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External Memorandum

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Subject: Changes to the Tailings Basin Flows in the Embarrass River Watershed – PolyMet RS-74

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1.0 Introduction

This memo presents additional deterministic predictions of surface water quality in the Embarrass River that corresponds to changes in the seepage from the Tailings Basin (Cells 1E & 2E and Cell 2W) and discharges from Babbitt WWTP and Pit 5NW during low flows under PolyMet's NorthMet Project for both Tailings Basin-Proposed Action and Tailings Basin-Geotechnical Mitigation. At the meeting between the Agencies (MDNR, MPCA), PolyMet, Tribes, and Barr held at Barr's Minneapolis Office on September 23, 2008, questions were raised regarding the accuracy of low flow estimates in the Embarrass River and the associated amount of seepage coming from the Tailings Basin Area. This memo was formally promised as a result of the meeting on October 9, 2008 between Barr, MDNR and the Tribes at Barr's Minneapolis Office. The information presented here does not supersede the information presented in the RS74B Draft-02 report submitted on September 13, 2008 (henceforth referred to as RS74B, Draft-02). This memo further analyzes the impacts to the Embarrass River during low flow conditions and confirms that even with the changes described, the deterministically predicted water quality in the Embarrass River does not exceed any Minnesota surface water quality standards other than those already represented in RS74B, Draft-02. Only changes with respect to RS74B, Draft-02 are presented; and the table and figure numbering follows RS74B, Draft-02.

2.0 Changes in Modeling Inputs

2.1 Changes in Tailings Basin Seepage

There are two inputs from the Tailings Basin included in the Embarrass River model: seepage from Cell 2W and seepage from Cells 1E/2E. Under existing conditions (i.e., prior to PolyMet Operations) the estimated seepage from LTVSMC Cell 2W was 4,123 gpm (9.2 cfs) and from Cells 1E/2E was 900 gpm (2.01 cfs) in RS74B, Draft-02. However, the lowest monitored total flow in the river at PM-13 was 7.2 cfs in July 2004, which is less than the calculated seepage from the existing LTVSMC Tailings Basin, indicating that not all of the estimated seepage is reaching the Embarrass River. Therefore in RS74B, Draft-02 during dry conditions, only 1.2 cfs of total seepage flow of the Tailings Basin was added to the model (because baseflow in the Embarrass River at PM-13 is approximately 5 cfs). The effective seepage value of 1.2 cfs was determined based on calibration of the Embarrass River model using sulfate as a sample parameter during low flow events. Therefore, not all of the load from the Tailings Basin was accounted for in the model during low flow conditions.

The existing 4,123 gpm seepage from LTVSMC Cell 2W was calibrated against 2001 data, which was when LTVSMC was shut-down and pond on Cell 2W started to dry up. It is expected that seepage from Cell 2W would decrease over time; hence it is probable that the actual seepage from LTVSMC Cell 2W is less than 4,123 gpm in 2008. The final steady state condition has been estimated at 610 gpm. However, all the groundwater flow models of the Tailings Basin are steady-state. It was never intended to predict transient seepage losses from Cell 2W.

It is possible that the instantaneous flow measurements taken during the water quality monitoring measurements in the Embarrass River are not extremely accurate. Accurate flow measurements require a detailed rating curve that can be difficult to develop for low flows or a well-calibrated measurement device such as an ACDP. Therefore, it is possible that the actual low flow in the Embarrass River is different from the estimate of 7.2 cfs based on the July 2004 measurement.

Therefore, it was decided to calibrate the existing conditions model to obtain the total LTVSMC Tailings Basin seepage. The calibration was completed focusing on low flow conditions using a variety of parameters: calcium, chloride, copper, fluoride, iron, magnesium, sodium, and sulfate. Calibrations were performed based on the average of parameter concentrations at PM-13 observed during two flow conditions: 1) flows less than 10 cfs (occurring in July 2004, August 2004, and October 2006), and 2) flows between 10 and 20 cfs (occurring in June 2004, August 2006, November 2006, and July 2007). These calibrations are presented in Appendix I of this memo.

Under the first flow conditions, calibration was performed by assuming no surface runoff to PM-12 or PM-13. The total seepage from the Tailings Basin was then varied in order to match the model-predicted parameter concentration at PM-13 to the average of the concentrations observed at that location on the dates listed above. Groundwater inflows to the Embarrass River were held constant. The total flow in the river at PM-13 was allowed to differ from that recorded during sampling; total flow as calculated in the calibration is the sum of the Babbitt WWTP inflow, the groundwater inflow (i.e., the natural groundwater recharge), and the seepage from the Tailings Basin. This process was performed both assuming no discharge from the Pit 5NW as well as a discharge of 0.26 cfs from the Pit 5NW (the minimum observed flow based on NTS sampling data).

Calibration to the periods of flow between 10 and 20 cfs differs slightly from the method used for flows less than 10 cfs. For these flows, the flow in the Embarrass River at PM-13 was held constant at 16.5 cfs (the average of the flows observed on the dates listed above, which vary from 15.2 to 17.9 cfs). Again, groundwater inflow was held constant. Surface runoff into the Embarrass River was calculated as the remainder of the 16.5 cfs total flow less the groundwater inflow, Babbitt WWTP discharge, Pit 5NW discharge, and Tailings Basin seepage. The seepage from the Tailings Basin was varied in order to match the model-predicted parameter concentration at PM-13 to the average of the concentrations observed at that location on the dates listed above. This process was performed both assuming no discharge from the Pit 5 NW as well as a discharge of 0.26 cfs from the Pit 5NW (the minimum observed flow based on NTS sampling data).

The results of the calibrations are presented in Table 1 of this memo. The results indicate that the seepage from the Tailings Basin to the Embarrass River upstream of PM-13 is less than the estimated seepage in RS74B, Draft-02 of 11.2 cfs during average and high flow conditions. However, the seepage from the Tailings Basin to the Embarrass River upstream of PM-13 is greater than the estimated seepage in RS74B, Draft-02 of 1.2 cfs during low flow conditions. The results of the calibration in Table 1 average about 2.1 cfs for the seepage from the Tailings Basin. The calibration of sulfate, calcium, and magnesium suggest a greater seepage flow as flows in the river at PM-13 increase from less than 10 cfs to values between 10 and 20 cfs. Chloride and sodium demonstrated the opposite trend. These contrasting trends prevent the development of a relationship between Tailings Basin seepage flow and flows in the Embarrass River. High concentrations of sulfate in the Pit 5NW prevented accurate calibration when flow in the river was less than 10 cfs and flows from Pit 5NW were considered (see Table 1). It is likely that the Pit 5NW discharge is insignificant during periods of very low flow or the load is being stored somewhere upstream in the watershed.

As seen in Table 1, the LTVSMC Tailings Basin seepage ranged from 1 to 4 cfs. When calibrated against chloride, a non-reactive solute, the estimated LTVSMC Tailings Basin seepage was 4 cfs during very low flows and with zero discharge from Pit 5NW. This is the highest value calibrated, and it was chosen to be used in the surface water quality model. Therefore, it was assumed that existing conditions seepage from Cells 1E/2E is 900 gpm (2.01 cfs). The remaining seepage (895 gpm or 1.99 cfs) is from Cell 2W and is assumed to be constant until PolyMet Tailings Basin closure. Seepage from PolyMet Tailings Basin Cells 1E/2E during operations and closure remain the same as in RS74B, Draft-02. Table 4-1 presents the seepage from the Tailings Basin-Proposed Action design and Table 4-4 presents the seepage from the Tailings Basin-Geotechnical Mitigation design for low, average and high flow conditions (i.e., the seepage rates used in modeling in this memo are the same for low, average and high flows). For comparison, Table 4-1 and Table 4-4 also provide the values used in RS74B, Draft-02.

2.2 Changes in Discharges from Babbitt WWTP & Pit 5NW

In RS74B, Draft-02 the discharges from Babbitt WWTP and Pit 5NW were assumed to be zero during low flow conditions. In this memo, the discharge from Babbitt WWTP was assumed to be 0.33 cfs under all flow conditions. The discharge from Pit 5NW is assumed to be 0.26 cfs during low flow conditions, which corresponds to the lowest measured discharge during the monitoring period of June 2001 to December 2007. The average monitored discharge from Pit 5NW of 1.99 cfs was assumed during average and high flow conditions. Table 2-1 has been updated to reflect the changes in modeled discharges from Babbitt WWTP and Pit 5NW during low flow conditions.

2.3 Changes in Input Water Quality

There are no changes in water quality from RS74B, Draft-02 except for the surface runoff, which was recalibrated for existing conditions (i.e., no PolyMet Tailings Basin and Hydrometallurgical Residue Facility inputs) using a seepage rate of 4 cfs from the existing LTVSMC Tailings Basin. Table 5-2 displays the recalibrated surface runoff water quality.

3.0 Modeling Results

3.1 Tailings Basin-Proposed Action

3.1.1 Deterministic Water Quality Predictions at PM-12 of Tailings Basin-Proposed Action

Results at surface water quality monitoring location PM-12 are not presented in this memo because this location is upstream of the Tailings Basin and the water quality of all inputs to this location are below the Minnesota surface water quality standards. However, for reference the results are presented in Tables 5-4 to 5-6.

3.1.2 Deterministic Water Quality Predictions at PM-13 of Tailings Basin-Proposed Action

Deterministic water quality predictions of each constituent of analysis during Years 1, 5, 8, 9, 15, 20, Closure, and Post-Closure at surface water monitoring location PM-13 along with the most stringent of the chronic aquatic toxicity-based Minnesota surface water quality standards are presented in Tables 5-7 to 5-9 for low, average and high flows under Tailings Basin-Proposed Action. The maximum deterministic water quality predictions of some key water quality parameters are summarized below:

- Antimony. The highest deterministic water quality prediction of antimony is 0.00509 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Proposed Action vs. 0.00209 mg/L at PM-13 in Year 20 during low flow conditions in RS74B, Draft-02. This new predicted highest value is about one-sixth of the Minnesota surface water quality standard of 0.031 mg/L. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00150 mg/L.

- Arsenic. The highest deterministic water quality prediction of arsenic is 0.00779 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Proposed Action vs. 0.00393 mg/L at PM-13 in Post-Closure during low flow conditions in RS74B, Draft-02. This new predicted highest value is about one-sixth of the Minnesota surface water quality standard of 0.053 mg/L. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00100 mg/L.

- Cobalt. The highest deterministic water quality prediction of cobalt is 0.00414 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Proposed Action vs. 0.00172 mg/L at PM-13 in Year 20 during low flow conditions in RS74B, Draft-02. This new predicted highest value is about 80 percent of the Minnesota surface water quality standard of 0.005 mg/L. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00050 mg/L.

- Copper. The highest deterministic water quality prediction of copper is 0.01110 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Proposed Action vs. 0.00579 mg/L at PM-13 in Post-Closure during low flow conditions in RS74B, Draft-02. This new predicted highest value is about two-thirds of the Minnesota surface water quality standard of 0.0172 mg/L, based on a hardness of 246.7 mg/L. (The corresponding Minnesota surface water quality standard in RS74B, Draft-02 is 0.0116 mg/L based on a hardness of 130.7 mg/L). The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00200 mg/L.

- Nickel. The highest deterministic water quality prediction of nickel is 0.06689 mg/L at PM-13 in Year 15 during low flow conditions under Tailings Basin-Proposed Action vs. 0.01829 mg/L at PM-13 in Year 20 during low flow conditions in RS74B, Draft-02. This new predicted highest value is less than two-thirds the Minnesota surface water quality standard of 0.1086 mg/L based on a hardness of 238.0 mg/L. (The corresponding Minnesota surface water quality standard in RS74B, Draft-02 is 0.0804 mg/L based on a hardness of 166.7 mg/L). The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00207 mg/L.

- Sulfate. The highest deterministic water quality prediction of sulfate is 156.1 mg/L at PM-13 in Year 15 during low flow conditions under Tailings Basin-Proposed Action vs. 63.4 mg/L at PM-13 in Year 20 during low flow conditions in RS74B, Draft-02. There is no Minnesota surface water quality standard for sulfate applicable to the Use Classification of the Embarrass River. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 36.1 mg/L.

Identical to RS74B, Draft-02, all constituents meet minimum in-stream Minnesota water quality standards at PM-13 during low, average and high flow conditions for all modeled scenarios under the

Tailings Basin-Proposed Action except for aluminum (see Tables 5-7 to 5-9). See Section 5.2.3.1 of RS74B, Draft-02 for discussion.

The deterministic model predicts sulfate concentrations at PM-13 that are above the average measured concentration of 36.1 mg/L. The high concentrations of sulfate in the Pit 5NW discharge (1,046 mg/L) result in a significant load to the Embarrass River, as the deterministic model assumes conservation of mass. During low flow conditions, seepage from Cells 1E/2E of the PolyMet Tailings Basin also results in a significant load in the Embarrass River (the highest predicted concentration of seepage from Cells 1E/2E is 241.9 mg/L in Year 15). Although the model calibration works well under average flow conditions, it does not under low flow conditions. Including the load from the Pit 5NW discharge and a flow of 4 cfs from the existing LTVSMC Tailings Basin, the model calibration resulted in predicted sulfate concentrations (95.9 mg/L for low flow conditions) that are higher than the measured concentrations during low flow conditions (41.30 mg/L) even without any additional mining inputs. When using the existing conditions model to obtain the total LTVSMC Tailings Basin seepage using sulfate, it was found that a LTVSMC Tailings Basin seepage flow rate of approximately 1.6 cfs provided the best fit calibration for flows less than 10 cfs and with no Pit 5NW discharge. It is possible that sulfate is being stored in wetlands, banks or ice during low flow conditions.

3.1.3 Culpability Analysis of Tailings Basin-Proposed Action

The culpability analysis (i.e., the degree of a particular Plant Site facility's or natural feature's impact on the overall deterministic water quality predictions in the Embarrass River) for the six water quality parameters of importance (antimony, arsenic, cobalt, copper, nickel and sulfate) and under low, average and high flow conditions are presented in Appendix G of this memo. All upstream impacts, including those from both natural features (i.e., groundwater recharge and surface runoff from areas that will not be disturbed by the Plant Site facilities) and Tailings Basin facilities (e.g., hydrometallurgical residue cell liner leakage, Cells 1E/2E seepage) were investigated for all scenarios and flow conditions at the PM-13 surface water quality monitoring stations.

The culpability analysis is completed for two sets of graphs which are presented in Appendix G of this memo for Tailings Basin-Proposed Action:

- Mass flux of upstream impacts (concentration of the feature multiplied by the flow of the feature).
- Percent contributions at PM-13 (mass flux of each feature divided by total mass flux at a certain location).

In Appendix G, "-" indicates that the mass flux is zero (e.g., there is no surface runoff during low flow conditions), whereas "0.00" indicates that the mass flux is very small. The figures in Appendix G present the full set of results of the culpability analysis for the Tailings Basin-Proposed Action. The main results of this analysis are presented below. If a result is different from RS74B, Draft-02, the RS74B, Draft-02 result is presented in a sub-bullet for comparison.

<u>Low Flow Conditions – Tailings Basin-Proposed Action</u>

- Seepage from Cells 1E/2E of the Tailings Basin in all years, followed by natural groundwater recharge from the watershed in Years 1, 5, 8, 9, Closure and Post-Closure, represents the main input determining concentrations of arsenic.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cell 2W in Year 1 and seepage from Cells 1E/2E of the Tailings Basin in all other years, represents the main input determining concentrations of arsenic.
- Seepage from Cells 1E/2E of the Tailings Basin in Years 5, 8, 9, 15 and 20, followed by natural groundwater recharge from the watershed in Years 5, 8, and 9, represents the main input determining concentrations of cobalt. Natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin and seepage from Cell 2W, represents the main input determining concentrations of cobalt in Years 1, Closure and Post-Closure.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cell 2W in Year 1 and seepage from Cells 1E/2E of the Tailings Basin in all other years, represents the main input determining concentrations of cobalt.
- Natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin and seepage from Cell 2W, represents the main input determining concentrations of copper and nickel in Years 1.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cell 2W in Year 1 and seepage from Cells 1E/2E of the Tailings

Basin in all other years, represents the main input determining concentrations of copper.

- In RS74B, Draft-02, natural groundwater recharge from the watershed represents the main input determining concentrations of nickel in Year 1.

- Seepage from Cells 1E/2E of the Tailings Basin in Years 5, 8, 9, 15, 20, Closure and Post-Closure, followed by natural groundwater recharge from the watershed in Years 5, 8, 9, Closure and Post-Closure, represents the main input determining concentrations of copper.
  - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cell 2W in Year 1 and seepage from Cells 1E/2E of the Tailings Basin in all other years, represents the main input determining concentrations of copper.
- Seepage from Cells 1E/2E of the Tailings Basin in Years 5, 8, 9, 15, 20, Closure and Post-Closure, followed by natural groundwater recharge from the watershed in Years 5, Closure and Post-Closure, represents the main input determining concentrations of nickel.
  - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of nickel in Years 15 and 20.
  - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of nickel in Years 5, 8, 9, Closure and Post-Closure.
- Seepage from Cells 1E/2E of the Tailings Basin in all years, followed by natural groundwater recharge from the watershed in Years 1, 5, Closure and Post-Closure, represents the main input determining concentrations of antimony.
  - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of antimony in all years.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by seepage from Cell 2W and discharge from Pit 5NW, represents the main input determining concentrations of sulfate in Years 1, 5, 8 and 9.
  - In RS74B, Draft-02, seepage from Cell 2W, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Year 1.

  - In RS74B, Draft-02, seepage from Cell 2W, followed by liner leakage from the Hydrometallurgical Residue Cells and seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Years 5, 8 and 9.

- Seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of sulfate in Years 15 and 20.

  - In RS74B, Draft-02, liner leakage from the Hydrometallurgical Residue Cells, followed by seepage from Cells 1E/2E of the Tailings Basin and from Cell 2W, represents the main input determining concentrations of sulfate in Years 15 and 20.

- Discharge from Pit 5NW, followed by seepage from Cells 1E/2E of the Tailings Basin and from Cell 2W, represents the main input determining concentrations of sulfate in Closure and Post-Closure.

  - In RS74B, Draft-02, seepage from Cell 2W, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Closure.

  - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by seepage from Cell 2W, represents the main input determining concentrations of sulfate in Post-Closure.

<u>Average Flow Conditions – Tailings Basin-Proposed Action</u>

- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of arsenic in Years 15 and 20. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed, followed by Seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of arsenic in Years 1, 5, 8, 9, Closure and Post-Closure.

  - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by seepage from Cell 2W, represents the main input determining concentrations of arsenic in Year 1.

  - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of arsenic in Years 5, 8, 9, Closure and Post-Closure.

- Natural surface water runoff from the watershed represents the main input determining concentrations of cobalt in Years 1, 5, 8, 9, Closure and Post-Closure.
    - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by seepage from Cell 2W, represents the main input determining concentrations of cobalt in Year 1.
    - In RS74B, Draft-02, natural surface water runoff from the watershed represents the main input determining concentrations of cobalt in Years 5, 8, 9, Closure and Post-Closure.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of cobalt in Years 15 and 20. This is the same as in RS74B, Draft-02.
- Natural surface water runoff from the watershed represents the main input determining concentrations of copper in Year 1.
    - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by seepage from Cell 2W, represents the main input determining concentrations of copper in Year 1.
- Natural surface water runoff from the watershed, followed by Seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of copper in Years 5, 8, 9, Closure and Post-Closure. This is the same as in RS74B, Draft-02.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of copper in Years 15 and 20. This is the same as in RS74B, Draft-02.
- Natural surface water runoff from the watershed, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of nickel in Year 1.
    - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by seepage from Cell 2W, represents the main input determining concentrations of nickel in Year 1.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of nickel in Years 5, 8, and 9. This is the same as in RS74B, Draft-02.
- Seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of nickel in Years 15 and 20. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of nickel in Closure and Post-Closure. This is the same as in RS74B, Draft-02.

- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of antimony in Years 1 and 5, and in Closure and Post-Closure.

    - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of antimony in Year 1 and in Closure and Post-Closure.

- Seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of antimony in Years 8, 9, 15 and 20.

    - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of antimony in Years 5, 8, 9, 15 and 20.

- Discharge from Pit 5NW in all years, followed by seepage from Cells 1E/2E of the Tailings Basin in Years 8, 9, 15 and 20, represents the main input determining concentrations of sulfate.

    - In RS74B, Draft-02, discharge from Pit 5NW, followed by seepage from Cell 2W and seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Years 1, 5, 8, and 9.

    - In RS74B, Draft-02, discharge from Pit 5NW, followed by seepage from Cells 1E/2E of the Tailings Basin and seepage from Cell 2W, represents the main input determining concentrations of sulfate in Years 15 and 20.

    - In RS74B, Draft-02, discharge from Pit 5NW represents the main input determining concentrations of sulfate in Closure and Post-Closure.

High Flow Conditions – Tailings Basin-Proposed Action

- Natural surface water runoff from the watershed represents the main input determining concentrations of arsenic, cobalt and copper in all years. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed represents the main input determining concentrations of nickel in Years 1, 5, 8, 9, Closure and Post-Closure. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of nickel in Years 15 and 20. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of antimony in Years 1, 5, Closure and Post-Closure.

    - In RS74B, Draft-02, Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of antimony in Years 1, Closure and Post-Closure.

- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of antimony in Years 8, 9, 15 and 20.

    - In RS74B, Draft-02, Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of antimony in Years 5, 8, 9, 15, and 20.

- Natural surface water runoff from the watershed, followed by discharge from Pit 5NW, represents the main input determining concentrations of sulfate in all years. This is the same as in RS74B, Draft-02.

3.1.4 Factor to Exceed of Tailings Basin-Proposed Action

This section presents the analysis conducted to determine what increase in NorthMet Project's Tailings Basin seepage chemical concentrations would cause the deterministic water quality predictions in the Embarrass River watershed to exceed Minnesota surface water quality standards under Tailings Basin-Proposed Action.

The predicted chemical concentrations for the leachate from the PolyMet Tailings Basin (Cells 1E/2E) and Hydrometallurgical Residue Facility were multiplied concurrently by a factor. The determination of the factor for a given parameter (antimony, arsenic, cobalt, copper and nickel) and flow condition (low, average or high) was based on deterministic water quality predictions in the Embarrass River that exceed Minnesota surface water quality standards for that parameter at PM-13 and a given stage of the Tailings Basin development or closure under the Tailings Basin- Proposed Action.

Table 5-10 presents the smallest factors, along with the location and scenario that would cause the deterministic water quality predictions to exceed Minnesota surface water quality standards in the Embarrass River at PM-13. There is no applicable Minnesota surface water quality standard for sulfate given the use classification of the Embarrass River. However, there is emerging interest in sulfate, and so the corresponding sulfate concentration for the smallest factors referred to above is also presented in Table 5-10.

Table 5-11 compares the concentrations of leachate from PolyMet Tailings Basin (Cells 1E/2E) and Hydrometallurgical Residue Facility (all occurring concurrently) that would cause Embarrass River deterministic water chemistry predictions to exceed Minnesota surface water quality standards and the "base case" concentrations of these Tailings Basin features. "Base Case" concentrations are those reasonable worst case concentrations presented in Tables 4-2 and 4-3 of RS74B, Draft-02.

The main results of this analysis are presented below:

- Antimony. The smallest factor to exceed the corresponding standard is 6.4 under the Tailings Basin- Proposed Action vs. 33.0 in RS74B, Draft-02.

- Arsenic. The smallest factor to exceed the corresponding standard is 7.9 under the Tailings Basin- Proposed Action vs. 34.0 in RS74B, Draft-02.

- Cobalt. The smallest factor to exceed the corresponding standard is 1.2 under the Tailings Basin- Proposed Action vs. 5.7 in RS74B, Draft-02.

- Copper. The smallest factor to exceed the corresponding standard is 1.7 under the Tailings Basin- Proposed Action vs. 3.6 in RS74B, Draft-02.

- Nickel. The smallest factor to exceed the corresponding standard is 1.8 under the Tailings Basin- Proposed Action vs. 6.1 in RS74B, Draft-02.

3.2 Tailings Basin-Geotechnical Mitigation

3.2.1 Deterministic Water Quality Predictions at PM-12 of Tailings Basin-Geotechnical Mitigation

Results at surface water quality monitoring location PM-12 are not presented in this memo because this location is upstream of the Tailings Basin and the water quality of all inputs to this location are below the Minnesota surface water quality standards. However, for reference the results are presented in Tables 7-1 to 7-3.

3.2.2 Deterministic Water Quality Predictions at PM-13 of Tailings Basin-Geotechnical Mitigation

Deterministic water quality predictions of each constituent of analysis during Years 1, 5, 10, 15, 20, Closure, and Post-Closure at surface water monitoring location PM-13 along with the most stringent of the chronic aquatic toxicity-based Minnesota surface water quality standards are presented in Tables 7-4 to 7-6 for low, average and high flows under Tailings Basin-Geotechnical Mitigation. The maximum deterministic water quality predictions of some key water quality parameters are summarized below:

- Antimony. The highest deterministic water quality prediction of antimony is 0.00555 mg/L at PM-13 in Year 10 during low flow conditions under Tailings Basin-Geotechnical Mitigation vs. 0.00217 mg/L at PM-13 in Year 10 during low flow conditions in RS74B, Draft-02. This new predicted highest value is about one-sixth of the Minnesota surface water quality standard of 0.031 mg/L. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00150 mg/L.

- Arsenic. The highest deterministic water quality prediction of arsenic is 0.00762 mg/L at PM-13 in Post-Closure during low flow conditions under Tailings Basin-Geotechnical Mitigation vs. 0.00545 mg/L at PM-13 in Post-Closure during low flow conditions in RS74B, Draft-02. This new predicted highest value is about one-sixth of the Minnesota surface water quality standard of 0.053 mg/L. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00100 mg/L.

- Cobalt. The highest deterministic water quality prediction of cobalt is 0.00164 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Geotechnical Mitigation vs. 0.00131 mg/L at PM-13 in Post-Closure during low flow conditions in RS74B, Draft-02. This new predicted highest value is about one-third of the Minnesota surface water quality standard of 0.005 mg/L. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00050 mg/L.

- Copper. The highest deterministic water quality prediction of copper is 0.00740 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Geotechnical Mitigation vs. 0.00513 mg/L at PM-13 in Post-Closure during low flow conditions in RS74B, Draft-02. This new predicted highest value is less than one-half the Minnesota surface water quality standard of 0.0162 mg/L, based on a hardness of 223.5 mg/L. (The corresponding Minnesota surface water quality standard in RS74B, Draft-02 is 0.01278 mg/L based on a hardness of 152.8 mg/L). The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00200 mg/L.

- Nickel. The highest deterministic water quality prediction of nickel is 0.01451 mg/L at PM-13 in Year 20 during low flow conditions under Tailings Basin-Geotechnical Mitigation vs. 0.00868 mg/L at PM-13 in Year 20 during low flow conditions in RS74B, Draft-02. This new predicted highest value is about one-sixth the Minnesota surface water quality standard of 0.1030 mg/L based on a hardness of 223.5 mg/L. (The corresponding Minnesota surface water quality standard in RS74B, Draft-02 is 0.07829 mg/L based on a hardness of 161.6 mg/L). The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 0.00207 mg/L.

- Sulfate. The highest deterministic water quality prediction of sulfate is 150.1 mg/L at PM-13 in Year 10 during low flow conditions under Tailings Basin-Geotechnical Mitigation vs. 61.6 mg/L at PM-13 in Year 10 during low flow conditions in RS74B, Draft-02. There is no Minnesota surface water quality standard for sulfate applicable to the Use Classification of the Embarrass River. The average concentration from surface water quality monitoring in 2004, 2006 and 2007 at PM-13 is 36.1 mg/L.

Identical to RS74B, Draft-02, all constituents meet minimum in-stream Minnesota water quality standards at PM-13 during low, average and high flow conditions for all modeled scenarios under the Tailings Basin-Geotechnical Mitigation except for aluminum (see Tables 7-4 to 7-6). See Section 7.2.3.1 of RS74B, Draft-02 for discussion.

The deterministic model predicts sulfate concentrations at PM-13 that are above the average measured concentration of 36.1 mg/L. The high concentrations of sulfate in the Pit 5NW discharge (1,046 mg/L) result in a significant load to the Embarrass River, as the deterministic model assumes conservation of mass. During low flow conditions, seepage from Cell 1E/2E of the PolyMet Tailings Basin also results in a significant load in the Embarrass River (the highest predicted concentration of seepage from Cell 1E/2E is 223.1 mg/L in Year 10). Although the model calibration works well under average flow conditions, it does not under low flow conditions. Including the load from the Pit 5NW discharge and a flow of 4 cfs from the LTVSMC Tailings Basin, the model calibration resulted in predicted sulfate concentrations (95.9 mg/L for low flow conditions) higher than the measured concentrations during low flow conditions (41.30 mg/L) even without any additional mining inputs. When using the existing conditions model to obtain the total LTVSMC Tailings Basin seepage using sulfate, it was found that a LTVSMC Tailings Basin seepage flow rate of approximately 1.6 cfs provided the best fit calibration for flows less than 10 cfs and with no Pit 5NW discharge. It is possible that sulfate is being stored in wetlands, banks or ice during low flow conditions.

3.2.3 Culpability Analysis of Tailings Basin-Geotechnical Mitigation

The culpability analysis (i.e., the degree of a particular Plant Site facility's or natural feature's impact on the overall deterministic water quality predictions in the Embarrass River) for the six water quality parameters of importance (antimony, arsenic, cobalt, copper, nickel and sulfate) and under low, average and high flow conditions are presented in Appendix G of this memo. All upstream impacts, including those from both natural features (i.e., groundwater recharge and surface runoff from areas that will not be disturbed by the Plant Site facilities) and Tailings Basin facilities (e.g., hydrometallurgical residue cells liner leakage, Cells 1E/2E seepage) were investigated for all scenarios and flow conditions at the PM-13 surface water quality monitoring stations.

The culpability analysis is completed for two sets of graphs which are presented in Appendix G for Tailings Basin-Geotechnical Mitigation:

- Mass flux of upstream impacts (concentration of the feature multiplied by the flow of the feature).
- Percent contributions at PM-13 (mass flux of each feature divided by total mass flux at a certain location).

In Appendix G, "-" indicates that the mass flux is zero (e.g., there is no surface runoff during low flow conditions), whereas "0.00" indicates that the mass flux is very small. The figures in Appendix G present the full set of results of the culpability analysis for the Tailings Basin-Geotechnical Mitigation. The main results of this analysis are presented below. If a result is different from RS74B, Draft-02, the RS74B, Draft-02 result is presented in a sub-bullet for comparison.

Low Flow Conditions – Tailings Basin-Geotechnical Mitigation

- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of arsenic in all years.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of arsenic in Years 1, 5, 10, 15, 20 and Closure.
    - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of arsenic in Post-Closure.
- Natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin and seepage from Cell 2W, represents the main input determining concentrations of cobalt in Years 1, Closure and Post-Closure.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of cobalt in Years 5, 10, 15 and 20.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed by seepage from Cell 2W, represents the main input determining concentrations of cobalt in Years 1, 5, 10, 15 and Closure.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed, followed seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of cobalt in Years 20 and Post-Closure.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of copper in all years.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed in all years, followed by seepage from Cells 1E/2E of the Tailings Basin in Years 20 and Post-Closure, represents the main input determining concentrations of copper.

- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of nickel in all years.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed in all years, followed by seepage from Cells 1E/2E of the Tailings Basin in Years 1, 5, 10, 15, and 20, represents the main input determining concentrations of nickel.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of antimony in Year 1.
- Seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of antimony in Years 5, 10, 15 and 20.
- Natural groundwater recharge from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of antimony in Closure and Post-Closure.
    - In RS74B, Draft-02, natural groundwater recharge from the watershed in all years, followed by seepage from Cells 1E/2E of the Tailings Basin in Years 1, 5, 10, 15, and 20, represents the main input determining concentrations of antimony.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by seepage from Cell 2W and discharge from Pit 5NW, represents the main input determining concentrations of sulfate in Year 1.
    - In RS74B, Draft-02, seepage from Cell 2W, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Years 1 and Closure.
- Seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of sulfate in Years 5, 10, 15, and 20.
    - In RS74B, Draft-02, seepage from Cell 2W, followed by liner leakage from the Hydrometallurgical Residue Cells and seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Year 5.
    - In RS74B, Draft-02, liner leakage from the Hydrometallurgical Residue Cells, followed by seepage from Cells 1E/2E of the Tailings Basin and seepage from Cell 2W, represents the main input determining concentrations of sulfate in Years 10, 15 and 20.

- Seepage from Cells 1E/2E of the Tailings Basin, followed by discharge from Pit 5NW and by seepage from Cell 2W, represents the main input determining concentrations of sulfate in Closure and Post-Closure.
    - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by seepage from Cell 2W, represents the main input determining concentrations of sulfate in Post-Closure.

<u>Average Flow Conditions – Tailings Basin-Geotechnical Mitigation</u>

- Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of arsenic in all years. This is the same as in RS74B, Draft-02.
- Natural surface water runoff from the watershed represents the main input determining concentrations of cobalt in all years. This is the same as in RS74B, Draft-02. However, in the updated modeling, seepage from Cells 1E/2E of the Tailings Basin is an important secondary input determining concentrations of cobalt in Year 20.
- Natural surface water runoff from the watershed in all years, followed by seepage from Cells 1E/2E of the Tailings Basin in Years 10, 15 and 20 only, represents the main input determining concentrations of copper. This is the same as in RS74B, Draft-02.
- Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of nickel in Year 1.
    - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin and seepage from Cell 2W, represents the main input determining concentrations of nickel in Year 1.
- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of nickel in Years 5, 10, 15 and 20.
    - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed and seepage from Cell 2W, represents the main input determining concentrations of nickel in Years 5, 10, 15 and 20.
- Natural surface water runoff from the watershed, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of nickel in Closure and Post-Closure. This is the same as in RS74B, Draft-02.

- Seepage from Cells 1E/2E of the Tailings Basin represents the main input determining concentrations of antimony in Years 1, 5, 10, 15 and 20. This is the same as in RS74B, Draft-02.

- Natural groundwater recharge from the watershed, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of antimony in Closure and Post-Closure.

    - In RS74B, Draft-02, natural groundwater recharge from the watershed represents the main input determining concentrations of antimony in Closure and Post-Closure.

- Discharge from Pit 5NW, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Years 1, 5, 10, 15 and 20.

    - In RS74B, Draft-02, discharge from Pit 5NW, followed by seepage from Cell 2W and seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of sulfate in Years 1, 5, 10, 15 and 20.

- Discharge from Pit 5NW represents the main input determining concentrations of sulfate in Closure and Post-Closure. This is the same as in RS74B, Draft-02.

<u>High Flow Conditions – Tailings Basin-Geotechnical Mitigation</u>

- Natural surface water runoff from the watershed represents the main input determining concentrations of arsenic, cobalt, copper, and nickel in all years. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed, followed by seepage from Cells 1E/2E of the Tailings Basin, represents the main input determining concentrations of antimony in Year 1.

    - In RS74B, Draft-02, seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of antimony in Year 1.

- Seepage from Cells 1E/2E of the Tailings Basin, followed by natural surface water runoff from the watershed, represents the main input determining concentrations of antimony in Years 5, 10, 15 and 20. This is the same as in RS74B, Draft-02.

- Natural surface water runoff from the watershed represents the main input determining concentrations of antimony in Closure and Post-Closure.

  - In RS74B, Draft-02, natural surface water runoff from the watershed, followed by natural groundwater recharge from the watershed, represents the main input determining concentrations of antimony in Closure.

  - In RS74B, Draft-02, natural surface water runoff from the watershed represents the main input determining concentrations of antimony in Post-Closure.

- Natural surface water runoff from the watershed, followed by discharge from Pit 5NW, represents the main input determining concentrations of sulfate in all years. This is the same as in RS74B, Draft-02.

3.2.4 Factor to Exceed of Tailings Basin-Geotechnical Mitigation

This section presents the analysis conducted to determine what increase in NorthMet Project's Tailings Basin seepage chemical concentrations would cause the deterministic water quality predictions in the Embarrass River watershed to exceed Minnesota surface water quality standards under Tailings Basin-Geotechnical Mitigation.

The predicted chemical concentrations for the leachate from the PolyMet Tailings Basin (Cells 1E/2E) and Hydrometallurgical Residue Facility were multiplied concurrently by a factor. The determination of the factor for a given parameter (antimony, arsenic, cobalt, copper and nickel) and flow condition (low, average or high) was based on deterministic water quality predictions in the Embarrass River that exceed Minnesota surface water quality standards for that parameter at PM-13 and a given stage of the Tailings Basin development or closure under the Tailings Basin-Geotechnical Mitigation.

Table 5-10 presents the smallest factors, along with the location and scenario that would cause the deterministic water quality predictions to exceed Minnesota surface water quality standards in the Embarrass River at PM-13. There is no applicable Minnesota surface water quality standard for sulfate given the use classification of the Embarrass River. However, there is emerging interest in sulfate, and so the corresponding sulfate concentration for the smallest factors referred to above is also presented in Table 5-10.

Table 5-11 compares the concentrations of leachate from PolyMet Tailings Basin (Cells 1E/2E) and Hydrometallurgical Residue Facility (all occurring concurrently) that would cause Embarrass River deterministic water chemistry predictions to exceed Minnesota surface water quality standards and the “base case” concentrations of these Tailings Basin features. “Base Case” concentrations are those reasonable worst case concentrations presented in Tables 4-3 and 4-5 of RS74B, Draft-02.

The main results of this analysis are presented below:

- Antimony. The smallest factor to exceed the corresponding standard is 6.2 under the Tailings Basin-Geotechnical Mitigation vs. 32.0 in RS74B, Draft-02.
- Arsenic. The smallest factor to exceed the corresponding standard is 9.3 under the Tailings Basin-Geotechnical Mitigation vs. 16.9 in RS74B, Draft-02.
- Cobalt. The smallest factor to exceed the corresponding standard is 4.4 under the Tailings Basin-Geotechnical Mitigation vs. 13.7 in RS74B, Draft-02.
- Copper. The smallest factor to exceed the corresponding standard is 2.7 under the Tailings Basin-Geotechnical Mitigation vs. 6.1 in RS74B, Draft-02.
- Nickel. The smallest factor to exceed the corresponding standard is 9.2 under the Tailings Basin-Geotechnical Mitigation vs. 31.1 in RS74B, Draft-02.

4.0 Conclusions

The deterministically predicted water quality in the Embarrass River does not exceed any additional Minnesota surface water quality standards than was presented in RS74B, Draft-02. (The only parameter to exceed Minnesota surface water quality standards in RS74B, Draft-02 was aluminum). However, there are increases in the concentrations of almost all parameters during low flow conditions when the seepage from the Tailings Basin (Cells 1E & 2E and Cell 2W) and discharges from Babbitt WWTP and Pit 5NW were increased. Under Tailings Basin-Proposed Action, the predicted concentrations at PM-13 of cobalt, copper and nickel are within two-thirds of the Minnesota surface water quality standard. The smallest factor to exceed the corresponding standard is 1.2, 1.7 and 1.8 for cobalt, copper, and nickel, respectively.

The predicted concentrations at PM-13 under the Tailings Basin-Geotechnical Mitigation are further below the Minnesota surface water quality standards than under the Tailings Basin-Proposed Action. The highest predicted concentration of copper is less than one-half the Minnesota surface water quality standard. The smallest factor to exceed the corresponding standard is 2.7 for copper under

Tailings Basin-Geotechnical Mitigation; factors for other parameters of interest are larger, indicating that the predicted concentrations are relatively much lower than the Minnesota surface water quality standard.

Table 1. Estimated LTVSMC Tailings Basin seepage for selected parameters calibrated to existing conditions

Parameter	Existing LTVSMC Tailings Basin Seepage			
	Calibration to flows at PM-13 < 10 cfs		Calibration to flows at PM-13 10-20 cfs	
	Pit 5NW Q = 0 cfs	Pit 5NW Q = 0.26 cfs	Pit 5NW Q = 0 cfs	Pit 5NW Q = 0.26 cfs
Ca	1.9	1.4	3.9	3.4
Cl	**4.0**	3.9	1.0	1.0
Cu	--[1]	--[1]	--[1]	--[1]
F	1.7	1.7	6.0 [2]	6.0 [2]
Fe	2.8	2.9	--[1]	--[1]
Mg	1.8	0.3	3.3	2.2
Na	4.2	3.1	2.5	1.8
SO_4	1.6	--[3]	4.0	2.4

[1] Concentrations in river or surface runoff were higher than in Tailings Basin seepage, preventing unique calibration solution

[2] Data may be skewed by a single high value (2.28 mg/L) at PM-13 in November 2006. Omission of this point leads to calibration flows of ~0.8 cfs.

[3] Loading from Pit 5NW is greater than load observed in river at PM-13.

Table 2-1. Low, Average, and High Flows in the Embarrass River at PM-12 and PM-13

Flow[1] (cfs)	Location in Embarrass River	
	PM-12	PM-13
Low	1.19	5.66
Average	13.80	81.53
High	144.35	853.08

[1] Flows include surface water runoff, natural groundwater seepage, and discharges from Babbitt WWTP and Pit 5NW

FOR COMPARISON: RS74B, Draft-02 Values

Flow[1] (cfs)	*Location in Embarrass River*	
	PM-12	*PM-13*
Low	*0.86*	*5.07*
Average	*13.80*	*81.53*
High	*144.35*	*853.08*

[1] Flows include surface water runoff, natural groundwater seepage, and discharges from Babbitt WWTP and Pit 5NW. In RS74B, Draft-02 no discharges from Babbitt WWTP and Pit 5NW were accounted for under low flow conditions.

Table 4-1. Unrecoverable Seepage Flows from the Tailings Basin During Operation and Closure under Tailings Basin - Proposed Action

	October 13, 2008 Memo - Unrecoverable Seepage to Embarrass River Watershed by Source - all flow conditions (gpm)		
	Hydrometallurgical Residue Cells	**Cells 1E & 2E**	**Cell 2W**
Prior to PolyMet Operations (2007)	--	900	895
Year 1	0.468	1430	895
Year 5	6.732	1841	895
Year 8	5.043	2150	895
Year 9	5.956	2360	895
Year 15	7.833	2535	895
Year 20	8.664	2680	895
Closure	0.744	1100	750
Post-Closure	0.744	1100	610

* 900 gpm + 895 gpm = 1795 gpm = 4 cfs

Prior to PolyMet Operations, the flows from Cells 1E & 2E and Cell 2W are calibrated to chloride concentrations measured in the Embarrass River to obtain a seepage of 4 cfs (1,795 gpm) from the combined LTVSMC Tailings Basin.

FOR COMPARISON: RS74B, Draft-02 Values

	RS74B, Draft-02 Unrecoverable Seepage to Embarrass River Watershed by Source - high and average flow (gpm)			*RS74B, Draft-02 Unrecoverable Seepage to Embarrass River Watershed by Source - low flow (gpm)*		
	Hydrometallurgical Residue Cells	*Cells 1E & 2E*	*Cell 2W*	*Hydrometallurgical Residue Cells*	*Cells 1E & 2E*	*Cell 2W*
Prior to PolyMet Operations (2001)	--	*900*	*4123*	--	*97*	*442*
Year 1	*0.468*	*1430*	*3573*	*0.468*	*154*	*385*
Year 5	*6.732*	*1841*	*3573*	*6.732*	*183*	*355*
Year 8	*5.043*	*2150*	*3573*	*5.043*	*202*	*336*
Year 9	*5.956*	*2360*	*3573*	*5.956*	*214*	*324*
Year 15	*7.833*	*2535*	*3573*	*7.833*	*224*	*315*
Year 20	*8.664*	*2680*	*3573*	*8.664*	*231*	*308*
Closure	*0.744*	*1100*	*1510*	*0.744*	*227*	*312*
Post-Closure	*0.744*	*1100*	*610*	*0.744*	*346*	*192*

Previously in RS74 Draft-01 and Draft-02, it was assumed that the existing flow from Cell 2W was 4,123 gpm (9.2 cfs) for high and average flows based on calibration of 2001 data. For low flows the sum of Cells 1E & 2E and Cell 2W was 1.2 cfs (539 gpm) which had been calibrated to measured sulfate concentrations in the river.

Table 4-4. Unrecoverable Seepage Flows from the Tailings Basin During Operation and Closure for Tailings Basin - Geotechnical Mitigation

	October 13, 2008 Memo - Unrecoverable Seepage to Embarrass River Watershed by Source - all flow conditions (gpm)		
	Hydrometallurgical Residue Cells[1]	**Cells 1E & 2E**	**Cell 2W**
Prior to PolyMet Operations (2007)	--	900	895
Year 1	0.468	1600	895
Year 5	6.732	2260	895
Year 10	7.712	2490	895
Year 15	7.833	2700	895
Year 20	8.664	2900	895
Closure	0.744	777	750
Post-Closure	0.744	777	610

* 900 gpm + 895 gpm = 1795 gpm = 4 cfs

[1]Seepage from Hydrometallurgical Residue Cells is the same for Tailings Basin-Proposed Action and Tailings Basin-Geotechnical Mitigation.
Prior to PolyMet Operations, the flows from Cells 1E & 2E and Cell 2W are calibrated to chloride concentrations measured in the Embarrass River to obtain a seepage of 4 cfs (1,795 gpm) from the combined LTVSMC Tailings Basin.

FOR COMPARISON: RS74B, Draft-02 Values

	RS74B, Draft-02 Unrecoverable Seepage to Embarrass River Watershed by Source - high and average flow (gpm)			***RS74B, Draft-02 Unrecoverable Seepage to Embarrass River Watershed by Source - low flow (gpm)***		
	Hydrometallurgical Residue Cells	***Cells 1E & 2E***	***Cell 2W***	***Hydrometallurgical Residue Cells***	***Cells 1E & 2E***	***Cell 2W***
Prior to PolyMet Operations (2001)	*--*	*900*	*4123*	*--*	*97*	*442*
Year 1	*0.468*	*1600*	*3573*	*0.468*	*167*	*372*
Year 5	*6.732*	*2260*	*3573*	*6.732*	*209*	*330*
Year 10	*7.712*	*2490*	*3573*	*5.043*	*221*	*317*
Year 15	*7.833*	*2700*	*3573*	*7.833*	*232*	*307*
Year 20	*8.664*	*2900*	*3573*	*8.664*	*241*	*297*
Closure	*0.744*	*777*	*1510*	*0.744*	*183*	*356*
Post-Closure	*0.744*	*777*	*610*	*0.744*	*302*	*237*

Previously in RS74 Draft-01 and Draft-02, it was assumed that the existing flow from Cell 2W was 4,123 gpm (9.2 cfs) for high and average flows based on calibration of 2001 data. For low flows the sum of Cells 1E & 2E and Cell 2W was 1.2 cfs (539 gpm) which had been calibrated to measured sulfate concentrations in the river.

Table 5-2. Input Concentrations Used in the Embarrass River Mass-Balance Model

FOR COMPARISON: RS74B, Draft-02 Values

Parameter	Units	Surface Runoff Concentration	Median Groundwater Concentration	Pre-PolyMet Seepage from Cell 2W	Area 5 Pit NW Discharge	*Surface Runoff Concentration*
Ag	mg/L	0.00011	0.000008	0.0001	0.00016	*0.00011*
Al	mg/L	0.12	0.025	1.5788	0.0133	*0.1*
As	mg/L	0.00075	0.00273	0.002905	0.0013	*0.00075*
B	mg/L	0.027	0.0212	0.33	0.132	*0.012*
Ba	mg/L	0.016	0.0681	0.09298	0.0044	*0.011*
Be	mg/L	0.0001	0.000023	0.00075	0.0001	*0.0001*
Ca	mg/L	15	19	59.78	95.4	*13*
Cd	mg/L	0.00008	0.0003	0.000188	0.0001	*0.00008*
Cl	mg/L	6.5	1.8	21.54	5.95	*10*
Co	mg/L	0.0006	0.0011	0.001556	0.00055	*0.0006*
Cu	mg/L	0.0015	0.004	0.004555	0.0035	*0.0015*
F	mg/L	0.2	0.385	1.55	0.125	*0.1*
Fe	mg/L	2.9	0.035	4.594	0.038	*2.9*
Hardness	mg/L	70	87.5	436.6	943	*70*
K	mg/L	0.6	1.6	7.77	53.8	*3.7*
Mg	mg/L	5.9	10.65	69.97	271	*6*
Mn	mg/L	0.3	0.188	1.183	0.485	*0.3*
Na	mg/L	6	4.9	44.31	120	*6*
Ni	mg/L	0.0012	0.007	0.00688	0.0052	*0.0012*
Pb	mg/L	0.00015	0.0012	0.0012	0.0003	*0*
Sb [1]	mg/L	0.00004	0.0015	0.00025	0.00025	*0.00002*
Se	mg/L	0.0003	0.00295	0.00109	0.0016	*0.0003*
SO_4	mg/L	4	8.5	152.4	1046	*4*
Tl	mg/L	0.0002	0.000004	0.0002	0.0006	*0.0002*
Zn	mg/L	0.016	0.0115	0.01435	0.003	*0.016*

[1] Antimony was not measured in the MPCA or the Copper Nickel Study, therefore the groundwater value from the Partridge River watershed was used for the median groundwater concentration.

Table 5-4. Deterministic water quality predictions at surface water monitoring station PM-12 (mg/L)

Embarrass River PM-12 Tailings Basin - Proposed Action

Low flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 08	Year 09	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.001
Al	0.0983	0.0513	0.0513	0.0513	0.0513	0.0513	0.0513	0.0513	0.0513	0.125
As	0.0010	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.053
B	0.0175	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.5
Ba	0.0155	0.0537	0.0537	0.0537	0.0537	0.0537	0.0537	0.0537	0.0537	
Be	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Ca	13.4	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	
Cd	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Cd-Std	0.0008	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	
Cl	4.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	230
Co	0.0006	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.005
Cu	0.0015	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	
Cu-Std	0.0062	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	
F	0.1000	0.3337	0.3337	0.3337	0.3337	0.3337	0.3337	0.3337	0.3337	
Fe	1.7200	0.8295	0.8295	0.8295	0.8295	0.8295	0.8295	0.8295	0.8295	
Hard	61.7	82.6	82.6	82.6	82.6	82.6	82.6	82.6	82.6	
K	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Mg	6.2	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	
Mn	0.1600	0.2191	0.2191	0.2191	0.2191	0.2191	0.2191	0.2191	0.2191	
Na	3.0	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	
Ni	0.0019	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	
Ni-Std	0.0346	0.0444	0.0444	0.0444	0.0444	0.0444	0.0444	0.0444	0.0444	
Pb	0.0002	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Pb-Std	0.0017	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	
Sb	0.0015	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.031
Se	0.0005	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.005
SO_4	4.6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	
Tl	0.0002	0.000058	0.000058	0.000058	0.000058	0.000058	0.000058	0.000058	0.000058	0.00056
Zn	0.0183	0.0127	0.0127	0.0127	0.0127	0.0127	0.0127	0.0127	0.0127	
Zn-Std	0.0704	0.0902	0.0902	0.0902	0.0902	0.0902	0.0902	0.0902	0.0902	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.
2) Deterministic water quality predictions at PM-12 does not change during mine operation and closure because it is upstream of the tailings basin.
3) Predictions for low flow conditions correspond to surface runoff equal to zero, and groundwater recharge as the only natural flow contribution.

Table 5-5. Deterministic water quality predictions at surface water monitoring station PM-12 (mg/L)

Embarrass River PM-12 **Tailings Basin - Proposed Action**

Average flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 08	Year 09	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Al	0.0983	0.1141	0.1141	0.1141	0.1141	0.1141	0.1141	0.1141	0.1141	0.125
As	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.053
B	0.0175	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.5
Ba	0.0155	0.0192	0.0192	0.0192	0.0192	0.0192	0.0192	0.0192	0.0192	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	13.4	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Cl	4.5	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	230
Co	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.005
Cu	0.0015	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	
Cu-Std	0.0062	0.0070	0.0070	0.0070	0.0070	0.0070	0.0070	0.0070	0.0070	
F	0.1000	0.2115	0.2115	0.2115	0.2115	0.2115	0.2115	0.2115	0.2115	
Fe	1.7200	2.7215	2.7215	2.7215	2.7215	2.7215	2.7215	2.7215	2.7215	
Hard	61.7	71.1	71.1	71.1	71.1	71.1	71.1	71.1	71.1	
K	0.8	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.6	
Mg	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
Mn	0.1600	0.2930	0.2930	0.2930	0.2930	0.2930	0.2930	0.2930	0.2930	
Na	3.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	
Ni	0.0019	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	
Ni-Std	0.0346	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	
Pb	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Pb-Std	0.0017	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	
Sb	0.0015	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.031
Se	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.005
SO_4	4.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00056
Zn	0.0183	0.0157	0.0157	0.0157	0.0157	0.0157	0.0157	0.0157	0.0157	
Zn-Std	0.0704	0.0794	0.0794	0.0794	0.0794	0.0794	0.0794	0.0794	0.0794	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.

2) Deterministic water quality predictions at PM-12 does not change during mine operation and closure because it is upstream of the tailings basin.

Table 5-6. Deterministic water quality predictions at surface water monitoring station PM-12 (mg/L)

Embarrass River PM-12 **Tailings Basin - Proposed Action**

High flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 08	Year 09	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Al	0.0983	0.1194	0.1194	0.1194	0.1194	0.1194	0.1194	0.1194	0.1194	0.125
As	0.0010	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.053
B	0.0175	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.5
Ba	0.0155	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	13.4	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Cl	4.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	230
Co	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.005
Cu	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	
Cu-Std	0.0062	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	
F	0.1000	0.2011	0.2011	0.2011	0.2011	0.2011	0.2011	0.2011	0.2011	
Fe	1.7200	2.8829	2.8829	2.8829	2.8829	2.8829	2.8829	2.8829	2.8829	
Hard	61.7	70.1	70.1	70.1	70.1	70.1	70.1	70.1	70.1	
K	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Mg	6.2	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	
Mn	0.1600	0.2993	0.2993	0.2993	0.2993	0.2993	0.2993	0.2993	0.2993	
Na	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Ni	0.0019	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	
Ni-Std	0.0346	0.0386	0.0386	0.0386	0.0386	0.0386	0.0386	0.0386	0.0386	
Pb	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Pb-Std	0.0017	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	
Sb	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.031
Se	0.0005	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.005
SO_4	4.6	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00056
Zn	0.0183	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	
Zn-Std	0.0704	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.

2) Deterministic water quality predictions at PM-12 does not change during mine operation and closure because it is upstream of the tailings basin.

Table 5-7. **Deterministic water quality predictions at surface water monitoring station PM-13 (mg/L)**

Embarrass River PM-13 **Tailings Basin - Proposed Action**

Low flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 08	Year 09	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0003	0.0003	0.001
Al	0.1916	0.3091	0.3157	0.3053	0.3004	0.4295	0.4069	0.4467	0.4094	0.125
As	0.0010	0.0036	0.0041	0.0043	0.0047	0.0072	0.0078	0.0051	0.0051	0.053
B	0.0443	0.1155	0.1160	0.1192	0.1217	0.1276	0.1356	0.1216	0.1147	0.5
Ba	0.0278	0.0651	0.0632	0.0625	0.0621	0.0457	0.0683	0.0639	0.0629	
Be	0.0001	0.0002	0.0003	0.0003	0.0004	0.0007	0.0007	0.0003	0.0003	
Ca	19.9	36.1	40.7	48.0	50.1	53.4	52.0	38.2	37.5	
Cd	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	
Cd-Std	0.0015	0.0023	0.0022	0.0022	0.0022	0.0022	0.0023	0.0020	0.0019	
Cl	7.0	10.9	10.7	8.4	8.5	9.1	9.9	6.9	6.4	230
Co	0.0005	0.0012	0.0015	0.0016	0.0017	0.0040	0.0041	0.0012	0.0012	0.005
Cu	0.0020	0.0046	0.0053	0.0058	0.0059	0.0099	0.0111	0.0076	0.0077	
Cu-Std	0.0123	0.0169	0.0168	0.0166	0.0167	0.0168	0.0172	0.0154	0.0150	
F	0.3900	1.8179	1.2235	0.7188	0.6819	0.6185	0.7180	0.4794	0.4441	
Fe	1.2900	0.9520	0.8969	0.8502	0.8219	0.8050	0.7940	1.0707	0.9547	
Hard	143.5	239.4	236.5	231.9	235.3	238.0	246.7	205.7	198.1	
K	2.3	6.2	5.9	5.6	5.8	8.5	8.7	7.0	6.9	
Mg	15.9	38.9	33.2	28.2	27.4	25.3	28.3	29.6	28.3	
Mn	0.1100	0.4114	0.4086	0.3983	0.3911	0.3895	0.4564	0.3917	0.3657	
Na	12.7	32.9	24.9	19.3	20.6	19.3	19.6	16.6	15.7	
Ni	0.0021	0.0075	0.0148	0.0190	0.0208	0.0669	0.0659	0.0088	0.0088	
Ni-Std	0.0708	0.1092	0.1080	0.1063	0.1076	0.1086	0.1120	0.0960	0.0930	
Pb	0.0003	0.0010	0.0010	0.0012	0.0014	0.0013	0.0014	0.0011	0.0011	
Pb-Std	0.0050	0.0097	0.0095	0.0093	0.0095	0.0096	0.0100	0.0080	0.0076	
Sb	0.0015	0.0022	0.0030	0.0038	0.0042	0.0050	0.0051	0.0022	0.0022	0.031
Se	0.0005	0.0019	0.0020	0.0020	0.0020	0.0015	0.0024	0.0022	0.0022	0.005
SO_4	36.1	99.9	111.0	115.4	123.3	156.1	148.6	87.2	85.1	
Tl	0.0002	0.0003	0.0004	0.0004	0.0004	0.0006	0.0005	0.0003	0.0003	0.00056
Zn	0.0123	0.0115	0.0141	0.0187	0.0234	0.0378	0.0336	0.0141	0.0141	
Zn-Std	0.1440	0.2221	0.2198	0.2162	0.2189	0.2210	0.2278	0.1953	0.1892	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.

2) Predictions for low flow conditions correspond to surface runoff equal to zero, and groundwater recharge as the only natural flow contribution.

Table 5-8. Deterministic water quality predictions at surface water monitoring station PM-13 (mg/L)

Embarrass River PM-13 **Tailings Basin - Proposed Action**

Average flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 08	Year 09	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.001
Al	0.1916	0.1415	0.1442	0.1440	0.1442	0.1642	0.1617	0.1552	0.1500	0.125
As	0.0010	0.0011	0.0012	0.0013	0.0013	0.0017	0.0018	0.0013	0.0012	0.053
B	0.0443	0.0401	0.0410	0.0421	0.0428	0.0440	0.0456	0.0399	0.0389	0.5
Ba	0.0278	0.0219	0.0221	0.0223	0.0225	0.0202	0.0237	0.0212	0.0210	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	
Ca	19.9	19.2	20.0	21.2	21.7	22.3	22.2	19.3	19.1	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0015	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013	0.0012	0.0012	
Cl	7.0	7.0	7.1	6.8	6.8	6.9	7.0	6.5	6.5	230
Co	0.0005	0.0007	0.0007	0.0007	0.0008	0.0011	0.0011	0.0007	0.0007	0.005
Cu	0.0020	0.0019	0.0021	0.0021	0.0022	0.0028	0.0030	0.0022	0.0022	
Cu-Std	0.0123	0.0100	0.0101	0.0101	0.0102	0.0103	0.0104	0.0096	0.0095	
F	0.3900	0.4008	0.3360	0.2717	0.2687	0.2610	0.2775	0.2304	0.2256	
Fe	1.2900	2.5993	2.5744	2.5549	2.5417	2.5316	2.5237	2.6332	2.6261	
Hard	143.5	108.6	109.6	109.9	111.1	112.0	113.8	103.1	101.9	
K	2.3	2.4	2.4	2.4	2.4	2.8	2.9	2.4	2.4	
Mg	15.9	15.3	14.8	14.2	14.2	13.9	14.4	14.0	13.8	
Mn	0.1100	0.3176	0.3182	0.3175	0.3169	0.3170	0.3274	0.3142	0.3110	
Na	12.7	11.6	10.8	10.1	10.3	10.2	10.3	9.5	9.4	
Ni	0.0021	0.0021	0.0031	0.0038	0.0041	0.0111	0.0111	0.0021	0.0021	
Ni-Std	0.0708	0.0559	0.0564	0.0565	0.0570	0.0574	0.0582	0.0535	0.0530	
Pb	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	
Pb-Std	0.0050	0.0035	0.0036	0.0036	0.0036	0.0037	0.0038	0.0033	0.0033	
Sb	0.0015	0.0003	0.0004	0.0006	0.0007	0.0008	0.0008	0.0003	0.0003	0.031
Se	0.0005	0.0005	0.0006	0.0006	0.0006	0.0005	0.0006	0.0005	0.0005	0.005
SO_4	36.1	36.8	38.9	40.1	41.7	46.9	46.2	34.6	34.1	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.00056
Zn	0.0123	0.0152	0.0155	0.0161	0.0168	0.0190	0.0184	0.0155	0.0155	
Zn-Std	0.1440	0.1137	0.1146	0.1149	0.1159	0.1167	0.1183	0.1088	0.1077	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.

Table 5-9. **Deterministic water quality predictions at surface water monitoring station PM-13 (mg/L)**

Embarrass River PM-13 **Tailings Basin - Proposed Action**

High flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 08	Year 09	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Al	0.1916	0.1222	0.1225	0.1225	0.1225	0.1246	0.1243	0.1235	0.1230	0.125
As	0.0010	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0008	0.0008	0.053
B	0.0443	0.0283	0.0284	0.0285	0.0286	0.0288	0.0289	0.0283	0.0282	0.5
Ba	0.0278	0.0166	0.0166	0.0167	0.0167	0.0164	0.0168	0.0165	0.0165	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	19.9	15.3	15.4	15.5	15.6	15.6	15.6	15.3	15.3	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0015	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Cl	7.0	6.6	6.6	6.5	6.5	6.5	6.6	6.5	6.5	230
Co	0.0005	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0006	0.0006	0.005
Cu	0.0020	0.0015	0.0016	0.0016	0.0016	0.0016	0.0017	0.0016	0.0016	
Cu-Std	0.0123	0.0072	0.0072	0.0072	0.0072	0.0072	0.0073	0.0072	0.0071	
F	0.3900	0.2203	0.2139	0.2074	0.2071	0.2063	0.2081	0.2030	0.2025	
Fe	1.2900	2.8696	2.8668	2.8645	2.8630	2.8618	2.8609	2.8733	2.8727	
Hard	143.5	73.9	74.0	74.1	74.2	74.4	74.6	73.3	73.2	
K	2.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Mg	15.9	6.9	6.8	6.8	6.8	6.7	6.8	6.7	6.7	
Mn	0.1100	0.3018	0.3019	0.3018	0.3017	0.3018	0.3028	0.3014	0.3011	
Na	12.7	6.6	6.5	6.4	6.4	6.4	6.4	6.3	6.3	
Ni	0.0021	0.0013	0.0014	0.0015	0.0015	0.0022	0.0022	0.0013	0.0013	
Ni-Std	0.0708	0.0404	0.0405	0.0405	0.0405	0.0406	0.0407	0.0401	0.0401	
Pb	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Pb-Std	0.0050	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0021	0.0021	
Sb	0.0015	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.031
Se	0.0005	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.005
SO_4	36.1	7.3	7.6	7.7	7.9	8.4	8.4	7.1	7.0	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00056
Zn	0.0123	0.0159	0.0159	0.0160	0.0161	0.0163	0.0163	0.0160	0.0160	
Zn-Std	0.1440	0.0820	0.0822	0.0822	0.0824	0.0825	0.0827	0.0815	0.0814	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.

Table 5-10. Multiplying Factors for Concentrations of Leachate from PolyMet Tailings Basin (Cell 1E & 2E) and Hydrometallurgical Residue Cells That Would Cause the Embarrass River Water Chemistry Predictions to Exceed the Minnesota Surface Water Quality Standards

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	Low Flow					Average Flow					High Flow				
Parameter	Standard (mg/L)[1]	Factor	Year	Location	Corresponding SO_4 concentration (mg/L)	Standard (mg/L)[1]	Factor	Year	Location	Corresponding SO_4 concentration (mg/L)	Standard (mg/L)[1]	Factor	Year	Location	Corresponding SO_4 concentration (mg/L)
As	0.0530	7.9	Year 15	PM-13	932.9	0.0530	54.0	Year 15	PM-13	935.3	0.0530	513.0	Year 15	PM-13	897.4
Co	0.0050	1.2	Year 15	PM-13	181.2	0.0050	8.0	Year 15	PM-13	164.6	0.0050	78.0	Year 15	PM-13	142.2
Cu	0.0172	1.7	Year 20	PM-13	220.8	0.0104	6.6	Year 20	PM-13	134.2	0.0073	41.0	Year 20	PM-13	73.8
Ni	0.1192	1.8	Year 15	PM-13	248.5	0.0592	6.0	Year 15	PM-13	131.1	0.0408	40.0	Year 15	PM-13	76.2
Sb	0.0310	6.4	Year 15	PM-13	764.6	0.0310	43.0	Year 15	PM-13	751.0	0.0310	416.0	Year 15	PM-13	729.0

Geotechnical Mitigation

	Low Flow					Average Flow					High Flow				
Parameter	Standard (mg/L)[1]	Factor	Year	Location	Corresponding SO_4 concentration (mg/L)	Standard (mg/L)[1]	Factor	Year	Location	Corresponding SO_4 concentration (mg/L)	Standard (mg/L)[1]	Factor	Year	Location	Corresponding SO_4 concentration (mg/L)
As	0.0530	9.3	Post-Closure	PM-13	397.5	0.0530	89.0	Year 10	PM-13	1393.3	0.0530	858.0	Year 10	PM-13	1,366.6
Co	0.0050	4.4	Year 20	PM-13	416.5	0.0050	27.9	Year 20	PM-13	415.1	0.0050	267.0	Year 20	PM-13	377.7
Cu	0.0162	2.7	Year 20	PM-13	272.6	0.0102	10.5	Year 20	PM-13	170.0	0.0072	67.0	Year 20	PM-13	99.8
Ni	0.1030	9.2	Year 20	PM-13	823.1	0.0569	32.3	Year 20	PM-13	459.9	0.0406	220.0	Year 20	PM-13	312.4
Sb	0.0310	6.2	Year 10	PM-13	686.7	0.0310	42.3	Year 10	PM-13	678.3	0.0310	409.0	Year 10	PM-13	655.0

[1] As, Co and Sb standards are hardness independent. Cu and Ni standards are hardness dependent and assume that the hardness and standards do not change from Tables 5-7 to 5-9 and Tables 7-4 to 7-6.

Table 5-11. Comparison of concentrations of leachate from PolyMet Tailings Basin (Cell 1E & 2E) and Hydrometallurgical Residue Cells (all occurring concurrently) that would cause Embarrass River water chemistry predictions to exceed the Minnesota surface water quality standards and the "Base Case" concentrations of these mine site features. "Base Case" concentrations are those presented in Tables 5-7 to 5-9 and Tables 7-4 to 7-6.

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As

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 15		Year 15		Year 15	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0155	0.123	0.0155	0.838	0.0155	7.959
Hydrometallurgical Residue Cells	0.0040	0.032	0.0040	0.2160	0.0040	2.0520
Factor to Exceed Standard		7.9		54.0		513.0

Co

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 15		Year 15		Year 15	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0087	0.010	0.0087	0.069	0.0087	0.676
Hydrometallurgical Residue Cells	0.0050	0.006	0.0050	0.0400	0.0050	0.3900
Factor to Exceed Standard		1.2		8.0		78.0

Cu

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 20		Year 20		Year 20	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0202	0.0344	0.0202	0.133	0.0202	0.829
Hydrometallurgical Residue Cells	0.0015	0.0026	0.0015	0.0099	0.0015	0.0615
Factor to Exceed Standard		1.7		6.6		41.0

Ni

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 15		Year 15		Year 15	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.1537	0.277	0.1537	0.922	0.1537	6.146
Hydrometallurgical Residue Cells	0.0980	0.176	0.0980	0.5880	0.0980	3.9200
Factor to Exceed Standard		1.8		6.0		40.0

Sb

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 15		Year 15		Year 15	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0113	0.073	0.0113	0.488	0.0113	4.719
Hydrometallurgical Residue Cells	0.0040	0.026	0.0040	0.1720	0.0040	1.6640
Factor to Exceed Standard		6.4		43.0		416.0

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As

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Post-Closure		Year 10		Year 10	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0279	0.221	0.0094	0.509	0.0094	4.839
Hydrometallurgical Residue Cells	0.0040	0.0316	0.0040	0.2160	0.0040	2.0520
Factor to Exceed Standard		9.3		89.0		858.0

Co

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 20		Year 20		Year 20	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0022	0.003	0.0022	0.017	0.0022	0.170
Hydrometallurgical Residue Cells	0.0050	0.0060	0.0050	0.0400	0.0050	0.3900
Factor to Exceed Standard		4.4		27.9		267.0

Cu

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 20		Year 20		Year 20	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0114	0.019	0.0114	0.075	0.0114	0.469
Hydrometallurgical Residue Cells	0.0015	0.0026	0.0015	0.0099	0.0015	0.0615
Factor to Exceed Standard		2.7		10.5		67.0

Ni

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 20		Year 20		Year 20	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0236	0.042	0.0236	0.141	0.0236	0.943
Hydrometallurgical Residue Cells	0.0980	0.1764	0.0980	0.5880	0.0980	3.9200
Factor to Exceed Standard		9.2		32.3		220.0

Sb

Flow/Yield Condition	Low Flow		Average Flow		High Flow	
Year when Standard Exceeded	Year 10		Year 10		Year 10	
Feature	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)	"Base Case" Concentration (mg/L)	Concentration causing exceedance (mg/L)
PolyMet Tailings Basin	0.0117	0.075	0.0117	0.504	0.0117	4.88
Hydrometallurgical Residue Cells	0.0040	0.0256	0.0040	0.1720	0.0040	1.6640
Factor to Exceed Standard		6.2		42.3		409.0

Table 7-1. **Deterministic water quality predictions at surface water monitoring station PM-12 (mg/L)**

Embarrass River PM-12 **Tailings Basin - Geotechnical Mitigation**

Low flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 10	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.001
Al	0.0983	0.0513	0.0513	0.0513	0.0513	0.0513	0.0513	0.0513	0.125
As	0.0010	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.053
B	0.0175	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.5
Ba	0.0155	0.0537	0.0537	0.0537	0.0537	0.0537	0.0537	0.0537	
Be	0.0001	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	
Ca	13.4	17.9	17.9	17.9	17.9	17.9	17.9	17.9	
Cd	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Cd-Std	0.0008	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	
Cl	4.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	230
Co	0.0006	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.005
Cu	0.0015	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	
Cu-Std	0.0062	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	
F	0.1000	0.3337	0.3337	0.3337	0.3337	0.3337	0.3337	0.3337	
Fe	1.7200	0.8295	0.8295	0.8295	0.8295	0.8295	0.8295	0.8295	
Hard	61.7	82.6	82.6	82.6	82.6	82.6	82.6	82.6	
K	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Mg	6.2	9.3	9.3	9.3	9.3	9.3	9.3	9.3	
Mn	0.1600	0.2191	0.2191	0.2191	0.2191	0.2191	0.2191	0.2191	
Na	3.0	5.2	5.2	5.2	5.2	5.2	5.2	5.2	
Ni	0.0019	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	0.0054	
Ni-Std	0.0346	0.0444	0.0444	0.0444	0.0444	0.0444	0.0444	0.0444	
Pb	0.0002	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Pb-Std	0.0017	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	
Sb	0.0015	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.031
Se	0.0005	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.005
SO_4	4.6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	
Tl	0.0002	0.000058	0.000058	0.000058	0.000058	0.000058	0.000058	0.000058	0.00056
Zn	0.0183	0.0127	0.0127	0.0127	0.0127	0.0127	0.0127	0.0127	
Zn-Std	0.0704	0.0902	0.0902	0.0902	0.0902	0.0902	0.0902	0.0902	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.
2) Deterministic water quality predictions at PM-12 does not change during mine operation and closure because it is upstream of the tailings ba
3) Predictions for low flow conditions correspond to surface runoff equal to zero, and groundwater recharge as the only natural flow contribution

Table 7-2. **Deterministic water quality predictions at surface water monitoring station PM-12 (mg/L)**

Embarrass River PM-12 **Tailings Basin - Geotechnical Mitigation**

Average flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 10	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Al	0.0983	0.1141	0.1141	0.1141	0.1141	0.1141	0.1141	0.1141	0.125
As	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.053
B	0.0175	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.5
Ba	0.0155	0.0192	0.0192	0.0192	0.0192	0.0192	0.0192	0.0192	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	13.4	15.2	15.2	15.2	15.2	15.2	15.2	15.2	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Cl	4.5	6.2	6.2	6.2	6.2	6.2	6.2	6.2	230
Co	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.005
Cu	0.0015	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	
Cu-Std	0.0062	0.0070	0.0070	0.0070	0.0070	0.0070	0.0070	0.0070	
F	0.1000	0.2115	0.2115	0.2115	0.2115	0.2115	0.2115	0.2115	
Fe	1.7200	2.7215	2.7215	2.7215	2.7215	2.7215	2.7215	2.7215	
Hard	61.7	71.1	71.1	71.1	71.1	71.1	71.1	71.1	
K	0.8	0.6	0.6	0.7	0.7	0.7	0.6	0.6	
Mg	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
Mn	0.1600	0.2930	0.2930	0.2930	0.2930	0.2930	0.2930	0.2930	
Na	3.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	
Ni	0.0019	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	
Ni-Std	0.0346	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	
Pb	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Pb-Std	0.0017	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	
Sb	0.0015	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.031
Se	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.005
SO_4	4.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00056
Zn	0.0183	0.0157	0.0157	0.0157	0.0157	0.0157	0.0157	0.0157	
Zn-Std	0.0704	0.0794	0.0794	0.0794	0.0794	0.0794	0.0794	0.0794	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter.

2) Deterministic water quality predictions at PM-12 does not change during mine operation and closure because it is upstream of the tailings ba

Table 7-3. **Deterministic water quality predictions at surface water monitoring station PM-12 (mg/L)**

Embarrass River PM-12 **Tailings Basin - Geotechnical Mitigation**

High flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 10	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Al	0.0983	0.1194	0.1194	0.1194	0.1194	0.1194	0.1194	0.1194	0.125
As	0.0010	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.053
B	0.0175	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.5
Ba	0.0155	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	13.4	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Cl	4.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	230
Co	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.005
Cu	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	
Cu-Std	0.0062	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	
F	0.1000	0.2011	0.2011	0.2011	0.2011	0.2011	0.2011	0.2011	
Fe	1.7200	2.8829	2.8829	2.8829	2.8829	2.8829	2.8829	2.8829	
Hard	61.7	70.1	70.1	70.1	70.1	70.1	70.1	70.1	
K	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Mg	6.2	5.9	5.9	5.9	5.9	5.9	5.9	5.9	
Mn	0.1600	0.2993	0.2993	0.2993	0.2993	0.2993	0.2993	0.2993	
Na	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Ni	0.0019	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	
Ni-Std	0.0346	0.0386	0.0386	0.0386	0.0386	0.0386	0.0386	0.0386	
Pb	0.0002	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	
Pb-Std	0.0017	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	
Sb	0.0015	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.031
Se	0.0005	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.005
SO_4	4.6	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00056
Zn	0.0183	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	
Zn-Std	0.0704	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter

2) Deterministic water quality predictions at PM-12 does not change during mine operation and closure because it is upstream of the tailings ba

Table 7-4. **Deterministic water quality predictions at surface water monitoring station PM-13 (mg/L)**

Embarrass River PM-13 **Tailings Basin - Geotechnical Mitigation**

Low flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 10	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0003	0.0004	0.0004	0.0004	0.0005	0.0003	0.0003	0.001
Al	0.1916	0.2989	0.2653	0.3038	0.2810	0.2664	0.4273	0.3862	0.125
As	0.0010	0.0040	0.0043	0.0055	0.0049	0.0048	0.0075	0.0076	0.053
B	0.0443	0.1159	0.1184	0.1243	0.1267	0.1299	0.1062	0.0983	0.5
Ba	0.0278	0.0639	0.0623	0.0613	0.0612	0.0627	0.0597	0.0585	
Be	0.0001	0.0003	0.0003	0.0004	0.0003	0.0003	0.0004	0.0004	
Ca	19.9	46.5	50.4	64.1	54.3	47.7	38.1	37.4	
Cd	0.0001	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	
Cd-Std	0.0015	0.0024	0.0026	0.0024	0.0022	0.0021	0.0022	0.0022	
Cl	7.0	10.0	12.5	8.6	8.8	9.0	6.5	5.9	230
Co	0.0005	0.0013	0.0013	0.0014	0.0015	0.0016	0.0015	0.0015	0.005
Cu	0.0020	0.0049	0.0051	0.0053	0.0062	0.0074	0.0059	0.0060	
Cu-Std	0.0123	0.0178	0.0187	0.0178	0.0168	0.0162	0.0168	0.0165	
F	0.3900	1.3809	1.5588	0.6054	0.6268	0.6416	0.7297	0.7004	
Fe	1.2900	0.9198	0.8132	0.7968	0.7704	0.7395	0.9922	0.8639	
Hard	143.5	260.8	283.1	261.3	238.5	223.5	237.4	230.3	
K	2.3	6.3	6.7	6.2	5.7	5.5	8.0	8.0	
Mg	15.9	37.7	38.6	24.8	25.1	25.2	37.6	36.4	
Mn	0.1100	0.3916	0.3737	0.3341	0.3436	0.3558	0.3755	0.3467	
Na	12.7	29.9	32.8	24.6	22.4	20.9	19.7	18.8	
Ni	0.0021	0.0106	0.0117	0.0144	0.0136	0.0145	0.0064	0.0064	
Ni-Std	0.0708	0.1174	0.1258	0.1176	0.1088	0.1030	0.1084	0.1056	
Pb	0.0003	0.0010	0.0010	0.0019	0.0018	0.0017	0.0011	0.0011	
Pb-Std	0.0050	0.0108	0.0120	0.0108	0.0096	0.0089	0.0096	0.0092	
Sb	0.0015	0.0033	0.0038	0.0055	0.0047	0.0046	0.0011	0.0011	0.031
Se	0.0005	0.0019	0.0019	0.0021	0.0020	0.0020	0.0026	0.0026	0.005
SO_4	36.1	116.3	132.8	150.1	135.5	128.6	98.1	96.1	
Tl	0.0002	0.0003	0.0004	0.0005	0.0005	0.0005	0.0001	0.0001	0.00056
Zn	0.0123	0.0141	0.0145	0.0337	0.0361	0.0334	0.0122	0.0121	
Zn-Std	0.1440	0.2388	0.2560	0.2392	0.2214	0.2095	0.2205	0.2149	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter

2) Predictions for low flow conditions correspond to surface runoff equal to zero, and groundwater recharge as the only natural flow contribution

Table 7-5. **Deterministic water quality predictions at surface water monitoring station PM-13 (mg/L)**

Embarrass River PM-13 **Tailings Basin - Geotechnical Mitigation**

Average flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 10	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.001
Al	0.1916	0.1409	0.1388	0.1452	0.1426	0.1409	0.1506	0.1454	0.125
As	0.0010	0.0012	0.0013	0.0015	0.0014	0.0014	0.0015	0.0015	0.053
B	0.0443	0.0405	0.0422	0.0435	0.0443	0.0452	0.0376	0.0365	0.5
Ba	0.0278	0.0219	0.0224	0.0225	0.0227	0.0231	0.0204	0.0202	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	19.9	20.6	21.7	23.8	22.6	21.7	19.1	19.0	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0015	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0012	
Cl	7.0	6.9	7.4	6.8	6.8	6.9	6.5	6.4	230
Co	0.0005	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007	0.005
Cu	0.0020	0.0020	0.0021	0.0021	0.0023	0.0025	0.0020	0.0020	
Cu-Std	0.0123	0.0103	0.0107	0.0105	0.0103	0.0102	0.0098	0.0097	
F	0.3900	0.3507	0.3934	0.2587	0.2638	0.2679	0.2550	0.2502	
Fe	1.2900	2.5880	2.5448	2.5323	2.5192	2.5057	2.6381	2.6309	
Hard	143.5	111.9	117.6	115.3	112.6	110.9	105.6	104.4	
K	2.3	2.4	2.5	2.5	2.4	2.4	2.5	2.4	
Mg	15.9	15.3	15.8	13.8	14.0	14.0	14.7	14.5	
Mn	0.1100	0.3155	0.3142	0.3087	0.3102	0.3123	0.3118	0.3086	
Na	12.7	11.3	12.1	11.0	10.7	10.5	9.8	9.6	
Ni	0.0021	0.0025	0.0028	0.0032	0.0032	0.0034	0.0018	0.0018	
Ni-Std	0.0708	0.0574	0.0598	0.0589	0.0577	0.0569	0.0546	0.0541	
Pb	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0003	0.0002	
Pb-Std	0.0050	0.0037	0.0039	0.0038	0.0037	0.0036	0.0034	0.0034	
Sb	0.0015	0.0005	0.0006	0.0009	0.0008	0.0008	0.0002	0.0002	0.031
Se	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.005
SO_4	36.1	39.2	42.8	45.9	44.2	43.6	35.3	34.8	
Tl	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.00056
Zn	0.0123	0.0155	0.0155	0.0184	0.0188	0.0185	0.0153	0.0153	
Zn-Std	0.1440	0.1166	0.1216	0.1196	0.1172	0.1157	0.1110	0.1100	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter

Table 7-6. **Deterministic water quality predictions at surface water monitoring station PM-13 (mg/L)**

Embarrass River PM-13 **Tailings Basin - Geotechnical Mitigation**

High flow conditions

Parameter	Average Measured Conditions	Year 01	Year 05	Year 10	Year 15	Year 20	Closure	Post-Closure	Hardness Independent Standard
Ag	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Al	0.1916	0.1221	0.1219	0.1226	0.1223	0.1222	0.1230	0.1225	0.125
As	0.0010	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.053
B	0.0443	0.0284	0.0286	0.0287	0.0288	0.0289	0.0280	0.0279	0.5
Ba	0.0278	0.0166	0.0167	0.0167	0.0167	0.0167	0.0164	0.0164	
Be	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Ca	19.9	15.4	15.5	15.8	15.6	15.6	15.3	15.3	
Cd	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Cd-Std	0.0015	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	
Cl	7.0	6.5	6.6	6.5	6.5	6.5	6.5	6.5	230
Co	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.005
Cu	0.0020	0.0015	0.0016	0.0016	0.0016	0.0016	0.0016	0.0015	
Cu-Std	0.0123	0.0072	0.0073	0.0073	0.0072	0.0072	0.0072	0.0072	
F	0.3900	0.2153	0.2199	0.2061	0.2066	0.2071	0.2055	0.2050	
Fe	1.2900	2.8684	2.8634	2.8619	2.8604	2.8588	2.8740	2.8734	
Hard	143.5	74.3	74.9	74.7	74.4	74.3	73.5	73.4	
K	2.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Mg	15.9	6.8	6.9	6.7	6.7	6.7	6.8	6.7	
Mn	0.1100	0.3016	0.3015	0.3009	0.3011	0.3013	0.3012	0.3009	
Na	12.7	6.5	6.6	6.5	6.5	6.5	6.4	6.4	
Ni	0.0021	0.0013	0.0014	0.0014	0.0014	0.0014	0.0013	0.0013	
Ni-Std	0.0708	0.0405	0.0408	0.0408	0.0406	0.0406	0.0402	0.0402	
Pb	0.0003	0.00016	0.00016	0.00018	0.00018	0.00018	0.00016	0.00016	
Pb-Std	0.0050	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0021	
Sb	0.0015	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.031
Se	0.0005	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.005
SO_4	36.1	7.6	8.0	8.3	8.2	8.1	7.1	7.0	
Tl	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00056
Zn	0.0123	0.0159	0.0160	0.0162	0.0163	0.0163	0.0159	0.0159	
Zn-Std	0.1440	0.0824	0.0830	0.0828	0.0825	0.0824	0.0817	0.0816	

Notes

1) The hardness dependent standards for Cd, Cu, Ni, Pb and Zn are listed below the deterministic water quality predictions for each parameter

Figure 5-3: Deterministic Water Quality Predictions for Arsenic, Cobalt, Copper, Nickel, Antimony and Sulfate at PM-12 (Embarrass River) as a Function of Tailings Basin - Proposed Action Development

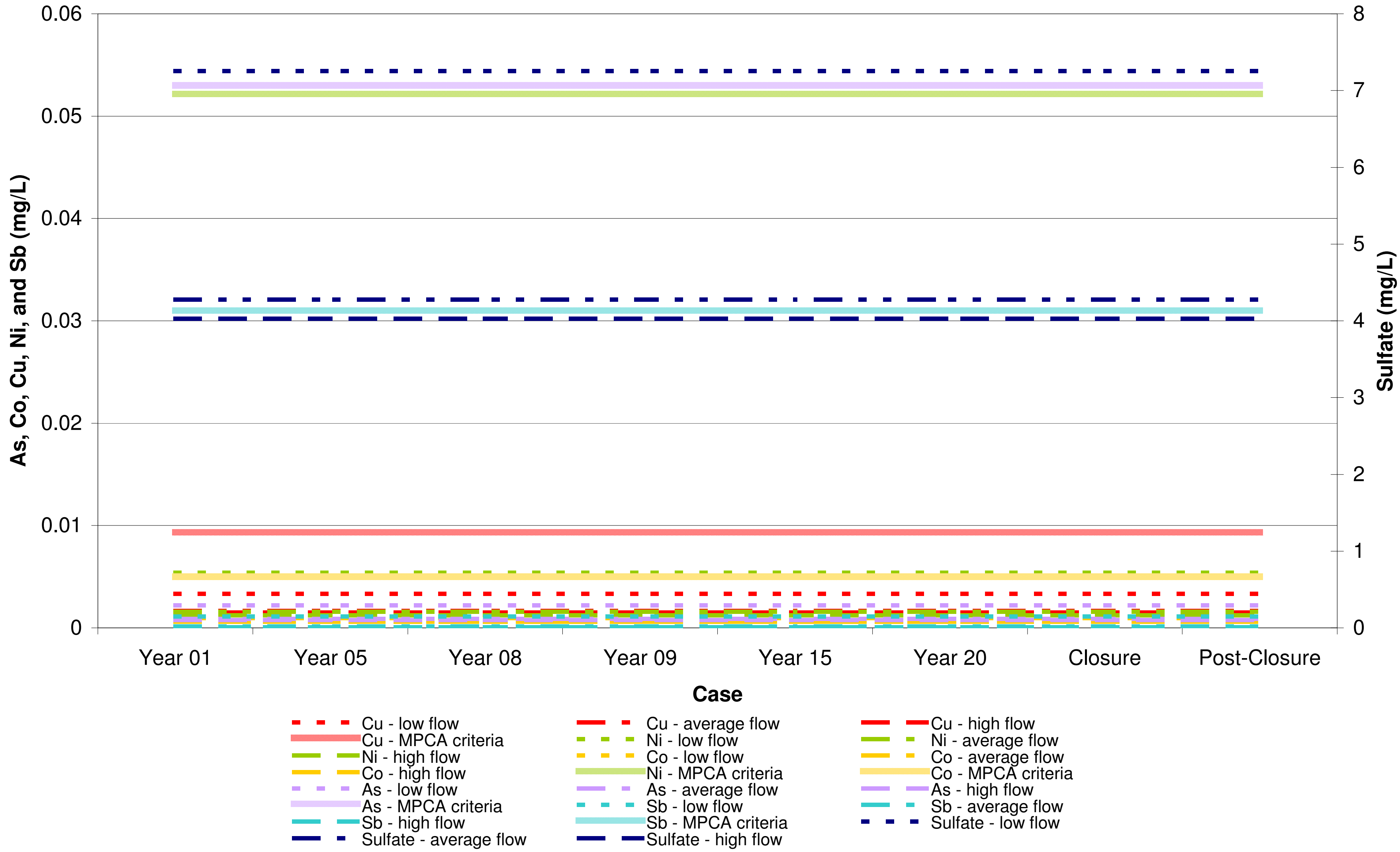


Figure 5-4: Deterministic Water Quality Predictions for Arsenic, Cobalt, Copper, Nickel, Antimony and Sulfate at PM-13 (Embarrass River) as a Function of Tailings Basin - Proposed Action Development

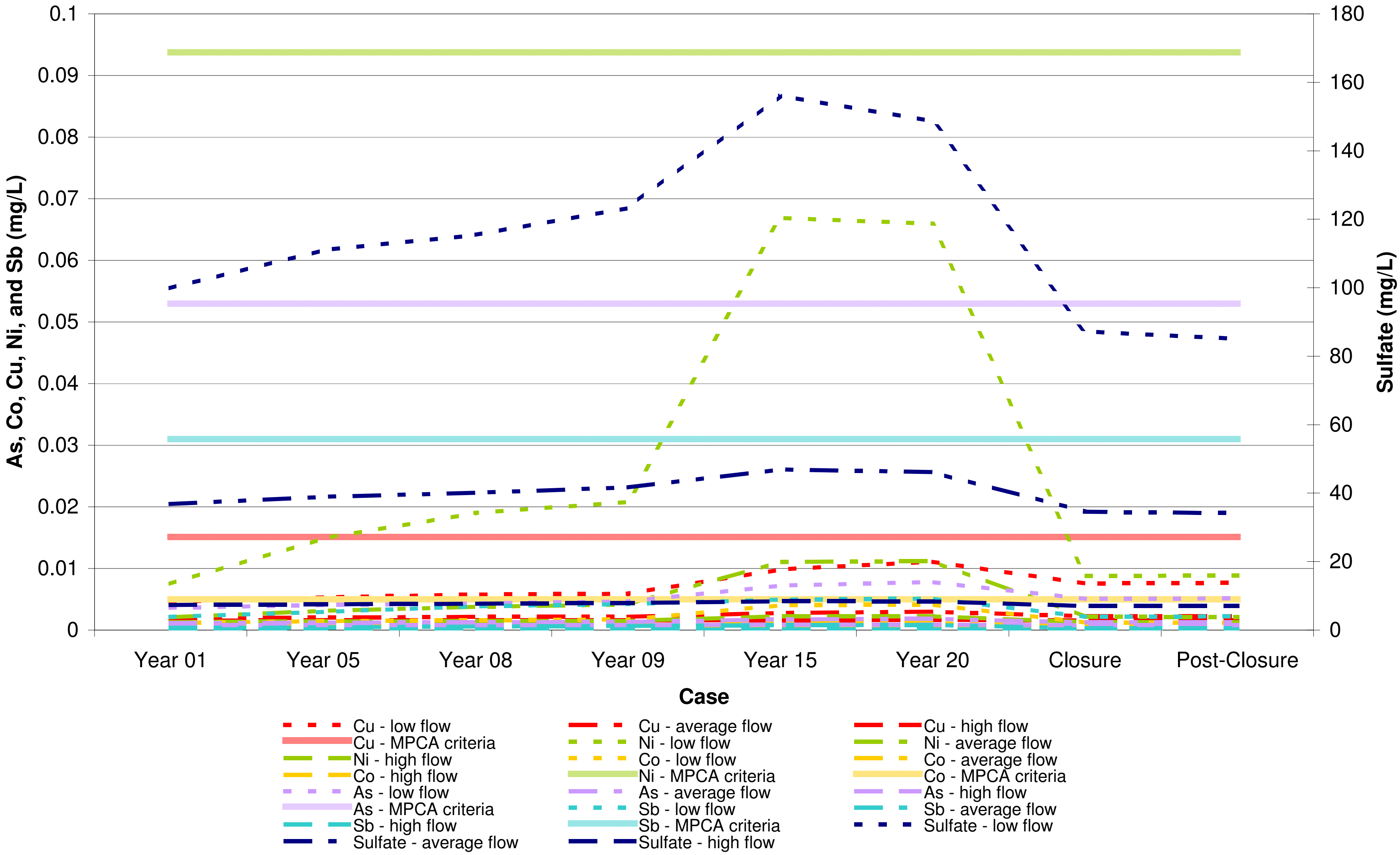


Figure 7-1: Deterministic Water Quality Predictions for Arsenic, Cobalt, Copper, Nickel, Antimony and Sulfate at PM-12 (Embarrass River) as a Function of Tailings Basin - Geotechnical Mitigation Development

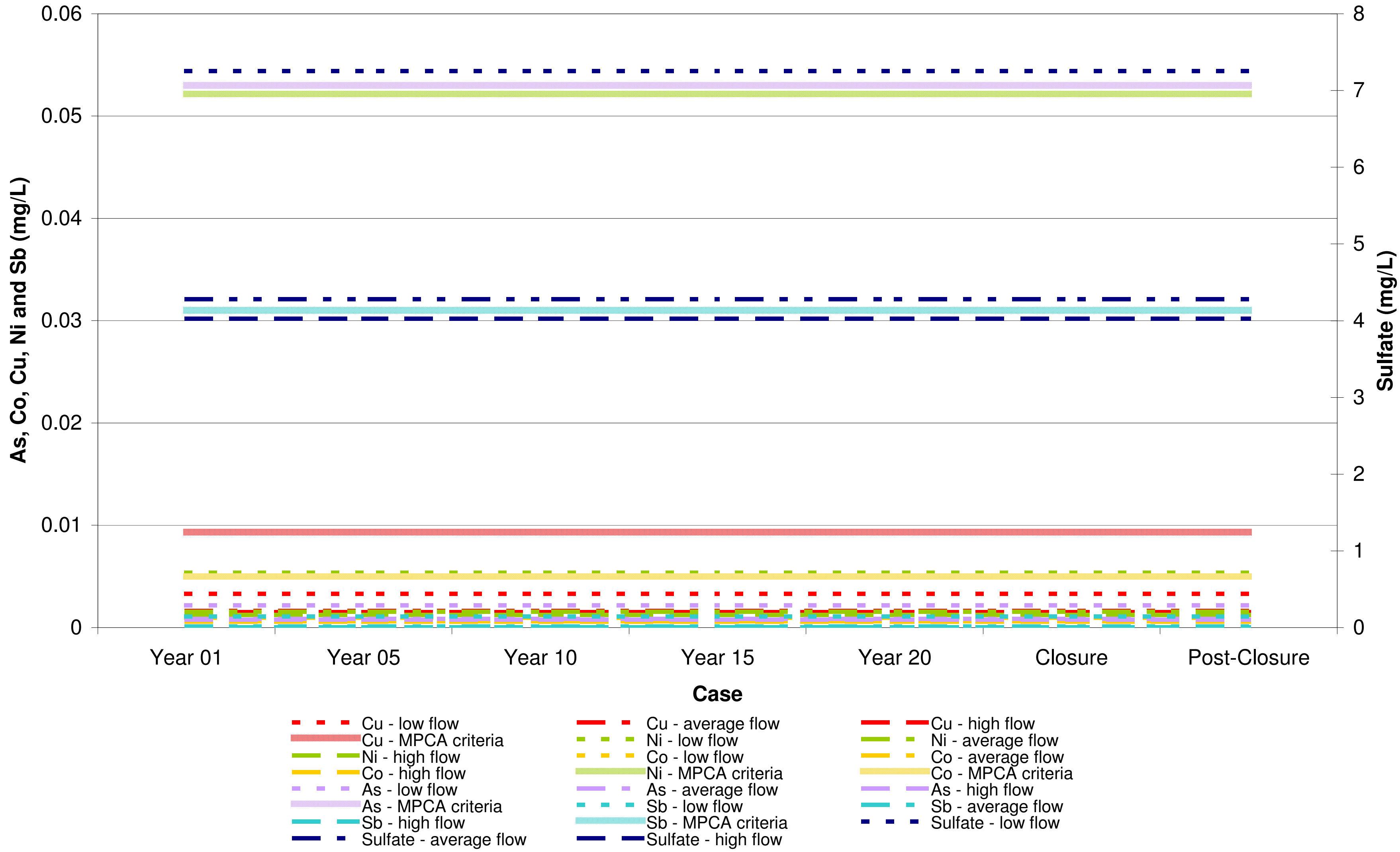
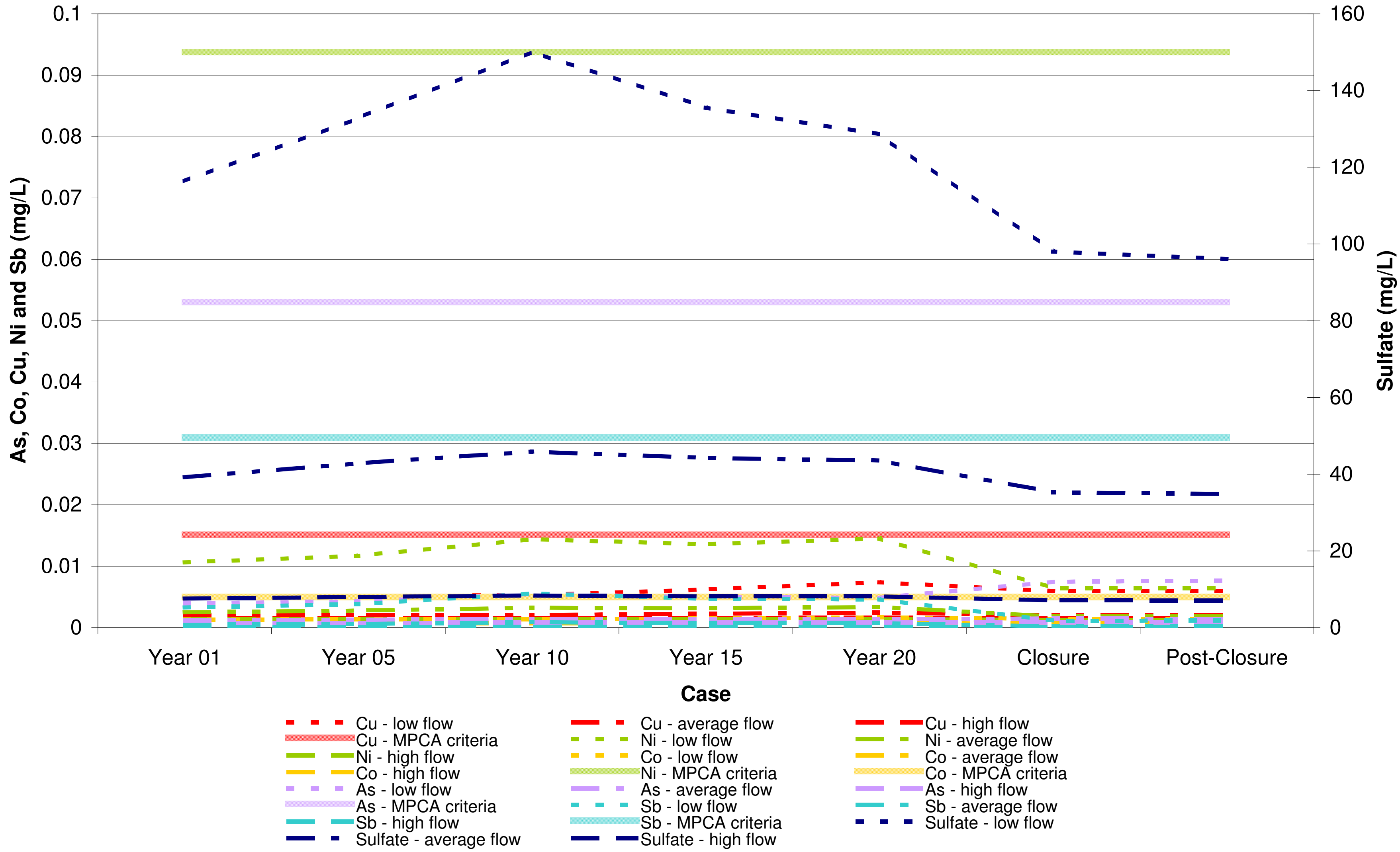


Figure 7-2: Deterministic Water Quality Predictions for Arsenic, Cobalt, Copper, Nickel, Antimony and Sulfate at PM-13 (Embarrass River) as a Function of Tailings Basin - Geotechnical Mitigation Development



Appendix E

Calibration of Mass-Balance Model for Embarrass River Watersheds for Surface Water Runoff Water Quality

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Silver

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.11	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.11	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.11	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.16	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	0.1	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.008	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.008	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	39	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	174	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	1	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	9	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	11	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	0	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	1	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	40	(µg/s)
	mass flux in river at PM-13	M_r13 =	236	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.10	(µg/l)
	concentration in river at PM-13	C_r13 =	0.10	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		ND (0.2)	(µg/l)
	Observed concentration in river at PM-13		ND (0.2)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Aluminum

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.12	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.01325	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.5788	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(mg/l)
	concentration of ground water flow into PM-12	C_g12 =	0.025	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.025	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	43	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	190	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	1	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	1	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	179	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/l)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/l)
	mass flux of ground water into PM-13	M_g13 =	3	(mg/l)

Mass Balance	mass flux in river at PM-12	M_r12 =	45	(mg/s)
	mass flux in river at PM-13	M_r13 =	417	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.114	(mg/l)
	concentration in river at PM-13	C_r13 =	0.184	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		0.099	(mg/l)
	Observed concentration in river at PM-13		0.192	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Arsenic

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.75	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.75	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.75	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1.325	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	2.905	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	2.73	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	2.73	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	268	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	1189	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	7	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	75	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	329	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	66	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	325	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	341	(µg/s)
	mass flux in river at PM-13	M_r13 =	2258	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.87	(µg/l)
	concentration in river at PM-13	C_r13 =	1.00	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		ND (2)	(µg/l)
	Observed concentration in river at PM-13		ND (2)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Boron

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	27	(μg/l)
	concentration of surface water into PM-13	C_s13 =	27	(μg/l)
	concentration of WWTP discharge	C_sBab =	27	(μg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	131.5	(μg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	330	(μg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	21.2	(μg/l)
	concentration of ground water flow into PM-13	C_g13 =	21.2	(μg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	9631	(μg/s)
	mass flux of surface water into PM-13	M_s13 =	42794	(μg/s)
	mass flux of Babbitt WWTP	M_sBab =	252	(μg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	7406	(μg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	37356	(μg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(μg/s)
	mass flux of ground water into PM-12	M_g12 =	516	(μg/s)
	mass flux of ground water into PM-13	M_g13 =	2526	(μg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	10399	(μg/s)
	mass flux in river at PM-13	M_r13 =	100481	(μg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	26.64	(μg/l)
	concentration in river at PM-13	C_r13 =	44.38	(μg/l)
Observed Concentration	Observed concentration in river at PM-12		ND (35)	(μg/l)
	Observed concentration in river at PM-13		44.3	(μg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Barium

Input Flow Data	surface water flow into PM-12	Q_s12 =	11.54	(cfs)
	surface water flow into PM-13	Q_s13 =	50.77	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	16	(µg/l)
	concentration of surface water into PM-13	C_s13 =	16	(µg/l)
	concentration of WWTP discharge	C_sBab =	16	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	4.4	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	92.98	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	68.1	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	68.1	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	12.73	(cfs)
	flow in river at PM-13	Q_r13 =	73.70	(cfs)
	flow check	Q_ck =	73.70	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5225	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	22989	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	149	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	248	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	10525	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	1657	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	8114	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	7032	(µg/s)
	mass flux in river at PM-13	M_r13 =	48908	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	19.52	(µg/l)
	concentration in river at PM-13	C_r13 =	23.45	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		15.50	(µg/l)
	Observed concentration in river at PM-13		27.80	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Beryllium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.1	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.1	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.1	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.1	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	0.75	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.023	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.023	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	36	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	158	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	1	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	6	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	85	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	3	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	37	(µg/s)
	mass flux in river at PM-13	M_r13 =	289	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.10	(µg/l)
	concentration in river at PM-13	C_r13 =	0.13	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		ND (0.2)	(µg/l)
	Observed concentration in river at PM-13		ND (0.2)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Calcium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	15	(mg/l)
	concentration of surface water into PM-13	C_s13 =	15	(mg/l)
	concentration of WWTP discharge	C_sBab =	15	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.35	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5350	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	23774	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	140	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	5370	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6767	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	5953	(mg/s)
	mass flux in river at PM-13	M_r13 =	44128	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	15.25	(mg/l)
	concentration in river at PM-13	C_r13 =	19.49	(mg/l)
Observed Concentration	Observed concentration in river at PM-12		13.4	(mg/l)
	Observed concentration in river at PM-13		19.9	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Cadmium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.08	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.08	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.08	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.1	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	0.188	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.3	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.3	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	29	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	127	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	1	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	6	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	21	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	7	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	36	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	37	(µg/s)
	mass flux in river at PM-13	M_r13 =	226	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.09	(µg/l)
	concentration in river at PM-13	C_r13 =	0.10	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		ND (0.2)	(µg/l)
	Observed concentration in river at PM-13		ND (0.2)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Chloride

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	6.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(mg/l)
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	2319	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	10302	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	61	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	335	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2438	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/l)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/l)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/l)

Mass Balance	mass flux in river at PM-12	M_r12 =	2423	(mg/s)
	mass flux in river at PM-13	M_r13 =	15713	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	6.21	(mg/l)
	concentration in river at PM-13	C_r13 =	6.94	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		4.49	(mg/l)
	Observed concentration in river at PM-13		6.98	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Cobalt

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.6	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.6	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.6	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.556	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(µg/l)
	concentration of ground water flow into PM-12	C_g12 =	1.1	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.1	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	214	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	951	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	6	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	28	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	176	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	27	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	131	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	246	(µg/s)
	mass flux in river at PM-13	M_r13 =	1533	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.63	(µg/l)
	concentration in river at PM-13	C_r13 =	0.68	(µg/l)

Observed Concentration	Observed concentration in river at PM-12		0.58	(µg/l)
	Observed concentration in river at PM-13		ND (1)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Copper

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(μg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(μg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(μg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.45	(μg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.555	(μg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(μg/l)
	concentration of ground water flow into PM-12	C_g12 =	4	(μg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(μg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	535	(μg/s)
	mass flux of surface water into PM-13	M_s13 =	2377	(μg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(μg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	194	(μg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	516	(μg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(μg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(μg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(μg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	646	(μg/s)
	mass flux in river at PM-13	M_r13 =	4210	(μg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	1.66	(μg/l)
	concentration in river at PM-13	C_r13 =	1.86	(μg/l)
Observed Concentration	Observed concentration in river at PM-12		1.53	(μg/l)
	Observed concentration in river at PM-13		2.00	(μg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Fluoride

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(mg/l)
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	71	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	317	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	7	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	175	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/l)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/l)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/l)

Mass Balance	mass flux in river at PM-12	M_r12 =	83	(mg/s)
	mass flux in river at PM-13	M_r13 =	628	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.21	(mg/l)
	concentration in river at PM-13	C_r13 =	0.28	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		0.10	(mg/l)
	Observed concentration in river at PM-13		0.39	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Iron

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.01	(cfs)
	surface water flow into PM-13	Q_s13 =	0.72	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(mg/l)
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	2.20	(cfs)
	flow in river at PM-13	Q_r13 =	11.39	(cfs)
	flow check	Q_ck =	11.39	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	83	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	59	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	520	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/l)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/l)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/l)

Mass Balance	mass flux in river at PM-12	M_r12 =	111	(mg/s)
	mass flux in river at PM-13	M_r13 =	694	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	1.78	(mg/l)
	concentration in river at PM-13	C_r13 =	2.15	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		2.26	(mg/l)
	Observed concentration in river at PM-13		1.70	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Hardness

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	70	(mg/l)
	concentration of surface water into PM-13	C_s13 =	70	(mg/l)
	concentration of WWTP discharge	C_sBab =	70	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	942.7	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	436.6	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(mg/l)
	concentration of ground water flow into PM-12	C_g12 =	87.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	87.5	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	24969	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	110947	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	654	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	53090	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	49423	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/l)
	mass flux of ground water into PM-12	M_g12 =	2130	(mg/l)
	mass flux of ground water into PM-13	M_g13 =	10425	(mg/l)

Mass Balance	mass flux in river at PM-12	M_r12 =	27752	(mg/s)
	mass flux in river at PM-13	M_r13 =	251638	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	71.09	(mg/l)
	concentration in river at PM-13	C_r13 =	111.15	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		53.66	(mg/l)
	Observed concentration in river at PM-13		121.55	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Magnesium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	5.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	5.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	5.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	2105	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	9351	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	55	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	15262	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	7921	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	2419	(mg/s)
	mass flux in river at PM-13	M_r13 =	36221	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	6.20	(mg/l)
	concentration in river at PM-13	C_r13 =	16.00	(mg/l)
Observed Concentration	Observed concentration in river at PM-12		6.2	(mg/l)
	Observed concentration in river at PM-13		15.9	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Manganese

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.3	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.3	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.3	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.65	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.183	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.188	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.188	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.91	(cfs)
	flow in river at PM-13	Q_r13 =	9.66	(cfs)
	flow check	Q_ck =	9.66	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	3	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	5	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	134	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	5	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	7	(mg/s)
	mass flux in river at PM-13	M_r13 =	168	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.14	(mg/l)
	concentration in river at PM-13	C_r13 =	0.62	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		0.34	(mg/l)
	Observed concentration in river at PM-13		0.20	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Sodium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6.0	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6.0	(mg/l)
	concentration of WWTP discharge	C_sBab =	6.0	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	119.5	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	2140	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	9510	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	6730	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	5016	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	2315	(mg/s)
	mass flux in river at PM-13	M_r13 =	24155	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	5.93	(mg/l)
	concentration in river at PM-13	C_r13 =	10.67	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		3.0	(mg/l)
	Observed concentration in river at PM-13		12.7	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Nickel

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.2	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.2	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.2	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.2	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	6.88	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	(µg/l)
	concentration of ground water flow into PM-12	C_g12 =	7	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	7	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	428	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	1902	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	11	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	293	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	779	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	170	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	834	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	610	(µg/s)
	mass flux in river at PM-13	M_r13 =	4417	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	1.6	(µg/l)
	concentration in river at PM-13	C_r13 =	2.0	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		1.9	(µg/l)
	Observed concentration in river at PM-13		2.1	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Lead

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.15	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.15	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.15	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.3	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.2	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.2	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.2	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	54	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	238	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	1	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	17	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	136	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	29	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	143	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	84	(µg/s)
	mass flux in river at PM-13	M_r13 =	618	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.22	(µg/l)
	concentration in river at PM-13	C_r13 =	0.27	(µg/l)
Observed Concentration	Observed concentration in river at PM-12		ND (0.30)	(µg/l)
	Observed concentration in river at PM-13		0.27	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Antimony

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.04	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.04	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.04	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.25	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	0.25	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.5	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.5	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	14	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	63	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	0	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	14	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	28	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	37	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	179	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	51	(µg/s)
	mass flux in river at PM-13	M_r13 =	336	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.13	(µg/l)
	concentration in river at PM-13	C_r13 =	0.15	(µg/l)

Observed Concentration	Observed concentration in river at PM-12		ND (0.3)	(µg/l)
	Observed concentration in river at PM-13		ND (0.3)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Selenium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.3	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.3	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.3	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1.6	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.09	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	2.95	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	2.95	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	107	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	475	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	3	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	90	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	123	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	72	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	351	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	182	(µg/s)
	mass flux in river at PM-13	M_r13 =	1222	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.47	(µg/l)
	concentration in river at PM-13	C_r13 =	0.54	(µg/l)

Observed Concentration	Observed concentration in river at PM-12		ND (1)	(µg/l)
	Observed concentration in river at PM-13		ND (1)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Sulfate

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046.3	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	1427	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	6340	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	58924	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	17252	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	1671	(mg/s)
	mass flux in river at PM-13	M_r13 =	85200	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	4.3	(mg/l)
	concentration in river at PM-13	C_r13 =	37.6	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		4.7	(mg/l)
	Observed concentration in river at PM-13		36.1	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Thallium

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.6	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	0.2	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.004	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.004	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	71	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	317	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	34	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	23	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	73	(mg/s)
	mass flux in river at PM-13	M_r13 =	447	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.19	(mg/l)
	concentration in river at PM-13	C_r13 =	0.20	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		ND (0.4)	(µg/l)
	Observed concentration in river at PM-13		ND (0.4)	(µg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Zinc

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	56.01	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	1.99	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	16	(μg/l)
	concentration of surface water into PM-13	C_s13 =	16	(μg/l)
	concentration of WWTP discharge	C_sBab =	16	(μg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3	(μg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	14.35	(μg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	11.5	(μg/l)
	concentration of ground water flow into PM-13	C_g13 =	11.5	(μg/l)
Water Balance	flow in river at PM-12	Q_r12 =	13.79	(cfs)
	flow in river at PM-13	Q_r13 =	80.00	(cfs)
	flow check	Q_ck =	80.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5707	(μg/s)
	mass flux of surface water into PM-13	M_s13 =	25359	(μg/s)
	mass flux of Babbitt WWTP	M_sBab =	149	(μg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	169	(μg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	1624	(μg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(μg/s)
	mass flux of ground water into PM-12	M_g12 =	280	(μg/s)
	mass flux of ground water into PM-13	M_g13 =	1370	(μg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	6137	(μg/s)
	mass flux in river at PM-13	M_r13 =	34659	(μg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	15.72	(μg/l)
	concentration in river at PM-13	C_r13 =	15.31	(μg/l)
Observed Concentration	Observed concentration in river at PM-12		18.3	(μg/l)
	Observed concentration in river at PM-13		12.3	(μg/l)

Appendix F.1

Embarrass River

Proposed Action

Year 1

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Year 1 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	10.84	(cfs)	PM-13
	flow check	Q_ck_L =	10.84	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	3.19	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 1 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	86.71	(cfs)	PM-13
	flow check	Q_ck_M =	86.71	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	3.19	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 1 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	858.26	(cfs)	PM-13
	flow check	Q_ck_H =	858.26	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	3.19	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00096	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.33	(mg/s)		2.74	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.18	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		2.98	(mg/s)		2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.90	(mg/s)		0.90	(mg/s)		0.90	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)		89.13	(mg/s)		89.13	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	94.84	(mg/s)		347.27	(mg/s)		2,967.45	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.309	(mg/L)		0.142	(mg/L)		0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005946518	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.54	(mg/s)	0.54	(mg/s)	0.54	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.11	(mg/s)	2.75	(mg/s)	19.12	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.138981444	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12.53	(mg/s)		12.53	(mg/s)		12.53	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)		18.63	(mg/s)		18.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	35.43	(mg/s)		98.51	(mg/s)		688.06	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.115	(mg/L)		0.040	(mg/L)		0.028	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.29E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4.77	(mg/s)		4.77	(mg/s)		4.77	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		5.25	(mg/s)		5.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	19.97	(mg/s)		53.76	(mg/s)		403.11	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.065	(mg/L)		0.022	(mg/L)		0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000271356	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)		0.29	(mg/s)		2.47	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	45.78662467	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,128.35	(mg/s)		4,128.35	(mg/s)		4,128.35	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	12.28	(mg/s)		12.28	(mg/s)		12.28	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,374.76	(mg/s)		3,374.76	(mg/s)		1.77	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	11,083.21	(mg/s)		47,223.88	(mg/s)		371,373.85	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	36.122	(mg/L)		19.244	(mg/l)		15.290	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000117453	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)		0.24	(mg/s)		1.99	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.89E+01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,700.65	(mg/s)		1,700.65	(mg/s)		1,700.65	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	51.97	(mg/s)		51.97	(mg/s)		51.97	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)		1,216.00	(mg/s)		1,216.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,331.37	(mg/s)		17,260.73	(mg/s)		159,187.35	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	10.858	(mg/L)		7.034	(mg/L)		6.554	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001174401	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.36	(mg/s)	1.65	(mg/s)	14.75	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 1
Parameter	Copper

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005888719	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.53	(mg/s)	0.53	(mg/s)	0.53	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.40	(mg/s)	4.72	(mg/s)	37.47	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.57E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	412.18	(mg/s)	412.18	(mg/s)	412.18	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)	87.50	(mg/s)	87.50	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	557.79	(mg/s)	983.54	(mg/s)	5,350.52	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	1.818	(mg/L)	0.401	(mg/L)	0.220	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.00E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.36	(mg/s)	0.36	(mg/s)	0.36	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)	259.35	(mg/s)	259.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	292.10	(mg/s)	6,378.62	(mg/s)	69,699.73	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.952	(mg/L)	2.599	(mg/L)	2.870	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.15E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	28,397.48	(mg/s)	28,397.48	(mg/s)	28,397.48	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	254.25	(mg/s)	254.25	(mg/s)	254.25	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	73,443.94	(mg/s)	266,469.63	(mg/s)	1,794,910.18	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	239.367	(mg/L)	108.588	(mg/L)	73.899	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.15	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	825.45	(mg/s)		825.45	(mg/s)		825.45	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)		438.64	(mg/s)		438.64	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	38.99	(mg/s)		253.11	(mg/s)		2,469.85	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,895.18	(mg/s)		5,788.07	(mg/s)		18,888.99	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.158	(mg/L)		0.648	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	6.177	(mg/L)		2.359	(mg/L)		0.778	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	48.72	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,392.66	(mg/s)	4,392.66	(mg/s)	4,392.66	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	6.29	(mg/s)	6.29	(mg/s)	6.29	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	11,926.17	(mg/s)	37,573.21	(mg/s)	166,398.91	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	38.870	(mg/L)	15.311	(mg/l)	6.851	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.29	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	26.10	(mg/s)	26.10	(mg/s)	26.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)	66.78	(mg/s)	66.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	126.23	(mg/s)	779.42	(mg/s)	7,329.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.411	(mg/L)	0.318	(mg/l)	0.302	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 1
Parameter	Sodium

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	66.13	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5,962.27	(mg/s)	5,962.27	(mg/s)	5,962.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	7.53	(mg/s)	7.53	(mg/s)	7.53	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)	2,501.44	(mg/s)	2,501.44	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,109.61	(mg/s)	28,549.18	(mg/s)	159,558.37	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	32.949	(mg/L)	11.634	(mg/l)	6.569	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009513833	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.86	(mg/s)		0.86	(mg/s)		0.86	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.30	(mg/s)		5.08	(mg/s)		31.28	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(mg/L)		0.002	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 1
Parameter	Lead

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000585798	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.30	(mg/s)		0.63	(mg/s)		3.90	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 1
Parameter	Antimony

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.83E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.44	(mg/s)		0.44	(mg/s)		0.44	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.67	(mg/s)		0.76	(mg/s)		1.64	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000967892	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.59	(mg/s)	1.30	(mg/s)	7.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	142.79	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12,874.84	(mg/s)	12,874.84	(mg/s)	12,874.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	216.95	(mg/s)	216.95	(mg/s)	216.95	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	30,650.62	(mg/s)	90,267.44	(mg/s)	177,606.90	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	99.896	(mg/L)	36.785	(mg/l)	7.312	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 1
Parameter	Thallium

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00096816	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)		0.55	(mg/s)		4.92	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 1**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009842772	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.89	(mg/s)		0.89	(mg/s)		0.89	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		0.81	(mg/s)		0.81	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.52	(mg/s)		37.24	(mg/s)		386.59	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.011	(mg/L)		0.015	(mg/L)		0.016	(mg/L)

Appendix F.2

Embarrass River

Proposed Action

Year 5

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Year 5 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	11.77	(cfs)	PM-13
	flow check	Q_ck_L =	11.77	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	4.10	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 5 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	87.64	(cfs)	PM-13
	flow check	Q_ck_M =	87.64	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	4.10	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 5 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	859.19	(cfs)	PM-13
	flow check	Q_ck_H =	859.19	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	4.10	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Silver**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00090	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)		0.35	(mg/s)		2.75	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.61E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.16	(mg/s)	11.16	(mg/s)	11.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	105.17	(mg/s)	357.60	(mg/s)	2,977.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.316	(mg/L)	0.144	(mg/L)	0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006775027	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.79	(mg/s)	0.79	(mg/s)	0.79	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.36	(mg/s)	3.00	(mg/s)	19.38	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.135355742	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15.72	(mg/s)	15.72	(mg/s)	15.72	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)	18.63	(mg/s)	18.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	38.65	(mg/s)	101.74	(mg/s)	691.28	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.116	(mg/L)	0.041	(mg/L)	0.028	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.03E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.84	(mg/s)		5.84	(mg/s)		5.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		5.25	(mg/s)		5.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	21.05	(mg/s)		54.83	(mg/s)		404.19	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.063	(mg/L)		0.022	(mg/L)		0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000454842	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.31	(mg/s)		2.50	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	55.55427025	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6,450.21	(mg/s)	6,450.21	(mg/s)	6,450.21	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	176.59	(mg/s)	176.59	(mg/s)	176.59	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,374.76	(mg/s)	3,374.76	(mg/s)	25.38	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	13,569.37	(mg/s)	49,710.04	(mg/s)	373,883.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	40.729	(mg/L)	20.042	(mg/l)	15.377	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000238486	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.08	(mg/s)		0.26	(mg/s)		2.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.07E+01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,244.90	(mg/s)		1,244.90	(mg/s)		1,244.90	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	747.10	(mg/s)		747.10	(mg/s)		747.10	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)		1,216.00	(mg/s)		1,216.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,570.75	(mg/s)		17,500.11	(mg/s)		159,426.73	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	10.718	(mg/L)		7.056	(mg/L)		6.557	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00200513	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.23	(mg/s)	0.23	(mg/s)	0.23	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.49	(mg/s)	1.78	(mg/s)	14.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007797191	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.91	(mg/s)	0.91	(mg/s)	0.91	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.78	(mg/s)	5.09	(mg/s)	37.84	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.25E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	260.89	(mg/s)		260.89	(mg/s)		260.89	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.21	(mg/s)		1.21	(mg/s)		1.21	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)		87.50	(mg/s)		87.50	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	407.63	(mg/s)		833.39	(mg/s)		5,200.36	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	1.224	(mg/L)		0.336	(mg/L)		0.214	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.96E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.92	(mg/s)		6.92	(mg/s)		6.92	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)		259.35	(mg/s)		259.35	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	298.82	(mg/s)		6,385.34	(mg/s)		69,706.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.897	(mg/L)		2.574	(mg/L)		2.867	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.61E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	30,336.71	(mg/s)	30,336.71	(mg/s)	30,336.71	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,654.83	(mg/s)	3,654.83	(mg/s)	3,654.83	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	78,783.76	(mg/s)	271,809.45	(mg/s)	1,800,250.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	236.473	(mg/L)	109.588	(mg/L)	74.038	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.67	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.76	(mg/s)		0.76	(mg/s)		0.76	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	890.78	(mg/s)		890.78	(mg/s)		890.78	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)		438.64	(mg/s)		438.64	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.70	(mg/s)		253.82	(mg/s)		2,470.56	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,961.22	(mg/s)		5,854.11	(mg/s)		18,955.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.179	(mg/L)		0.650	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	5.887	(mg/L)		2.360	(mg/L)		0.780	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	29.76	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,455.69	(mg/s)	3,455.69	(mg/s)	3,455.69	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	90.42	(mg/s)	90.42	(mg/s)	90.42	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	11,073.32	(mg/s)	36,720.36	(mg/s)	165,546.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	33.237	(mg/L)	14.805	(mg/l)	6.808	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.31	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)		22.40	(mg/s)		22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	36.00	(mg/s)		36.00	(mg/s)		36.00	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)		66.78	(mg/s)		66.78	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	136.13	(mg/s)		789.32	(mg/s)		7,339.78	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.409	(mg/L)		0.318	(mg/l)		0.302	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	34.82	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,042.46	(mg/s)		4,042.46	(mg/s)		4,042.46	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	108.24	(mg/s)		108.24	(mg/s)		108.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)		2,501.44	(mg/s)		2,501.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	8,290.51	(mg/s)		26,730.09	(mg/s)		157,739.28	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	24.884	(mg/L)		10.777	(mg/l)		6.487	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.029814715	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.46	(mg/s)		3.46	(mg/s)		3.46	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	4.95	(mg/s)		7.72	(mg/s)		33.92	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.015	(mg/L)		0.003	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000769203	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.33	(mg/s)	0.66	(mg/s)	3.94	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.47E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.75	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.98	(mg/s)		1.08	(mg/s)		1.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001159434	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.66	(mg/s)	1.36	(mg/s)	7.92	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	140.42	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	16,304.02	(mg/s)	16,304.02	(mg/s)	16,304.02	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,118.71	(mg/s)	3,118.71	(mg/s)	3,118.71	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	36,981.55	(mg/s)	96,598.37	(mg/s)	183,937.83	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	111.002	(mg/L)	38.947	(mg/l)	7.565	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Thallium**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000906999	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.12	(mg/s)		0.57	(mg/s)		4.94	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 5**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.017646569	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.05	(mg/s)	2.05	(mg/s)	2.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	4.68	(mg/s)	38.40	(mg/s)	387.76	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.015	(mg/L)	0.016	(mg/L)

Appendix F.3

Embarrass River

Proposed Action

Year 8

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Year 8 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	12.46	(cfs)	PM-13
	flow check	Q_ck_L =	12.46	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	4.79	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 8 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	88.33	(cfs)	PM-13
	flow check	Q_ck_M =	88.33	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	4.79	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 8 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	859.88	(cfs)	PM-13
	flow check	Q_ck_H =	859.88	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	4.79	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Silver**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00089	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(mg/s)	0.12	(mg/s)	0.12	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)	0.37	(mg/s)	2.77	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Aluminum**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.01E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.63	(mg/s)	13.63	(mg/s)	13.63	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	107.62	(mg/s)	360.05	(mg/s)	2,980.23	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.305	(mg/L)	0.144	(mg/L)	0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 8
Parameter	Arsenic

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007035766	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.95	(mg/s)	0.95	(mg/s)	0.95	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.53	(mg/s)	3.17	(mg/s)	19.54	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 8
Parameter	Boron

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.140897597	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.10	(mg/s)		19.10	(mg/s)		19.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)		18.63	(mg/s)		18.63	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	42.03	(mg/s)		105.11	(mg/s)		694.66	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.119	(mg/L)		0.042	(mg/L)		0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.04E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.84	(mg/s)	6.84	(mg/s)	6.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	22.04	(mg/s)	55.82	(mg/s)	405.18	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.063	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000543459	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.12	(mg/s)		0.34	(mg/s)		2.52	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	72.53696661	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9,833.30	(mg/s)	9,833.30	(mg/s)	9,833.30	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	132.27	(mg/s)	132.27	(mg/s)	132.27	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,374.76	(mg/s)	3,374.76	(mg/s)	19.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	16,908.15	(mg/s)	53,048.82	(mg/s)	377,216.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	47.965	(mg/L)	21.223	(mg/l)	15.501	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000383404	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)	0.28	(mg/s)	2.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.07E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	823.25	(mg/s)	823.25	(mg/s)	823.25	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	559.62	(mg/s)	559.62	(mg/s)	559.62	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,961.63	(mg/s)	16,890.98	(mg/s)	158,817.61	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	8.401	(mg/L)	6.757	(mg/L)	6.526	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002321539	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.31	(mg/s)	0.31	(mg/s)	0.31	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.57	(mg/s)	1.86	(mg/s)	14.96	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00854201	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.16	(mg/s)	1.16	(mg/s)	1.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.03	(mg/s)	5.35	(mg/s)	38.10	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.89E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	106.94	(mg/s)		106.94	(mg/s)		106.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.91	(mg/s)		0.91	(mg/s)		0.91	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)		87.50	(mg/s)		87.50	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	253.37	(mg/s)		679.12	(mg/s)		5,046.10	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.719	(mg/L)		0.272	(mg/L)		0.207	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.80E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.86	(mg/s)		7.86	(mg/s)		7.86	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)		259.35	(mg/s)		259.35	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	299.72	(mg/s)		6,386.23	(mg/s)		69,707.34	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.850	(mg/L)		2.555	(mg/L)		2.865	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.52E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	34,228.62	(mg/s)	34,228.62	(mg/s)	34,228.62	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	2,737.70	(mg/s)	2,737.70	(mg/s)	2,737.70	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	81,758.54	(mg/s)	274,784.23	(mg/s)	1,803,224.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	231.931	(mg/L)	109.930	(mg/L)	74.102	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.73	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.57	(mg/s)		0.57	(mg/s)		0.57	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	912.75	(mg/s)		912.75	(mg/s)		912.75	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)		438.64	(mg/s)		438.64	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.51	(mg/s)		253.63	(mg/s)		2,470.37	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,982.99	(mg/s)		5,875.88	(mg/s)		18,976.80	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.173	(mg/L)		0.649	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	5.625	(mg/L)		2.351	(mg/L)		0.780	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 8
Parameter	Magnesium

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	17.33	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,349.41	(mg/s)	2,349.41	(mg/s)	2,349.41	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	67.73	(mg/s)	67.73	(mg/s)	67.73	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,944.35	(mg/s)	35,591.39	(mg/s)	164,417.09	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	28.210	(mg/L)	14.239	(mg/l)	6.757	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.30	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	40.29	(mg/s)	40.29	(mg/s)	40.29	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)	66.78	(mg/s)	66.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	140.42	(mg/s)	793.61	(mg/s)	7,344.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.398	(mg/L)	0.317	(mg/l)	0.302	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	18.93	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,566.23	(mg/s)		2,566.23	(mg/s)		2,566.23	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	81.08	(mg/s)		81.08	(mg/s)		81.08	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)		2,501.44	(mg/s)		2,501.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	6,787.12	(mg/s)		25,226.70	(mg/s)		156,235.89	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	19.254	(mg/L)		10.092	(mg/l)		6.420	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.038551821	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.23	(mg/s)		5.23	(mg/s)		5.23	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	6.70	(mg/s)		9.47	(mg/s)		35.67	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.019	(mg/L)		0.004	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001239552	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.41	(mg/s)	0.74	(mg/s)	4.02	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 8
Parameter	Antimony

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.28E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.35	(mg/s)	1.45	(mg/s)	2.32	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001331851	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.70	(mg/s)	1.40	(mg/s)	7.96	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 8
Parameter	Sulfate

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	153.28	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,427.45	(mg/s)		16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)		206.87	(mg/s)		206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)		37.36	(mg/s)		37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,965.20	(mg/s)		79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)		1,012.72	(mg/s)		1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)		58,922.60	(mg/s)		58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	20,779.12	(mg/s)		20,779.12	(mg/s)		20,779.12	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	2,336.11	(mg/s)		2,336.11	(mg/s)		2,336.11	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)		8,603.45	(mg/s)		8,603.45	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	40,674.05	(mg/s)		100,290.87	(mg/s)		187,630.33	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	115.384	(mg/L)		40.122	(mg/l)		7.710	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000934618	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.14	(mg/s)		0.59	(mg/s)		4.96	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 8**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.029073121	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.94	(mg/s)	3.94	(mg/s)	3.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	6.58	(mg/s)	40.29	(mg/s)	389.65	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.019	(mg/L)	0.016	(mg/L)	0.016	(mg/L)

Appendix F.4

Embarrass River

Proposed Action

Year 9

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Year 9 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	12.93	(cfs)	PM-13
	flow check	Q_ck_L =	12.93	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.26	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 9 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	88.80	(cfs)	PM-13
	flow check	Q_ck_M =	88.80	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.26	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 9 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	860.35	(cfs)	PM-13
	flow check	Q_ck_H =	860.35	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.26	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00090	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.14	(mg/s)		0.38	(mg/s)		2.78	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Aluminum**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.07E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	43	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	209	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15.88	(mg/s)	15.88	(mg/s)	15.88	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	109.89	(mg/s)	362.31	(mg/s)	2,982.50	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.300	(mg/L)	0.144	(mg/L)	0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007592467	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.13	(mg/s)	1.13	(mg/s)	1.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.70	(mg/s)	3.34	(mg/s)	19.72	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.145082047	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		10	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	21.59	(mg/s)		21.59	(mg/s)		21.59	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)		18.63	(mg/s)		18.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	44.52	(mg/s)		107.61	(mg/s)		697.15	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.122	(mg/L)		0.043	(mg/L)		0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.05E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	6	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	28	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.51	(mg/s)	7.51	(mg/s)	7.51	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	22.72	(mg/s)	56.50	(mg/s)	405.86	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.062	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00056357	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)		0.35	(mg/s)		2.53	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	75.53238205	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11,239.50	(mg/s)	11,239.50	(mg/s)	11,239.50	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	156.22	(mg/s)	156.22	(mg/s)	156.22	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,374.76	(mg/s)	3,374.76	(mg/s)	22.45	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	18,338.29	(mg/s)	54,478.96	(mg/s)	378,649.62	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/L)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	50.131	(mg/L)	21.679	(mg/L)	15.552	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000407879	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.12	(mg/s)		0.29	(mg/s)		2.04	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.89E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	876.22	(mg/s)	876.22	(mg/s)	876.22	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	660.93	(mg/s)	660.93	(mg/s)	660.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,115.90	(mg/s)	17,045.26	(mg/s)	158,971.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	8.518	(mg/L)	6.783	(mg/L)	6.529	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002481389	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.37	(mg/s)		0.37	(mg/s)		0.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.63	(mg/s)		1.91	(mg/s)		15.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.008625606	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.28	(mg/s)	1.28	(mg/s)	1.28	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.15	(mg/s)	5.47	(mg/s)	38.22	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.91E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	102.84	(mg/s)		102.84	(mg/s)		102.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.07	(mg/s)		1.07	(mg/s)		1.07	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)		87.50	(mg/s)		87.50	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	249.44	(mg/s)		675.19	(mg/s)		5,042.16	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.682	(mg/L)		0.269	(mg/L)		0.207	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.91E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8.80	(mg/s)		8.80	(mg/s)		8.80	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)		259.35	(mg/s)		259.35	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	300.68	(mg/s)		6,387.20	(mg/s)		69,708.30	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.822	(mg/L)		2.542	(mg/L)		2.863	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.56E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		24,980.41	(mg/s)		283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)		2,129.58	(mg/s)		2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)		653.73	(mg/s)		653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		121,890.93	(mg/s)		1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)		10,425.01	(mg/s)		10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)		53,090.84	(mg/s)		53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	38,042.63	(mg/s)		38,042.63	(mg/s)		38,042.63	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,233.31	(mg/s)		3,233.31	(mg/s)		3,233.31	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)		24,647.41	(mg/s)		24,647.41	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	86,068.16	(mg/s)		279,093.85	(mg/s)		1,807,534.40	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	235.281	(mg/L)		111.063	(mg/L)		74.238	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.04	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.68	(mg/s)	5.60	(mg/s)	0.68	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	3,029.85	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	1,048.24	(mg/s)	3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,048.24	(mg/s)	0.68	(mg/s)	1,048.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.62	(mg/s)	258.66	(mg/s)	2,470.47	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,118.59	(mg/s)	6,011.48	(mg/s)	19,112.40	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.176	(mg/L)	0.662	(mg/L)	0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	5.791	(mg/L)	2.392	(mg/L)	0.785	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	16.28	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,422.93	(mg/s)	2,422.93	(mg/s)	2,422.93	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	79.99	(mg/s)	79.99	(mg/s)	79.99	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,030.13	(mg/s)	35,677.17	(mg/s)	164,502.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/L)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	27.419	(mg/L)	14.197	(mg/L)	6.756	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.29	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	42.96	(mg/s)	42.96	(mg/s)	42.96	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)	66.78	(mg/s)	66.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	143.09	(mg/s)	796.28	(mg/s)	7,346.74	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/L)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.391	(mg/L)	0.317	(mg/L)	0.302	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	22.11	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,289.71	(mg/s)		3,289.71	(mg/s)		3,289.71	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	95.76	(mg/s)		95.76	(mg/s)		95.76	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)		2,501.44	(mg/s)		2,501.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,525.28	(mg/s)		25,964.85	(mg/s)		156,974.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/L)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	20.572	(mg/L)		10.332	(mg/L)		6.447	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.041162911	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.13	(mg/s)		6.13	(mg/s)		6.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	7.60	(mg/s)		10.38	(mg/s)		36.58	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.021	(mg/L)		0.004	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001749429	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.50	(mg/s)		0.83	(mg/s)		4.11	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.83E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.31	(mg/s)		1.31	(mg/s)		1.31	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.55	(mg/s)		1.64	(mg/s)		2.52	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001403839	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.21	(mg/s)	0.21	(mg/s)	0.21	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.73	(mg/s)	1.44	(mg/s)	7.99	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	166.62	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24,792.97	(mg/s)	24,792.97	(mg/s)	24,792.97	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	2,759.02	(mg/s)	2,759.02	(mg/s)	2,759.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	45,110.81	(mg/s)	104,727.62	(mg/s)	192,067.08	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/L)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	123.317	(mg/L)	41.675	(mg/L)	7.888	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 9
Parameter	Thallium

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000967503	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.16	(mg/s)		0.61	(mg/s)		4.98	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 9**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.039738069	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.91	(mg/s)		5.91	(mg/s)		5.91	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		0.81	(mg/s)		0.81	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	8.55	(mg/s)		42.27	(mg/s)		391.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.023	(mg/L)		0.017	(mg/L)		0.016	(mg/L)

Appendix F.5

Embarrass River

Proposed Action

Year 15

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Year 15 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	13.32	(cfs)	PM-13
	flow check	Q_ck_L =	13.32	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.65	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 15 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	89.19	(cfs)	PM-13
	flow check	Q_ck_M =	89.19	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.65	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 15 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	860.74	(cfs)	PM-13
	flow check	Q_ck_H =	860.74	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.65	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00122	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000000	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.19	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.20	(mg/s)		0.44	(mg/s)		2.84	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.43E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	70.86	(mg/s)		70.86	(mg/s)		70.86	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)		89.13	(mg/s)		89.13	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	161.90	(mg/s)		414.33	(mg/s)		3,034.51	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.430	(mg/L)		0.164	(mg/L)		0.125	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.015514819	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.48	(mg/s)	2.48	(mg/s)	2.48	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.73	(mg/s)	4.37	(mg/s)	20.74	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.007	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.173169588	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	27.67	(mg/s)		27.67	(mg/s)		27.67	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)		18.63	(mg/s)		18.63	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	48.09	(mg/s)		111.18	(mg/s)		700.72	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.128	(mg/L)		0.044	(mg/L)		0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.35E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	10.14	(mg/s)	10.14	(mg/s)	10.14	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	17.23	(mg/s)	51.02	(mg/s)	400.37	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.046	(mg/L)	0.020	(mg/L)	0.016	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001410903	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.23	(mg/s)	0.23	(mg/s)	0.23	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.27	(mg/s)	0.48	(mg/s)	2.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	95.38057957	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15,242.69	(mg/s)	15,242.69	(mg/s)	15,242.69	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	205.46	(mg/s)	205.46	(mg/s)	205.46	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,374.76	(mg/s)	3,374.76	(mg/s)	29.52	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	20,127.01	(mg/s)	56,267.68	(mg/s)	380,445.41	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	53.397	(mg/L)	22.293	(mg/l)	15.618	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000705708	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)	0.31	(mg/s)	2.05	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.60E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,215.25	(mg/s)	1,215.25	(mg/s)	1,215.25	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	869.24	(mg/s)	869.24	(mg/s)	869.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,448.78	(mg/s)	17,378.14	(mg/s)	159,304.77	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	9.150	(mg/L)	6.885	(mg/L)	6.540	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.008661931	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.38	(mg/s)	1.38	(mg/s)	1.38	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.51	(mg/s)	2.80	(mg/s)	15.90	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020766721	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.32	(mg/s)	3.32	(mg/s)	3.32	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.71	(mg/s)	7.03	(mg/s)	39.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.0017	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.010	(mg/L)	0.0028	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.26E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	132.08	(mg/s)	132.08	(mg/s)	132.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.41	(mg/s)	1.41	(mg/s)	1.41	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)	87.50	(mg/s)	87.50	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	233.15	(mg/s)	658.90	(mg/s)	5,025.87	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.619	(mg/L)	0.261	(mg/L)	0.206	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.82E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15.69	(mg/s)	15.69	(mg/s)	15.69	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.20	(mg/s)	0.20	(mg/s)	0.20	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)	259.35	(mg/s)	259.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	303.44	(mg/s)	6,389.96	(mg/s)	69,711.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.805	(mg/L)	2.532	(mg/L)	2.862	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.20E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	51,106.04	(mg/s)	51,106.04	(mg/s)	51,106.04	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,252.38	(mg/s)	4,252.38	(mg/s)	4,252.38	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	89,725.62	(mg/s)	282,751.31	(mg/s)	1,811,191.86	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	238.041	(mg/L)	112.023	(mg/L)	74.354	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	14.58	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.89	(mg/s)	0.89	(mg/s)	0.89	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,330.24	(mg/s)	2,330.24	(mg/s)	2,330.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.83	(mg/s)	253.95	(mg/s)	2,470.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,210.18	(mg/s)	7,103.07	(mg/s)	20,203.99	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.183	(mg/L)	0.650	(mg/L)	0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	8.517	(mg/L)	2.814	(mg/L)	0.829	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	19.82	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,105.49	(mg/s)		23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)		259.20	(mg/s)		259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)		55.10	(mg/s)		55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,273.66	(mg/s)		117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)		15,261.91	(mg/s)		15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,167.81	(mg/s)		3,167.81	(mg/s)		3,167.81	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	105.20	(mg/s)		105.20	(mg/s)		105.20	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)		3,950.02	(mg/s)		3,950.02	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)		2,419.79	(mg/s)		24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,531.35	(mg/s)		35,178.39	(mg/s)		164,004.09	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		6.196	(mg/l)		5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	25.287	(mg/L)		13.937	(mg/l)		6.733	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 15
Parameter	Manganese

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.43	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	69.10	(mg/s)		69.10	(mg/s)		69.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)		66.78	(mg/s)		66.78	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	146.83	(mg/s)		800.03	(mg/s)		7,350.49	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.390	(mg/L)		0.317	(mg/l)		0.302	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	22.52	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,599.56	(mg/s)		3,599.56	(mg/s)		3,599.56	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	125.94	(mg/s)		125.94	(mg/s)		125.94	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)		2,501.44	(mg/s)		2,501.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,281.51	(mg/s)		25,721.08	(mg/s)		156,730.27	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	19.318	(mg/L)		10.190	(mg/l)		6.434	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.153655831	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24.56	(mg/s)	24.56	(mg/s)	24.56	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	25.21	(mg/s)	27.98	(mg/s)	54.19	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.067	(mg/L)	0.011	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002409879	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.49	(mg/s)	0.82	(mg/s)	4.09	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.13E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00E+00	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.81	(mg/s)		1.81	(mg/s)		1.81	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.87	(mg/s)		1.96	(mg/s)		2.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002521801	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(mg/s)		0.40	(mg/s)		0.40	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.58	(mg/s)		1.29	(mg/s)		7.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 15
Parameter	Sulfate

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	241.92	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	38,661.16	(mg/s)	38,661.16	(mg/s)	38,661.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,628.60	(mg/s)	3,628.60	(mg/s)	3,628.60	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	58,835.87	(mg/s)	118,452.69	(mg/s)	205,792.15	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	156.091	(mg/L)	46.930	(mg/l)	8.448	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001193197	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.19	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.66	(mg/s)	5.02	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 15**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.081197396	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12.98	(mg/s)	12.98	(mg/s)	12.98	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	14.24	(mg/s)	47.96	(mg/s)	397.32	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.038	(mg/L)	0.019	(mg/L)	0.016	(mg/L)

Appendix F.6

Embarrass River

Proposed Action

Year 20

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Year 20 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	13.64	(cfs)	PM-13
	flow check	Q_ck_L =	13.64	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.97	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 20 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	89.51	(cfs)	PM-13
	flow check	Q_ck_M =	89.51	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.97	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 20 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	861.06	(cfs)	PM-13
	flow check	Q_ck_H =	861.06	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.97	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00124	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.21	(mg/s)		0.21	(mg/s)		0.21	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.22	(mg/s)		0.46	(mg/s)		2.86	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Aluminum**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.74E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		2.98	(mg/s)		2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	63.12	(mg/s)		63.12	(mg/s)		63.12	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)		89.10	(mg/s)		89.10	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	157.12	(mg/s)		409.55	(mg/s)		3,029.73	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.407	(mg/L)		0.162	(mg/L)		0.124	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.014389887	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.27	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.31	(mg/s)		15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)		0.33	(mg/s)		0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.43	(mg/s)		2.43	(mg/s)		2.43	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)		0.16	(mg/s)		0.16	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.34	(mg/s)		3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.01	(mg/s)		4.64	(mg/s)		21.02	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(mg/L)		0.002	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 20
Parameter	Boron

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.174123916	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	29.42	(mg/s)	29.42	(mg/s)	29.42	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	52.37	(mg/s)	115.46	(mg/s)	705.00	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.136	(mg/L)	0.046	(mg/L)	0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.60E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.15	(mg/s)	11.15	(mg/s)	11.15	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	26.36	(mg/s)	60.14	(mg/s)	409.50	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.068	(mg/L)	0.024	(mg/L)	0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00131326	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.22	(mg/s)	0.22	(mg/s)	0.22	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.27	(mg/s)	0.48	(mg/s)	2.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Year 20
Parameter	Calcium

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	76.37590202	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12,906.03	(mg/s)		12,906.03	(mg/s)		12,906.03	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	227.25	(mg/s)		227.25	(mg/s)		227.25	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)		3,373.51	(mg/s)		32.66	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	20,074.61	(mg/s)		56,215.28	(mg/s)		380,397.40	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	51.988	(mg/L)		22.191	(mg/l)		15.610	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Cadmium**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000534314	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.15	(mg/s)		0.32	(mg/s)		2.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.66E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,293.94	(mg/s)	1,293.94	(mg/s)	1,293.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	961.45	(mg/s)	961.45	(mg/s)	961.45	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55	(mg/s)	1,215.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,833.69	(mg/s)	17,763.05	(mg/s)	159,689.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	9.928	(mg/L)	7.012	(mg/L)	6.553	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007940593	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.34	(mg/s)		1.34	(mg/s)		1.34	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.60	(mg/s)		2.89	(mg/s)		15.99	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020208301	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.41	(mg/s)	3.41	(mg/s)	3.41	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	4.29	(mg/s)	7.60	(mg/s)	40.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.011	(mg/L)	0.003	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.70E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	130.19	(mg/s)		130.19	(mg/s)		130.19	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.56	(mg/s)		1.56	(mg/s)		1.56	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)		87.47	(mg/s)		87.47	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	277.25	(mg/s)		703.00	(mg/s)		5,069.97	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.718	(mg/L)		0.278	(mg/L)		0.208	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.72E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	14.74	(mg/s)		14.74	(mg/s)		14.74	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.22	(mg/s)		0.22	(mg/s)		0.22	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)		259.25	(mg/s)		259.25	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	306.59	(mg/s)		6,393.11	(mg/s)		69,714.22	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.794	(mg/L)		2.524	(mg/L)		2.861	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.71E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	45,758.38	(mg/s)	45,758.38	(mg/s)	45,758.38	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,703.46	(mg/s)	4,703.46	(mg/s)	4,703.46	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	95,244.92	(mg/s)	288,270.61	(mg/s)	1,816,711.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	246.661	(mg/L)	113.794	(mg/L)	74.553	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Potassium**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.45	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.98	(mg/s)	0.98	(mg/s)	0.98	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,272.35	(mg/s)	2,272.35	(mg/s)	2,272.35	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.92	(mg/s)	254.04	(mg/s)	2,470.78	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,342.85	(mg/s)	7,235.74	(mg/s)	20,336.66	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.186	(mg/L)	0.650	(mg/L)	0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	8.657	(mg/L)	2.856	(mg/L)	0.835	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	19.45	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,105.49	(mg/s)		23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)		259.20	(mg/s)		259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)		55.10	(mg/s)		55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,273.66	(mg/s)		117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)		1,268.87	(mg/s)		1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)		15,261.91	(mg/s)		15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,286.07	(mg/s)		3,286.07	(mg/s)		3,286.07	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	116.36	(mg/s)		116.36	(mg/s)		116.36	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)		3,948.56	(mg/s)		3,948.56	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)		2,419.79	(mg/s)		24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,928.17	(mg/s)		36,575.21	(mg/s)		165,400.92	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		6.196	(mg/l)		5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	28.301	(mg/L)		14.438	(mg/l)		6.788	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.45	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)		22.40	(mg/s)		22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	76.11	(mg/s)		76.11	(mg/s)		76.11	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)		66.76	(mg/s)		66.76	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	176.22	(mg/s)		829.41	(mg/s)		7,379.87	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.456	(mg/L)		0.327	(mg/l)		0.303	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	19.36	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,272.20	(mg/s)		3,272.20	(mg/s)		3,272.20	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	139.30	(mg/s)		139.30	(mg/s)		139.30	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)		2,500.51	(mg/s)		2,500.51	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,550.38	(mg/s)		25,989.95	(mg/s)		156,999.14	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	19.554	(mg/L)		10.259	(mg/l)		6.443	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.141786777	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	23.96	(mg/s)		23.96	(mg/s)		23.96	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	25.45	(mg/s)		28.23	(mg/s)		54.43	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.066	(mg/L)		0.011	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001841737	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.31	(mg/s)		0.31	(mg/s)		0.31	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.55	(mg/s)		0.88	(mg/s)		4.16	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.02E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.73	(mg/s)	1.73	(mg/s)	1.73	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.96	(mg/s)	2.06	(mg/s)	2.93	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002326015	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		0.35	(mg/s)		0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.92	(mg/s)		1.63	(mg/s)		8.18	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	211.97	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	35,819.52	(mg/s)	35,819.52	(mg/s)	35,819.52	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,013.51	(mg/s)	4,013.51	(mg/s)	4,013.51	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	57,388.66	(mg/s)	117,005.48	(mg/s)	204,344.94	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	148.623	(mg/L)	46.188	(mg/l)	8.386	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001147722	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.19	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)		0.66	(mg/s)		5.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Year 20**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.061124366	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	10.33	(mg/s)		10.33	(mg/s)		10.33	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		0.81	(mg/s)		0.81	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.97	(mg/s)		46.68	(mg/s)		396.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.034	(mg/L)		0.018	(mg/L)		0.016	(mg/L)

Appendix F.7

Embarrass River

Proposed Action

Closure

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Closure Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	9.78	(cfs)	PM-13
	flow check	Q_ck_L =	9.78	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	2.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.67	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Closure Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	85.65	(cfs)	PM-13
	flow check	Q_ck_M =	85.65	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	2.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.67	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Closure High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	857.20	(cfs)	PM-13
	flow check	Q_ck_H =	857.20	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	2.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.67	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00097	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.08	(mg/s)		0.31	(mg/s)		2.72	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Closure
Parameter	Aluminum

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.37E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	44.20	(mg/s)	44.20	(mg/s)	44.20	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	74.66	(mg/s)	74.66	(mg/s)	74.66	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	123.68	(mg/s)	376.10	(mg/s)	2,996.29	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.447	(mg/L)	0.155	(mg/L)	0.124	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012359831	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.86	(mg/s)	0.86	(mg/s)	0.86	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.40	(mg/s)	3.04	(mg/s)	19.42	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.198832748	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.79	(mg/s)		13.79	(mg/s)		13.79	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	15.61	(mg/s)		15.61	(mg/s)		15.61	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	33.66	(mg/s)		96.75	(mg/s)		686.29	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.122	(mg/L)		0.040	(mg/L)		0.028	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.81E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.34	(mg/s)	3.34	(mg/s)	3.34	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	4.40	(mg/s)	4.40	(mg/s)	4.40	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	17.69	(mg/s)	51.47	(mg/s)	400.83	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.064	(mg/L)	0.021	(mg/L)	0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Closure
Parameter	Beryllium

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000808254	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.31	(mg/s)		2.49	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	59.94387899	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,157.57	(mg/s)		4,157.57	(mg/s)		4,157.57	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)		19.51	(mg/s)		19.51	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,826.97	(mg/s)		2,826.97	(mg/s)		2.80	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,571.86	(mg/s)		46,712.53	(mg/s)		371,411.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	38.183	(mg/L)		19.271	(mg/l)		15.310	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000227872	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)		0.24	(mg/s)		1.99	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.29E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	436.24	(mg/s)		436.24	(mg/s)		436.24	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)		82.56	(mg/s)		82.56	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,018.62	(mg/s)		1,018.62	(mg/s)		1,018.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,900.17	(mg/s)		15,829.53	(mg/s)		157,756.15	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	6.863	(mg/L)		6.530	(mg/L)		6.503	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Cobalt**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001356866	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.34	(mg/s)		1.62	(mg/s)		14.72	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.018240705	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.27	(mg/s)		1.27	(mg/s)		1.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.22	(mg/s)		0.22	(mg/s)		0.22	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.09	(mg/s)		5.41	(mg/s)		38.16	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.82E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.27	(mg/s)	1.27	(mg/s)	1.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	73.30	(mg/s)	73.30	(mg/s)	73.30	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	132.73	(mg/s)	558.48	(mg/s)	4,925.45	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.479	(mg/L)	0.230	(mg/L)	0.203	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.75E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	46.80	(mg/s)	46.80	(mg/s)	46.80	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	217.25	(mg/s)	217.25	(mg/s)	217.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	296.45	(mg/s)	6,382.97	(mg/s)	69,704.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	1.071	(mg/L)	2.633	(mg/L)	2.873	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	227	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8610	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15,770.06	(mg/s)	15,770.06	(mg/s)	15,770.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)	403.90	(mg/s)	403.90	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	20,646.59	(mg/s)	20,646.59	(mg/s)	20,646.59	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	56,965.36	(mg/s)	249,991.05	(mg/s)	1,778,431.60	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	205.746	(mg/L)	103.132	(mg/L)	73.311	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.37	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	927.38	(mg/s)		927.38	(mg/s)		927.38	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	367.44	(mg/s)		367.44	(mg/s)		367.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.03	(mg/s)		253.14	(mg/s)		2,469.88	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,925.94	(mg/s)		5,818.83	(mg/s)		18,919.75	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.159	(mg/L)		0.648	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	6.956	(mg/L)		2.401	(mg/L)		0.780	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	18.87	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,105.49	(mg/s)		23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)		259.20	(mg/s)		259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)		55.10	(mg/s)		55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,273.66	(mg/s)		117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)		1,268.87	(mg/s)		1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)		15,261.91	(mg/s)		15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,308.55	(mg/s)		1,308.55	(mg/s)		1,308.55	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)		9.99	(mg/s)		9.99	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,308.85	(mg/s)		3,308.85	(mg/s)		3,308.85	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)		2,419.79	(mg/s)		24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	8,204.58	(mg/s)		33,851.63	(mg/s)		162,677.33	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		6.196	(mg/l)		5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	29.633	(mg/L)		13.965	(mg/l)		6.706	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.28	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.17	(mg/s)	19.17	(mg/s)	19.17	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	55.94	(mg/s)	55.94	(mg/s)	55.94	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	108.46	(mg/s)	761.65	(mg/s)	7,312.11	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.392	(mg/L)	0.314	(mg/l)	0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	12.15	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	842.70	(mg/s)		842.70	(mg/s)		842.70	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)		11.96	(mg/s)		11.96	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,095.40	(mg/s)		2,095.40	(mg/s)		2,095.40	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,588.43	(mg/s)		23,028.01	(mg/s)		154,037.20	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	16.572	(mg/L)		9.500	(mg/l)		6.350	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.015125217	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.05	(mg/s)		1.05	(mg/s)		1.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.33	(mg/s)		0.33	(mg/s)		0.33	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.43	(mg/s)		5.21	(mg/s)		31.41	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.009	(mg/L)		0.002	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001097329	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.31	(mg/s)		0.64	(mg/s)		3.91	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.37E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.37	(mg/s)		0.37	(mg/s)		0.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.60	(mg/s)		0.70	(mg/s)		1.57	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001503093	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.60	(mg/s)	1.30	(mg/s)	7.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	110.25	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,646.82	(mg/s)	7,646.82	(mg/s)	7,646.82	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)	344.66	(mg/s)	344.66	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	7,206.92	(mg/s)	7,206.92	(mg/s)	7,206.92	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	24,153.77	(mg/s)	83,770.59	(mg/s)	171,110.05	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	87.238	(mg/L)	34.559	(mg/l)	7.054	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000917488	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.08	(mg/s)	0.53	(mg/s)	4.90	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Closure**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020231354	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.40	(mg/s)		1.40	(mg/s)		1.40	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.68	(mg/s)		0.68	(mg/s)		0.68	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.90	(mg/s)		37.62	(mg/s)		386.98	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)		0.016	(mg/L)		0.016	(mg/L)

Appendix F.8

Embarrass River

Proposed Action

Post-Closure

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

FLOWS

Case Flows	Post-Closure Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	9.47	(cfs)	PM-13
	flow check	Q_ck_L =	9.47	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	2.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.36	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Post-Closure Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	85.34	(cfs)	PM-13
	flow check	Q_ck_M =	85.34	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	2.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.36	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Post-Closure High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	856.89	(cfs)	PM-13
	flow check	Q_ck_H =	856.89	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	2.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.36	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00097	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)		0.31	(mg/s)		2.71	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.37E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		2.98	(mg/s)		2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	44.20	(mg/s)		44.20	(mg/s)		44.20	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	60.72	(mg/s)		60.72	(mg/s)		60.72	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	109.74	(mg/s)		362.17	(mg/s)		2,982.35	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.409	(mg/L)		0.150	(mg/L)		0.123	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012359831	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.86	(mg/s)	0.86	(mg/s)	0.86	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.38	(mg/s)	3.02	(mg/s)	19.39	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.0022	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.0051	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.198832748	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.79	(mg/s)		13.79	(mg/s)		13.79	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	12.69	(mg/s)		12.69	(mg/s)		12.69	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	30.75	(mg/s)		93.84	(mg/s)		683.38	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.115	(mg/L)		0.039	(mg/L)		0.028	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.81E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.34	(mg/s)		3.34	(mg/s)		3.34	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3.58	(mg/s)		3.58	(mg/s)		3.58	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	16.87	(mg/s)		50.65	(mg/s)		400.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.063	(mg/L)		0.021	(mg/L)		0.016	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Post-Closure
Parameter	Beryllium

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000808254	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.09	(mg/s)		0.30	(mg/s)		2.49	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	59.94387899	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,157.57	(mg/s)		4,157.57	(mg/s)		4,157.57	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)		19.51	(mg/s)		19.51	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,299.27	(mg/s)		2,299.27	(mg/s)		2.80	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,044.16	(mg/s)		46,184.83	(mg/s)		371,411.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	37.472	(mg/L)		19.123	(mg/l)		15.316	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000227872	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)		0.24	(mg/s)		1.99	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.29E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	436.24	(mg/s)	436.24	(mg/s)	436.24	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)	82.56	(mg/s)	82.56	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	828.47	(mg/s)	828.47	(mg/s)	828.47	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,710.03	(mg/s)	15,639.39	(mg/s)	157,566.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	6.380	(mg/L)	6.475	(mg/L)	6.498	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001356866	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.32	(mg/s)		1.61	(mg/s)		14.71	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.018240705	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.27	(mg/s)		1.27	(mg/s)		1.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.05	(mg/s)		5.37	(mg/s)		38.12	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.00331	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.00766	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.82E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.27	(mg/s)		1.27	(mg/s)		1.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	59.62	(mg/s)		59.62	(mg/s)		59.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	119.04	(mg/s)		544.80	(mg/s)		4,911.77	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.444	(mg/L)		0.226	(mg/L)		0.203	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.75E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	46.80	(mg/s)	46.80	(mg/s)	46.80	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	176.69	(mg/s)	176.69	(mg/s)	176.69	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	255.89	(mg/s)	6,342.41	(mg/s)	69,663.52	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.955	(mg/L)	2.626	(mg/L)	2.873	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.27E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15,770.06	(mg/s)	15,770.06	(mg/s)	15,770.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)	403.90	(mg/s)	403.90	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	16,792.56	(mg/s)	16,792.56	(mg/s)	16,792.56	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	53,111.33	(mg/s)	246,137.02	(mg/s)	1,774,577.57	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	198.144	(mg/L)	101.913	(mg/L)	73.178	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.37	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	927.38	(mg/s)	927.38	(mg/s)	927.38	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	298.85	(mg/s)	298.85	(mg/s)	298.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.03	(mg/s)	253.14	(mg/s)	2,469.88	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,857.35	(mg/s)	5,750.24	(mg/s)	18,851.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.159	(mg/L)	0.648	(mg/L)	0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	6.929	(mg/L)	2.381	(mg/L)	0.777	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	18.87	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,308.55	(mg/s)	1,308.55	(mg/s)	1,308.55	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)	9.99	(mg/s)	9.99	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,691.19	(mg/s)	2,691.19	(mg/s)	2,691.19	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,586.93	(mg/s)	33,233.97	(mg/s)	162,059.68	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	28.305	(mg/L)	13.761	(mg/l)	6.683	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Post-Closure
Parameter	Manganese

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.28	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.17	(mg/s)	19.17	(mg/s)	19.17	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	45.50	(mg/s)	45.50	(mg/s)	45.50	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	98.02	(mg/s)	751.21	(mg/s)	7,301.67	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.366	(mg/L)	0.311	(mg/l)	0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	12.15	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	842.70	(mg/s)		842.70	(mg/s)		842.70	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)		11.96	(mg/s)		11.96	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,704.26	(mg/s)		1,704.26	(mg/s)		1,704.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,197.29	(mg/s)		22,636.87	(mg/s)		153,646.06	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	15.659	(mg/L)		9.373	(mg/l)		6.336	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.015125217	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.05	(mg/s)		1.05	(mg/s)		1.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.37	(mg/s)		5.14	(mg/s)		31.35	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.009	(mg/L)		0.002	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Post-Closure
Parameter	Lead

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001097329	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.30	(mg/s)	0.63	(mg/s)	3.90	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	Post-Closure
Parameter	Antimony

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.37E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.37	(mg/s)	0.37	(mg/s)	0.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.60	(mg/s)	0.70	(mg/s)	1.57	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001503093	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		0.35	(mg/s)		0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.59	(mg/s)		1.29	(mg/s)		7.84	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	110.25	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,427.45	(mg/s)		16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)		206.87	(mg/s)		206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)		37.36	(mg/s)		37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,965.20	(mg/s)		79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)		1,012.72	(mg/s)		1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)		58,922.60	(mg/s)		58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,646.82	(mg/s)		7,646.82	(mg/s)		7,646.82	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)		344.66	(mg/s)		344.66	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5,861.63	(mg/s)		5,861.63	(mg/s)		5,861.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	22,808.48	(mg/s)		82,425.30	(mg/s)		169,764.76	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	85.092	(mg/L)		34.128	(mg/l)		7.001	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000917488	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.08	(mg/s)		0.53	(mg/s)		4.89	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Proposed Action

Case	**Post-Closure**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020231354	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.40	(mg/s)	1.40	(mg/s)	1.40	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.55	(mg/s)	0.55	(mg/s)	0.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.78	(mg/s)	37.49	(mg/s)	386.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.016	(mg/L)	0.016	(mg/L)

Appendix F.9

Embarrass River

Geotechnical Mitigation

Year 1

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

FLOWS

Case Flows	Year 1 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	11.22	(cfs)	PM-13
	flow check	Q_ck_L =	11.22	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	3.56	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.0010	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 1 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	87.09	(cfs)	PM-13
	flow check	Q_ck_M =	87.09	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	3.56	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.0010	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 1 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	858.64	(cfs)	PM-13
	flow check	Q_ck_H =	858.64	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	3.56	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.0010	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00086	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.33	(mg/s)		2.74	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.00004	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.00030	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.18	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.01	(mg/s)	1.01	(mg/s)	1.01	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)	89.10	(mg/s)	89.10	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	94.91	(mg/s)	347.34	(mg/s)	2,967.53	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.299	(mg/L)	0.141	(mg/L)	0.122	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006769615	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.68	(mg/s)	0.68	(mg/s)	0.68	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.26	(mg/s)	2.89	(mg/s)	19.27	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.137838474	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.91	(mg/s)	13.91	(mg/s)	13.91	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	36.79	(mg/s)	99.88	(mg/s)	689.42	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.116	(mg/L)	0.041	(mg/L)	0.028	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.05E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.09	(mg/s)		5.09	(mg/s)		5.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		5.25	(mg/s)		5.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	20.29	(mg/s)		54.08	(mg/s)		403.43	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.064	(mg/L)		0.022	(mg/L)		0.017	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000376001	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.09	(mg/s)		0.30	(mg/s)		2.48	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	77.28097689	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,796.40	(mg/s)		7,796.40	(mg/s)		7,796.40	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	12.28	(mg/s)		12.28	(mg/s)		12.28	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)		3,373.51	(mg/s)		1.77	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	14,750.01	(mg/s)		50,890.68	(mg/s)		375,041.91	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	46.453	(mg/L)		20.648	(mg/l)		15.434	(mg/l)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00032784	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.09	(mg/s)		0.26	(mg/s)		2.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	Year 1
Parameter	Chloride

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.52E+01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,538.17	(mg/s)		1,538.17	(mg/s)		1,538.17	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	51.97	(mg/s)		51.97	(mg/s)		51.97	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)		1,215.55	(mg/s)		1,215.55	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,168.44	(mg/s)		17,097.80	(mg/s)		159,024.42	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	9.979	(mg/L)		6.937	(mg/L)		6.544	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001495727	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.41	(mg/s)	1.69	(mg/s)	14.79	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0068095	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(mg/s)		0.69	(mg/s)		0.69	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.56	(mg/s)		4.87	(mg/s)		37.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.90E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	292.90	(mg/s)		292.90	(mg/s)		292.90	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)		87.47	(mg/s)		87.47	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	438.48	(mg/s)		864.24	(mg/s)		5,231.21	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	1.381	(mg/L)		0.351	(mg/L)		0.215	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.00E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(mg/s)	0.40	(mg/s)	0.40	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)	259.25	(mg/s)	259.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	292.05	(mg/s)	6,378.57	(mg/s)	69,699.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.920	(mg/L)	2.588	(mg/L)	2.868	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.74E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		24,980.41	(mg/s)		283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)		2,129.58	(mg/s)		2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)		653.73	(mg/s)		653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		121,890.93	(mg/s)		1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)		10,425.01	(mg/s)		10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)		53,090.84	(mg/s)		53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	37,758.64	(mg/s)		37,758.64	(mg/s)		37,758.64	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	254.25	(mg/s)		254.25	(mg/s)		254.25	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)		24,638.27	(mg/s)		24,638.27	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	82,795.96	(mg/s)		275,821.65	(mg/s)		1,804,262.20	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	260.755	(mg/L)		111.911	(mg/L)		74.251	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.31	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	938.93	(mg/s)		938.93	(mg/s)		938.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)		438.48	(mg/s)		438.48	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	38.99	(mg/s)		253.11	(mg/s)		2,469.85	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,008.49	(mg/s)		5,901.39	(mg/s)		19,002.31	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.158	(mg/L)		0.648	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	6.326	(mg/L)		2.394	(mg/L)		0.782	(mg/l)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	44.03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,105.49	(mg/s)		23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)		259.20	(mg/s)		259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)		55.10	(mg/s)		55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,273.66	(mg/s)		117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)		1,268.87	(mg/s)		1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)		15,261.91	(mg/s)		15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,441.73	(mg/s)		4,441.73	(mg/s)		4,441.73	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	6.29	(mg/s)		6.29	(mg/s)		6.29	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)		3,948.56	(mg/s)		3,948.56	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)		2,419.79	(mg/s)		24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	11,973.76	(mg/s)		37,620.81	(mg/s)		166,446.51	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		6.196	(mg/l)		5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	37.710	(mg/L)		15.264	(mg/l)		6.850	(mg/l)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.24	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)		22.40	(mg/s)		22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24.25	(mg/s)		24.25	(mg/s)		24.25	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)		66.76	(mg/s)		66.76	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	124.35	(mg/s)		777.54	(mg/s)		7,328.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.392	(mg/L)		0.315	(mg/l)		0.302	(mg/l)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	52.95	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5,341.70	(mg/s)	5,341.70	(mg/s)	5,341.70	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	7.53	(mg/s)	7.53	(mg/s)	7.53	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)	2,500.51	(mg/s)	2,500.51	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,488.11	(mg/s)	27,927.68	(mg/s)	158,936.87	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	29.882	(mg/L)	11.331	(mg/l)	6.541	(mg/l)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.019144051	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.93	(mg/s)	1.93	(mg/s)	1.93	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.38	(mg/s)	6.15	(mg/s)	32.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.011	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000886329	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.33	(mg/s)		0.66	(mg/s)		3.94	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.05E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.04	(mg/s)	1.14	(mg/s)	2.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001106406	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		0.35	(mg/s)		0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.61	(mg/s)		1.32	(mg/s)		7.87	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	190.00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19,167.71	(mg/s)	19,167.71	(mg/s)	19,167.71	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	216.95	(mg/s)	216.95	(mg/s)	216.95	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	36,940.30	(mg/s)	96,557.11	(mg/s)	183,896.57	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	116.339	(mg/L)	39.177	(mg/l)	7.568	(mg/l)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000907911	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)		0.56	(mg/s)		4.93	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model -Tailings Basin- Geotechnical Mitigation

Case	**Year 1**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0182086	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.84	(mg/s)	1.84	(mg/s)	1.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	4.47	(mg/s)	38.19	(mg/s)	387.54	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.015	(mg/L)	0.016	(mg/L)

Appendix F.10

Embarrass River

Geotechnical Mitigation

Year 5

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

FLOWS

Case Flows	Year 5 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	12.70	(cfs)	PM-13
	flow check	Q_ck_L =	12.70	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.04	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.015	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 5 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	88.57	(cfs)	PM-13
	flow check	Q_ck_M =	88.57	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.04	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.015	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 5 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	860.12	(cfs)	PM-13
	flow check	Q_ck_H =	860.12	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.04	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.015	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00086	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(mg/s)		0.12	(mg/s)		0.12	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)		0.37	(mg/s)		2.77	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.00E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		2.98	(mg/s)		2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.42	(mg/s)		1.42	(mg/s)		1.42	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)		89.10	(mg/s)		89.10	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	95.40	(mg/s)		347.83	(mg/s)		2,968.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.265	(mg/L)		0.139	(mg/L)		0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 5
Parameter	Arsenic

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006769615	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.27	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.31	(mg/s)		15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)		0.33	(mg/s)		0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.96	(mg/s)		0.96	(mg/s)		0.96	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)		0.16	(mg/s)		0.16	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.34	(mg/s)		3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.54	(mg/s)		3.18	(mg/s)		19.55	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.137838474	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.64	(mg/s)		19.64	(mg/s)		19.64	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)		18.62	(mg/s)		18.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	42.57	(mg/s)		105.66	(mg/s)		695.20	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.118	(mg/L)		0.042	(mg/L)		0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.05E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.19	(mg/s)	7.19	(mg/s)	7.19	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	22.39	(mg/s)	56.18	(mg/s)	405.54	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.062	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000376001	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.32	(mg/s)		2.50	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	77.28097689	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11,012.42	(mg/s)	11,012.42	(mg/s)	11,012.42	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	176.59	(mg/s)	176.59	(mg/s)	176.59	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)	3,373.51	(mg/s)	25.38	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	18,130.33	(mg/s)	54,271.00	(mg/s)	378,445.83	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	50.427	(mg/L)	21.651	(mg/l)	15.547	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00032784	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.27	(mg/s)		2.02	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 5
Parameter	Chloride

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.52E+01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,172.67	(mg/s)	2,172.67	(mg/s)	2,172.67	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	747.10	(mg/s)	747.10	(mg/s)	747.10	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55	(mg/s)	1,215.55	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,498.06	(mg/s)	18,427.42	(mg/s)	160,354.05	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	12.511	(mg/L)	7.351	(mg/L)	6.588	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001495727	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.21	(mg/s)		0.21	(mg/s)		0.21	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.47	(mg/s)		1.76	(mg/s)		14.86	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0068095	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.97	(mg/s)	0.97	(mg/s)	0.97	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.84	(mg/s)	5.16	(mg/s)	37.91	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.90E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	413.72	(mg/s)	413.72	(mg/s)	413.72	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.21	(mg/s)	1.21	(mg/s)	1.21	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	560.43	(mg/s)	986.18	(mg/s)	5,353.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	1.559	(mg/L)	0.393	(mg/L)	0.220	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.00E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.57	(mg/s)	0.57	(mg/s)	0.57	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)	259.25	(mg/s)	259.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	292.37	(mg/s)	6,378.89	(mg/s)	69,700.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.813	(mg/L)	2.545	(mg/L)	2.863	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.74E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		24,980.41	(mg/s)		283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)		2,129.58	(mg/s)		2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)		653.73	(mg/s)		653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		121,890.93	(mg/s)		1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)		10,425.01	(mg/s)		10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)		53,090.84	(mg/s)		53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	53,334.08	(mg/s)		53,334.08	(mg/s)		53,334.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,654.83	(mg/s)		3,654.83	(mg/s)		3,654.83	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)		24,638.27	(mg/s)		24,638.27	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	101,771.99	(mg/s)		294,797.68	(mg/s)		1,823,238.23	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	283.067	(mg/L)		117.606	(mg/L)		74.902	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.31	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.76	(mg/s)	0.76	(mg/s)	0.76	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,326.24	(mg/s)	1,326.24	(mg/s)	1,326.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.70	(mg/s)	253.82	(mg/s)	2,470.56	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,396.51	(mg/s)	6,289.41	(mg/s)	19,390.33	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.179	(mg/L)	0.650	(mg/L)	0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	6.666	(mg/L)	2.509	(mg/L)	0.797	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	44.03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6,273.94	(mg/s)	6,273.94	(mg/s)	6,273.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	90.42	(mg/s)	90.42	(mg/s)	90.42	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)	3,948.56	(mg/s)	3,948.56	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	13,890.10	(mg/s)	39,537.14	(mg/s)	168,362.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	38.634	(mg/L)	15.773	(mg/l)	6.917	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.24	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)		22.40	(mg/s)		22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	34.25	(mg/s)		34.25	(mg/s)		34.25	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)		66.76	(mg/s)		66.76	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	134.35	(mg/s)		787.55	(mg/s)		7,338.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.374	(mg/L)		0.314	(mg/l)		0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Sodium**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	52.95	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,545.15	(mg/s)	7,545.15	(mg/s)	7,545.15	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	108.24	(mg/s)	108.24	(mg/s)	108.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)	2,500.51	(mg/s)	2,500.51	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	11,792.27	(mg/s)	30,231.84	(mg/s)	161,241.03	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	32.799	(mg/L)	12.061	(mg/l)	6.624	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.019144051	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.73	(mg/s)		2.73	(mg/s)		2.73	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	4.21	(mg/s)		6.98	(mg/s)		33.19	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.012	(mg/L)		0.003	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000886329	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.37	(mg/s)		0.70	(mg/s)		3.97	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.05E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.15	(mg/s)	1.15	(mg/s)	1.15	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.38	(mg/s)	1.48	(mg/s)	2.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001106406	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		0.35	(mg/s)		0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)		0.16	(mg/s)		0.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.68	(mg/s)		1.39	(mg/s)		7.94	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Sulfate**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	190.00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	27,074.39	(mg/s)	27,074.39	(mg/s)	27,074.39	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,118.71	(mg/s)	3,118.71	(mg/s)	3,118.71	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	47,748.73	(mg/s)	107,365.55	(mg/s)	194,705.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	132.808	(mg/L)	42.832	(mg/l)	7.999	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000907911	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.15	(mg/s)	0.60	(mg/s)	4.96	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 5**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0182086	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.59	(mg/s)		2.59	(mg/s)		2.59	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		0.81	(mg/s)		0.81	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	5.23	(mg/s)		38.95	(mg/s)		388.31	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.015	(mg/L)		0.016	(mg/L)		0.016	(mg/L)

Appendix F.11

Embarrass River

Geotechnical Mitigation

Year 10

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

FLOWS

Case Flows	Year 10 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	13.22	(cfs)	PM-13
	flow check	Q_ck_L =	13.22	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.55	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.017	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 10 Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	89.09	(cfs)	PM-13
	flow check	Q_ck_M =	89.09	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.55	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.017	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 10 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	860.64	(cfs)	PM-13
	flow check	Q_ck_H =	860.64	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.55	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.017	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00084	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.14	(mg/s)	0.38	(mg/s)	2.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Aluminum**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.25E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		2.98	(mg/s)		2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.65	(mg/s)		19.65	(mg/s)		19.65	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)		89.10	(mg/s)		89.10	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	113.63	(mg/s)		366.06	(mg/s)		2,986.25	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.304	(mg/L)		0.145	(mg/L)		0.123	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 10
Parameter	Arsenic

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009432521	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.48	(mg/s)	1.48	(mg/s)	1.48	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.06	(mg/s)	3.69	(mg/s)	20.07	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.149974322	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	23.55	(mg/s)	23.55	(mg/s)	23.55	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	46.48	(mg/s)	109.57	(mg/s)	699.11	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.124	(mg/L)	0.043	(mg/L)	0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.92E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.73	(mg/s)		7.73	(mg/s)		7.73	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		5.25	(mg/s)		5.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	22.93	(mg/s)		56.71	(mg/s)		406.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.061	(mg/L)		0.022	(mg/L)		0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000587308	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.14	(mg/s)	0.35	(mg/s)	2.54	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	107.272439	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	16,841.82	(mg/s)		16,841.82	(mg/s)		16,841.82	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	202.28	(mg/s)		202.28	(mg/s)		202.28	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)		3,373.51	(mg/s)		29.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	23,985.42	(mg/s)		60,126.09	(mg/s)		384,304.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	64.116	(mg/L)		23.848	(mg/l)		15.779	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000645923	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.16	(mg/s)		0.33	(mg/s)		2.08	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 10
Parameter	Chloride

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.09E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	799.23	(mg/s)	799.23	(mg/s)	799.23	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	855.78	(mg/s)	855.78	(mg/s)	855.78	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55	(mg/s)	1,215.55	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,233.31	(mg/s)	17,162.67	(mg/s)	159,089.29	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	8.643	(mg/L)	6.807	(mg/L)	6.532	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001629161	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.51	(mg/s)		1.80	(mg/s)		14.90	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 10
Parameter	Copper

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006983188	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.10	(mg/s)		1.10	(mg/s)		1.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.97	(mg/s)		5.28	(mg/s)		38.04	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.07E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	79.61	(mg/s)	79.61	(mg/s)	79.61	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.39	(mg/s)	1.39	(mg/s)	1.39	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	226.49	(mg/s)	652.24	(mg/s)	5,019.21	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.605	(mg/L)	0.259	(mg/L)	0.206	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.97E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.24	(mg/s)		6.24	(mg/s)		6.24	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.19	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)		259.25	(mg/s)		259.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	298.06	(mg/s)		6,384.58	(mg/s)		69,705.69	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.797	(mg/L)		2.532	(mg/L)		2.862	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.11E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	48,800.08	(mg/s)	48,800.08	(mg/s)	48,800.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,186.52	(mg/s)	4,186.52	(mg/s)	4,186.52	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	97,769.68	(mg/s)	290,795.36	(mg/s)	1,819,235.91	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	261.349	(mg/L)	115.339	(mg/L)	74.693	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 10
Parameter	Potassium

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.98	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.88	(mg/s)	0.88	(mg/s)	0.88	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,252.62	(mg/s)	1,252.62	(mg/s)	1,252.62	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.82	(mg/s)	253.93	(mg/s)	2,470.67	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,323.01	(mg/s)	6,215.90	(mg/s)	19,316.82	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.182	(mg/L)	0.650	(mg/L)	0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	6.210	(mg/L)	2.465	(mg/L)	0.793	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	10.43	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,638.19	(mg/s)	1,638.19	(mg/s)	1,638.19	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	103.57	(mg/s)	103.57	(mg/s)	103.57	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)	3,948.56	(mg/s)	3,948.56	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,267.50	(mg/s)	34,914.55	(mg/s)	163,740.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	24.773	(mg/L)	13.848	(mg/l)	6.723	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.16	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24.88	(mg/s)	24.88	(mg/s)	24.88	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)	66.76	(mg/s)	66.76	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	124.99	(mg/s)	778.18	(mg/s)	7,328.64	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.334	(mg/L)	0.309	(mg/l)	0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Sodium**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	31.37	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,924.53	(mg/s)	4,924.53	(mg/s)	4,924.53	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	123.99	(mg/s)	123.99	(mg/s)	123.99	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)	2,500.51	(mg/s)	2,500.51	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,187.40	(mg/s)	27,626.97	(mg/s)	158,636.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	24.559	(mg/L)	10.958	(mg/l)	6.513	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.024818317	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.90	(mg/s)		3.90	(mg/s)		3.90	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)		0.39	(mg/s)		0.39	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	5.39	(mg/s)		8.16	(mg/s)		34.36	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)		0.003	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002998768	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.47	(mg/s)	0.47	(mg/s)	0.47	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.71	(mg/s)	1.04	(mg/s)	4.32	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 10
Parameter	Antimony

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.17E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.84	(mg/s)	1.84	(mg/s)	1.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.08	(mg/s)	2.17	(mg/s)	3.04	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00156894	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		0.35	(mg/s)		0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.77	(mg/s)		1.48	(mg/s)		8.03	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Sulfate**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	223.12	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	35,029.37	(mg/s)	35,029.37	(mg/s)	35,029.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,572.40	(mg/s)	3,572.40	(mg/s)	3,572.40	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	56,157.40	(mg/s)	115,774.21	(mg/s)	203,113.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	150.115	(mg/L)	45.920	(mg/l)	8.339	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001032064	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)		0.16	(mg/s)		0.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.18	(mg/s)		0.63	(mg/s)		5.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 10**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.063569909	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.98	(mg/s)		9.98	(mg/s)		9.98	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		0.81	(mg/s)		0.81	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.62	(mg/s)		46.33	(mg/s)		395.69	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.034	(mg/L)		0.018	(mg/L)		0.016	(mg/L)

Appendix F.12

Embarrass River

Geotechnical Mitigation

Year 15

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

FLOWS

Case Flows	Year 15 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	13.69	(cfs)	PM-13
	flow check	Q_ck_L =	13.69	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	6.02	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 15 Average Flow Conditions (mean annual)					
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12	
	flow in river at PM-13	Q_r13_M =	89.56	(cfs)	PM-13	81.53
	flow check	Q_ck_M =	89.56	(cfs)		
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12	
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13	
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12	
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13	
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	6.02	(cfs)	PM-13	
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.02	(cfs)	PM-13	
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13	
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12	
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13	

Case Flow	Year 15 High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	861.11	(cfs)	PM-13
	flow check	Q_ck_H =	861.11	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	6.02	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00089	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.16	(mg/s)		0.40	(mg/s)		2.80	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.74E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	14.87	(mg/s)	14.87	(mg/s)	14.87	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)	89.10	(mg/s)	89.10	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	108.86	(mg/s)	361.29	(mg/s)	2,981.47	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.281	(mg/L)	0.143	(mg/L)	0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007825647	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.33	(mg/s)	1.33	(mg/s)	1.33	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.91	(mg/s)	3.55	(mg/s)	19.92	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.153530941	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	26.14	(mg/s)	26.14	(mg/s)	26.14	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	49.08	(mg/s)	112.16	(mg/s)	701.71	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.127	(mg/L)	0.044	(mg/L)	0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.00E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8.50	(mg/s)		8.50	(mg/s)		8.50	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		5.25	(mg/s)		5.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	23.71	(mg/s)		57.49	(mg/s)		406.85	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.061	(mg/L)		0.023	(mg/L)		0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000487063	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)		0.34	(mg/s)		2.53	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	81.6110992	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13,893.59	(mg/s)	13,893.59	(mg/s)	13,893.59	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	205.46	(mg/s)	205.46	(mg/s)	205.46	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)	3,373.51	(mg/s)	29.52	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	21,040.37	(mg/s)	57,181.04	(mg/s)	381,360.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/L)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	54.319	(mg/L)	22.561	(mg/L)	15.649	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000567381	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.15	(mg/s)		0.32	(mg/s)		2.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.66E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	963.96	(mg/s)		963.96	(mg/s)		963.96	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	869.24	(mg/s)		869.24	(mg/s)		869.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)		1,215.55	(mg/s)		1,215.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,411.50	(mg/s)		17,340.86	(mg/s)		159,267.48	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	8.807	(mg/L)		6.842	(mg/L)		6.536	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 15
Parameter	Cobalt

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001926627	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.59	(mg/s)	1.87	(mg/s)	14.97	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009053616	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.54	(mg/s)		1.54	(mg/s)		1.54	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.41	(mg/s)		5.73	(mg/s)		38.48	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.63E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	95.87	(mg/s)		95.87	(mg/s)		95.87	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.41	(mg/s)		1.41	(mg/s)		1.41	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)		87.47	(mg/s)		87.47	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	242.78	(mg/s)		668.53	(mg/s)		5,035.50	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.627	(mg/L)		0.264	(mg/L)		0.207	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.86E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.57	(mg/s)		6.57	(mg/s)		6.57	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.20	(mg/s)		0.20	(mg/s)		0.20	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)		259.25	(mg/s)		259.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	298.40	(mg/s)		6,384.92	(mg/s)		69,706.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.770	(mg/L)		2.519	(mg/L)		2.860	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.55E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	43,358.02	(mg/s)	43,358.02	(mg/s)	43,358.02	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,252.38	(mg/s)	4,252.38	(mg/s)	4,252.38	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	92,393.48	(mg/s)	285,419.17	(mg/s)	1,813,859.72	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	238.530	(mg/L)	112.615	(mg/L)	74.432	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.68	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.89	(mg/s)		5.60	(mg/s)		0.89	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		3,029.85	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		1,137.30	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,137.30	(mg/s)		0.89	(mg/s)		1,137.30	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)		438.48	(mg/s)		438.48	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.83	(mg/s)		258.66	(mg/s)		2,470.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,207.70	(mg/s)		6,100.59	(mg/s)		19,201.51	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.183	(mg/L)		0.662	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	5.700	(mg/L)		2.407	(mg/L)		0.788	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	12.36	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,104.35	(mg/s)	2,104.35	(mg/s)	2,104.35	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	105.20	(mg/s)	105.20	(mg/s)	105.20	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)	3,948.56	(mg/s)	3,948.56	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,735.30	(mg/s)	35,382.34	(mg/s)	164,208.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/L)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	25.133	(mg/L)	13.960	(mg/L)	6.738	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Manganese**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.19	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)		22.40	(mg/s)		22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	33.00	(mg/s)		33.00	(mg/s)		33.00	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)		66.76	(mg/s)		66.76	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	133.10	(mg/s)		786.29	(mg/s)		7,336.75	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/L)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.344	(mg/L)		0.310	(mg/L)		0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	26.02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,430.53	(mg/s)		4,430.53	(mg/s)		4,430.53	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	125.94	(mg/s)		125.94	(mg/s)		125.94	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)		2,500.51	(mg/s)		2,500.51	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	8,695.35	(mg/s)		27,134.93	(mg/s)		158,144.12	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/L)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	22.449	(mg/L)		10.706	(mg/L)		6.489	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.022174447	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.78	(mg/s)	3.78	(mg/s)	3.78	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	5.27	(mg/s)	8.04	(mg/s)	34.24	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.003	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002700416	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.46	(mg/s)		0.46	(mg/s)		0.46	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.70	(mg/s)		1.03	(mg/s)		4.31	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 15
Parameter	Antimony

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.29E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.58	(mg/s)		1.58	(mg/s)		1.58	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.82	(mg/s)		1.91	(mg/s)		2.78	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001534421	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.79	(mg/s)	1.50	(mg/s)	8.05	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	183.93	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	31,312.16	(mg/s)	31,312.16	(mg/s)	31,312.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,628.60	(mg/s)	3,628.60	(mg/s)	3,628.60	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	52,496.39	(mg/s)	112,113.21	(mg/s)	199,452.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/L)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	135.529	(mg/L)	44.235	(mg/L)	8.185	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001032291	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.19	(mg/s)		0.64	(mg/s)		5.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 15**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.066565637	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.33	(mg/s)	11.33	(mg/s)	11.33	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	13.97	(mg/s)	47.69	(mg/s)	397.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.036	(mg/L)	0.019	(mg/L)	0.016	(mg/L)

Appendix F.13

Embarrass River

Geotechnical Mitigation

Year 20

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

FLOWS

Case Flows	Year 20 Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	14.13	(cfs)	PM-13
	flow check	Q_ck_L =	14.13	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	6.46	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.0193	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Year 20 Average Flow Conditions (mean annual)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	90.00	(cfs)	PM-13
	flow check	Q_ck_M =	90.00	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	6.46	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.0193	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 20 High Flow Conditions (avg. annual 1-day max flow)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	861.55	(cfs)	PM-13
	flow check	Q_ck_H =	861.55	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	6.46	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.0193	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00095	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.19	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.18	(mg/s)		0.42	(mg/s)		2.82	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.88E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		42.82	(mg/s)		486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)		0.61	(mg/s)		0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)		1.12	(mg/s)		1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		208.96	(mg/s)		2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		2.98	(mg/s)		2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12.58	(mg/s)		12.58	(mg/s)		12.58	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)		89.10	(mg/s)		89.10	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)		44.55	(mg/s)		487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	106.58	(mg/s)		359.01	(mg/s)		2,979.19	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)		0.114	(mg/L)		0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.266	(mg/L)		0.141	(mg/L)		0.122	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007453418	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.36	(mg/s)	1.36	(mg/s)	1.36	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.94	(mg/s)	3.58	(mg/s)	19.95	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.158659552	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	29.01	(mg/s)	29.01	(mg/s)	29.01	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	51.96	(mg/s)	115.04	(mg/s)	704.59	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.130	(mg/L)	0.045	(mg/L)	0.029	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.40E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.87	(mg/s)		9.87	(mg/s)		9.87	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		5.25	(mg/s)		5.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	25.08	(mg/s)		58.86	(mg/s)		408.22	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.063	(mg/L)		0.023	(mg/L)		0.017	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000472927	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)		0.35	(mg/s)		2.53	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	65.23766506	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11,928.83	(mg/s)		11,928.83	(mg/s)		11,928.83	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	227.25	(mg/s)		227.25	(mg/s)		227.25	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)		3,373.51	(mg/s)		32.66	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	19,097.41	(mg/s)		55,238.08	(mg/s)		379,420.20	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	47.743	(mg/L)		21.686	(mg/l)		15.561	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000503271	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.03	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.14	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.15	(mg/s)		0.32	(mg/s)		2.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.85E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,070.58	(mg/s)		1,070.58	(mg/s)		1,070.58	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	961.45	(mg/s)		961.45	(mg/s)		961.45	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)		1,215.55	(mg/s)		1,215.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,610.33	(mg/s)		17,539.69	(mg/s)		159,466.31	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	9.026	(mg/L)		6.886	(mg/L)		6.540	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00218589	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(mg/s)		0.40	(mg/s)		0.40	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.66	(mg/s)		1.94	(mg/s)		15.04	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.011428793	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.09	(mg/s)		2.09	(mg/s)		2.09	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.96	(mg/s)		6.28	(mg/s)		39.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.007	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.99E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	109.60	(mg/s)		109.60	(mg/s)		109.60	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.56	(mg/s)		1.56	(mg/s)		1.56	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)		87.47	(mg/s)		87.47	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	256.65	(mg/s)		682.40	(mg/s)		5,049.38	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.642	(mg/L)		0.268	(mg/L)		0.207	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.17E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.97	(mg/s)		3.97	(mg/s)		3.97	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.22	(mg/s)		0.22	(mg/s)		0.22	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)		259.25	(mg/s)		259.25	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	295.82	(mg/s)		6,382.34	(mg/s)		69,703.45	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.740	(mg/L)		2.506	(mg/L)		2.859	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Year 20
Parameter	Hardness

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.18E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	39,904.86	(mg/s)	39,904.86	(mg/s)	39,904.86	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,703.46	(mg/s)	4,703.46	(mg/s)	4,703.46	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	89,391.40	(mg/s)	282,417.09	(mg/s)	1,810,857.64	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	223.474	(mg/L)	110.877	(mg/L)	74.270	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.23	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.98	(mg/s)		0.98	(mg/s)		0.98	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,138.87	(mg/s)		1,138.87	(mg/s)		1,138.87	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)		438.48	(mg/s)		438.48	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.92	(mg/s)		254.04	(mg/s)		2,470.78	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,209.36	(mg/s)		6,102.25	(mg/s)		19,203.17	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.186	(mg/L)		0.650	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	5.523	(mg/L)		2.396	(mg/L)		0.788	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.44	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,105.49	(mg/s)		23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)		259.20	(mg/s)		259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)		55.10	(mg/s)		55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,273.66	(mg/s)		117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)		1,268.87	(mg/s)		1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)		15,261.91	(mg/s)		15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,457.15	(mg/s)		2,457.15	(mg/s)		2,457.15	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	116.36	(mg/s)		116.36	(mg/s)		116.36	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)		3,948.56	(mg/s)		3,948.56	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)		2,419.79	(mg/s)		24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,099.26	(mg/s)		35,746.30	(mg/s)		164,572.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		6.196	(mg/l)		5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	25.248	(mg/L)		14.034	(mg/l)		6.750	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.23	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	42.20	(mg/s)	42.20	(mg/s)	42.20	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)	66.76	(mg/s)	66.76	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	142.30	(mg/s)	795.50	(mg/s)	7,345.96	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.356	(mg/L)	0.312	(mg/l)	0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	22.22	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,062.28	(mg/s)	4,062.28	(mg/s)	4,062.28	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	139.30	(mg/s)	139.30	(mg/s)	139.30	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)	2,500.51	(mg/s)	2,500.51	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	8,340.46	(mg/s)	26,780.03	(mg/s)	157,789.22	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	20.851	(mg/L)	10.514	(mg/l)	6.472	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.023571036	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4.31	(mg/s)	4.31	(mg/s)	4.31	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	5.81	(mg/s)	8.58	(mg/s)	34.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.015	(mg/L)	0.003	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002295615	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.42	(mg/s)		0.42	(mg/s)		0.42	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.66	(mg/s)		0.99	(mg/s)		4.27	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.78E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.61	(mg/s)	1.61	(mg/s)	1.61	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.84	(mg/s)	1.94	(mg/s)	2.81	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001434159	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.79	(mg/s)	1.50	(mg/s)	8.05	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	163.33	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	29,864.60	(mg/s)	29,864.60	(mg/s)	29,864.60	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,013.51	(mg/s)	4,013.51	(mg/s)	4,013.51	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	51,433.74	(mg/s)	111,050.56	(mg/s)	198,390.02	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	128.582	(mg/L)	43.598	(mg/l)	8.137	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001001115	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.20	(mg/s)		0.65	(mg/s)		5.02	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Year 20**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.058688337	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	10.73	(mg/s)		10.73	(mg/s)		10.73	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		0.81	(mg/s)		0.81	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	13.37	(mg/s)		47.09	(mg/s)		396.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.033	(mg/L)		0.018	(mg/L)		0.016	(mg/L)

Appendix F.14

Embarrass River

Geotechnical Mitigation

Closure

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

FLOWS

Case Flows	Closure Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	9.06	(cfs)	PM-13
	flow check	Q_ck_L =	9.06	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	1.73	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.0017	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.67	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Closure Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	84.93	(cfs)	PM-13
	flow check	Q_ck_M =	84.93	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	1.73	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.0017	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.67	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Closure High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	856.48	(cfs)	PM-13
	flow check	Q_ck_H =	856.48	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	1.73	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.67	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00124	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)	0.31	(mg/s)	2.71	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.15E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	30.13	(mg/s)	30.13	(mg/s)	30.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	74.66	(mg/s)	74.66	(mg/s)	74.66	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	109.60	(mg/s)	362.03	(mg/s)	2,982.21	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.427	(mg/L)	0.151	(mg/L)	0.123	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Arsenic**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.027915158	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.91	(mg/s)	3.55	(mg/s)	19.93	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.007	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.150573845	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		9.64	(mg/s)		109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)		0.52	(mg/s)		0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		47.02	(mg/s)		537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)		2.53	(mg/s)		2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.38	(mg/s)		7.38	(mg/s)		7.38	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	15.61	(mg/s)		15.61	(mg/s)		15.61	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)		10.40	(mg/s)		110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	27.25	(mg/s)		90.34	(mg/s)		679.88	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)		0.027	(mg/L)		0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.106	(mg/L)		0.038	(mg/L)		0.028	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.95E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)		1.66	(mg/s)		1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		8.11	(mg/s)		8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.95	(mg/s)		0.95	(mg/s)		0.95	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	4.40	(mg/s)		4.40	(mg/s)		4.40	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)		7.52	(mg/s)		66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	15.30	(mg/s)		49.09	(mg/s)		398.45	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)		0.019	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.060	(mg/L)		0.020	(mg/L)		0.016	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001323498	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)	0.32	(mg/s)	2.50	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	68.73996034	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5,352.95	(mg/s)		60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)		462.42	(mg/s)		462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)		140.09	(mg/s)		140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		26,119.49	(mg/s)		298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)		2,263.72	(mg/s)		2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)		5,369.83	(mg/s)		5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,367.90	(mg/s)		3,367.90	(mg/s)		3,367.90	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)		19.51	(mg/s)		19.51	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,826.97	(mg/s)		2,826.97	(mg/s)		2.80	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)		5,955.45	(mg/s)		61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,782.19	(mg/s)		45,922.86	(mg/s)		370,621.67	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)		15.249	(mg/l)		15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	38.136	(mg/L)		19.106	(mg/l)		15.291	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001182282	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)	0.28	(mg/s)	2.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Chloride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.97E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,319.61	(mg/s)		26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)		43.81	(mg/s)		43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)		60.70	(mg/s)		60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		11,318.44	(mg/s)		129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)		214.46	(mg/s)		214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	194.68	(mg/s)		194.68	(mg/s)		194.68	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)		82.56	(mg/s)		82.56	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,018.62	(mg/s)		1,018.62	(mg/s)		1,018.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)		2,424.12	(mg/s)		26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,658.61	(mg/s)		15,587.96	(mg/s)		157,514.59	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		6.207	(mg/L)		6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	6.466	(mg/L)		6.485	(mg/L)		6.499	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002707554	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.37	(mg/s)		1.66	(mg/s)		14.76	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.014116893	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.54	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.61	(mg/s)		30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)		0.48	(mg/s)		0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(mg/s)		0.69	(mg/s)		0.69	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.22	(mg/s)		0.22	(mg/s)		0.22	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.52	(mg/s)		4.84	(mg/s)		37.59	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)		0.002	(mg/L)		0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.14E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	55.70	(mg/s)		55.70	(mg/s)		55.70	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	73.30	(mg/s)		73.30	(mg/s)		73.30	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	187.16	(mg/s)		612.92	(mg/s)		4,979.89	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.730	(mg/L)		0.255	(mg/L)		0.205	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.94E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,034.90	(mg/s)		11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)		0.85	(mg/s)		0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)		27.08	(mg/s)		27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		5,049.77	(mg/s)		57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)		4.17	(mg/s)		4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4.87	(mg/s)		4.87	(mg/s)		4.87	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	217.25	(mg/s)		217.25	(mg/s)		217.25	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	254.52	(mg/s)		6,341.04	(mg/s)		69,662.15	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.992	(mg/L)		2.638	(mg/L)		2.874	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	402	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8610	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		24,980.41	(mg/s)		283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)		2,129.58	(mg/s)		2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)		653.73	(mg/s)		653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		121,890.93	(mg/s)		1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)		10,425.01	(mg/s)		10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)		53,090.84	(mg/s)		53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19,699.16	(mg/s)		19,699.16	(mg/s)		19,699.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)		403.90	(mg/s)		403.90	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	20,646.59	(mg/s)		20,646.59	(mg/s)		20,646.59	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	60,894.46	(mg/s)		253,920.15	(mg/s)		1,782,360.70	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	237.397	(mg/L)		105.640	(mg/L)		73.534	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	21.31	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,043.93	(mg/s)		1,043.93	(mg/s)		1,043.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	367.44	(mg/s)		367.44	(mg/s)		367.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.03	(mg/s)		253.14	(mg/s)		2,469.88	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,042.48	(mg/s)		5,935.37	(mg/s)		19,036.29	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.159	(mg/L)		0.648	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	7.963	(mg/L)		2.469	(mg/L)		0.785	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Closure
Parameter	Magnesium

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	55.96	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,105.49	(mg/s)		23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)		259.20	(mg/s)		259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)		55.10	(mg/s)		55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,273.66	(mg/s)		117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)		1,268.87	(mg/s)		1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)		15,261.91	(mg/s)		15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,741.51	(mg/s)		2,741.51	(mg/s)		2,741.51	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)		9.99	(mg/s)		9.99	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3,308.85	(mg/s)		3,308.85	(mg/s)		3,308.85	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)		2,419.79	(mg/s)		24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,637.53	(mg/s)		35,284.58	(mg/s)		164,110.28	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		6.196	(mg/l)		5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	37.572	(mg/L)		14.680	(mg/l)		6.771	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.14	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		107.06	(mg/s)		1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)		4.58	(mg/s)		4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)		2.80	(mg/s)		2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		522.39	(mg/s)		5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)		22.40	(mg/s)		22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.03	(mg/s)		7.03	(mg/s)		7.03	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	55.94	(mg/s)		55.94	(mg/s)		55.94	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	96.32	(mg/s)		749.51	(mg/s)		7,299.97	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.376	(mg/L)		0.312	(mg/l)		0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	26.63	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		2,141.18	(mg/s)		24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)		119.26	(mg/s)		119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)		56.03	(mg/s)		56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		10,447.79	(mg/s)		119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)		583.80	(mg/s)		583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)		6,729.88	(mg/s)		6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,304.55	(mg/s)		1,304.55	(mg/s)		1,304.55	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)		11.96	(mg/s)		11.96	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,095.40	(mg/s)		2,095.40	(mg/s)		2,095.40	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)		2,316.47	(mg/s)		24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,050.29	(mg/s)		23,489.86	(mg/s)		154,499.05	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)		5.931	(mg/l)		5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	19.689	(mg/L)		9.773	(mg/l)		6.374	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005498724	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.27	(mg/s)	0.27	(mg/s)	0.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.65	(mg/s)	4.43	(mg/s)	30.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00095888	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.28	(mg/s)		0.61	(mg/s)		3.88	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.16E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.01	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)		0.04	(mg/s)		0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)		0.18	(mg/s)		0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)		0.05	(mg/s)		0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.29	(mg/s)		0.38	(mg/s)		1.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Selenium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.003346354	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.11	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.52	(mg/s)		6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		0.35	(mg/s)		0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)		0.16	(mg/s)		0.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)		0.18	(mg/s)		1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.66	(mg/s)		1.36	(mg/s)		7.91	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Sulfate**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	176.50	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,427.45	(mg/s)		16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)		206.87	(mg/s)		206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)		37.36	(mg/s)		37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,965.20	(mg/s)		79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)		1,012.72	(mg/s)		1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)		58,922.60	(mg/s)		58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8,647.39	(mg/s)		8,647.39	(mg/s)		8,647.39	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)		344.66	(mg/s)		344.66	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	7,206.92	(mg/s)		7,206.92	(mg/s)		7,206.92	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	25,154.34	(mg/s)		84,771.16	(mg/s)		172,110.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	98.064	(mg/L)		35.268	(mg/l)		7.101	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000106288	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)	0.47	(mg/s)	4.84	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Closure**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012754048	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.62	(mg/s)	0.62	(mg/s)	0.62	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.68	(mg/s)	0.68	(mg/s)	0.68	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.13	(mg/s)	36.84	(mg/s)	386.20	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.012	(mg/L)	0.015	(mg/L)	0.016	(mg/L)

Appendix F.15

Embarrass River

Geotechnical Mitigation

Post-Closure

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

FLOWS

Case Flows	Post-Closure Low Flow Conditions (no surface runoff)				Node
Total flow in Embarrass River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	8.75	(cfs)	PM-13
	flow check	Q_ck_L =	8.75	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	1.73	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	1.36	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case Flow	Post-Closure Average Flow Conditions (mean annual)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
	flow in river at PM-13	Q_r13_M =	84.62	(cfs)	PM-13
	flow check	Q_ck_M =	84.62	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	1.73	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	1.36	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Post-Closure High Flow Conditions (avg. annual 1-day max flow)				
Total flow in Embarrass River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
	flow in river at PM-13	Q_r13_H =	856.17	(cfs)	PM-13
	flow check	Q_ck_H =	856.17	(cfs)	
Input flow data	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	1.73	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	1.36	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Silver**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00124	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000008	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)	0.31	(mg/s)	2.71	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.15E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	30.13	(mg/s)	30.13	(mg/s)	30.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	60.72	(mg/s)	60.72	(mg/s)	60.72	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	95.66	(mg/s)	348.09	(mg/s)	2,968.28	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
	concentration in river at PM-13	C_r13 =	0.386	(mg/L)	0.145	(mg/L)	0.123	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Post-Closure
Parameter	Arsenic

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.027915158	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.89	(mg/s)	3.53	(mg/s)	19.90	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.150573845	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.38	(mg/s)	7.38	(mg/s)	7.38	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	12.69	(mg/s)	12.69	(mg/s)	12.69	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
	mass flux in river at PM-13	M_r13 =	24.34	(mg/s)	87.42	(mg/s)	676.97	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
	concentration in river at PM-13	C_r13 =	0.098	(mg/L)	0.037	(mg/L)	0.028	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Barium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.95E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.95	(mg/s)	0.95	(mg/s)	0.95	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	3.58	(mg/s)	3.58	(mg/s)	3.58	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
	mass flux in river at PM-13	M_r13 =	14.48	(mg/s)	48.27	(mg/s)	397.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.058	(mg/L)	0.020	(mg/L)	0.016	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Beryllium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001323498	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.04	(mg/s)		0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.17	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)		0.31	(mg/s)		2.50	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Calcium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	68.73996034	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,367.90	(mg/s)	3,367.90	(mg/s)	3,367.90	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)	19.51	(mg/s)	19.51	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,299.27	(mg/s)	2,299.27	(mg/s)	2.80	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,254.49	(mg/s)	45,395.16	(mg/s)	370,621.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
	concentration in river at PM-13	C_r13 =	37.364	(mg/L)	18.956	(mg/l)	15.296	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Cadmium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001182282	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.11	(mg/s)	0.28	(mg/s)	2.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Post-Closure
Parameter	Chloride

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.97E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	194.68	(mg/s)	194.68	(mg/s)	194.68	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)	82.56	(mg/s)	82.56	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	828.47	(mg/s)	828.47	(mg/s)	828.47	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,468.46	(mg/s)	15,397.82	(mg/s)	157,324.45	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
	concentration in river at PM-13	C_r13 =	5.929	(mg/L)	6.430	(mg/L)	6.493	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Cobalt**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002707554	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.21	(mg/s)		2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1.04	(mg/s)		12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		0.06	(mg/s)		0.06	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.25	(mg/s)		2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.36	(mg/s)		1.65	(mg/s)		14.75	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Copper**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.014116893	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(mg/s)	0.69	(mg/s)	0.69	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.48	(mg/s)	4.80	(mg/s)	37.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.14E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		71.37	(mg/s)		810	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)		9.37	(mg/s)		9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)		1.87	(mg/s)		1.87	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		348.26	(mg/s)		3,976	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)		45.87	(mg/s)		45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	55.70	(mg/s)		55.70	(mg/s)		55.70	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)		0.13	(mg/s)		0.13	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	59.62	(mg/s)		59.62	(mg/s)		59.62	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)		82.61	(mg/s)		821.52	(mg/s)
	mass flux in river at PM-13	M_r13 =	173.48	(mg/s)		599.23	(mg/s)		4,966.21	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)		0.212	(mg/L)		0.201	(mg/L)
	concentration in river at PM-13	C_r13 =	0.700	(mg/L)		0.250	(mg/L)		0.205	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Iron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.94E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4.87	(mg/s)	4.87	(mg/s)	4.87	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	176.69	(mg/s)	176.69	(mg/s)	176.69	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	213.97	(mg/s)	6,300.48	(mg/s)	69,621.59	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.864	(mg/L)	2.631	(mg/L)	2.873	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Hardness**

Input concentration data	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.02E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		24,980.41	(mg/s)		283,600	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)		2,129.58	(mg/s)		2,129.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)		653.73	(mg/s)		653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		121,890.93	(mg/s)		1,391,712	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)		10,425.01	(mg/s)		10,425.01	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)		53,090.84	(mg/s)		53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19,699.16	(mg/s)		19,699.16	(mg/s)		19,699.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)		403.90	(mg/s)		403.90	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	16,792.56	(mg/s)		16,792.56	(mg/s)		16,792.56	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	57,040.43	(mg/s)		250,066.12	(mg/s)		1,778,506.67	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	230.297	(mg/L)		104.420	(mg/L)		73.402	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Potassium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	21.31	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		214.12	(mg/s)		2,431	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)		38.94	(mg/s)		38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)		0.08	(mg/s)		0.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		1,044.78	(mg/s)		11,929	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)		190.63	(mg/s)		190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)		5.60	(mg/s)		5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)		3,029.85	(mg/s)		3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,043.93	(mg/s)		1,043.93	(mg/s)		1,043.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	298.85	(mg/s)		298.85	(mg/s)		298.85	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.03	(mg/s)		253.14	(mg/s)		2,469.88	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,973.89	(mg/s)		5,866.78	(mg/s)		18,967.70	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.159	(mg/L)		0.648	(mg/L)		0.605	(mg/l)
	concentration in river at PM-13	C_r13 =	7.969	(mg/L)		2.450	(mg/L)		0.783	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Magnesium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	55.96	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,741.51	(mg/s)	2,741.51	(mg/s)	2,741.51	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)	9.99	(mg/s)	9.99	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	2,691.19	(mg/s)	2,691.19	(mg/s)	2,691.19	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,019.88	(mg/s)	34,666.93	(mg/s)	163,492.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
	concentration in river at PM-13	C_r13 =	36.417	(mg/L)	14.476	(mg/l)	6.748	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Manganese**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.14	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.03	(mg/s)	7.03	(mg/s)	7.03	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	45.50	(mg/s)	45.50	(mg/s)	45.50	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	85.88	(mg/s)	739.07	(mg/s)	7,289.53	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.347	(mg/L)	0.309	(mg/l)	0.301	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Sodium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	26.63	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flow		**Average Flow**		**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,304.55	(mg/s)	1,304.55	(mg/s)	1,304.55	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)	11.96	(mg/s)	11.96	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1,704.26	(mg/s)	1,704.26	(mg/s)	1,704.26	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,659.15	(mg/s)	23,098.72	(mg/s)	154,107.91	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
	concentration in river at PM-13	C_r13 =	18.811	(mg/L)	9.645	(mg/l)	6.360	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Nickel**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005498724	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.43	(mg/s)		5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		2.09	(mg/s)		24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)		0.83	(mg/s)		0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.27	(mg/s)		0.27	(mg/s)		0.27	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		0.26	(mg/s)		0.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.59	(mg/s)		4.36	(mg/s)		30.57	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.006	(mg/L)		0.002	(mg/L)		0.001	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00095888	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.05	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.26	(mg/s)		3	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)		0.14	(mg/s)		0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.05	(mg/s)		0.05	(mg/s)		0.05	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)		0.08	(mg/s)		0.64	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.27	(mg/s)		0.60	(mg/s)		3.87	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.16E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.28	(mg/s)	0.38	(mg/s)	1.25	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Post-Closure
Parameter	Selenium

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.003346354	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flow		Average Flow		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.65	(mg/s)	1.35	(mg/s)	7.90	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	Post-Closure
Parameter	Sulfate

Input concentration data	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	176.50	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		1,427.45	(mg/s)		16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)		206.87	(mg/s)		206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)		37.36	(mg/s)		37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,965.20	(mg/s)		79,526	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)		1,012.72	(mg/s)		1,012.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)		58,922.60	(mg/s)		58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8,647.39	(mg/s)		8,647.39	(mg/s)		8,647.39	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)		344.66	(mg/s)		344.66	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	5,861.63	(mg/s)		5,861.63	(mg/s)		5,861.63	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	23,809.05	(mg/s)		83,425.87	(mg/s)		170,765.33	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	96.128	(mg/L)		34.836	(mg/l)		7.048	(mg/l)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Thallium**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000106288	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow			Average Flow			High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		0.07	(mg/s)		1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.35	(mg/s)		4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.47	(mg/s)		4.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

Embarrass River Mass-Balance Model-Tailings Basin-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Zinc**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012754048	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flow			**Average Flow**			**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)		5.71	(mg/s)		65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)		0.28	(mg/s)		0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)		0.15	(mg/s)		0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		27.86	(mg/s)		318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.62	(mg/s)		0.62	(mg/s)		0.62	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.55	(mg/s)		0.55	(mg/s)		0.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.43	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.00	(mg/s)		36.72	(mg/s)		386.07	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.012	(mg/L)		0.015	(mg/L)		0.016	(mg/L)

Appendix G

Culpability Analysis of Tailings Basin Features and Embarrass River Watershed Features for Tailings Basin-Proposed Action and Tailings Basin-Geotechnical Mitigation

Tailings Basin-Proposed Action

G.2 Embarrass River Watershed

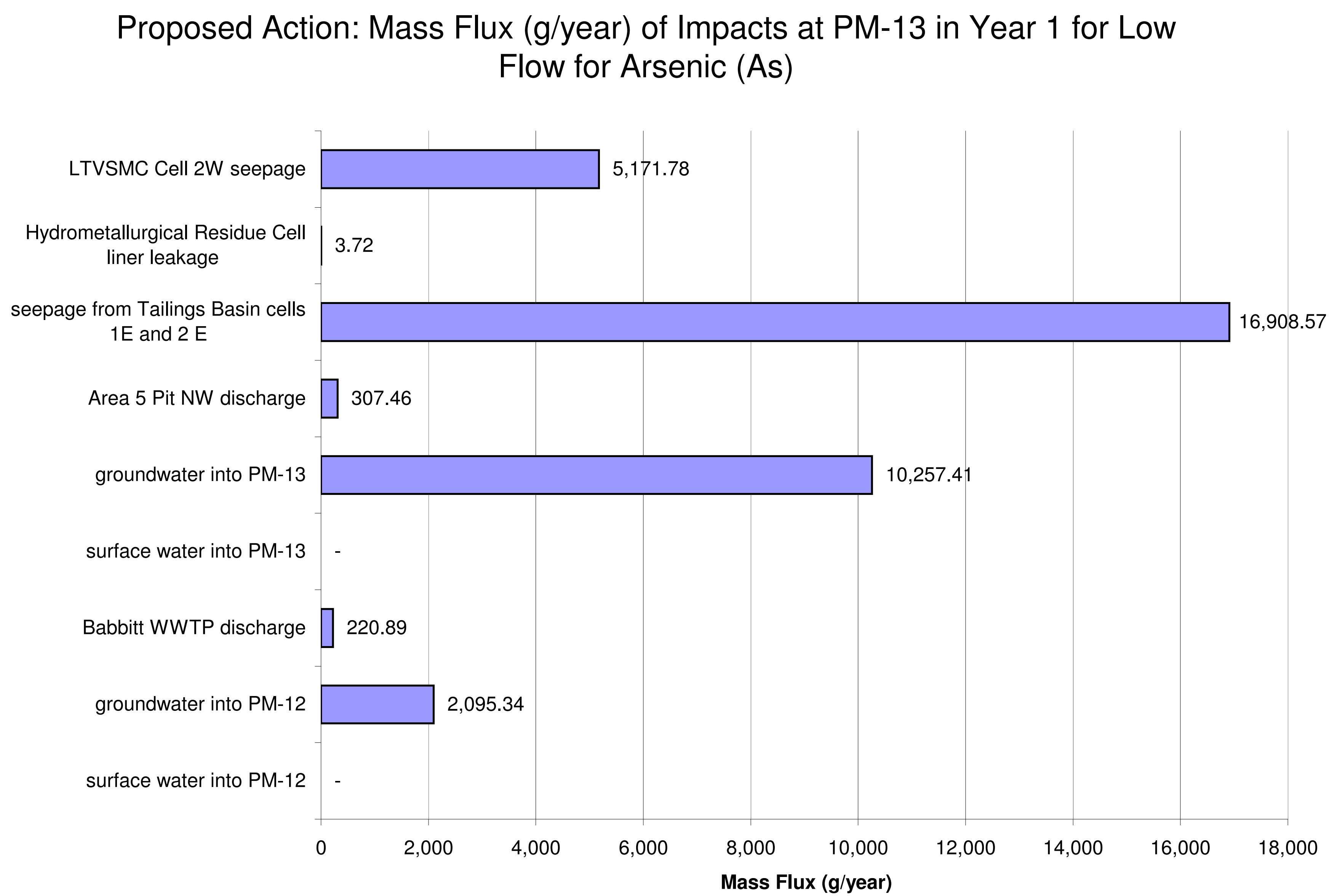
Tailings Basin-Geotechnical Mitigation

G.4 Embarrass River Watershed

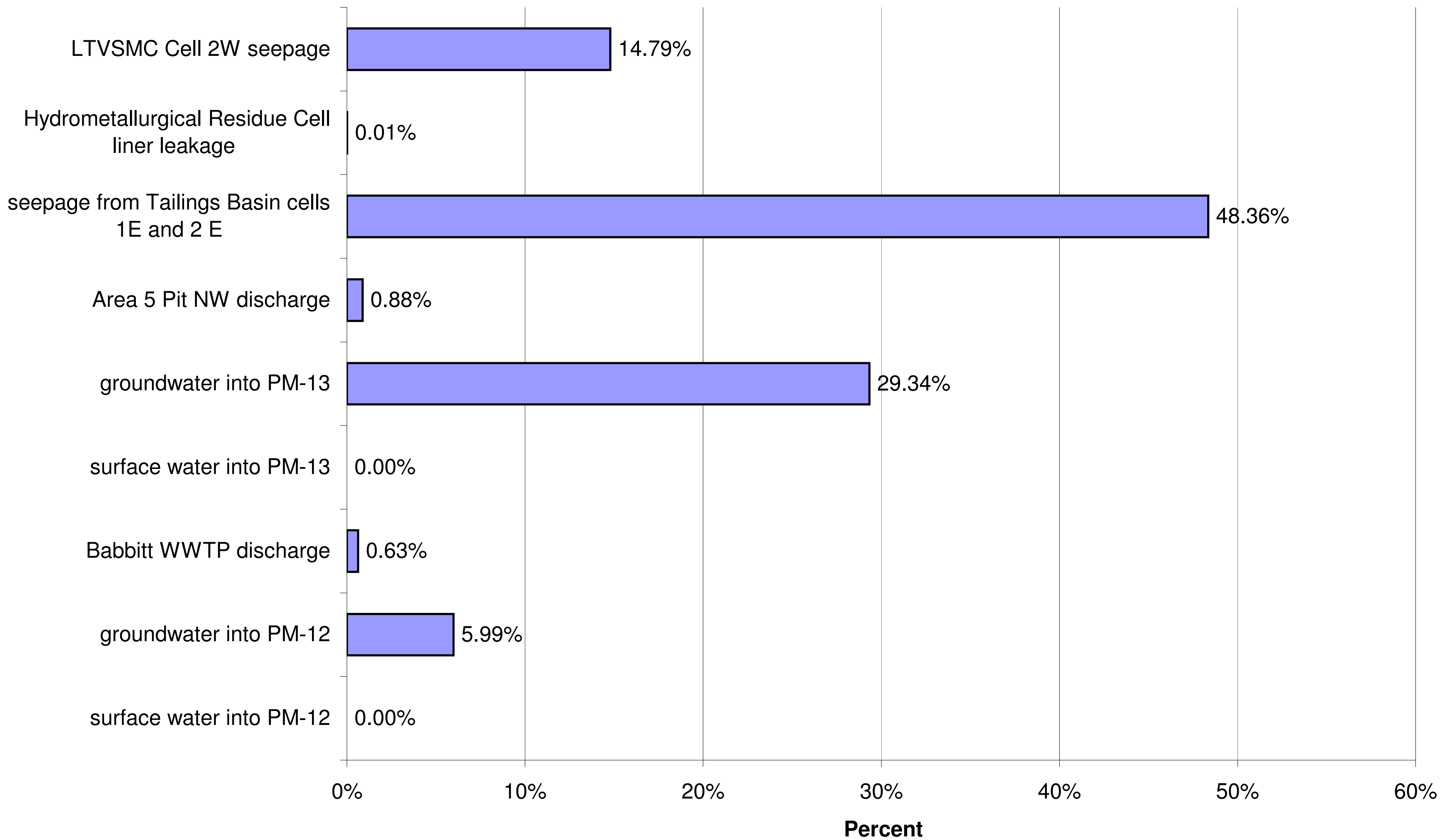
Appendix G.2

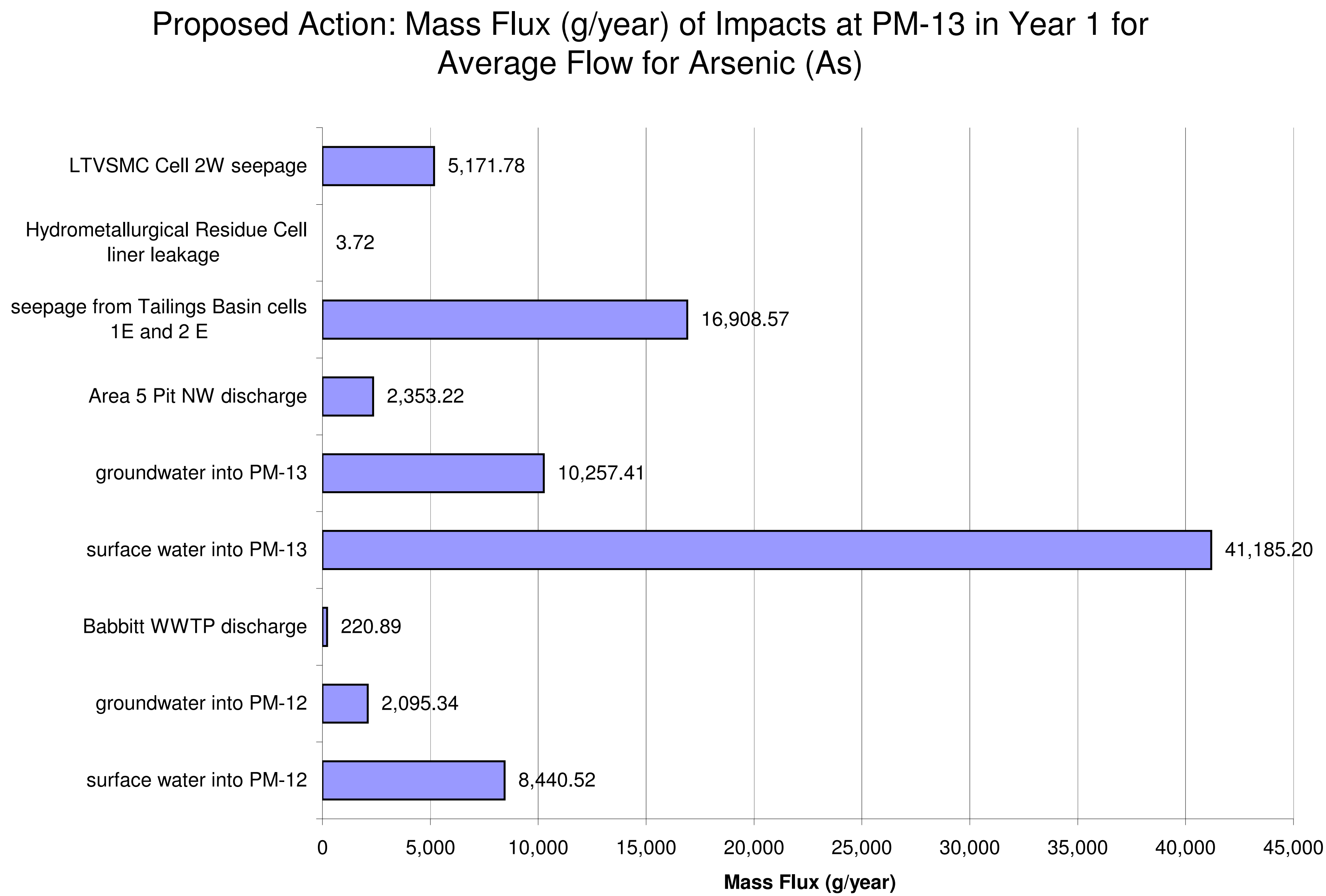
Embarrass River Watershed

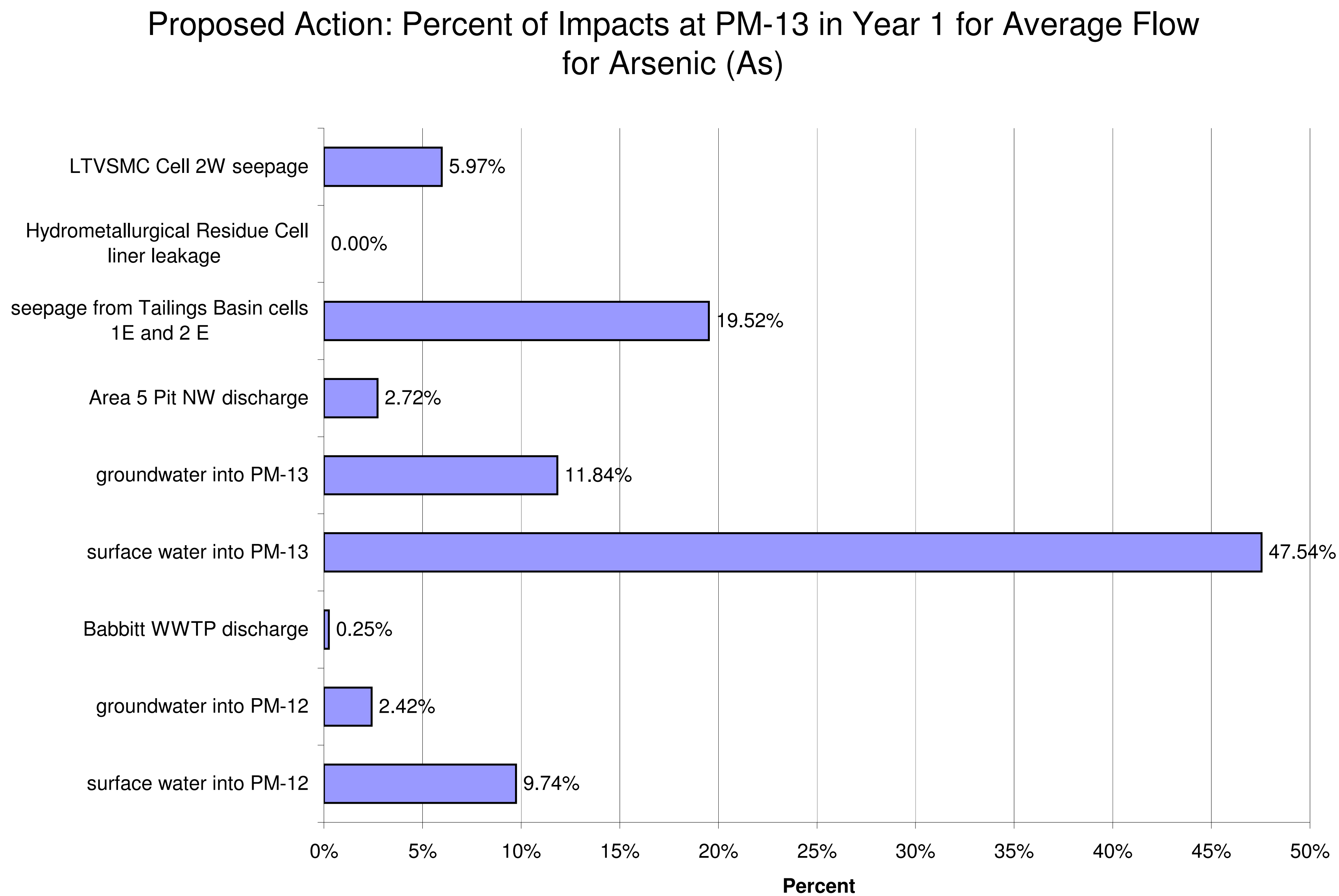
Proposed Action

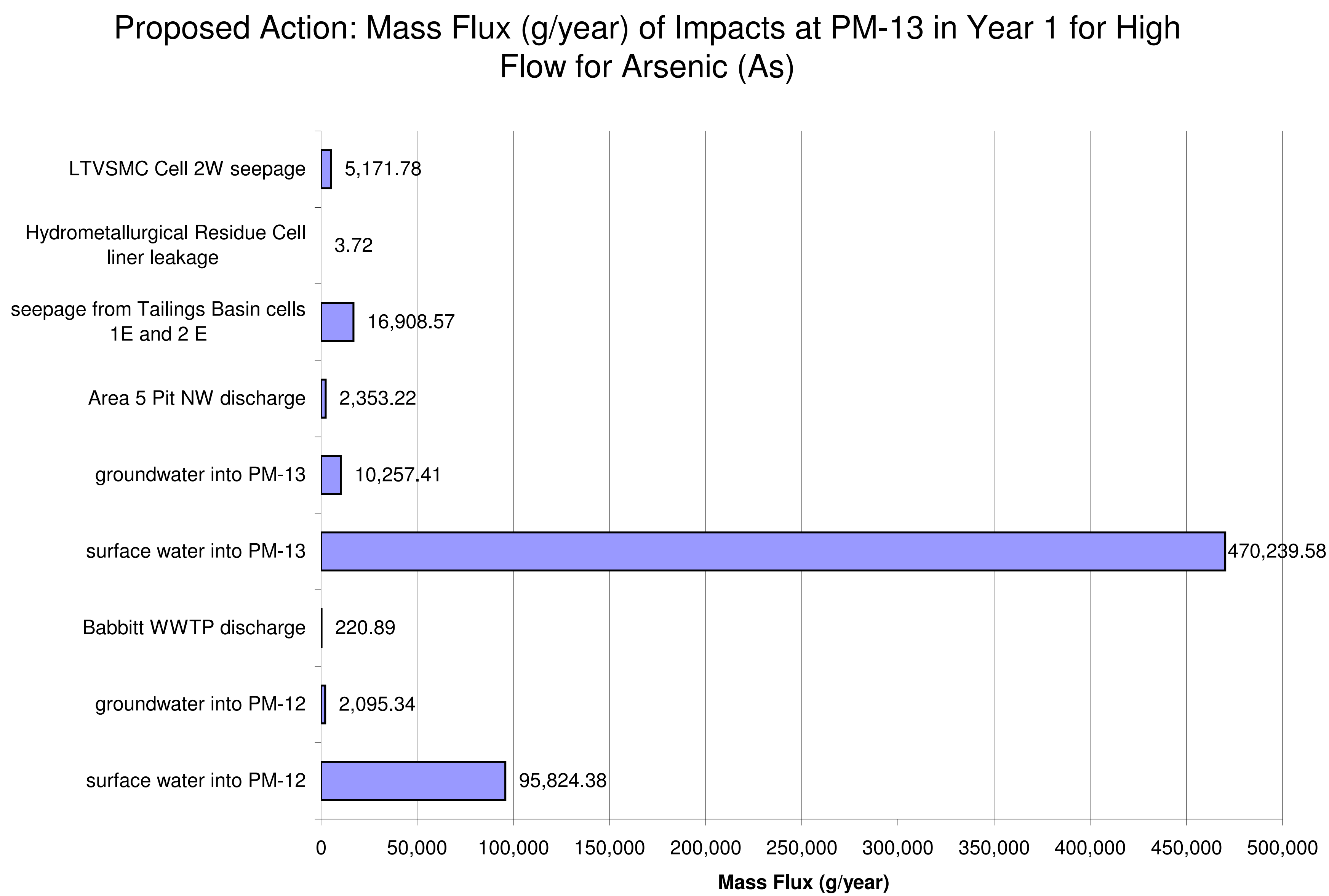

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
16,908.57
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Mass Flux (g/year)

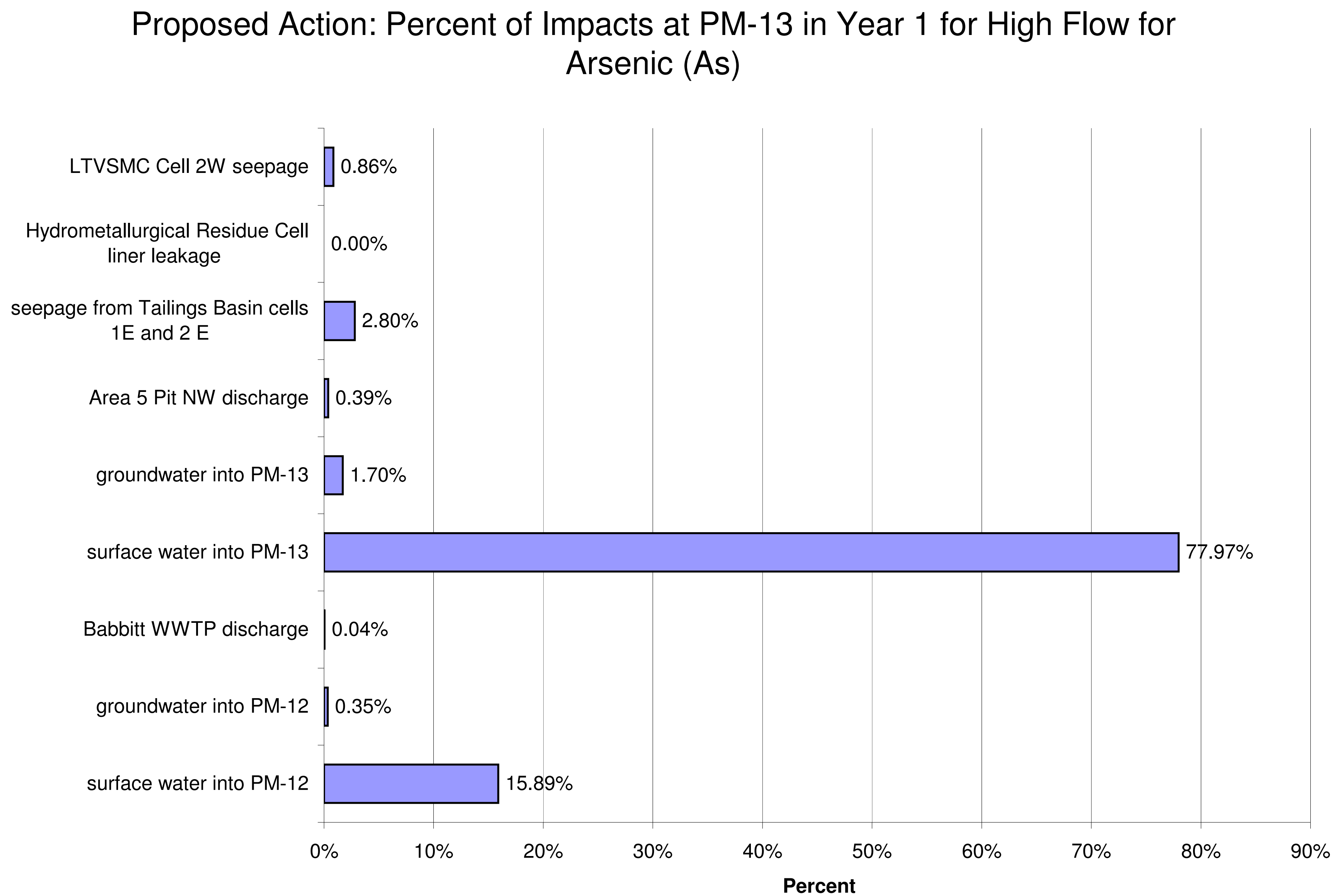
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)



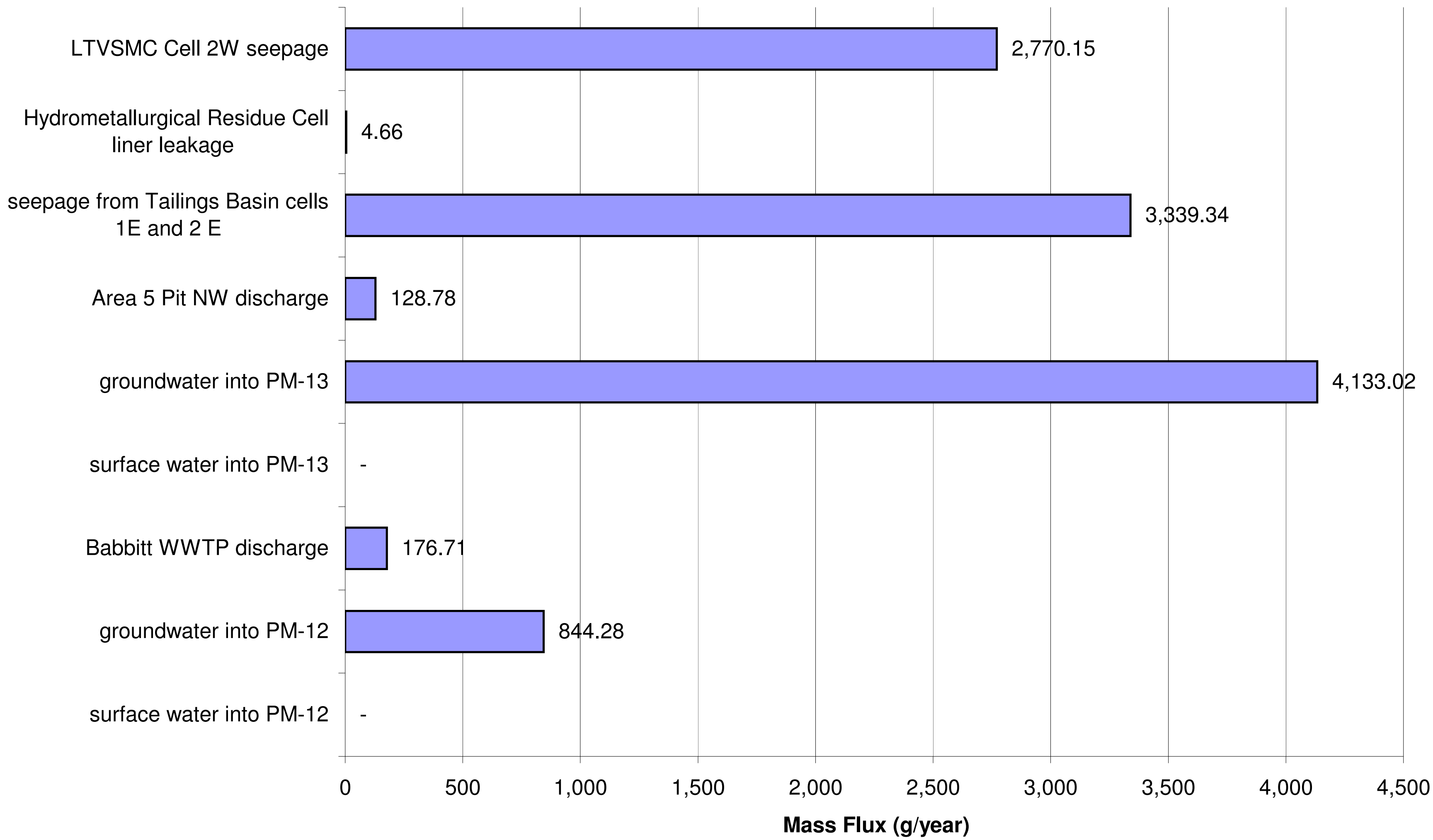

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
16,908.57
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5.97%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
19.52%
Area 5 Pit NW discharge
2.72%
groundwater into PM-13
11.84%
surface water into PM-13
47.54%
Babbitt WWTP discharge
0.25%
groundwater into PM-12
2.42%
surface water into PM-12
9.74%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

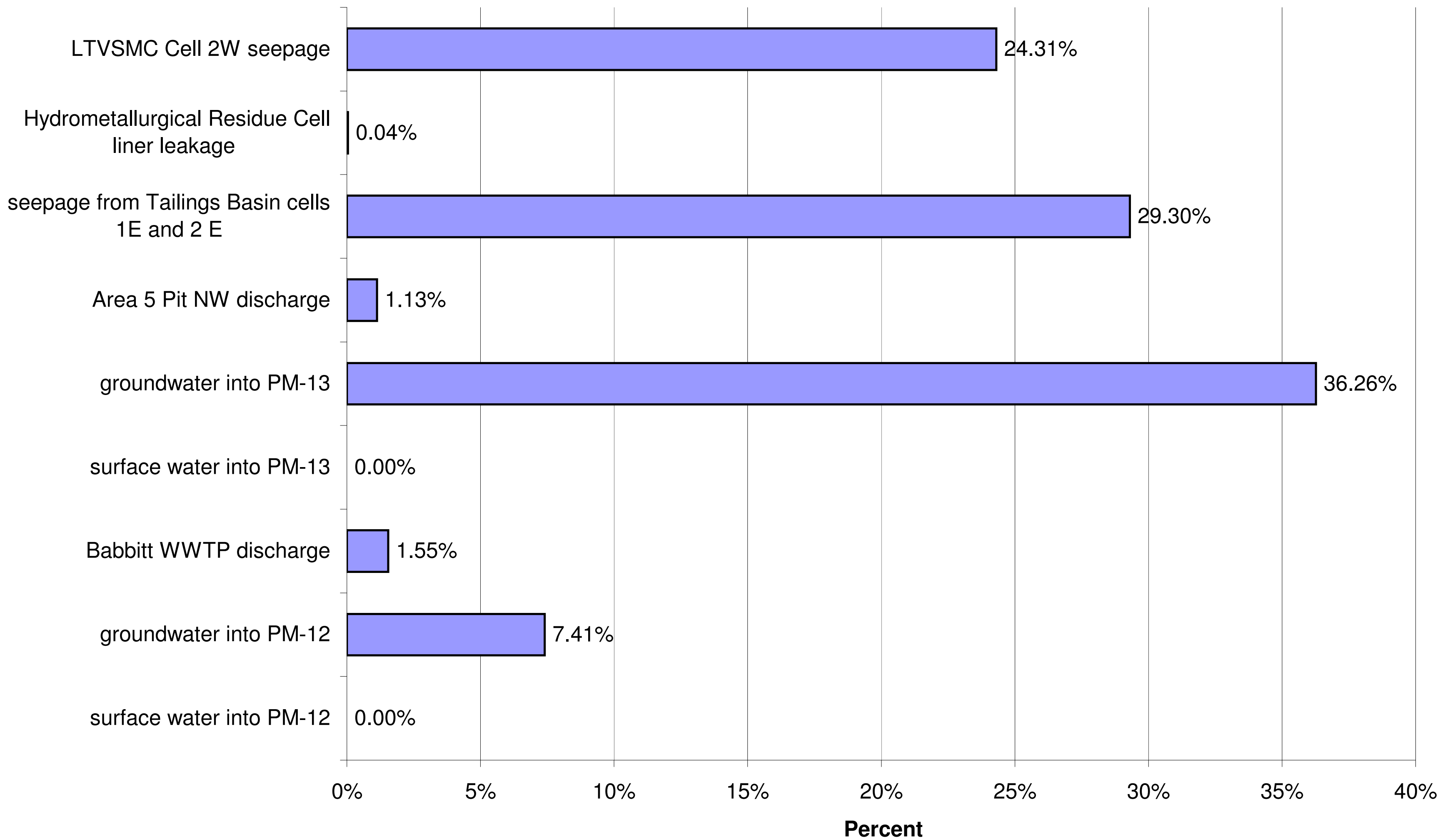

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
16,908.57
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

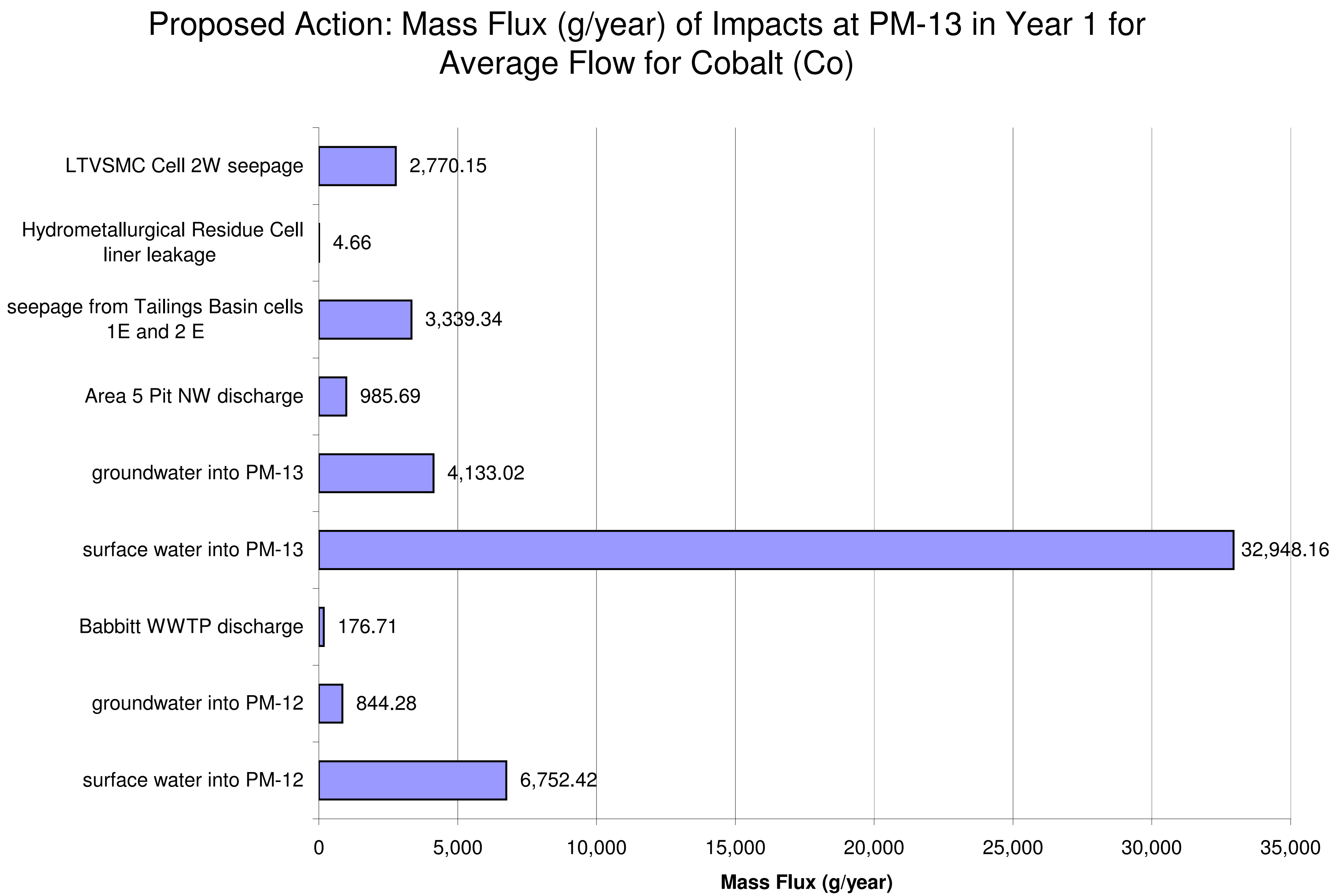

Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.86%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
2.80%
Area 5 Pit NW discharge
0.39%
groundwater into PM-13
1.70%
surface water into PM-13
77.97%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.35%
surface water into PM-12
15.89%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)

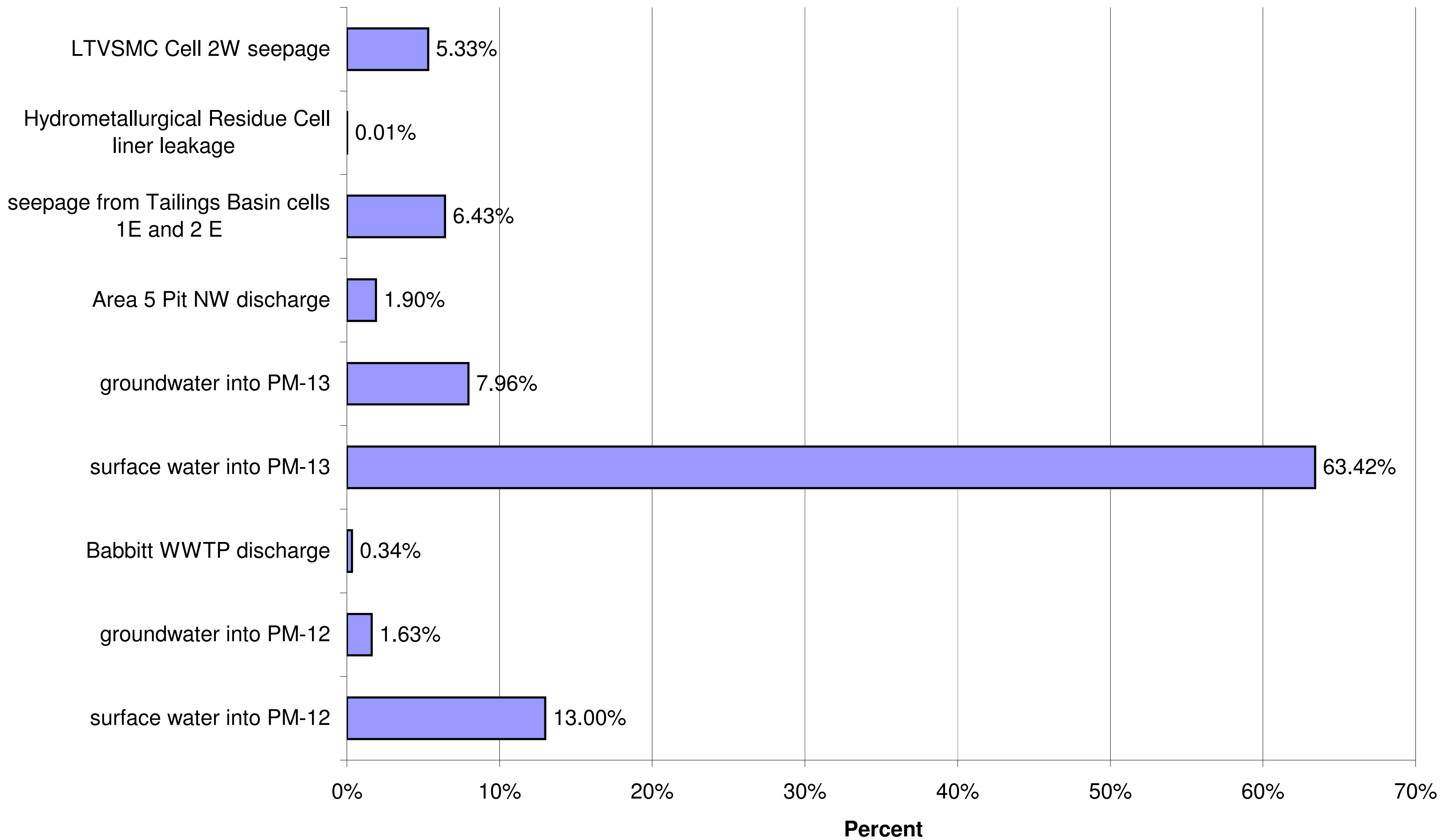


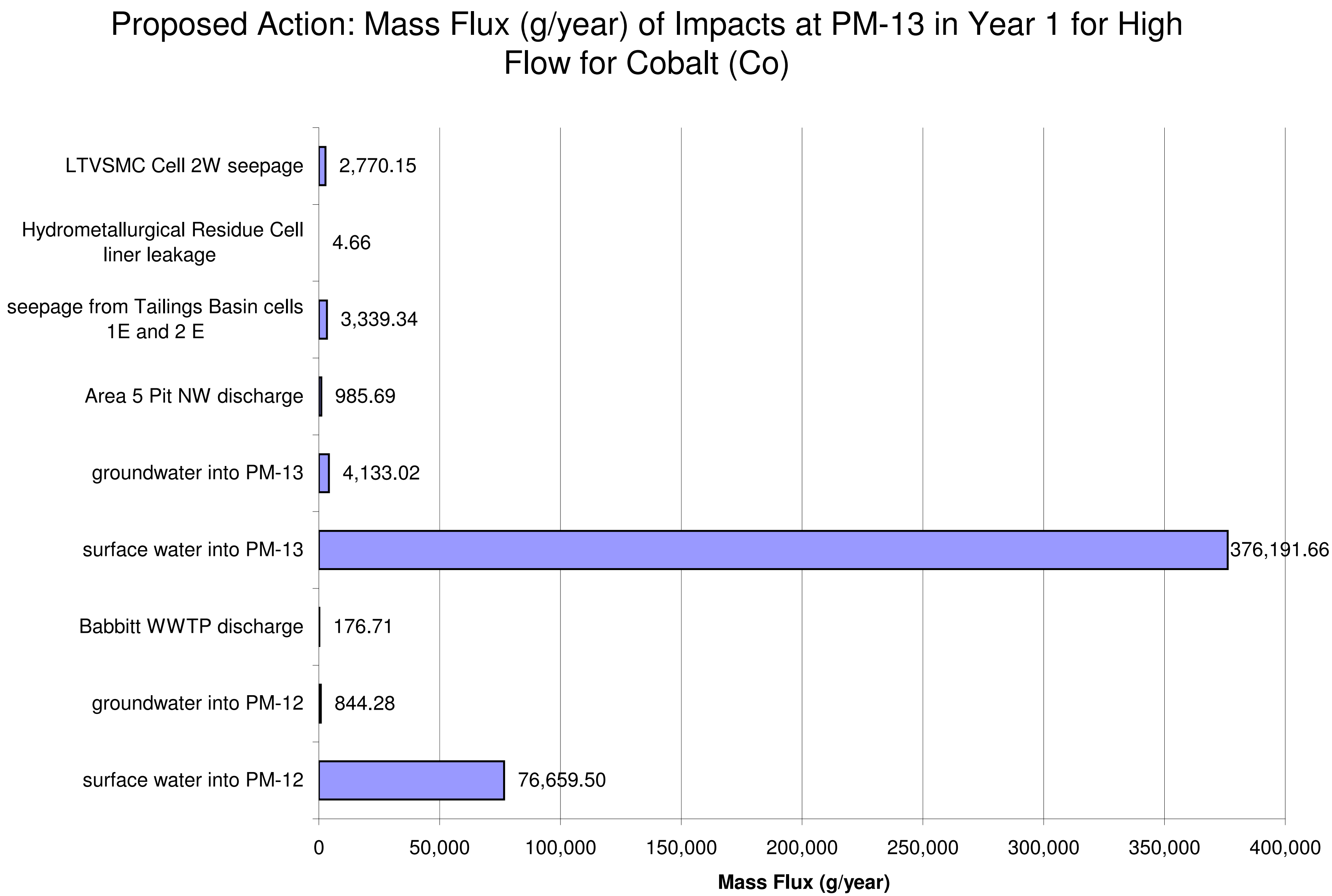
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)



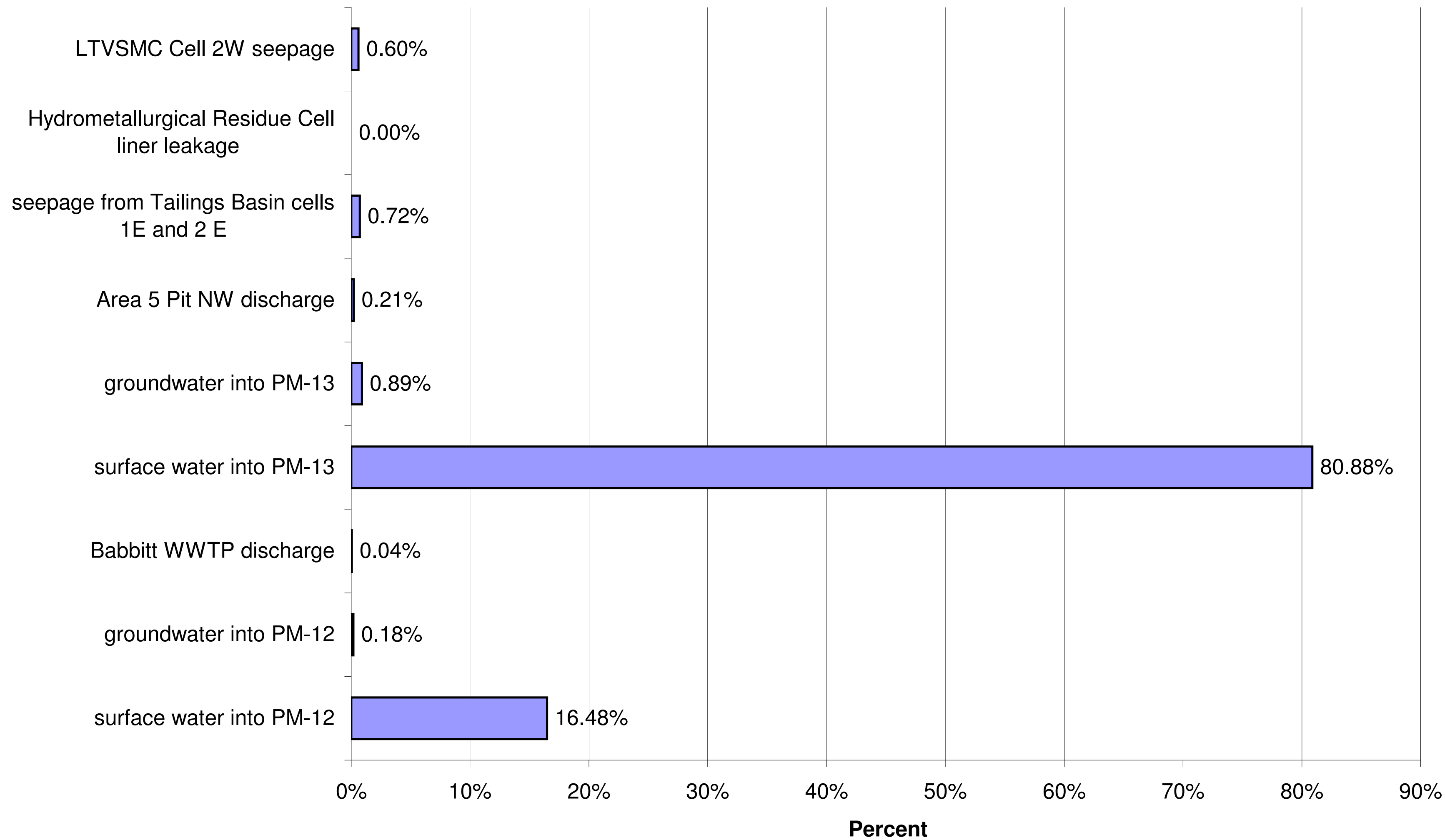

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2 E
3,339.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)

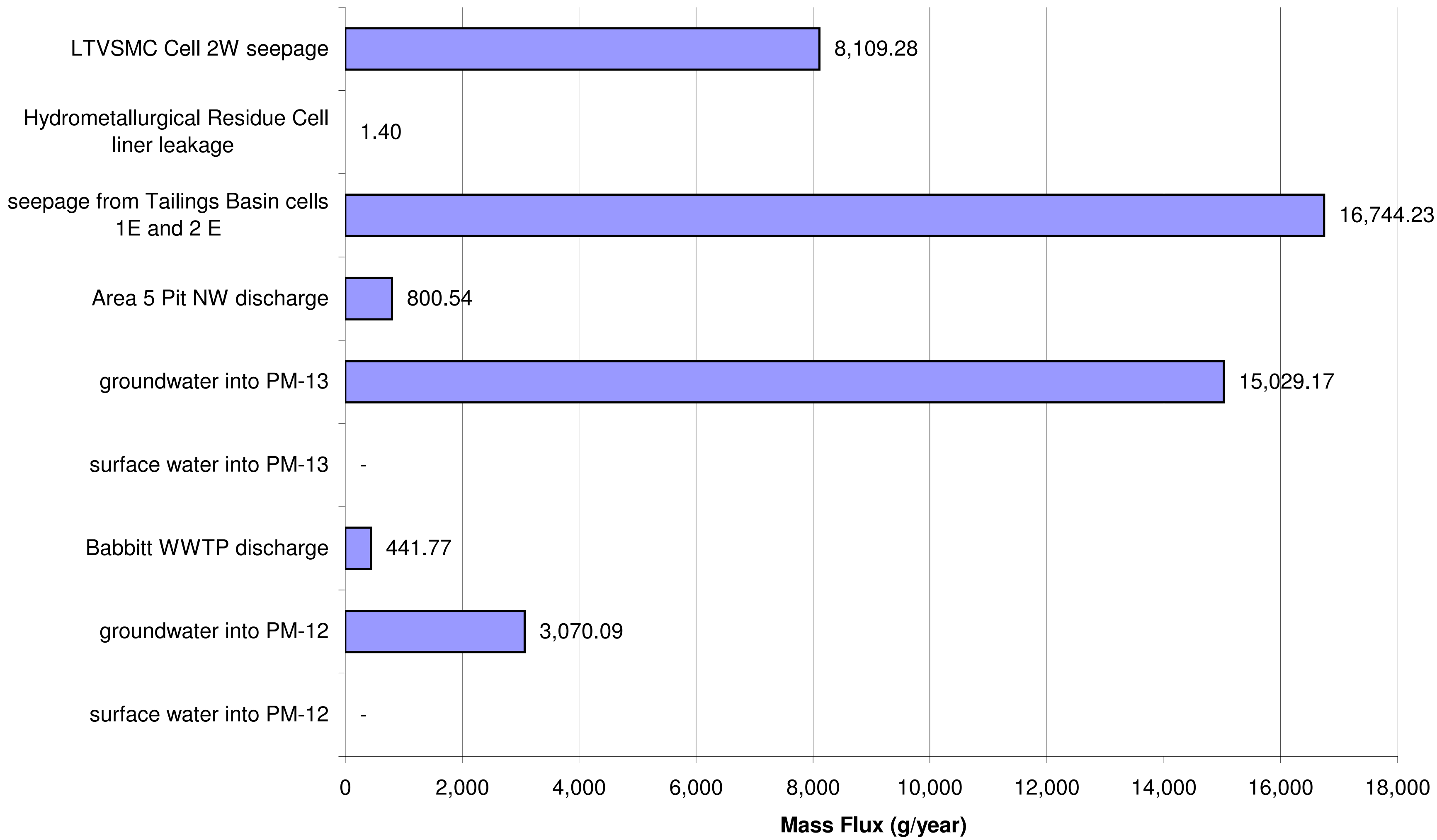


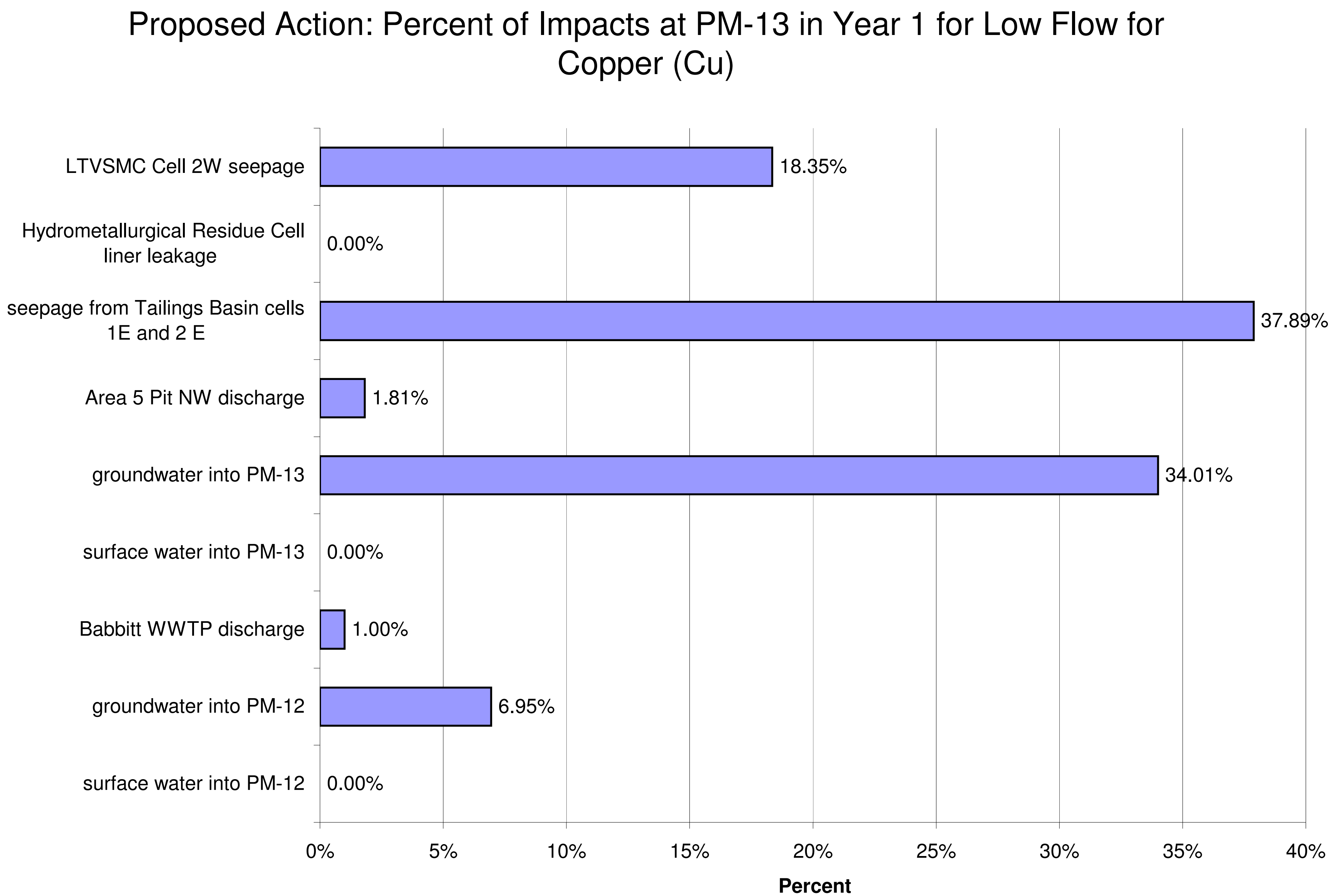

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2 E
3,339.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

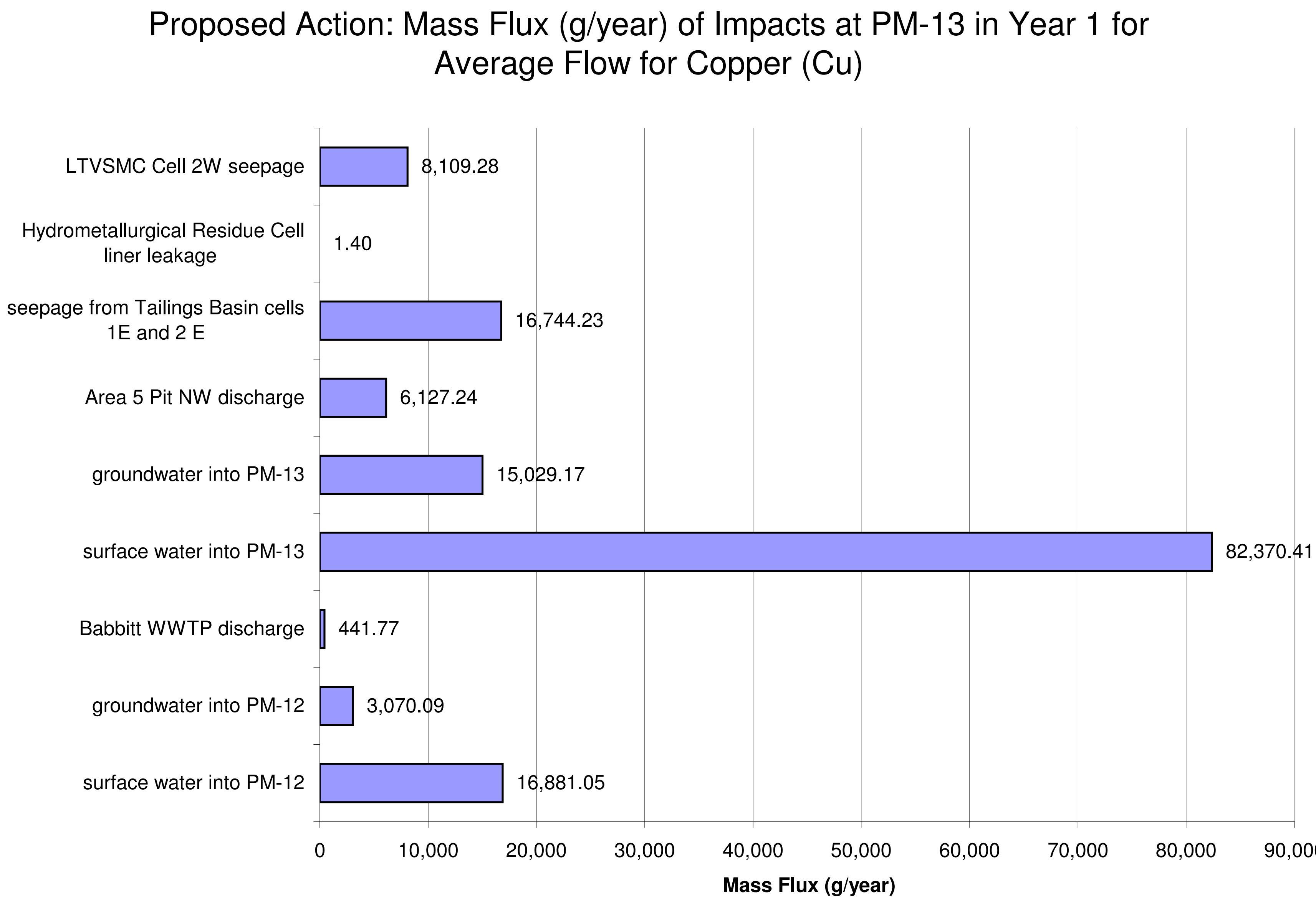
Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)



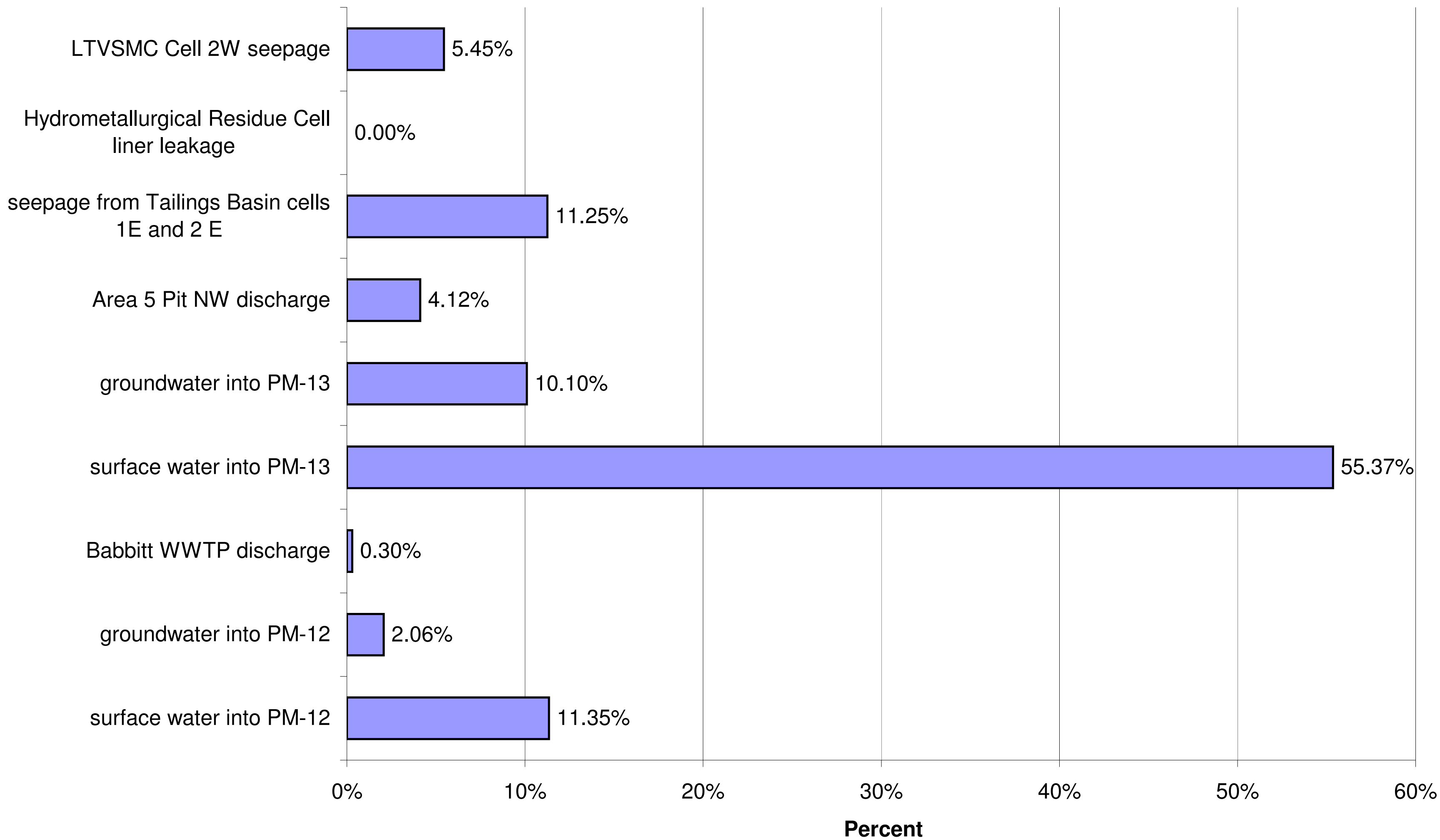
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)



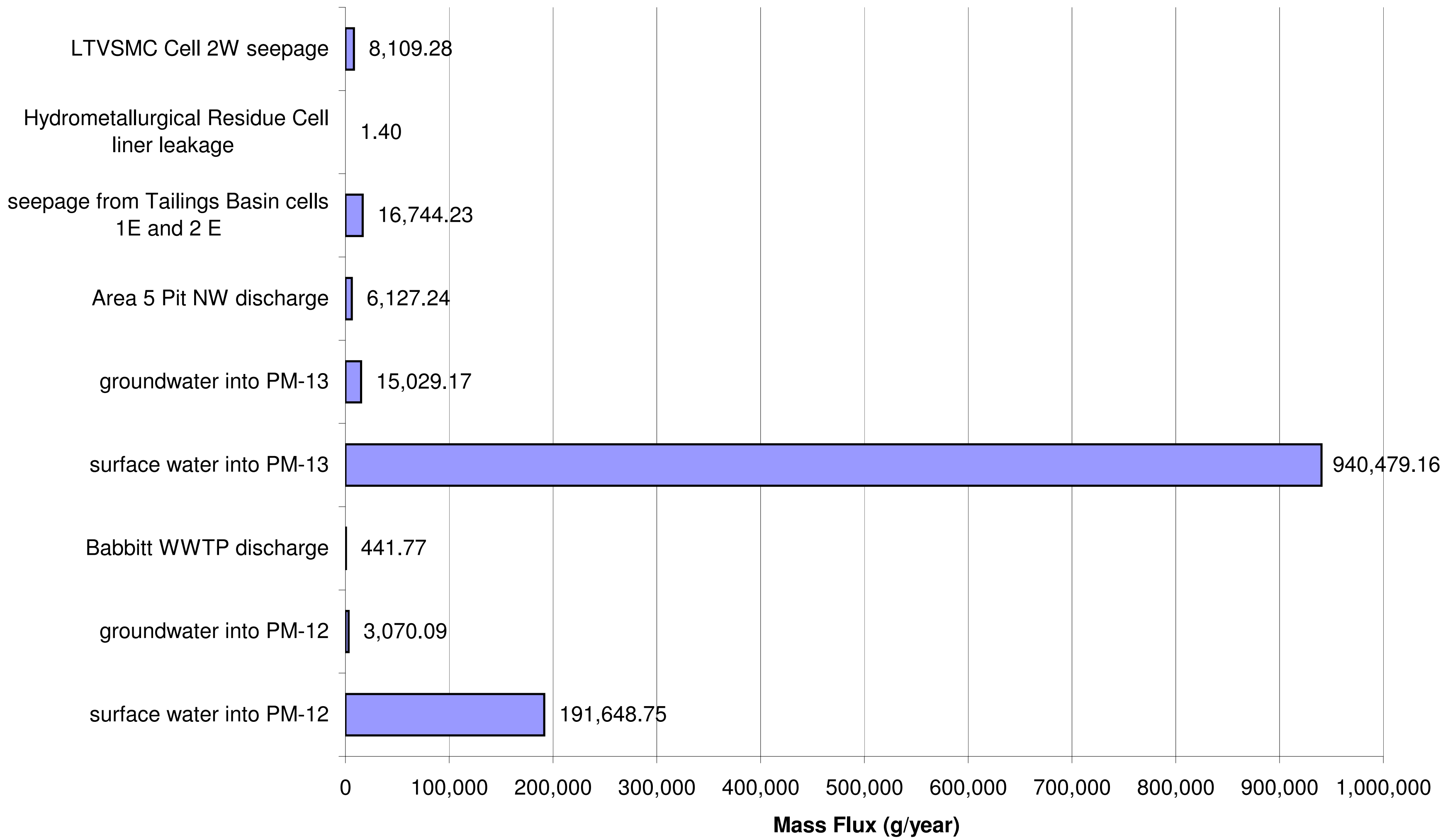

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
18.35%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
37.89%
Area 5 Pit NW discharge
1.81%
groundwater into PM-13
34.01%
surface water into PM-13
0.00%
Babbitt WWTP discharge
1.00%
groundwater into PM-12
6.95%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
1.40
seepage from Tailings Basin cells 1E and 2 E
16,744.23
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

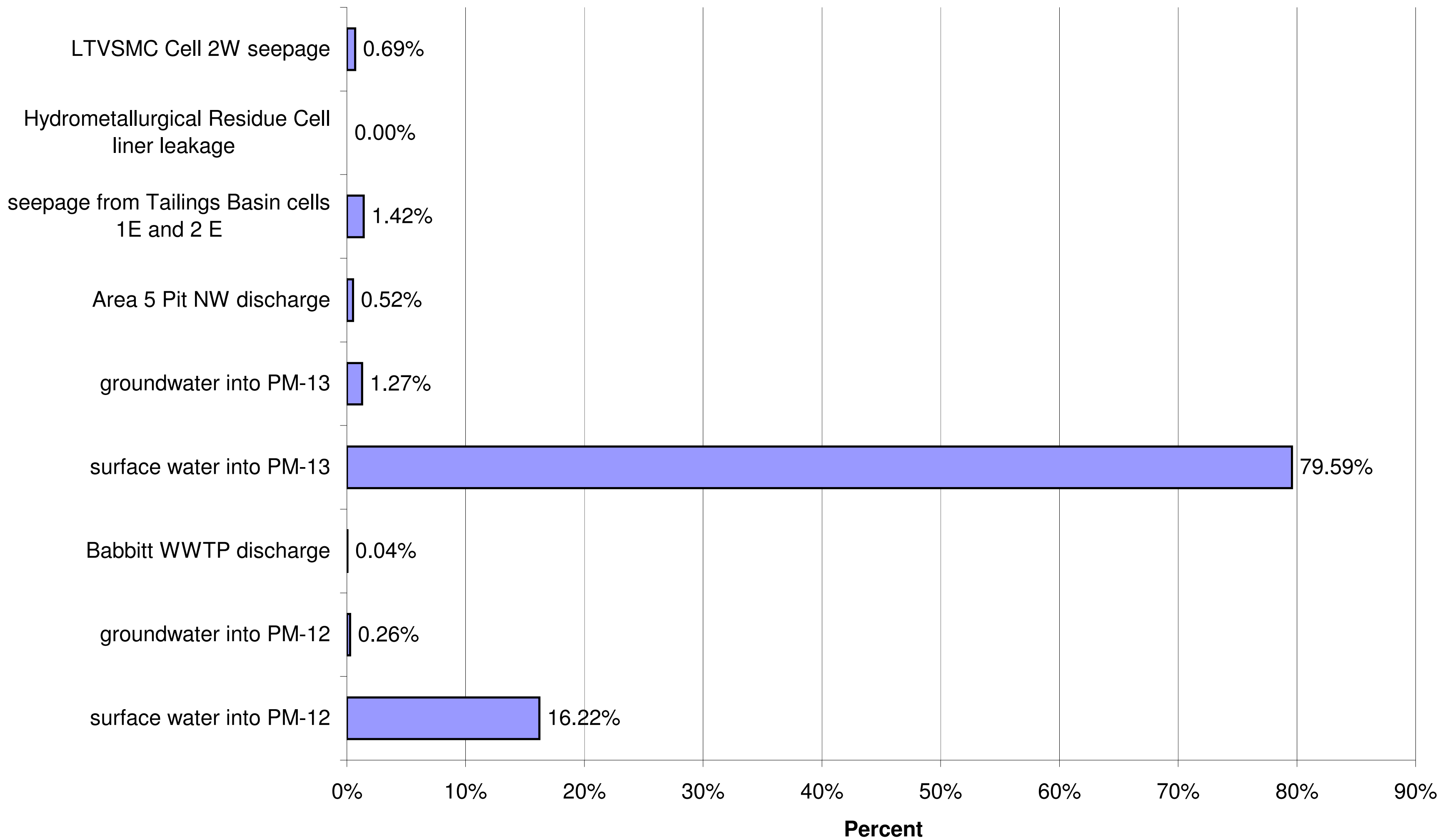
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Copper (Cu)



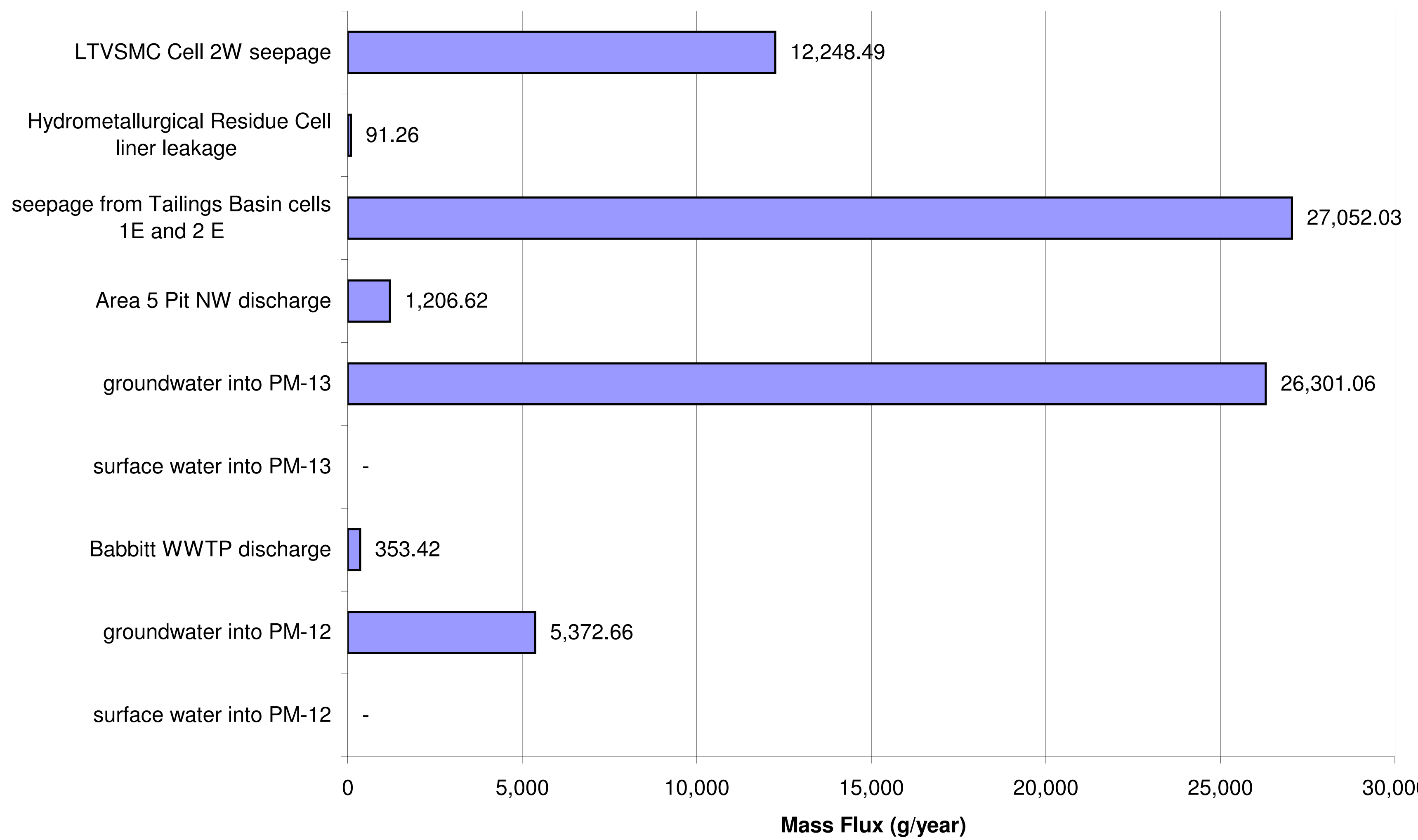
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)

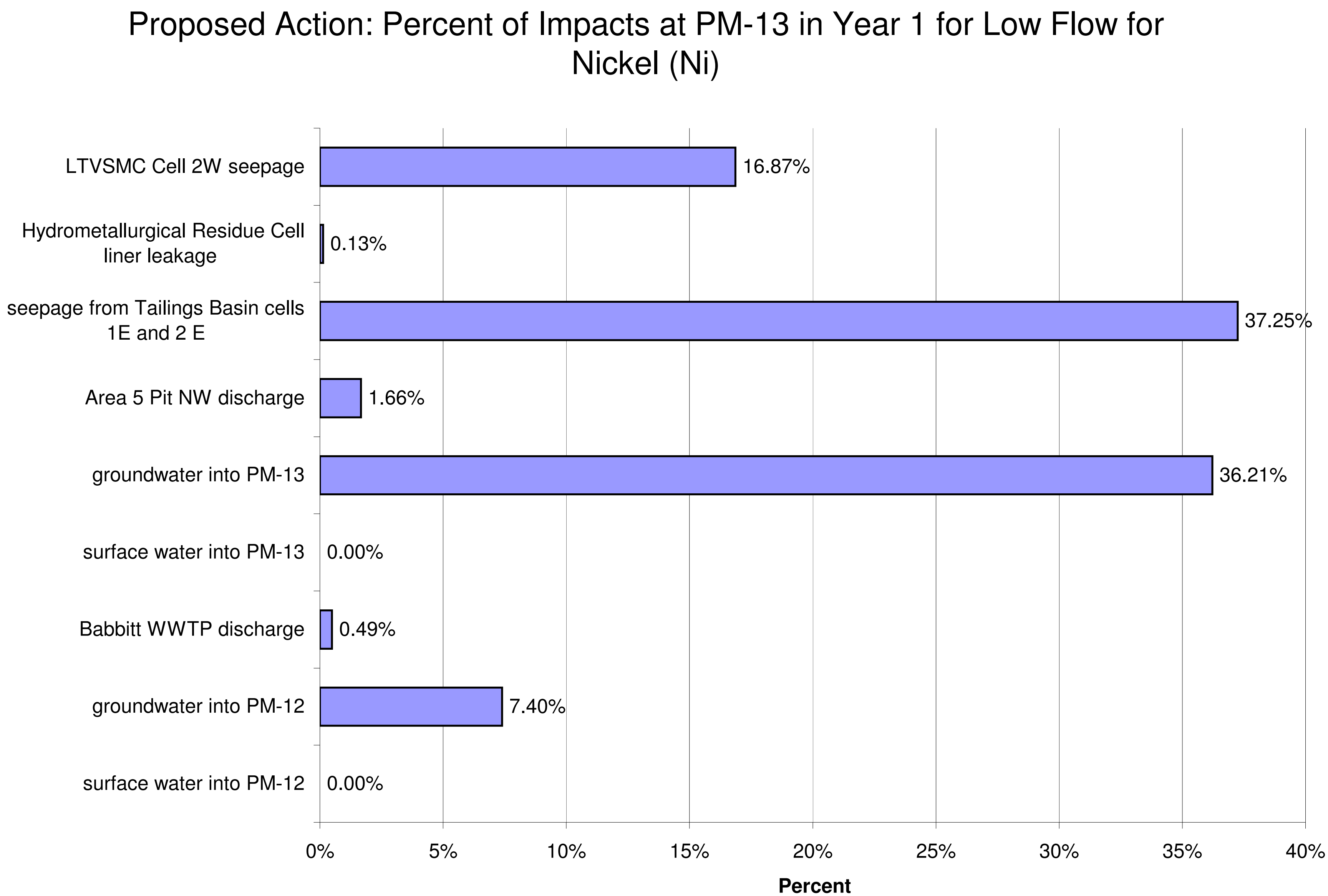


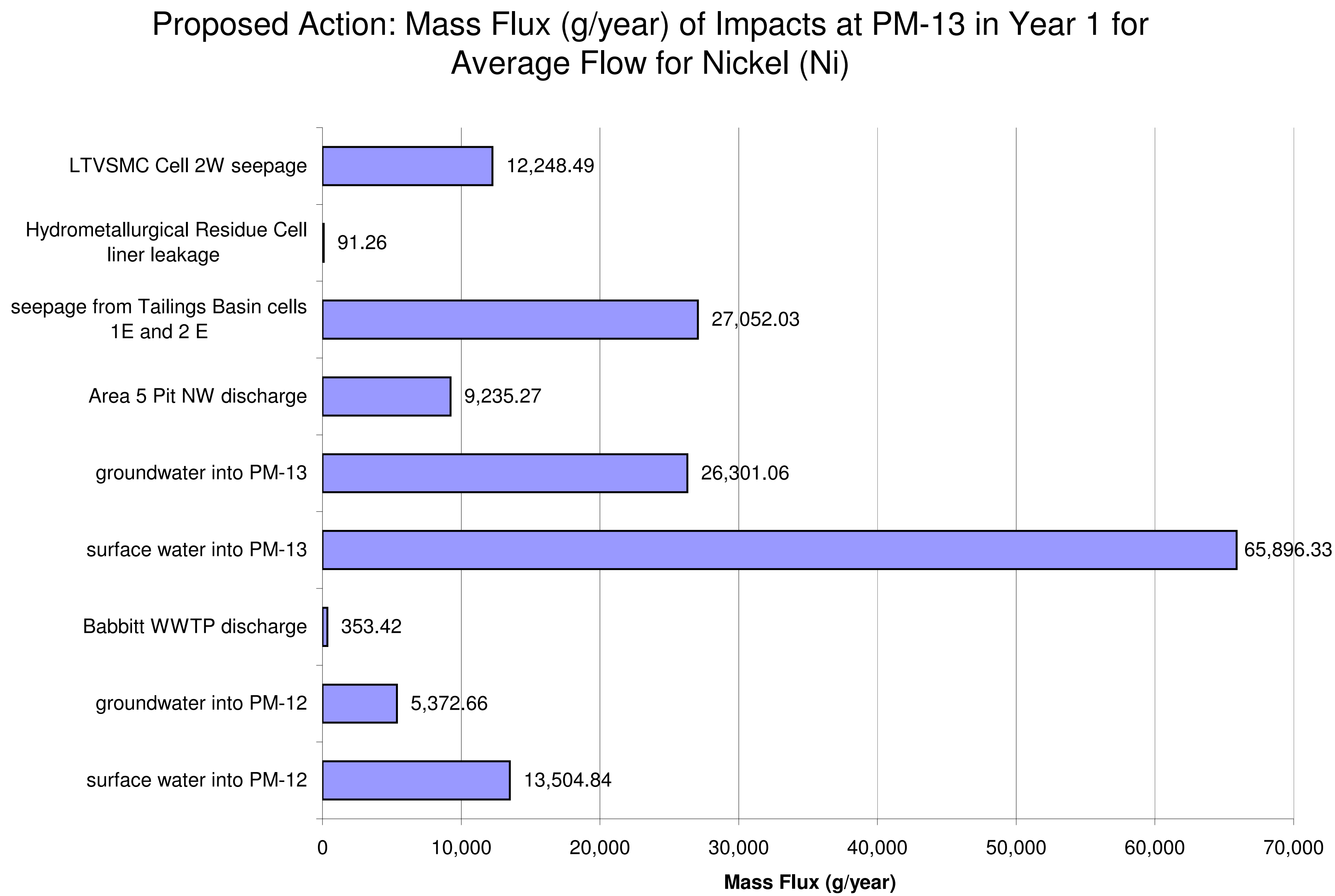
Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)

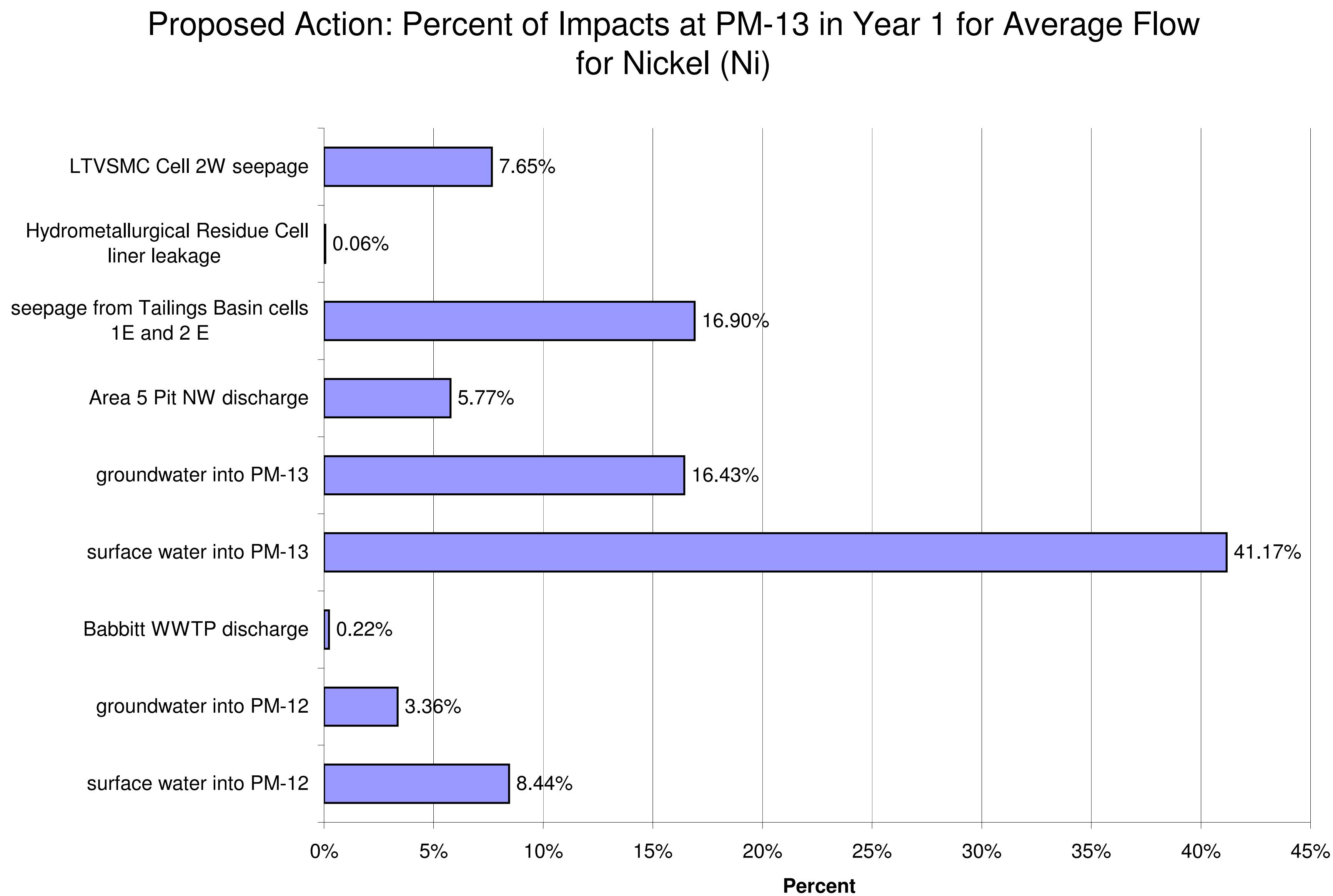


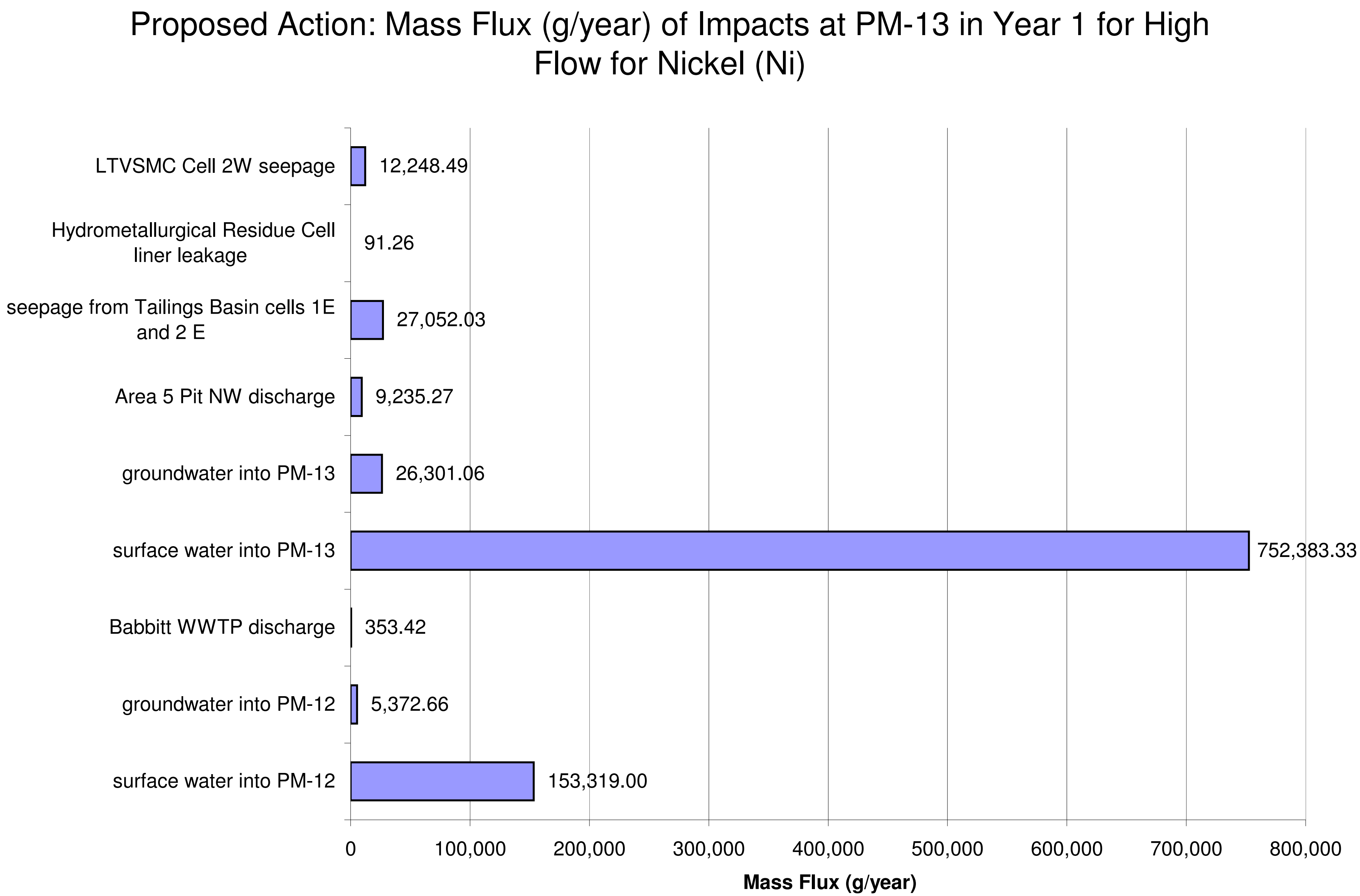
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)



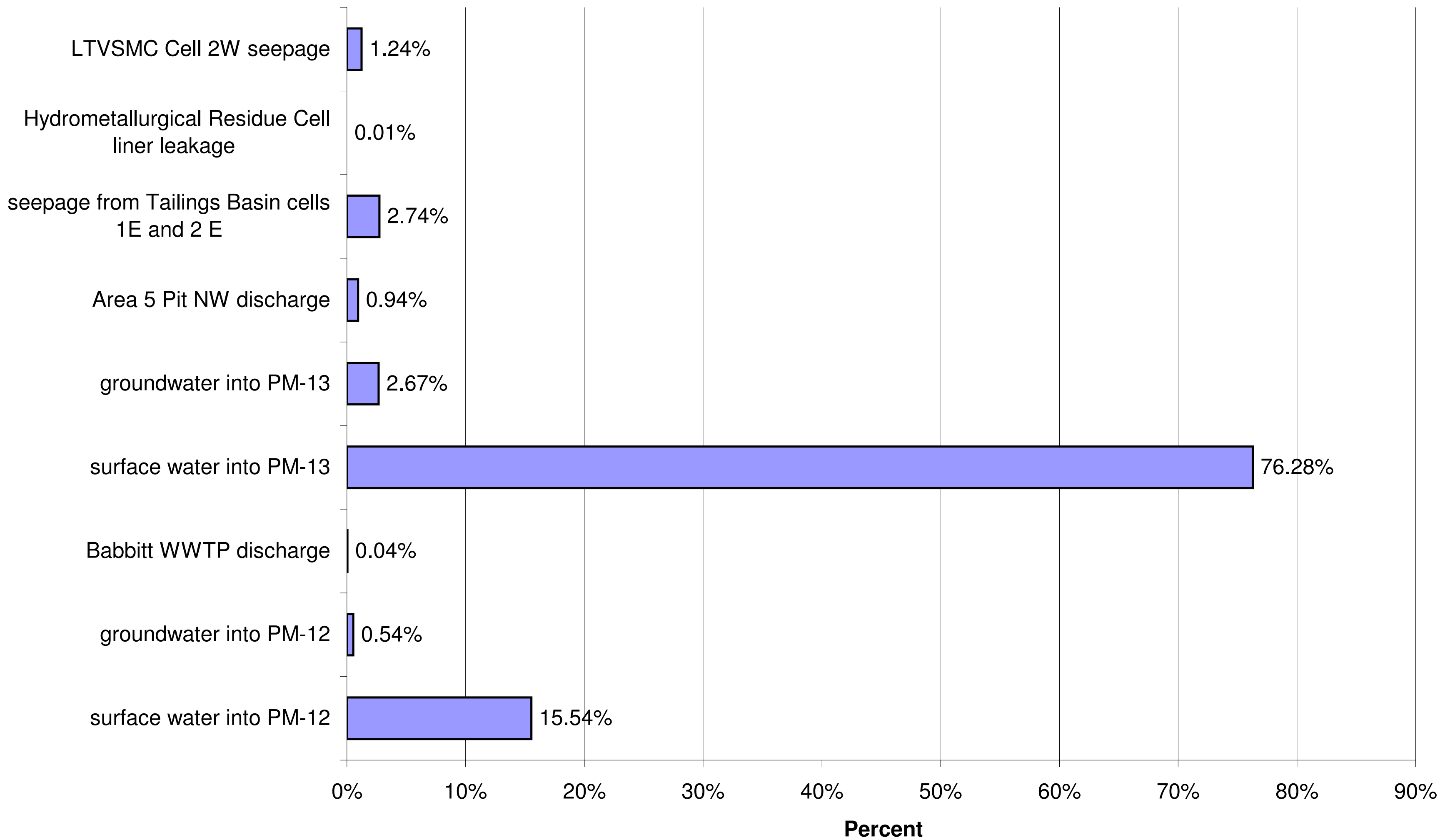

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
16.87%
Hydrometallurgical Residue Cell liner leakage
0.13%
seepage from Tailings Basin cells 1E and 2 E
37.25%
Area 5 Pit NW discharge
1.66%
groundwater into PM-13
36.21%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.49%
groundwater into PM-12
7.40%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

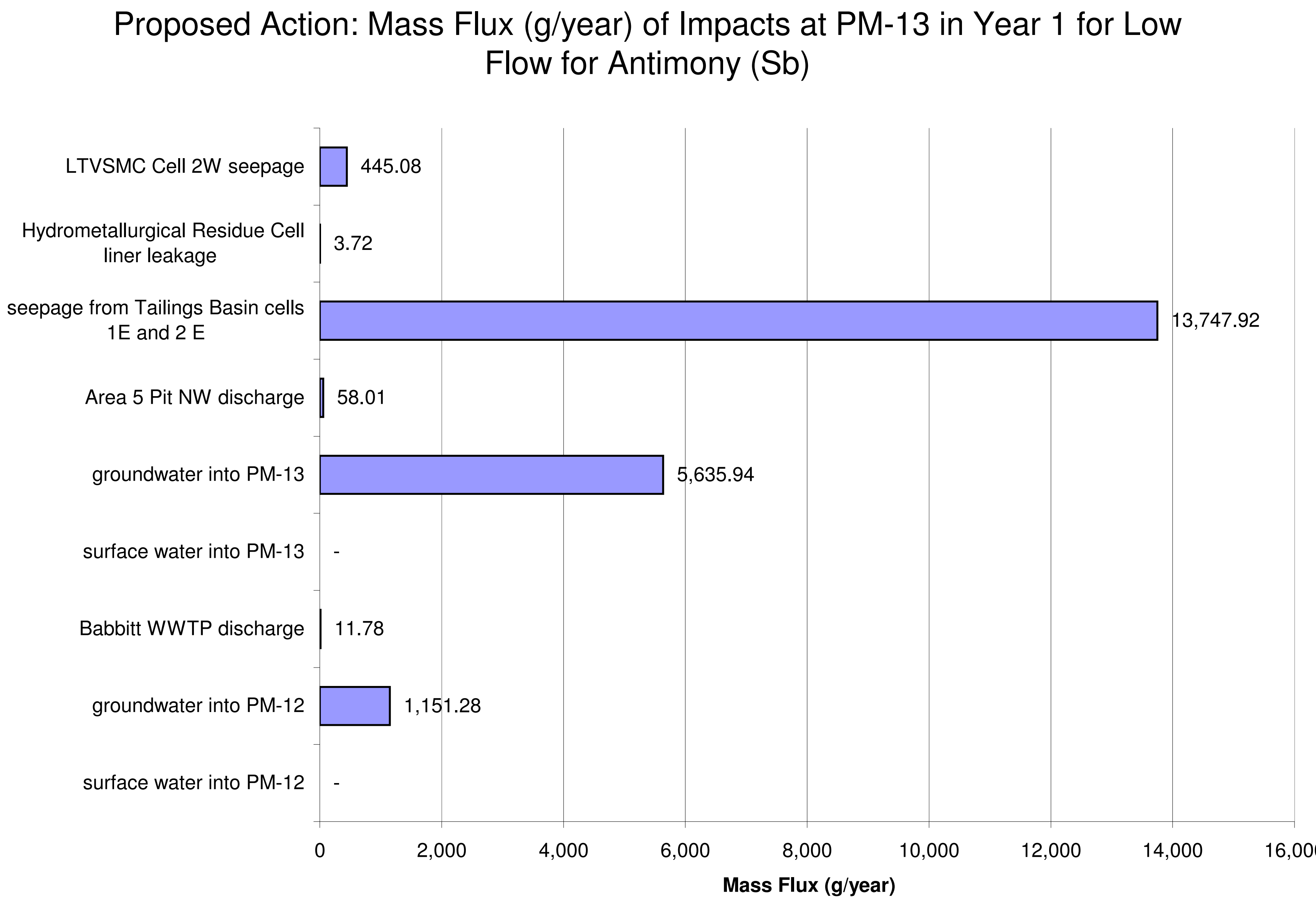

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
91.26
seepage from Tailings Basin cells 1E and 2 E
27,052.03
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

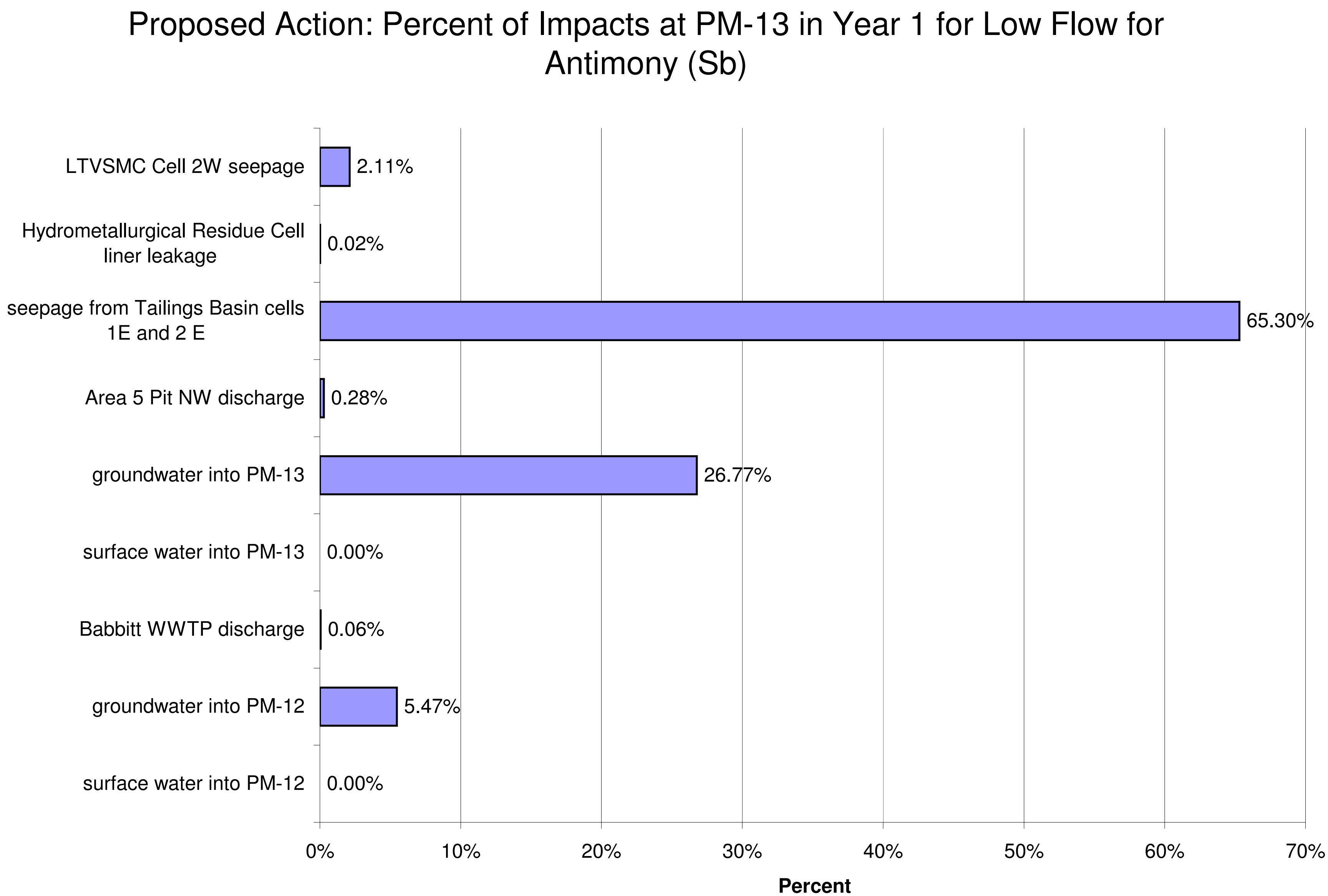

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
7.65%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin cells 1E and 2 E
16.90%
Area 5 Pit NW discharge
5.77%
groundwater into PM-13
16.43%
surface water into PM-13
41.17%
Babbitt WWTP discharge
0.22%
groundwater into PM-12
3.36%
surface water into PM-12
8.44%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
91.26
seepage from Tailings Basin cells 1E and 2 E
27,052.03
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

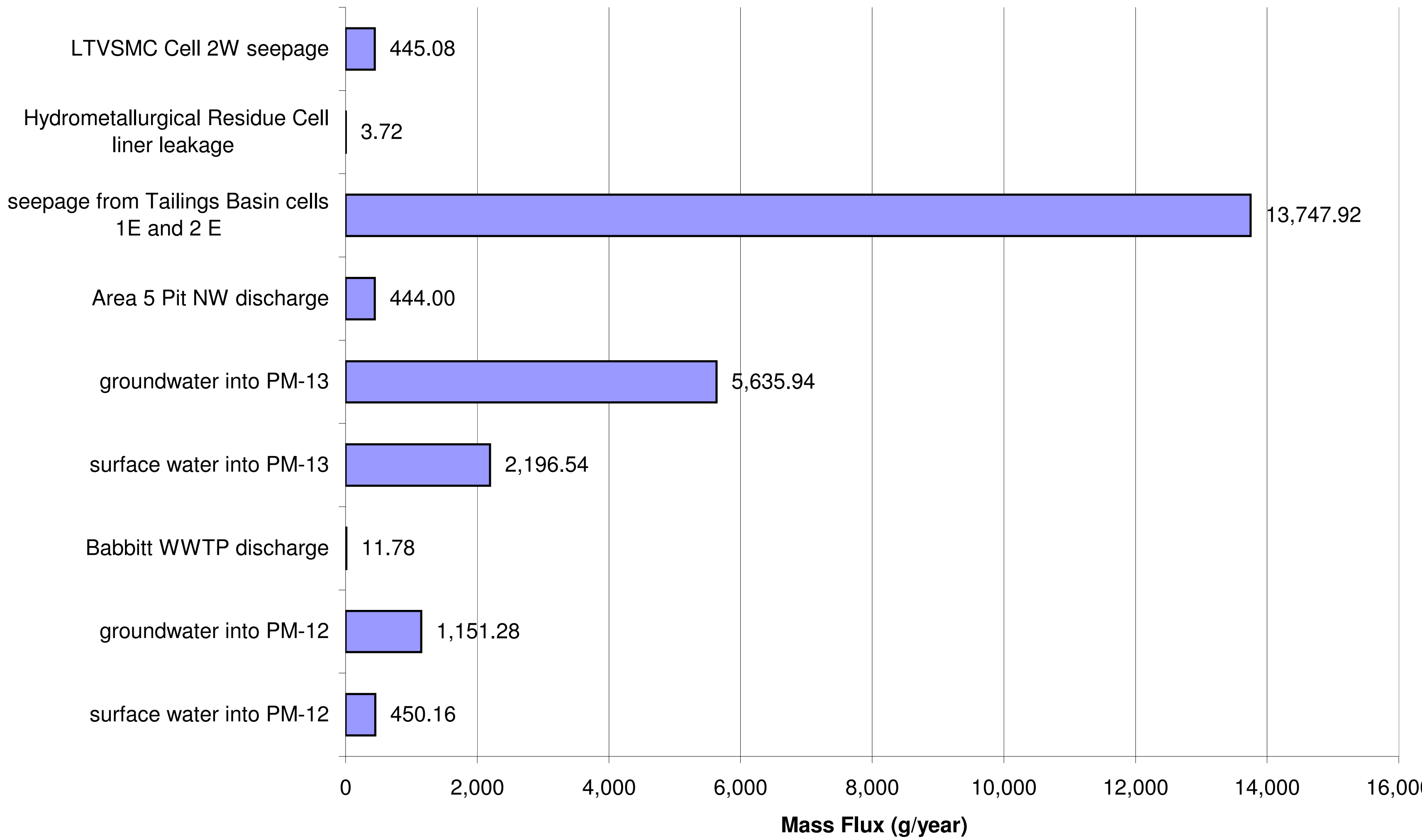
Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)



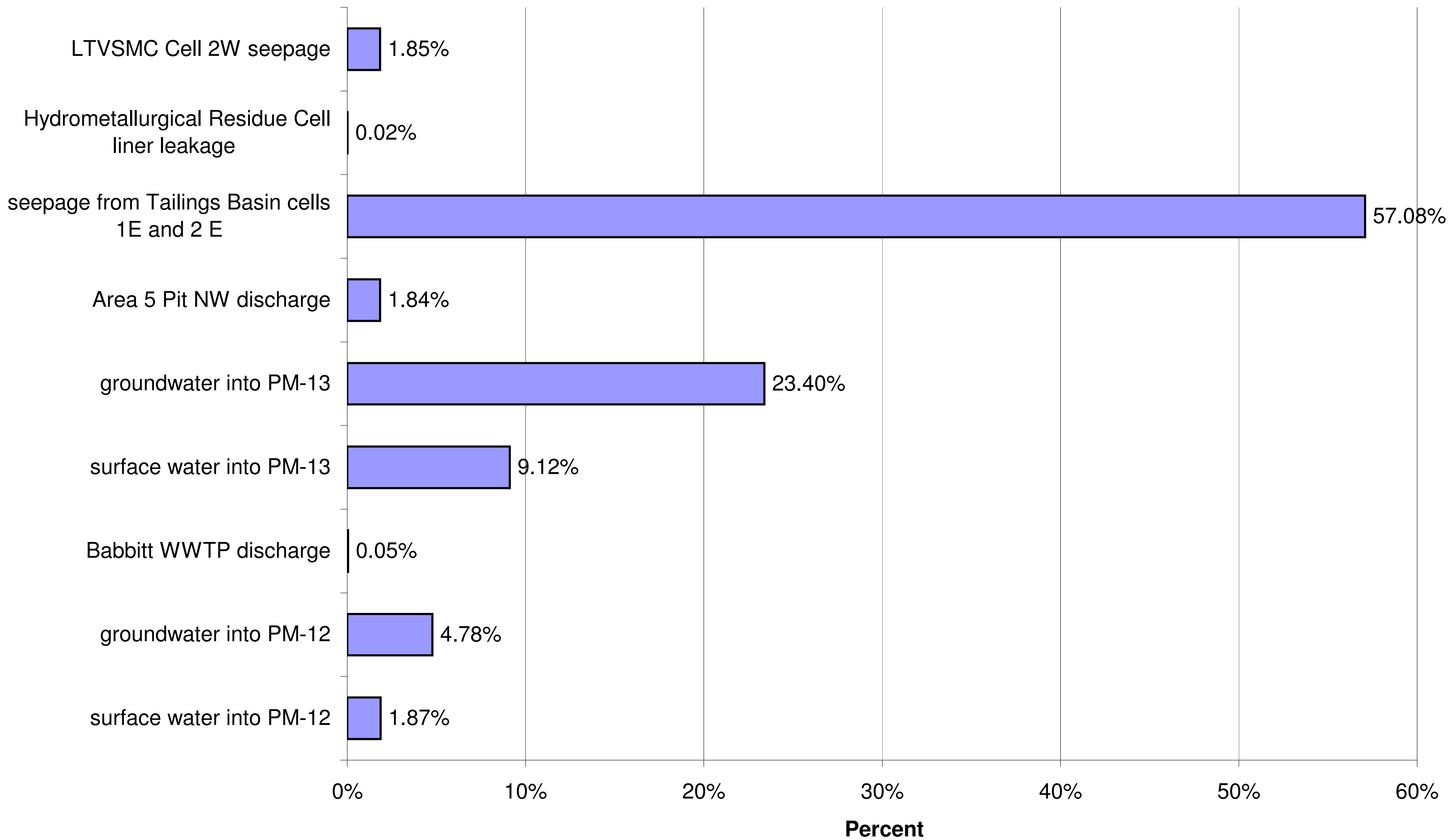

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
13,747.92
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Mass Flux (g/year)

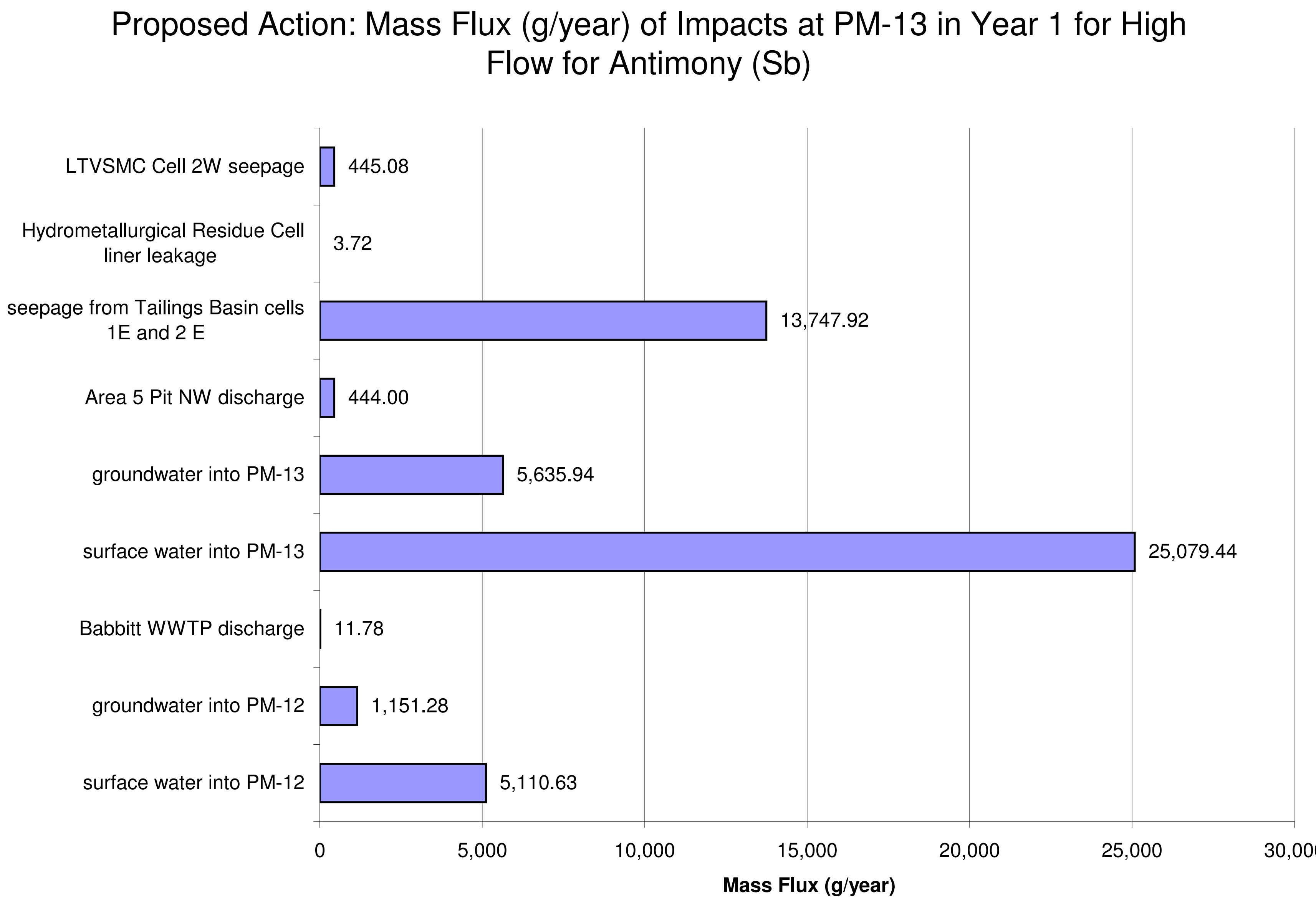

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
2.11%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2 E
65.30%
Area 5 Pit NW discharge
0.28%
groundwater into PM-13
26.77%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.06%
groundwater into PM-12
5.47%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)

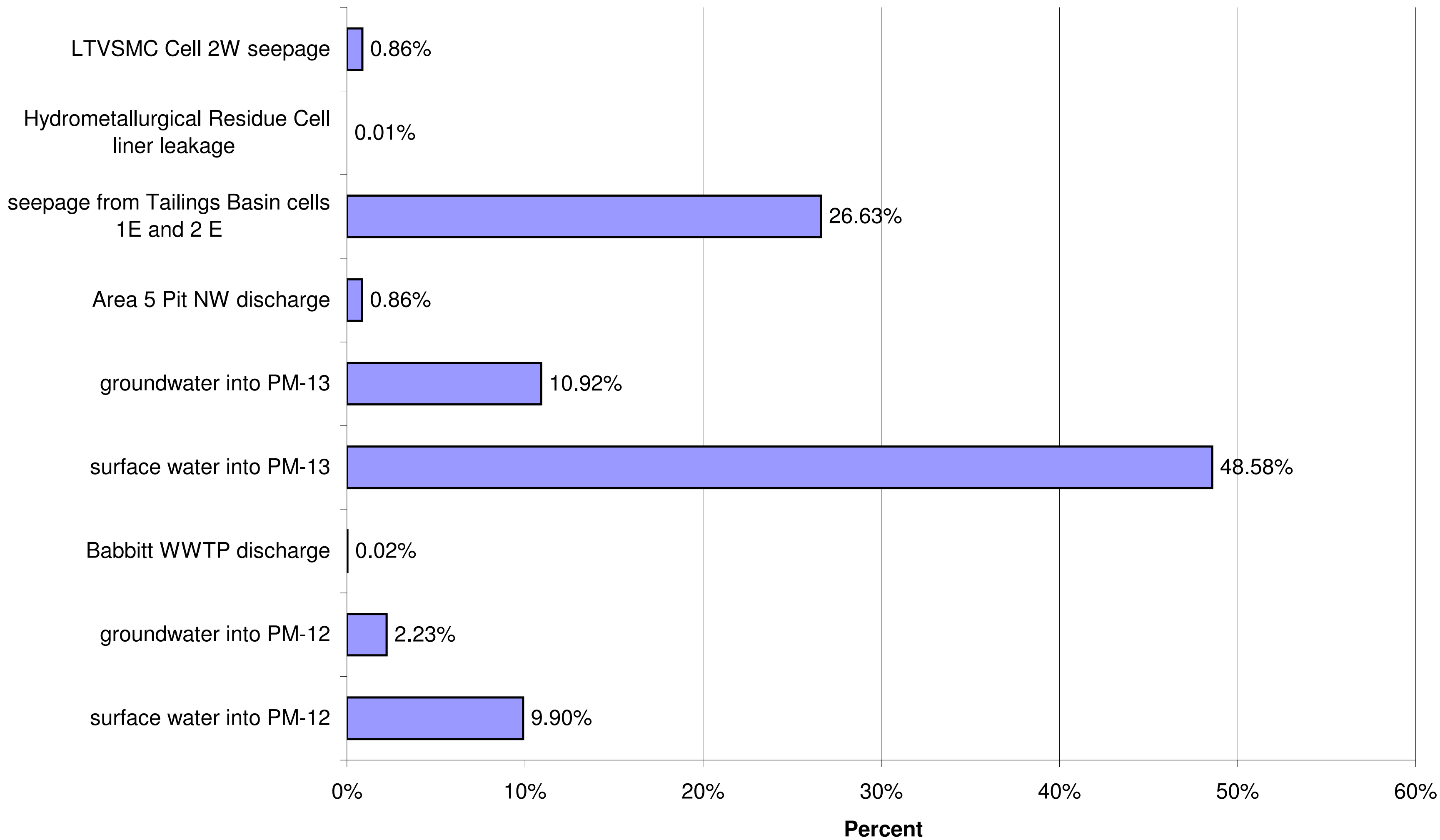


Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)

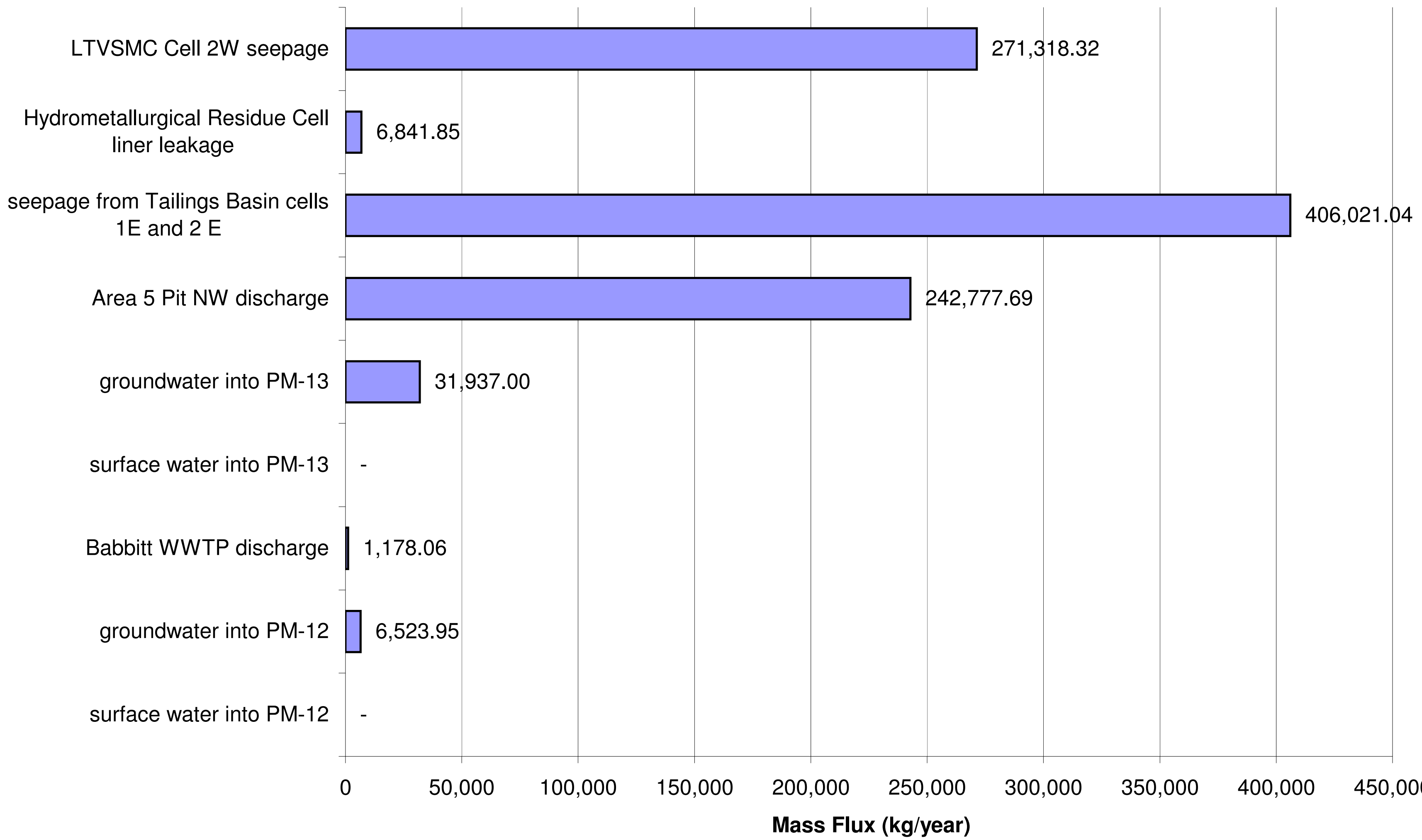



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
13,747.92
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

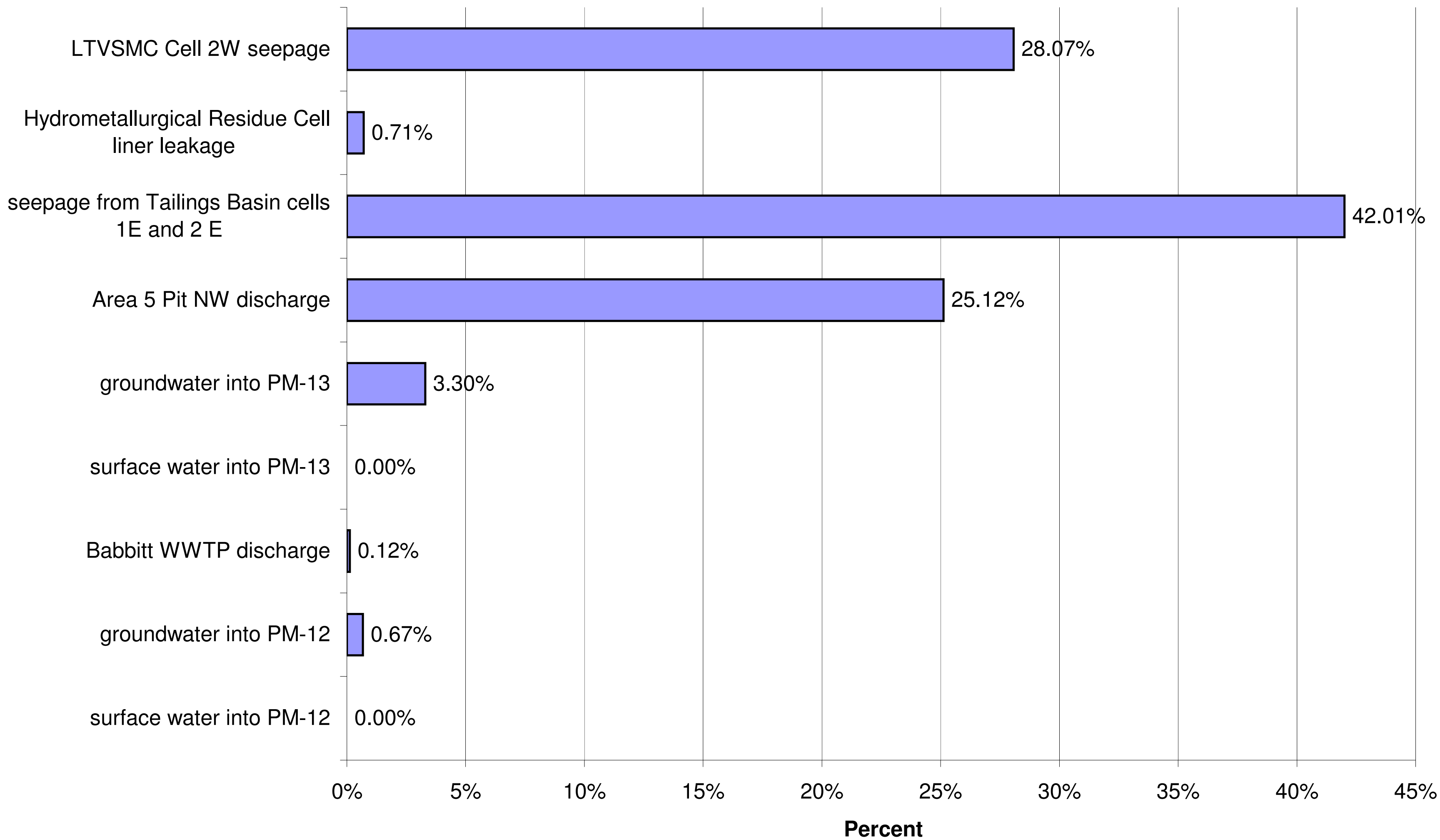
Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)



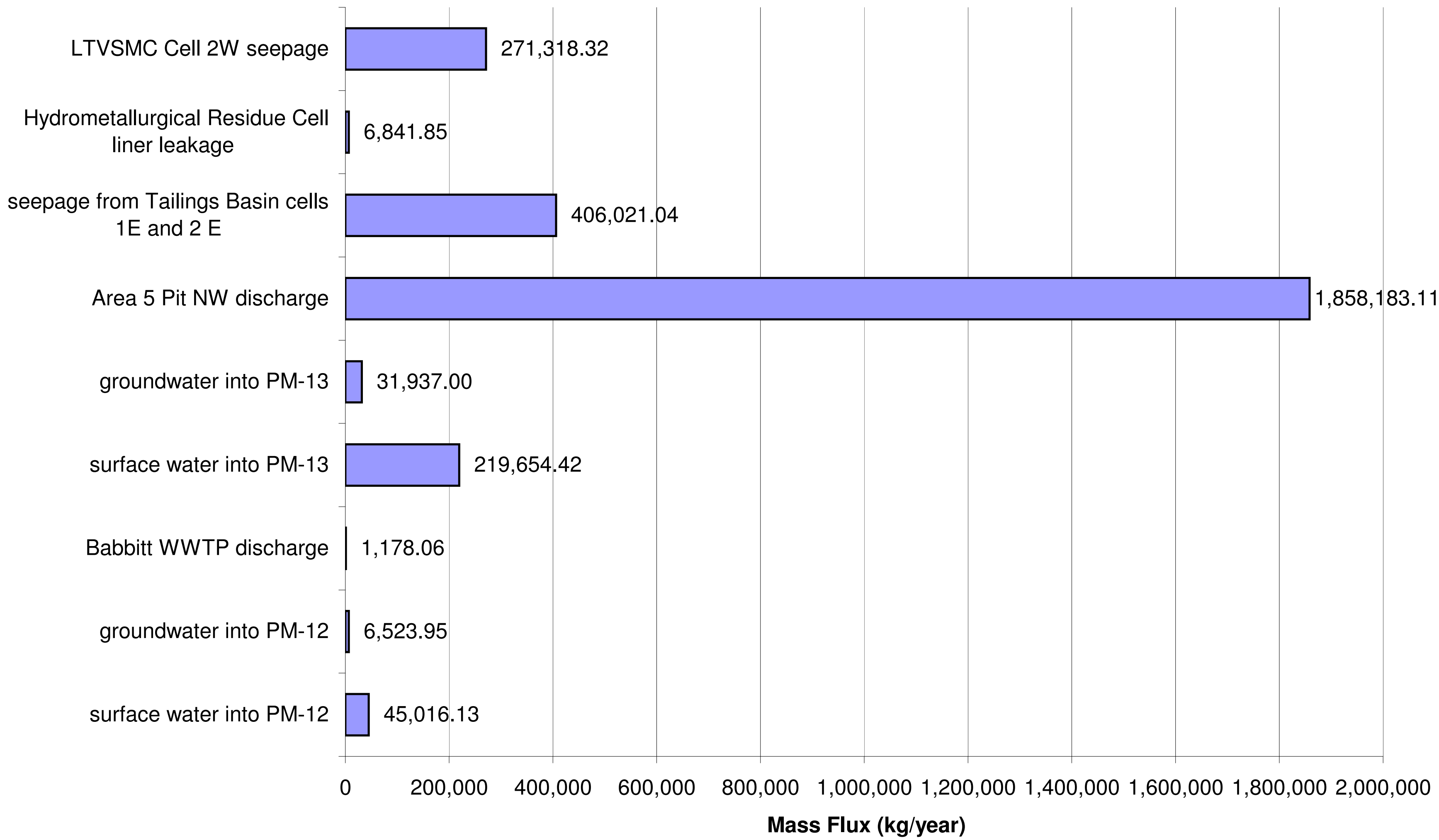
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)



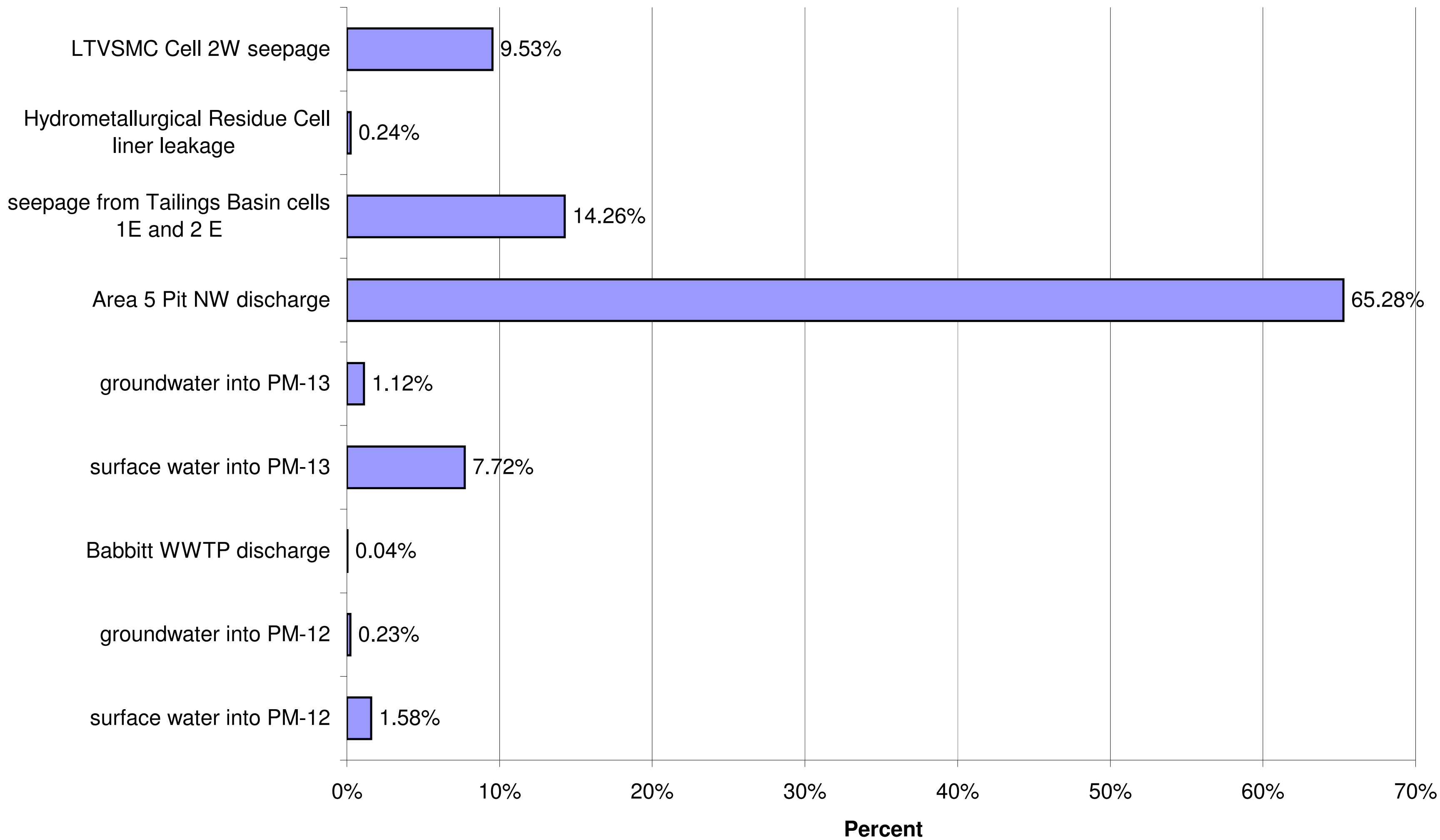
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)



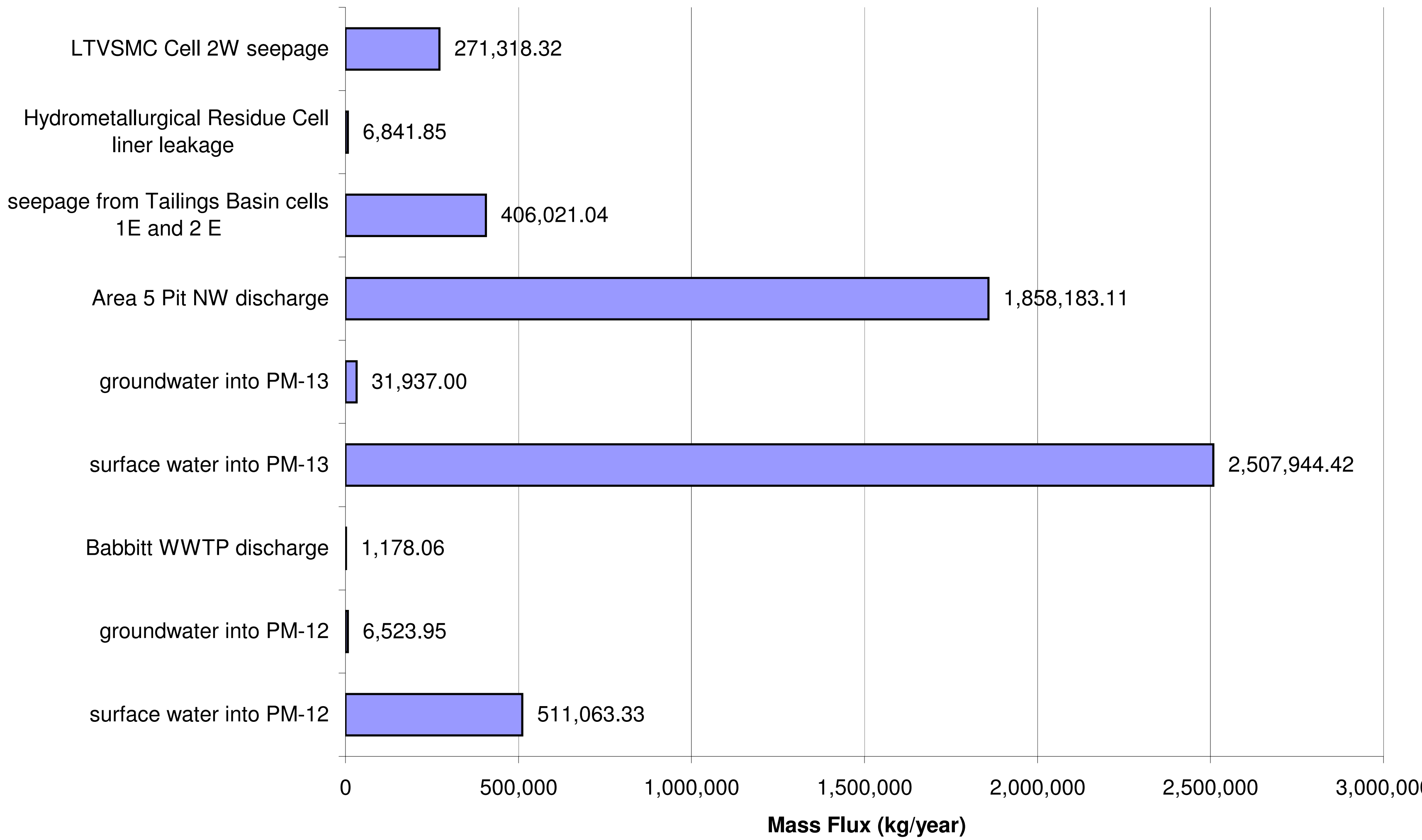
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)



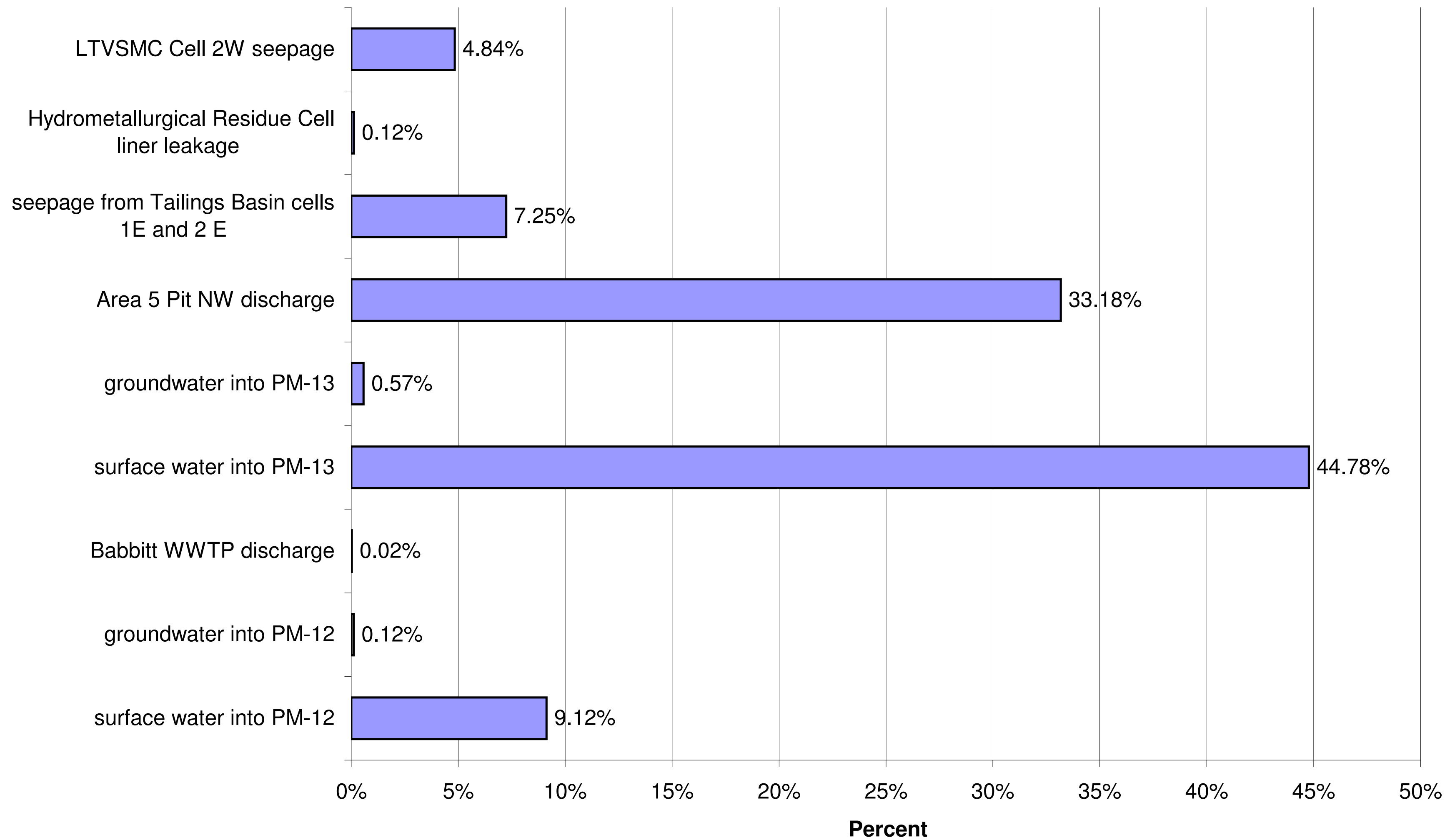
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)



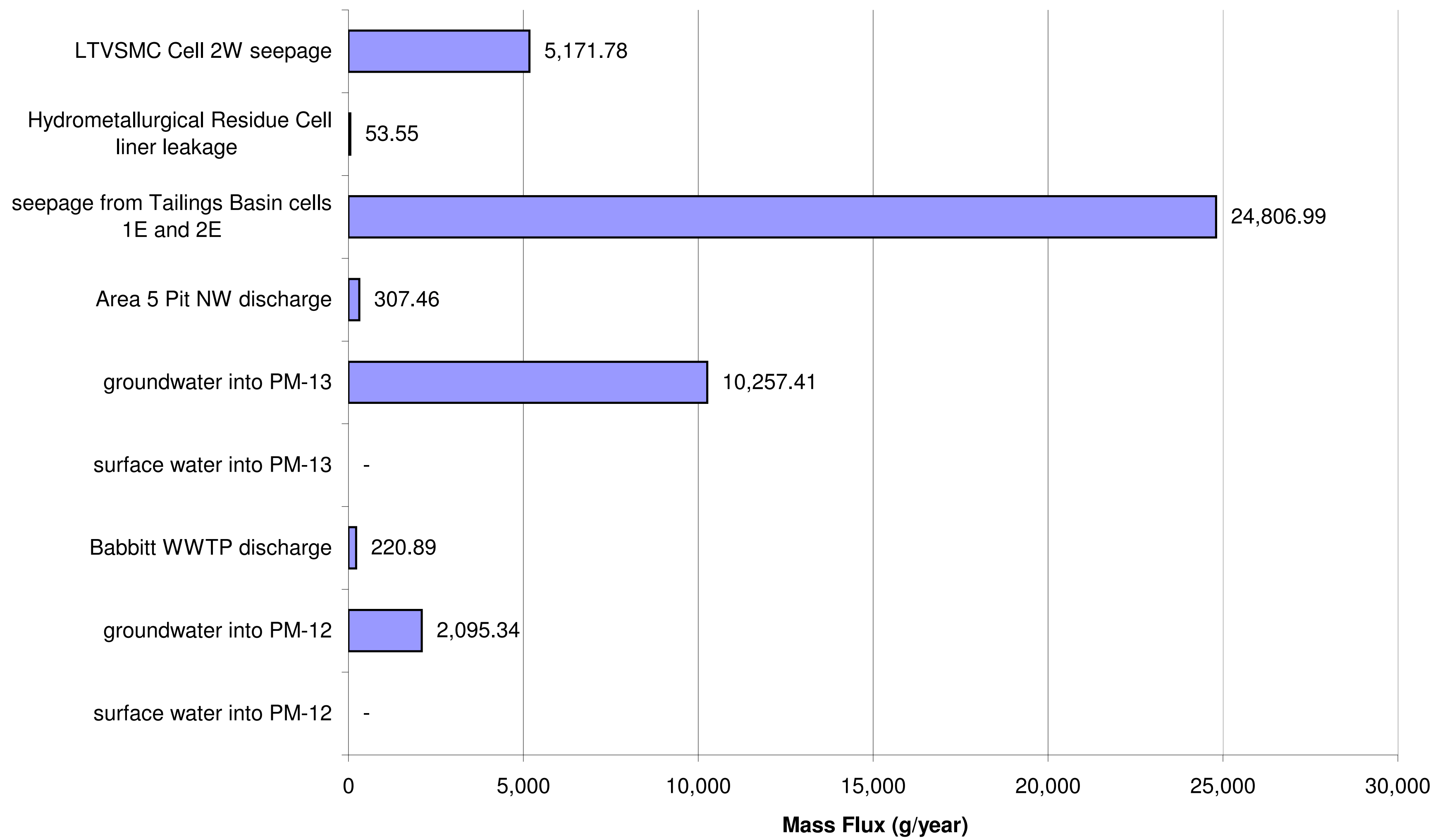
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)

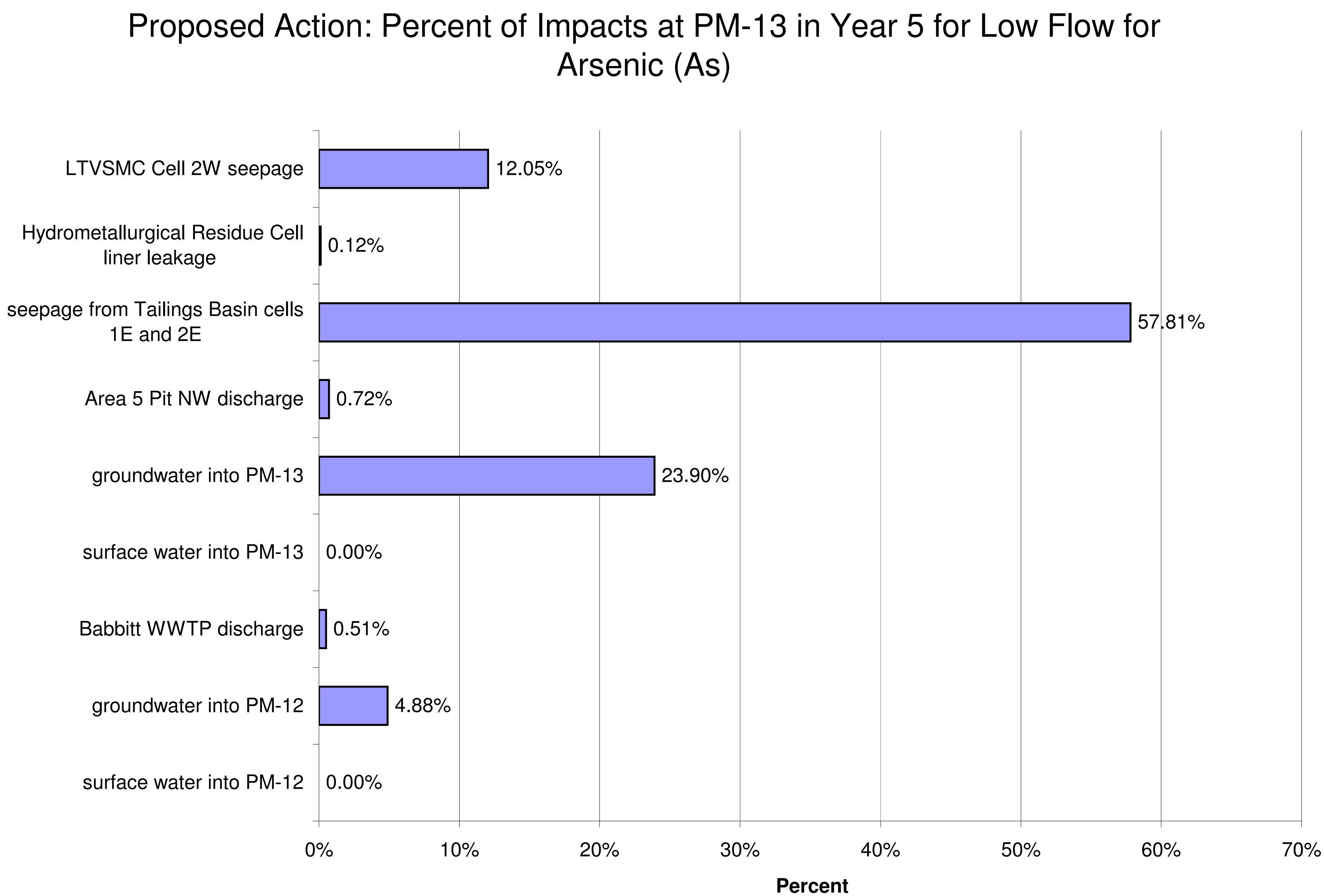


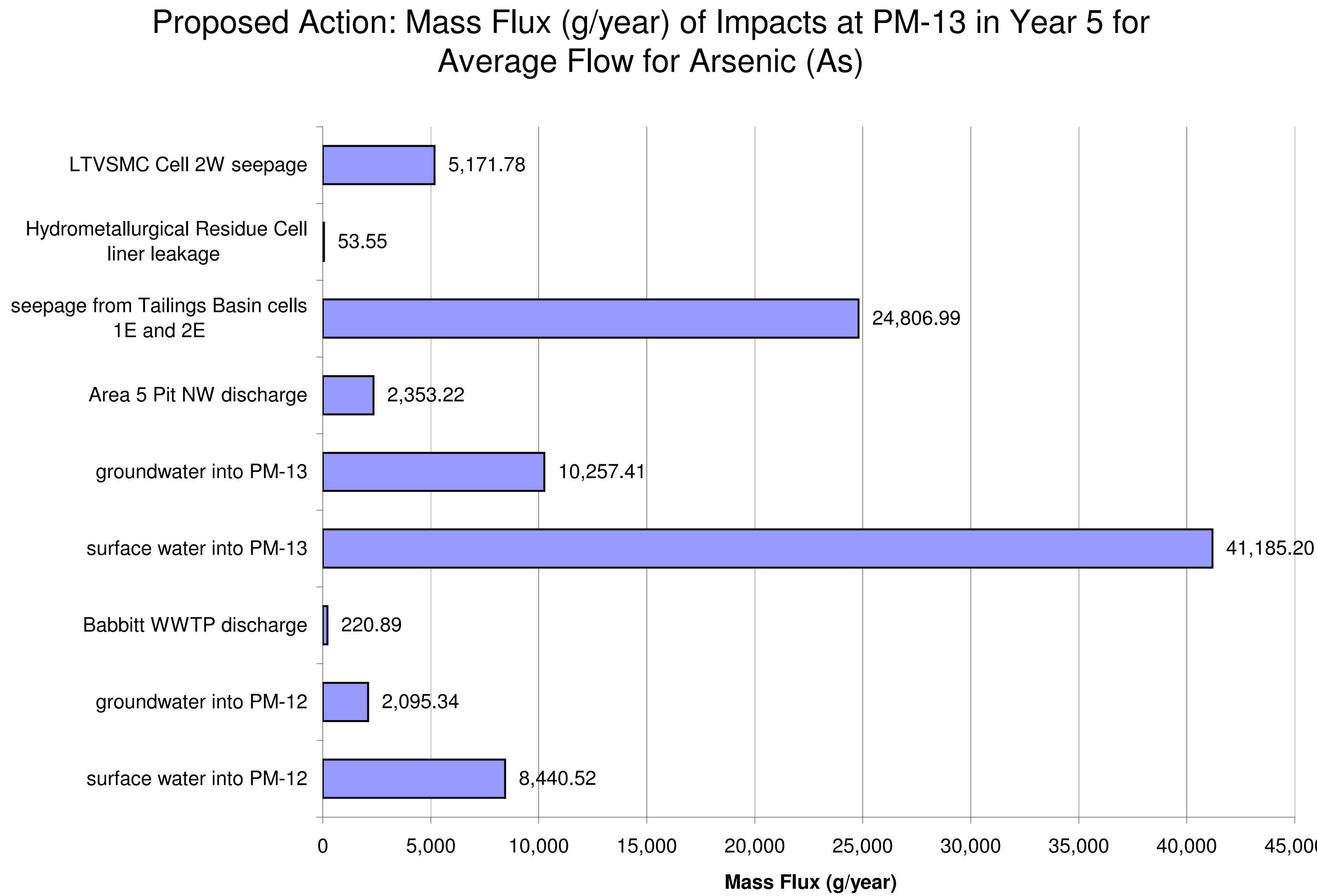
Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)

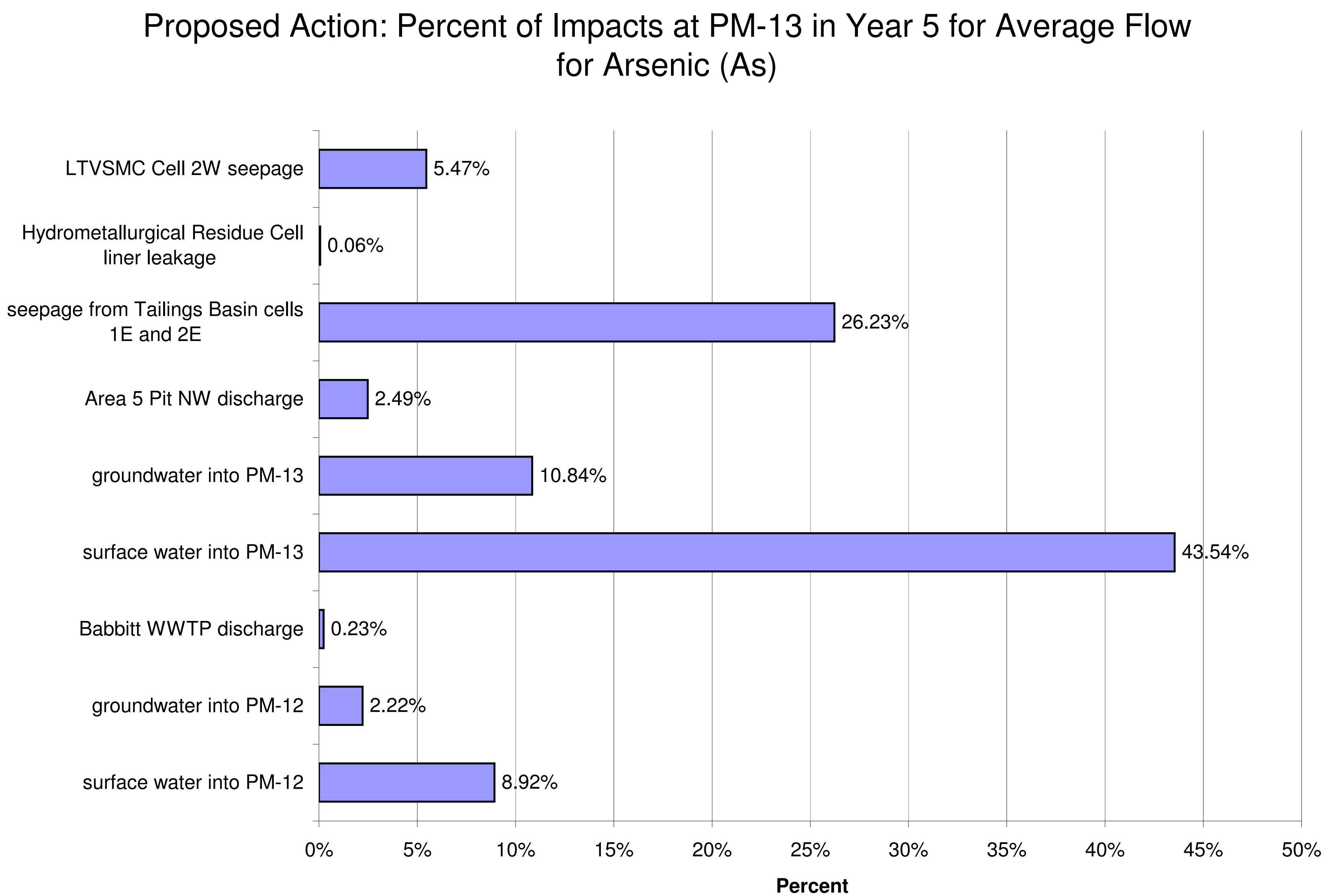


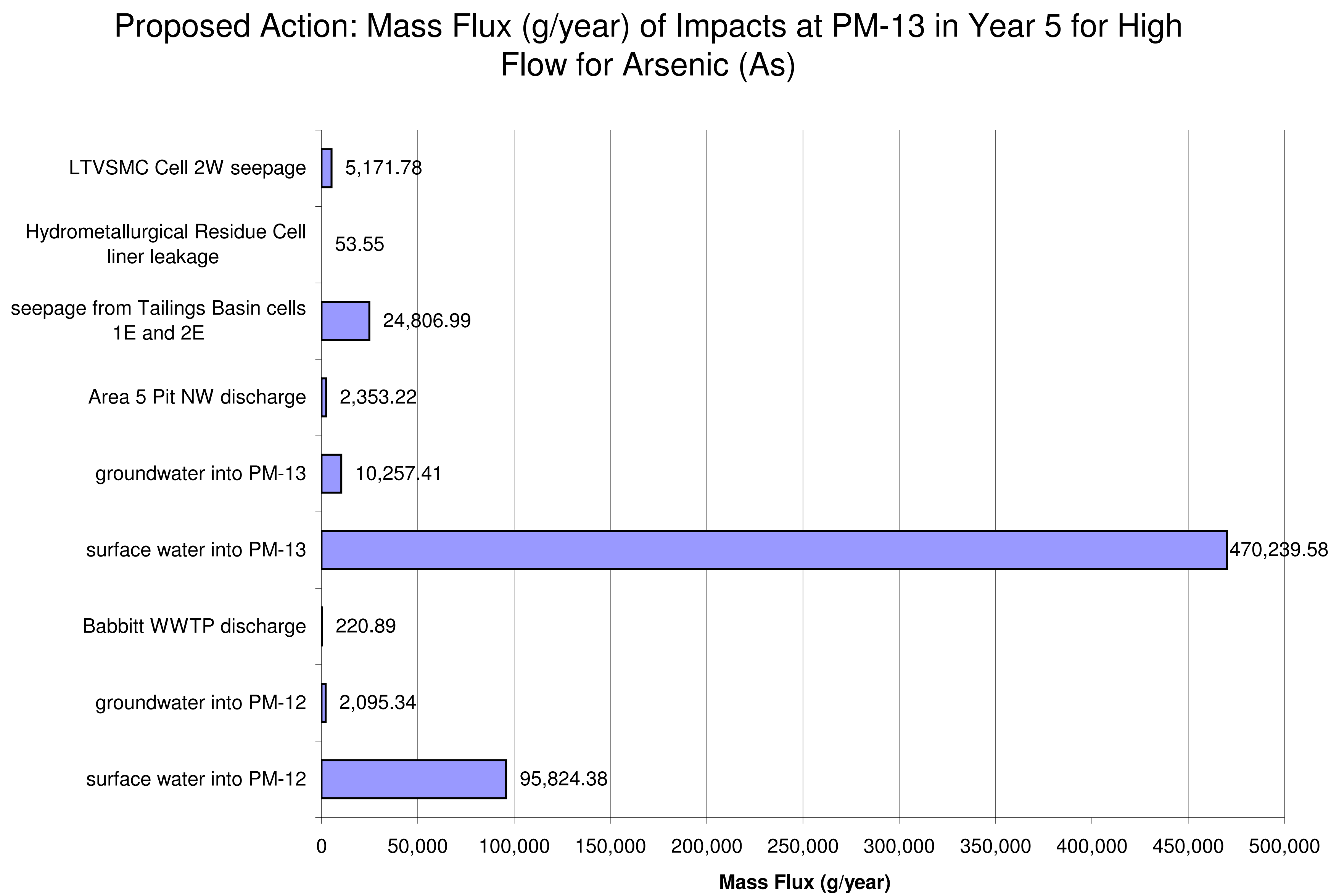
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)



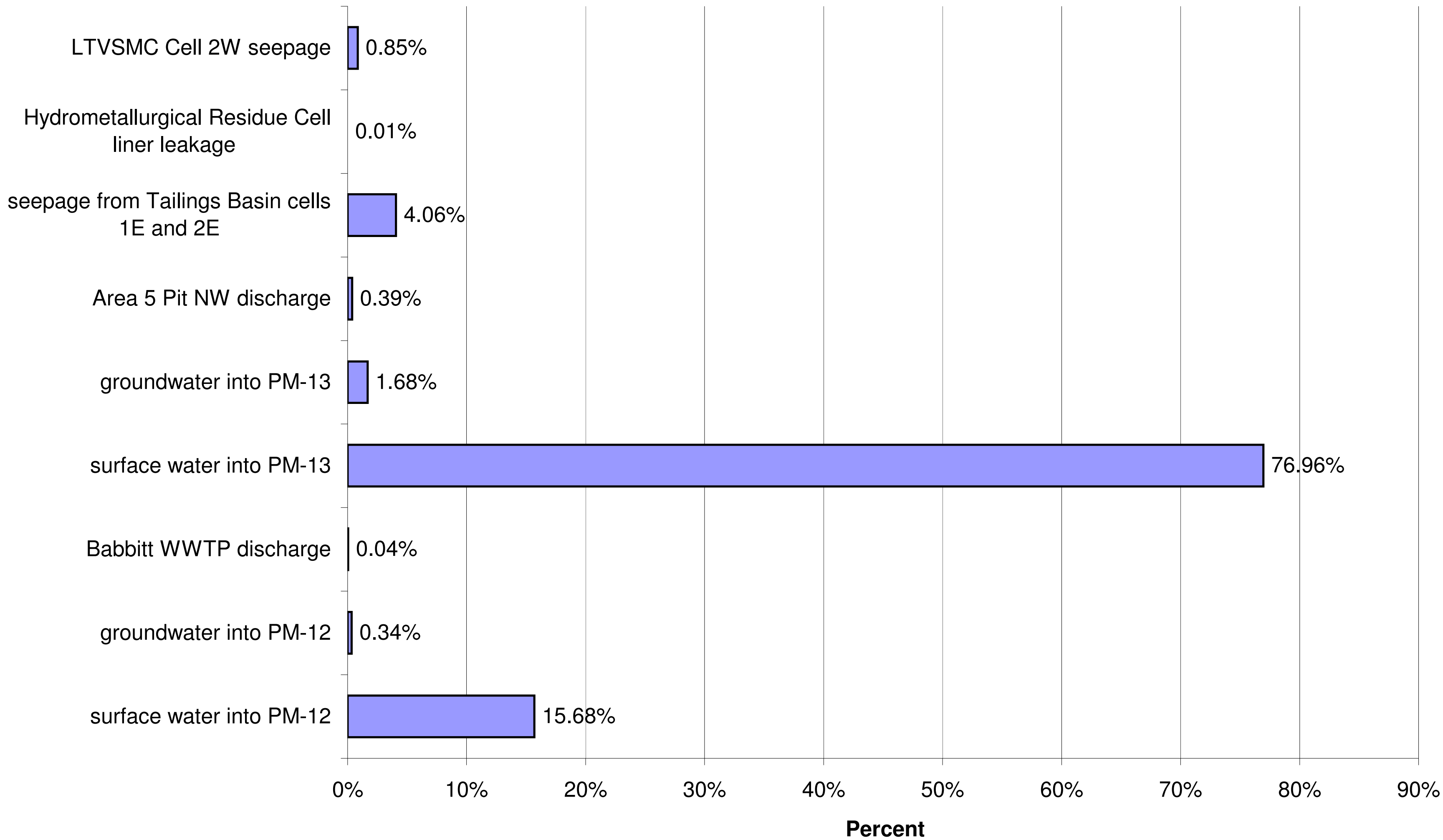

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
12.05%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
57.81%
Area 5 Pit NW discharge
0.72%
groundwater into PM-13
23.90%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.51%
groundwater into PM-12
4.88%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

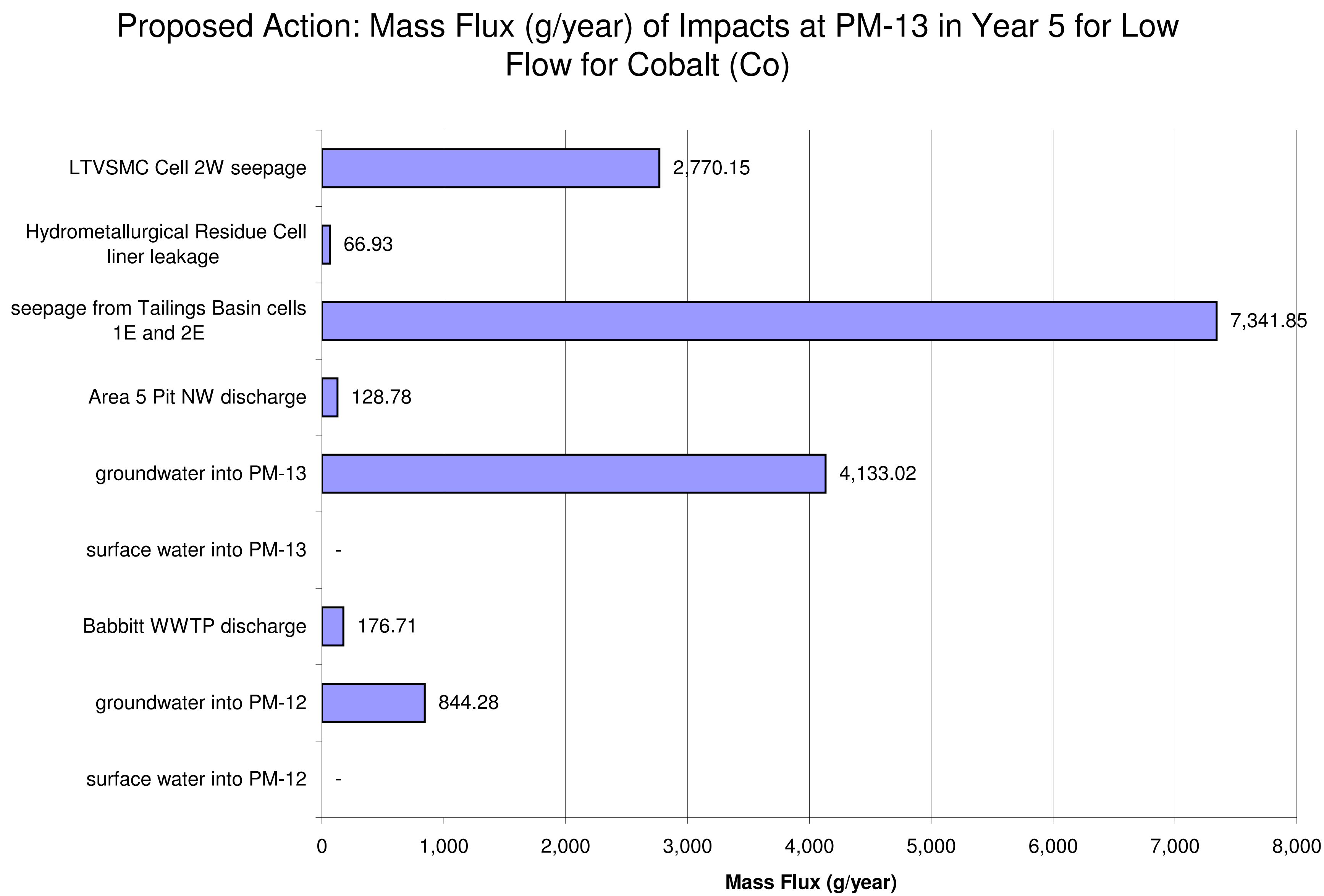

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
24,806.99
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

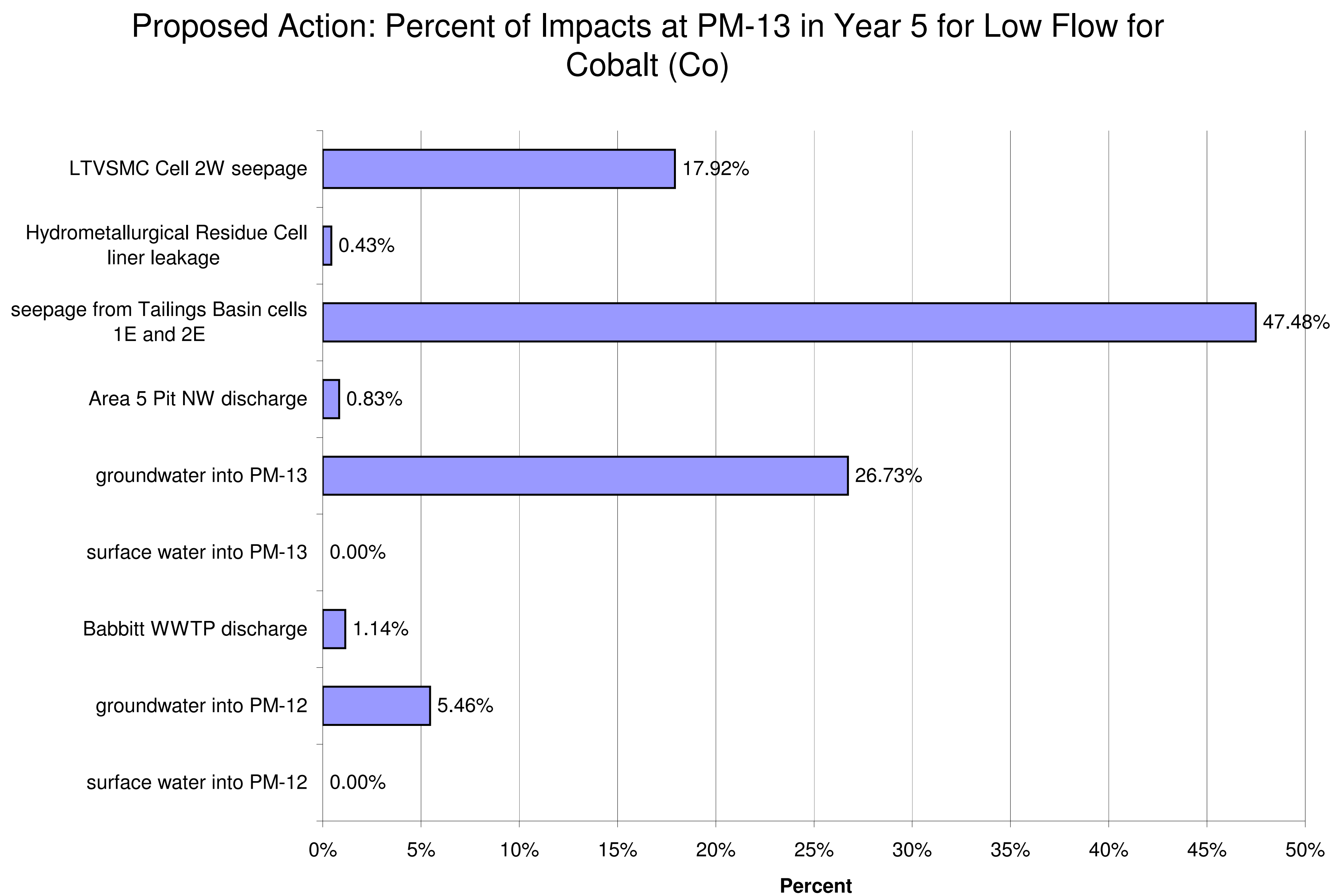

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5.47%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin cells 1E and 2E
26.23%
Area 5 Pit NW discharge
2.49%
groundwater into PM-13
10.84%
surface water into PM-13
43.54%
Babbitt WWTP discharge
0.23%
groundwater into PM-12
2.22%
surface water into PM-12
8.92%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
24,806.99
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

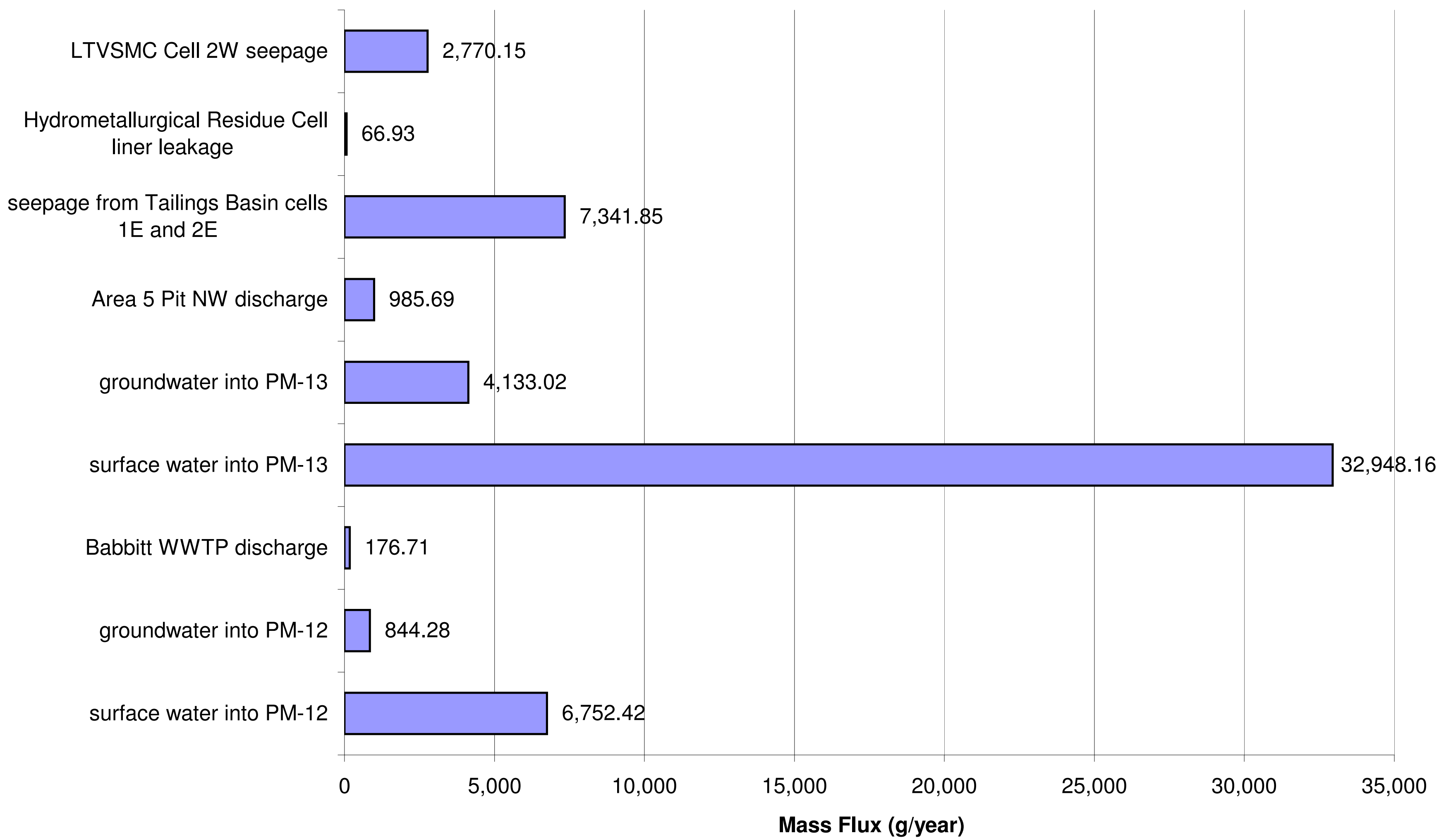
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)



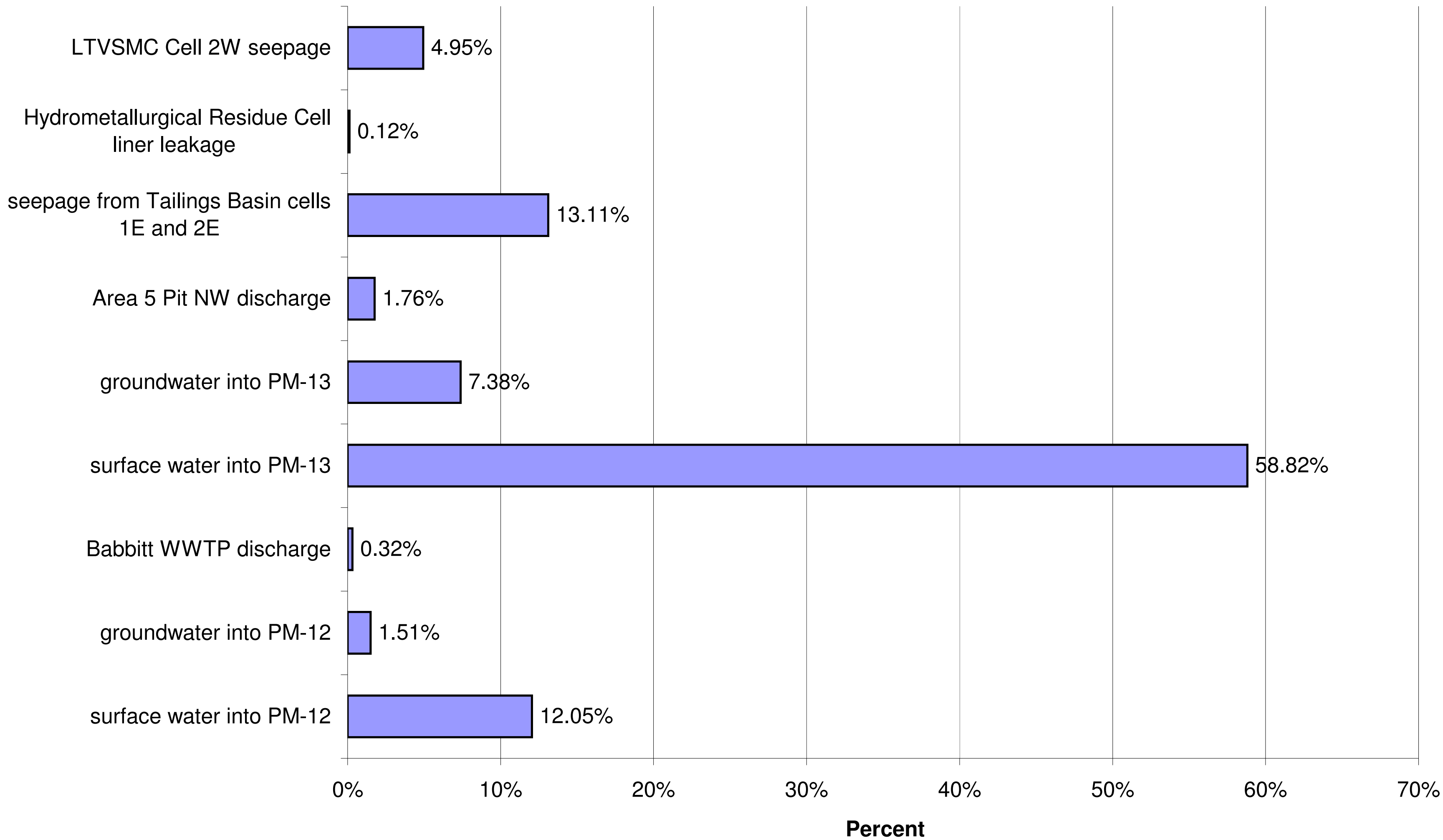

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
7,341.85
Area 5 Pit NW discharge
128.78
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
-
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Mass Flux (g/year)

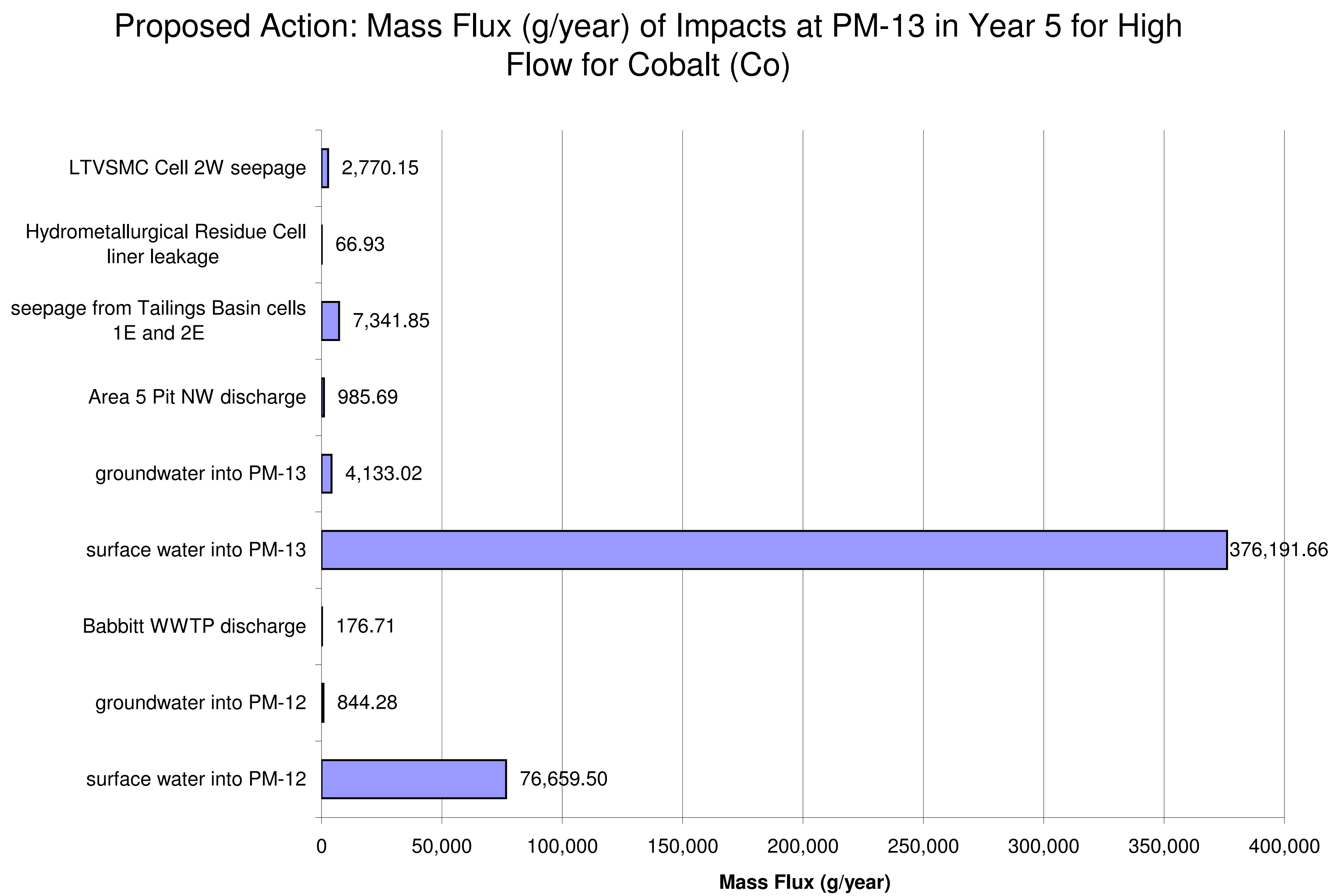

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
17.92%
Hydrometallurgical Residue Cell liner leakage
0.43%
seepage from Tailings Basin cells 1E and 2E
47.48%
Area 5 Pit NW discharge
0.83%
groundwater into PM-13
26.73%
surface water into PM-13
0.00%
Babbitt WWTP discharge
1.14%
groundwater into PM-12
5.46%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

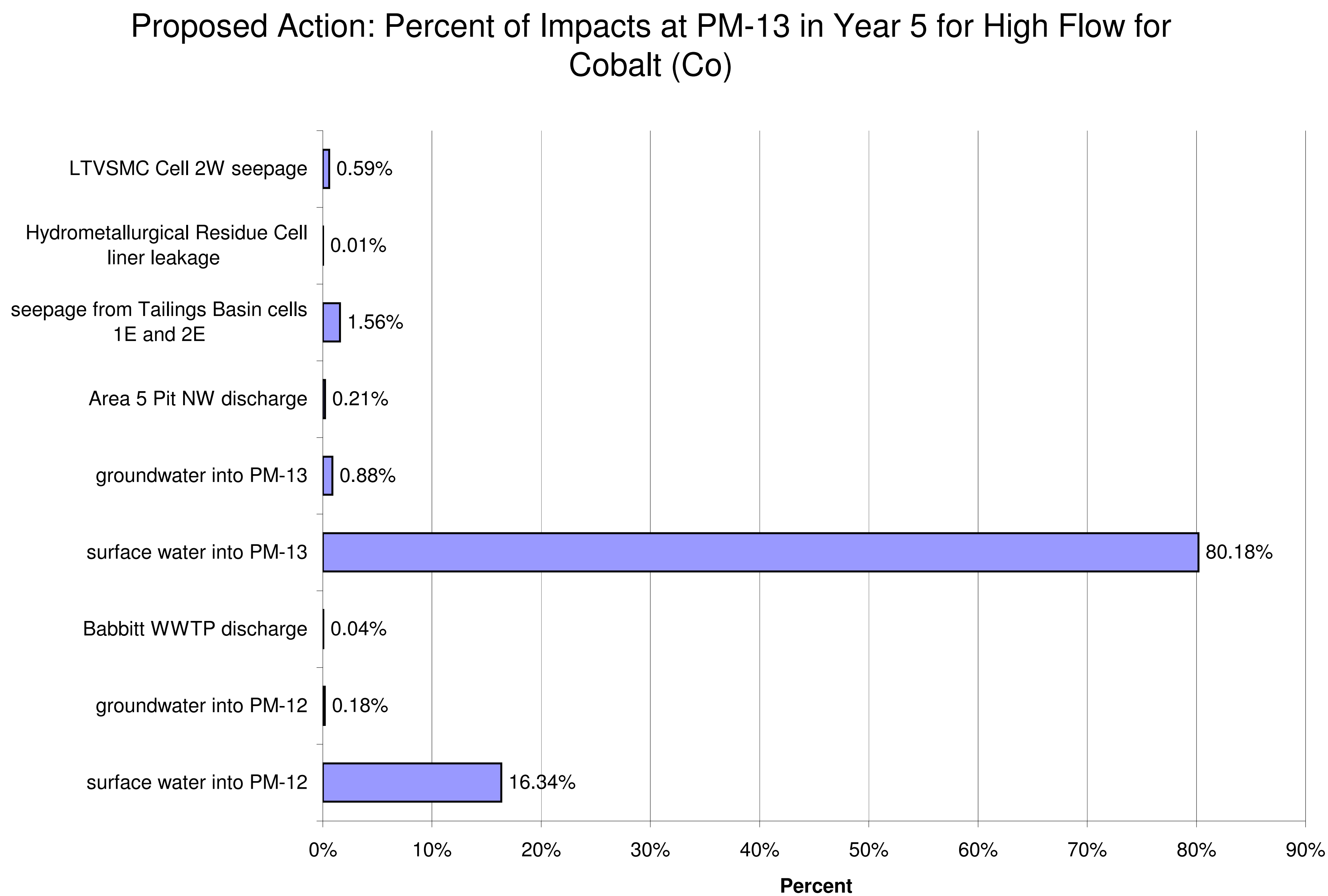
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)



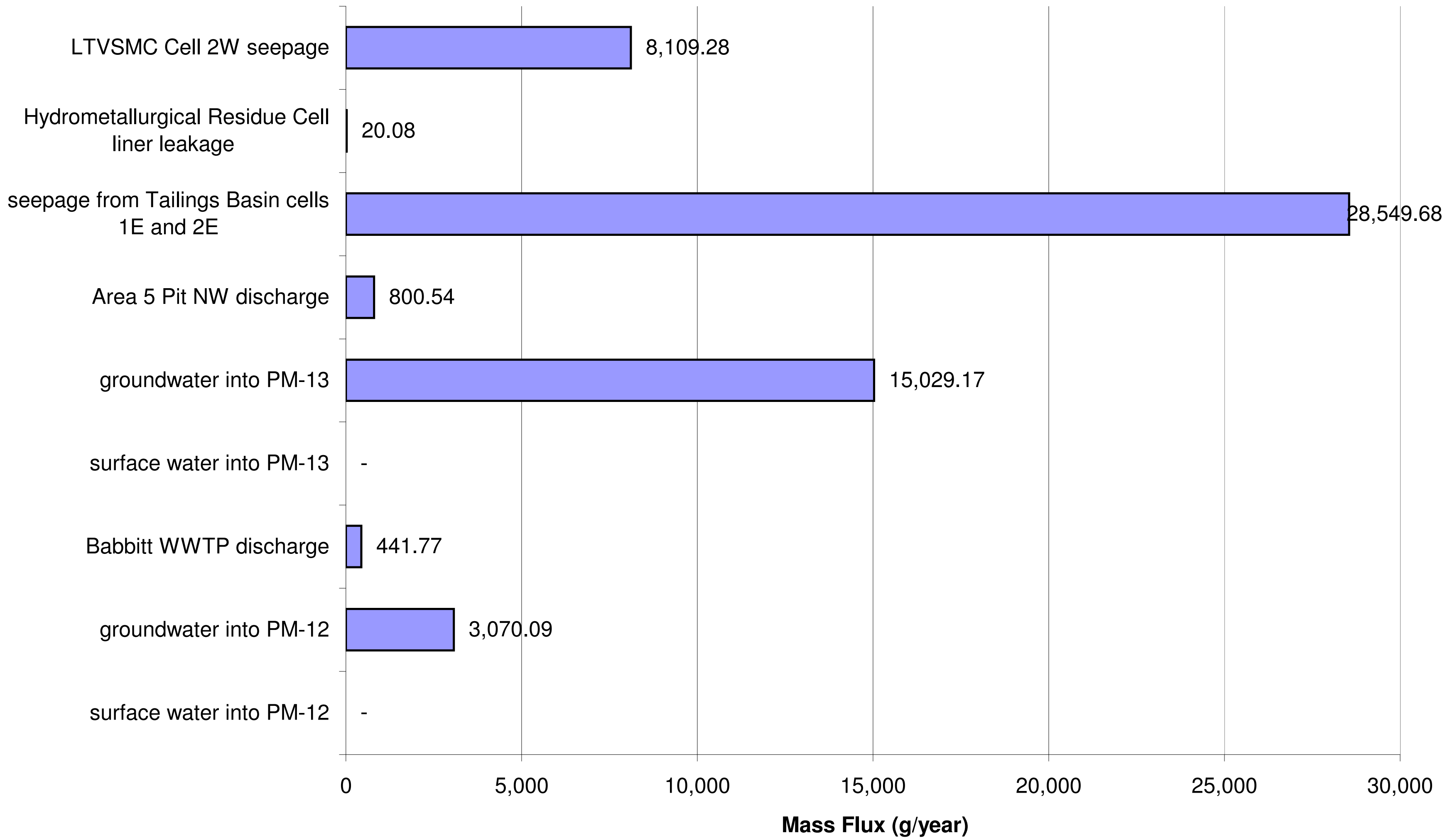
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)

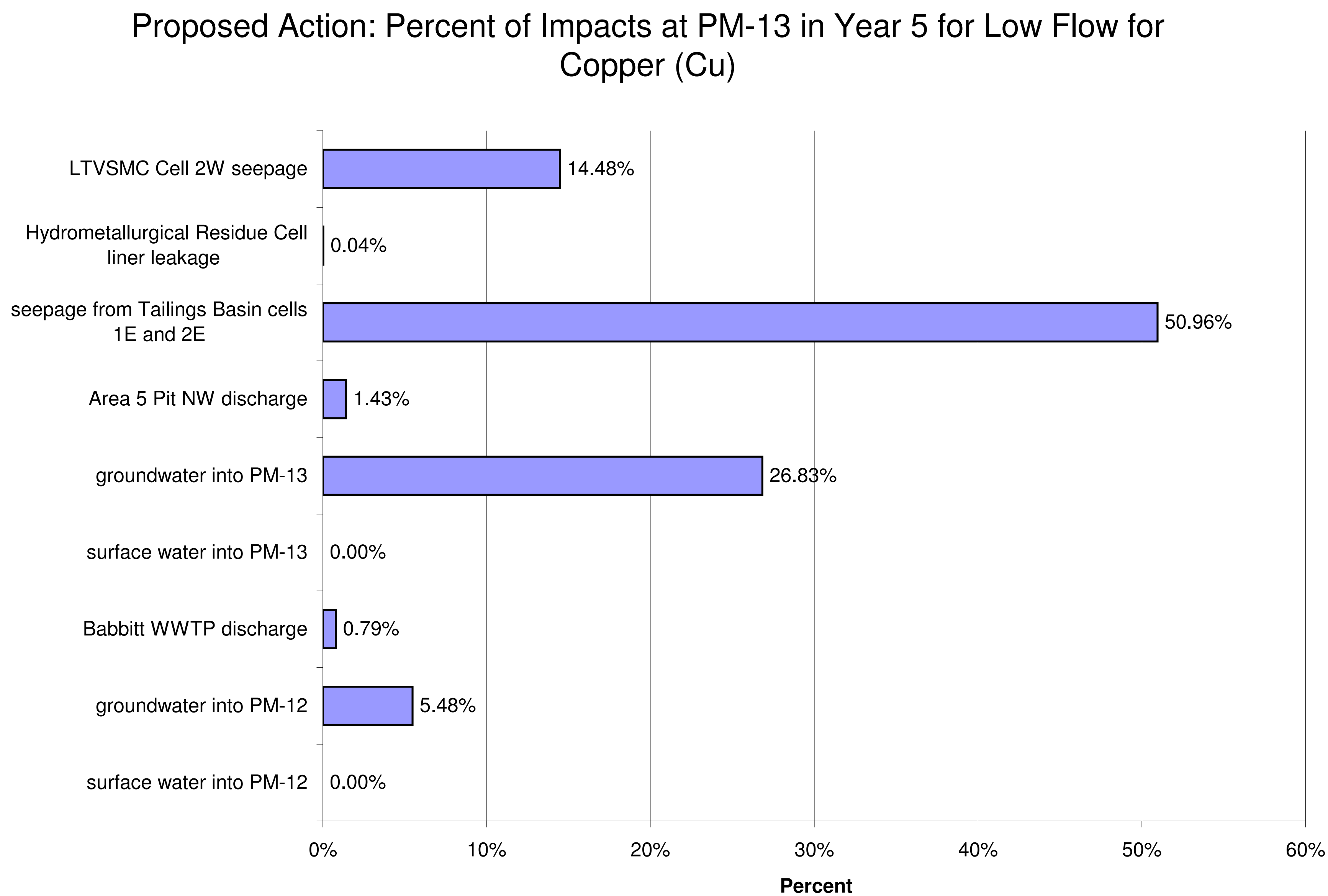



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
7,341.85
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

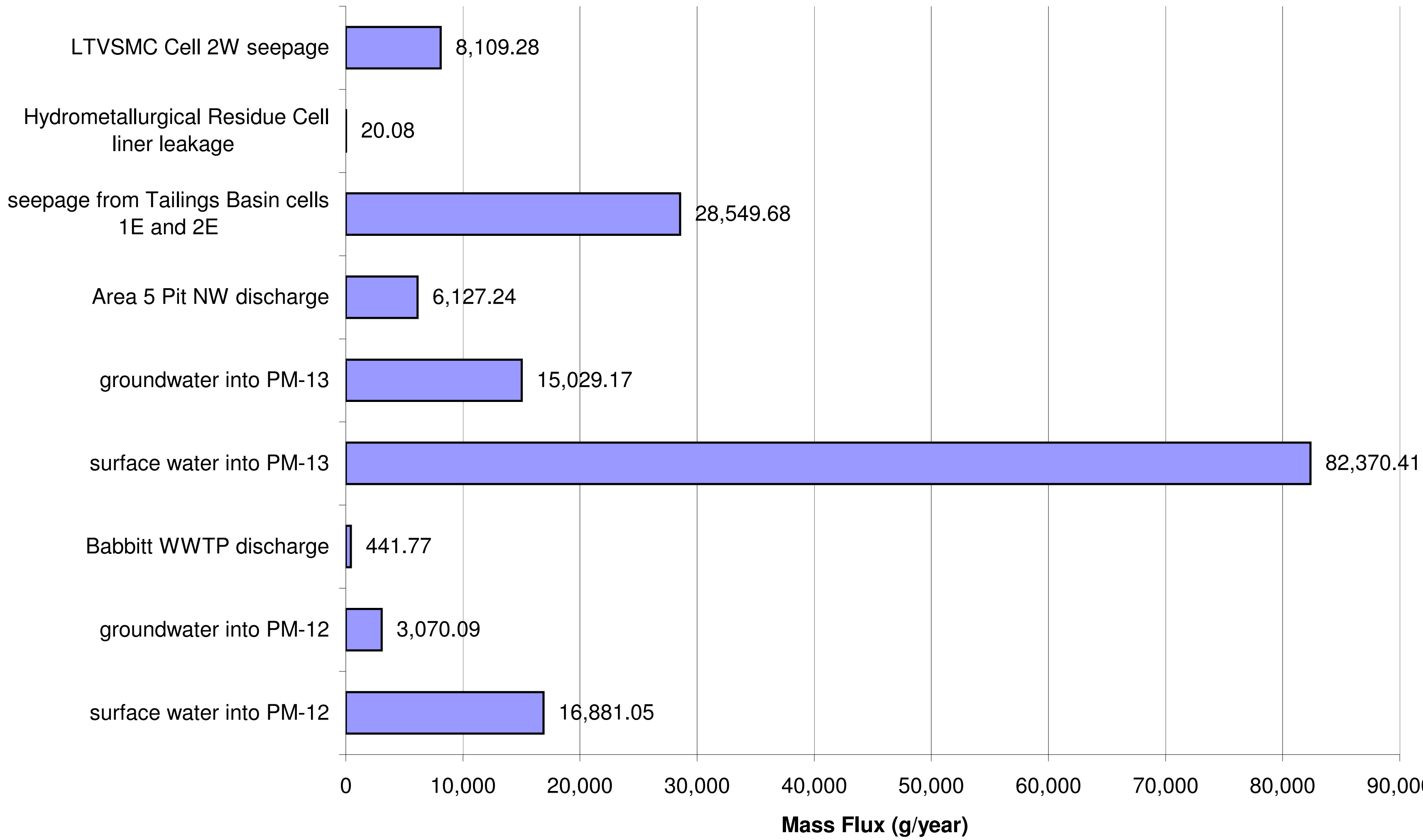

Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.59%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
1.56%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.88%
surface water into PM-13
80.18%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.34%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)

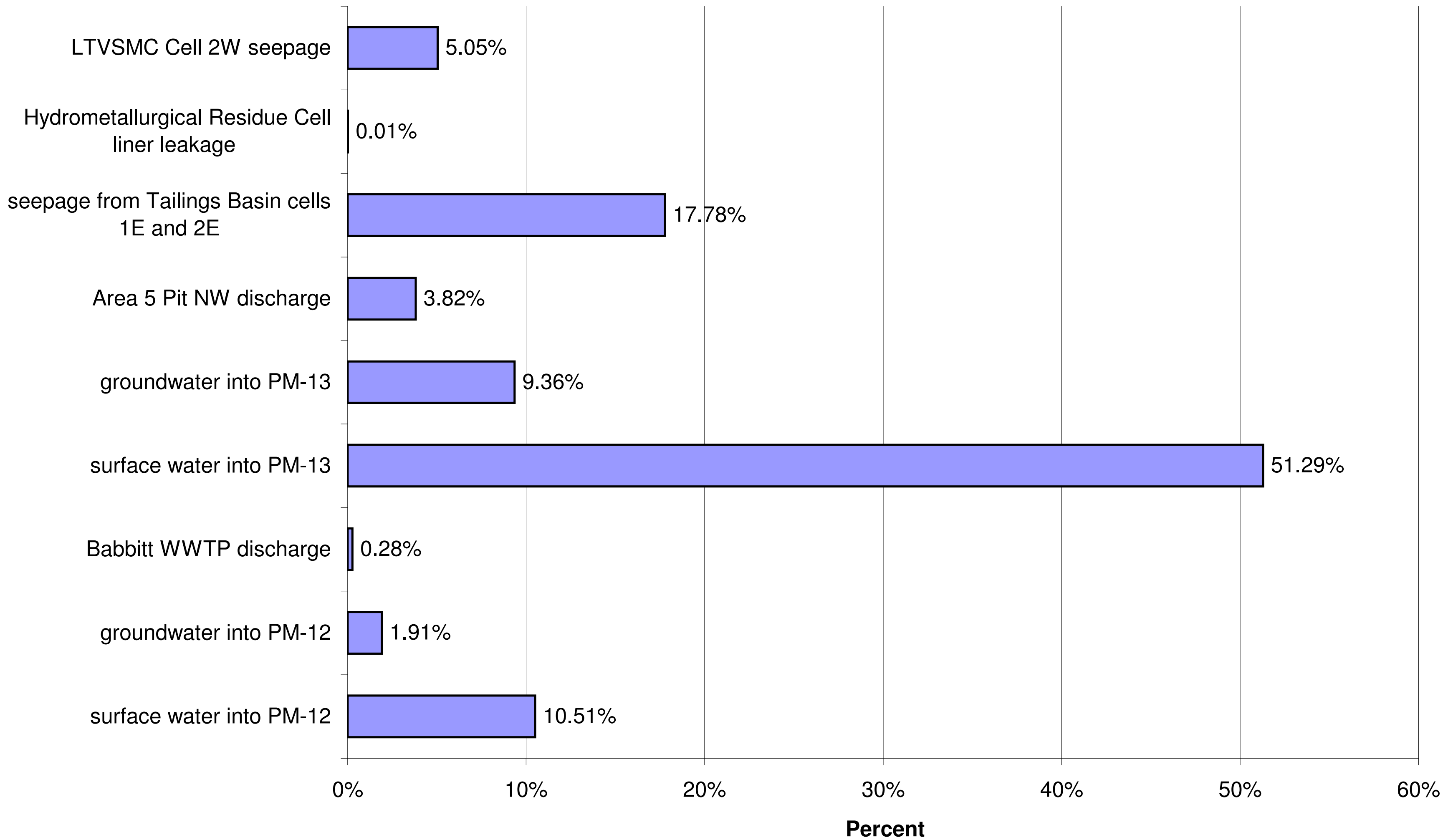


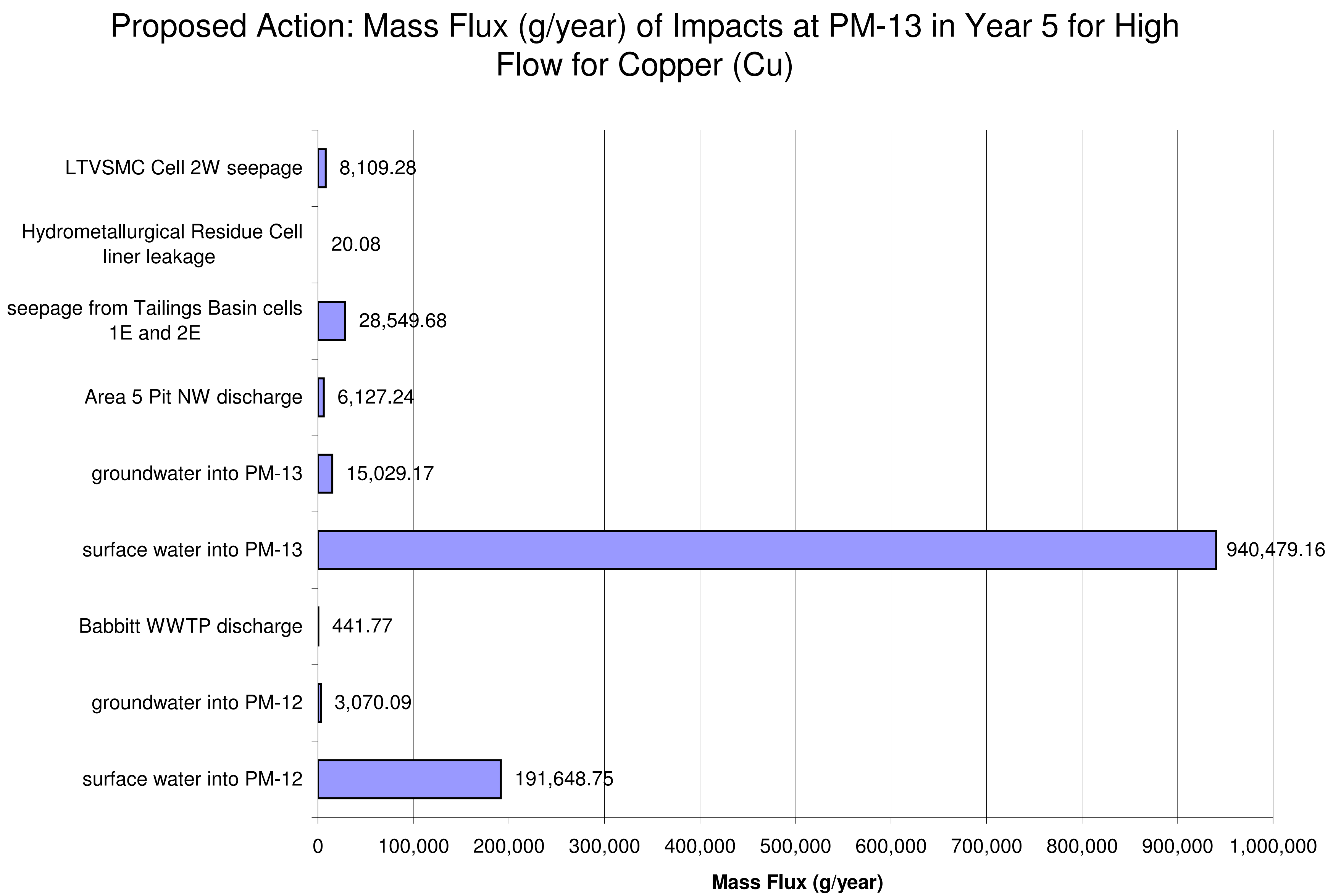

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
14.48%
Hydrometallurgical Residue Cell liner leakage
0.04%
seepage from Tailings Basin cells 1E and 2E
50.96%
Area 5 Pit NW discharge
1.43%
groundwater into PM-13
26.83%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.79%
groundwater into PM-12
5.48%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Copper (Cu)

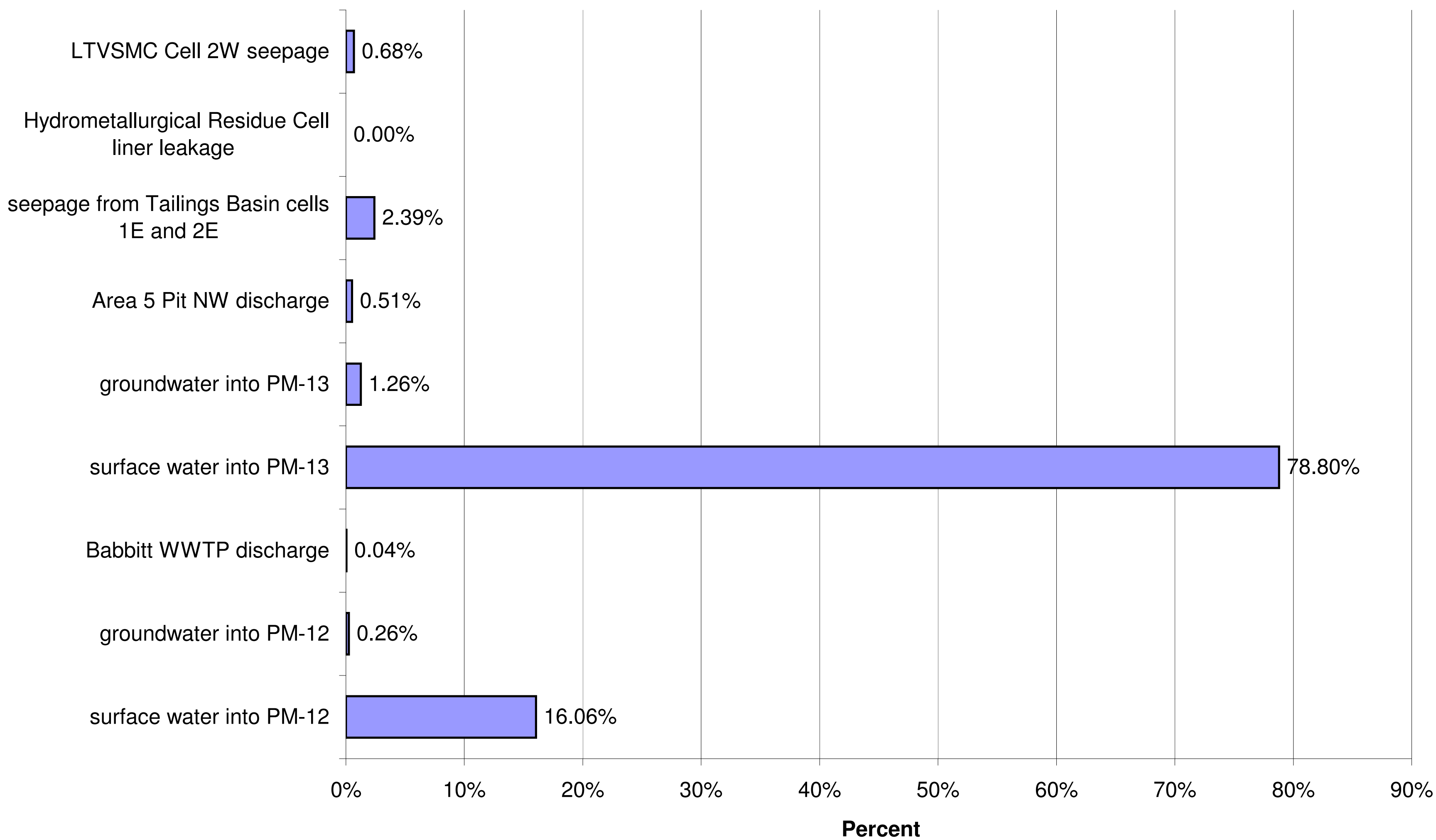


Proposed Action: Percent of Impacts at PM-13 in Closure for Year 5 Flow for Copper (Cu)

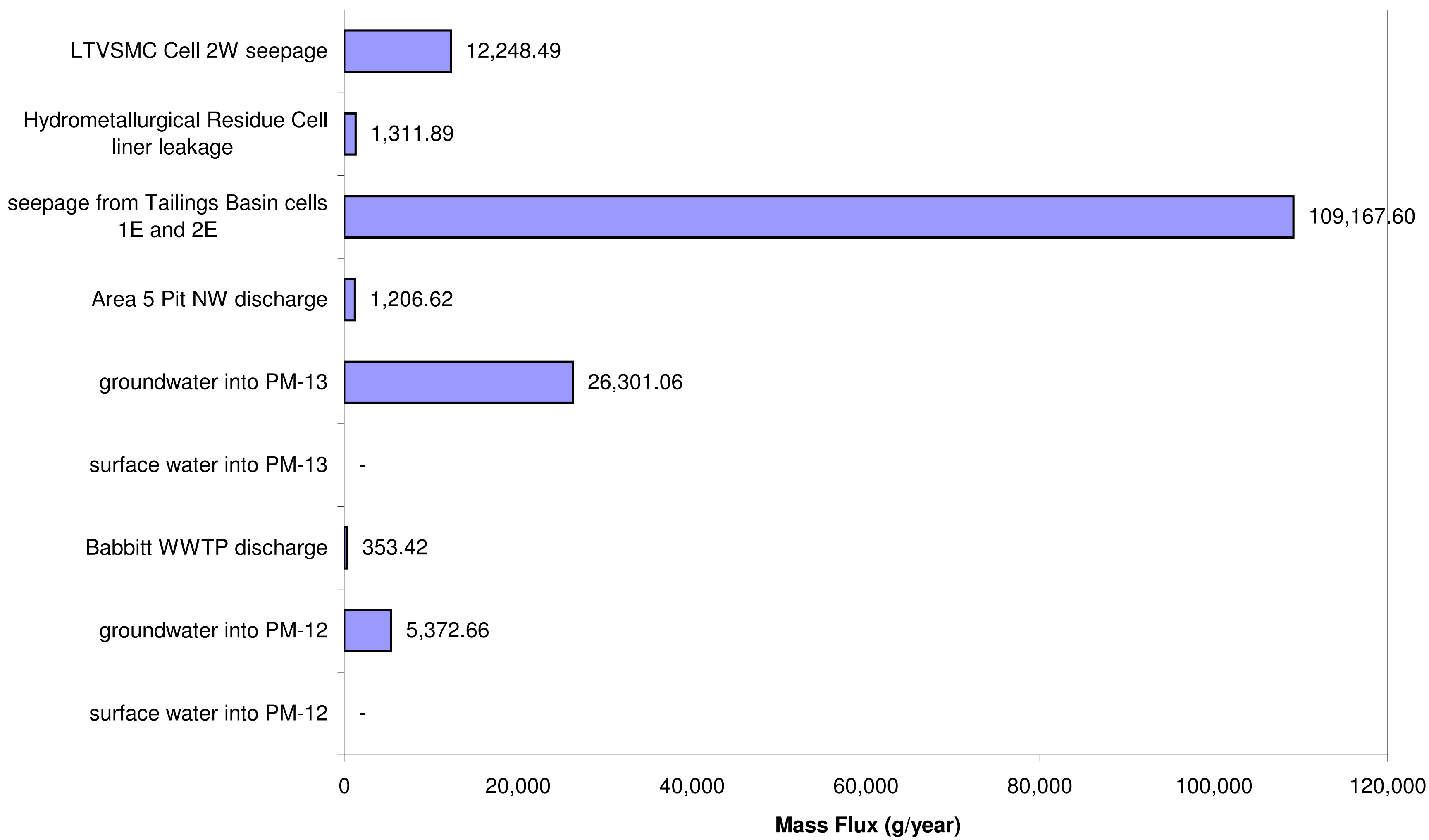


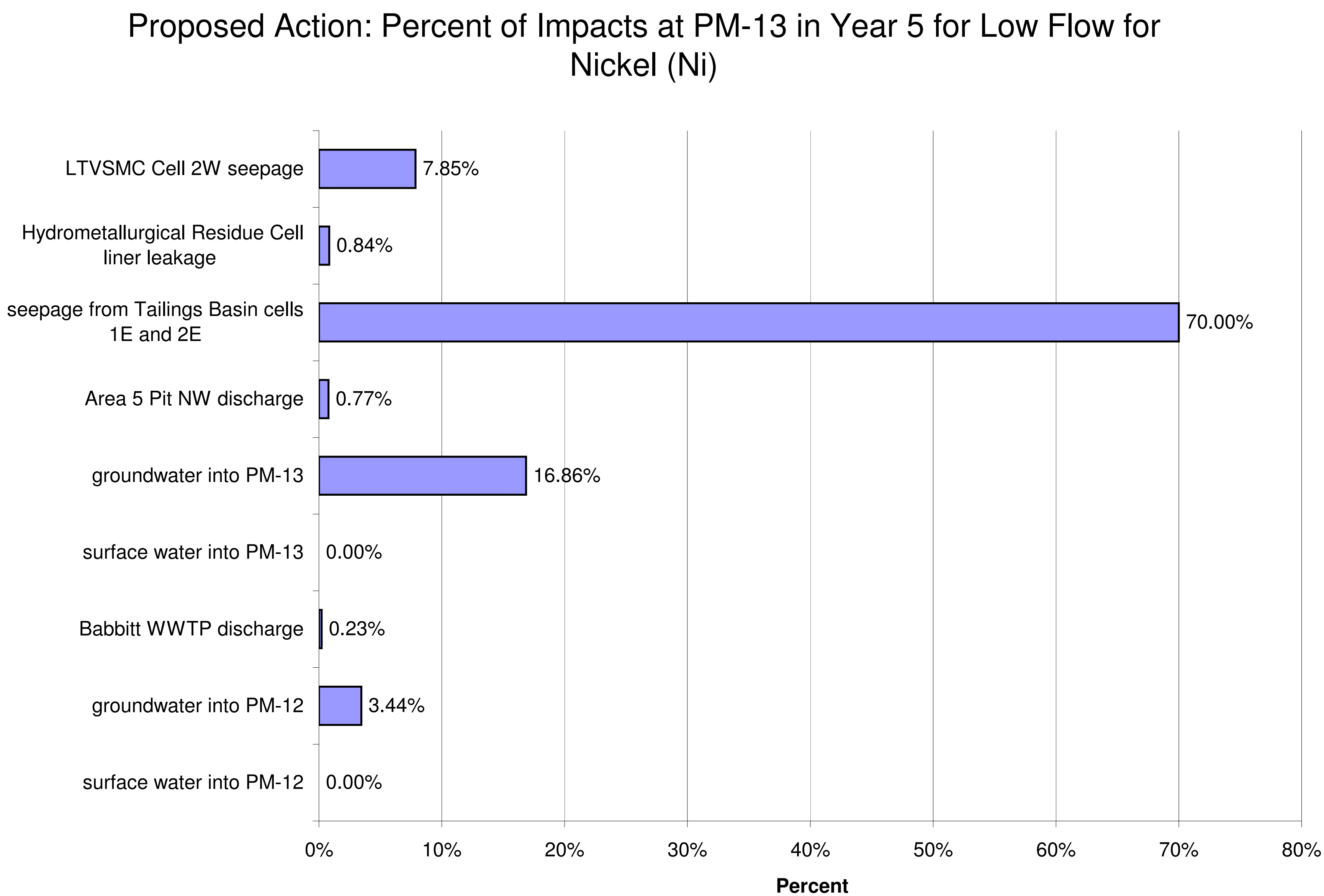

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
20.08
seepage from Tailings Basin cells 1E and 2E
28,549.68
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

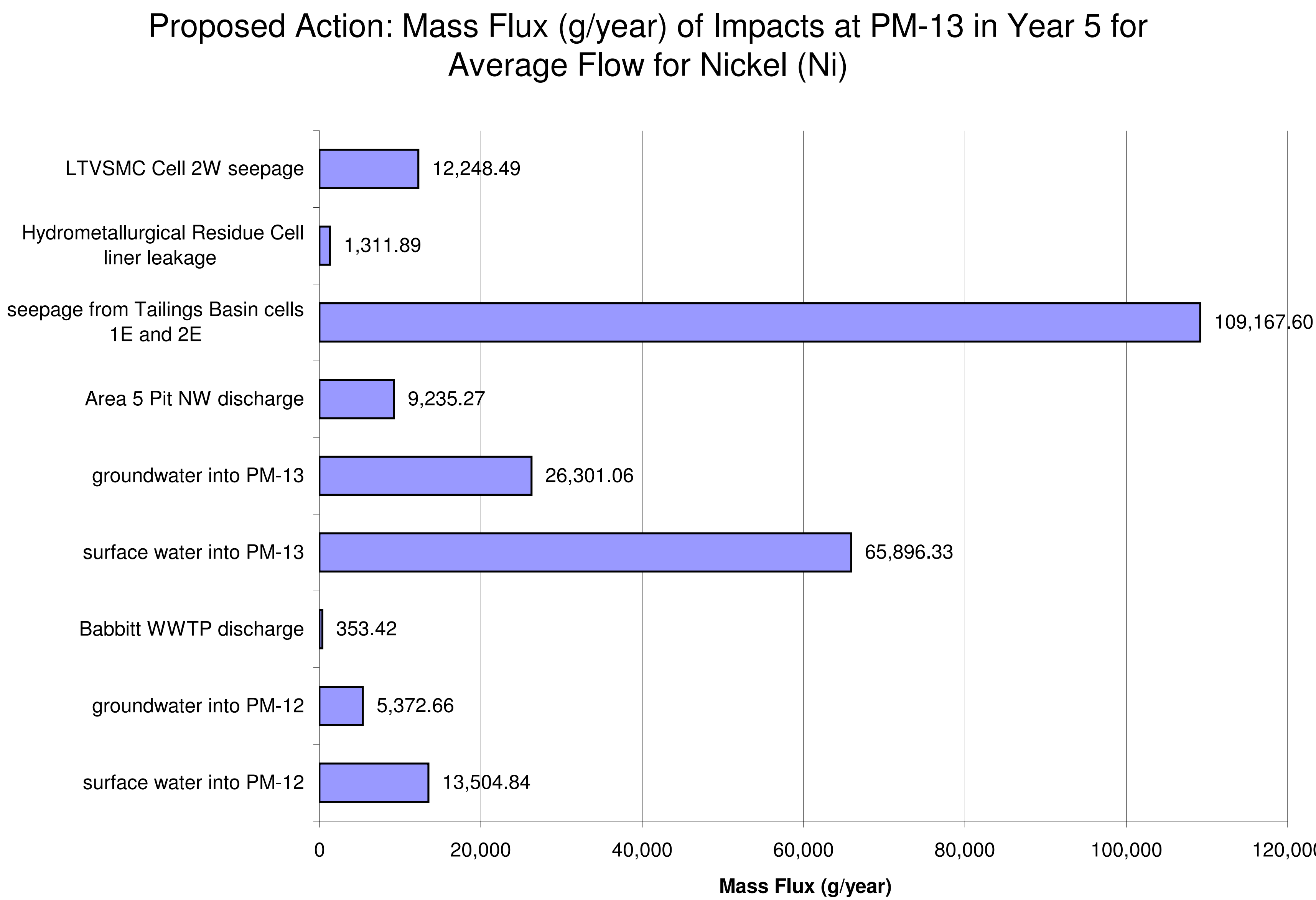
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Copper (Cu)



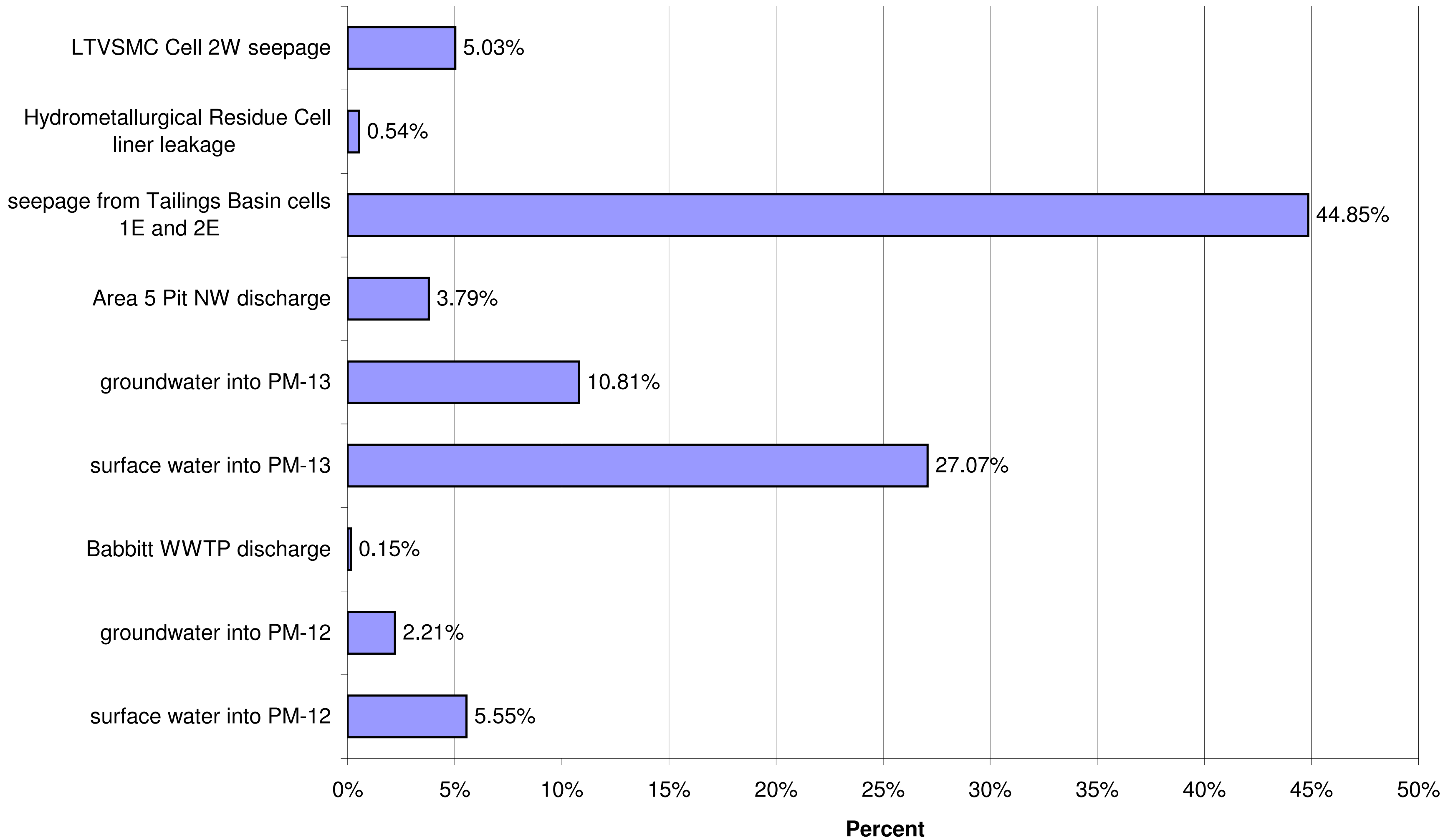
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)

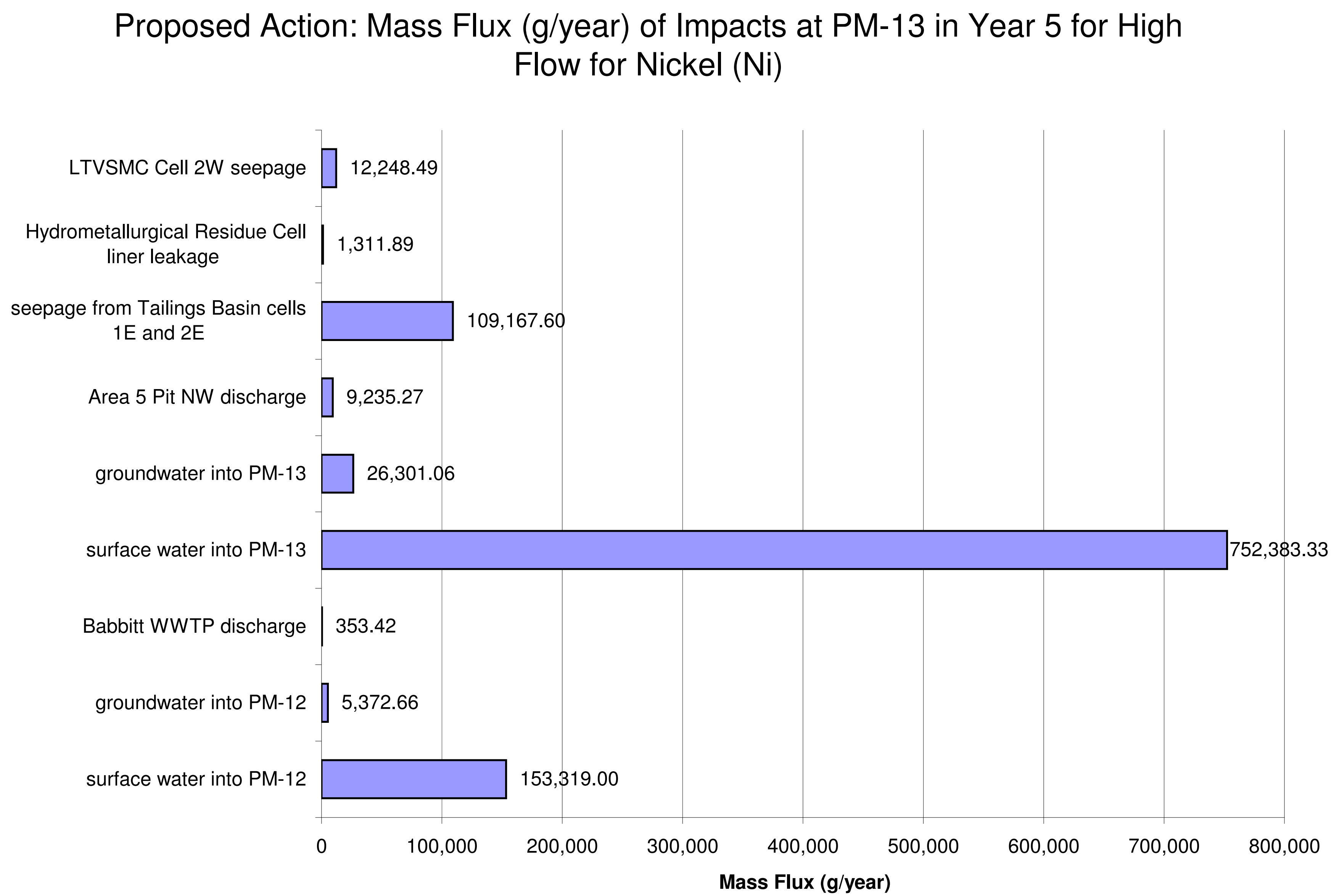



Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
7.85%
Hydrometallurgical Residue Cell liner leakage
0.84%
seepage from Tailings Basin cells 1E and 2E
70.00%
Area 5 Pit NW discharge
0.77%
groundwater into PM-13
16.86%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.23%
groundwater into PM-12
3.44%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

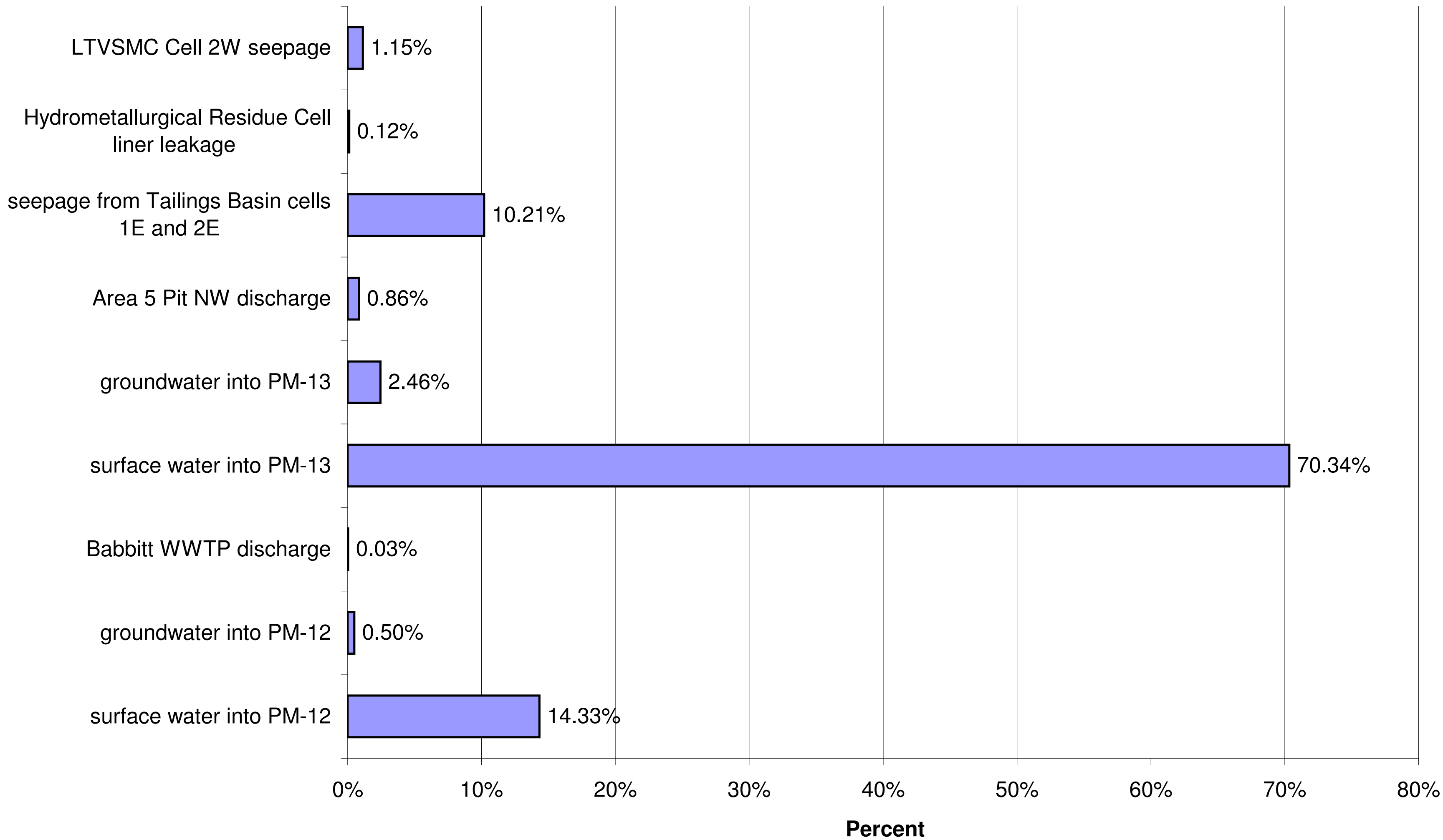

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,311.89
seepage from Tailings Basin cells 1E and 2E
109,167.60
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
20,000
40,000
60,000
80,000
100,000
120,000
Mass Flux (g/year)

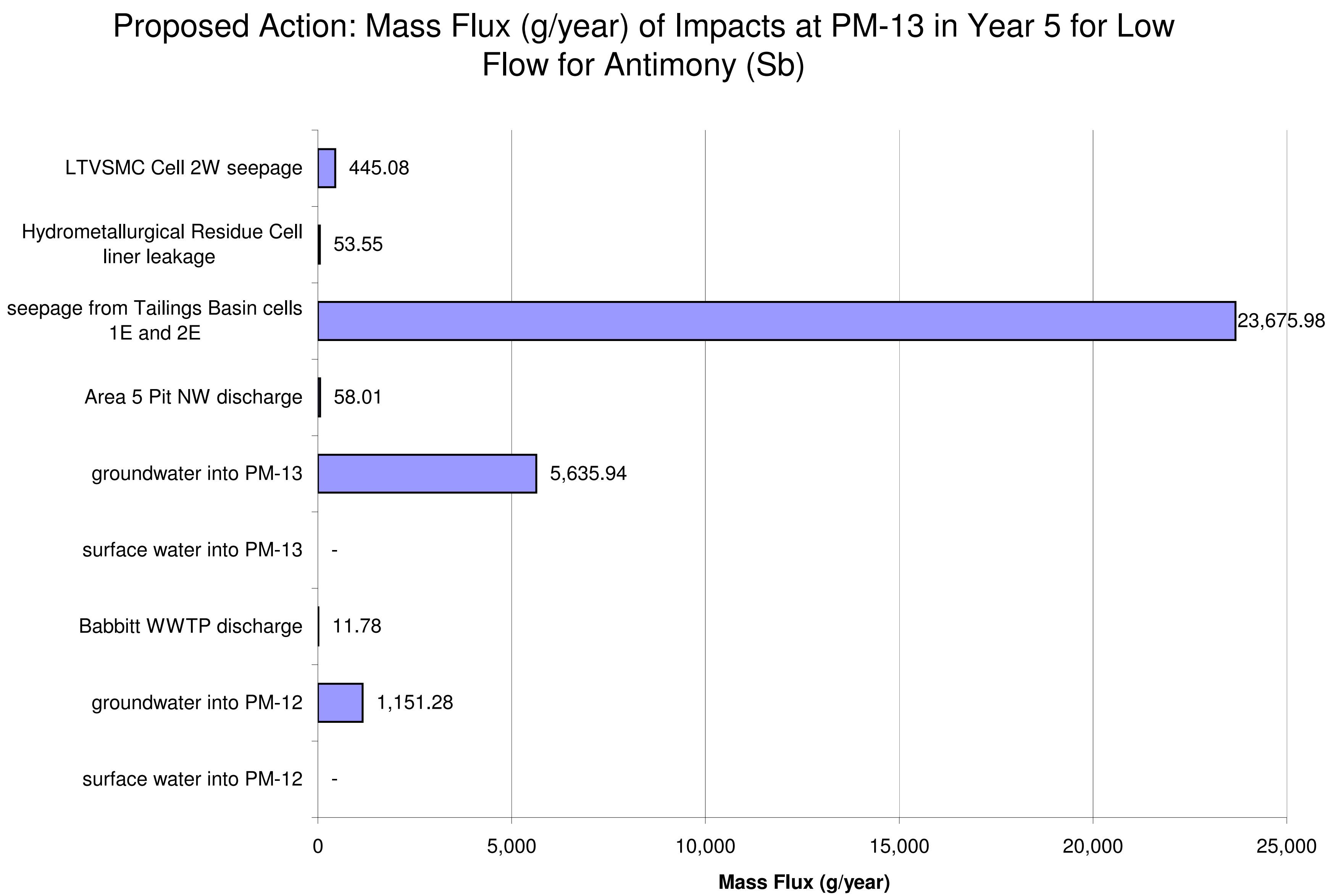
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)

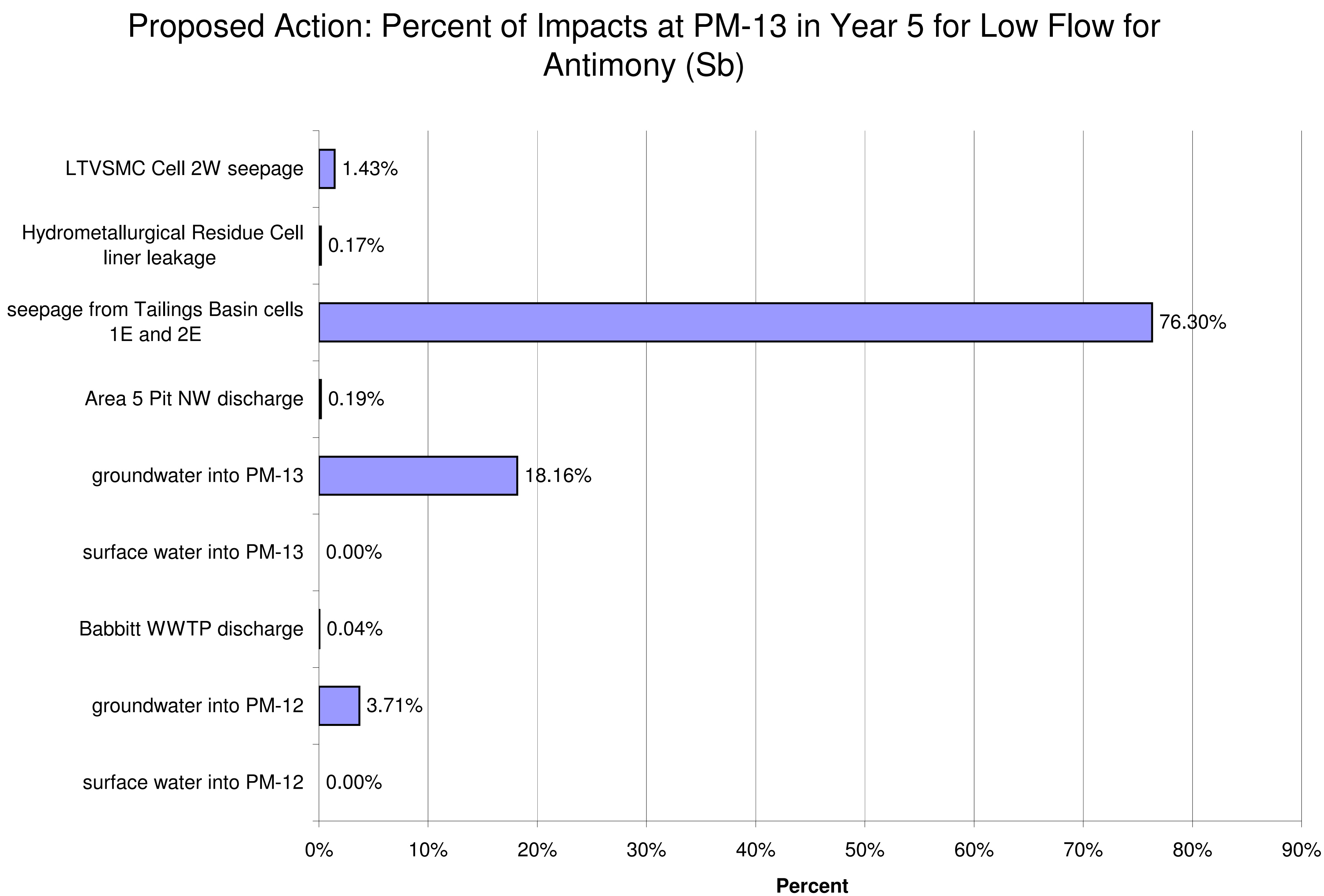


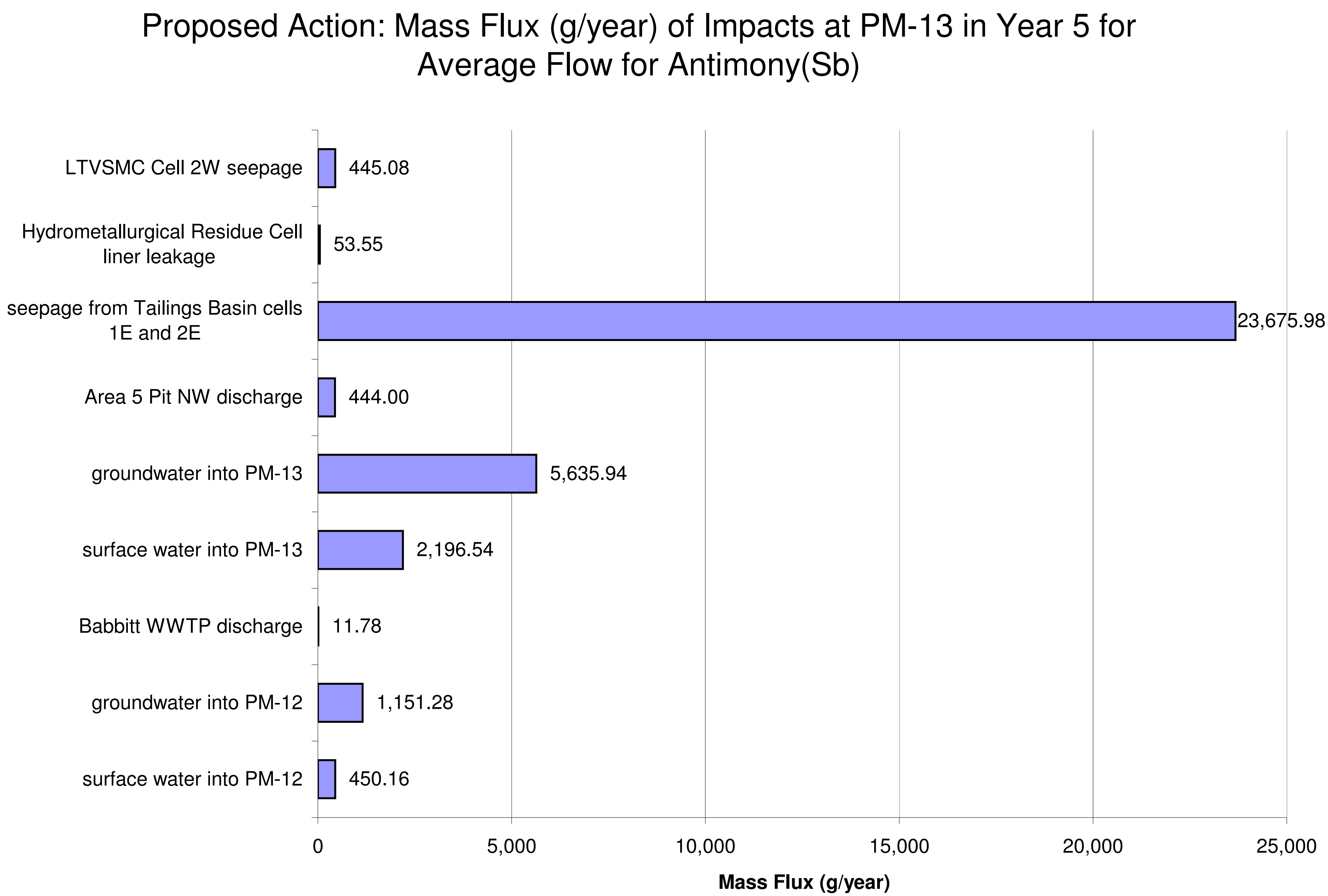

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,311.89
seepage from Tailings Basin cells 1E and 2E
109,167.60
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

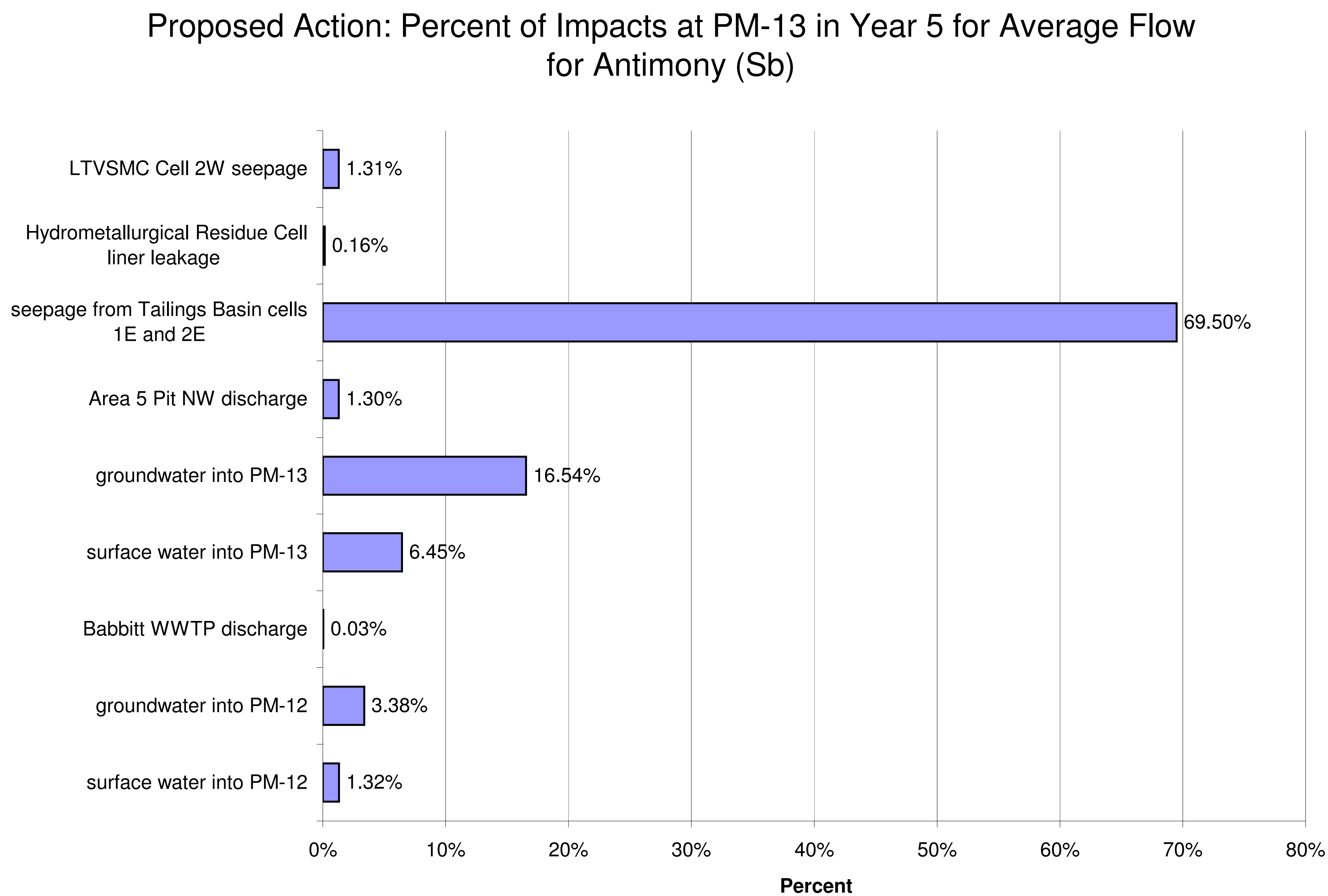
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)

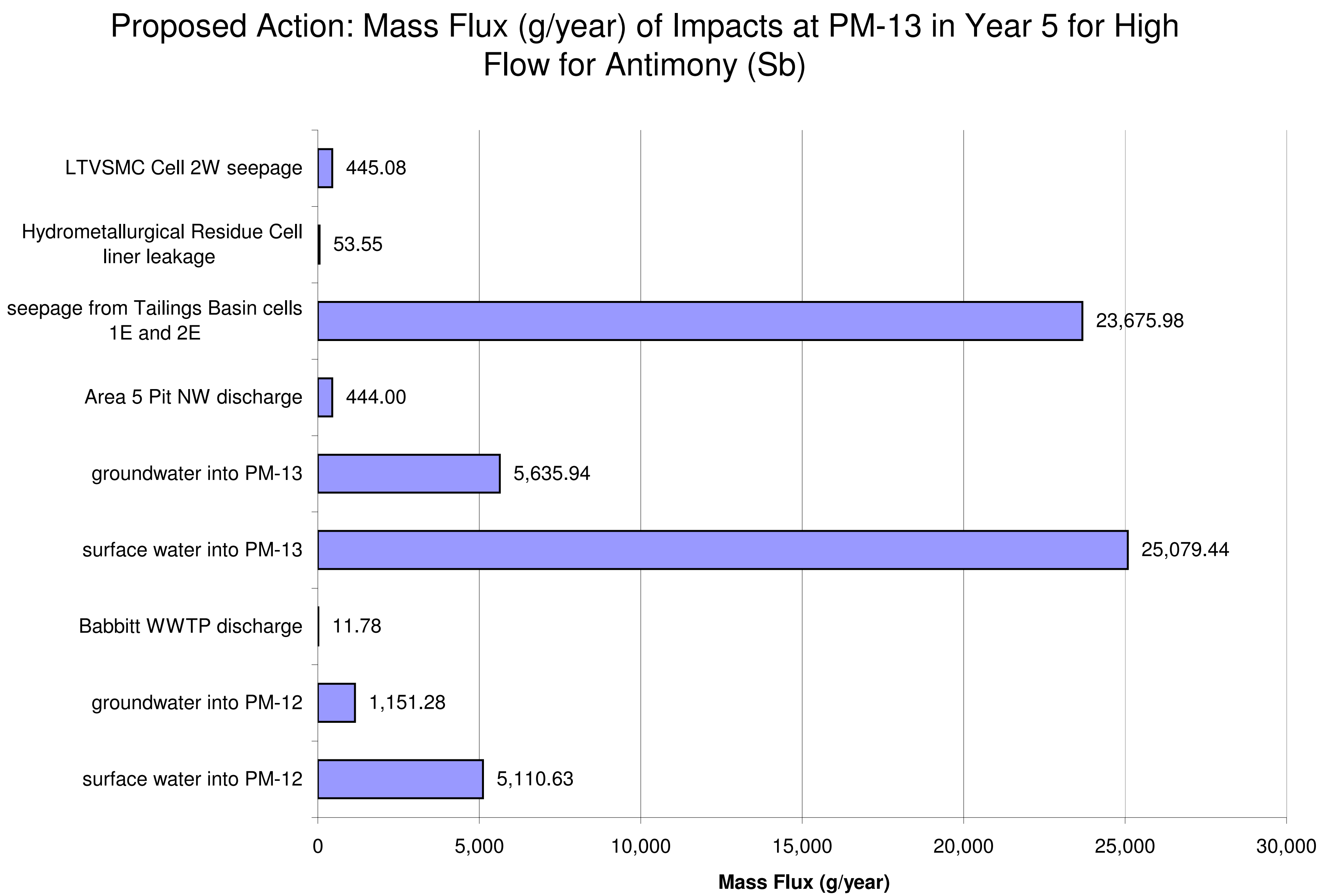



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
23,675.98
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

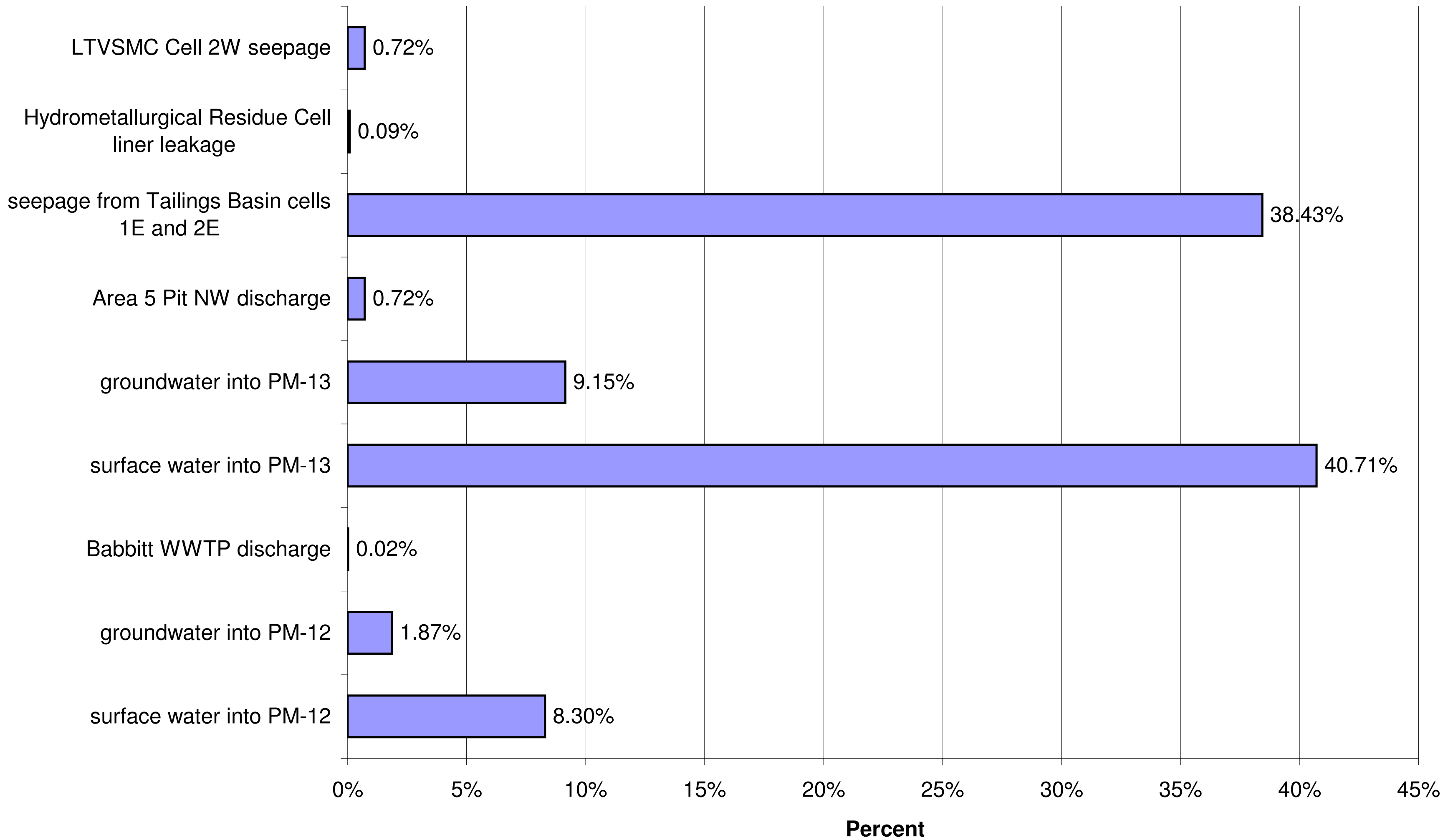

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.43%
Hydrometallurgical Residue Cell liner leakage
0.17%
seepage from Tailings Basin cells 1E and 2E
76.30%
Area 5 Pit NW discharge
0.19%
groundwater into PM-13
18.16%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
3.71%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Antimony(Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
23,675.98
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

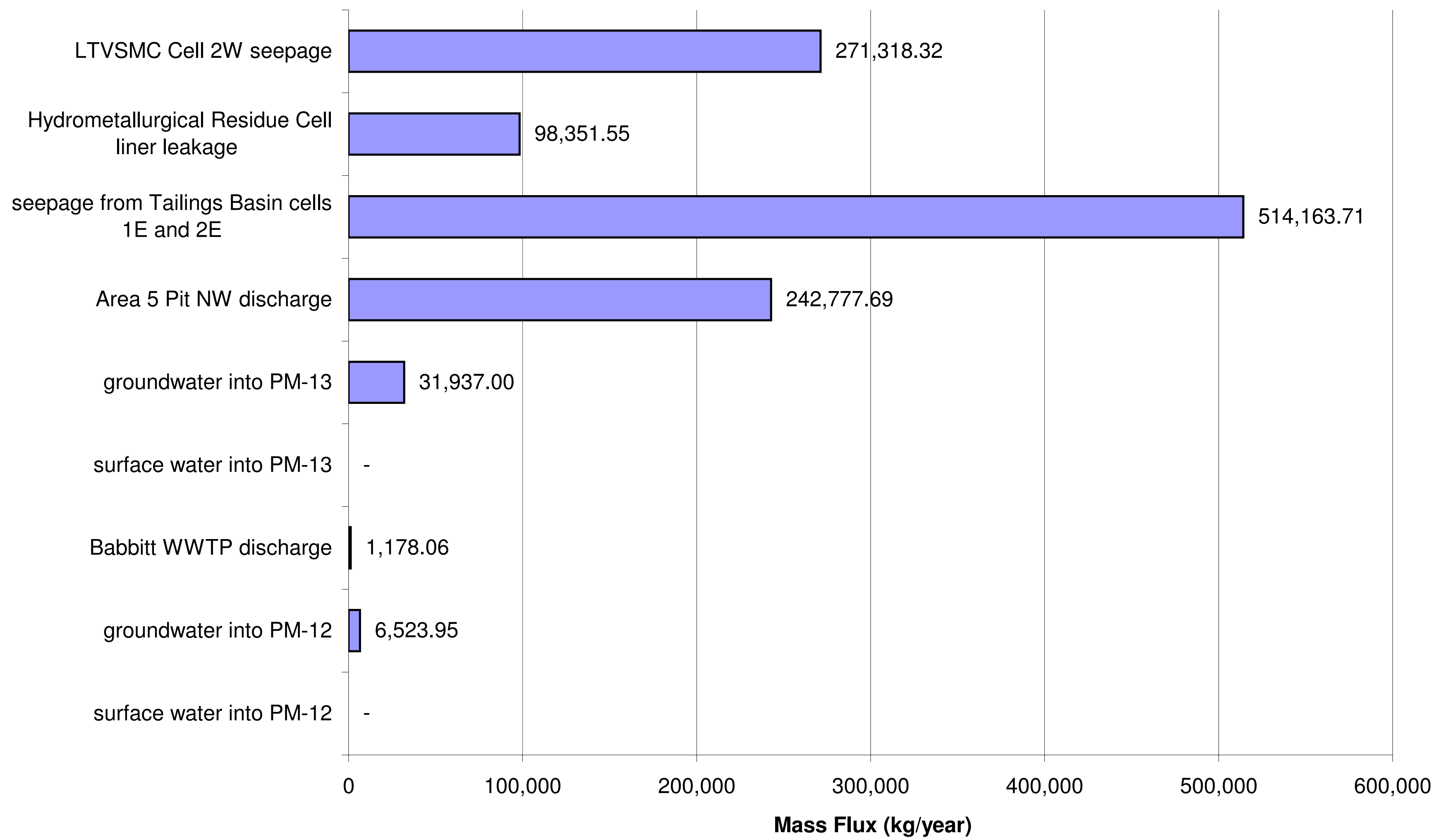

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.31%
Hydrometallurgical Residue Cell liner leakage
0.16%
seepage from Tailings Basin cells 1E and 2E
69.50%
Area 5 Pit NW discharge
1.30%
groundwater into PM-13
16.54%
surface water into PM-13
6.45%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
3.38%
surface water into PM-12
1.32%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

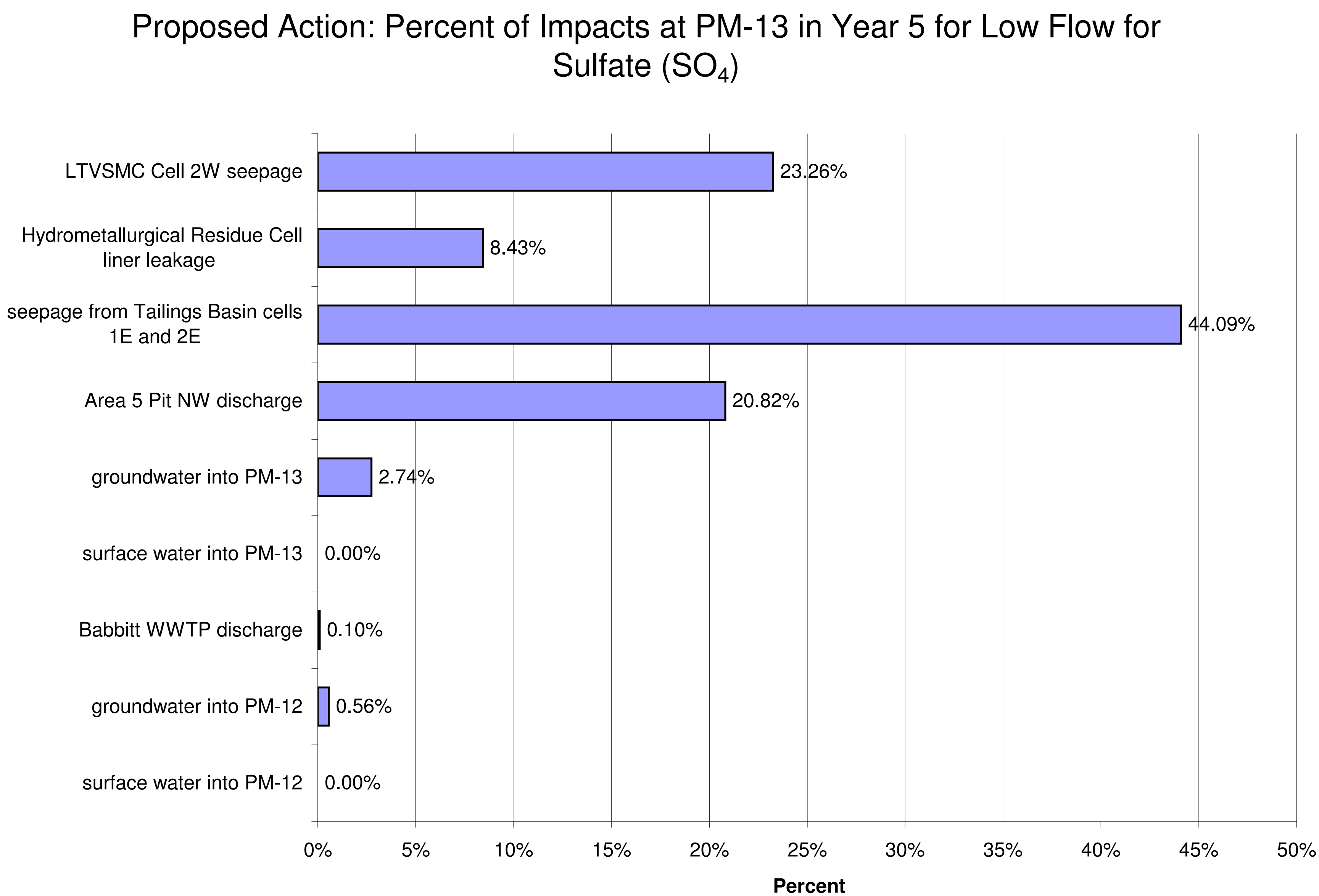

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
23,675.98
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

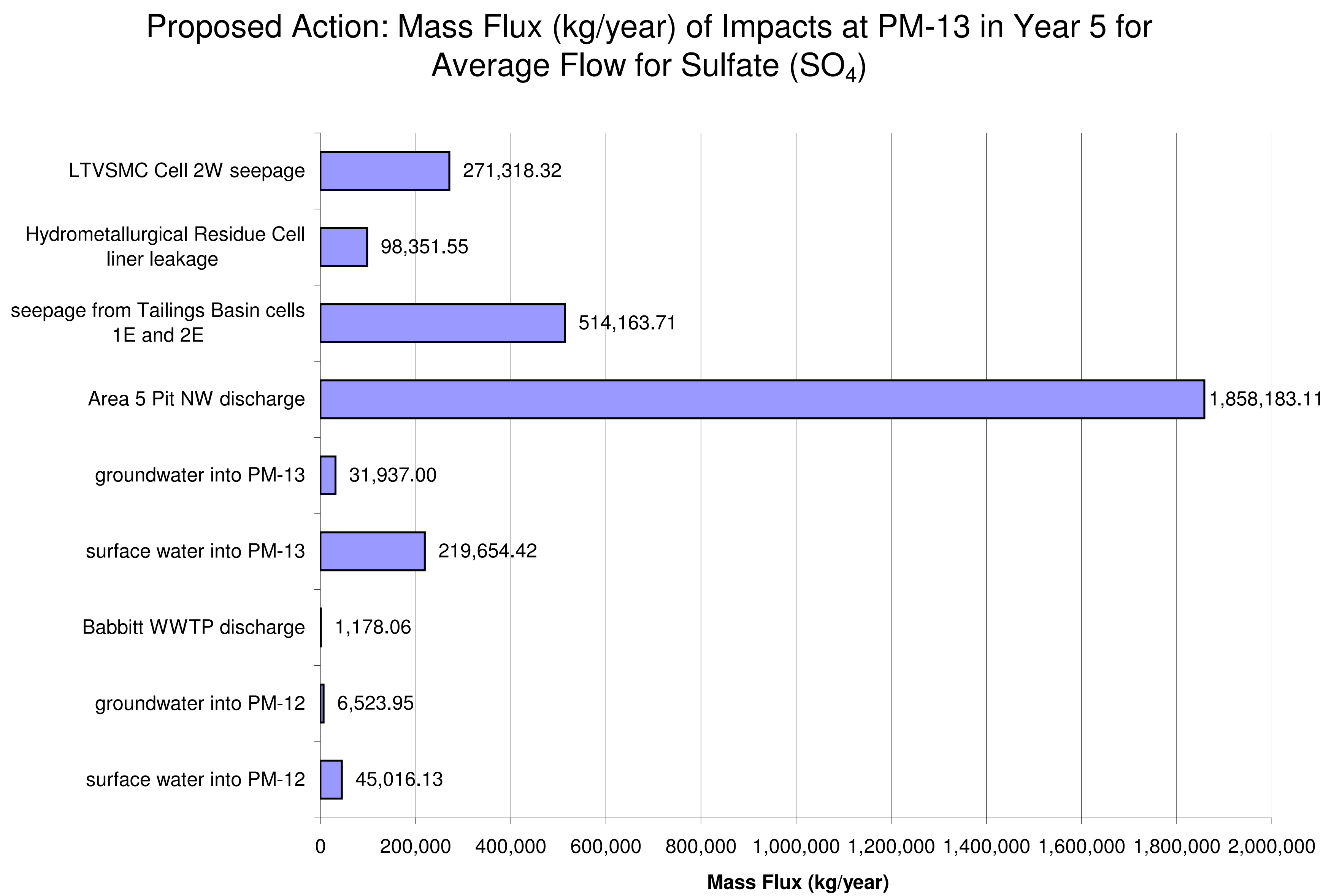
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)



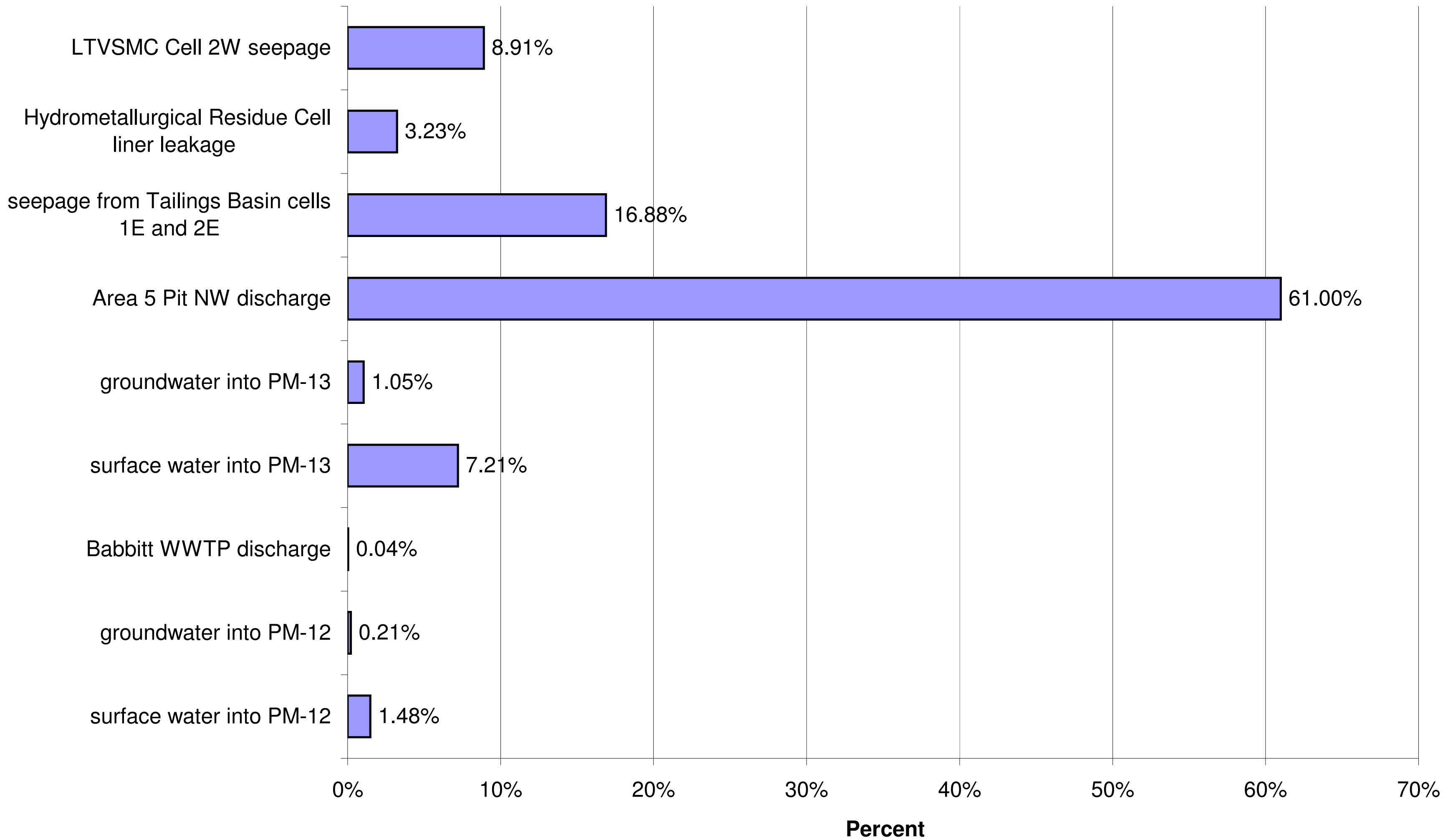
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)



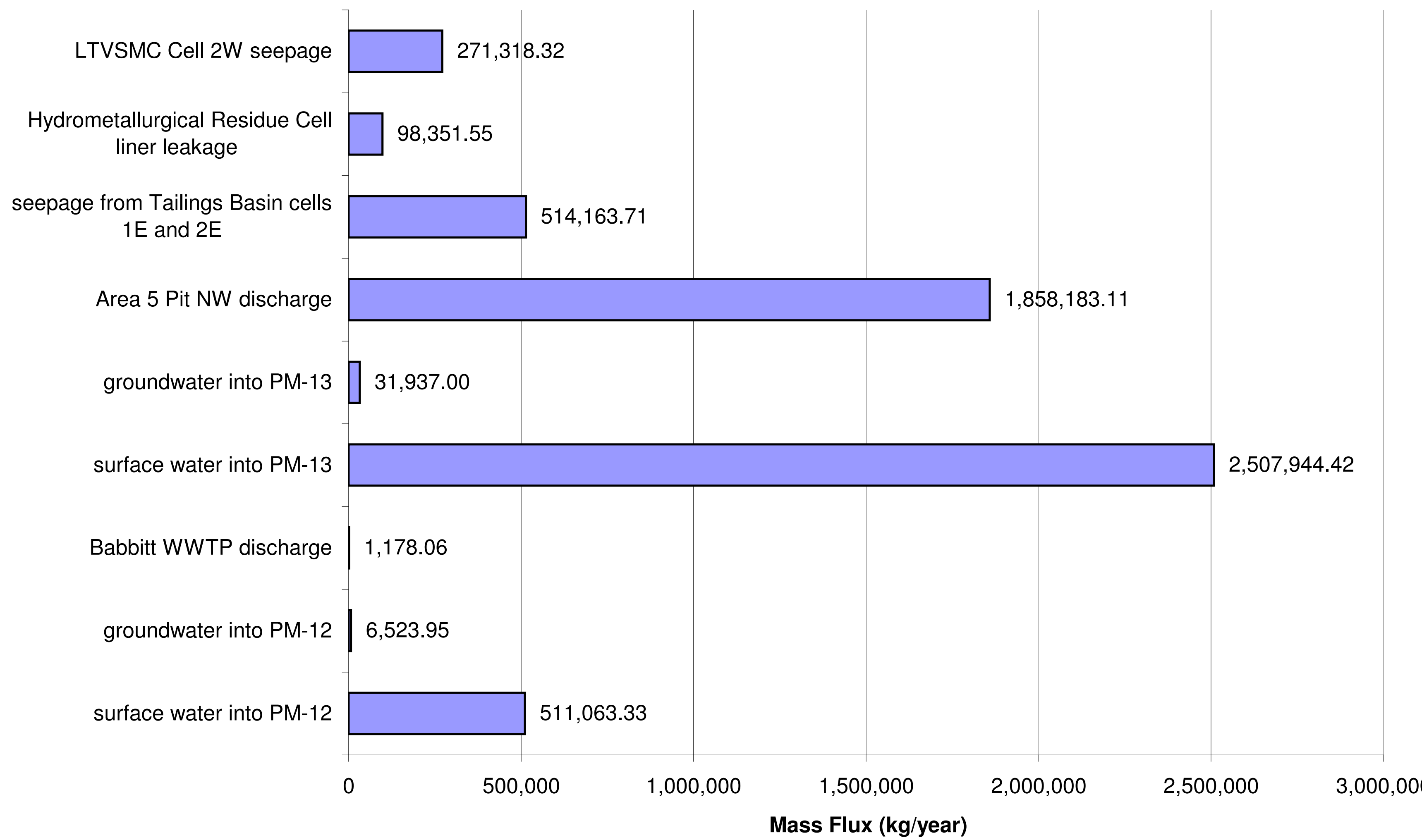

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
23.26%
Hydrometallurgical Residue Cell liner leakage
8.43%
seepage from Tailings Basin cells 1E and 2E
44.09%
Area 5 Pit NW discharge
20.82%
groundwater into PM-13
2.74%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.10%
groundwater into PM-12
0.56%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent


Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,318.32
Hydrometallurgical Residue Cell liner leakage
98,351.55
seepage from Tailings Basin cells 1E and 2E
514,163.71
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
219,654.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
45,016.13
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
1,400,000
1,600,000
1,800,000
2,000,000
Mass Flux (kg/year)

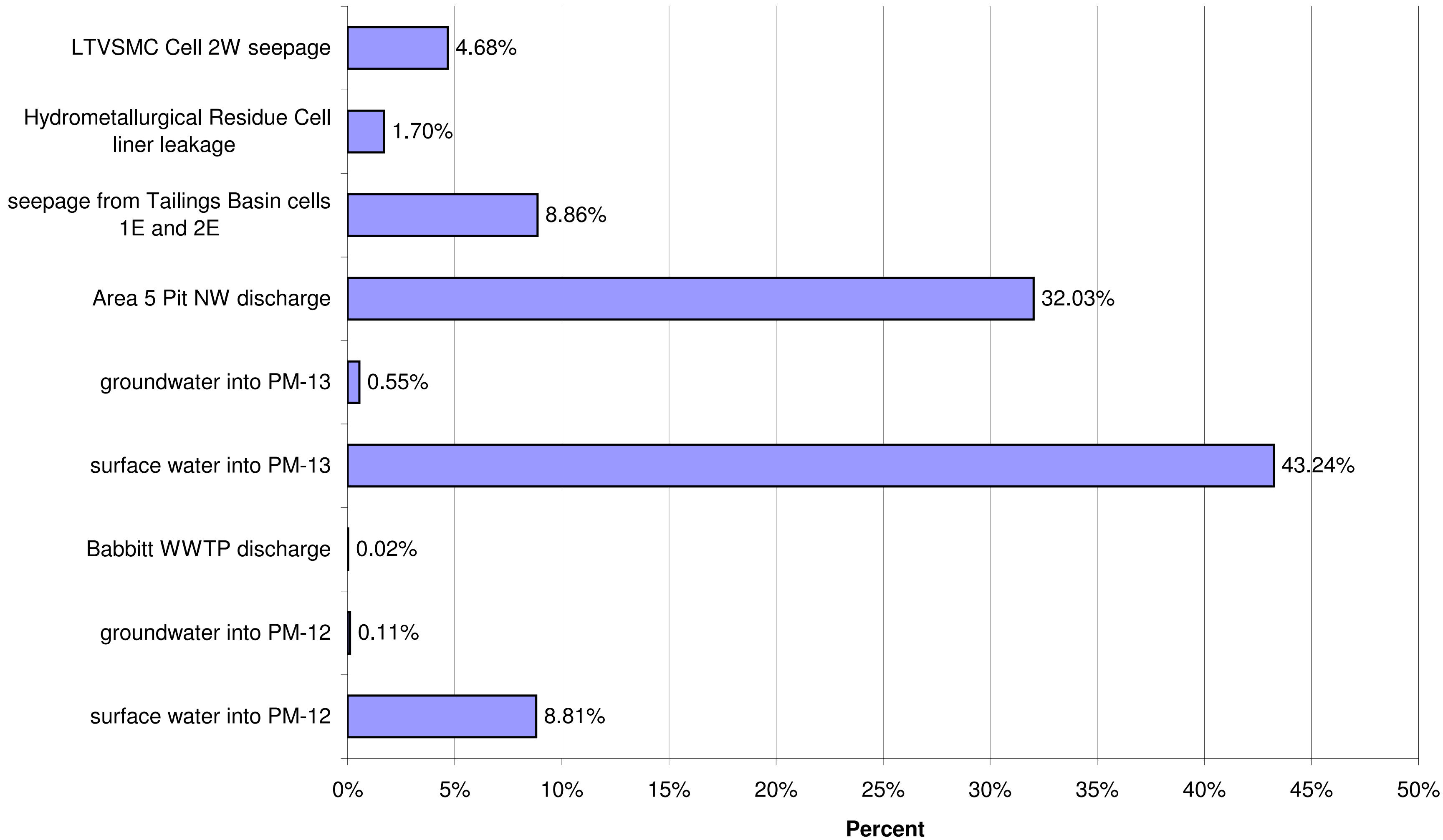
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)



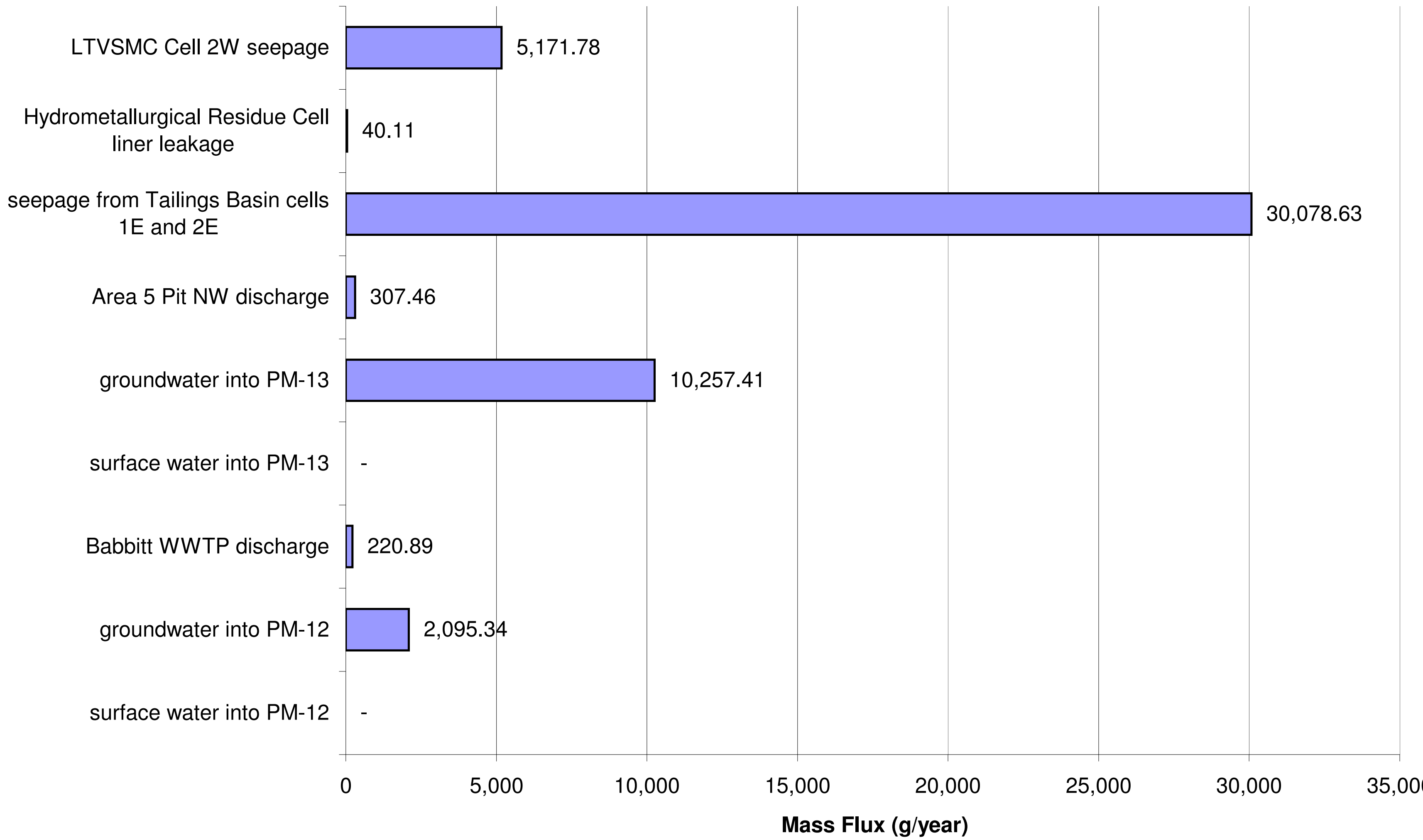
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)



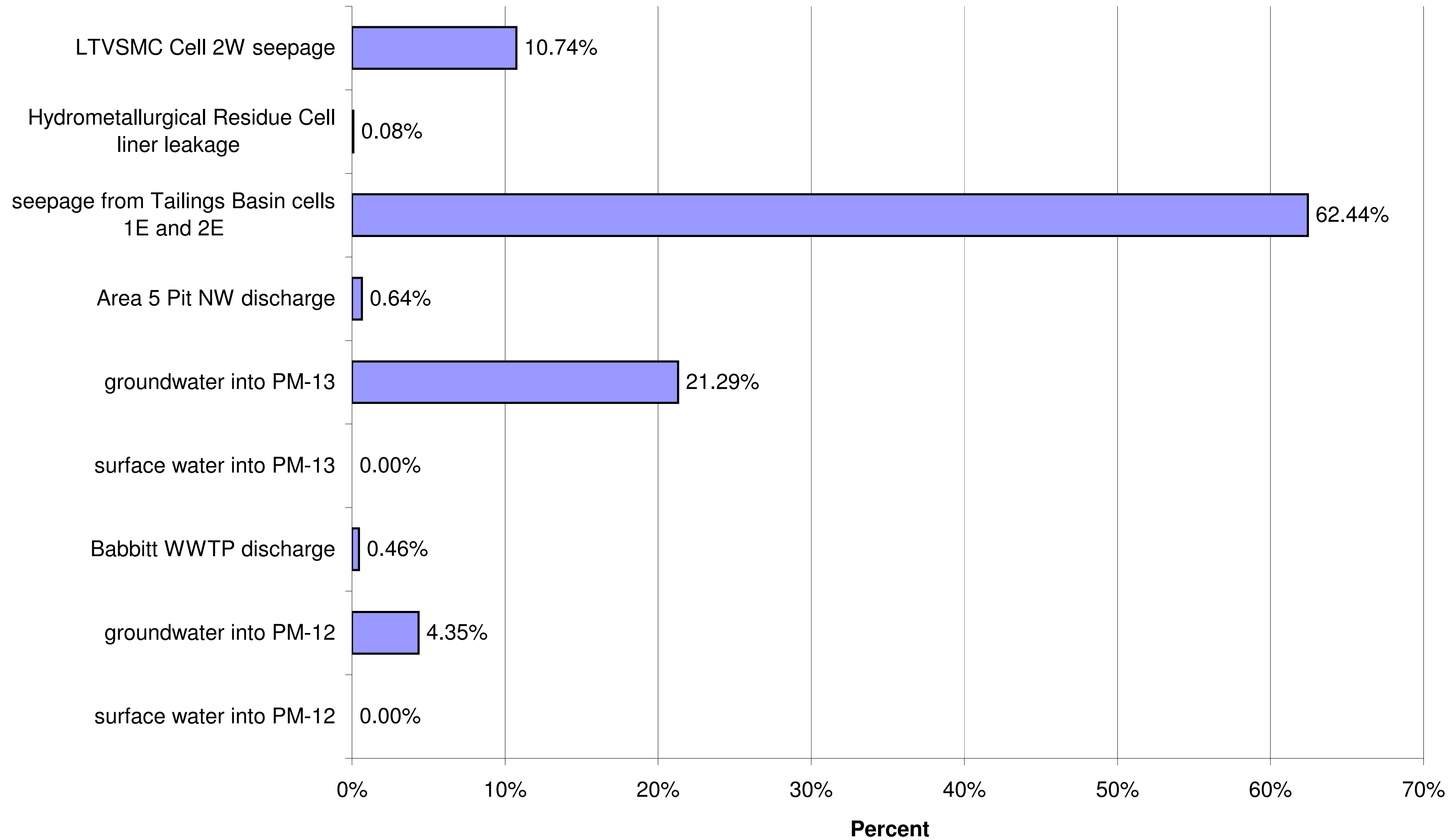
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)

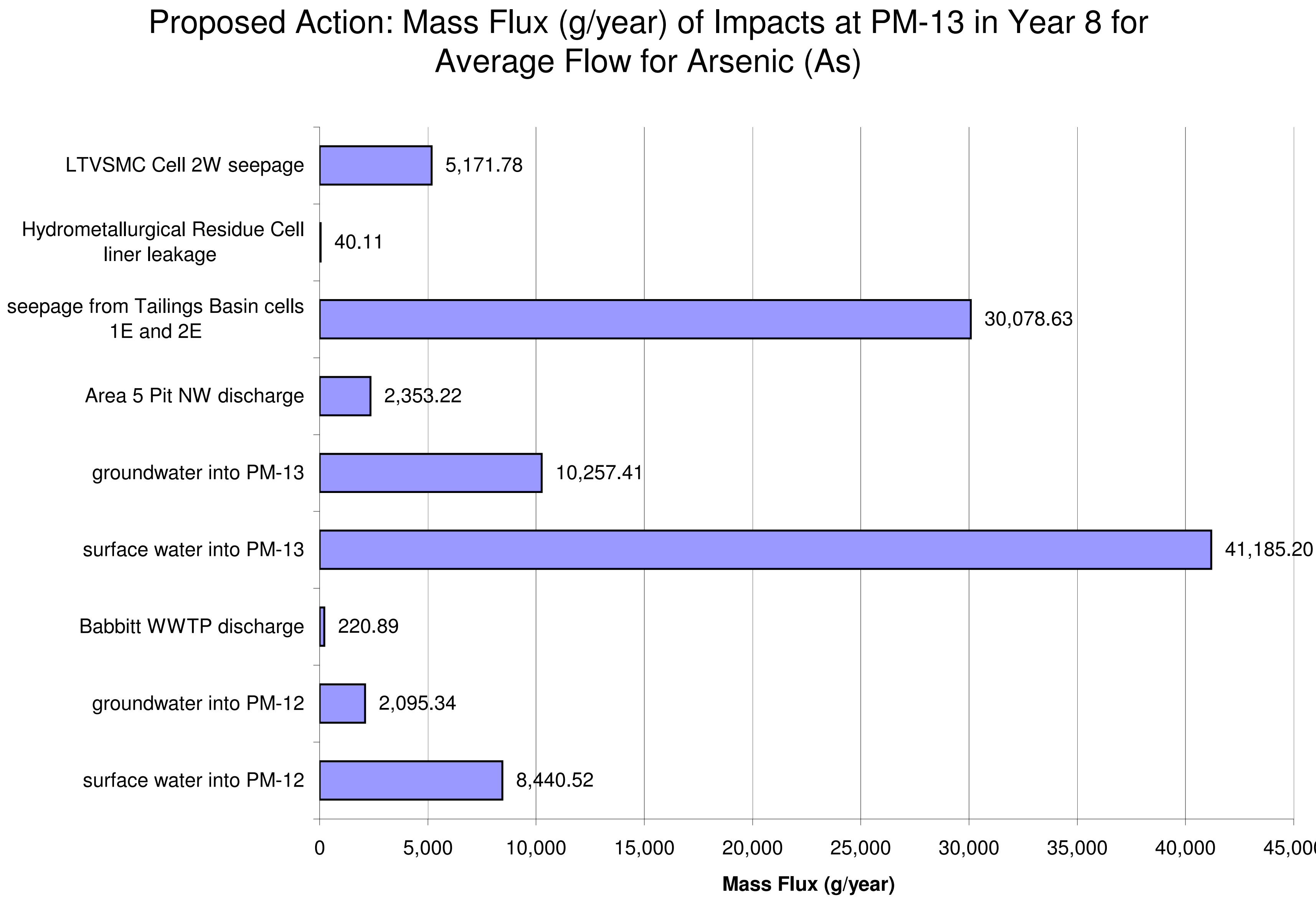


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Arsenic (As)

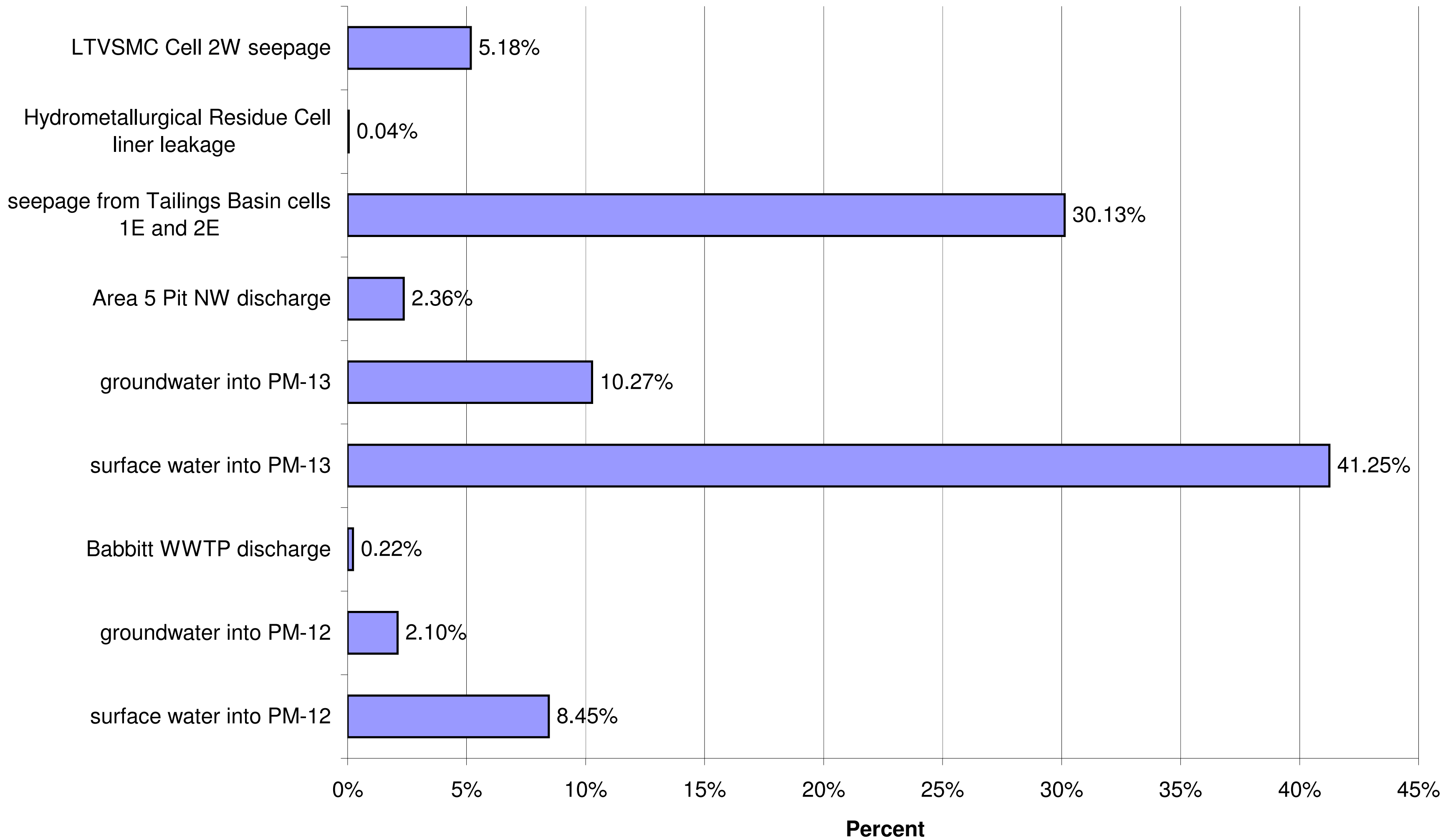


Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Arsenic (As)

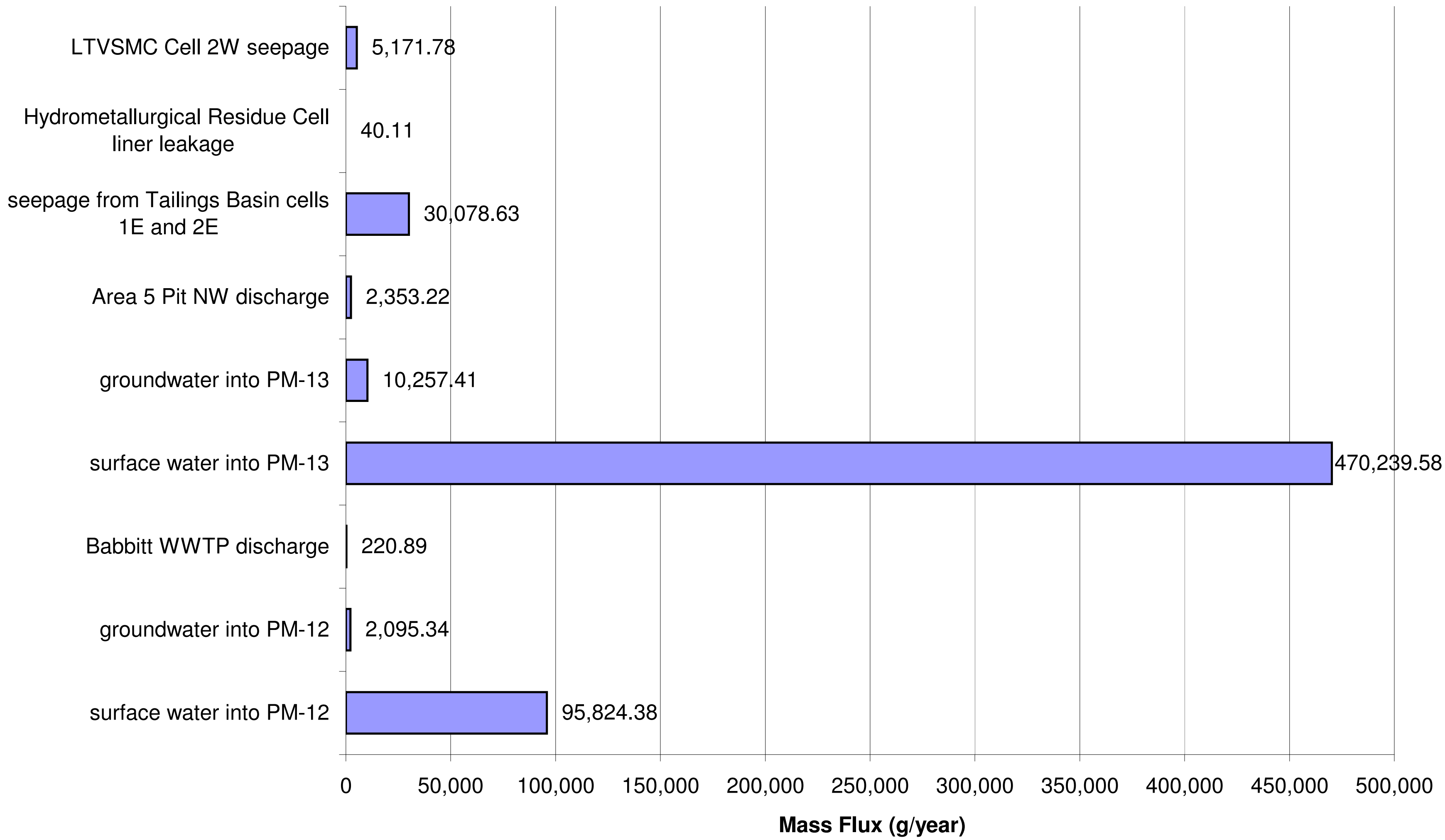


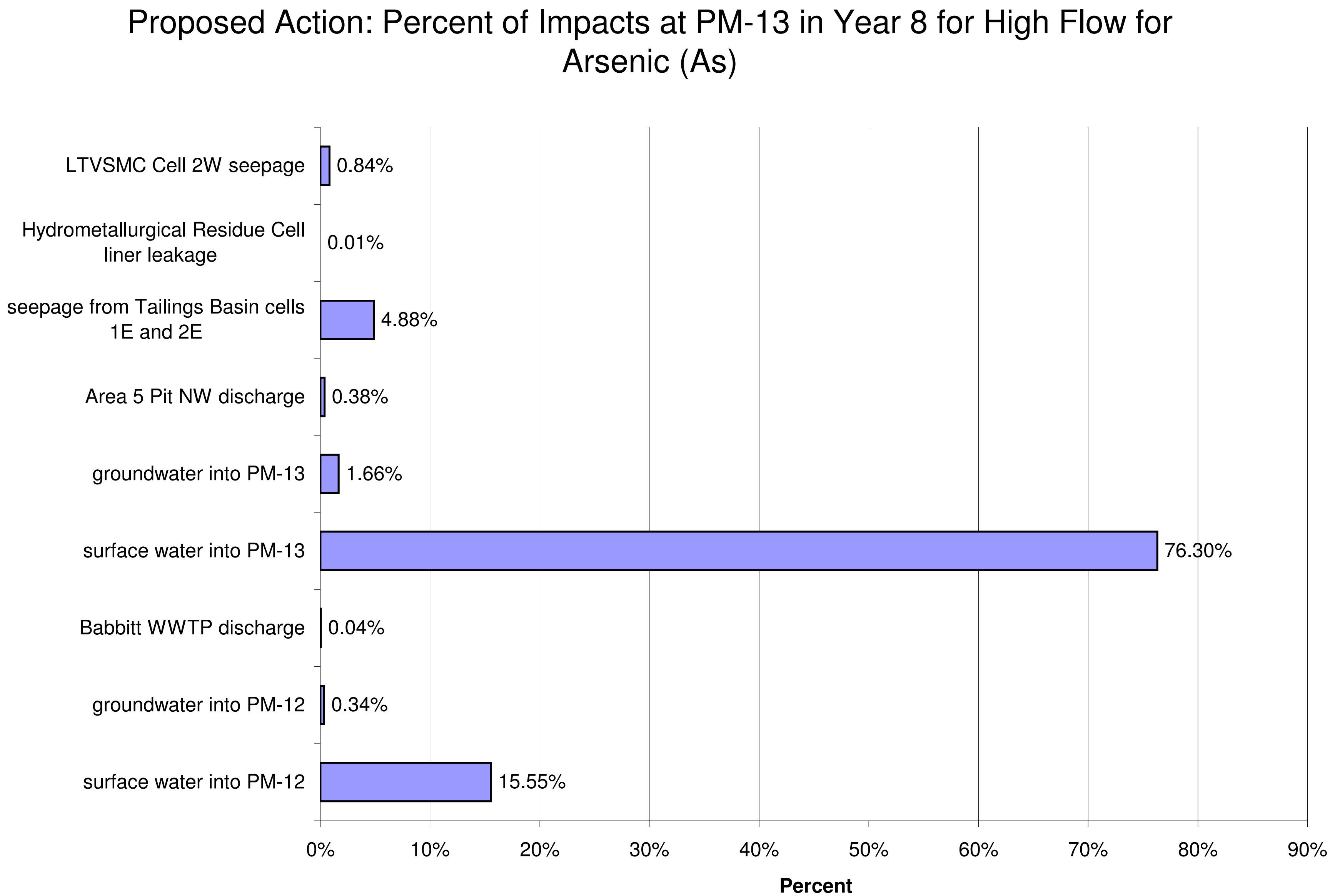

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
30,078.63
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Arsenic (As)

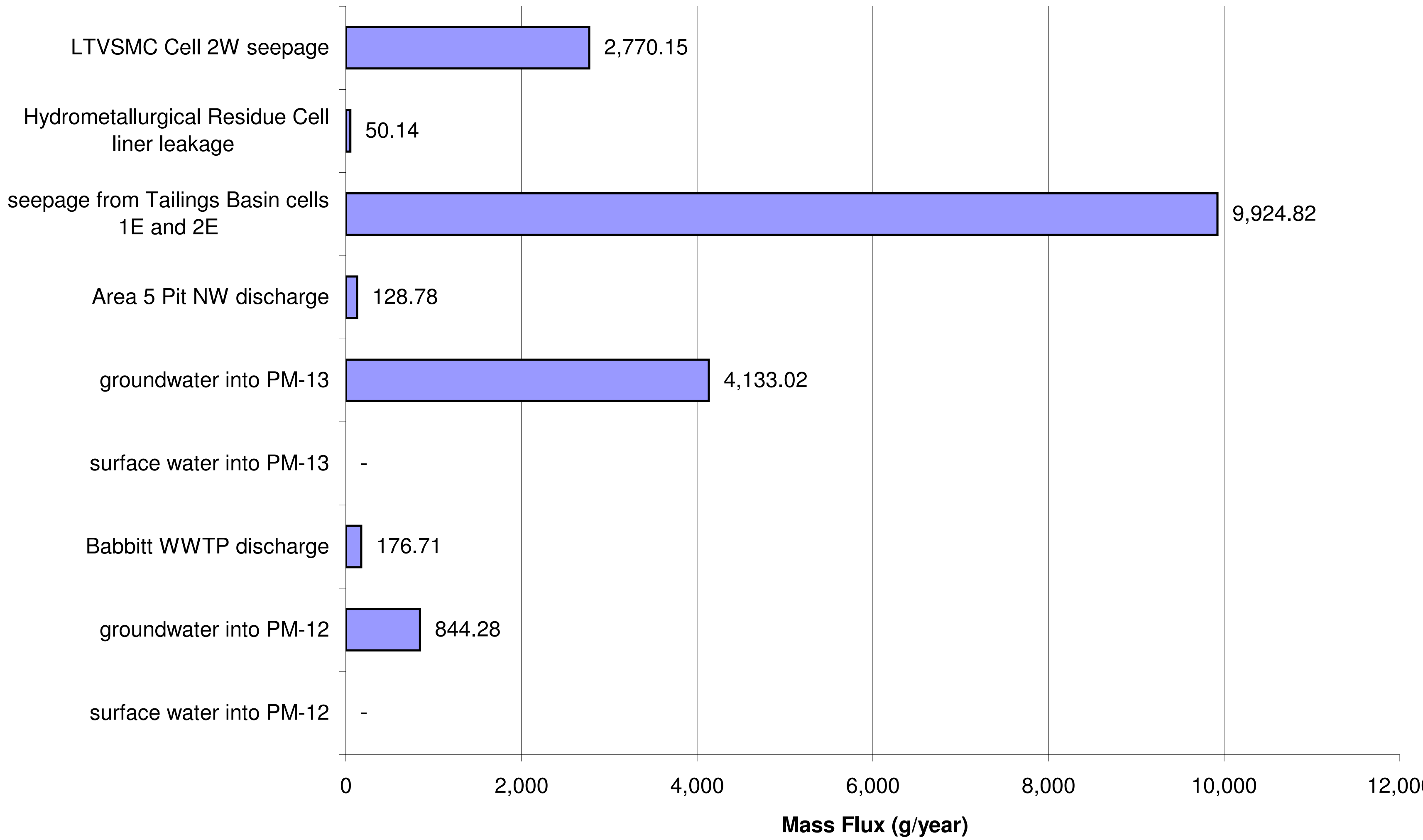


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Arsenic (As)

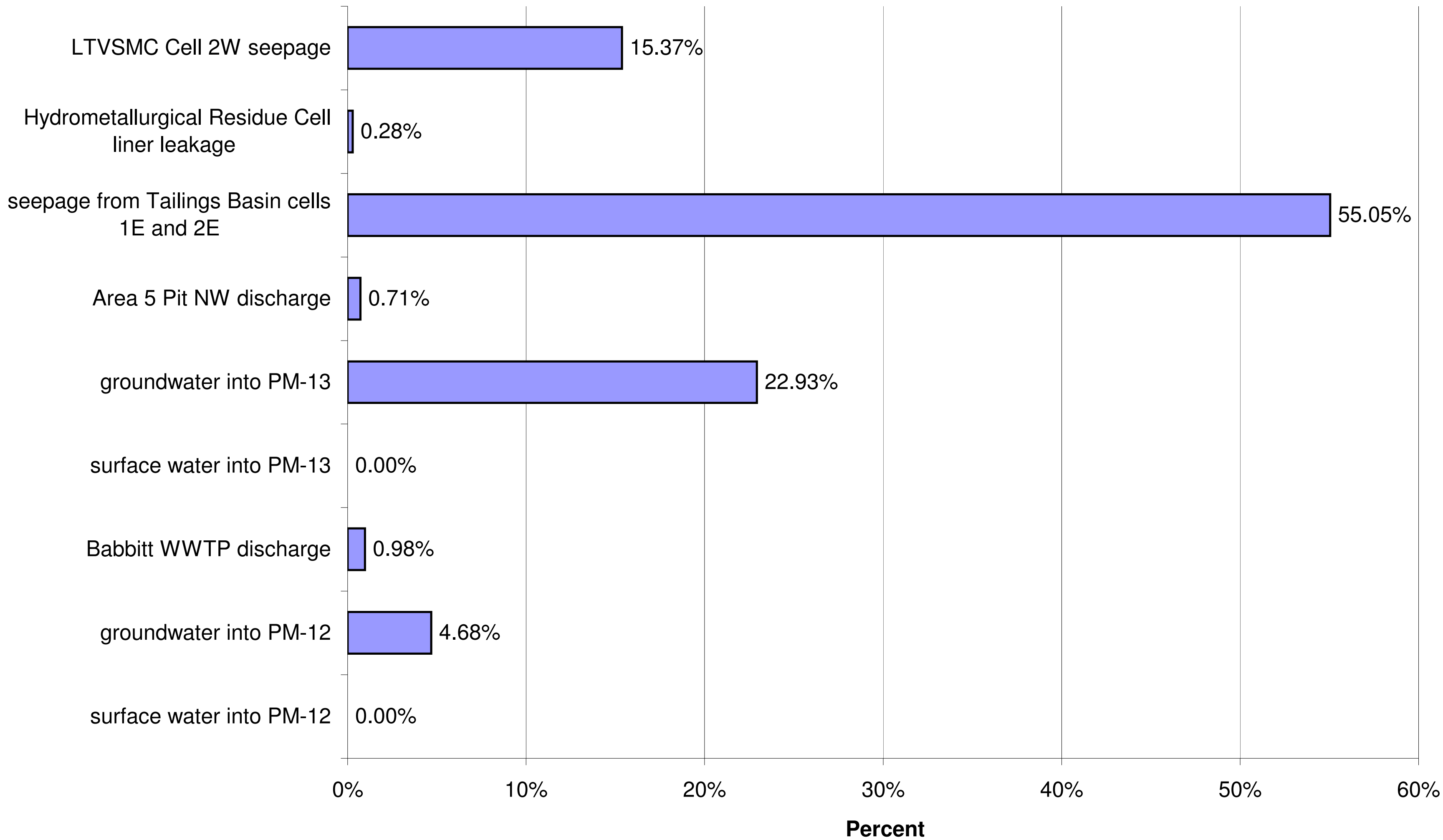


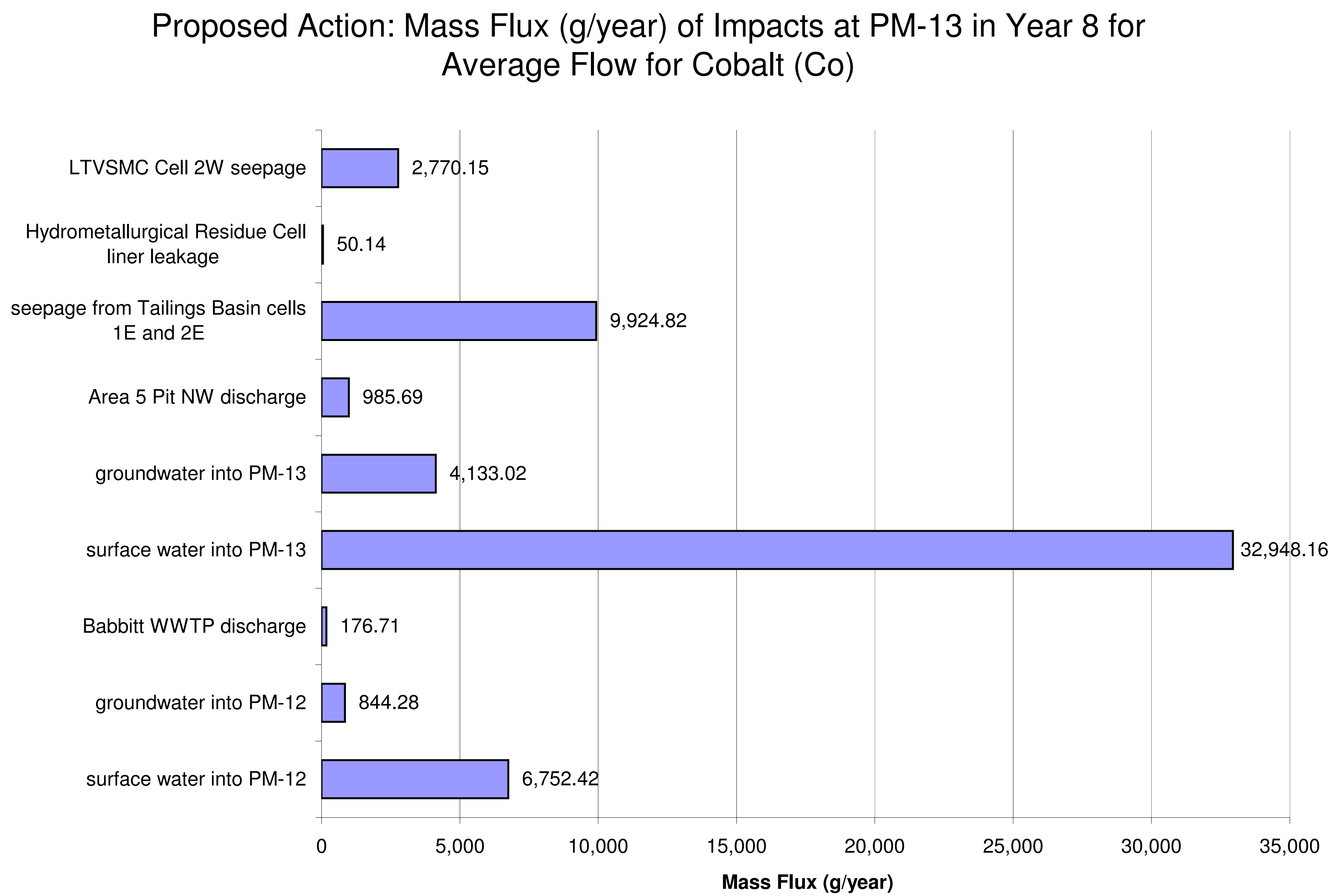

Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.84%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
4.88%
Area 5 Pit NW discharge
0.38%
groundwater into PM-13
1.66%
surface water into PM-13
76.30%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.34%
surface water into PM-12
15.55%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Cobalt (Co)

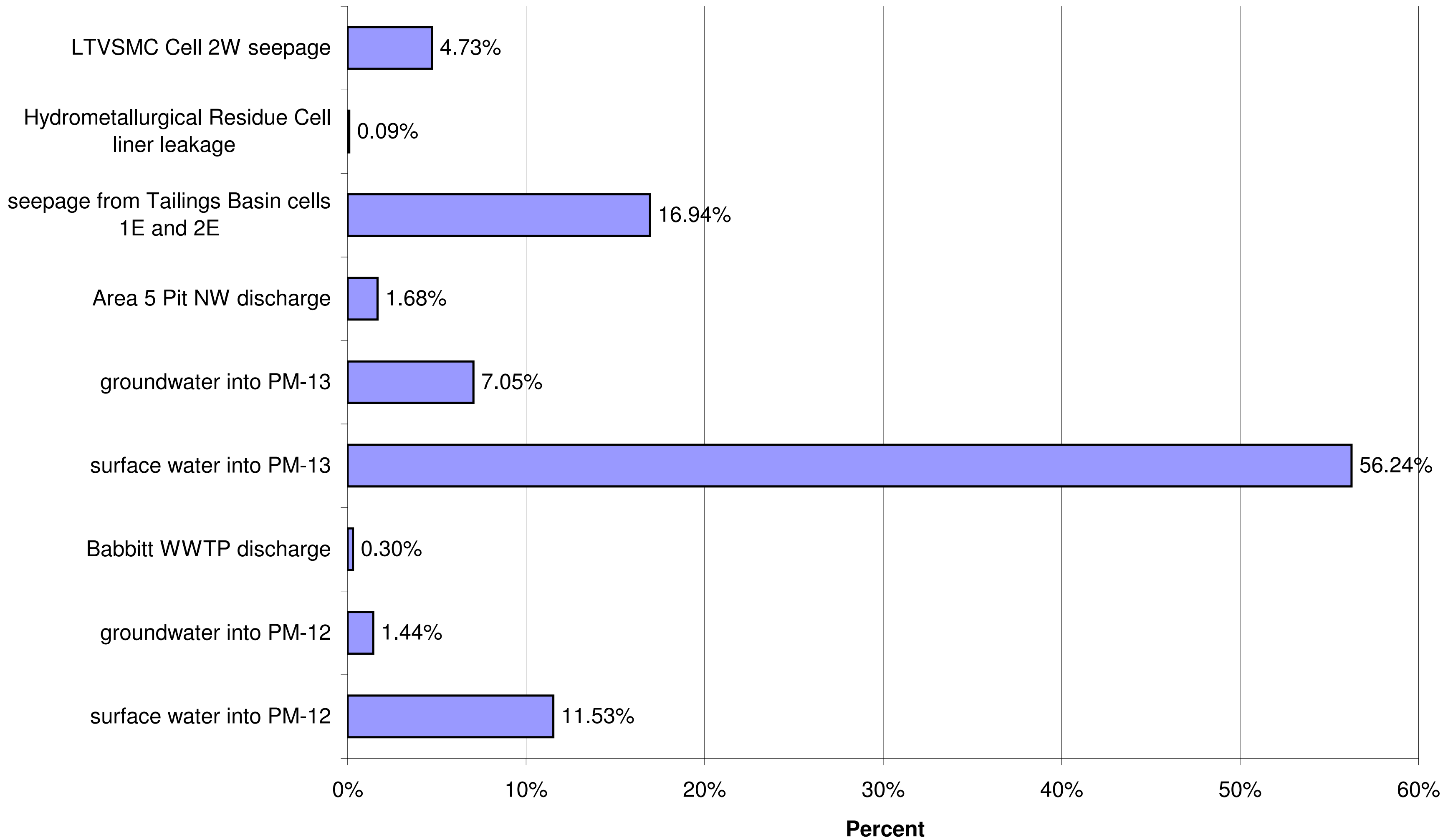


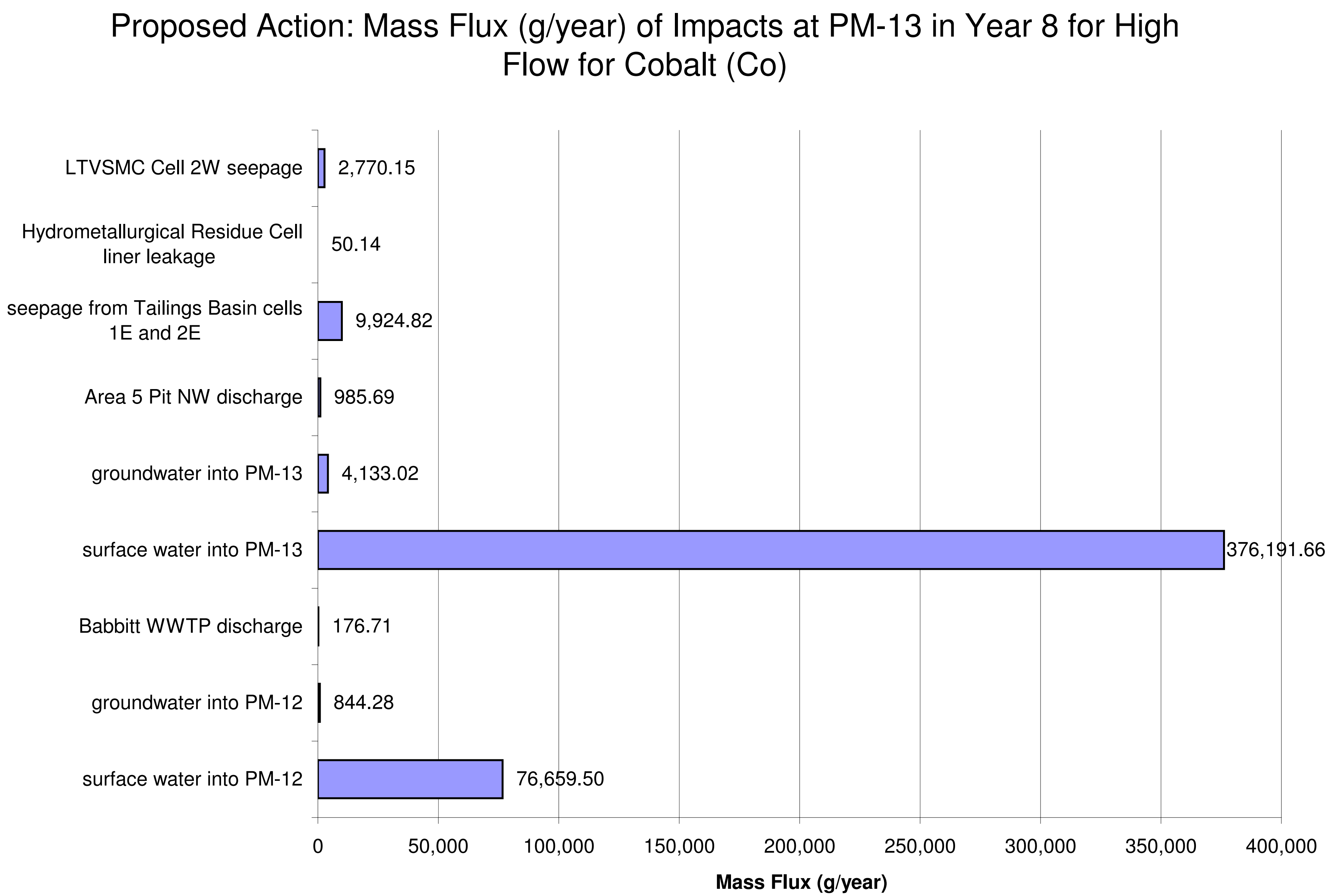
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Cobalt (Co)



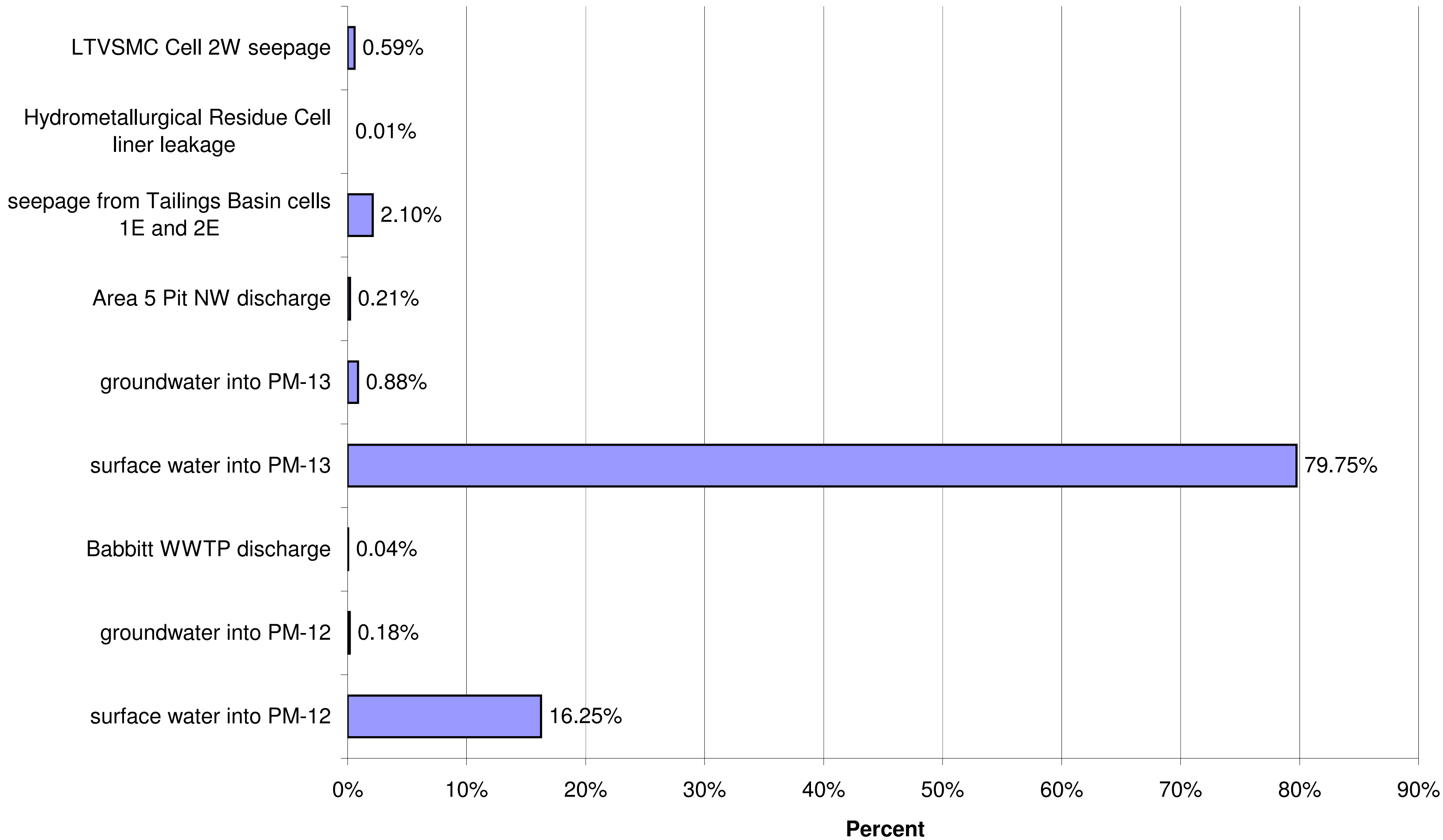

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
50.14
seepage from Tailings Basin cells 1E and 2E
9,924.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

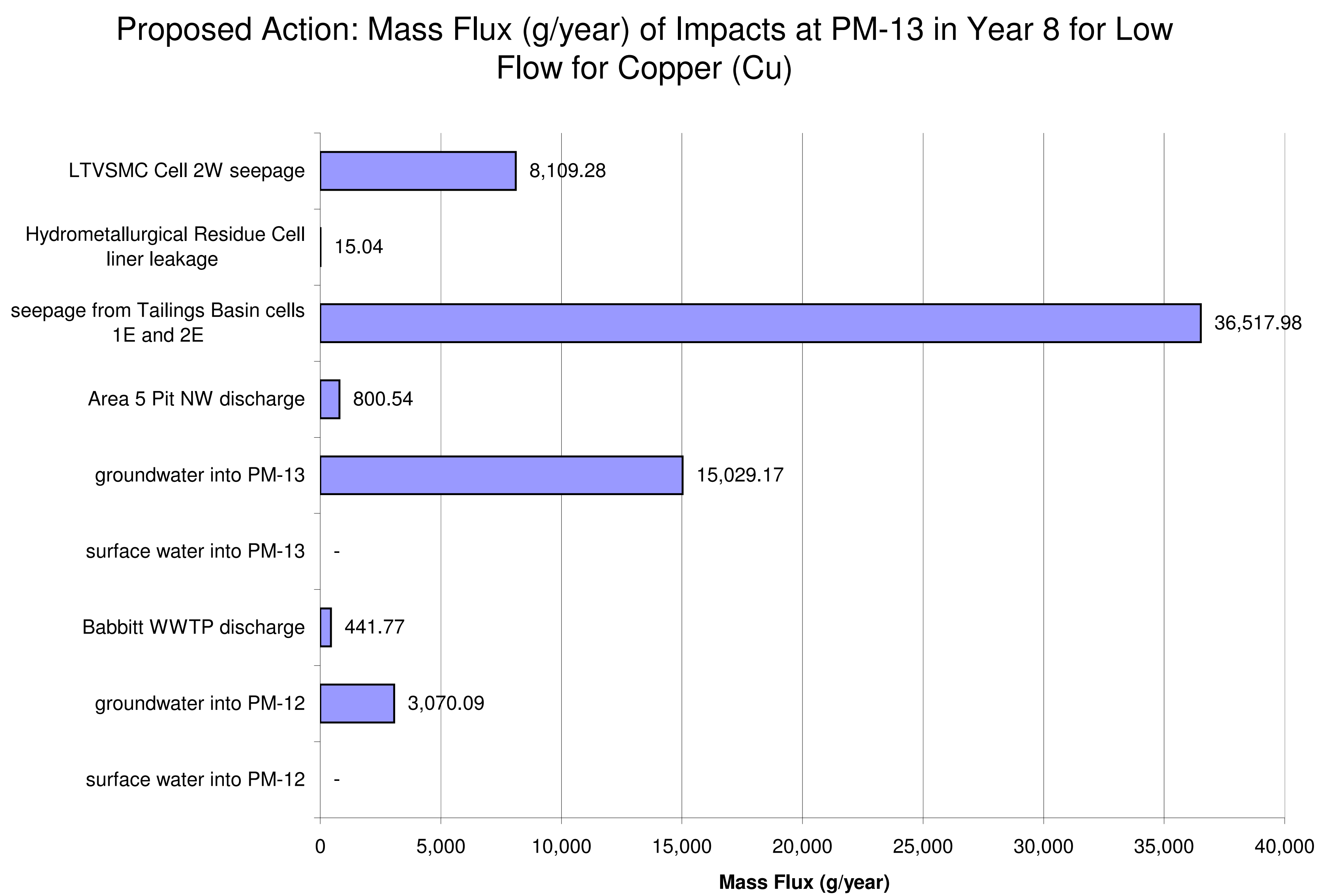
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Cobalt (Co)



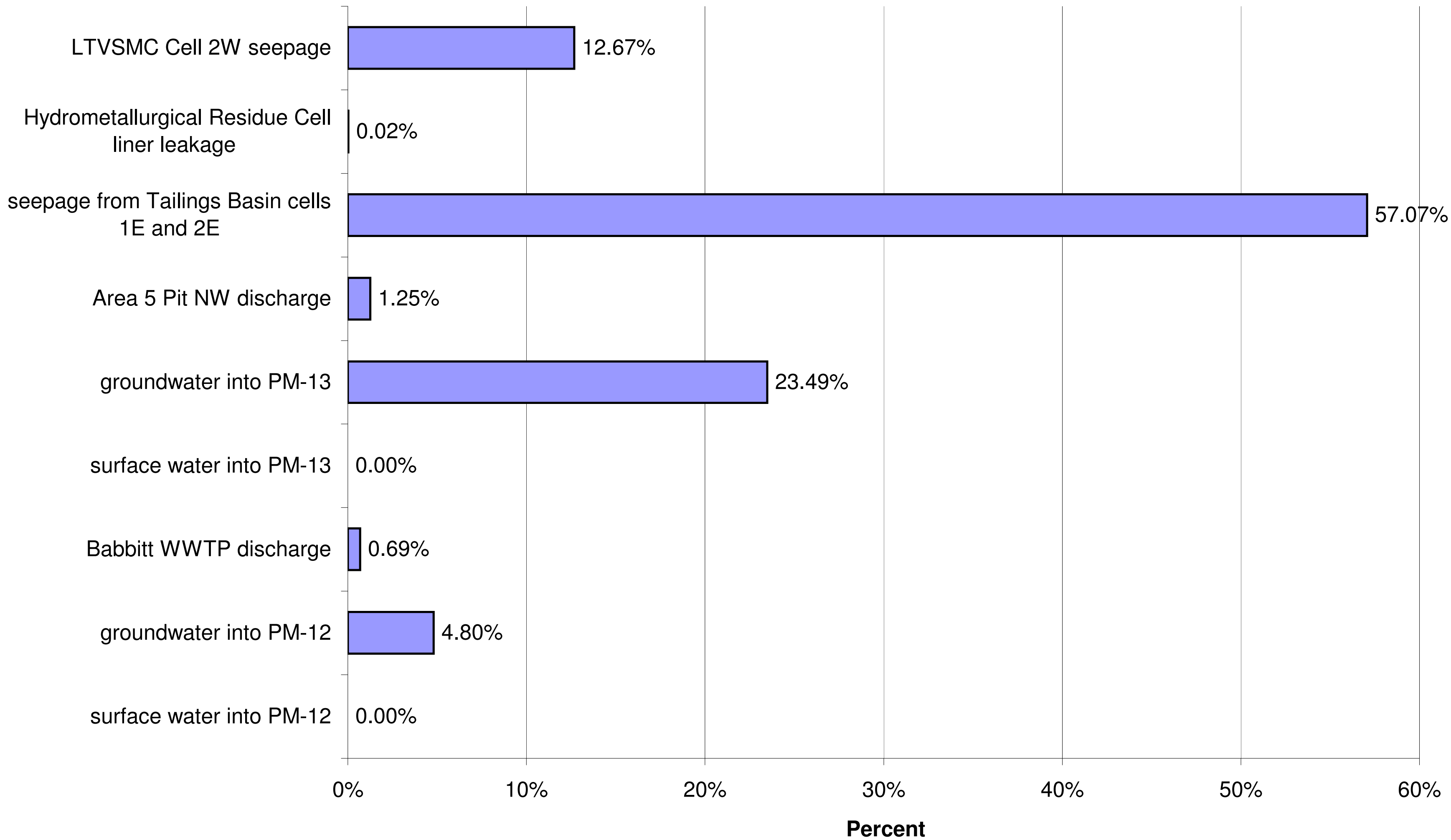

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
50.14
seepage from Tailings Basin cells 1E and 2E
9,924.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

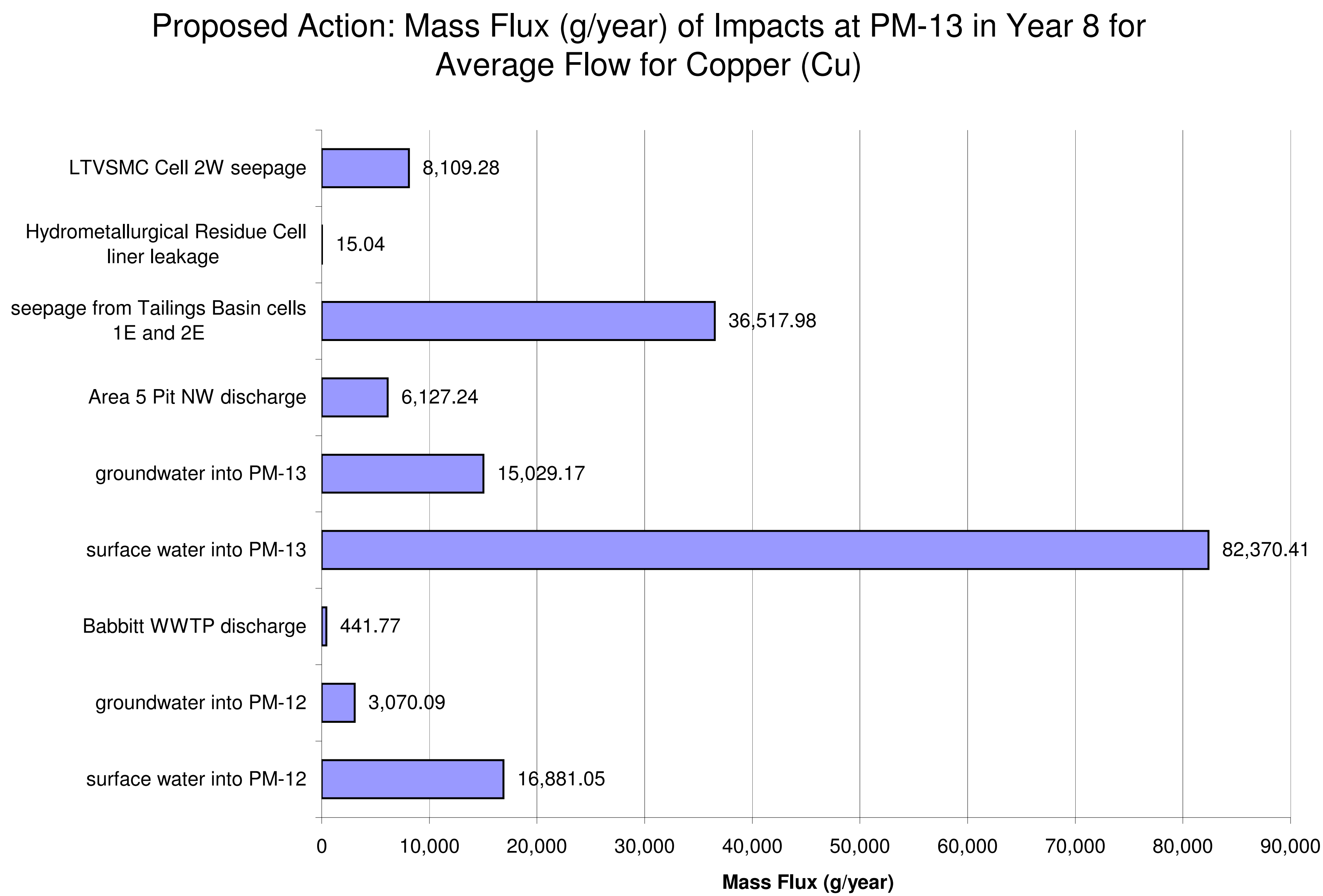
Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Cobalt (Co)



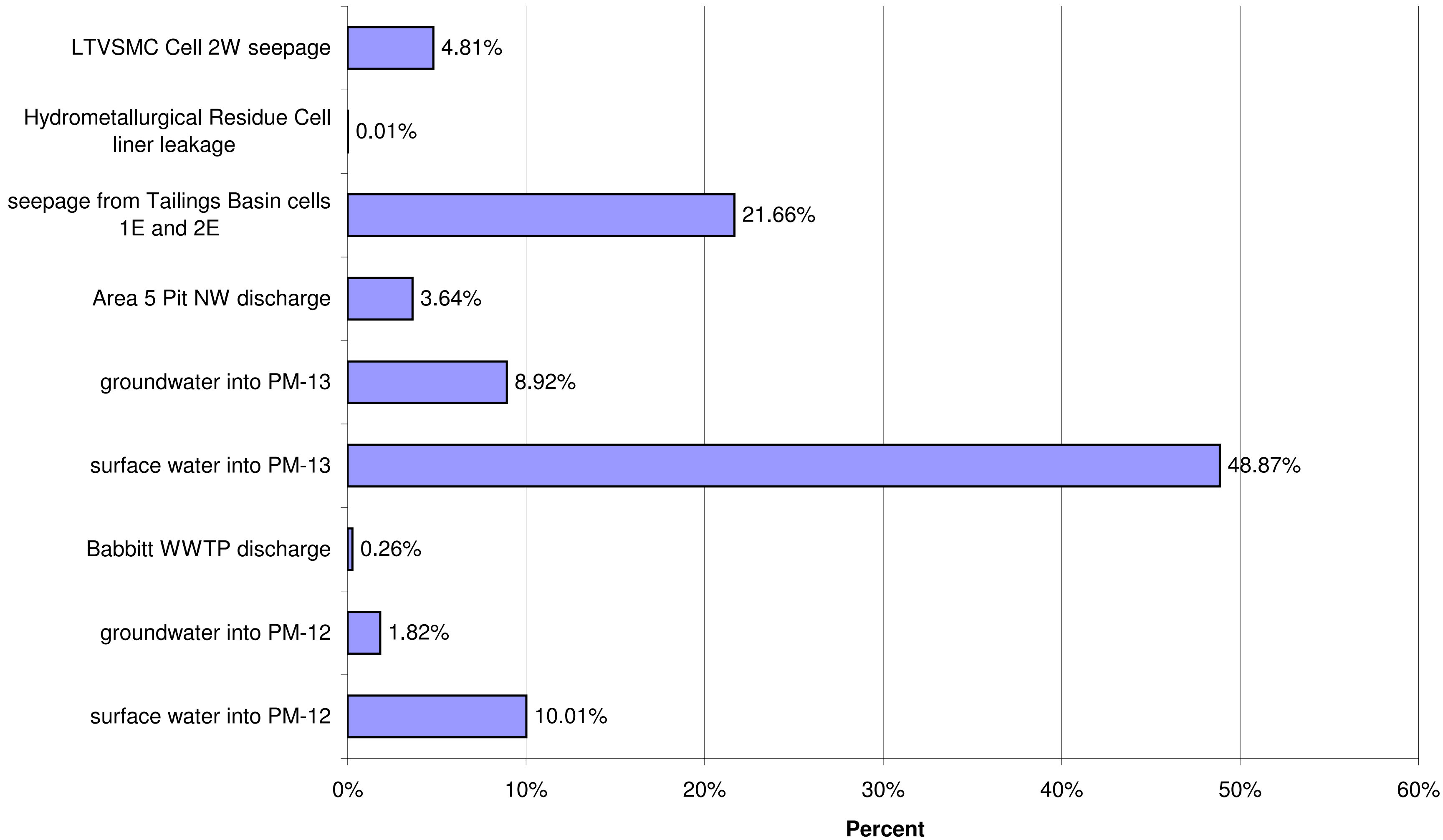

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
15.04
seepage from Tailings Basin cells 1E and 2E
36,517.98
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

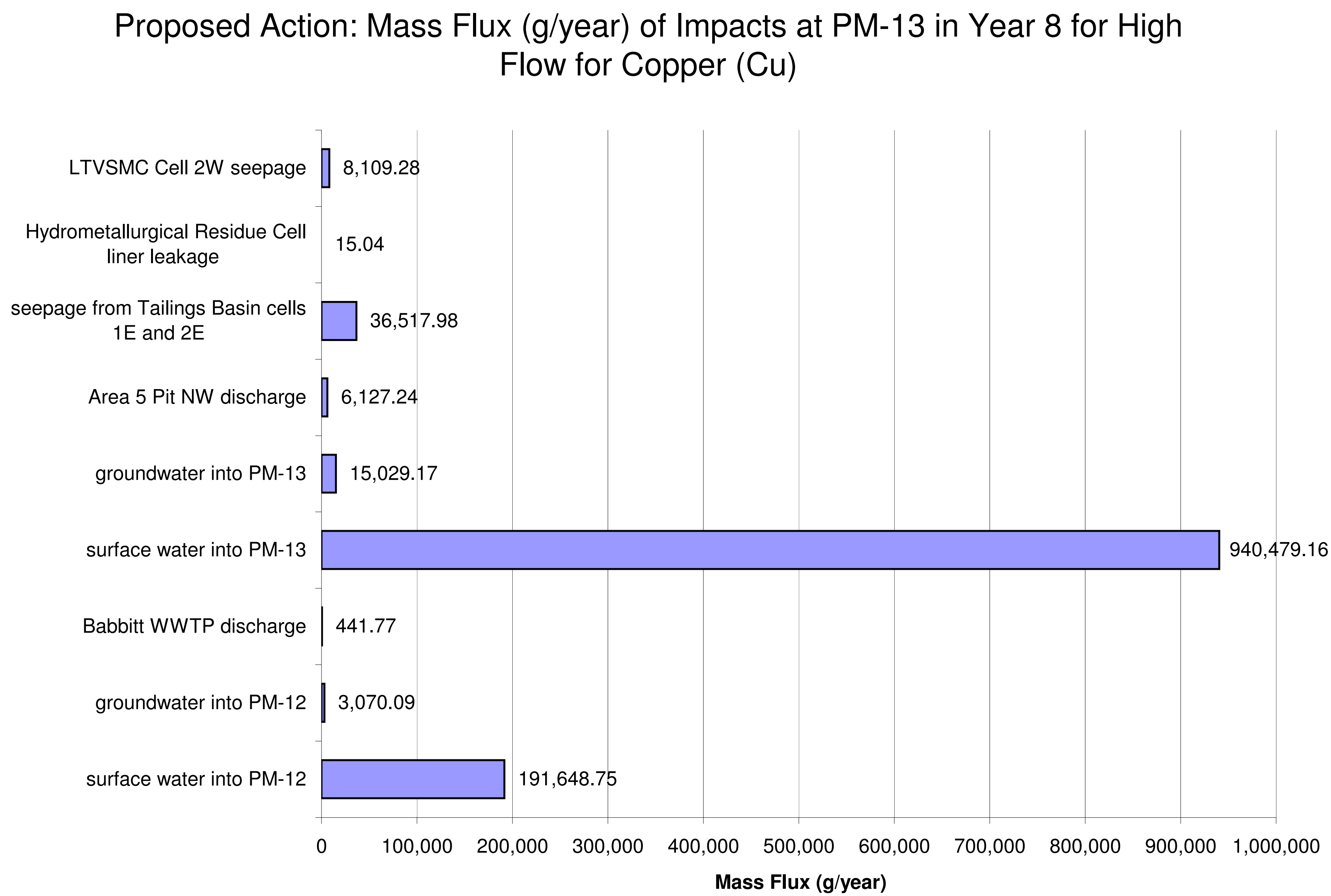
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Copper (Cu)

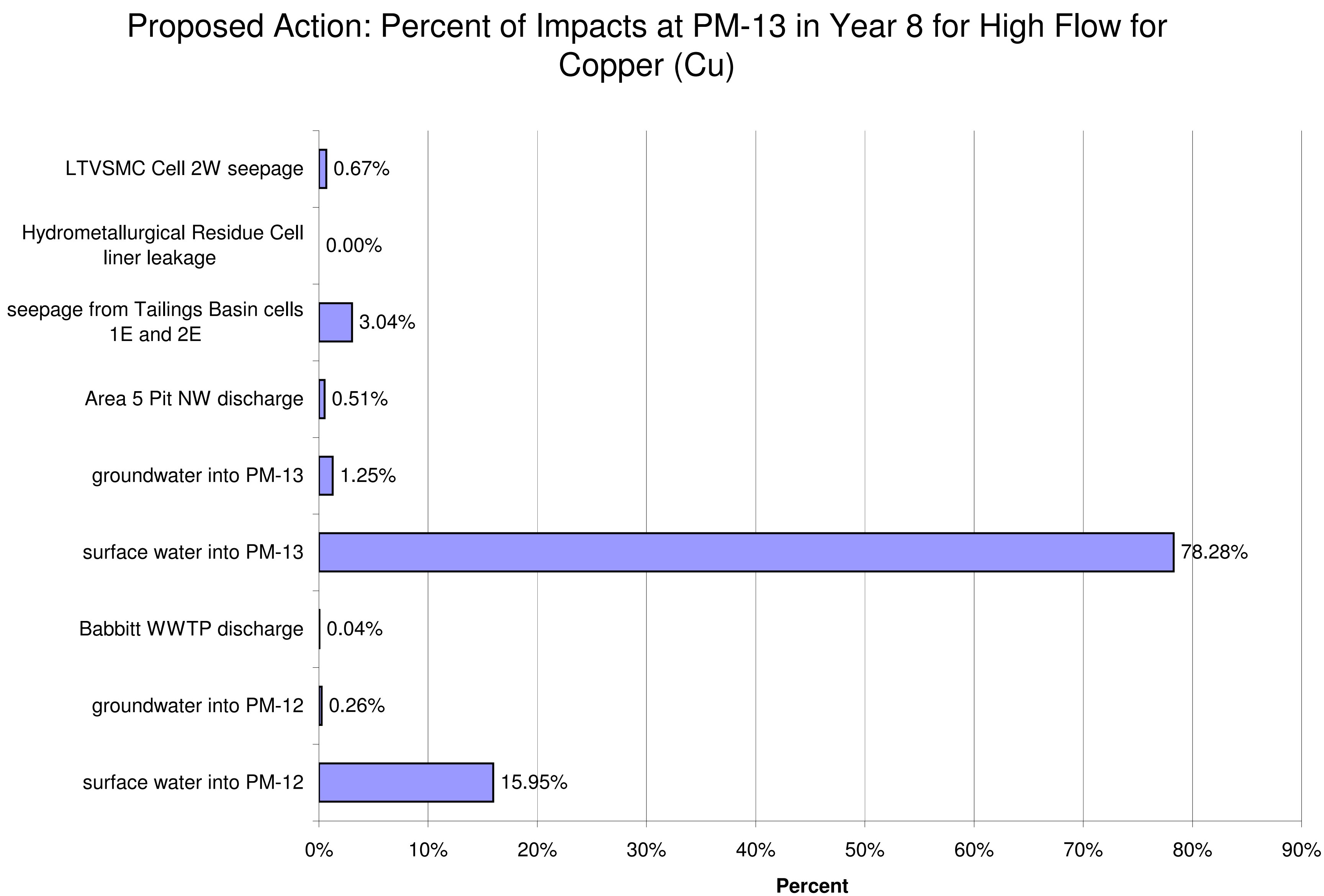


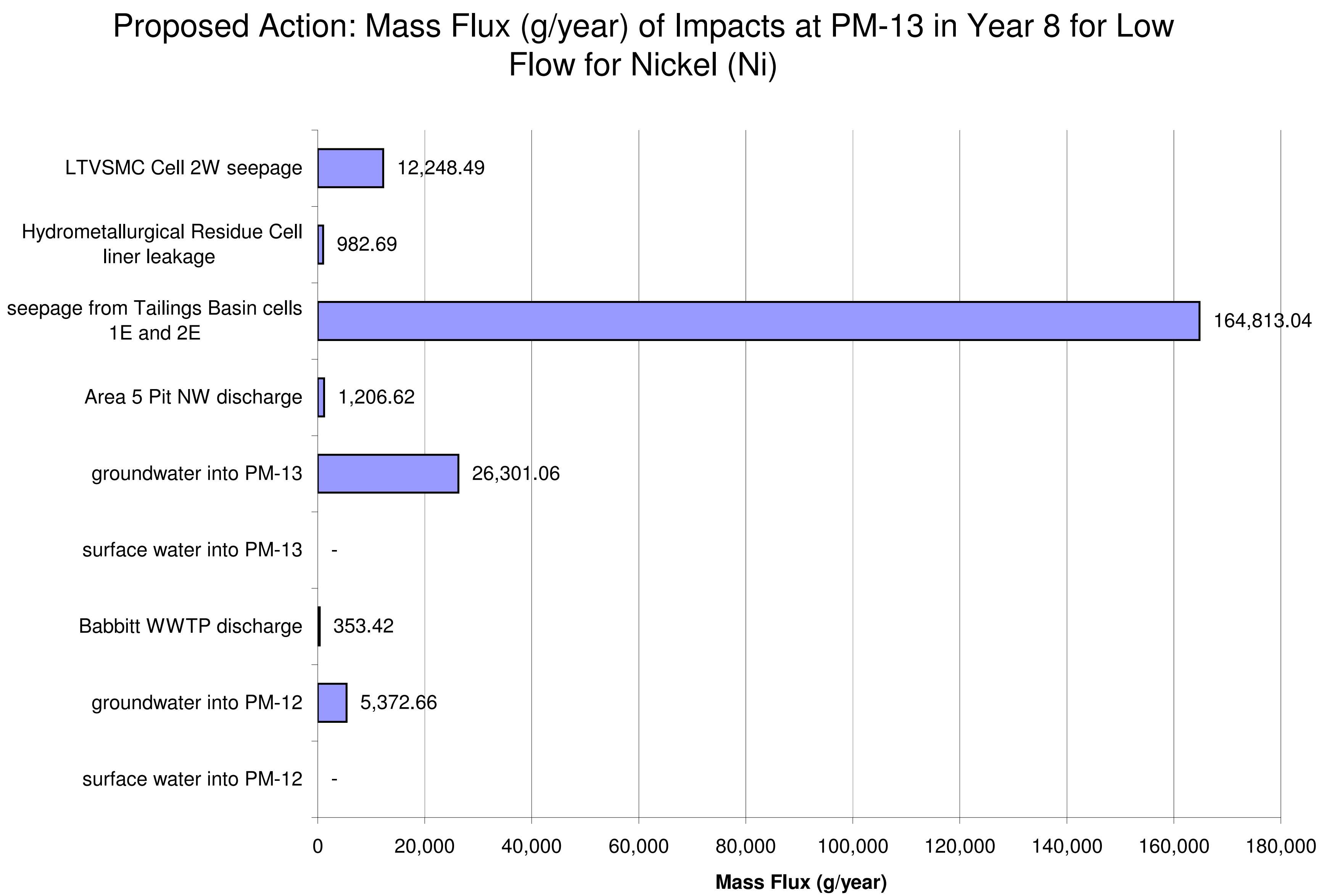

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
15.04
seepage from Tailings Basin cells 1E and 2E
36,517.98
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Copper (Cu)

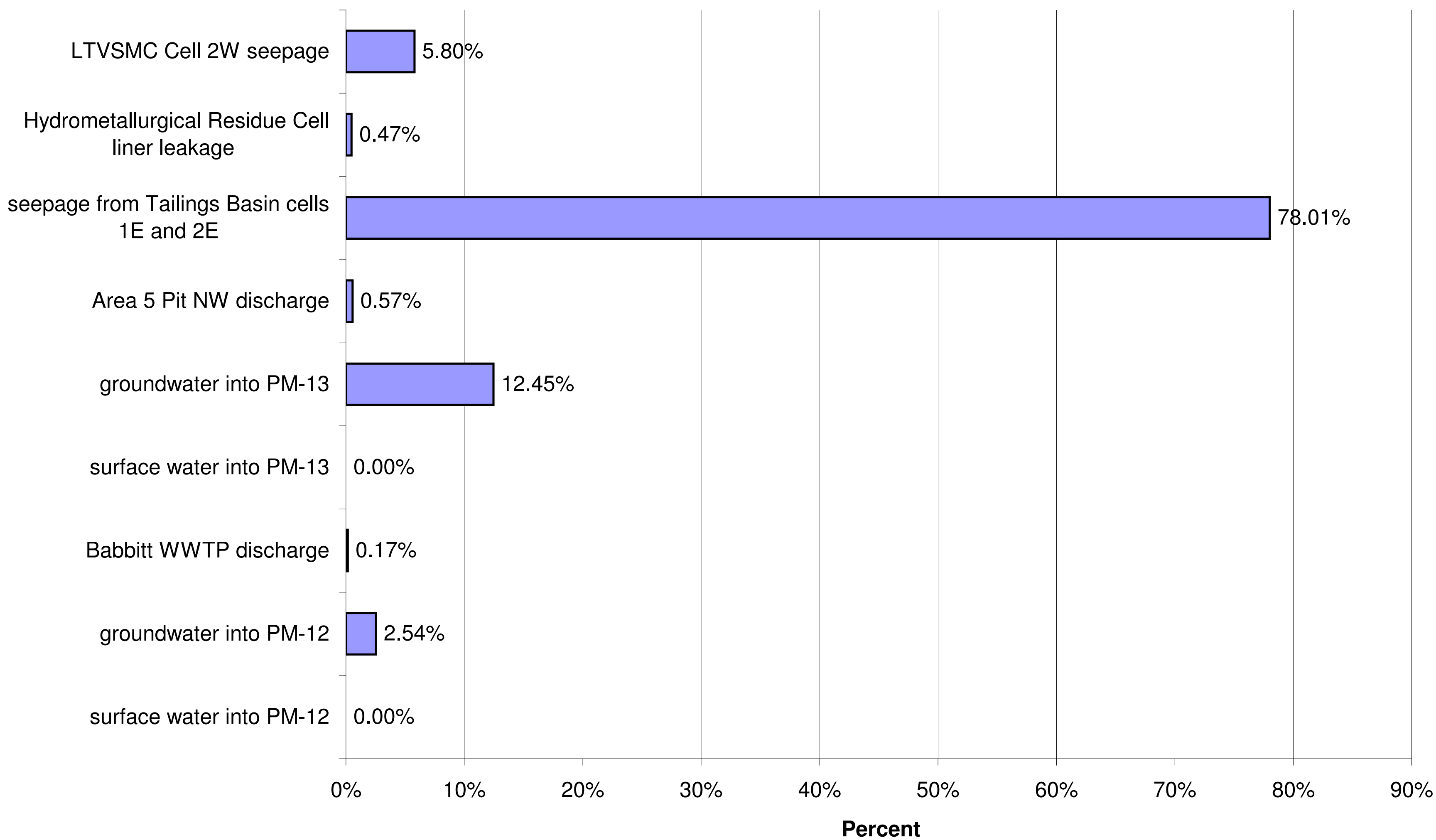



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
15.04
seepage from Tailings Basin cells 1E and 2E
36,517.98
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

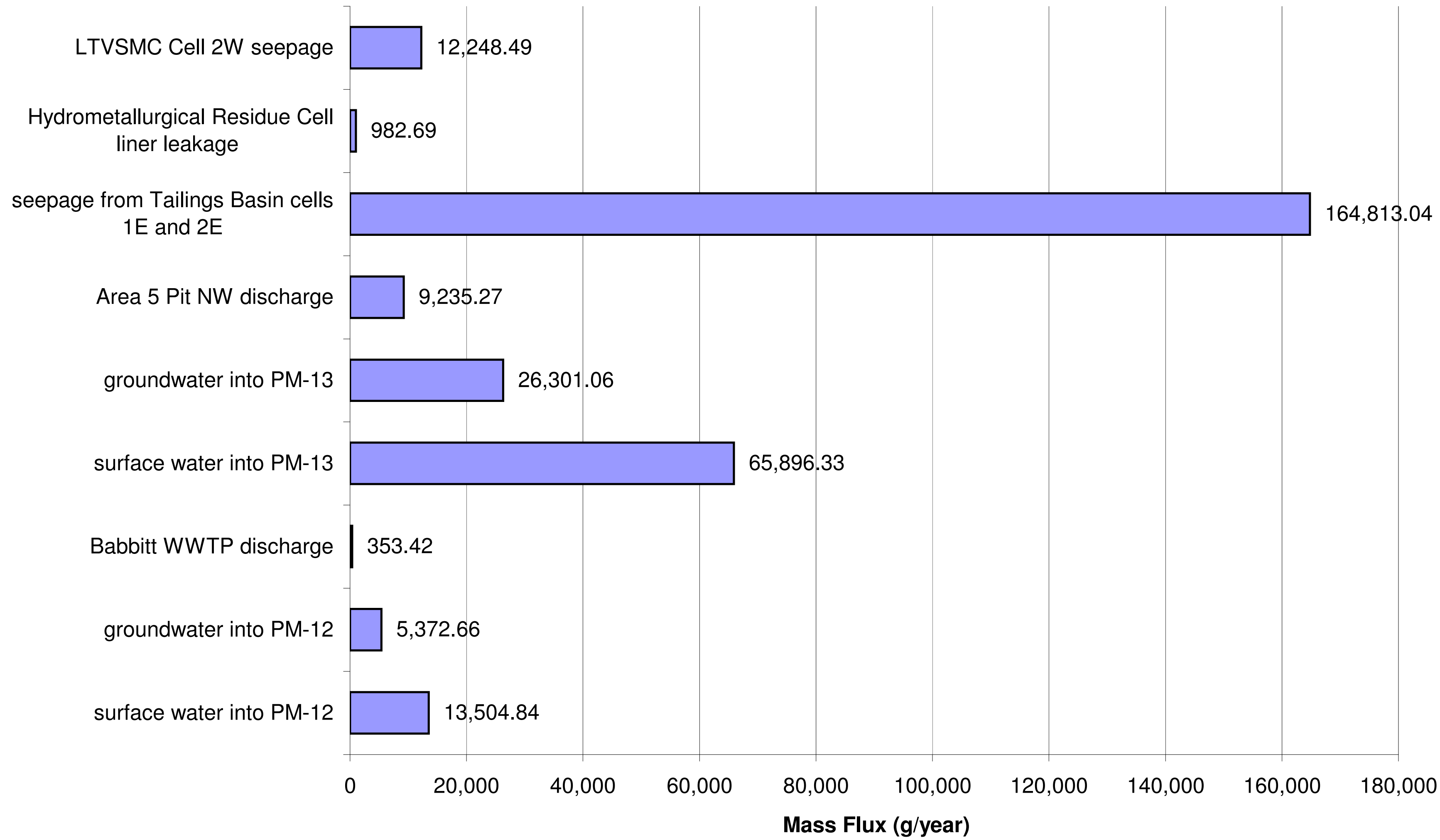

Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.67%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
3.04%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.25%
surface water into PM-13
78.28%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
15.95%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
982.69
seepage from Tailings Basin cells 1E and 2E
164,813.04
Area 5 Pit NW discharge
1,206.62
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
-
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
160,000
180,000
Mass Flux (g/year)

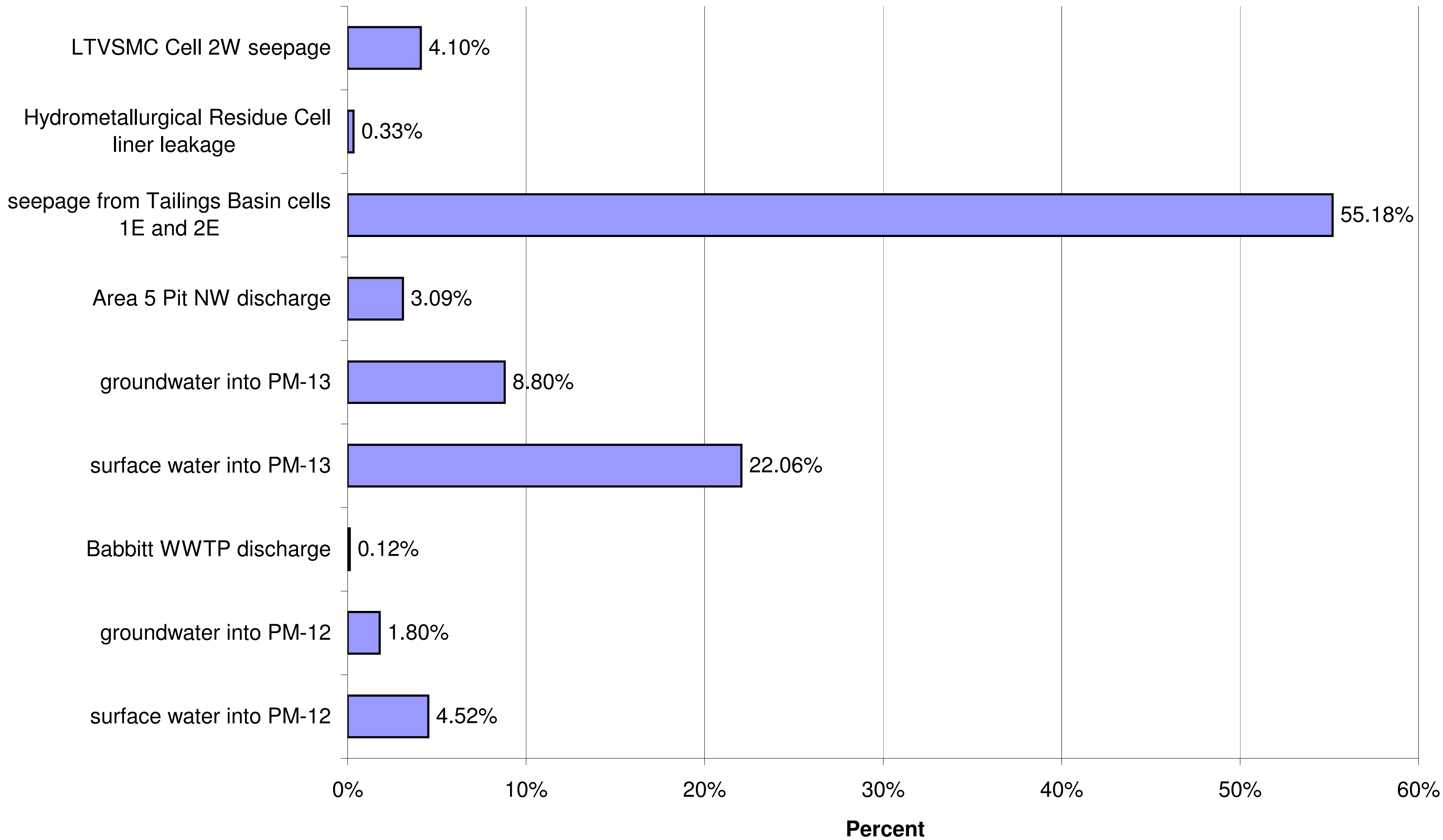
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Nickel (Ni)

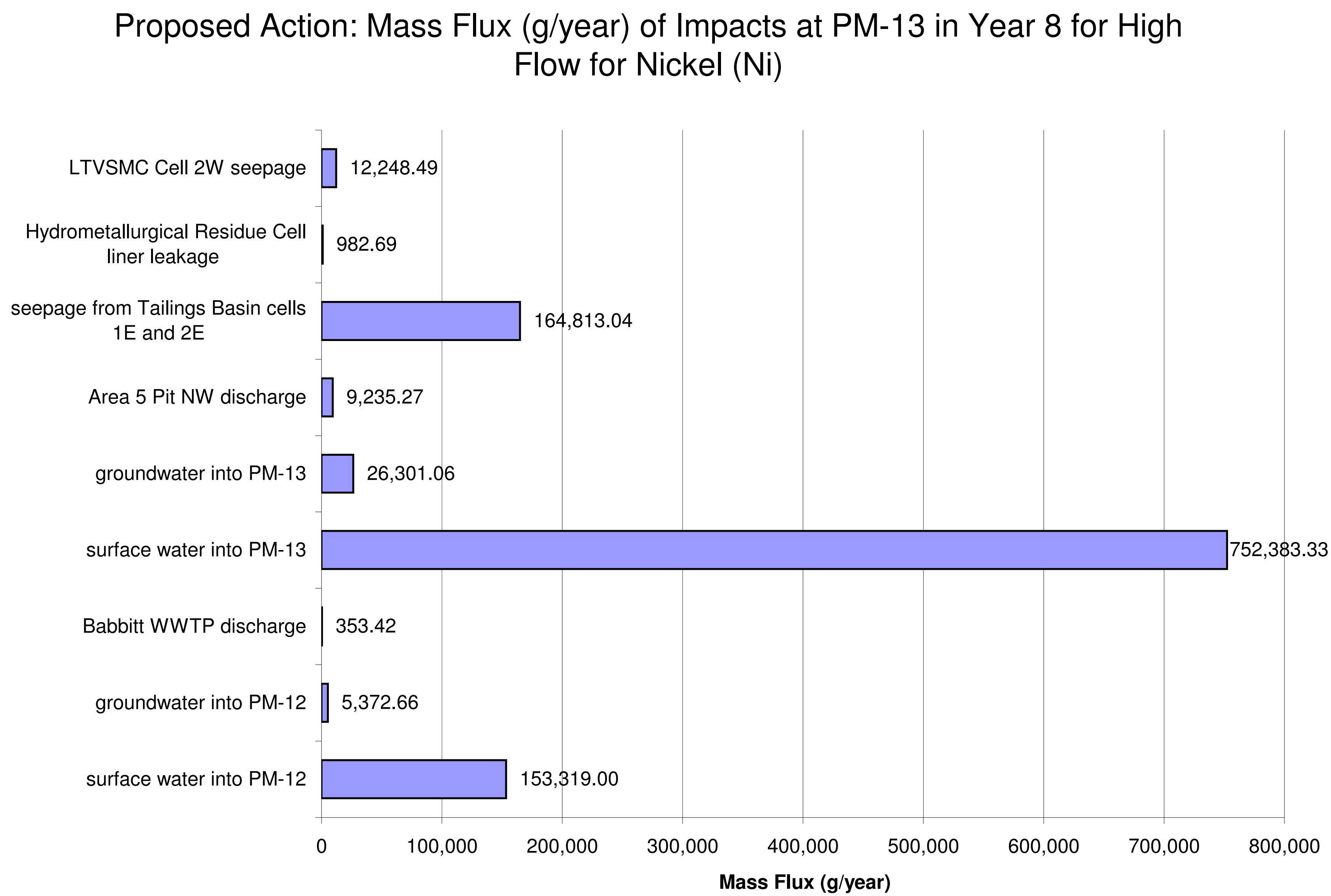


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Nickel (Ni)

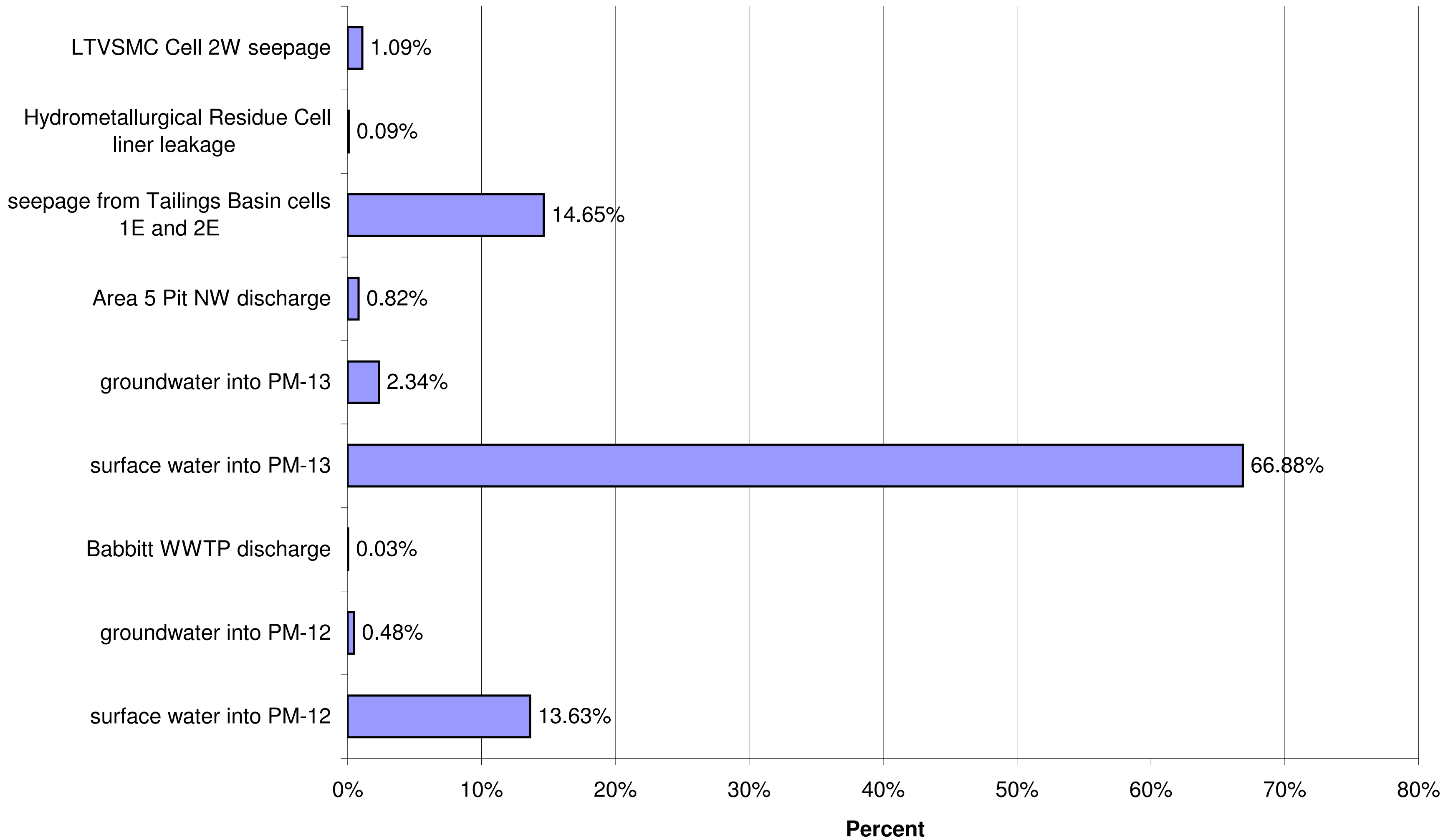


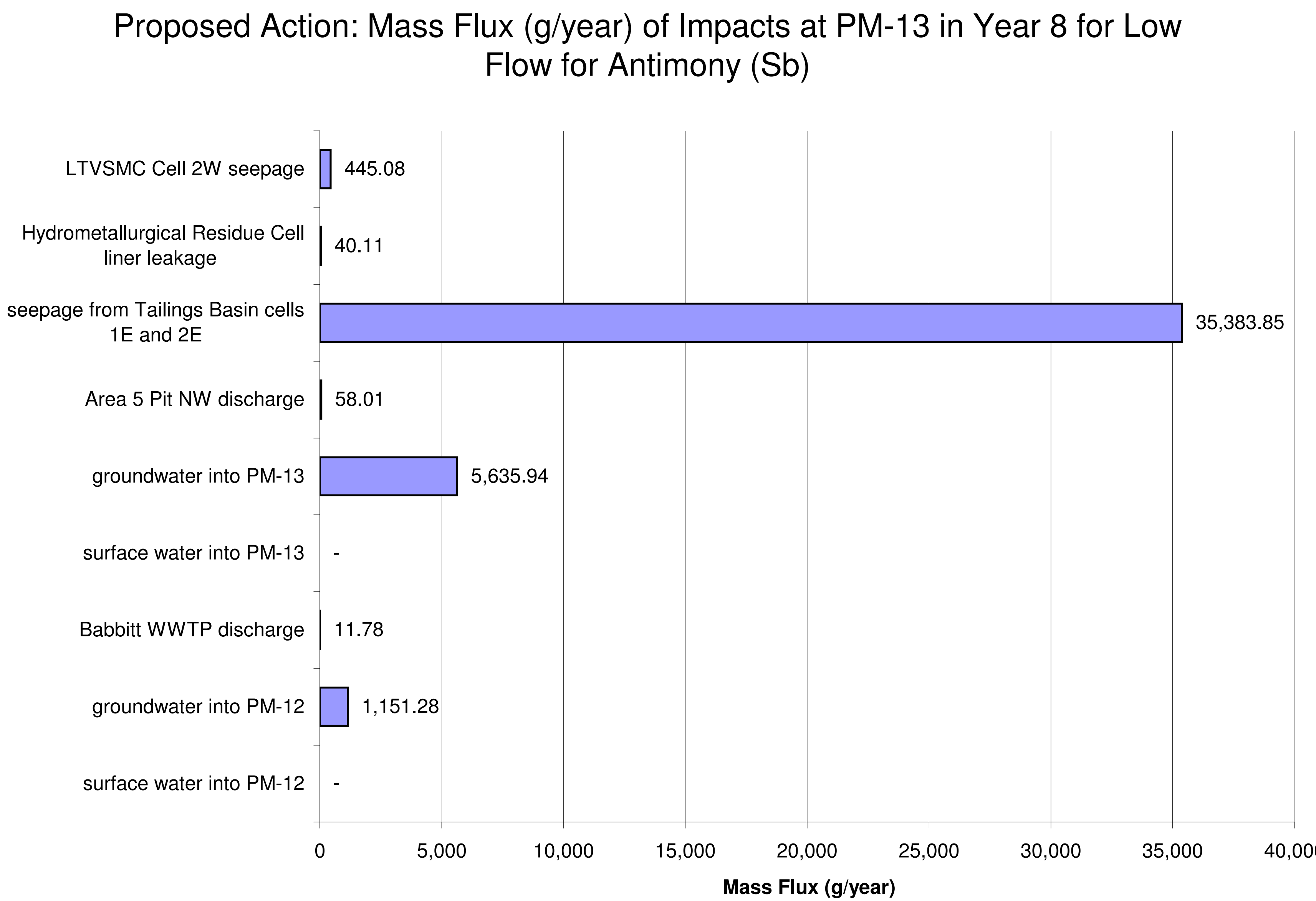
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Nickel (Ni)



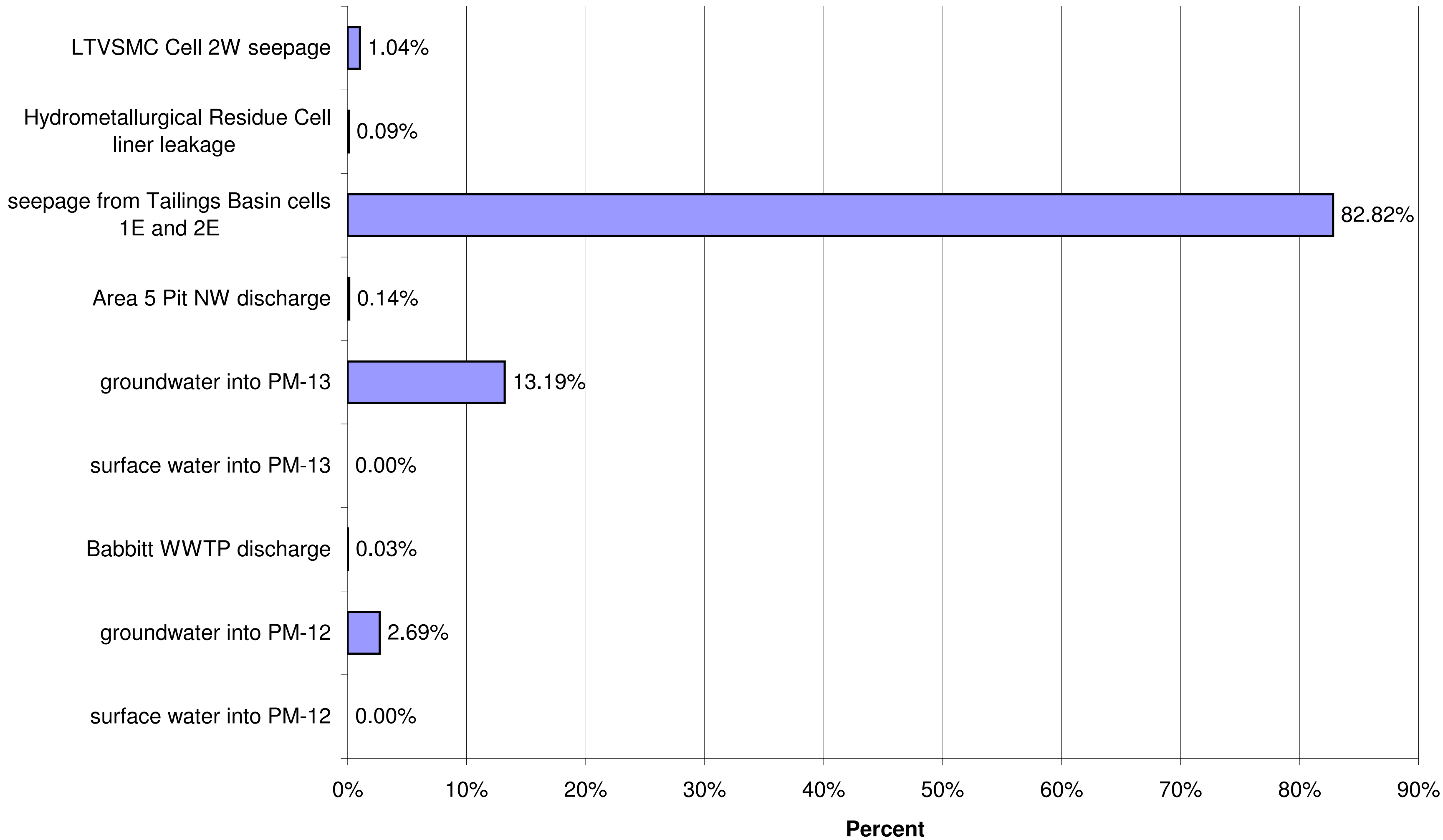

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
982.69
seepage from Tailings Basin cells 1E and 2E
164,813.04
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

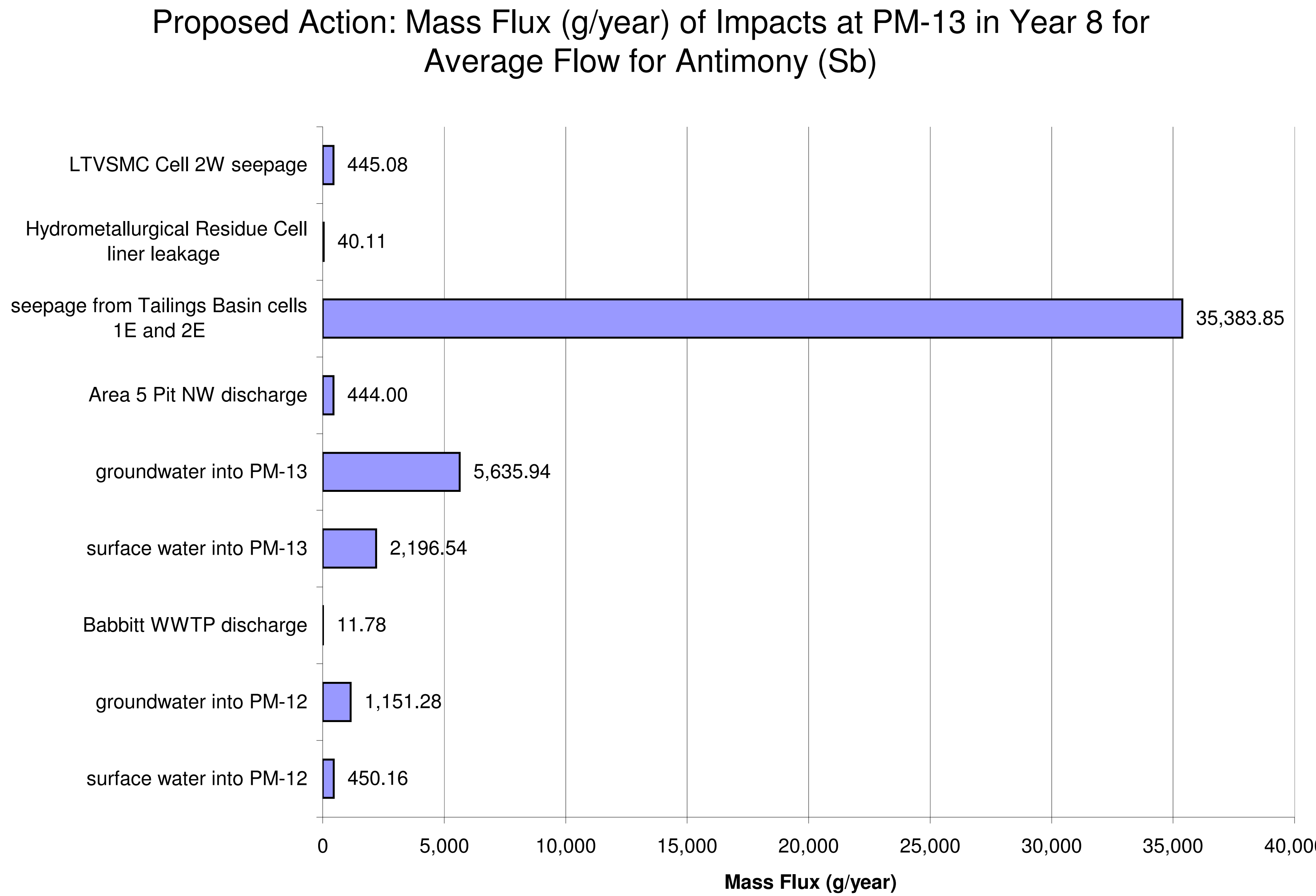
Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Nickel (Ni)

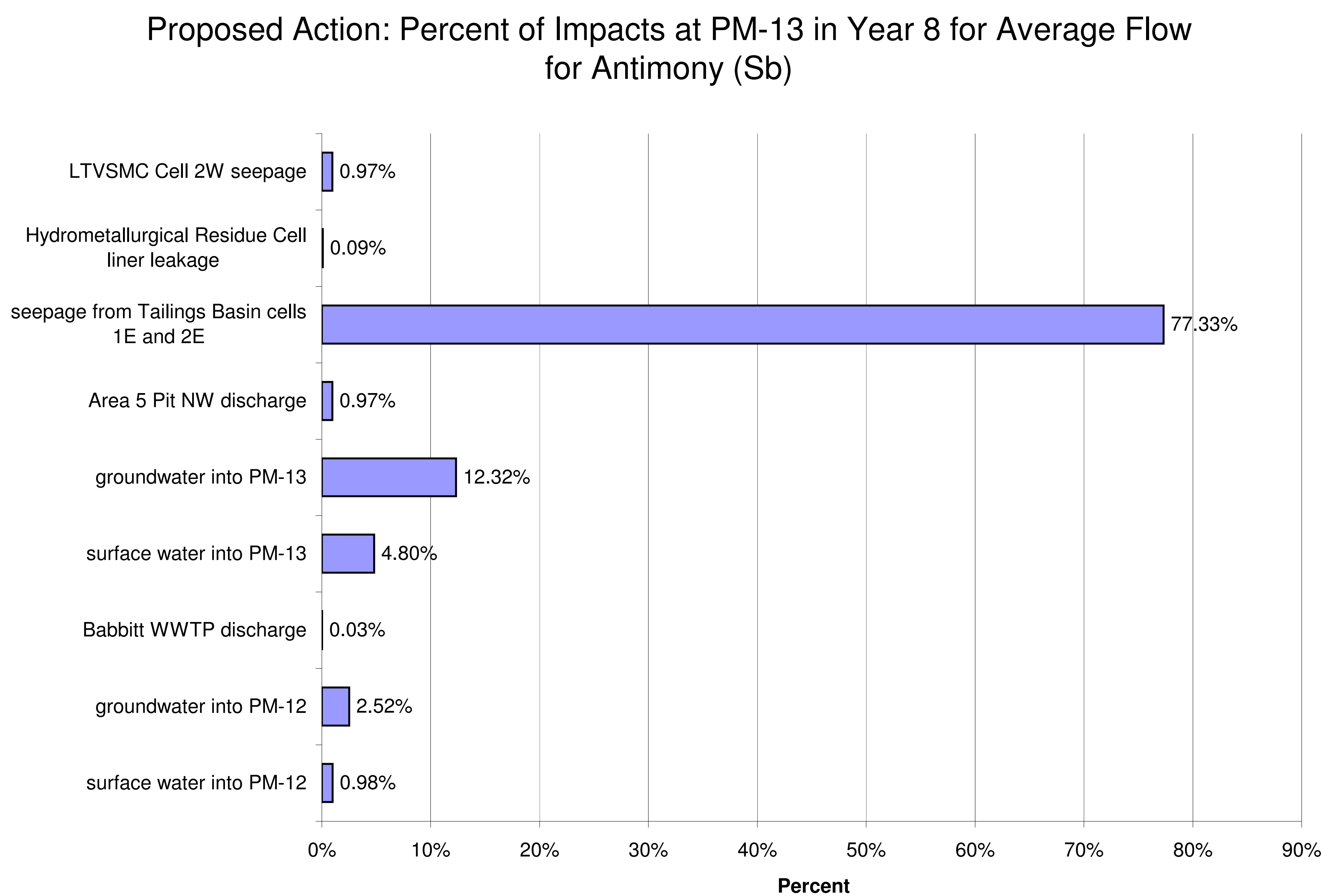


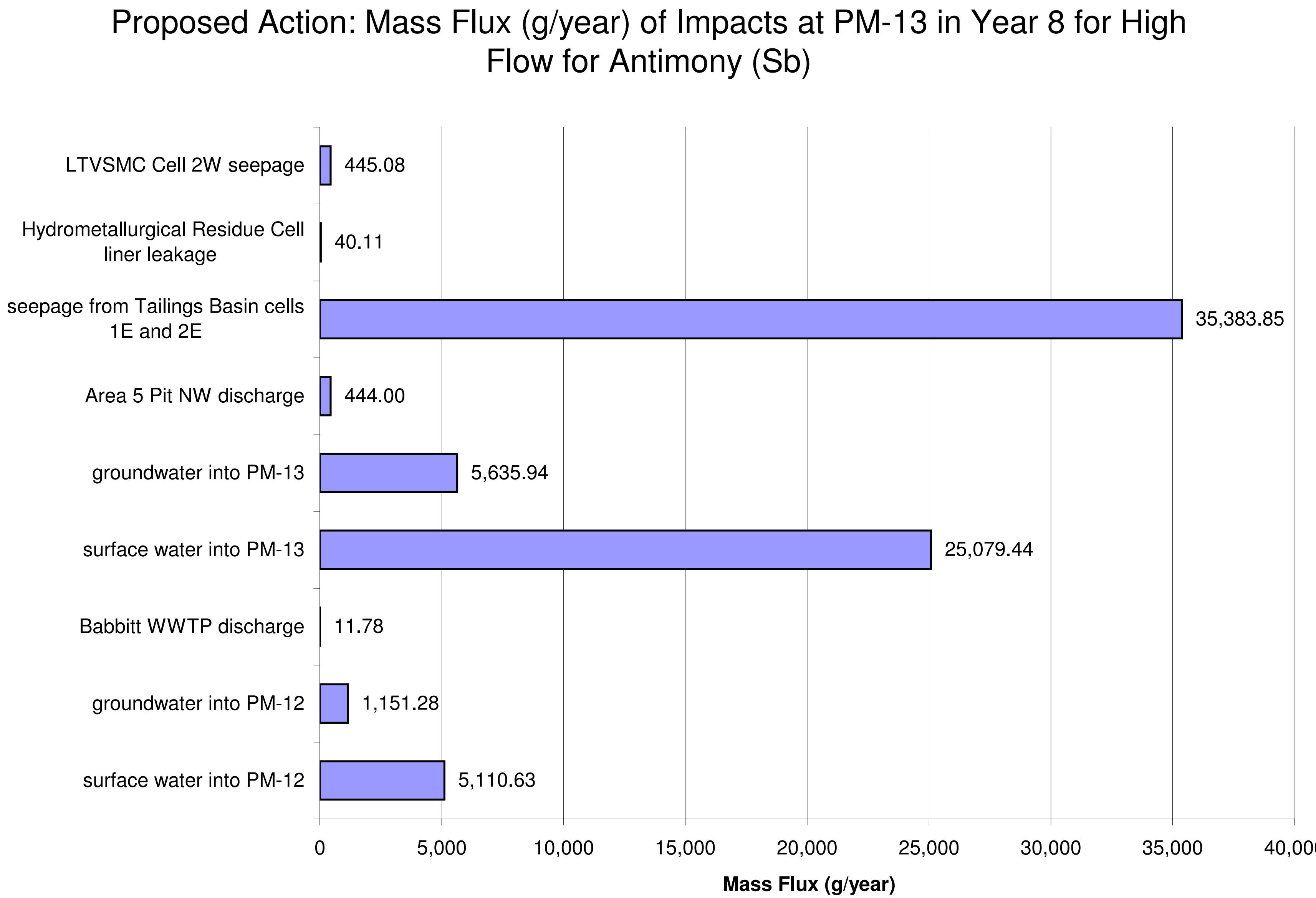

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
35,383.85
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

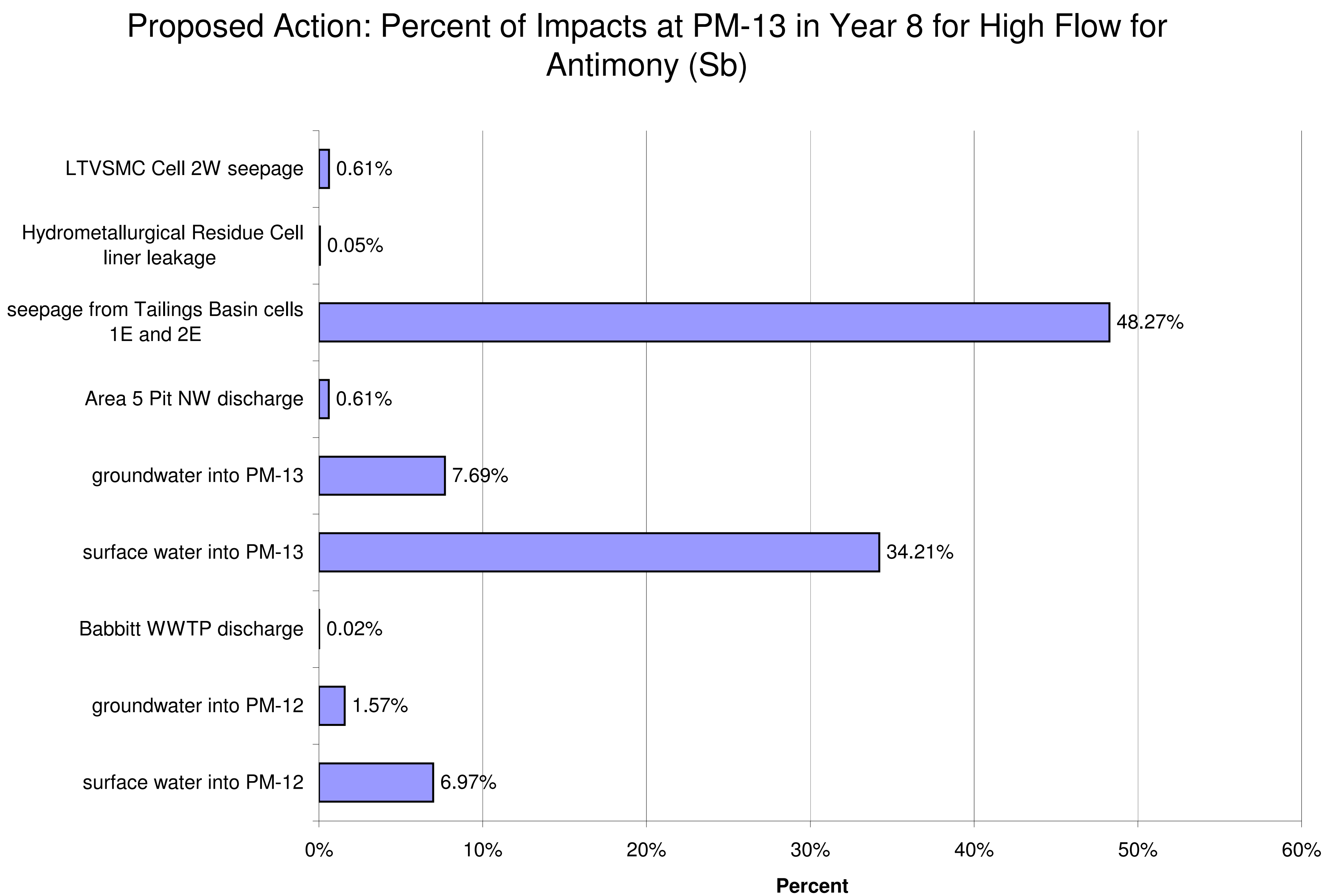
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Antimony (Sb)



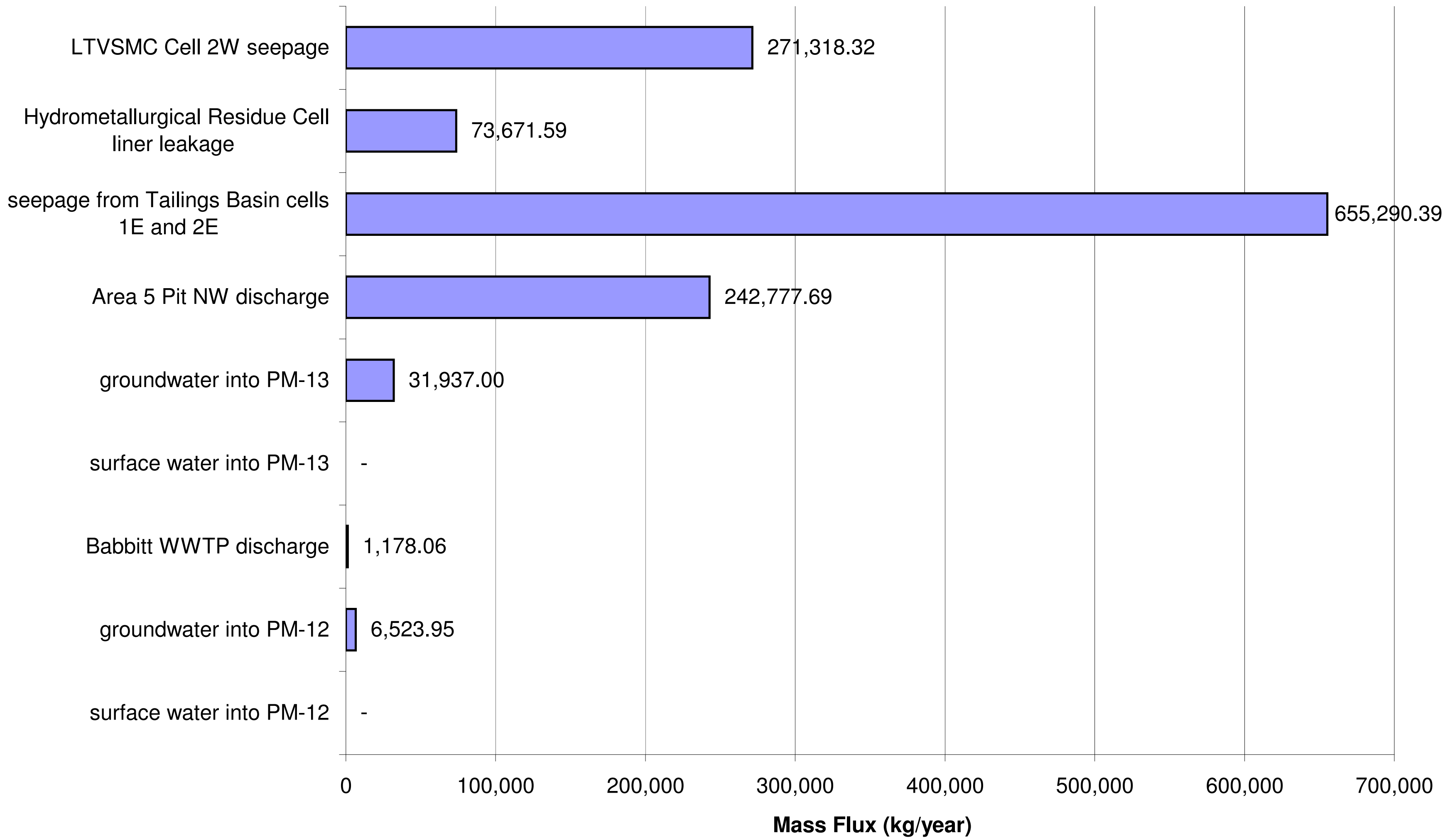

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
35,383.85
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.97%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
77.33%
Area 5 Pit NW discharge
0.97%
groundwater into PM-13
12.32%
surface water into PM-13
4.80%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
2.52%
surface water into PM-12
0.98%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

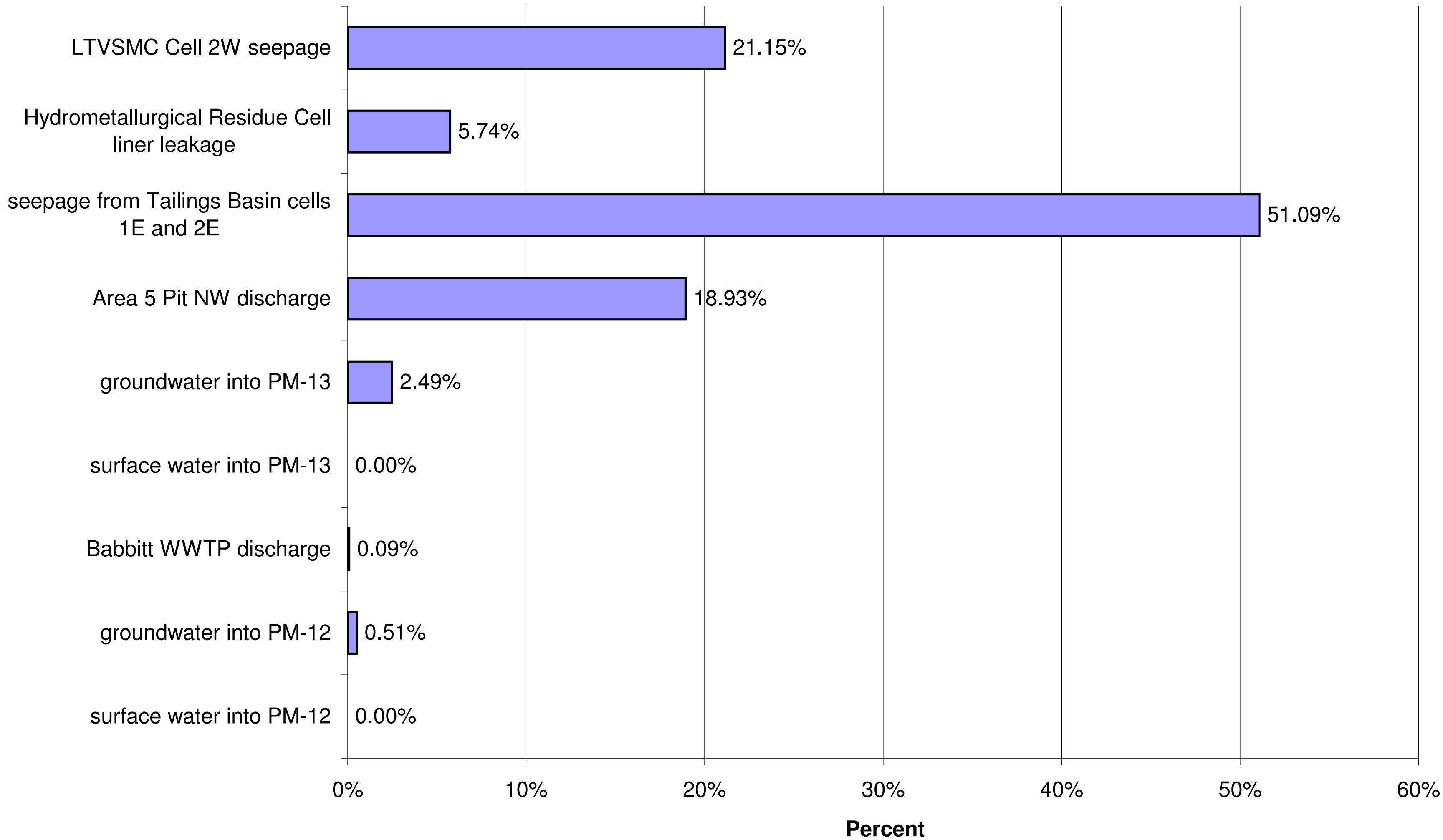

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
35,383.85
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.61%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
48.27%
Area 5 Pit NW discharge
0.61%
groundwater into PM-13
7.69%
surface water into PM-13
34.21%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
1.57%
surface water into PM-12
6.97%
0%
10%
20%
30%
40%
50%
60%
Percent

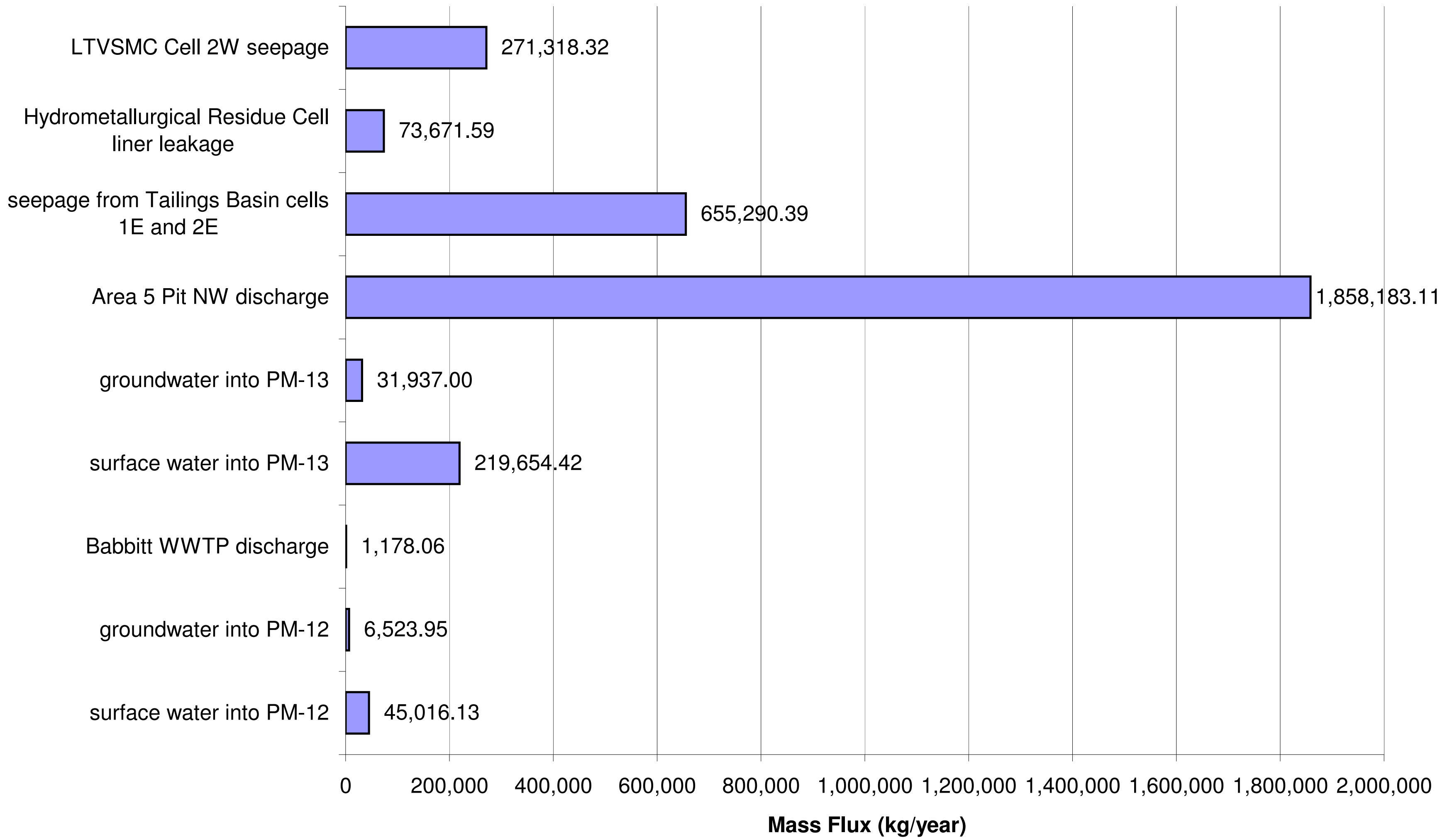
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 8 for Low Flow for Sulfate (SO_4)



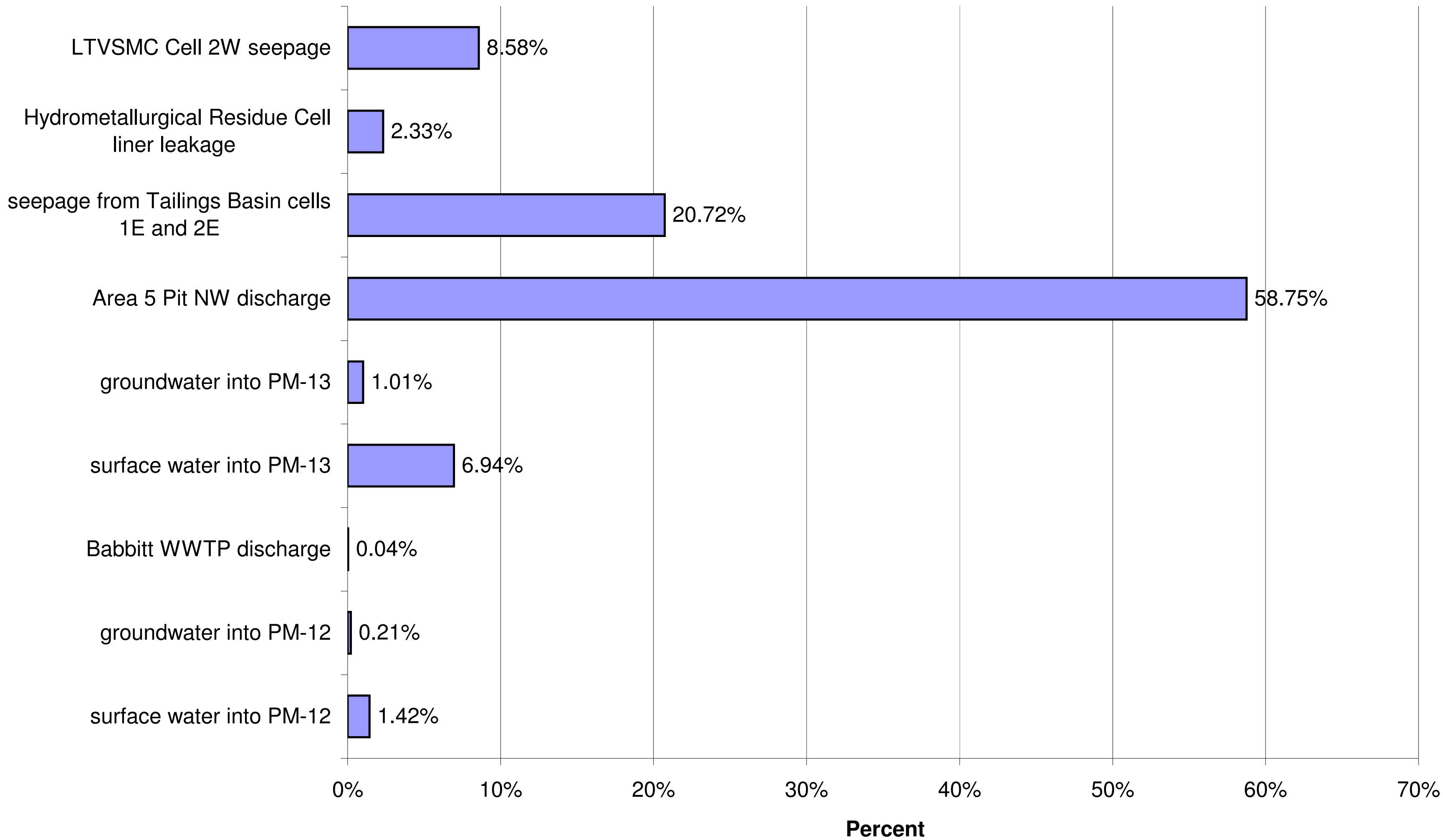
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Sulfate (SO_4)



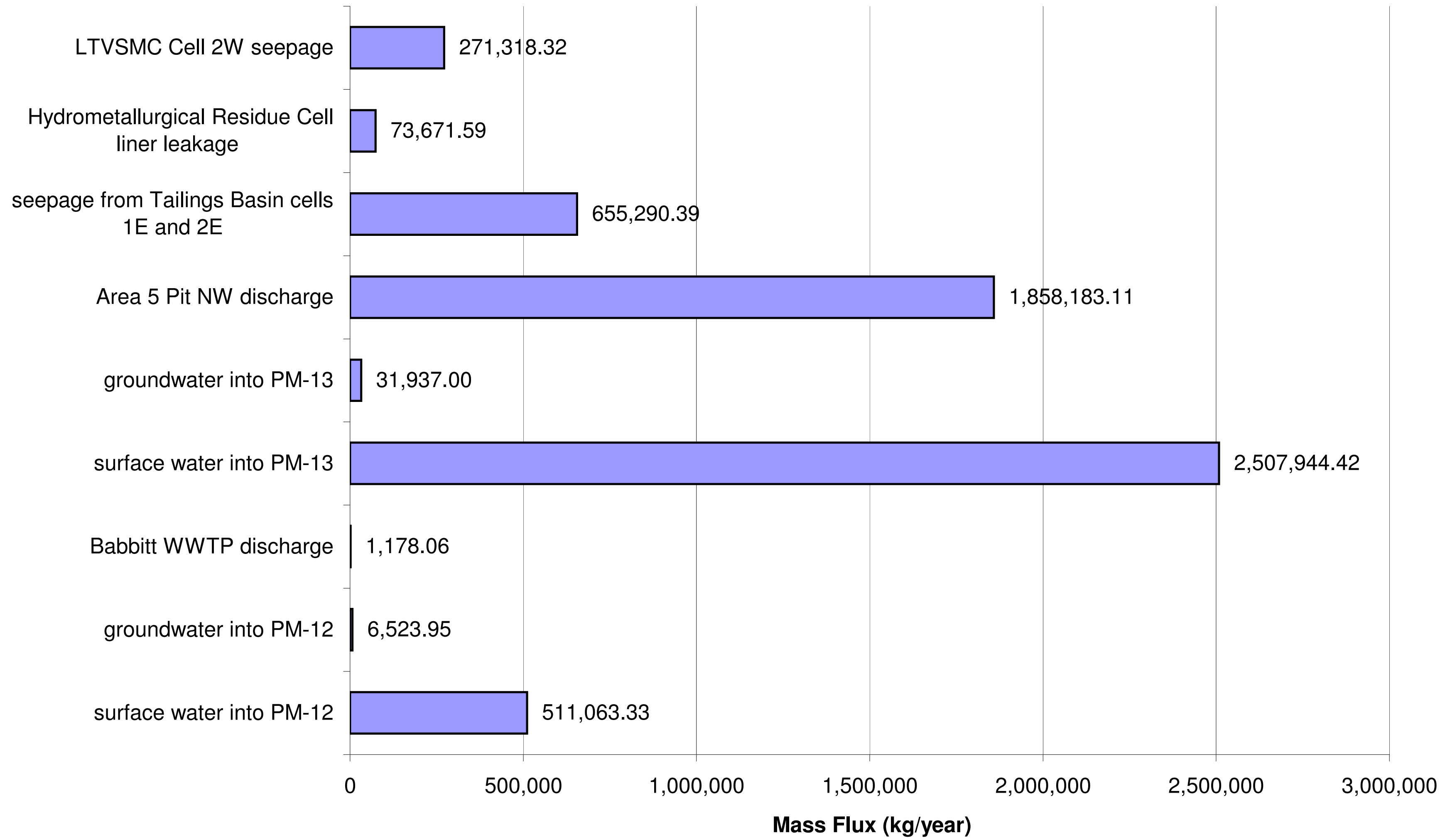
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 8 for Average Flow for Sulfate (SO_4)



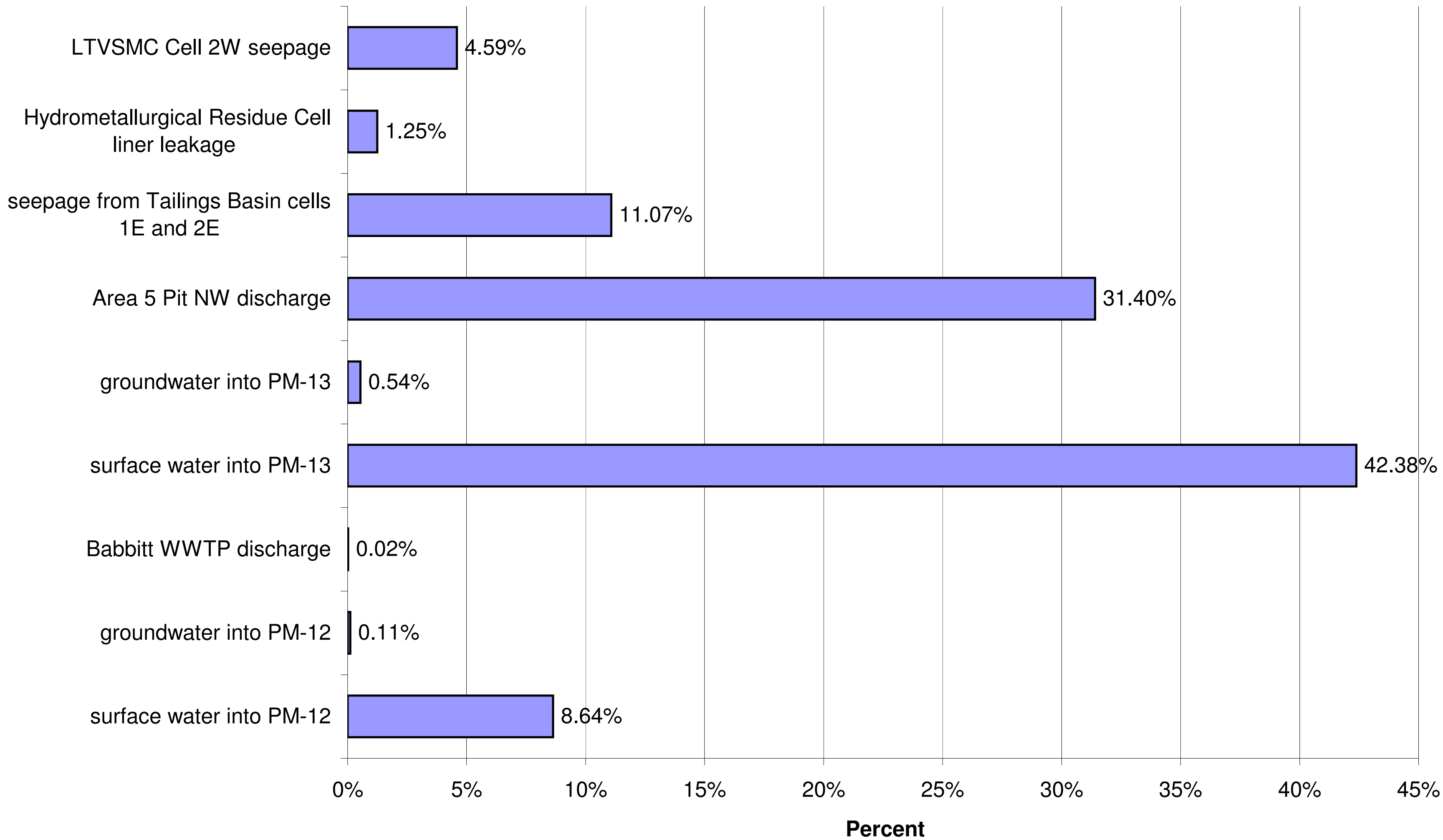
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Sulfate (SO_4)

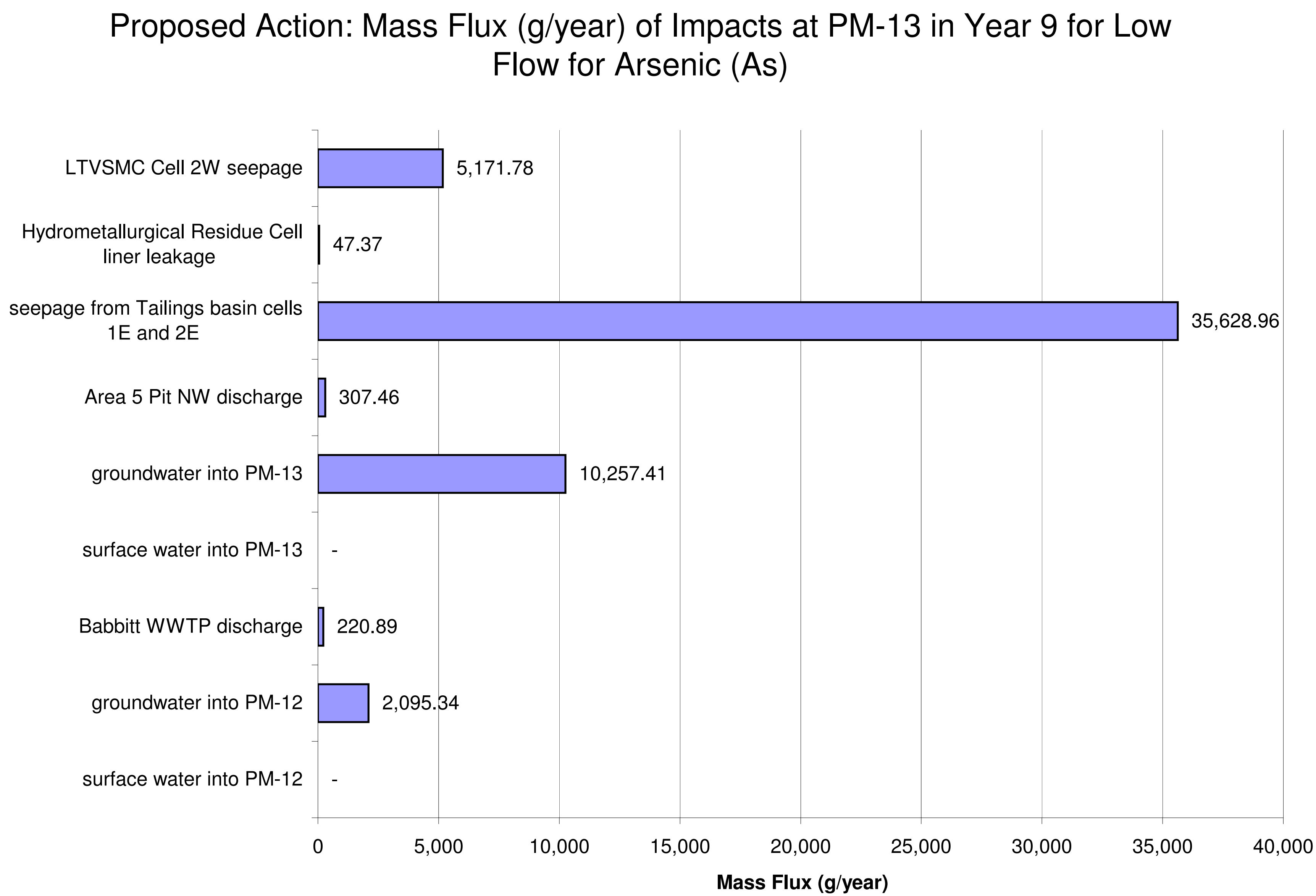


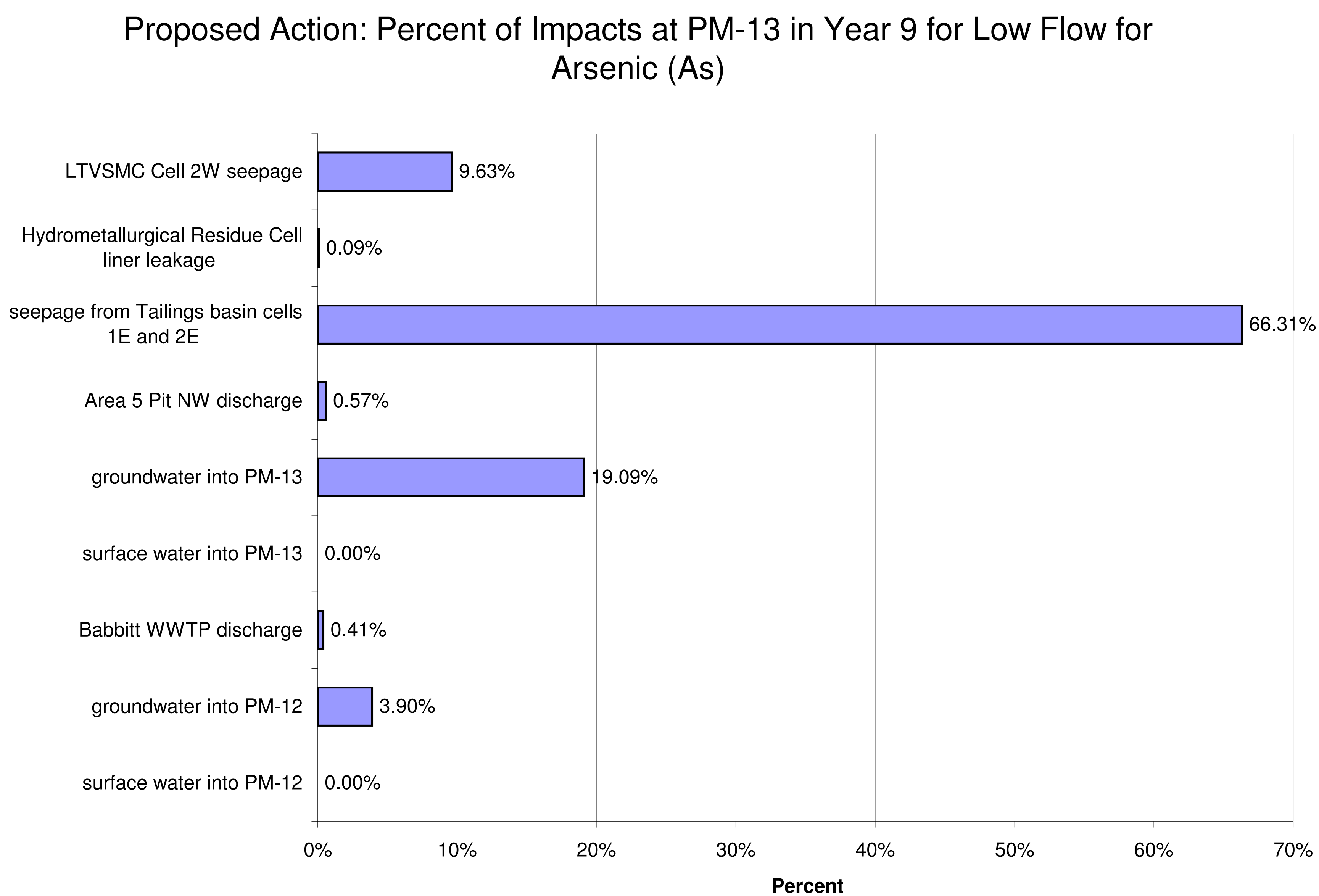
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 8 for High Flow for Sulfate (SO_4)

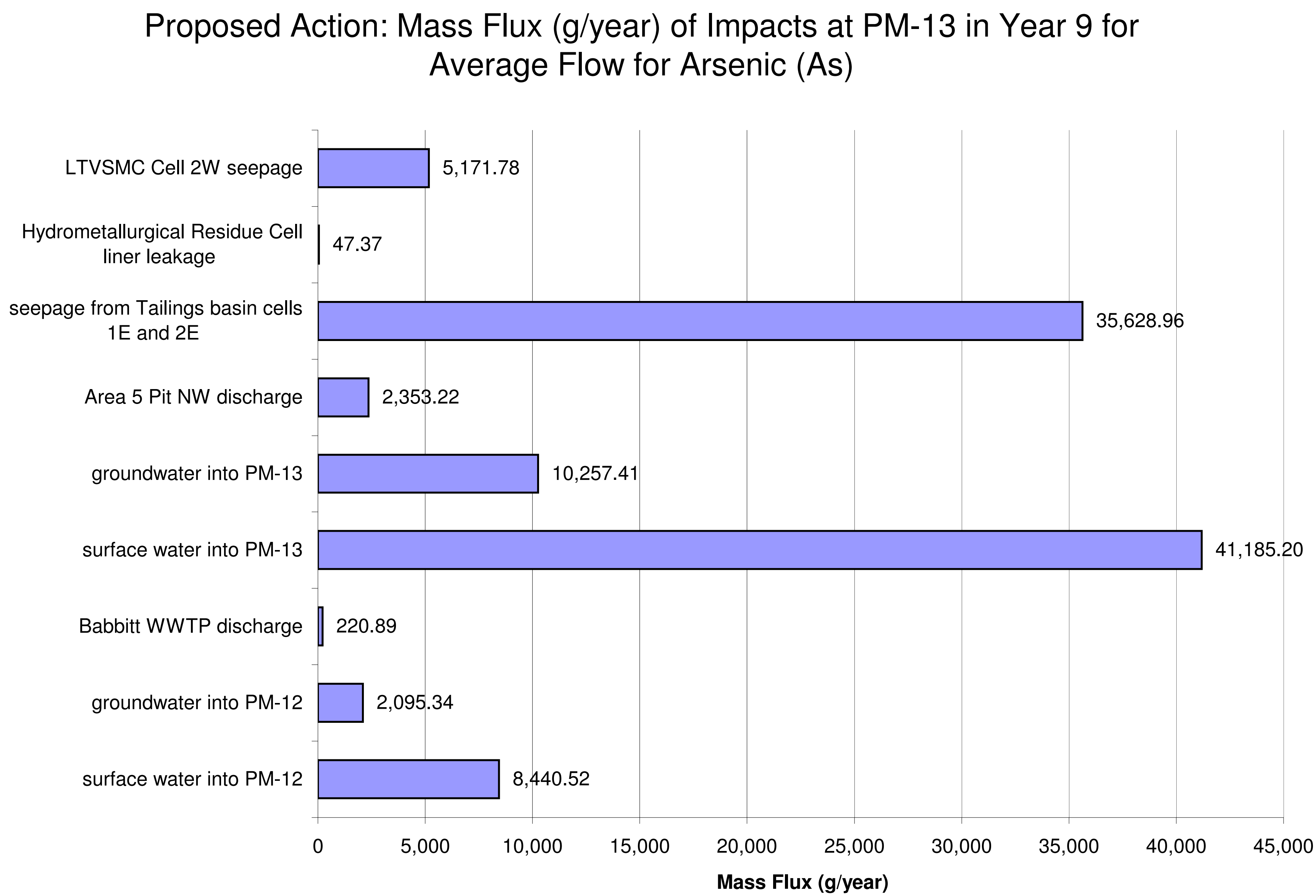


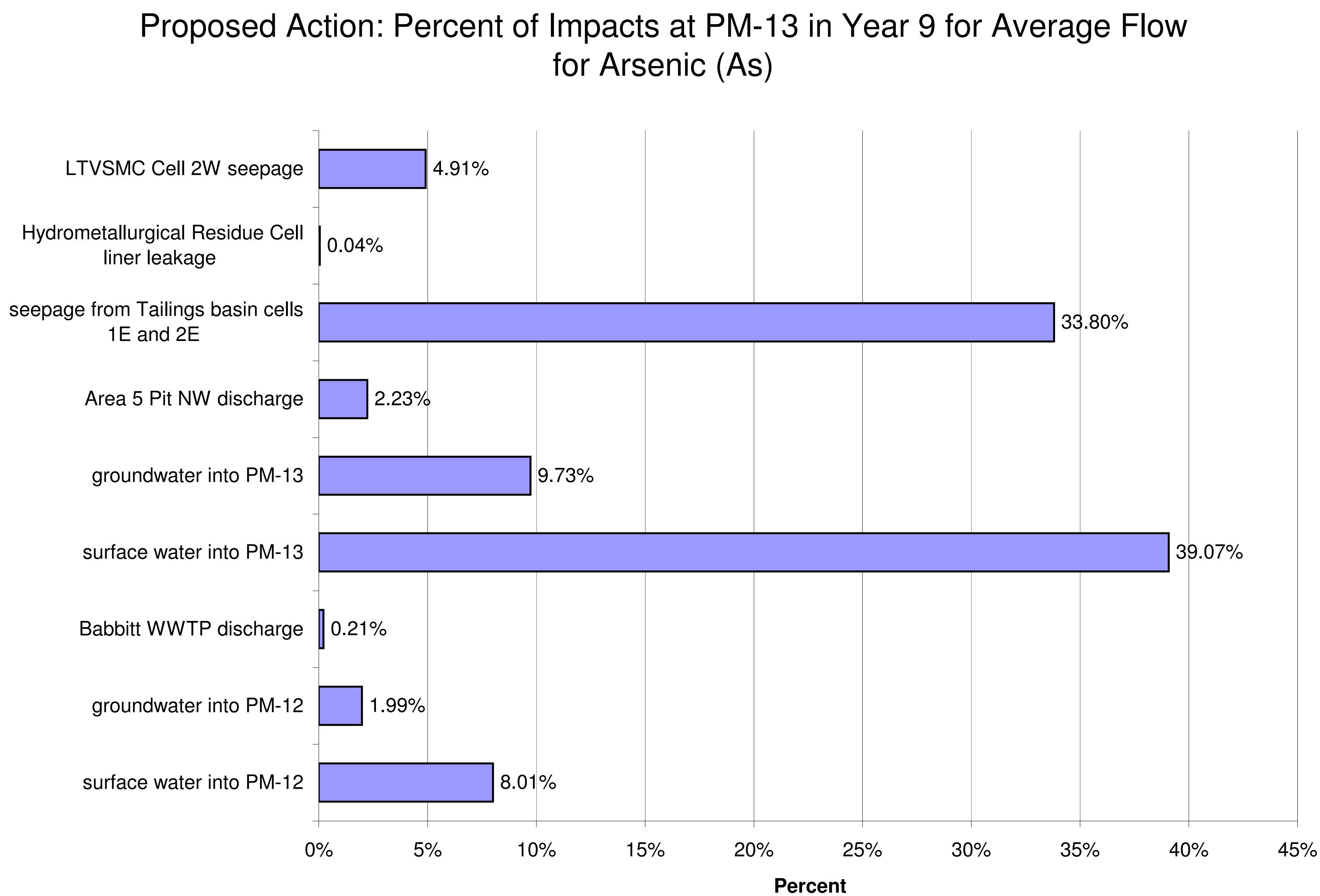
Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Sulfate (SO_4)

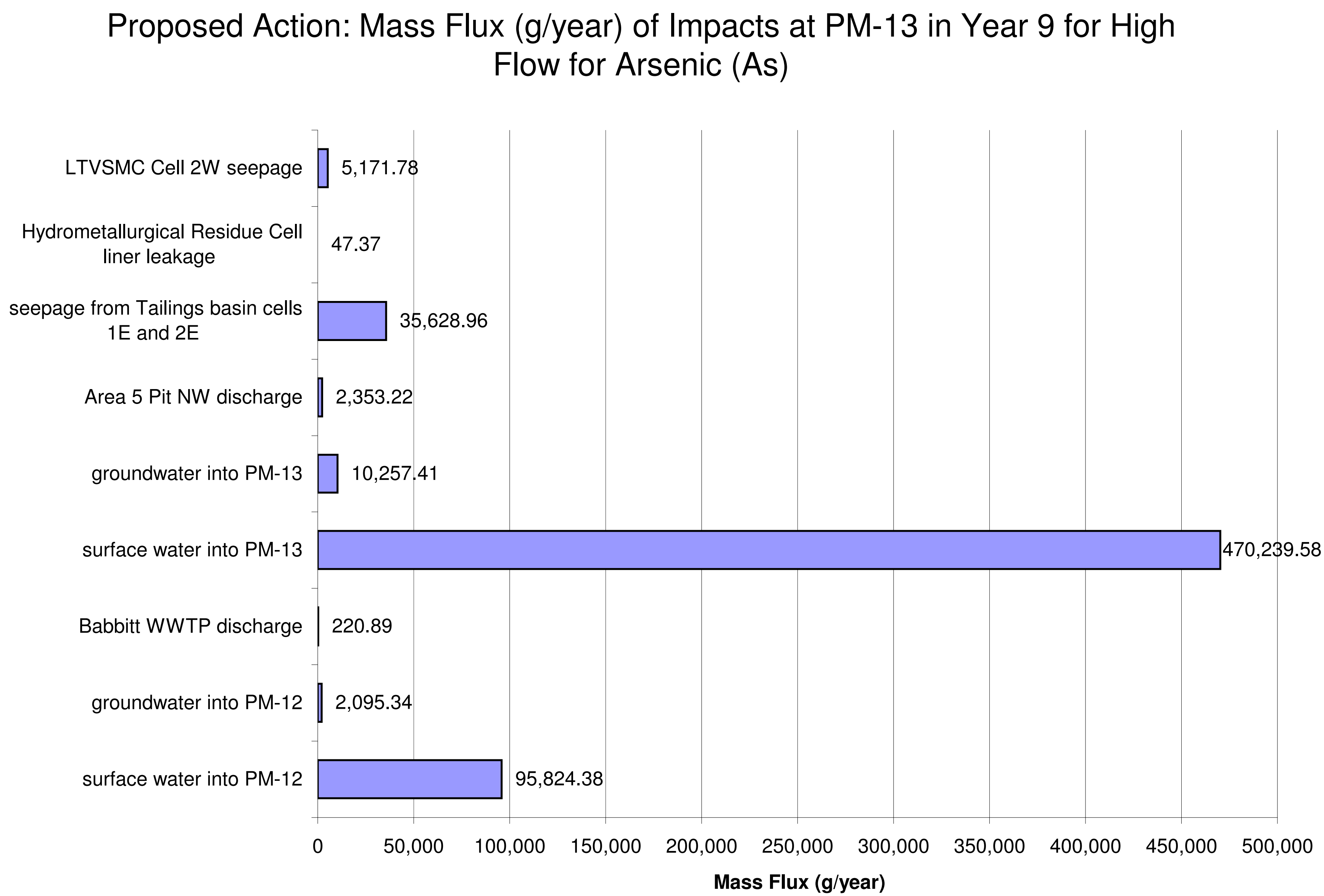



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
35,628.96
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

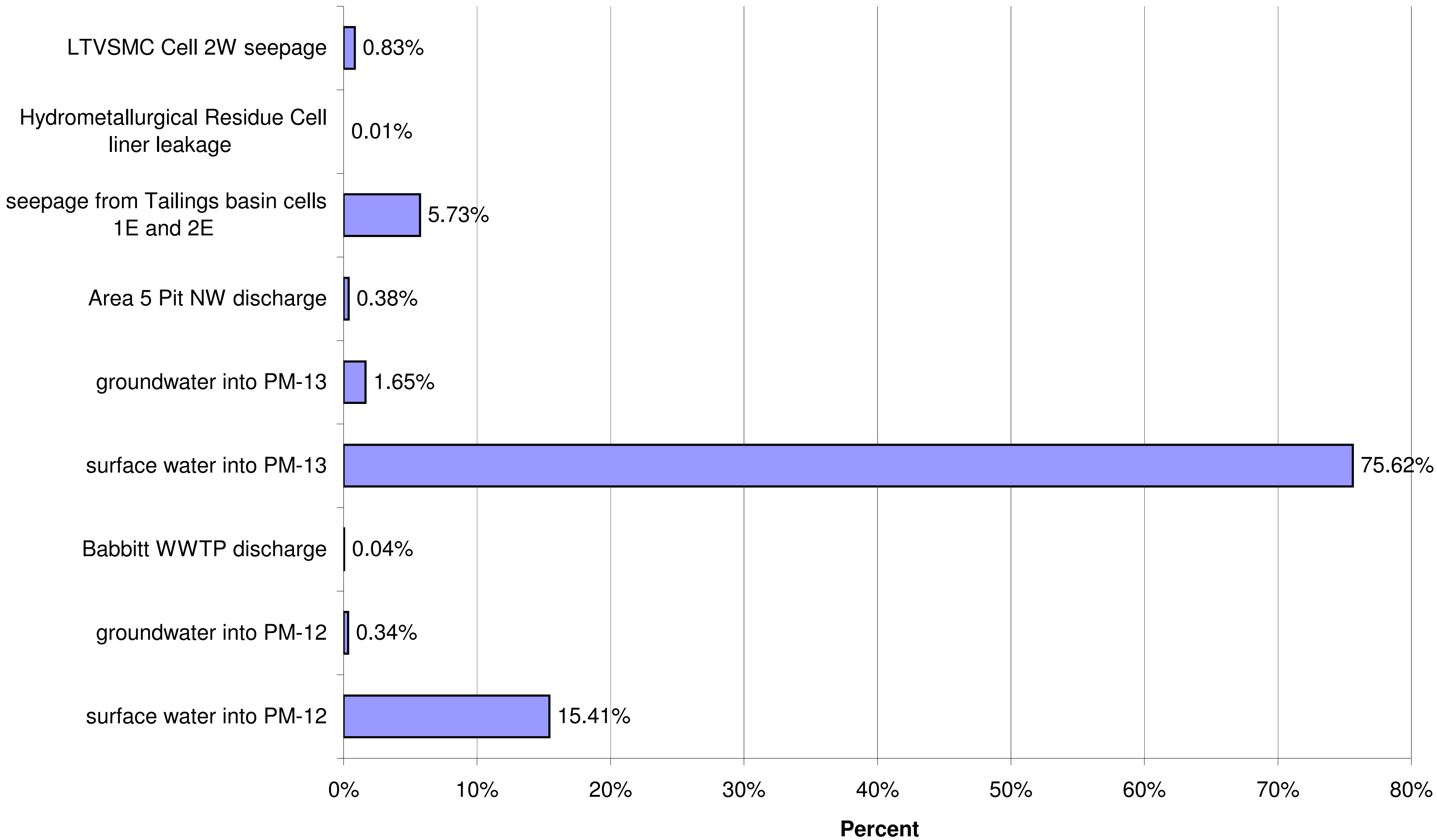

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
9.63%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings basin cells 1E and 2E
66.31%
Area 5 Pit NW discharge
0.57%
groundwater into PM-13
19.09%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.41%
groundwater into PM-12
3.90%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
35,628.96
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

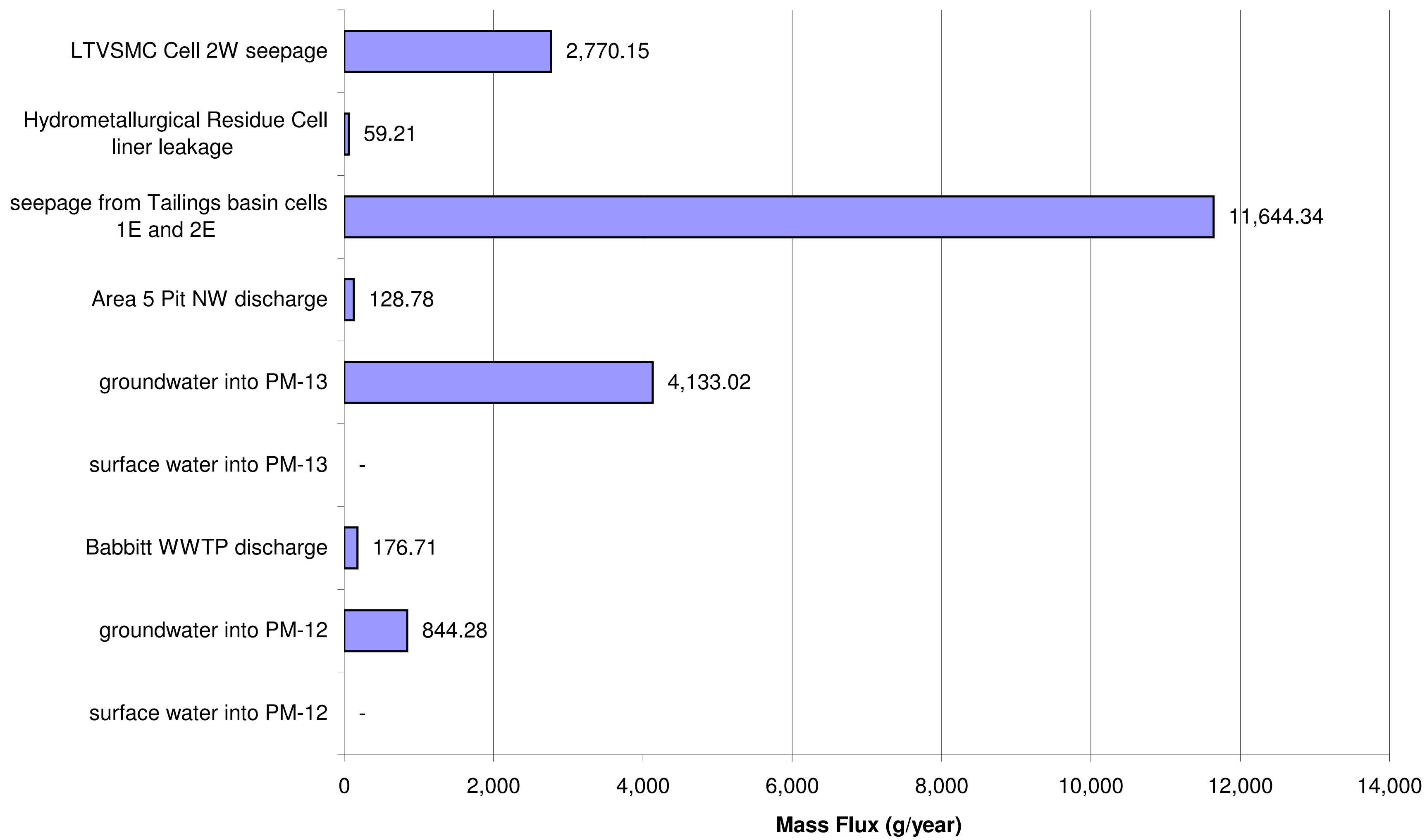

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4.91%
Hydrometallurgical Residue Cell liner leakage
0.04%
seepage from Tailings basin cells 1E and 2E
33.80%
Area 5 Pit NW discharge
2.23%
groundwater into PM-13
9.73%
surface water into PM-13
39.07%
Babbitt WWTP discharge
0.21%
groundwater into PM-12
1.99%
surface water into PM-12
8.01%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
35,628.96
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

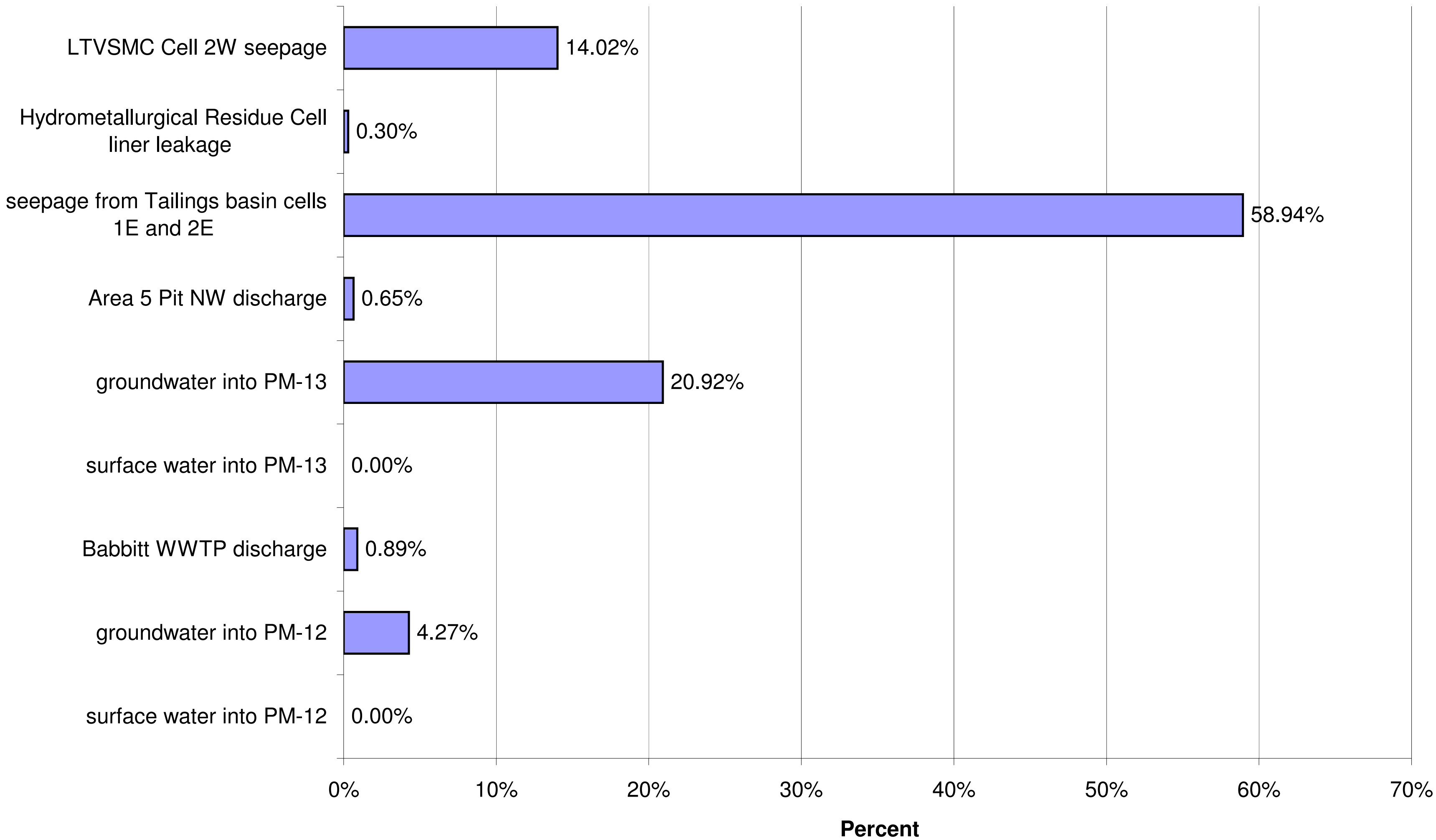
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Arsenic (As)

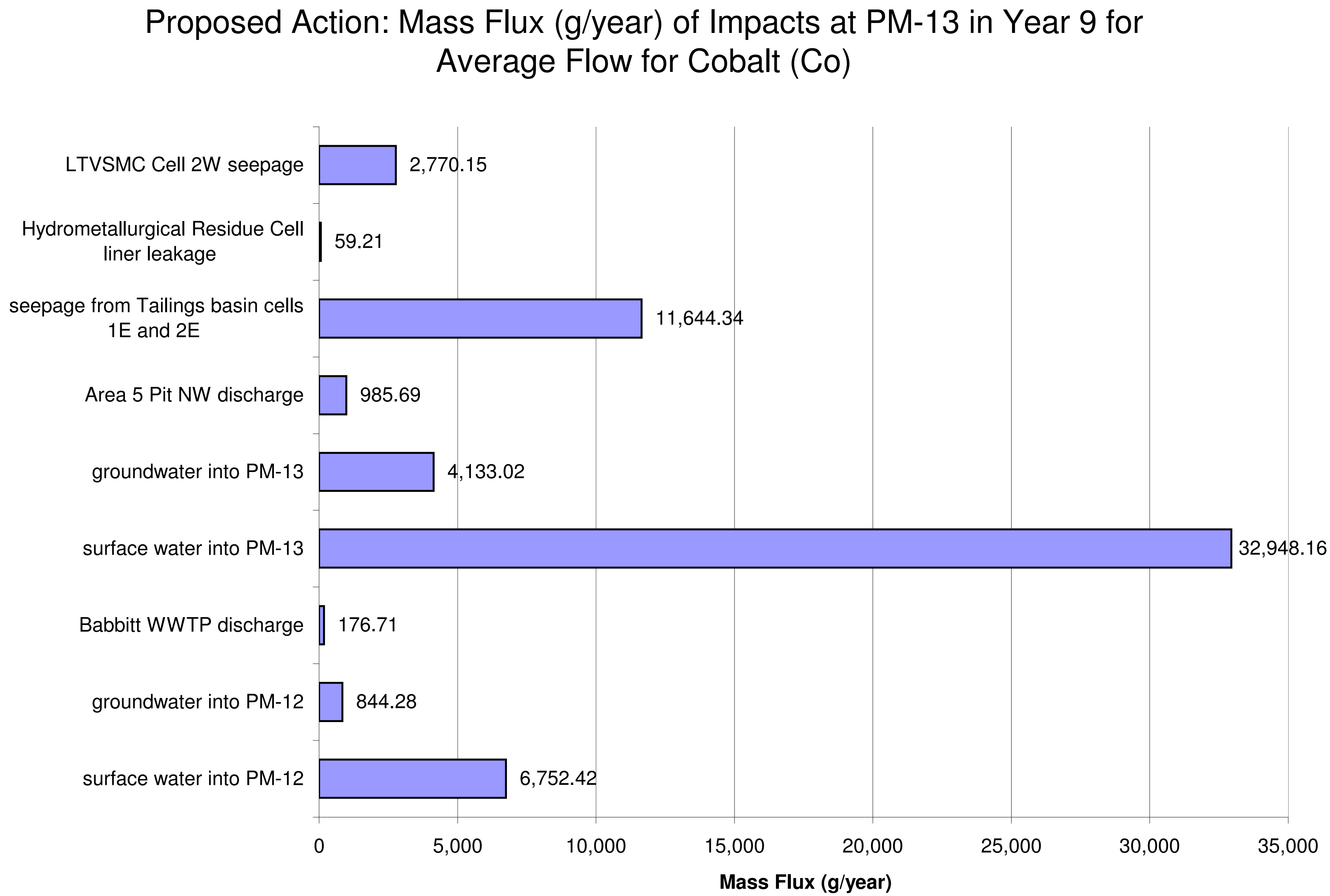


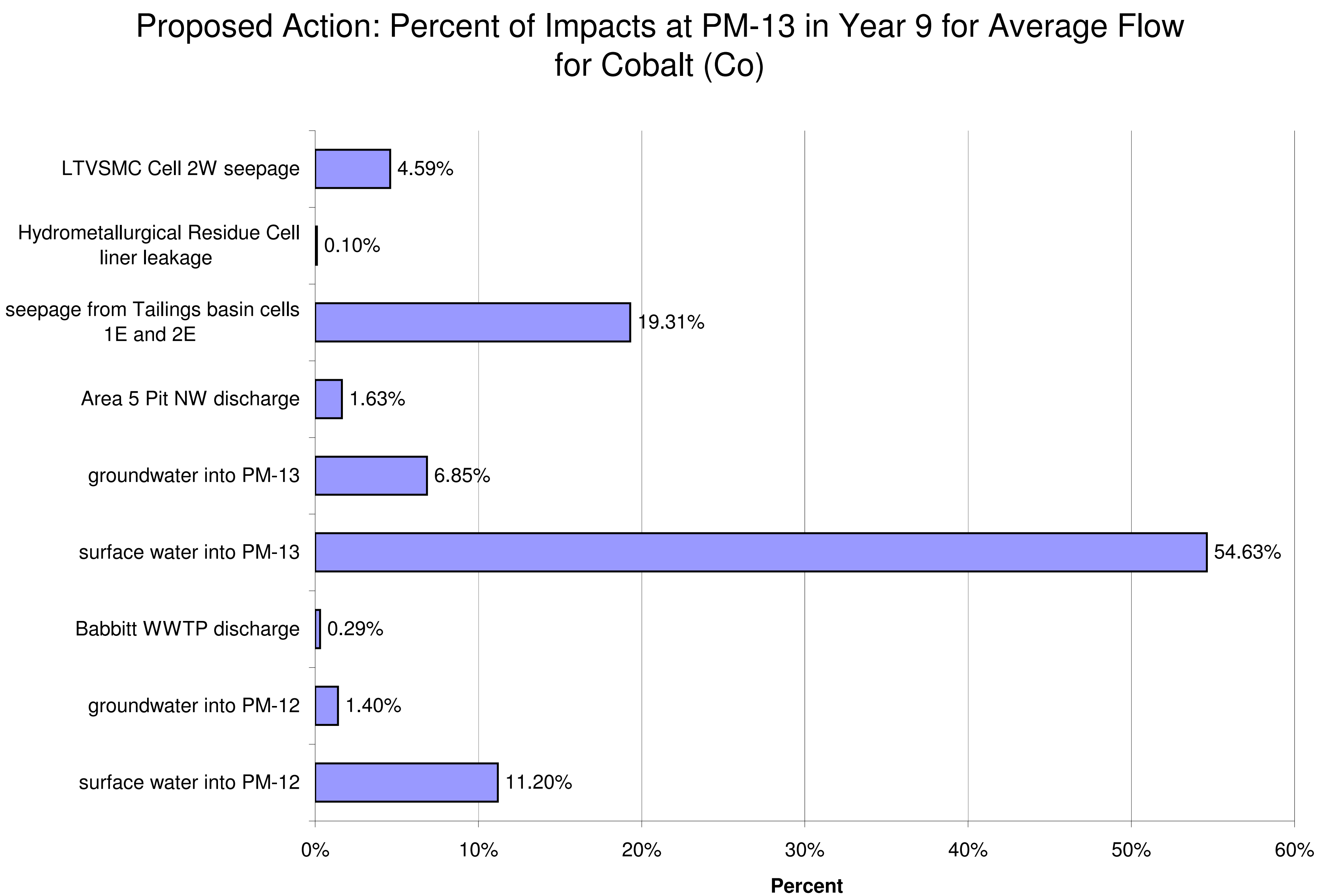
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Cobalt (Co)

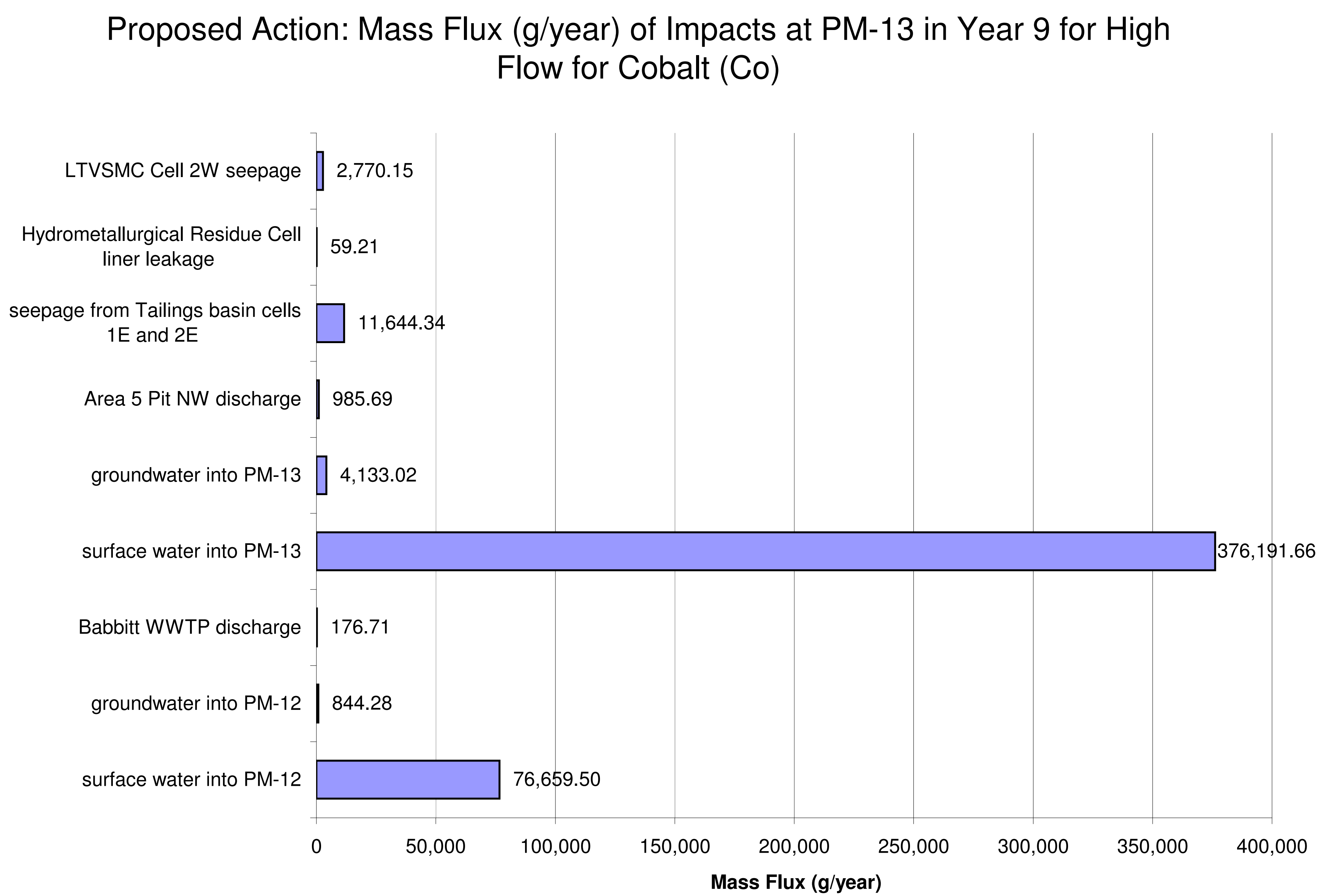


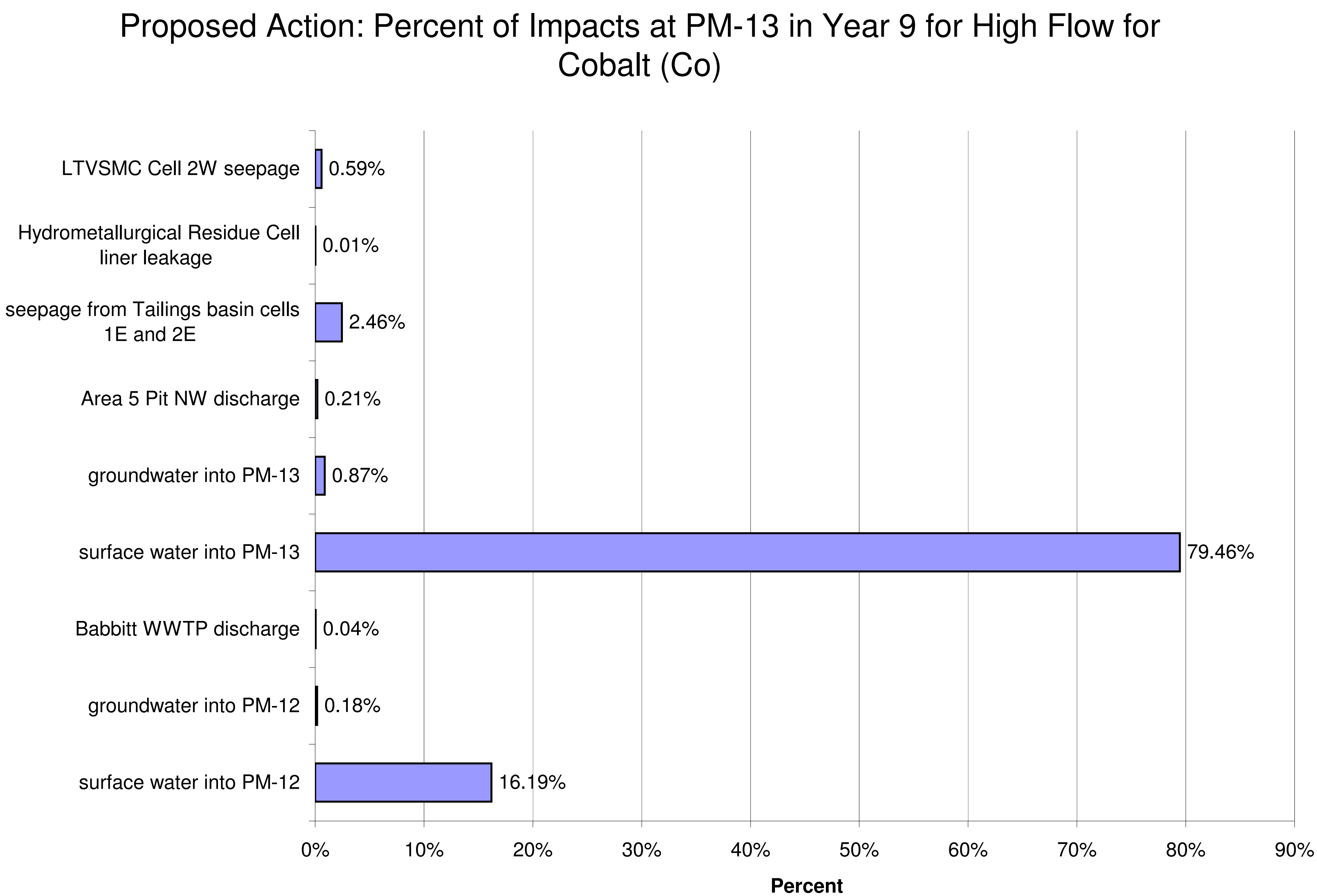
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Cobalt (Co)

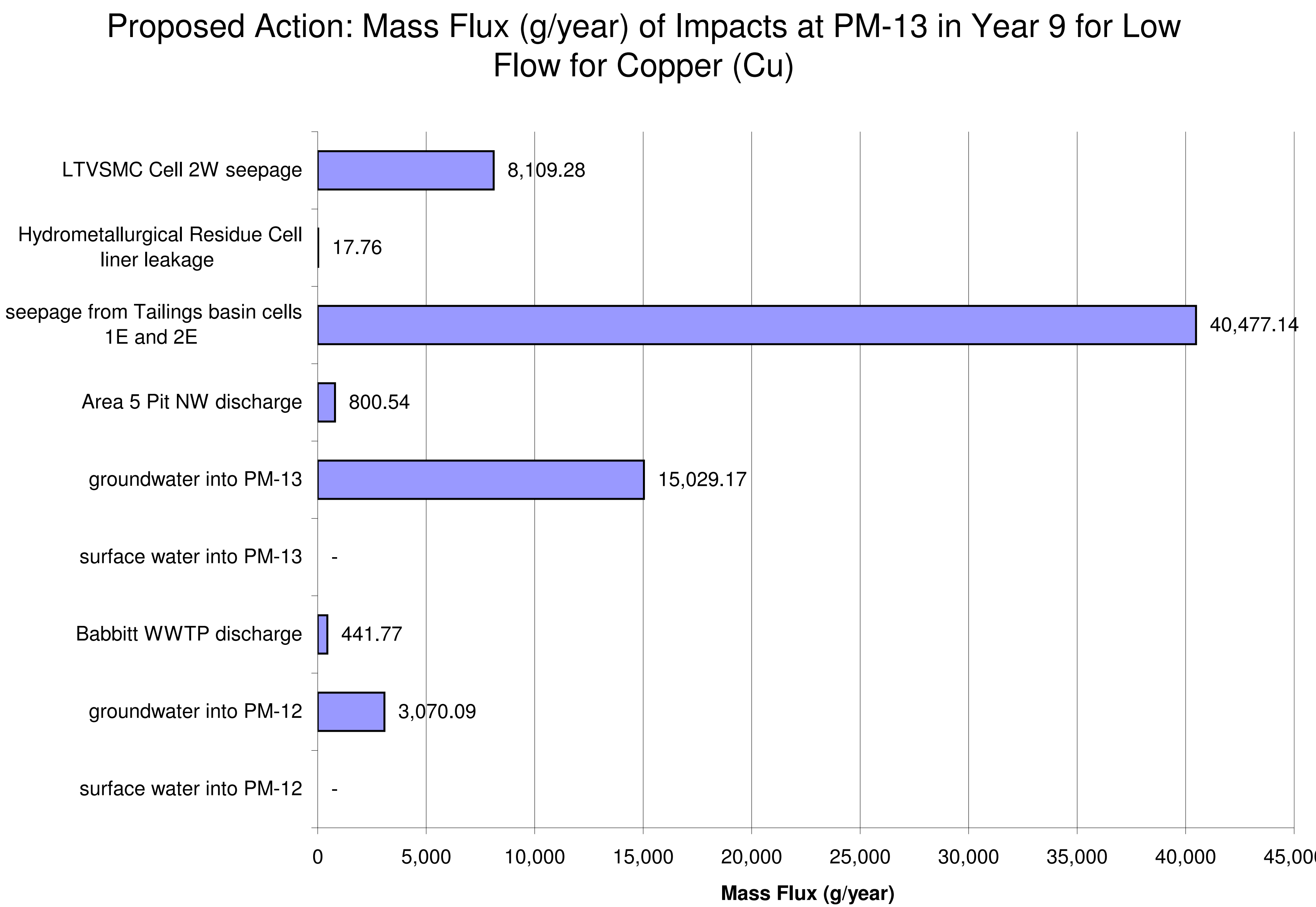



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
59.21
seepage from Tailings basin cells 1E and 2E
11,644.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

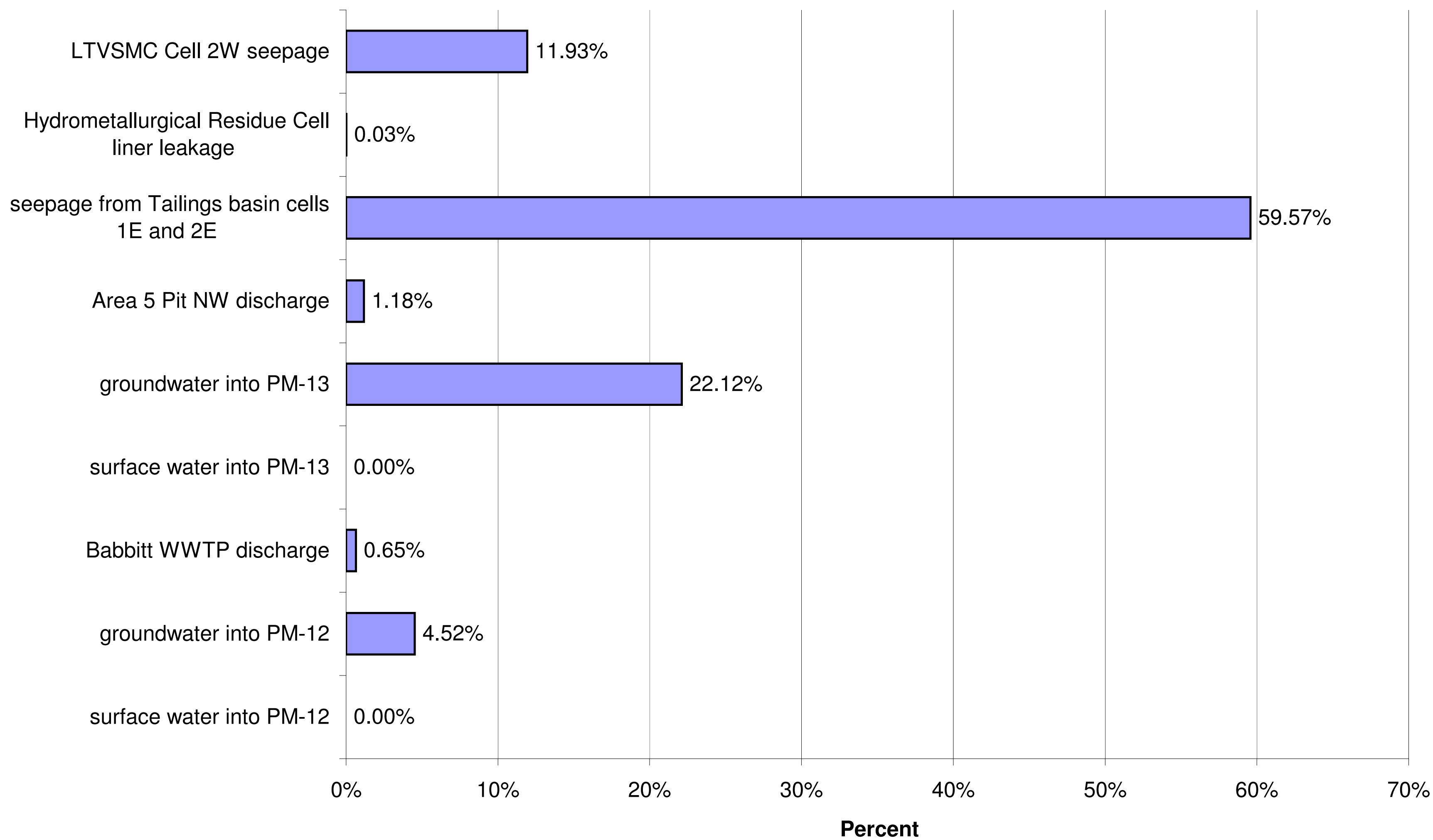

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
4.59%
Hydrometallurgical Residue Cell liner leakage
0.10%
seepage from Tailings basin cells 1E and 2E
19.31%
Area 5 Pit NW discharge
1.63%
groundwater into PM-13
6.85%
surface water into PM-13
54.63%
Babbitt WWTP discharge
0.29%
groundwater into PM-12
1.40%
surface water into PM-12
11.20%
0%
10%
20%
30%
40%
50%
60%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
59.21
seepage from Tailings basin cells 1E and 2E
11,644.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

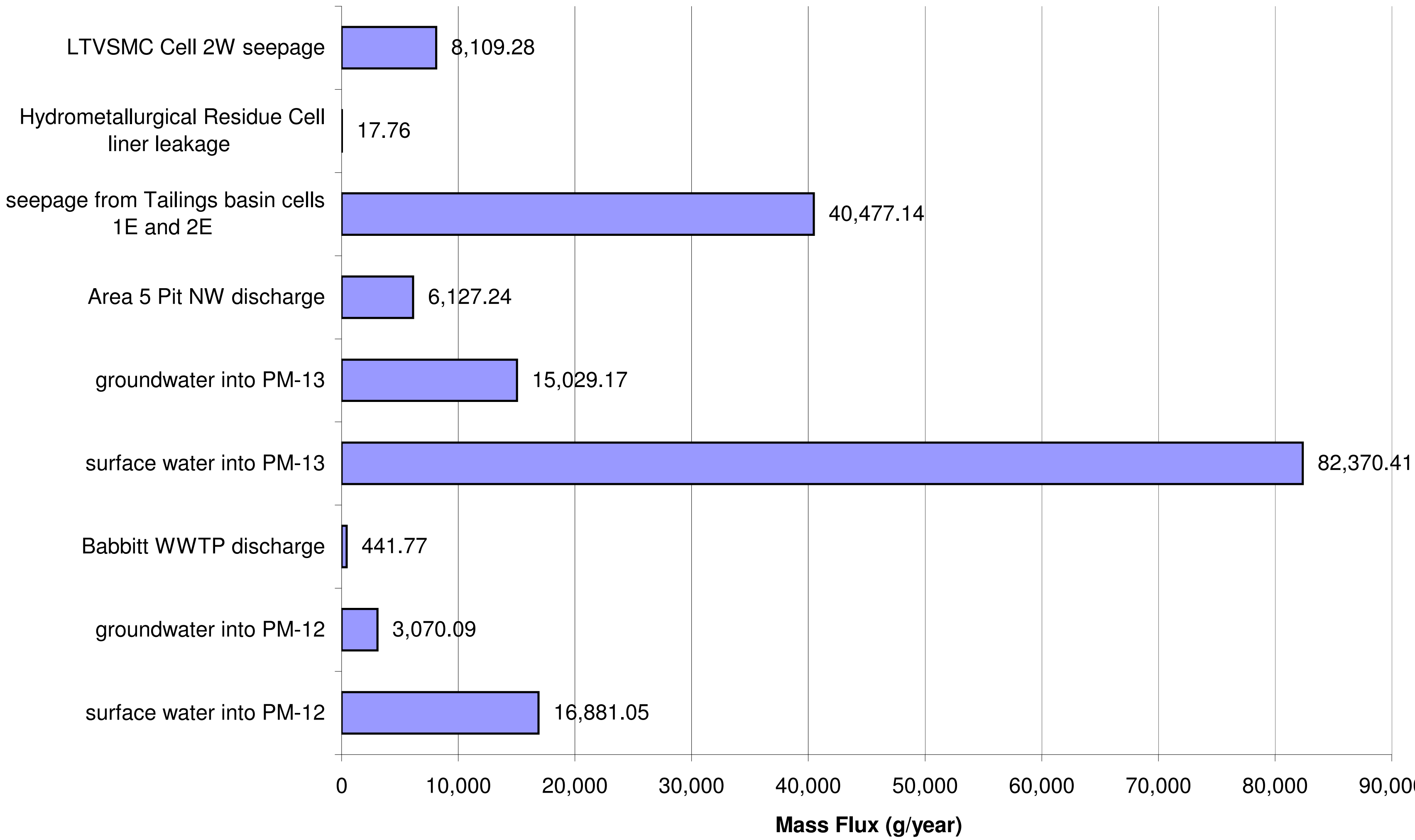

Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.59%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings basin cells 1E and 2E
2.46%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.87%
surface water into PM-13
79.46%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.19%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
17.76
seepage from Tailings basin cells 1E and 2E
40,477.14
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

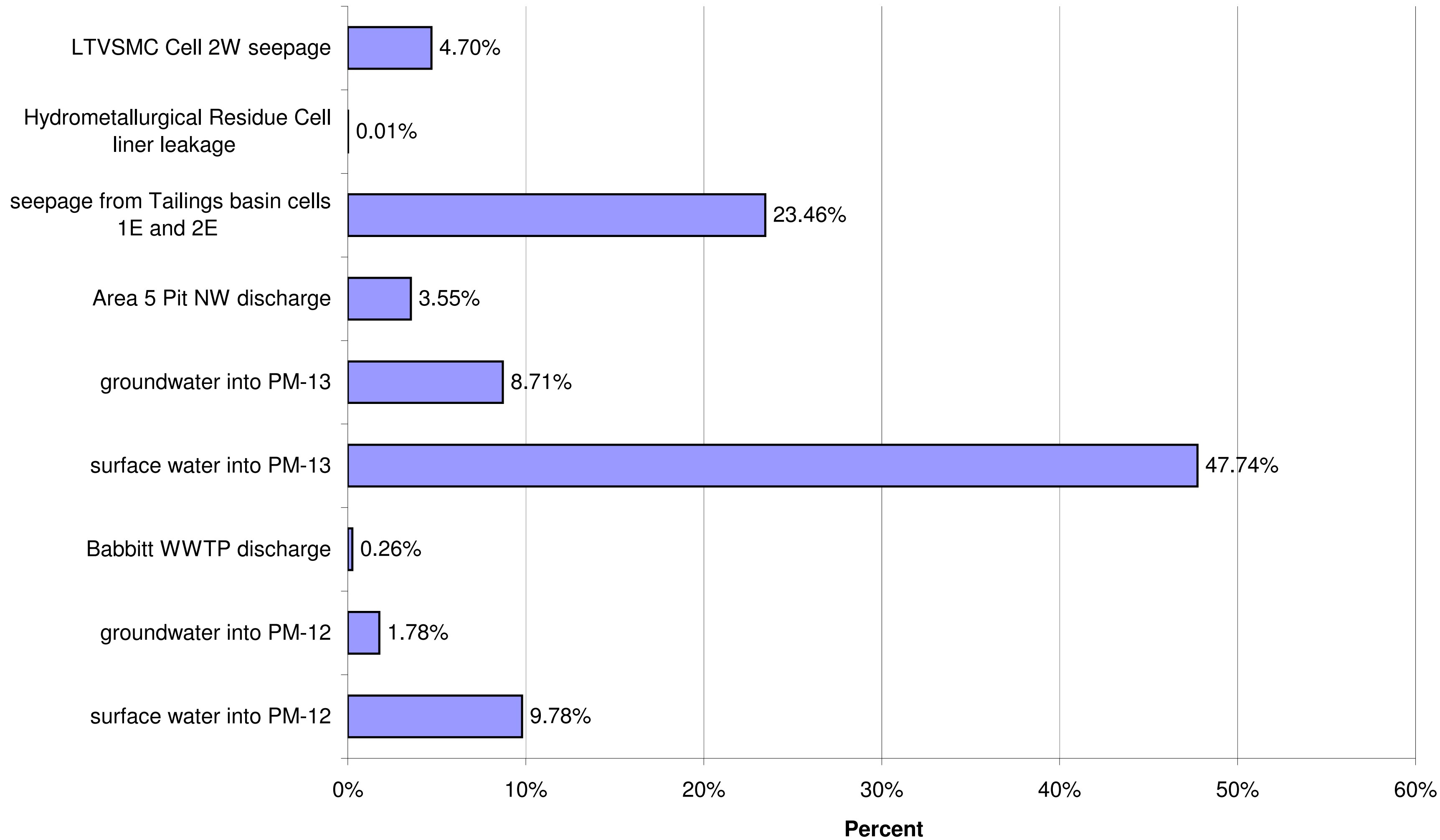
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Copper (Cu)

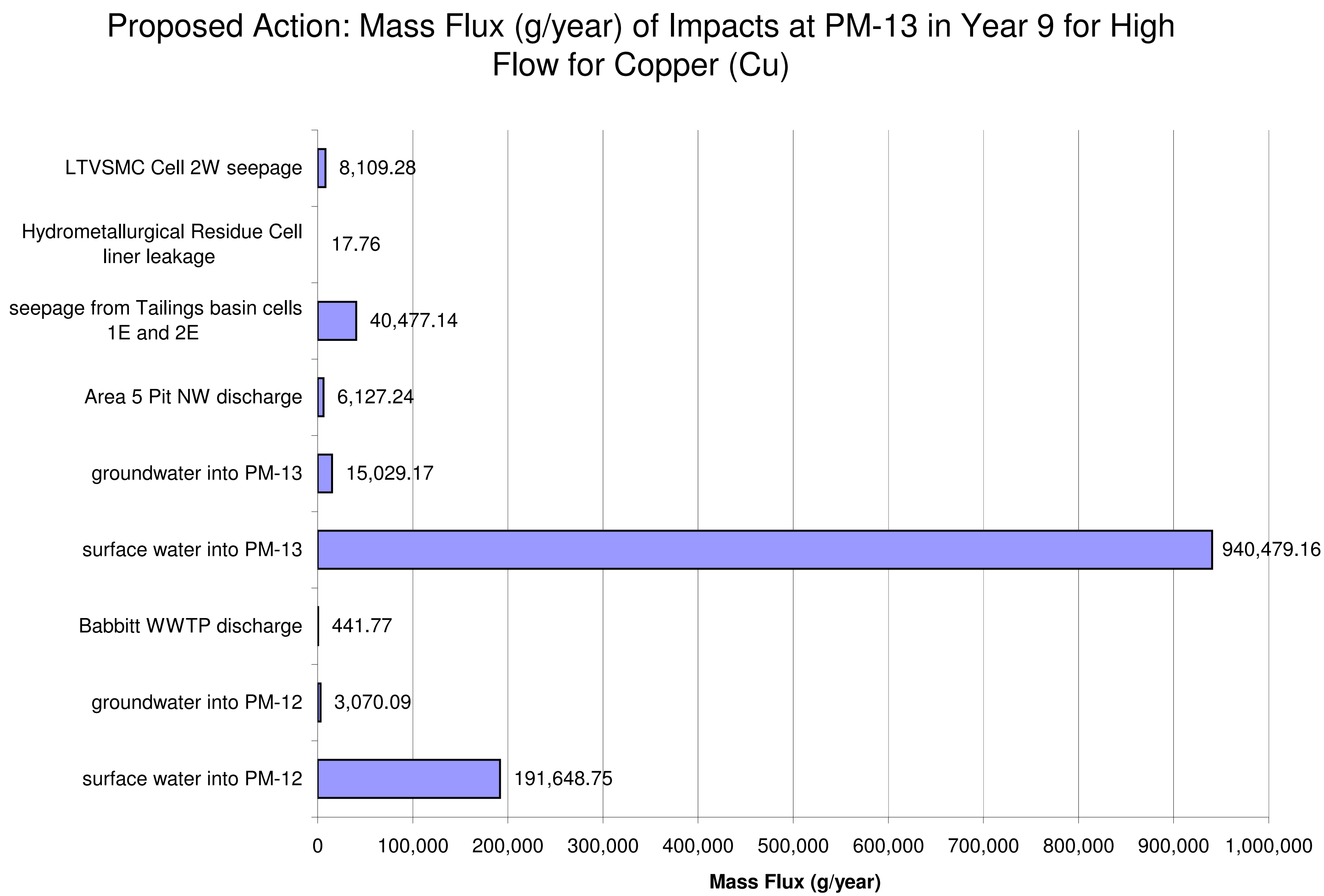


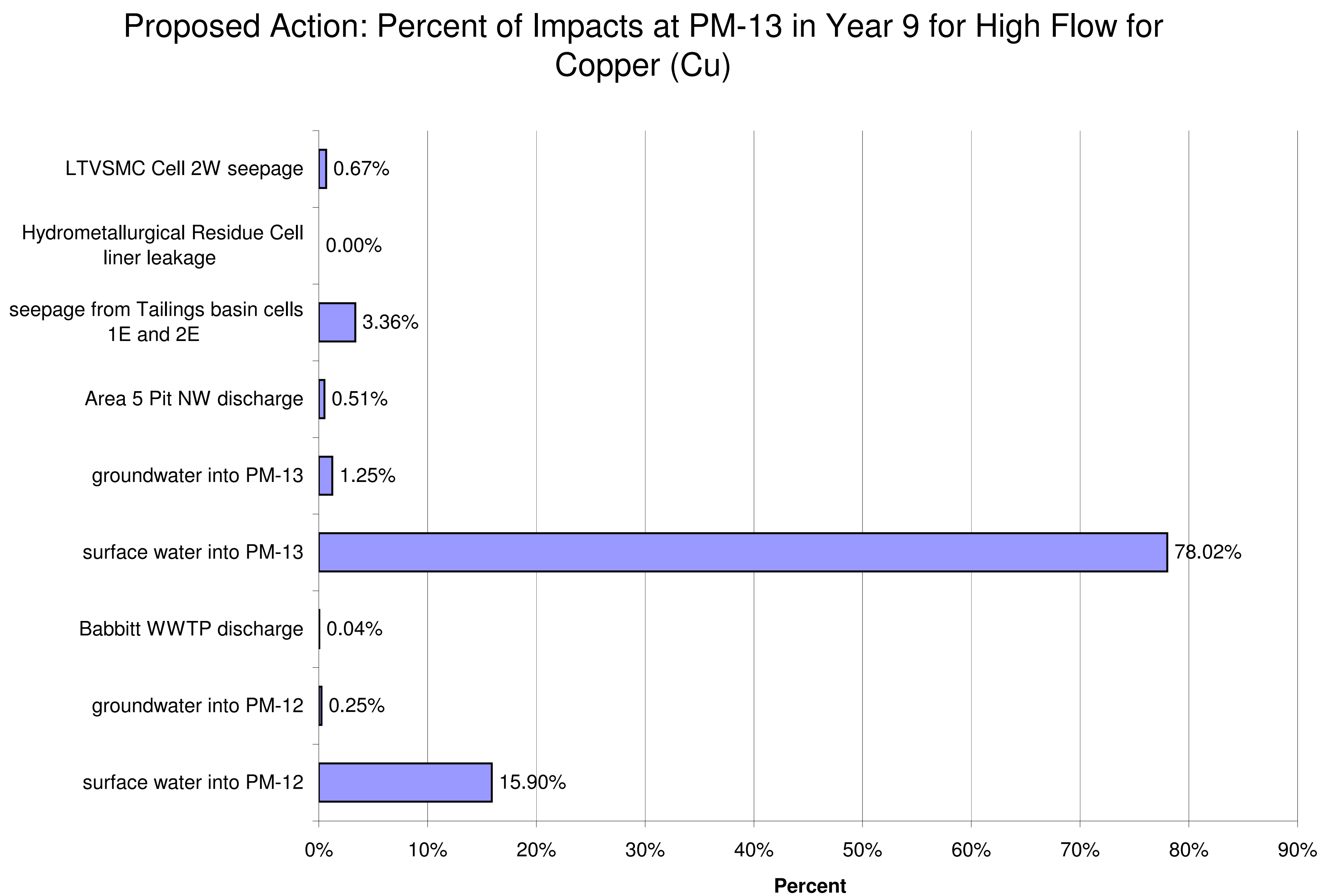
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Copper (Cu)

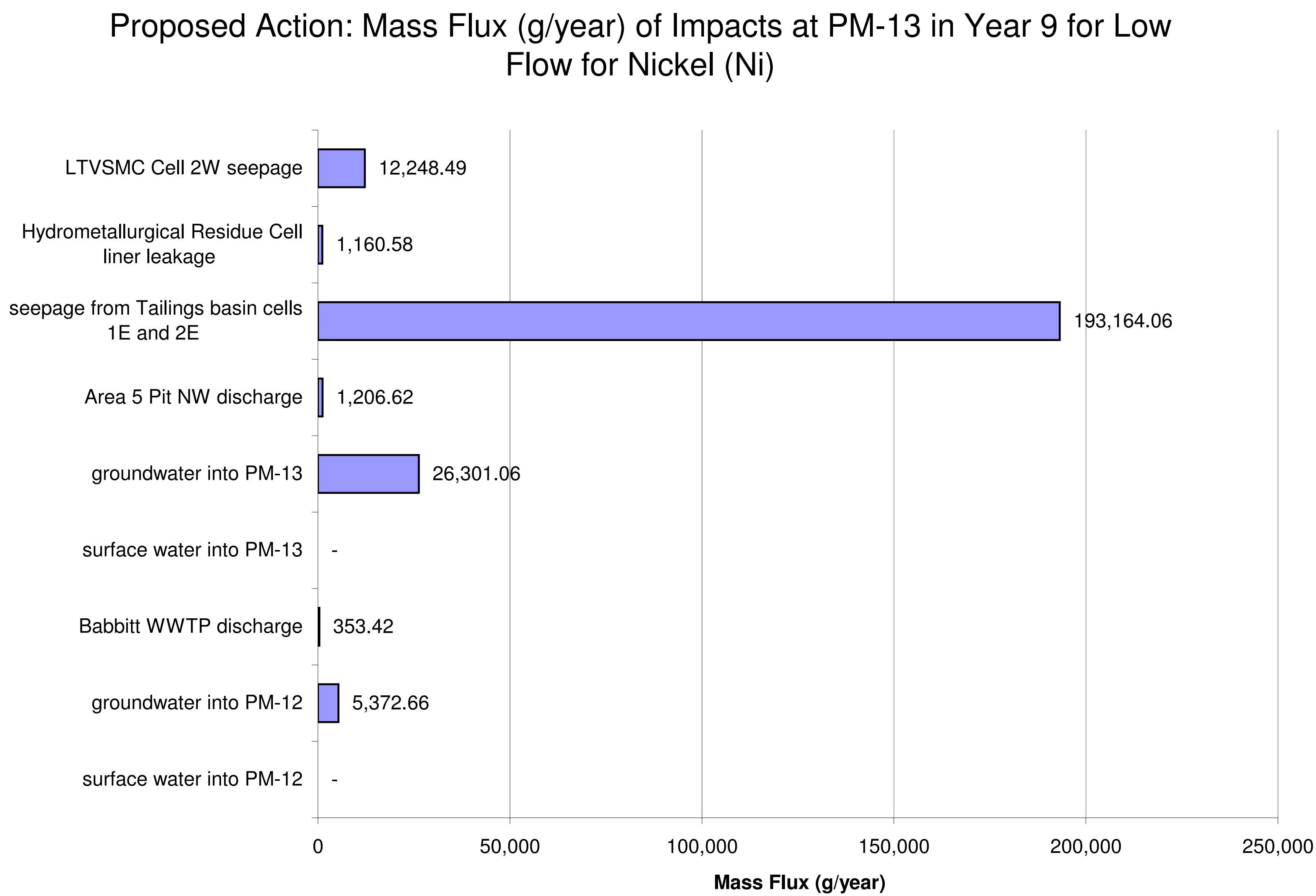


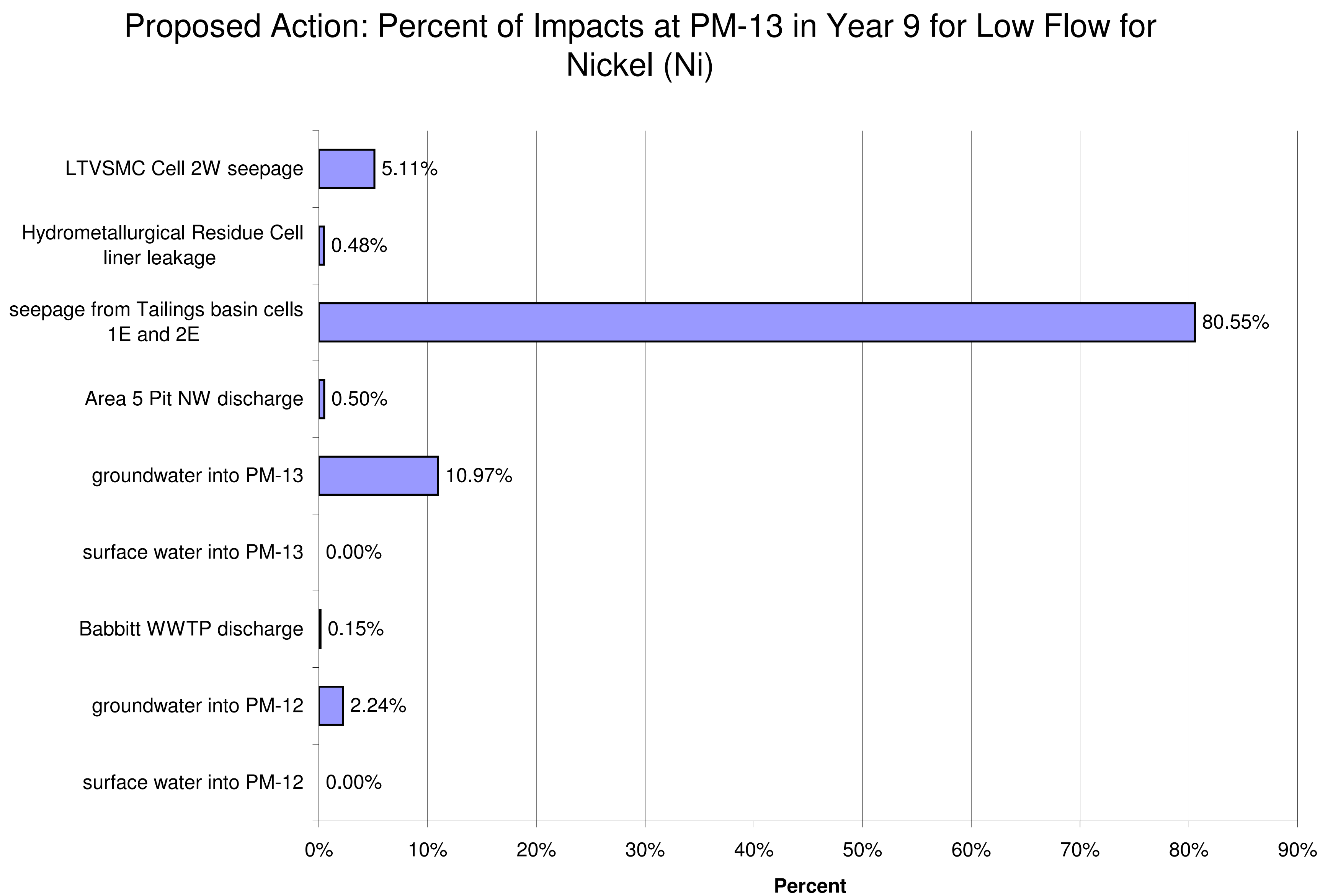
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Copper (Cu)

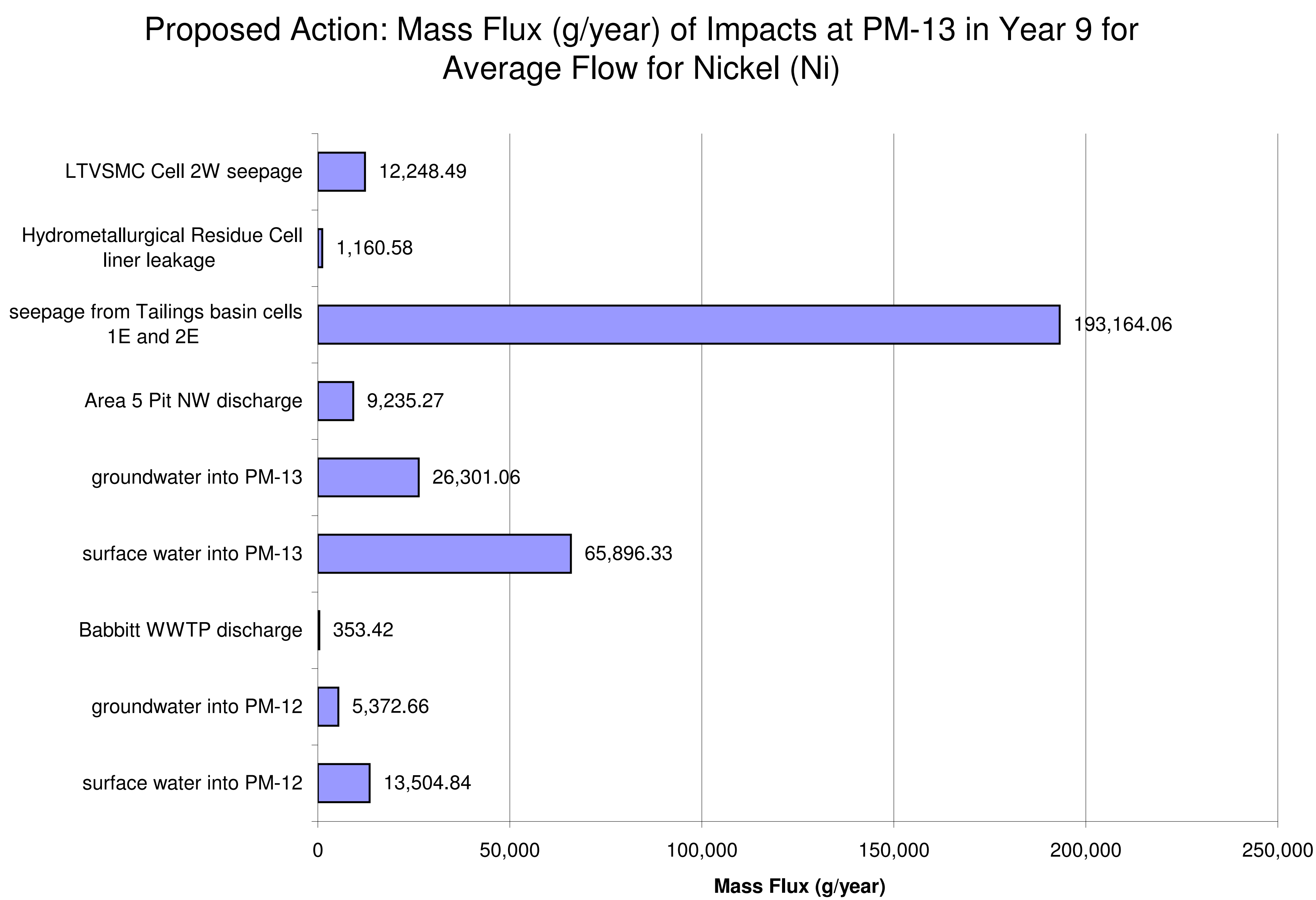


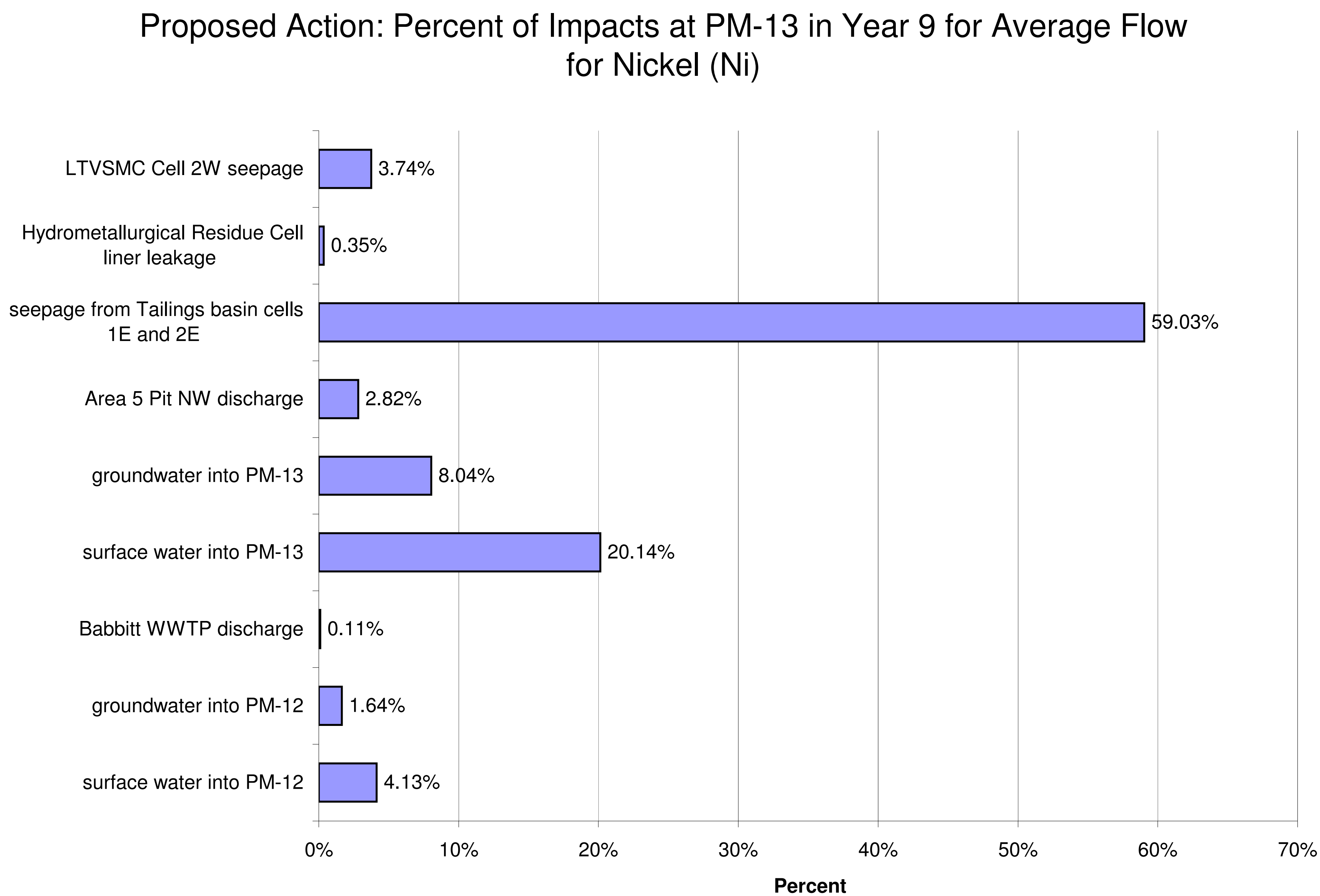

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
17.76
seepage from Tailings basin cells 1E and 2E
40,477.14
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

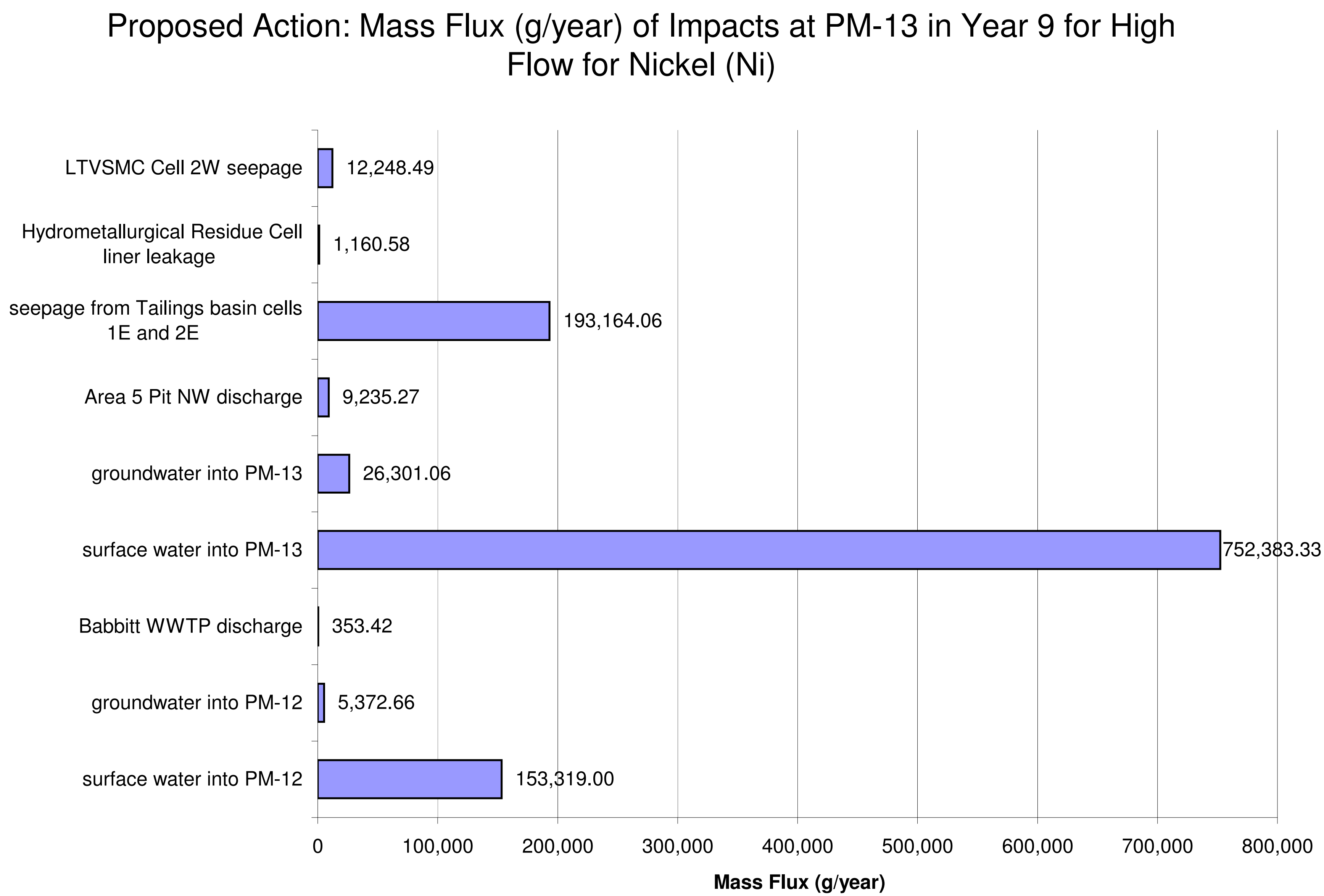

Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.67%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings basin cells 1E and 2E
3.36%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.25%
surface water into PM-13
78.02%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.25%
surface water into PM-12
15.90%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,160.58
seepage from Tailings basin cells 1E and 2E
193,164.06
Area 5 Pit NW discharge
1,206.62
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
-
0
50,000
100,000
150,000
200,000
250,000
Mass Flux (g/year)

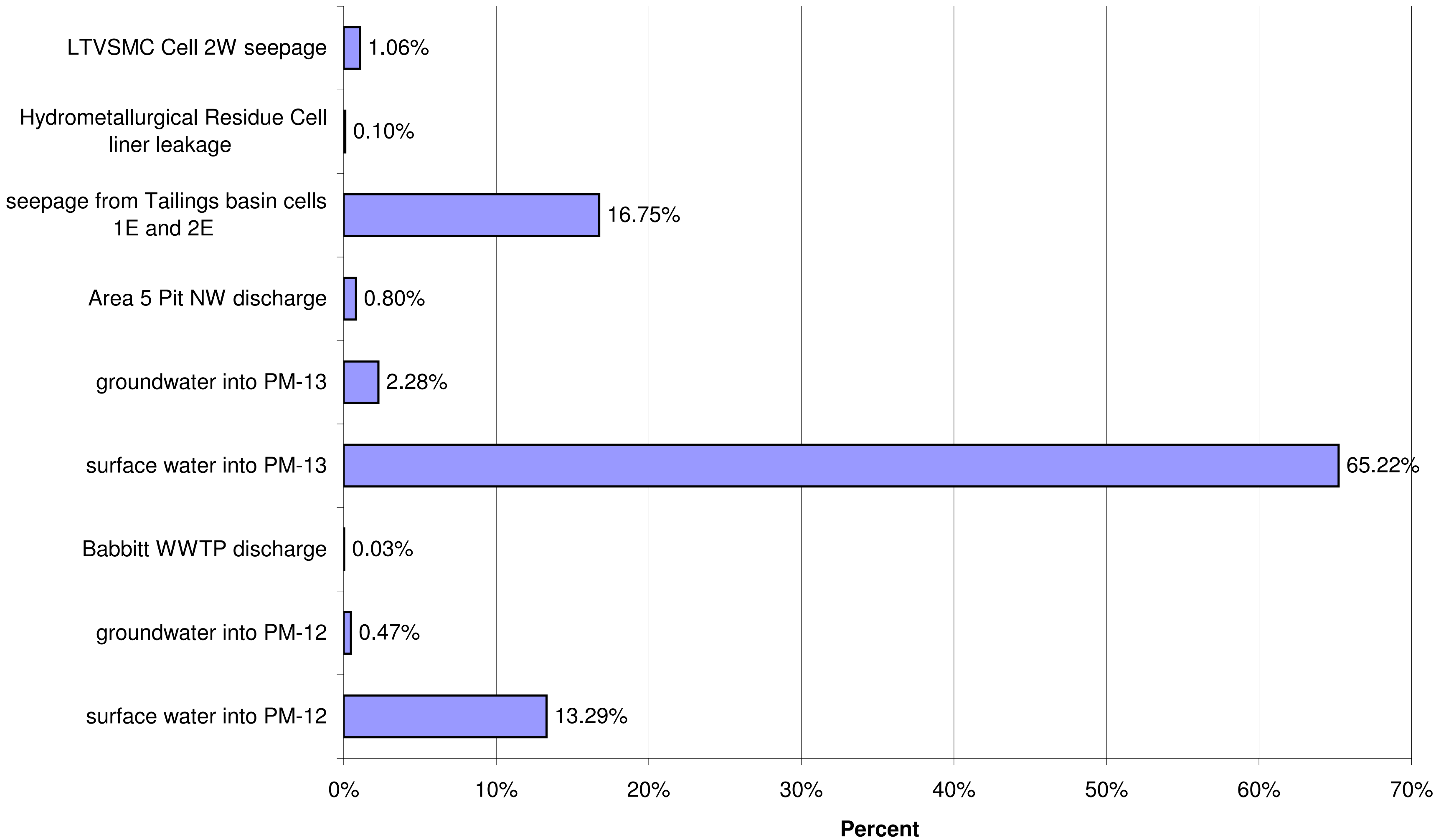

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5.11%
Hydrometallurgical Residue Cell liner leakage
0.48%
seepage from Tailings basin cells 1E and 2E
80.55%
Area 5 Pit NW discharge
0.50%
groundwater into PM-13
10.97%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.15%
groundwater into PM-12
2.24%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

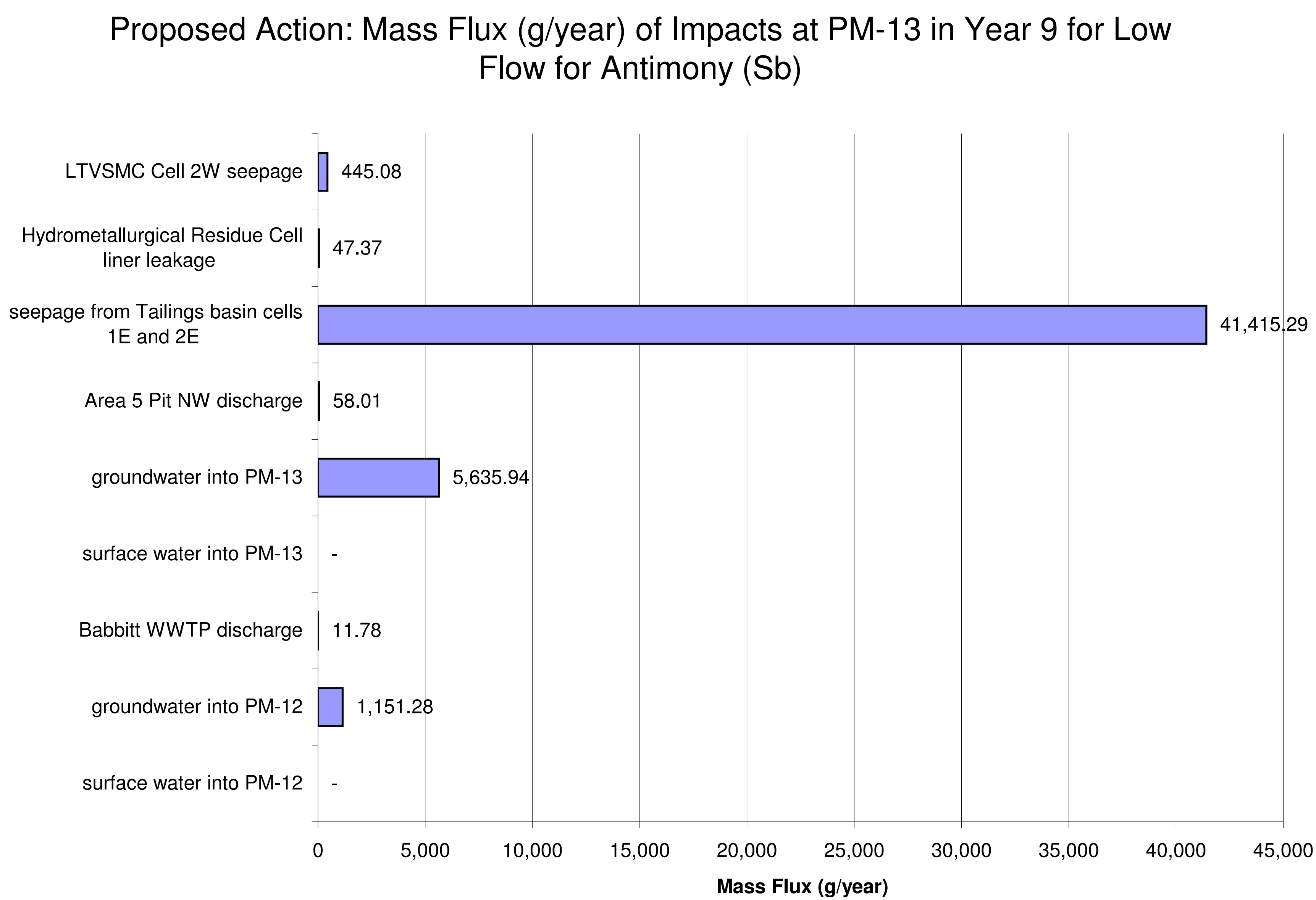

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,160.58
seepage from Tailings basin cells 1E and 2E
193,164.06
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
50,000
100,000
150,000
200,000
250,000
Mass Flux (g/year)

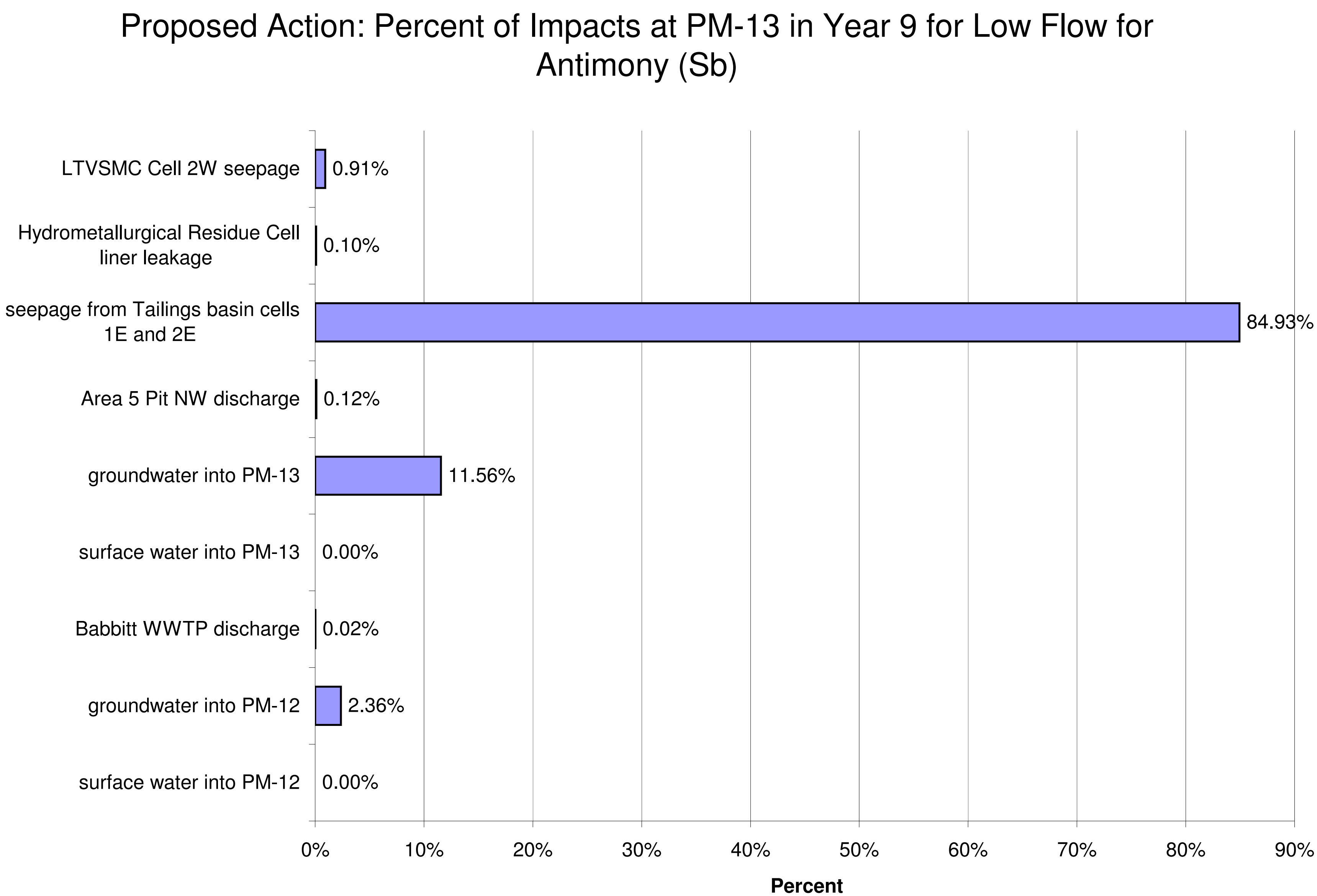

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
3.74%
Hydrometallurgical Residue Cell liner leakage
0.35%
seepage from Tailings basin cells 1E and 2E
59.03%
Area 5 Pit NW discharge
2.82%
groundwater into PM-13
8.04%
surface water into PM-13
20.14%
Babbitt WWTP discharge
0.11%
groundwater into PM-12
1.64%
surface water into PM-12
4.13%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,160.58
seepage from Tailings basin cells 1E and 2E
193,164.06
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

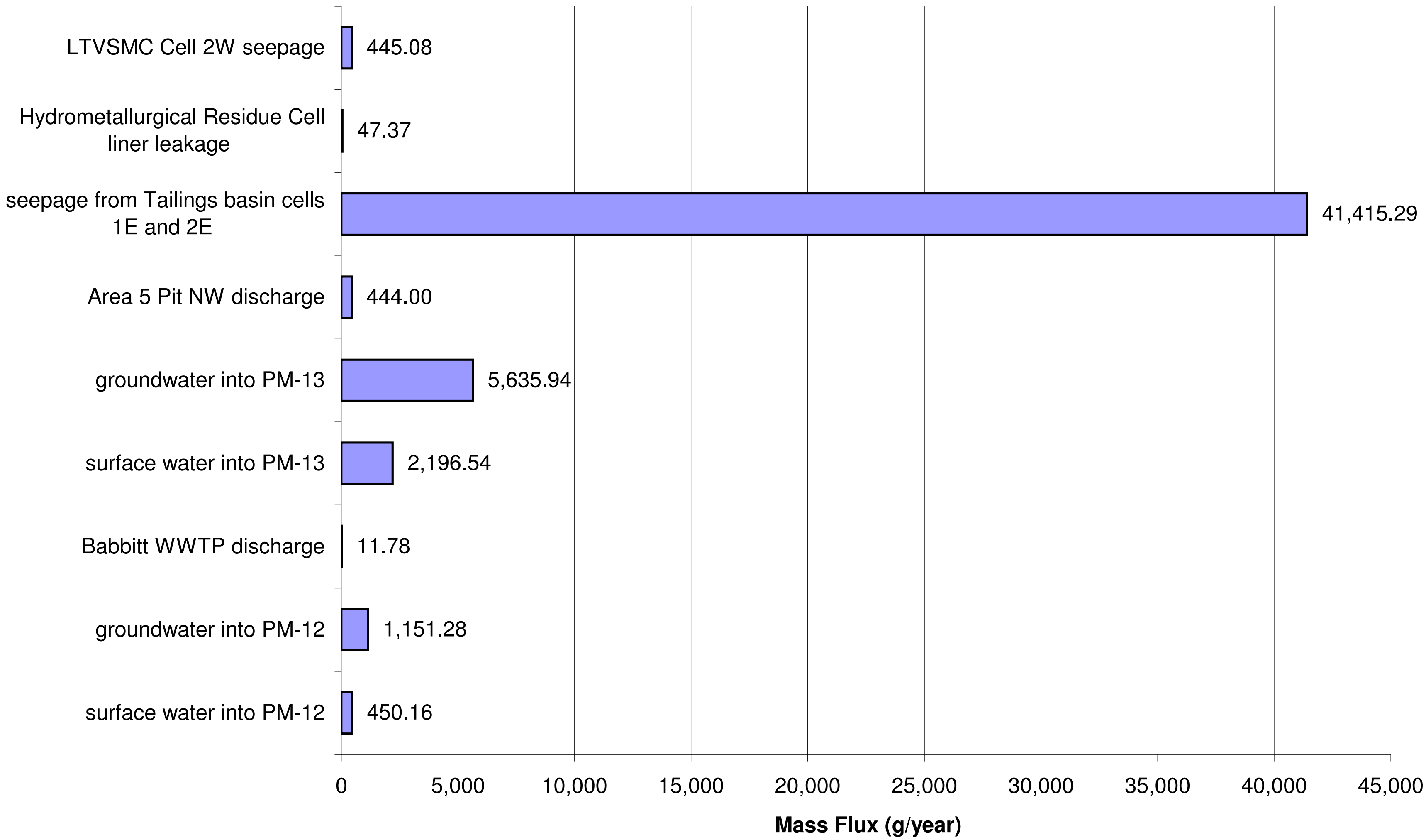
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Nickel (Ni)

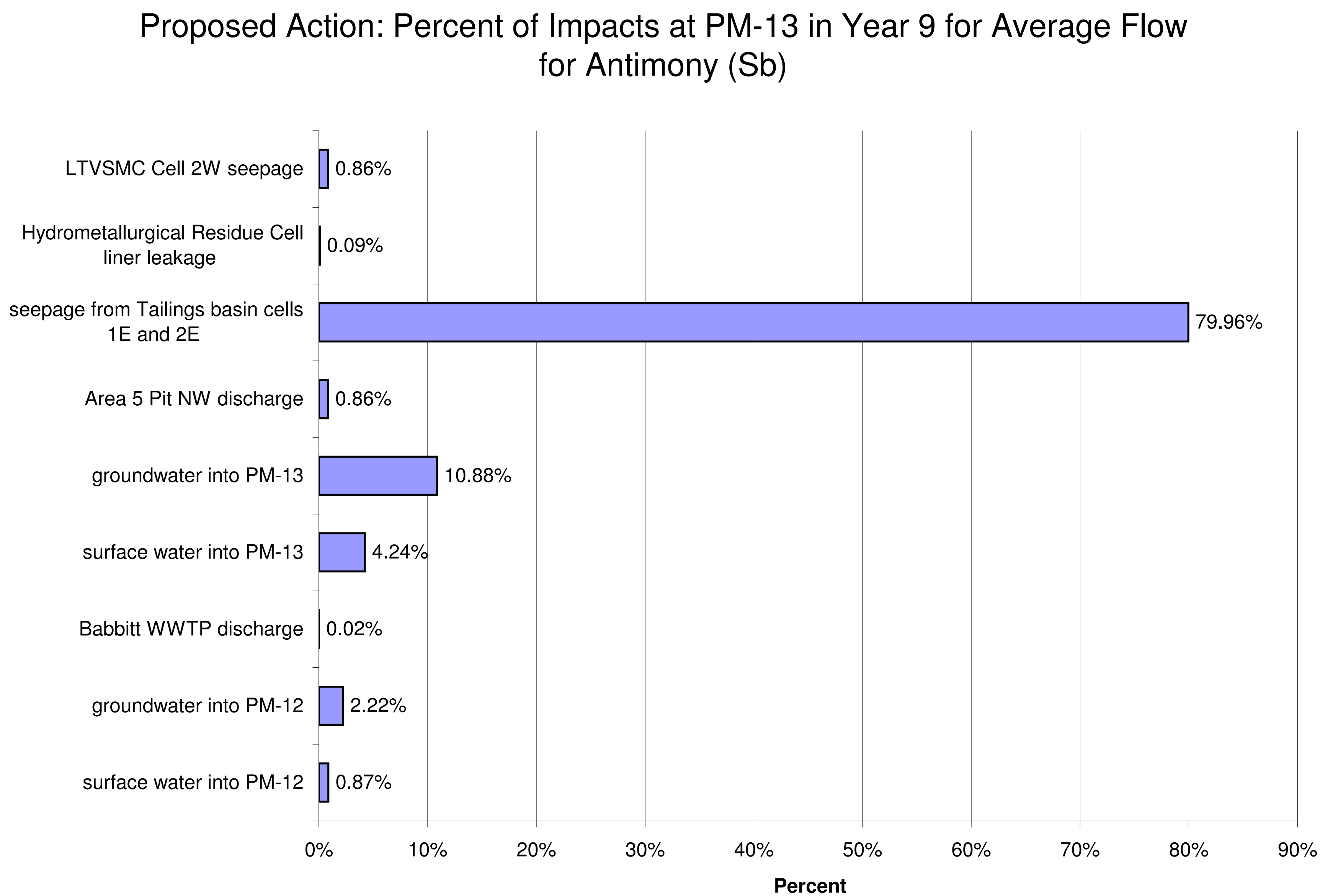



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
41,415.29
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

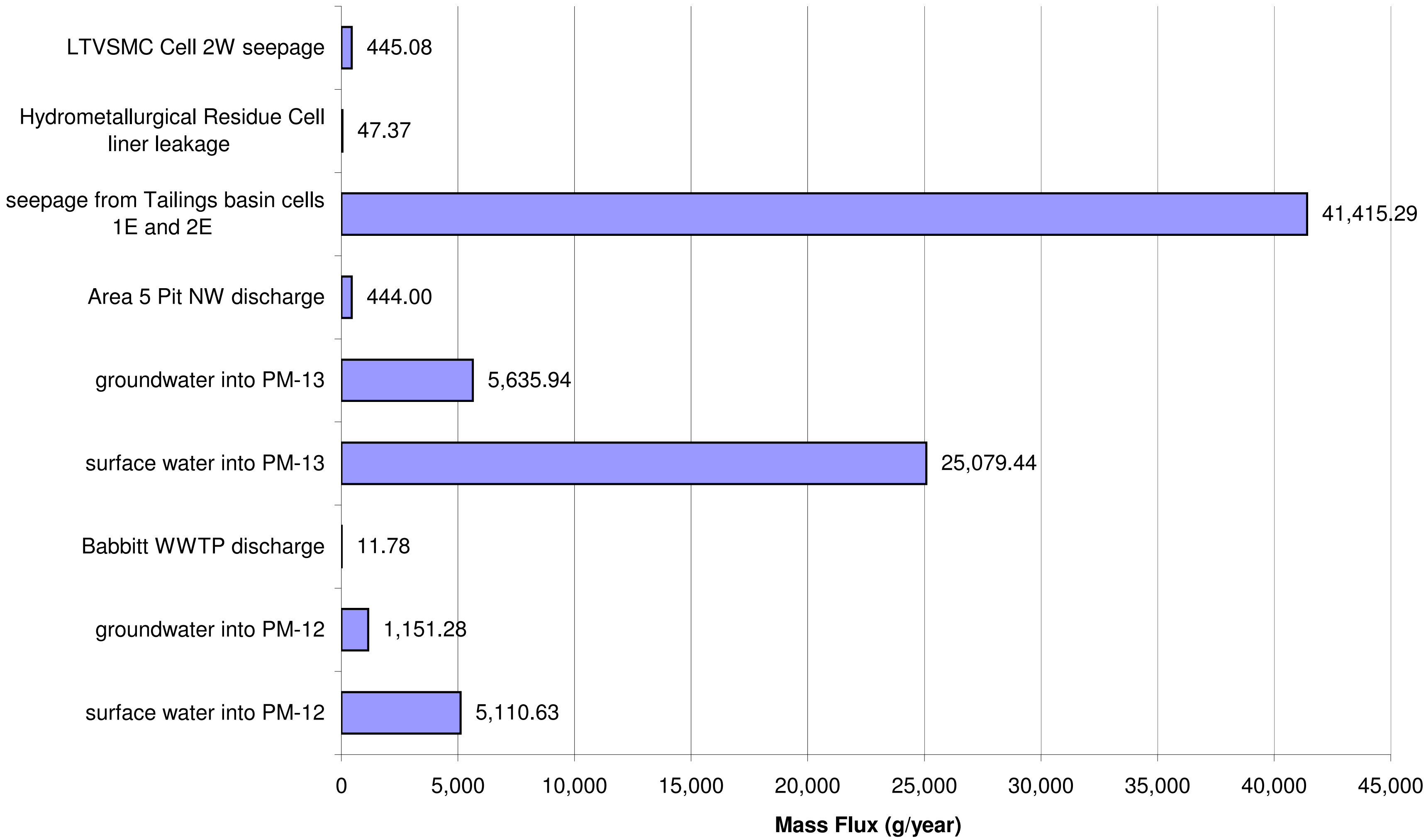

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.91%
Hydrometallurgical Residue Cell liner leakage
0.10%
seepage from Tailings basin cells 1E and 2E
84.93%
Area 5 Pit NW discharge
0.12%
groundwater into PM-13
11.56%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
2.36%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Antimony (Sb)

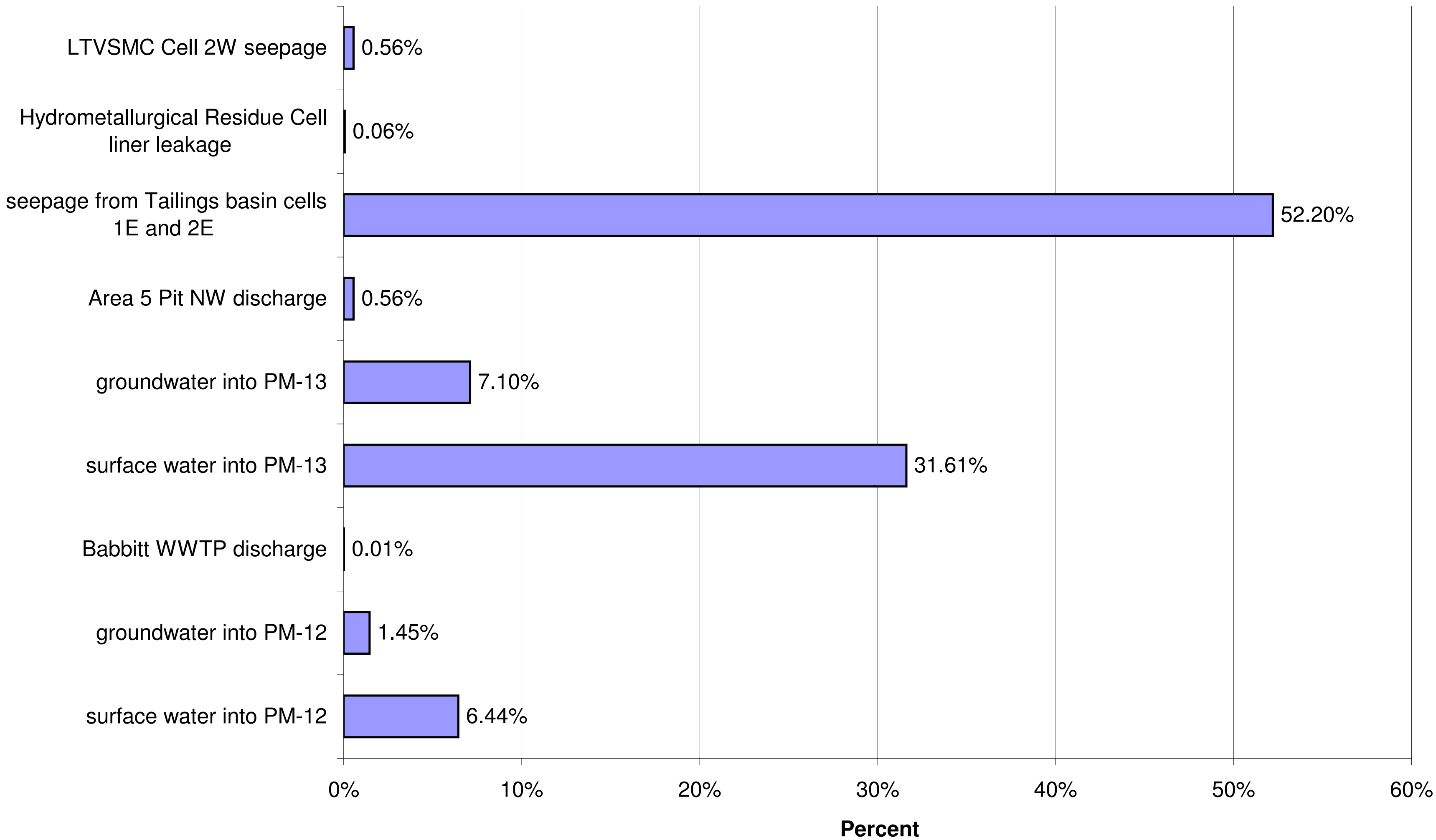



Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.86%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings basin cells 1E and 2E
79.96%
Area 5 Pit NW discharge
0.86%
groundwater into PM-13
10.88%
surface water into PM-13
4.24%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
2.22%
surface water into PM-12
0.87%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

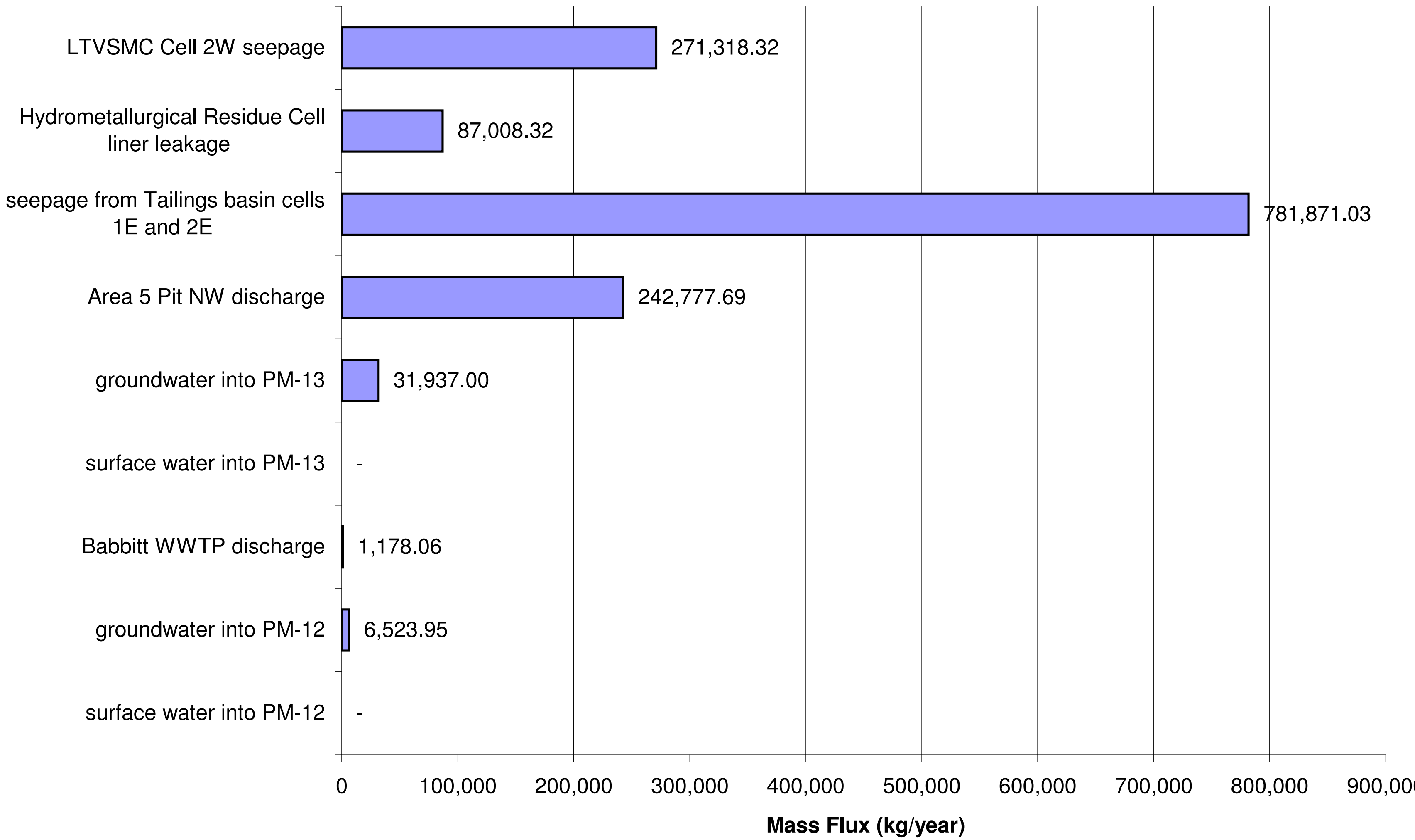
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Antimony (Sb)



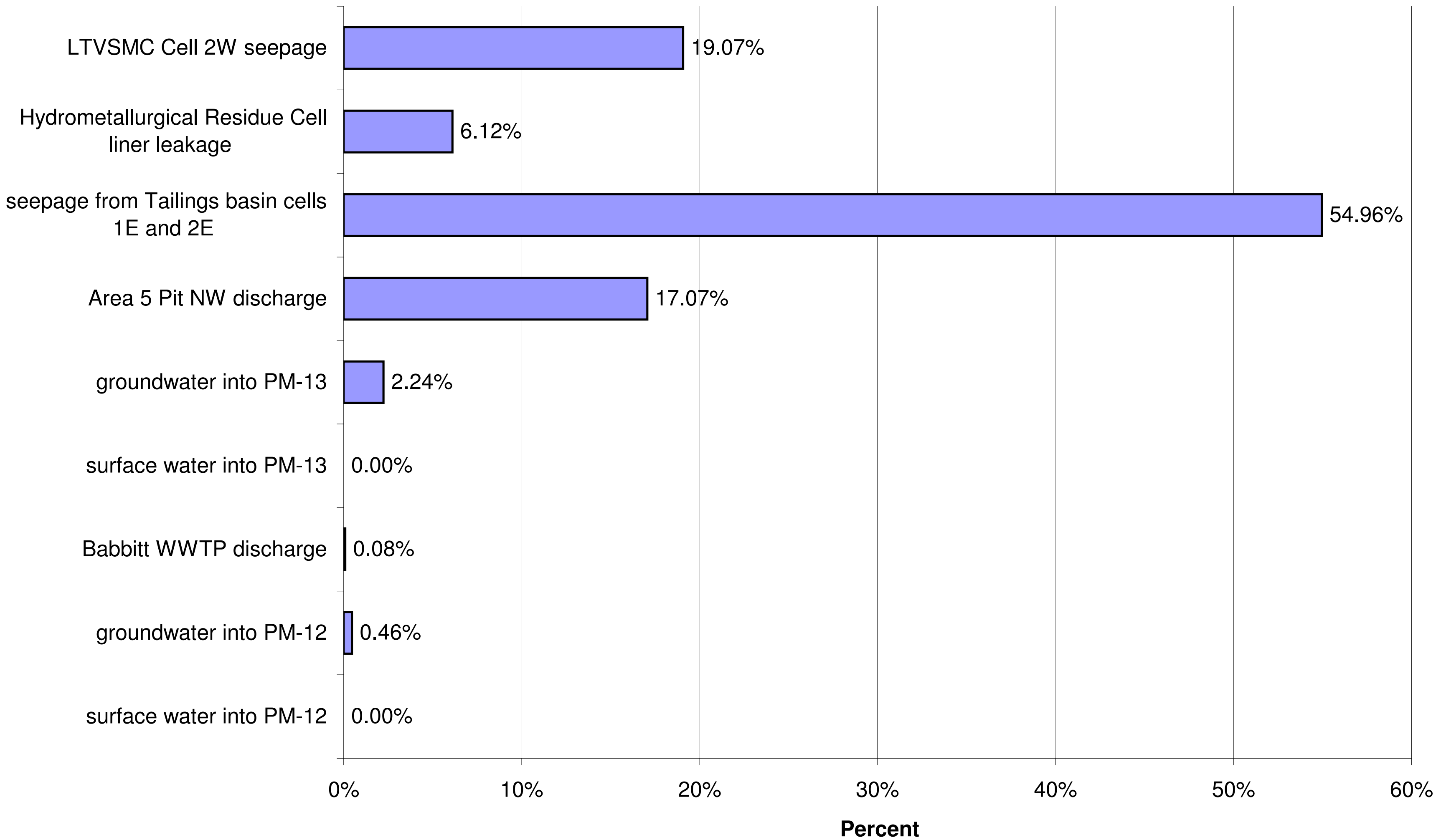
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Antimony (Sb)



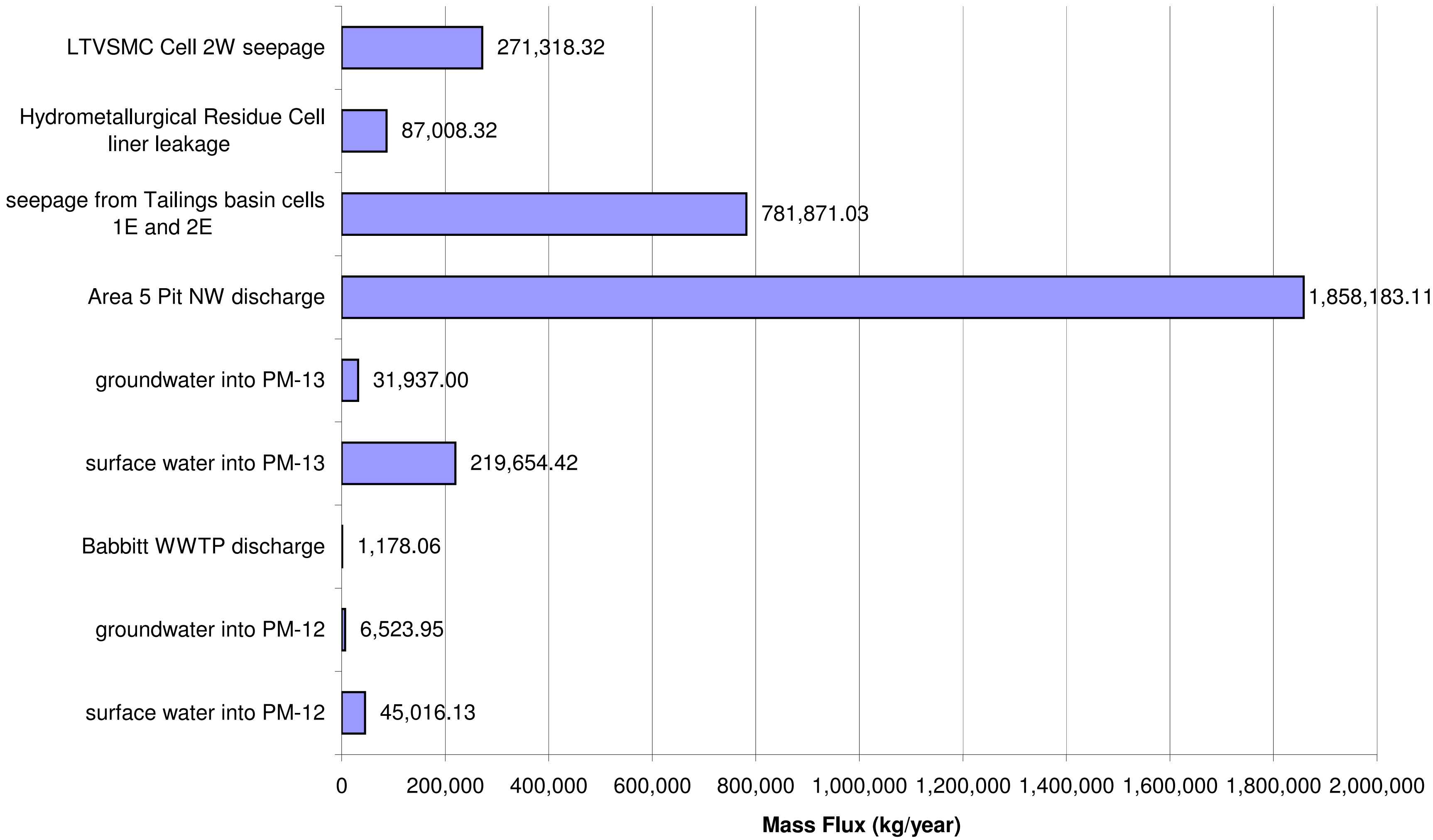
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 9 for Low Flow for Sulfate (SO_4)



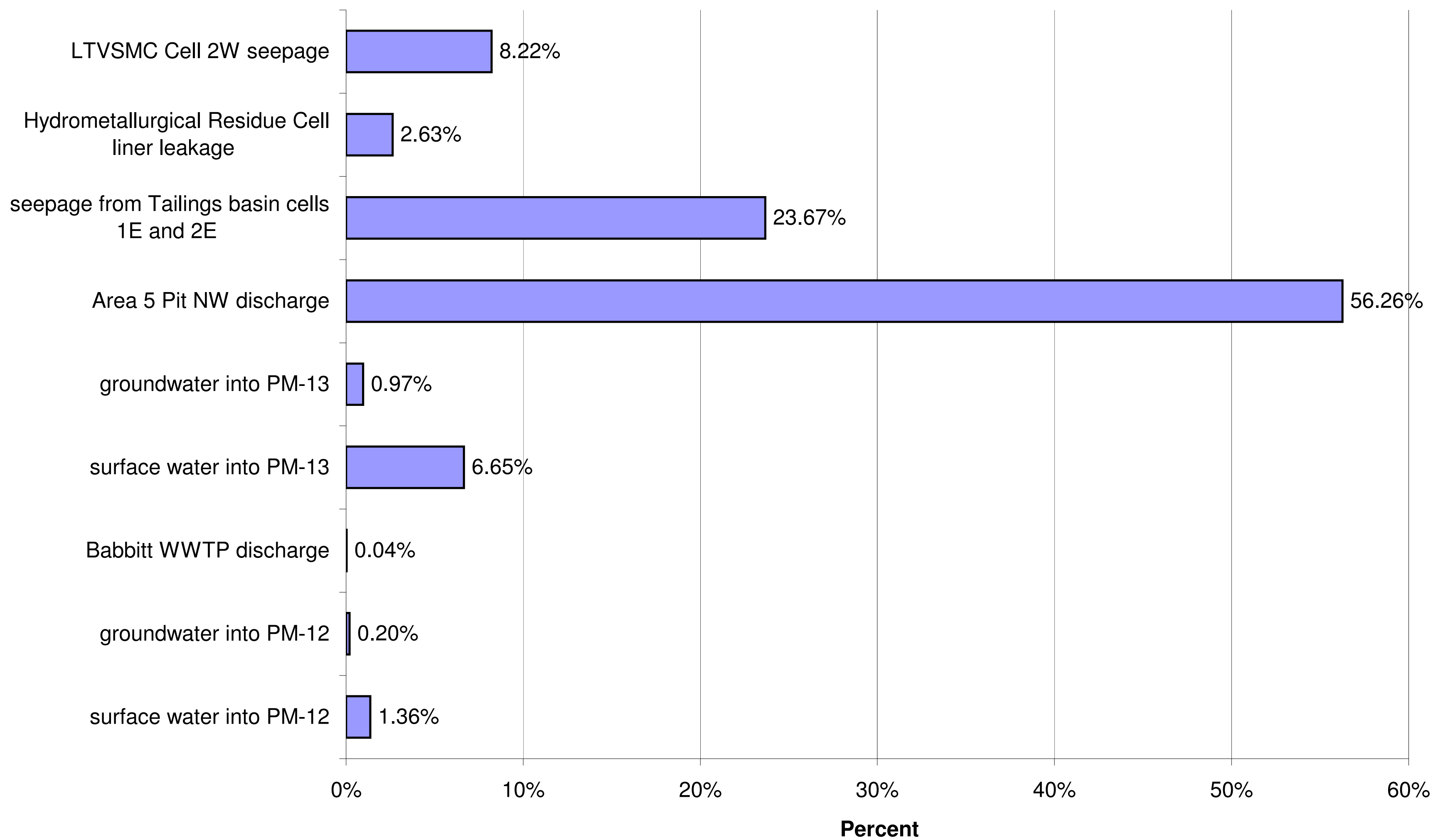
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Sulfate (SO_4)



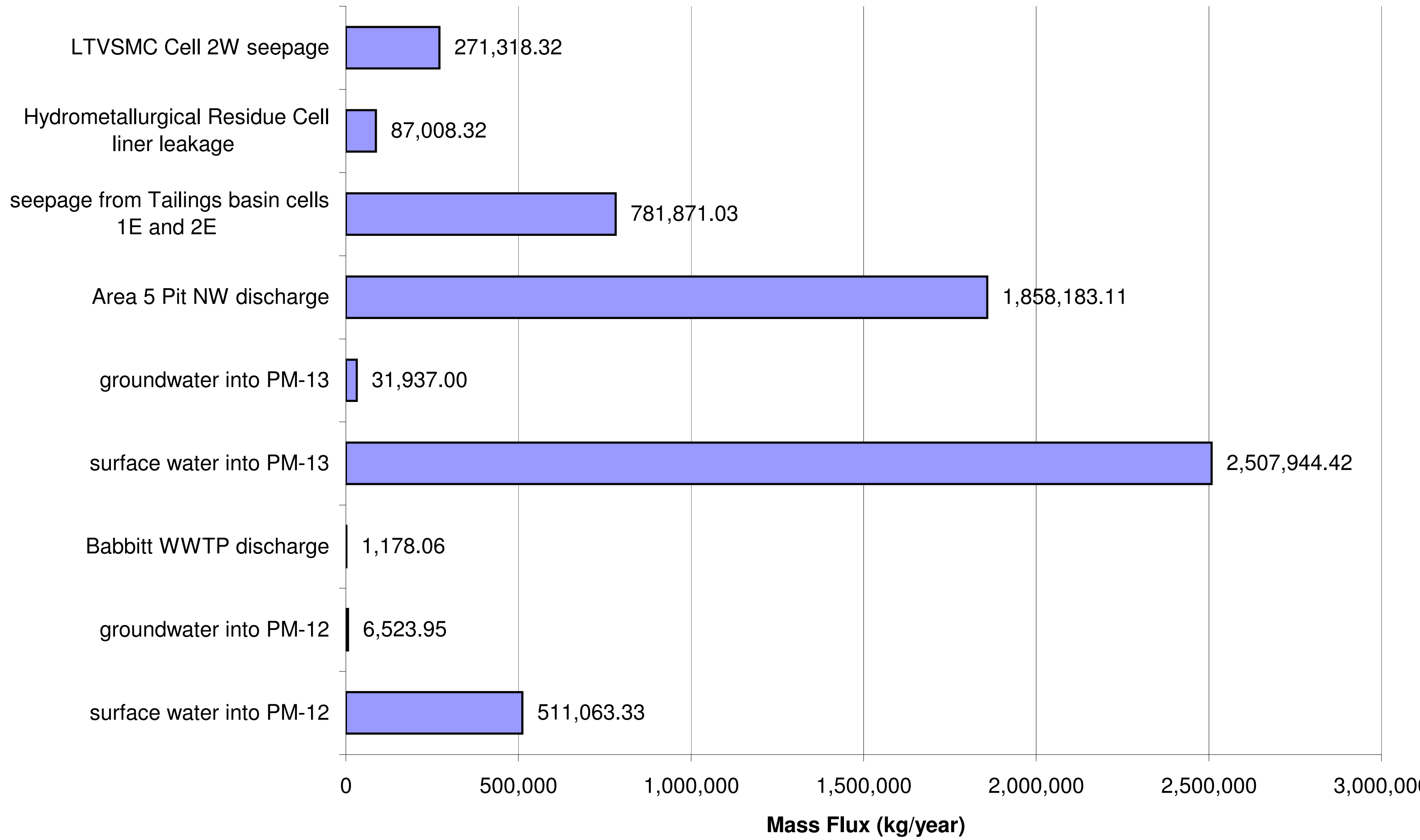
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 9 for Average Flow for Sulfate (SO_4)



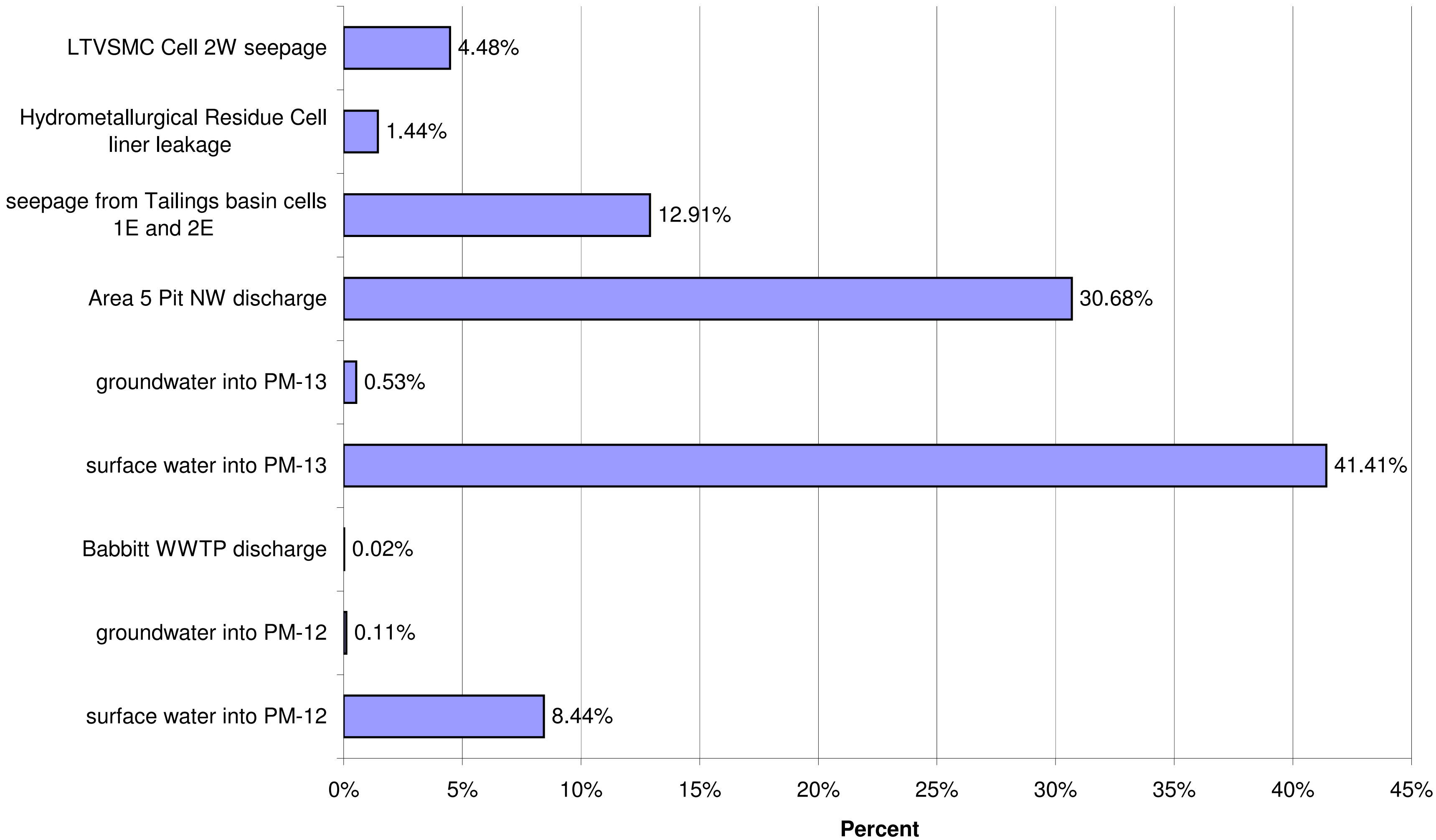
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Sulfate (SO_4)



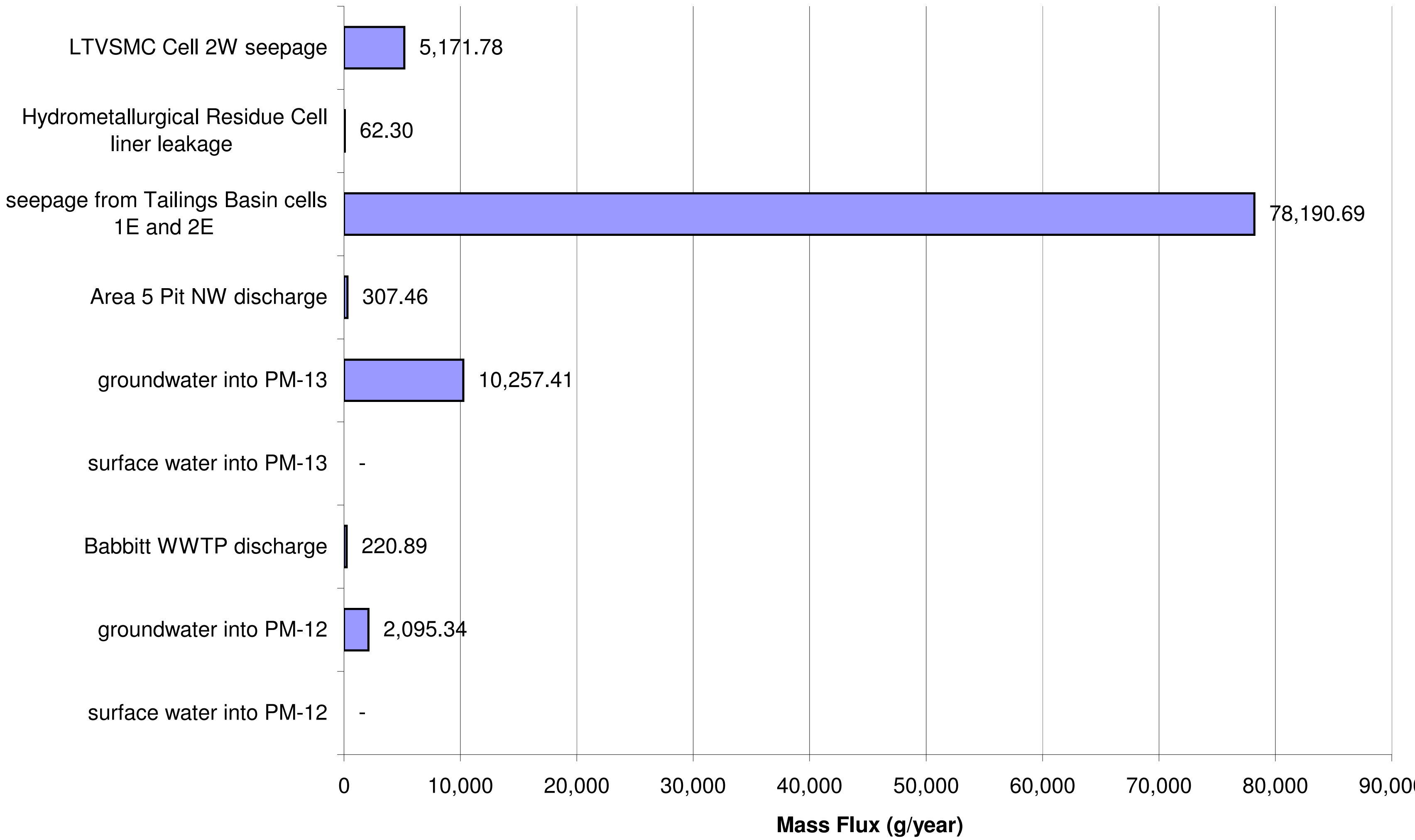
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 9 for High Flow for Sulfate (SO_4)



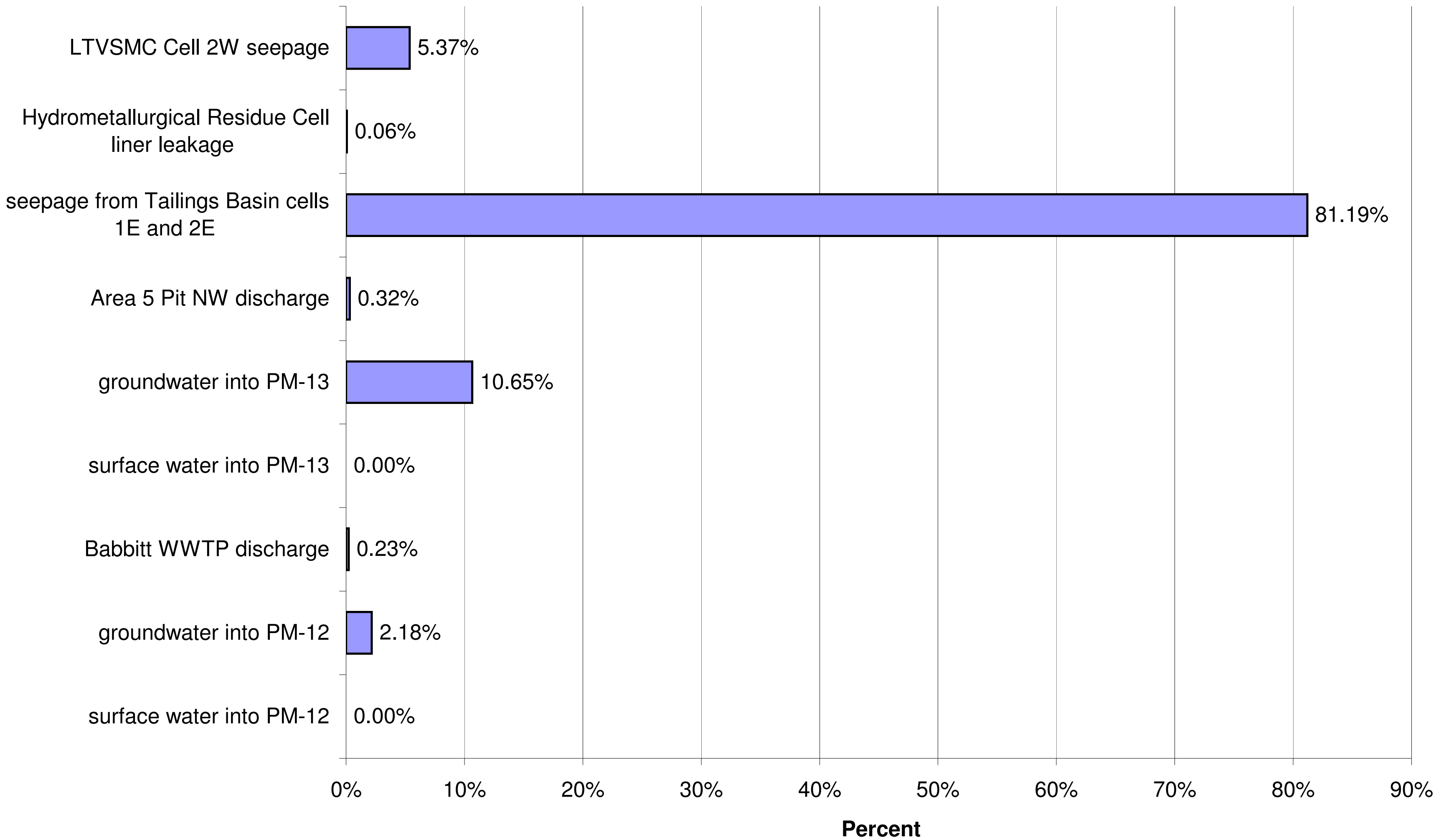
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Sulfate (SO_4)

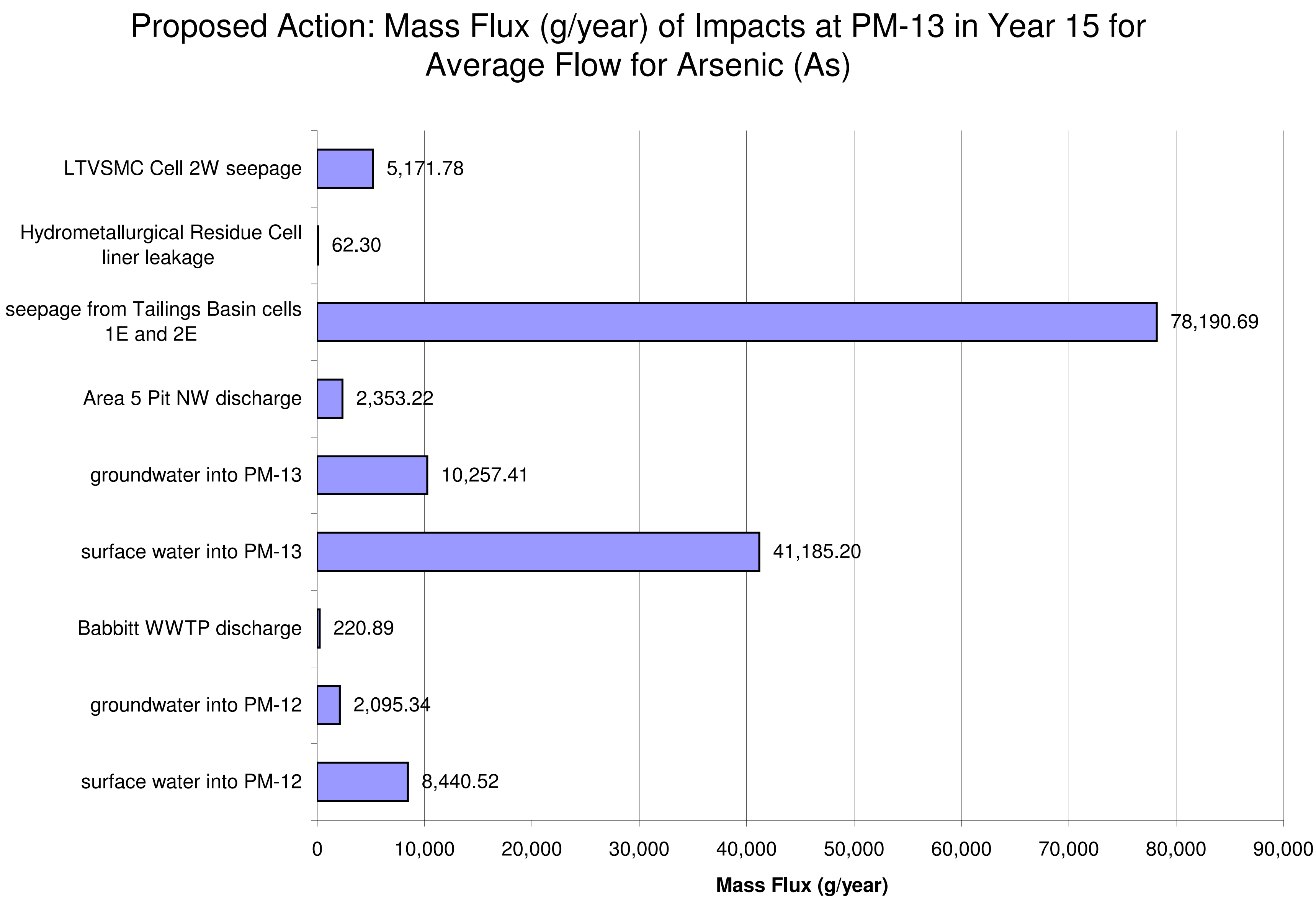


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)

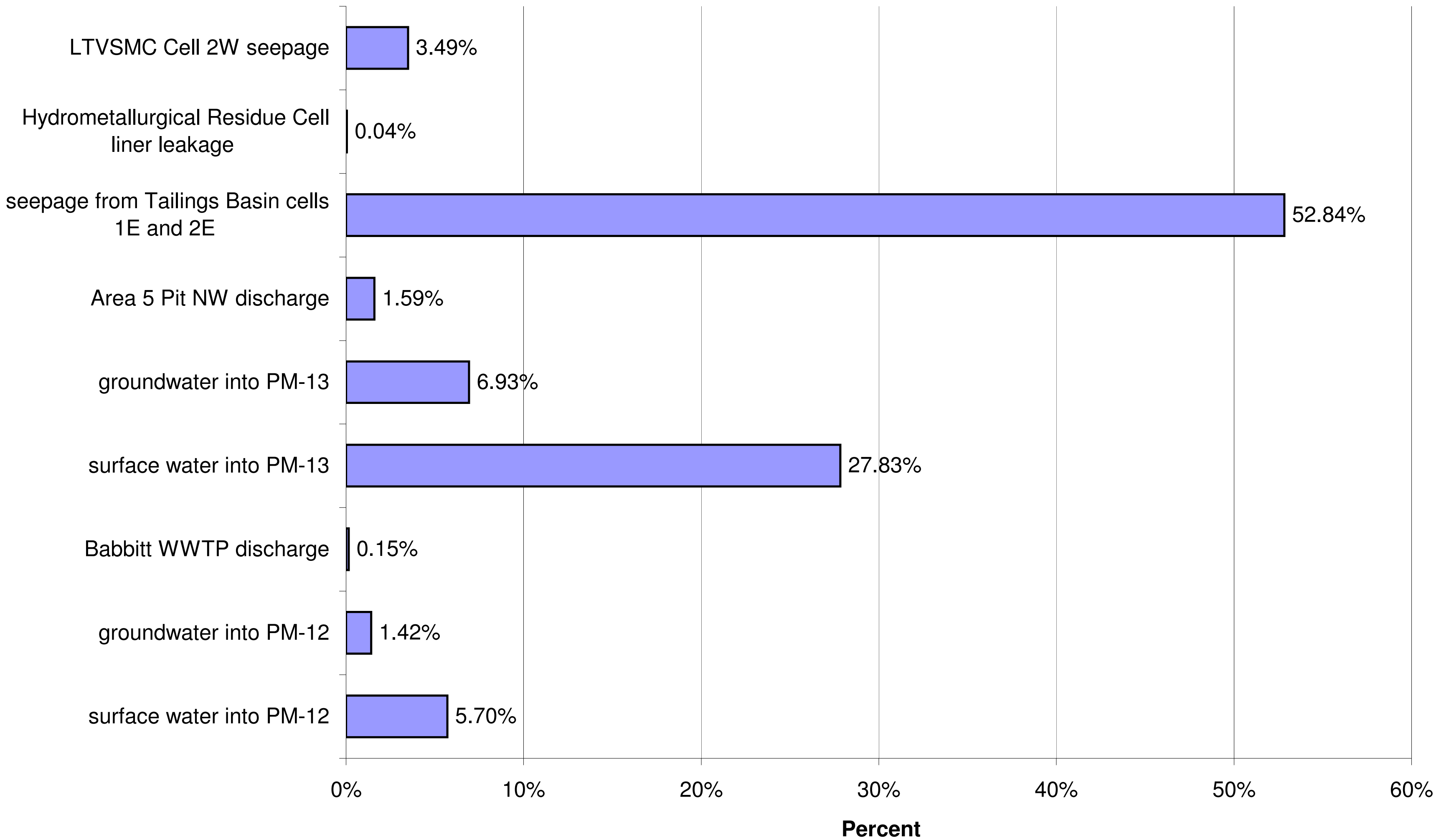


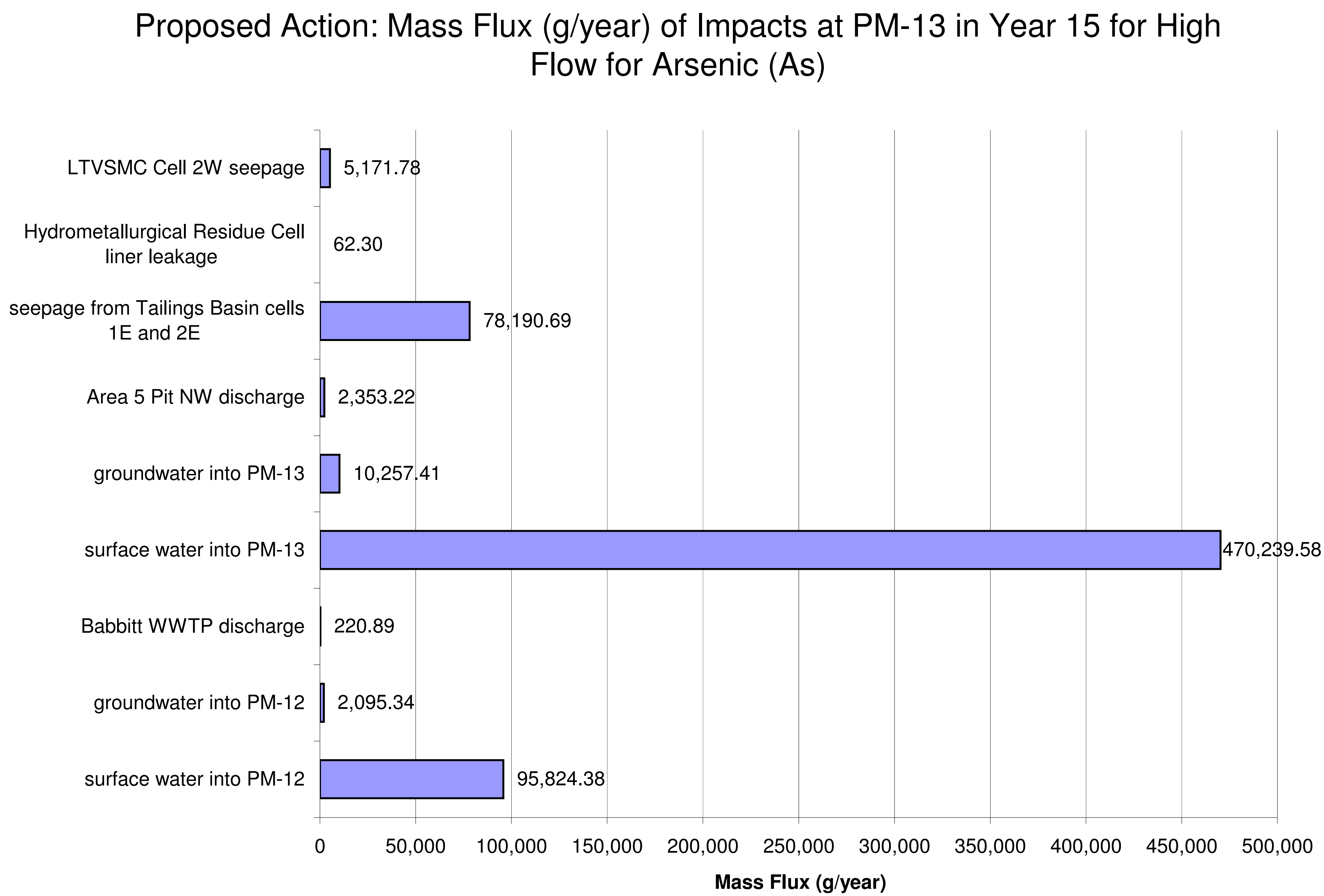
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)



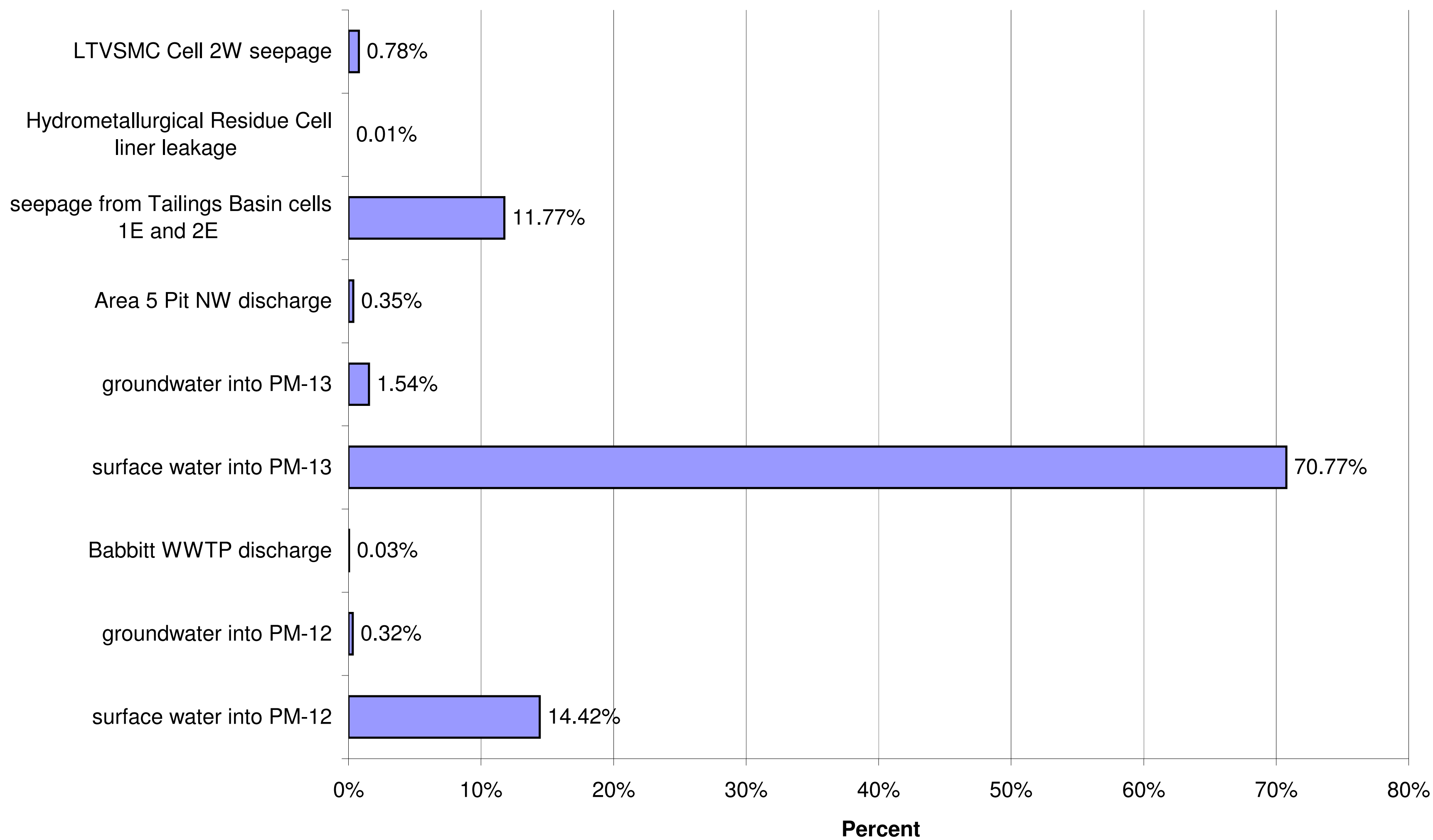

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
78,190.69
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)

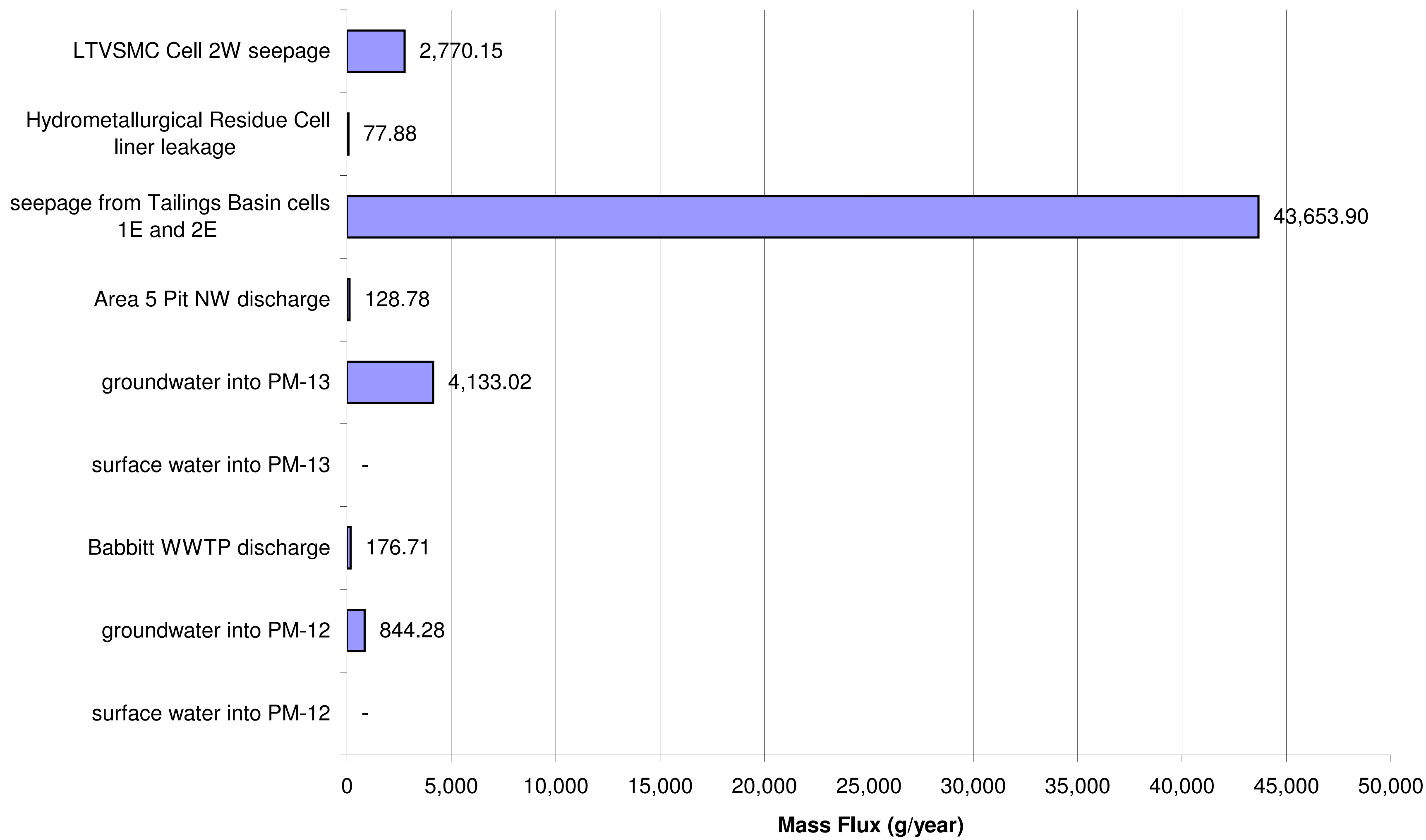



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,171.78
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
78,190.69
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

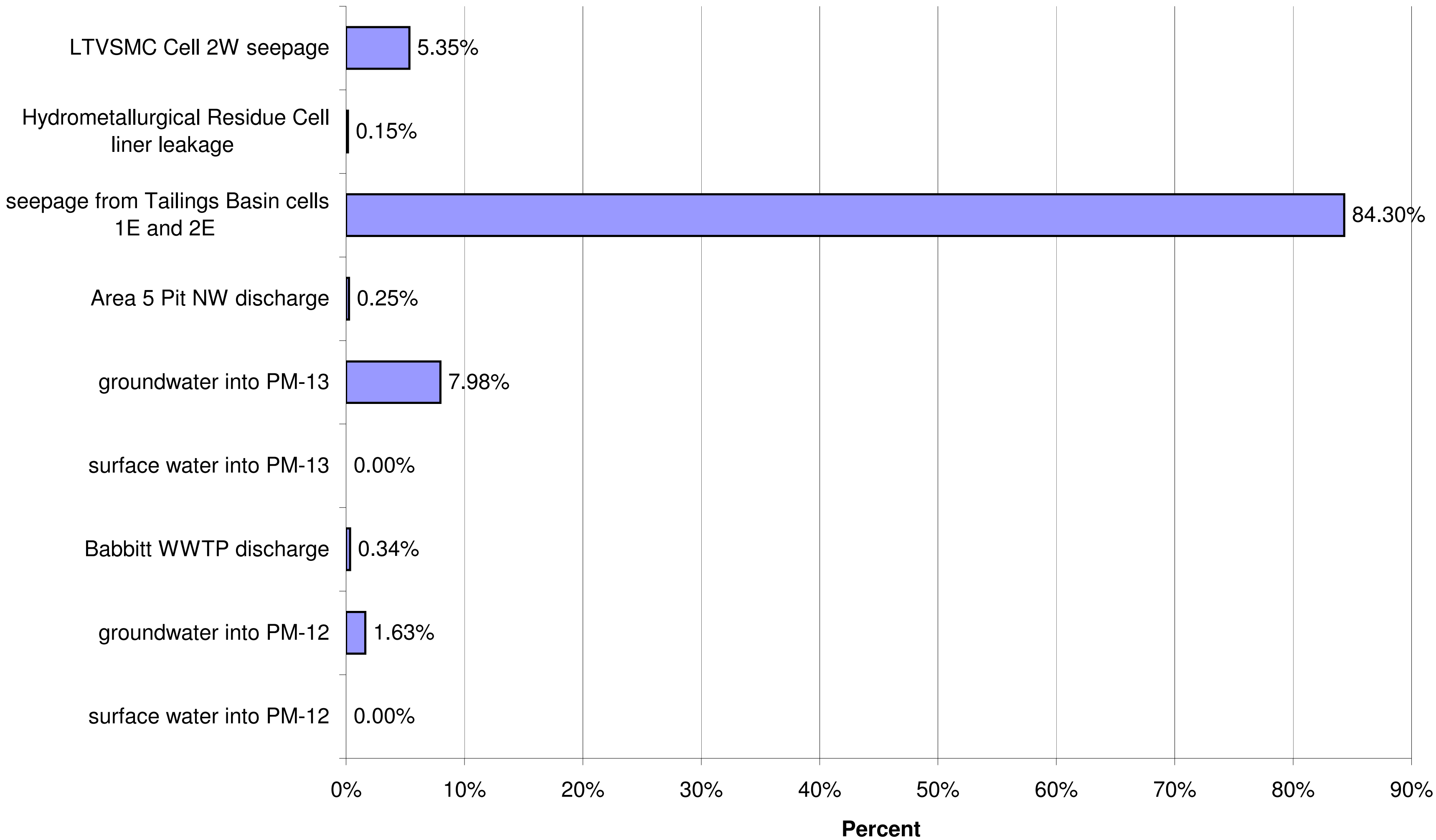
Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)

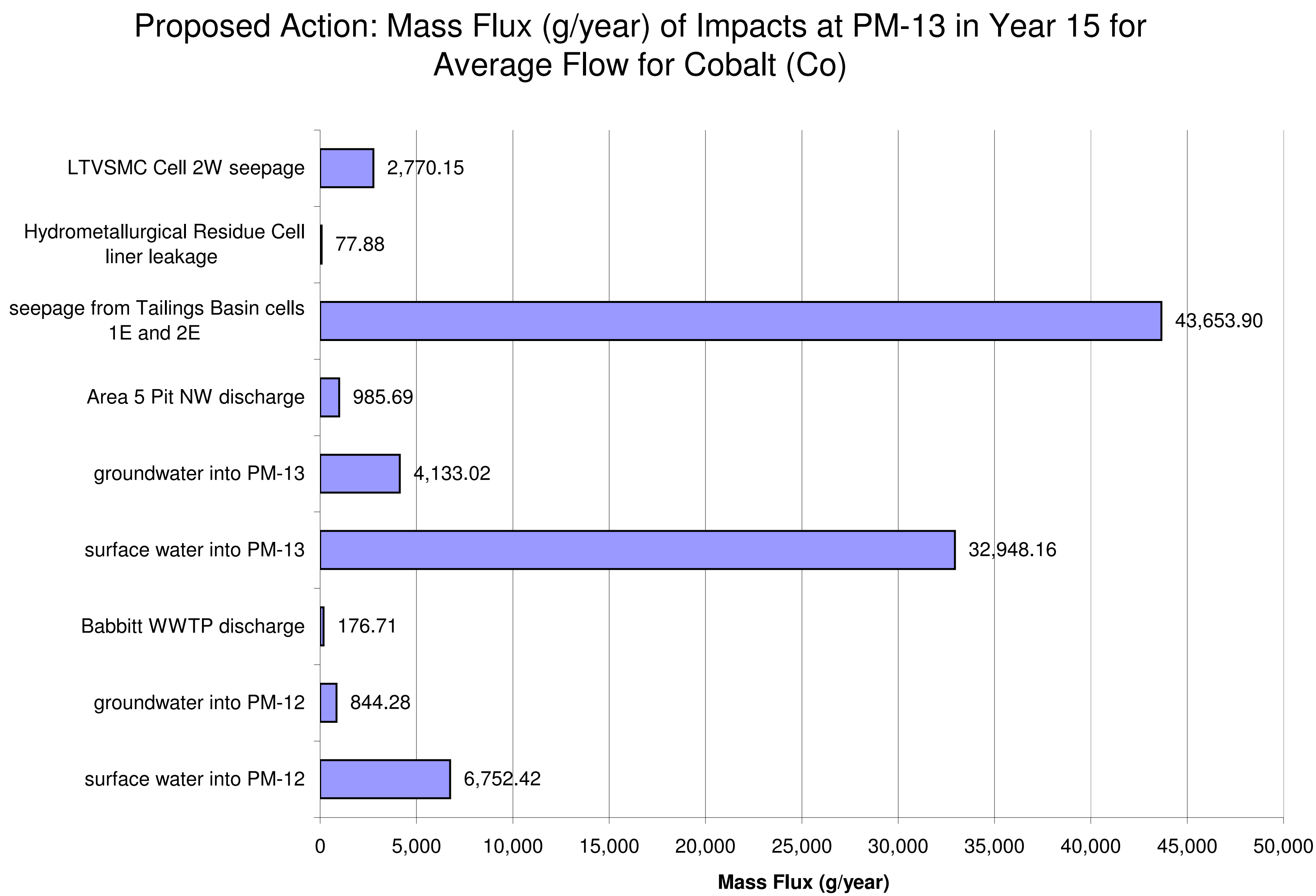


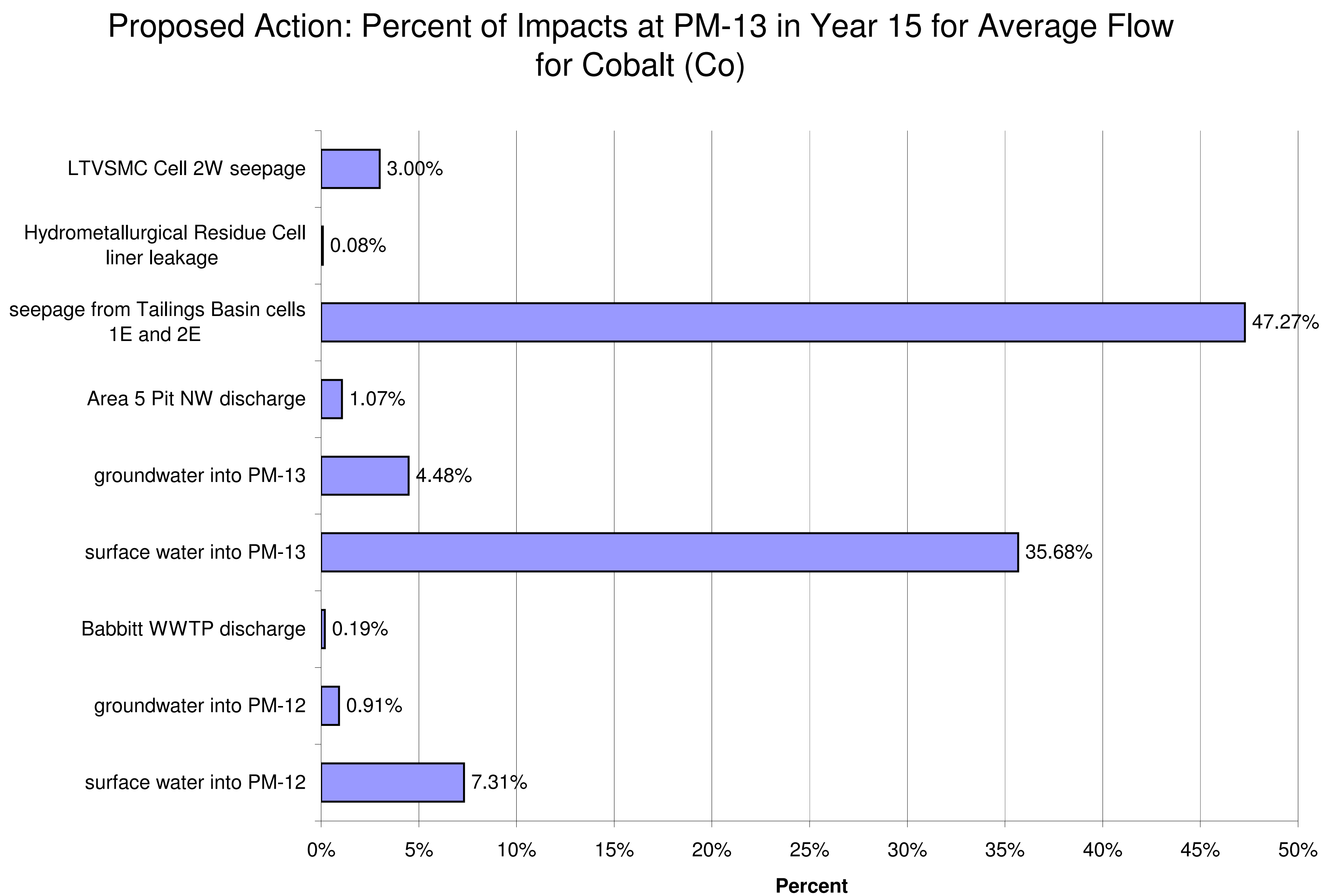
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Cobalt (Co)



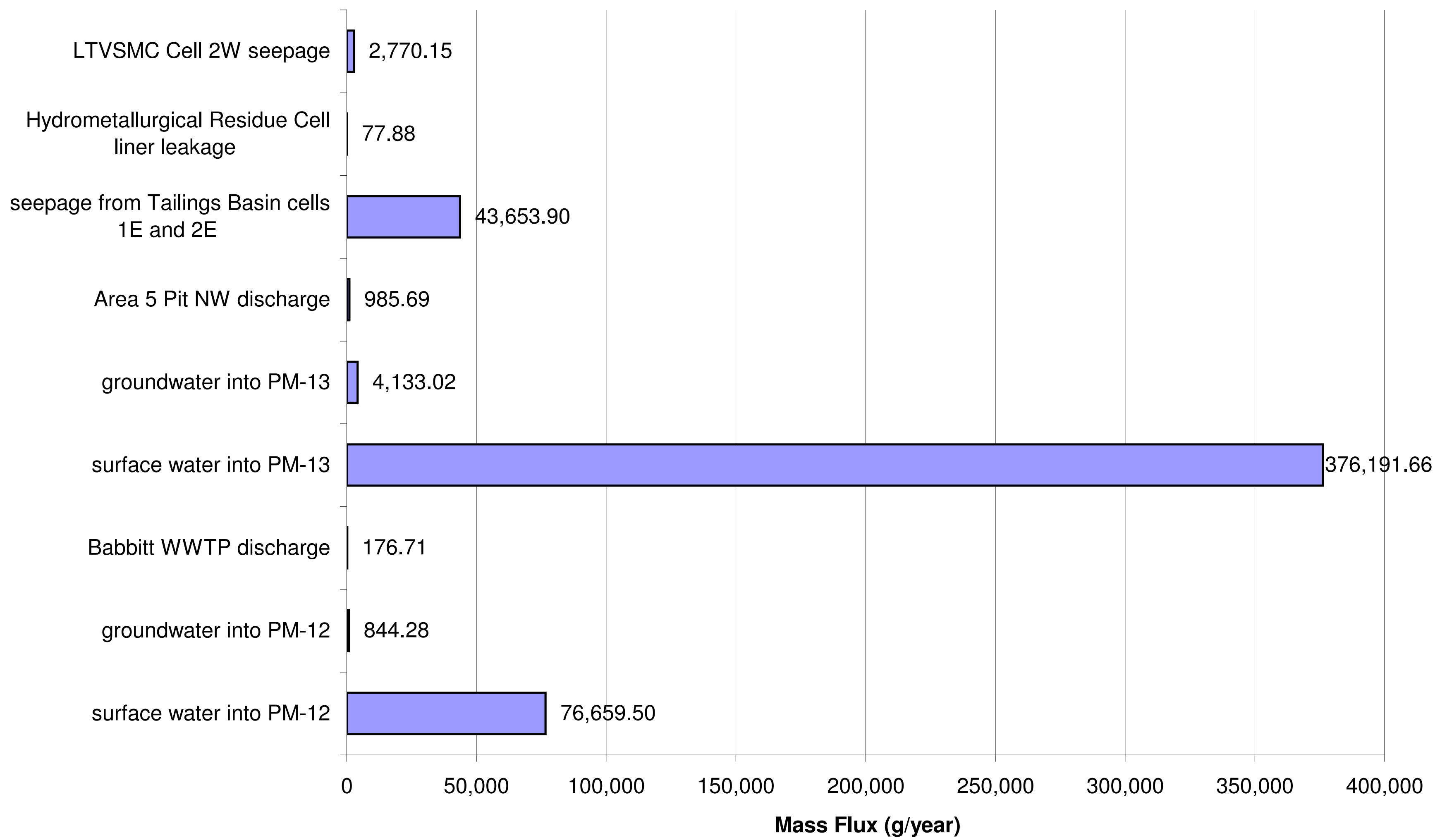
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Cobalt (Co)

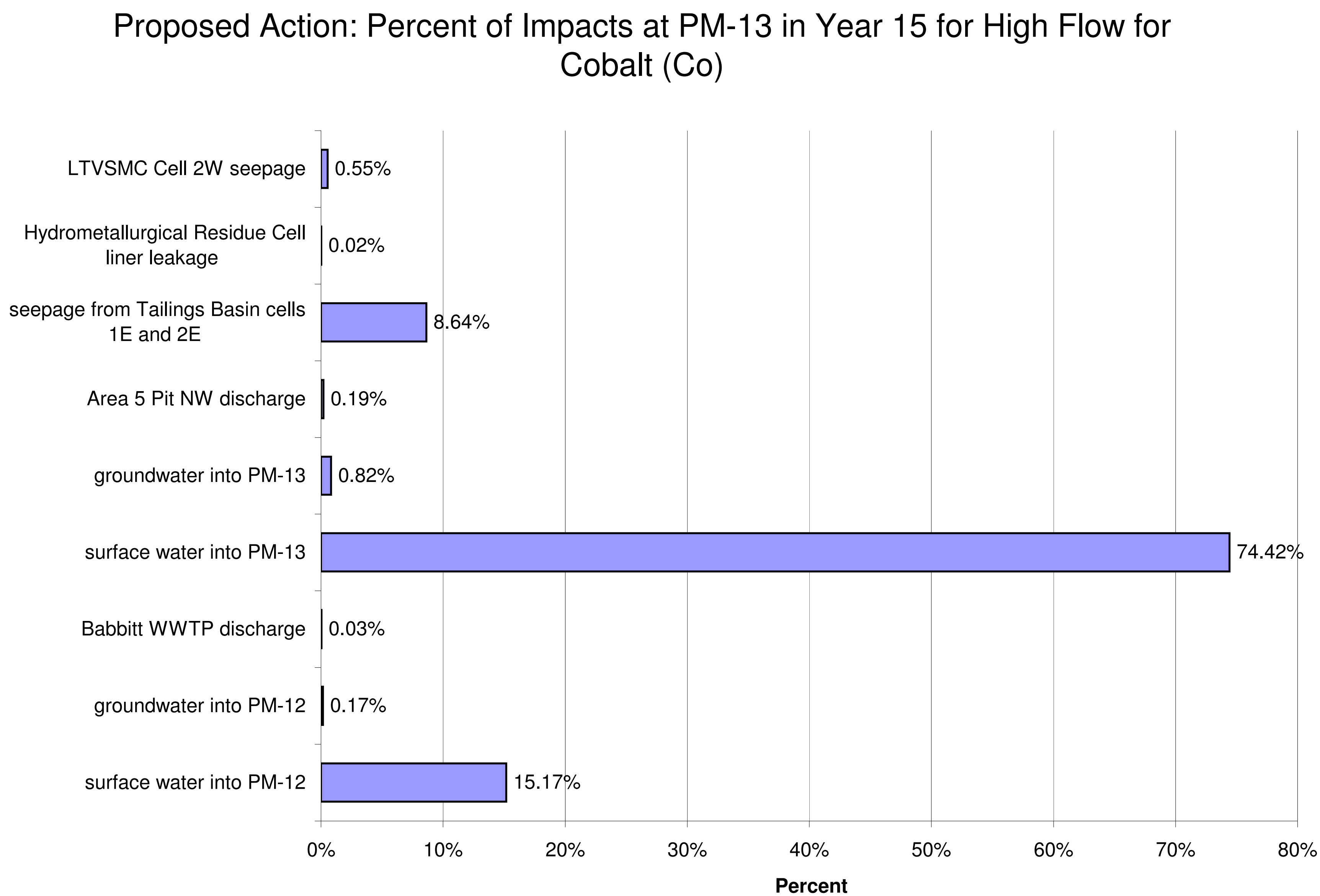


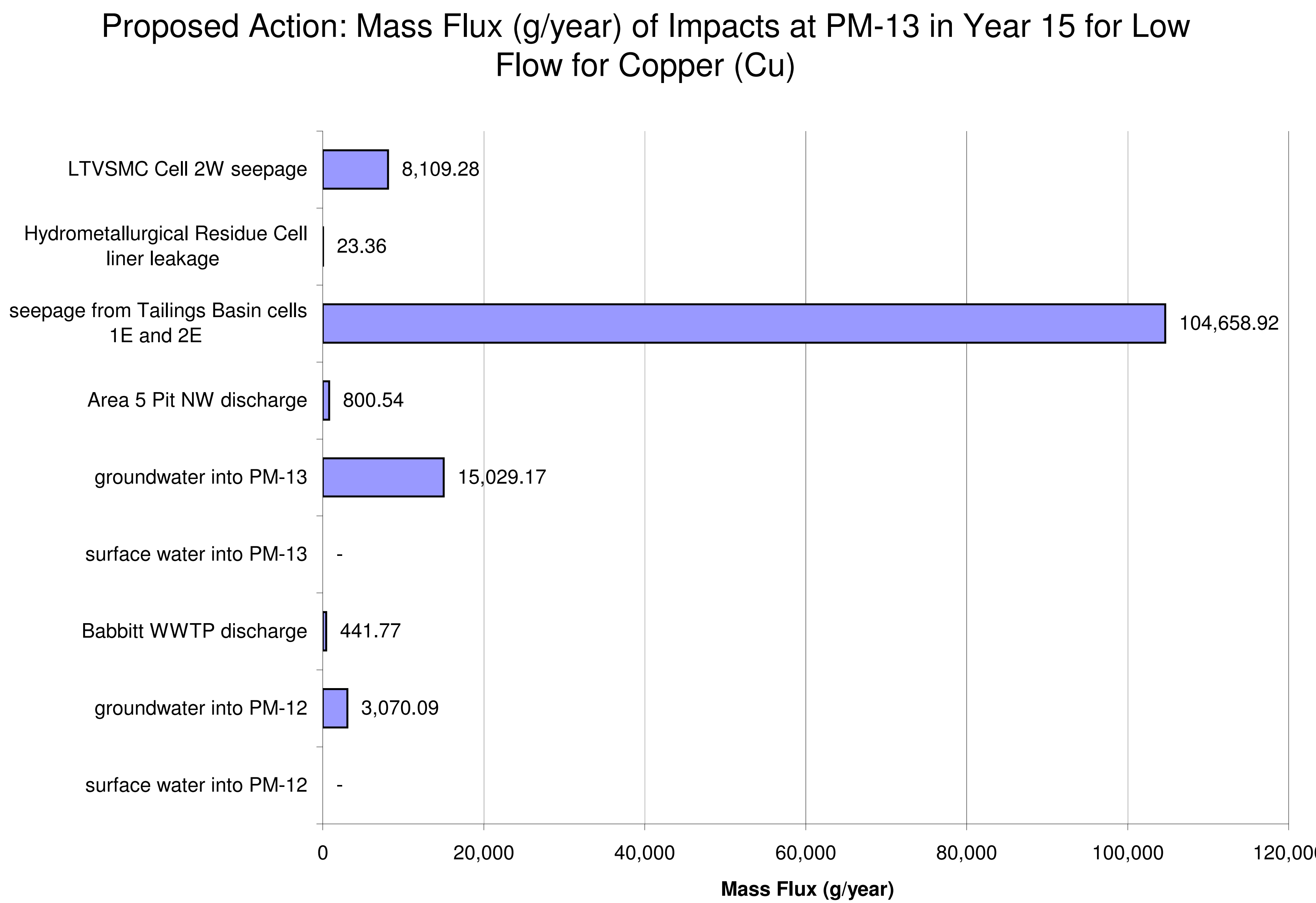

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,770.15
Hydrometallurgical Residue Cell liner leakage
77.88
seepage from Tailings Basin cells 1E and 2E
43,653.90
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Mass Flux (g/year)

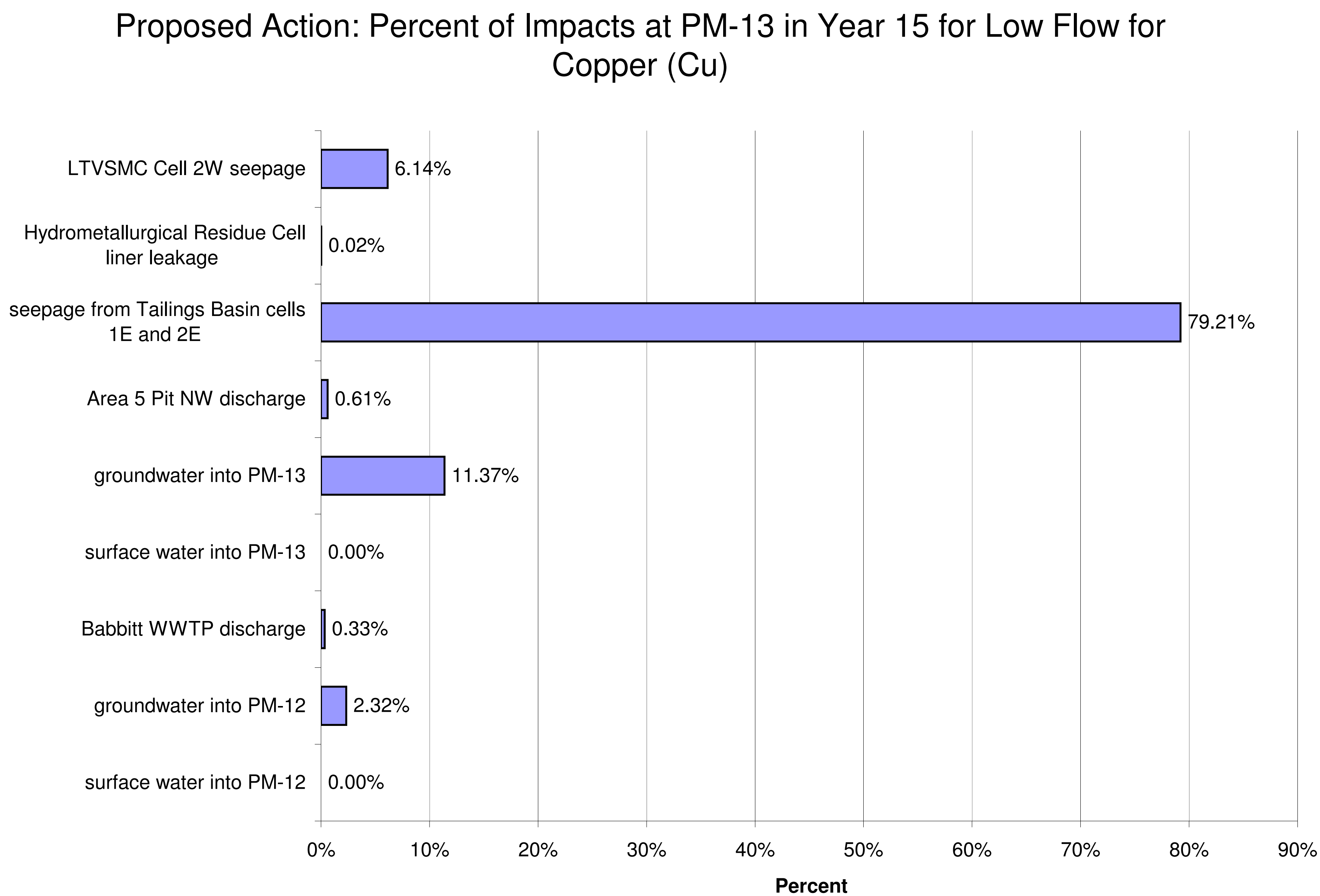

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
3.00%
Hydrometallurgical Residue Cell liner leakage
0.08%
seepage from Tailings Basin cells 1E and 2E
47.27%
Area 5 Pit NW discharge
1.07%
groundwater into PM-13
4.48%
surface water into PM-13
35.68%
Babbitt WWTP discharge
0.19%
groundwater into PM-12
0.91%
surface water into PM-12
7.31%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

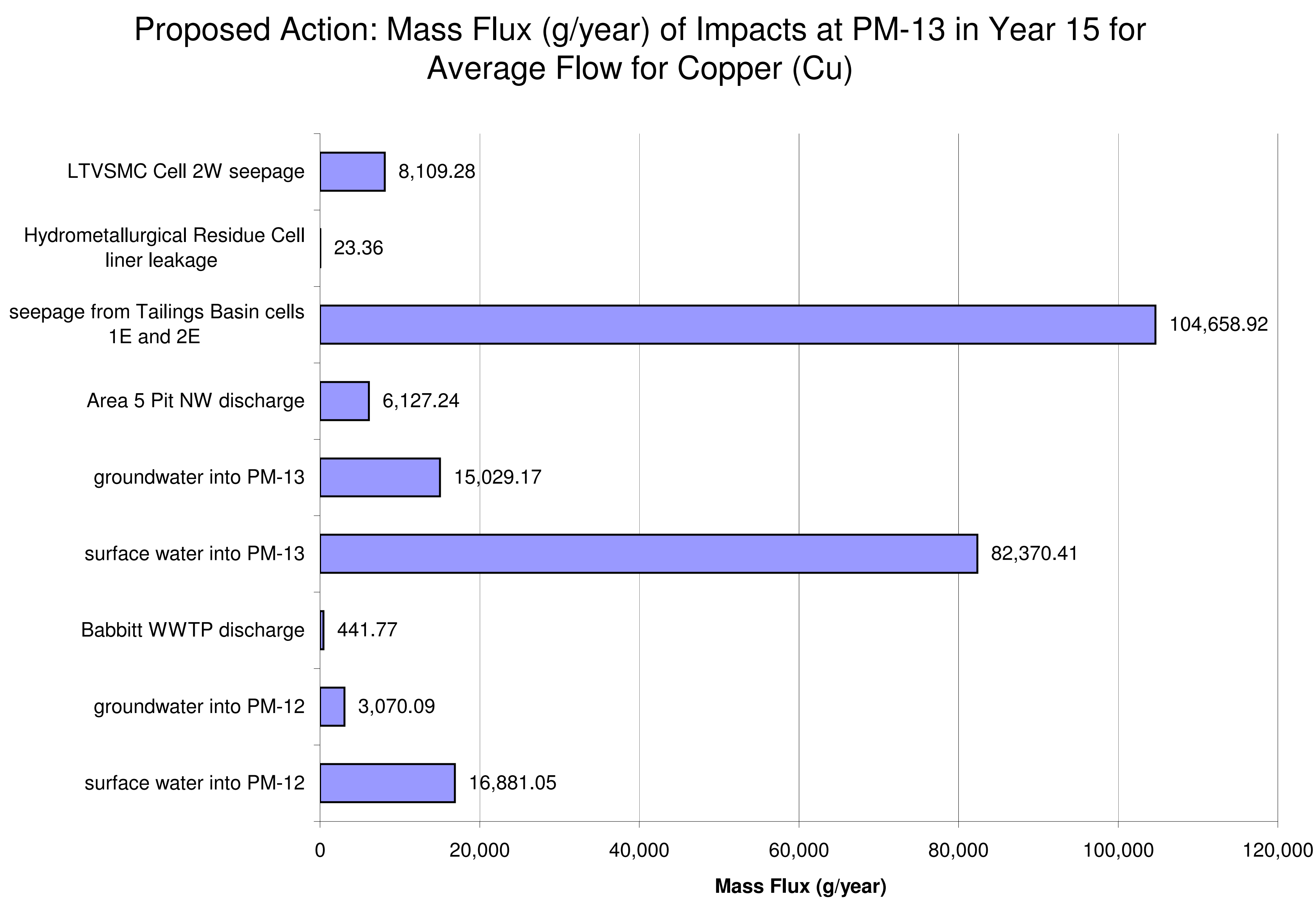
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)

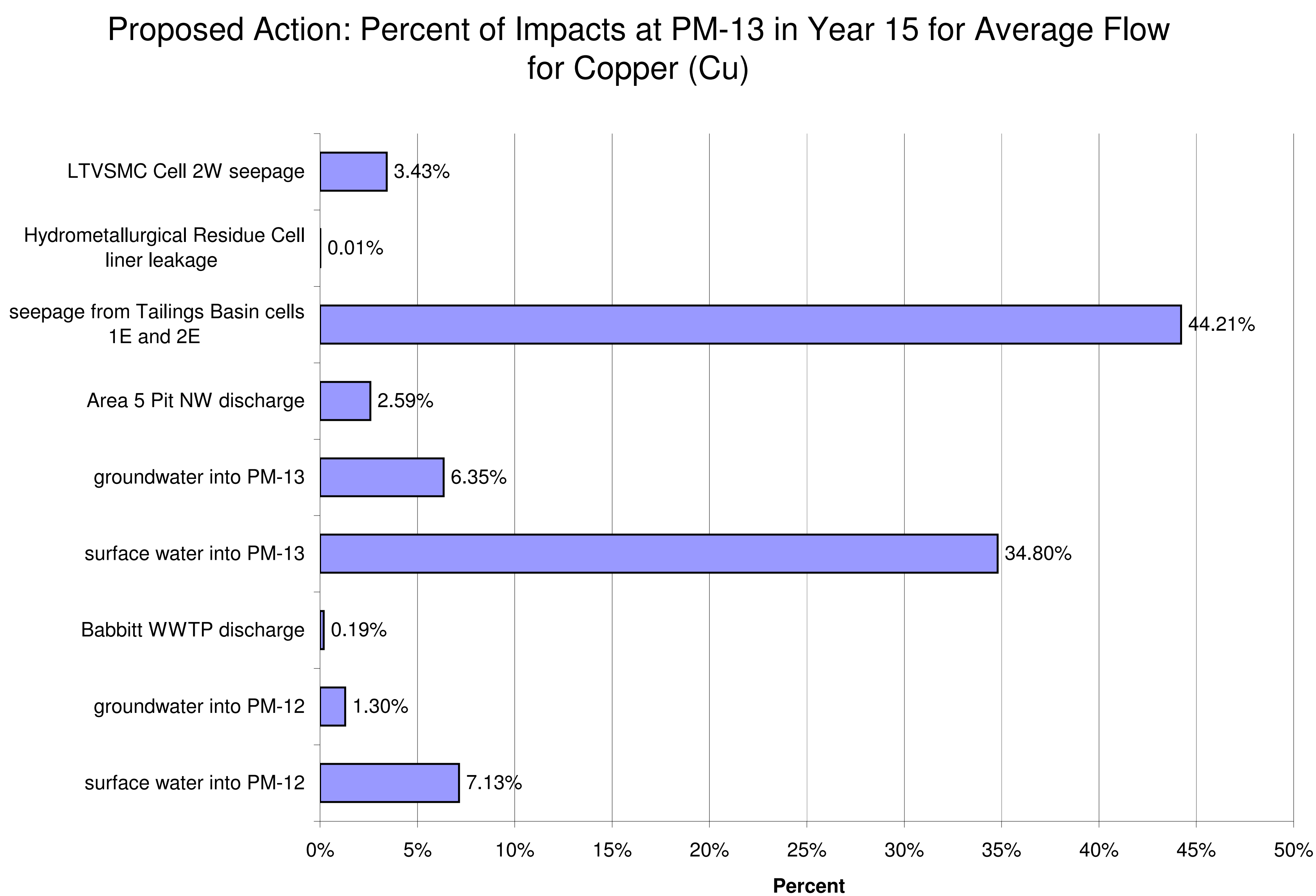


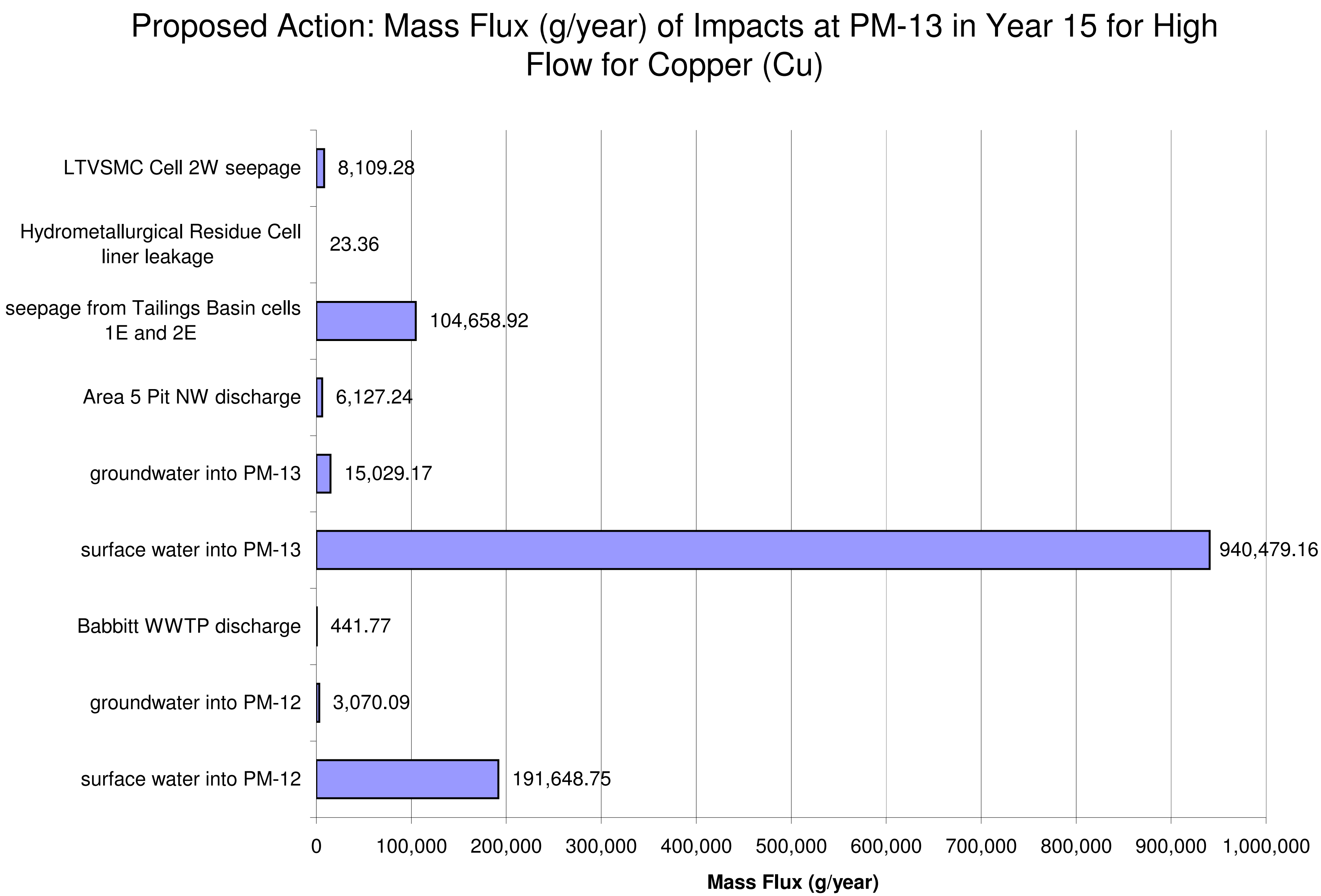

Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.55%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2E
8.64%
Area 5 Pit NW discharge
0.19%
groundwater into PM-13
0.82%
surface water into PM-13
74.42%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.17%
surface water into PM-12
15.17%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

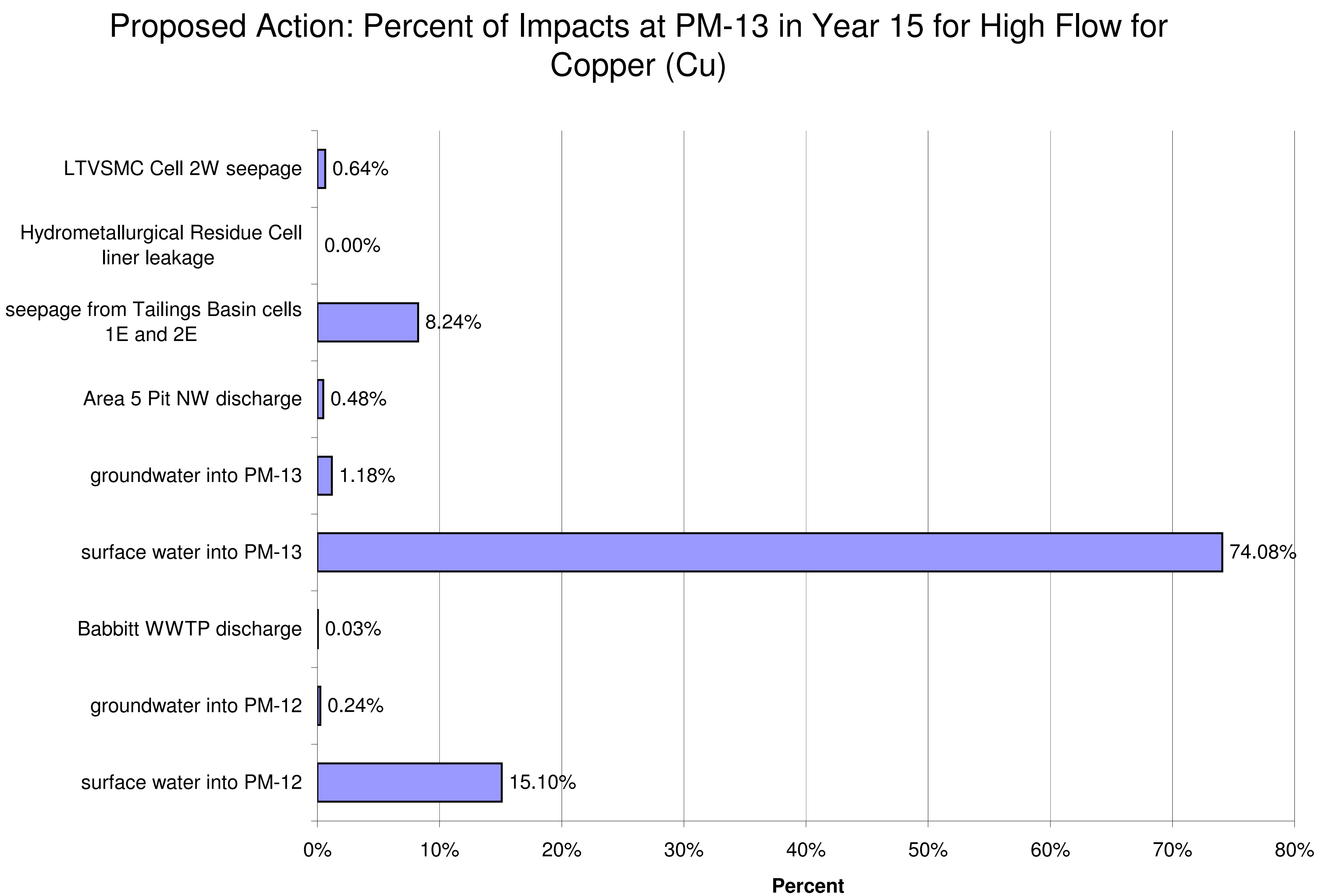

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
104,658.92
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
20,000
40,000
60,000
80,000
100,000
120,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6.14%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2E
79.21%
Area 5 Pit NW discharge
0.61%
groundwater into PM-13
11.37%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.33%
groundwater into PM-12
2.32%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

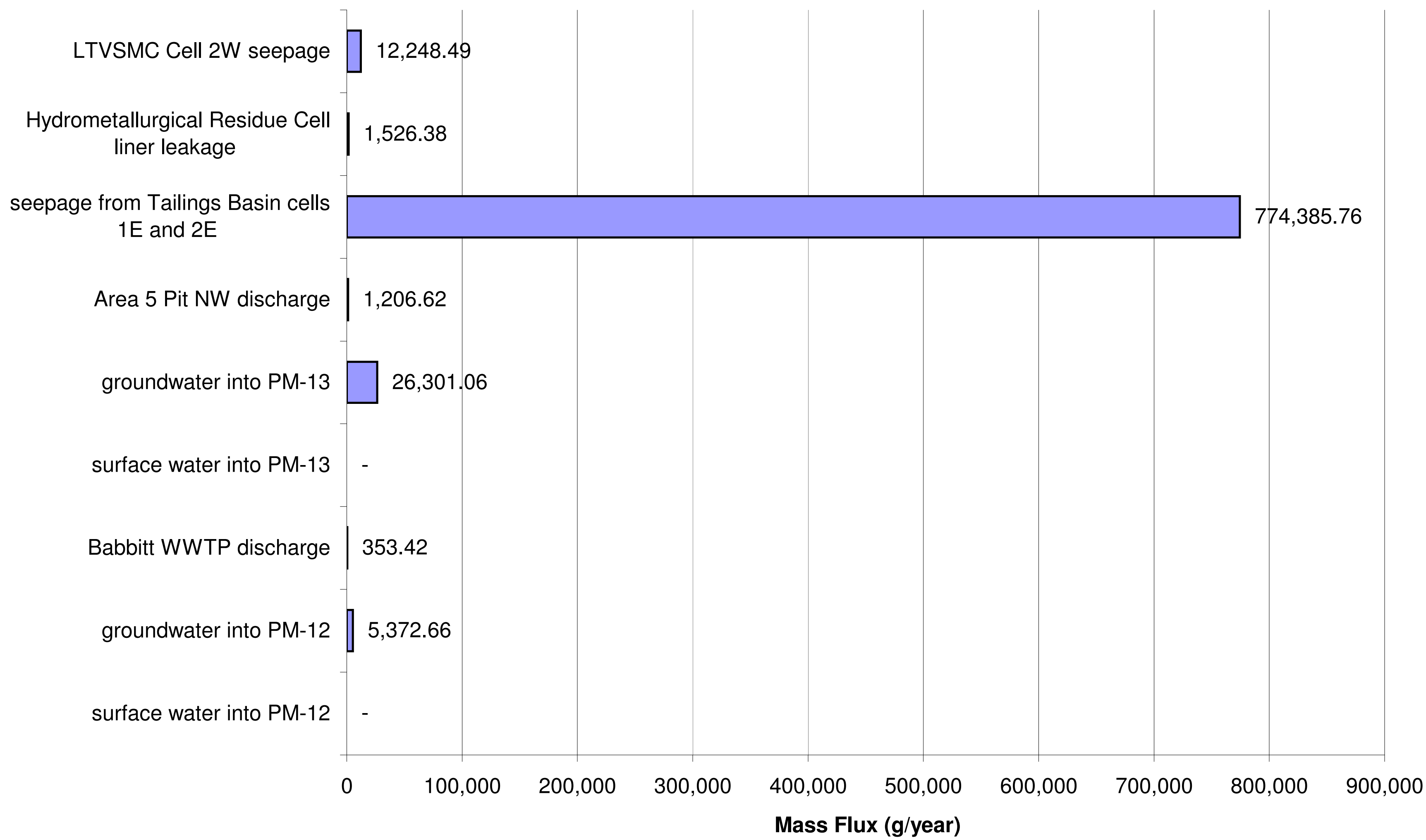

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
104,658.92
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
20,000
40,000
60,000
80,000
100,000
120,000
Mass Flux (g/year)

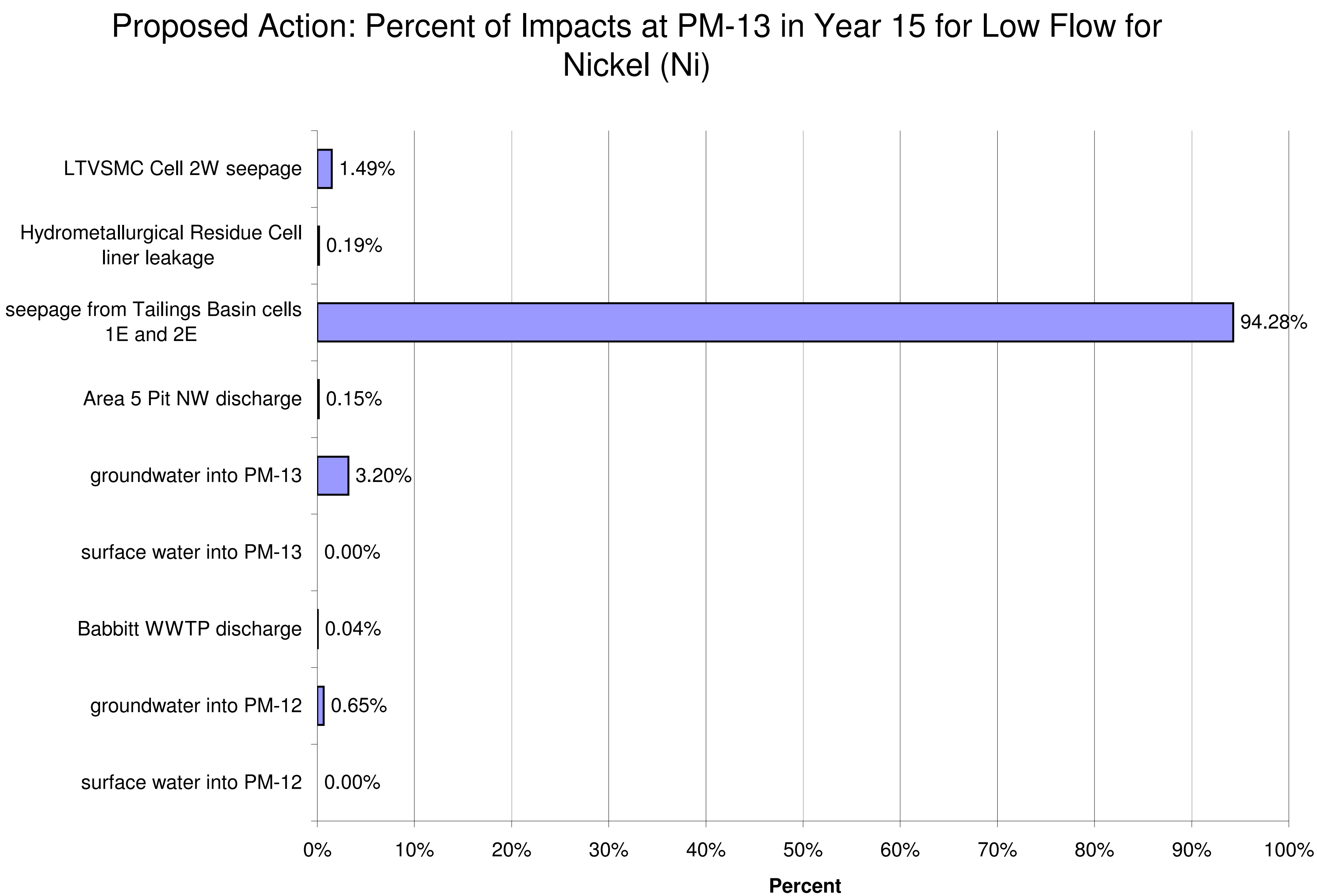

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
3.43%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
44.21%
Area 5 Pit NW discharge
2.59%
groundwater into PM-13
6.35%
surface water into PM-13
34.80%
Babbitt WWTP discharge
0.19%
groundwater into PM-12
1.30%
surface water into PM-12
7.13%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

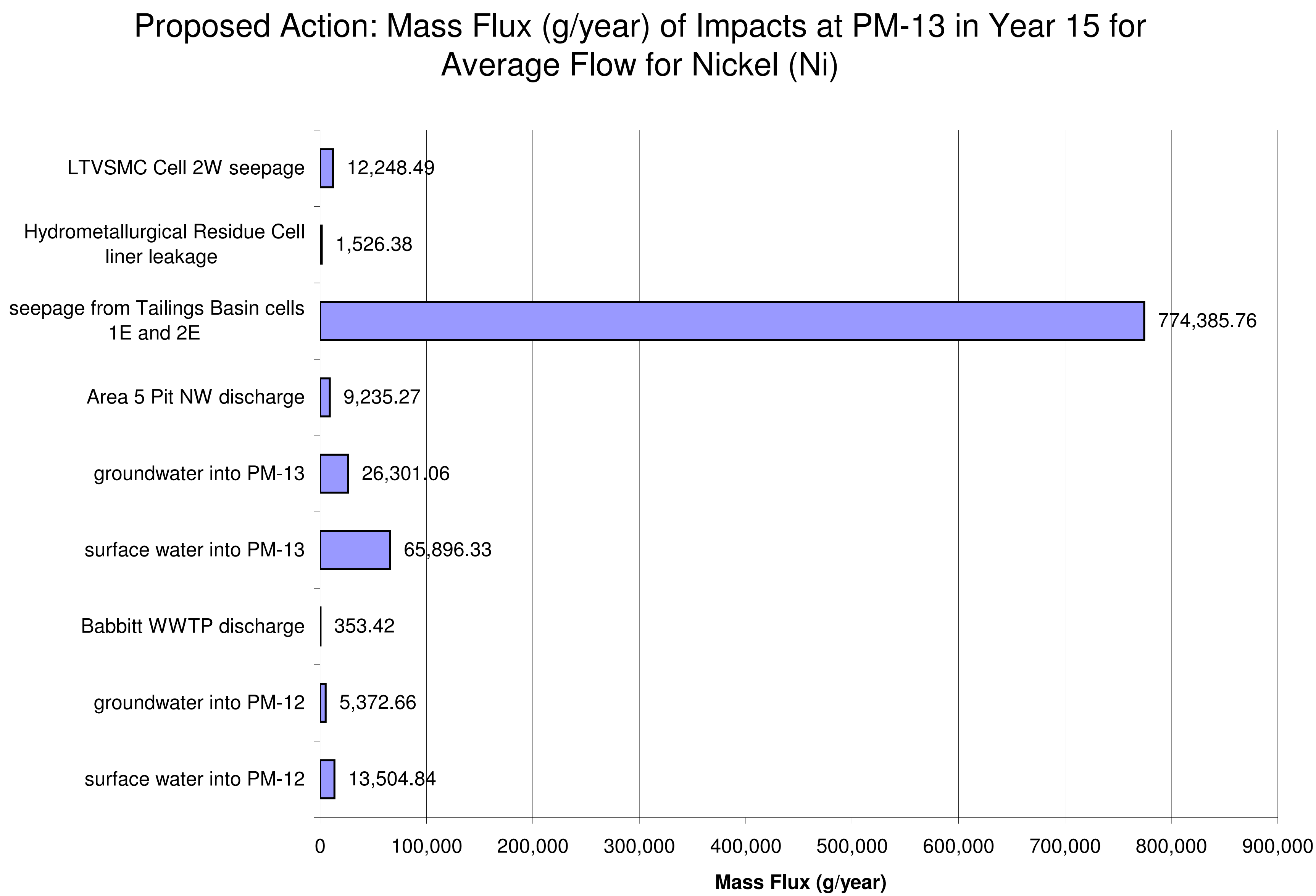

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,109.28
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
104,658.92
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.64%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
8.24%
Area 5 Pit NW discharge
0.48%
groundwater into PM-13
1.18%
surface water into PM-13
74.08%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.24%
surface water into PM-12
15.10%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

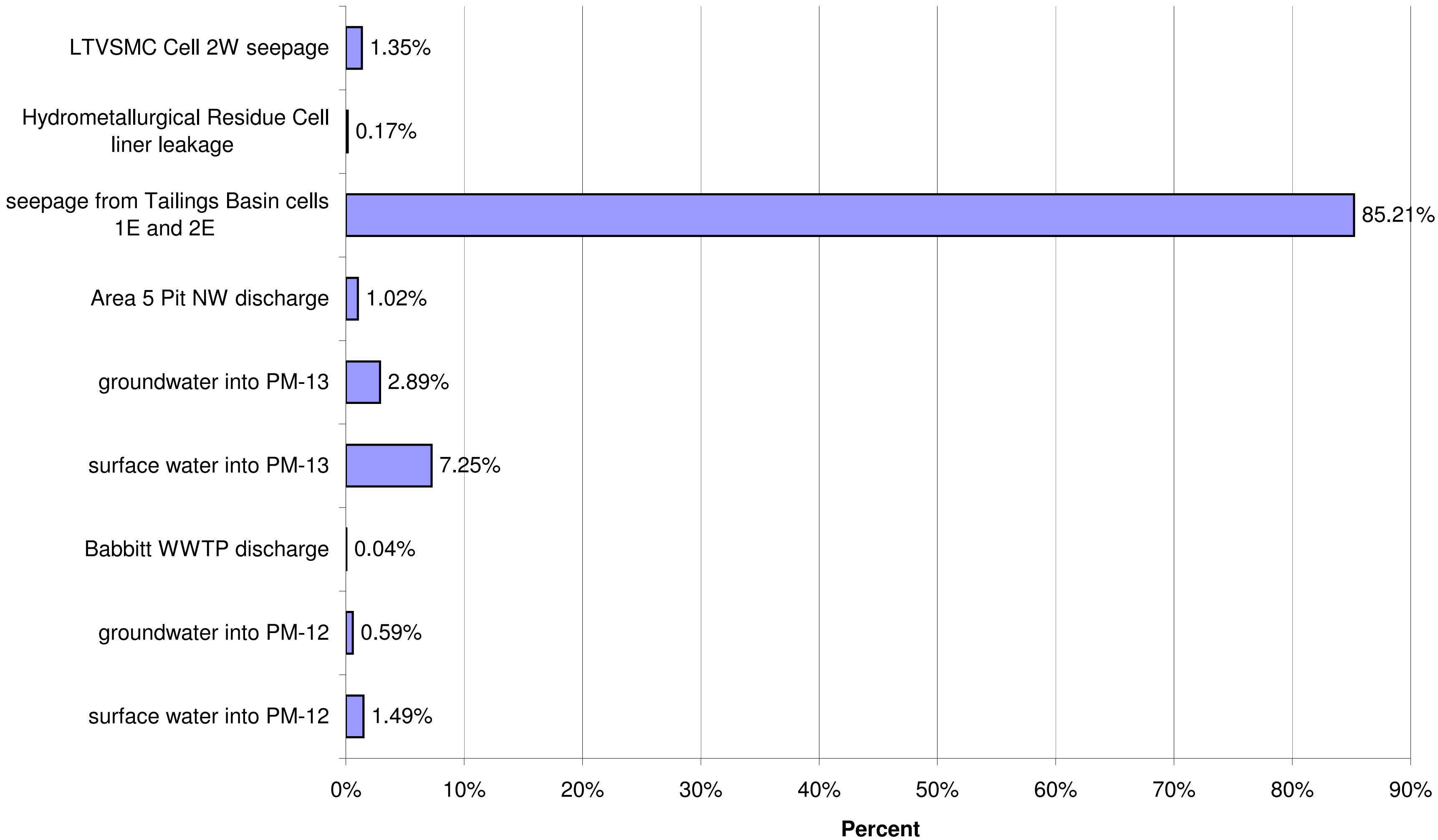
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)

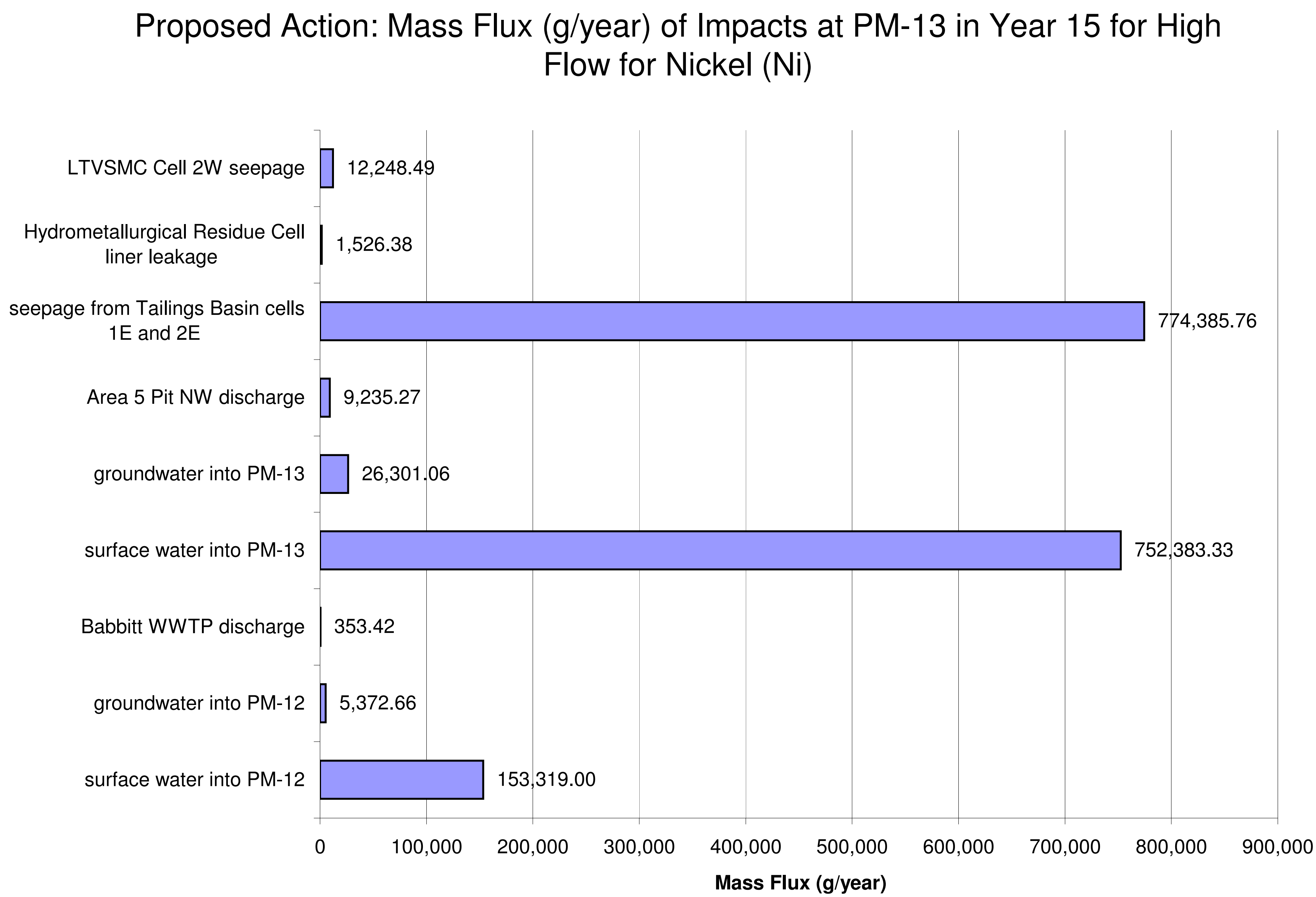



Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
1.49%
Hydrometallurgical Residue Cell liner leakage
0.19%
seepage from Tailings Basin cells 1E and 2E
94.28%
Area 5 Pit NW discharge
0.15%
groundwater into PM-13
3.20%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.65%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

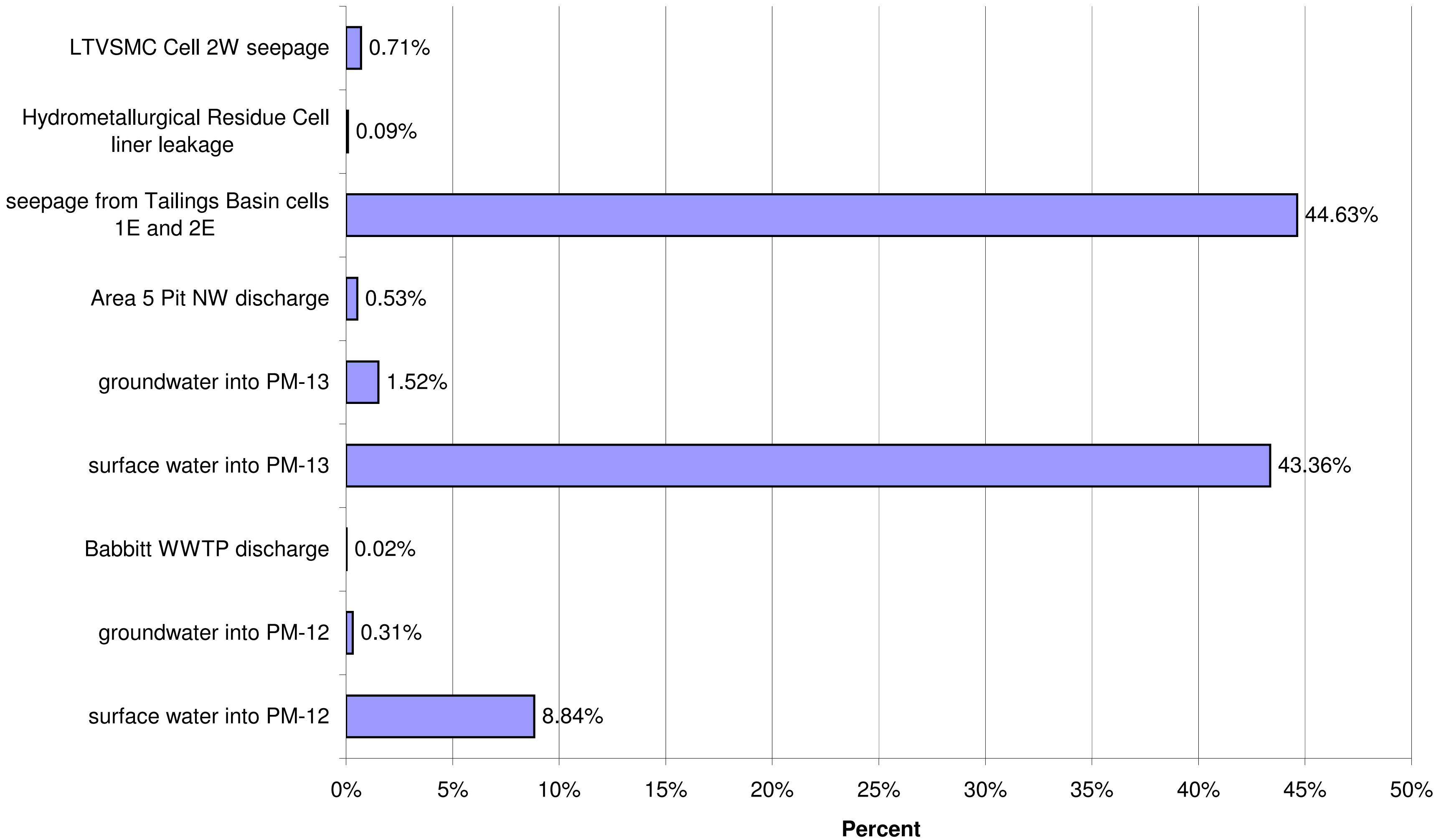

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
774,385.76
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Nickel (Ni)

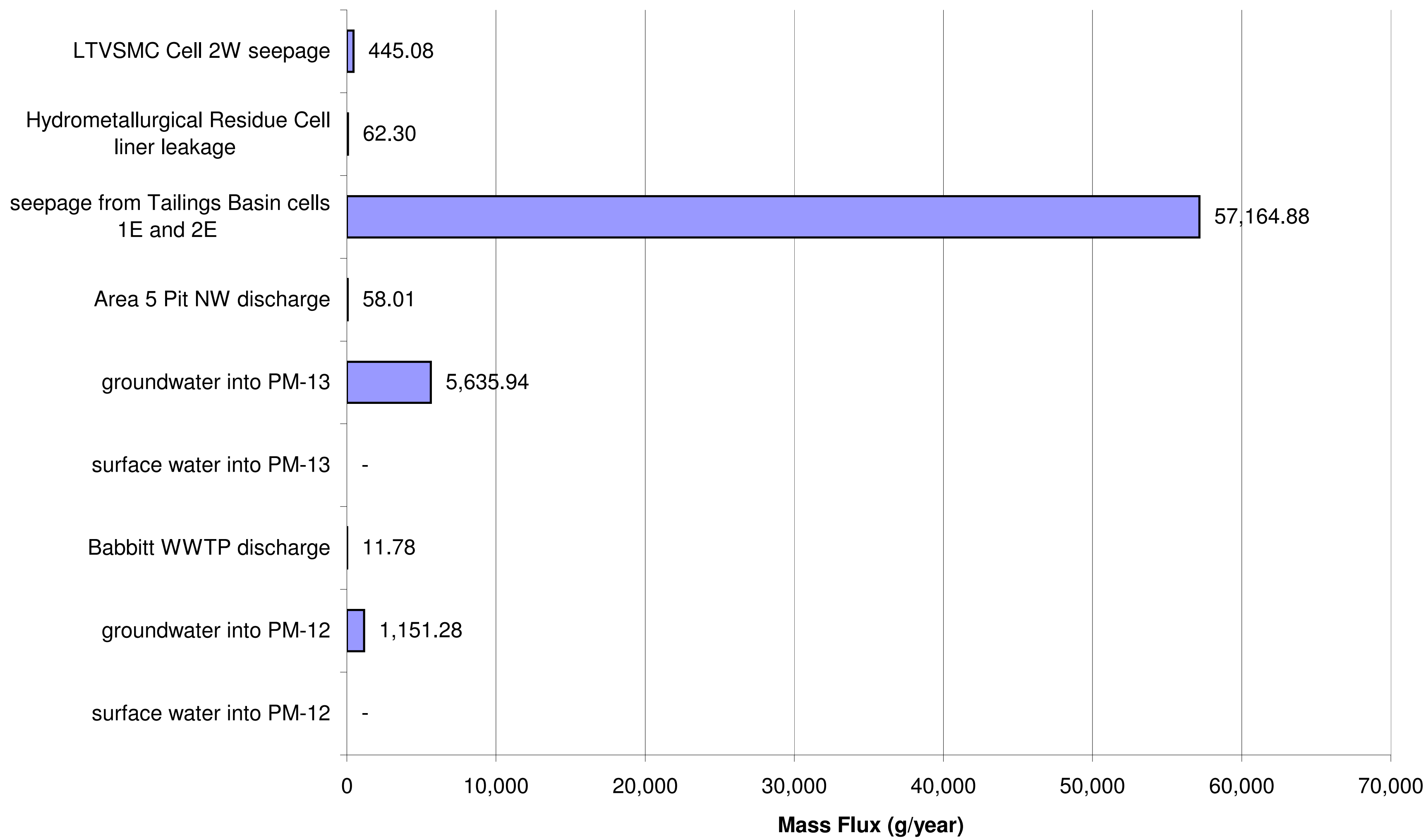



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,248.49
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
774,385.76
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
Mass Flux (g/year)

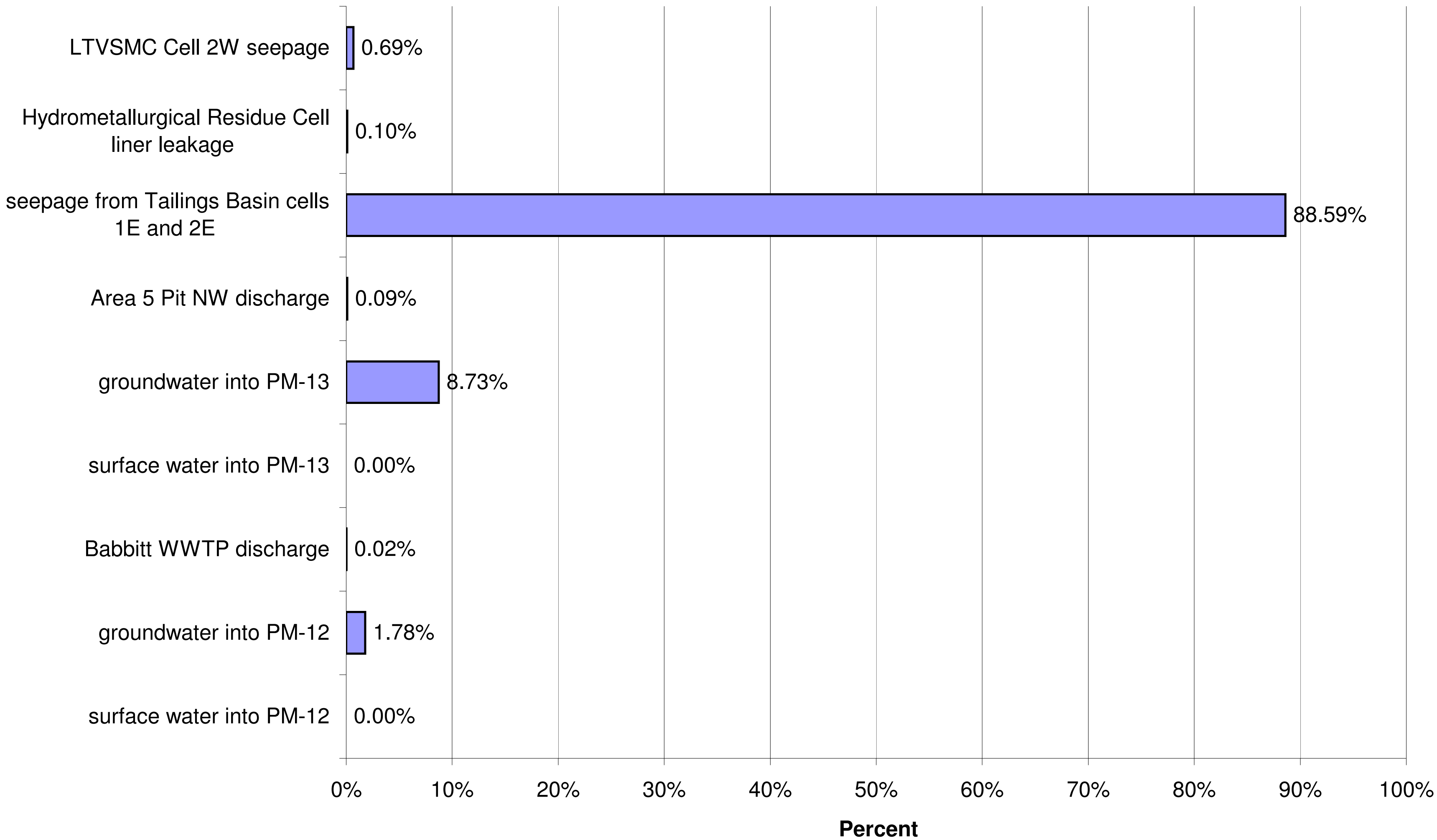
Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)

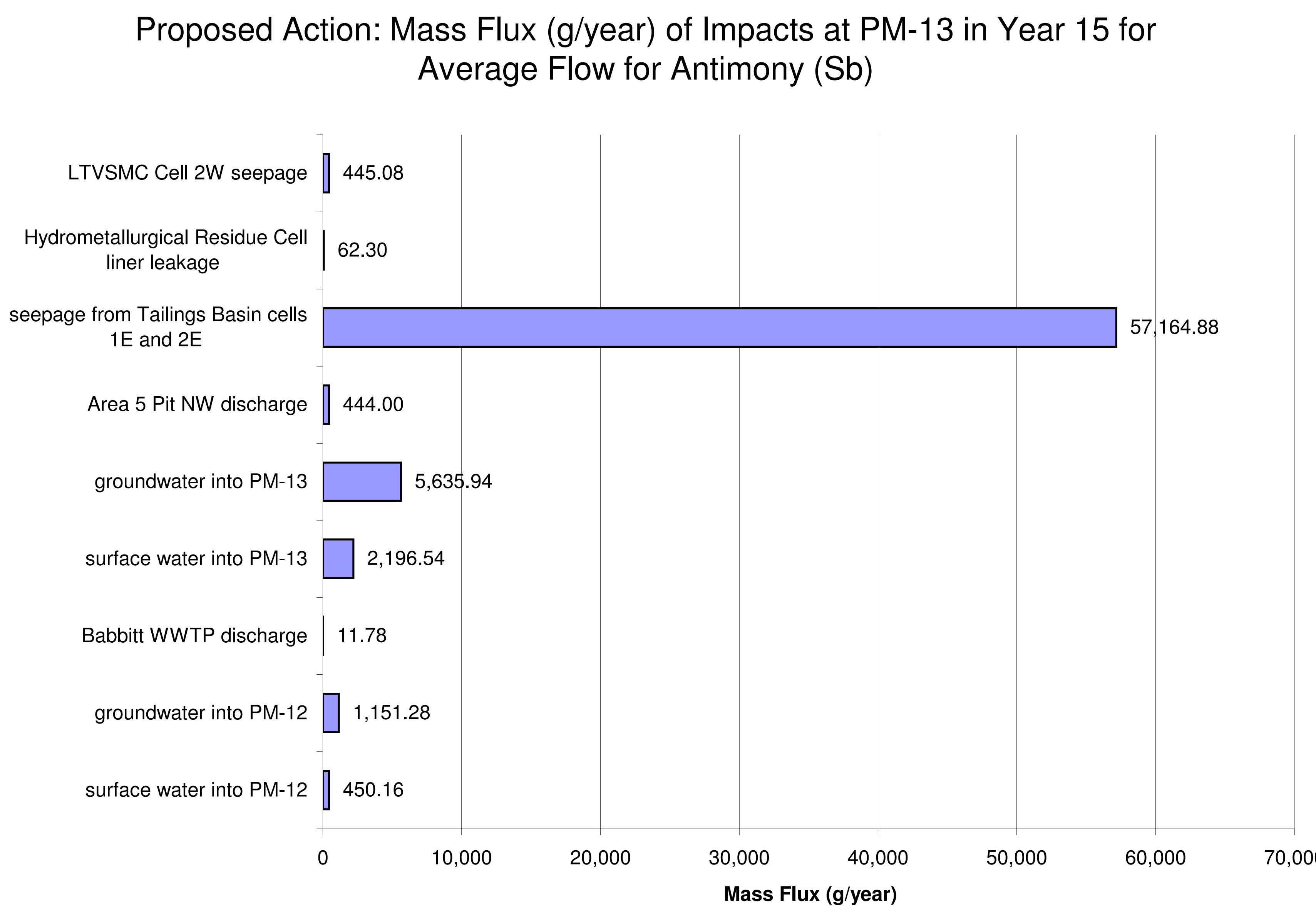


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)

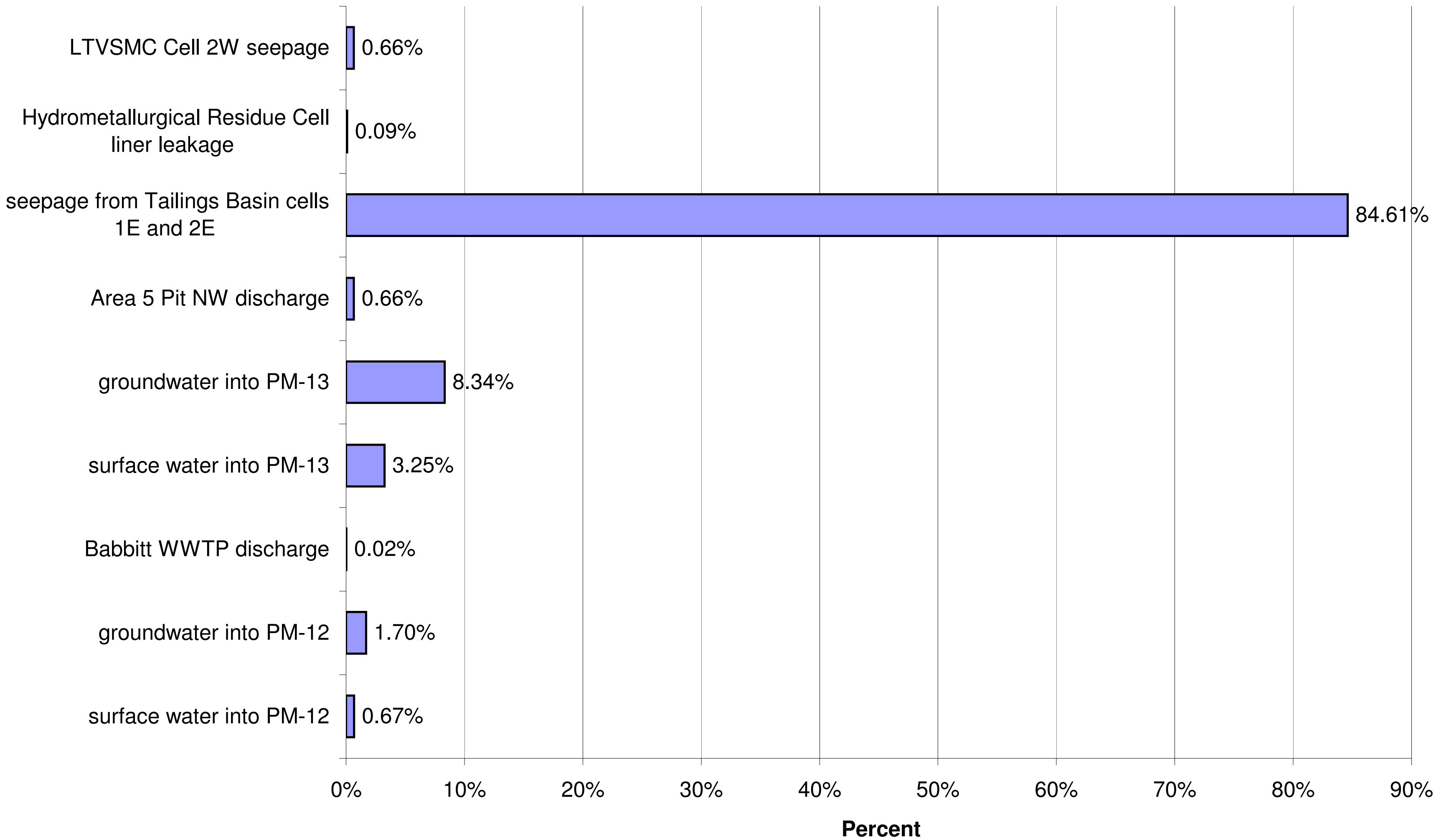


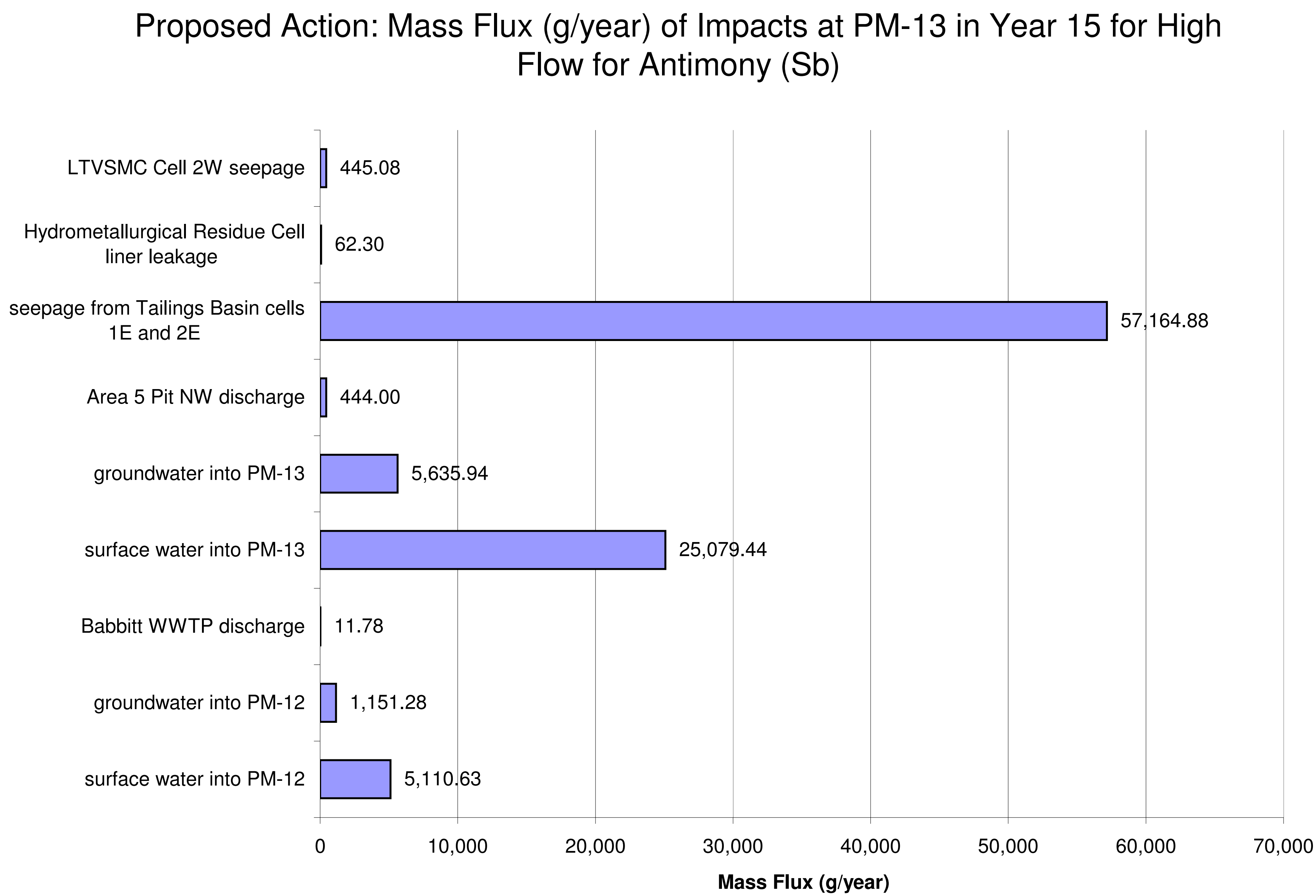
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)



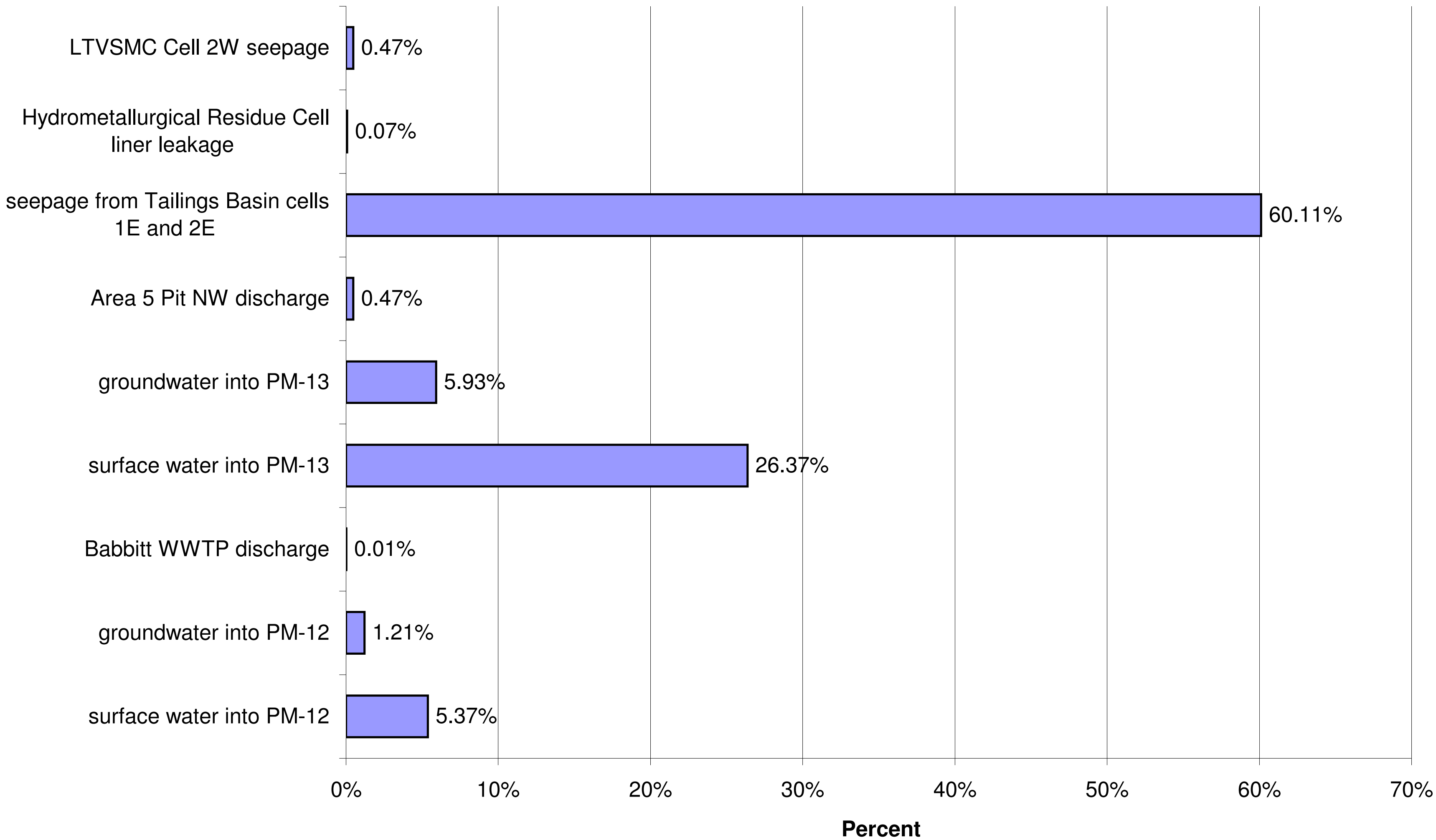

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
57,164.88
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

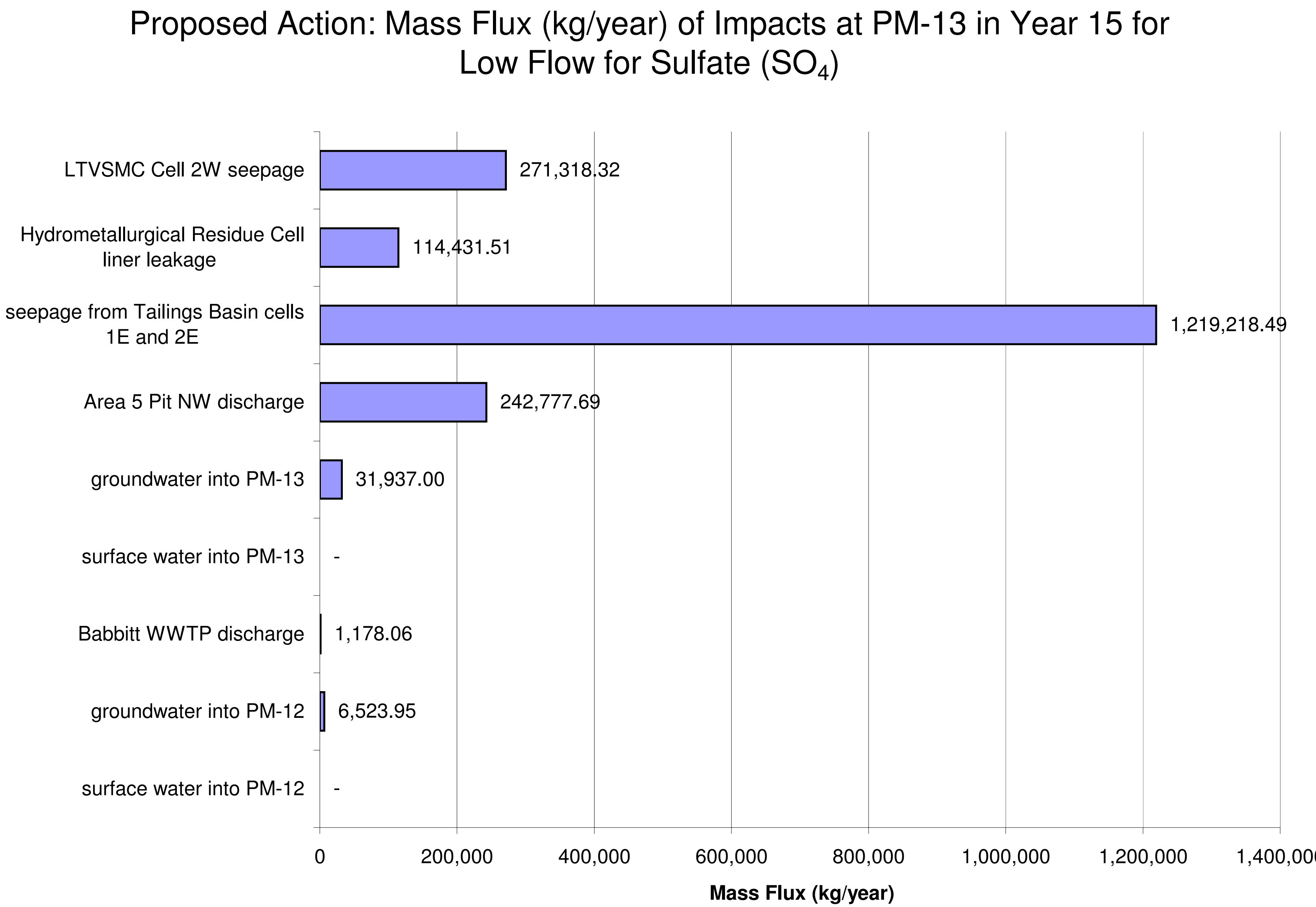
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)

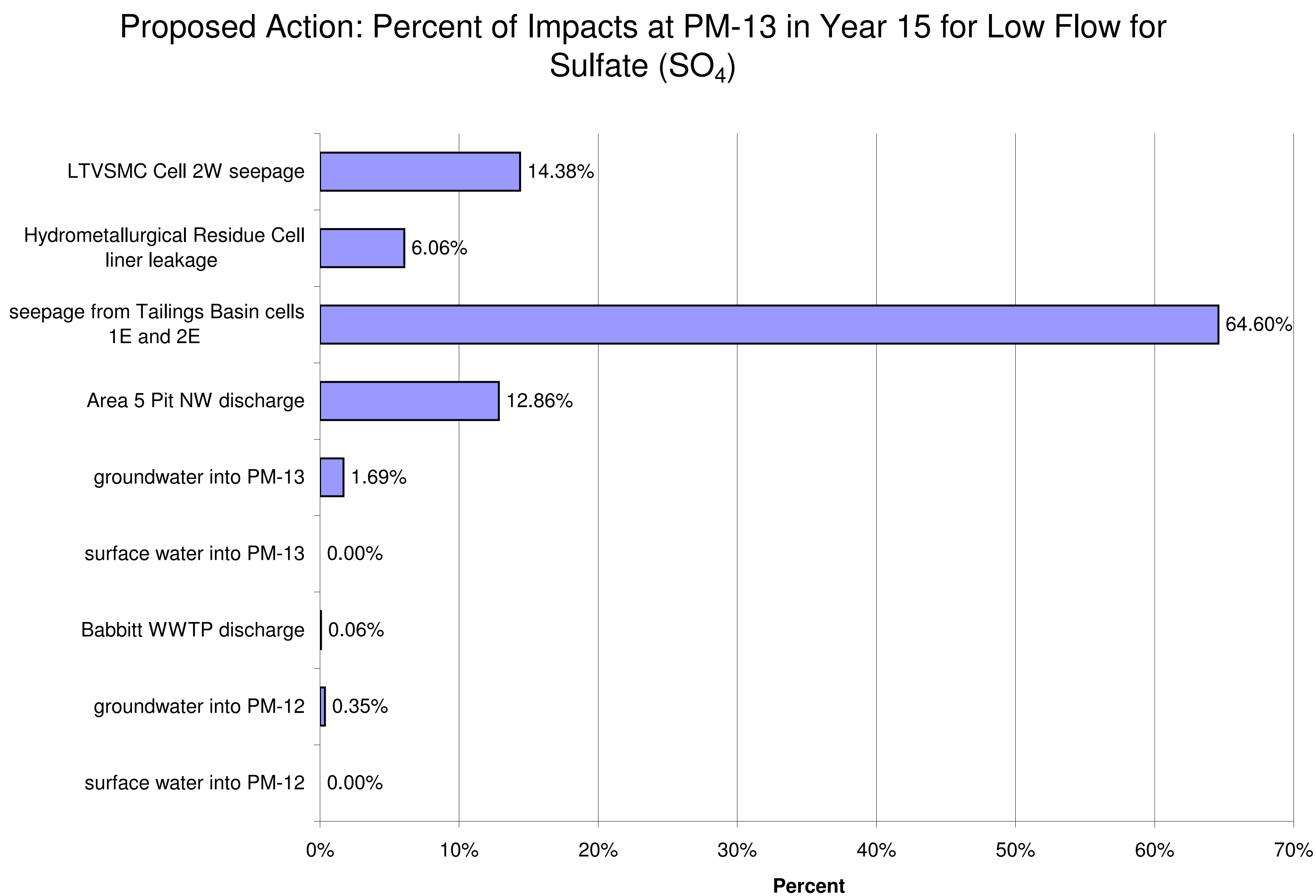


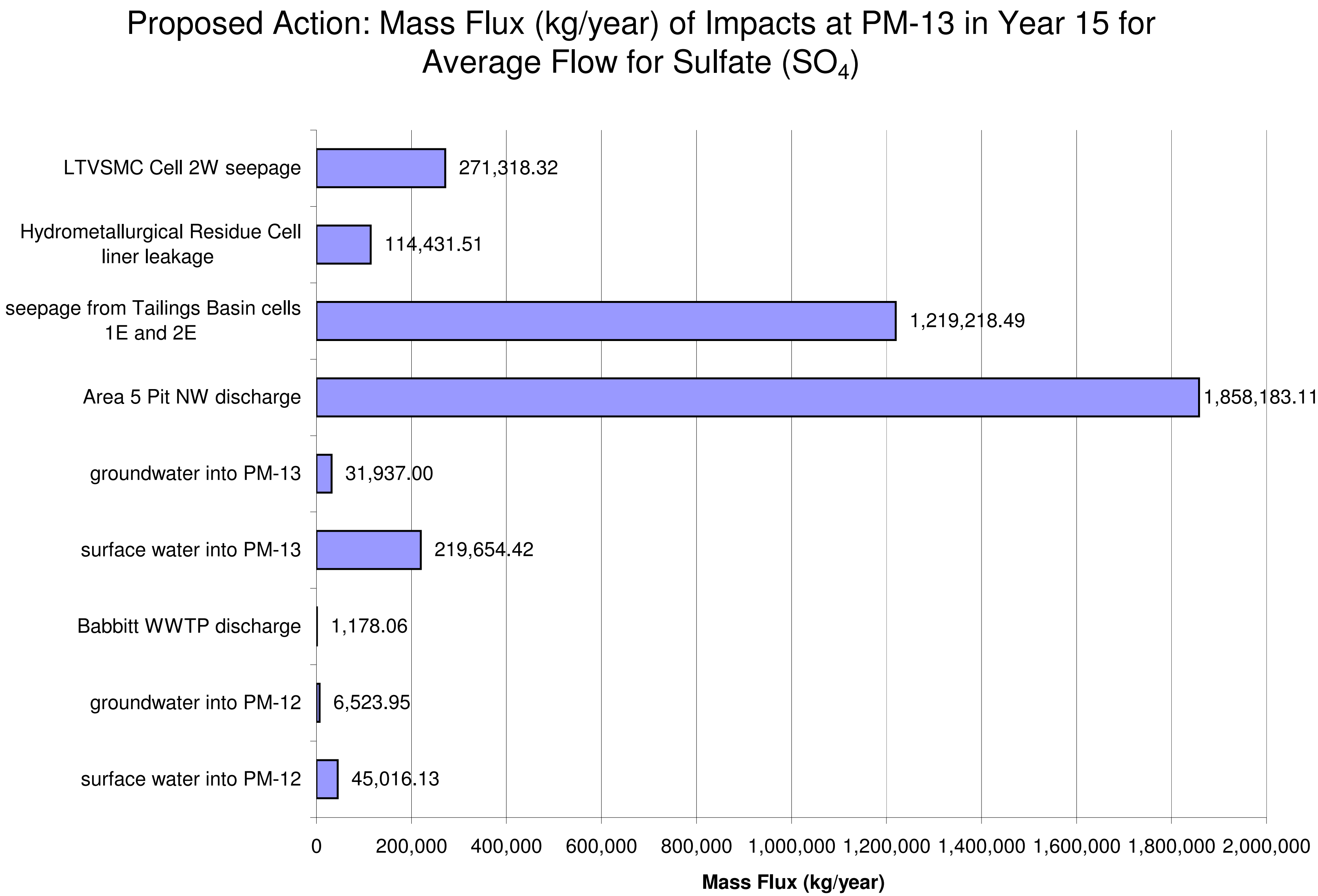

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
445.08
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
57,164.88
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)

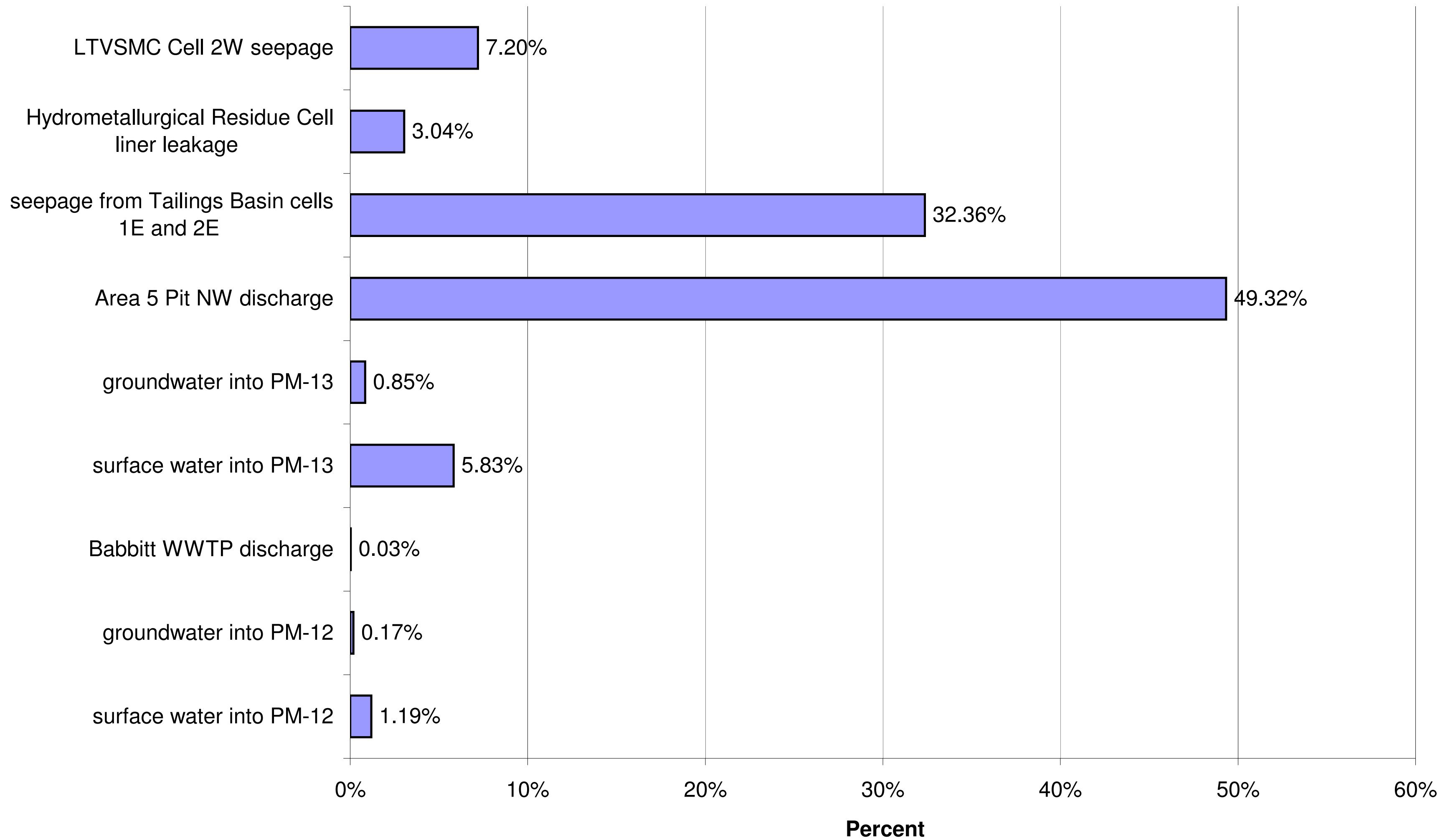


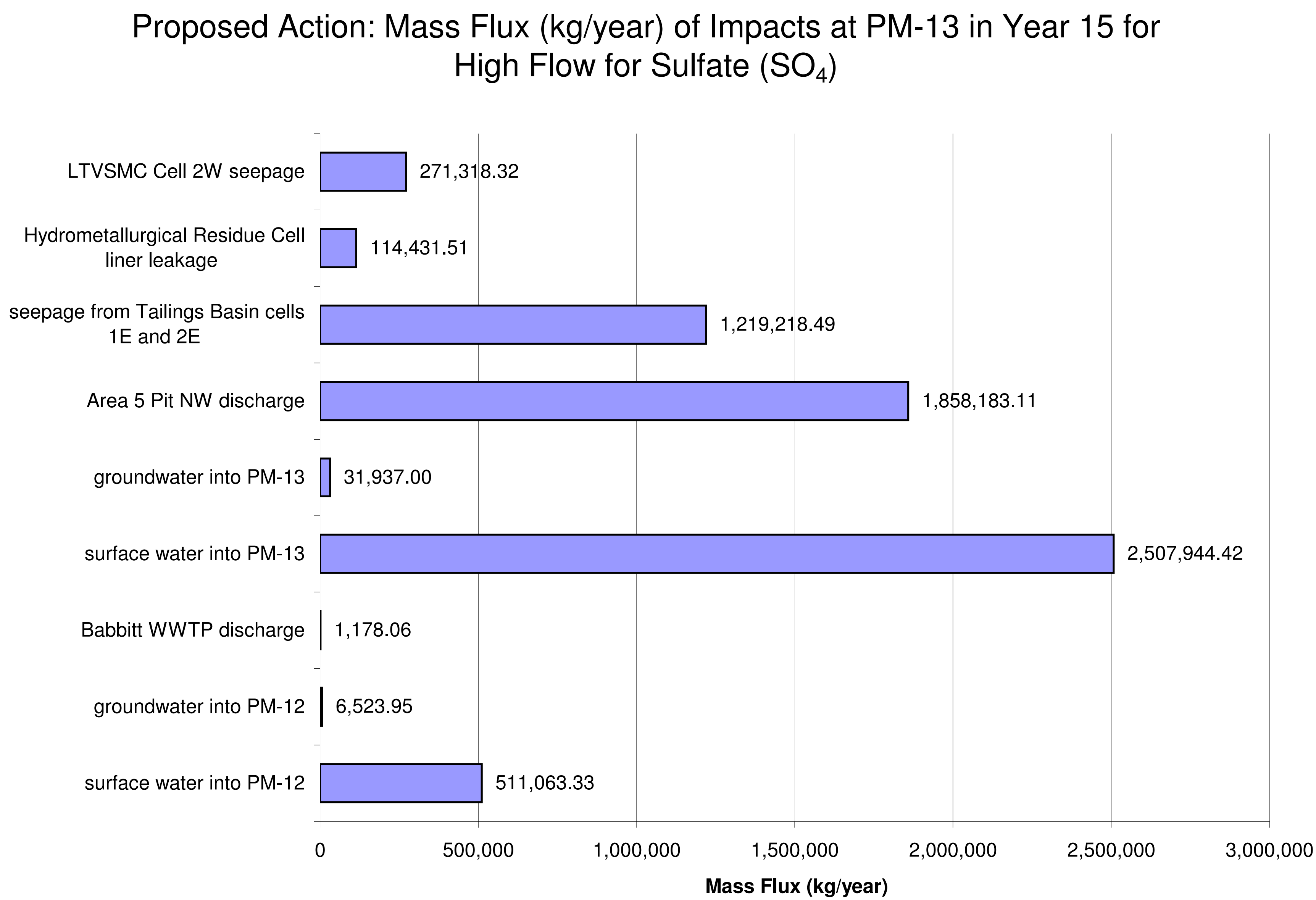

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,318.32
Hydrometallurgical Residue Cell liner leakage
114,431.51
seepage from Tailings Basin cells 1E and 2E
1,219,218.49
Area 5 Pit NW discharge
242,777.69
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
1,400,000
Mass Flux (kg/year)


Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
14.38%
Hydrometallurgical Residue Cell liner leakage
6.06%
seepage from Tailings Basin cells 1E and 2E
64.60%
Area 5 Pit NW discharge
12.86%
groundwater into PM-13
1.69%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.06%
groundwater into PM-12
0.35%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

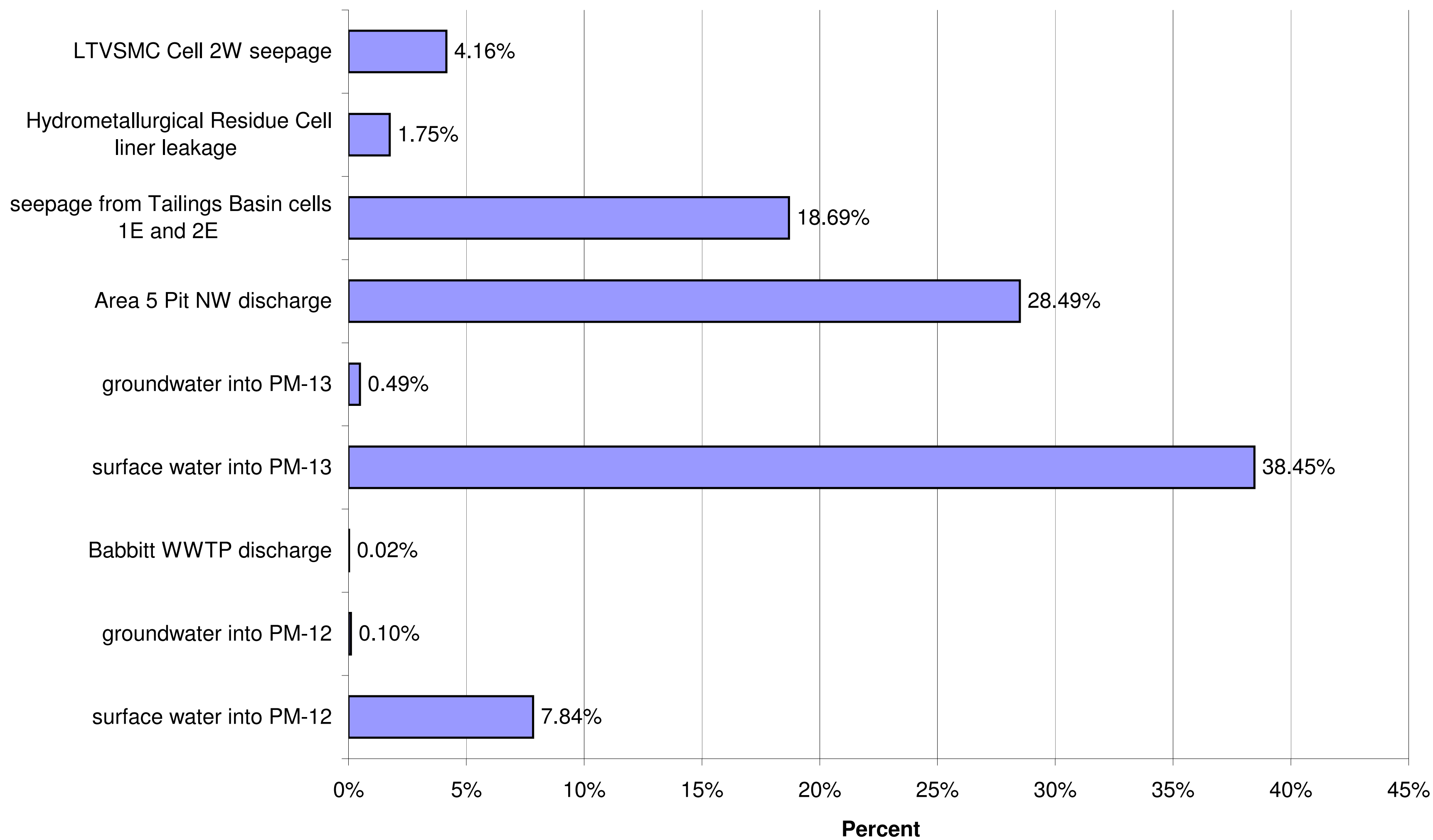

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,318.32
Hydrometallurgical Residue Cell liner leakage
114,431.51
seepage from Tailings Basin cells 1E and 2E
1,219,218.49
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
219,654.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
45,016.13
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
1,400,000
1,600,000
1,800,000
2,000,000
Mass Flux (kg/year)

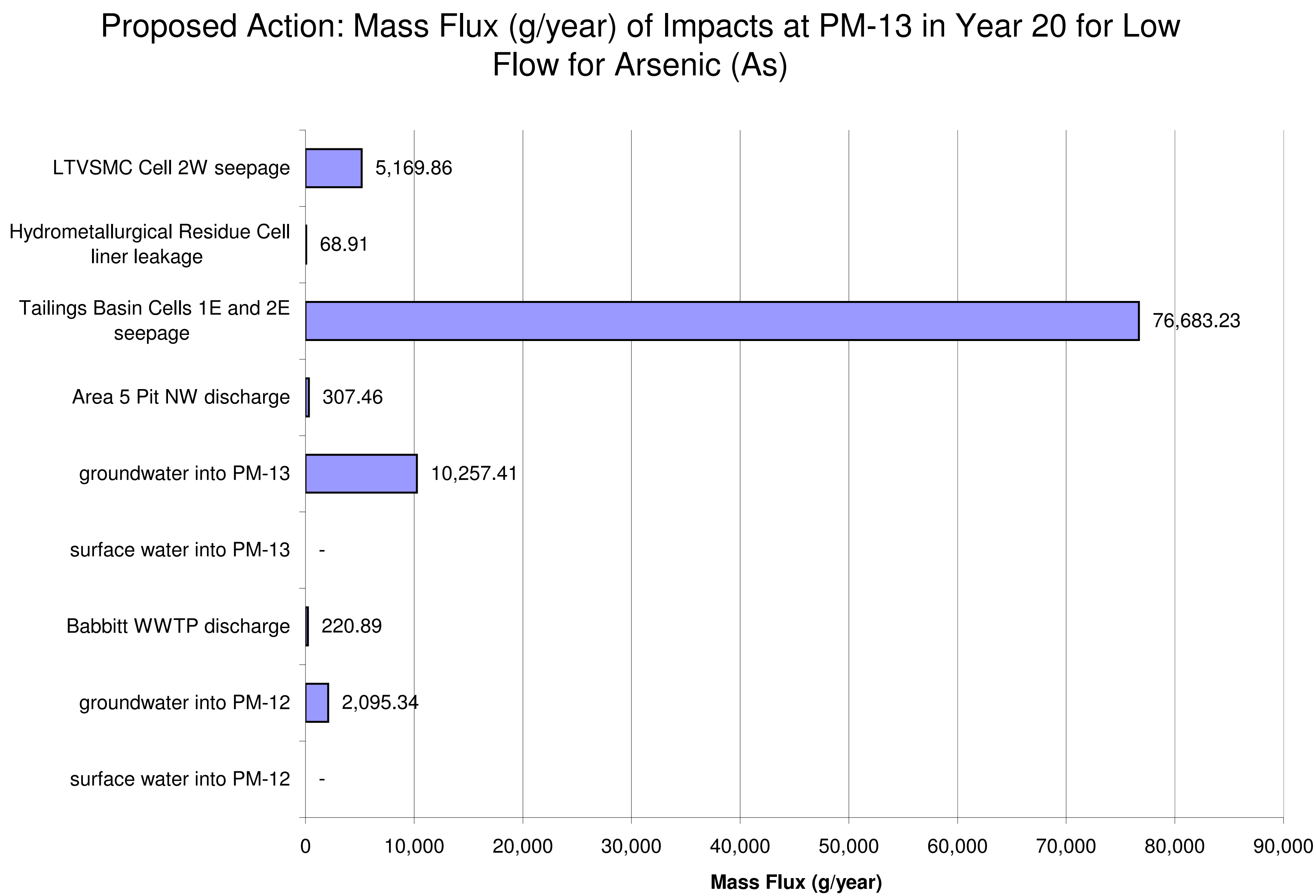
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)



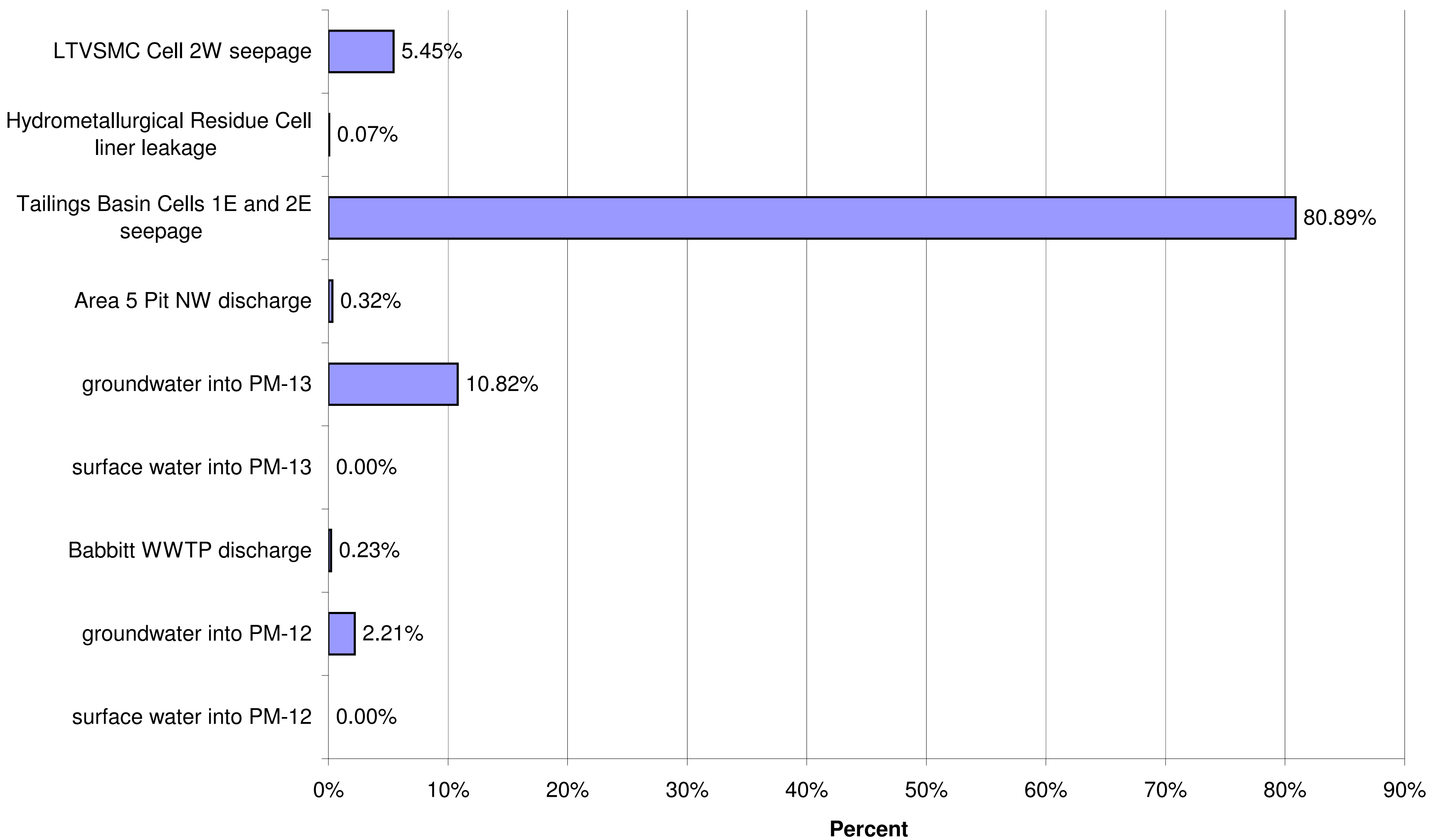

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,318.32
Hydrometallurgical Residue Cell liner leakage
114,431.51
seepage from Tailings Basin cells 1E and 2E
1,219,218.49
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
2,507,944.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
511,063.33
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
Mass Flux (kg/year)

Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)

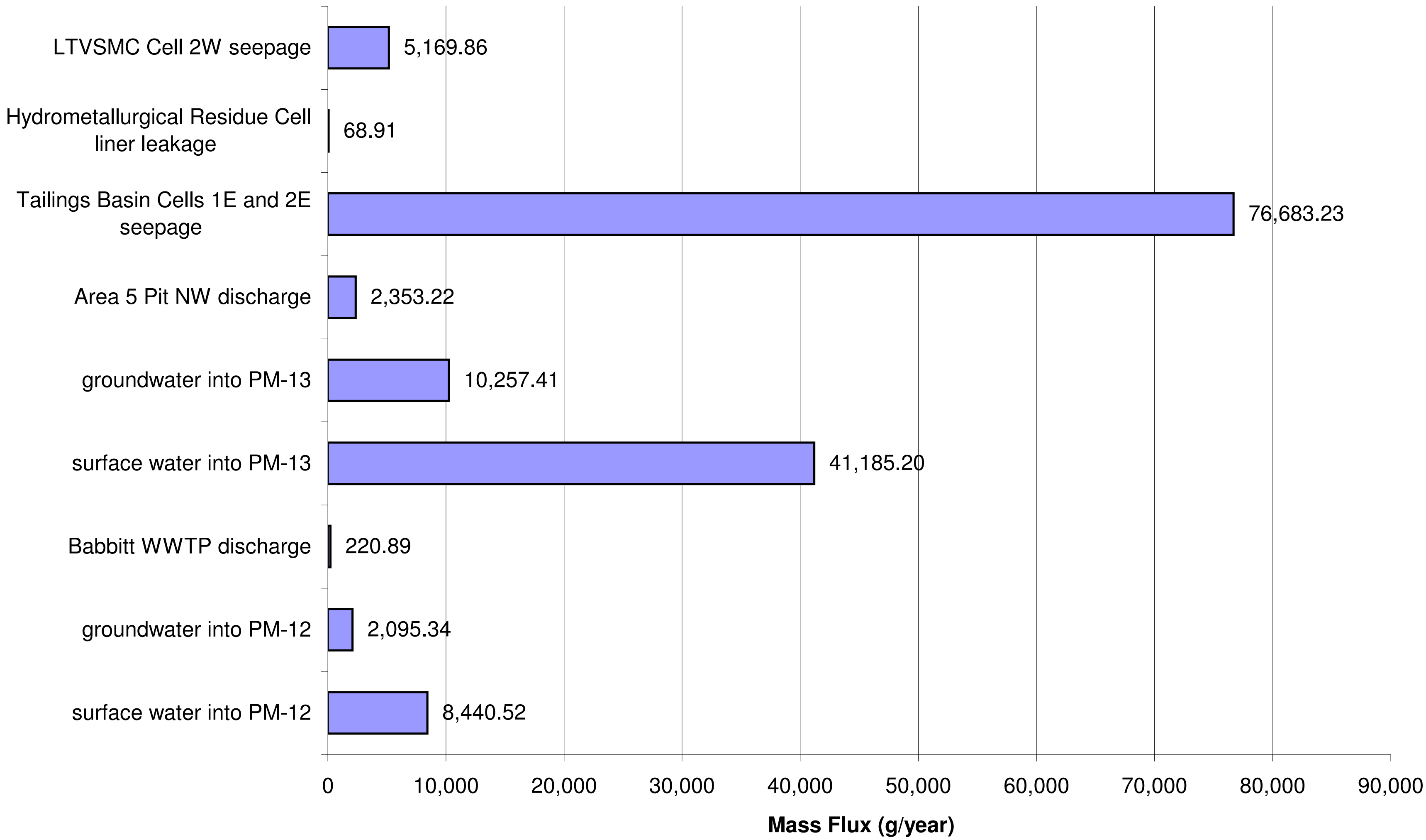



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
68.91
Tailings Basin Cells 1E and 2E seepage
76,683.23
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

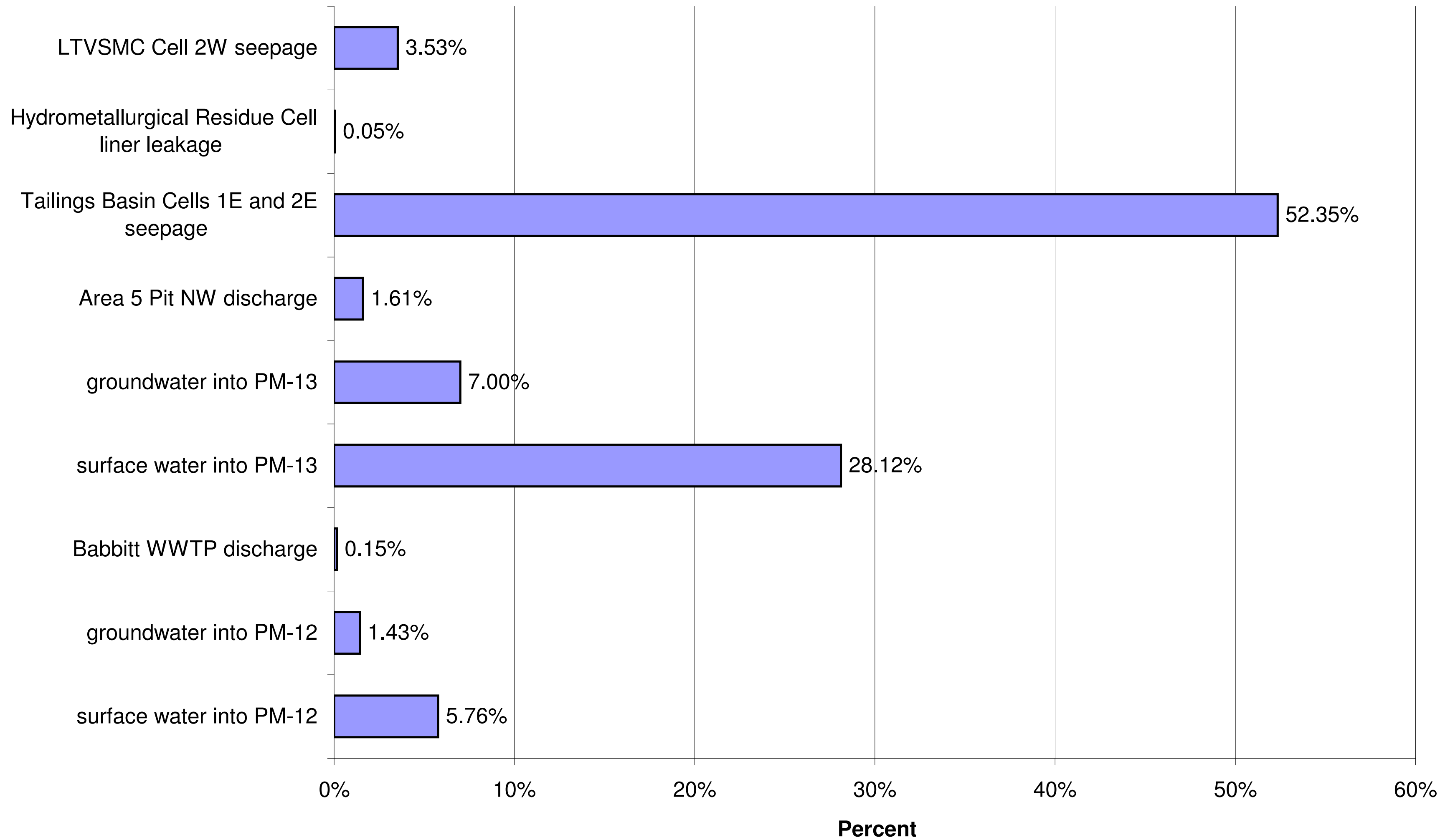
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)



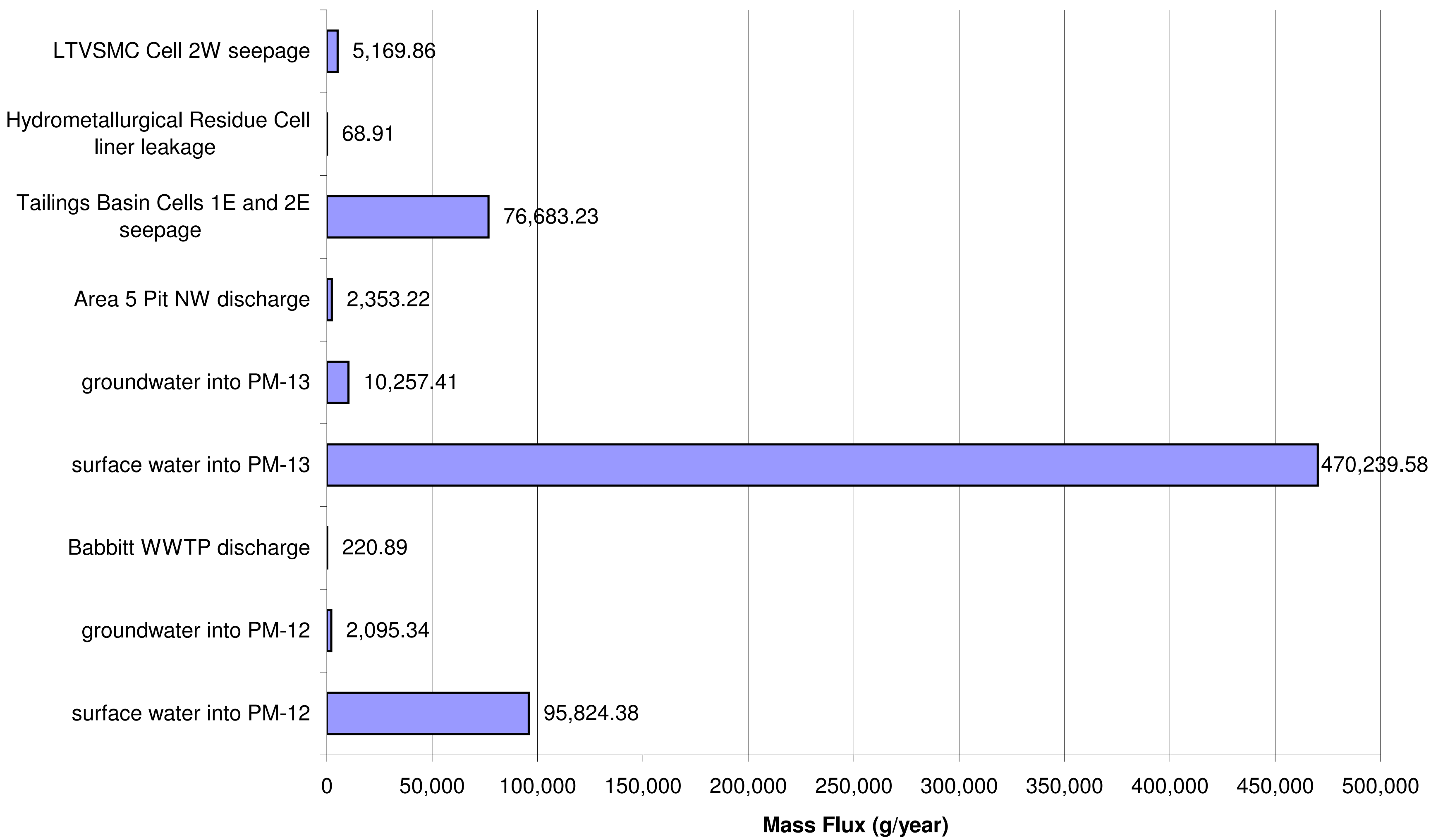
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)

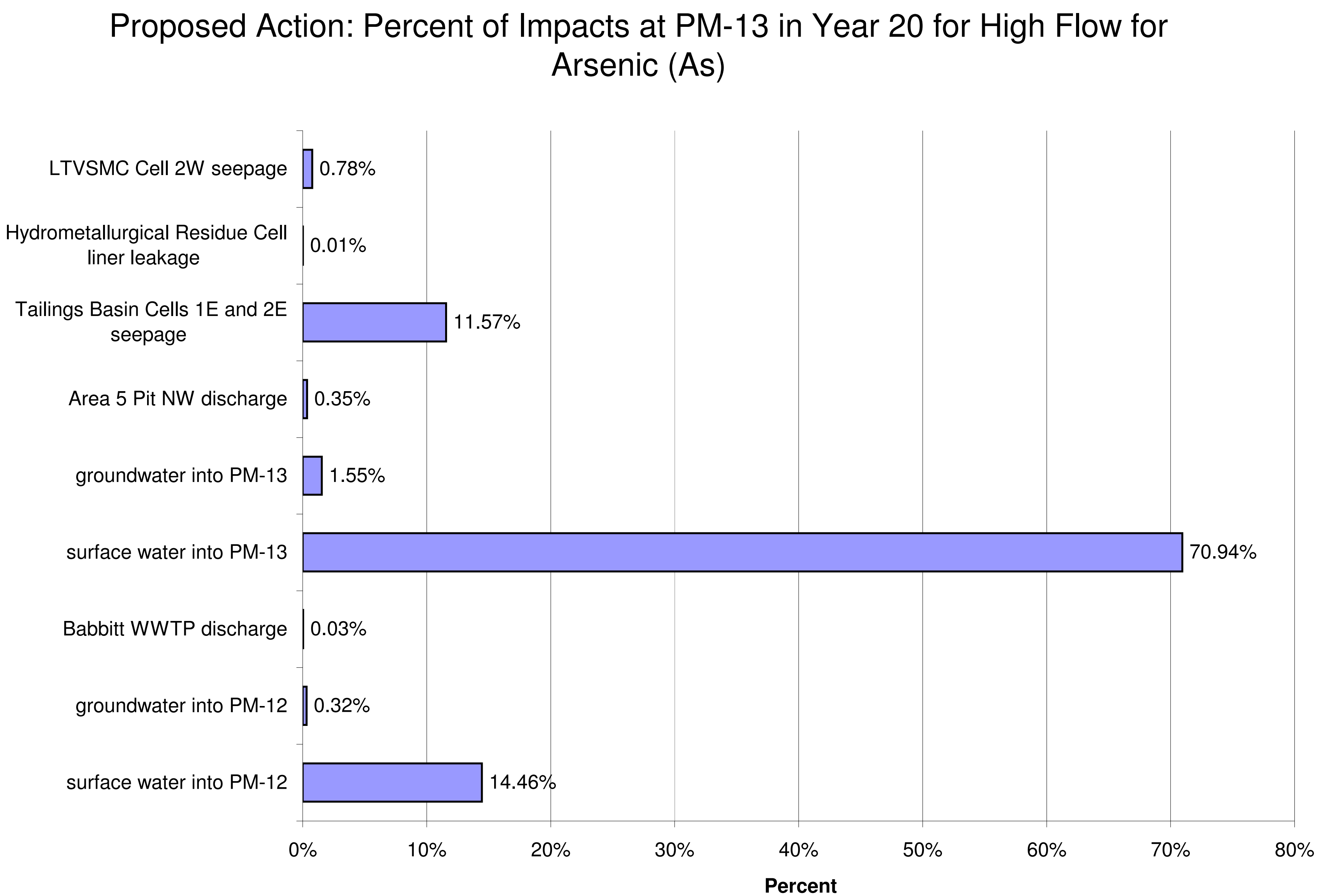


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)

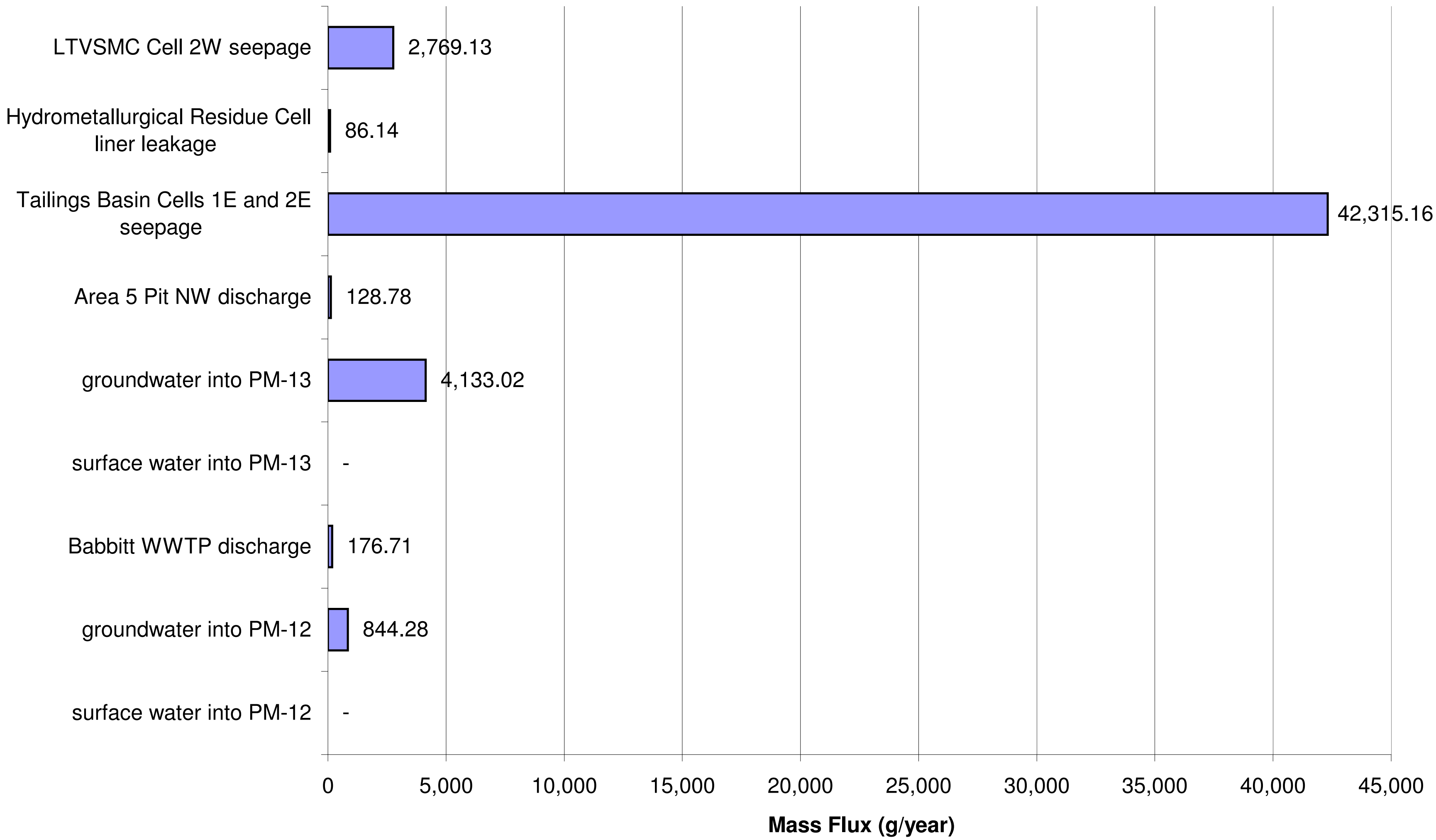


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)

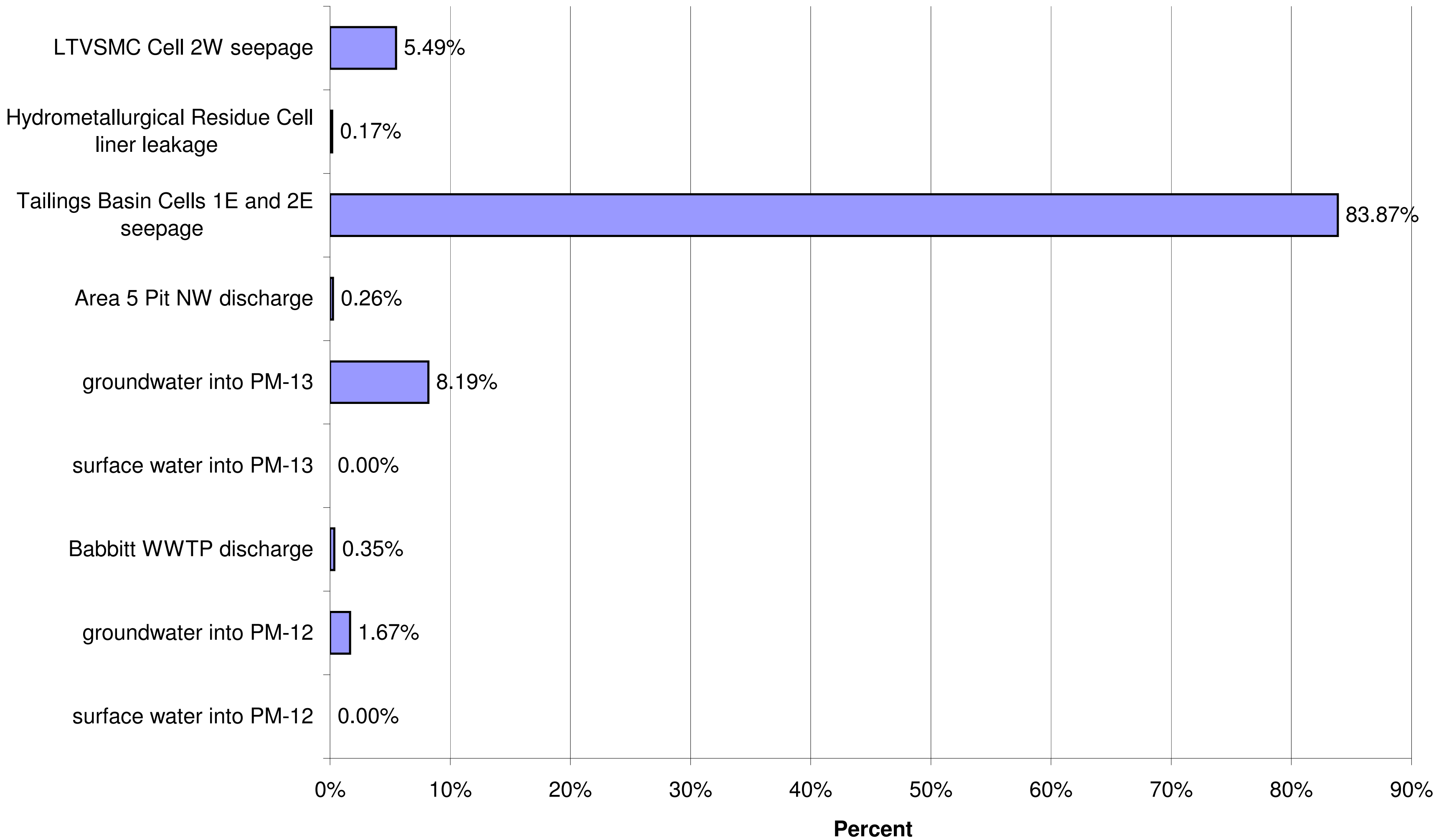



Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.78%
Hydrometallurgical Residue Cell liner leakage
0.01%
Tailings Basin Cells 1E and 2E seepage
11.57%
Area 5 Pit NW discharge
0.35%
groundwater into PM-13
1.55%
surface water into PM-13
70.94%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.32%
surface water into PM-12
14.46%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

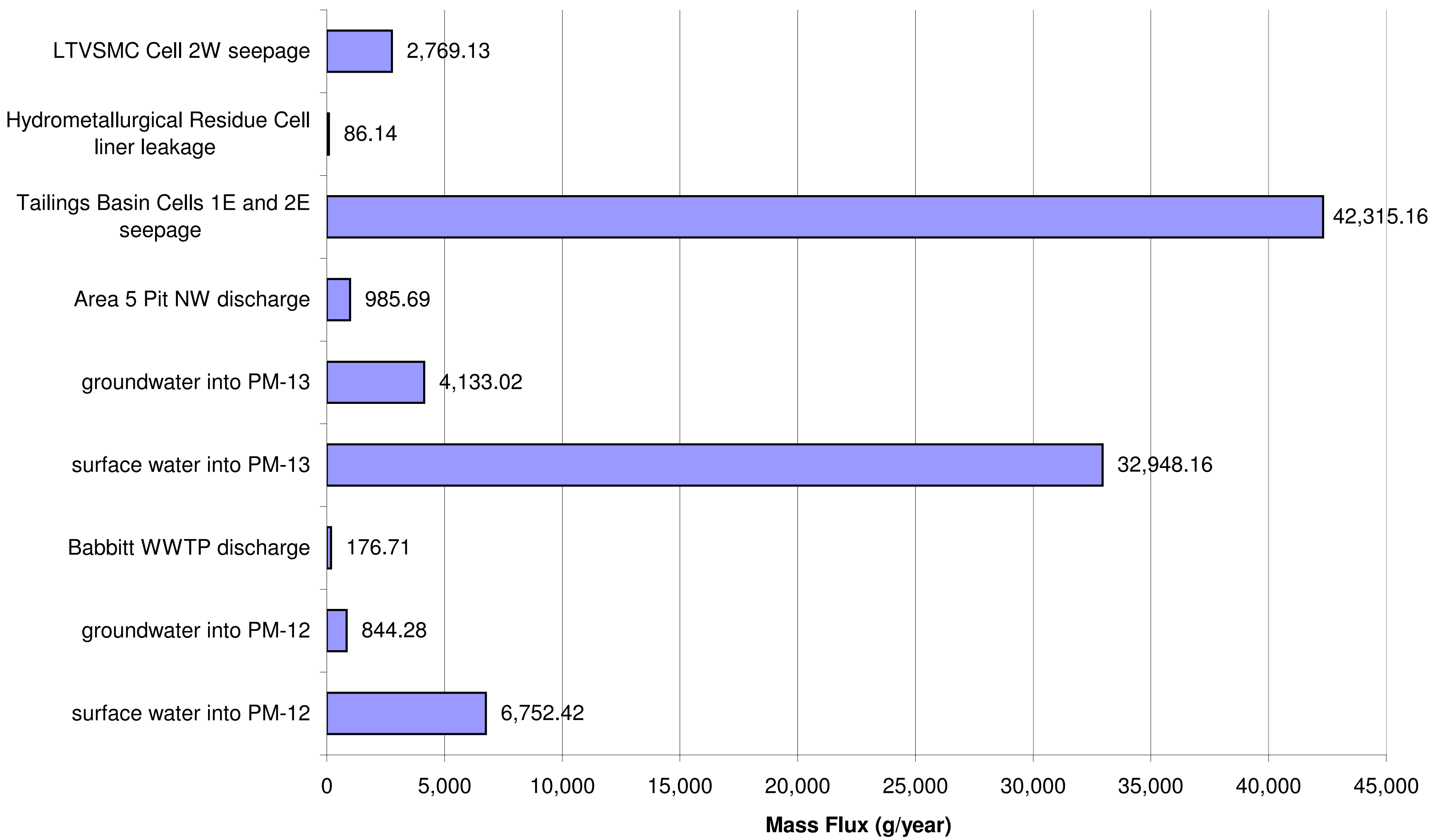
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)

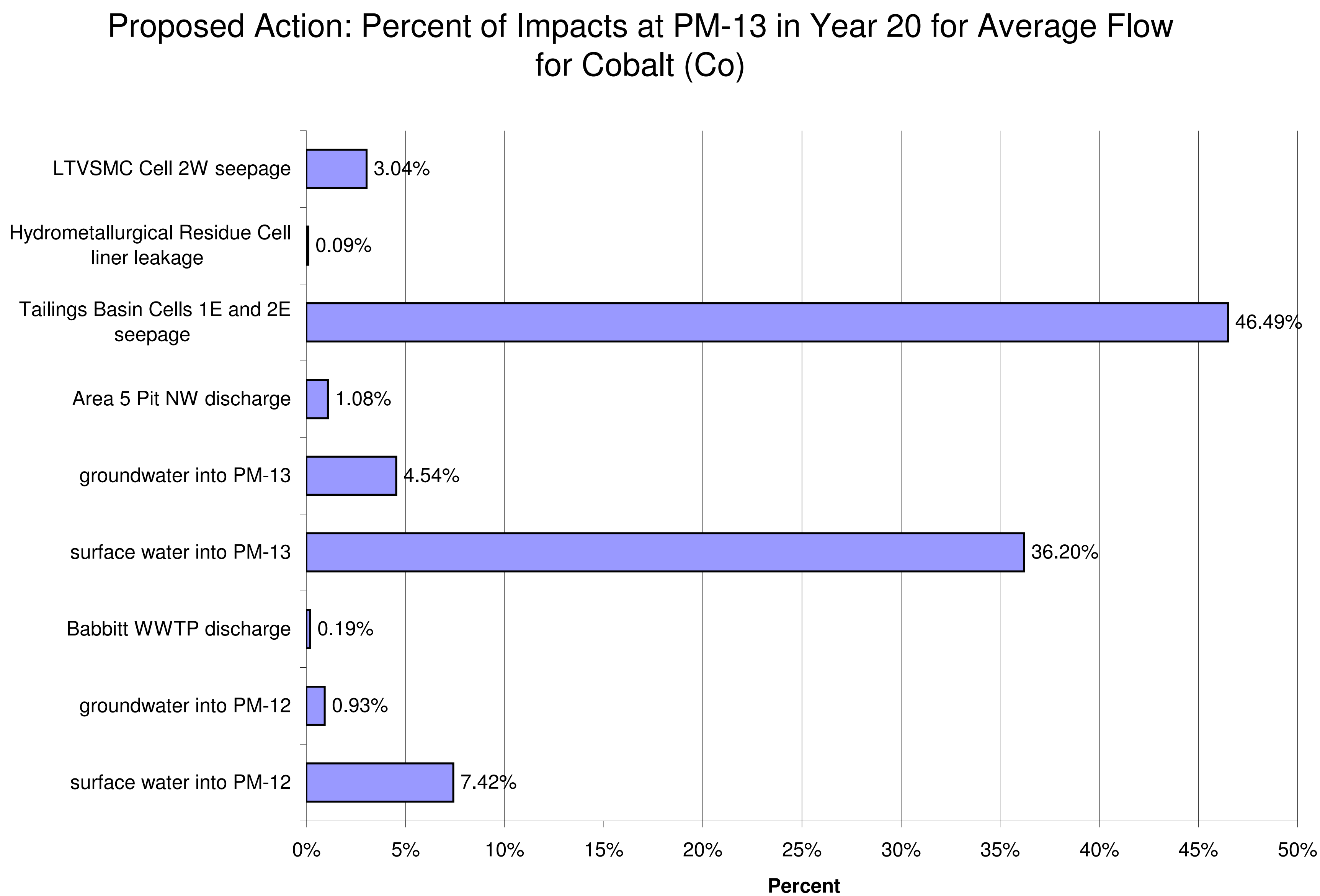


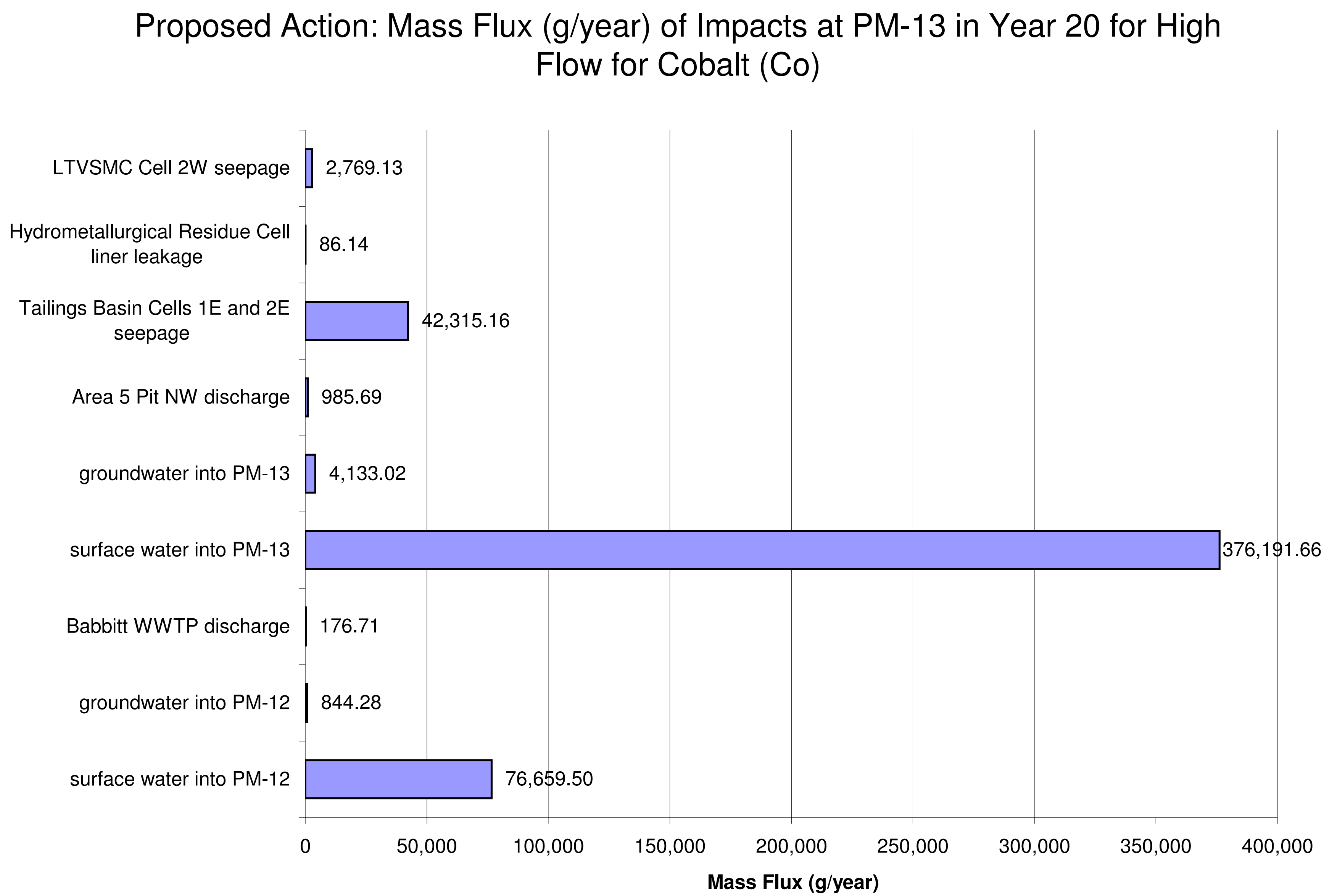
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)



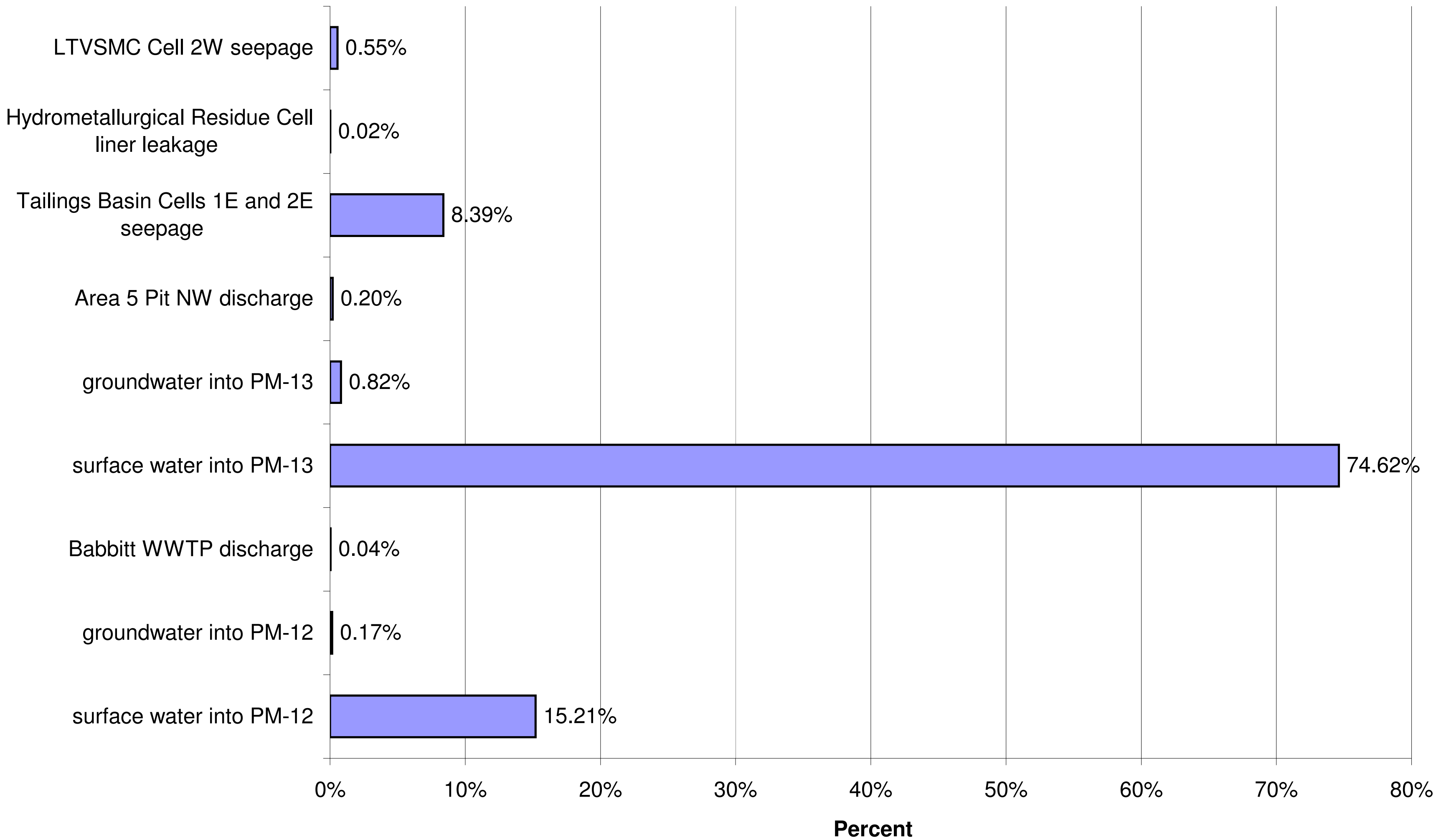
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)



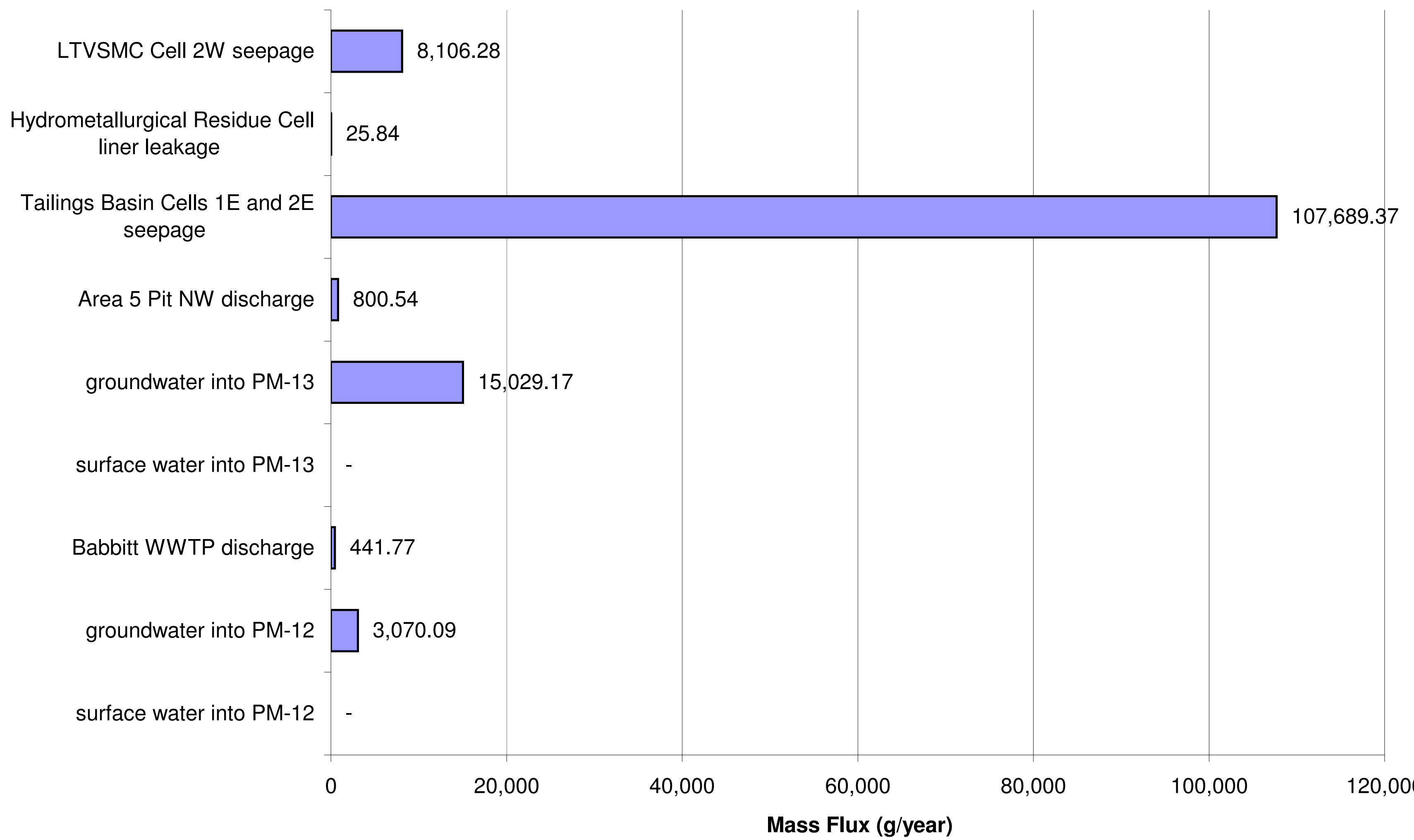

Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
3.04%
Hydrometallurgical Residue Cell liner leakage
0.09%
Tailings Basin Cells 1E and 2E seepage
46.49%
Area 5 Pit NW discharge
1.08%
groundwater into PM-13
4.54%
surface water into PM-13
36.20%
Babbitt WWTP discharge
0.19%
groundwater into PM-12
0.93%
surface water into PM-12
7.42%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

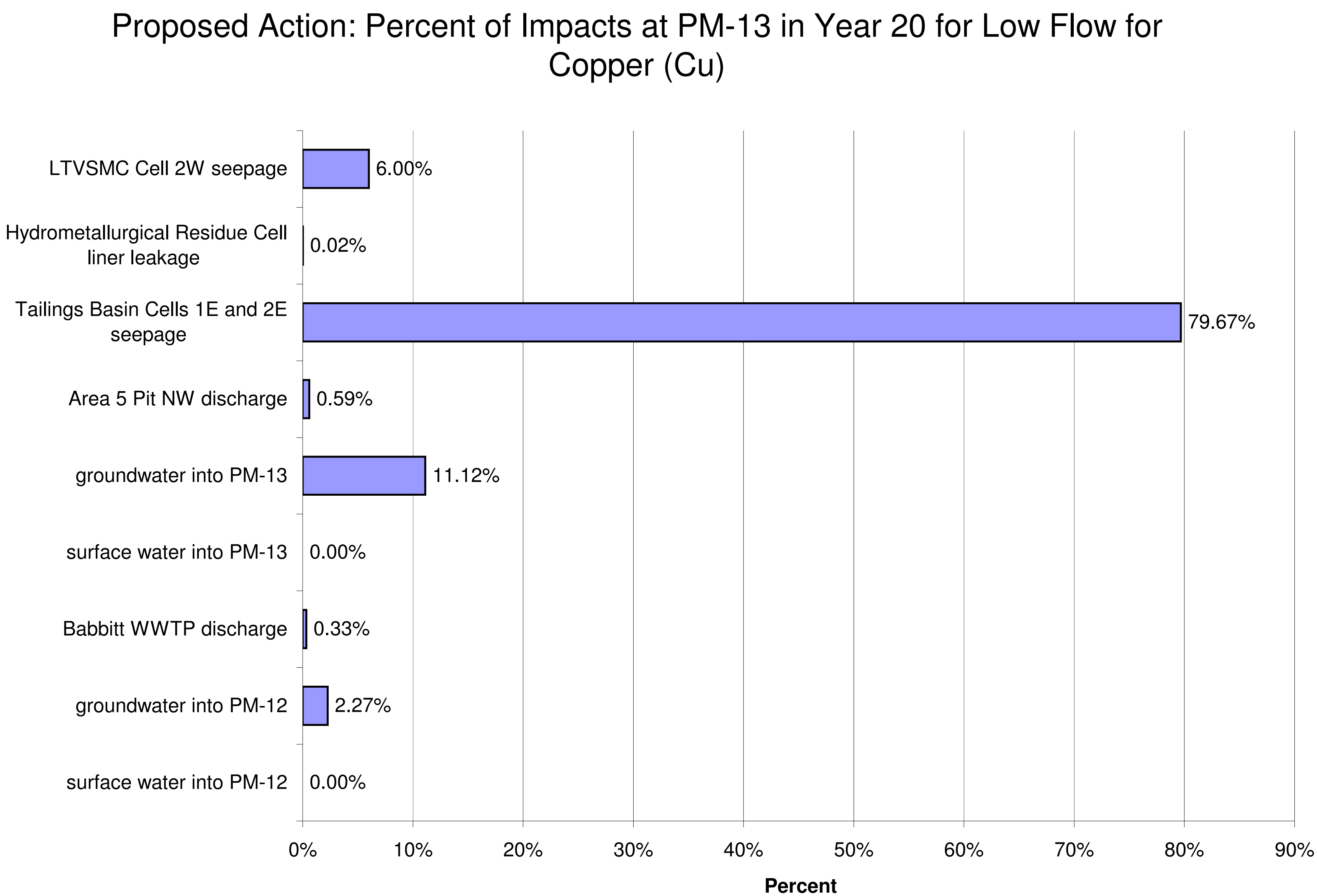

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
86.14
Tailings Basin Cells 1E and 2E seepage
42,315.16
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)

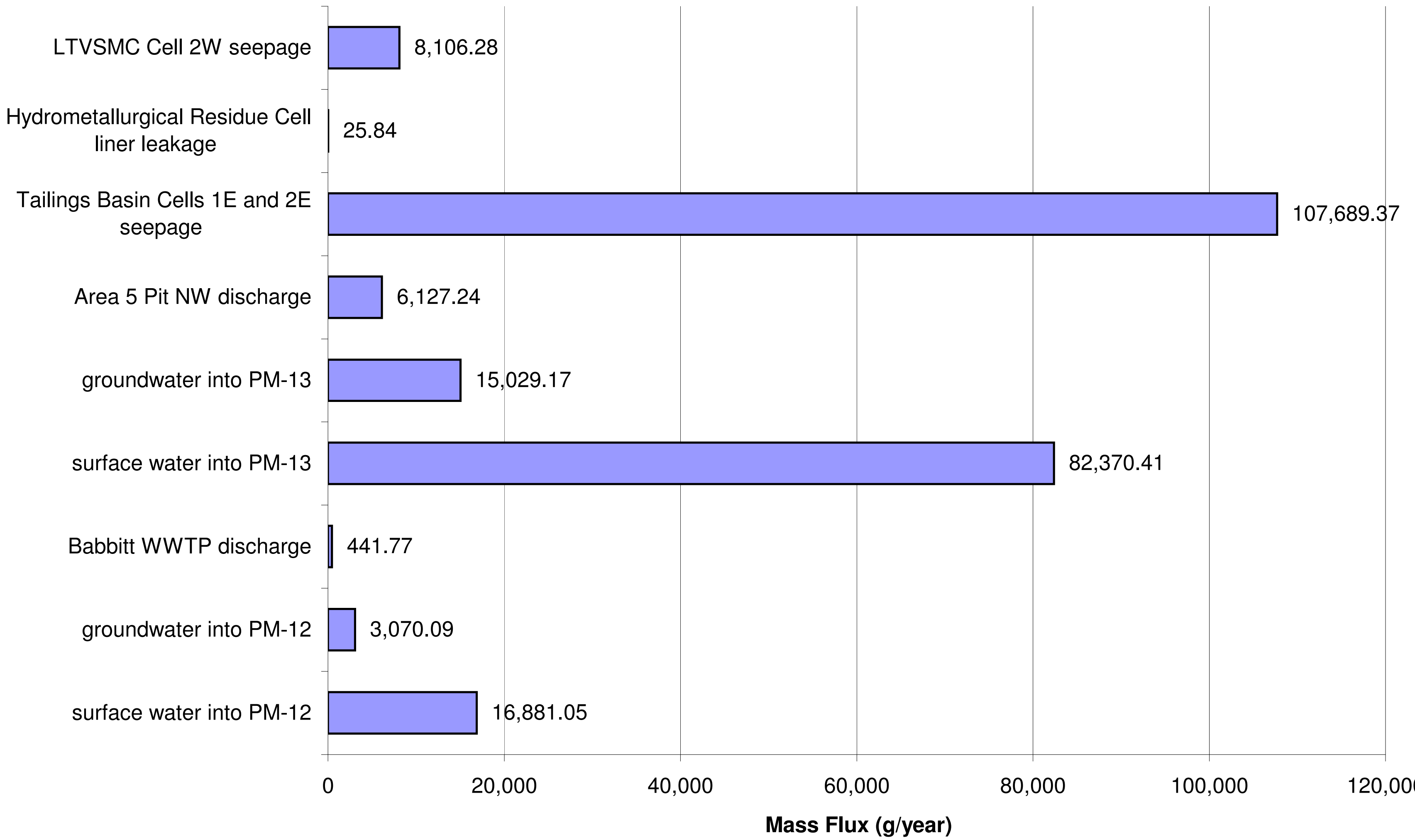


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)

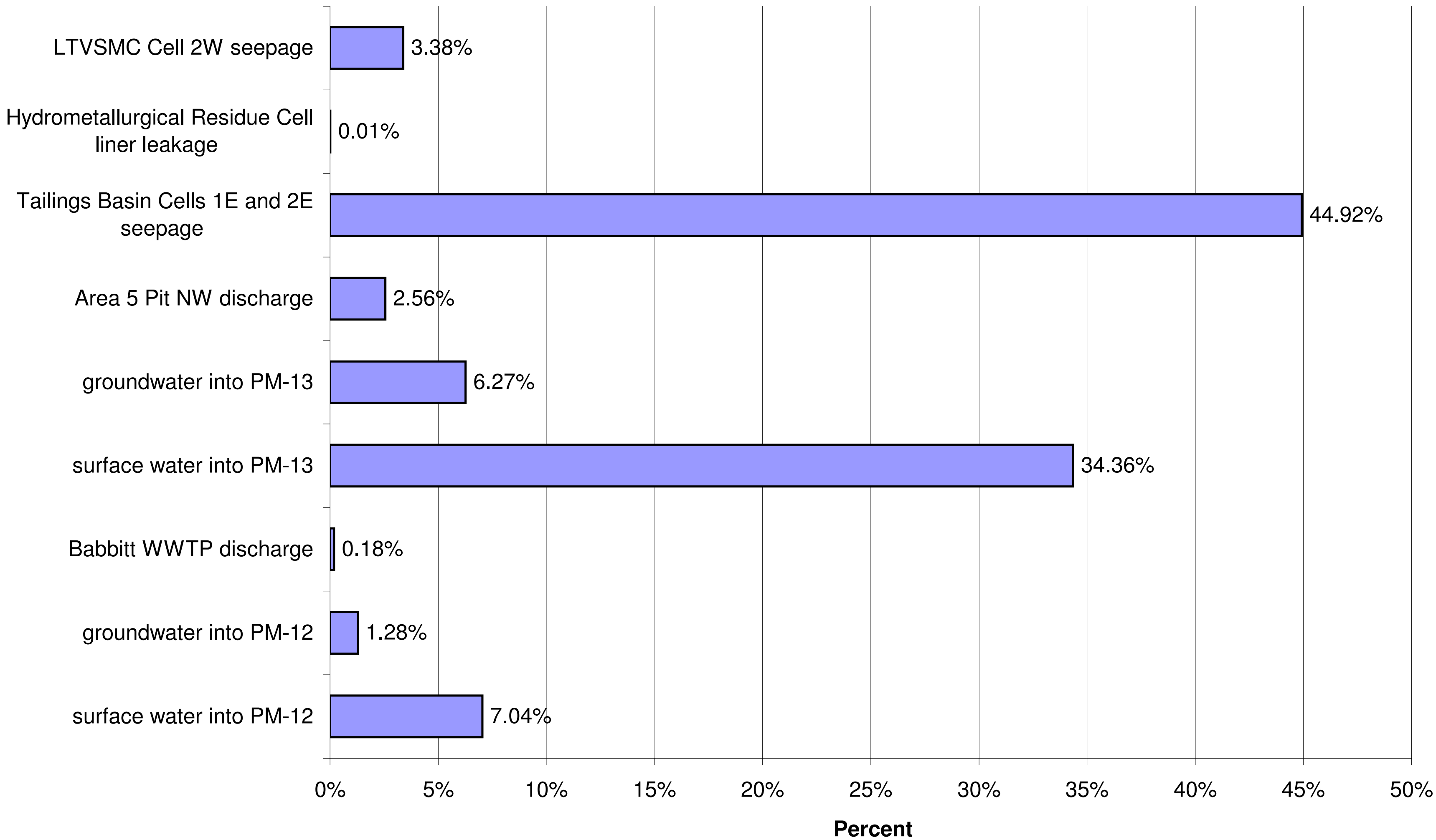



Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6.00%
Hydrometallurgical Residue Cell liner leakage
0.02%
Tailings Basin Cells 1E and 2E seepage
79.67%
Area 5 Pit NW discharge
0.59%
groundwater into PM-13
11.12%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.33%
groundwater into PM-12
2.27%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

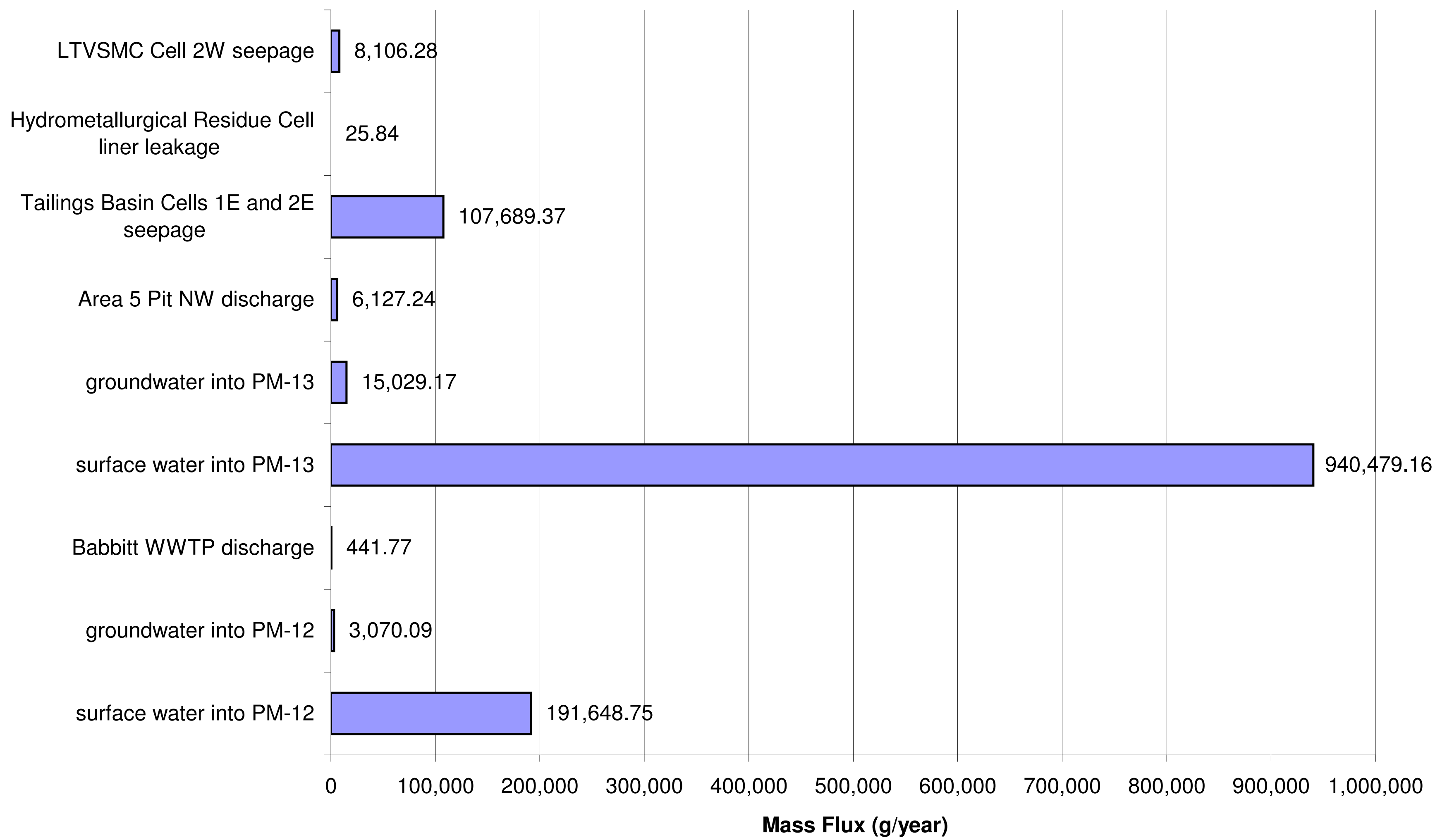
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)



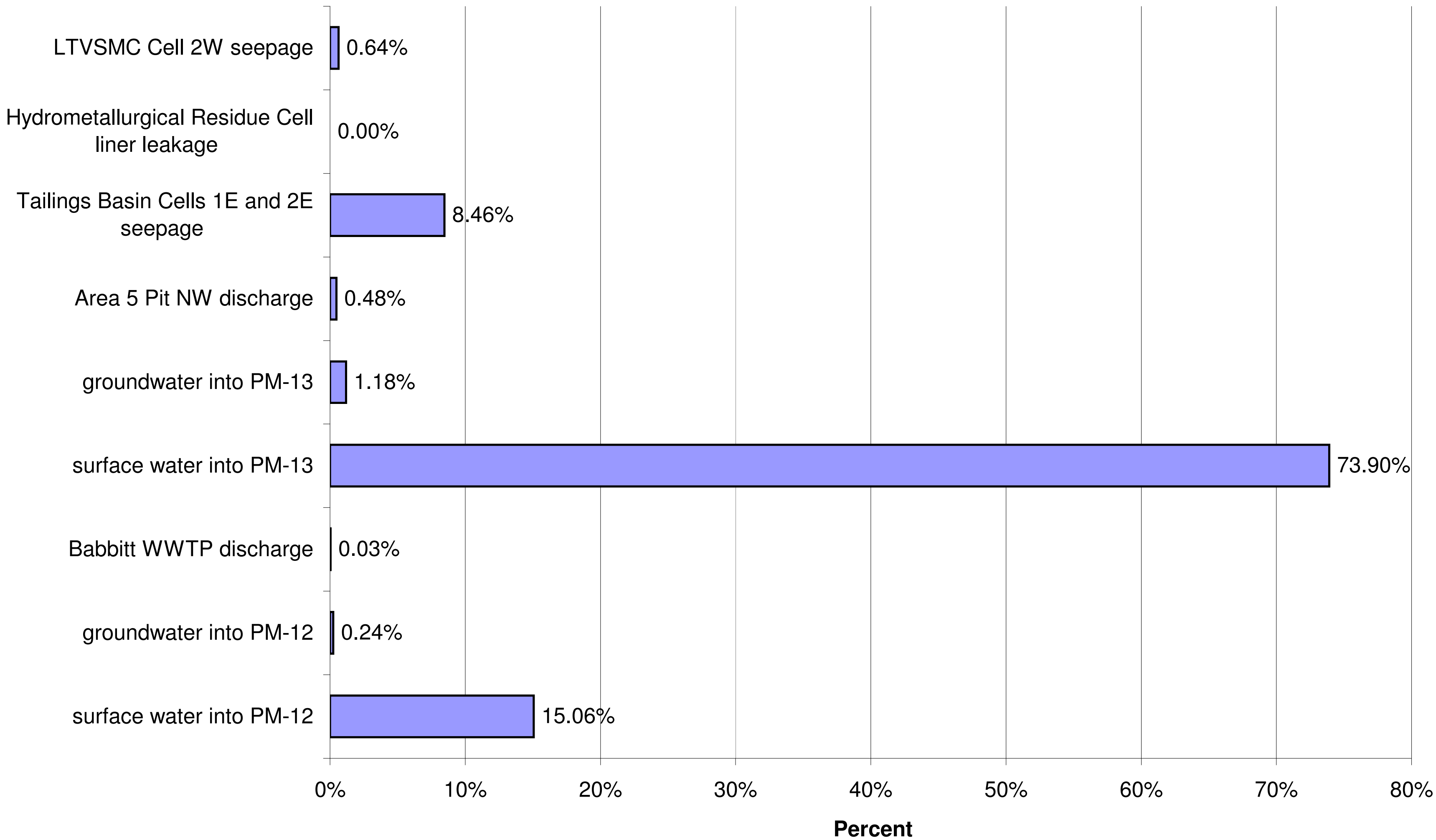
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)

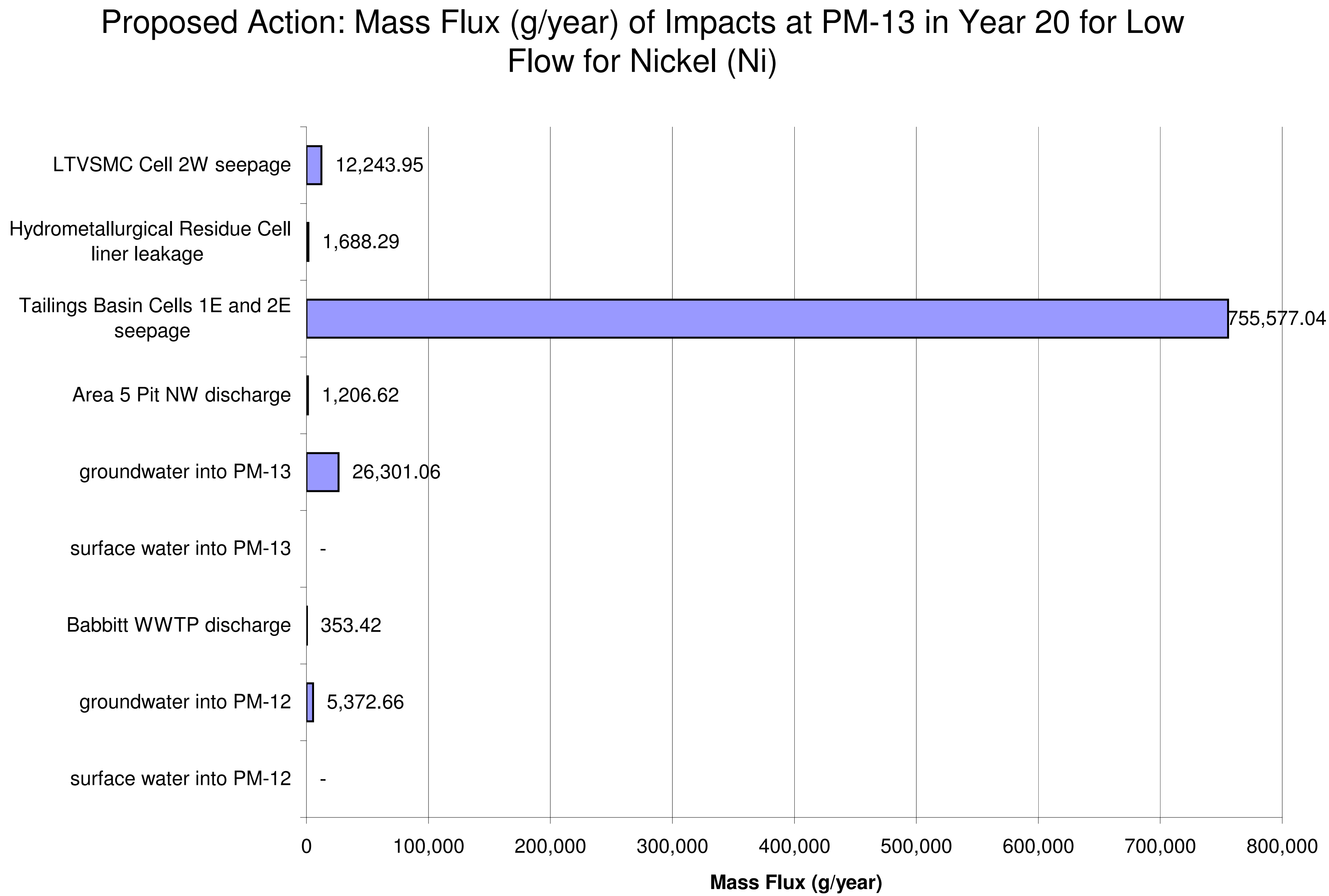


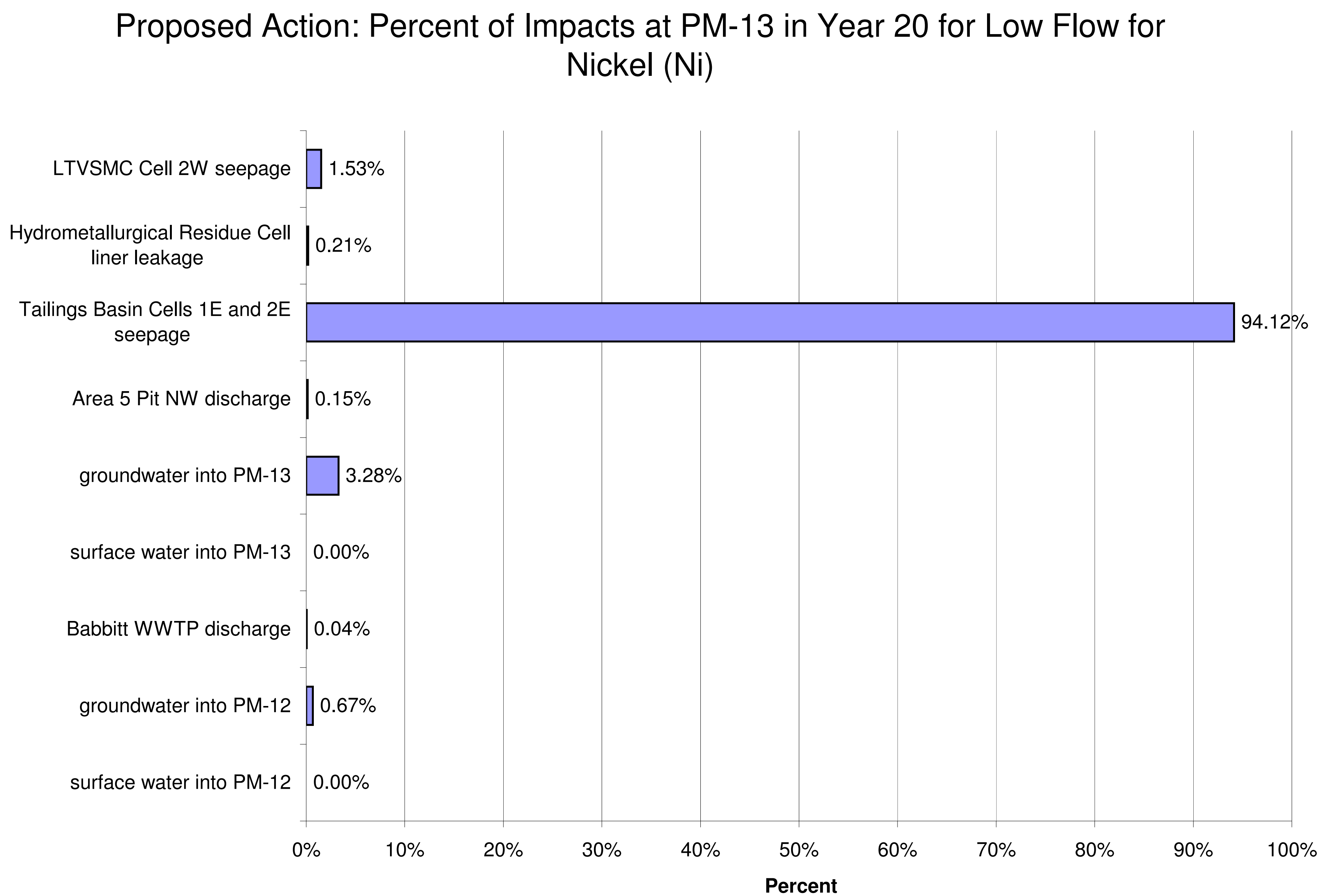
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)



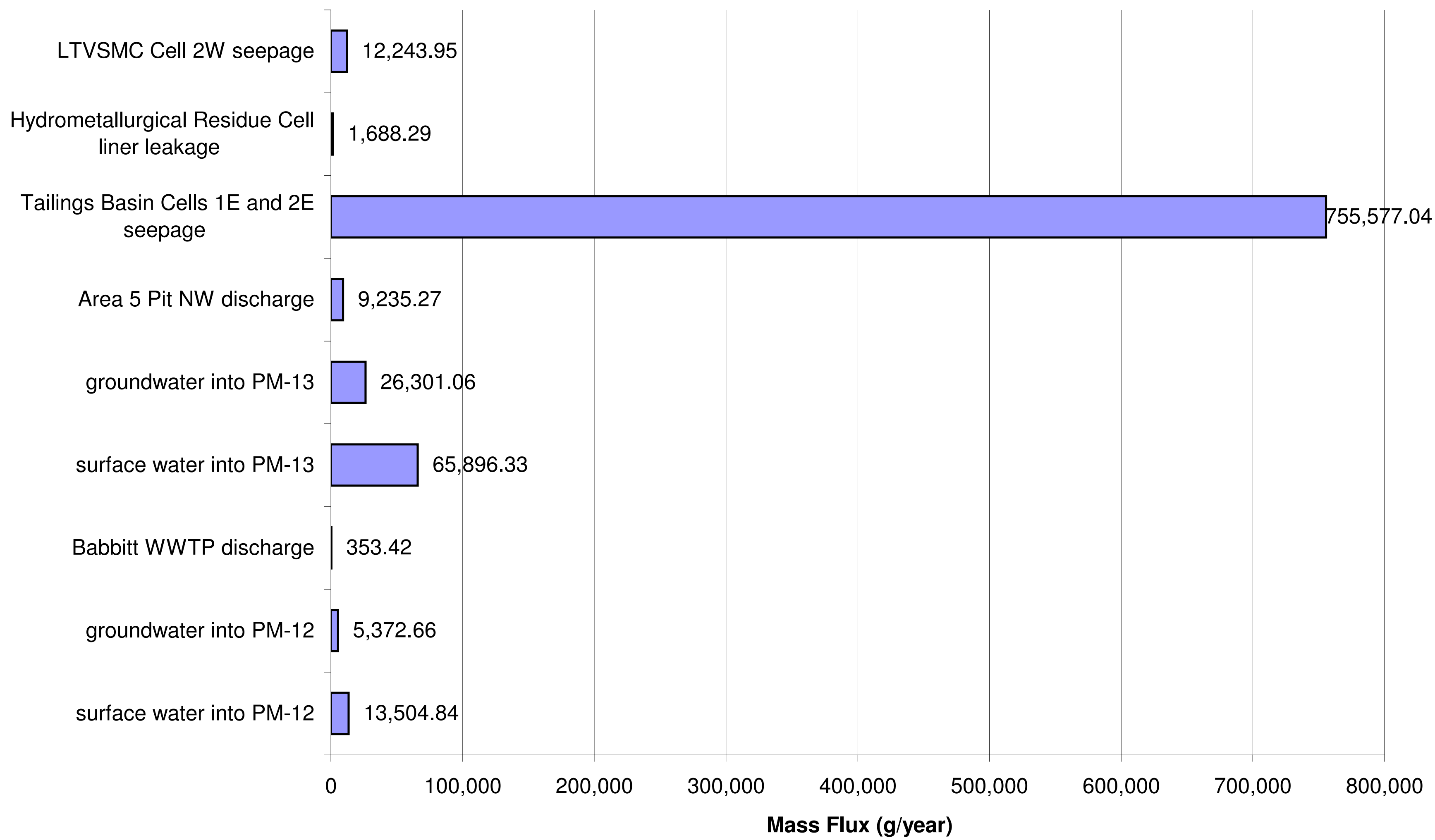
Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)

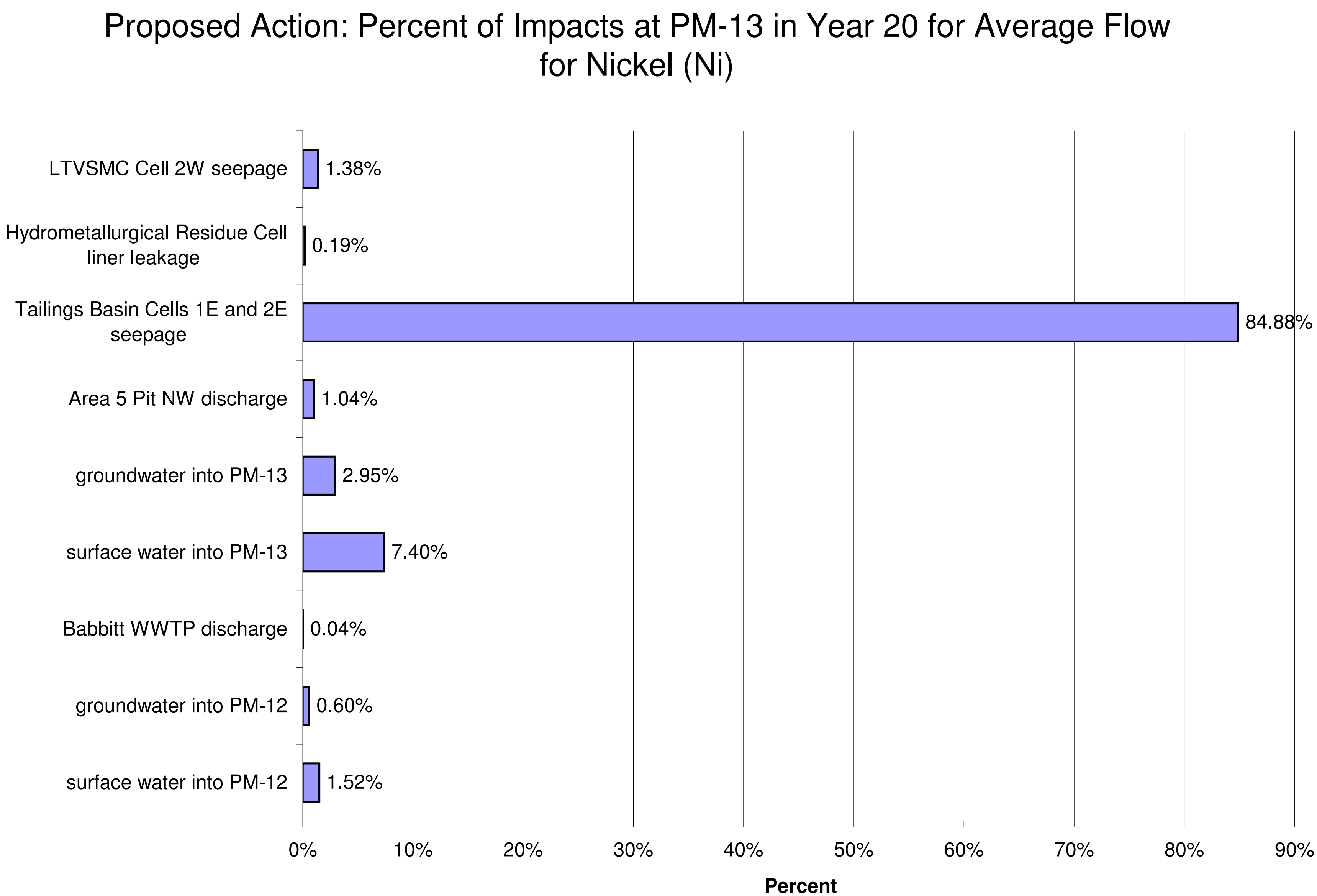



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,688.29
Tailings Basin Cells 1E and 2E seepage
755,577.04
Area 5 Pit NW discharge
1,206.62
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
-
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

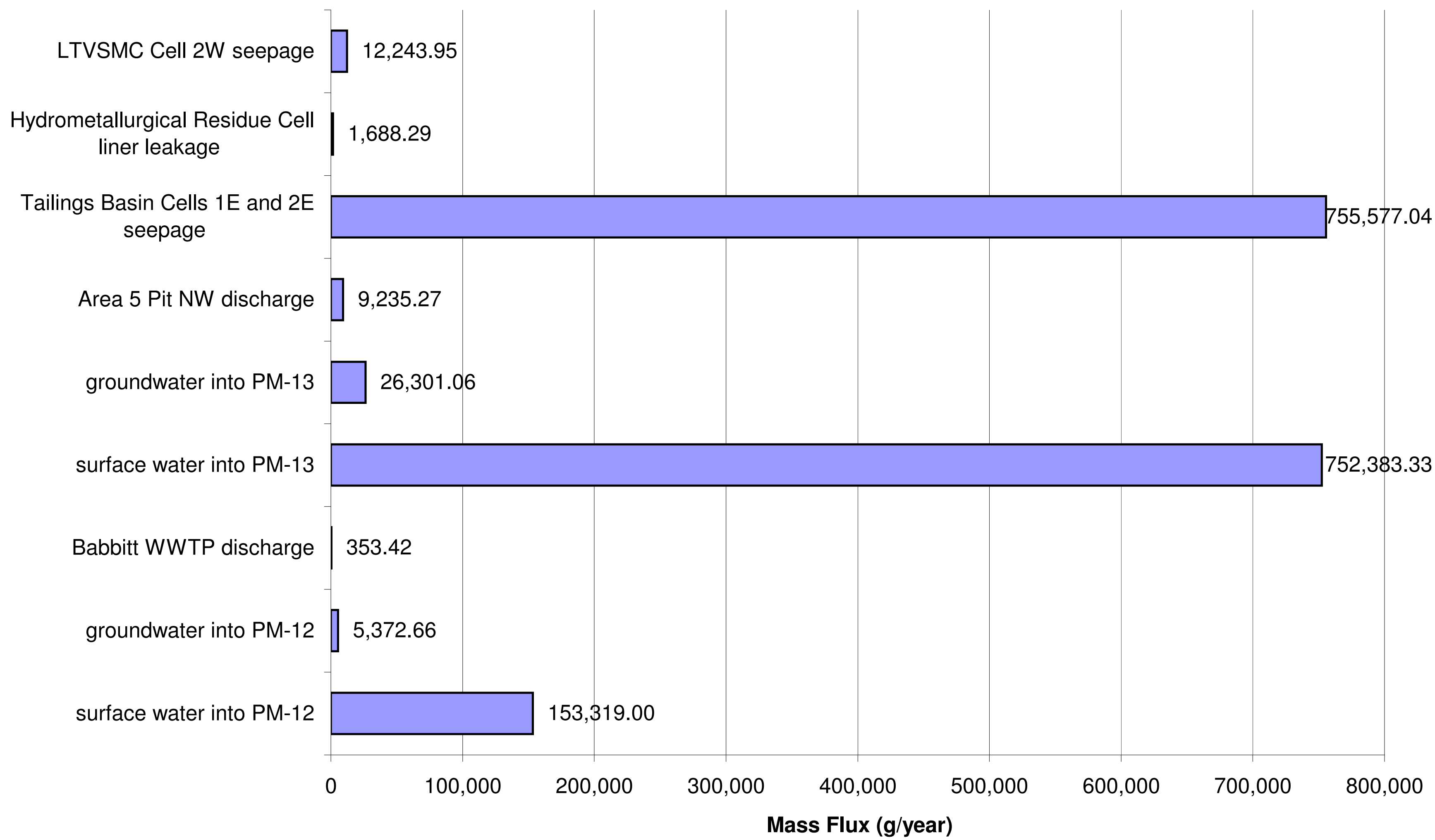

Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
1.53%
Hydrometallurgical Residue Cell liner leakage
0.21%
Tailings Basin Cells 1E and 2E seepage
94.12%
Area 5 Pit NW discharge
0.15%
groundwater into PM-13
3.28%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.67%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

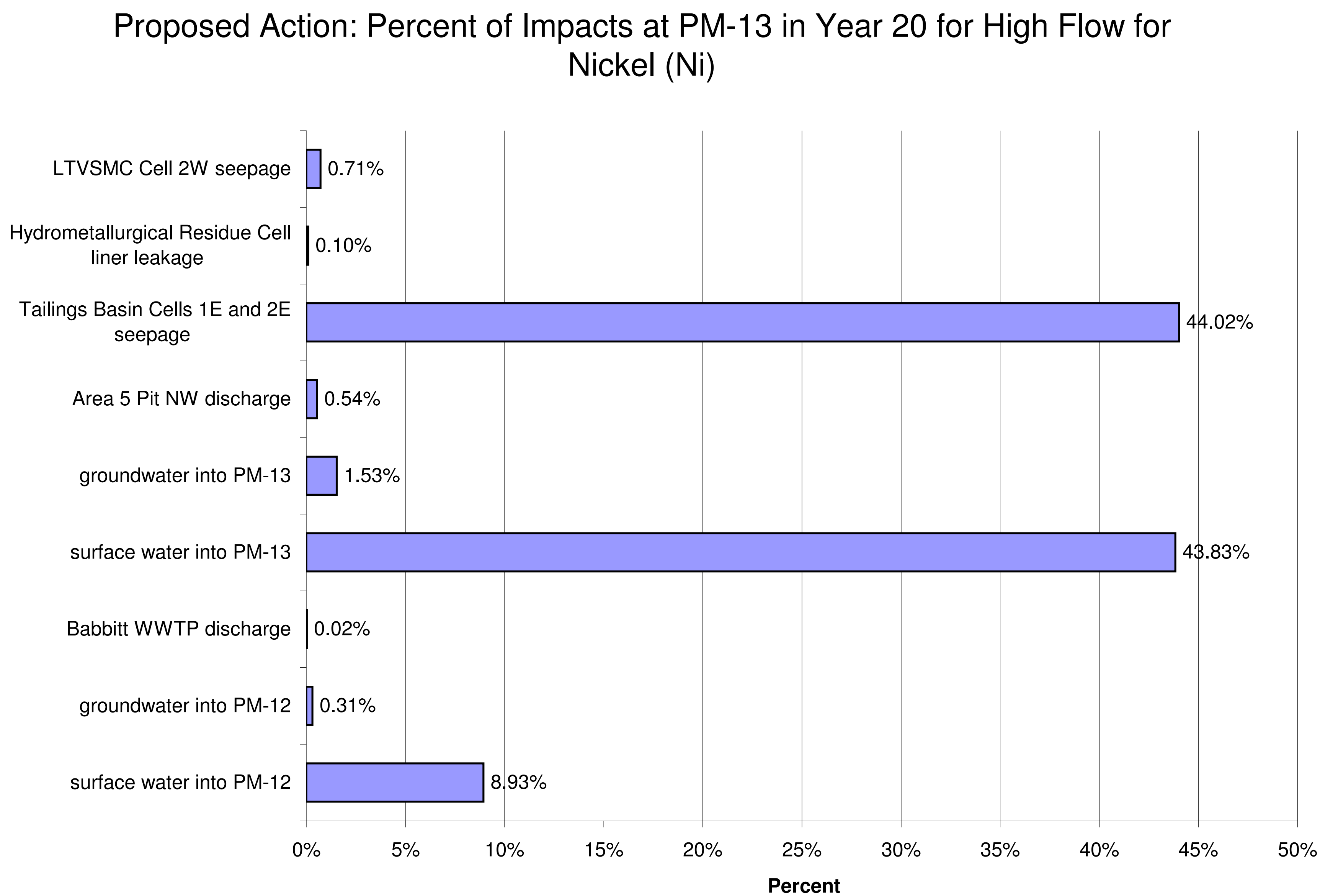
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)



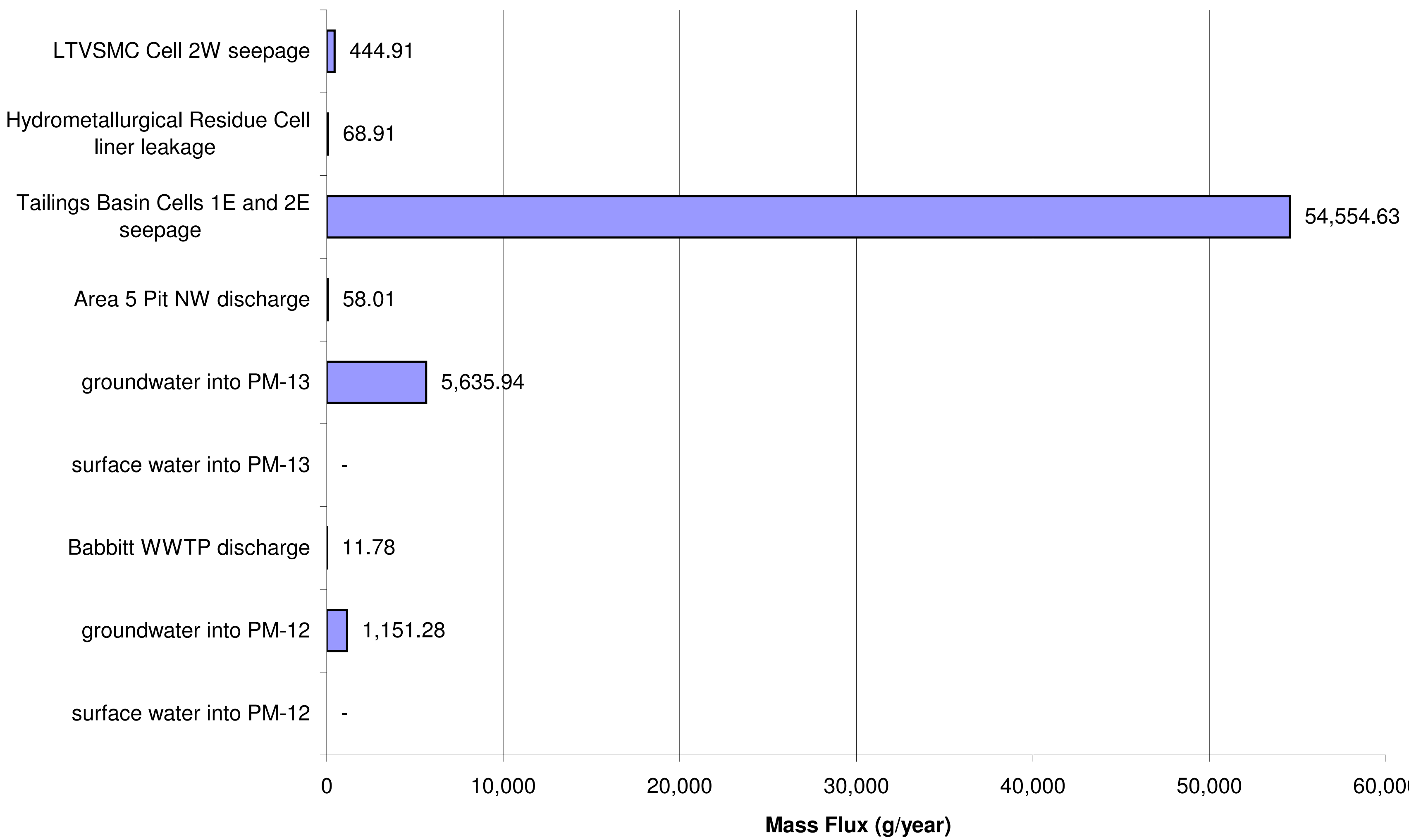

Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
1.38%
Hydrometallurgical Residue Cell liner leakage
0.19%
Tailings Basin Cells 1E and 2E seepage
84.88%
Area 5 Pit NW discharge
1.04%
groundwater into PM-13
2.95%
surface water into PM-13
7.40%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.60%
surface water into PM-12
1.52%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)

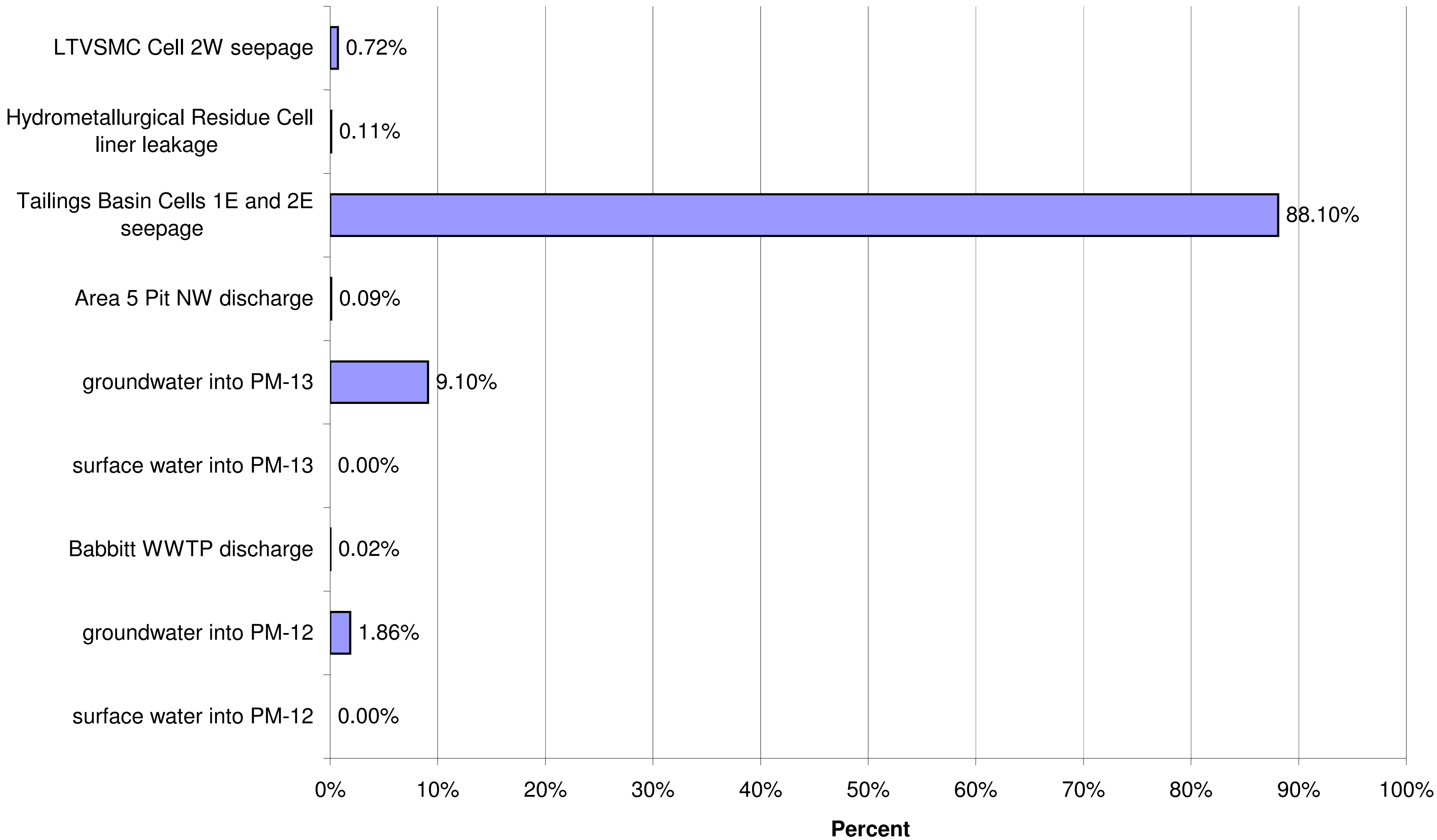



Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
0.71%
Hydrometallurgical Residue Cell liner leakage
0.10%
Tailings Basin Cells 1E and 2E seepage
44.02%
Area 5 Pit NW discharge
0.54%
groundwater into PM-13
1.53%
surface water into PM-13
43.83%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
0.31%
surface water into PM-12
8.93%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

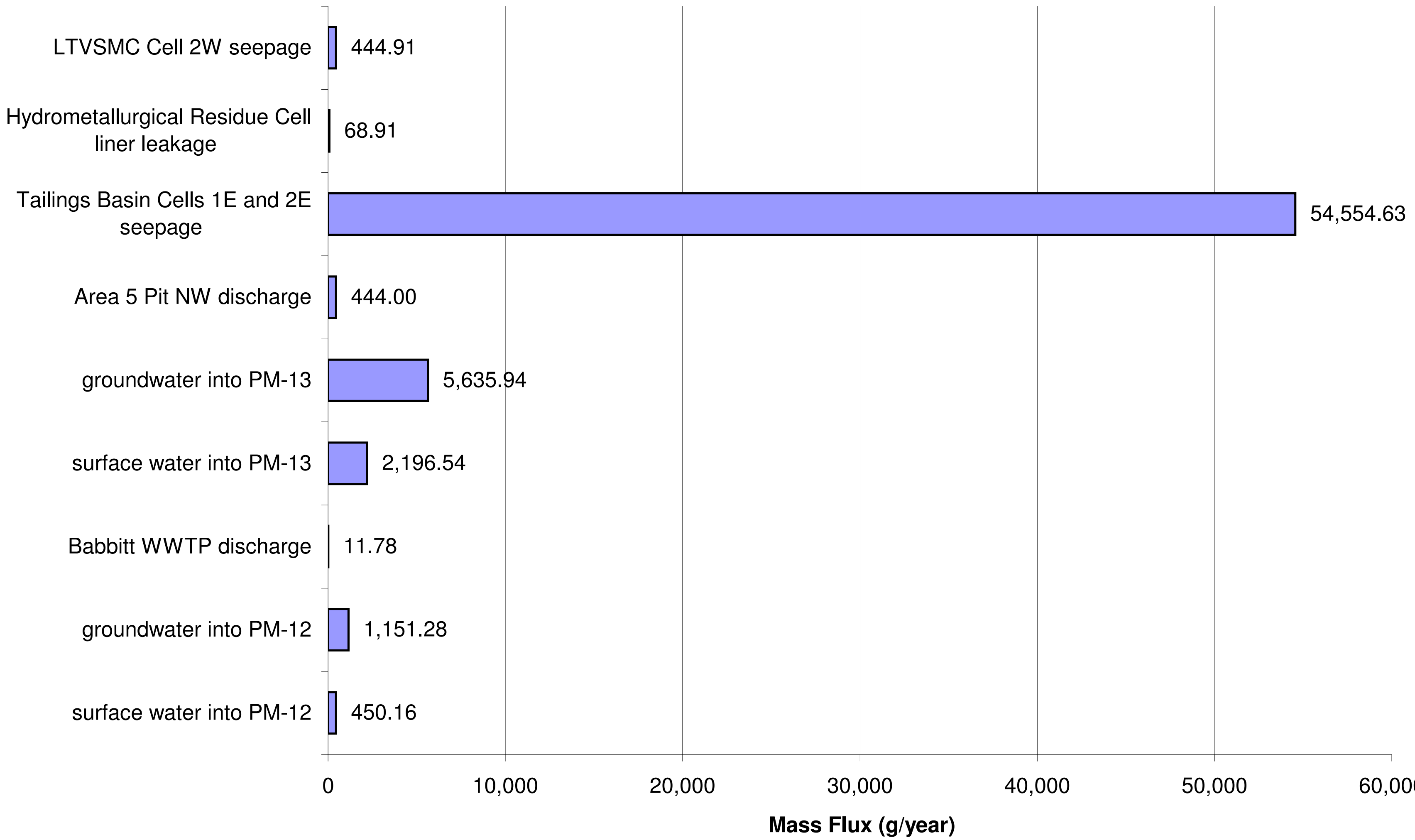
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)



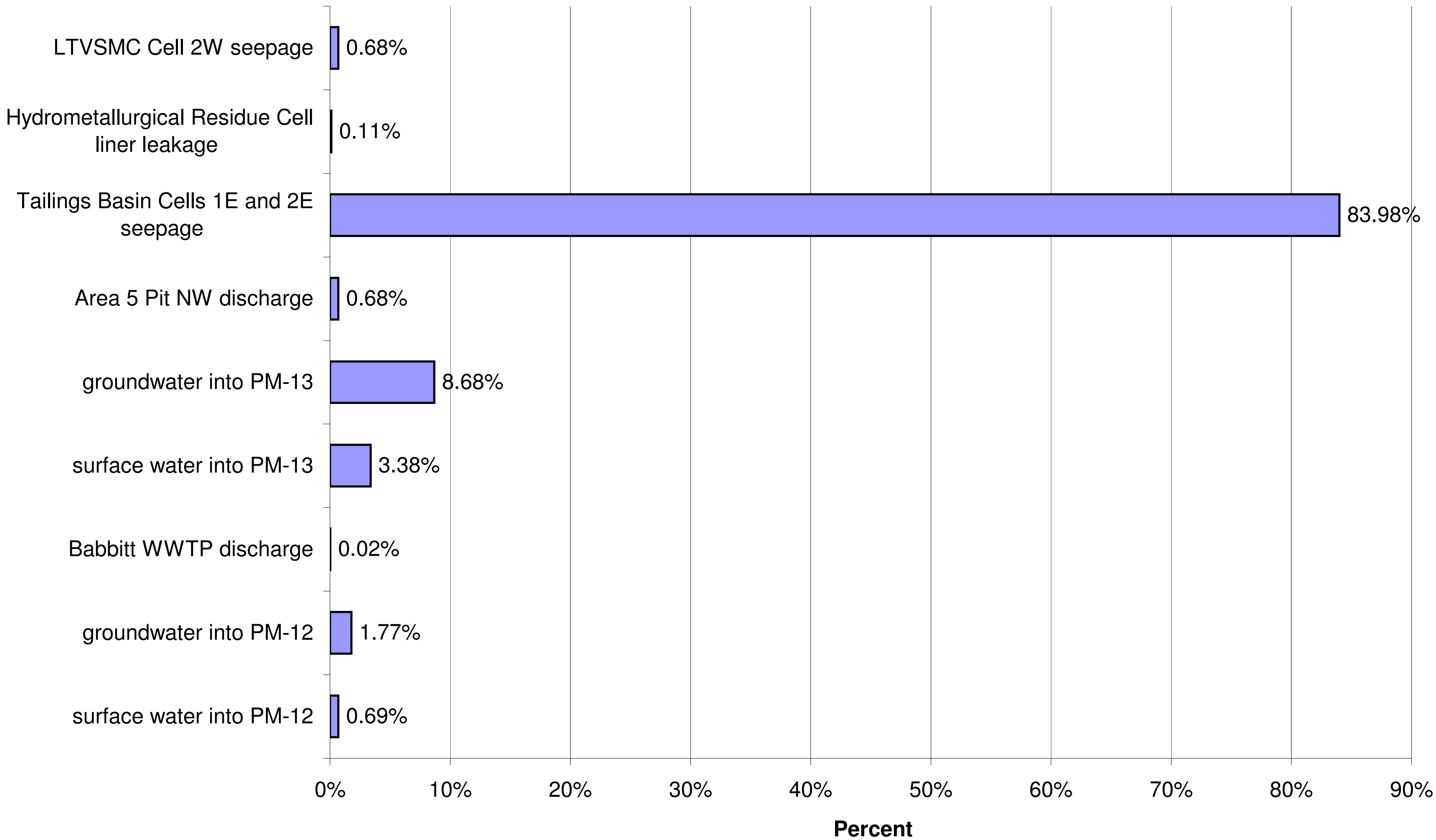
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)

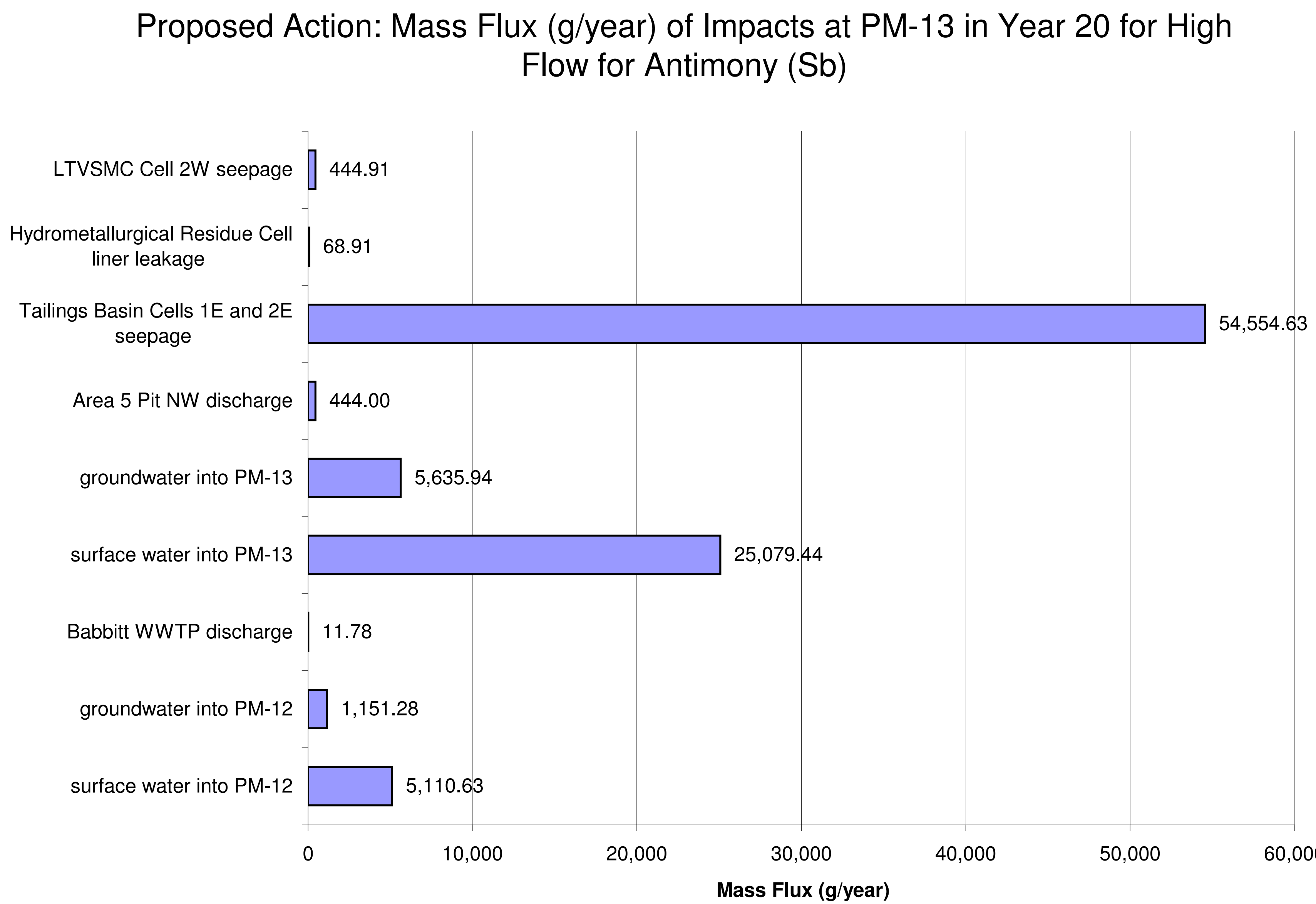


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Antimony (Sb)

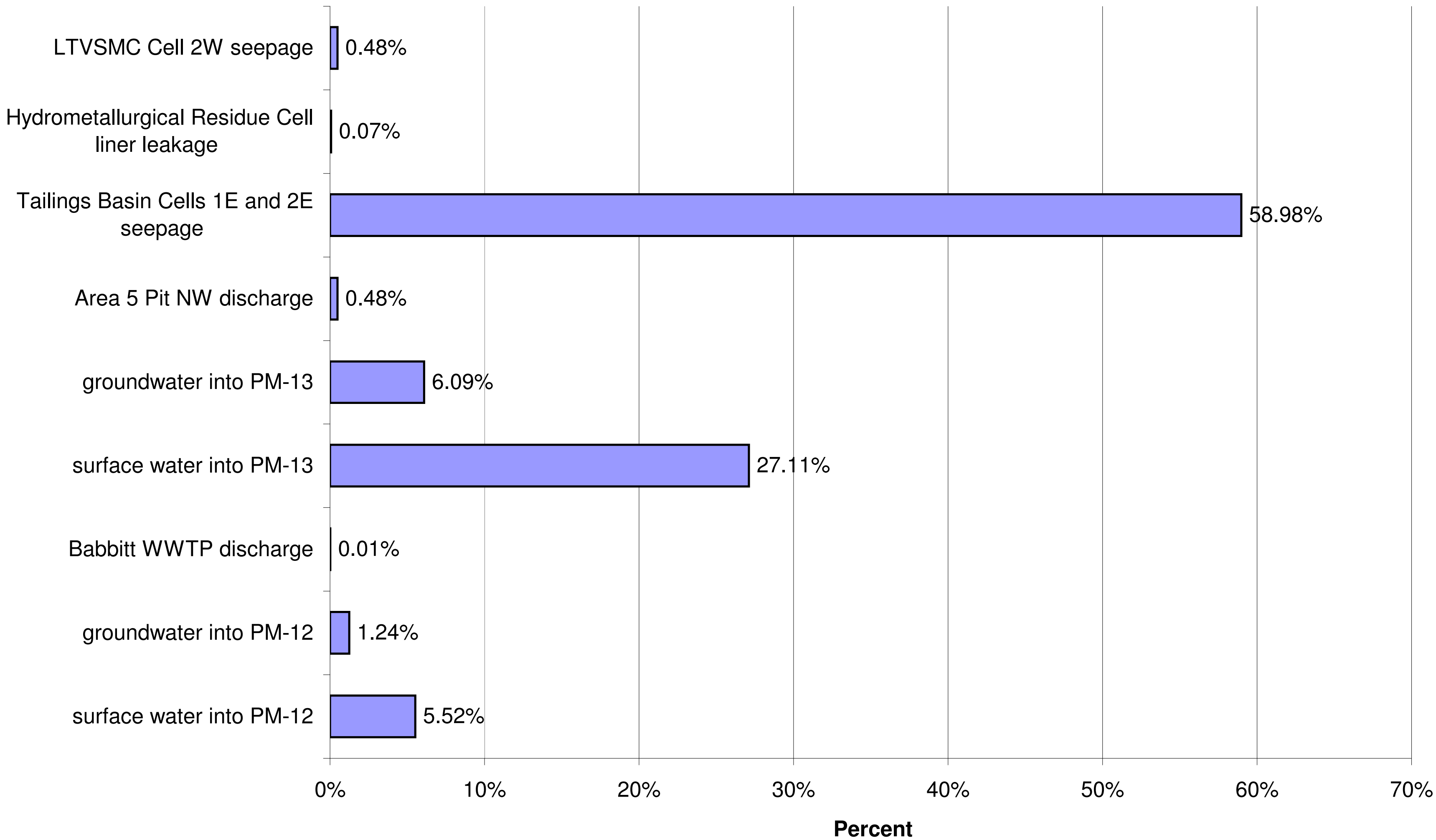


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Antimony (Sb)

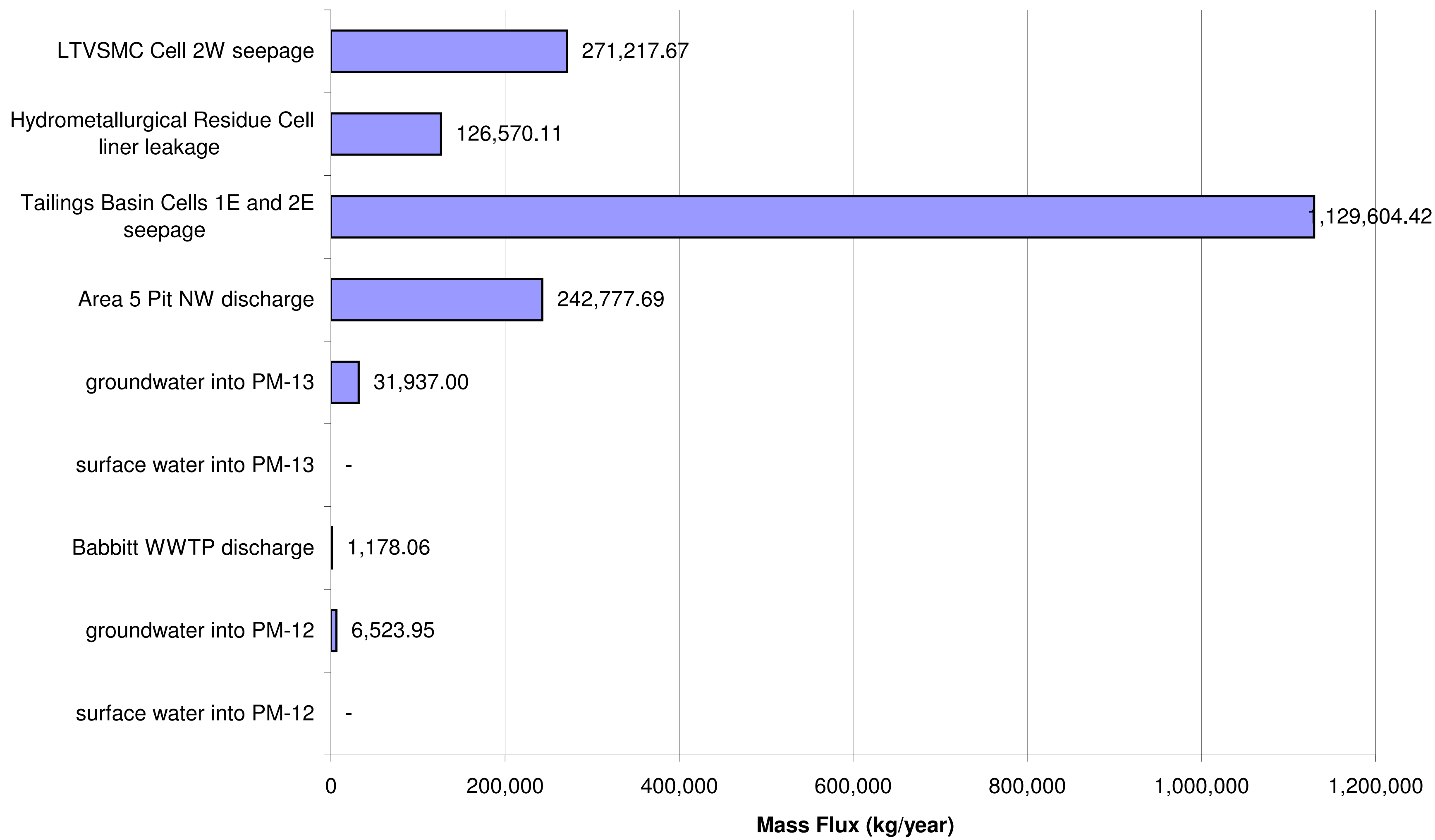



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
68.91
Tailings Basin Cells 1E and 2E seepage
54,554.63
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

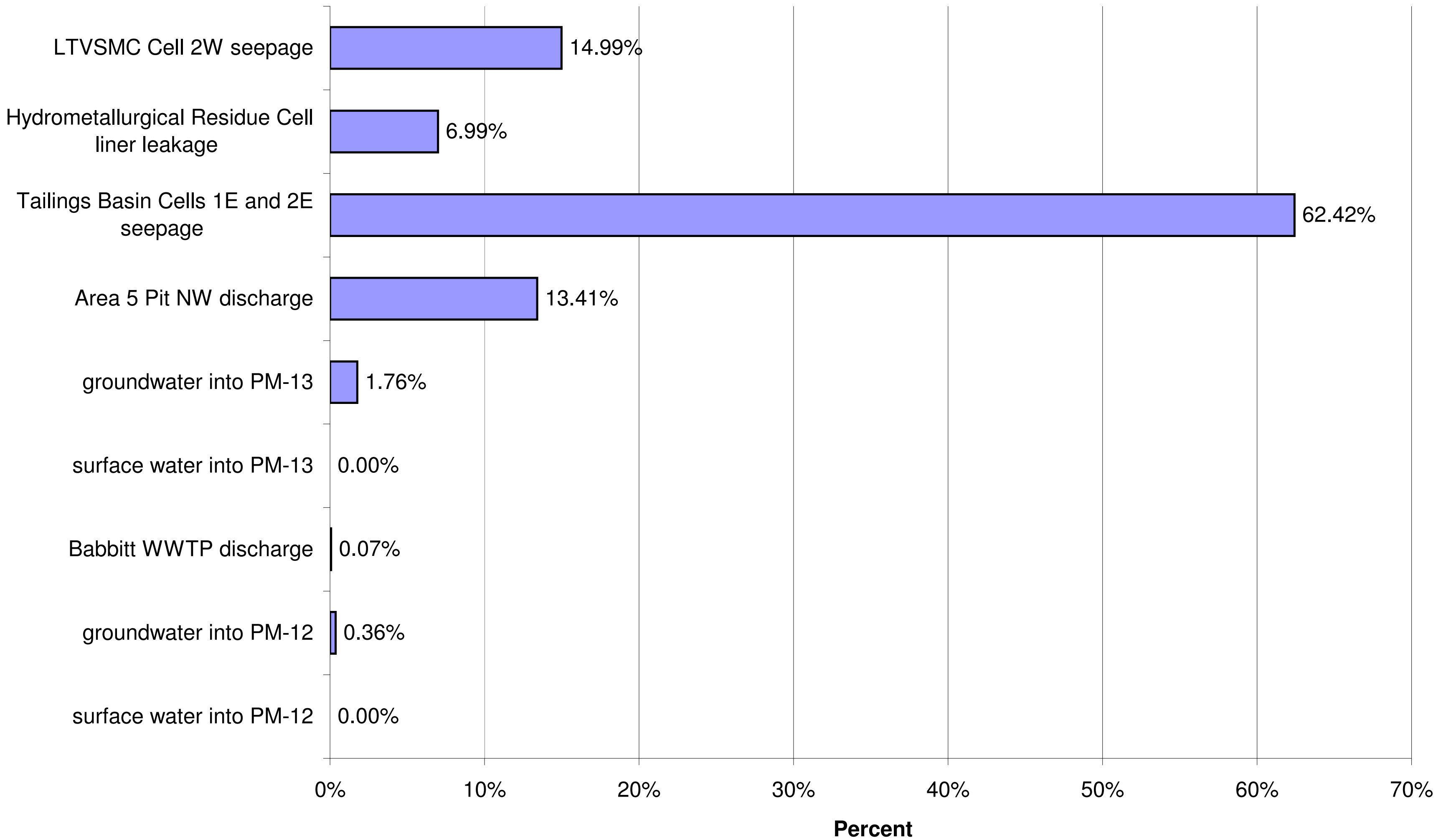
Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)



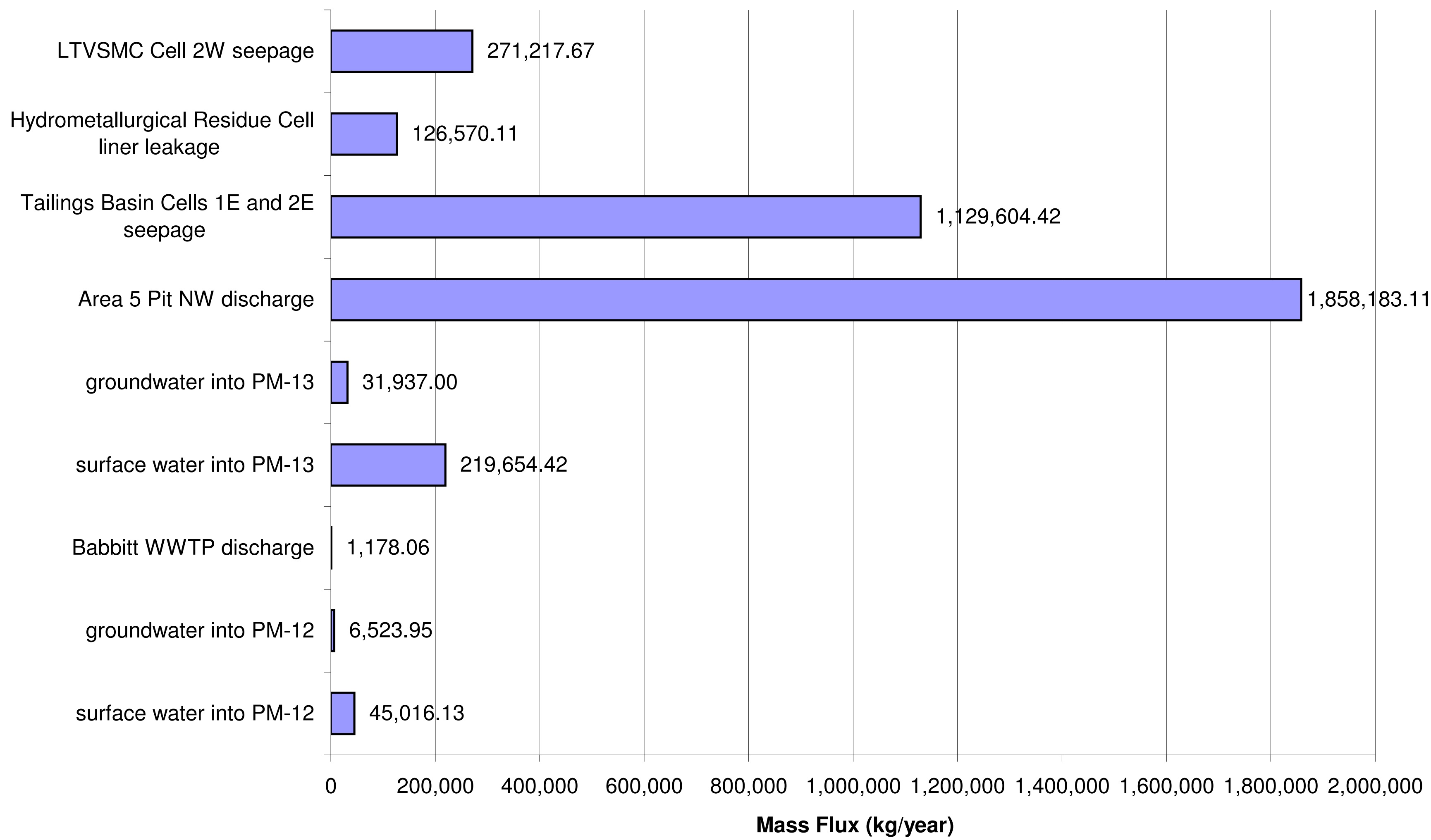
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)



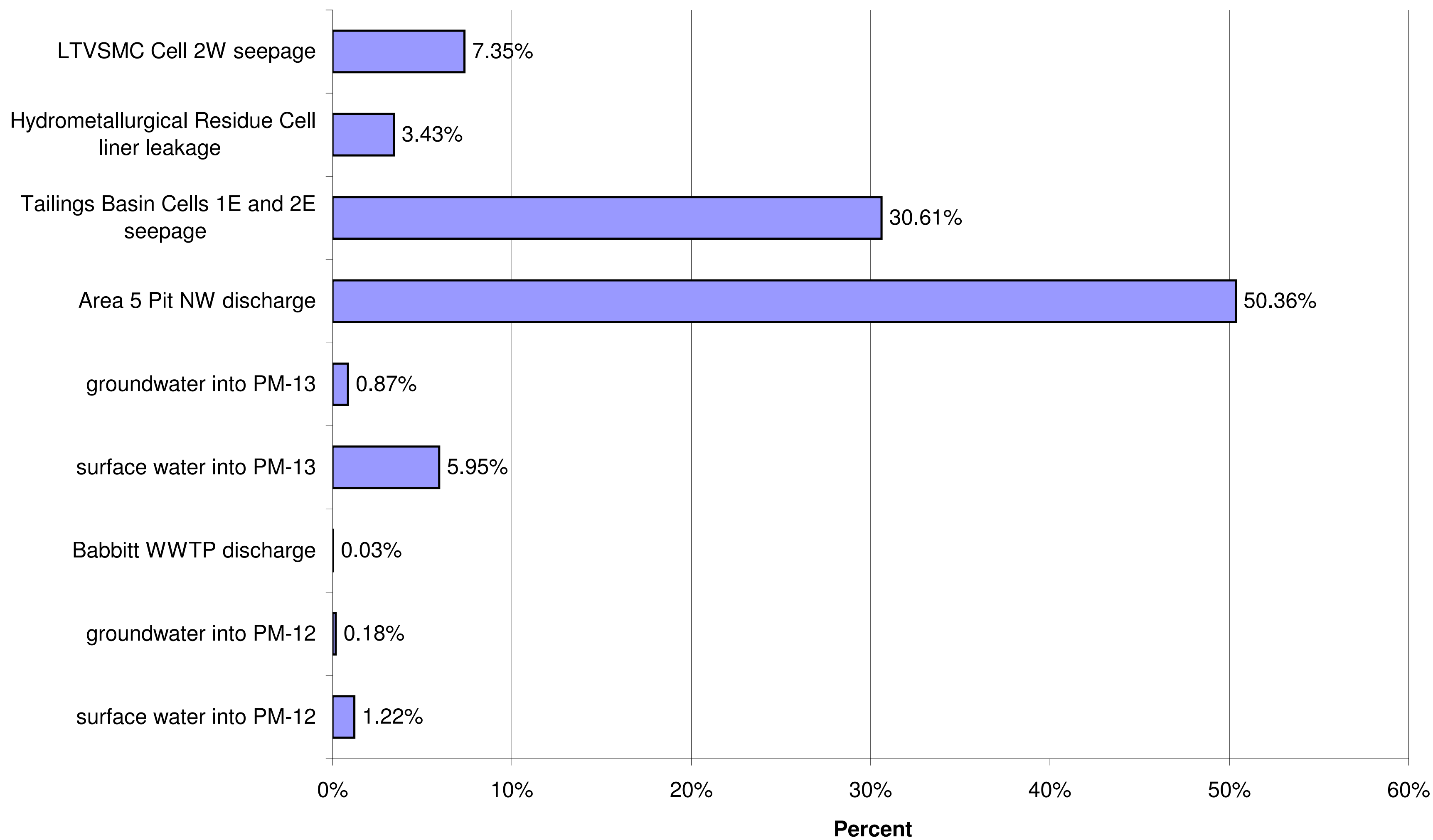
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)



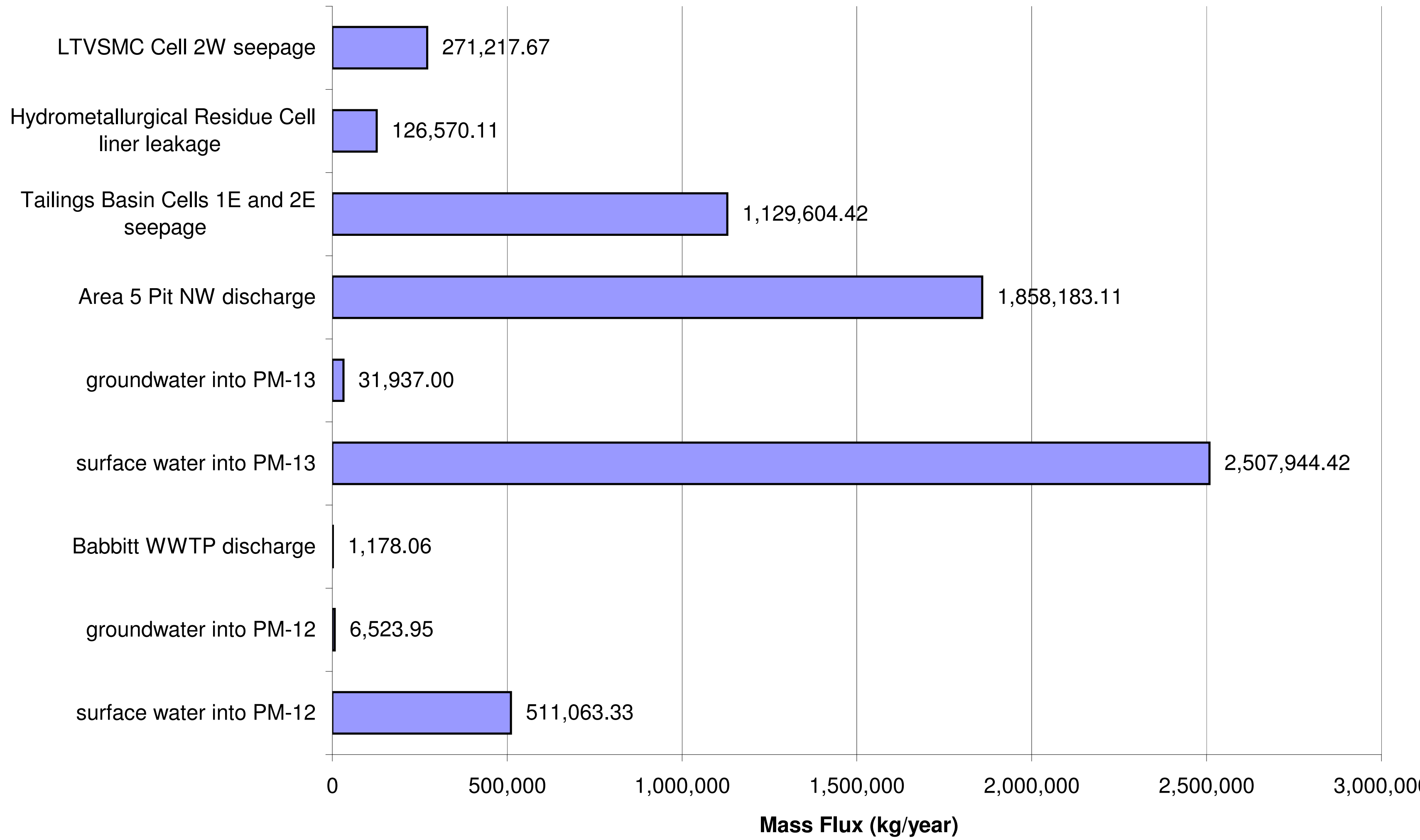
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO_4)



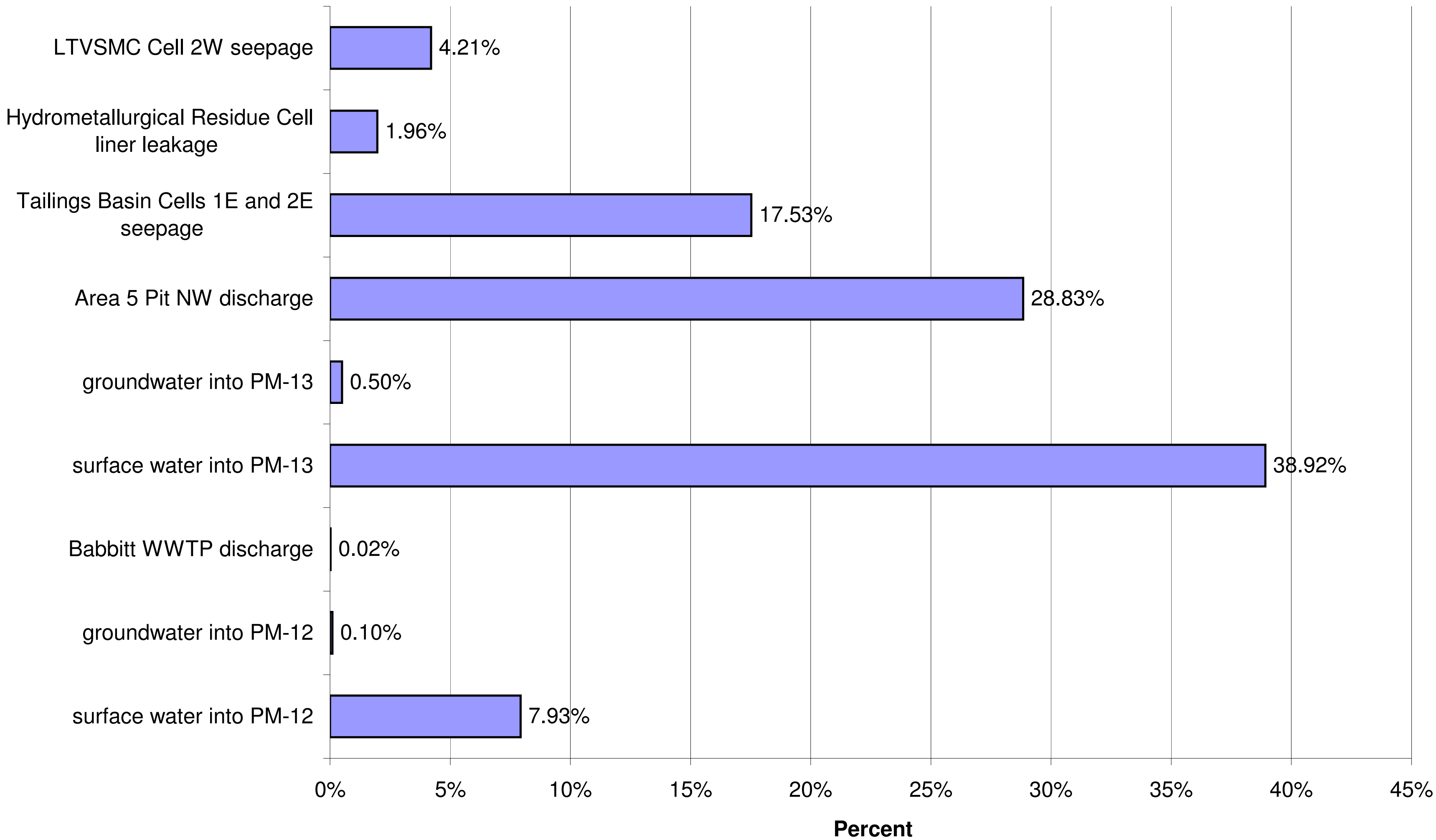
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO_4)

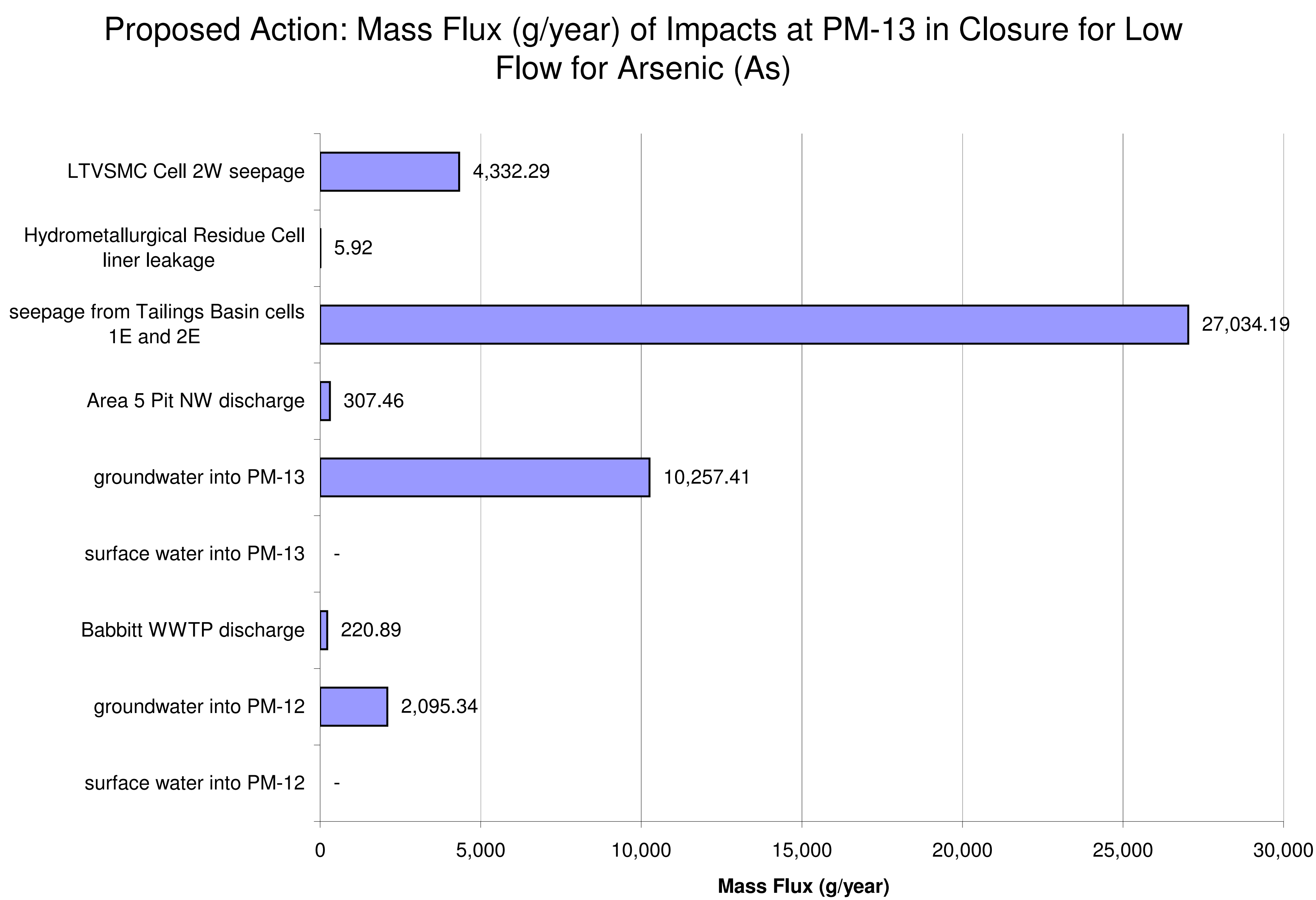


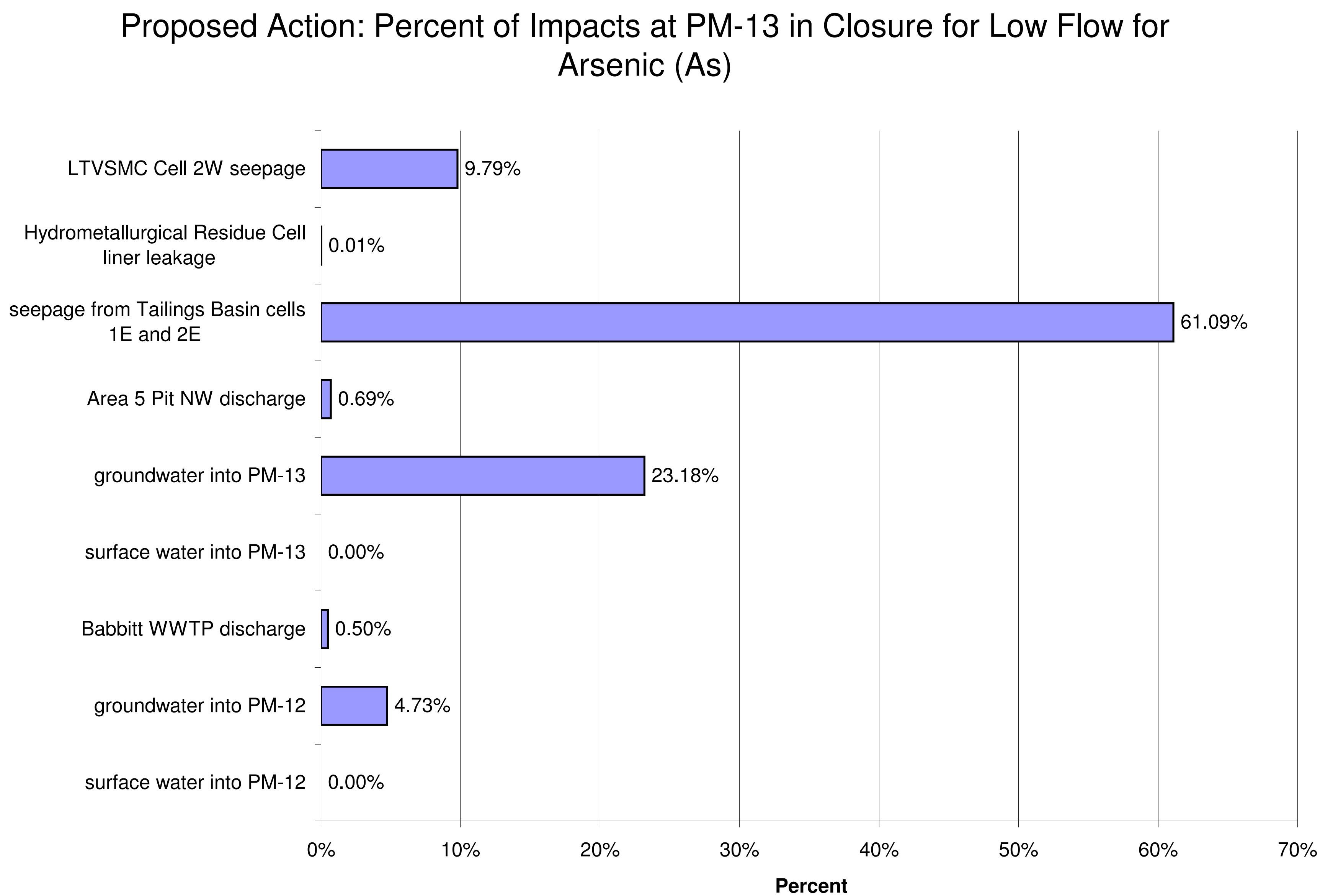
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)

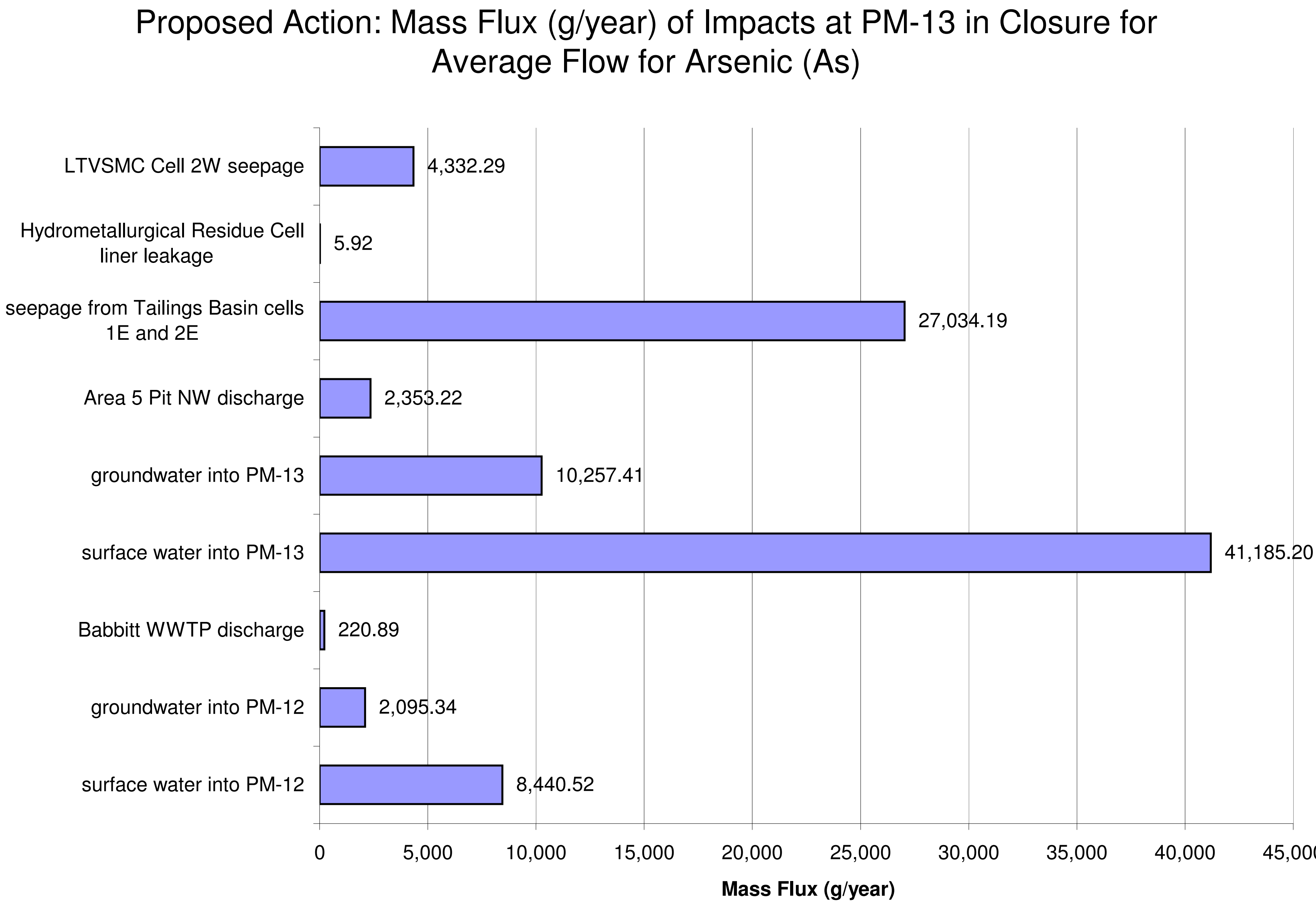


Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)

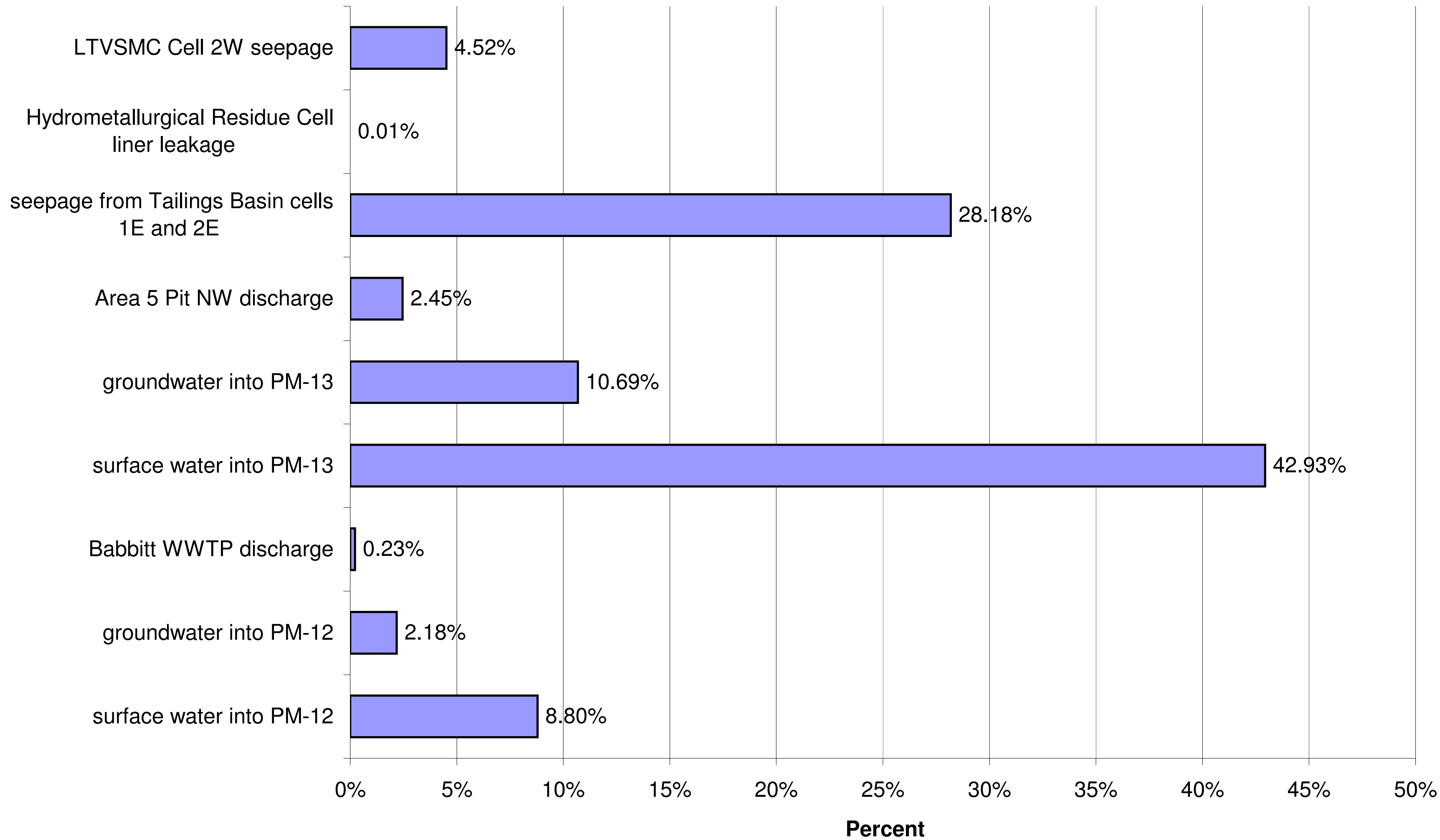


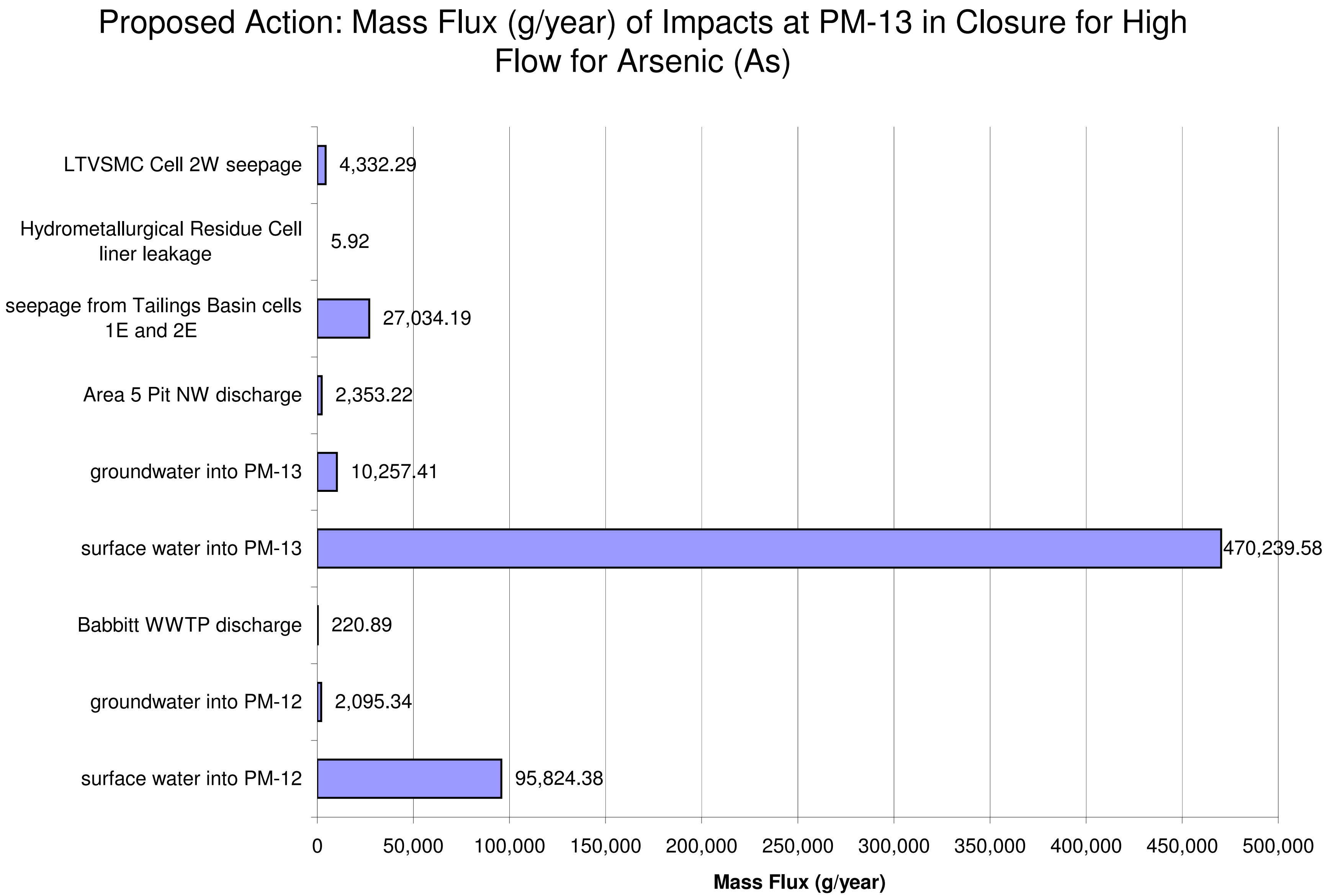

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4,332.29
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
27,034.19
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
9.79%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
61.09%
Area 5 Pit NW discharge
0.69%
groundwater into PM-13
23.18%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.50%
groundwater into PM-12
4.73%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

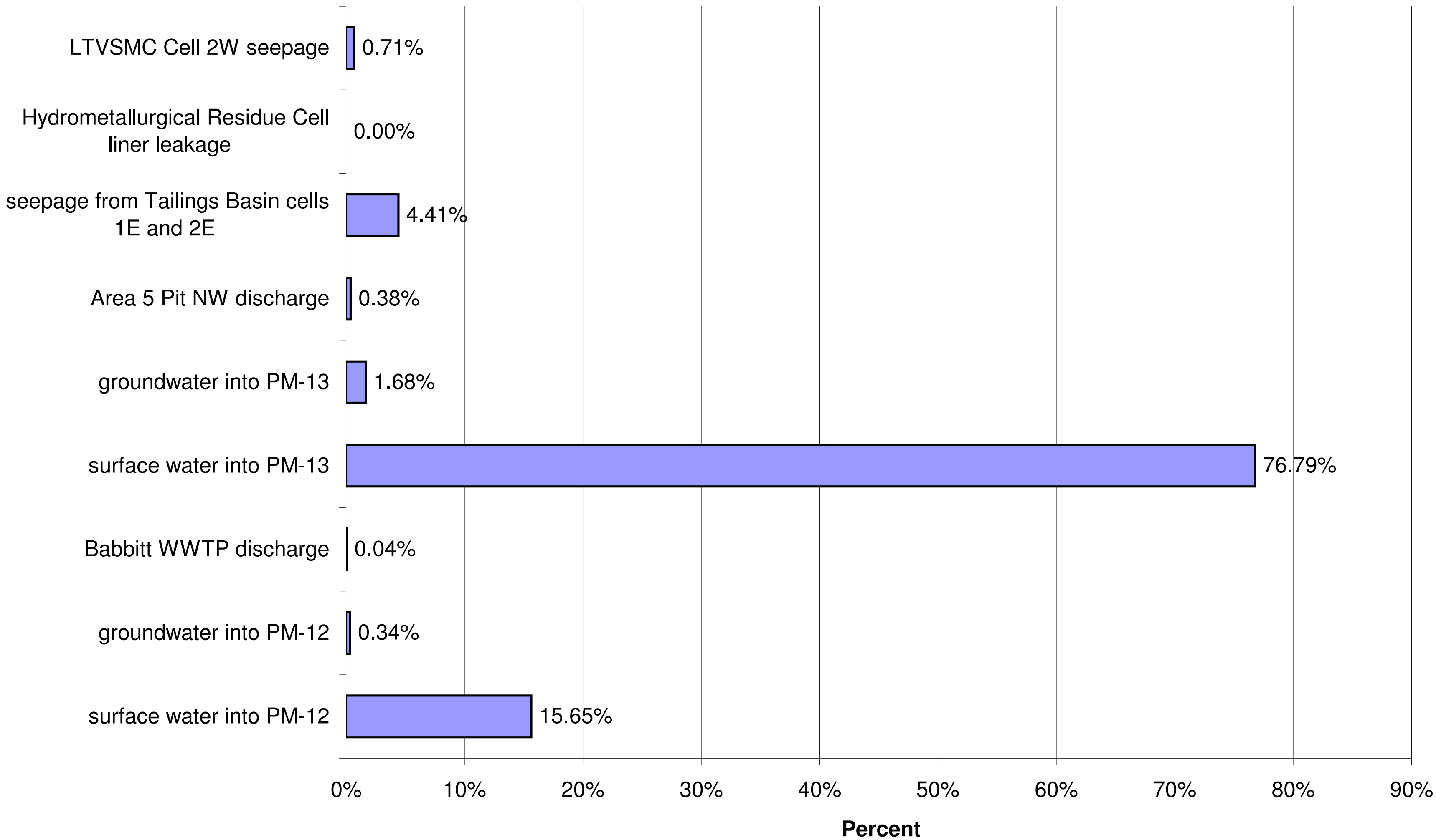

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4,332.29
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
27,034.19
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

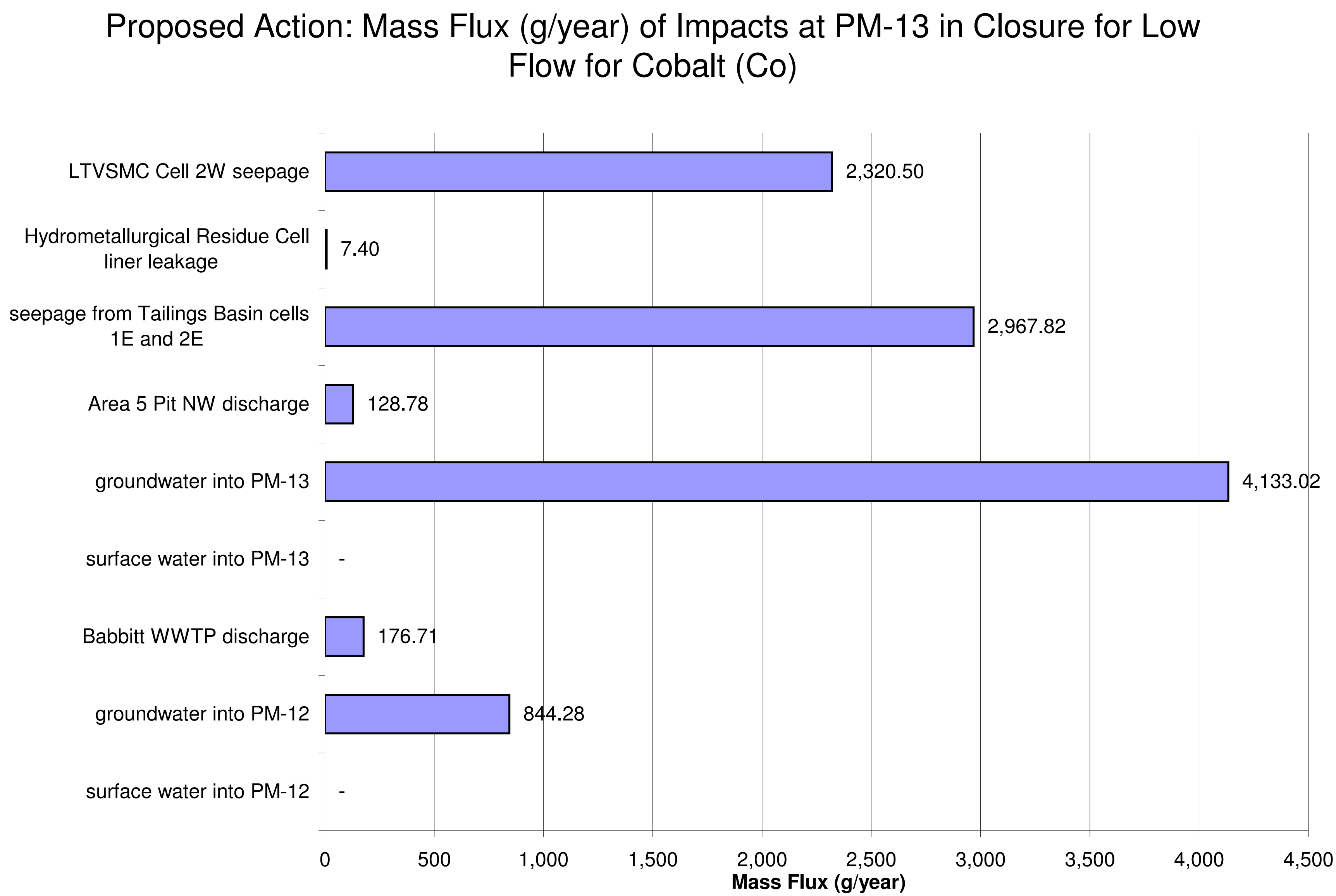
Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)

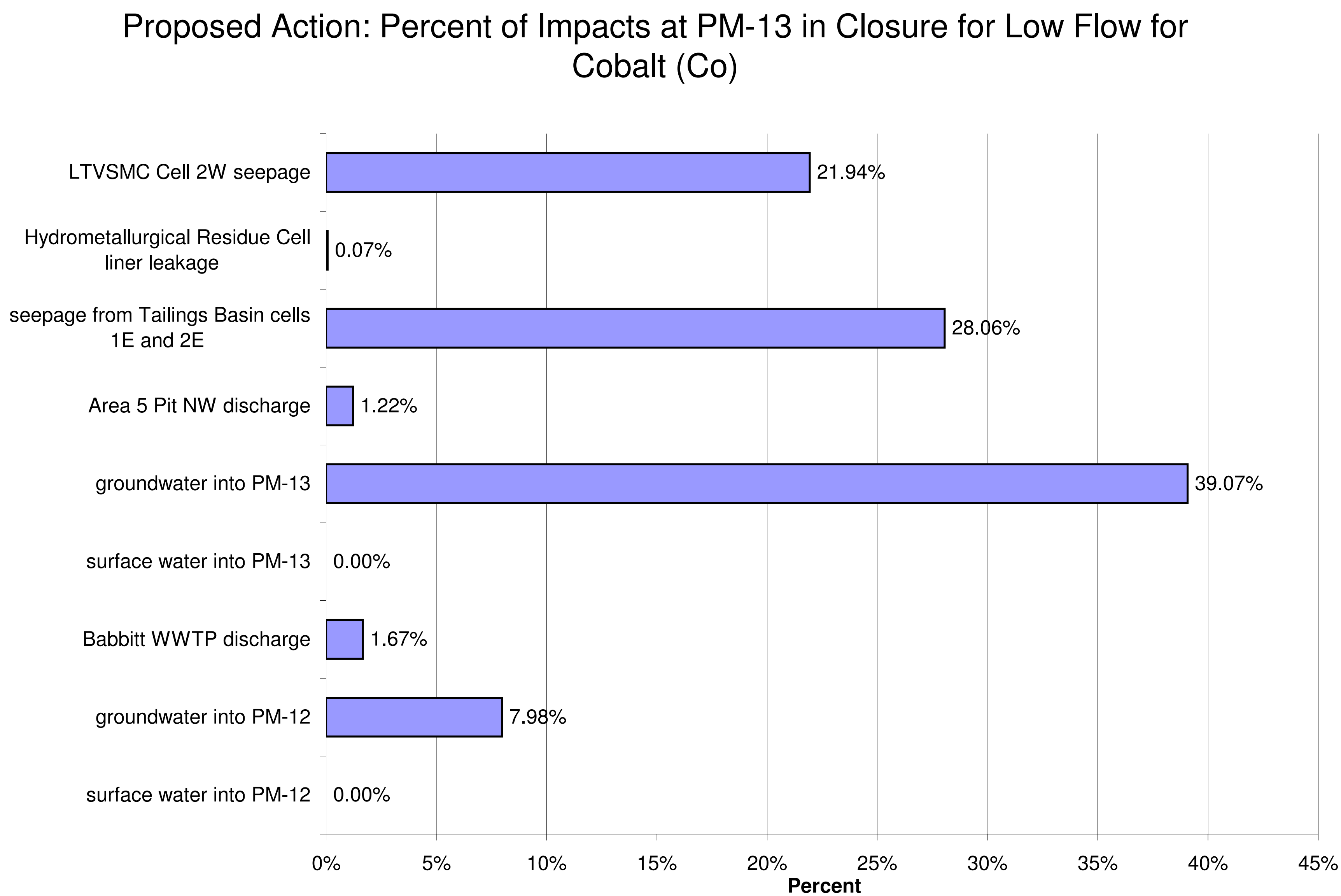


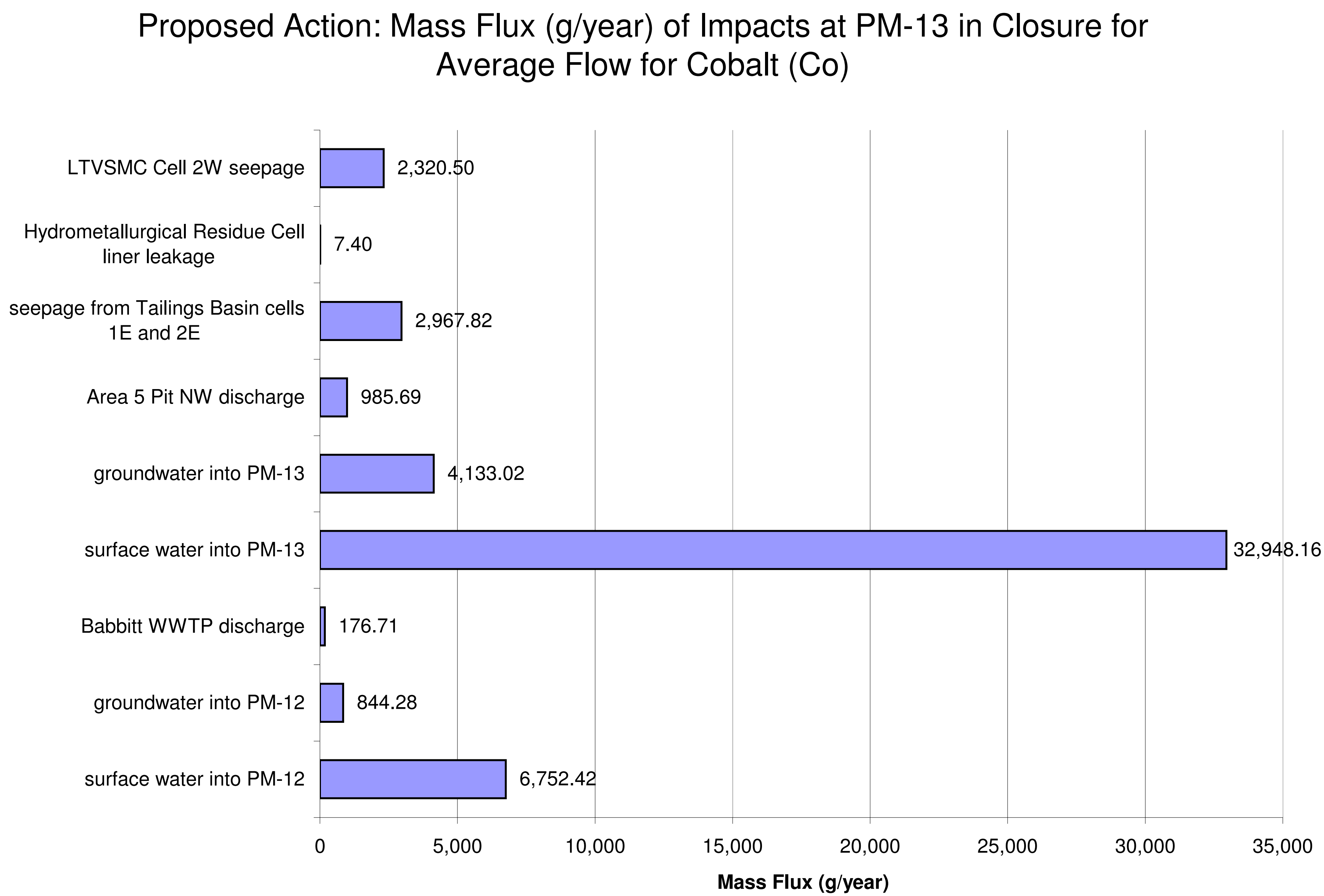

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4,332.29
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
27,034.19
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Arsenic (As)

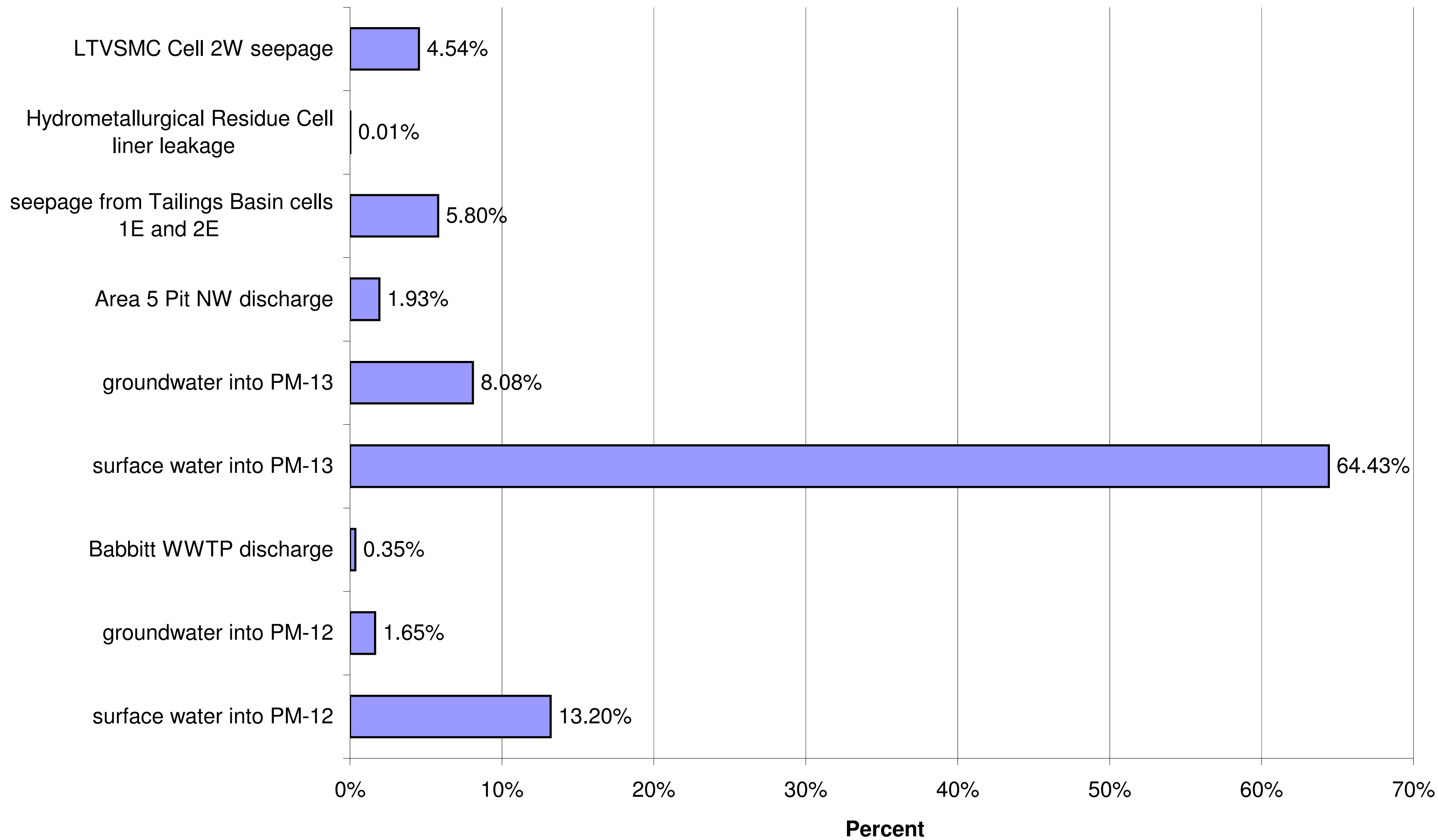


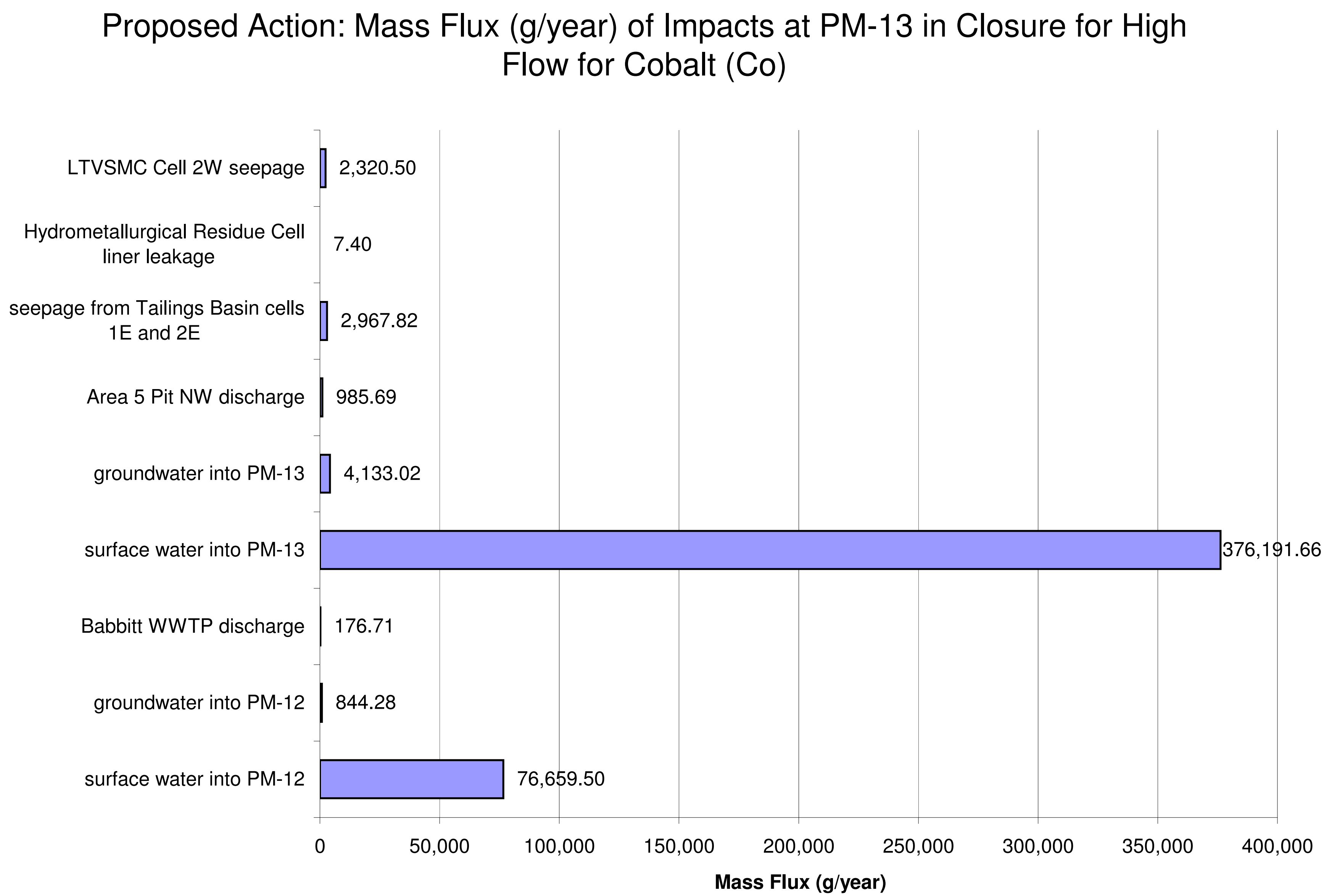

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,320.50
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
128.78
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
-
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
Mass Flux (g/year)

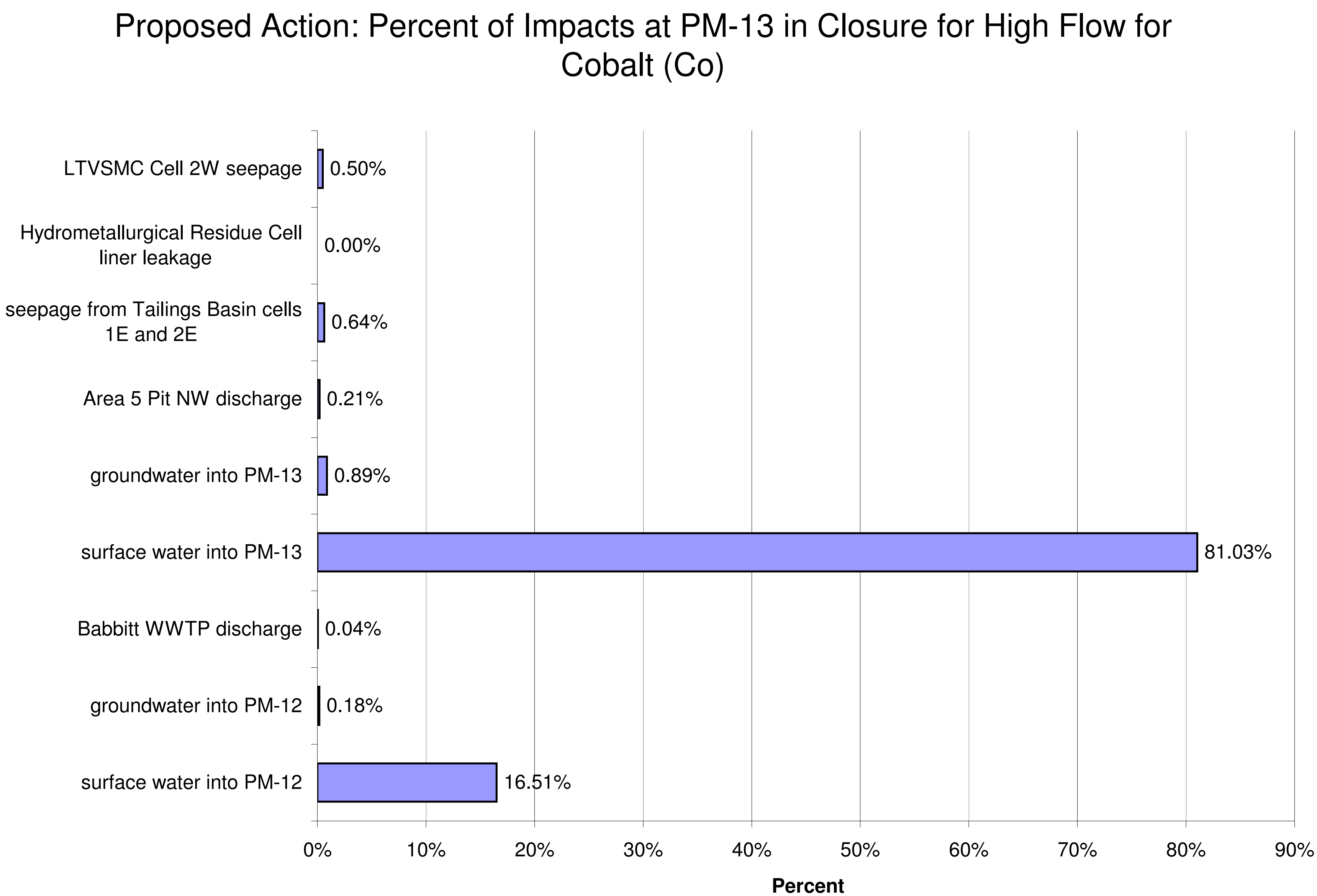

Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
21.94%
Hydrometallurgical Residue Cell liner leakage
0.07%
seepage from Tailings Basin cells 1E and 2E
28.06%
Area 5 Pit NW discharge
1.22%
groundwater into PM-13
39.07%
surface water into PM-13
0.00%
Babbitt WWTP discharge
1.67%
groundwater into PM-12
7.98%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

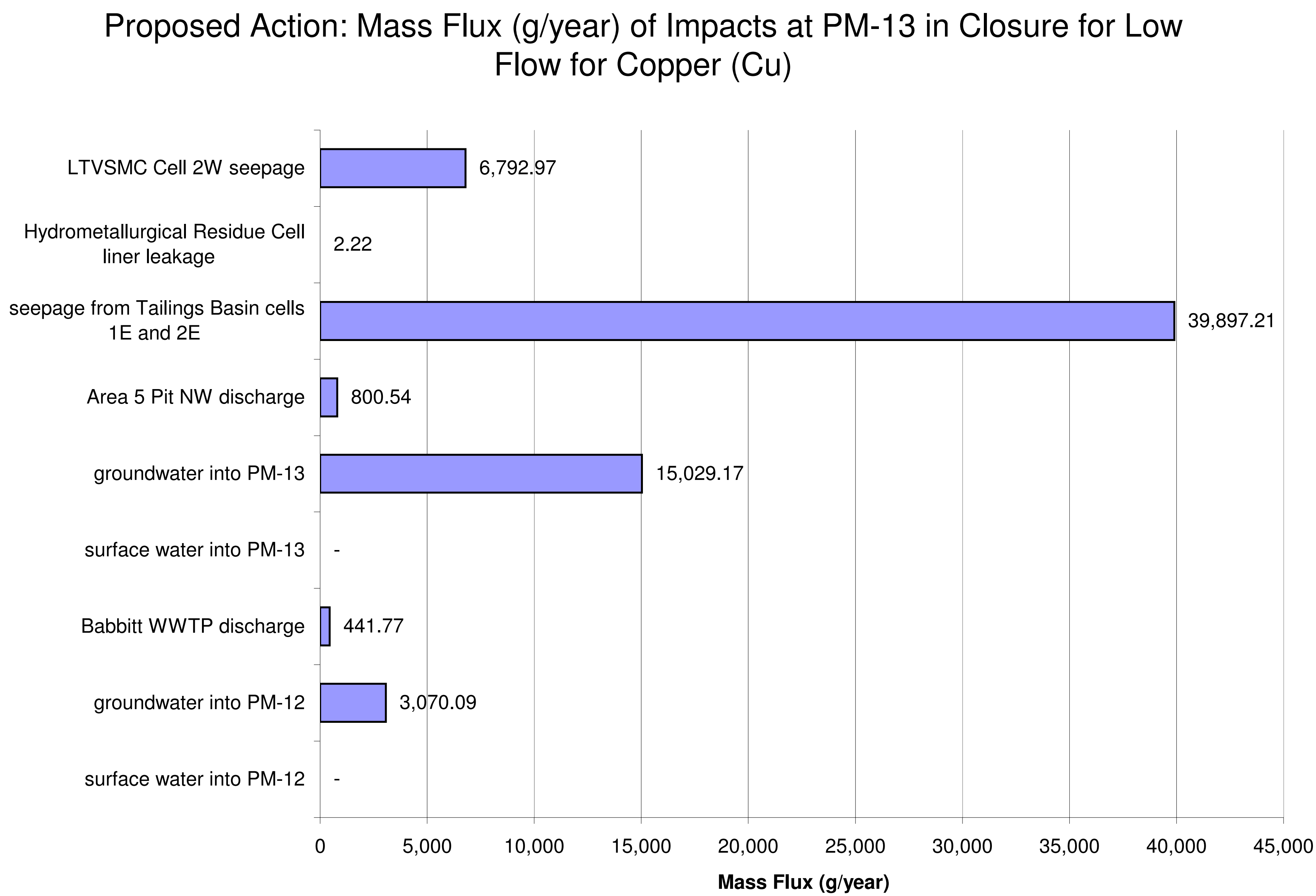

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,320.50
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

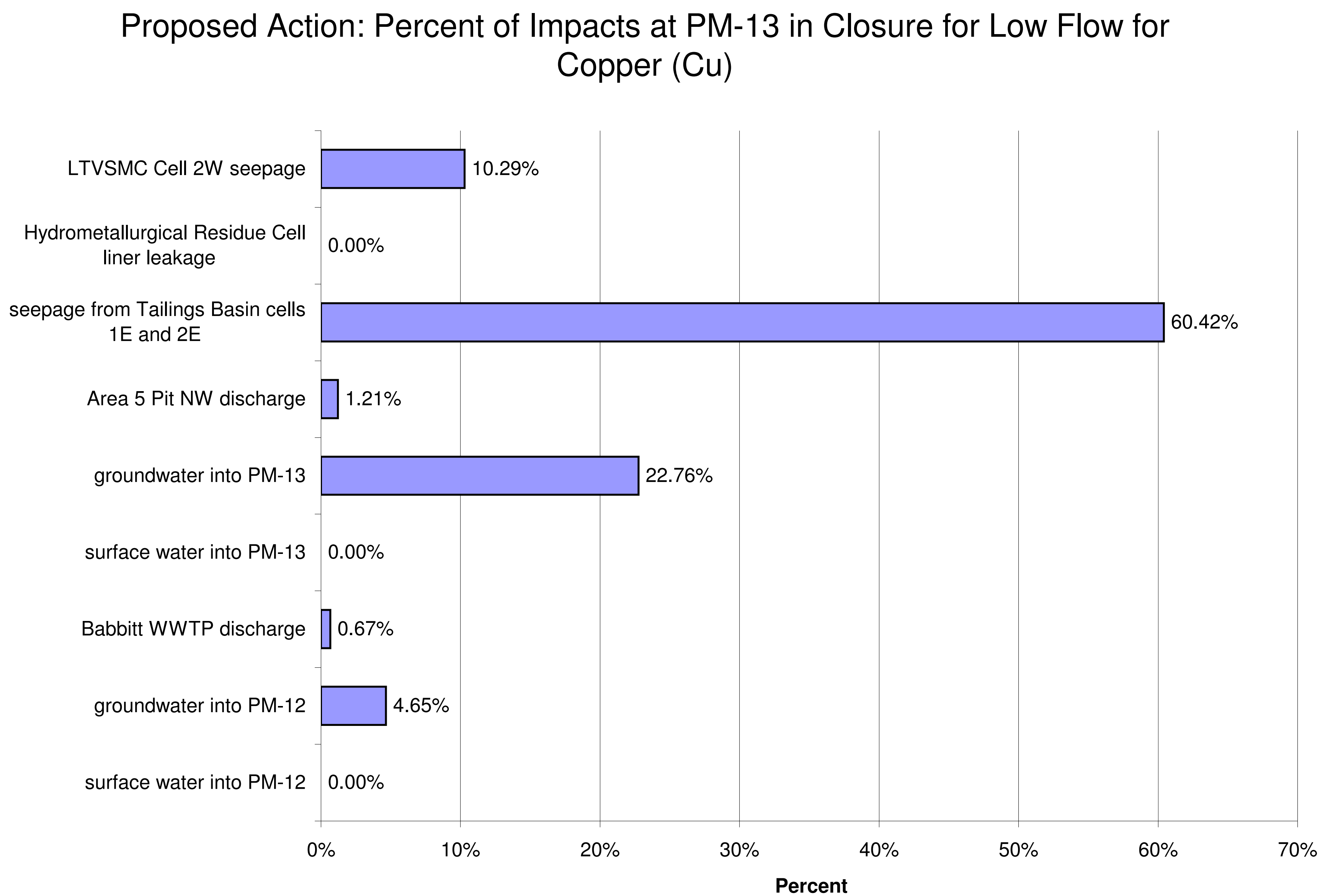
Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)

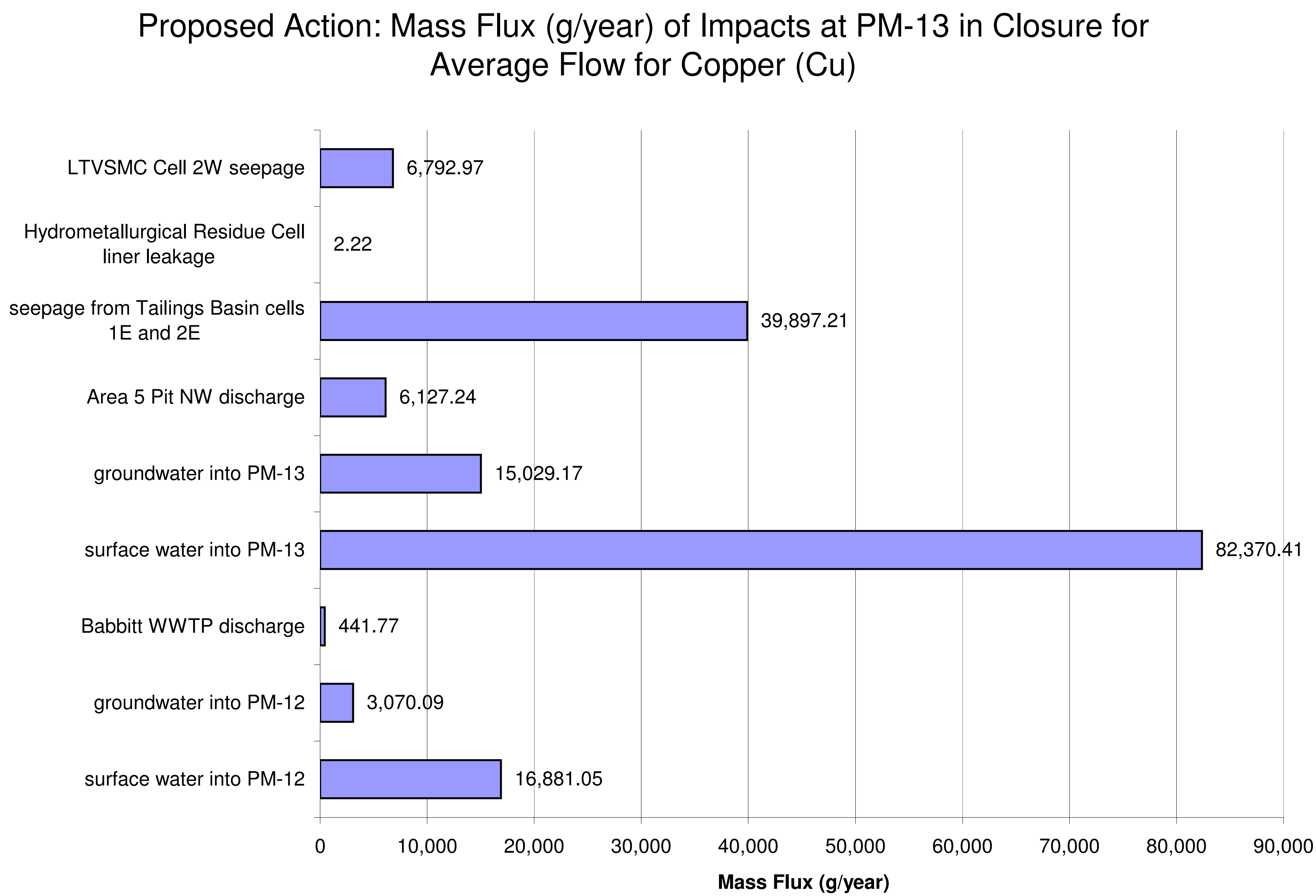


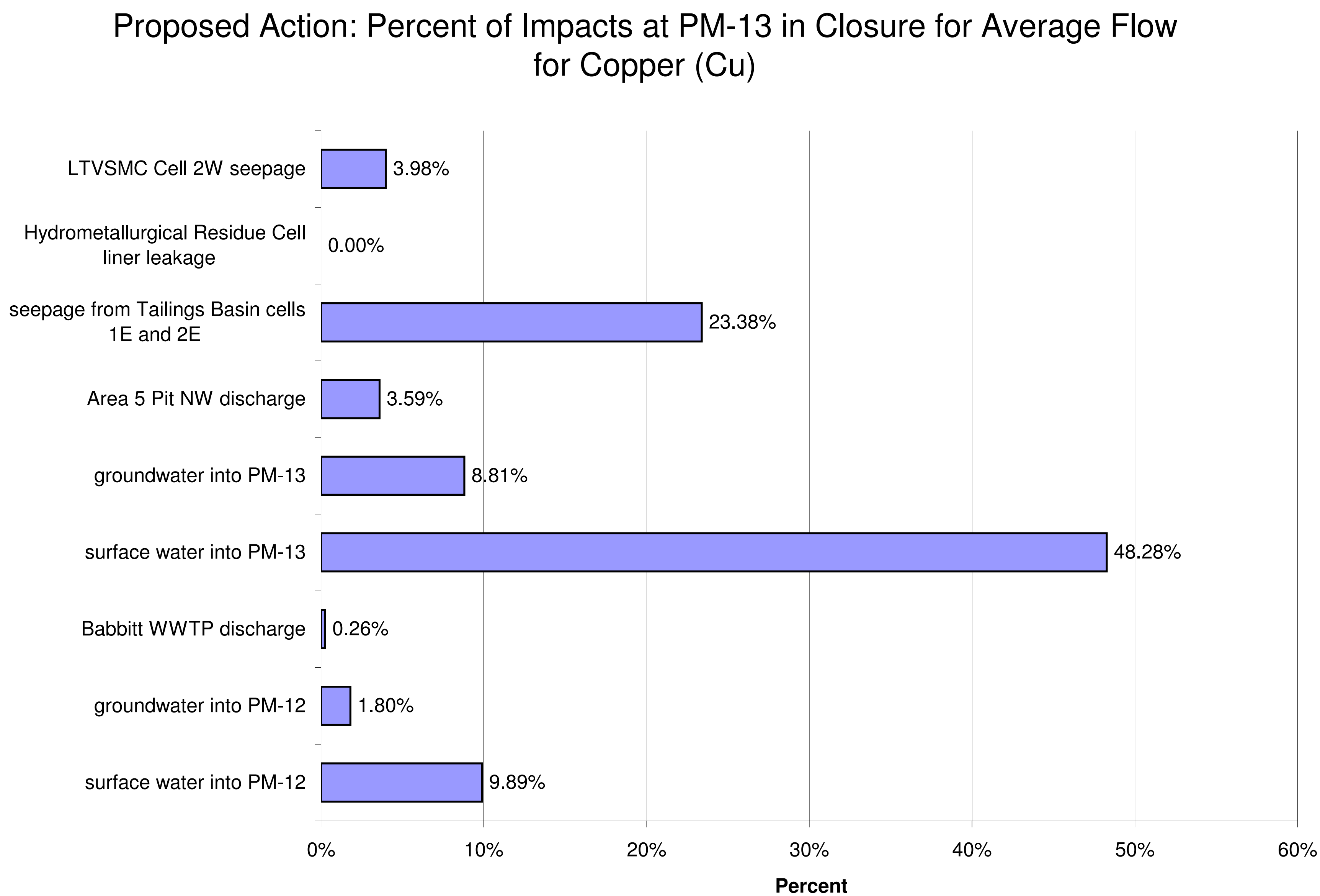

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,320.50
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

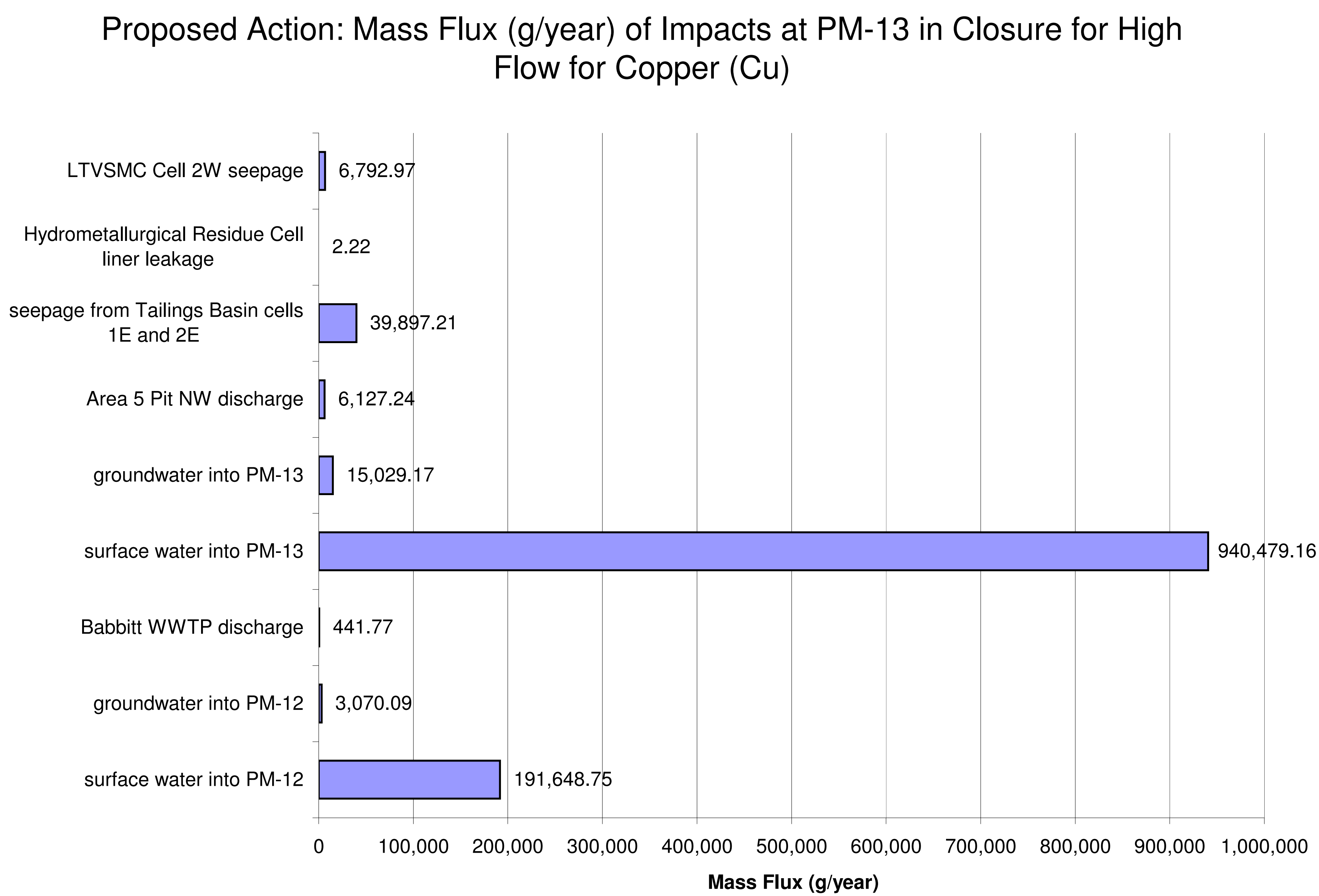

Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.50%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
0.64%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.89%
surface water into PM-13
81.03%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.51%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

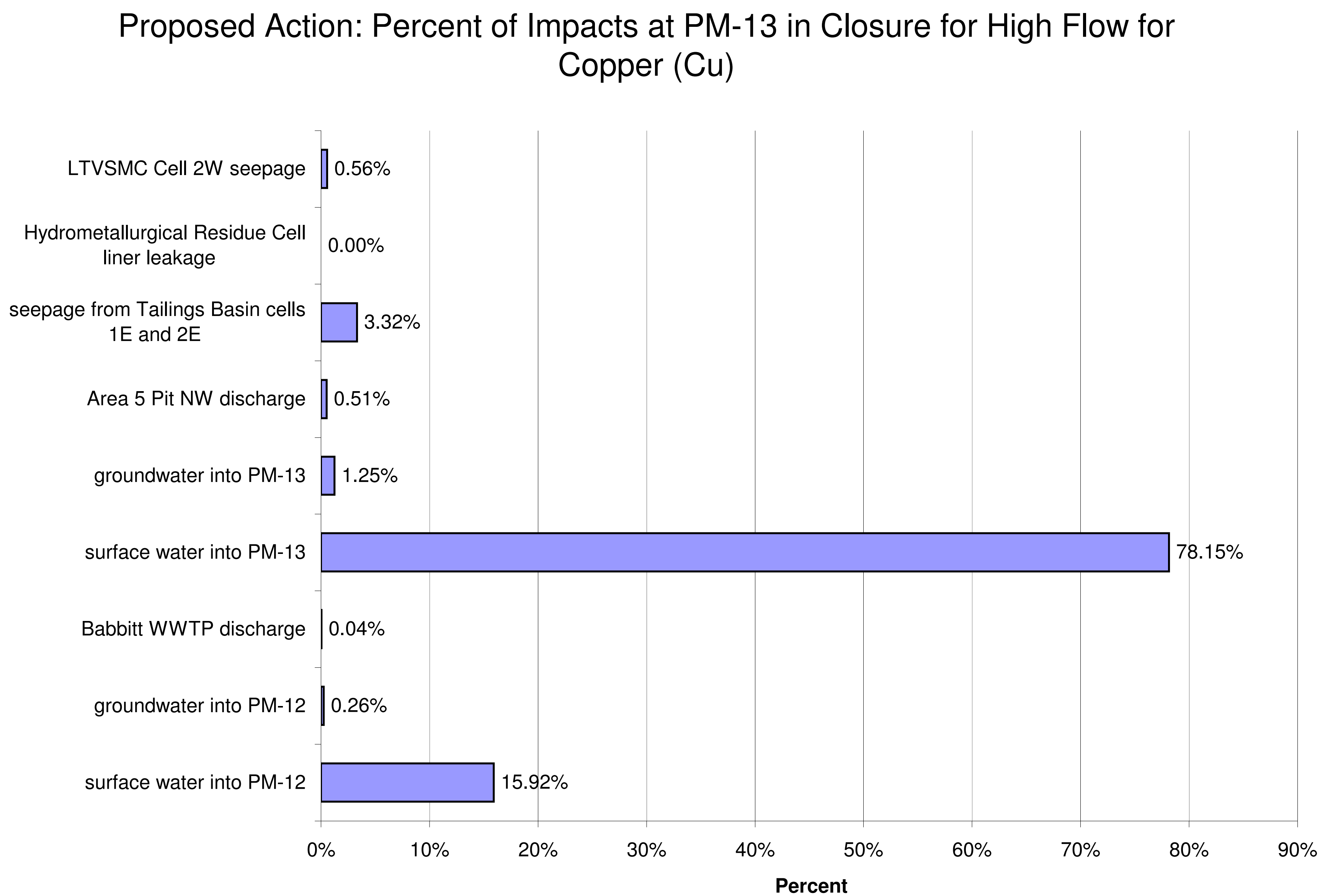

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6,792.97
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
10.29%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
60.42%
Area 5 Pit NW discharge
1.21%
groundwater into PM-13
22.76%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.67%
groundwater into PM-12
4.65%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

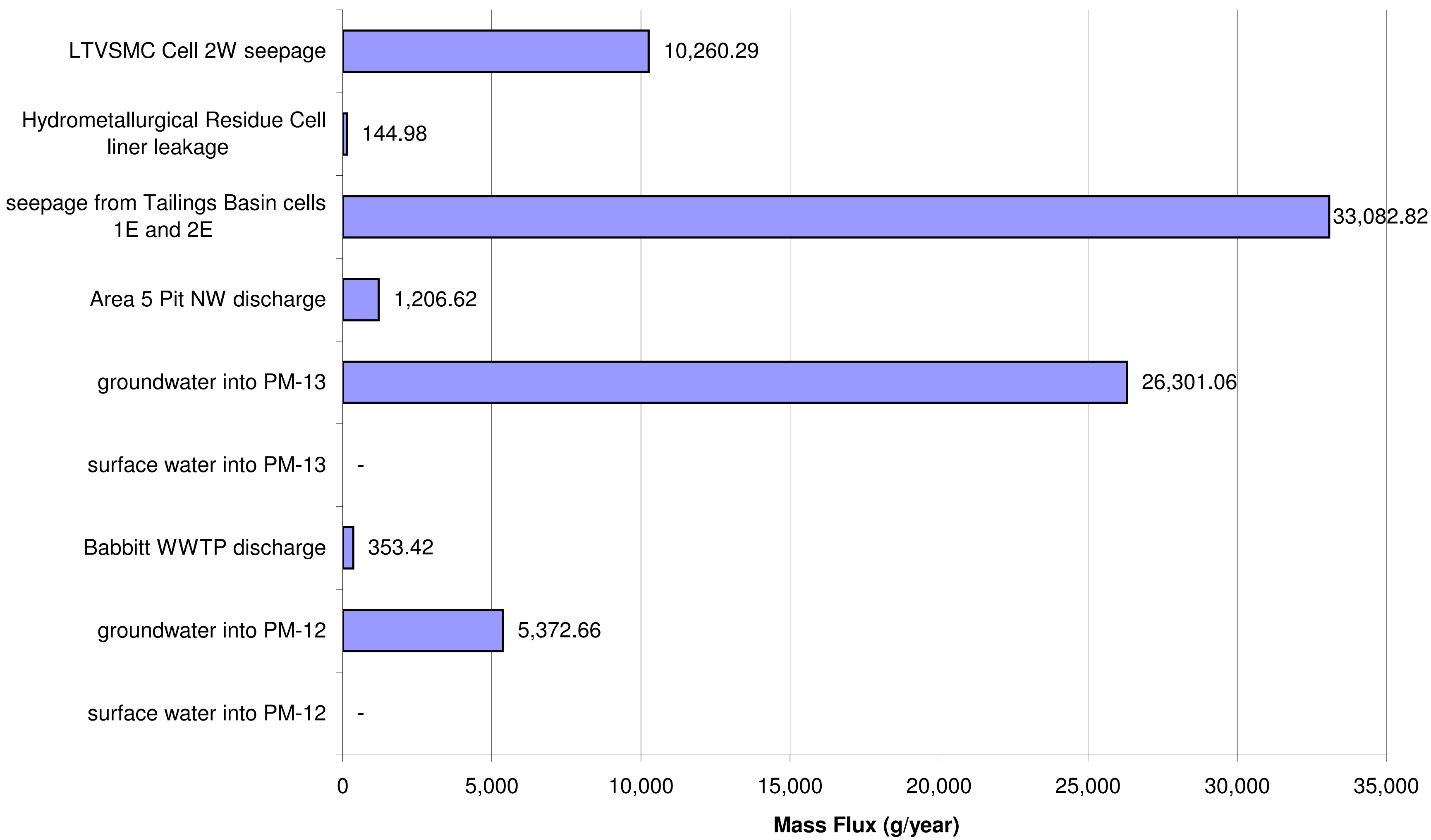

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6,792.97
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
3.98%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
23.38%
Area 5 Pit NW discharge
3.59%
groundwater into PM-13
8.81%
surface water into PM-13
48.28%
Babbitt WWTP discharge
0.26%
groundwater into PM-12
1.80%
surface water into PM-12
9.89%
0%
10%
20%
30%
40%
50%
60%
Percent

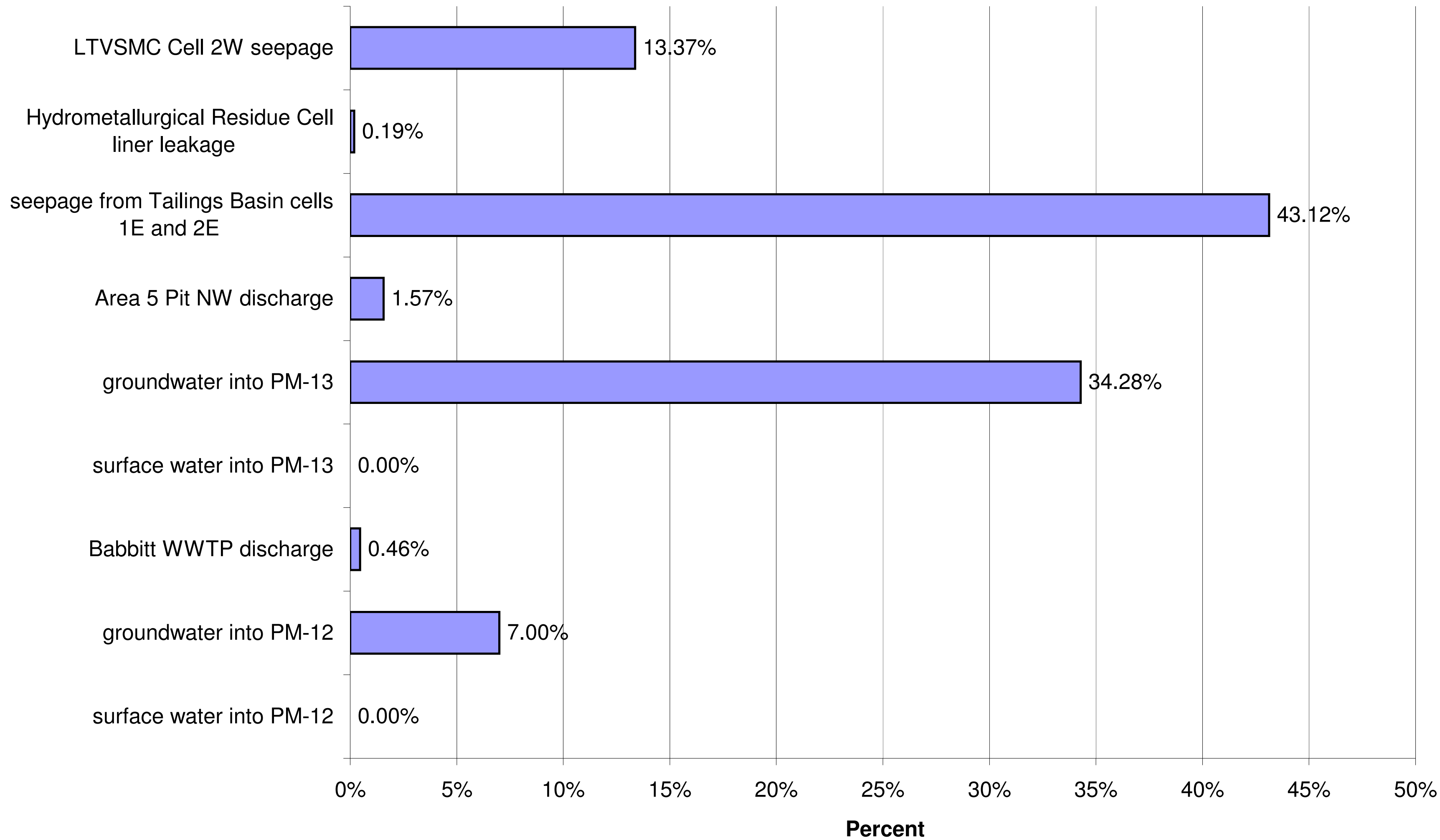

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6,792.97
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.56%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
3.32%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.25%
surface water into PM-13
78.15%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
15.92%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

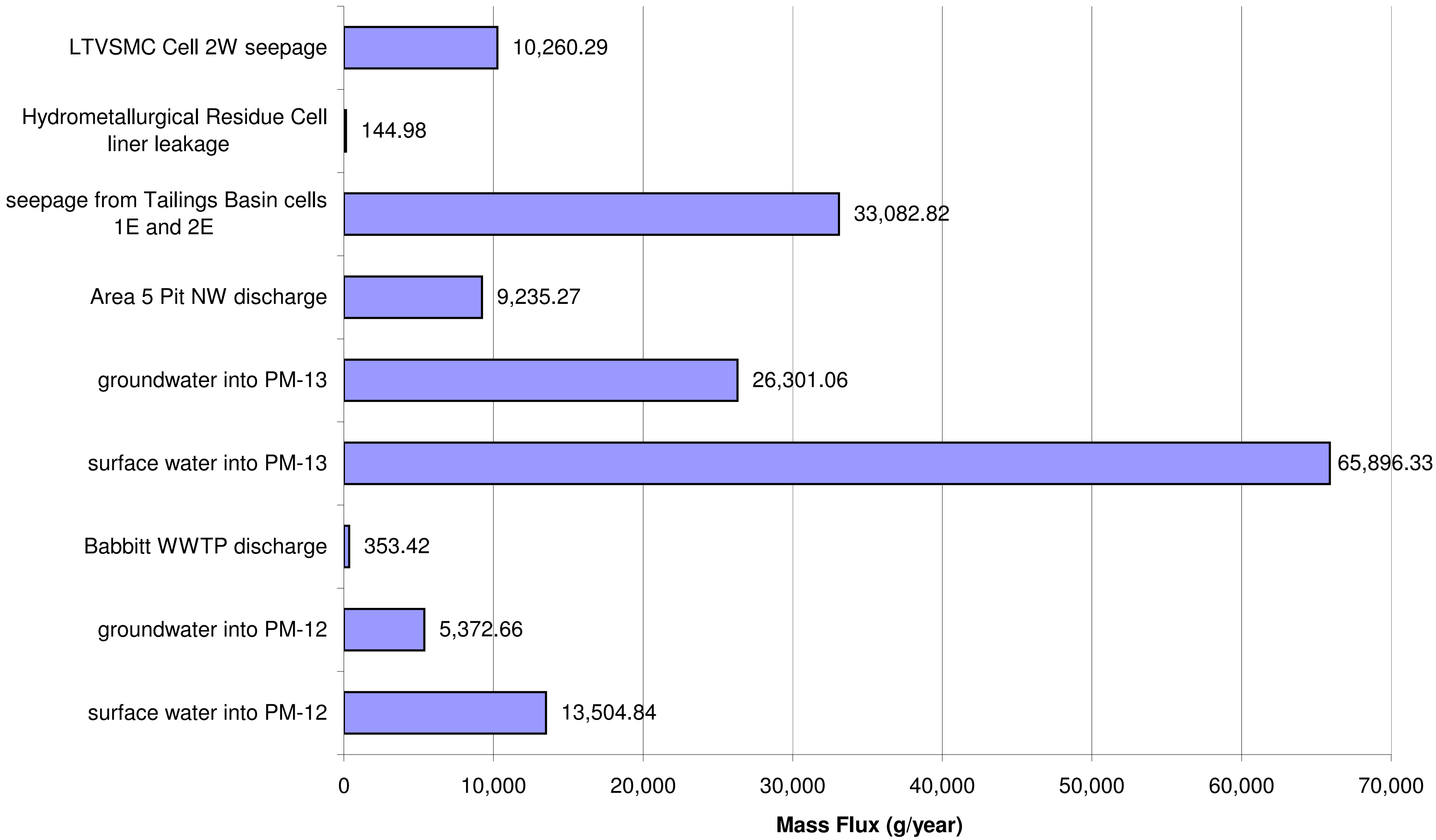
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)

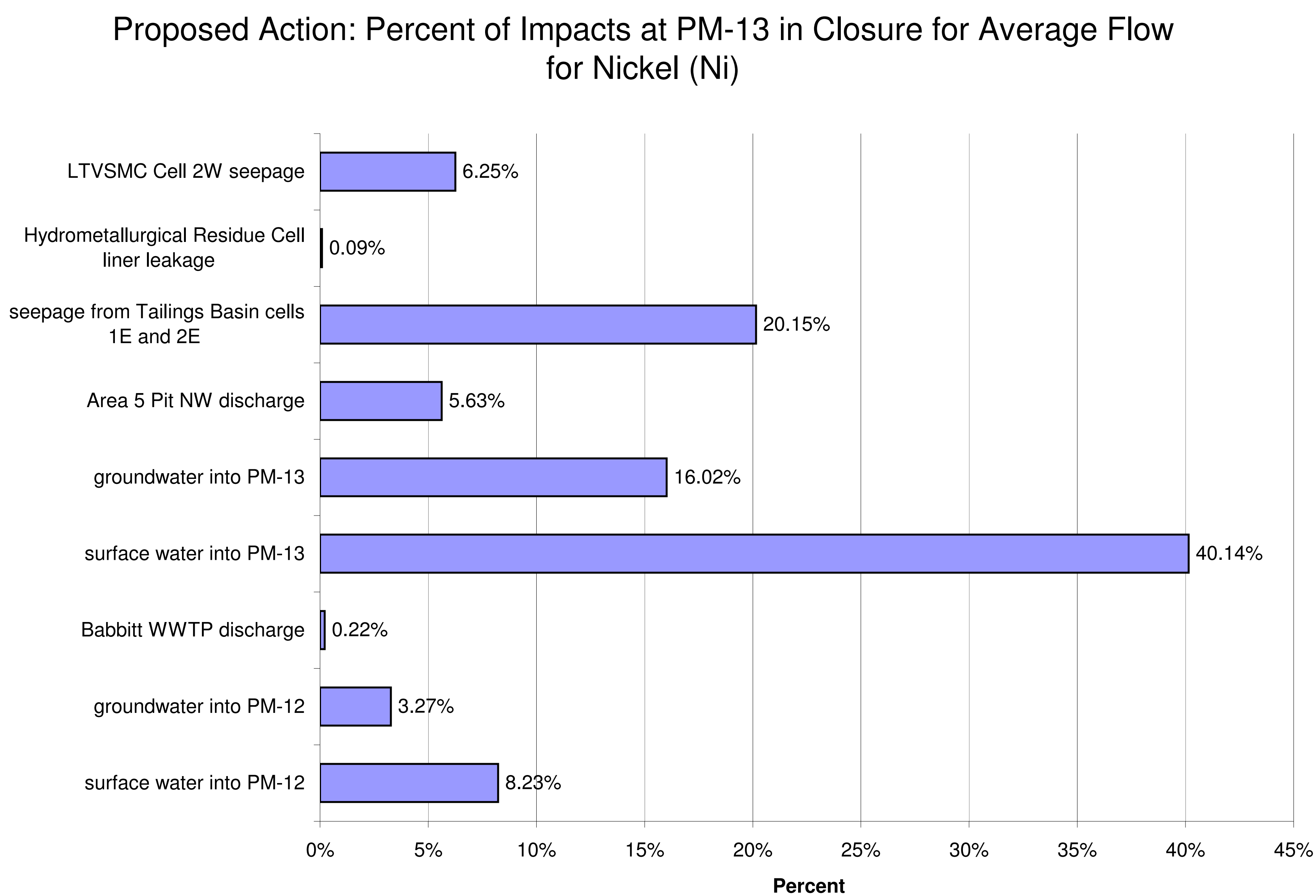


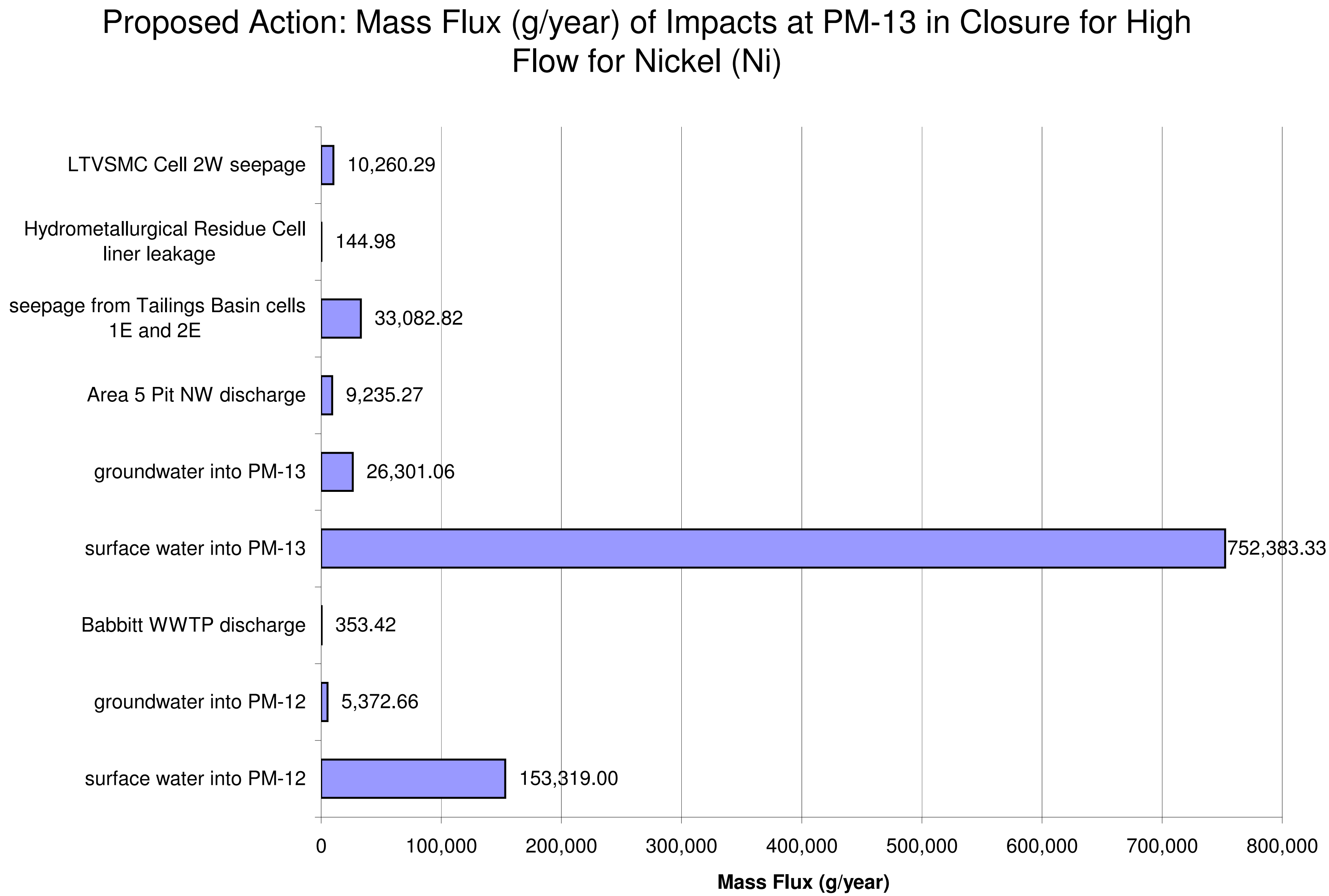
Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)



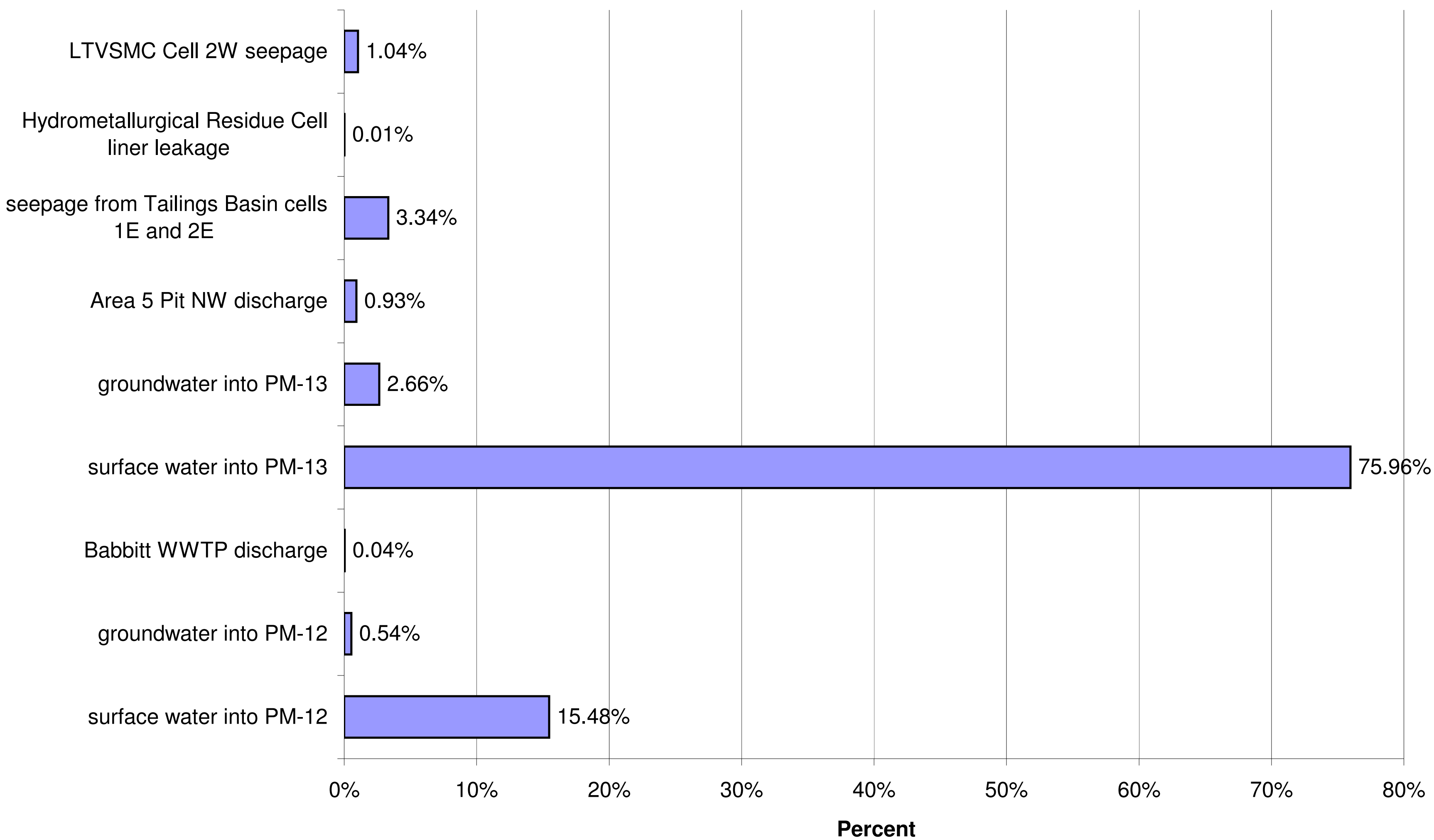
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Nickel (Ni)

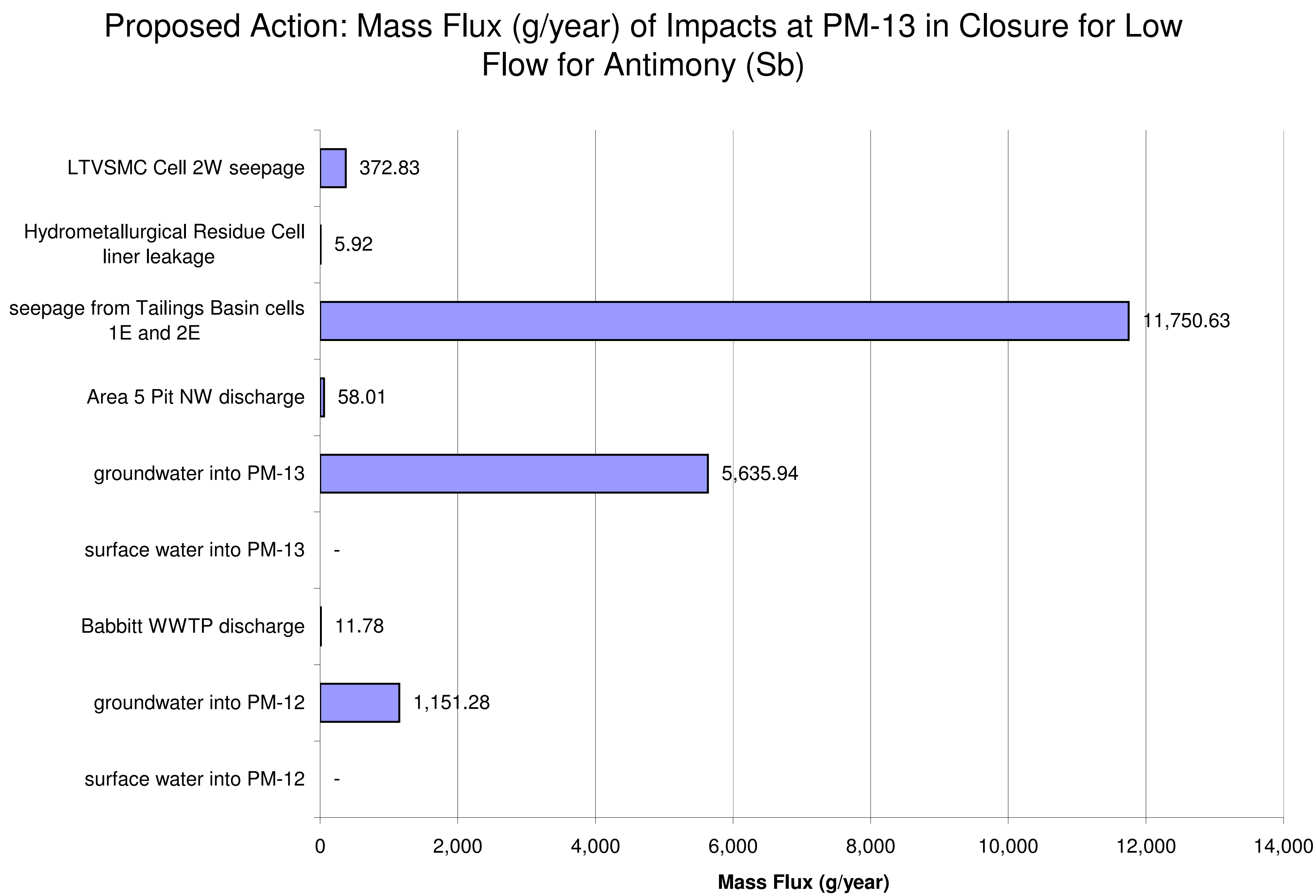


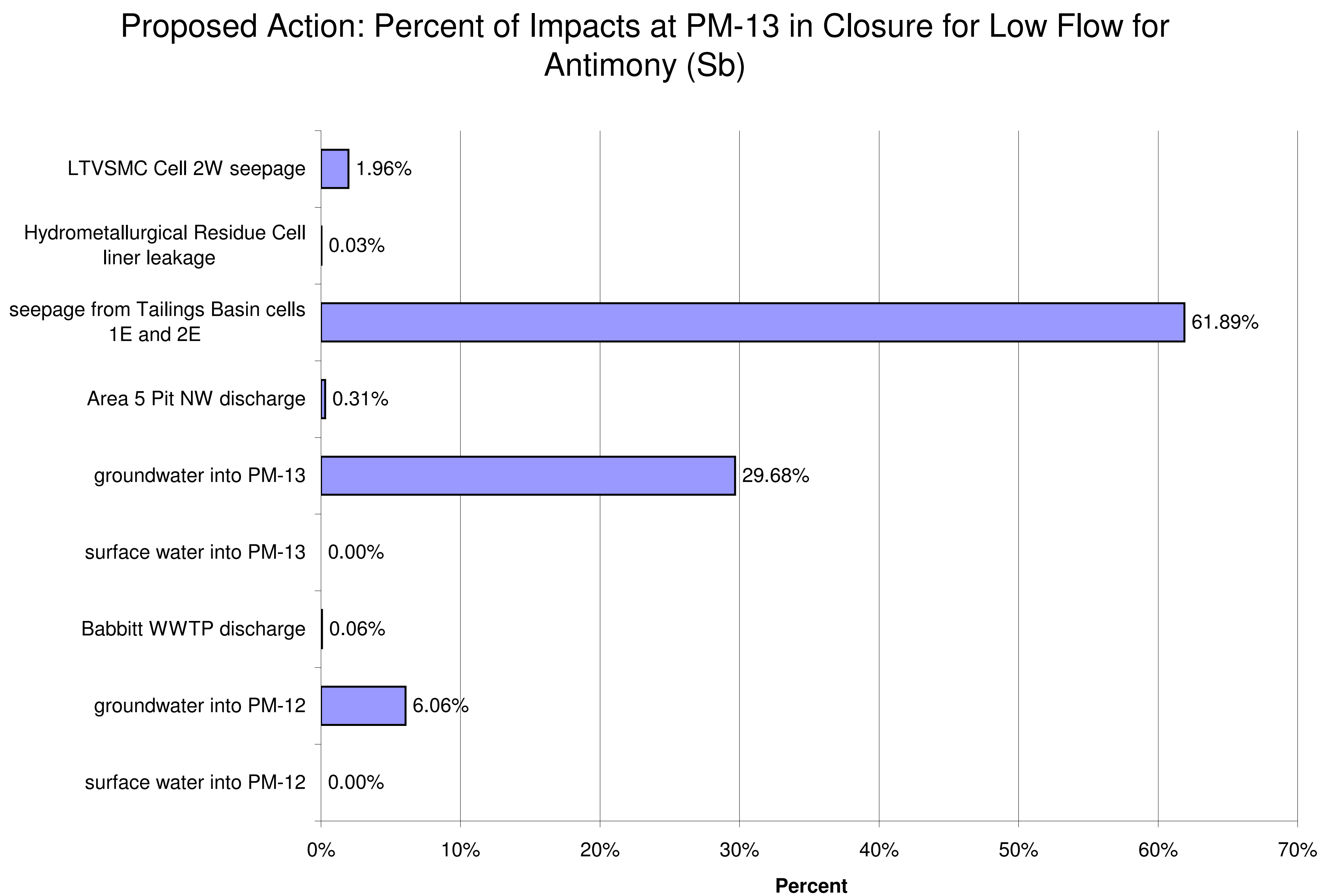

Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
6.25%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
20.15%
Area 5 Pit NW discharge
5.63%
groundwater into PM-13
16.02%
surface water into PM-13
40.14%
Babbitt WWTP discharge
0.22%
groundwater into PM-12
3.27%
surface water into PM-12
8.23%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

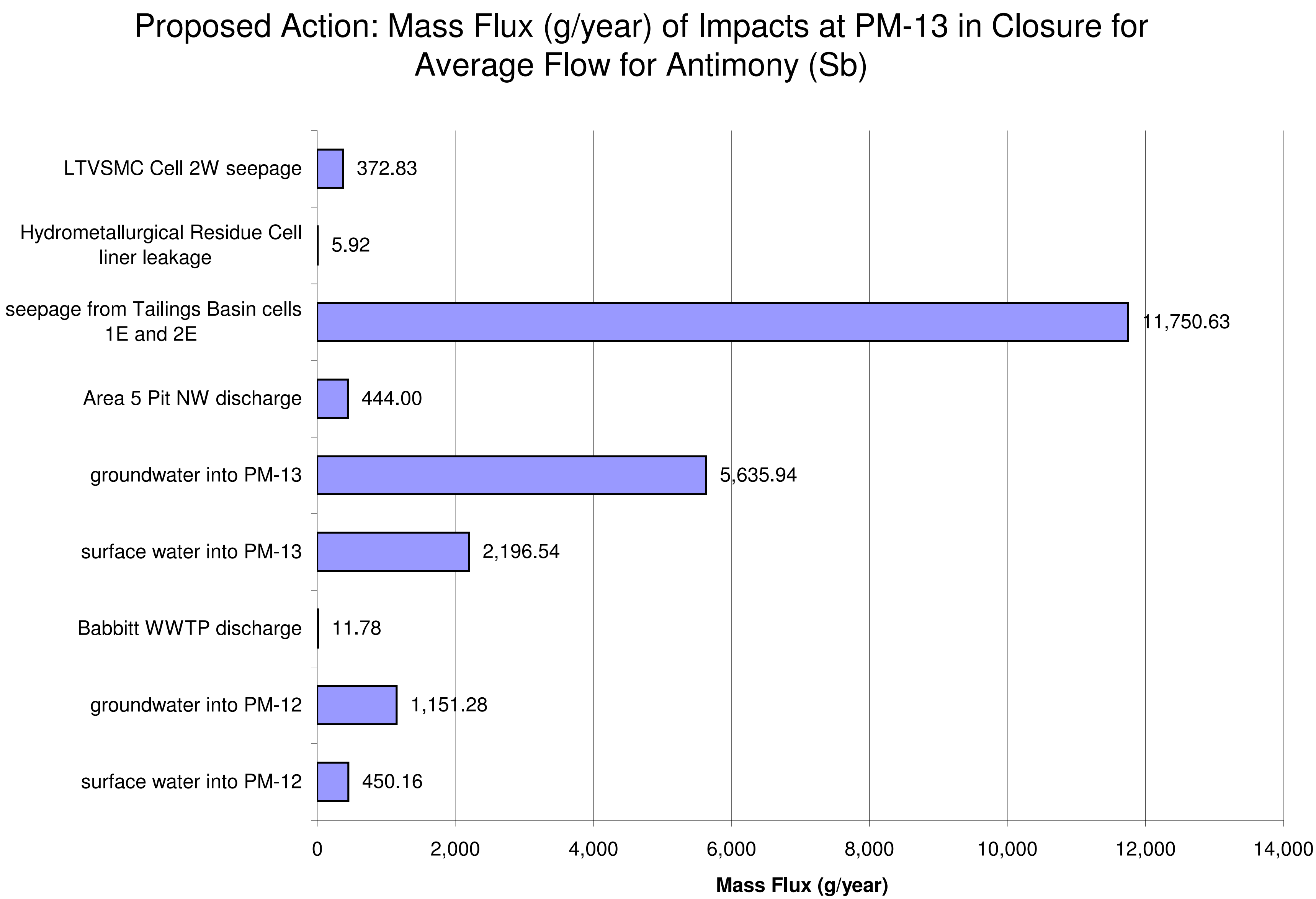

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
10,260.29
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin cells 1E and 2E
33,082.82
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

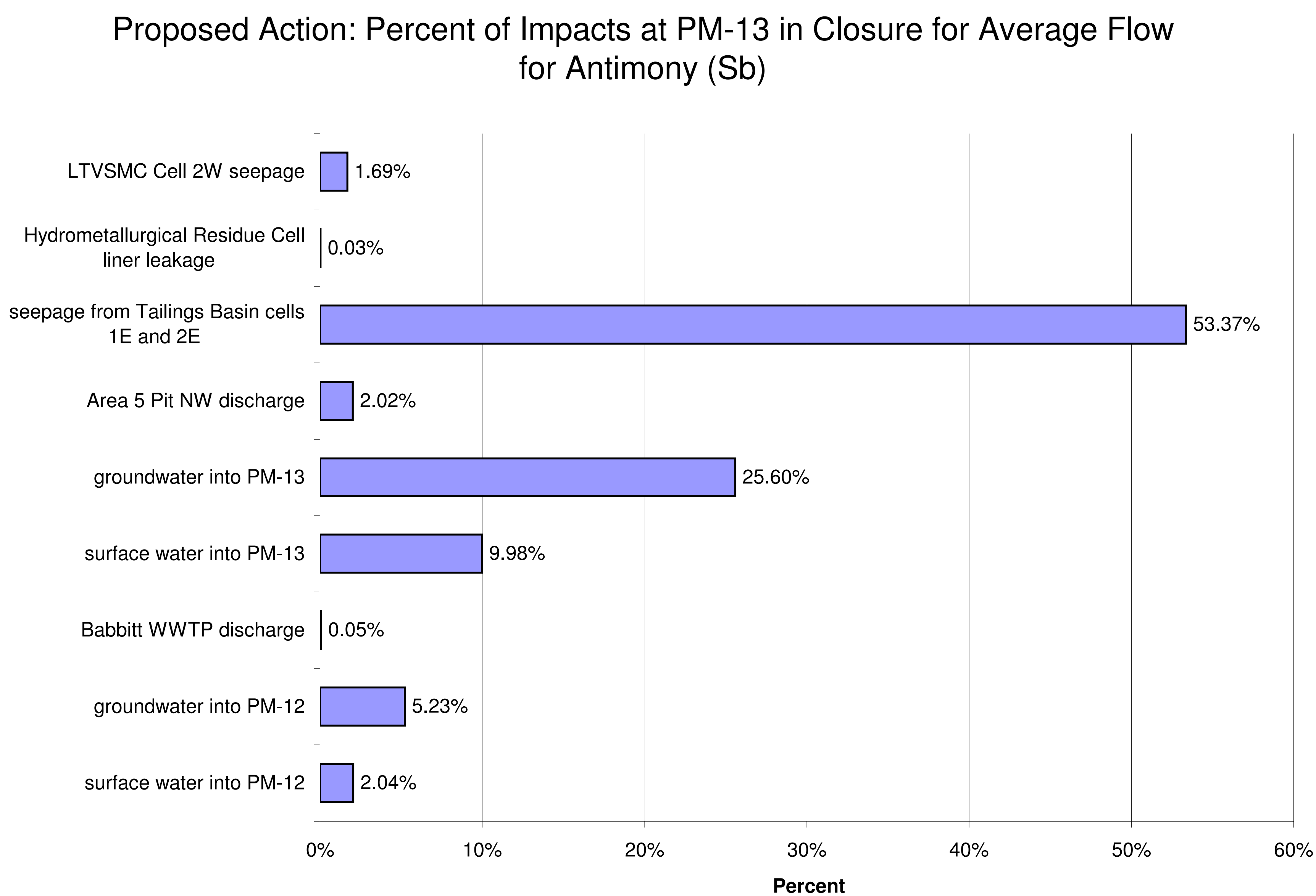
Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)

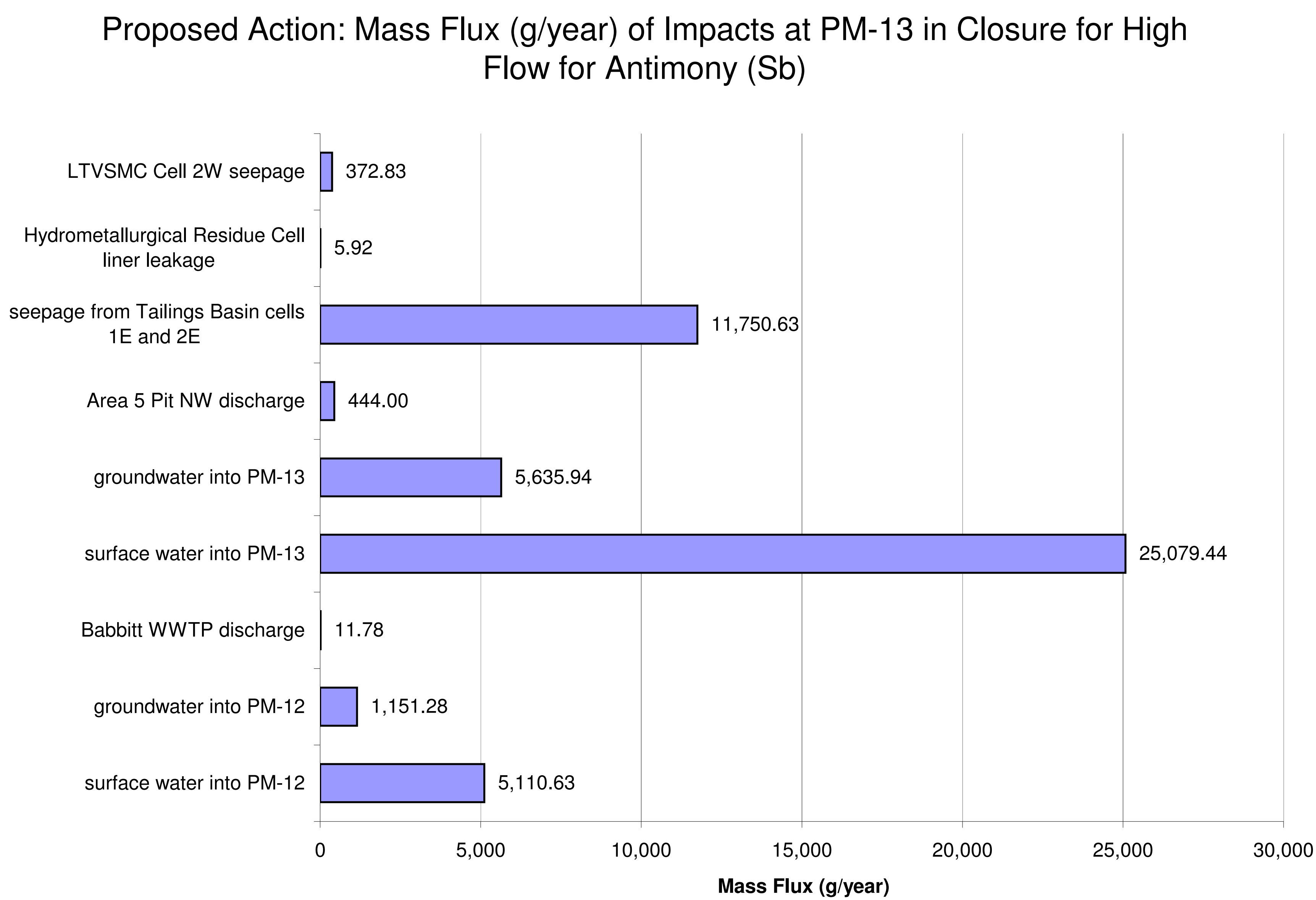


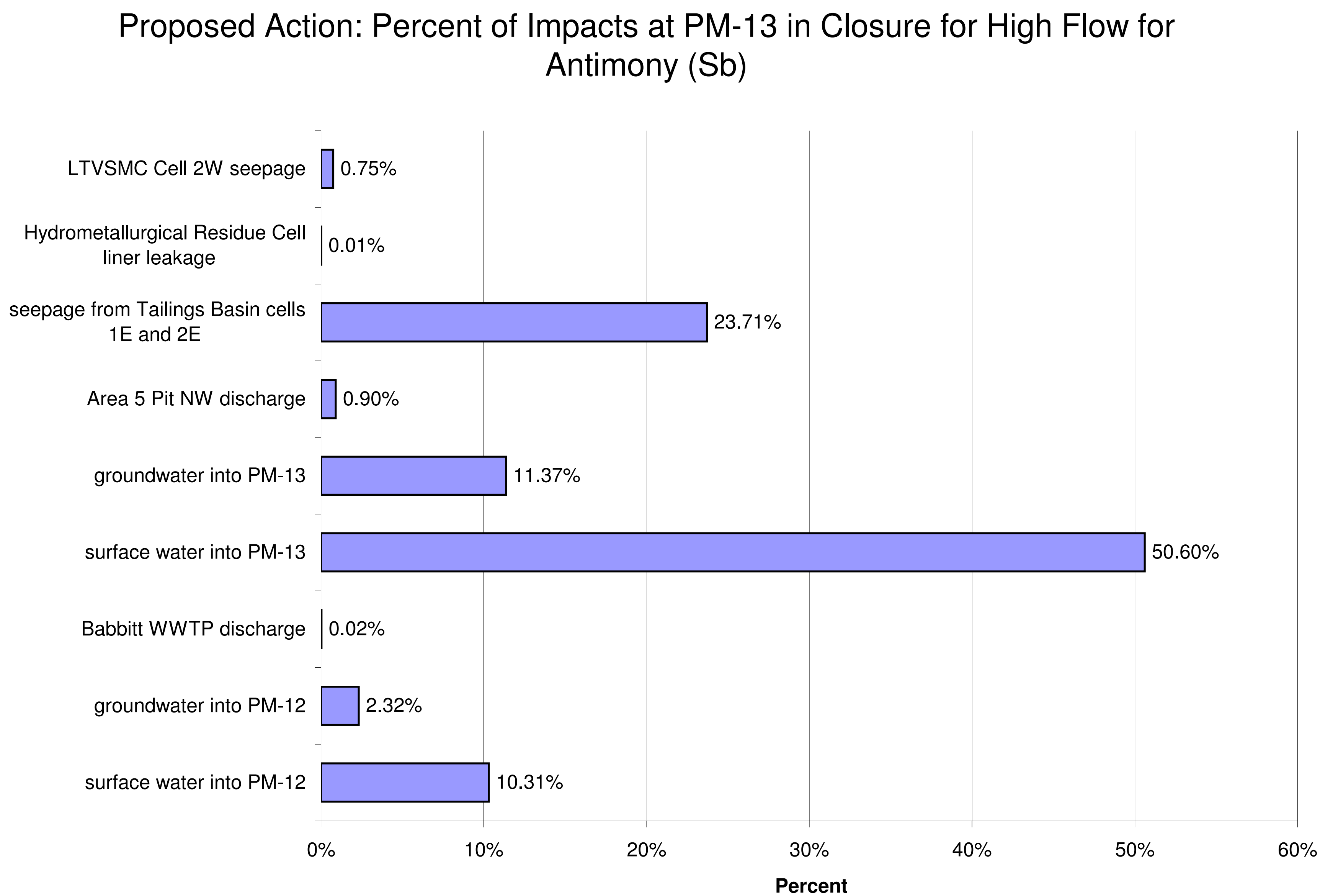

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
372.83
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
11,750.63
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
Mass Flux (g/year)

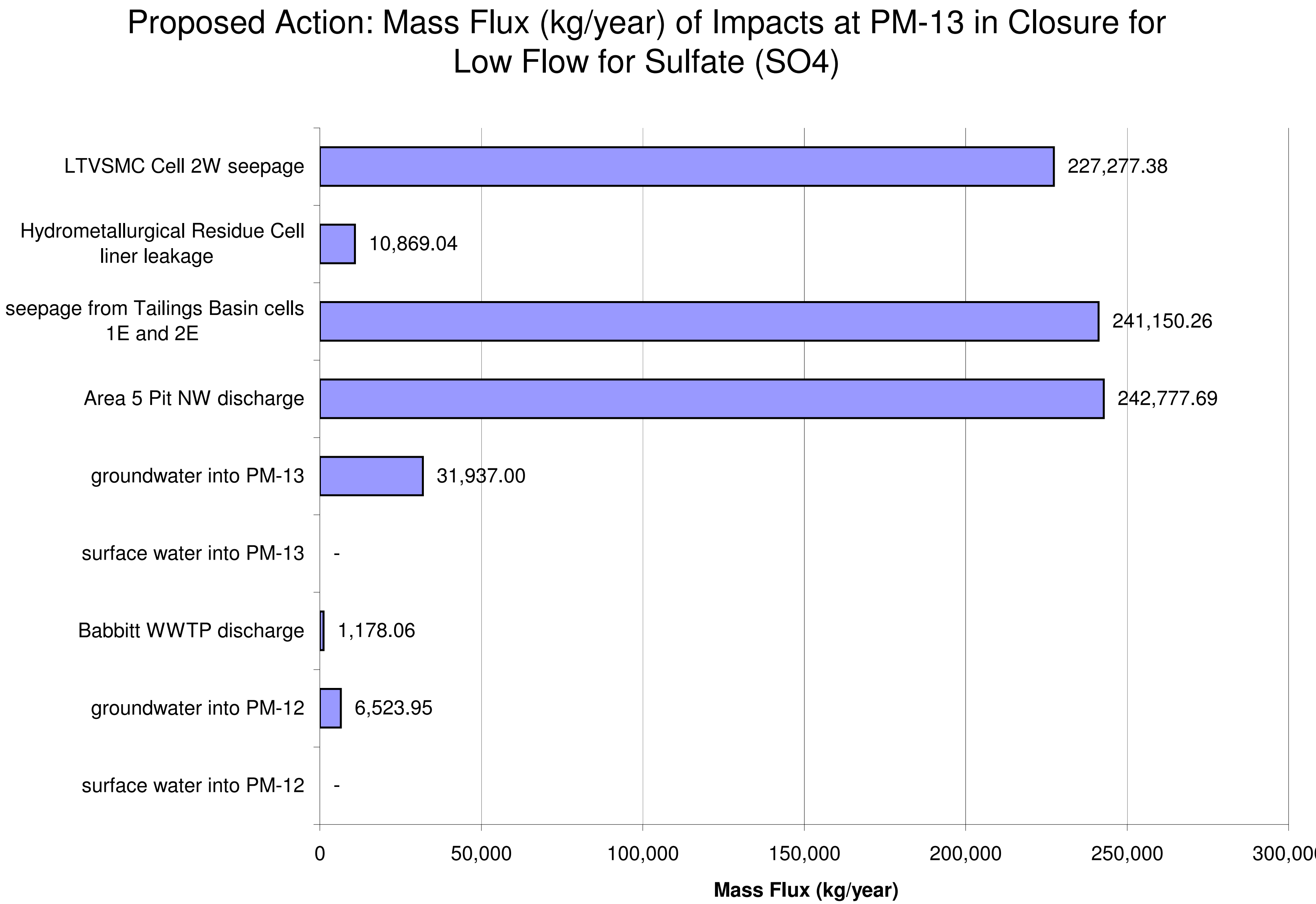

Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.96%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
61.89%
Area 5 Pit NW discharge
0.31%
groundwater into PM-13
29.68%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.06%
groundwater into PM-12
6.06%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

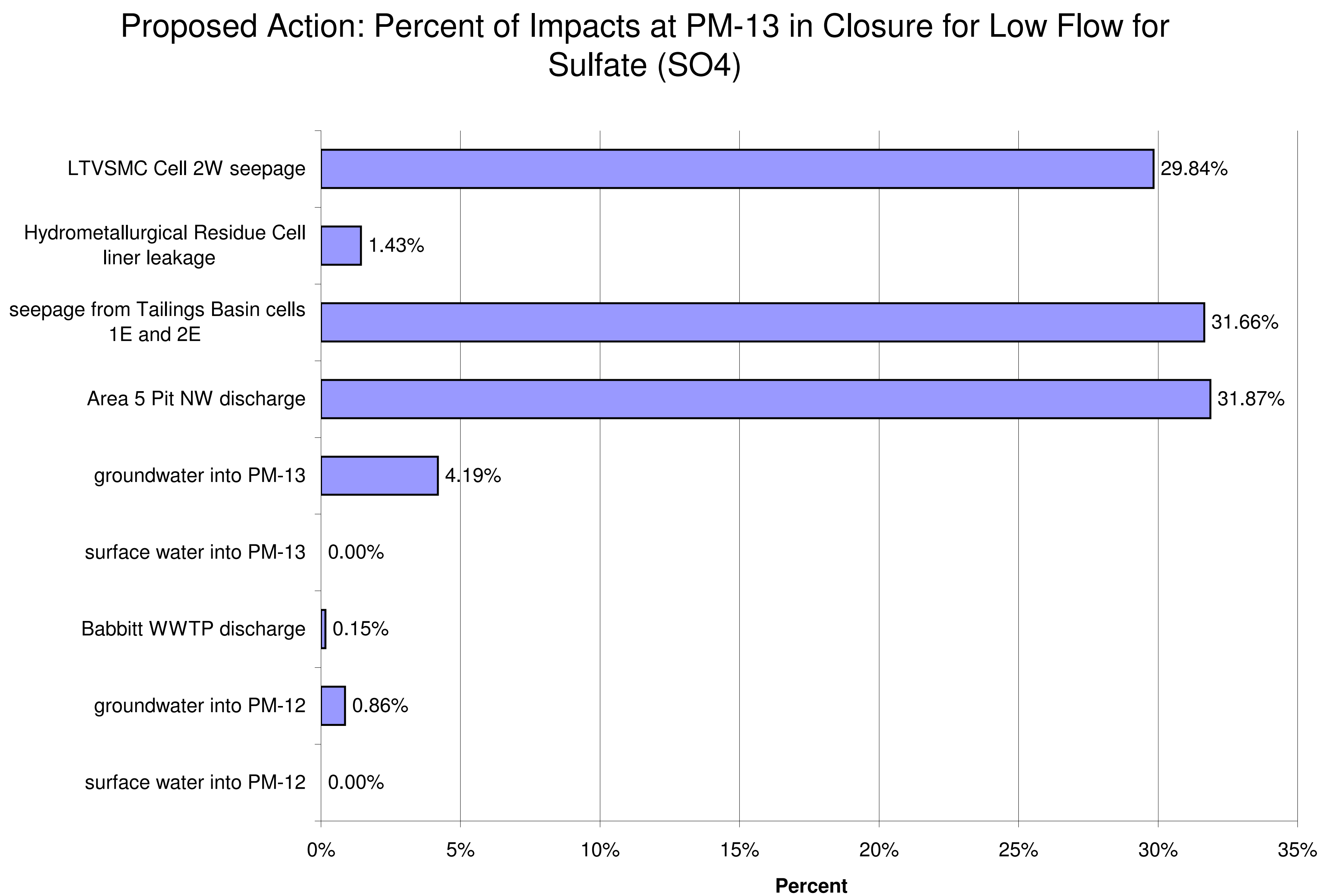

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
372.83
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
11,750.63
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.69%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
53.37%
Area 5 Pit NW discharge
2.02%
groundwater into PM-13
25.60%
surface water into PM-13
9.98%
Babbitt WWTP discharge
0.05%
groundwater into PM-12
5.23%
surface water into PM-12
2.04%
0%
10%
20%
30%
40%
50%
60%
Percent

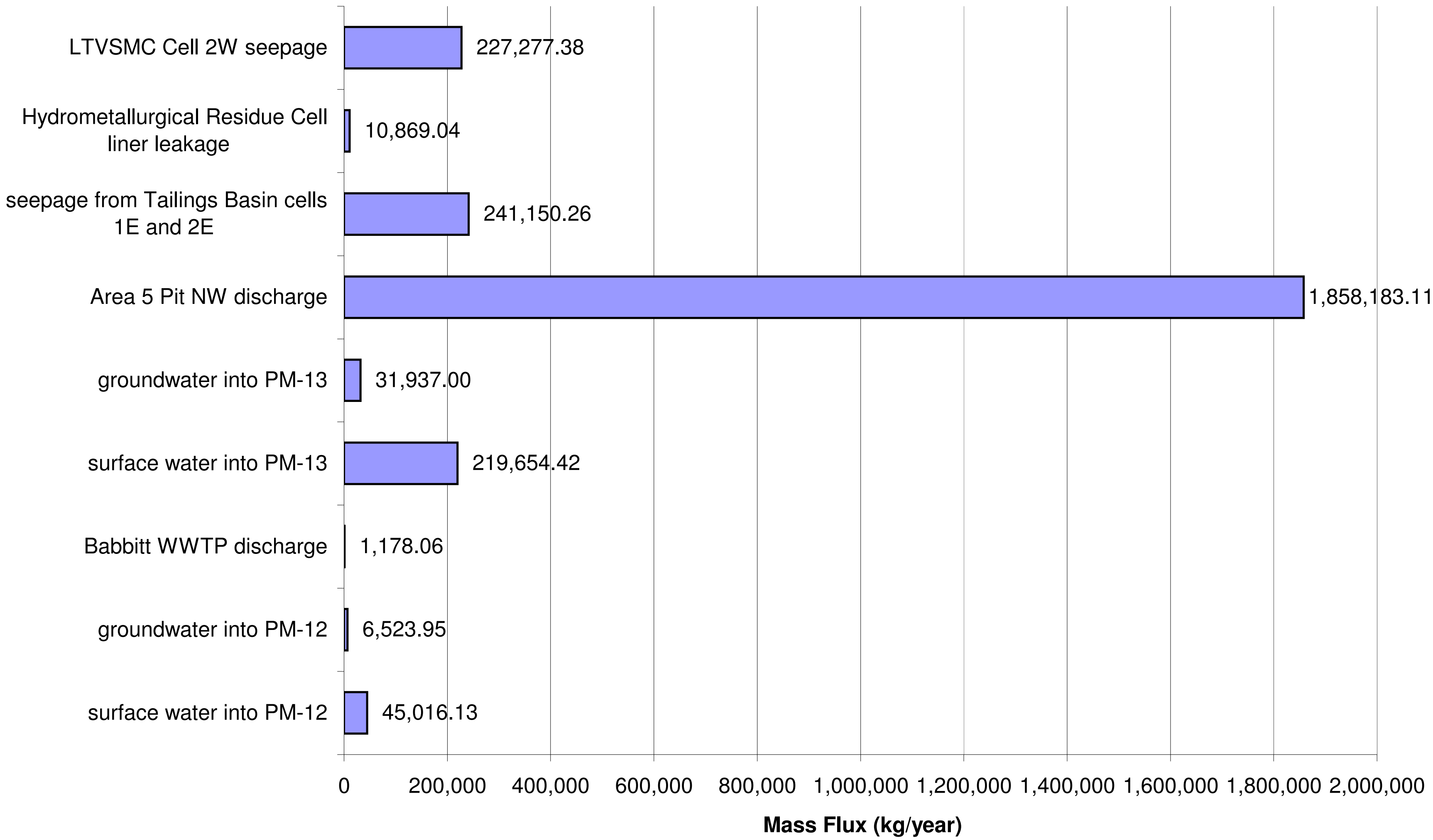

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
372.83
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
11,750.63
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.75%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
23.71%
Area 5 Pit NW discharge
0.90%
groundwater into PM-13
11.37%
surface water into PM-13
50.60%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
2.32%
surface water into PM-12
10.31%
0%
10%
20%
30%
40%
50%
60%
Percent

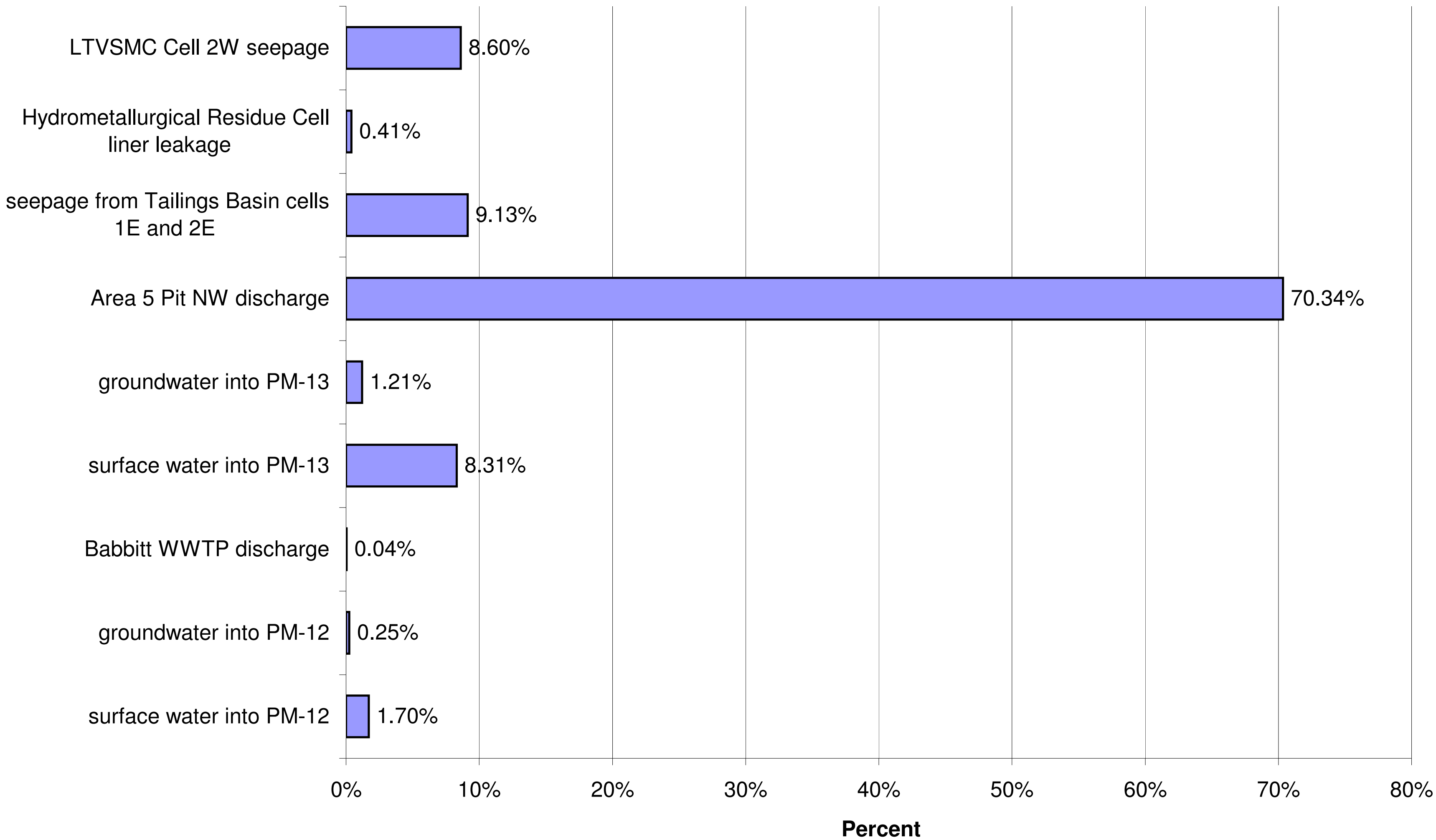

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
227,277.38
Hydrometallurgical Residue Cell liner leakage
10,869.04
seepage from Tailings Basin cells 1E and 2E
241,150.26
Area 5 Pit NW discharge
242,777.69
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
50,000
100,000
150,000
200,000
250,000
300,000
Mass Flux (kg/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
29.84%
Hydrometallurgical Residue Cell liner leakage
1.43%
seepage from Tailings Basin cells 1E and 2E
31.66%
Area 5 Pit NW discharge
31.87%
groundwater into PM-13
4.19%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.15%
groundwater into PM-12
0.86%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
Percent

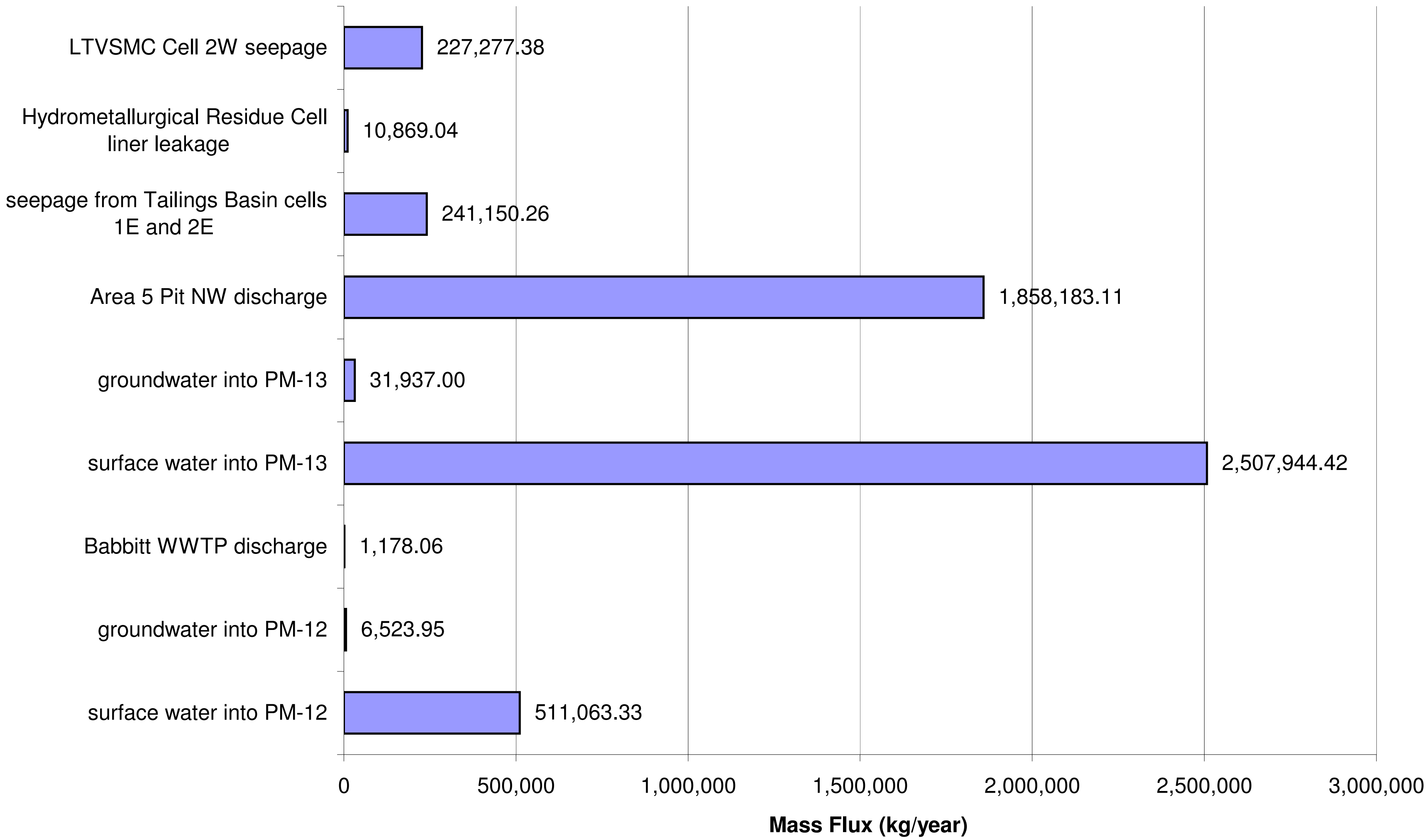
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO4)

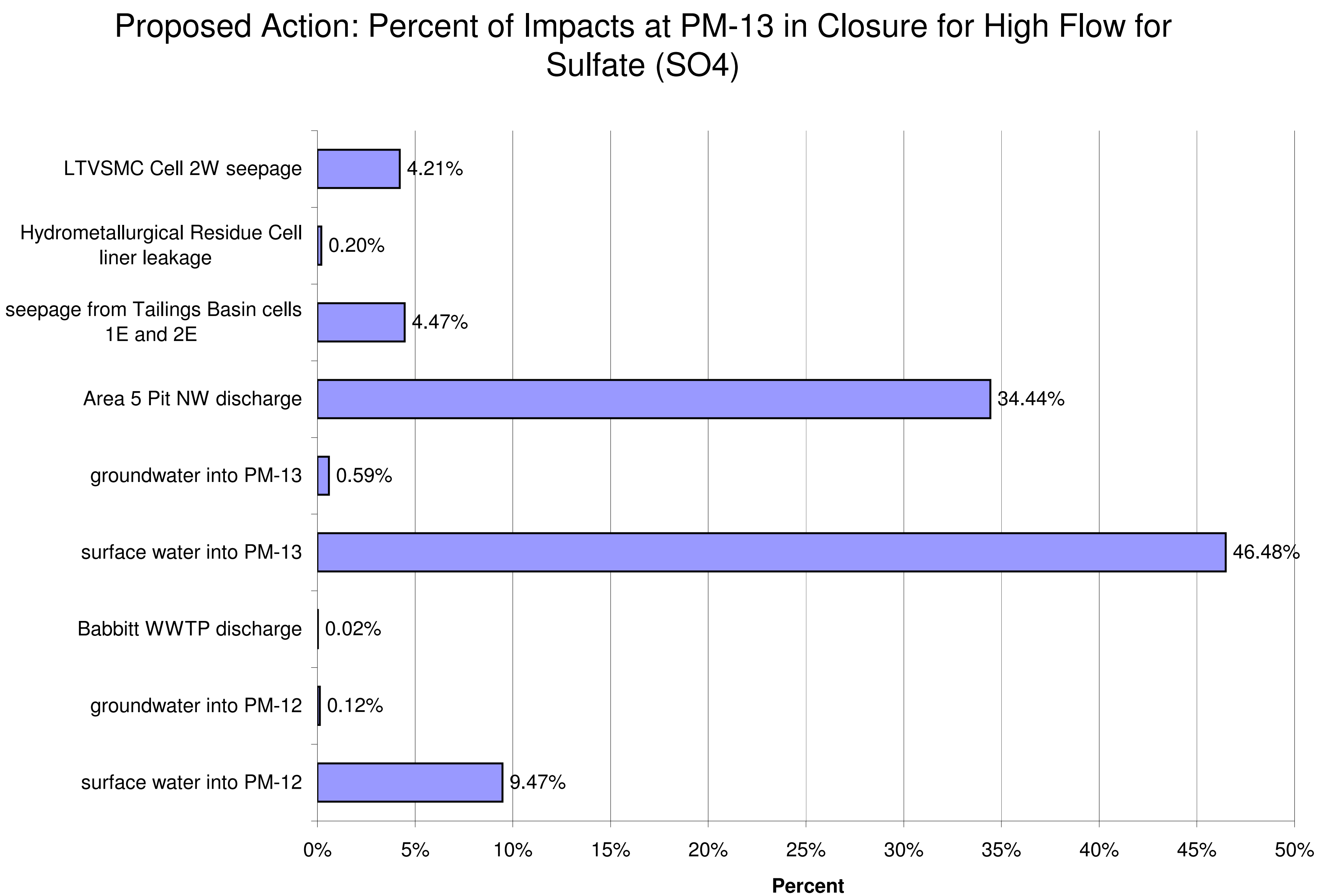


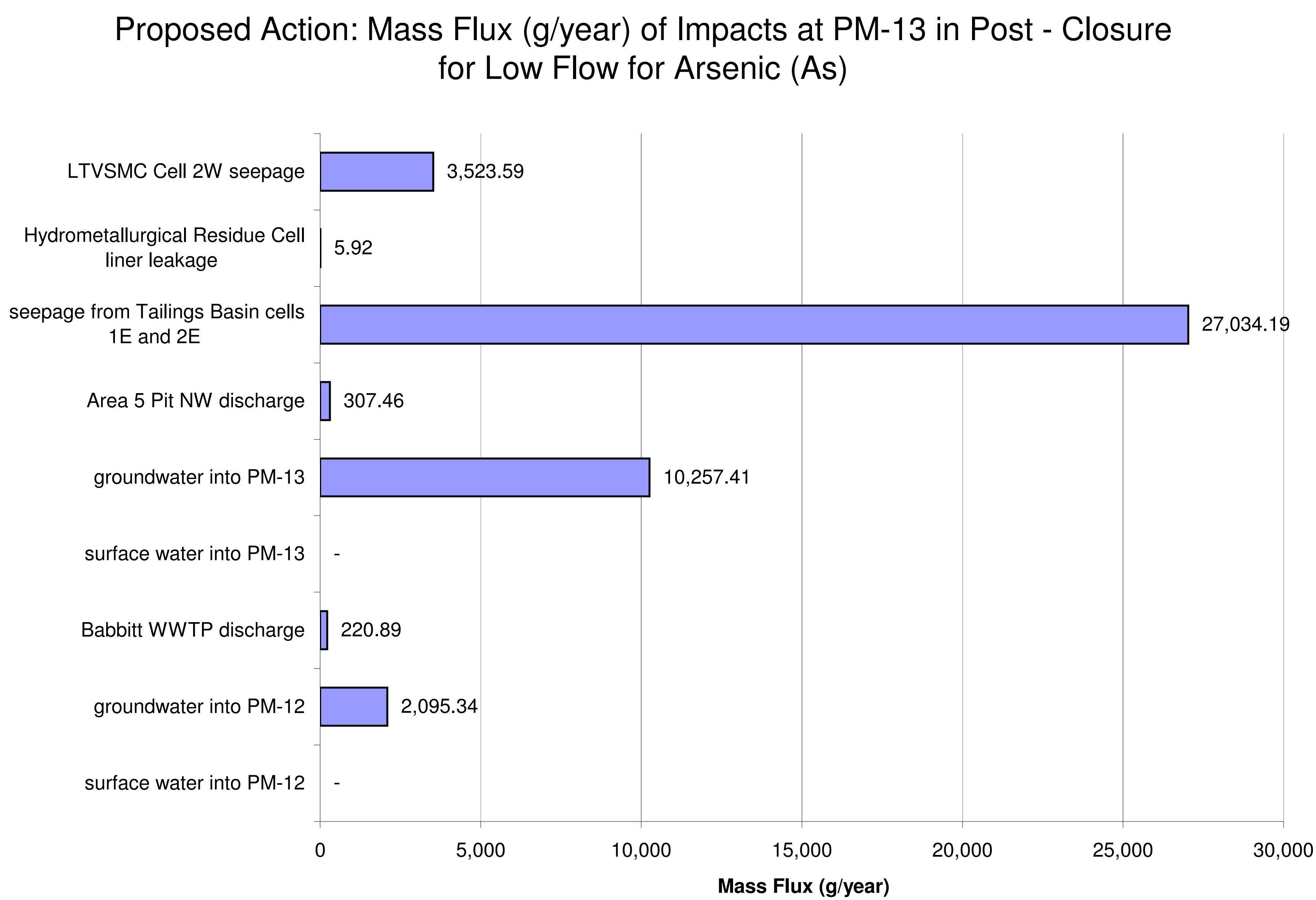
Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO4)

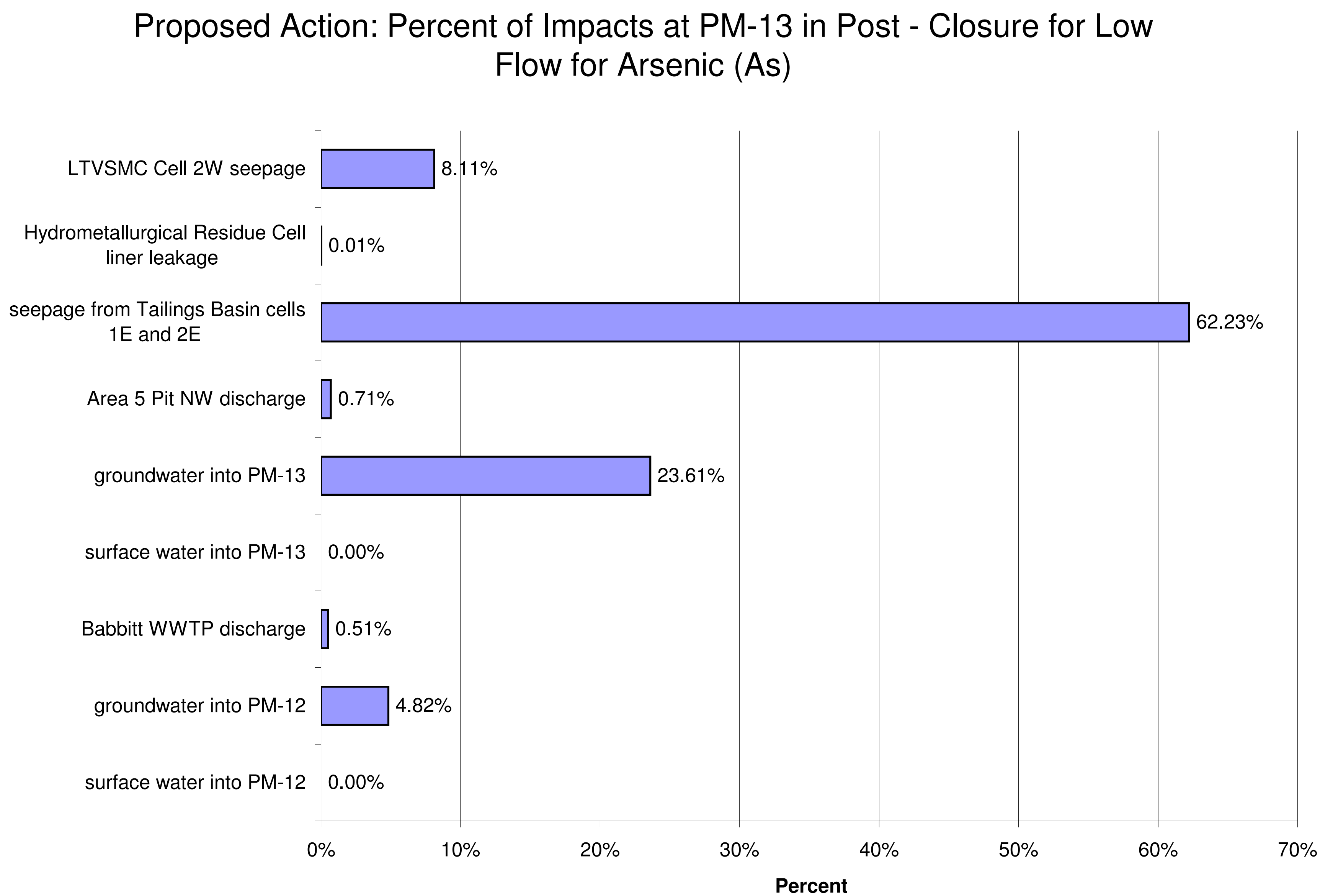


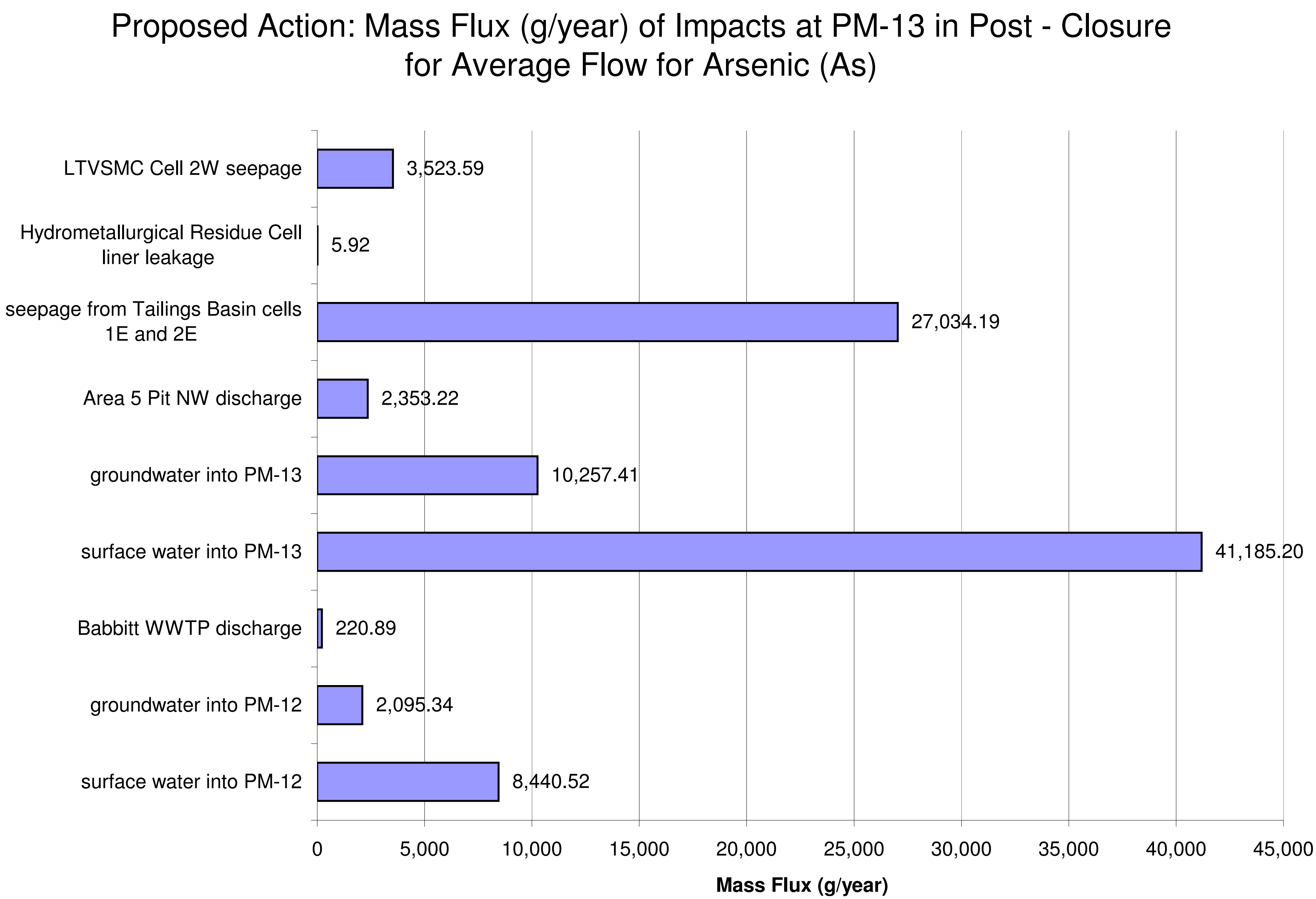
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Closure for High Flow for Sulfate (SO4)



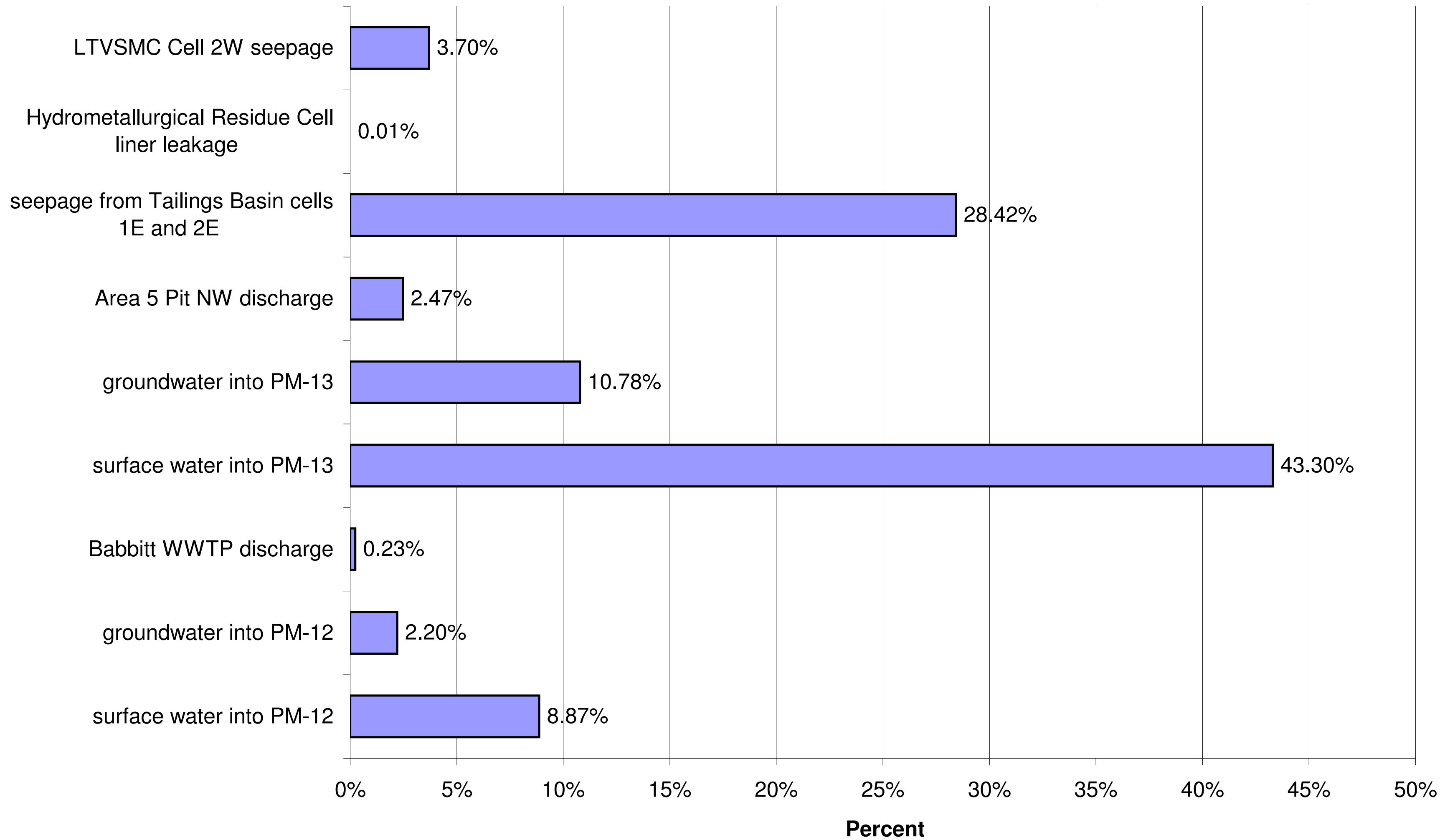

Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
4.21%
Hydrometallurgical Residue Cell liner leakage
0.20%
seepage from Tailings Basin cells 1E and 2E
4.47%
Area 5 Pit NW discharge
34.44%
groundwater into PM-13
0.59%
surface water into PM-13
46.48%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
0.12%
surface water into PM-12
9.47%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

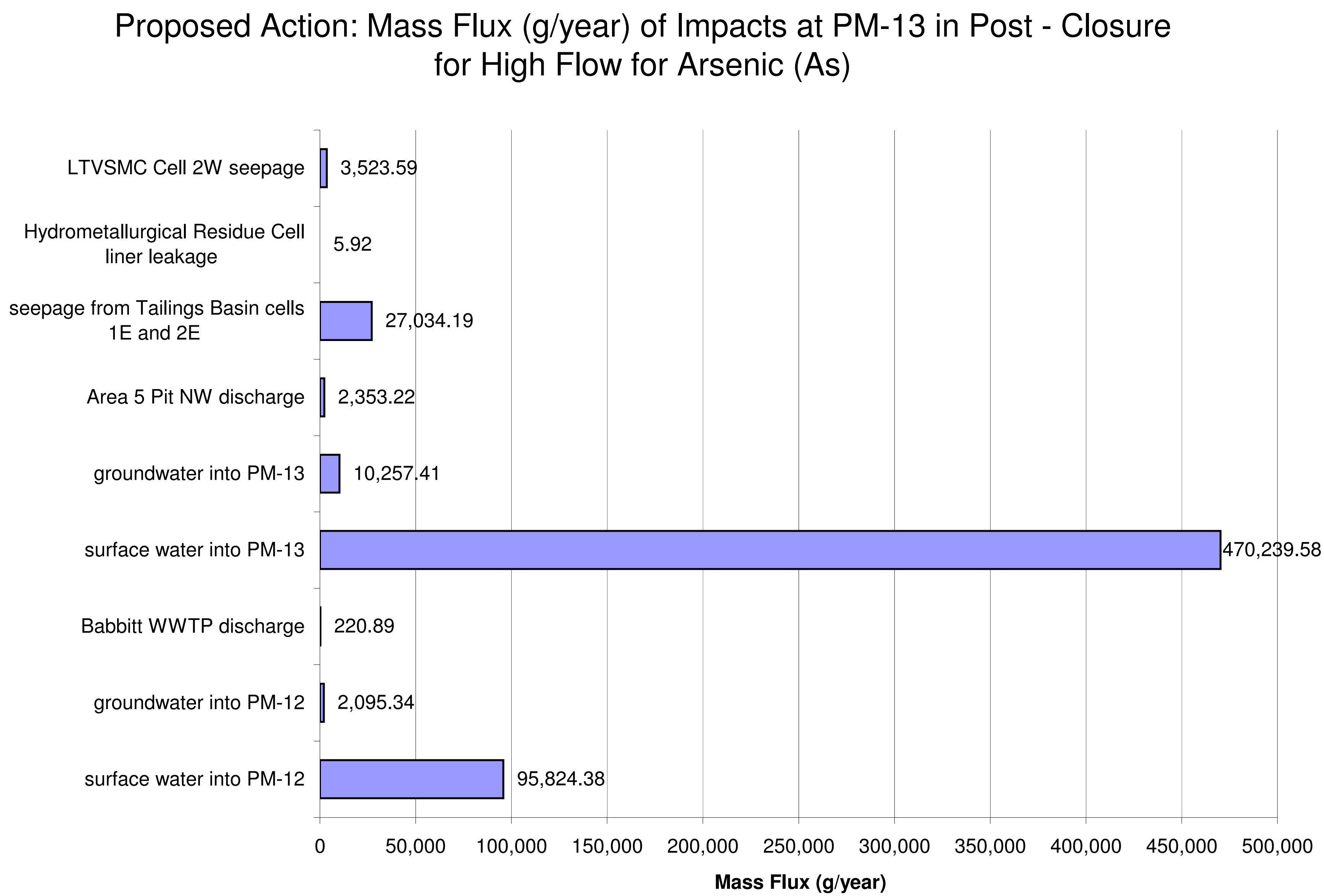

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,523.59
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
27,034.19
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

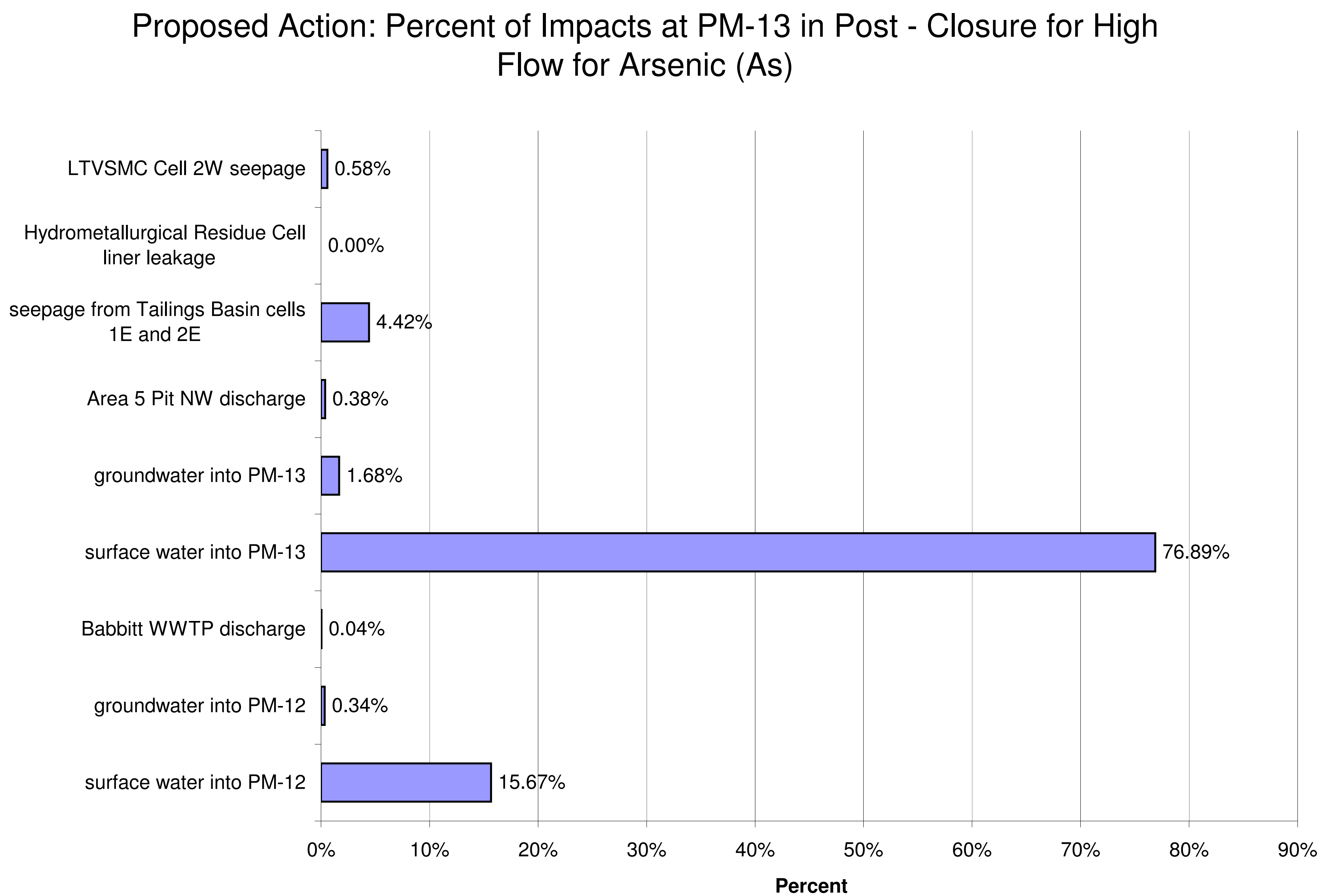

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
8.11%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
62.23%
Area 5 Pit NW discharge
0.71%
groundwater into PM-13
23.61%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.51%
groundwater into PM-12
4.82%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,523.59
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
27,034.19
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

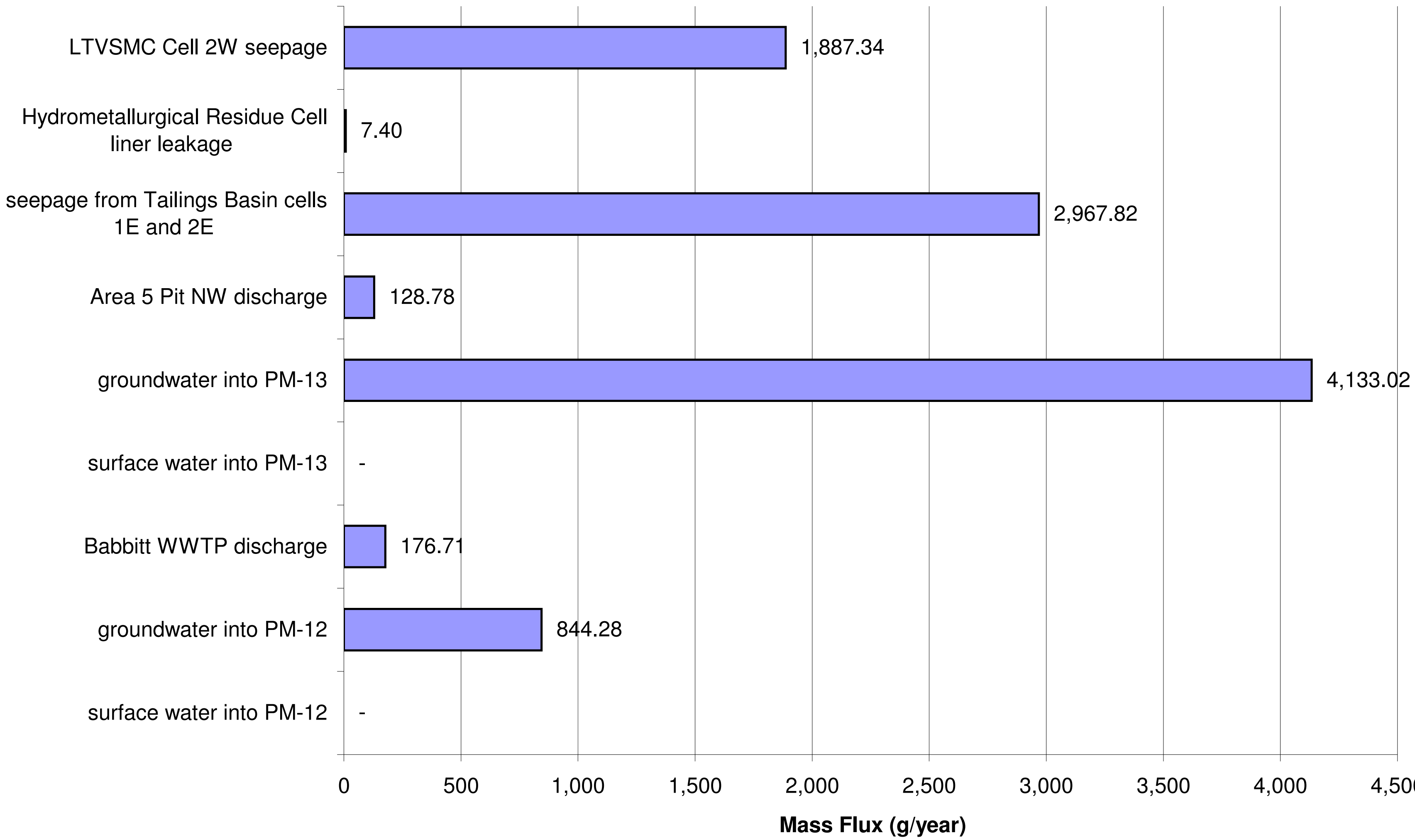
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)



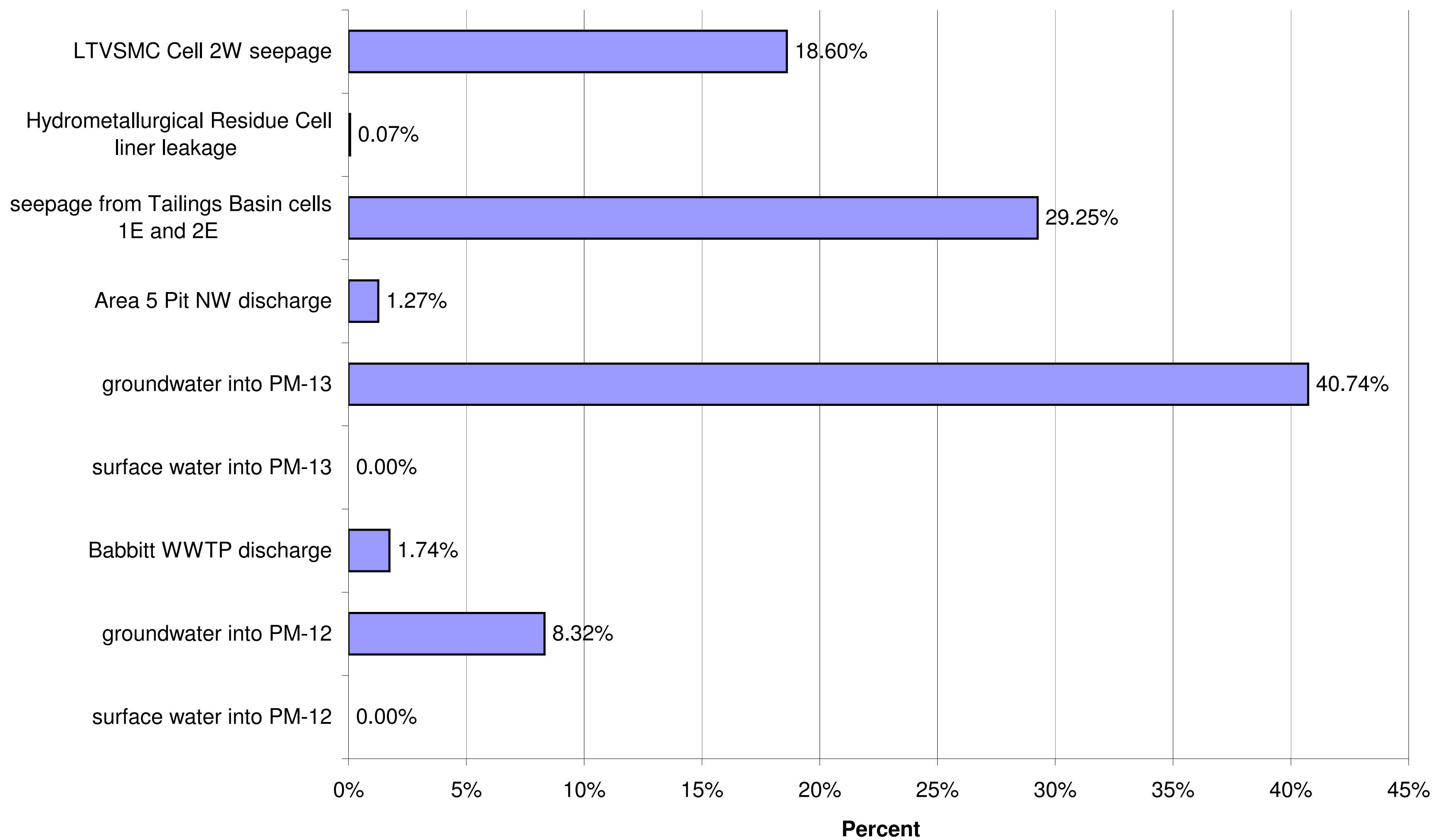

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,523.59
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
27,034.19
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.58%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
4.42%
Area 5 Pit NW discharge
0.38%
groundwater into PM-13
1.68%
surface water into PM-13
76.89%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.34%
surface water into PM-12
15.67%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

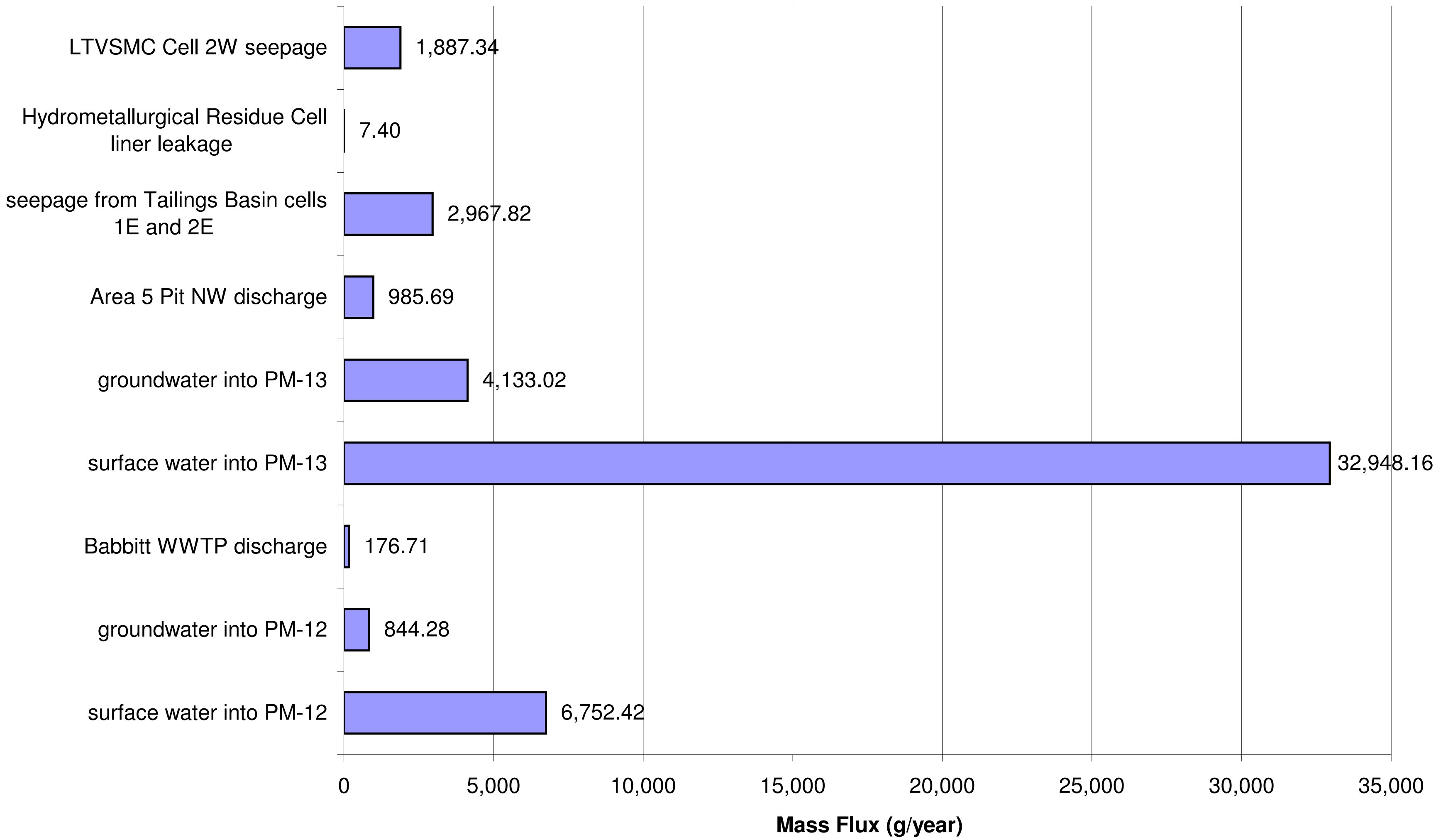
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)



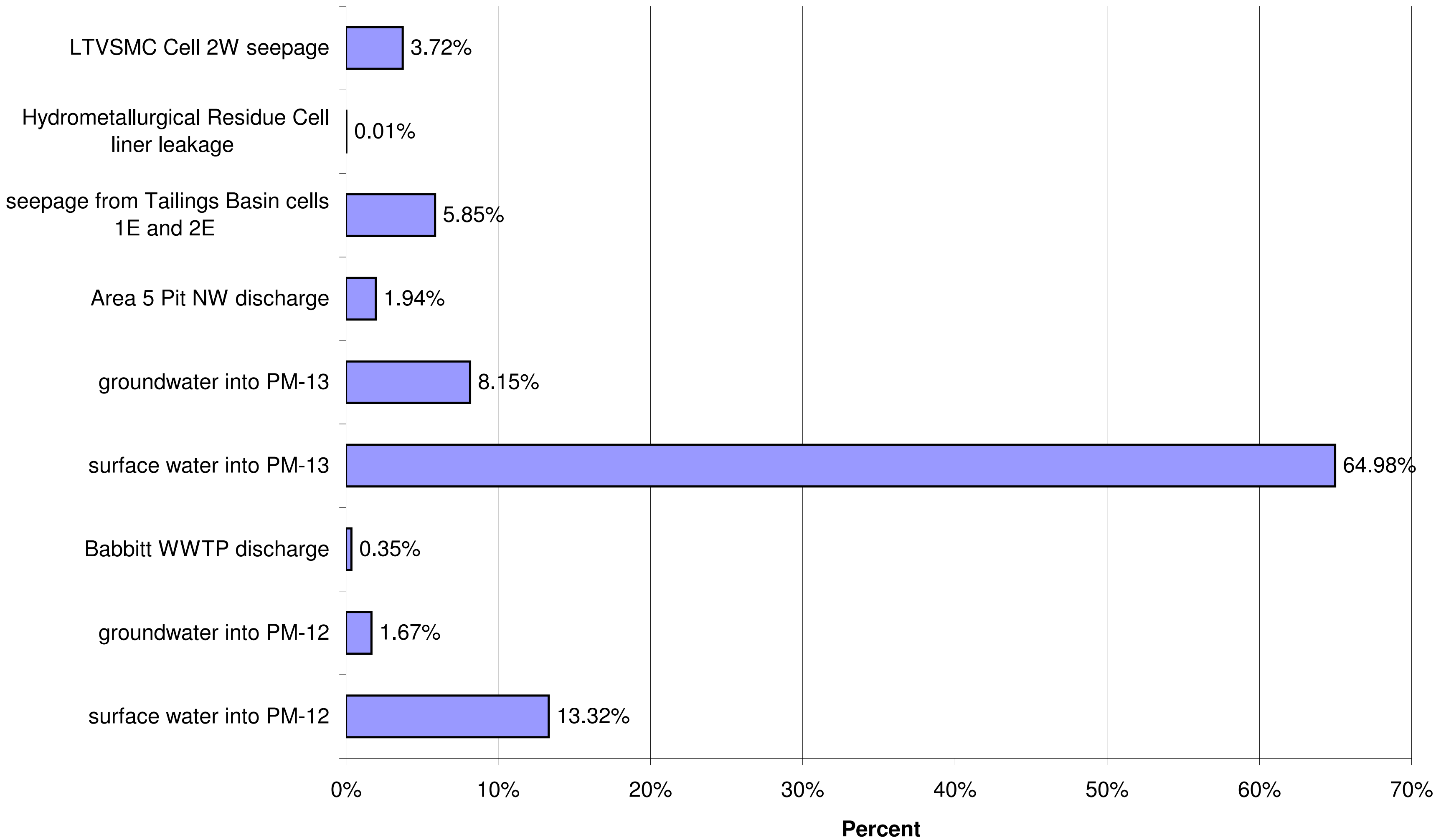
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)

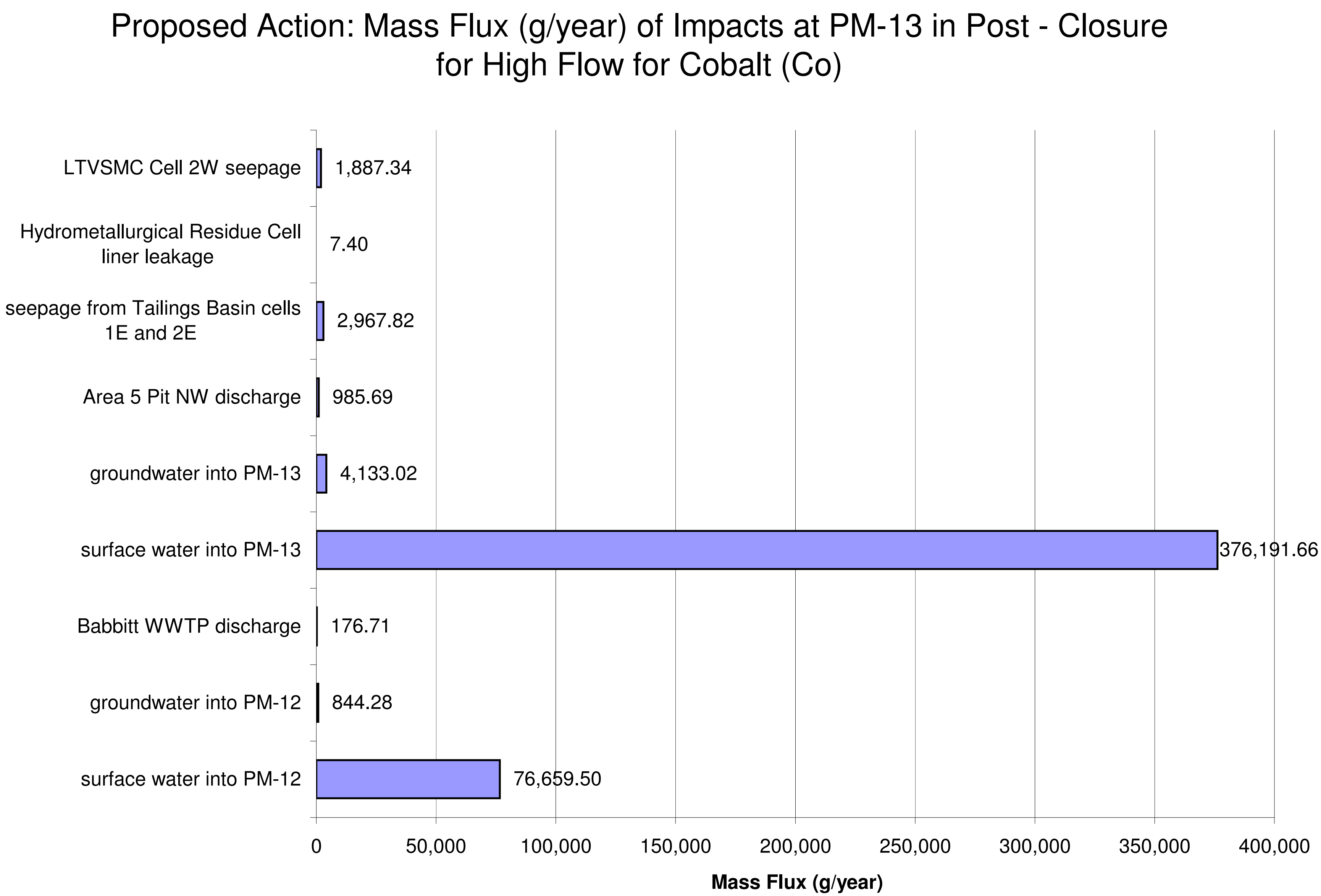


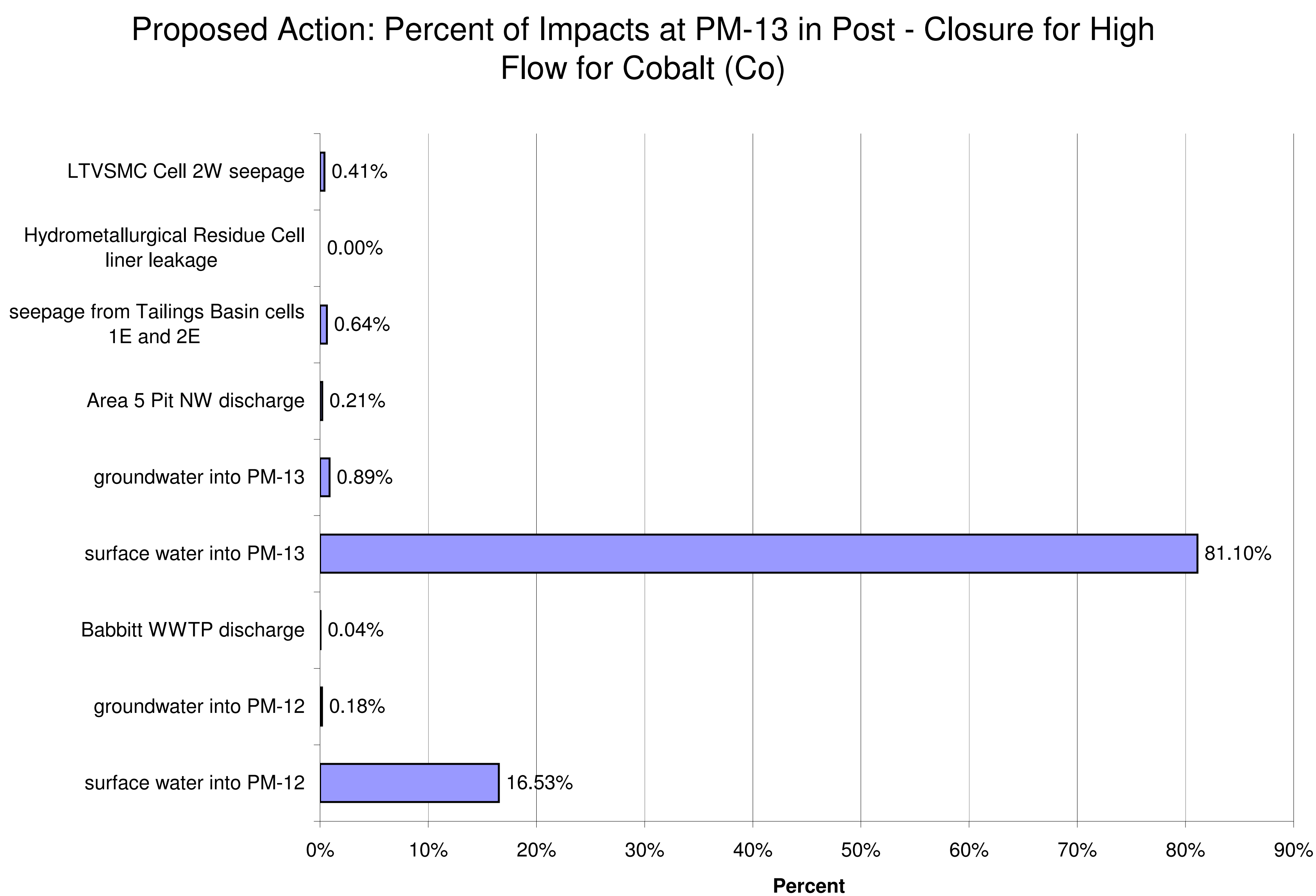
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)

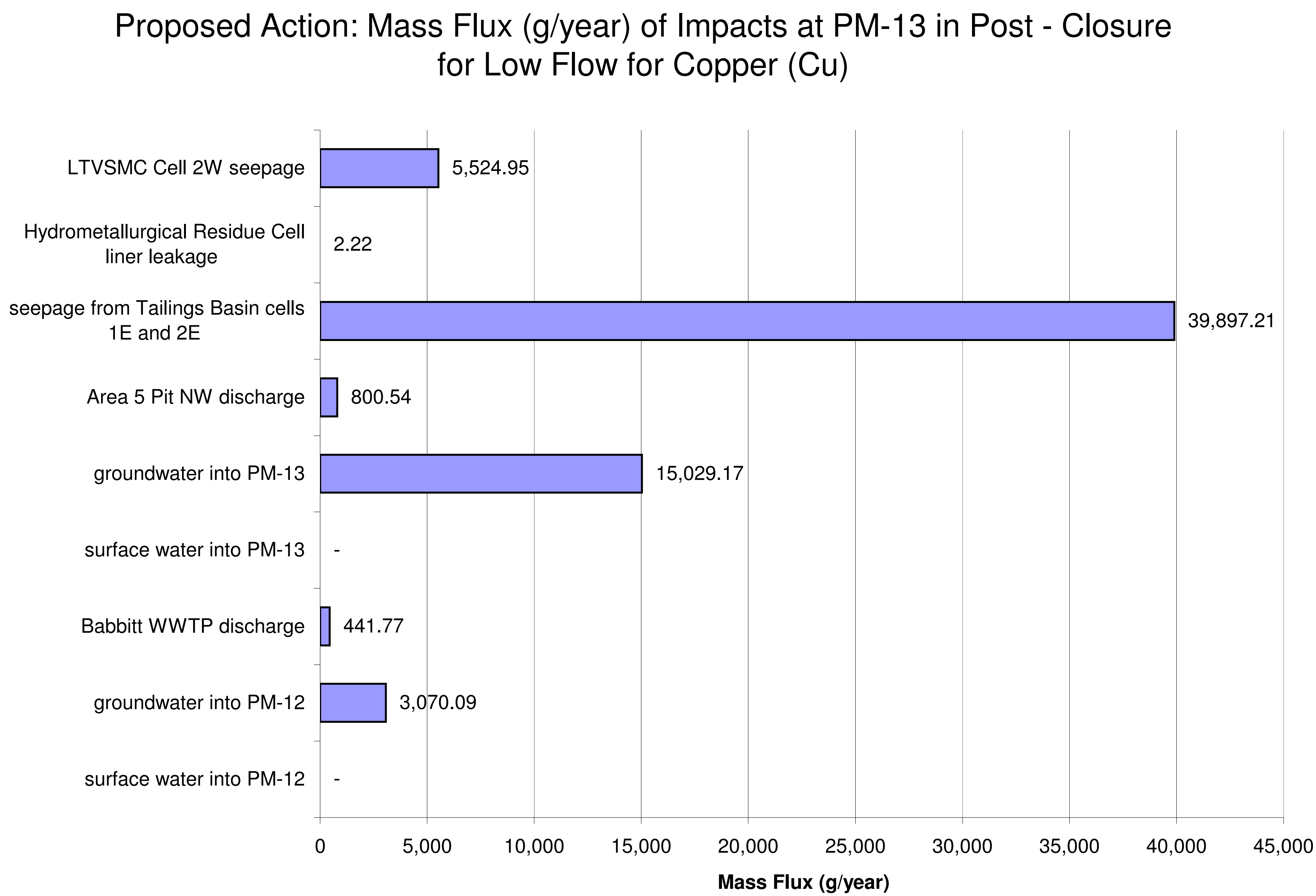


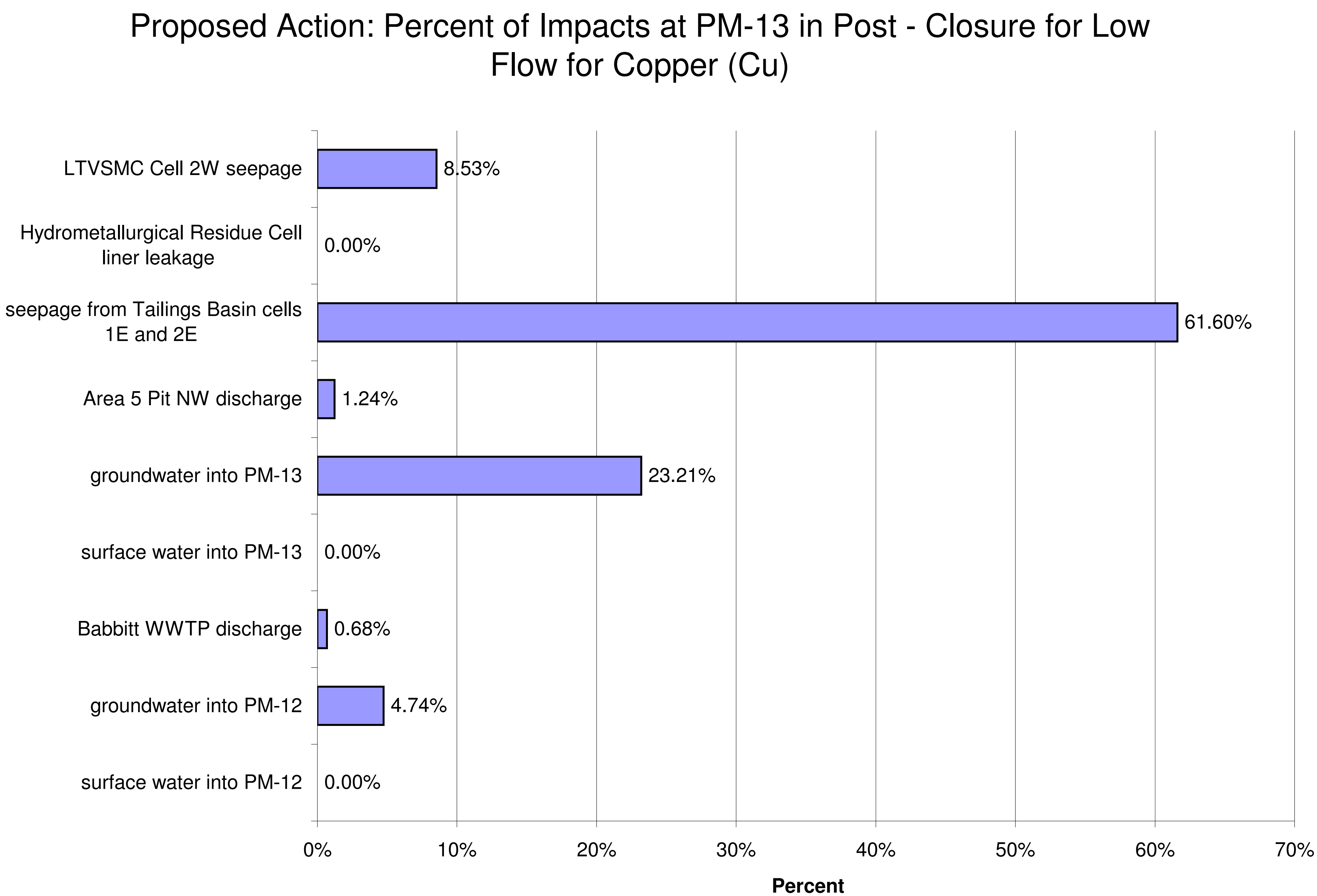
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)

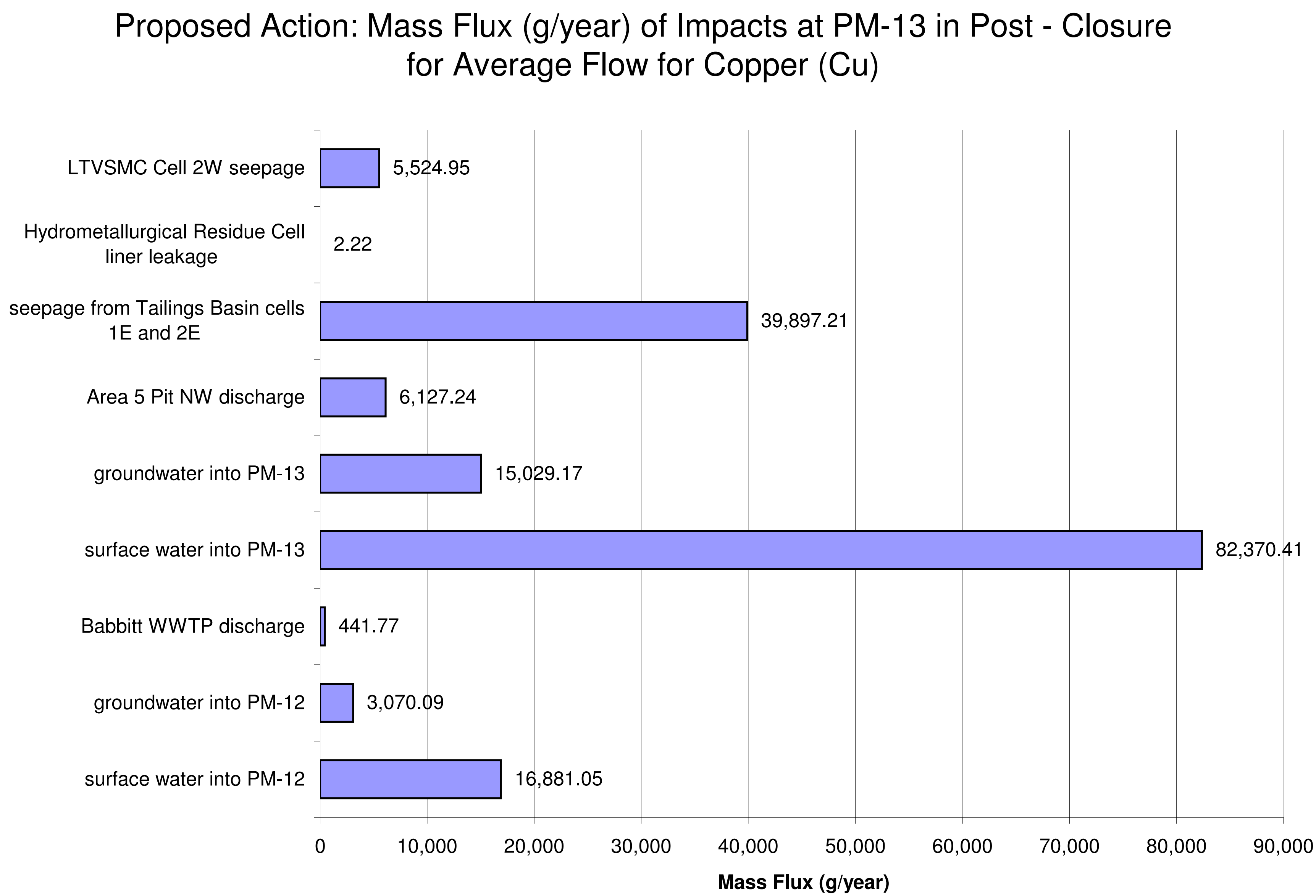



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,887.34
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

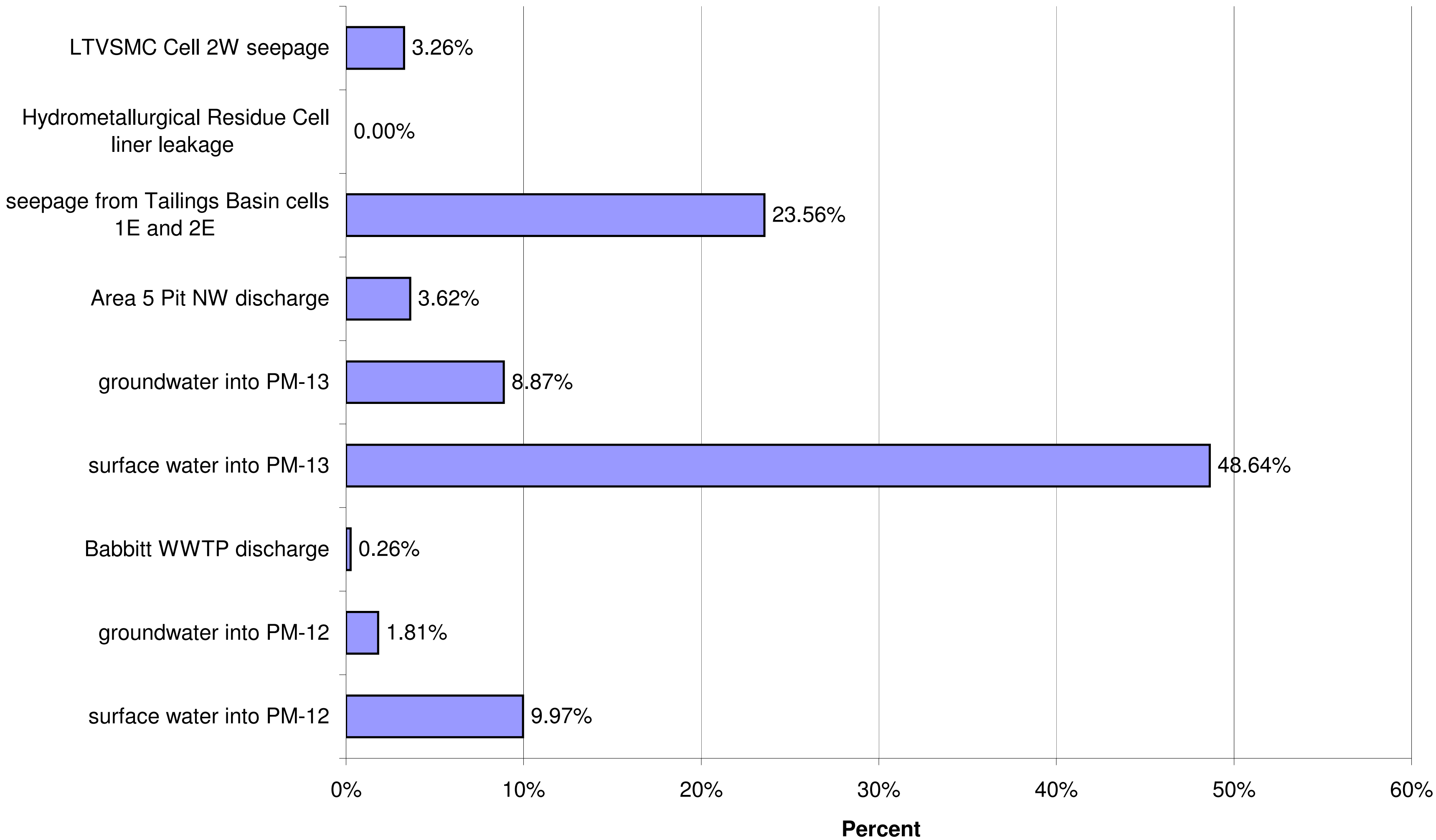

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.41%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
0.64%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.89%
surface water into PM-13
81.10%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.53%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

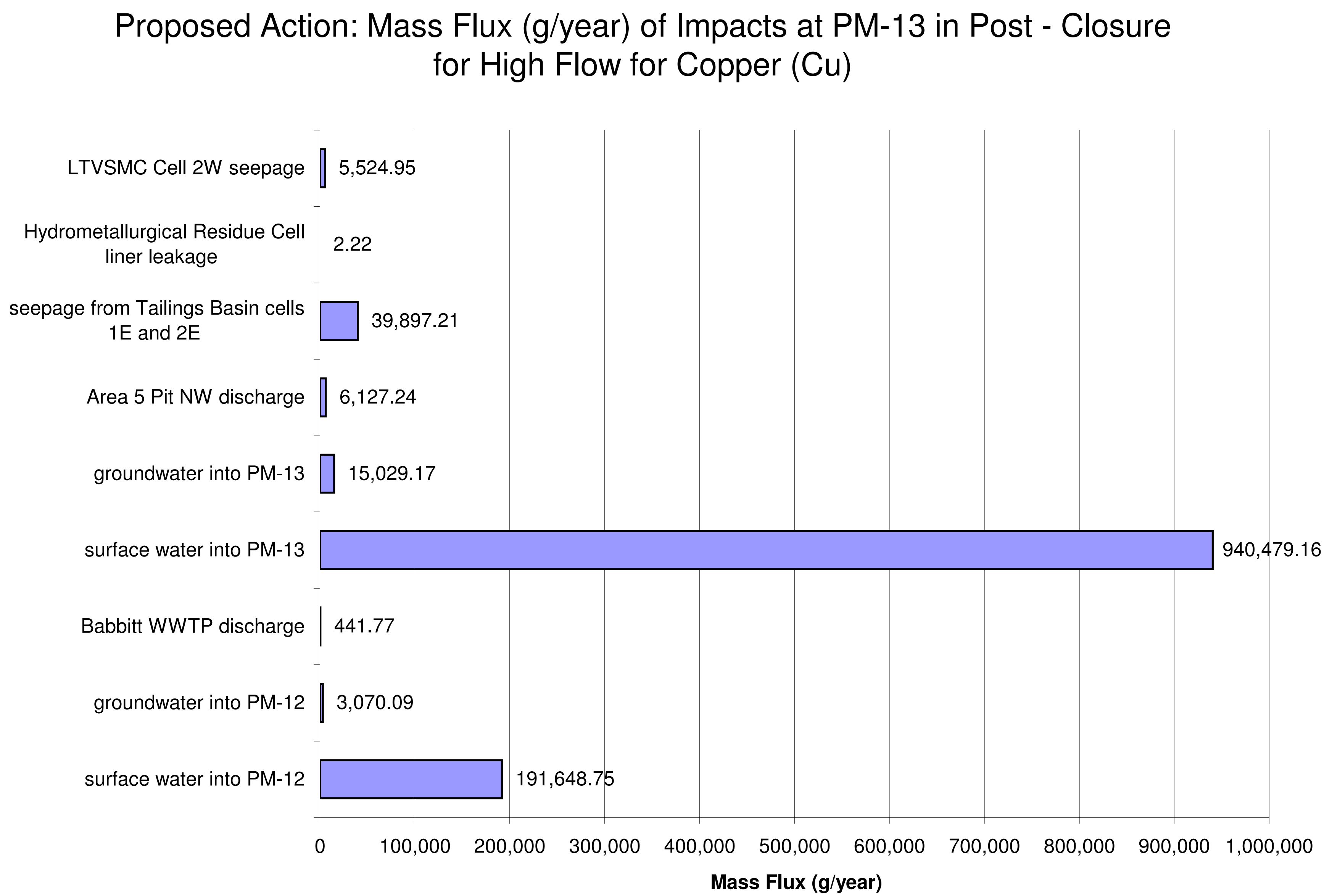

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,524.95
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

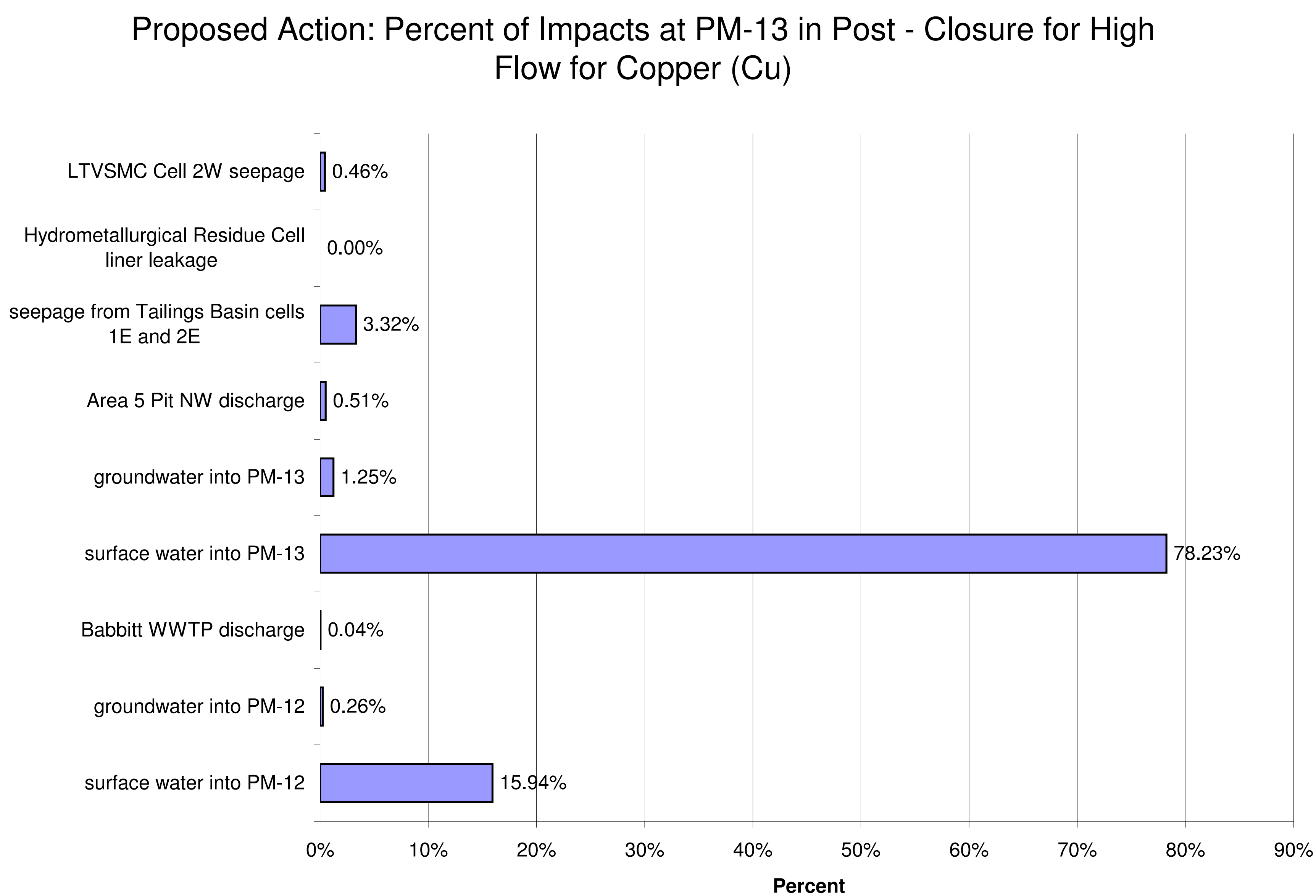

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8.53%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
61.60%
Area 5 Pit NW discharge
1.24%
groundwater into PM-13
23.21%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.68%
groundwater into PM-12
4.74%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,524.95
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

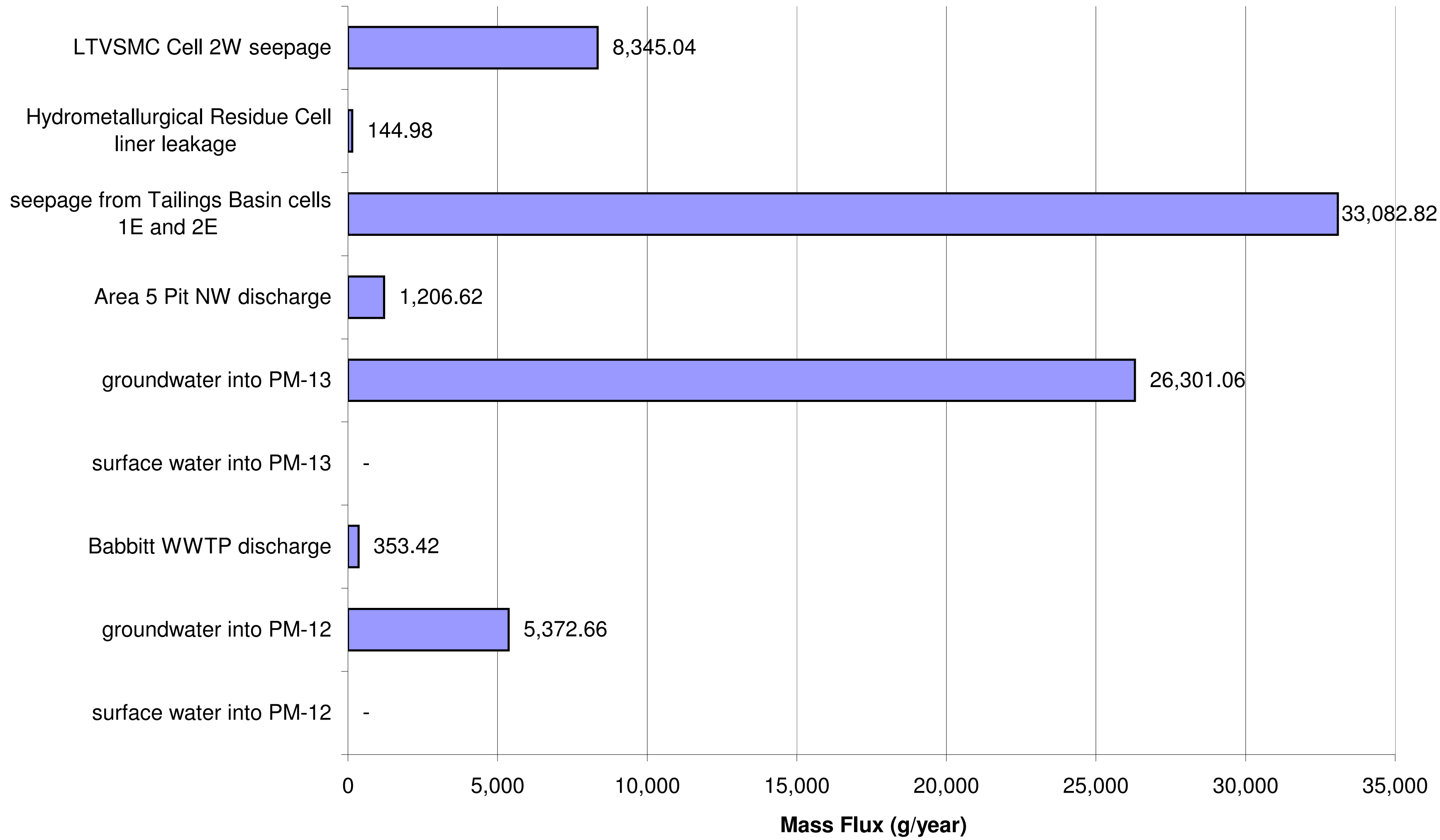
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)

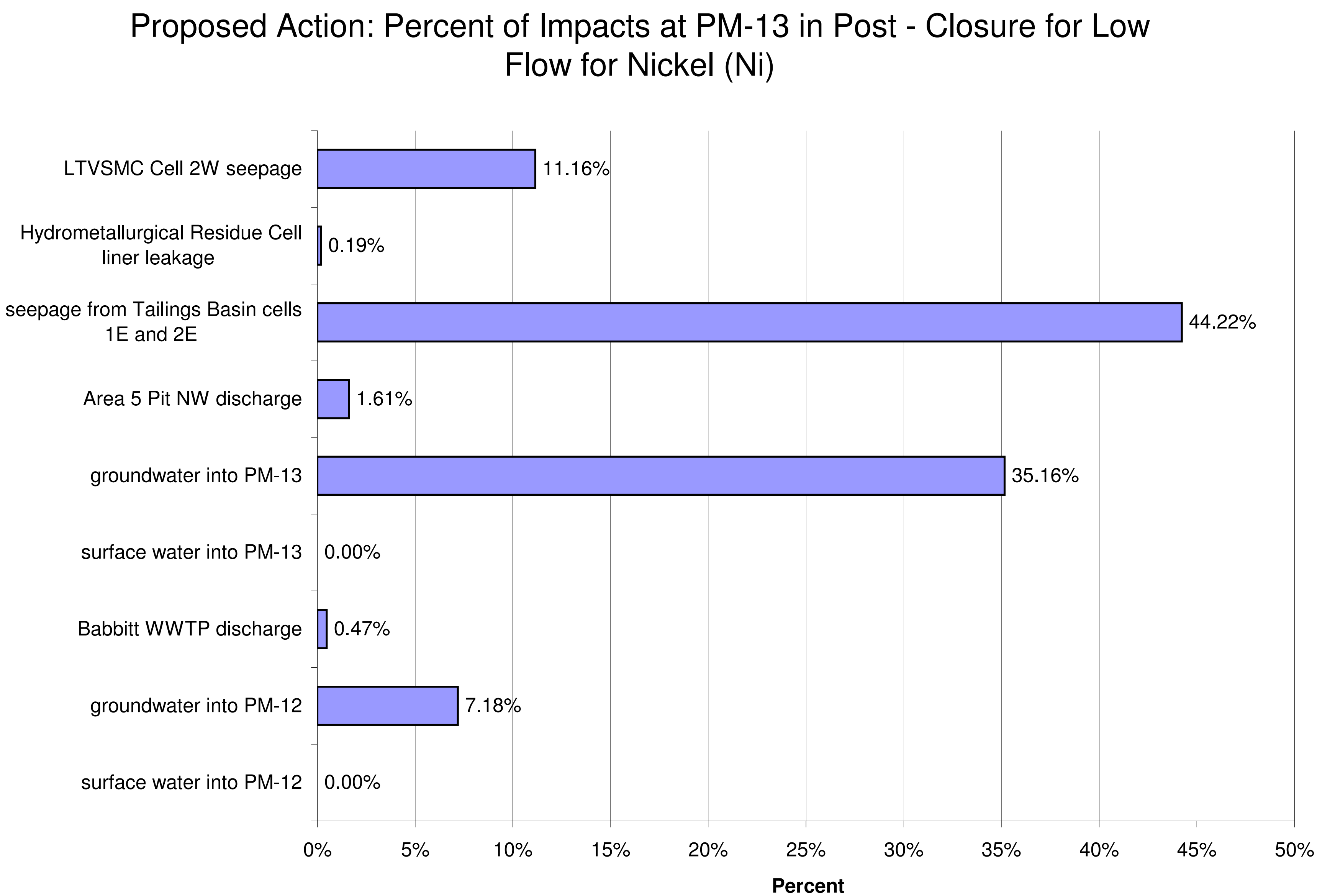



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,524.95
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

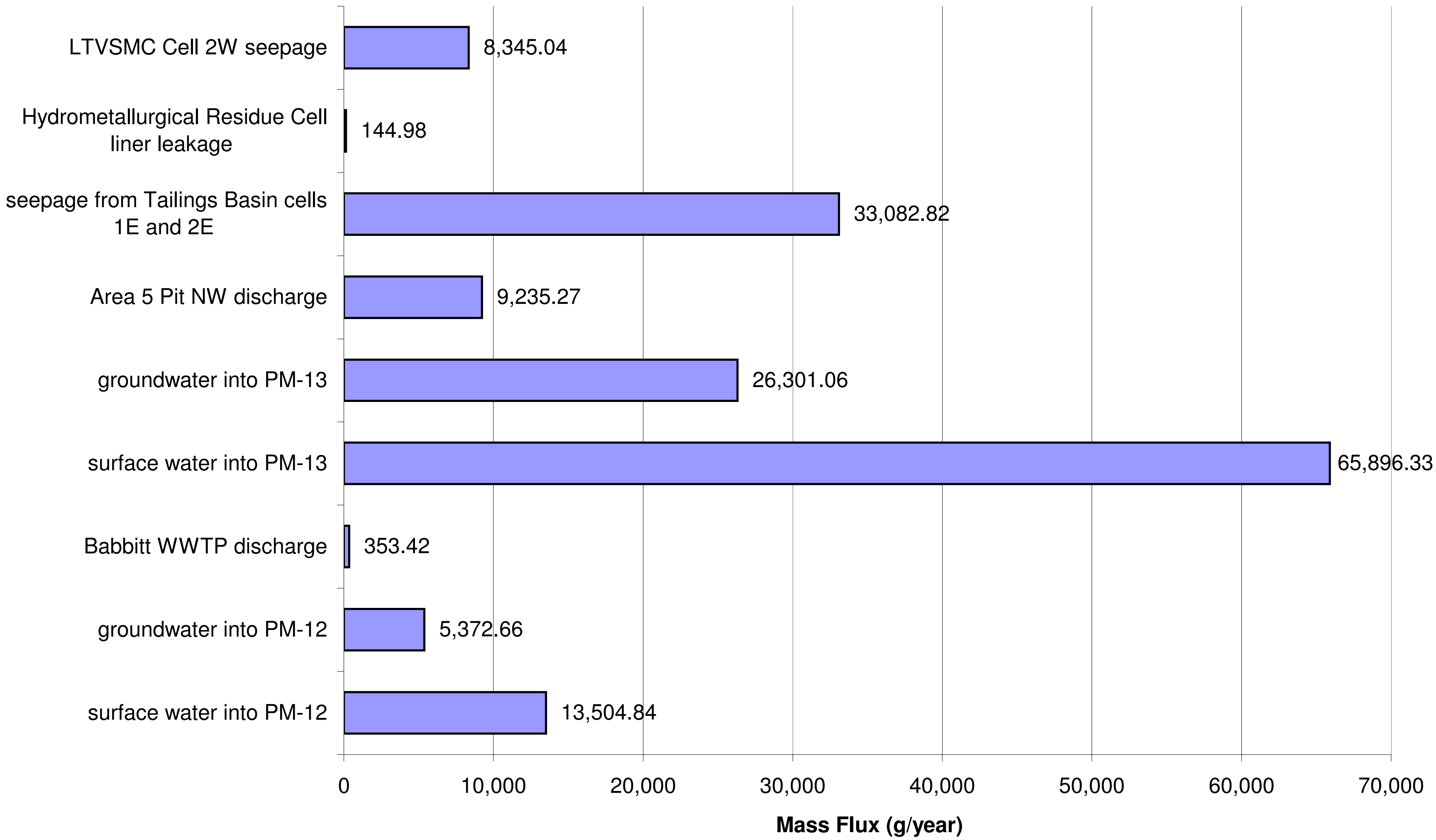

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.46%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
3.32%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.25%
surface water into PM-13
78.23%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
15.94%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

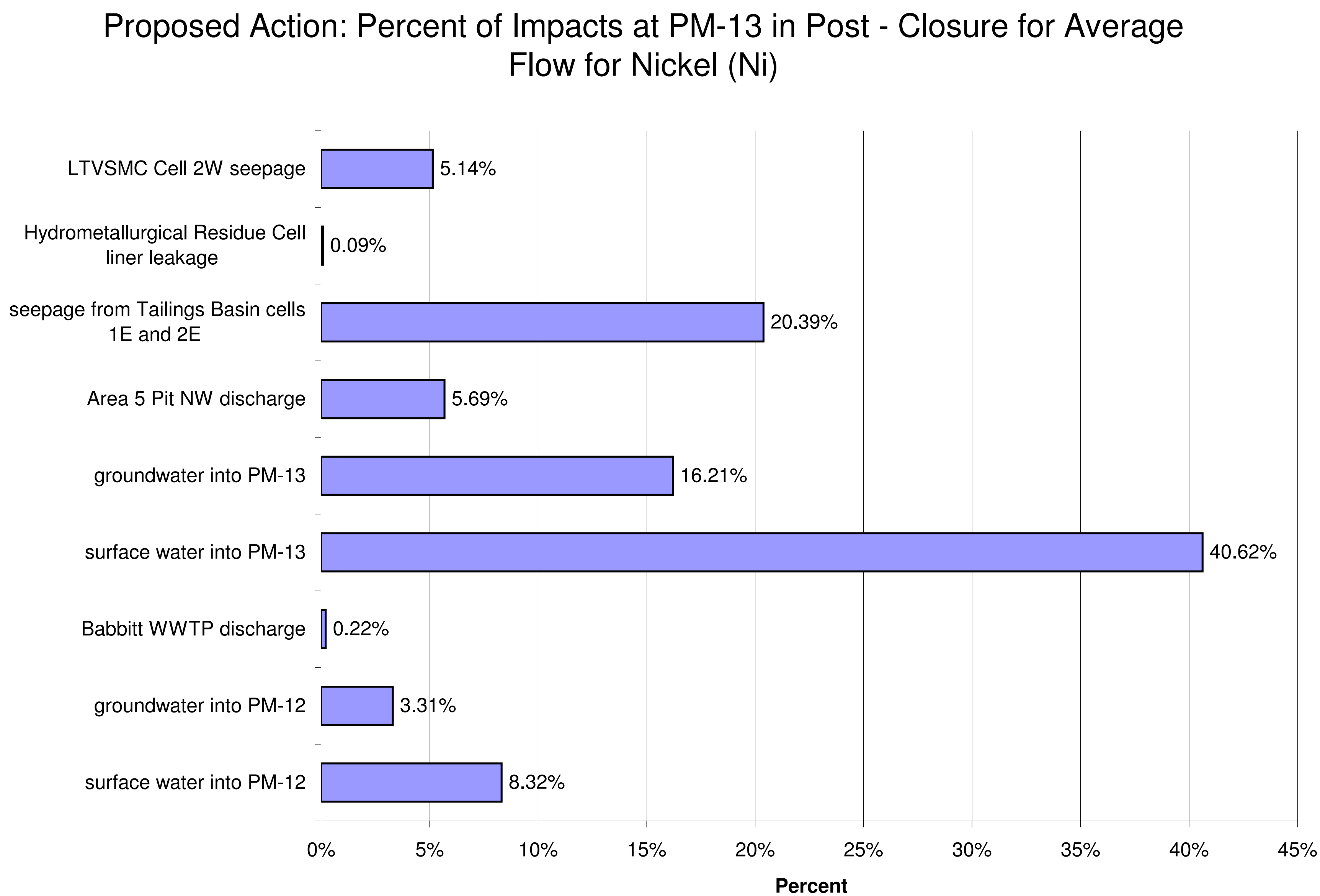
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)

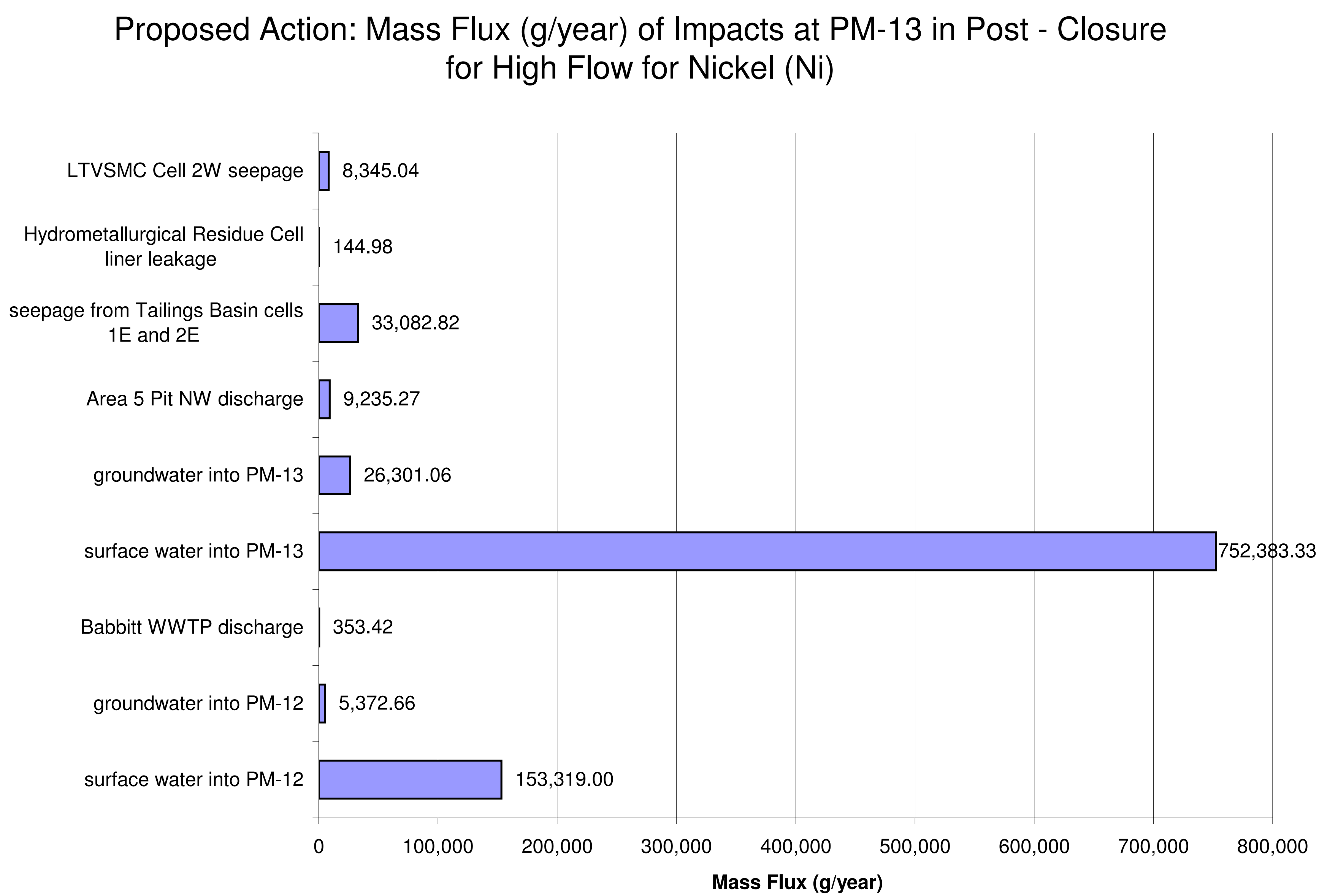


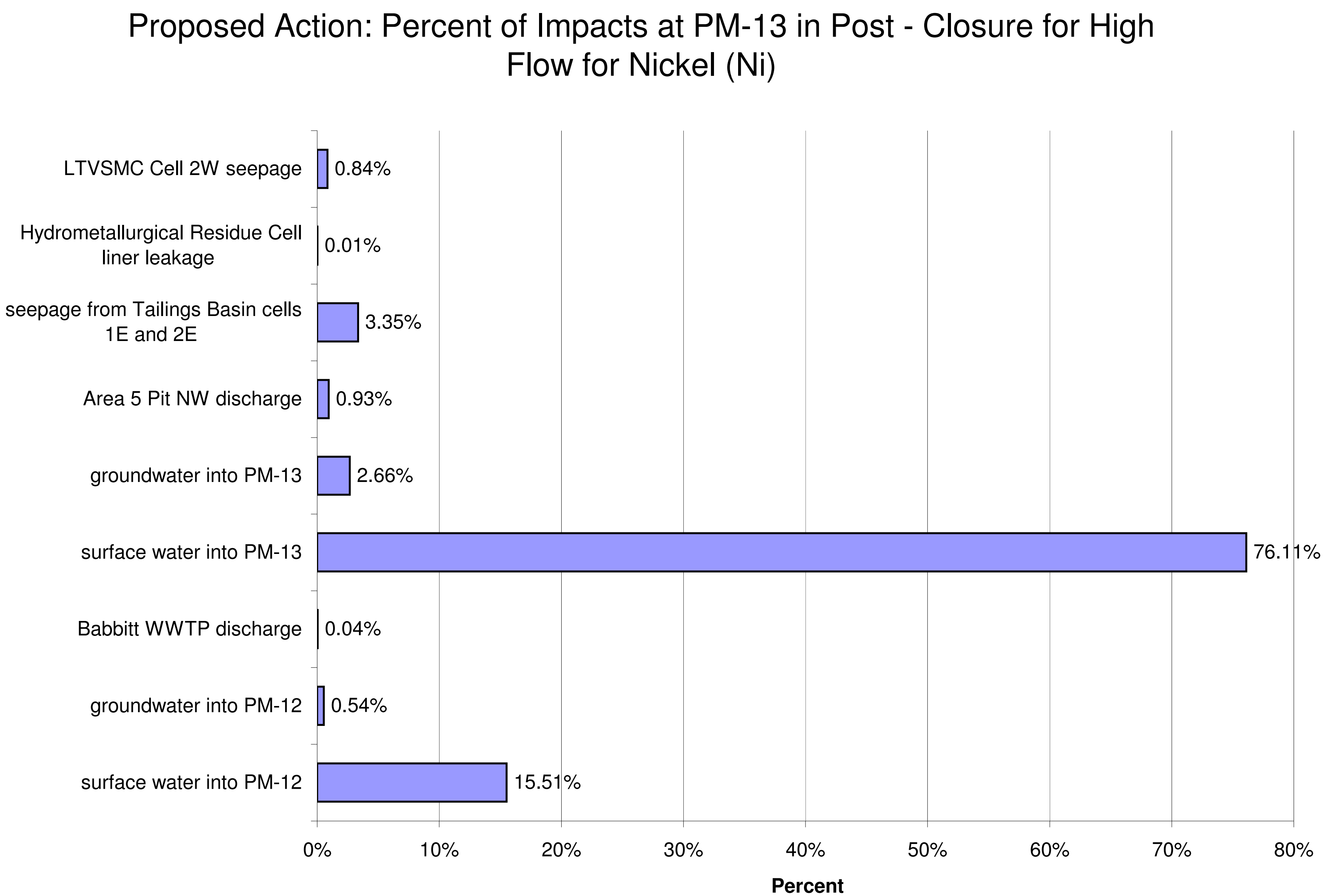

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
11.16%
Hydrometallurgical Residue Cell liner leakage
0.19%
seepage from Tailings Basin cells 1E and 2E
44.22%
Area 5 Pit NW discharge
1.61%
groundwater into PM-13
35.16%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.47%
groundwater into PM-12
7.18%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)

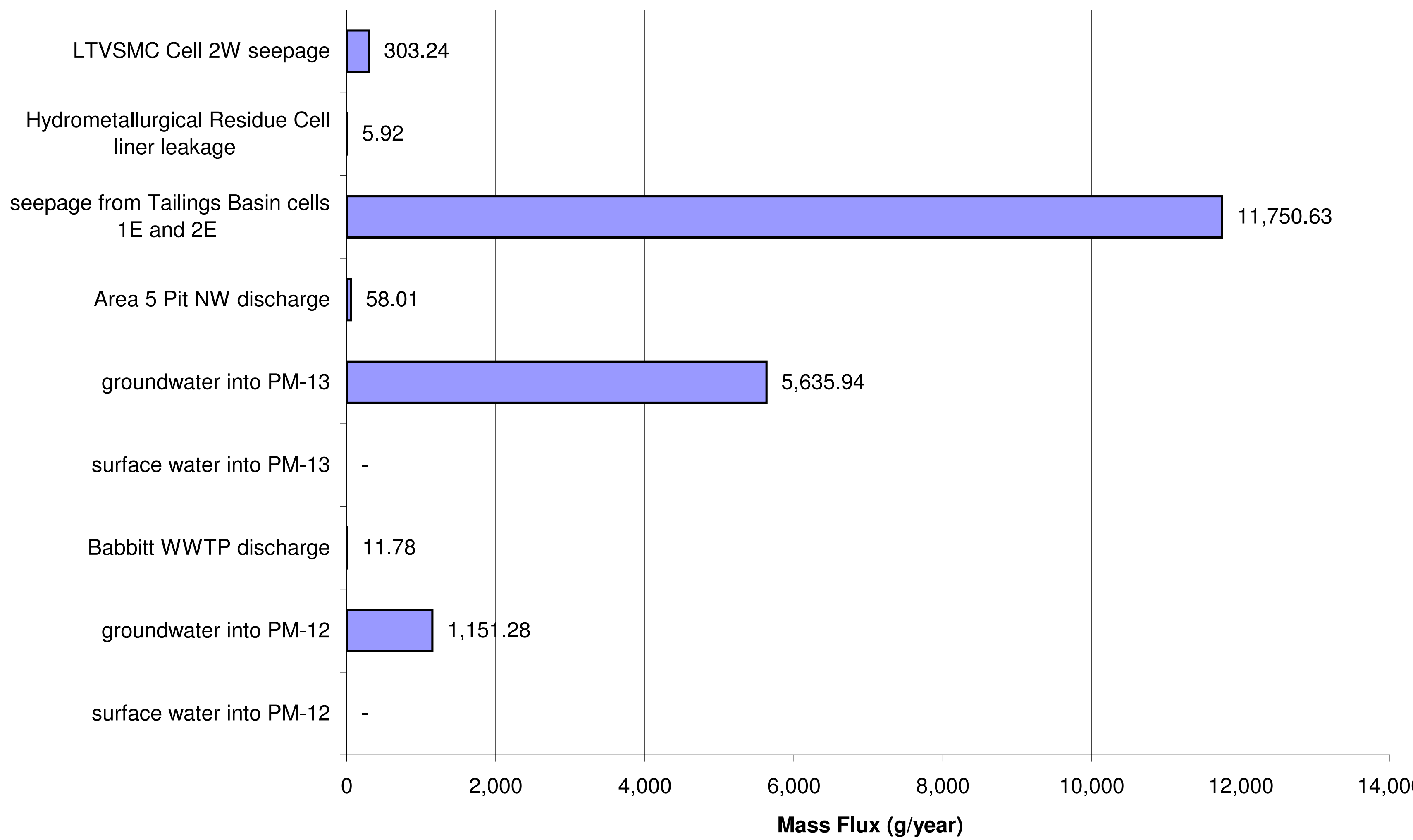


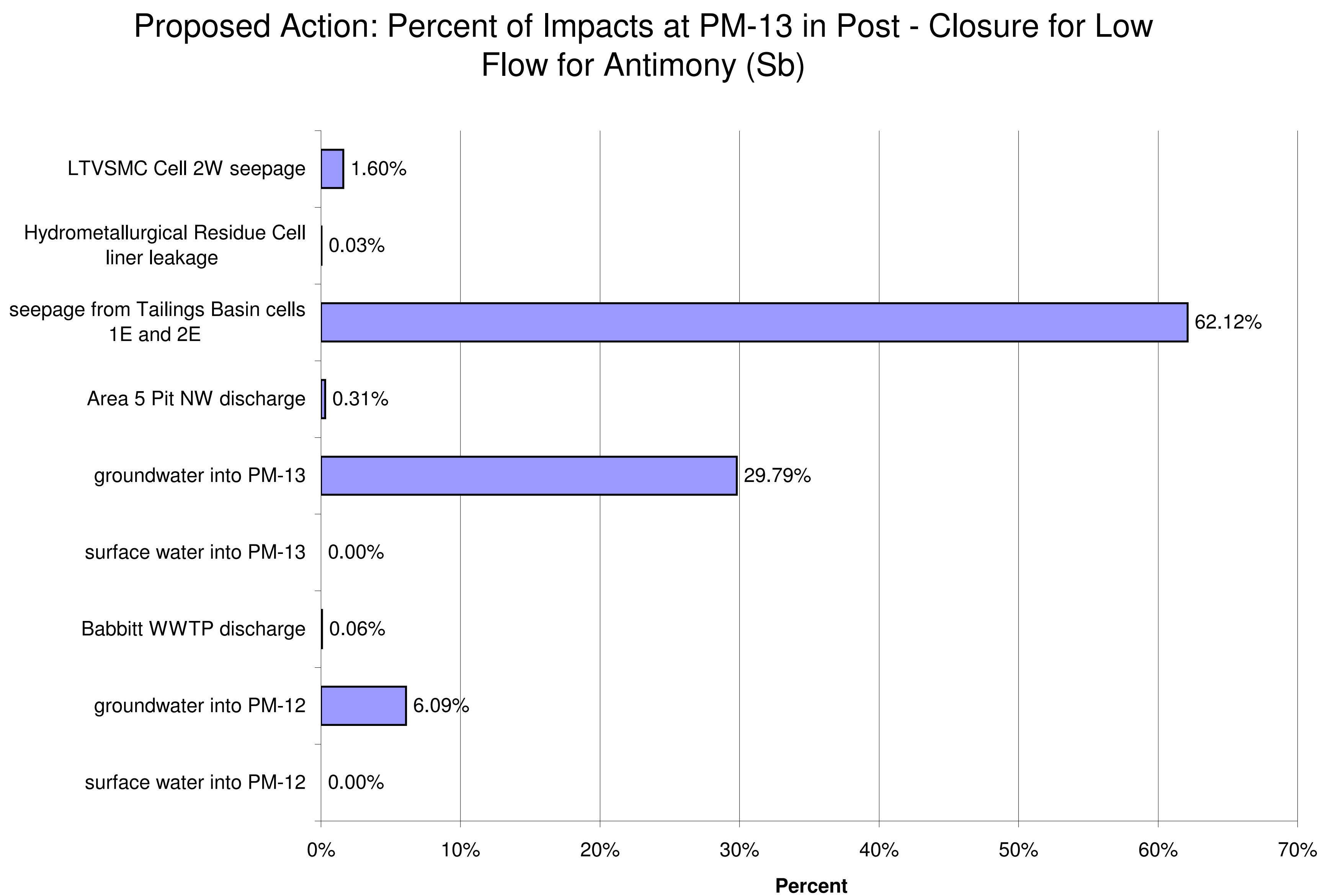

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5.14%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
20.39%
Area 5 Pit NW discharge
5.69%
groundwater into PM-13
16.21%
surface water into PM-13
40.62%
Babbitt WWTP discharge
0.22%
groundwater into PM-12
3.31%
surface water into PM-12
8.32%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

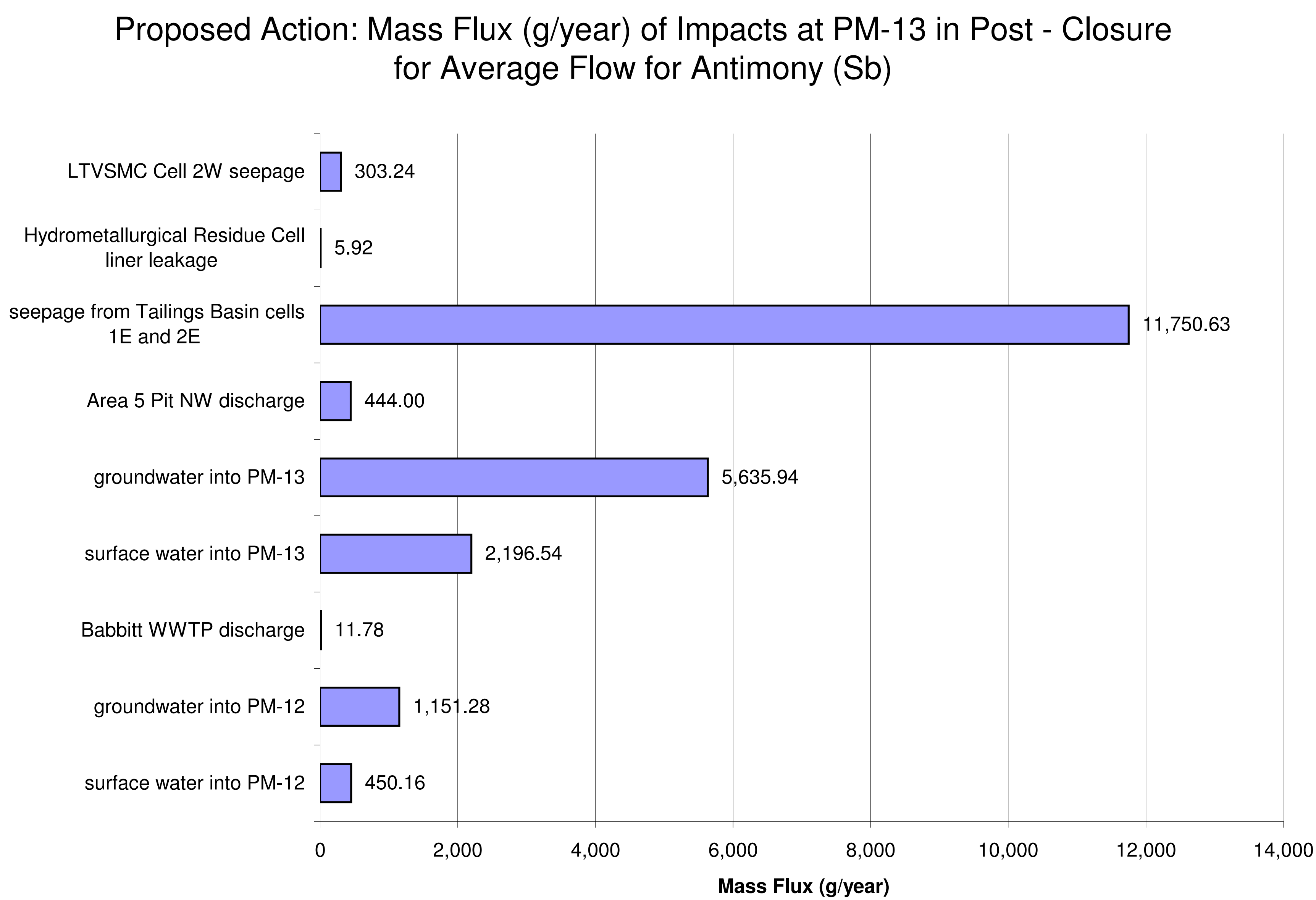

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
8,345.04
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin cells 1E and 2E
33,082.82
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
0.84%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
3.35%
Area 5 Pit NW discharge
0.93%
groundwater into PM-13
2.66%
surface water into PM-13
76.11%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.54%
surface water into PM-12
15.51%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

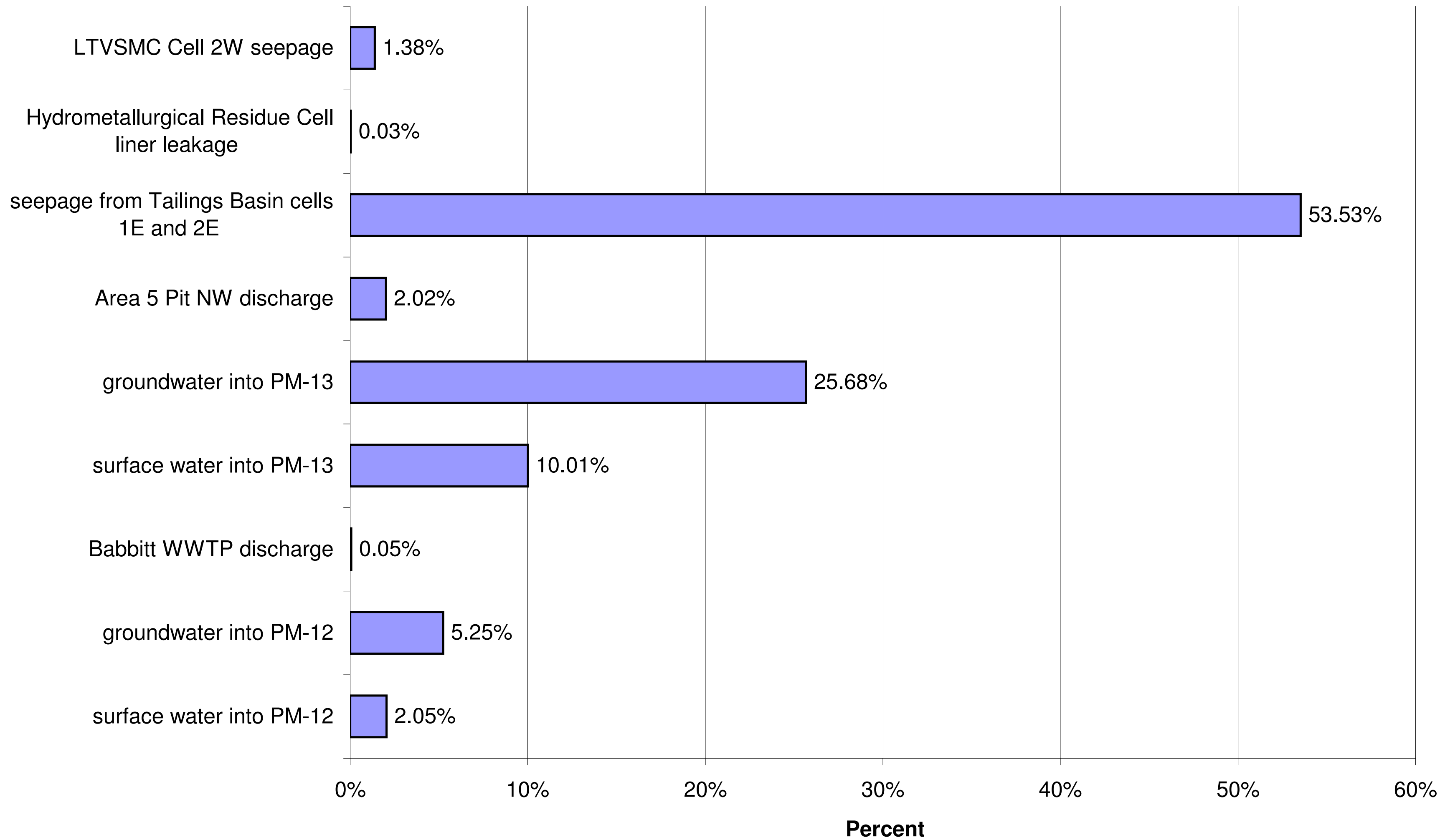
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)



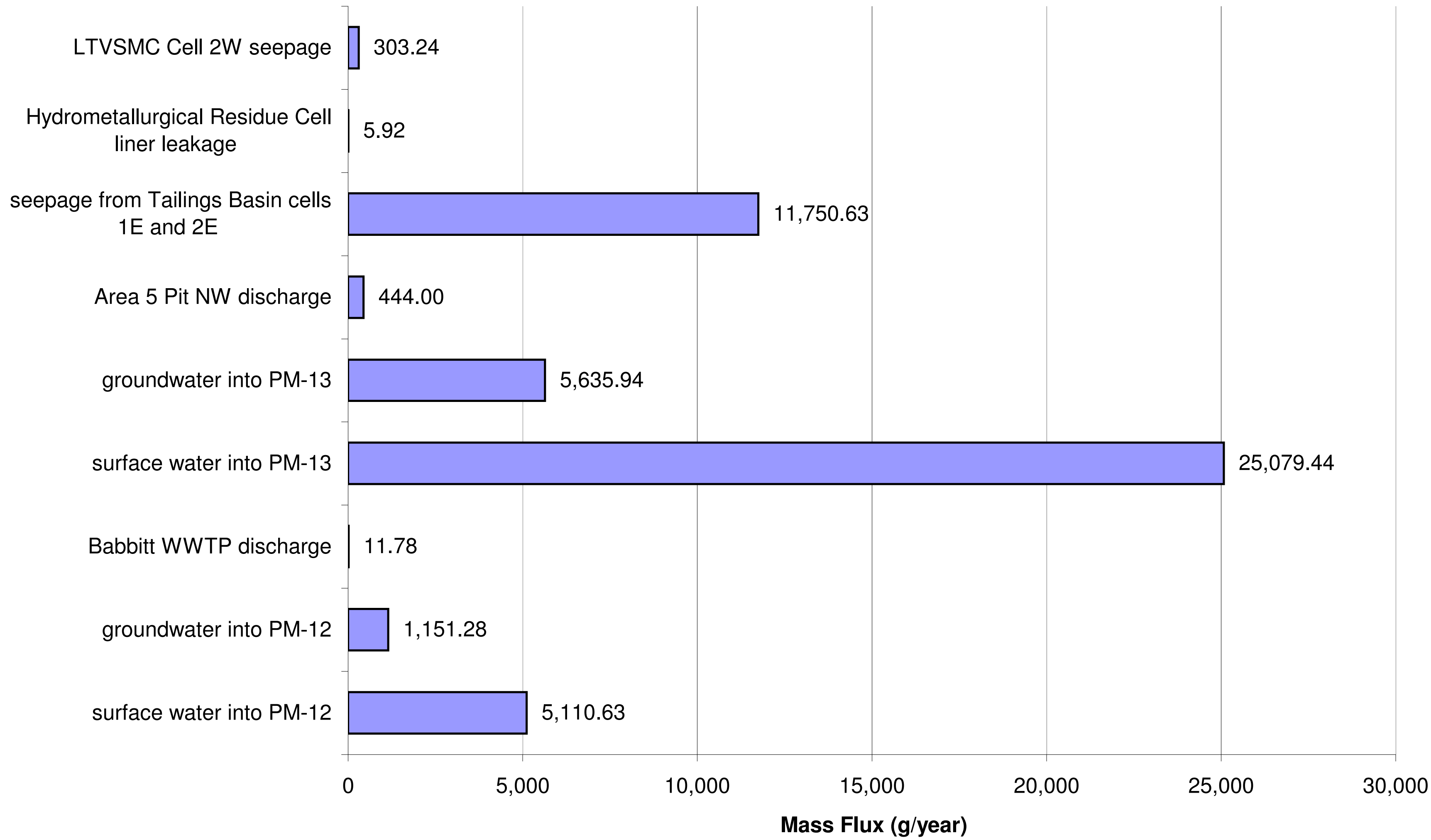

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.60%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
62.12%
Area 5 Pit NW discharge
0.31%
groundwater into PM-13
29.79%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.06%
groundwater into PM-12
6.09%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

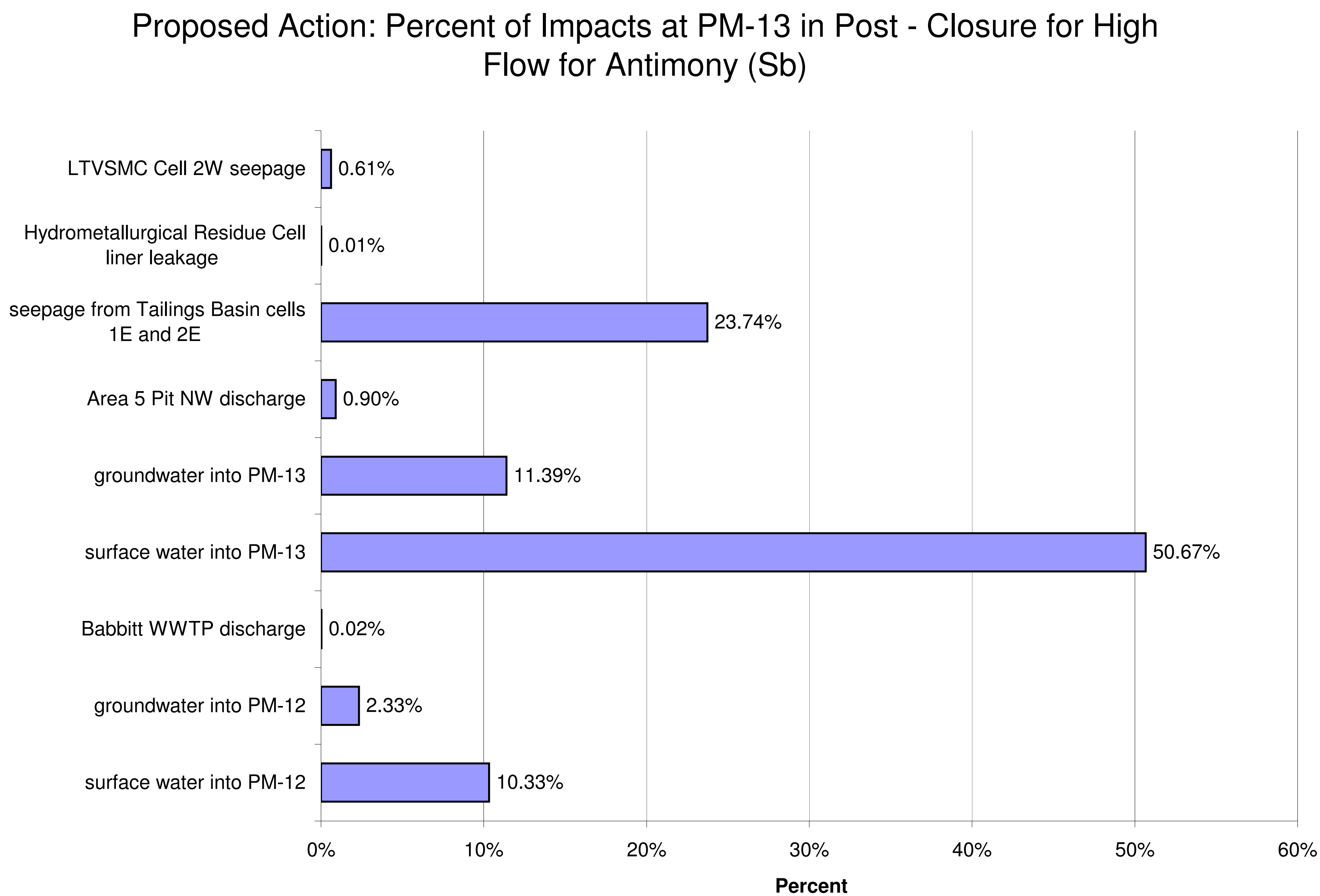

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
303.24
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
11,750.63
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
Mass Flux (g/year)

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)

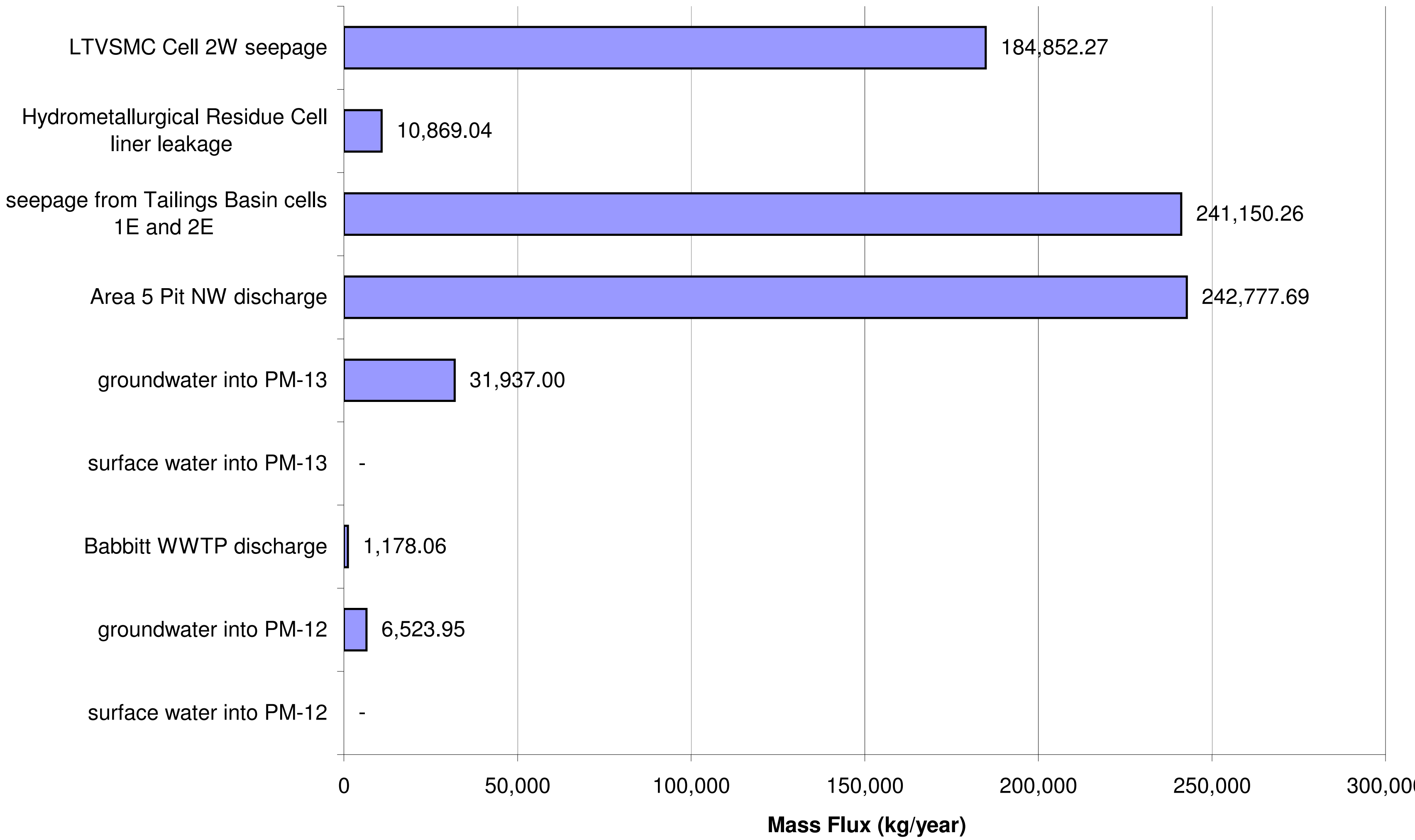


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)

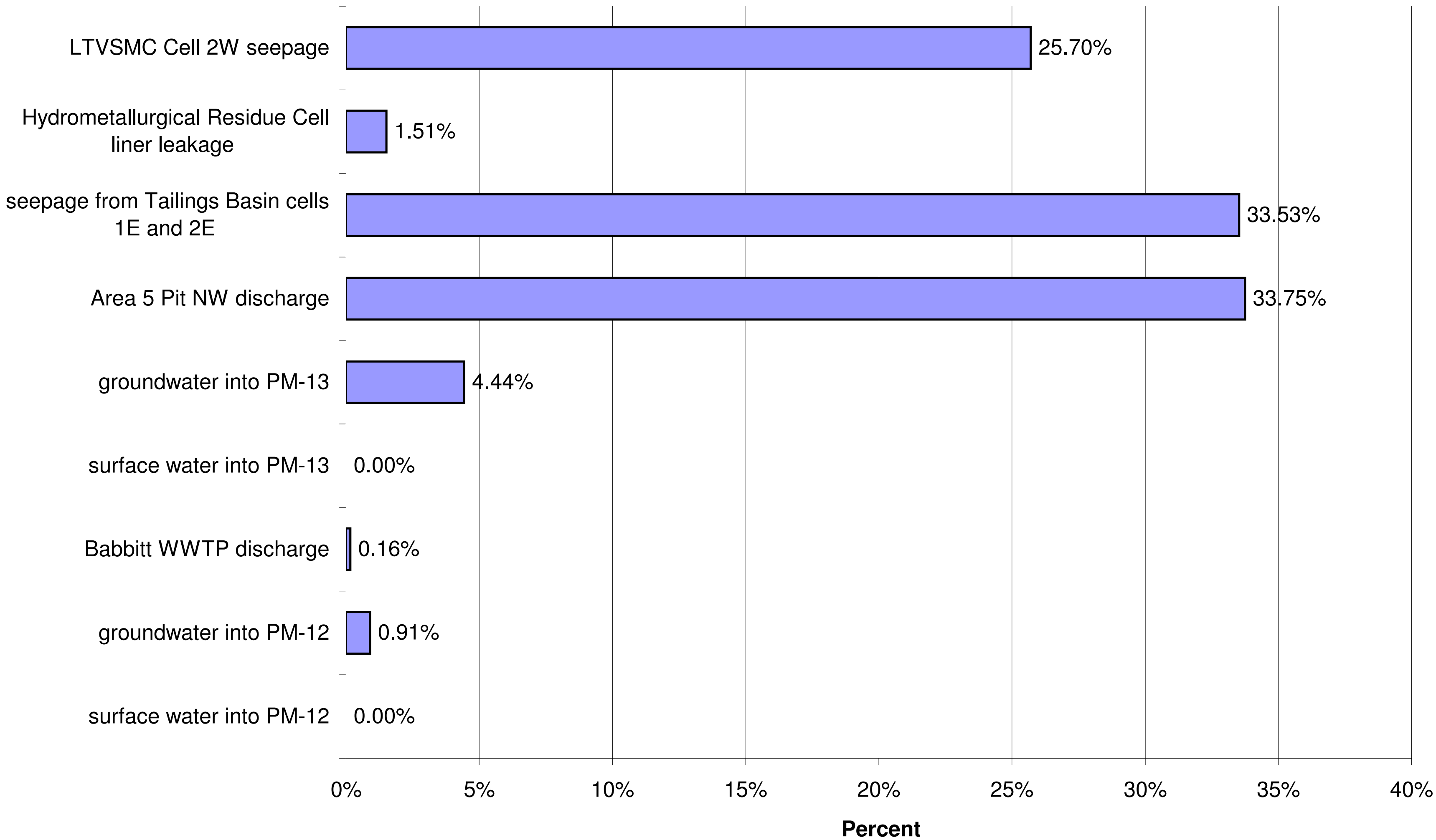



Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.61%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
23.74%
Area 5 Pit NW discharge
0.90%
groundwater into PM-13
11.39%
surface water into PM-13
50.67%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
2.33%
surface water into PM-12
10.33%
0%
10%
20%
30%
40%
50%
60%
Percent

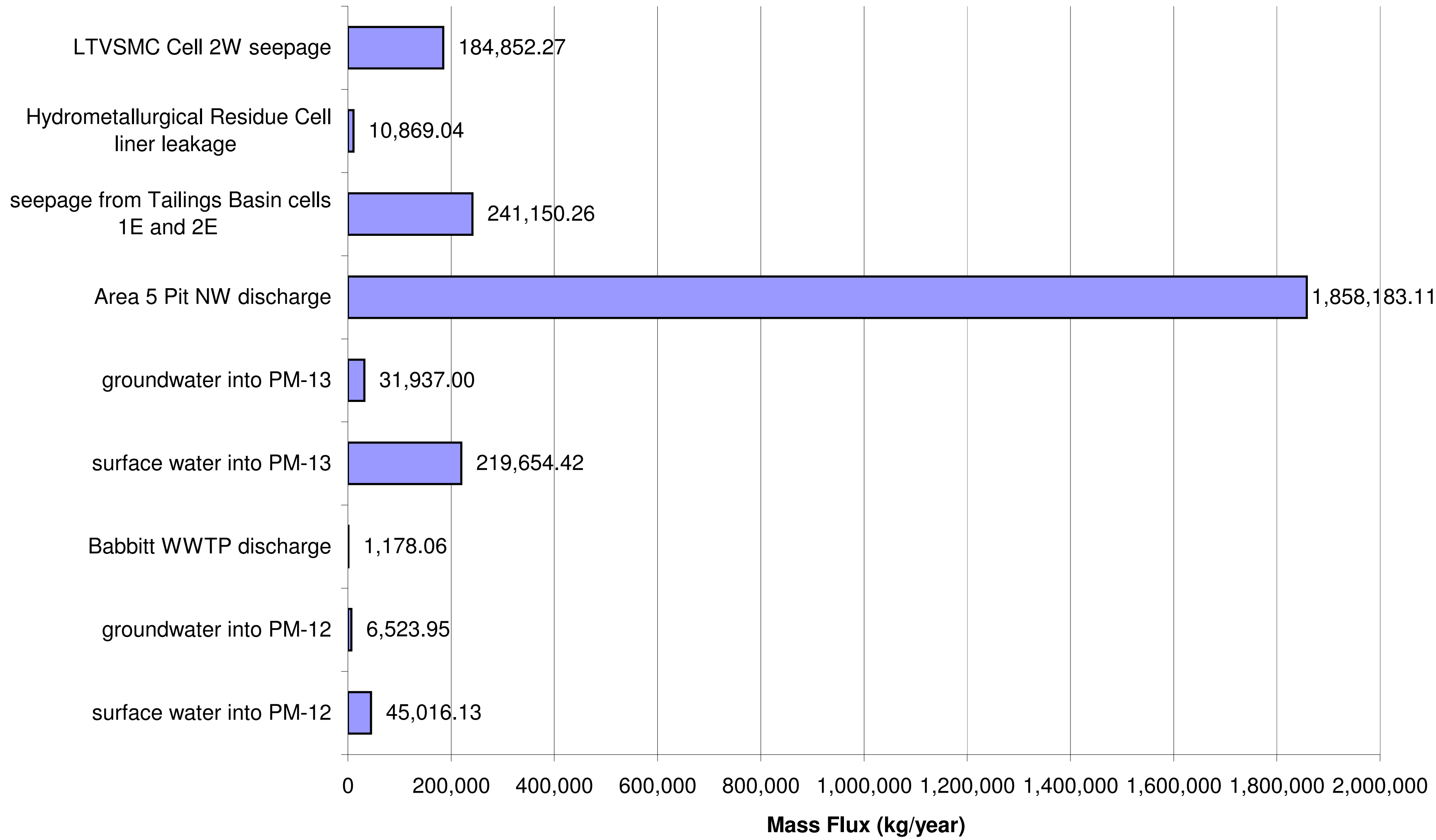
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)



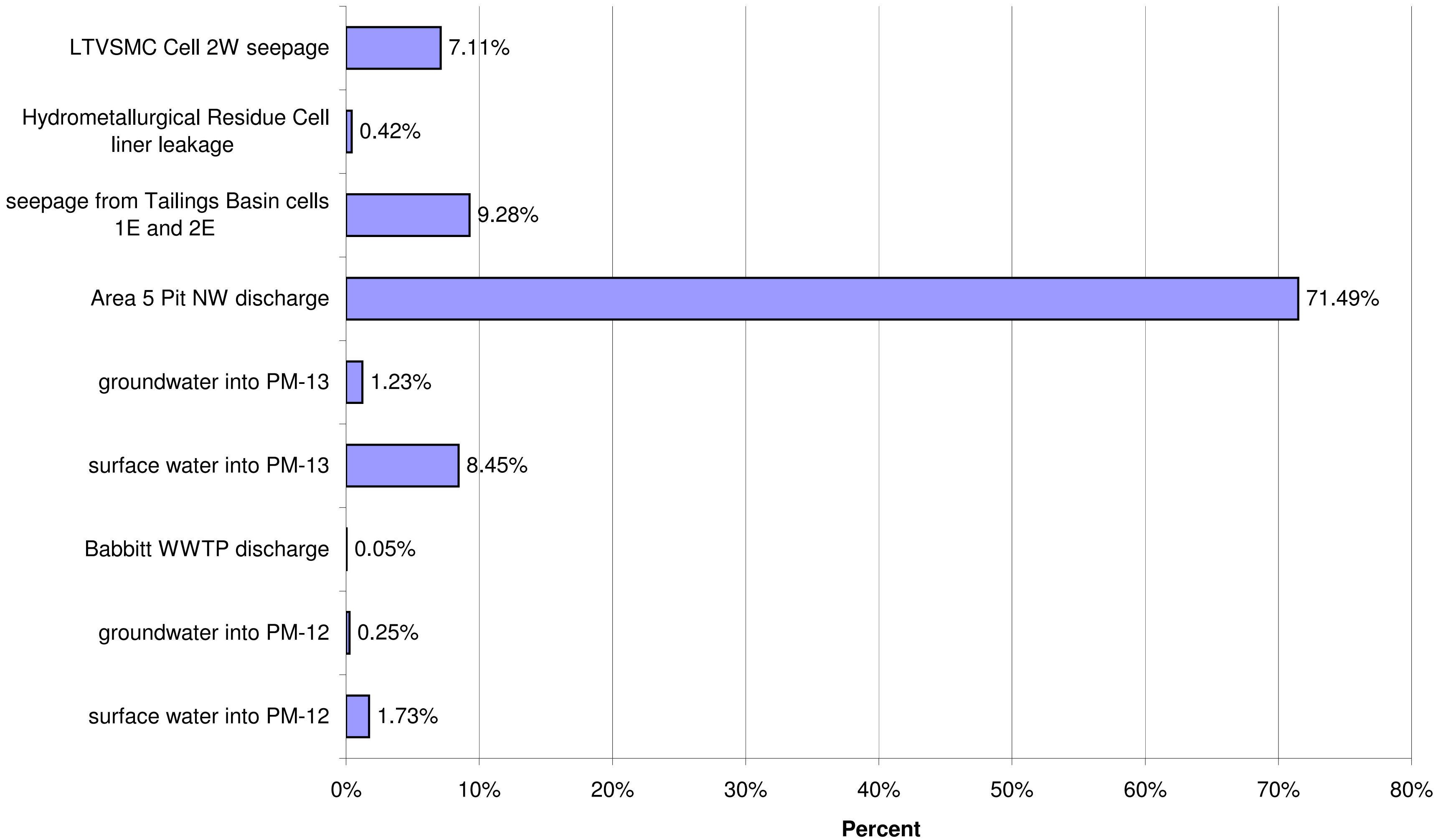
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)



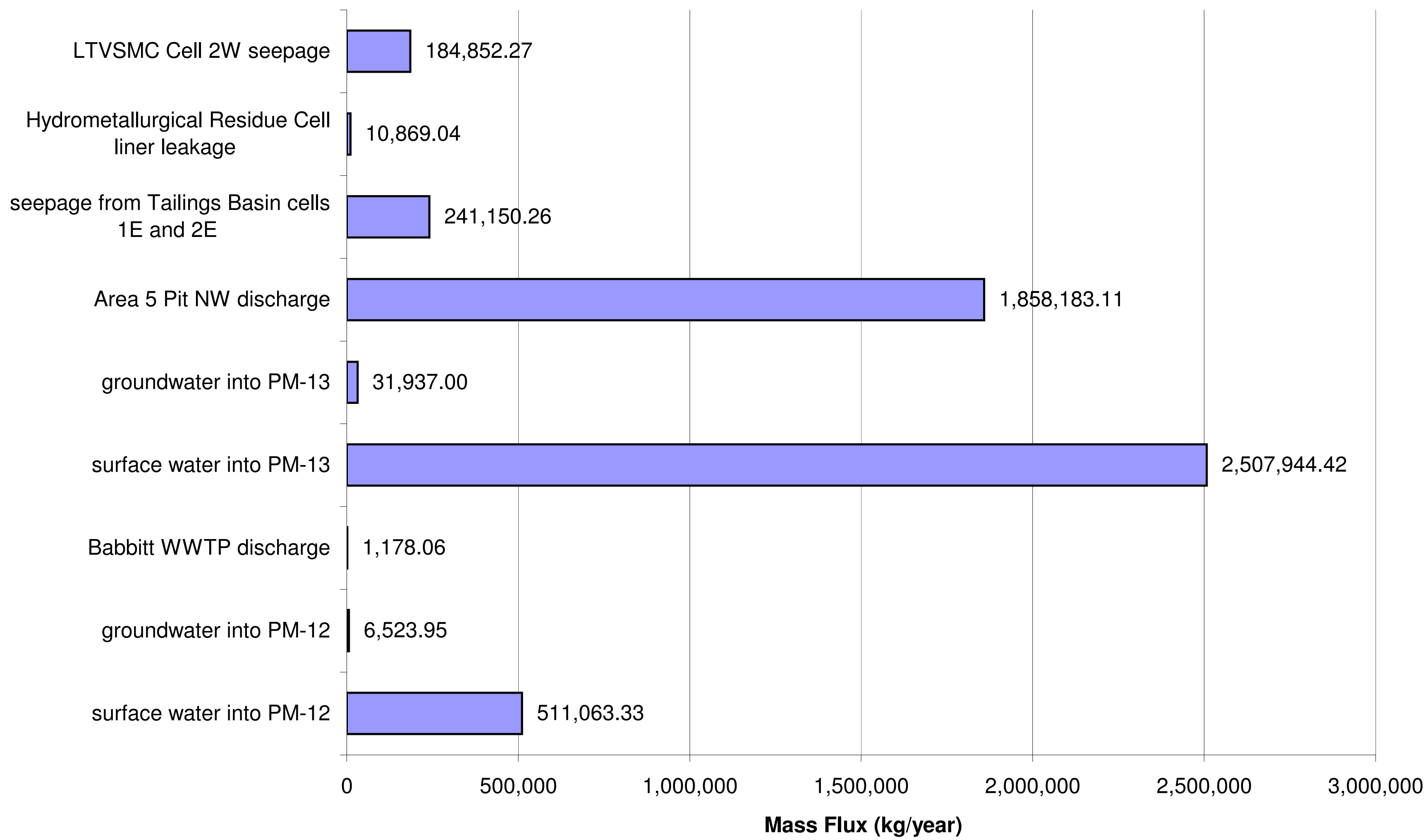
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)



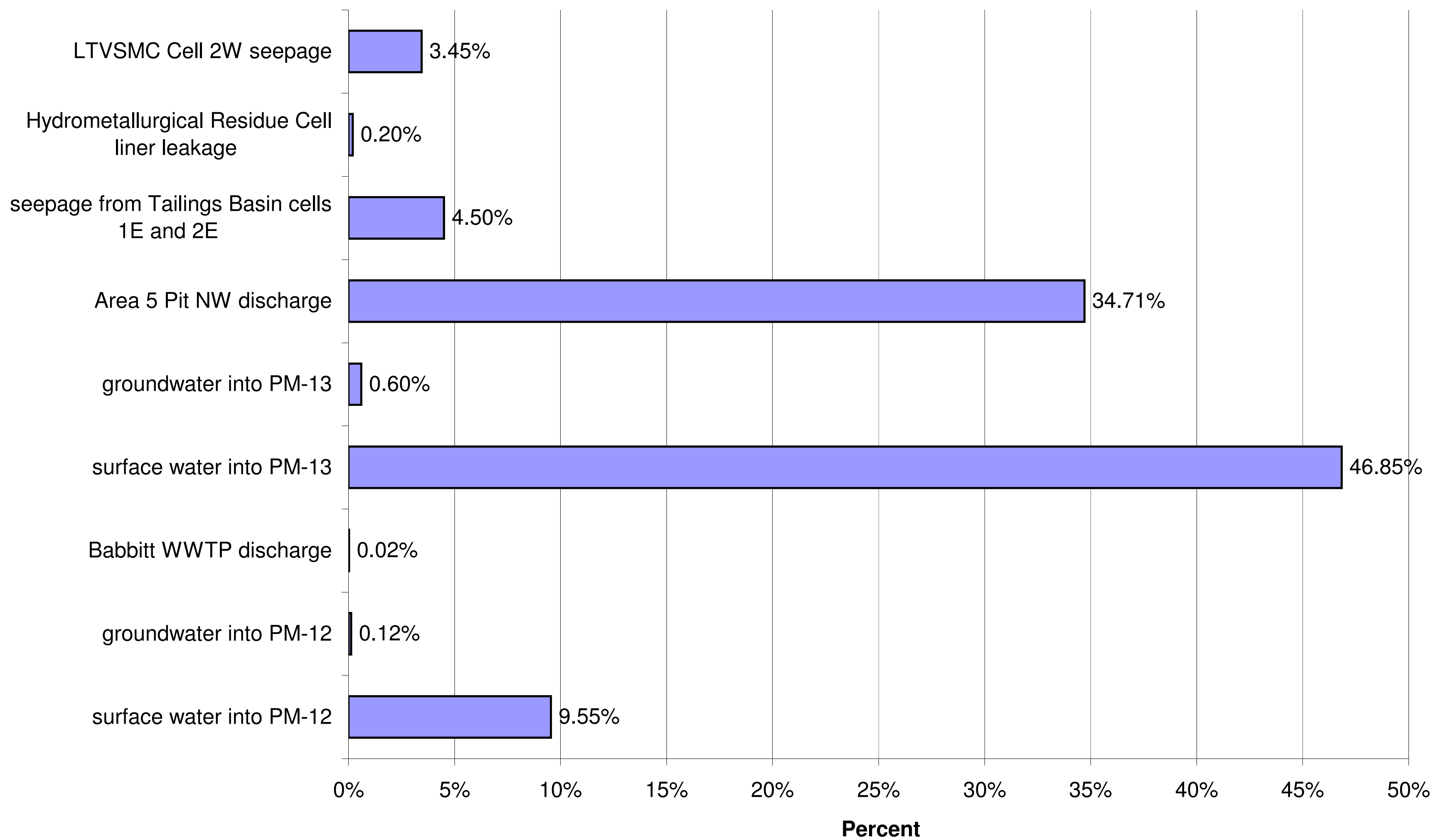
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)



Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for High Flow for Sulfate (SO_4)



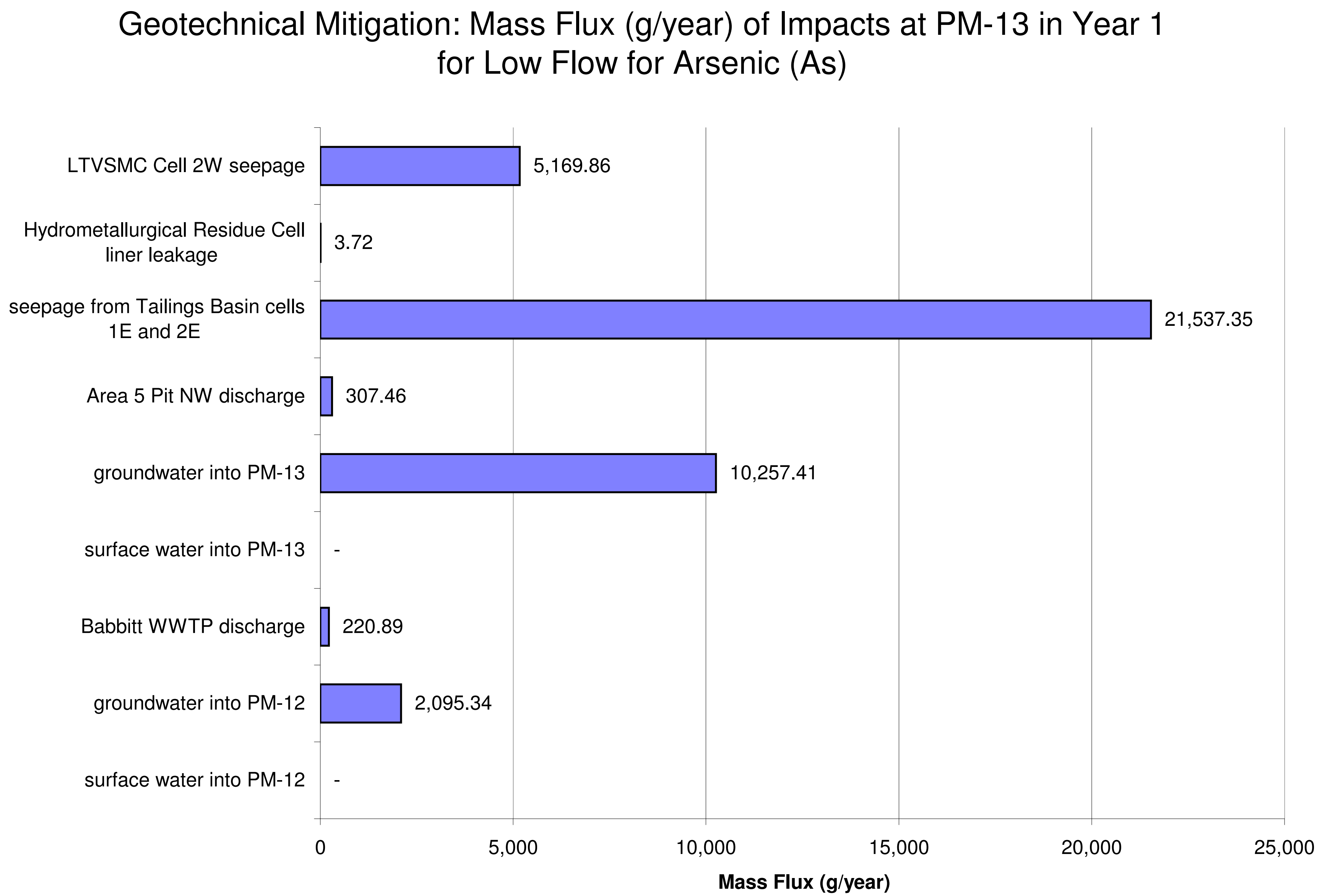
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Sulfate (SO_4)

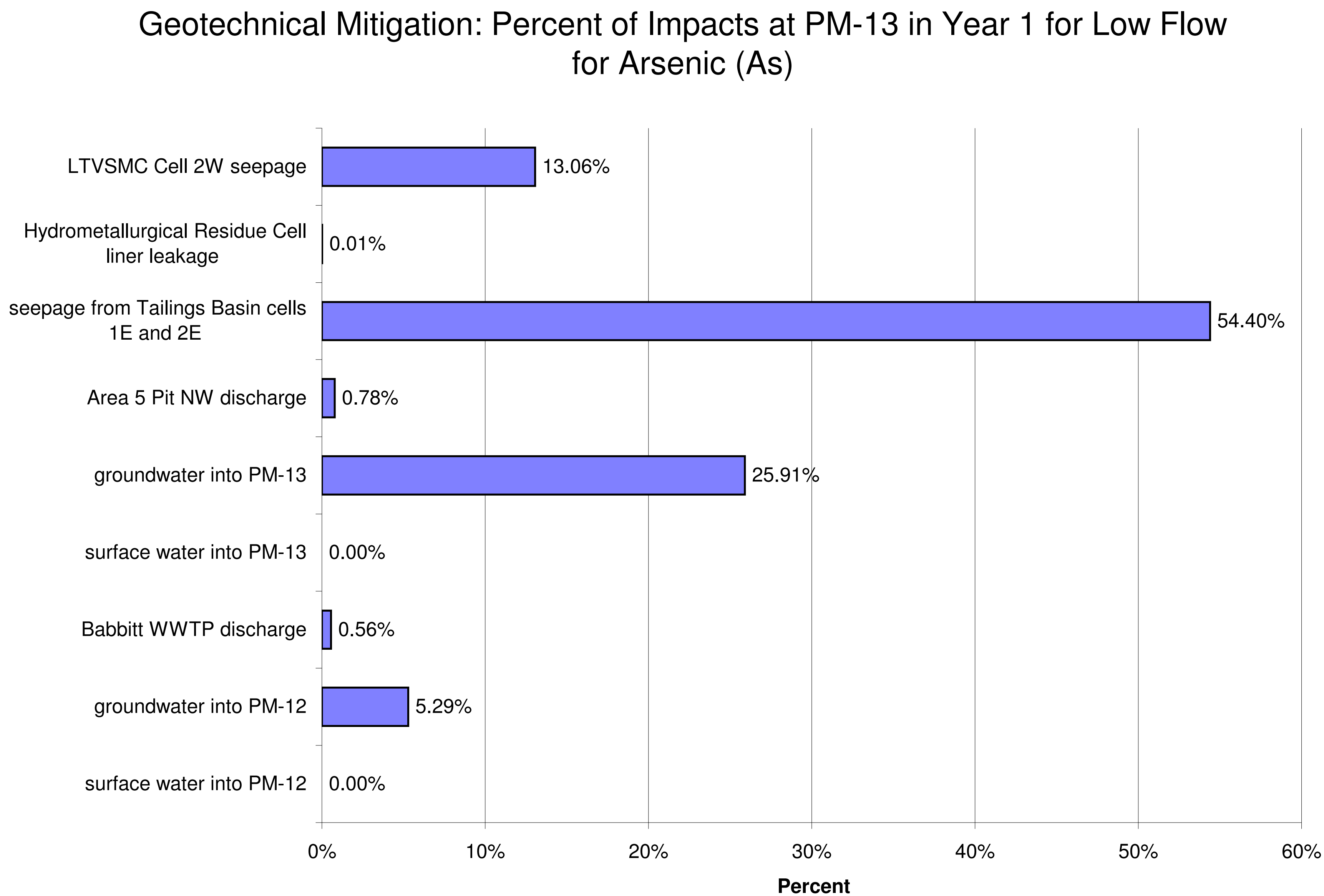


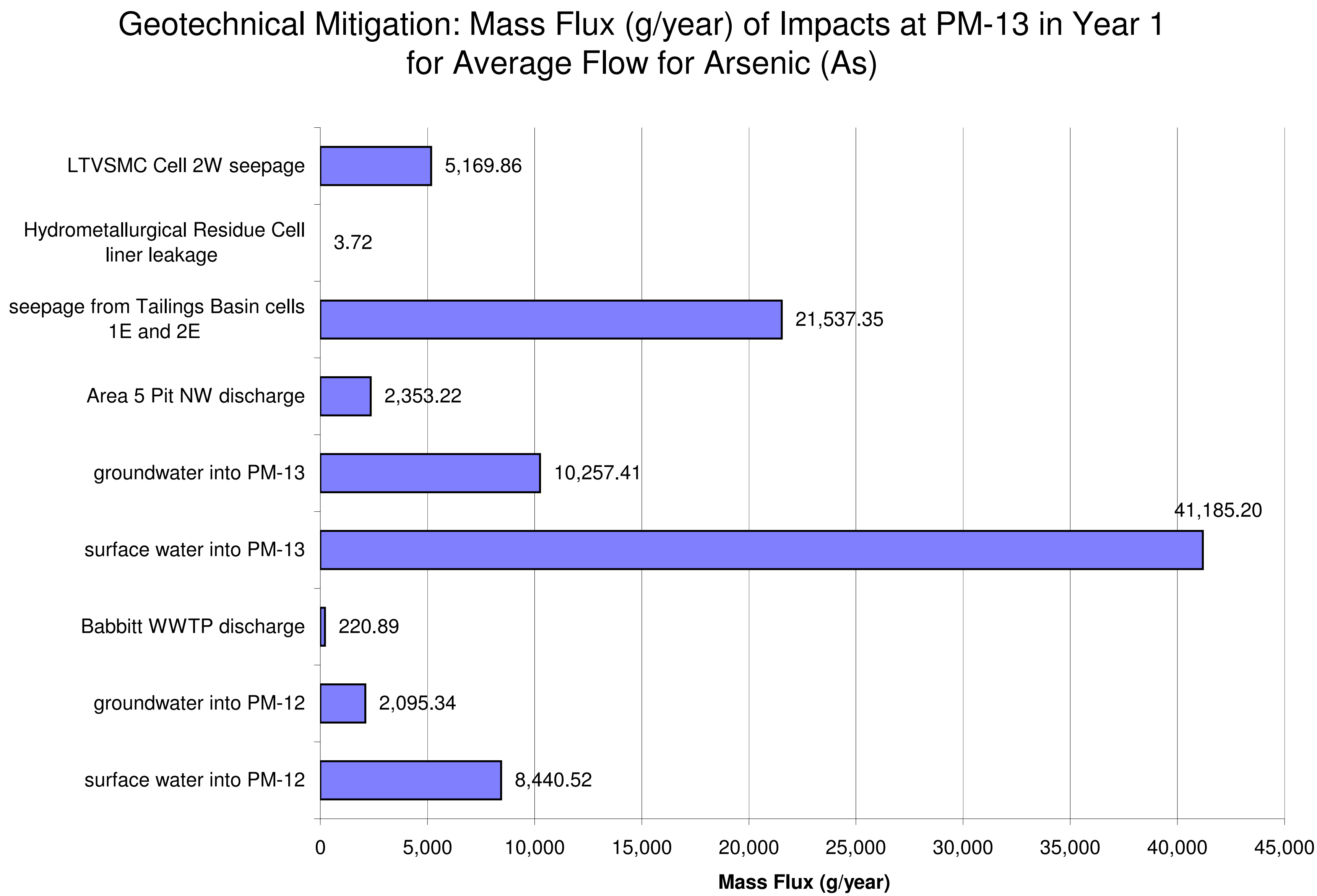
Appendix G.4

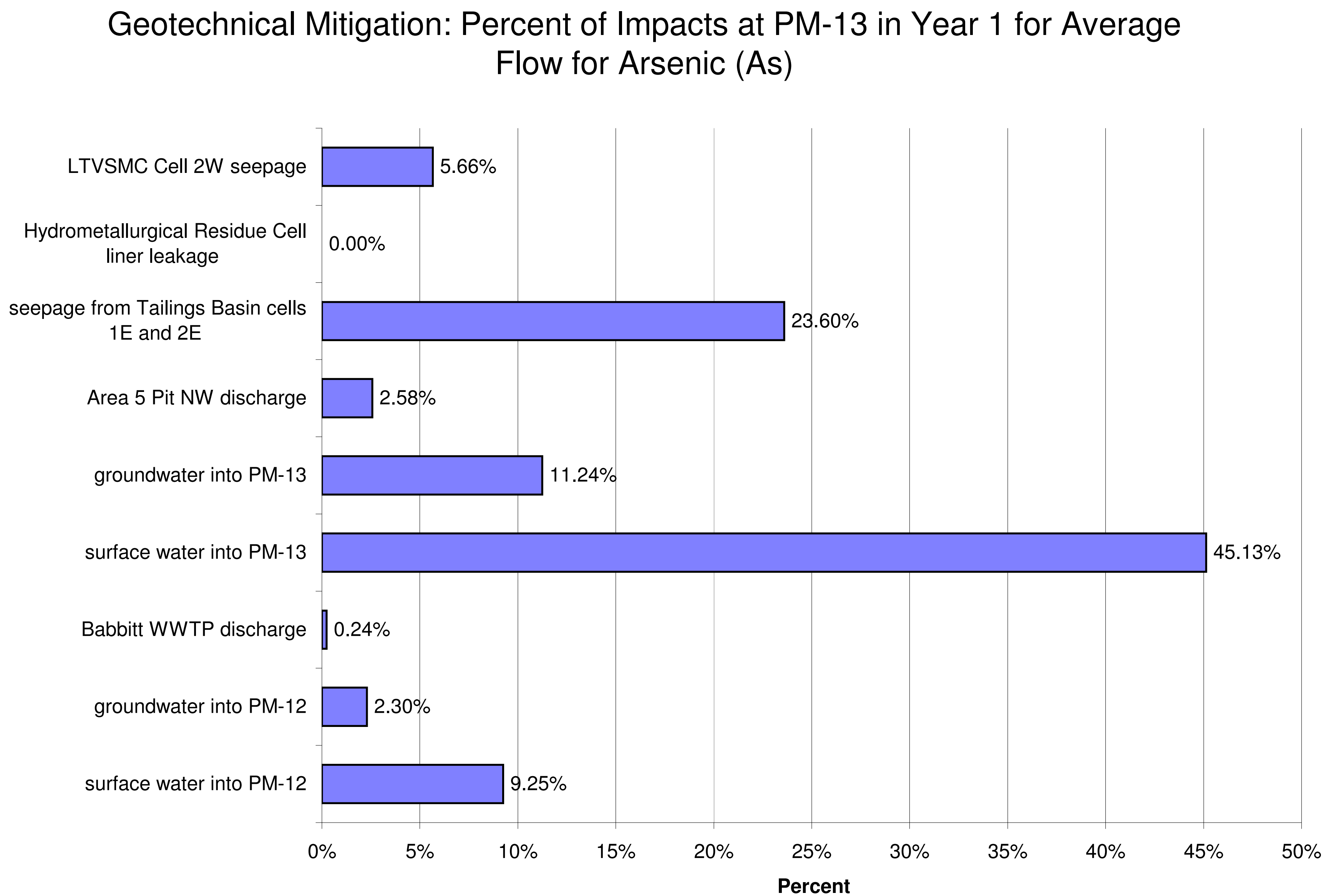
Embarrass River Watershed

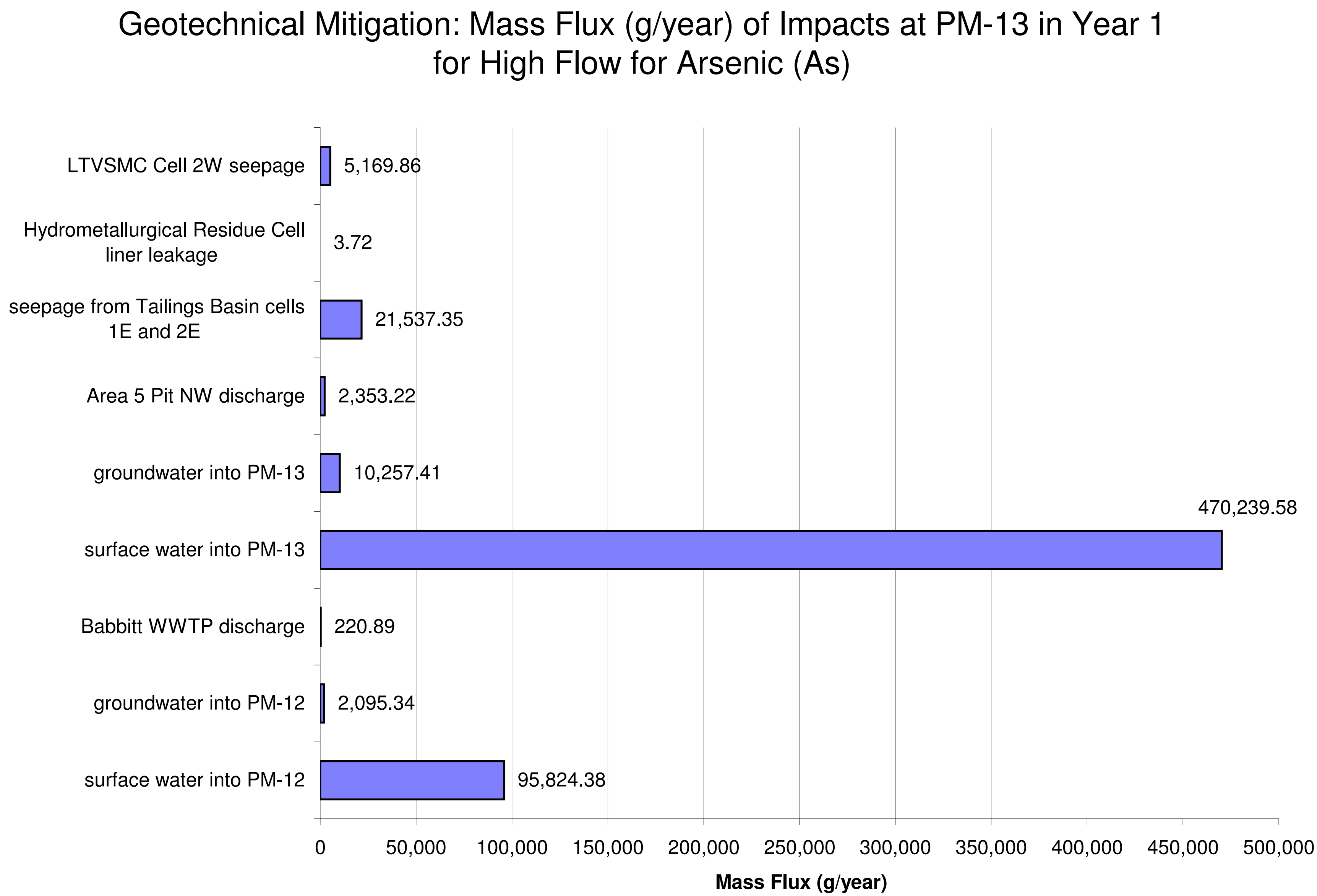
Geotechnical Mitigation


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
21,537.35
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

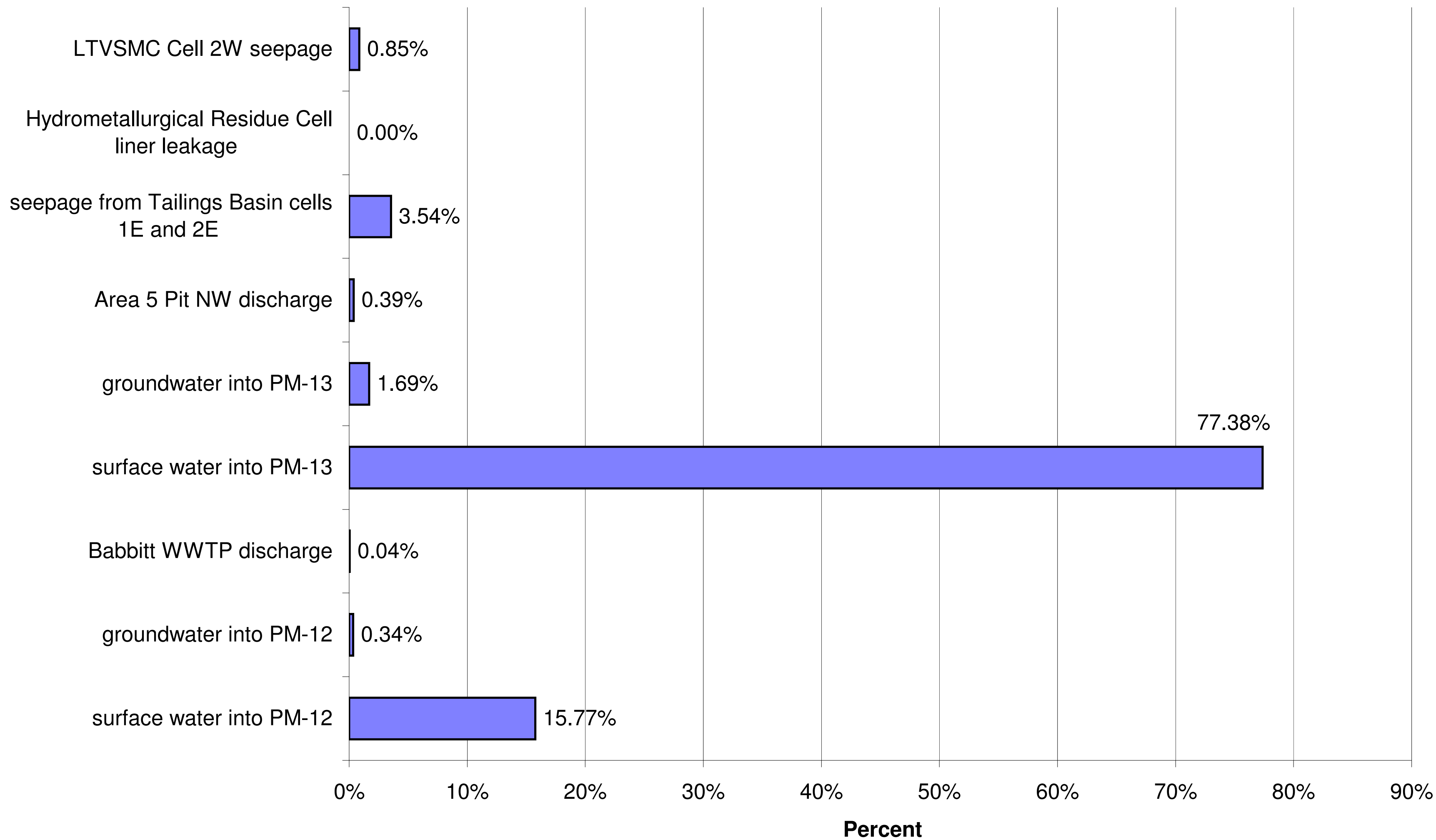

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
13.06%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
54.40%
Area 5 Pit NW discharge
0.78%
groundwater into PM-13
25.91%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.56%
groundwater into PM-12
5.29%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
21,537.35
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

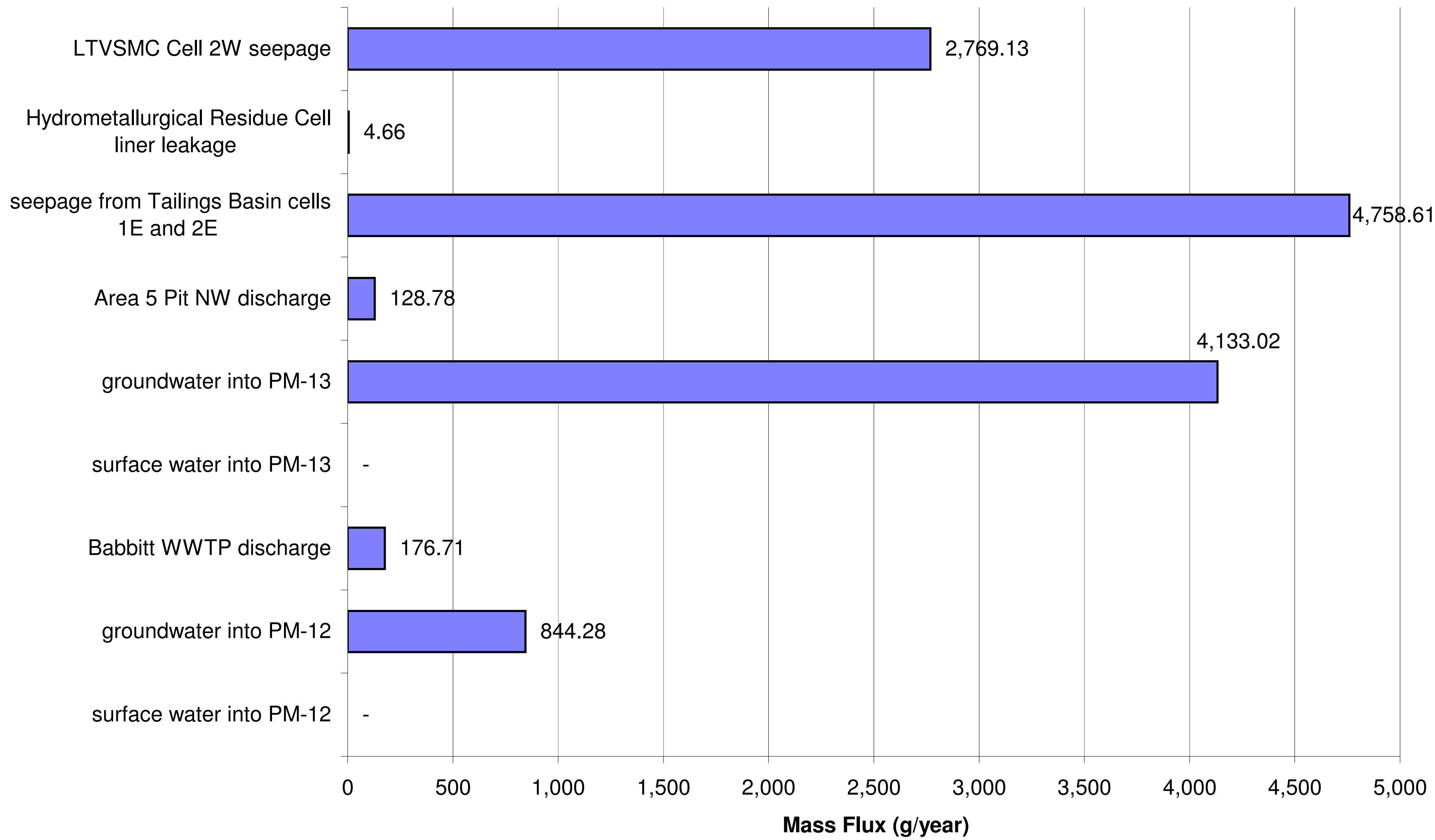

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5.66%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
23.60%
Area 5 Pit NW discharge
2.58%
groundwater into PM-13
11.24%
surface water into PM-13
45.13%
Babbitt WWTP discharge
0.24%
groundwater into PM-12
2.30%
surface water into PM-12
9.25%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

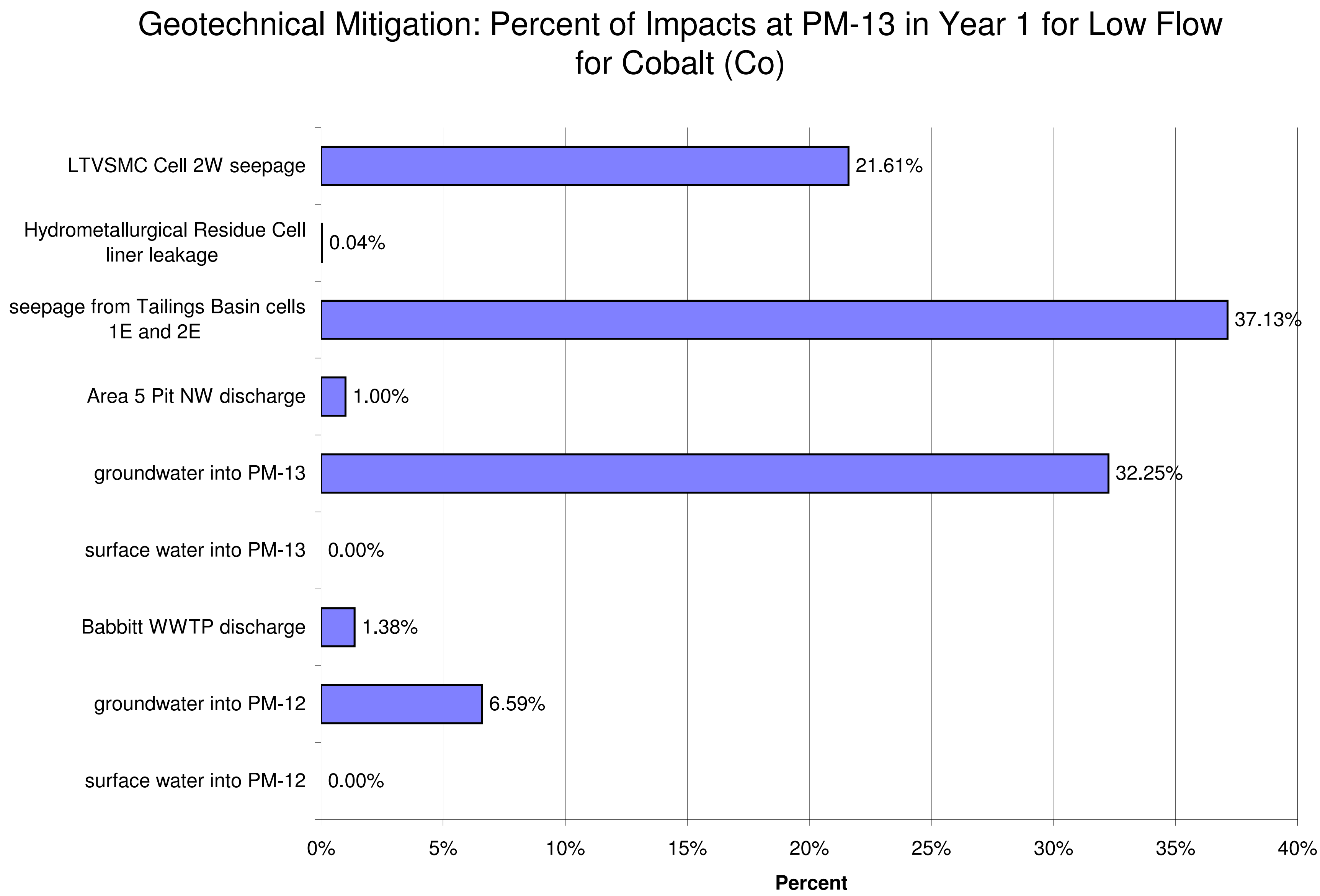

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
21,537.35
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

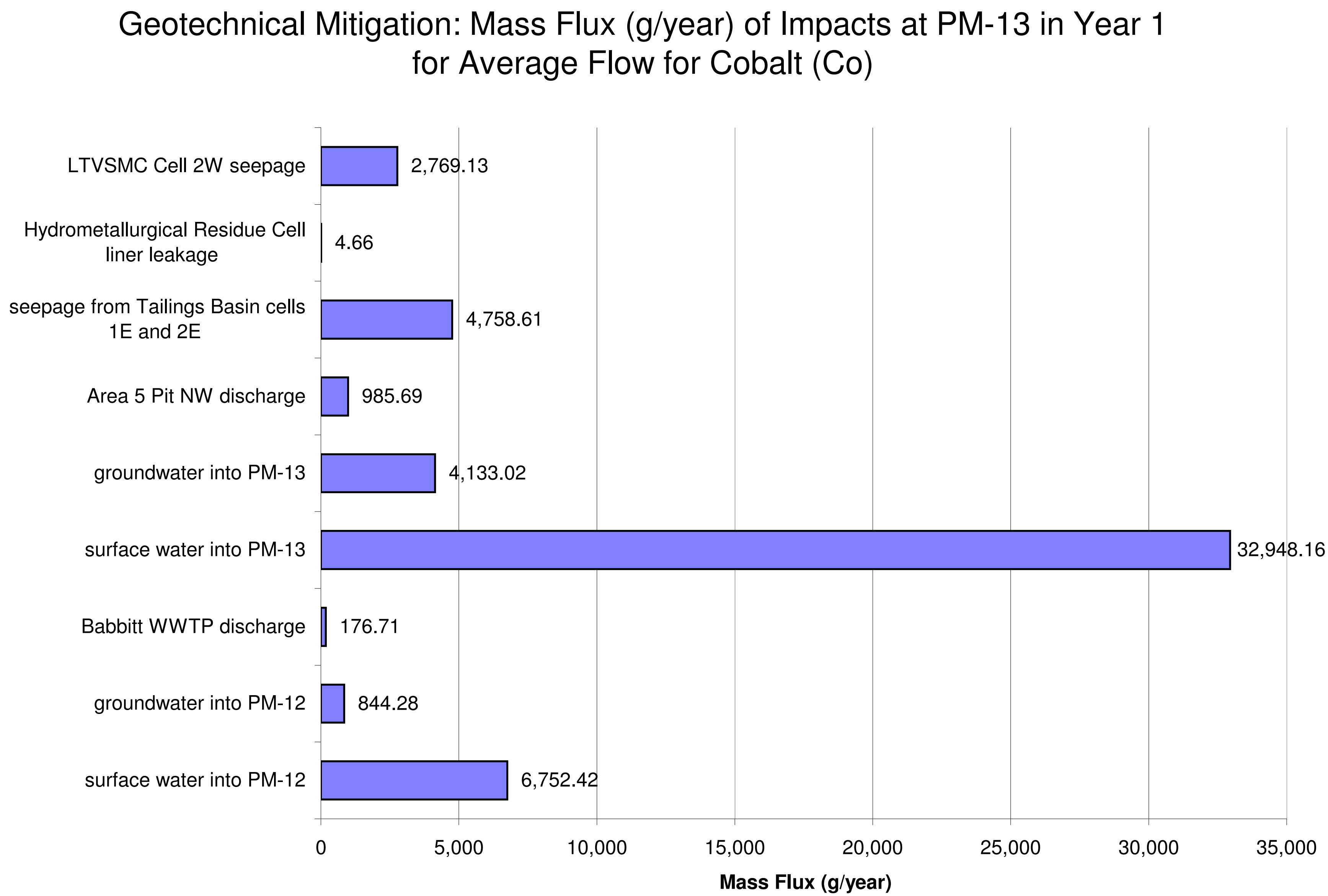
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)

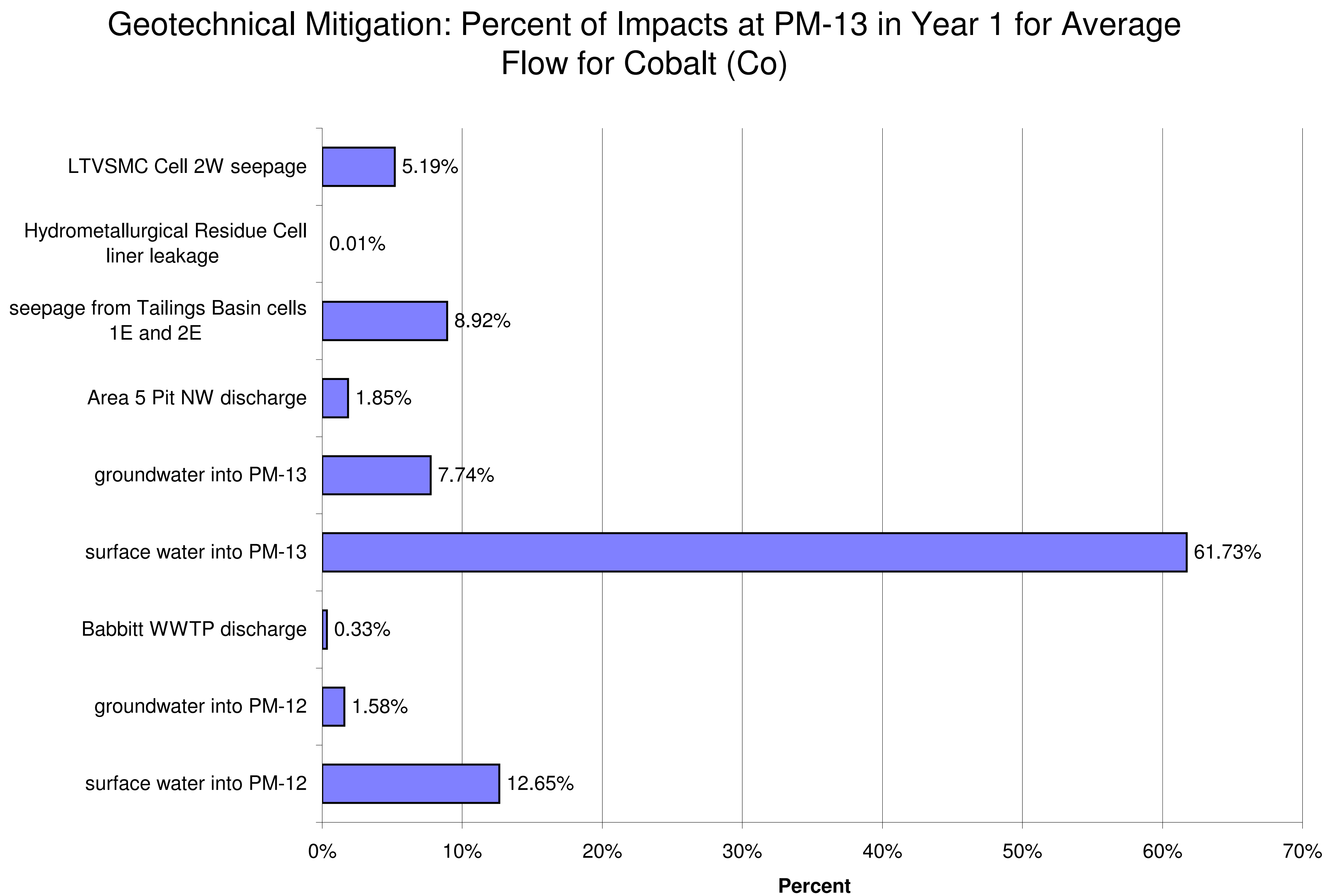


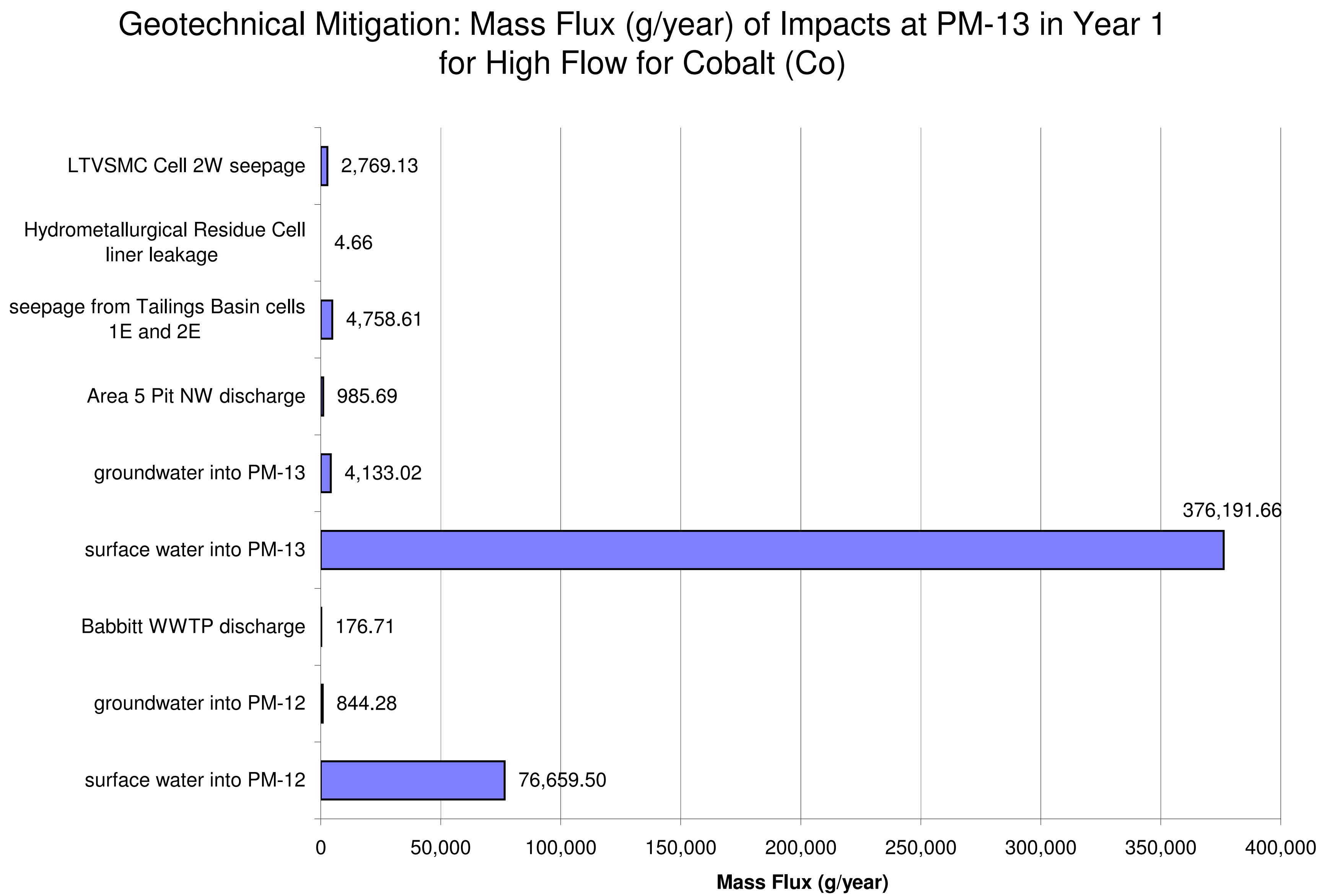
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)



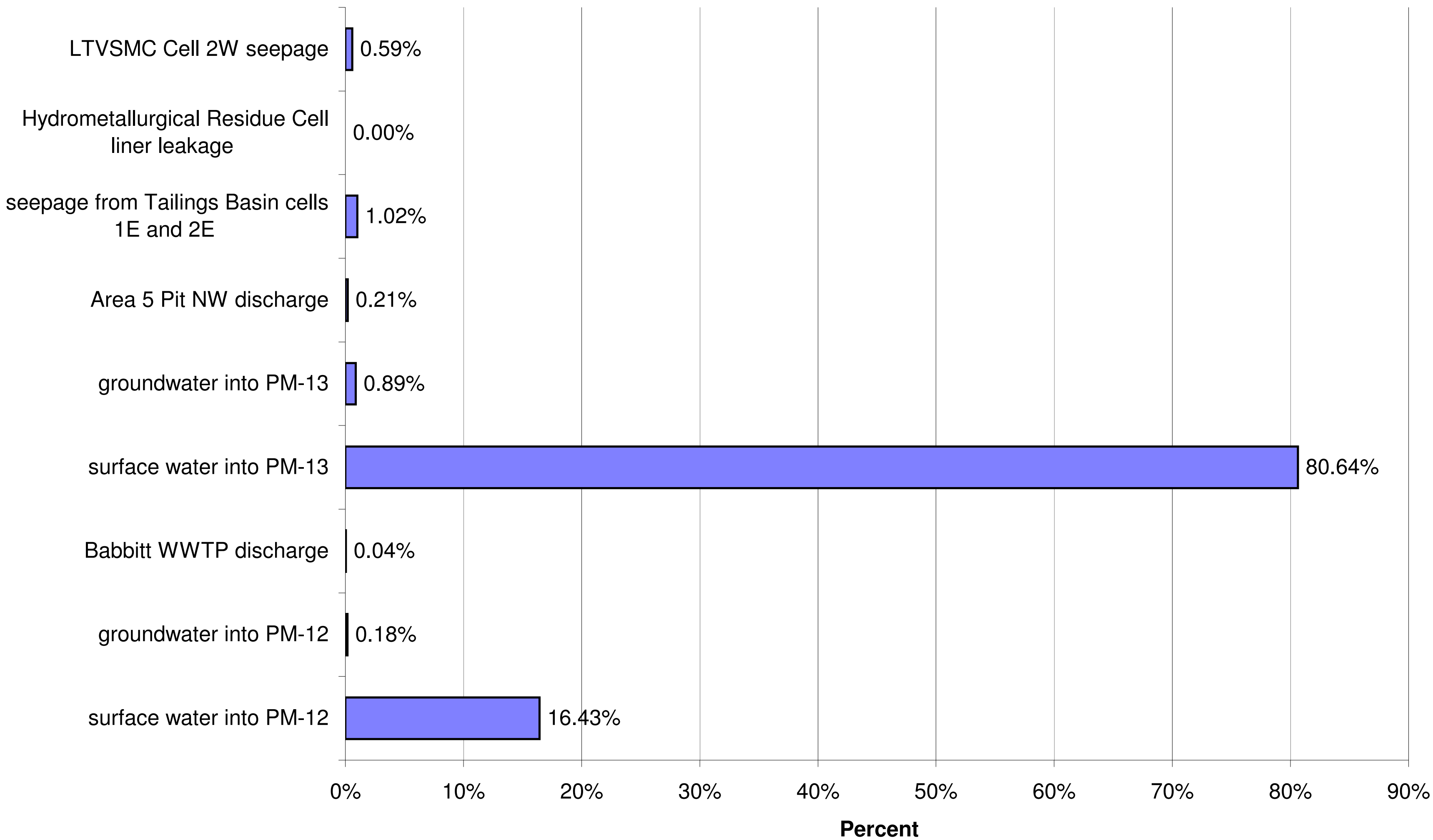

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
21.61%
Hydrometallurgical Residue Cell liner leakage
0.04%
seepage from Tailings Basin cells 1E and 2E
37.13%
Area 5 Pit NW discharge
1.00%
groundwater into PM-13
32.25%
surface water into PM-13
0.00%
Babbitt WWTP discharge
1.38%
groundwater into PM-12
6.59%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

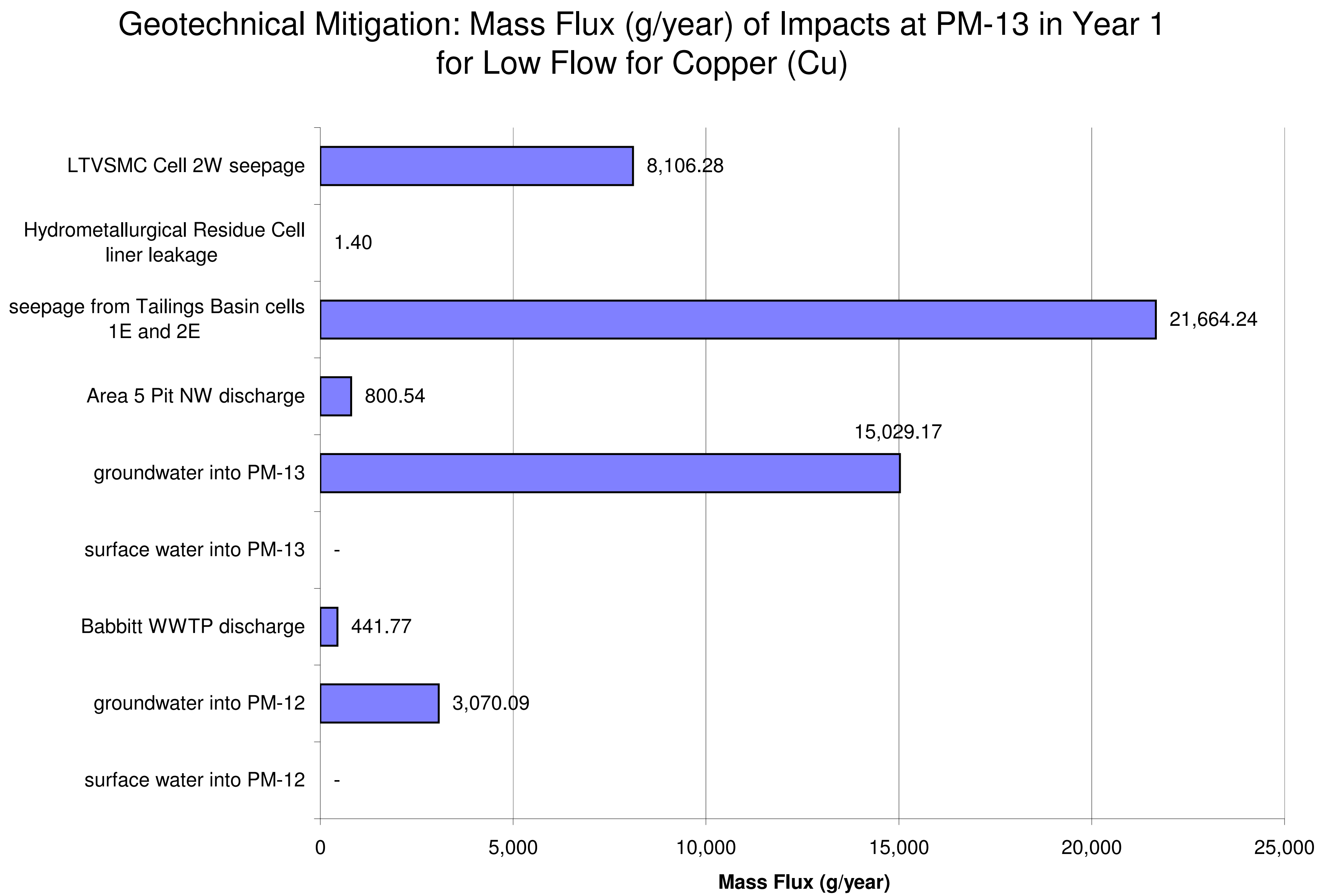

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2E
4,758.61
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

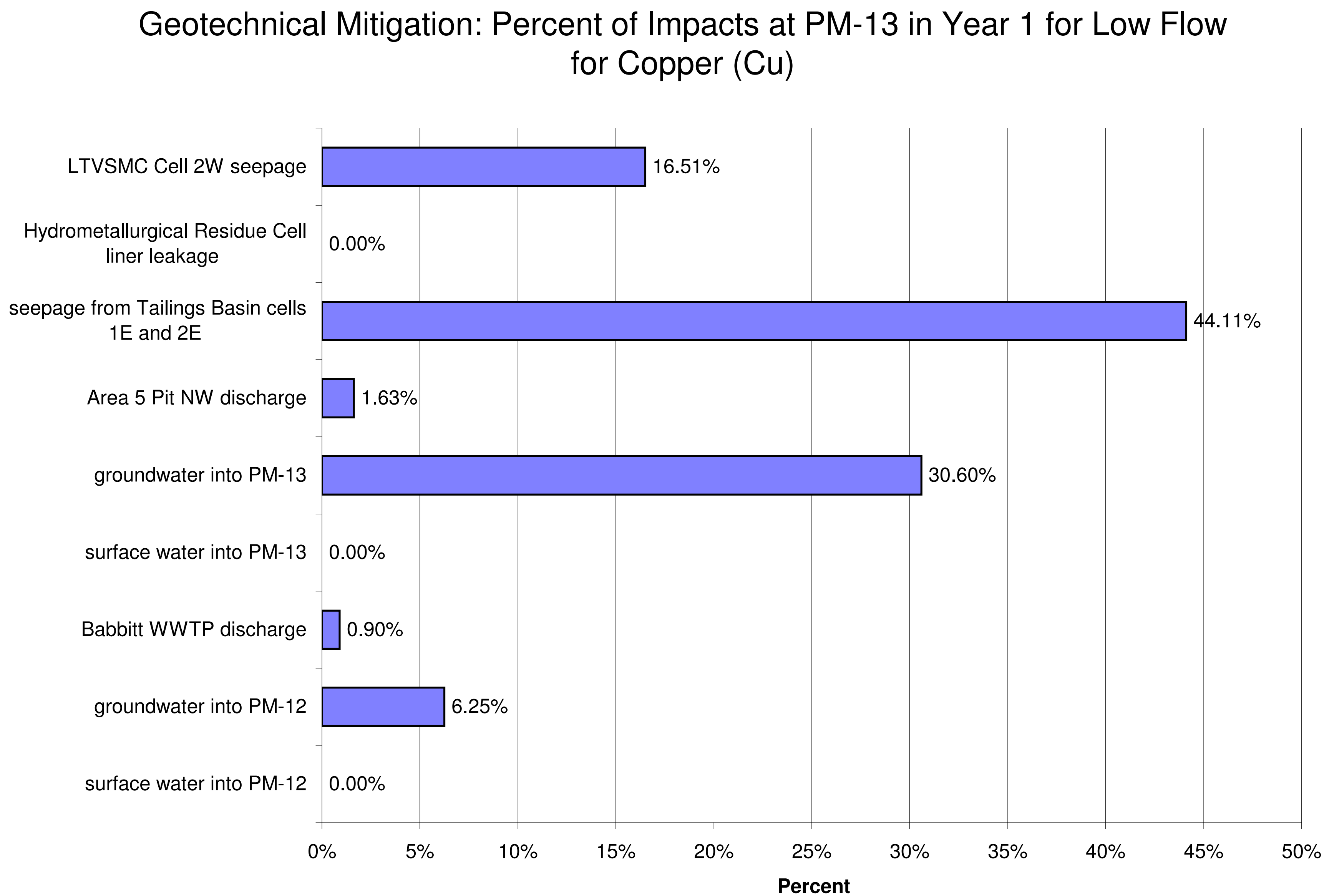

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
5.19%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
8.92%
Area 5 Pit NW discharge
1.85%
groundwater into PM-13
7.74%
surface water into PM-13
61.73%
Babbitt WWTP discharge
0.33%
groundwater into PM-12
1.58%
surface water into PM-12
12.65%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

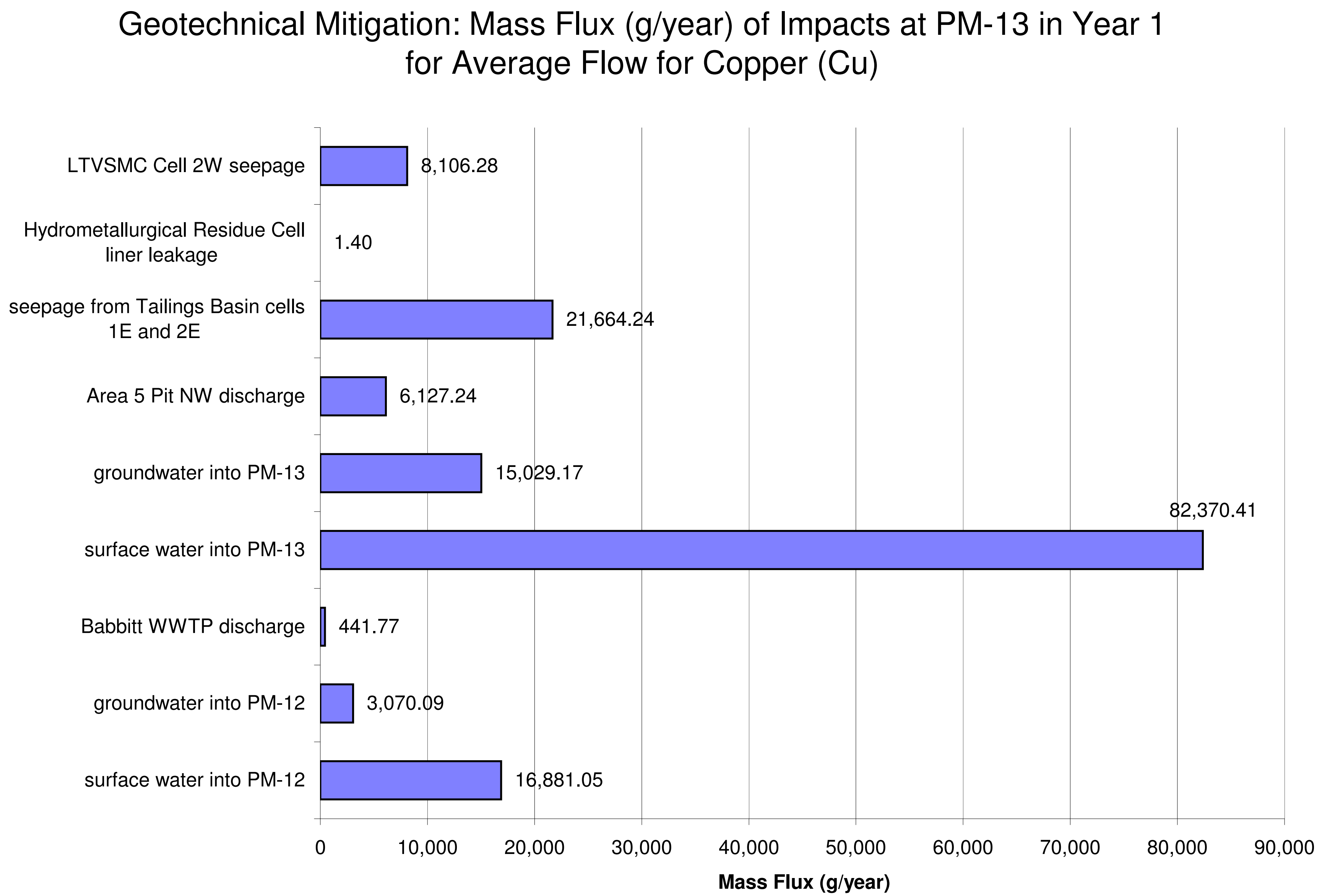

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2E
4,758.61
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

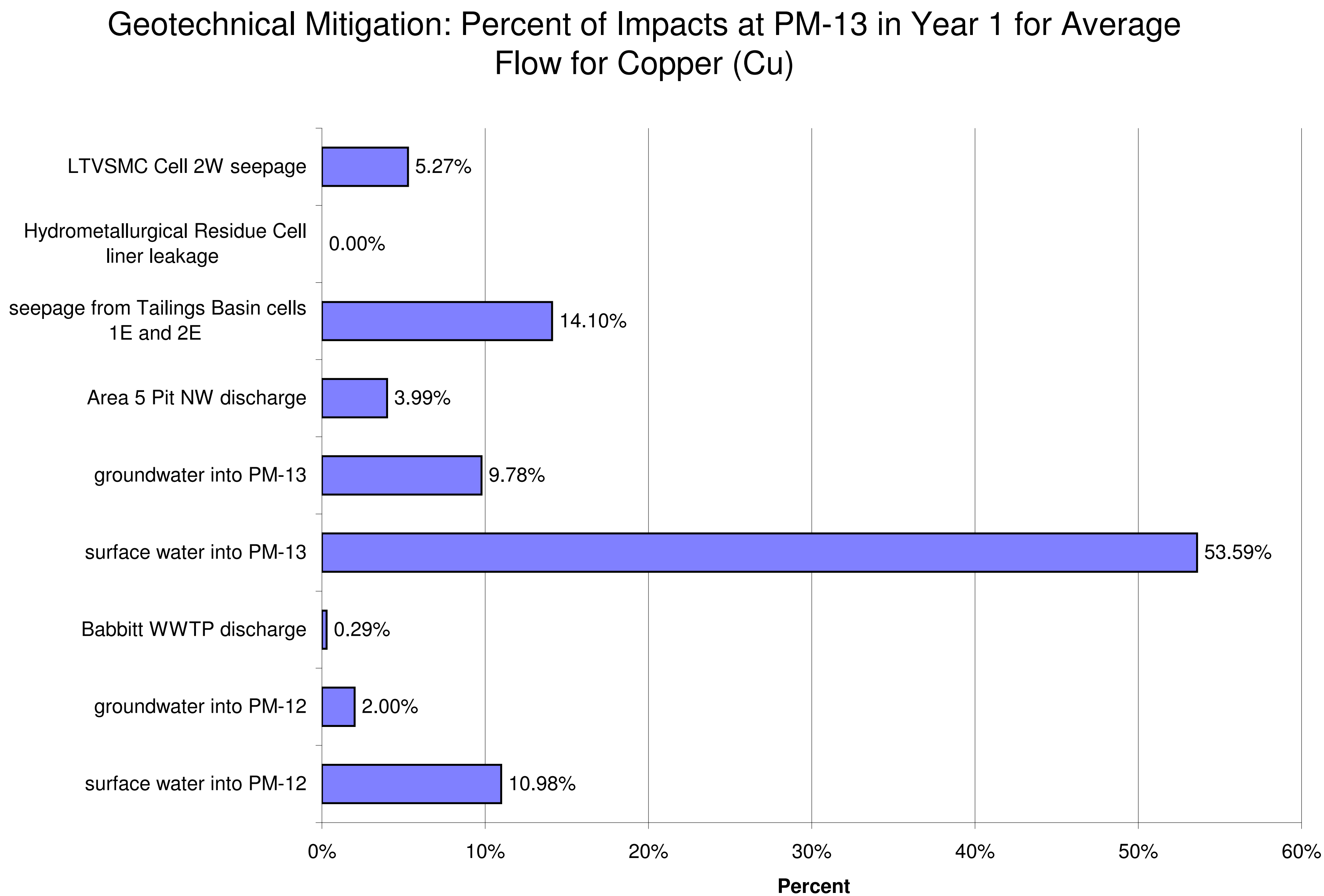
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)



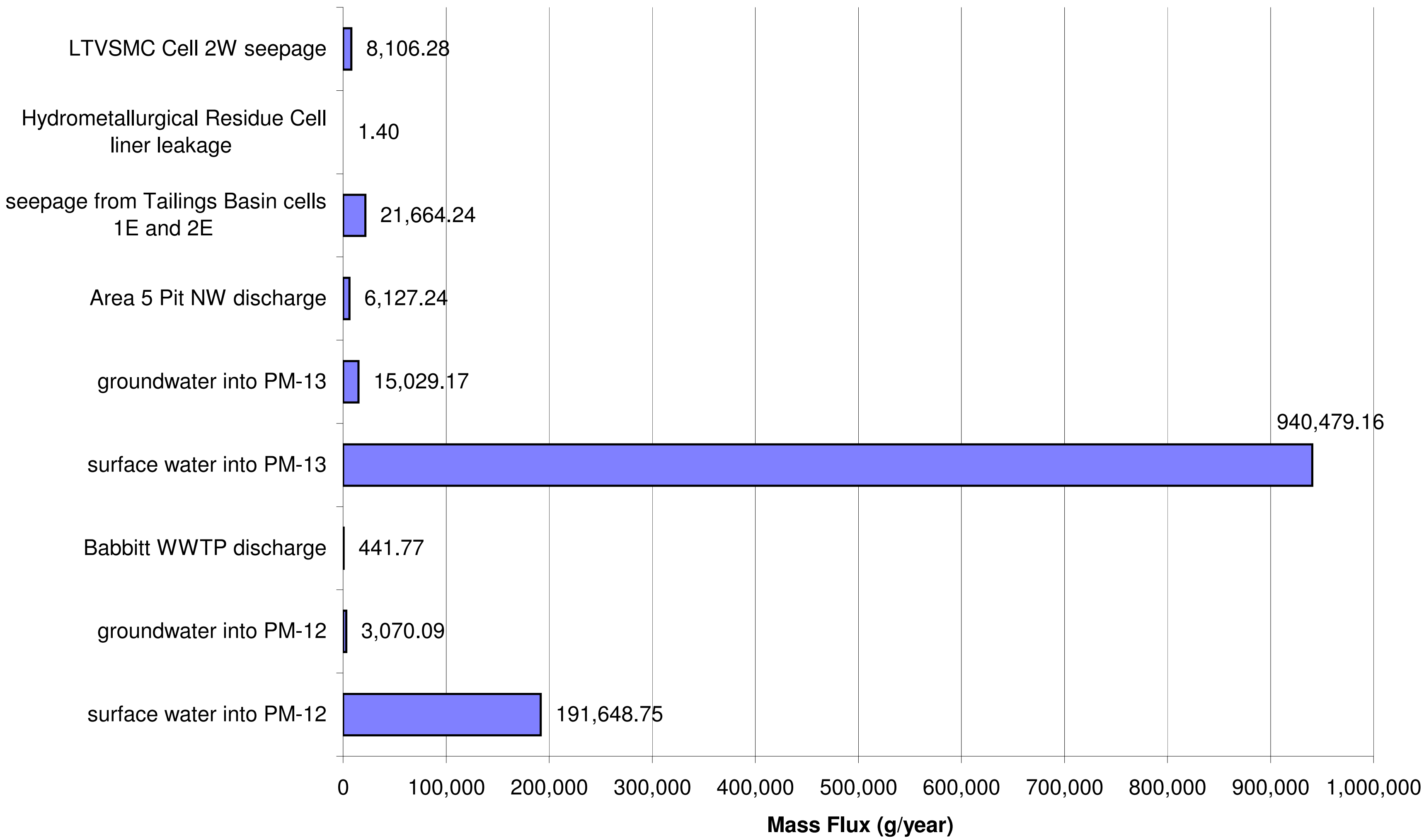

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
1.40
seepage from Tailings Basin cells 1E and 2E
21,664.24
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

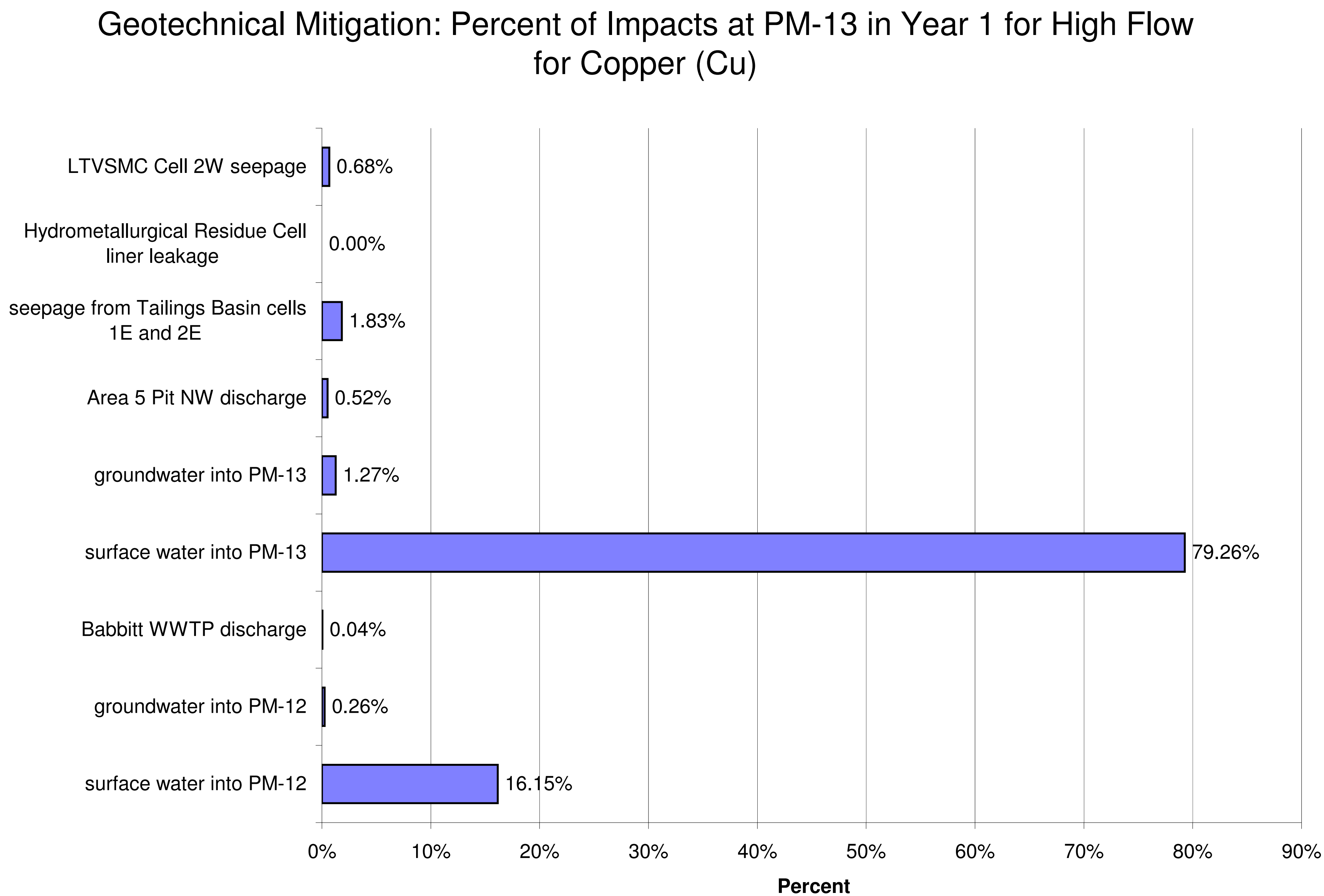

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
16.51%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
44.11%
Area 5 Pit NW discharge
1.63%
groundwater into PM-13
30.60%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.90%
groundwater into PM-12
6.25%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

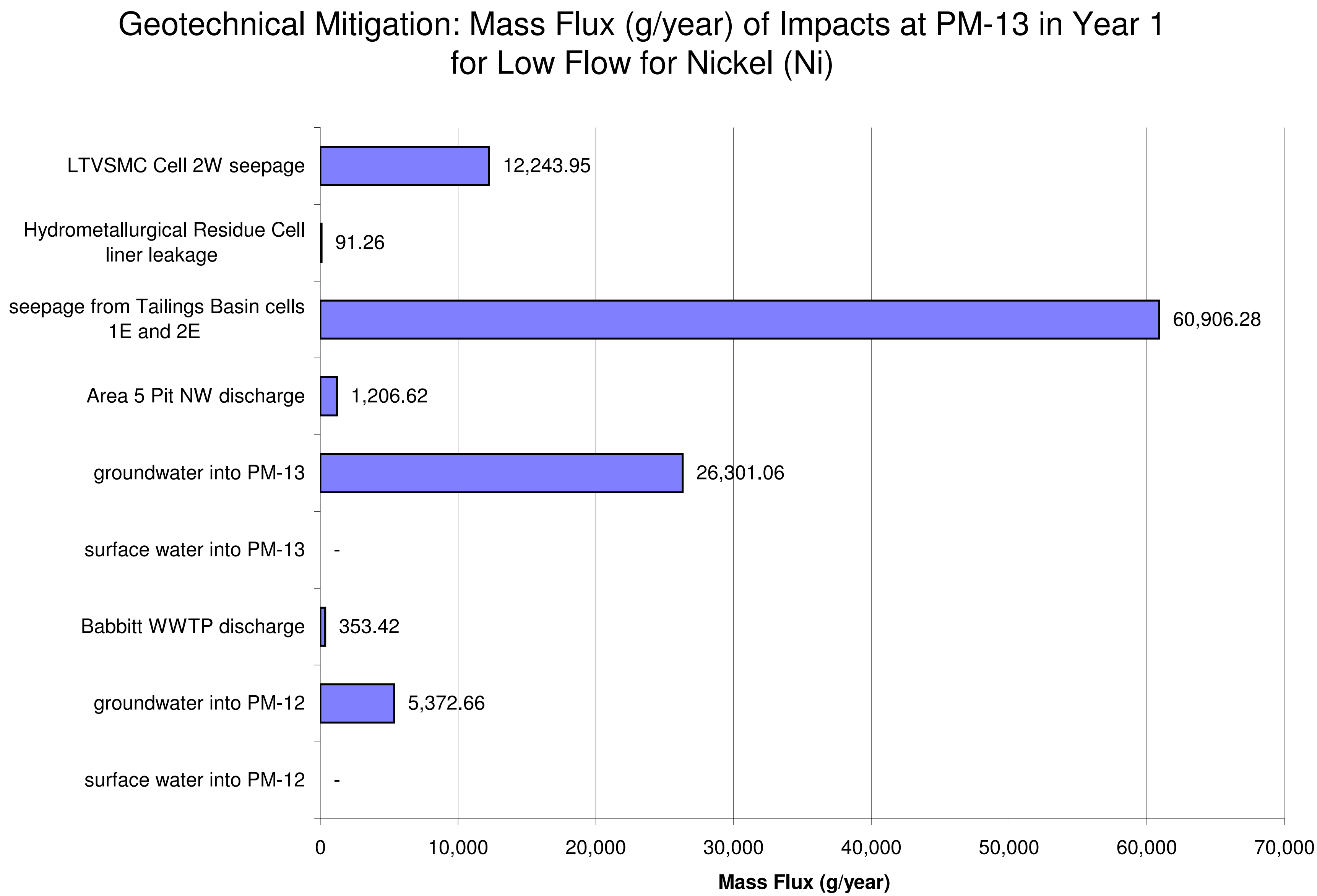

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
1.40
seepage from Tailings Basin cells 1E and 2E
21,664.24
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

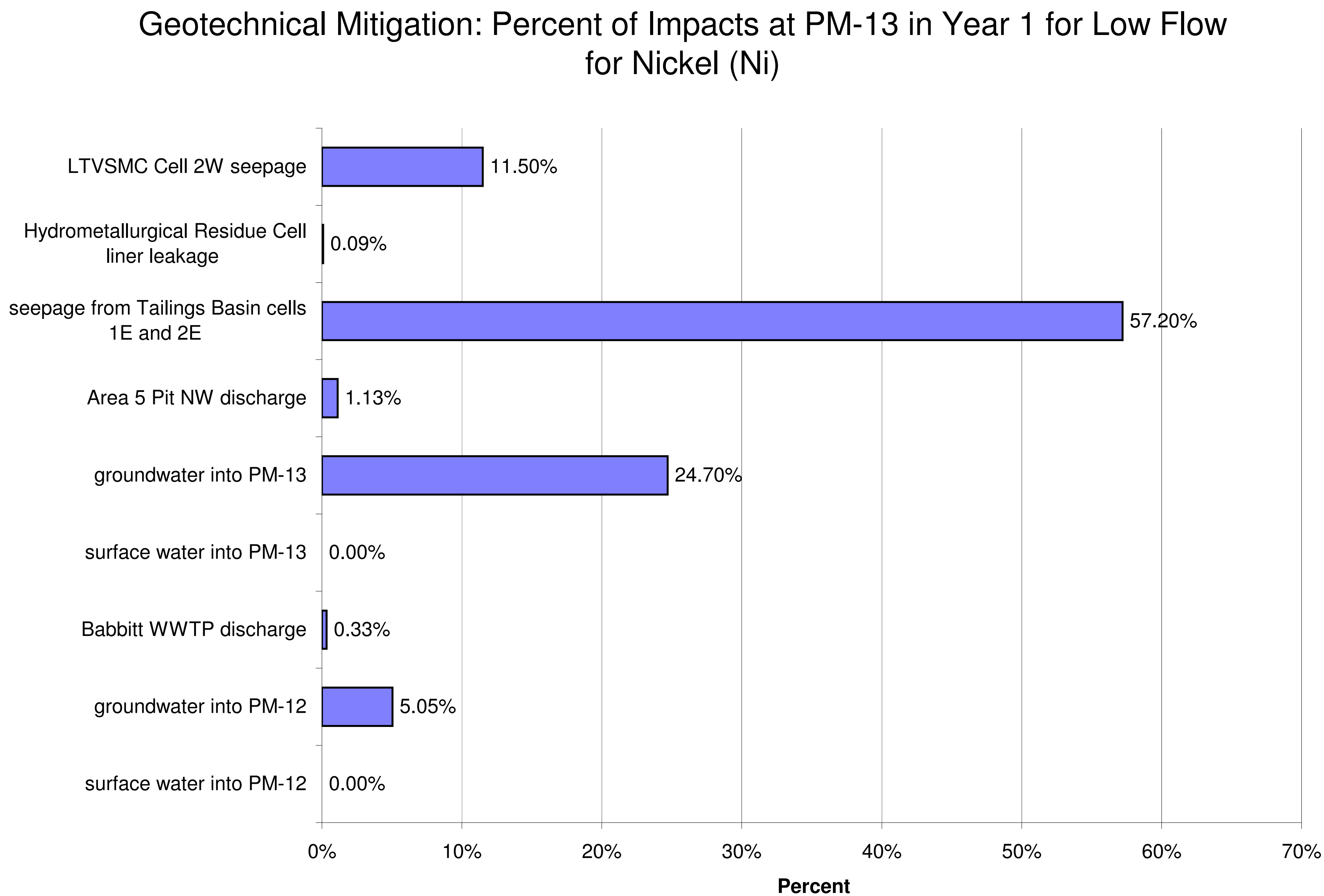

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5.27%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
14.10%
Area 5 Pit NW discharge
3.99%
groundwater into PM-13
9.78%
surface water into PM-13
53.59%
Babbitt WWTP discharge
0.29%
groundwater into PM-12
2.00%
surface water into PM-12
10.98%
0%
10%
20%
30%
40%
50%
60%
Percent

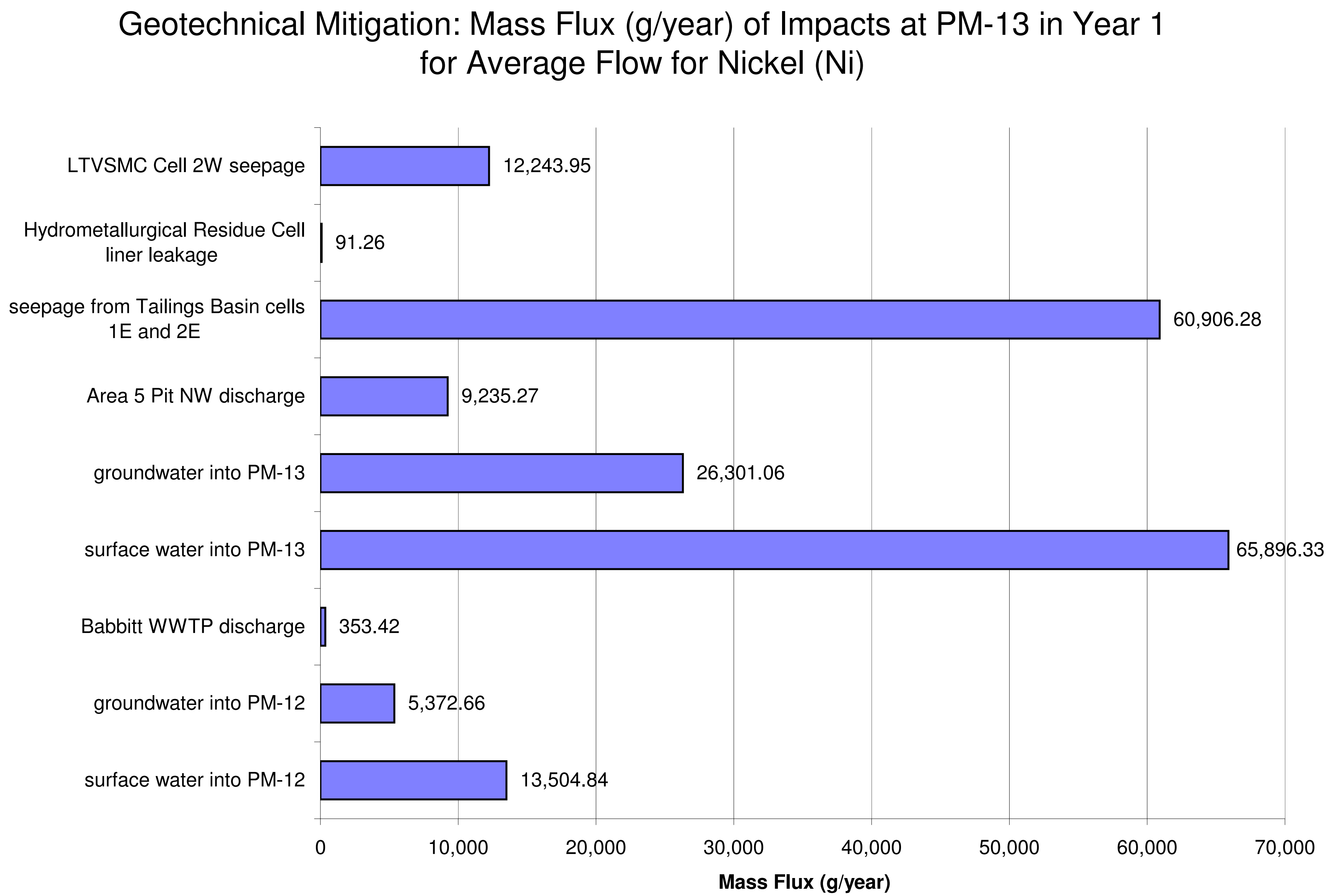
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)

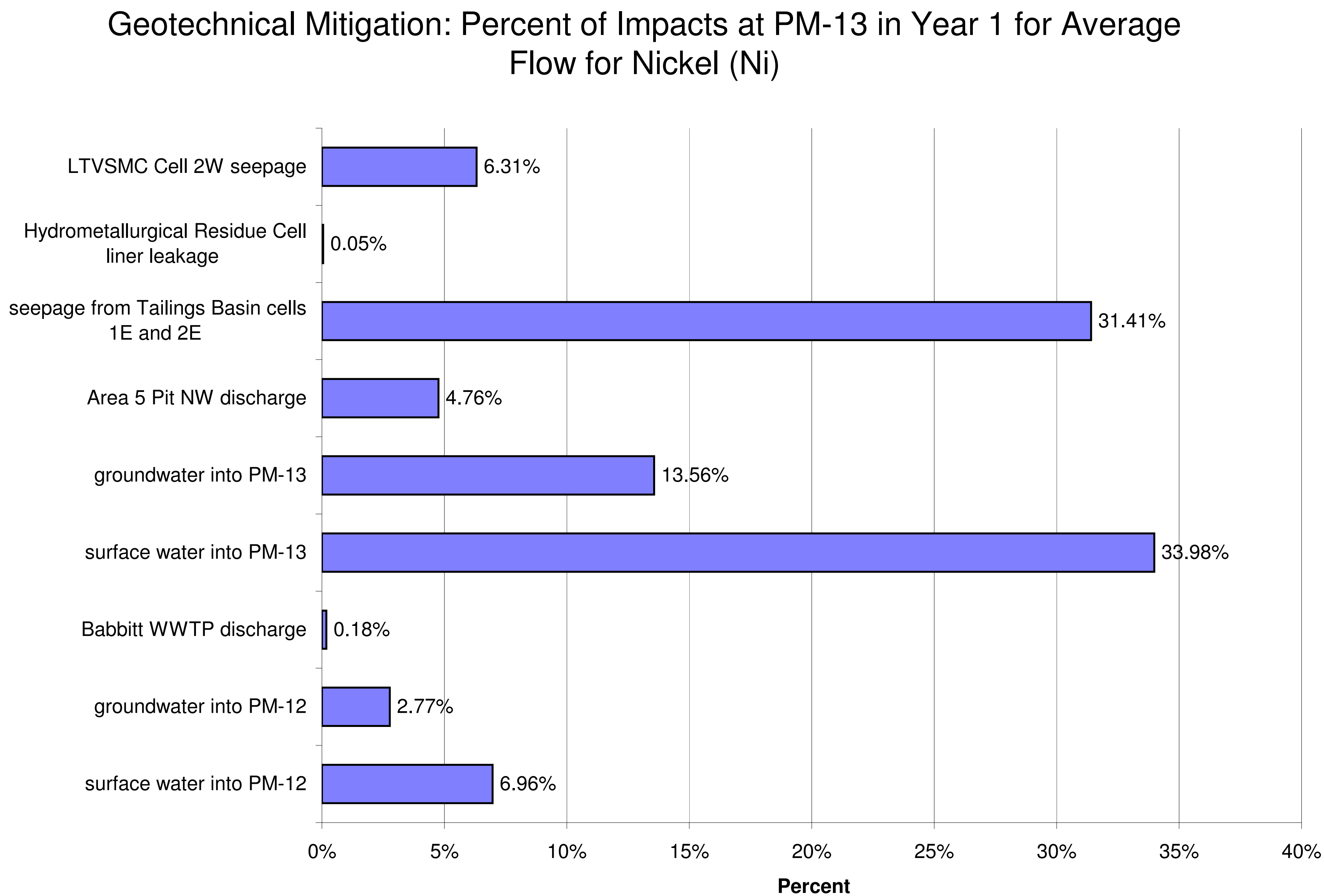



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.68%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
1.83%
Area 5 Pit NW discharge
0.52%
groundwater into PM-13
1.27%
surface water into PM-13
79.26%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
16.15%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

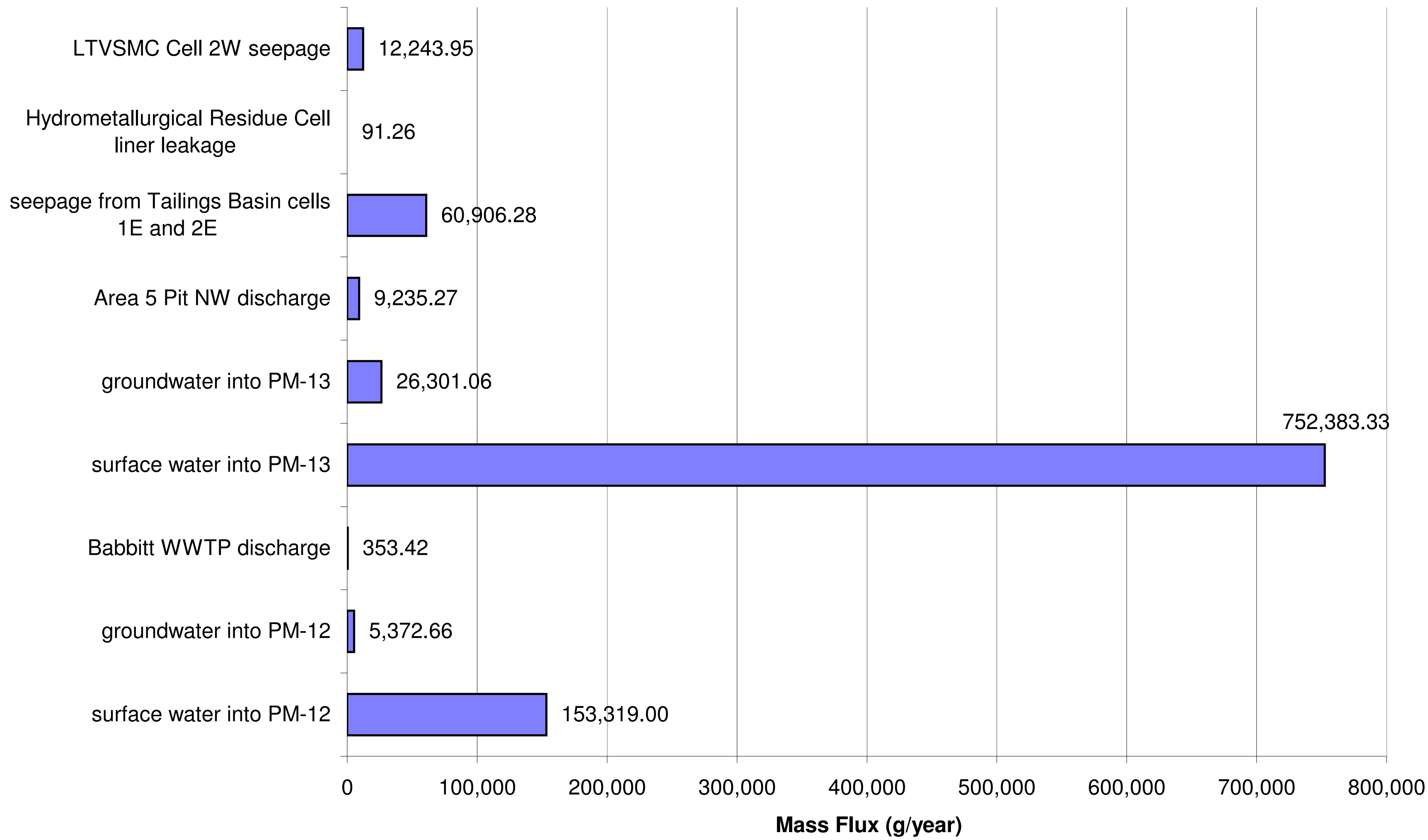

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
91.26
seepage from Tailings Basin cells 1E and 2E
60,906.28
Area 5 Pit NW discharge
1,206.62
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
-
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

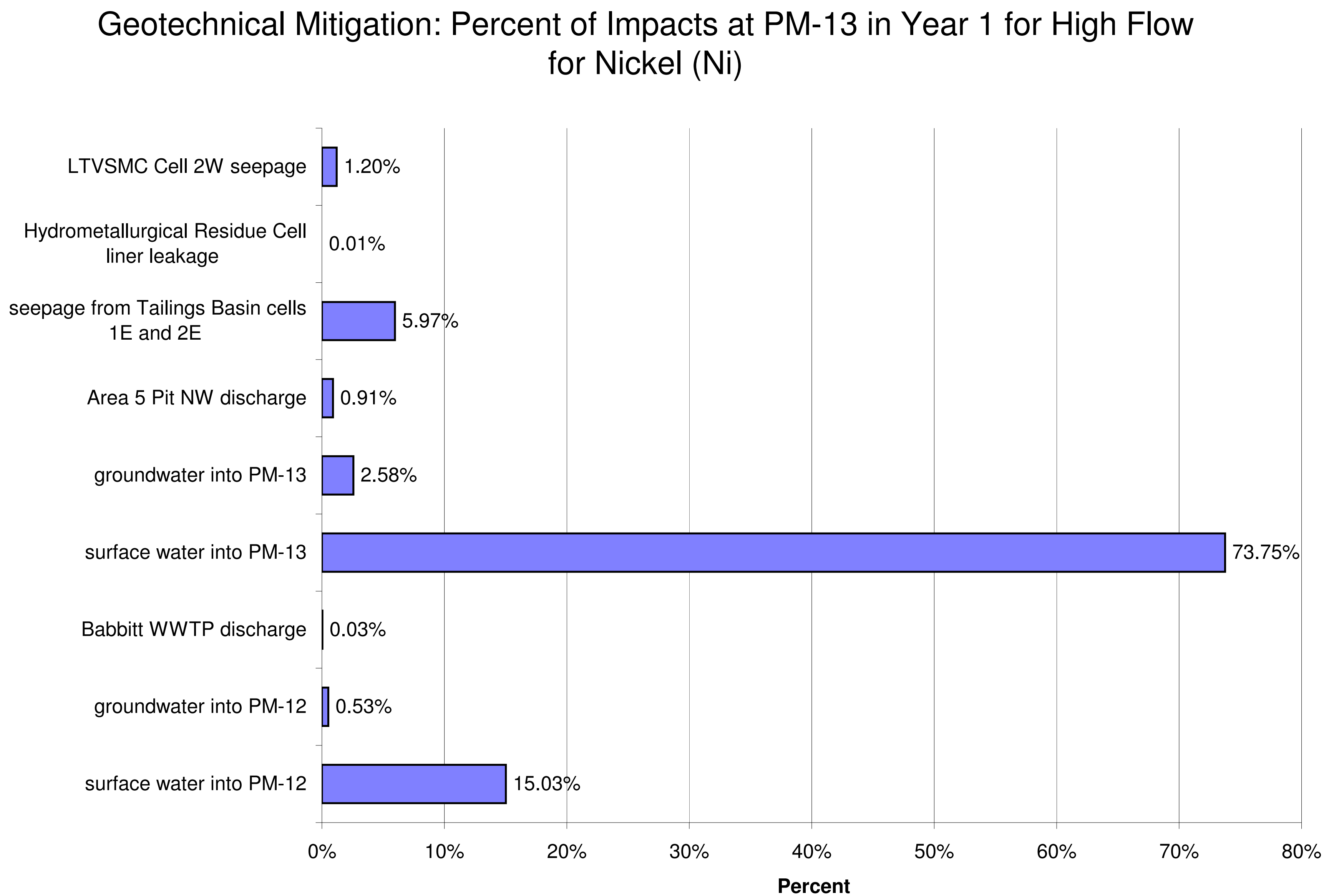

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
11.50%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
57.20%
Area 5 Pit NW discharge
1.13%
groundwater into PM-13
24.70%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.33%
groundwater into PM-12
5.05%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
91.26
seepage from Tailings Basin cells 1E and 2E
60,906.28
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

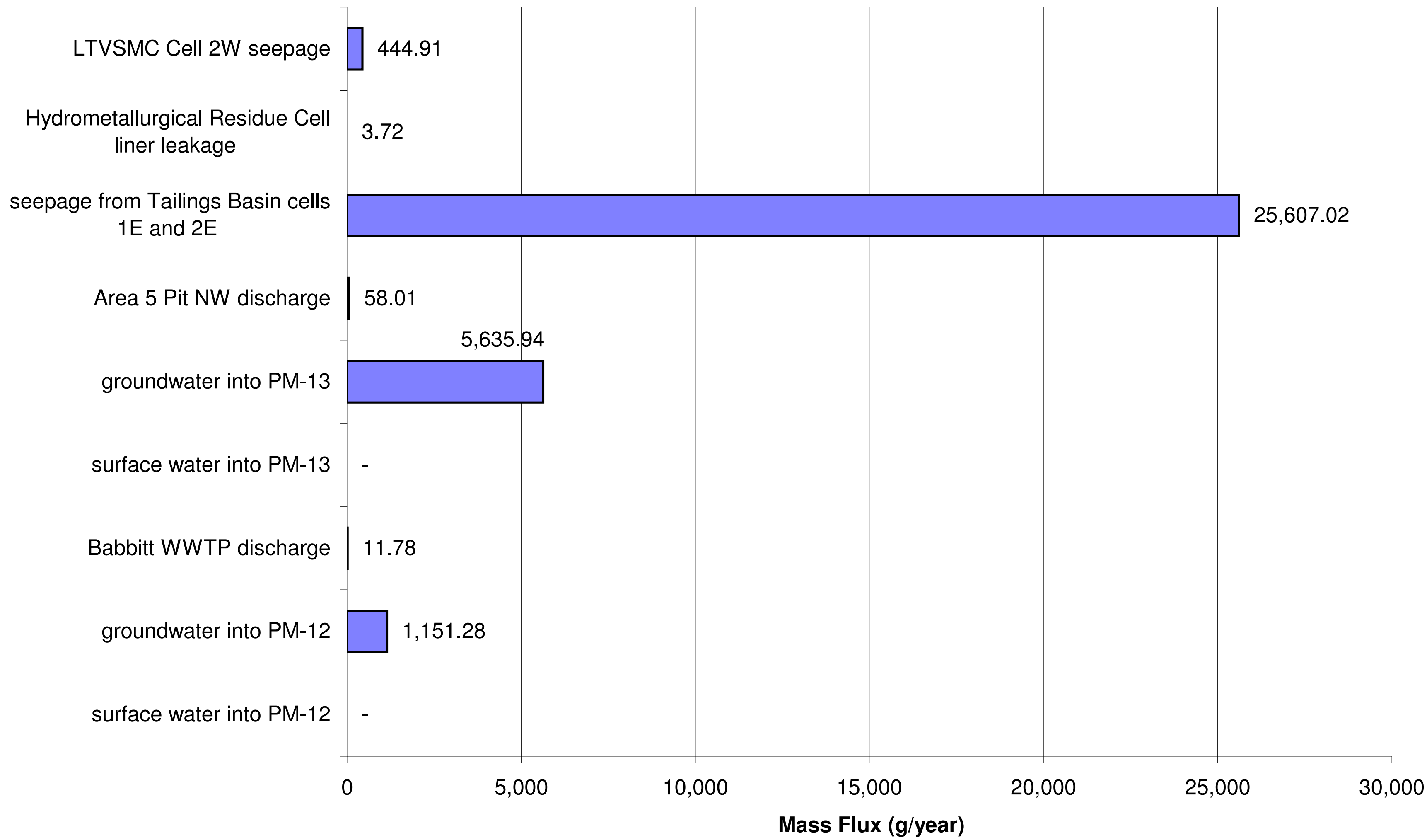

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
6.31%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
31.41%
Area 5 Pit NW discharge
4.76%
groundwater into PM-13
13.56%
surface water into PM-13
33.98%
Babbitt WWTP discharge
0.18%
groundwater into PM-12
2.77%
surface water into PM-12
6.96%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)

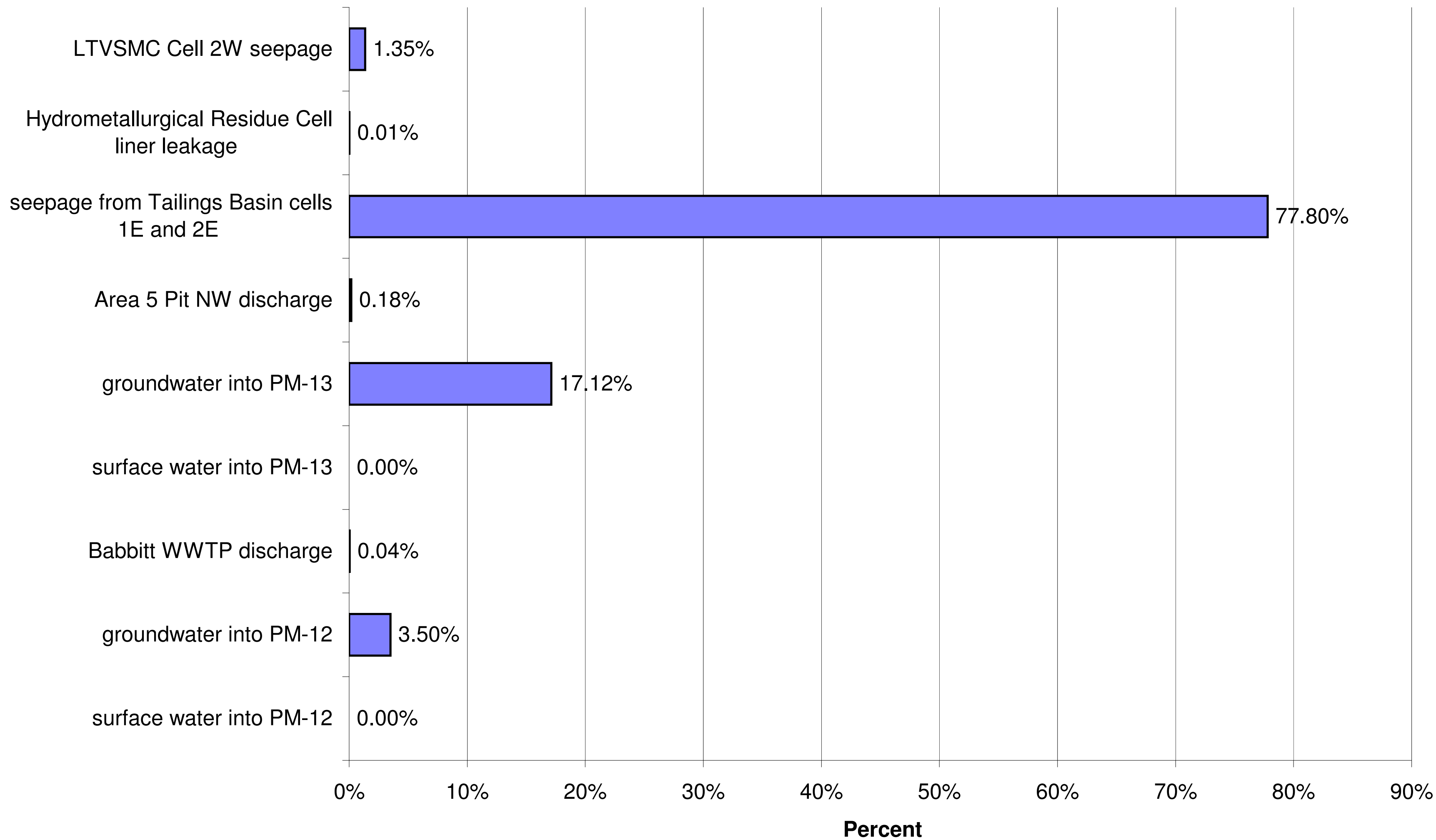


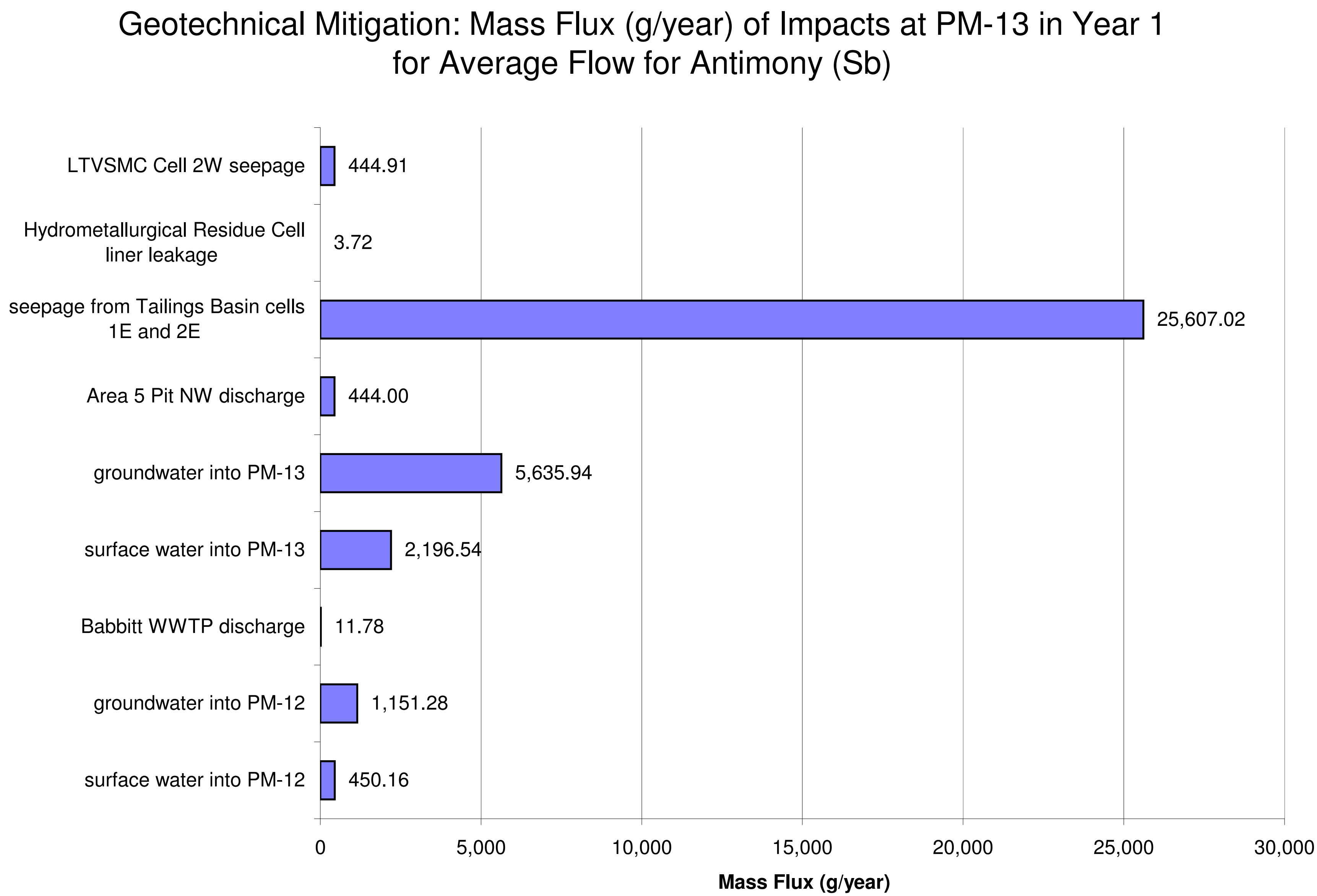

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
1.20%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
5.97%
Area 5 Pit NW discharge
0.91%
groundwater into PM-13
2.58%
surface water into PM-13
73.75%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.53%
surface water into PM-12
15.03%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

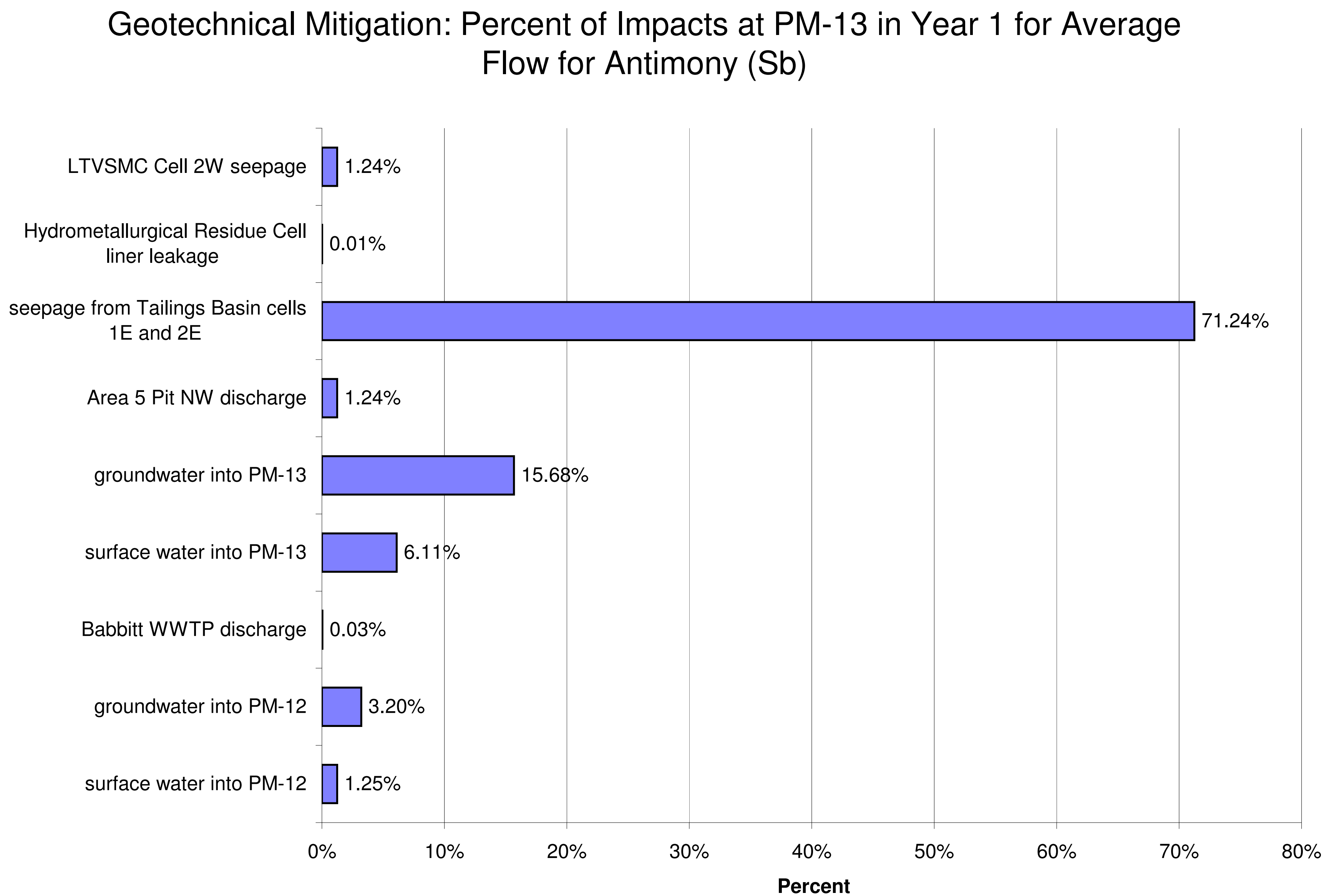
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)

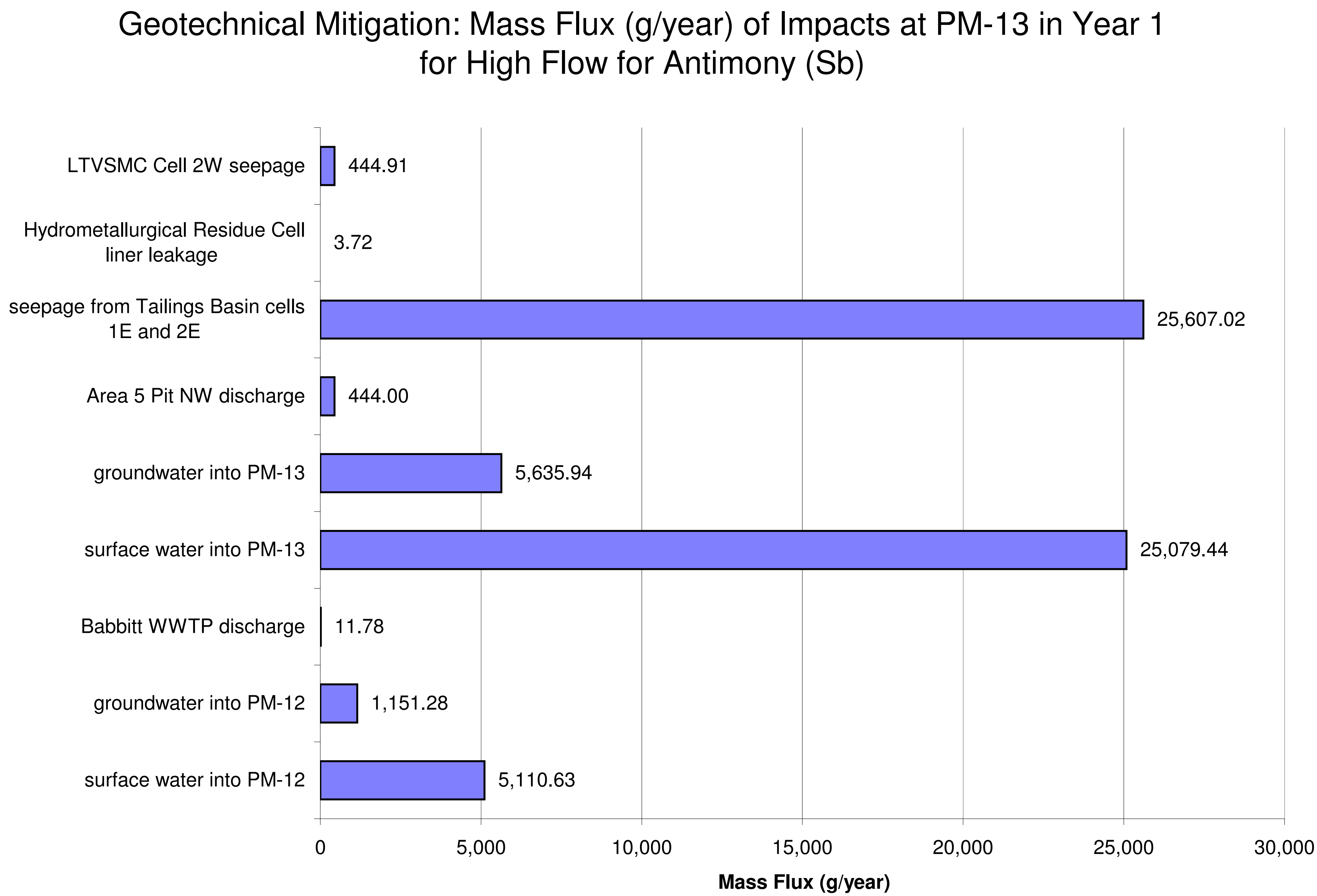


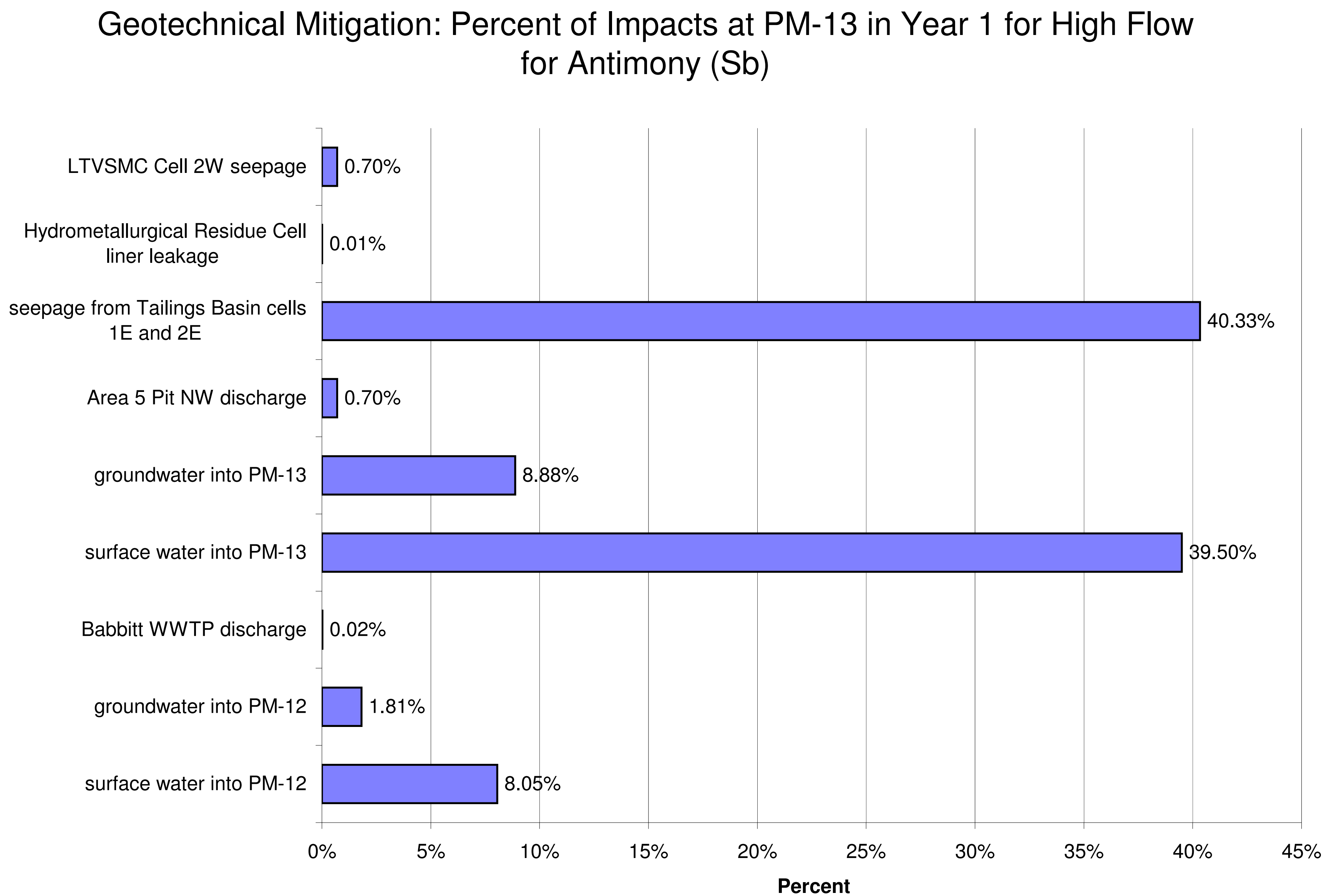
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)



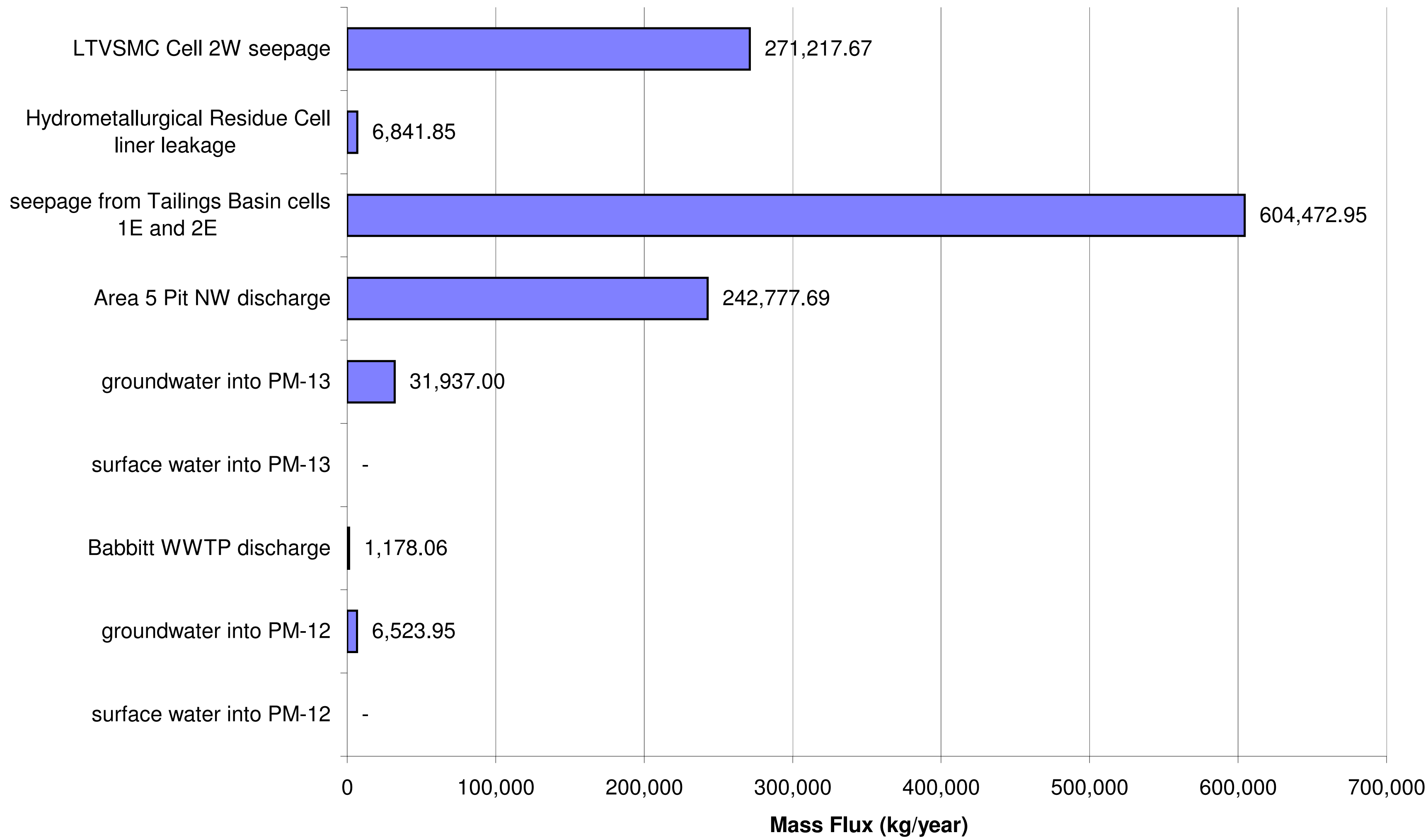

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
25,607.02
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.24%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
71.24%
Area 5 Pit NW discharge
1.24%
groundwater into PM-13
15.68%
surface water into PM-13
6.11%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
3.20%
surface water into PM-12
1.25%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

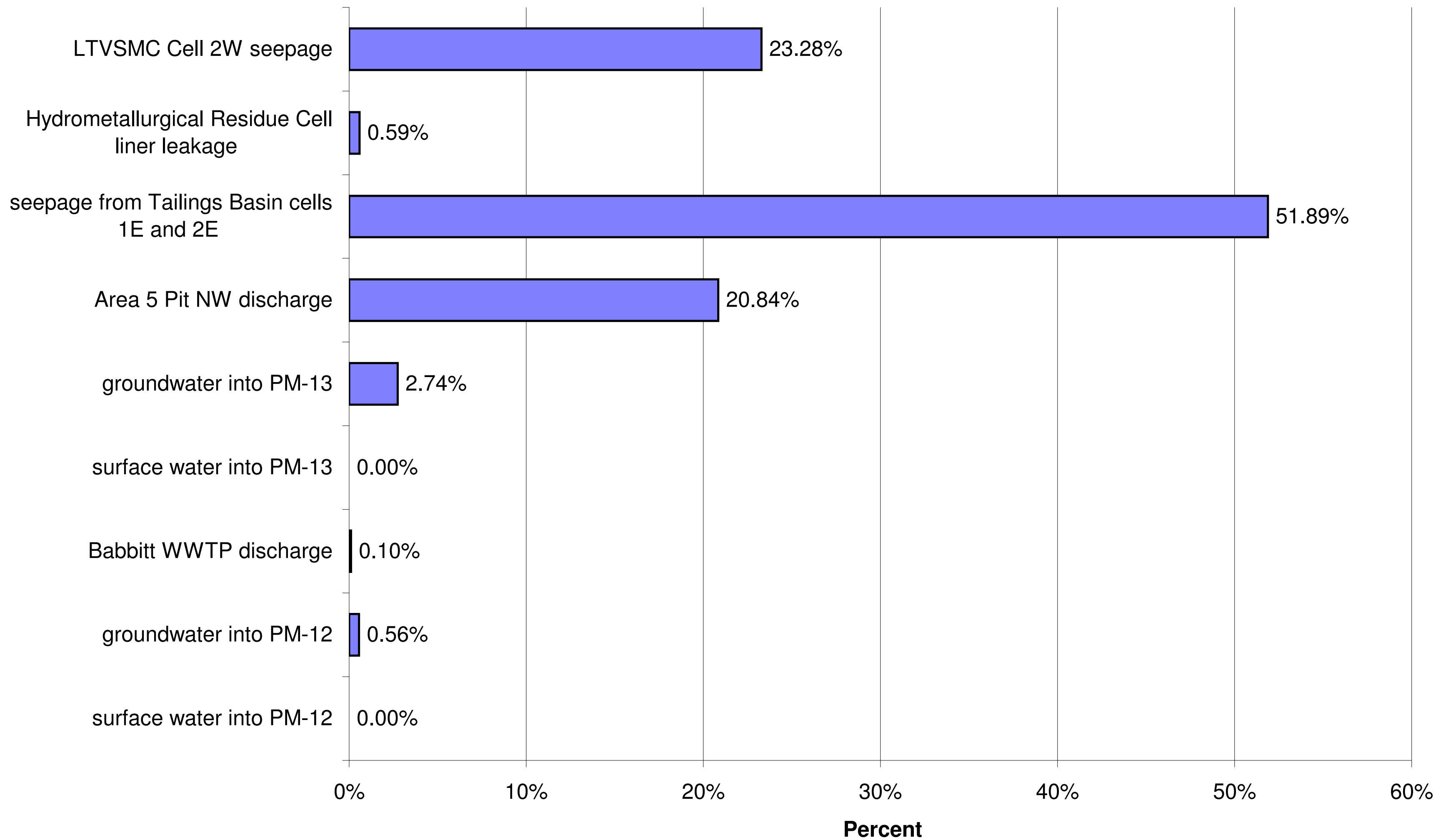

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
25,607.02
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.70%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
40.33%
Area 5 Pit NW discharge
0.70%
groundwater into PM-13
8.88%
surface water into PM-13
39.50%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
1.81%
surface water into PM-12
8.05%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

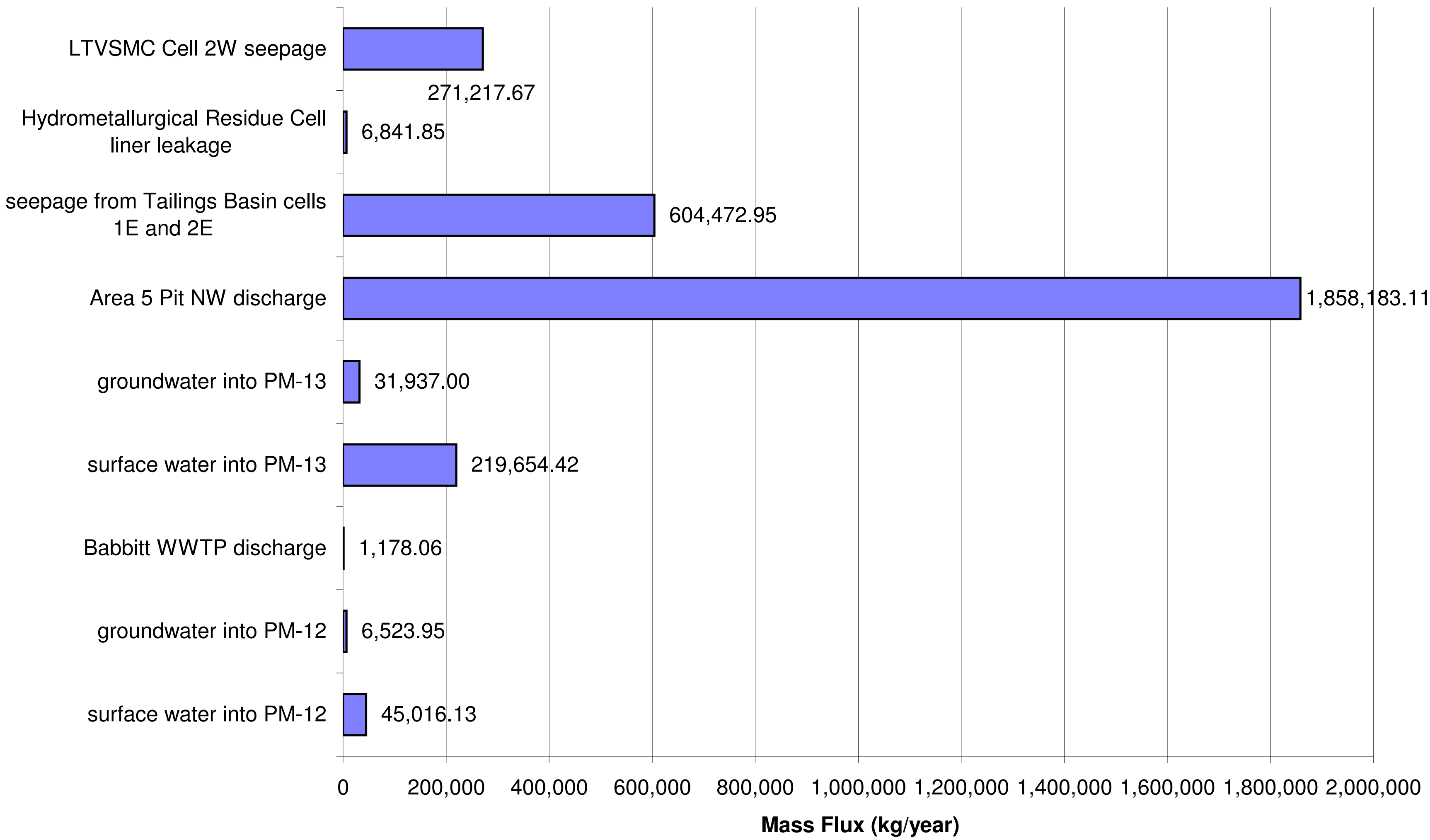
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)



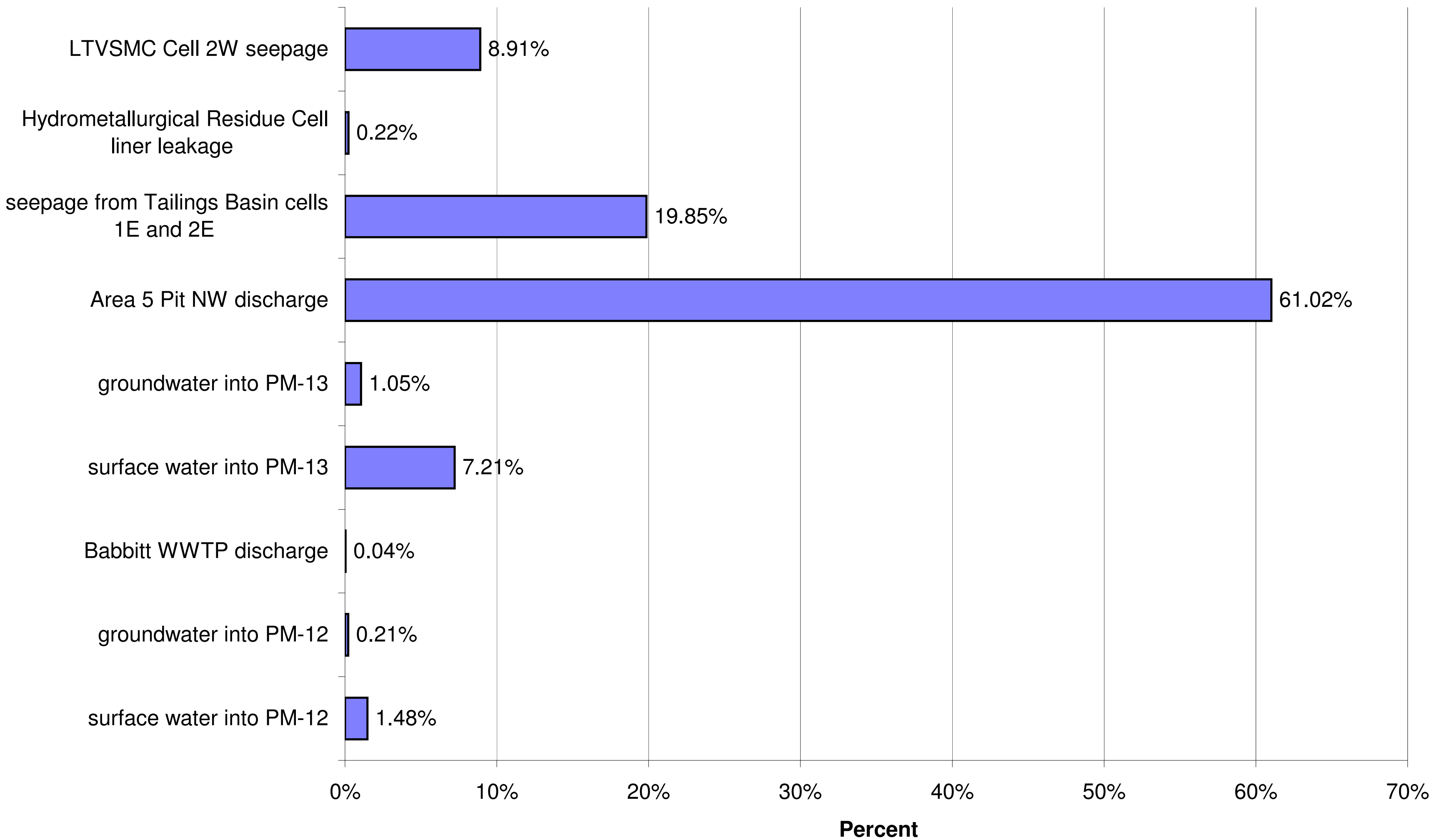
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)

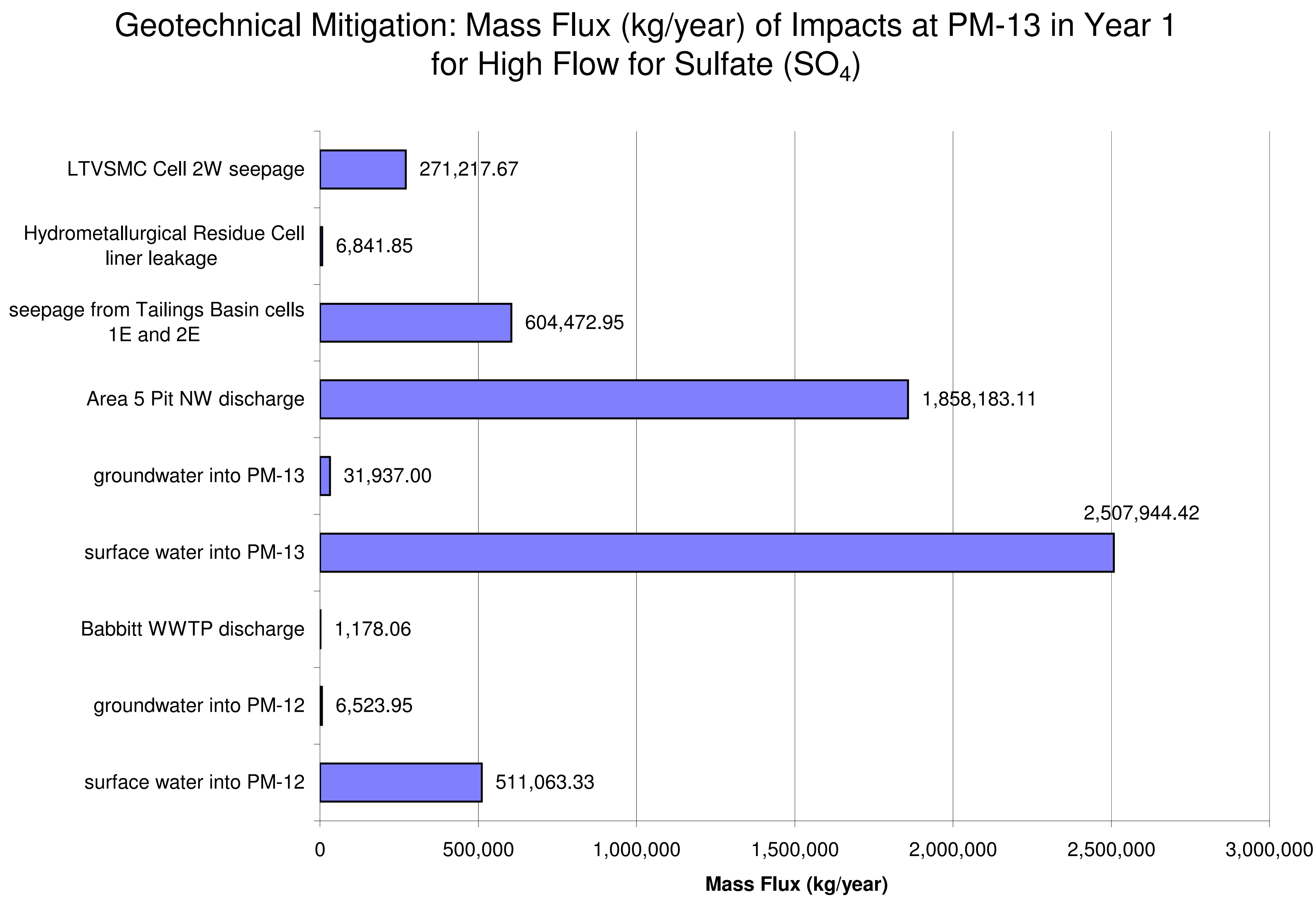


Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)

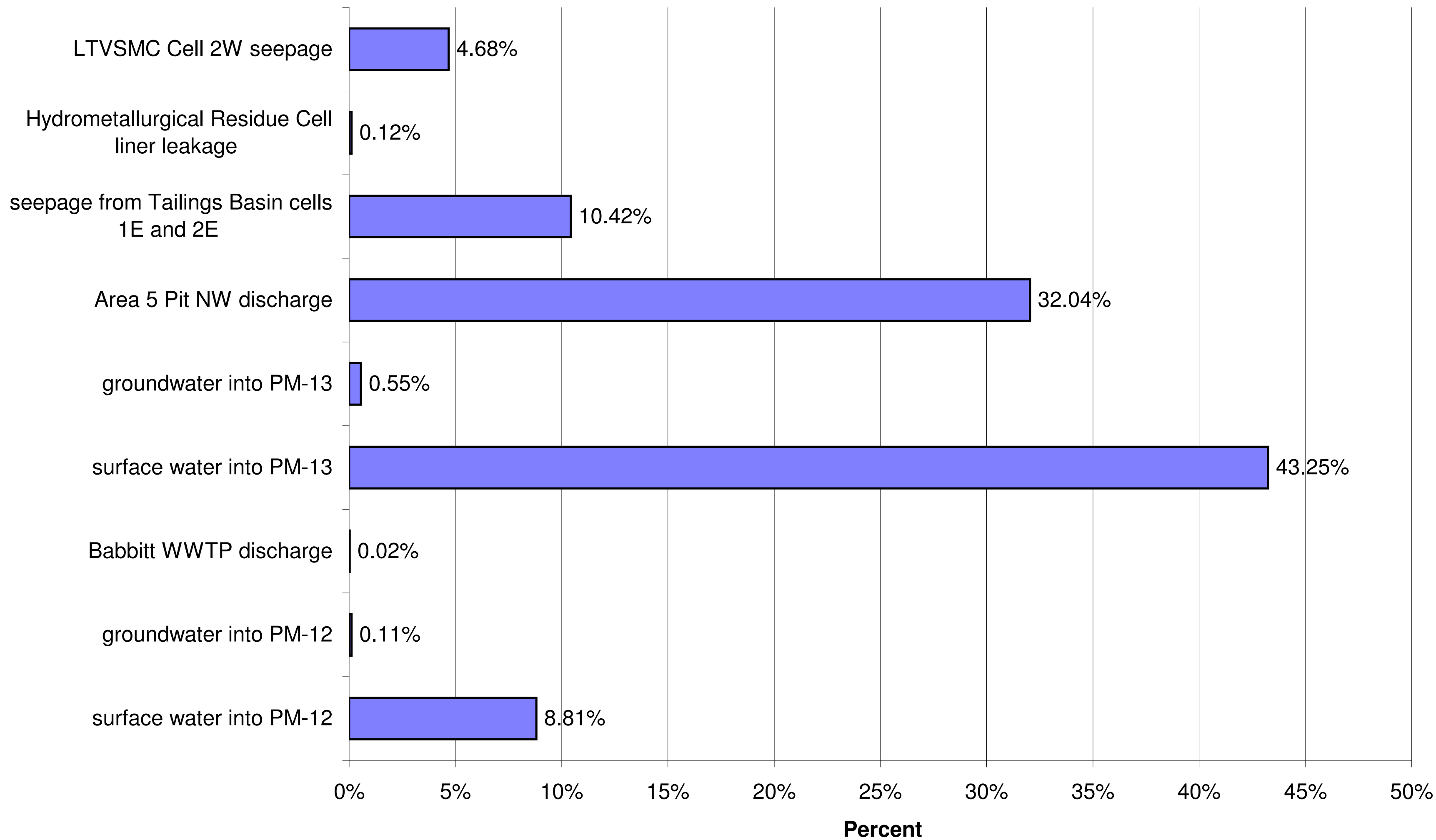


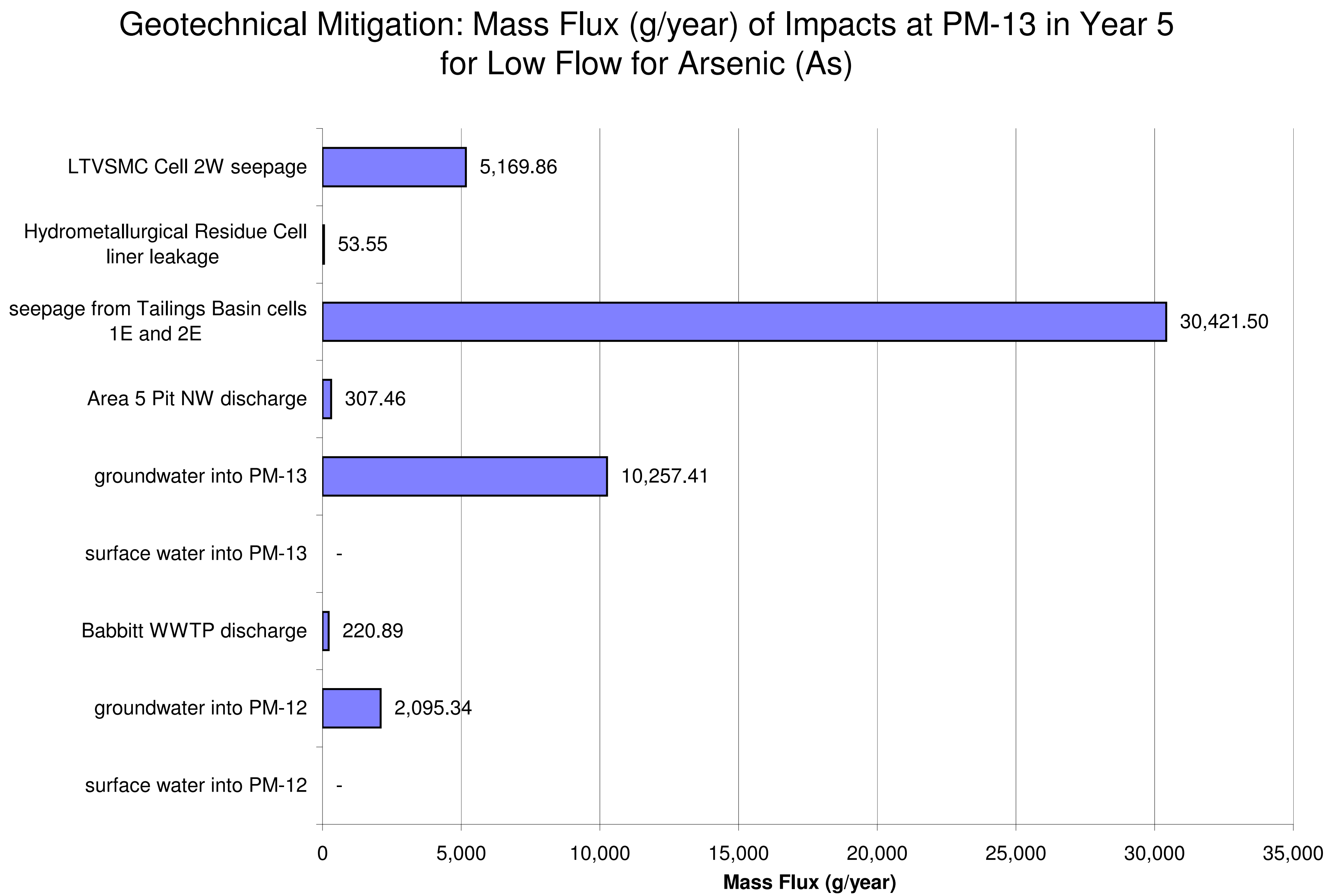
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)

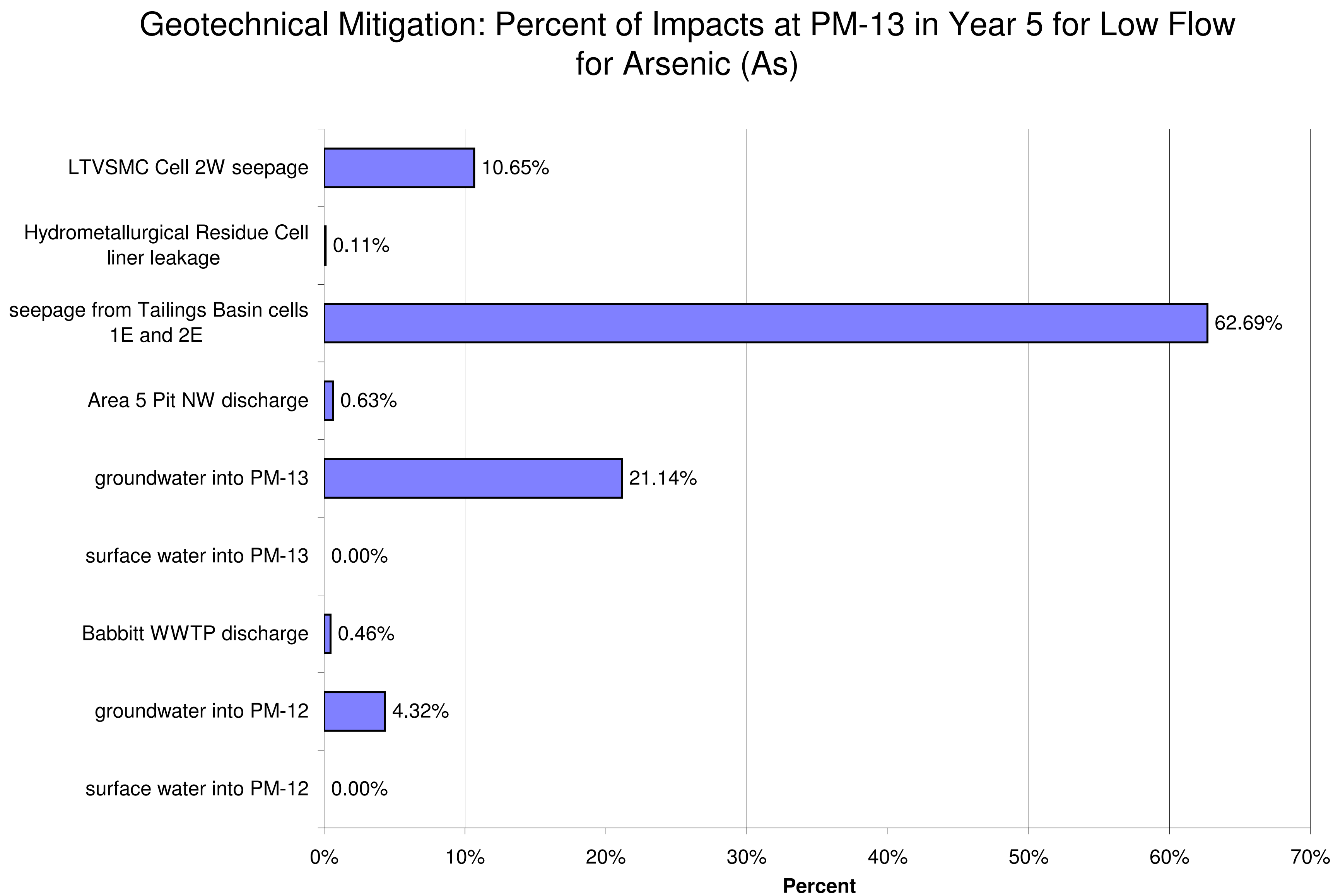


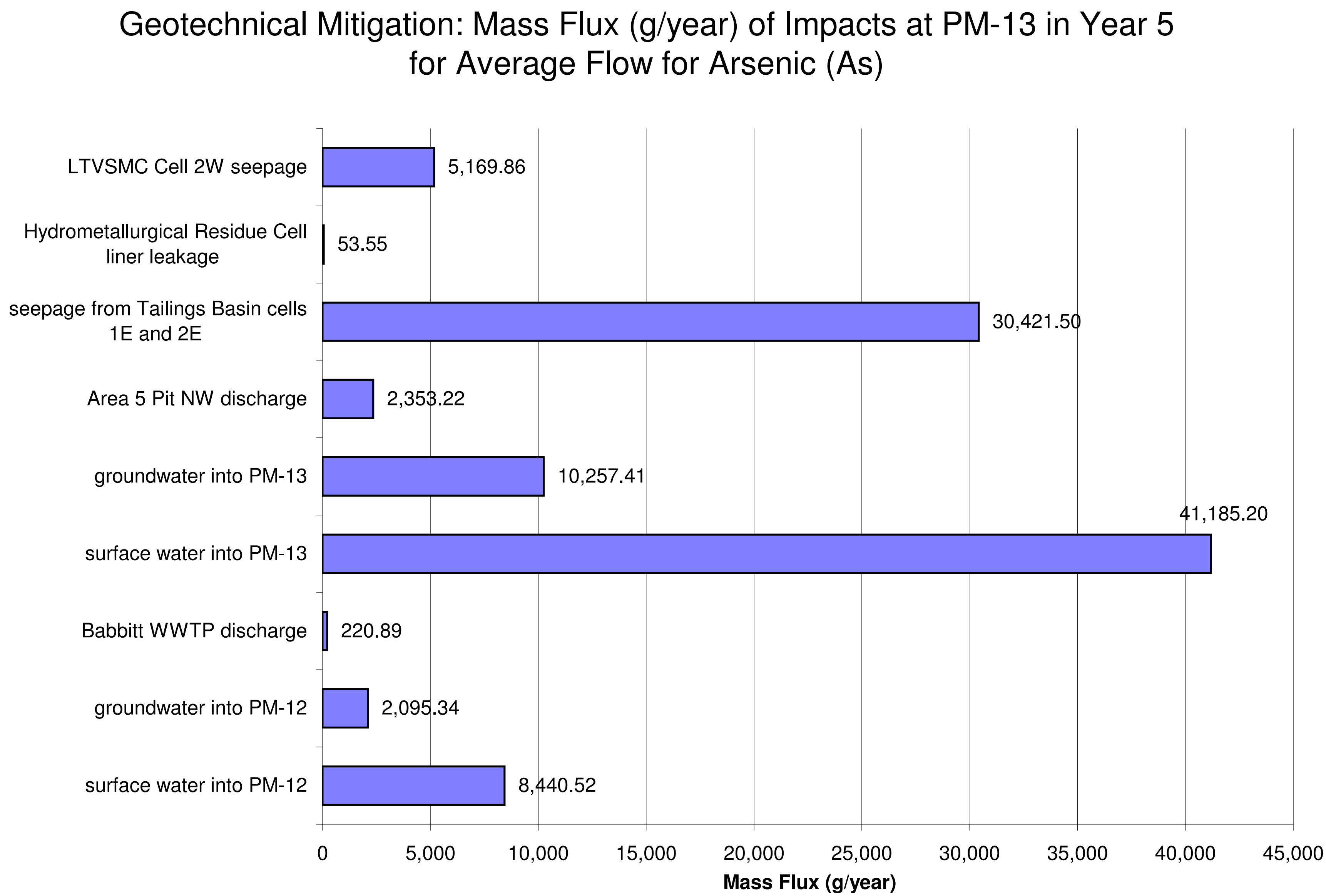

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,217.67
Hydrometallurgical Residue Cell liner leakage
6,841.85
seepage from Tailings Basin cells 1E and 2E
604,472.95
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
2,507,944.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
511,063.33
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
Mass Flux (kg/year)

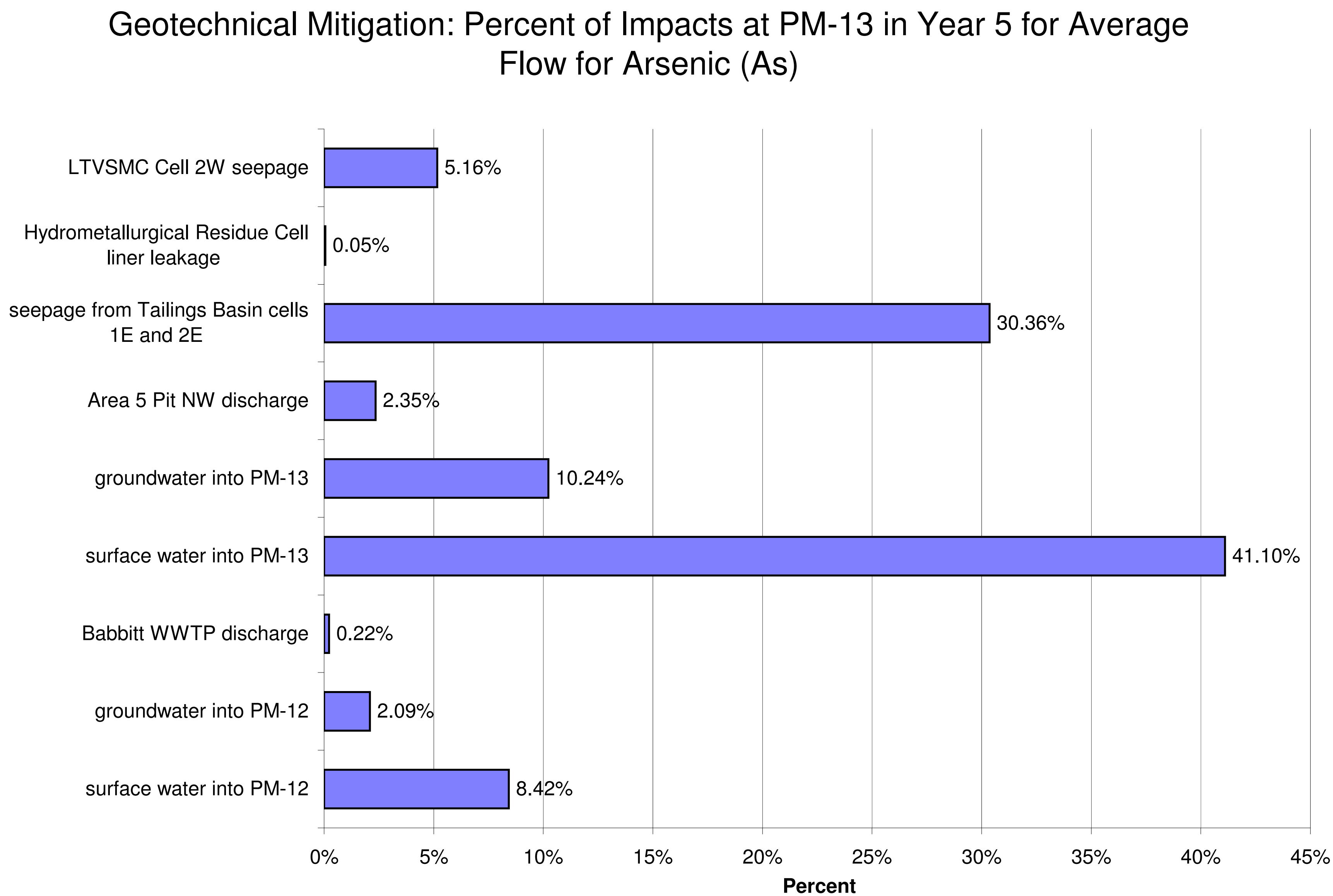
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)



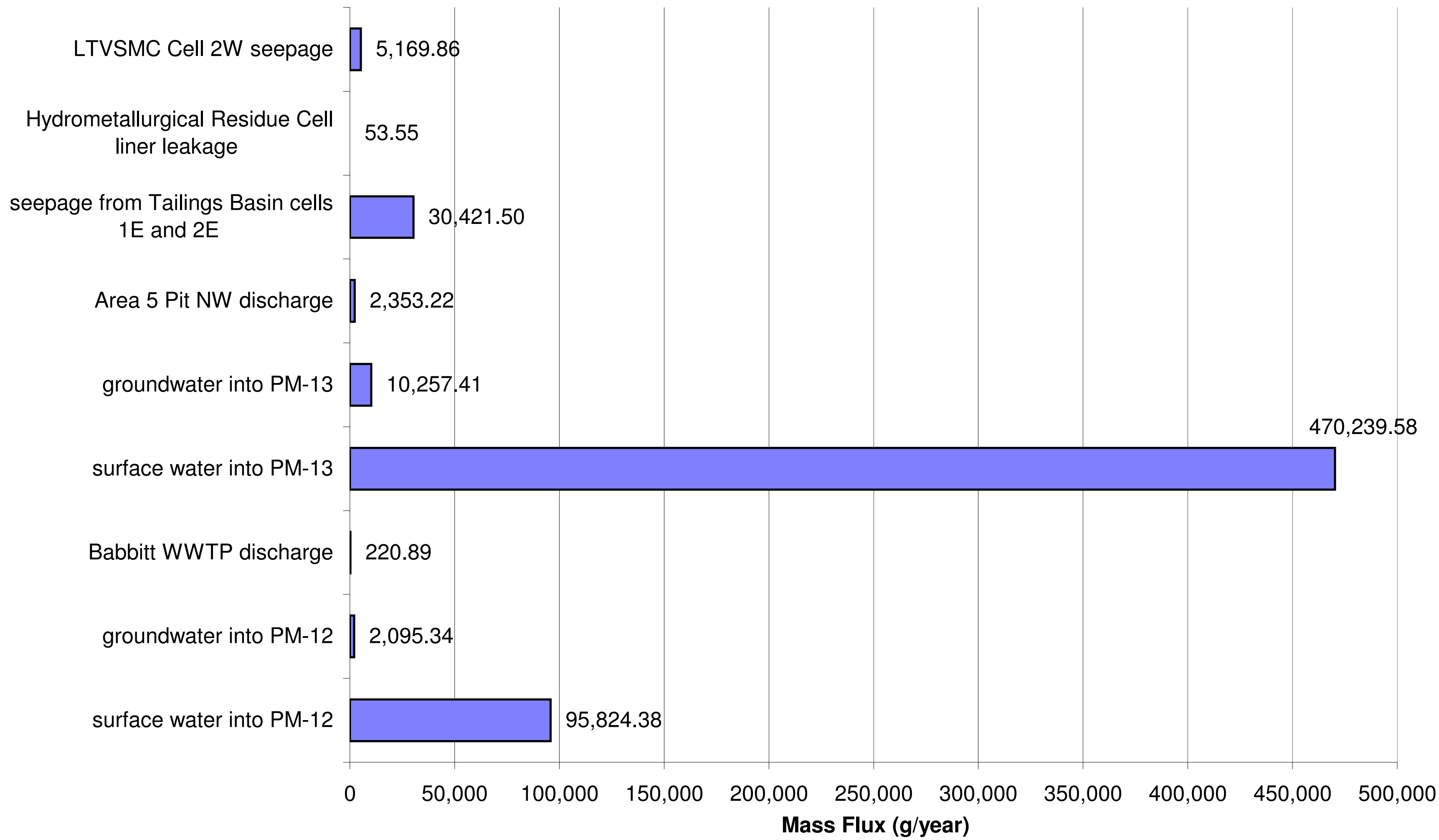

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
30,421.50
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
10.65%
Hydrometallurgical Residue Cell liner leakage
0.11%
seepage from Tailings Basin cells 1E and 2E
62.69%
Area 5 Pit NW discharge
0.63%
groundwater into PM-13
21.14%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.46%
groundwater into PM-12
4.32%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

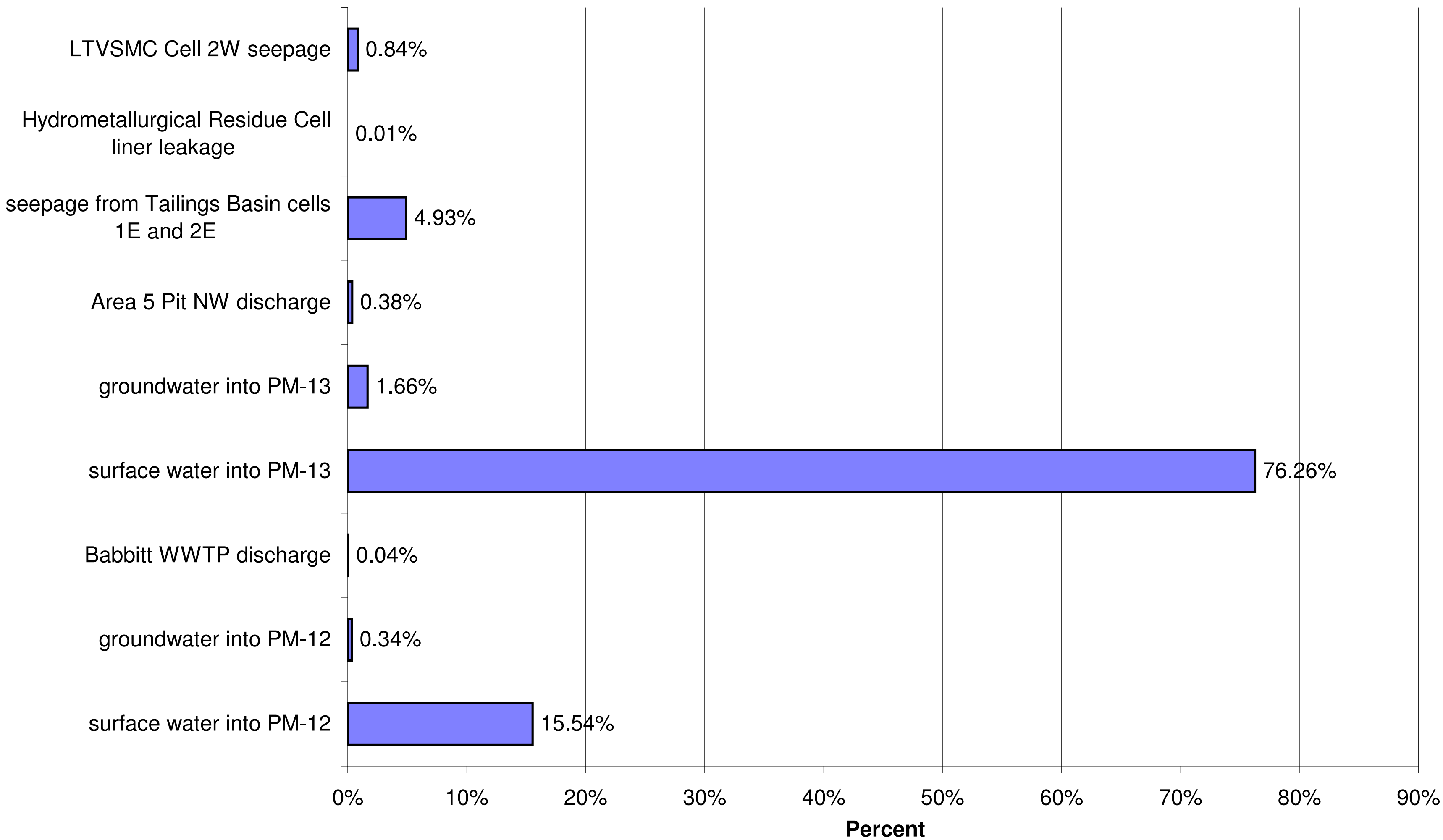

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
30,421.50
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

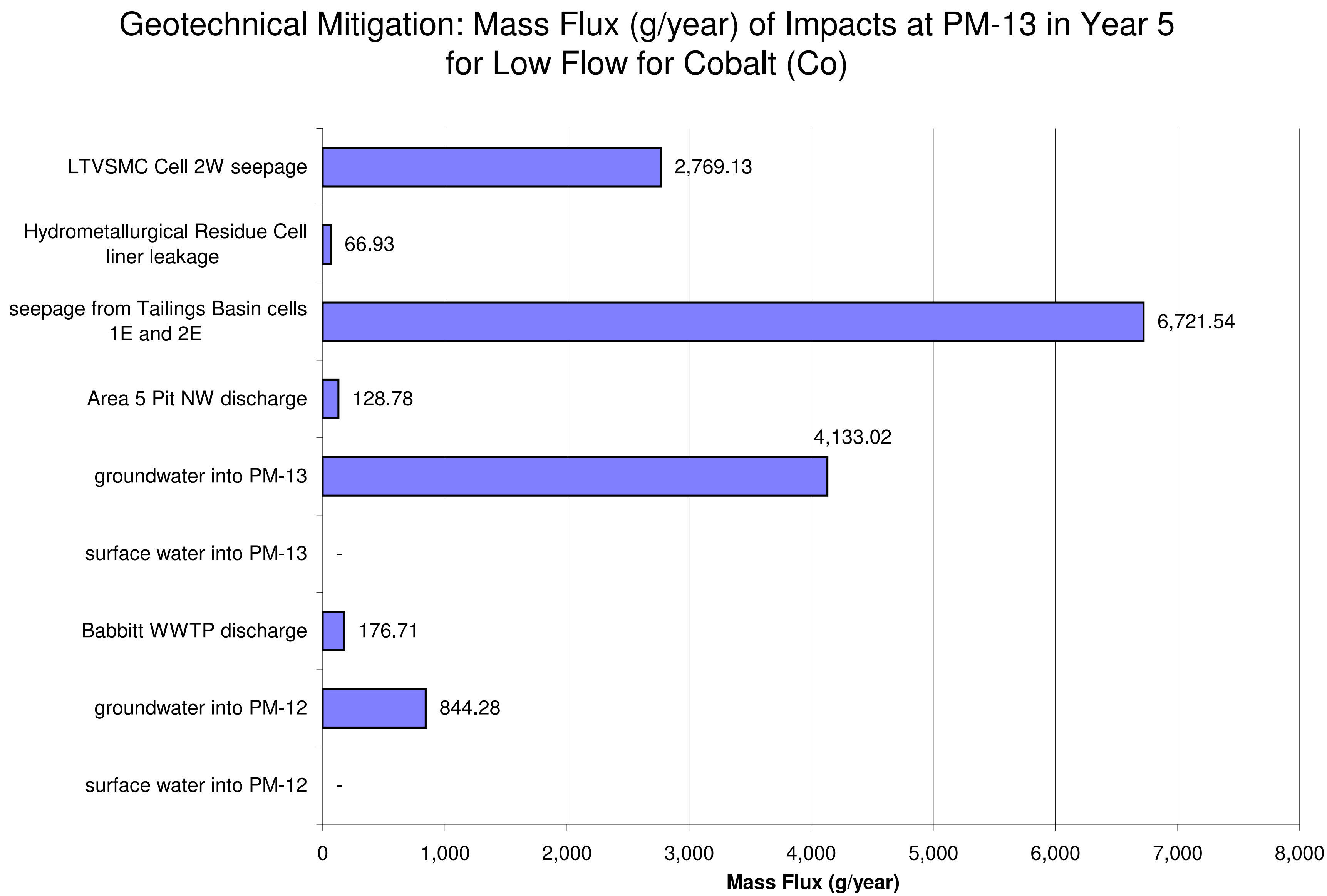

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5.16%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
30.36%
Area 5 Pit NW discharge
2.35%
groundwater into PM-13
10.24%
surface water into PM-13
41.10%
Babbitt WWTP discharge
0.22%
groundwater into PM-12
2.09%
surface water into PM-12
8.42%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)

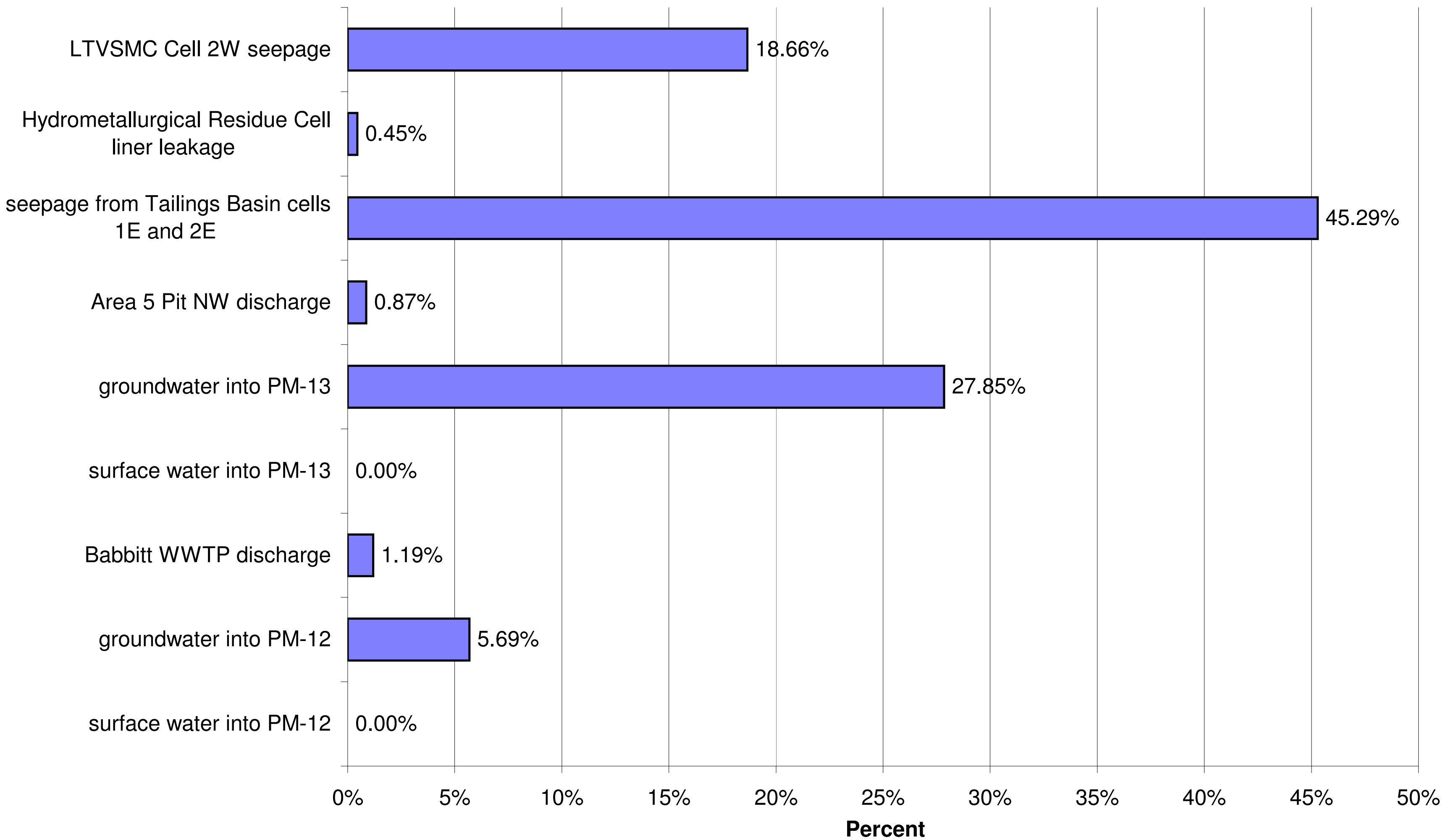


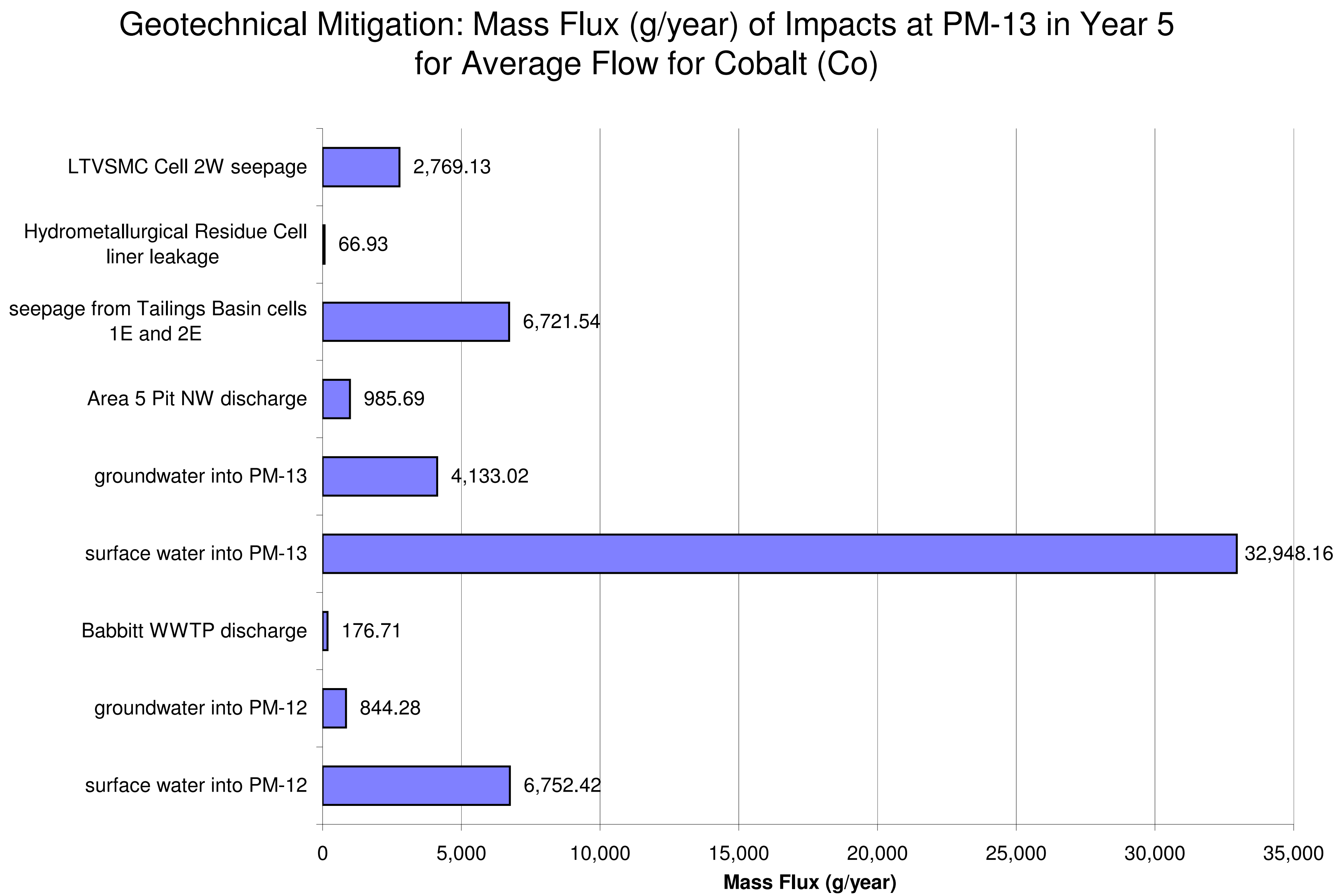
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)

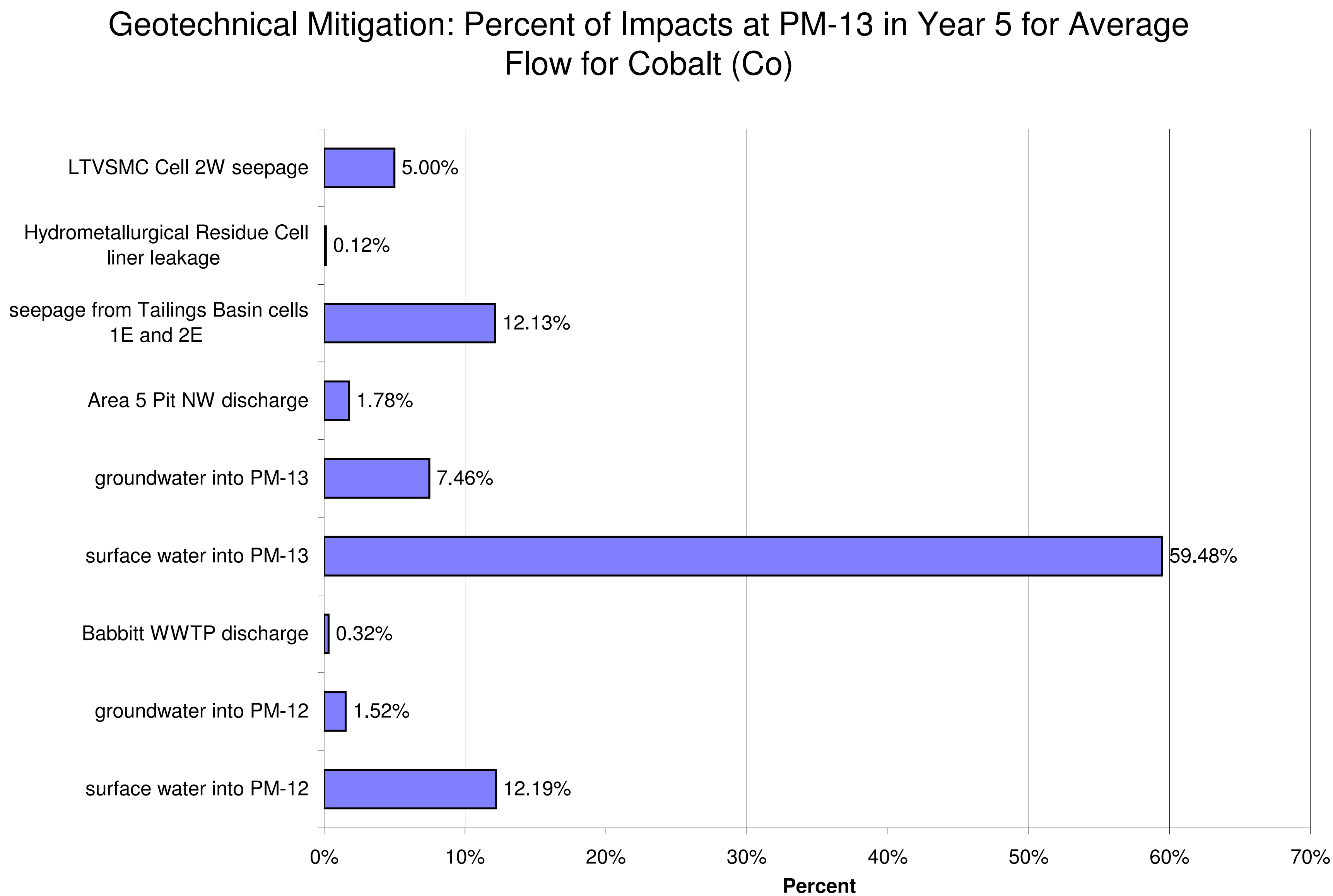


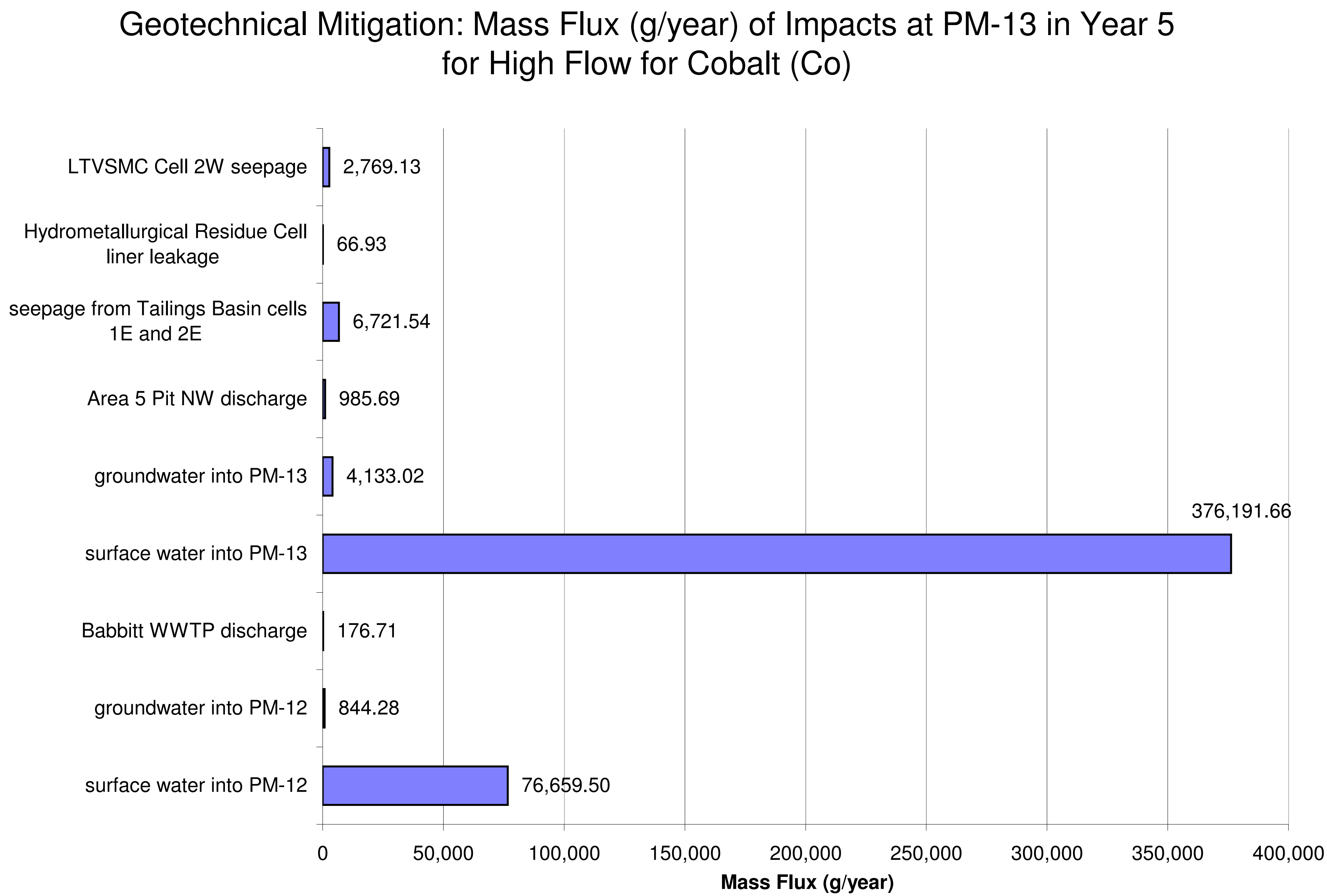

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
6,721.54
Area 5 Pit NW discharge
128.78
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
-
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Mass Flux (g/year)

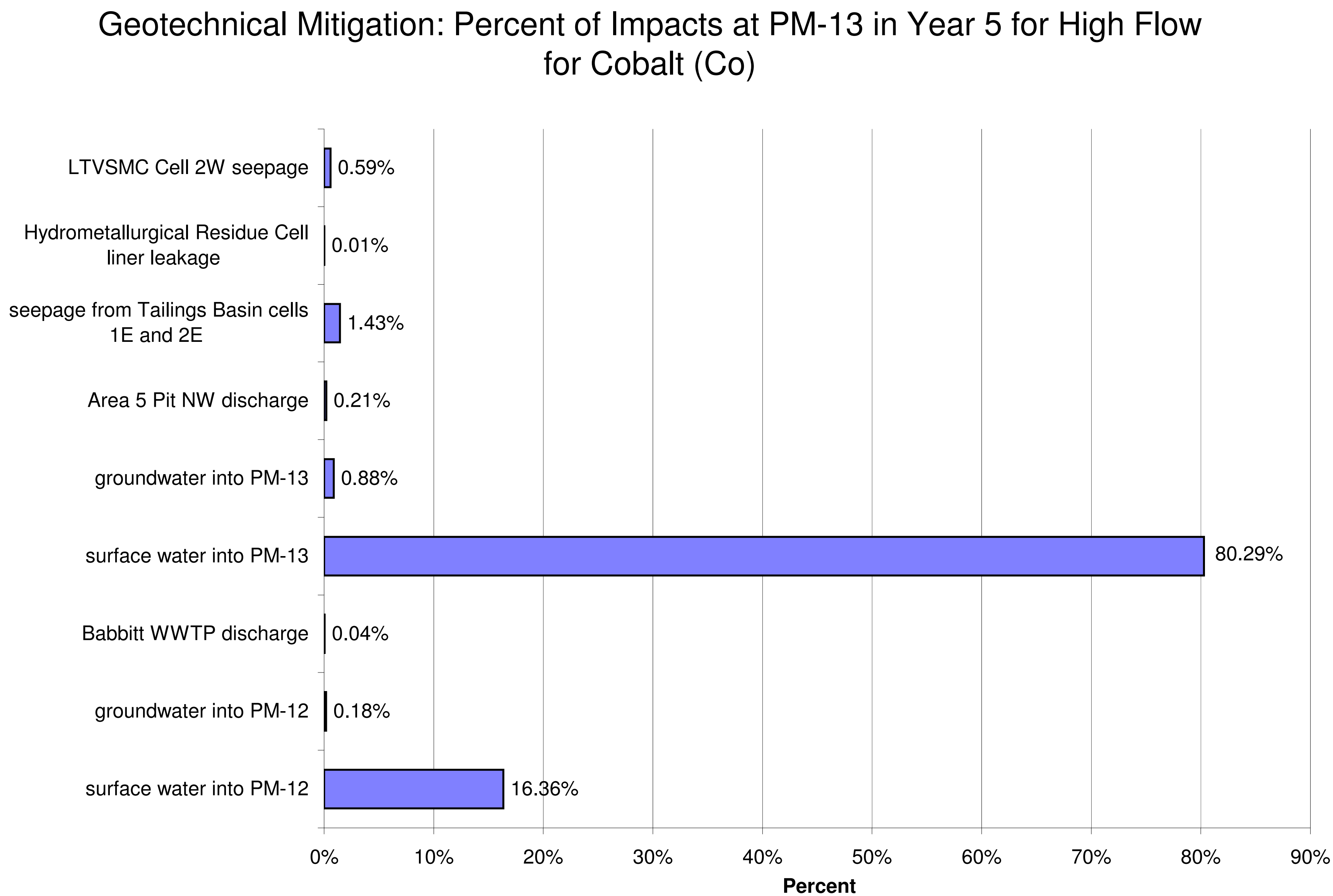
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)



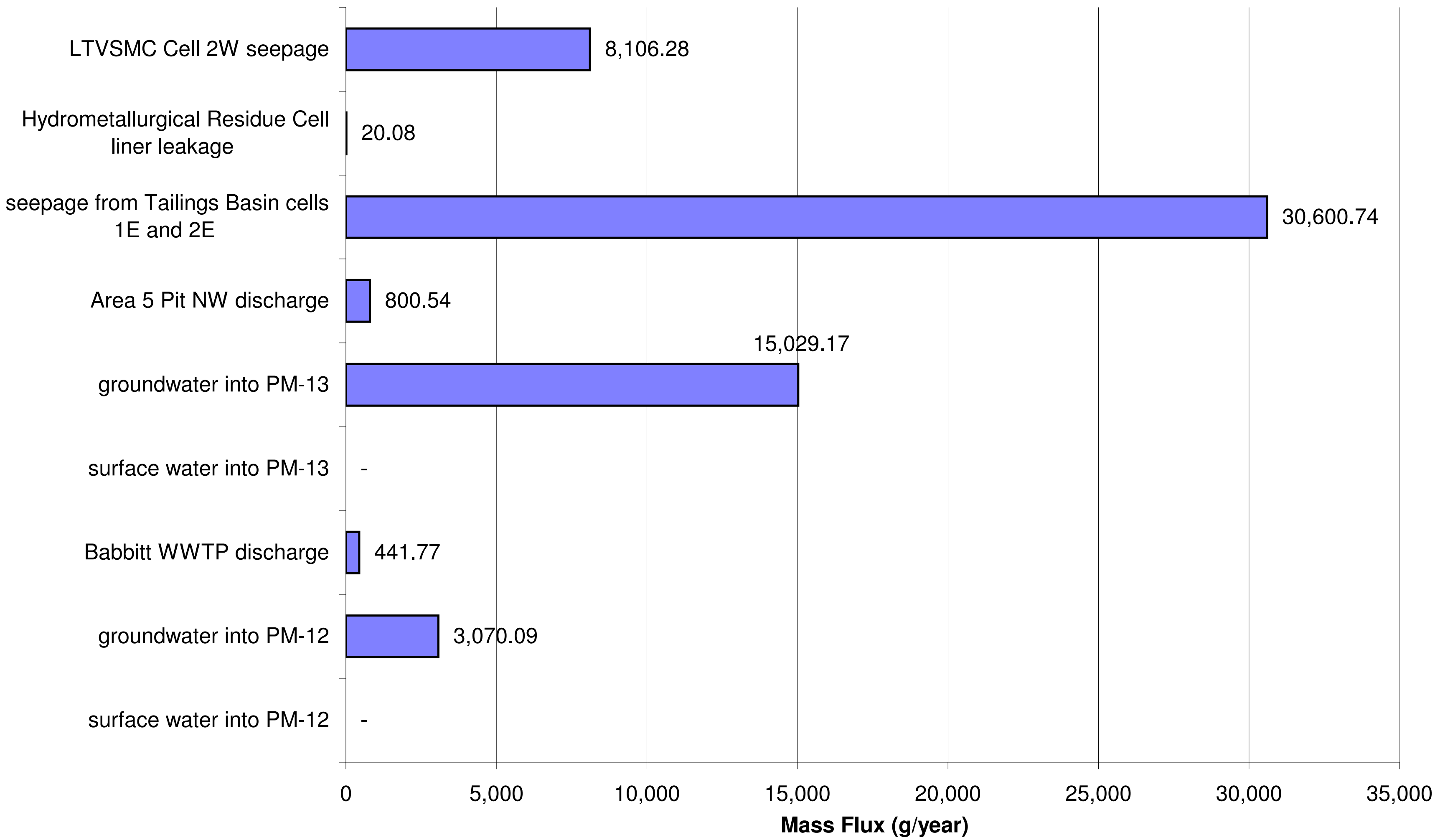

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
6,721.54
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

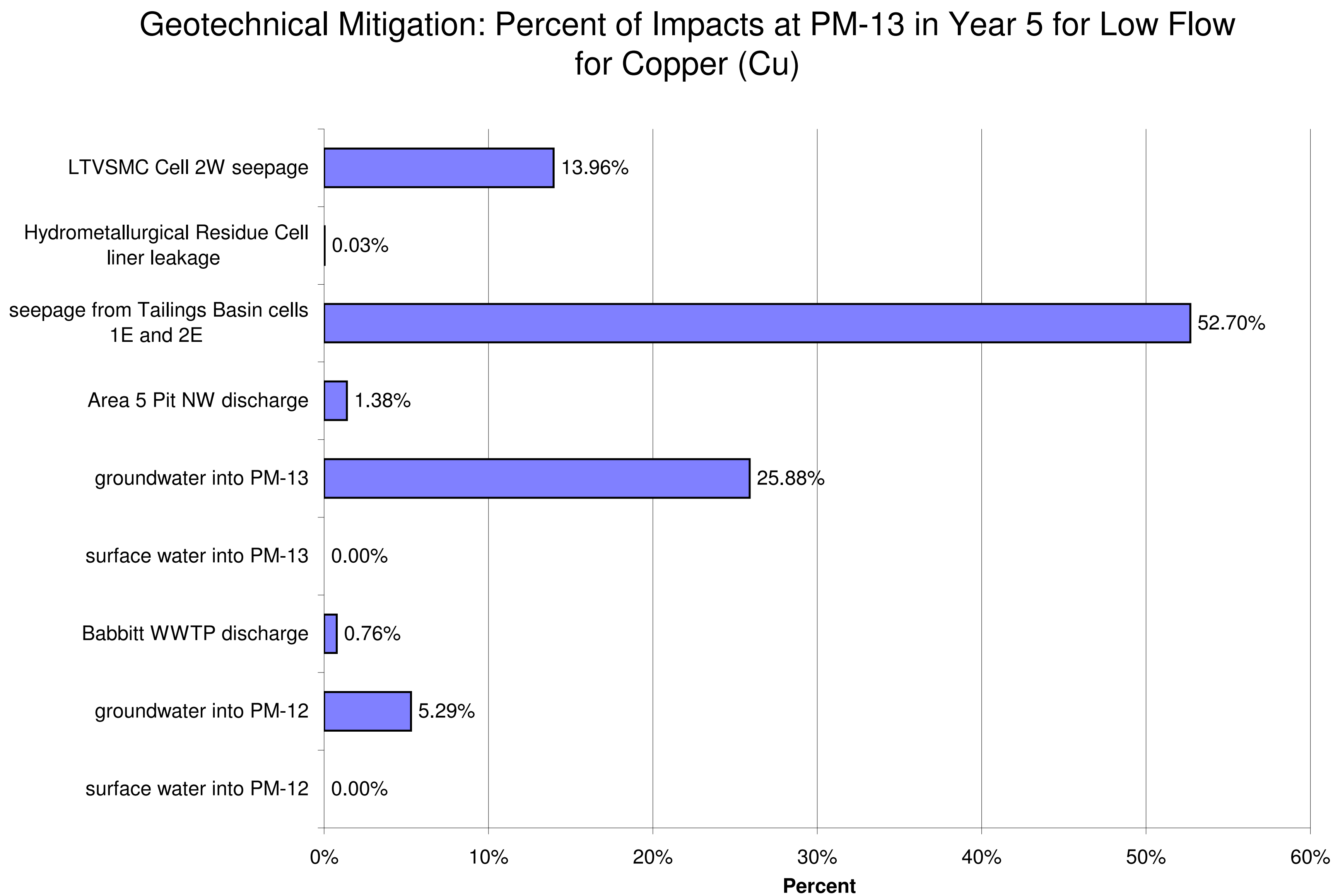

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
5.00%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
12.13%
Area 5 Pit NW discharge
1.78%
groundwater into PM-13
7.46%
surface water into PM-13
59.48%
Babbitt WWTP discharge
0.32%
groundwater into PM-12
1.52%
surface water into PM-12
12.19%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
6,721.54
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

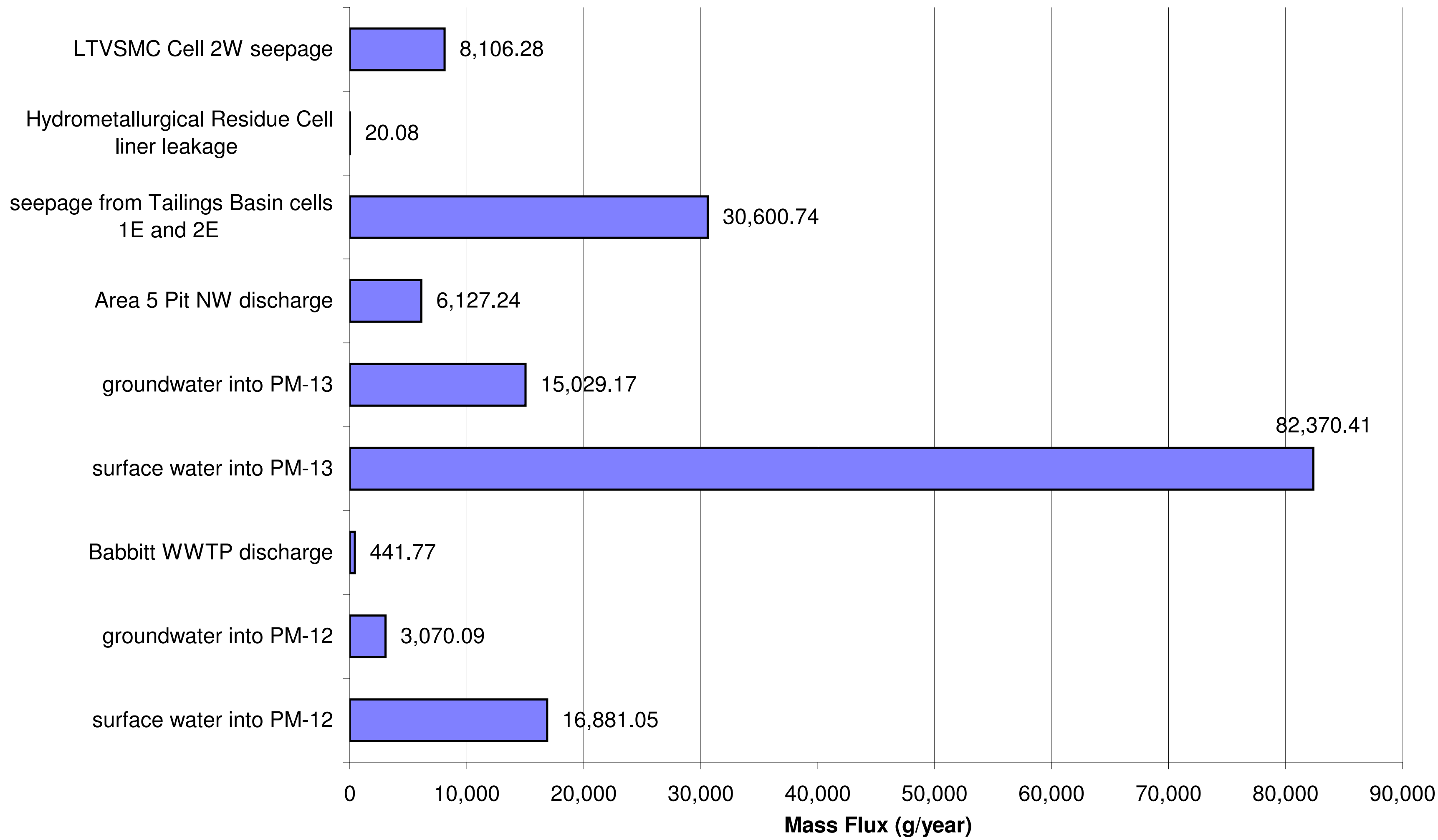

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.59%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
1.43%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.88%
surface water into PM-13
80.29%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.36%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)

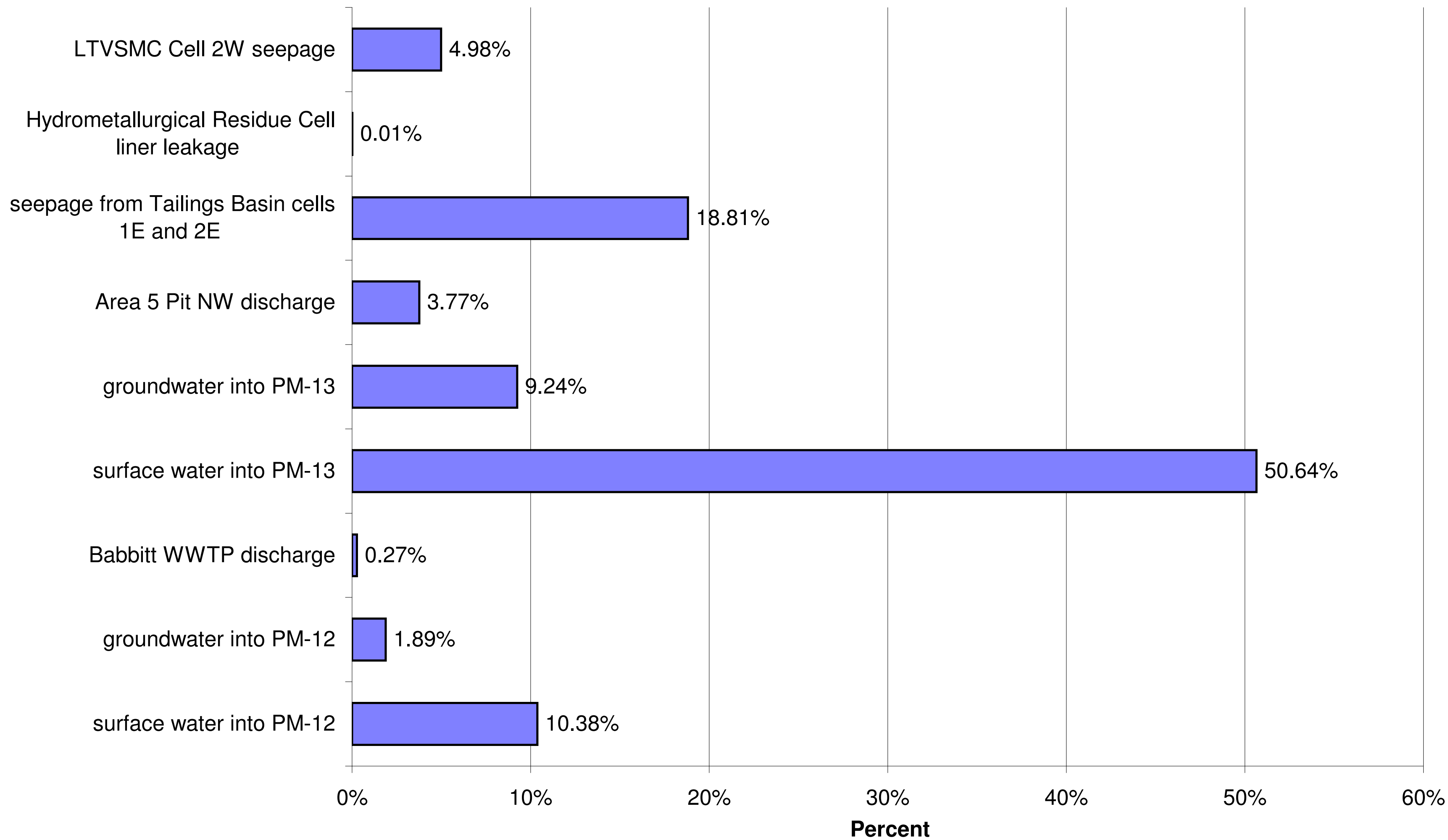


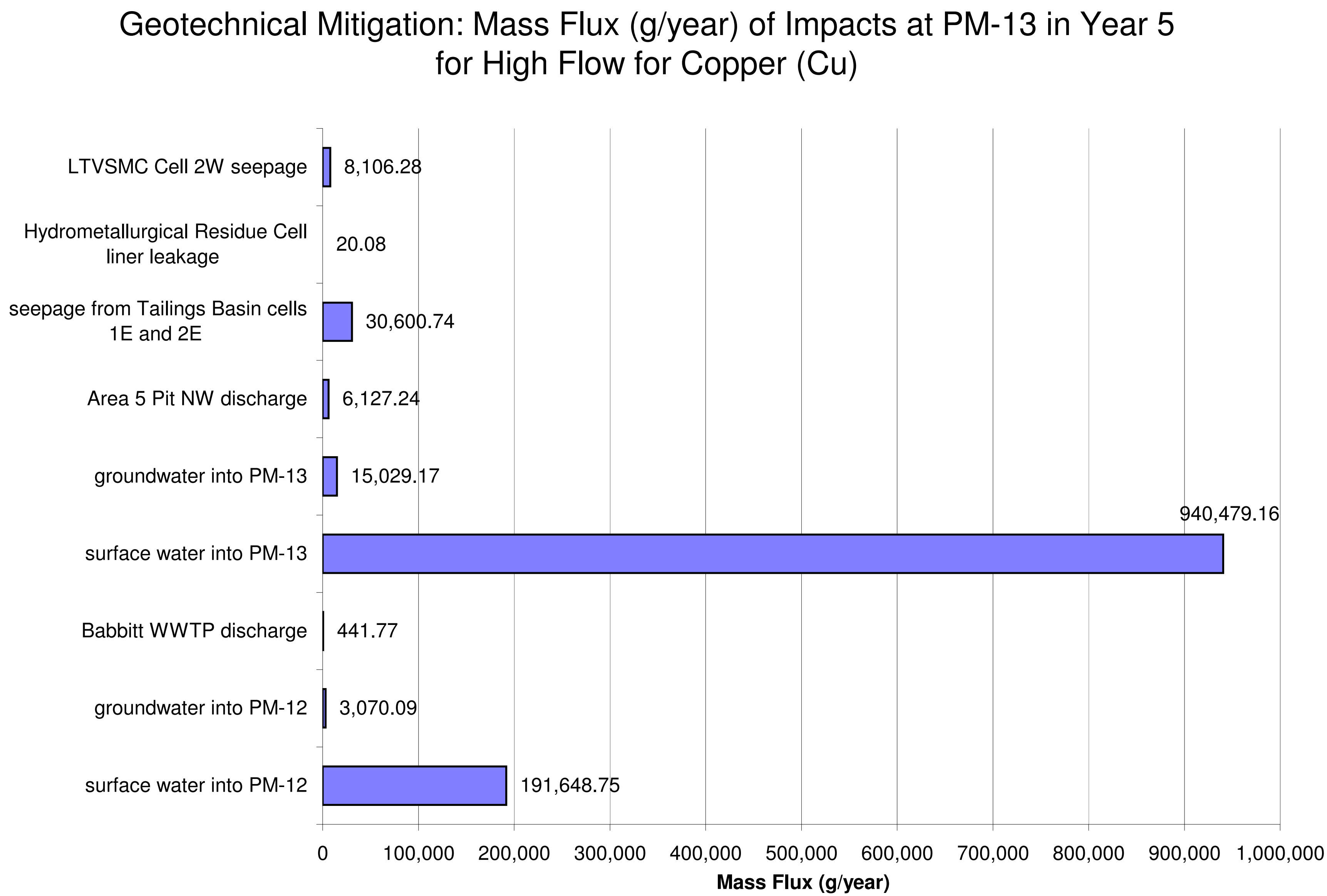

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
13.96%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
52.70%
Area 5 Pit NW discharge
1.38%
groundwater into PM-13
25.88%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.76%
groundwater into PM-12
5.29%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

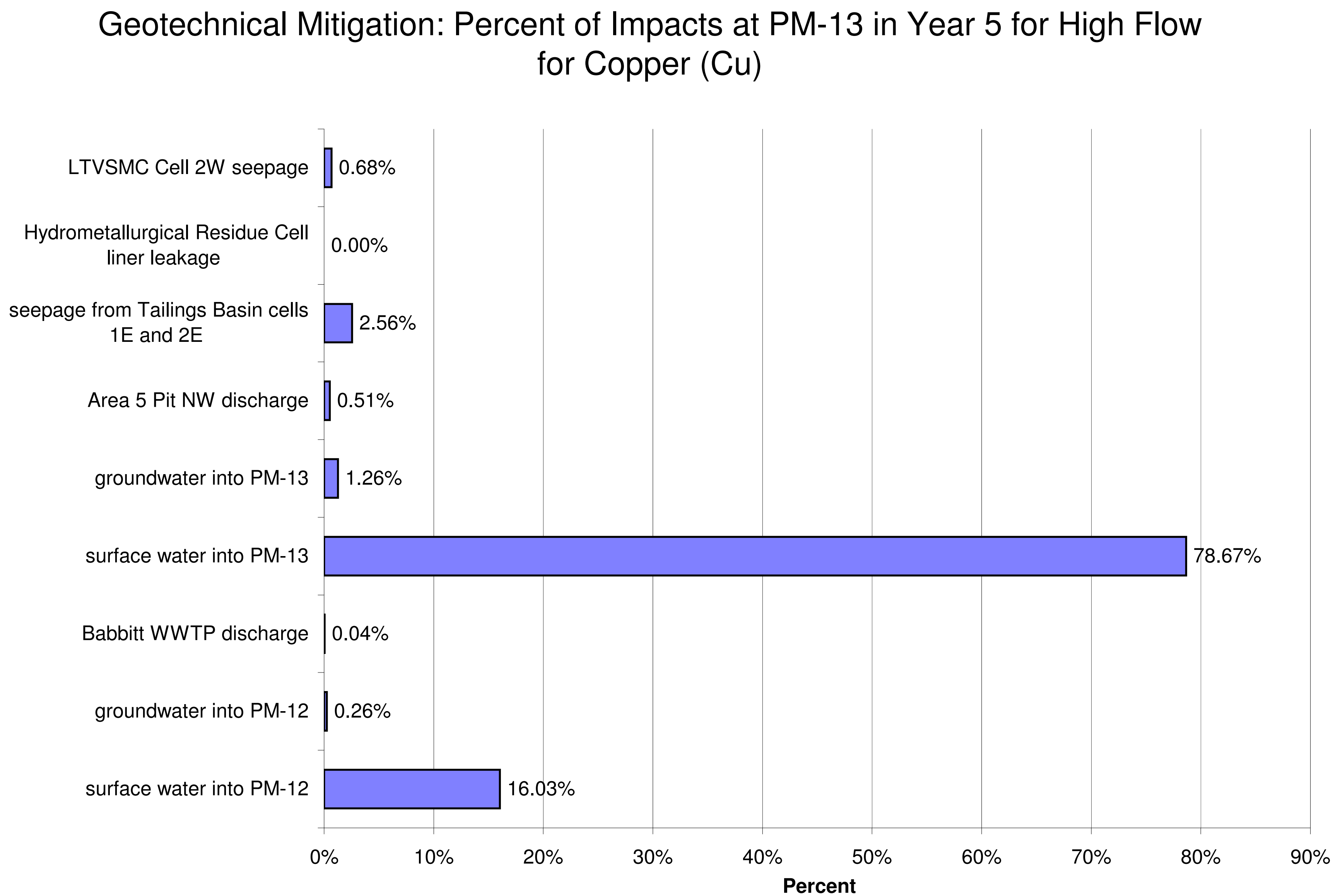
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Copper (Cu)



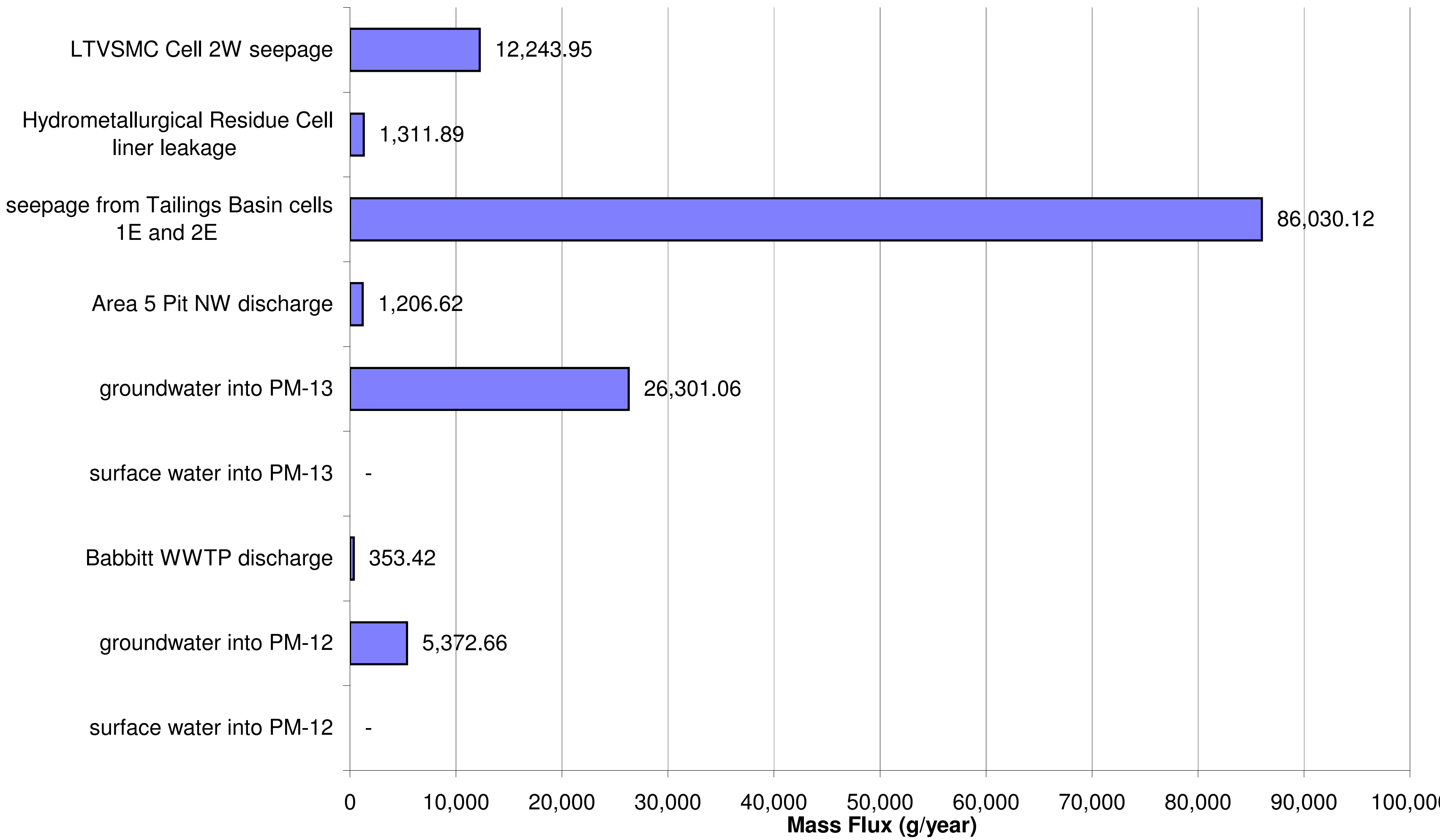
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Copper (Cu)

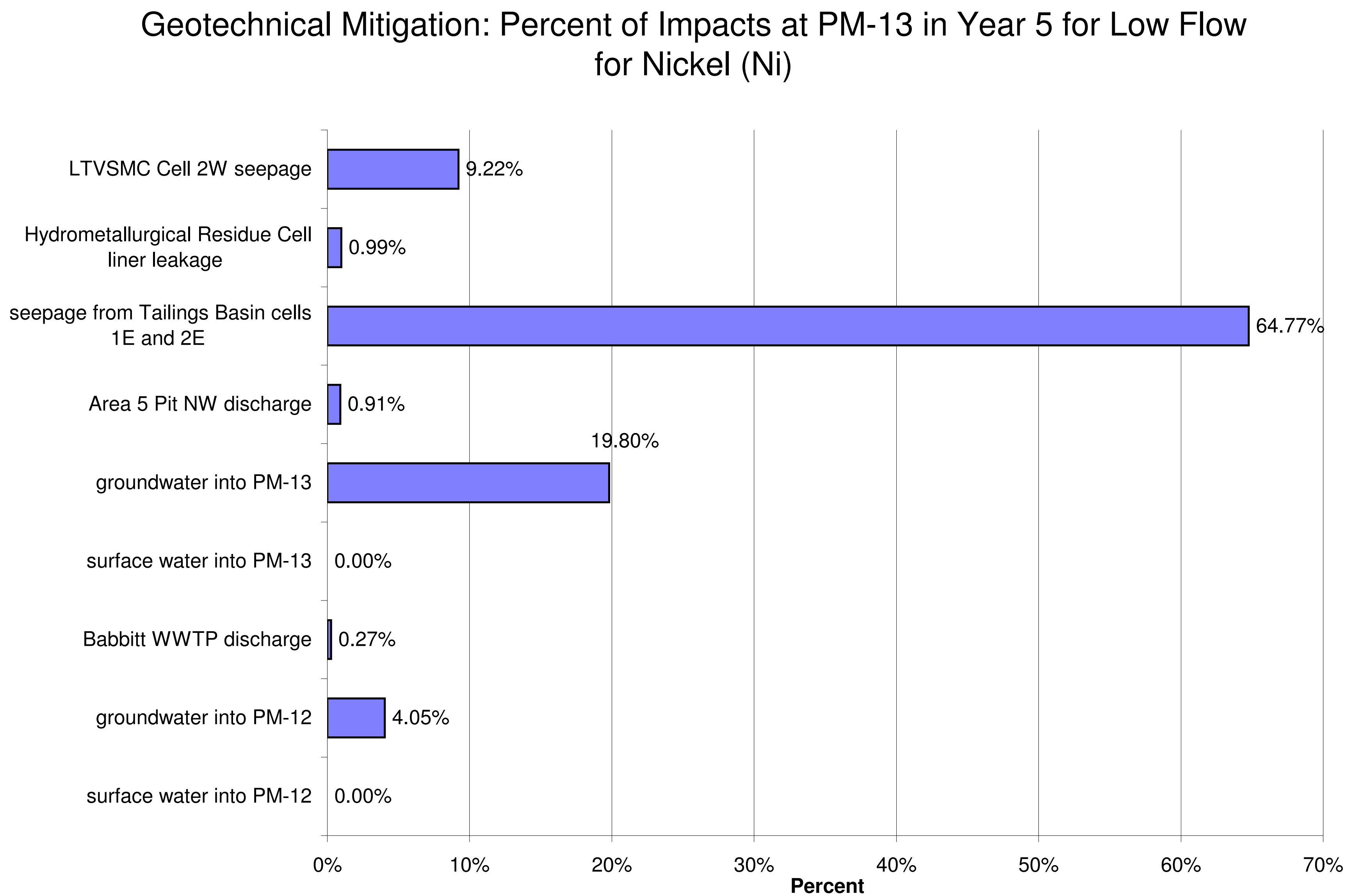



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
20.08
seepage from Tailings Basin cells 1E and 2E
30,600.74
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

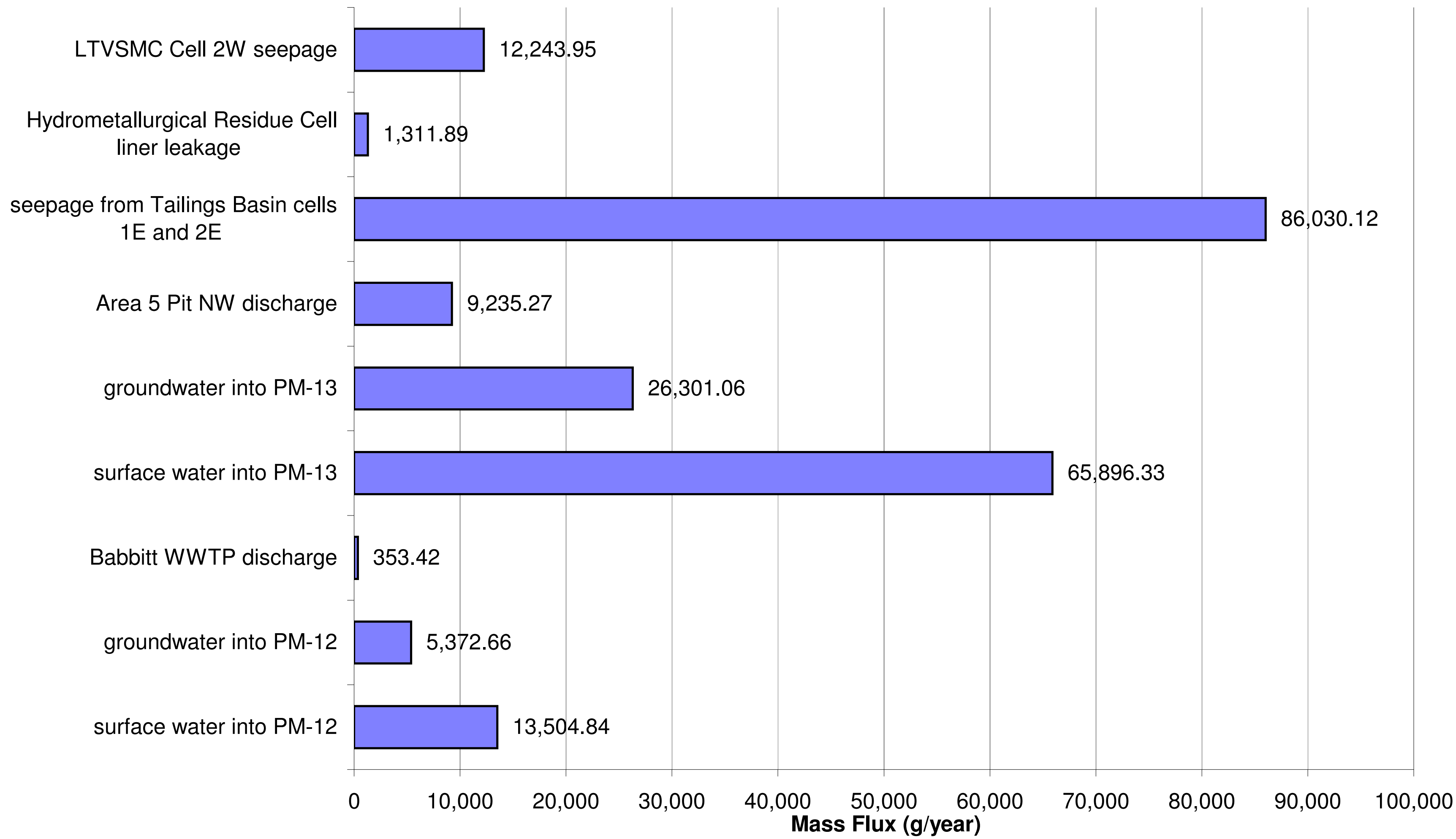

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.68%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
2.56%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.26%
surface water into PM-13
78.67%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
16.03%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

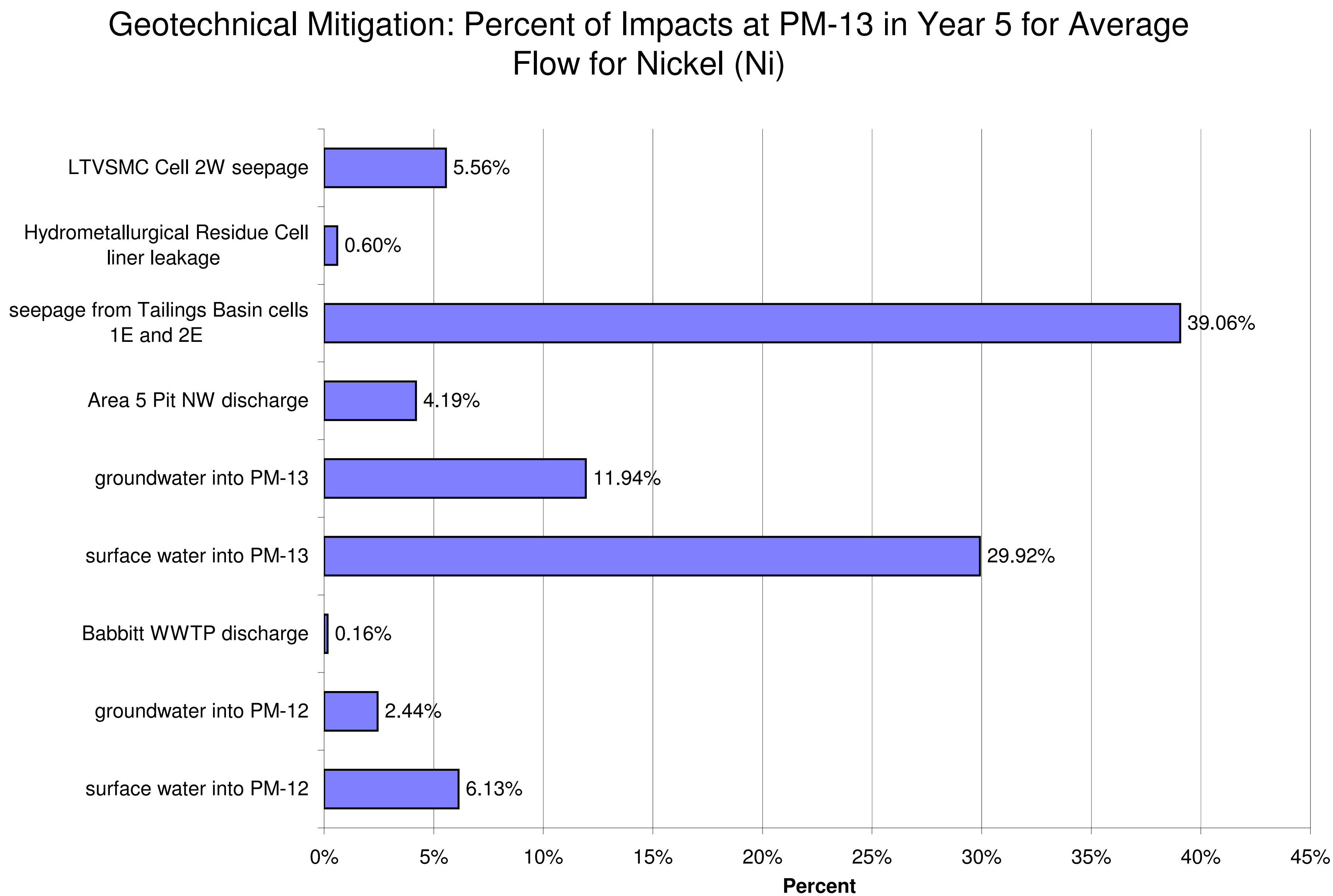
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)

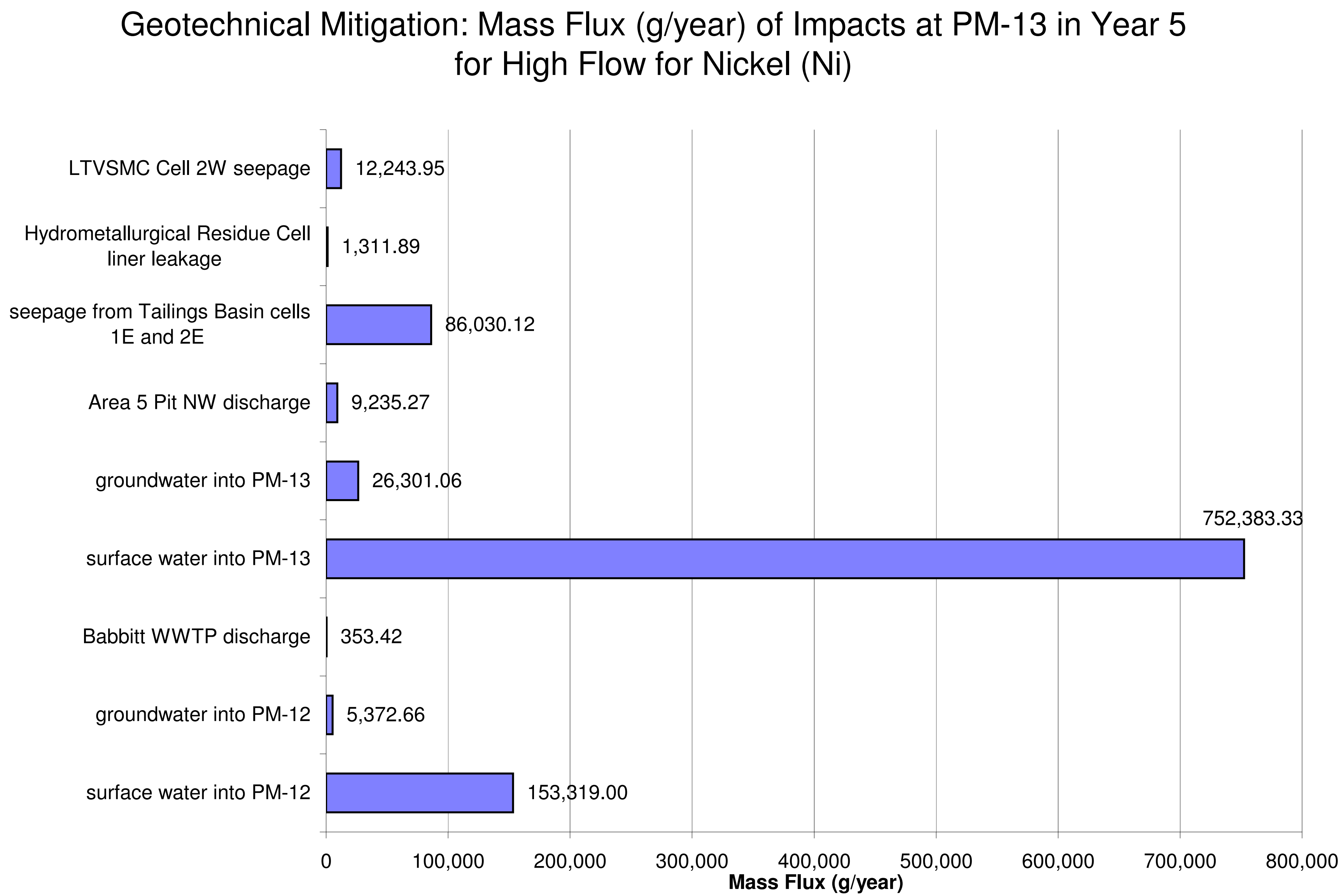



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
9.22%
Hydrometallurgical Residue Cell liner leakage
0.99%
seepage from Tailings Basin cells 1E and 2E
64.77%
Area 5 Pit NW discharge
0.91%
groundwater into PM-13
19.80%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.27%
groundwater into PM-12
4.05%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)

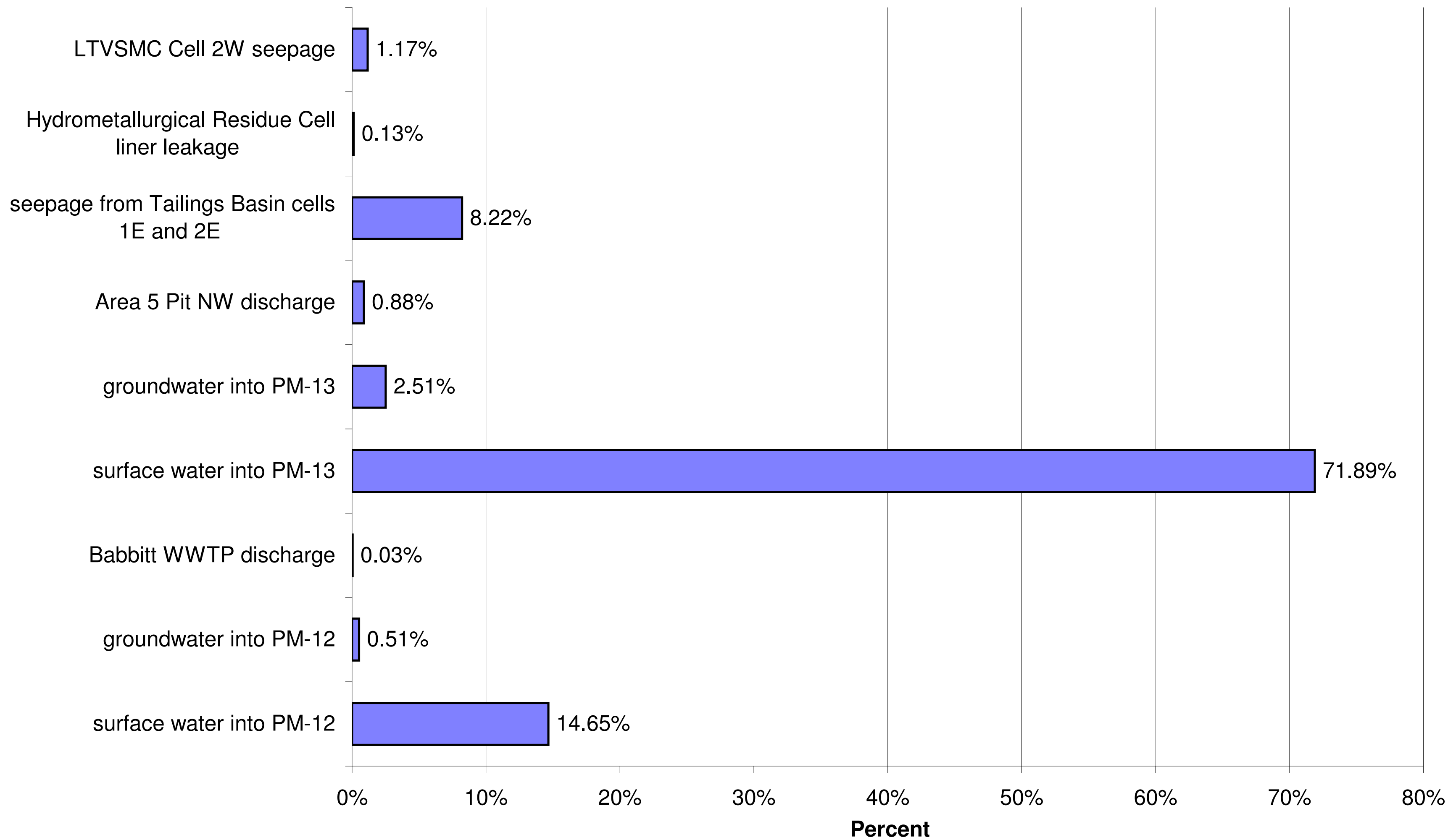


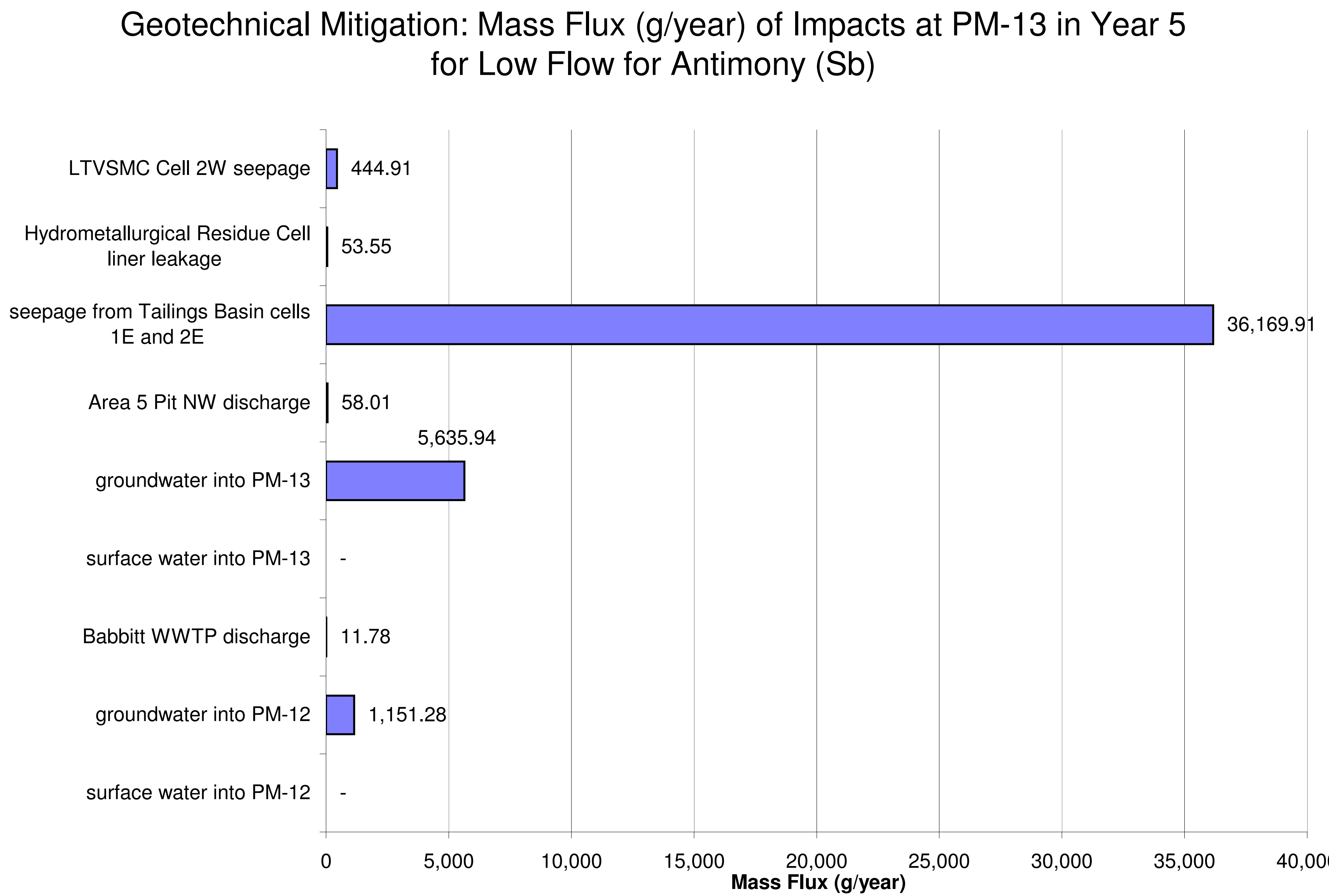

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5.56%
Hydrometallurgical Residue Cell liner leakage
0.60%
seepage from Tailings Basin cells 1E and 2E
39.06%
Area 5 Pit NW discharge
4.19%
groundwater into PM-13
11.94%
surface water into PM-13
29.92%
Babbitt WWTP discharge
0.16%
groundwater into PM-12
2.44%
surface water into PM-12
6.13%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,311.89
seepage from Tailings Basin cells 1E and 2E
86,030.12
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

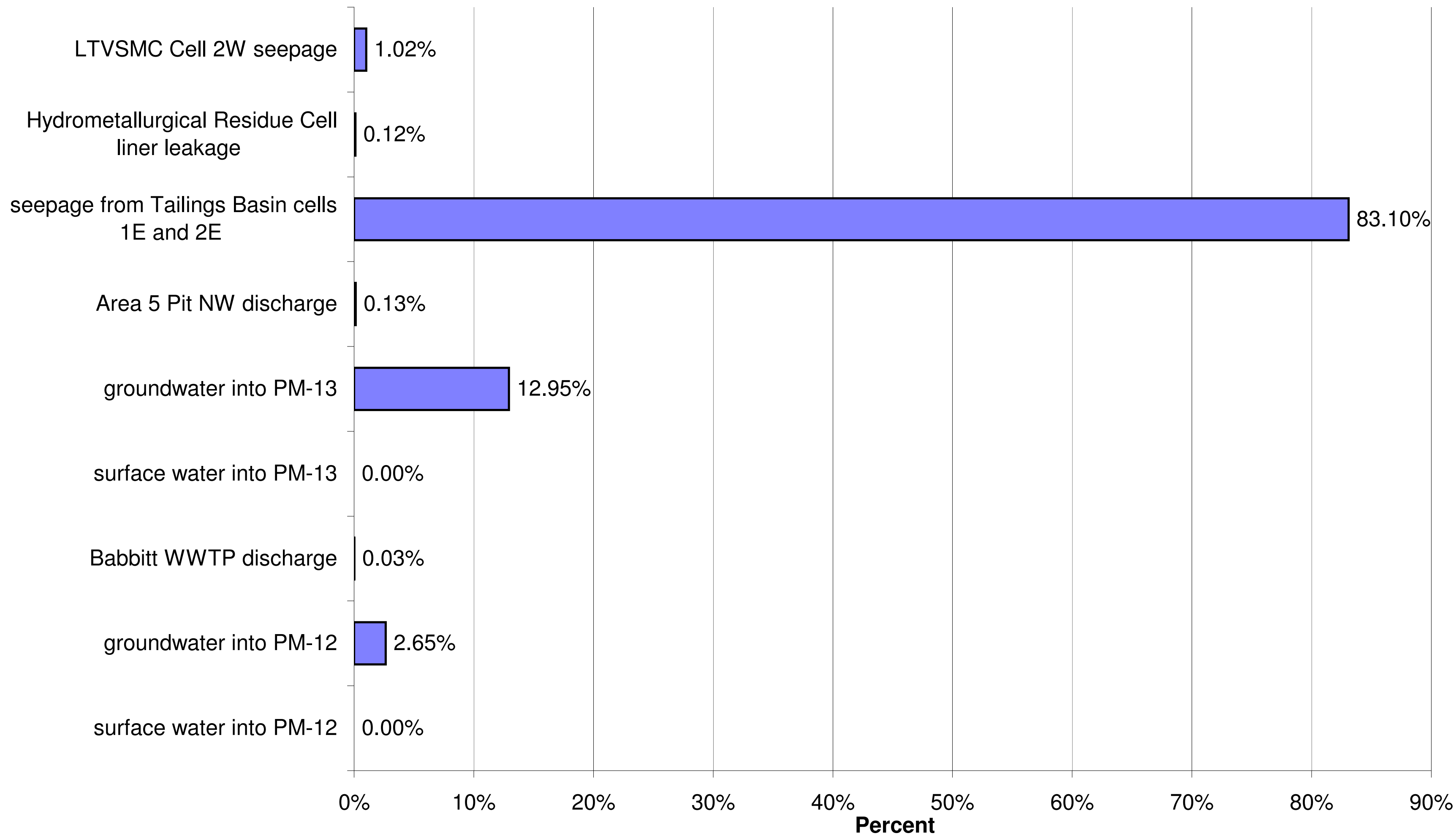
P:\Mpls\23 MN\69\2369862_MovedFromMpls_P\WO 015 EIS Rpts Studies\RS74 Water Quality Modeling\Model Predictions\Embarrass_v6_Mitigation\Sensitivity_Year5_TB_Mitigation_v6.xls
Ni, PM-13, high, percent

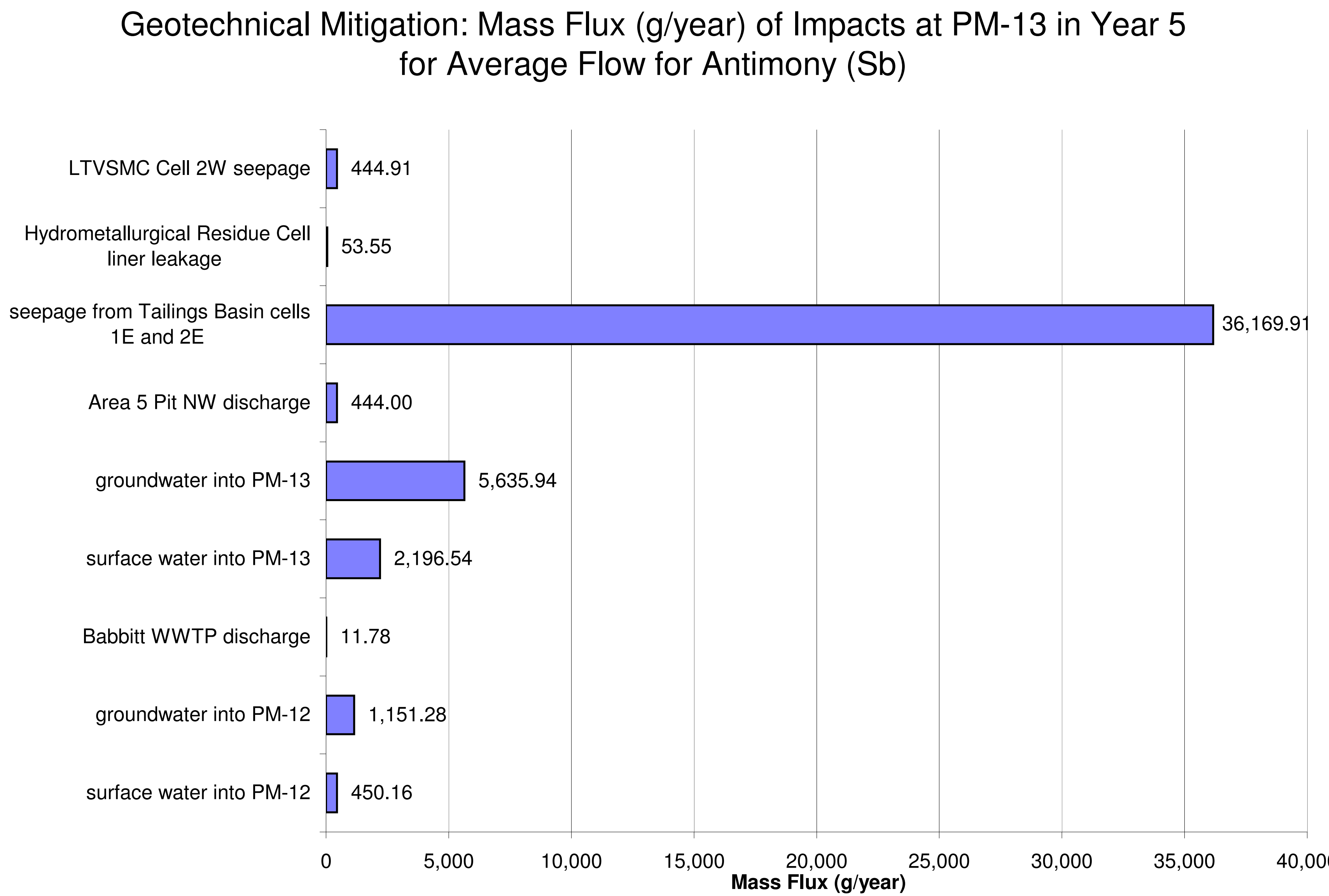
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)

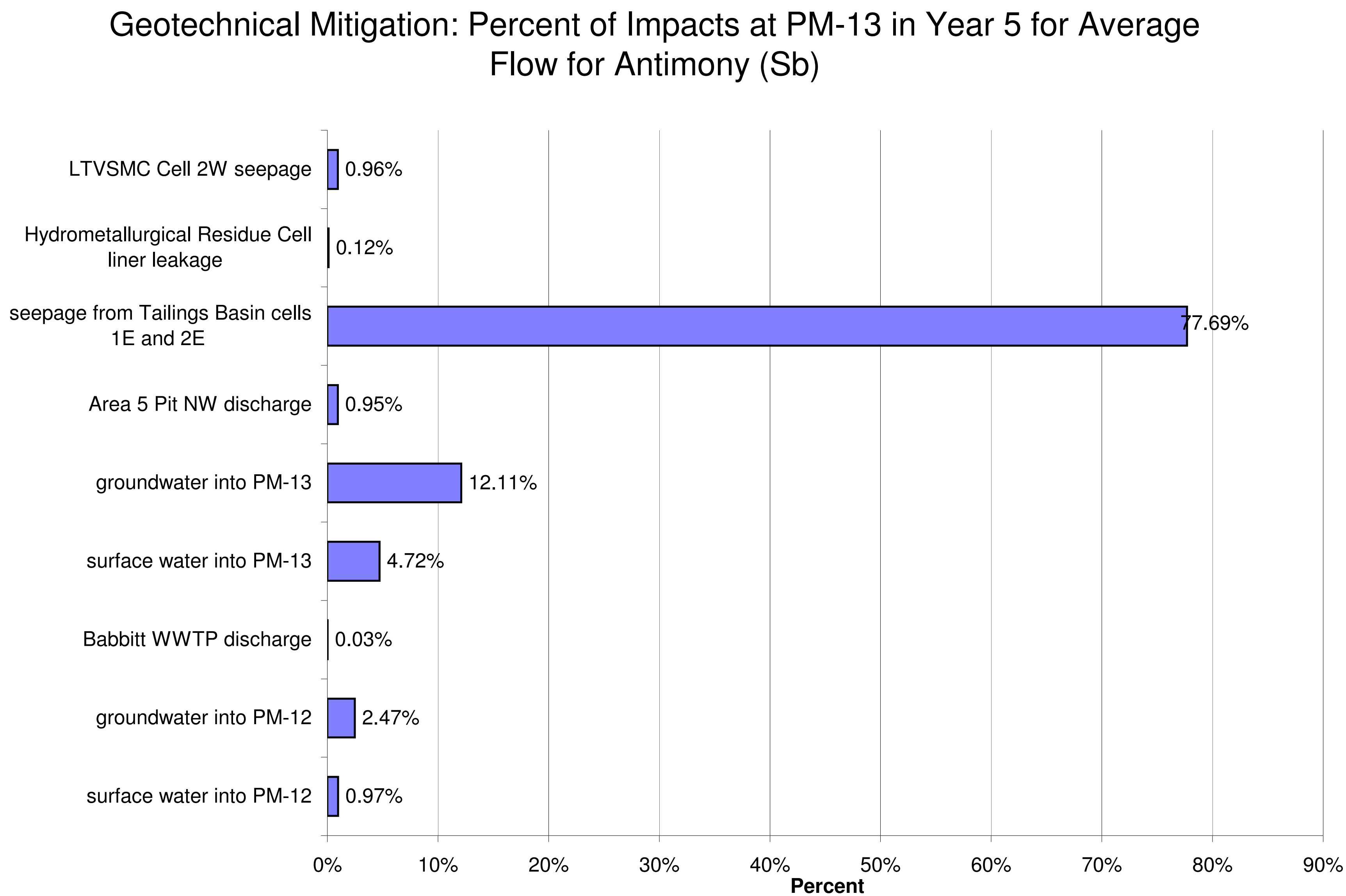


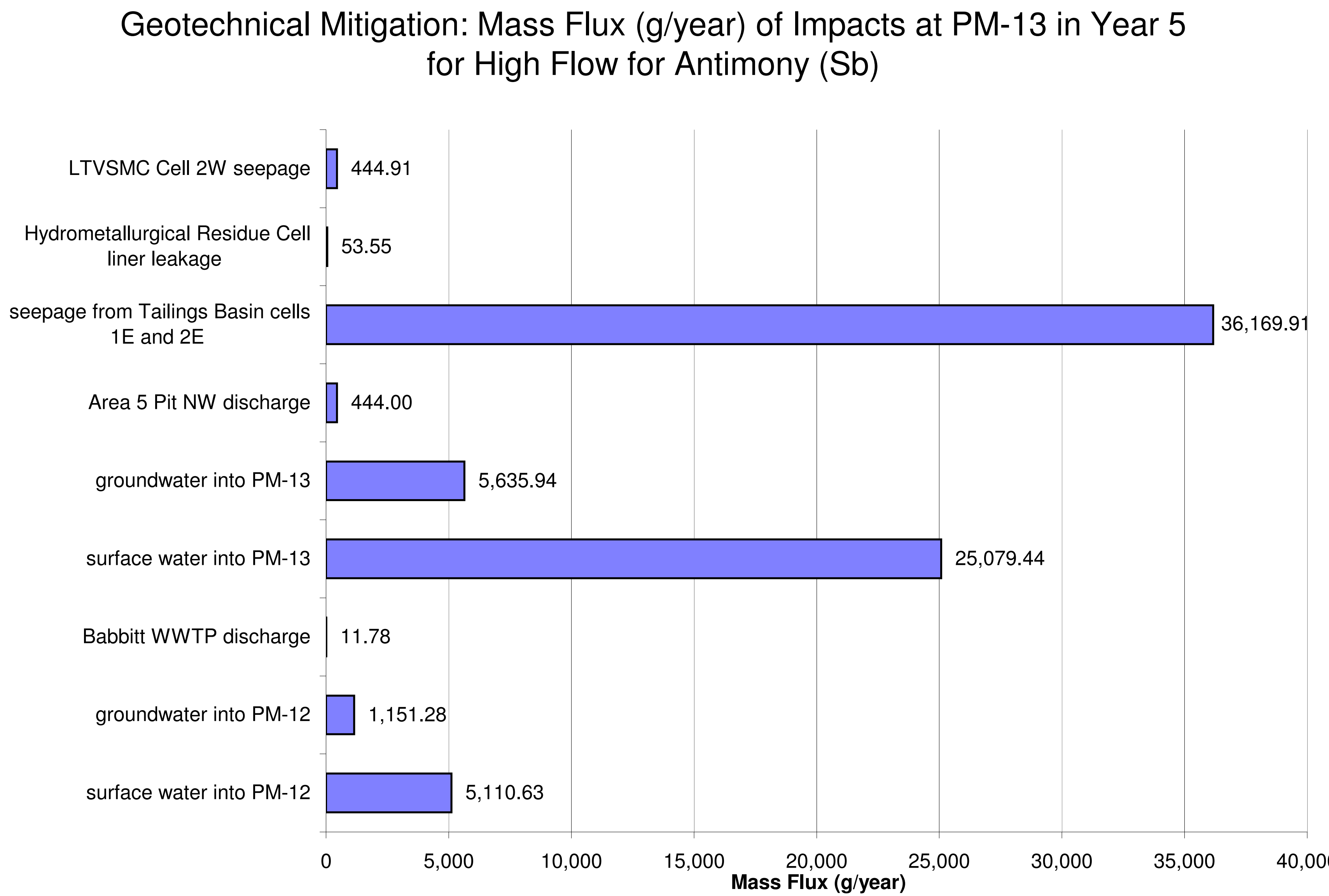

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
36,169.91
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

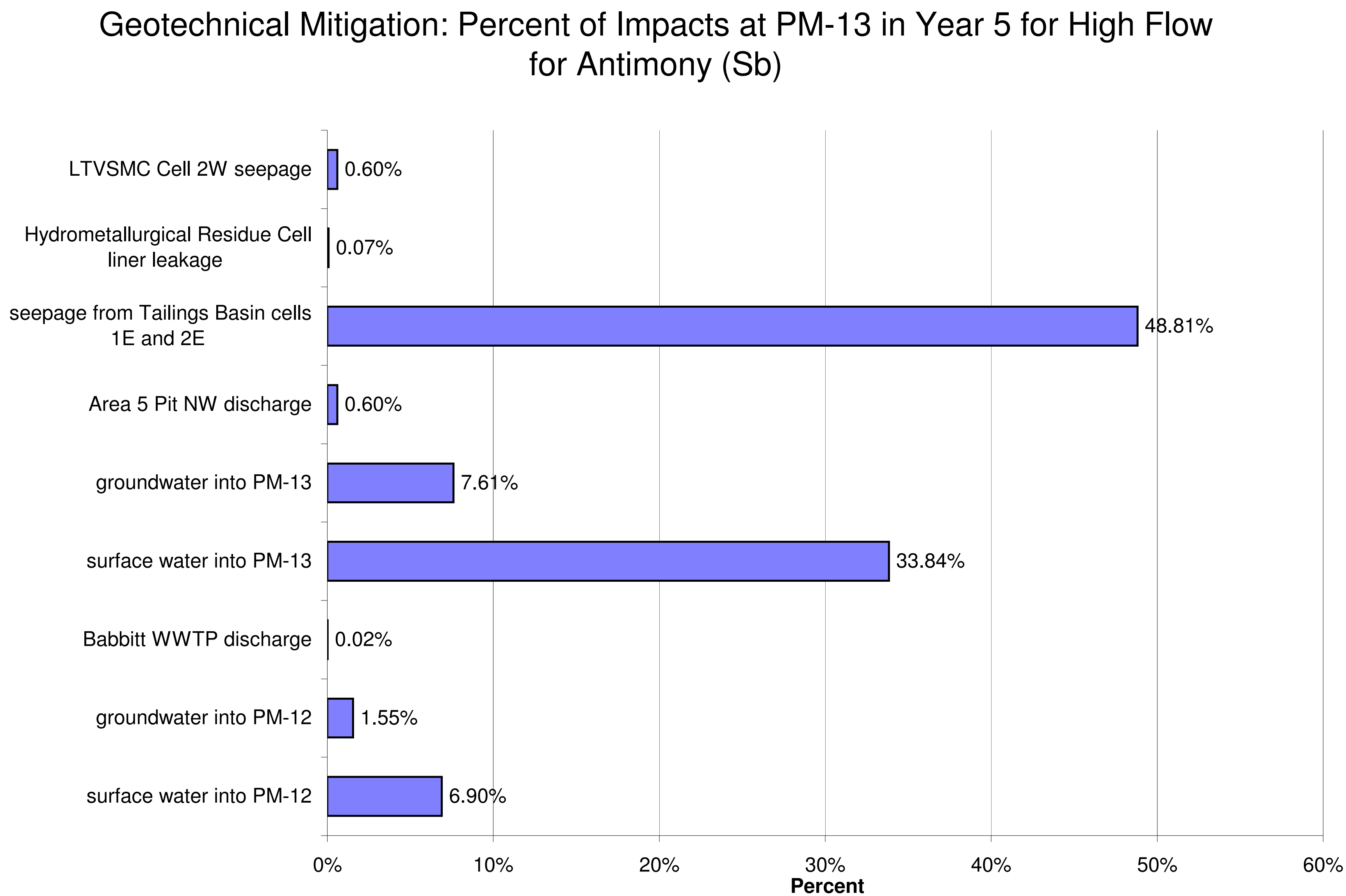
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)

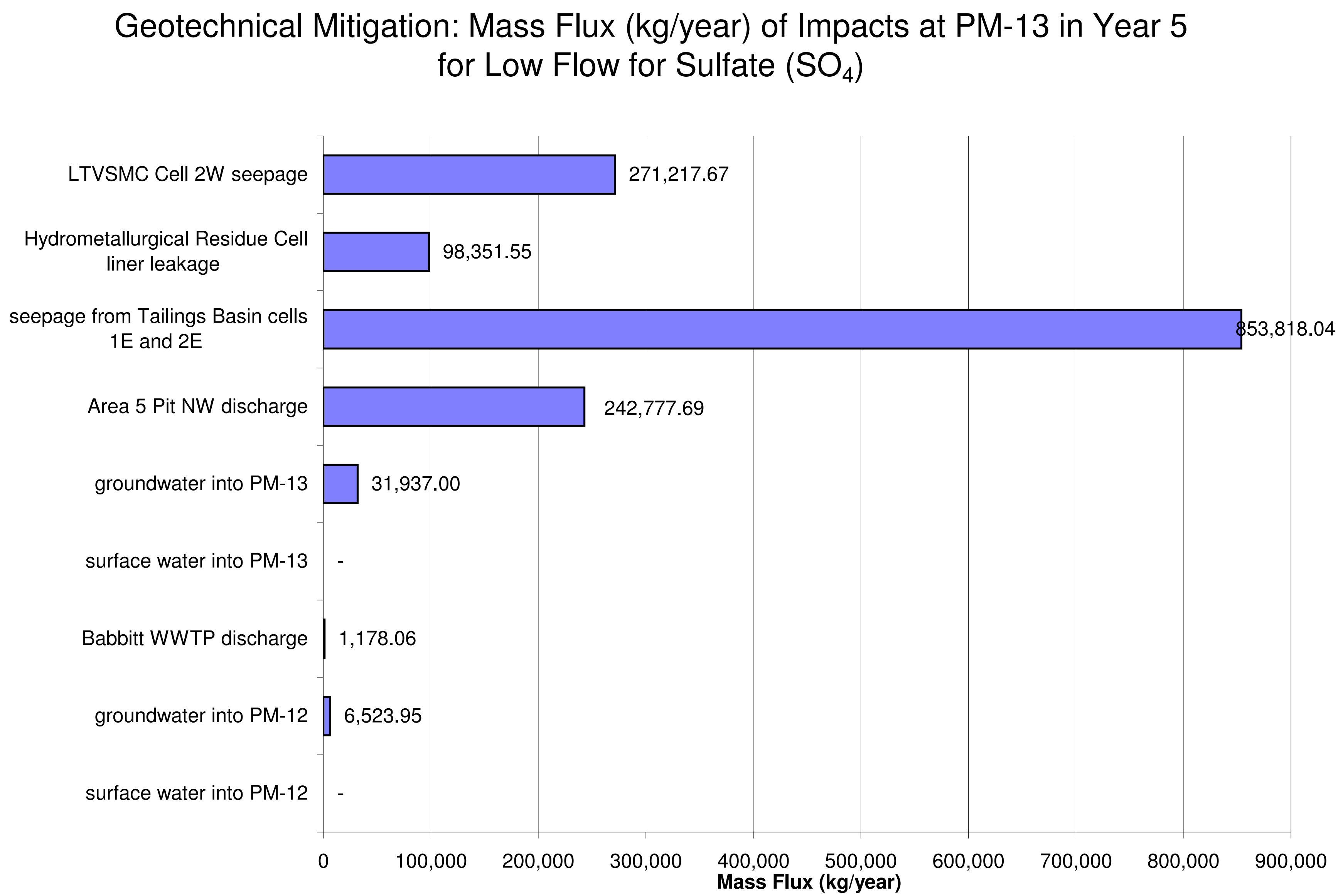



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
36,169.91
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

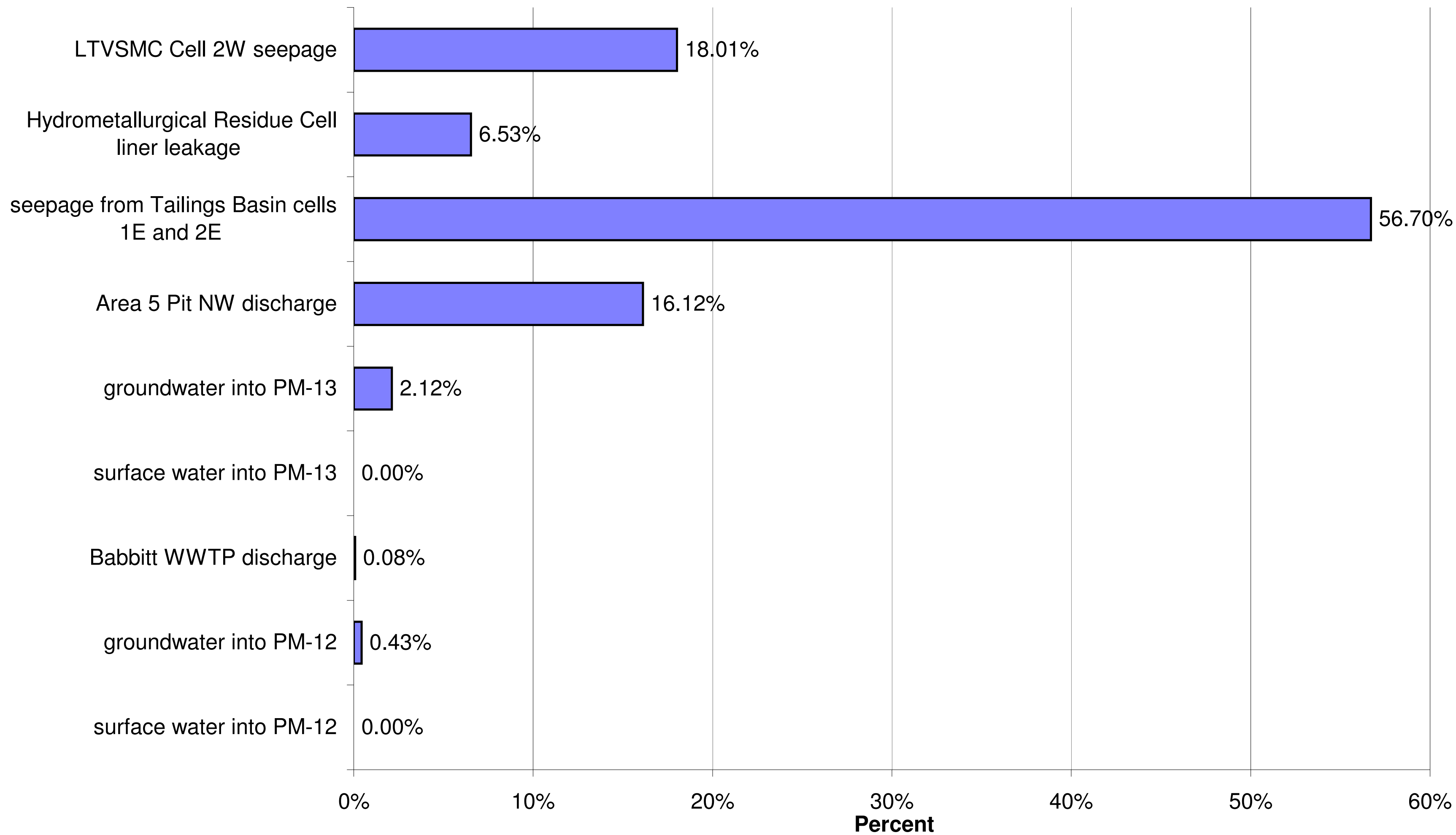

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.96%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
77.69%
Area 5 Pit NW discharge
0.95%
groundwater into PM-13
12.11%
surface water into PM-13
4.72%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
2.47%
surface water into PM-12
0.97%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
36,169.91
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

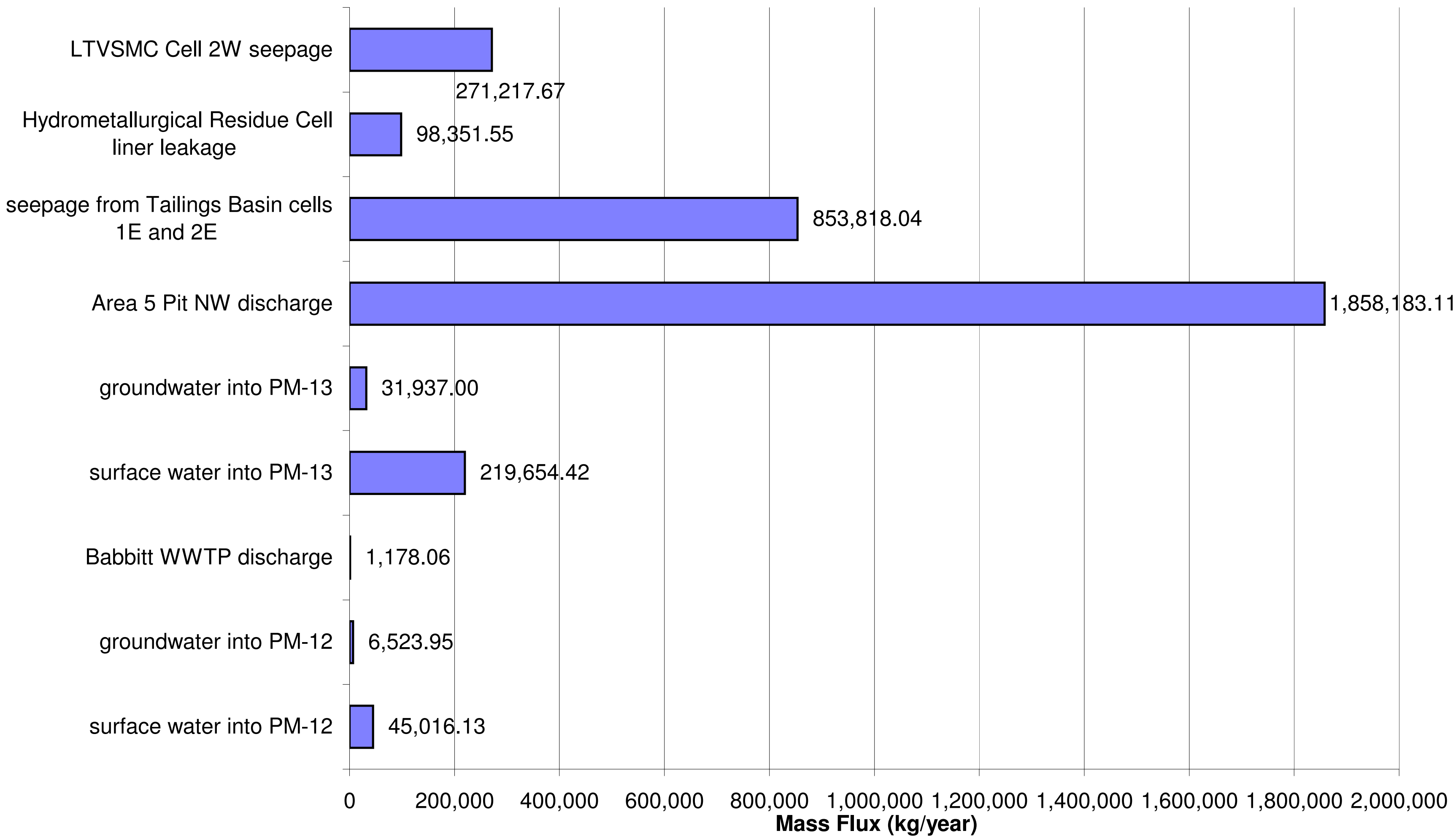

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.60%
Hydrometallurgical Residue Cell liner leakage
0.07%
seepage from Tailings Basin cells 1E and 2E
48.81%
Area 5 Pit NW discharge
0.60%
groundwater into PM-13
7.61%
surface water into PM-13
33.84%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
1.55%
surface water into PM-12
6.90%
0%
10%
20%
30%
40%
50%
60%
Percent

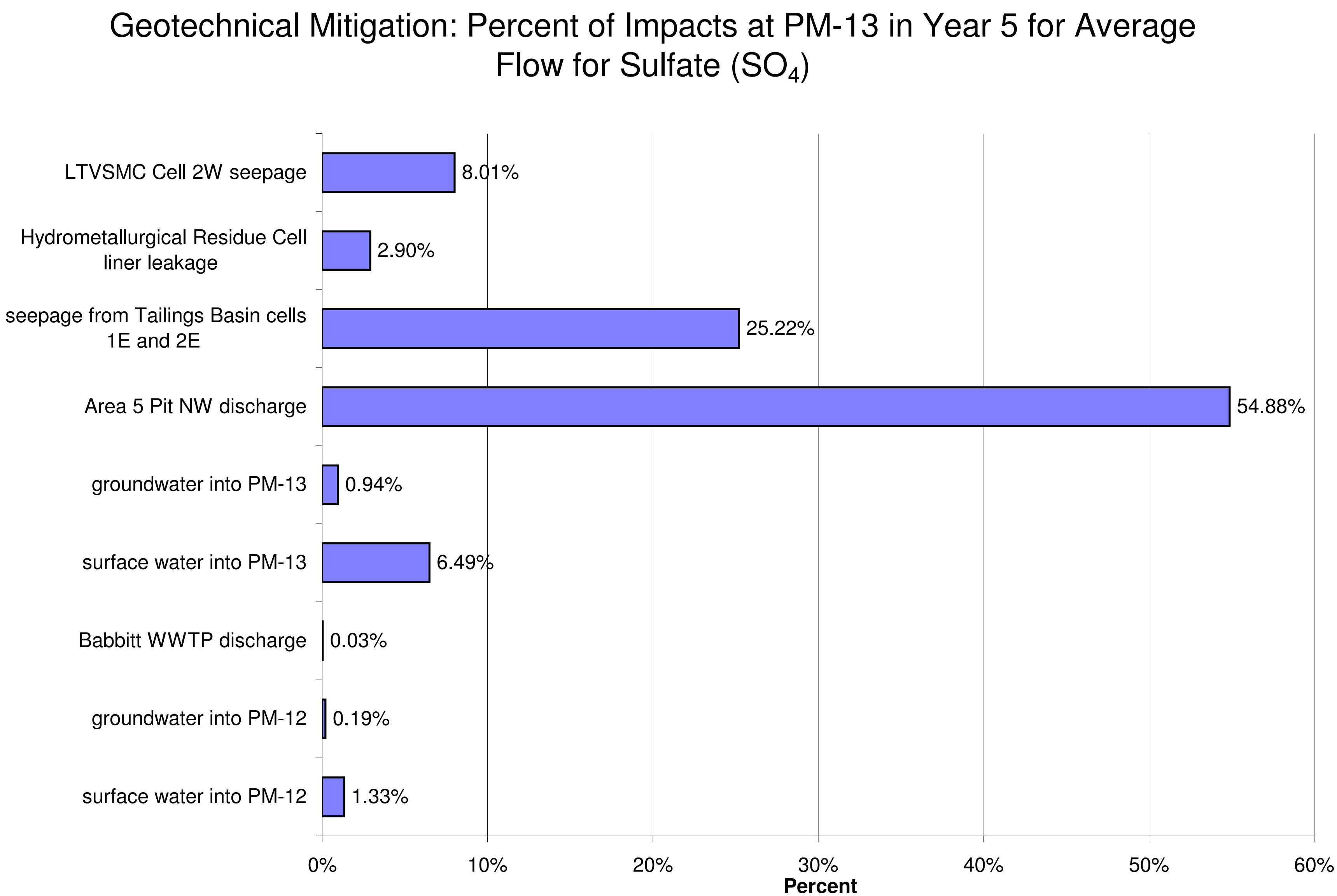

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,217.67
Hydrometallurgical Residue Cell liner leakage
98,351.55
seepage from Tailings Basin cells 1E and 2E
853,818.04
Area 5 Pit NW discharge
242,777.69
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
Mass Flux (kg/year)

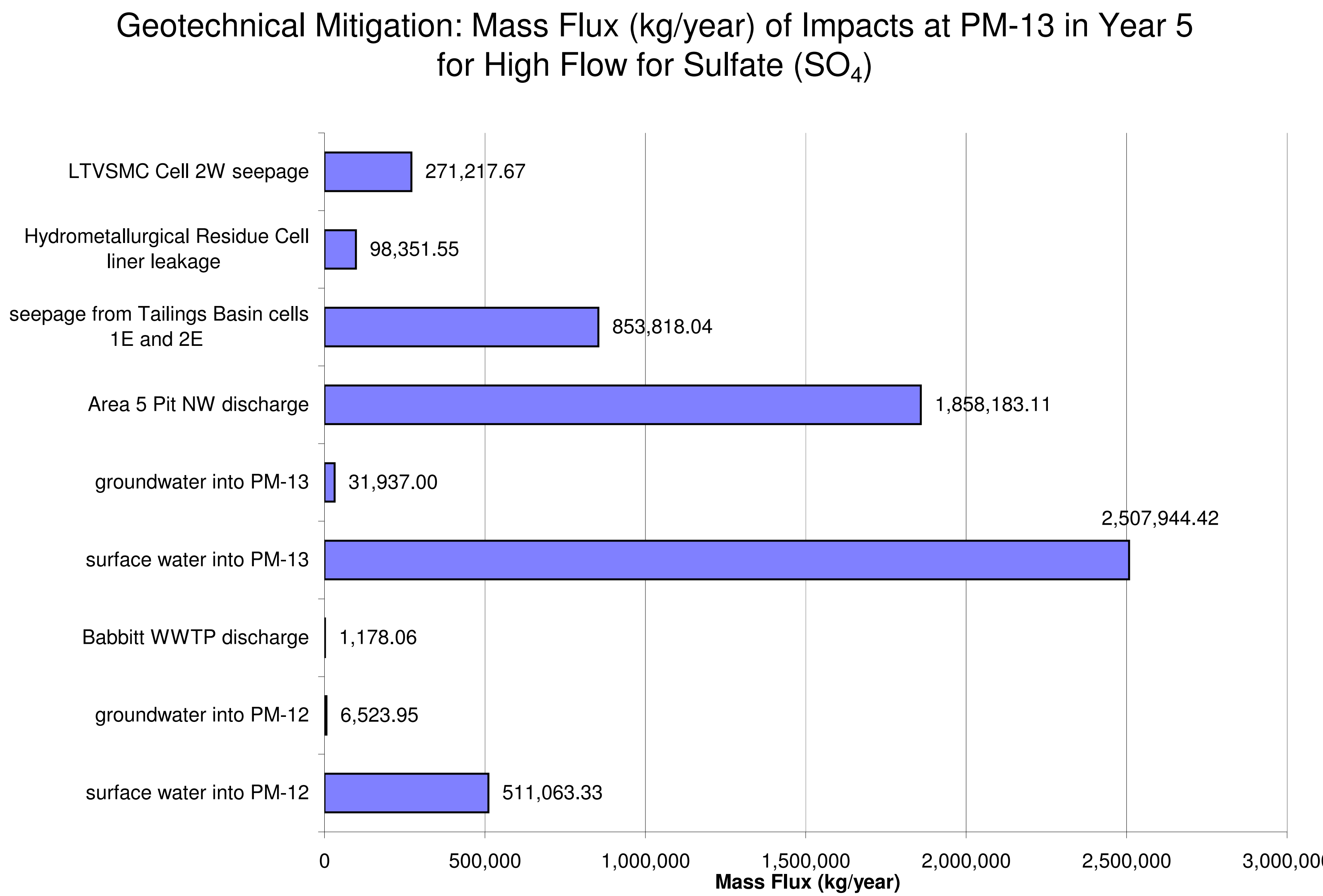
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)



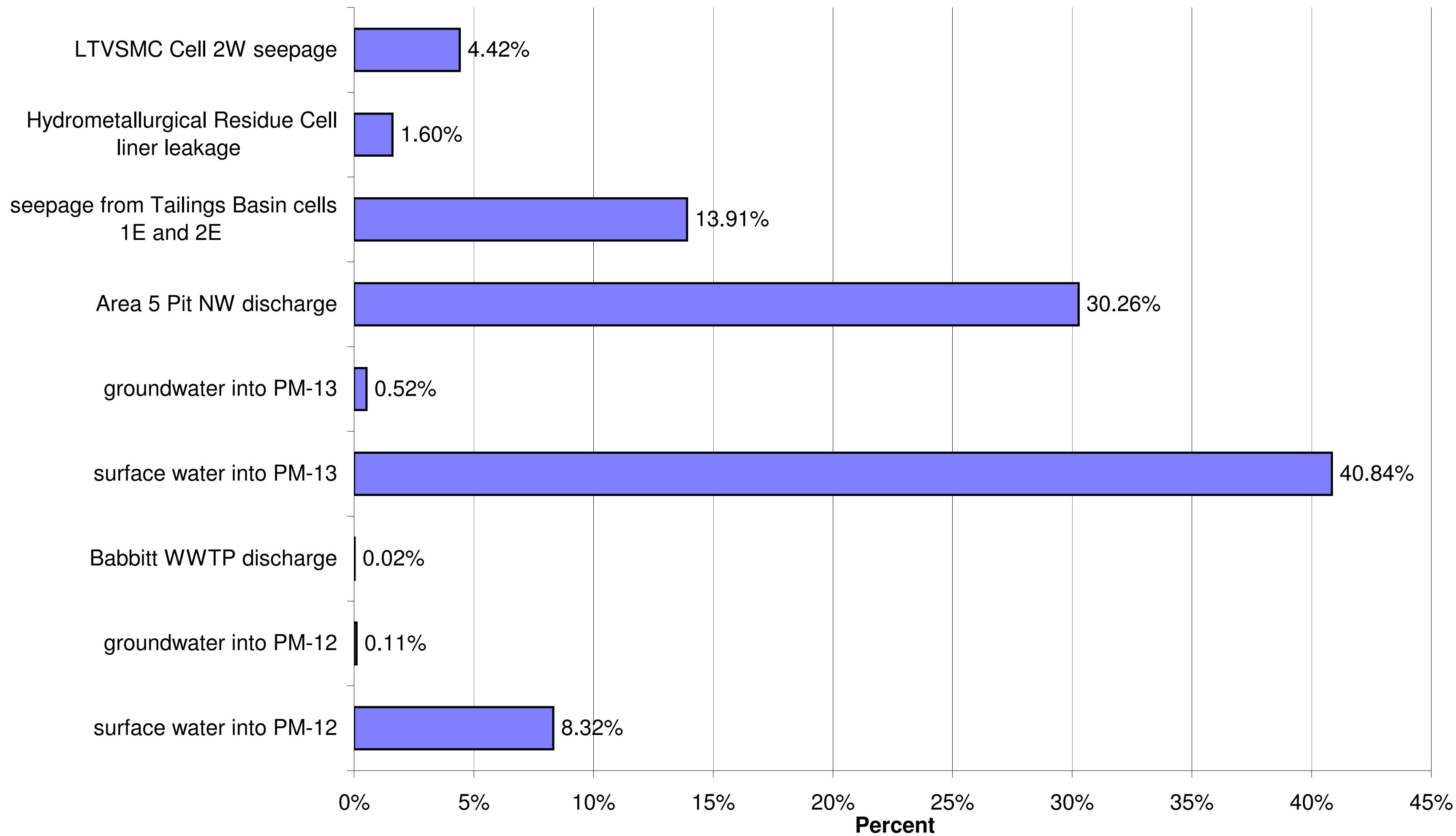
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)



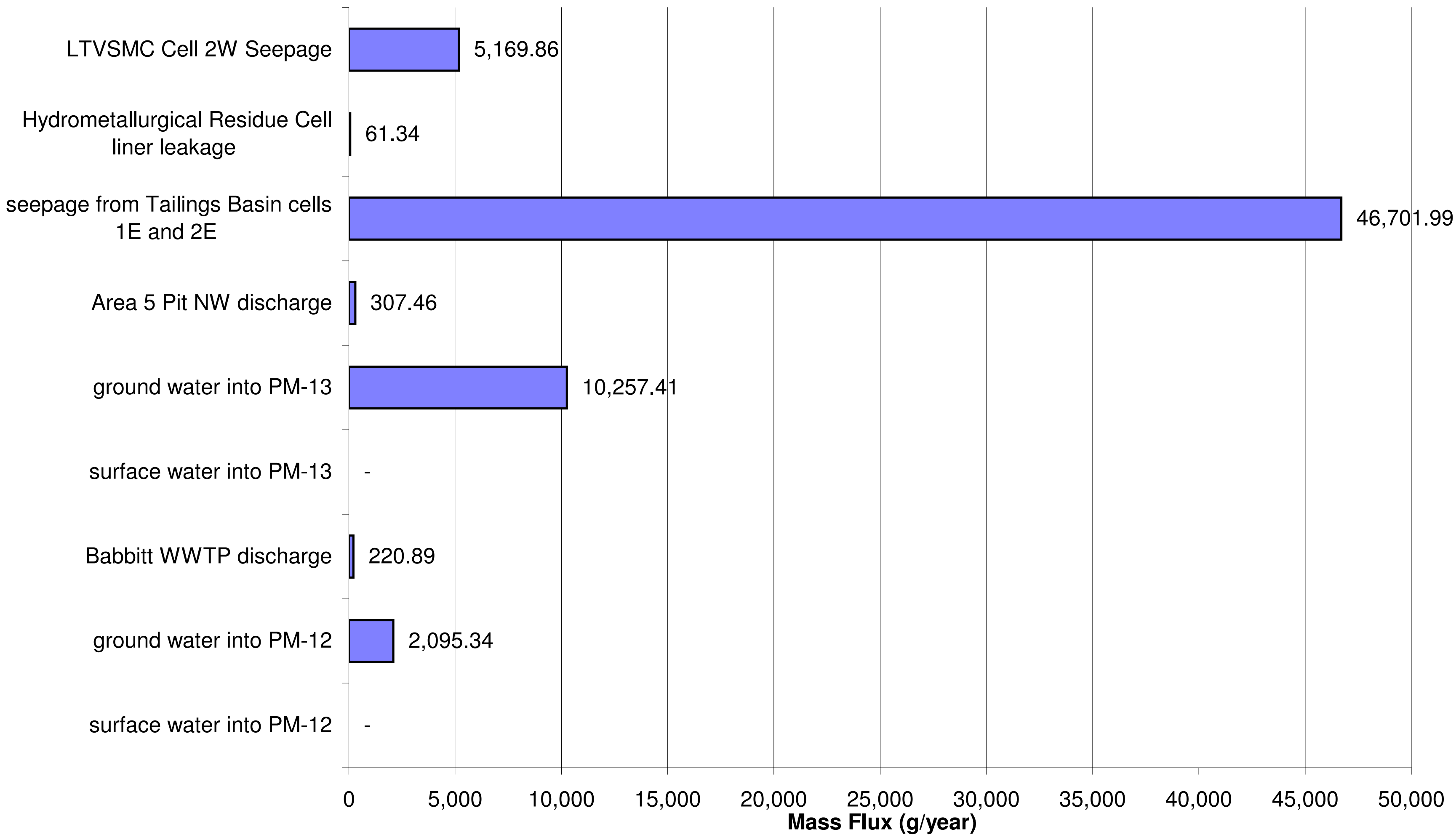

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
8.01%
Hydrometallurgical Residue Cell liner leakage
2.90%
seepage from Tailings Basin cells 1E and 2E
25.22%
Area 5 Pit NW discharge
54.88%
groundwater into PM-13
0.94%
surface water into PM-13
6.49%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.19%
surface water into PM-12
1.33%
0%
10%
20%
30%
40%
50%
60%
Percent

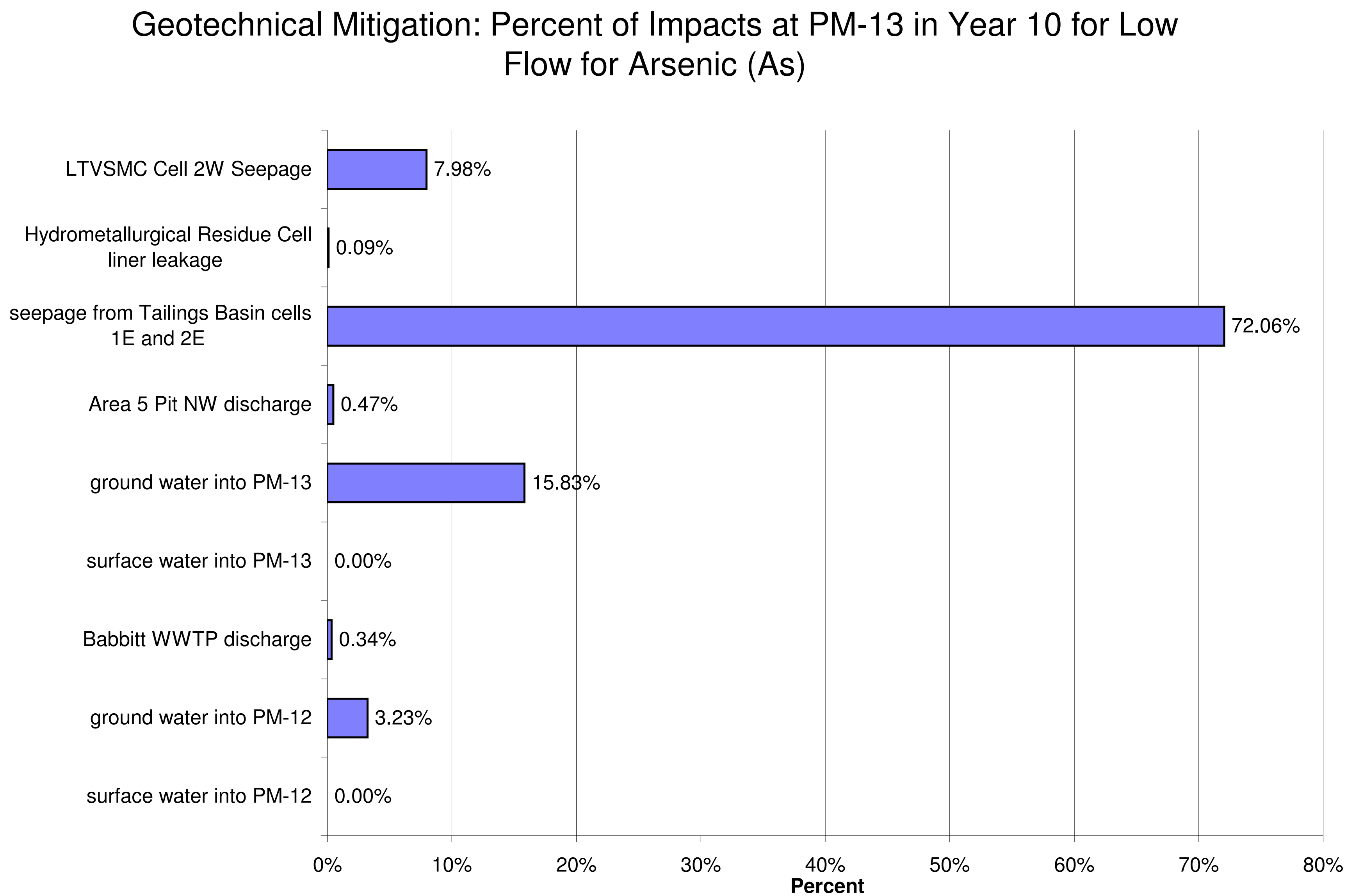

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
271,217.67
Hydrometallurgical Residue Cell liner leakage
98,351.55
seepage from Tailings Basin cells 1E and 2E
853,818.04
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
2,507,944.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
511,063.33
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
Mass Flux (kg/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)

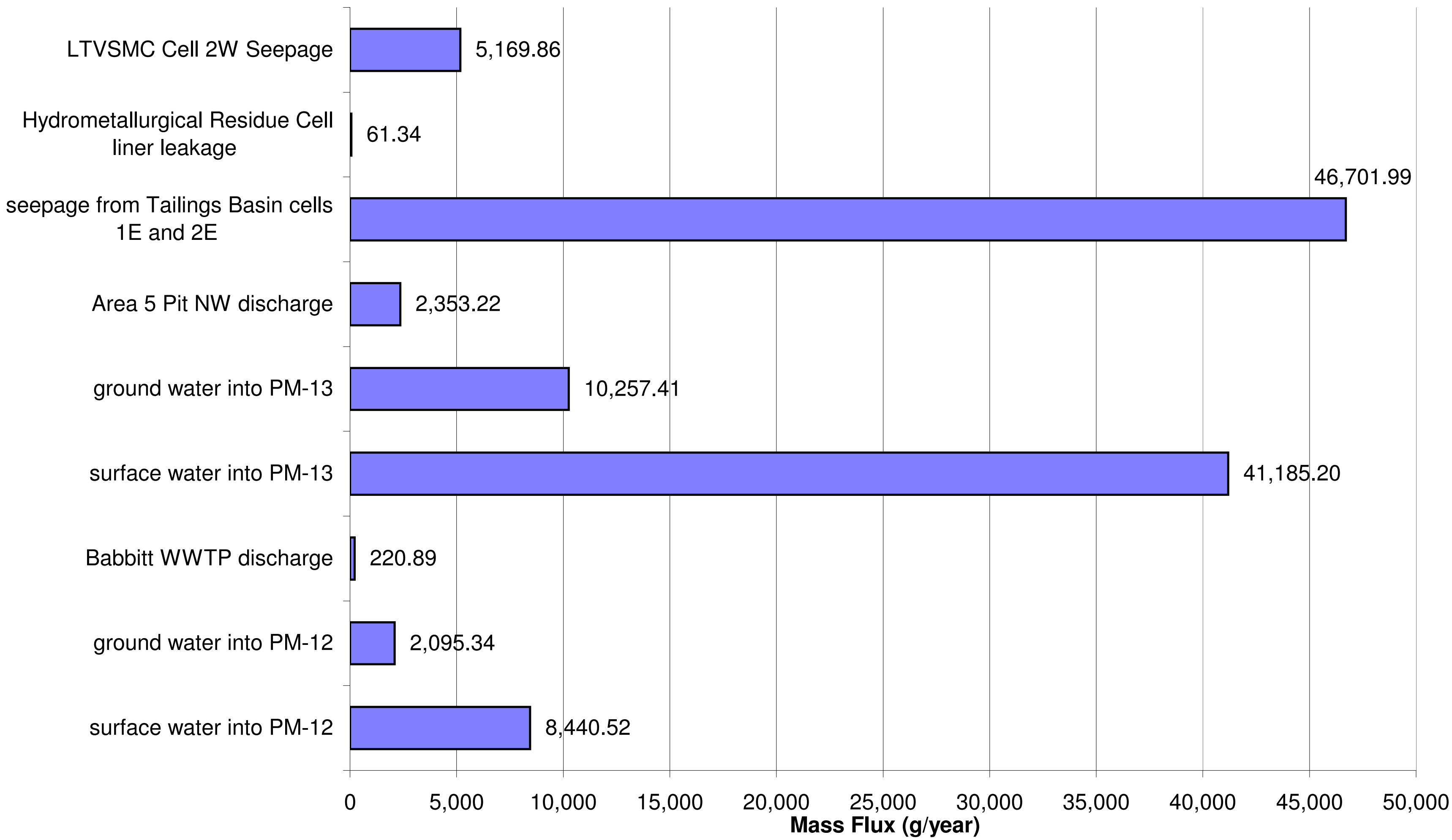


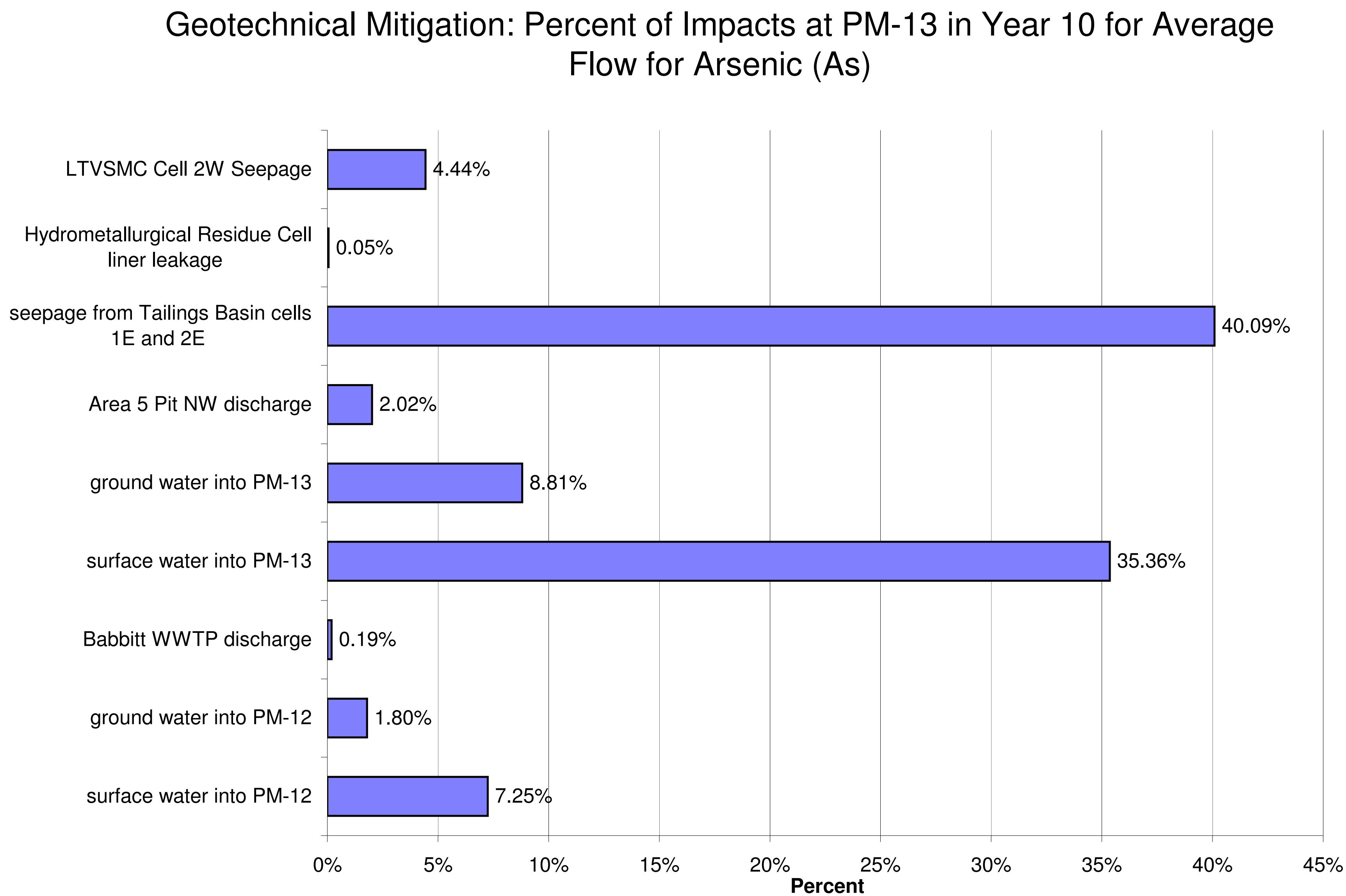
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Arsenic (As)



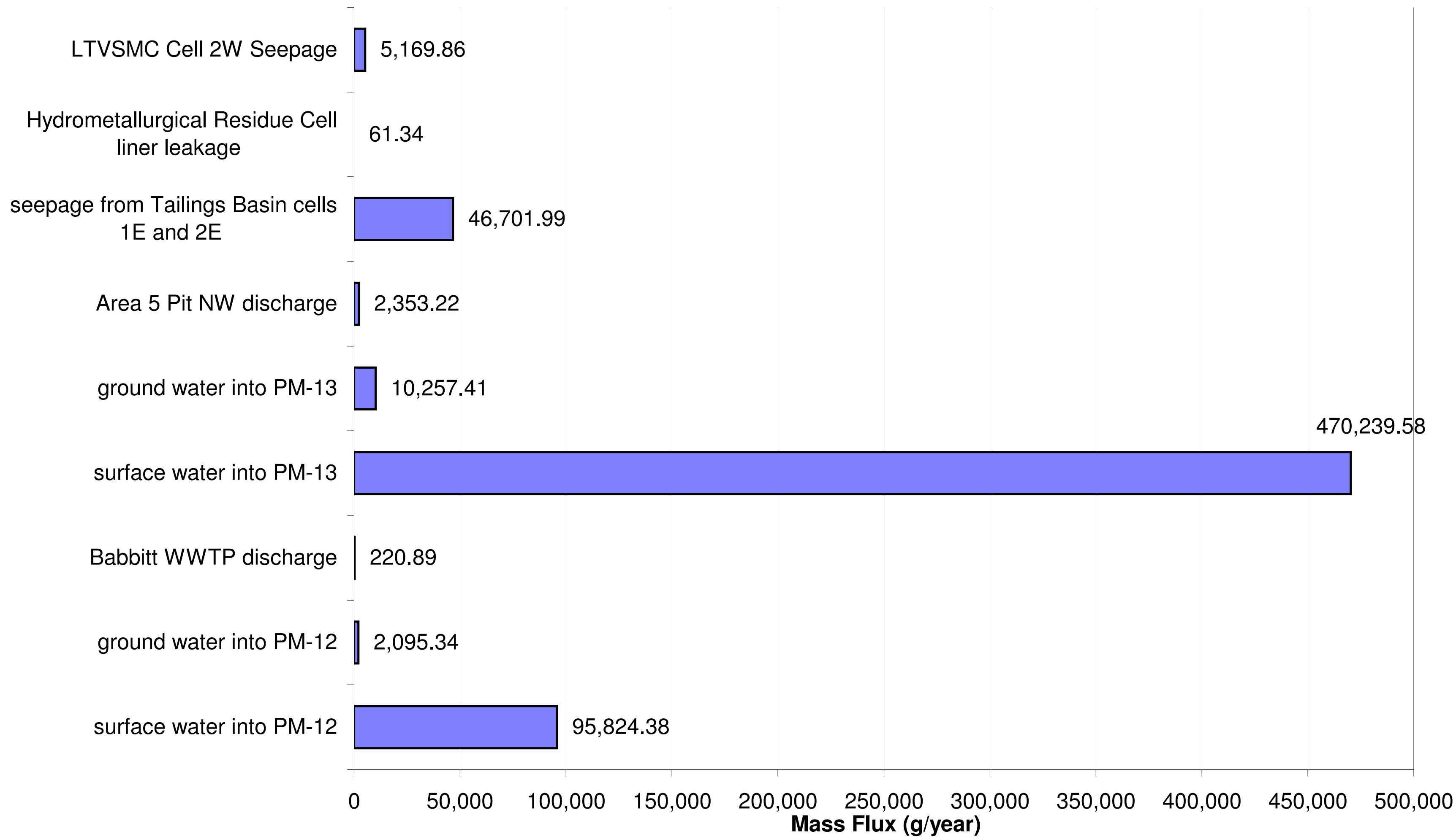

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Arsenic (As)
LTVSMC Cell 2W Seepage
7.98%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
72.06%
Area 5 Pit NW discharge
0.47%
ground water into PM-13
15.83%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.34%
ground water into PM-12
3.23%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

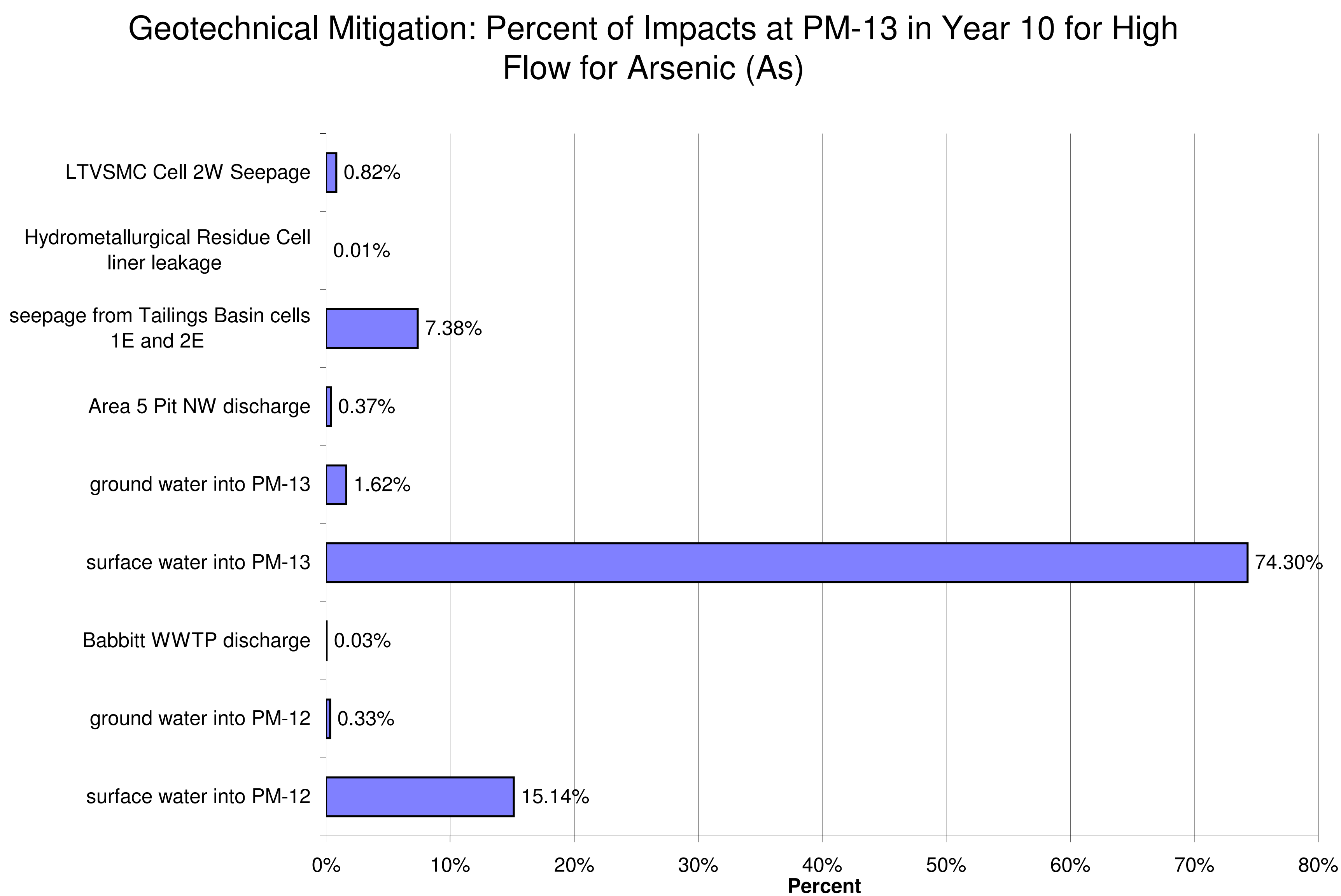
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Arsenic (As)



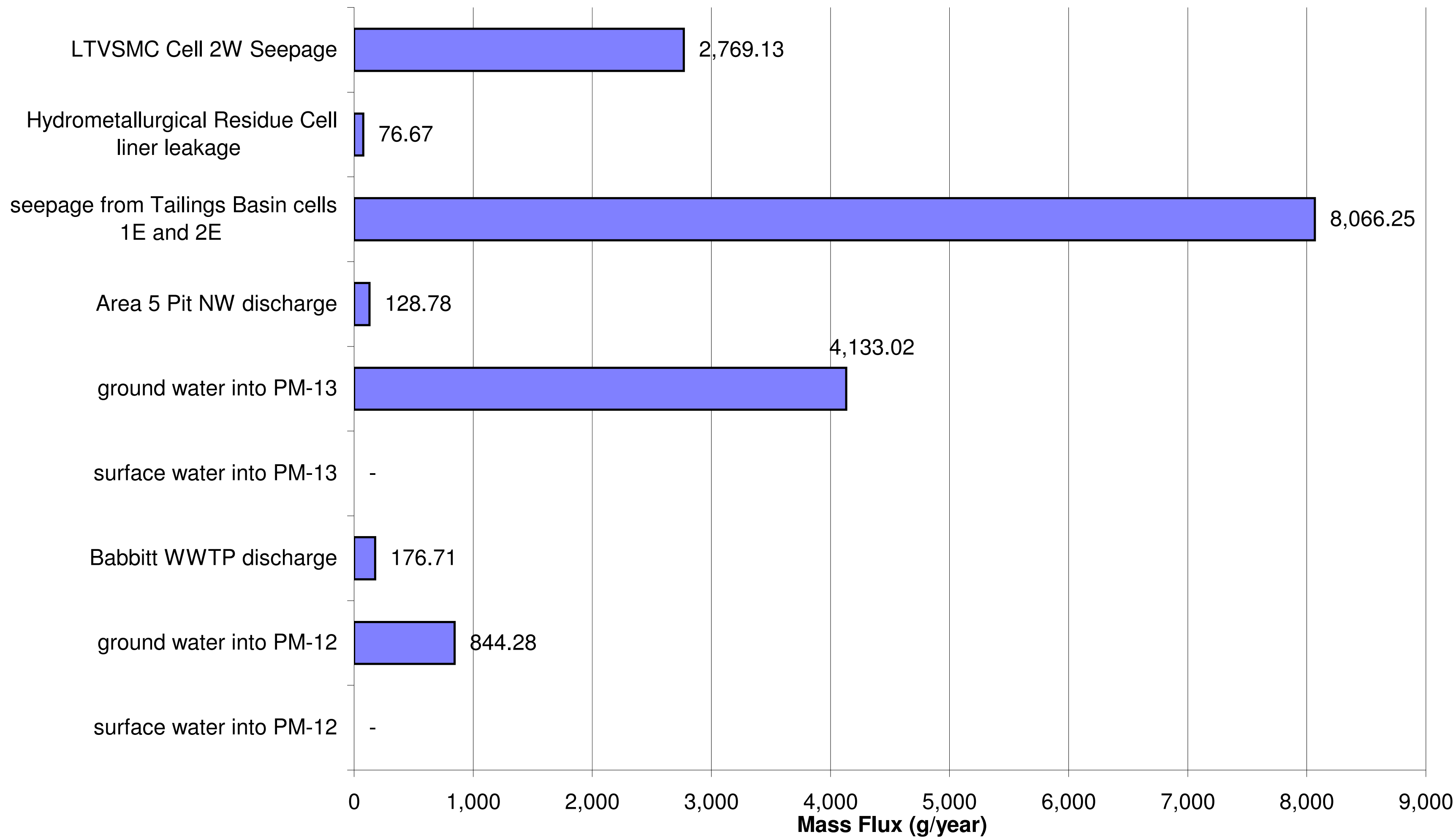

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Arsenic (As)
LTVSMC Cell 2W Seepage
4.44%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
40.09%
Area 5 Pit NW discharge
2.02%
ground water into PM-13
8.81%
surface water into PM-13
35.36%
Babbitt WWTP discharge
0.19%
ground water into PM-12
1.80%
surface water into PM-12
7.25%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

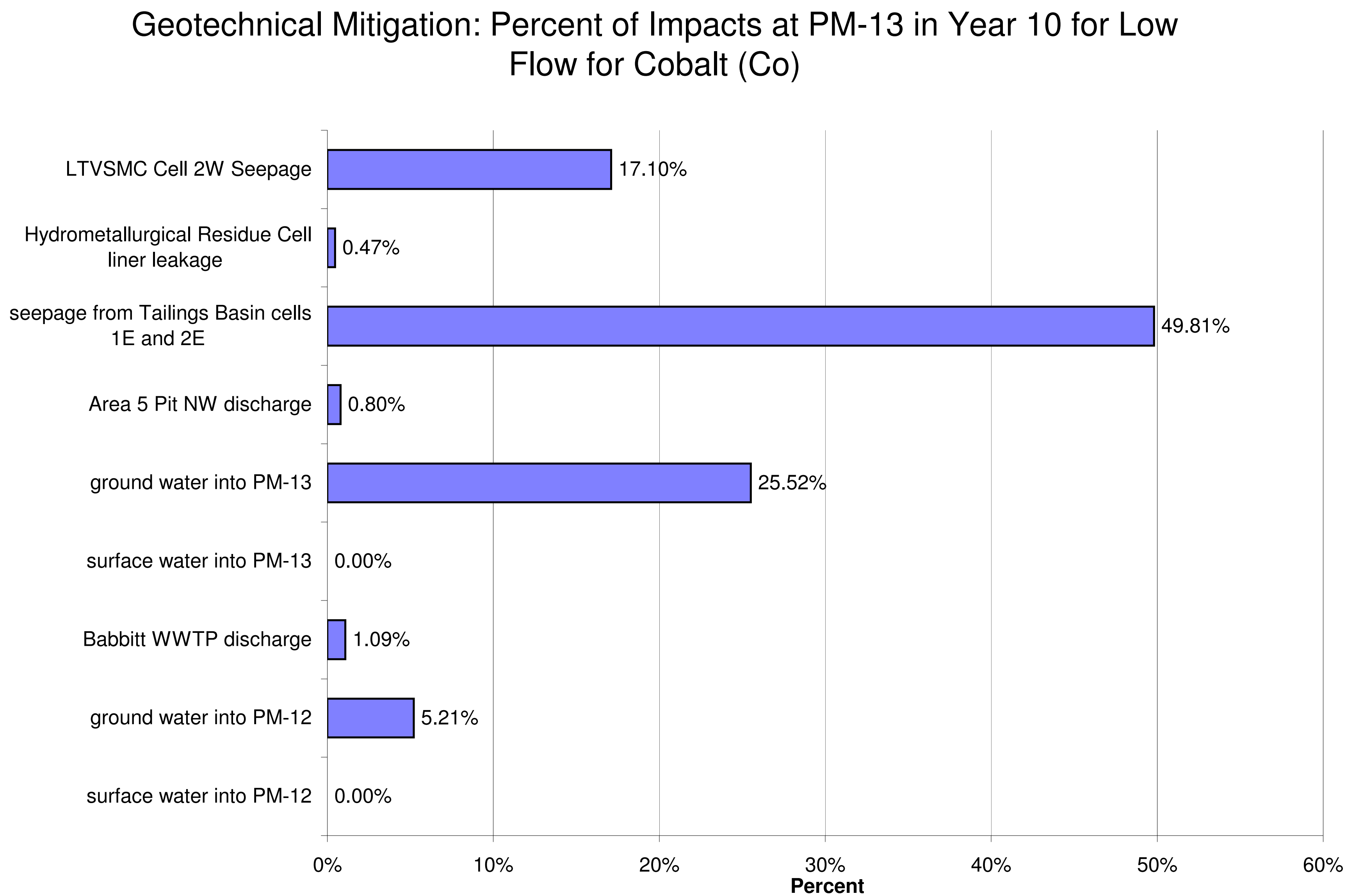
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Arsenic (As)

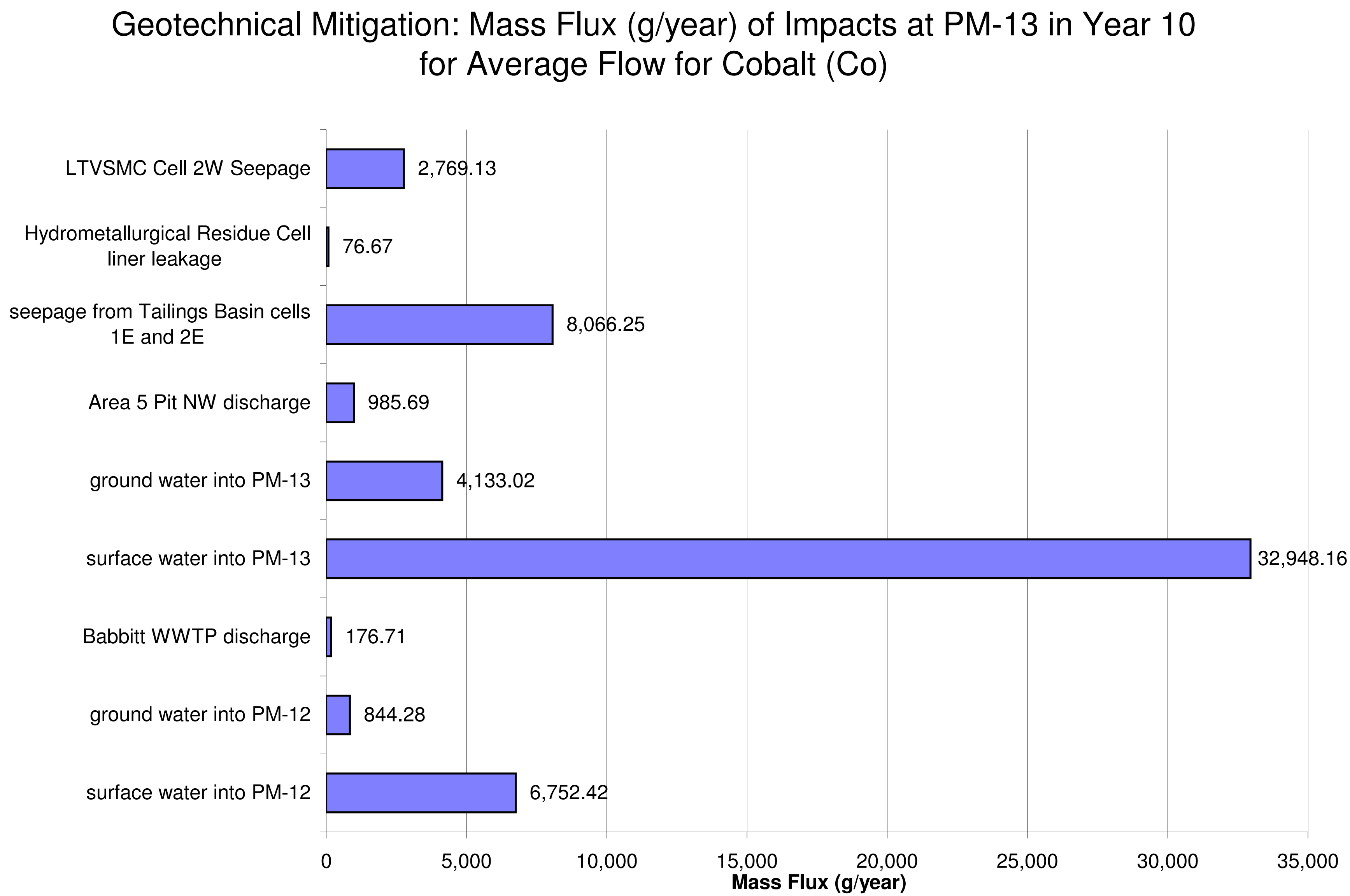


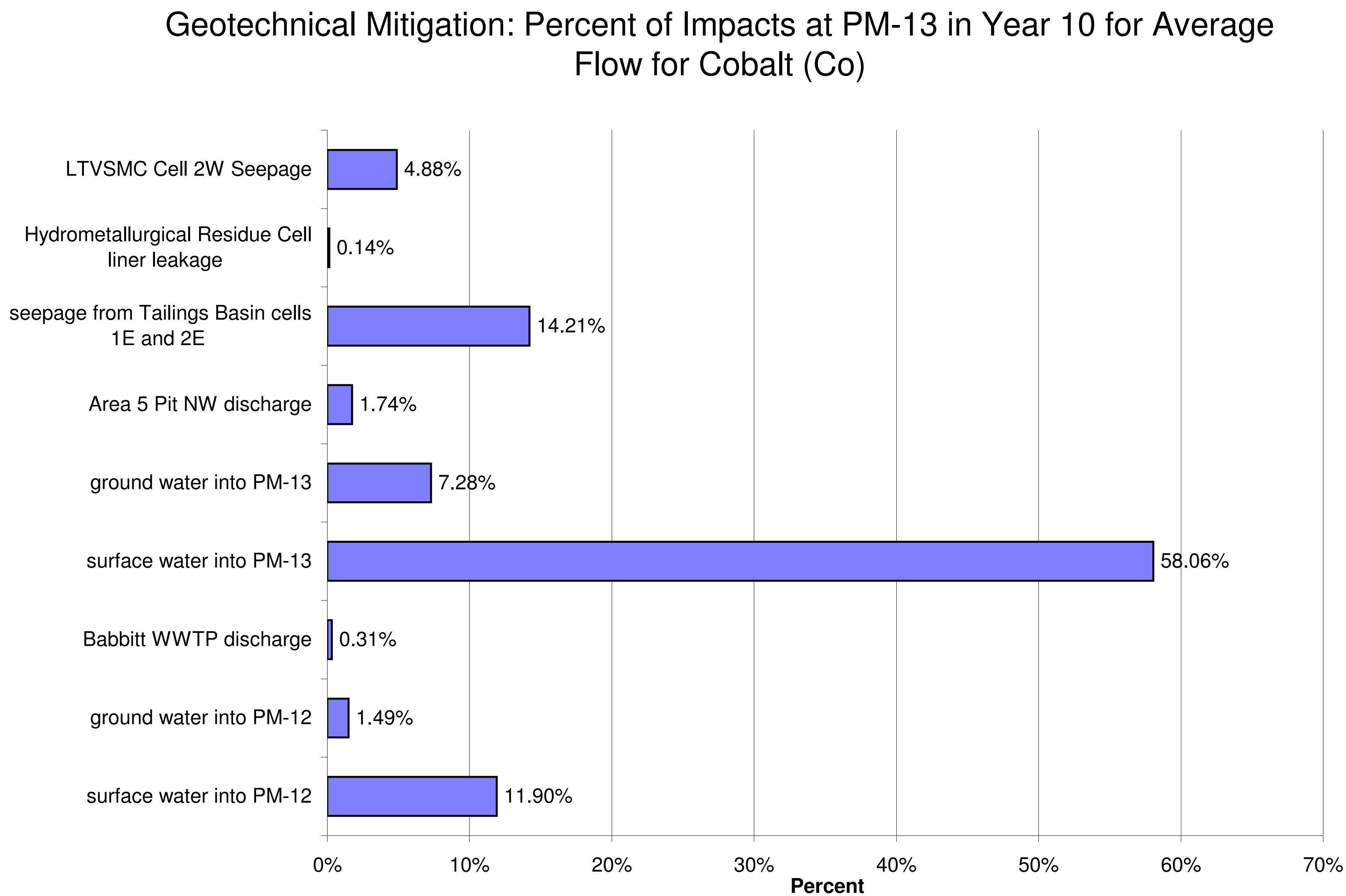

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Arsenic (As)
LTVSMC Cell 2W Seepage
0.82%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
7.38%
Area 5 Pit NW discharge
0.37%
ground water into PM-13
1.62%
surface water into PM-13
74.30%
Babbitt WWTP discharge
0.03%
ground water into PM-12
0.33%
surface water into PM-12
15.14%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

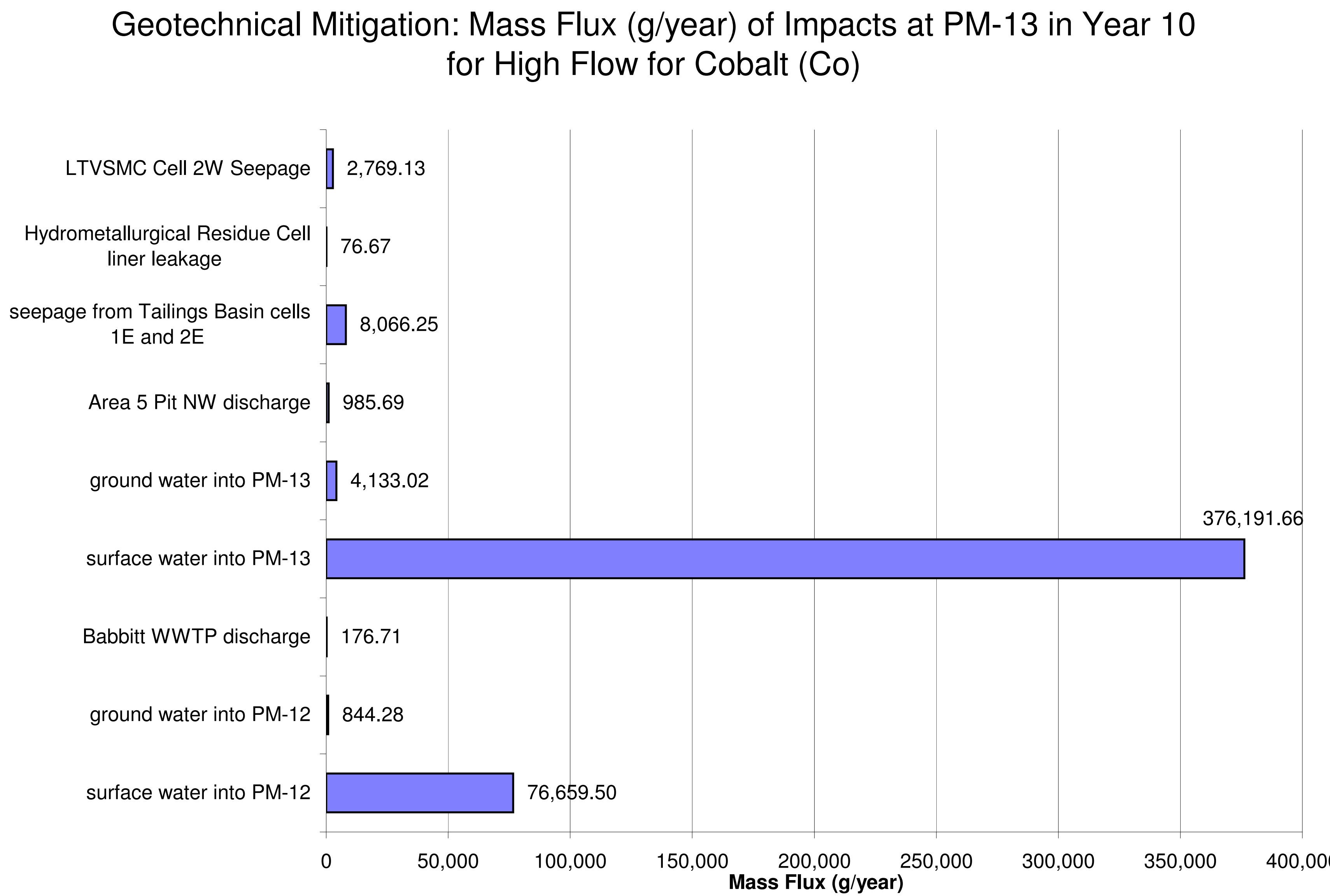
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Cobalt (Co)



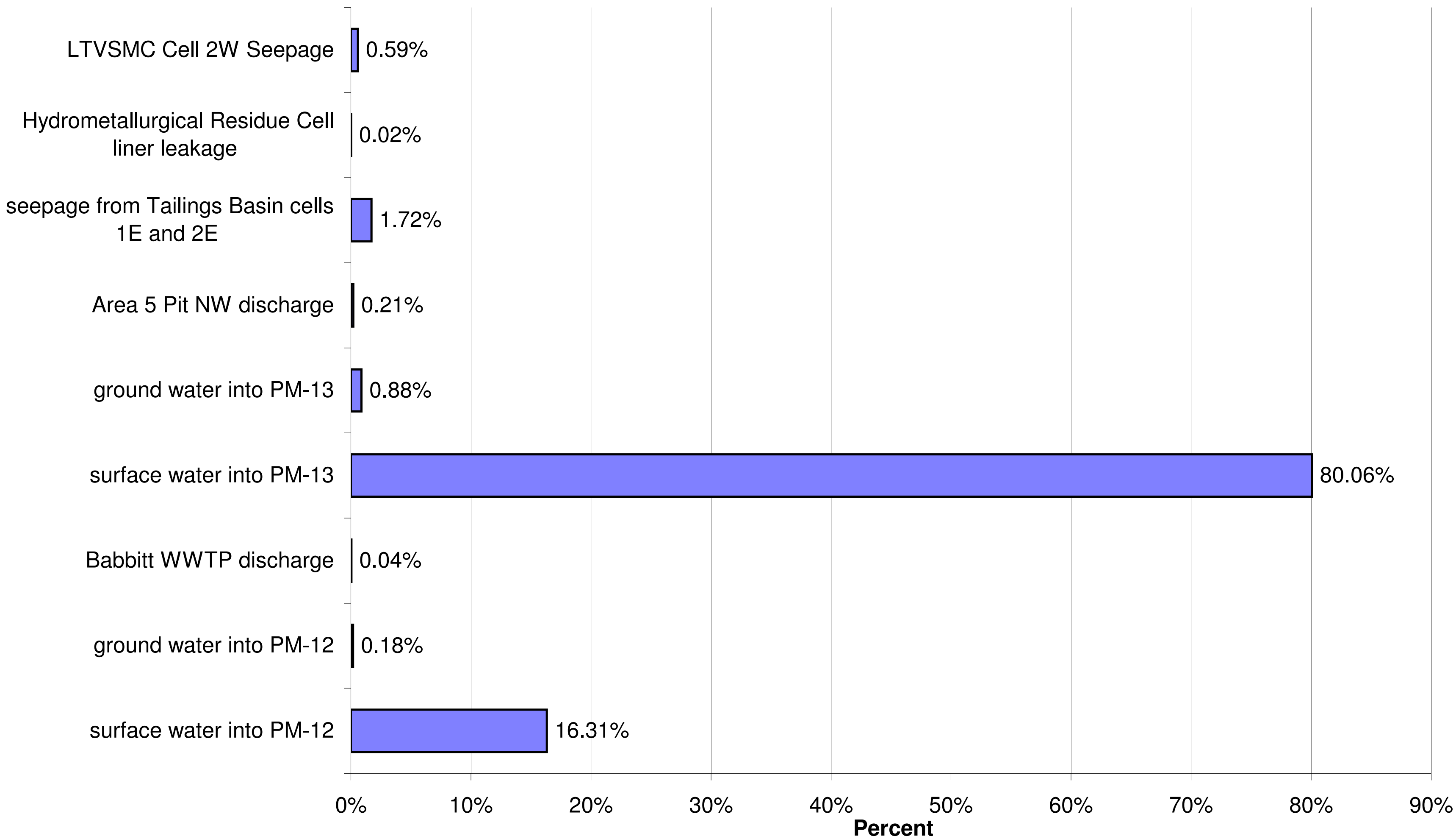

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W Seepage
17.10%
Hydrometallurgical Residue Cell liner leakage
0.47%
seepage from Tailings Basin cells 1E and 2E
49.81%
Area 5 Pit NW discharge
0.80%
ground water into PM-13
25.52%
surface water into PM-13
0.00%
Babbitt WWTP discharge
1.09%
ground water into PM-12
5.21%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

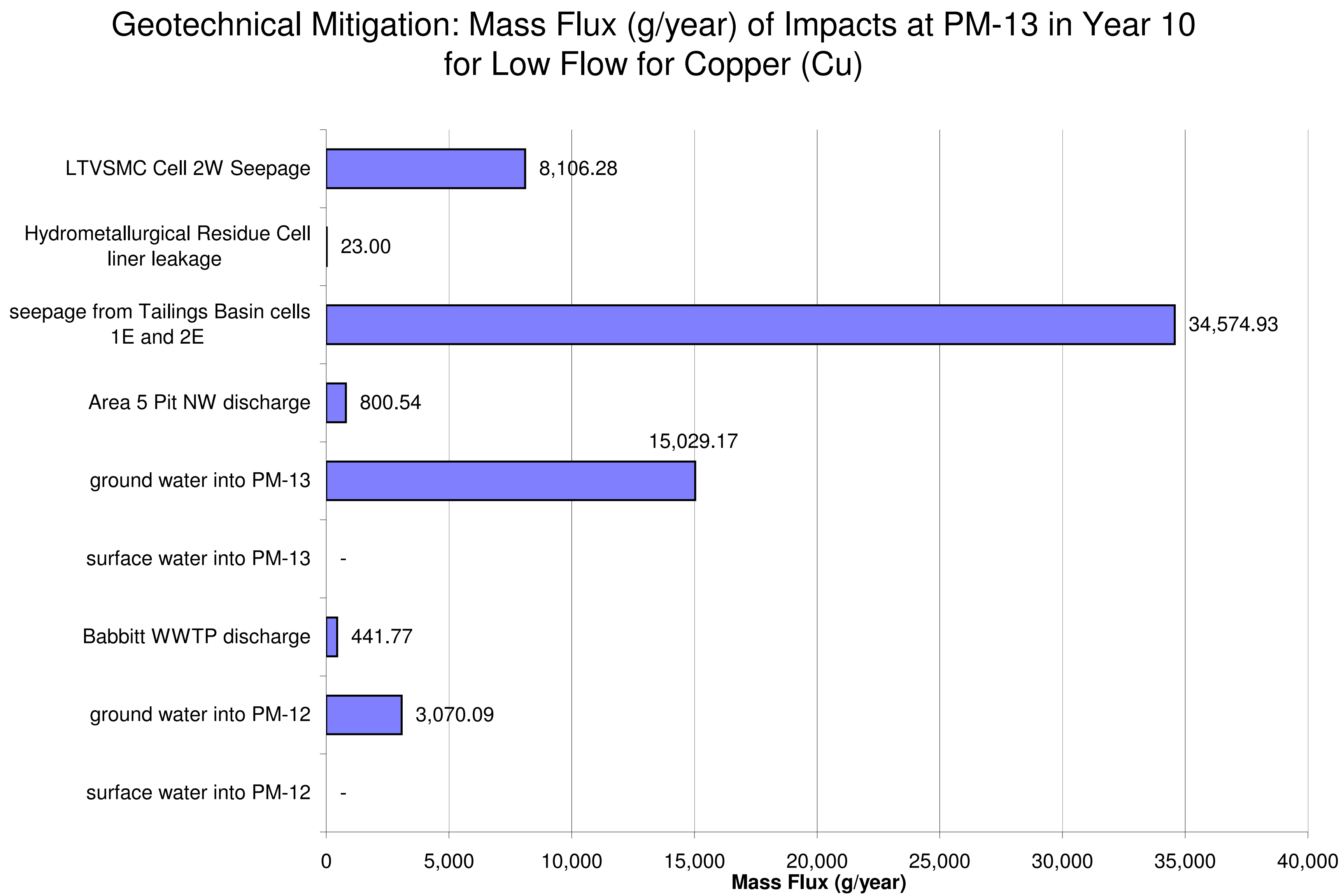

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W Seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
76.67
seepage from Tailings Basin cells 1E and 2E
8,066.25
Area 5 Pit NW discharge
985.69
ground water into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
ground water into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

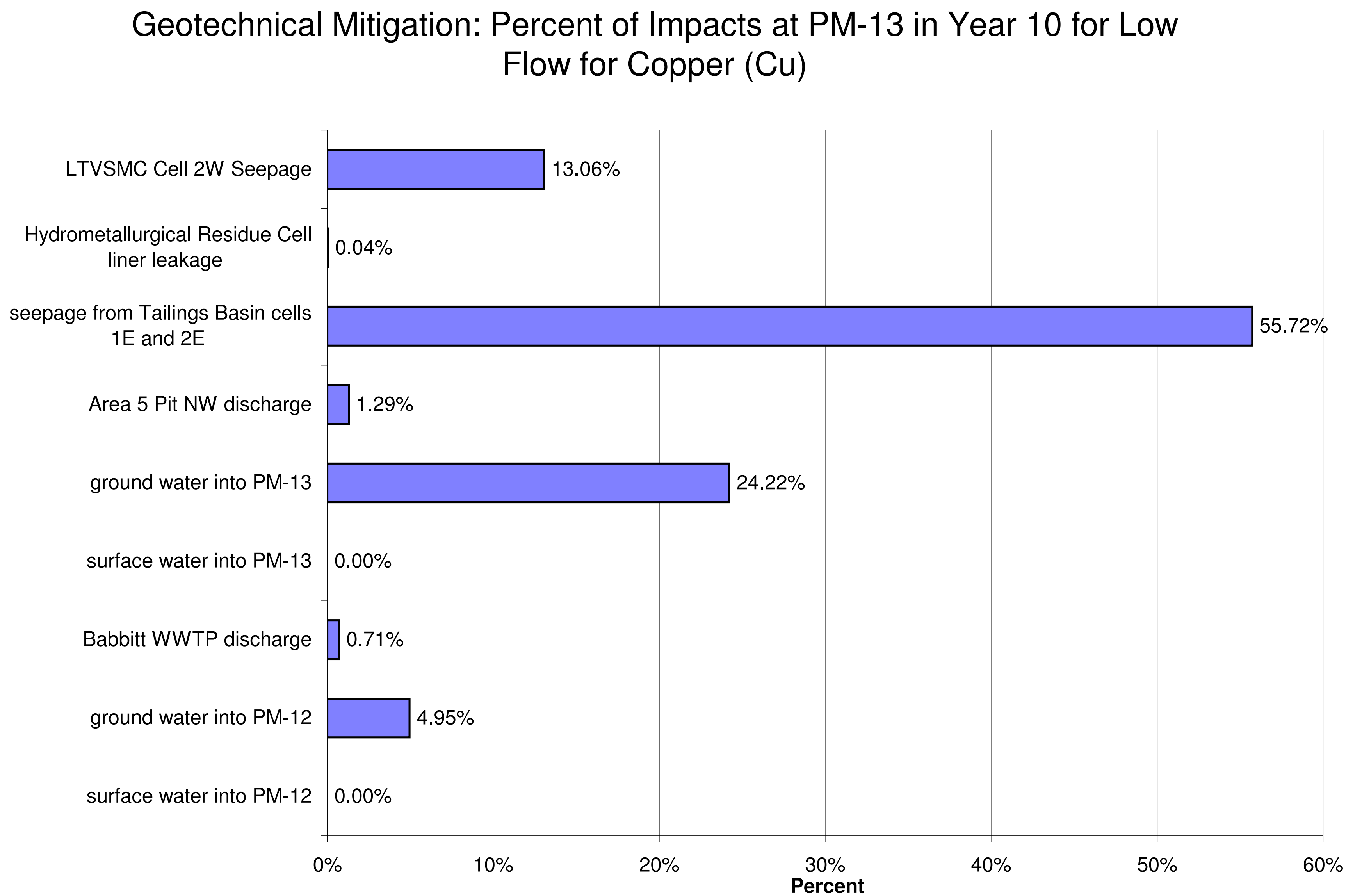

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W Seepage
4.88%
Hydrometallurgical Residue Cell liner leakage
0.14%
seepage from Tailings Basin cells 1E and 2E
14.21%
Area 5 Pit NW discharge
1.74%
ground water into PM-13
7.28%
surface water into PM-13
58.06%
Babbitt WWTP discharge
0.31%
ground water into PM-12
1.49%
surface water into PM-12
11.90%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

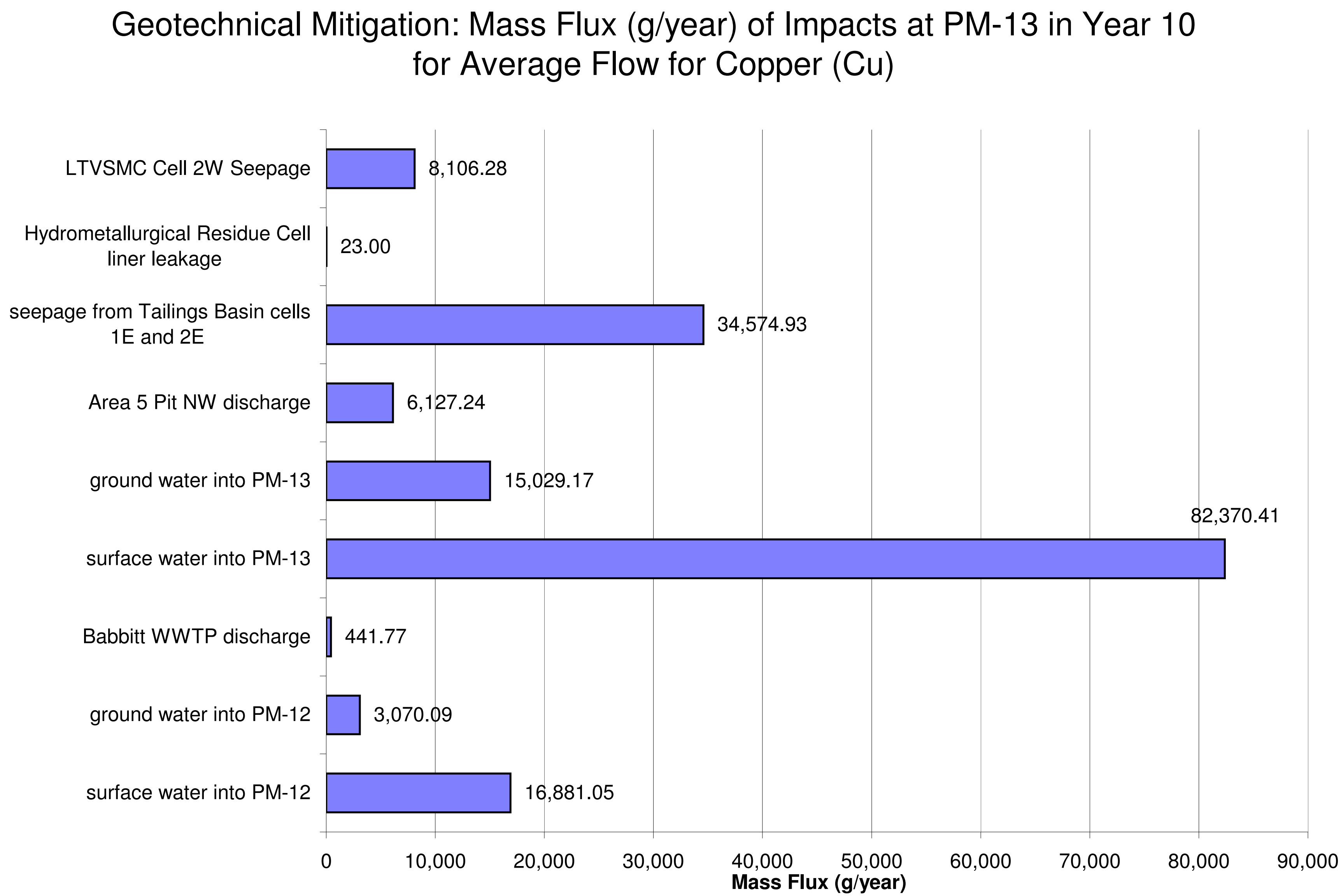

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Cobalt (Co)
LTVSMC Cell 2W Seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
76.67
seepage from Tailings Basin cells 1E and 2E
8,066.25
Area 5 Pit NW discharge
985.69
ground water into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
ground water into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

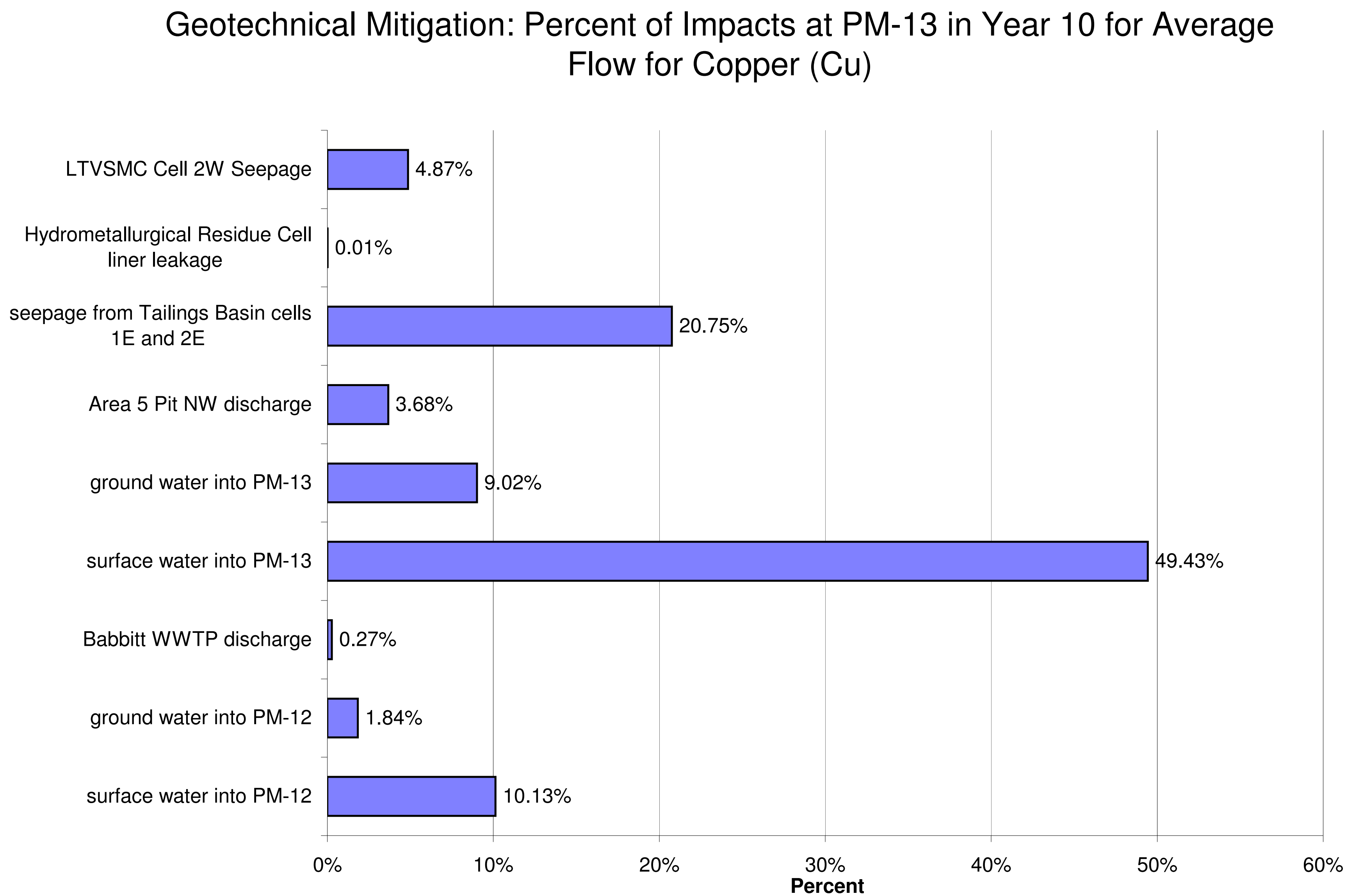
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Cobalt (Co)

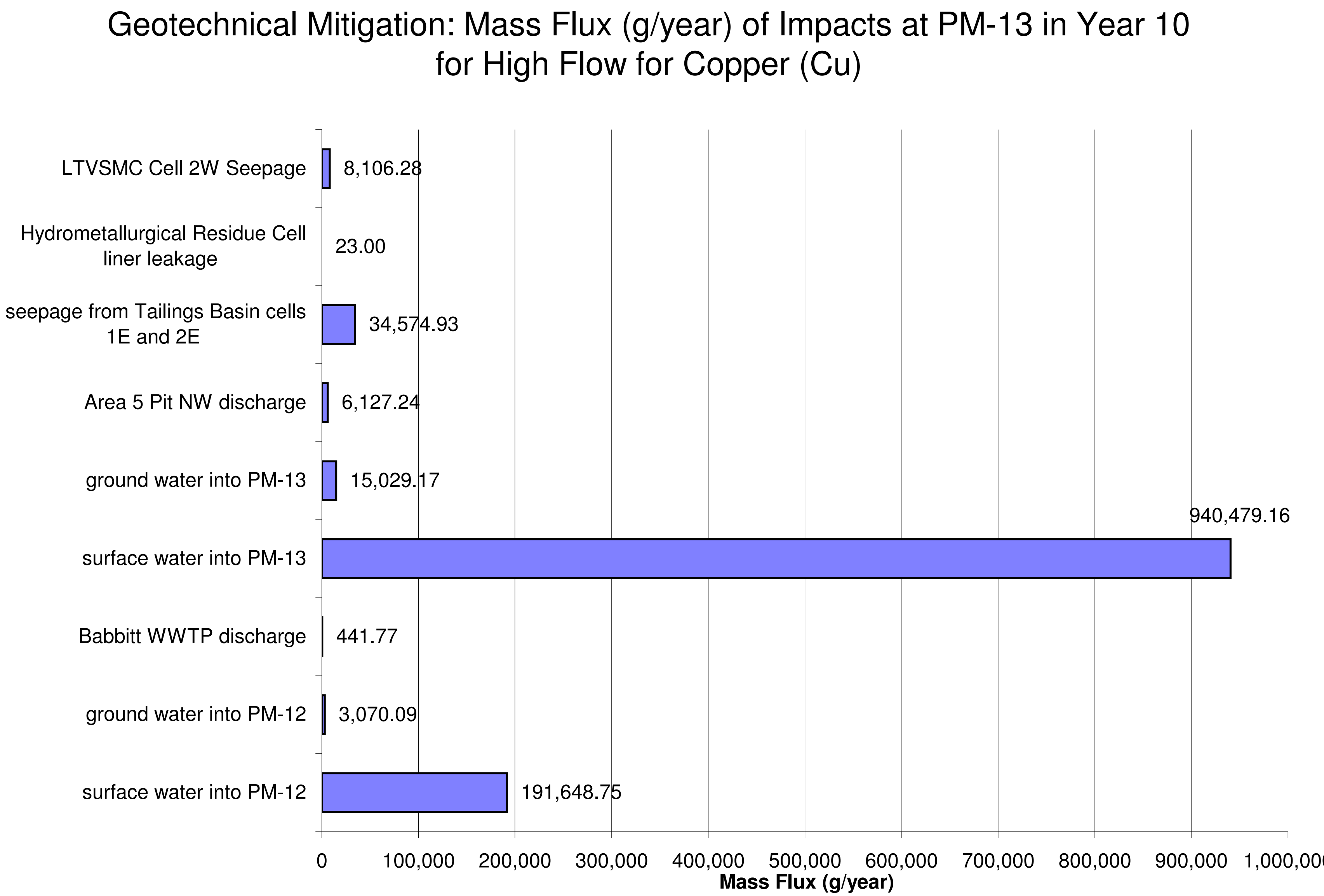



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Copper (Cu)
LTVSMC Cell 2W Seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
23.00
seepage from Tailings Basin cells 1E and 2E
34,574.93
Area 5 Pit NW discharge
800.54
ground water into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
ground water into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

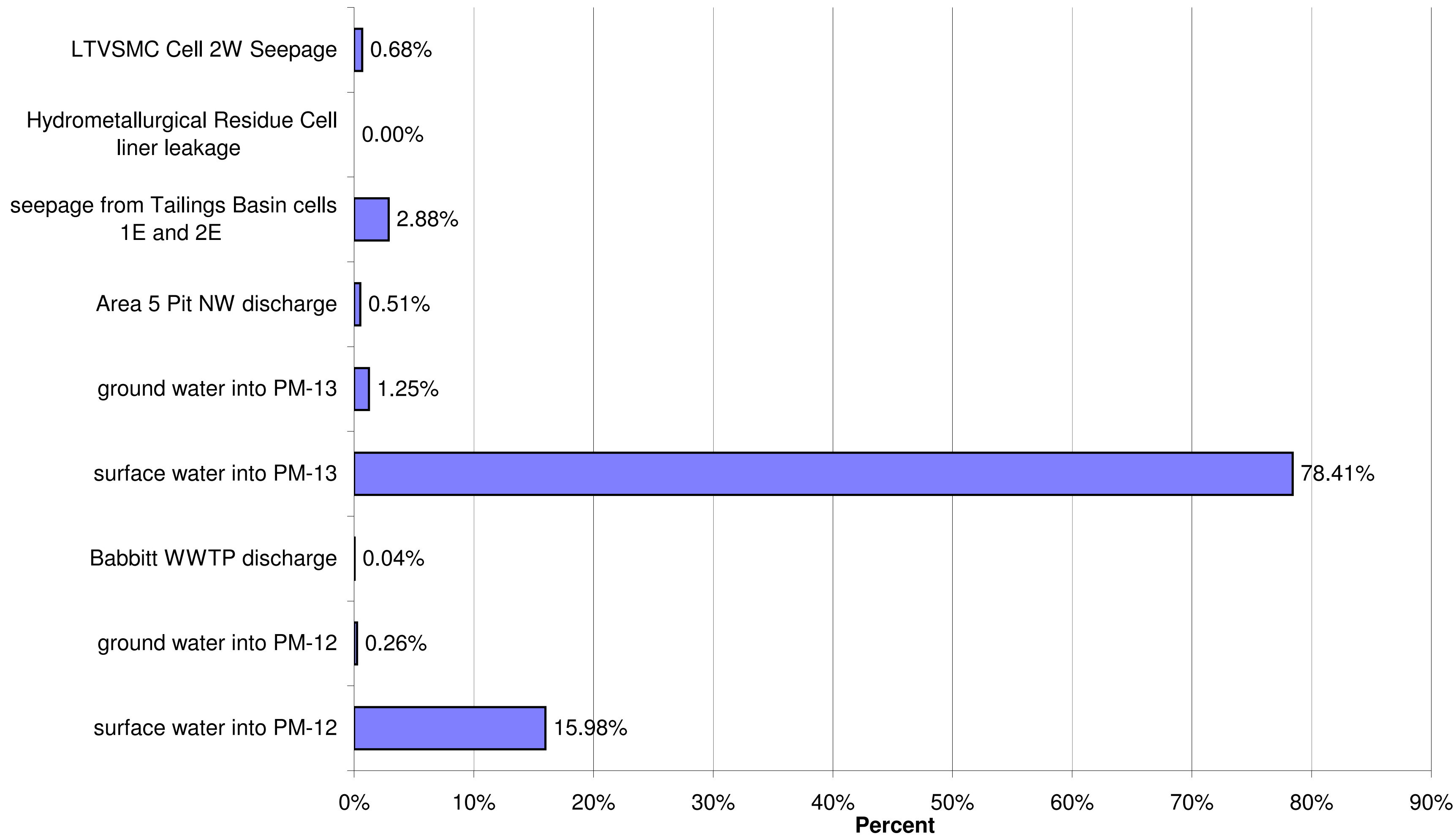

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Copper (Cu)
LTVSMC Cell 2W Seepage
13.06%
Hydrometallurgical Residue Cell liner leakage
0.04%
seepage from Tailings Basin cells 1E and 2E
55.72%
Area 5 Pit NW discharge
1.29%
ground water into PM-13
24.22%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.71%
ground water into PM-12
4.95%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Copper (Cu)
LTVSMC Cell 2W Seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
23.00
seepage from Tailings Basin cells 1E and 2E
34,574.93
Area 5 Pit NW discharge
6,127.24
ground water into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
ground water into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

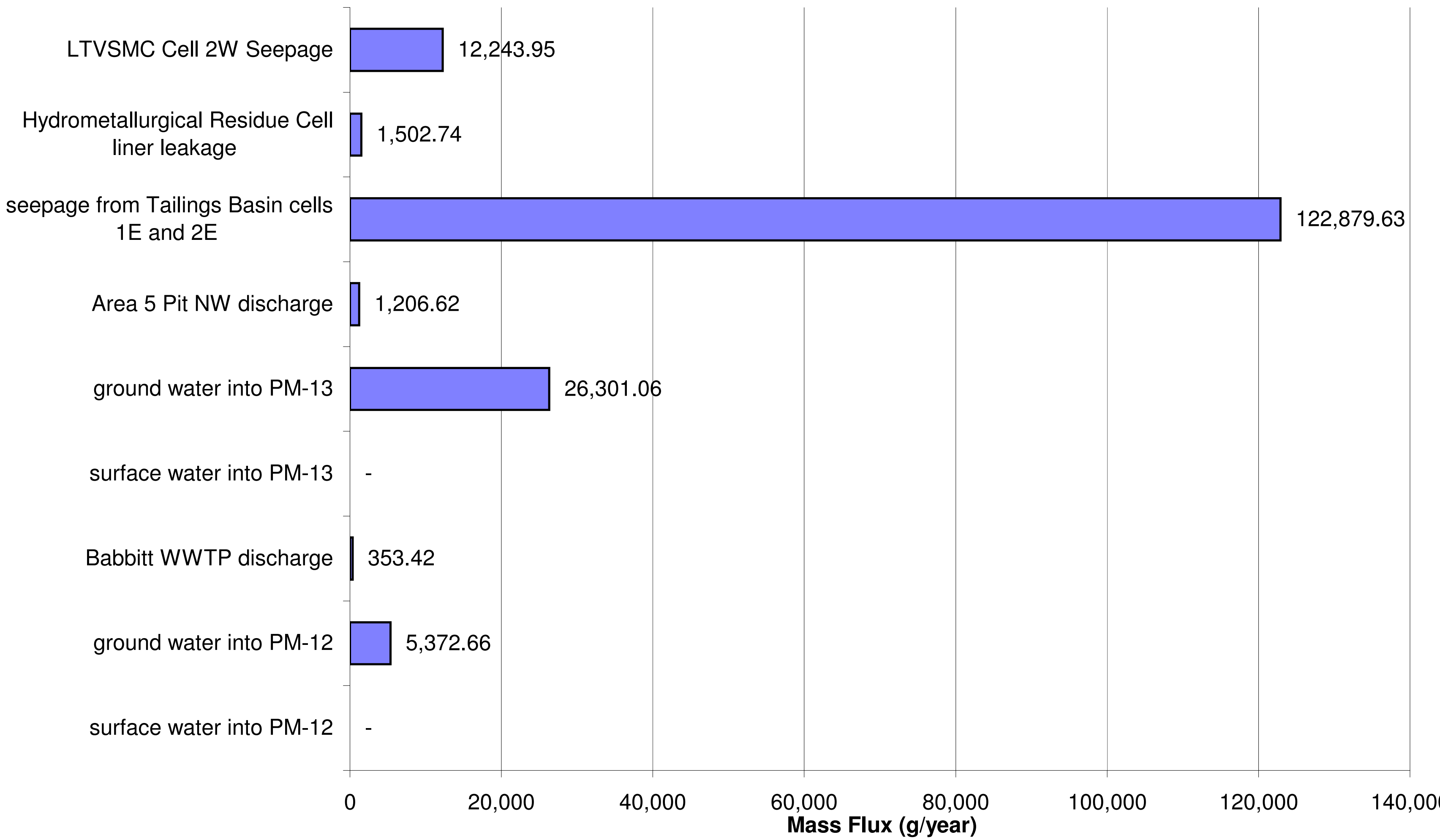

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Copper (Cu)
LTVSMC Cell 2W Seepage
4.87%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
20.75%
Area 5 Pit NW discharge
3.68%
ground water into PM-13
9.02%
surface water into PM-13
49.43%
Babbitt WWTP discharge
0.27%
ground water into PM-12
1.84%
surface water into PM-12
10.13%
0%
10%
20%
30%
40%
50%
60%
Percent

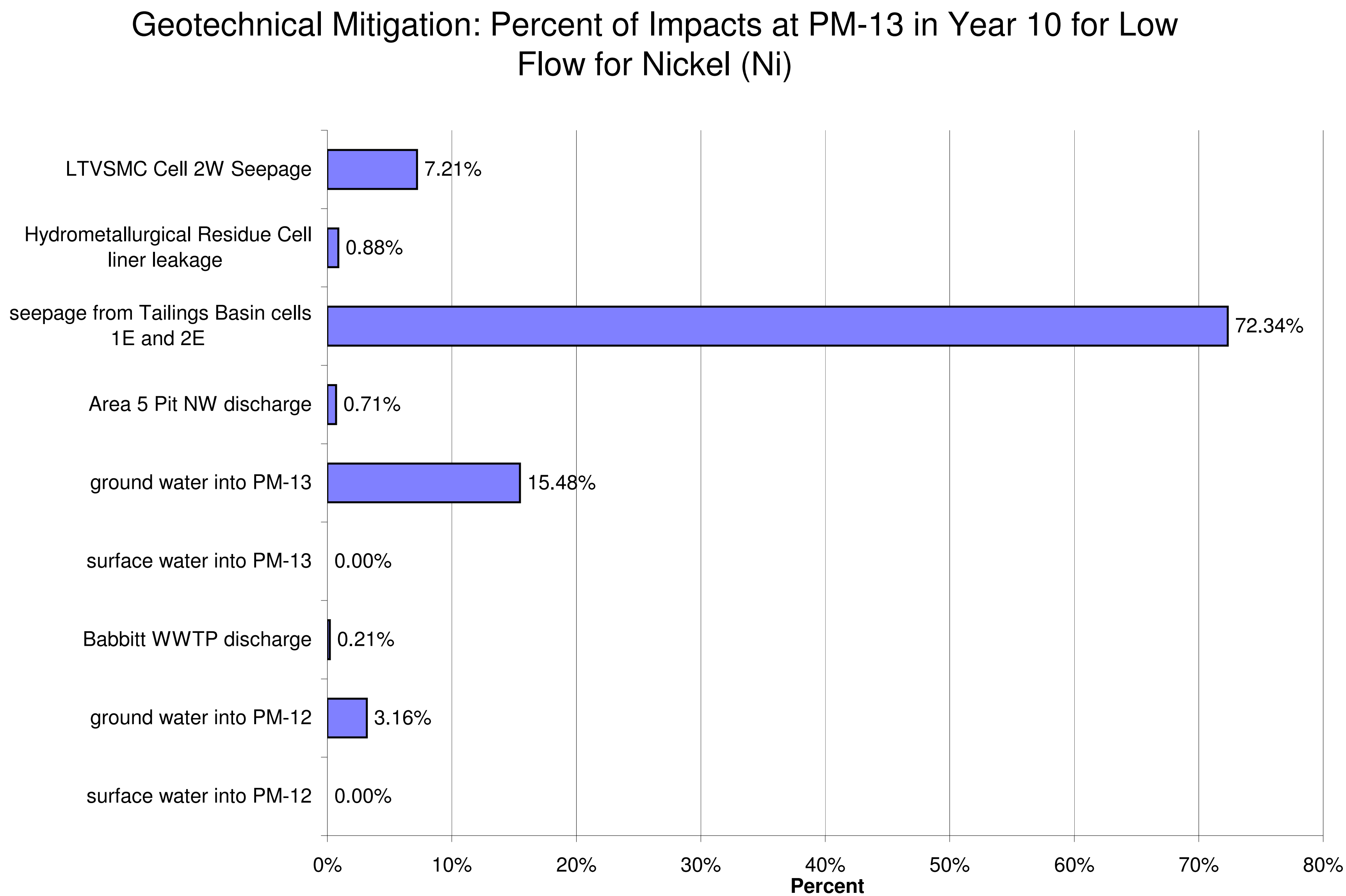

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Copper (Cu)
LTVSMC Cell 2W Seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
23.00
seepage from Tailings Basin cells 1E and 2E
34,574.93
Area 5 Pit NW discharge
6,127.24
ground water into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
ground water into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

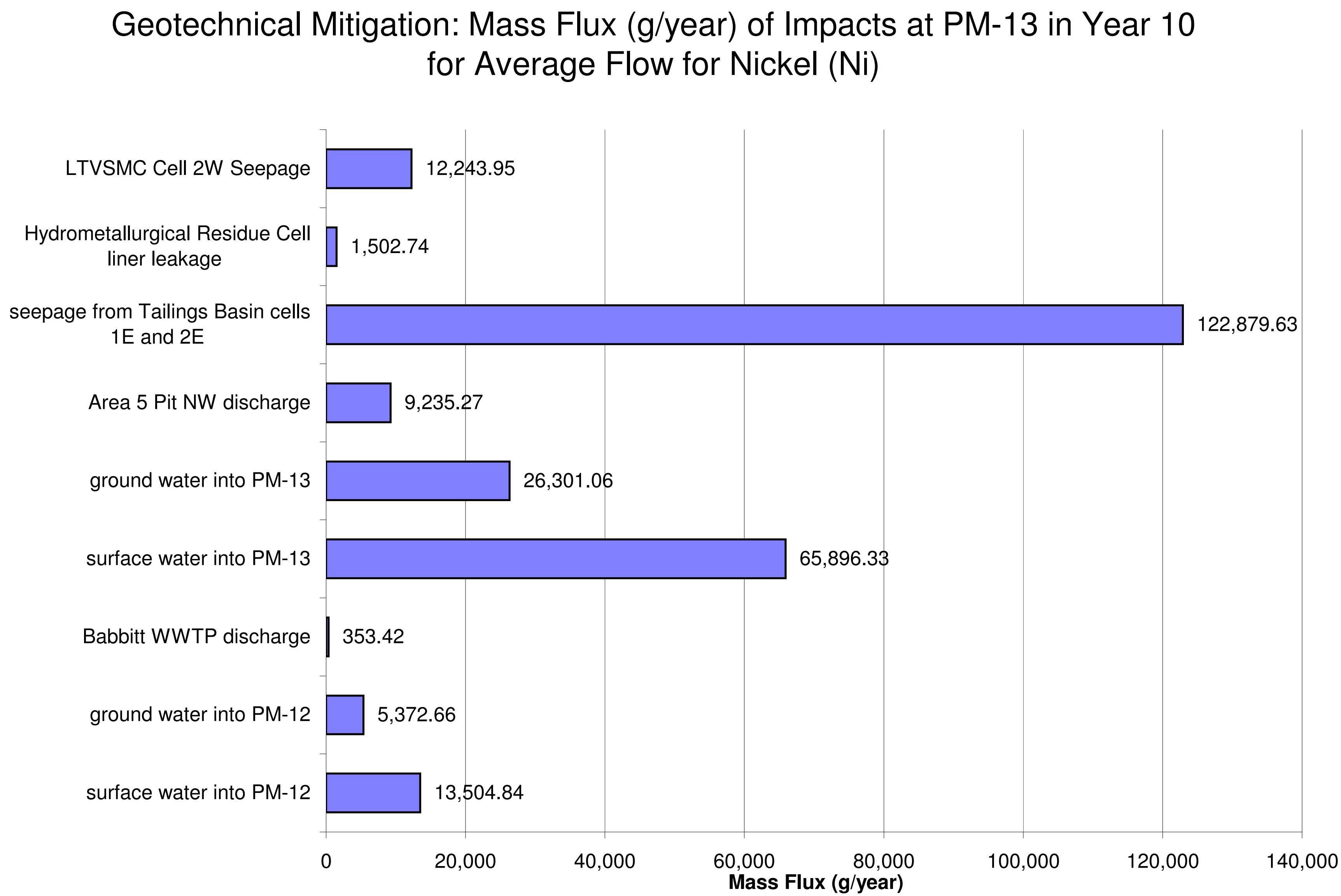
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Copper (Cu)



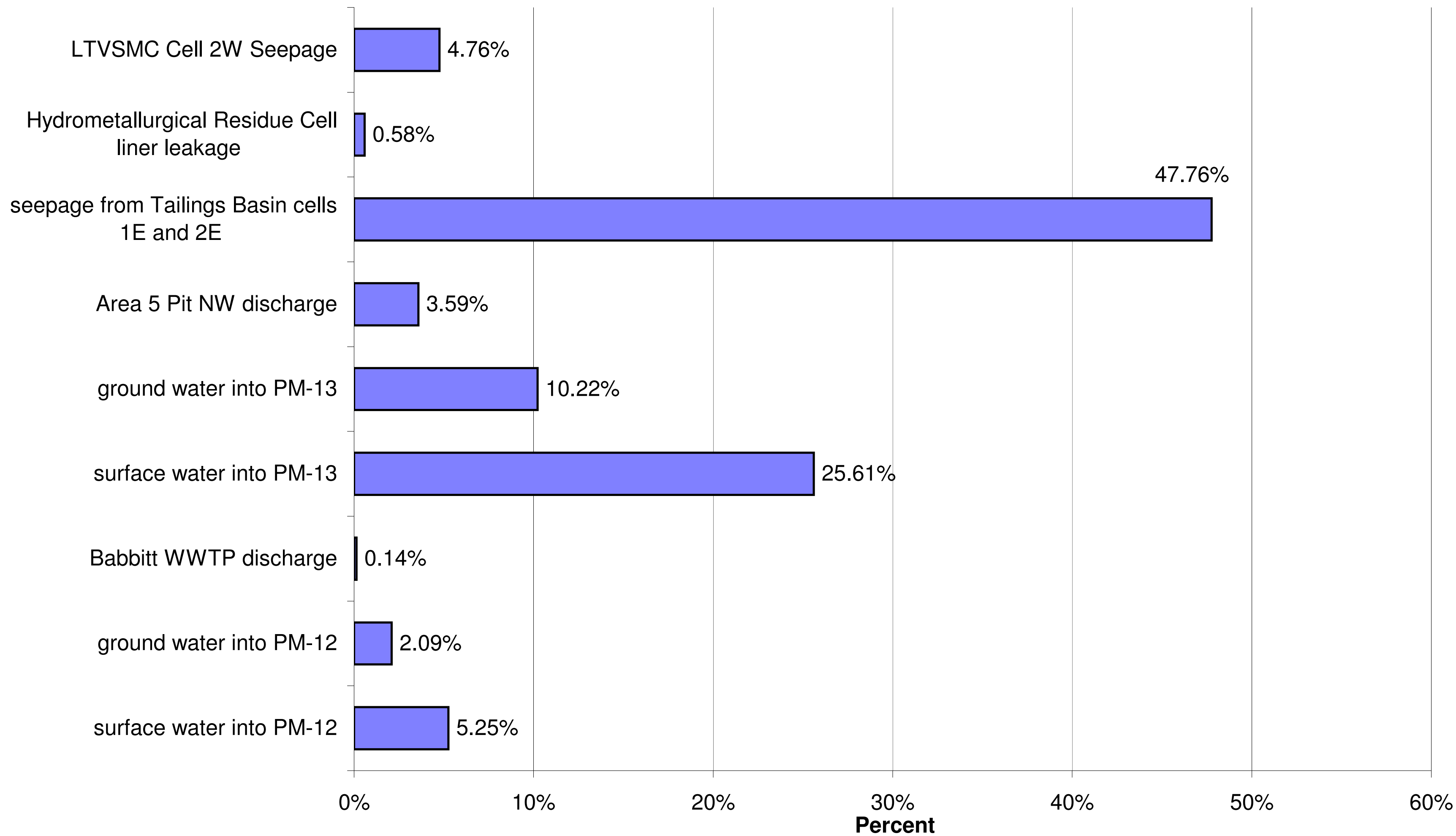
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Nickel (Ni)

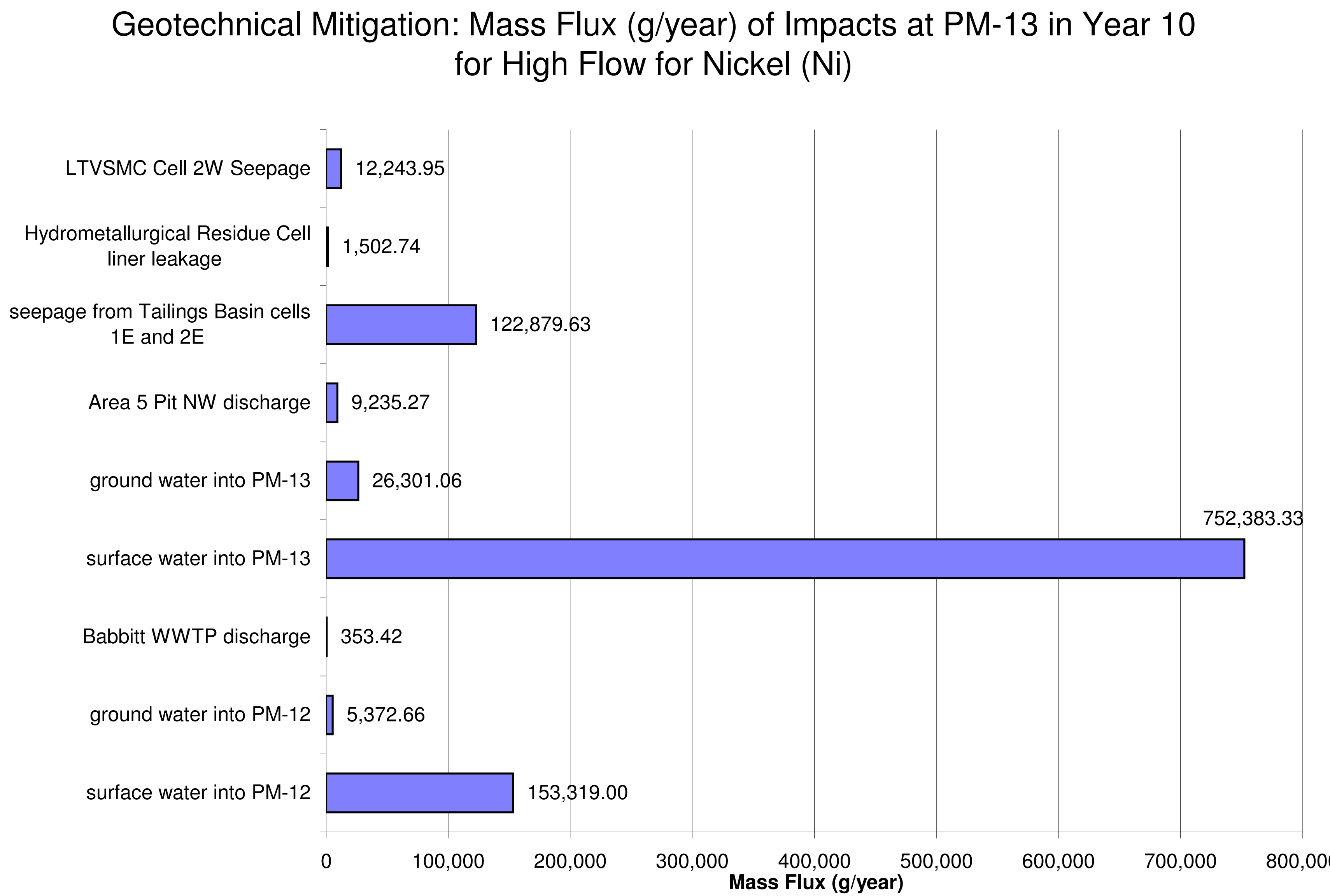


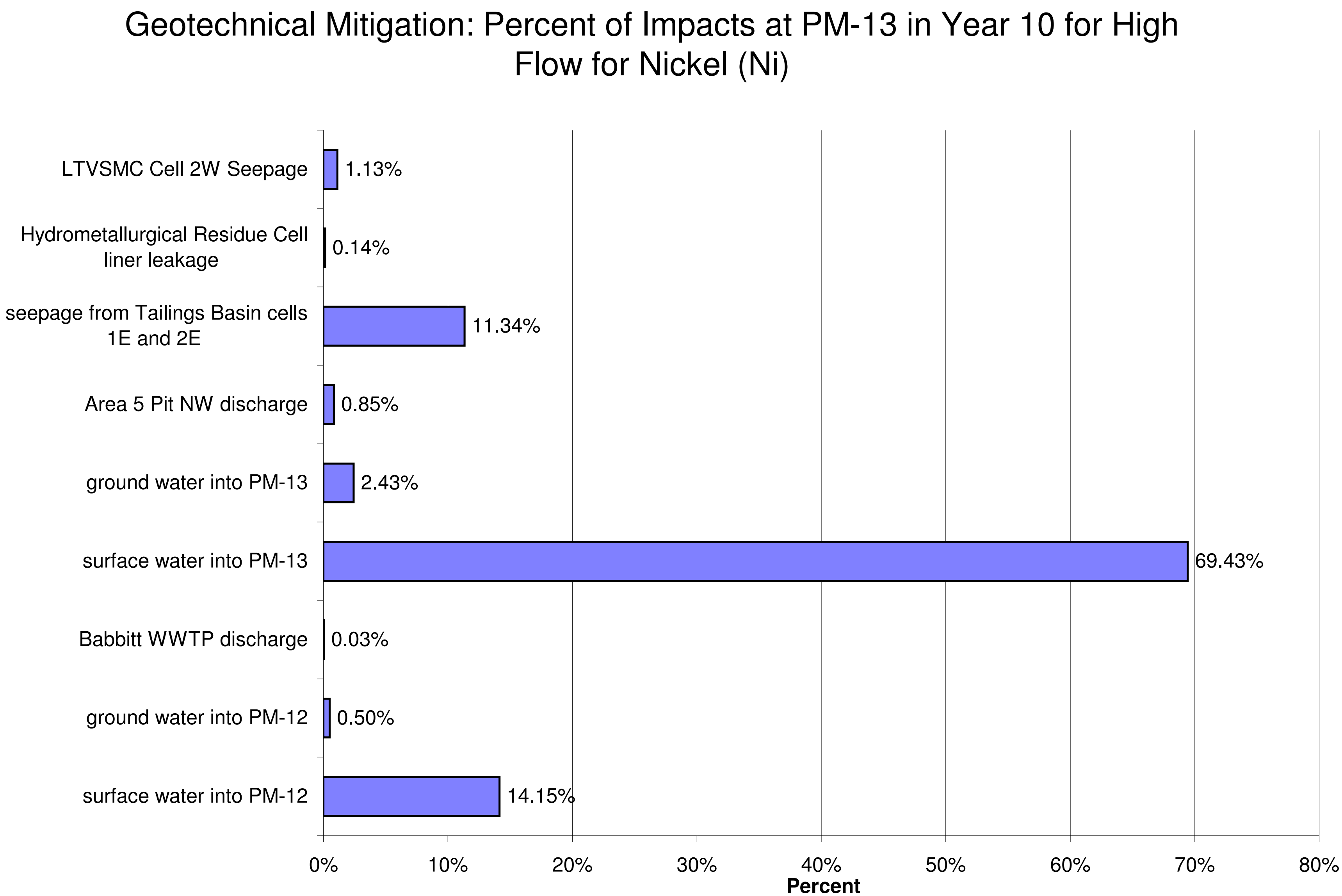

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W Seepage
7.21%
Hydrometallurgical Residue Cell liner leakage
0.88%
seepage from Tailings Basin cells 1E and 2E
72.34%
Area 5 Pit NW discharge
0.71%
ground water into PM-13
15.48%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.21%
ground water into PM-12
3.16%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W Seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,502.74
seepage from Tailings Basin cells 1E and 2E
122,879.63
Area 5 Pit NW discharge
9,235.27
ground water into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
ground water into PM-12
5,372.66
surface water into PM-12
13,504.84
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Mass Flux (g/year)

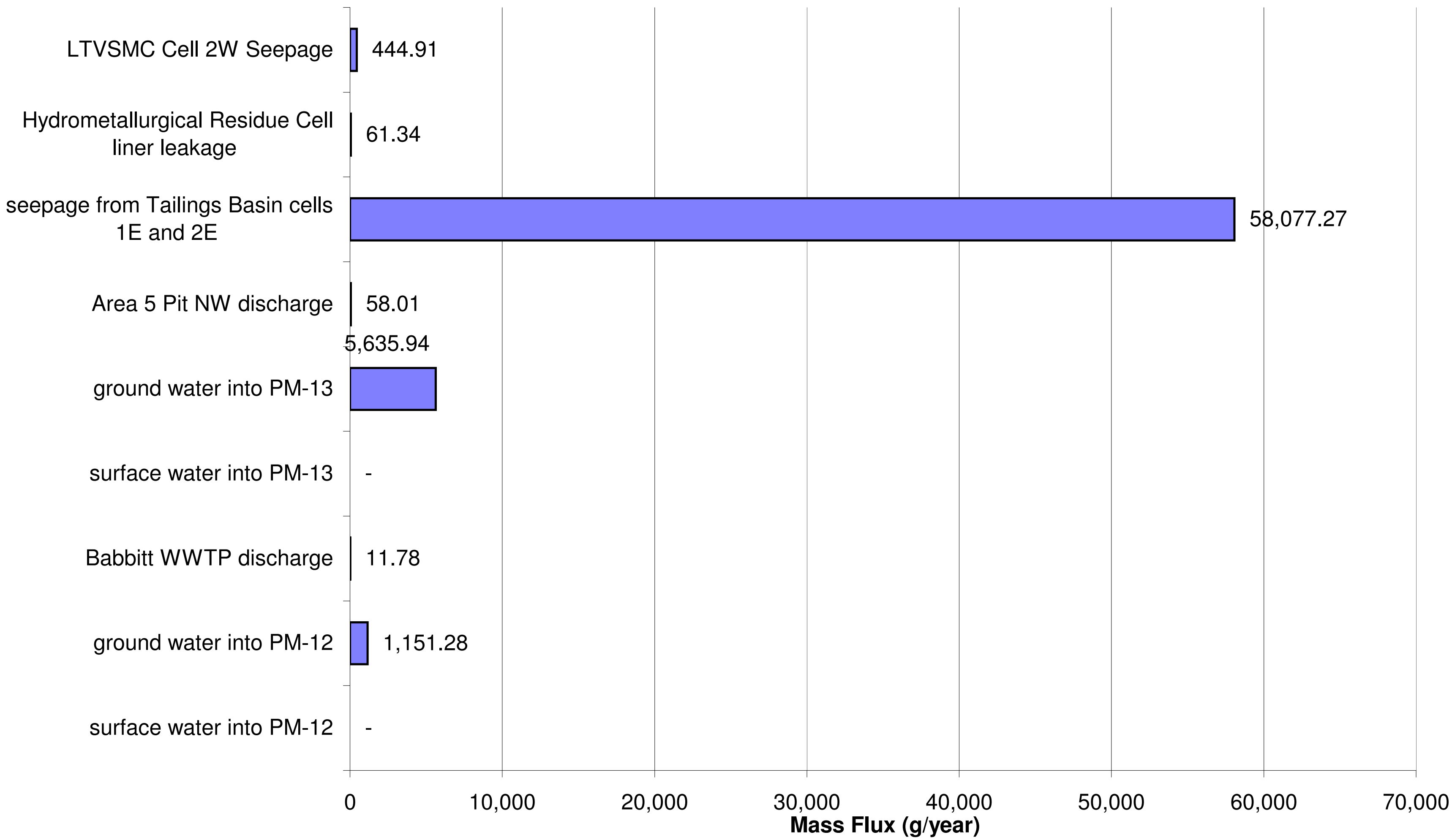
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Nickel (Ni)

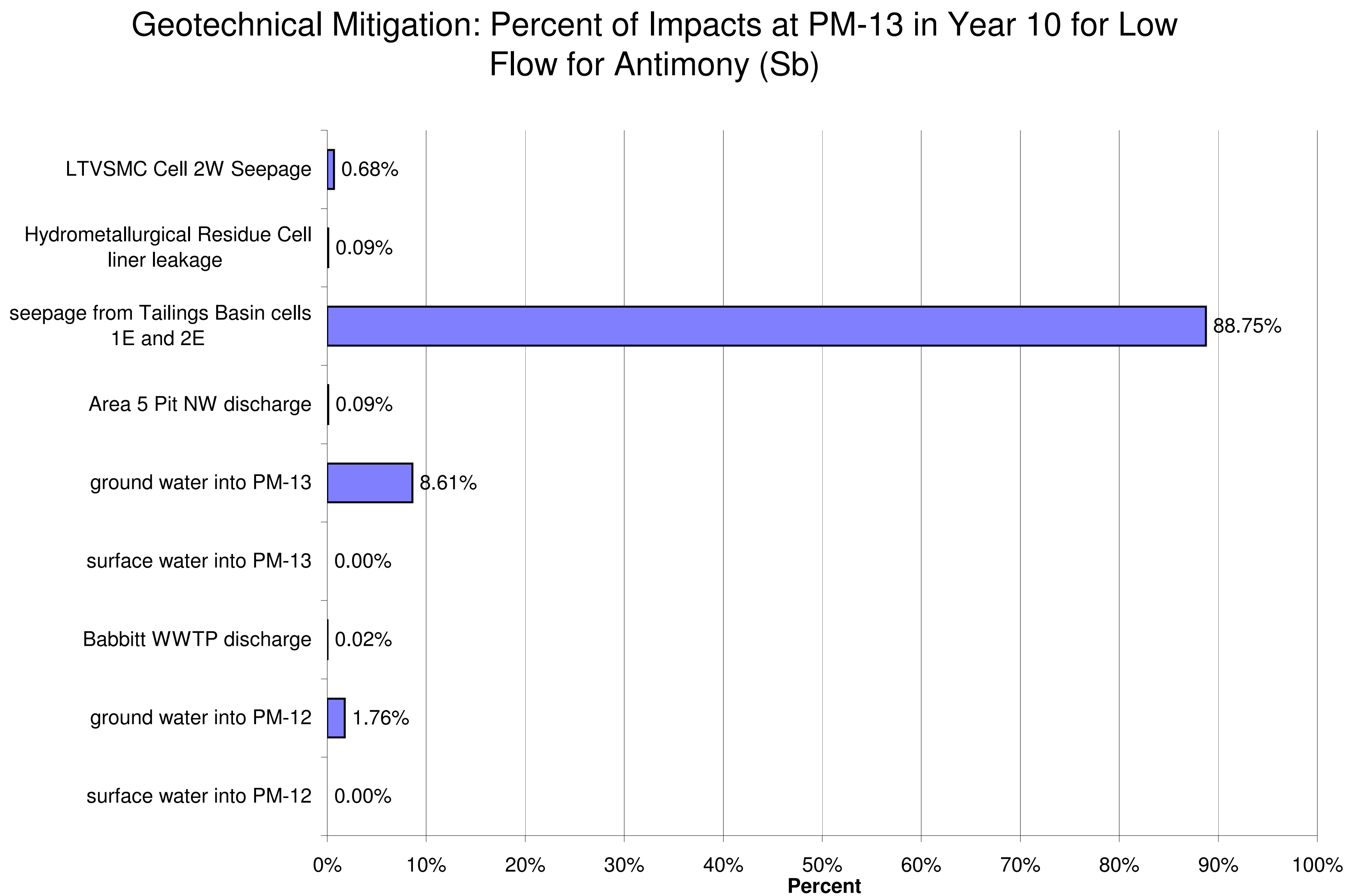


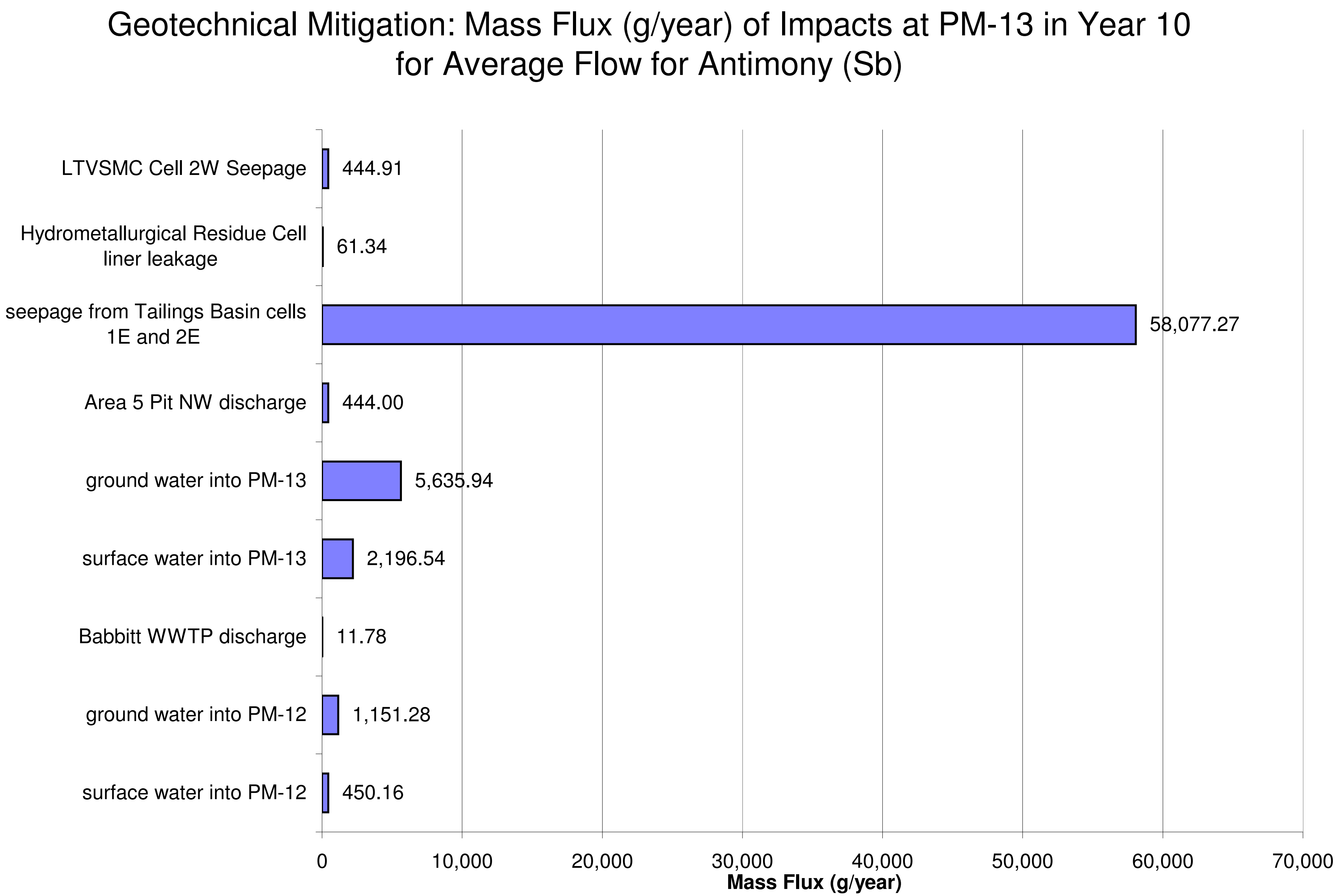

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Nickel (Ni)
LTVSMC Cell 2W Seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,502.74
seepage from Tailings Basin cells 1E and 2E
122,879.63
Area 5 Pit NW discharge
9,235.27
ground water into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
ground water into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

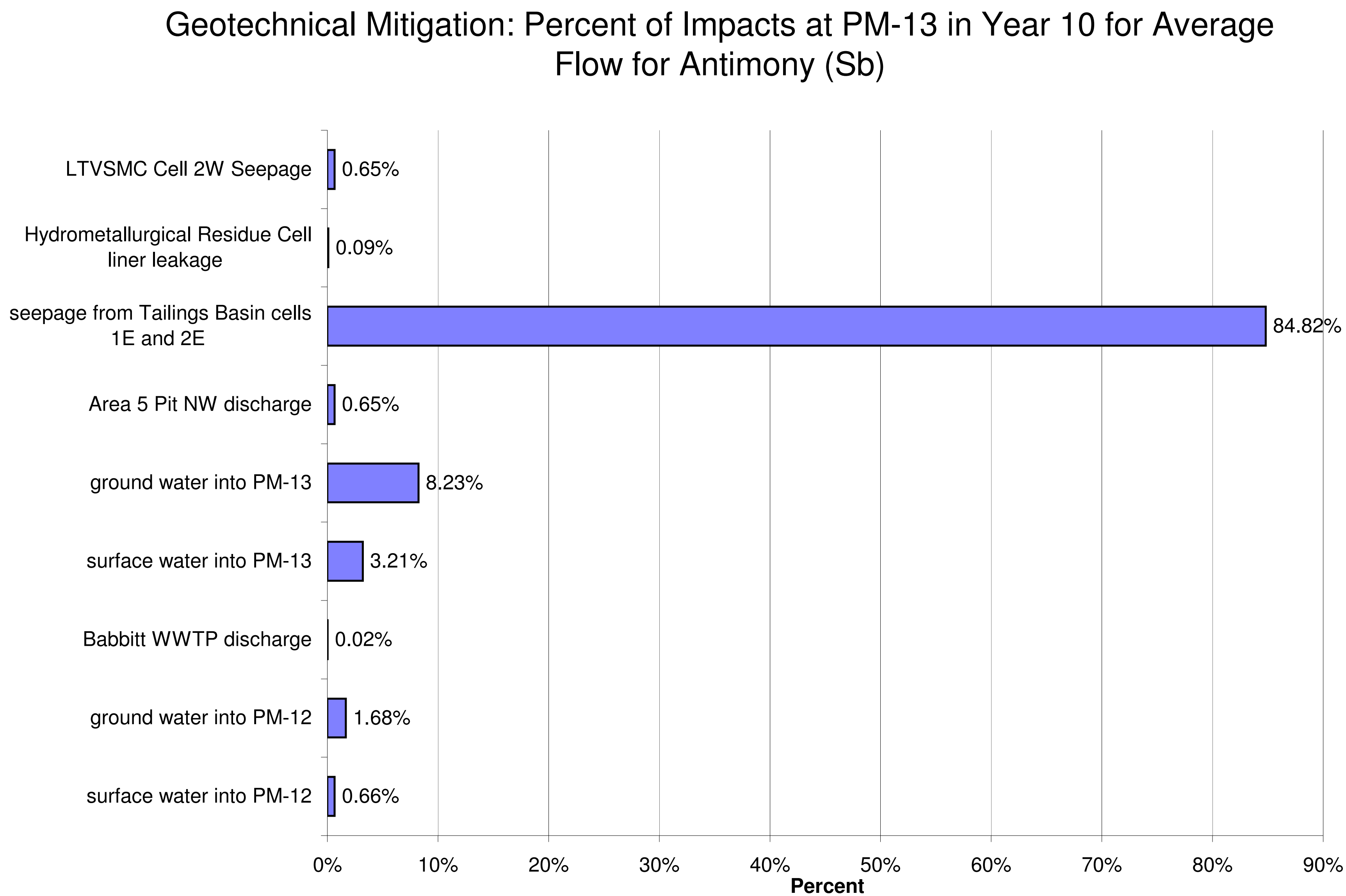

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Nickel (Ni)
LTVSMC Cell 2W Seepage
1.13%
Hydrometallurgical Residue Cell liner leakage
0.14%
seepage from Tailings Basin cells 1E and 2E
11.34%
Area 5 Pit NW discharge
0.85%
ground water into PM-13
2.43%
surface water into PM-13
69.43%
Babbitt WWTP discharge
0.03%
ground water into PM-12
0.50%
surface water into PM-12
14.15%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Antimony (Sb)

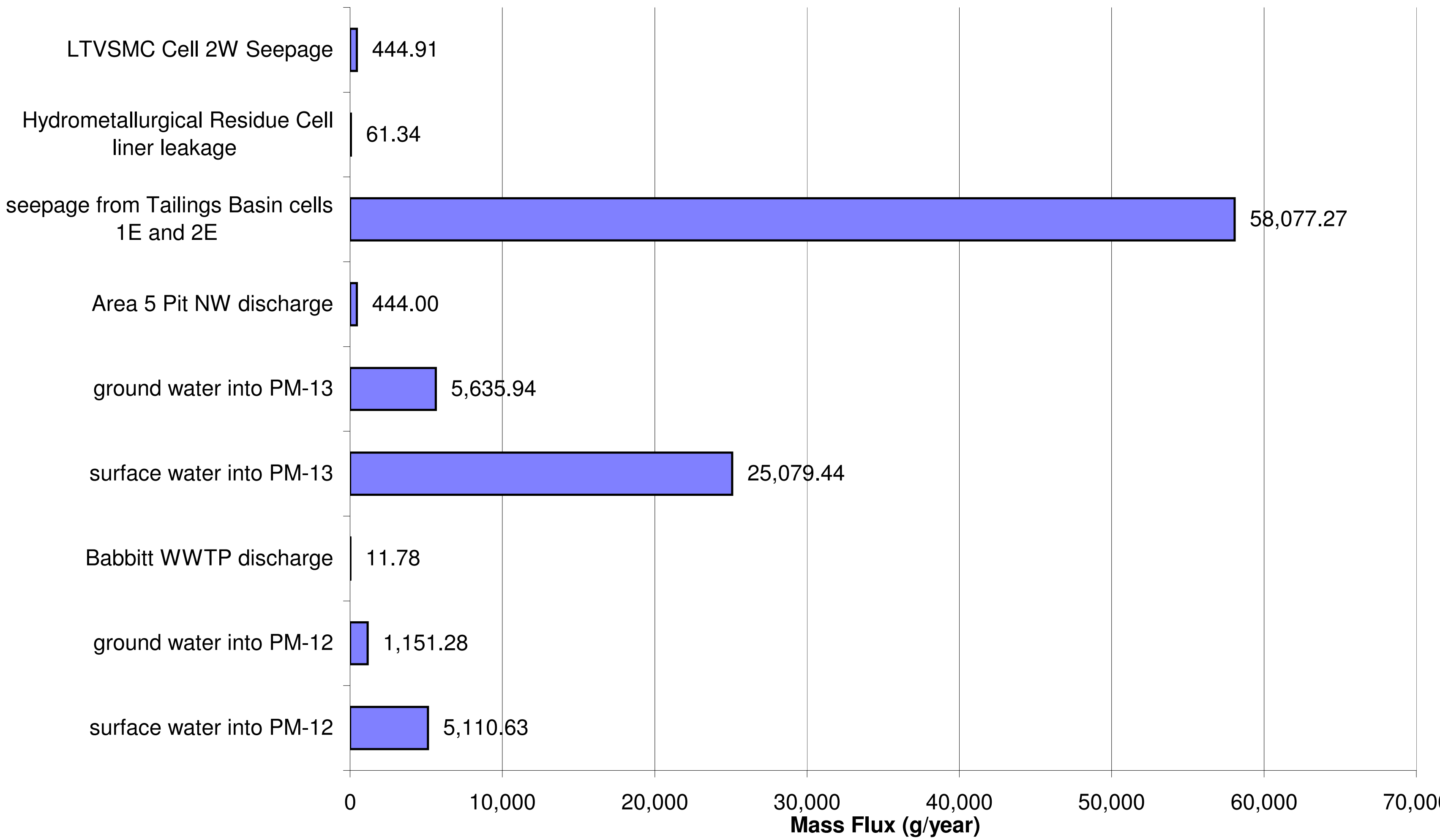



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W Seepage
0.68%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
88.75%
Area 5 Pit NW discharge
0.09%
ground water into PM-13
8.61%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.02%
ground water into PM-12
1.76%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

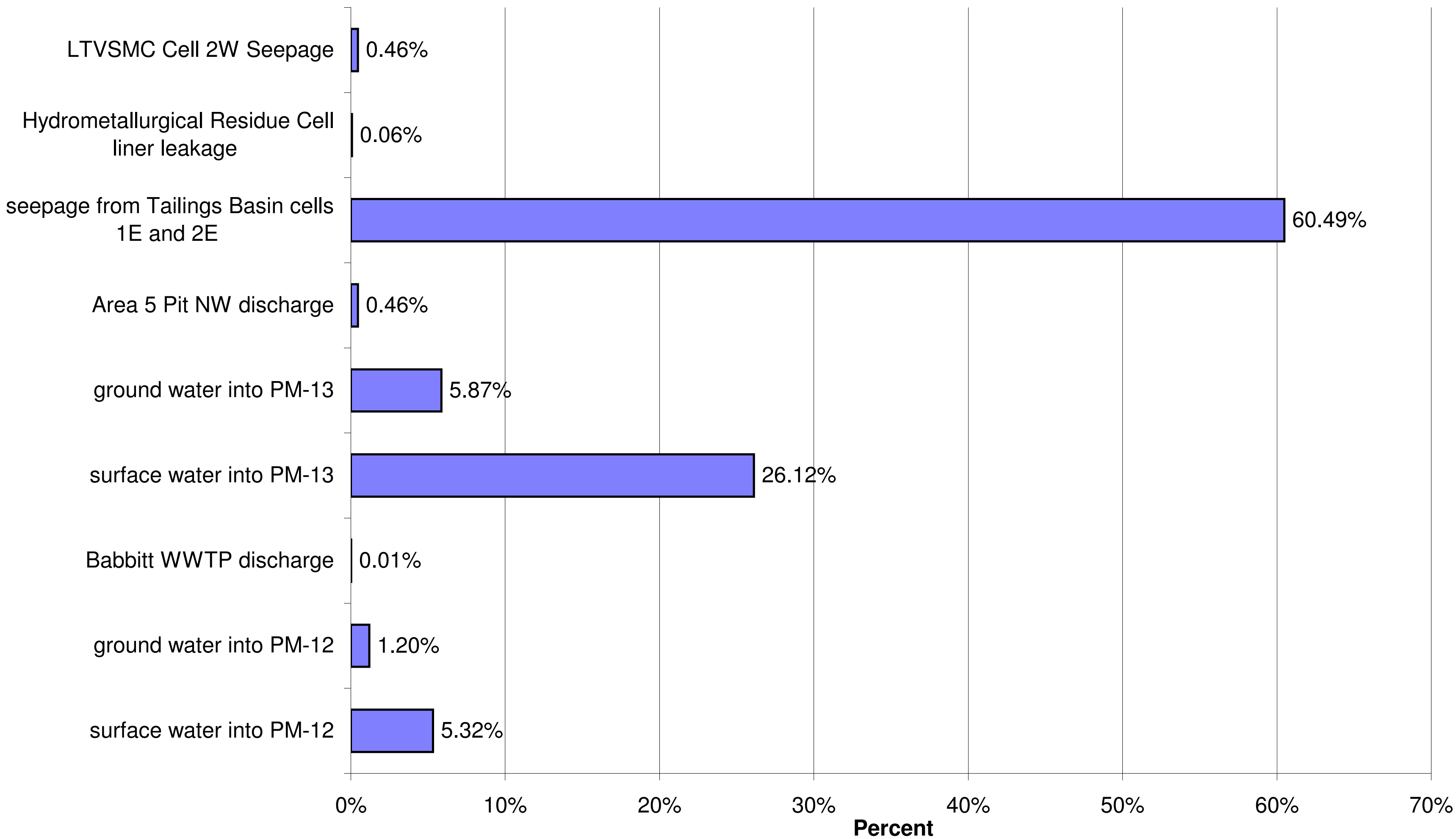

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W Seepage
444.91
Hydrometallurgical Residue Cell liner leakage
61.34
seepage from Tailings Basin cells 1E and 2E
58,077.27
Area 5 Pit NW discharge
444.00
ground water into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
ground water into PM-12
1,151.28
surface water into PM-12
450.16
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W Seepage
0.65%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
84.82%
Area 5 Pit NW discharge
0.65%
ground water into PM-13
8.23%
surface water into PM-13
3.21%
Babbitt WWTP discharge
0.02%
ground water into PM-12
1.68%
surface water into PM-12
0.66%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

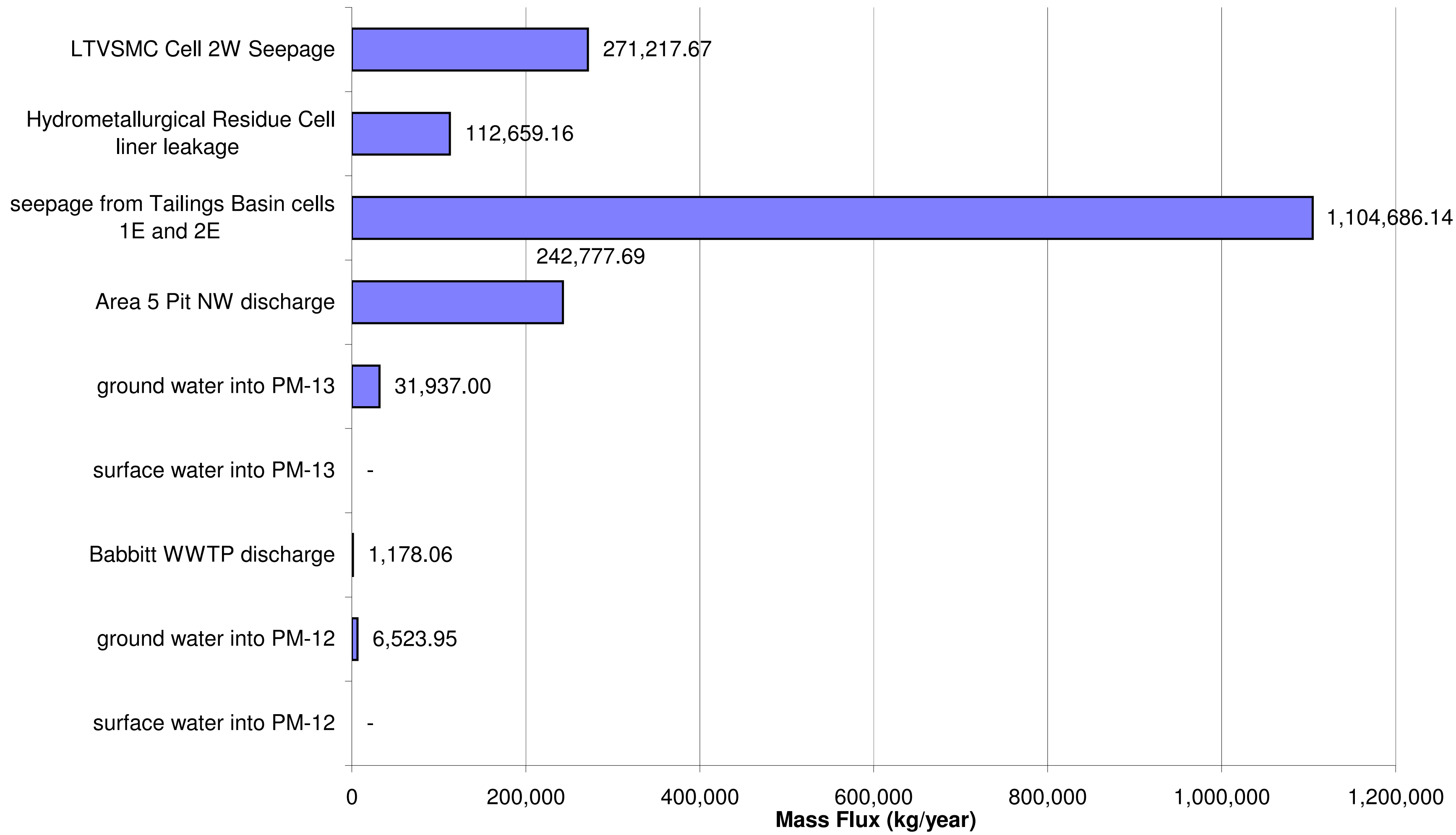
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Antimony (Sb)

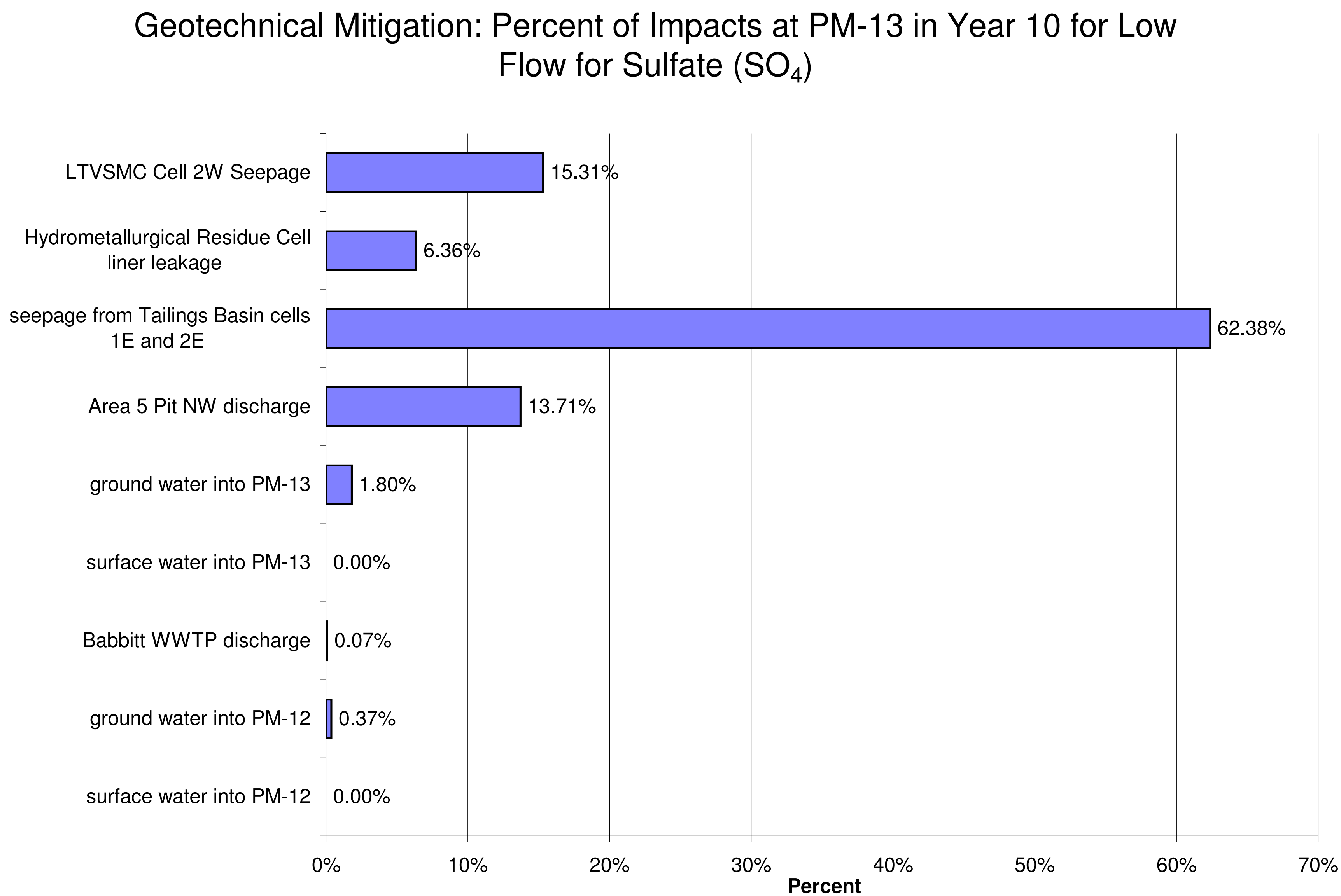


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Antimony (Sb)

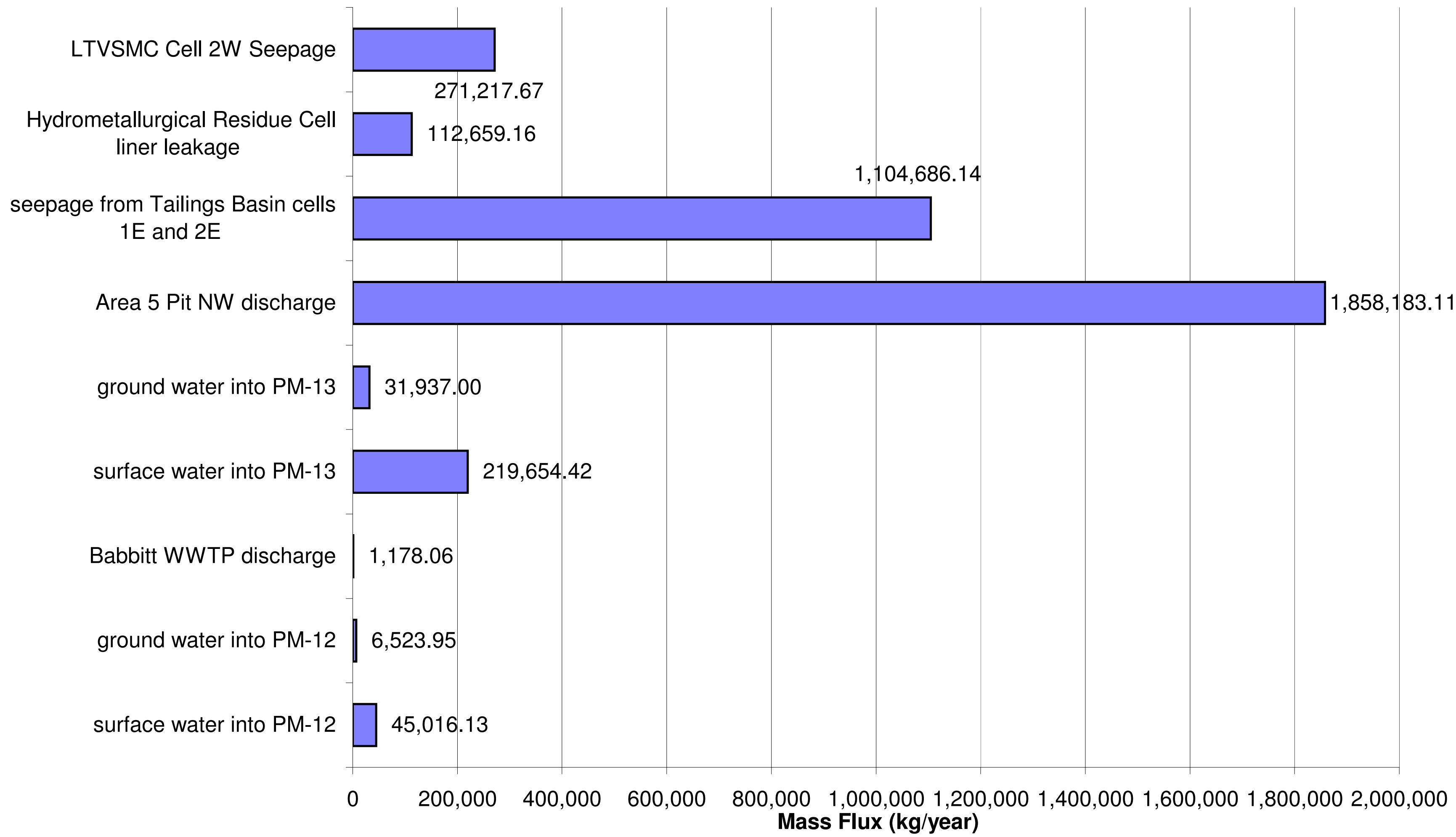


Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 10 for Low Flow for Sulfate (SO_4)

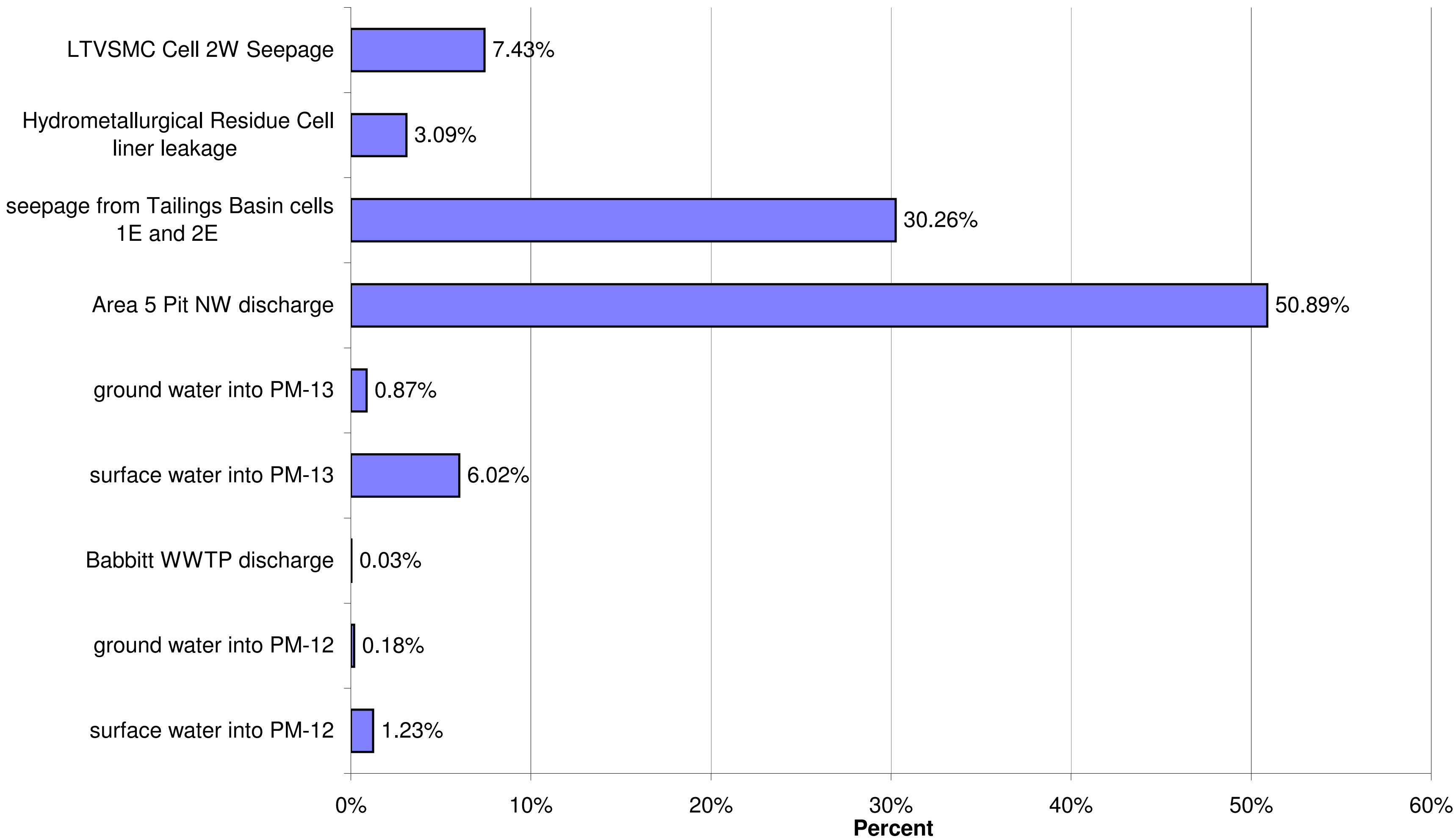


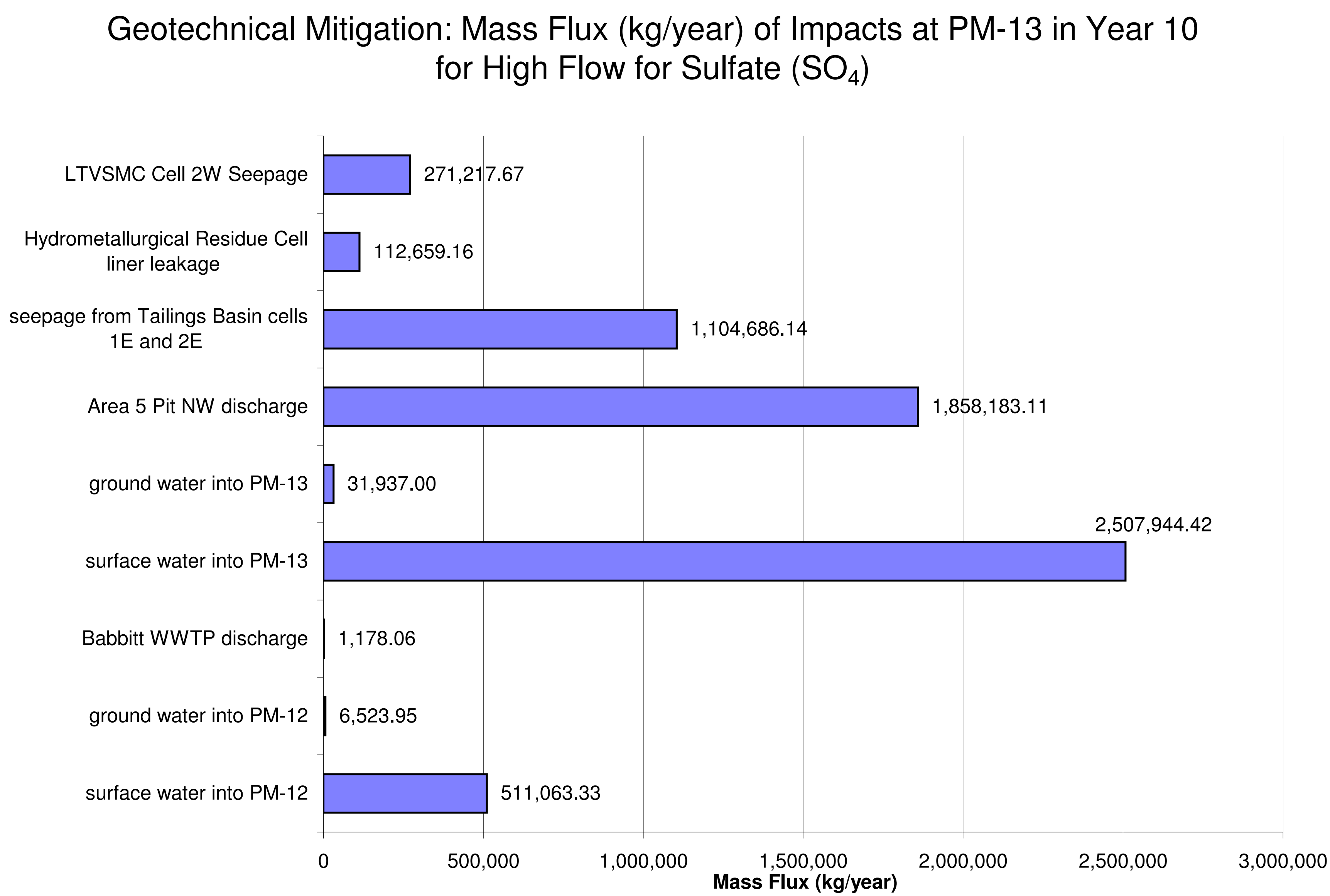

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W Seepage
15.31%
Hydrometallurgical Residue Cell liner leakage
6.36%
seepage from Tailings Basin cells 1E and 2E
62.38%
Area 5 Pit NW discharge
13.71%
ground water into PM-13
1.80%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.07%
ground water into PM-12
0.37%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

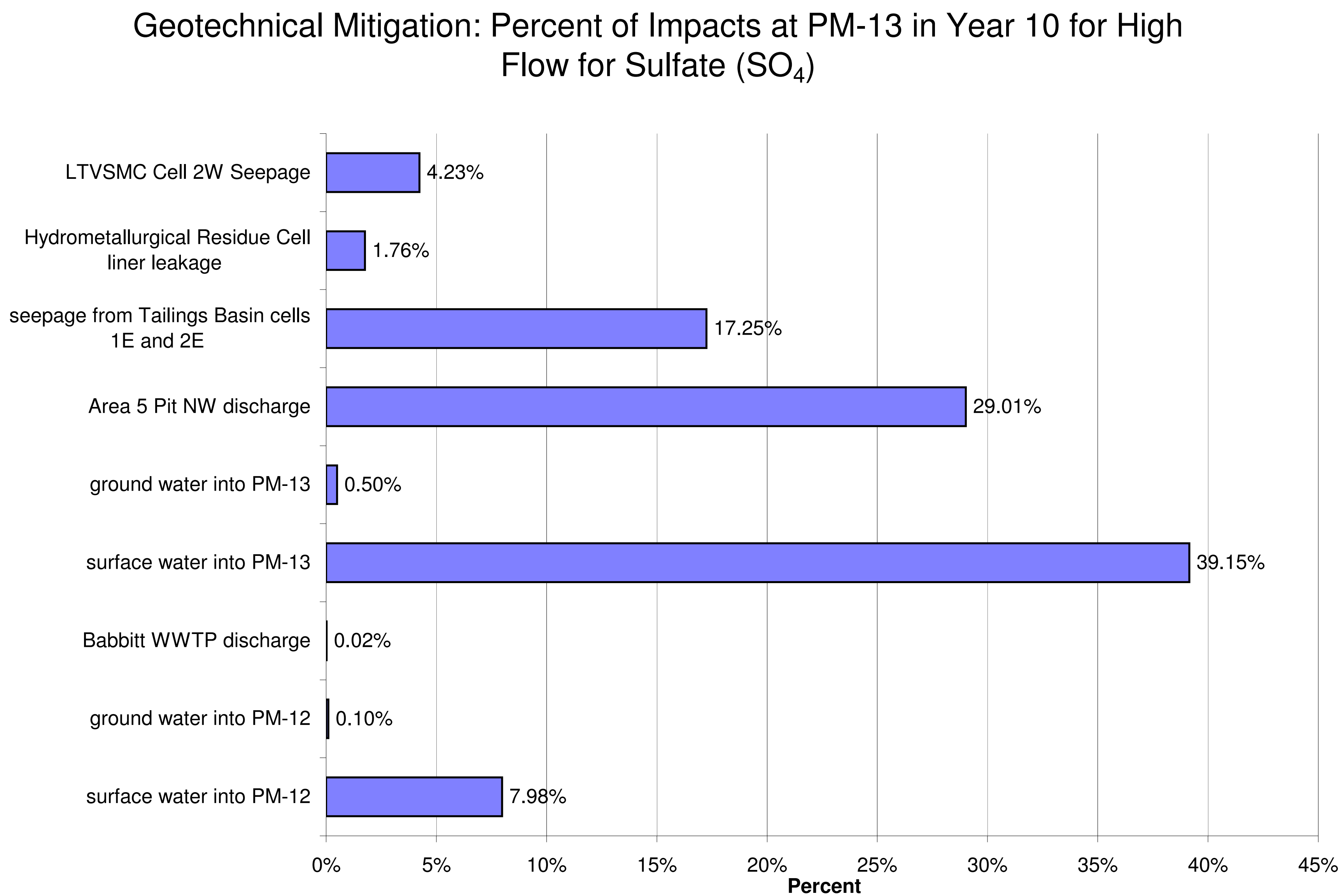
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 10 for Average Flow for Sulfate (SO_4)

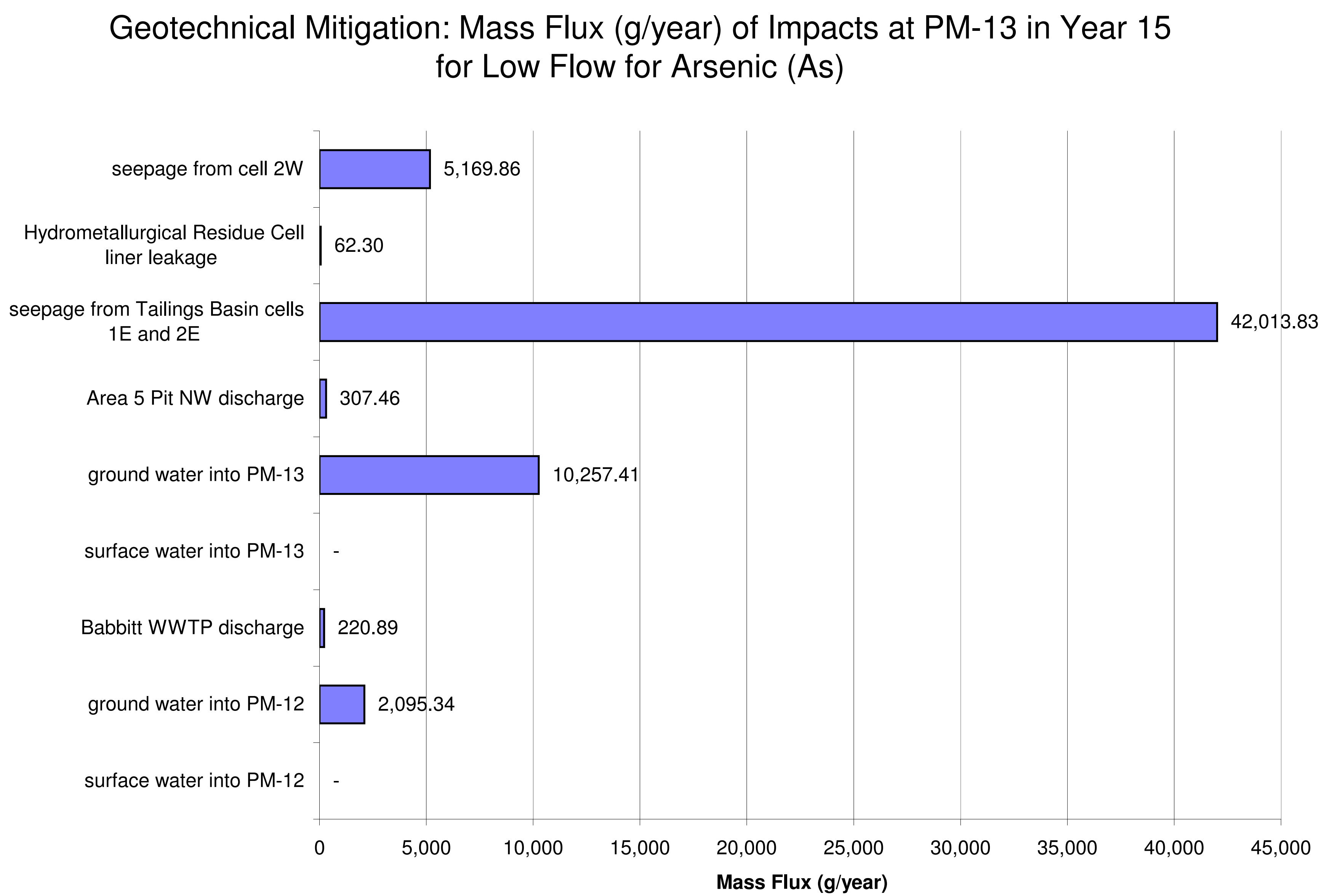


GeotechnicalMitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Sulfate (SO_4)

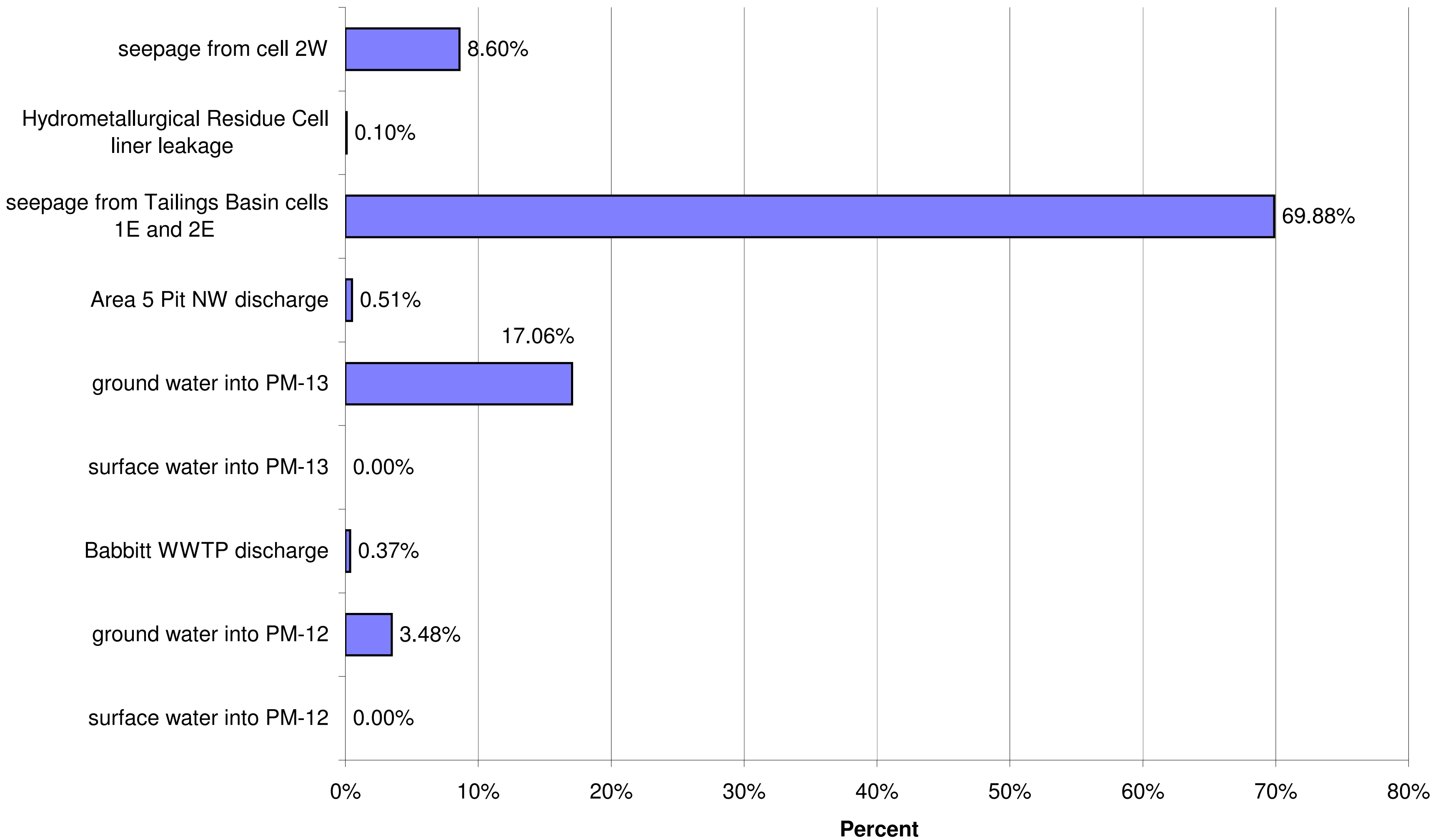


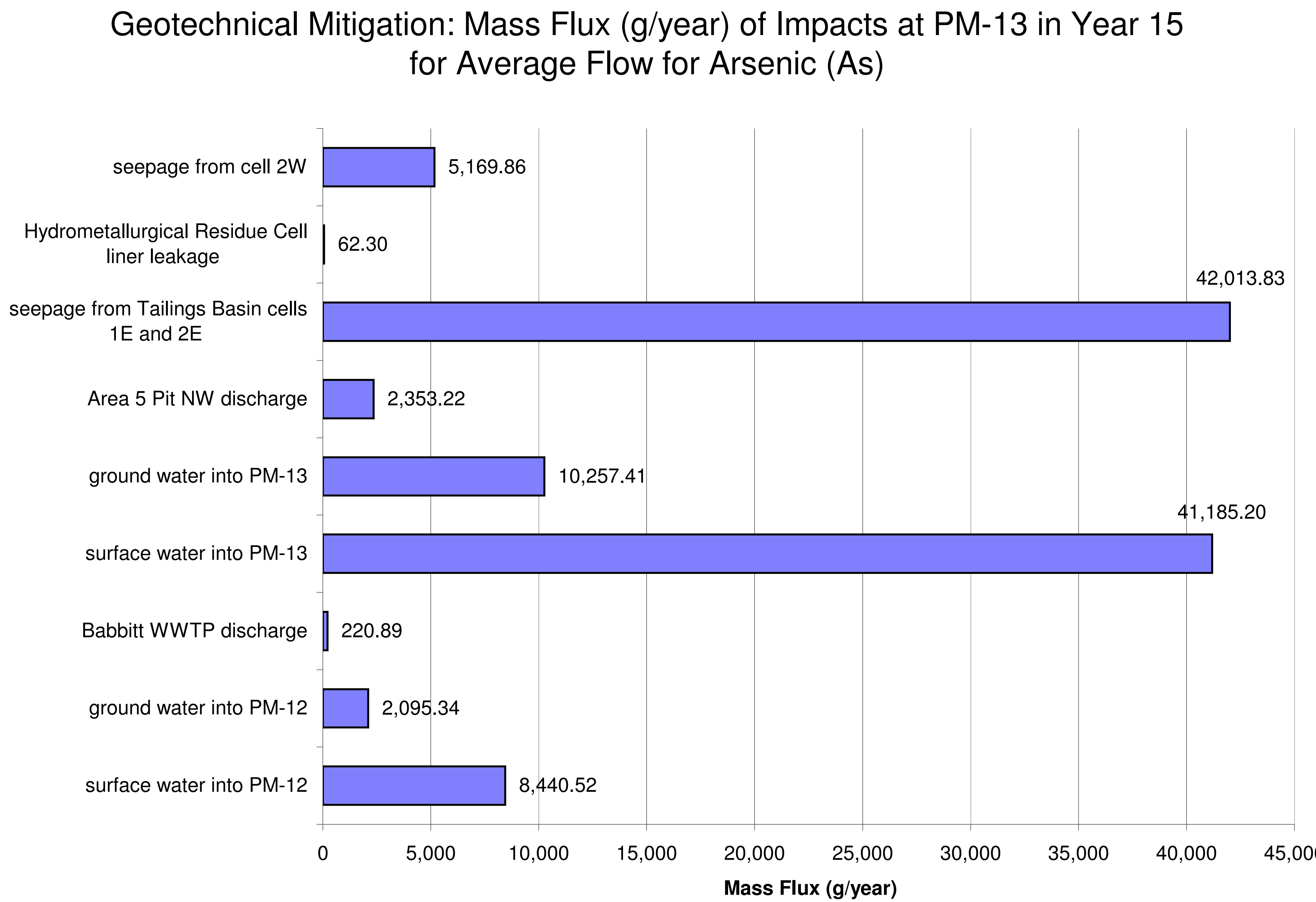

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 10 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W Seepage
271,217.67
Hydrometallurgical Residue Cell liner leakage
112,659.16
seepage from Tailings Basin cells 1E and 2E
1,104,686.14
Area 5 Pit NW discharge
1,858,183.11
ground water into PM-13
31,937.00
surface water into PM-13
2,507,944.42
Babbitt WWTP discharge
1,178.06
ground water into PM-12
6,523.95
surface water into PM-12
511,063.33
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
Mass Flux (kg/year)

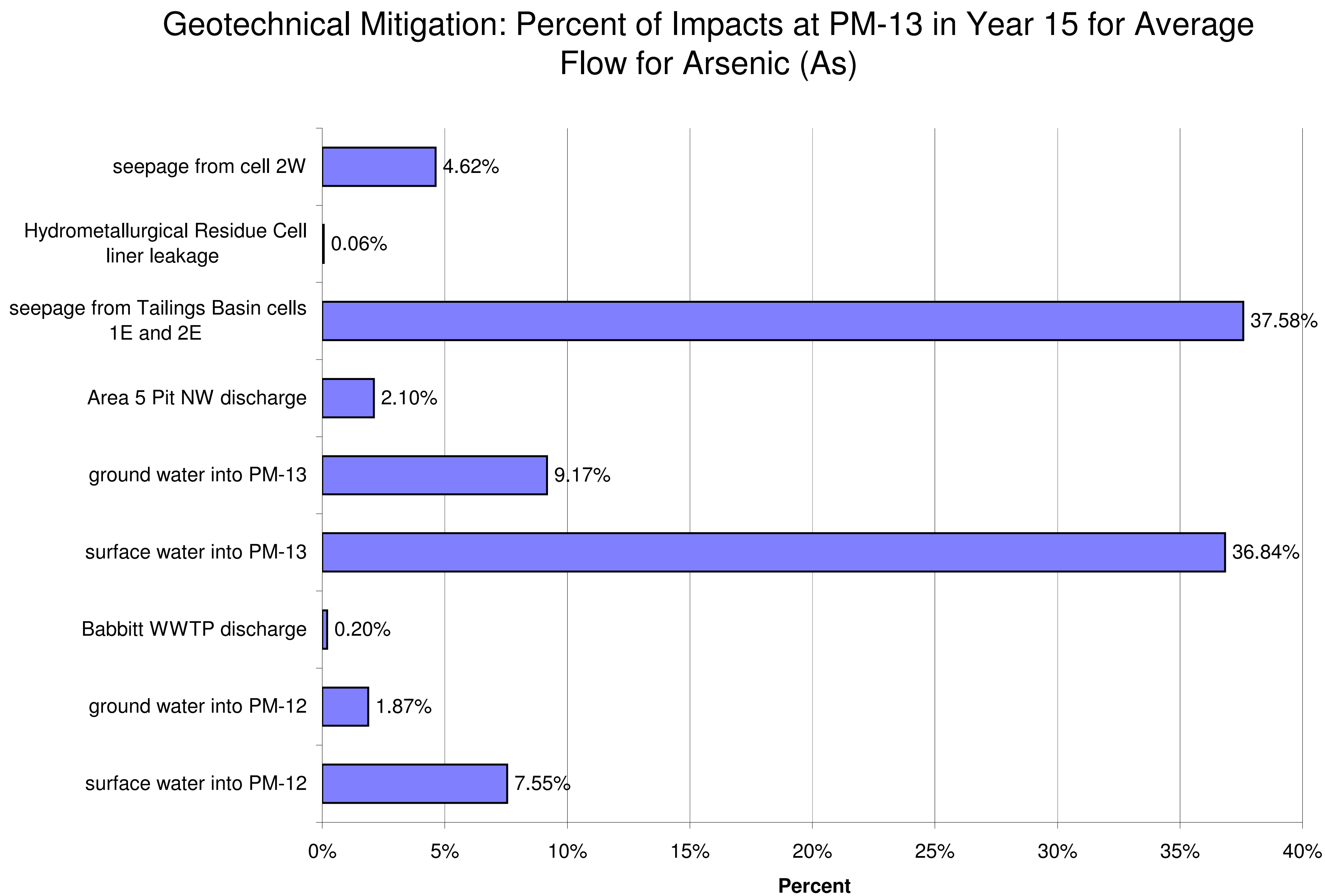

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W Seepage
4.23%
Hydrometallurgical Residue Cell liner leakage
1.76%
seepage from Tailings Basin cells 1E and 2E
17.25%
Area 5 Pit NW discharge
29.01%
ground water into PM-13
0.50%
surface water into PM-13
39.15%
Babbitt WWTP discharge
0.02%
ground water into PM-12
0.10%
surface water into PM-12
7.98%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

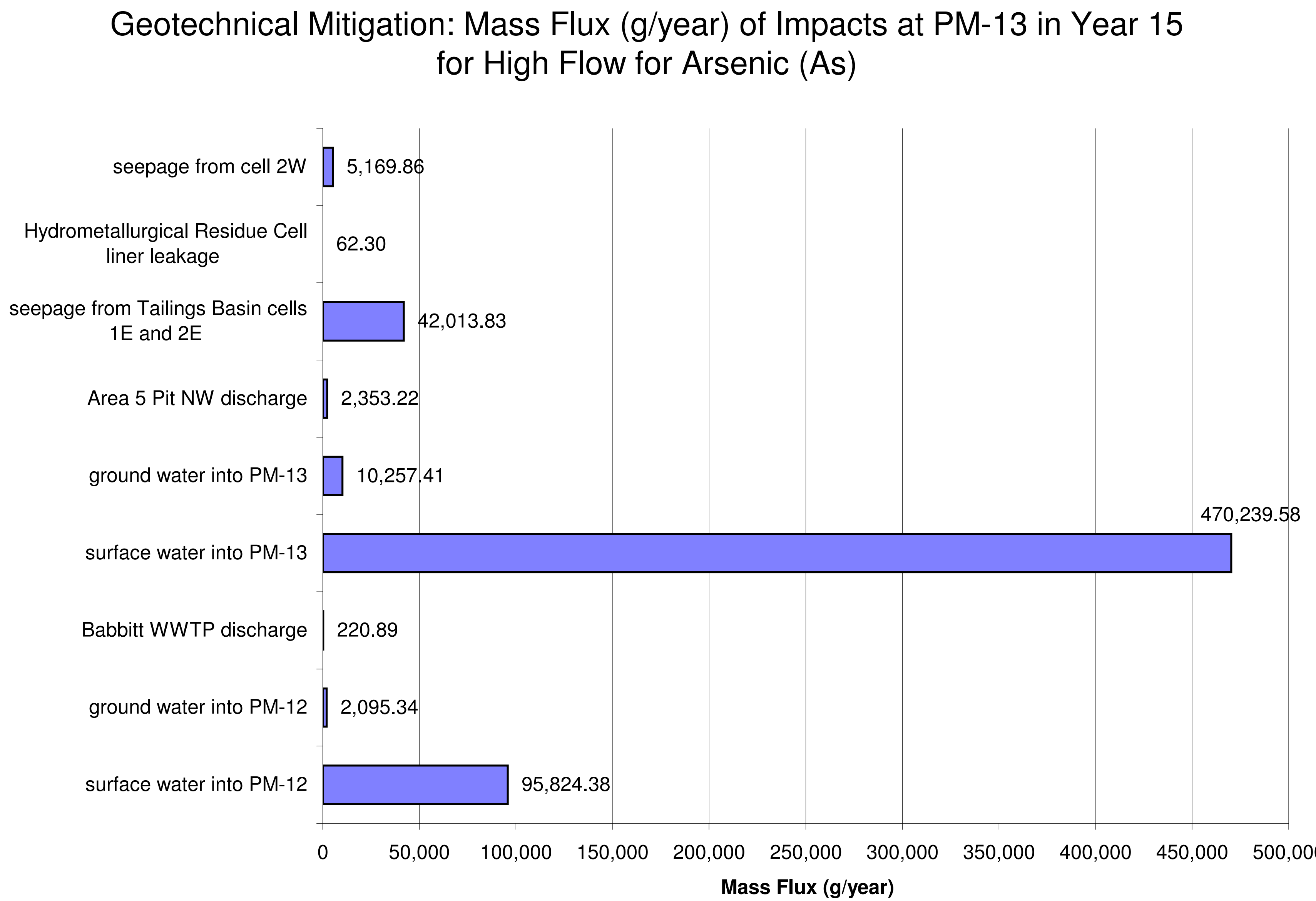

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)
seepage from cell 2W
5,169.86
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
42,013.83
Area 5 Pit NW discharge
307.46
ground water into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
ground water into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)

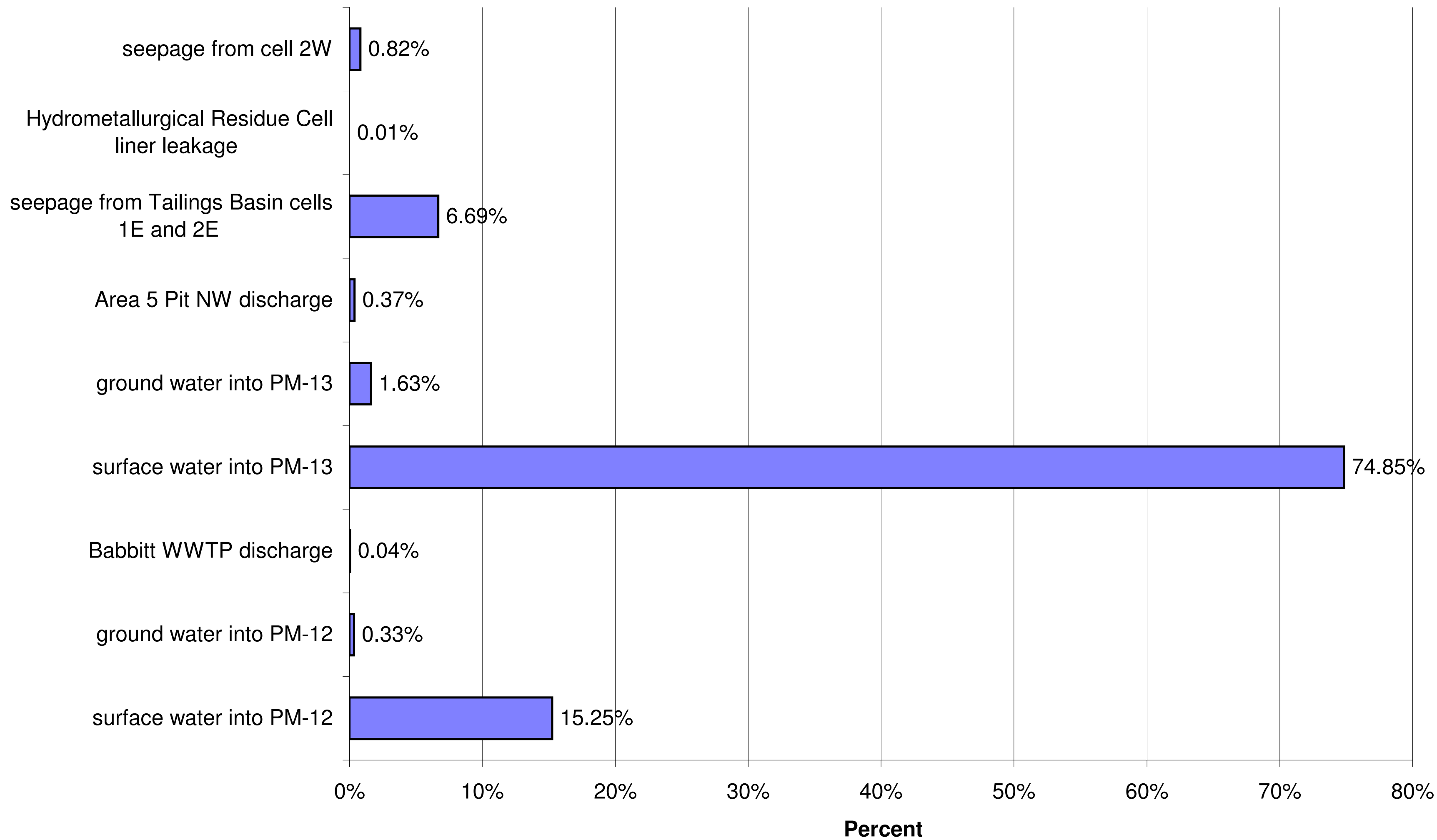



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)
seepage from cell 2W
5,169.86
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
42,013.83
Area 5 Pit NW discharge
2,353.22
ground water into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
ground water into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

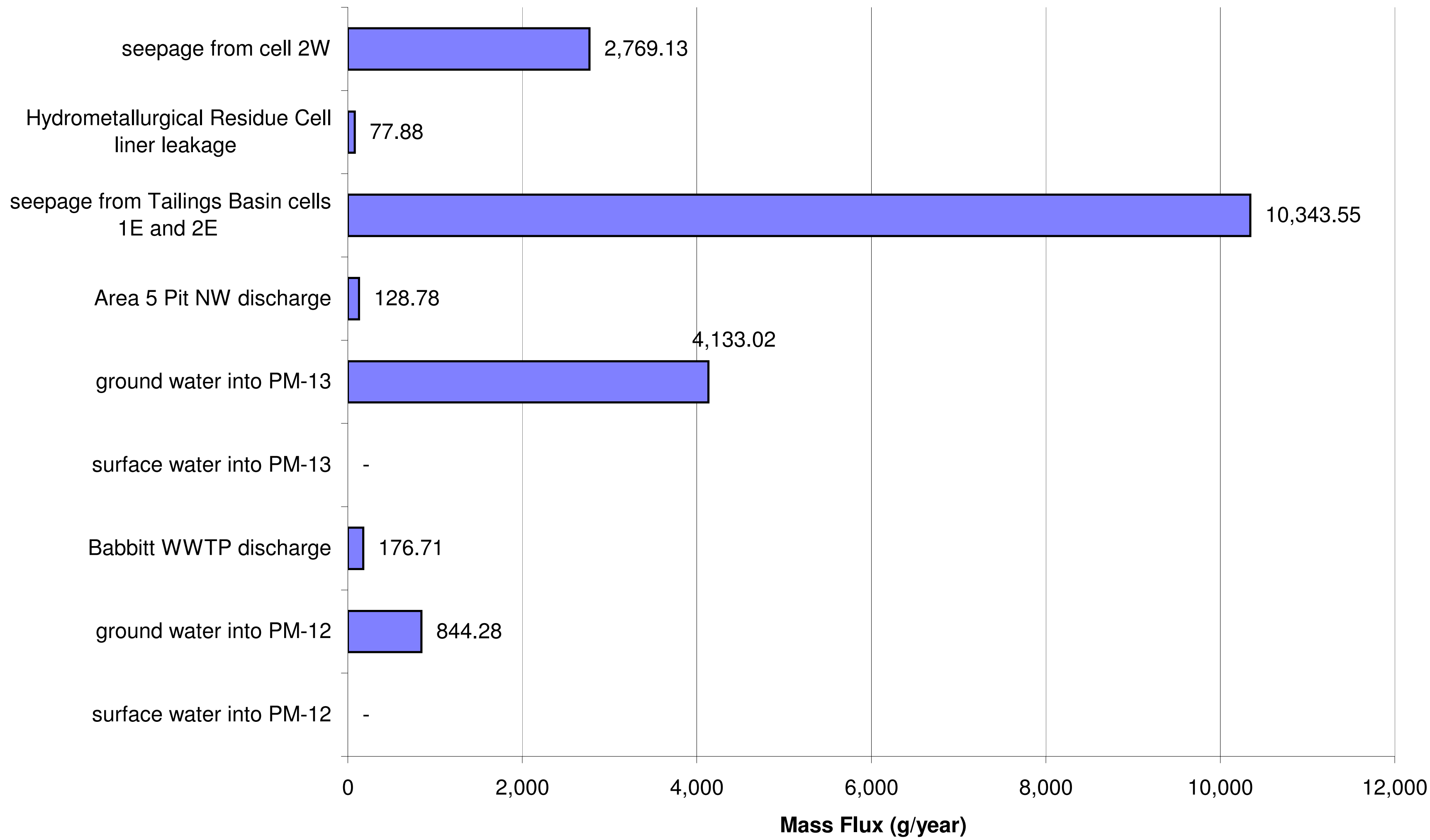

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)
seepage from cell 2W
4.62%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin cells 1E and 2E
37.58%
Area 5 Pit NW discharge
2.10%
ground water into PM-13
9.17%
surface water into PM-13
36.84%
Babbitt WWTP discharge
0.20%
ground water into PM-12
1.87%
surface water into PM-12
7.55%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)
seepage from cell 2W
5,169.86
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
42,013.83
Area 5 Pit NW discharge
2,353.22
ground water into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
ground water into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

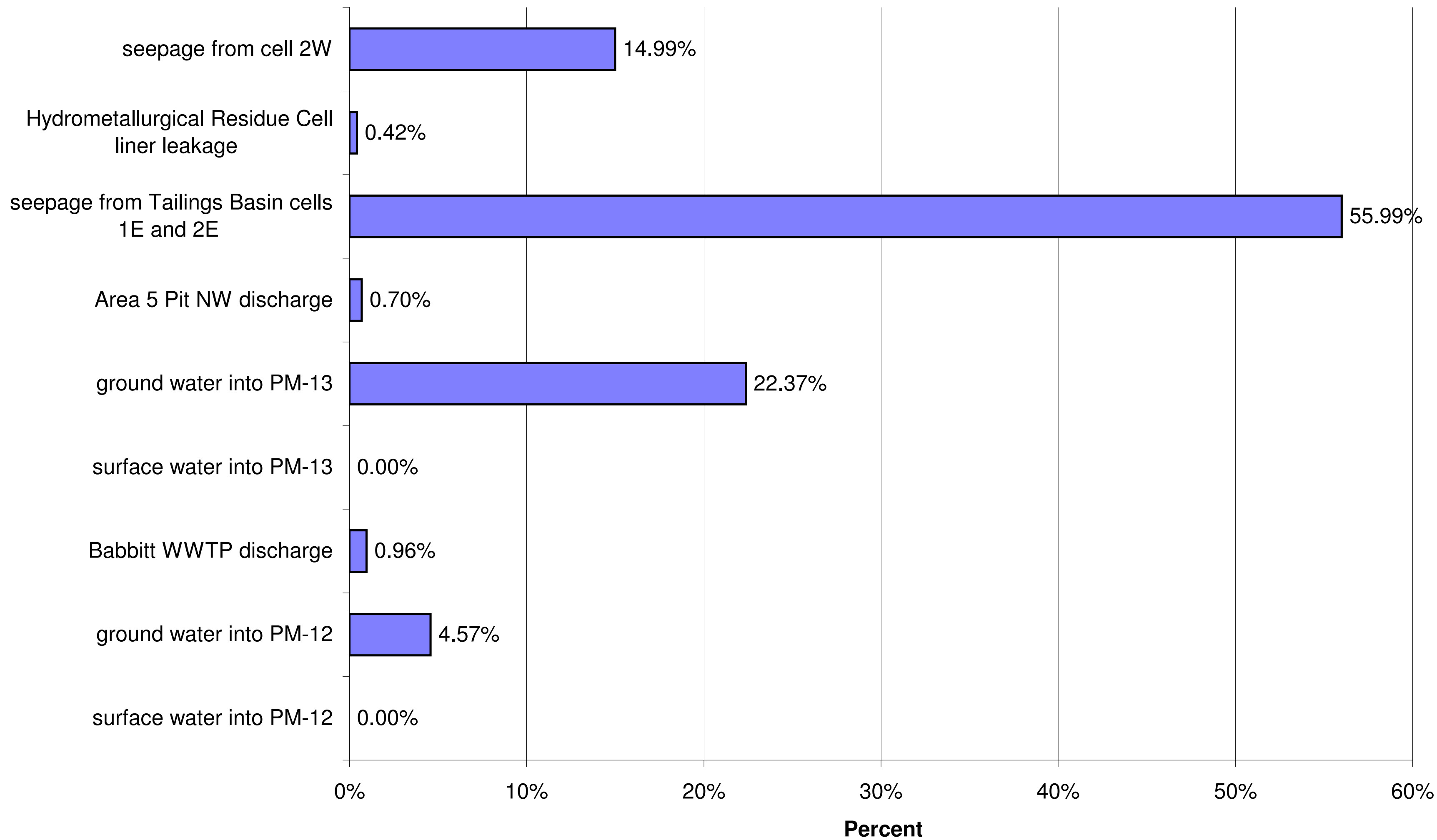
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)



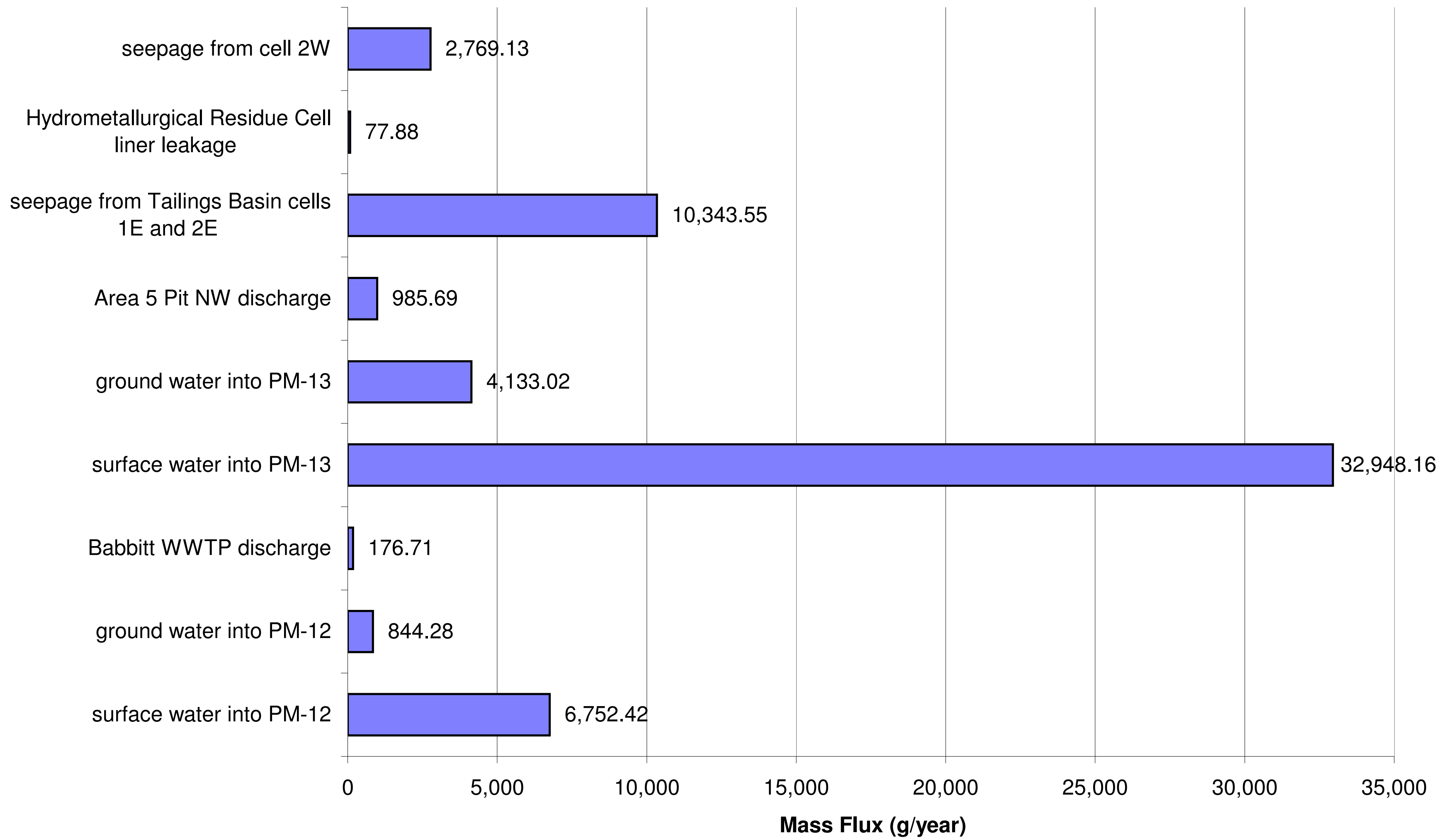
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Cobalt (Co)

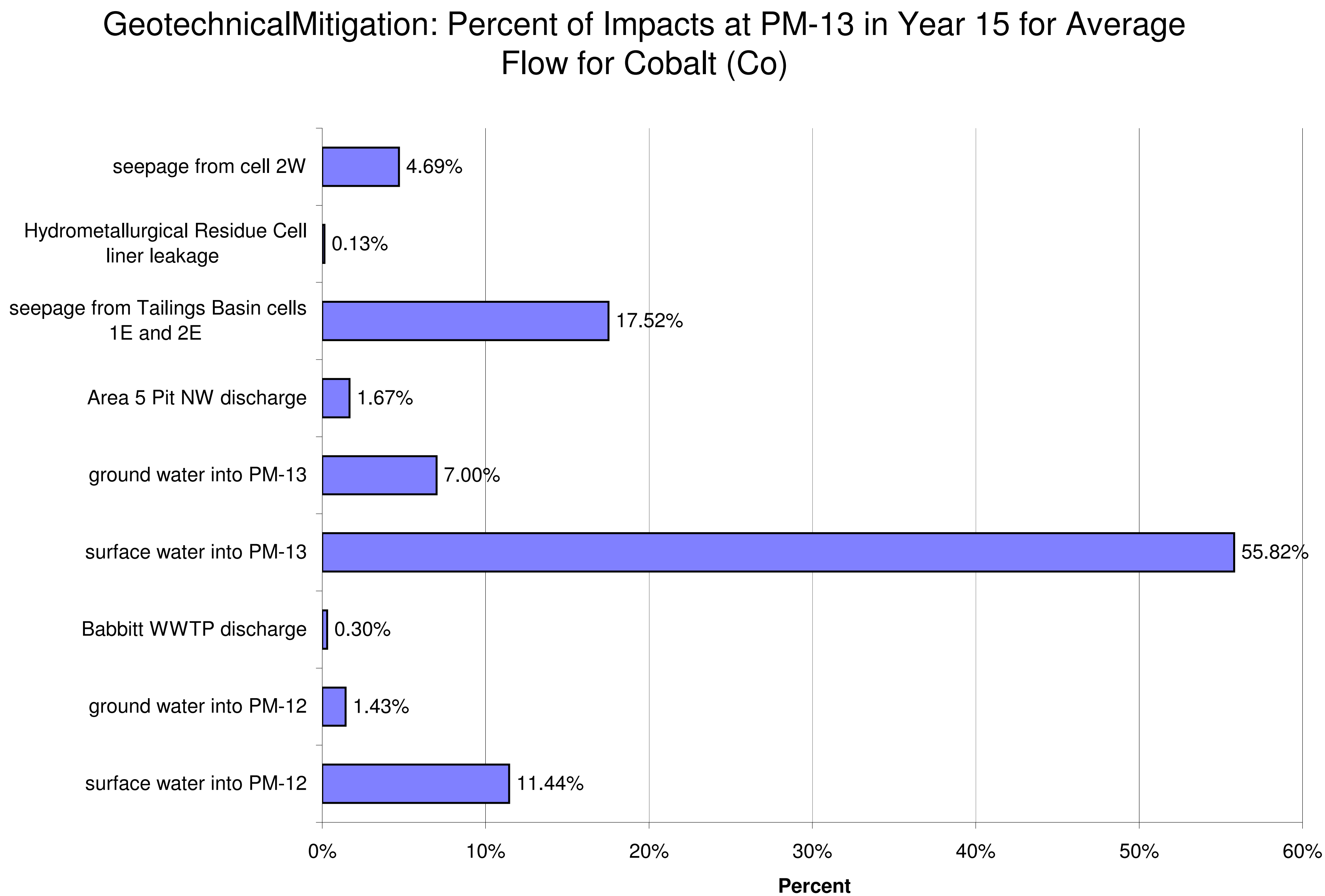


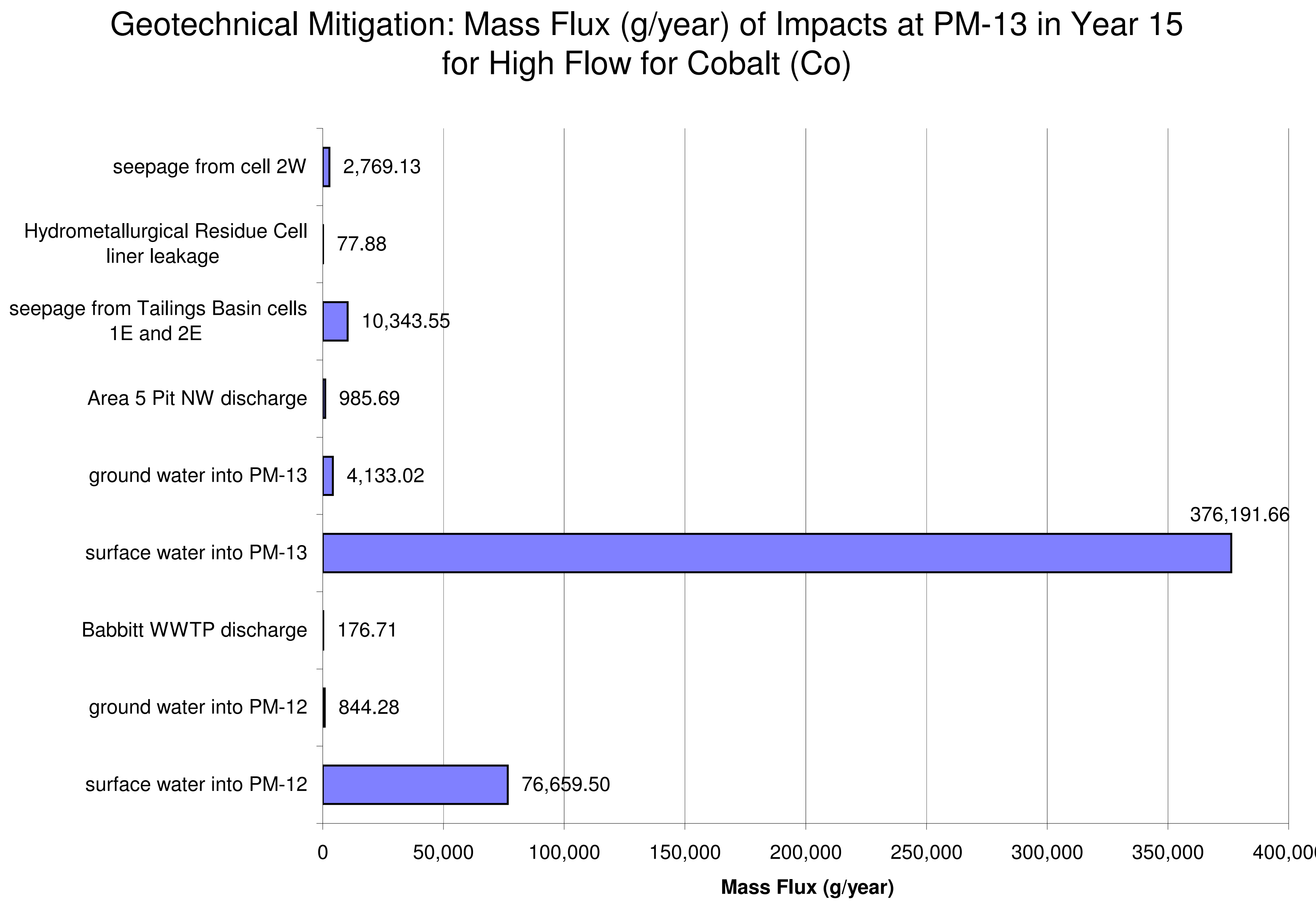
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Cobalt (Co)



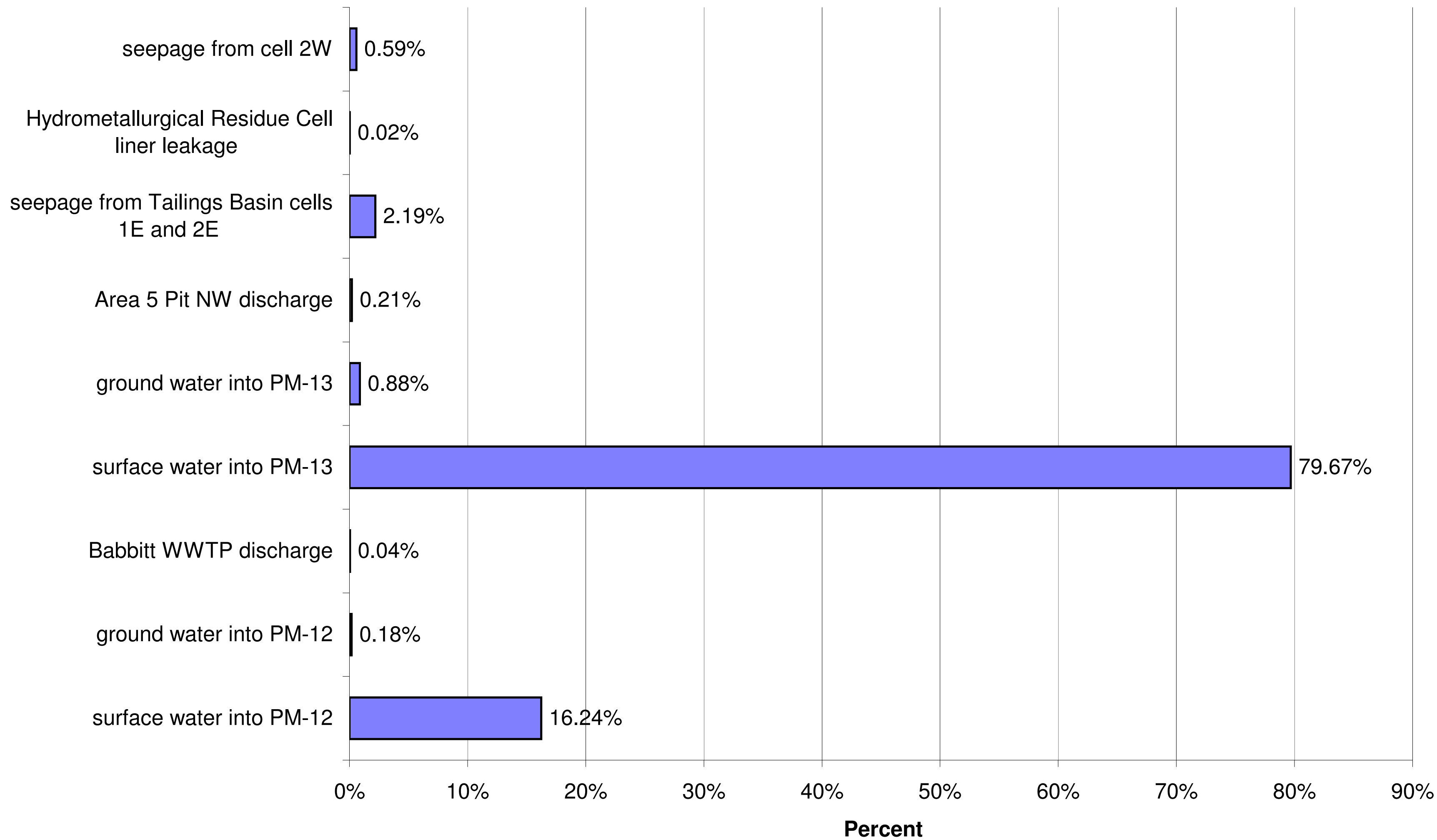
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)



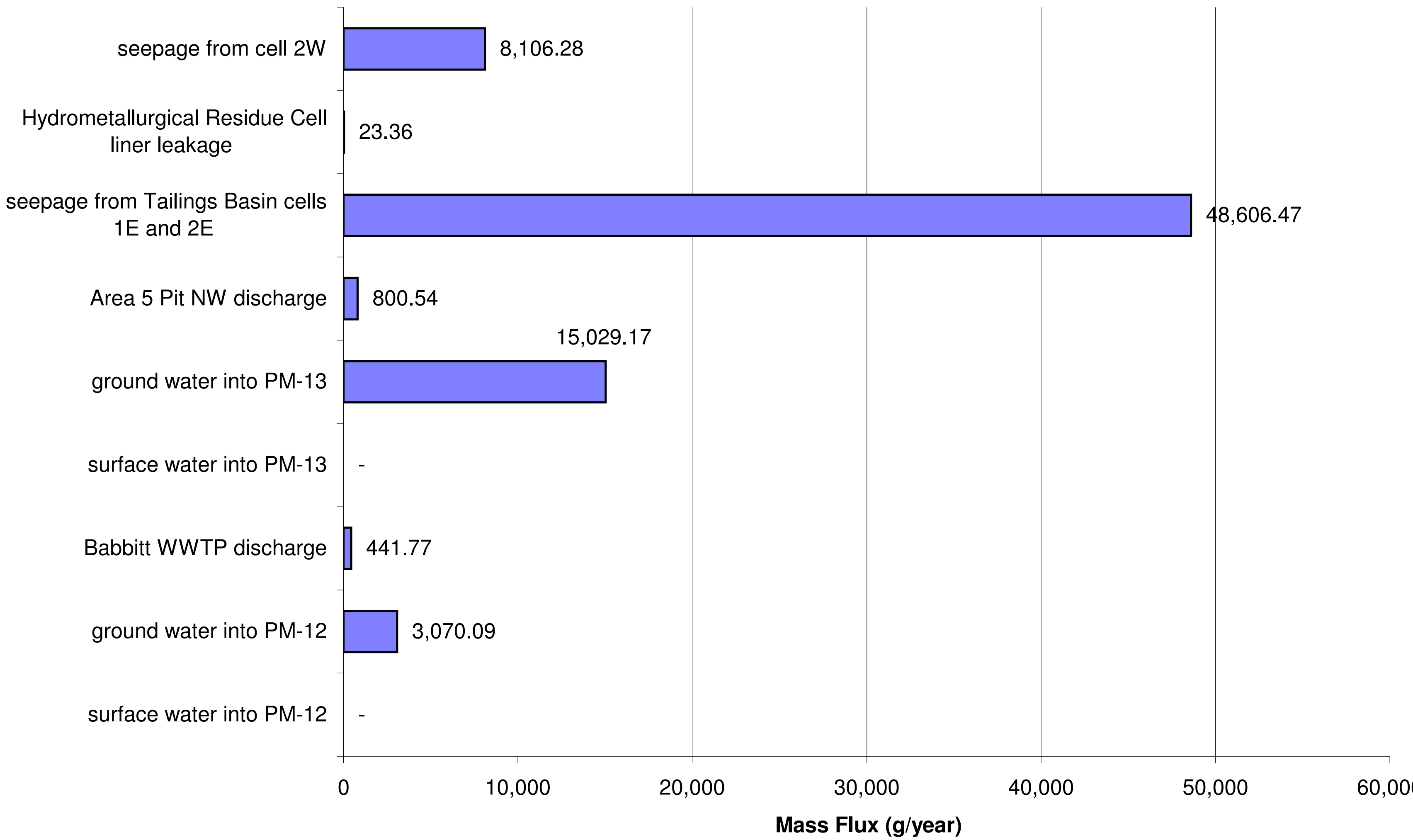

GeotechnicalMitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)
seepage from cell 2W
4.69%
Hydrometallurgical Residue Cell liner leakage
0.13%
seepage from Tailings Basin cells 1E and 2E
17.52%
Area 5 Pit NW discharge
1.67%
ground water into PM-13
7.00%
surface water into PM-13
55.82%
Babbitt WWTP discharge
0.30%
ground water into PM-12
1.43%
surface water into PM-12
11.44%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)
seepage from cell 2W
2,769.13
Hydrometallurgical Residue Cell liner leakage
77.88
seepage from Tailings Basin cells 1E and 2E
10,343.55
Area 5 Pit NW discharge
985.69
ground water into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
ground water into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

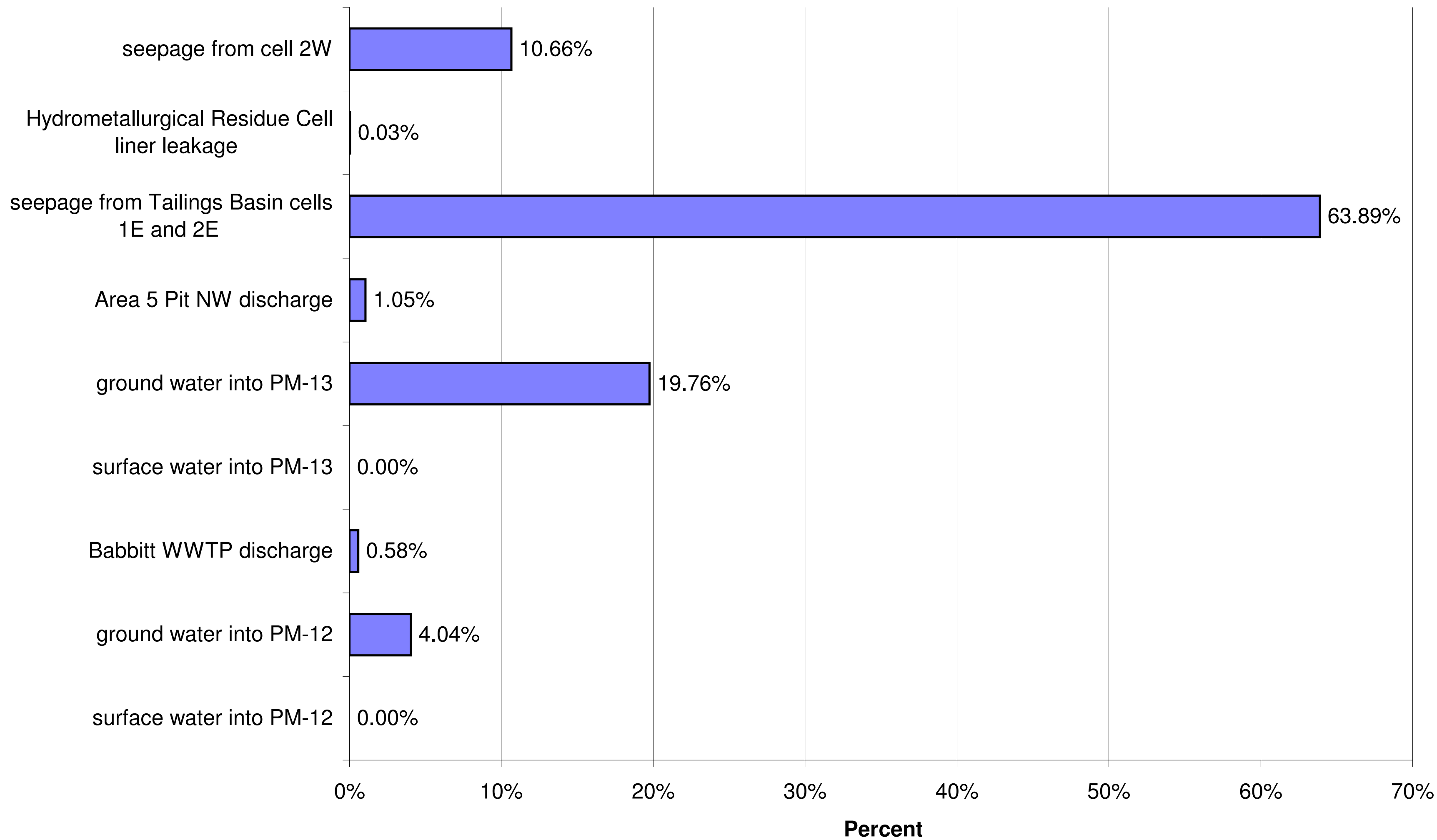
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)

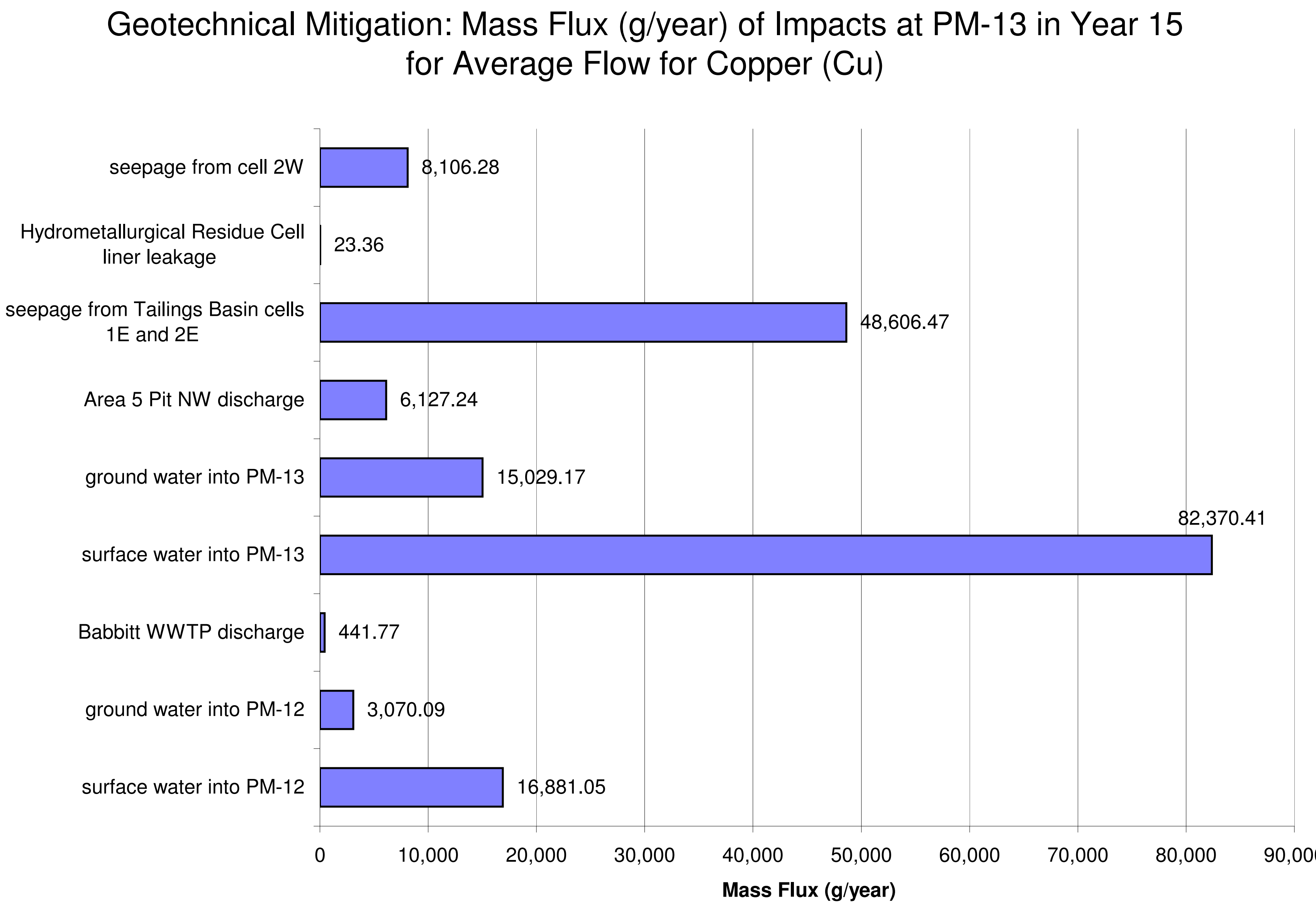


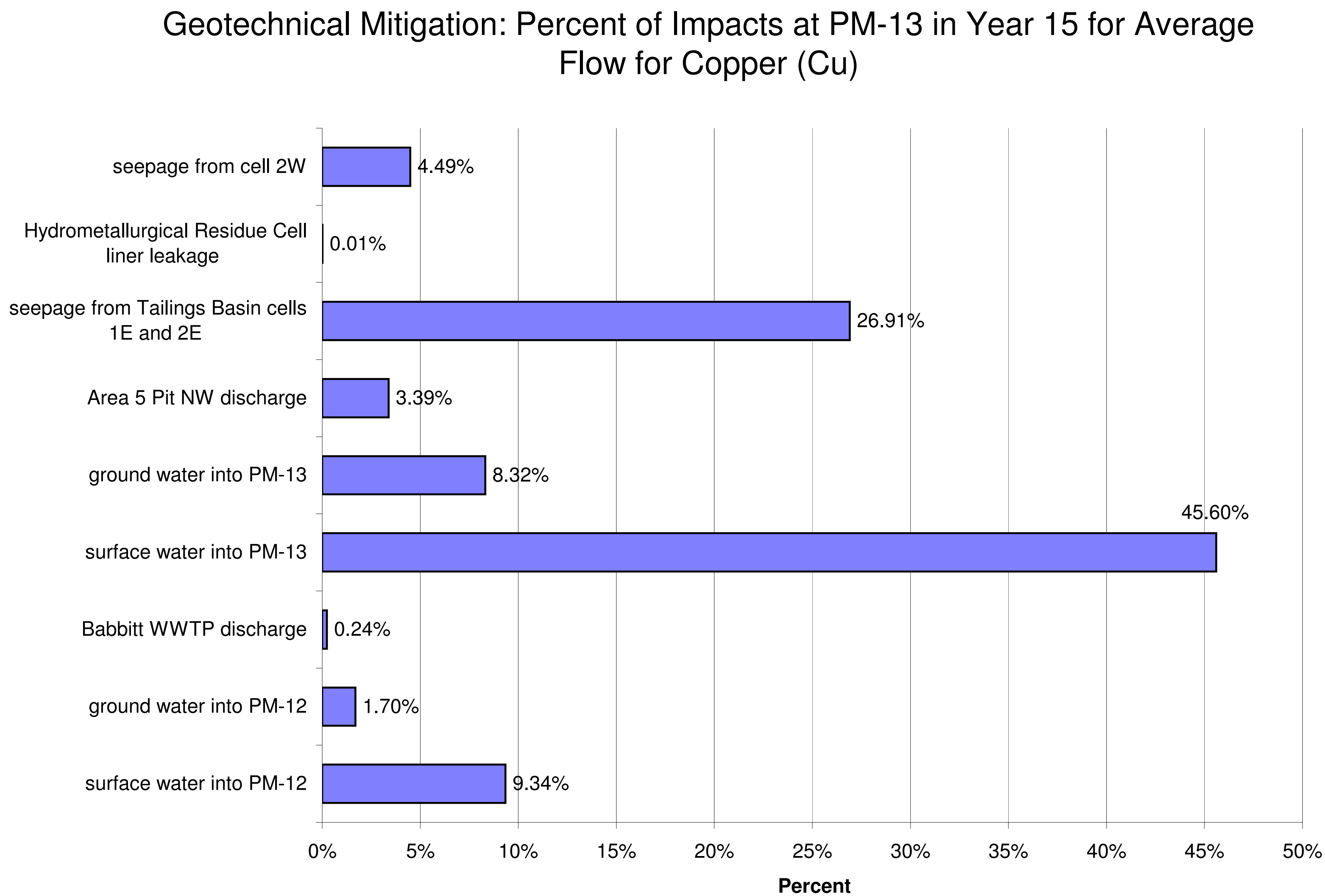
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)

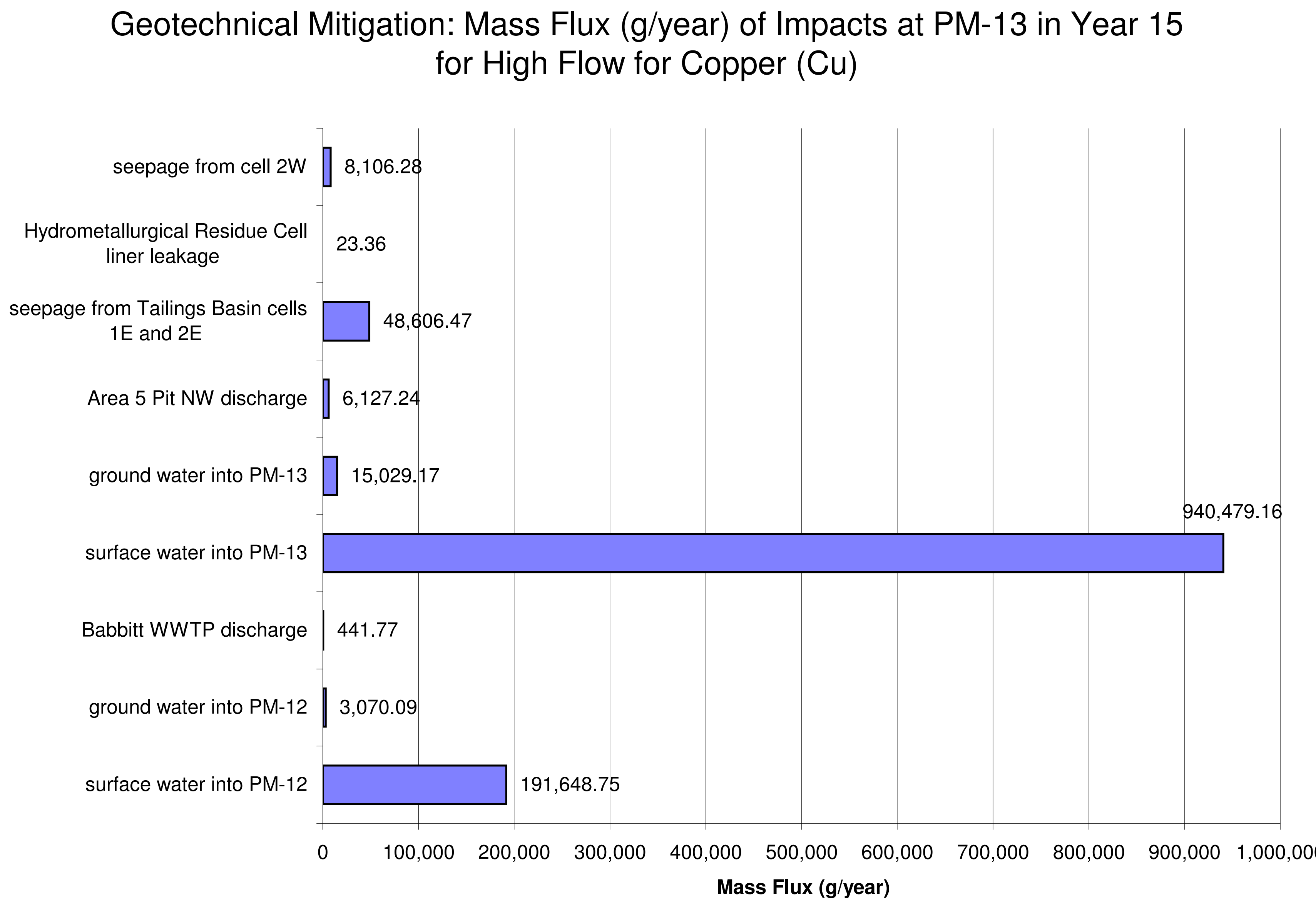


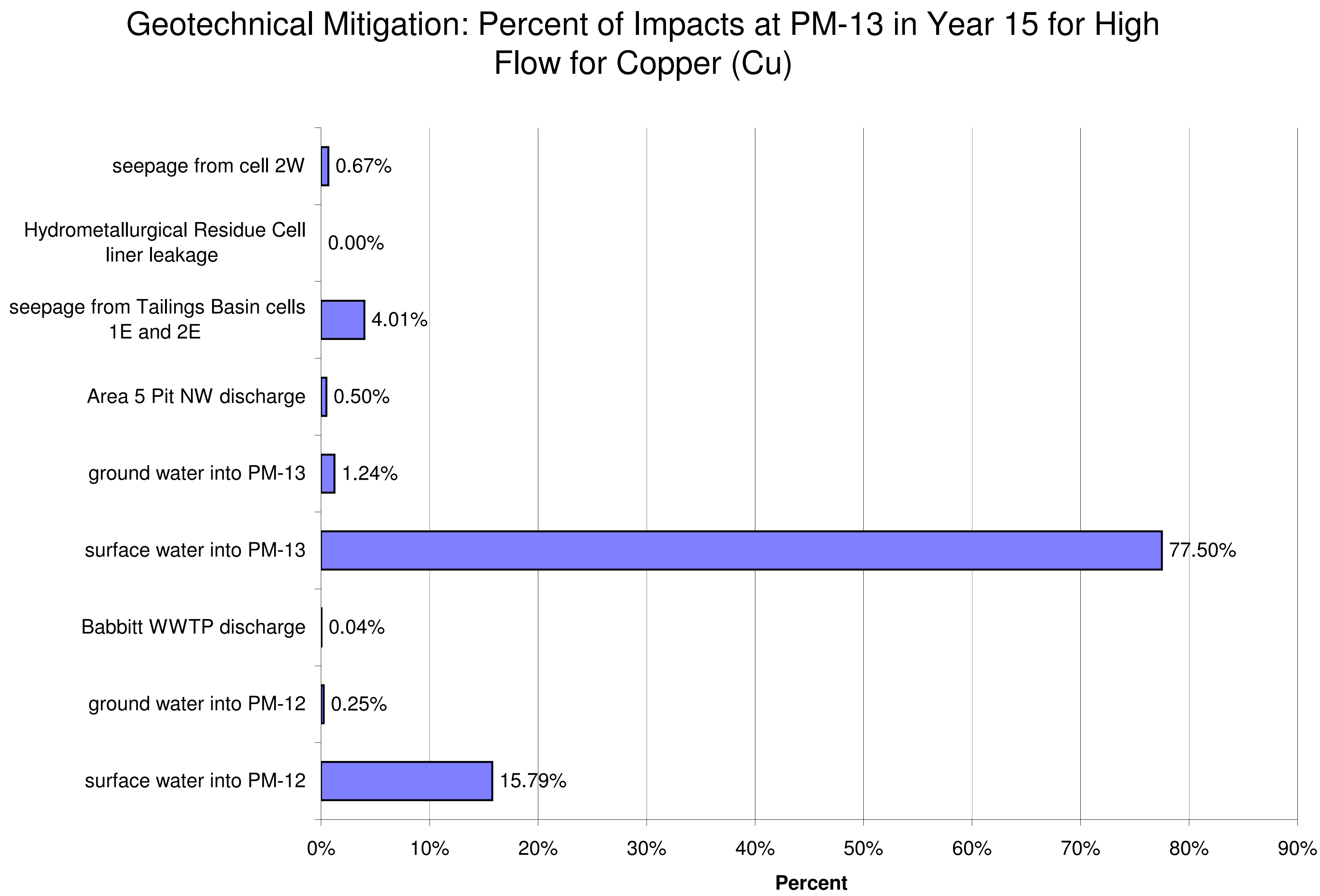
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)

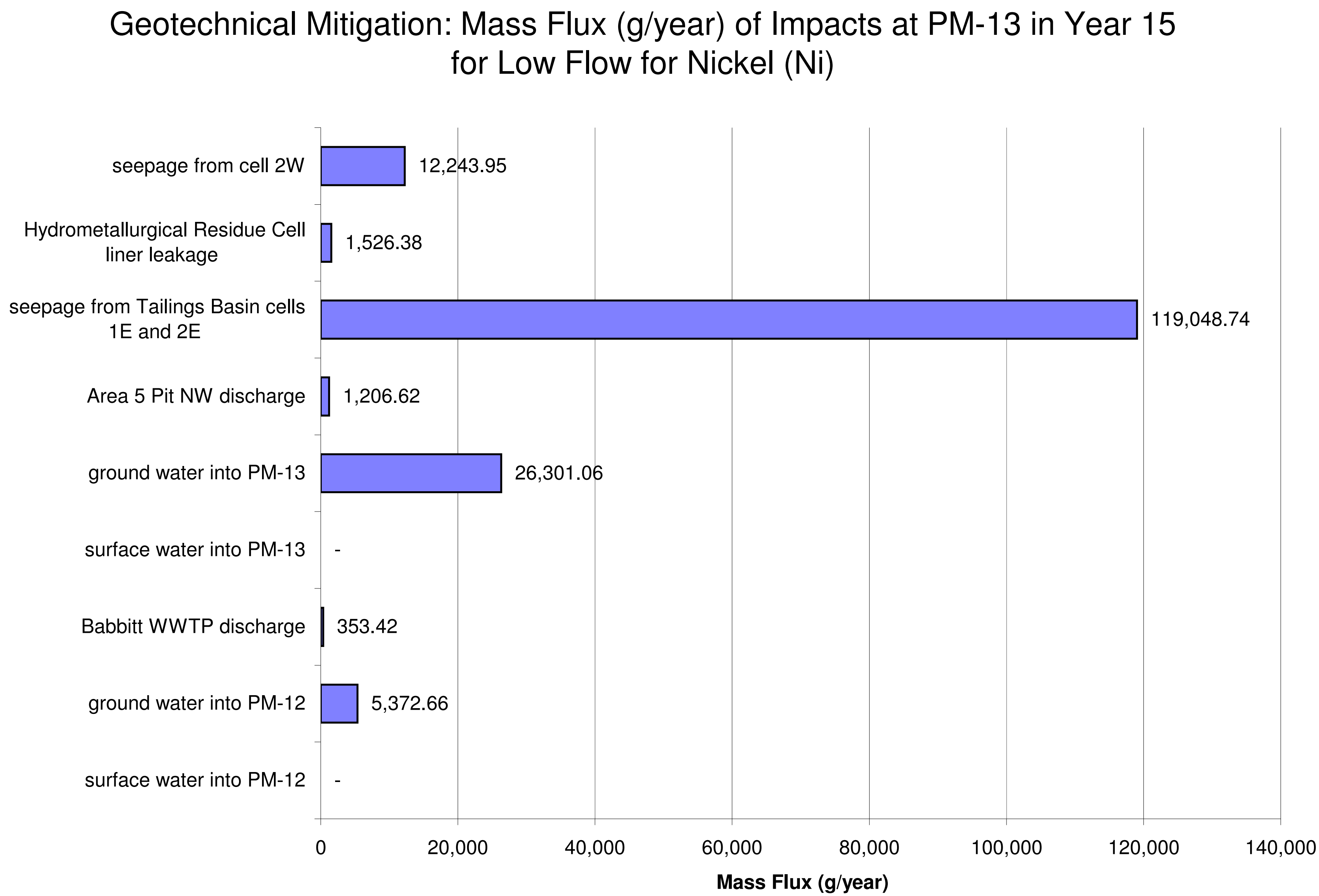


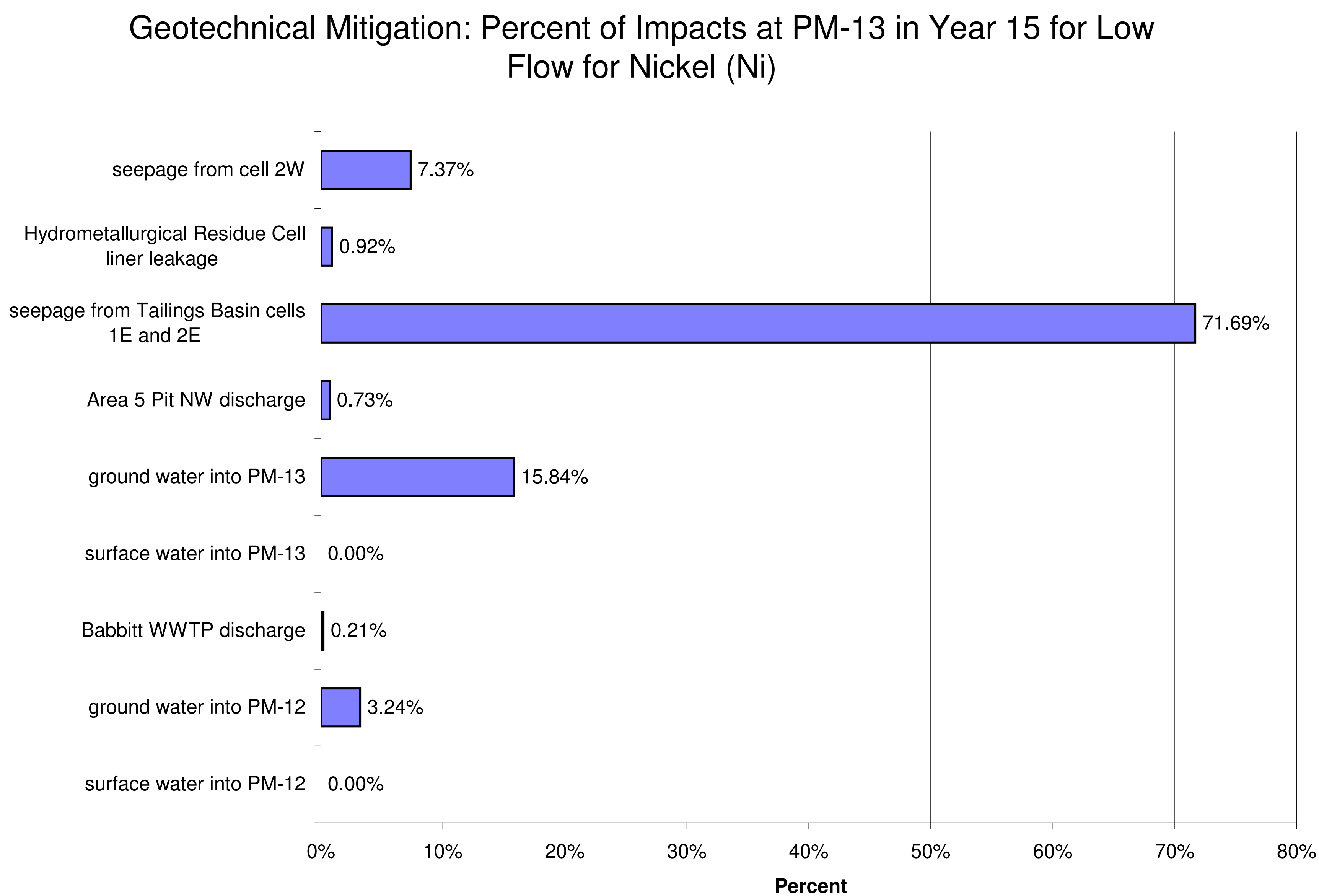

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Copper (Cu)
seepage from cell 2W
8,106.28
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
48,606.47
Area 5 Pit NW discharge
6,127.24
ground water into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
ground water into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

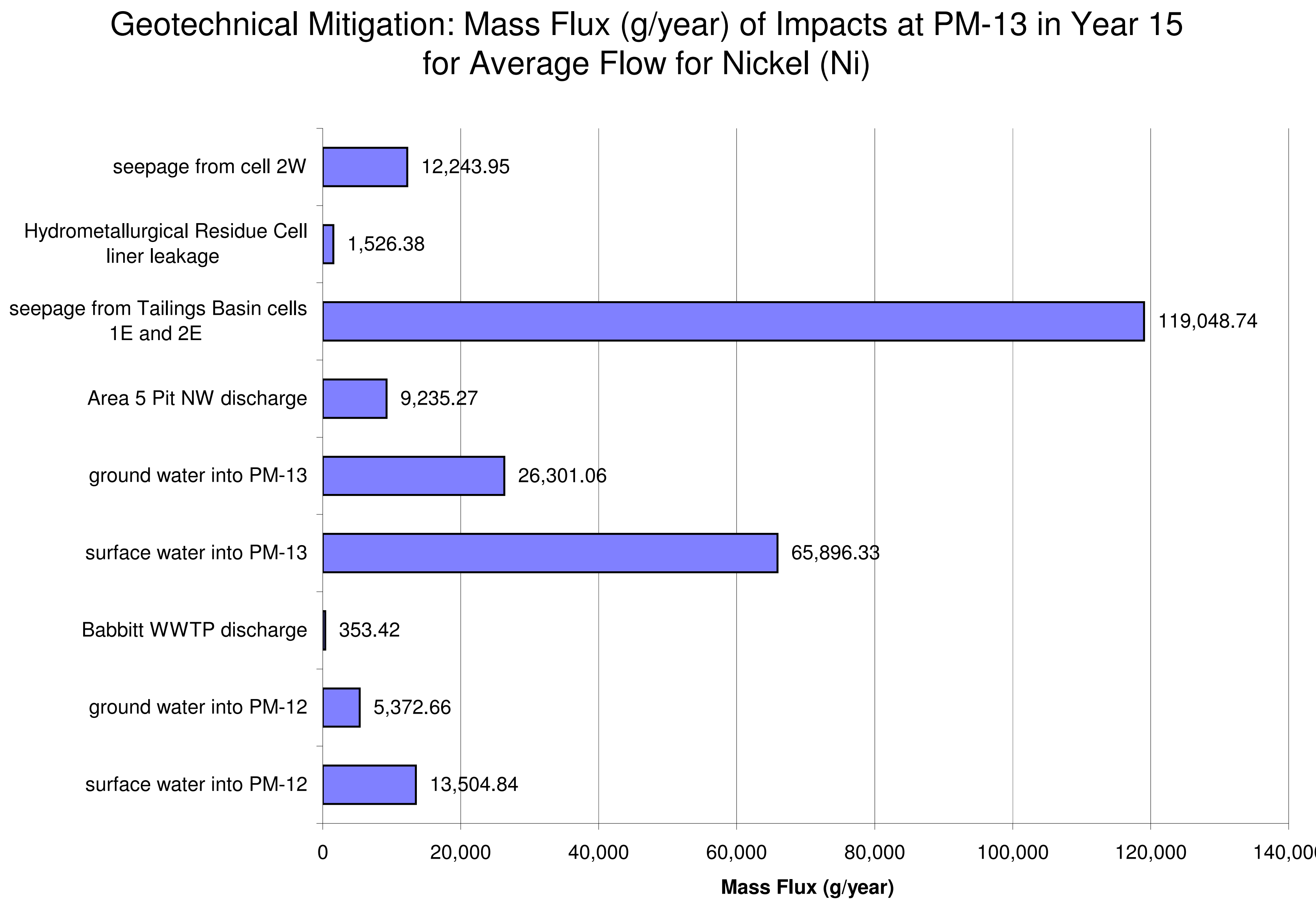

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Copper (Cu)
seepage from cell 2W
4.49%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
26.91%
Area 5 Pit NW discharge
3.39%
ground water into PM-13
8.32%
surface water into PM-13
45.60%
Babbitt WWTP discharge
0.24%
ground water into PM-12
1.70%
surface water into PM-12
9.34%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

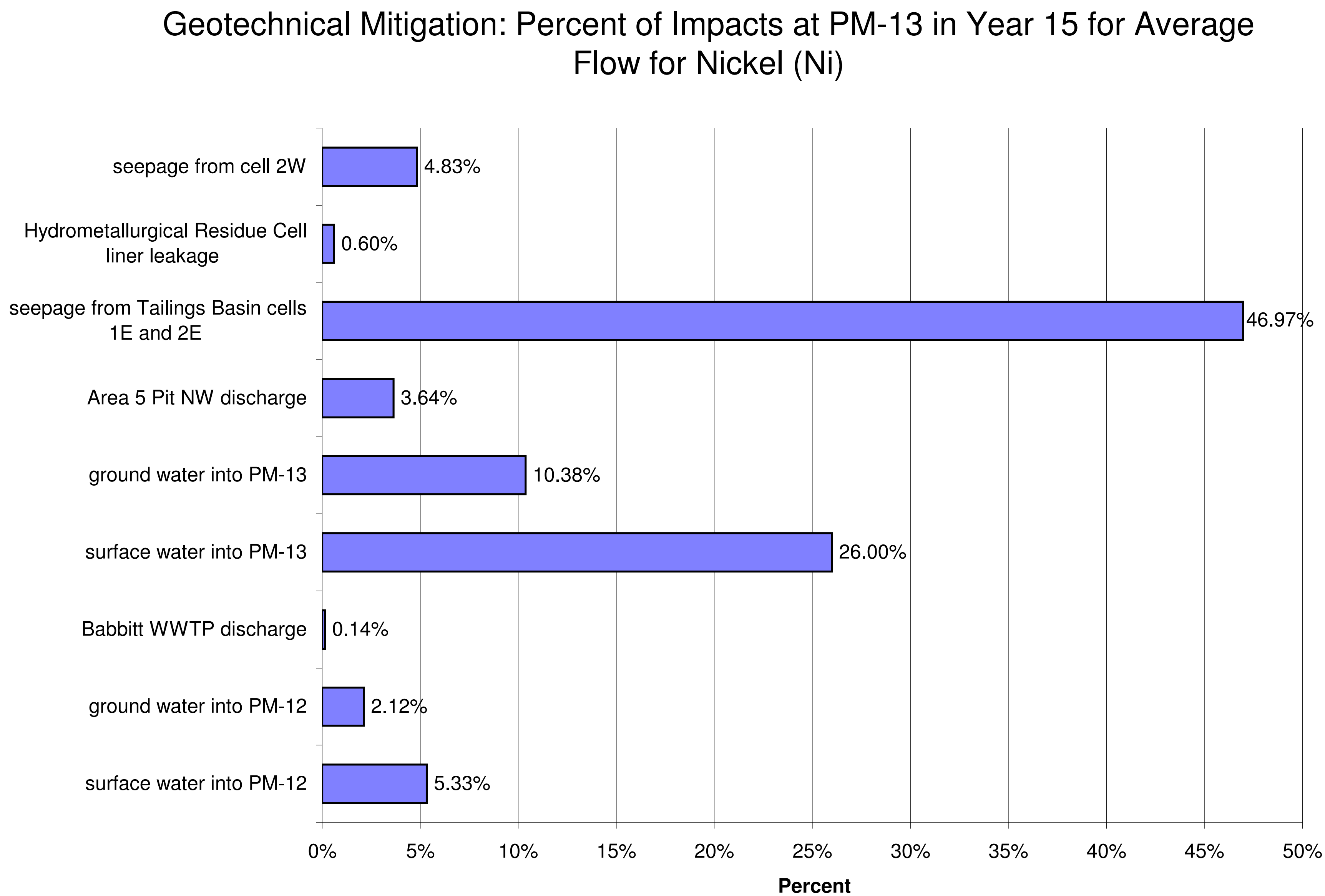

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)
seepage from cell 2W
8,106.28
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
48,606.47
Area 5 Pit NW discharge
6,127.24
ground water into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
ground water into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)
seepage from cell 2W
0.67%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
4.01%
Area 5 Pit NW discharge
0.50%
ground water into PM-13
1.24%
surface water into PM-13
77.50%
Babbitt WWTP discharge
0.04%
ground water into PM-12
0.25%
surface water into PM-12
15.79%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

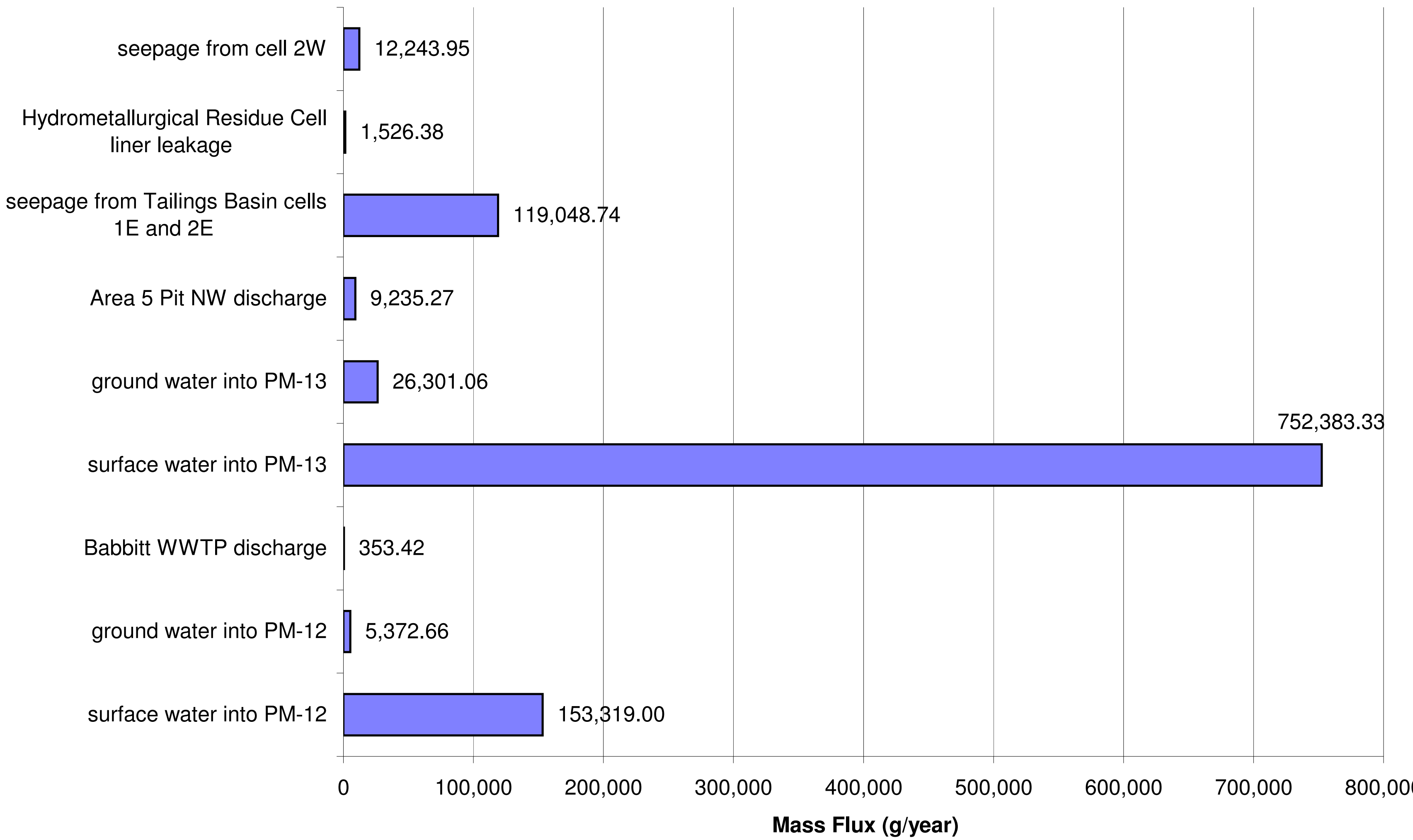

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)
seepage from cell 2W
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
119,048.74
Area 5 Pit NW discharge
1,206.62
ground water into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
ground water into PM-12
5,372.66
surface water into PM-12
-
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)
seepage from cell 2W
7.37%
Hydrometallurgical Residue Cell liner leakage
0.92%
seepage from Tailings Basin cells 1E and 2E
71.69%
Area 5 Pit NW discharge
0.73%
ground water into PM-13
15.84%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.21%
ground water into PM-12
3.24%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

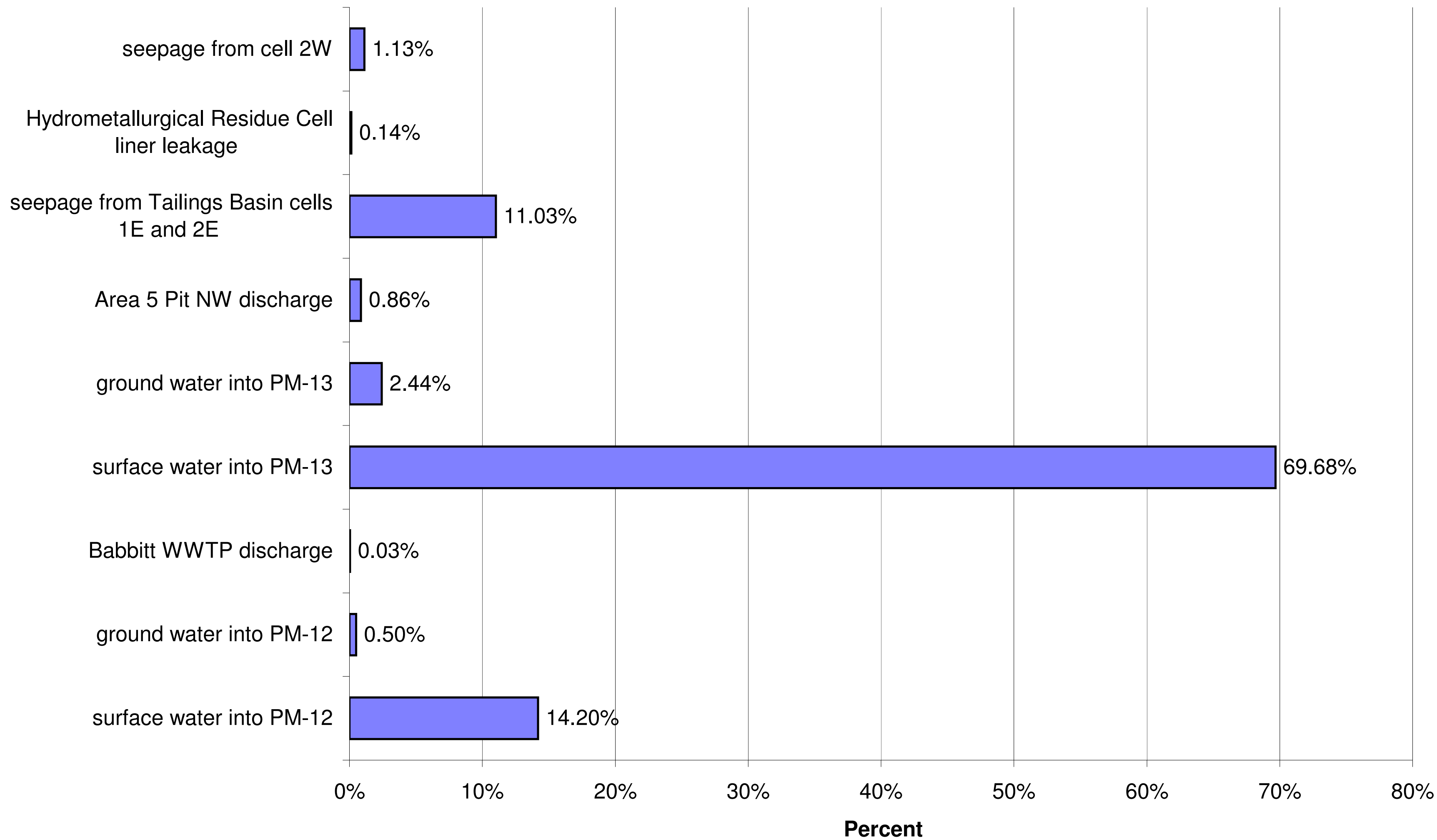

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Nickel (Ni)
seepage from cell 2W
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
119,048.74
Area 5 Pit NW discharge
9,235.27
ground water into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
ground water into PM-12
5,372.66
surface water into PM-12
13,504.84
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Mass Flux (g/year)

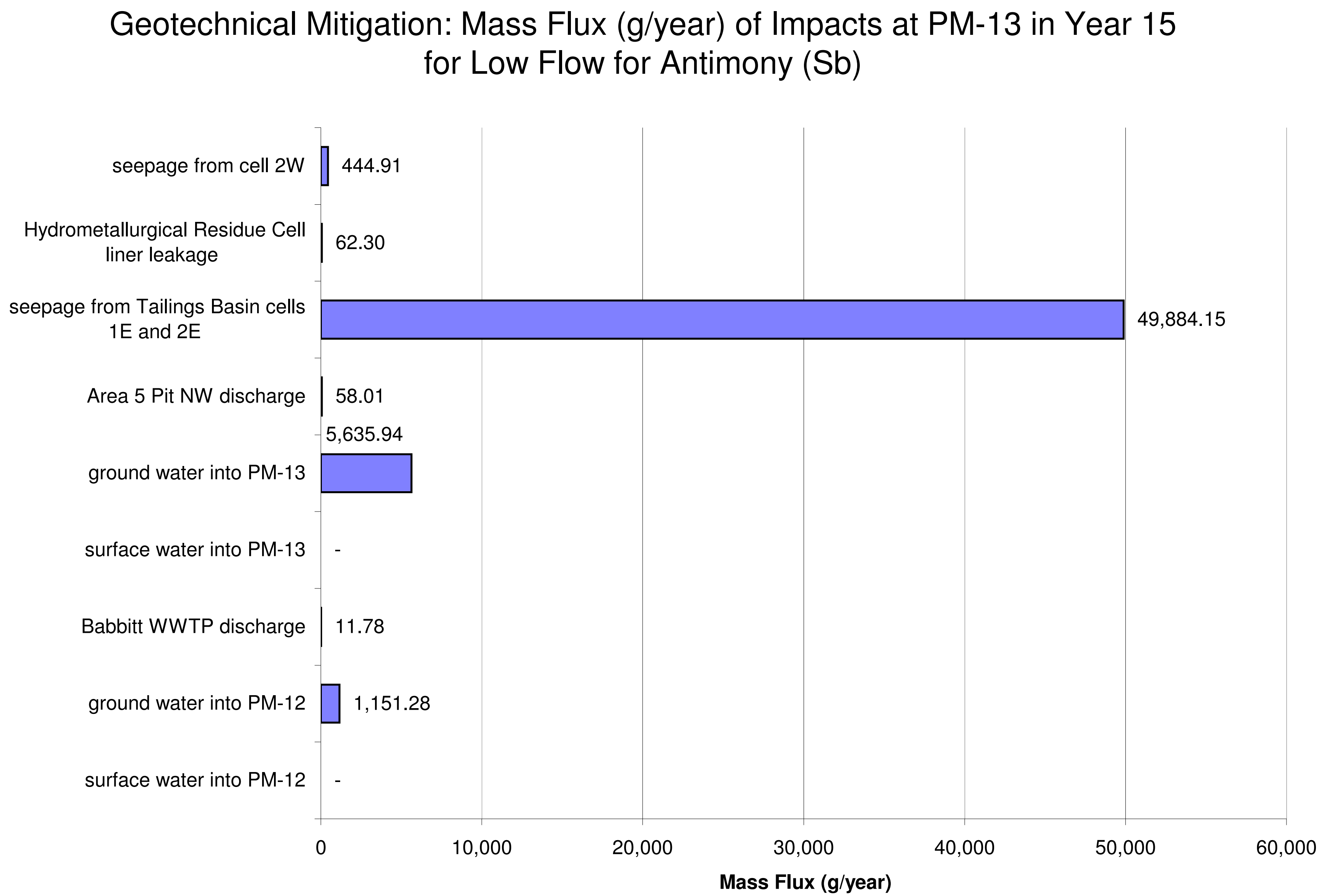

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Nickel (Ni)
seepage from cell 2W
4.83%
Hydrometallurgical Residue Cell liner leakage
0.60%
seepage from Tailings Basin cells 1E and 2E
46.97%
Area 5 Pit NW discharge
3.64%
ground water into PM-13
10.38%
surface water into PM-13
26.00%
Babbitt WWTP discharge
0.14%
ground water into PM-12
2.12%
surface water into PM-12
5.33%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)

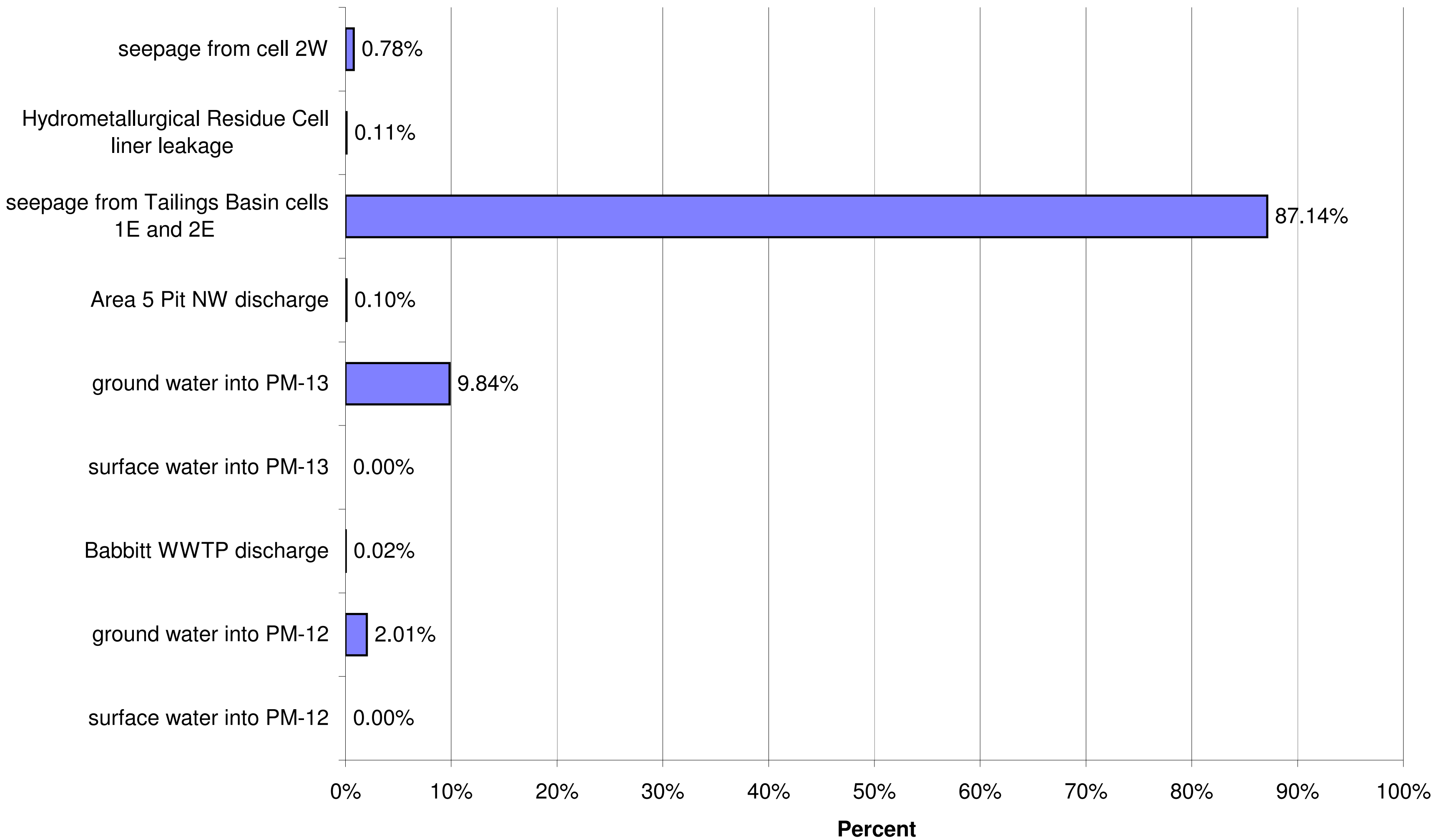


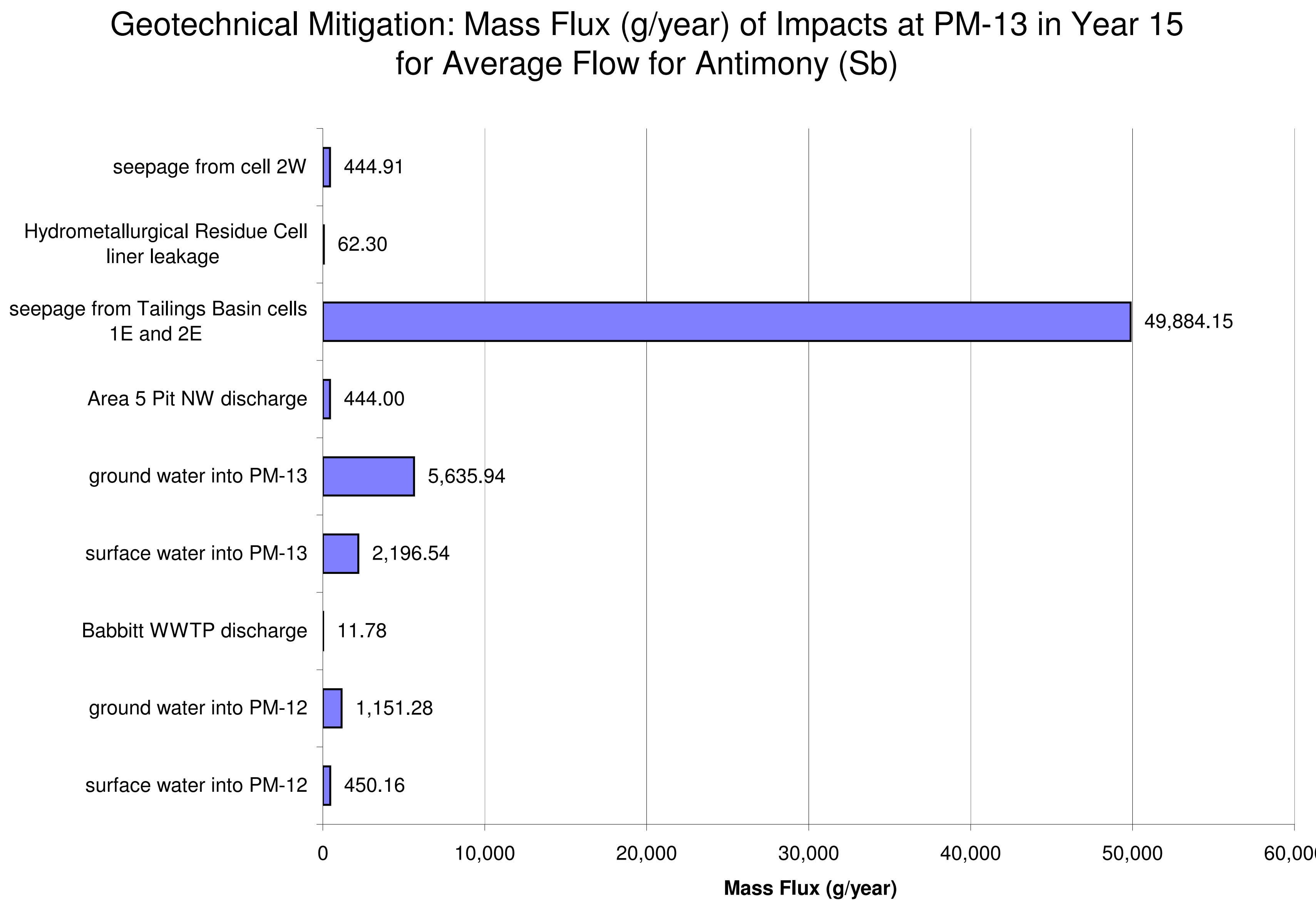
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)



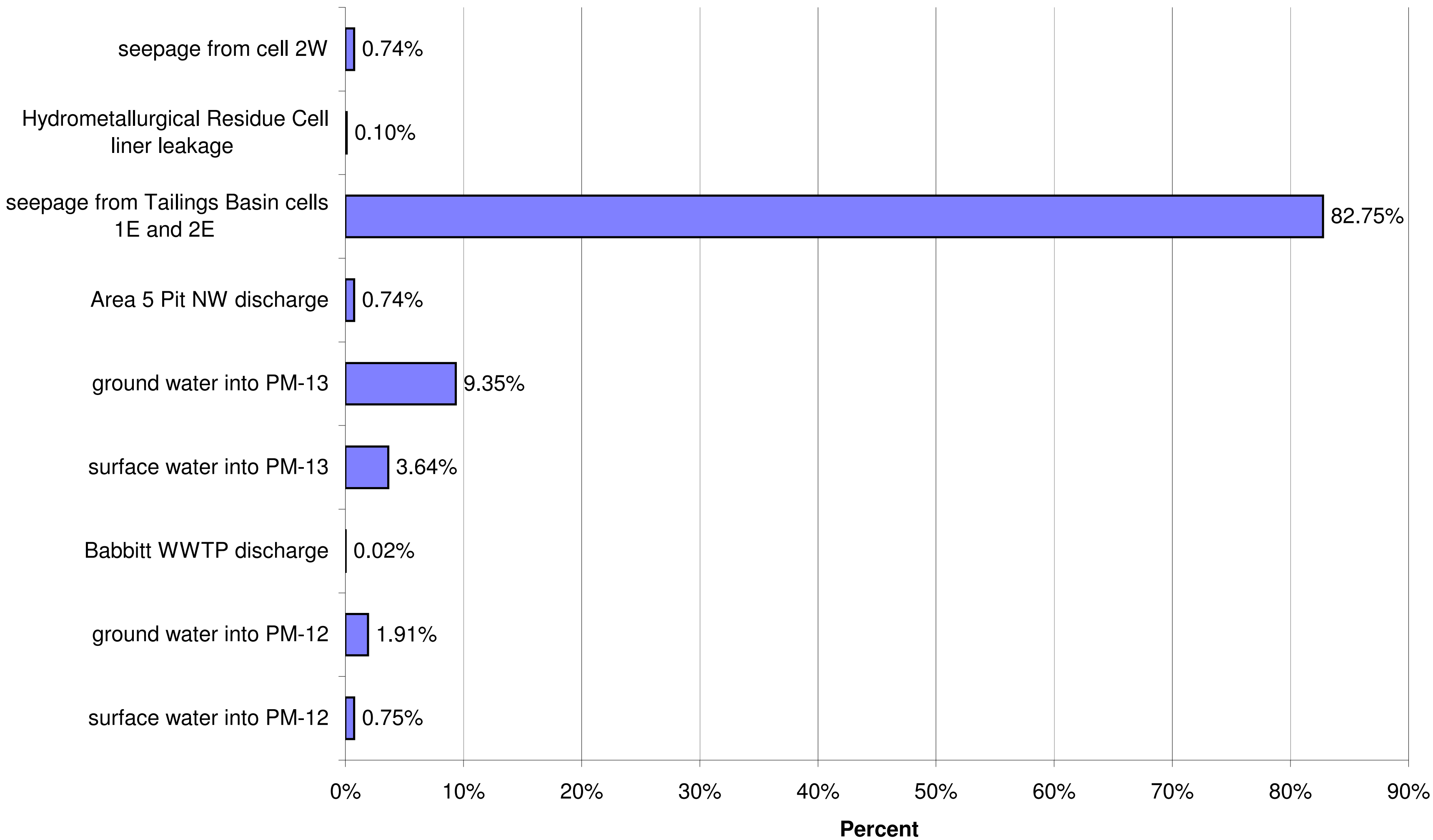

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)
seepage from cell 2W
444.91
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
49,884.15
Area 5 Pit NW discharge
58.01
5,635.94
ground water into PM-13
surface water into PM-13
-
Babbitt WWTP discharge
11.78
ground water into PM-12
1,151.28
surface water into PM-12
-
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

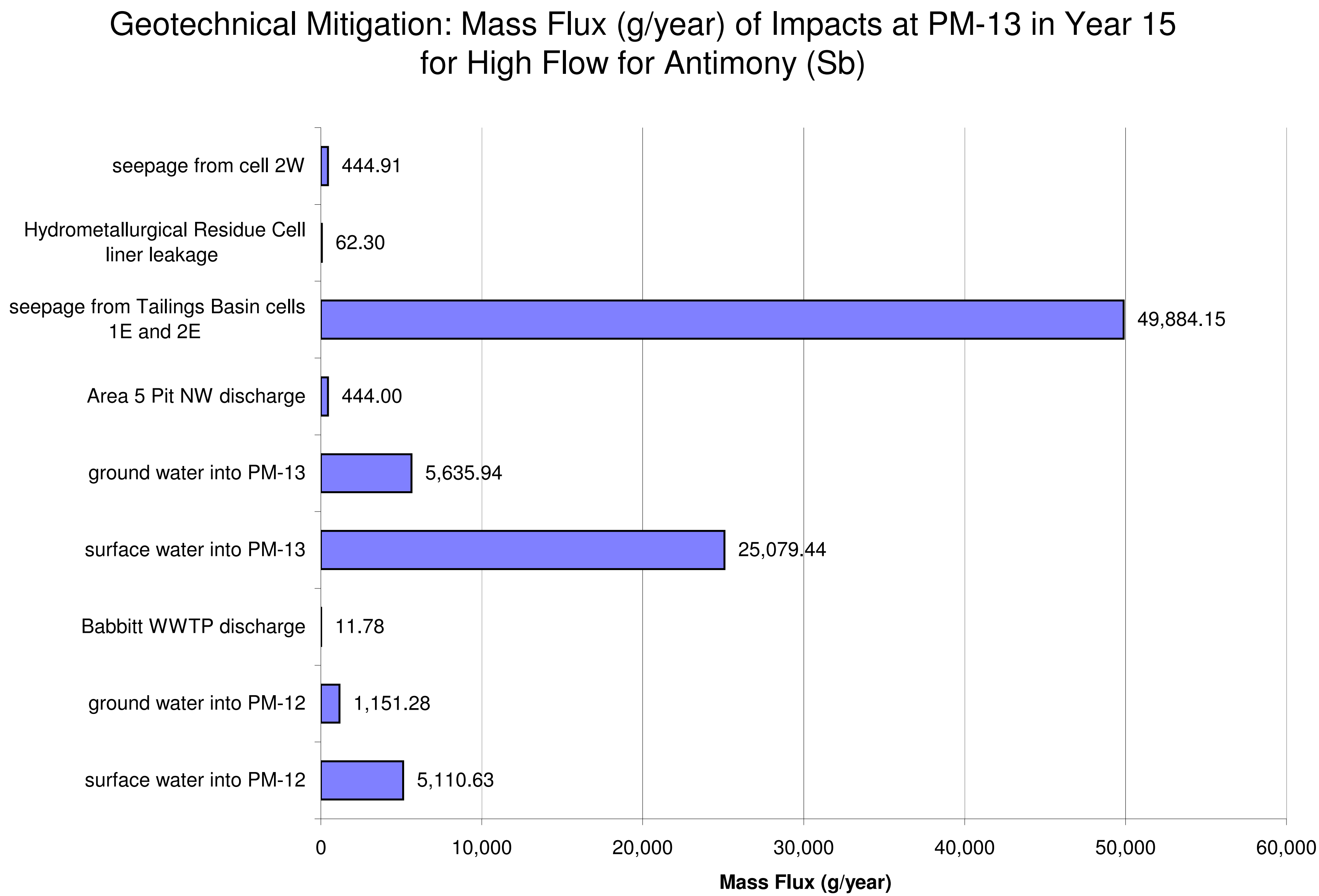
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)

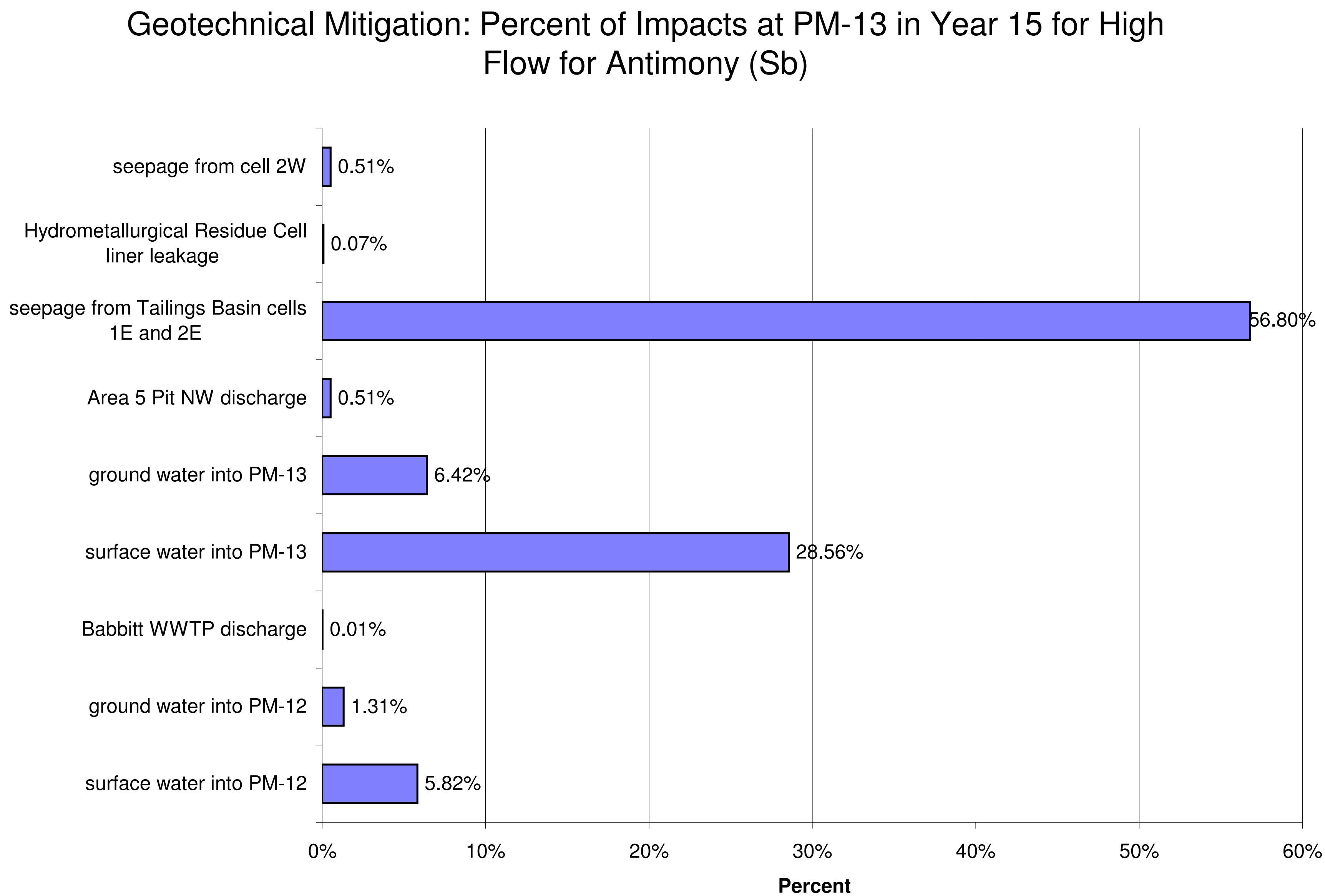



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)
seepage from cell 2W
444.91
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
49,884.15
Area 5 Pit NW discharge
444.00
ground water into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
ground water into PM-12
1,151.28
surface water into PM-12
450.16
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)

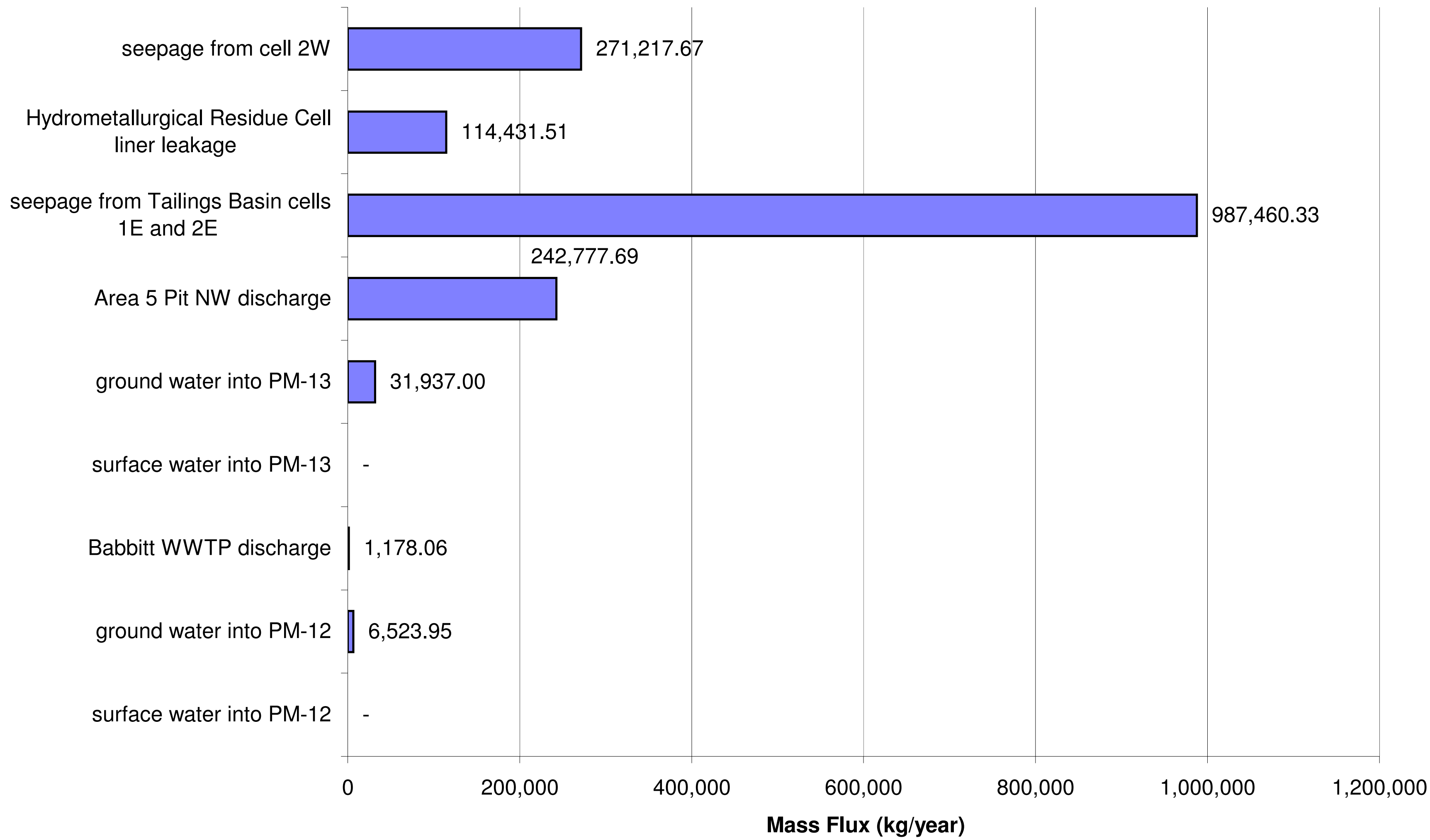



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)
seepage from cell 2W
444.91
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
49,884.15
Area 5 Pit NW discharge
444.00
ground water into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
ground water into PM-12
1,151.28
surface water into PM-12
5,110.63
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

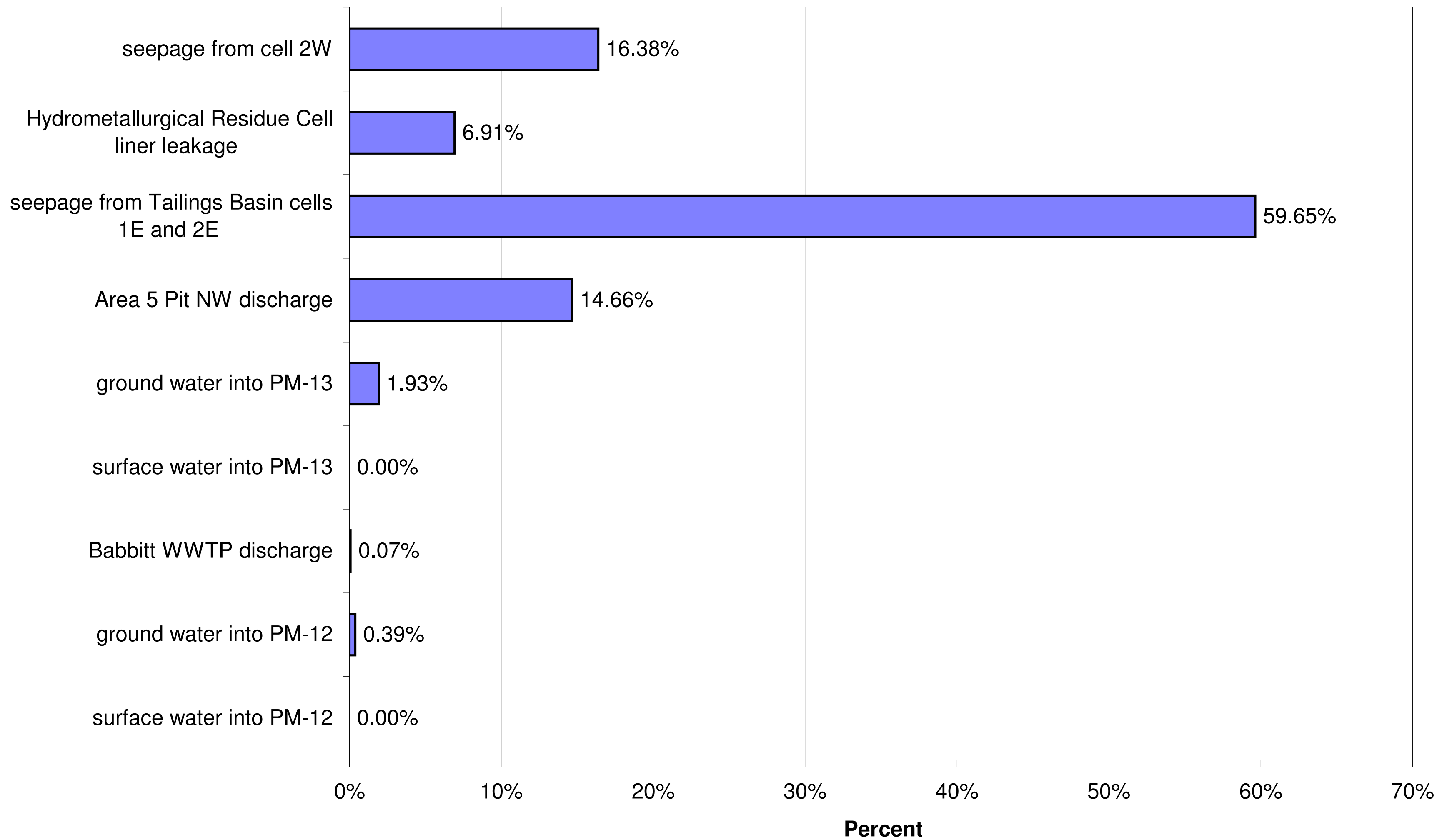

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)
seepage from cell 2W
0.51%
Hydrometallurgical Residue Cell liner leakage
0.07%
seepage from Tailings Basin cells 1E and 2E
56.80%
Area 5 Pit NW discharge
0.51%
ground water into PM-13
6.42%
surface water into PM-13
28.56%
Babbitt WWTP discharge
0.01%
ground water into PM-12
1.31%
surface water into PM-12
5.82%
0%
10%
20%
30%
40%
50%
60%
Percent

P:\Mpls\23 MN\69\2369862_MovedFromMpls_P\WO 015 EIS Rpts Studies\RS74 Water Quality Modeling\Model Predictions\Embarrass_v6_Mitigation\Sensitivity_Year15_TB_Mitigation_v6.xls
SO4, PM-13, low, mass flux

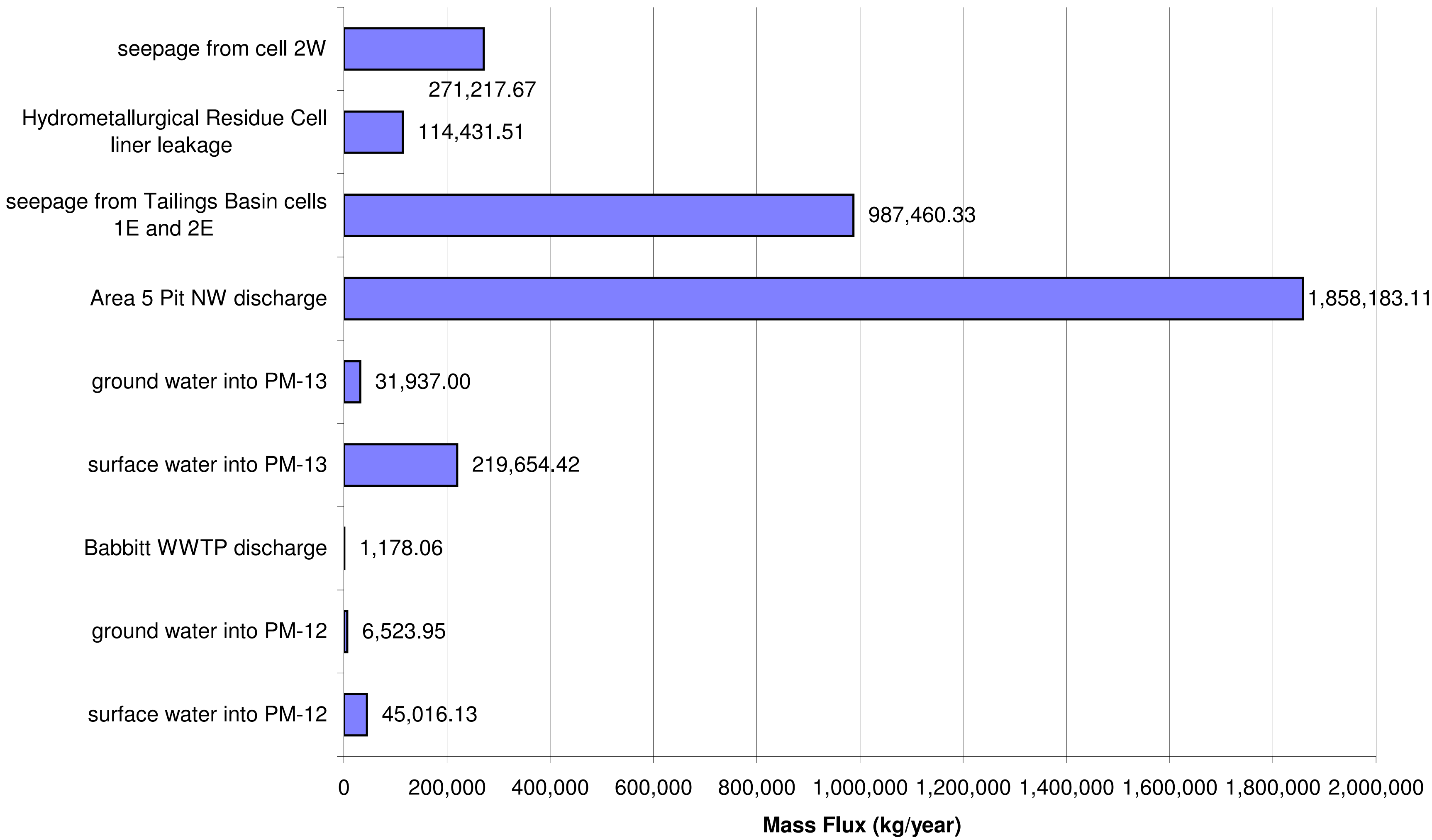
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)

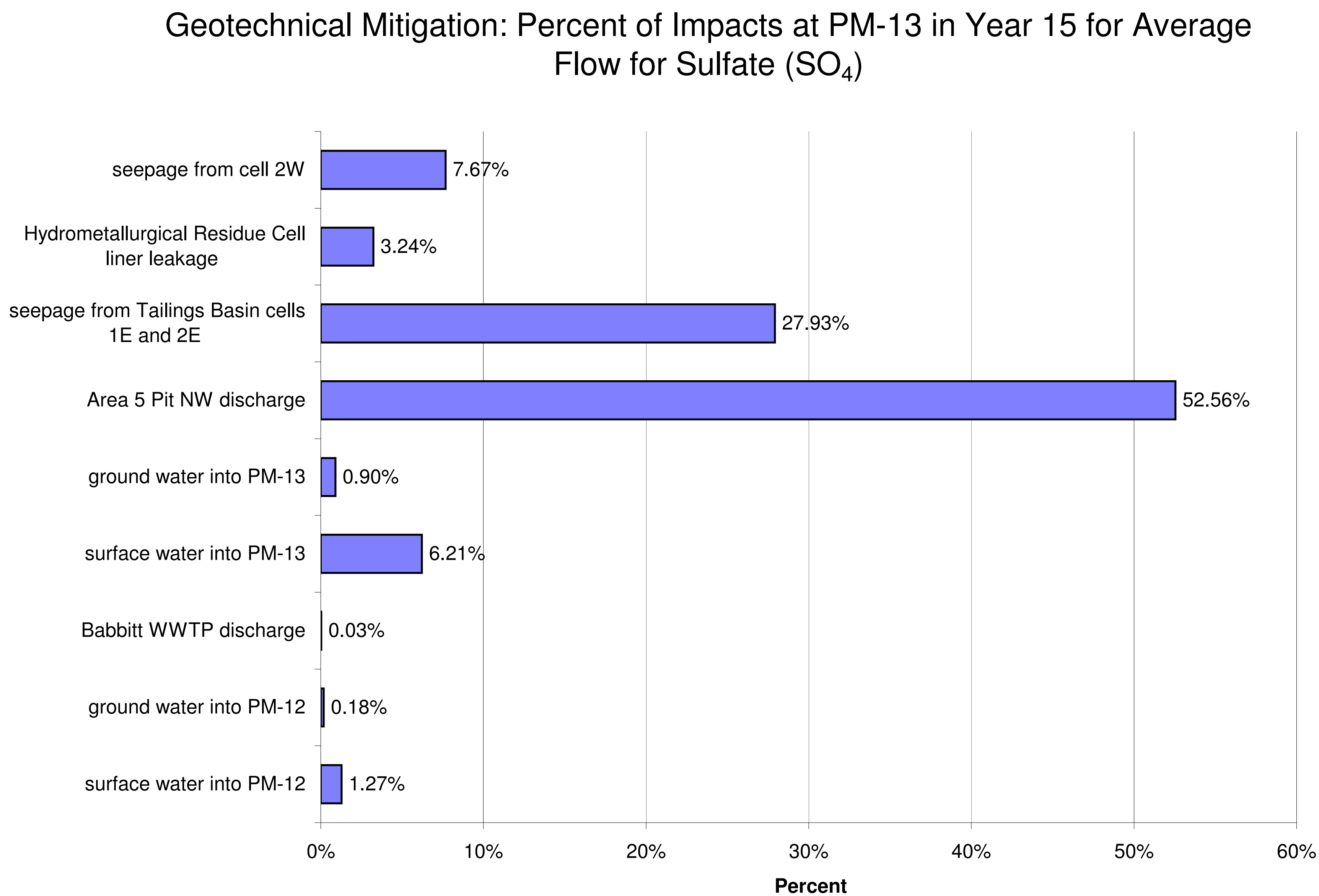


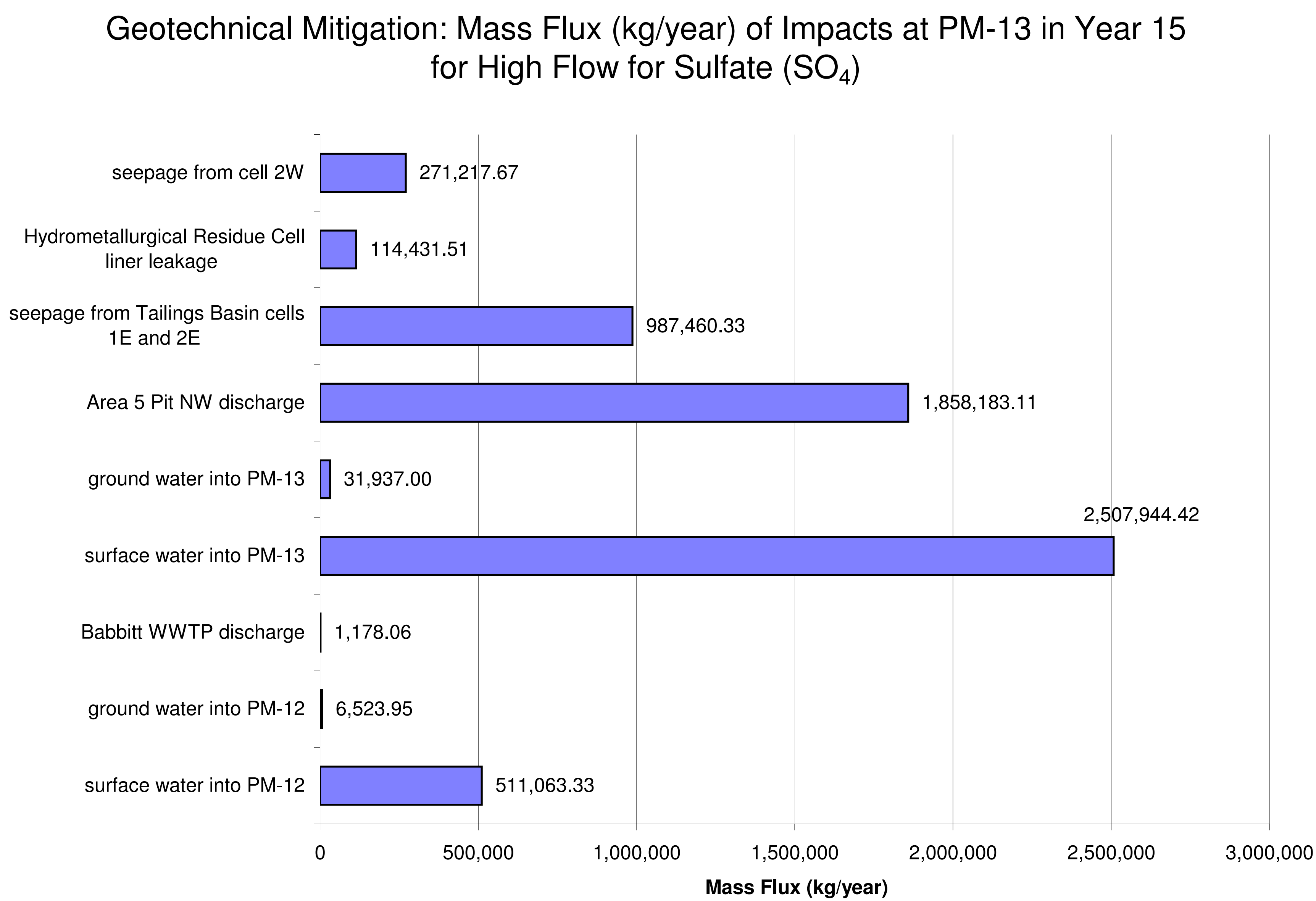
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)



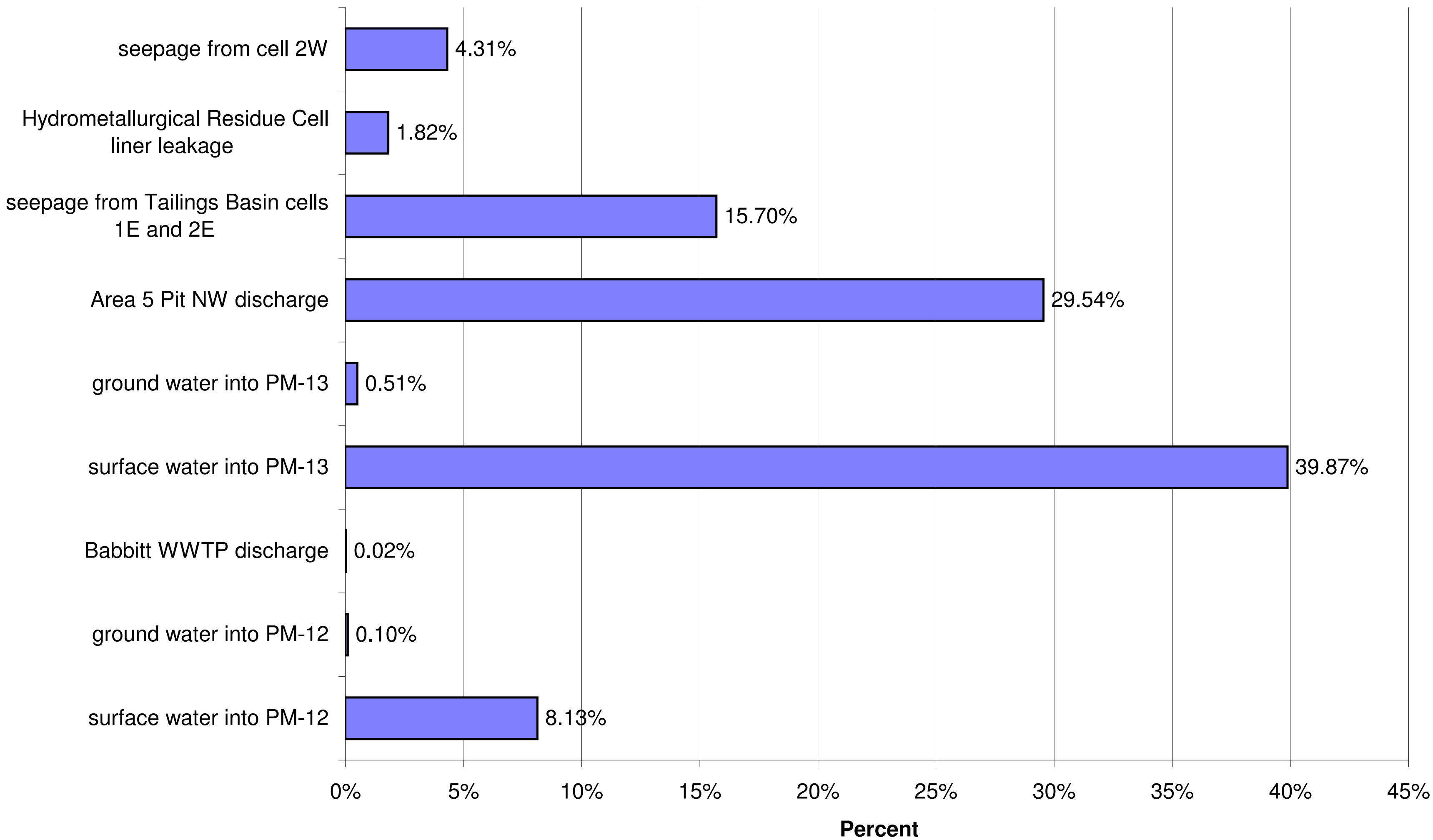
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)



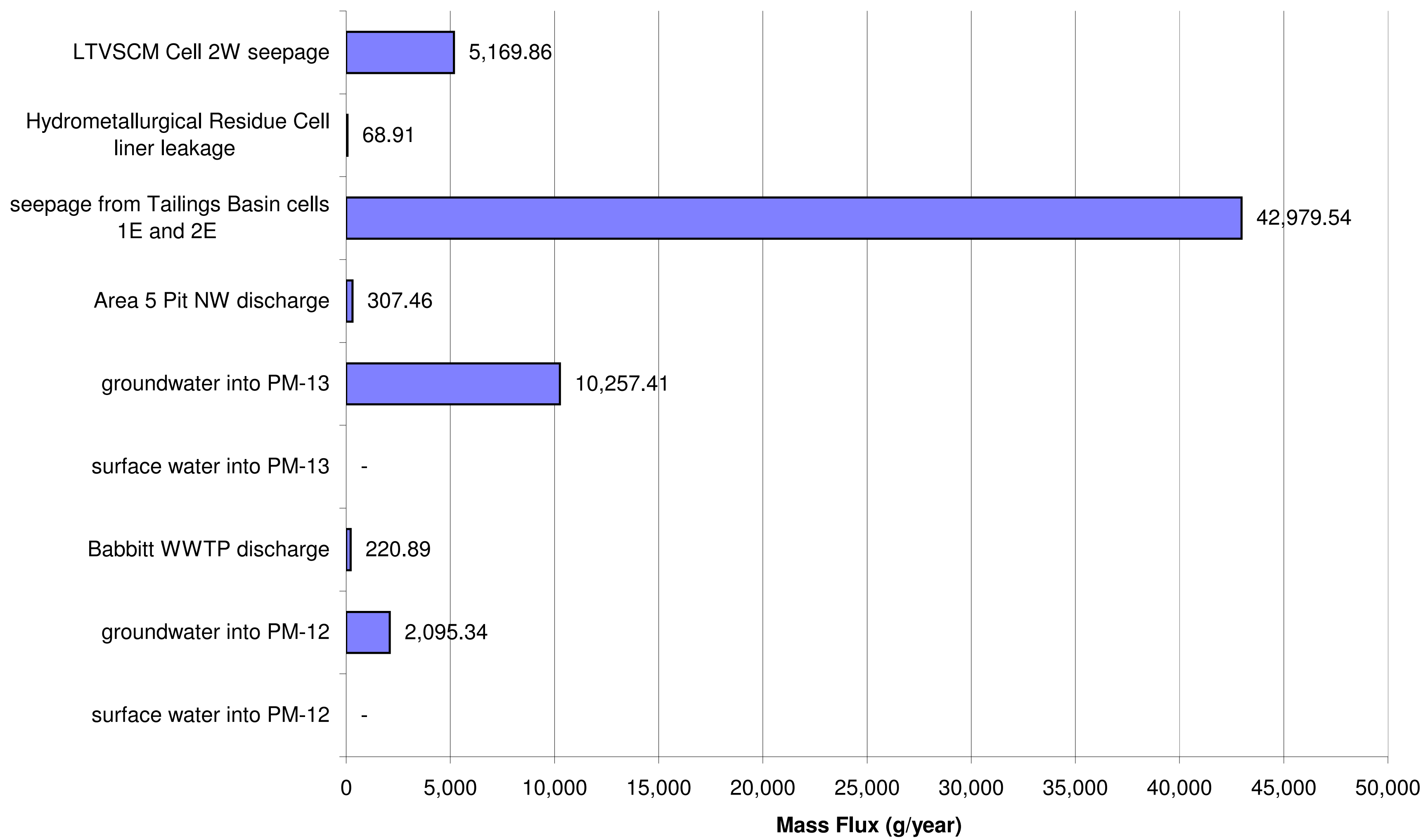

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)
seepage from cell 2W
7.67%
Hydrometallurgical Residue Cell liner leakage
3.24%
seepage from Tailings Basin cells 1E and 2E
27.93%
Area 5 Pit NW discharge
52.56%
ground water into PM-13
0.90%
surface water into PM-13
6.21%
Babbitt WWTP discharge
0.03%
ground water into PM-12
0.18%
surface water into PM-12
1.27%
0%
10%
20%
30%
40%
50%
60%
Percent

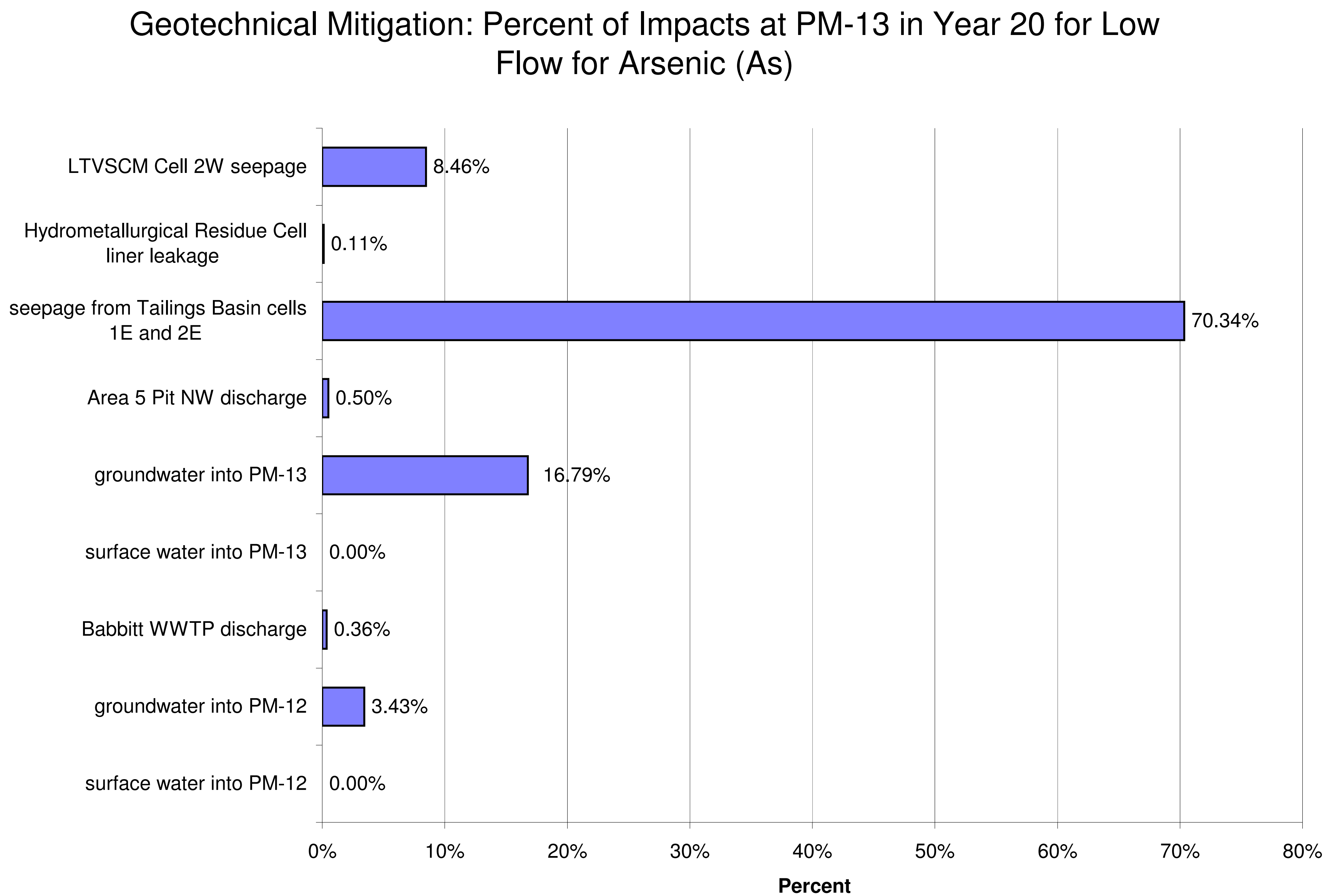

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)
seepage from cell 2W
271,217.67
Hydrometallurgical Residue Cell liner leakage
114,431.51
seepage from Tailings Basin cells 1E and 2E
987,460.33
Area 5 Pit NW discharge
1,858,183.11
ground water into PM-13
31,937.00
surface water into PM-13
2,507,944.42
Babbitt WWTP discharge
1,178.06
ground water into PM-12
6,523.95
surface water into PM-12
511,063.33
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
Mass Flux (kg/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)

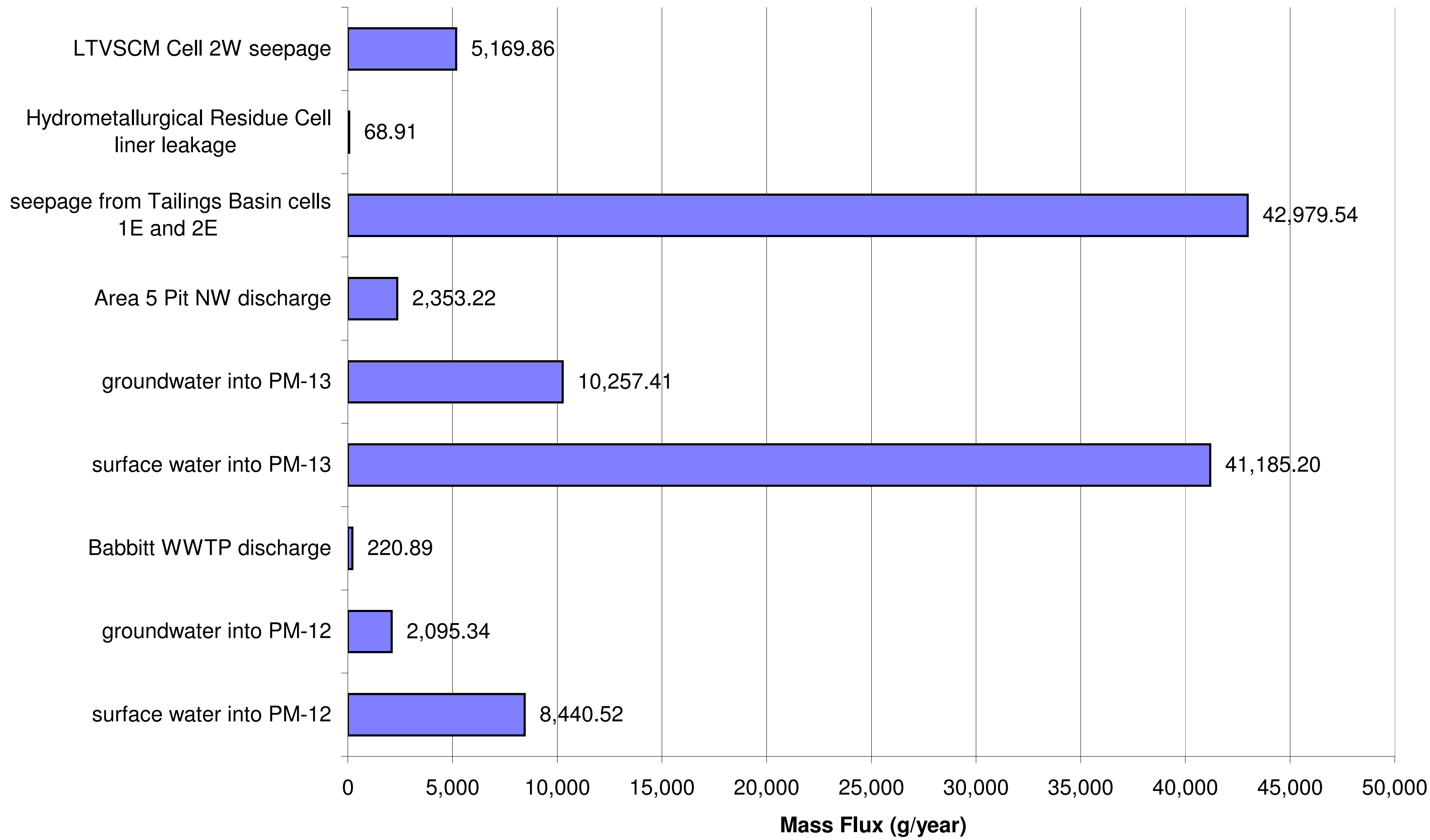


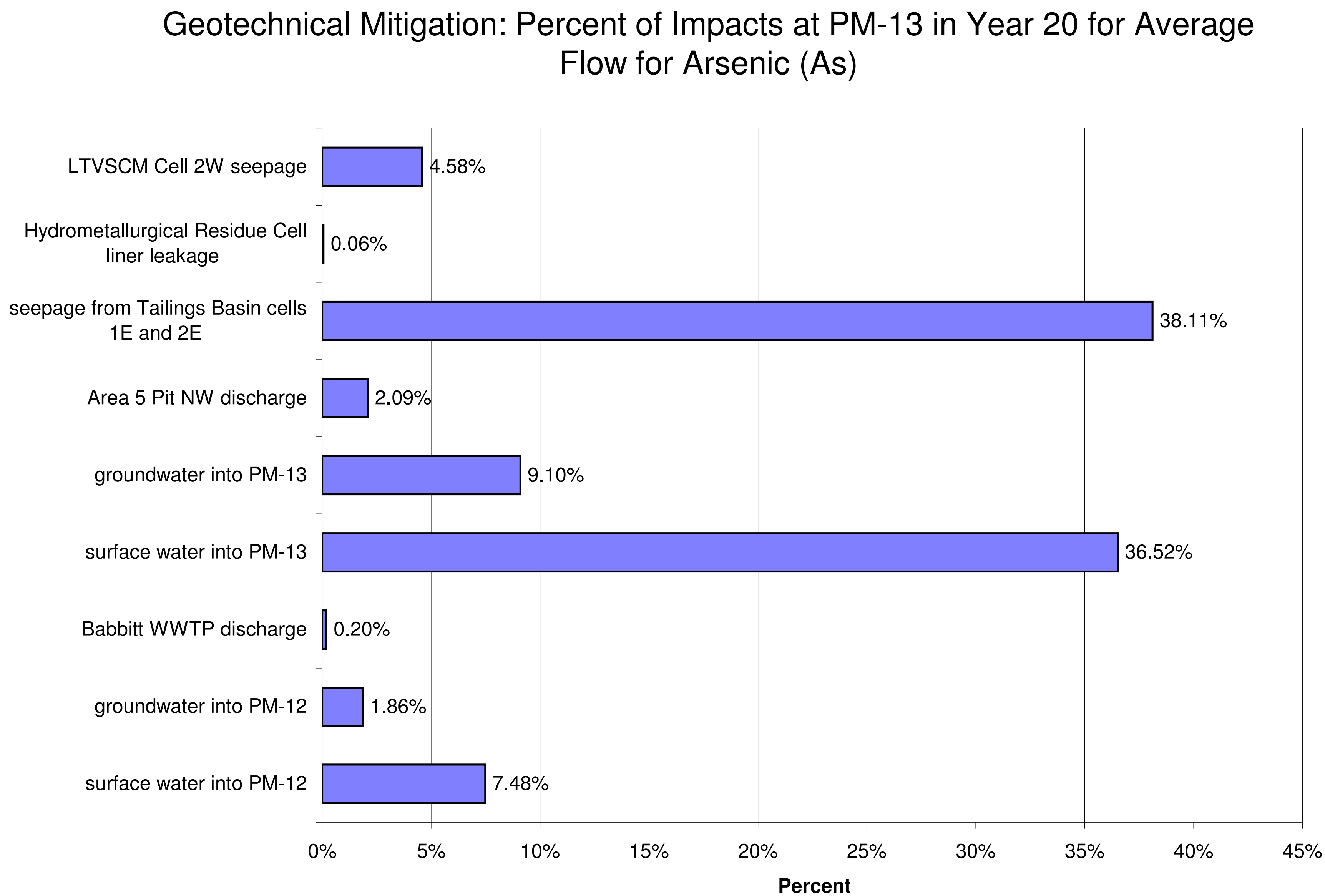
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)

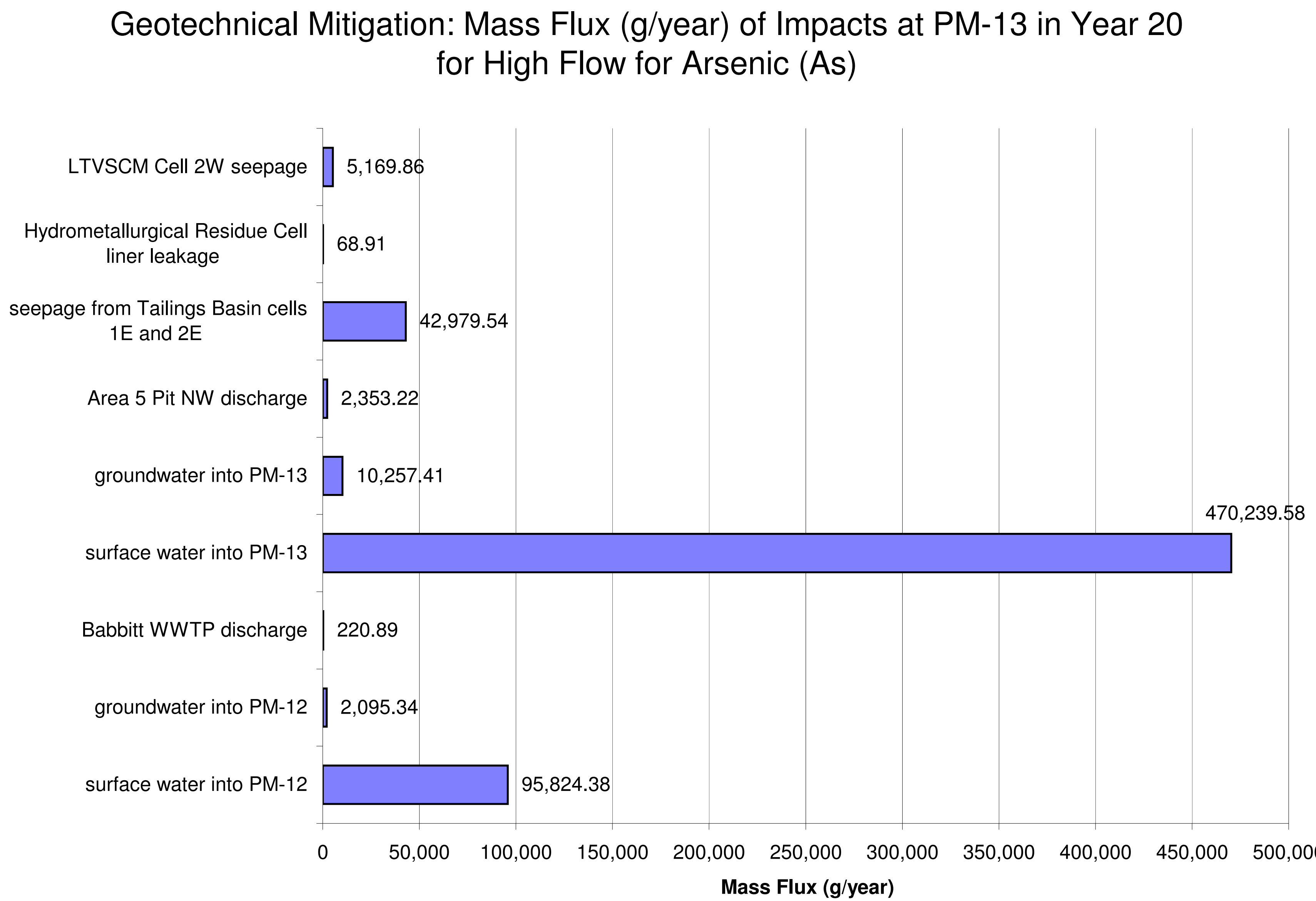


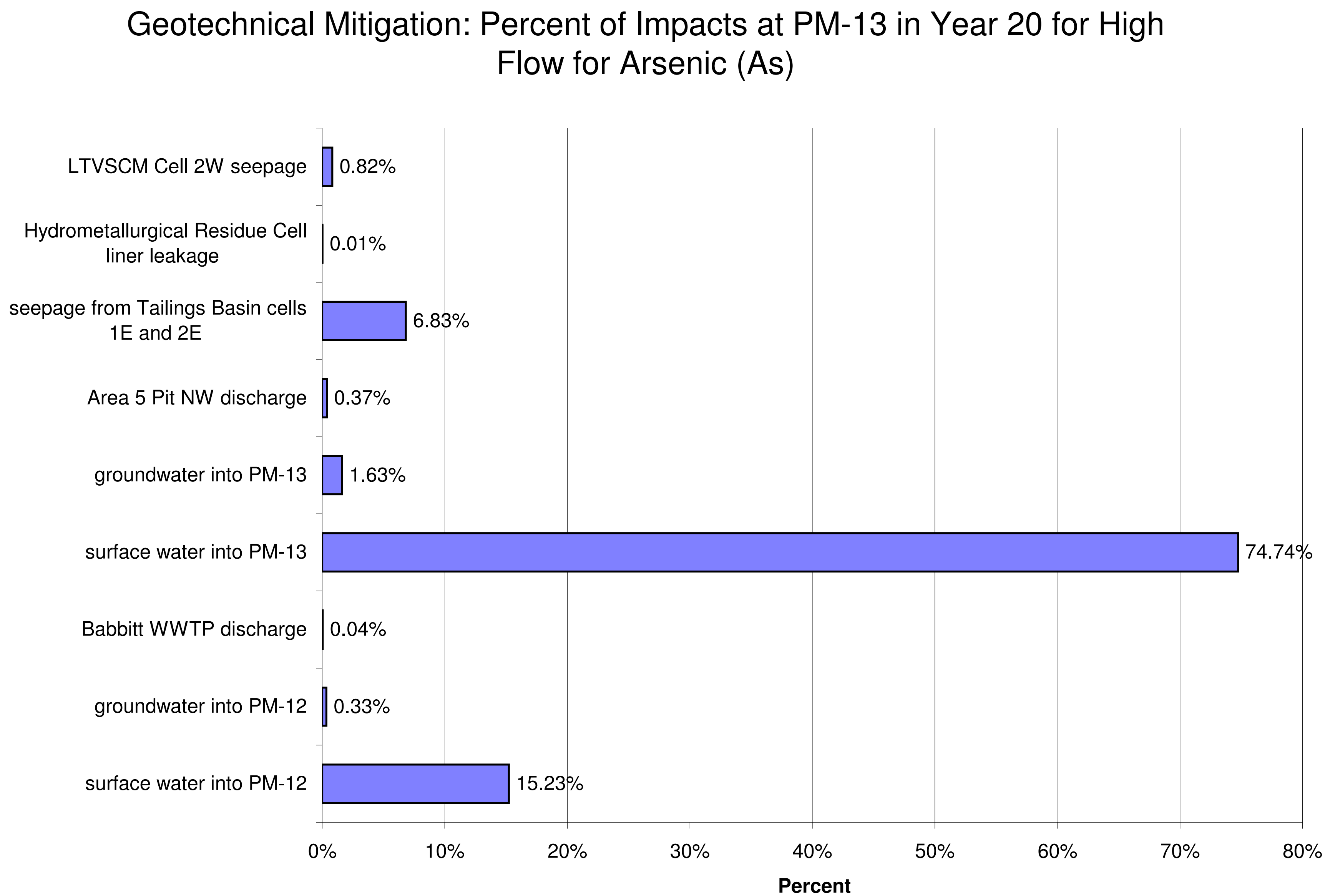

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)
LTVSCM Cell 2W seepage
8.46%
Hydrometallurgical Residue Cell liner leakage
0.11%
seepage from Tailings Basin cells 1E and 2E
70.34%
Area 5 Pit NW discharge
0.50%
groundwater into PM-13
16.79%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.36%
groundwater into PM-12
3.43%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

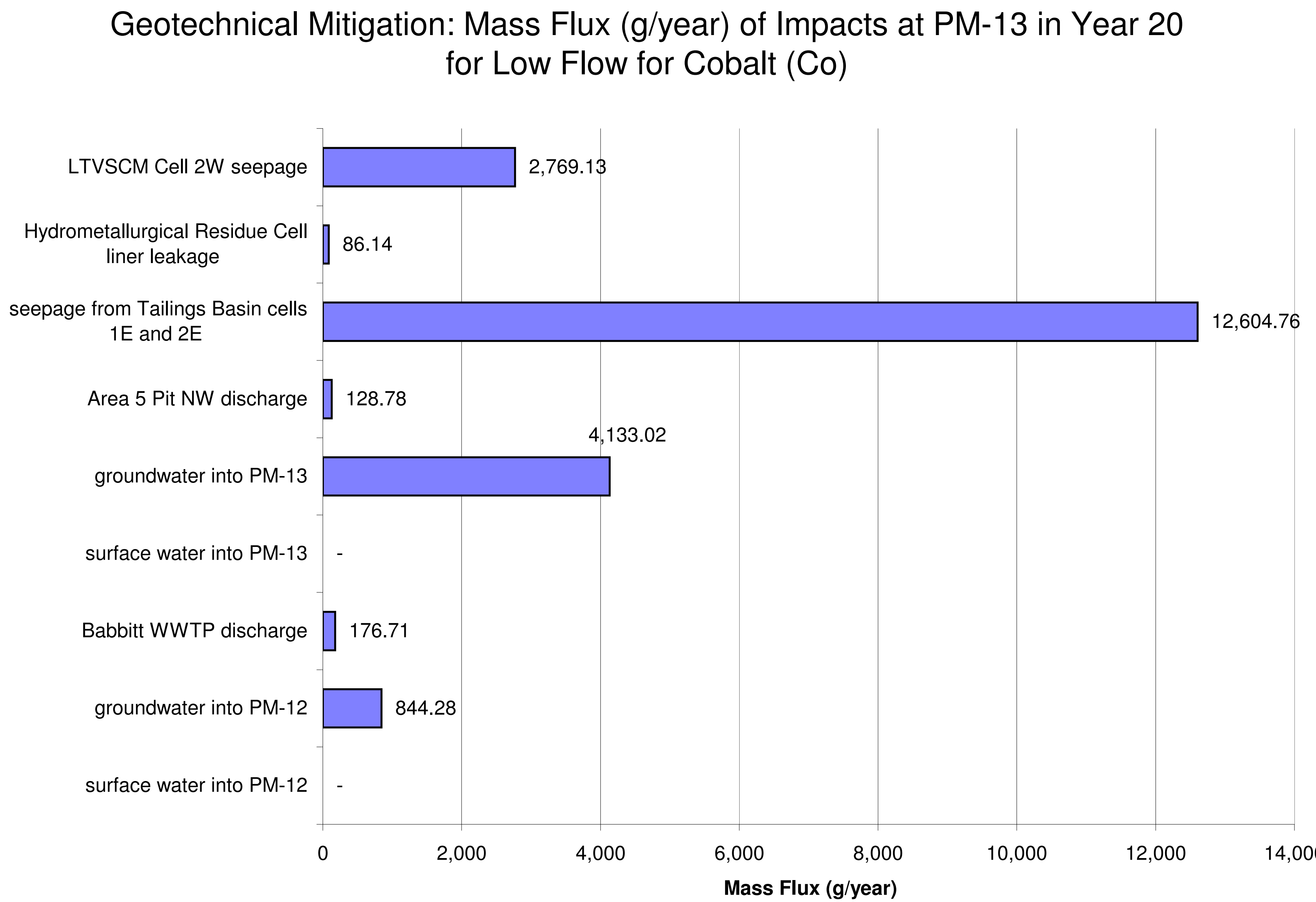
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)

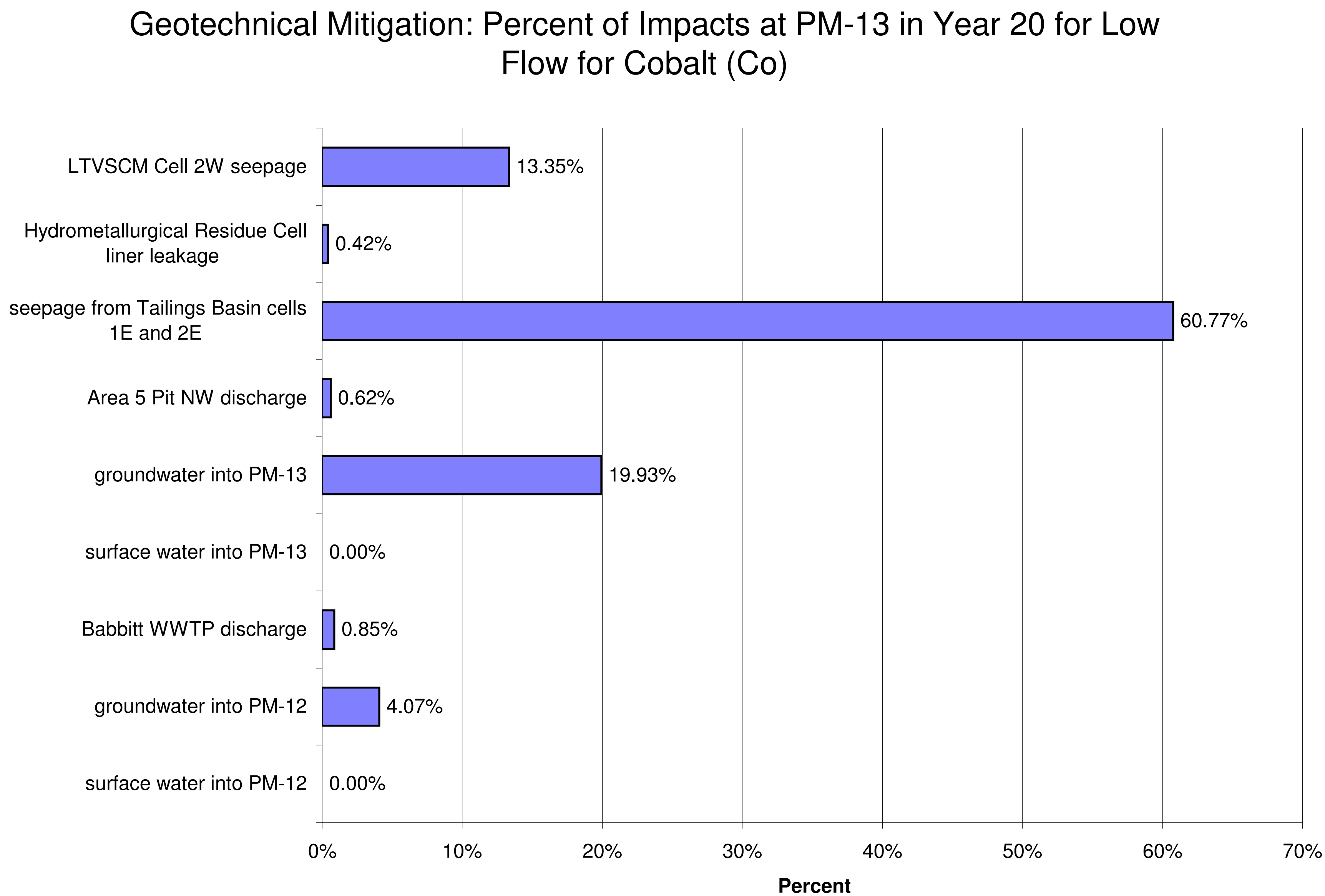


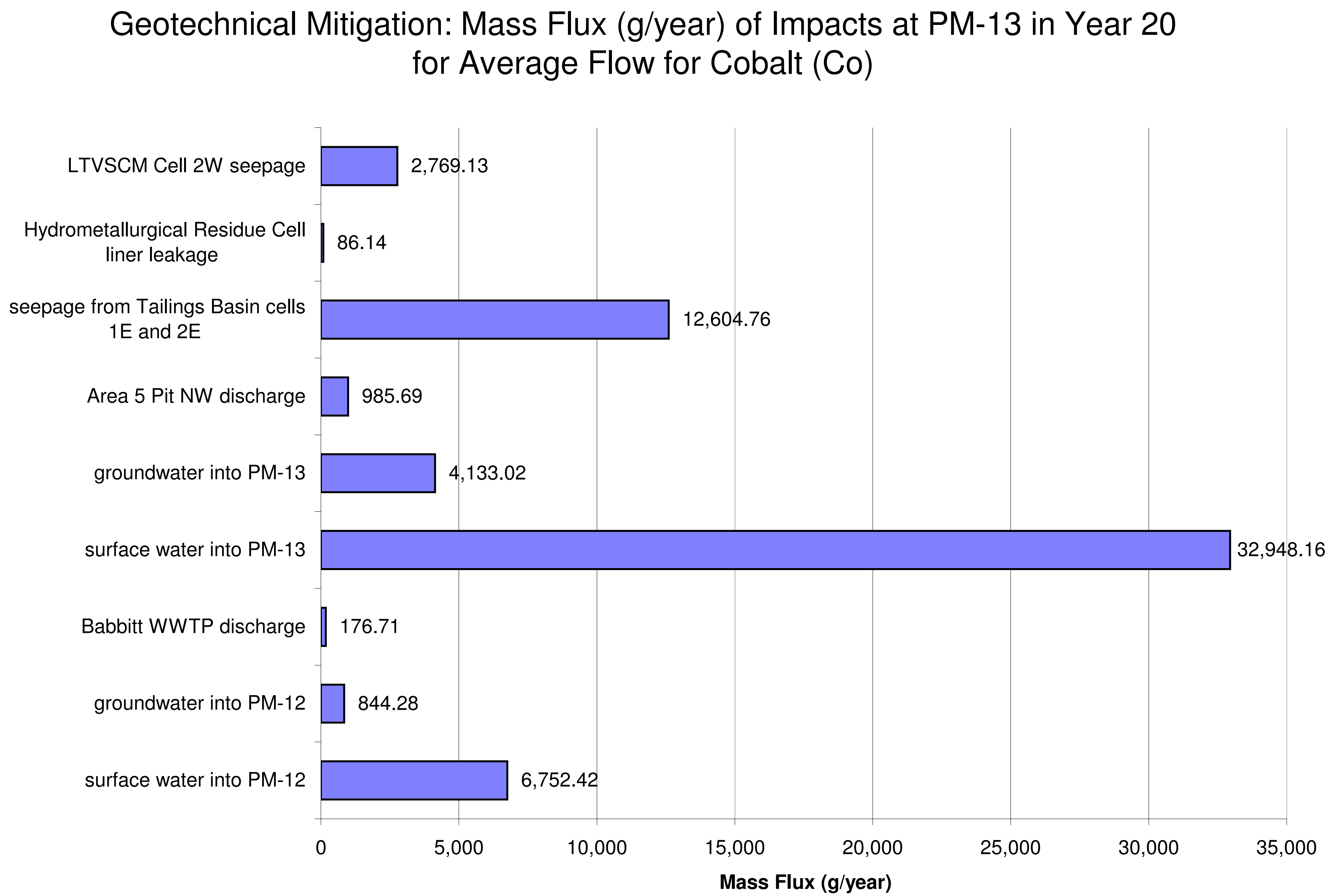

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)
LTVSCM Cell 2W seepage
4.58%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin cells 1E and 2E
38.11%
Area 5 Pit NW discharge
2.09%
groundwater into PM-13
9.10%
surface water into PM-13
36.52%
Babbitt WWTP discharge
0.20%
groundwater into PM-12
1.86%
surface water into PM-12
7.48%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

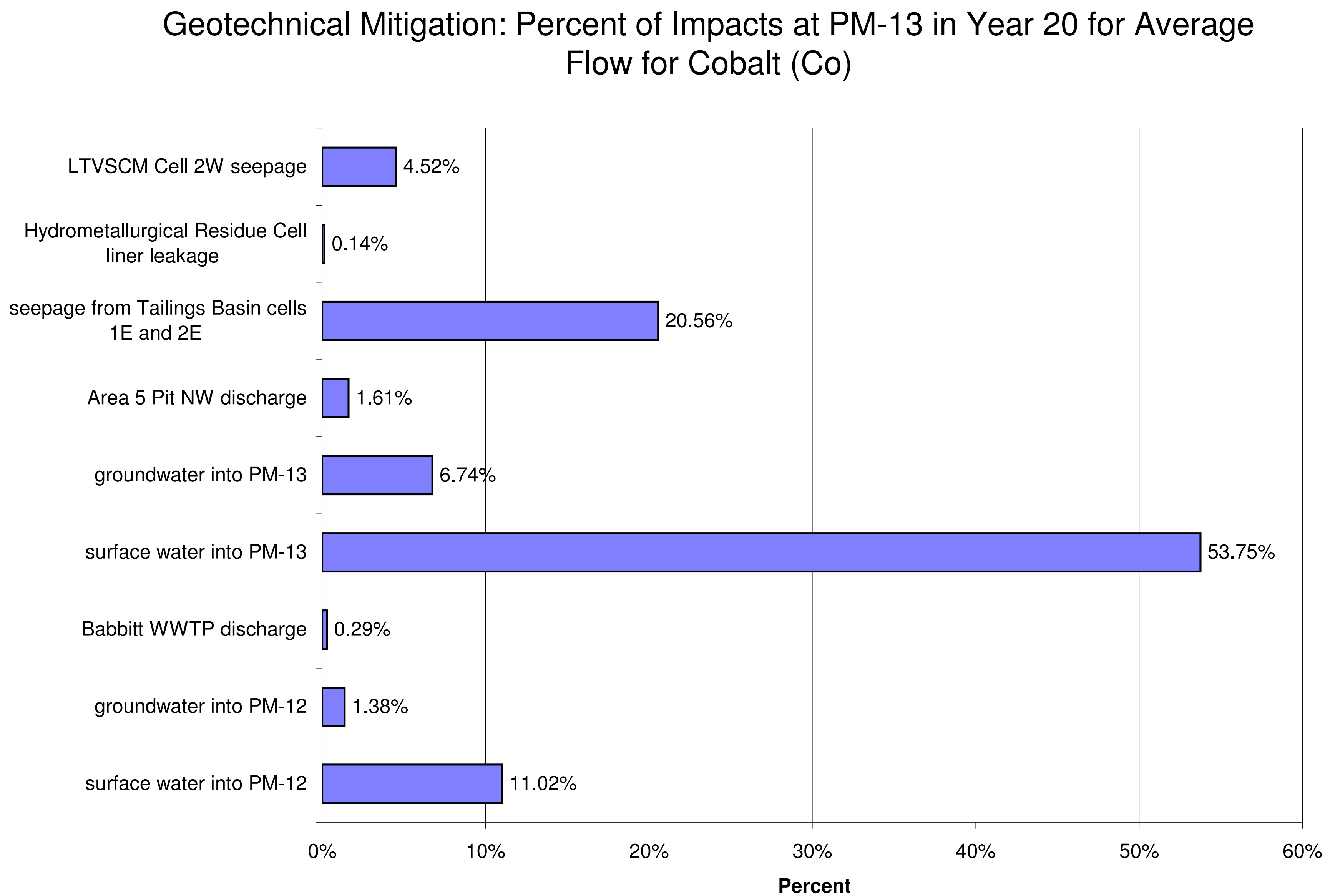

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)
LTVSCM Cell 2W seepage
5,169.86
Hydrometallurgical Residue Cell liner leakage
68.91
seepage from Tailings Basin cells 1E and 2E
42,979.54
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

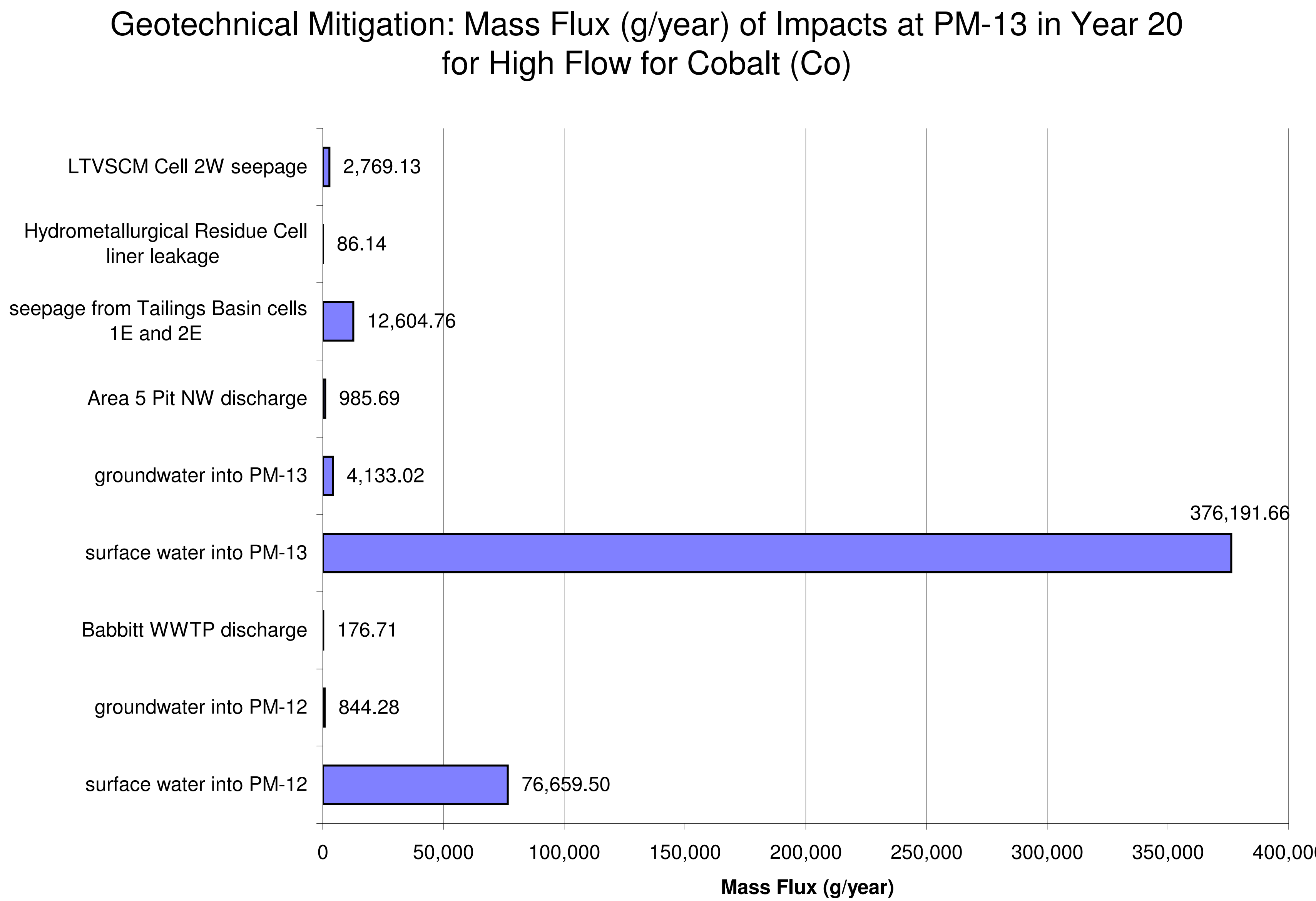

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)
LTVSCM Cell 2W seepage
0.82%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
6.83%
Area 5 Pit NW discharge
0.37%
groundwater into PM-13
1.63%
surface water into PM-13
74.74%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.33%
surface water into PM-12
15.23%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)
LTVSCM Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
86.14
seepage from Tailings Basin cells 1E and 2E
12,604.76
Area 5 Pit NW discharge
128.78
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
-
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
Mass Flux (g/year)

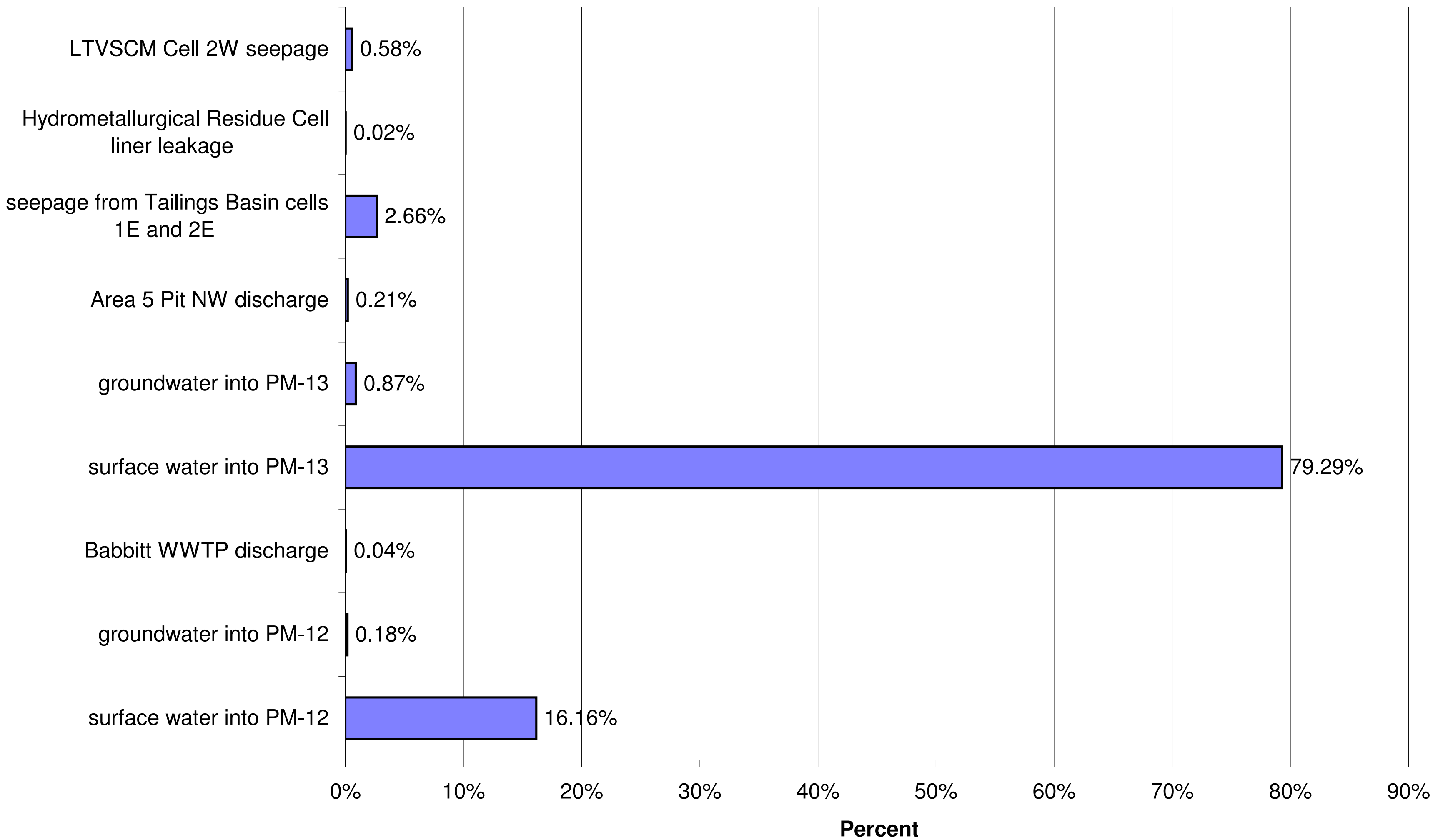

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)
LTVSCM Cell 2W seepage
13.35%
Hydrometallurgical Residue Cell liner leakage
0.42%
seepage from Tailings Basin cells 1E and 2E
60.77%
Area 5 Pit NW discharge
0.62%
groundwater into PM-13
19.93%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.85%
groundwater into PM-12
4.07%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)
LTVSCM Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
86.14
seepage from Tailings Basin cells 1E and 2E
12,604.76
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

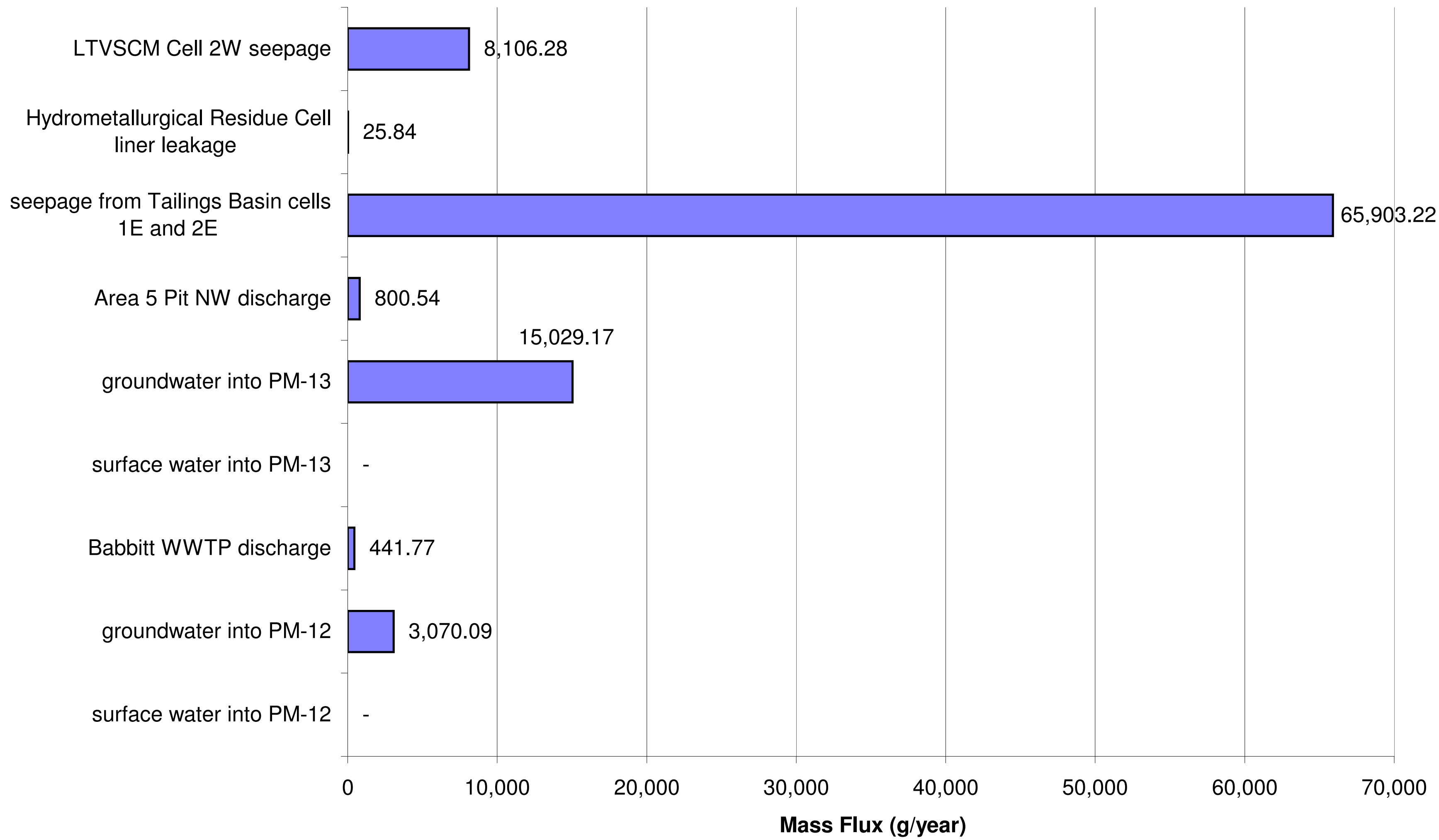

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)
LTVSCM Cell 2W seepage
4.52%
Hydrometallurgical Residue Cell liner leakage
0.14%
seepage from Tailings Basin cells 1E and 2E
20.56%
Area 5 Pit NW discharge
1.61%
groundwater into PM-13
6.74%
surface water into PM-13
53.75%
Babbitt WWTP discharge
0.29%
groundwater into PM-12
1.38%
surface water into PM-12
11.02%
0%
10%
20%
30%
40%
50%
60%
Percent

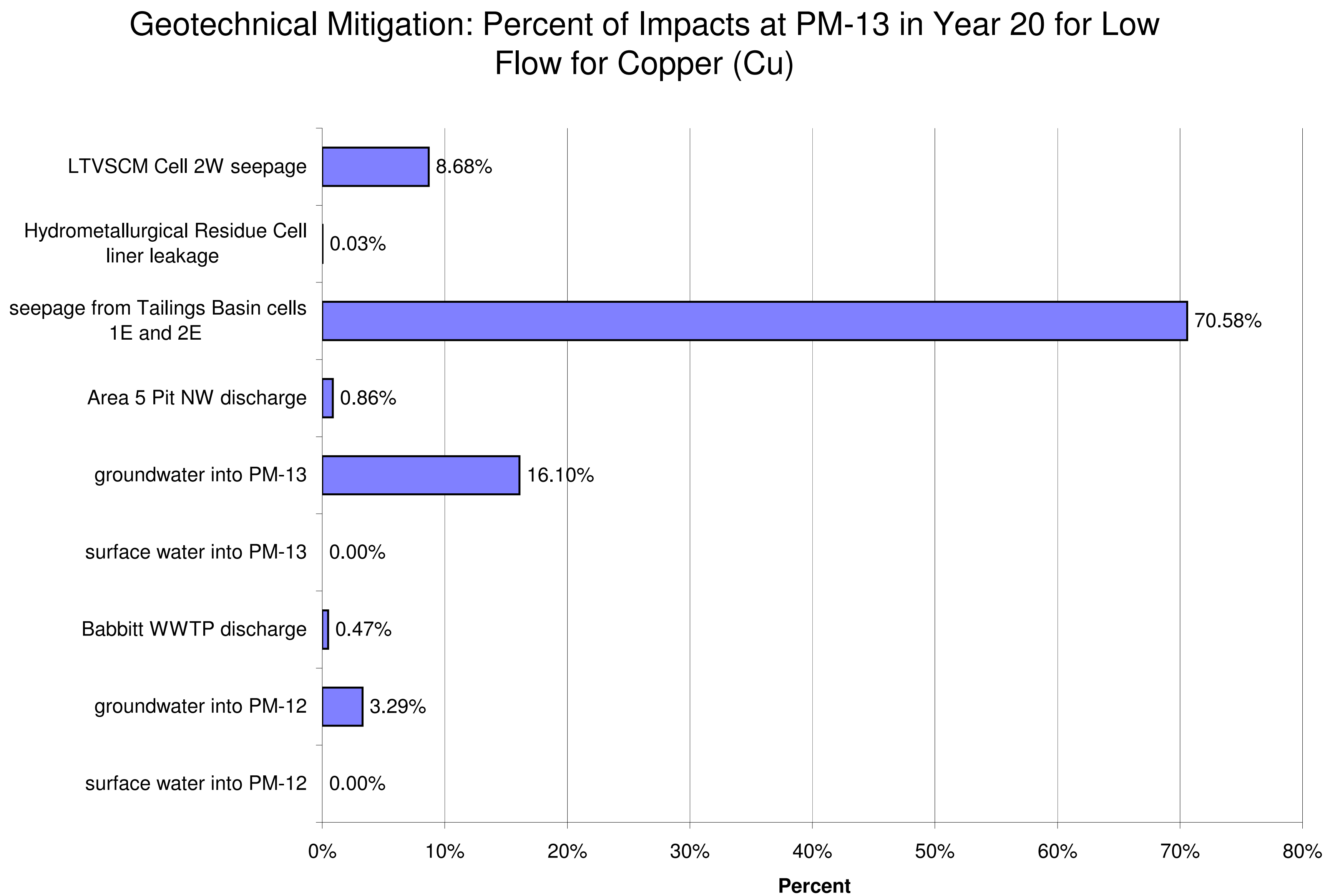

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)
LTVSCM Cell 2W seepage
2,769.13
Hydrometallurgical Residue Cell liner leakage
86.14
seepage from Tailings Basin cells 1E and 2E
12,604.76
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

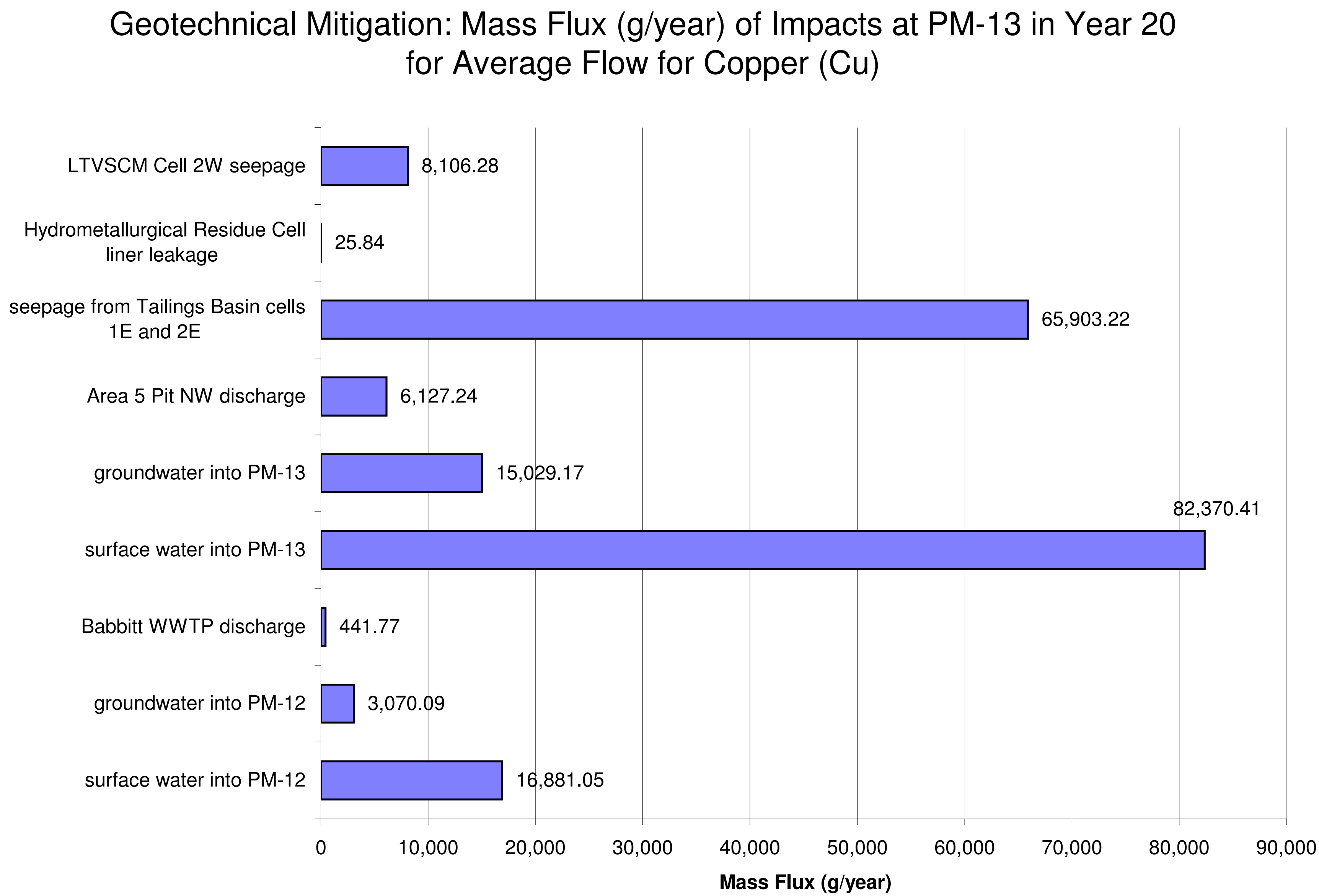
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)



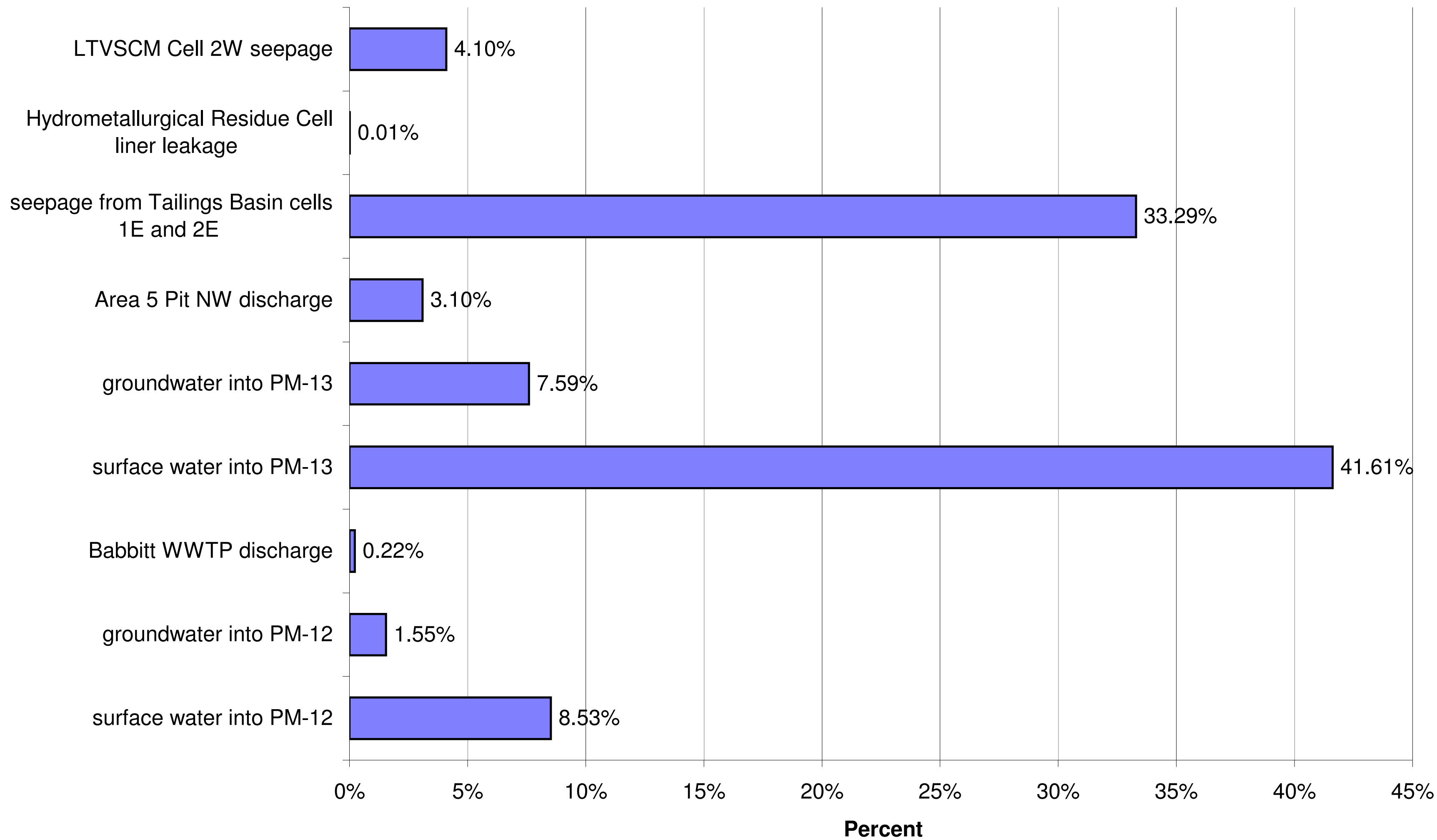
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)

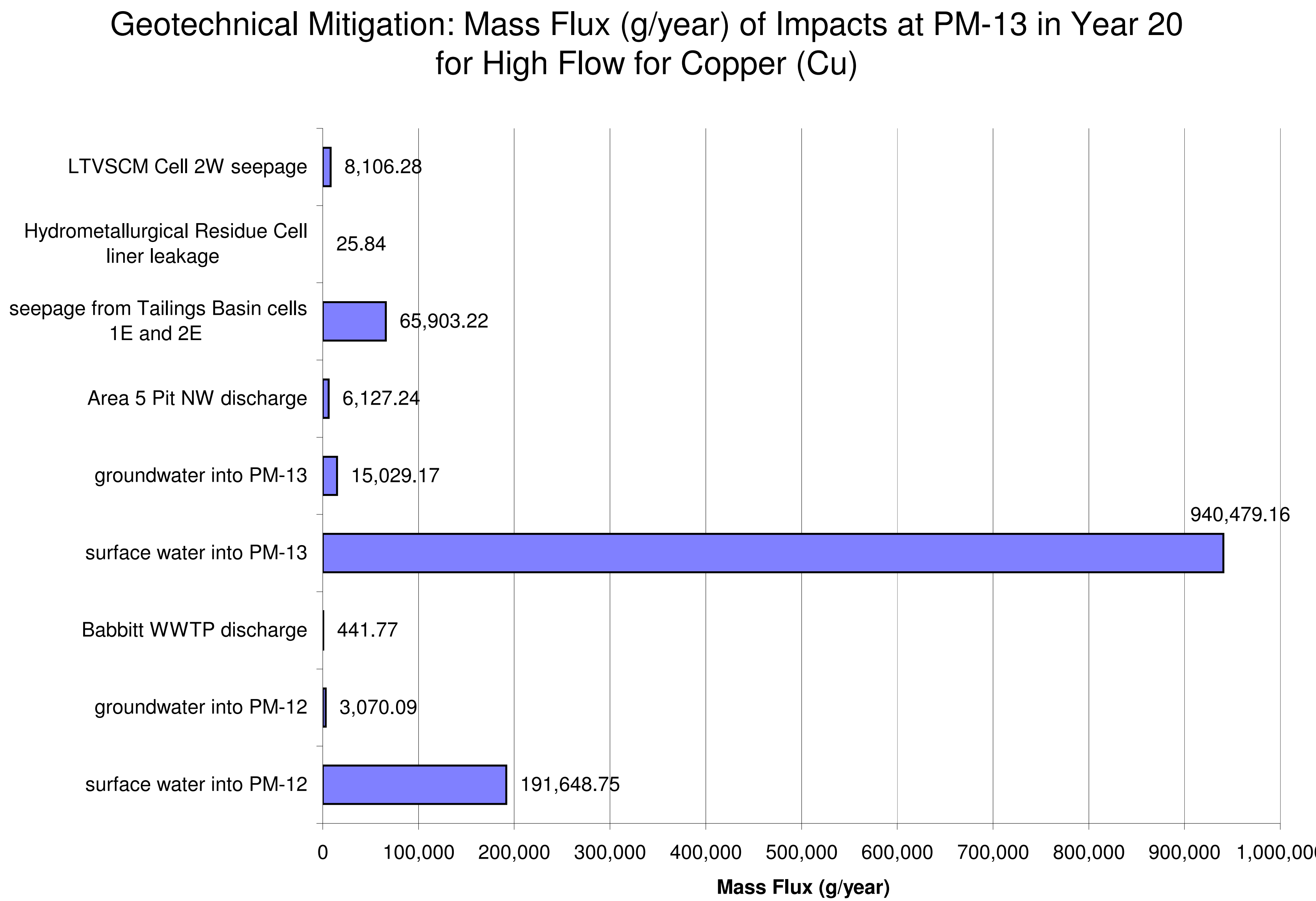


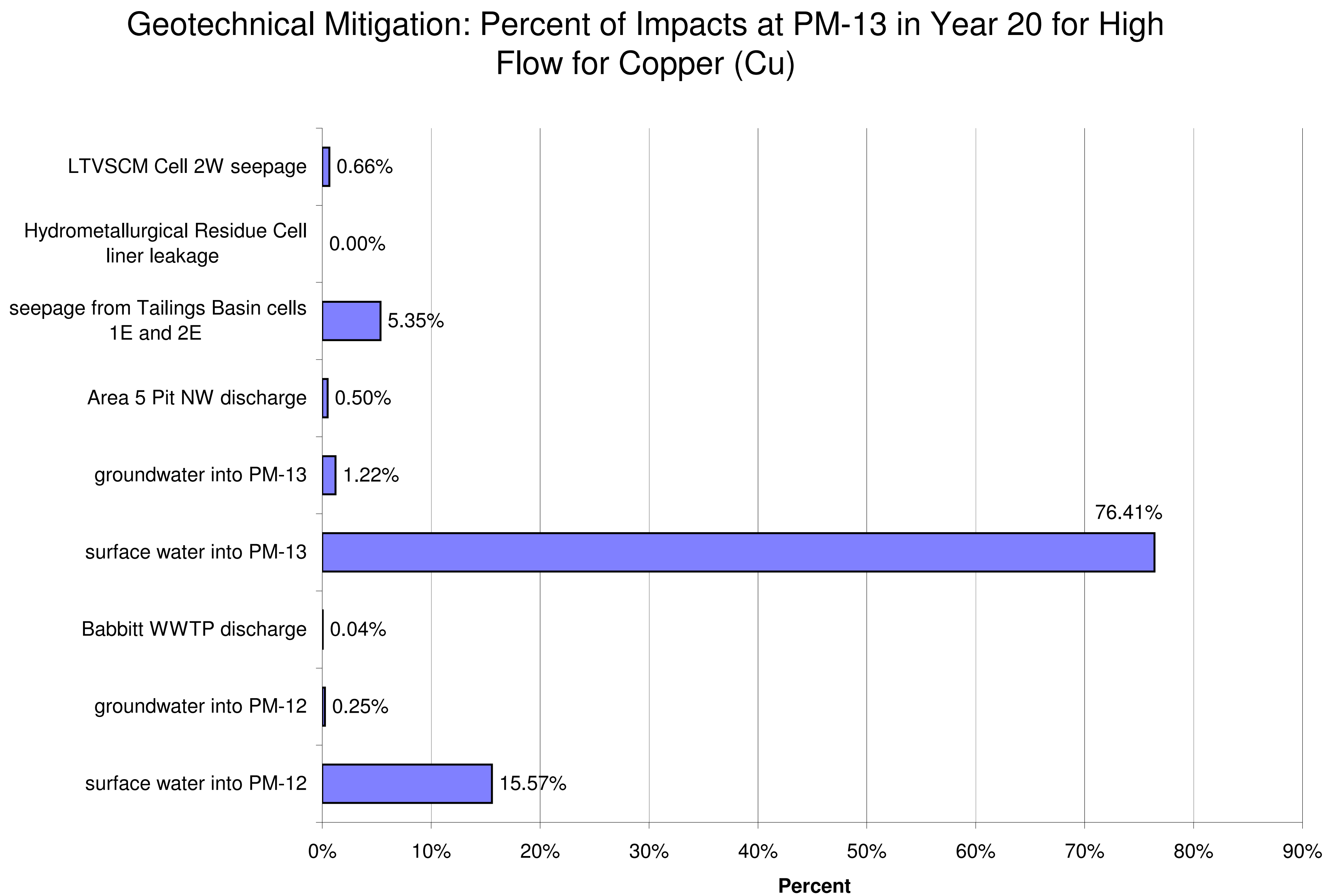

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)
LTVSCM Cell 2W seepage
8.68%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
70.58%
Area 5 Pit NW discharge
0.86%
groundwater into PM-13
16.10%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.47%
groundwater into PM-12
3.29%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

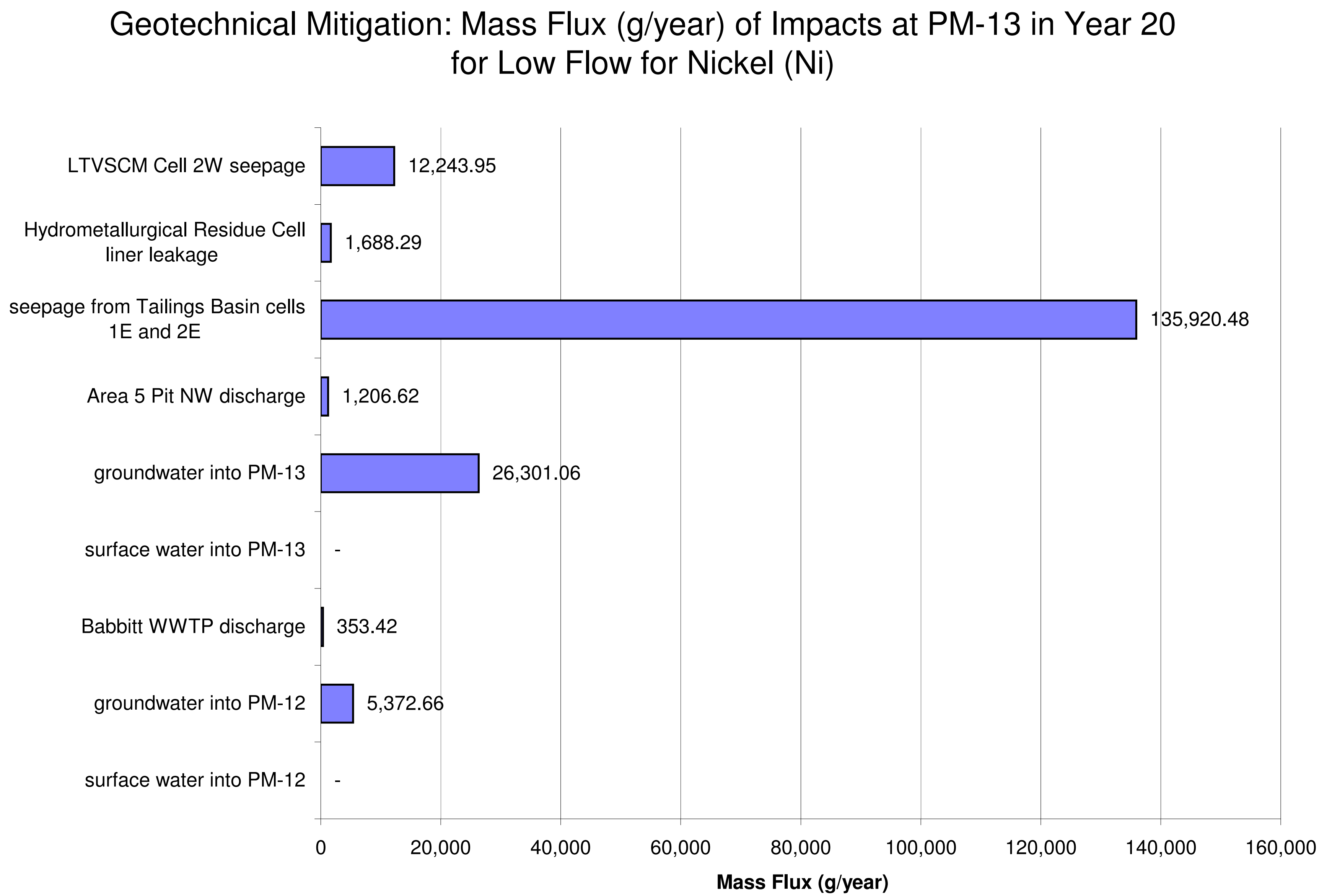

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)
LTVSCM Cell 2W seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
25.84
seepage from Tailings Basin cells 1E and 2E
65,903.22
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

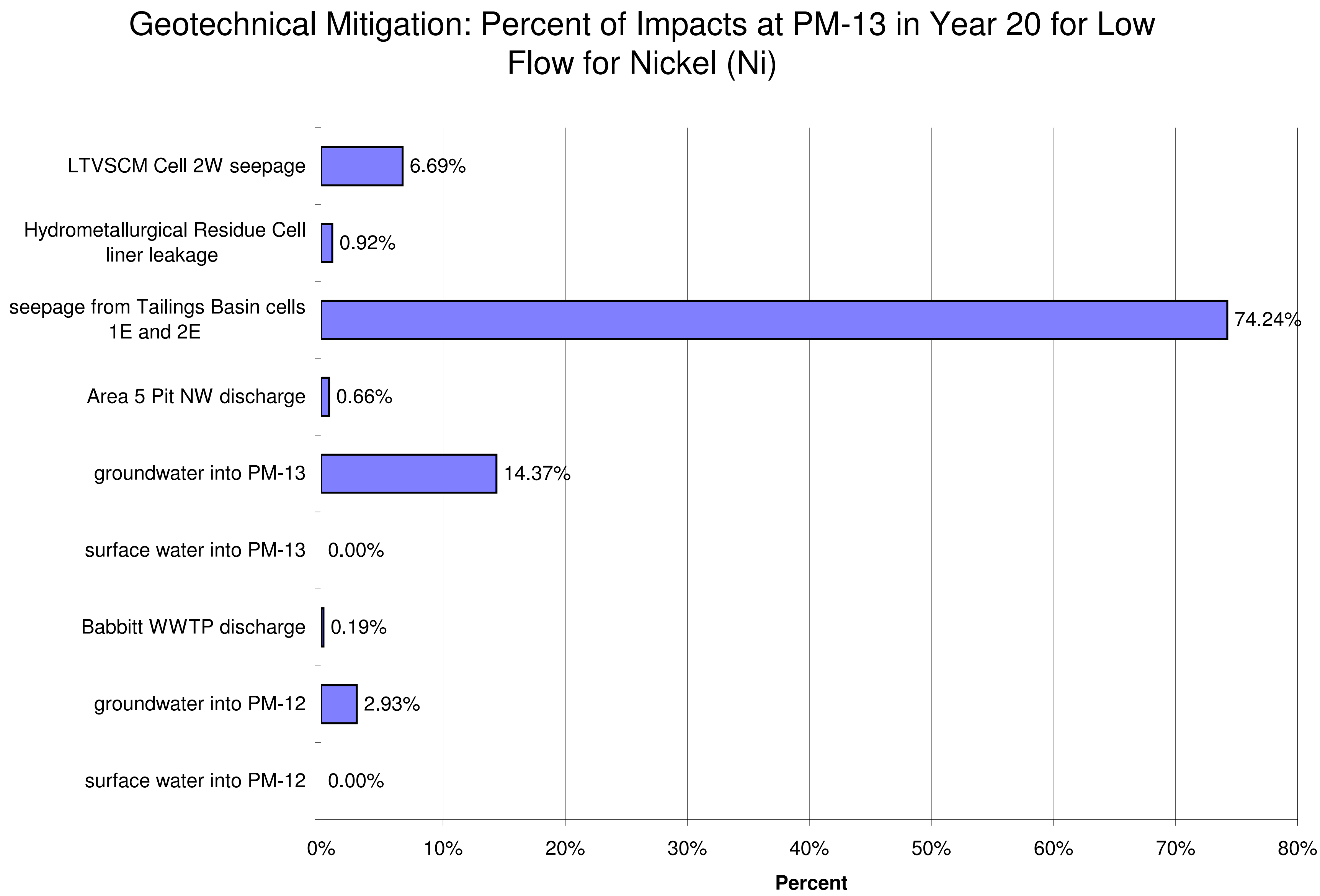
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)

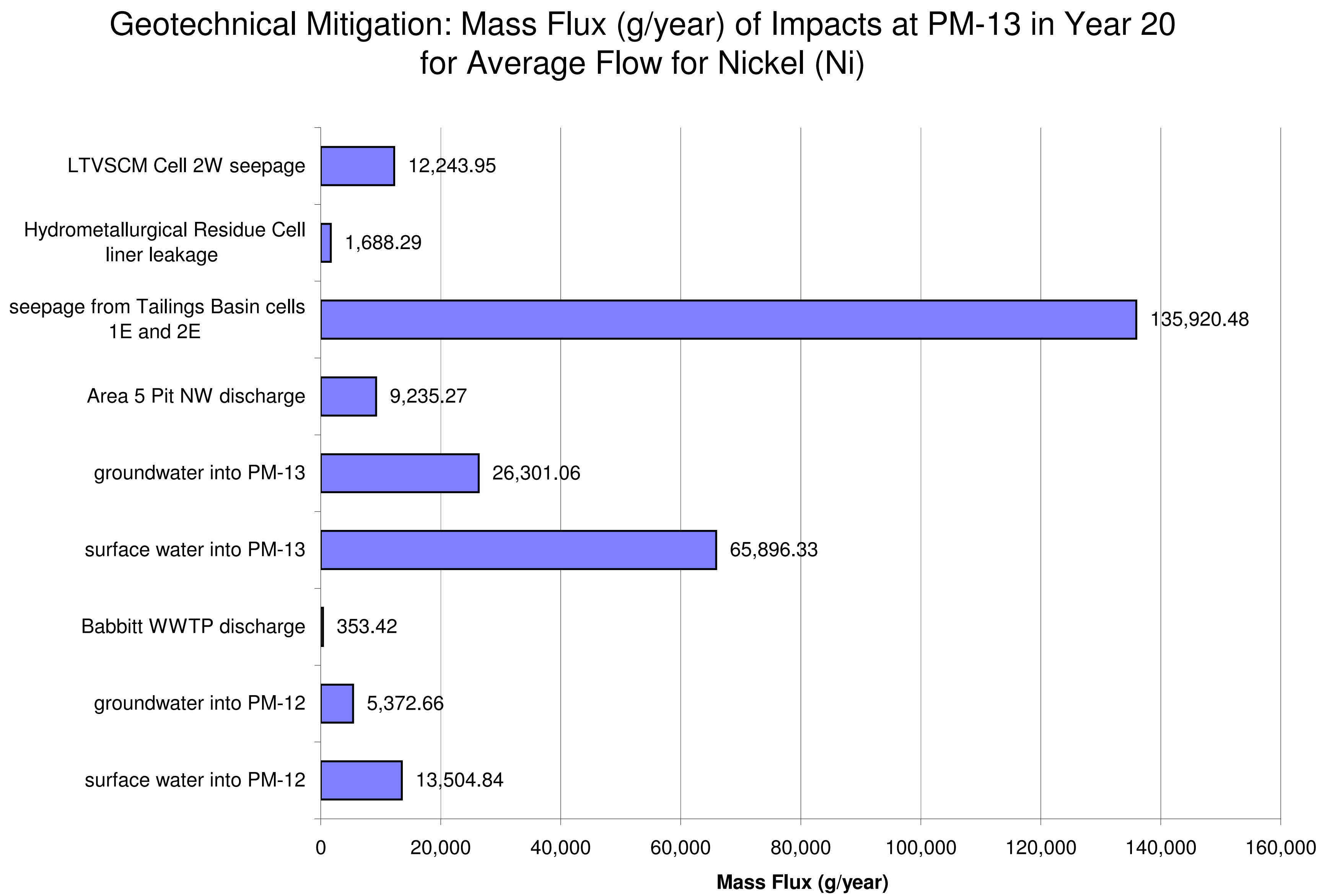


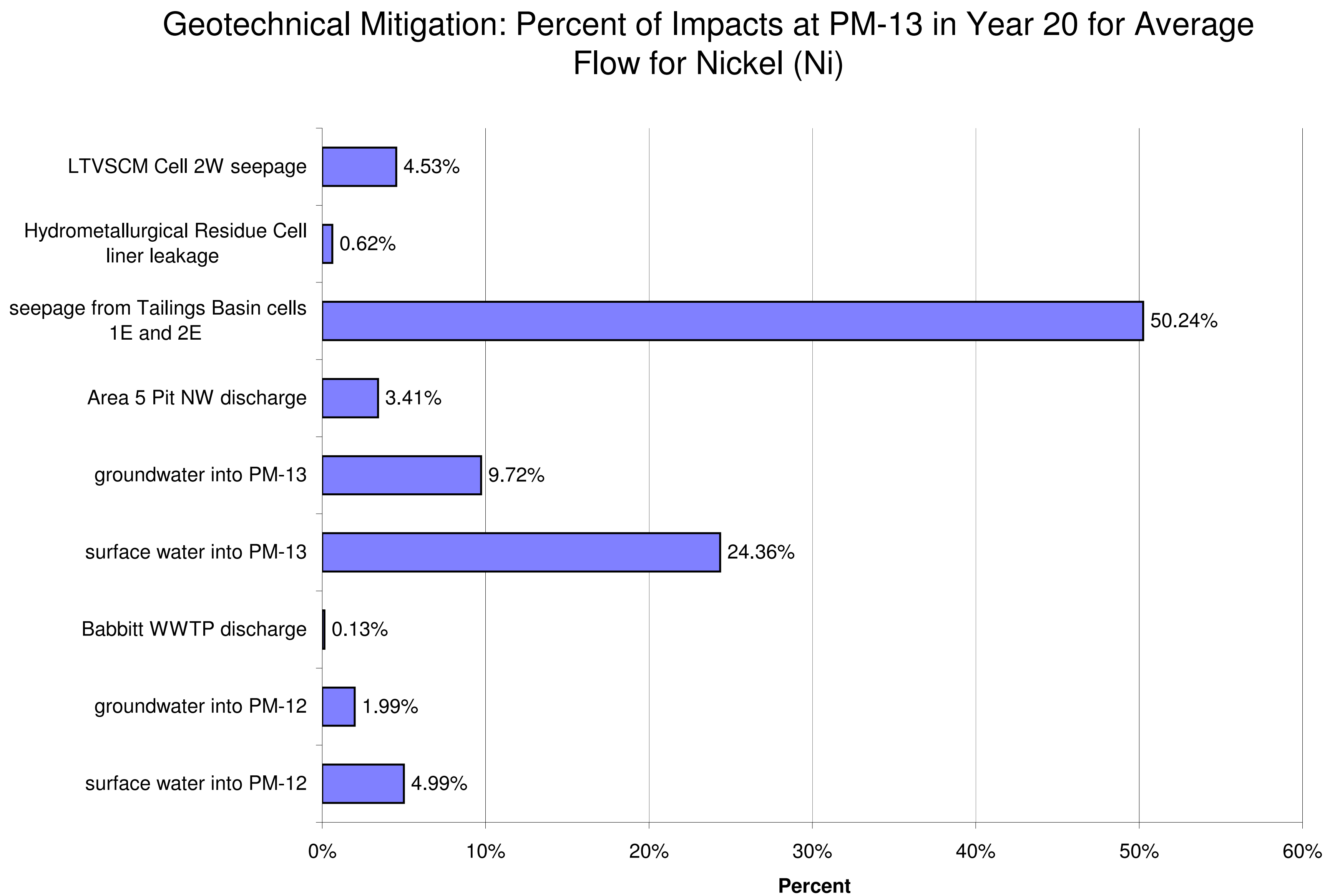

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)
LTVSCM Cell 2W seepage
8,106.28
Hydrometallurgical Residue Cell liner leakage
25.84
seepage from Tailings Basin cells 1E and 2E
65,903.22
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)
LTVSCM Cell 2W seepage
0.66%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
5.35%
Area 5 Pit NW discharge
0.50%
groundwater into PM-13
1.22%
surface water into PM-13
76.41%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.25%
surface water into PM-12
15.57%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

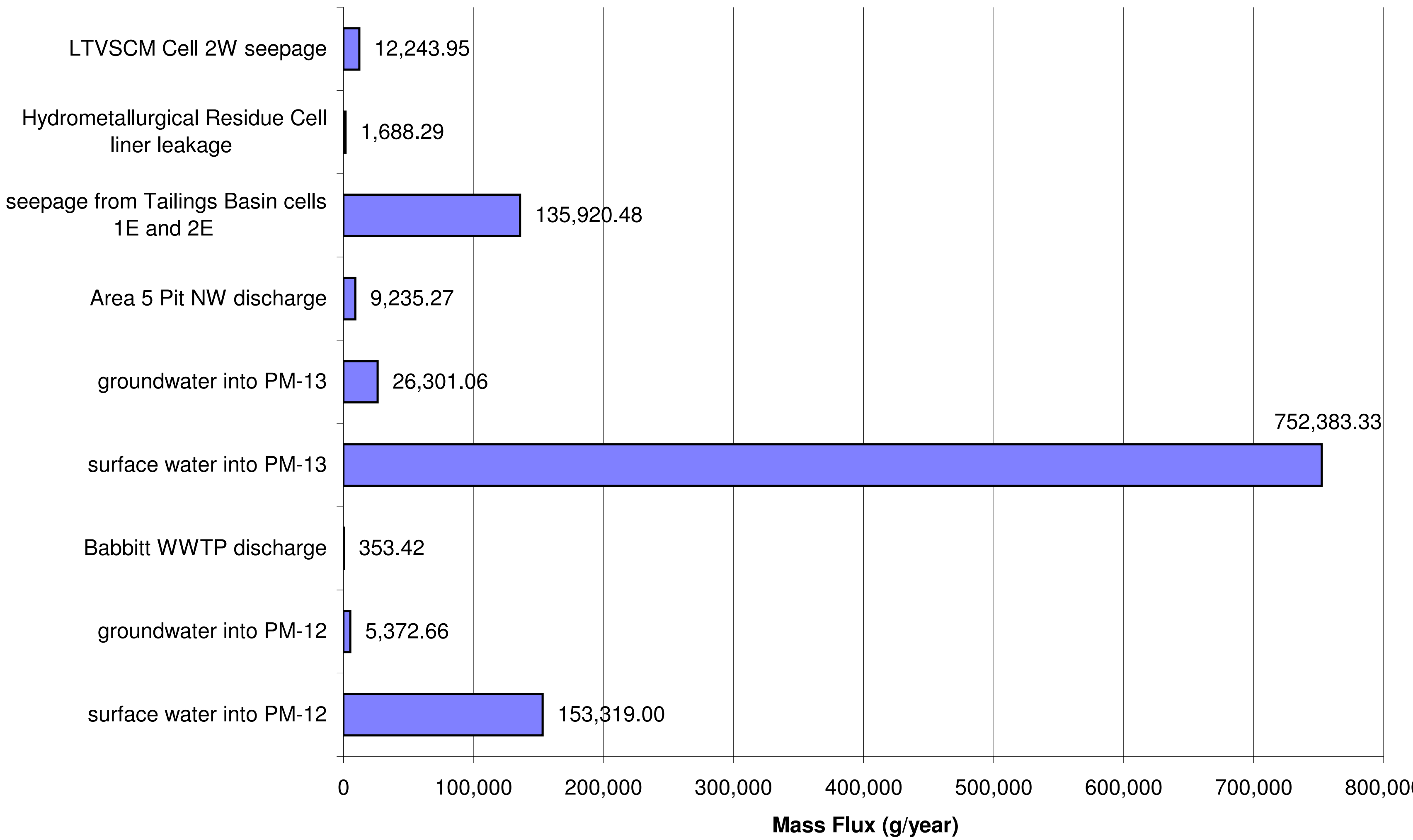

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,688.29
seepage from Tailings Basin cells 1E and 2E
135,920.48
Area 5 Pit NW discharge
1,206.62
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
-
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
160,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
6.69%
Hydrometallurgical Residue Cell liner leakage
0.92%
seepage from Tailings Basin cells 1E and 2E
74.24%
Area 5 Pit NW discharge
0.66%
groundwater into PM-13
14.37%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.19%
groundwater into PM-12
2.93%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

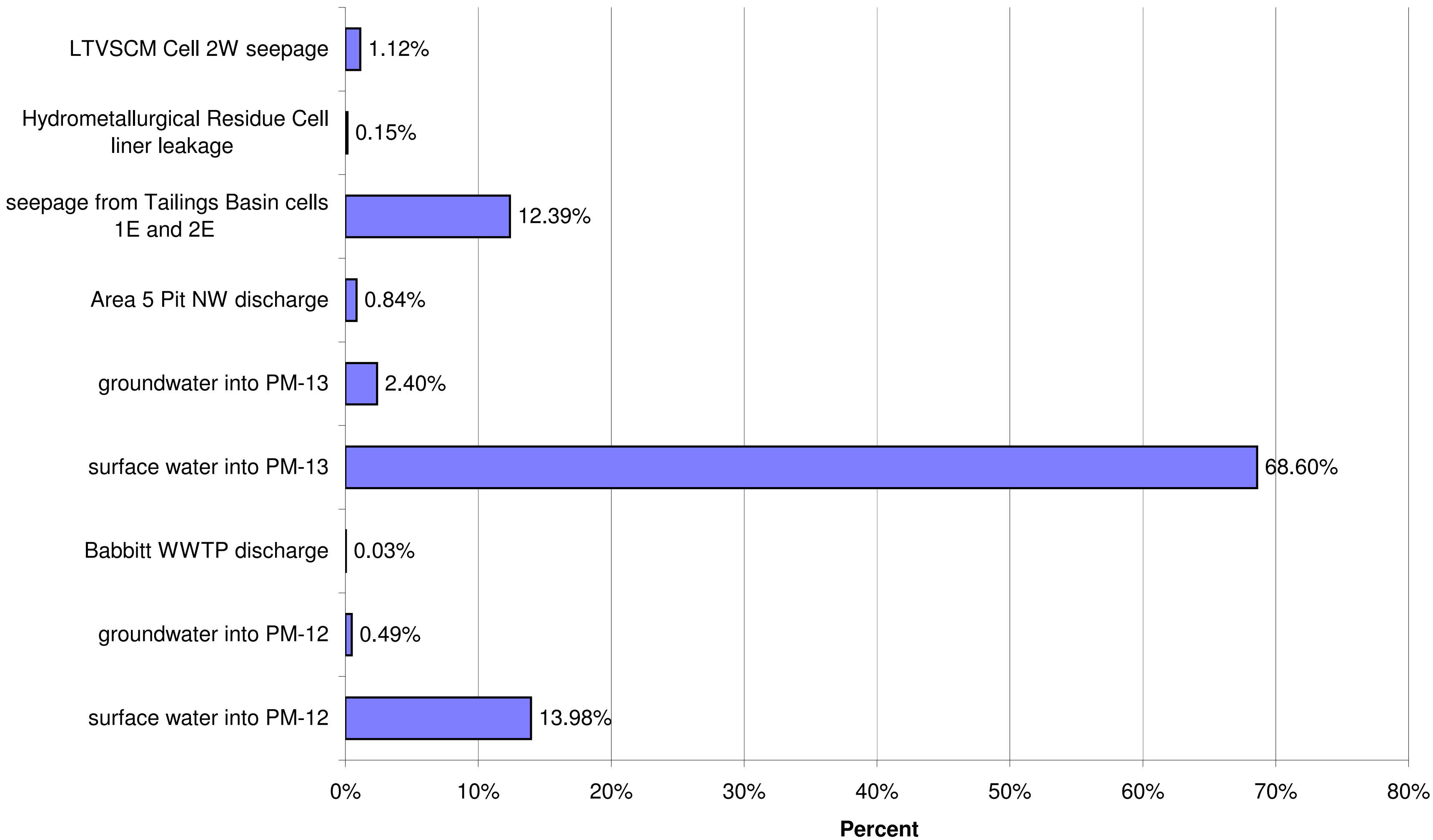

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
12,243.95
Hydrometallurgical Residue Cell liner leakage
1,688.29
seepage from Tailings Basin cells 1E and 2E
135,920.48
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
160,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
4.53%
Hydrometallurgical Residue Cell liner leakage
0.62%
seepage from Tailings Basin cells 1E and 2E
50.24%
Area 5 Pit NW discharge
3.41%
groundwater into PM-13
9.72%
surface water into PM-13
24.36%
Babbitt WWTP discharge
0.13%
groundwater into PM-12
1.99%
surface water into PM-12
4.99%
0%
10%
20%
30%
40%
50%
60%
Percent

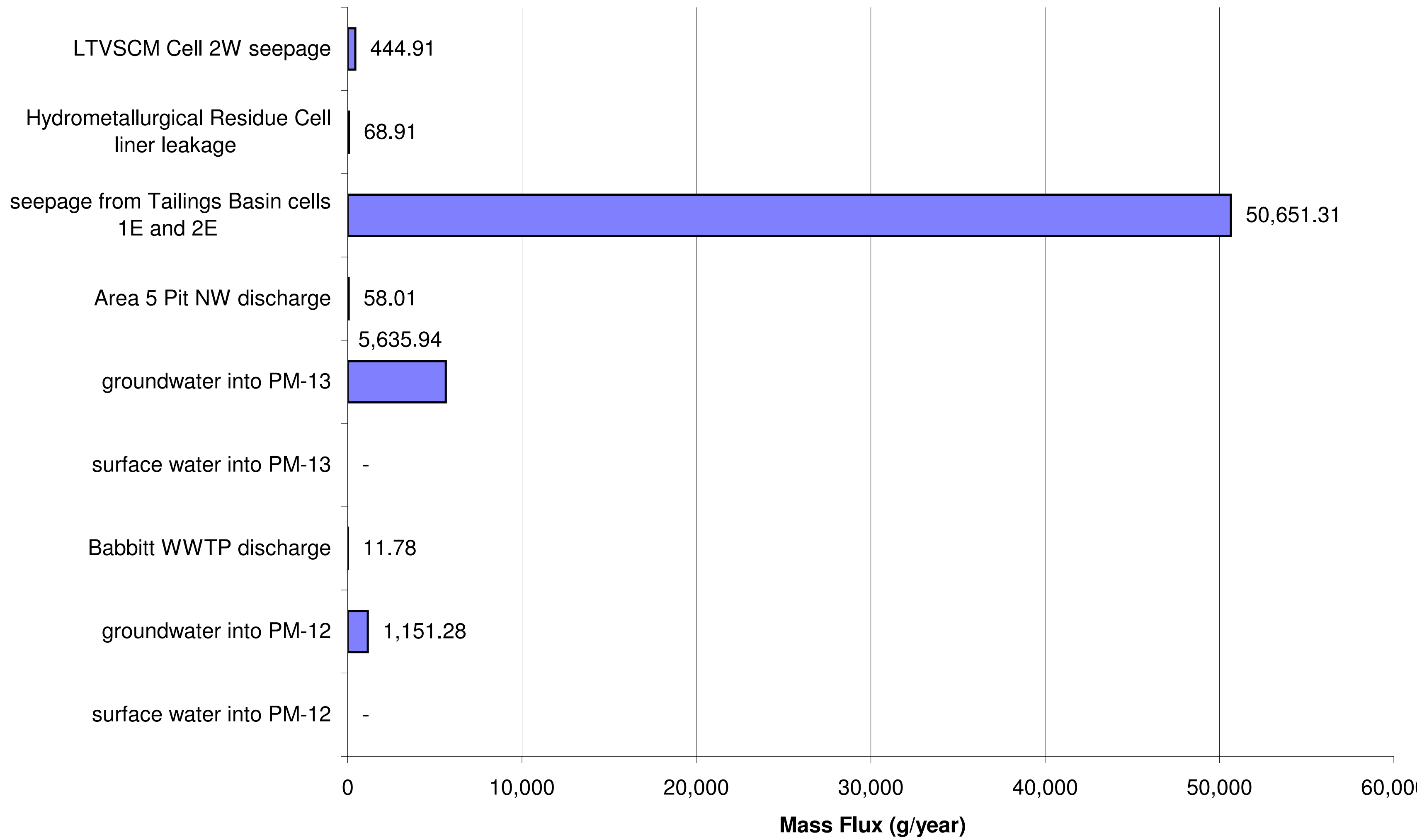
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)

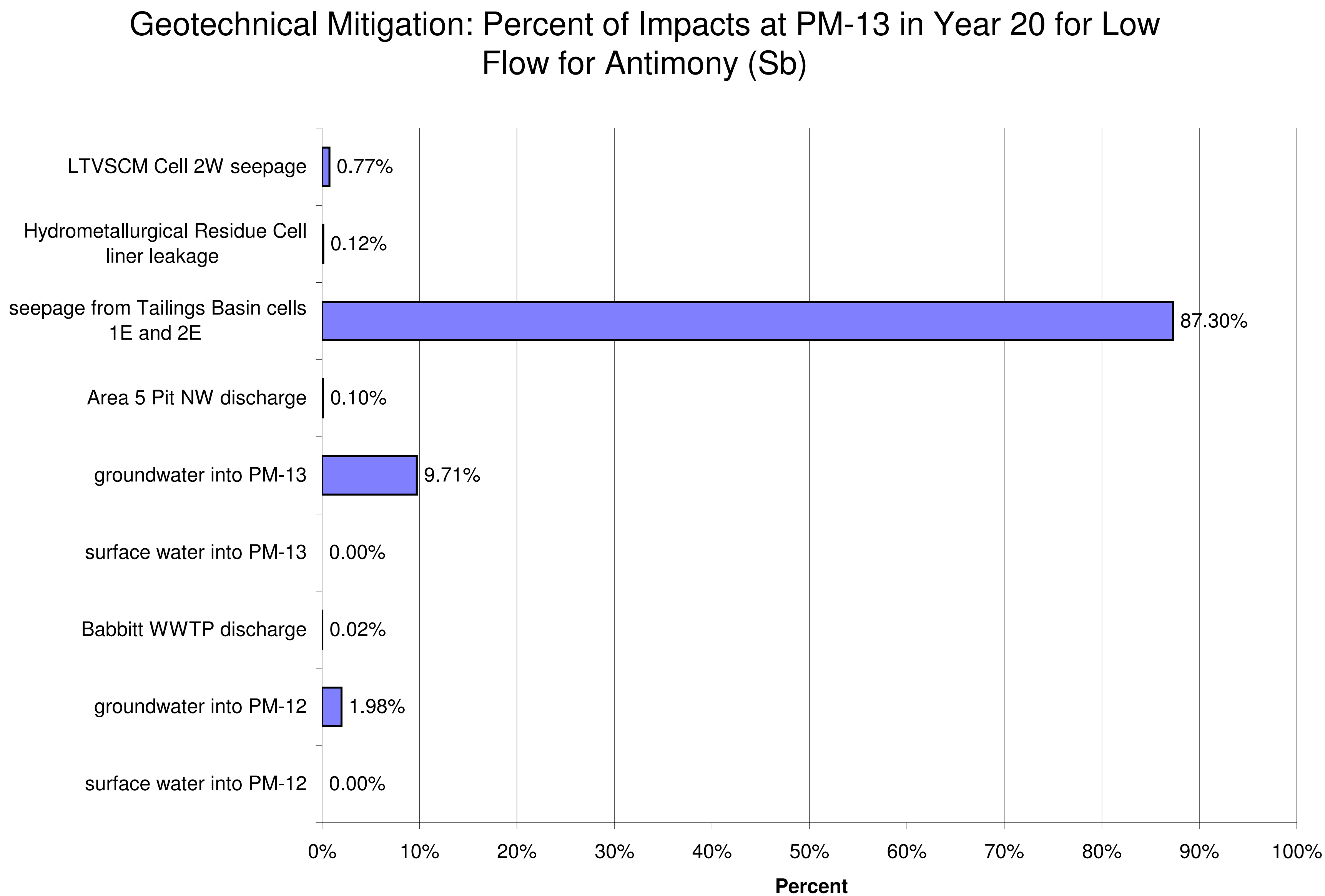


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)

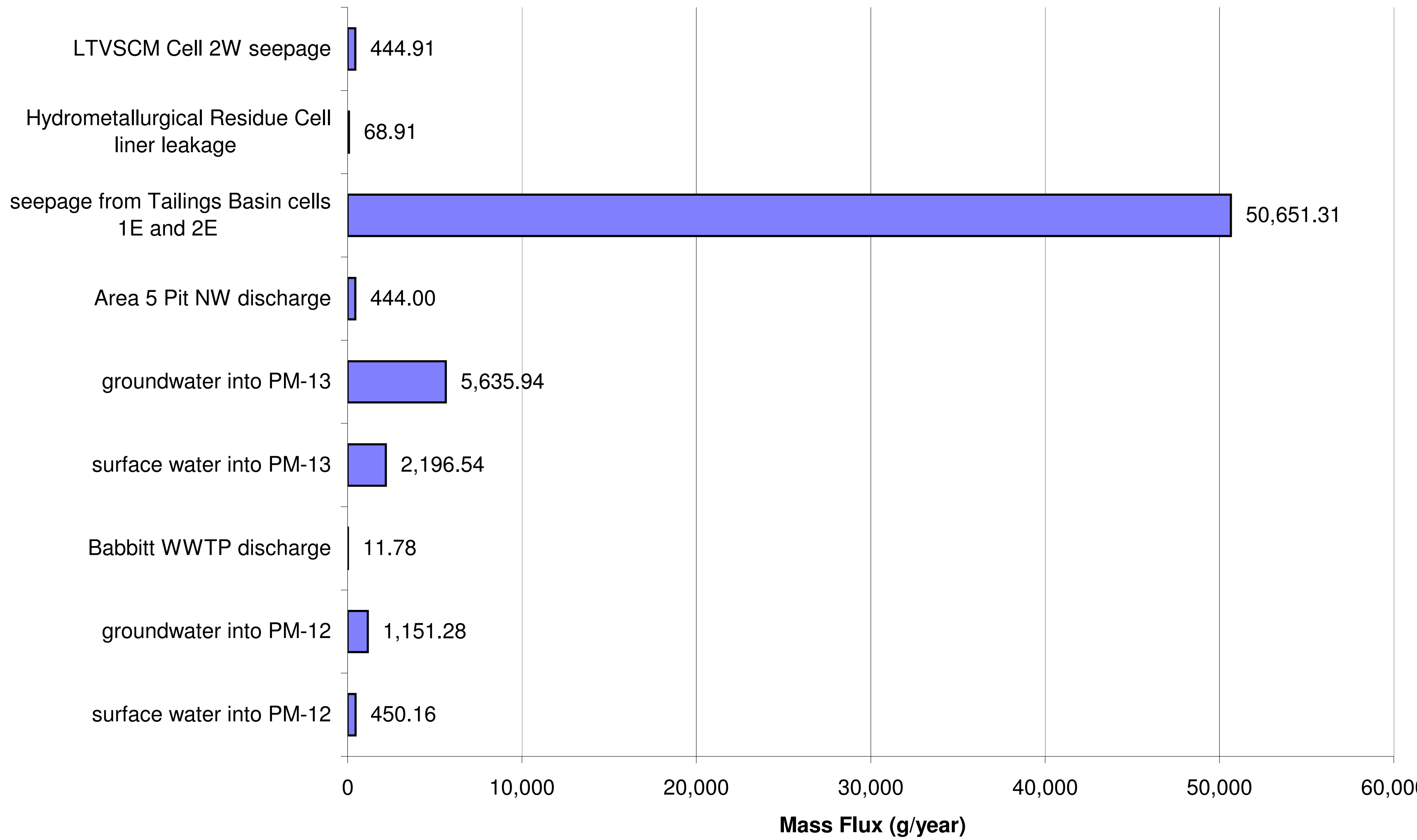


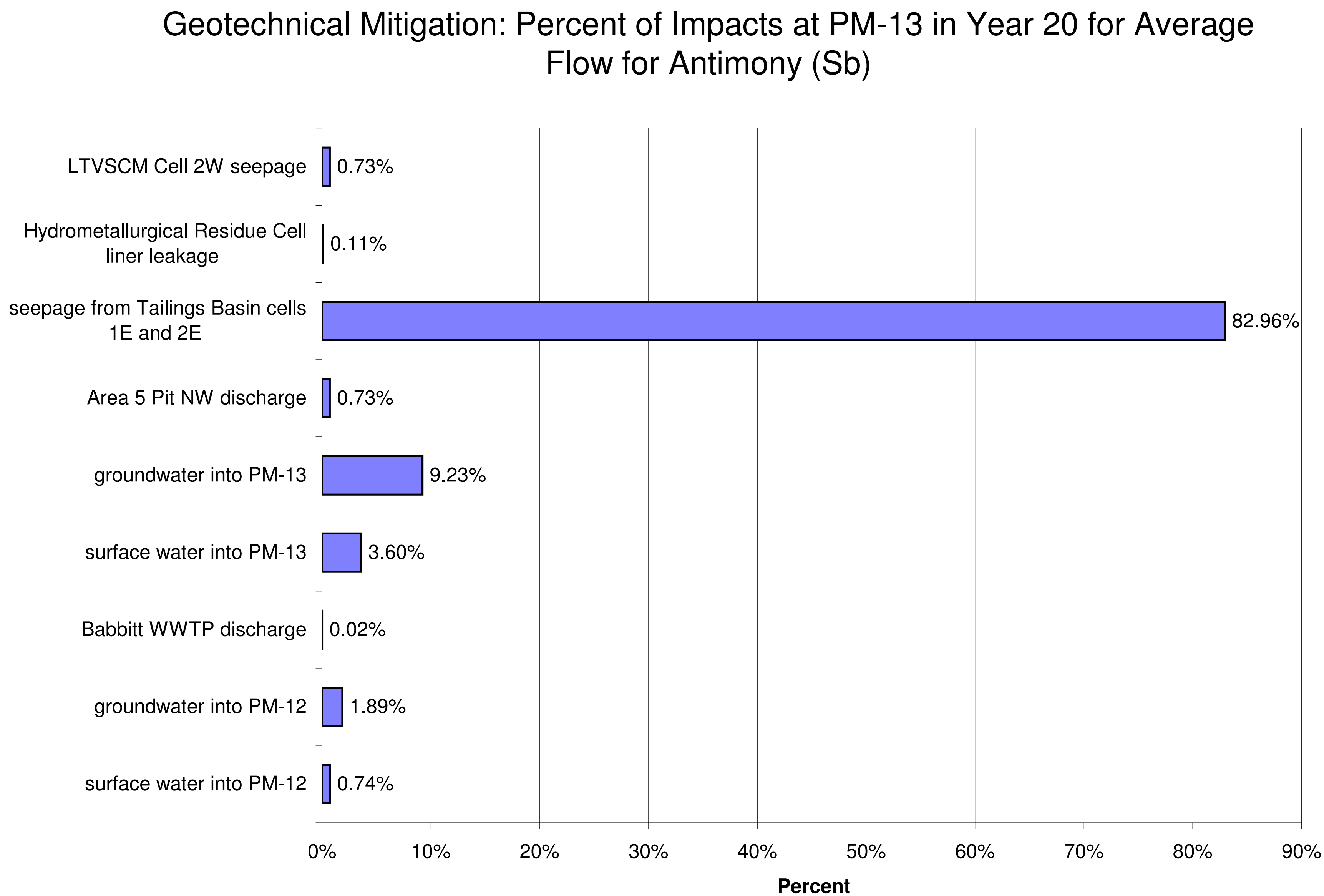
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)

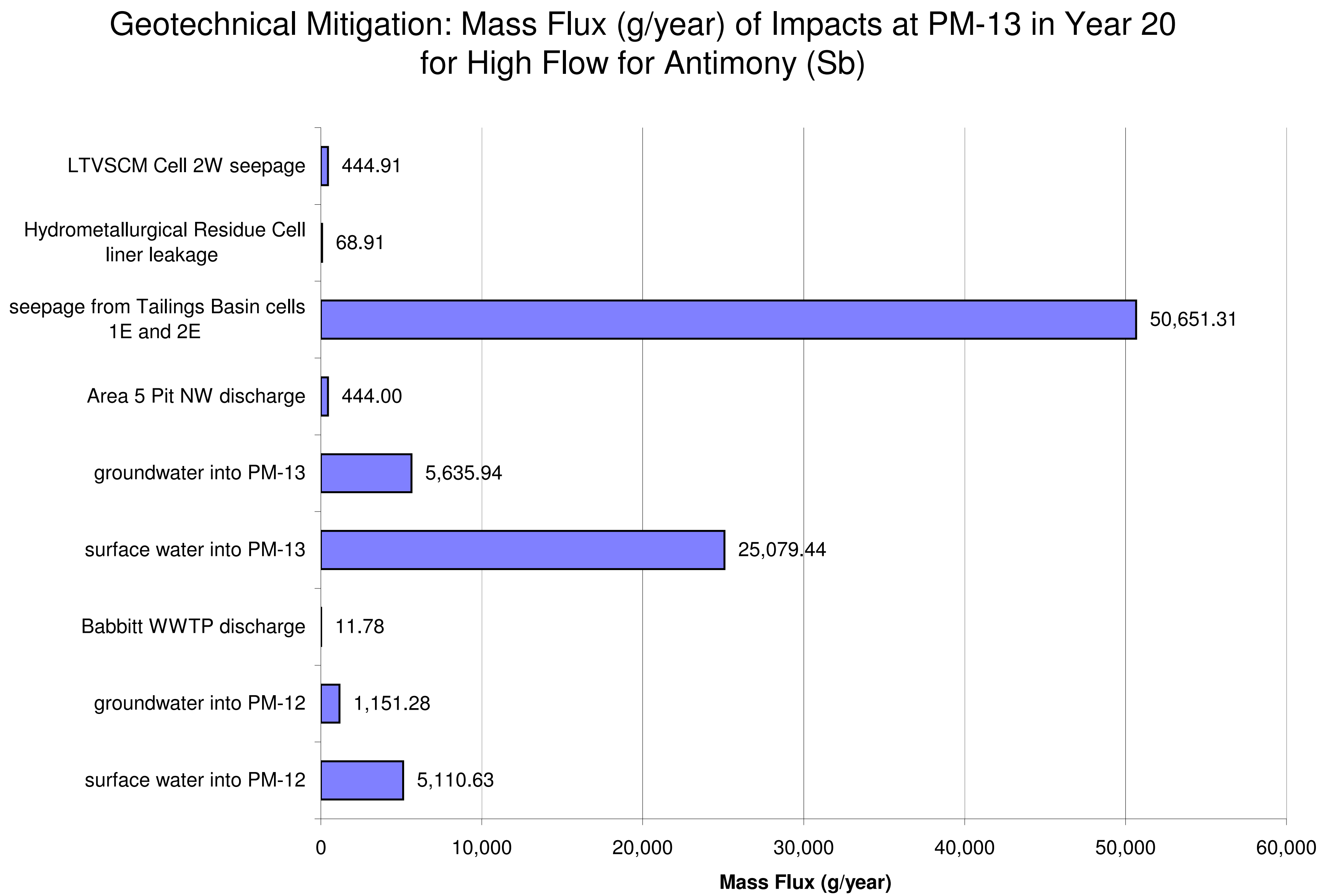


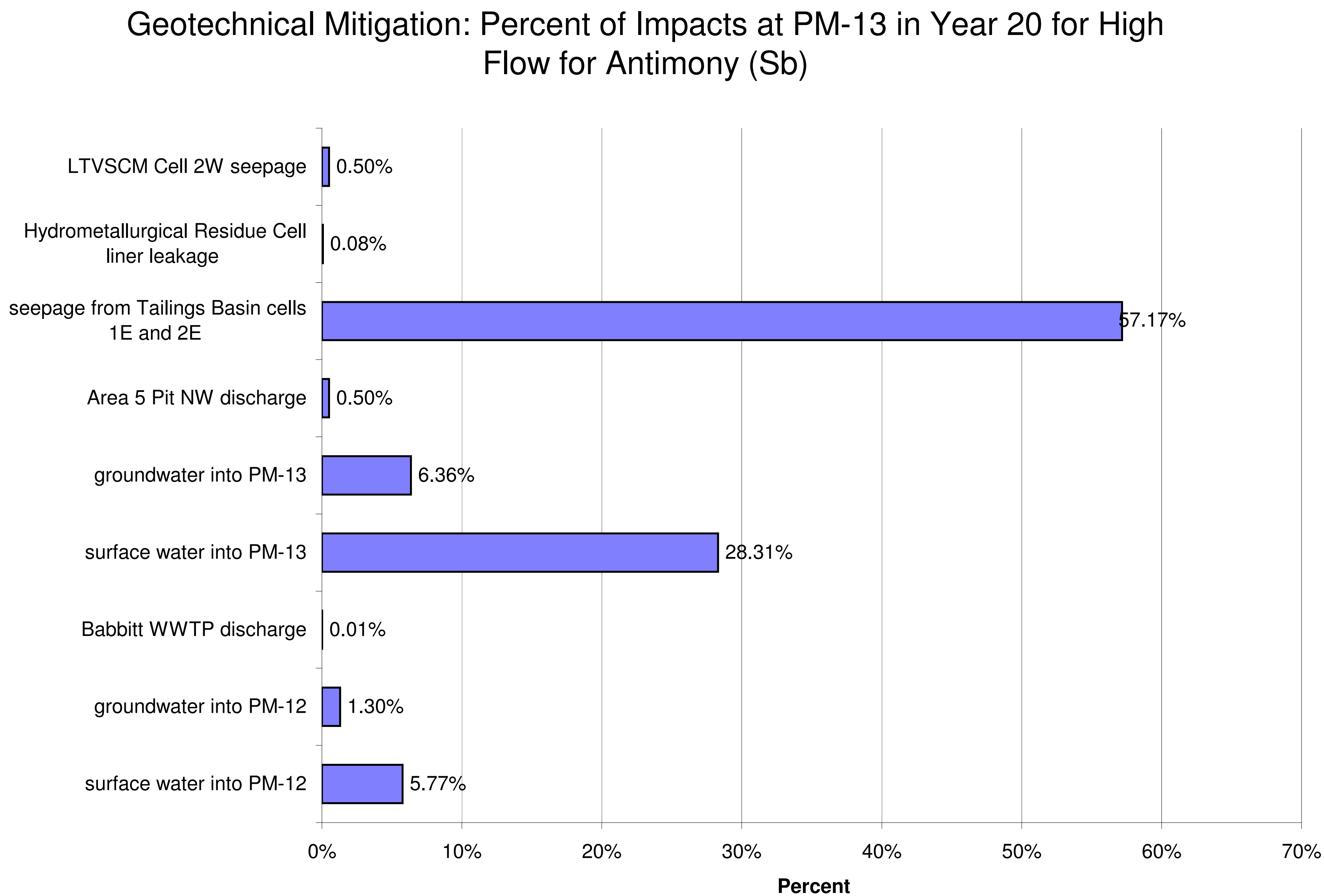

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
0.77%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
87.30%
Area 5 Pit NW discharge
0.10%
groundwater into PM-13
9.71%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
1.98%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

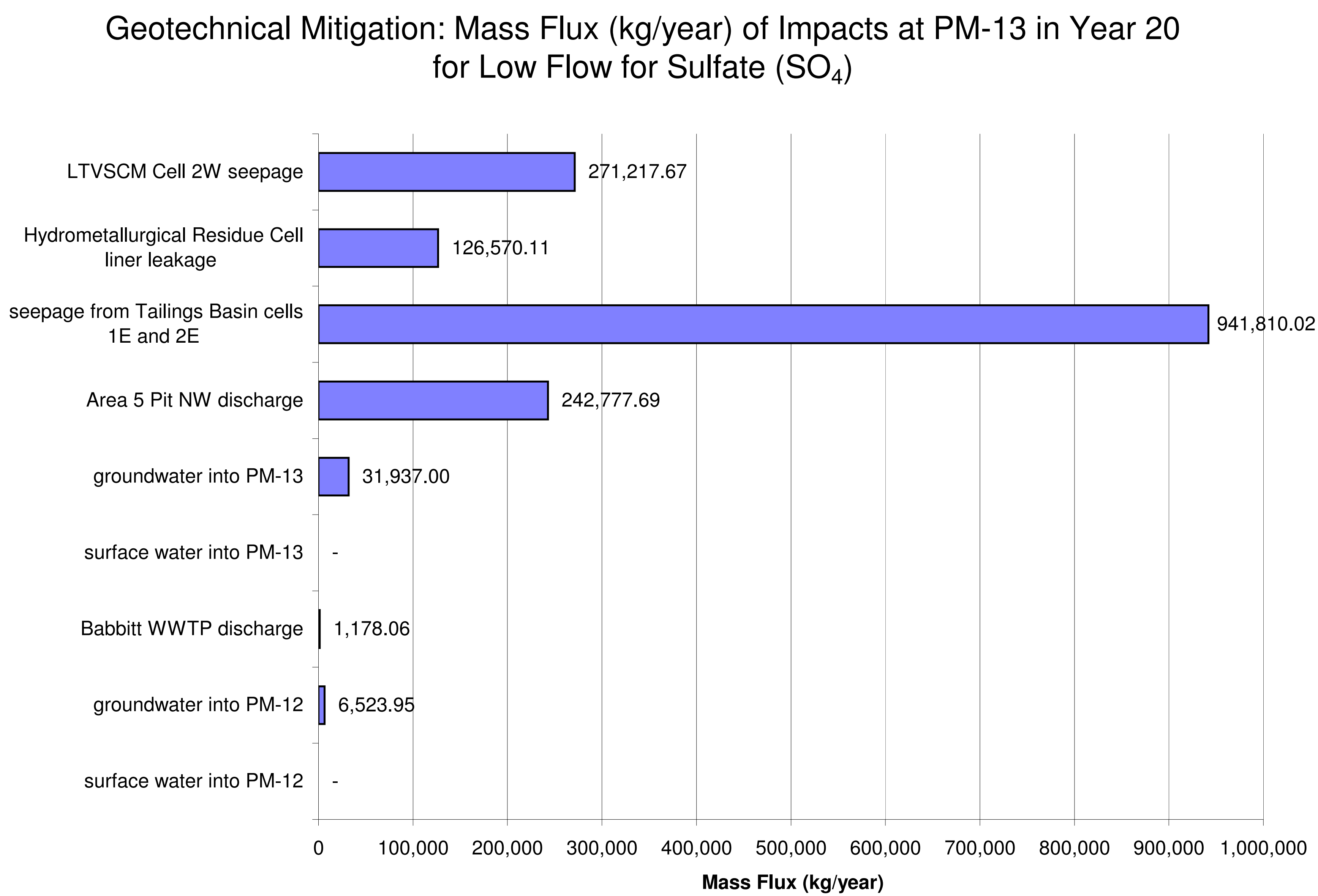
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Antimony (Sb)

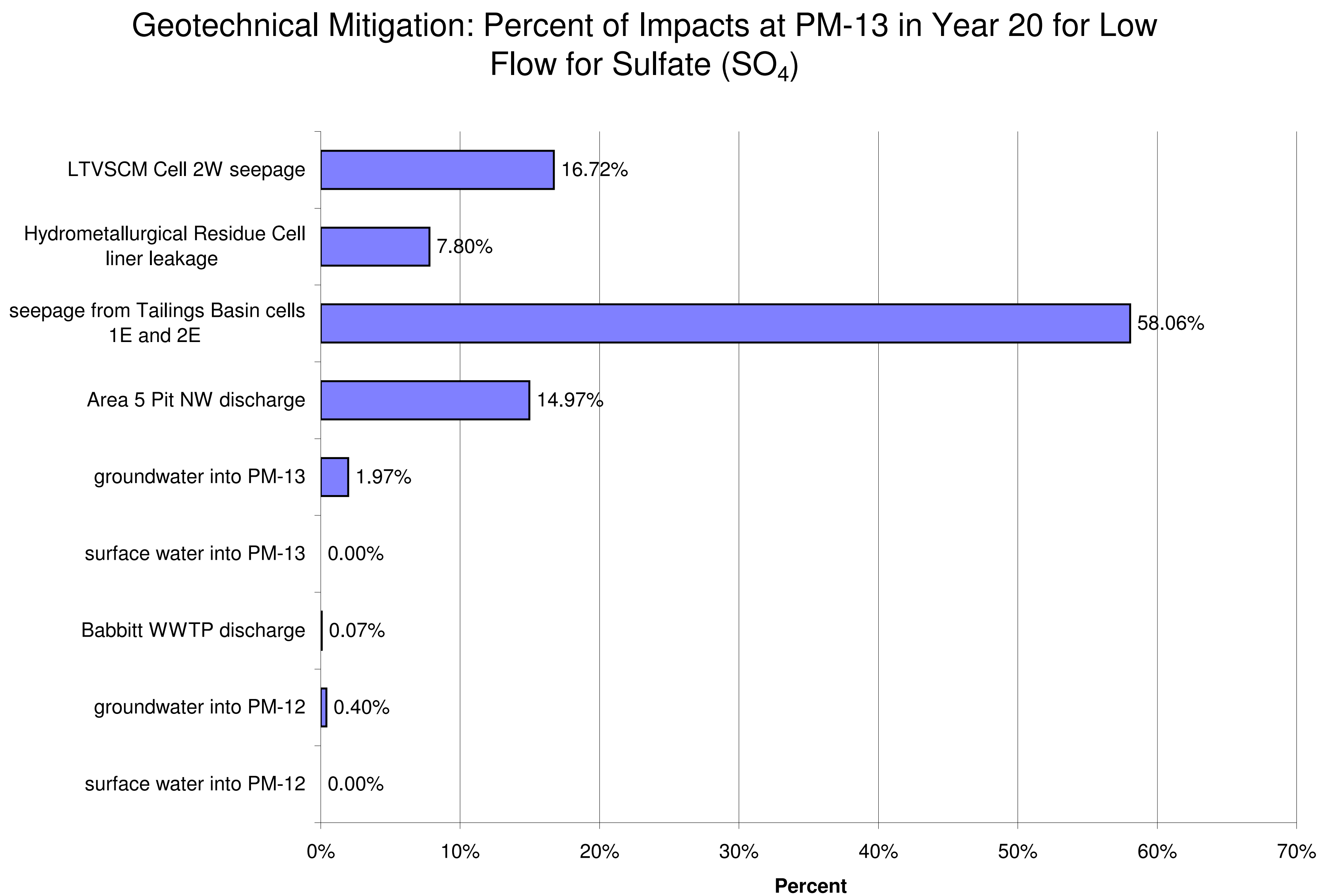



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
0.73%
Hydrometallurgical Residue Cell liner leakage
0.11%
seepage from Tailings Basin cells 1E and 2E
82.96%
Area 5 Pit NW discharge
0.73%
groundwater into PM-13
9.23%
surface water into PM-13
3.60%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
1.89%
surface water into PM-12
0.74%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

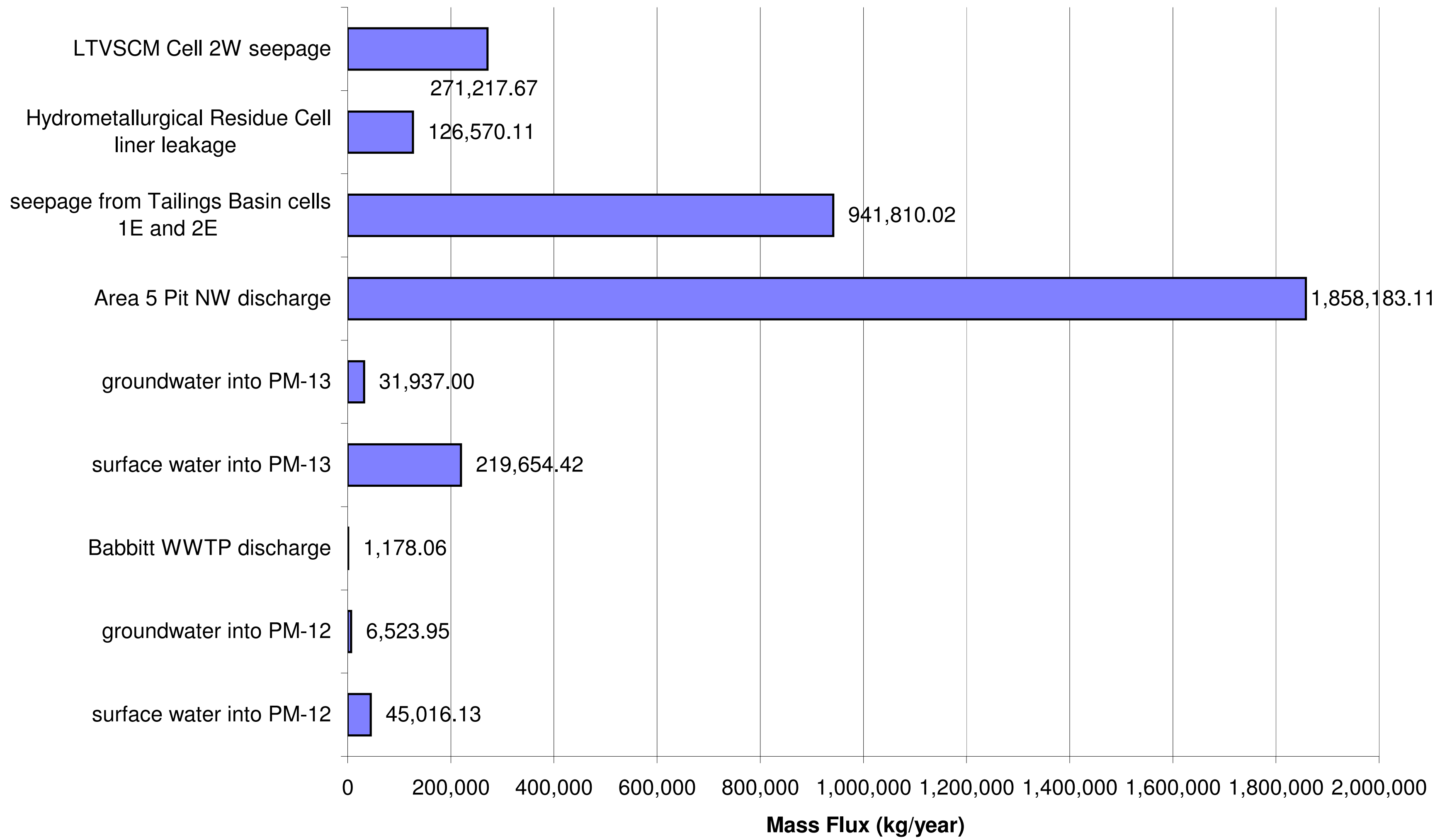

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
444.91
Hydrometallurgical Residue Cell liner leakage
68.91
seepage from Tailings Basin cells 1E and 2E
50,651.31
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

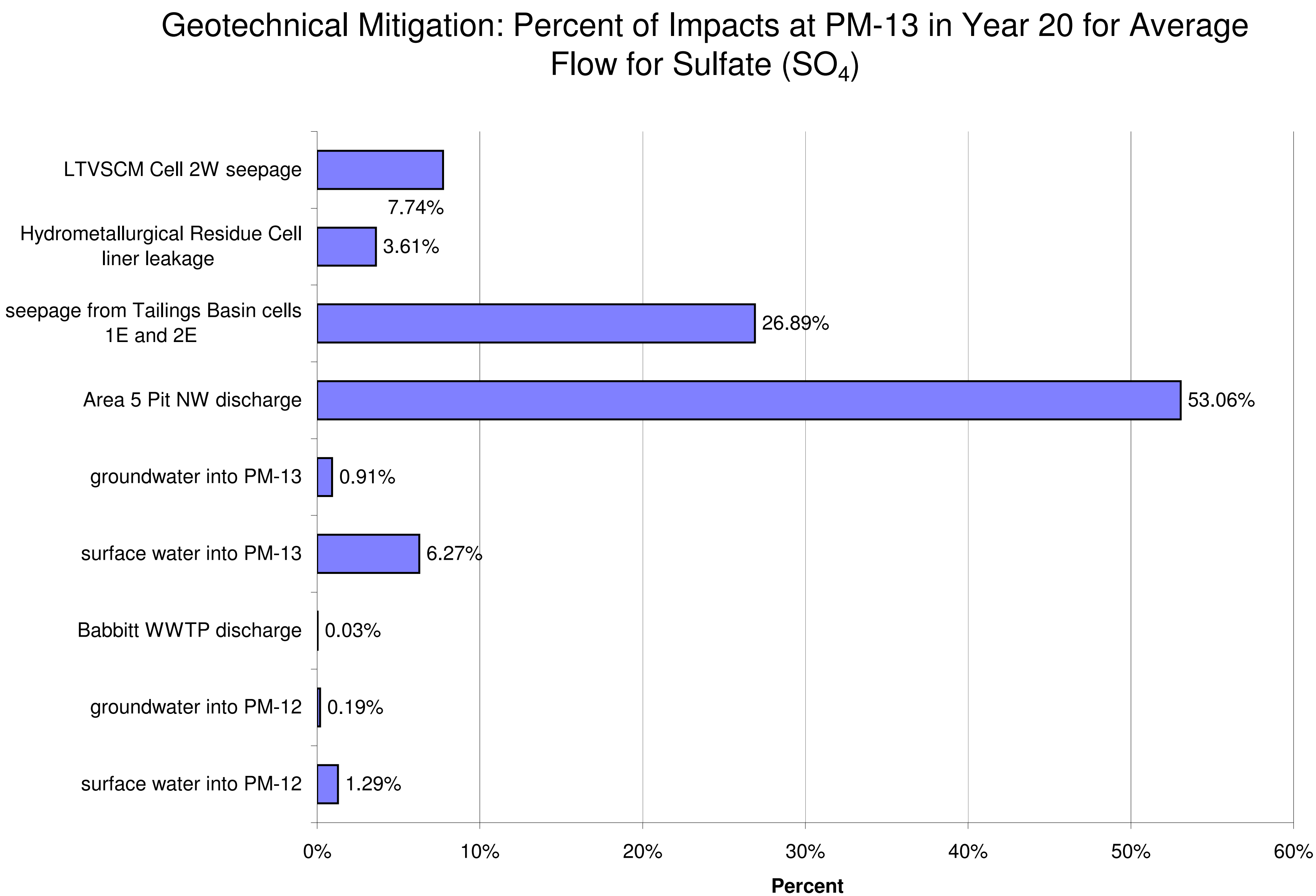

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
0.50%
Hydrometallurgical Residue Cell liner leakage
0.08%
seepage from Tailings Basin cells 1E and 2E
57.17%
Area 5 Pit NW discharge
0.50%
groundwater into PM-13
6.36%
surface water into PM-13
28.31%
Babbitt WWTP discharge
0.01%
groundwater into PM-12
1.30%
surface water into PM-12
5.77%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

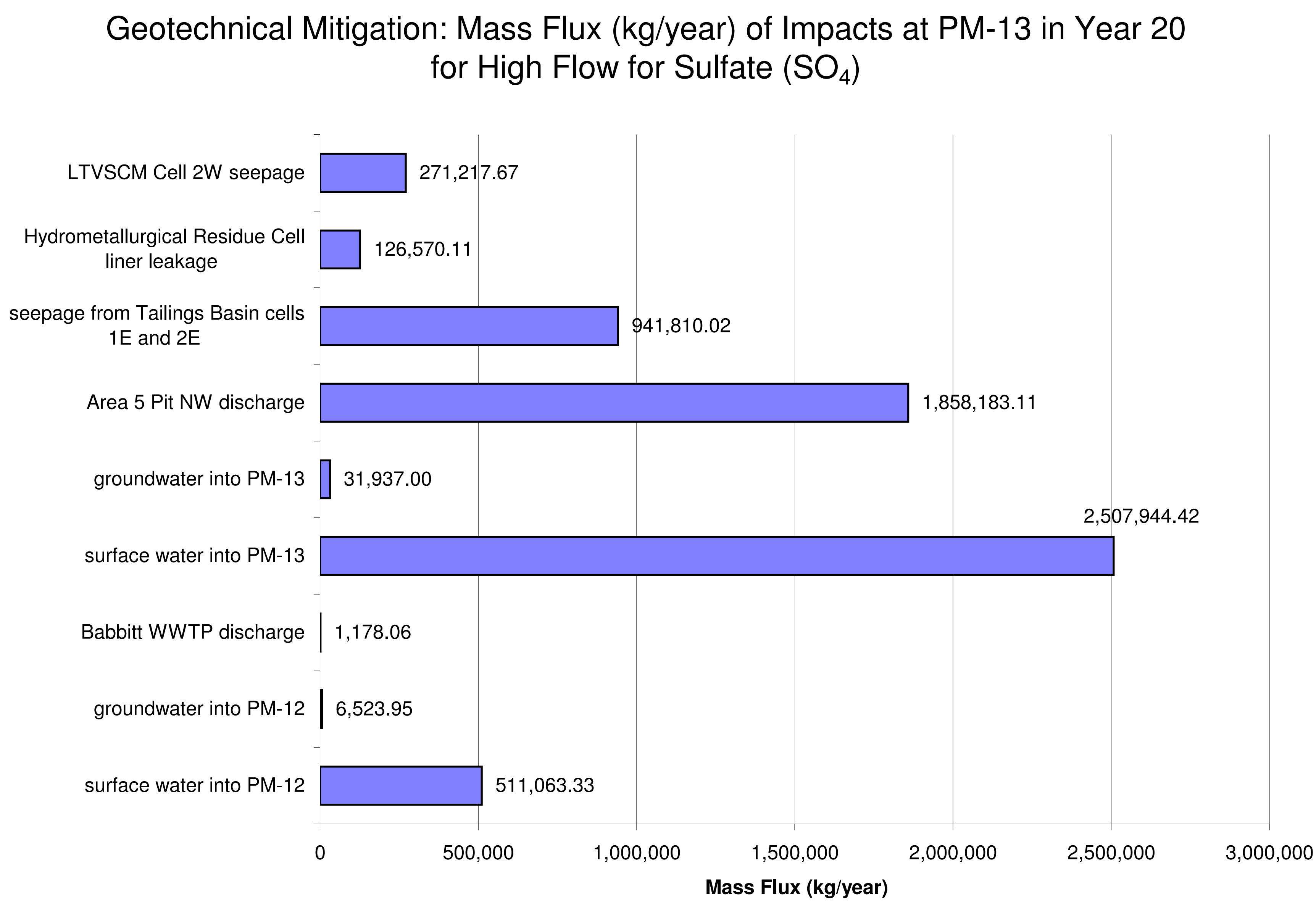

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)
LTVSCM Cell 2W seepage
271,217.67
Hydrometallurgical Residue Cell liner leakage
126,570.11
seepage from Tailings Basin cells 1E and 2E
941,810.02
Area 5 Pit NW discharge
242,777.69
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (kg/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)
LTVSCM Cell 2W seepage
16.72%
Hydrometallurgical Residue Cell liner leakage
7.80%
seepage from Tailings Basin cells 1E and 2E
58.06%
Area 5 Pit NW discharge
14.97%
groundwater into PM-13
1.97%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.07%
groundwater into PM-12
0.40%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

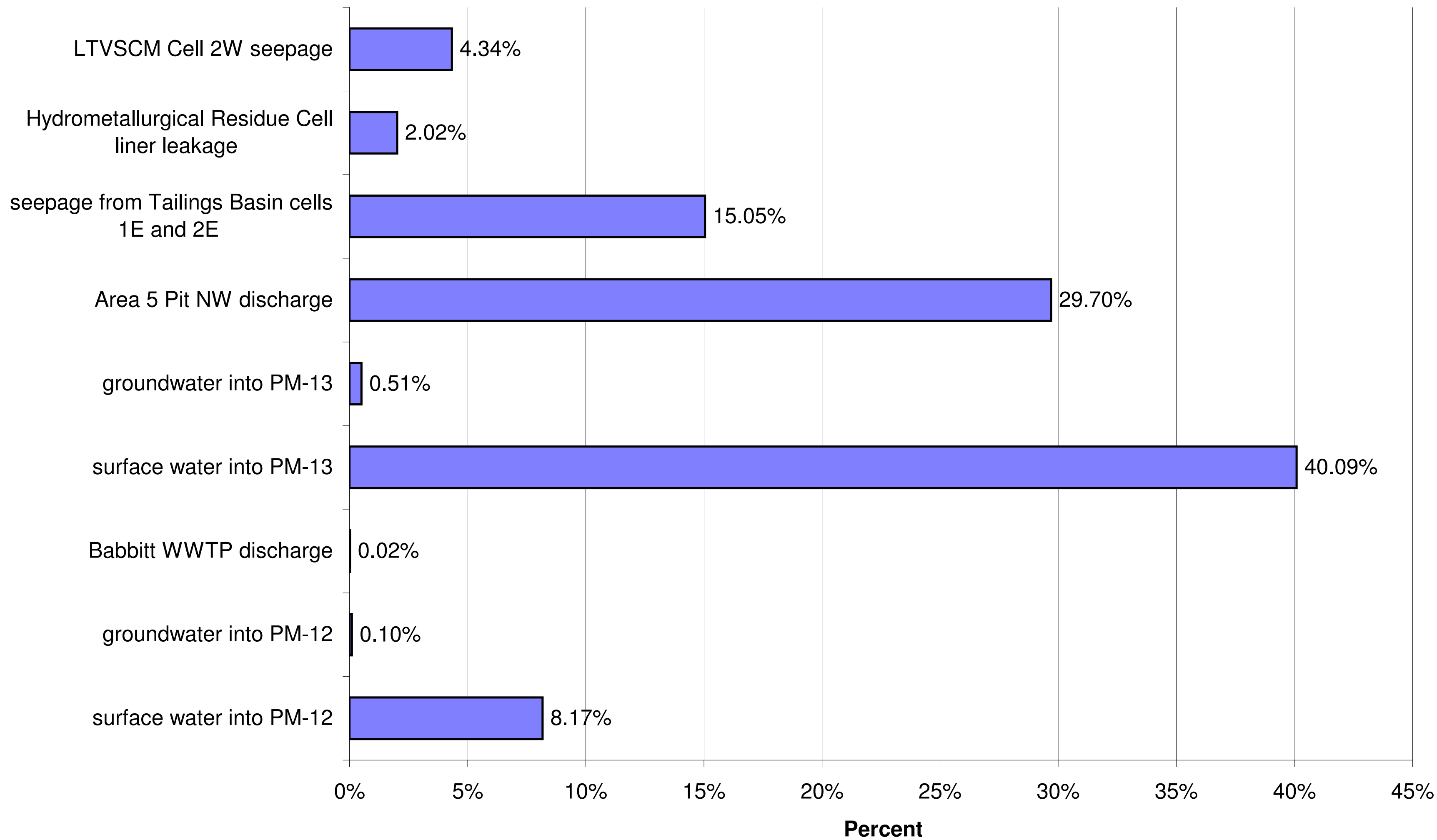
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO4)

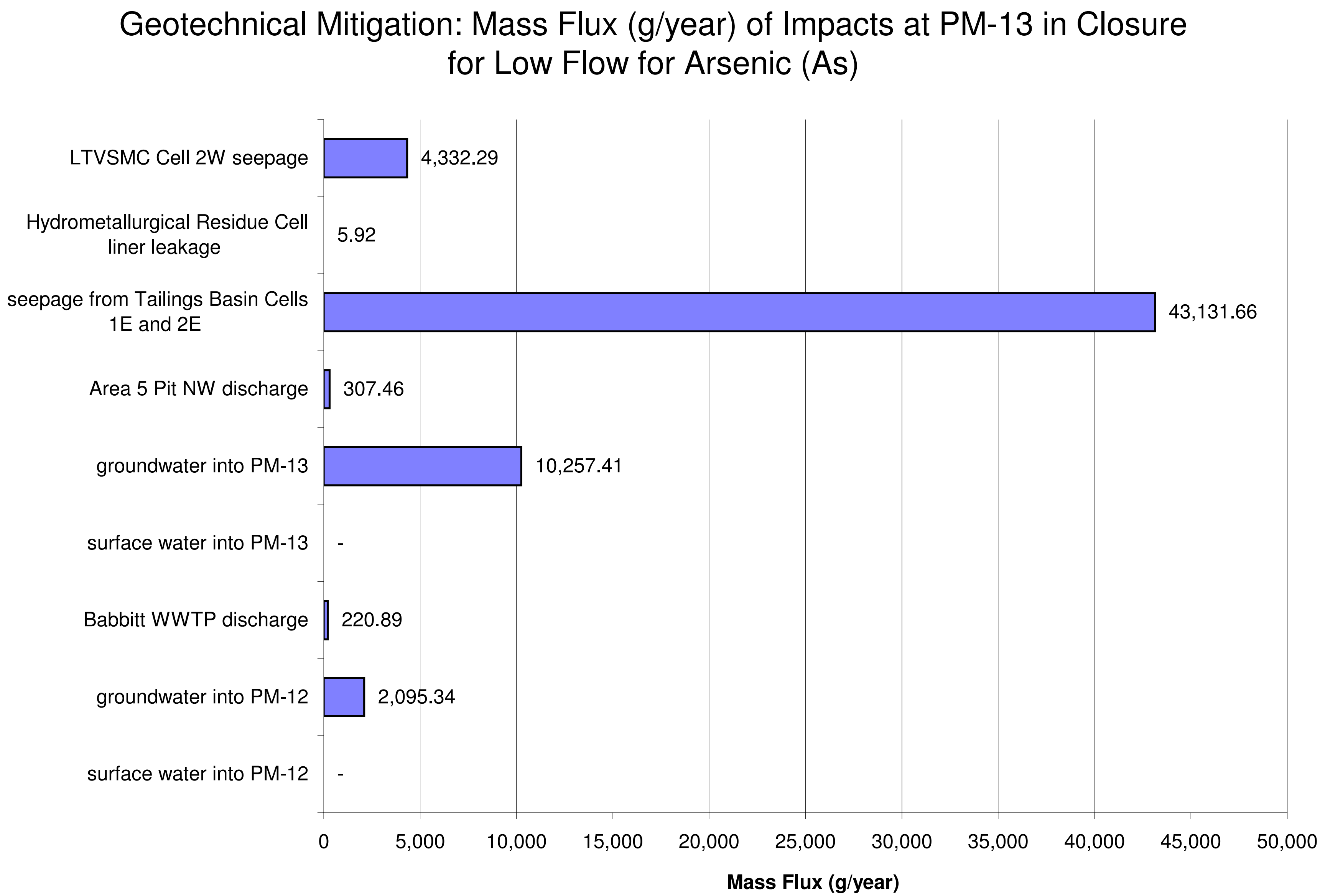


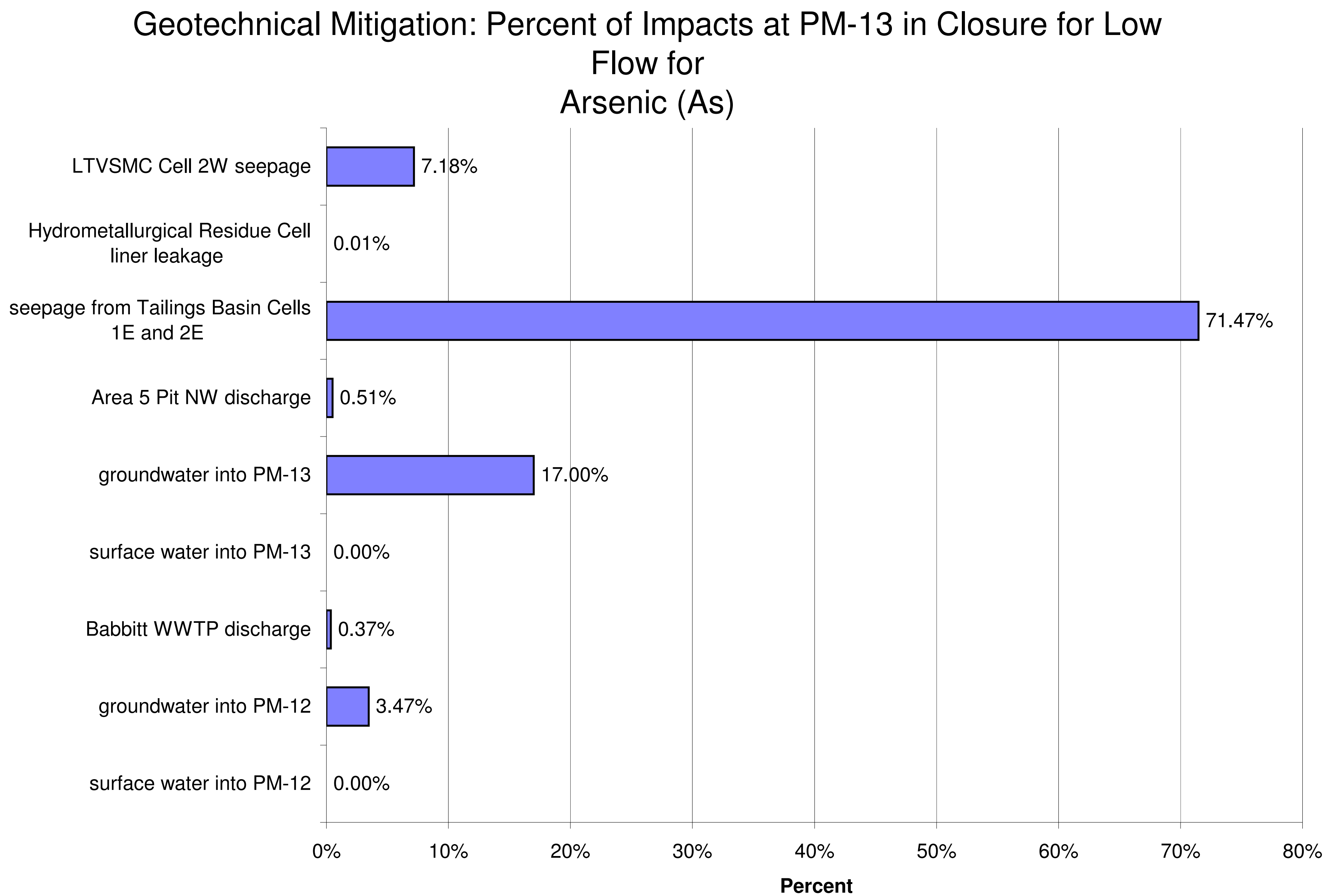

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO_4)
LTVSCM Cell 2W seepage
7.74%
Hydrometallurgical Residue Cell liner leakage
3.61%
seepage from Tailings Basin cells 1E and 2E
26.89%
Area 5 Pit NW discharge
53.06%
groundwater into PM-13
0.91%
surface water into PM-13
6.27%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.19%
surface water into PM-12
1.29%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)
LTVSCM Cell 2W seepage
271,217.67
Hydrometallurgical Residue Cell liner leakage
126,570.11
seepage from Tailings Basin cells 1E and 2E
941,810.02
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
2,507,944.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
511,063.33
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
Mass Flux (kg/year)

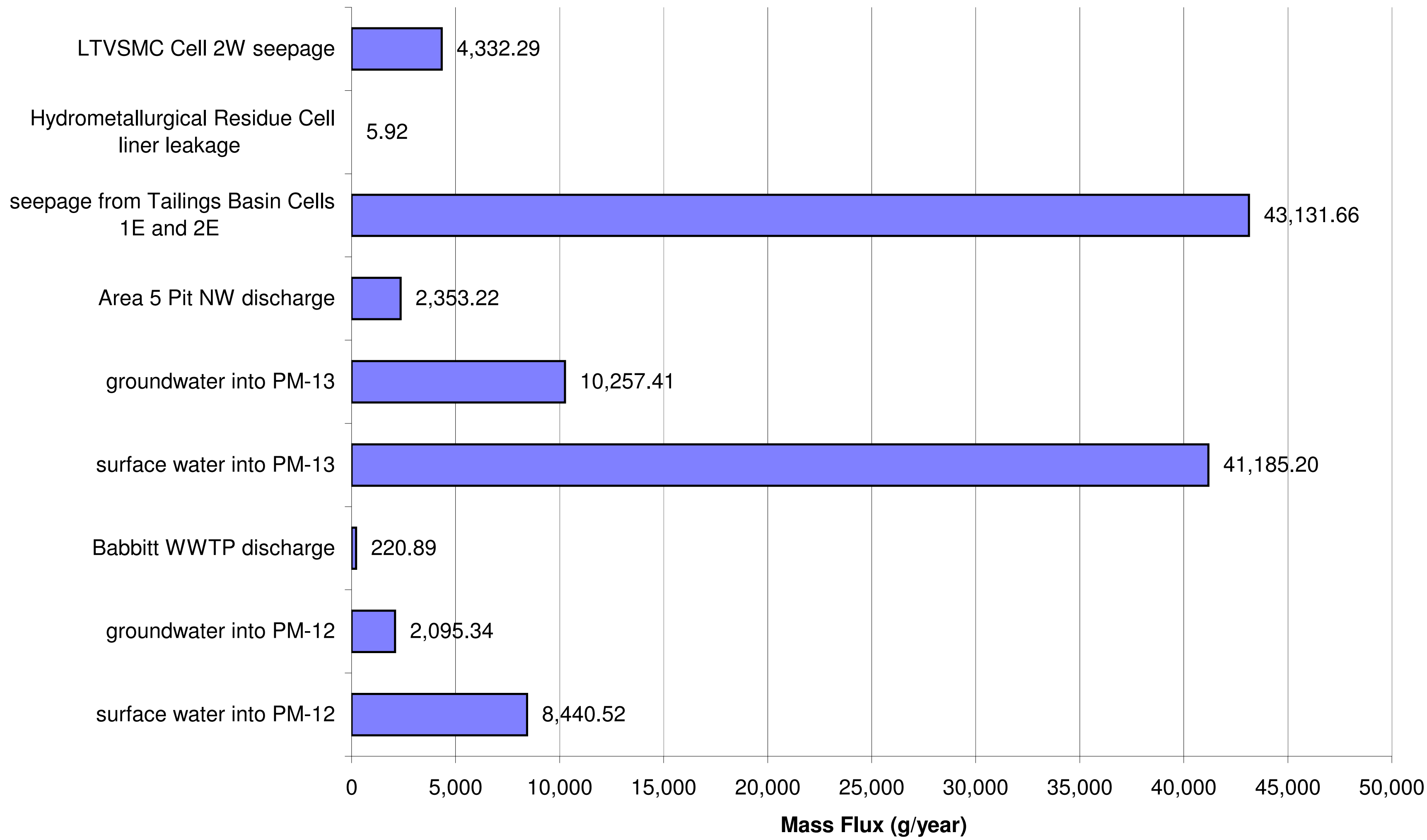
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)

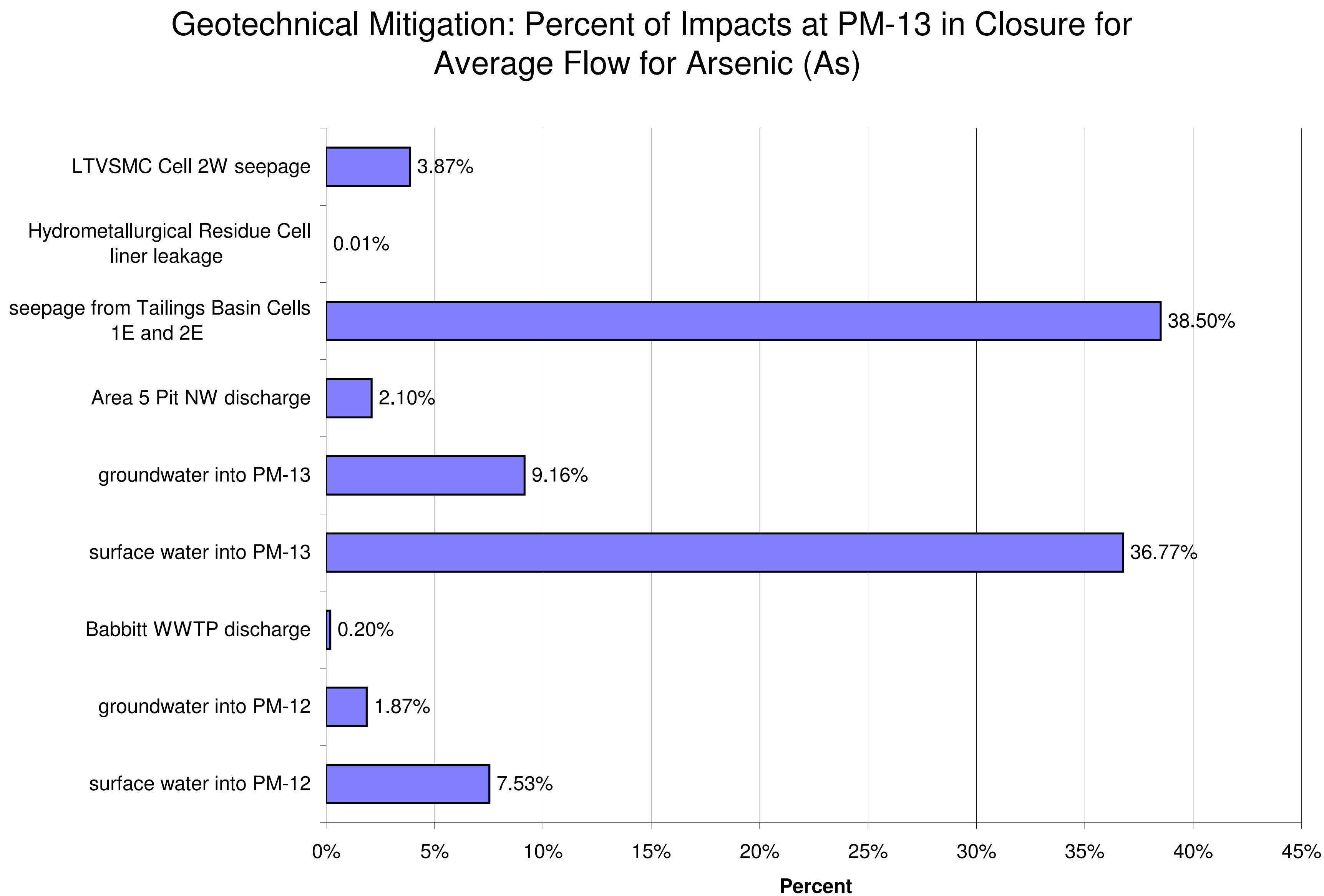


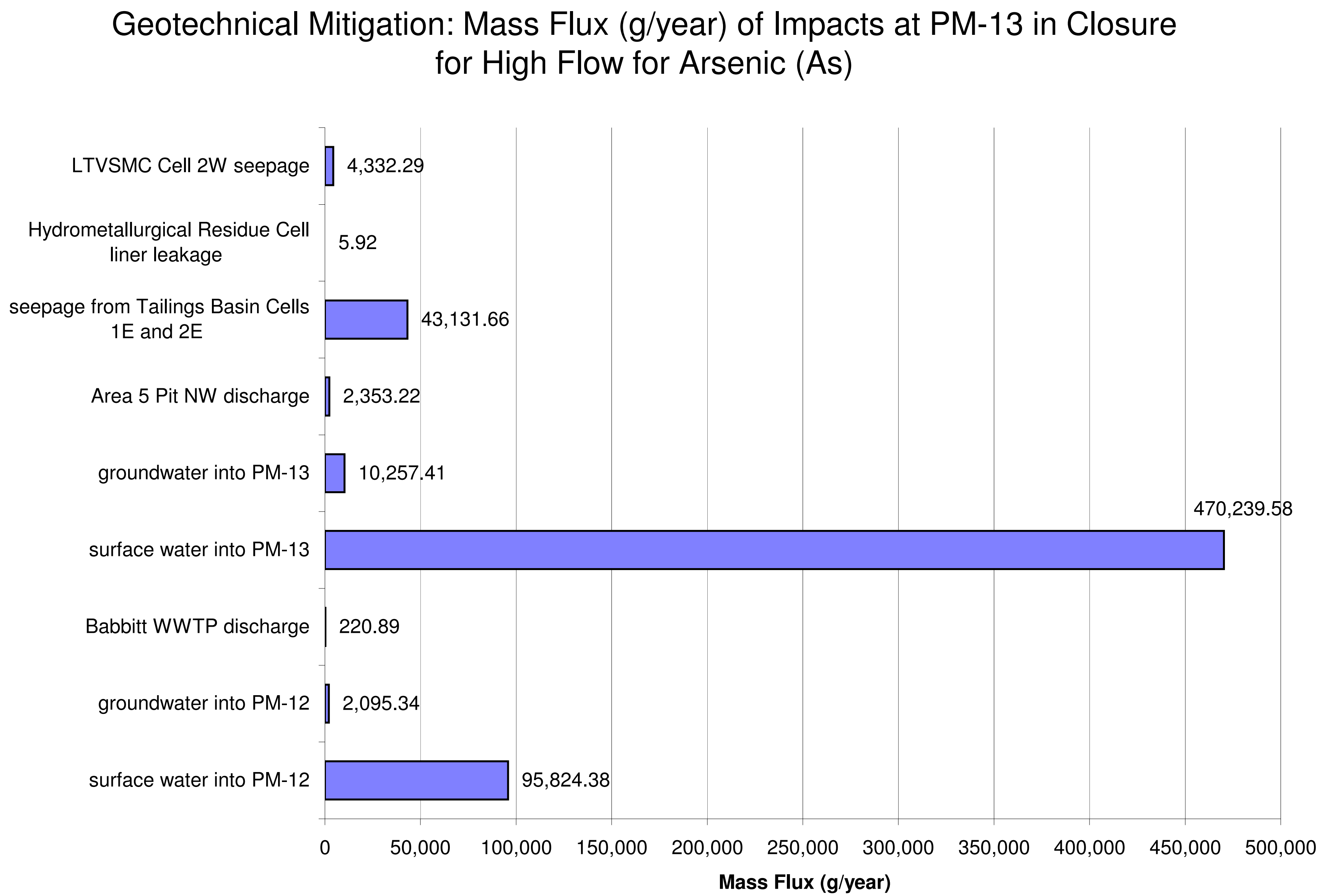

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4,332.29
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
43,131.66
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Mass Flux (g/year)

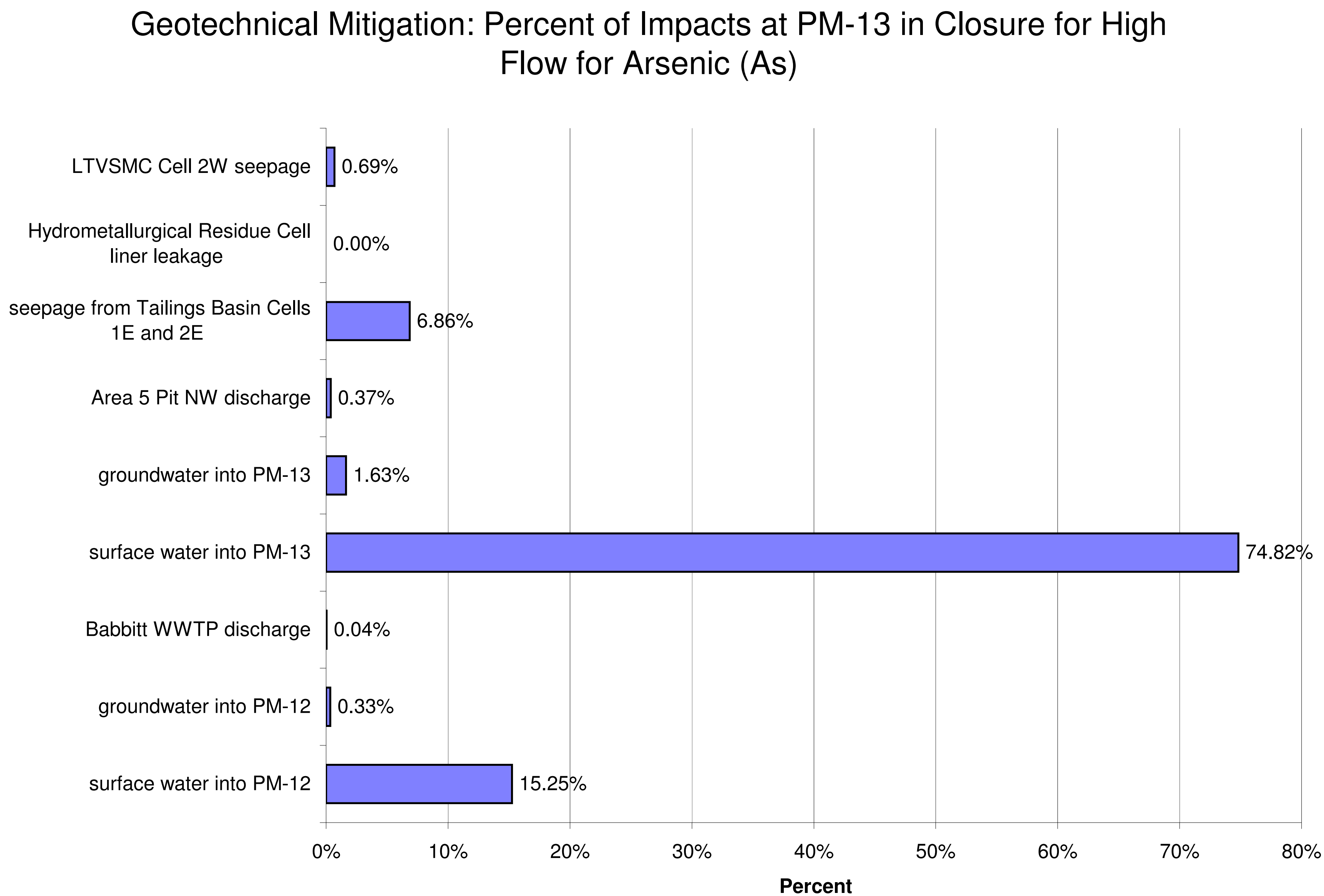

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
7.18%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
71.47%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
17.00%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.37%
groundwater into PM-12
3.47%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

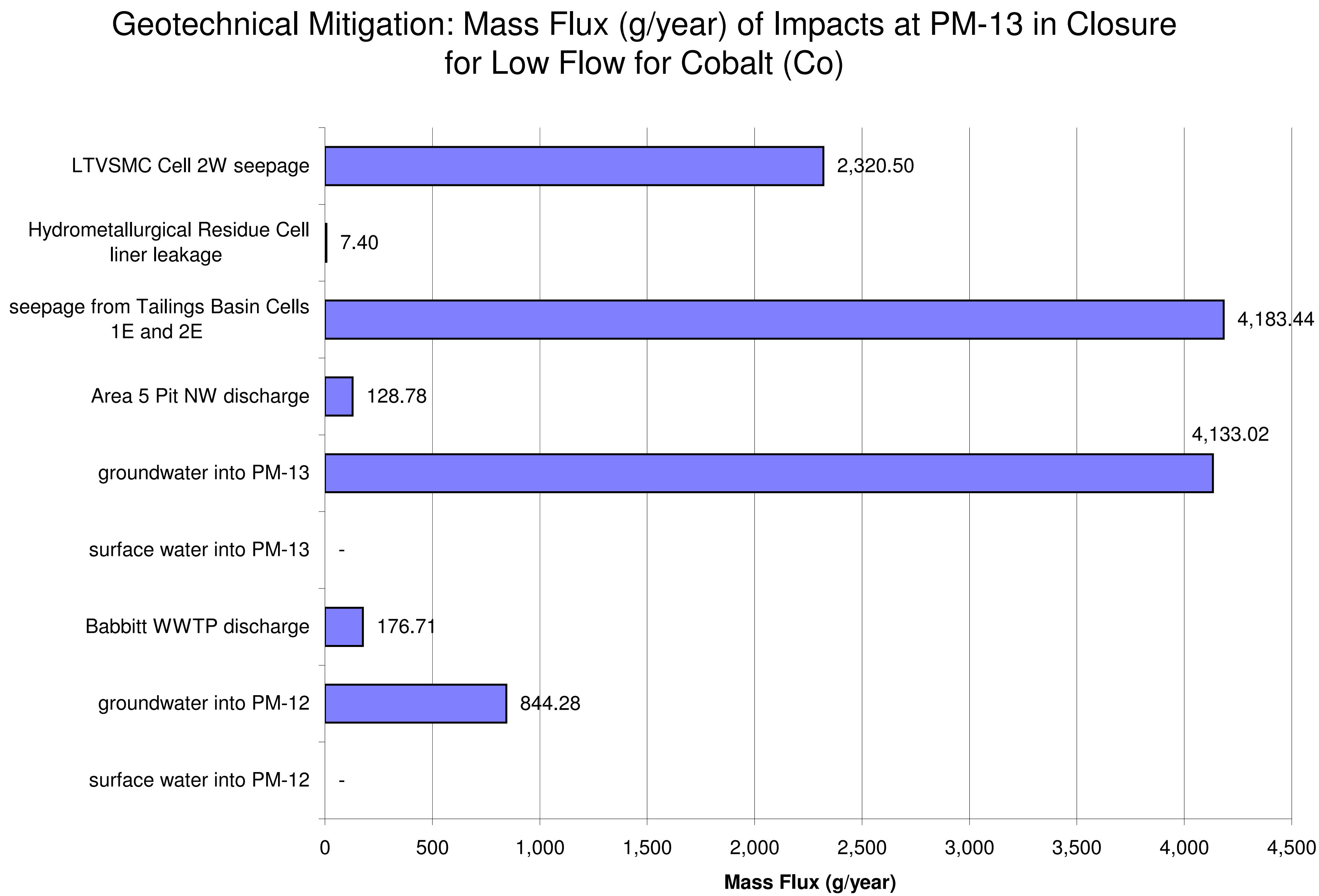
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)

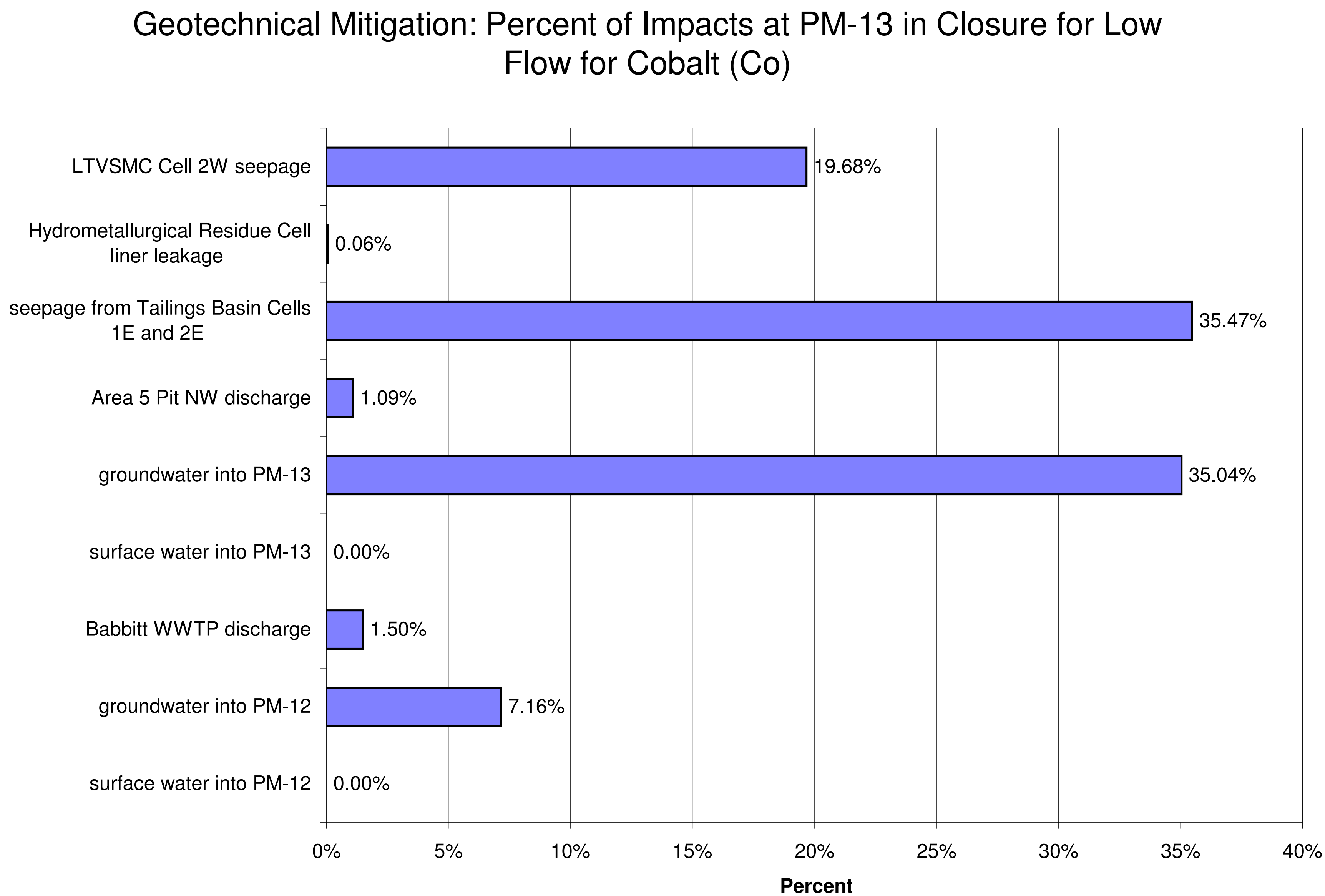


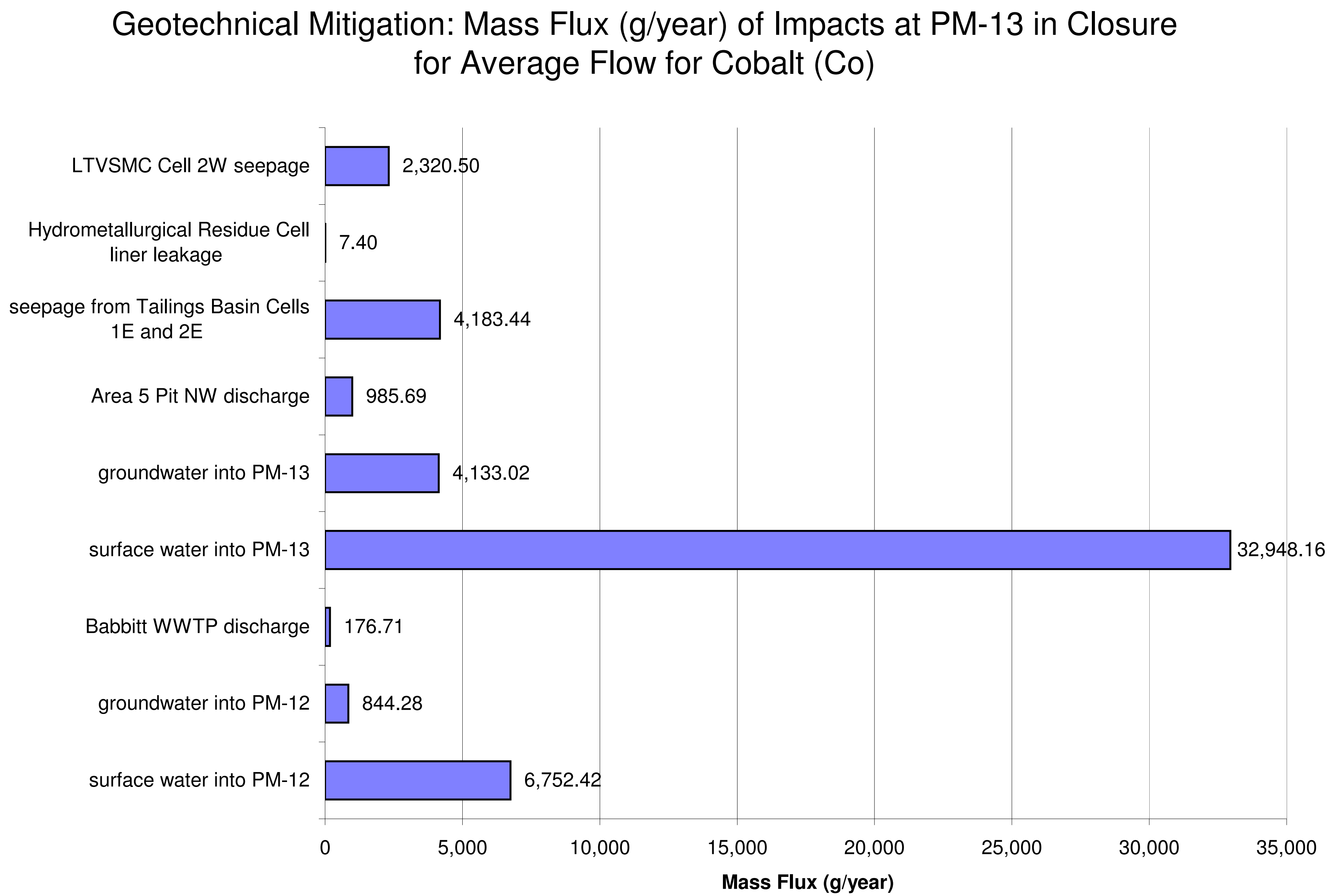

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.87%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
38.50%
Area 5 Pit NW discharge
2.10%
groundwater into PM-13
9.16%
surface water into PM-13
36.77%
Babbitt WWTP discharge
0.20%
groundwater into PM-12
1.87%
surface water into PM-12
7.53%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

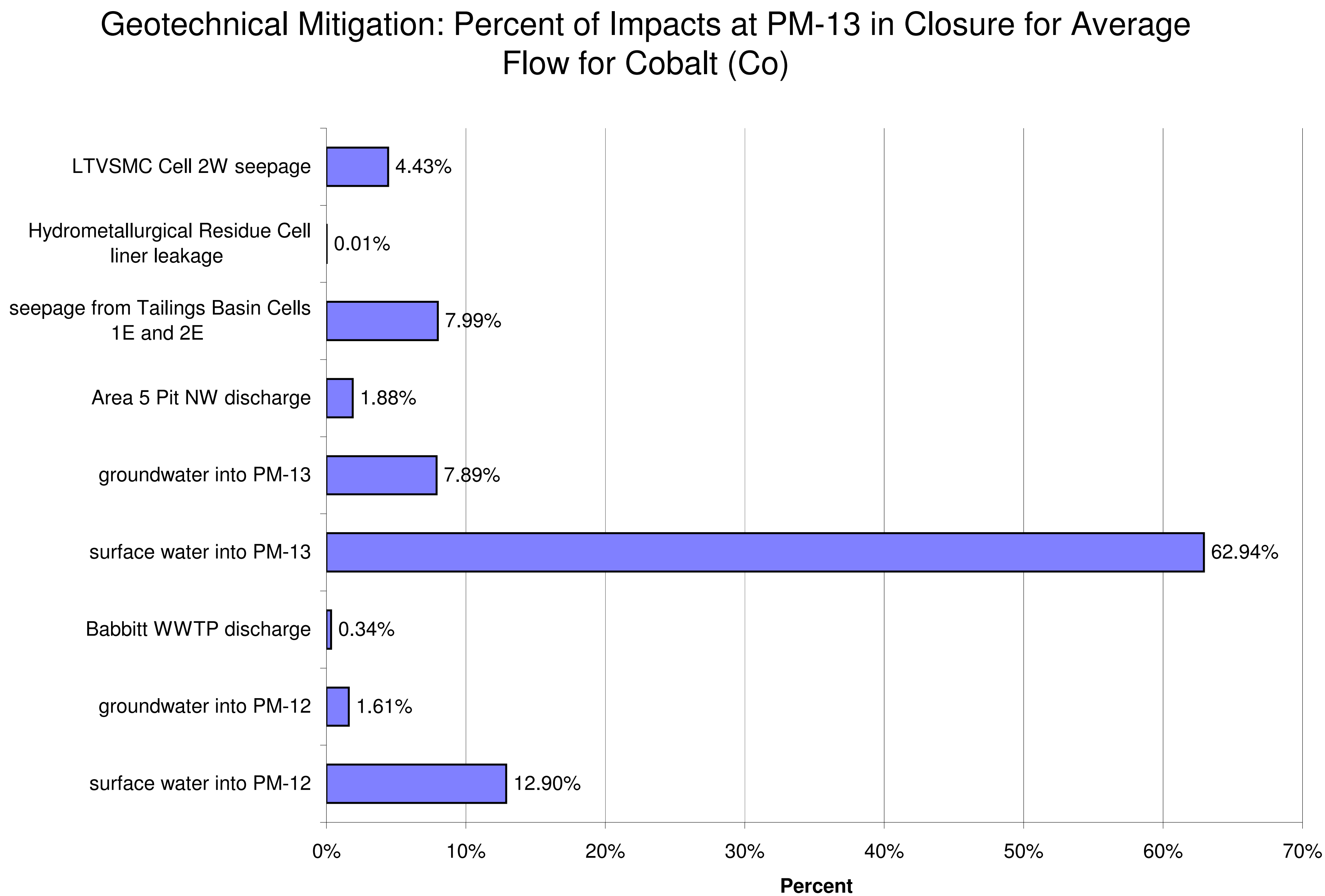

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4,332.29
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
43,131.66
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.69%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
6.86%
Area 5 Pit NW discharge
0.37%
groundwater into PM-13
1.63%
surface water into PM-13
74.82%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.33%
surface water into PM-12
15.25%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

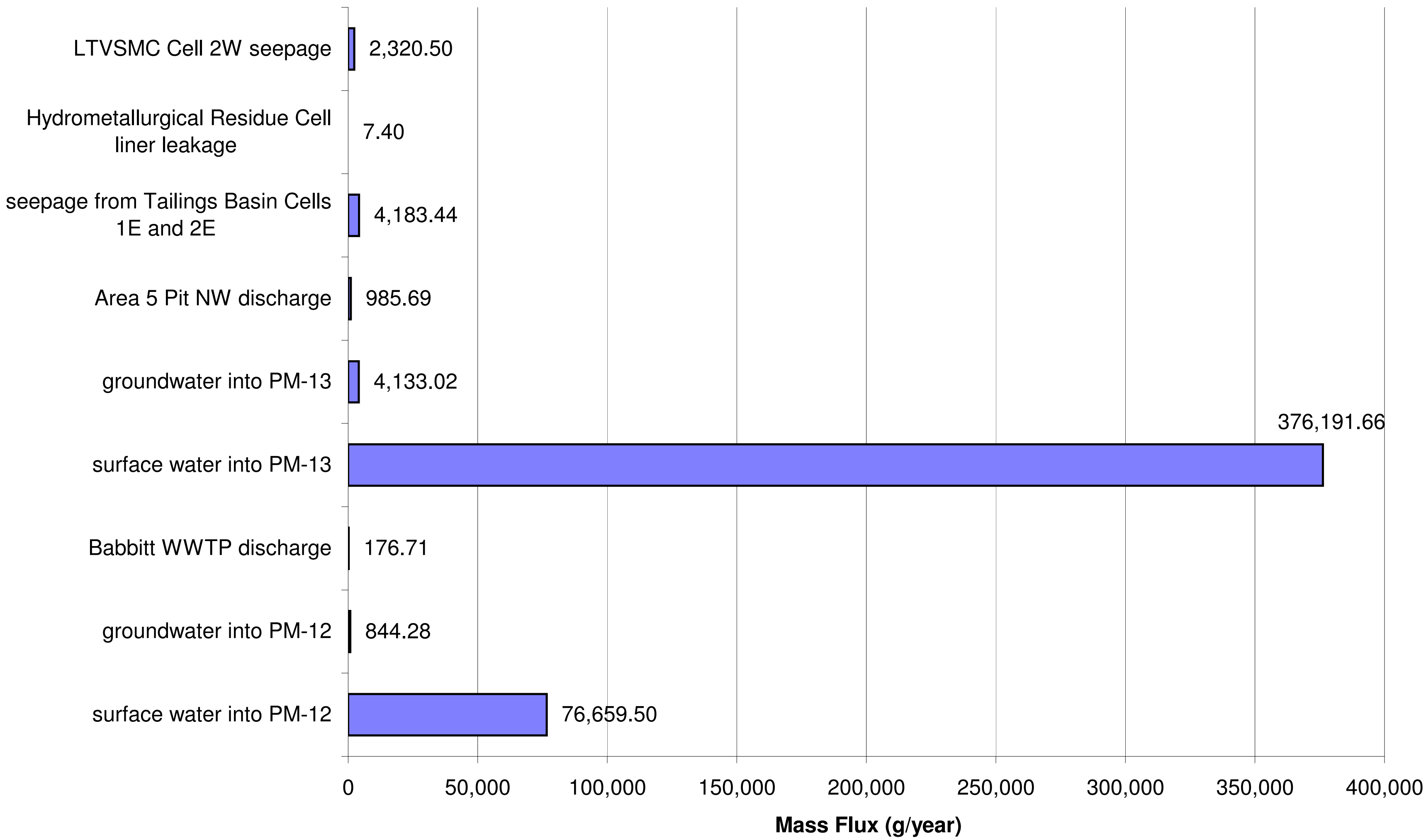

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,320.50
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin Cells 1E and 2E
4,183.44
Area 5 Pit NW discharge
128.78
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
-
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
19.68%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin Cells 1E and 2E
35.47%
Area 5 Pit NW discharge
1.09%
groundwater into PM-13
35.04%
surface water into PM-13
0.00%
Babbitt WWTP discharge
1.50%
groundwater into PM-12
7.16%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

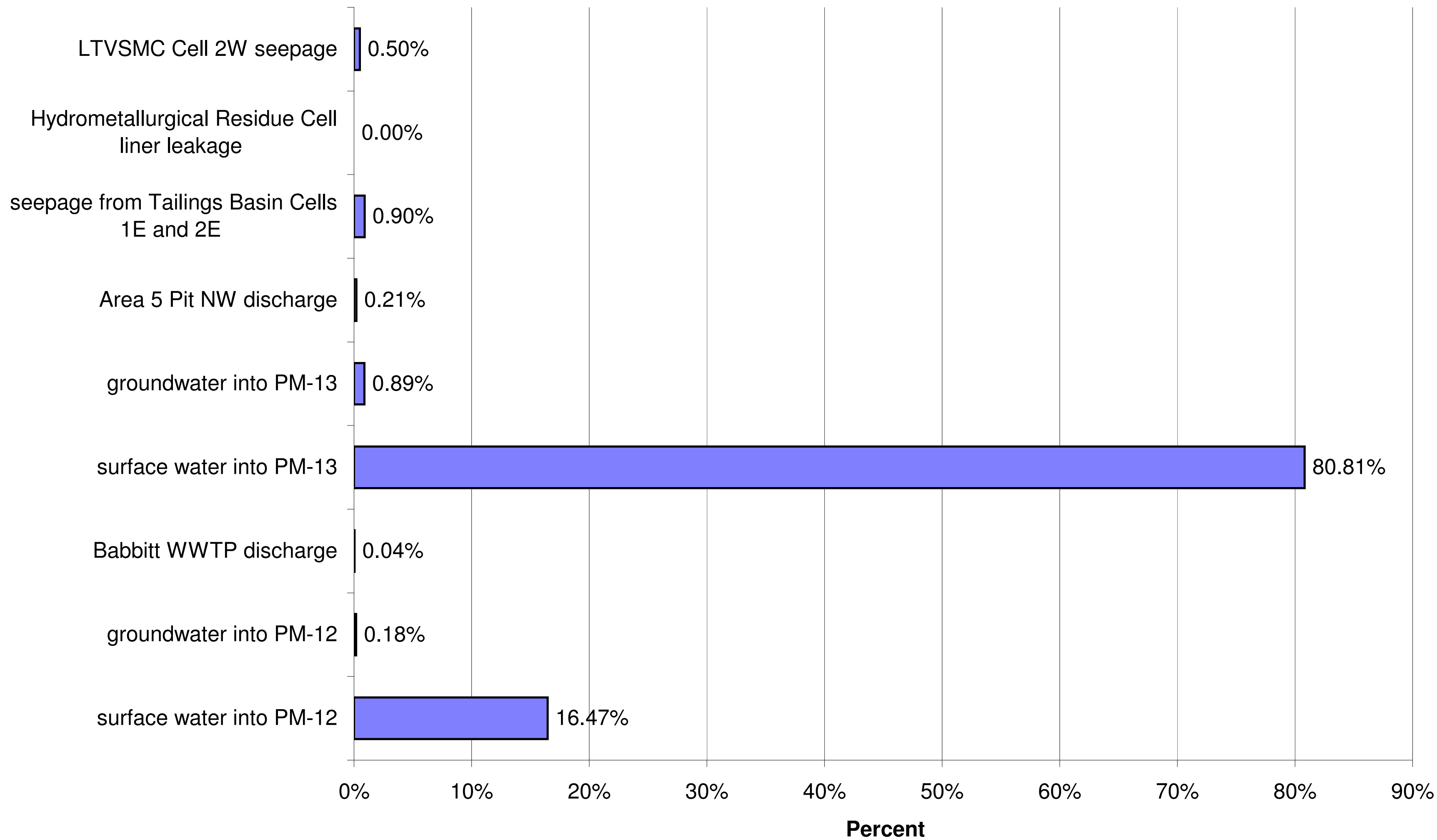

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2,320.50
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin Cells 1E and 2E
4,183.44
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
4.43%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
7.99%
Area 5 Pit NW discharge
1.88%
groundwater into PM-13
7.89%
surface water into PM-13
62.94%
Babbitt WWTP discharge
0.34%
groundwater into PM-12
1.61%
surface water into PM-12
12.90%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

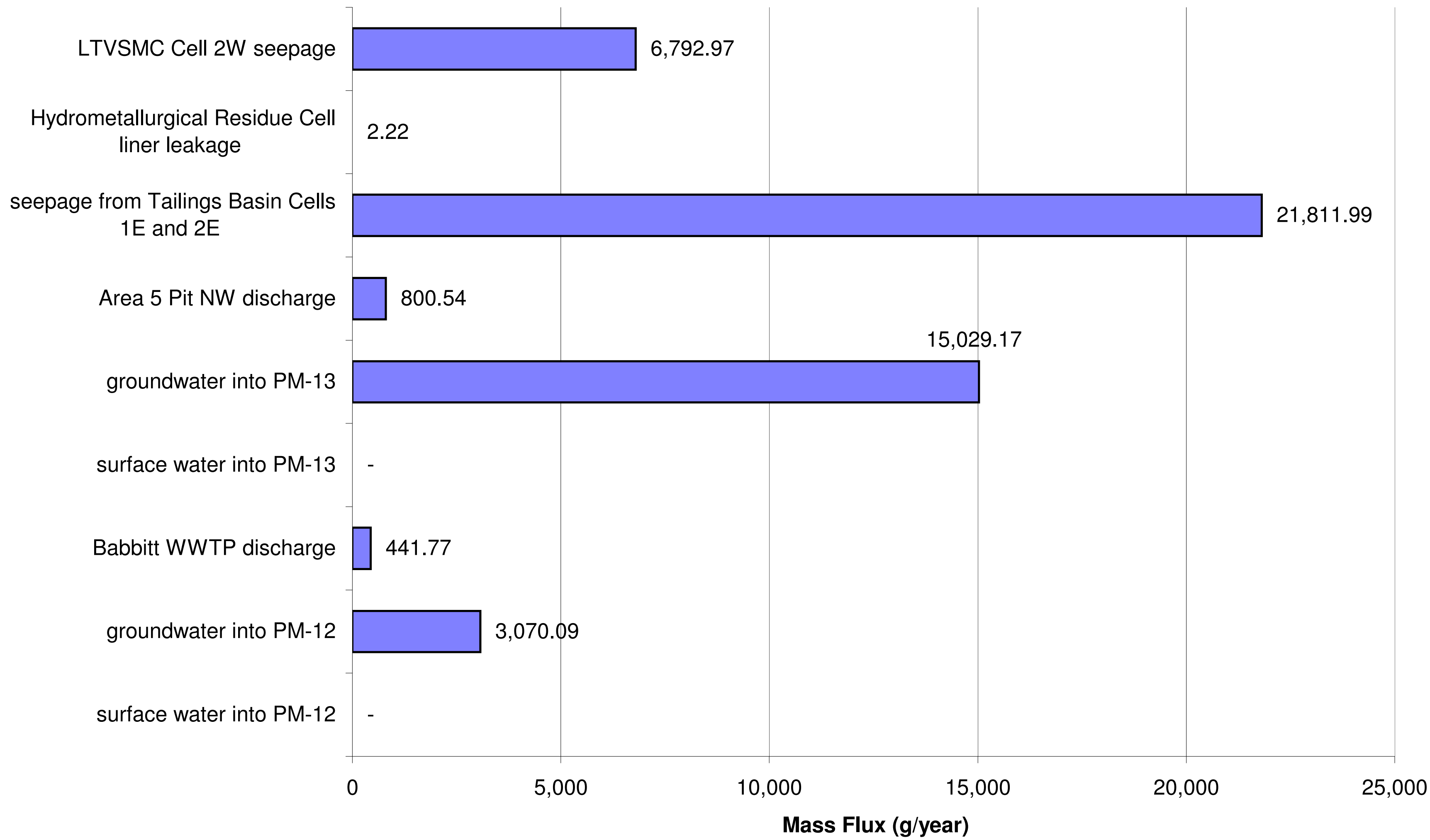
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)



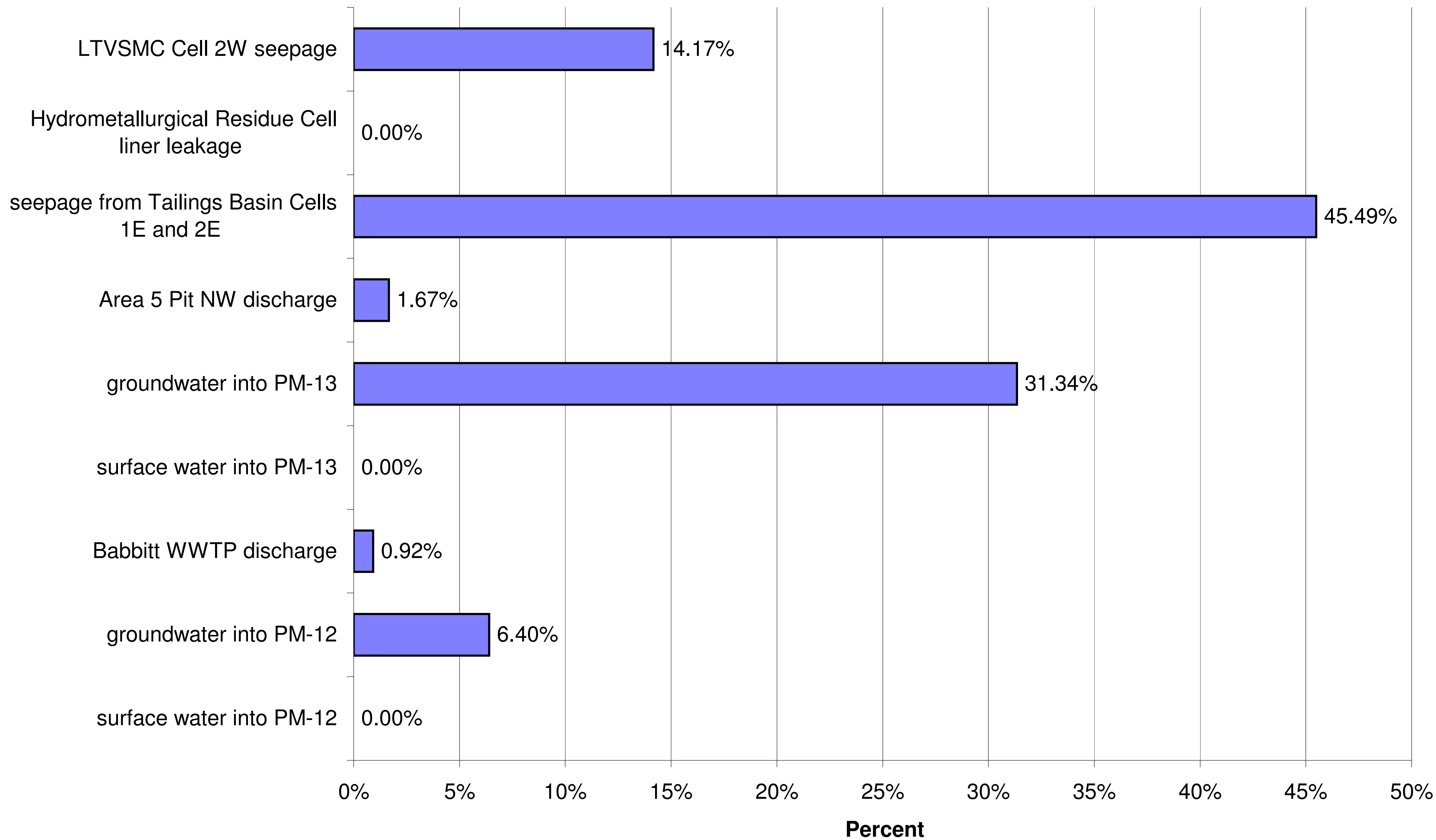
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)

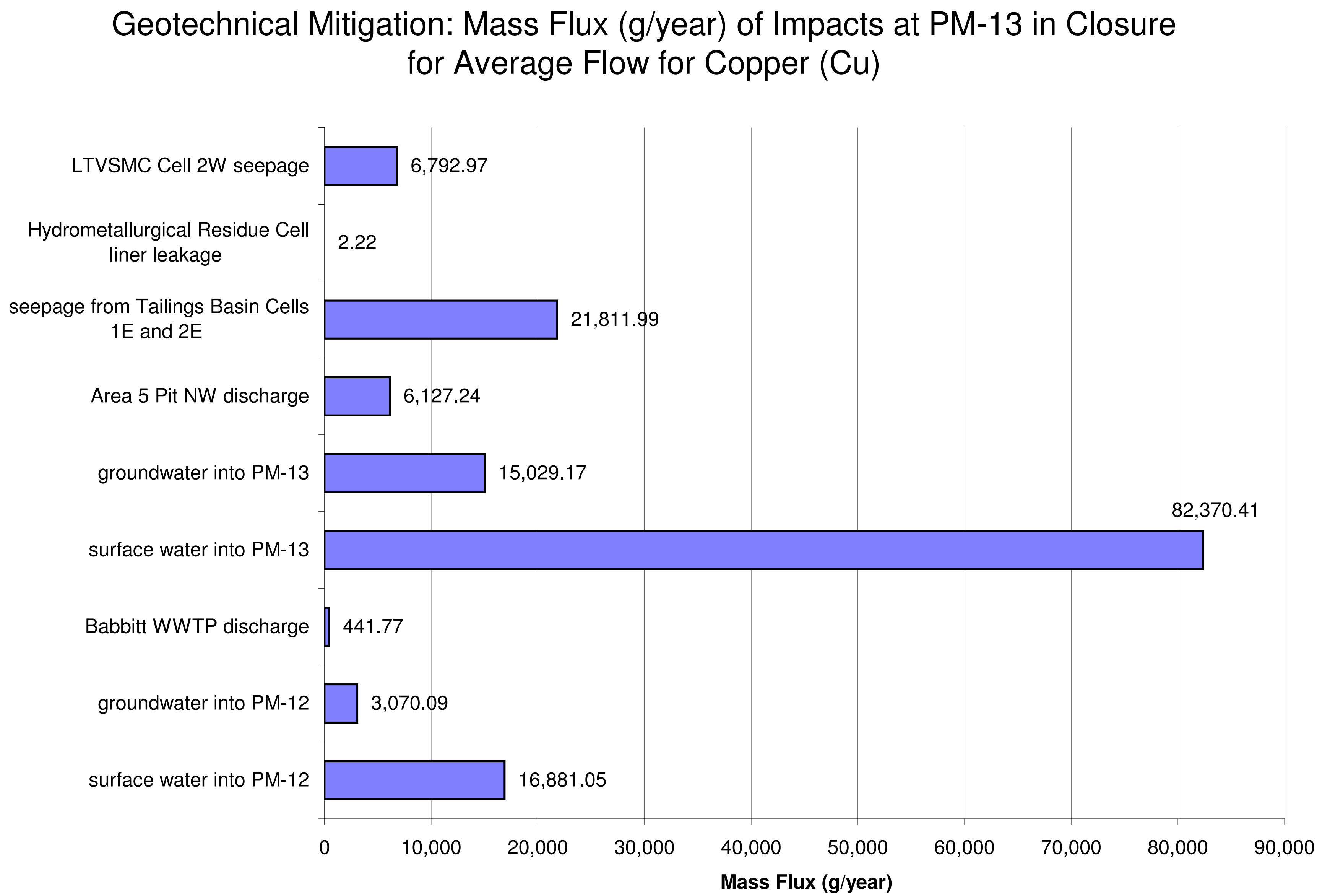


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)

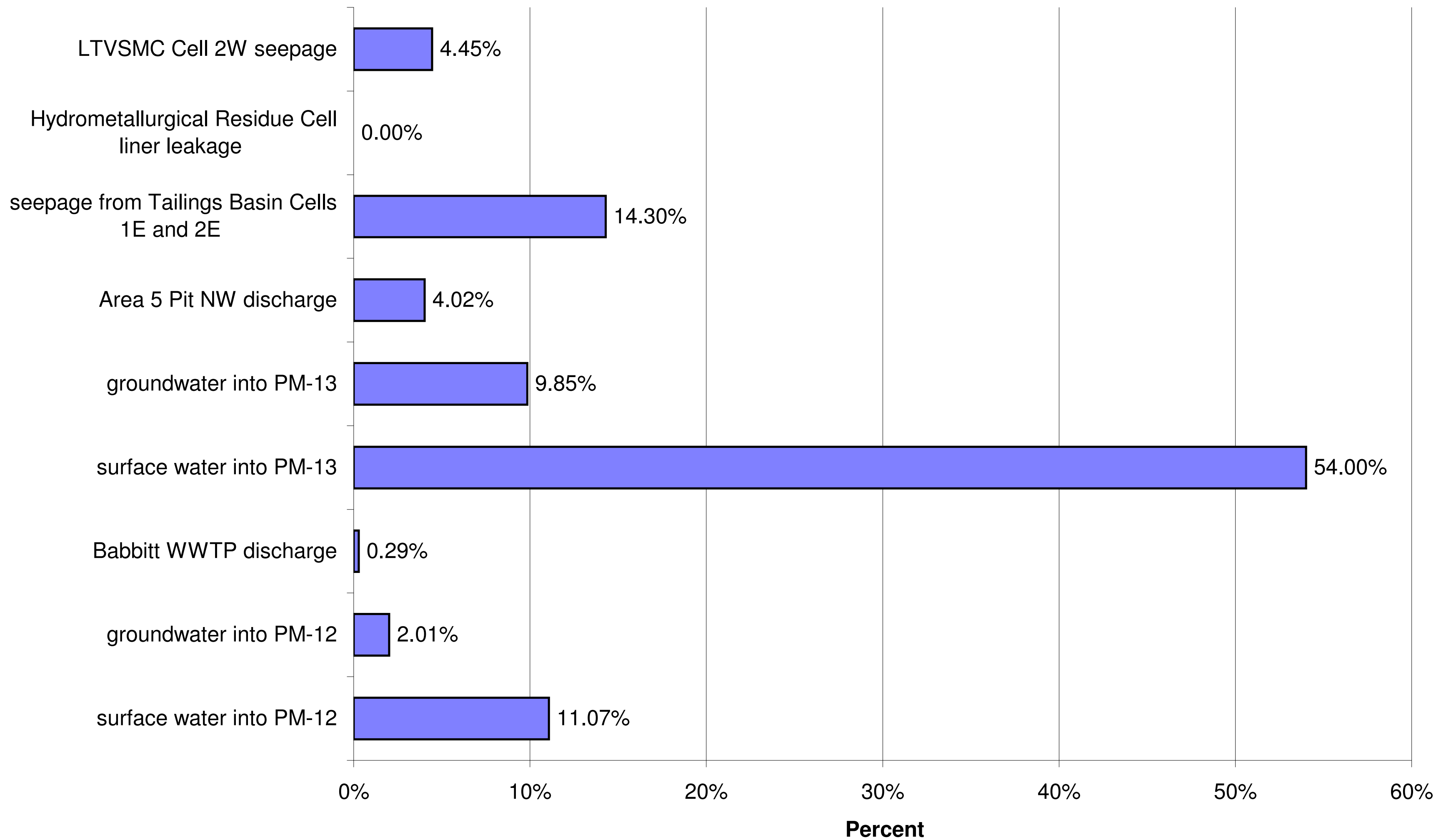


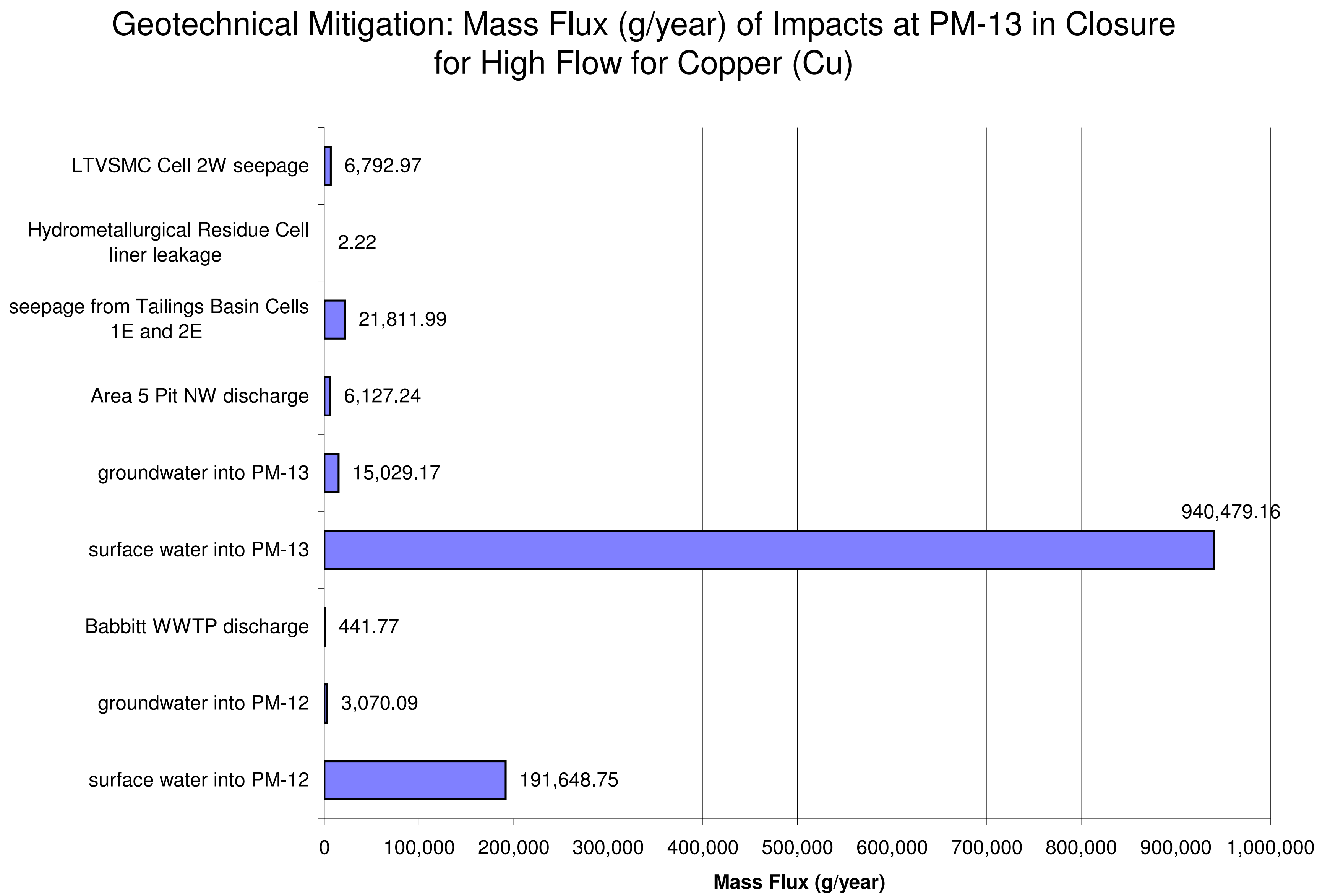
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)

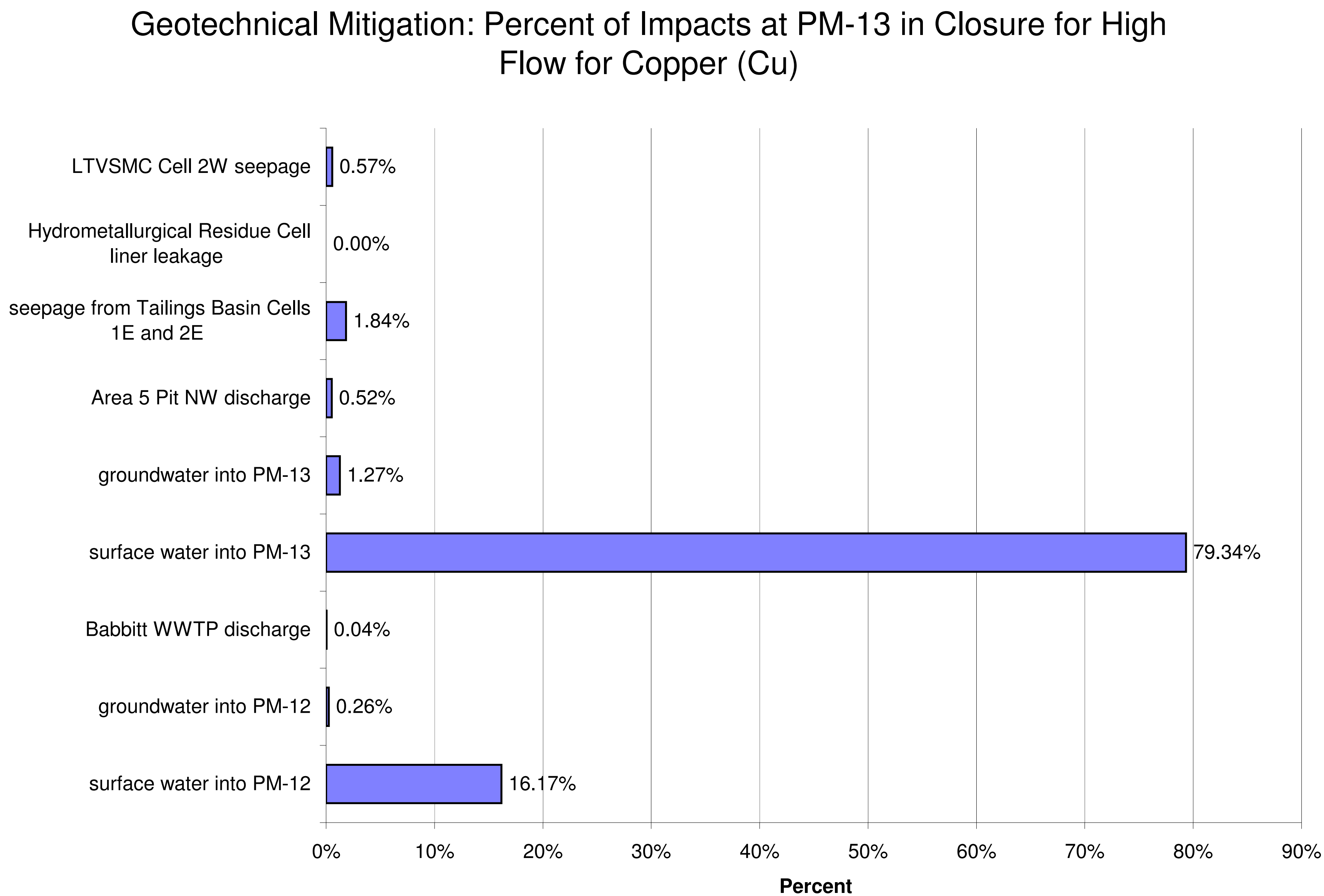


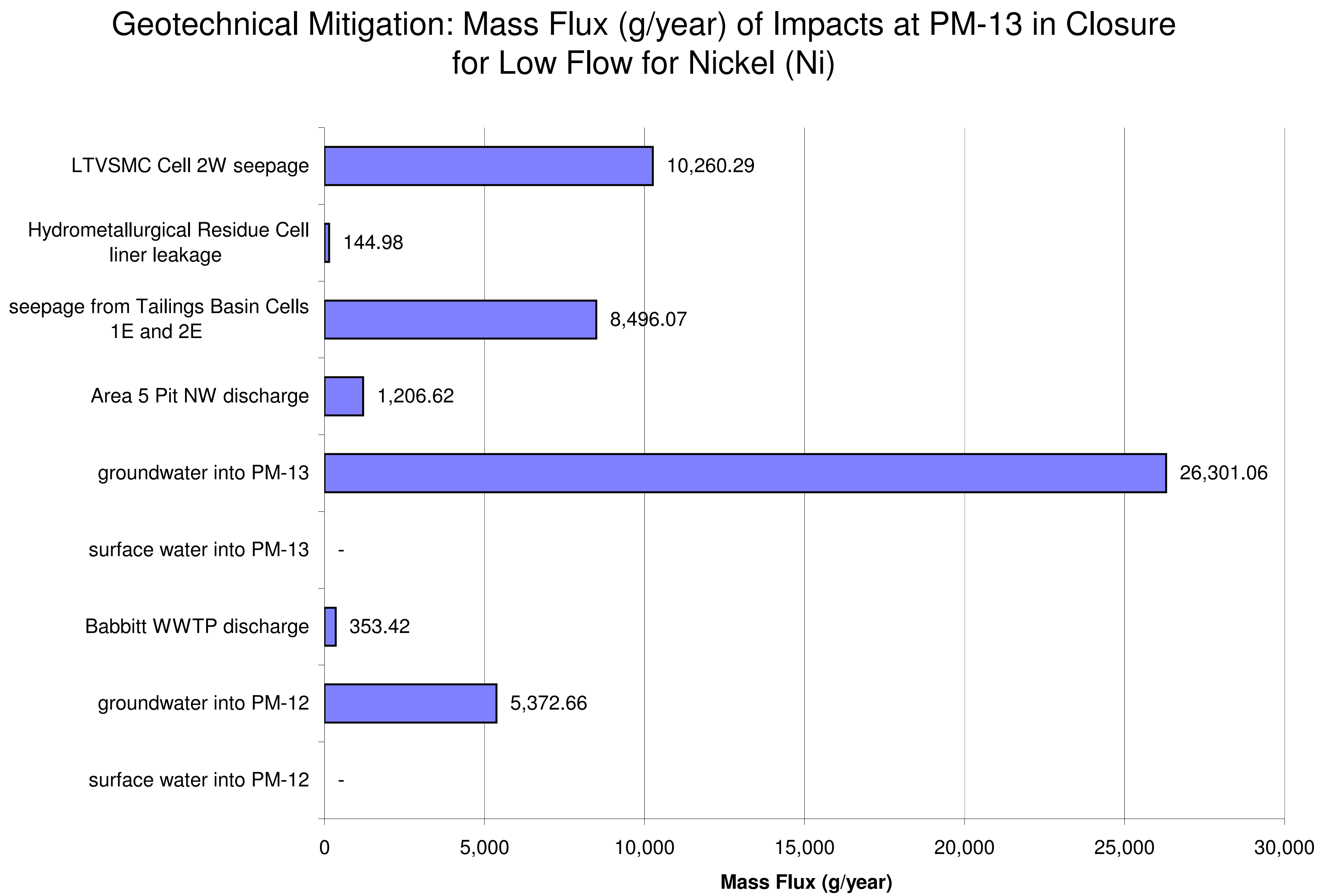

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6,792.97
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin Cells 1E and 2E
21,811.99
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
82,370.41
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
16,881.05
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

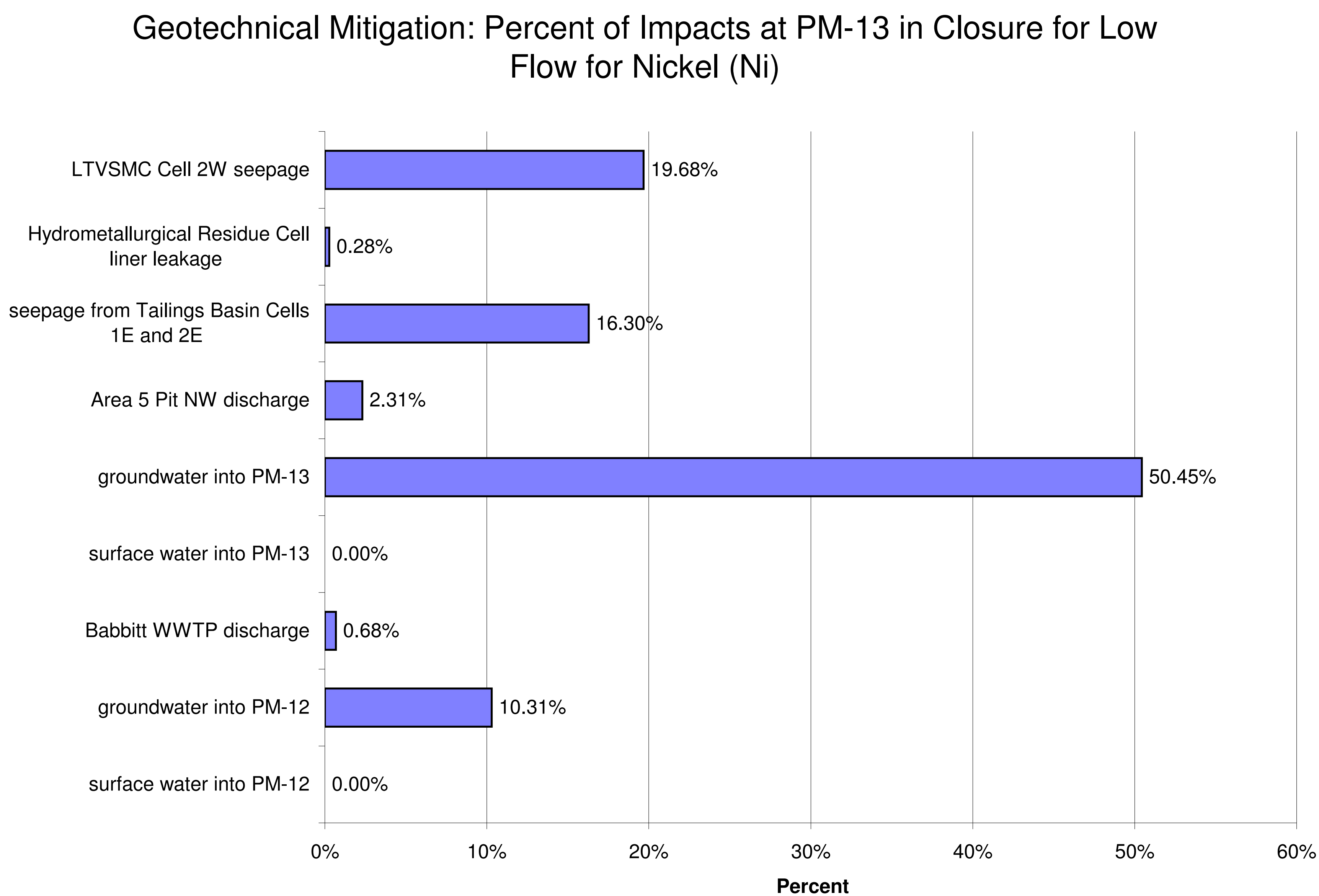
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)

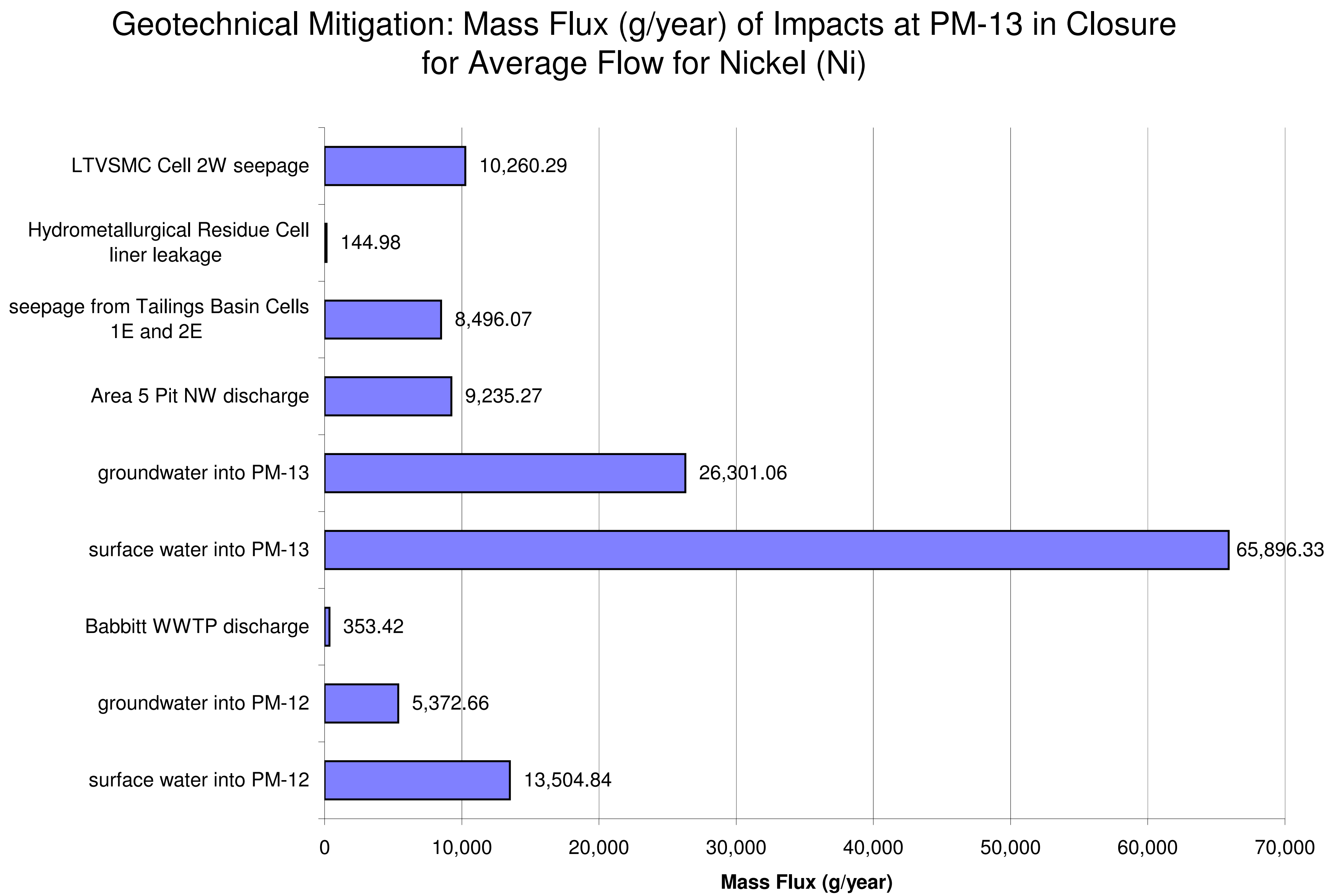


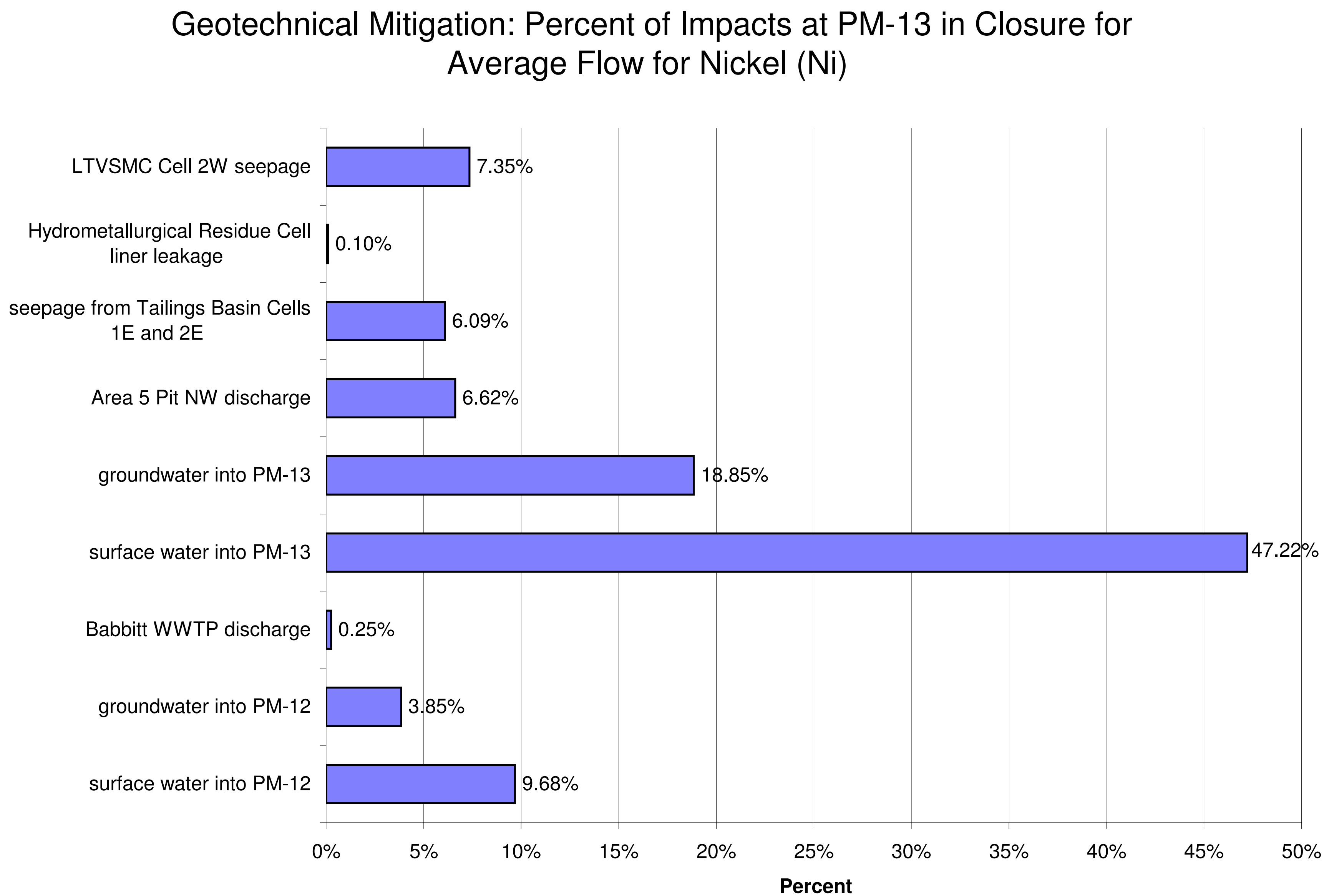

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
6,792.97
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin Cells 1E and 2E
21,811.99
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)

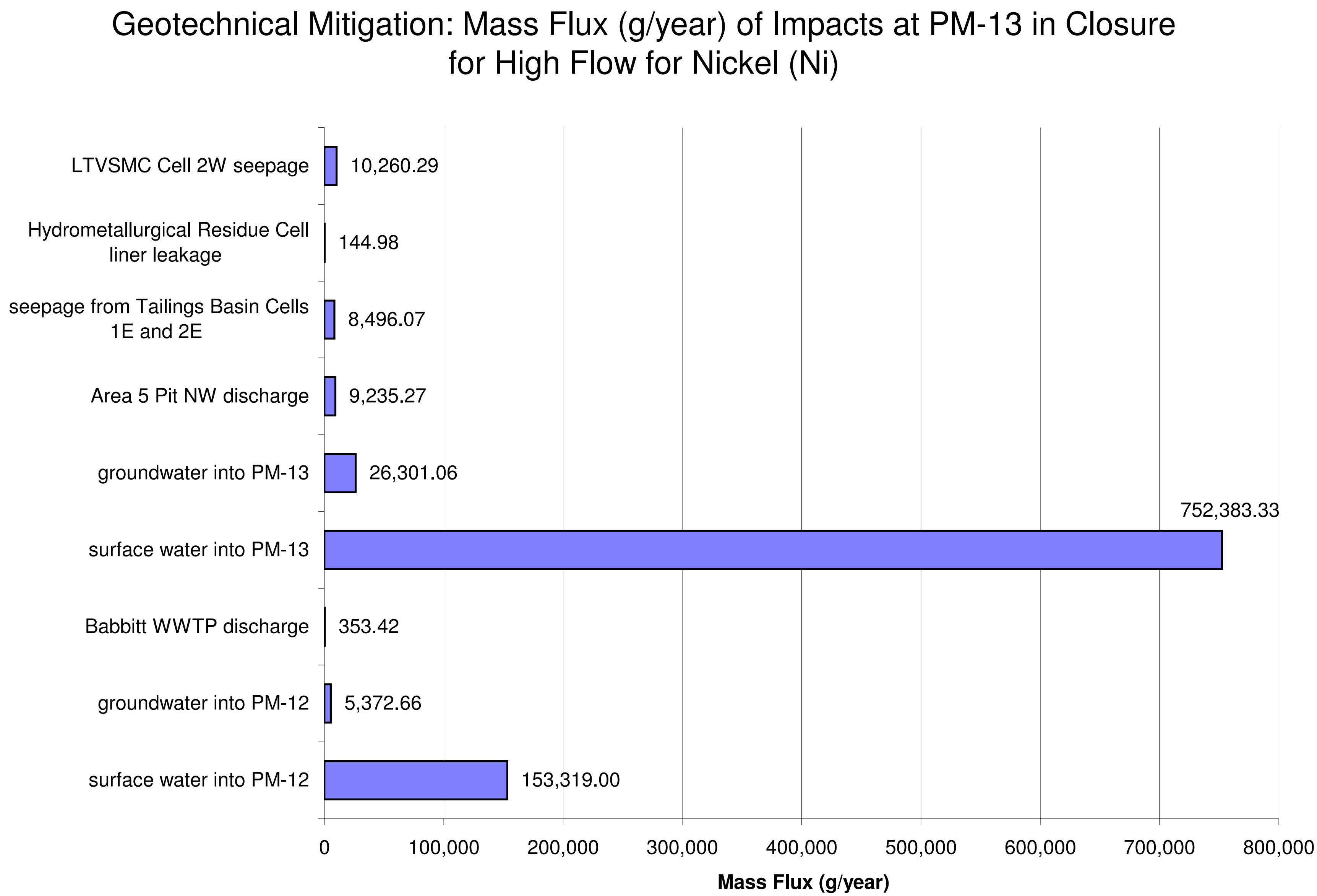

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.57%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
1.84%
Area 5 Pit NW discharge
0.52%
groundwater into PM-13
1.27%
surface water into PM-13
79.34%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
16.17%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
10,260.29
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
1,206.62
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

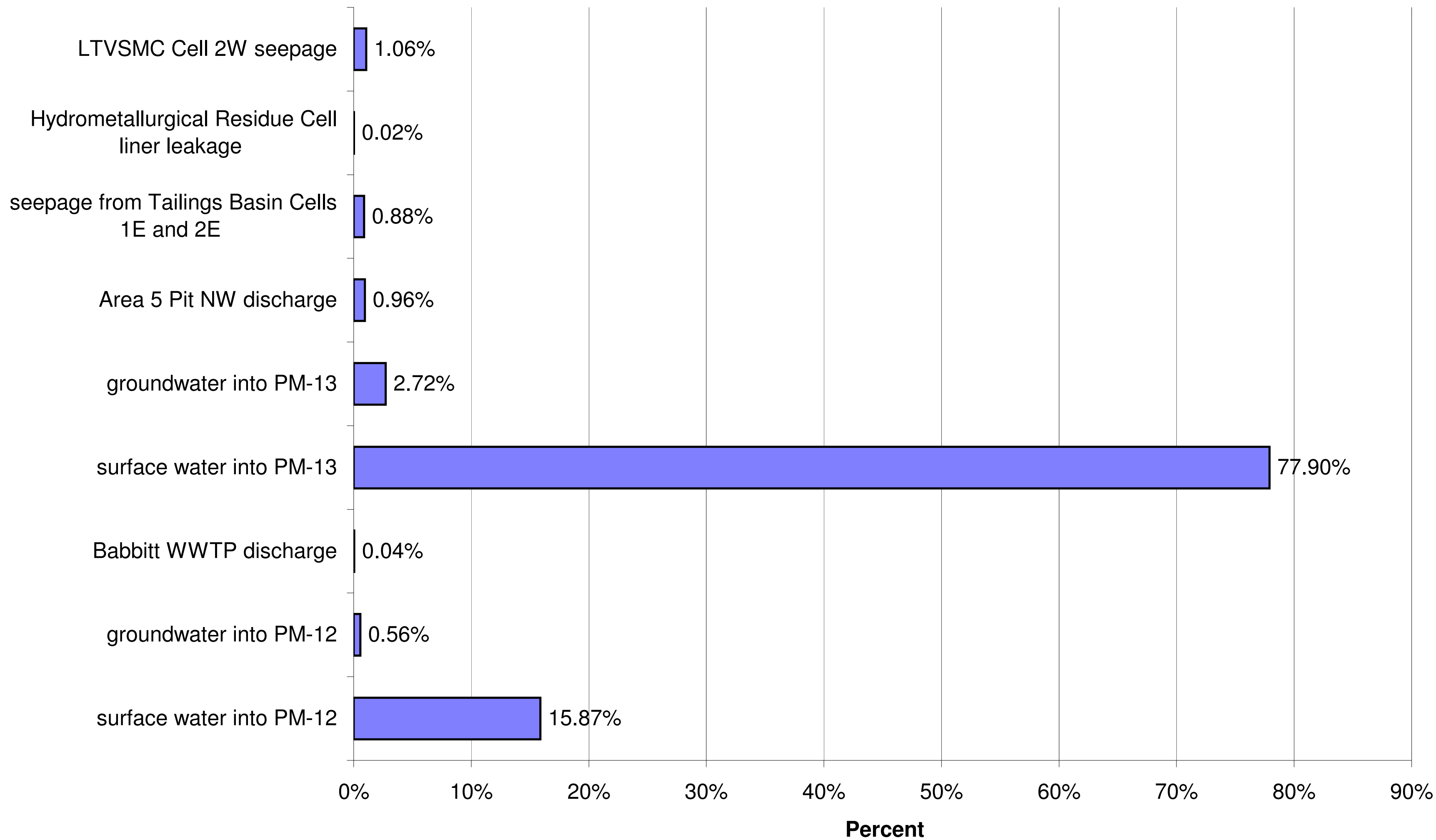

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
19.68%
Hydrometallurgical Residue Cell liner leakage
0.28%
seepage from Tailings Basin Cells 1E and 2E
16.30%
Area 5 Pit NW discharge
2.31%
groundwater into PM-13
50.45%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.68%
groundwater into PM-12
10.31%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
10,260.29
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

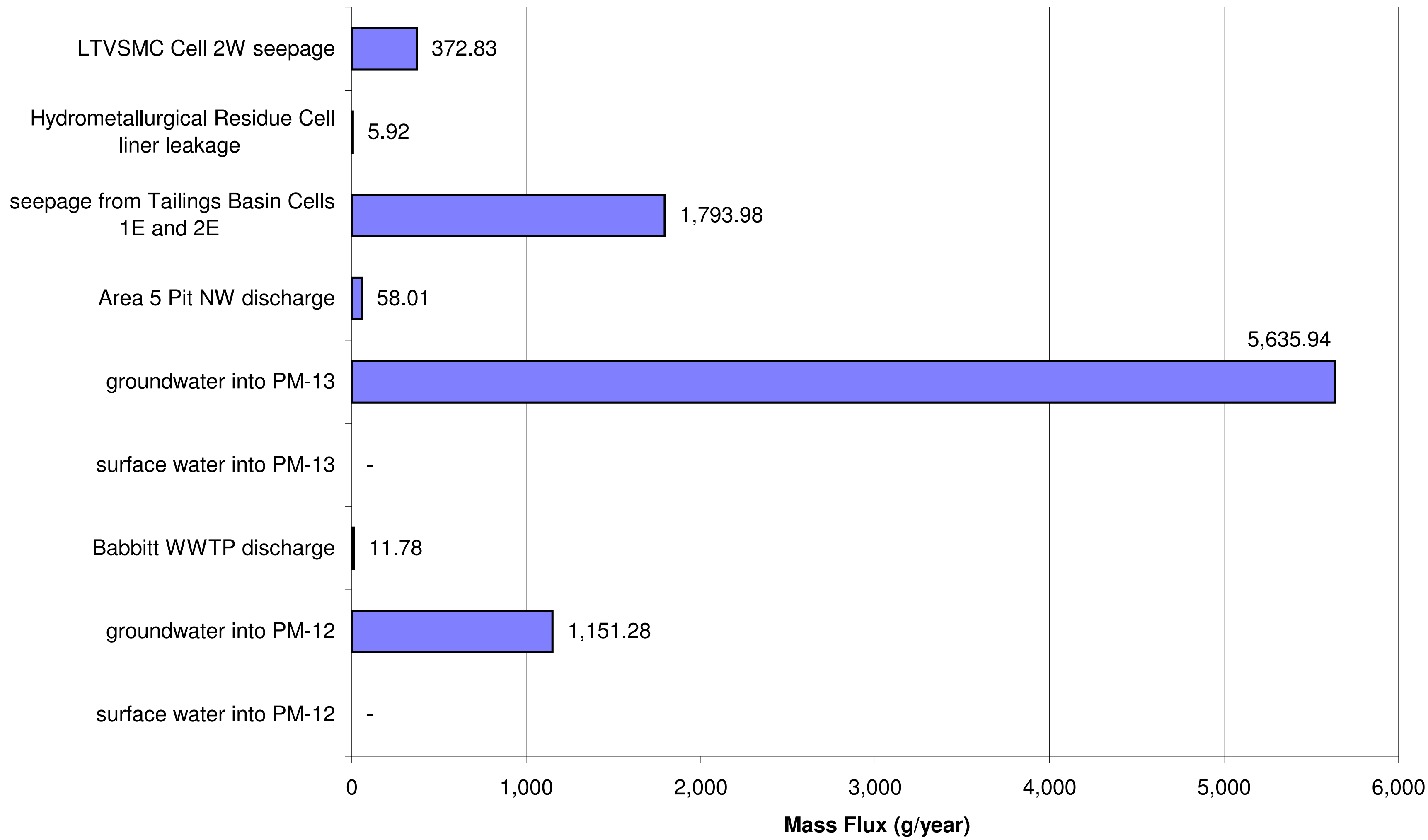

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
7.35%
Hydrometallurgical Residue Cell liner leakage
0.10%
seepage from Tailings Basin Cells 1E and 2E
6.09%
Area 5 Pit NW discharge
6.62%
groundwater into PM-13
18.85%
surface water into PM-13
47.22%
Babbitt WWTP discharge
0.25%
groundwater into PM-12
3.85%
surface water into PM-12
9.68%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
10,260.29
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
153,319.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Mass Flux (g/year)

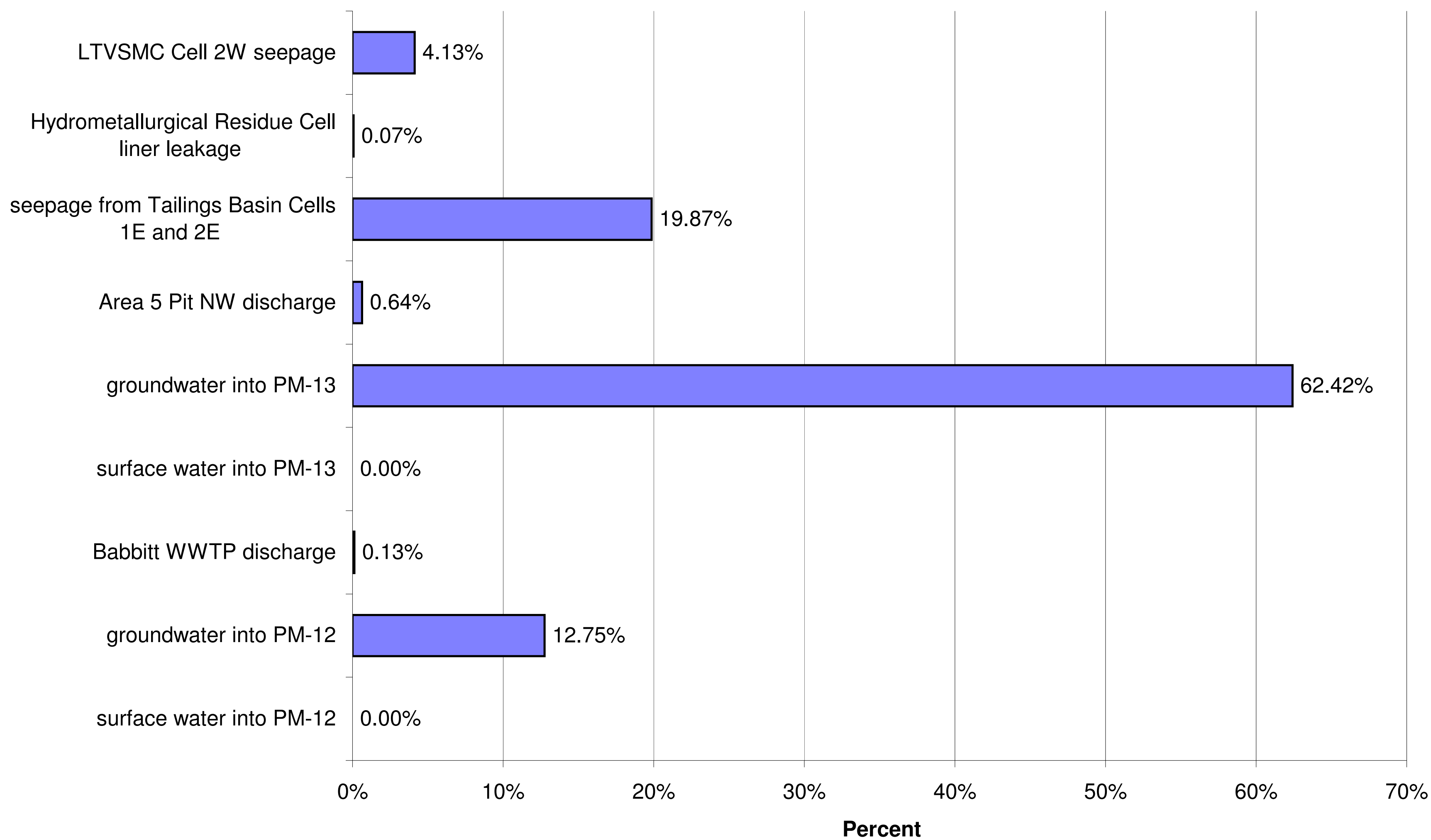
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)

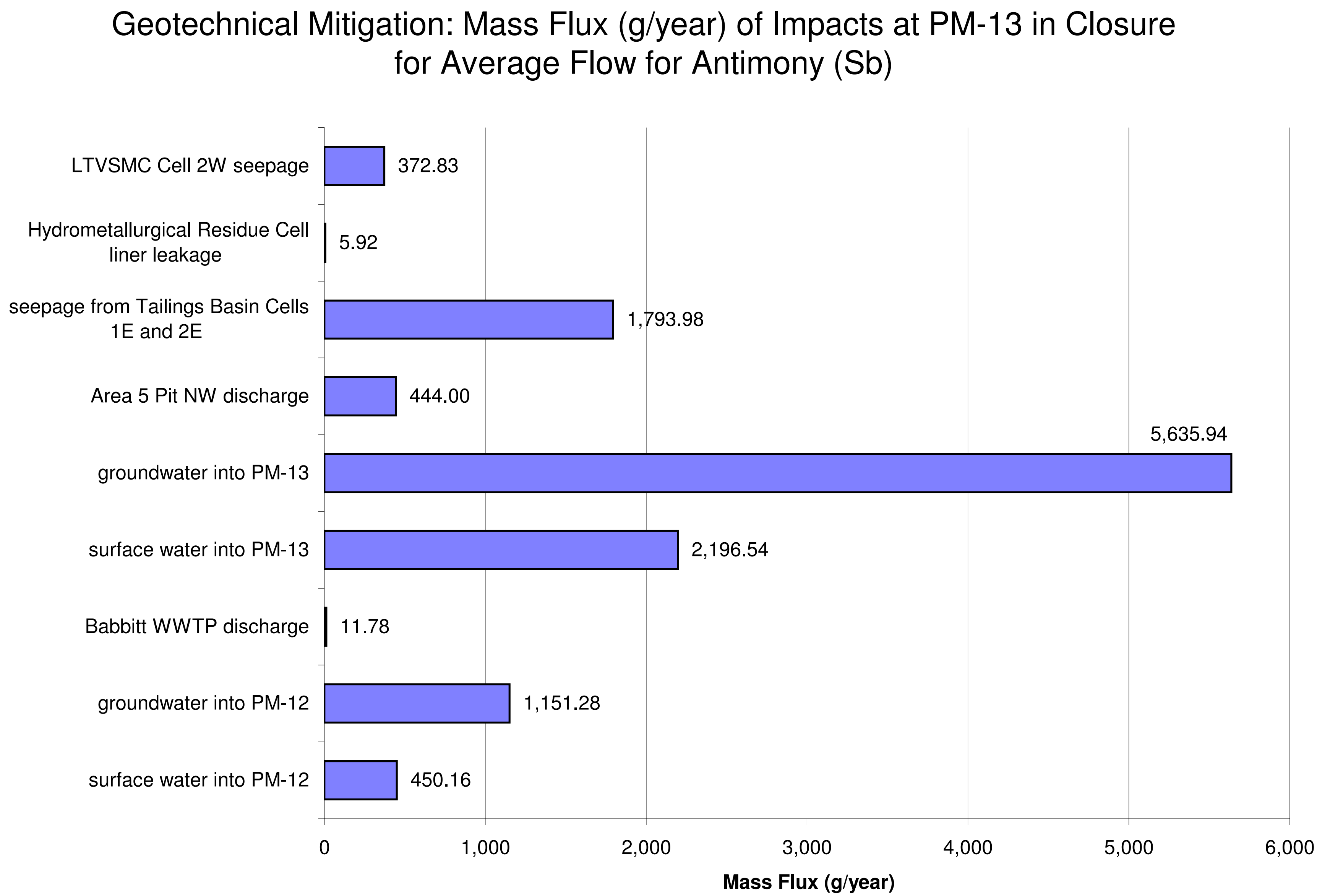


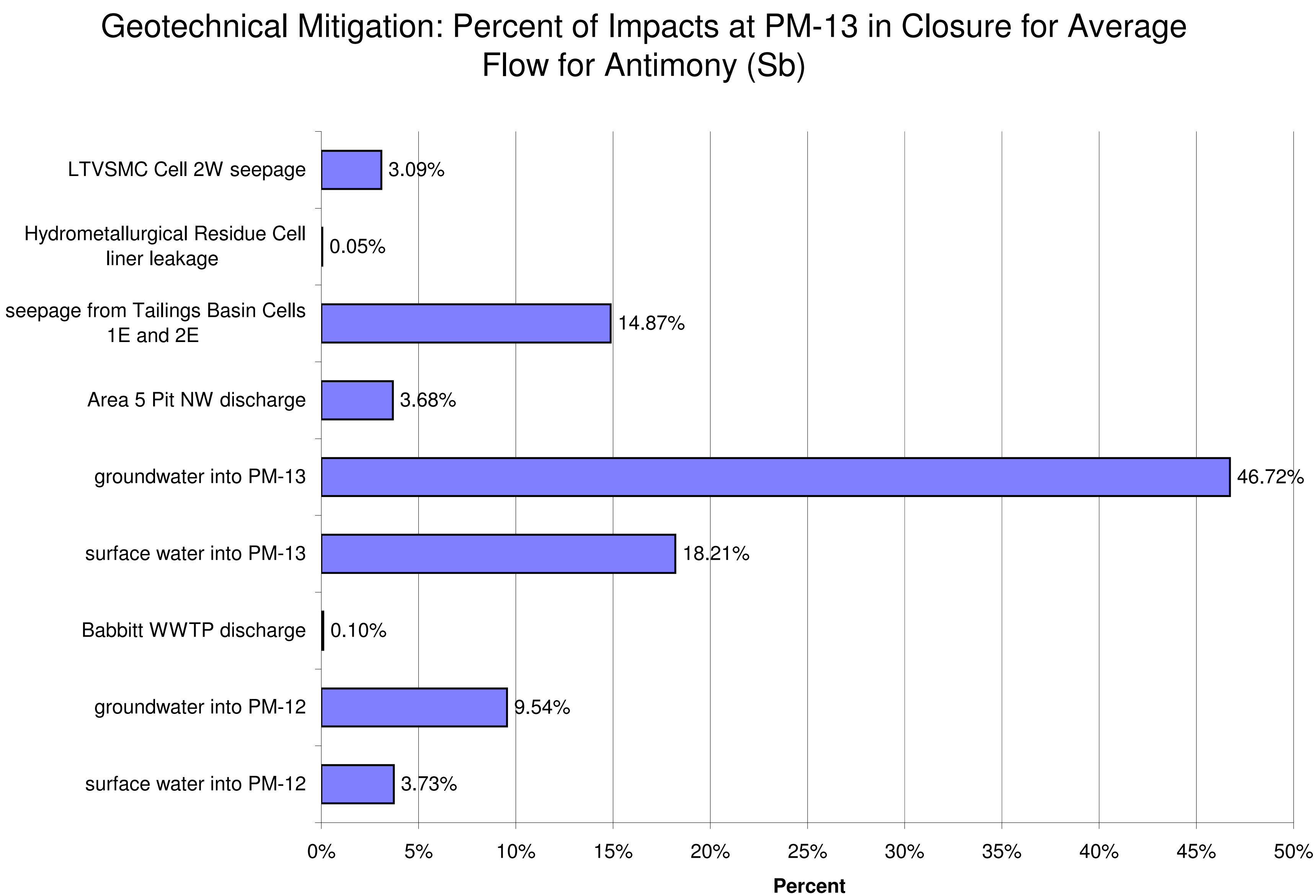
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)



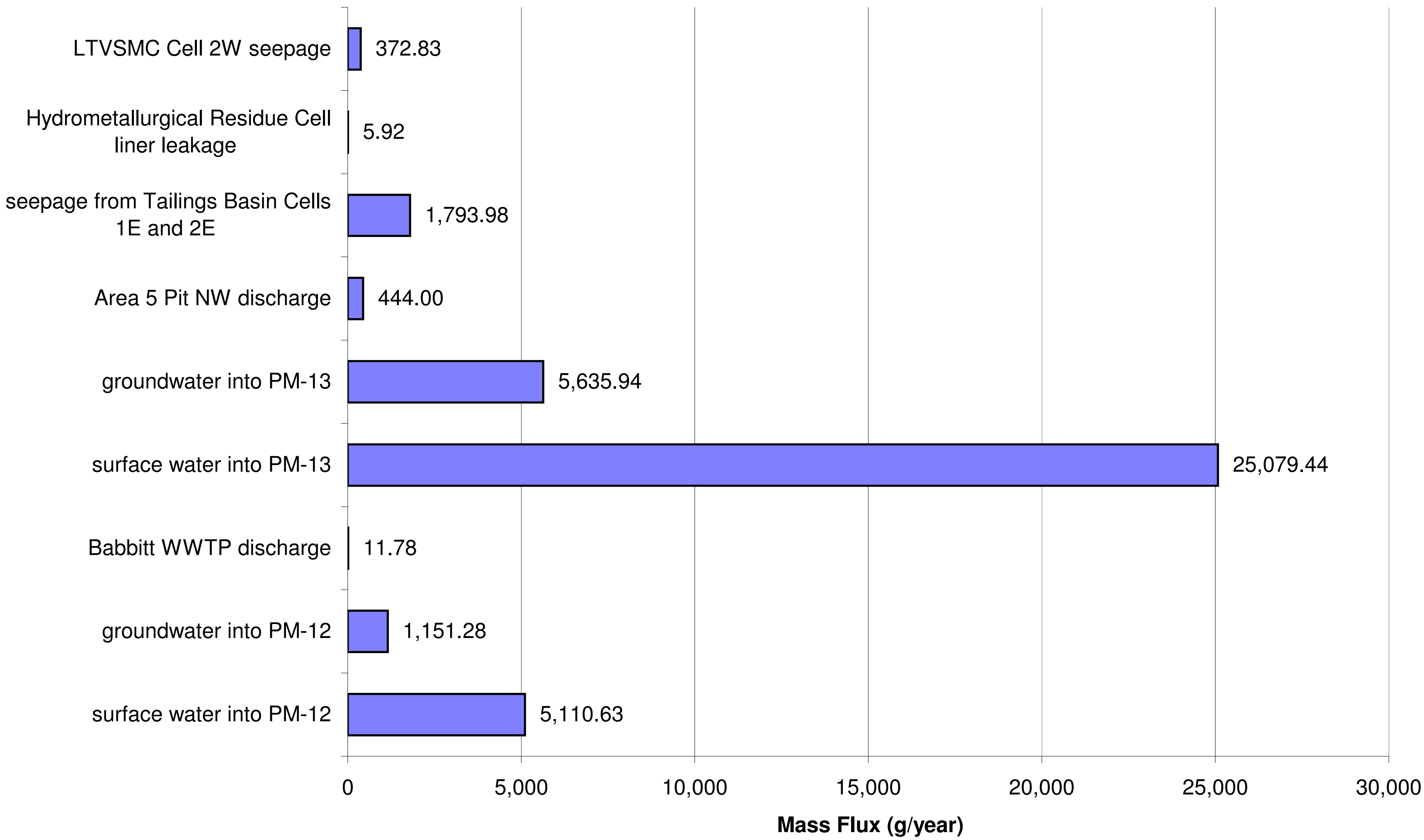
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)

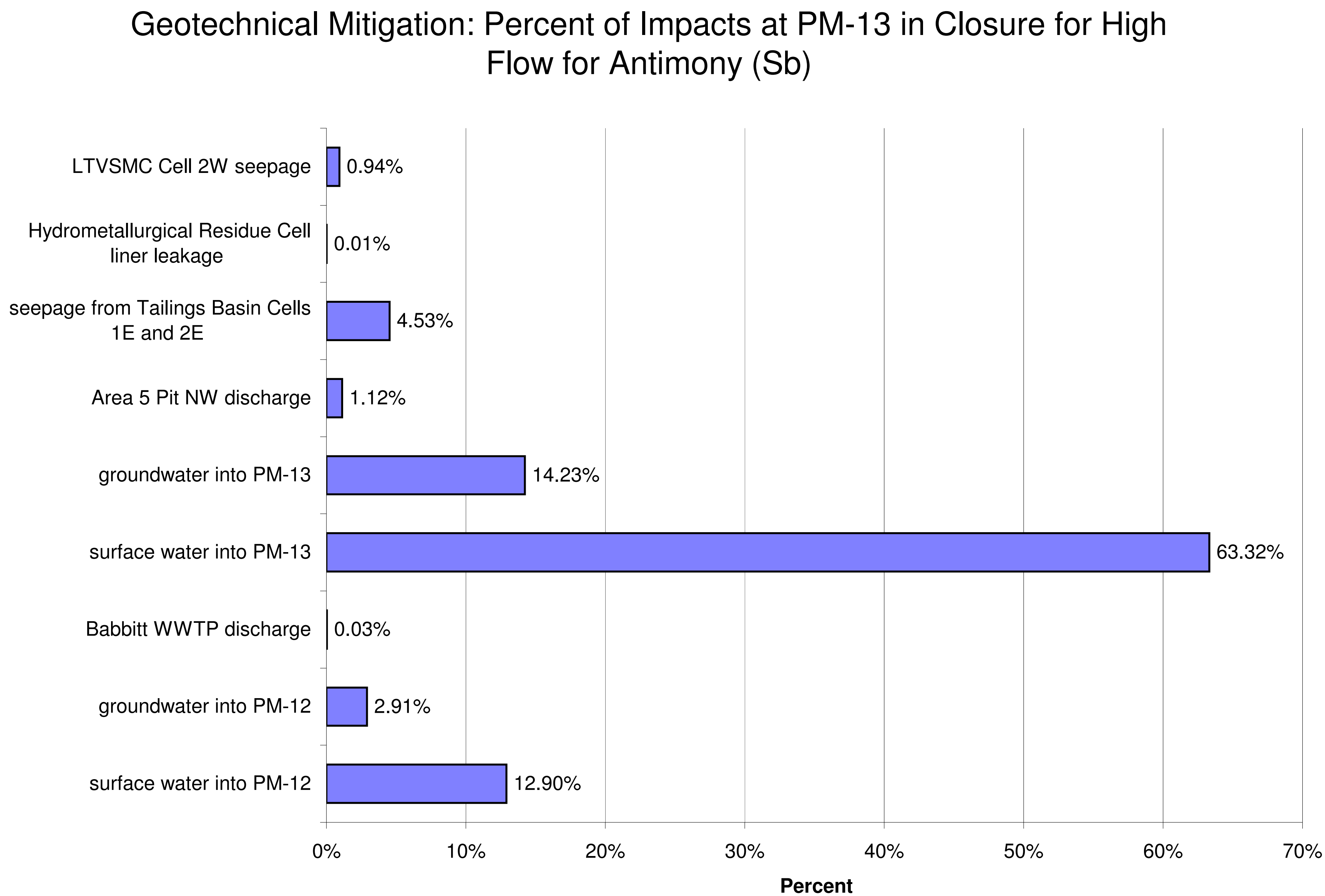



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
372.83
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
1,793.98
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
2,196.54
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
450.16
0
1,000
2,000
3,000
4,000
5,000
6,000
Mass Flux (g/year)

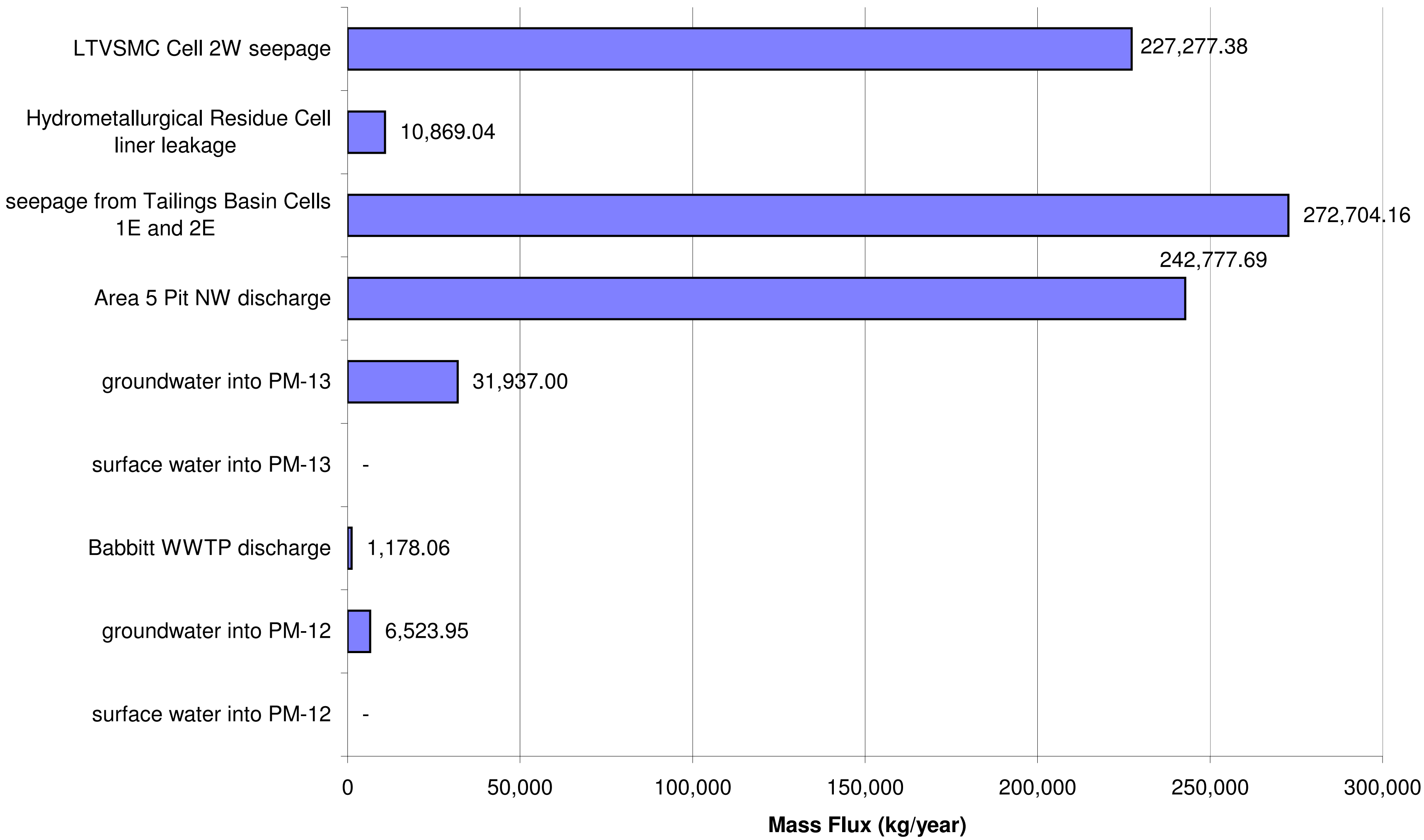

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
3.09%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin Cells 1E and 2E
14.87%
Area 5 Pit NW discharge
3.68%
groundwater into PM-13
46.72%
surface water into PM-13
18.21%
Babbitt WWTP discharge
0.10%
groundwater into PM-12
9.54%
surface water into PM-12
3.73%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)

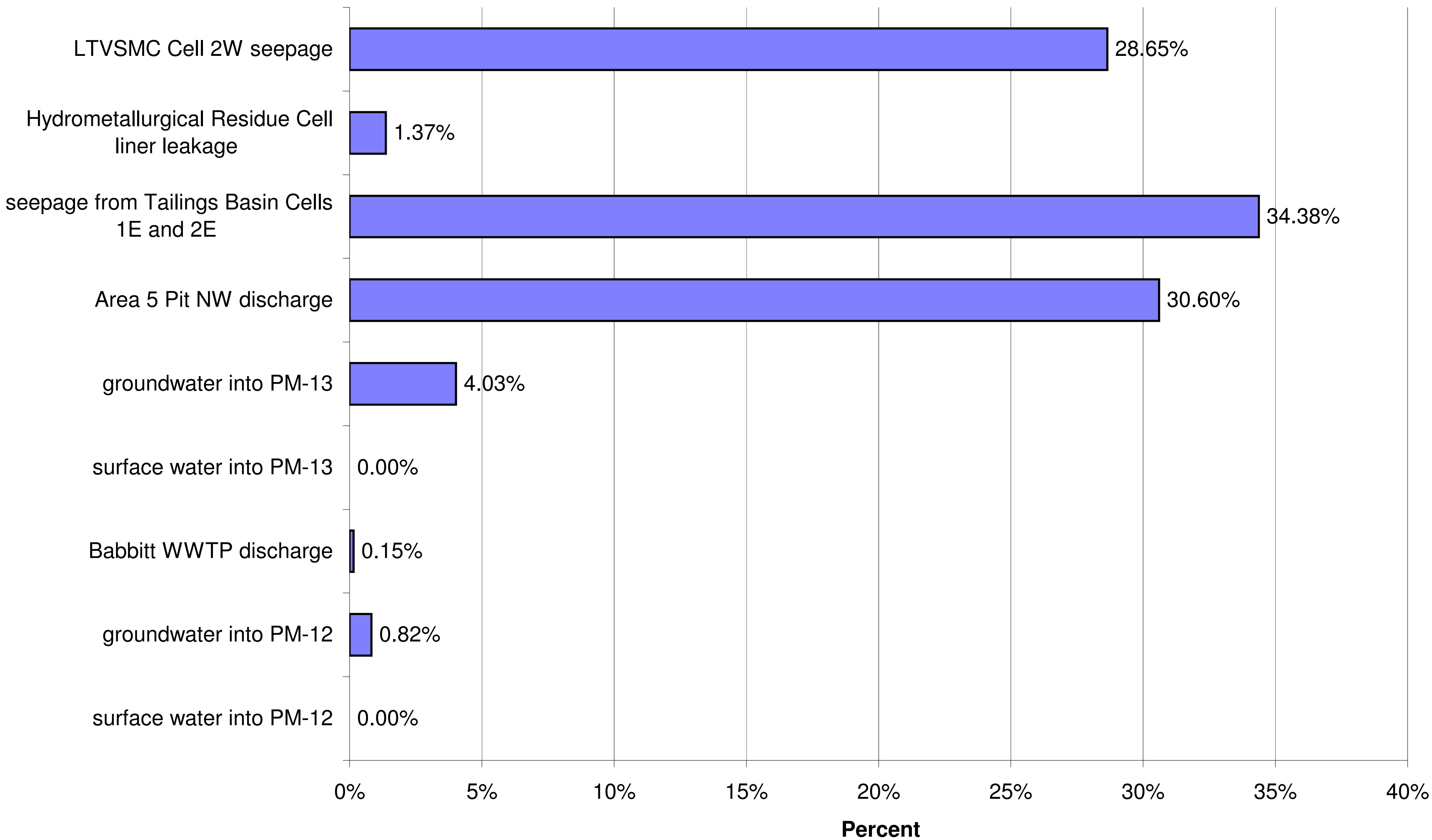


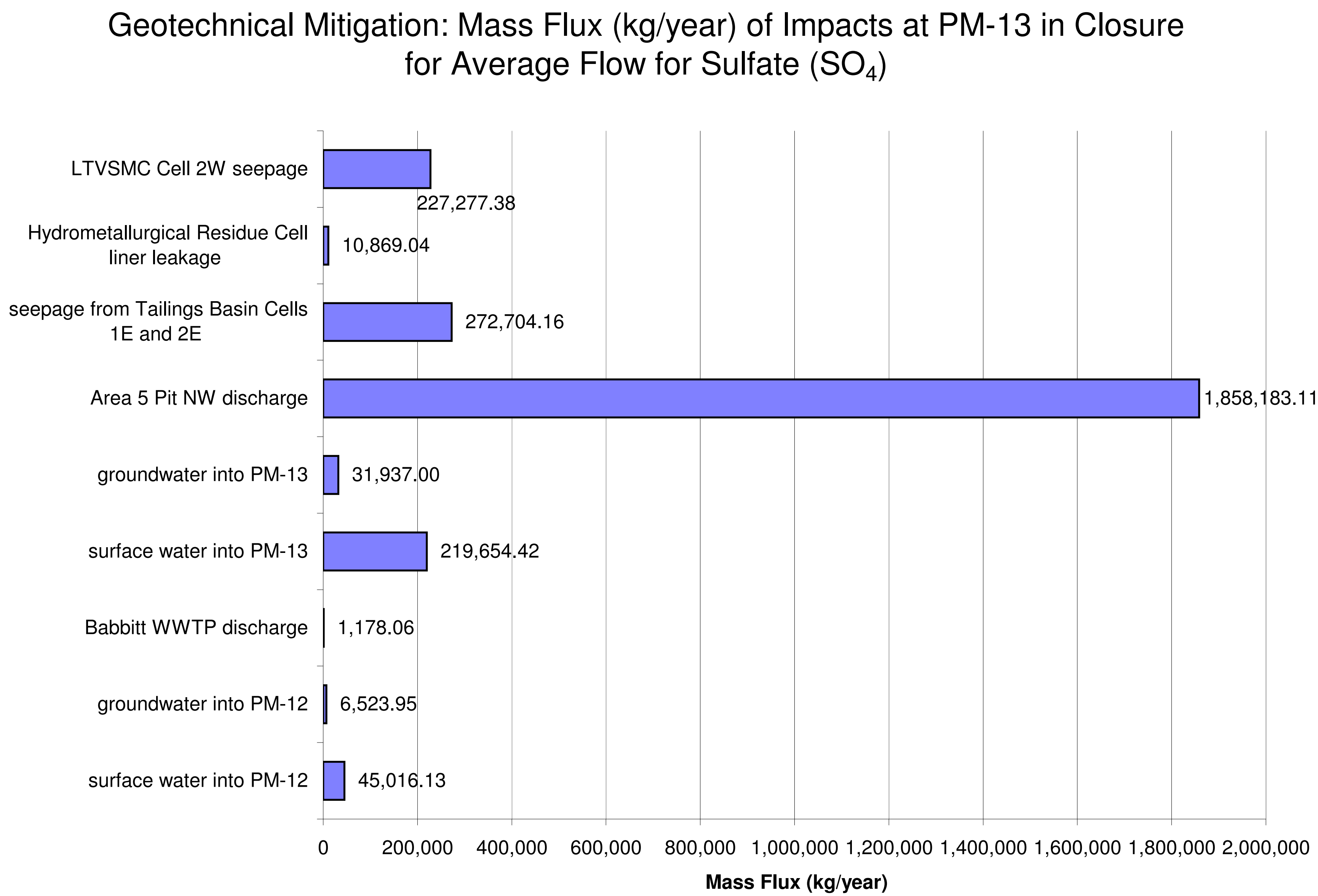

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
0.94%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
4.53%
Area 5 Pit NW discharge
1.12%
groundwater into PM-13
14.23%
surface water into PM-13
63.32%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
2.91%
surface water into PM-12
12.90%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO_4)

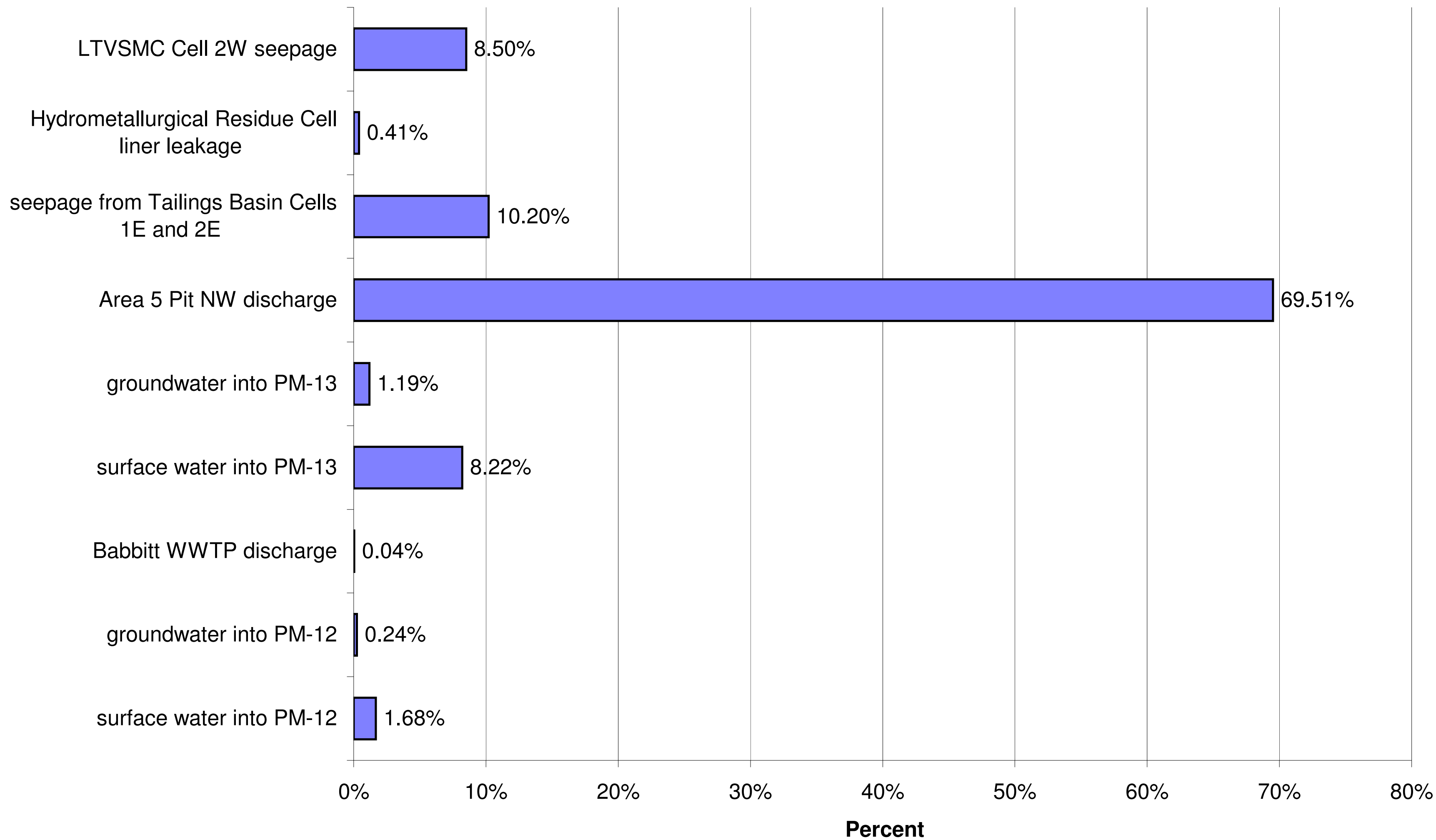


Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO_4)

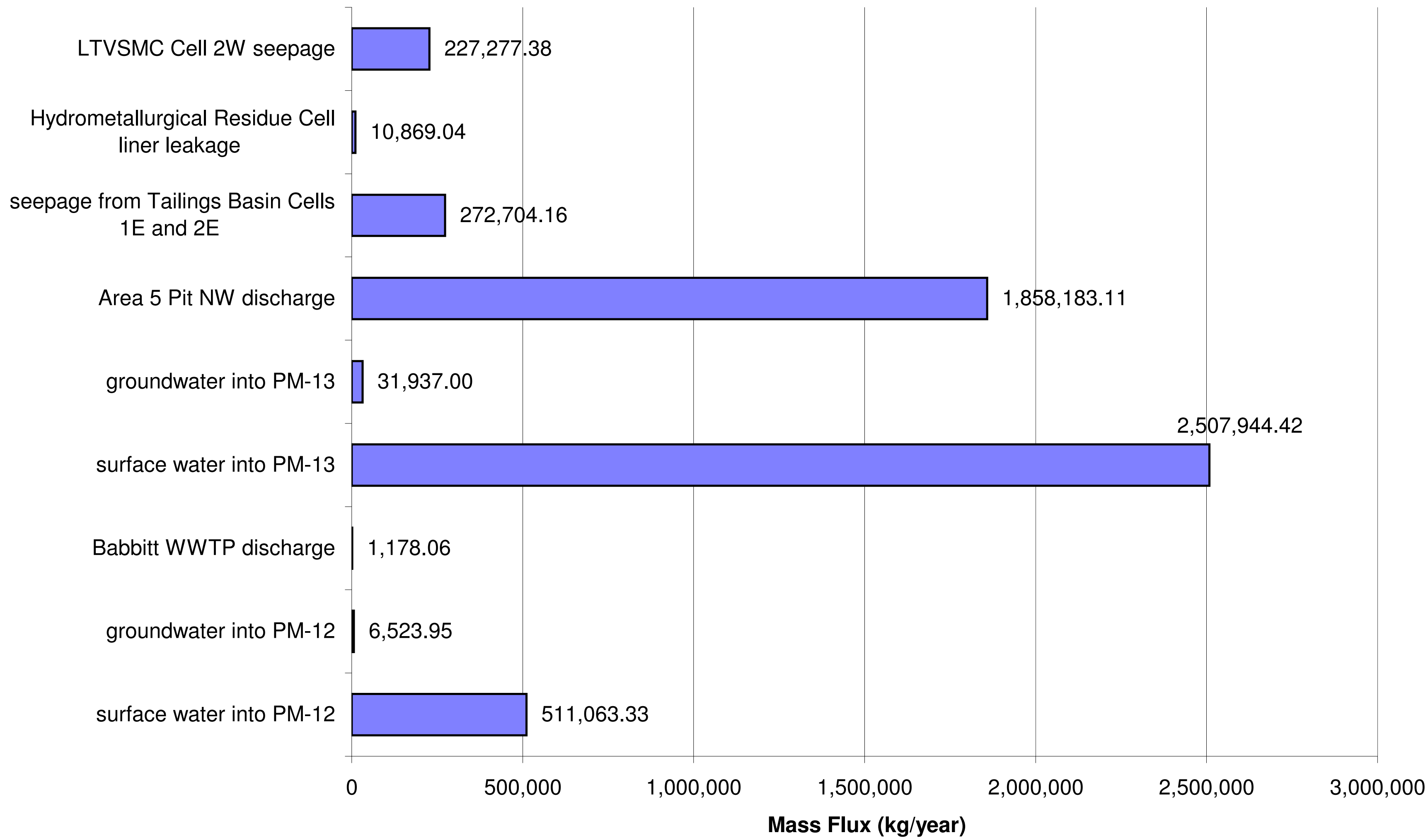



Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
227,277.38
Hydrometallurgical Residue Cell liner leakage
10,869.04
seepage from Tailings Basin Cells 1E and 2E
272,704.16
Area 5 Pit NW discharge
1,858,183.11
groundwater into PM-13
31,937.00
surface water into PM-13
219,654.42
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
45,016.13
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
1,400,000
1,600,000
1,800,000
2,000,000
Mass Flux (kg/year)

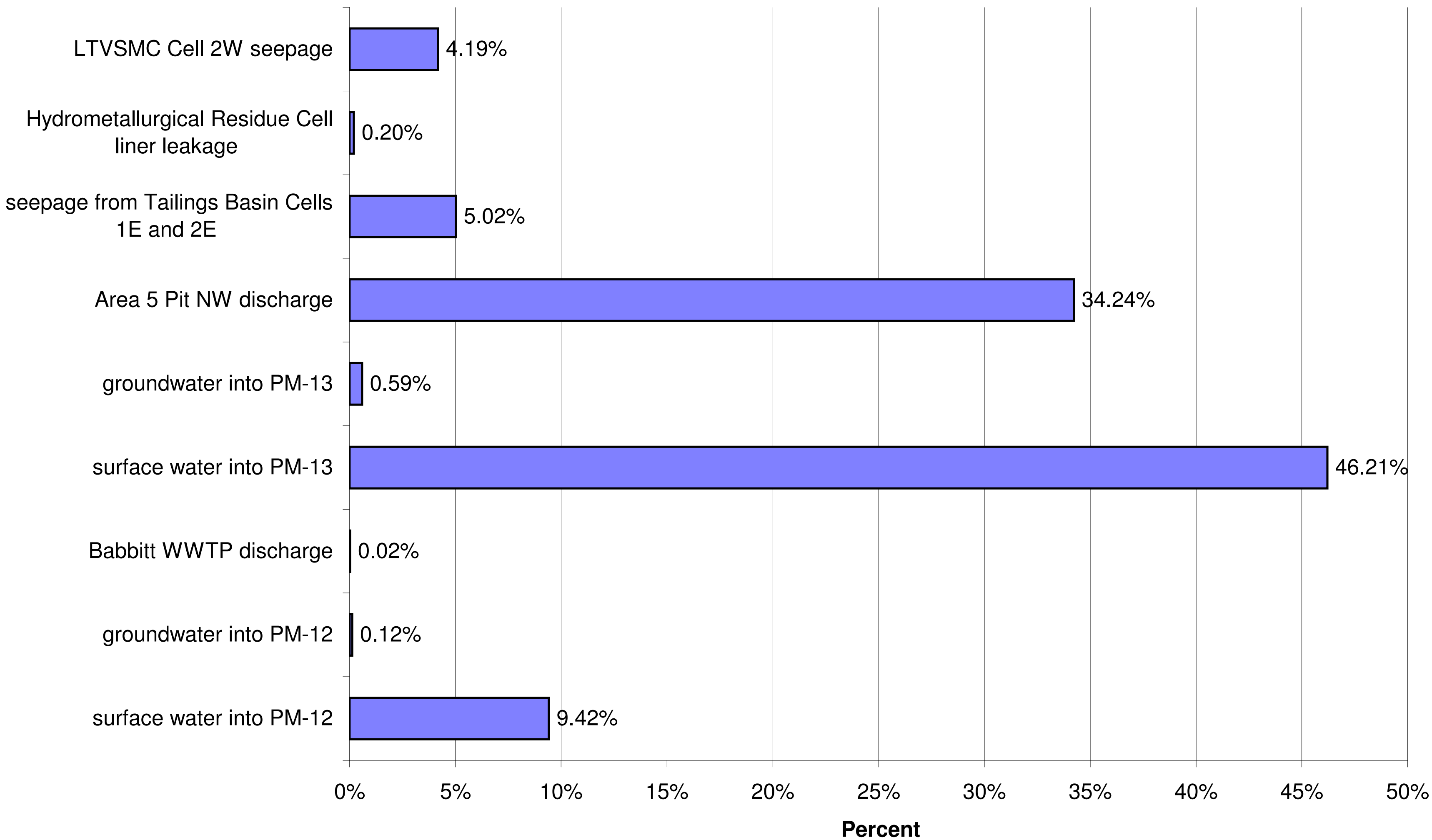
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO_4)

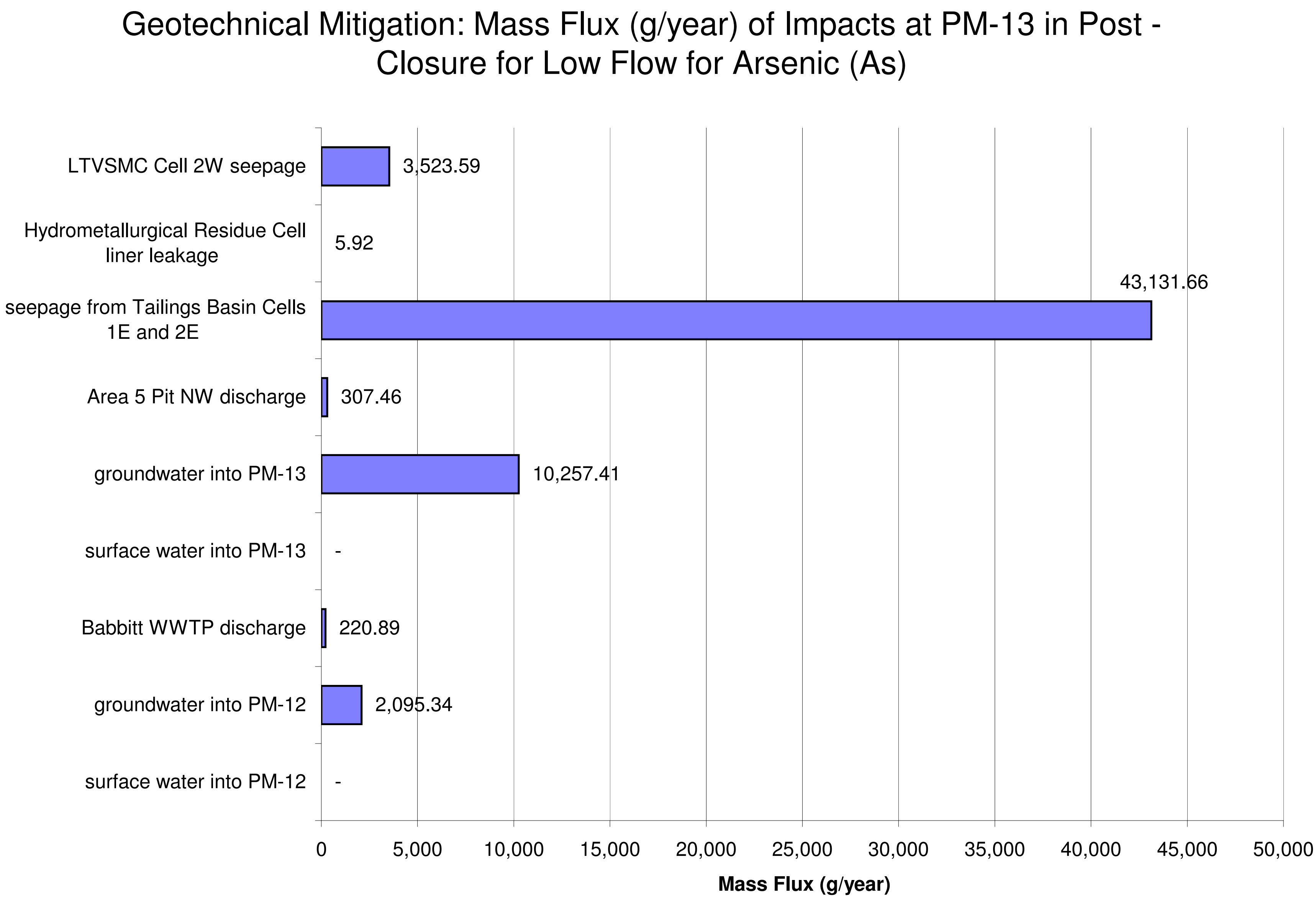


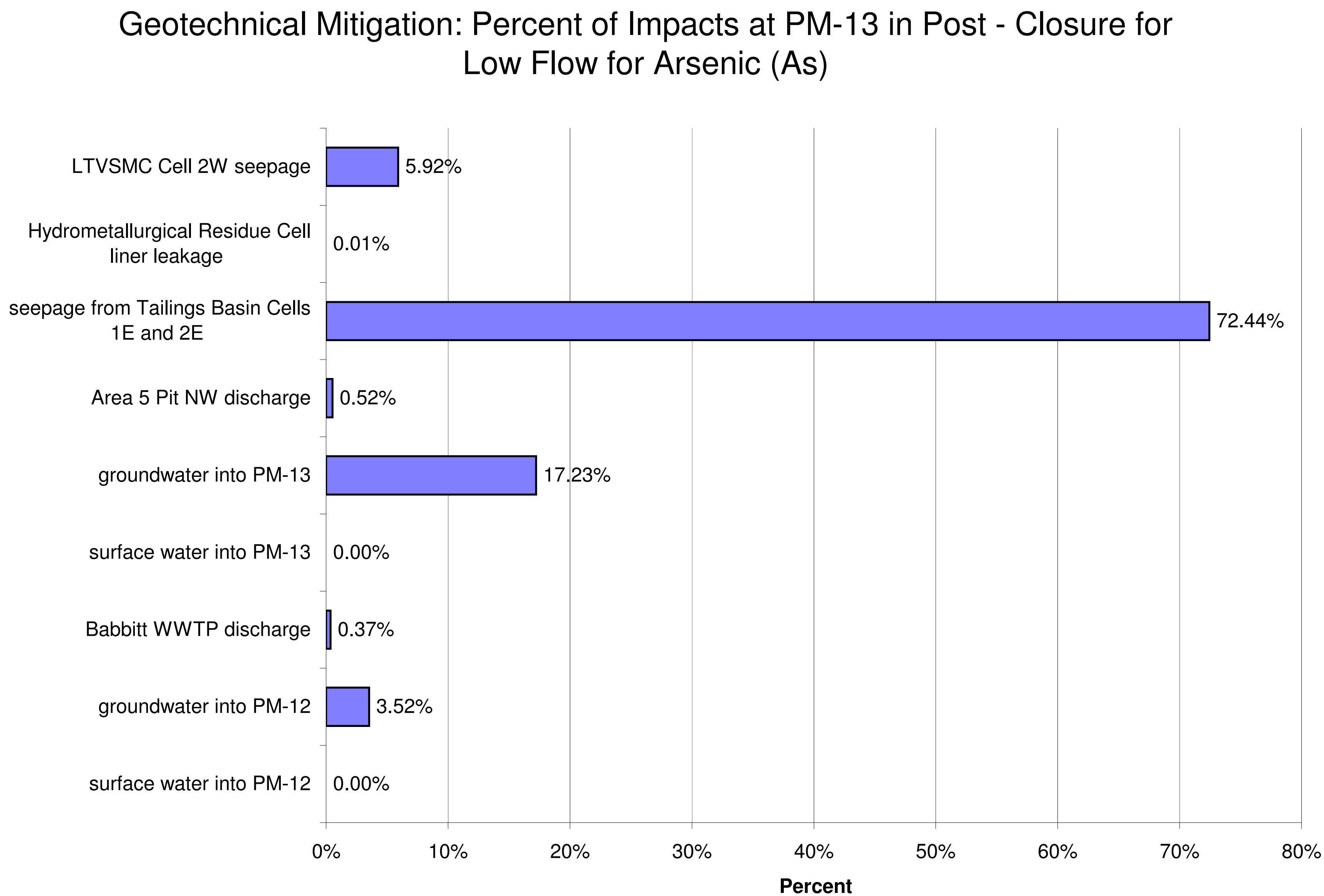
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Closure for High Flow for Sulfate (SO_4)

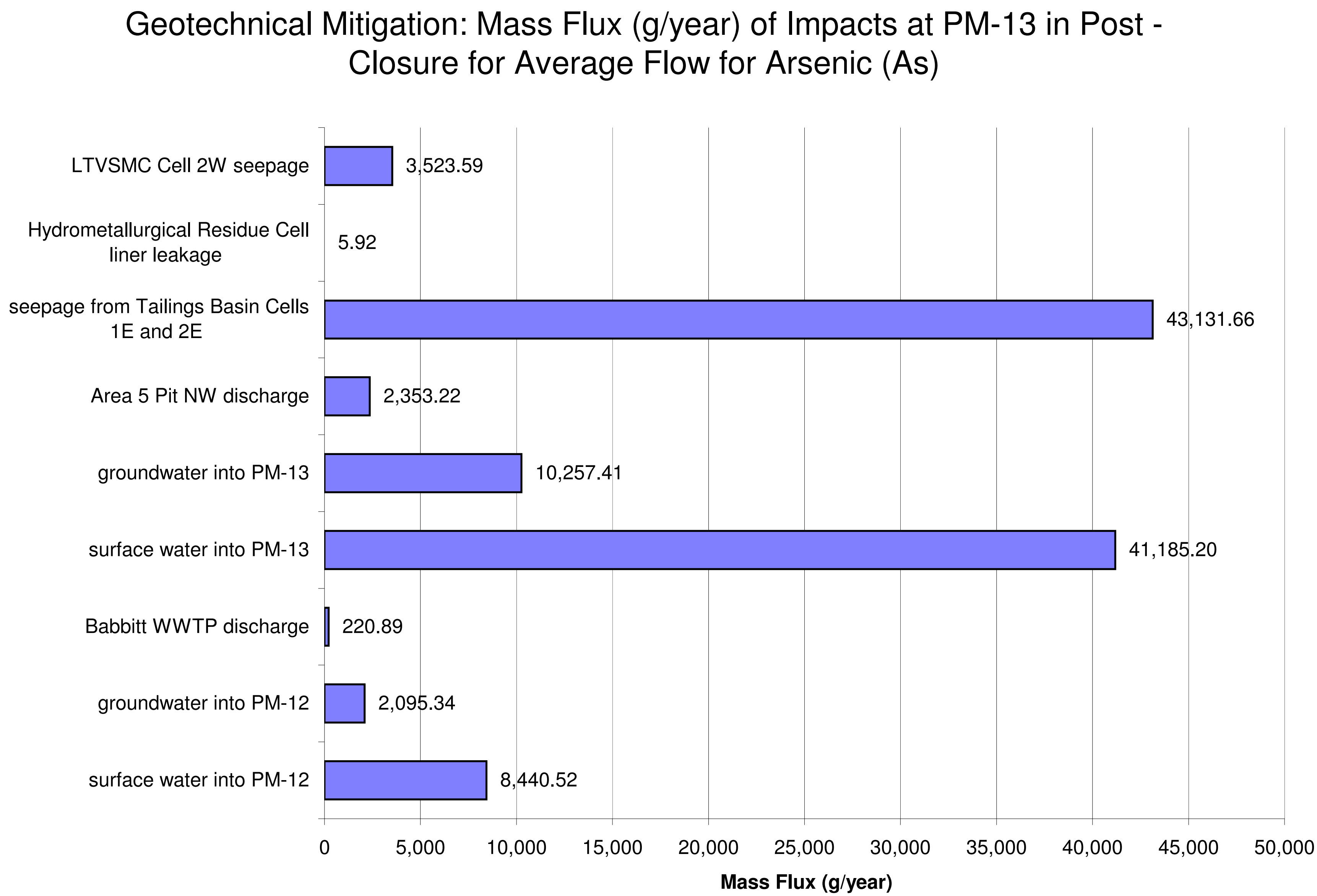


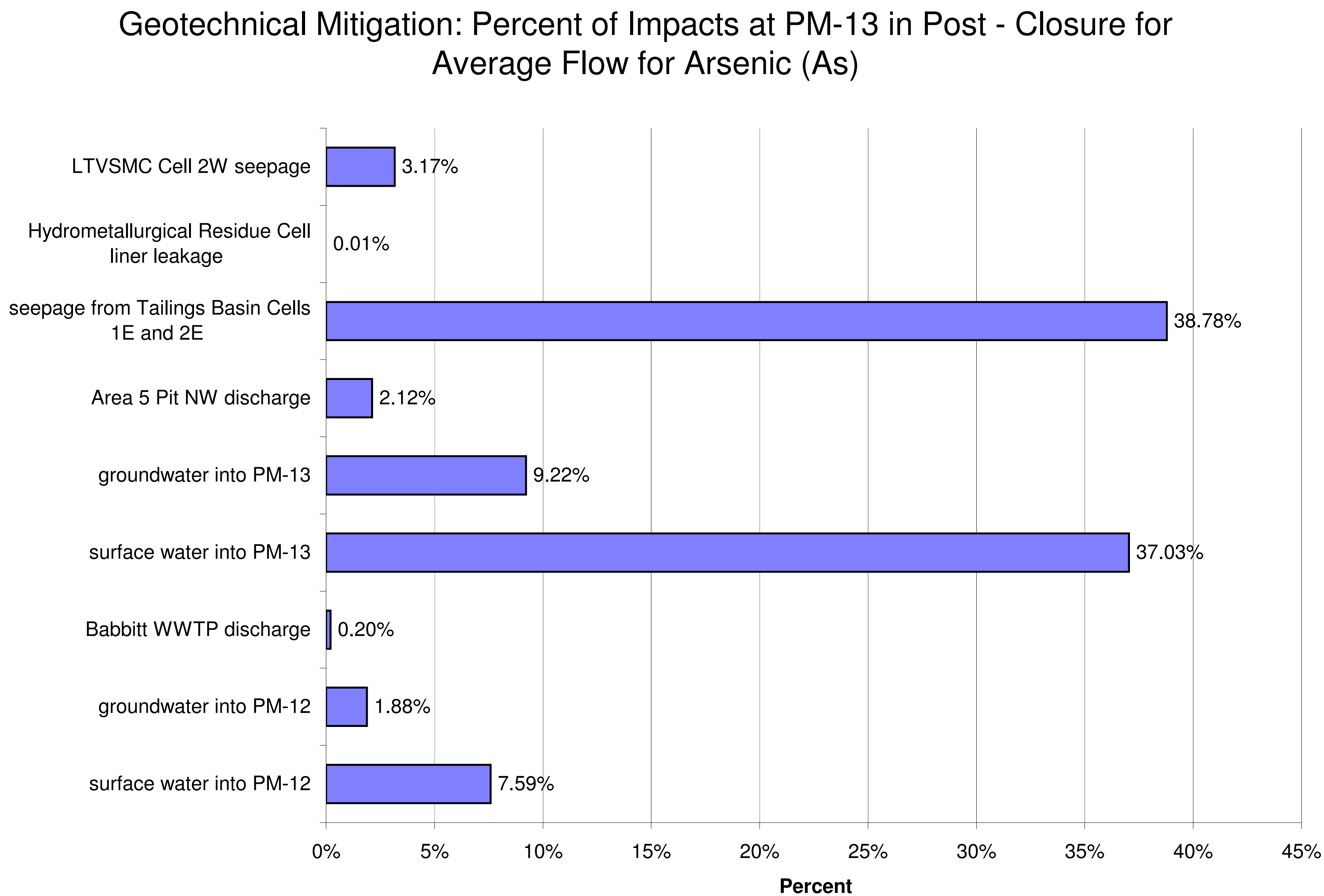
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Sulfate (SO_4)

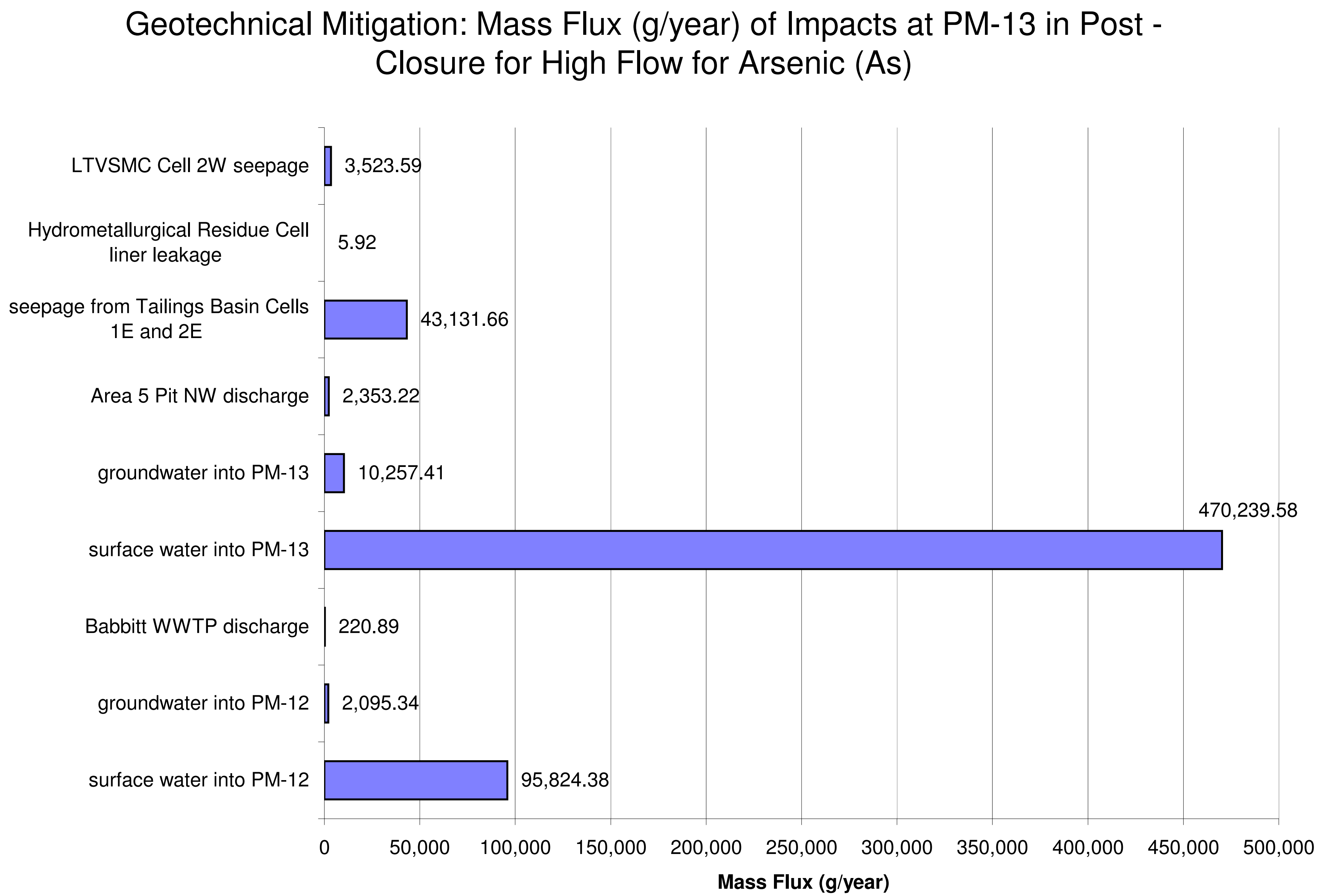


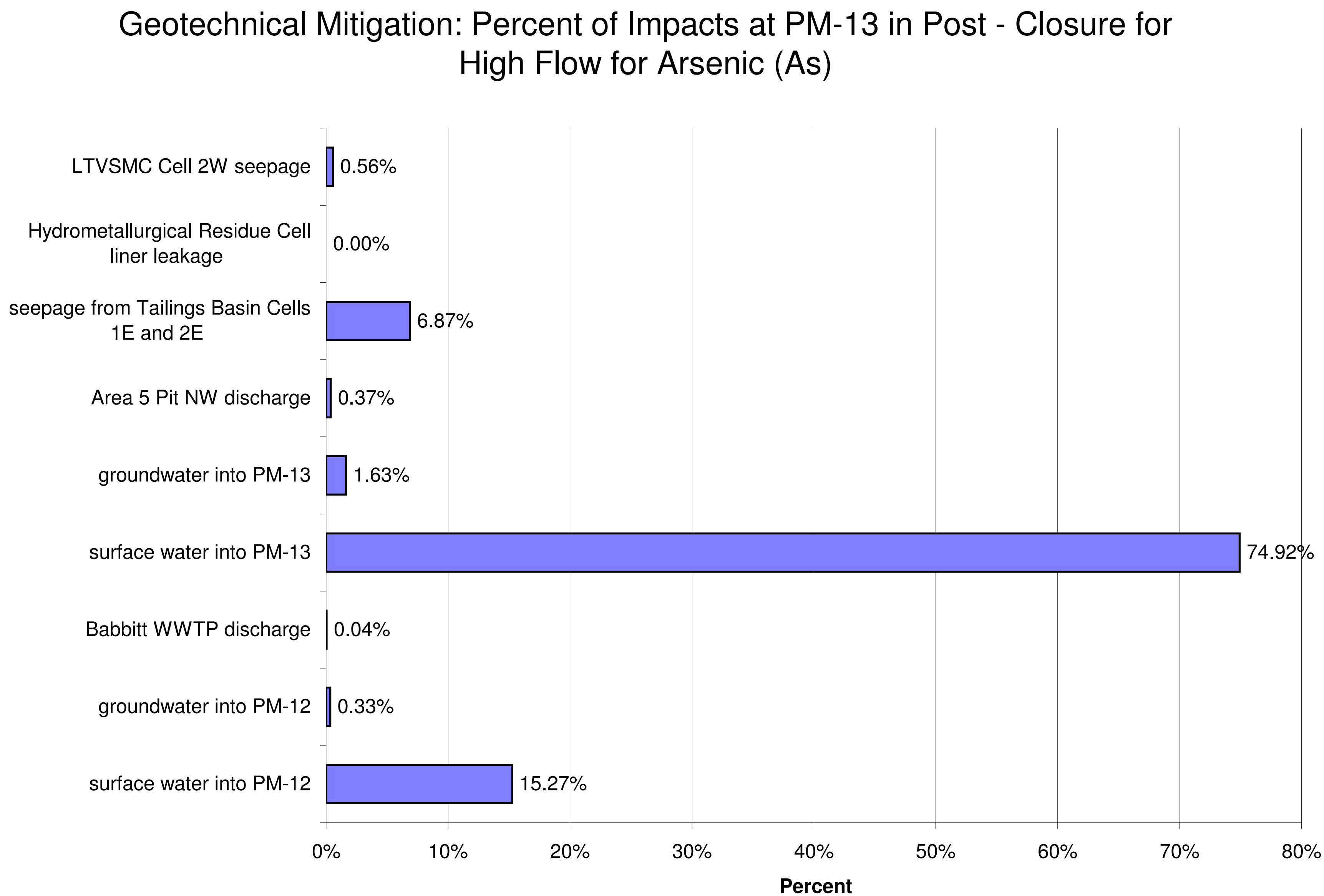

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,523.59
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
43,131.66
Area 5 Pit NW discharge
307.46
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Mass Flux (g/year)

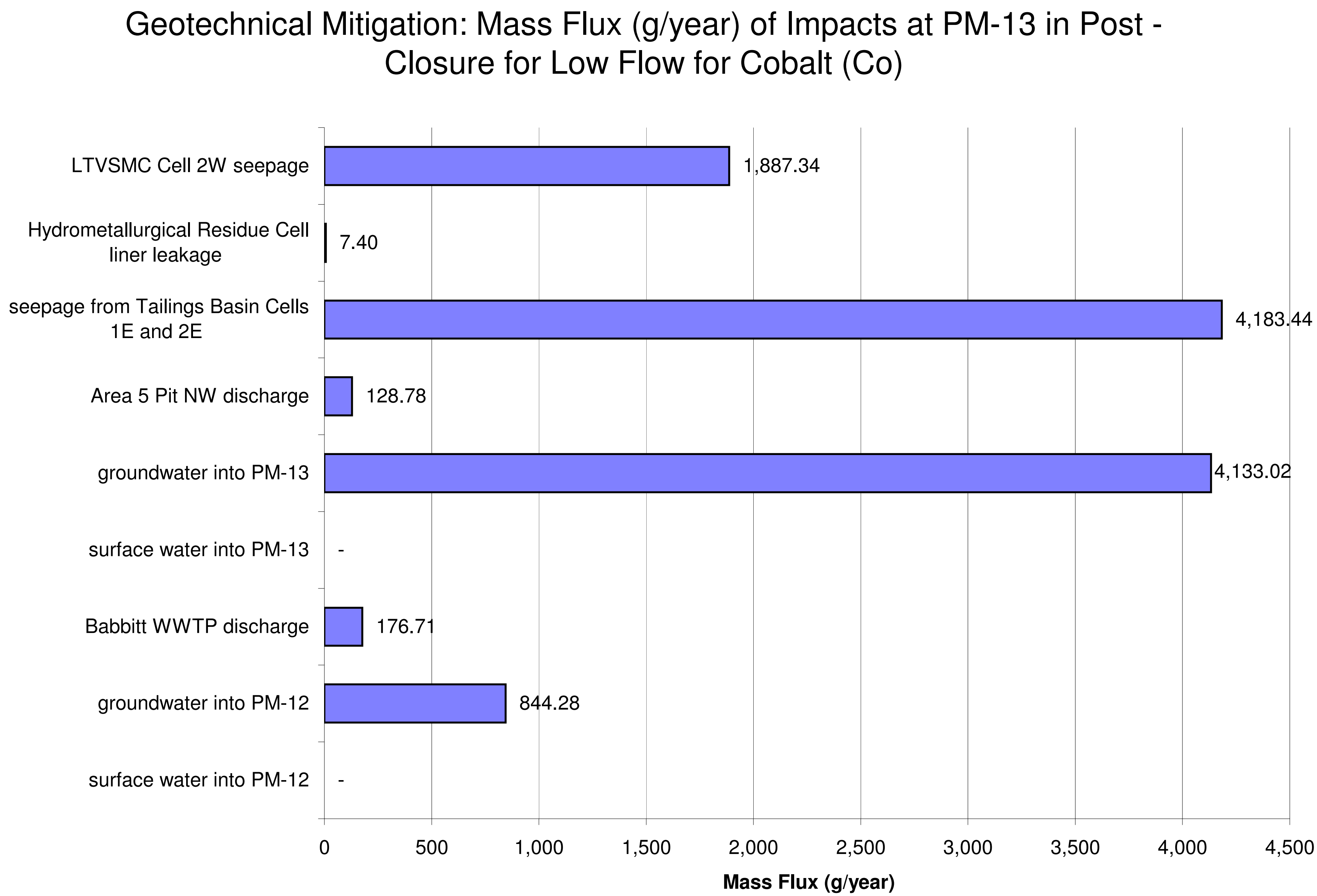

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5.92%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
72.44%
Area 5 Pit NW discharge
0.52%
groundwater into PM-13
17.23%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.37%
groundwater into PM-12
3.52%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,523.59
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
43,131.66
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
41,185.20
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
8,440.52
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Mass Flux (g/year)

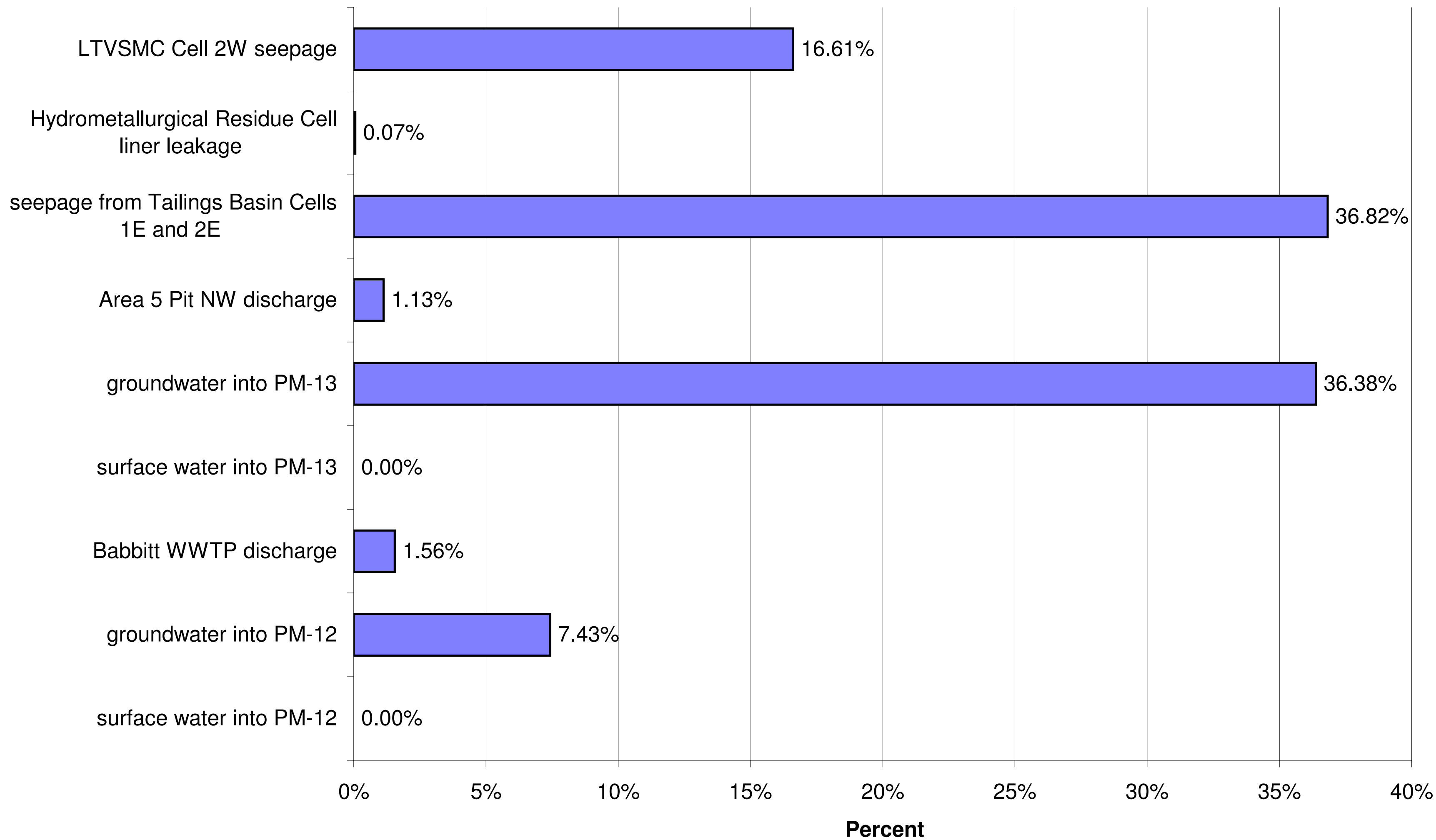

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.17%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
38.78%
Area 5 Pit NW discharge
2.12%
groundwater into PM-13
9.22%
surface water into PM-13
37.03%
Babbitt WWTP discharge
0.20%
groundwater into PM-12
1.88%
surface water into PM-12
7.59%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

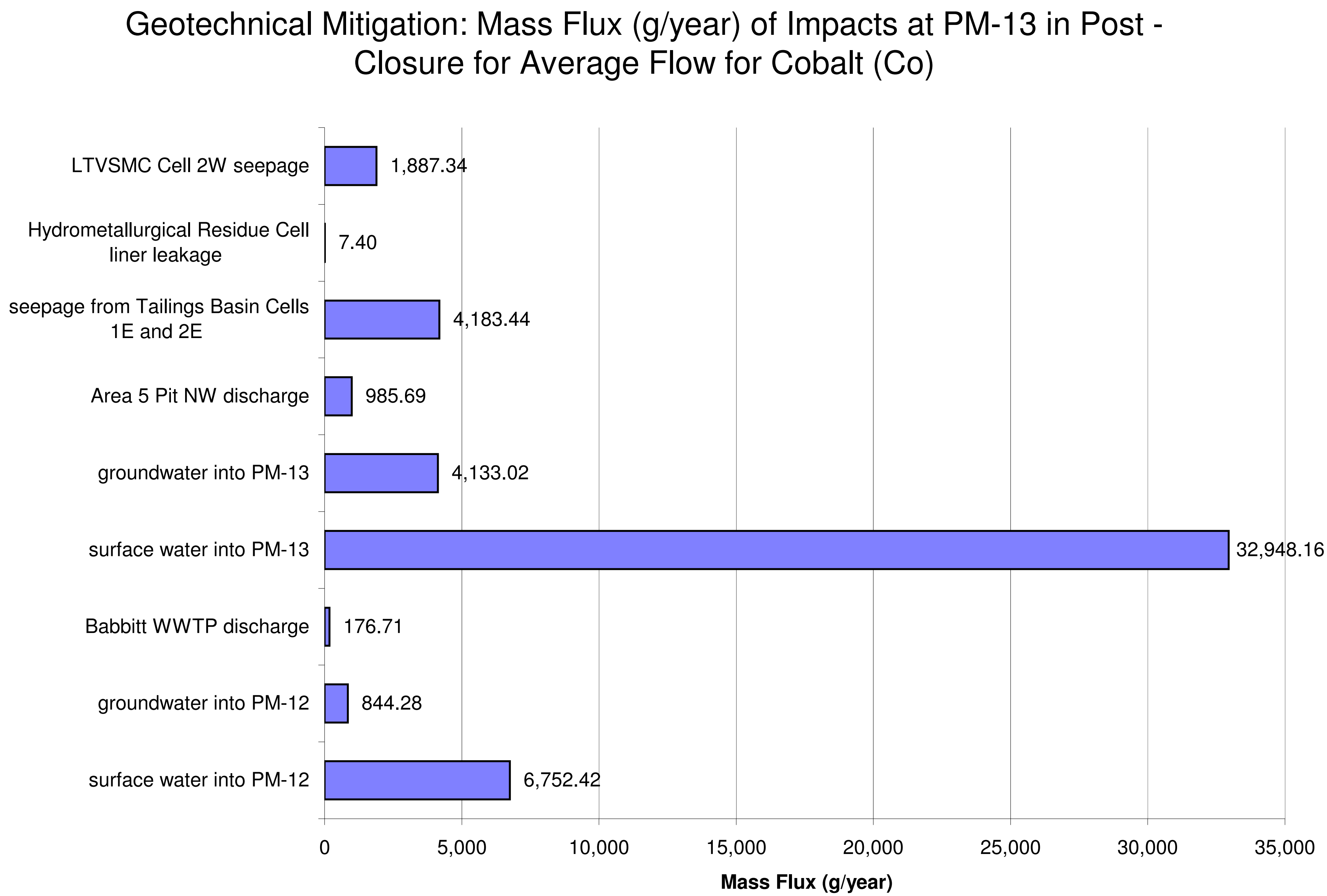

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,523.59
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
43,131.66
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface water into PM-13
470,239.58
Babbitt WWTP discharge
220.89
groundwater into PM-12
2,095.34
surface water into PM-12
95,824.38
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.56%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
6.87%
Area 5 Pit NW discharge
0.37%
groundwater into PM-13
1.63%
surface water into PM-13
74.92%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.33%
surface water into PM-12
15.27%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

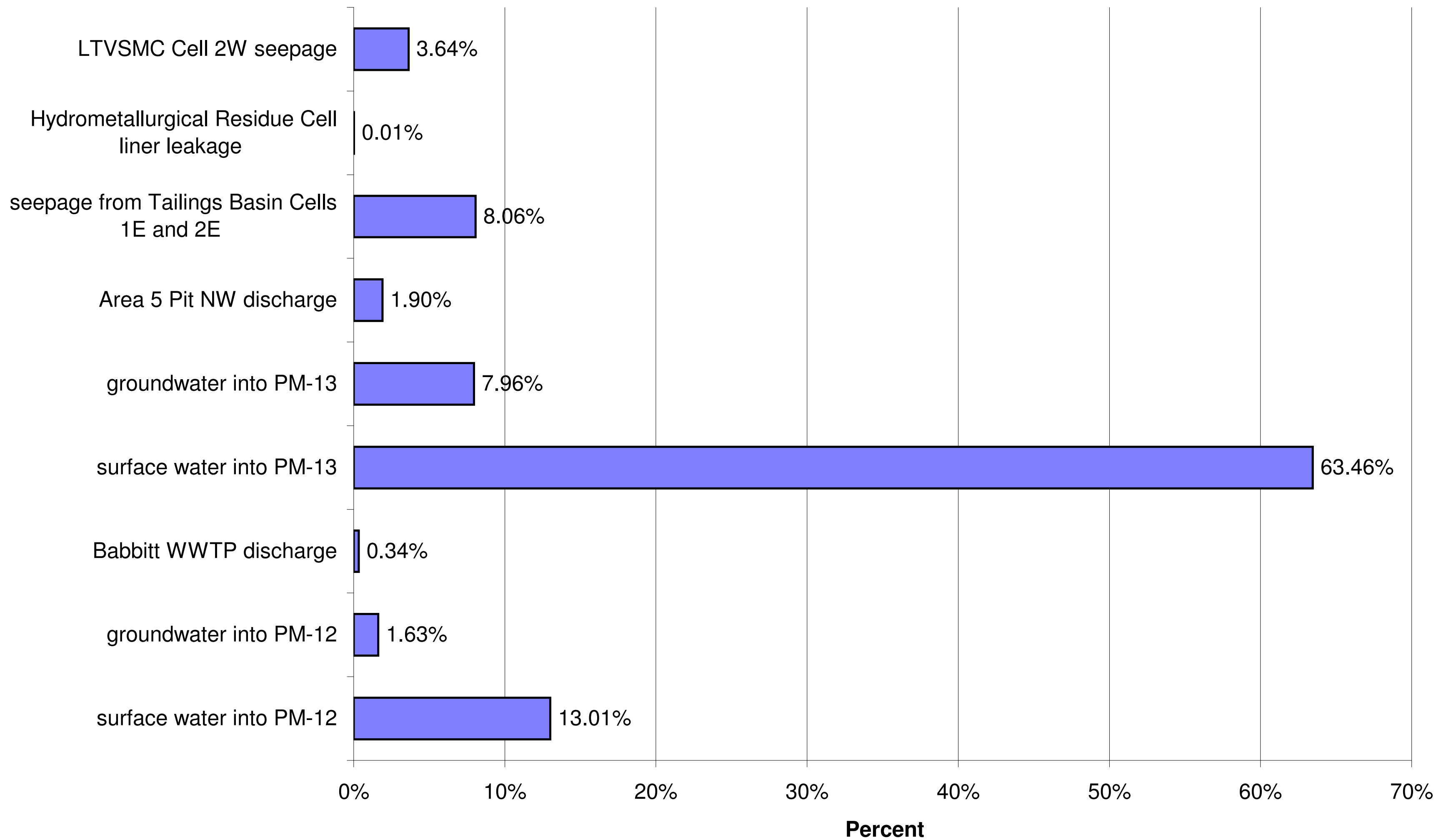

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,887.34
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin Cells 1E and 2E
4,183.44
Area 5 Pit NW discharge
128.78
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
-
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
Mass Flux (g/year)

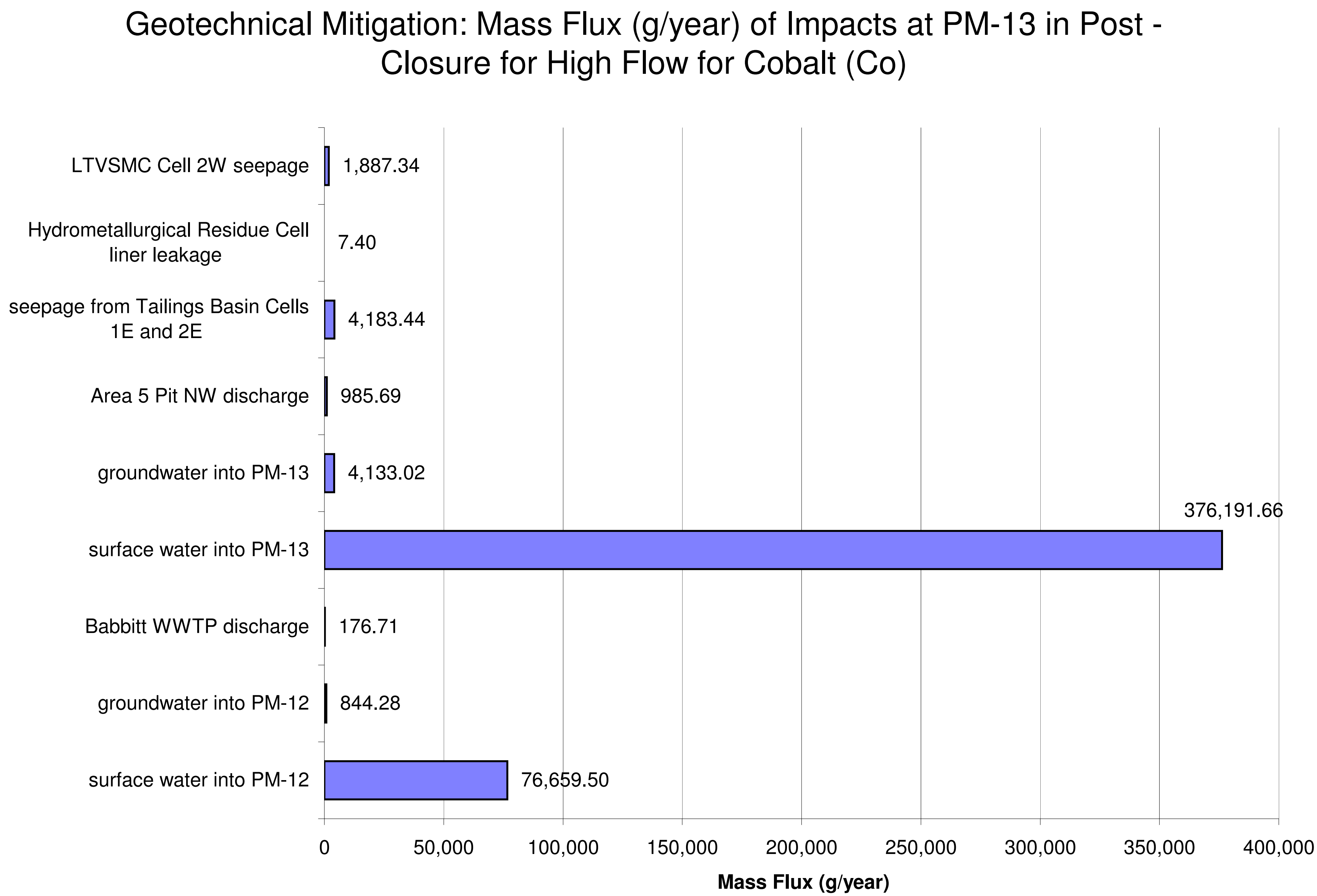
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)

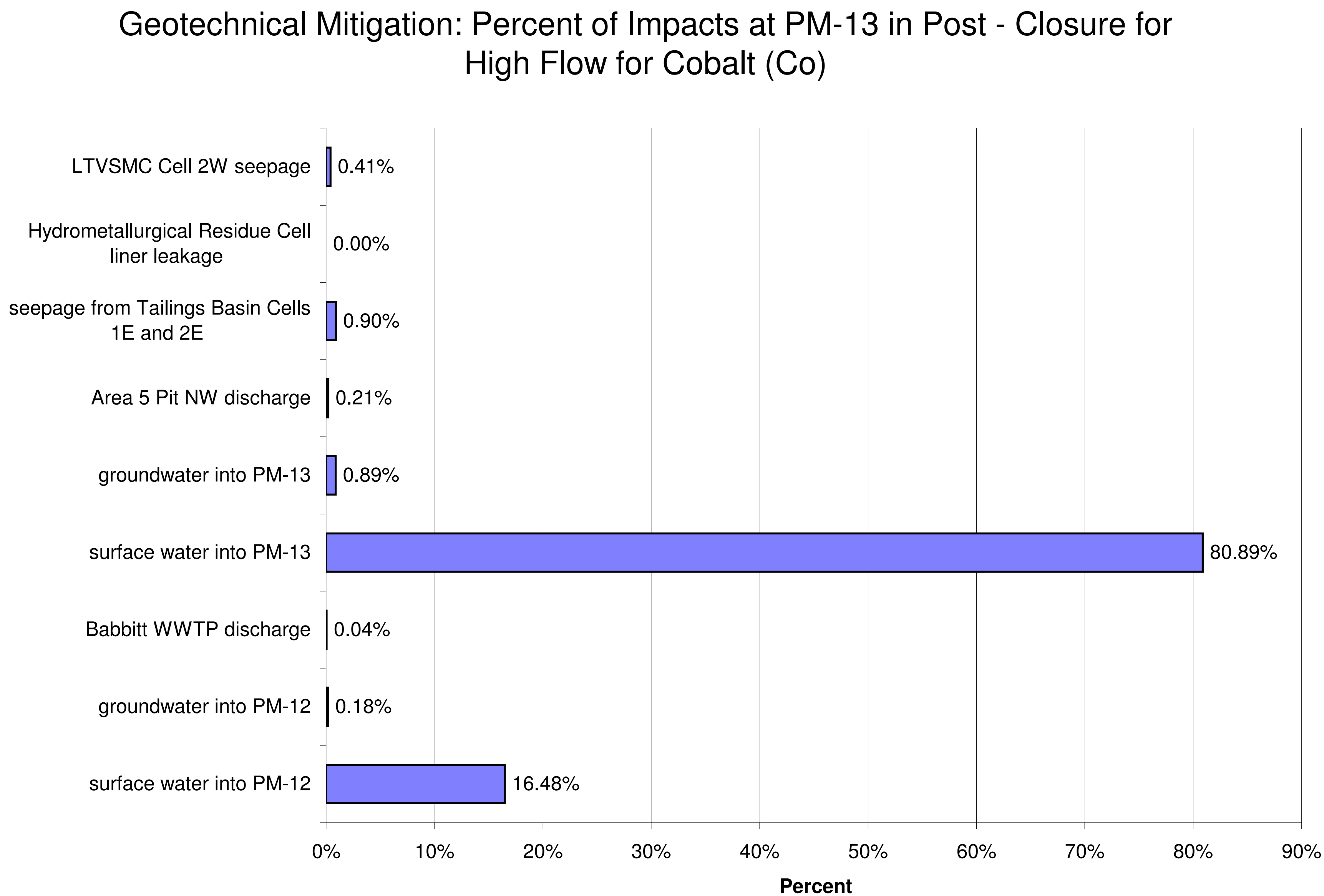


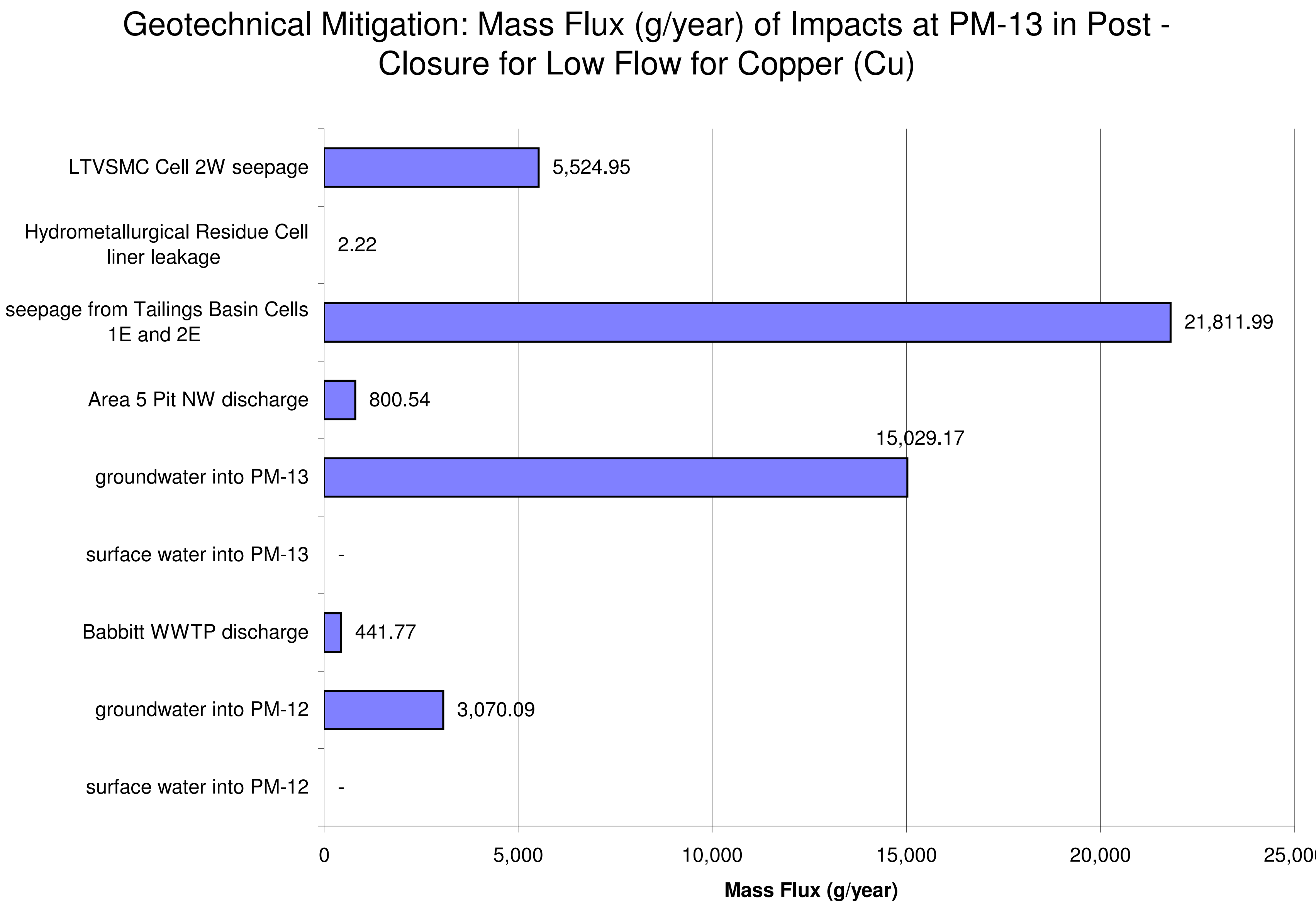

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,887.34
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin Cells 1E and 2E
4,183.44
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
32,948.16
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
6,752.42
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)

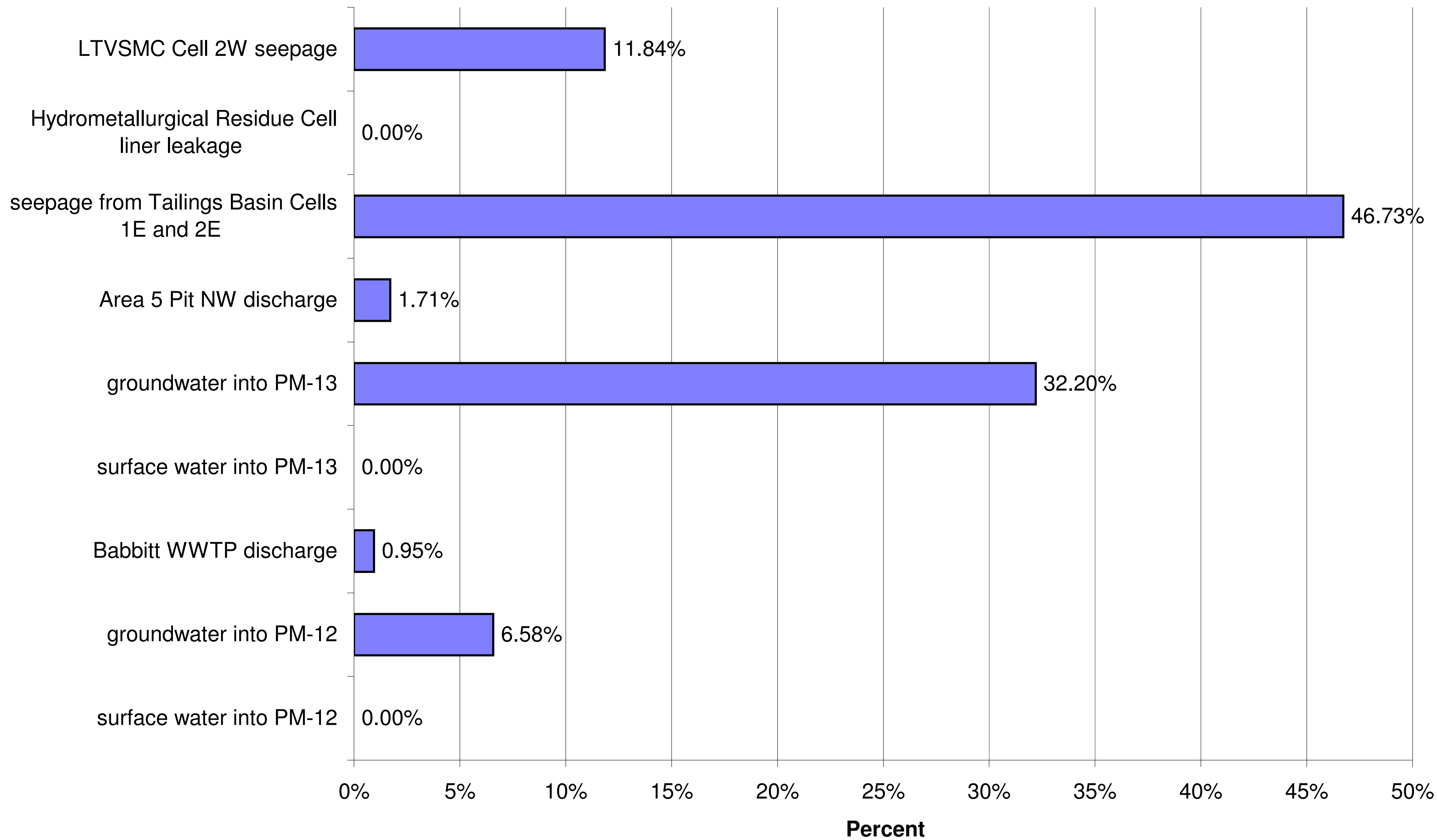



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,887.34
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin Cells 1E and 2E
4,183.44
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
376,191.66
Babbitt WWTP discharge
176.71
groundwater into PM-12
844.28
surface water into PM-12
76,659.50
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Mass Flux (g/year)

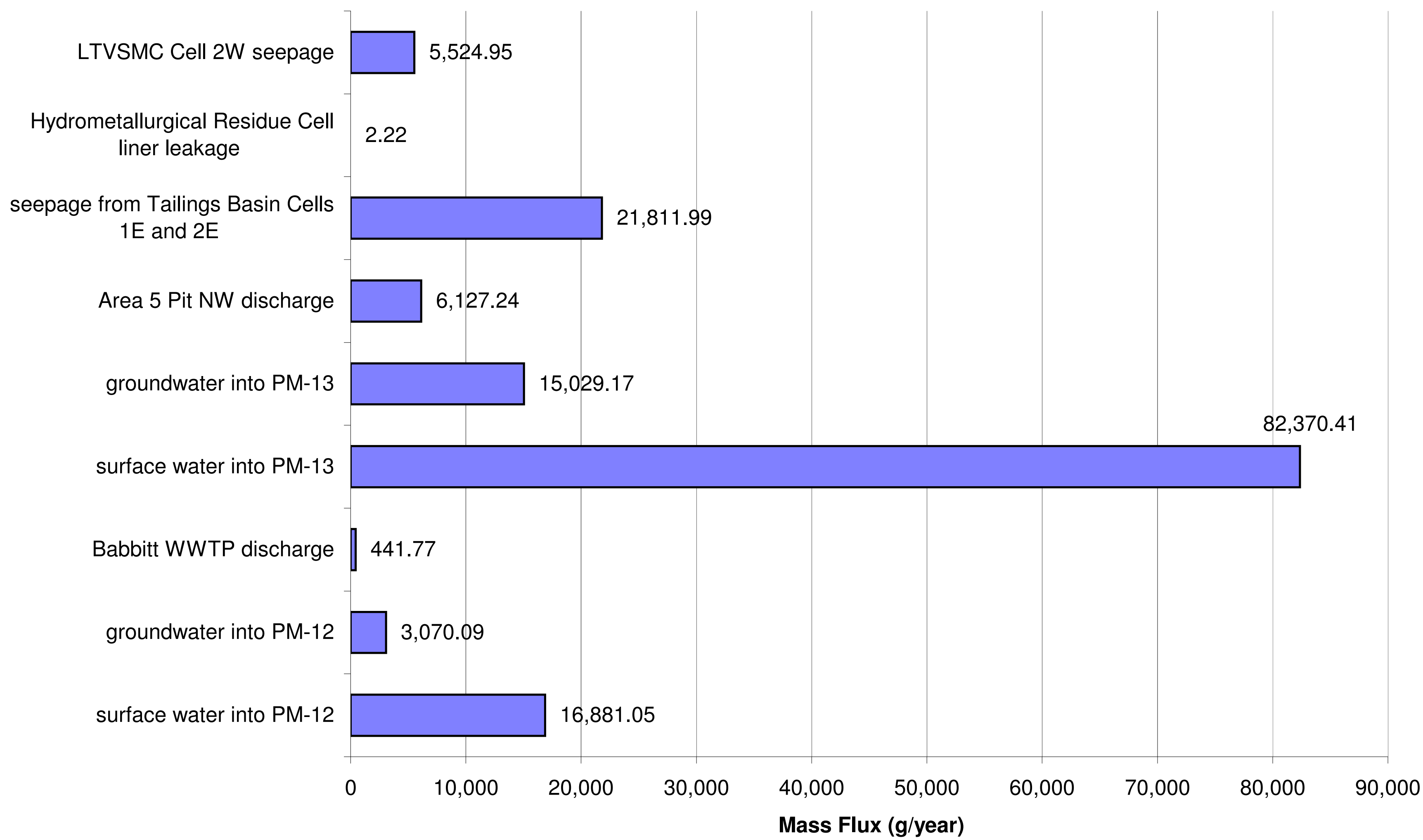

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
0.41%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
0.90%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.89%
surface water into PM-13
80.89%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.48%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,524.95
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin Cells 1E and 2E
21,811.99
Area 5 Pit NW discharge
800.54
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
-
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

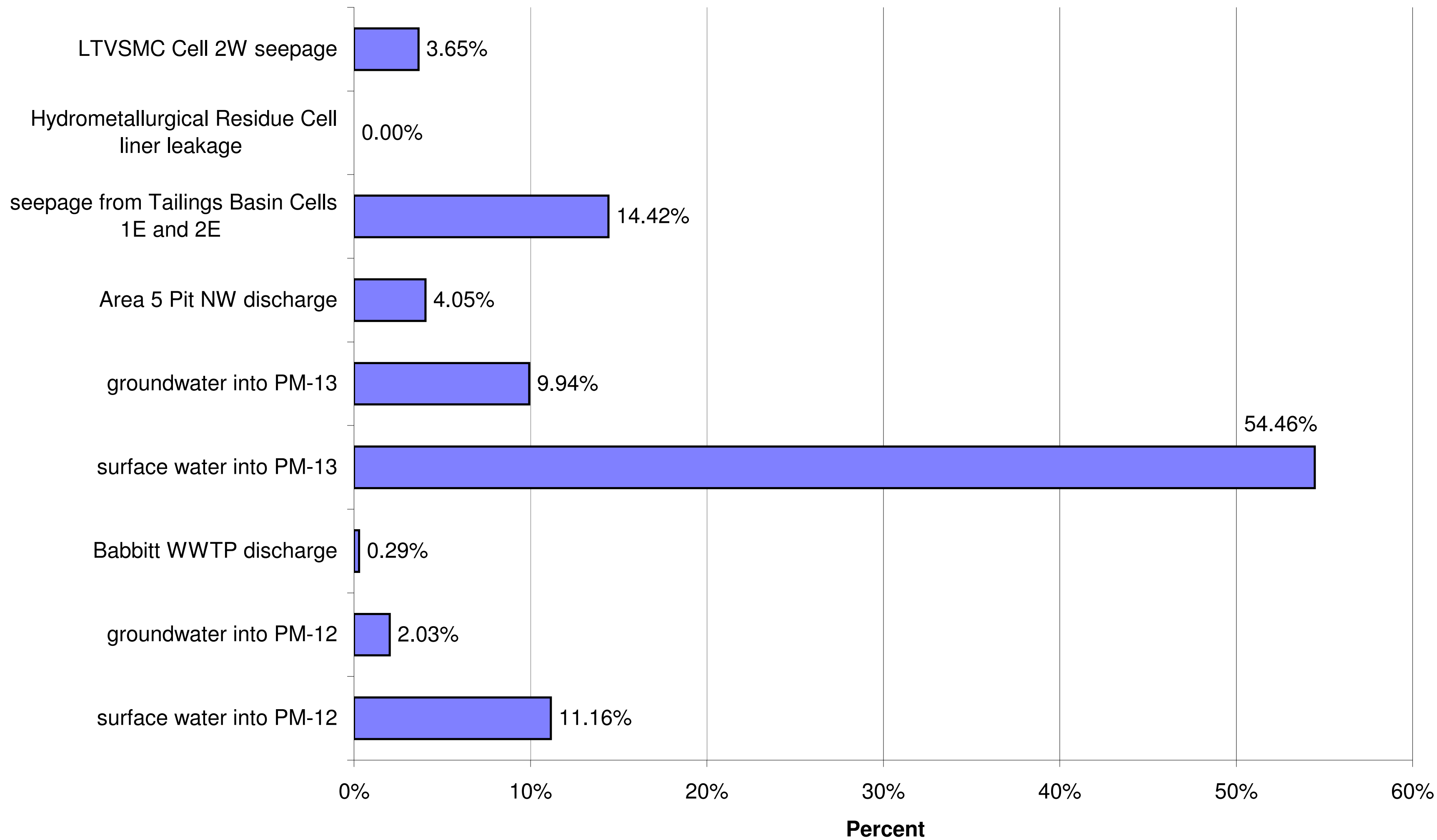
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)

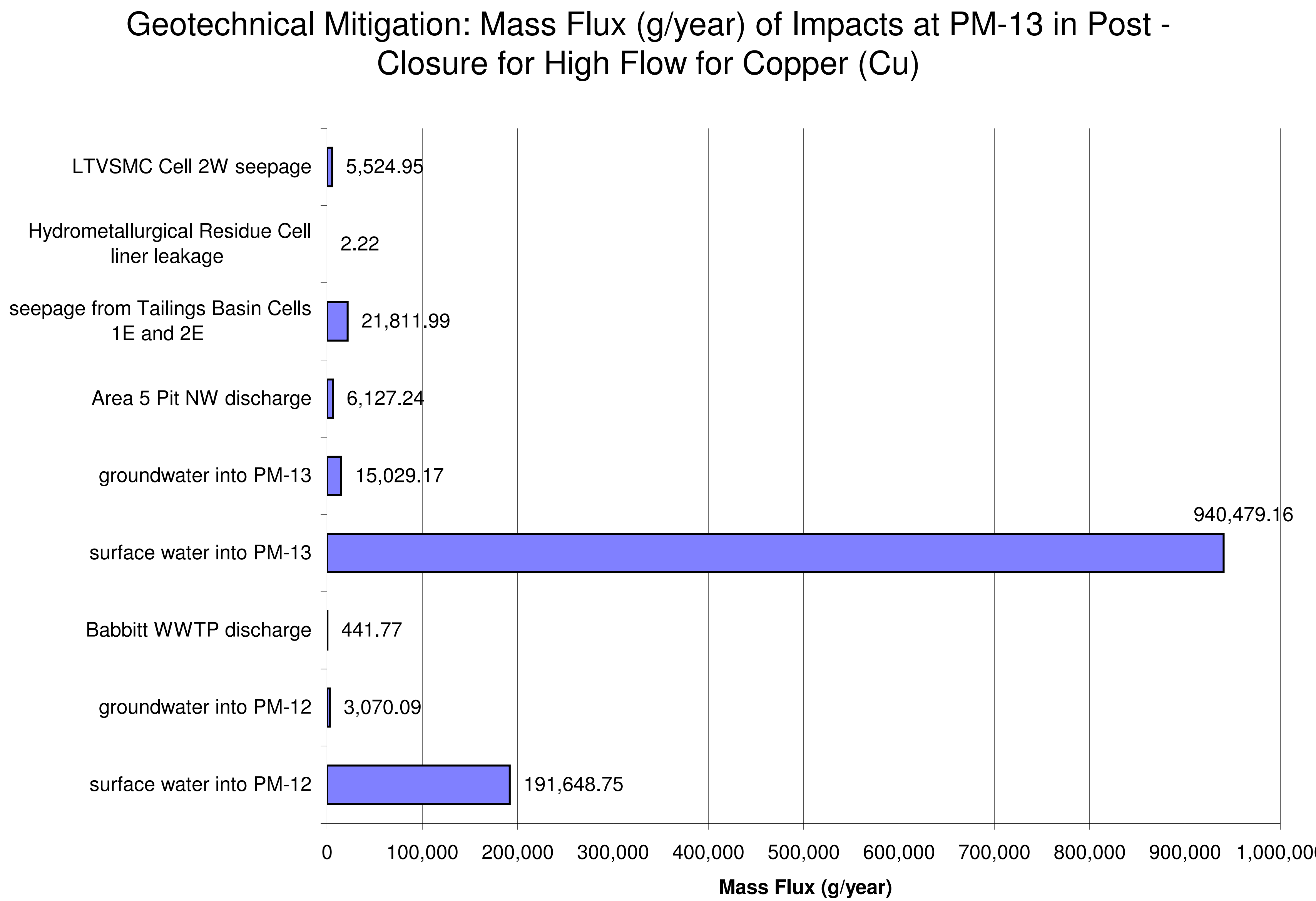


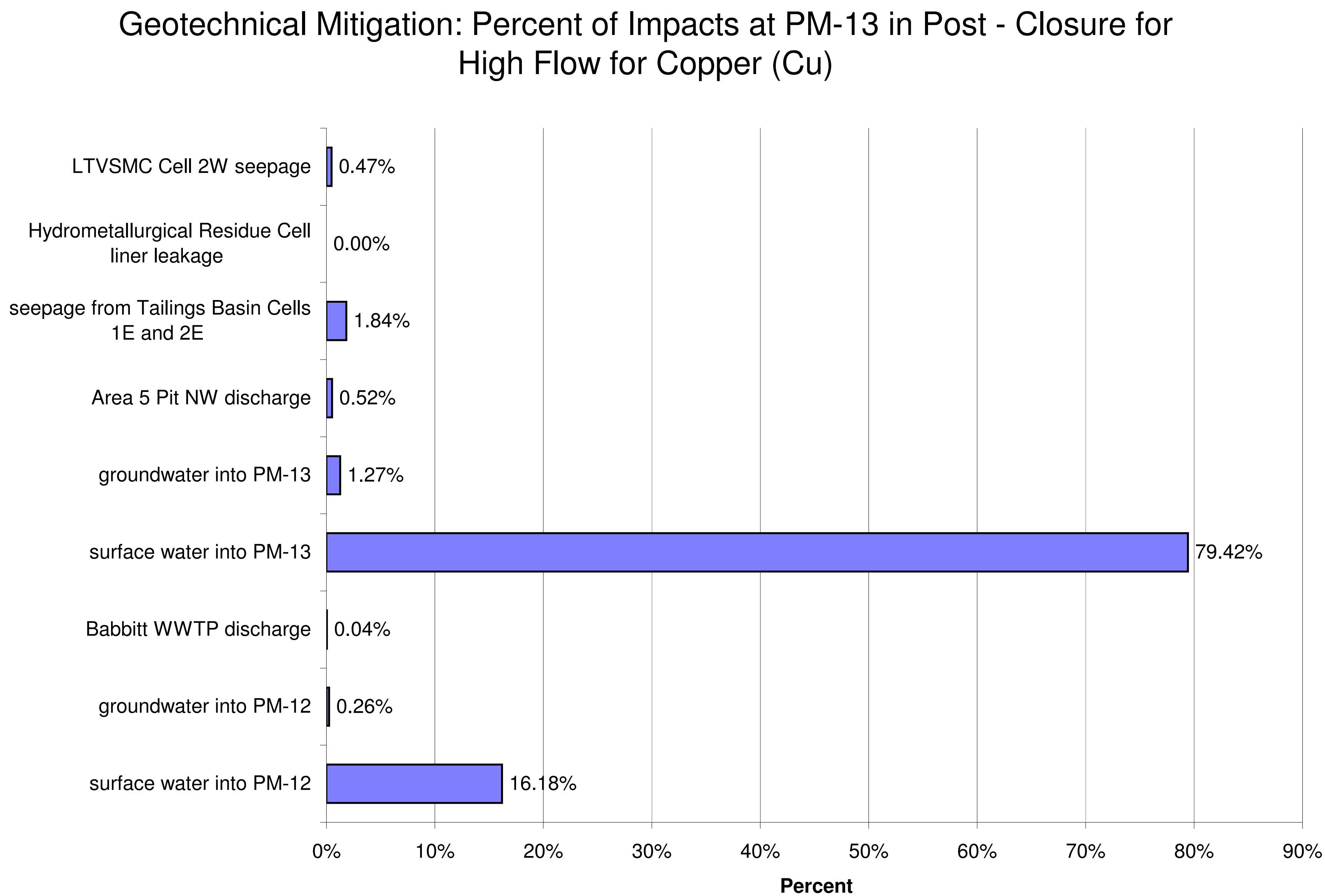
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)



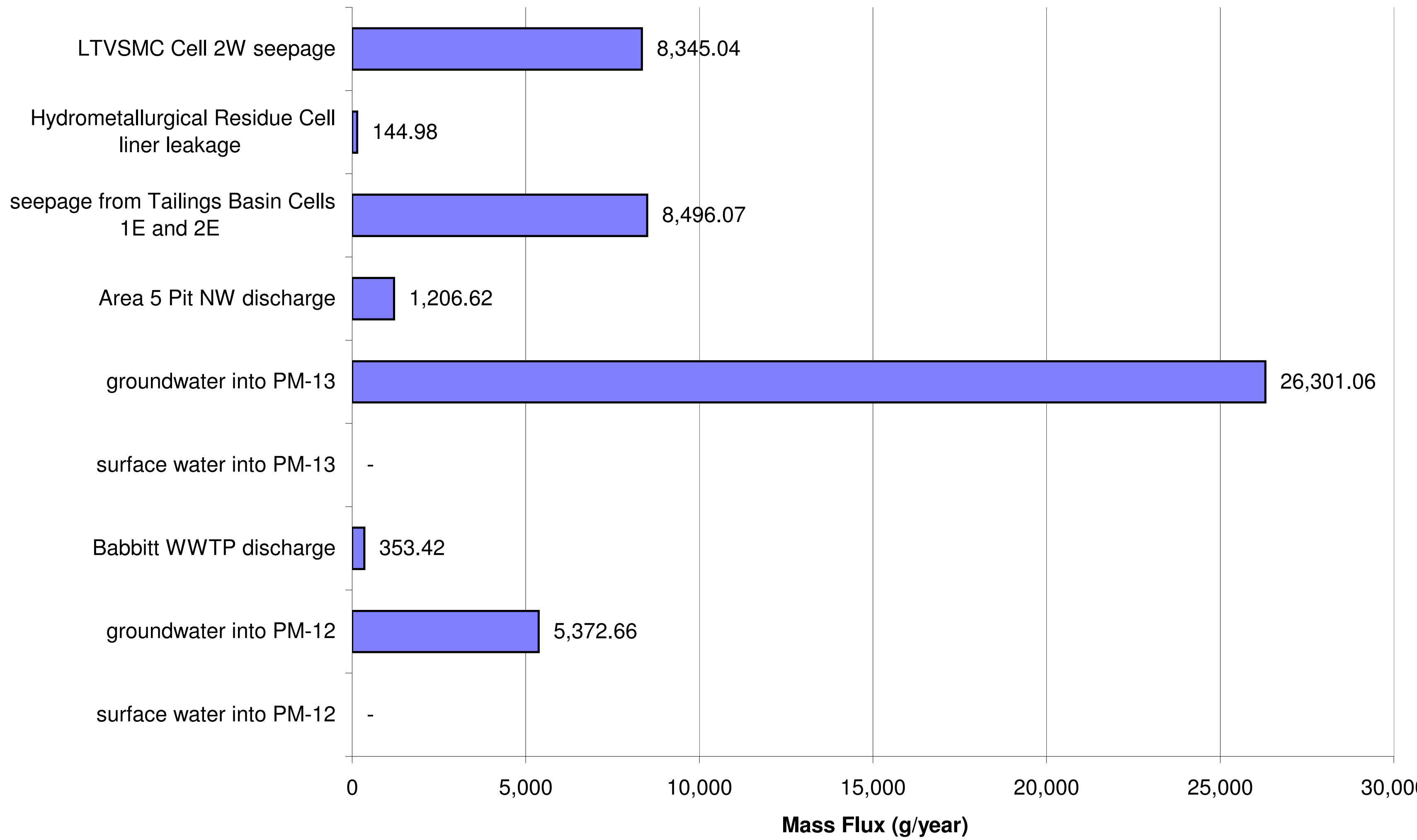
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)

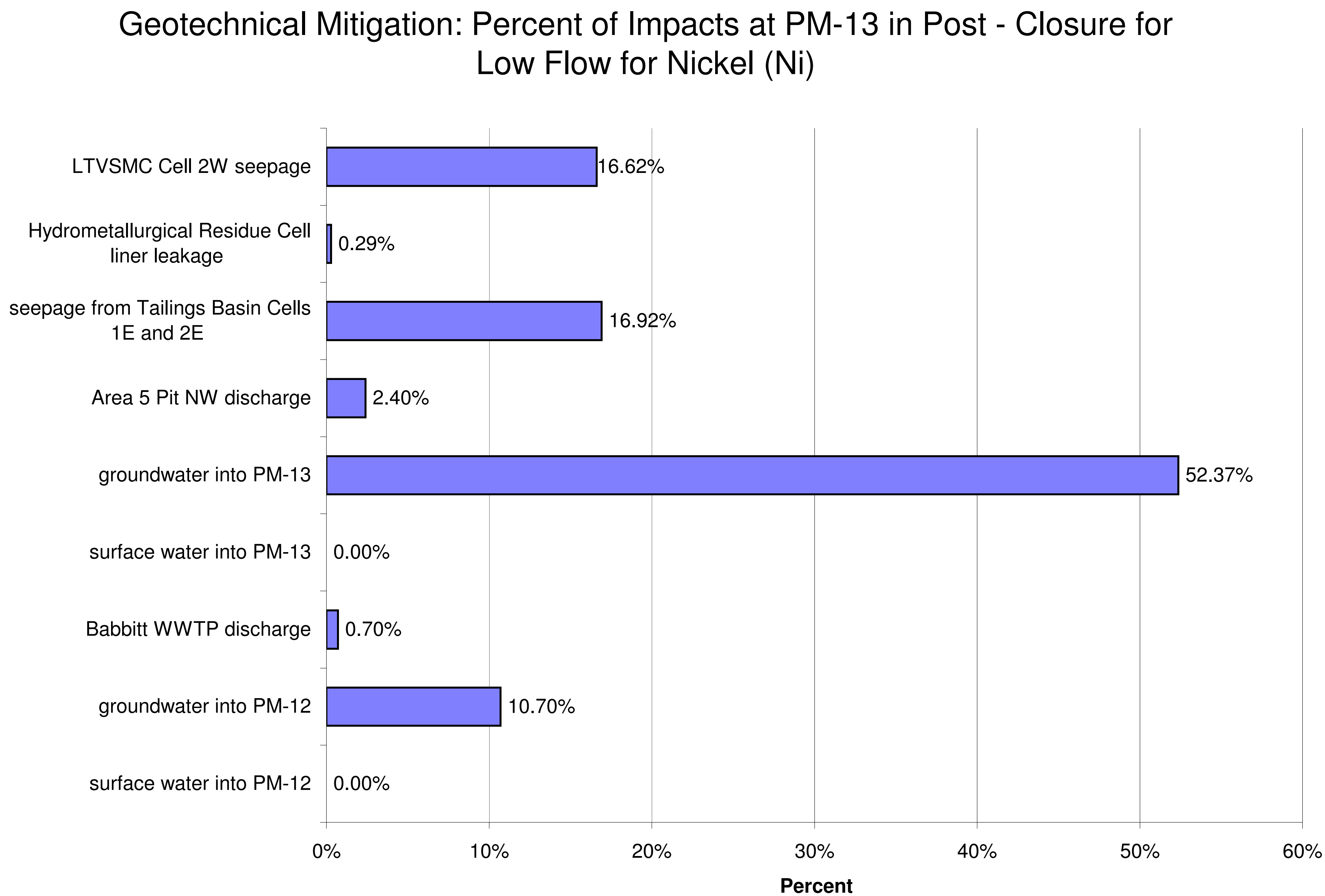


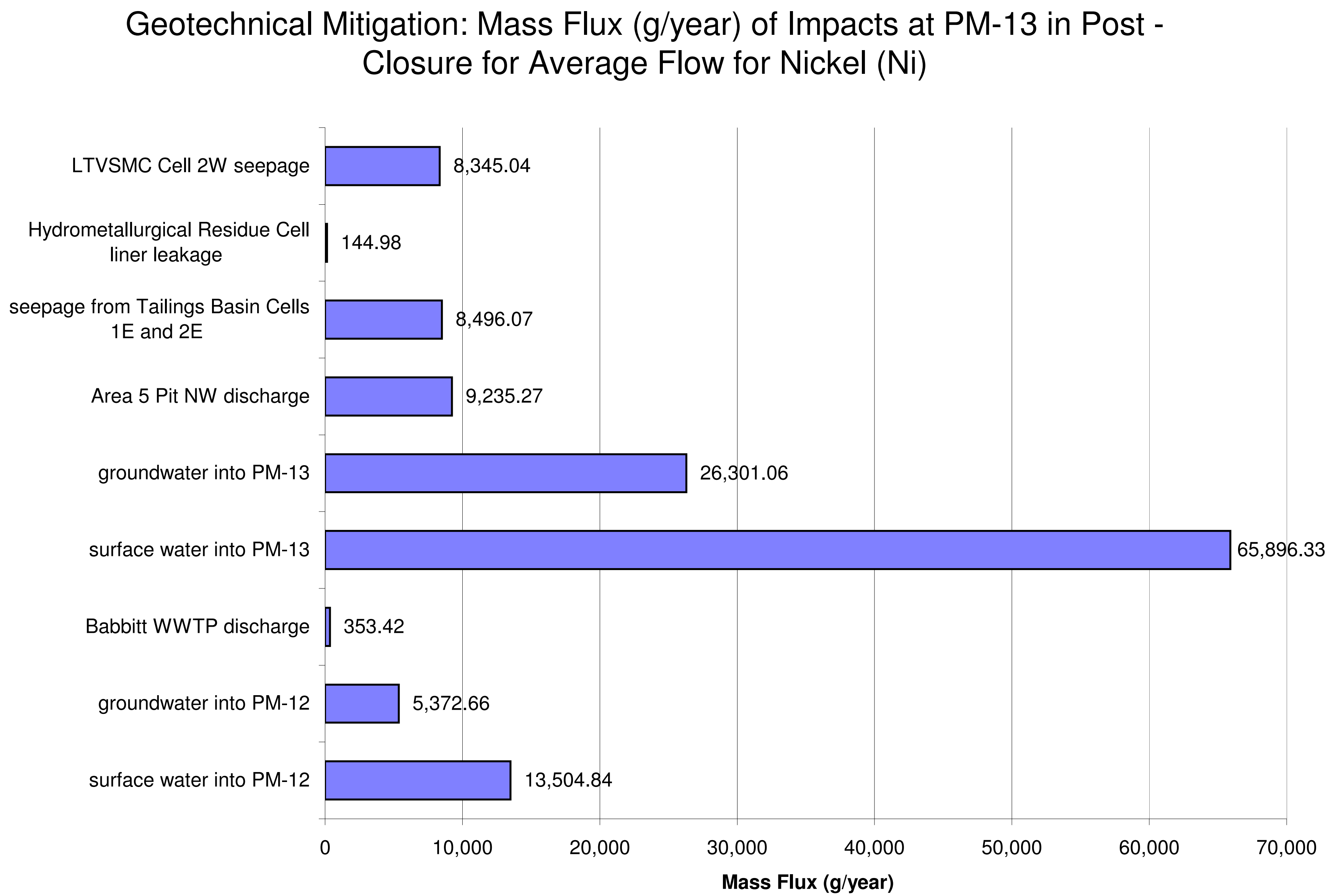

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,524.95
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin Cells 1E and 2E
21,811.99
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
surface water into PM-13
940,479.16
Babbitt WWTP discharge
441.77
groundwater into PM-12
3,070.09
surface water into PM-12
191,648.75
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.47%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
1.84%
Area 5 Pit NW discharge
0.52%
groundwater into PM-13
1.27%
surface water into PM-13
79.42%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.26%
surface water into PM-12
16.18%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

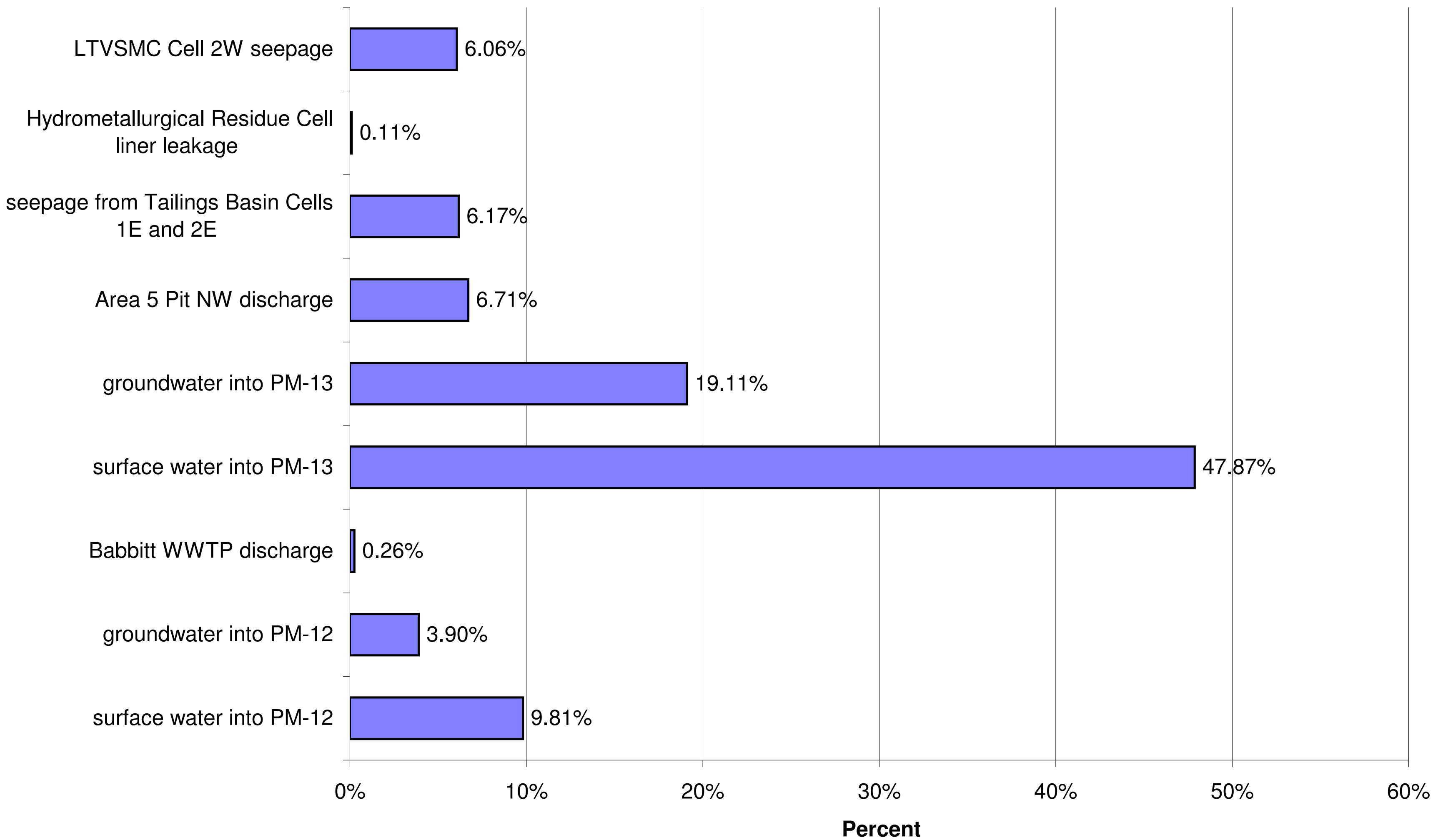
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)



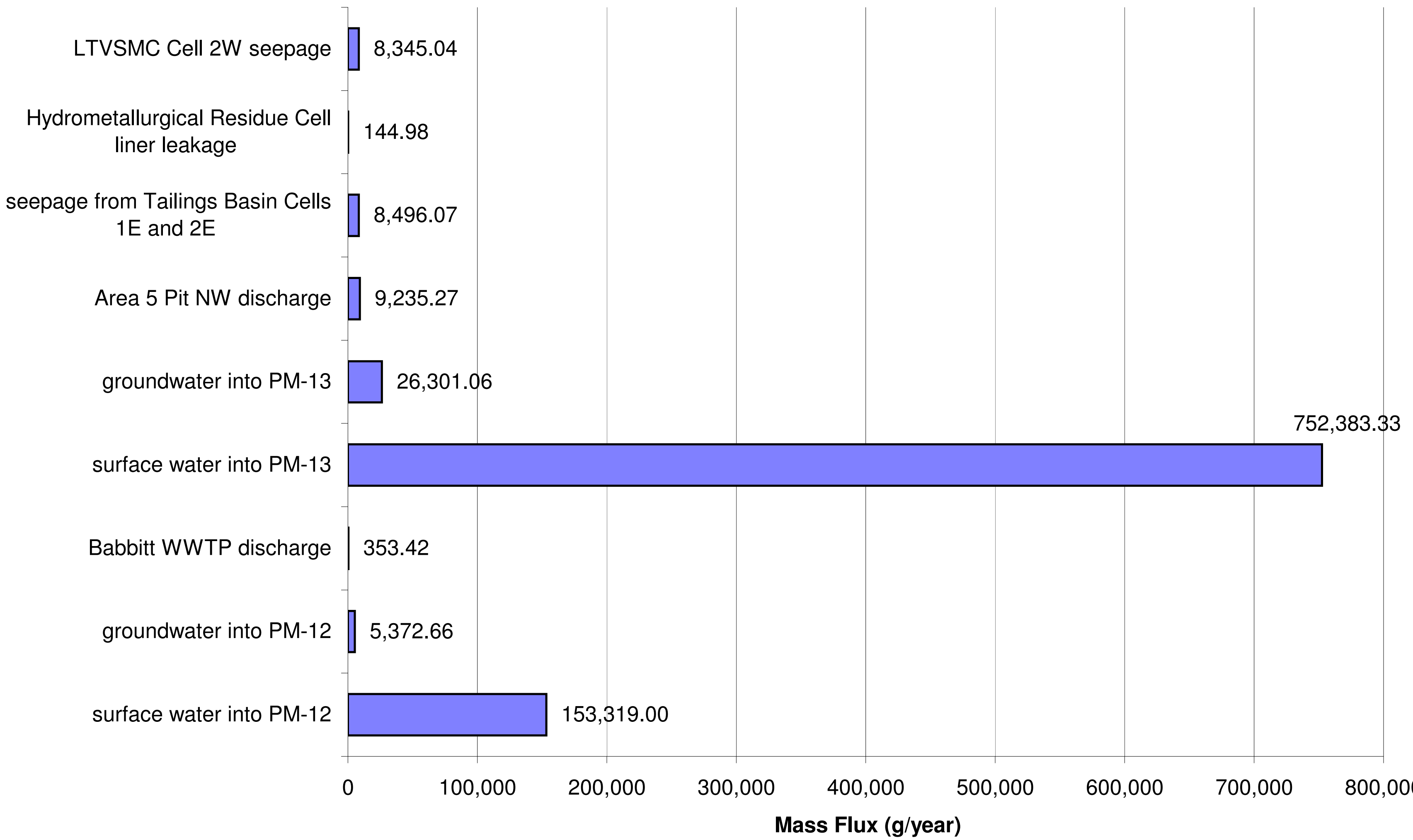

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
16.62%
Hydrometallurgical Residue Cell liner leakage
0.29%
seepage from Tailings Basin Cells 1E and 2E
16.92%
Area 5 Pit NW discharge
2.40%
groundwater into PM-13
52.37%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.70%
groundwater into PM-12
10.70%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
8,345.04
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwater into PM-12
5,372.66
surface water into PM-12
13,504.84
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

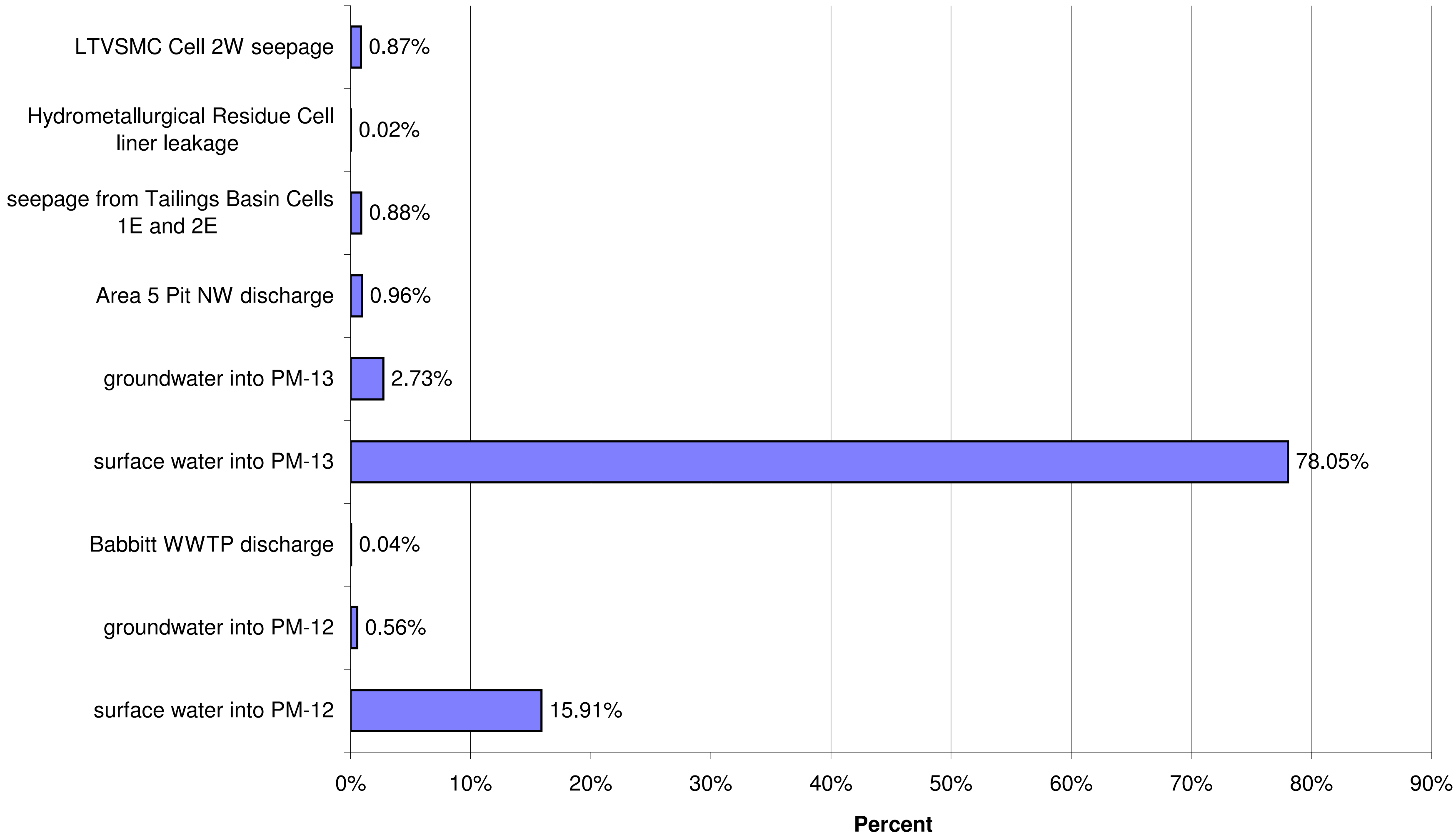
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)

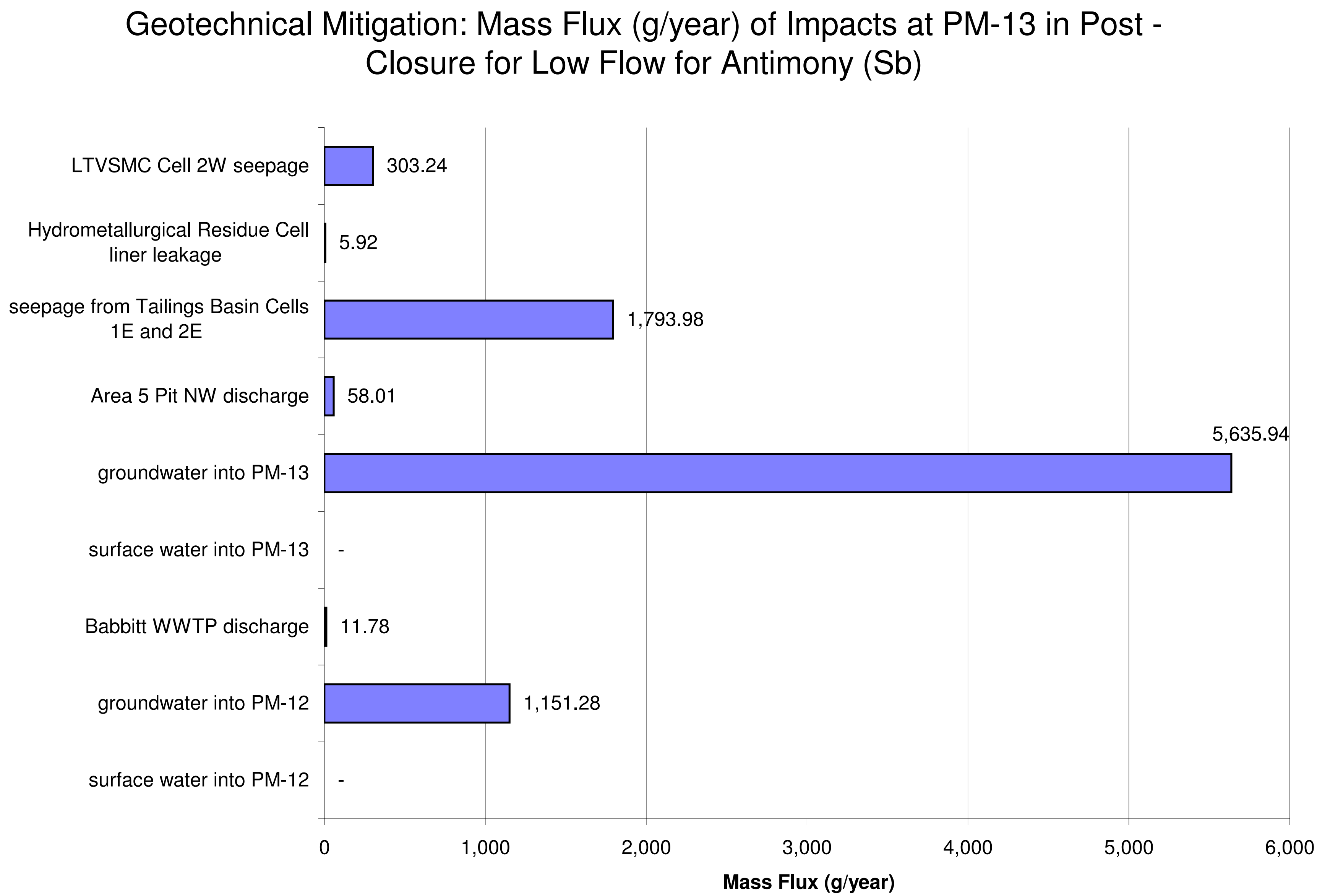


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)

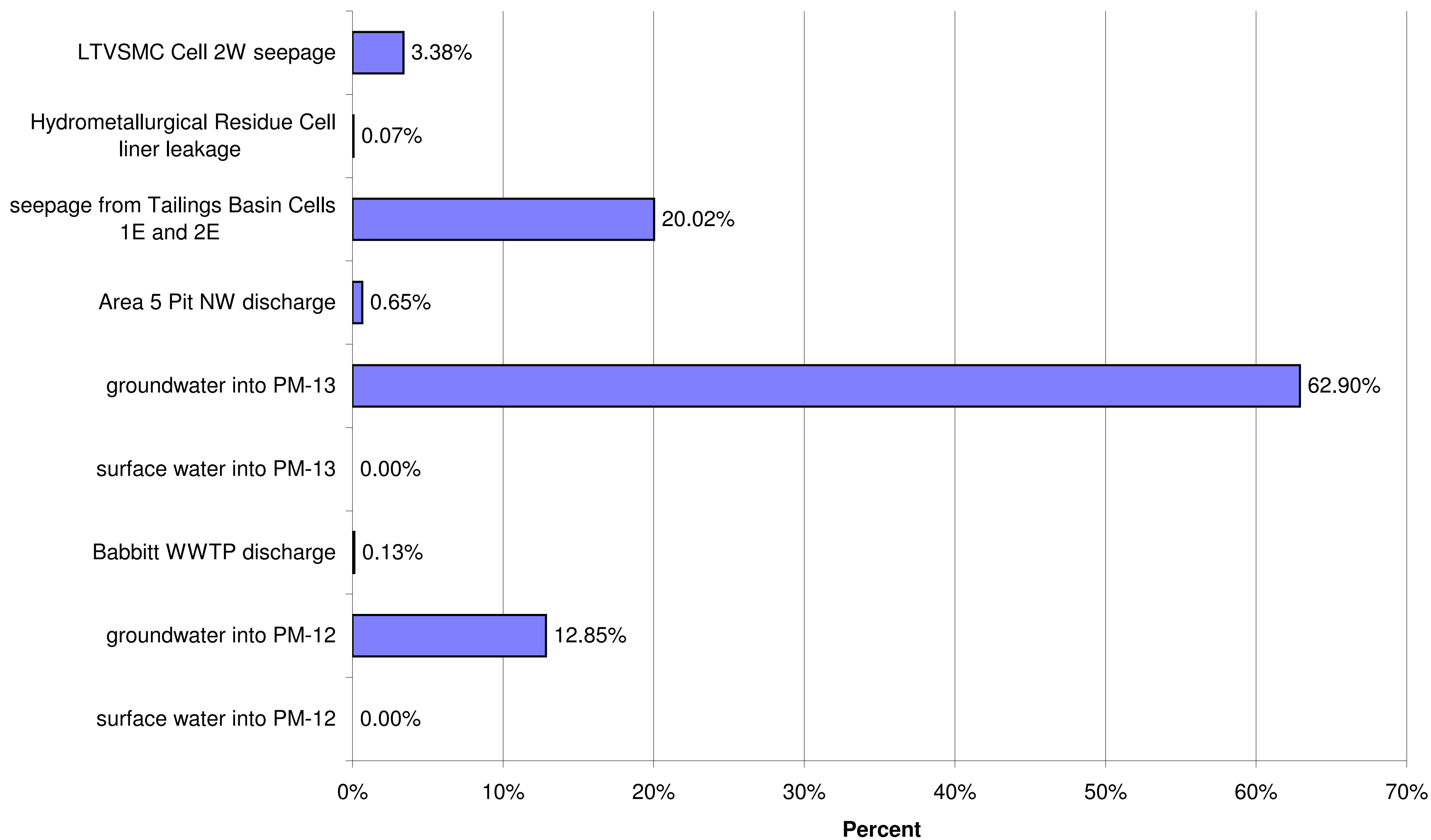


Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)

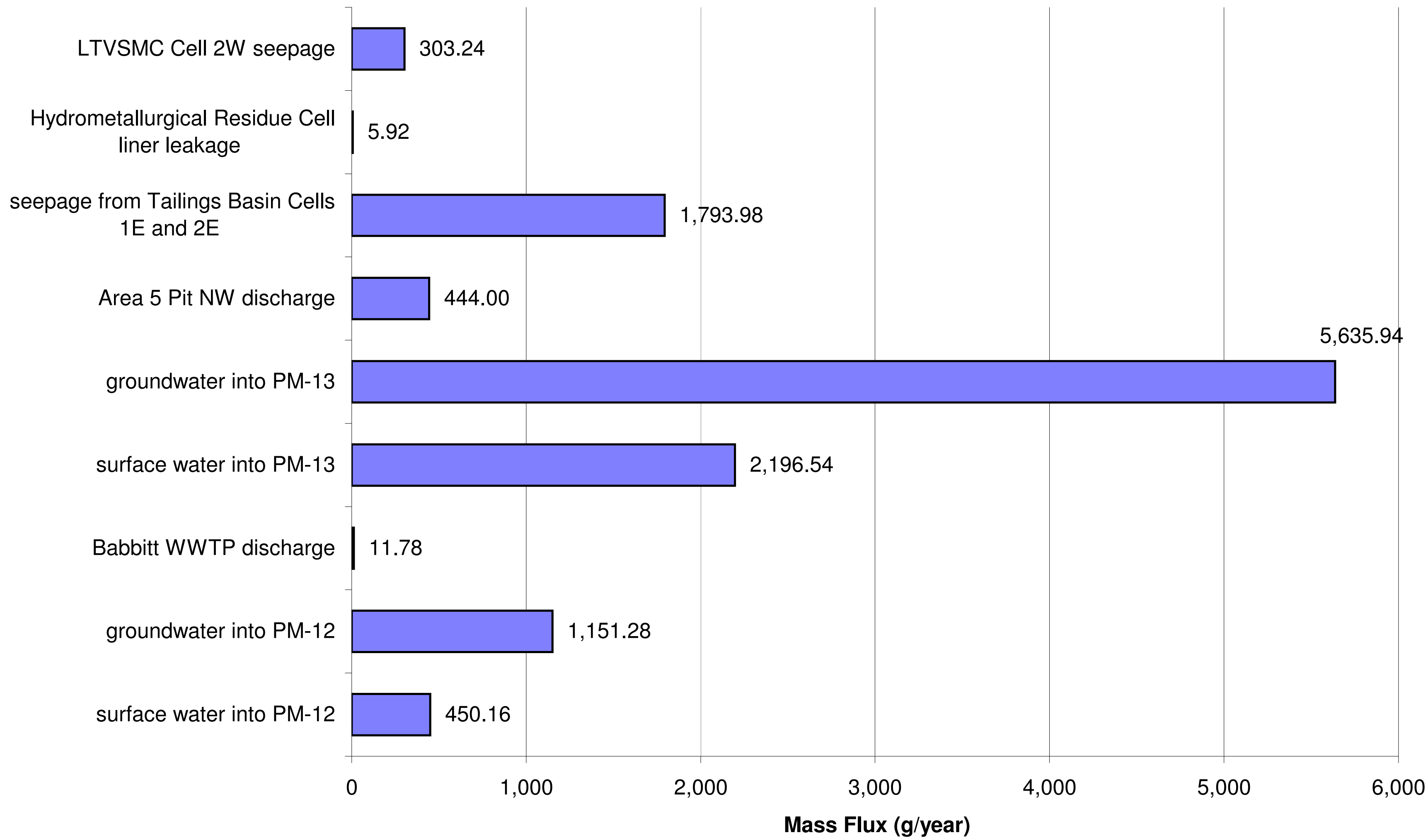


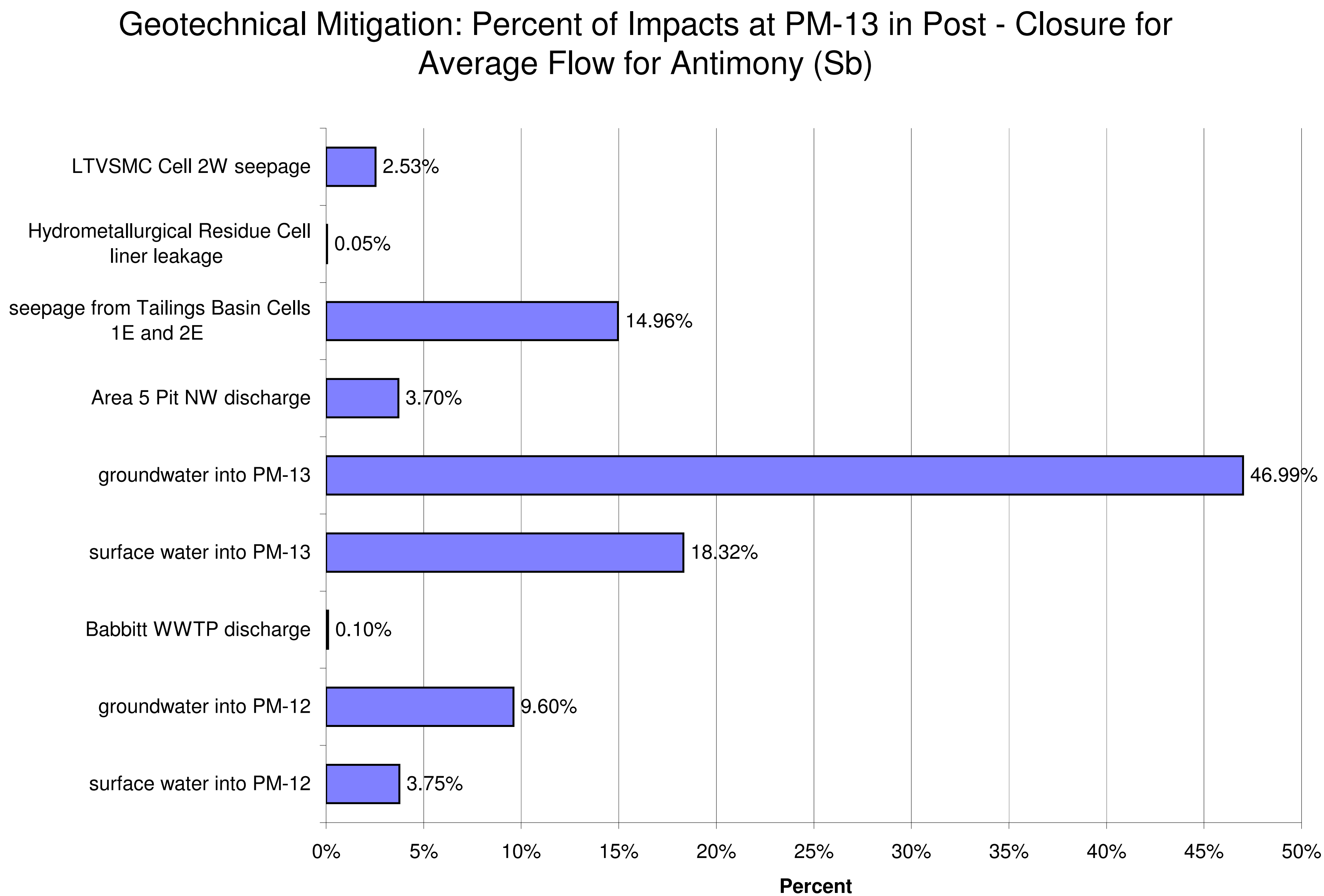

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
303.24
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
1,793.98
Area 5 Pit NW discharge
58.01
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
-
0
1,000
2,000
3,000
4,000
5,000
6,000
Mass Flux (g/year)

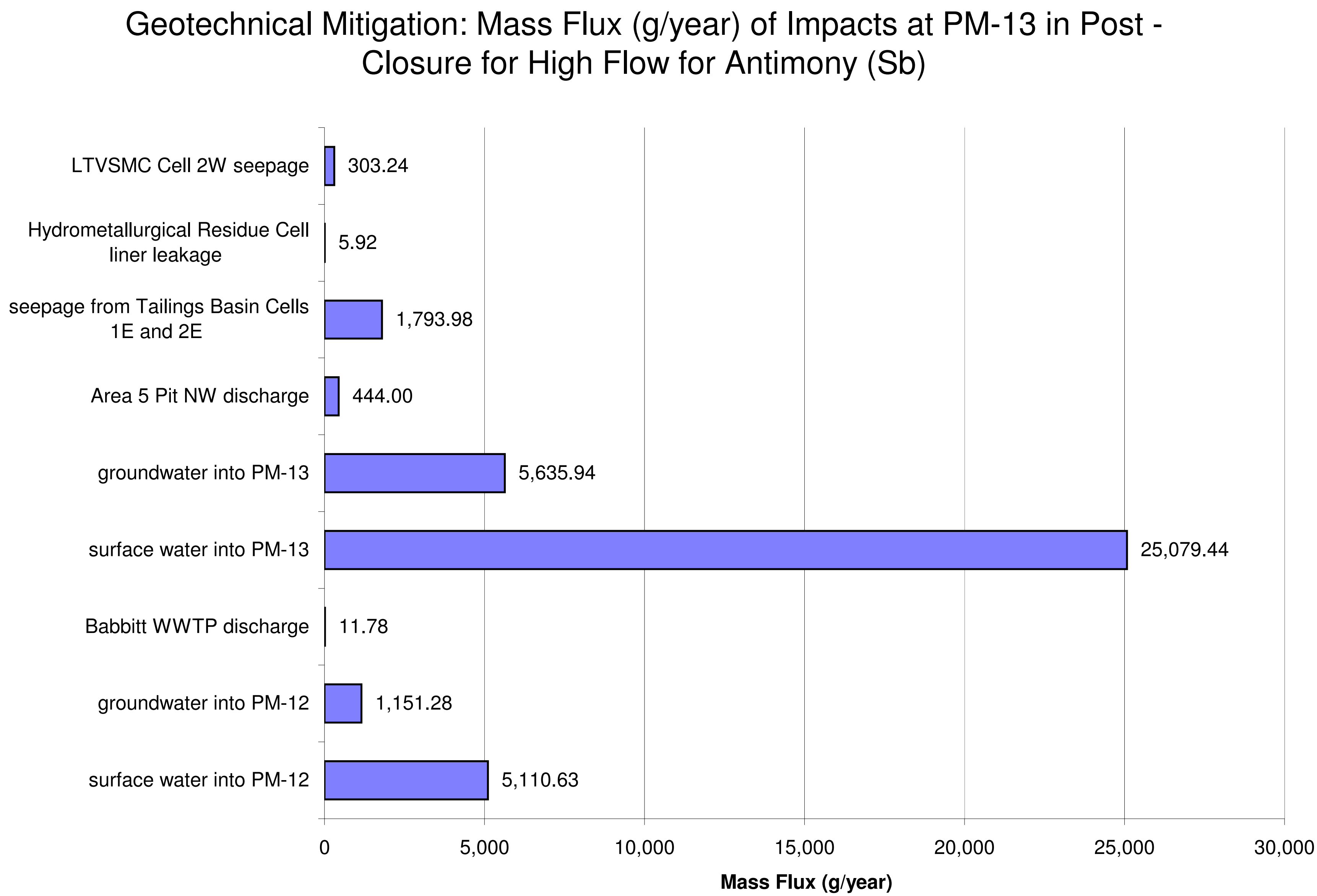
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)



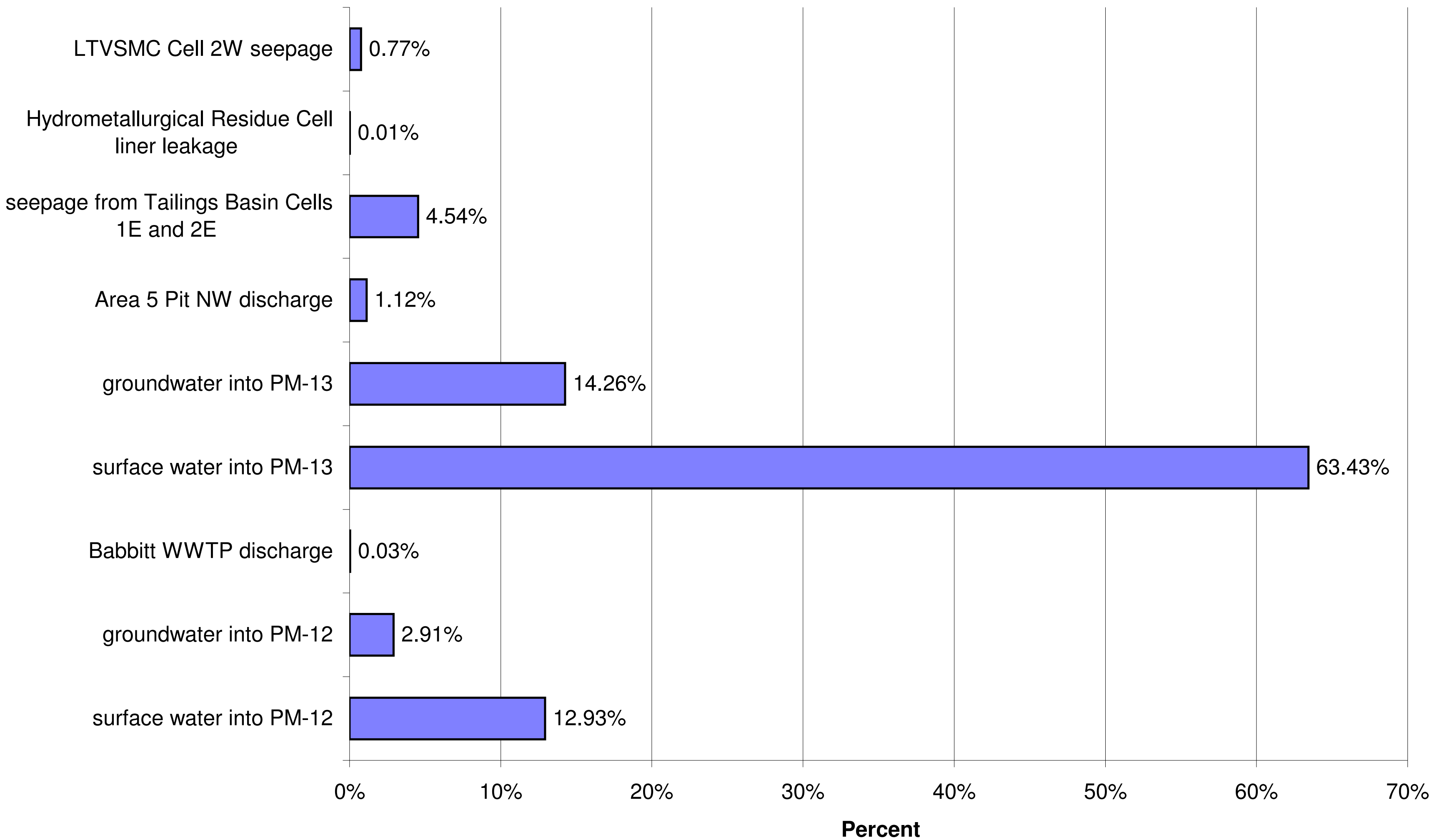
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)

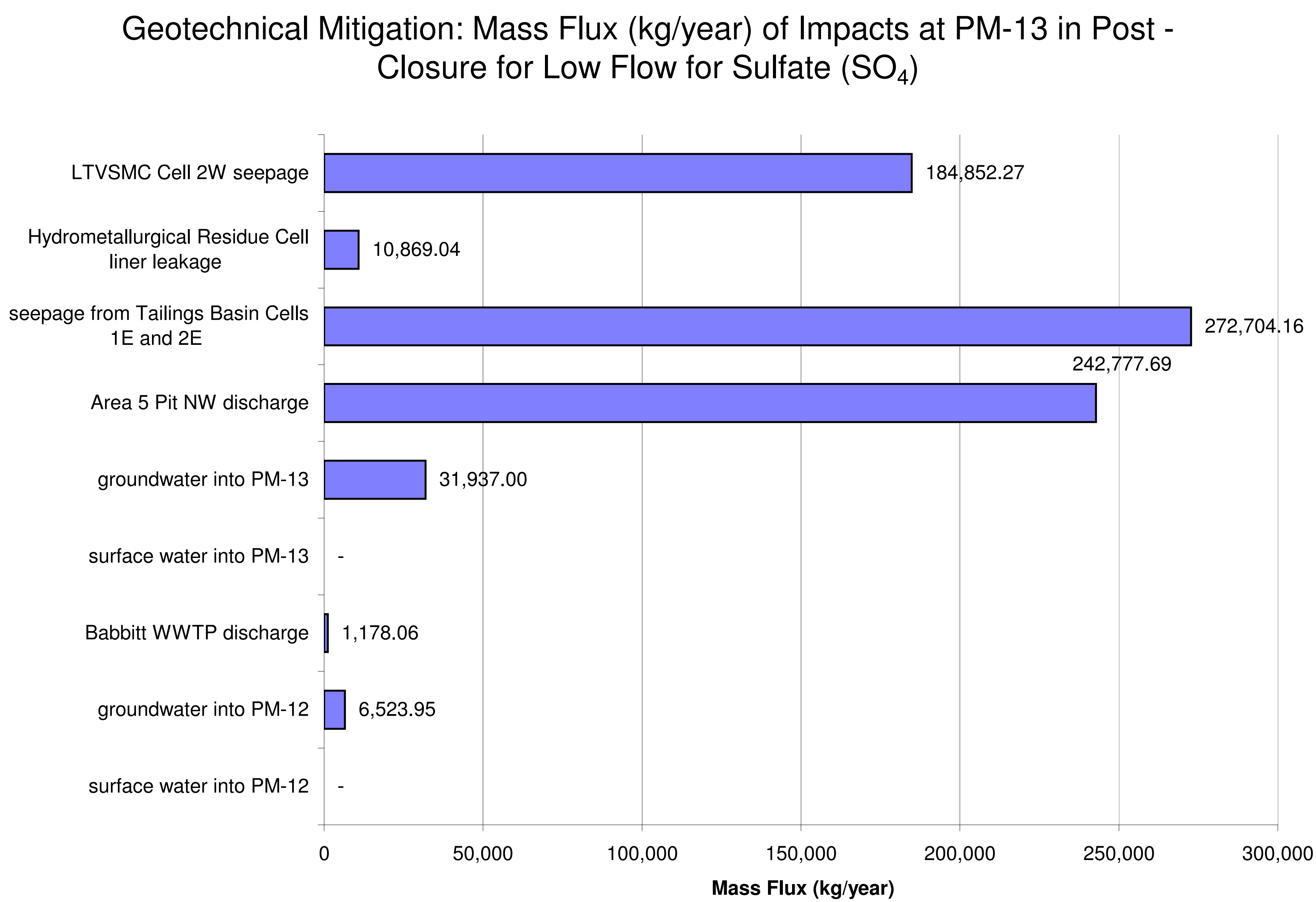



Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
2.53%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin Cells 1E and 2E
14.96%
Area 5 Pit NW discharge
3.70%
groundwater into PM-13
46.99%
surface water into PM-13
18.32%
Babbitt WWTP discharge
0.10%
groundwater into PM-12
9.60%
surface water into PM-12
3.75%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

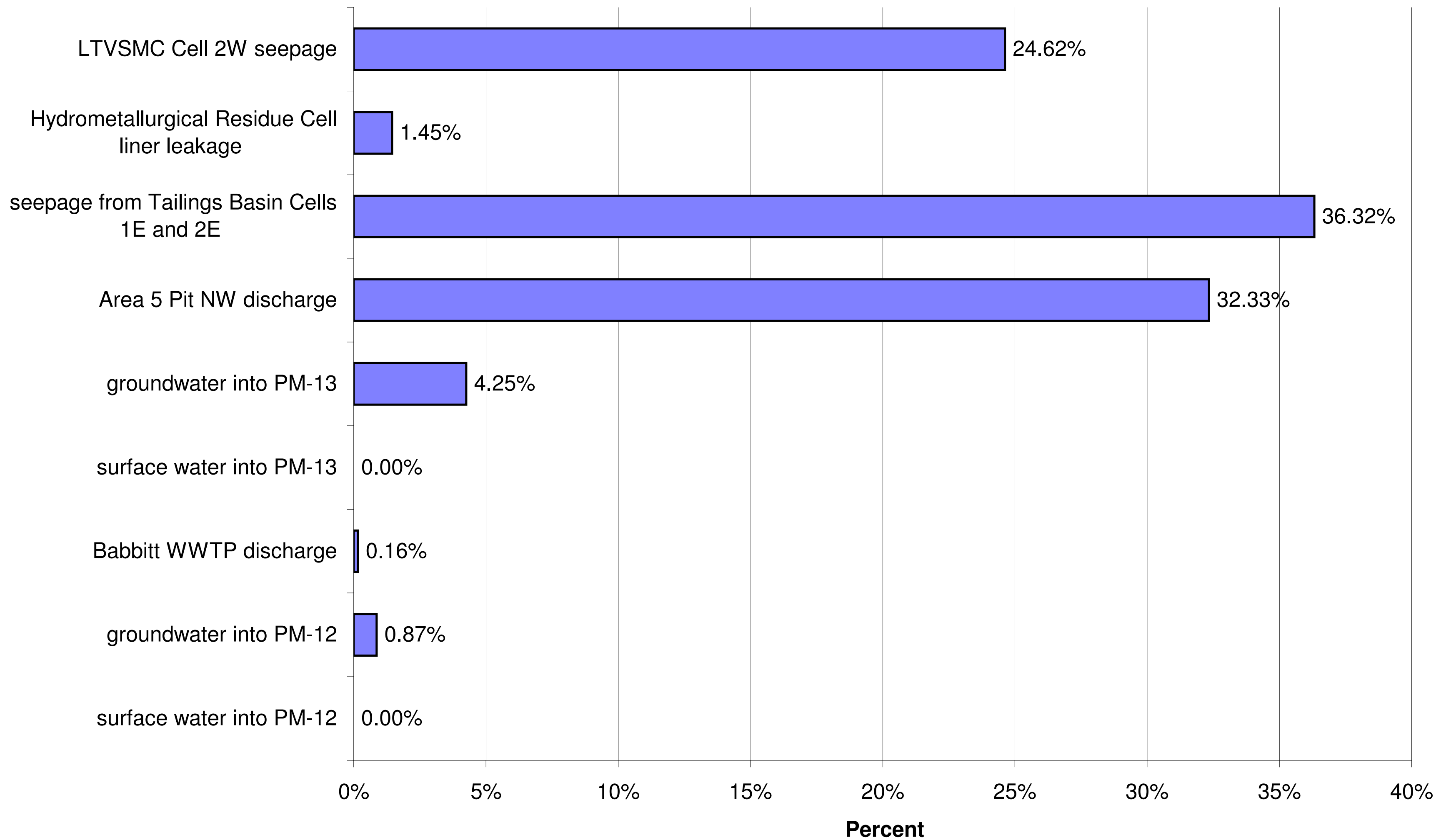

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
303.24
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
1,793.98
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
25,079.44
Babbitt WWTP discharge
11.78
groundwater into PM-12
1,151.28
surface water into PM-12
5,110.63
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)

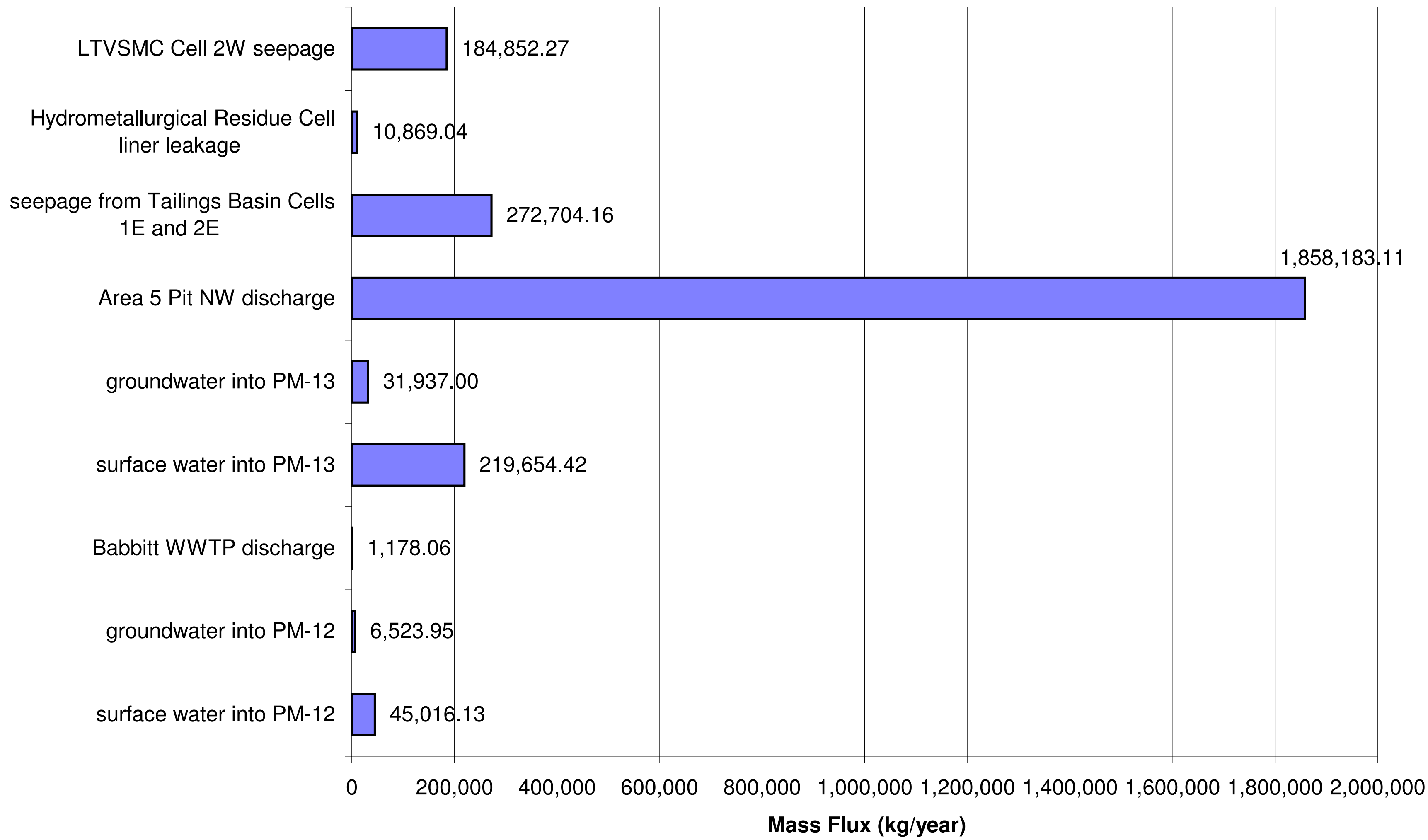



Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
184,852.27
Hydrometallurgical Residue Cell liner leakage
10,869.04
seepage from Tailings Basin Cells 1E and 2E
272,704.16
Area 5 Pit NW discharge
242,777.69
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
1,178.06
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
50,000
100,000
150,000
200,000
250,000
300,000
Mass Flux (kg/year)

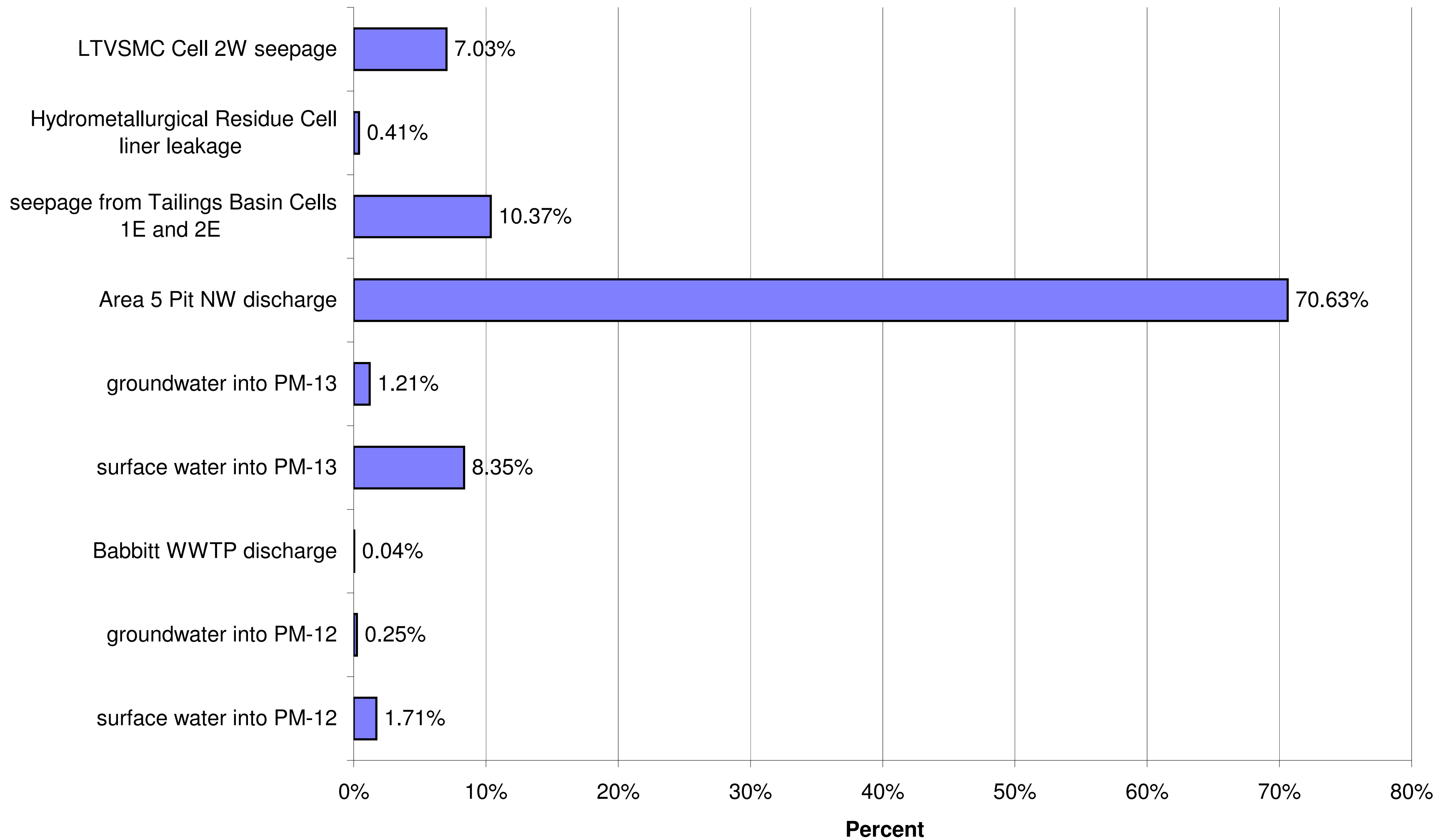
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)



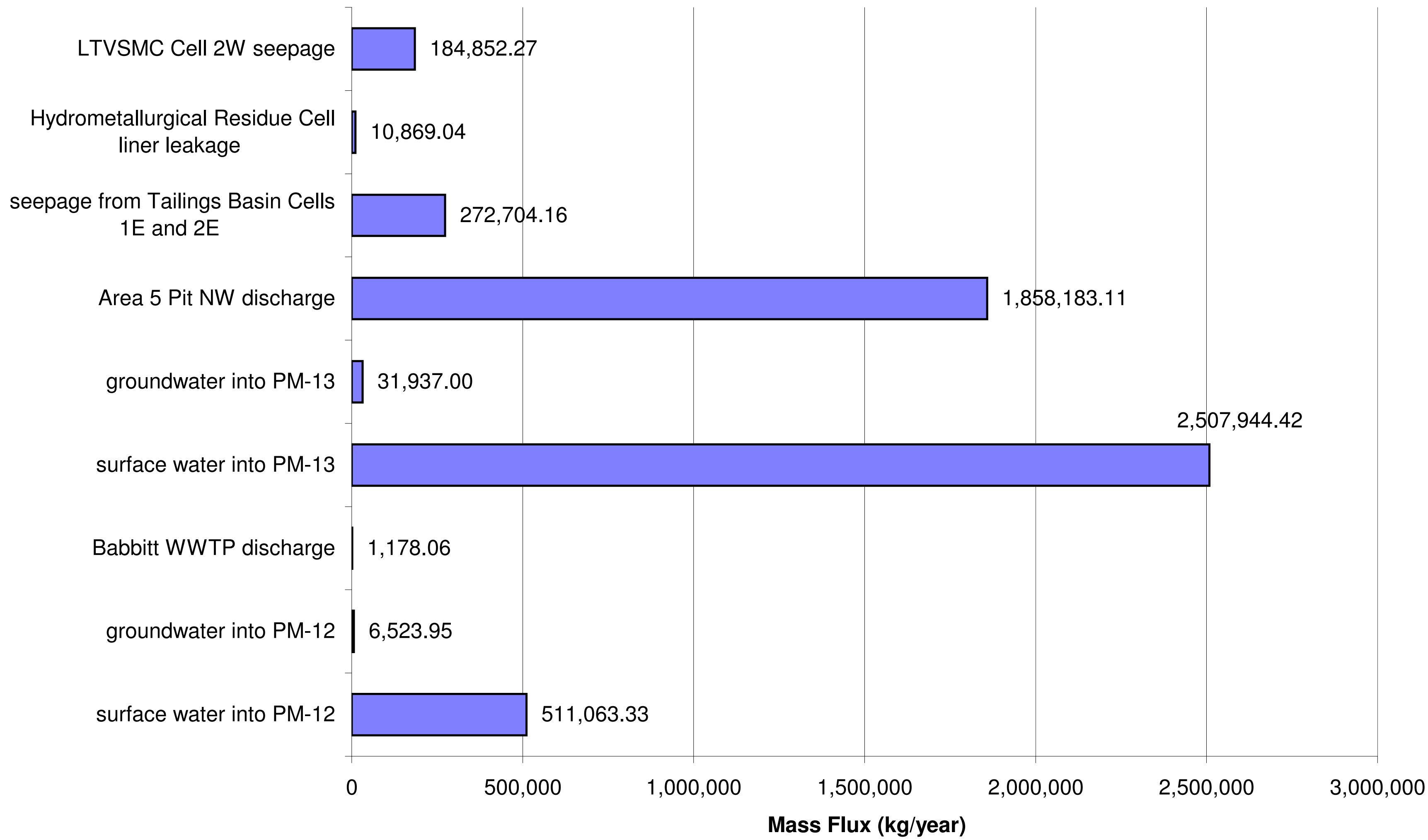
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)



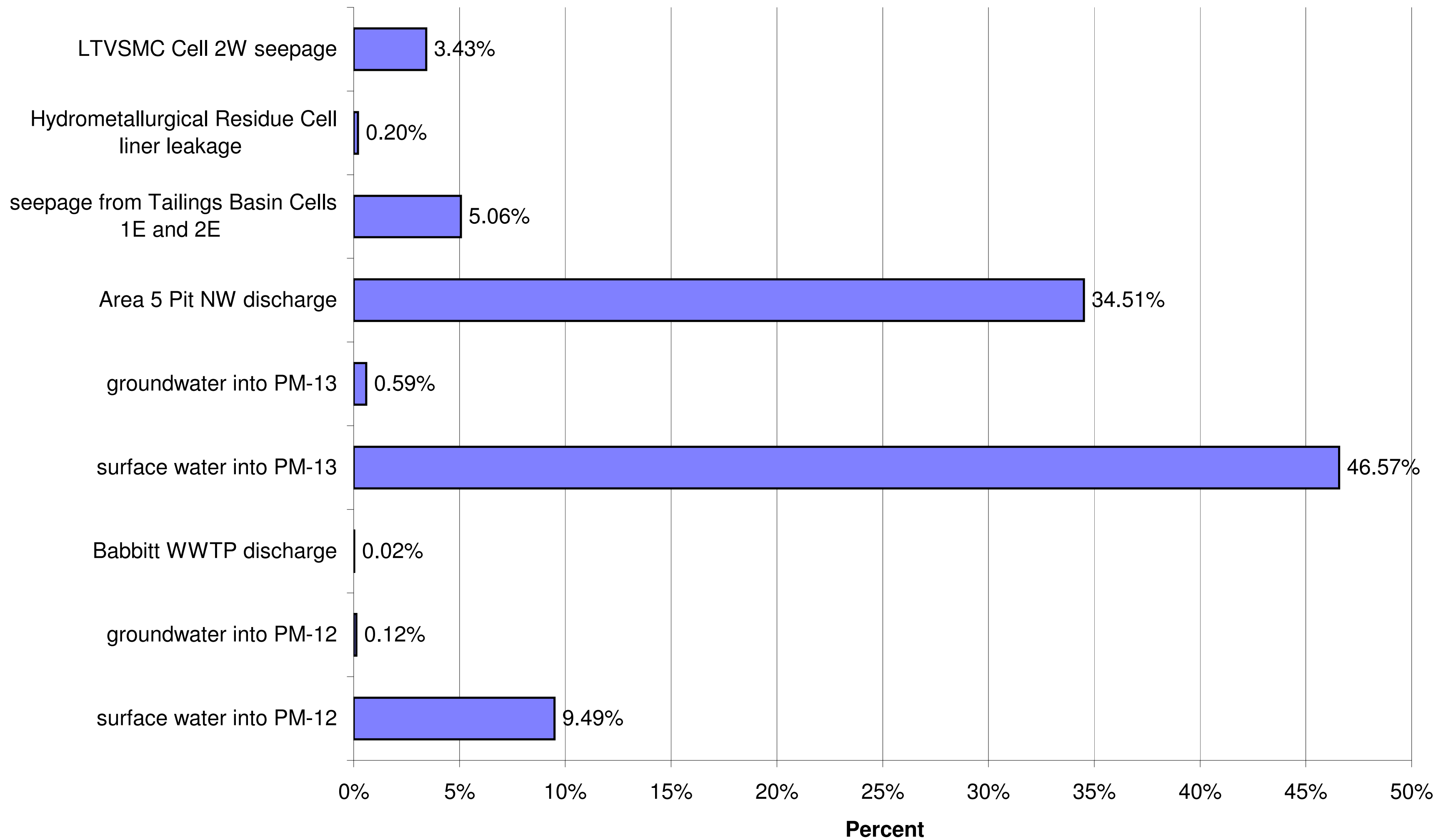
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)



Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for High Flow for Sulfate (SO_4)



Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Sulfate (SO_4)



Appendix I

Calibration of Mass-Balance Model for Existing LTVSMC Tailings Basin Seepage Rate in the Embarrass River Watershed

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Section	Description	Symbol	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.51	(cfs)
	flow in river at PM-13	Q_r13 =	7.30	(cfs)
	flow check	Q_ck =	7.30	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3214	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	584	(mg/s)
	mass flux in river at PM-13	M_r13 =	6062	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	13.68	(mg/l)
	concentration in river at PM-13	C_r13 =	29.34	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		18.80	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		29.60	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.40	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.47	(cfs)
	flow in river at PM-13	Q_r13 =	7.06	(cfs)
	flow check	Q_ck =	7.06	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	702	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2368	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	584	(mg/s)
	mass flux in river at PM-13	M_r13 =	5918	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	14.06	(mg/l)
	concentration in river at PM-13	C_r13 =	29.62	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	18.80	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	29.60	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 = 10 - 20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.22	(cfs)
	surface water flow into PM-13	Q_s13 =	5.98	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	450	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2199	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6598	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	1034	(mg/s)
	mass flux in river at PM-13	M_r13 =	12094	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	11.93	(mg/l)
	concentration in river at PM-13	C_r13 =	25.90	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	15.65	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	24.03	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Calcium: Flows at PM-13 = 10 - 20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.26	(cfs)
	surface water flow into PM-13	Q_s13 =	6.18	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.40	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	13	(mg/l)
	concentration of surface water into PM-13	C_s13 =	13	(mg/l)
	concentration of WWTP discharge	C_sBab =	13	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	95.4	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	59.78	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	19	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	19	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	465	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2272	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	702	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	5752	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2264	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	1049	(mg/s)
	mass flux in river at PM-13	M_r13 =	12039	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	12.10	(mg/l)
	concentration in river at PM-13	C_r13 =	25.78	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	15.65	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	24.03	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.86	(cfs)
	flow in river at PM-13	Q_r13 =	9.40	(cfs)
	flow check	Q_ck =	9.40	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2438	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	137	(mg/s)
	mass flux in river at PM-13	M_r13 =	2790	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.60	(mg/l)
	concentration in river at PM-13	C_r13 =	10.49	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	5.33	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	10.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Section	Description	Symbol	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.89	(cfs)
	flow in river at PM-13	Q_r13 =	9.56	(cfs)
	flow check	Q_ck =	9.56	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	44	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2377	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	137	(mg/s)
	mass flux in river at PM-13	M_r13 =	2773	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	2.57	(mg/l)
	concentration in river at PM-13	C_r13 =	10.25	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		5.33	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		10.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.63	(cfs)
	surface water flow into PM-13	Q_s13 =	7.97	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.00	(cfs)
	flow check	Q_ck =	16.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	462	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2255	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	610	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	599	(mg/s)
	mass flux in river at PM-13	M_r13 =	3678	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	7.11	(mg/l)
	concentration in river at PM-13	C_r13 =	8.12	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		5.23	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		5.27	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Chloride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.59	(cfs)
	surface water flow into PM-13	Q_s13 =	7.75	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	10	(mg/l)
	concentration of surface water into PM-13	C_s13 =	10	(mg/l)
	concentration of WWTP discharge	C_sBab =	10	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5.95	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	21.54	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.8	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.8	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.00	(cfs)
	flow check	Q_ck =	16.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	449	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	2194	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	44	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	610	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	44	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	587	(mg/s)
	mass flux in river at PM-13	M_r13 =	3648	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	6.96	(mg/l)
	concentration in river at PM-13	C_r13 =	8.06	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		5.23	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		5.27	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(µg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.19	(cfs)
	flow in river at PM-13	Q_r13 =	5.40	(cfs)
	flow check	Q_ck =	5.40	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(µg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	111	(µg/s)
	mass flux in river at PM-13	M_r13 =	588	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.32	(µg/l)
	concentration in river at PM-13	C_r13 =	3.85	(µg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	1.19	(µg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.30	(µg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Section	Description	Variable	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(μg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(μg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(μg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(μg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(μg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(μg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(μg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.23	(cfs)
	flow in river at PM-13	Q_r13 =	5.66	(cfs)
	flow check	Q_ck =	5.66	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(μg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(μg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(μg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	26	(μg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(μg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(μg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(μg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(μg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	111	(μg/s)
	mass flux in river at PM-13	M_r13 =	614	(μg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	3.20	(μg/l)
	concentration in river at PM-13	C_r13 =	3.83	(μg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		1.19	(μg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		1.30	(μg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.89	(cfs)
	surface water flow into PM-13	Q_s13 =	9.21	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(μg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(μg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(μg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(μg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(μg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(μg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(μg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	80	(μg/s)
	mass flux of surface water into PM-13	M_s13 =	391	(μg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(μg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(μg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(μg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(μg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(μg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(μg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	191	(μg/s)
	mass flux in river at PM-13	M_r13 =	1059	(μg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.21	(μg/l)
	concentration in river at PM-13	C_r13 =	2.27	(μg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	2.06	(μg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	1.88	(μg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Copper: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.84	(cfs)
	surface water flow into PM-13	Q_s13 =	9.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	1.5	(µg/l)
	concentration of surface water into PM-13	C_s13 =	1.5	(µg/l)
	concentration of WWTP discharge	C_sBab =	1.5	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	3.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.55	(µg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4	(µg/l)
	concentration of ground water flow into PM-13	C_g13 =	4	(µg/l)
Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	78	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	382	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	26	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(µg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(µg/s)
	mass flux of ground water into PM-12	M_g12 =	97	(µg/s)
	mass flux of ground water into PM-13	M_g13 =	477	(µg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	190	(µg/s)
	mass flux in river at PM-13	M_r13 =	1074	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	2.19	(µg/l)
	concentration in river at PM-13	C_r13 =	2.30	(µg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		2.06	(µg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		1.88	(µg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.70	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.47	(cfs)
	flow in river at PM-13	Q_r13 =	7.10	(cfs)
	flow check	Q_ck =	7.10	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	75	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	11	(mg/s)
	mass flux in river at PM-13	M_r13 =	132	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.27	(mg/l)
	concentration in river at PM-13	C_r13 =	0.66	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	0.17	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	0.63	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.70	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.52	(cfs)
	flow in river at PM-13	Q_r13 =	7.36	(cfs)
	flow check	Q_ck =	7.36	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	75	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	11	(mg/s)
	mass flux in river at PM-13	M_r13 =	133	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.26	(mg/l)
	concentration in river at PM-13	C_r13 =	0.64	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		0.17	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		0.63	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Section	Description	Symbol	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.87	(cfs)
	surface water flow into PM-13	Q_s13 =	4.23	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	6.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Section	Description	Symbol	Value	Units
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Section	Description	Symbol	Value	Units
Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Section	Description	Symbol	Value	Units
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	24	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	263	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Section	Description	Symbol	Value	Units
Mass Balance	mass flux in river at PM-12	M_r12 =	16	(mg/s)
	mass flux in river at PM-13	M_r13 =	349	(mg/s)

Section	Description	Symbol	Value	Units
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.19	(mg/l)
	concentration in river at PM-13	C_r13 =	0.75	(mg/l)

Section	Description	Value	Units
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	0.11	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	0.76	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Fluoride: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.82	(cfs)
	surface water flow into PM-13	Q_s13 =	4.02	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	6.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	0.2	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.2	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.2	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.125	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	1.55	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.385	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.385	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	5	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	23	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	263	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	46	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	16	(mg/s)
	mass flux in river at PM-13	M_r13 =	349	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.18	(mg/l)
	concentration in river at PM-13	C_r13 =	0.75	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	0.11	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	0.76	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Section	Description	Symbol	Value	Unit
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.80	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Section	Description	Symbol	Value	Unit
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Section	Description	Symbol	Value	Unit
Water Balance	flow in river at PM-12	Q_r12 =	1.66	(cfs)
	flow in river at PM-13	Q_r13 =	8.20	(cfs)
	flow check	Q_ck =	8.20	(cfs)

Section	Description	Symbol	Value	Unit
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	364	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Section	Description	Symbol	Value	Unit
Mass Balance	mass flux in river at PM-12	M_r12 =	28	(mg/s)
	mass flux in river at PM-13	M_r13 =	396	(mg/s)

Section	Description	Symbol	Value	Unit
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.59	(mg/l)
	concentration in river at PM-13	C_r13 =	1.71	(mg/l)

Section	Description	Value	Unit
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	2.41	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.52	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.90	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.72	(cfs)
	flow in river at PM-13	Q_r13 =	8.56	(cfs)
	flow check	Q_ck =	8.56	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	377	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	28	(mg/s)
	mass flux in river at PM-13	M_r13 =	409	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.57	(mg/l)
	concentration in river at PM-13	C_r13 =	1.69	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	2.41	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	1.52	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.89	(cfs)
	surface water flow into PM-13	Q_s13 =	9.21	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	155	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	756	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	183	(mg/s)
	mass flux in river at PM-13	M_r13 =	943	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.11	(mg/l)
	concentration in river at PM-13	C_r13 =	2.02	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	3.43	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	1.75	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Iron: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Section	Description	Symbol	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	1.84	(cfs)
	surface water flow into PM-13	Q_s13 =	9.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	2.9	(mg/l)
	concentration of surface water into PM-13	C_s13 =	2.9	(mg/l)
	concentration of WWTP discharge	C_sBab =	2.9	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.038	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	4.594	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	0.035	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	0.035	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	151	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	738	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	27	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	179	(mg/s)
	mass flux in river at PM-13	M_r13 =	922	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	2.07	(mg/l)
	concentration in river at PM-13	C_r13 =	1.97	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		3.43	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		1.75	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Section	Description	Variable	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.80	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.49	(cfs)
	flow in river at PM-13	Q_r13 =	7.20	(cfs)
	flow check	Q_ck =	7.20	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3564	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	315	(mg/s)
	mass flux in river at PM-13	M_r13 =	5148	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	7.47	(mg/l)
	concentration in river at PM-13	C_r13 =	25.27	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		6.90	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		24.53	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Section	Description	Variable	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.30	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.28	(cfs)
	flow in river at PM-13	Q_r13 =	5.96	(cfs)
	flow check	Q_ck =	5.96	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1994	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	594	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	315	(mg/s)
	mass flux in river at PM-13	M_r13 =	4172	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	8.69	(mg/l)
	concentration in river at PM-13	C_r13 =	24.74	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		6.90	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		24.53	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.33	(cfs)
	surface water flow into PM-13	Q_s13 =	6.47	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.30	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	225	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	1099	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6534	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	540	(mg/s)
	mass flux in river at PM-13	M_r13 =	9443	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	6.23	(mg/l)
	concentration in river at PM-13	C_r13 =	20.22	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	6.06	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	20.33	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Magnesium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.47	(cfs)
	surface water flow into PM-13	Q_s13 =	7.17	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.20	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	6	(mg/l)
	concentration of surface water into PM-13	C_s13 =	6	(mg/l)
	concentration of WWTP discharge	C_sBab =	6	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	271	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	69.97	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	10.65	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	10.65	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	249	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	1218	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	1994	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	4356	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1269	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	565	(mg/s)
	mass flux in river at PM-13	M_r13 =	9402	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	6.51	(mg/l)
	concentration in river at PM-13	C_r13 =	20.13	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	6.06	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	20.33	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.20	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.90	(cfs)
	flow in river at PM-13	Q_r13 =	9.60	(cfs)
	flow check	Q_ck =	9.60	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	5267	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	152	(mg/s)
	mass flux in river at PM-13	M_r13 =	6002	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	2.83	(mg/l)
	concentration in river at PM-13	C_r13 =	22.09	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	3.20	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	22.20	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	3.10	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	1.75	(cfs)
	flow in river at PM-13	Q_r13 =	8.76	(cfs)
	flow check	Q_ck =	8.76	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	883	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3887	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	152	(mg/s)
	mass flux in river at PM-13	M_r13 =	5506	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.06	(mg/l)
	concentration in river at PM-13	C_r13 =	22.21	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs	3.20	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs	22.20	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Section	Description	Variable	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	1.46	(cfs)
	surface water flow into PM-13	Q_s13 =	7.14	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.50	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	145	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	707	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	3135	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	297	(mg/s)
	mass flux in river at PM-13	M_r13 =	4723	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	3.42	(mg/l)
	concentration in river at PM-13	C_r13 =	10.11	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		2.70	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		9.90	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sodium: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.54	(cfs)
	surface water flow into PM-13	Q_s13 =	7.50	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.80	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)

Input Concentration Data	concentration of surface water into PM-12	C_s12 =	3.5	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.5	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.5	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	120	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	44.31	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	4.9	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	4.9	(mg/l)

Water Balance	flow in river at PM-12	Q_r12 =	3.06	(cfs)
	flow in river at PM-13	Q_r13 =	16.50	(cfs)
	flow check	Q_ck =	16.50	(cfs)

Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	152	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	743	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	883	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2257	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	584	(mg/s)

Mass Balance	mass flux in river at PM-12	M_r12 =	304	(mg/s)
	mass flux in river at PM-13	M_r13 =	4771	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	3.51	(mg/l)
	concentration in river at PM-13	C_r13 =	10.22	(mg/l)

Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs	2.70	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs	9.90	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0 cfs

Section	Description	Variable	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	1.60	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.46	(cfs)
	flow in river at PM-13	Q_r13 =	7.00	(cfs)
	flow check	Q_ck =	7.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	6901	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	244	(mg/s)
	mass flux in river at PM-13	M_r13 =	8158	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	5.92	(mg/l)
	concentration in river at PM-13	C_r13 =	41.18	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		3.06	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		41.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 < 10 cfs, Pit 5NW Q = 0.26 cfs

Section	Description	Symbol	Value	Units
Input Flow Data	surface water flow into PM-12	Q_s12 =	0.00	(cfs)
	surface water flow into PM-13	Q_s13 =	0.00	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	0.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	1.23	(cfs)
	flow in river at PM-13	Q_r13 =	5.66	(cfs)
	flow check	Q_ck =	5.66	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	0	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	7696	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	0	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	244	(mg/s)
	mass flux in river at PM-13	M_r13 =	8953	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	7.01	(mg/l)
	concentration in river at PM-13	C_r13 =	55.90	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of < 10 cfs		3.06	(mg/l)
	Observed concentration in river at PM-13 for flows < 10 cfs		41.30	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.12	(cfs)
	surface water flow into PM-13	Q_s13 =	5.49	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.00	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	4.00	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.01	(cfs)
	flow check	Q_ck =	16.01	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	127	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	621	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	17252	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	371	(mg/s)
	mass flux in river at PM-13	M_r13 =	19257	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	4.40	(mg/l)
	concentration in river at PM-13	C_r13 =	42.50	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		5.03	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		45.33	(mg/l)

Embarrass River Model - Calibration of Tailings Basin Seepage

Parameter: Sulfate: Flows at PM-13 of 10-20 cfs, Pit 5NW Q = 0.26 cfs

Input Flow Data	surface water flow into PM-12	Q_s12 =	1.35	(cfs)
	surface water flow into PM-13	Q_s13 =	6.60	(cfs)
	Babbitt WWTP discharge	Q_sBab =	0.33	(cfs)
	Area 5 Pit NW discharge	Q_spit =	0.26	(cfs)
	LTVSMC Tailings Basin seepage	Q_fs =	2.40	(cfs)
	Hydrometallurgical Residue Cells Liner Leakage	Q_rrs =	0.00	(cfs)
	ground water flow into PM-12	Q_g12 =	0.86	(cfs)
	ground water flow into PM-13	Q_g13 =	4.21	(cfs)
Input Concentration Data	concentration of surface water into PM-12	C_s12 =	4	(mg/l)
	concentration of surface water into PM-13	C_s13 =	4	(mg/l)
	concentration of WWTP discharge	C_sBab =	4	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1046	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	152.4	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	8.5	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	8.5	(mg/l)
Water Balance	flow in river at PM-12	Q_r12 =	2.98	(cfs)
	flow in river at PM-13	Q_r13 =	16.01	(cfs)
	flow check	Q_ck =	16.01	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	153	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	747	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	7696	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	10351	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	207	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1013	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	397	(mg/s)
	mass flux in river at PM-13	M_r13 =	20204	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	4.71	(mg/l)
	concentration in river at PM-13	C_r13 =	44.59	(mg/l)
Observed Concentration	Observed concentration in river at PM-12 for flows at PM-13 of 10-20 cfs		5.03	(mg/l)
	Observed concentration in river at PM-13 for flows of 10-20 cfs		45.33	(mg/l)