VRANESH AND RAISCH, LLP
ATTORNEYS AT LAW
5303 Spine Road, Suite 202 Boulder, Colorado 80301
Telephone: 303.443.6151 www.vrlaw.com

July 1, 2022

Sent via E-Mail to blake.beyea@state.co.us

Blake Beyea, Standards Unit Manager
Water Quality Control Division
Colorado Department of Public Health and Environment

Re: Climax Molybdenum Company's Progress Update on the Molybdenum Temporary Modification on Blue River Segment 14

Dear Mr. Beyea,

Climax Molybdenum Company ("Climax") submits the attached update and data to the Water Quality Control Division and Molybdenum Standards Stakeholders. The update reports on Climax's progress to resolve uncertainty associated with the human health standard for molybdenum applicable in Tenmile Creek, Blue River Segment 14 (COUCBL14), in the Upper Colorado River Basin, Regulation 33.

In summary, we are pleased to report that:

- Climax continues to maintain current conditions and remains committed to the health, safety, and sustainability of our surrounding environment and communities.
- Climax is advancing construction of an additional water treatment plant to reduce molybdenum concentrations in its effluent so that it can maintain current conditions and meet market demand for a product critical to our clean energy future.
- Climax continues to resolve uncertainty raised by the parties to this proceeding concerning the copper molybdenum interaction, and has sponsored an expert study that is expected to be independently peer reviewed and published by early 2023.

- A June 2023 rulemaking hearing has been scheduled by the Water Quality Control Commission to revise the human health standard for molybdenum now that more recent and robust science has been reviewed by a federal agency.

- Climax will continue to engage stakeholders in advance of the rulemaking hearing to try and find consensus on a science-based proposal to submit to the Commission.

Sincerely,

VRANESH AND RAISCH, LLP

Justine C. Beckstrom, Esq.
Gabe Racz, Esq.
Attorneys for Climax Molybdenum Company

cc Molybdenum Standards Stakeholders

Attachments:

1. Temporary Modification Progress Update
2. Water Quality Monitoring Data
3. Graphs of Molybdenum Data

Temporary Modification Progress Update
Climax Molybdenum Company – Climax Mine - Molybdenum

Segment(s)	COUCBL14 (Blue River Segment 14)
Temporary Modification(s) (parameter, duration (acute/chronic/DM/MWAT), operative value and seasonal and/or spatial extent)	Molybdenum (chronic) = current conditions "Current conditions" defined in Reg. 33, § 33.63(A): • *Instream:* 170 µg/L (50th percentile) • *Effluent:* 490 µg/L (50th percentile), 1,610 µg/L (95th percentile)
Original Adoption Date(s) and Date(s) of Any Revisions	Adopted June 2014 Revised January 2018 and December 2019 Administratively extended June 2022
Expiration Date	December 31, 2023
Types of Uncertainty that Apply	☒ Water quality standard necessary to protect uses ☐ Extent to which existing quality is the result of natural/irreversible human-induced conditions
Rulemaking Hearing, Phase, and Exhibit Number under which Most Recent Plan to Resolve Uncertainty was Submitted (e.g., Reg. 38 2020, PHS, Exhibit 3)	Regs. 31 & 33 2017-18, Suppl. Filing, Exhibit 29[1] Temp Mods 2019, Rebuttal, Exhibit 10[2]
When will this temporary modification next be reviewed? (i.e., date of rulemaking hearing)	June 2023 Regs. 31 & 33 Molybdenum Standards RMH
Water quality and effluent data attached?	☒ Yes (see Attachment 2; data are also available to the public at ClimaxMoinCO.com) ☐ No (if no, why not)

[1] 2017 Plan to Resolve Uncertainty, https://drive.google.com/file/d/1eGPqxIDtE_-TZHHBm0he5bpPwz5AHQLV/view ("2017 PTRU").
[2] 2019 Addendum to 2017 Plan, https://drive.google.com/file/d/1pg7HKgJ-Yx-XK6UEUgq2djlkGOc16lVT/view ("2019 PTRU").

I. Demonstrated or Predicted Waterbody Non-attainment

Data demonstrate non-attainment of the instream table value standard ("TVS") in Tenmile Creek (Blue River Segment 14, COUCBL14) of 210 µg/L. See Attachment 3 (Graph 4); see also data in Attachment 2 (Table 1).

II. Demonstrated or Predicted Non-compliance

Climax Molybdenum Company ("Climax") discharges to the upstream segment (Blue River Segment 13, COUCBL13). Climax expects the Water Quality Control Division ("Division") to consider the Blue River Segment 14 standards in a future renewal of the Climax Mine discharge permit. It is anticipated that the water quality-based effluent limitation ("WQBEL") would be set at or near the 210 µg/L standard. Effluent data indicate a predicted exceedance of this WQBEL. See Attachment 3 (Graphs 1 and 2); see also data in Attachment 2 (Table 1).

III. Description of Remaining Uncertainty

The molybdenum temporary modification is based on significant uncertainty in the underlying molybdenum standard that has existed since at least 2010. The molybdenum human-health standard (also referred to as the water supply standard) is calculated using Water Quality Control Commission ("Commission") Policy 96-2, which includes various input factors.[3] The significant uncertainty continues to apply to two of these input factors: a) what is the appropriate reference dose ("RfD"), and b) which relative source contribution ("RSC") value should be applied.

Climax is continuing to discuss these factors with stakeholders, and at this time has not proposed a number for the revised molybdenum standard. The June 2023 rulemaking hearing is expected to resolve the uncertainties as to the appropriate RfD and RSC to use in calculating the human health standard for molybdenum.

a. Reference Dose

In 2007, the Commission adopted a molybdenum human-health standard for Regulation 41 (groundwater) of 35 µg/L. Regulation 41 (5 CCR 1002-41), § 41.25(2). This value is based on EPA's Integrated Risk Information System ("IRIS") assessment, last updated in 1992, which is based on a now-discredited study by Koval'skiy et al. (1961) (the "Koval'skiy Study).[4] *See* US. EPA, Molybdenum; CASRN 7439-98-7 (rev'd Nov. 1,1992).

In 2010, recognizing that the Koval'skiy Study had been discredited, the Commission adopted a 210 µg/L molybdenum standard in Regulation 31 based on a study by Fungwe et al. (1990)

[3] Human Health-Based Water Quality Criteria and Standards, Water Quality Control Commission, Policy 96-2 https://drive.google.com/file/d/1LYhwmMY2fMOt9lED21FldUT3D1hGS5Xz/view. Although not specified in Policy 96-2, consistent with EPA guidance updates in 2015, Commission standards decisions will use EPA's updated input values of 80 kg (weight of average adult) and 2.4 L (daily drinking water consumption).

[4] The Koval'skiy Study was determined to be flawed based on a variety of methodological and reporting deficiencies and was considered an unreliable reference for the assessment of potential adverse effects of molybdenum on human health. *See* Critical Review of the Kovalskiy et al. Study, 1961, International Molybdenum Association, London (2010).

(the "Fungwe Study"). See Regulation 31 (5 CCR 1002-31), § 31.48(l)(H). The Commission included the following statement of basis and purpose language (*id.*):

> The Commission adopted total recoverable molybdenum table-values for the drinking water supply and agriculture use classifications. The molybdenum criterion of 210 ug/l for water supply is based on an RfD-like value that the Institute of Medicine derived from the Fungwe et. al. (1990) study and was calculated in accordance with Policy 96-2. The Commission urges the Division to review this standard and consider EPA's expected health reference level and the work underway in Europe.

In 2014, based on two completed studies sponsored by the European-based International Molybdenum Association ("IMOA") (Murray et al. (2014a)[5] and Murray et al. (2014b)[6]), Climax proposed adoption of a revised water supply standard for molybdenum on Blue River Segment 14 in the Regulation 33 rulemaking hearing. The Commission instead adopted the Regulation 31 TVS of 210 µg/L, together with a temporary modification on Blue River Segment 14. Regulation 33 (5 CCR 1002-33), § 33.52(J). The 2014 statement of basis and purpose explained (*id.*):

> The Commission recognizes that there is new toxicological information that should be included in recalculation of a human health-based criterion. Parties do not agree on the uncertainty factors that need to be included in the calculations. Since this issue is larger than a segment-specific issue, it is more appropriate to address this situation in the review of the Basic Standards and the expiration date was set to accommodate that schedule.

The molybdenum standard for water supply was scheduled for revision in the 2016 Regulation 31 Basic Standards hearing. However, in anticipation of the completion of a third IMOA study, the Commission instead scheduled a Molybdenum Standards Hearing for December 2017.

Climax was the proponent for a water supply standard in the December 2017 Molybdenum Standards Hearing. The proposal was based on the updated scientific information included in Murray et al. (2014a), Murray et al. (2014b), and Murray et al. (final report in 2017, final publication in 2018/2019),[7] the third study referred to above (collectively, the "Murray Studies"). Climax proposed simultaneous adoption of the standard on Blue River Segment 14 in Regulation 33 to resolve the molybdenum temporary modification.

In its rebuttal in that hearing, the Division proposed that no changes be made to the molybdenum standard until the most recent IMOA study had been peer-reviewed and

[5] Murray, F. Jay, R.W. Tyl, F.M. Sulllivan, A.K. Tiwary, S. Carey. 2014a. Developmental toxicity study of sodium molybdate dihydrate administered in the diet to Sprague Dawley rats. Reproductive Toxicology 49:202-208. https://doi.org/10.1016/j.reprotox.2014.09.001.

[6] Murray, F. Jay, F.M. Sullivan, A.K. Tiwary, S. Carey. 2014b. 90-Day subchronic toxicity study of sodium molybdate dihydrate in rats. J. of Regulatory Toxicology & Pharmacology 70:579-588. https://doi.org/10.1016/j.yrtph.2013.09.003.

[7] Murray, F. Jay, F.M. Sullivan, S.A. Hubbard, A.M. Hoberman, S. Carey. 2019. A two-generation reproductive toxicity study of sodium molybdate dihydrate administered in drinking water or diet to Sprague-Dawley rats. Reproductive Toxicology 84:75-92. https://doi.org/10.1016/j.reprotox.2018.11.004.

published, and the Agency for Toxic Substances and Disease Registry ("ATSDR") had considered the results of the Murray Studies in a final toxicological profile for molybdenum, or another federal agency had conducted a toxicology assessment.[8]

As part of the December 2017 Molybdenum Standards Hearing, the Commission ultimately continued consideration of the water supply standard for molybdenum in Regulations 31 and 33 until November 2019; and continued the rulemaking until January 2018, for the limited purpose of considering an extension of the temporary modification of the water supply standard in Blue River Segment 14.

At the January 2018 hearing, the Commission extended the molybdenum temporary modification on Blue River Segment 14 until June 30, 2020, allowing time for resolution of the molybdenum standards issue in the November 2019 Regulation 31 and 33 hearing. Reg. 33, § 33.60. Based in part on an agreement between the Division and Climax to continue the molybdenum hearing again to wait for ATSDR to issue the final molybdenum toxicological profile, in the December 2019 Temporary Modifications hearing the Commission extended the temporary modification for Blue River Segment 14 until June 30, 2023. Reg. 33, § 33.63(A).

ATSDR subsequently issued the Toxicological Profile for Molybdenum in May 2020.[9] ATSDR considered the Murray study to be a "high quality study" and used it as the scientific basis for the no observed adverse effect level ("NOAEL") of 17 mg molybdenum/kg/day as the "Point of Departure" for ATSDR's findings.

Although other issues have been raised with the ATSDR profile, of primary relevance here is the application of a modifying factor ("MF") to this NOAEL in development of an RfD. ATSDR applied an unprecedented MF of 3, in addition to a total uncertainty factor ("UF") of 100 (10 for interspecies, 10 for intraspecies). The MF was not included in the 2017 draft profile that was subject to public review and comment, and appeared for the first time in the appendix to the final profile, and therefore was never subject to public comment.[10]

Climax is discussing with stakeholders the application of the MF of 3, and its appropriateness in calculating the RfD for use in a molybdenum standard calculated under Policy 96-2. Scientific data indicate that the MF of 3 is already incorporated into ATSDR's chosen NOAEL of 17 mg/kg/day. This data includes information from an IMOA-commissioned supplemental toxicity study of molybdenum in rats at higher dose levels than previously tested (Hoberman (2021)), and an IMOA-commissioned benchmark dose ("BMD") analysis of the combined developmental toxicity data from the Hoberman study and Murray et al. (2014a).[11] ATSDR was not aware of the Hoberman study, and because the addition of the MF was not publicly

[8] *See* WQCD Rebuttal (Nov. 22, 2017), *submitted in* the 2017 Molybdenum Standards Hearing. Materials from that hearing and the continuation into January 2018 are available at https://drive.google.com/drive/folders/0B4B0XEVym7wTdmV2dUs4X1hIVEk.
[9] *Available at* https://www.atsdr.cdc.gov/toxprofiles/tp212.pdf.
[10] IMOA raised similar concerns in a March 2021 letter to ATSDR.
[11] BMD methods are used by the EPA (and throughout the world) for dose-response analysis to support chemical risk assessments and regulatory actions, and is scientifically superior to the NOAEL approach in risk assessment. Climax has presented initial information on the Hoberman (2021) study and the BMD analysis to interested stakeholders, and will continue to provide further information going forward.

noticed, IMOA did not have the opportunity to submit this study to ATSDR prior to the finalization of the molybdenum toxicological profile.

Responsive to comments from the Division and others at the 2017 Molybdenum Standards Hearing,[12] Climax also commissioned a study to further address concerns about the interaction between copper and molybdenum originating in the discredited Fungwe Study. The objective of the study was to evaluate developmental effects of molybdenum on rats with a marginal copper diet, at dose levels of 0, 20, and 40 mg molybdenum/kg bw/day via drinking water. The study took place from December 2021 to March 2022. The preliminary results of the study found no developmental effect from any of the doses of molybdenum used in the study, despite the rats being on a copper-deficient diet. The final report is anticipated by August 1, 2022, and will be promptly distributed to all Molybdenum Standards Stakeholders. Publication is anticipated for late 2022 or early 2023.

In January 2022, Climax petitioned the Commission to schedule the continued and postponed Molybdenum Standards Hearing.[13] The hearing is scheduled for June 2023.[14] Much of the uncertainty underlying the appropriate RfD is expected to be resolved in that hearing

b. Relative Source Contribution

The Commission's Policy 96-2 includes an additional input factor in the calculation of human-health based water quality standards that is not included in ATSDR's toxicological profile: the relative source contribution, or RSC.

RSC is a factor chosen to apply in the equation to account for exposure to a parameter from drinking water versus diet. While 0.20 is the default RSC (allowing 20% of exposure through drinking water, and 80% through diet), RSCs of 0.5 and 0.8 were supported by the Division and EPA, respectively, in the 2017 hearing. As explained in EPA's Responsive Prehearing Statement, an RSC of 0.8 was deemed appropriate by EPA based on national data on the content of molybdenum in diet—which is actually quite low.[15] In addition, Climax has completed a study of produce consumed in Summit County to evaluate whether residents may have some exposure in diet from locally grown produce.[16] The study concluded produce available in Summit County is not locally grown due to a comparatively short growing season. Applying an RSC of 0.8 allows 80% of exposure to molybdenum (an essential element) in drinking water, and is protective of human health.

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[12] *See, e.g.*, WQCD Rebuttal (Nov. 22, 2017) (referring to the commercial rat diet fed in the Murray Studies, suggesting that "[c]opper intake in the IMOA-sponsored studies may have ameliorated the toxic effects of molybdenum. Therefore, the studies may underestimate molybdenum toxicity to people, including sensitive populations.").
[13] Climax's Petition & Motion to Schedule the Continued & Postponed Molybdenum Standards Hearing, (Jan. 21, 2022) ("2022 Petition"), available at https://drive.google.com/drive/folders/1PklnBMH05dqpVUGwC5GnLmeph8ES6I0O.
[14] Climax had requested a hearing by December 2022. The Division expressed concerns about resource availability, and Climax ultimately agreed to a hearing in June 2023. The Commission recently took preliminary action approving the Division's proposal to administratively extend the temporary modification until December 31, 2023, based on the June 2023 hearing date.
[15] EPA's RPHS, pg. 7 (Oct. 27, 2017), *submitted in* the 2017 Molybdenum Standards Hearing.
[16] Climax Molybdenum Company, Summit County Produce Study (June 2021), https://drive.google.com/file/d/1Nwtw_5PNJyxLUlul9oBVS4UDG2S5SzFH/view.

Climax is also discussing the appropriate RSC with stakeholders. Uncertainty underlying the appropriate RSC is expected to be resolved in the June 2023 hearing.

IV. Maintenance of Status Quo

Status quo has been maintained, both instream and in the effluent.

a. Maintenance of status quo instream Tenmile Creek

The 50th percentile molybdenum concentration of 170 µg/L in Tenmile Creek from May 2012 to June 2014 period of record is used as the baseline for maintenance of status quo instream. *See* Reg. 33, § 33.63(A). Comparisons are to be conducted using the ambient standards assessment technique in Appendix B of the 303(d) listing methodology, using water quality data from the two sites on Tenmile Creek near Frisco (Climax site "Frisco 3rd Ave" and Denver Water site "Ten Mile Creek above Dillon"). *Id.*

Data through this July 2022 update show a lower confidence limit ("LCL") 50th percentile molybdenum concentration of 153 µg/L, which is below this baseline. See Attachment 2 (Table 1). Status quo is being maintained instream.

b. Maintenance of status quo in the effluent

While the temporary modification has an operative value of "current condition," the Commission included values for purposes of assessing maintenance of the status quo in the statement of basis and purpose for the 2019 hearing. Reg. 33, § 33.63(A). The 50th and 95th percentiles of effluent molybdenum concentrations (at Outfall 001A) from the May 2012 to June 2014 period of record were 490 µg/L and 1,610 µg/L, respectively.

Using the ambient standards assessment methodology, the data through this July 2022 update show LCLs of 394 µg/L (50th percentile) and 1,253 µg/L (95th percentile), which are below the levels included in the statement of basis and purpose. See Attachment 2 (Table 1). Status quo is being maintained in the effluent.

V. Provide a Progress Update on the Plan to Resolve Uncertainty

Climax has made significant progress on its Plan to Resolve Uncertainty. Updates submitted in prior years detail progress made through July 2021.[17]

a. ATSDR Toxicological Profile

ATSDR released its Toxicological Profile for Molybdenum in May 2020. Climax's 2021 Update addresses the final profile in more detail, as well as concerns raised by IMOA in its letter to ATSDR in March 2021.[18]

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[17] *See, e.g.*, Climax's 2019 Update (https://drive.google.com/drive/folders/1Of_Vei49y88Wi-jru-XQLtAjiD0_PvBR), 2020 Update (https://drive.google.com/drive/folders/1bPyi0pSo-tst4FYMxbQFwoM90s0GGwU4), and 2021 Update (https://drive.google.com/drive/folders/1qi7ZC-vMCalj14W0DyrchVhFLv4WfPTU). Climax submitted an update to the Division in 2018, but was unable to locate it online.

[18] 2021 Update Appx. A, https://drive.google.com/drive/folders/1qi7ZC-vMCalj14W0DyrchVhFLv4WfPTU.

As explained above in Section III.a, additional toxicological studies indicate that ATSDR's application of an MF in calculating an RfD was unwarranted. *See also* Climax's 2021 Update; Climax's 2022 Petition. Climax is discussing these issues with stakeholders.

b. Effluent, instream, and municipal monitoring; maintenance of current conditions

Climax has continued to monitor molybdenum concentrations at Outfall 001A and multiple locations instream, including:

- Outfall 001A
- Blue River Segment 13 above confluence with Tenmile Creek (Copper Mountain)
- Blue River Segment 14 below confluence with Tenmile Creek (Copper Mountain Bike Path)
- Blue River Segment 14 at Frisco (3rd Avenue)
- Blue River Segment 17 below Dillon Reservoir (Blue River at Dillon Dam).

Latitude/longitudes for these sites are included in Table 2 of this Update, and they are shown in the map in Figure 2. The data are included in Attachment 2 (Table 1), and graphs of the data for these locations are included in Attachment 3. Data are also available at ClimaxMoinCo.com.

Current conditions continue to be maintained (*see* Section IV above).

Climax has also continued to monitor molybdenum concentrations at the following locations (all but Roberts Tunnel are municipal sampling):

- Breckenridge Recreation Center
- Copper Mountain Conference Center
- Frisco Wal-Mart
- Keystone Conference Center
- Summit County Library – North Branch
- Silverthorne Recreation Center
- North Fork of South Platte River below Roberts Tunnel Outlet (surface water sampling)

Locations are included in Table 2 of this Update, and shown in the Map in Figure 3. The data (updated through May 2022) are included in Attachment 2 (Table 2). Data are also available at ClimaxMoinCo.com.

c. Investigations of potential treatment alternatives

Climax has identified multiple treatment alternatives, the expected effluent quality that could be achieved with each alternative, and the estimated costs. A description of the alternatives that were further evaluated, and Climax's progress implementing treatment alternatives, is described below.

i. Treatment alternatives

Climax evaluated the feasibility of various treatment alternatives; this information was included in the 2019 Stantec Report shared with all stakeholders.[19] By the 2020 Update, four treatment alternatives were identified for further investigation (Alternatives 1, 1A, 2, and 3). These alternatives all involve construction of a molybdenum removal water treatment plant ("MRWTP"). Climax's 2019 and 2020 Updates included comprehensive discussions of these treatment alternatives. Climax's 2021 Update also includes information on a treatment alternative that Climax had been investigating with the Colorado School of Mines. *See* 2021 Update, Appx. D.

Climax presented on the treatment information most recently in January 2022.[20]

The table below includes Climax's analysis of Alternatives 1, 1A, 2, and 3, including estimates of capital expenditures ("CAPEX") and operating expenses ("OPEX"), and the effluent level that could be achieved by each alternative. As illustrated in the table, there are significantly higher costs for molybdenum treatment associated with an effluent limitation of 210 µg/L.

	Alternative 1	**Alternative 1A**	**Alternative 2**	**Alternative 3**
Description	Full flow MRWTP with sand filters	Full flow MRWTP without sand filters	MRWTP 75% of full flow	MRWTP 50% of full flow
CAPEX estimate *(Q2 2022 dollars)*	$155,000,000-$163,000,000	$112,000,000-$120,000,000	$125,000,000-$134,000,000	$95,000,000-$103,000,000
OPEX estimate *(Q3 2021 dollars)*	$3,688,000	$3,318,000	$3,242,000	$2,724,000
Flow at capacity, gpm	14,000	14,000	10,500	7,000
Mo effluent criteria with low exceedance risk	210 µg/L	1,000 µg/L	4,330 µg/L	7,660 µg/L
Duration to implement *(2020 Estimate)*	3 years	2.5 years	3 years	3 years
Treatment plant still needed after closure	Yes	Under investigation	No	No

ii. Progress on implementing treatment alternatives

In an effort to make progress in reducing molybdenum in its effluent, Climax is currently working through the permitting process for Alternative 1A (full flow MRWTP without sand filters), including with Summit County and the Division of Reclamation, Mining and Safety ("DRMS"). DRMS approved a technical revision for the construction on May 31, 2022. Construction is tentatively scheduled to start end of July/early August 2022. Alternative 1A

[19] Stantec, *Analysis of Molybdenum Sources, Water Management, and Treatment Alternatives* (July 1, 2019), https://drive.google.com/file/d/1-jQxWjtclXPcUVDpNNDUg3Iq9xme5saY/view.
[20] Presentation from January 2022 stakeholder meeting available at https://climaxmoinco.com/wp-content/uploads/2022/01/Climax-Stakeholder-January-2022.pdf.

would allow Climax to continue to maintain current conditions, while operating the mine to meet market demands.

d. Stakeholder outreach

Stakeholder outreach and written and oral updates since the July 2021 Update have included:

- November 4, 2021: Written comments submitted in the November 2021 Issues Formulation Hearing on Regulations 34 & 35.[21]
- November 8, 2021: Oral comments provided at the November 2021 Issues Formulation Hearing on Regulations 34 & 35.
- December 16, 2021: Meeting with Division and EPA on molybdenum standards.
- January 11, 2022: Meeting with Molybdenum Standards Stakeholders to discuss molybdenum standard.
- January 21, 2022: Petition and Motion to Schedule the Continued and Postponed Molybdenum Standards Hearing submitted to the Commission.
- April 6, 2022: Responsive prehearing statement submitted for June 2022 hearing on administrative extension of temporary modifications.[22]
- May 4, 2022: Rebuttal submitted for June 2022 hearing on administrative extension of temporary modifications.[23]
- May 18, 2022: Presentation to Summit County Water Quality/Water Quantity committee (which includes numerous Molybdenum Standards Stakeholders).
- June 13, 2022: Oral presentation at the June 2022 hearing on administrative extension of temporary modifications.

There is a virtual stakeholder meeting scheduled for August 11, 2022, at 10:00 a.m.

e. Progress on regulatory options

In response to Climax's January 2022 Petition, a rulemaking to resolve the molybdenum standard has been scheduled for June 2023. See also discussion on RfD and RSC above in Section III.

f. Agriculture standard

While unrelated to the temporary modification, Climax typically includes an update on progress related to the agriculture molybdenum standard in these annual progress reports.

The current agriculture standard for molybdenum is based on limited research. In order to better understand the impact of molybdenum water concentration on beef cattle performance, Kistner et al. (2017) performed an experiment with 30 steers exposed to varying doses of molybdenum in drinking water. The Kistner study demonstrated that cattle exposed to molybdenum concentrations of 1,000 µg/L in water were not adversely affected.

[21] https://drive.google.com/file/d/1-IIcK2zh1GsrbXYTd3JN5E13TxxD6FE6/view. The scope of this hearing also included the molybdenum temporary modification.
[22] https://drive.google.com/file/d/1JV-bz5bXDyS1Ij5uiksh9pqP3R-DLWbP/view. Submitted as part of the Regulations 34, 35, Temporary Modifications, and Discharger Specific Variance hearing.
[23] https://drive.google.com/file/d/13pHvqDVRafKQ0sU0YQmYr4jbn_xulrBd/view.

In 2018, a new study was initiated to supplement the Kistner study with data from a larger number of animals on a high forage diet, for a longer period of time, at relevant test concentrations of molybdenum in drinking water and diet, and with and without copper supplementation. This experiment provided robust copper-to-molybdenum ratios for gestating and lactating cattle and their calves and provided new information of how molybdenum concentrations in drinking water influence beef cattle growth, reproductive performance, health, and dam and offspring copper nutritional status.

A second objective of this experiment was to determine the influence of molybdenum supplied in drinking water or feed on apparent absorption and retention of molybdenum and copper in beef cattle. This will help determine if sources (water or feed) of molybdenum affect molybdenum and copper metabolism differently. In addition, water and feed intake rates under range-like and pen conditions were measured. Results from these experiments provided data on additional life stages that may be considered by the Commission in determining an appropriate agricultural molybdenum standard.

During development of the study plan, several stakeholder meetings were held, and suggestions were incorporated into the study plan, including utilizing local hay and cattle in the study, and conducting baseline studies on ranches in the Williams Fork River Valley.

The agricultural studies were performed by the Colorado State University ("CSU") Department of Animal Sciences at pastures adjacent to the Henderson Mill near Parshall, Colorado, and at the CSU Agricultural Research, Development, and Education Center ("ARDEC") near Fort Collins, Colorado. Dr. Terry Engle was the principal investigator for this study and managed the day-to-day requirements of this research. The study began in 2018 and was completed in Spring 2020.

A summary of the cattle study, its results, and a list of publications from the study were included in the 2021 Update. Climax shared the cattle study final report and accompanying summary fact sheet with the agriculture molybdenum stakeholders on June 29, 2021. A stakeholder meeting was held on September 29, 2021, where Dr. Engle presented on the final study results. CSU continues to work on publishing the cow/calf study.

VI. Discussion of Findings thus Far

Discussions on findings thus far related to the calculation of the water supply standard for molybdenum are included in Section III above.

A rulemaking hearing has been scheduled for June 2023 to revise the molybdenum water supply standard in both Regulation 31, and in Regulation 33 for Blue River Segment 14. This hearing is anticipated to resolve the uncertainty with the underlying Regulation 31 TVS.

As explained in detail in Section III, there is substantial scientific evidence to support revision of the molybdenum standard of 210 µg/L. This includes the Murray Studies; the final ATSDR profile; two IMOA-commissioned studies (Hoberman (2021) and the BMD study); Climax's copper study (publication expected late 2022 or early 2023); national data on molybdenum in diet; and a Summit County produce study to further support departure from the default RSC. Climax will continue discussing this evidence with the stakeholders, including at the August 2022 meeting.

By the mid-January 2023 deadline for its proposal for the June 2023 rulemaking hearing, Climax will propose a numeric human health standard for molybdenum, based on the selected RfD and RSC.

Table 1 Summary of Progress on Proposed Timeline of Activities from Plan to Resolve Uncertainty[24]

Anticipated Date of Completion	Activity	Resulting Deliverables	Delays incurred*	Notes on Tasks Accomplished thus Far
2018	Discuss potential additional monitoring efforts with the Town of Frisco.	Data	No	Additional municipal sources added to Climax's monitoring program in 2018. See Attachment 2 (Table 2). Data also available at ClimaxMoinCO.com.
2018	In 2018, report on the status of the peer review and pending publication of the 2-generation study, status of the ATSDR review, and Climax's progress under the temporary modification to the Commission.	Update to Division and Commission	No	Progress update submitted to Division in June 2018; updates provided to the Commission in November 2018 Regs. 33 & 37 IFH[25] and December 2018 Temporary Modifications RMH.[26]
2018	Publication and peer-reviewed article concerning the third IMOA-sponsored study, Two-Generation (One Litter per Generation) Reproduction Study of Sodium Molybdate Dihydrate in Rats, Study Conducted by Charles River Laboratories, USA (April 2017).	Publication of Murray et al. (2017)	No	Peer-reviewed article published online November 2018; appeared in the print version of Reproductive Toxicology in March 2019.
2019	In 2019, report on progress on the ATSDR review, and Climax's progress under the temporary modification to the Commission.	Update to stakeholders and Commission.	Partially	Reported on progress at the June 2019 Commission meeting, and submitted written updates in 2019. No November 2019 hearing was held, as the Division and Climax agreed to a postponement to a later date to await ATSDR. Climax provided an update in the

[24] Note that Climax's 2017 and 2019 PTRUs do not include timelines of activities, as they were developed prior to this requirement. Information was adapted from these two PTRUs. Progress on the 2014 PTRU (https://drive.google.com/drive/folders/1cXdAuHMEk8S3mC-5ESkMnP2g3rBQgPqg) was not explicitly included, as all activities have long been completed or are repeated in the 2017/2019 PTRUs.
[25] https://drive.google.com/file/d/16dqmm2NB8kG6cWuKqQCCypCshbpvq5m8/view.
[26] *See* Climax RPHS, Rebuttal, and Surrebuttal, available at https://drive.google.com/drive/folders/1VzMNquQVOyjjZa66oq0tckIlS6IoMx6b.

				December 2019 Temporary Modifications RMH.[27]
2019/2020	Issuance of a revised Toxicological Profile for Molybdenum by ATSDR.	ATSDR Profile	Partially	This item was originally anticipated for Spring 2018, but was later revised to 2019/2020 based on delays from ATSDR. ATSDR issued its Toxicological Profile for Molybdenum in May 2020.
2019/2020	Discuss regulatory options with the Division following the conclusion of ATSDR's revisions to the draft toxicological profile for molybdenum or issuance of a revised EPA health advisory.	n/a	Partially	This item was originally anticipated for 2018, but later revised to 2019/2020 due to delay in ATSDR profile. Discussions have since occurred in October 2020 and December 2021, as well as at a January 2022 stakeholder meeting. Next stakeholder meeting is scheduled for August 11, 2022 to further discussions.
n/a	Discuss regulatory options with the Division regarding the EPA 1993 draft health advisory for molybdenum.	n/a	n/a	No time frame was provided for this activity. While general discussions have been held, focus has been on the ATSDR Profile
n/a	Continue source identification (ore type, operational, and seasonal influences).	Stakeholder update	n/a	No time frame was provided for this activity. Stantec report was provided to stakeholders July 1, 2019. Climax also provided updates to stakeholders.
n/a	Continue investigations of potential alternatives with respect to technical and economic feasibility.	Stakeholder updates	n/a	No time frame was provided for this item. Stantec report was provided to stakeholders July 1, 2019. Climax provided updates to stakeholders, including 2019, 2020, and 2021 (and now 2022).

[27] See Climax's PPHS, RPHS, and Rebuttal, https://drive.google.com/drive/folders/1LtlVyDswhX6uW8xsQd_VUufBh15jLlyJ.

Ongoing	Continue monthly monitoring of molybdenum concentrations in the Climax Mine effluent and Tenmile Creek.	Data	n/a	Monitoring has continued, see Attachment 2 (Table 1); see also ClimaxMoinCO.com
Ongoing	Continue to provide updates to the Division, EPA, and molybdenum stakeholders, including those parties participating in the rulemaking.	Stakeholder updates	No	Written updates have been provided in 2018, 2019, 2020, 2021, and now 2022. Stakeholder meetings were held in 2018, 2019, 2021, and 2022, with additional meetings scheduled.
2021/2022	In 2021 and 2022, provide updates to the Commission as part of the review of temporary modifications that expire within two years.	n/a	No	The Commission did not hold a 2021 review. Climax provided updates as part of the June 2022 review.

*For any milestone not met on schedule, please provide justification

Figure 1 Map of Blue River Segments 13 and 14

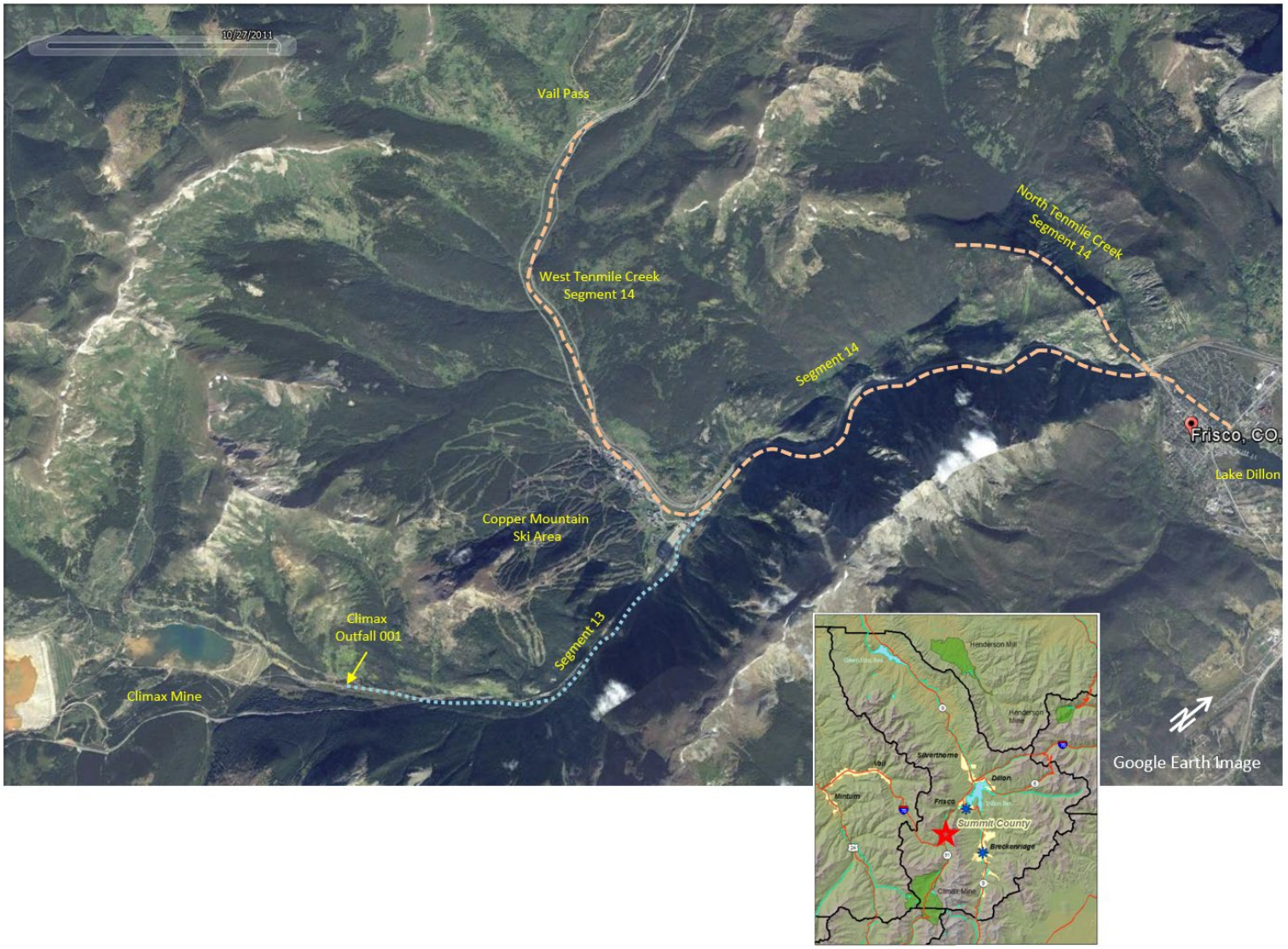


Figure 2 Map of Surface Water Sample Locations

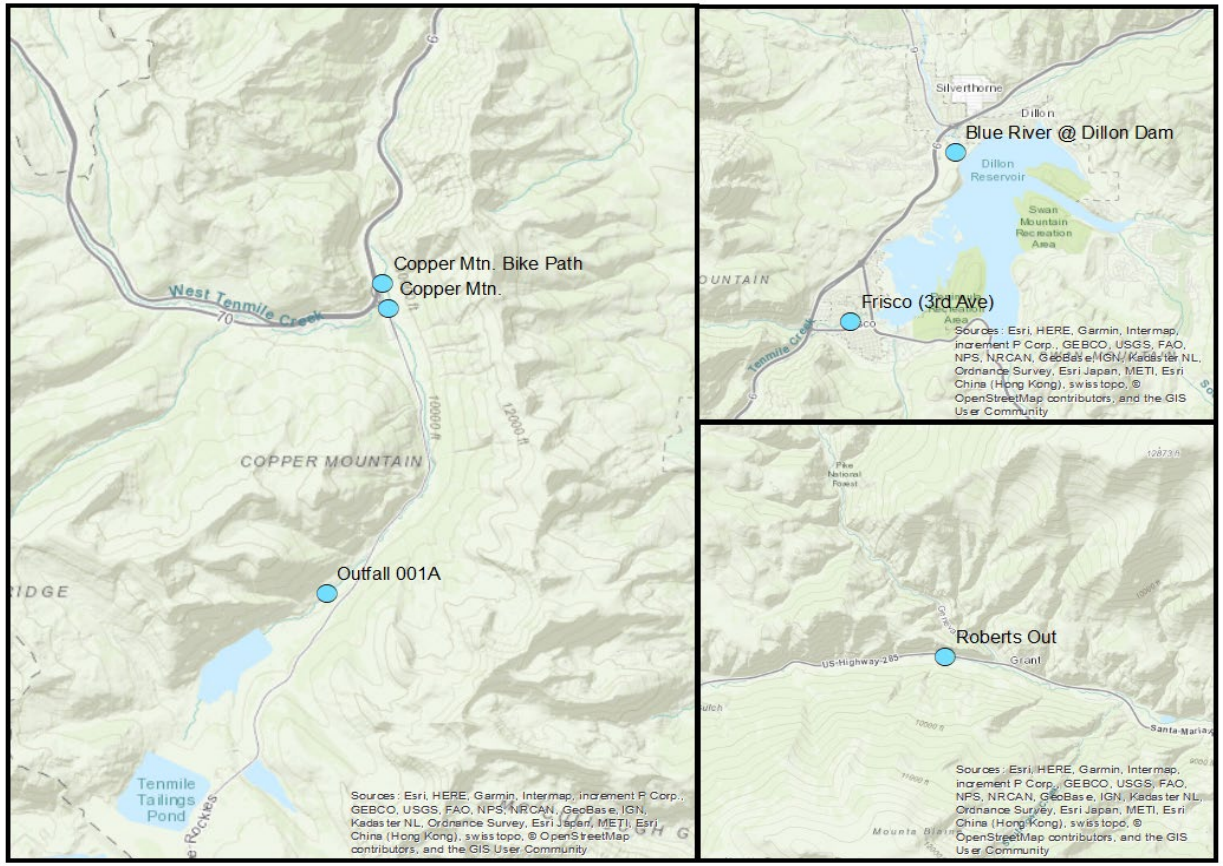


Figure 3 Map of Municipal Water Sampling Locations

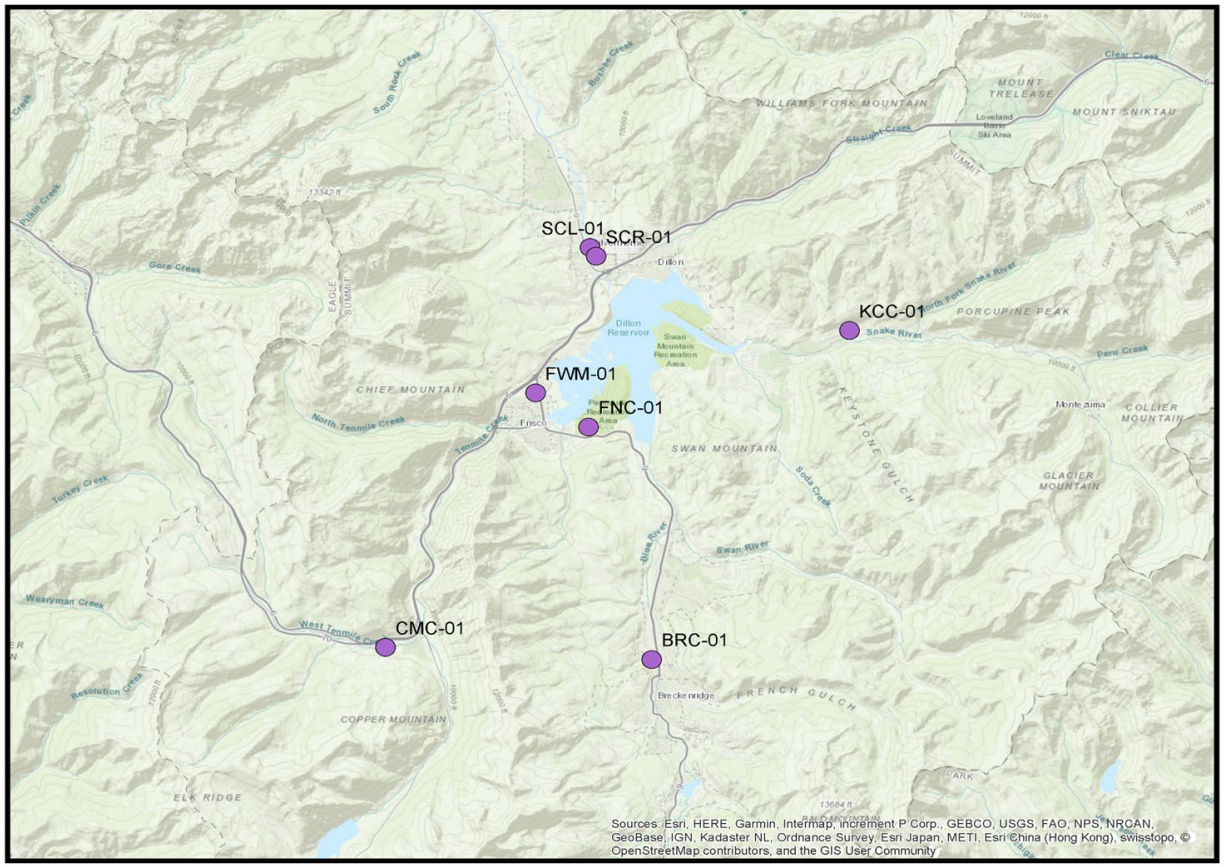


Table 2 Sampling Location Coordinates

Site ID	Description	Latitude	Longitude
Outfall 001A	Outfall 001A	39.448333	-106.154722
Copper Mtn	Blue River Segment 13 above confluence with Tenmile Creek (Copper Mountain)	39.507211	-106.140786
Copper Mountain Bike Path	Blue River Segment 14 below confluence with Tenmile Creek (Copper Mountain Bike Path)	39.510203	-106.141833
Frisco 3rd Ave	Blue River Segment 14 at Frisco (3rd Ave)	39.577472	-106.099683
Blue River @ Dillon Dam	Blue River Segment 17 below Dillon Reservoir (Blue River @ Dillon Dam)	39.621983	-106.066511
BRC-01	Breckenridge Recreation Center	39.495789	-106.047764
CMC-01	Copper Mountain Conference Center	39.502547	-106.151156
FWM-01	Frisco Wal-Mart (previously at Frisco Nordic Center)	39.573928	-106.096581
KCC-01	Keystone Conference Center	39.608497	-105.966892
SCL-01	Summit County Library – North Branch	39.637014	-106.074028
SCR-01	Silverthorne Recreation Center	39.634289	-106.071386
Roberts Out	North Fork of South Platte River below Roberts Tunnel Outlet	39.460772	-105.673061

Attachment 2

Table 1 – Surface Water and Effluent Data, Total Recoverable Molybdenum (µg/L) (1/2013-6/2022)

Date	Copper Mtn	Copper Mtn Bike Path	Frisco (3rd Ave)	Blue River @ Dillon Dam	Outfall 001A Sample Date	Outfall 001A Result
01/03/2013	740	650	190	30	--	--
01/10/2013	900	790	250	30	--	--
01/16/2013	950	930	240	40	--	--
01/24/2013	820	730	220	40	--	--
01/31/2013	710	670	200	30	--	--
02/07/2013	590	530	170	40	--	--
02/14/2013	470	420	170	40	--	--
02/21/2013	930	840	250	30	--	--
02/28/2013	790	690	240	30	--	--
03/07/2013	680	590	170	30	--	--
03/14/2013	1520	1400	400	50	--	--
03/21/2013	2000	1950	920	30	--	--
03/28/2013	1520	1490	800	60	--	--
04/04/2013	1270	1240	520	60	--	--
04/11/2013	1050	1040	400	40	4/17/2013	1540
04/18/2013	1080	950	360	50	--	--
04/25/2013	1230	1210	420	60	--	--
05/02/2013	460	280	170	60	5/6/2013	710
05/09/2013	1030	710	330	60	--	--
05/16/2013	760	470	270	70	--	--
05/22/2013	730	600	320	70	--	--
05/30/2013	300	230	130	70	--	--
06/06/2013	270	210	120	60	6/5/2013	370
06/13/2013	40	30	30	60	--	--
06/20/2013	50	30	30	50	--	--
06/27/2013	60	40	40	50	--	--
07/01/2013	70	50	50	50	--	--
07/11/2013	90	70	80	60	7/9/2013	120
07/17/2013	80	60	60	40	--	--
07/25/2013	120	80	80	40	--	--
08/01/2013	100	70	70	40	--	--
08/08/2013	80	60	70	40	--	--
08/15/2013	170	130	100	40	8/12/2013	170
08/22/2013	350	310	100	30	--	--
08/29/2013	350	290	220	40	--	--
09/05/2013	240	190	140	40	9/4/2013	320
09/12/2013	300	250	200	40	--	--
09/19/2013	80	60	80	40	--	--

Date	Copper Mtn	Copper Mtn Bike Path	Frisco (3rd Ave)	Blue River @ Dillon Dam	Outfall 001A Sample Date	Outfall 001A Result
09/26/2013	170	100	80	40	--	--
10/03/2013	100	90	90	40	--	--
10/10/2013	110	100	80	40	10/9/2013	140
10/17/2013	150	120	80	40	--	--
10/24/2013	150	130	80	40	--	--
10/31/2013	330	260	140	40	--	--
11/07/2013	280	150	120	30	--	--
11/14/2013	240	190	130	40	11/13/2013	470
11/21/2013	220	140	110	30	--	--
11/25/2013	220	150	110	30	--	--
12/05/2013	390	250	150	<20	12/4/2013	610
12/12/2013	460	330	180	30	--	--
12/19/2013	660	510	260	20	--	--
12/26/2013	650	550	300	30	--	--
01/02/2014	740	600	320	30	--	--
01/09/2014	770	650	330	30	1/8/2014	960
01/16/2014	820	740	360	<40	--	--
01/23/2014	860	770	390	40	--	--
01/30/2014	1120	1000	500	50	--	--
02/06/2014	1080	960	460	40	2/5/2014	1350
02/13/2014	1110	1080	510	60	--	--
02/20/2014	1190	1130	540	60	--	--
02/26/2014	1220	1140	550	70	--	--
03/06/2014	1130	1070	490	60	3/5/2014	1460
03/12/2014	710	470	270	60	--	--
03/20/2014	1380	1320	580	60	--	--
03/27/2014	1720	1610	900	60	--	--
04/03/2014	1750	1730	1110	60	--	--
04/10/2014	1980	1930	1150	80	--	--
04/17/2014	1930	1580	1000	100	4/16/2014	2240
04/24/2014	1910	970	790	120	--	--
05/01/2014	1640	1140	810	110	--	--
05/08/2014	770	360	280	100	--	--
05/15/2014	560	300	240	90	5/13/2014	840
05/22/2014	300	120	110	90	--	--
05/29/2014	150	60	60	60	--	--
06/05/2014	110	40	50	50	--	--
06/12/2014	100	40	50	40	6/11/2014	120
06/19/2014	120	60	60	50	--	--
06/26/2014	110	50	50	30	--	--

Date	Copper Mtn	Copper Mtn Bike Path	Frisco (3rd Ave)	Blue River @ Dillon Dam	Outfall 001A Sample Date	Outfall 001A Result
07/02/2014	80	40	40	30	7/1/2014	120
07/10/2014	100	50	50	40	--	--
07/17/2014	50	20	40	30	--	--
07/24/2014	20	<20	40	30	--	--
07/31/2014	20	<20	40	30	--	--
08/07/2014	80	50	60	<20	--	--
08/14/2014	30	<20	50	<20	--	--
08/21/2014	40	20	60	<20	8/19/2014	350
08/28/2014	40	30	60	20	--	--
09/04/2014	520	360	160	<20	--	--
09/11/2014	370	250	140	<20	9/8/2014	630
09/18/2014	500	360	200	<20	--	--
09/24/2014	480	370	200	20	--	--
10/02/2014	510	290	190	30	--	--
10/09/2014	610	450	240	30	--	--
10/16/2014	720	430	250	<20	10/13/2014	880
10/23/2014	80	40	90	30	--	--
10/30/2014	900	810	270	30	--	--
11/20/2014	1610	1400	580	20	11/12/2014	1360
12/16/2014	1840	1780	940	40	12/2/2014	2040
01/21/2015	1330	1320	953	31.2	1/7/2015	2230
02/24/2015	439	397	264	80.6	2/10/2015	518
03/10/2015	521	492	230	80	3/3/2015	339
04/28/2015	1140	896	553	67.6	4/8/2015	601
05/12/2015	1060	811	429	73.4	5/6/2015	525
06/09/2015	58.9	40.6	36.7	54.3	6/10/2015	66.1
07/21/2015	55.7	35.3	39	30.7	7/8/2015	47.3
08/27/2015	129.9	91.3	93.6	38	8/12/2015	164.2
09/16/2015	121.4	92.5	83.1	33.5	9/2/2015	181.1
10/26/2015	164.2	111.7	92.3	33.7	10/7/2015	102.7
11/18/2015	257	132.2	95.7	23.2	11/4/2015	215
12/21/2015	668	478	257	28	12/2/2015	879
01/21/2016	689	535	348	40.4	1/11/2016	679
02/17/2016	794	802	425	53	2/3/2016	703
No Sample March 2016					3/2/2016	848
04/12/2016	1330	1140	476.7	59.5	4/6/2016	1360
05/11/2016	2720	1740	1520	158.5	5/3/2016	3830
06/15/2016	102.7	45.4	59.6	79.6	6/8/2016	295.7
07/20/2016	464.6	315.6	188.8	102.3	7/25/2016	458.5

Date	Copper Mtn	Copper Mtn Bike Path	Frisco (3rd Ave)	Blue River @ Dillon Dam	Outfall 001A Sample Date	Outfall 001A Result
08/23/2016	570.2	357.7	290.3	53.1	8/23/2016	794.2
09/22/2016	510	473	372.4	53.2	9/7/2016	915.7
10/25/2016	652.1	564.4	320.7	47.7	10/12/2016	947.2
No Sample November 2016					11/8/2016	655.6
12/20/2016		384	220	43.2	12/7/2016	463
01/25/2017	Frozen	490	Frozen	53.4	1/16/2017	518
02/27/2017	408	396	Frozen		2/7/2017	512
03/29/2017	285	224	134	56.7	3/8/2017	428
04/26/2017	516	428	245		4/5/2017	371
No Sample May 2017					5/9/2017	377
06/01/2017	269	212	114	49.2	6/6/2017	125
06/27/2017	143	124	66.2	46.4	7/11/2017	53.7
07/18/2017	91.6	64.1	57.2	32.6	8/1/2017	130
09/12/2017	192	133	108	38.8	9/12/2017	236
10/26/2017	219	182	124	37.7	10/3/2017	242
11/29/2017	983	905	314	31.8	11/1/2017	286
12/28/2017	Frozen	1160	Frozen	39.8	12/11/2017	1050
01/30/2018	Frozen	Frozen	1010	64	1/3/2018	1280
02/27/2018	1640	1540	910	100	2/5/2018	1820
03/28/2018	1950	1850	857	118	3/7/2018	2290
04/26/2018	1880	1360	974	120	4/9/2018	2260
05/31/2018	80	66.6	43.1	56.7	5/2/2018	823
06/20/2018	77.9	72.3	81	76.9	6/4/2018	68
07/16/2018	47.1	39.6	71.5	59.8	7/3/2018	137
08/29/2018	378	338	170	49.1	8/6/2018	405
09/27/2018	459	404	197	48.9	9/4/2018	465
10/31/2018	436	382	240	45.6	10/3/2018	1100
11/27/2018	Frozen	506	210	35.8	11/7/2018	557
12/27/2018	Frozen	950	Frozen	43	12/4/2018	668
01/28/2019	Frozen	Frozen	Frozen	58.8	1/14/2019	1100
02/19/2019	Frozen	882	Frozen	65.8	2/6/2019	1050
03/12/2019	Inaccessible	Inaccessible	Frozen	72.2	3/6/2019	1240
04/16/2019	1670	1640	988	109	4/9/2019	1610
05/14/2019	751	498	319	99.8	5/13/2019	1100
06/05/2019	256	156	97.9	80.7	6/10/2019	58
07/09/2019	96.9	46.8	45.4	51.3	7/8/2019	47.7
08/21/2019	35.1	18.2	55	38.4	8/12/2019	45.9
09/10/2019	559	394	253	40.2	9/9/2019	729
10/15/2019	382	339	156	36.1	10/2/2019	745

Date	Copper Mtn	Copper Mtn Bike Path	Frisco (3rd Ave)	Blue River @ Dillon Dam	Outfall 001A Sample Date	Outfall 001A Result
11/19/2019	488	442	229	31.7	11/5/2019	670
12/18/2019	Inaccessible	292	Inaccessible	31.7	12/3/2019	553
01/15/2020	Inaccessible	333	237	40.1	1/7/2020	394
02/25/2020	Inaccessible	Inaccessible	Inaccessible	Inaccessible	2/11/2020	431
03/18/2020	Inaccessible	Inaccessible	409	57.5	3/2/2020	671
04/20/2020	746	580	299	60.4	4/13/2020	774
05/18/2020	204	55.1	77.6	53.7	5/5/2020	466
06/03/2020	11.7	5.9	16.4	48.4	6/10/2020	42.5
07/29/2020	22.7	22.7	41.5	34.1	7/30/2020	No Sample Taken
8/12/2020	174	174	10.2	29.7	8/10/2020	243
9/15/2020	168	168	10.3	31.4	9/1/2020	176
10/8/2020	155	155	11.2	29.9	10/6/2020	187
11/17/2020	111	111	Frozen	21	11/9/2020	105
12/28/2020	Inaccessible	Inaccessible	Frozen	24.1	12/1/2020	81.2
1/27/2021	Inaccessible	Inaccessible	Frozen	28.9	1/14/2021	101
2/24/2021	Inaccessible	230	Frozen	28.1	2/2/2021	102
3/16/2021	Inaccessible	Frozen	Frozen	31.5	3/1/2021	279
4/27/2021	540	256	41.2	40.4	4/13/2021	514
					4/27/2021	635
5/26/2021	168	63	63.8	35.7	5/18/2021	197
6/2/2021	172	65.8	67.4	36.2	6/1/2021	208
7/29/2021	206	169	127	28.7	7/6/2021	126
8/17/2021	223	179	125	26.3	8/3/2021	106
9/29/2021	418	334	206	26.9	9/2/2021	431
10/26/2021	614	496	258	25.5	10/19/2021	569
11/8/2021	598	569	228	25.2	11/1/2021	698
12/22/2021	Frozen	576	304	30.2	12/7/2021	636
1/25/2022	Frozen	964	Frozen	43.1	1/10/2022	875
2/15/2022	Frozen	978	Frozen	59.9	2/7/2022	1080
3/17/2022	Frozen	832	417	69	3/7/2022	1110
4/26/2022	108	95.7	539	75.5	4/4/2022	1110
5/17/2022	111	42.7	50.5	75.4	5/16/2022	133
6/2/2022	265	104	120	60	6/1/2022	345

Table 2 – Municipal and Roberts Tunnel Data, Total Recoverable Molybdenum (µg/L) (1/2018–5/2022)

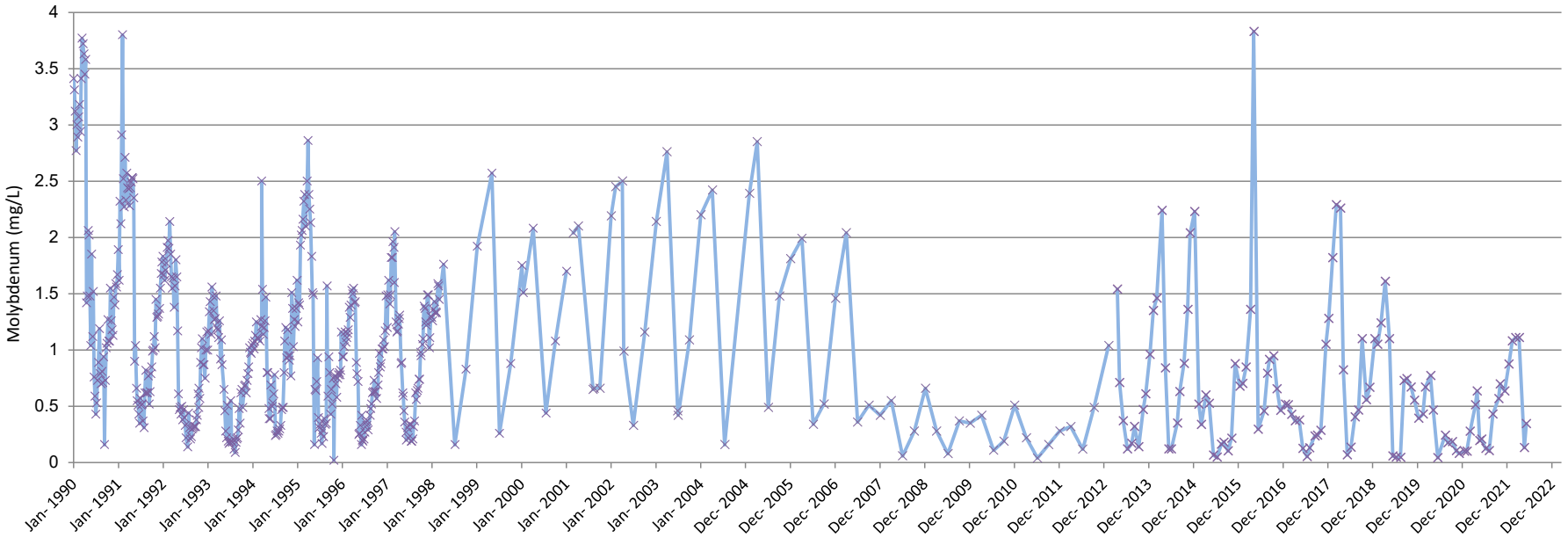
Sample Date	Total Recoverable Molybdenum in µg/L							
	Breckenridge Recreation Center (BRC-01)	Copper Mountain Conference Center (CMC-01)	Frisco Nordic Center***	Frisco Wal-Mart*** (FWM-01)	Keystone Conference Center (KCC-01)	Summit County Library - North Branch (SCL-01)	Silverthorne Recreation Center (SRC-01)	North Fork of South Platte River at Roberts Tunnel Outlet* (Roberts Out)
01/31/2018	0.47	0.21	0.54	--	0.55	44	--	--
02/26/2018	<0.5	<0.5	<0.5	--	<0.5	40.6	--	3.2
03/29/2018	<0.5	<0.5	<0.5	--	<0.5	40.7	--	80.6
04/30/2018	<0.5	<0.5	<0.5	--	<0.5	29.4	--	90.2
05/31/2018	0.5	<0.5	<0.5	--	<0.5	37.2	--	70
06/20/2018	0.6	<0.5	<0.5	--	<0.5	37	--	56.4
07/25/2018	0.6	<0.5	<0.5	--	<0.5	37.8	--	50.2
08/21/2018	0.5	<0.5	<0.5	--	<0.5	36.1	--	46.7
09/27/2018	0.7	1.2	0.8	--	<0.5	29.3	--	45.2
10/31/2018	<0.5	Inaccessible (construction)	<0.5	--	<0.5	30	--	37.6
11/27/2018	0.5	1.1	0.6	--	--	39.7	--	37.4
12/27/2018	0.9	2	--	<0.5	0.7	28	--	Inaccessible
01/28/2019	<0.5	<0.5	--	<0.5	<0.5	35	40.2	Inaccessible
02/19/2019	<0.5	<0.5	--	<0.5	0.5	37.8	37.3	0.6
03/12/2019	<0.5	<0.5		No sample during March 2019				Inaccessible
04/16/2019	<0.5	0.5	--	0.5	<0.5	27.7	37.2	0.8
05/14/2019	<0.5	<0.5	--	Inaccessible	<0.5	29.2	34.3	0.8
06/05/2019	0.5	0.6	--	<0.5	<0.5	32.9	32.9	Inaccessible
07/09/2019	0.6	Inaccessible	--	<0.5	<0.5	29.9	30.9	0.5
08/21/2019	0.7	Inaccessible	--	Inaccessible	<0.5	39.8	39.3	20.2
09/10/2019	0.6	<0.5	--	<0.5	<0.5	43.8	41.6	35.3
10/15/2019	0.5	<0.5	--	<0.5	<0.5	33.2	36.1	29

Sample Date	Total Recoverable Molybdenum in µg/L							
	Breckenridge Recreation Center (BRC-01)	**Copper Mountain Conference Center (CMC-01)**	**Frisco Nordic Center*** **	**Frisco Wal-Mart*** (FWM-01)**	**Keystone Conference Center (KCC-01)**	**Summit County Library - North Branch (SCL-01)**	**Silverthorne Recreation Center (SRC-01)**	**North Fork of South Platte River at Roberts Tunnel Outlet* (Roberts Out)**
11/18/2019	0.5	0.7	--	<0.5	<0.5	43	41.2	27.9
12/18/2019	Inaccessible	1.1	--	Inaccessible	Inaccessible	27.4	33.7	Inaccessible
01/15/2020	<0.5	0.6	--	<0.5	<0.5	43.5	41.7	Inaccessible
02/26/2020	<0.5	0.5	--	0.6	<0.5	43.1	43.1	Inaccessible
03/18/2020	No sample - sites inaccessible due to COVID-19 closures			0.6	No sample - sites inaccessible due to COVID-19 closures			
04/20/2020	No sample - sites inaccessible due to COVID-19 closures							
05/18/2020	No sample - sites inaccessible due to COVID-19 closures							
06/03/2020	No sample - sites inaccessible due to COVID-19 closures							
07/31/2020	No sample - sites inaccessible due to COVID-19 closures							
8/12/2020	Closed; COVID-19	<0.5	No sample - sites inaccessible due to COVID-19 closures			29.4	29.8	10.2
9/15/2020	Closed; COVID-19	<0.5	No sample - sites inaccessible due to COVID-19 closures			37.8	31.1	6.9
10/8/2020	No sample - sites inaccessible due to COVID-19 closures							47.5
11/4/2020	No sample - sites inaccessible due to COVID-19 closures							22.9
12/31/2020	No sample - sites inaccessible due to COVID-19 closures							No Flow
1/31/2001	No sample - sites inaccessible due to COVID-19 closures							No Flow
2/28/2021	No sample - sites inaccessible due to COVID-19 closures							No Flow
3/31/2021	No sample - sites inaccessible due to COVID-19 closures							No Flow
4/30/2021	No sample - sites inaccessible due to COVID-19 closures							0.58
5/12/2021	No sample - sites inaccessible due to COVID-19 closures							
6/30/2021	No sample - sites inaccessible due to COVID-19 closures							23
7/29/2021	1.01	<.2	NA	<.2	<.4	25.8	31.9	
8/17/2021	0.97	0.45	NA	<.2	0.38	40.5	39.3	
9/29/2021	0.54	0.5	NA	0.58	0.44	36.5	40.7	
10/26/2021	0.89	0.42	NA	0.42	0.41	40.7	39.3	4.92

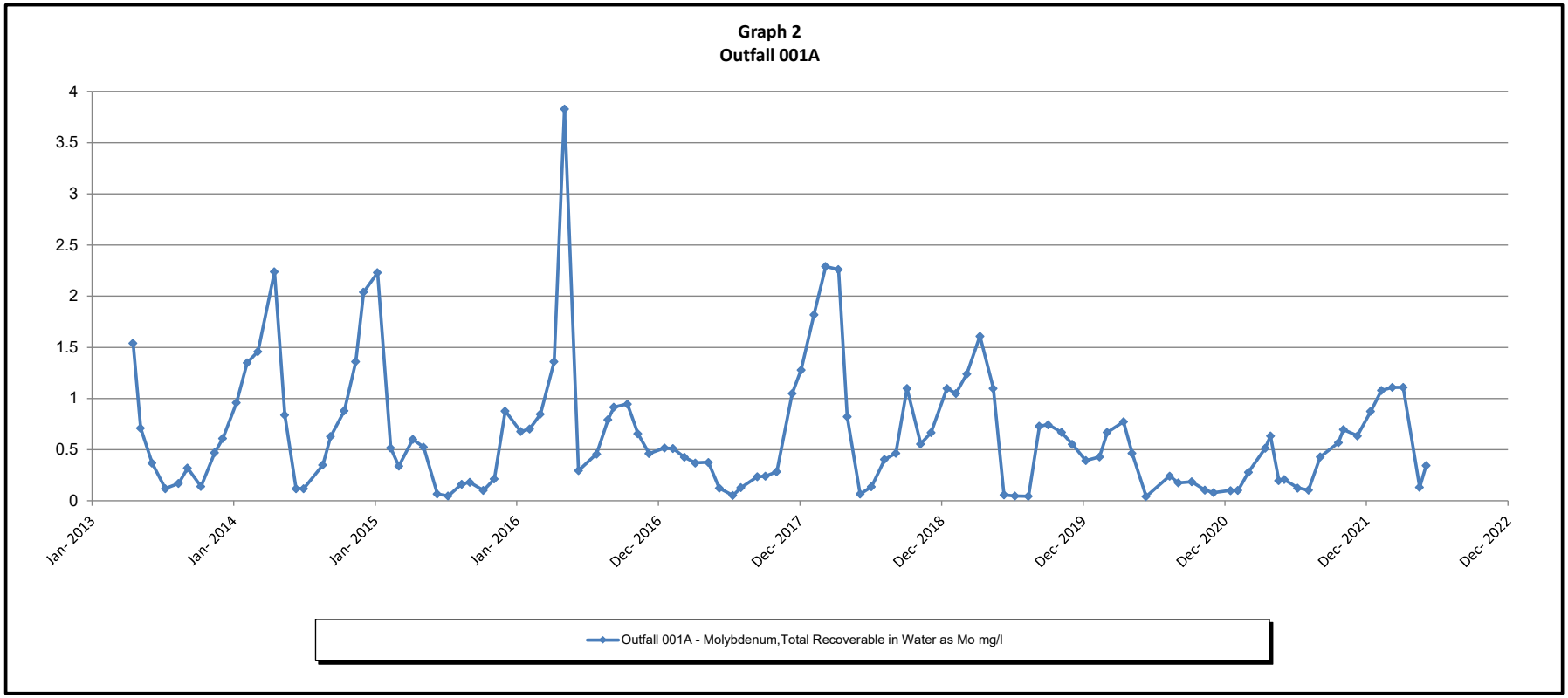
Sample Date	Total Recoverable Molybdenum in µg/L							
	Breckenridge Recreation Center (BRC-01)	**Copper Mountain Conference Center (CMC-01)**	**Frisco Nordic Center*** **	**Frisco Wal-Mart*** (FWM-01)**	**Keystone Conference Center (KCC-01)**	**Summit County Library - North Branch (SCL-01)**	**Silverthorne Recreation Center (SRC-01)**	**North Fork of South Platte River at Roberts Tunnel Outlet* (Roberts Out)**
11/8/2021	0.9	0.56	NA	0.4	0.44	31.9	41.6	
12/22/2021	NA	NA	NA	Out of Order	building locked	NA	NA	no sample
1/27/2022	0.57	0.58	NA	0.44	0.42	41	41.7	no sample
2/22/2022	0.39	0.5	NA	<.2	building locked	39.6	38	no sample
3/16/2022	0.86	0.36	NA	<.2	0.38	40	41.3	no sample
4/26/2022	0.82	0.41	NA	<0.2	<0.2	33.2	34.1	no sample
5/19/2022	0.88	NA	NA	0.46	0.51	30.2	30.8	51.6

Attachment 3

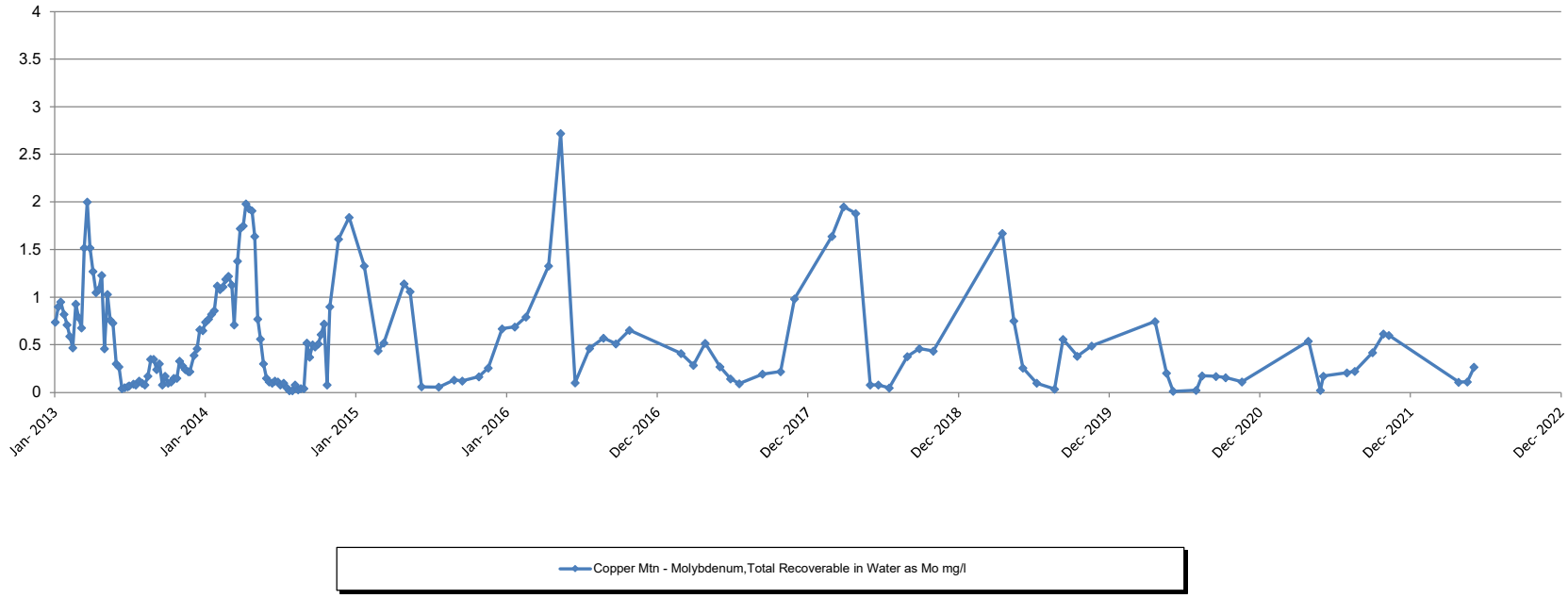
Graph 1 - Outfall 001A Molybdenum Concentrations - 1990 to 2022



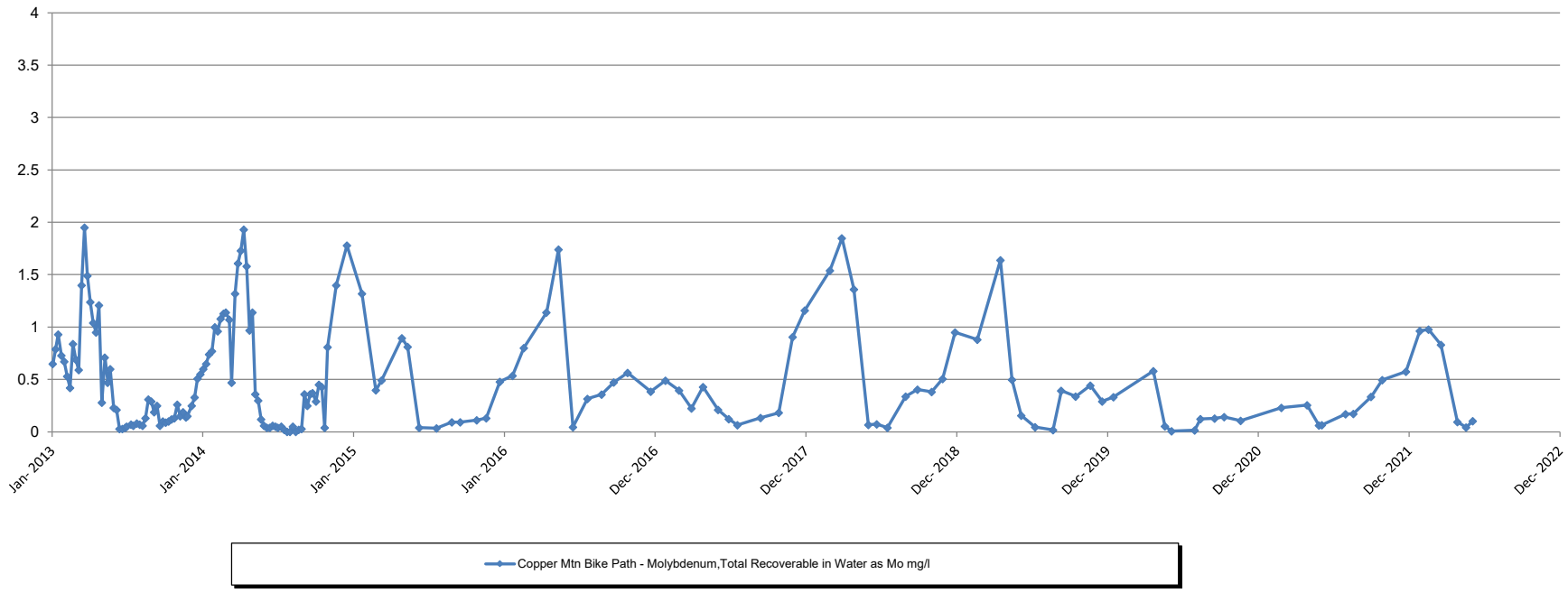
*Results shown are Total Recoverable from 1990-2001, Total from 2001-2013, and Total Recoverable from 2013-Present

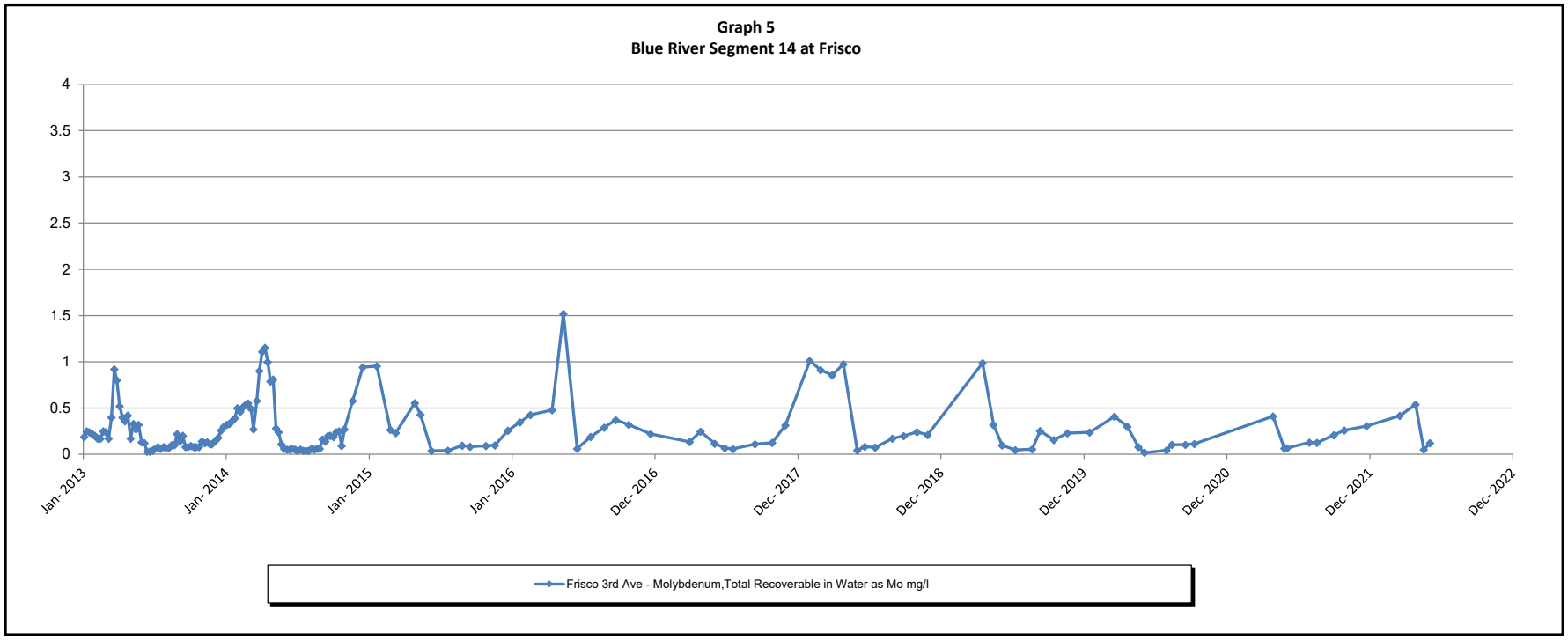

Graph 2
Outfall 001A
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan- 2013
Jan- 2014
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Dec- 2022
Outfall 001A - Molybdenum,Total Recoverable in Water as Mo mg/l

Graph 3
Blue River Segment 13 above confluence with West Tenmile Creek



Graph 4
Blue River Segment 14 below confluence with West Tenmile Creek




Graph 5
Blue River Segment 14 at Frisco
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan- 2013
Jan- 2014
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Dec- 2022
Frisco 3rd Ave - Molybdenum,Total Recoverable in Water as Mo mg/l

Graph 6
Blue River Segment 17 below Dillon Reservoir