.010	0.070	0.103	0.080	0.080	41	2.0	16	23	26	26
3/7/11 [3]		0.159	0.206	0.197	0.145	32		29	36	47	35
3/21/2011	0.097	0.462	0.513	0.400	0.358	43	20	111	119	137	123
4/4/2011	0.105	0.341	0.674	0.589	0.371	66	33	124	240	329	207
4/18/2011	0.095	0.270	0.364	0.291	0.291	*119*	*54*	*176*	*234*	*307*	*307*
5/4/2011	0.083	0.282	0.337	0.215	0.272	96	38	148	175	181	228
10/11/2011	0.005 **	0.059	0.099	0.097		51	1.2 **	17	27	41	
3/12/12	0.026	0.230	0.316			25	3.1	33	43		
3/19/12			0.245			36			48		
3/26/12	0.025	0.131	0.158	0.120		85	10	61	73	88	
4/3/12			0.178			*116*			*111*		
4/10/12	0.029	0.040	0.064	0.055		*144*	*20*	*31*	*50*	*71*	
4/17/12			0.117			*103*			*65*		
10/18/12	0.010 **	0.047	0.095	0.057	0.055	28	1.3 **	7.6	14	12	11
3/12/13 [3]		0.113	0.166	0.121	0.110	9		6.6	8.2	3.2	2.9
3/22/13	0.010 **	0.157	0.129	0.140	0.129	12	0.6 **	12	8.4	7.5	6.9
4/5/13	0.105	0.231	0.288	0.243	0.222	38	19	49.43	59.10	72	66
4/19/13	0.067	0.223	0.445	0.377	0.231	33	11	42	79	94	58
5/3/13	0.154	0.235	0.370	0.266	0.215	*130*	*96*	*167*	*260*	*308*	*249*
9/30/13	0.010 **	0.028	0.041	0.033	0.035	86	4.1 **	13	19	24	26

Notes:

Concentrations marked with ** were not detected and reported concentration is estimated and reported at 1/2 the detection limit. Load is calculated using this concentration.

1) Blanks indicate station was not sampled on designated date.
2) Load was calculated using the flow for the designated station and the flow relationship to the E-12A gage (see Appendix A). Loads calculated with flows greater than 100 cfs are flow driven and are italicized
3) Samples were not collected at E-3 due to unsafe ice/river access conditions.

Table 2-4
Rock Creek Dissolved Metal Concentrations and Loads
2009 - 2013

Date	Dissolved Metal Concentration [1] (mg/L)			Flow [2] (cfs)	Dissolved Metal Load [3] (lbs/day)		
	Cadmium	Copper	Zinc		Cadmium	Copper	Zinc
2/19/09	0.0066	0.0018	4.45	0.04	0.0014	0.0004	0.96
3/11/09	0.0030	0.0035	1.91	0.22 *	0.0036	0.0042	2.3
3/20/09	0.0029	0.0028	1.22	0.30	0.0047	0.0046	2.0
3/25/09	0.0034	0.0018	1.72	0.40	0.0074	0.0040	3.7
4/8/09	0.0017	0.0029	1.16	0.70	0.0062	0.011	4.4
4/20/09	0.0058	0.0148	2.30	0.30	0.0094	0.024	3.7
9/23/09	0.0015	0.0037	0.897	0.23 *	0.0018	0.005	1.1
3/6/10	0.0099	0.0078	5.45	0.11 *	0.0059	0.005	3.2
3/17/10	0.0067	0.0068	3.65	0.27 *	0.0098	0.010	5.3
4/2/10	0.0072	0.0034	2.87	0.45 *	0.0175	0.008	7.0
4/15/10	0.0202	0.0301	8.52	NM			
9/24/10	0.0022	0.0028	1.160	0.09 *	0.0011	0.001	0.6
3/7/11	0.0105	0.0119	4.01	0.38	0.0215	0.024	8.2
3/21/11	0.0054	0.0107	2.42	0.66	0.0192	0.038	8.6
4/4/11	0.0061	0.0174	2.79	0.79	0.0260	0.074	11.9
4/18/11	0.0115	0.0370	4.85	0.79	0.0491	0.158	20.7
5/4/11	0.0038	0.0205	1.52	0.68	0.0140	0.075	5.6
10/11/11	0.0049	0.0039	2.56	0.37	0.0098	0.008	5.1
3/12/12	0.0031	0.0044	1.9	0.19 *	0.0032	0.005	2.0
3/26/12	0.0119	0.0225	6.22	0.28	0.0180	0.034	9.4
4/10/12	0.0046	0.0115	2.12	0.59 *	0.0146	0.036	6.7
10/18/12	0.0025	0.0026	1.53	0.16 *	0.0022	0.002	1.3
3/12/13	0.0039	0.0023	2.65	0.13	0.0027	0.002	1.9
3/22/13	0.0044	0.0040	2.61	0.02 *	0.0005	0.000	0.32
4/5/13	0.0032	0.0152	1.67	0.06 *	0.0010	0.005	0.52
4/19/13	0.0072	0.0176	4.21	0.45	0.0175	0.043	10.2
5/3/13	0.0144	0.0354	6.66	0.45	0.0350	0.086	16.2
9/30/13	0.0029	0.0056	1.22	0.41 *	0.0064	0.012	2.7

Notes:

1) Concentrations marked with ** were not detected and reported concentration is estimated and reported at 1/2 the detection limit.
2) T-10 flow measured at the station or if marked with * estimated using a relationship with T-18 (using T-18 flow measured at USGS station 09065100 until July 2009). Flows after July 2009 are estimated using field measurements when conditions allowed. Comparisons to the T-18 relationship to estimated T-10 flows indicate the relationship has a high bias during dry years.
3) Load was calculated using the flow for the designated station and concentration presented in table. Loads marked with ** are based on estimated concentrations when metal was not detected.

Table 2-5
Cross Creek Dissolved Metal Concentrations and Loads
2009 - 2013

Date	Dissolved Metal Concentration [1] (mg/L)			Flow [2] (cfs)	Dissolved Metal Load [3] (lbs/day)		
	Cadmium	Copper	Zinc		Cadmium	Copper	Zinc
3/11/09	0.00025 **	0.0024	0.090	7.8	0.0105 **	0.10	3.8
3/25/09	0.00025 **	0.0023	0.057	15	0.0203 **	0.19	4.6
4/8/09	0.00025 **	0.0023	0.074	14	0.0189 **	0.17	5.6
4/20/09	0.00025 **	0.0026	0.048	22	0.0297 **	0.31	5.7
9/23/09	0.00025 **	0.0017	0.049	22	0.0297 **	0.20	5.8
3/6/10	0.00005 **	0.0010	0.154	NM			
3/17/10	0.00005 **	0.0010	0.184	NM			
4/2/10	0.00005 **	0.0022	0.086	NM			
4/15/10	0.00020	0.0036	0.072	73	0.0788	1.42	28.5
9/24/10	0.00043	0.0057	0.123	12	0.0272	0.36	7.8
3/7/11	0.00015	0.0051	0.118	4	0.0032	0.11	2.5
3/21/11	0.00024	0.0040	0.128	7	0.0096	0.16	5.1
4/4/11	0.00005 **	0.0041	0.104	19	0.0051 **	0.42	10.7
4/18/11	0.00018	0.0058	0.076	22	0.0214	0.69	9.1
5/4/11	0.00005 **	0.0021	0.055	17	0.0046 **	0.19	5.0
10/11/11	0.00020	0.0038	0.090	15	0.0162	0.31	7.3
3/12/12	0.0002	0.001 **	0.173	5	0.0044	0.028 **	4.8
3/26/12	0.00005 **	0.0023	0.038	16	0.0043 **	0.199	3.3
4/10/12	0.00005 **	0.0028	0.0265	36	0.0097 **	0.544	5.2
10/18/12	0.00005 **	0.001 **	0.0567	11	0.0030 **	0.059 **	3.4
3/12/13	0.00011	0.001 **	0.1820	3	0.0017	0.015 **	2.8
3/22/13	0.00010 **	0.002 **	0.1200	3	0.0015 **	0.029 **	1.7
4/5/13	0.00011	0.0023	0.0799	6	0.0037	0.077	2.7
4/19/13	0.00005 **	0.0021	0.0726	5	0.0012 **	0.051	1.8
5/3/13	0.00011	0.0044	0.0551	31	0.0184	0.737	9.2
9/30/13	0.00005 **	0.0038	0.0189	42	0.0113 **	0.862	4.3

Notes:

1) Concentrations marked with ** were not detected and reported concentration is estimated and reported at 1/2 the detection limit.
2) T-18 flow measured at USGS station 09065100. Flows from August 2009 through November 2010 (when the gage was not operating) are estimated on day of sampling. Flows during ice over could not be estimated with accuracy and are not reported.
3) Load was calculated using the flow for the designated station and concentration presented in table. Loads marked with ** are based on estimated concentrations when metal was not detected.

Table 2-6
Zinc Loading Summary
2009 - 2013

Date	Eagle River Flow (cfs) at E-12A	Zinc Loading for Eagle River (lbs/day) [1]							
		Segment 2 (Background)	Upper Segment 5a (Belden)	Lower Segment 5a (Rock Creek)			Segment 5b		
				Entire Segment	Rock Creek Load	Without Rock Creek Load	Entire Segment	Cross Creek Load	Without Cross Creek Load
1/8/2009	32	1.1	10	5.9	0.4	5.5	2.7	2.0	0.7
2/19/2009	23	1.1	18	7.3	1.0	6.4	2.6	3.0	-0.4
3/11/2009	25	4.3	38	14	2.3	12	-2.4	3.8	-6.2
3/25/2009	47	21	71	2.0	3.7	-1.7	16	4.6	11
4/8/2009	54	33	66	27	4.4	23	16	5.6	10
4/20/2009	91	39	111	10	3.7	6.6	38	5.7	32
9/23/2009	47	1.9	15	8.6	1.1	7.5	-0.90	5.8	-6.7
3/6/2010	18	NM	18	1.5	3.2	-1.7	-0.74	NM	NA
3/17/2010	23	NM	54	-24	5.3	-29	-2.4	NM	NA
4/2/2010	31	NM	23	18	7.0	11	3.6	NM	NA
4/15/2010	123	25	100	62	NM	NA	18	29	-11
9/24/2010	41	2.0	14	6.7	0.6	6.1	3.3	7.8	-4.5
3/7/2011	32	NM	29	6.7	8.2	-1.5	12	2.5	9.3
3/21/2011	43	20	91	7.8	8.6	-0.8	18	5.1	13
4/4/2011	66	33	91	116	12	104	89	11	78
4/18/2011	119	54	122	58	21	38	73	9.1	64
5/4/2011	96	38	111	26	5.6	21	5.8	5.0	0.8
10/11/2011	47	1.2	16	10	5.1	5.4	13	7.3	6.1
3/12/2012	25	3.1	30	10	2.0	7.6	NM	4.8	NM
3/26/2012	85	10	51	11	9.4	1.9	16	3.3	12.6
4/10/2012	144	20	12	19	6.7	12	21	5.2	16
10/18/2012	28	1.3	6.3	6.8	1.3	5.5	-2.9	3.4	-6.3
3/12/2013	9	NM	6.6	1.6	1.9	-0.3	-5.0	2.8	-7.7
3/22/2013	12	0.6	11	-3.2	0.32	-3.6	-0.9	1.7	-2.6
4/5/2013	38	19	30	9.7	0.52	9.147	13	2.7	10
4/19/2013	33	11	31	38	10.2	27	15	1.8	13
5/3/2013	130	96	71	93	16.2	77	48	9.2	39
9/30/2013	86	4.1	9.3	5.5	2.7	2.8	5.3	4.3	1.1

Notes:

1) Individual zinc loads are presented on Table 2-3 for the Eagle River stations and Tables 2-4 and 2-5 for the tributary stations Rock Creek (T-10) and Cross Creek (T-18), respectively. Zinc Loading for a segment is calculated using the stations listed below.

Segment 2 or Background is the measured load at E-3.

Upper Segment 5a or Belden is the load measured at E-10 minus the background load (E-3).

Lower Segment 5a is the load measured at E-12A minus the load measured at E-10. When the Rock Creek load (T-10) is removed, the remaining gain/loss is from unaccounted sources.

Segment 5b is the load measured at E-15 minus the load measured at E-12A. When the Cross Creek load (T-18) is removed, the remaining gain/loss is from unaccounted sources and the WTP (which is typically small approximately 0.2 lbs/day).

NM - Not Measured

NA - Not applicable - if a tributary load could not be measured, it as not applicable to present the Segment load "without" the tributary.

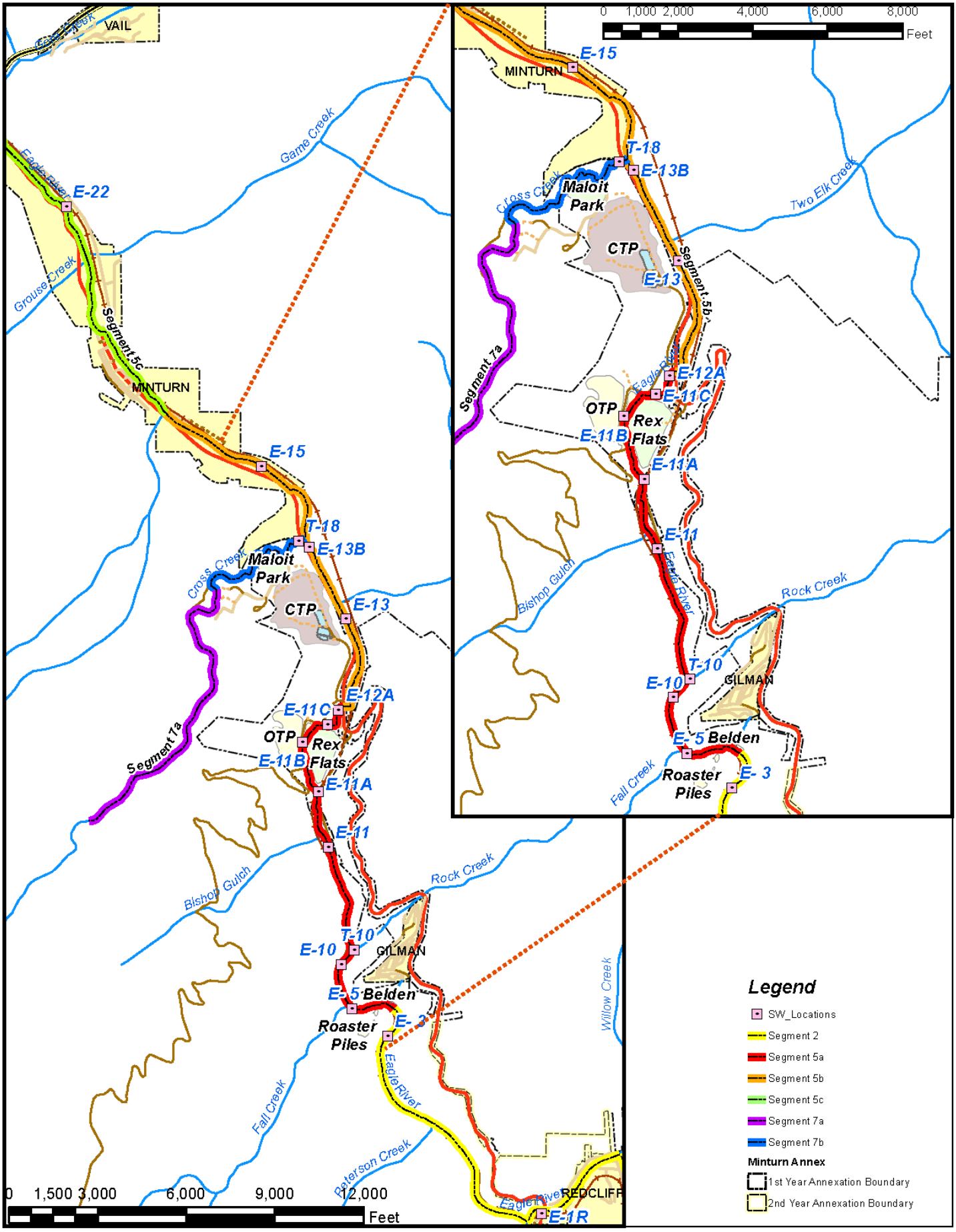
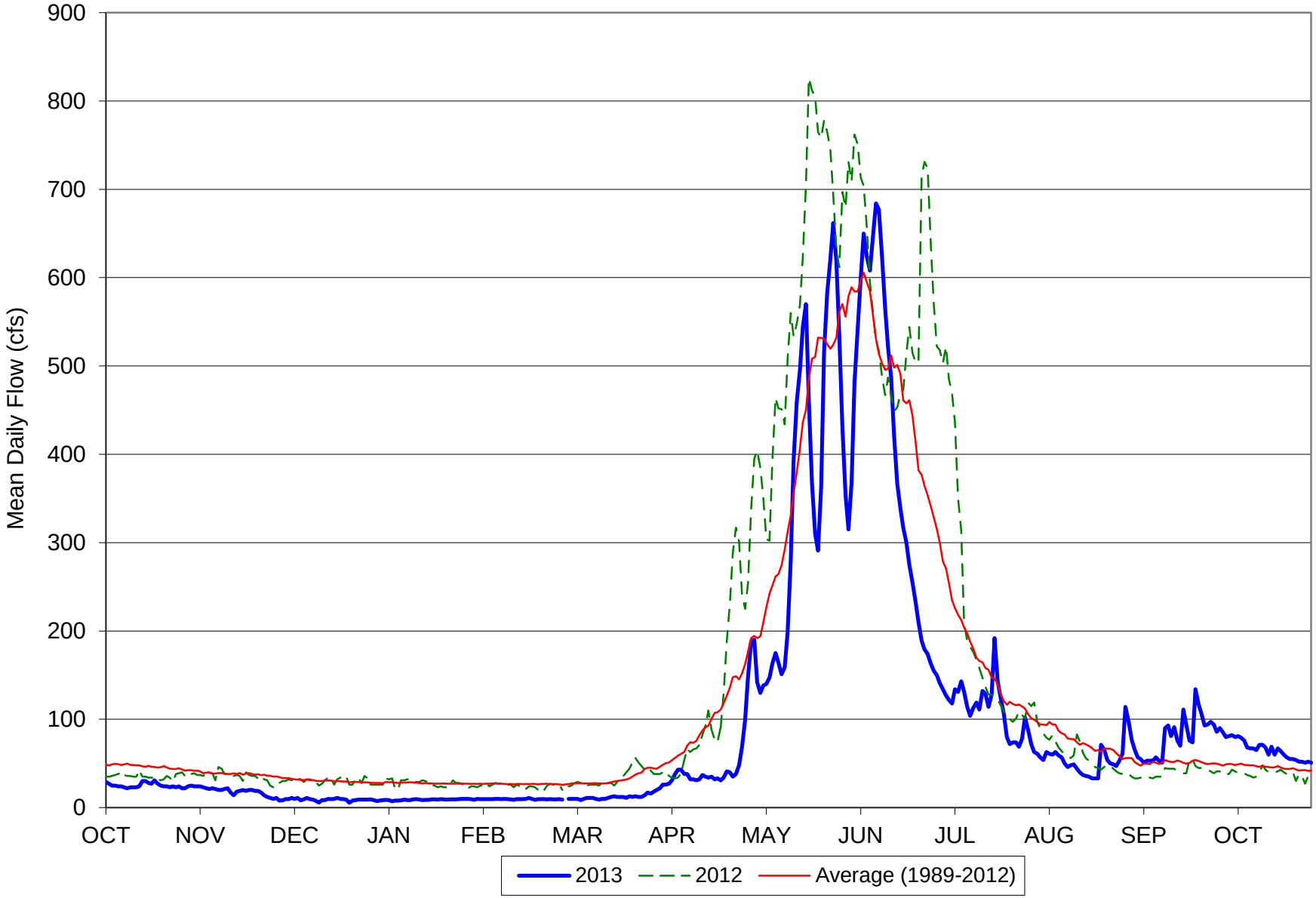


Figure 2-1 Surface Water Monitoring Locations and Eagle River Basin Segments

Eagle River Mean Daily Flow
Station E-12A: 2013 vs 2012 vs Average

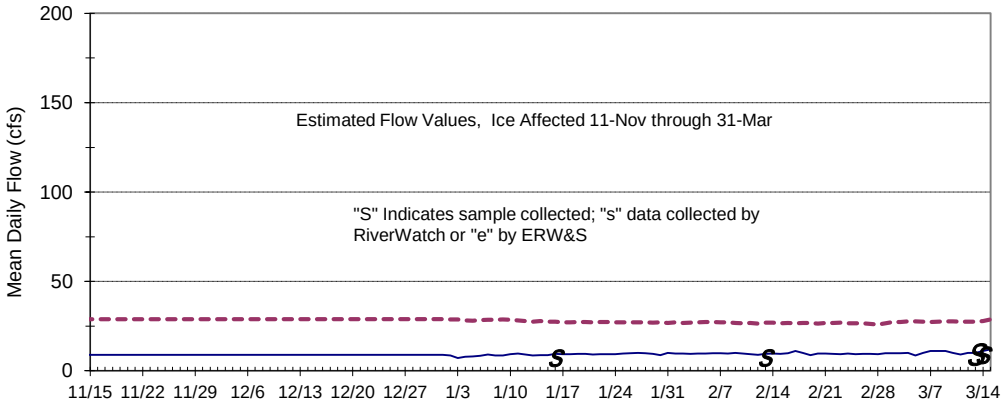


Source: USGS station 0906460 0accessed at http://waterdata.usgs.gov/co/nwis
Note: Data beginning on June 27, 2013 is reported as provisional by the USGS and subject to change.

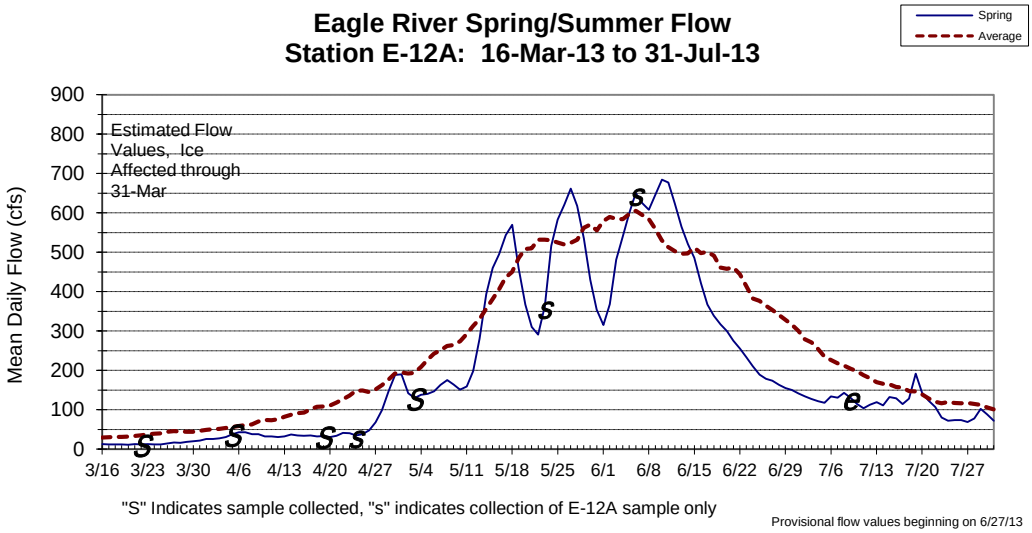
Figure 2-2

Eagle River Flow by Season at Station E-12A

Eagle River Winter Flow
Station E-12A: 15-Nov-12 to 15-Mar-13



Eagle River Spring/Summer Flow
Station E-12A: 16-Mar-13 to 31-Jul-13



Eagle River Fall Flow
Station E-12A: 1-Aug-13 to 31-Oct-13

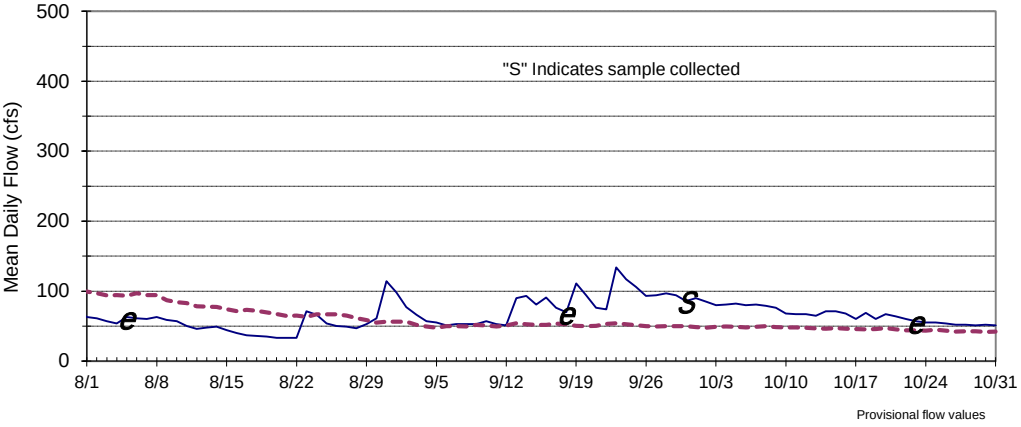
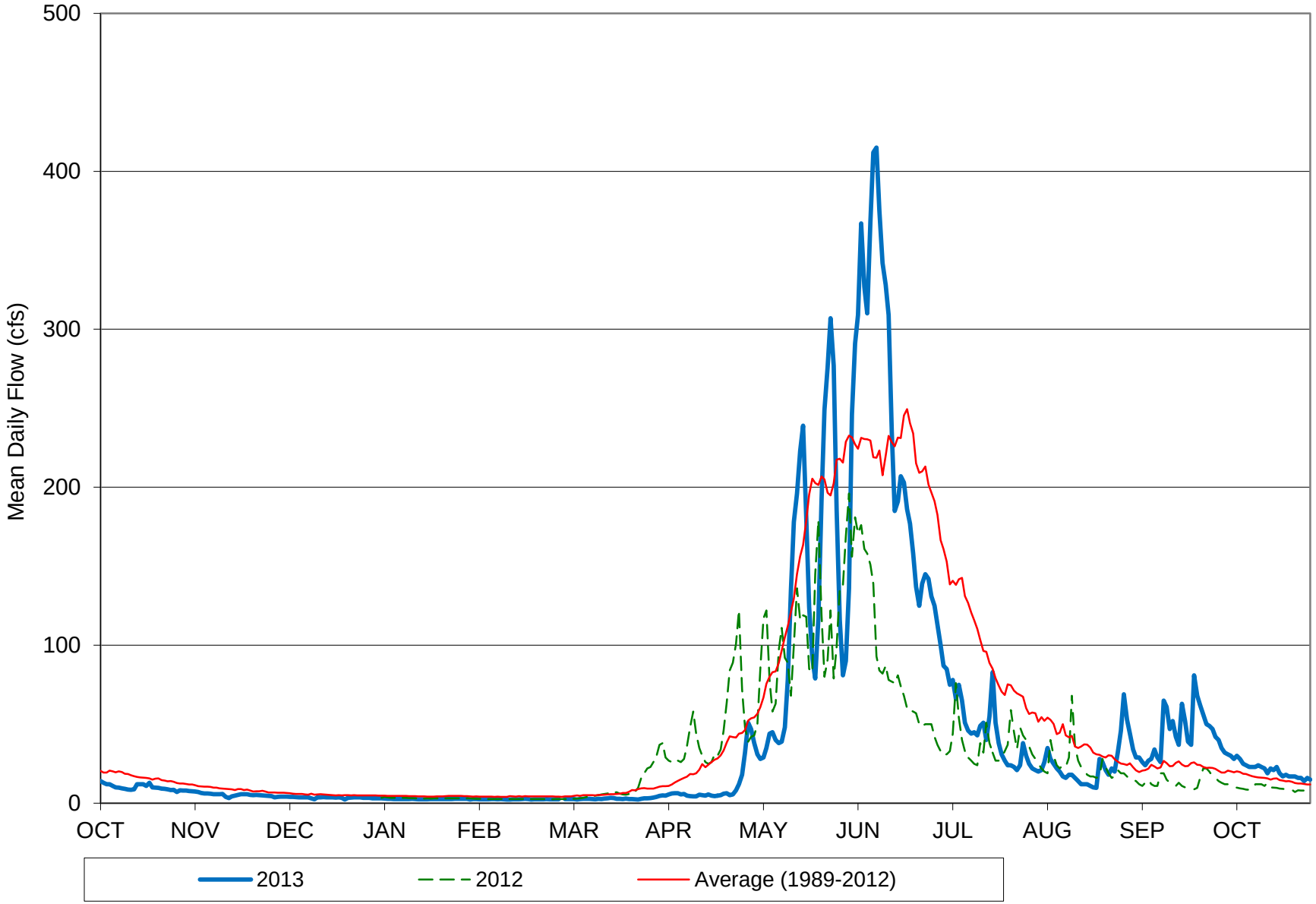


Figure 2-3

Cross Creek Mean Daily Flow
Station T-18: 2013 vs 2012 vs Average



Source: USGS station 09065100 accessed at http://waterdata.usgs.gov/co/nwis
Note: Data beginning on July 1, 2013 is reported as provisional by the USGS and subject to change.

Figure 2-4

Eagle River Seasonal Water Quality
Dissolved Zinc: Oct-2012 to Oct-2013

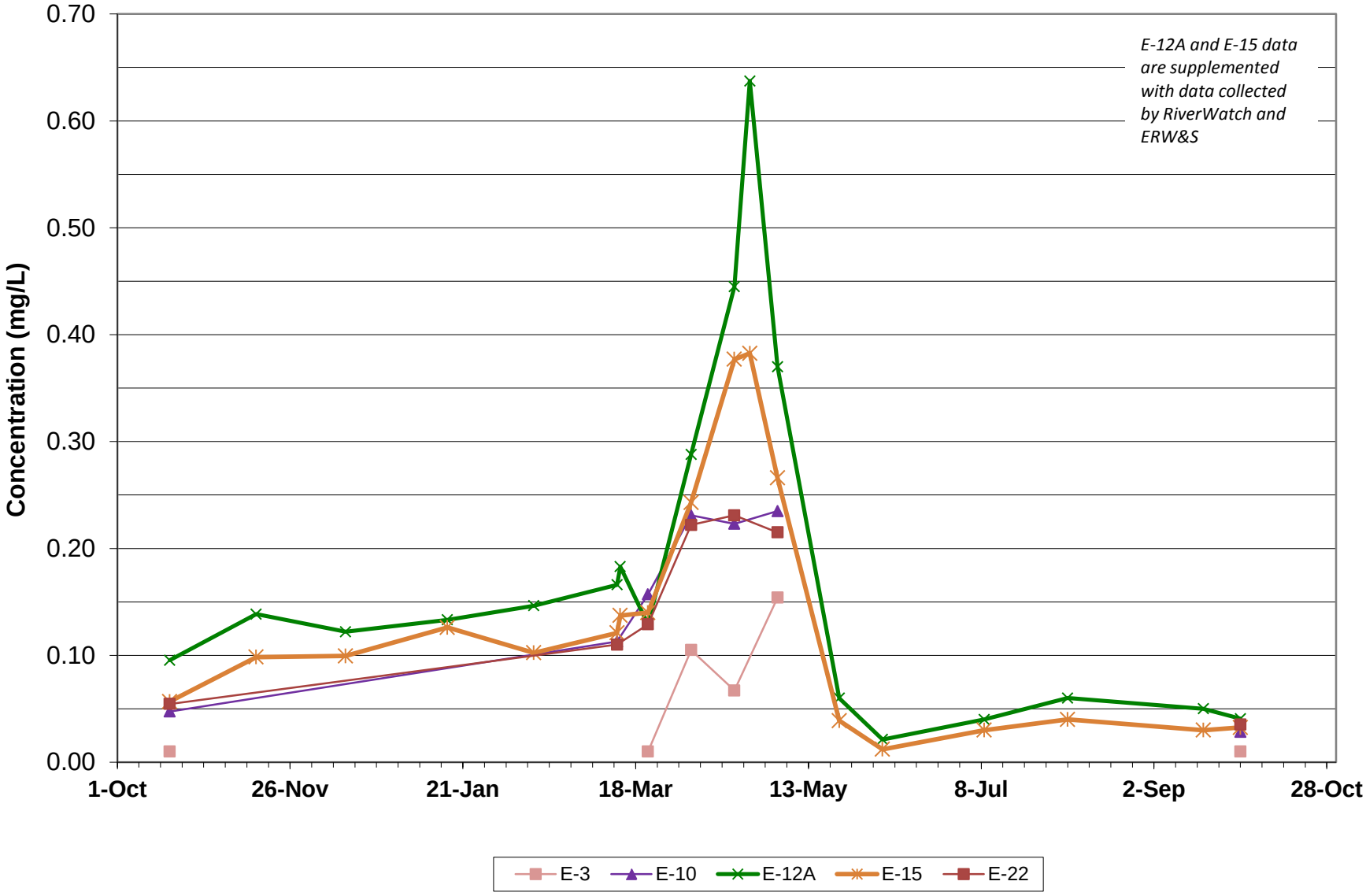
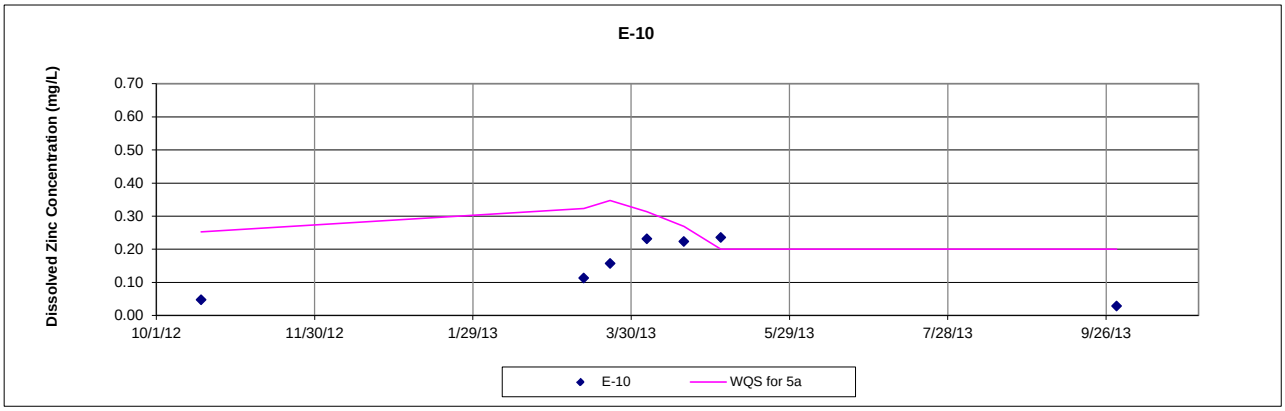


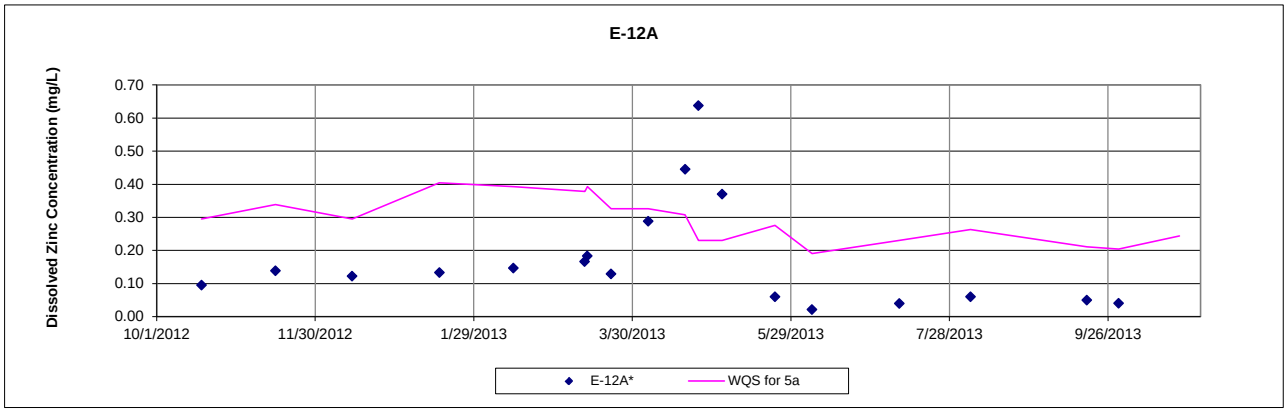
Figure 2-5

Dissolved Zinc Concentrations in Eagle River Segment 5

WQS are based on equations found in Table 3 of CCR 33, effective 1/1/2009 and were calculated using the hardness of the corresponding sample.

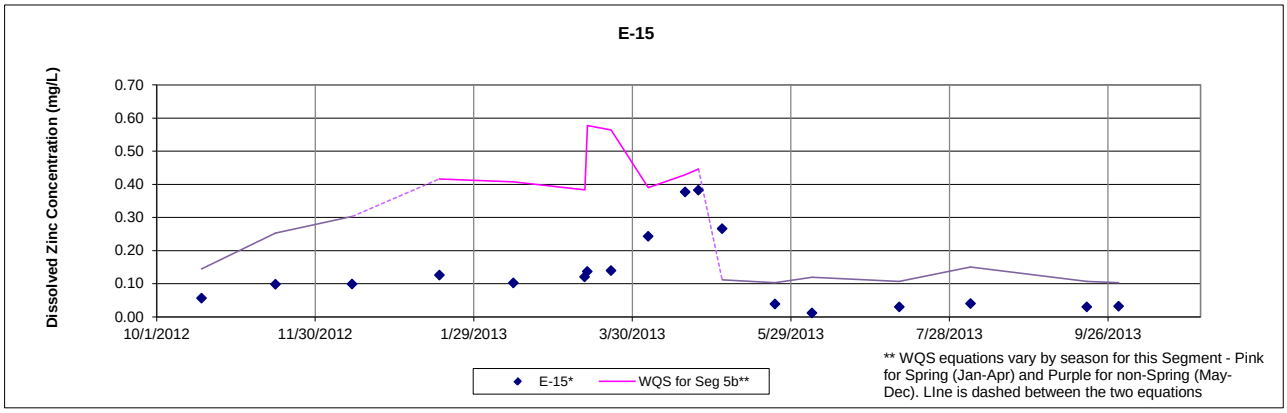
Segment 5a





**E-12A and E-15 data are supplemented with data collected by RiverWatch and ERW&S*

Segment 5b



** WQS equations vary by season for this Segment - Pink for Spring (Jan-Apr) and Purple for non-Spring (May-Dec). LIne is dashed between the two equations

Segment 5c

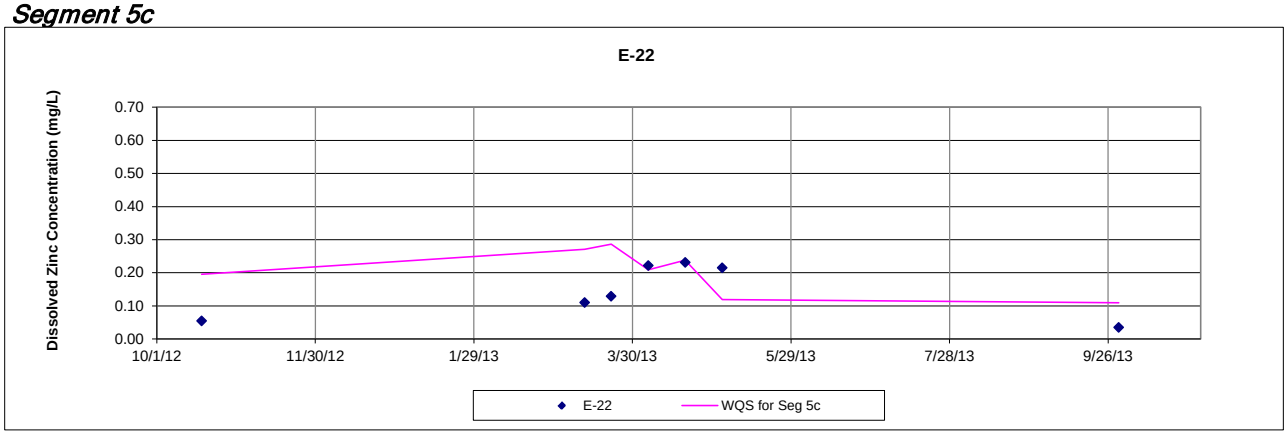
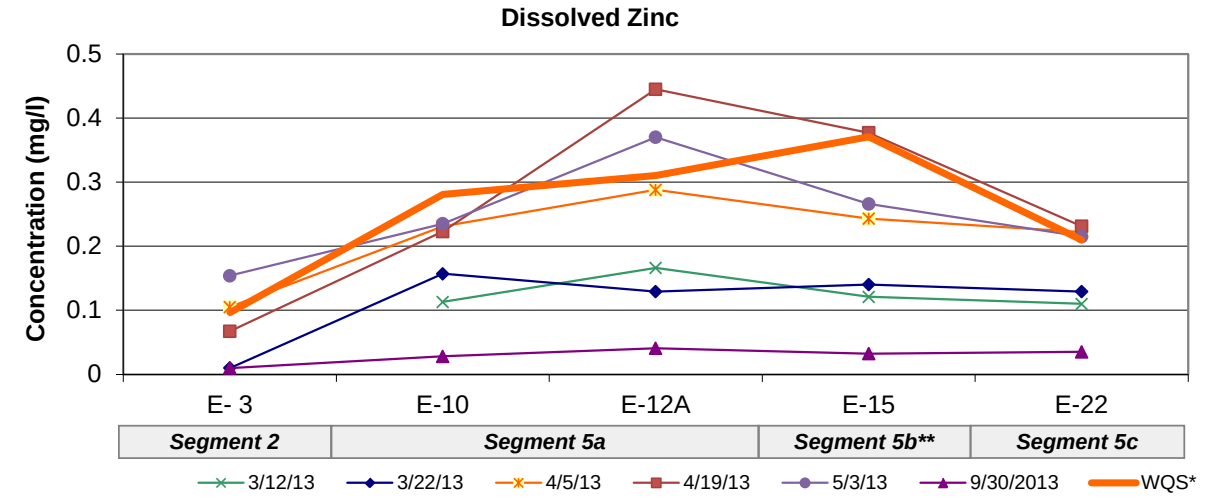
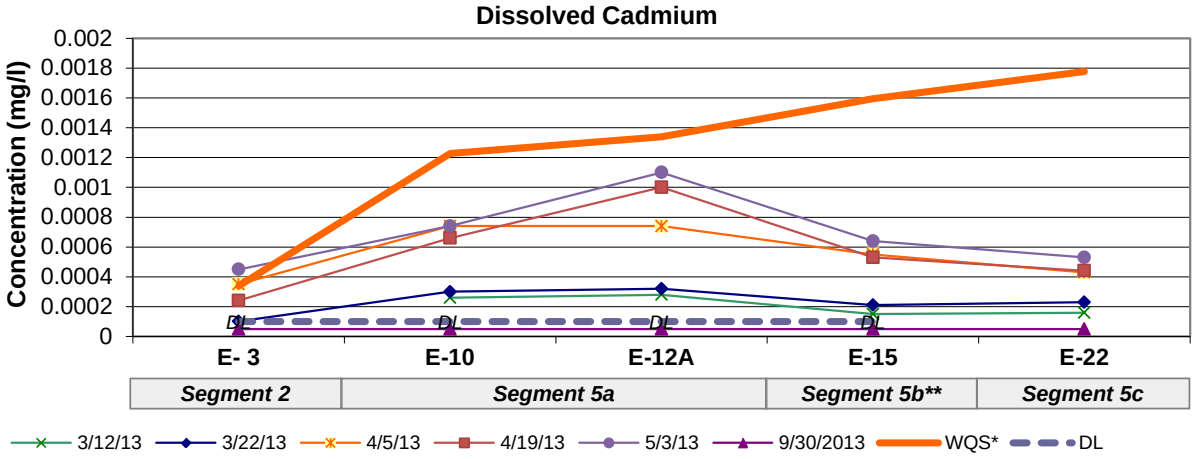
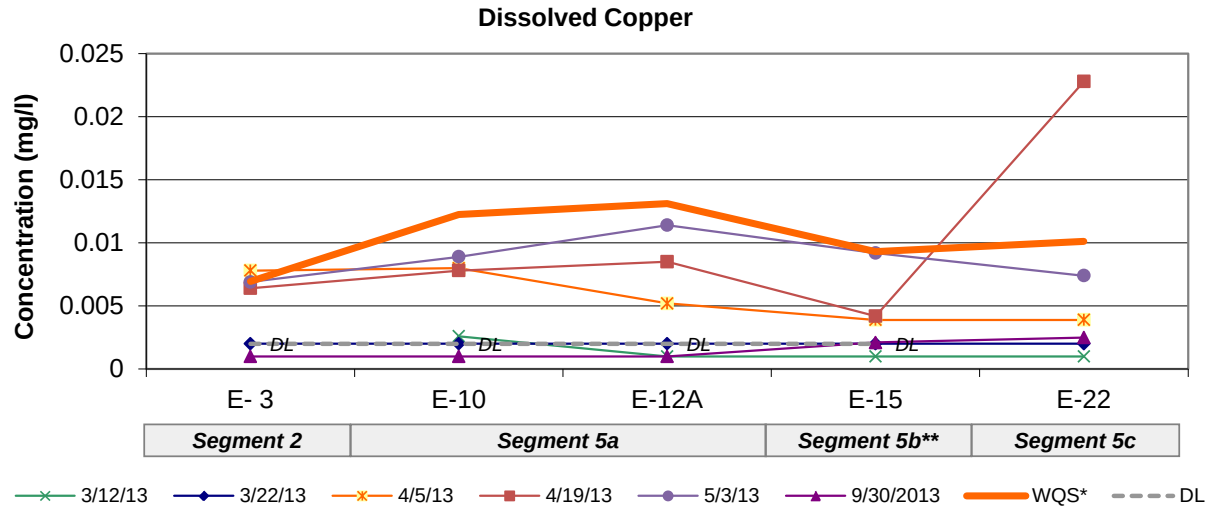


Figure 2-6

Comparisons of Dissolved Zinc, Cadmium, and Copper in the Eagle River to Chronic Ambient Water Quality Standards







* Average Hardness for each station was calculated using data from 2009-2012 and used in WQS calculation; equations vary by Segment.

** WQS for dissolved zinc shown for Segment 5b is the January-April WQS as this is appropriate comparison for all but September's sample. See Figure 2-6 for comparison of individual samples to the seasonal standards.

Figure 2-7

Dissolved Zinc Concentration
Station T-10: Rock Creek

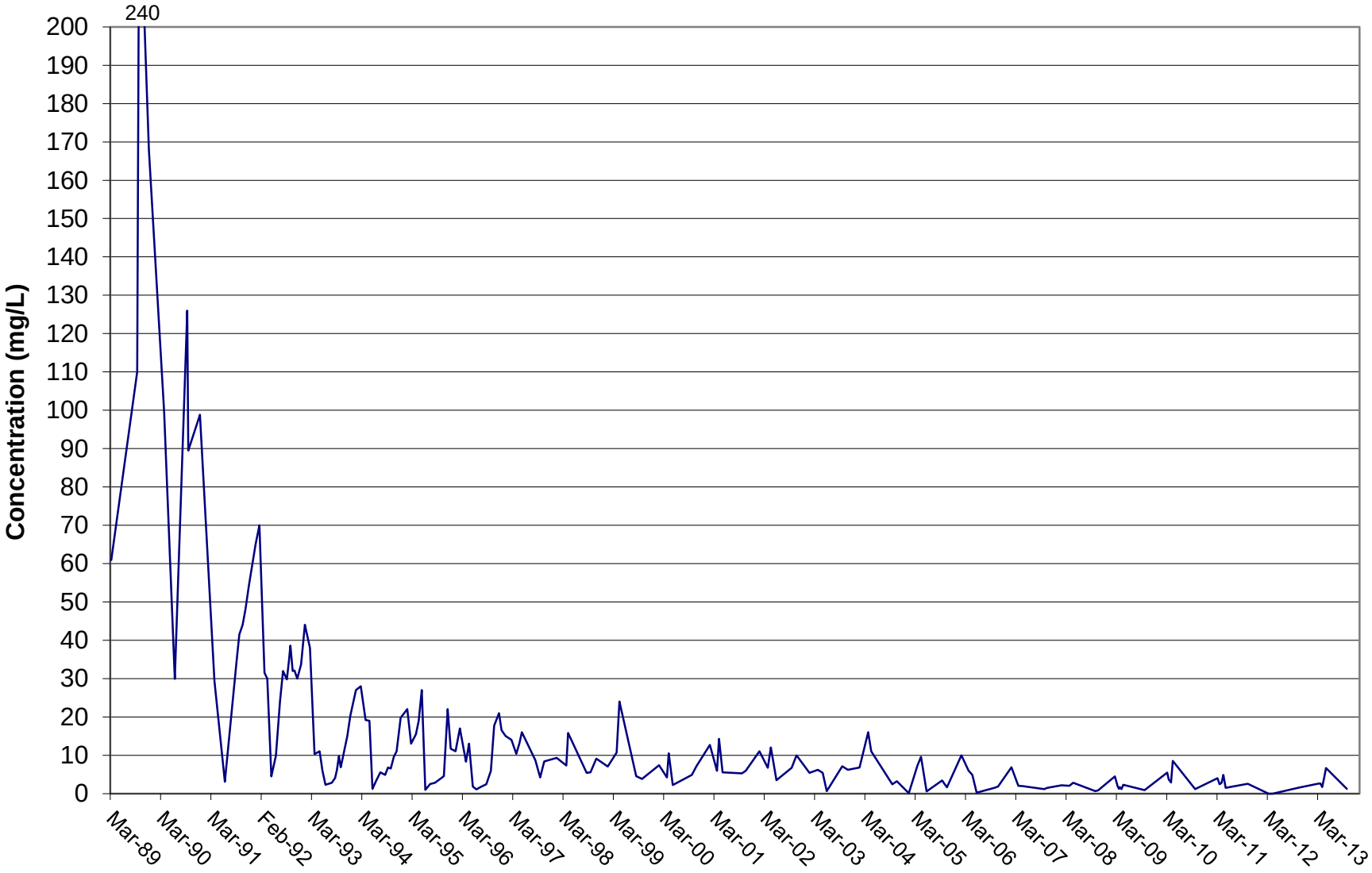


Figure 2-8

Dissolved Zinc Concentration
Station T-18: Cross Creek

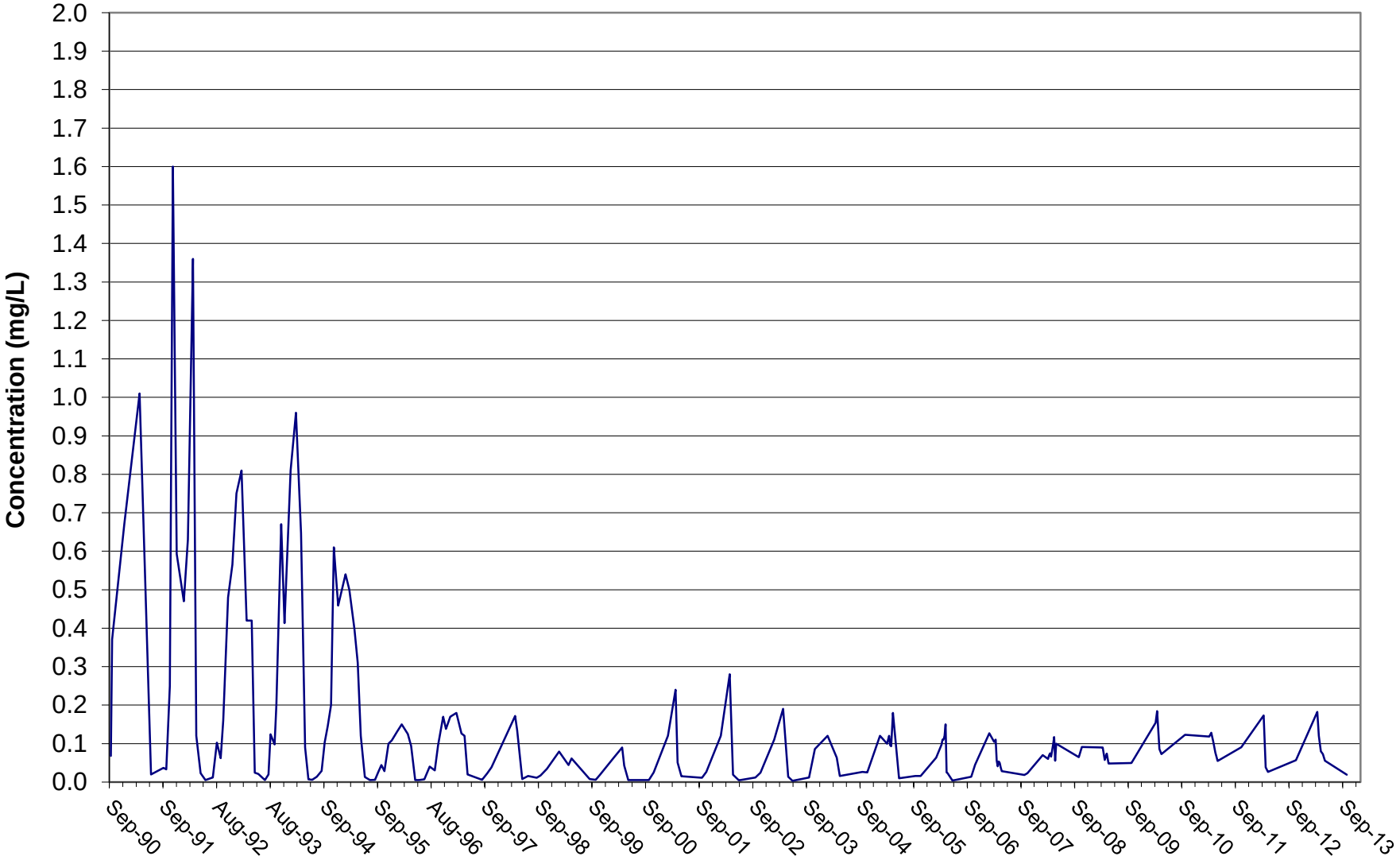
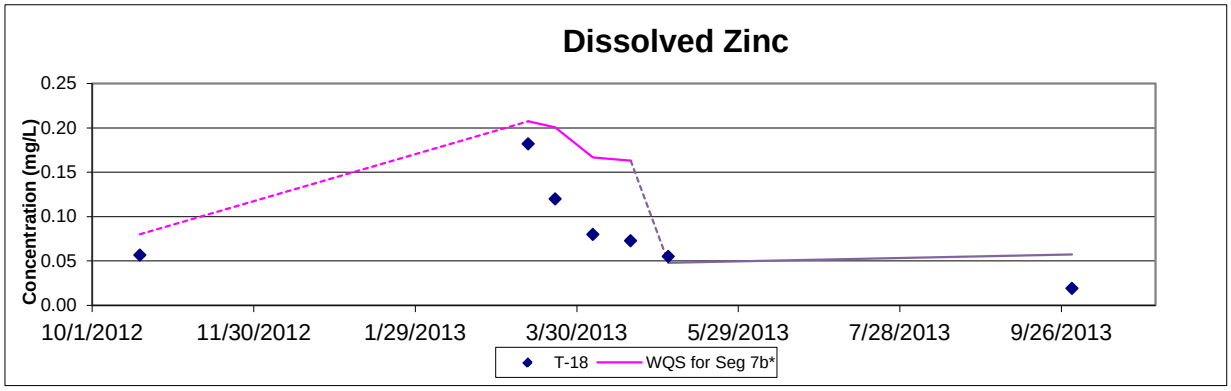


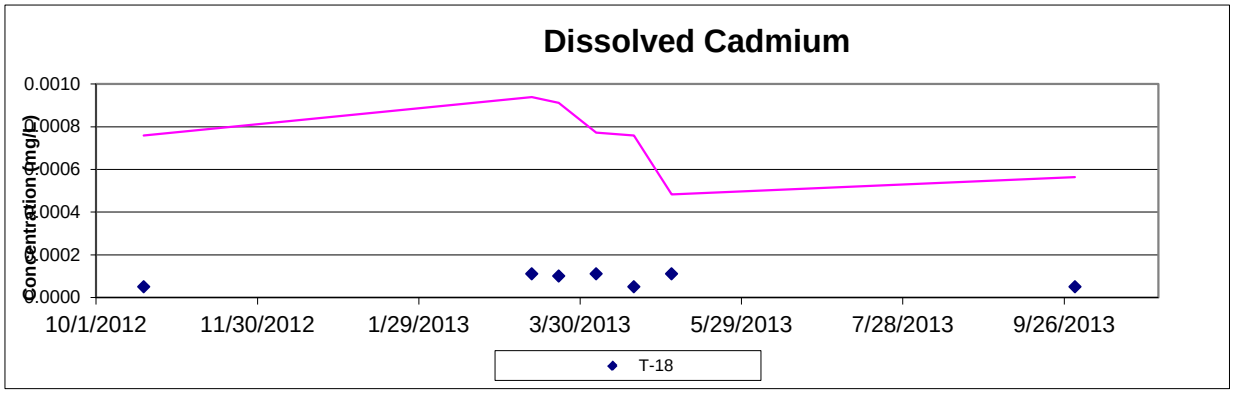
Figure 2-9

Dissolved Metal Concentrations in Cross Creek, Segment 7b

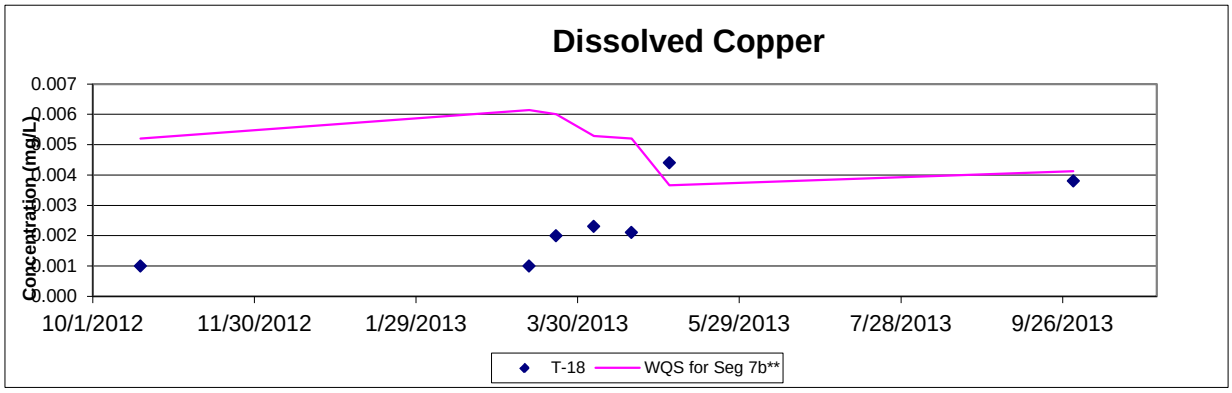
Segment 7b - Cross Creek



* All WQSs are based on equations found in Table 3 of CCR 33, effective 1/1/2009 and were calculated using the hardness of the sample. WQS equations vary by season for this Segment - Pink for Spring (Jan-Apr) and Purple for non-Spring (May-Dec). LIne is dashed between



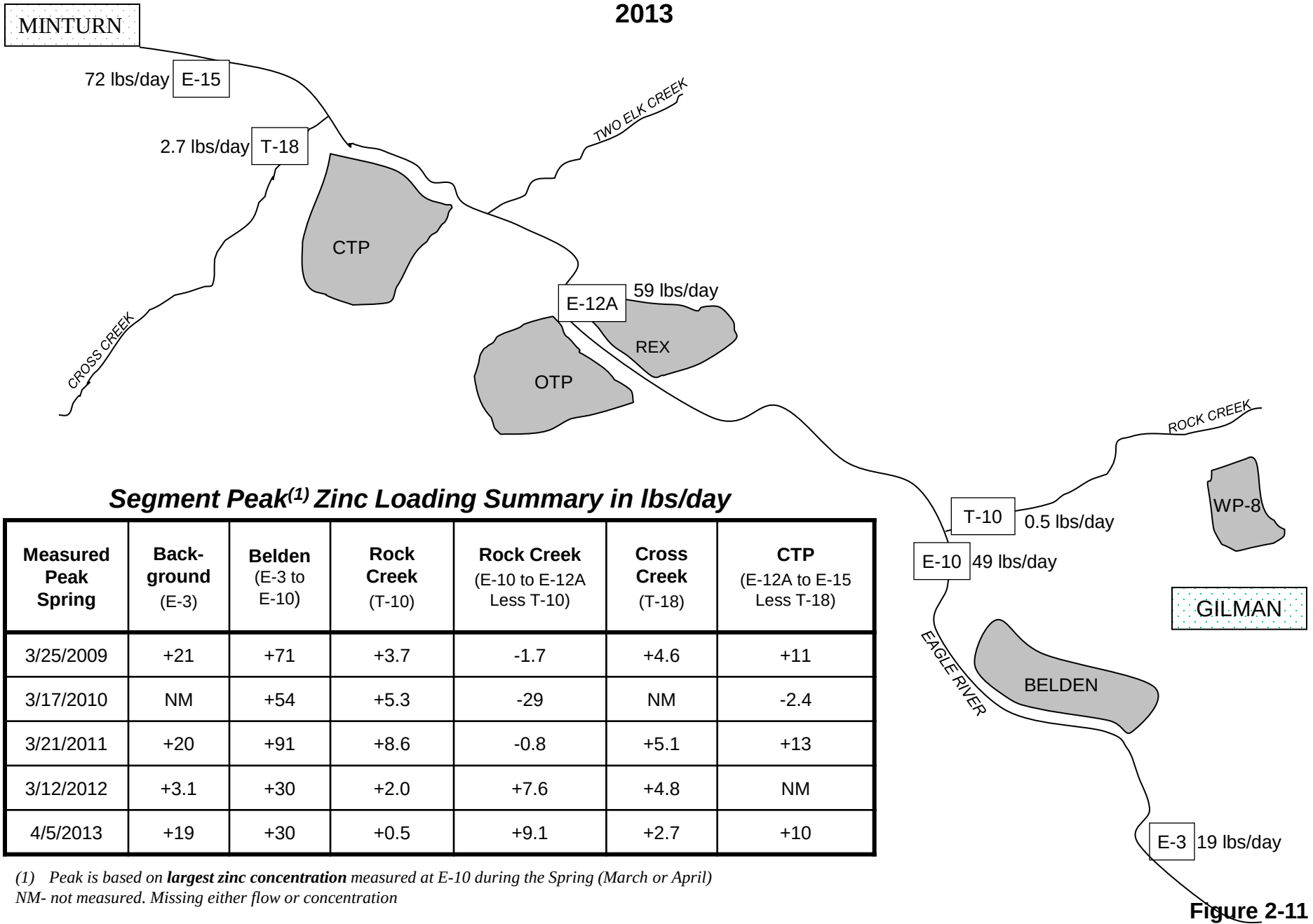
** All WQS are based on equations found in Table 3 of CCR 33, effective 1/1/2009 and were calculated using the hardness of the sample.



** All WQS are based on equations found in Table 3 of CCR 33, effective 1/1/2009 and were calculated using the hardness of the sample.

Figure 2-10

ZINC PEAK LOADING
2013



Segment Peak(1) Zinc Loading Summary in lbs/day

Measured Peak Spring	**Back-ground** (E-3)	**Belden** (E-3 to E-10)	**Rock Creek** (T-10)	**Rock Creek** (E-10 to E-12A Less T-10)	**Cross Creek** (T-18)	**CTP** (E-12A to E-15 Less T-18)
3/25/2009	+21	+71	+3.7	-1.7	+4.6	+11
3/17/2010	NM	+54	+5.3	-29	NM	-2.4
3/21/2011	+20	+91	+8.6	-0.8	+5.1	+13
3/12/2012	+3.1	+30	+2.0	+7.6	+4.8	NM
4/5/2013	+19	+30	+0.5	+9.1	+2.7	+10

*(1) Peak is based on **largest zinc concentration** measured at E-10 during the Spring (March or April)*
NM- not measured. Missing either flow or concentration

Figure 2-11

3.0 EAGLE MINE WATER MONITORING AND DATA SUMMARY

Eagle Mine water monitoring activities conducted in 2013 included the following:

- Measuring mine water levels
- Collecting mine water samples
- Monitoring mine seepage flow.

These monitoring activities and related data are summarized in this section. Activities conducted at the Liberty No. 4 well, which intercepts clean water prior to flowing into the Eagle Mine, are also summarized in this section.

3.1 Mine Water Levels

The mine pool level was historically measured in the Wilkesbarre shaft in Gilman. Beginning in July 1998 until 2002, the mine water level was measured from a reference point set in the Bleakhouse Mine workings (elevation 8503.8 ft MSL). Since 1992, mine water has been released at the Adit No. 5 bulkhead and gravity drained through a pipeline to the WTP for treatment (the MDD). Since 2002, the mine water levels have been monitored using a pressure transducer in the MDD pipeline. The Wilkesbarre shaft is not deep enough to access low mine pool levels. A graphical representation of the Eagle Mine water levels for 1992 through 2013 and then focusing on 2012 through 2013 is presented in Figure 3-1.

The mine pool elevation continued the 2012 downward trend for another 6.7 feet, from 8462.44 ft MSL on December 28, 2012 to 8455.74 ft MSL on April 3, 2013. In April, the mine pool elevation began to rise with the typical Spring recharge to 8463.82 ft MSL by June 28, 2013 (rise of 8.08 ft). The mine pool was brought down again to 8457.82 ft MSL by mid-September (drop of 6 ft). The rest of the year, the MDD flow rates were adjusted to maintain the mine pool between 8458 and 8460 ft MSL as WTP maintenance and the Liberty well and pump overhaul were conducted. Overall drawdown was 4.39 feet for the year.

3.2 Mine Water Sampling

In the 1990s, mine pool seepage through rock fractures was a significant source of metals, especially in the Rock Creek drainage where the flooded workings in the Bleakhouse area were leaking through highly fractured Cambrian quartzite. Mine pool seepage ceased to be a major source of metal loading since the inception of the MDD program and control of the mine pool level below 8500 MSL. Operational history has

demonstrated that as long as the elevation of the mine pool is maintained below 8500 ft MSL, most of the seeps are under control.

Mine water has been historically sampled directly from the mine pool via the Wilkesbarre shaft, from the bulkhead valve in Adit 5, and from the MDD at the Rock Creek vault. The MDD, sampled on October 1, 2013 as part of a new treatment plant siting study, contained 20 mg/L dissolved zinc. Comparisons to previous samples (see Figure 3-2 for zinc) indicate that the 2013 results for zinc are typical for the mine pool. In the spring, melting ice and snow collects in the mine workings that house the underground mill between the Newhouse level (8483 ft MSL) and the Copper Tipple Loading Tunnel (8397 ft MSL) or about 40 feet topographically above the Eagle River. When the mine and mill were operating, water that accumulated in the Mill Level was pumped out for treatment. At present, the so-called Mill Level water picks up elevated metal concentrations due to contact with ore and concentrates in the underground mill. Once the Mill Level water reaches its maximum level of 10 inches or so, it leaks outside the mine through old pipelines, fractures in the bedrock, and two tunnels that serviced the mill, the Loading Tipple and the Service Incline. Mill Level seepage probably recharges the shallow groundwater in the Copper Tipple Trench area. The Mill Level pool did not rise appreciably in the Spring of 2013; a portable electric sump pump was used to dewater the Mill Level pool to the floor level between October 14 through 16, 2013.

The 2013 analytical results and field measurements are provided in Appendix B.

3.3 Eagle Mine Seeps

The Eagle Mine began filling with water in 1984 when the mine dewatering pumps were turned off. The mine filled and eventually began leaking water in the Rock Creek area in September 1989. Subsequently, monitoring stations were established. Since 1990, seepage has been collected and piped to the WTP for treatment. Seepage stations are shown on Figure 3-3: Flow at collected seeps S-5 (Adit 5 bulkhead), S-6 (Adit 6 bulkhead), and S-TT (Tip Top bulkhead) is typically monitoring on a daily basis, unless access is difficult in the winter. These seeps were sampled on October 1, 2013 as part of a new treatment plant siting study. Sample results are presented in Appendix B.

3.4 Liberty No. 4 Well

Since 1990, investigations have been conducted to identify means to reduce inflow to the Eagle Mine, thereby allowing better control of the mine pool level and, eventually, reduce flow to the WTP. From these investigations, it was concluded that the most feasible method to reduce recharge to the mine is to stop or reduce flow entering on the 19 Level, via exploratory drift 19-5-E-3. It has been estimated that 200 gpm or more of fresh water continuously recharges the drift via core holes drilled horizontally from the

tunnel into the Leadville Dolomite. To intercept flow in the 19-5-E-3 drift, a well (Liberty No. 4 or LIB-4) was installed in the drift in July 1998.

On September 1, 1999, EPA issued an Explanation of Significant Differences (ESD) describing EPA's decision regarding this mine pool component of the remedy for the Site. The ESD, which is an addition to the 1993 Record of Decision, required installation of a pumping system at the Liberty No. 4 well. After delays due to securing an easement and pump problems, the Liberty No. 4 well began pumping on October 30, 2001. The well has operated since 2001 including during most of 2013, with the exception of the period from September 20, 2013 through November 16, 2013.

On September 20, 2013, the existing riser pipe, pump and motor were pulled from the well. The well was then redrilled to remove sand that had accumulated since the most recent rehabilitation in 2004. Upon reaching the original total depth of 978 ft bgs, the tunnel and well screen were acidified on September 27, 2013. The tunnel was videoed on September 28, 2013 by Colog. Boart Longyear set a new larger-diameter riser pipe, pump, motor and variable frequency controller (VFD) in LIB-4 between November 12 through 16, 2013, and on November 16, 2013 the well resumed operation.

Discharge to Willow Creek is measured by a totalizing flow meter in the pump house. The well pumped at approximately 60 to 65 gpm during the early part of 2013 (until September 20) and then resumed pumping on November 16, 2013 at approximately 145 gpm. In 2013, approximately 32,000,000 gallons were pumped from the Liberty No. 4 well to Willow Creek.

Monthly samples are collected of the discharge in accordance with CDPHE Permit No. COG-600000. No samples were collected in October as the well was shut down for pump replacement. Field parameters and sample results are provided in Appendix B. All permit requirements were met.

CDPHE is phasing out the general "MINDI" permit under which the LIB-4 well discharges. New permitting options were reviewed in the latter half of 2013. A full suite of metals was analyzed on a well sample collected on August 22, 2013 in anticipation of the discharge permit modification. Additionally a sample of Willow Creek (receiving stream) was collected on October 15, 2013. Sample results for both samples are presented in Appendix B. Preliminary effluent limits (PEL) were requested at the end of the year to evaluate obtaining an individual discharge permit for the discharge. Additionally, CBS would like to increase the allowable pump rate from the Liberty 4 well to over 200 gpm and this has been requested in the pending permit application.

3.5 Liberty No. 5 Slant Well

In 2004, the 10 in diameter Liberty No. 5 (LIB-5) hole was directionally drilled to intersect the tunnel. In 2005, 100 cubic yards of sand, gravel, concrete, bentonite and other plugging agents were injected to establish a plug in the tunnel, on the mine side of the horizontal core holes. The plug failed after an hour of service under a differential head of about 170 feet. In 2006, an attempt was made to reopen the hole and case it. This attempt failed due to unstable hole conditions and the hole was abandoned, plugged at 500 feet.

Between September 5 and 20, 2013, the Liberty No. 5 was cased from the surface to the 19-5-E-3 tunnel with 7 in diameter steel casing by Boart Longyear of Salt Lake City, Utah under supervision by NewFields and Adrian Brown Consultants. The tunnel backfill and casing were videoed by Colog upon completion of the casing work. The LIB-5 well was cased to provide a backup pumping well for LIB-4 or as an access point for future drift plugging attempts.

Figure 3-1 Eagle Mine Water Level

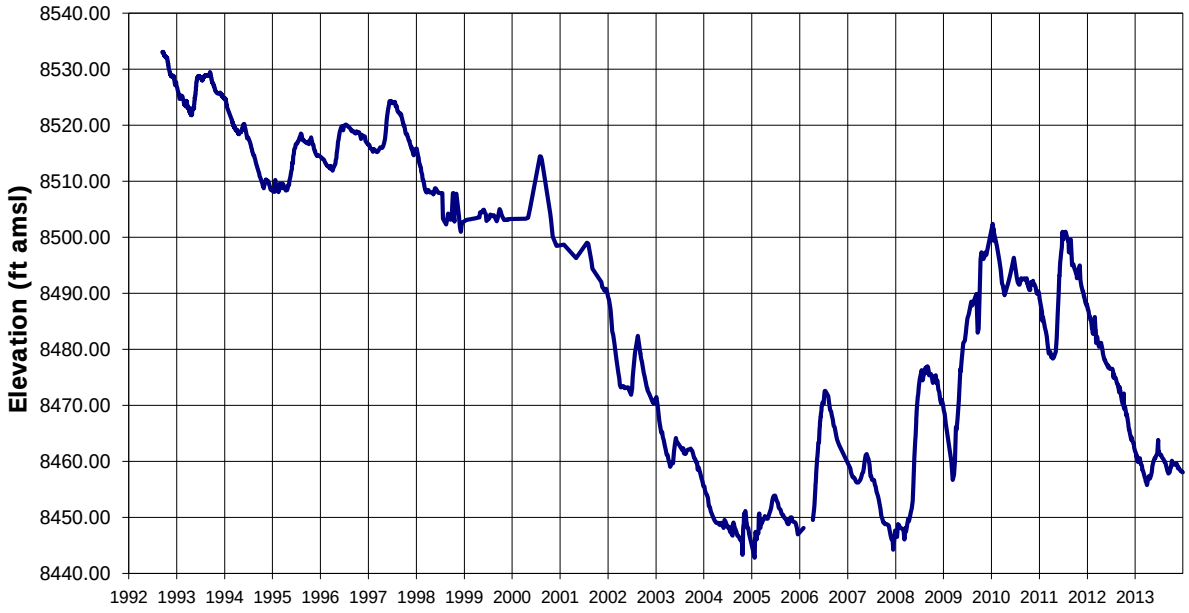
Figure 3-2 Adit #5 Zinc Concentrations, (MS-5 or MDD) 1992 to 2013

Figure 3-3 Approximate Mine Seep/Adit Locations

Eagle Mine Water Level

(measured in the Bleakhouse tunnel)

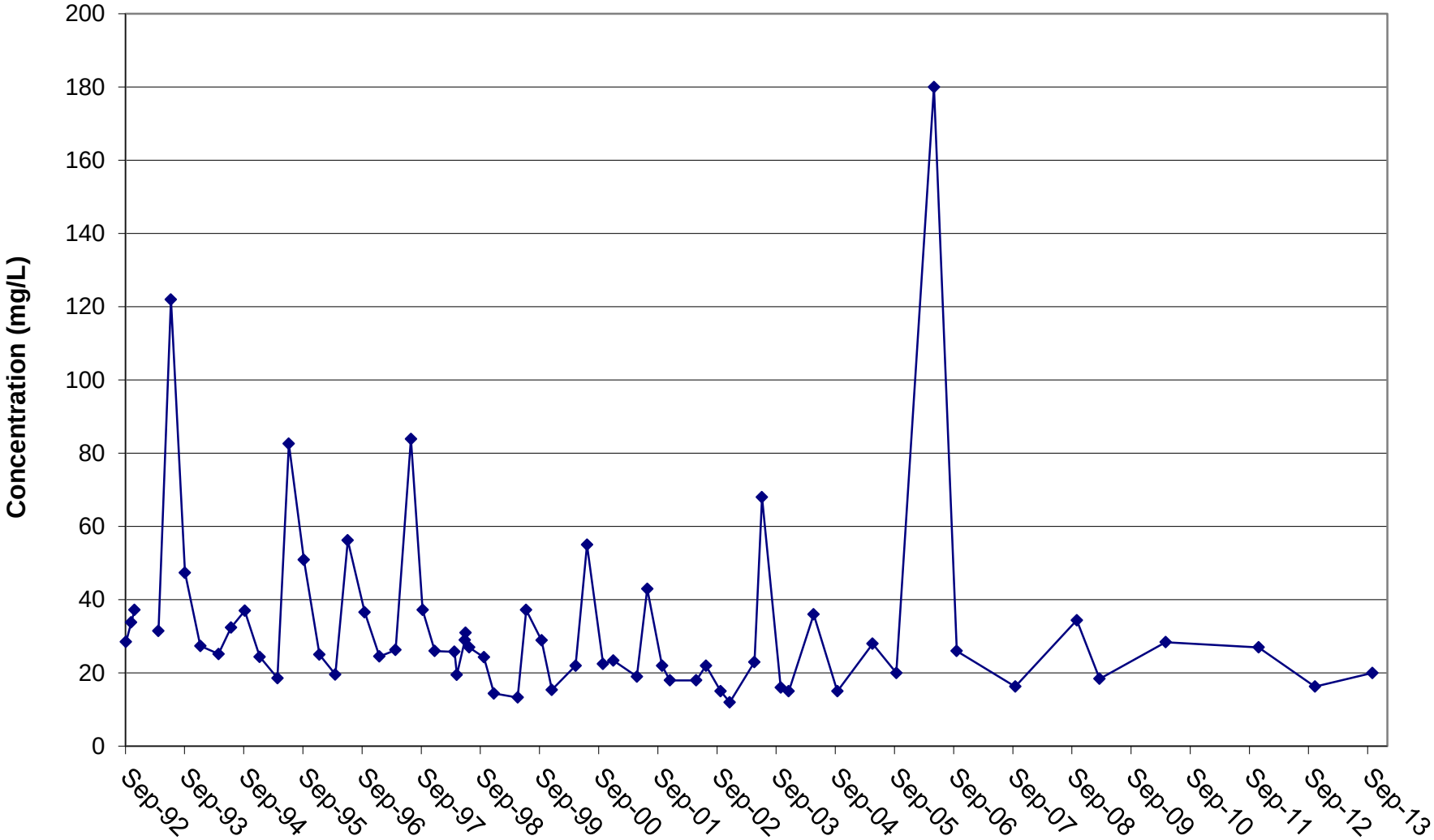
Mine Pool 1992 - 2013



Mine Pool 2012 - 2013

Figure 3-1

Adit #5 Zinc Concentrations[(1)] (MS-5 or MDD) 1992 to 2013



(1) Dissolved zinc except for 2011 and 2012 measurements

Figure 3-2

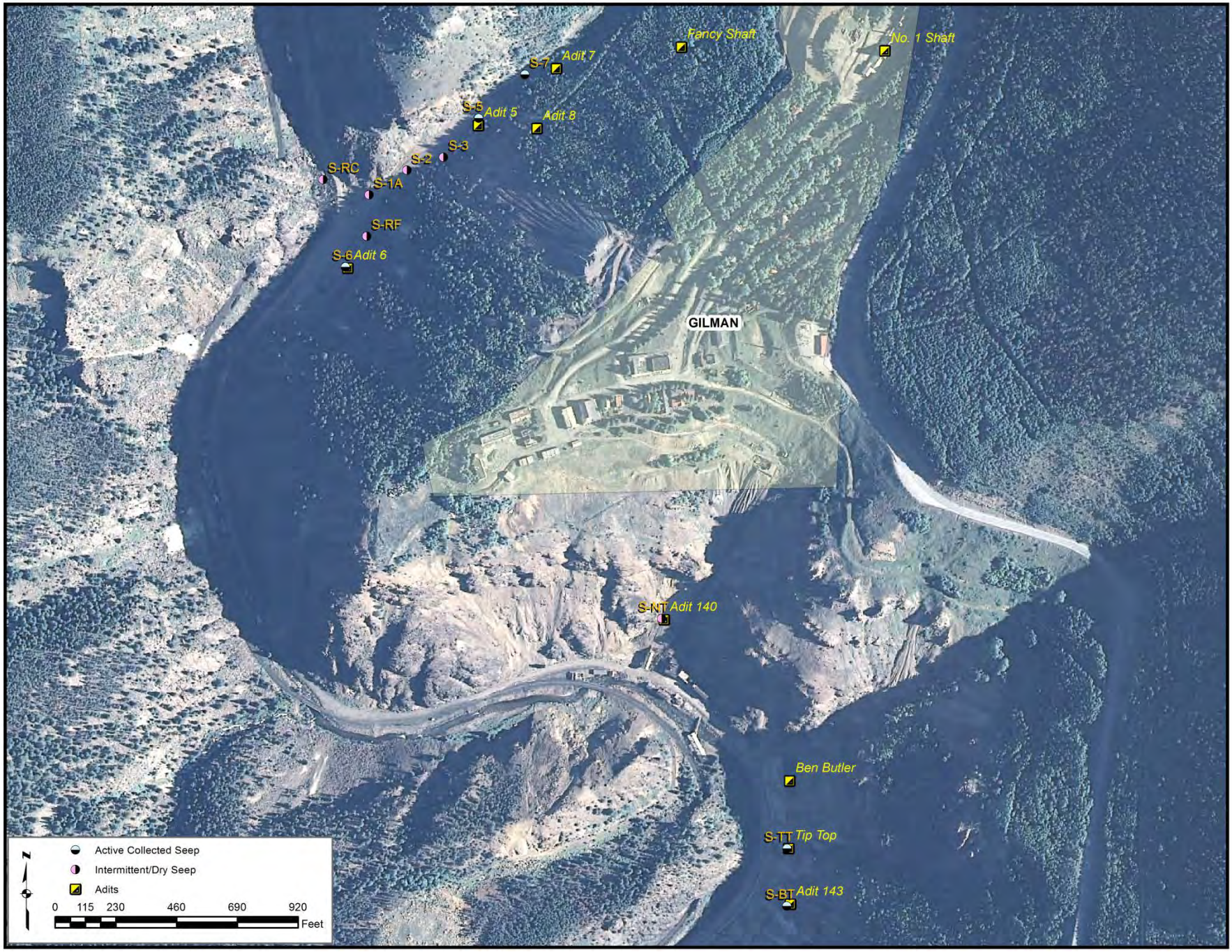


Figure 3-3 Approximate Mine Seep/Adit Locations

4.0 GROUNDWATER MONITORING AND DATA SUMMARY

Section 4 presents an historical background of the groundwater monitoring activities conducted at the Site and a summary of the 2013 groundwater quality data. Also discussed in this section are the groundwater extraction and diversion systems that were operated in 2013. The Rock Creek groundwater extraction system (siphon) is discussed with the Rock Creek groundwater in Section 4.2. Section 4.3 presents the operation summary of the upgradient groundwater diversion trench (UGDT) at the CTP. Section 4.4 presents the operation summary of the CTP groundwater extraction trenches.

4.1 Belden Area

Several years of water level measurements in seven Belden area monitoring wells indicate that the water table rises in the spring in response to recharge from snowmelt. This rise in the local water table in the Belden area is commensurate with a seasonal increase in the zinc concentration in the Belden reach of the river.

Based on recent sampling, groundwater in the Belden area is moderately acidic (pH range 2.8 to 5.8) and contains elevated concentrations of sulfate, zinc, and other metals leached from sulfide minerals within undifferentiated mineralized source materials in the area and from seepage from the Mill Level of the Eagle Mine.

In 2006, CBS and NewFields proposed to meet the anticipated WQS in Segment 5a by extracting and treating groundwater in Belden. System performance reports (NewFields 2007a, 2007b, 2007c; and 2008a) document data collected from Belden wells and the as-built information for the groundwater collection trench constructed in 2007 (this trench is referred to as the Copper Tipple Trench). Figure 4-1 presents the location of the Belden groundwater wells and the Copper Tipple Trench. This year groundwater started to collect in the Cooper Tipple Trench in mid-February with the marked spring inflow occurring on March 3, 2013. Overall, the groundwater level rose almost 8 feet in the collection trench (Figure 4-2).

As documented in *Focused Feasibility Study, Eagle Mine Site* (NewFields 2013b), Belden groundwater contains up to 979 mg/L zinc compared to 20 mg/L in the MDD mine water. BW-10 water sample (in the Belden area) was collected as part of a new treatment plant siting study. The measured zinc concentrations (610 mg/L dissolved and 790 mg/L total) were consistent with previous measurements from this well and area. The 2013 analytical results and field measurements are provided in Appendix B.

Water levels from wells to calibrate the HOBO water level transducers. The 2013 water elevations (non-HOBO) are provided in Appendix C.

4.2 Rock Creek

Groundwater baseflow within Rock Creek canyon colluvium is a source of metal loading to Segment 5a. No groundwater samples were collected from the Rock Creek wells during 2013.

A groundwater extraction system consisting of four, 4-inch diameter wells was installed at a narrow bedrock constriction in lower Rock Creek Canyon near Seep S-2 in October 1992. These extraction wells are spaced approximately 15 feet apart and are approximately 15 feet deep with the well bottom in granite. A gravity siphon was installed in one extraction well (RX-3) on June 23, 1993 that removes approximately 1 gpm. The RX-3 siphon did not operate throughout most of 2013, as suction could not be maintained due to low groundwater levels. The siphon was restarted on April 26, 2013 after groundwater levels rose with the spring; however, the siphon still could not be maintained. The EDS-3 pumping well at the base of Rock Creek operated at approximately 10 gpm during April and May 2013.

4.3 CTP Upgradient Groundwater Diversion Trench (UGDT)

The UGDT was originally installed in the late 1980s, but its use was discontinued in 1990 due to elevated metal concentrations in the discharge. Section 9.0 of the CD/SOW required an analysis of the need to reactivate or reconstruct the UGDT. CBS requested reopening the UGDT in 1997 because the CTP cap was complete and water quality of the groundwater in the nearby DT wells was good. In March 1999, CDPHE and EPA agreed that operation of the UGDT benefited the reestablishment of wetland vegetation in Maloit Park and increased the efficiency of the north groundwater extraction trench. The UGDT has flowed seasonally since that time.

The UGDT outfall was flowing at approximately 2 gpm by late-April 2013 and flowed into the summer. The UGDT was dry by mid-July 2013.

4.4 CTP Groundwater Extraction

Two extraction trenches at the CTP intercept groundwater and route it to the WTP surge ponds for treatment. The combined flow from the east groundwater extraction trench and north groundwater extraction trench is measured at the surge ponds by a totalizing meter. Run times are recorded for each of the pumps.

The average combined daily flow rates of the two trenches were greatly reduced in late 2012 and early 2013 compared to previous years. Partial pipeline blockages were identified and the force main and east trench collection pipe were jetted in May 2013. Flow rates increased from combined daily rate of 10 gpm to a combined daily rate of

almost 30 gpm. Combined, approximately 8.365,000 gallons of water were pumped from the trenches in 2013 representing 6 percent of the total amount treated at the WTP in 2013. The total monthly production is provided in Appendix C.

Water samples from the East and North trench sumps were collected as part of a new treatment plant siting study. The 2013 analytical results and field measurements are provided in Appendix B.

Water levels in east trench manholes and nearby monitoring well ET-1 are monitored periodically to assess the effectiveness of pipe cleaning and pumping. An ET-1 water level profile is included as Figure 4-3. High water levels in this well in the Spring are not unusual but the low pumping rates associated with the water level rise indicated the trench needed maintenance.

The CTP trenches were sampled as discussed above for the new treatment plant siting study. Water levels from several wells were measured to calibrate the HOBO water level transducers. The 2013 water elevations (non-HOBO) are provided in Appendix C.

Figure 4-1 Belden Area Groundwater Well Locations

Figure 4-2 2013 Water Levels, Belden Area

Figure 4-3 Water Levels, CTP East End (ET-1)

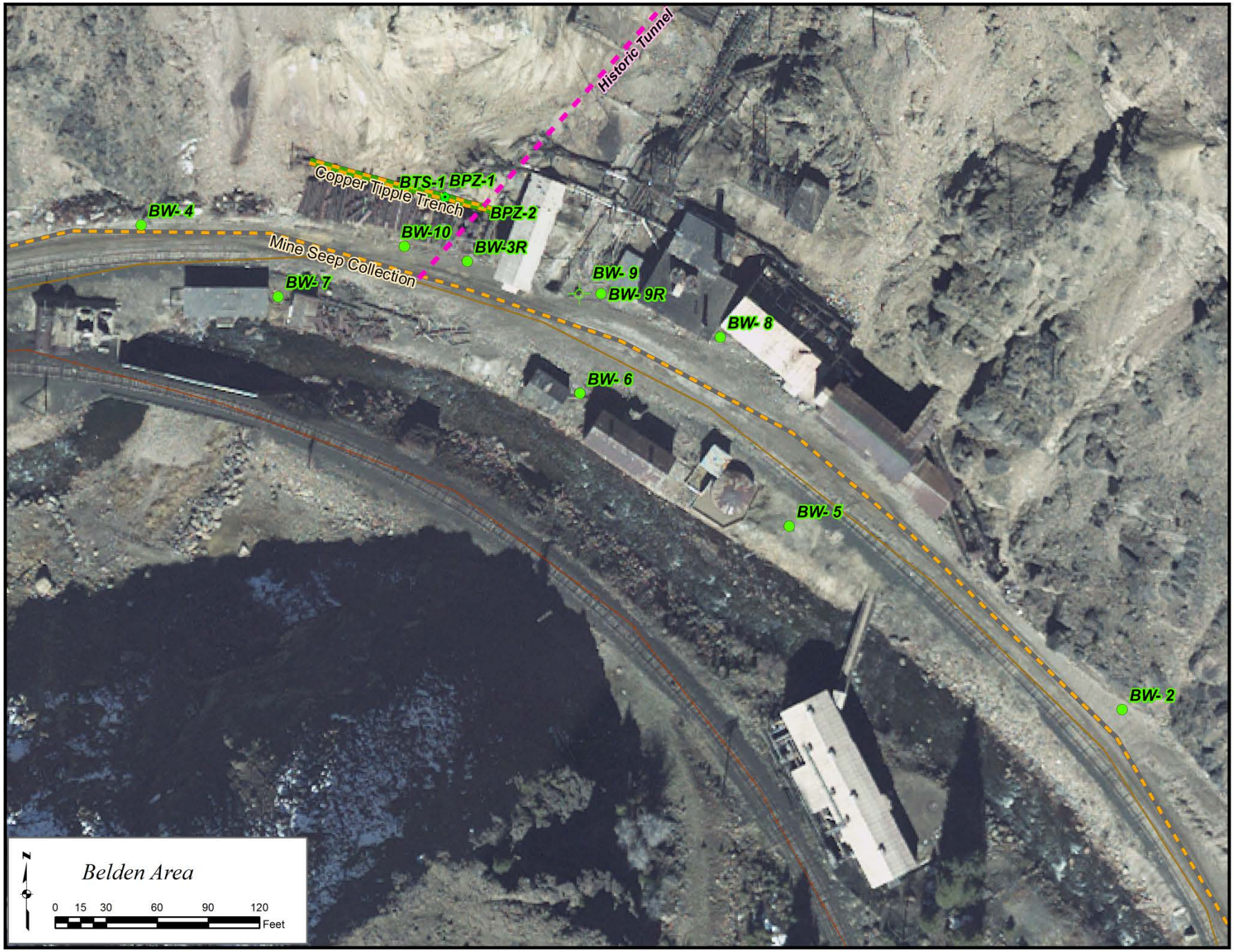
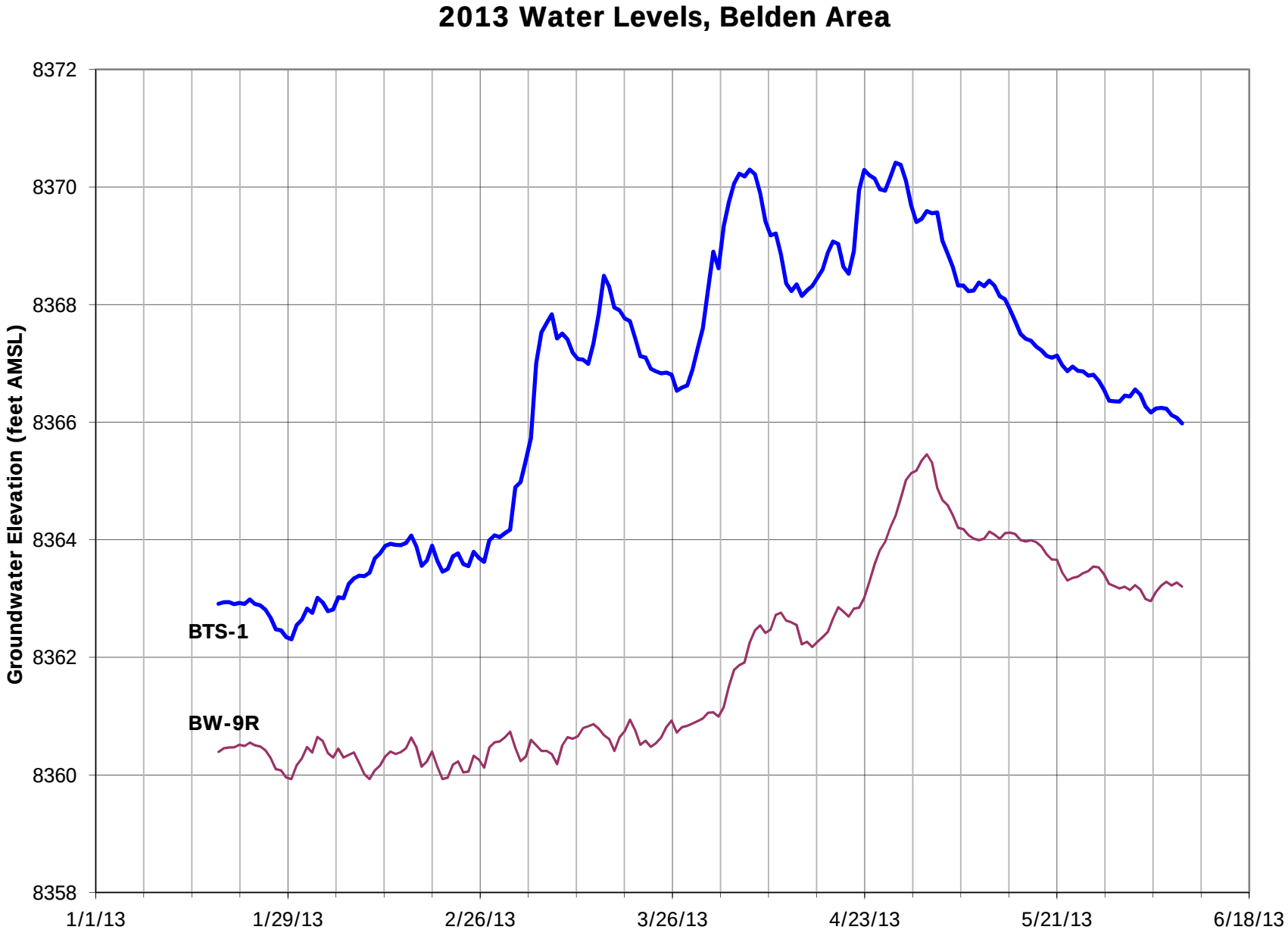


Figure 4-1 Belden Area Groundwater Well Locations



water levels are not corrected for daily barometeric changes

Figure 4-2

Water Levels, CTP East End (ET-1)

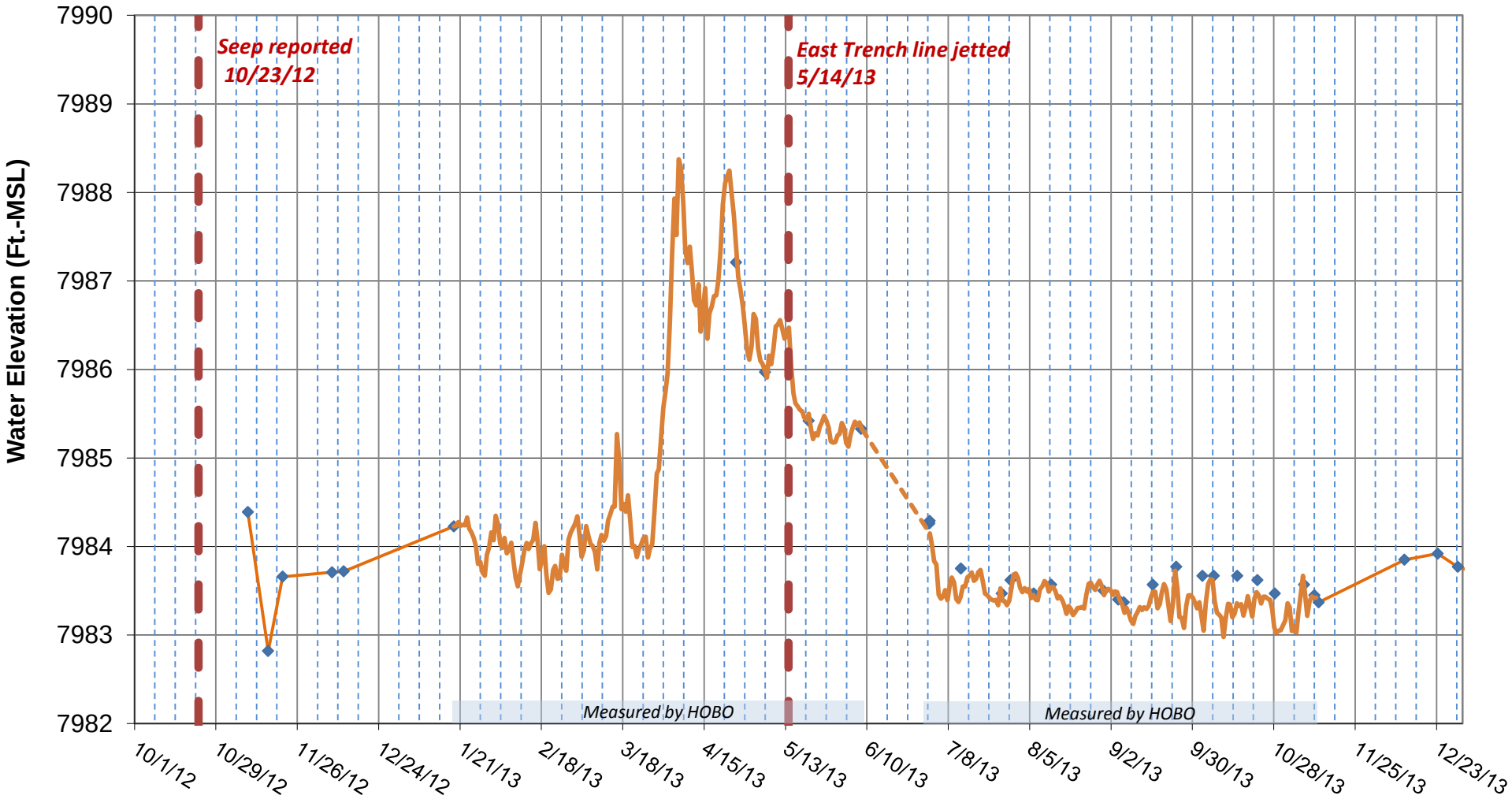


Figure 4-3

5.0 SUMMARY OF SITE ACTIVITIES

Section 5.0 contains a summary of the key submittals and the significant activities that occurred in 2013.

5.1 Deliverables, Reports, and Letters Completed and Submitted

- On January 11, 2013, the Surface Water and Groundwater Monitoring Plan for 2013 was submitted to EPA and CDPHE.

- An East Groundwater Extraction Trench evaluation report was submitted on January 16, 2013 following a reported seep in October 2012.

- On, January 24, 2013 CBS submitted a revised version of the Focused Feasibility Study (FFS). This version is based on the November 15, 2012 response to EPA and CDPHE July 13, 2012 comments on the July 5, 2011 version of the FFS.

- The 2012 Pipeline Inspection and Maintenance Report was submitted on January 22, 2012.

- ENVIRON revised the Draft Emergency Response Plan and submitted it to CDPHE and USEPA on April 12, 2013.

- On April 24, 2013, the Annual Report for 2012 was submitted.

- The Fourth Five-Year Review Report for Eagle Mine Superfund Site, EPA ID COD081961518, Minturn, Eagle County, Colorado, September 2013, was issued by EPA.

- A Release Response Report was submitted to CDPHE and USEPA on November 10, 2013 associated with a minor release from a failed PVC connector on the MDD pipe near the MDD vault on November 3, 2013.

5.2 Design and Construction

- CBS selected Golder Associates to conduct pre-design services for a new water treatment plant. The goals of the pre-design study are to identify the most cost effective treatment process and site for a new water treatment plant.

5.3 Operations and Maintenance

- The mine pool elevation was measured routinely using the MDD pressure transducer.

- Pipelines carrying seepage from Adit 5, Adit 6, seep 7 and Tip Top mine were jetted or rodded by hand periodically to maintain flow.

- The air system in R1 at the WTP was serviced on March 20 and 21, 2013. The air lines and diffusers were plugged with grit and debris with effectively 80% of the line plugged. All diffusers were cleaned and the air pipe was cut to enable jetting from two directions. The pipe was welded back together and all 29 diffusers were tightened back in place and tested with air then again with water above the diffusers to ensure that the R1 tank receives a uniform aeration process.

- North and East trench pipelines and force main were jetted and sumps and manholes were serviced in May 2013.

- An approximately 0.5 gpm release from a leaking valve was identified at the Rock Box clean out on the 8 in diameter bypass pipeline in Rex Flats on May 10, 2013. Flow was switched from the bypass line to the Trestle; the leak was repaired on May 13, 2013. NewFields reported the release, and CDPHE generated the release report #2013-0307 on May 13, 2013. The iron-stained soil removal and restoration work was performed in October 2013.

- WP 8 collection pipeline was jetted in June 2013.

- The force main wye at CO#1 uphill from the North Trench was replaced and pressure tested on July 31, 2013.

- Several portions of the pipeline were cleaned in early July 2013: the 6 in line from Adit 6 to the confluence with the main line, main line segments downstream of the vault to Two Mack Gulch, and a 100 ft segment at MH 0.

- In preparation for the overhaul of the Liberty wells, the Liberty road was improved in July 2013. The Liberty road improvement task was coordinated with EPA, XCEL high pressure gas personnel, Battle Mountain, and the Town of Red Cliff.

- ED Mining inspected Adit 5 support timbers and Clearwater removed the accumulated iron material in the portal in July 2013. ED Mining replaced the weak timbers with steel sets and replaced the portal door with a metal door in November 2013. This door is now locked with a padlock.

- The pipeline and trestle were periodically inspected throughout the year. On July 29, 2013, leaks were observed in Rex Flats at the T-cleanouts. The upstream end of the pipe is shifting towards the left (a bend was observed where the leak was). Most of the planks appeared to be fine and intact with some requiring repair or replacement. However, several of the cross pieces that the pipe rests on are missing. The flow was returned to the bypass.

- Jetting was performed on August 1, 2013 which included:
  - Discharge line from the vault to the upper pond.
  - By-pass line from the vault to the upper pond and the vault was vacuumed of remaining debris.
  - Remaining solids in the plant vault were vacuumed.
  - Sump by the in–house water supply was vacuumed.
  - R3 tank bottom was vacuumed (approximately 1.5 feet of material) which required a maintenance shutdown for 4 hours.

- The CTP force main and other pipelines from the East trench were jetted in May and August 2013.

- The Tip Top line from E-7 manhole (near Belden) was jetted 2,100 ft downstream to Rock Creek in August 2013.

- Two Liberty wells were overhauled (see Section 3.4). The pumping well did not discharge from September 20 through November 16, 2013.

- Structural repairs to the trestle across Rex Flats were made in August, November, and December 2013.

- An obstruction in the influent pipe from the Upper Pond into the wet well in the WTP was observed on November 17, 2013, which caused reduced flow into the WTP. Attempts to remove the obstruction were unsuccessful. The MDD flow rate was reduced to less than 140 gpm as a result. (The MDD flow rate was also reduced due to the increased flow from Liberty and the fact that the mine pool is near the target elevation and there is no need to treat a higher flow rate of water from the mine.)

- The butterfly control valve at the MDD was replaced in October 2013.

- The pipeline from Tip Top was jetted from the clean out in the retaining wall down to the E-7 manhole on November 4, 2013. The E-7 manhole was cleaned out after jetting.

- A new flow meter was installed to measure effluent flow from the WTP on December 3, 2013.

5.4 Inspections

- General site inspections were performed daily and any issues noted on the Daily Inspection Forms.

- EPA's 5-year review contractor Skeo Solutions conducted site visits on February 12, 2013 and May 10, 2013. **Error! Hyperlink reference not valid.**

- CDPHE annual inspection was conducted during the May 10, 2013 5-year review site visit.

- A Compliance Inspection of the WTP was conducted by the CDPHE Field Services Section of the Water Quality Control Division on September 12, 2013. One alleged violation of the CDPS permit was identified associated with documentation of on-site monitoring of pH. Following the inspection, ENVIRON provided the Division with an updated procedure for pH sampling as well as a bench sheet that contains all of the required information to address this alleged violation; CDPHE indicated that no additional response was required.

5.5 WTP Operation

- In 2013, the WTP treated 142,208,936 gallons of water, generating approximately 1,713 cubic yards of dewatered sludge. The sludge was placed in the lined Sludge Cell.

- In 2013, WTP operation continued with the following plant upgrades.
  - Upgrades to the WTP SCADA system occurred throughout the year. These upgrades included improved polymer controls and new more advanced alarms for pH and calibration modes. The remote log in for WTP staff was also improved.
  - The pipe from the influent wet well to R1 tank was jetted allowing for increased plant flow.
  - A timer was added to the lime feed system allowing for increased lime feed and control of lime dust.
  - The WTP influent pump was replaced which improved plant flow.

- In 2013, WTP operation improvements included:
  - Standard operating procedures (SOPs) revised to reflect current operating procedures.
  - Staffing has been increased and modified to meet the current needs of the WTP operations.
  - Daily operations sheets and information recorded into WIMS system has been revised and improved.

5.6 Community Relations

- ENVIRON personnel participated in the Eagle River Cleanup on Saturday September 14, 2013.
- ENVIRON presented to the 6th Grade Class of the Homestake School of Expeditionary Learning on October 24, 2013.

5.7 Planned 2014 Activities

- Mine water withdrawal rate will be measured daily as recorded by the SCADA system at the plant and at the totalizing meter on the MDD pipeline located near the mouth of Rock Creek.
- The mine pool elevation will be measured routinely using the MDD pressure transducer located near the mouth of Rock Creek.
- General site inspections will be performed by site personnel on weekdays.
- Accumulated water in the Temp Cell and Sludge Cell will be periodically pumped to the WTP surge ponds for treatment.
- Accumulated debris at the Tramway culvert in Belden will be periodically removed.
- Accumulated debris at seep 7 and the WP-8 seep collection facilities will be periodically removed and transported to the Sludge Cell.
- Debris from the beaver dams in upper Rock Creek will be periodically removed and transported to the Sludge Cell.
- Scale will be periodically cleaned from the pipelines and the sediment traps.

- The Liberty No. 4 well will be operated on a full-time basis. Samples will be collected to meet the permit requirements. A new permit will be issued by CDPHE WQCD in 2014. CBS plans to extract higher flows from this well in 2014 if the new permit allows.

- The North and East groundwater extraction trenches will continue to operate. The North trench collection pipe will be jetted to remove accumulated scale.

- The RX-3 siphon in Rock Creek will be cleaned and restarted if sufficient water is present.

- Rock Creek pumping well EDS-3 will be pumped in the spring to intercept metal load entering the river from Rock Creek.

- The Mill Level in Belden will be dewatered if the pool nears its maximum level.

- The WTP will continue to operate and upgrades will continue to be made as needed.

- The obstruction in the WTP influent line will be cleared.

- The river will be sampled every other week during March and April in accordance with the 2014 Surface Water Sampling Plan, dated January 27, 2014.

- The East trench pump house will be insulated on January 8, 2014.

- Eagle Mine personnel will give a presentation at Water Wise Wednesday sponsored by ERWC.

6.0 REFERENCES

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NewFields, 2007a. *Eagle Mine Site - Belden Groundwater Extraction System Performance Report.* January 19.

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NewFields, 2011a. *Eagle Mine Annual Report – 2010, Eagle Mine Site, Minturn, Colorado.* Prepared for CBS Operations, Inc. April 7, 2011.

NewFields, 2013a. *East Trench Evaluation Report*. Prepared for CBS Operations, Inc. January 16, 2013.

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APPENDIX A

SURFACE WATER DATA

A-1 Eagle River Water Quality Data
Eagle Mine Site
January through December 2013

Eagle River Water Quality Report

Eagle Mine Site, January through December 2013

Station ID / Sample Date and Time	Station Description / Flow (cfs)	Field Temperature (Deg. C)	Field Spec. Cond. @25C (umhos/cm)	Field Temperature (Deg. C)	Calcium Dissolved (mg/L)	Magnesium Dissolved (mg/L)	Calculated Hardness (mg/L)	Arsenic Total (mg/L)	Cadmium Dissolved (mg/L)	Copper Dissolved (mg/L)	Zinc Dissolved (mg/L)
E- 3	*EAGLE RIVER ABOVE BELDEN*										
3/22/2013 14:00	8 est	2	285	2	24.3	10.3	103	0.0004 U	0.0002 U	0.004 U	0.02 U
4/5/2013 12:20	34 est	3	155	3	19.8	7.94	82	0.00025	0.00035	0.0078	0.105
4/19/2013 14:30	29 est	1	166	1	20.3	8.49	86	0.0002 U	0.00024	0.0064	0.0671
5/3/2013 12:59	115 est	5	113	5	13.2	5.45	55	0.00034	0.00045	0.0069	0.154
9/30/2013 13:36	76 est	9	114	9	13	5.03	53	0.0002 U	0.0001 U	0.002 U	0.01 U
E-10	*EAGLE RIVER ABOVE ROCK CREEK*										
3/12/2013 12:45	11 est	1	166	1	22.1	8.27	89	0.00058	0.00026	0.0026	0.113
3/22/2013 12:20	14 est	1	166	1	22.5	10	97	0.00086	0.0003	0.004 U	0.157
4/5/2013 11:50	34 est	3	155	3	19.7	9	86	0.00041	0.00074	0.008	0.231
4/19/2013 14:32	35 est	1	148	1	17.2	7.11	72	0.00034	0.00066	0.0078	0.223
5/3/2013 12:20	131 est	4	100	4	12.3	5.03	51	0.00059	0.00074	0.0089	0.235
9/30/2013 13:23	87.5 est	8	103	8	12.4	4.82	51	0.0002 U	0.0001 U	0.002 U	0.0283
E-12A	*EAGLE RIVER BELOW OLD TAILINGS*										
3/12/2013 12:30	9.1 est	1	203	1	24.8	10.9	107	0.00072	0.00028	0.002 U	0.166
3/22/2013 14:30	12 est	1	185	1	21	9.04	90	0.00065	0.00032	0.004 U	0.129
4/5/2013 11:10	38	2	178	2	20.5	9.38	90	0.00045	0.00074	0.0052	0.288
4/19/2013 14:40	33	2	178	2	19.4	8.63	84	0.00052	0.001	0.0085	0.445
5/3/2013 11:29	130	3	121	3	13.8	6.1	60	0.00064	0.0011	0.0114	0.37
9/30/2013 14:10	86 P	10	112	10	12.7	5.03	52	0.0002	0.0001 U	0.002 U	0.0407
E-15	*EAGLE RIVER BELOW CROSS CREEK*										
3/12/2013 11:20	5 est	2	223	2	25.7	10.9	109	0.00035	0.00015	0.002 U	0.121
3/22/2013 11:15	10 est	1	295	1	37.4	19	171	0.00046	0.00021	0.004 U	0.14
4/5/2013 10:40	55 est	1	203	1	24.2	12.2	111	0.00049	0.00055	0.0039	0.243
4/19/2013 14:50	46 est	2	161	2	27.5	13.5	124	0.00049	0.00053	0.0042	0.377
5/3/2013 11:05	214 est	3	121	3	14.2	5.78	59	0.00044	0.00064	0.0092	0.266
9/30/2013 12:05	138 est	10	119	10	13.3	5.12	54	0.0002 U	0.0001 U	0.0021	0.0325

NM or "--" - Not Measured NA - Not Available est - Estimated Flow U - Undetected at stated detection limit J - Estimated Concentration

Flow for E-12A and T-18 from USGS gages, est due to ice; P indicates the USGS reported this datum as preliminary and subject to revision.

Eagle River Water Quality Report

Eagle Mine Site, January through December 2013

Station ID / Sample Date and Time	Station Description / Flow (cfs)	Field Temperature (Deg. C)	Field Spec. Cond. @25C (umhos/cm)	Field Temperature (Deg. C)	Calcium Dissolved (mg/L)	Magnesium Dissolved (mg/L)	Calculated Hardness (mg/L)	Arsenic Total (mg/L)	Cadmium Dissolved (mg/L)	Copper Dissolved (mg/L)	Zinc Dissolved (mg/L)
E-22	*EAGLE RIVER ABOVE DOWDS JUNCT.*										
3/12/2013 11:10	5 est	5.5	327	5.5	39.2	16.8	167	0.0005	0.00016	0.002 U	0.11
3/22/2013 11:00	10 est	1	295	1	40	19	178	0.00043	0.00023	0.004 U	0.129
4/5/2013 10:15	55 est	2	223	2	27.2	13.3	123	0.00056	0.00043	0.0039	0.222
4/19/2013 15:00	46 est	4	184	4	31.8	15.4	143	0.00044	0.00044	0.0228	0.231
5/3/2013 10:43	214 est	3	121	3	15.6	6.1	64	0.00043	0.00053	0.0074	0.215
9/30/2013 11:44	138 est	10	127	10	14.2	5.41	58	0.0002 U	0.0001 U	0.0025	0.0352
T-10	*ROCK CREEK AT MOUTH*										
3/12/2013 13:05	0.13	1	545	1	58	42.9	321	0.0018	0.0039	0.0023	2.65
3/22/2013 12:30	IceNR	1	480	1	54.8	47.8	333	0.0015	0.0044	0.004	2.61
4/5/2013 11:50	IceNR	3	414	3	36.7	28.7	210	0.0031	0.0032	0.0152	1.67
4/19/2013 15:00	0.45 est	3	500	3	51.8	43.4	308	0.002	0.0072	0.0176	4.21
5/3/2013 12:25	0.45	5	485	5	40.8	50.8	311	0.002	0.0144	0.0354	6.66
9/30/2013 13:25	--	10	545	10	49.4	35.1	268	0.0026	0.0029	0.0056	1.22
T-18	*CROSS CREEK NEAR MOUTH*										
3/12/2013 11:30	2.8 est	1	129	1	11.7	5.7	53	0.0002 U	0.00011	0.002 U	0.182
3/22/2013 11:25	2.7 est	1	111	1	11.8	5.14	51	0.0004 U	0.0002 U	0.004 U	0.12
4/5/2013 10:52	6.2 est	1	92	1	10.1	3.83	41	0.00027	0.00011	0.0023	0.0799
4/19/2013 15:20	4.5 est	2	89	2	9.98	3.63	40	0.0002 U	0.0001 U	0.0021	0.0726
5/3/2013 11:18	31	2	54	2	6	1.75	22	0.0002 U	0.00011	0.0044	0.0551
9/30/2013 14:00	42 P	9	68	9	7.63	1.94	27	0.0002 U	0.0001 U	0.0038	0.0189

NM or "--" - Not Measured NA - Not Available est - Estimated Flow U - Undetected at stated detection limit J - Estimated Concentration

Flow for E-12A and T-18 from USGS gages, est due to ice; P indicates the USGS reported this datum as preliminary and subject to revision.

A-2 Eagle River Flow Relationships

Appendix A-2

Estimated Flow Rates from Historical Flow Records for Each Eagle River Monitoring Station to Monitoring Station E-12A

Eagle River Monitoring Station	Flow Rate Equation
E-3 - above Belden	*E-3 Flow = 0.8855 (E-12A Flow) - 0.0872*
E-5 - above Fall Creek	*E-5 Flow = 0.9424 (E-12A Flow) - 2.0748*
E-10 - above Rock Creek	*E-10 Flow = 0.9979 (E-12A Flow) + 1.7100*
E-11 - below Rock Creek	*E-11 Flow = 1.0124 (E-12A Flow) + 1.7416*
E-12A - below Old Tailings Pile/Rex Flats	*E-12A Flow (measured at USGS station 09064600)*
E-13B - above Cross Creek	*E-13B Flow = 1.1390 (E-12A Flow) - 0.2774*
E-15 - below Cross Creek	*E-15 Flow = 1.7333 (E-12A Flow) - 10.918*
E-22 - above Dowds Junction	*E-22 Flow = E-15 Flow (conservative assumption per CDPHE)*

Graphs used to determine the equation are provided in *Eagle Mine Annual Report – 2007, Eagle Mine Site Minturn, Colorado*, prepared by NewFields, February 29, 2008 for CBS Operations Inc.

APPENDIX B

EAGLE MINE WATER DATA

B-1 Eagle Mine Drawdown (MDD)
Eagle Mine Site
January through December 2013

Table B-1 Eagle Mine Drawdown

Eagle Mine Site, January through December 2013

Date	Discharge (gallons/day)	Cumulative Discharge (gallons YTD)	Hours from Previous Reading	Average Discharge (gpm)	Eagle Mine Water Level (Ft. MSL)
1/2/13	327,790	616,200	45.1	228	
1/3/13	616,200	1,232,400	24.0	428	
1/4/13	411,299	1,641,700	23.9	286	8,461.74 *
1/7/13	396,917	2,864,699	74.0	276	8,461.51 *
1/8/13	397,154	3,277,022	24.9	276	
1/9/13	442,021	3,695,100	22.7	307	
1/10/13	356,303	4,069,713	25.2	247	
1/11/13	397,869	4,457,359	23.4	276	8,461.28 *
1/14/13	387,961	5,626,900	72.4	269	8,460.82 *
1/15/13	393,728	6,016,800	23.8	273	
1/16/13	422,717	6,457,130	25.0	294	8,461.05 *
1/17/13	307,634	6,752,800	23.1	214	
1/18/13	455,408	7,235,406	25.4	316	8,460.36 *
1/21/13	361,975	8,256,729	67.7	251	8,460.13 *
1/22/13	367,257	8,672,444	27.2	255	
1/23/13	368,258	9,042,236	24.1	256	8,460.13 *
1/24/13	359,080	9,405,804	24.3	249	
1/28/13	362,531	10,868,514	96.8	252	8,460.13 *
1/29/13	367,812	11,217,680	22.8	255	
1/30/13	371,978	11,586,300	23.8	258	
1/31/13	366,872	11,955,720	24.2	255	
2/1/13	367,787	12,314,568	23.4	255	8,460.13 *
2/5/13	294,678	13,455,014	92.9	205	8,460.59 *
2/6/13	325,914	13,829,136	27.6	226	
2/8/13	327,423	14,461,700	46.4	227	8,460.59 *
2/11/13	345,964	15,525,300	73.8	240	
2/12/13	290,376	15,816,684	24.1	202	8,459.90 *
2/13/13	364,664	16,124,876	20.3	253	8,459.90 *
2/14/13	340,353	16,528,100	28.4	236	
2/15/13	392,690	16,907,700	23.2	273	8,459.66 *
2/19/13	359,870	18,337,934	95.4	250	8,459.43 *
2/20/13	358,479	18,702,139	24.4	249	8,459.43 *
2/21/13	369,760	19,081,400	24.6	257	
2/22/13	361,007	19,439,900	23.8	251	
2/25/13	354,775	20,441,400	67.7	246	8,458.97 *
2/26/13	365,821	20,814,080	24.5	254	8,458.74 *
2/27/13	427,048	21,274,639	25.9	297	8,458.51 *
2/28/13	350,472	21,653,100	25.9	243	
3/1/13	347,164	22,008,943	24.6	241	8,458.51 *
3/4/13	230,227	22,692,590	71.3	160	
3/5/13	362,464	23,034,414	22.6	252	
3/6/13	641,338	23,718,062	25.6	445	

* Mine water level reading from pressure transducer

Table B-1 Eagle Mine Drawdown

Eagle Mine Site, January through December 2013

Date	Discharge (gallons/day)	Cumulative Discharge (gallons YTD)	Hours from Previous Reading	Average Discharge (gpm)	Eagle Mine Water Level (Ft. MSL)
3/7/13	340,405	24,059,885	24.1	236	
3/8/13	425,583	24,428,428	20.8	296	8,458.05 *
3/11/13	372,198	25,592,840	75.1	258	
3/12/13	340,197	25,941,778	24.6	236	
3/13/13	416,317	26,363,588	24.3	289	
3/14/13	378,003	26,719,541	22.6	263	
3/15/13	377,743	27,082,594	23.1	262	8,457.36 *
3/18/13	373,816	28,168,477	69.7	260	8,457.12 *
3/19/13	378,837	28,622,818	28.8	263	
3/20/13	376,184	28,994,300	23.7	261	
3/21/13	381,289	29,374,000	23.9	265	
3/22/13	375,789	29,675,153	19.2	261	8,456.89 *
3/25/13	378,624	30,875,707	76.1	263	
3/26/13	386,564	31,223,615	21.6	268	8,456.43 *
3/27/13	397,355	31,578,199	21.4	276	
3/28/13	378,220	31,952,742	23.8	263	
3/29/13	376,144	32,409,600	29.2	261	8,456.20 *
4/1/13	377,743	33,464,395	67.0	262	8,455.97 *
4/2/13	389,342	33,855,359	24.1	270	8,455.97 *
4/3/13	367,673	34,288,651	28.3	255	8,455.74 *
4/4/13	301,964	34,597,535	24.5	210	
4/5/13	301,815	34,862,252	21.0	210	8,455.97 *
4/8/13	233,703	35,592,898	75.0	162	
4/9/13	205,535	35,794,722	23.6	143	
4/10/13	204,617	36,007,154	24.9	142	
4/11/13	204,038	36,213,884	24.3	142	
4/12/13	204,126	36,412,056	23.3	142	8,456.66 *
4/15/13	222,945	37,050,390	68.7	155	
4/16/13	223,095	37,296,259	26.4	155	
4/17/13	250,013	37,547,835	24.2	174	
4/18/13	290,727	37,787,483	19.8	202	
4/19/13	359,946	38,211,170	28.3	250	8,457.36 *
4/22/13	360,728	39,283,585	71.3	251	
4/23/13	358,430	39,663,670	25.5	249	
4/24/13	358,119	40,003,137	22.7	249	
4/25/13	424,912	40,356,050	19.9	295	8,456.89 *
4/26/13	229,219	40,600,869	25.6	159	8,456.89 *
4/29/13	285,768	41,494,688	75.1	198	
4/30/13	279,885	41,764,660	23.1	194	
5/1/13	280,078	42,044,155	24.0	194	
5/2/13	280,042	42,279,079	20.1	194	
5/3/13	279,766	42,597,313	27.3	194	8,457.36 *

* Mine water level reading from pressure transducer

Table B-1 Eagle Mine Drawdown

Eagle Mine Site, January through December 2013

Date	Discharge (gallons/day)	Cumulative Discharge (gallons YTD)	Hours from Previous Reading	Average Discharge (gpm)	Eagle Mine Water Level (Ft. MSL)
5/6/13	278,146	43,452,613	73.8	193	
5/7/13	275,560	43,729,704	24.1	191	
5/8/13	218,666	43,944,726	23.6	152	
5/9/13	184,998	44,108,526	21.3	128	
5/10/13	191,977	44,326,500	27.2	133	8,458.05 *
5/13/13	226,877	45,001,774	71.4	158	
5/14/13	223,325	45,190,670	20.3	155	
5/15/13	218,321	45,422,788	25.5	152	8,459.20 *
5/16/13	307,169	45,708,626	22.3	213	
5/17/13	306,161	46,053,270	27.0	213	
5/20/13	298,903	46,887,500	67.0	208	
5/21/13	296,089	47,268,920	30.9	206	
5/22/13	299,558	47,573,471	24.4	208	
5/23/13	301,412	47,854,789	22.4	209	
5/24/13	317,159	48,111,600	19.4	220	8,460.13 *
5/28/13	334,546	49,458,613	96.6	232	
5/29/13	331,786	49,841,088	27.7	230	
5/30/13	333,034	50,114,685	19.7	231	
5/31/13	359,848	50,513,017	26.6	250	8,460.59 *
6/3/13	325,932	51,543,099	75.8	226	
6/4/13	324,598	51,853,270	22.9	225	
6/5/13	327,091	52,167,414	23.1	227	
6/6/13	335,415	52,492,580	23.3	233	
6/7/13	263,486	52,764,300	24.8	183	8,460.59 *
6/10/13	366,370	53,869,770	72.4	254	
6/11/13	341,007	54,203,673	23.5	237	
6/12/13	340,871	54,551,409	24.5	237	
6/13/13	340,647	54,883,303	23.4	237	
6/14/13	341,087	55,185,070	21.2	237	8,461.05 *
6/17/13	302,216	56,125,508	74.7	210	
6/18/13	303,528	56,376,762	19.9	211	
6/19/13	304,039	56,692,202	24.9	211	
6/20/13	304,444	56,990,938	23.5	211	
6/21/13	304,205	57,303,382	24.7	211	8,461.17 *
6/24/13	308,267	58,231,394	72.2	214	
6/25/13	257,114	58,464,761	21.8	179	
6/26/13	292,000	58,840,103	30.9	203	
6/27/13	294,991	59,120,549	22.8	205	
6/28/13	294,720	59,356,530	19.2	205	8,463.82 *
7/1/13	297,748	60,288,027	75.1	207	8,461.51 *
7/2/13	227,293	60,540,101	26.6	158	
7/3/13	43,970	60,574,208	18.6	31	8,461.74 *

* Mine water level reading from pressure transducer

Table B-1 Eagle Mine Drawdown

Eagle Mine Site, January through December 2013

Date	Discharge (gallons/day)	Cumulative Discharge (gallons YTD)	Hours from Previous Reading	Average Discharge (gpm)	Eagle Mine Water Level (Ft. MSL)
7/5/13	284,260	61,147,466	48.4	197	8,461.51 *
7/8/13	297,975	62,034,976	71.5	207	
7/9/13	323,800	62,369,120	24.8	225	
7/10/13	318,779	62,699,632	24.9	221	
7/11/13	318,884	62,976,220	20.8	221	
7/12/13	318,453	63,294,010	24.0	221	8,461.28 *
7/15/13	310,463	64,249,761	73.9	216	
7/16/13	310,049	64,590,169	26.3	215	
7/17/13	309,973	64,877,540	22.2	215	
7/18/13	310,147	65,174,118	23.0	215	
7/19/13	310,169	65,478,902	23.6	215	8,461.05 *
7/22/13	324,023	66,474,824	73.8	225	8,461.05 *
7/23/13	318,084	66,796,663	24.3	221	
7/24/13	318,233	67,096,553	22.6	221	
7/25/13	317,920	67,429,044	25.1	221	
7/26/13	298,761	67,724,070	23.7	207	8,460.82 *
7/29/13	291,785	68,608,949	72.8	203	
7/30/13	290,994	68,884,787	22.7	202	
7/31/13	347,825	69,239,134	24.5	242	
8/1/13	350,616	69,585,854	23.7	243	
8/2/13	350,168	69,940,156	24.3	243	8,460.59 *
8/5/13	348,003	70,990,449	72.4	242	
8/6/13	347,990	71,350,764	24.9	242	
8/7/13	347,961	71,685,193	23.1	242	
8/8/13	347,504	71,993,120	21.3	241	
8/9/13	346,687	72,363,401	25.6	241	8,460.36 *
8/12/13	350,536	73,415,983	72.1	243	
8/13/13	351,244	73,780,886	24.9	244	
8/14/13	312,718	74,107,285	25.0	217	
8/15/13	354,995	74,501,970	26.7	247	
8/16/13	355,440	74,840,625	22.9	247	8,459.90 *
8/19/13	355,234	75,900,900	71.6	247	
8/20/13	355,804	76,216,182	21.3	247	8,459.90 *
8/21/13	349,958	76,566,140	24.0	243	
8/22/13	360,094	76,930,235	24.3	250	
8/23/13	364,294	77,287,951	23.6	253	8,459.66 *
8/26/13	348,364	78,359,896	73.9	242	
8/27/13	360,921	78,701,267	22.7	251	
8/28/13	361,925	79,069,978	24.5	251	
8/29/13	379,449	79,450,745	24.1	264	8,459.20 *
8/30/13	390,129	79,815,678	22.5	271	8,458.97 *
9/3/13	396,639	81,474,675	100.4	275	

* Mine water level reading from pressure transducer

OpsCalc_2013.xlsxMDD=Discharge

Table B-1 Eagle Mine Drawdown

Eagle Mine Site, January through December 2013

Date	Discharge (gallons/day)	Cumulative Discharge (gallons YTD)	Hours from Previous Reading	Average Discharge (gpm)	Eagle Mine Water Level (Ft. MSL)
9/4/13	396,944	81,809,872	20.3	276	
9/5/13	396,685	82,257,245	27.1	275	
9/6/13	396,117	82,590,093	20.2	275	8,458.28 *
9/9/13	396,760	83,800,212	73.2	276	
9/10/13	395,911	84,188,150	23.5	275	
9/11/13	395,498	84,566,620	23.0	275	
9/12/13	395,315	85,089,040	31.7	275	
9/13/13	394,509	85,381,908	17.8	274	8,457.82 *
9/16/13	387,840	86,542,464	71.8	269	
9/17/13	386,649	86,927,770	23.9	269	
9/18/13	387,466	87,314,160	23.9	269	
9/19/13	386,780	87,711,952	24.7	269	
9/20/13	385,078	88,097,297	24.0	267	
9/23/13	349,609	89,176,230	74.1	243	
9/25/13	337,112	89,805,740	44.8	234	8,458.05 *
9/26/13	356,851	90,236,687	29.0	248	
9/27/13	358,770	90,553,850	21.2	249	
9/30/13	271,016	91,366,144	71.9	188	
10/1/13	227,079	91,587,073	23.3	158	
10/2/13	223,699	91,805,180	23.4	155	8,458.97 *
10/3/13	228,386	92,036,579	24.3	159	
10/4/13	227,991	92,254,120	22.9	158	8,458.97 *
10/7/13	230,606	92,944,176	71.8	160	
10/8/13	230,824	93,180,129	24.5	160	
10/9/13	261,711	93,448,746	24.6	182	
10/10/13	262,376	93,706,202	23.6	182	8,460.13 *
10/11/13	314,768	94,024,249	24.2	219	
10/14/13	344,656	95,044,334	71.0	239	
10/15/13	369,094	95,420,092	24.4	256	
10/16/13	407,455	95,823,586	23.8	283	8,459.66 *
10/17/13	409,297	96,238,568	24.3	284	
10/18/13	408,656	96,642,967	23.8	284	8,459.66 *
10/21/13	408,417	97,889,207	73.2	284	
10/22/13	361,036	98,232,191	22.8	251	
10/23/13	360,329	98,548,730	21.1	250	
10/24/13	359,584	98,970,742	28.2	250	8,459.43 *
10/25/13	358,081	99,311,665	22.8	249	
10/28/13	357,475	100,377,885	71.6	248	8,459.43 *
10/29/13	360,239	100,746,630	24.6	250	
10/30/13	360,321	101,110,204	24.2	250	
10/31/13	360,046	101,460,749	23.4	250	8,459.43 *
11/1/13	358,375	101,815,640	23.8	249	8,459.43 *

* Mine water level reading from pressure transducer

OpsCalc_2013.xlsxMDD=Discharge

Table B-1 Eagle Mine Drawdown

Eagle Mine Site, January through December 2013

Date	Discharge (gallons/day)	Cumulative Discharge (gallons YTD)	Hours from Previous Reading	Average Discharge (gpm)	Eagle Mine Water Level (Ft. MSL)
11/4/13	335,315	102,828,338	72.5	233	
11/5/13	330,473	103,183,367	25.8	229	
11/6/13	330,231	103,496,857	22.8	229	
11/7/13	329,887	103,819,413	23.5	229	8,459.43 *
11/8/13	328,914	104,153,352	24.4	228	
11/11/13	328,552	105,168,896	74.2	228	
11/12/13	328,403	105,478,598	22.6	228	
11/13/13	328,222	105,833,488	25.9	228	
11/14/13	327,464	106,113,652	20.5	227	8,459.66 *
11/15/13	326,867	106,443,016	24.2	227	
11/19/13	270,358	107,537,404	97.1	188	8,459.43 *
11/20/13	221,324	107,769,948	25.2	154	
11/22/13	221,569	108,240,320	50.9	154	8,459.20 *
11/25/13	224,889	108,927,482	73.3	156	
11/26/13	169,770	109,092,418	23.3	118	
11/27/13	169,610	109,215,385	17.4	118	8,458.74 *
11/29/13	168,648	109,597,887	54.4	117	8,458.97 *
12/2/13	154,032	110,048,964	70.3	107	
12/3/13	153,708	110,171,397	19.1	107	
12/5/13	158,968	110,496,177	49.0	110	
12/10/13	200,695	111,508,850	121.1	139	
12/11/13	200,134	111,697,171	22.6	139	
12/16/13	163,887	112,529,468	121.9	114	8,458.28 *
12/17/13	149,222	112,674,752	23.4	104	
12/18/13	170,192	112,866,691	27.1	118	
12/19/13	149,405	112,986,215	19.2	104	
12/23/13	169,671	113,667,021	96.3	118	8,458.28 *
12/24/13	154,985	113,830,078	25.2	108	
12/26/13	188,680	114,213,465	48.8	131	
12/27/13	188,040	114,397,065	23.4	131	8,458.05 *
12/30/13	185,740	114,938,936	70.0	129	8,458.05 *
12/31/13	187,675	115,147,724	26.7	130	8,458.05 *

* Mine water level reading from pressure transducer

OpsCalc_2013.xlsxMDD=Discharge

B-2 Mine, Seep, and Groundwater Quality Report
Eagle Mine Site
October 1, 2013

Mine, Seep, and Groundwater Quality Report

Eagle Mine Site, October 1, 2014

PARAMETER	UNITS	BW-10 BELDEN GROUNDWATER WELL	MS- 5 MDD (ADIT #5)	S- 5 SEEPAGE FROM ADIT NO. 5	S- 6 SEEP- ADJ. ROCK CRK CULVERT INLET	S-TT SEEPAGE FROM TIP TOP ADIT	E-SUMP SUMP OF EAST CTP EXTRACT TRENCH	N-SUMP SUMP OF NORTH CTP EXTRACT TRENCH	WTP-INF WTP INFLUENT
Aluminum Dissolved	mg/L	72	0.038 J	0.5	0.018 U	2.3	0.64	0.081 J	0.018 U
Aluminum Total Rec.	mg/L	91	0.09 J	5	0.24	2.4	0.71	0.15	0.036 J
Antimony Dissolved	mg/L	0.0011 J	0.00023 J	0.00016 U	0.00037 J	0.00046	0.00016 U	0.00016 U	0.00016 U
Antimony Total Rec.	mg/L	0.023 JB	0.00078 UJB	0.0014 UJB	0.00051 UJB	0.00065 UJB	0.00031 UJB	0.00061 UJB	0.00073 UJB
Arsenic Dissolved	mg/L	0.083	0.34	0.0051	0.02	0.18	0.07	0.27	0.005
Arsenic Total Rec.	mg/L	1.1	0.41	0.1	1.3	0.25	0.076	0.28	0.015
Barium Dissolved	mg/L	0.00058 U	0.011	0.01	0.0092 J	0.0054 J	0.0095 J	0.013	0.0097 J
Barium Total Rec.	mg/L	0.2	0.011	0.038	0.021	0.0056 J	0.0087 J	0.014	0.011
Boron Dissolved	mg/L	0.022 J	0.035 J	0.083 J	0.043 J	0.024 J	0.047 J	0.15	0.044 J
Boron Total Rec.	mg/L	0.016 J	0.03 J	0.078 J	0.035 J	0.021 J	0.038 J	0.14	0.039 J
Cadmium Dissolved	mg/L	3.9	0.036	0.38	0.037	0.058	0.0033 J	0.0021 J	0.025
Cadmium Total Rec.	mg/L	5.7	0.036	0.36	0.078	0.062	0.0066	0.0034 J	0.027
Calcium Dissolved	mg/L	350	390	320	400	270	430	210	360
Calcium Total Rec.	mg/L	330	390	300	370	270	380	210	380
Chromium Total Rec.	mg/L	0.017	0.00066 U	0.00088 J	0.00066 U	0.00066 U	0.00066 U	0.00066 U	0.00066 U
Cobalt Dissolved	mg/L	0.12	0.011	0.059	0.022	0.056	0.039	0.008 J	0.012
Cobalt Total Rec.	mg/L	0.15	0.011	0.056	0.02	0.059	0.035	0.0072 J	0.013
Copper Dissolved	mg/L	14	0.046	2	0.0021 J	2.5	0.017 J	0.0037 J	0.0075 J
Copper Total Rec.	mg/L	18	0.067	2.9	0.02	2.6	0.0097 J	0.0024 J	0.017
Iron Dissolved	mg/L	490	63	16	50	240	460	88	13
Iron Total Rec.	mg/L	880	64	73	530	250	420	87	18
Lead Dissolved	mg/L	0.019	0.0016	0.059	0.0001 U	0.0075	0.0026	0.00022 J	0.0001 U
Lead Total Rec.	mg/L	3.5	0.022	1.1	0.48	0.011	0.0037	0.00038 J	0.0024
Magnesium Dissolved	mg/L	410	290	780	270	200	670	210	280
Magnesium Total Rec.	mg/L	440	280	720	260	200	600	200	280
Manganese Dissolved	mg/L	150	17	46	25	76	190	60	24
Manganese Total Rec.	mg/L	190	17	44	24	77	170	61	25
Mercury	mg/L	0.0019	0.000027 U	0.00032	0.000027 U	0.000027 U	0.000027 U	0.000027 U	0.000027 U
Molybdenum Dissolved	mg/L	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U
Molybdenum Total Rec.	mg/L	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U
Nickel Dissolved	mg/L	0.28	0.05	0.19	0.051	0.15	0.15	0.014 J	0.045
Nickel Total Rec.	mg/L	0.33	0.049	0.18	0.055	0.16	0.14	0.017 J	0.047
Potassium Dissolved	mg/L	0.24 U	14	10	12	6.1	10	11	13

U - Undetected at stated detection limit
J - Estimated value

Mine, Seep, and Groundwater Quality Report

Eagle Mine Site, October 1, 2014

PARAMETER	UNITS	BW-10 BELDEN GROUNDWATER WELL	MS- 5 MDD (ADIT #5)	S- 5 SEEPAGE FROM ADIT NO. 5	S- 6 SEEP- ADJ. ROCK CRK CULVERT INLET	S-TT SEEPAGE FROM TIP TOP ADIT	E-SUMP SUMP OF EAST CTP EXTRACT TRENCH	N-SUMP SUMP OF NORTH CTP EXTRACT TRENCH	WTP-INF WTP INFLUENT
Selenium Dissolved	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Selenium Total Rec.	mg/L	0.0025 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silica Dissolved	mg/L	68	17	20	16	20	29	18	12
Silica Total Rec.	mg/L	86	16	30	50	21	27	18	13
Silver Dissolved	mg/L	0.0093 U	0.00093 U	0.0047 U	0.0047 U	0.0047 U	0.0093 U	0.0047 U	0.0047 U
Silver Total Rec.	mg/L	0.29	0.00093 U	0.0097 J	0.0047 U	0.0047 U	0.0093 U	0.0047 U	0.0047 U
Sodium Dissolved	mg/L	8.7	8.2	9.6	21	14	71	97	14
Strontium Dissolved	mg/L	0.55	0.29	0.36	1.2	0.37	0.7	0.55	0.3
Strontium Total Rec.	mg/L	0.56	0.28	0.35	1.2	0.39	0.64	0.55	0.32
Thallium Dissolved	mg/L	0.0008 J	0.006	0.0024	0.0021	0.0043	0.0028	0.0045	0.0054
Thallium Total Rec.	mg/L	0.0054	0.0063	0.0026	0.0034	0.0047	0.003	0.0046	0.0057
Zinc Dissolved	mg/L	610	20	160	28	62	43	14	17
Zinc Total Rec.	mg/L	790	20	150	45	63	46	15	19
Alkalinity Total	mg/L	1.1 U	150	1.1 U	72	1.1 U	13	180	49
Ammonia Dissolved	mg/L	0.75	0.16	0.1	0.14	0.083 J	2	2	0.29
Chloride Dissolved	mg/L	3.7 J	7.6	9	7.6	3.2 J	19	34	11
Cyanide	mg/L	0.0025 JB	0.0047 JB	0.005 JB	0.0069 JB	0.002 JB	0.017	0.0039 JB	0.0034 JB
Fluoride Dissolved	mg/L	3.6	0.47 J	0.35 J	0.32 J	1.2	0.12 U	0.83	0.39 J
Lab pH	SU	2.87 HF	6.24 HF	5.46 HF	6.2 HF	3.45 HF	5.77 HF	6.67 HF	6.27 HF
Nitrate	mg/L	0.21 U	0.084 U	0.63 J	0.084 U	0.084 U	0.084 U	0.042 U	0.084 U
Nitrite	mg/L	0.25 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.049 U	0.098 U
Phosphorus Total	mg/L	2.6 J	0.014 U	0.26 J	0.07 J	0.53 J	0.014 U	0.014 U	0.014 UJ
Phosphorus Dissolved	mg/L	0.48 J	0.014 U	0.014 U	0.014 U	0.43 J	0.014 U	0.014 U	0.021 J
Sulfate	mg/L	14000	2800	6100	3000	5200	5900	1500	2200
Sulfide	mg/L	0.22 J	0.14 U	0.34 J	0.14 U	0.14 U	0.14 U	0.48 J	0.14 U
Total Dissolved Solids	mg/L	8900	3100	5800	3100	3500	7300	2500	3200
Total Suspended Solids	mg/L	360	44	170	570	68	74	64	28
Dissolved Oxygen	mg/l	2.59	1.27	8.94	5.7	1.87	6.95	4.51	5.23
Field pH	SU	2.7	6.11	6.03	6.68	3.3	5.87	6.48	5.98
Field Temperature	deg C	10.7	20.93	12.37	7.7	10.65	13.01	13	14.38
Spec. Cond. Field @25C	umhos/cm	6440	3170	5131	3250	3298	5916	2857	3211
ORP (oxygen reduction potential, field meas.)	unitless	415.8	3.3	116.2	20.8	381.3	17.6	-63.4	34.7
Flow or Discharge Rate	GPM	NA	157.7	2 est	0.1	3	14 est	32 est	160

U - Undetected at stated detection limit
J - Estimated value

B-3 Liberty Well No. 4 Water Quality Report
Eagle Mine Site
January - December 2013
and
August 22, 2013

Liberty Well No. 4 Water Quality Report

Eagle Mine Site, January - December 2013

Station ID	Station Description	Sample Date and Time	Field pH (Std. Units)	Field Temperature (Deg. C)	Field Spec. Cond. @25C (umhos/cm)	Suspended Solids, Total (mg/L)	Copper Dissolved (mg/L)	Manganese Dissolved (mg/L)	Zinc Dissolved (mg/L)
LIB- 4	LIBERTY WELL AT WILLOW CREEK	1/11/2013 10:45	7.71	10.8	430	5 U	0.004 U	0.0127	0.0554
		2/7/2013 13:20	7.64	11.7	441	5 U	0.002 U	0.0122	0.0533
		3/7/2013 11:45	7.65	12	443	5 U	0.004 U	0.0107	0.0551
		4/2/2013 15:30	7.53	15.2	448	5 U	0.004 U	0.014	0.0507
		5/22/2013 13:34	7.49	18.8	459	5 U	0.002 U	0.0164	0.0668
		6/27/2013 13:39	7.48	22.4	456	5 U	0.002 U	0.0112	0.0611
		7/22/2013 10:34	7.41	20.9	447	5 U	0.002 U	0.0275	0.0692
		8/15/2013 10:25	7.49	15.7	434	5 U	0.002 U	0.0138	0.0909
		8/22/2013 10:19	7.35	17.5	433	--	--	0.0115	--
		9/9/2013 13:30	7.48	13	318	5 U	0.002 U	0.0114	0.0464
		10/1/2013 0:00	--	--	--	--	--	--	--
		11/26/2013 10:30	7.04	NR	446	5 U	0.002 U	0.0425	0.13
		12/1/2013 14:25	7.35	13.1	457	5 U	0.002 U	0.038	0.0824

U - Undetected at stated detection limit
J - Estimated value

See next page for additional metal results for the 8/22/13 sample

Liberty Well No. 4 Water Quality Report

Eagle Mine Site, August 22, 2014

PARAMETER	UNITS	LIB- 4 LIBERTY WELL AT WILLOW CREEK
Aluminum Total Rec.	mg/l	0.05 U
Antimony Total Rec.	mg/l	0.0004 U
Arsenic Potentially Dissolved	mg/l	0.0023
Arsenic Total Rec.	mg/l	0.0024
Barium Total Rec.	mg/l	0.0444
Beryllium Total Rec.	mg/l	0.0002 U
Cadmium Potentially Dissolved	mg/l	0.0002
Cadmium Total Rec.	mg/l	0.00026
Chromium Potentially Dissolved	mg/l	0.002 U
Chromium Total Rec.	mg/l	0.002 U
Copper Potentially Dissolved	mg/l	0.002 U
Copper Total Rec.	mg/l	0.002 U
Iron Dissolved	mg/l	0.01 U
Iron Total Rec.	mg/l	0.0385
Lead Potentially Dissolved	mg/l	0.0024
Lead Total Rec.	mg/l	0.0027
Manganese Dissolved	mg/L	0.0115
Manganese Potentially Dissolved	mg/L	0.012
Manganese Total Rec.	mg/L	0.0161
Molybdenum Total Rec.	mg/l	0.0012
Nickel Potentially Dissolved	mg/l	0.002 U
Nickel Total Rec.	mg/l	0.002 U
Selenium Potentially Dissolved	mg/l	0.0026
Selenium Total Rec.	mg/l	0.0032
Thallium Potentially Dissolved	mg/l	0.0002
Thallium Total Rec.	mg/l	0.00022
Uranium Potentially Dissolved	mg/l	0.0023
Uranium Total Rec.	mg/l	0.0024
Zinc Potentially Dissolved	mg/l	0.0561
Zinc Total Rec.	mg/l	0.0851

U - Undetected at stated detection limit
J - Estimated value

APPENDIX C

GROUNDWATER DATA

C-1 Groundwater Elevation Data
Eagle Mine Site
January – December 2013

Groundwater Elevation Data

Eagle Mine Site, January -December 2013

Well ID	DATE	Measuring Point Elevation (ft MSL)	Depth to Water (feet)	Elevation (ft MSL)	
BTS-1	3/22/2013	8,381.18	13.99	8,367.19	
	4/5/2013	8,381.18	11.00	8,370.18	
BW- 3R	3/12/2013	8,378.60	17.64	8,360.96	
BW-10	10/1/2013	8,377.34	17.70	8,359.64	Est
E-SUMP	1/4/2013	7,993.54	7.85	7,985.69	East trench pumping
ET- 1	1/18/2013	7,993.37	9.14	7,984.23	
	4/26/2013	7,993.37	6.16	7,987.21	
	5/6/2013	7,993.37	7.40	7,985.97	
	5/21/2013	7,993.37	7.95	7,985.42	
	6/8/2013	7,993.37	8.04	7,985.33	
	7/1/2013	7,993.37	9.11	7,984.26	
	7/1/2013	7,993.37	9.08	7,984.29	Est
	7/12/2013	7,993.37	9.62	7,983.75	Est
	7/26/2013	7,993.37	9.90	7,983.47	Est
	7/29/2013	7,993.37	9.75	7,983.62	Est
	8/6/2013	7,993.37	9.90	7,983.47	Est
	8/12/2013	7,993.37	9.80	7,983.57	Est
	8/30/2013	7,993.37	9.90	7,983.47	Est
	9/4/2013	7,993.37	9.97	7,983.40	
	9/6/2013	7,993.37	10.00	7,983.37	Est
	9/16/2013	7,993.37	9.80	7,983.57	Est
	9/24/2013	7,993.37	9.60	7,983.77	Est
	10/3/2013	7,993.37	9.70	7,983.67	Est
	10/7/2013	7,993.37	9.70	7,983.67	Est
	10/15/2013	7,993.37	9.70	7,983.67	Est
	10/22/2013	7,993.37	9.75	7,983.62	Est
	10/28/2013	7,993.37	9.90	7,983.47	Est
	11/7/2013	7,993.37	9.80	7,983.57	Est
	11/11/2013	7,993.37	9.92	7,983.45	
	11/12/2013	7,993.37	10.00	7,983.37	Est
	12/12/2013	7,993.37	9.52	7,983.85	
	12/23/2013	7,993.37	9.75	7,983.62	Est
MH-E	1/4/2013	7,993.06	5.10	7,987.96	East trench pumping
NT- 2	9/4/2013	7,993.45	8.85	7,984.60	
	12/12/2013	7,993.45	8.80	7,984.65	

C-2 CTP Groundwater Extraction System
Eagle Mine Site
January – December 2013

CTP Groundwater Extraction System

Eagle Mine Site, January - December 2013

Month	Tot. Gallons Pumped per Month	Cumulative Gallons Pumped for the Year	Cumulative Gallons Pumped
January	540,129	540,129	374,698,298
February	361,450	901,579	375,059,748
March	548,690	1,450,269	375,608,438
April	377,205	1,827,474	375,985,643
May	508,627	2,336,101	376,494,270
June	764,211	3,100,311	377,258,480
July	865,248	3,965,559	378,123,728
August	724,367	4,689,925	378,848,094
September	813,712	5,503,637	379,661,806
October	937,821	6,441,458	380,599,627
November	925,676	7,367,134	381,525,303
December	998,139	8,365,273	382,523,442

Notes:

North and East Trenches combined total gallons is measured via a flow meter at the surge pond.