Appendices

Appendix A

Scope of Work for RS74
according to final Scoping Decision Document

Scope of Work for
Cumulative Water Quality Impacts

(taken from Final PolyMet EIS Scoping Decision Document, October 25, 2005)

A quantitative assessment of cumulative water quality impacts will be performed for the upper Partridge River (including Colby Lake) and the Upper Embarrass River (including Wynn and Sabin Lakes). PolyMet's discharges will be treated to meet chronic aquatic toxicity-based standards but levels of metals such as nickel may be elevated above natural background levels. At the plant site and tailings basin, discharges from the wastewater treatment plant may contain dissolved solids, hardness, chlorides and possibly sulfate at levels above background. Other common pollutants such as Biological Oxygen Demand (BOD), bacteria and suspended solids are not expected to be present in significant quantities in the discharges. The actual construction of the PolyMet facility can be expected to generate sediment but this impact is readily mitigated by use of stormwater best management practices such as sedimentation basins and will be of short duration. Therefore, this impact is not proposed as a suitable subject for cumulative impact analysis.

A number of models are available to analyze the generation, fate and transport of pollutants in streams. Models recently used in Minnesota EIS's and National Pollutant Discharge Elimination System (NPDES) permitting procedures include HSPF and QUAL2E and dilution models. Toxic metals will be modeled using a conservative dilution model of the stream water quality. If this indicates that potential cumulative impacts may be experienced, a more comprehensive model could then be applied. It appears likely that the initial modeling phase will be required for the NPDES permit and will be available to the EIS contractor. In this phase, both streams will be modeled using the hydrologic loading of water from tributary sub-watersheds for dry, normal and wet conditions. The background loading of pollutants from the watershed will be estimated based on historic and recent monitoring results. For each hydrologic scenario, loading from the PolyMet facility will be included and the resultant concentrations will be calculated as a simple dilution model. Upstream and downstream additions of pollutants from other discharges will be evaluated for past, present and future actions by other parties

The models will first be calibrated to existing conditions monitoring data from 2004. This will inherently include the effects of past and present actions (through the date of monitoring) including:

- Embarrass River
    - Existing discharges from Babbitt POTW
    - Existing Cliffs Erie tailings basin seepage
    - Other existing sources within the former LTVSMC site (e.g. waste rock piles tributary to Spring Mine Creek)
    - Modification of land use (including wetland loss) by past mining practices within the Embarrass River watershed above Sabin and Wynne Lakes
    - Typical timber harvest activities on SNF, state and county lands and private lands

  - Existing rural and residential development in Embarrass township
  - Construction of Embarrass Wetland Bank by LTVSMC
  - Closure of LTVSMC
- Partridge River and Colby Lake
  - Existing Cliffs Erie discharges (overflow) from pits
  - Other existing sources within the former LTVSMC (e.g. waste rock piles adjacent to Wyman Creek)
  - Modification of land use (including wetland loss) by past mining practices within the upper Partridge River watershed
  - Existing discharge from Northshore Mining Company Mine and Crusher area
  - Existing Syl Laskin Energy Center discharges
  - Existing discharge from City of Hoyt Lakes POTW
  - Operation of Whitewater Reservoir
  - Typical timber harvest activities of SNF, state and county lands and private lands
  - Existing runoff from the development of the City of Hoyt Lakes

The hydrologic models will than be modified to include actions since the date of the monitoring and potential future actions including:

- Embarrass River
  - PolyMet tailings basin wastewater treatment plant discharge
  - Changes to existing discharges from Cliffs Erie tailings basin due to PolyMet's proposed collection and treatment of seeps
  - Implementation of Regional Mercury TMDL
  - Any reasonably foreseeable changes to discharges from Babbitt POTW due to development and/or treatment system changes
  - Any reasonably foreseeable changes to timber harvest activities on SNF, state and county lands and private lands
- Partridge River and Colby Lake
  - PolyMet discharges from mine site and long-term discharges from closed pit and stockpiles
  - Potential future discharge from Mesabi Nugget facility

- Proposed Cliffs Erie Railroad Pellet Transfer Facility construction and operation
- Any reasonably foreseeable changes to timber harvest activities on SNF, state and county lands and private lands
- Changes in runoff quality due to future development of City of Hoyt Lakes
- Implementation of Regional Mercury TMDL
- Any reasonably foreseeable changes to discharges from Hoyt Lakes POTW due to development and/or treatment system changes

Minnesota water quality standards were promulgated to protect the designated uses of waters of the state, which include protection for domestic consumption (human health), aquatic life, and recreation, industrial consumption, and agriculture and wildlife. The threshold for this cumulative impacts assessment will be the most restrictive water quality standards that apply to the respective waters being evaluated which, at a minimum, would be the chronic aquatic toxicity-based standards applicable to the respective waters being evaluated and the Class I drinking water standards that are applicable to Colby Lake as a drinking water source for the City of Hoyt Lakes. The future conditions scenarios will be completed for both operation and post-closure conditions, assuming that all other reasonably foreseeable actions have been completed.

Appendix B

Internal Barr Memorandum from Miguel Wong to John Borovsky and Keith Pilgrim, dated July 18, 2007, Regarding Wet and Dry Periods of Precipitation

Internal
Memorandum

To: John Borovsky, Keith Pilgrim

From: Miguel Wong

Subject: Wet and dry periods of precipitation

Date: May 18, 2007

Project: 23/69-862-015-074

c: Greg Williams

Introduction

This memo presents the results of the statistical analysis of precipitation data representative of the long-term climatic conditions in the Partridge River and Embarrass River watersheds. These results will be used as a reference to determine whether the periods of water quality monitoring in the two referred watersheds corresponded to wet or dry flow conditions; flow data is available for the Partridge River and Embarrass River, but such data do not necessarily cover the same periods of water quality monitoring.

Data Available

Water Quality Monitoring

Water quality data in the Partridge River watershed and/or Embarrass River watershed are available for the following periods:

- 1955-1966.
- 1974-1979.
- 2001-2002.
- 2004.
- 2006.

Most of the water quality data is from two periods: 1970's and 2000's.

USGS Flow Gaging Stations

Daily flow data in the Partridge River watershed and Embarrass River watershed are available for the following periods:

- USGS gaging station # 04015455, South Branch Partridge River near Babbitt – from June 1, 1977 to November 5, 1980.
- USGS gaging station # 04015475, Partridge River above Colby Lake at Hoyt Lakes – from September 19, 1978 to November 2, 1988.
- USGS gaging station # 04015500, Second Creek near Aurora – from April 1, 1955 to September 30, 1980.
- USGS gaging station # 04016000, Partridge River near Aurora – from August 1, 1942 to September 30, 1982.
- USGS gaging station # 04017000, Embarrass River at Embarrass – from August 1, 1942 to December 31, 1964.
- USGS gaging station # 04018000, Embarrass River near McKinley – from October 1, 1953 to September 30, 1962.

There is not flow gaging station that covers both the 1970's and the 2000's in either the Partridge River or the Embarrass River. Although the flow data available includes periods of wet and dry flows (see discussion in RS73B for the Partridge River, and in RS74 for the Embarrass River), a direct comparison of flows in the 1970's and 2000's is not possible from the flow data itself.

Precipitation

The Minnesota Department of Natural Resources (MnDNR) follows the definition given by the Climate Prediction Center of the National Weather Service (NWS), which considers a climate normal as that given by 30 years of recent data. The current definition corresponds to the period 1971-2001.

Monthly precipitation data is available from the NWS weather station (Coop ID) # 218311, Tower 3S – from January 1926 to March 2007. This precipitation record, limited to the period 1971-2001, has been used to obtain precipitation statistics that are considered representative for both the Partridge River and Embarrass River watersheds.

In addition, monthly precipitation data is available from the NWS weather station (Coop ID) # 210387, Babbitt (Partridge River watershed) – from June 1999 to March 2007, and from the NWS weather station (Coop ID) # 212576, Embarrass (Embarrass River watershed) – from January 1995 to

March 2007. Information for Water Years (October to September) 2005 and 2006 is incomplete in both the Babbitt and Embarrass precipitation records.

Statistical Analysis

A frequency analysis was conducted on the annual precipitation record of the weather station at Tower 3S for the period 1971-2001. A normal probability distribution provided a good fit of the transformed (cubic root) series of annual precipitation values (Shahin et al., 1993). The annual precipitation varied between a maximum of 38.4 inches and a minimum of 22.2 inches, with a mean annual value of 29.3 inches and a standard deviation of 5.1 inches.

Using the Tower 3S precipitation record and the normal probability distribution obtained from the statistical fitting described above, the probability of non-exceedance of precipitation (used as a proxy for flows) during 1955-1966 and 1974-1979 resulted in:

Water Year (October to September)	Probability of non-exceedance
1954	4.8%
1955	4.1%
1956	40.3%
1957	9.9%
1958	51.3%
1959	8.9%
1960	32.3%
1961	56.9%
1962	17.2%
1963	75.7%
1964	71.0%
1965	63.6%
1966	21.5%
1973	78.9%
1974	78.3%
1975	9.9%
1976	92.2%
1977	85.9%
1978	14.4%
1979	38.1%

Using the Babbitt (Partridge River watershed) precipitation record and the normal probability distribution obtained from the statistical fitting described above, the probability of non-exceedance of precipitation (used as a proxy for flows) during the 2000's resulted in:

Water Year (October to September)	Probability of non-exceedance
2000	96.5%
2001	34.3%
2002	16.9%
2003	13.7%
2004	69.3%

Using the Embarrass (Embarrass River watershed) precipitation record and the normal probability distribution obtained from the statistical fitting described above, the probability of non-exceedance of precipitation (used as a proxy for flows) during the 2000's resulted in:

Water Year (October to September)	**Probability of non-exceedance**
2000	72.8%
2001	28.9%
2002	24.1%
2003	15.6%
2004	30.0%

References

Shahin, M., van Oorschot, H.J.L., and De Lange, S.J. (1993). Statistical Analysis in Water Resources Engineering – Balkema, Rotterdam, the Netherlands. 393 pp.

Appendix C

Internal Barr Memorandum
From Miguel Wong
To Project File
Dated May 7, 2007
Regarding Embarrass River USGS Gage Flow Data

Internal
Memorandum

To: Project File

From: Miguel Wong

Subject: Embarrass River - USGS Gage Flow Data

Date: May 7, 2007

Project: 23/69-862-015-074

c:

Introduction

This memo a) summarizes the information available on daily stream flows at USGS gaging stations located within the Embarrass River watershed, and b) provides flow estimates for average, wet and dry weather conditions at two surface water monitoring stations in the Embarrass River.

USGS Gage Flow Data

Daily flows in the Embarrass River watershed are available at:

- USGS gaging station # 04017000 – Embarrass River at Embarrass, Minnesota – Drainage area = 88.3 square miles – August 1, 1942 through December 31, 1964; and,
- USGS gaging station # 04018000 – Embarrass River near McKinley, Minnesota – Drainage area = 171.0 square miles – October 1, 1953 through September 30, 1962.

Figure 1 shows that the time series of flow per unit catchment area at the two USGS gaging stations of the Embarrass River are very similar for the coincident period of record October 1, 1953 through September 30, 1962; the coefficient of correlation is 0.90. Flows recorded in the gaging station Embarrass River at Embarrass during 1953-1962, denoted by the green double-arrow in Figure 2, were on the average 36% smaller than those recorded at the same gaging station during 1942-1953. Precipitation records indicate the annual average snowfall during 1953-1962 was 25% smaller than that recorded during the previous decade, and most of the difference in the annual average flows observed at the Embarrass River at Embarrass before and during the coincident period of record referred to above can be explained by the difference in high flows occurring during spring snowmelt events. The decrease in flows during 1953-1962 was thus in response to natural climatic variability. Therefore, the entire period of record of the gaging station Embarrass River at Embarrass has been selected as representative of the hydrology at the two surface water monitoring stations in the Embarrass River.

Flow Estimates

Three statistics have been computed for the time series of flow yields at the gaging station Embarrass River at Embarrass:

- Mean annual flow = 0.73 cubic feet per second per square mile of catchment area;
- Average of the 1-day maximum annual flows = 7.6 cubic feet per second per square mile of catchment area; and,
- Average of the 30-day minimum annual flows = 0.045 cubic feet per second per square mile of catchment area.

These flow yield statistics represent average, wet and dry weather conditions for the entire Embarrass River watershed, respectively. The corresponding flow values at the two surface water monitoring stations in the Embarrass River are:

Station PM-12 (18.9 square miles)

- Average flow = 13.8 cubic feet per second.
- Wet flow = 144.4 cubic feet per second.
- Dry flow = 0.9 cubic feet per second.

Station PM-13 (111.8 square miles)

- Average flow = 81.5 cubic feet per second.
- Wet flow = 853.1 cubic feet per second.
- Dry flow = 5.1 cubic feet per second.

Figure 1: Time series of flow yields at the two gaging stations in the Embarrass River for the coincident period of record 1953-1962

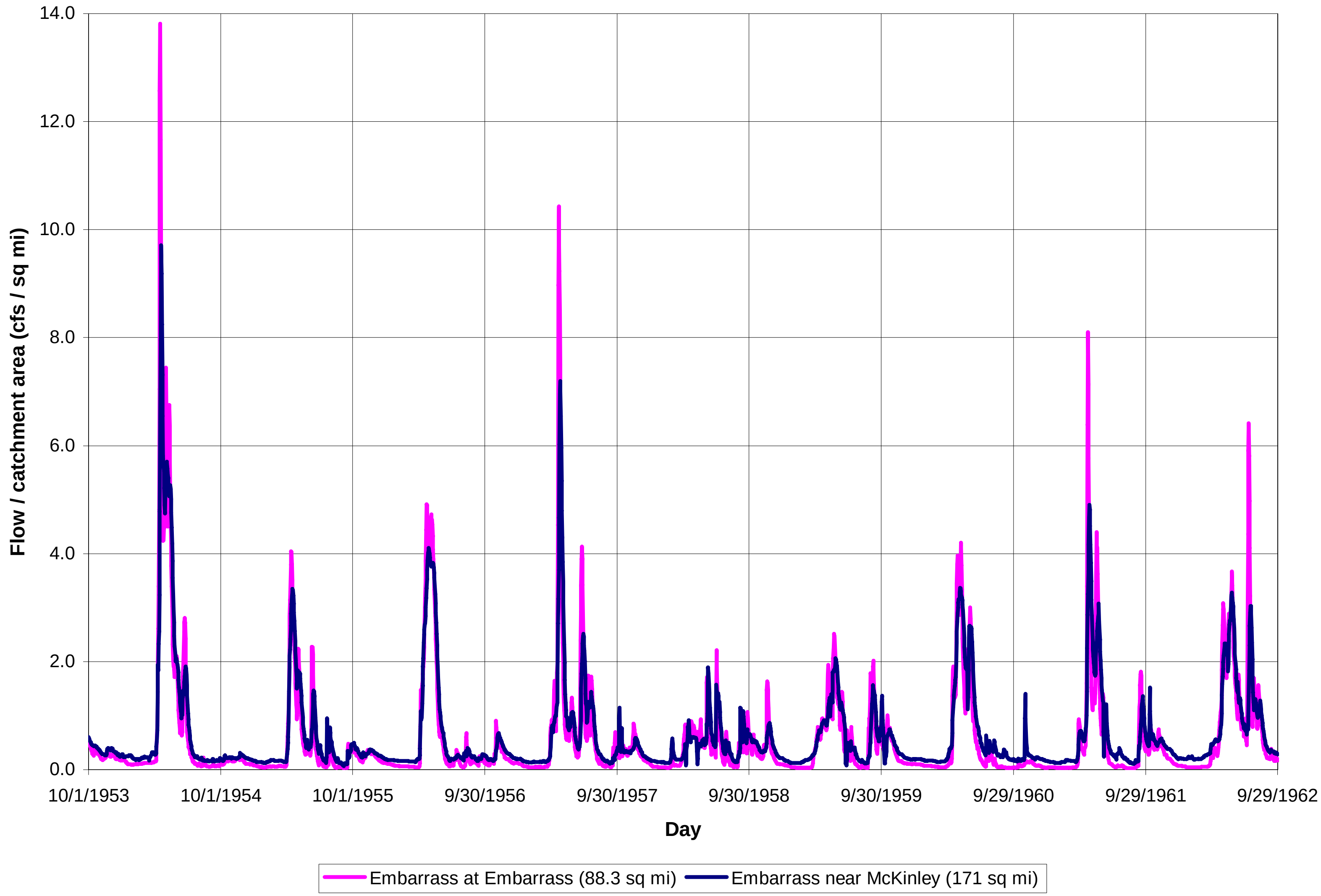
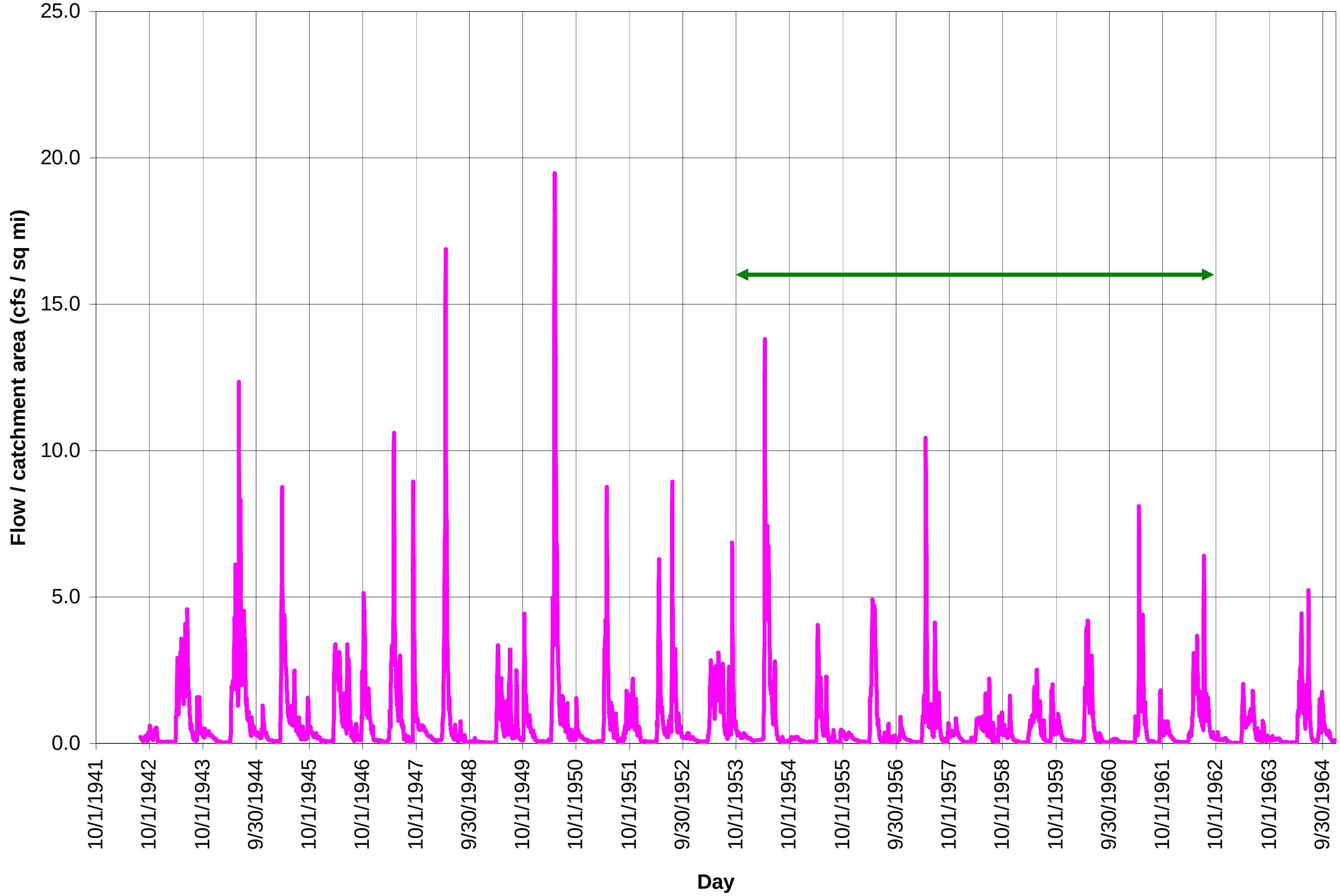


Figure 2: Time series of flow yields at the gaging station in the Embarrass River at Embarrass for the entire period of record 1942-1964



Appendix D

MPCA Baseline Water Quality Data: Quaternary Aquifer Wells within the Copper Nickel Study Area

MPCA Baseline Water Quality Data:
Quaternary Aquifer Wells within the
Copper Nickel Study Area

ID Number		GWMAP00716	GWMAP00906	GWMAP01189	GWMAP00759	GWMAP00889	GWMAP01038
Universal Trans Mercator - east		561261	556345	577699	577858	555921	553861
Universal Trans Mercator - north		5285293	5247911	5285468	5285406	5248401	5266949
County		St. Louis	St. Louis	St. Louis	St. Louis	St. Louis	St. Louis
MPCA Region		1	1	1	1	1	1
Well Use		Domestic	Domestic	Domestic	Domestic	Domestic	Domestic
Well Diameter	inch	4	4	6	4	4	6
CWI Aquifer Code		QBAA	QBAA	QBAA	QWTA	QWTA	QWTA
Aquifer		Buried artesian aquifer	Buried artesian aquifer	Buried artesian aquifer	Water table aquifer	Water table aquifer	Water table aquifer
Aquifer Group		buried Quaternary	buried Quaternary	buried Quaternary	surficial Quaternary	surficial Quaternary	surficial Quaternary
Well Depth	ft	136	117	152	151	148	86
Water Level	ft	10	25	12	0	14	35
Sampling Date		9/14/1995	8/22/1995	8/21/1996	9/14/1995	8/22/1995	6/5/1996
VOC Detected		yes	yes	no	no	no	no
Alkalinity	ug/L	112000	282000	125000	164000	290000	95000
Aluminum	ug/L	257.73	1.14	869.82	756.46	1.59	6.49
Antimony	ug/L	0.007	0.050	0.007	0.030	0.020	0.015
Arsenic	ug/L	12.800	2.950	1.670	6.140	2.510	0.090
Barium	ug/L	133.7	41.5	61.2	144.7	35.4	75.0
Beryllium	ug/L	0.0400	0.0050	0.0600	0.0600	0.0050	0.0050
Bismuth	ug/L	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300
Boron	ug/L	14.8	93.0	14.3	27.6	65.4	12.0
Bromide	ug/L	0.100	0.100	0.100	0.100	0.100	0.100
Cadmium	ug/L	0.010	0.010	0.030	0.190	0.010	0.110
Calcium	ug/L	35477	27306	37426	57016	47169	40874
Cesium	ug/L	0.070	0.360	0.110	0.060	0.270	0.009
Chloride	ug/L	520	16320	10340	16340	2020	6610
Chromium	ug/L	2.49	0.04	3.76	5.03	0.04	0.08
Cobalt	ug/L	0.780	0.170	2.403	1.870	0.300	0.779
Copper	ug/L	530.4	9.6	7.4	140.0	11.8	8.3
Dissolved oxygen	ug/L	290	290	290	290	290	290
Eh	mV	86	276	-28	186	260	174
Fluoride	ug/L	200	630		220	550	
Iron	ug/L	4173.5	252.0	2281.2	13773.6	894.7	461.3
Lead	ug/L	25.32	1.31	1.71	10.57	0.02	0.32
Lithium	ug/L	4.4	15.8	4.4	4.4	16.5	4.4
Magnesium	ug/L	6195	49755	10433	18118	37601	5356
Manganese	ug/L	466.5	94.4	166.2	300.8	288.2	202.6
Mercury							
Molybdenum	ug/L	4.10	9.40	4.10	4.10	10.00	4.10
Nickel	ug/L	6.60	11.90	5.90	8.50	12.80	5.90
Nitrate-N	ug/L	490	490	490	490	490	490
Oxidation-reduction potential	mV	-137	54	-248	-35	40	-47
pH		7.90	8.30	8.26	7.90	7.80	7.03
Total Phosphorus	ug/L	212.4	164.7	84.0	440.5	72.0	14.8
Potassium	ug/L	1637	2782	1691	2555	2705	1336
Rubidium	ug/L	555	555	555	555	555	555
Selenium	ug/L	3.4	2.5	0.9	9.0	3.7	0.9
Silica	ug/L	12998	5616	7221	12200	9129	7959

MPCA Baseline Water Quality Data: Quaternary Aquifer Wells within the Copper Nickel Study Area

ID Number		GWMAP00716	GWMAP00906	GWMAP01189	GWMAP00759	GWMAP00889	GWMAP01038
Silver	ug/L	0.008	0.020	0.008	0.030	0.008	0.008
Sodium	ug/L	3451	19119	4670	5152	11455	2498
Specific Conductance	mmhos/cm	0.215	0.586	0.277	0.405	0.544	0.260
Strontium	ug/L	136.5	282.5	133.4	156.6	212.2	91.8
Sulfate-S	ug/L	120	1500	2650	4860	90	5690
Sulfate	ug/L	360	4500	7950	14580	270	17070
Total Sulfur	ug/L	212	1678	2877	5059	160	5698
Temperature	°C	6.4	7.6	8.5	8.0	8.5	8.2
Thallium	ug/L	0.004	0.004	0.032	0.004	0.004	0.009
Tin	ug/L	0.650	0.050	0.030	0.110	0.030	0.310
Titanium	ug/L	0.0117	0.0062	0.0141	0.0176	0.0069	0.0034
Total dissolved solids	ug/L	156000	332000	168000	250000	344000	186000
Total organic carbon	ug/L	5600	1800	1800	2300	2600	1300
Total phosphate-P	ug/L	200	140	50	1020	40	10
Total suspended solids	ug/L	18000	2000	112000	26000	2000	2000
Tritium	ug/L		0.7	22.2			
Vanadium	ug/L	4.6	10.9	5.6	10.9	11.9	5.2
Zinc	ug/L	169.1	12.2	8.5	76.2	11.0	2.6
Zirconium	ug/L	0.280	0.040	0.650	0.230	0.090	0.020

Data from Minnesota Pollution Control Agency's Ground Water Monitoring and Assessment Program (GWMAP) Baseline Data Sets
http://www.pca.state.mn.us/water/groundwater/gwmap/gwbaseline.html

Appendix E

Calibration of Mass Balance Models for Embarrass River Watershed

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 =	48.51	(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 =	11.50	(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 =	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 =	151	(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 =	33	(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 =	234	(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 =	11.54	(cfs)
	surface water flow into PM-13	Q_s13 =	43.27	(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 =	11.50	(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 =	0.1	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.1	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.0125	(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 =	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 =	33	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	122	(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 =	514	(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 =	34	(mg/s)
	mass flux in river at PM-13	M_r13 =	674	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.09	(mg/l)
	concentration in river at PM-13	C_r13 =	0.32	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		0.10	(mg/l)
	Observed concentration in river at PM-13		0.19	(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 =	48.51	(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 =	11.50	(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 =	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	(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 =	1030	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	7	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	56	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	945	(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 =	2698	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.87	(µg/l)
	concentration in river at PM-13	C_r13 =	1.19	(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 =	48.51	(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 =	11.50	(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 =	12	(µg/l)
	concentration of surface water into PM-13	C_s13 =	12	(µg/l)
	concentration of WWTP discharge	C_sBab =	12	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	163	(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 =	4280	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	16473	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	112	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	9180	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	107399	(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 =	4908	(µg/s)
	mass flux in river at PM-13	M_r13 =	140485	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	12.57	(µg/l)
	concentration in river at PM-13	C_r13 =	62.05	(µg/l)

Observed Concentration	Observed concentration in river at PM-12		ND (35)	(µg/l)
	Observed concentration in river at PM-13		68.9	(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 =	43.27	(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 =	11.50	(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 =	11	(μg/l)
	concentration of surface water into PM-13	C_s13 =	11	(μg/l)
	concentration of WWTP discharge	C_sBab =	11	(μg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	5	(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 =	3592	(μg/s)
	mass flux of surface water into PM-13	M_s13 =	13470	(μg/s)
	mass flux of Babbitt WWTP	M_sBab =	103	(μg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	282	(μg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	30260	(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 =	5352	(μg/s)
	mass flux in river at PM-13	M_r13 =	57478	(μg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	14.86	(μg/l)
	concentration in river at PM-13	C_r13 =	27.56	(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 =	48.51	(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 =	11.50	(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 =	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 =	137	(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 =	244	(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 =	427	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.10	(µg/l)
	concentration in river at PM-13	C_r13 =	0.19	(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 =	48.51	(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 =	11.50	(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 =	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 =	98.7	(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 =	4637	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	17845	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	121	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	5558	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	19455	(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 =	5221	(mg/s)
	mass flux in river at PM-13	M_r13 =	50344	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	13.37	(mg/l)
	concentration in river at PM-13	C_r13 =	22.24	(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 =	48.51	(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 =	11.50	(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 =	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 =	110	(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 =	61	(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 =	249	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.09	(µg/l)
	concentration in river at PM-13	C_r13 =	0.11	(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 =	0.30	(cfs)
	surface water flow into PM-13	Q_s13 =	0.30	(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 =	1.20	(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 =	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 =	6.5	(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 =	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 =	85	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	85	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	93	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	731	(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 =	222	(mg/s)
	mass flux in river at PM-13	M_r13 =	1253	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	5.27	(mg/l)
	concentration in river at PM-13	C_r13 =	6.15	(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 =	48.51	(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 =	11.50	(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 =	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 =	824	(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 =	506	(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 =	1736	(μg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.6	(μg/l)
	concentration in river at PM-13	C_r13 =	0.8	(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 =	48.51	(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 =	11.50	(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 =	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 =	2.5	(µg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	2.5	(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 =	2059	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	14	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	141	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	814	(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 =	4136	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	1.66	(µg/l)
	concentration in river at PM-13	C_r13 =	1.83	(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: Flouride

Input Flow Data	surface water flow into PM-12	Q_s12 =	12.60	(cfs)
	surface water flow into PM-13	Q_s13 =	48.51	(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 =	11.50	(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 =	0.1	(mg/l)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/l)
	concentration of WWTP discharge	C_sBab =	0.1	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.2	(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 =	36	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	137	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	1	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	11	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	504	(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 =	46	(mg/s)
	mass flux in river at PM-13	M_r13 =	745	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.12	(mg/l)
	concentration in river at PM-13	C_r13 =	0.33	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		0.10	(mg/l)
	Observed concentration in river at PM-13		0.37	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Iron

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.77	(cfs)
	surface water flow into PM-13	Q_s13 =	2.63	(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 =	1.20	(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 =	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 =	1.96	(cfs)
	flow in river at PM-13	Q_r13 =	10.00	(cfs)
	flow check	Q_ck =	10.00	(cfs)
Calculation of Mass Flux	mass flux of surface water into PM-12	M_s12 =	64	(mg/l)
	mass flux of surface water into PM-13	M_s13 =	215	(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 =	156	(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 =	91	(mg/s)
	mass flux in river at PM-13	M_r13 =	467	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	1.65	(mg/l)
	concentration in river at PM-13	C_r13 =	1.65	(mg/l)
Observed Concentration	Observed concentration in river at PM-12		1.75	(mg/l)
	Observed concentration in river at PM-13		1.29	(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 =	48.51	(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 =	11.50	(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 =	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 =	925	(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 =	96090	(mg/l)
	mass flux of Babbitt WWTP	M_sBab =	654	(mg/l)
	concentration of Area 5 Pit NW discharge	M_spit =	52093	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	142091	(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 =	328452	(mg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	71.09	(mg/l)
	concentration in river at PM-13	C_r13 =	145.08	(mg/l)

Observed Concentration	Observed concentration in river at PM-12		61.70	(mg/l)
	Observed concentration in river at PM-13		143.50	(mg/l)

Embarrass River Model - Calibration to Baseline Water Quality Data

Parameter: Potassium

Input Flow Data	surface water flow into PM-12	Q_s12 =	0.30	(cfs)
	surface water flow into PM-13	Q_s13 =	0.30	(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 =	1.20	(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 =	3.7	(mg/l)
	concentration of surface water into PM-13	C_s13 =	3.7	(mg/l)
	concentration of WWTP discharge	C_sBab =	3.7	(mg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	48.6	(mg/l)
	concentration of LTVSMC Tailings Basin seepage	C_fs =	7.77	(mg/l)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	C_rrs =	0	
	concentration of ground water flow into PM-12	C_g12 =	1.6	(mg/l)
	concentration of ground water flow into PM-13	C_g13 =	1.6	(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 =	32	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	31	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	35	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	264	(mg/s)
	concentration of Hydrometallurgical Residue Cells Liner Leakage	M_rrs =	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	39	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	191	(mg/s)
Mass Balance	mass flux in river at PM-12	M_r12 =	105	(mg/s)
	mass flux in river at PM-13	M_r13 =	591	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	2.49	(mg/l)
	concentration in river at PM-13	C_r13 =	2.90	(mg/l)
Observed Concentration	Observed concentration in river at PM-12		0.78	(mg/l)
	Observed concentration in river at PM-13		2.31	(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 =	48.51	(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 =	11.50	(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 =	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 =	252	(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 =	2140	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	8236	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	56	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	14192	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	22772	(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 =	2455	(mg/s)
	mass flux in river at PM-13	M_r13 =	48924	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	6.29	(mg/l)
	concentration in river at PM-13	C_r13 =	21.61	(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 =	0.30	(cfs)
	surface water flow into PM-13	Q_s13 =	0.30	(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 =	1.20	(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 =	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 =	1.49	(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 =	3	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	3	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	3	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	0	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	40	(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 =	10	(mg/s)
	mass flux in river at PM-13	M_r13 =	75	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.24	(mg/l)
	concentration in river at PM-13	C_r13 =	0.37	(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 =	48.51	(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 =	11.50	(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 =	119	(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 =	1248	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	4804	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	33	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	6702	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	14421	(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 =	1400	(mg/s)
	mass flux in river at PM-13	M_r13 =	27911	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	3.59	(mg/l)
	concentration in river at PM-13	C_r13 =	12.33	(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 =	48.51	(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 =	11.50	(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 =	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 =	2.5	(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 =	1647	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	11	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	141	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	2239	(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 =	5471	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	1.6	(µg/l)
	concentration in river at PM-13	C_r13 =	2.4	(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 =	48.51	(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 =	11.50	(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 =	0	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0	(µg/l)
	concentration of WWTP discharge	C_sBab =	0	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	0.5	(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 =	0	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	0	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	0	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	28	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	391	(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 =	29	(µg/s)
	mass flux in river at PM-13	M_r13 =	591	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.07	(µg/l)
	concentration in river at PM-13	C_r13 =	0.26	(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 =	48.51	(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 =	11.50	(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 =	0.02	(µg/l)
	concentration of surface water into PM-13	C_s13 =	0.02	(µg/l)
	concentration of WWTP discharge	C_sBab =	0.02	(µg/l)
	concentration of Area 5 Pit NW discharge	C_spit =	1.5	(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 =	7	(µg/s)
	mass flux of surface water into PM-13	M_s13 =	27	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	0	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	84	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	81	(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 =	44	(µg/s)
	mass flux in river at PM-13	M_r13 =	416	(µg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.11	(µg/l)
	concentration in river at PM-13	C_r13 =	0.18	(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 =	48.51	(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 =	11.50	(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 =	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	(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 =	412	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	3	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	56	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	355	(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 =	1356	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	0.47	(µg/l)
	concentration in river at PM-13	C_r13 =	0.60	(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 =	48.51	(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 =	11.50	(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 =	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 =	1042	(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 =	5491	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	37	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	58682	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	49599	(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 =	116455	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	4.3	(mg/l)
	concentration in river at PM-13	C_r13 =	51.4	(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 =	48.51	(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 =	11.50	(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 =	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 =	1	(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 =	275	(mg/s)
	mass flux of Babbitt WWTP	M_sBab =	2	(mg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	56	(mg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	65	(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 =	470	(mg/s)
Calculated Concentration	concentration in river at PM-12	C_r12 =	0.19	(mg/l)
	concentration in river at PM-13	C_r13 =	0.21	(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 =	48.51	(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 =	11.50	(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 =	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 =	5	(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 =	21963	(µg/s)
	mass flux of Babbitt WWTP	M_sBab =	149	(µg/s)
	concentration of Area 5 Pit NW discharge	M_spit =	282	(µg/s)
	concentration of LTVSMC Tailings Basin seepage	M_fs =	4670	(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 =	34422	(µg/s)

Calculated Concentration	concentration in river at PM-12	C_r12 =	15.72	(µg/l)
	concentration in river at PM-13	C_r13 =	15.20	(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

Predicted Concentrations Using Mass-Balance Models for Embarrass River Watershed

Tailings Basin - Proposed Action

Tailings Basin - Geotechnical Mitigation

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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.27	(cfs)	PM-13
	flow check	Q_ck_L =	6.27	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.34	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.86	(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 =	92.68	(cfs)	PM-13
	flow check	Q_ck_M =	92.68	(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 =	7.96	(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 =	864.23	(cfs)	PM-13
	flow check	Q_ck_H =	864.23	(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 =	7.96	(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 =	-	(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 =	-	(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)		0.09	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.01	(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 1**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(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 =	38.29	(mg/s)		355.65	(mg/s)		355.65	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)		37.23	(mg/s)		406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	41.98	(mg/s)		571.64	(mg/s)		2,755.13	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)		0.095	(mg/L)		0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.237	(mg/L)		0.218	(mg/L)		0.113	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(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 =	0.07	(mg/s)	0.65	(mg/s)	0.65	(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 =	0.52	(mg/s)	3.24	(mg/s)	19.61	(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)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)	4.28	(mg/s)	49	(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 =	-	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	20.90	(mg/s)	239	(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 =	-	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.35	(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 =	8.00	(mg/s)	74.34	(mg/s)	74.34	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)	4.91	(mg/s)	49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.40	(mg/s)	122.61	(mg/s)	384.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)	0.013	(mg/L)	0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)	0.047	(mg/L)	0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.51	(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 =	2.26	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.54	(mg/s)		58.92	(mg/s)		299.10	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.071	(mg/L)		0.022	(mg/L)		0.012	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.02	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.02	(mg/s)		0.41	(mg/s)		2.60	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)		4,639.22	(mg/s)		52,669	(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 =	-	(mg/s)		121.41	(mg/s)		121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		22,636.89	(mg/s)		258,461	(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 =	-	(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 =	444.46	(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 =	1,449.83	(mg/s)		13,466.52	(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 =	462.42	(mg/s)		5,223.05	(mg/s)		53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,632.71	(mg/s)		53,100.63	(mg/s)		323,489.12	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)		13.374	(mg/l)		13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	26.104	(mg/L)		20.246	(mg/l)		13.227	(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 =	-	(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 =	-	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(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-Proposed Action

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

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 in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	183.09	(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 =	522.40	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,015.74	(mg/s)	28,273.26	(mg/s)	246,621.91	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	5.723	(mg/L)	10.780	(mg/L)	10.084	(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 =	-	(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 =	-	(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)	0.11	(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 =	0.04	(mg/s)	0.35	(mg/s)	0.35	(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 =	0.21	(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 =	0.001	(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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(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 =	0.11	(mg/s)		1.03	(mg/s)		1.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.74	(mg/s)		5.49	(mg/s)		38.24	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	44.38	(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 =	37.59	(mg/s)	349.17	(mg/s)	349.17	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	45.99	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	137.29	(mg/s)	1,034.46	(mg/s)	3,217.94	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.118	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.774	(mg/L)	0.394	(mg/L)	0.132	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(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 =	111.42	(mg/s)		1,034.88	(mg/s)		1,034.88	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	116.49	(mg/s)		7,154.16	(mg/s)		70,475.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.656	(mg/L)		2.728	(mg/L)		2.882	(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 =	-	(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 =	-	(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 =	3,057.32	(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 =	10,588.73	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	26,454.88	(mg/s)	340,174.23	(mg/s)	1,868,614.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	149.066	(mg/L)	129.701	(mg/L)	76.402	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	88.87	(mg/s)		825.45	(mg/s)		825.45	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	188.44	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,359.39	(mg/s)		15,029.28	(mg/s)
	mass flux in river at PM-13	M_r13 =	506.94	(mg/s)		13,633.01	(mg/s)		94,422.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.602	(mg/L)		3.481	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.856	(mg/L)		5.198	(mg/L)		3.861	(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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	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 =	-	(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 =	472.92	(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 =	1,696.96	(mg/s)		15,762.00	(mg/s)		15,762.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,704.25	(mg/s)		49,595.94	(mg/s)		180,605.13	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	20.872	(mg/L)		18.910	(mg/l)		7.384	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.81	(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 =	28.69	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	58.48	(mg/s)		979.13	(mg/s)		7,529.59	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.329	(mg/L)		0.373	(mg/l)		0.308	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)		1,249.02	(mg/s)		14,180	(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 =	-	(mg/s)		32.69	(mg/s)		32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,094.55	(mg/s)		69,586	(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 =	-	(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 =	641.91	(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 =	1,074.64	(mg/s)		9,981.63	(mg/s)		9,981.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)		1,400.96	(mg/s)		14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,427.13	(mg/s)		30,760.62	(mg/s)		107,182.65	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)		3.587	(mg/l)		3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	13.676	(mg/L)		11.728	(mg/l)		4.382	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(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 =	0.17	(mg/s)		1.55	(mg/s)		1.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.27	(mg/s)		6.24	(mg/s)		32.44	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)		0.002	(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 1**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.03	(mg/s)	0.27	(mg/s)	0.27	(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)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.51	(mg/s)	0.51	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	0.44	(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)	0.06	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.27	(mg/s)	0.76	(mg/s)	1.20	(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)	0.000	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.03	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.46	(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 =	0.003	(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-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 =	-	(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 =	-	(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 =	1,386.13	(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 =	3,696.11	(mg/s)	34,330.84	(mg/s)	34,330.84	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	6,518.78	(mg/s)	115,994.83	(mg/s)	203,334.29	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	36.732	(mg/L)	44.226	(mg/l)	8.314	(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 =	-	(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 =	-	(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)	0.09	(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 =	0.00	(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 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.01	(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 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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(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 =	0.35	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.09	(mg/s)		39.66	(mg/s)		389.02	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(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.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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.28	(cfs)	PM-13
	flow check	Q_ck_L =	6.28	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.41	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.79	(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 =	93.61	(cfs)	PM-13
	flow check	Q_ck_M =	93.61	(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 =	7.96	(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 =	865.16	(cfs)	PM-13
	flow check	Q_ck_H =	865.16	(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 =	7.96	(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 =	-	(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 =	-	(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)		0.10	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.01	(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 5**
Parameter	**Aluminum**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.11	(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 =	35.38	(mg/s)	355.65	(mg/s)	355.65	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	40.15	(mg/s)	581.97	(mg/s)	2,765.46	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.226	(mg/L)	0.220	(mg/L)	0.113	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(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 =	0.07	(mg/s)	0.65	(mg/s)	0.65	(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 =	0.54	(mg/s)	3.49	(mg/s)	19.87	(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)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.56	(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 =	7.40	(mg/s)		74.34	(mg/s)		74.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.05	(mg/s)		125.84	(mg/s)		387.86	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.068	(mg/L)		0.048	(mg/L)		0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)	3.93	(mg/s)	45	(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 =	-	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	19.15	(mg/s)	219	(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 =	-	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.58	(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 =	2.08	(mg/s)	20.95	(mg/s)	20.95	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	5.69	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.44	(mg/s)	59.99	(mg/s)	300.17	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.015	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)	0.023	(mg/L)	0.012	(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 =	-	(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 =	-	(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)		0.05	(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 =	0.02	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.03	(mg/s)		0.44	(mg/s)		2.62	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	641.67	(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 =	1,339.65	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,884.05	(mg/s)	55,586.80	(mg/s)	325,998.90	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	27.459	(mg/L)	20.983	(mg/l)	13.315	(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 =	-	(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 =	-	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(mg/s)	0.29	(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 5**
Parameter	**Chloride**

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 in Babbitt WWTP discharge	C_sBab =	10	(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)		3,568.63	(mg/s)		40,514	(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 =	-	(mg/s)		93.39	(mg/s)		93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		17,412.99	(mg/s)		198,816	(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 =	-	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	123.84	(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 =	482.71	(mg/s)		4,852.27	(mg/s)		4,852.27	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)		3,705.83	(mg/s)		40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,611.91	(mg/s)		28,512.64	(mg/s)		246,861.29	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)		9.489	(mg/L)		9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	9.063	(mg/L)		10.763	(mg/L)		10.083	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.03	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.22	(mg/s)		2.04	(mg/s)		15.14	(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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(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 =	0.10	(mg/s)	1.03	(mg/s)	1.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.77	(mg/s)	5.86	(mg/s)	38.61	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	25.95	(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 =	34.74	(mg/s)		349.17	(mg/s)		349.17	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	117.14	(mg/s)		884.30	(mg/s)		3,067.79	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.659	(mg/L)		0.334	(mg/L)		0.125	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(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 =	102.95	(mg/s)		1,034.88	(mg/s)		1,034.88	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	108.83	(mg/s)		7,160.87	(mg/s)		70,481.98	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.612	(mg/L)		2.703	(mg/L)		2.879	(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 =	-	(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 =	-	(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 =	3,017.90	(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 =	9,784.08	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	29,011.40	(mg/s)	345,514.05	(mg/s)	1,873,954.60	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	163.109	(mg/L)	130.427	(mg/L)	76.538	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	88.61	(mg/s)		890.78	(mg/s)		890.78	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	174.12	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,360.10	(mg/s)		15,029.99	(mg/s)
	mass flux in river at PM-13	M_r13 =	493.07	(mg/s)		13,699.05	(mg/s)		94,488.05	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.631	(mg/L)		3.483	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.772	(mg/L)		5.171	(mg/L)		3.859	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	343.77	(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 =	1,568.01	(mg/s)	15,762.00	(mg/s)	15,762.00	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,530.27	(mg/s)	48,743.09	(mg/s)	179,752.28	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/l)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	19.848	(mg/L)	18.400	(mg/l)	7.342	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.58	(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 =	26.51	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	57.07	(mg/s)		989.03	(mg/s)		7,539.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.321	(mg/L)		0.373	(mg/l)		0.308	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)		1,249.02	(mg/s)		14,180	(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 =	-	(mg/s)		32.69	(mg/s)		32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,094.55	(mg/s)		69,586	(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 =	-	(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 =	402.15	(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 =	992.97	(mg/s)		9,981.63	(mg/s)		9,981.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)		1,400.96	(mg/s)		14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,206.42	(mg/s)		28,941.52	(mg/s)		105,363.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)		3.587	(mg/l)		3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	12.405	(mg/L)		10.925	(mg/l)		4.303	(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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.34	(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 =	0.15	(mg/s)	1.55	(mg/s)	1.55	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.54	(mg/s)	8.88	(mg/s)	35.08	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.009	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.03	(mg/s)	0.27	(mg/s)	0.27	(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)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.55	(mg/s)	0.55	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.03	(mg/s)		0	(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 =	-	(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)		0.75	(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)		0.06	(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 =	0.04	(mg/s)		0.04	(mg/s)		0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.30	(mg/s)		1.08	(mg/s)		1.52	(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)		0.000	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.02	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.48	(mg/s)		1.55	(mg/s)		8.10	(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)		0.000	(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-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 =	-	(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 =	-	(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 =	1,621.93	(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 =	3,415.24	(mg/s)	34,330.84	(mg/s)	34,330.84	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,375.46	(mg/s)	122,325.77	(mg/s)	209,665.23	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	52.711	(mg/L)	46.176	(mg/l)	8.563	(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 =	-	(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 =	-	(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)		0.11	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.61	(mg/s)		4.97	(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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.20	(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 =	0.32	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.18	(mg/s)		40.82	(mg/s)		390.18	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(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.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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.28	(cfs)	PM-13
	flow check	Q_ck_L =	6.28	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.45	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.75	(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 =	94.29	(cfs)	PM-13
	flow check	Q_ck_M =	94.29	(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 =	7.96	(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 =	865.84	(cfs)	PM-13
	flow check	Q_ck_H =	865.84	(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 =	7.96	(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 =	-	(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 =	-	(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)		0.12	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.01	(mg/s)		0.38	(mg/s)		2.79	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.28	(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 =	33.47	(mg/s)	355.65	(mg/s)	355.65	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	38.40	(mg/s)	584.42	(mg/s)	2,767.91	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.216	(mg/L)	0.219	(mg/L)	0.113	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(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 =	0.06	(mg/s)	0.65	(mg/s)	0.65	(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 =	0.54	(mg/s)	3.66	(mg/s)	20.03	(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)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.80	(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 =	7.00	(mg/s)		74.34	(mg/s)		74.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.87	(mg/s)		129.21	(mg/s)		391.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.067	(mg/L)		0.048	(mg/L)		0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.64	(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 =	1.97	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.39	(mg/s)		60.98	(mg/s)		301.17	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)		0.023	(mg/L)		0.012	(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 =	-	(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 =	-	(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)		0.07	(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 =	0.02	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.03	(mg/s)		0.46	(mg/s)		2.65	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	925.47	(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 =	1,267.42	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,051.30	(mg/s)	58,925.58	(mg/s)	329,331.31	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	28.417	(mg/L)	22.082	(mg/l)	13.440	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(mg/s)		0.31	(mg/s)		2.06	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	77.48	(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 =	456.68	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,352.05	(mg/s)	27,903.51	(mg/s)	246,252.16	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	7.606	(mg/L)	10.457	(mg/L)	10.050	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.03	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.22	(mg/s)		2.12	(mg/s)		15.22	(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 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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(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 =	0.10	(mg/s)	1.03	(mg/s)	1.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.78	(mg/s)	6.11	(mg/s)	38.87	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	10.06	(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 =	32.86	(mg/s)		349.17	(mg/s)		349.17	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	99.07	(mg/s)		730.04	(mg/s)		2,913.52	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.557	(mg/L)		0.274	(mg/L)		0.119	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.74	(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 =	97.40	(mg/s)		1,034.88	(mg/s)		1,034.88	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	103.29	(mg/s)		7,161.77	(mg/s)		70,482.88	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.581	(mg/L)		2.684	(mg/L)		2.876	(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 =	-	(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 =	-	(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 =	3,221.47	(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 =	9,256.51	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	27,770.27	(mg/s)	348,488.83	(mg/s)	1,876,929.38	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	156.224	(mg/L)	130.596	(mg/L)	76.599	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	85.90	(mg/s)		912.75	(mg/s)		912.75	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	164.73	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,359.91	(mg/s)		15,029.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	480.78	(mg/s)		13,720.83	(mg/s)		94,509.83	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.624	(mg/L)		3.482	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.705	(mg/L)		5.142	(mg/L)		3.857	(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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	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 =	-	(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 =	221.12	(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 =	1,483.46	(mg/s)		15,762.00	(mg/s)		15,762.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,300.38	(mg/s)		47,614.12	(mg/s)		178,623.31	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	18.567	(mg/L)		17.843	(mg/l)		7.290	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.79	(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 =	25.08	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	55.85	(mg/s)		993.32	(mg/s)		7,543.78	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.314	(mg/L)		0.372	(mg/l)		0.308	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)		1,249.02	(mg/s)		14,180	(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 =	-	(mg/s)		32.69	(mg/s)		32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,094.55	(mg/s)		69,586	(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 =	-	(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 =	241.52	(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 =	939.43	(mg/s)		9,981.63	(mg/s)		9,981.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)		1,400.96	(mg/s)		14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,965.10	(mg/s)		27,438.13	(mg/s)		103,860.16	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)		3.587	(mg/l)		3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	11.055	(mg/L)		10.282	(mg/l)		4.239	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.49	(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 =	0.15	(mg/s)		1.55	(mg/s)		1.55	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.67	(mg/s)		10.63	(mg/s)		36.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.009	(mg/L)		0.004	(mg/L)		0.002	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.03	(mg/s)	0.27	(mg/s)	0.27	(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)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.63	(mg/s)	0.63	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	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)	0.06	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.33	(mg/s)	1.45	(mg/s)	1.89	(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	**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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.48	(mg/s)		1.59	(mg/s)		8.14	(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)		0.000	(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-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 =	-	(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 =	-	(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 =	1,955.65	(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 =	3,231.09	(mg/s)	34,330.84	(mg/s)	34,330.84	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	8,742.44	(mg/s)	126,018.27	(mg/s)	213,357.73	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	49.181	(mg/L)	47.225	(mg/l)	8.707	(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 =	-	(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 =	-	(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)	0.13	(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 =	0.00	(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 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)	0.63	(mg/s)	4.99	(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 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 =	-	(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 =	-	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.37	(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 =	0.30	(mg/s)	3.23	(mg/s)	3.23	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.33	(mg/s)	42.72	(mg/s)	392.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.013	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.28	(cfs)	PM-13
	flow check	Q_ck_L =	6.28	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.48	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.72	(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 =	94.76	(cfs)	PM-13
	flow check	Q_ck_M =	94.76	(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 =	7.96	(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 =	866.31	(cfs)	PM-13
	flow check	Q_ck_H =	866.31	(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 =	7.96	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)					0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)					0.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)					0.02	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)					0.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)					2.80	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)					0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	405	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,988	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.44	(mg/s)	15.88	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	32.29	(mg/s)	355.65	(mg/s)
			Low Flow		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	37.38	(mg/s)	2,770.18	(mg/s)
			Low Flow		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.210	(mg/L)	0.113	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					3	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)					0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					15	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)					0.33	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)					1.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)					0.65	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)					3.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.56	(mg/s)					20.21	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)					0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					49	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)					0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					239	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)					2.53	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.96	(mg/s)					21.59	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)					0.04	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	6.75	(mg/s)					74.34	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)					49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.79	(mg/s)					393.72	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)					0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.066	(mg/L)					0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	45	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	219	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.68	(mg/s)	7.51	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	1.90	(mg/s)	20.95	(mg/s)
			Low Flow		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.36	(mg/s)	301.85	(mg/s)
			Low Flow		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)	0.012	(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		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)	0.08	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.02	(mg/s)	0.17	(mg/s)
			Low Flow		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.03	(mg/s)	2.66	(mg/s)
			Low Flow		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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						**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					52,669	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)					462.42	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					258,461	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)					2,263.72	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,020.37	(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)
	mass flux in seepage from cell 2W	M_s2w =	1,222.55	(mg/s)					22.45	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	462.42	(mg/s)					53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,125.29	(mg/s)					330,764.89	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)					13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	28.823	(mg/L)					13.491	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)					0.01	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					2	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)					0.04	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)					0.06	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)					0.04	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)					0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(mg/s)					2.07	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)					0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.000	(mg/L)					0.000	(mg/L)

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

Case	Year 9
Parameter	Chloride

Section	Description	Variable	Value	Unit
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 in Babbitt WWTP discharge	C_sBab =	10	(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)

Section	Description	Variable	Low Flow	Unit					High Flow	Unit
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					40,514	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)					43.81	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					198,816	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)					214.46	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	79.55	(mg/s)					876.22	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	660.93	(mg/s)					660.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	440.51	(mg/s)					4,852.27	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)					40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,439.26	(mg/s)					246,406.43	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)					9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	8.094	(mg/L)					10.051	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					2	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)					0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					12	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)					0.13	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(mg/s)					0.37	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.03	(mg/s)					0.35	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)					2.46	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.23	(mg/s)					15.28	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)					0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					6	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)					0.10	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					30	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)					0.48	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(mg/s)					1.28	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)					1.03	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)					6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.78	(mg/s)					38.99	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)					0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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		High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	405	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,988	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.34	(mg/s)	102.84	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.07	(mg/s)	1.07	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	31.70	(mg/s)	349.17	(mg/s)
			Low Flow		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	97.35	(mg/s)	2,909.59	(mg/s)
			Low Flow		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.547	(mg/L)	0.119	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					11,749	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)					0.85	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					27.08	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					57,657	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)					4.17	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.80	(mg/s)					8.80	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.15	(mg/s)					0.15	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	93.95	(mg/s)					1,034.88	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)					11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	99.92	(mg/s)					70,483.84	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)					2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.562	(mg/L)					2.875	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(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)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					653.73	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(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)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,453.69	(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)
	mass flux in seepage from cell 2W	M_s2w =	8,928.86	(mg/s)					98,352.01	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)					286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	28,170.45	(mg/s)					1,881,239.00	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)					70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	158.424	(mg/L)					76.733	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					14,990	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)					38.94	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.68	(mg/s)					0.68	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					73,562	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)					190.63	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					3,029.85	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	95.16	(mg/s)					1,048.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	158.90	(mg/s)					1,750.33	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.62	(mg/s)					15,029.90	(mg/s)
	mass flux in river at PM-13	M_r13 =	484.31	(mg/s)					94,645.42	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.628	(mg/L)					3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.724	(mg/L)					3.860	(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 =	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 =	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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					24,309	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)					259.20	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					56.03	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					119,290	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)					1,268.87	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	219.96	(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)
	mass flux in seepage from cell 2W	M_s2w =	1,430.95	(mg/s)					15,762.00	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)					24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,258.97	(mg/s)					178,709.09	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)					6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	18.328	(mg/L)					7.289	(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						**High Flow**	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					1,215	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)					4.58	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					2.80	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					5,964	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)					22.40	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.90	(mg/s)					42.96	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	24.19	(mg/s)					266.49	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)					1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	55.07	(mg/s)					7,546.45	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)					0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.310	(mg/L)					0.308	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					14,180	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)					119.26	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					69,586	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)					583.80	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	298.66	(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)
	mass flux in seepage from cell 2W	M_s2w =	906.18	(mg/s)					9,981.63	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)					14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,003.65	(mg/s)					104,598.32	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)					3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	11.268	(mg/L)					4.266	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					5	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)					0.17	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.01	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					24	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)					0.83	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.56	(mg/s)					6.13	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)					0.04	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.14	(mg/s)					1.55	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)					5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.74	(mg/s)					37.74	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)					0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.010	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					-	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)					0.03	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					-	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)					0.14	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)					0.26	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.02	(mg/s)					0.27	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)					0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.22	(mg/s)					0.72	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)					0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					0	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)					0.04	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					0	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)					0.18	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(mg/s)					1.31	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)					0.06	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)					0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.34	(mg/s)					2.08	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)					0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)					0.07	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					6	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)					0.35	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)					0.21	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)					0.02	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.02	(mg/s)					0.25	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)					1.29	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.48	(mg/s)					8.17	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)					0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					16,206	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)					206.87	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					37.36	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(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)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,250.82	(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)
	mass flux in seepage from cell 2W	M_s2w =	3,116.72	(mg/s)					34,330.84	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)					16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	9,346.14	(mg/s)					217,794.48	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)					4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	52.561	(mg/L)					8.884	(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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					1	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					4	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)					0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)					0.14	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)					0.05	(mg/s)
			Low Flow						High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)					0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)					5.01	(mg/s)
			Low Flow						High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)					0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	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						High Flow	
Convert concentration to mass flux	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)					65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)					0.28	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	-	(mg/s)					0.15	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)					318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)					1.37	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(mg/s)					0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.54	(mg/s)					5.91	(mg/s)
	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)					0.00	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	0.29	(mg/s)					3.23	(mg/s)
			Low Flow						**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)					65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.48	(mg/s)					394.05	(mg/s)
			Low Flow						**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)					0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.29	(cfs)	PM-13
	flow check	Q_ck_L =	6.29	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.50	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.70	(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 =	95.15	(cfs)	PM-13
	flow check	Q_ck_M =	95.15	(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 =	7.96	(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 =	866.70	(cfs)	PM-13
	flow check	Q_ck_H =	866.70	(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 =	7.96	(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 =	-	(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 =	-	(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)		0.19	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.02	(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 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

1.99
5.646967273

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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.25	(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 =	31.37	(mg/s)		355.65	(mg/s)		355.65	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)		37.23	(mg/s)		406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	38.31	(mg/s)		638.71	(mg/s)		2,822.19	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)		0.095	(mg/L)		0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.215	(mg/L)		0.237	(mg/L)		0.115	(mg/L)

1.99
5.646967273

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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.22	(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 =	0.06	(mg/s)	0.65	(mg/s)	0.65	(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 =	0.34	(mg/s)	4.86	(mg/s)	21.23	(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)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

1.99
5.646967273

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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.44	(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 =	6.56	(mg/s)		74.34	(mg/s)		74.34	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	9.57	(mg/s)		135.28	(mg/s)		397.30	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.054	(mg/L)		0.050	(mg/L)		0.016	(mg/L)

1.99
5.646967273

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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.89	(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 =	1.85	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	4.40	(mg/s)		56.18	(mg/s)		296.36	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.025	(mg/L)		0.021	(mg/L)		0.012	(mg/L)

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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 =	-	(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 =	-	(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)		0.23	(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 =	0.01	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.04	(mg/s)		0.61	(mg/s)		2.79	(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)

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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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	1,344.25	(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 =	1,187.61	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,199.75	(mg/s)	62,144.43	(mg/s)	332,560.68	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	17.983	(mg/L)	23.077	(mg/l)	13.559	(mg/l)

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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 =	-	(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 =	-	(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)		0.11	(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 =	0.00	(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 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.34	(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)

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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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	107.17	(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 =	427.92	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,448.15	(mg/s)	28,390.67	(mg/s)	246,739.32	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	8.139	(mg/L)	10.543	(mg/L)	10.060	(mg/L)

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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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(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 =	0.03	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.18	(mg/s)		3.06	(mg/s)		16.16	(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)		0.001	(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)

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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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.29	(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 =	0.09	(mg/s)		1.03	(mg/s)		1.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.48	(mg/s)		7.80	(mg/s)		40.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(mg/L)		0.003	(mg/L)		0.002	(mg/L)

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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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.65	(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 =	30.79	(mg/s)	349.17	(mg/s)	349.17	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	45.99	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	53.22	(mg/s)	709.81	(mg/s)	2,893.30	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.118	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.299	(mg/L)	0.264	(mg/L)	0.118	(mg/L)

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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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.38	(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 =	91.27	(mg/s)	1,034.88	(mg/s)	1,034.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	93.70	(mg/s)	7,165.50	(mg/s)	70,486.61	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.527	(mg/L)	2.661	(mg/L)	2.874	(mg/L)

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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 =	-	(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 =	-	(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 =	4,507.05	(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 =	8,673.67	(mg/s)		98,352.01	(mg/s)		98,352.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	19,562.68	(mg/s)		356,455.91	(mg/s)		1,884,896.46	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	109.943	(mg/L)		132.370	(mg/L)		76.848	(mg/L)

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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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	205.50	(mg/s)		2,330.24	(mg/s)		2,330.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	154.36	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,360.22	(mg/s)		15,030.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	399.70	(mg/s)		14,948.01	(mg/s)		95,737.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.637	(mg/L)		3.483	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.246	(mg/L)		5.551	(mg/L)		3.903	(mg/l)

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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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	-	(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 =	279.37	(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 =	1,390.05	(mg/s)		15,762.00	(mg/s)		15,762.00	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,033.82	(mg/s)		47,201.12	(mg/s)		178,210.31	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	11.430	(mg/L)		17.528	(mg/l)		7.266	(mg/l)

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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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.09	(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 =	23.50	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	34.17	(mg/s)		999.74	(mg/s)		7,550.19	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.192	(mg/L)		0.371	(mg/l)		0.308	(mg/l)

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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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	317.45	(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 =	880.28	(mg/s)	9,981.63	(mg/s)	9,981.63	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,442.92	(mg/s)	27,932.52	(mg/s)	104,354.55	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	8.109	(mg/L)	10.373	(mg/l)	4.255	(mg/l)

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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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.17	(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 =	0.14	(mg/s)	1.55	(mg/s)	1.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.52	(mg/s)	29.15	(mg/s)	55.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.011	(mg/L)	0.002	(mg/L)

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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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.02	(mg/s)		0.27	(mg/s)		0.27	(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)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.09	(mg/s)		0.70	(mg/s)		0.70	(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 =	0.000	(mg/L)		0.000	(mg/L)		0.000	(mg/L)

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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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(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 =	0.00	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.20	(mg/s)	1.96	(mg/s)	2.40	(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 =	0.001	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

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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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(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 =	0.02	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.16	(mg/s)		1.47	(mg/s)		8.02	(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)		0.000	(mg/L)		0.000	(mg/L)
	concentration in river at PM-13	C_r13 =	0.001	(mg/L)		0.001	(mg/L)		0.000	(mg/L)

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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 =	-	(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 =	-	(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 =	3,409.53	(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 =	3,027.64	(mg/s)		34,330.84	(mg/s)		34,330.84	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,272.65	(mg/s)		144,180.08	(mg/s)		231,519.54	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	57.733	(mg/L)		53.541	(mg/l)		9.439	(mg/l)

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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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.69	(mg/s)		5.06	(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)

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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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.14	(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 =	0.29	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.71	(mg/s)		50.38	(mg/s)		399.74	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.010	(mg/L)		0.019	(mg/L)		0.016	(mg/L)

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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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.29	(cfs)	PM-13
	flow check	Q_ck_L =	6.29	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.51	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.69	(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 =	95.48	(cfs)	PM-13
	flow check	Q_ck_M =	95.48	(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 =	7.96	(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 =	867.03	(cfs)	PM-13
	flow check	Q_ck_H =	867.03	(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 =	7.96	(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 =	-	(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 =	-	(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)		0.21	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.02	(mg/s)		0.47	(mg/s)		2.88	(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	**Aluminum**

Input concentration data				
	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.44	(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 =	30.64	(mg/s)	355.65	(mg/s)	355.65	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	39.76	(mg/s)	633.96	(mg/s)	2,817.44	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.223	(mg/L)	0.235	(mg/L)	0.115	(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 =	-	(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 =	-	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.21	(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 =	0.06	(mg/s)		0.65	(mg/s)		0.65	(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 =	0.66	(mg/s)		5.14	(mg/s)		21.51	(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)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)	4.28	(mg/s)	49	(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 =	-	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	20.90	(mg/s)	239	(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 =	-	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.53	(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 =	6.40	(mg/s)	74.34	(mg/s)	74.34	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)	4.91	(mg/s)	49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.04	(mg/s)	139.56	(mg/s)	401.58	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)	0.013	(mg/L)	0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.068	(mg/L)	0.052	(mg/L)	0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.96	(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 =	1.80	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.54	(mg/s)		65.30	(mg/s)		305.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)		0.024	(mg/L)		0.012	(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 =	-	(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 =	-	(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)		0.22	(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 =	0.01	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.04	(mg/s)		0.61	(mg/s)		2.79	(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	**Calcium**

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 in Babbitt WWTP discharge	C_sBab =	13	(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)		4,639.22	(mg/s)		52,669	(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 =	-	(mg/s)		121.41	(mg/s)		121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		22,636.89	(mg/s)		258,461	(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 =	-	(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 =	1,111.71	(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 =	1,159.99	(mg/s)		13,466.52	(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 =	462.42	(mg/s)		5,223.05	(mg/s)		53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,225.09	(mg/s)		62,093.28	(mg/s)		332,512.66	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)		13.374	(mg/l)		13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	29.357	(mg/L)		22.980	(mg/l)		13.552	(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 =	-	(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 =	-	(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)	0.09	(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 =	0.00	(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 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(mg/s)	0.35	(mg/s)	2.10	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	111.46	(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 =	417.97	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,749.14	(mg/s)	28,776.03	(mg/s)	247,124.68	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	9.827	(mg/L)	10.650	(mg/L)	10.072	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(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 =	0.03	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.31	(mg/s)		3.15	(mg/s)		16.25	(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)		0.001	(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 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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.29	(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 =	0.09	(mg/s)	1.03	(mg/s)	1.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.96	(mg/s)	8.37	(mg/s)	41.12	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.21	(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 =	30.08	(mg/s)		349.17	(mg/s)		349.17	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	98.09	(mg/s)		753.94	(mg/s)		2,937.43	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.551	(mg/L)		0.279	(mg/L)		0.120	(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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.27	(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 =	89.14	(mg/s)	1,034.88	(mg/s)	1,034.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	95.65	(mg/s)	7,168.74	(mg/s)	70,489.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.537	(mg/L)	2.653	(mg/L)	2.873	(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 =	-	(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 =	-	(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 =	3,941.56	(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 =	8,471.90	(mg/s)		98,352.01	(mg/s)		98,352.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	29,671.51	(mg/s)		361,984.35	(mg/s)		1,890,424.90	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	166.706	(mg/L)		133.964	(mg/L)		77.044	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	195.74	(mg/s)		2,272.35	(mg/s)		2,272.35	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	150.77	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,360.32	(mg/s)		15,030.21	(mg/s)
	mass flux in river at PM-13	M_r13 =	577.06	(mg/s)		15,080.85	(mg/s)		95,869.85	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.640	(mg/L)		3.483	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	3.242	(mg/L)		5.581	(mg/L)		3.907	(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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	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 =	-	(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 =	283.06	(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 =	1,357.72	(mg/s)		15,762.00	(mg/s)		15,762.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,285.20	(mg/s)		48,599.41	(mg/s)		179,608.60	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	18.458	(mg/L)		17.986	(mg/l)		7.320	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.56	(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 =	22.96	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	56.49	(mg/s)		1,029.15	(mg/s)		7,579.60	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.317	(mg/L)		0.381	(mg/l)		0.309	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	281.86	(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 =	859.80	(mg/s)	9,981.63	(mg/s)	9,981.63	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,984.02	(mg/s)	28,202.32	(mg/s)	104,624.34	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	11.147	(mg/L)	10.437	(mg/l)	4.264	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.06	(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 =	0.13	(mg/s)		1.55	(mg/s)		1.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	3.26	(mg/s)		29.39	(mg/s)		55.59	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.018	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.02	(mg/s)		0.27	(mg/s)		0.27	(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)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.22	(mg/s)		0.77	(mg/s)		0.77	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	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 =	0.00	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.37	(mg/s)	2.06	(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 =	0.002	(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	**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 =	-	(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 =	-	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.02	(mg/s)	0.25	(mg/s)	0.25	(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 =	0.51	(mg/s)	1.81	(mg/s)	8.36	(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)	0.000	(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-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 =	-	(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 =	-	(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 =	3,085.44	(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 =	2,957.21	(mg/s)		34,330.84	(mg/s)		34,330.84	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	11,275.75	(mg/s)		142,736.07	(mg/s)		230,075.53	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	63.351	(mg/L)		52.824	(mg/l)		9.377	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.69	(mg/s)		5.06	(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	**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 =	-	(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 =	-	(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)	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 =	0.28	(mg/s)	3.23	(mg/s)	3.23	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.82	(mg/s)	49.11	(mg/s)	398.46	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.016	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.27	(cfs)	PM-13
	flow check	Q_ck_L =	6.27	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.51	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.69	(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 =	87.35	(cfs)	PM-13
	flow check	Q_ck_M =	87.35	(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 =	3.37	(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 =	858.90	(cfs)	PM-13
	flow check	Q_ck_H =	858.90	(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 =	3.37	(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 =	-	(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 =	-	(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)		0.07	(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)		0.01	(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 =	0.02	(mg/s)		0.32	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.11	(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 =	31.04	(mg/s)	150.57	(mg/s)	150.57	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	43.75	(mg/s)	409.87	(mg/s)	2,593.35	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.246	(mg/L)	0.166	(mg/L)	0.107	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.18	(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 =	0.06	(mg/s)	0.28	(mg/s)	0.28	(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 =	0.63	(mg/s)	3.18	(mg/s)	19.56	(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)	0.001	(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	**Closure**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.84	(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 =	6.49	(mg/s)		31.47	(mg/s)		31.47	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.38	(mg/s)		81.01	(mg/s)		343.02	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)		0.033	(mg/L)		0.014	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(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 =	1.83	(mg/s)		8.87	(mg/s)		8.87	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.29	(mg/s)		45.41	(mg/s)		285.59	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)		0.018	(mg/L)		0.012	(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 =	-	(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 =	-	(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)		0.06	(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 =	0.01	(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 =	0.00	(mg/s)		0.04	(mg/s)		0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.03	(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	Closure
Parameter	Calcium

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 in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	857.11	(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 =	1,175.36	(mg/s)	5,701.28	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,778.13	(mg/s)	45,371.84	(mg/s)	323,526.61	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	26.921	(mg/L)	18.354	(mg/l)	13.310	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.05	(mg/s)		0.25	(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	**Closure**
Parameter	**Chloride**

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 in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	89.94	(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 =	423.51	(mg/s)	2,054.29	(mg/s)	2,054.29	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	854.27	(mg/s)	24,241.46	(mg/s)	242,590.11	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	4.813	(mg/L)	9.806	(mg/L)	9.980	(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 =	-	(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 =	-	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.03	(mg/s)	0.15	(mg/s)	0.15	(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 =	0.21	(mg/s)	1.70	(mg/s)	14.80	(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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(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 =	0.09	(mg/s)		0.43	(mg/s)		0.43	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.92	(mg/s)		5.63	(mg/s)		38.38	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(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	**Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(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 =	30.48	(mg/s)		147.83	(mg/s)		147.83	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	86.11	(mg/s)		422.25	(mg/s)		2,605.74	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.485	(mg/L)		0.171	(mg/L)		0.107	(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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.65	(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 =	90.32	(mg/s)	438.13	(mg/s)	438.13	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	105.01	(mg/s)	6,603.85	(mg/s)	69,924.96	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.592	(mg/L)	2.671	(mg/L)	2.877	(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 =	-	(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 =	-	(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 =	3,251.11	(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 =	8,584.18	(mg/s)		41,638.98	(mg/s)		41,638.98	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	24,793.78	(mg/s)		270,983.44	(mg/s)		1,799,423.99	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	139.693	(mg/L)		109.618	(mg/L)		74.029	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	191.19	(mg/s)		927.38	(mg/s)		927.38	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	152.77	(mg/s)		741.03	(mg/s)		741.03	(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)		1,359.42	(mg/s)		15,029.31	(mg/s)
	mass flux in river at PM-13	M_r13 =	573.61	(mg/s)		12,725.67	(mg/s)		93,514.67	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.603	(mg/L)		3.481	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	3.232	(mg/L)		5.148	(mg/L)		3.847	(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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	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 =	-	(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 =	269.77	(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 =	1,375.71	(mg/s)		6,673.11	(mg/s)		6,673.11	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,183.54	(mg/s)		37,426.64	(mg/s)		168,435.83	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	17.937	(mg/L)		15.140	(mg/l)		6.930	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.95	(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 =	23.26	(mg/s)		112.82	(mg/s)		112.82	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	54.19	(mg/s)		818.53	(mg/s)		7,368.99	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.305	(mg/L)		0.331	(mg/l)		0.303	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	173.73	(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 =	871.20	(mg/s)	4,225.89	(mg/s)	4,225.89	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,759.95	(mg/s)	19,889.75	(mg/s)	96,311.77	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	9.916	(mg/L)	8.046	(mg/l)	3.962	(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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.22	(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 =	0.14	(mg/s)	0.66	(mg/s)	0.66	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.36	(mg/s)	5.54	(mg/s)	31.74	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(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	**Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(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 =	0.03	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)		0.38	(mg/s)		0.38	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	0.37	(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 =	0.00	(mg/s)	0.02	(mg/s)	0.02	(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)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.30	(mg/s)	0.67	(mg/s)	1.10	(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)	0.000	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(mg/s)		0.10	(mg/s)		0.10	(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 =	0.47	(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 =	0.003	(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-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 =	-	(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 =	-	(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 =	1,576.45	(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 =	2,996.40	(mg/s)	14,534.54	(mg/s)	14,534.54	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	6,137.09	(mg/s)	91,098.21	(mg/s)	178,437.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	34.578	(mg/L)	36.851	(mg/l)	7.341	(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 =	-	(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 =	-	(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)		0.06	(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)		0.02	(mg/s)		0.02	(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)		0.54	(mg/s)		4.91	(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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.29	(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 =	0.28	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.22	(mg/s)		38.31	(mg/s)		387.67	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.013	(mg/L)		0.015	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.27	(cfs)	PM-13
	flow check	Q_ck_L =	6.27	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.77	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.43	(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 =	85.33	(cfs)	PM-13
	flow check	Q_ck_M =	85.33	(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 =	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 =	1.35	(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 =	856.88	(cfs)	PM-13
	flow check	Q_ck_H =	856.88	(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 =	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 =	1.35	(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 =	-	(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 =	-	(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)		0.07	(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 =	0.02	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.96	(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 =	19.04	(mg/s)	60.32	(mg/s)	60.32	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	36.59	(mg/s)	319.61	(mg/s)	2,503.10	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.206	(mg/L)	0.132	(mg/L)	0.103	(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 =	-	(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 =	-	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.27	(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 =	0.04	(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 =	0.70	(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 =	0.0027	(mg/L)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.0039	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)	4.28	(mg/s)	49	(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 =	-	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	20.90	(mg/s)	239	(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 =	-	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4.35	(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 =	3.98	(mg/s)	12.61	(mg/s)	12.61	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)	4.91	(mg/s)	49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.38	(mg/s)	62.14	(mg/s)	324.16	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)	0.013	(mg/L)	0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.064	(mg/L)	0.026	(mg/L)	0.013	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)	3.93	(mg/s)	45	(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 =	-	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	19.15	(mg/s)	219	(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 =	-	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.05	(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 =	1.12	(mg/s)	3.55	(mg/s)	3.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	5.69	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.95	(mg/s)	40.09	(mg/s)	280.28	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.015	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.067	(mg/L)	0.017	(mg/L)	0.012	(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 =	-	(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 =	-	(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)		0.06	(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 =	0.01	(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 =	0.03	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	1,312.64	(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 =	721.08	(mg/s)	2,283.89	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,779.37	(mg/s)	41,954.45	(mg/s)	323,526.61	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	26.928	(mg/L)	17.373	(mg/l)	13.341	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.05	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)		3,568.63	(mg/s)		40,514	(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 =	-	(mg/s)		93.39	(mg/s)		93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		17,412.99	(mg/s)		198,816	(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 =	-	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	137.73	(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 =	259.82	(mg/s)		822.94	(mg/s)		822.94	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)		3,705.83	(mg/s)		40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	738.38	(mg/s)		23,010.11	(mg/s)		241,358.76	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)		9.489	(mg/L)		9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	4.160	(mg/L)		9.528	(mg/L)		9.953	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.02	(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 =	0.21	(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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(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 =	0.05	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.03	(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 =	0.00400	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.00579	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(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 =	18.70	(mg/s)		59.22	(mg/s)		59.22	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	74.47	(mg/s)		333.65	(mg/s)		2,517.13	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.420	(mg/L)		0.138	(mg/L)		0.104	(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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	14.78	(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 =	55.41	(mg/s)	175.51	(mg/s)	175.51	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	75.23	(mg/s)	6,341.23	(mg/s)	69,662.34	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.424	(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 =	-	(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 =	-	(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 =	4,978.97	(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 =	5,266.36	(mg/s)		16,680.30	(mg/s)		16,680.30	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	23,203.82	(mg/s)		246,024.76	(mg/s)		1,774,465.31	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	130.735	(mg/L)		101.877	(mg/L)		73.175	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	292.79	(mg/s)		927.38	(mg/s)		927.38	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	93.72	(mg/s)		296.85	(mg/s)		296.85	(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)		1,359.42	(mg/s)		15,029.31	(mg/s)
	mass flux in river at PM-13	M_r13 =	616.17	(mg/s)		12,281.49	(mg/s)		93,070.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.603	(mg/L)		3.481	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	3.472	(mg/L)		5.086	(mg/L)		3.838	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	413.14	(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 =	843.99	(mg/s)	2,673.20	(mg/s)	2,673.20	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,795.20	(mg/s)	33,426.73	(mg/s)	164,435.92	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/l)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	15.749	(mg/L)	13.842	(mg/l)	6.781	(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 =	-	(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 =	-	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.05	(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 =	14.27	(mg/s)	45.20	(mg/s)	45.20	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	47.30	(mg/s)	750.91	(mg/s)	7,301.36	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.266	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	266.06	(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 =	534.48	(mg/s)	1,692.86	(mg/s)	1,692.86	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,515.56	(mg/s)	17,356.72	(mg/s)	93,778.75	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	8.539	(mg/L)	7.187	(mg/l)	3.867	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.33	(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 =	0.08	(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 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.42	(mg/s)		5.14	(mg/s)		31.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(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	**Post-Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.01	(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)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)		0.31	(mg/s)		0.31	(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 =	0.001	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.03	(mg/s)		0	(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 =	-	(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)		0.37	(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 =	0.00	(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)		0.04	(mg/s)		0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.34	(mg/s)		0.65	(mg/s)		1.09	(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)		0.000	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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)		0.04	(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 =	0.47	(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 =	0.003	(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-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 =	-	(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 =	-	(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 =	2,414.28	(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 =	1,838.28	(mg/s)	5,822.44	(mg/s)	5,822.44	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,816.80	(mg/s)	82,386.11	(mg/s)	169,725.57	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	32.773	(mg/L)	34.116	(mg/l)	6.999	(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 =	-	(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 =	-	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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)	0.01	(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)	0.53	(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 =	-	(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 =	-	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.44	(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 =	0.17	(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 =	0.28	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.27	(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 =	0.012	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.013	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.27	(cfs)	PM-13
	flow check	Q_ck_L =	6.27	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.37	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.83	(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 =	93.06	(cfs)	PM-13
	flow check	Q_ck_M =	93.06	(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 =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	7.96	(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 =	864.61	(cfs)	PM-13
	flow check	Q_ck_H =	864.61	(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 =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	7.96	(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 =	-	(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 =	-	(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)		0.09	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.01	(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- Geotechnical Mitigation

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

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(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 =	37.03	(mg/s)	355.65	(mg/s)	355.65	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	40.73	(mg/s)	571.75	(mg/s)	2,755.24	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.229	(mg/L)	0.217	(mg/L)	0.113	(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 =	-	(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 =	-	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(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 =	0.07	(mg/s)		0.65	(mg/s)		0.65	(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 =	0.53	(mg/s)		3.38	(mg/s)		19.76	(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)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.45	(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 =	7.74	(mg/s)		74.34	(mg/s)		74.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.23	(mg/s)		123.98	(mg/s)		386.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)		0.047	(mg/L)		0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)	3.93	(mg/s)	45	(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 =	-	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	19.15	(mg/s)	219	(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 =	-	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.53	(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 =	2.18	(mg/s)	20.95	(mg/s)	20.95	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	5.69	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.48	(mg/s)	59.24	(mg/s)	299.42	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.015	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)	0.022	(mg/L)	0.012	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.02	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.02	(mg/s)		0.43	(mg/s)		2.61	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	811.79	(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 =	1,402.18	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,952.39	(mg/s)	56,768.68	(mg/s)	327,157.17	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	27.905	(mg/L)	21.557	(mg/l)	13.371	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(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- Geotechnical Mitigation

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

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 in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	160.16	(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 =	505.23	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	975.63	(mg/s)	28,110.78	(mg/s)	246,459.43	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	5.497	(mg/L)	10.674	(mg/L)	10.073	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.04	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.21	(mg/s)		1.96	(mg/s)		15.06	(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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(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 =	0.11	(mg/s)		1.03	(mg/s)		1.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.75	(mg/s)		5.64	(mg/s)		38.39	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	30.50	(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 =	36.36	(mg/s)	349.17	(mg/s)	349.17	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	45.99	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	122.18	(mg/s)	915.18	(mg/s)	3,098.67	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.118	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.688	(mg/L)	0.348	(mg/L)	0.127	(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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(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 =	107.76	(mg/s)	1,034.88	(mg/s)	1,034.88	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	112.83	(mg/s)	7,154.20	(mg/s)	70,475.31	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.636	(mg/L)	2.717	(mg/L)	2.880	(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 =	-	(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 =	-	(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 =	3,931.55	(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 =	10,240.73	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	26,981.12	(mg/s)	349,535.40	(mg/s)	1,877,975.95	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	152.032	(mg/L)	132.728	(mg/L)	76.751	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	97.76	(mg/s)		938.93	(mg/s)		938.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	182.25	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,359.39	(mg/s)		15,029.28	(mg/s)
	mass flux in river at PM-13	M_r13 =	509.64	(mg/s)		13,746.49	(mg/s)		94,535.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.602	(mg/L)		3.481	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.872	(mg/L)		5.220	(mg/L)		3.864	(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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	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 =	-	(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 =	462.49	(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 =	1,641.19	(mg/s)		15,762.00	(mg/s)		15,762.00	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,638.04	(mg/s)		49,645.00	(mg/s)		180,654.19	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	20.499	(mg/L)		18.851	(mg/l)		7.383	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.52	(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 =	27.75	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	57.25	(mg/s)		977.28	(mg/s)		7,527.74	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.323	(mg/L)		0.371	(mg/l)		0.308	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	556.20	(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 =	1,039.32	(mg/s)	9,981.63	(mg/s)	9,981.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,306.10	(mg/s)	30,140.04	(mg/s)	106,562.07	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	12.994	(mg/L)	11.445	(mg/l)	4.355	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.20	(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 =	0.16	(mg/s)		1.55	(mg/s)		1.55	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.37	(mg/s)		7.31	(mg/s)		33.51	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(mg/L)		0.003	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.03	(mg/s)	0.27	(mg/s)	0.27	(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)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.55	(mg/s)	0.55	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.03	(mg/s)		0	(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 =	-	(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)		0.81	(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)		0.06	(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 =	0.04	(mg/s)		0.04	(mg/s)		0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.31	(mg/s)		1.14	(mg/s)		1.58	(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)		0.000	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.03	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.46	(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 =	0.003	(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	**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 =	-	(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 =	-	(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 =	1,995.81	(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 =	3,574.64	(mg/s)		34,330.84	(mg/s)		34,330.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,006.99	(mg/s)		122,287.70	(mg/s)		209,627.16	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	39.483	(mg/L)		46.436	(mg/l)		8.567	(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 =	-	(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 =	-	(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)		0.09	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.01	(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- 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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.19	(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 =	0.34	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.18	(mg/s)		40.61	(mg/s)		389.97	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(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.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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.28	(cfs)	PM-13
	flow check	Q_ck_L =	6.28	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.46	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.74	(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 =	94.54	(cfs)	PM-13
	flow check	Q_ck_M =	94.54	(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 =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	7.96	(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 =	866.09	(cfs)	PM-13
	flow check	Q_ck_H =	866.09	(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 =	0.01	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	7.96	(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 =	-	(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 =	-	(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)		0.12	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.01	(mg/s)		0.39	(mg/s)		2.79	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(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 =	32.84	(mg/s)	355.65	(mg/s)	355.65	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	36.64	(mg/s)	572.24	(mg/s)	2,755.72	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.206	(mg/L)	0.214	(mg/L)	0.112	(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 =	-	(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 =	-	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(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 =	0.06	(mg/s)		0.65	(mg/s)		0.65	(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 =	0.54	(mg/s)		3.67	(mg/s)		20.04	(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)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)	4.28	(mg/s)	49	(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 =	-	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	20.90	(mg/s)	239	(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 =	-	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.81	(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 =	6.86	(mg/s)	74.34	(mg/s)	74.34	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)	4.91	(mg/s)	49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.77	(mg/s)	129.76	(mg/s)	391.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)	0.013	(mg/L)	0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.066	(mg/L)	0.049	(mg/L)	0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)	3.93	(mg/s)	45	(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 =	-	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	19.15	(mg/s)	219	(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 =	-	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.66	(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 =	1.93	(mg/s)	20.95	(mg/s)	20.95	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	5.69	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.37	(mg/s)	61.34	(mg/s)	301.52	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.015	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.070	(mg/L)	0.023	(mg/L)	0.012	(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 =	-	(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 =	-	(mg/s)		0.01	(mg/s)		0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.02	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.02	(mg/s)		0.44	(mg/s)		2.63	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	1,016.90	(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 =	1,243.51	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,163.14	(mg/s)	60,149.00	(mg/s)	330,561.10	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	29.028	(mg/L)	22.481	(mg/l)	13.487	(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 =	-	(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 =	-	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(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-Geotechnical Mitigation

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

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 in Babbitt WWTP discharge	C_sBab =	10	(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)		3,568.63	(mg/s)		40,514	(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 =	-	(mg/s)		93.39	(mg/s)		93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		17,412.99	(mg/s)		198,816	(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 =	-	(mg/s)		335.09	(mg/s)		335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	200.63	(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 =	448.06	(mg/s)		4,852.27	(mg/s)		4,852.27	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)		3,705.83	(mg/s)		40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,654.05	(mg/s)		29,440.40	(mg/s)		247,789.05	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)		9.489	(mg/L)		9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	9.299	(mg/L)		11.004	(mg/L)		10.110	(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 =	-	(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 =	-	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.03	(mg/s)	0.35	(mg/s)	0.35	(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 =	0.21	(mg/s)	2.02	(mg/s)	15.12	(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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(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 =	0.09	(mg/s)	1.03	(mg/s)	1.03	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.76	(mg/s)	5.93	(mg/s)	38.68	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	38.20	(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 =	32.24	(mg/s)		349.17	(mg/s)		349.17	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	126.90	(mg/s)		1,037.13	(mg/s)		3,220.61	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.713	(mg/L)		0.388	(mg/L)		0.131	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(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 =	95.56	(mg/s)		1,034.88	(mg/s)		1,034.88	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	100.81	(mg/s)		7,154.52	(mg/s)		70,475.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.567	(mg/L)		2.674	(mg/L)		2.875	(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 =	-	(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 =	-	(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 =	4,924.93	(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 =	9,081.94	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	30,216.30	(mg/s)	368,511.42	(mg/s)	1,896,951.97	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	169.883	(mg/L)	137.736	(mg/L)	77.394	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	122.47	(mg/s)		1,326.24	(mg/s)		1,326.24	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	161.63	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,360.10	(mg/s)		15,029.99	(mg/s)
	mass flux in river at PM-13	M_r13 =	514.43	(mg/s)		14,134.51	(mg/s)		94,923.51	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.631	(mg/L)		3.483	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.892	(mg/L)		5.283	(mg/L)		3.873	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	579.34	(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 =	1,455.48	(mg/s)	15,762.00	(mg/s)	15,762.00	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,653.31	(mg/s)	51,561.34	(mg/s)	182,570.53	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/l)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	20.540	(mg/L)	19.272	(mg/l)	7.449	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.16	(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 =	24.61	(mg/s)		266.49	(mg/s)		266.49	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	54.75	(mg/s)		987.28	(mg/s)		7,537.74	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.308	(mg/L)		0.369	(mg/l)		0.308	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	696.73	(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 =	921.72	(mg/s)	9,981.63	(mg/s)	9,981.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,429.74	(mg/s)	32,444.21	(mg/s)	108,866.24	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	13.661	(mg/L)	12.126	(mg/l)	4.442	(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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.25	(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 =	0.14	(mg/s)	1.55	(mg/s)	1.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.44	(mg/s)	8.15	(mg/s)	34.35	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.02	(mg/s)	0.27	(mg/s)	0.27	(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)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.59	(mg/s)	0.59	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	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)	0.06	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.33	(mg/s)	1.48	(mg/s)	1.91	(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 =	0.002	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.02	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.48	(mg/s)		1.57	(mg/s)		8.12	(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)		0.000	(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	**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 =	-	(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 =	-	(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 =	2,500.08	(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 =	3,170.15	(mg/s)	34,330.84	(mg/s)	34,330.84	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,008.53	(mg/s)	133,096.13	(mg/s)	220,435.59	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	56.270	(mg/L)	49.746	(mg/l)	8.994	(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 =	-	(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 =	-	(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)		0.13	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.63	(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 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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.24	(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 =	0.30	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.19	(mg/s)		41.37	(mg/s)		390.73	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(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.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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.29	(cfs)	PM-13
	flow check	Q_ck_L =	6.29	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.49	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.71	(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 =	95.05	(cfs)	PM-13
	flow check	Q_ck_M =	95.05	(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 =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	7.96	(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 =	866.60	(cfs)	PM-13
	flow check	Q_ck_H =	866.60	(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 =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	7.96	(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 =	-	(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 =	-	(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)	0.13	(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 =	0.00	(mg/s)	0.02	(mg/s)	0.02	(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 =	0.01	(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 10**
Parameter	**Aluminum**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.75	(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 =	31.60	(mg/s)		355.65	(mg/s)		355.65	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)		37.23	(mg/s)		406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	37.02	(mg/s)		590.47	(mg/s)		2,773.96	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)		0.095	(mg/L)		0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.208	(mg/L)		0.220	(mg/L)		0.113	(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 =	-	(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 =	-	(mg/s)		0.07	(mg/s)		0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(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 =	0.06	(mg/s)		0.65	(mg/s)		0.65	(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 =	0.58	(mg/s)		4.18	(mg/s)		20.56	(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)		0.001	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(mg/L)		0.002	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)	4.28	(mg/s)	49	(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 =	-	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	20.90	(mg/s)	239	(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 =	-	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.09	(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 =	6.60	(mg/s)	74.34	(mg/s)	74.34	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)	4.91	(mg/s)	49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.79	(mg/s)	133.68	(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 =	0.021	(mg/L)	0.013	(mg/L)	0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.066	(mg/L)	0.050	(mg/L)	0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(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 =	1.86	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.32	(mg/s)		61.88	(mg/s)		302.06	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)		0.023	(mg/L)		0.012	(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 =	-	(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 =	-	(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)	0.09	(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 =	0.02	(mg/s)	0.17	(mg/s)	0.17	(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 =	0.03	(mg/s)	0.48	(mg/s)	2.66	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)		4,639.22	(mg/s)		52,669	(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 =	-	(mg/s)		121.41	(mg/s)		121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		22,636.89	(mg/s)		258,461	(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 =	-	(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 =	1,496.20	(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 =	1,196.34	(mg/s)		13,466.52	(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 =	462.42	(mg/s)		5,223.05	(mg/s)		53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,620.95	(mg/s)		66,004.10	(mg/s)		336,419.89	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)		13.374	(mg/l)		13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	31.591	(mg/L)		24.536	(mg/l)		13.717	(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 =	-	(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 =	-	(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)	0.10	(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 =	0.00	(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 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.06	(mg/s)	0.36	(mg/s)	2.11	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	71.00	(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 =	431.07	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,616.12	(mg/s)	28,175.65	(mg/s)	246,524.30	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	9.083	(mg/L)	10.474	(mg/L)	10.052	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.03	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.21	(mg/s)		2.06	(mg/s)		15.16	(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)		0.001	(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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(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 =	0.09	(mg/s)		1.03	(mg/s)		1.03	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.76	(mg/s)		6.05	(mg/s)		38.80	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.07	(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 =	31.02	(mg/s)		349.17	(mg/s)		349.17	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	94.72	(mg/s)		703.19	(mg/s)		2,886.67	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.532	(mg/L)		0.261	(mg/L)		0.118	(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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.55	(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 =	91.94	(mg/s)	1,034.88	(mg/s)	1,034.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	97.71	(mg/s)	7,160.21	(mg/s)	70,481.32	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.549	(mg/L)	2.662	(mg/L)	2.874	(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 =	-	(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 =	-	(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 =	4,335.31	(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 =	8,737.40	(mg/s)		98,352.01	(mg/s)		98,352.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	29,813.82	(mg/s)		364,509.11	(mg/s)		1,892,949.66	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	167.562	(mg/L)		135.503	(mg/L)		77.185	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		34.55	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	111.28	(mg/s)		1,252.62	(mg/s)		1,252.62	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	155.50	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,360.21	(mg/s)		15,030.10	(mg/s)
	mass flux in river at PM-13	M_r13 =	497.22	(mg/s)		14,061.01	(mg/s)		94,850.01	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.636	(mg/L)		3.483	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.795	(mg/L)		5.227	(mg/L)		3.867	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	145.53	(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 =	1,400.27	(mg/s)	15,762.00	(mg/s)	15,762.00	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,177.44	(mg/s)	46,938.74	(mg/s)	177,947.93	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/l)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	17.858	(mg/L)	17.449	(mg/l)	7.256	(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 =	-	(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 =	-	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.21	(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 =	23.67	(mg/s)	266.49	(mg/s)	266.49	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	52.86	(mg/s)	977.91	(mg/s)	7,528.37	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.297	(mg/L)	0.364	(mg/l)	0.307	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	437.49	(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 =	886.75	(mg/s)	9,981.63	(mg/s)	9,981.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,151.28	(mg/s)	29,839.34	(mg/s)	106,261.36	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	12.091	(mg/L)	11.092	(mg/l)	4.333	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.35	(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 =	0.14	(mg/s)		1.55	(mg/s)		1.55	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.54	(mg/s)		9.32	(mg/s)		35.52	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)		0.002	(mg/L)		0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.009	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(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 =	0.02	(mg/s)	0.27	(mg/s)	0.27	(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)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.24	(mg/s)	0.93	(mg/s)	0.93	(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 =	0.001	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(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)	0.06	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.39	(mg/s)	2.17	(mg/s)	2.61	(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	**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 =	-	(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 =	-	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(mg/s)	0.25	(mg/s)	0.25	(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 =	0.49	(mg/s)	1.66	(mg/s)	8.21	(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)	0.000	(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	**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 =	-	(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 =	-	(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 =	3,111.94	(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 =	3,049.89	(mg/s)		34,330.84	(mg/s)		34,330.84	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,953.82	(mg/s)		141,504.80	(mg/s)		228,844.26	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	61.563	(mg/L)		52.603	(mg/l)		9.331	(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 =	-	(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 =	-	(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)		0.16	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.66	(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 =	0.000	(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 =	-	(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 =	-	(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)	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 =	0.29	(mg/s)	3.23	(mg/s)	3.23	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.83	(mg/s)	48.76	(mg/s)	398.11	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.016	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.29	(cfs)	PM-13
	flow check	Q_ck_L =	6.29	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.52	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.68	(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 =	95.52	(cfs)	PM-13
	flow check	Q_ck_M =	95.52	(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 =	7.96	(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 =	867.07	(cfs)	PM-13
	flow check	Q_ck_H =	867.07	(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 =	7.96	(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 =	-	(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 =	-	(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)		0.15	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.02	(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 15
Parameter	Aluminum

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.28	(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 =	30.54	(mg/s)	355.65	(mg/s)	355.65	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	35.49	(mg/s)	585.70	(mg/s)	2,769.19	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.199	(mg/L)	0.217	(mg/L)	0.113	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(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 =	0.06	(mg/s)	0.65	(mg/s)	0.65	(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 =	0.56	(mg/s)	4.04	(mg/s)	20.41	(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)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)	4.28	(mg/s)	49	(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 =	-	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	20.90	(mg/s)	239	(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 =	-	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.24	(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 =	6.38	(mg/s)	74.34	(mg/s)	74.34	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)	4.91	(mg/s)	49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.72	(mg/s)	136.27	(mg/s)	398.29	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)	0.013	(mg/L)	0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.066	(mg/L)	0.050	(mg/L)	0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.73	(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 =	1.80	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.30	(mg/s)		62.65	(mg/s)		302.84	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)		0.023	(mg/L)		0.012	(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 =	-	(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 =	-	(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)		0.08	(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 =	0.01	(mg/s)		0.17	(mg/s)		0.17	(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 =	0.02	(mg/s)		0.47	(mg/s)		2.66	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	1,192.96	(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 =	1,156.29	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,280.84	(mg/s)	63,059.05	(mg/s)	333,475.30	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/L)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	29.679	(mg/L)	23.327	(mg/L)	13.590	(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 =	-	(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 =	-	(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)		0.10	(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 =	0.00	(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 =	0.01	(mg/s)		0.04	(mg/s)		0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.06	(mg/s)		0.36	(mg/s)		2.10	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	82.77	(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 =	416.64	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,626.91	(mg/s)	28,353.84	(mg/s)	246,702.49	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	9.143	(mg/L)	10.489	(mg/L)	10.054	(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 =	-	(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 =	-	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.03	(mg/s)	0.35	(mg/s)	0.35	(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 =	0.22	(mg/s)	2.13	(mg/s)	15.24	(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 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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(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 =	0.09	(mg/s)	1.03	(mg/s)	1.03	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.80	(mg/s)	6.50	(mg/s)	39.25	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		7.04	(mg/s)		7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8.23	(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 =	29.98	(mg/s)		349.17	(mg/s)		349.17	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)		45.99	(mg/s)		415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	94.86	(mg/s)		719.47	(mg/s)		2,902.96	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)		0.118	(mg/L)		0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.533	(mg/L)		0.266	(mg/L)		0.118	(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 =	-	(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 =	-	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.56	(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 =	88.86	(mg/s)	1,034.88	(mg/s)	1,034.88	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	94.64	(mg/s)	7,160.55	(mg/s)	70,481.66	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.532	(mg/L)	2.649	(mg/L)	2.872	(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 =	-	(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 =	-	(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 =	3,722.89	(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 =	8,444.89	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	28,974.75	(mg/s)	359,132.91	(mg/s)	1,887,573.46	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	162.839	(mg/L)	132.850	(mg/L)	76.924	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)		1,320.39	(mg/s)		14,990	(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)		34.55	(mg/s)		0.89	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,442.81	(mg/s)		73,562	(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 =	-	(mg/s)		3,029.85	(mg/s)		34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	97.65	(mg/s)		0.89	(mg/s)		1,137.30	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	150.29	(mg/s)		1,750.33	(mg/s)		1,750.33	(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)		1,393.89	(mg/s)		15,030.11	(mg/s)
	mass flux in river at PM-13	M_r13 =	478.40	(mg/s)		13,945.70	(mg/s)		94,734.70	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.637	(mg/L)		3.569	(mg/L)		3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.689	(mg/L)		5.159	(mg/L)		3.861	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	180.69	(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 =	1,353.39	(mg/s)	15,762.00	(mg/s)	15,762.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,167.35	(mg/s)	47,406.54	(mg/s)	178,415.73	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/L)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	17.801	(mg/L)	17.537	(mg/L)	7.271	(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 =	-	(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 =	-	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.83	(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 =	22.88	(mg/s)	266.49	(mg/s)	266.49	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	52.69	(mg/s)	986.03	(mg/s)	7,536.49	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)	0.293	(mg/L)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.296	(mg/L)	0.365	(mg/L)	0.307	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	380.42	(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 =	857.06	(mg/s)	9,981.63	(mg/s)	9,981.63	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,066.48	(mg/s)	29,347.29	(mg/s)	105,769.32	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/L)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	11.614	(mg/L)	10.856	(mg/L)	4.310	(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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.32	(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 =	0.13	(mg/s)	1.55	(mg/s)	1.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.51	(mg/s)	9.20	(mg/s)	35.40	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.008	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(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 =	0.02	(mg/s)		0.27	(mg/s)		0.27	(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)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.24	(mg/s)		0.92	(mg/s)		0.92	(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 15
Parameter	Antimony

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.14	(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 =	0.00	(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 =	0.04	(mg/s)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.36	(mg/s)	1.91	(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 =	0.002	(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	**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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(mg/s)		0.25	(mg/s)		0.25	(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 =	0.49	(mg/s)		1.68	(mg/s)		8.23	(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)		0.000	(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	**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 =	-	(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 =	-	(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 =	2,688.59	(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 =	2,947.78	(mg/s)		34,330.84	(mg/s)		34,330.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,484.55	(mg/s)		137,843.80	(mg/s)		225,183.26	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/L)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	58.924	(mg/L)		50.991	(mg/L)		9.177	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.68	(mg/s)		5.04	(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-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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.97	(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 =	0.28	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.91	(mg/s)		50.11	(mg/s)		399.47	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.016	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.29	(cfs)	PM-13
	flow check	Q_ck_L =	6.29	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.54	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.66	(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 =	95.97	(cfs)	PM-13
	flow check	Q_ck_M =	95.97	(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 =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_M =	7.96	(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 =	867.52	(cfs)	PM-13
	flow check	Q_ck_H =	867.52	(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 =	0.02	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_H =	7.96	(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 =	-	(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 =	-	(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)	0.17	(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 =	0.00	(mg/s)	0.02	(mg/s)	0.02	(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 =	0.02	(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 =	0.000	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)		35.69	(mg/s)		405	(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 =	-	(mg/s)		0.93	(mg/s)		0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		174.13	(mg/s)		1,988	(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 =	-	(mg/s)		0.75	(mg/s)		0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.05	(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 =	29.59	(mg/s)		355.65	(mg/s)		355.65	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)		37.23	(mg/s)		406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	34.33	(mg/s)		583.41	(mg/s)		2,766.90	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)		0.095	(mg/L)		0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.193	(mg/L)		0.215	(mg/L)		0.113	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(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 =	0.05	(mg/s)	0.65	(mg/s)	0.65	(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 =	0.56	(mg/s)	4.07	(mg/s)	20.44	(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)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.003	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.41	(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 =	6.19	(mg/s)		74.34	(mg/s)		74.34	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.70	(mg/s)		139.15	(mg/s)		401.17	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.066	(mg/L)		0.051	(mg/L)		0.016	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)		3.93	(mg/s)		45	(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 =	-	(mg/s)		0.10	(mg/s)		0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		19.15	(mg/s)		219	(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 =	-	(mg/s)		0.25	(mg/s)		0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.82	(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 =	1.74	(mg/s)		20.95	(mg/s)		20.95	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)		5.69	(mg/s)		46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.34	(mg/s)		64.02	(mg/s)		304.21	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)		0.015	(mg/L)		0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)		0.024	(mg/L)		0.012	(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 =	-	(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 =	-	(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)	0.09	(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 =	0.01	(mg/s)	0.17	(mg/s)	0.17	(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 =	0.02	(mg/s)	0.48	(mg/s)	2.66	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	992.61	(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 =	1,120.56	(mg/s)	13,466.52	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	5,066.56	(mg/s)	61,116.09	(mg/s)	331,535.47	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	28.466	(mg/L)	22.503	(mg/l)	13.504	(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 =	-	(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 =	-	(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)	0.09	(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 =	0.00	(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 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.05	(mg/s)	0.35	(mg/s)	2.10	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	89.08	(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 =	403.76	(mg/s)	4,852.27	(mg/s)	4,852.27	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,712.56	(mg/s)	28,552.66	(mg/s)	246,901.31	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	9.622	(mg/L)	10.513	(mg/L)	10.057	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.03	(mg/s)		0.35	(mg/s)		0.35	(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 =	0.22	(mg/s)		2.21	(mg/s)		15.31	(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)		0.001	(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 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 =	-	(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 =	-	(mg/s)		0.19	(mg/s)		0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.17	(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 =	0.09	(mg/s)		1.03	(mg/s)		1.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)		0.65	(mg/s)		6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.83	(mg/s)		7.05	(mg/s)		39.80	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(mg/L)		0.002	(mg/L)		0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.005	(mg/L)		0.003	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.12	(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 =	29.05	(mg/s)	349.17	(mg/s)	349.17	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	45.99	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	94.97	(mg/s)	733.35	(mg/s)	2,916.84	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.118	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.534	(mg/L)	0.270	(mg/L)	0.119	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.33	(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 =	86.11	(mg/s)		1,034.88	(mg/s)		1,034.88	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	91.68	(mg/s)		7,157.97	(mg/s)		70,479.08	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.515	(mg/L)		2.636	(mg/L)		2.871	(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 =	-	(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 =	-	(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 =	3,320.52	(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 =	8,183.95	(mg/s)	98,352.01	(mg/s)	98,352.01	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	28,762.52	(mg/s)	356,130.83	(mg/s)	1,884,571.38	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	161.599	(mg/L)	131.125	(mg/L)	76.762	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)	1,320.39	(mg/s)	14,990	(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)	6,442.81	(mg/s)	73,562	(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 =	-	(mg/s)	34.55	(mg/s)	34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	94.77	(mg/s)	1,138.87	(mg/s)	1,138.87	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	145.65	(mg/s)	1,750.33	(mg/s)	1,750.33	(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)	1,360.32	(mg/s)	15,030.21	(mg/s)
	mass flux in river at PM-13	M_r13 =	470.97	(mg/s)	13,947.36	(mg/s)	94,736.36	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.640	(mg/L)	3.483	(mg/L)	3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	2.646	(mg/L)	5.135	(mg/L)	3.859	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	204.46	(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 =	1,311.57	(mg/s)	15,762.00	(mg/s)	15,762.00	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,160.46	(mg/s)	47,770.50	(mg/s)	178,779.69	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/l)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	17.757	(mg/L)	17.589	(mg/l)	7.282	(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 =	-	(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 =	-	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.51	(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 =	22.18	(mg/s)	266.49	(mg/s)	266.49	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	52.66	(mg/s)	995.23	(mg/s)	7,545.69	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.296	(mg/L)	0.366	(mg/l)	0.307	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)		1,249.02	(mg/s)		14,180	(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 =	-	(mg/s)		32.69	(mg/s)		32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		6,094.55	(mg/s)		69,586	(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 =	-	(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 =	338.03	(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 =	830.58	(mg/s)		9,981.63	(mg/s)		9,981.63	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)		1,400.96	(mg/s)		14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,010.96	(mg/s)		28,992.40	(mg/s)		105,414.43	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)		3.587	(mg/l)		3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	11.298	(mg/L)		10.675	(mg/l)		4.294	(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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.36	(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 =	0.13	(mg/s)	1.55	(mg/s)	1.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.55	(mg/s)	9.74	(mg/s)	35.94	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.009	(mg/L)	0.004	(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	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.02	(mg/s)		0.27	(mg/s)		0.27	(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)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.23	(mg/s)		0.88	(mg/s)		0.88	(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	**Year 20**
Parameter	**Antimony**

Input concentration data	concentration of surface water into PM-12	C_s12 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)		0.00	(mg/s)		0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		0.03	(mg/s)		0	(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 =	-	(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)		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 =	0.00	(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 =	0.04	(mg/s)		0.04	(mg/s)		0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.36	(mg/s)		1.94	(mg/s)		2.37	(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	**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 =	-	(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 =	-	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(mg/s)	0.25	(mg/s)	0.25	(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 =	0.50	(mg/s)	1.68	(mg/s)	8.23	(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)	0.000	(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	**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 =	-	(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 =	-	(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 =	2,485.06	(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 =	2,856.70	(mg/s)		34,330.84	(mg/s)		34,330.84	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	10,574.86	(mg/s)		136,781.15	(mg/s)		224,120.61	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	59.414	(mg/L)		50.362	(mg/l)		9.129	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.00	(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 =	0.00	(mg/s)		0.07	(mg/s)		0.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)		0.68	(mg/s)		5.05	(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-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 =	-	(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 =	-	(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)		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 =	0.27	(mg/s)		3.23	(mg/s)		3.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.82	(mg/s)		49.51	(mg/s)		398.87	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(mg/L)		0.016	(mg/L)		0.016	(mg/L)
	concentration in river at PM-13	C_r13 =	0.016	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.27	(cfs)	PM-13
	flow check	Q_ck_L =	6.27	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.41	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.79	(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 =	86.63	(cfs)	PM-13
	flow check	Q_ck_M =	86.63	(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 =	3.37	(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 =	858.18	(cfs)	PM-13
	flow check	Q_ck_H =	858.18	(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 =	3.37	(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 =	-	(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 =	-	(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)		0.06	(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)		0.01	(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 =	0.02	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.09	(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 =	35.42	(mg/s)	150.57	(mg/s)	150.57	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	46.10	(mg/s)	395.79	(mg/s)	2,579.28	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.260	(mg/L)	0.161	(mg/L)	0.106	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.32	(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 =	0.07	(mg/s)	0.28	(mg/s)	0.28	(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 =	0.78	(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 =	0.003	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.002	(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 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.74	(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 =	7.40	(mg/s)		31.47	(mg/s)		31.47	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.19	(mg/s)		74.59	(mg/s)		336.61	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.069	(mg/L)		0.030	(mg/L)		0.014	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)	3.93	(mg/s)	45	(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 =	-	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	19.15	(mg/s)	219	(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 =	-	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.22	(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 =	2.09	(mg/s)	8.87	(mg/s)	8.87	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	5.69	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	12.08	(mg/s)	43.02	(mg/s)	283.21	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.015	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.068	(mg/L)	0.018	(mg/L)	0.012	(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 =	-	(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 =	-	(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)	0.06	(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 =	0.02	(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 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.04	(mg/s)	0.36	(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	**Closure**
Parameter	**Calcium**

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 in Babbitt WWTP discharge	C_sBab =	13	(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)		4,639.22	(mg/s)		52,669	(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 =	-	(mg/s)		121.41	(mg/s)		121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		22,636.89	(mg/s)		258,461	(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 =	-	(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 =	792.25	(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 =	1,341.15	(mg/s)		5,701.28	(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 =	462.42	(mg/s)		5,223.05	(mg/s)		53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,879.05	(mg/s)		44,582.17	(mg/s)		322,736.94	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)		13.374	(mg/l)		13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	27.489	(mg/L)		18.184	(mg/l)		13.289	(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 =	-	(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 =	-	(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)	0.06	(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)	0.02	(mg/s)	0.02	(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 =	0.06	(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-Geotechnical Mitigation

Case	Closure
Parameter	Chloride

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 in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	45.80	(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 =	483.24	(mg/s)	2,054.29	(mg/s)	2,054.29	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	869.87	(mg/s)	23,999.89	(mg/s)	242,348.54	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	4.901	(mg/L)	9.789	(mg/L)	9.979	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.03	(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 =	0.03	(mg/s)		0.15	(mg/s)		0.15	(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 =	0.22	(mg/s)		1.73	(mg/s)		14.84	(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)		0.001	(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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(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 =	0.10	(mg/s)	0.43	(mg/s)	0.43	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.84	(mg/s)	5.06	(mg/s)	37.81	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.004	(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	**Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.10	(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 =	34.77	(mg/s)	147.83	(mg/s)	147.83	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	45.99	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	103.25	(mg/s)	476.69	(mg/s)	2,660.18	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.118	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.582	(mg/L)	0.194	(mg/L)	0.110	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.15	(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 =	103.06	(mg/s)		438.13	(mg/s)		438.13	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	109.25	(mg/s)		6,561.92	(mg/s)		69,883.03	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.616	(mg/L)		2.676	(mg/L)		2.877	(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 =	-	(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 =	-	(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 =	4,633.95	(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 =	9,794.98	(mg/s)		41,638.98	(mg/s)		41,638.98	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	27,387.42	(mg/s)		274,912.54	(mg/s)		1,803,353.09	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	154.306	(mg/L)		112.131	(mg/L)		74.253	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)	1,320.39	(mg/s)	14,990	(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)	6,442.81	(mg/s)	73,562	(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 =	-	(mg/s)	34.55	(mg/s)	34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	245.57	(mg/s)	1,043.93	(mg/s)	1,043.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	174.32	(mg/s)	741.03	(mg/s)	741.03	(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)	1,359.42	(mg/s)	15,029.31	(mg/s)
	mass flux in river at PM-13	M_r13 =	649.54	(mg/s)	12,842.22	(mg/s)	93,631.22	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.603	(mg/L)	3.481	(mg/L)	3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	3.660	(mg/L)	5.238	(mg/L)	3.855	(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 =	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 =	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)	2,141.18	(mg/s)	24,309	(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 =	-	(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 =	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 =	-	(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 =	644.90	(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 =	1,569.75	(mg/s)	6,673.11	(mg/s)	6,673.11	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)	2,456.41	(mg/s)	24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,752.72	(mg/s)	38,859.59	(mg/s)	169,868.78	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)	6.290	(mg/l)	6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	21.144	(mg/L)	15.850	(mg/l)	6.994	(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 =	-	(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 =	-	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.65	(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 =	26.54	(mg/s)	112.82	(mg/s)	112.82	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	55.17	(mg/s)	806.39	(mg/s)	7,356.85	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.311	(mg/L)	0.329	(mg/l)	0.303	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	306.88	(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 =	994.08	(mg/s)	4,225.89	(mg/s)	4,225.89	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	2,015.98	(mg/s)	20,351.60	(mg/s)	96,773.63	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	11.358	(mg/L)	8.301	(mg/l)	3.985	(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 =	-	(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 =	-	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(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 =	0.15	(mg/s)	0.66	(mg/s)	0.66	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.17	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.23	(mg/s)	4.76	(mg/s)	30.96	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)	0.002	(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-Geotechnical Mitigation

Case	**Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)	-	(mg/s)	-	(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 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	-	(mg/s)	-	(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 =	-	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(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 =	0.03	(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 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)	0.35	(mg/s)	0.35	(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 =	0.001	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	0.06	(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)	0.02	(mg/s)	0.02	(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)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.23	(mg/s)	0.35	(mg/s)	0.79	(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 =	0.001	(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 =	-	(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 =	-	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(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 =	0.02	(mg/s)	0.10	(mg/s)	0.10	(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 =	0.49	(mg/s)	1.42	(mg/s)	7.97	(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)	0.000	(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 =	-	(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 =	-	(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 =	2,034.18	(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 =	3,419.05	(mg/s)		14,534.54	(mg/s)		14,534.54	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)		1,671.68	(mg/s)		16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,017.47	(mg/s)		92,098.78	(mg/s)		179,438.24	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)		4.280	(mg/l)		4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	39.538	(mg/L)		37.565	(mg/l)		7.388	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(mg/s)		0.02	(mg/s)		0.02	(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 =	0.01	(mg/s)		0.48	(mg/s)		4.85	(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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.15	(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 =	0.32	(mg/s)		1.37	(mg/s)		1.37	(mg/s)
			Low Flow			Average Flow			High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.12	(mg/s)		37.53	(mg/s)		386.89	(mg/s)
			Low Flow			Average Flow			High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.012	(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 =	0.86	(cfs)	PM-12
	flow in river at PM-13	Q_r13_L =	6.27	(cfs)	PM-13
	flow check	Q_ck_L =	6.27	(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 =	0.00	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.00	(cfs)	PM-13
	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	0.67	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
	seepage from cell 2W	Q_s2w_L =	0.53	(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 =	84.61	(cfs)	PM-13
	flow check	Q_ck_M =	84.61	(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 =	1.35	(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 =	856.16	(cfs)	PM-13
	flow check	Q_ck_H =	856.16	(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 =	1.35	(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 =	-	(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 =	-	(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)		0.06	(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 =	0.03	(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 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.73	(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 =	23.49	(mg/s)	60.32	(mg/s)	60.32	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.61	(mg/s)	37.23	(mg/s)	406.69	(mg/s)
	mass flux in river at PM-13	M_r13 =	38.82	(mg/s)	305.54	(mg/s)	2,489.02	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.025	(mg/L)	0.095	(mg/L)	0.100	(mg/L)
	concentration in river at PM-13	C_r13 =	0.219	(mg/L)	0.128	(mg/L)	0.103	(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 =	-	(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 =	-	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.53	(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 =	0.04	(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 =	0.97	(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 =	0.003	(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	**Post-Closure**
Parameter	**Boron**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.012	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.012	(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)		4.28	(mg/s)		49	(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 =	-	(mg/s)		0.11	(mg/s)		0.11	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		20.90	(mg/s)		239	(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 =	-	(mg/s)		7.41	(mg/s)		7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.87	(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 =	4.91	(mg/s)		12.61	(mg/s)		12.61	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.52	(mg/s)		4.91	(mg/s)		49.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	10.83	(mg/s)		55.73	(mg/s)		317.75	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.021	(mg/L)		0.013	(mg/L)		0.012	(mg/L)
	concentration in river at PM-13	C_r13 =	0.061	(mg/L)		0.023	(mg/L)		0.013	(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 =	0.011	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.011	(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)	3.93	(mg/s)	45	(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 =	-	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	19.15	(mg/s)	219	(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 =	-	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.37	(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 =	1.38	(mg/s)	3.55	(mg/s)	3.55	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.66	(mg/s)	5.69	(mg/s)	46.33	(mg/s)
	mass flux in river at PM-13	M_r13 =	11.53	(mg/s)	37.71	(mg/s)	277.89	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.068	(mg/L)	0.015	(mg/L)	0.011	(mg/L)
	concentration in river at PM-13	C_r13 =	0.065	(mg/L)	0.016	(mg/L)	0.011	(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 =	-	(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 =	-	(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)	0.06	(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 =	0.01	(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 =	0.04	(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 =	13	(mg/L)
	concentration of surface water into PM-13	C_s13 =	13	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	13	(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)	4,639.22	(mg/s)	52,669	(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 =	-	(mg/s)	121.41	(mg/s)	121.41	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	22,636.89	(mg/s)	258,461	(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 =	-	(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 =	1,311.63	(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 =	889.46	(mg/s)	2,283.89	(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 =	462.42	(mg/s)	5,223.05	(mg/s)	53,252.39	(mg/s)
	mass flux in river at PM-13	M_r13 =	4,946.75	(mg/s)	41,164.78	(mg/s)	322,736.94	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	19.000	(mg/L)	13.374	(mg/l)	13.036	(mg/l)
	concentration in river at PM-13	C_r13 =	27.871	(mg/L)	17.191	(mg/l)	13.320	(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 =	-	(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 =	-	(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)	0.06	(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)	0.01	(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)	0.28	(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 =	10	(mg/L)
	concentration of surface water into PM-13	C_s13 =	10	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	10	(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)	3,568.63	(mg/s)	40,514	(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 =	-	(mg/s)	93.39	(mg/s)	93.39	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	17,412.99	(mg/s)	198,816	(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 =	-	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	75.82	(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 =	320.49	(mg/s)	822.94	(mg/s)	822.94	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	43.81	(mg/s)	3,705.83	(mg/s)	40,651.48	(mg/s)
	mass flux in river at PM-13	M_r13 =	737.14	(mg/s)	22,768.54	(mg/s)	241,117.19	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.800	(mg/L)	9.489	(mg/L)	9.951	(mg/L)
	concentration in river at PM-13	C_r13 =	4.153	(mg/L)	9.509	(mg/L)	9.951	(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 =	-	(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 =	-	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(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 =	0.02	(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 =	0.23	(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 =	-	(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 =	-	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.27	(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 =	0.07	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.10	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.91	(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 =	0.004	(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	**Post-Closure**
Parameter	**Fluoride**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0.1	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0.1	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.1	(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)	35.69	(mg/s)	405	(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 =	-	(mg/s)	0.93	(mg/s)	0.93	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	174.13	(mg/s)	1,988	(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 =	-	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	21.69	(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 =	23.06	(mg/s)	59.22	(mg/s)	59.22	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	9.37	(mg/s)	45.99	(mg/s)	415.45	(mg/s)
	mass flux in river at PM-13	M_r13 =	100.13	(mg/s)	388.09	(mg/s)	2,571.57	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.385	(mg/L)	0.118	(mg/L)	0.102	(mg/L)
	concentration in river at PM-13	C_r13 =	0.564	(mg/L)	0.162	(mg/L)	0.106	(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 =	-	(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 =	-	(mg/s)		2.13	(mg/s)		2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.90	(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 =	68.35	(mg/s)		175.51	(mg/s)		175.51	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.85	(mg/s)		1,062.84	(mg/s)		11,777.08	(mg/s)
	mass flux in river at PM-13	M_r13 =	75.29	(mg/s)		6,299.30	(mg/s)		69,620.41	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.035	(mg/L)		2.721	(mg/L)		2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	0.424	(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 =	-	(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 =	-	(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 =	7,671.85	(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 =	6,496.16	(mg/s)		16,680.30	(mg/s)		16,680.30	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,129.58	(mg/s)		27,763.72	(mg/s)		286,383.27	(mg/s)
	mass flux in river at PM-13	M_r13 =	27,126.50	(mg/s)		249,953.86	(mg/s)		1,778,394.41	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	87.500	(mg/L)		71.091	(mg/L)		70.104	(mg/L)
	concentration in river at PM-13	C_r13 =	152.836	(mg/L)		104.385	(mg/L)		73.398	(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 =	3.70	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.70	(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)	1,320.39	(mg/s)	14,990	(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)	6,442.81	(mg/s)	73,562	(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 =	-	(mg/s)	34.55	(mg/s)	34.55	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	-	(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 =	406.56	(mg/s)	1,043.93	(mg/s)	1,043.93	(mg/s)
	mass flux in seepage from cell 2W	M_s2w =	115.61	(mg/s)	296.85	(mg/s)	296.85	(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)	1,359.42	(mg/s)	15,029.31	(mg/s)
	mass flux in river at PM-13	M_r13 =	751.82	(mg/s)	12,398.04	(mg/s)	93,187.04	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.603	(mg/L)	3.481	(mg/L)	3.679	(mg/l)
	concentration in river at PM-13	C_r13 =	4.236	(mg/L)	5.178	(mg/L)	3.846	(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 =	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 =	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)		2,141.18	(mg/s)		24,309	(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 =	-	(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 =	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 =	-	(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 =	1,067.68	(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 =	1,041.08	(mg/s)		2,673.20	(mg/s)		2,673.20	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	259.20	(mg/s)		2,456.41	(mg/s)		24,623.80	(mg/s)
	mass flux in river at PM-13	M_r13 =	3,646.83	(mg/s)		34,859.69	(mg/s)		165,868.88	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	10.650	(mg/L)		6.290	(mg/l)		6.028	(mg/l)
	concentration in river at PM-13	C_r13 =	20.547	(mg/L)		14.558	(mg/l)		6.846	(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 =	-	(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 =	-	(mg/s)		27.31	(mg/s)		27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.74	(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 =	17.60	(mg/s)		45.20	(mg/s)		45.20	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	4.58	(mg/s)		114.44	(mg/s)		1,222.81	(mg/s)
	mass flux in river at PM-13	M_r13 =	47.32	(mg/s)		738.77	(mg/s)		7,289.23	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.188	(mg/L)		0.293	(mg/l)		0.299	(mg/l)
	concentration in river at PM-13	C_r13 =	0.267	(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 =	3.50	(mg/L)
	concentration of surface water into PM-13	C_s13 =	3.50	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	3.50	(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)	1,249.02	(mg/s)	14,180	(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 =	-	(mg/s)	32.69	(mg/s)	32.69	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,094.55	(mg/s)	69,586	(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 =	-	(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 =	508.06	(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 =	659.29	(mg/s)	1,692.86	(mg/s)	1,692.86	(mg/s)
			Low Flow		Average Flow		High Flow	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	119.26	(mg/s)	1,400.96	(mg/s)	14,331.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	1,882.37	(mg/s)	17,818.57	(mg/s)	94,240.60	(mg/s)
			Low Flow		Average Flow		High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	4.900	(mg/L)	3.587	(mg/l)	3.508	(mg/l)
	concentration in river at PM-13	C_r13 =	10.606	(mg/L)	7.441	(mg/l)	3.890	(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 =	-	(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 =	-	(mg/s)		0.29	(mg/s)		0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(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 =	0.10	(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 =	0.17	(mg/s)		0.61	(mg/s)		5.04	(mg/s)
	mass flux in river at PM-13	M_r13 =	1.22	(mg/s)		4.36	(mg/s)		30.56	(mg/s)
			Low Flow			**Average Flow**			**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.007	(mg/L)		0.002	(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-Geotechnical Mitigation

Case	**Post-Closure**
Parameter	**Lead**

Input concentration data	concentration of surface water into PM-12	C_s12 =	0	(mg/L)
	concentration of surface water into PM-13	C_s13 =	0	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0	(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)		-	(mg/s)		-	(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 =	-	(mg/s)		-	(mg/s)		-	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)		-	(mg/s)		-	(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 =	-	(mg/s)		0.02	(mg/s)		0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(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 =	0.02	(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)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.21	(mg/s)		0.28	(mg/s)		0.28	(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 =	2.00E-05	(mg/L)
	concentration of surface water into PM-13	C_s13 =	2.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.00E-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 =	-	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.03	(mg/s)	0	(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 =	-	(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)	0.06	(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)	0.01	(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)	0.04	(mg/s)	0.12	(mg/s)
	mass flux in river at PM-13	M_r13 =	0.24	(mg/s)	0.34	(mg/s)	0.77	(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 =	0.001	(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 =	-	(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 =	-	(mg/s)		0.09	(mg/s)		0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(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 =	0.02	(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 =	0.51	(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 =	0.003	(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 =	-	(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 =	-	(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 =	3,367.73	(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 =	2,267.55	(mg/s)	5,822.44	(mg/s)	5,822.44	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Mass balance at each node	mass flux in river at PM-12	M_r12 =	206.87	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
	mass flux in river at PM-13	M_r13 =	7,199.53	(mg/s)	83,386.68	(mg/s)	170,726.14	(mg/s)
			Low Flow		**Average Flow**		**High Flow**	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	8.500	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
	concentration in river at PM-13	C_r13 =	40.563	(mg/L)	34.824	(mg/l)	7.046	(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 =	-	(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 =	-	(mg/s)		0.03	(mg/s)		0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.00	(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 =	0.00	(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 =	0.01	(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 =	-	(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 =	-	(mg/s)		0.17	(mg/s)		0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.24	(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 =	0.21	(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 =	0.28	(mg/s)		6.14	(mg/s)		65.25	(mg/s)
	mass flux in river at PM-13	M_r13 =	2.11	(mg/s)		36.71	(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 =	0.012	(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 Plant Site, Tailings Basin and Embarrass River Watershed

Tailings Basin - Proposed Action

G.1 Tailings Basin

G.2 Embarrass River Watershed

Tailings Basin - Geotechnical Mitigation

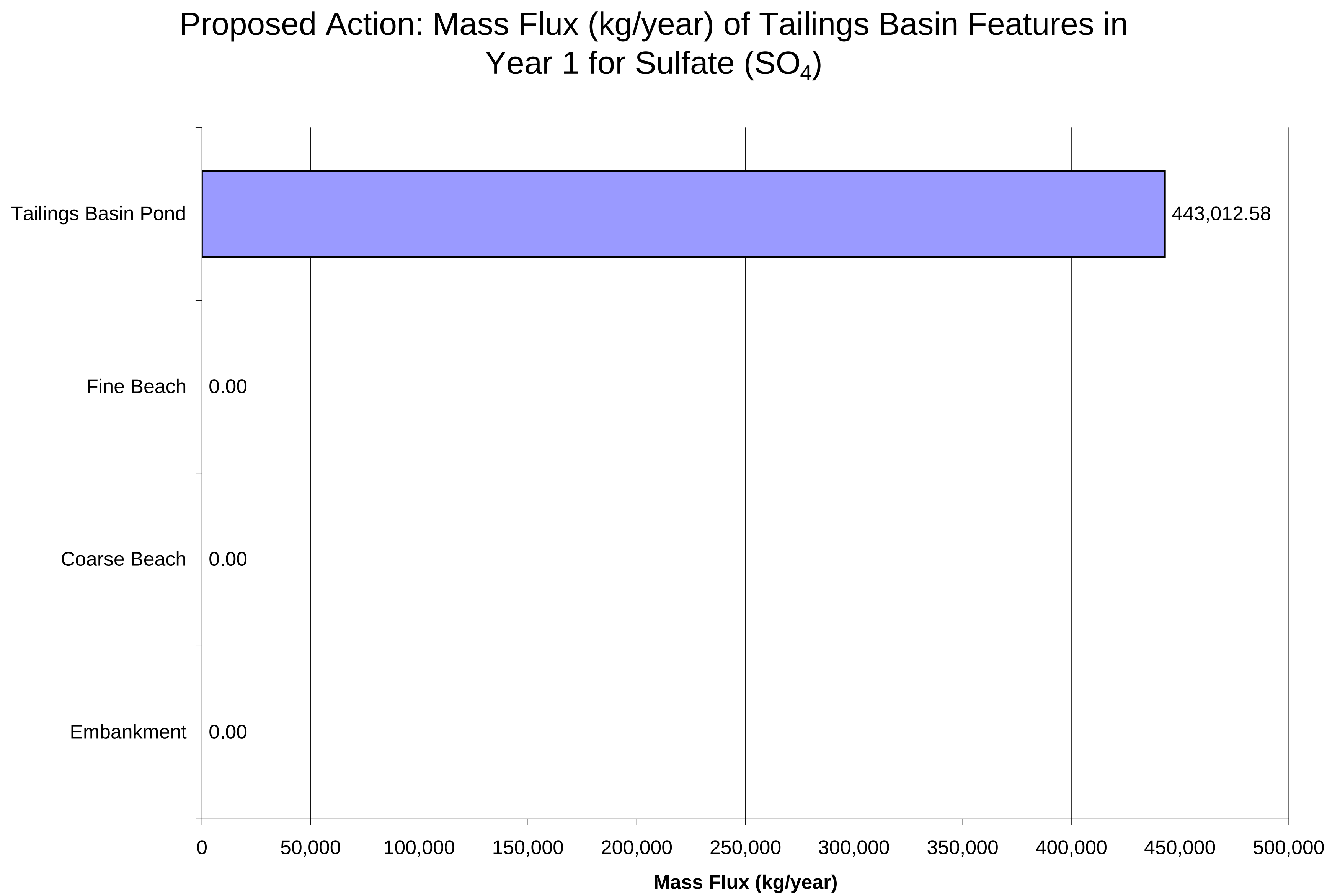
G.3 Tailings Basin

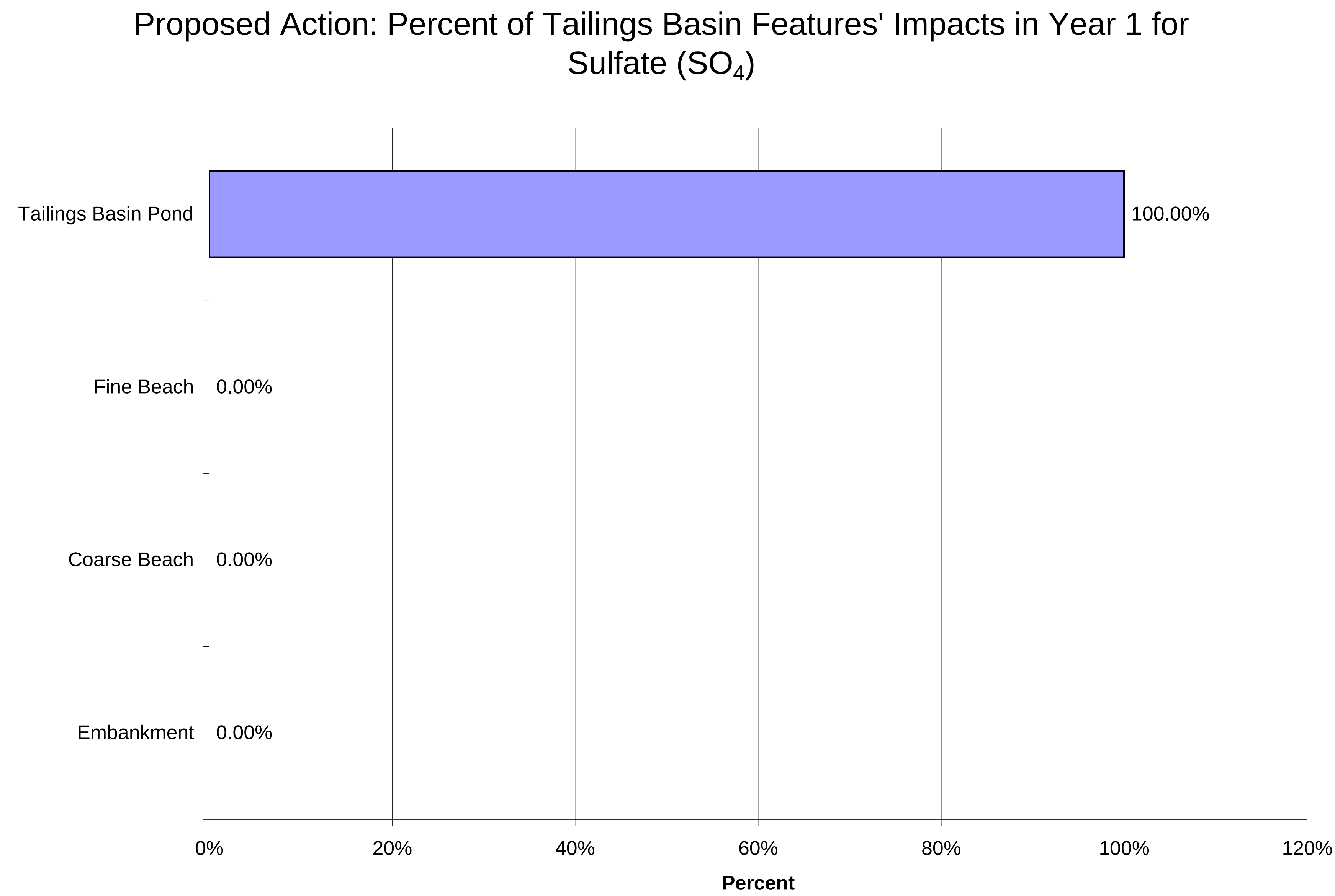
G.4 Embarrass River Watershed

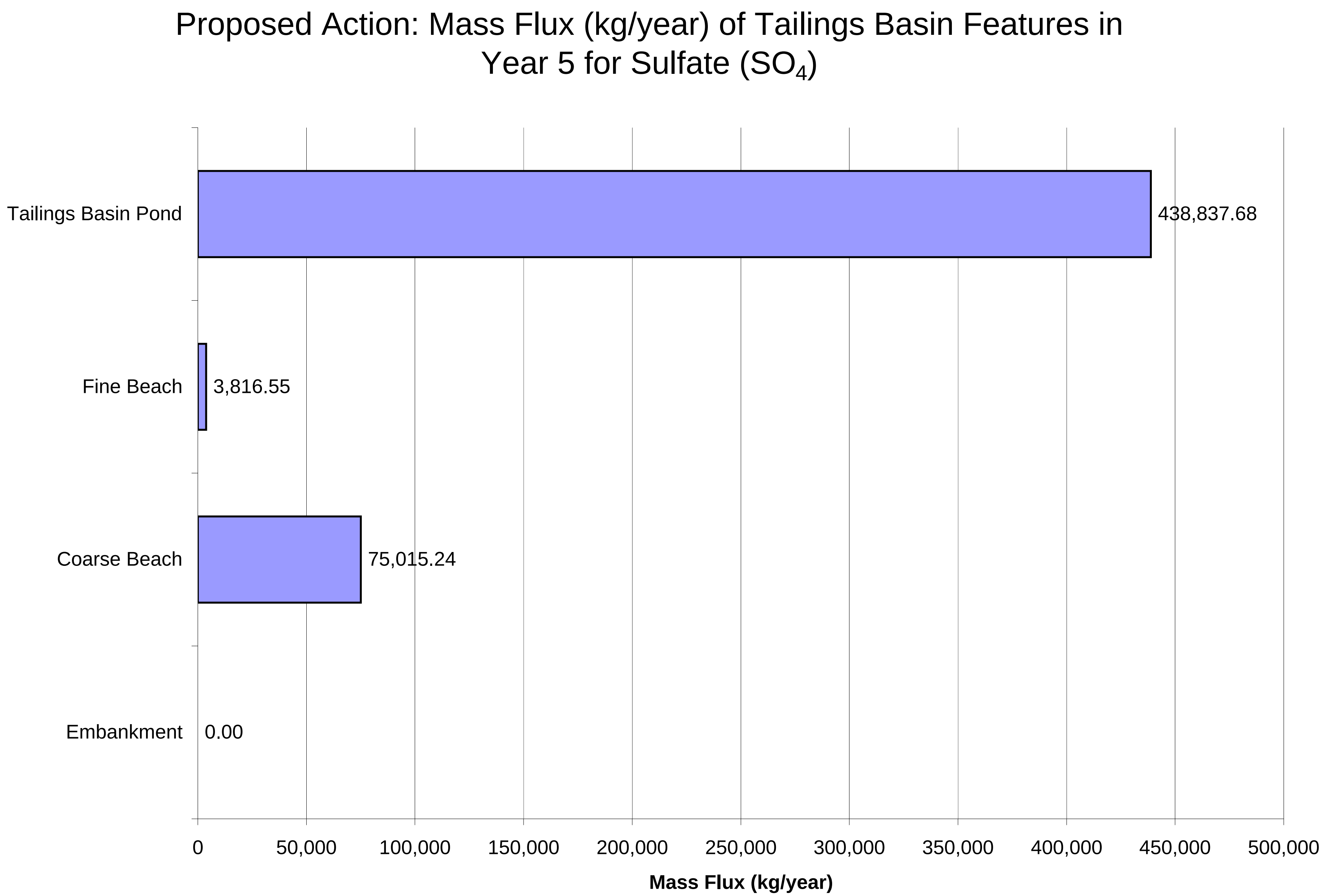
Appendix G.1

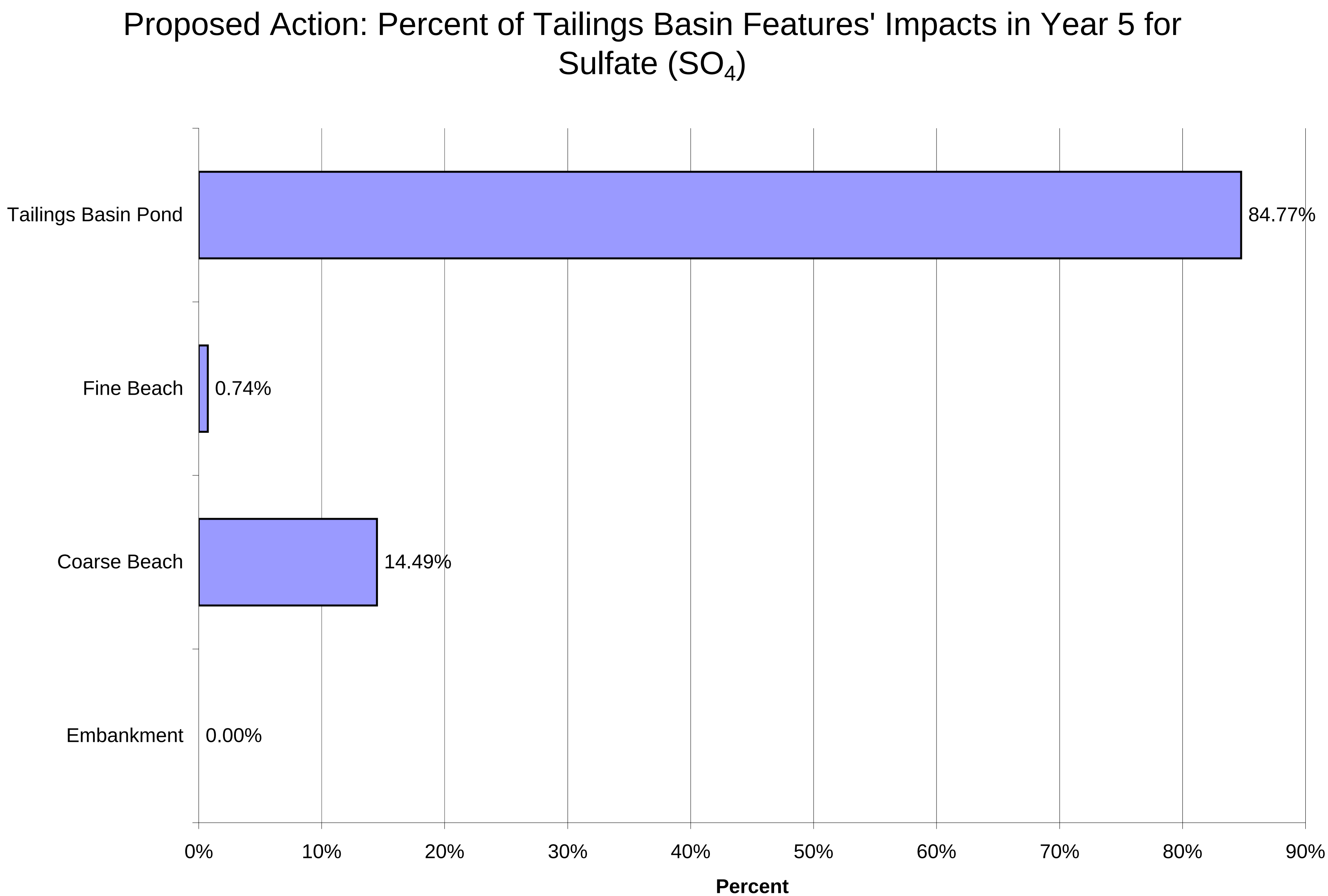
Tailings Basin

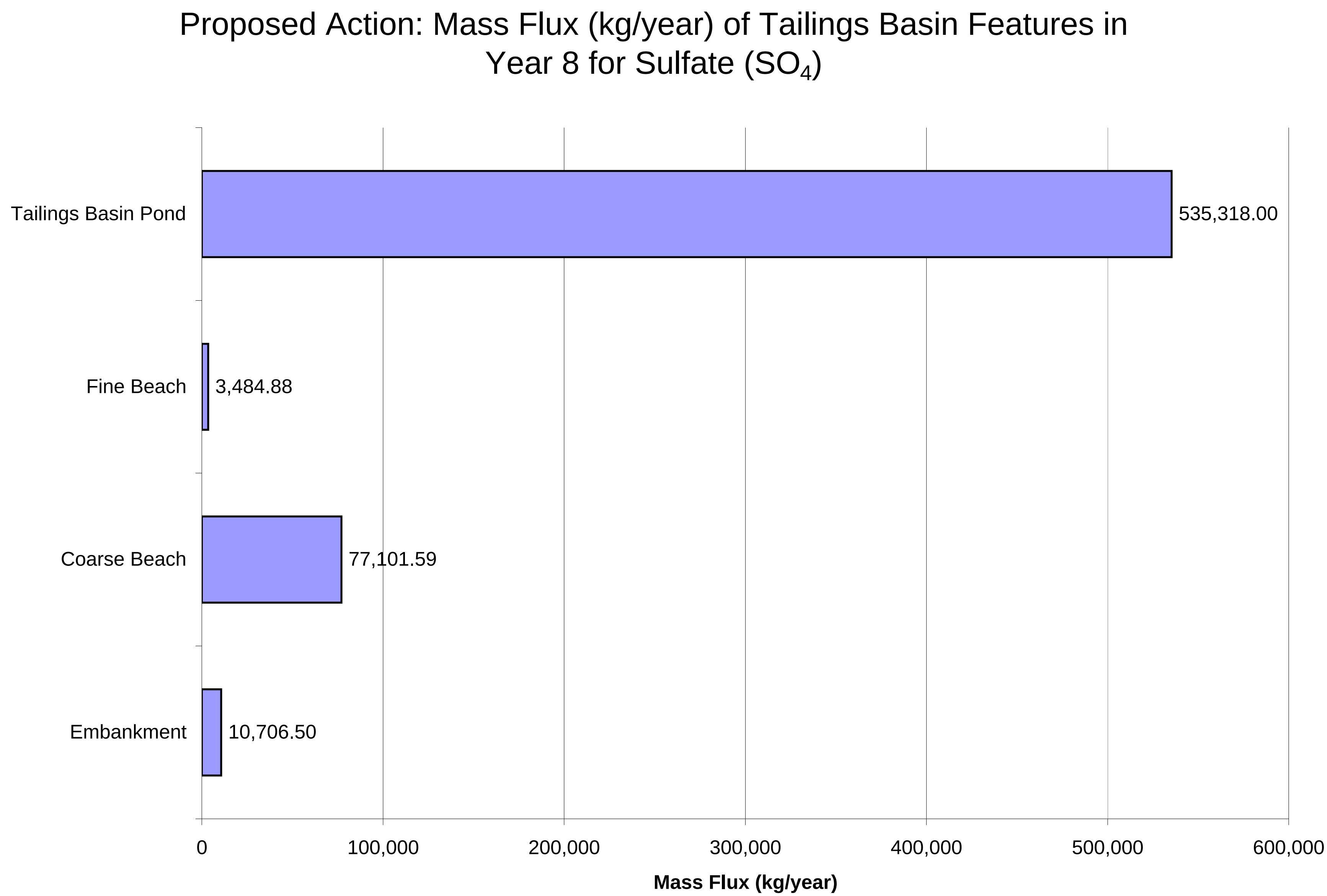
Proposed Action

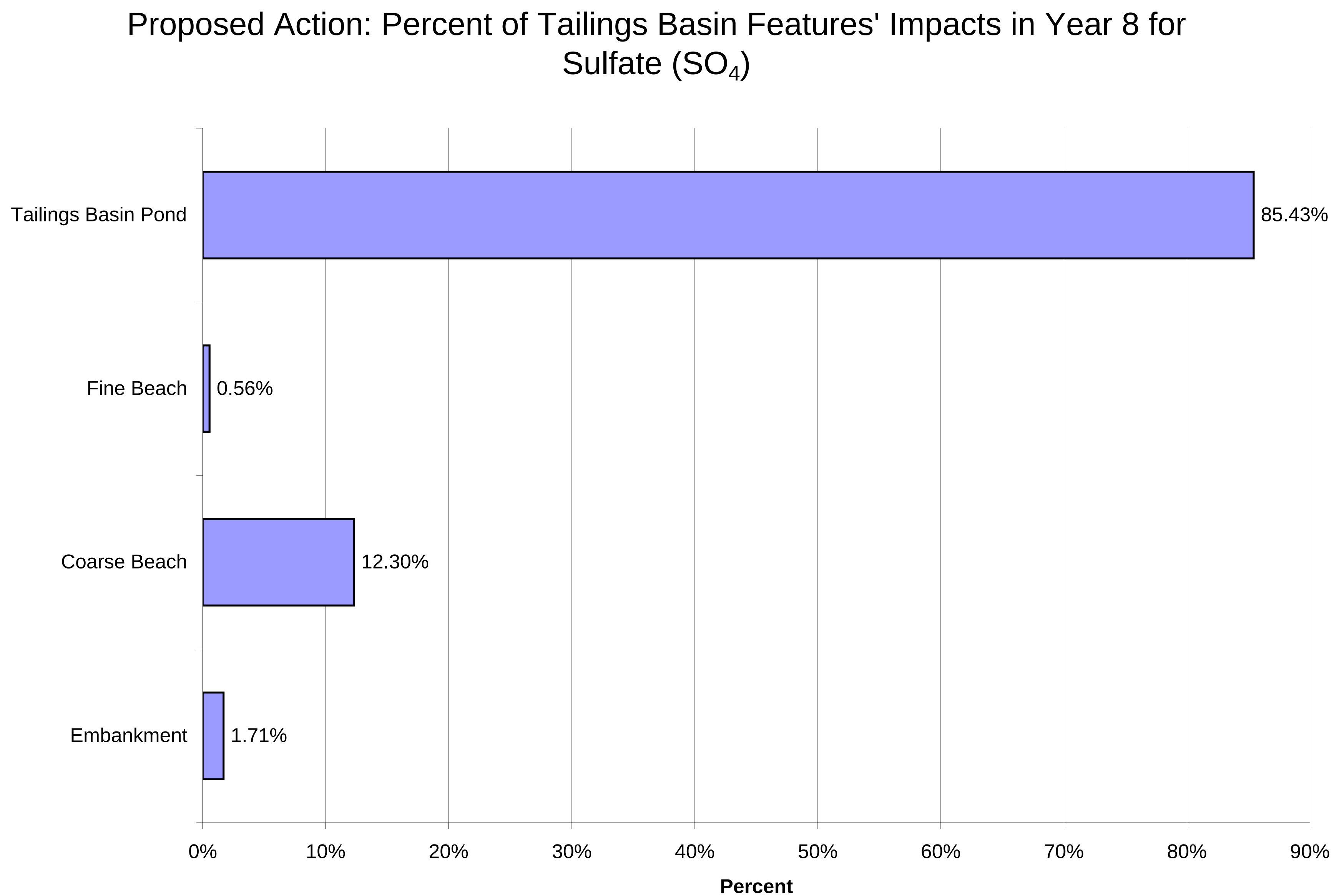

Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 1 for Sulfate (SO_4)
Tailings Basin Pond
443,012.58
Fine Beach
0.00
Coarse Beach
0.00
Embankment
0.00
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (kg/year)

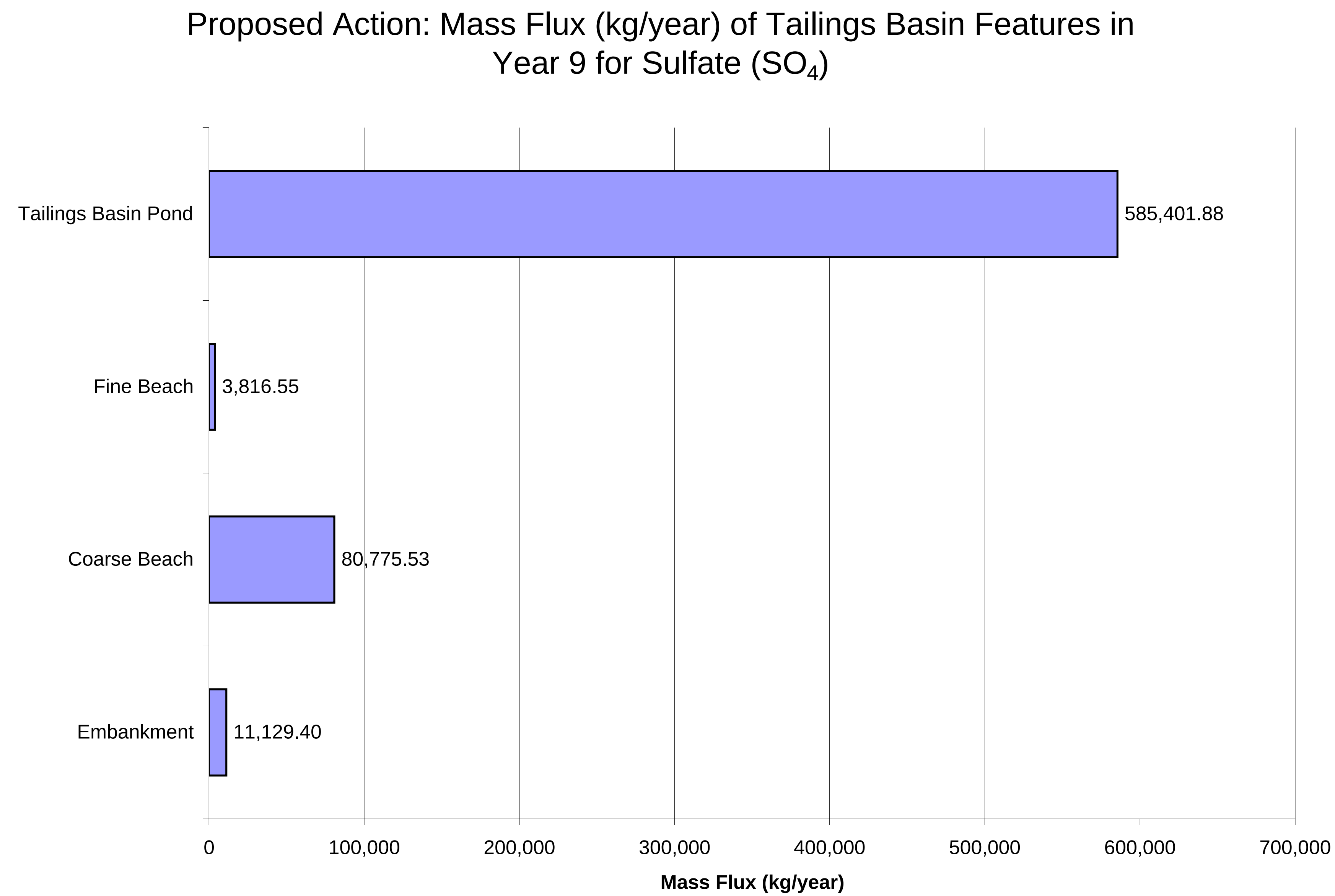

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 1 for Sulfate (SO_4)
Tailings Basin Pond
100.00%
Fine Beach
0.00%
Coarse Beach
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

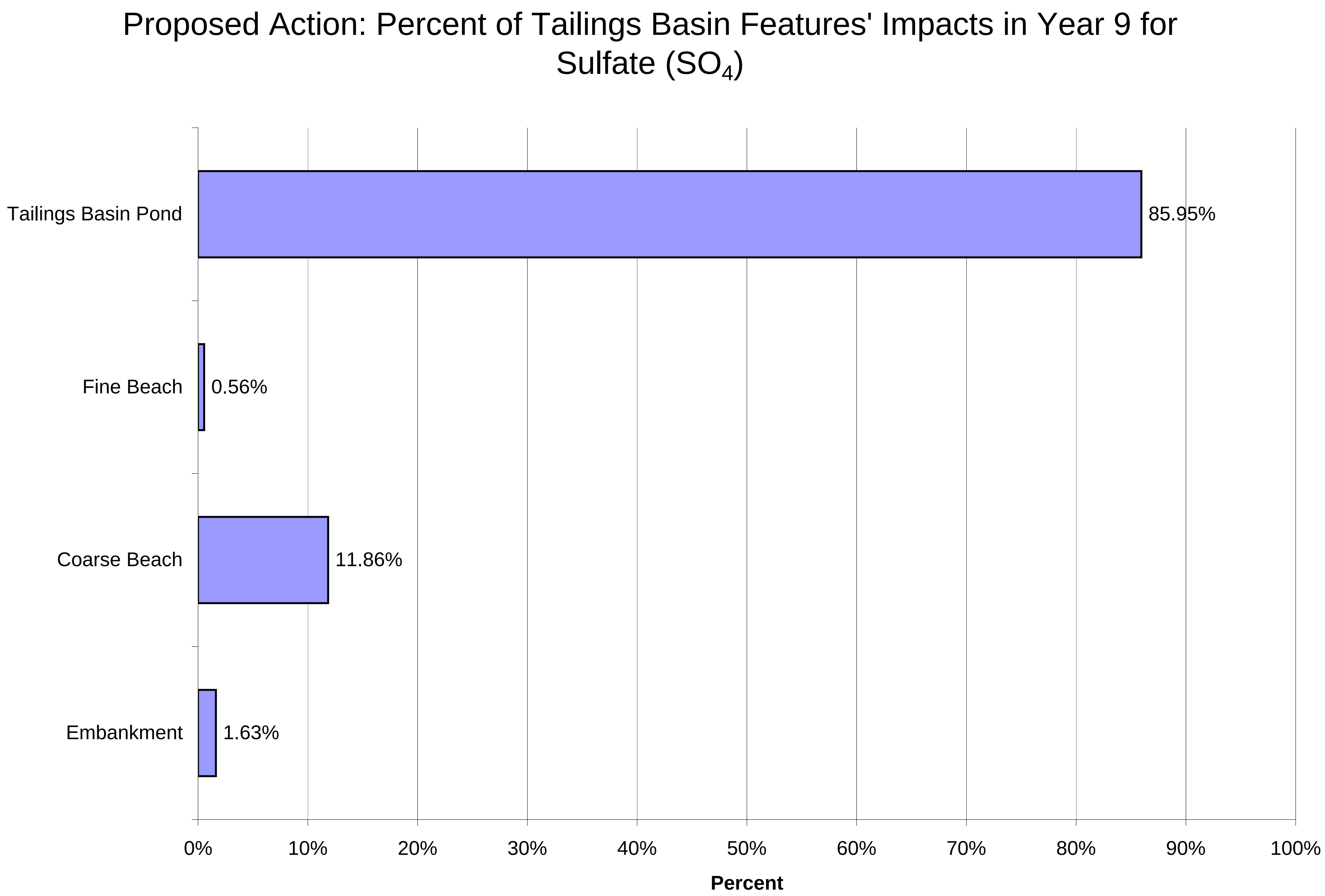

Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 5 for Sulfate (SO_4)
Tailings Basin Pond
438,837.68
Fine Beach
3,816.55
Coarse Beach
75,015.24
Embankment
0.00
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (kg/year)


Proposed Action: Percent of Tailings Basin Features' Impacts in Year 5 for Sulfate (SO_4)
Tailings Basin Pond
84.77%
Fine Beach
0.74%
Coarse Beach
14.49%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

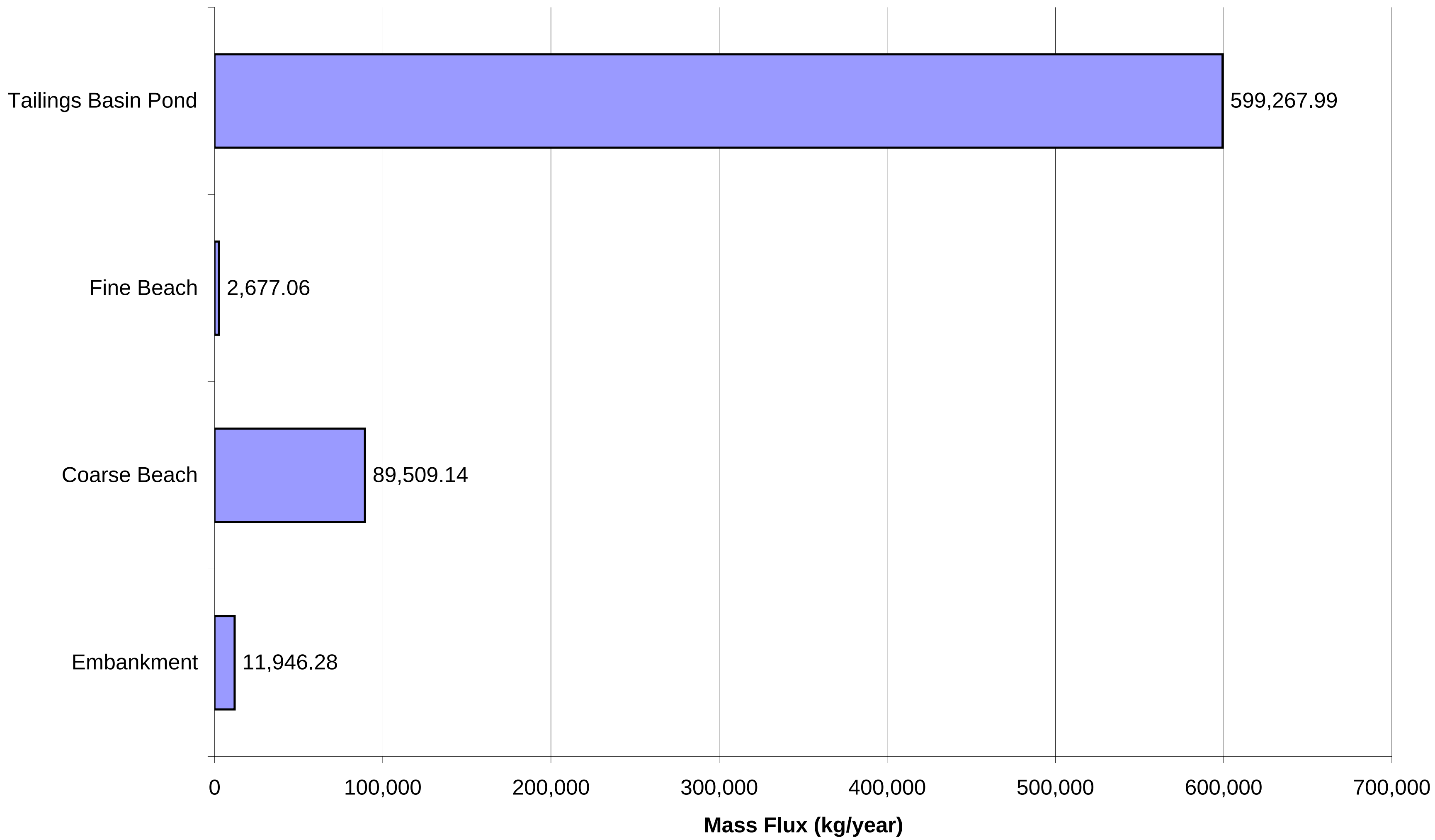

Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 8 for Sulfate (SO_4)
Tailings Basin Pond
535,318.00
Fine Beach
3,484.88
Coarse Beach
77,101.59
Embankment
10,706.50
0
100,000
200,000
300,000
400,000
500,000
600,000
Mass Flux (kg/year)


Proposed Action: Percent of Tailings Basin Features' Impacts in Year 8 for Sulfate (SO_4)
Tailings Basin Pond
85.43%
Fine Beach
0.56%
Coarse Beach
12.30%
Embankment
1.71%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

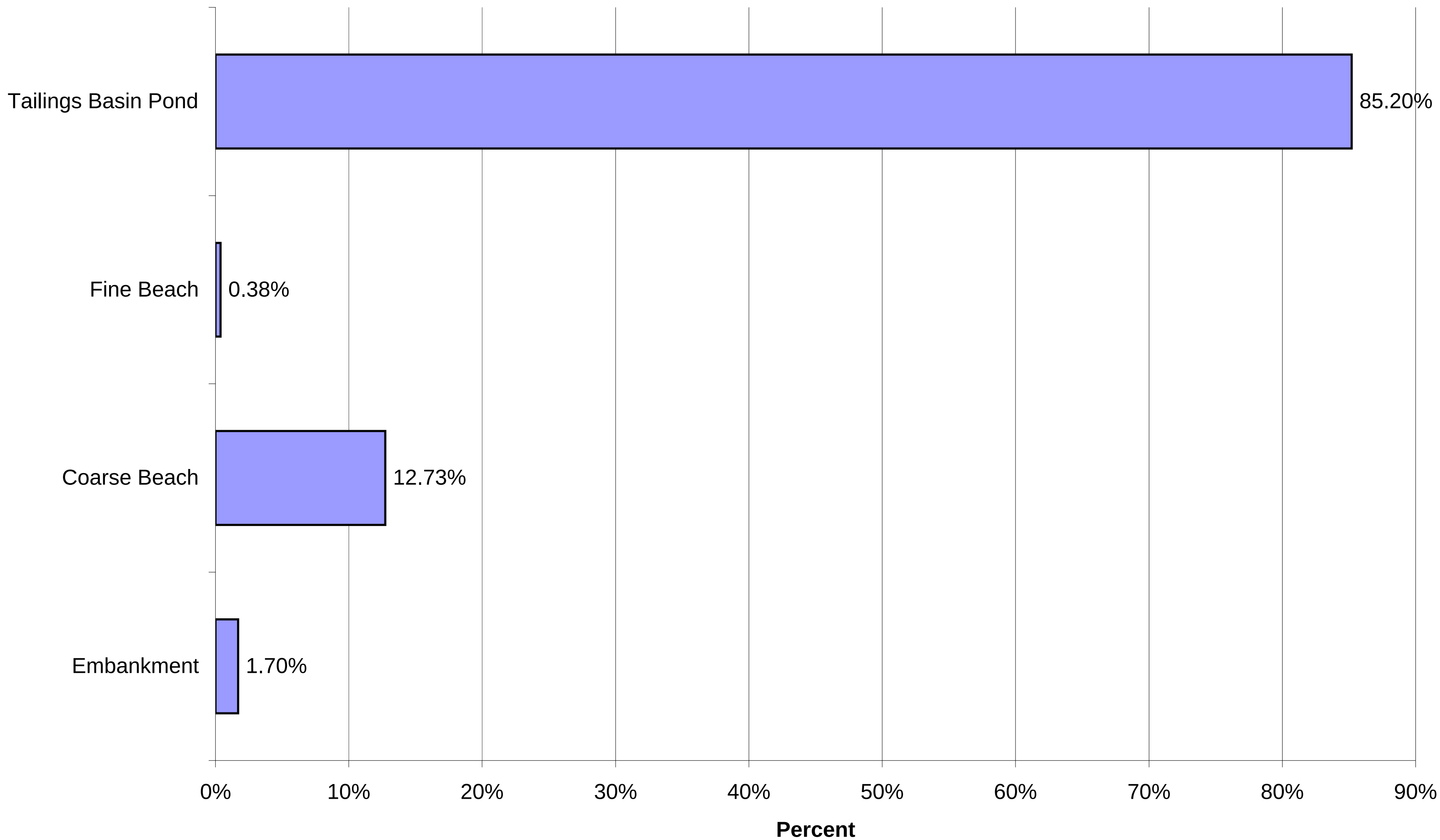

Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 9 for Sulfate (SO4)
Tailings Basin Pond
585,401.88
Fine Beach
3,816.55
Coarse Beach
80,775.53
Embankment
11,129.40
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Mass Flux (kg/year)

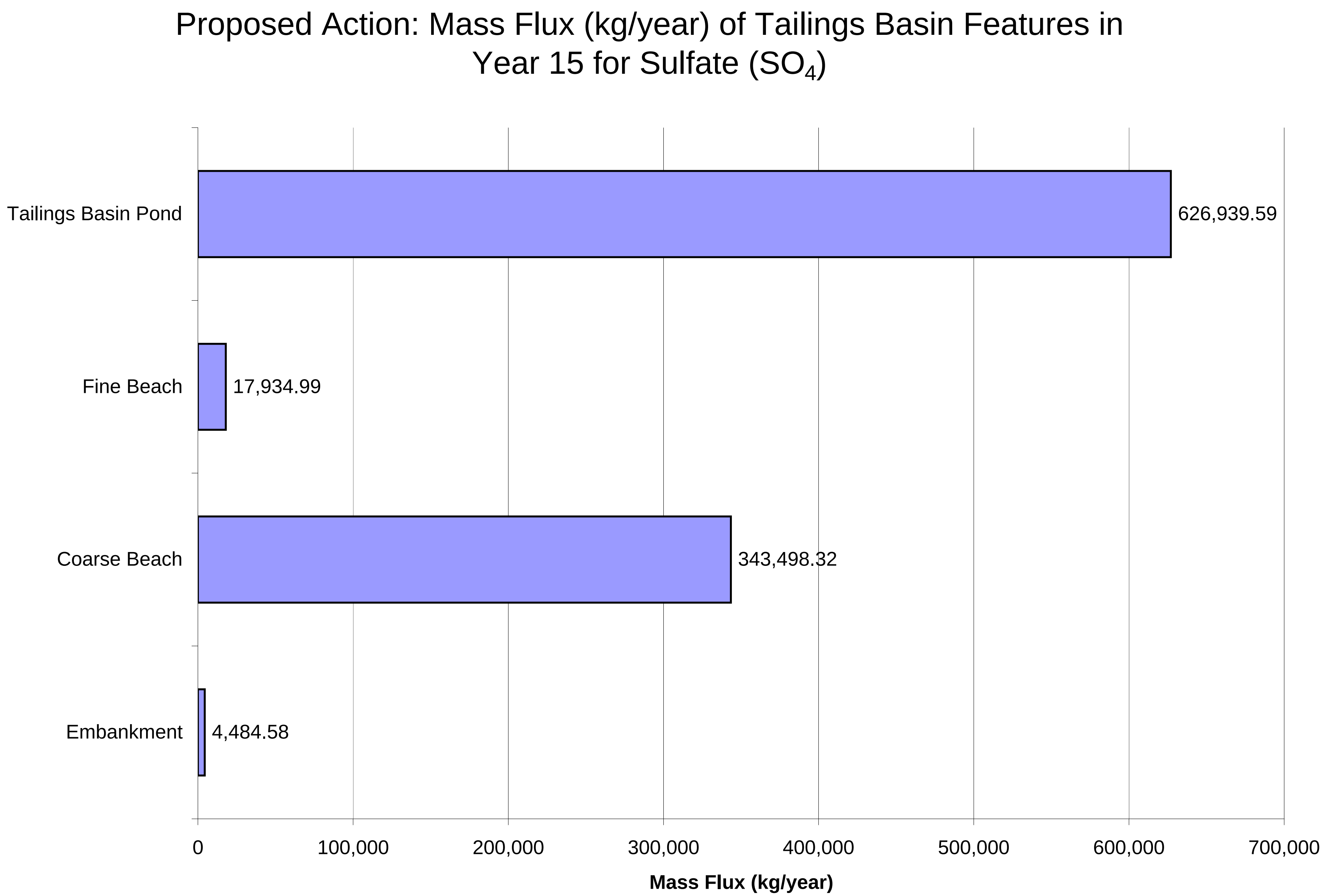

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 9 for Sulfate (SO_4)
Tailings Basin Pond
85.95%
Fine Beach
0.56%
Coarse Beach
11.86%
Embankment
1.63%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

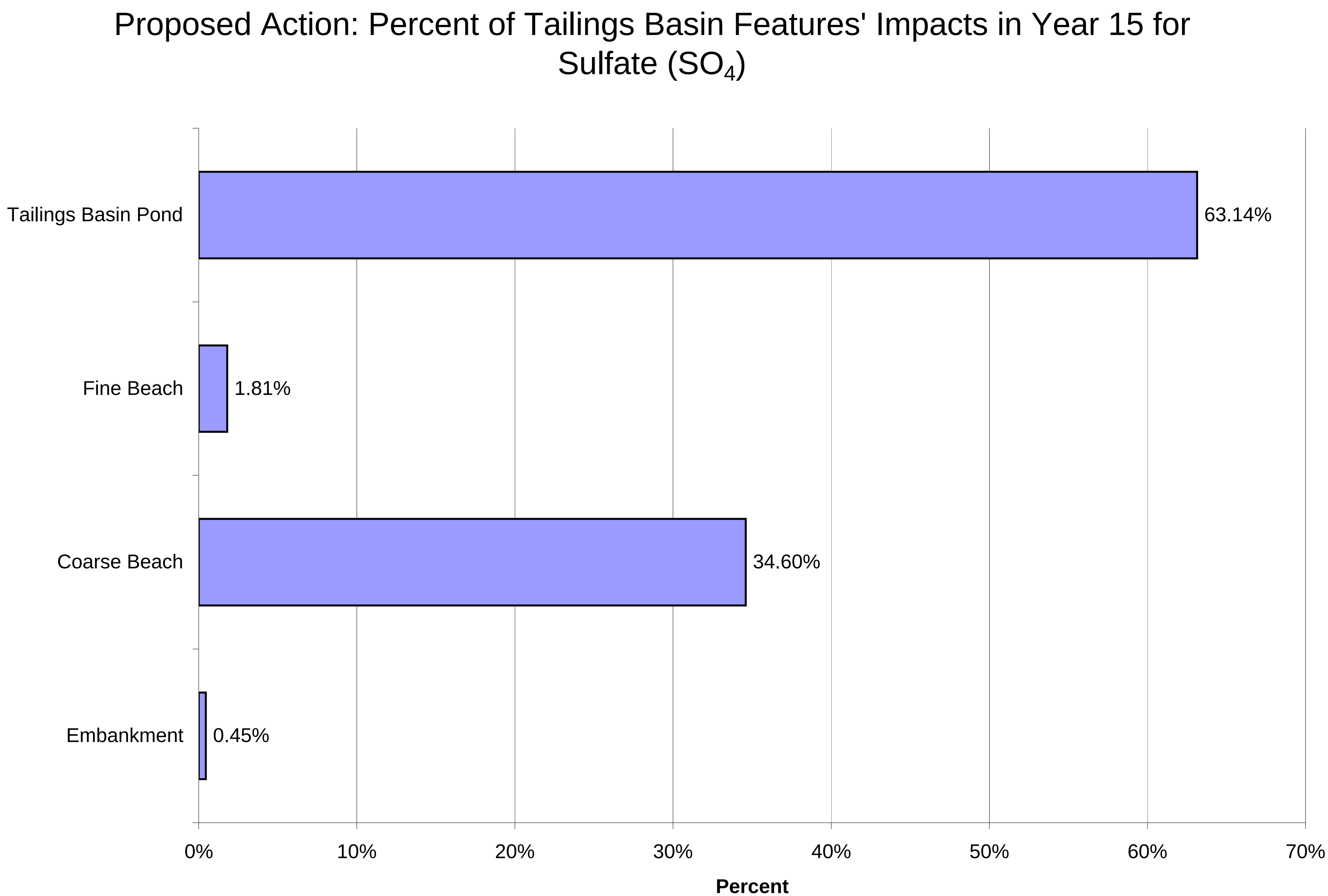
Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 10 for Sulfate (SO_4)



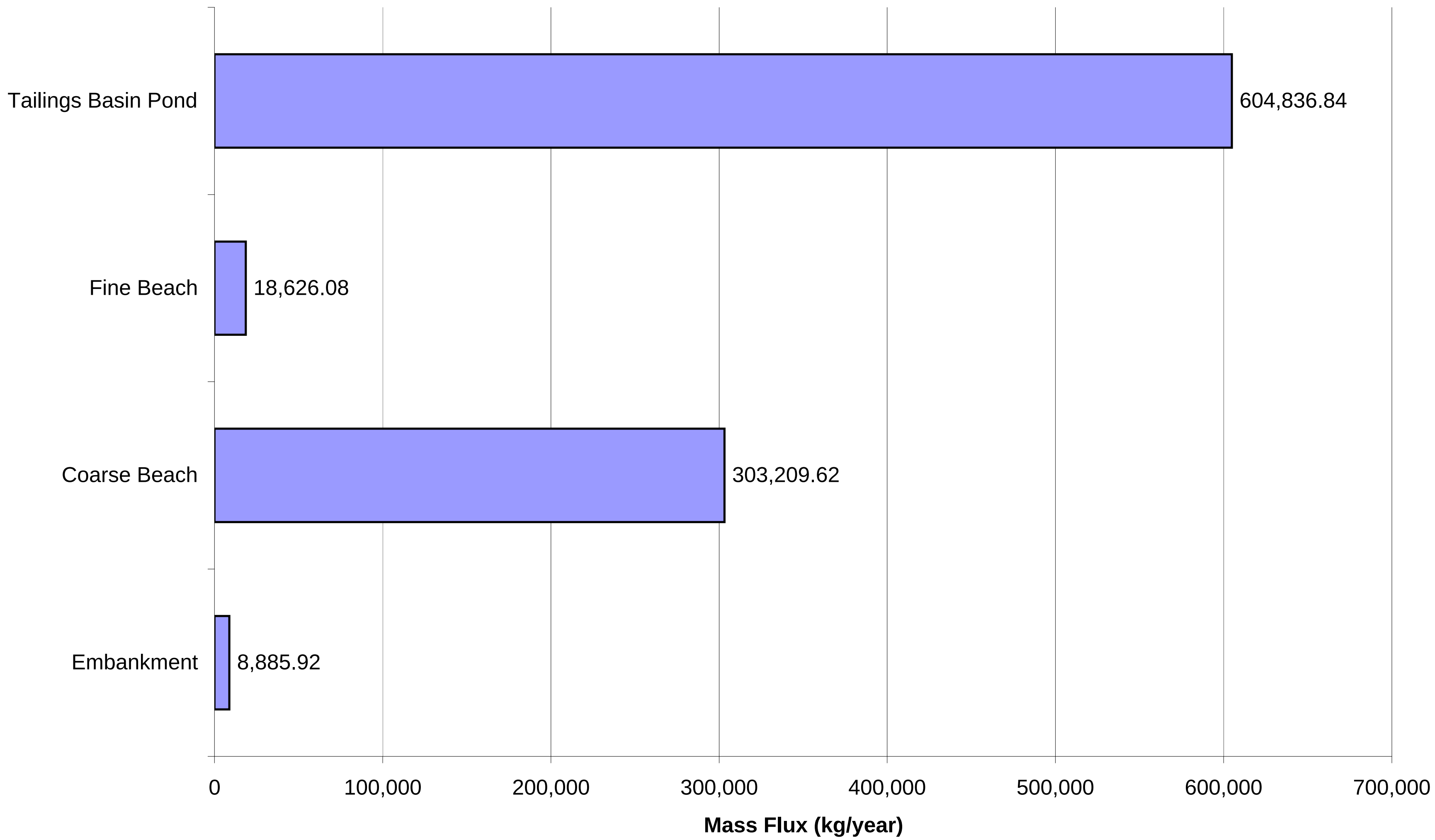
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 10 for Sulfate (SO_4)

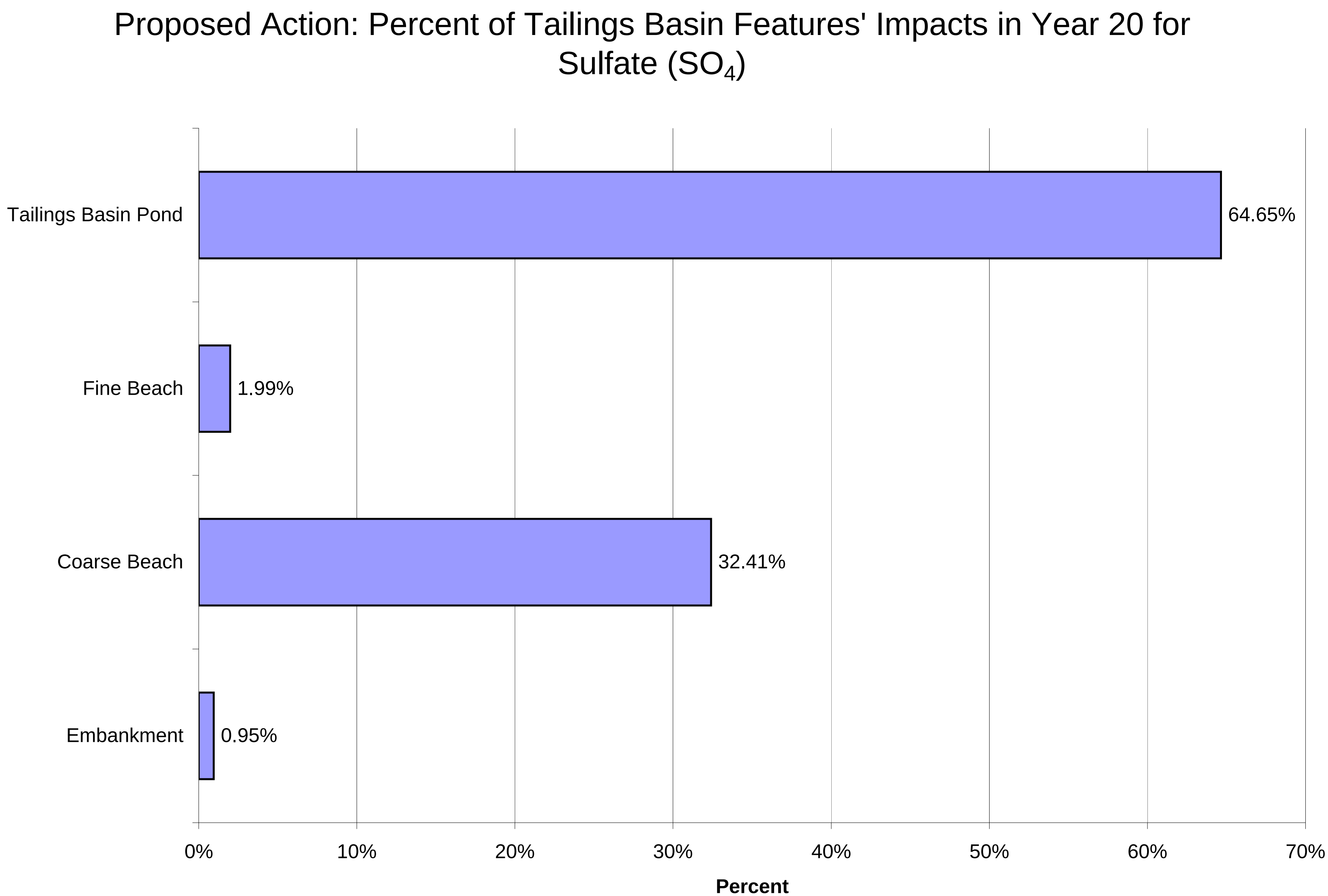


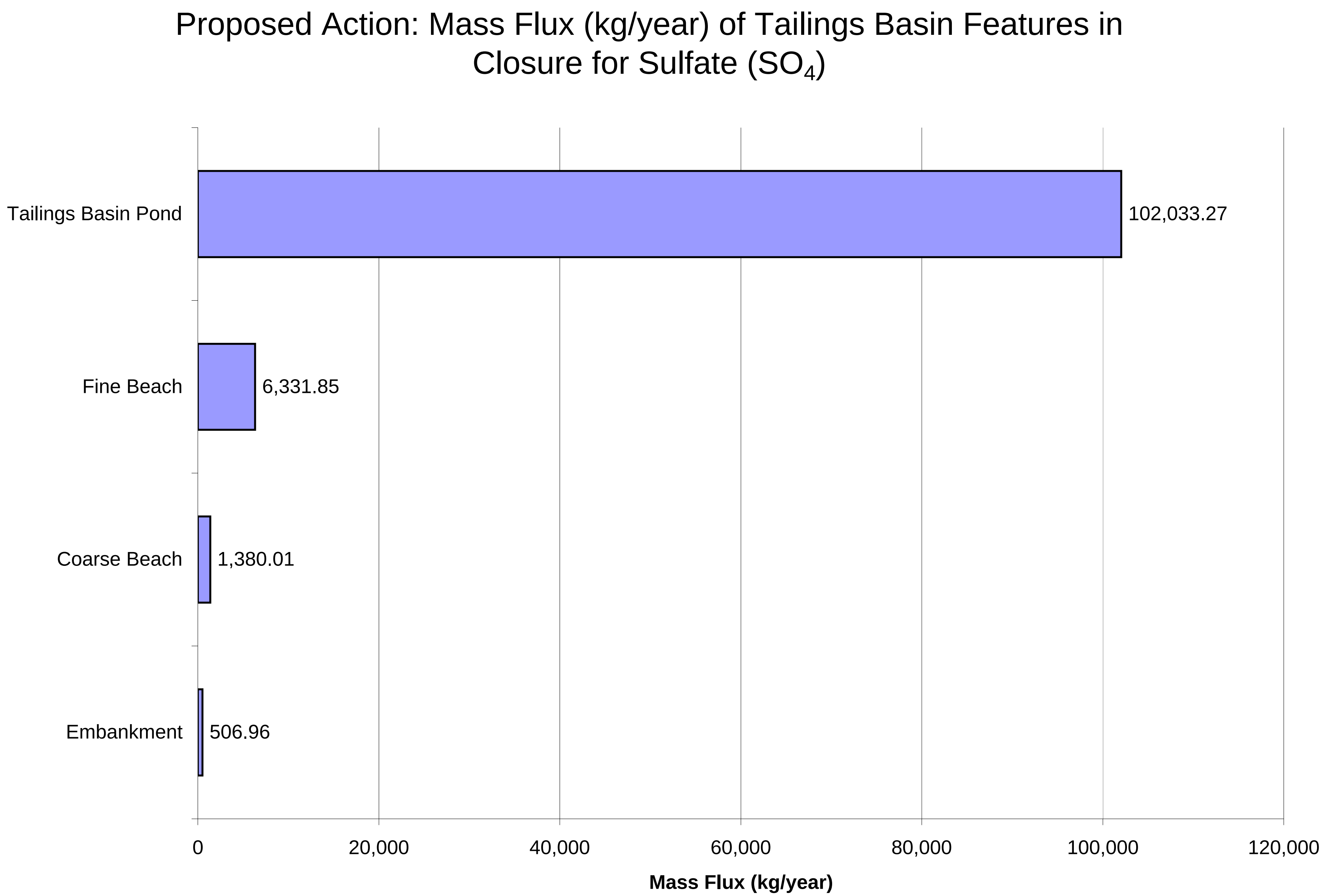

Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 15 for Sulfate (SO_4)
Tailings Basin Pond
Fine Beach
Coarse Beach
Embankment
626,939.59
17,934.99
343,498.32
4,484.58
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Mass Flux (kg/year)

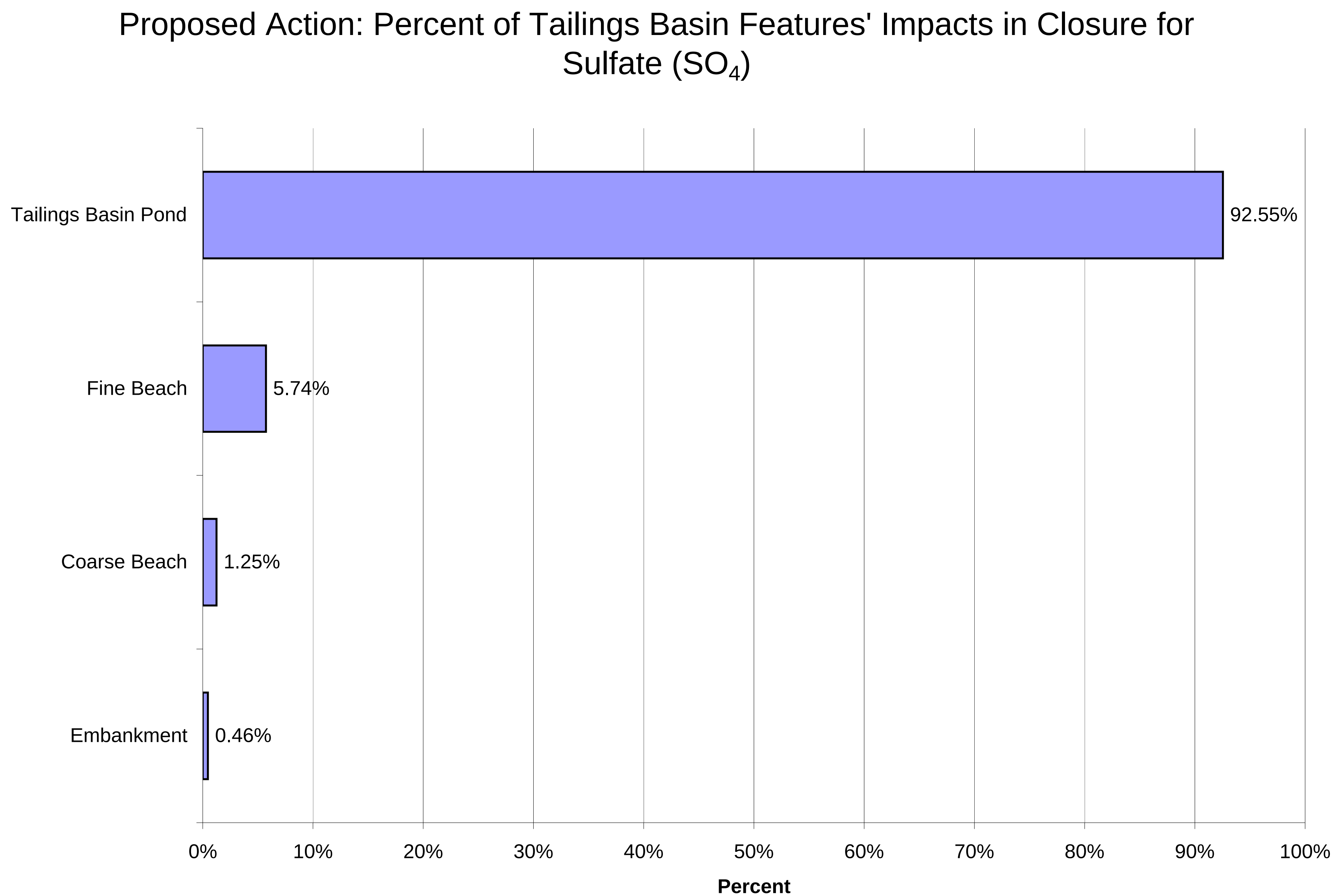

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 15 for Sulfate (SO_4)
Tailings Basin Pond
63.14%
Fine Beach
1.81%
Coarse Beach
34.60%
Embankment
0.45%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

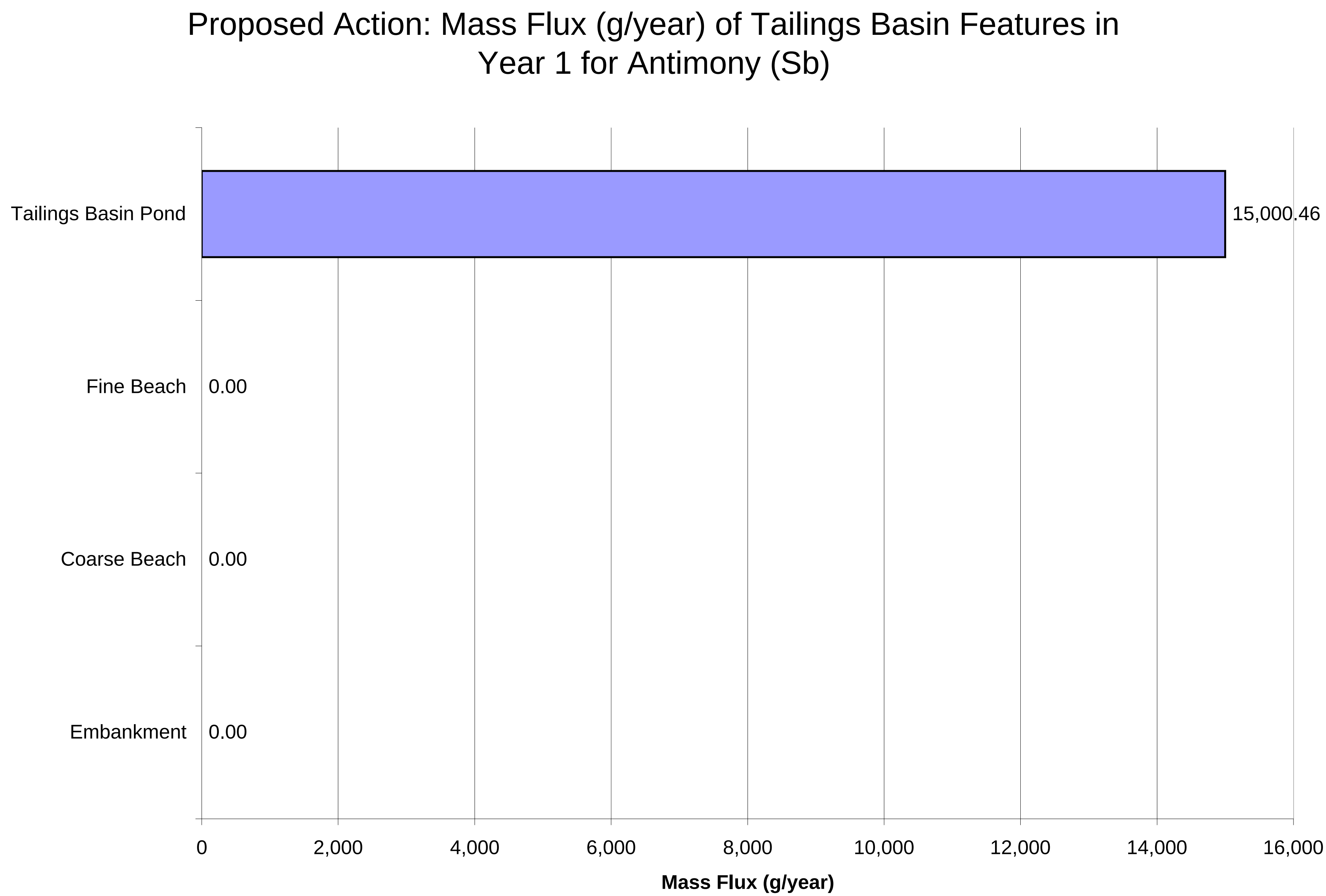
Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Year 20 for Sulfate (SO_4)



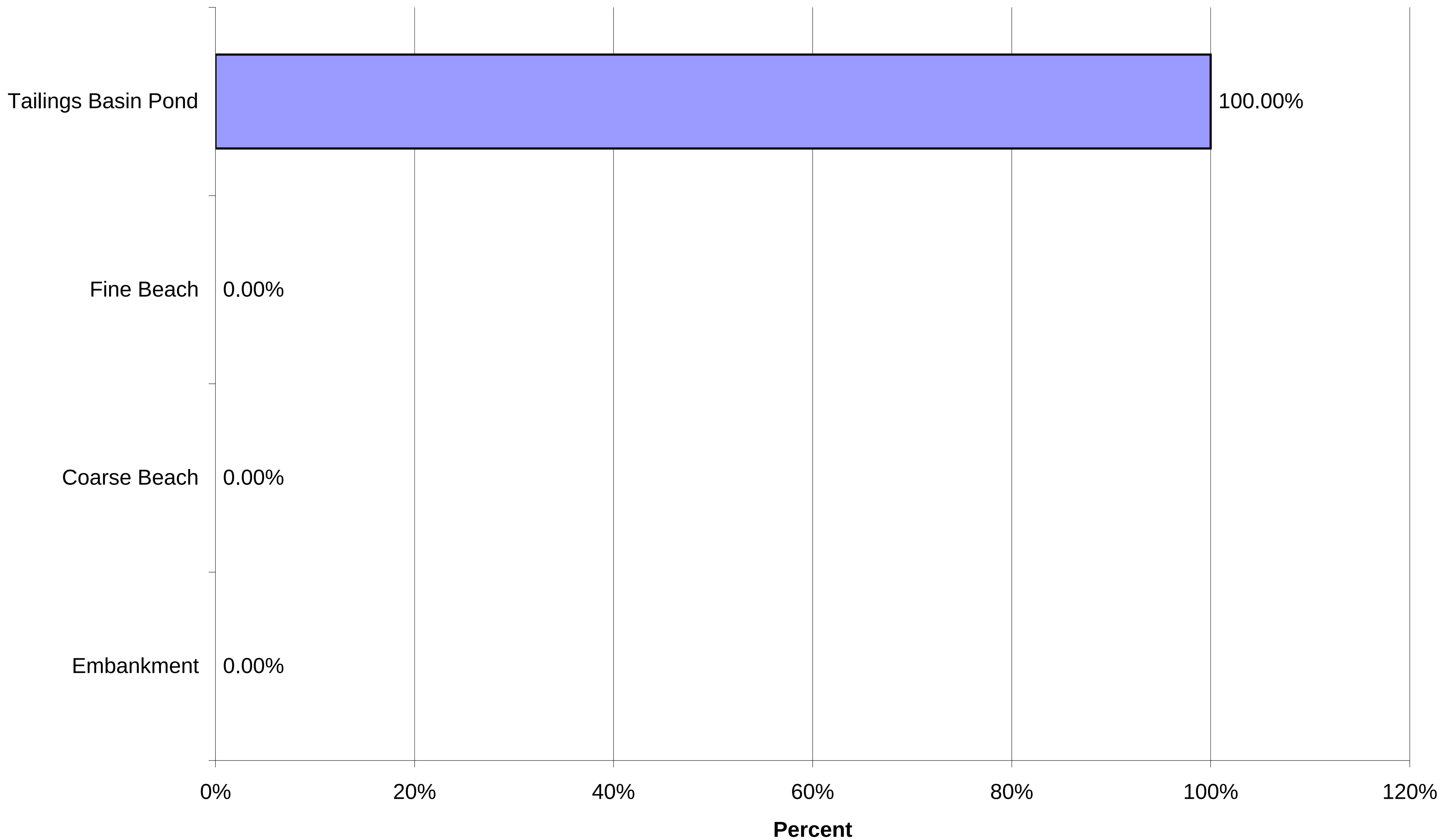

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 20 for Sulfate (SO_4)
Tailings Basin Pond
64.65%
Fine Beach
1.99%
Coarse Beach
32.41%
Embankment
0.95%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

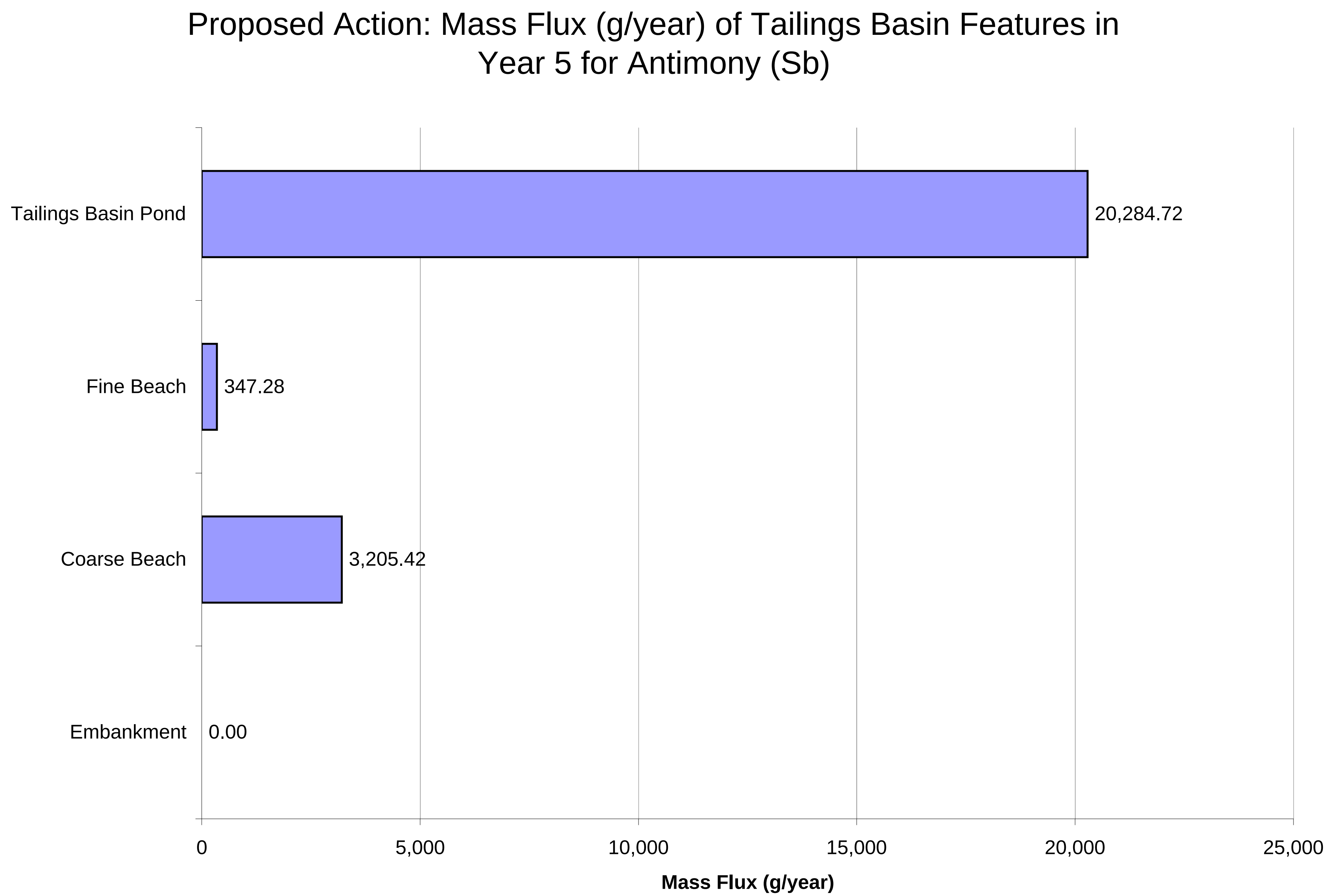

Proposed Action: Mass Flux (kg/year) of Tailings Basin Features in Closure for Sulfate (SO_4)
Tailings Basin Pond
102,033.27
Fine Beach
6,331.85
Coarse Beach
1,380.01
Embankment
506.96
0
20,000
40,000
60,000
80,000
100,000
120,000
Mass Flux (kg/year)

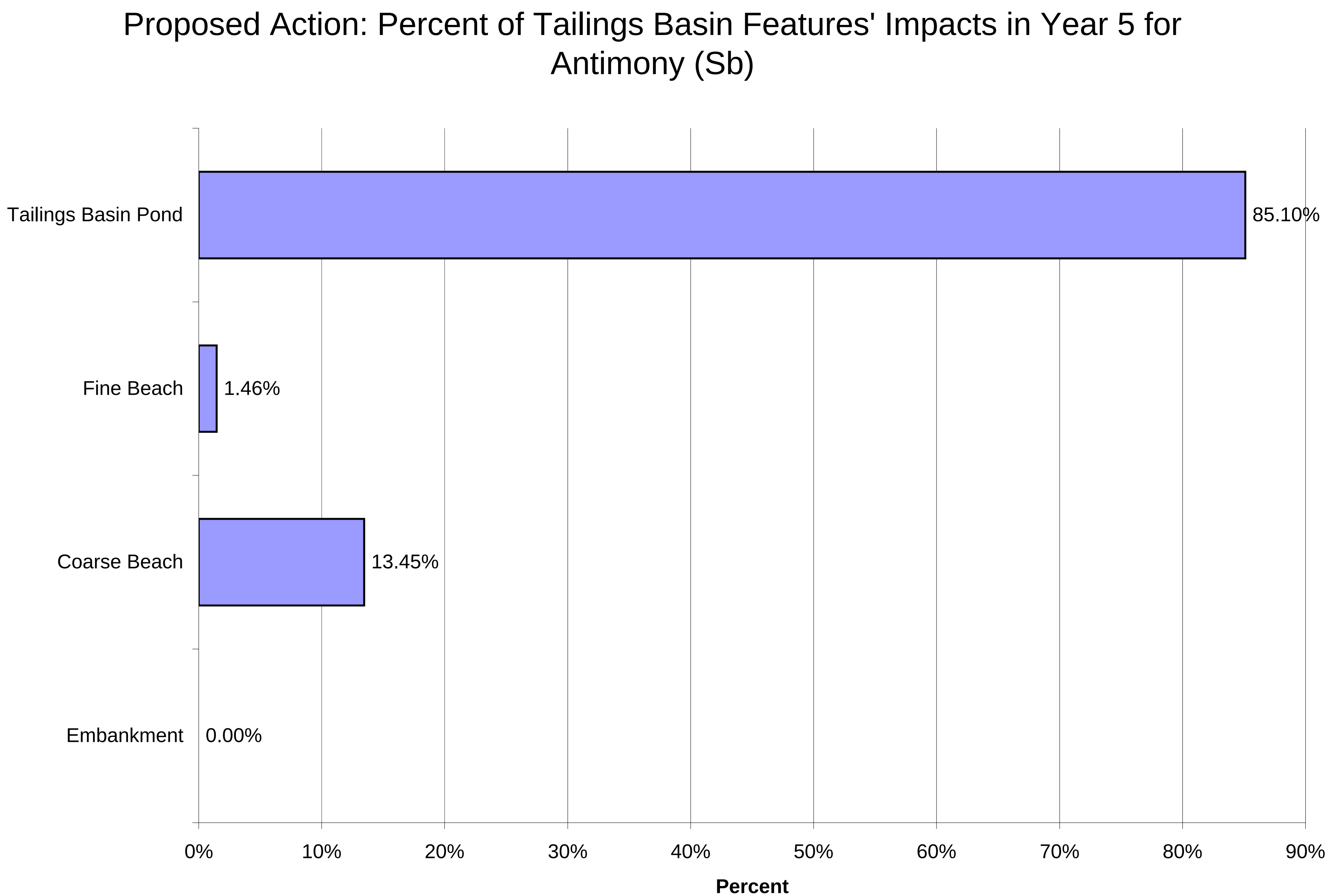

Proposed Action: Percent of Tailings Basin Features' Impacts in Closure for Sulfate (SO_4)
Tailings Basin Pond
92.55%
Fine Beach
5.74%
Coarse Beach
1.25%
Embankment
0.46%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent


Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Antimony (Sb)
Tailings Basin Pond
15,000.46
Fine Beach
0.00
Coarse Beach
0.00
Embankment
0.00
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Mass Flux (g/year)

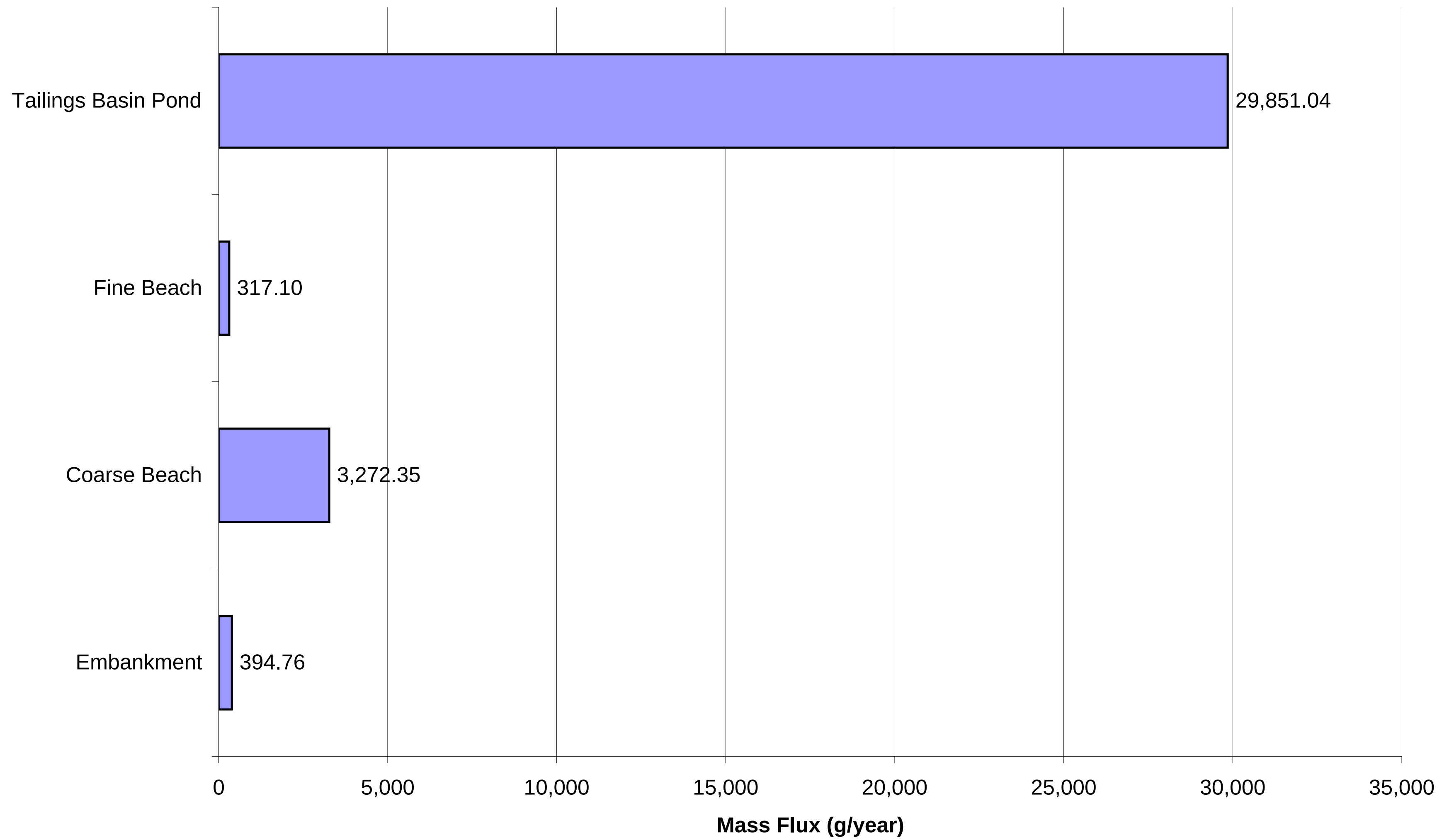
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 1 for Antimony (Sb)



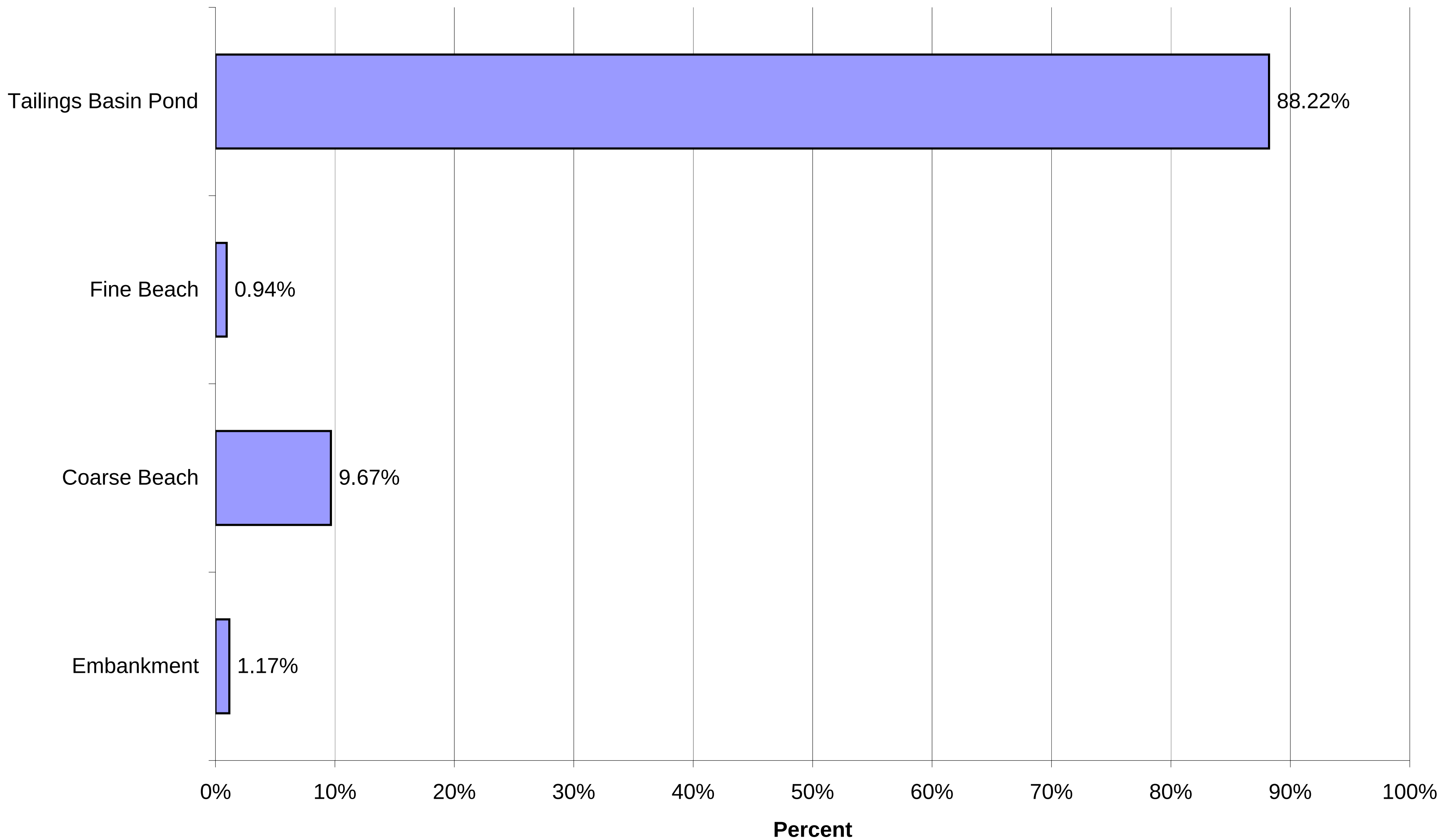

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Antimony (Sb)
Tailings Basin Pond
20,284.72
Fine Beach
347.28
Coarse Beach
3,205.42
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

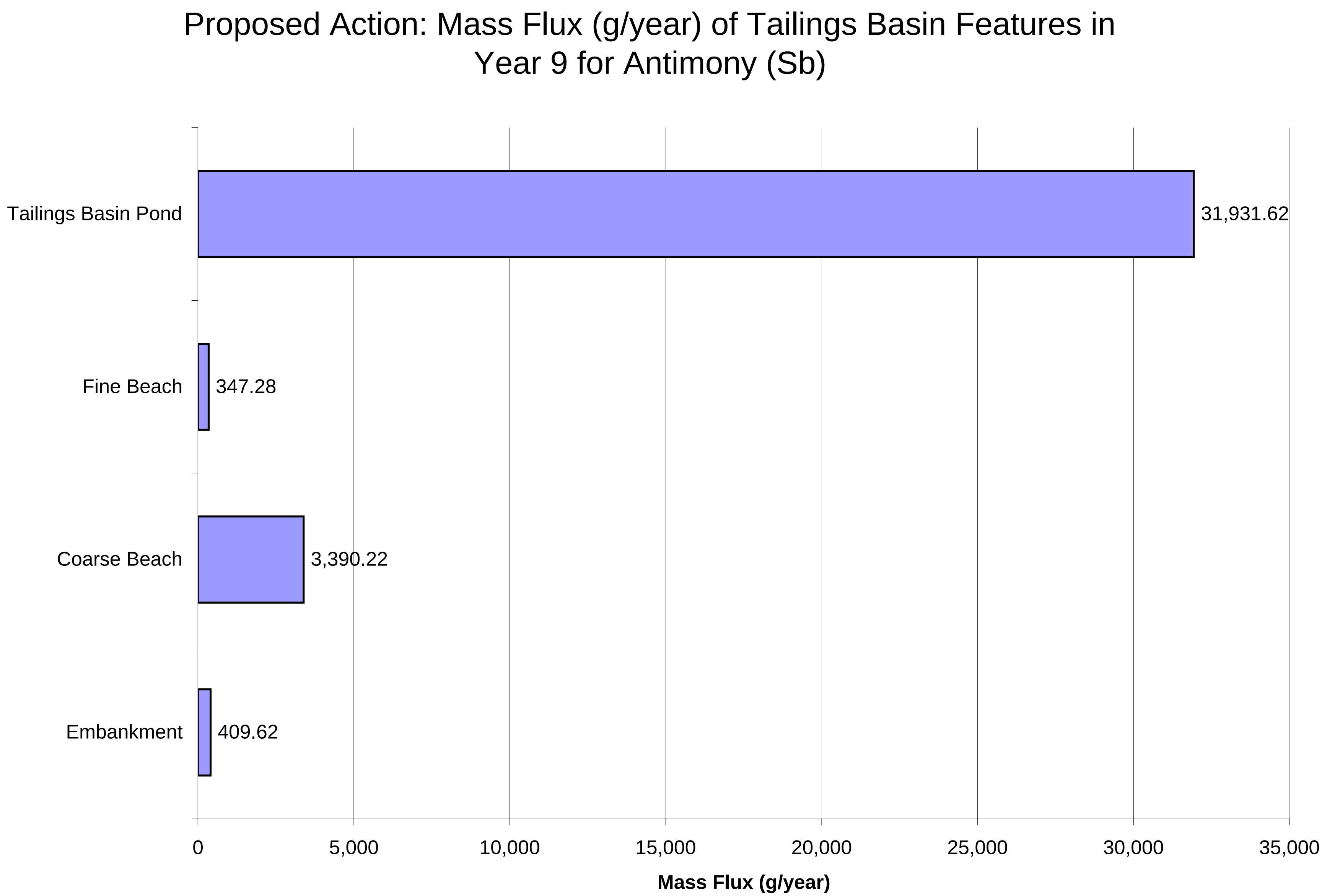

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 5 for Antimony (Sb)
Tailings Basin Pond
85.10%
Fine Beach
1.46%
Coarse Beach
13.45%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 8 for Antimony (Sb)

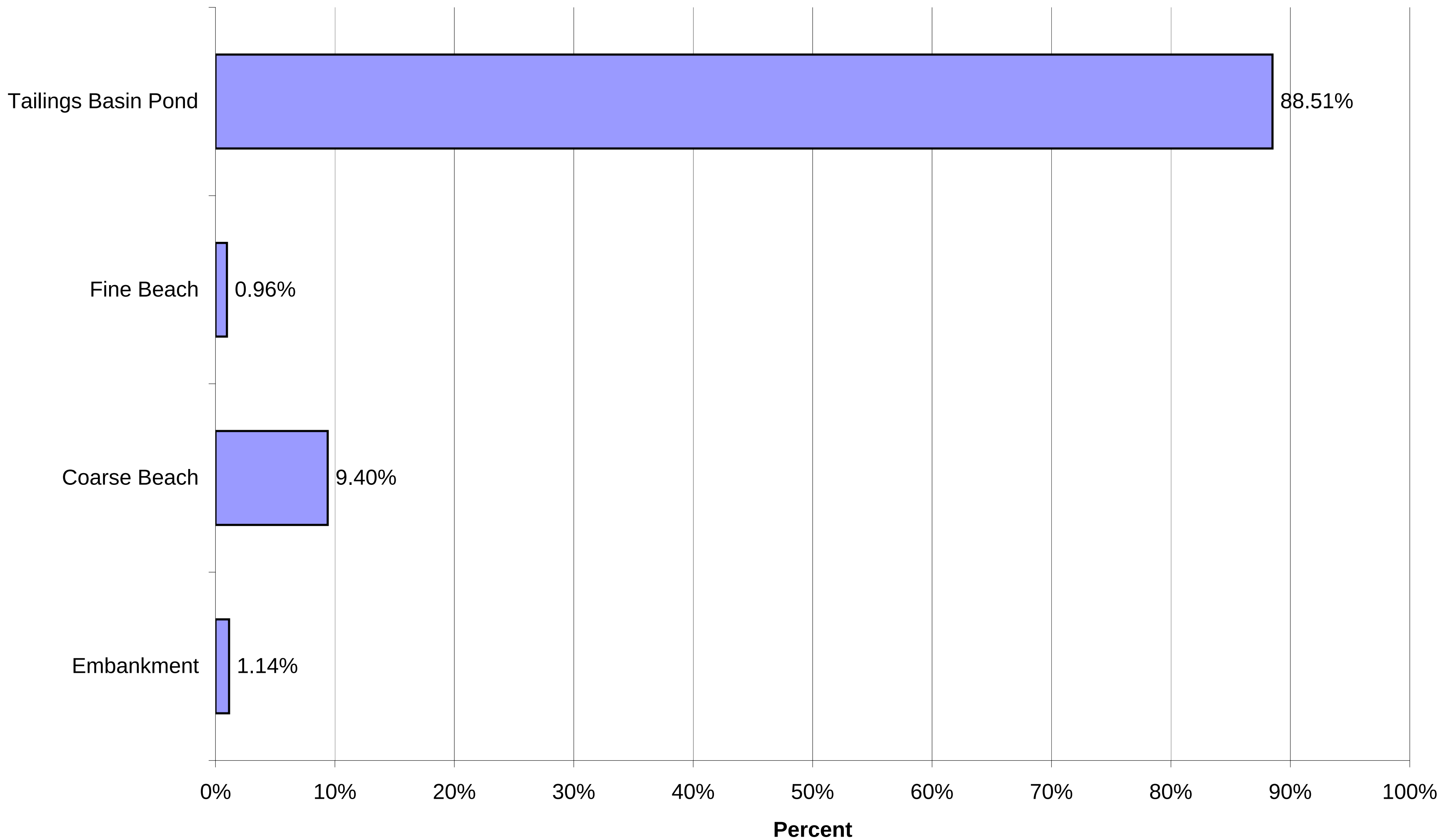


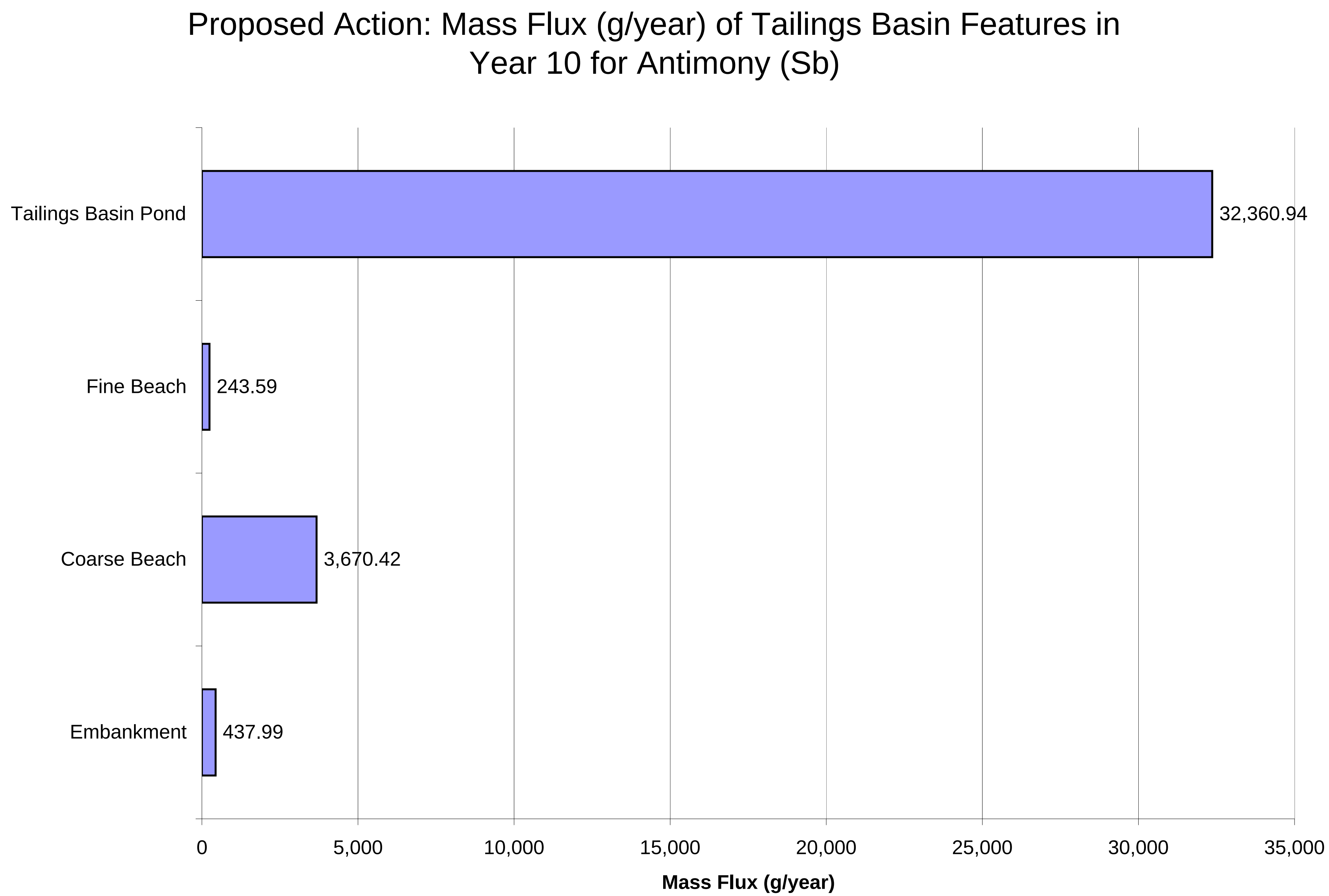
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 8 for Antimony (Sb)

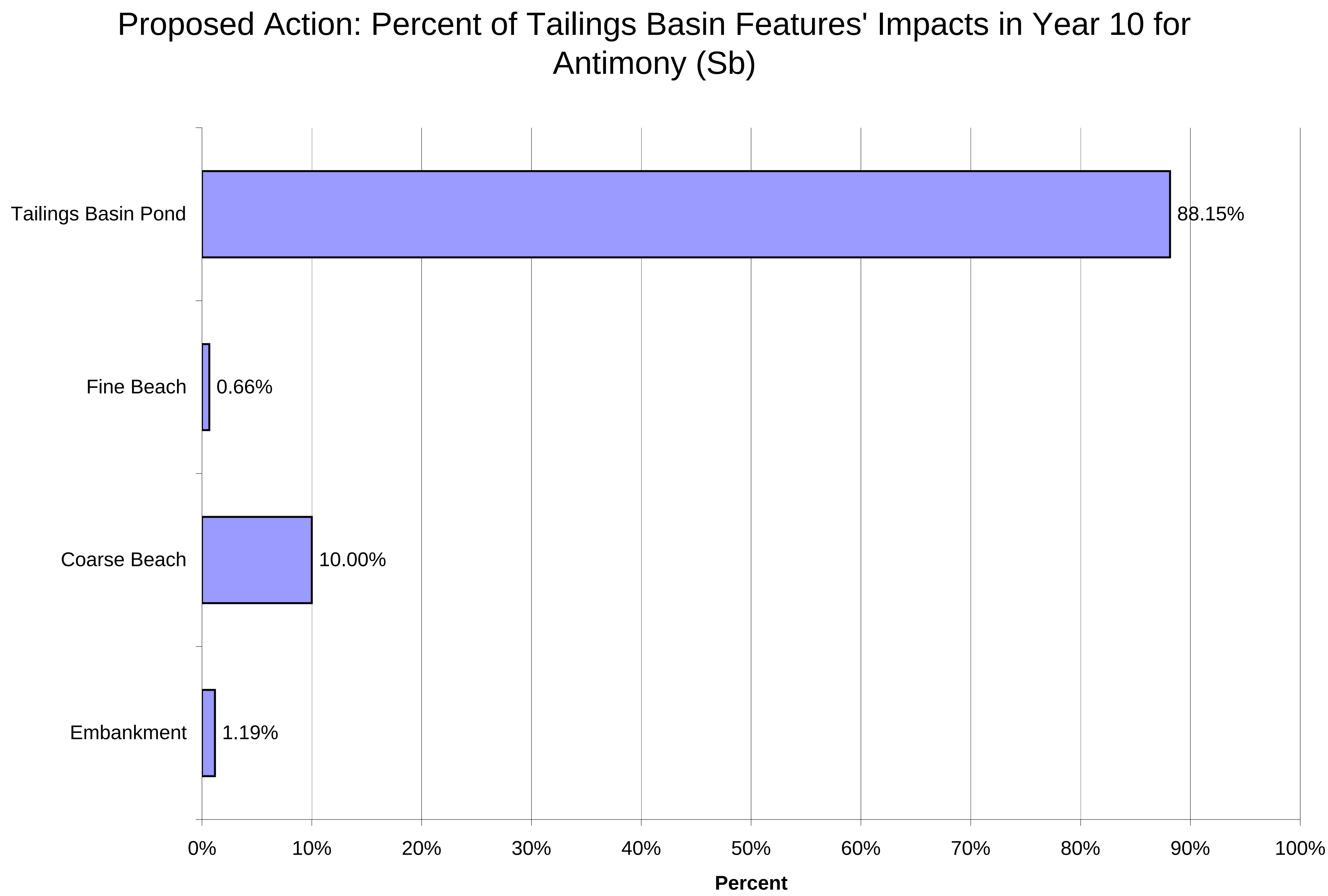


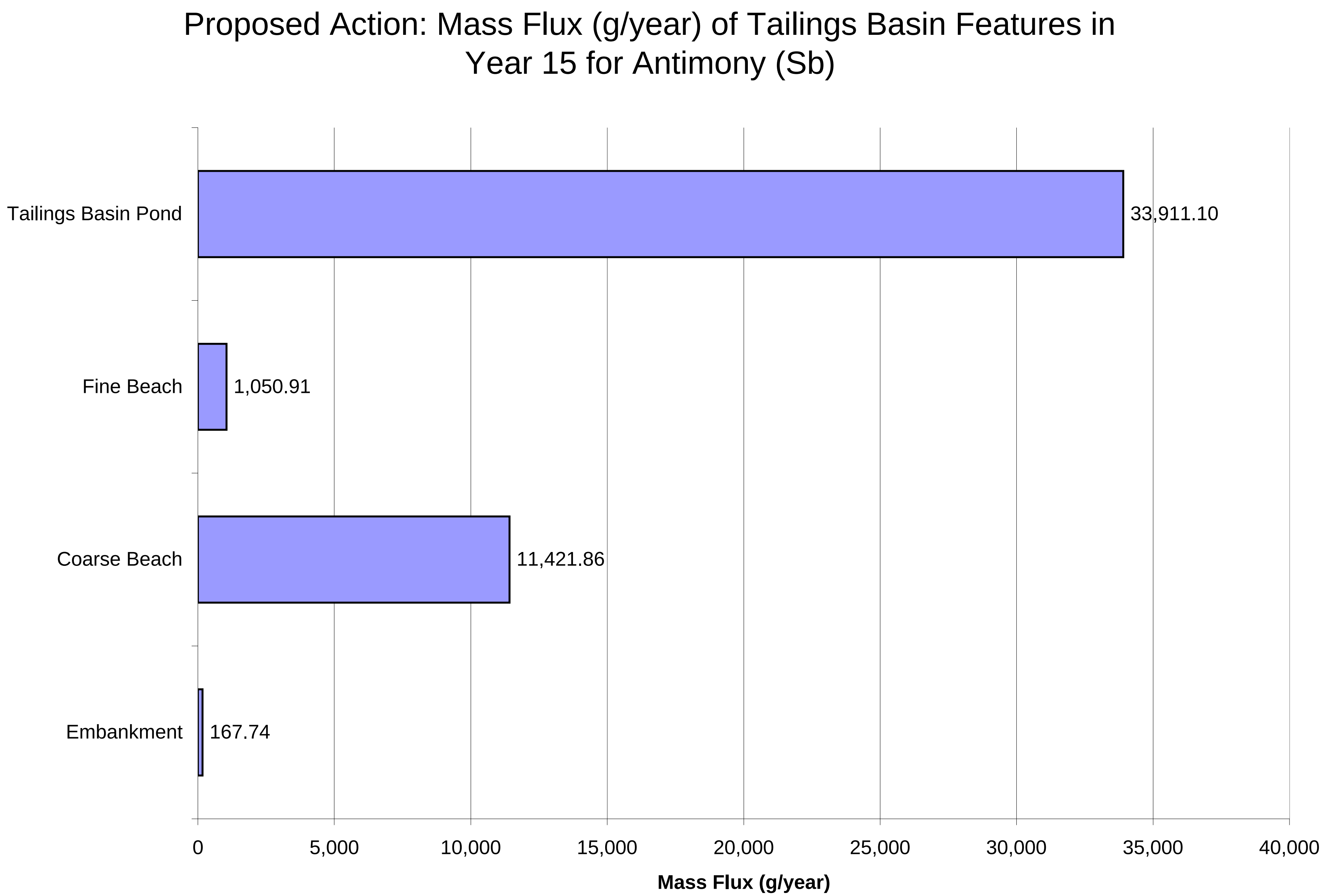

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 9 for Antimony (Sb)
Tailings Basin Pond
31,931.62
Fine Beach
347.28
Coarse Beach
3,390.22
Embankment
409.62
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

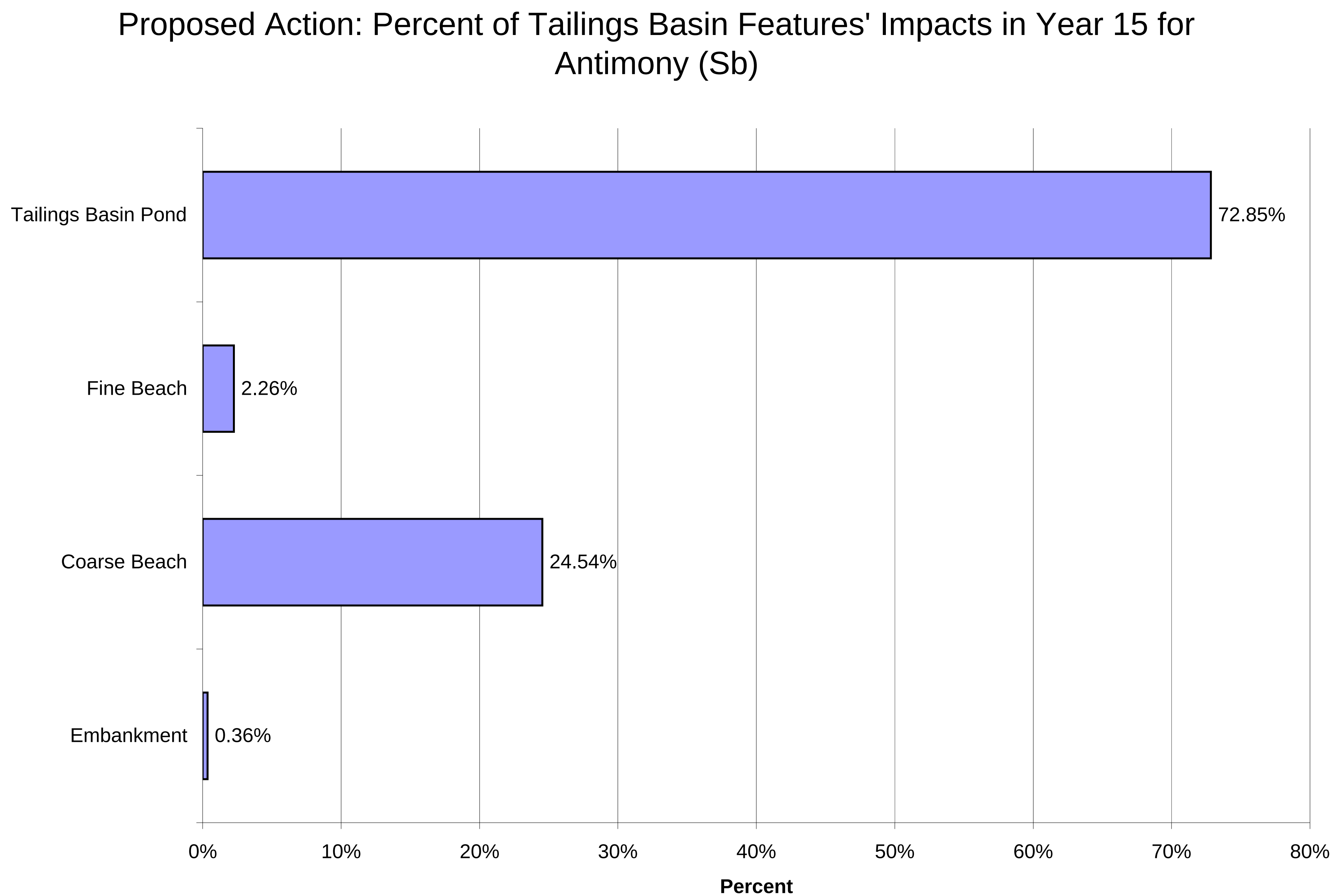
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 9 for Antimony (Sb)

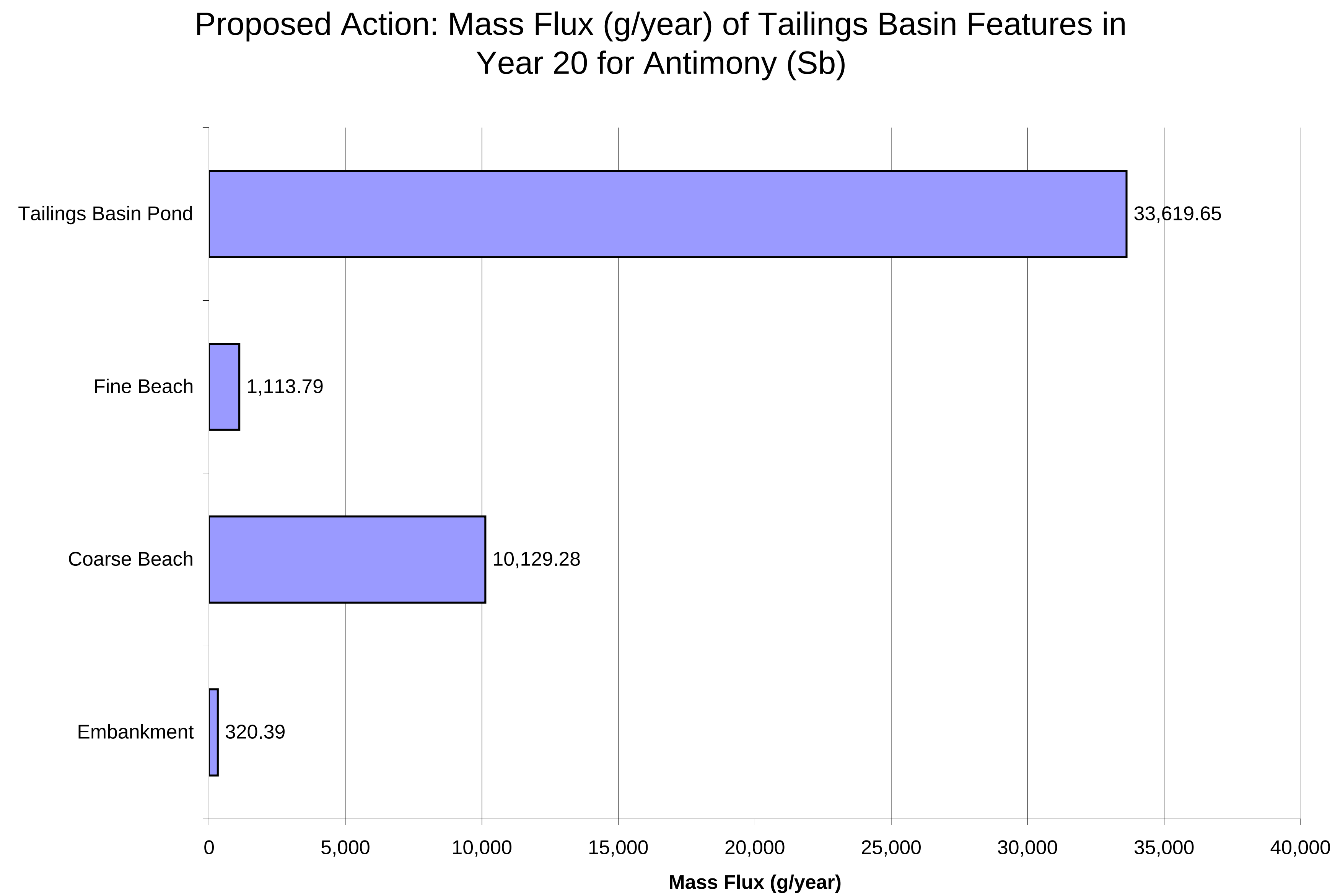



Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Antimony (Sb)
Tailings Basin Pond
32,360.94
Fine Beach
243.59
Coarse Beach
3,670.42
Embankment
437.99
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

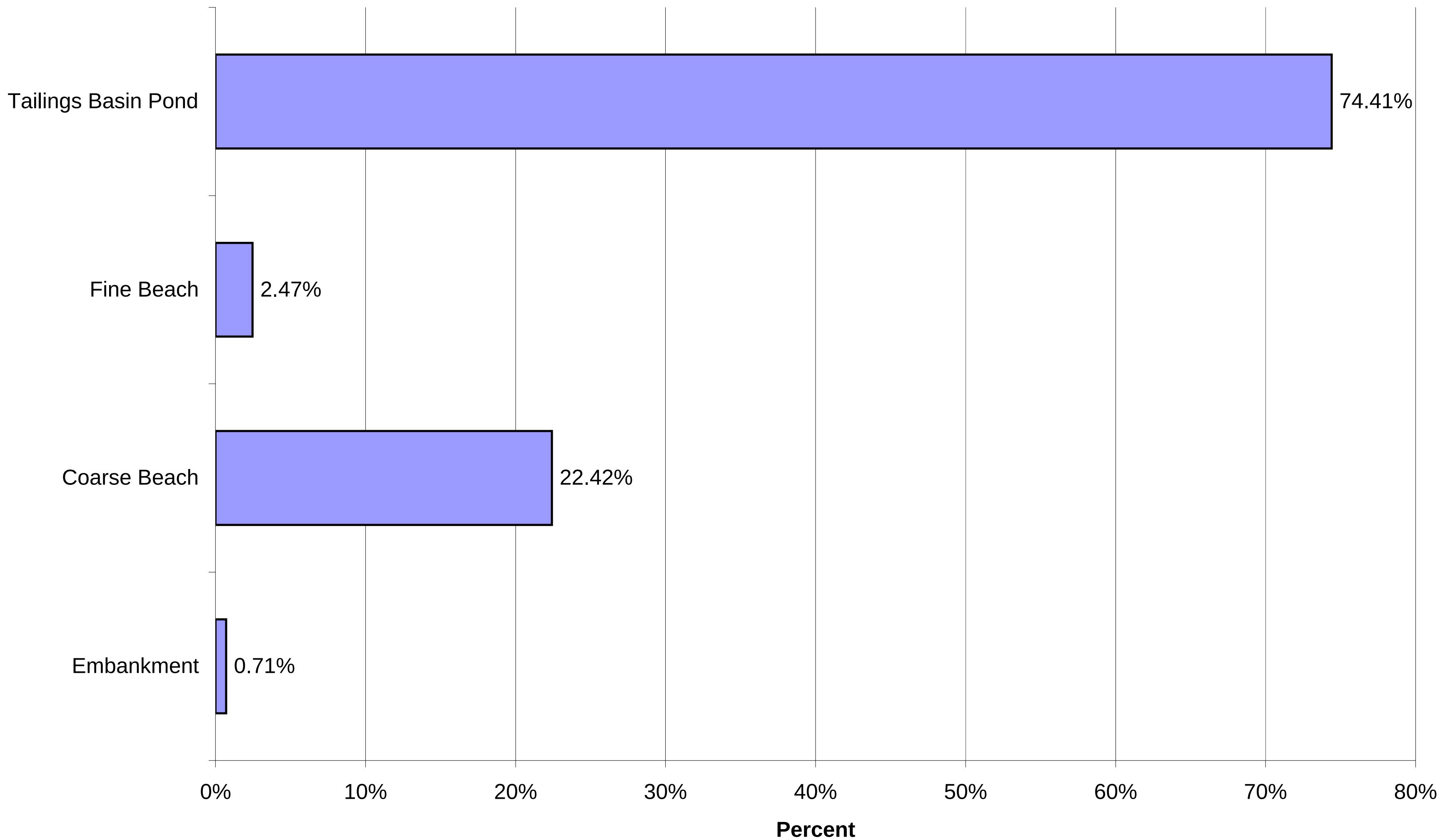

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 10 for Antimony (Sb)
Tailings Basin Pond
88.15%
Fine Beach
0.66%
Coarse Beach
10.00%
Embankment
1.19%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

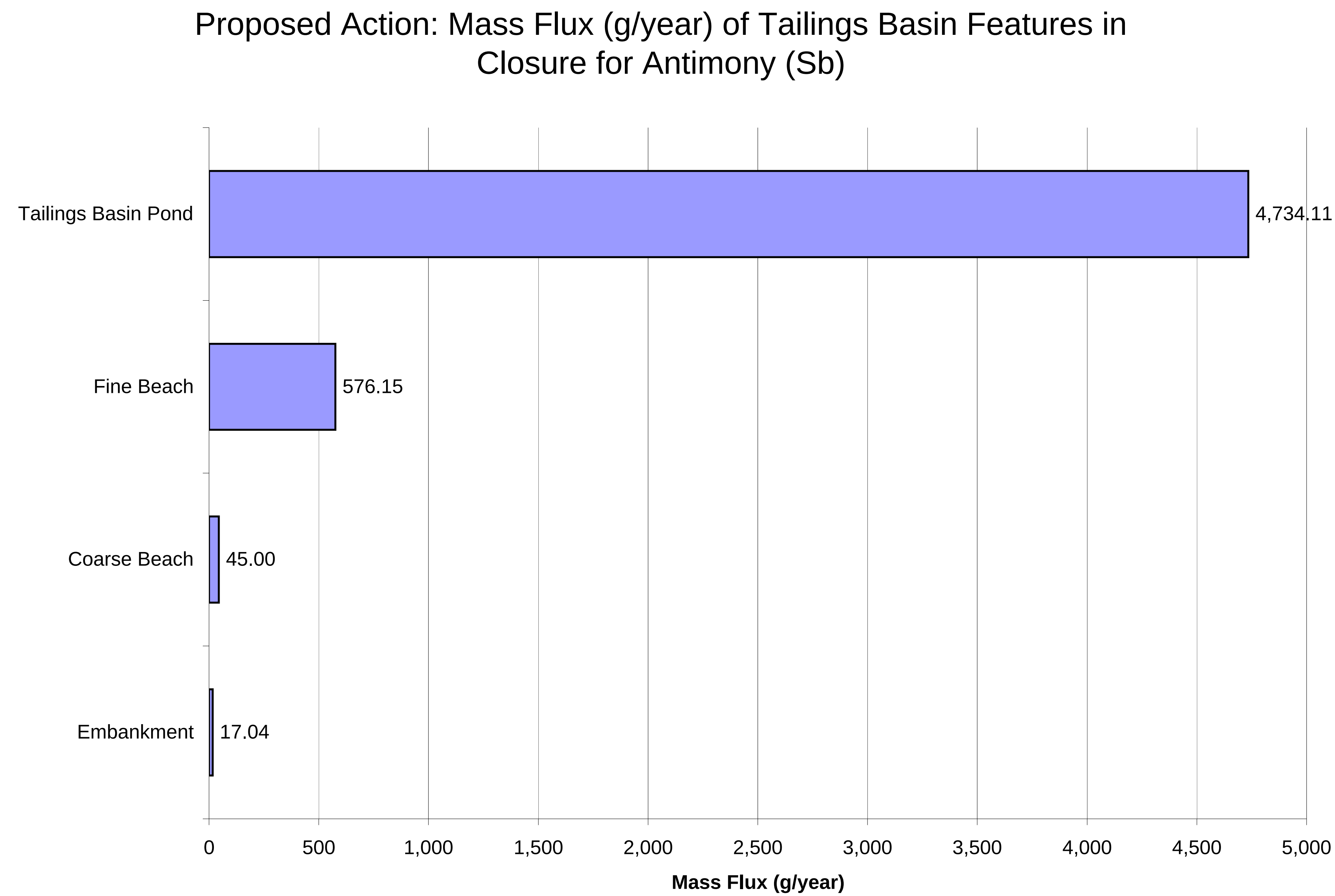

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Antimony (Sb)
Tailings Basin Pond
33,911.10
Fine Beach
1,050.91
Coarse Beach
11,421.86
Embankment
167.74
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

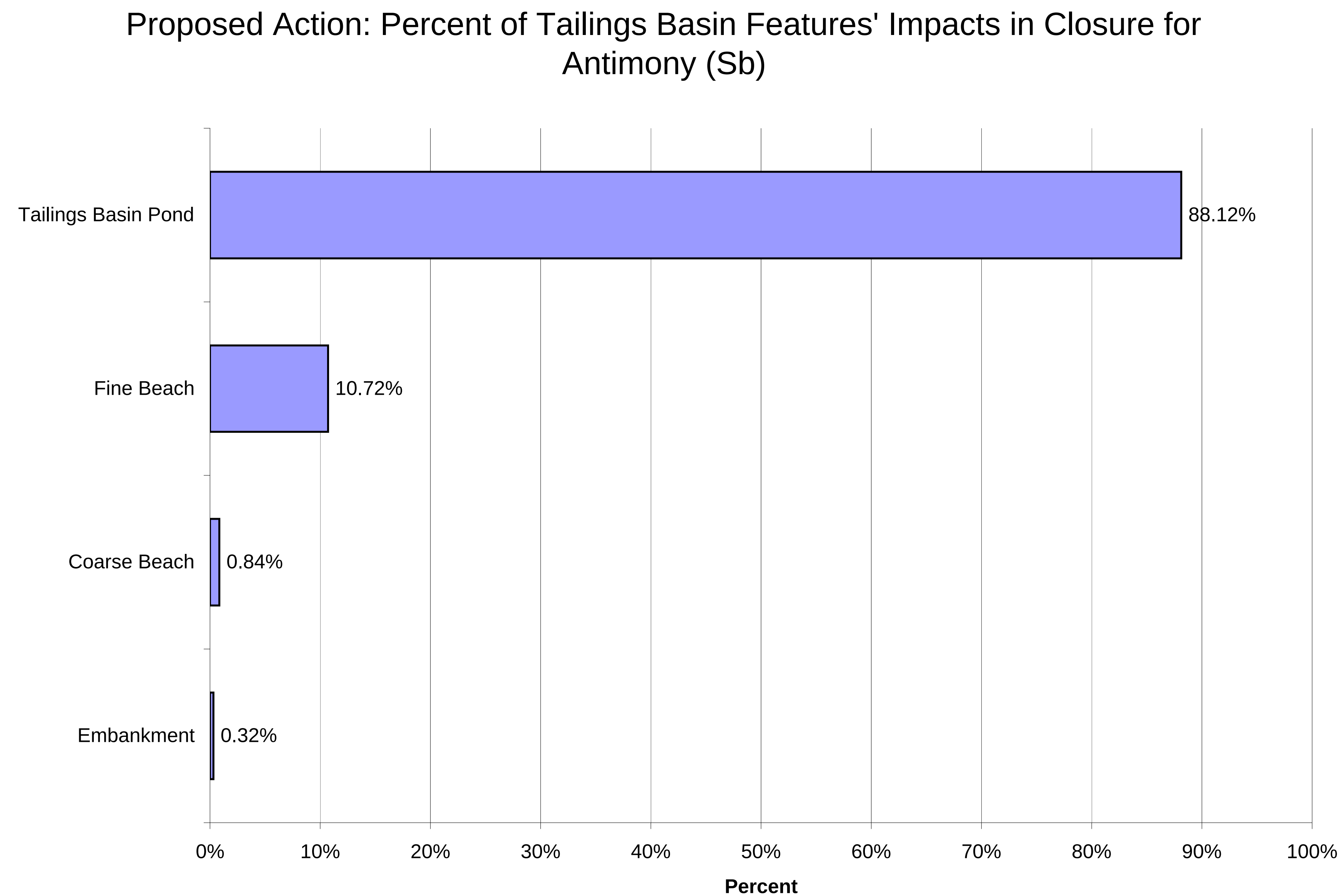

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 15 for Antimony (Sb)
Tailings Basin Pond
72.85%
Fine Beach
2.26%
Coarse Beach
24.54%
Embankment
0.36%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

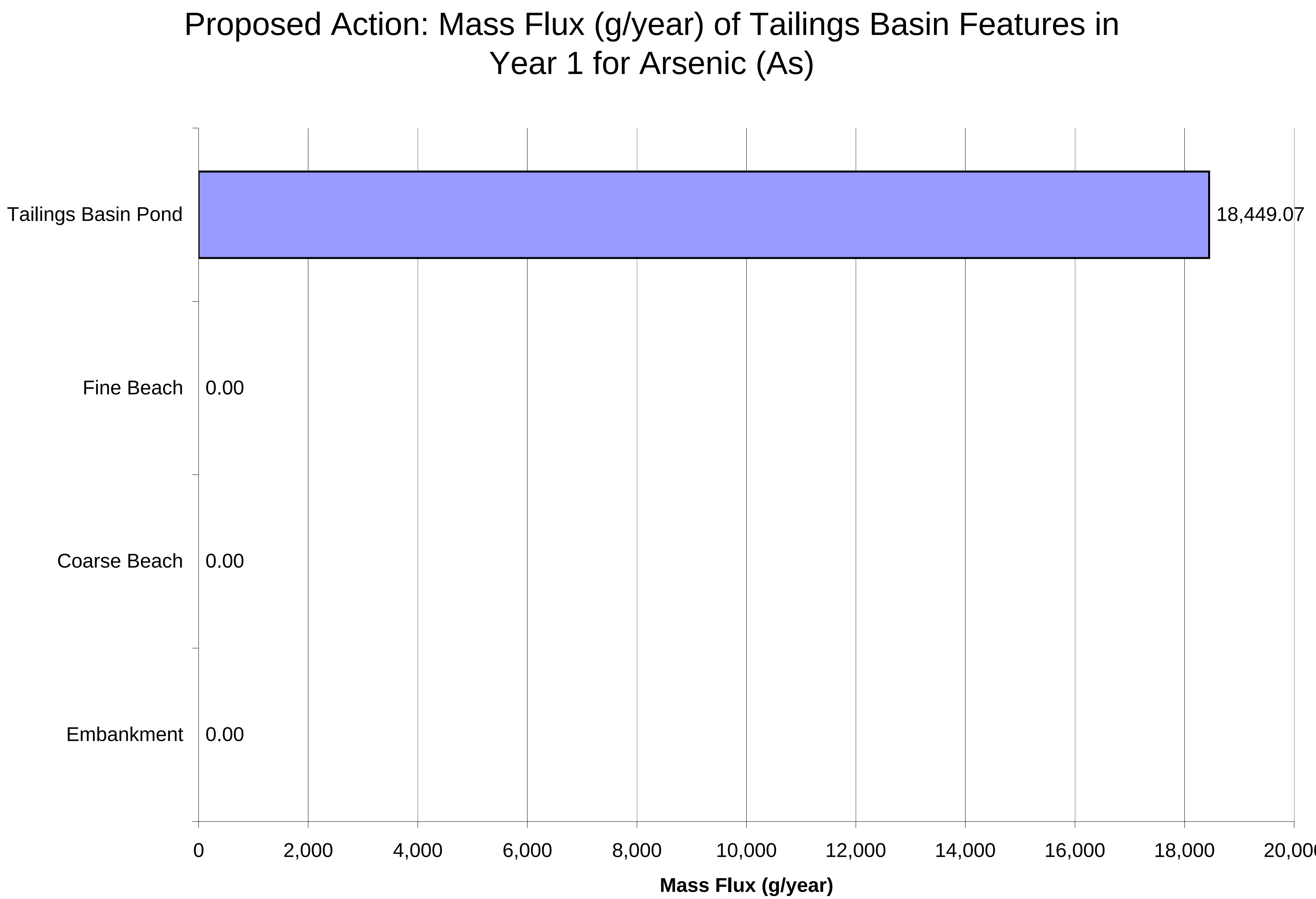

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Antimony (Sb)
Tailings Basin Pond
33,619.65
Fine Beach
1,113.79
Coarse Beach
10,129.28
Embankment
320.39
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

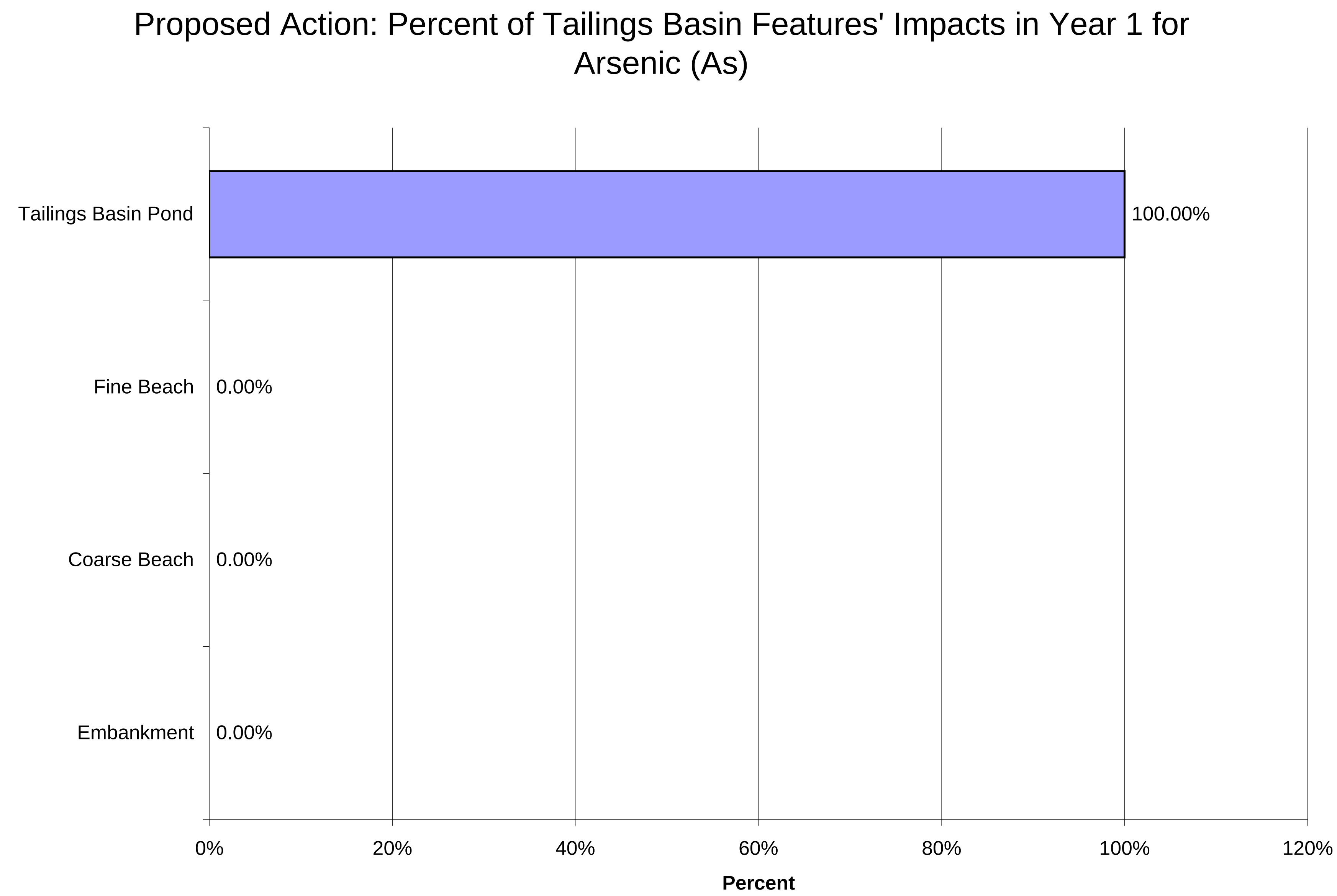
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 20 for Antimony (Sb)

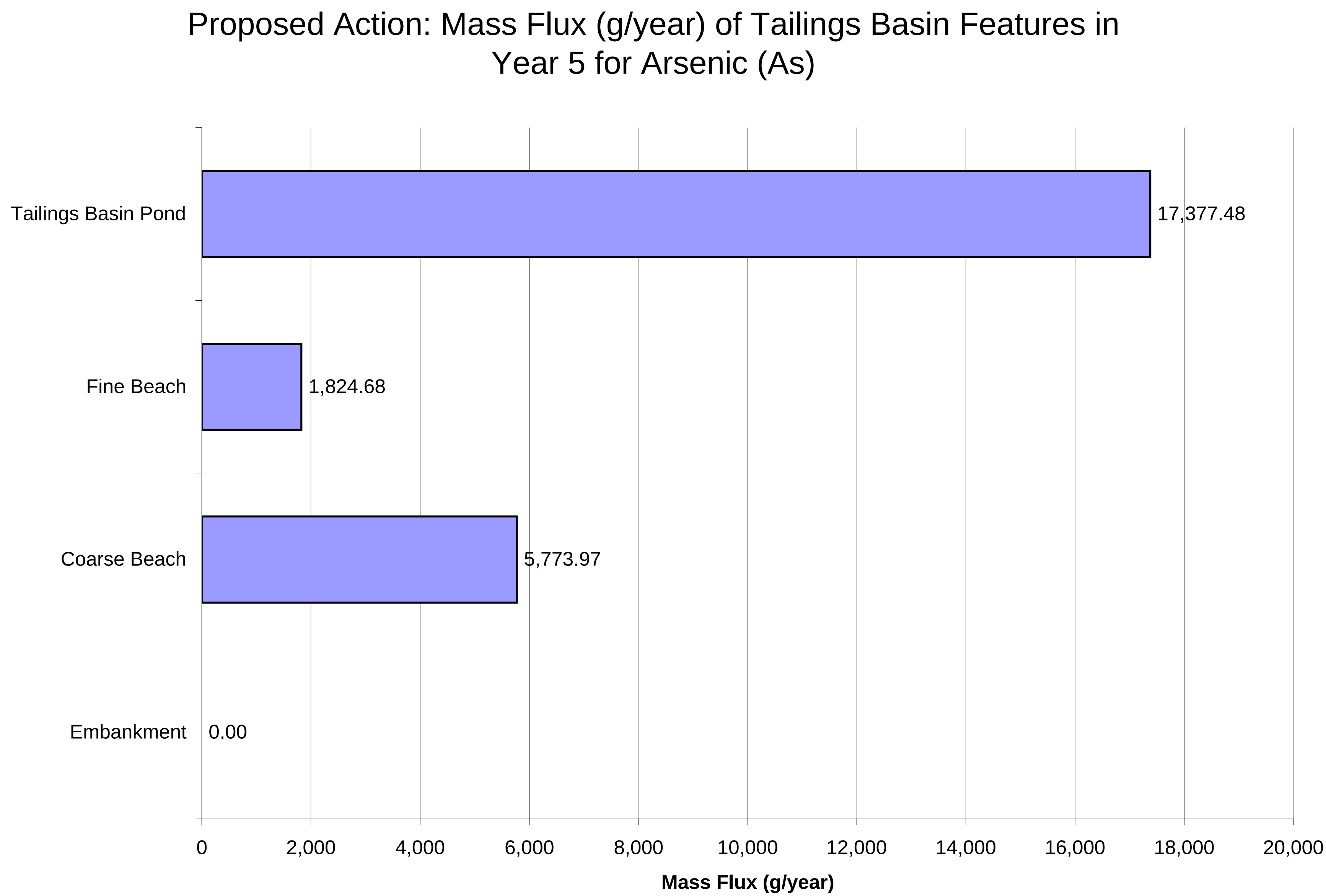


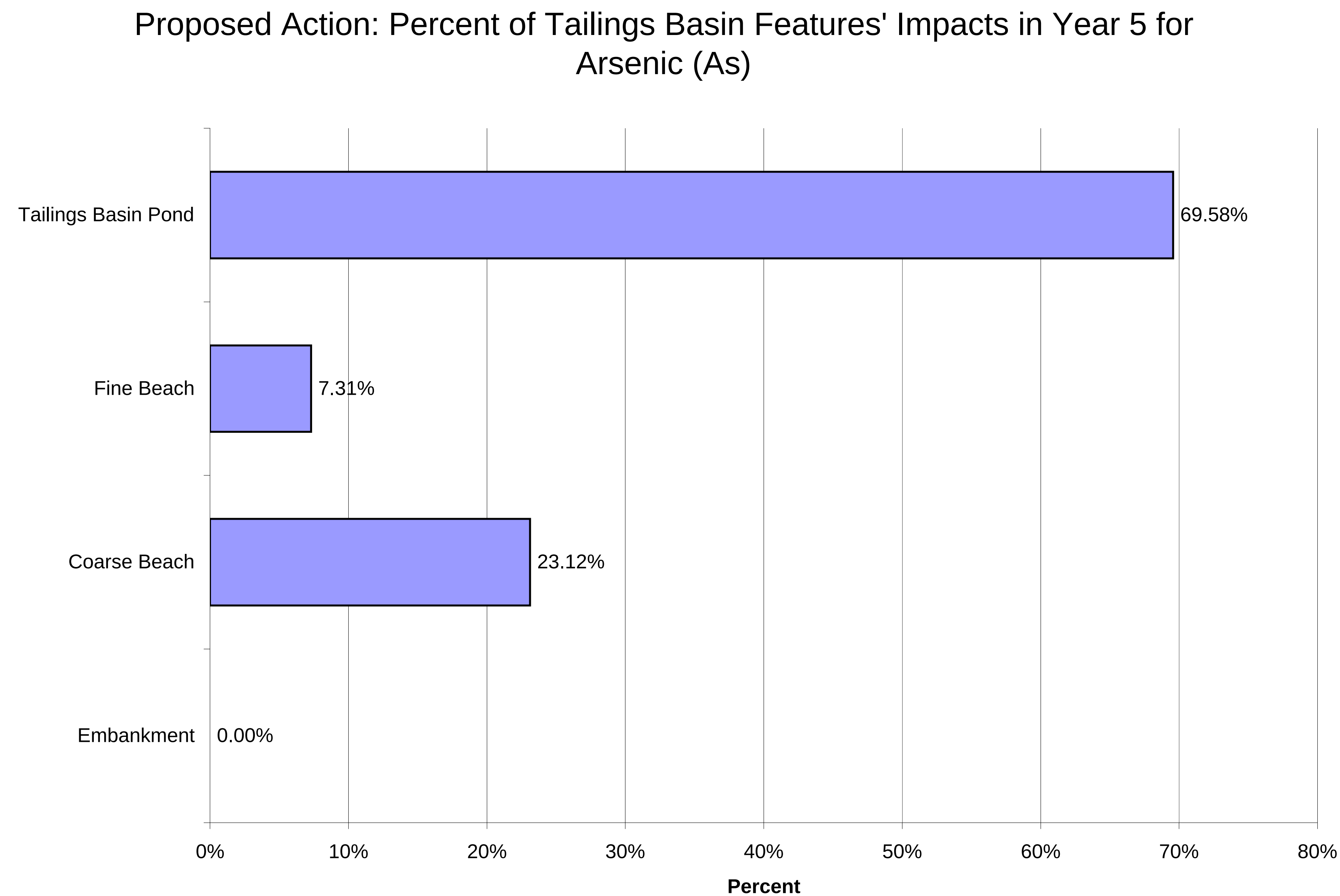

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Closure for Antimony (Sb)
Tailings Basin Pond
4,734.11
Fine Beach
576.15
Coarse Beach
45.00
Embankment
17.04
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Mass Flux (g/year)

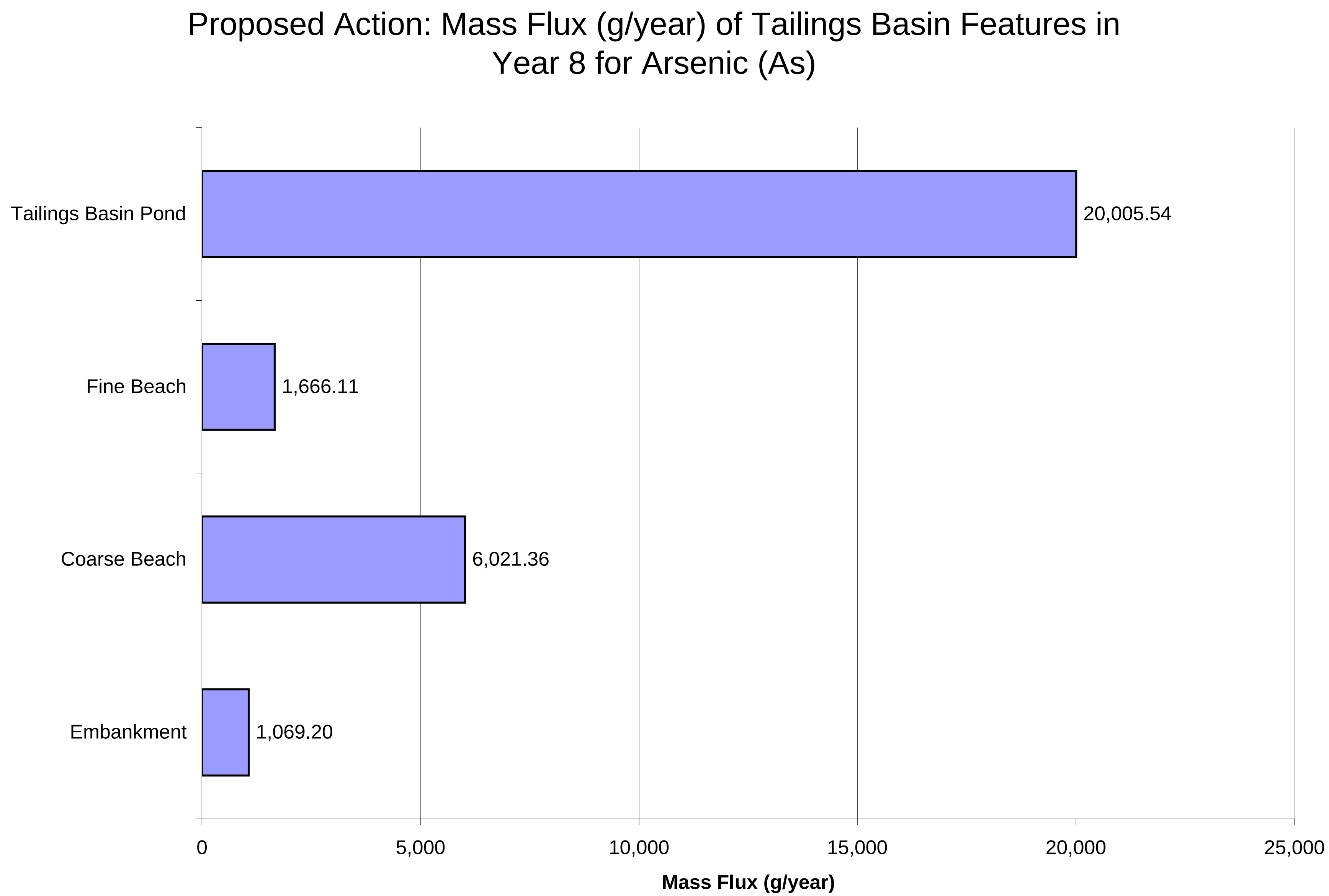

Proposed Action: Percent of Tailings Basin Features' Impacts in Closure for Antimony (Sb)
Tailings Basin Pond
88.12%
Fine Beach
10.72%
Coarse Beach
0.84%
Embankment
0.32%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

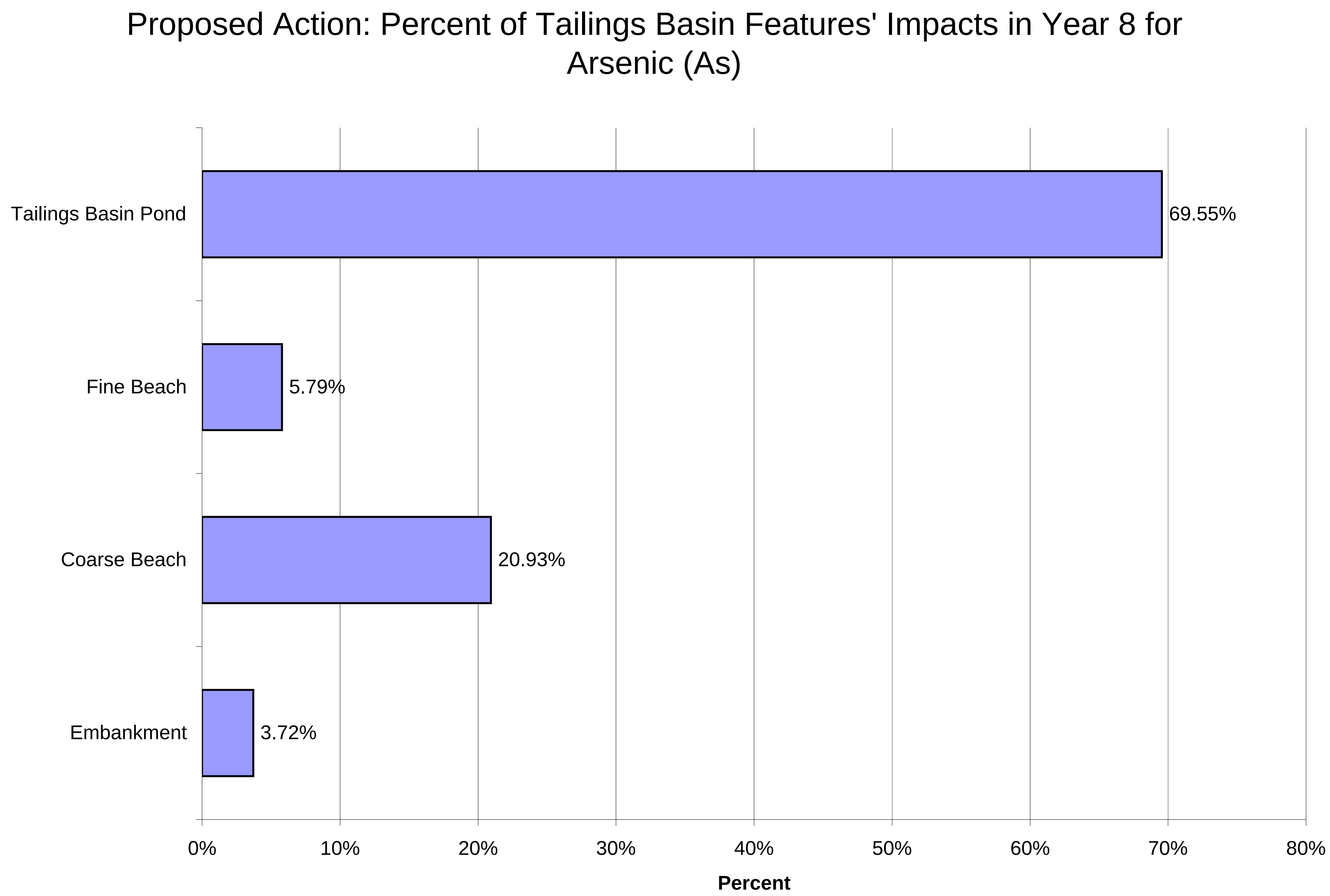

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Arsenic (As)
Tailings Basin Pond
18,449.07
Fine Beach
0.00
Coarse Beach
0.00
Embankment
0.00
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
Mass Flux (g/year)

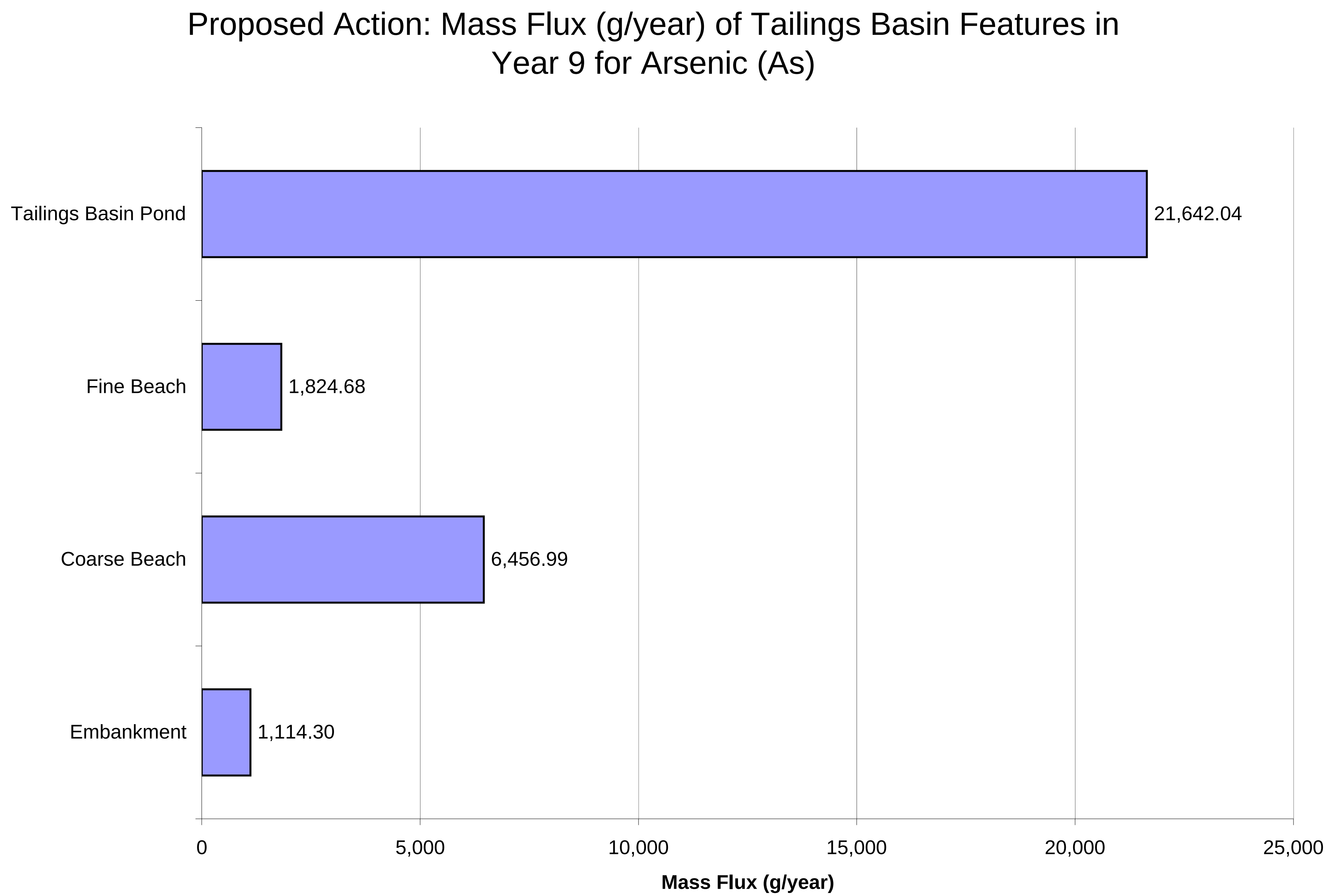

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 1 for Arsenic (As)
Tailings Basin Pond
100.00%
Fine Beach
0.00%
Coarse Beach
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

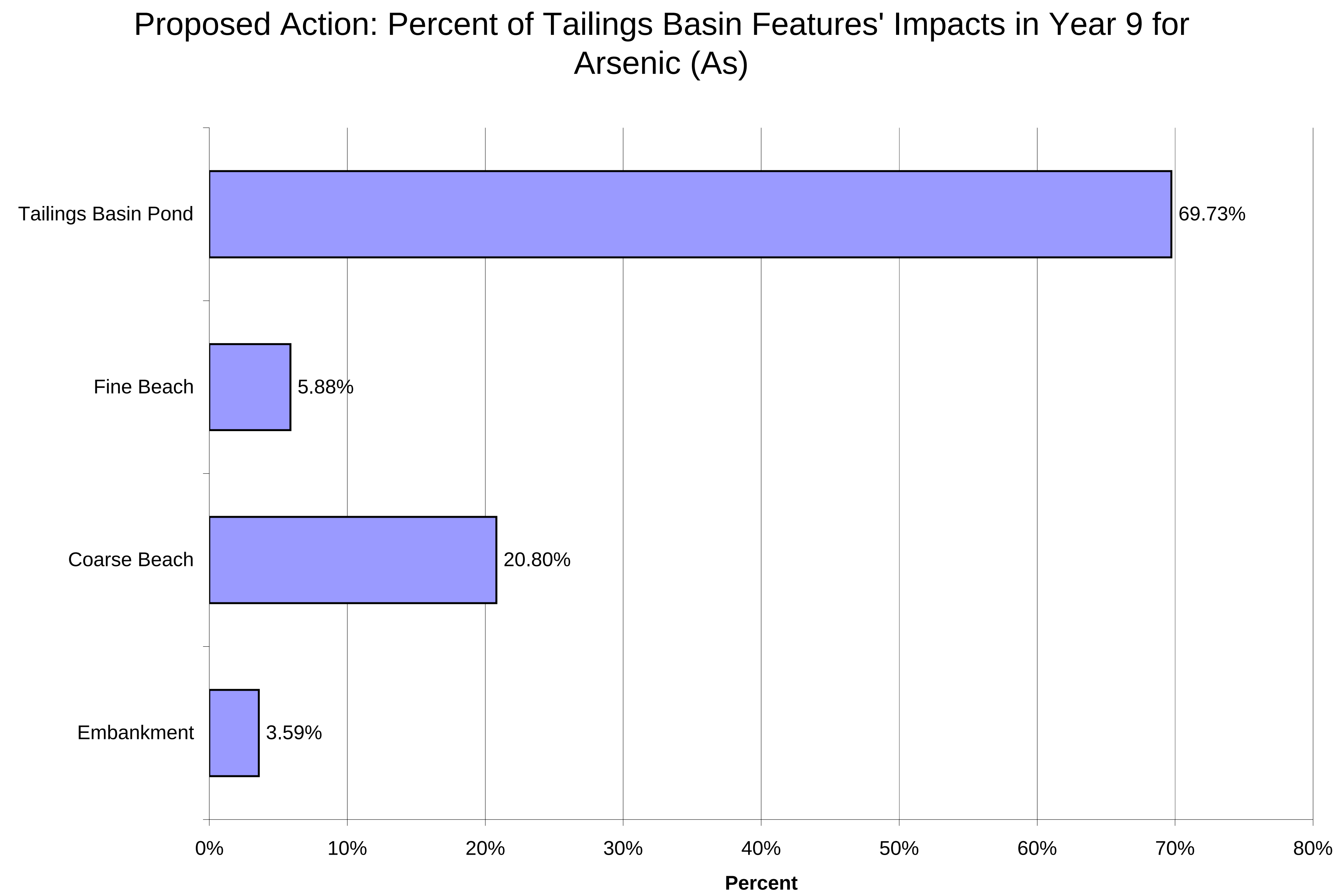

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Arsenic (As)
Tailings Basin Pond
17,377.48
Fine Beach
1,824.68
Coarse Beach
5,773.97
Embankment
0.00
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
Mass Flux (g/year)

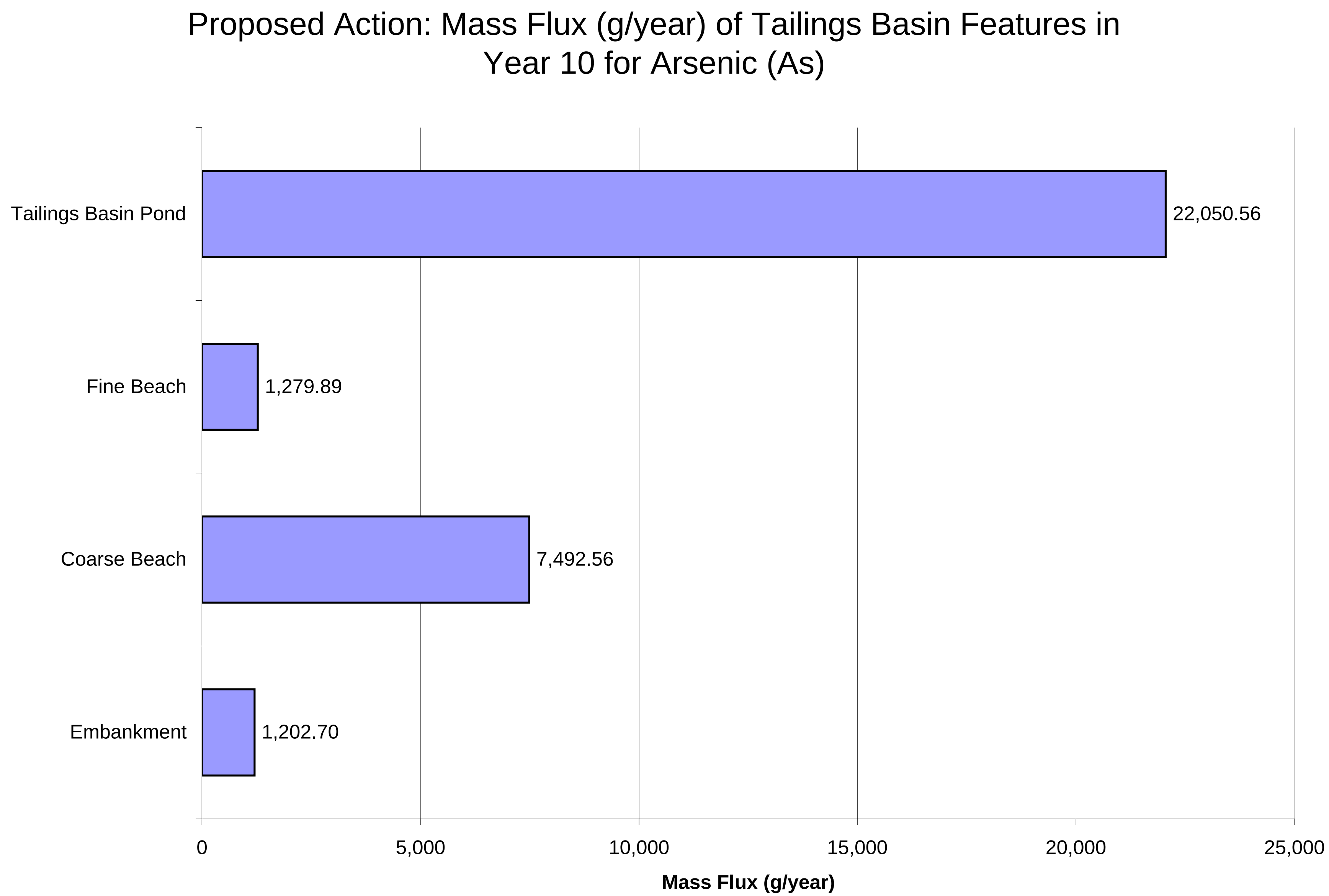

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 5 for Arsenic (As)
Tailings Basin Pond
69.58%
Fine Beach
7.31%
Coarse Beach
23.12%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

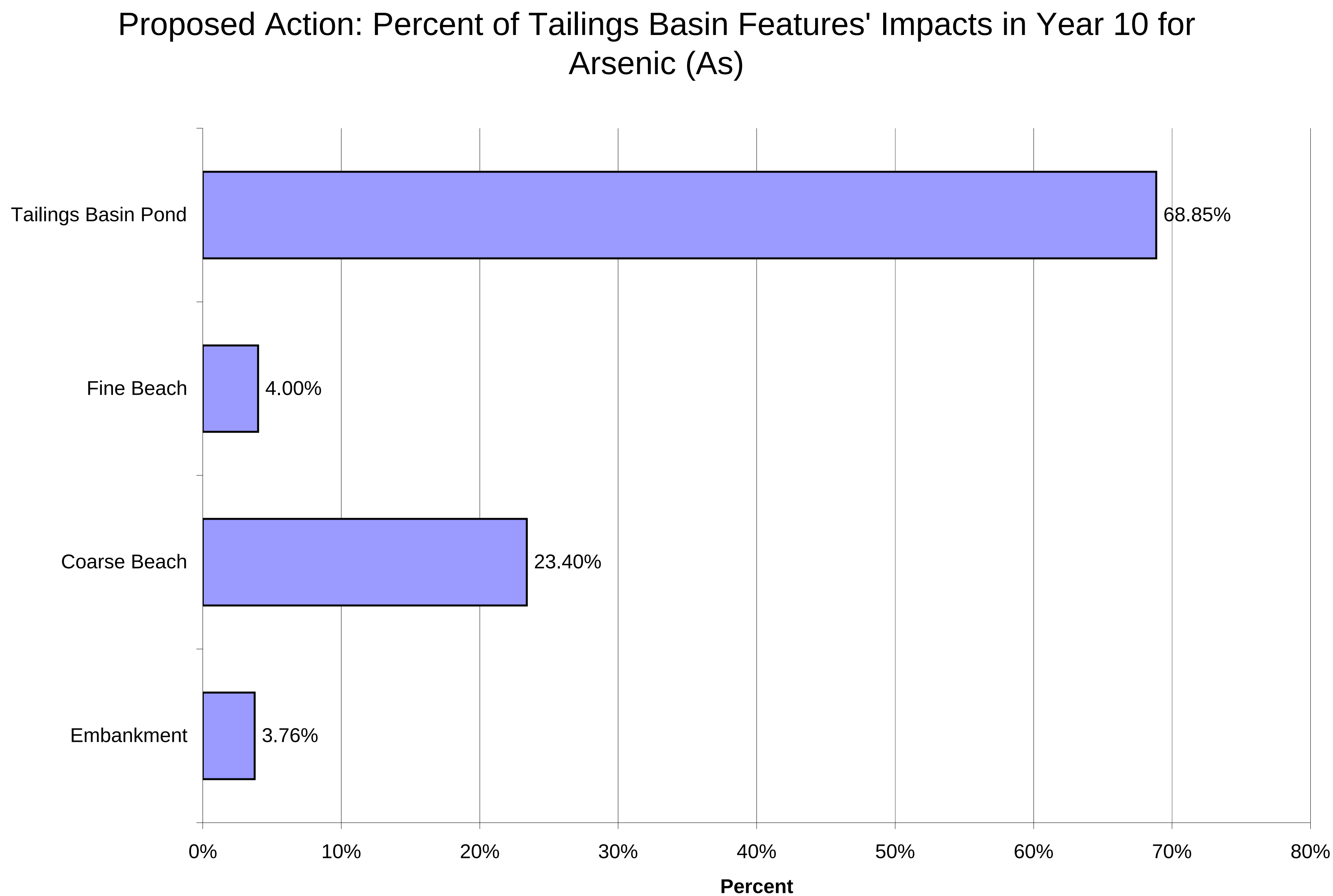

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 8 for Arsenic (As)
Tailings Basin Pond
Fine Beach
Coarse Beach
Embankment
20,005.54
1,666.11
6,021.36
1,069.20
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

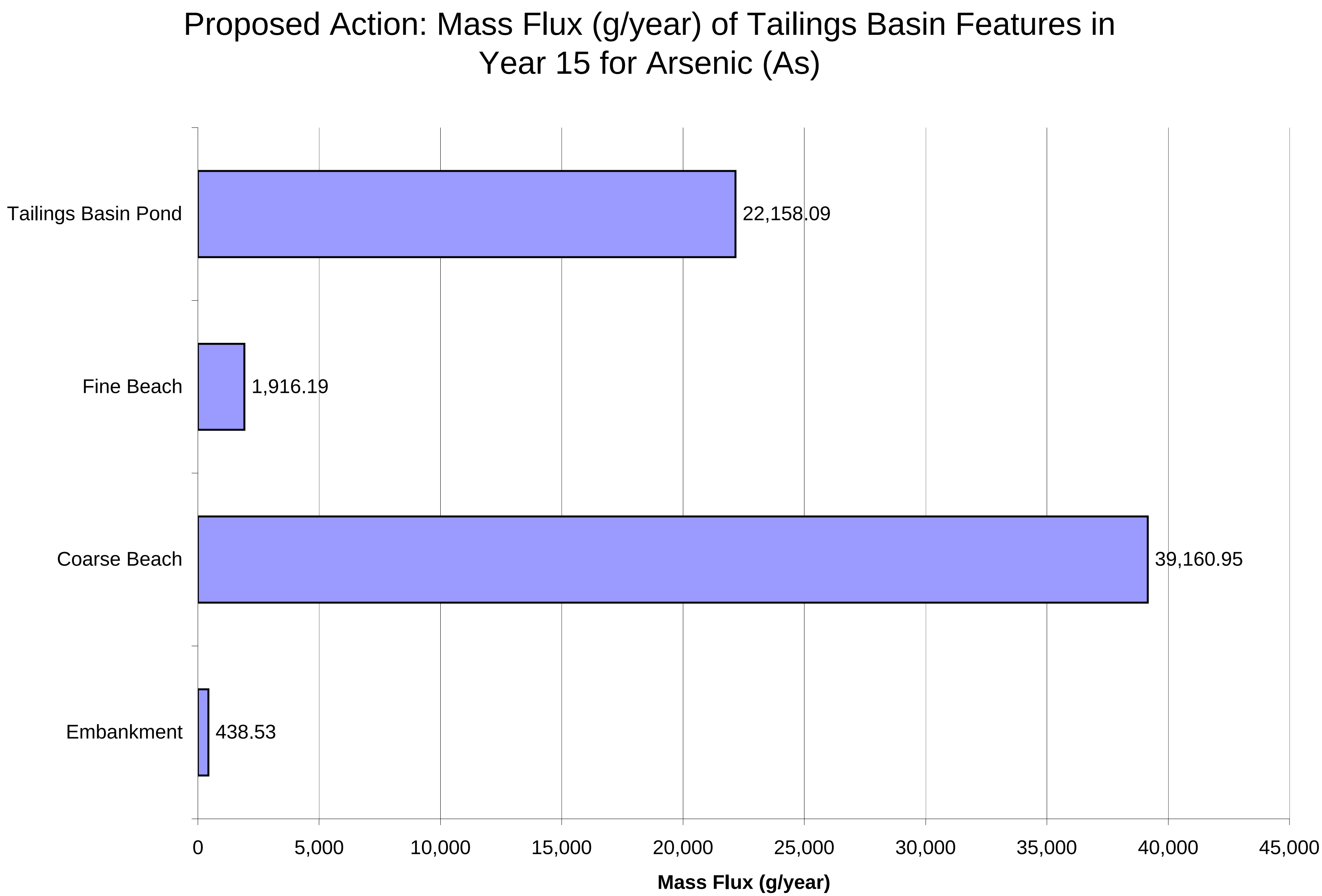

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 8 for Arsenic (As)
Tailings Basin Pond
69.55%
Fine Beach
5.79%
Coarse Beach
20.93%
Embankment
3.72%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

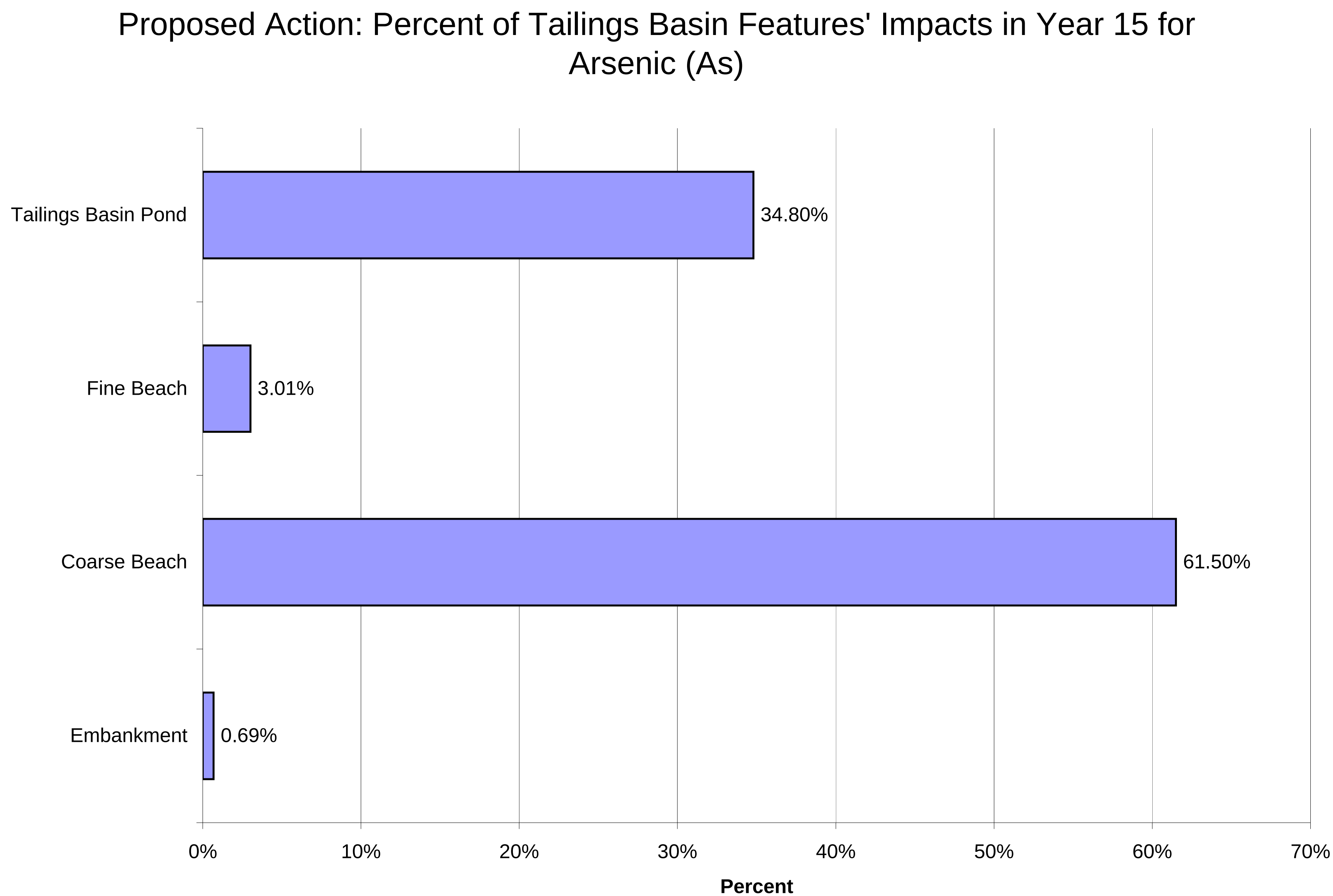

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 9 for Arsenic (As)
Tailings Basin Pond
21,642.04
Fine Beach
1,824.68
Coarse Beach
6,456.99
Embankment
1,114.30
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

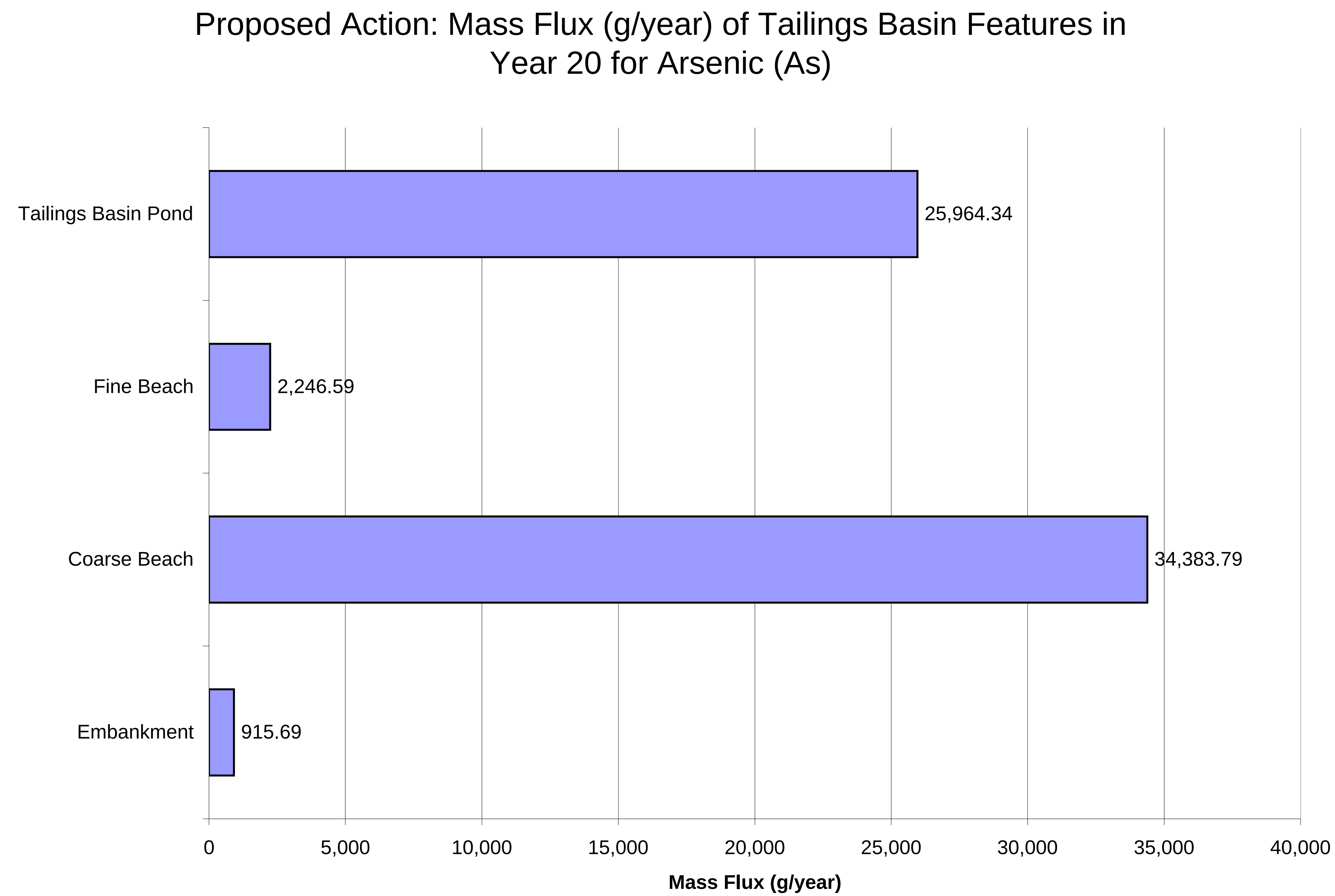

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 9 for Arsenic (As)
Tailings Basin Pond
69.73%
Fine Beach
5.88%
Coarse Beach
20.80%
Embankment
3.59%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

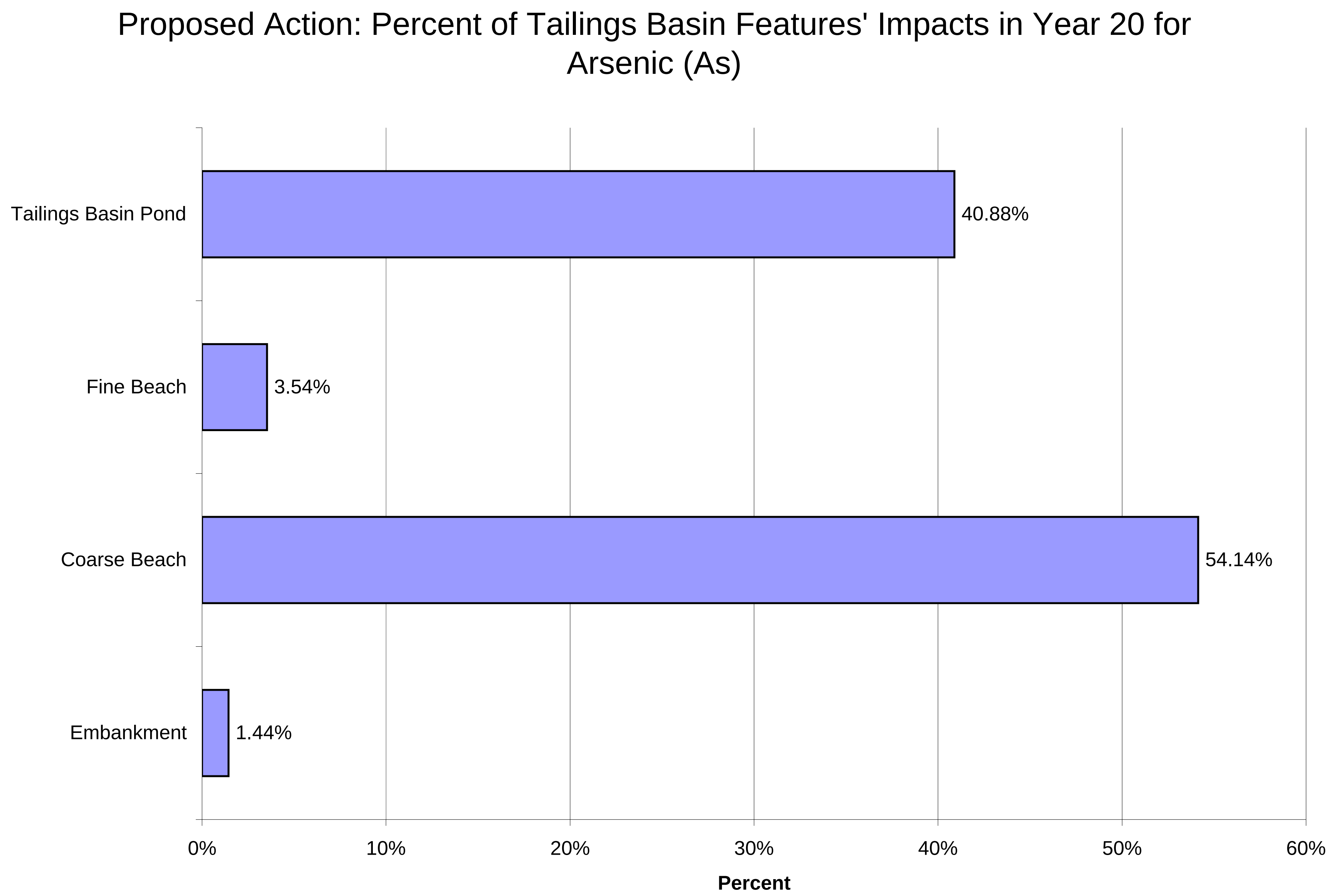

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Arsenic (As)
Tailings Basin Pond
22,050.56
Fine Beach
1,279.89
Coarse Beach
7,492.56
Embankment
1,202.70
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)


Proposed Action: Percent of Tailings Basin Features' Impacts in Year 10 for Arsenic (As)
Tailings Basin Pond
68.85%
Fine Beach
4.00%
Coarse Beach
23.40%
Embankment
3.76%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

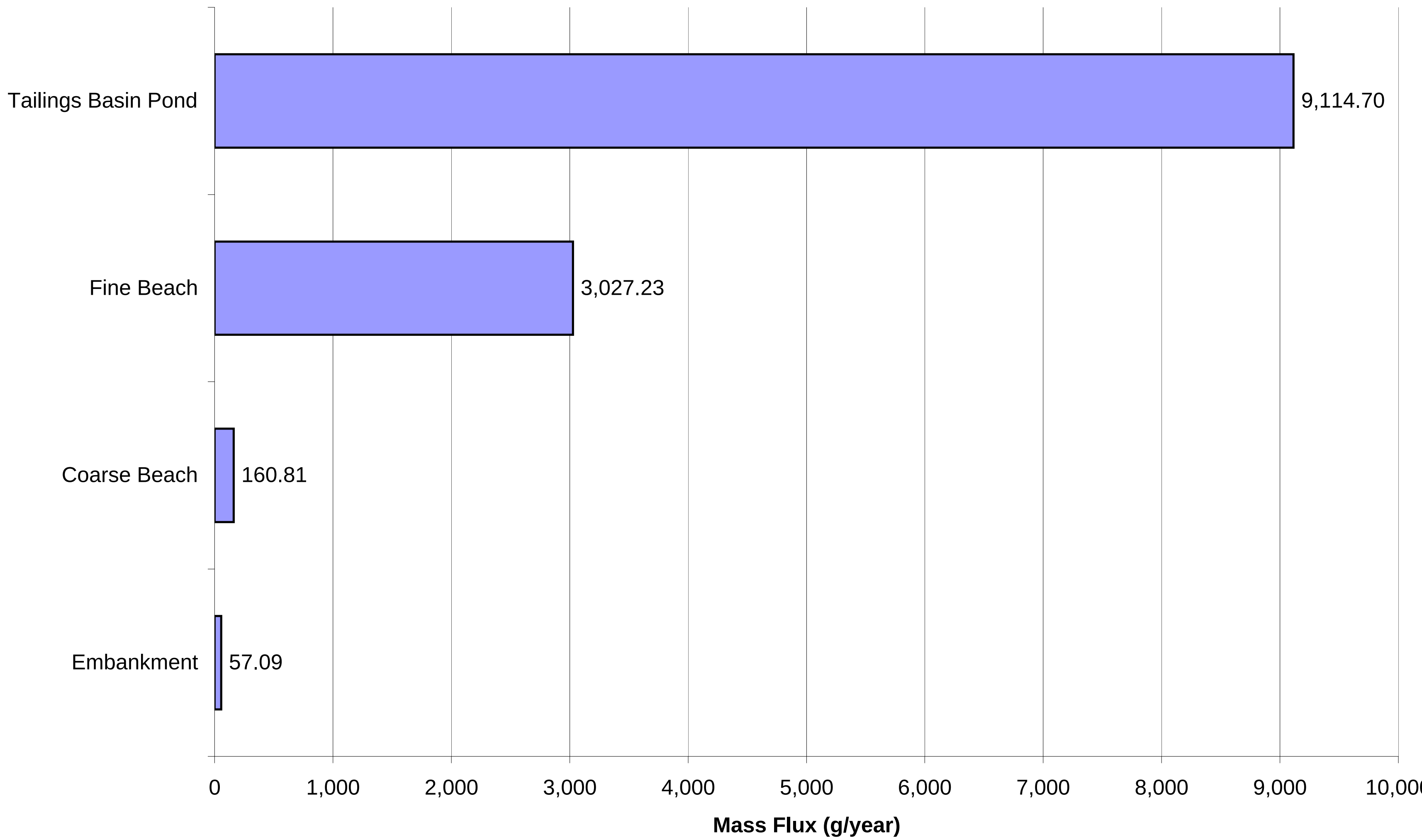

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Arsenic (As)
Tailings Basin Pond
22,158.09
Fine Beach
1,916.19
Coarse Beach
39,160.95
Embankment
438.53
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

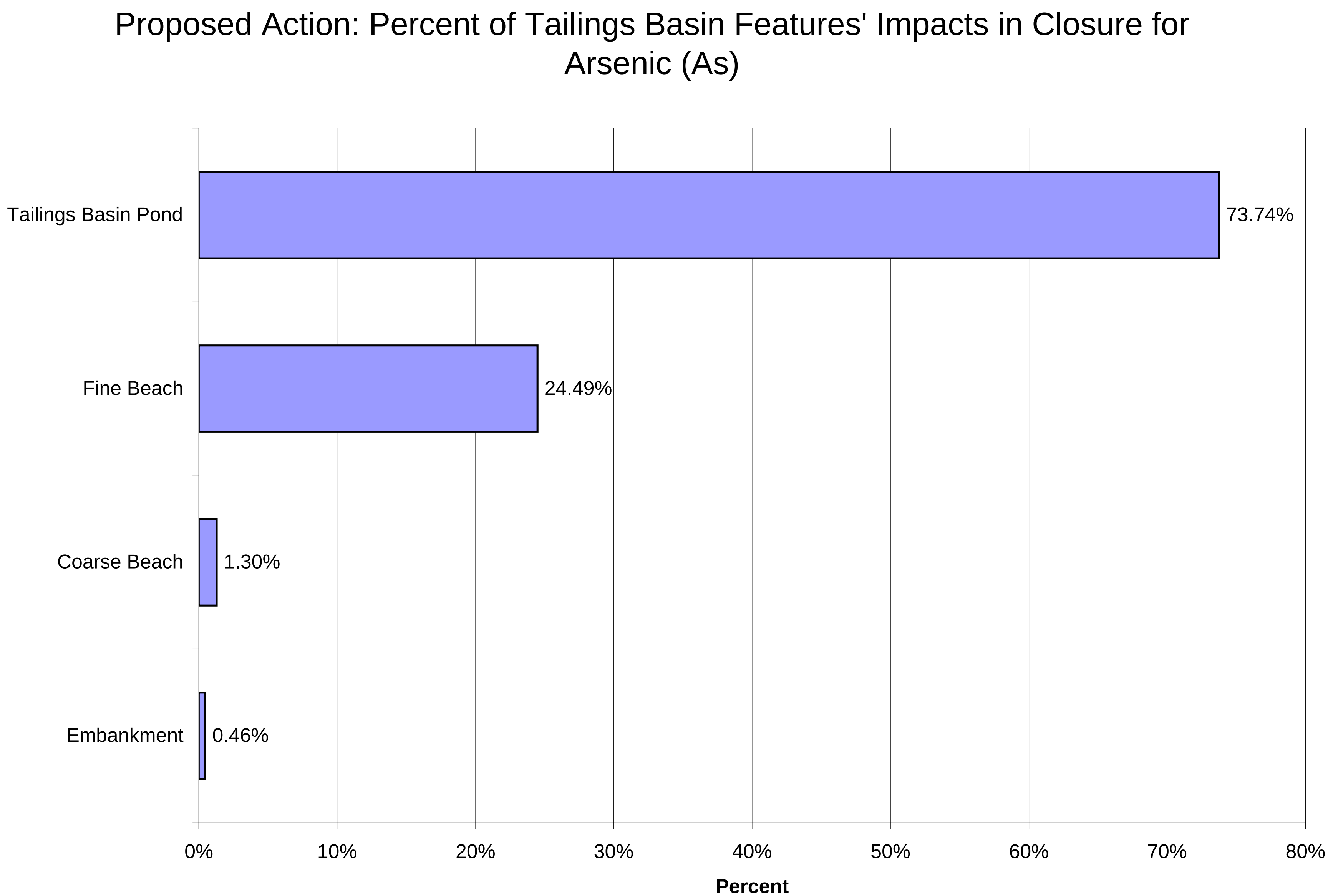

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 15 for Arsenic (As)
Tailings Basin Pond
34.80%
Fine Beach
3.01%
Coarse Beach
61.50%
Embankment
0.69%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Arsenic (As)
Tailings Basin Pond
25,964.34
Fine Beach
2,246.59
Coarse Beach
34,383.79
Embankment
915.69
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

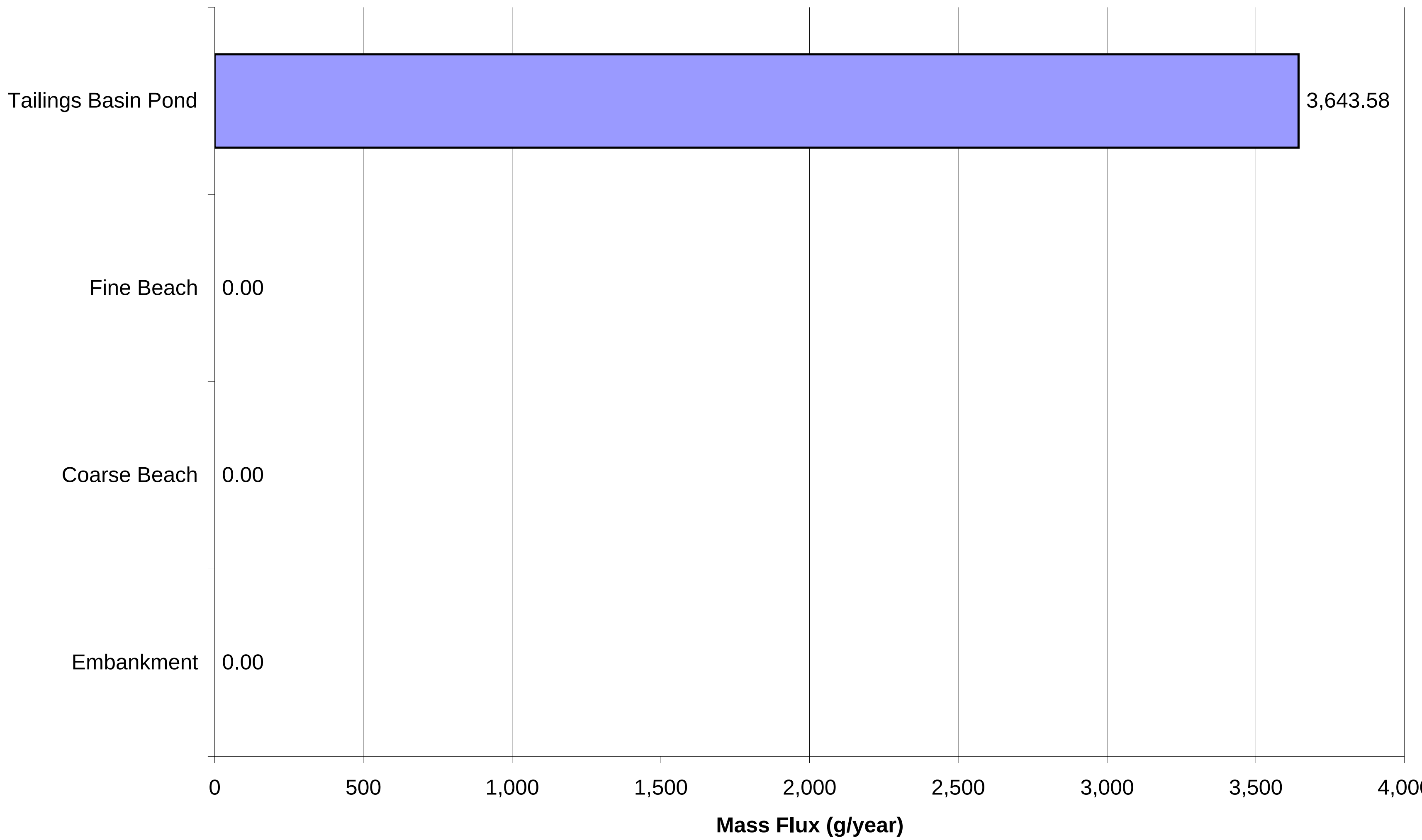

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 20 for Arsenic (As)
Tailings Basin Pond
40.88%
Fine Beach
3.54%
Coarse Beach
54.14%
Embankment
1.44%
0%
10%
20%
30%
40%
50%
60%
Percent

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Closure for Arsenic (As)

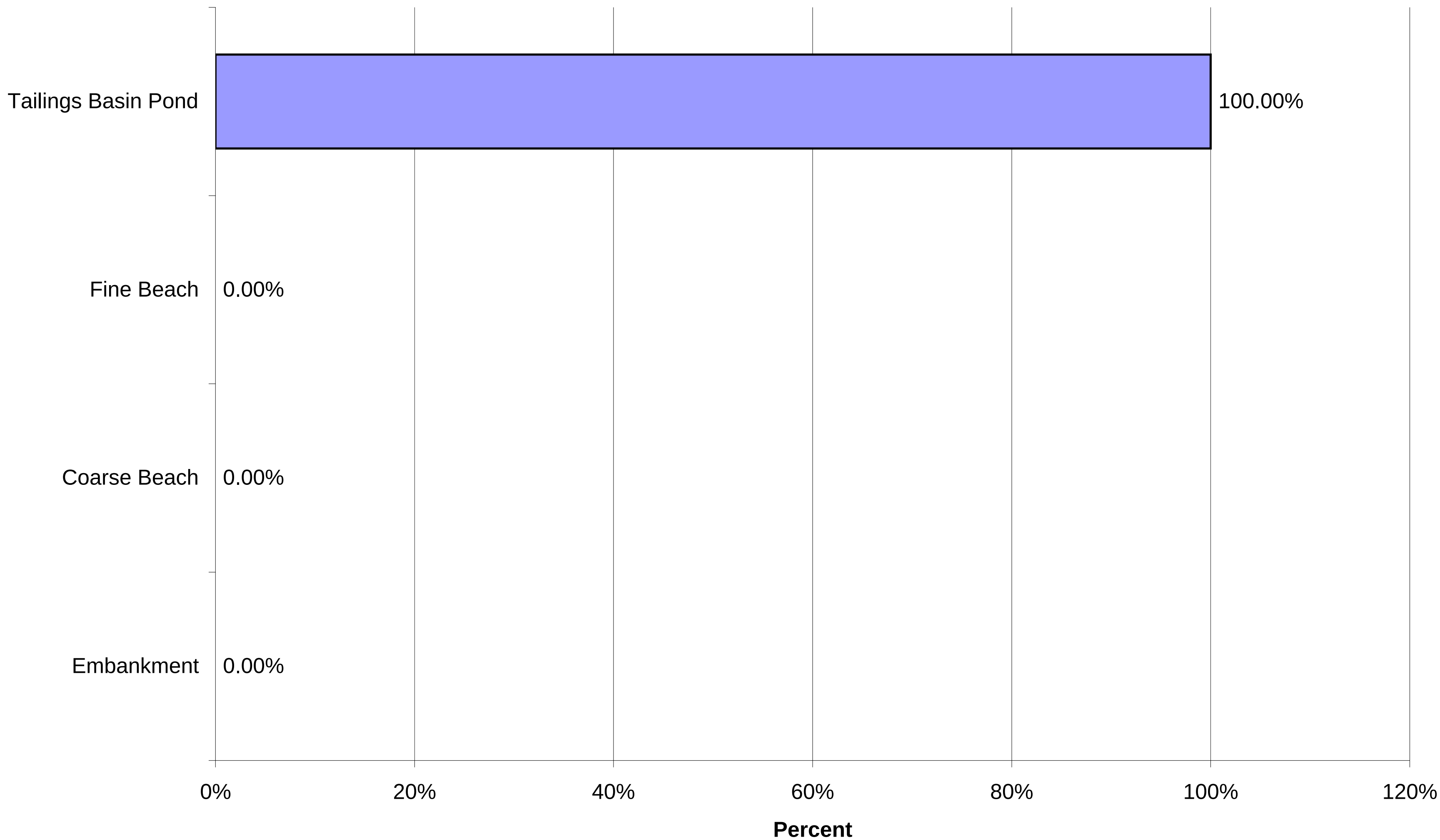


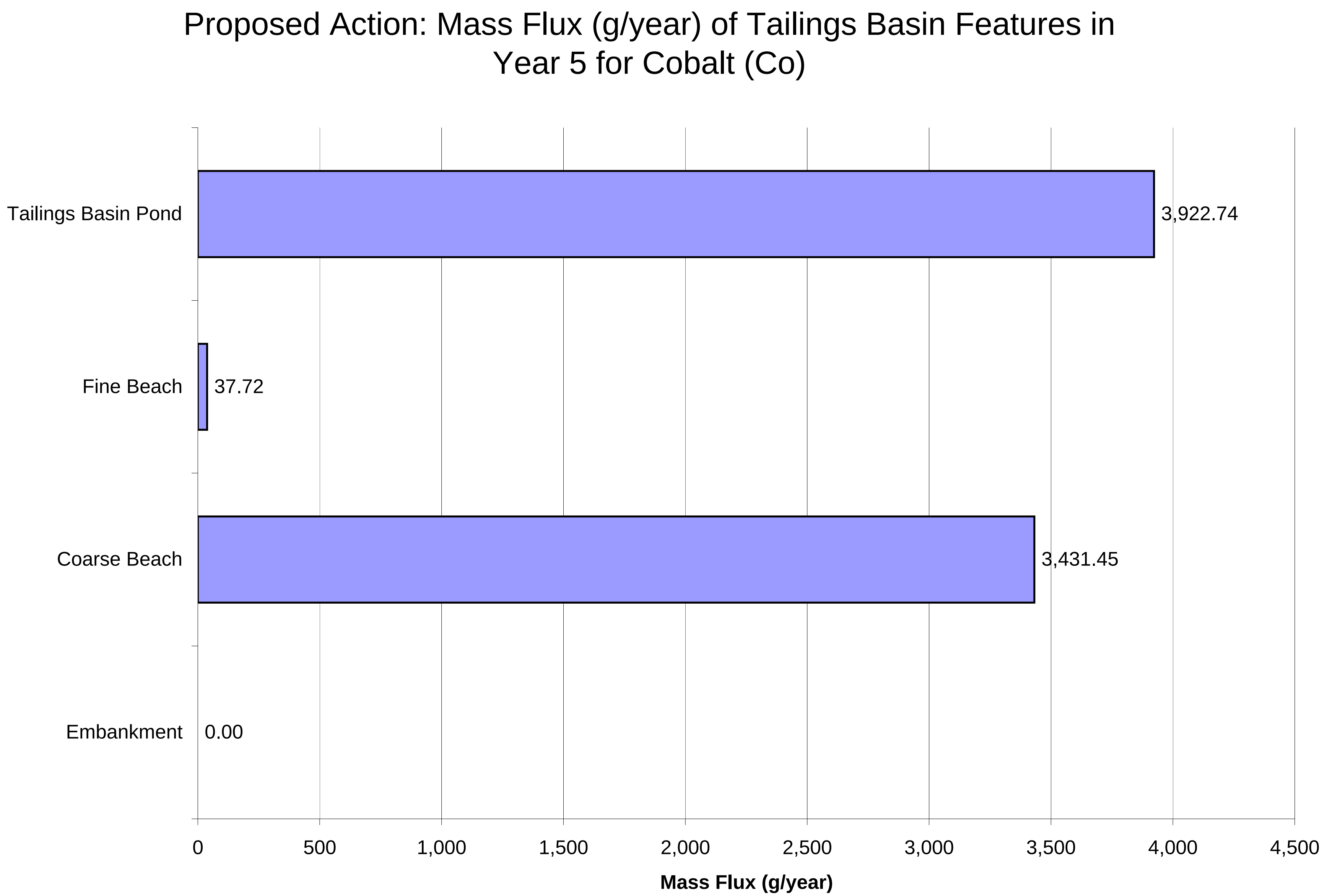

Proposed Action: Percent of Tailings Basin Features' Impacts in Closure for Arsenic (As)
Tailings Basin Pond
73.74%
Fine Beach
24.49%
Coarse Beach
1.30%
Embankment
0.46%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Cobalt (Co)

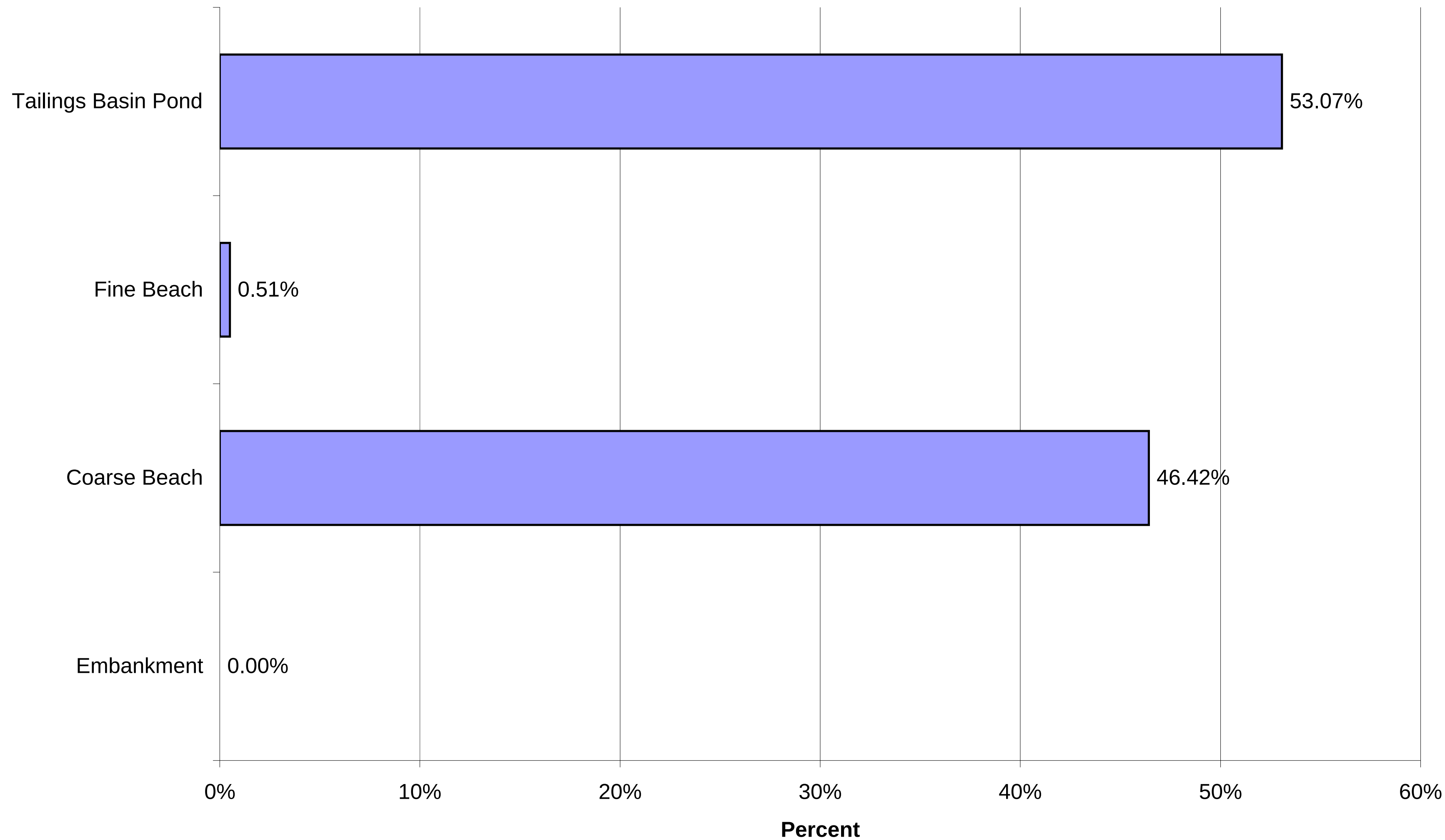


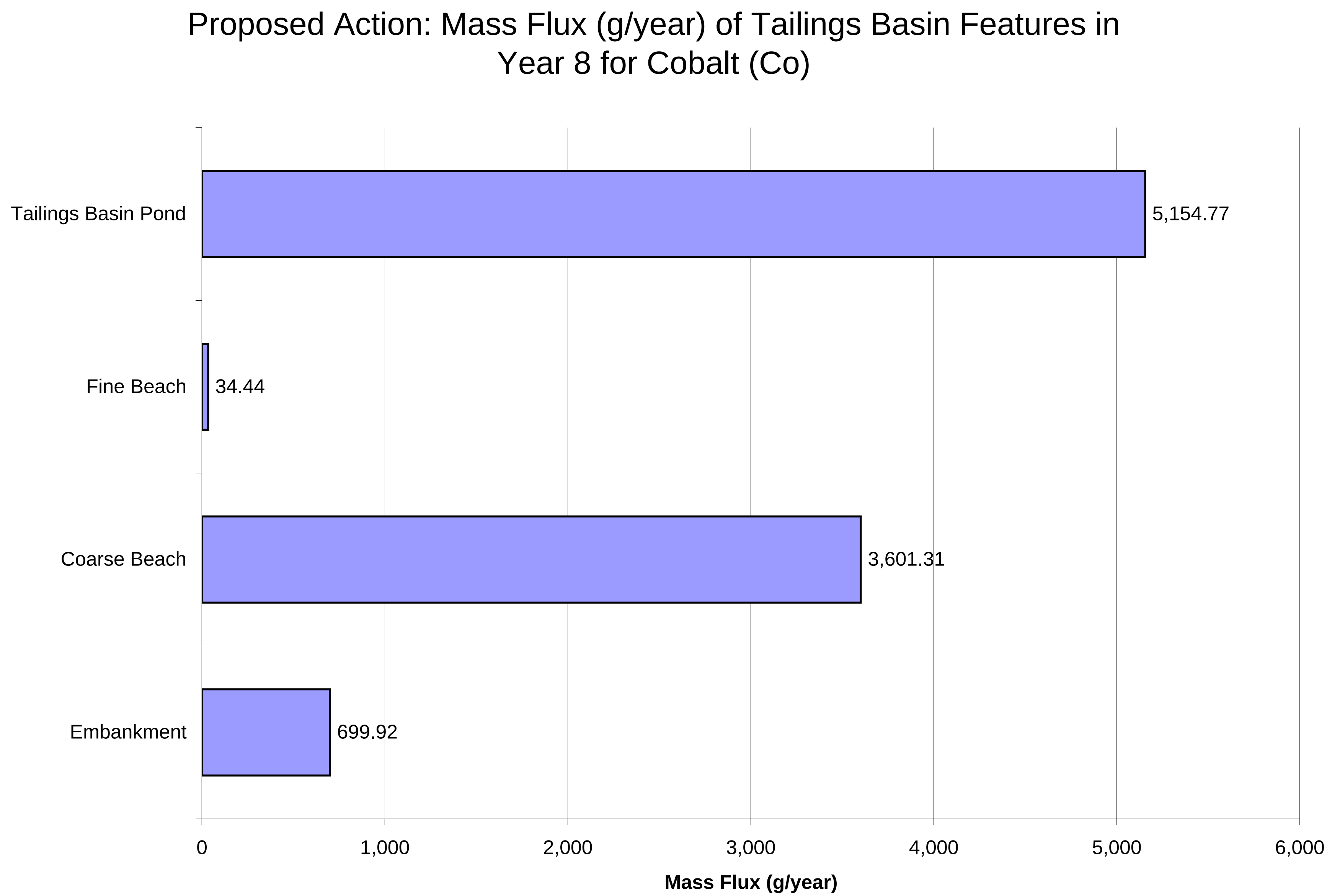
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 1 for Cobalt (Co)



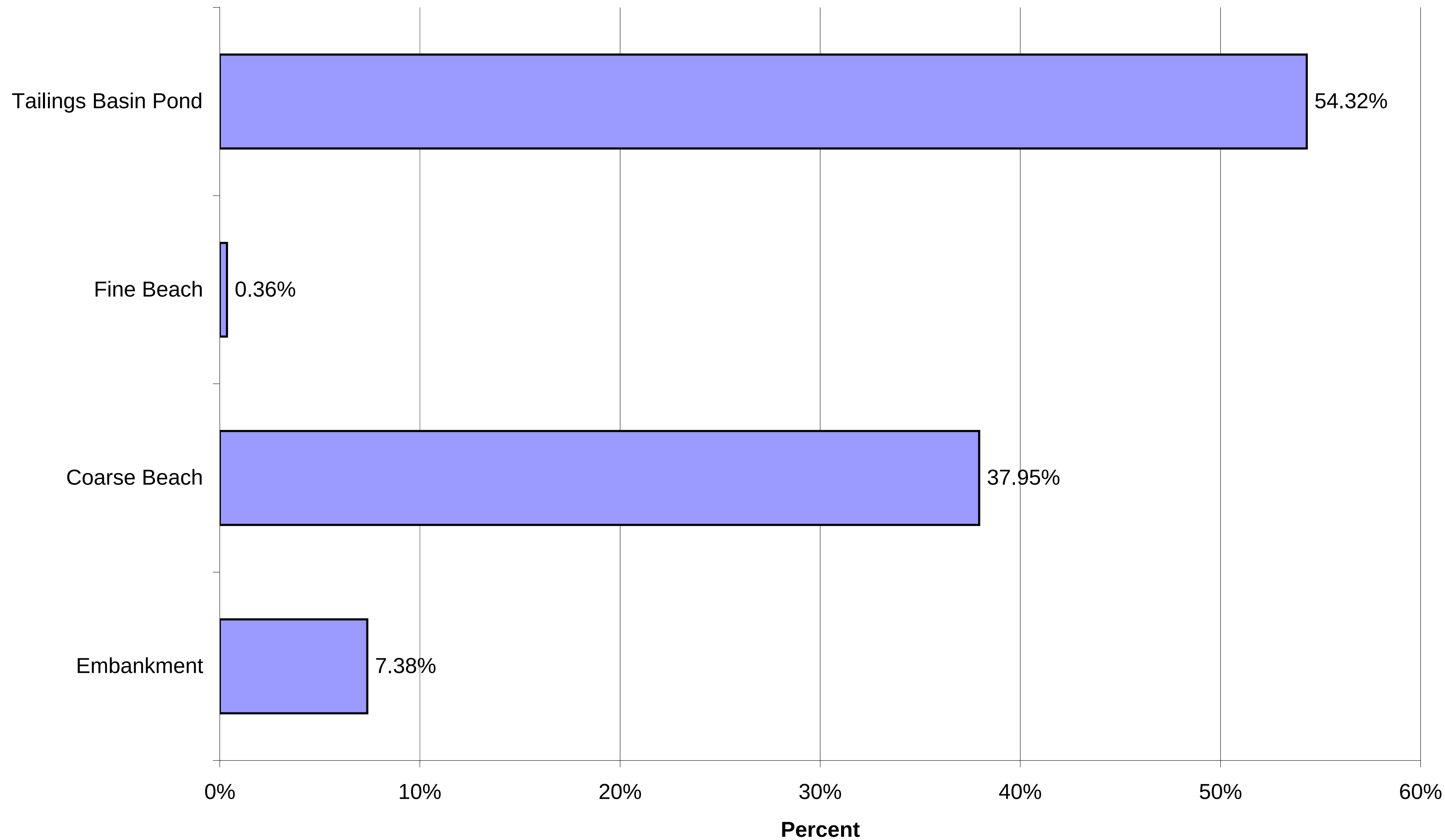

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Cobalt (Co)
Tailings Basin Pond
3,922.74
Fine Beach
37.72
Coarse Beach
3,431.45
Embankment
0.00
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
Mass Flux (g/year)

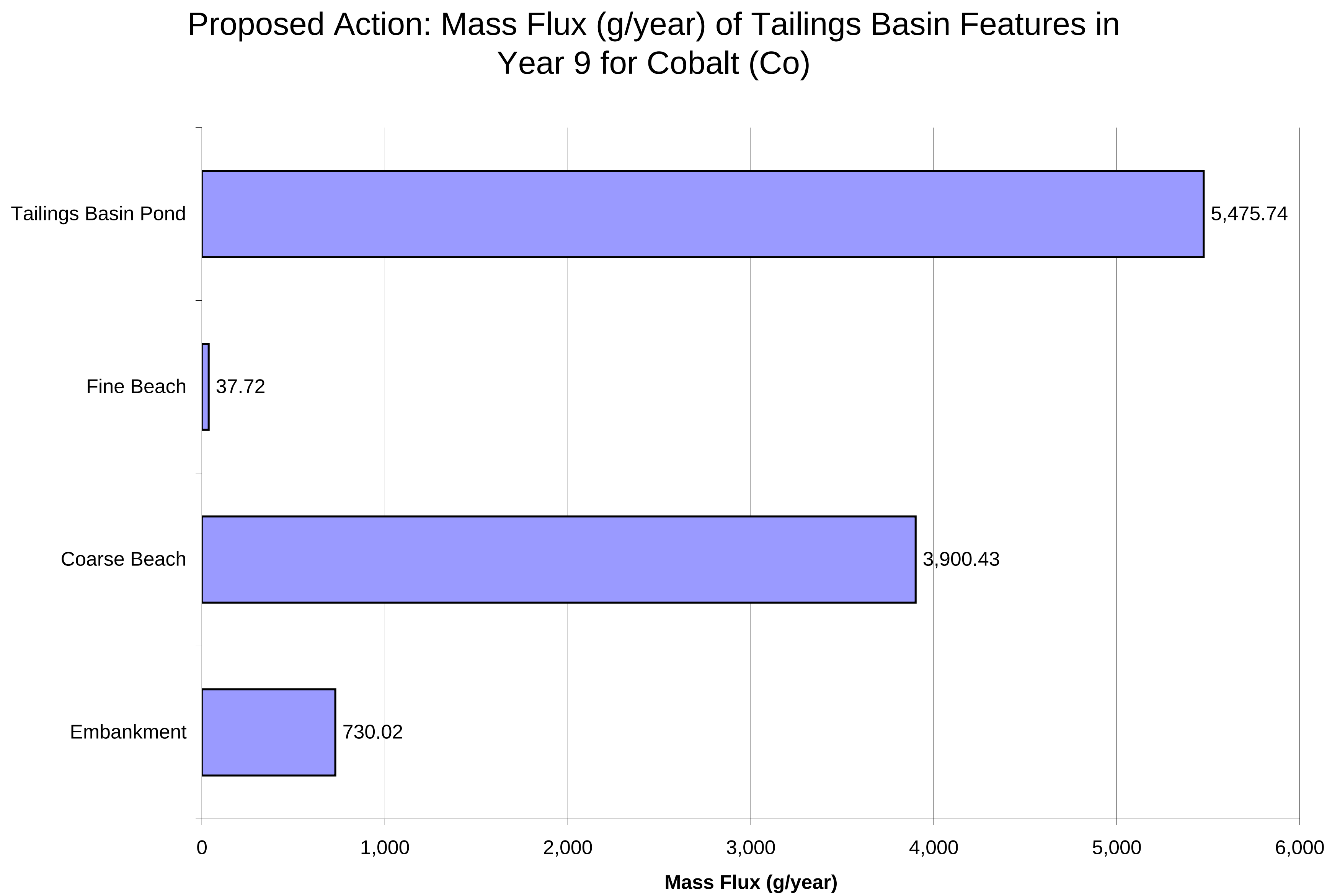
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 5 for Cobalt (Co)



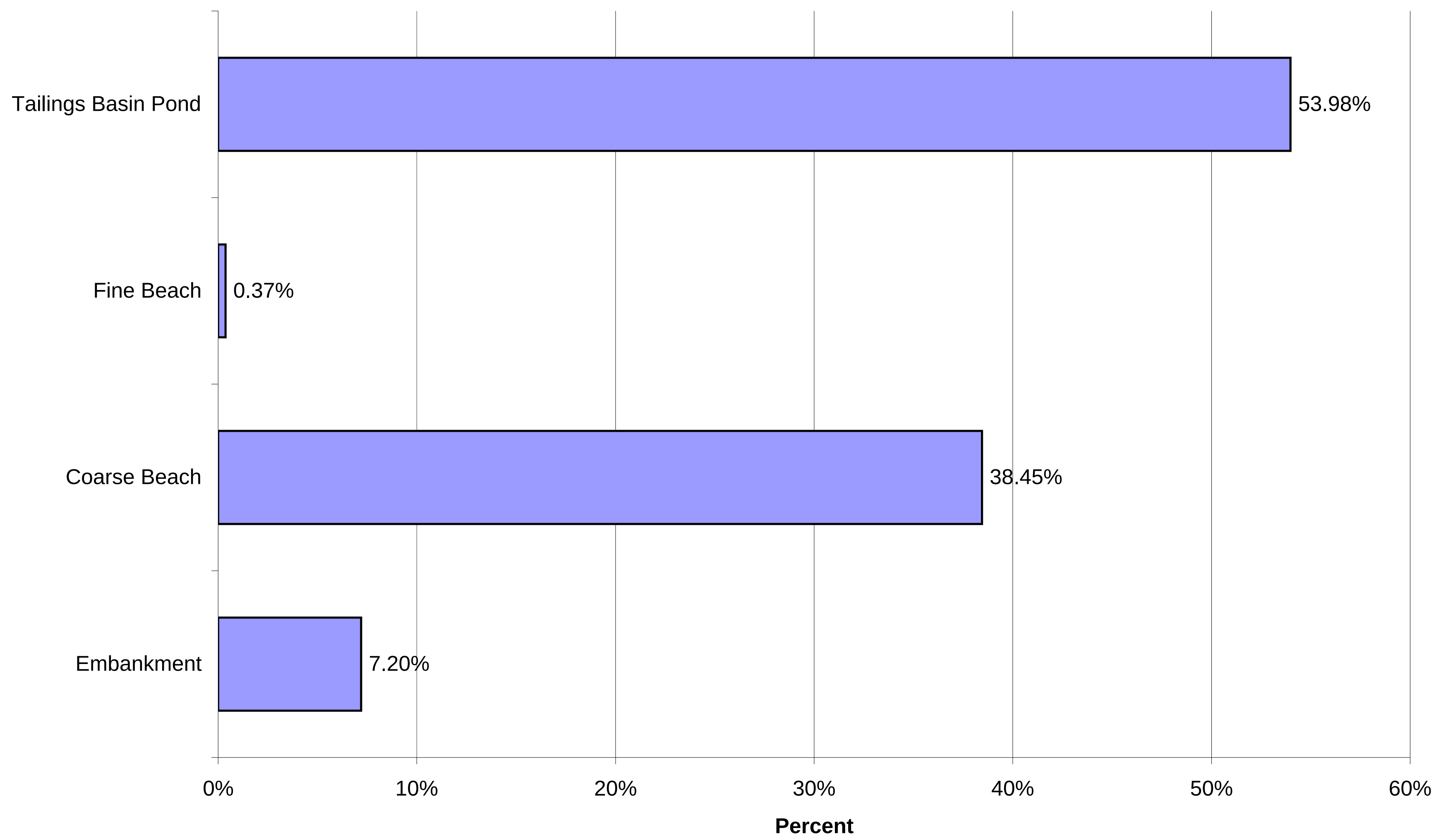

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 8 for Cobalt (Co)
Tailings Basin Pond
5,154.77
Fine Beach
34.44
Coarse Beach
3,601.31
Embankment
699.92
0
1,000
2,000
3,000
4,000
5,000
6,000
Mass Flux (g/year)

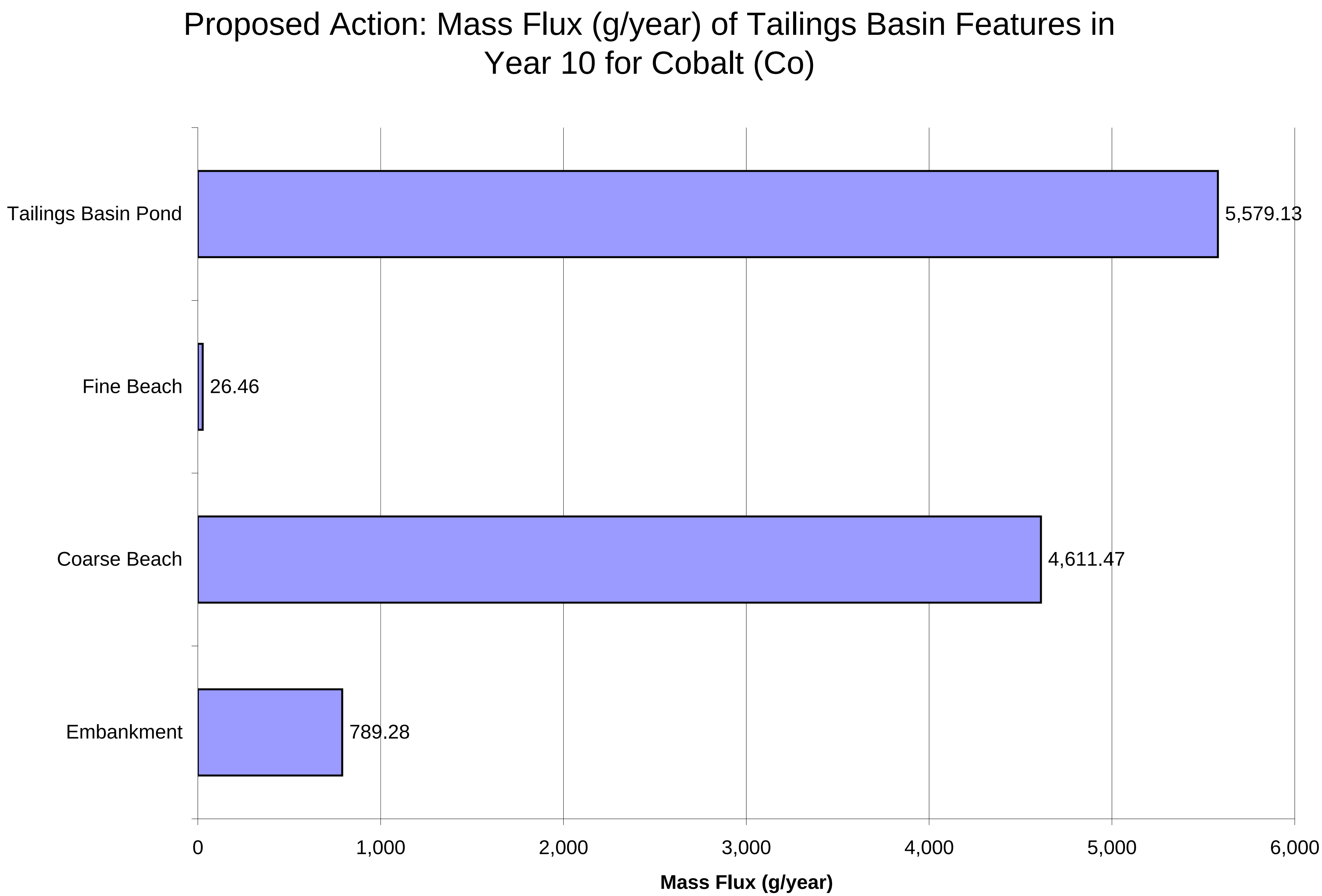
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 8 for Cobalt (Co)

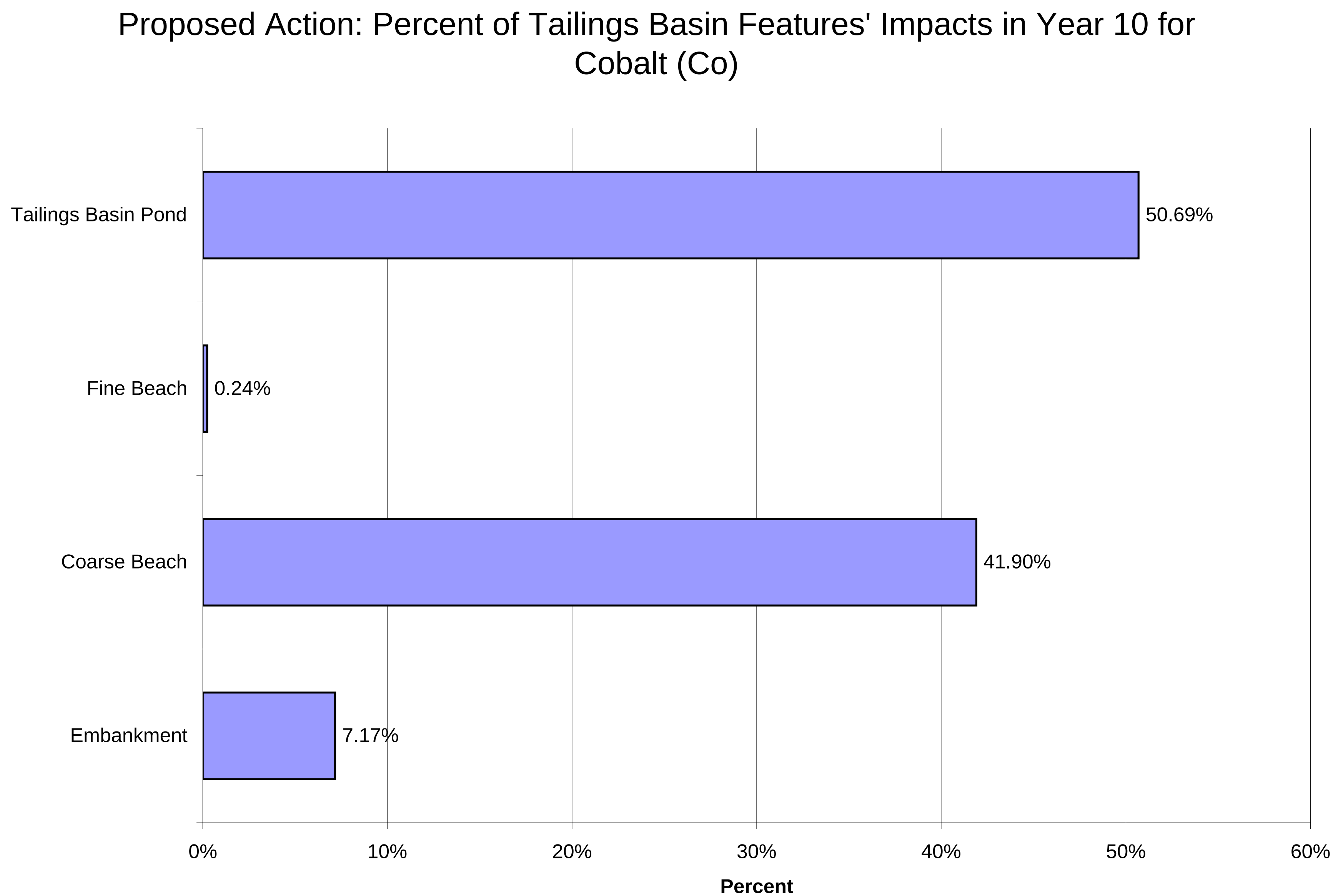



Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 9 for Cobalt (Co)
Tailings Basin Pond
5,475.74
Fine Beach
37.72
Coarse Beach
3,900.43
Embankment
730.02
0
1,000
2,000
3,000
4,000
5,000
6,000
Mass Flux (g/year)

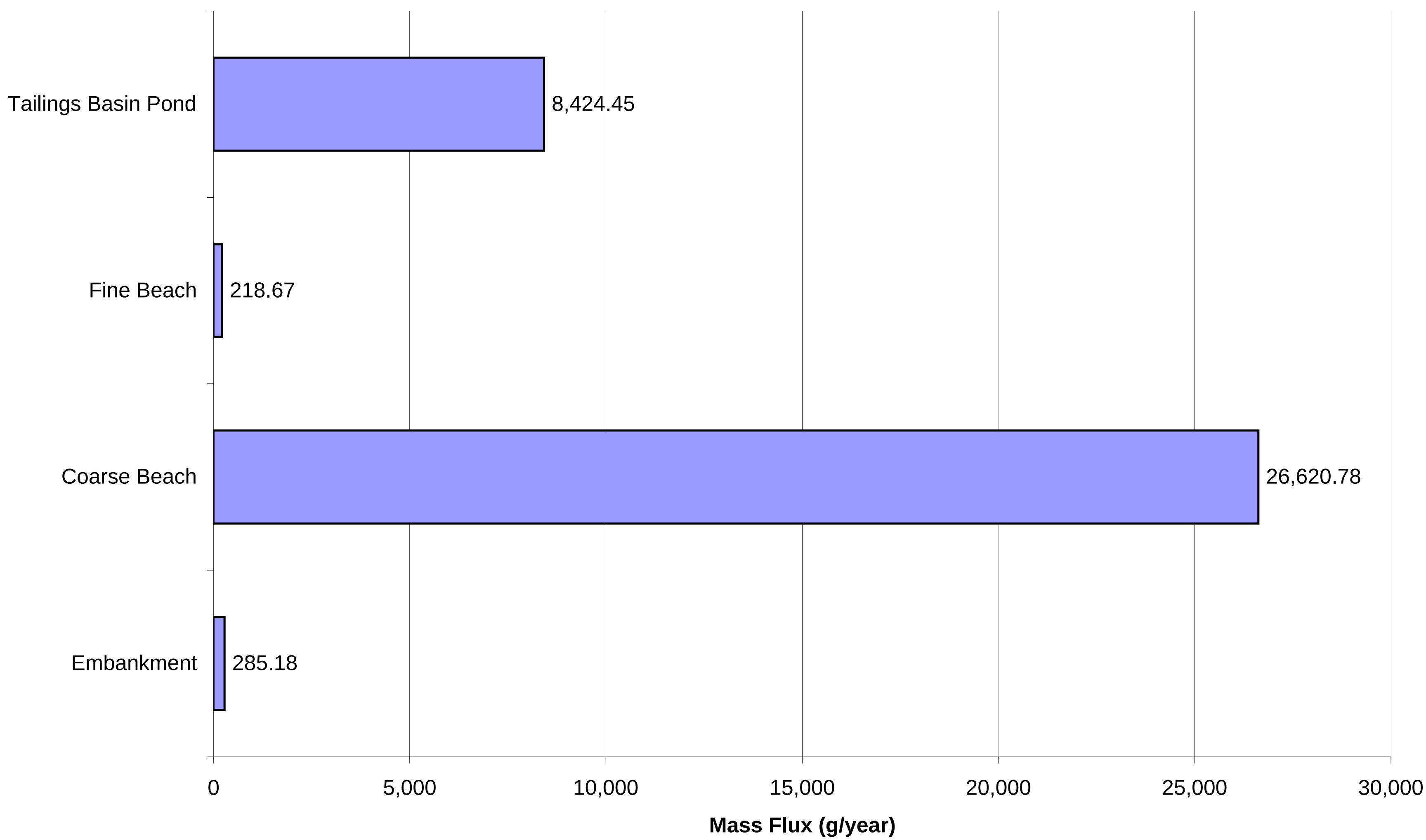
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 9 for Cobalt (Co)



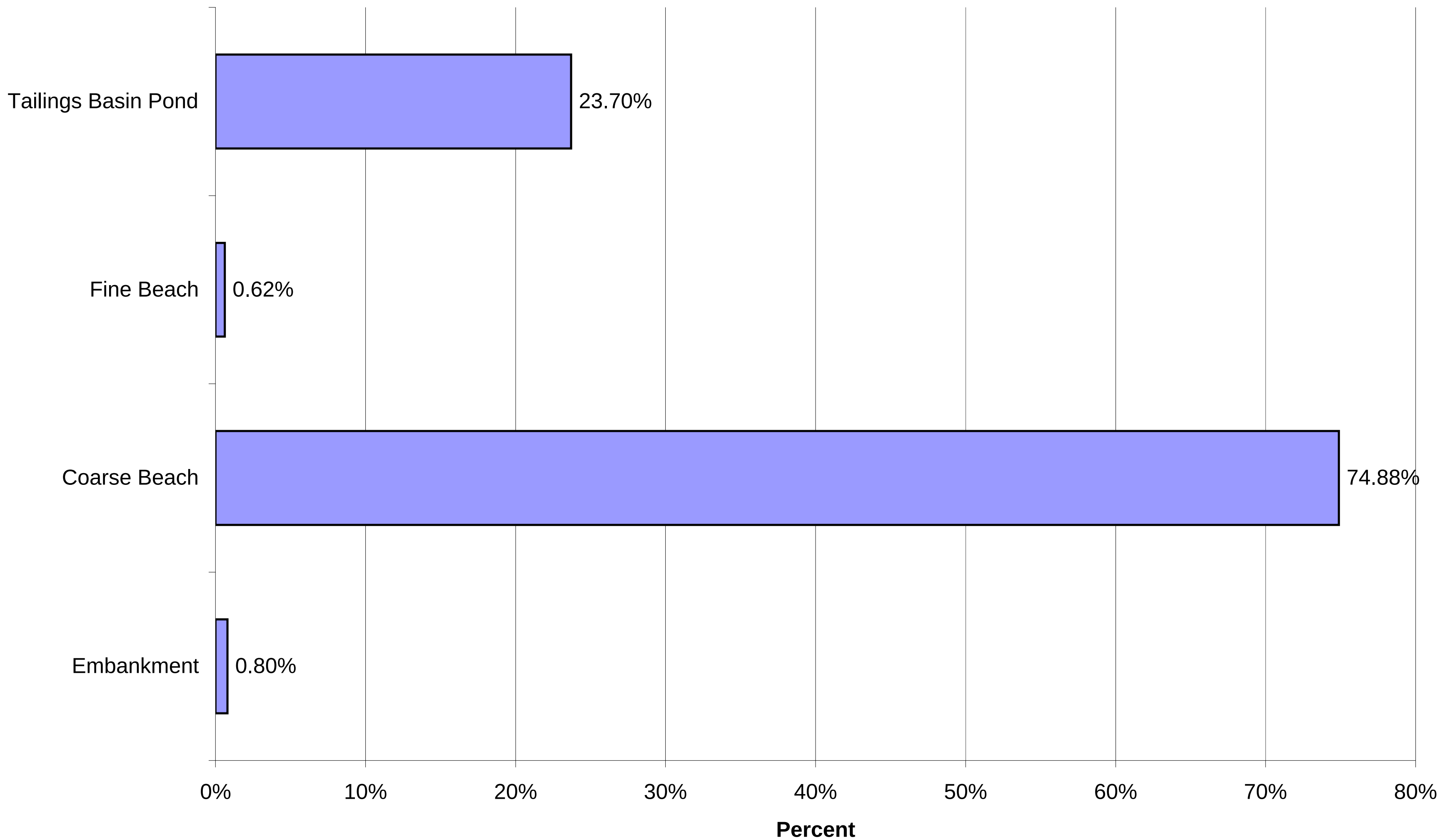

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Cobalt (Co)
Tailings Basin Pond
5,579.13
Fine Beach
26.46
Coarse Beach
4,611.47
Embankment
789.28
0
1,000
2,000
3,000
4,000
5,000
6,000
Mass Flux (g/year)

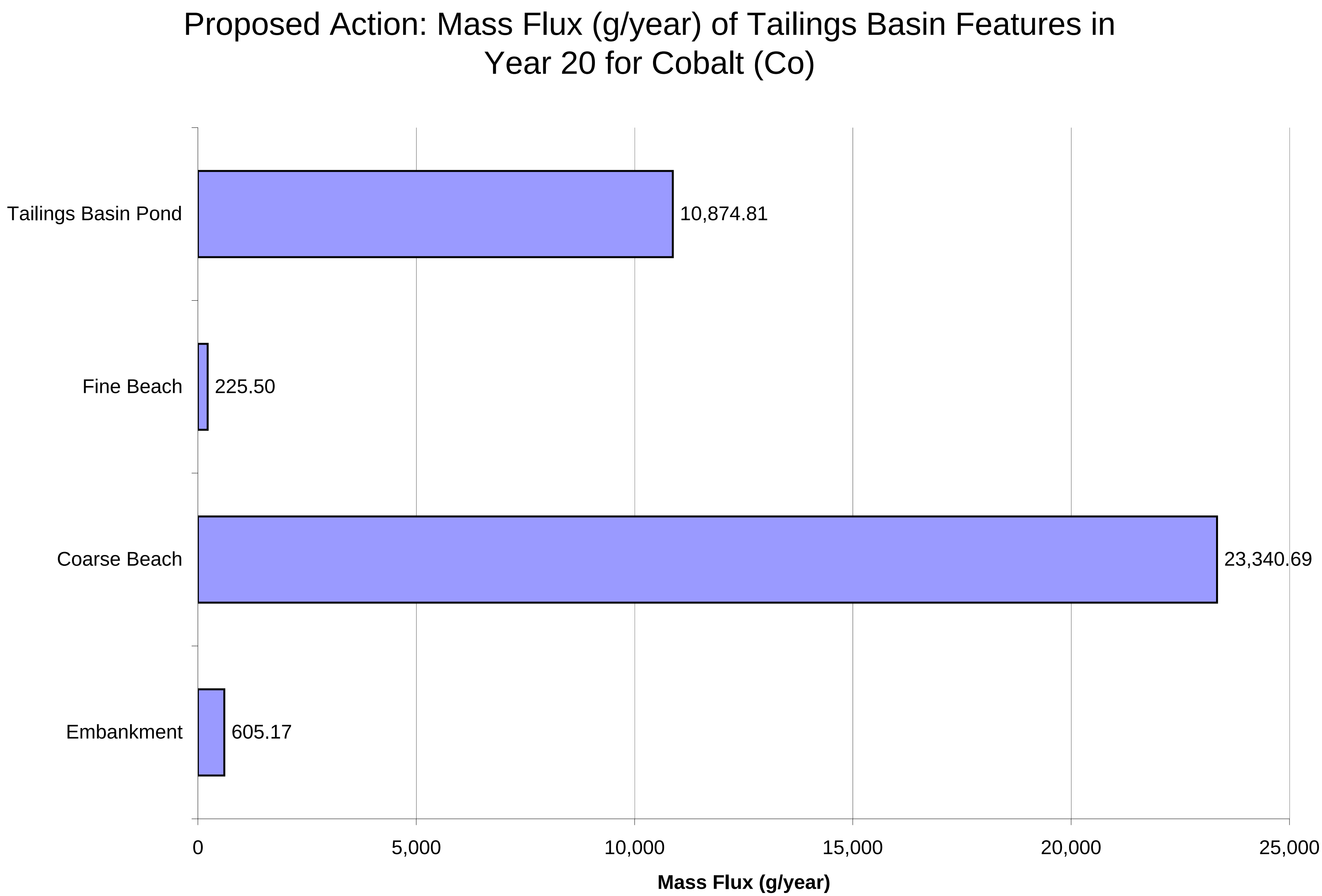

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 10 for Cobalt (Co)
Tailings Basin Pond
50.69%
Fine Beach
0.24%
Coarse Beach
41.90%
Embankment
7.17%
0%
10%
20%
30%
40%
50%
60%
Percent

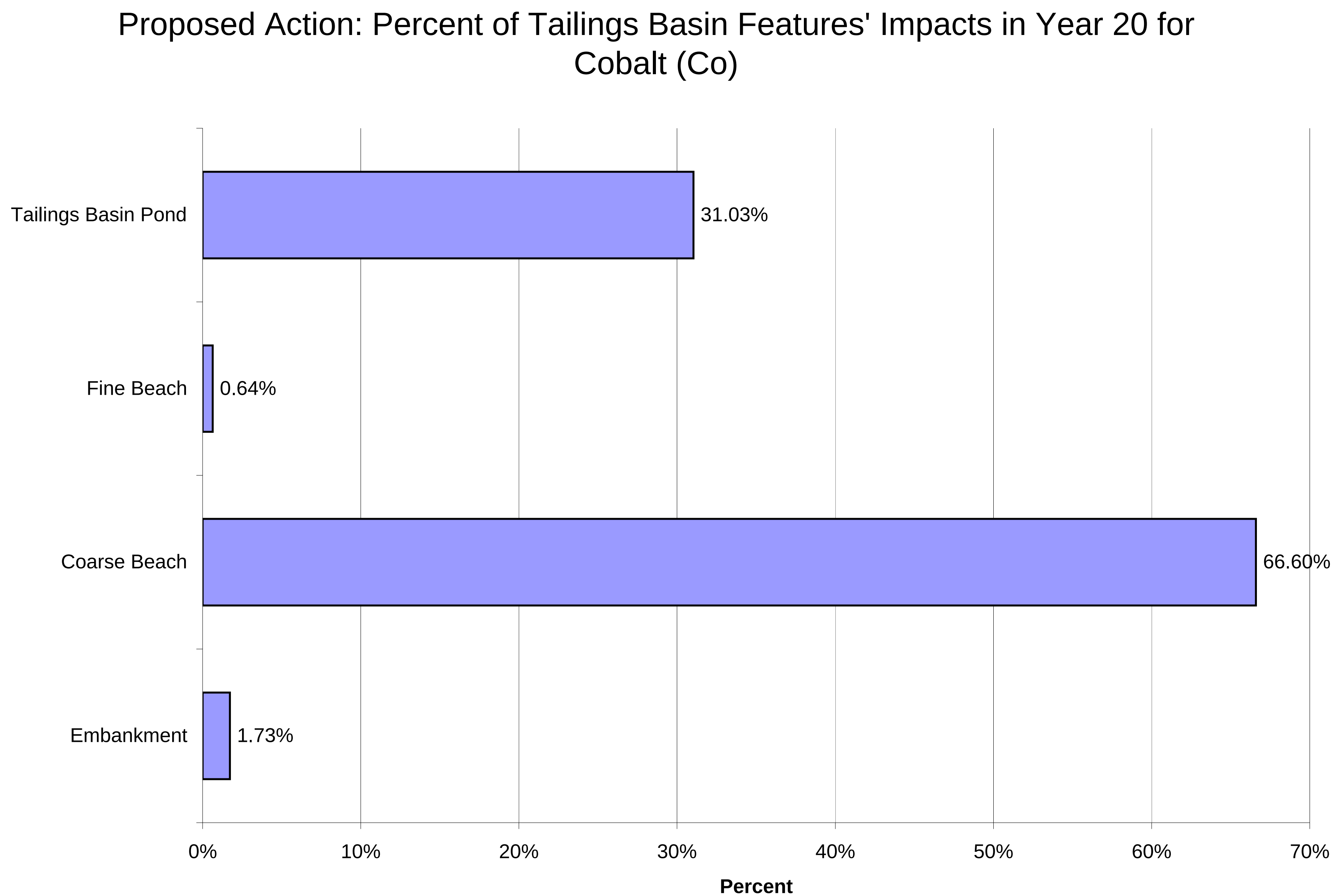
Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Cobalt (Co)

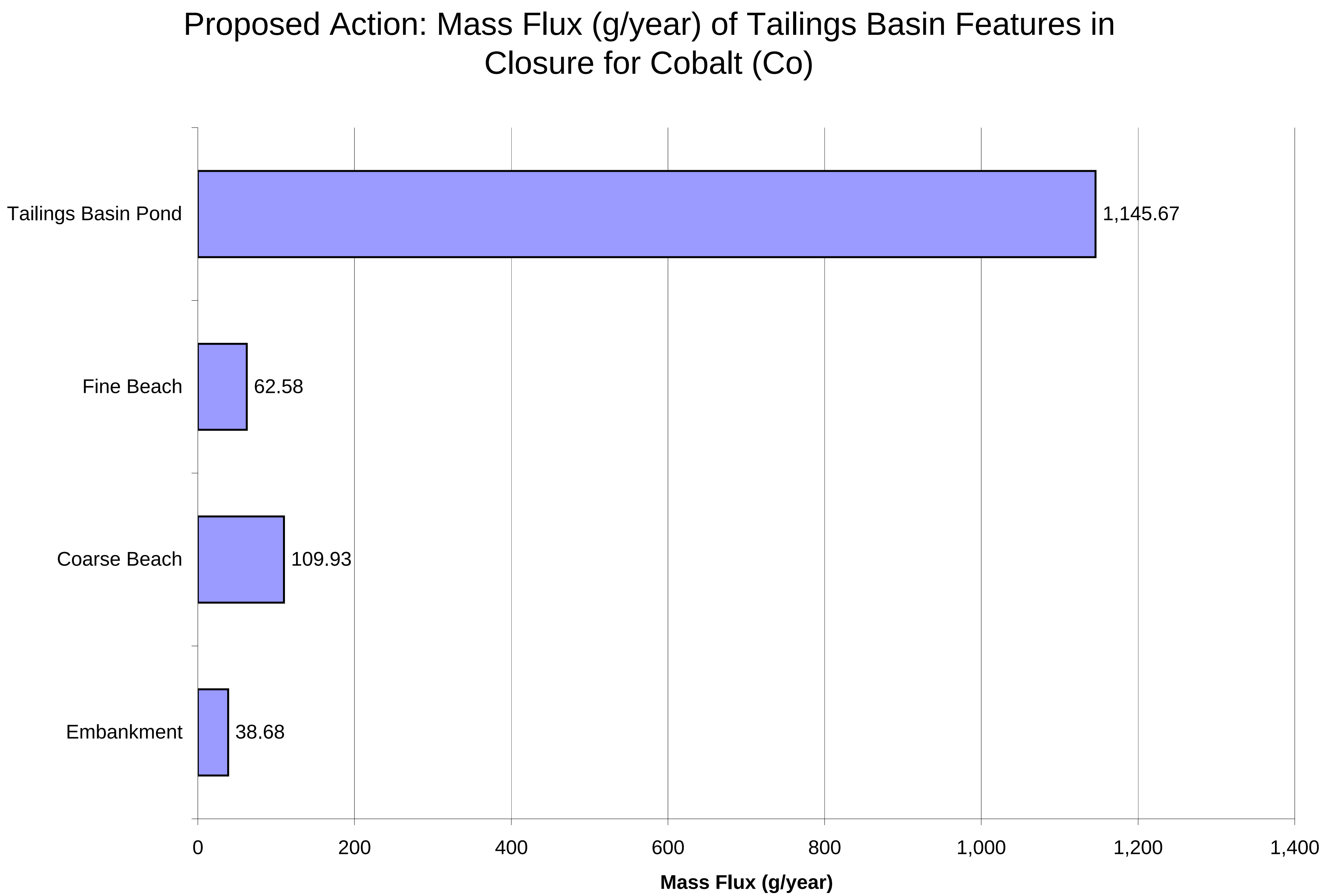


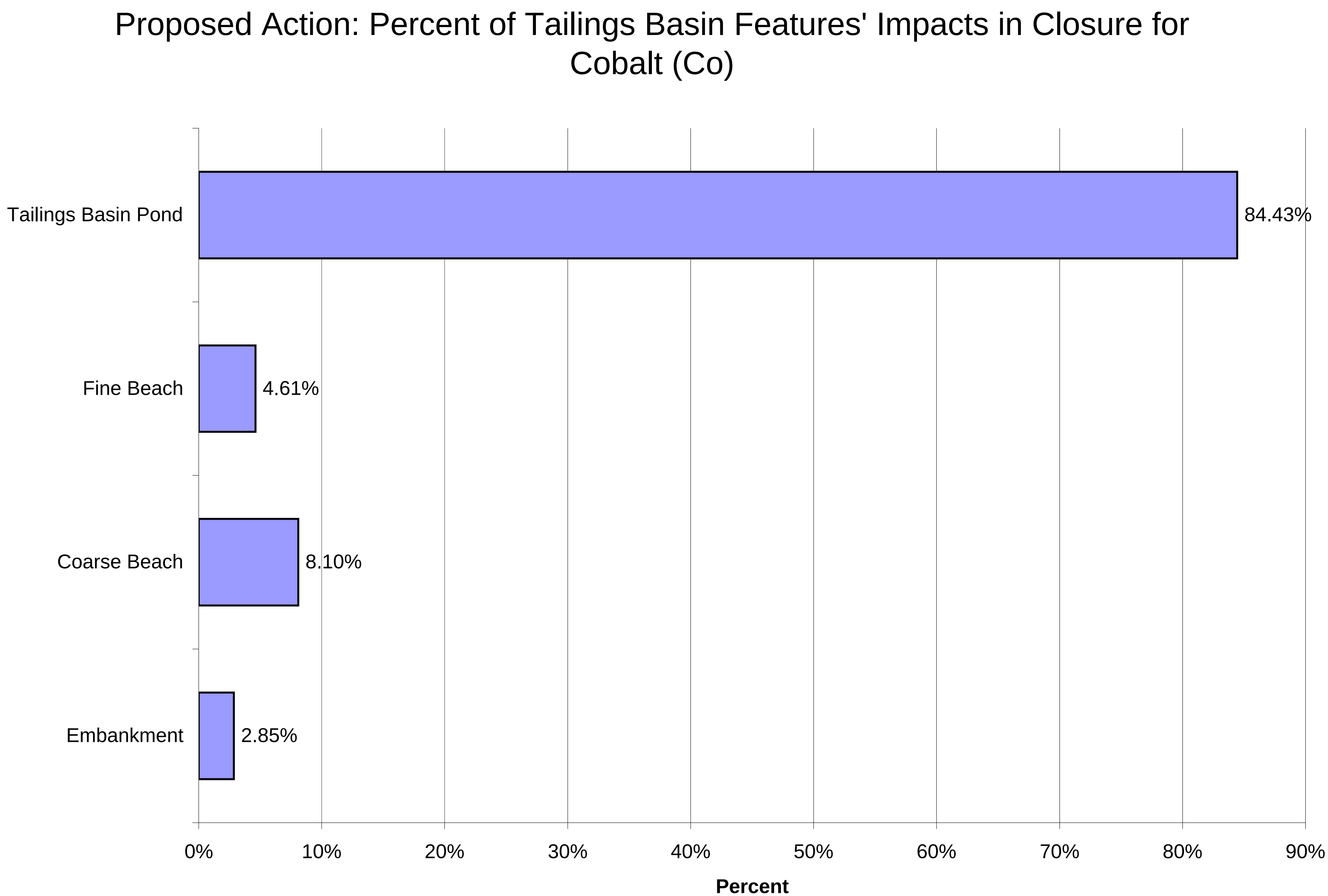
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 15 for Cobalt (Co)

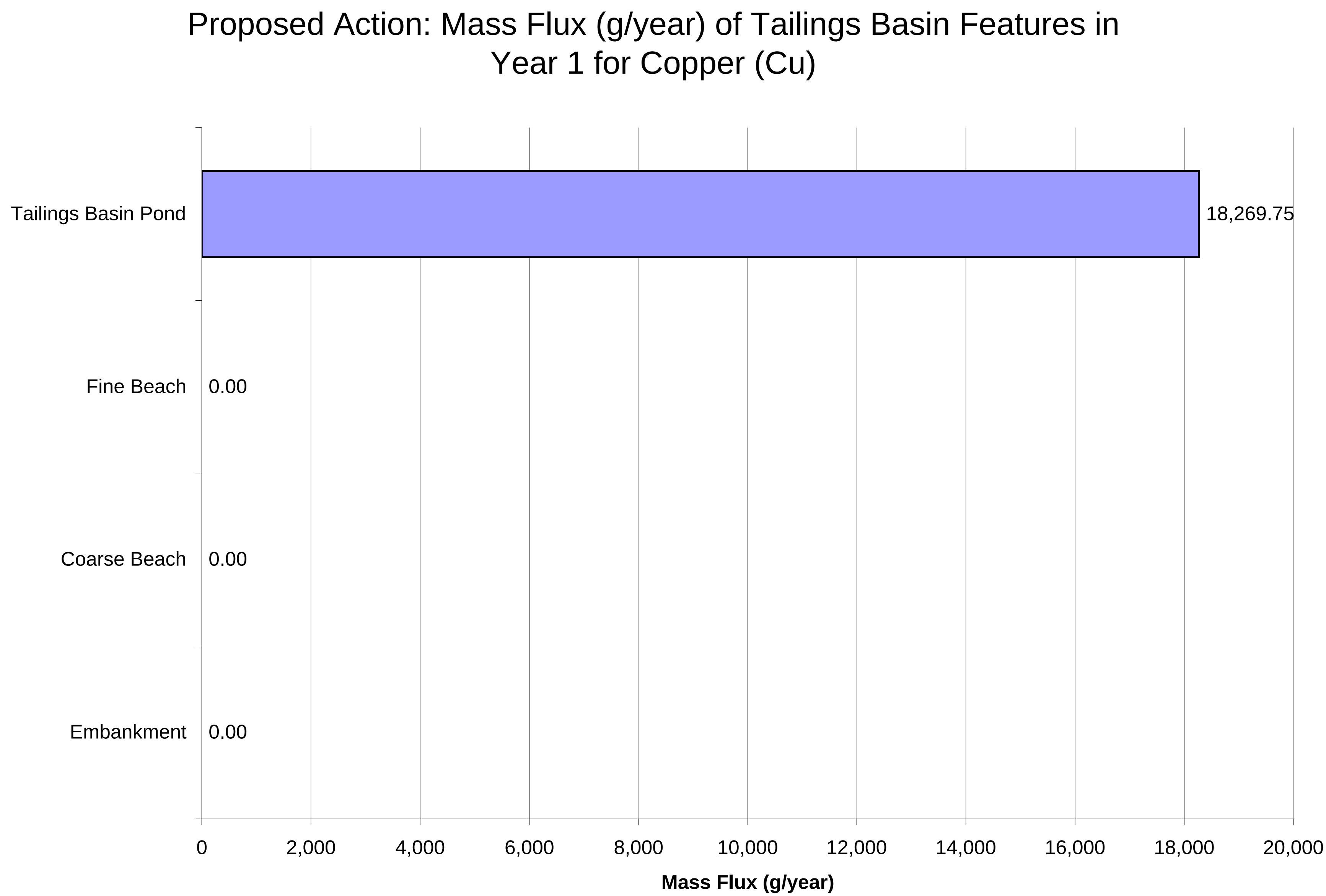



Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Cobalt (Co)
Tailings Basin Pond
10,874.81
Fine Beach
225.50
Coarse Beach
23,340.69
Embankment
605.17
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

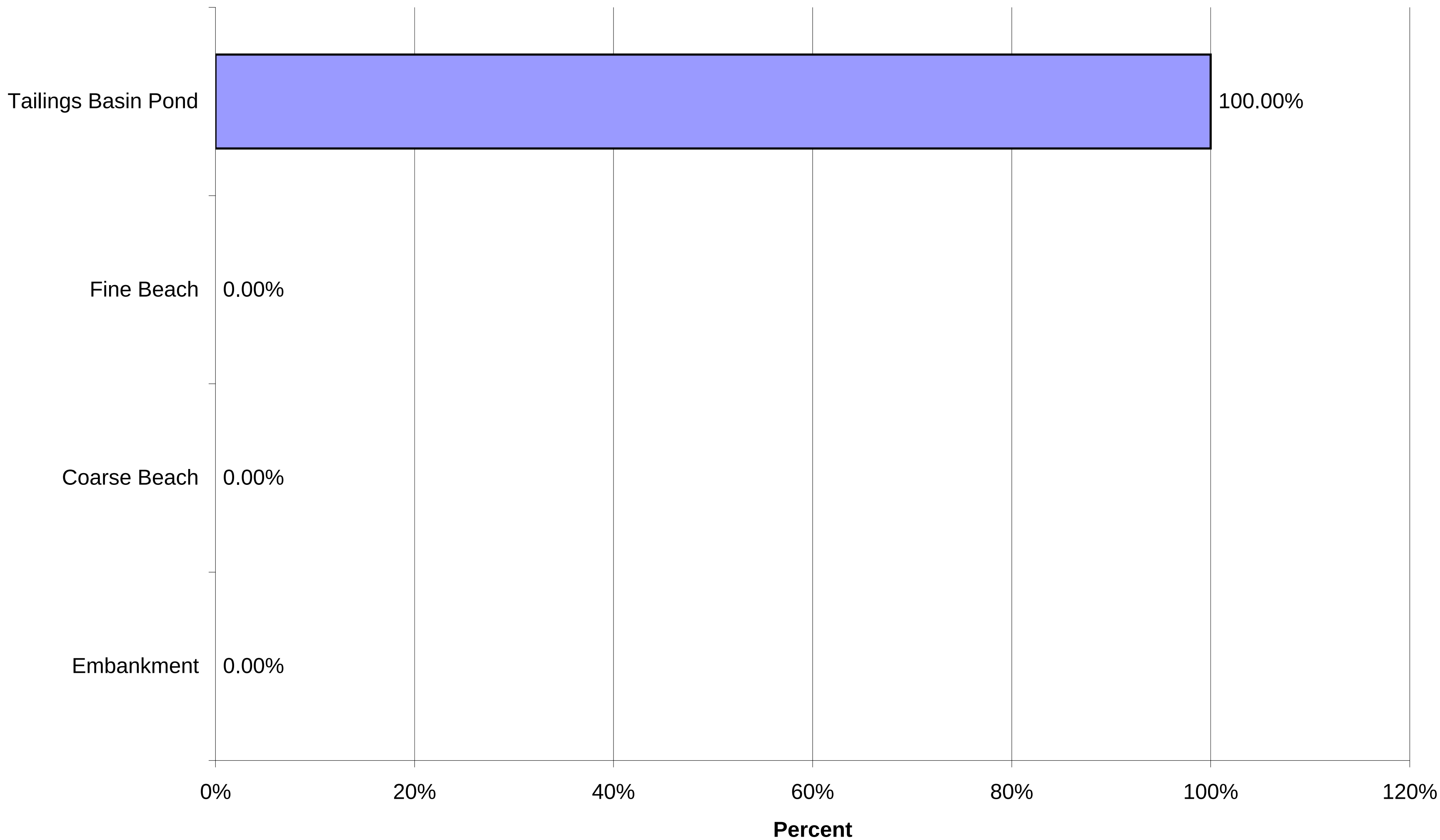

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 20 for Cobalt (Co)
Tailings Basin Pond
31.03%
Fine Beach
0.64%
Coarse Beach
66.60%
Embankment
1.73%
0%
10%
20%
30%
40%
50%
60%
70%
Percent


Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Closure for Cobalt (Co)
Tailings Basin Pond
1,145.67
Fine Beach
62.58
Coarse Beach
109.93
Embankment
38.68
0
200
400
600
800
1,000
1,200
1,400
Mass Flux (g/year)

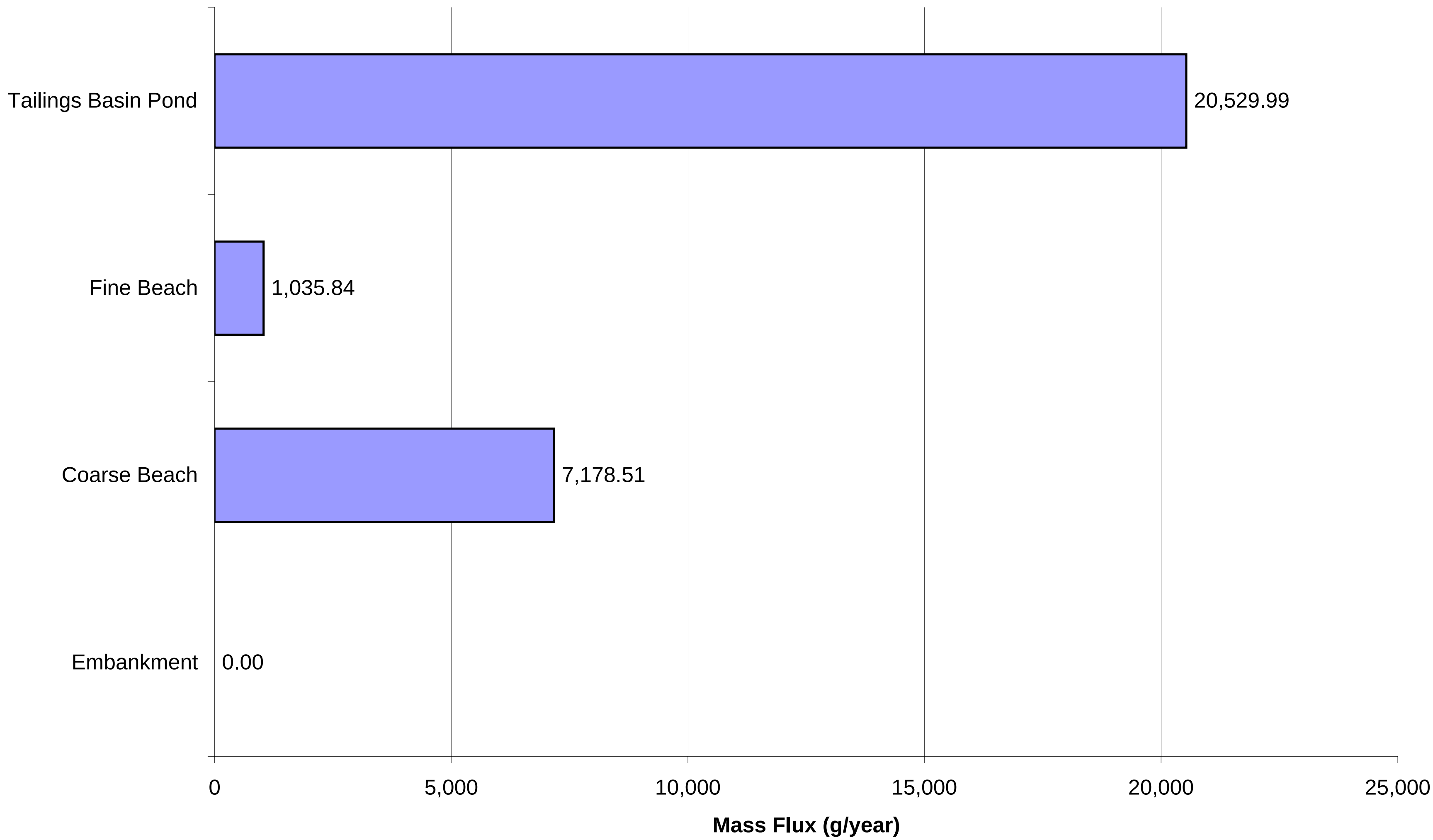

Proposed Action: Percent of Tailings Basin Features' Impacts in Closure for Cobalt (Co)
Tailings Basin Pond
84.43%
Fine Beach
4.61%
Coarse Beach
8.10%
Embankment
2.85%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

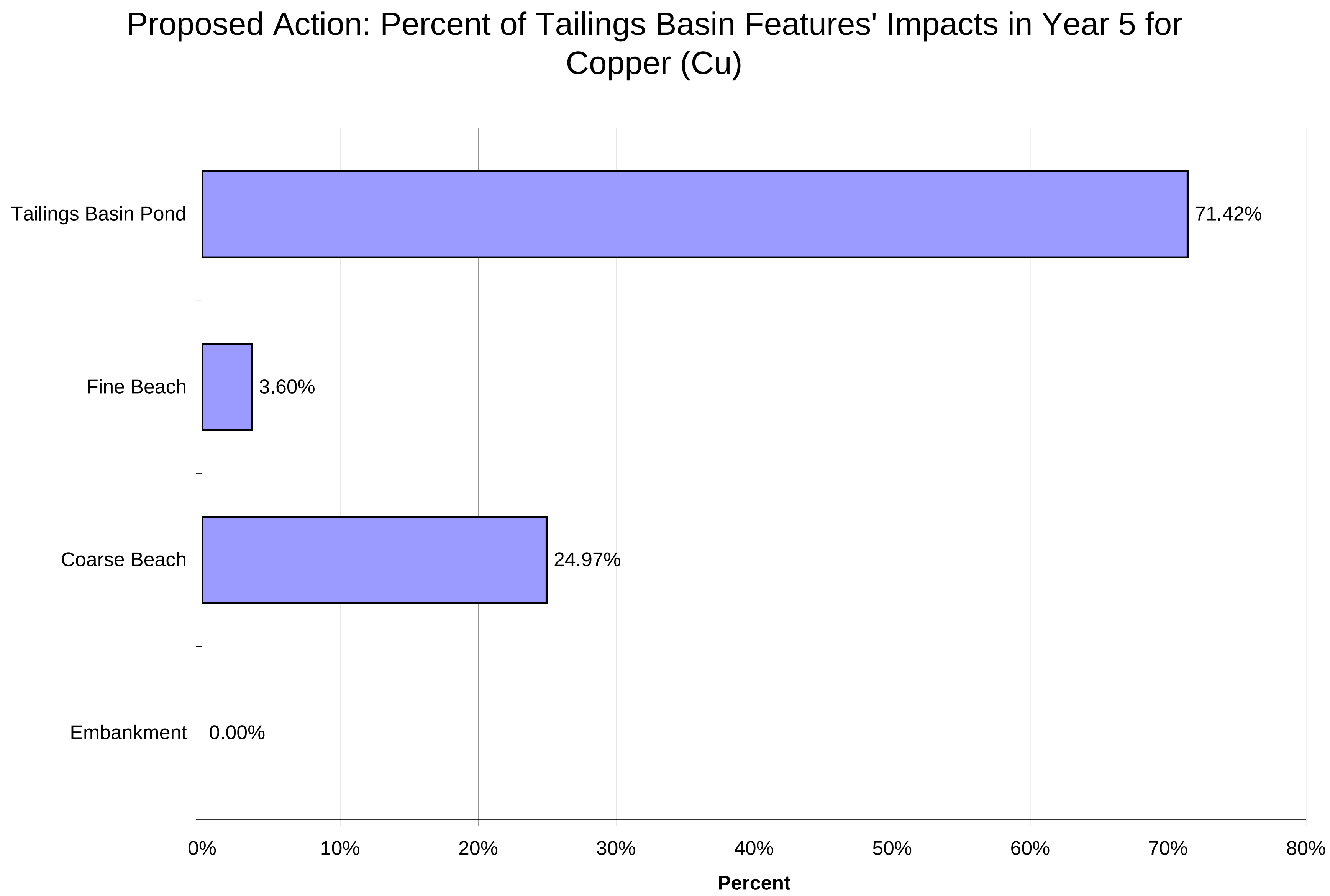

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Copper (Cu)
Tailings Basin Pond
18,269.75
Fine Beach
0.00
Coarse Beach
0.00
Embankment
0.00
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
Mass Flux (g/year)

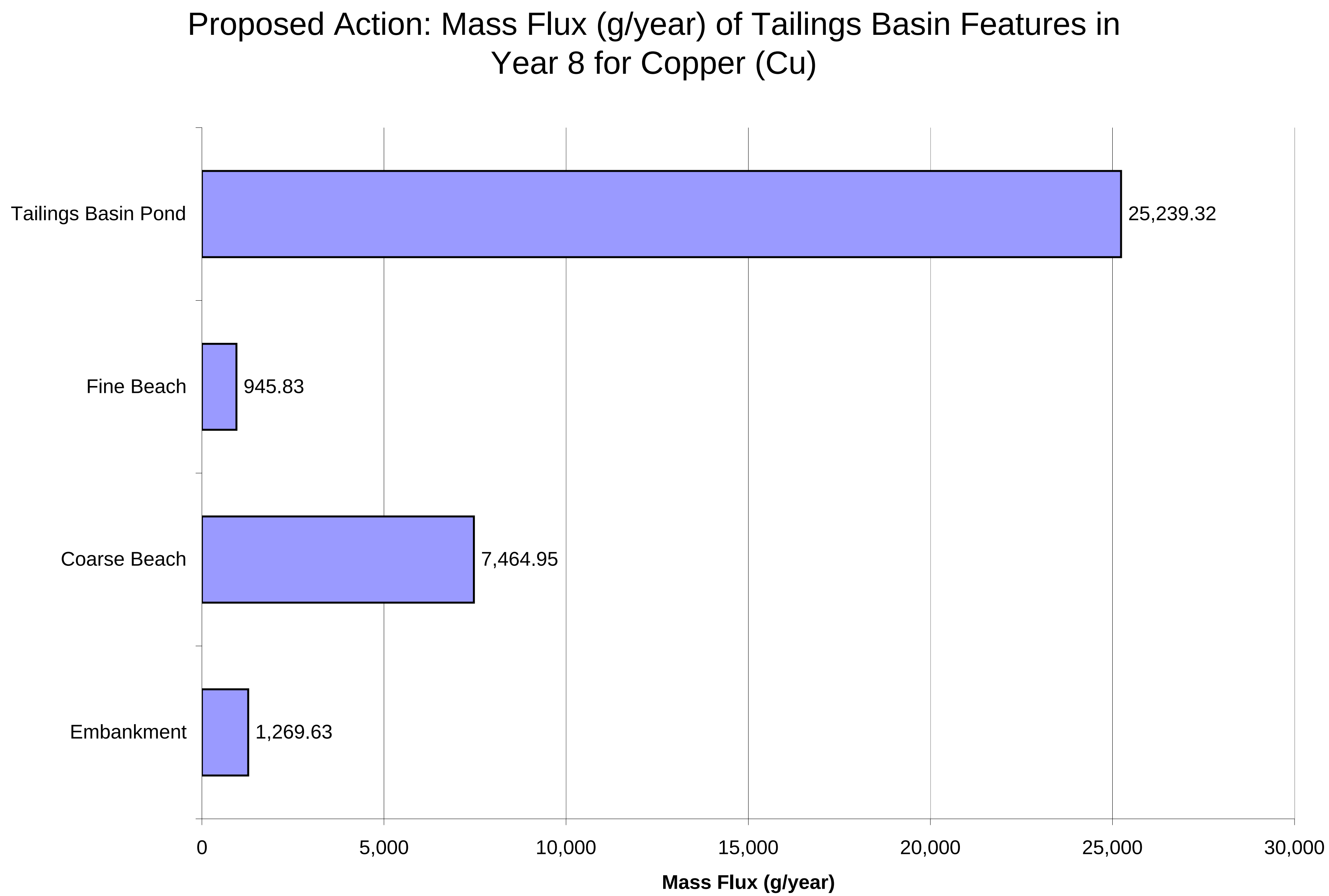
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 1 for Copper (Cu)

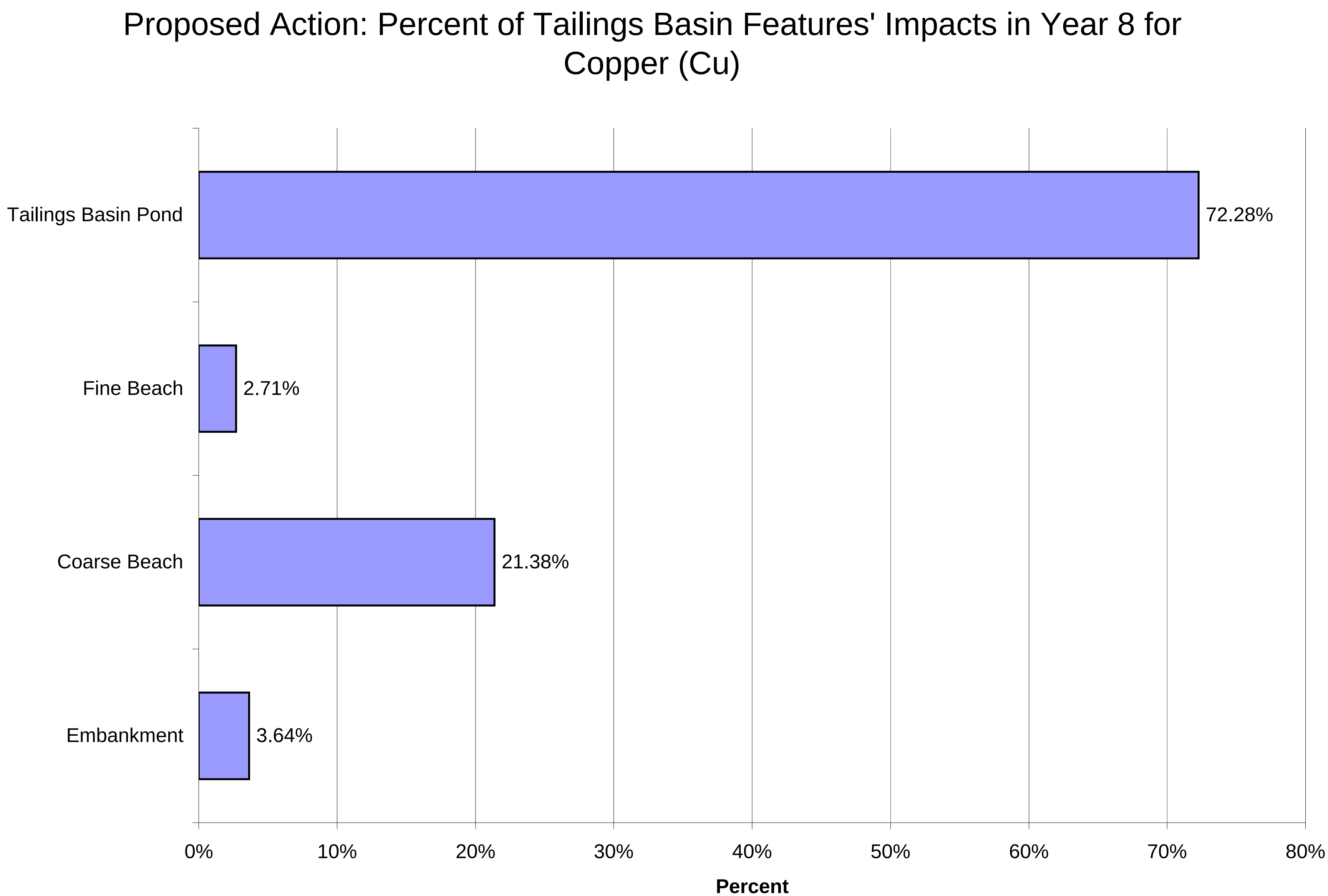


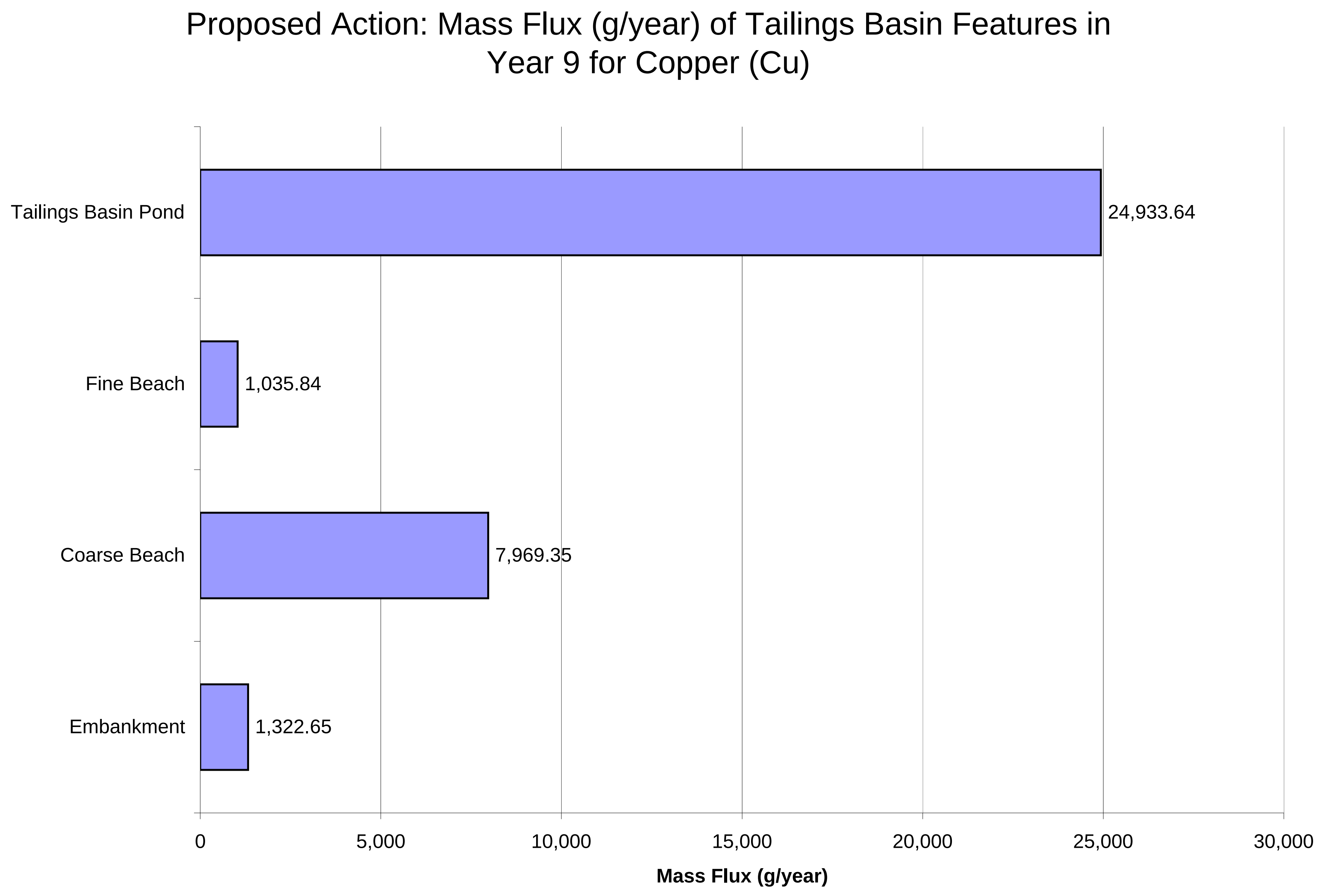
Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Copper (Cu)



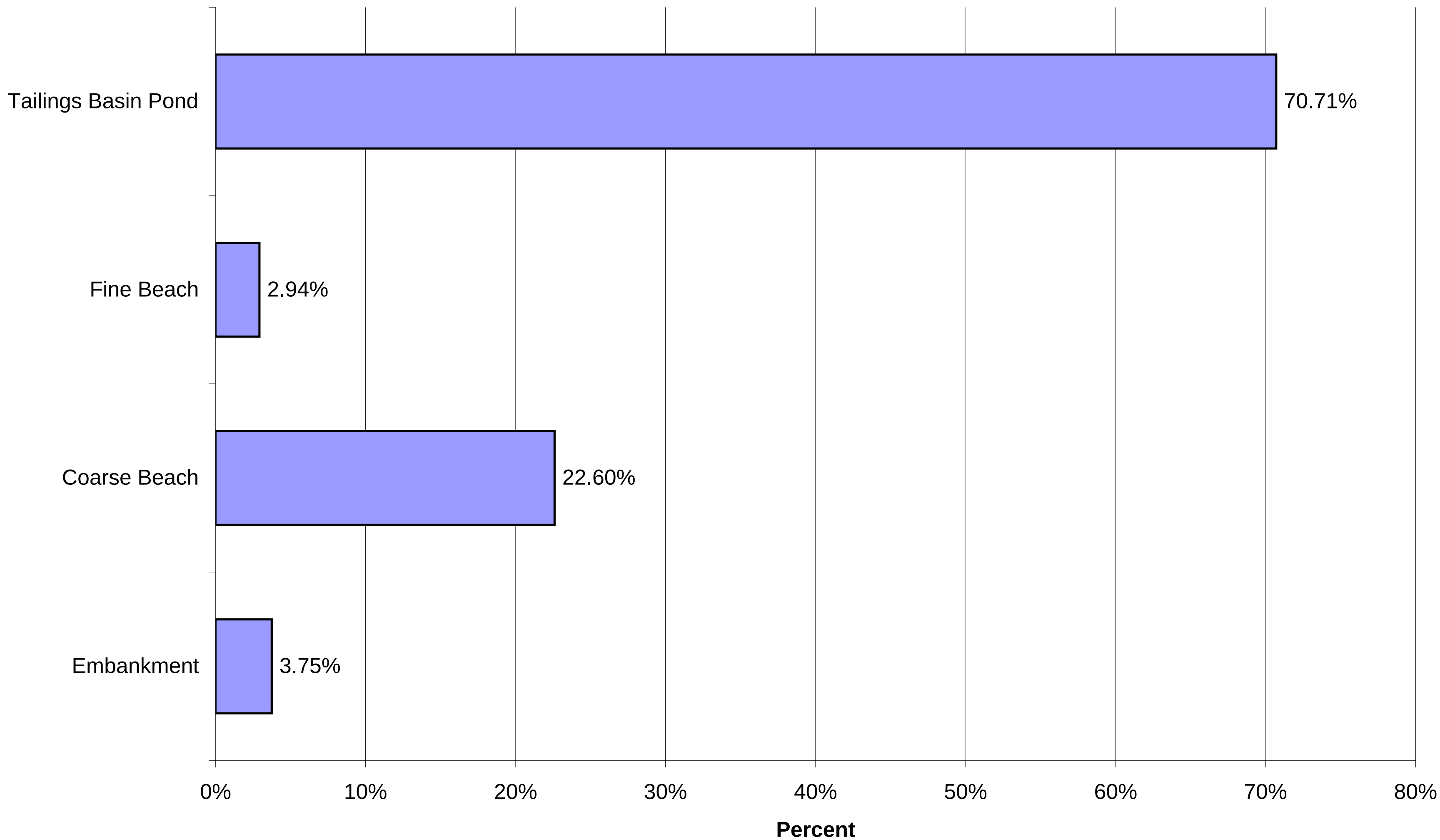

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 5 for Copper (Cu)
Tailings Basin Pond
71.42%
Fine Beach
3.60%
Coarse Beach
24.97%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent


Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 8 for Copper (Cu)
Tailings Basin Pond
25,239.32
Fine Beach
945.83
Coarse Beach
7,464.95
Embankment
1,269.63
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

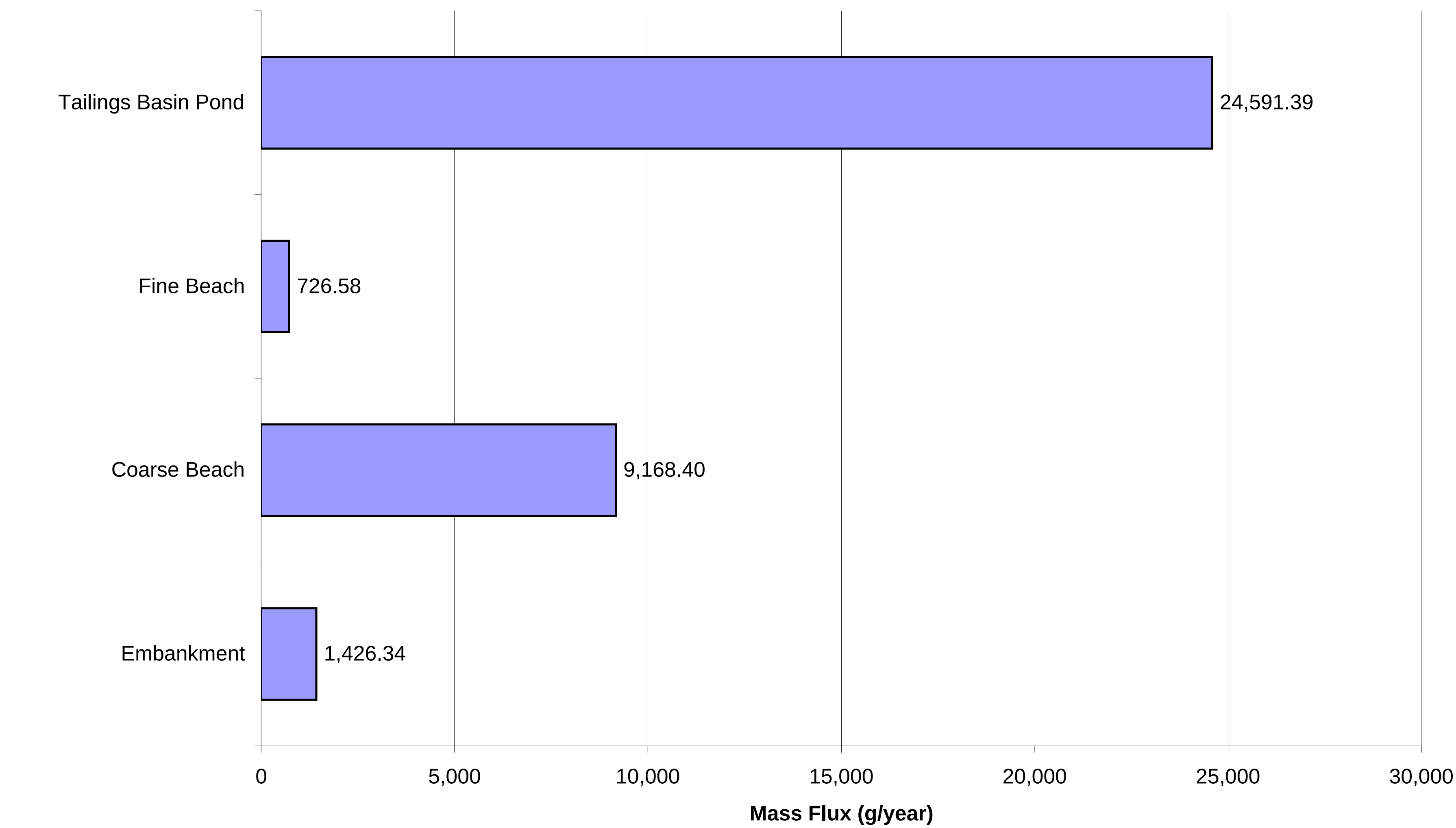

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 8 for Copper (Cu)
Tailings Basin Pond
72.28%
Fine Beach
2.71%
Coarse Beach
21.38%
Embankment
3.64%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

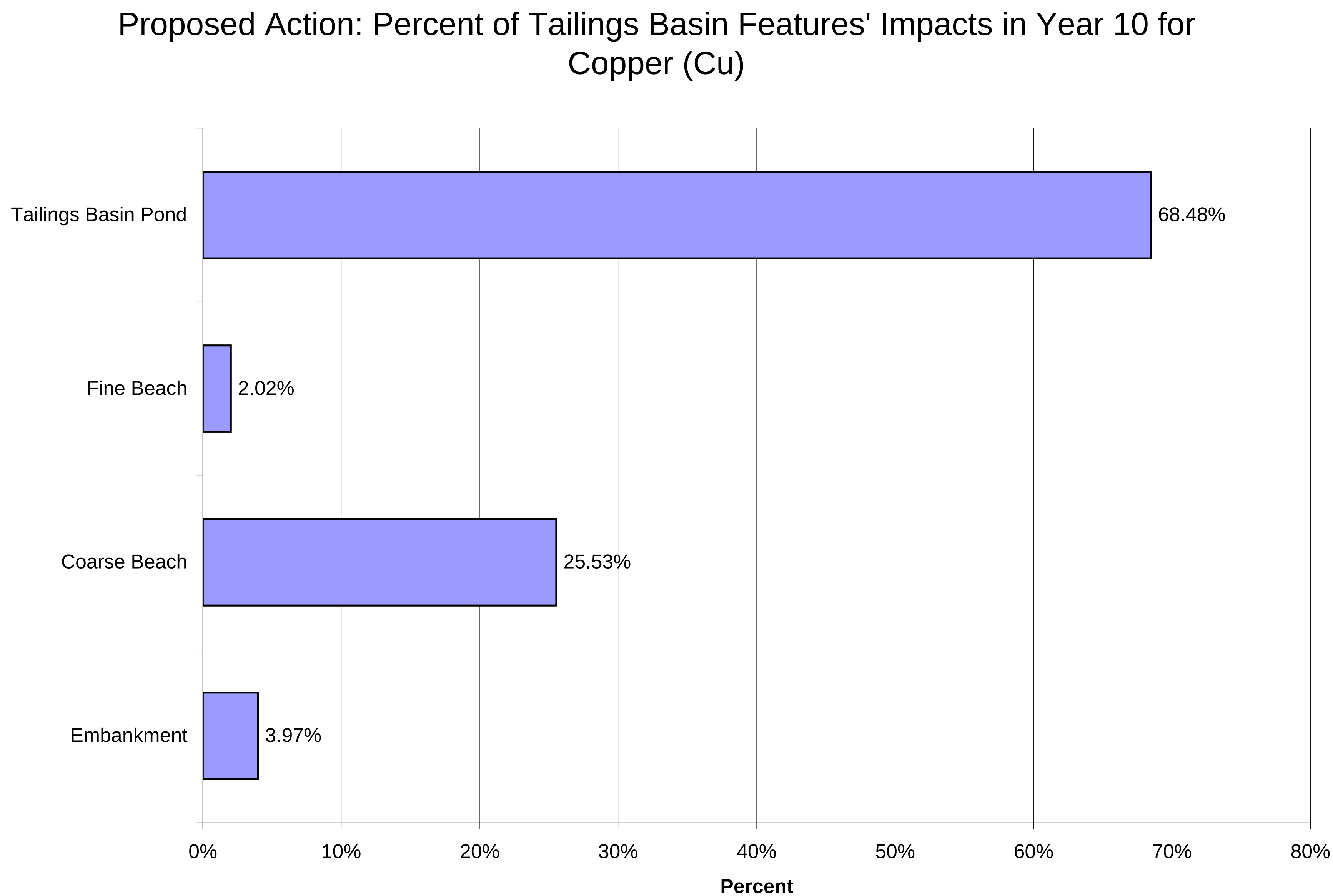

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 9 for Copper (Cu)
Tailings Basin Pond
24,933.64
Fine Beach
1,035.84
Coarse Beach
7,969.35
Embankment
1,322.65
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

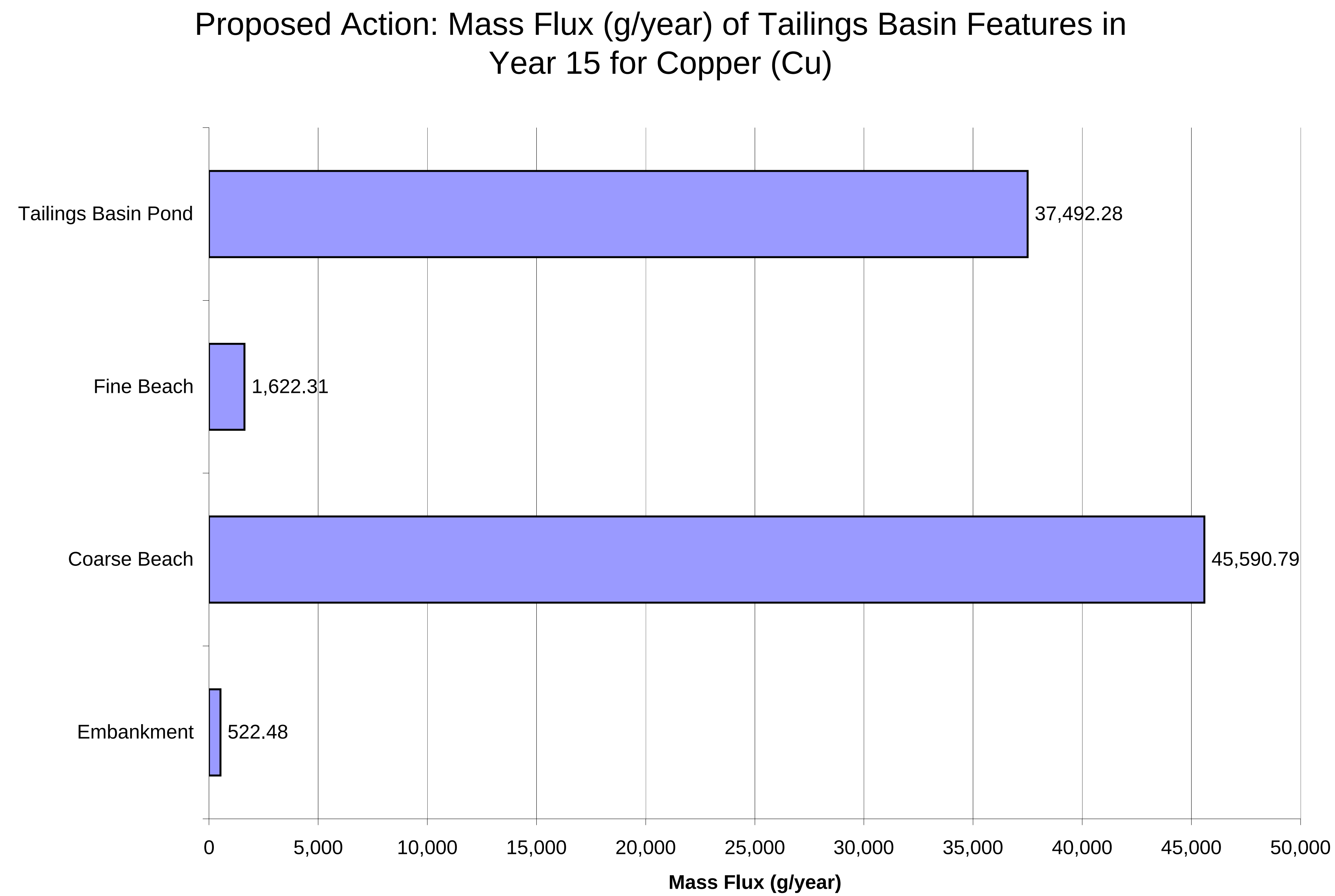
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 9 for Copper (Cu)



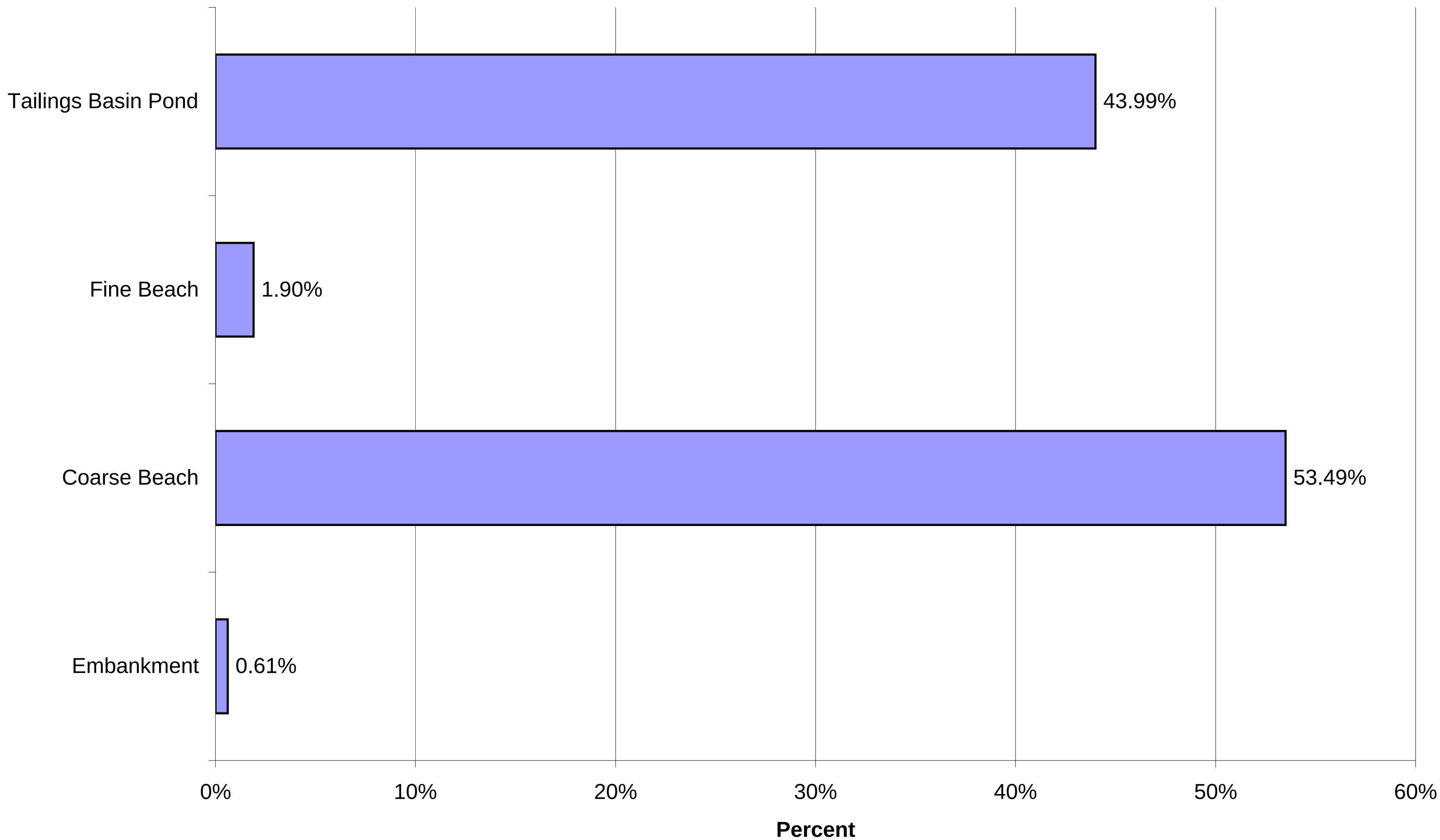
Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Copper (Cu)

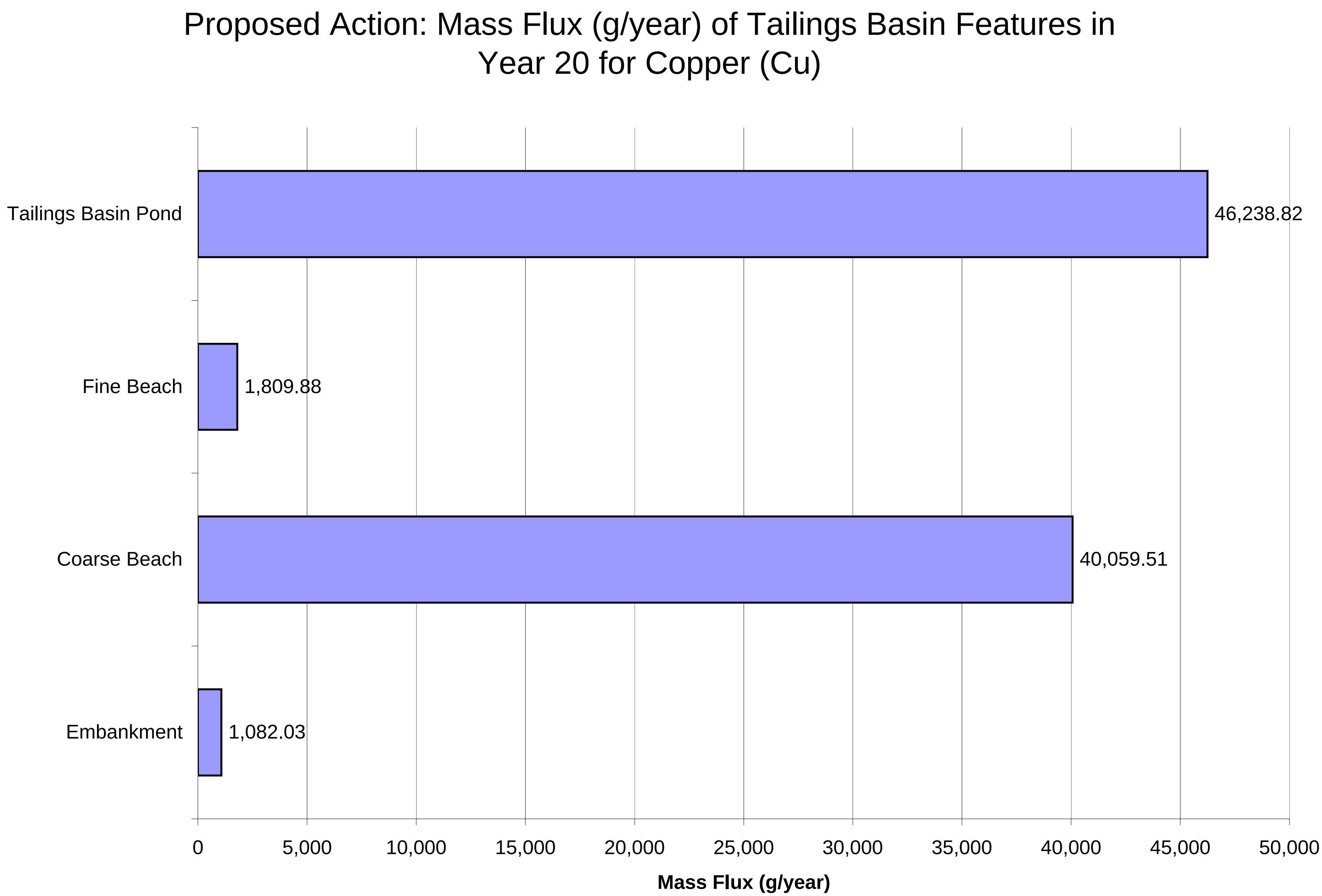


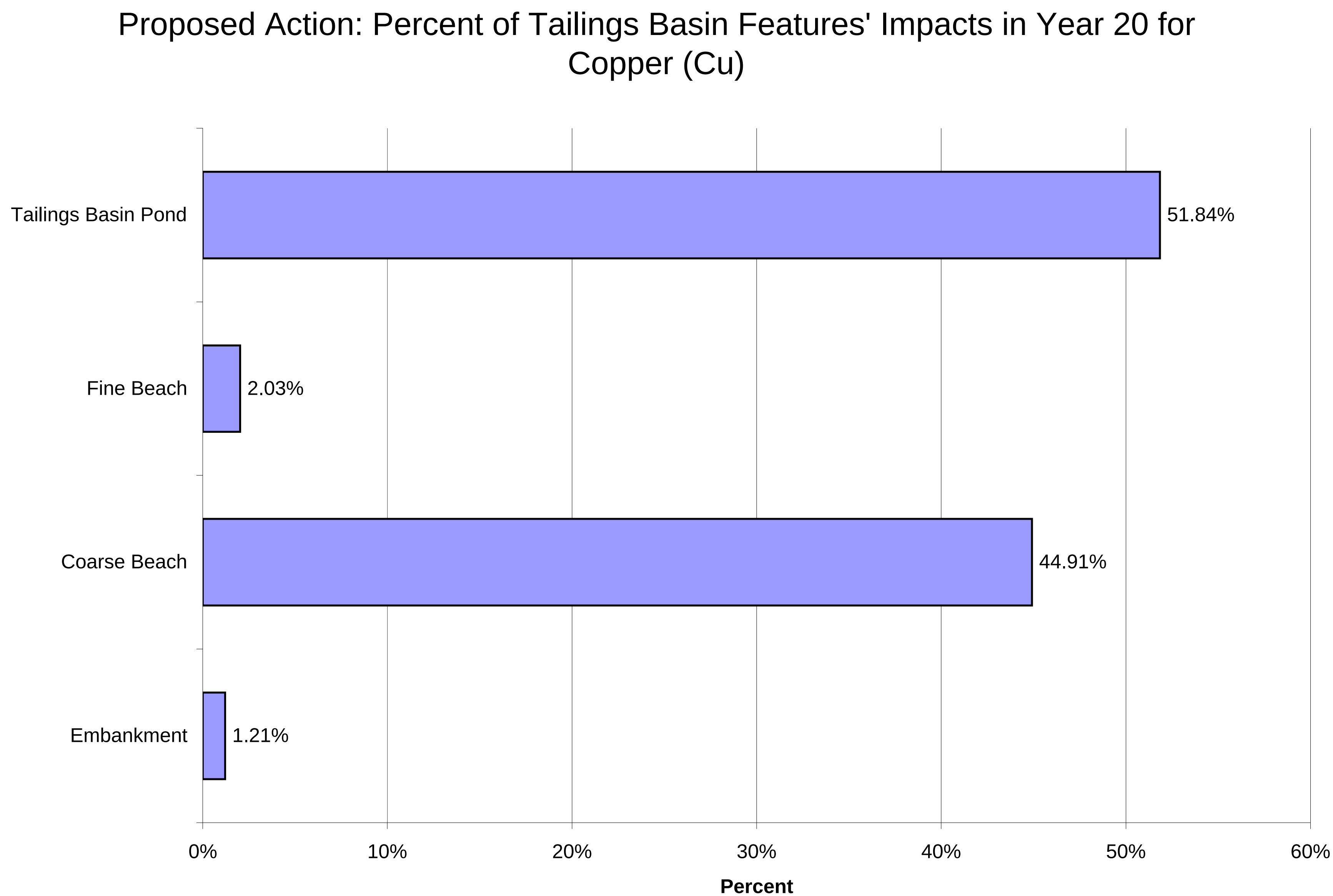

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 10 for Copper (Cu)
Tailings Basin Pond
68.48%
Fine Beach
2.02%
Coarse Beach
25.53%
Embankment
3.97%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

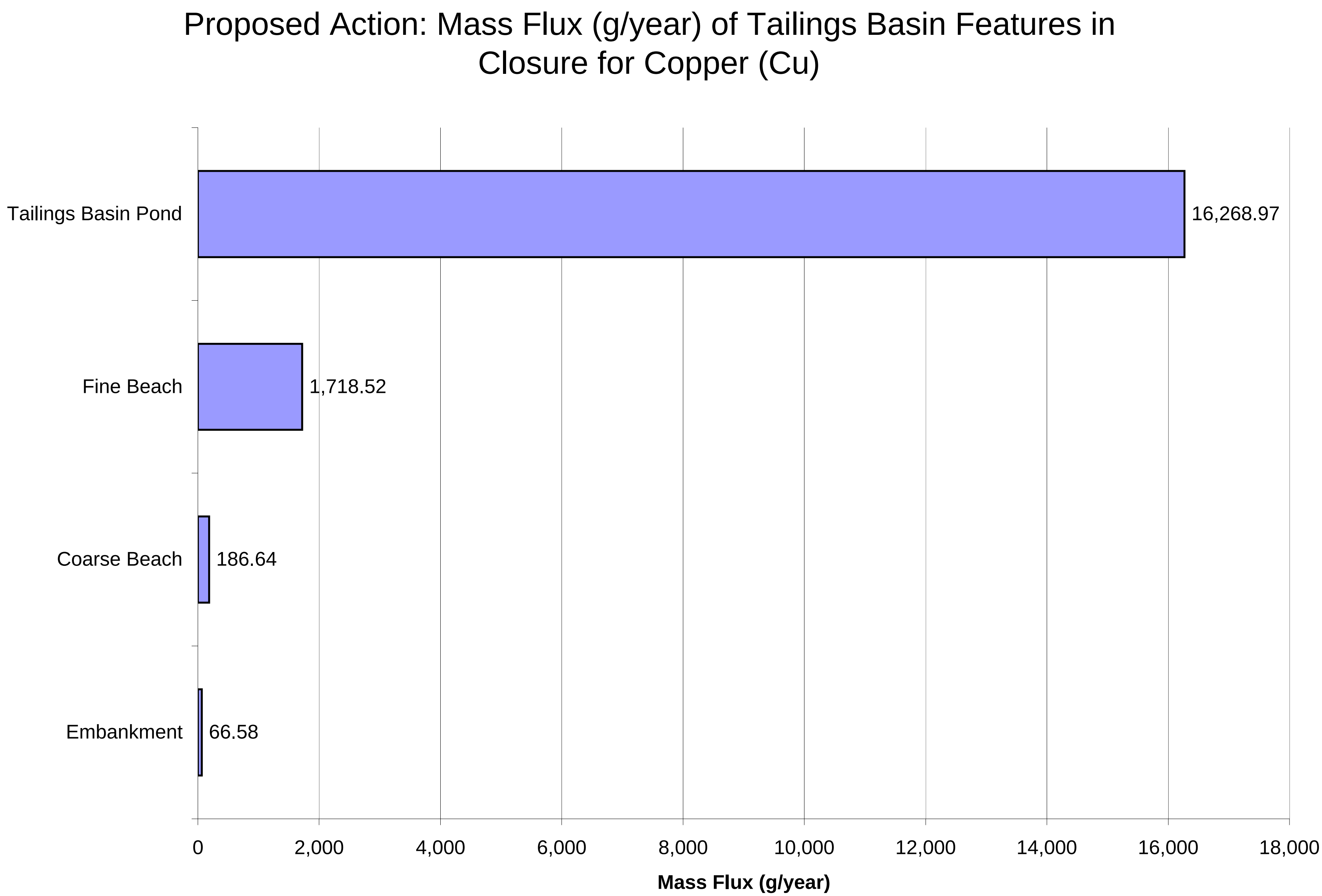

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Copper (Cu)
Tailings Basin Pond
37,492.28
Fine Beach
1,622.31
Coarse Beach
45,590.79
Embankment
522.48
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Mass Flux (g/year)

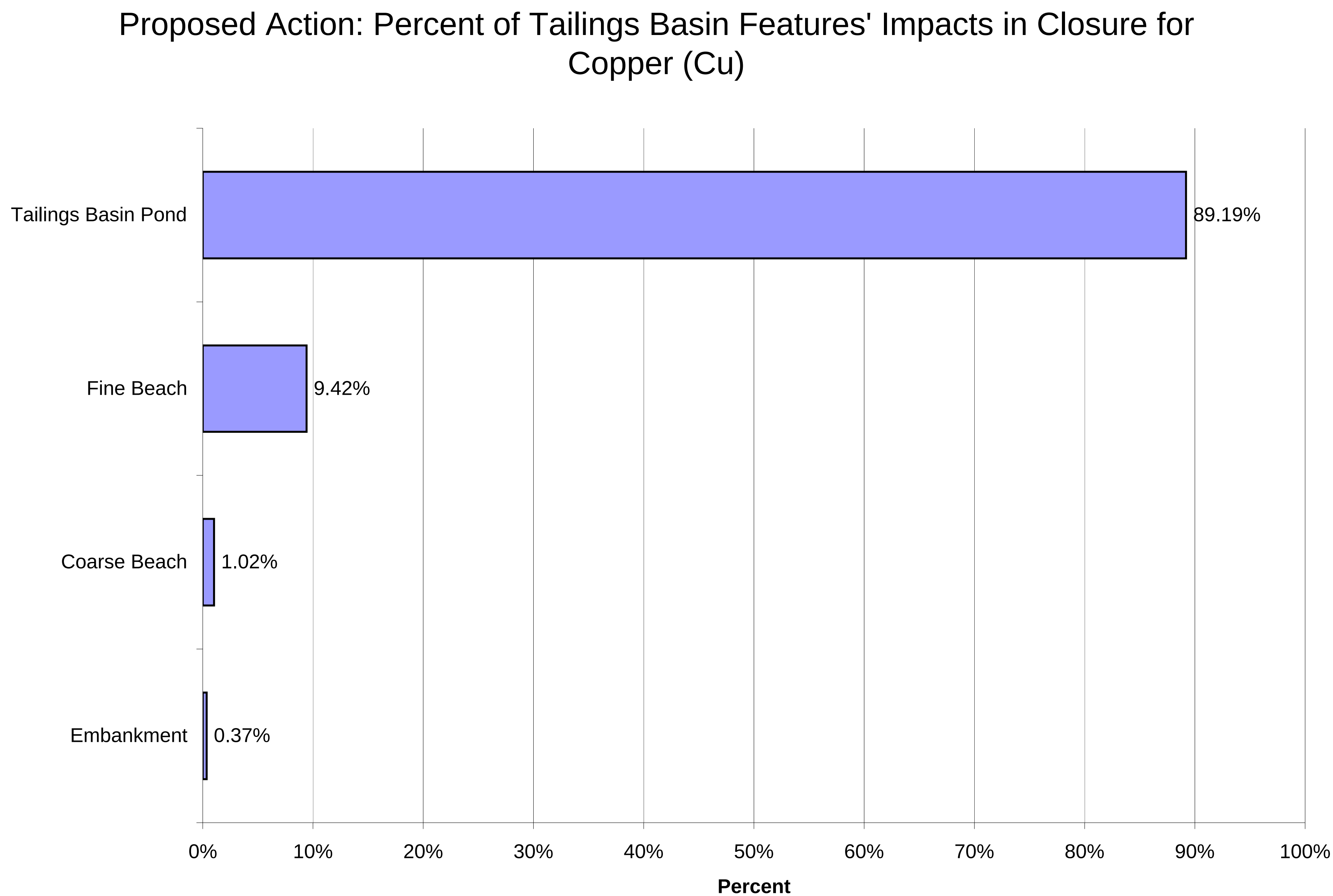
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 15 for Copper (Cu)

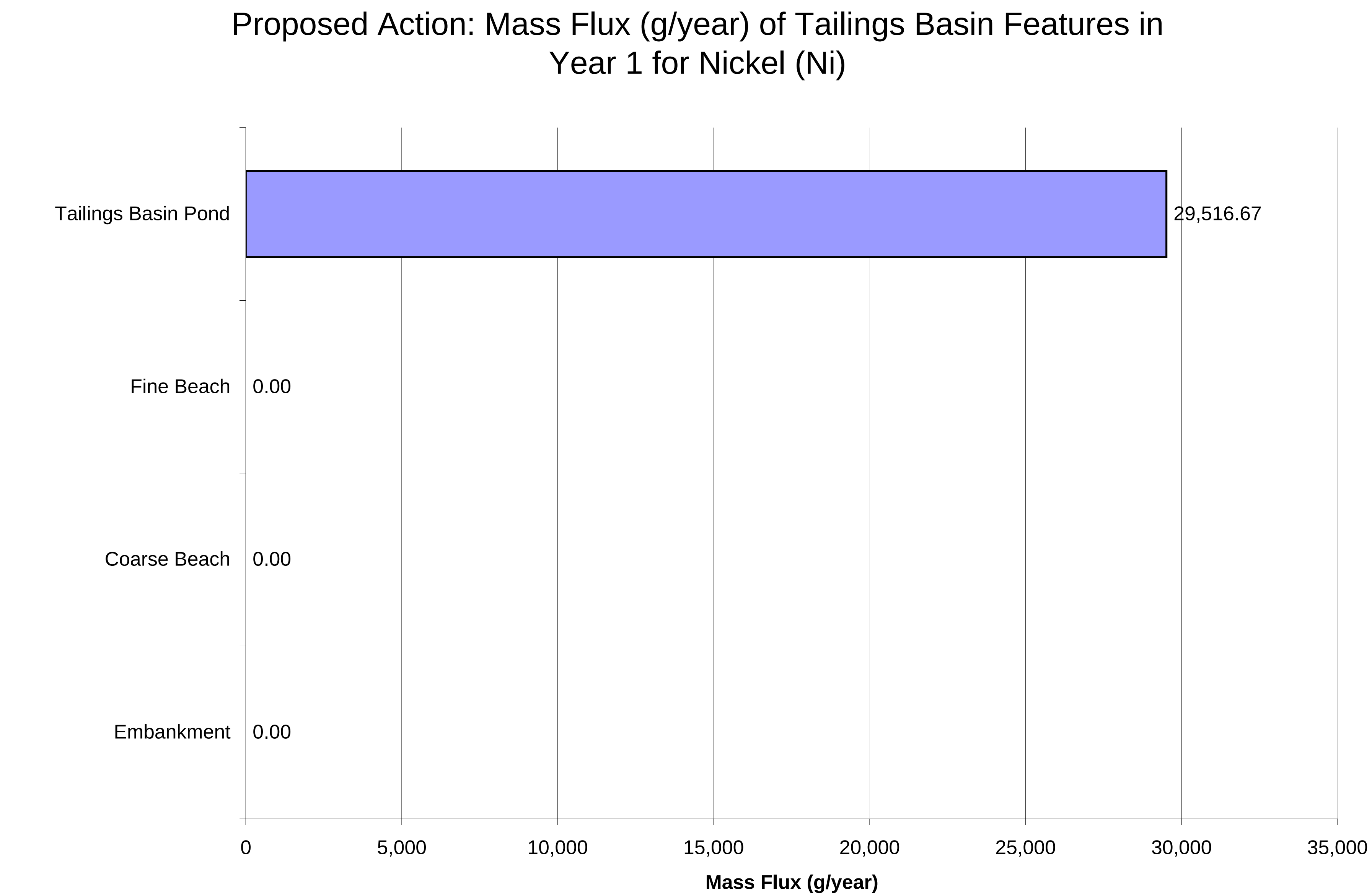



Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Copper (Cu)
Tailings Basin Pond
46,238.82
Fine Beach
1,809.88
Coarse Beach
40,059.51
Embankment
1,082.03
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Mass Flux (g/year)

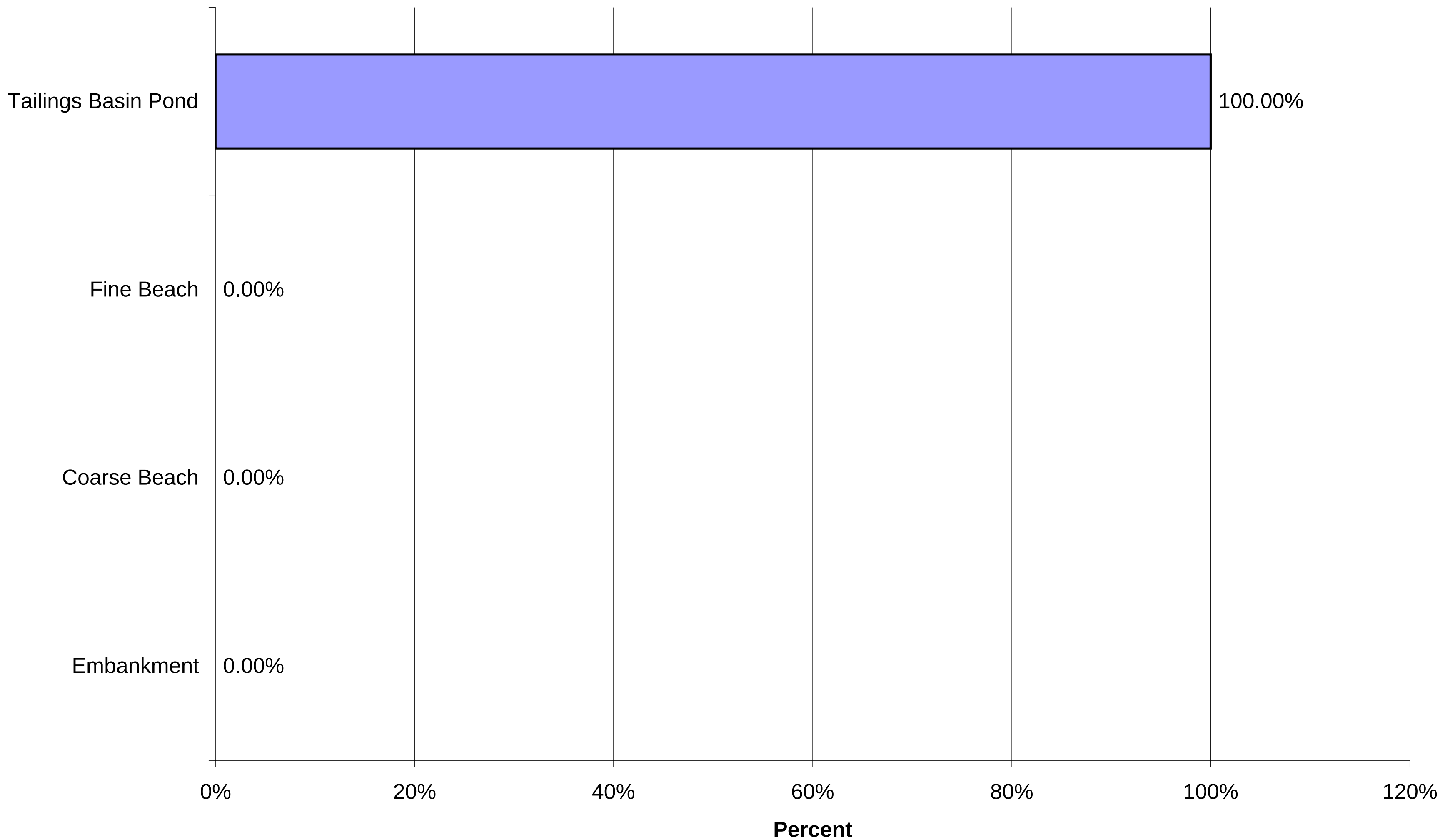

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 20 for Copper (Cu)
Tailings Basin Pond
51.84%
Fine Beach
2.03%
Coarse Beach
44.91%
Embankment
1.21%
0%
10%
20%
30%
40%
50%
60%
Percent

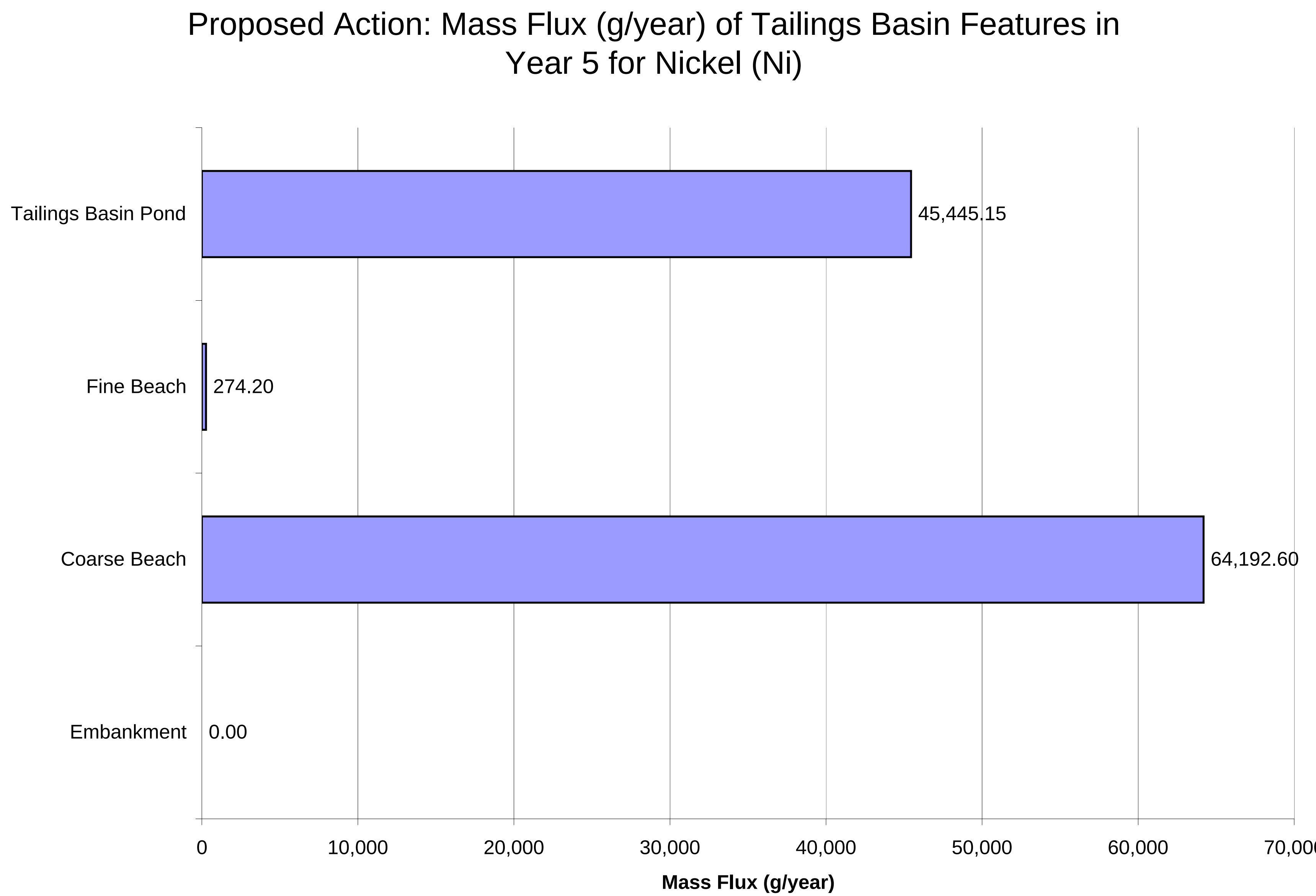

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Closure for Copper (Cu)
Tailings Basin Pond
16,268.97
Fine Beach
1,718.52
Coarse Beach
186.64
Embankment
66.58
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Mass Flux (g/year)

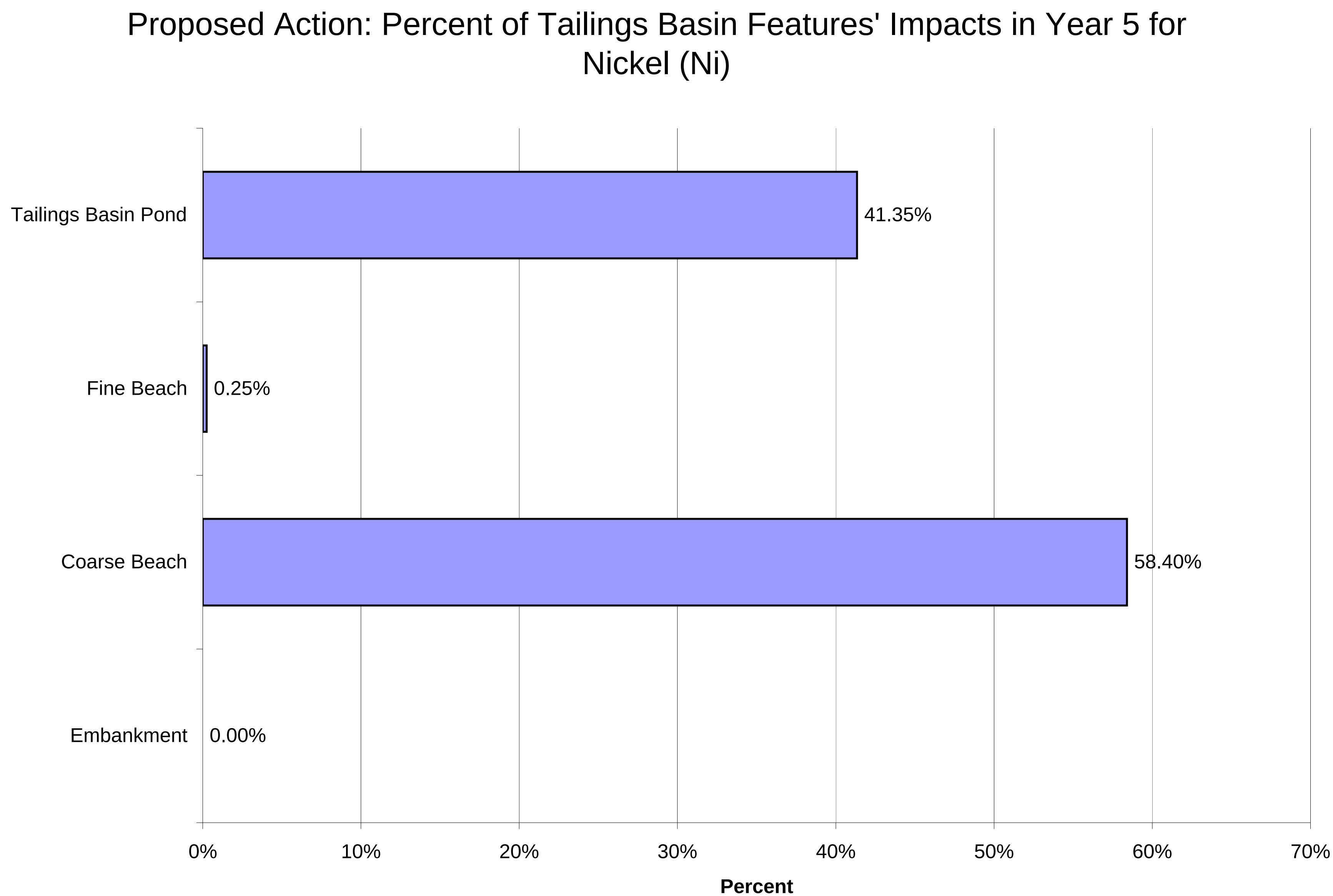

Proposed Action: Percent of Tailings Basin Features' Impacts in Closure for Copper (Cu)
Tailings Basin Pond
89.19%
Fine Beach
9.42%
Coarse Beach
1.02%
Embankment
0.37%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

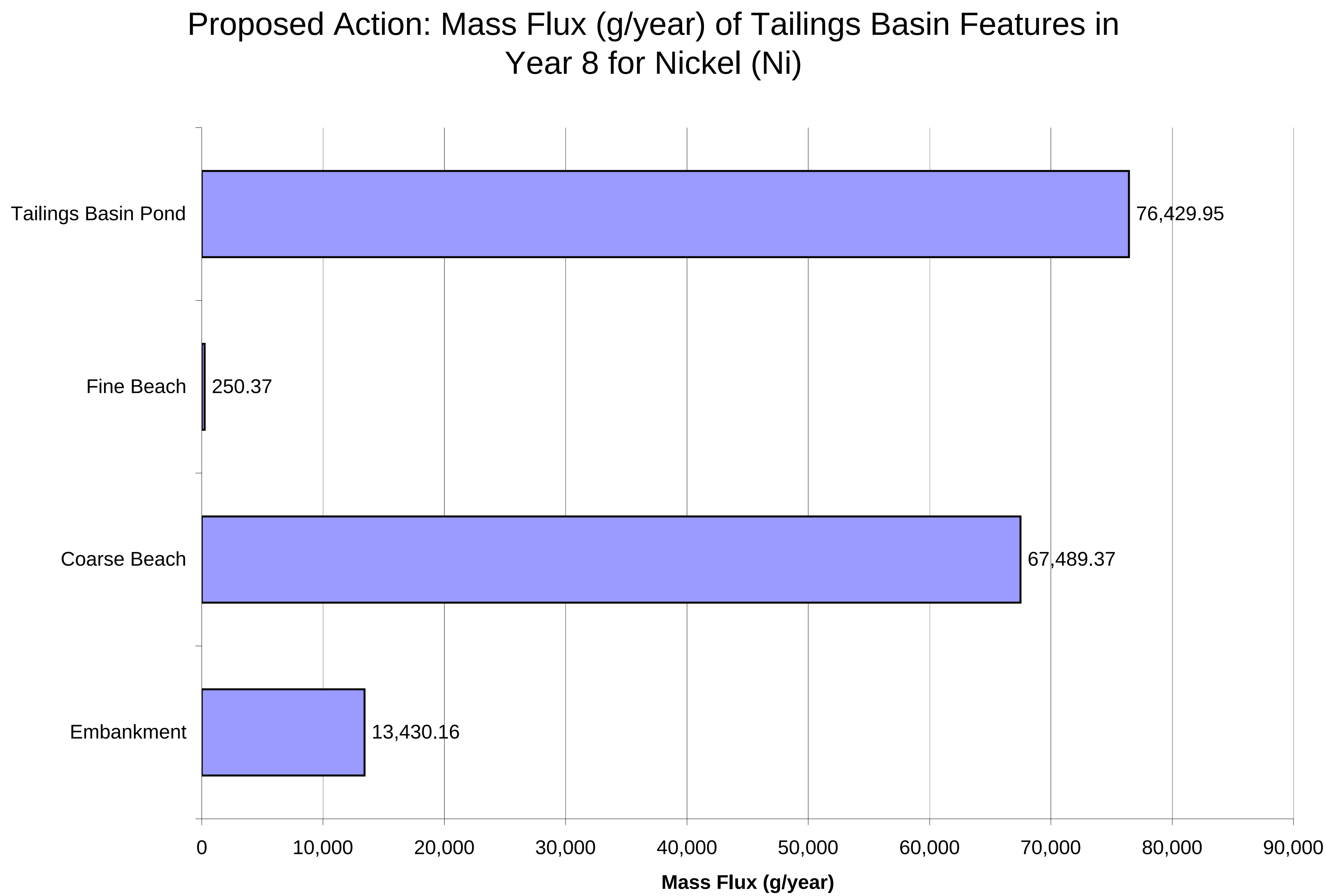

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Nickel (Ni)
Tailings Basin Pond
29,516.67
Fine Beach
0.00
Coarse Beach
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

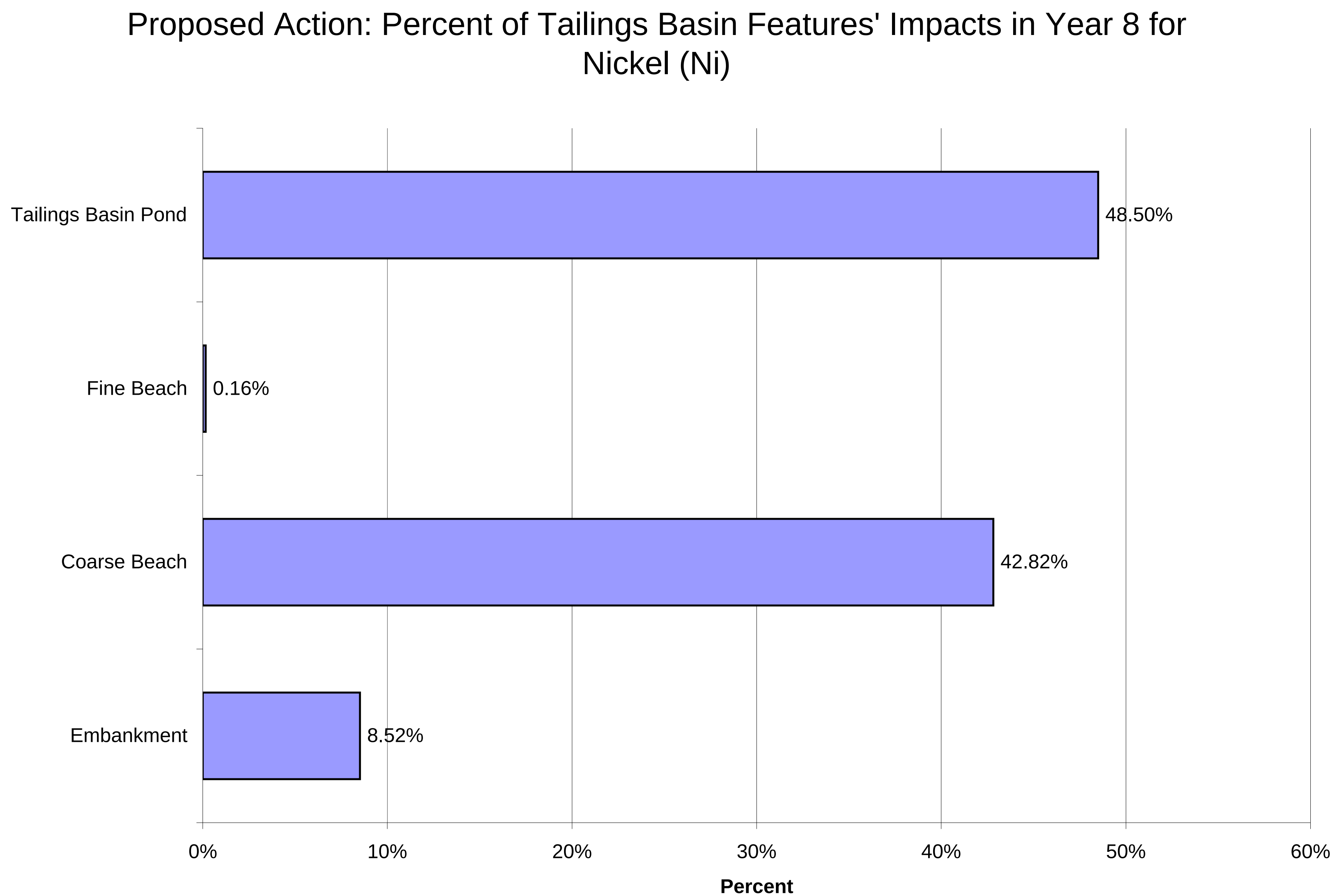
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 1 for Nickel (Ni)

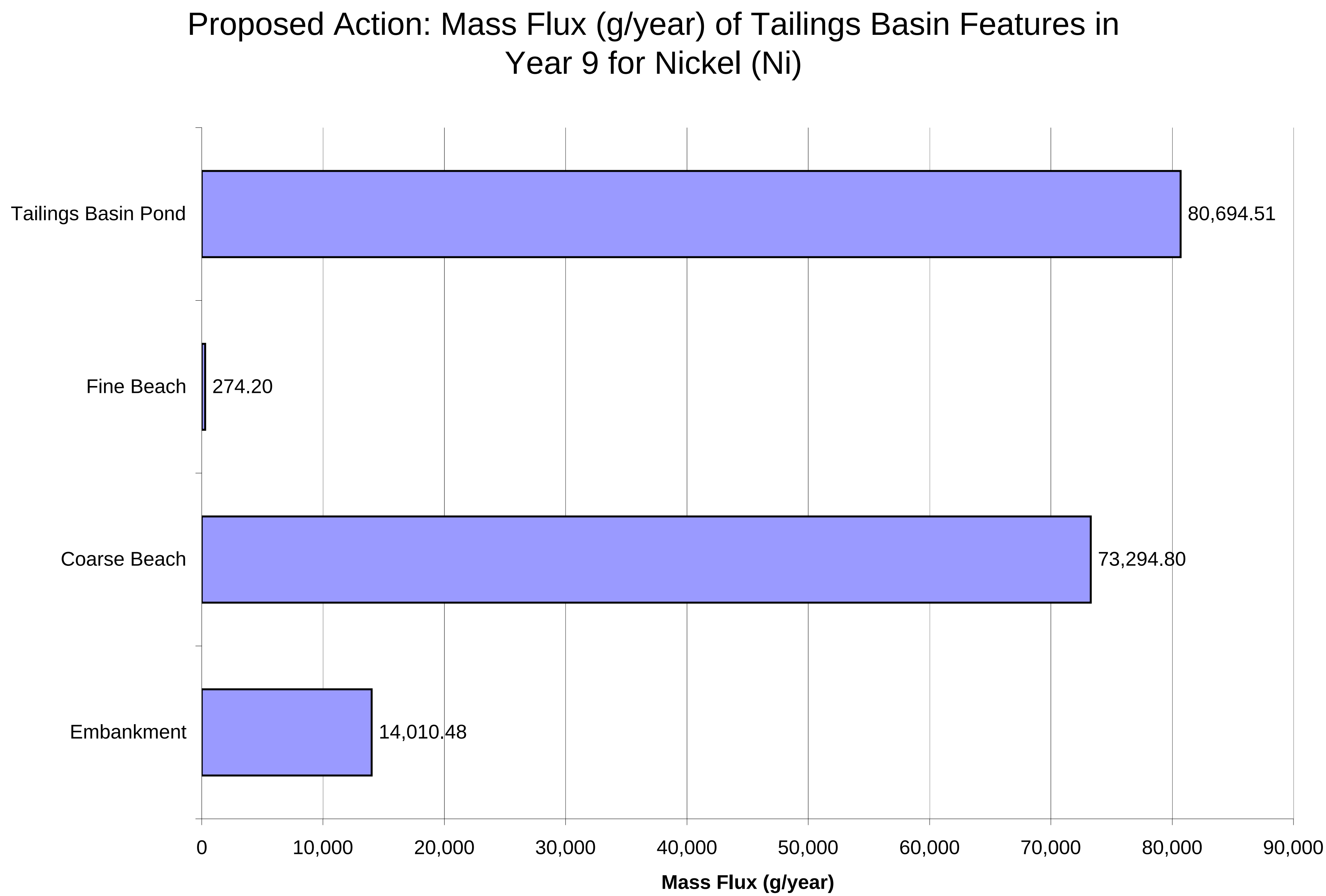



Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Nickel (Ni)
Tailings Basin Pond
45,445.15
Fine Beach
274.20
Coarse Beach
64,192.60
Embankment
0.00
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

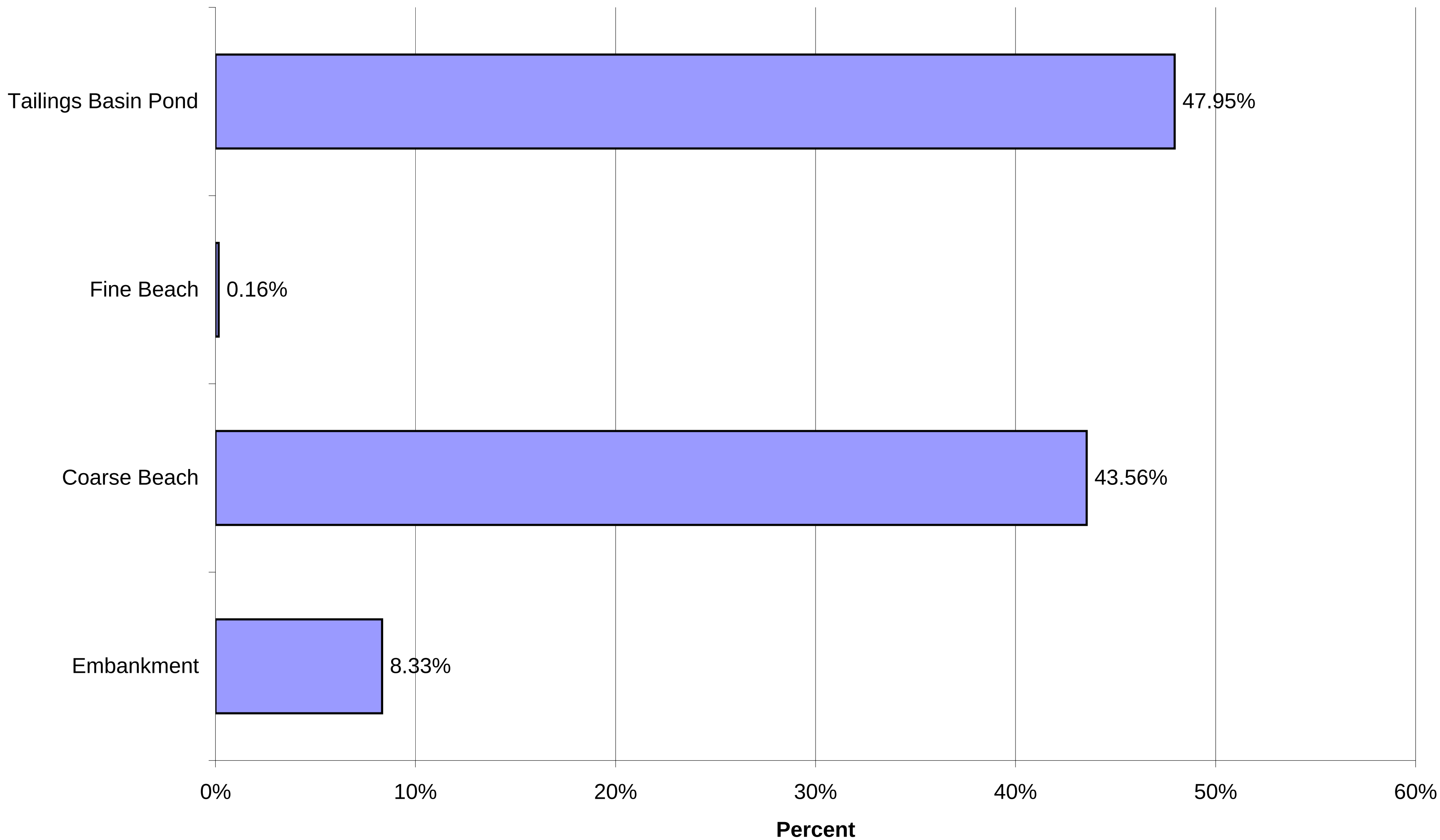

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 5 for Nickel (Ni)
Tailings Basin Pond
41.35%
Fine Beach
0.25%
Coarse Beach
58.40%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

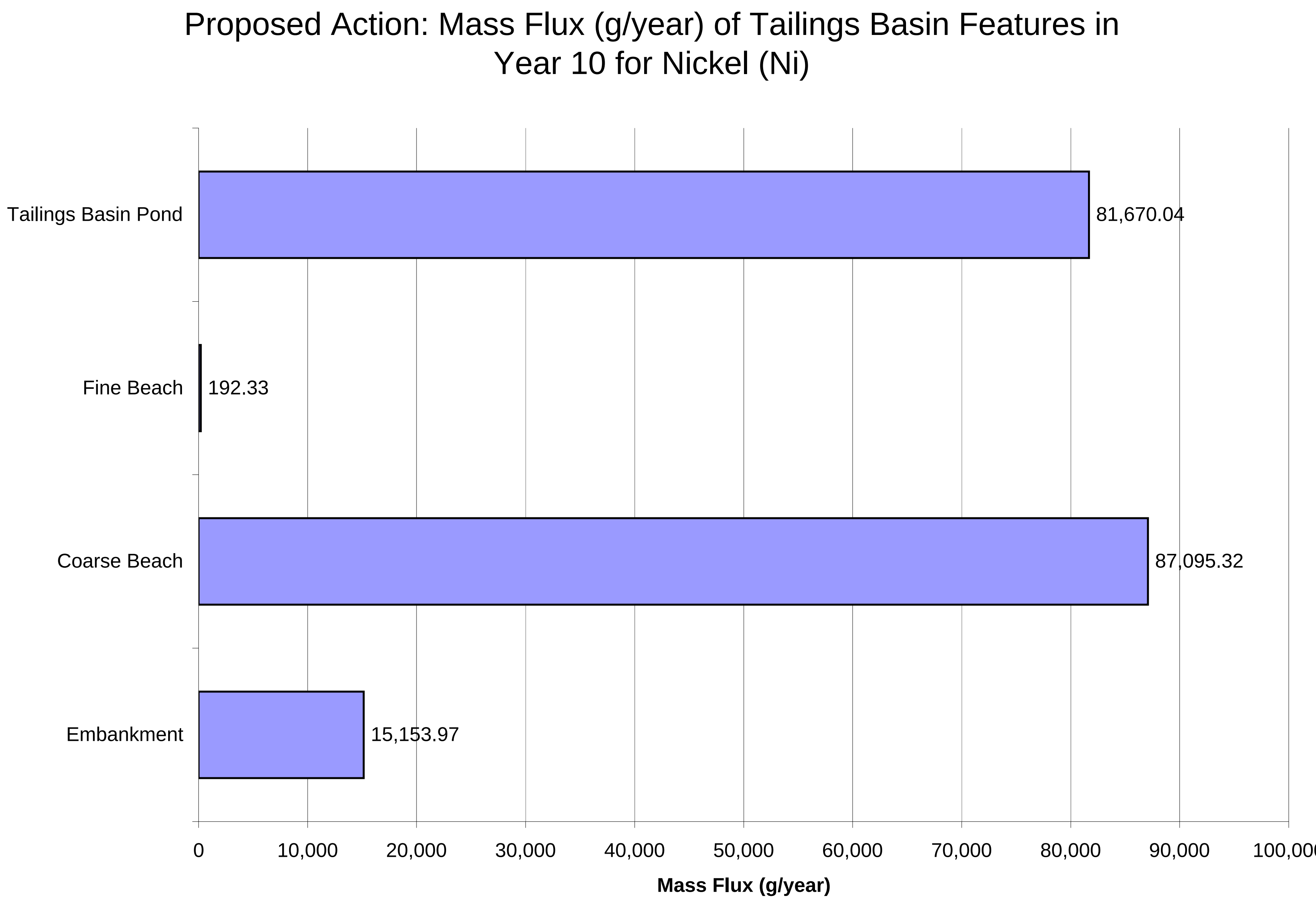

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 8 for Nickel (Ni)
Tailings Basin Pond
76,429.95
Fine Beach
250.37
Coarse Beach
67,489.37
Embankment
13,430.16
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

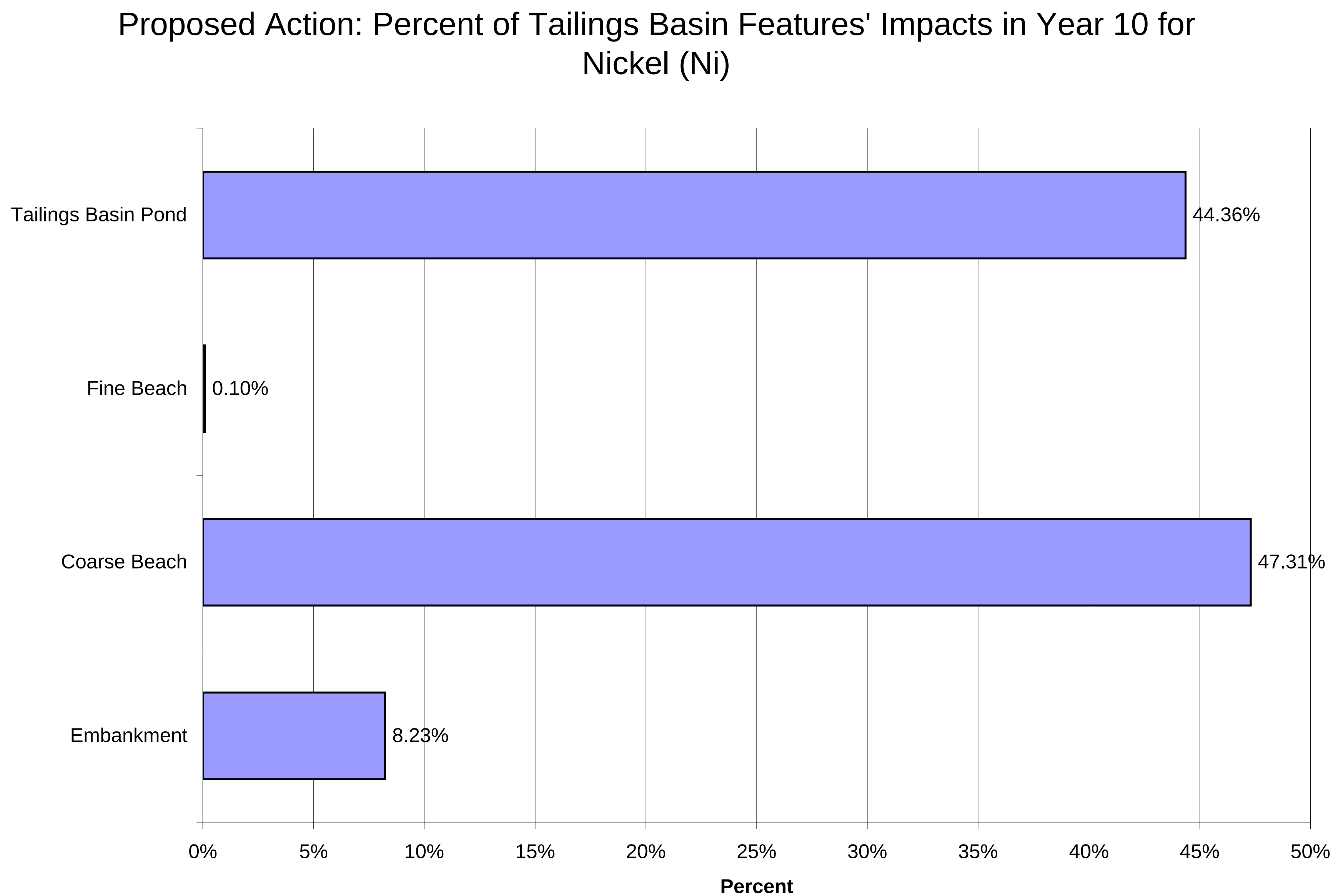

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 8 for Nickel (Ni)
Tailings Basin Pond
48.50%
Fine Beach
0.16%
Coarse Beach
42.82%
Embankment
8.52%
0%
10%
20%
30%
40%
50%
60%
Percent

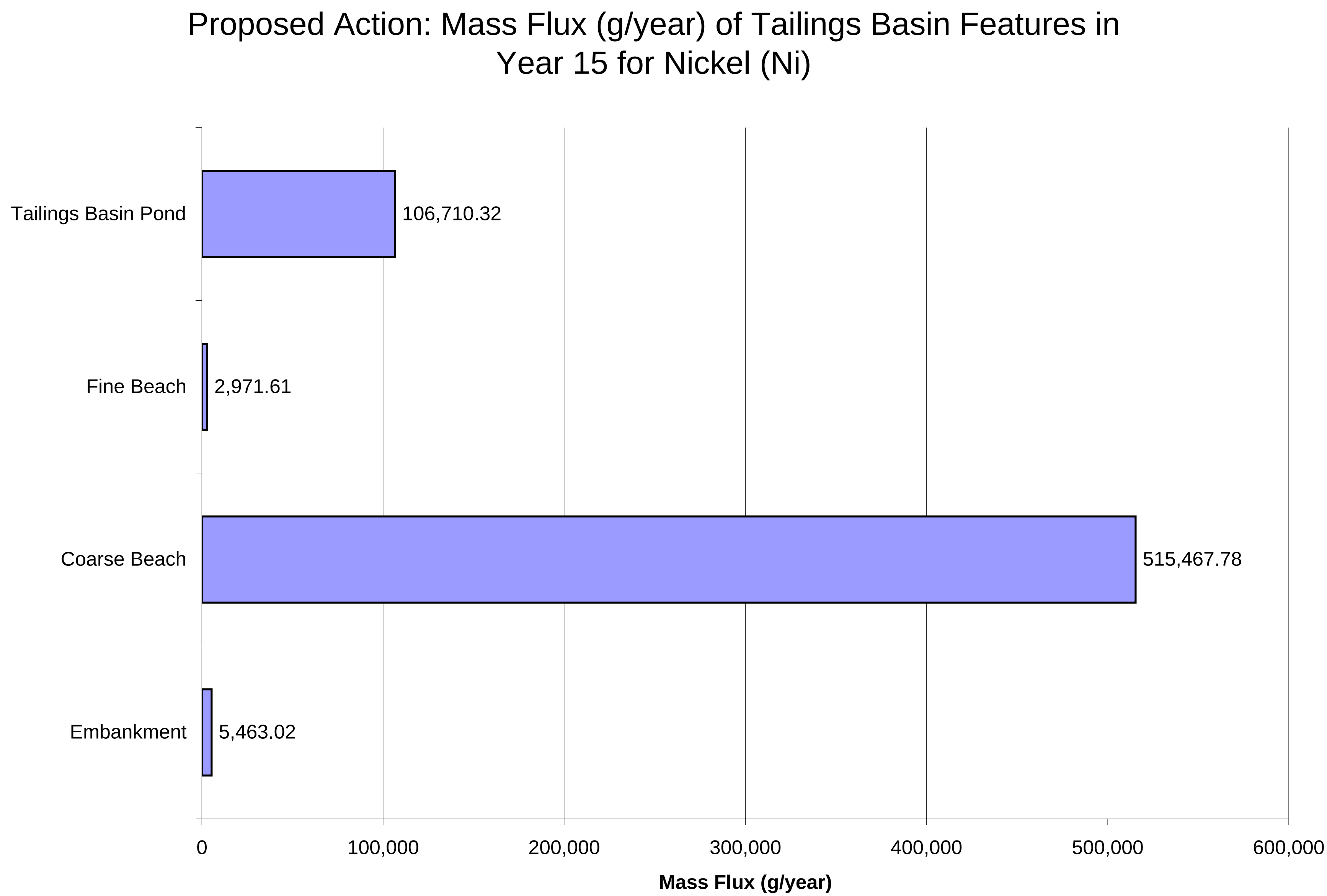

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 9 for Nickel (Ni)
Tailings Basin Pond
80,694.51
Fine Beach
274.20
Coarse Beach
73,294.80
Embankment
14,010.48
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

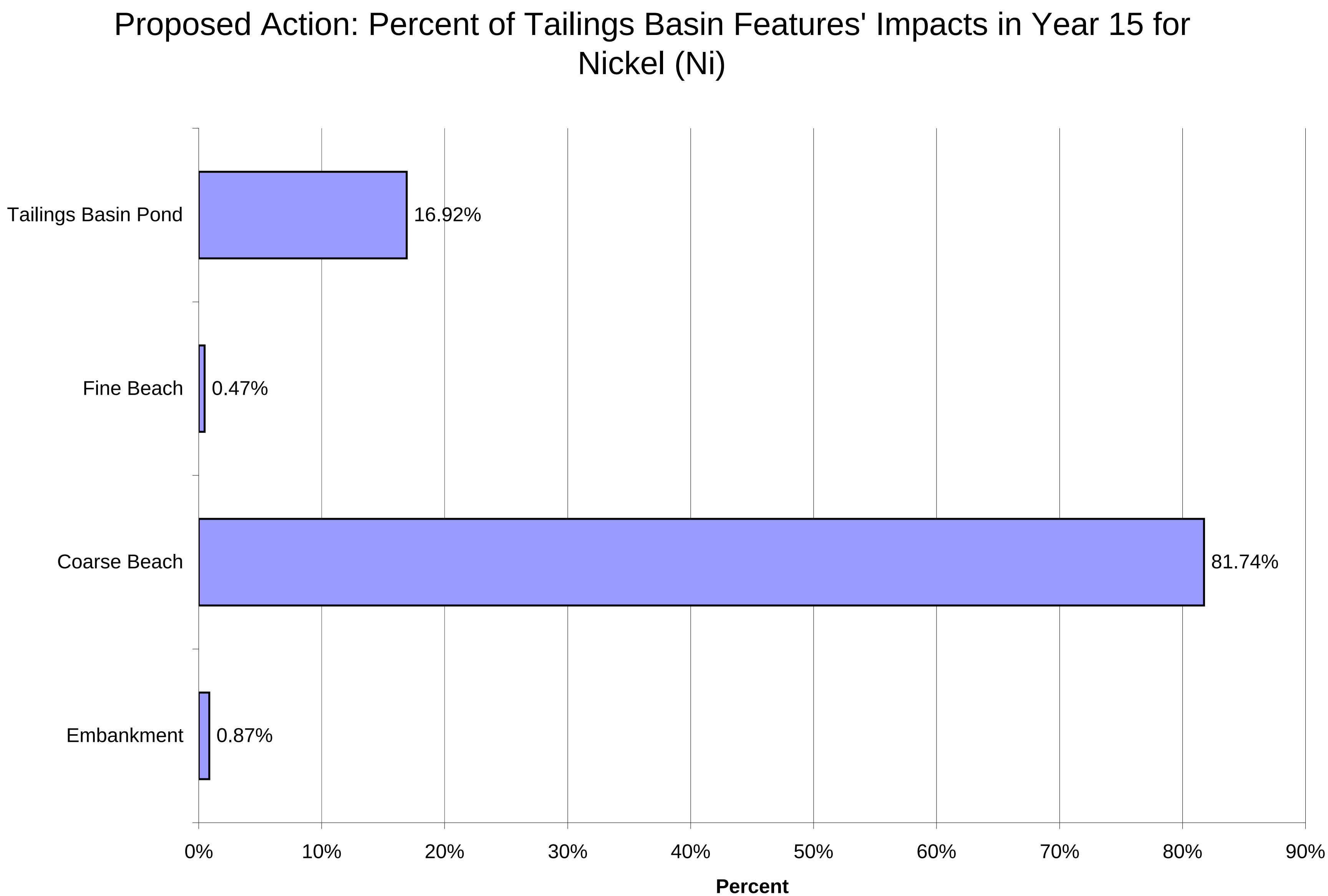
Proposed Action: Percent of Tailings Basin Features' Impacts in Year 9 for Nickel (Ni)

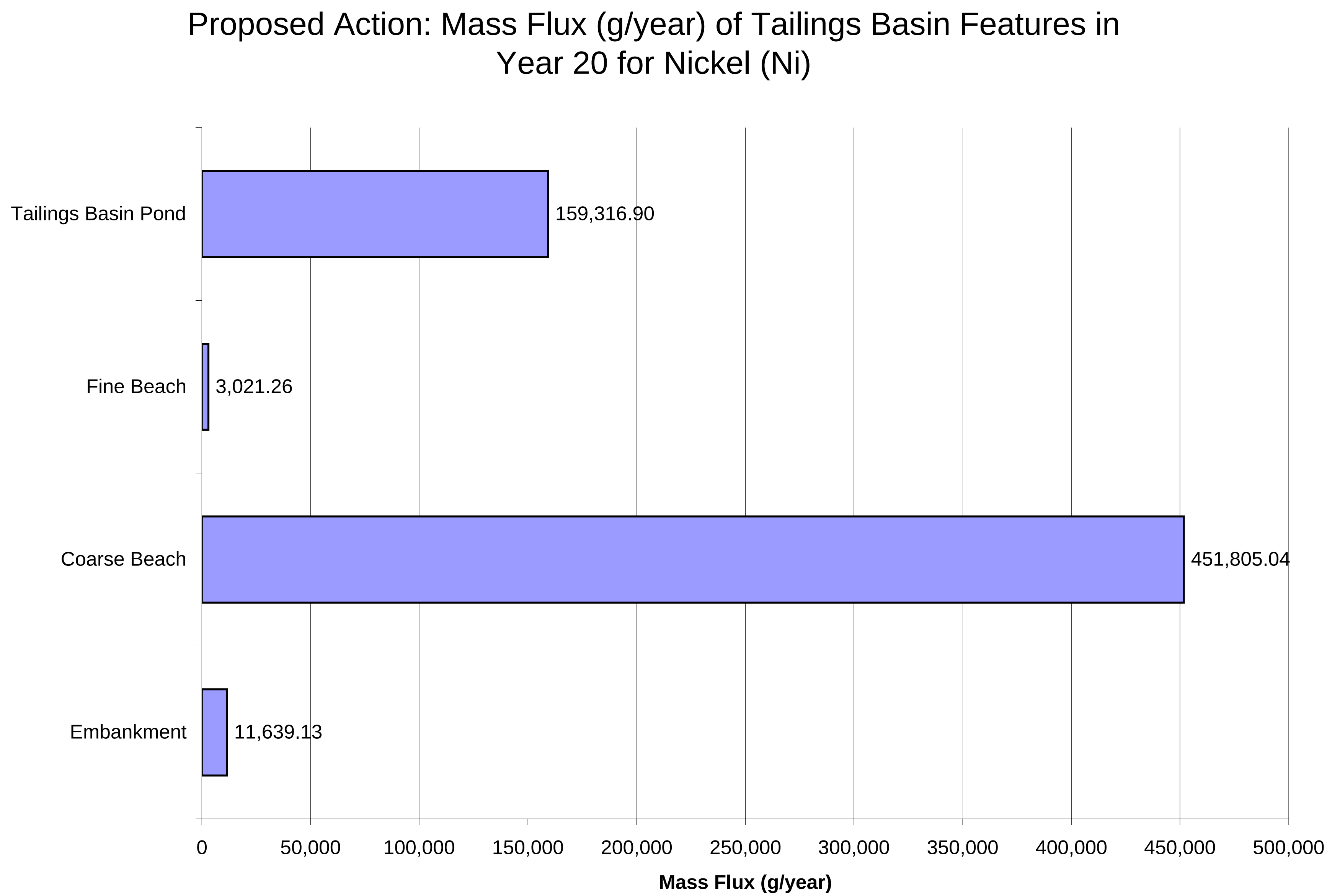



Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Nickel (Ni)
Tailings Basin Pond
81,670.04
Fine Beach
192.33
Coarse Beach
87,095.32
Embankment
15,153.97
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
Mass Flux (g/year)

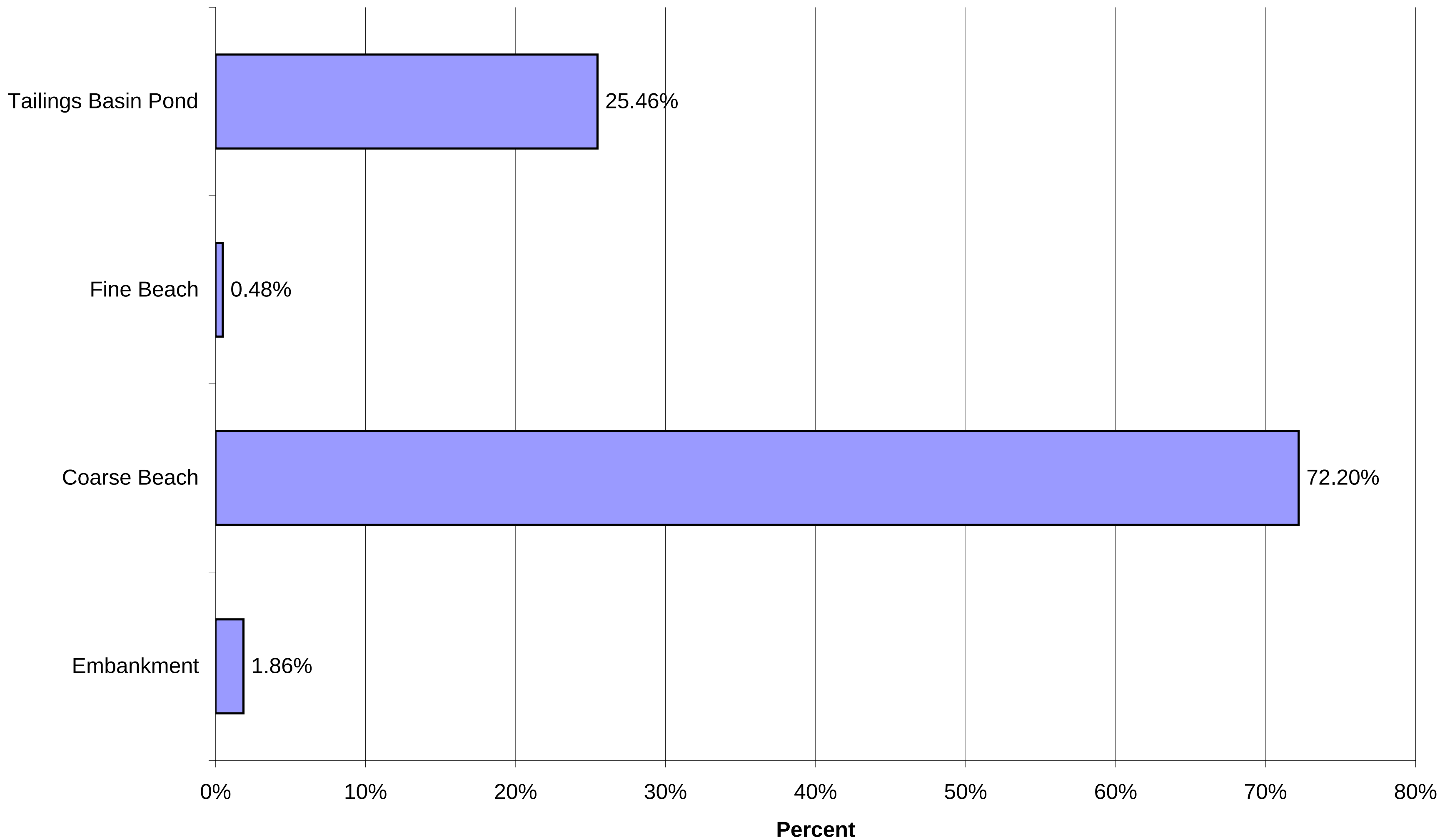

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 10 for Nickel (Ni)
Tailings Basin Pond
44.36%
Fine Beach
0.10%
Coarse Beach
47.31%
Embankment
8.23%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

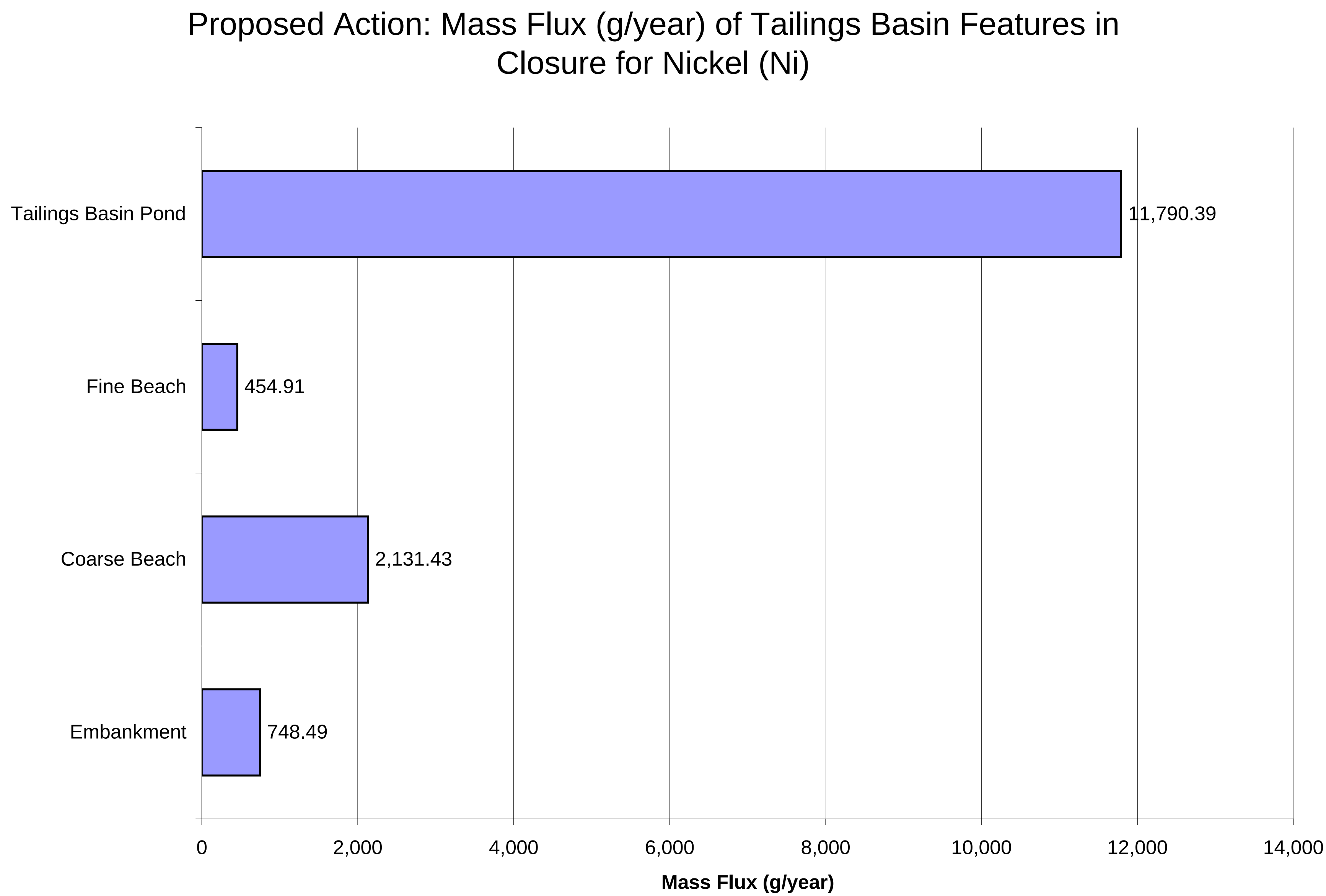

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Nickel (Ni)
Tailings Basin Pond
106,710.32
Fine Beach
2,971.61
Coarse Beach
515,467.78
Embankment
5,463.02
0
100,000
200,000
300,000
400,000
500,000
600,000
Mass Flux (g/year)


Proposed Action: Percent of Tailings Basin Features' Impacts in Year 15 for Nickel (Ni)
Tailings Basin Pond
16.92%
Fine Beach
0.47%
Coarse Beach
81.74%
Embankment
0.87%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

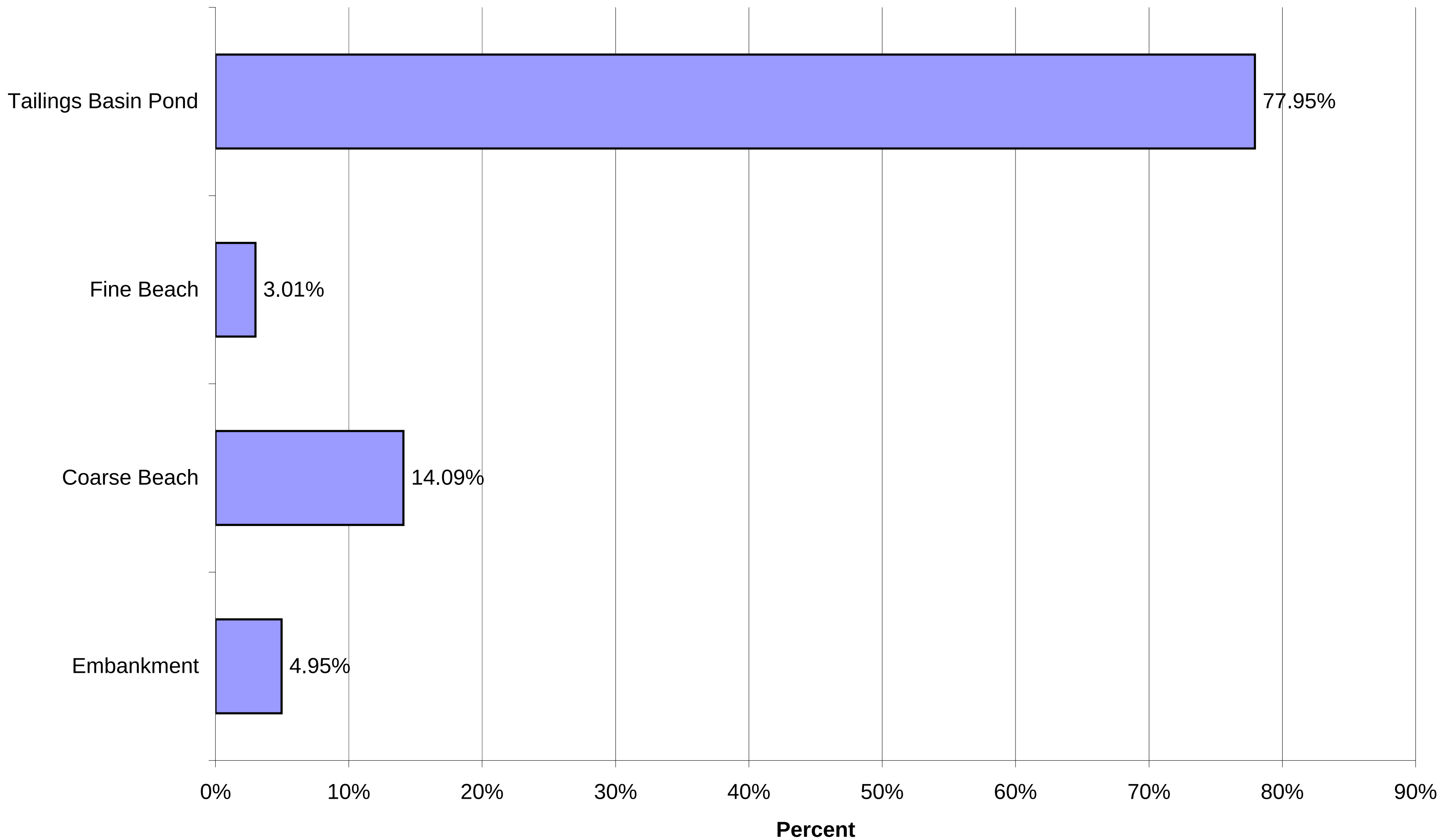

Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Nickel (Ni)
Tailings Basin Pond
159,316.90
Fine Beach
3,021.26
Coarse Beach
451,805.04
Embankment
11,639.13
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
500,000
Mass Flux (g/year)

Proposed Action: Percent of Tailings Basin Features' Impacts in Year 20 for Nickel (Ni)




Proposed Action: Mass Flux (g/year) of Tailings Basin Features in Closure for Nickel (Ni)
Tailings Basin Pond
11,790.39
Fine Beach
454.91
Coarse Beach
2,131.43
Embankment
748.49
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
Mass Flux (g/year)

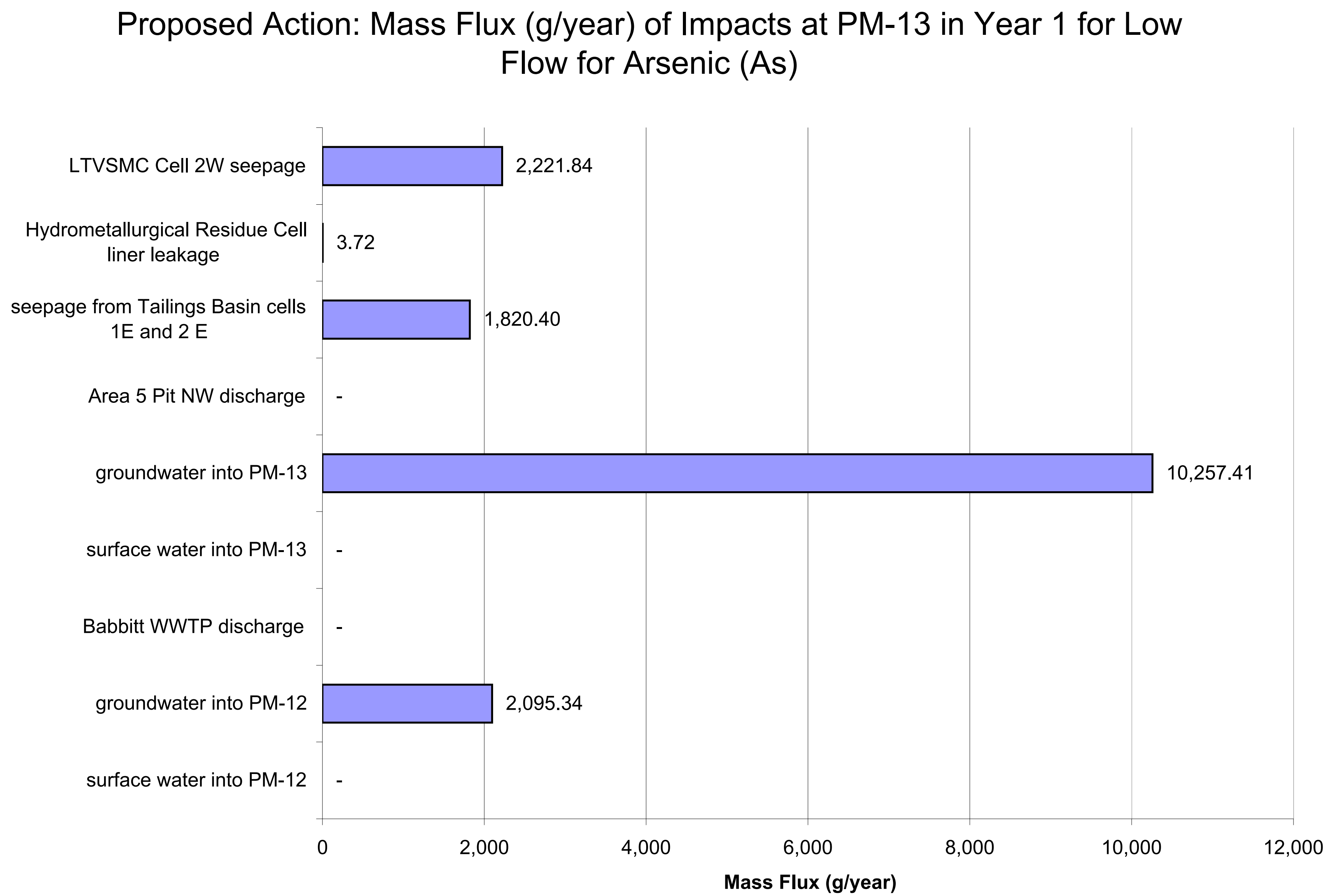
Proposed Action: Percent of Tailings Basin Features' Impacts in Closure for Nickel (Ni)



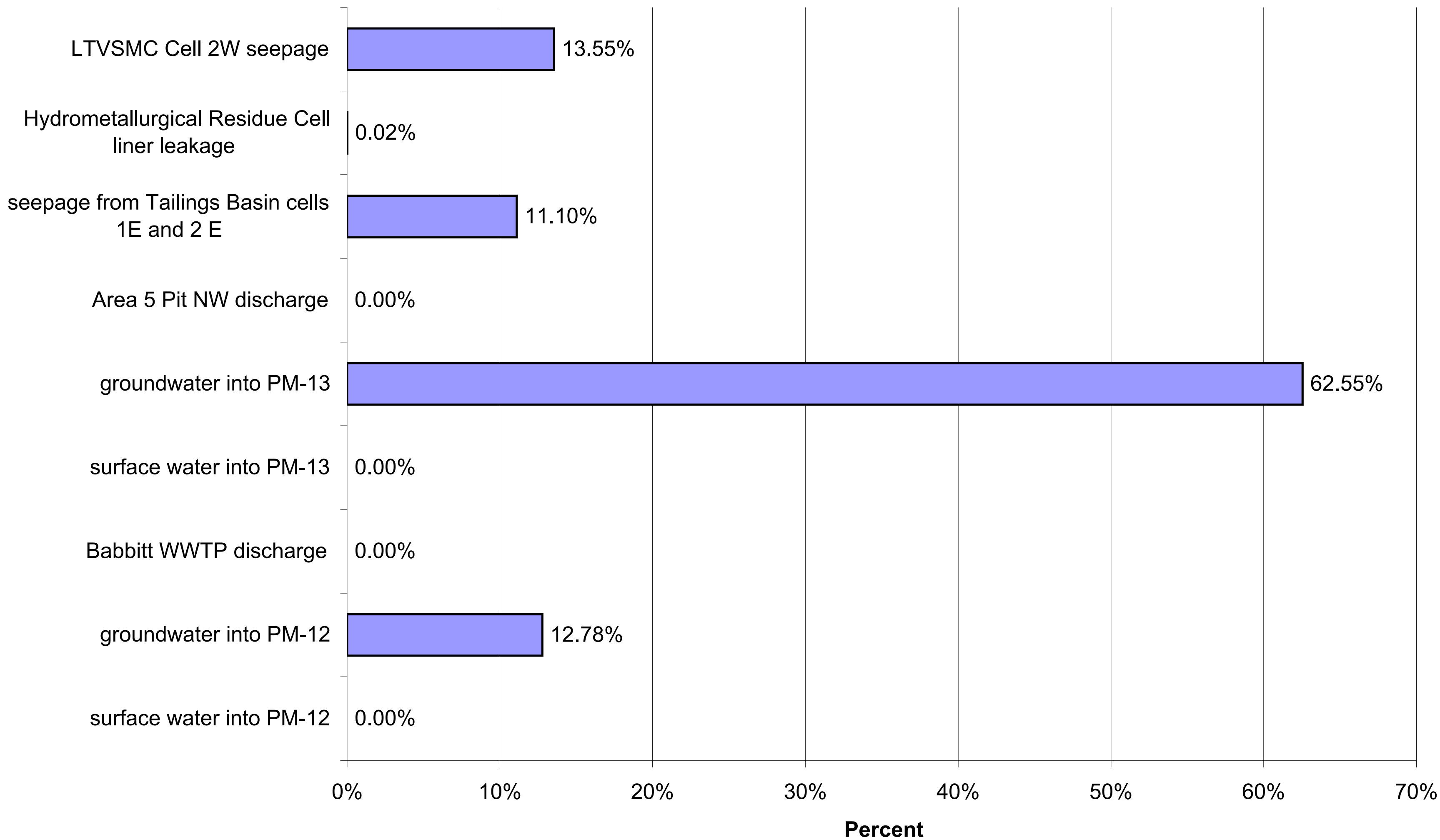
Appendix G.2

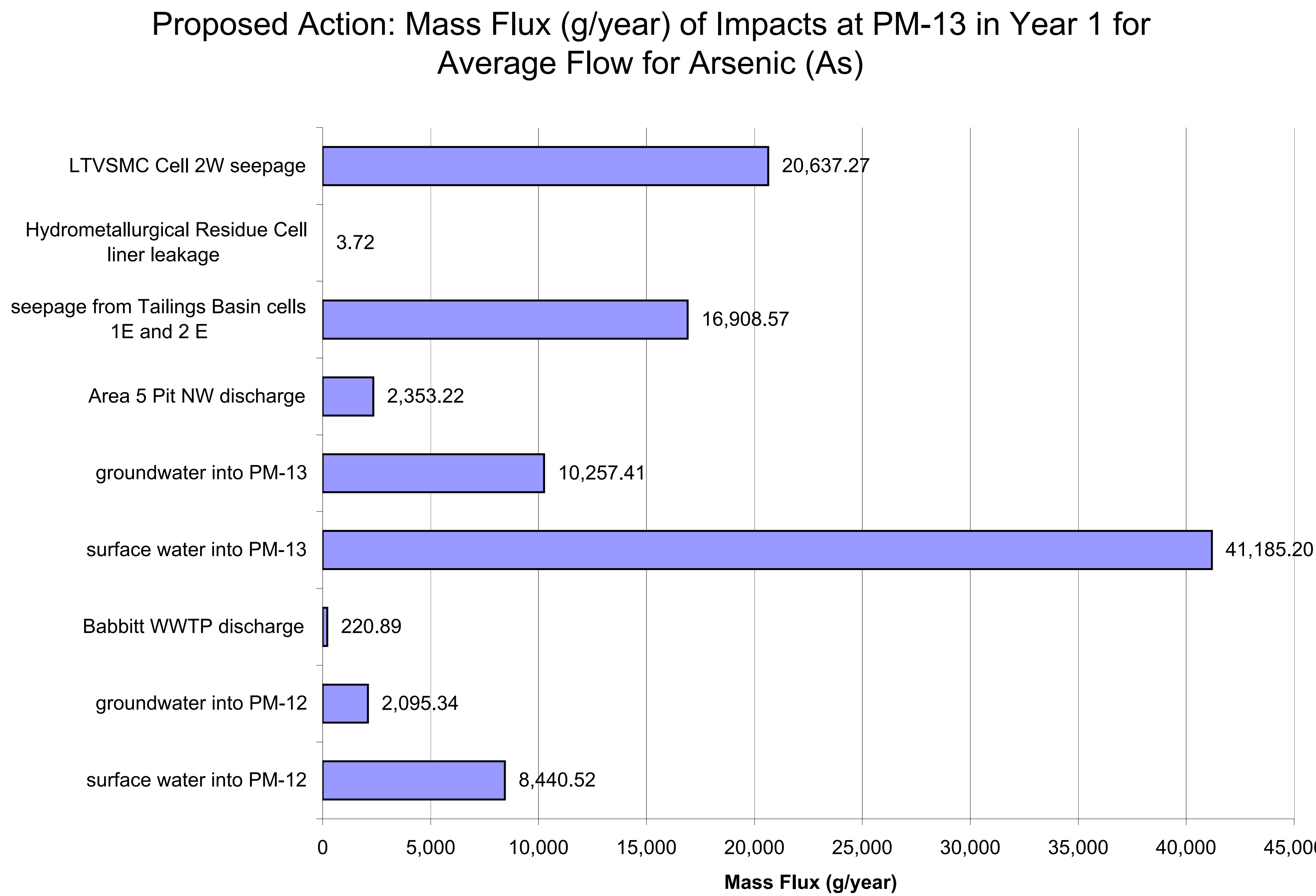
Embarrass River Watershed

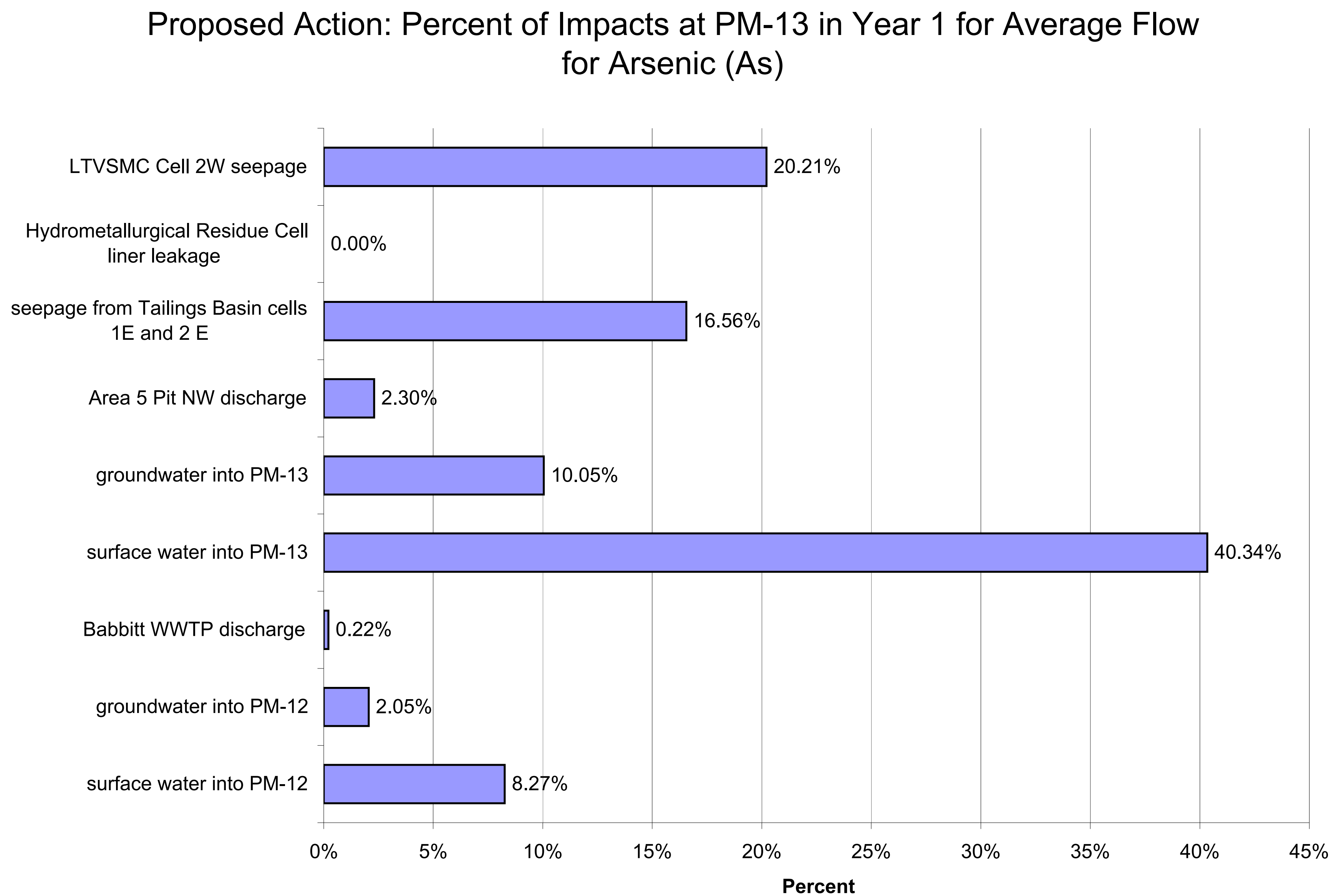
Proposed Action


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
2,221.84
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
1,820.40
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)

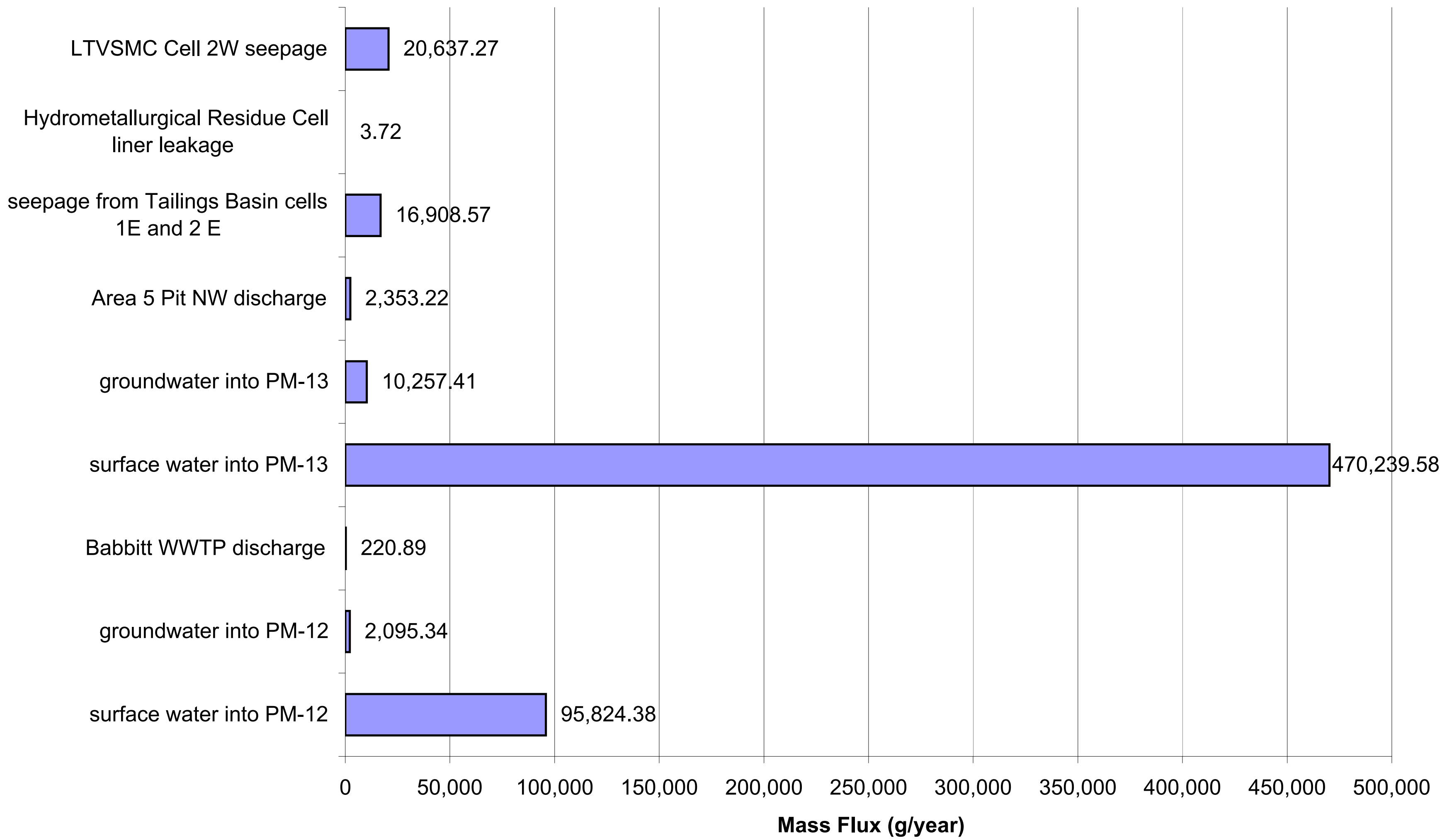
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)

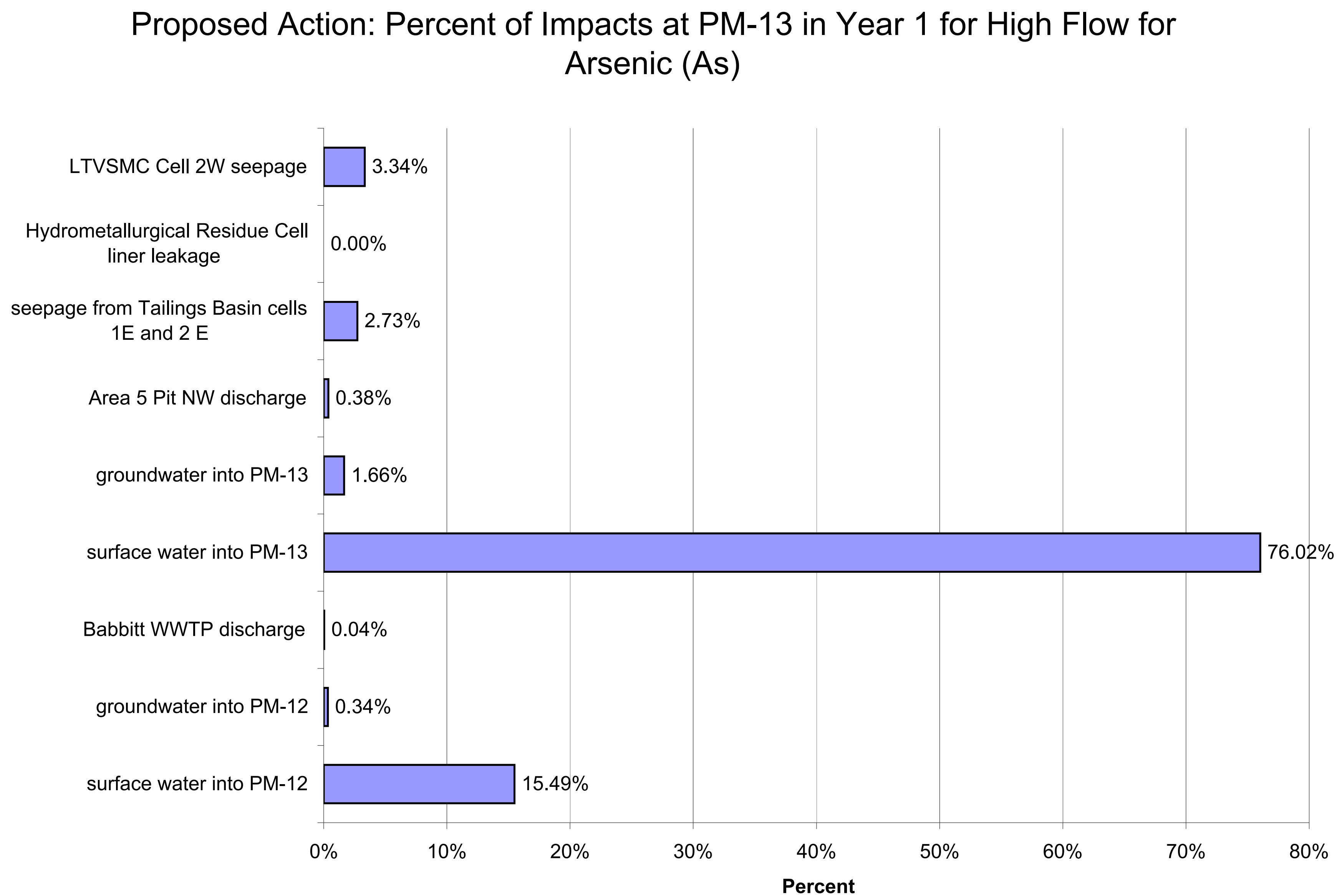


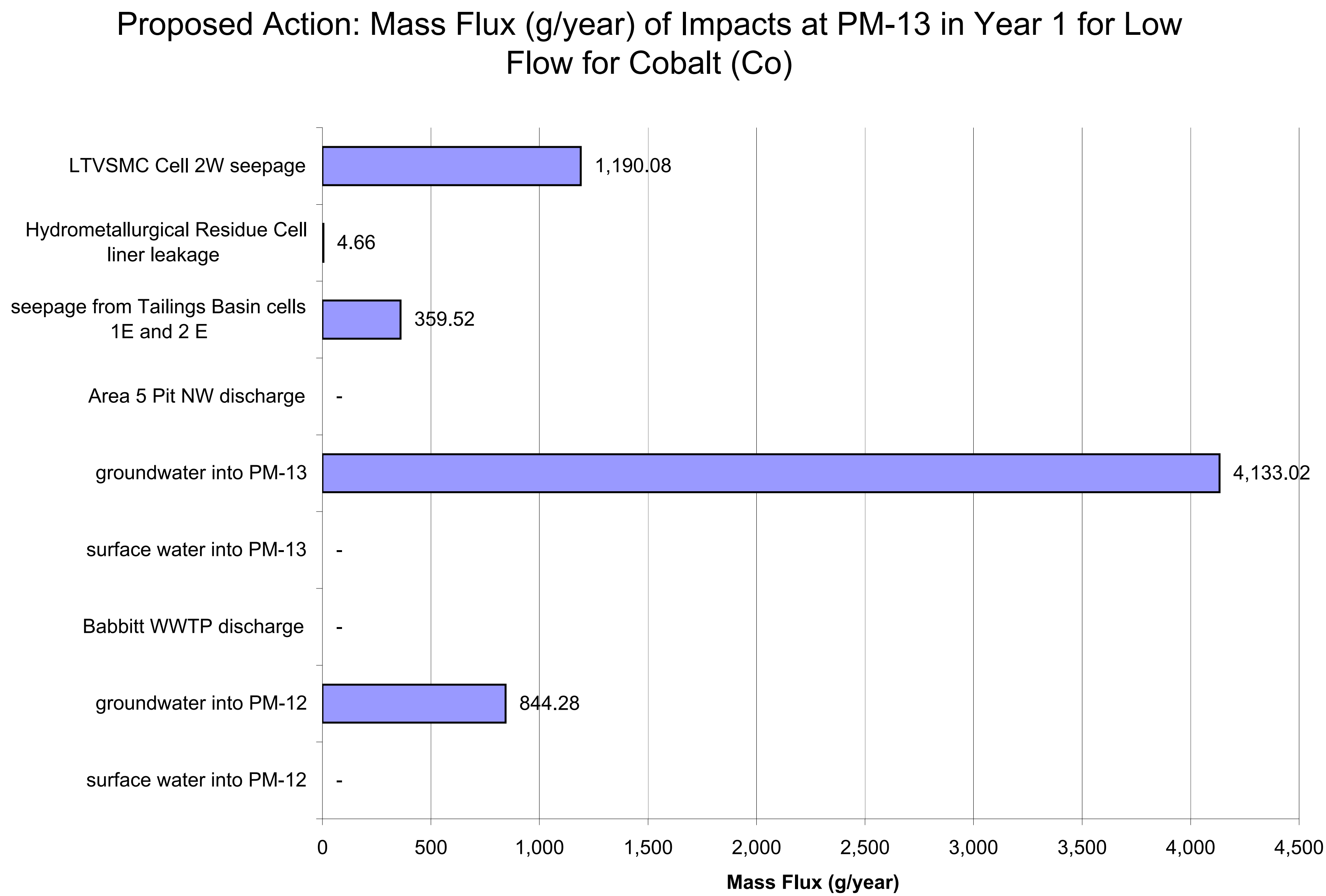

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
16,908.57
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
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)

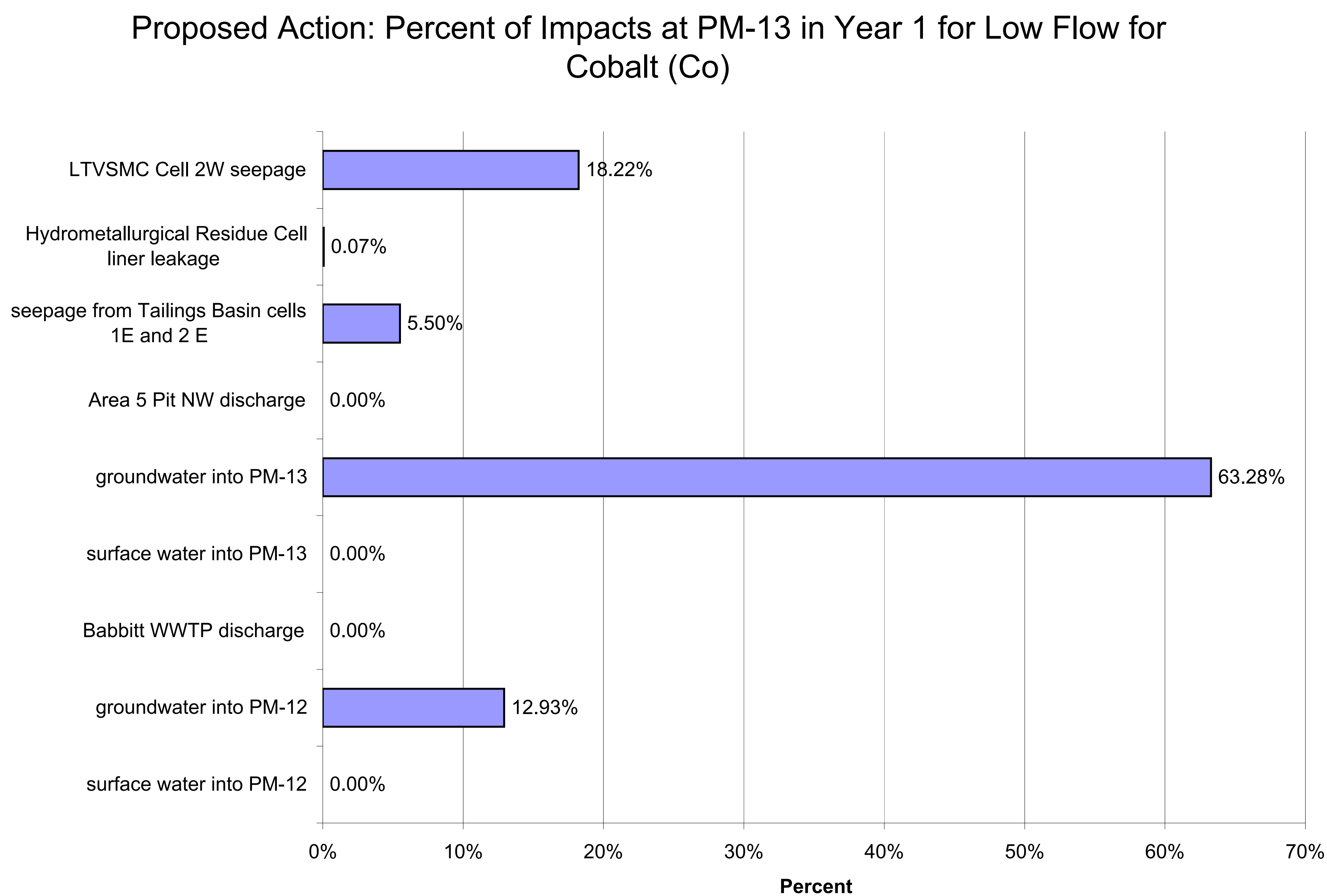

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20.21%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
16.56%
Area 5 Pit NW discharge
2.30%
groundwater into PM-13
10.05%
surface water into PM-13
40.34%
Babbitt WWTP discharge
0.22%
groundwater into PM-12
2.05%
surface water into PM-12
8.27%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

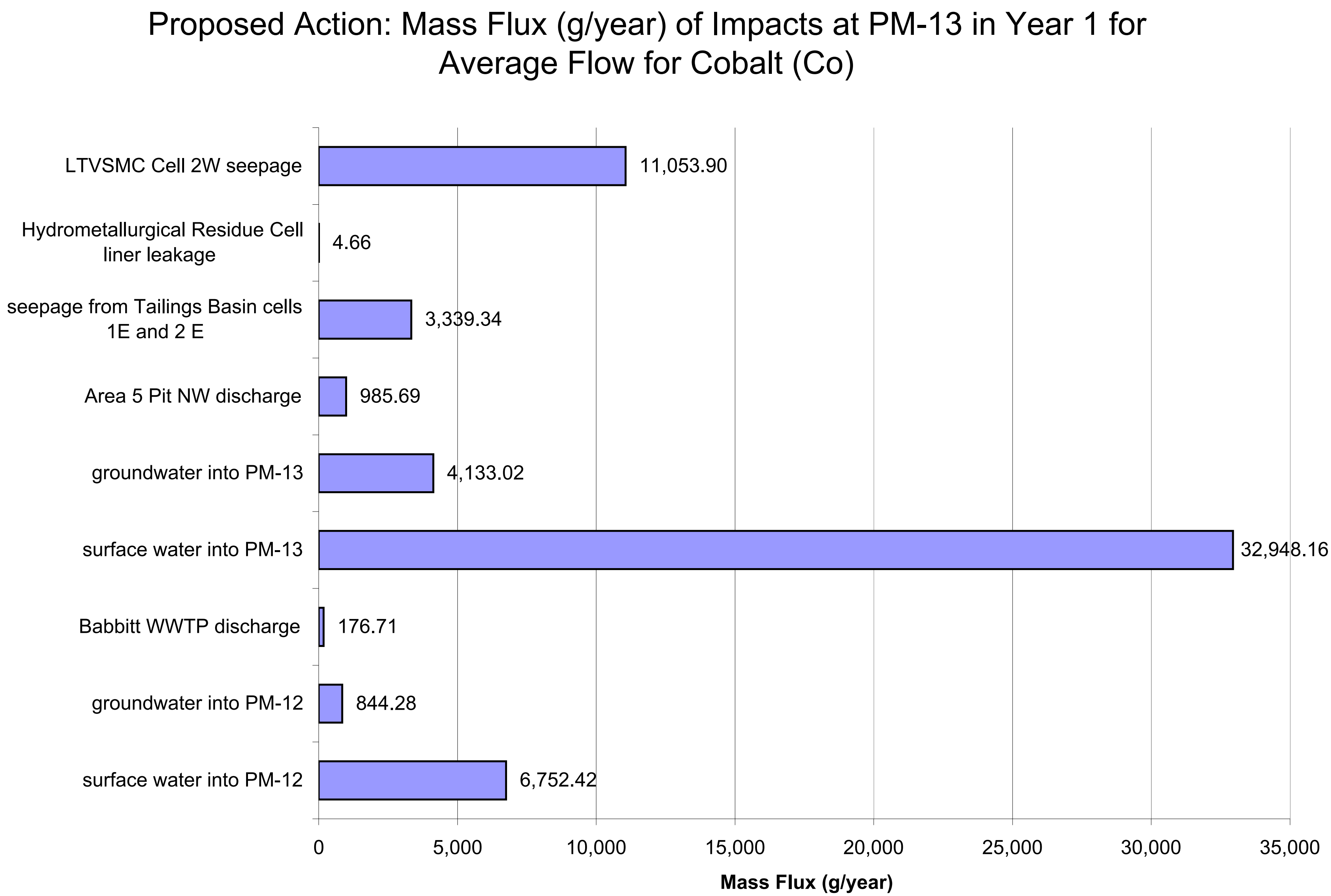
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)



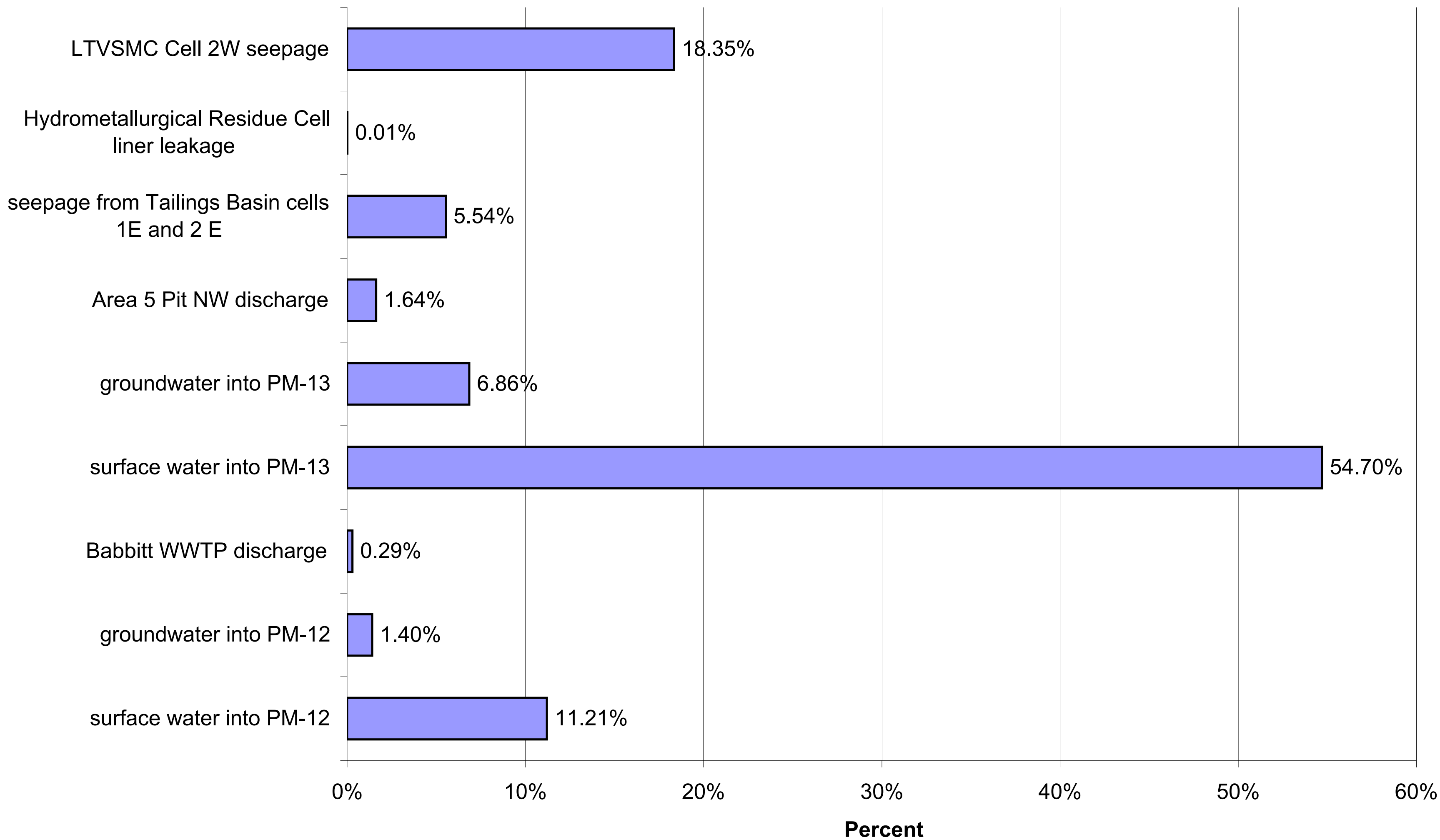

Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.34%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
2.73%
Area 5 Pit NW discharge
0.38%
groundwater into PM-13
1.66%
surface water into PM-13
76.02%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.34%
surface water into PM-12
15.49%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,190.08
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2 E
359.52
Area 5 Pit NW discharge
-
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

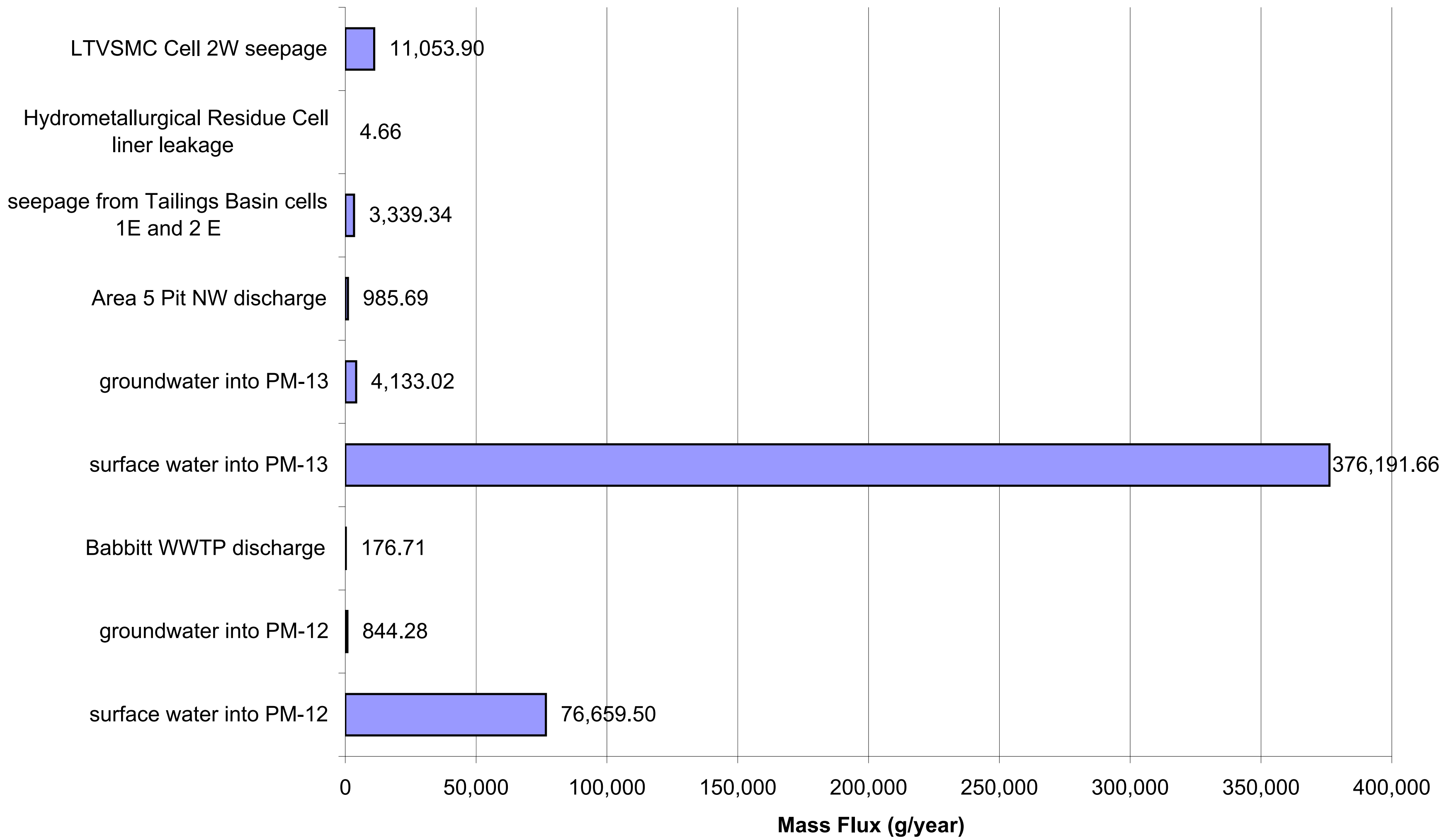

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
18.22%
Hydrometallurgical Residue Cell liner leakage
0.07%
seepage from Tailings Basin cells 1E and 2 E
5.50%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
63.28%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.93%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

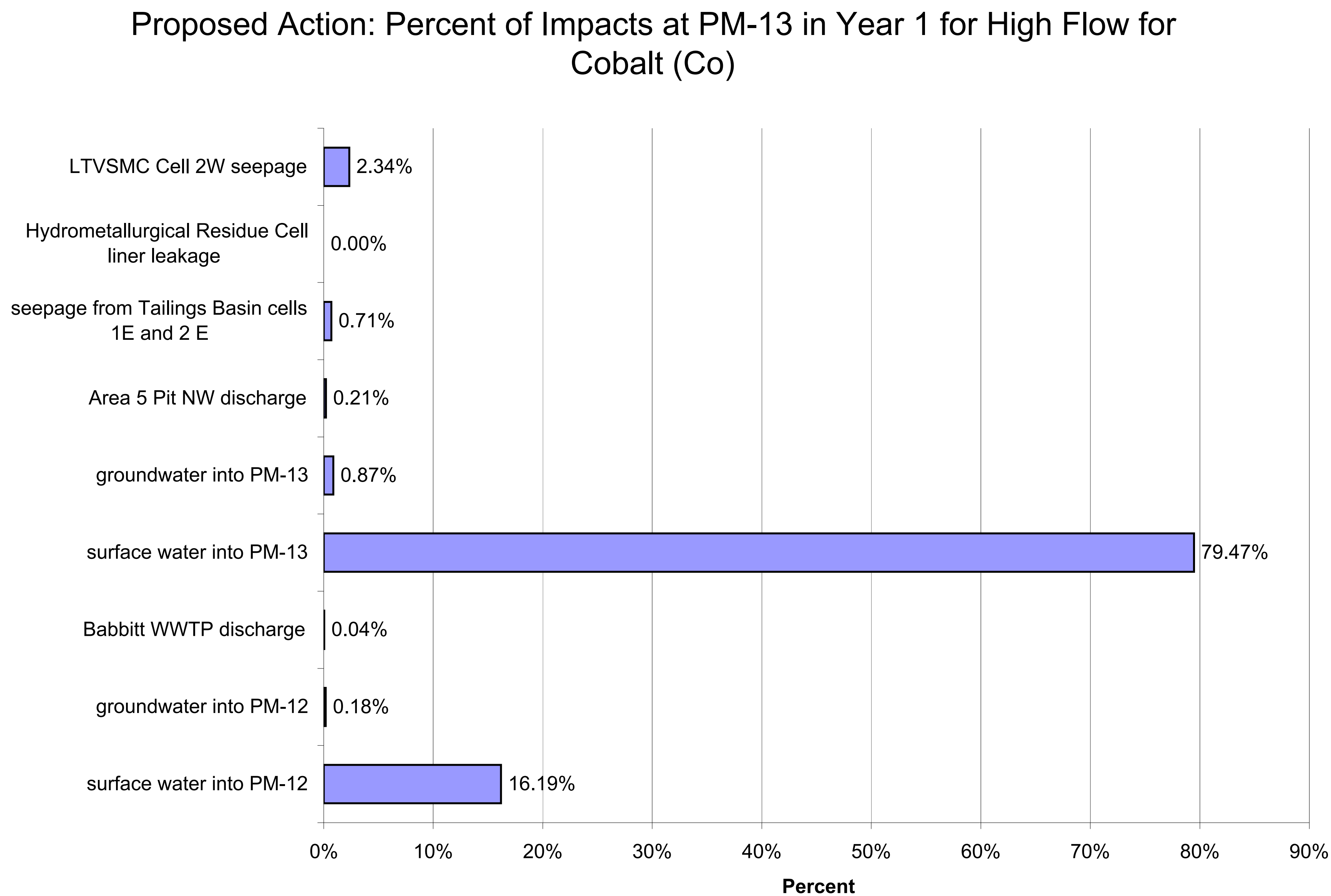

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2 E
3,339.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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)

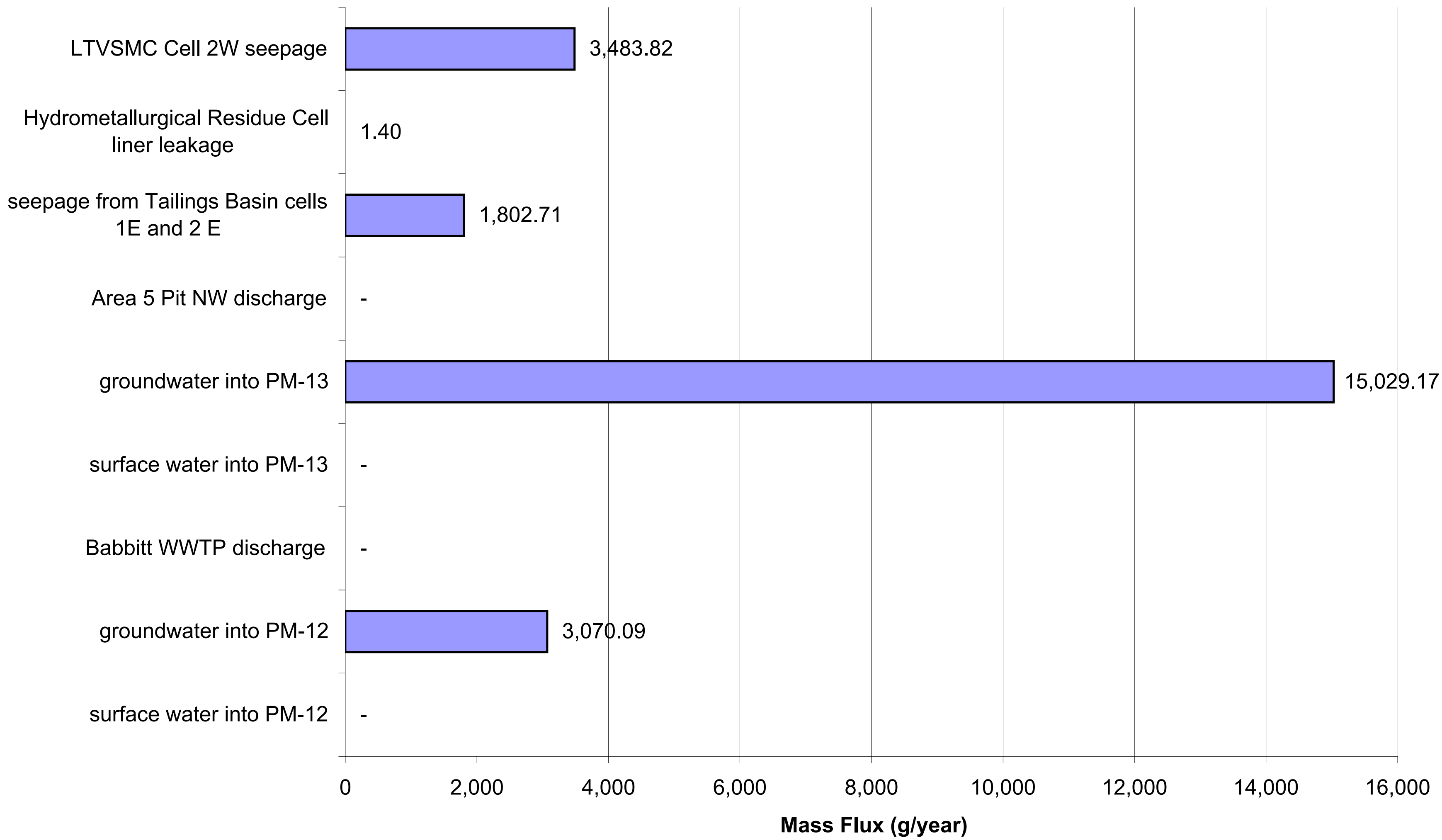


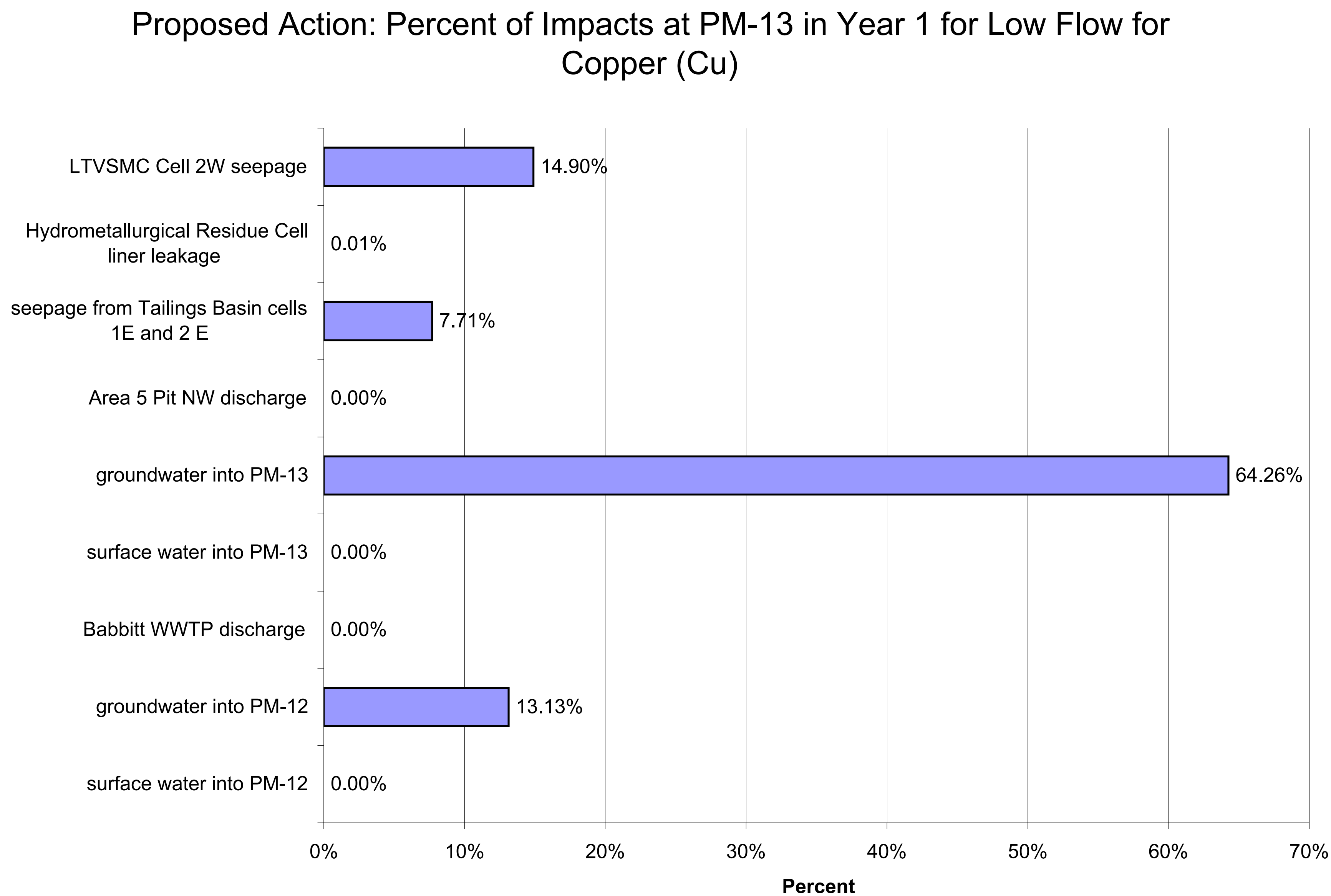
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)



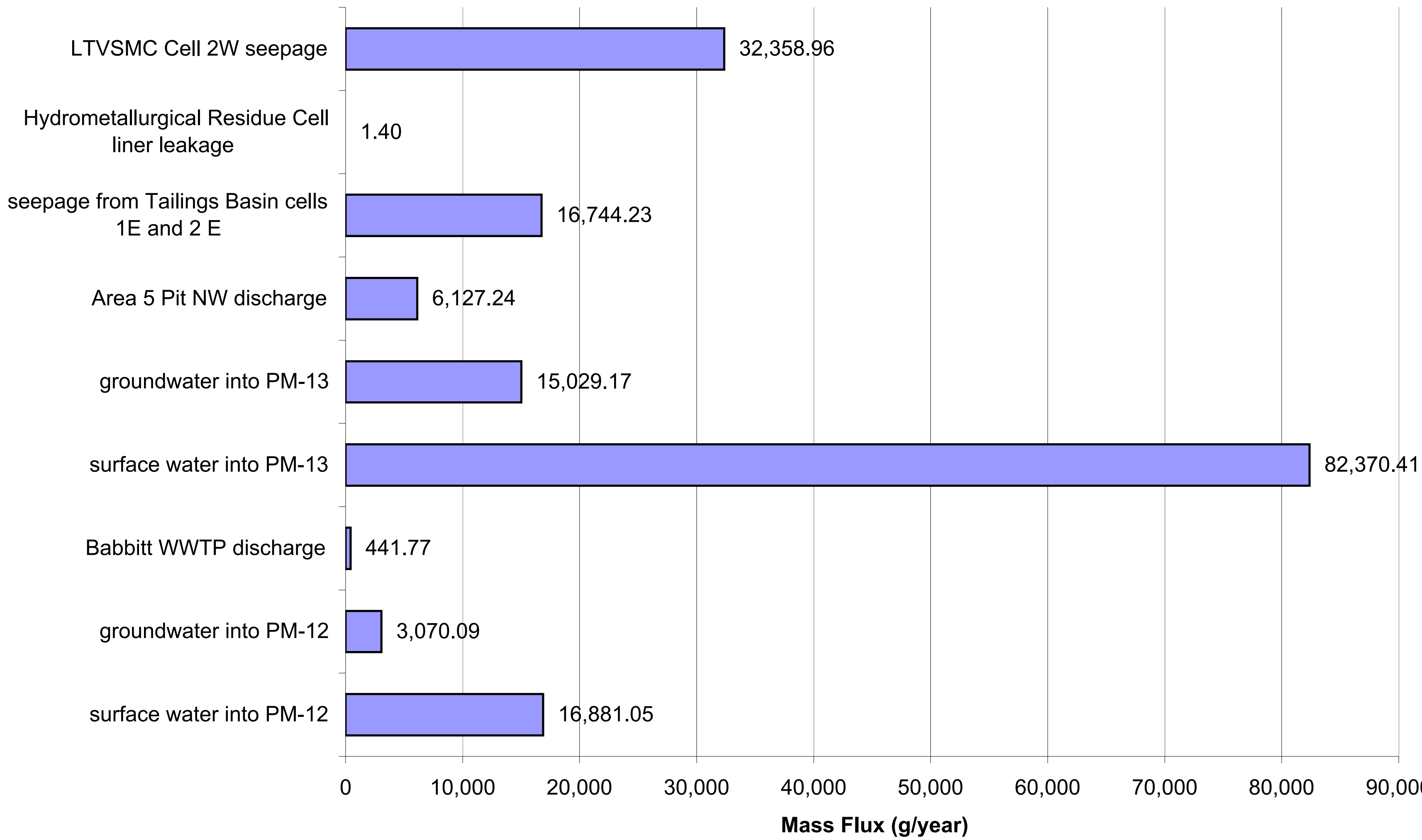

Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2.34%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
0.71%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.87%
surface water into PM-13
79.47%
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

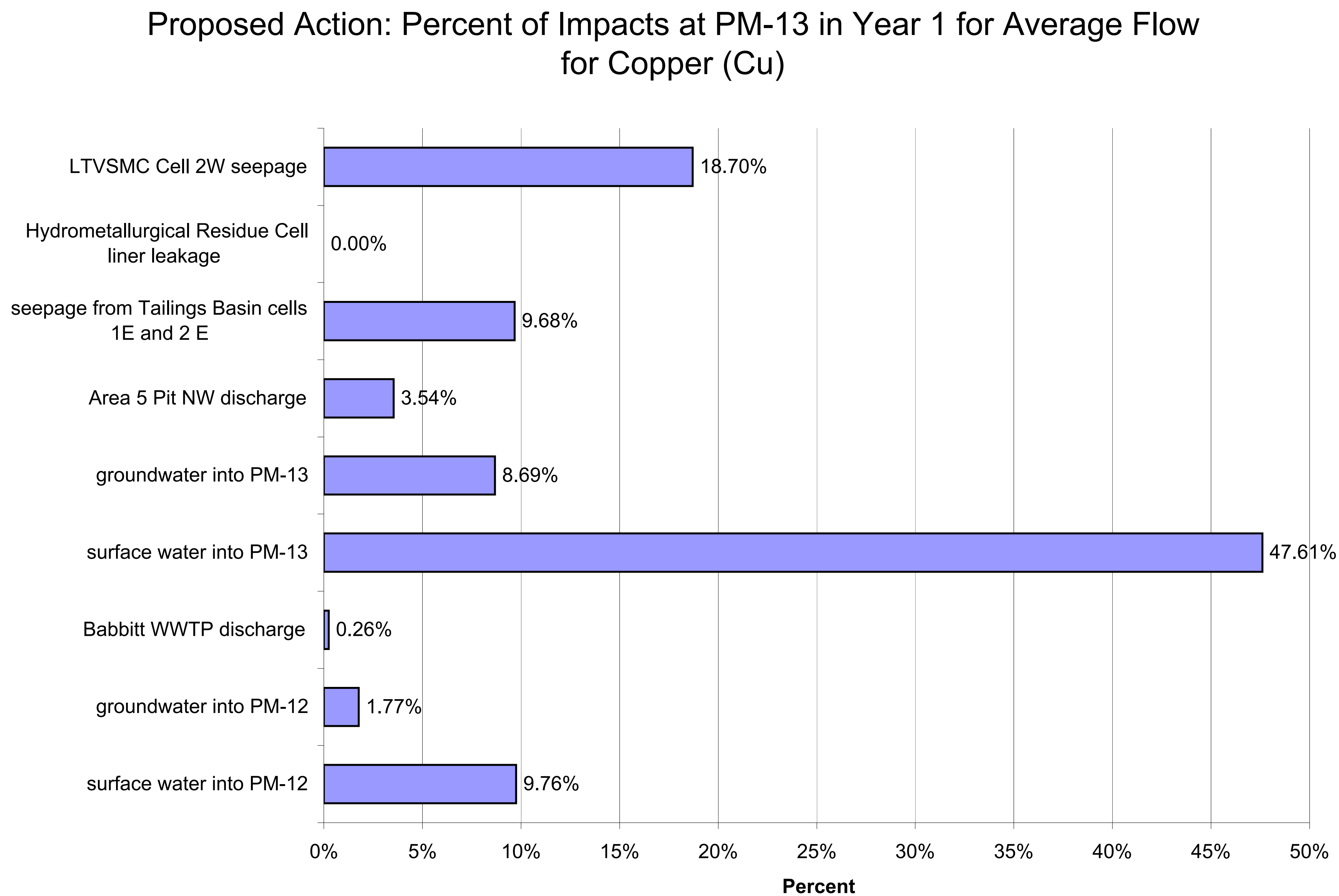
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)



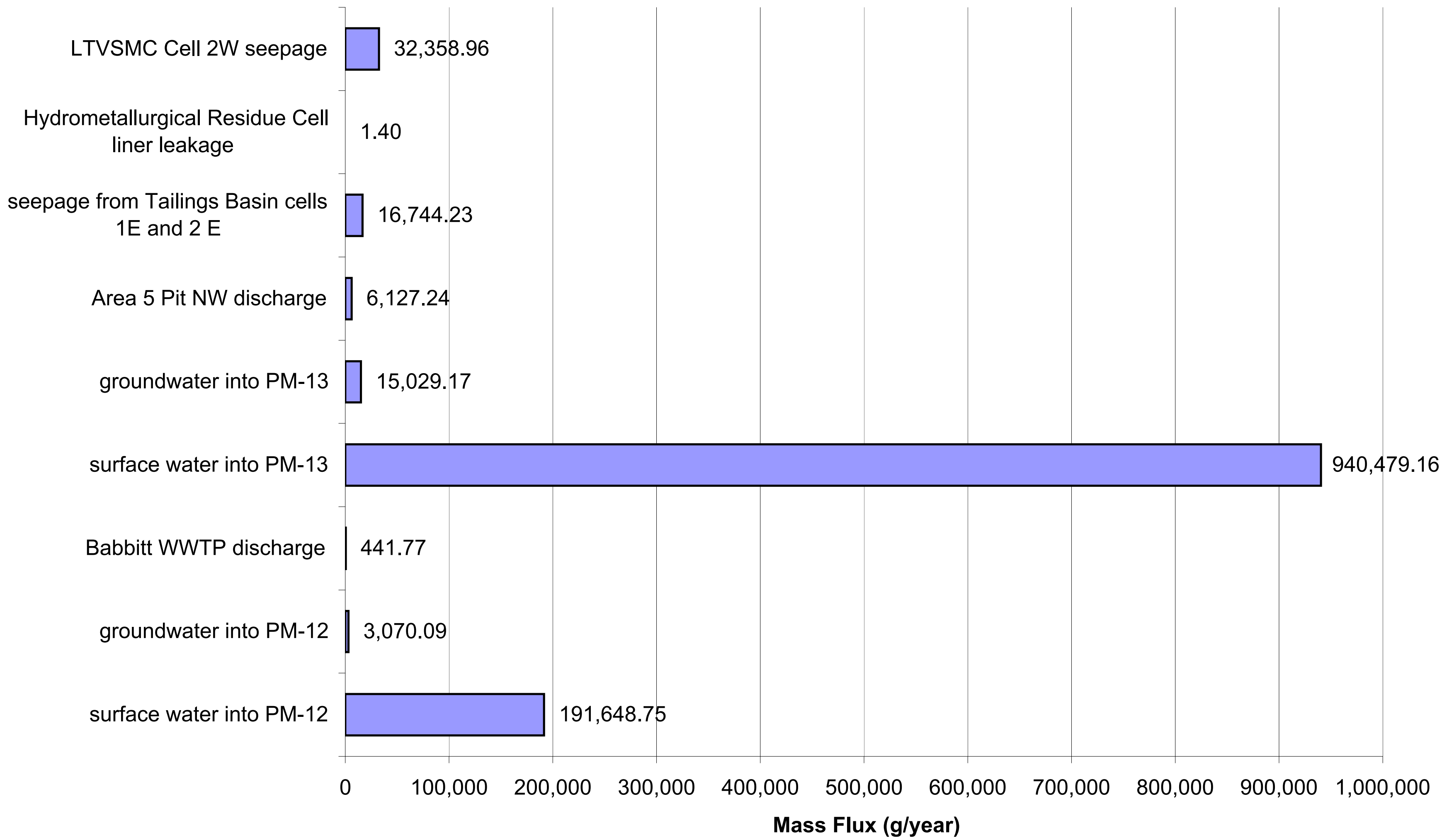

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
14.90%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2 E
7.71%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
64.26%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
13.13%
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 Copper (Cu)

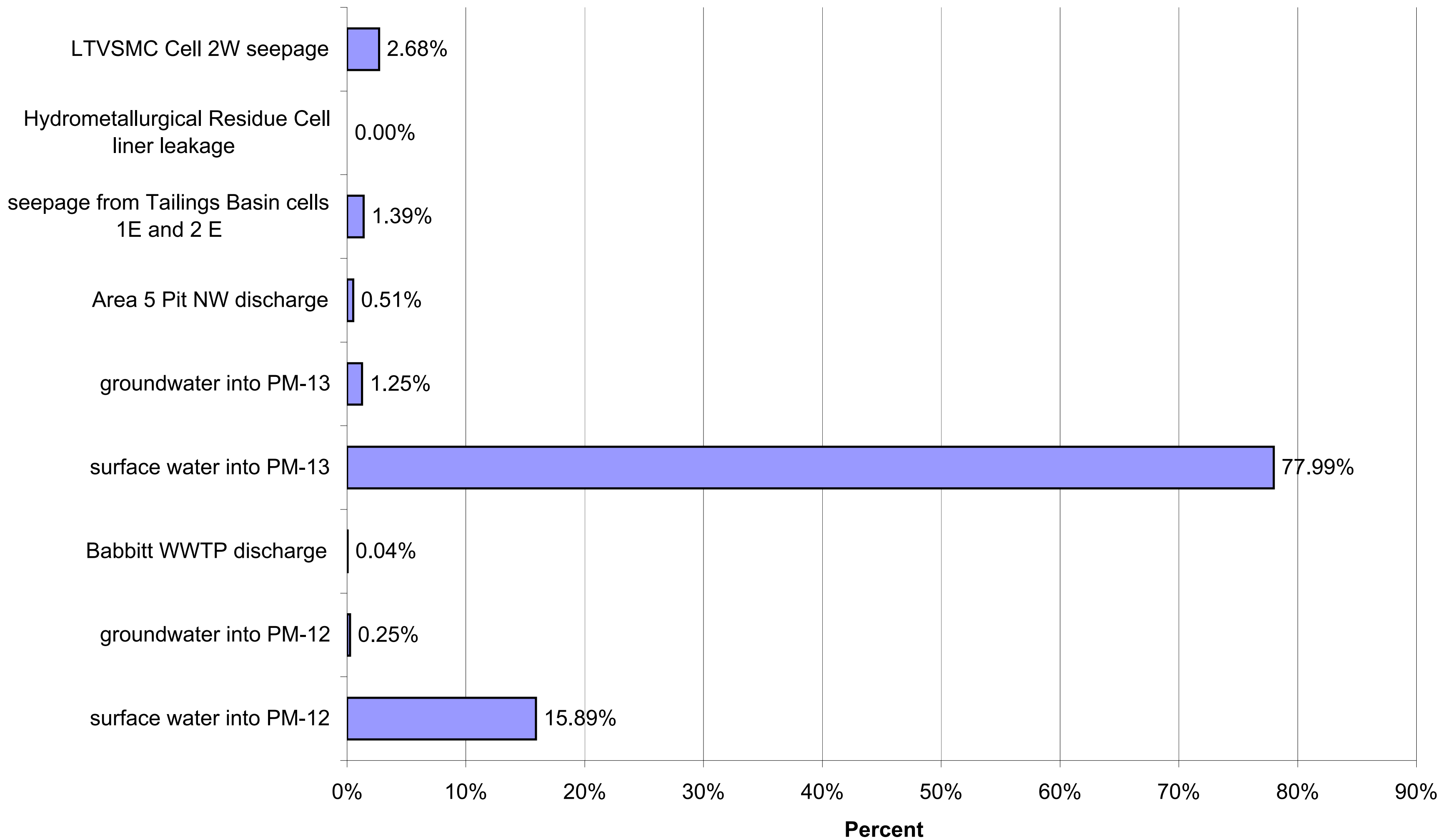


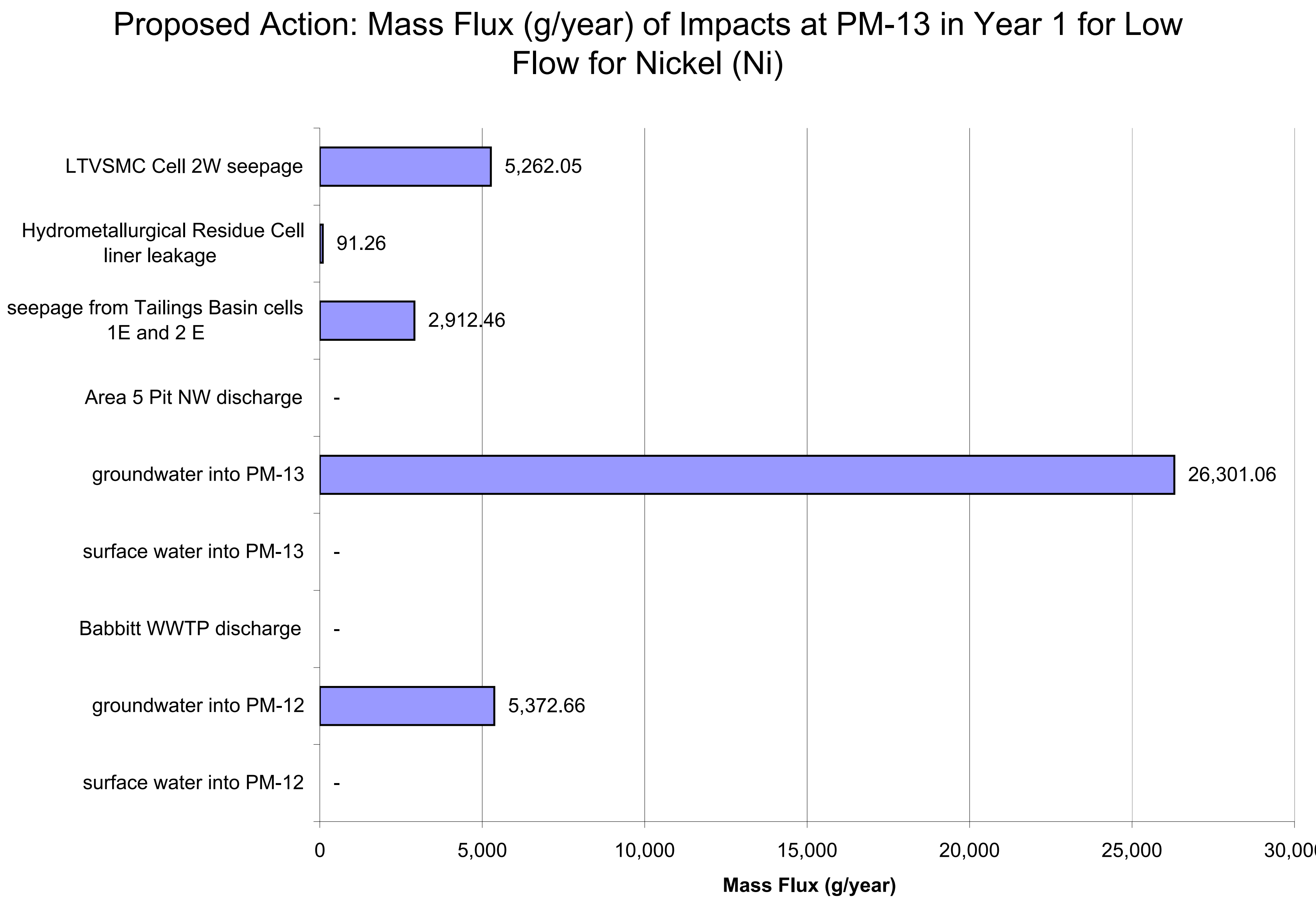

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
18.70%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2 E
9.68%
Area 5 Pit NW discharge
3.54%
groundwater into PM-13
8.69%
surface water into PM-13
47.61%
Babbitt WWTP discharge
0.26%
groundwater into PM-12
1.77%
surface water into PM-12
9.76%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

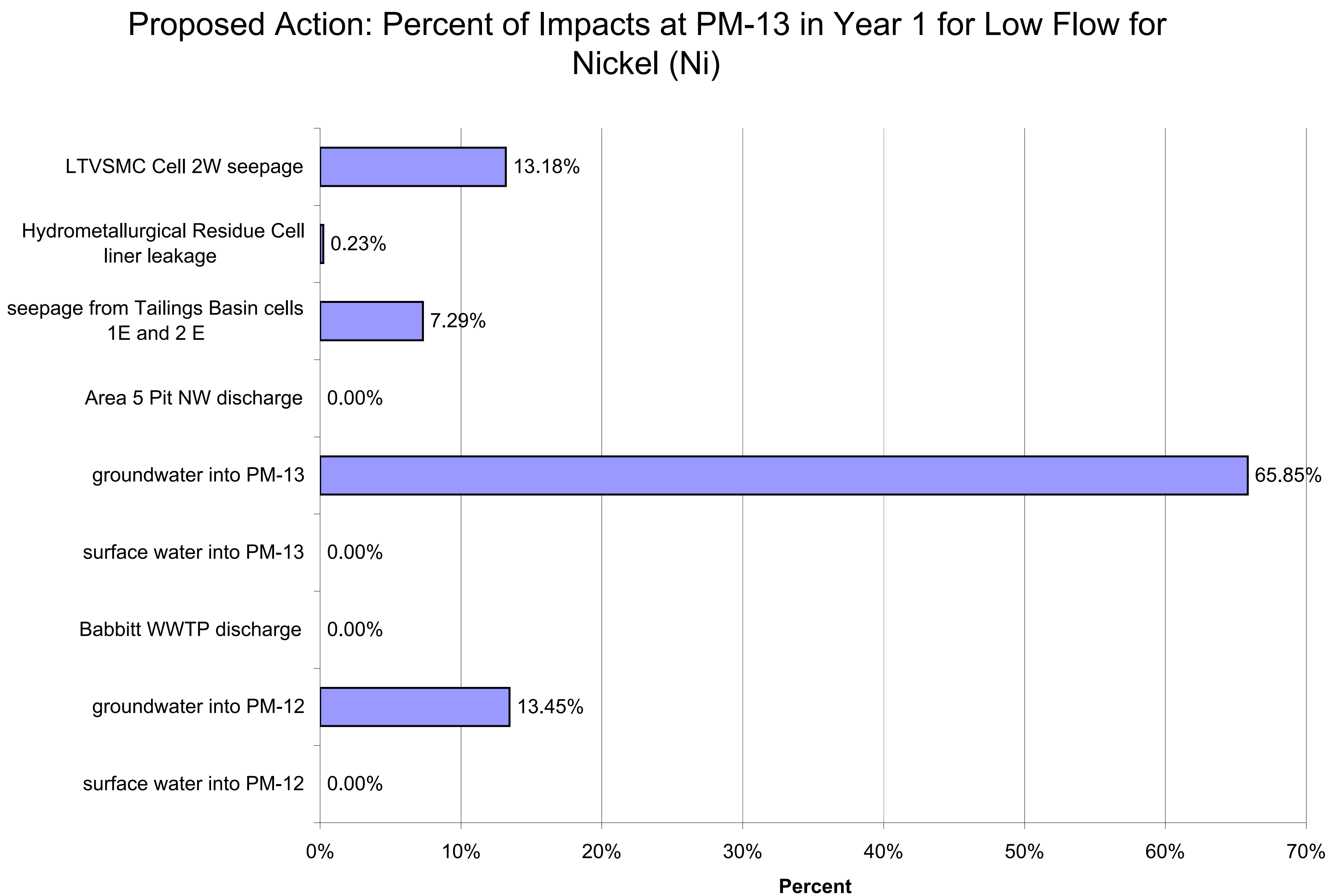
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)



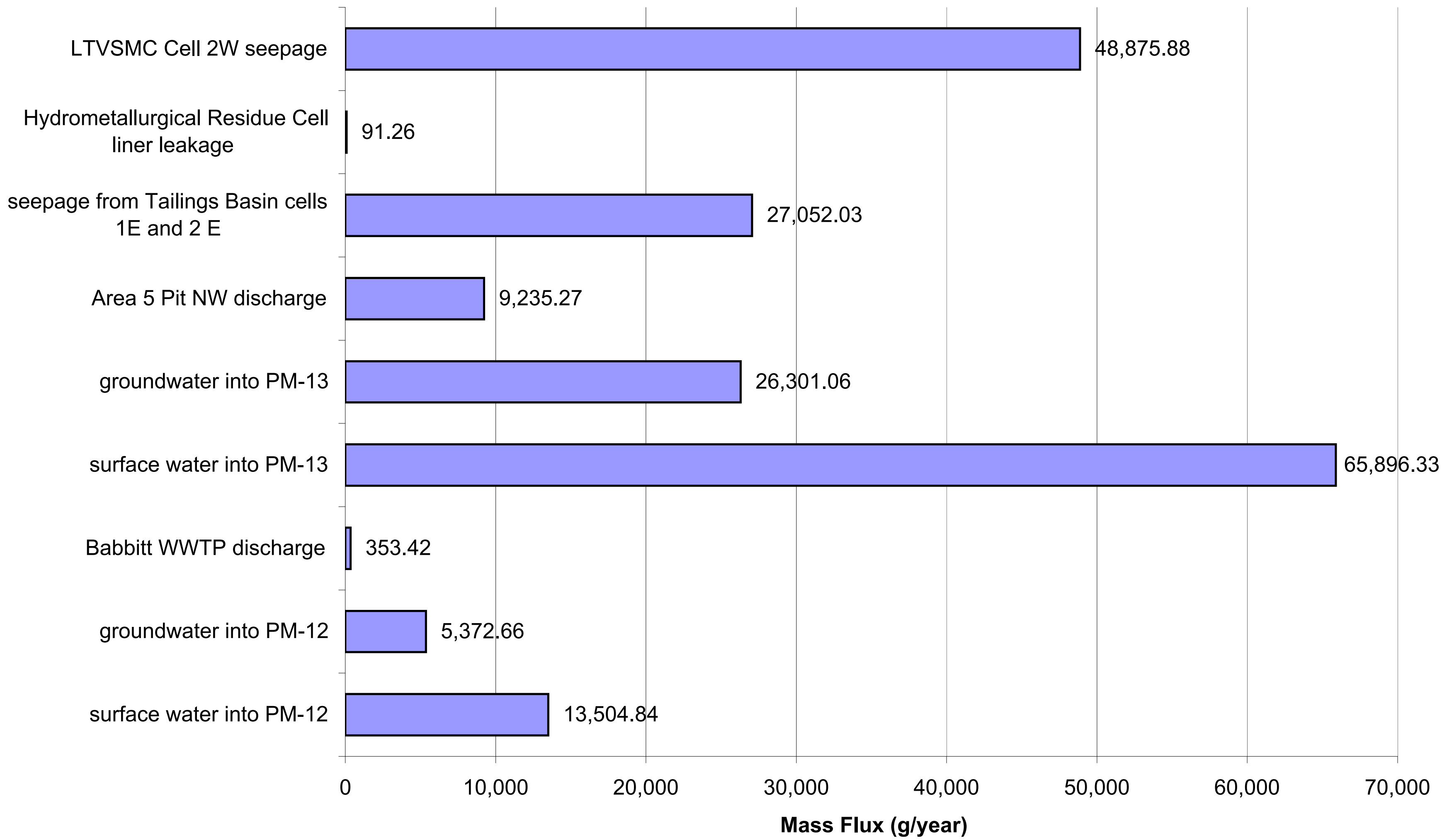
Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)

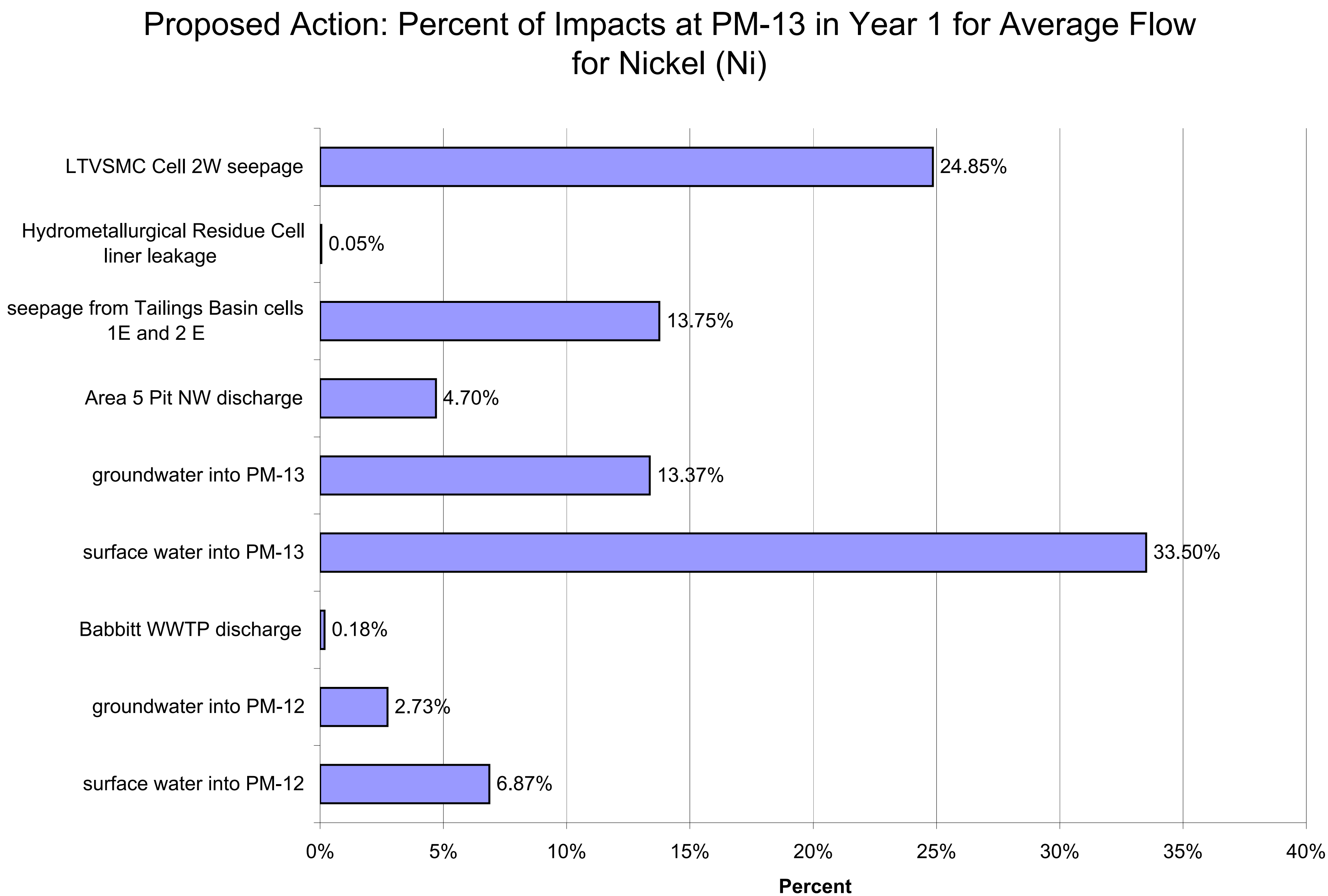



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5,262.05
Hydrometallurgical Residue Cell liner leakage
91.26
seepage from Tailings Basin cells 1E and 2 E
2,912.46
Area 5 Pit NW discharge
-
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

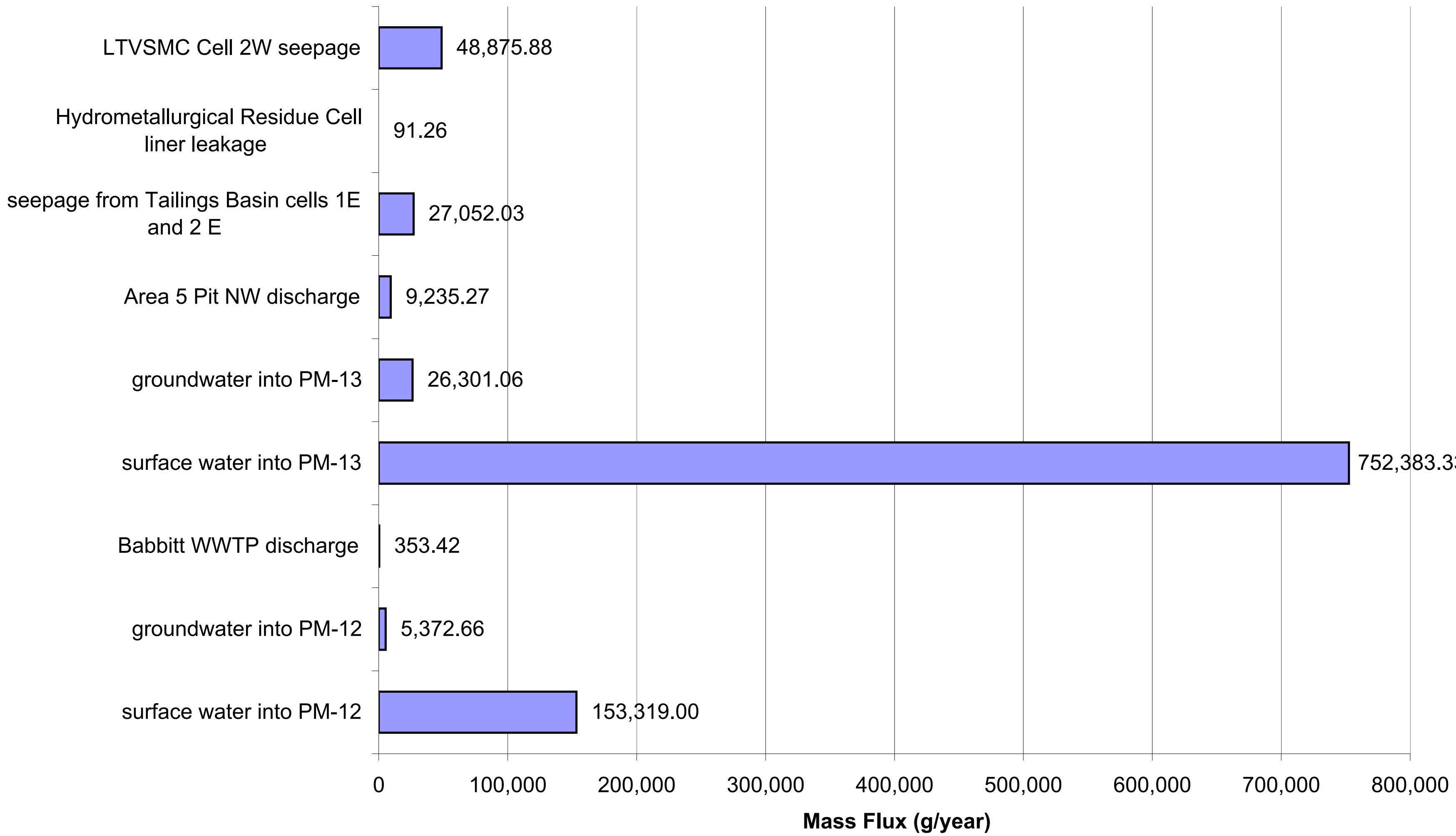

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
13.18%
Hydrometallurgical Residue Cell liner leakage
0.23%
seepage from Tailings Basin cells 1E and 2 E
7.29%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
65.85%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
13.45%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

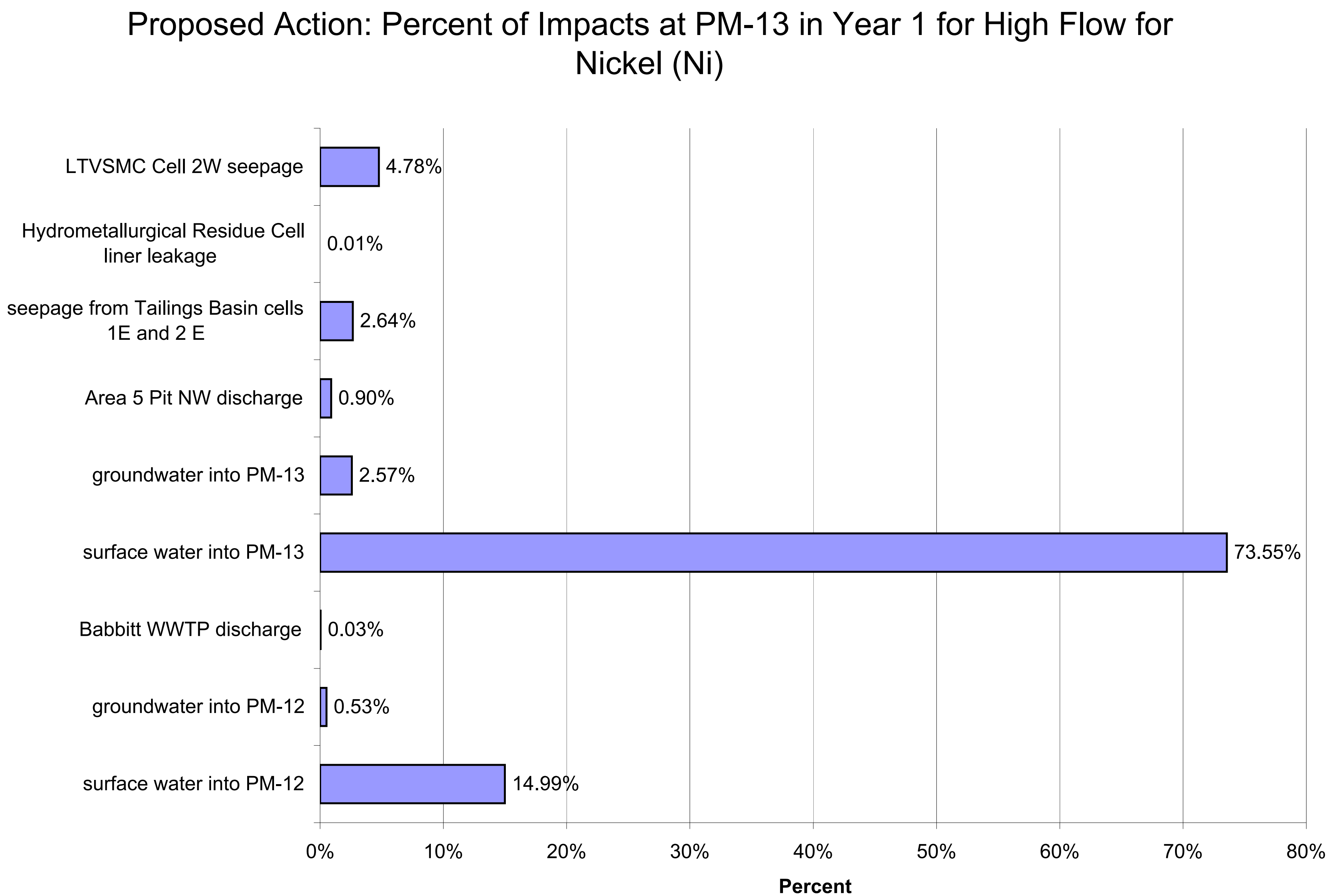
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)

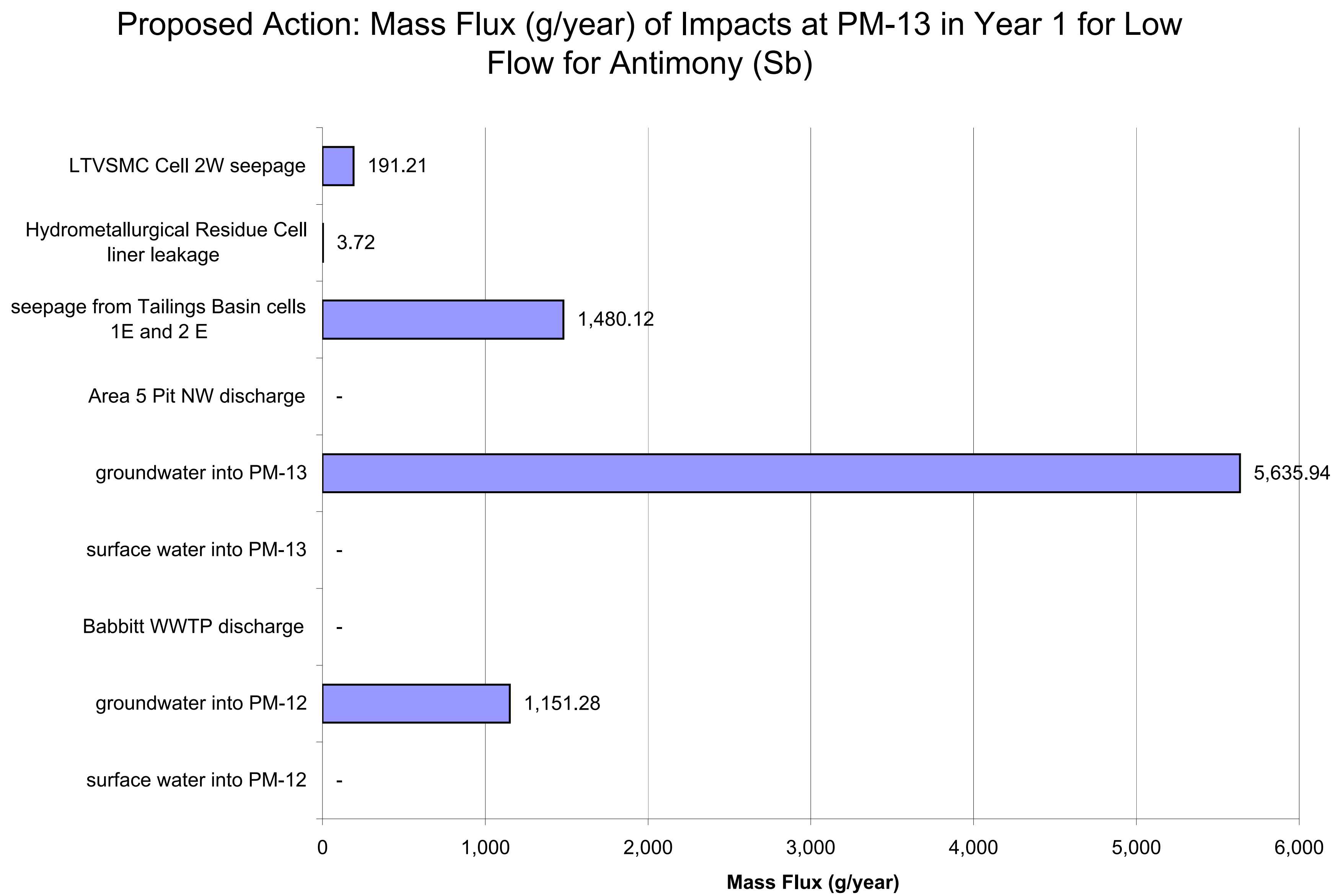



Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
24.85%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2 E
13.75%
Area 5 Pit NW discharge
4.70%
groundwater into PM-13
13.37%
surface water into PM-13
33.50%
Babbitt WWTP discharge
0.18%
groundwater into PM-12
2.73%
surface water into PM-12
6.87%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

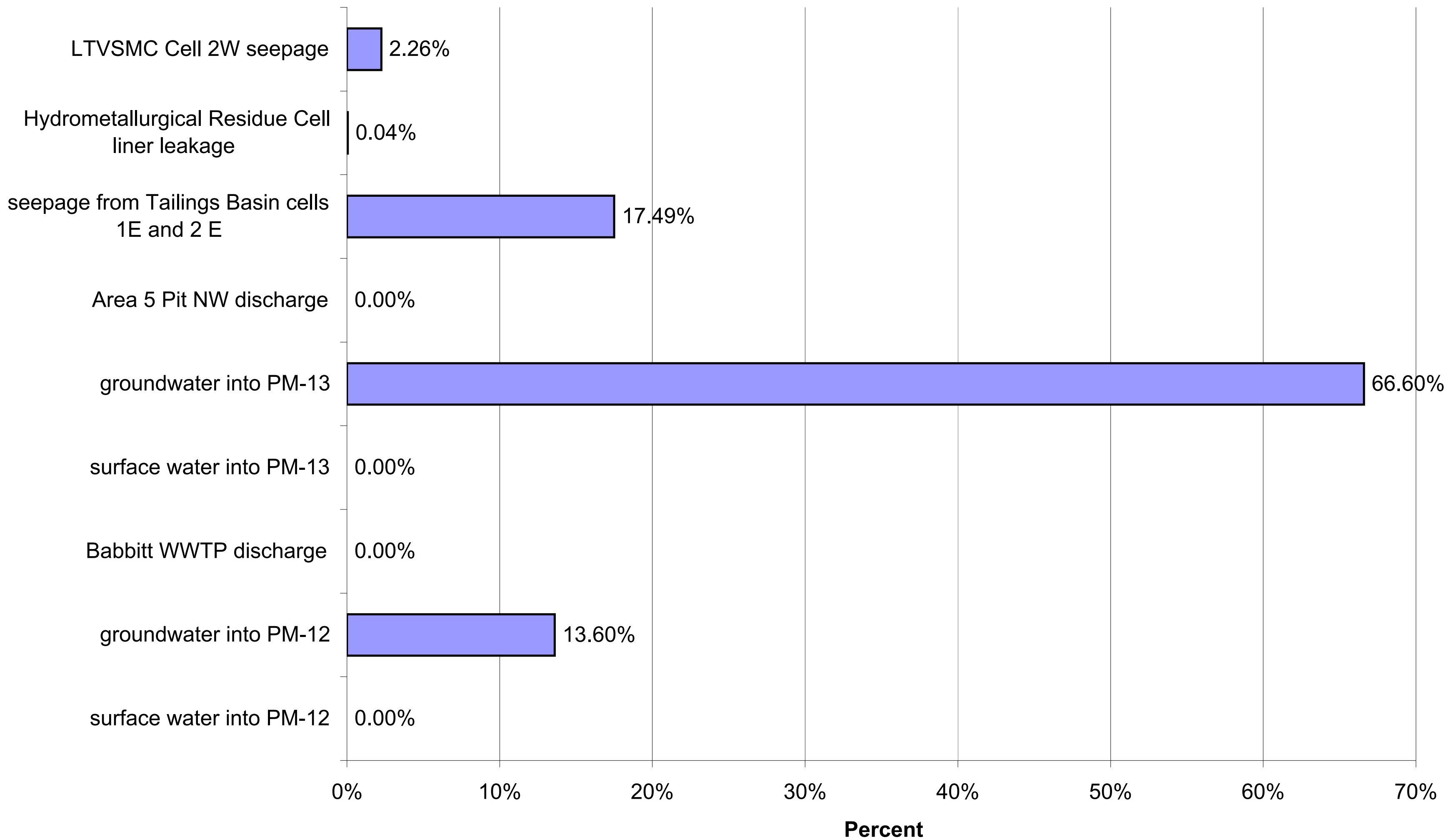
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)

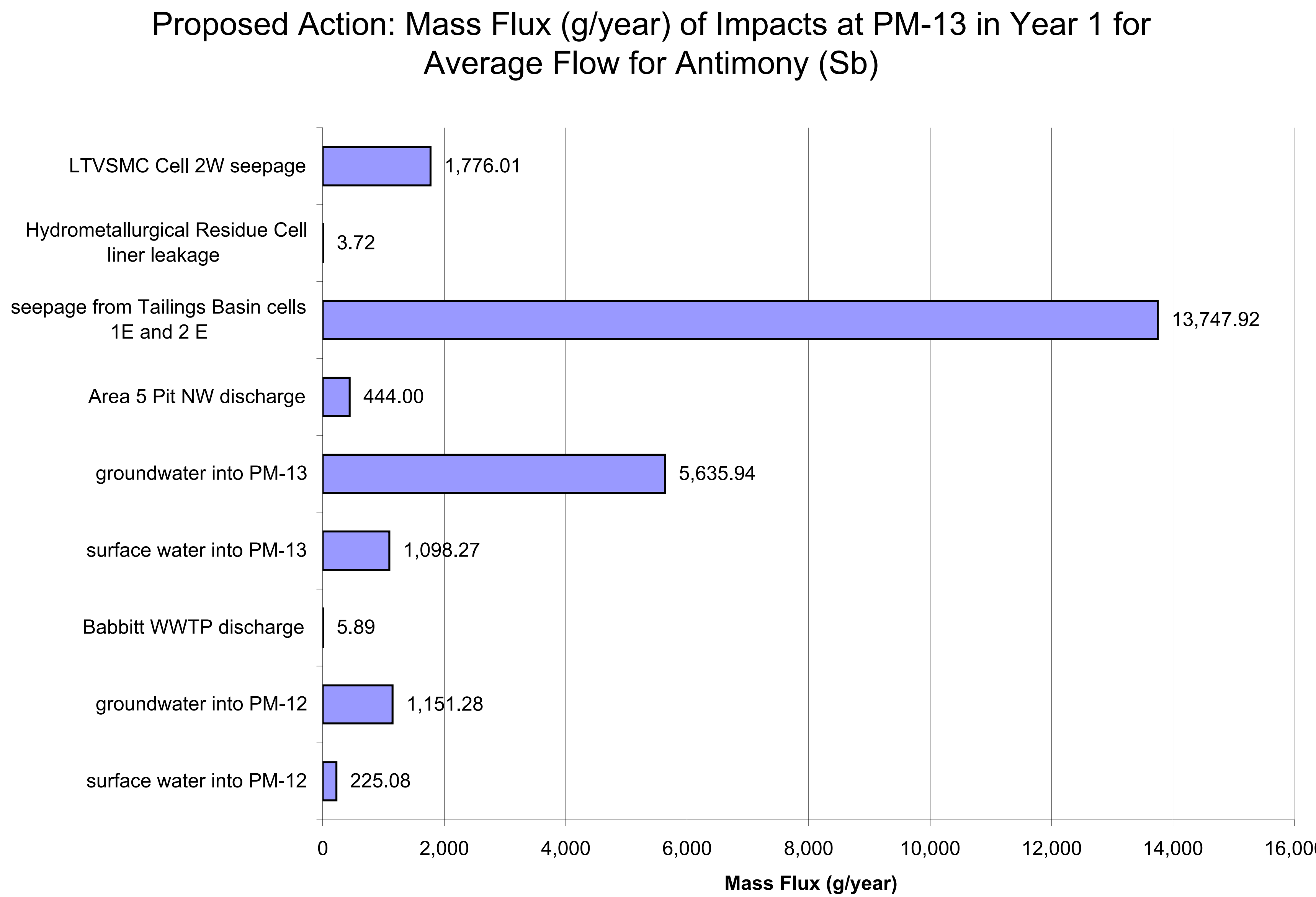


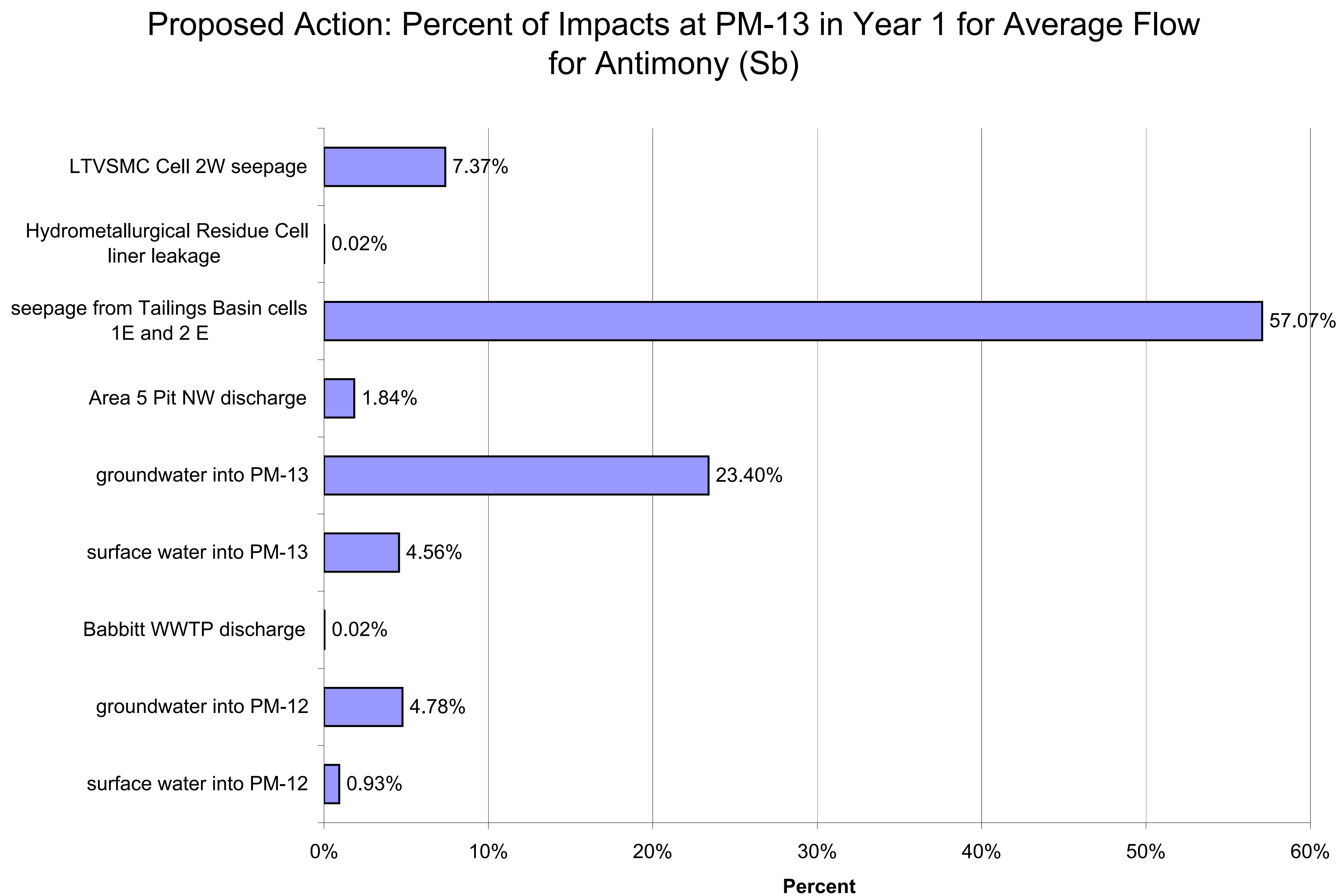

Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
4.78%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2 E
2.64%
Area 5 Pit NW discharge
0.90%
groundwater into PM-13
2.57%
surface water into PM-13
73.55%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.53%
surface water into PM-12
14.99%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
191.21
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
1,480.12
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

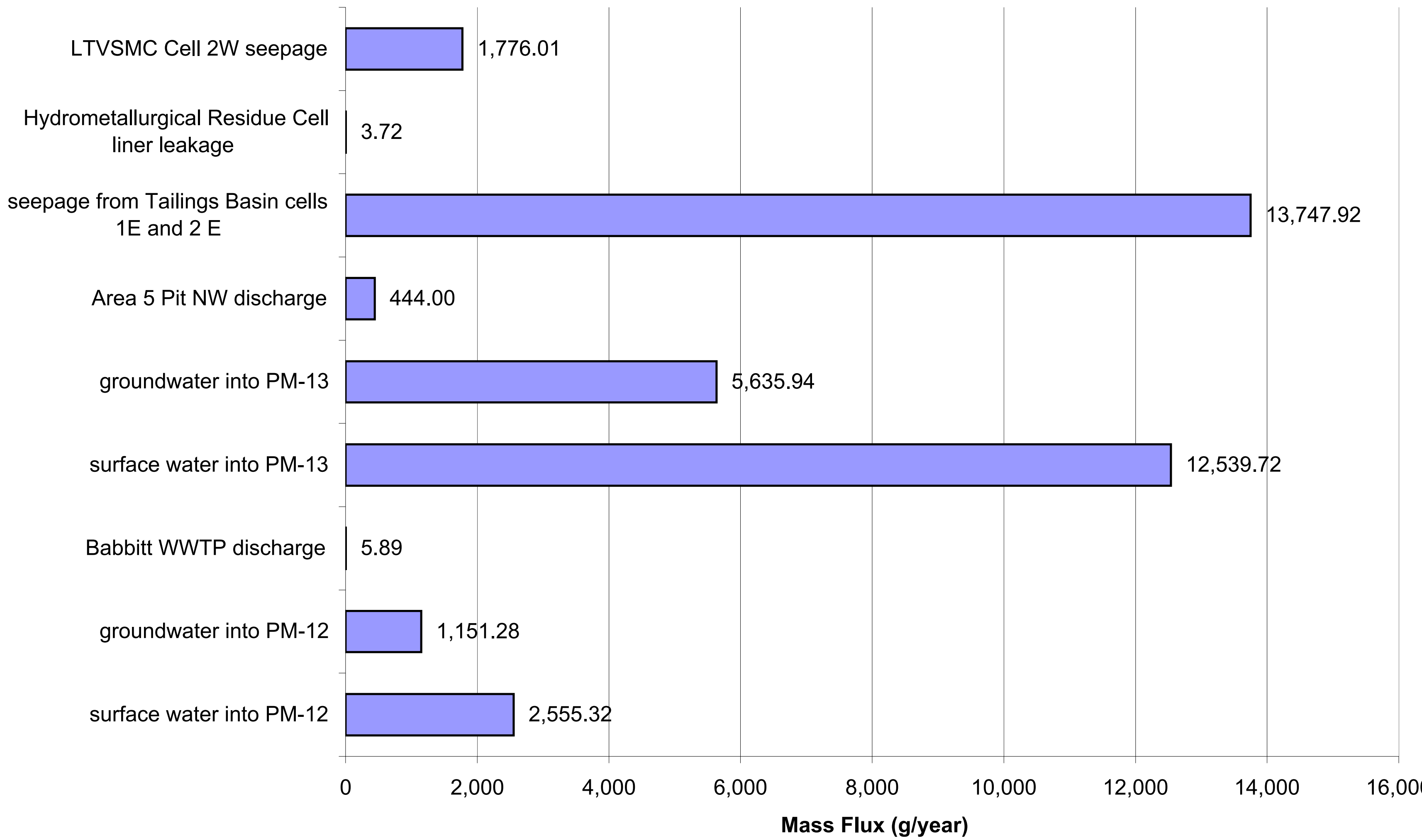
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)



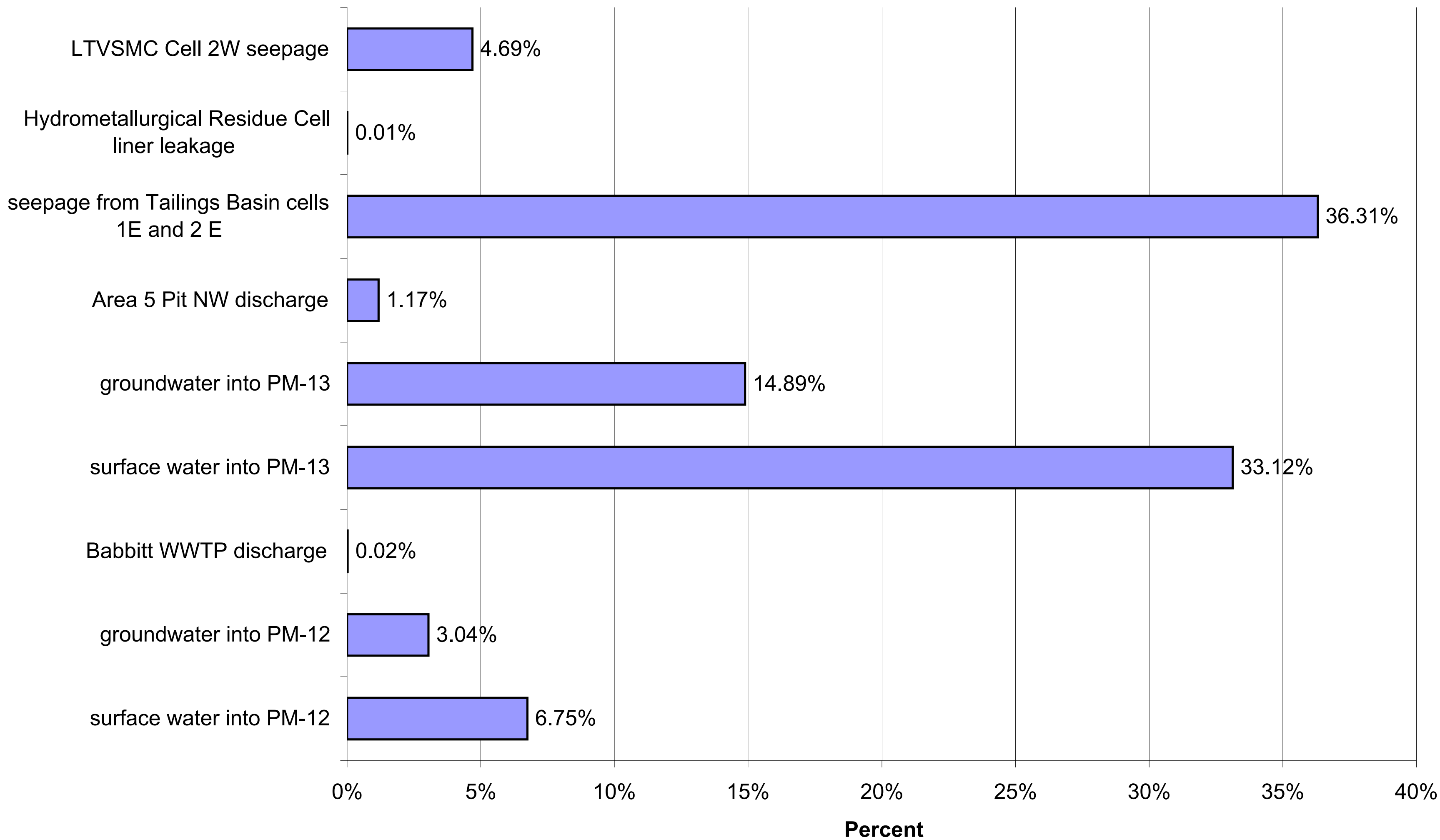

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2 E
13,747.92
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Mass Flux (g/year)

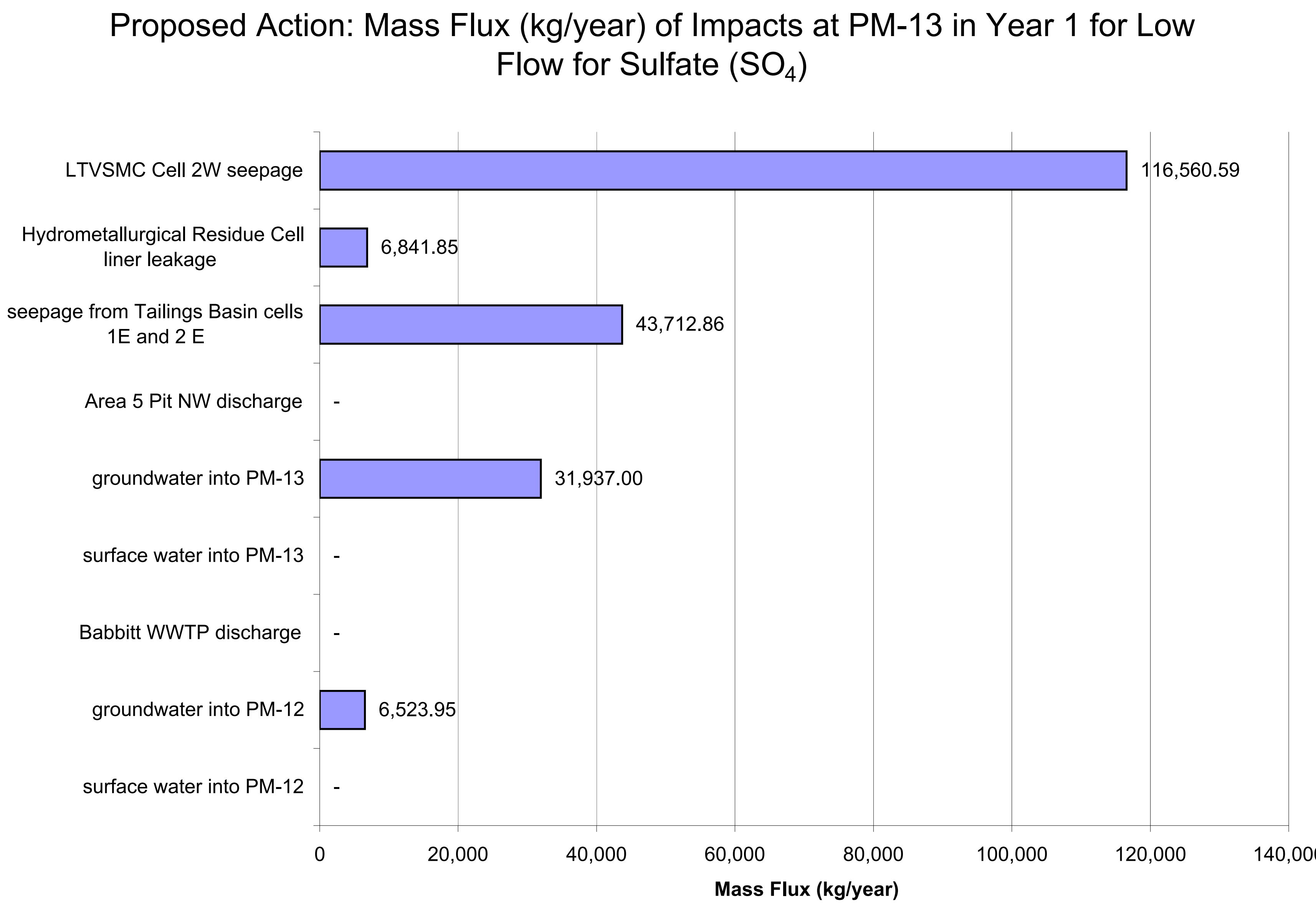

Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
7.37%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2 E
57.07%
Area 5 Pit NW discharge
1.84%
groundwater into PM-13
23.40%
surface water into PM-13
4.56%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
4.78%
surface water into PM-12
0.93%
0%
10%
20%
30%
40%
50%
60%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)

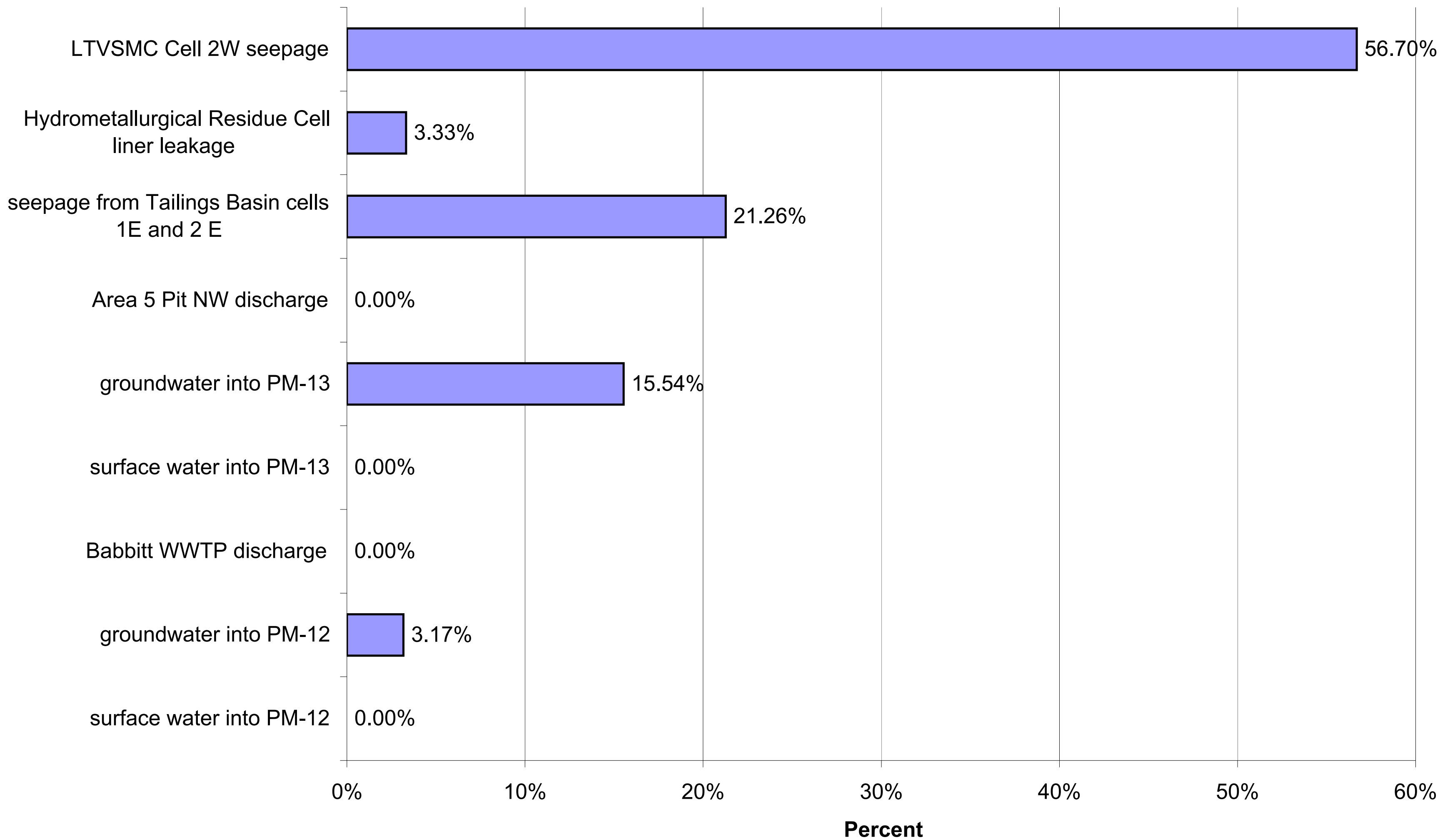


Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)

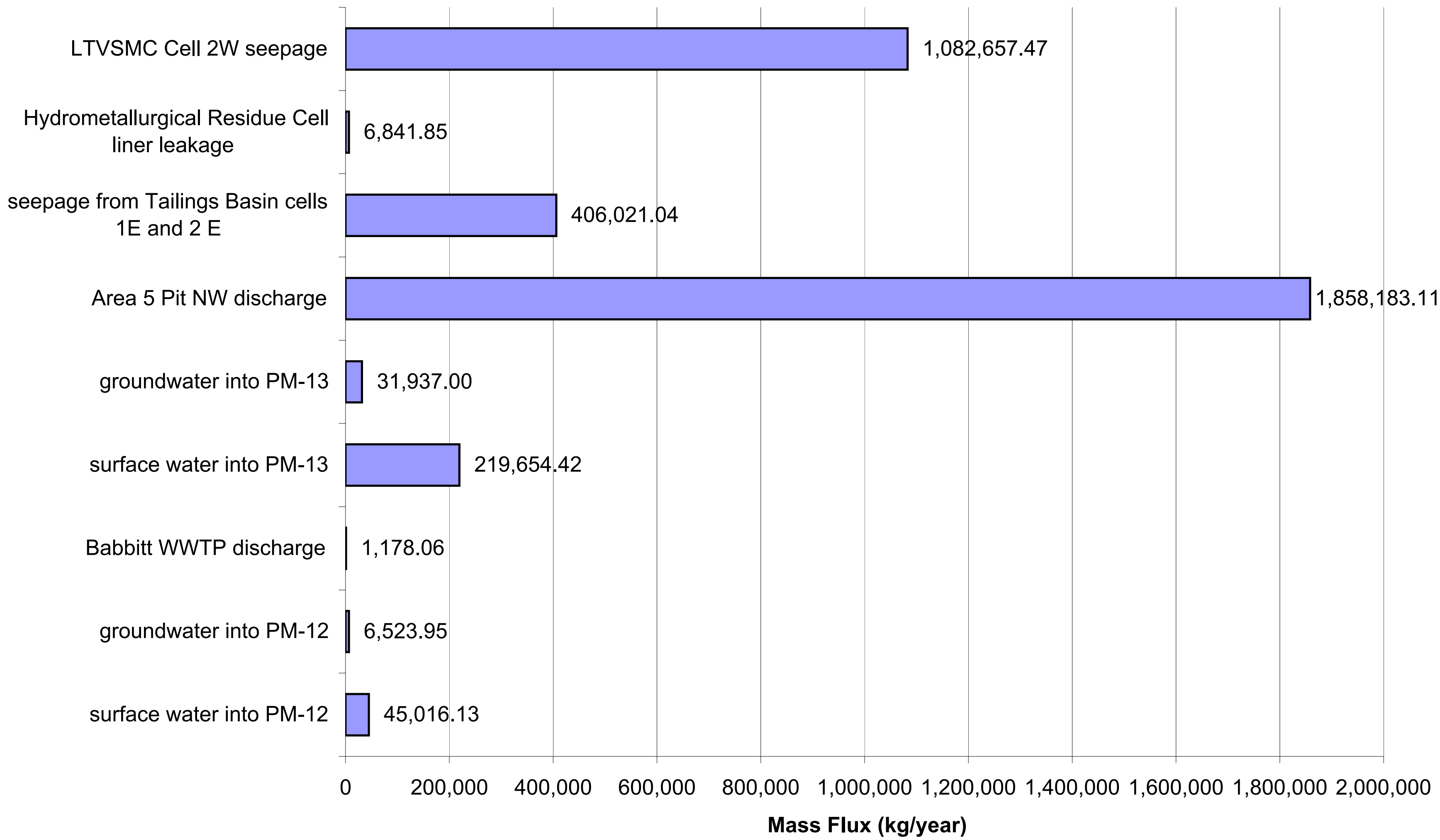



Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
116,560.59
Hydrometallurgical Residue Cell liner leakage
6,841.85
seepage from Tailings Basin cells 1E and 2 E
43,712.86
Area 5 Pit NW discharge
-
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Mass Flux (kg/year)

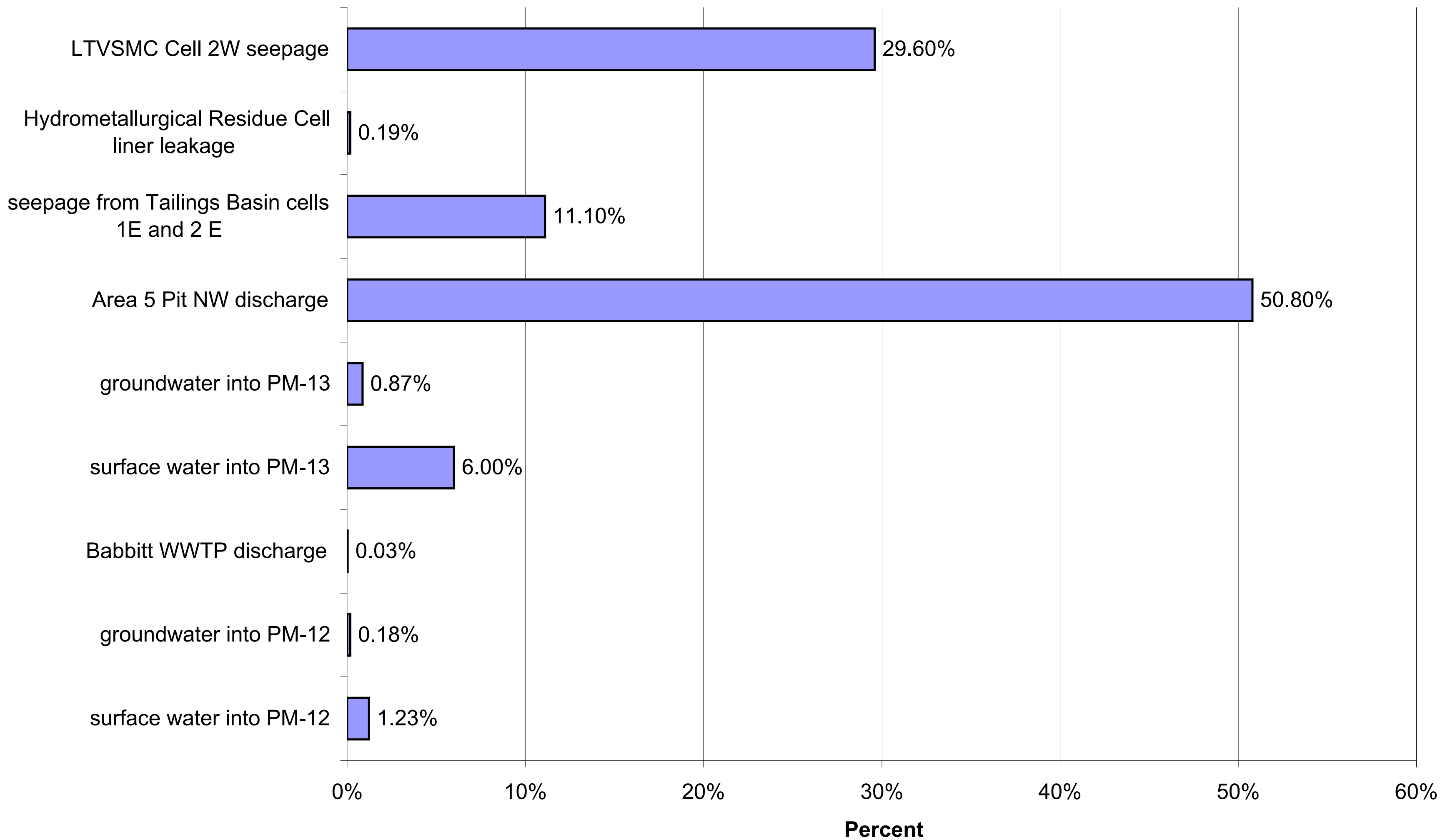
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)



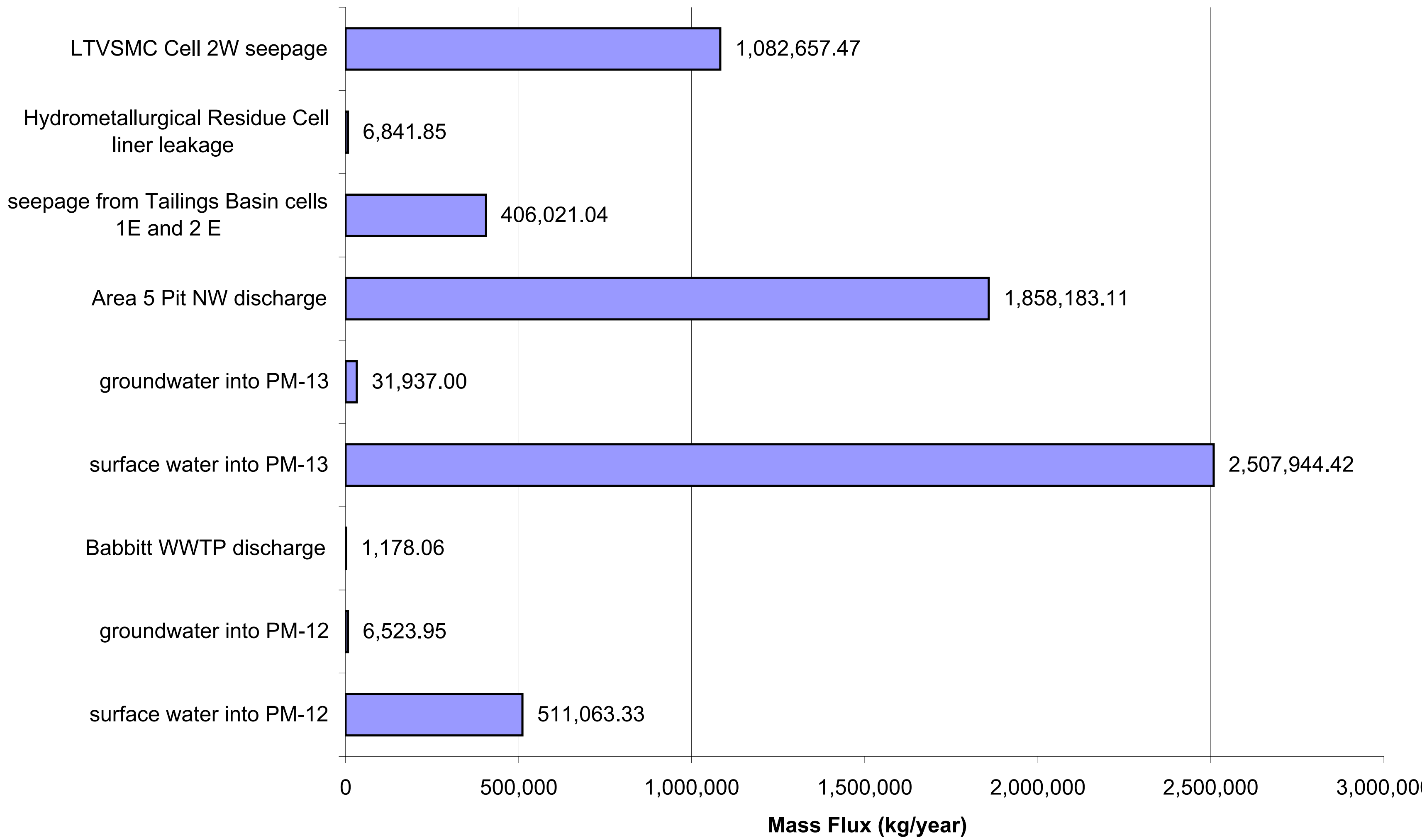
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)

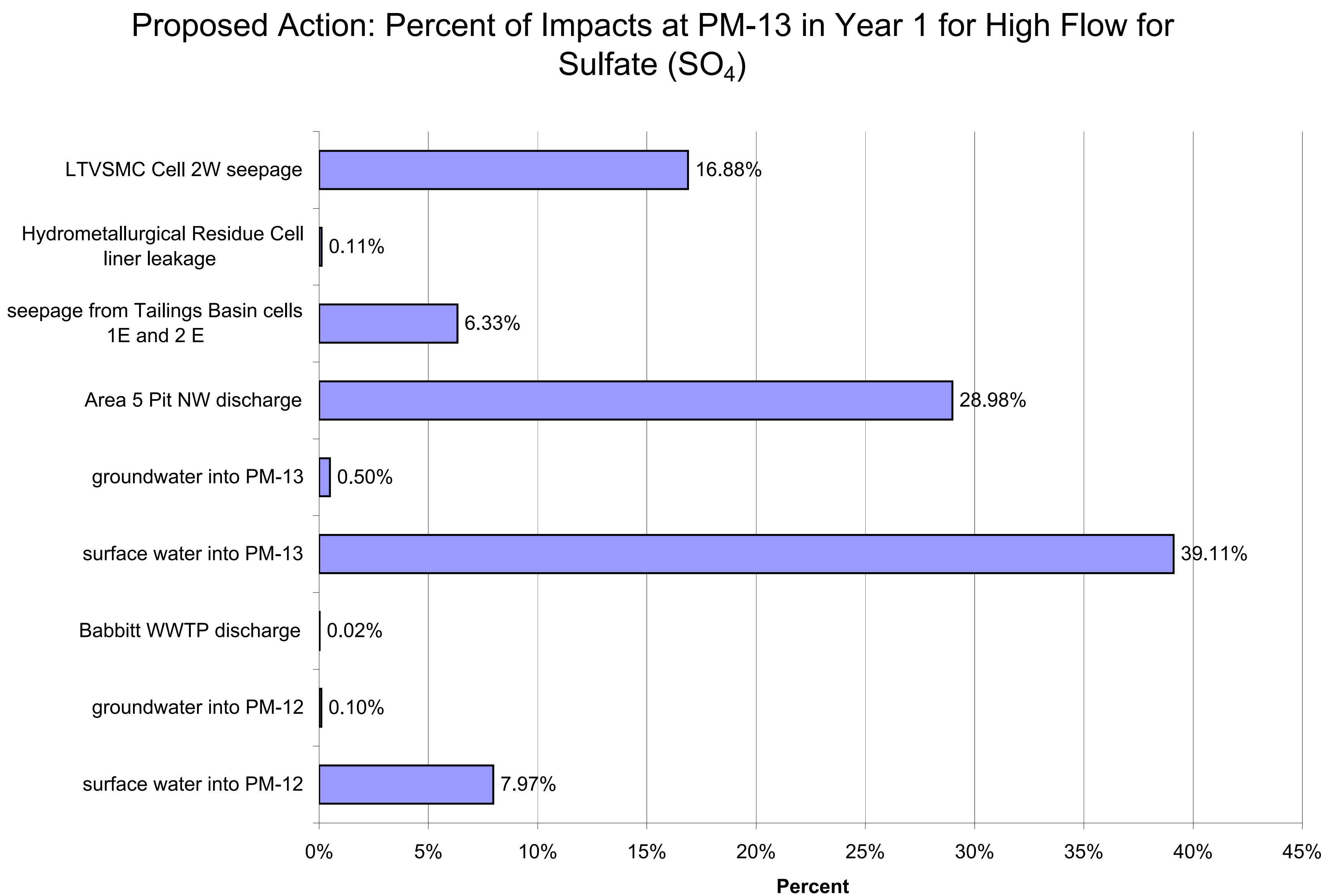


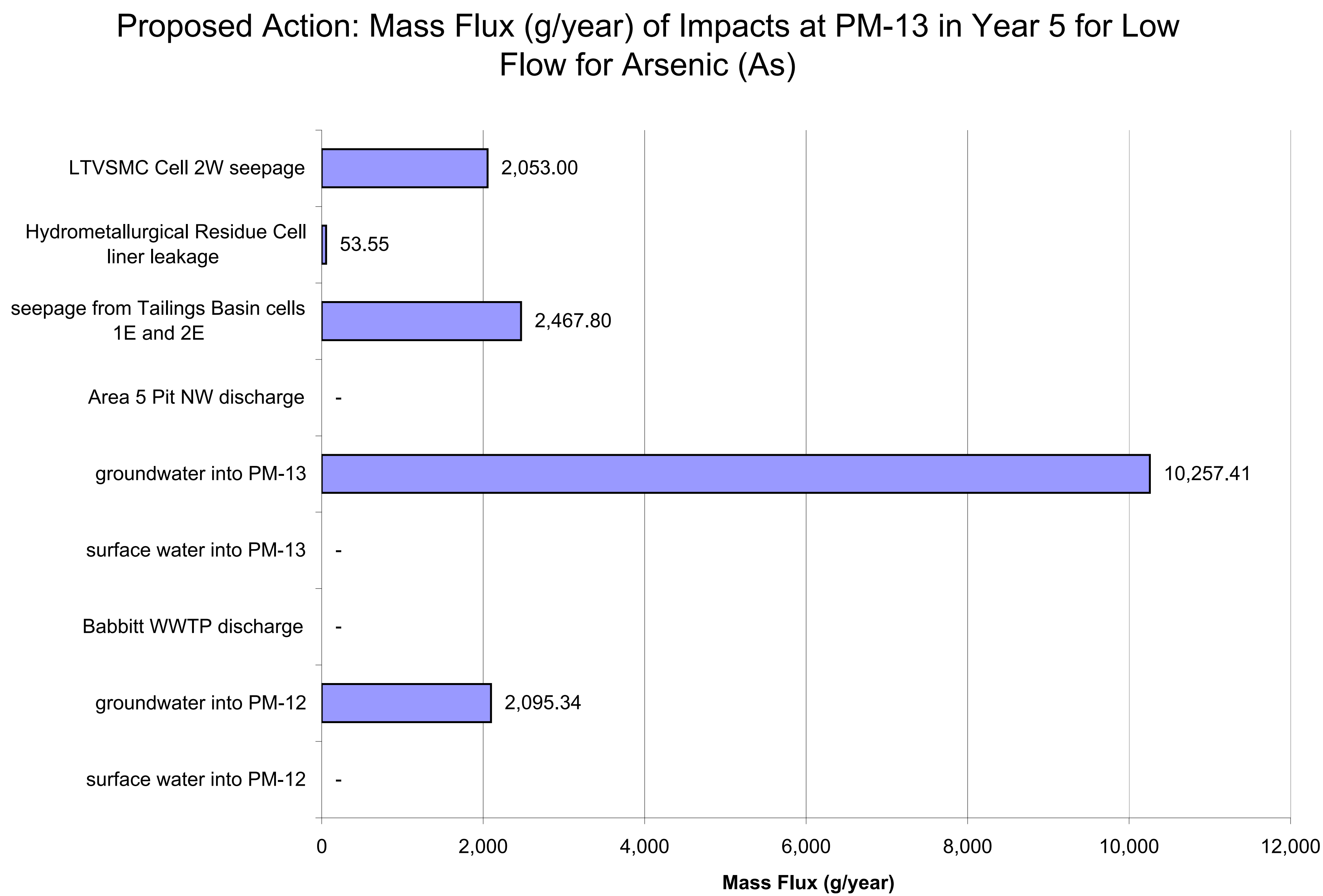
Proposed Action: Percent of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)



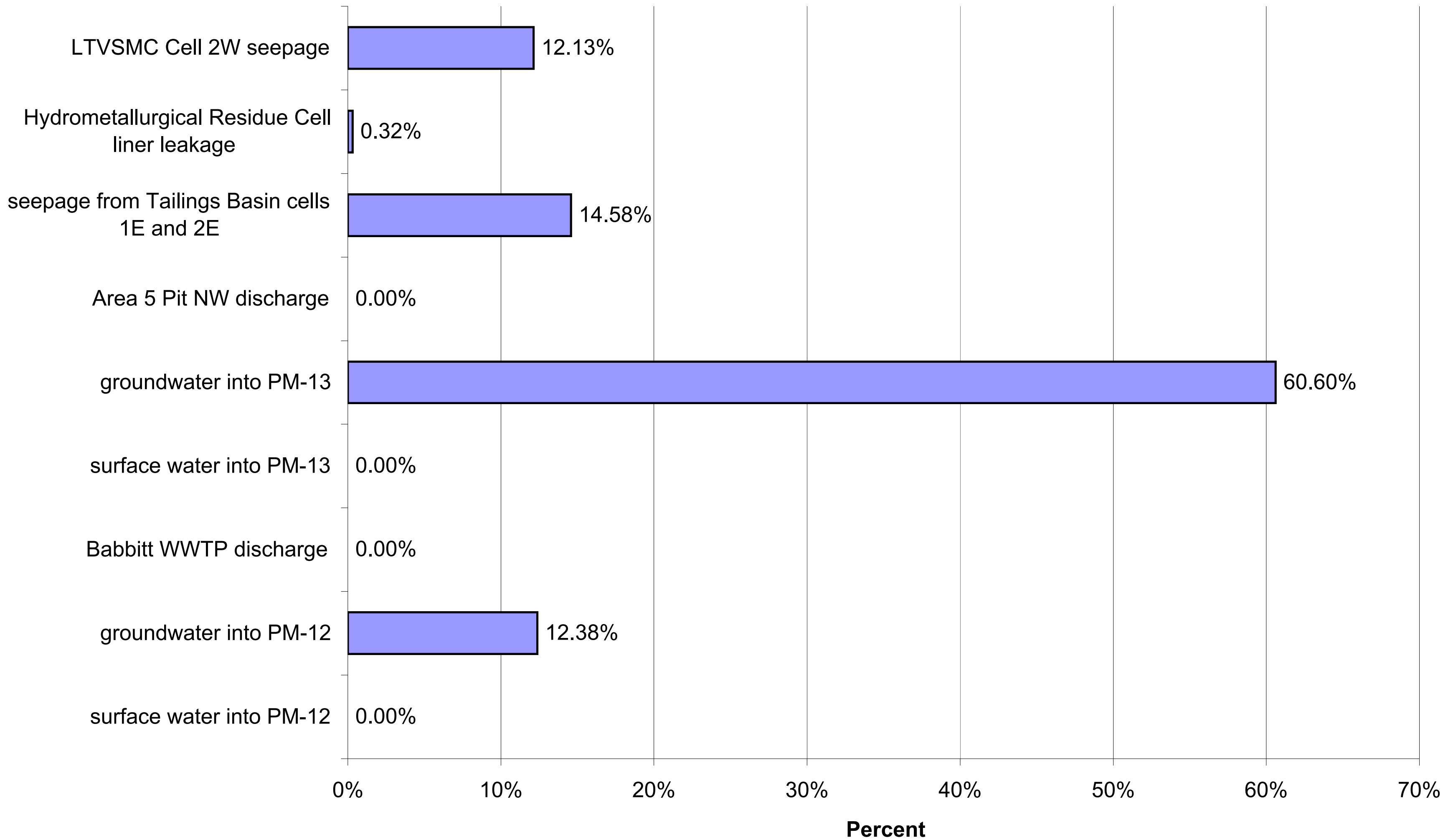
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)



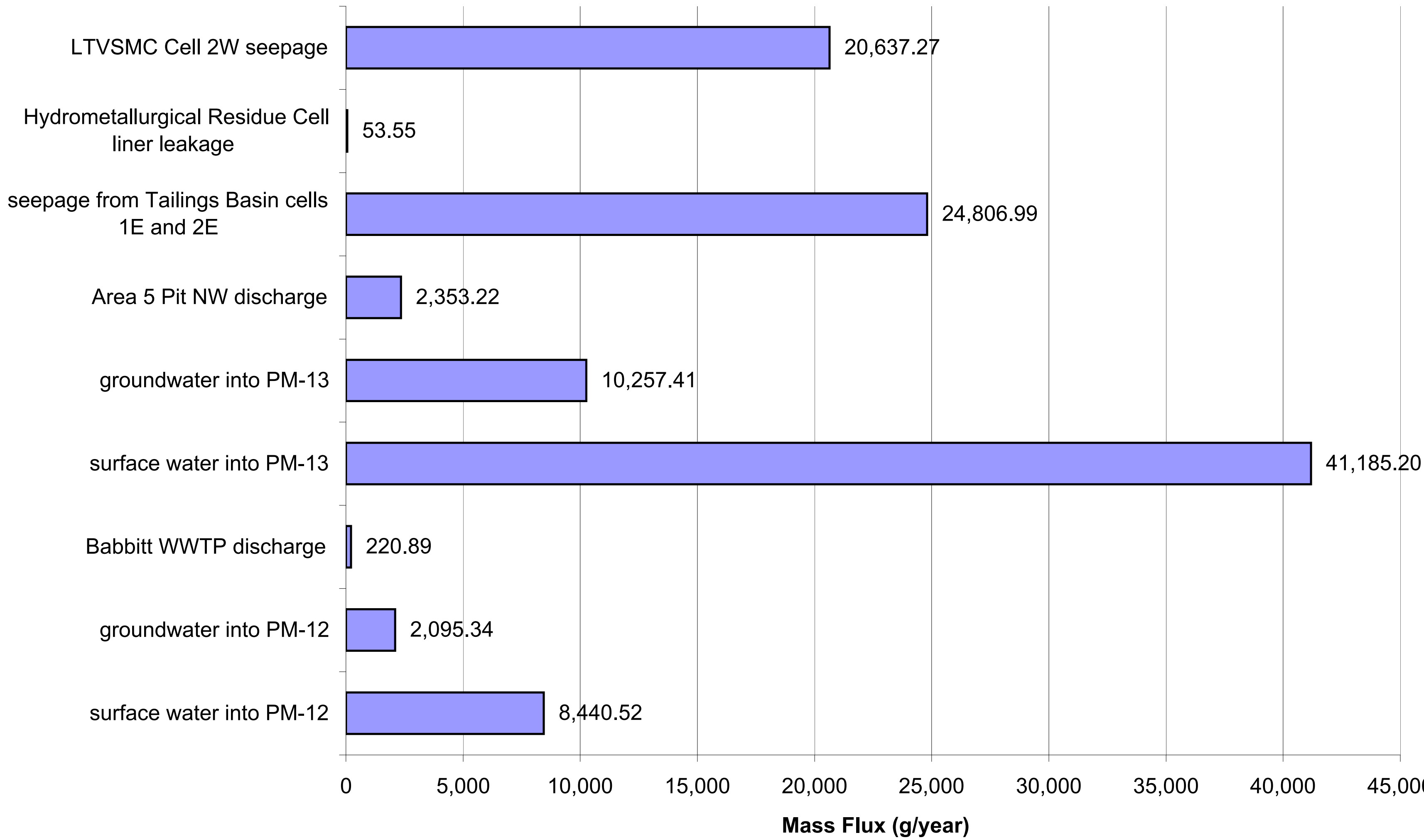

Proposed Action: Percent of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
16.88%
Hydrometallurgical Residue Cell liner leakage
0.11%
seepage from Tailings Basin cells 1E and 2 E
6.33%
Area 5 Pit NW discharge
28.98%
groundwater into PM-13
0.50%
surface water into PM-13
39.11%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
0.10%
surface water into PM-12
7.97%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

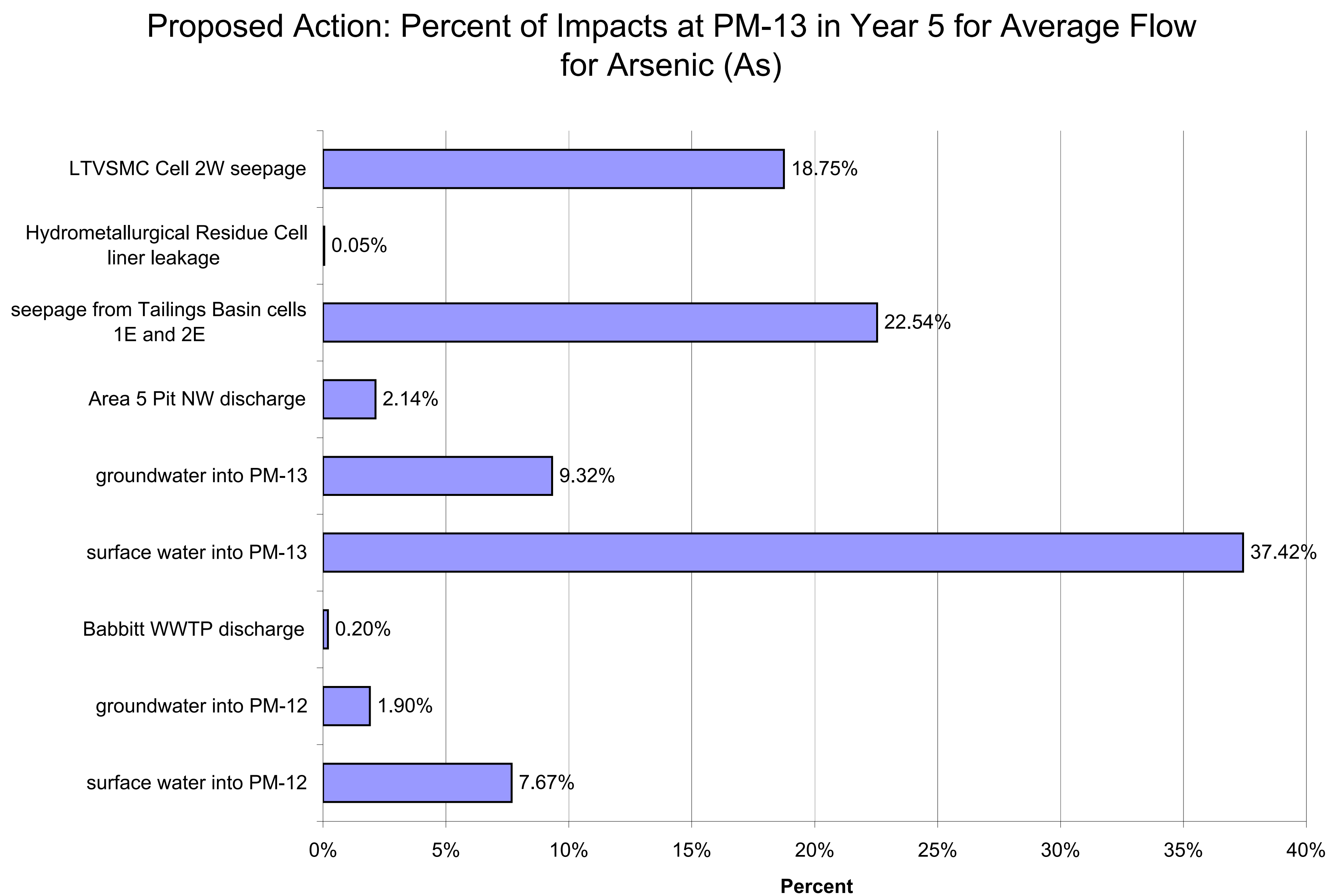

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
2,053.00
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
2,467.80
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)

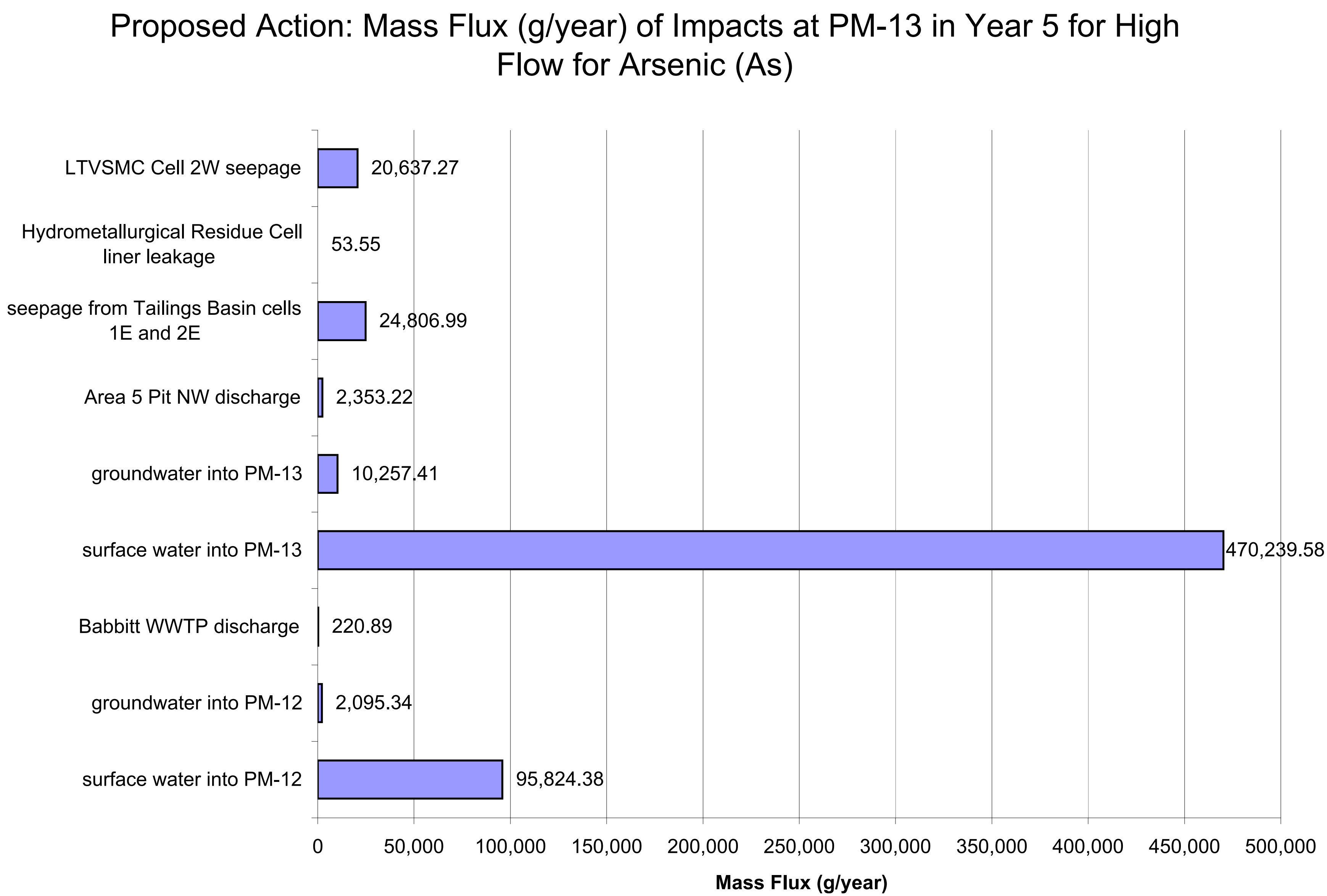
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)



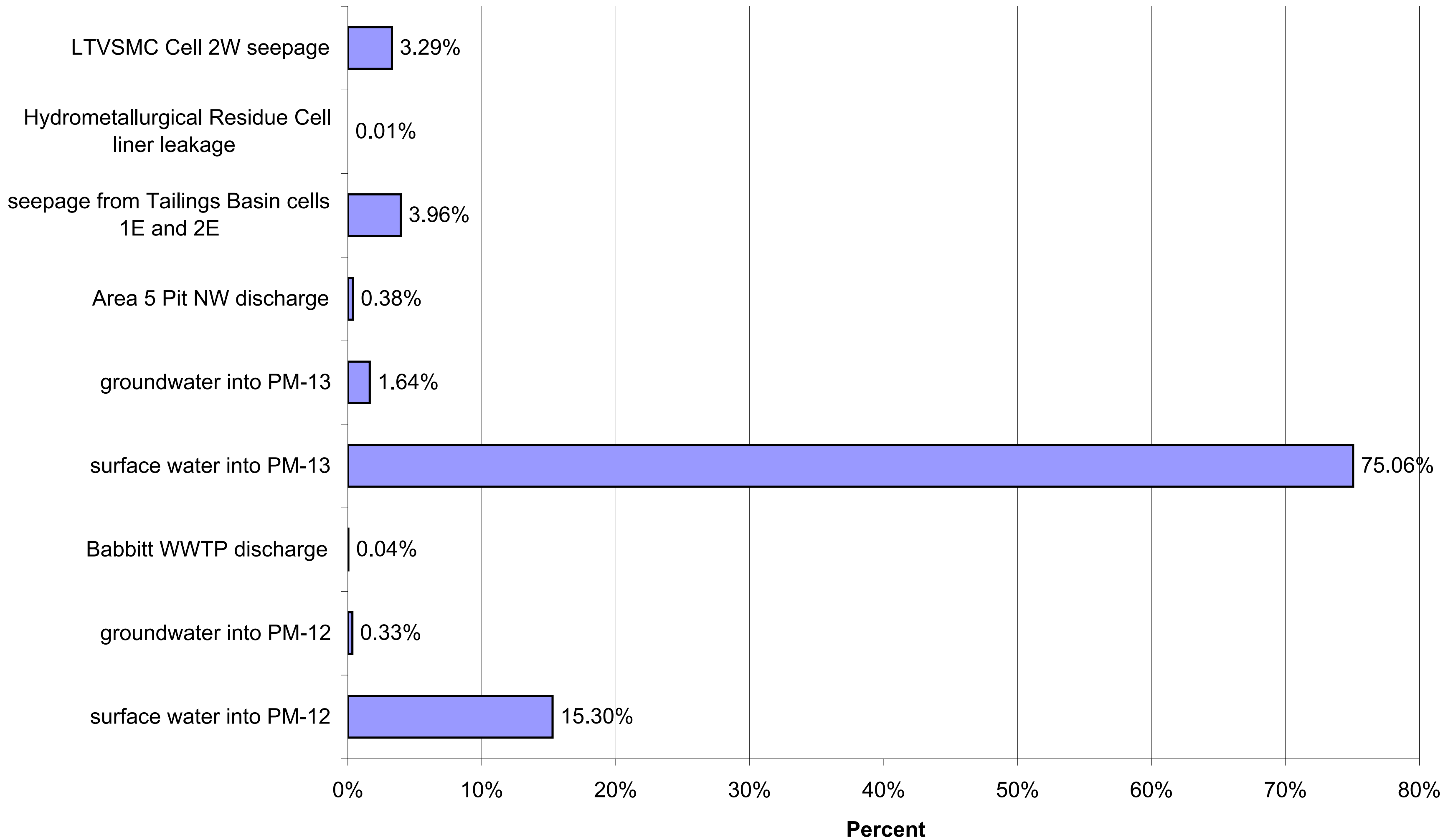
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)

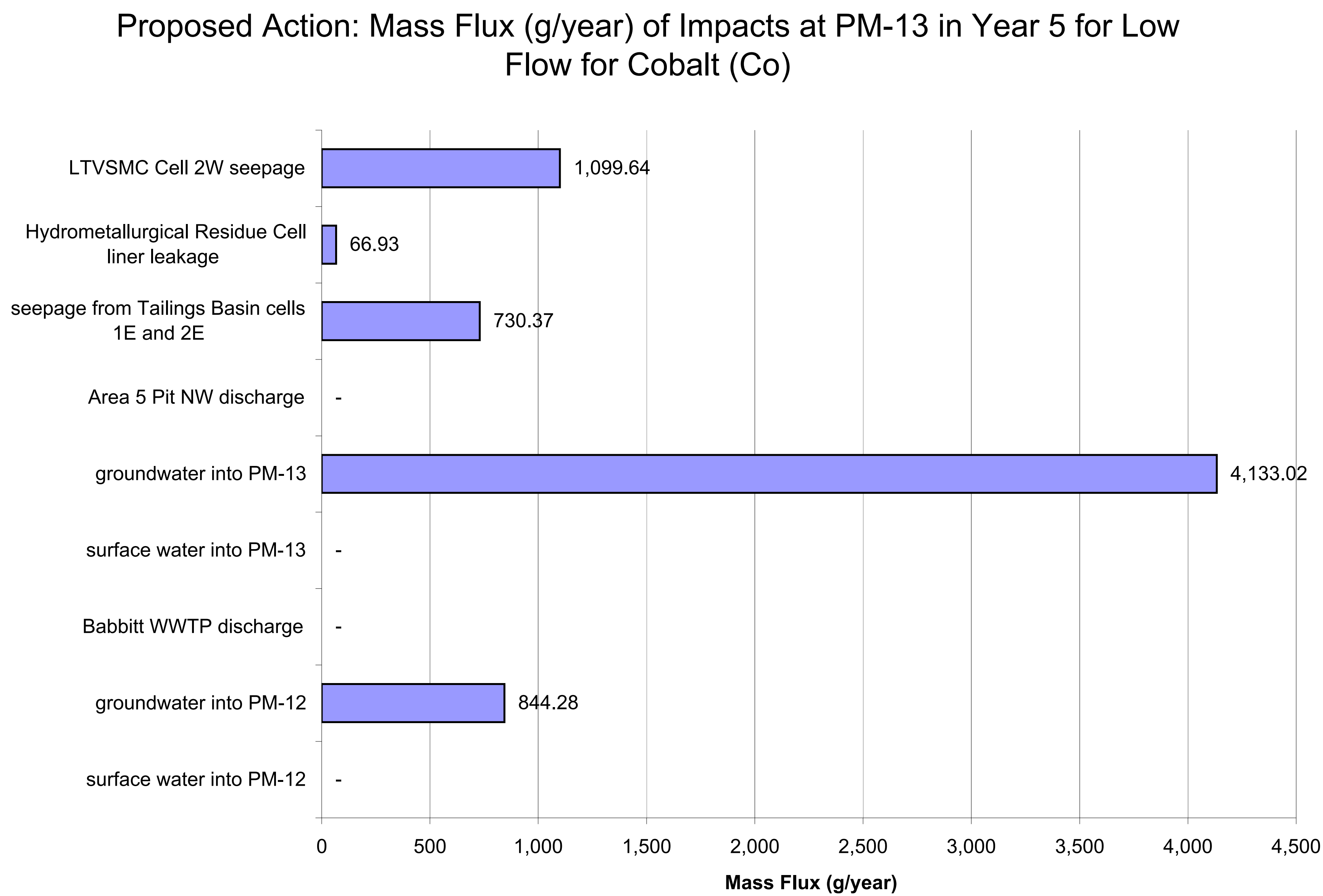



Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
18.75%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
22.54%
Area 5 Pit NW discharge
2.14%
groundwater into PM-13
9.32%
surface water into PM-13
37.42%
Babbitt WWTP discharge
0.20%
groundwater into PM-12
1.90%
surface water into PM-12
7.67%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

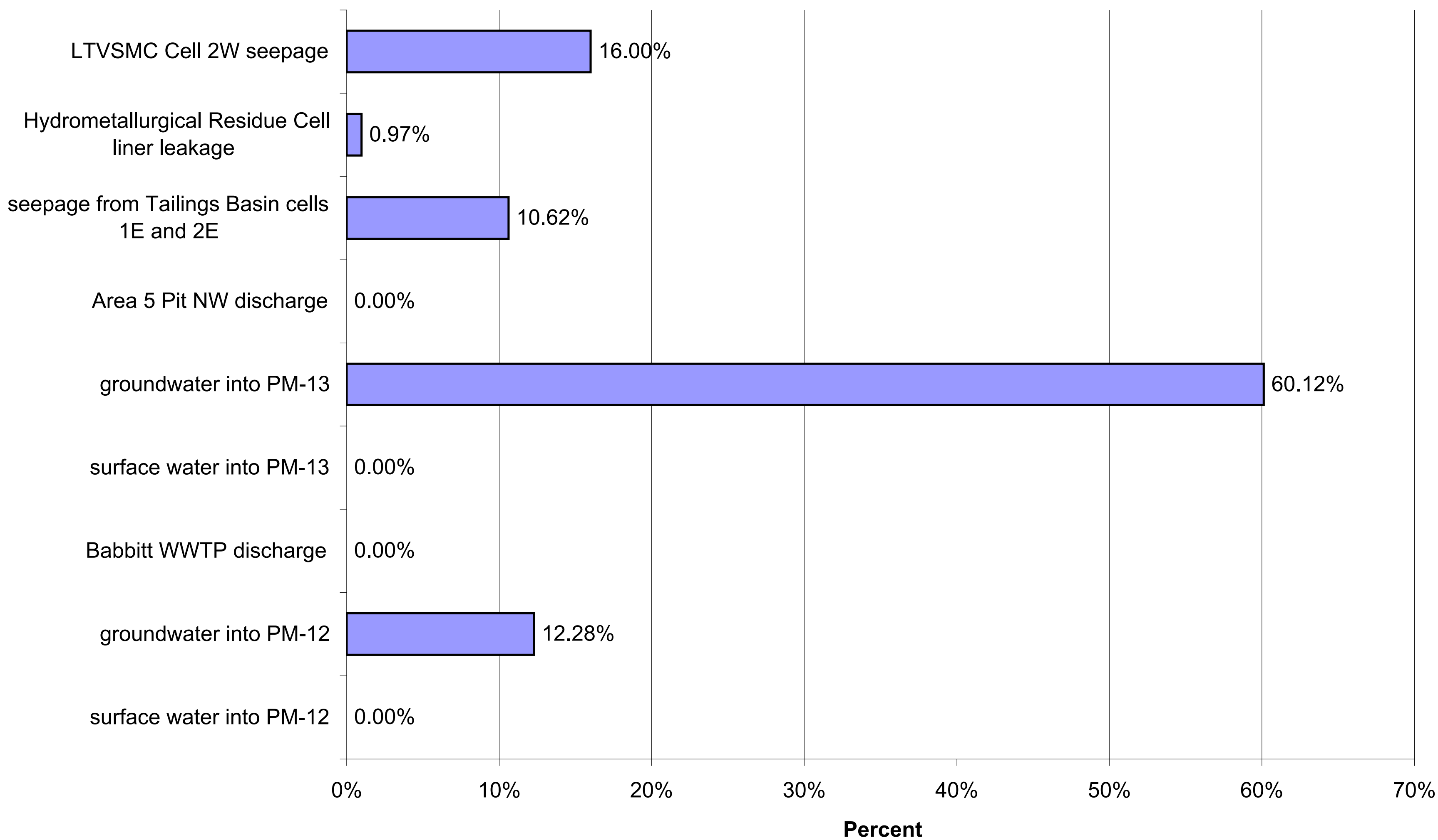

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
24,806.99
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
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)

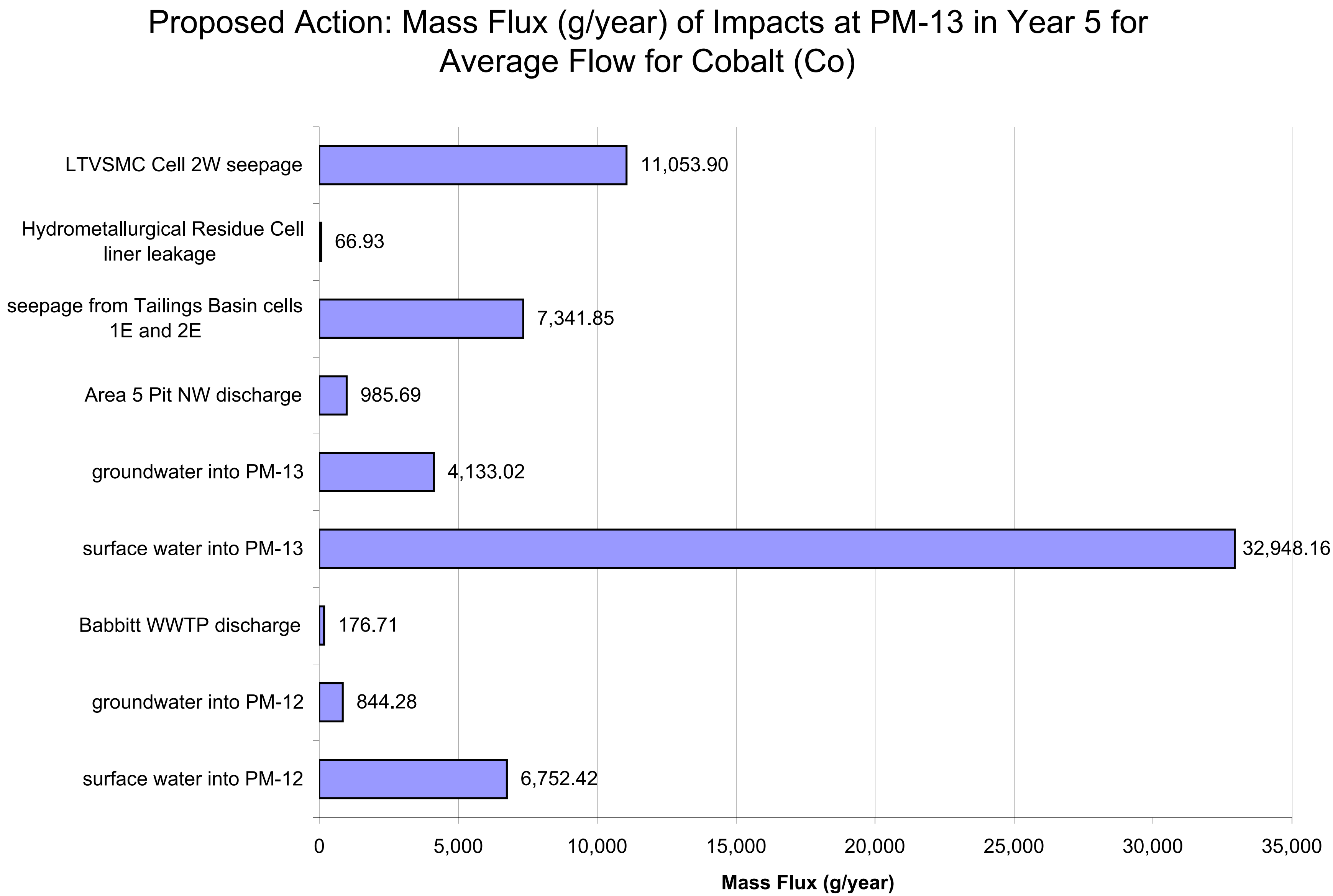
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)



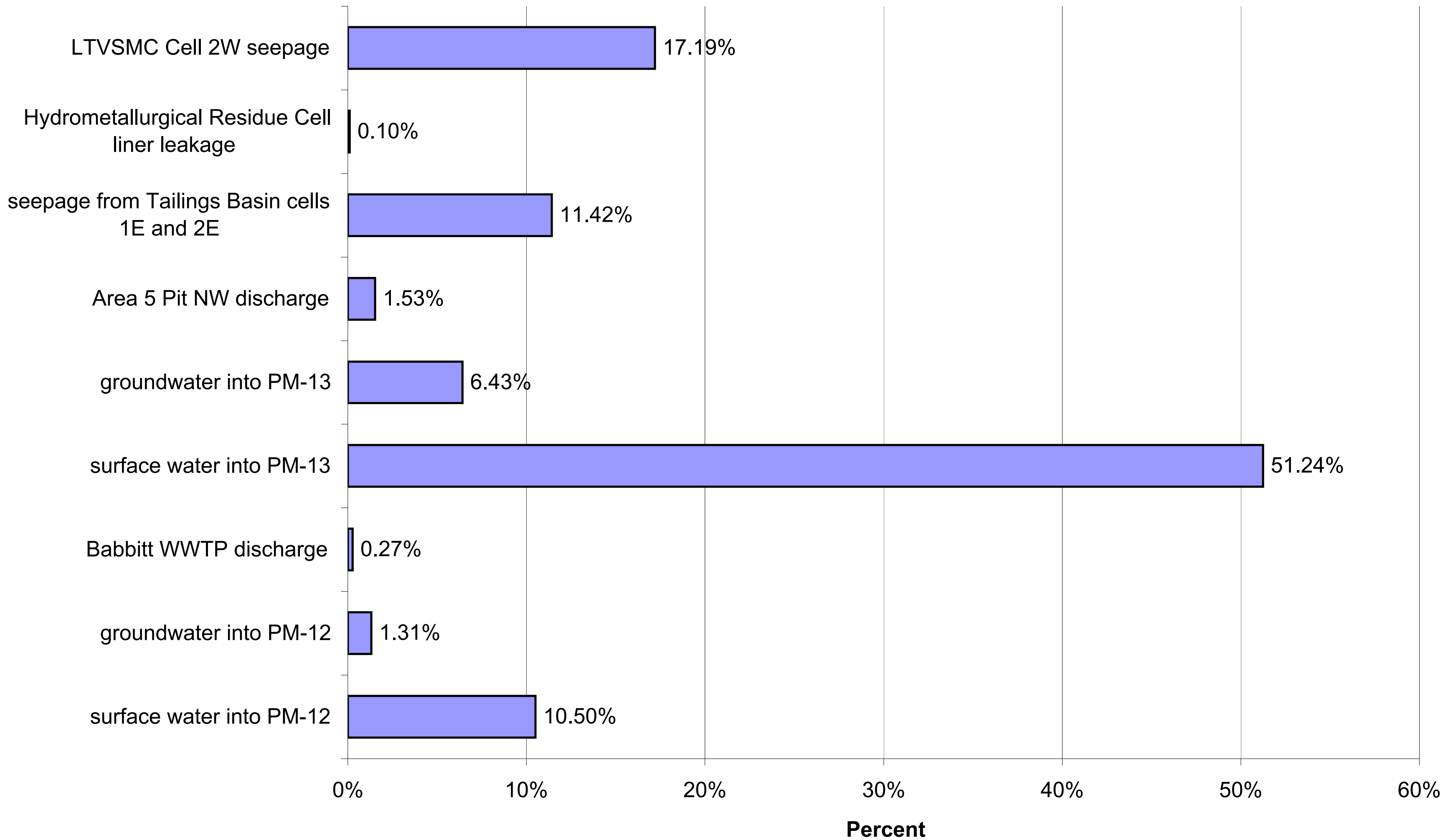

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,099.64
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
730.37
Area 5 Pit NW discharge
-
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

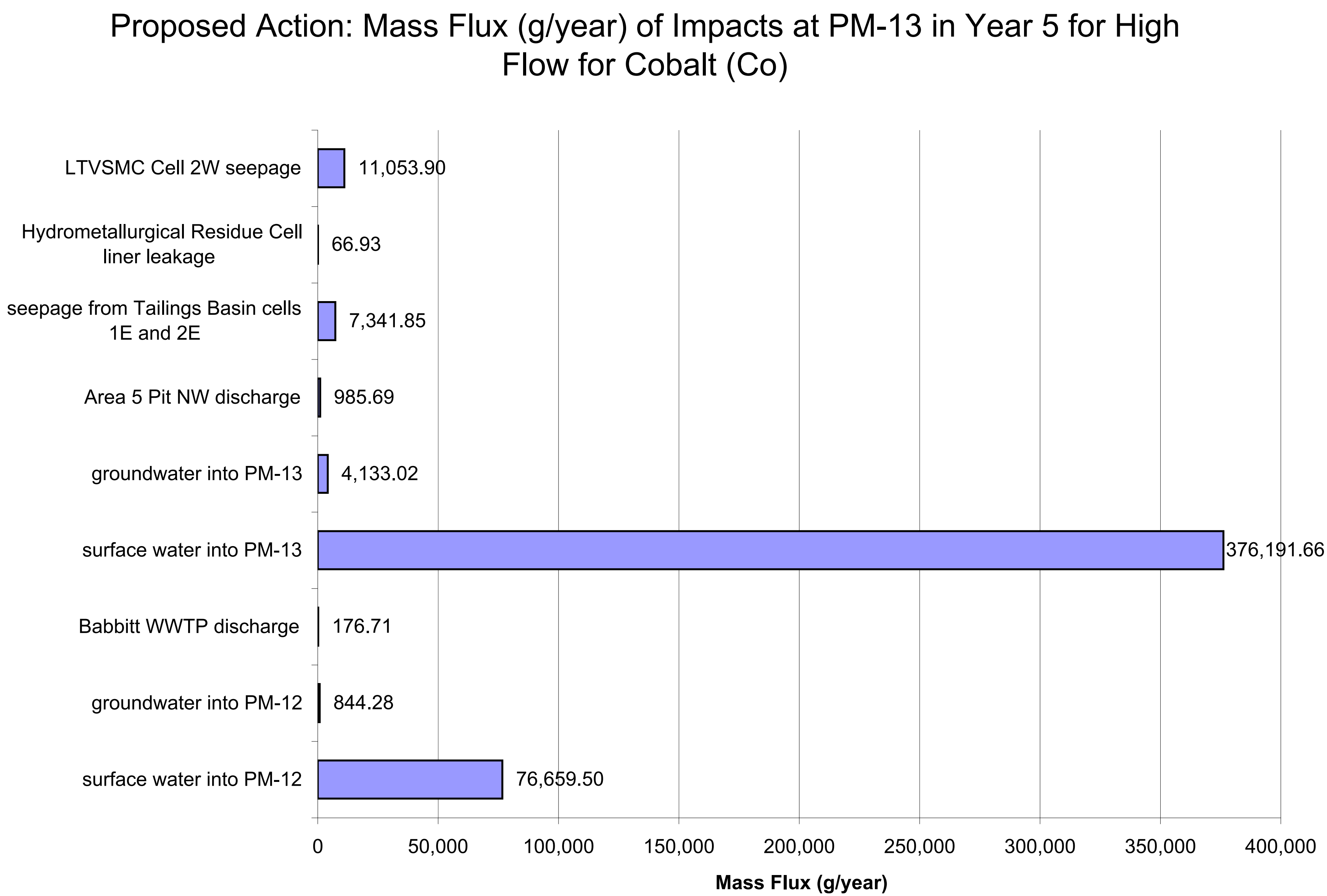
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)

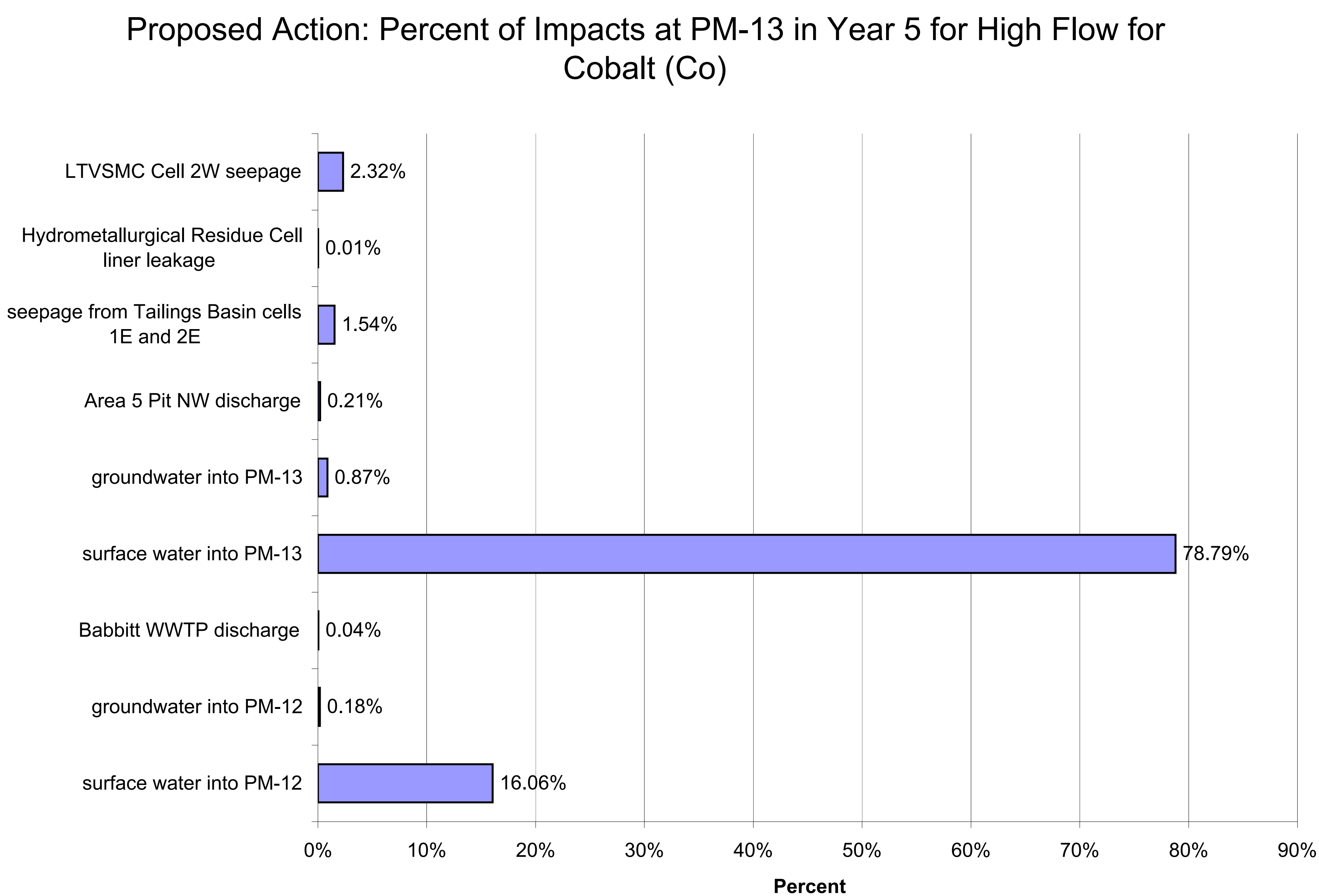



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
7,341.85
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface water into PM-13
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)

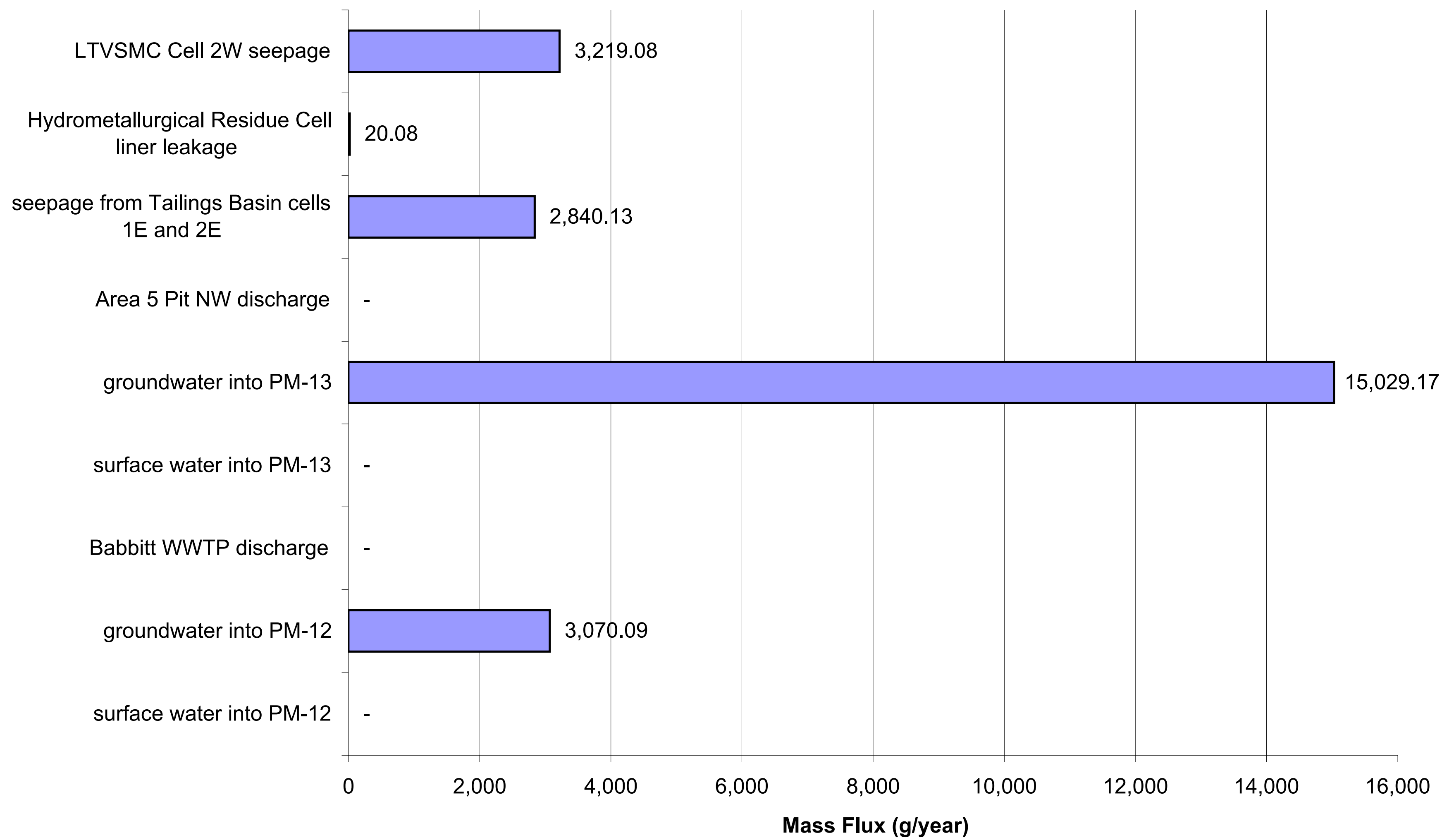
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)



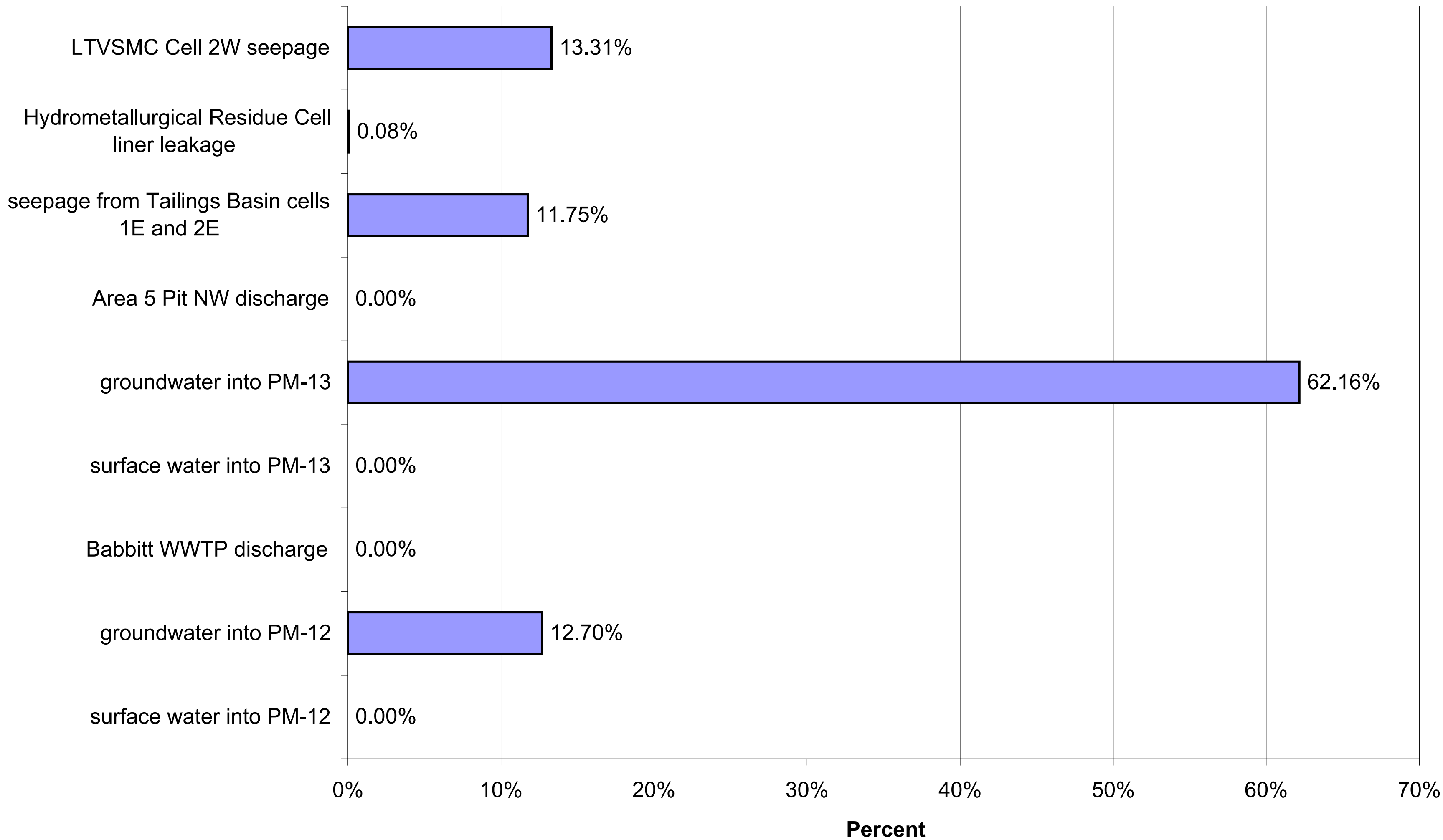

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
7,341.85
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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
2.32%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
1.54%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.87%
surface water into PM-13
78.79%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.06%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

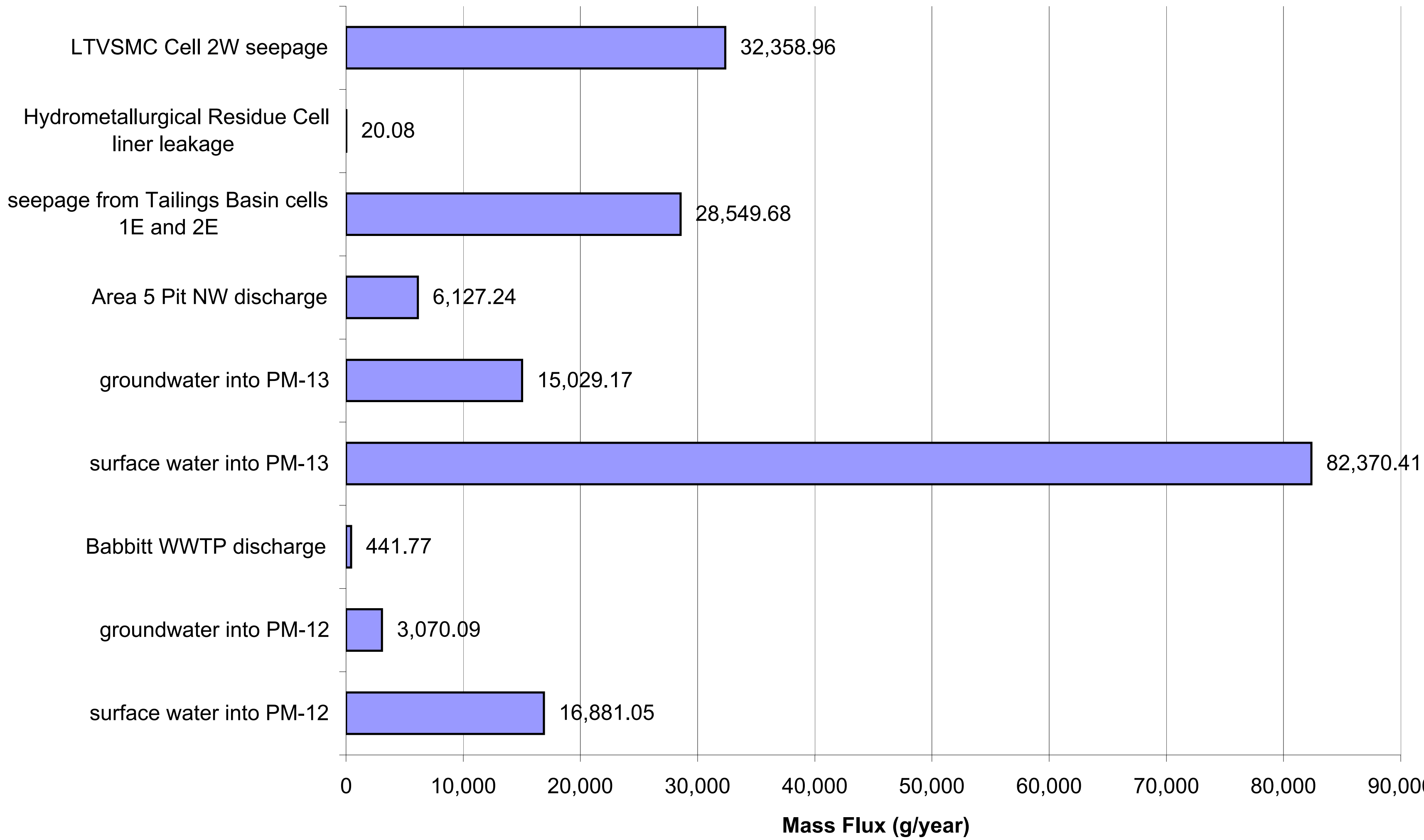
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)

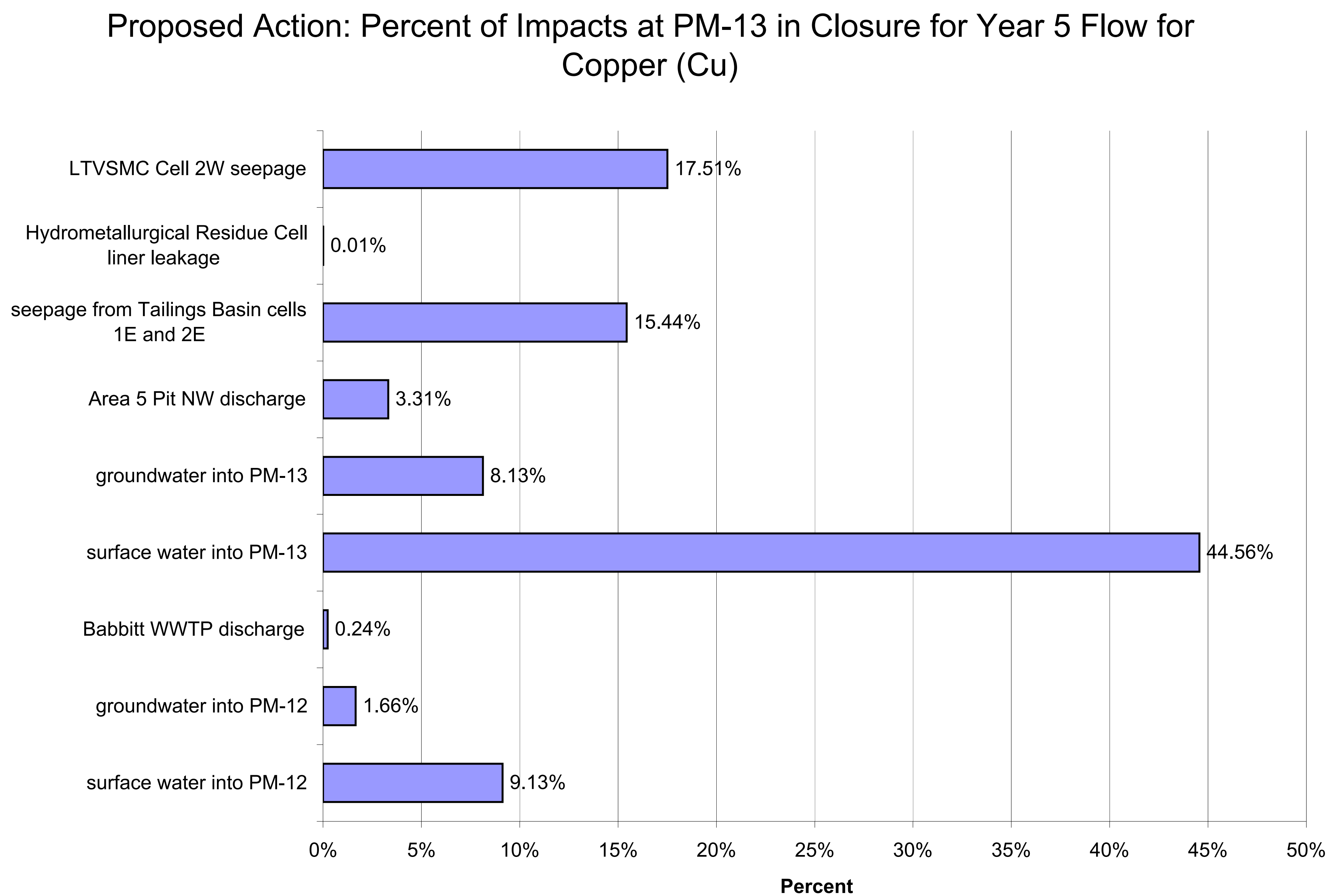


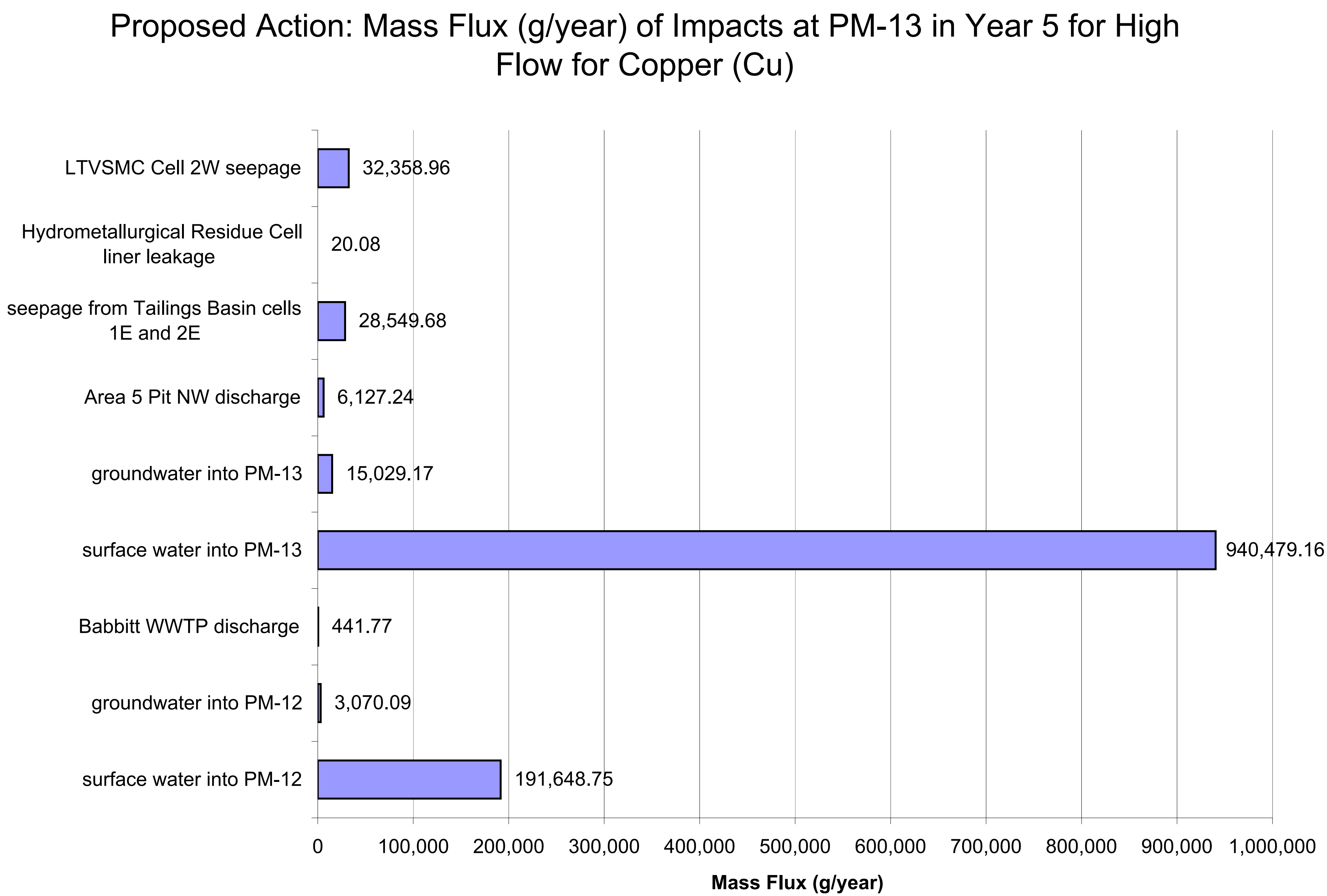
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)

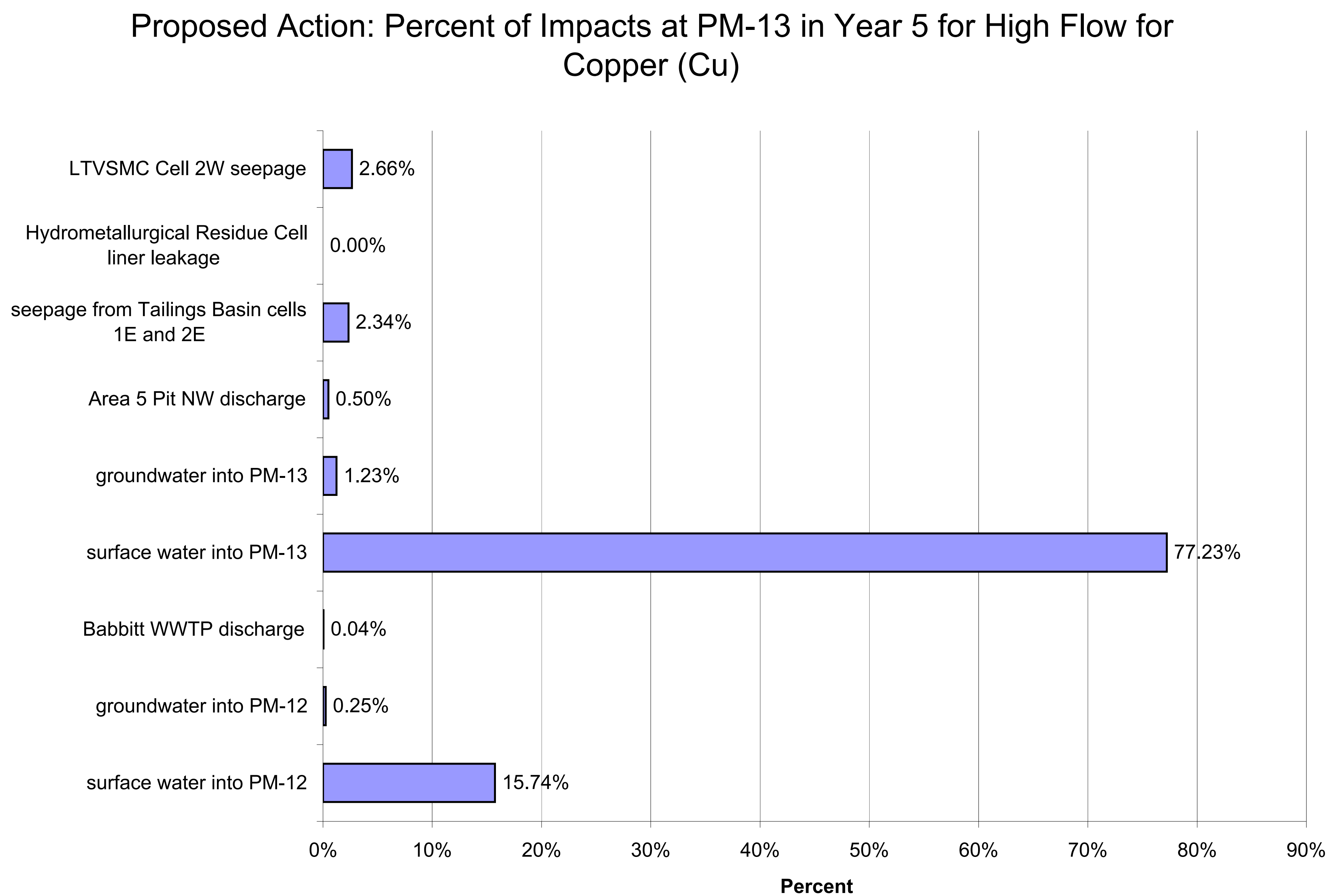


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Copper (Cu)

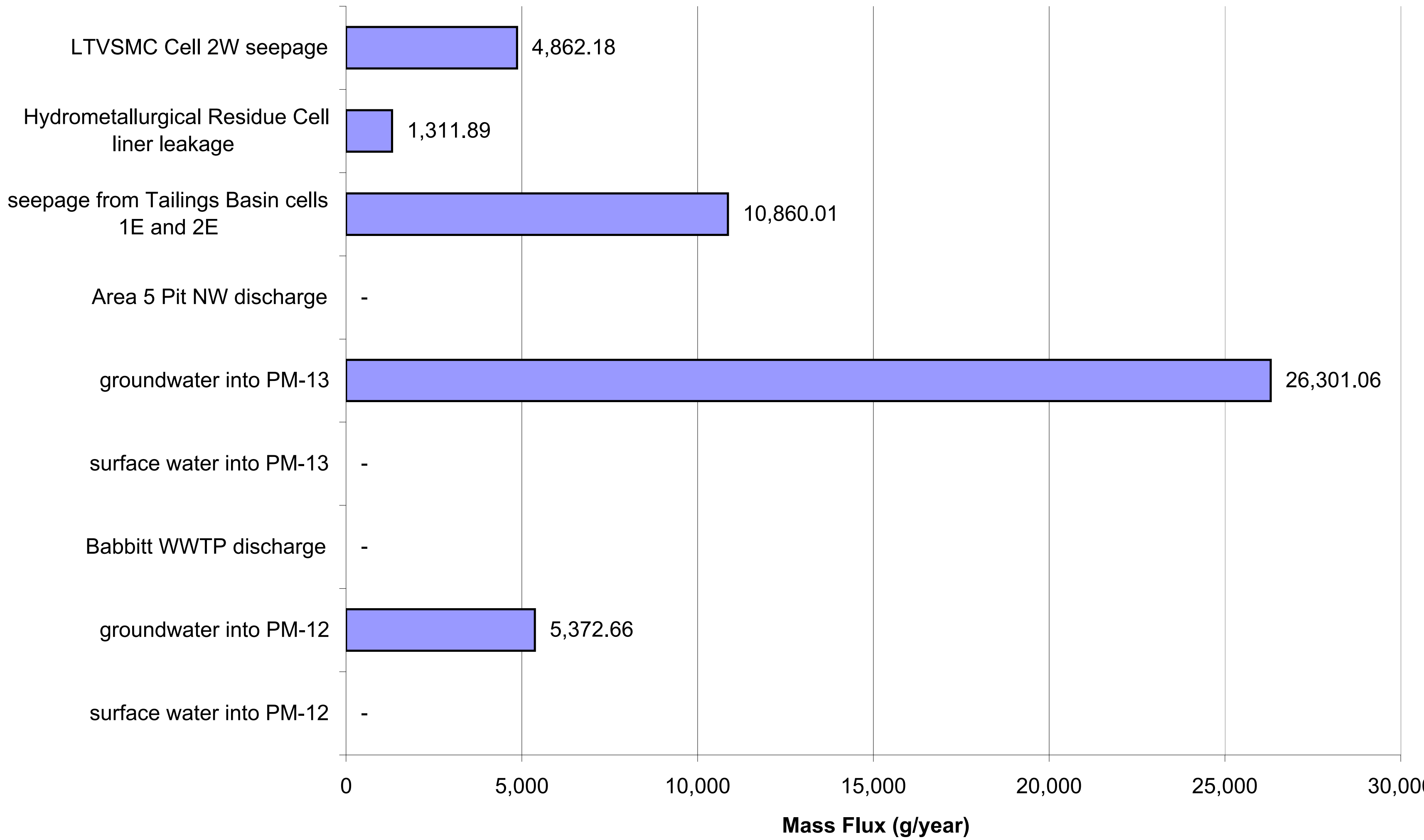



Proposed Action: Percent of Impacts at PM-13 in Closure for Year 5 Flow for Copper (Cu)
LTVSMC Cell 2W seepage
17.51%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
15.44%
Area 5 Pit NW discharge
3.31%
groundwater into PM-13
8.13%
surface water into PM-13
44.56%
Babbitt WWTP discharge
0.24%
groundwater into PM-12
1.66%
surface water into PM-12
9.13%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

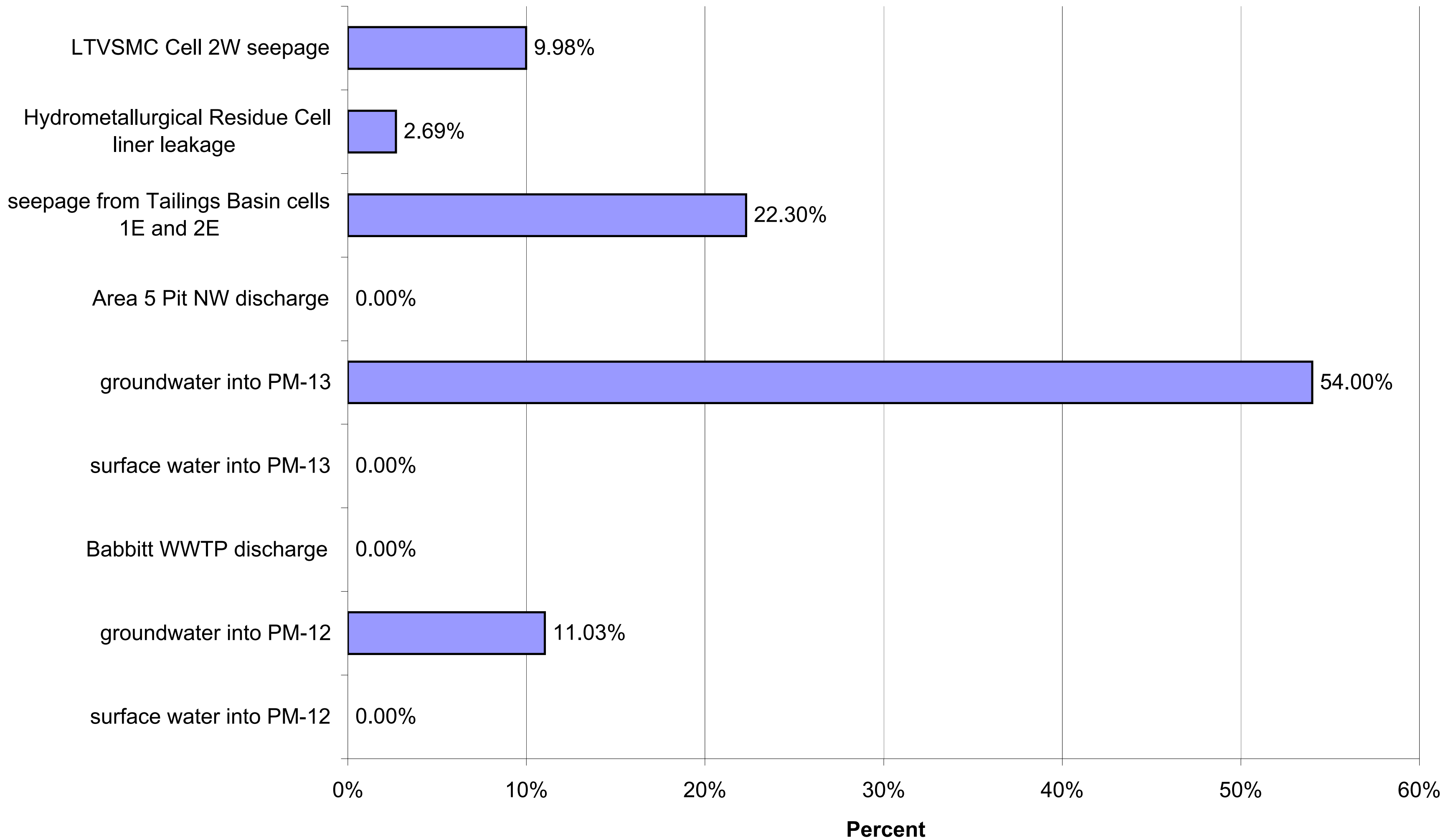

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
32,358.96
Hydrometallurgical Residue Cell liner leakage
20.08
seepage from Tailings Basin cells 1E and 2E
28,549.68
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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)
LTVSMC Cell 2W seepage
2.66%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
2.34%
Area 5 Pit NW discharge
0.50%
groundwater into PM-13
1.23%
surface water into PM-13
77.23%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.25%
surface water into PM-12
15.74%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

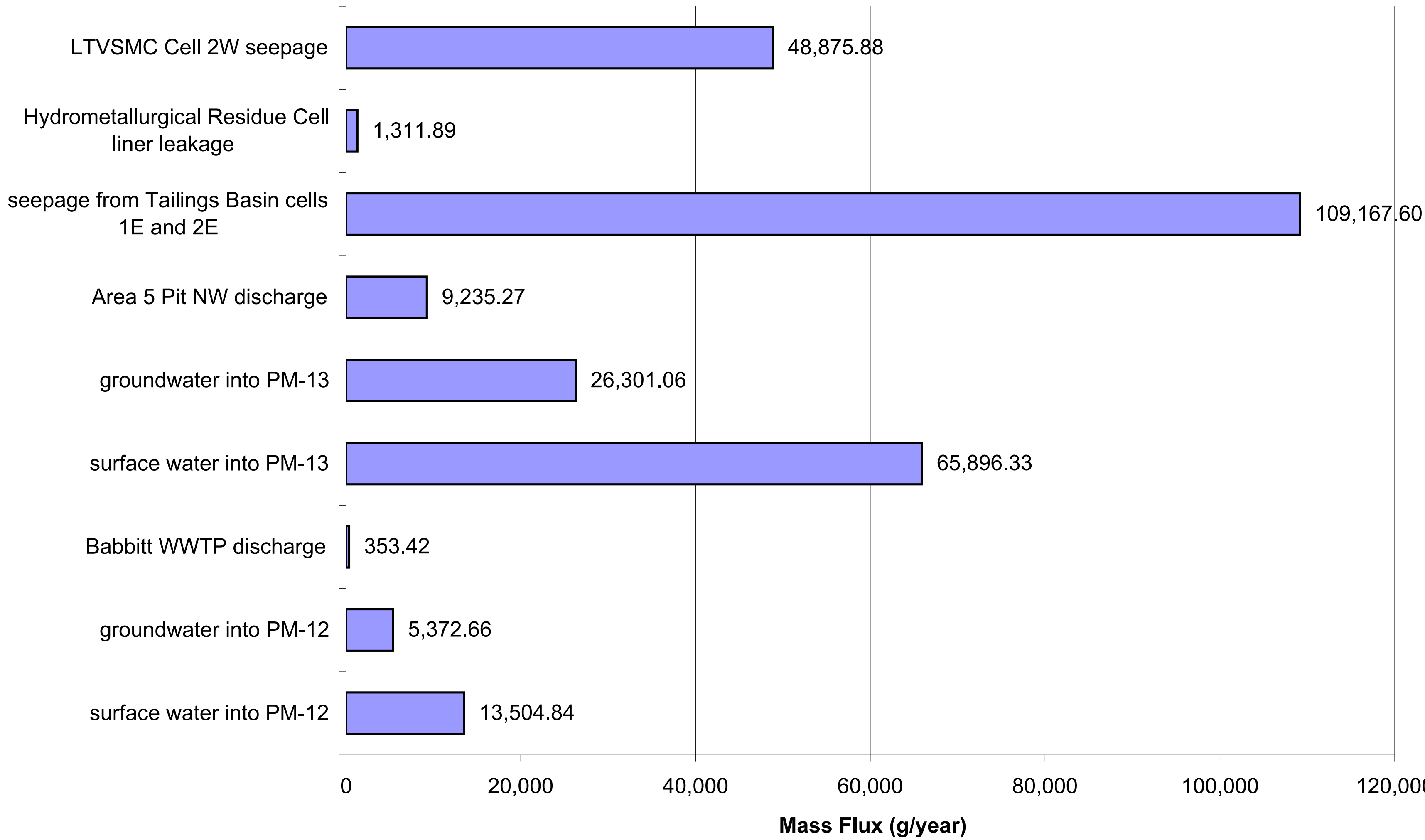
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)

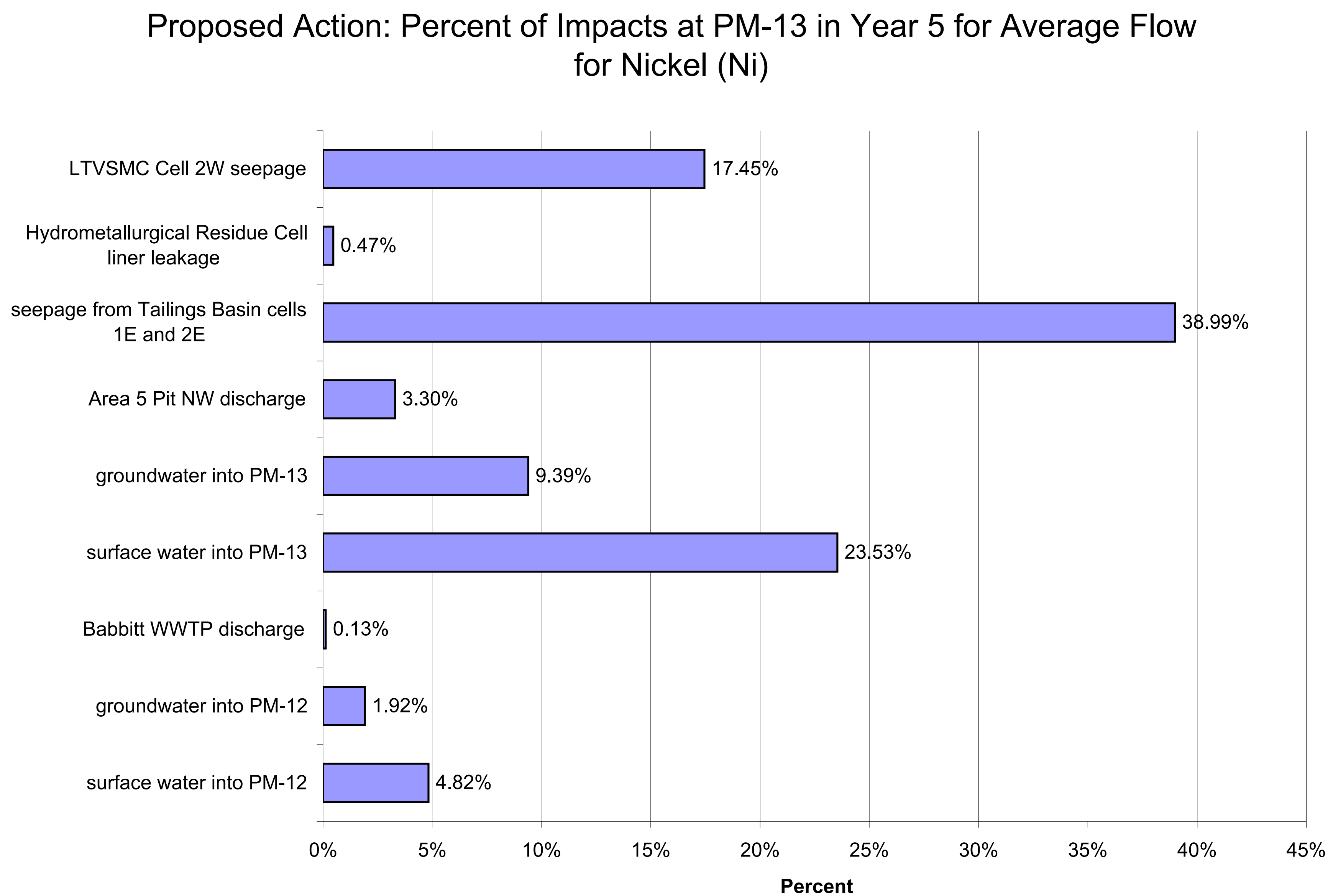


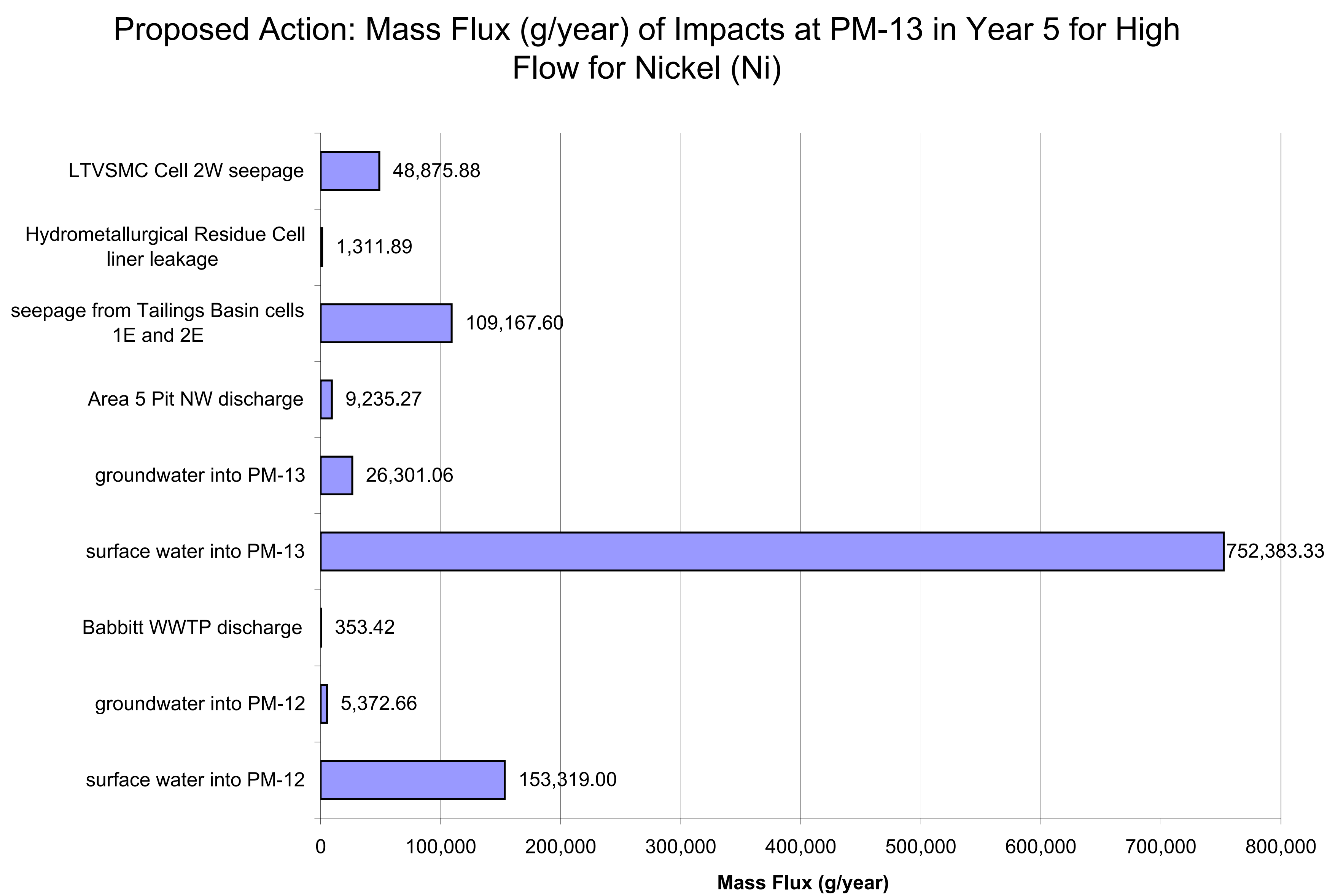
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)



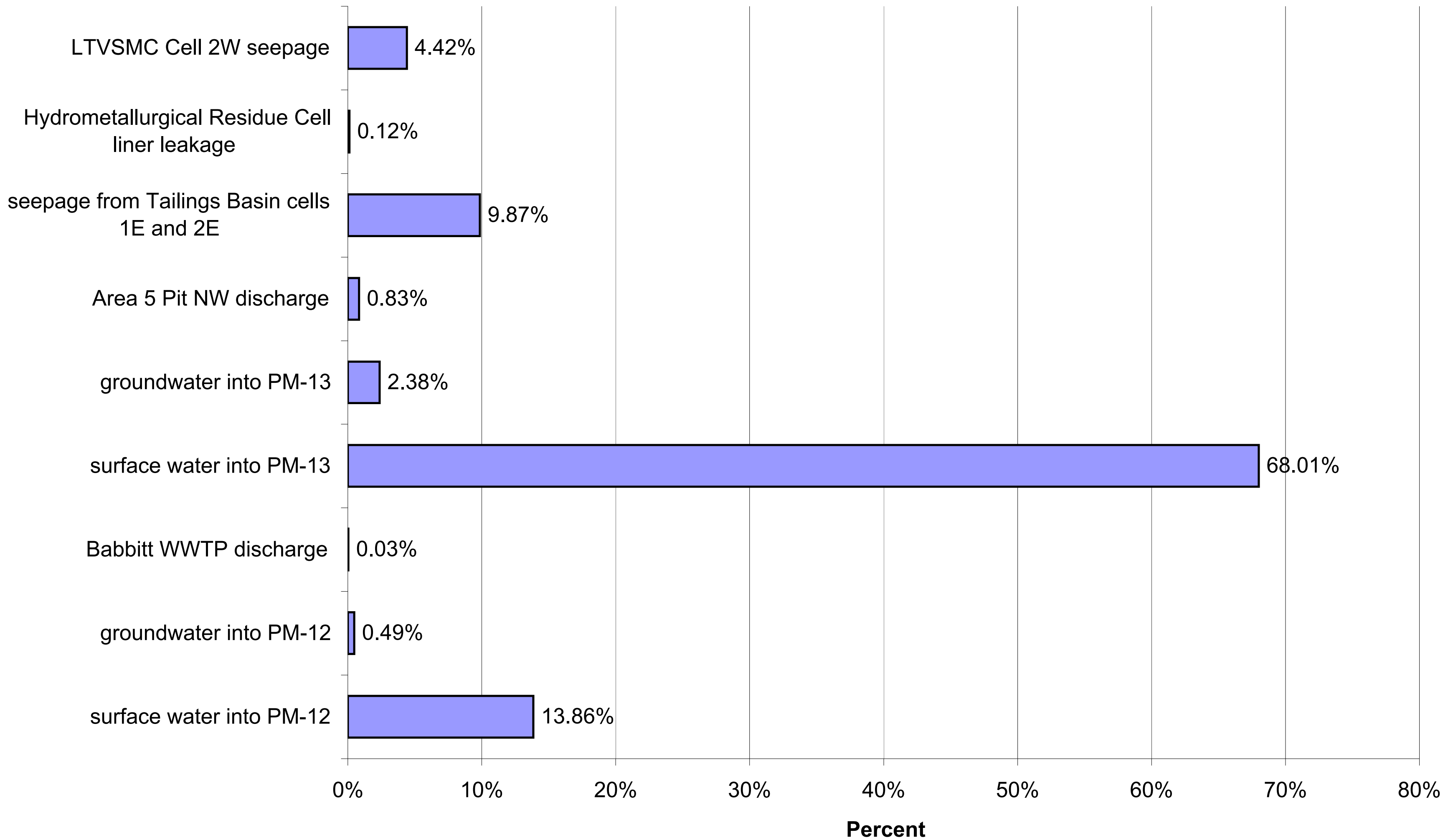
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)

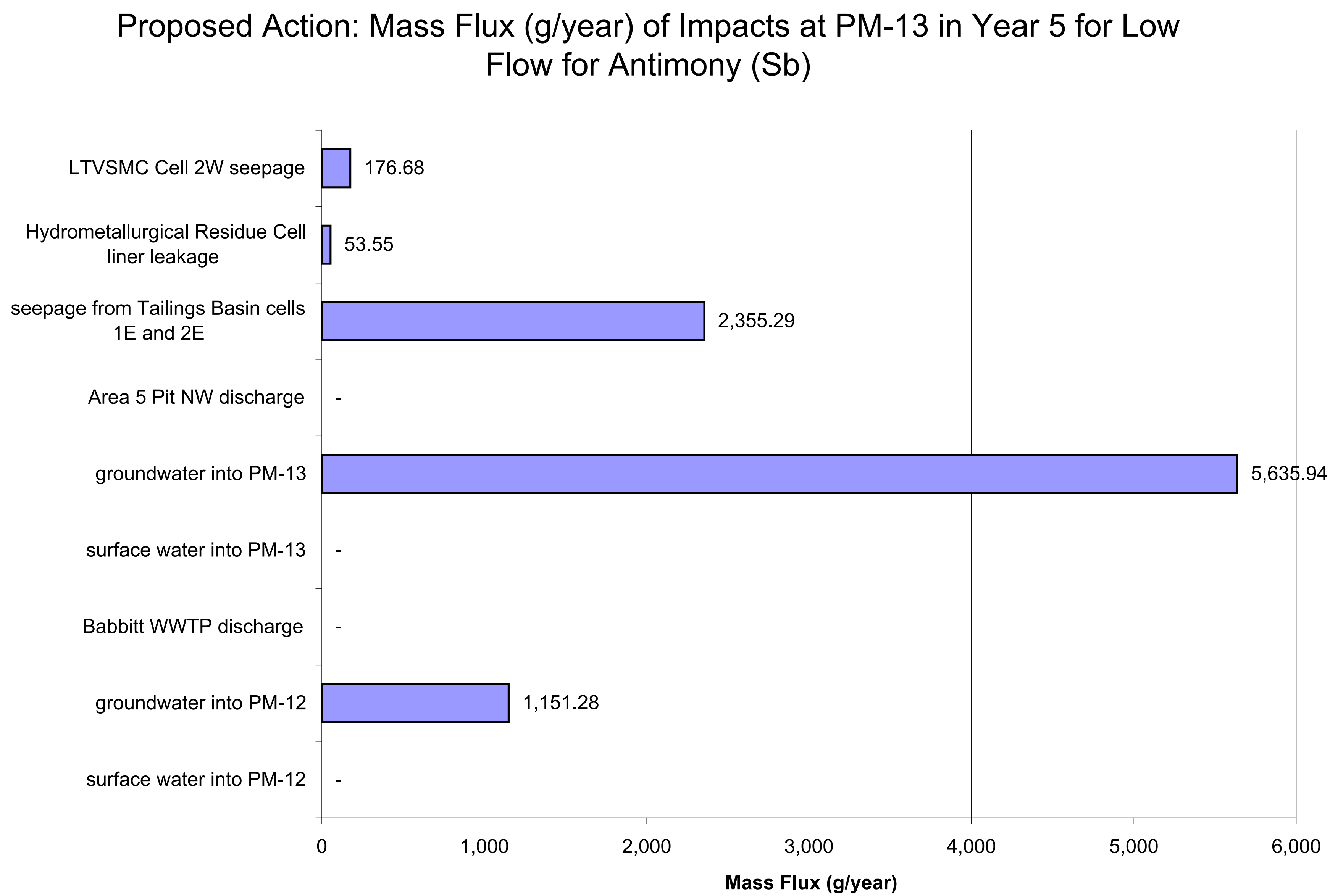


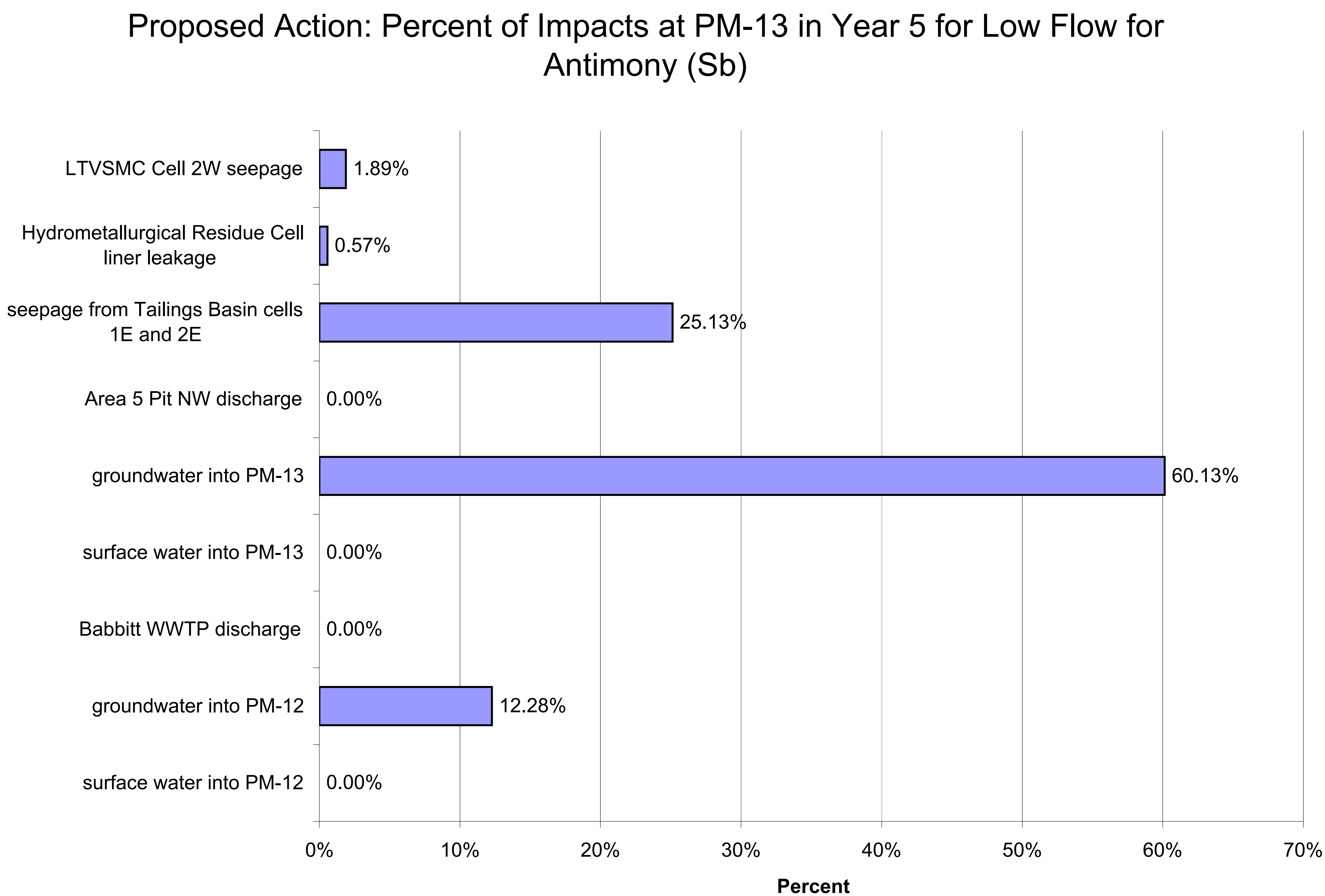

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
17.45%
Hydrometallurgical Residue Cell liner leakage
0.47%
seepage from Tailings Basin cells 1E and 2E
38.99%
Area 5 Pit NW discharge
3.30%
groundwater into PM-13
9.39%
surface water into PM-13
23.53%
Babbitt WWTP discharge
0.13%
groundwater into PM-12
1.92%
surface water into PM-12
4.82%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

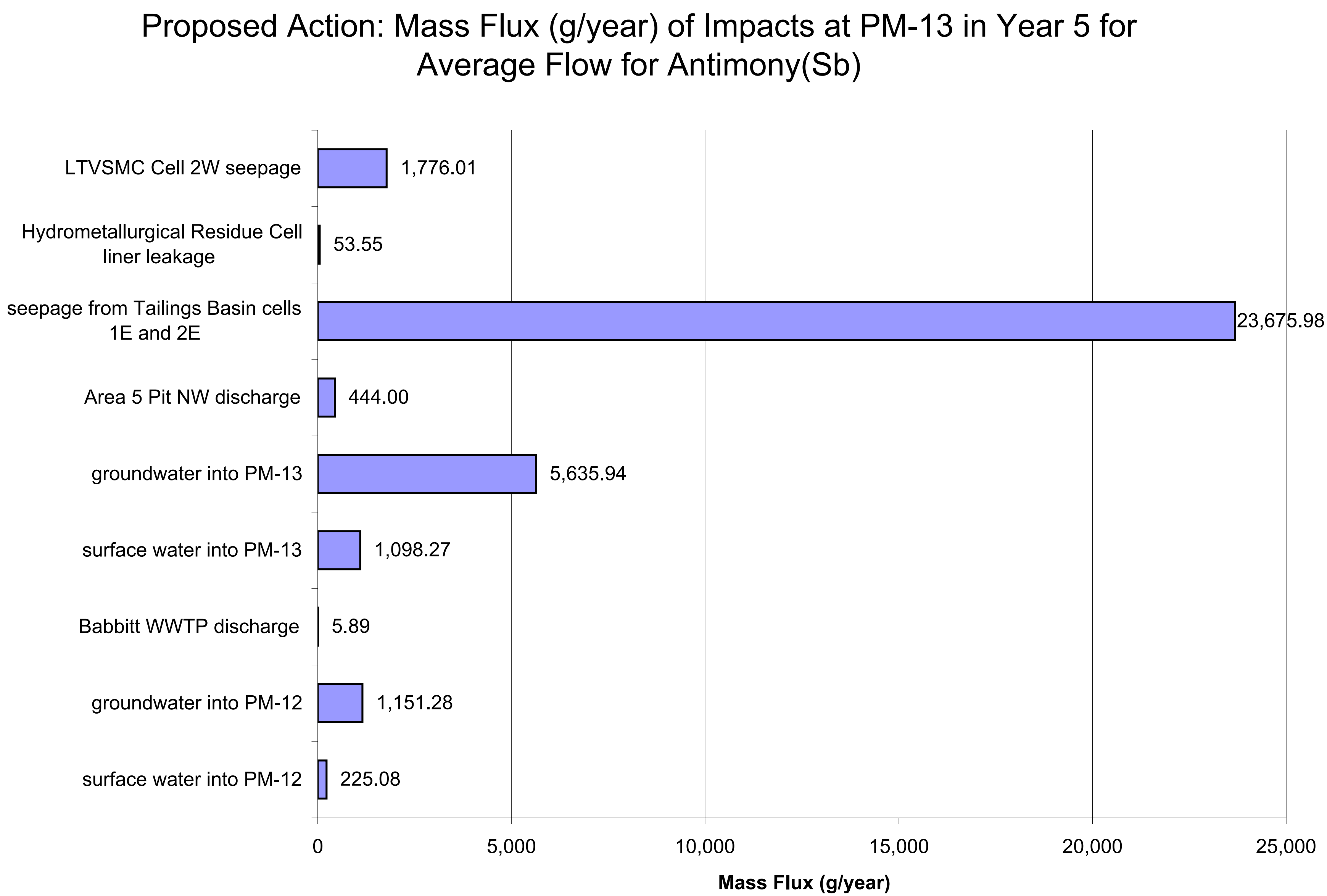

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,311.89
seepage from Tailings Basin cells 1E and 2E
109,167.60
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)

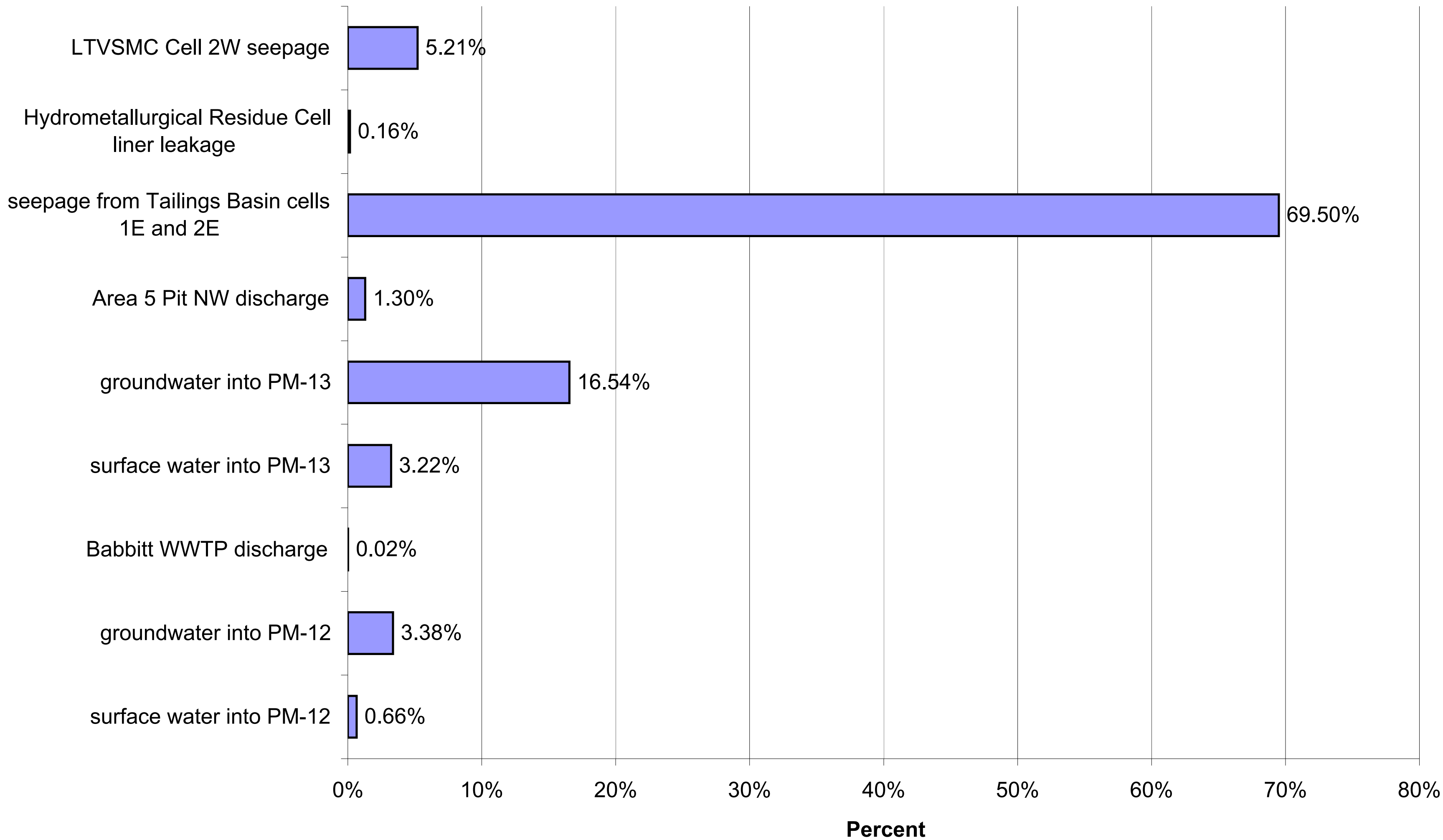



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
176.68
Hydrometallurgical Residue Cell liner leakage
53.55
seepage from Tailings Basin cells 1E and 2E
2,355.29
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

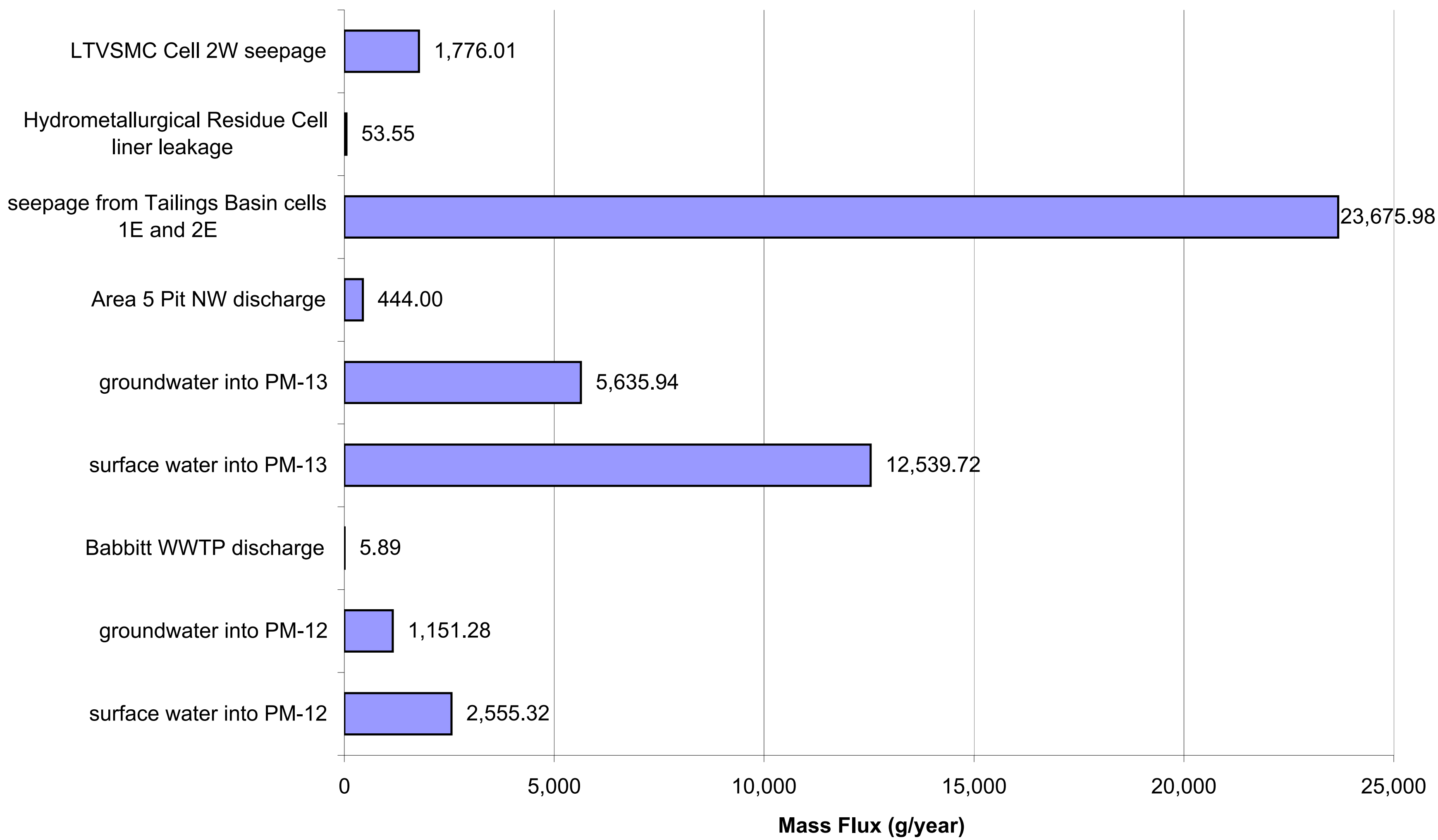

Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.89%
Hydrometallurgical Residue Cell liner leakage
0.57%
seepage from Tailings Basin cells 1E and 2E
25.13%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
60.13%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.28%
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 Antimony(Sb)
LTVSMC Cell 2W seepage
1,776.01
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
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

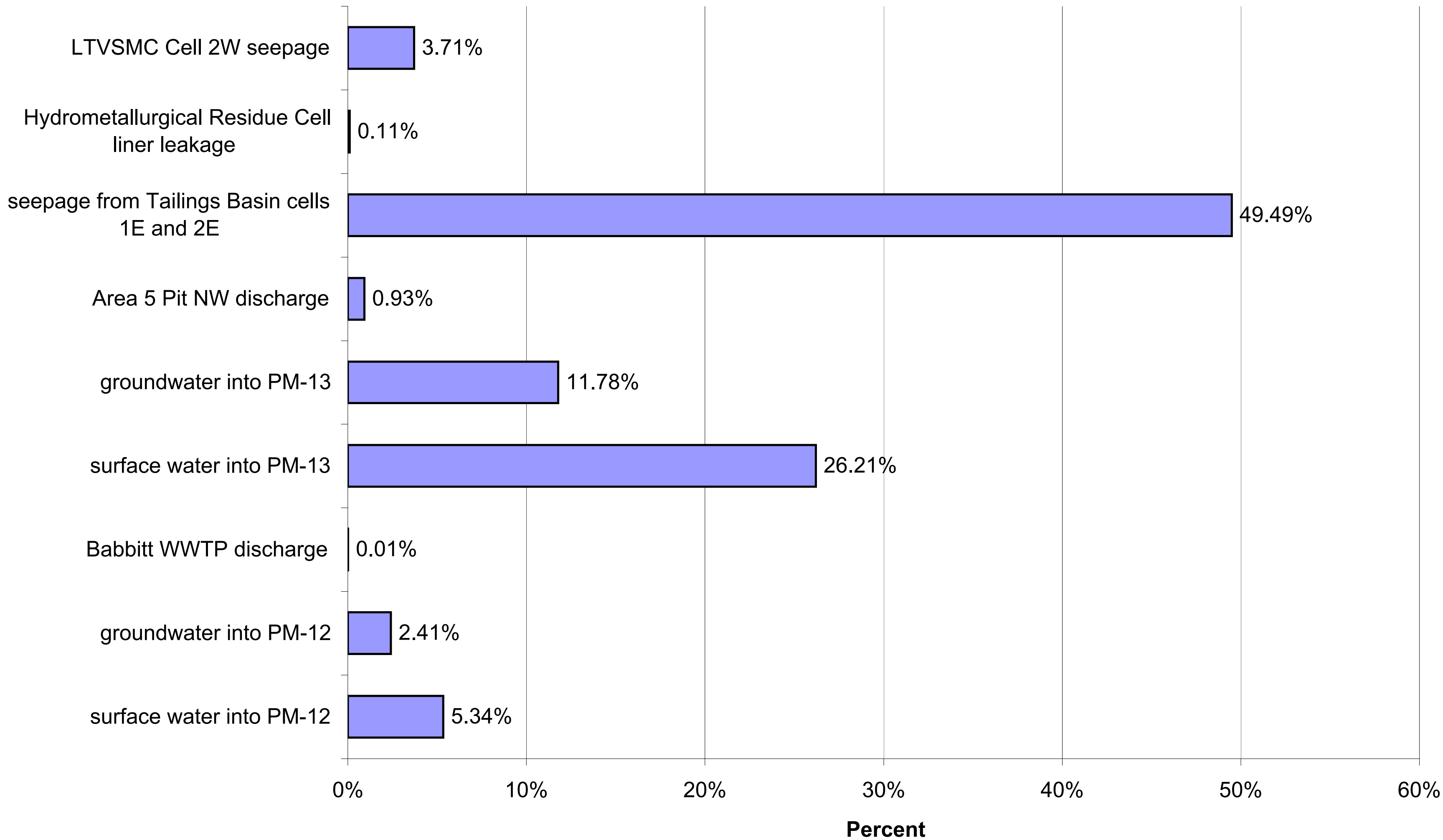
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Antimony (Sb)



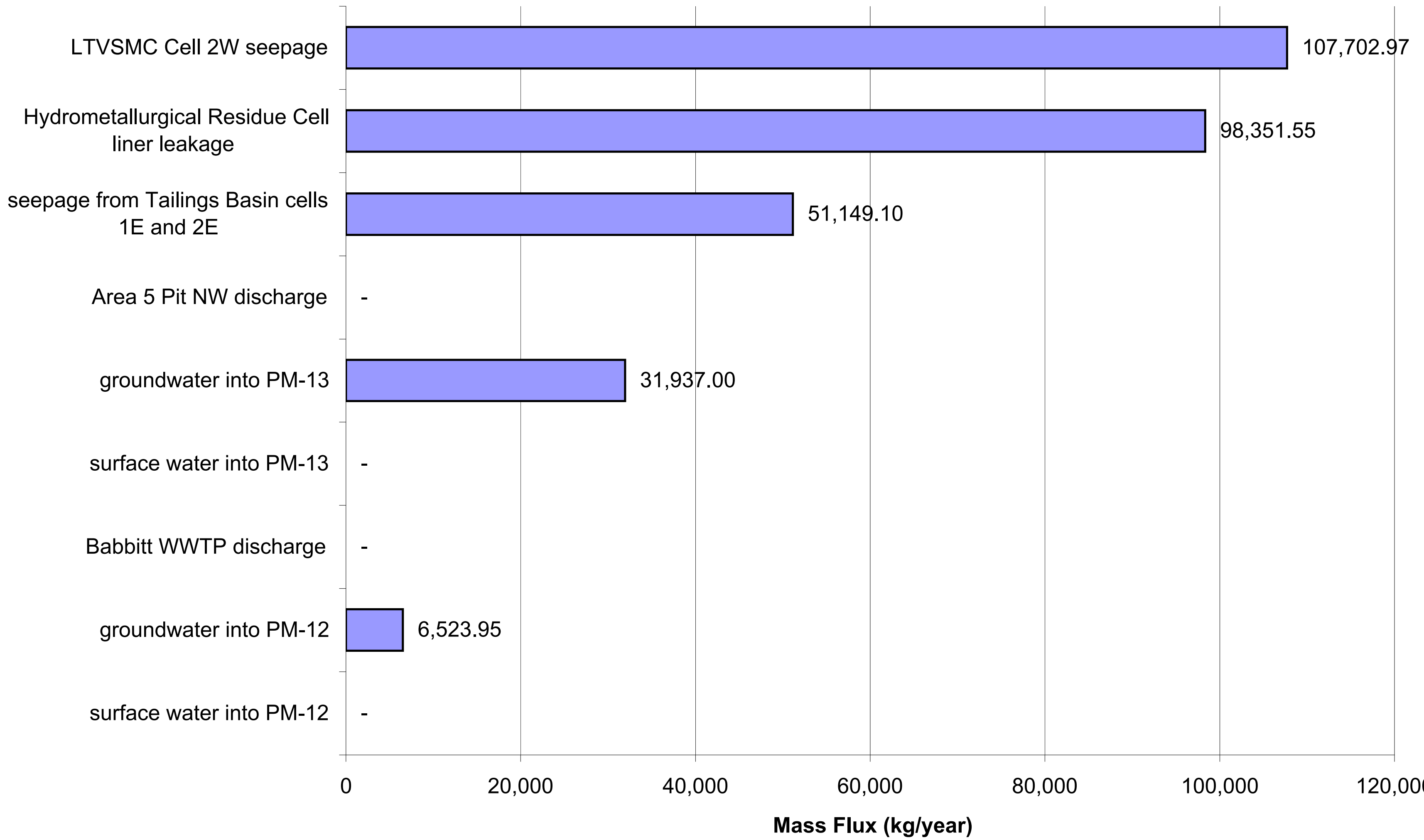
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)



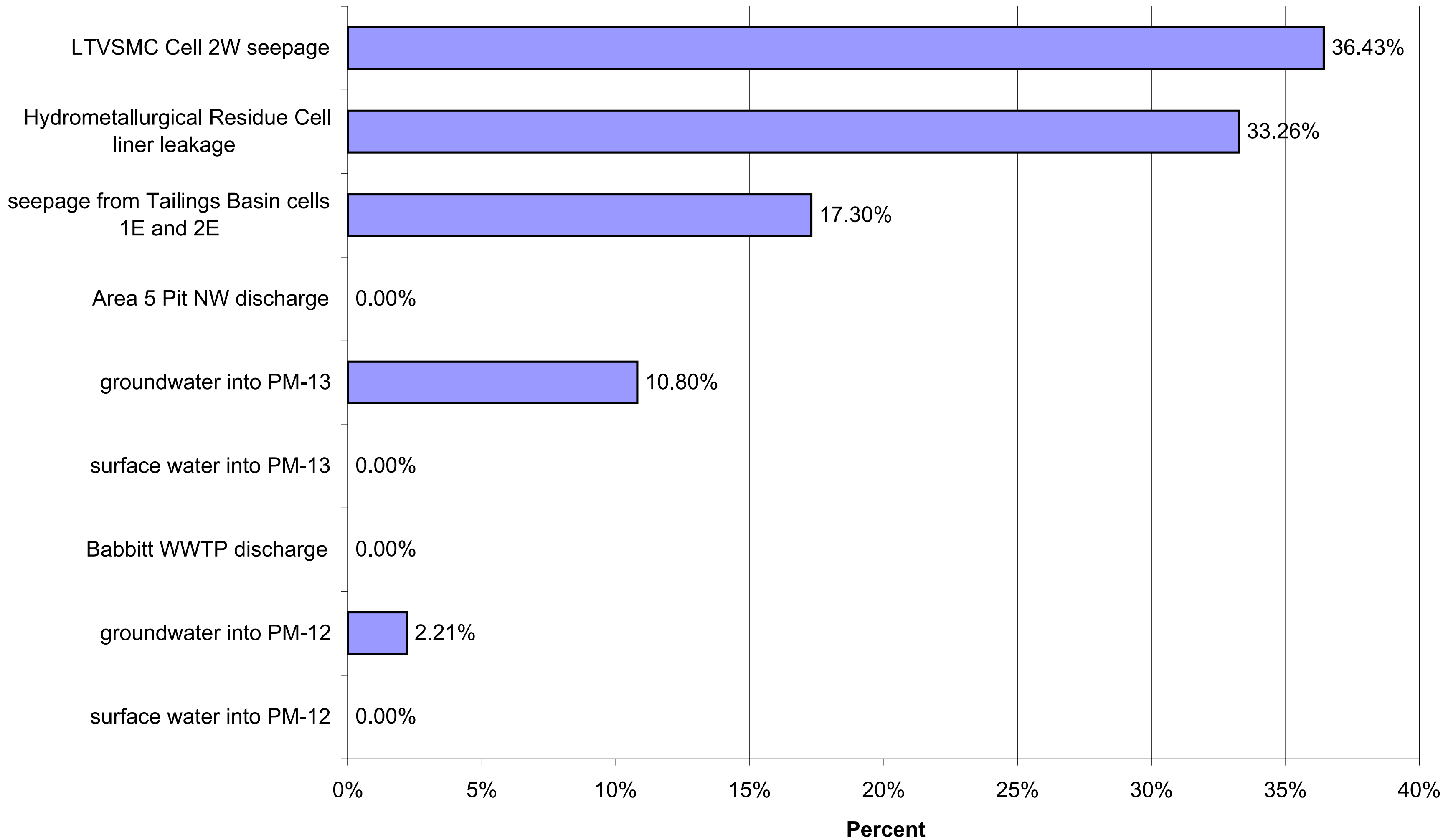
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)



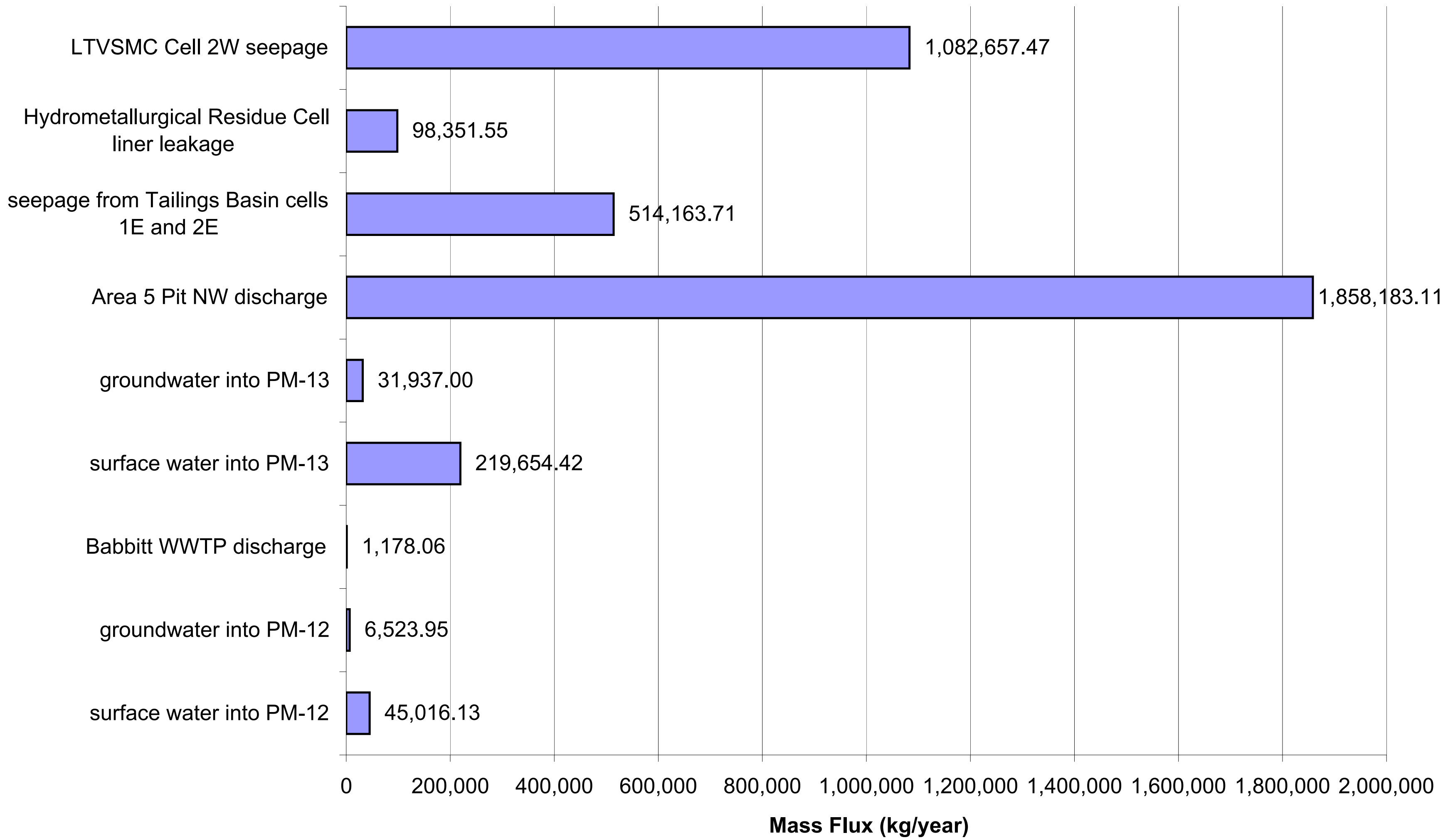
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)



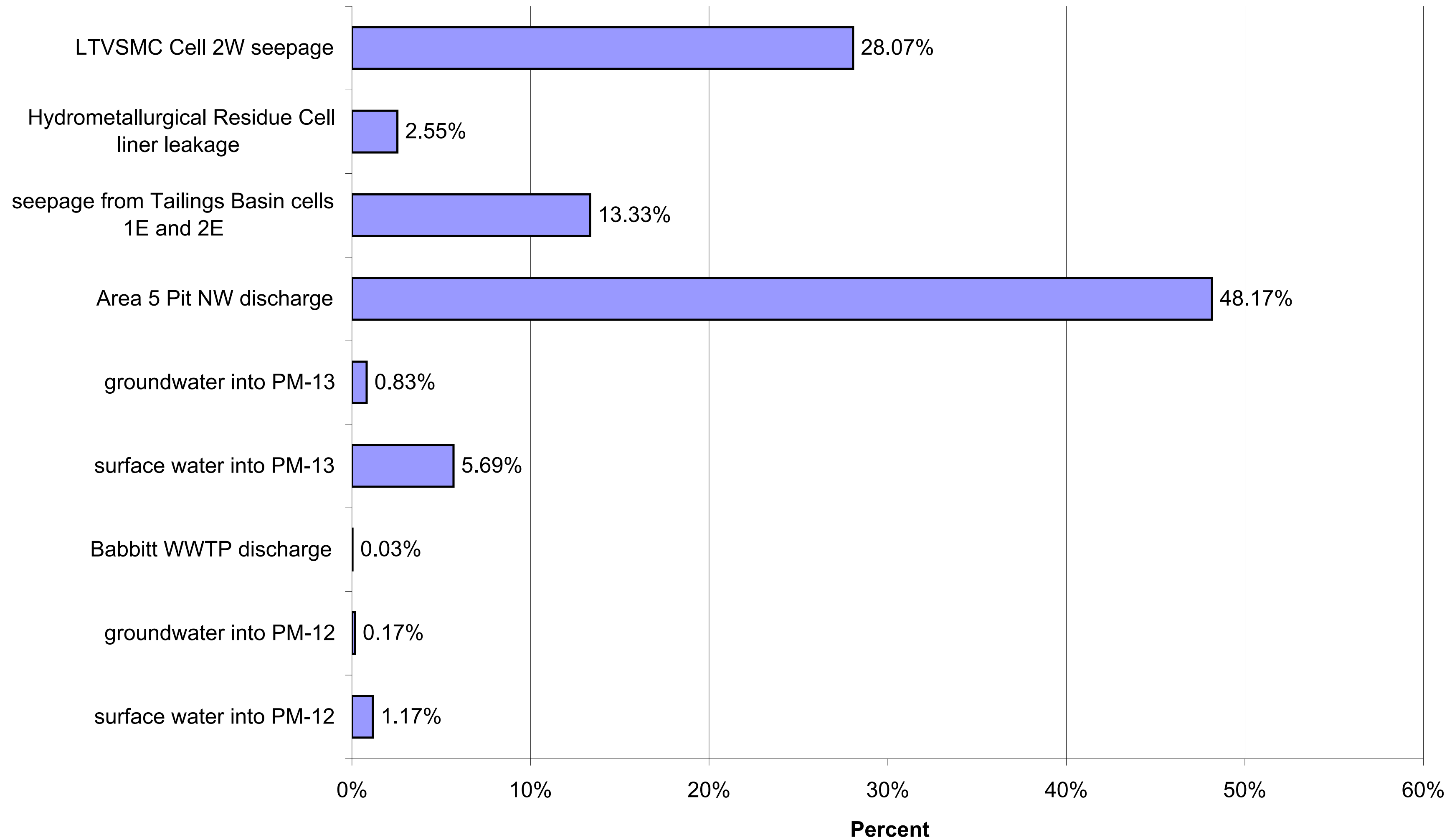
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)



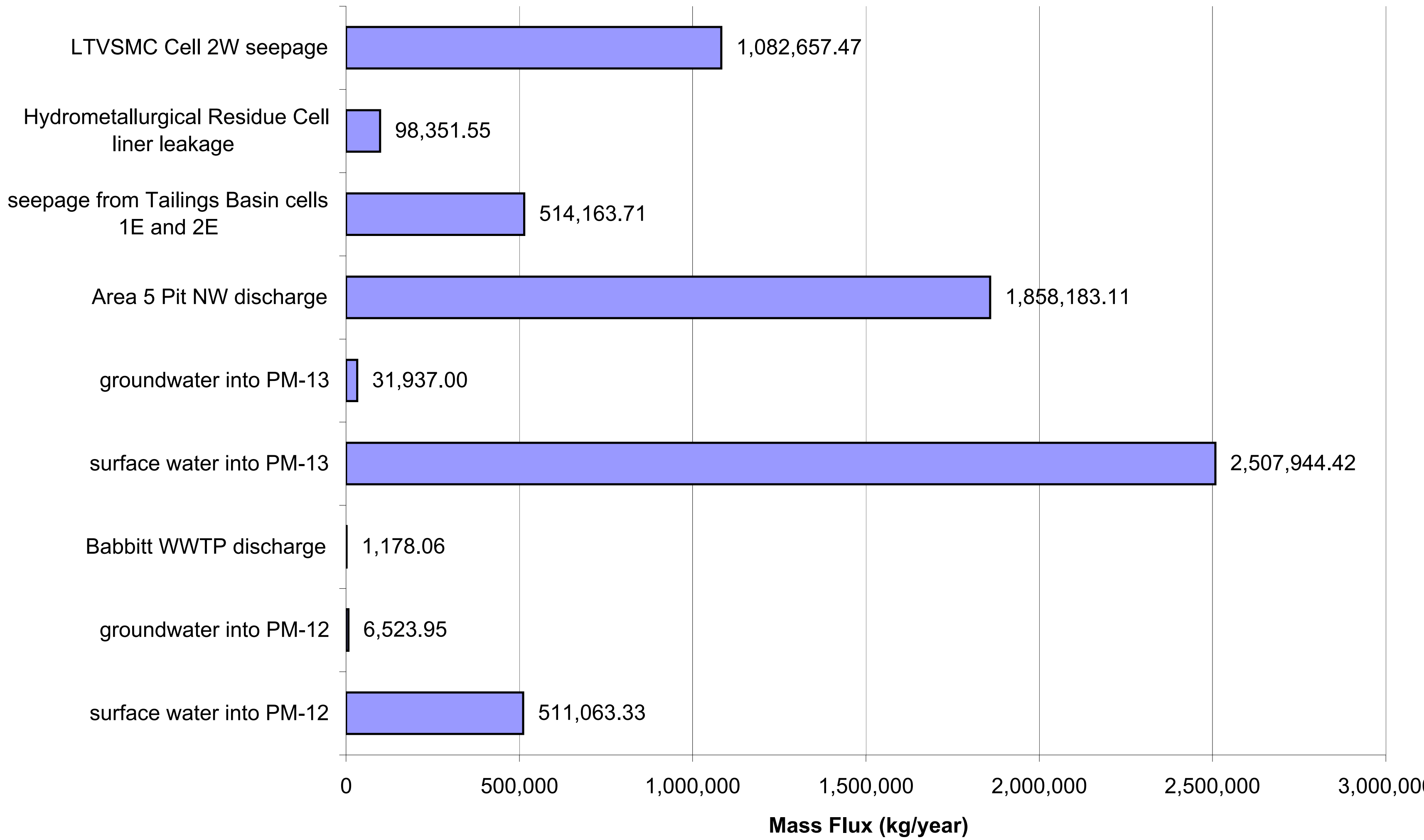
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)



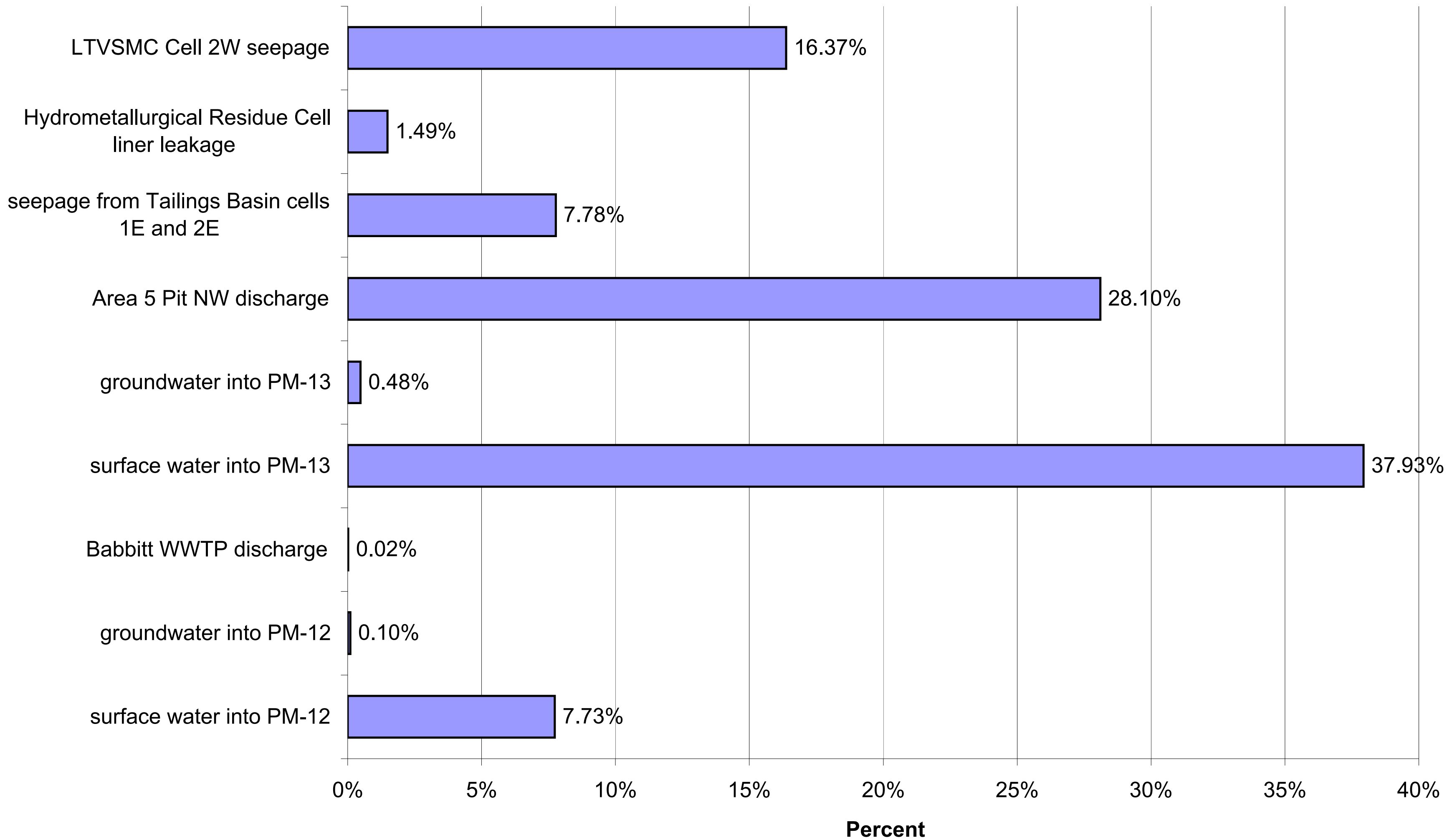
Proposed Action: Percent of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)



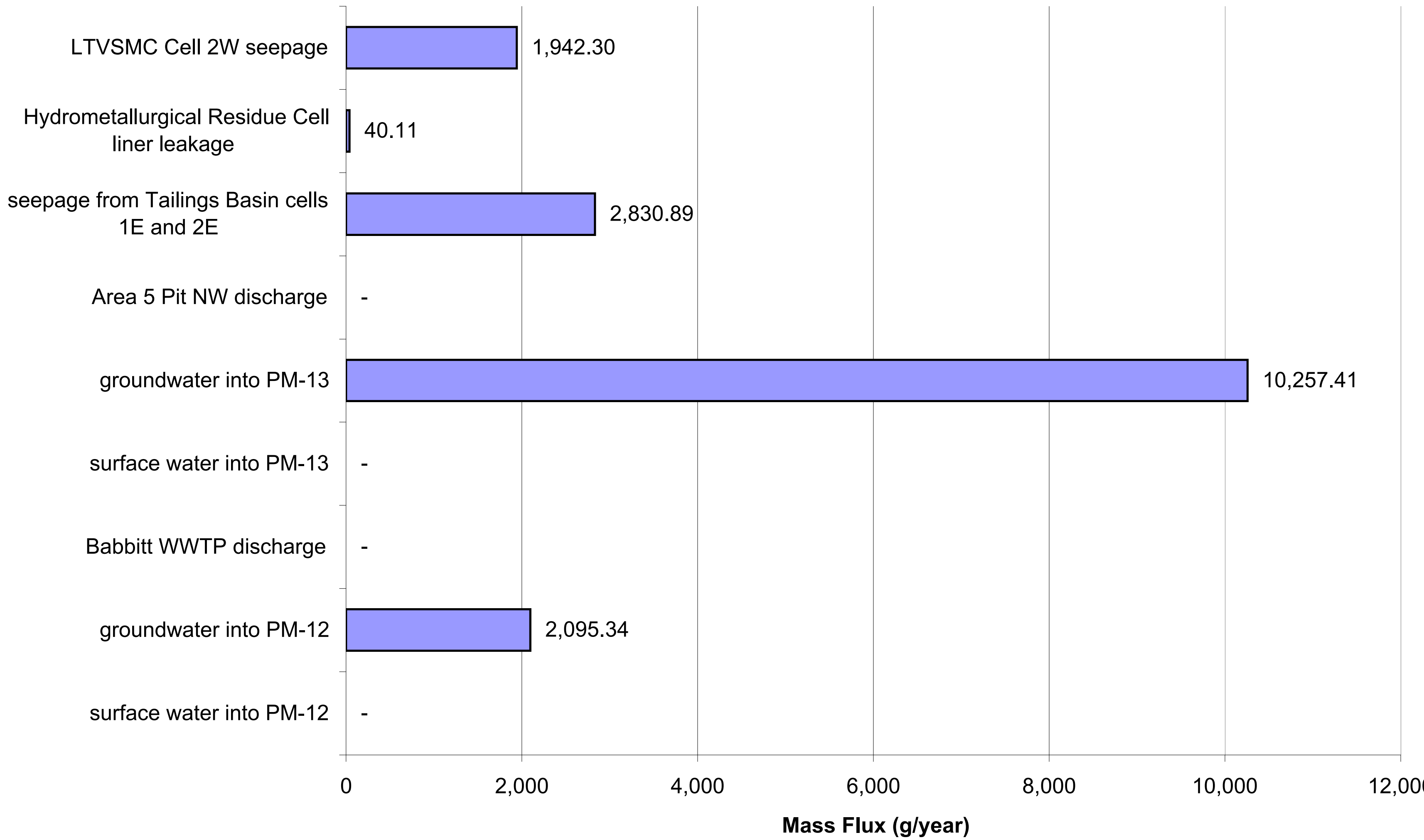
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)



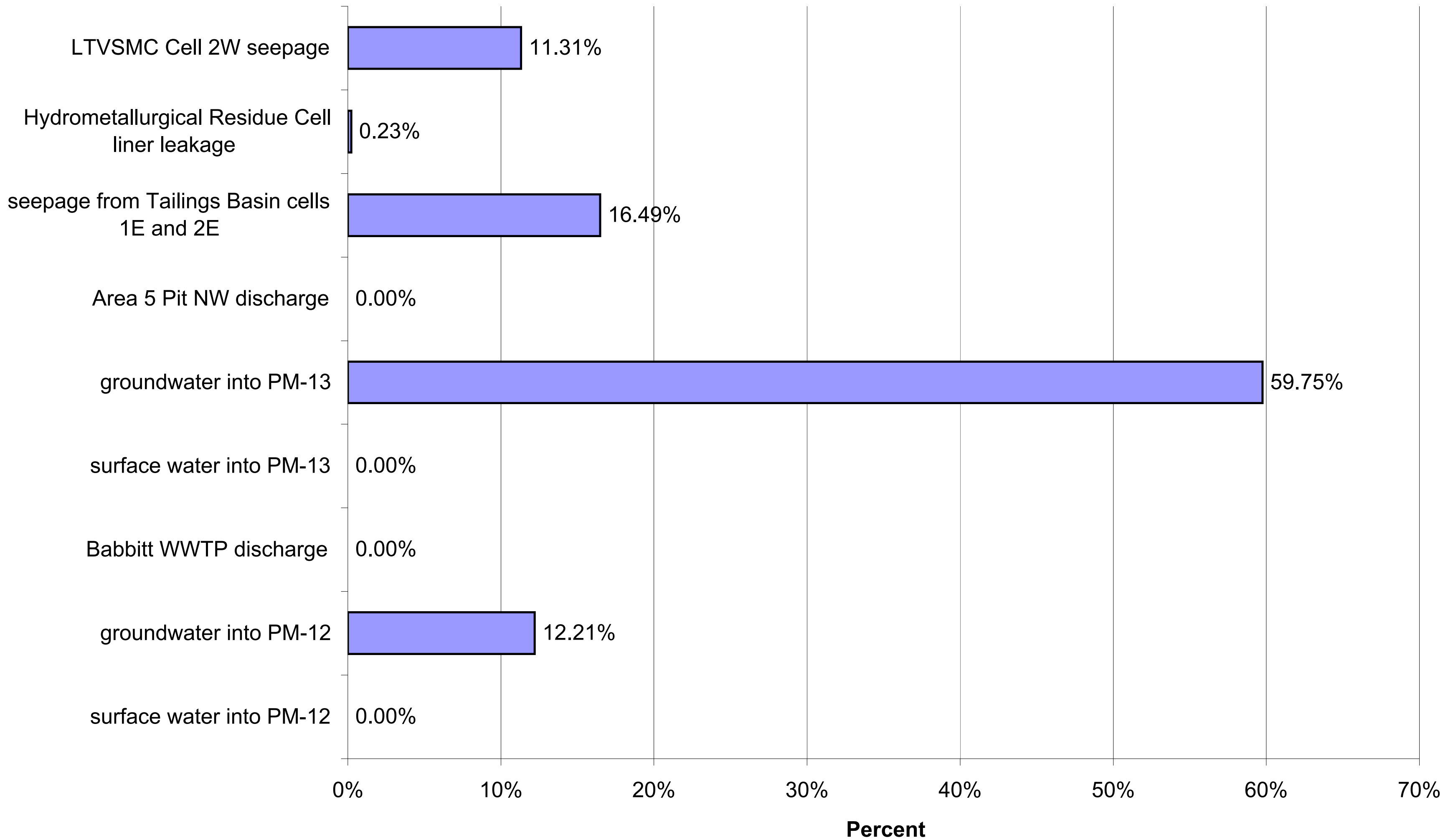
Proposed Action: Percent of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)

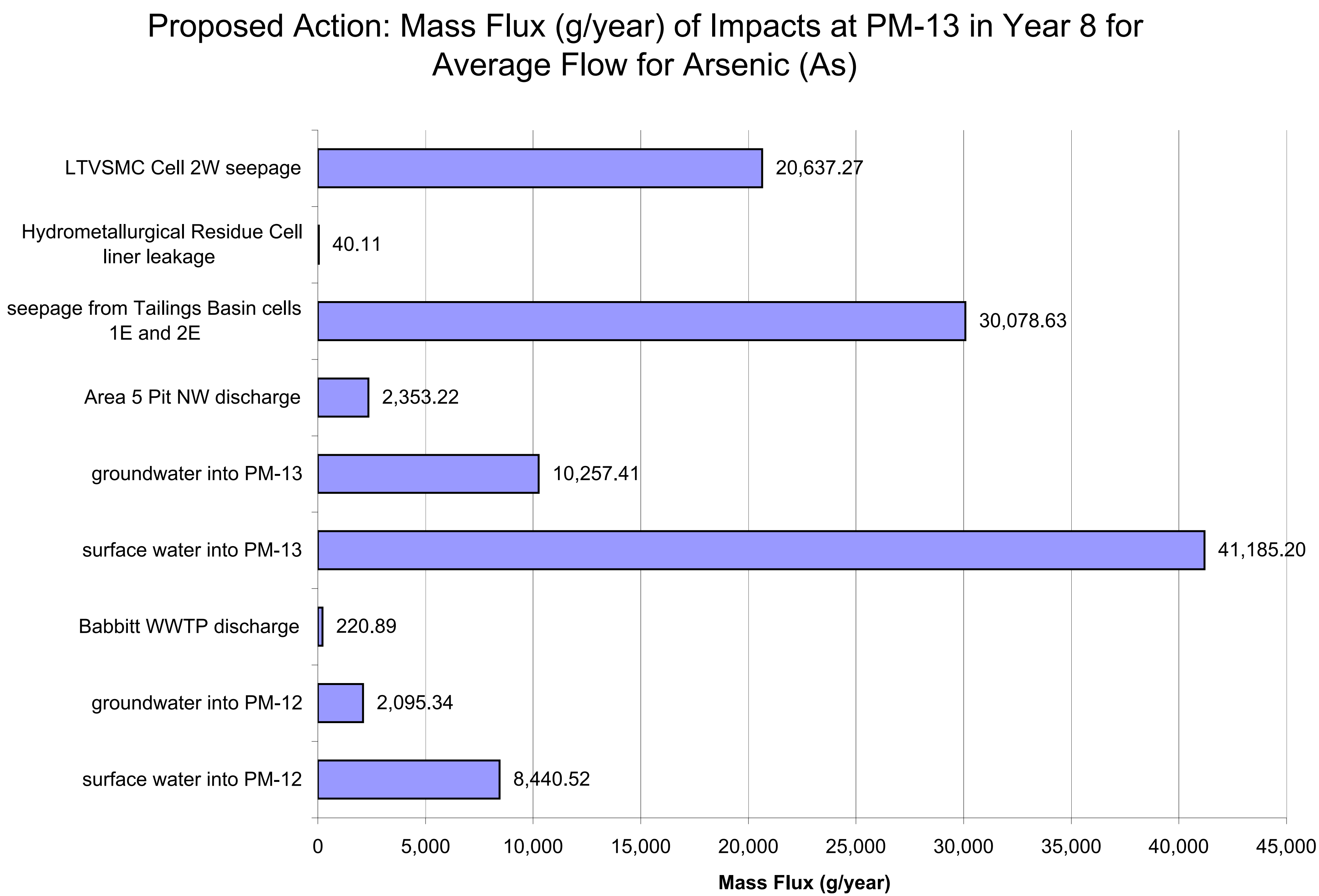


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Arsenic (As)

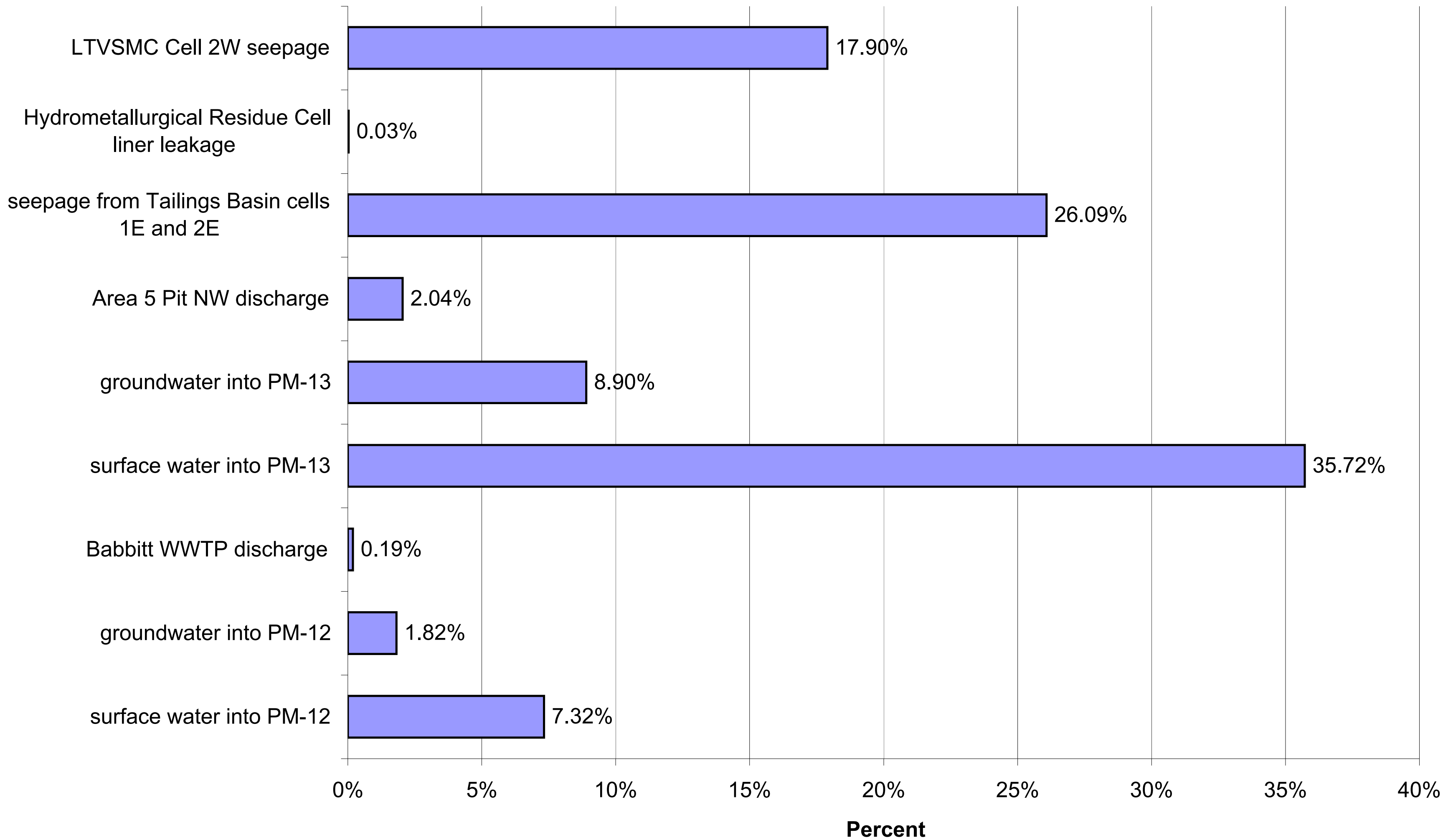


Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Arsenic (As)

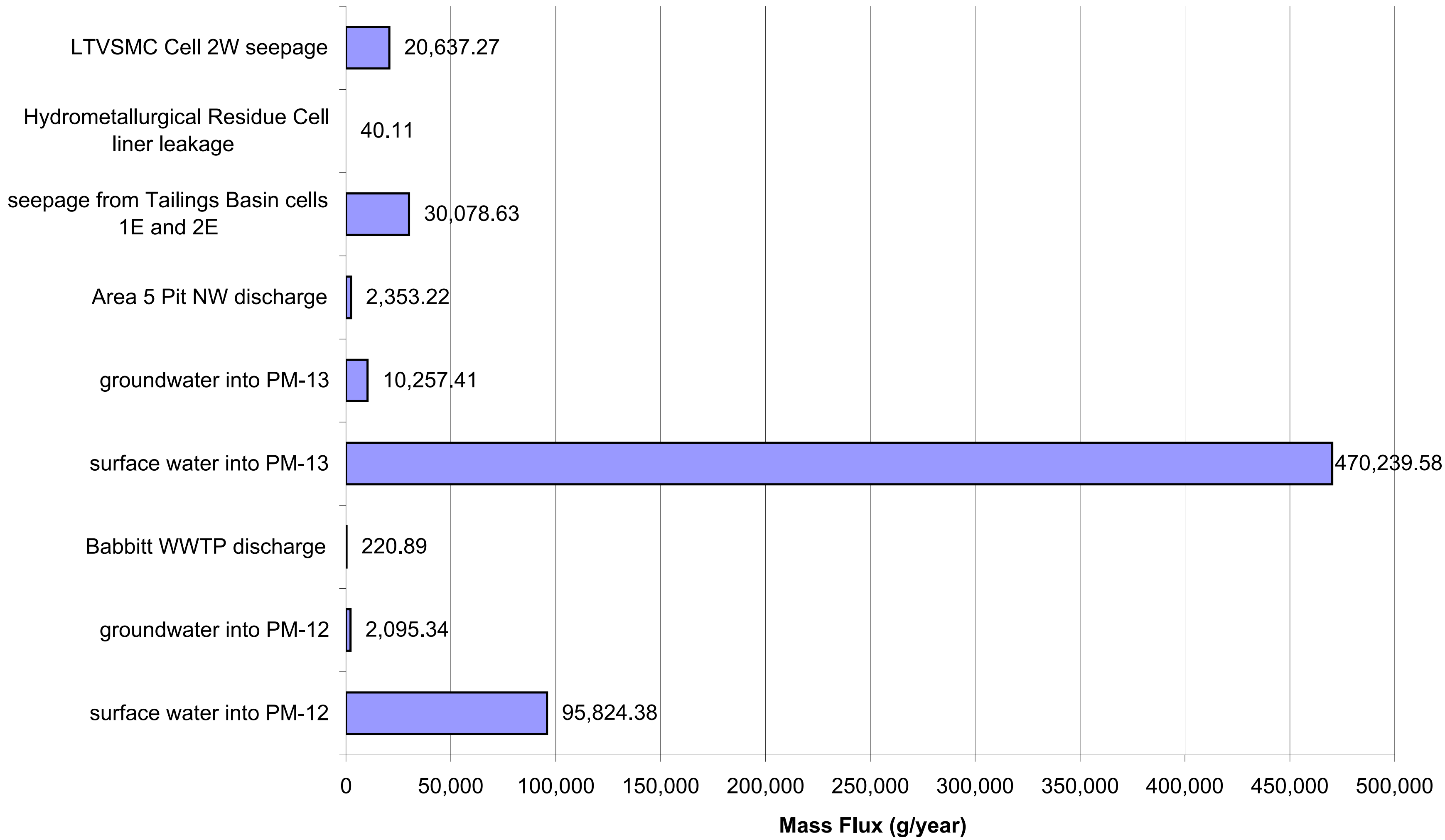


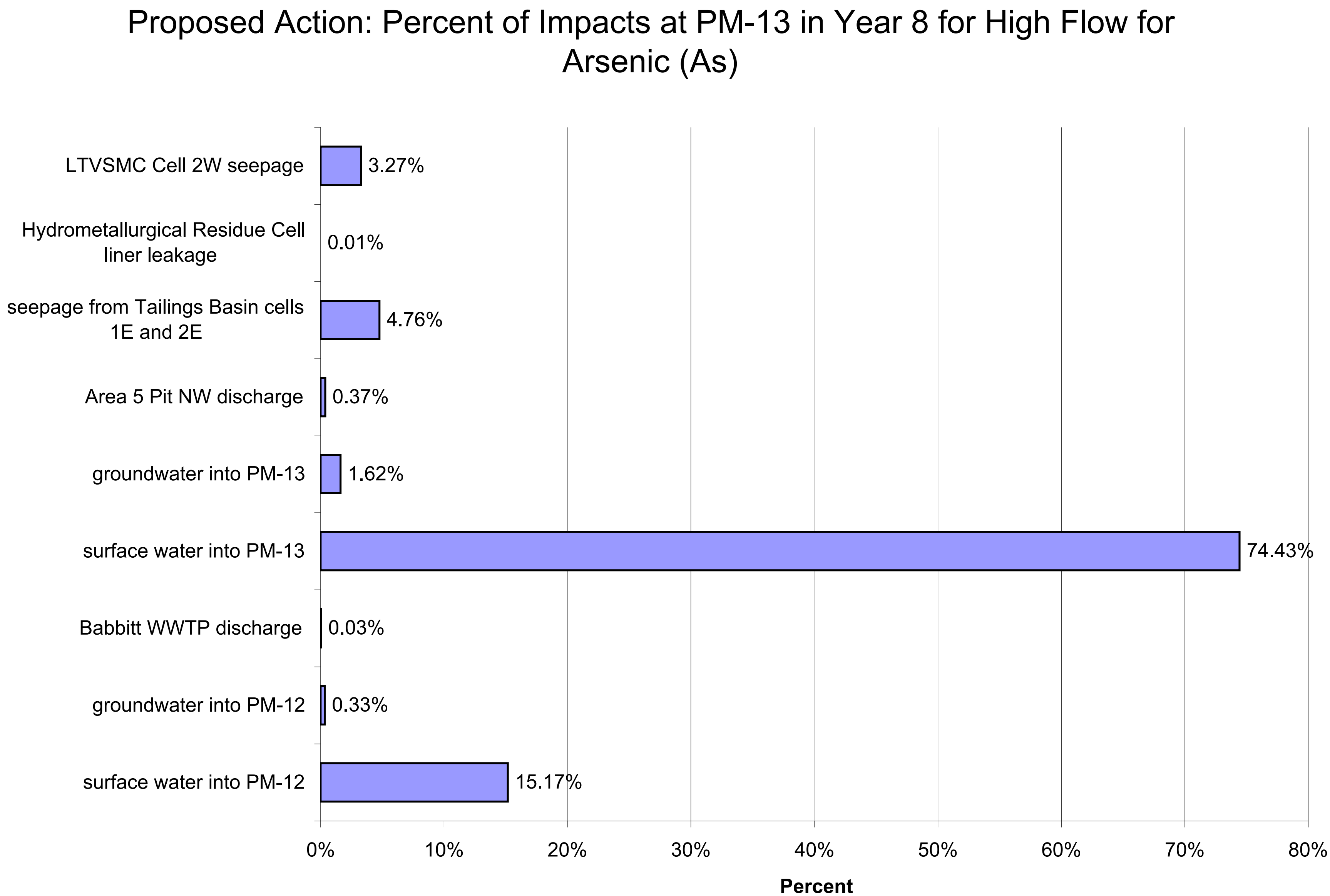

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
30,078.63
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
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)

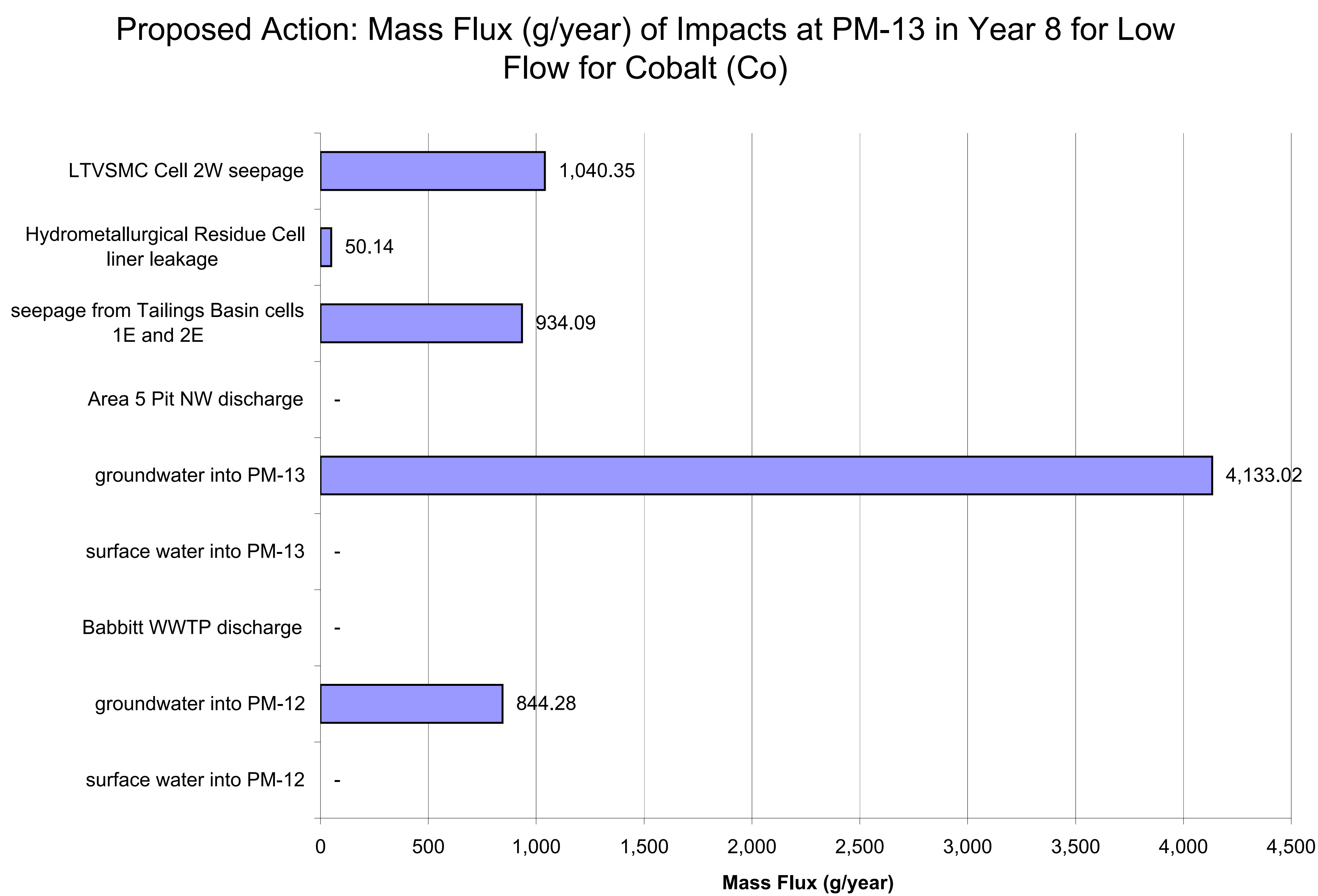
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Arsenic (As)



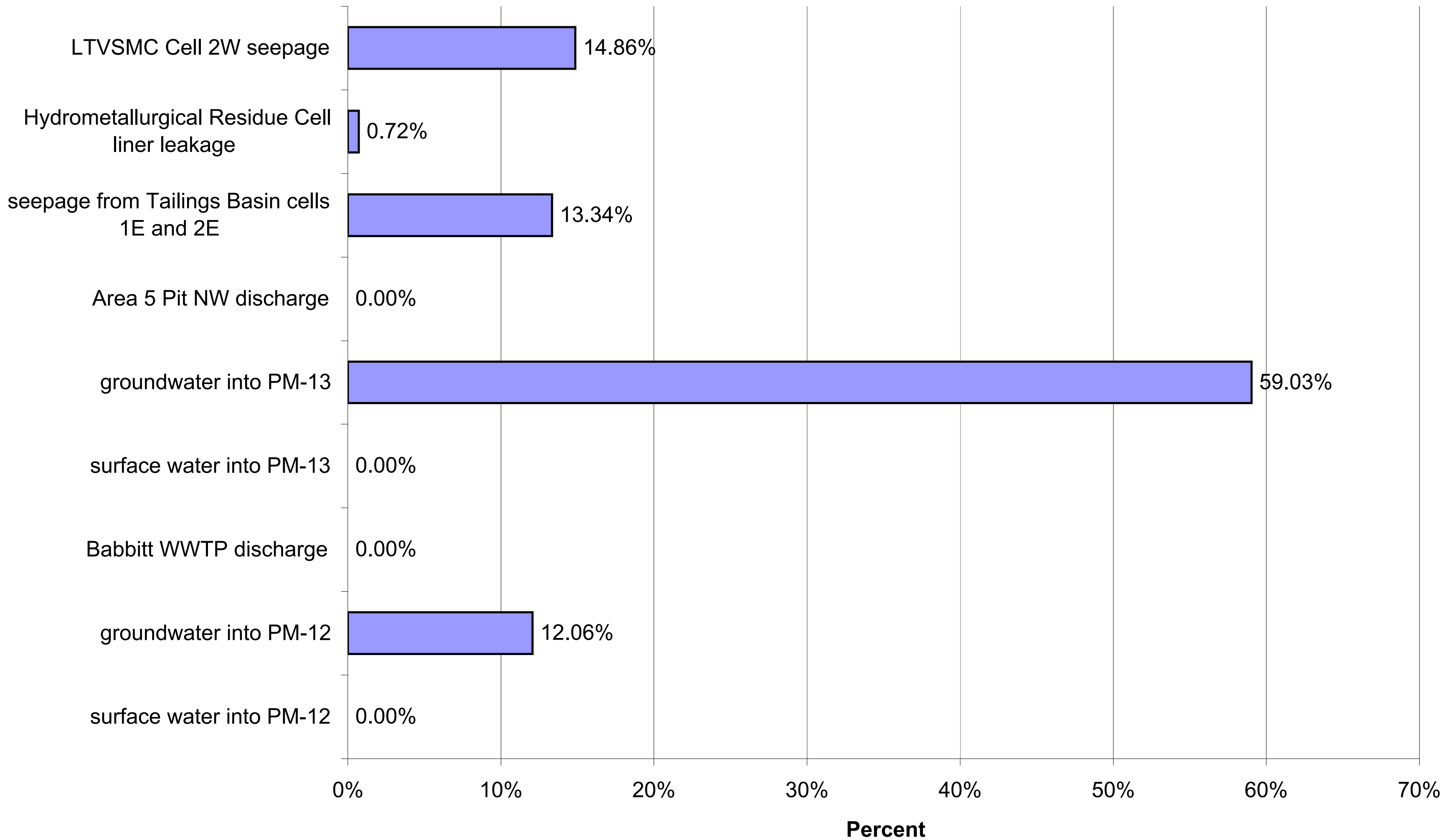
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Arsenic (As)

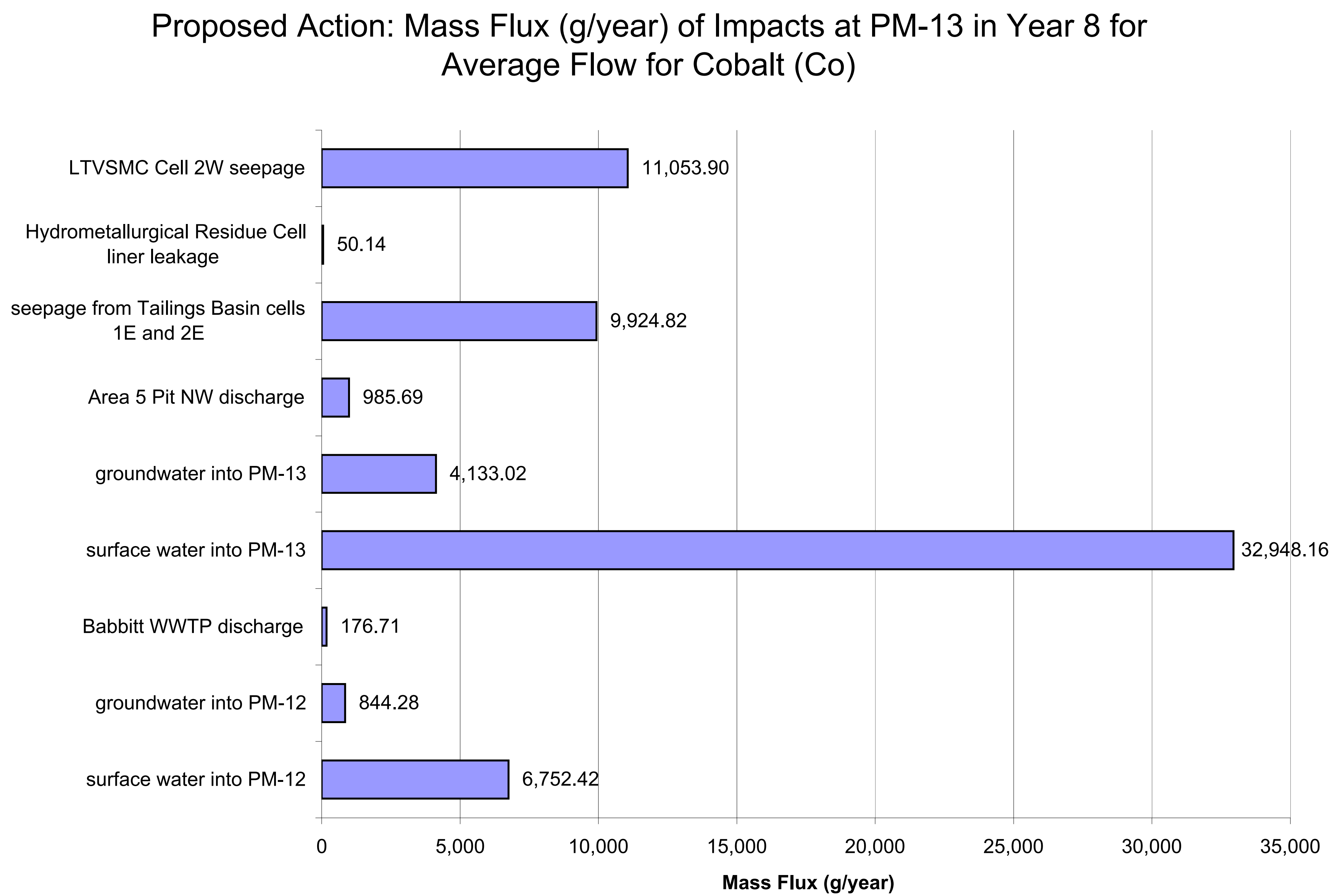


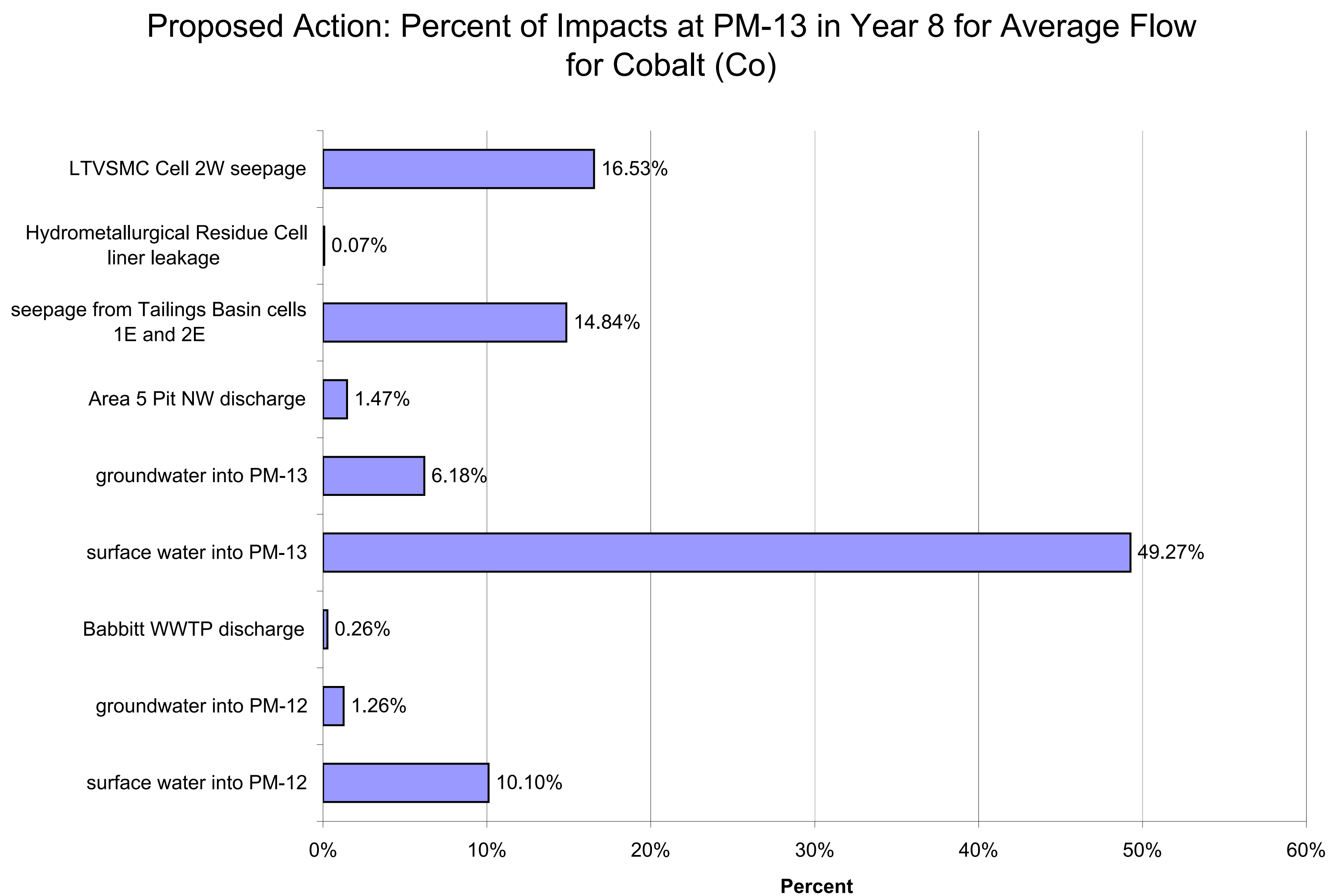

Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.27%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
4.76%
Area 5 Pit NW discharge
0.37%
groundwater into PM-13
1.62%
surface water into PM-13
74.43%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.33%
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 8 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,040.35
Hydrometallurgical Residue Cell liner leakage
50.14
seepage from Tailings Basin cells 1E and 2E
934.09
Area 5 Pit NW discharge
-
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

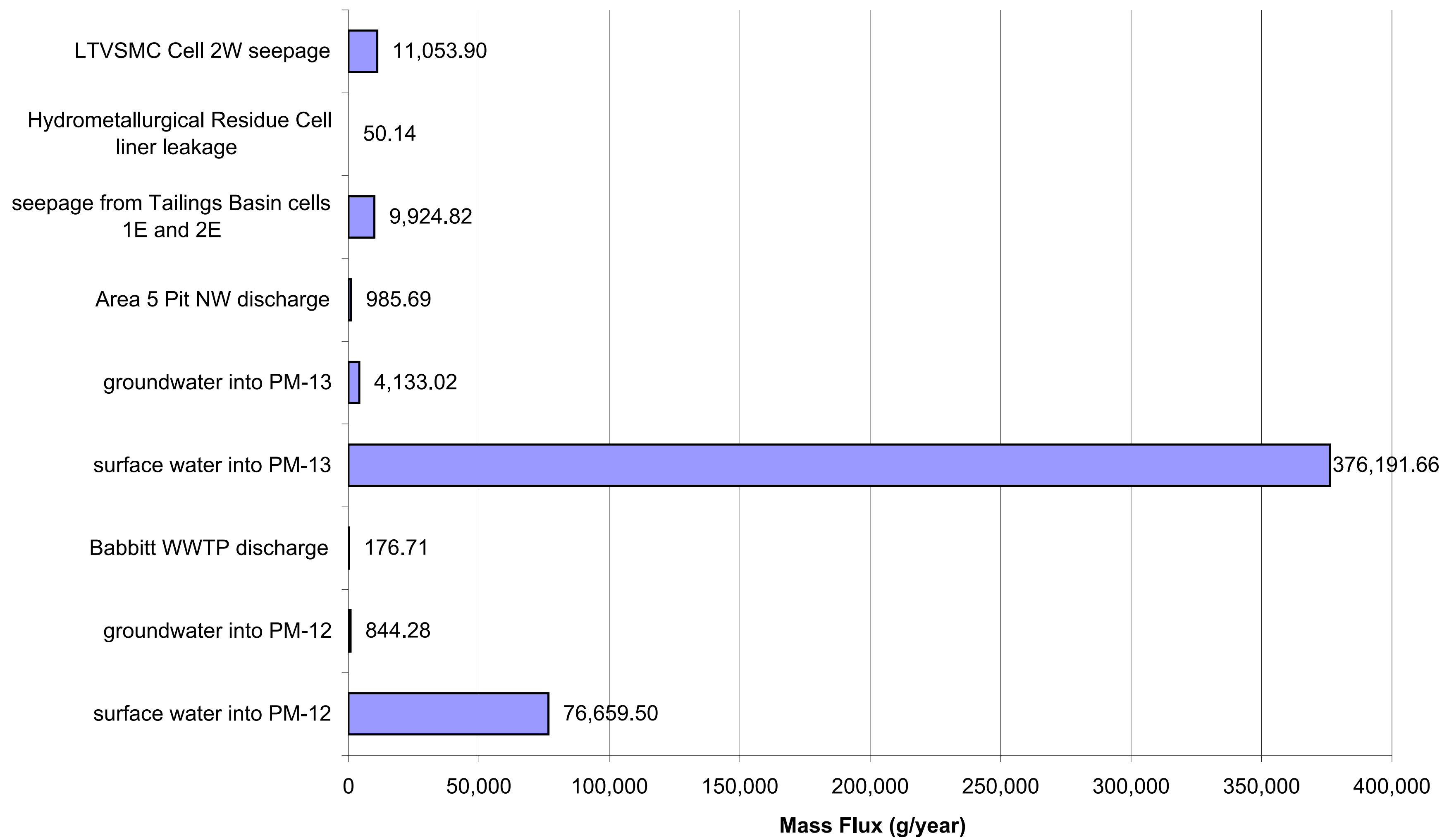
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Cobalt (Co)



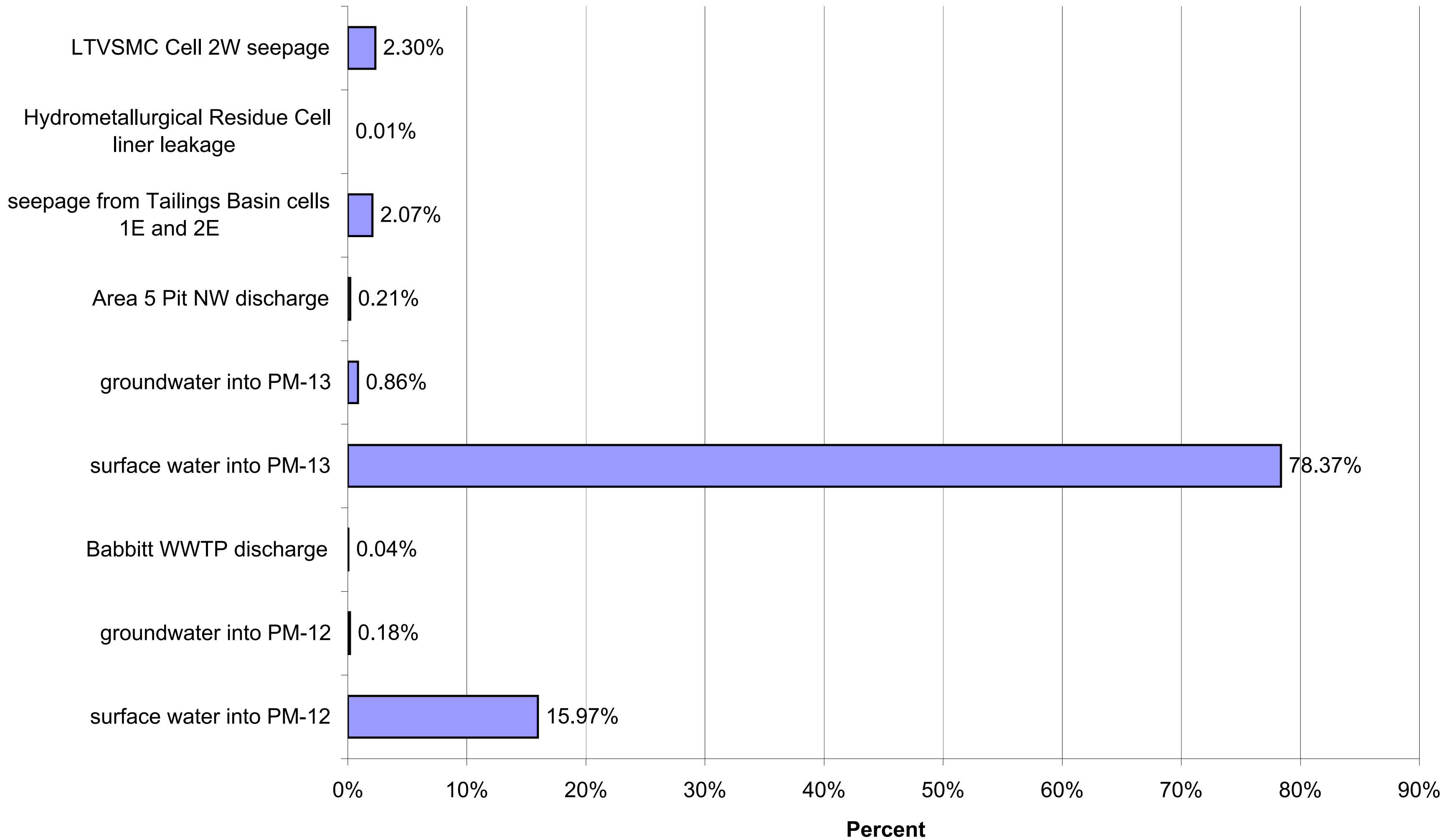

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
50.14
seepage from Tailings Basin cells 1E and 2E
9,924.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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)

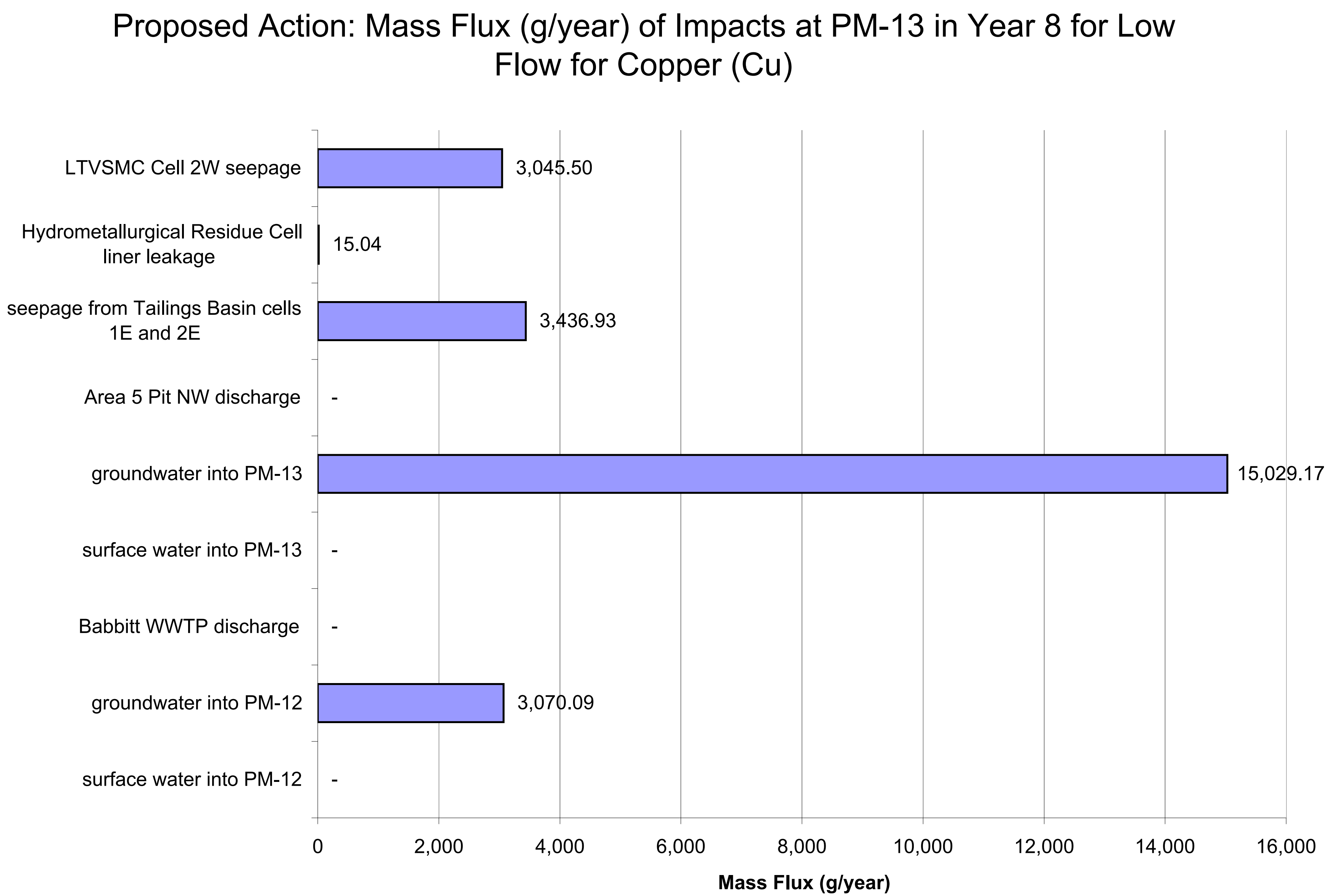

Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
16.53%
Hydrometallurgical Residue Cell liner leakage
0.07%
seepage from Tailings Basin cells 1E and 2E
14.84%
Area 5 Pit NW discharge
1.47%
groundwater into PM-13
6.18%
surface water into PM-13
49.27%
Babbitt WWTP discharge
0.26%
groundwater into PM-12
1.26%
surface water into PM-12
10.10%
0%
10%
20%
30%
40%
50%
60%
Percent

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Cobalt (Co)

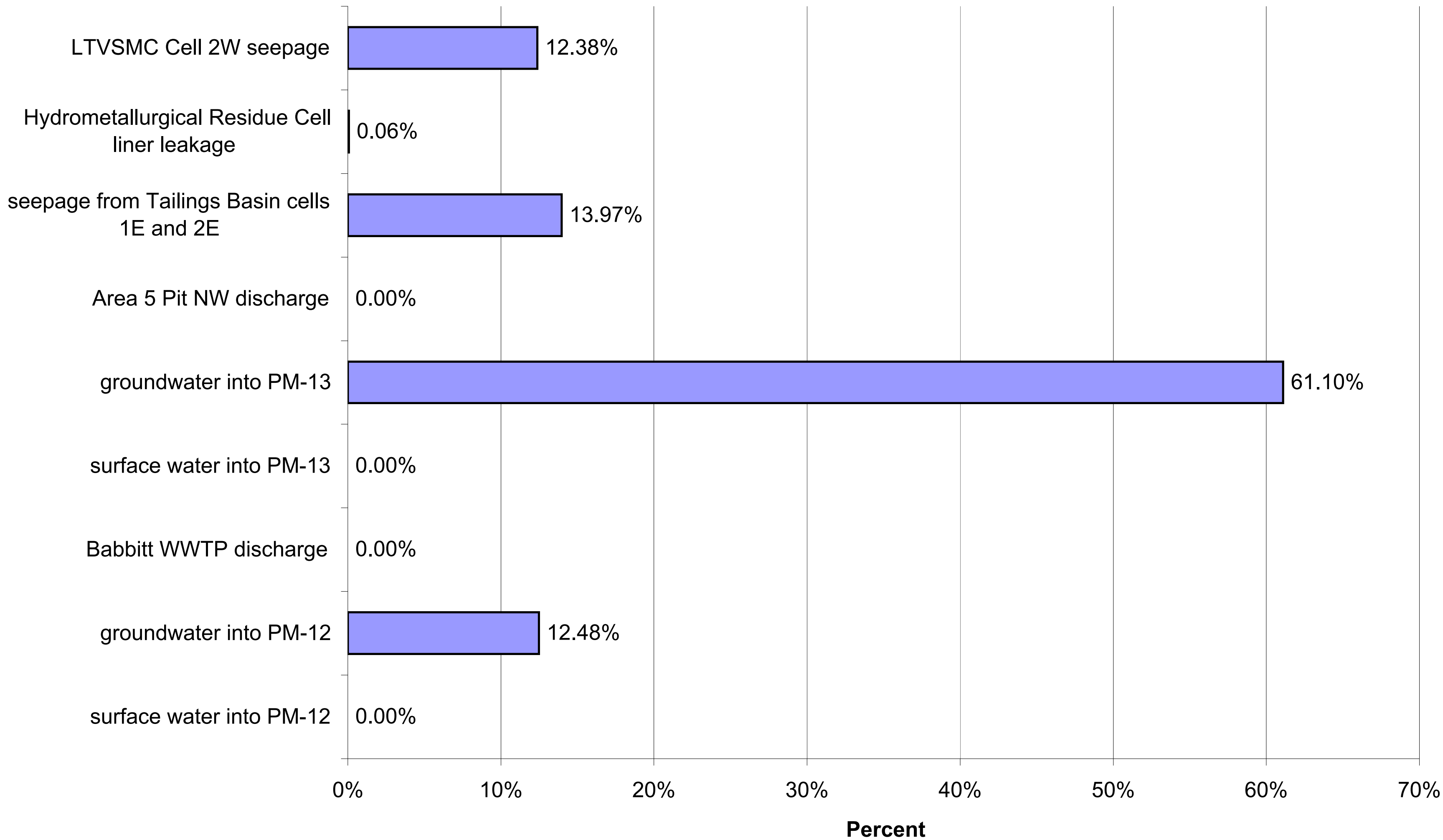


Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Cobalt (Co)

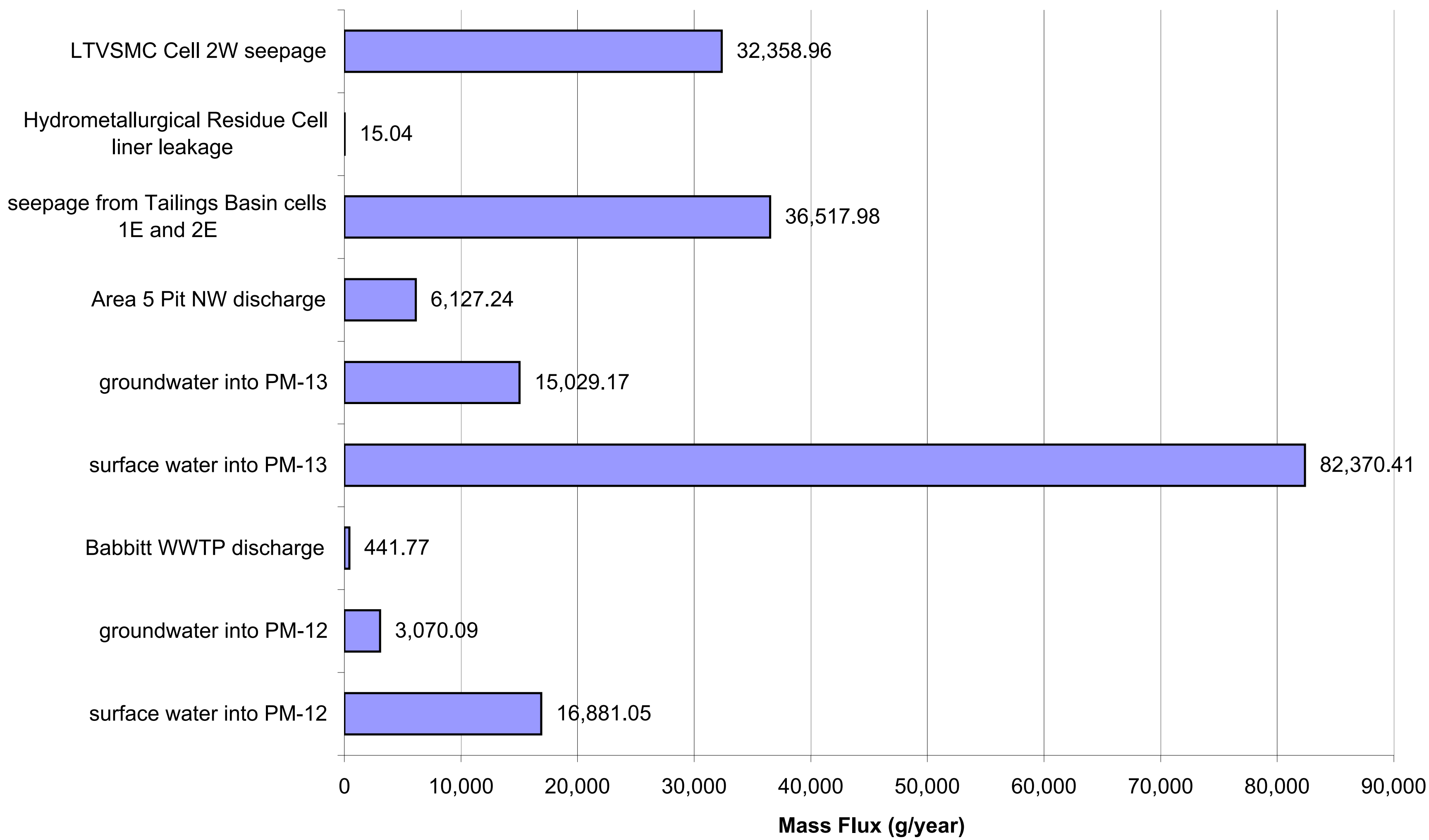



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
3,045.50
Hydrometallurgical Residue Cell liner leakage
15.04
seepage from Tailings Basin cells 1E and 2E
3,436.93
Area 5 Pit NW discharge
-
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwater into PM-12
3,070.09
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)

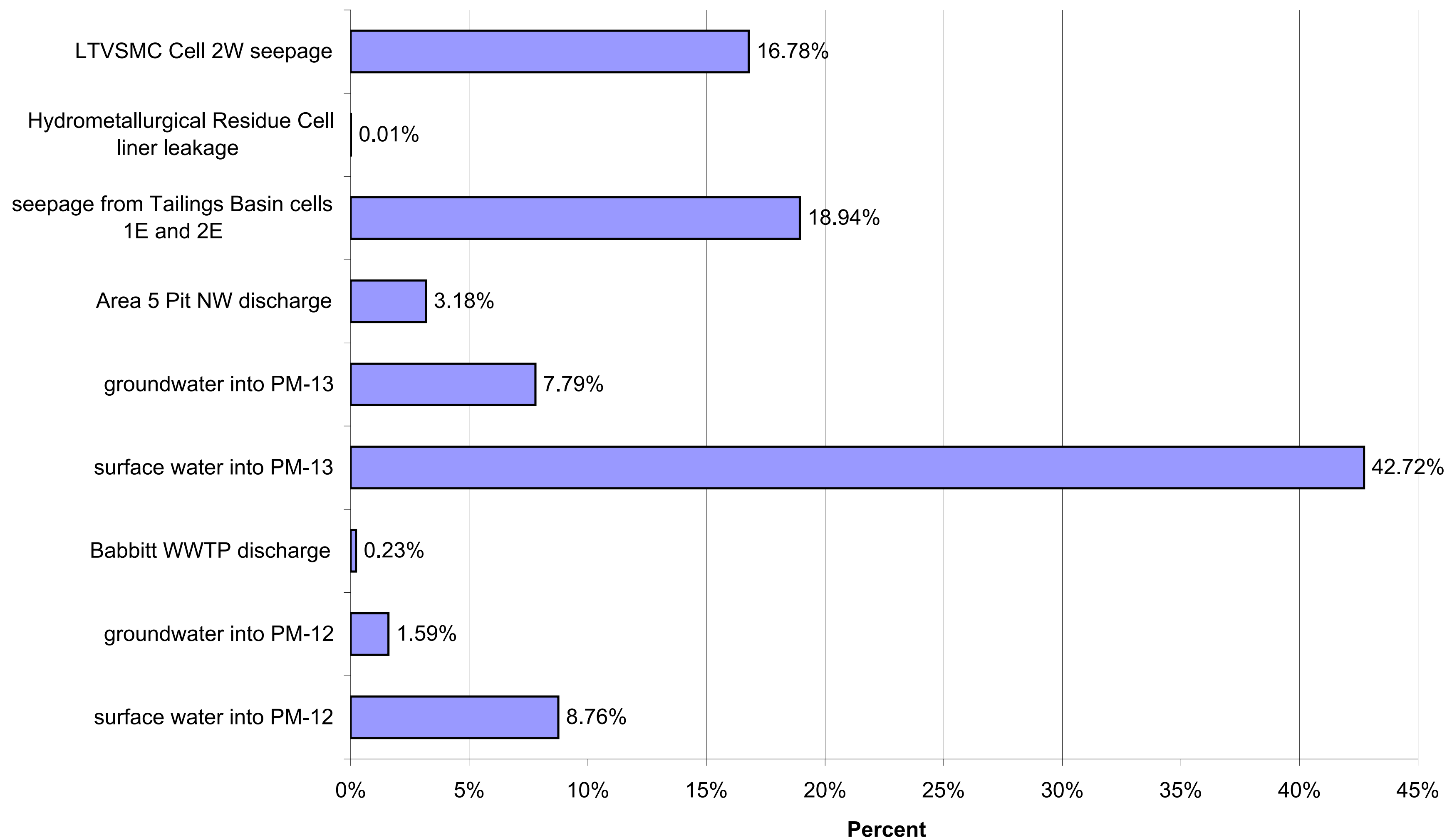
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Copper (Cu)



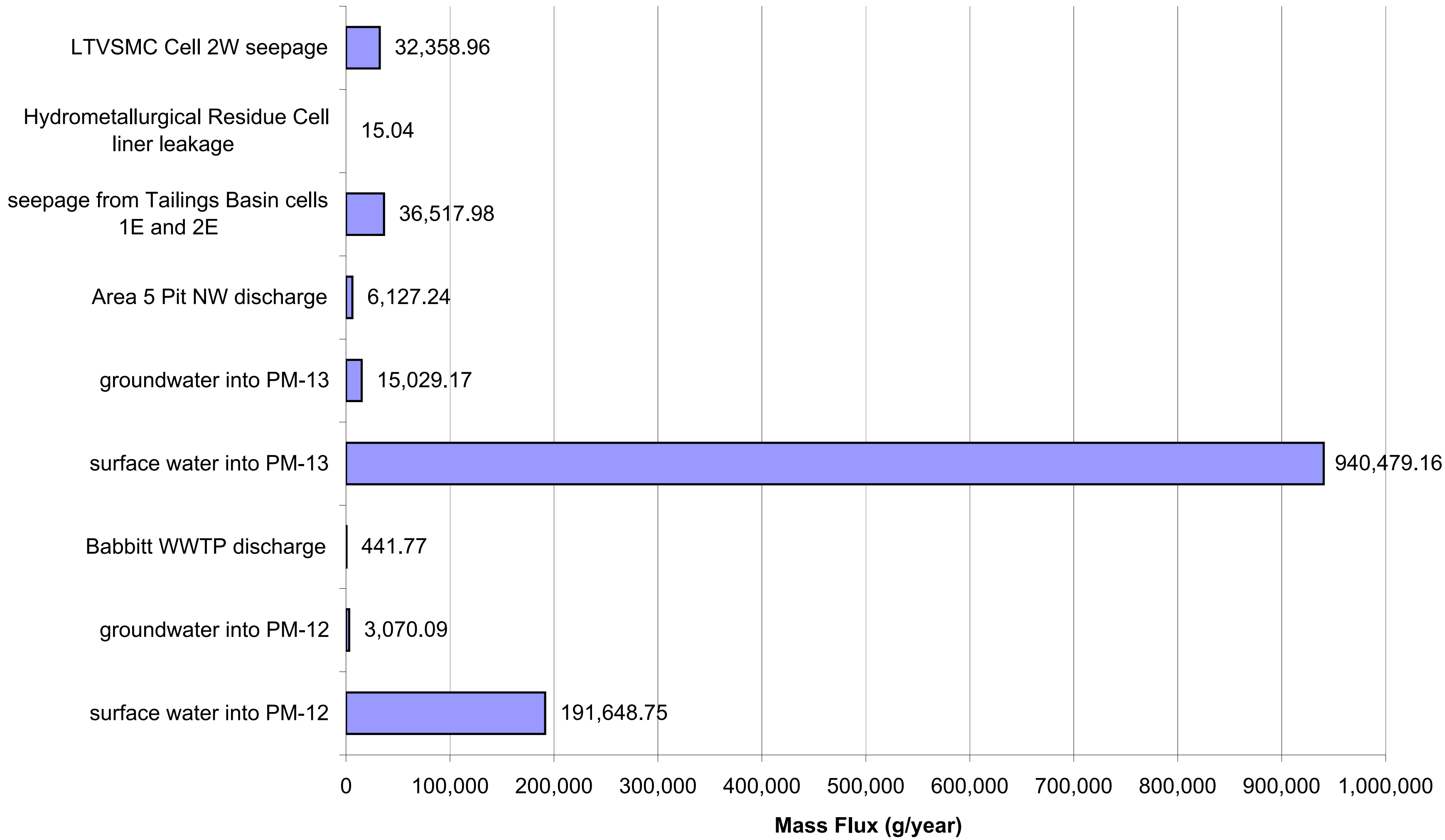
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Copper (Cu)

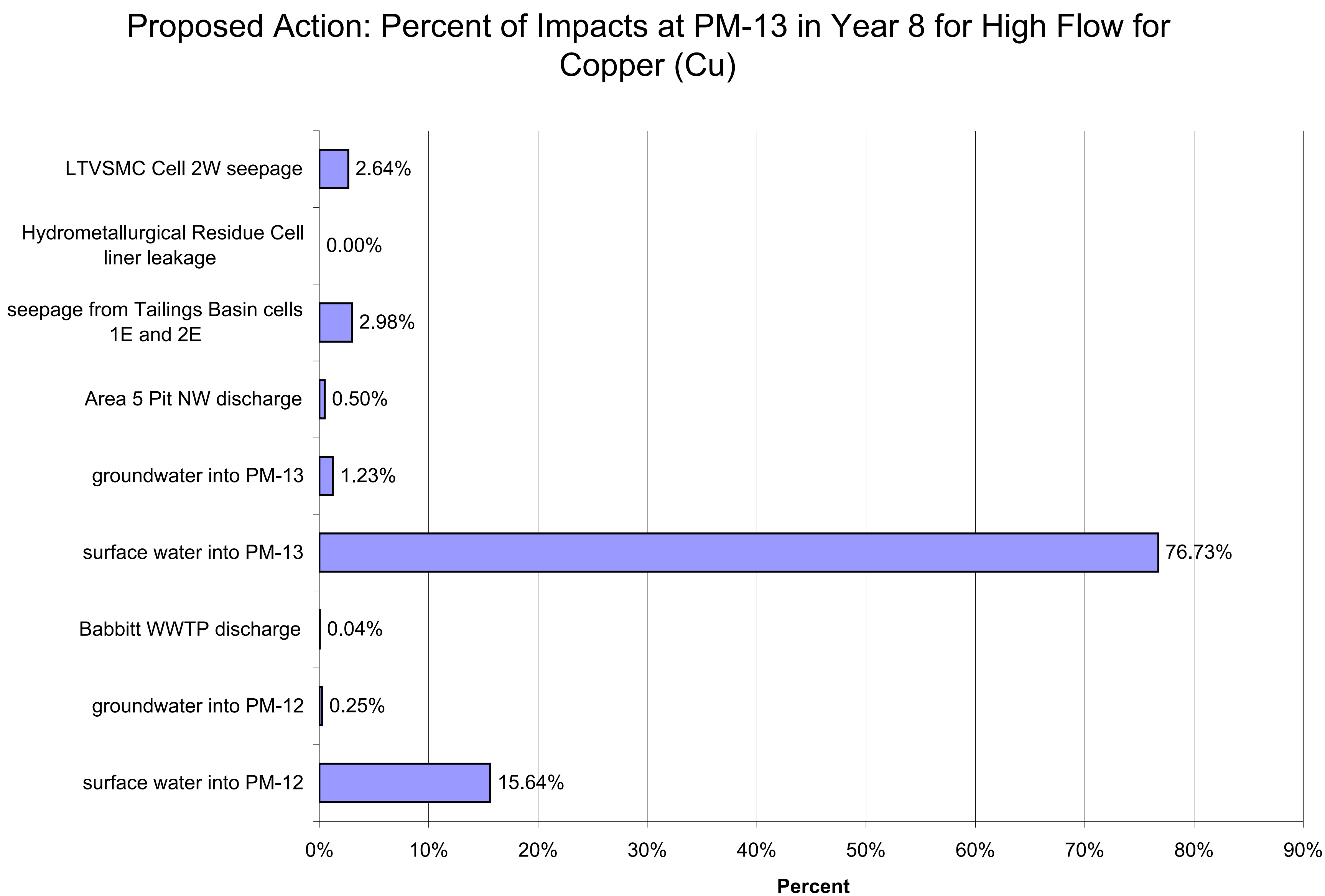


Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Copper (Cu)

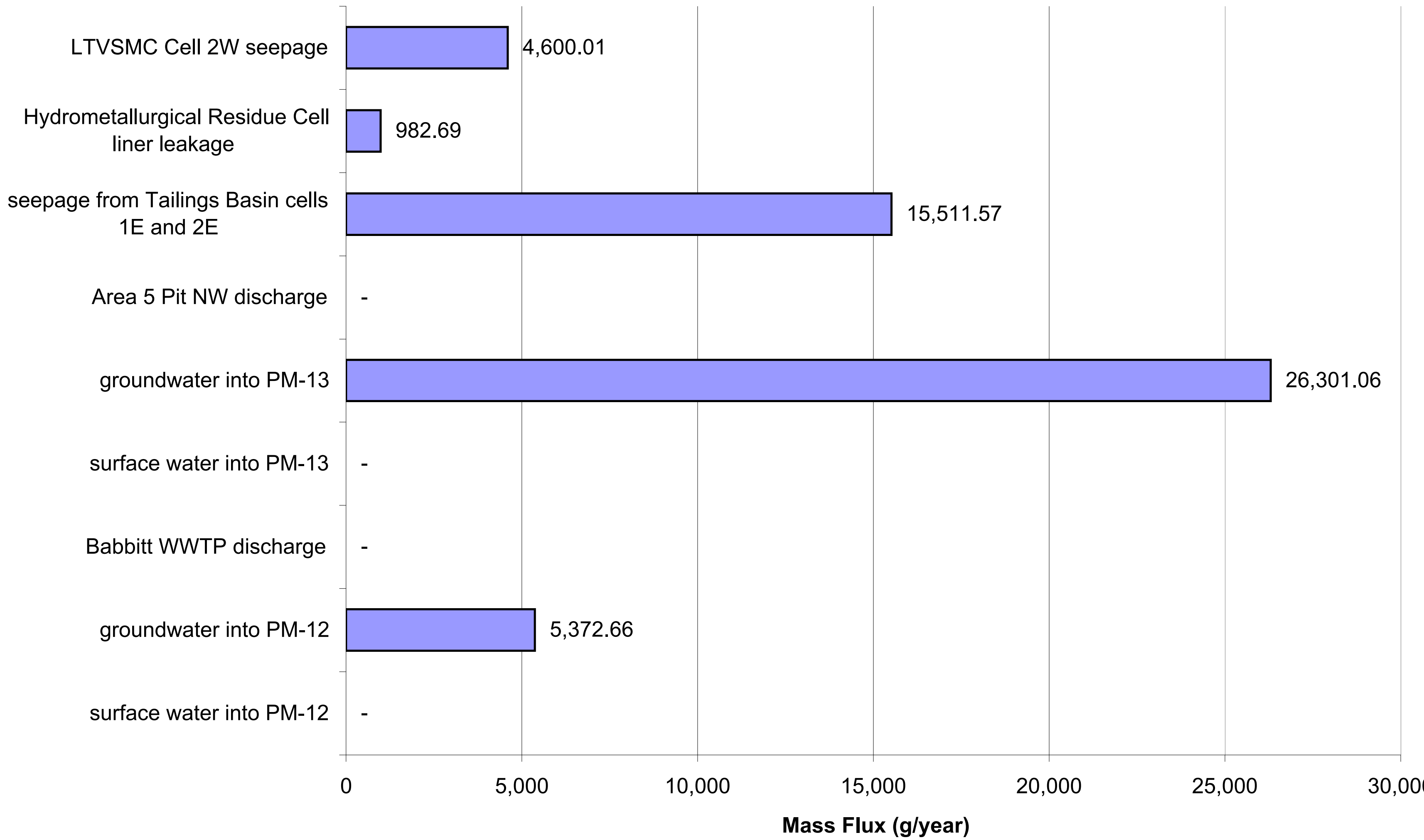


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Copper (Cu)

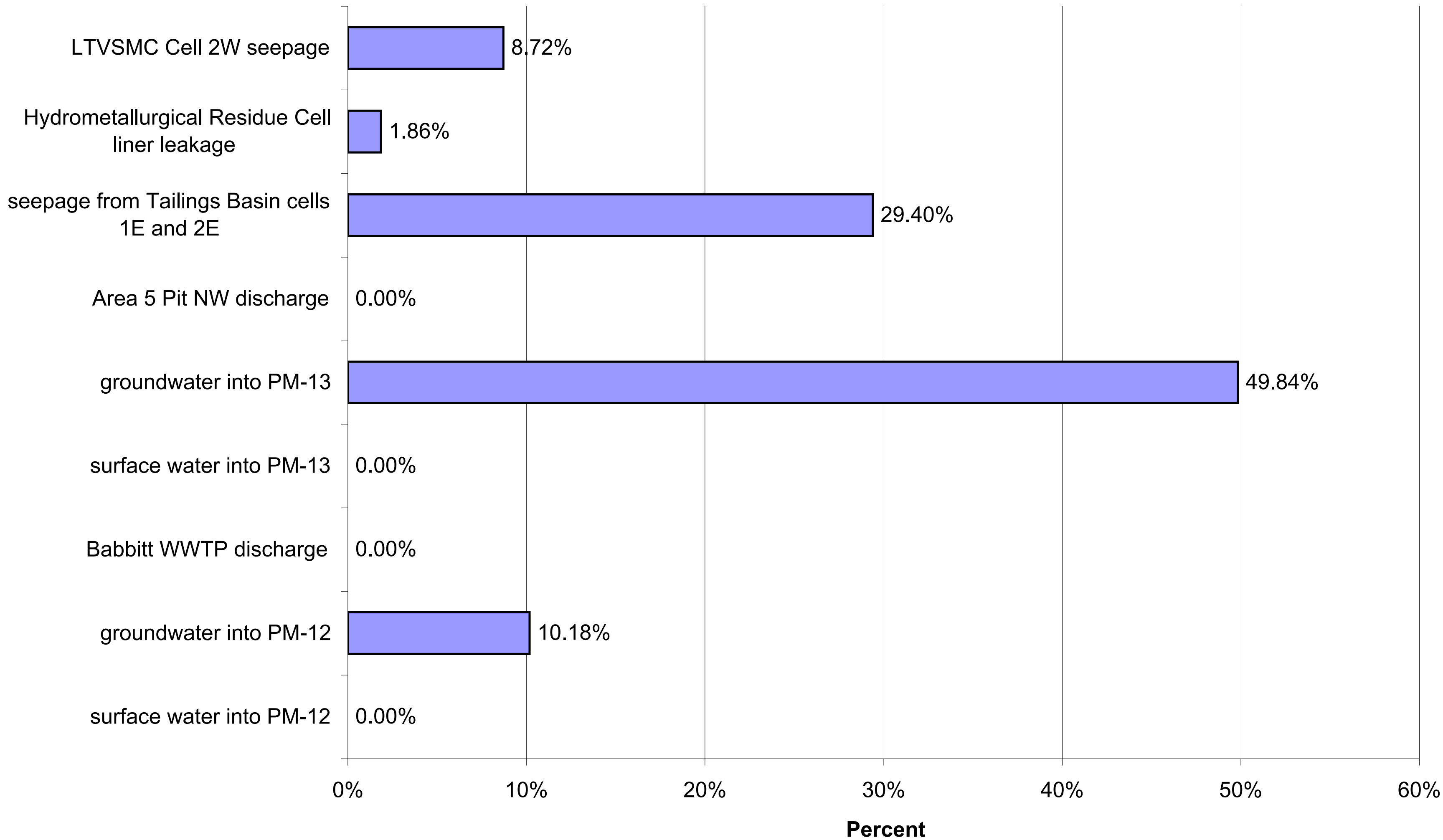


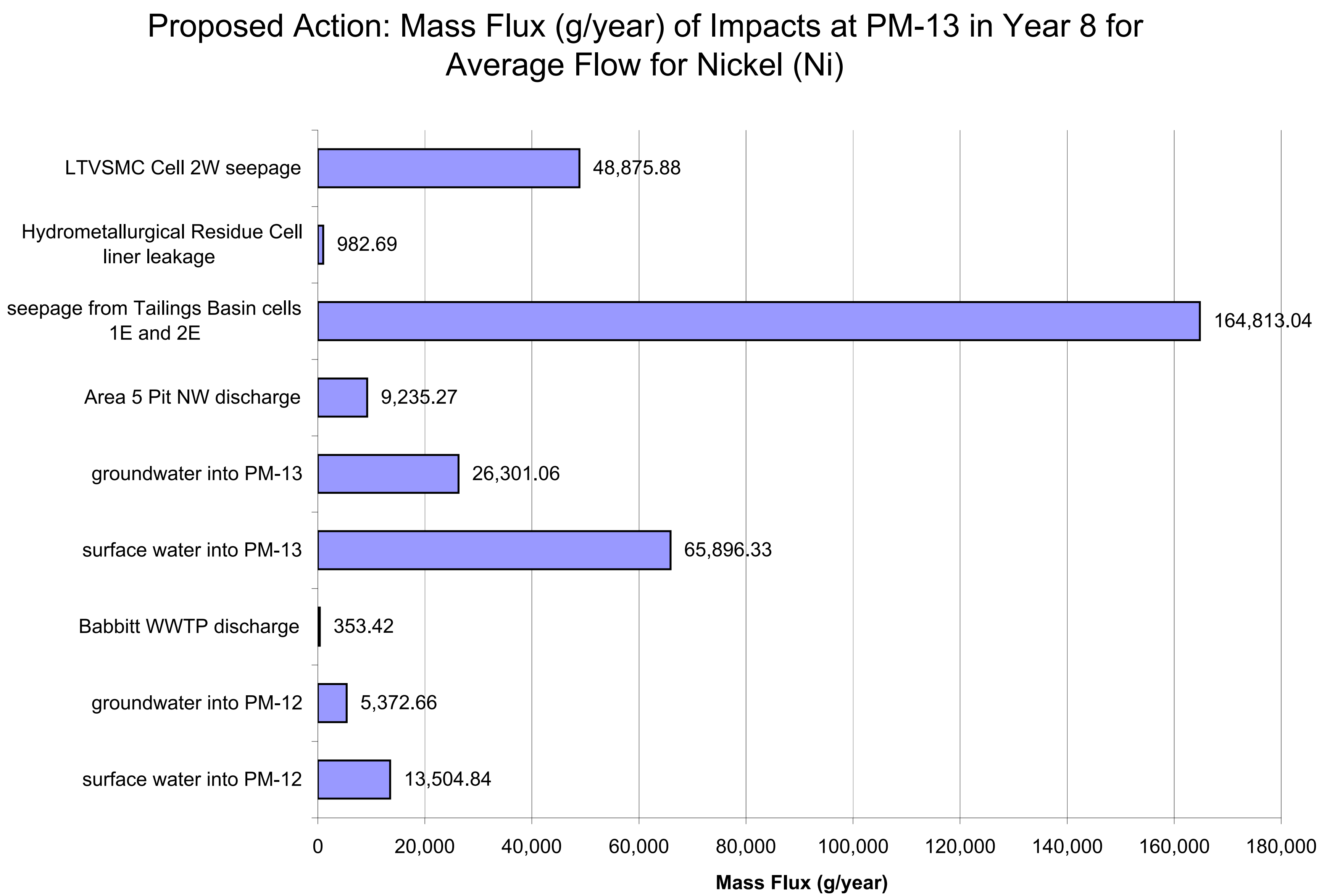

Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
2.64%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
2.98%
Area 5 Pit NW discharge
0.50%
groundwater into PM-13
1.23%
surface water into PM-13
76.73%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.25%
surface water into PM-12
15.64%
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)

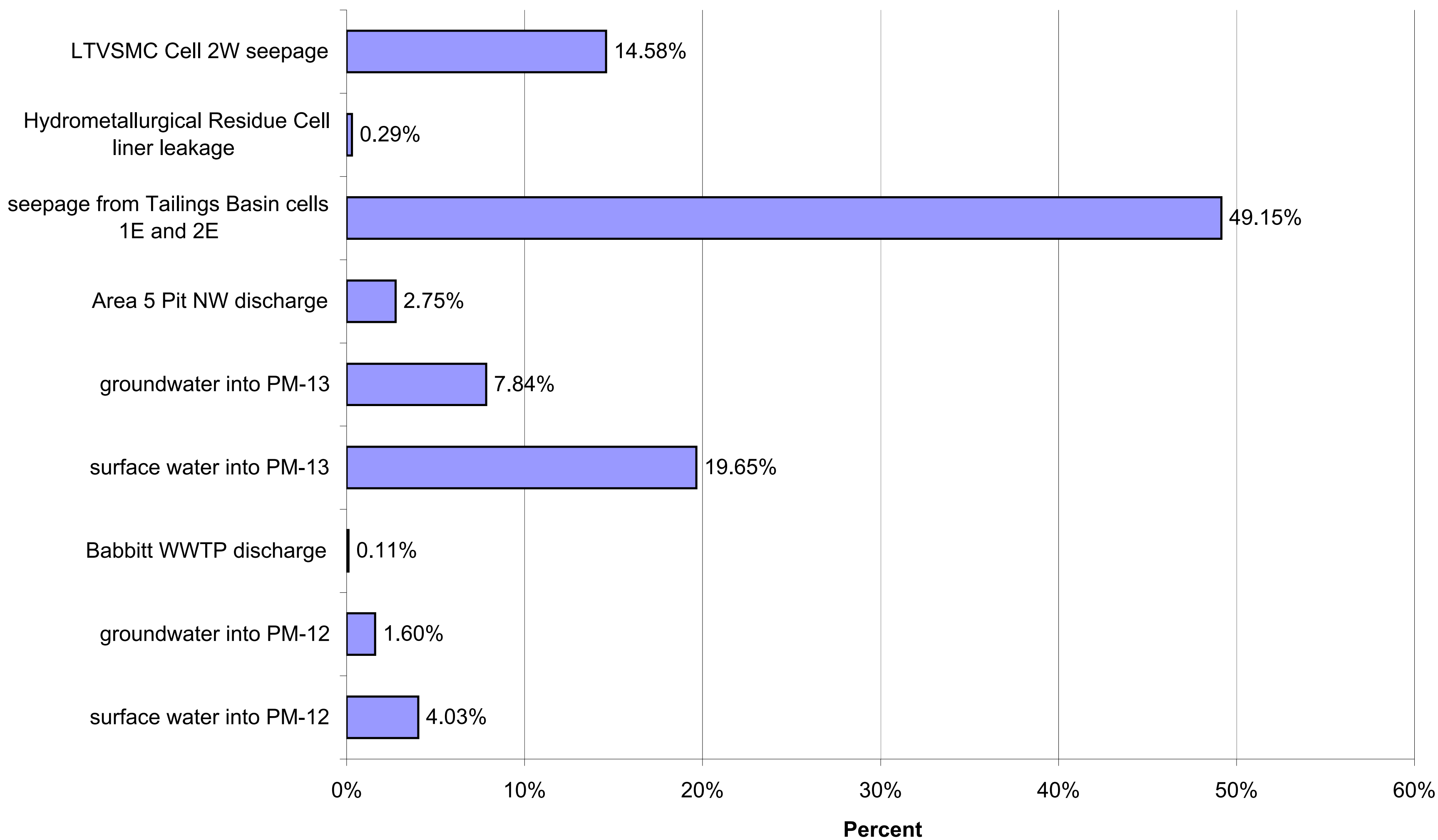


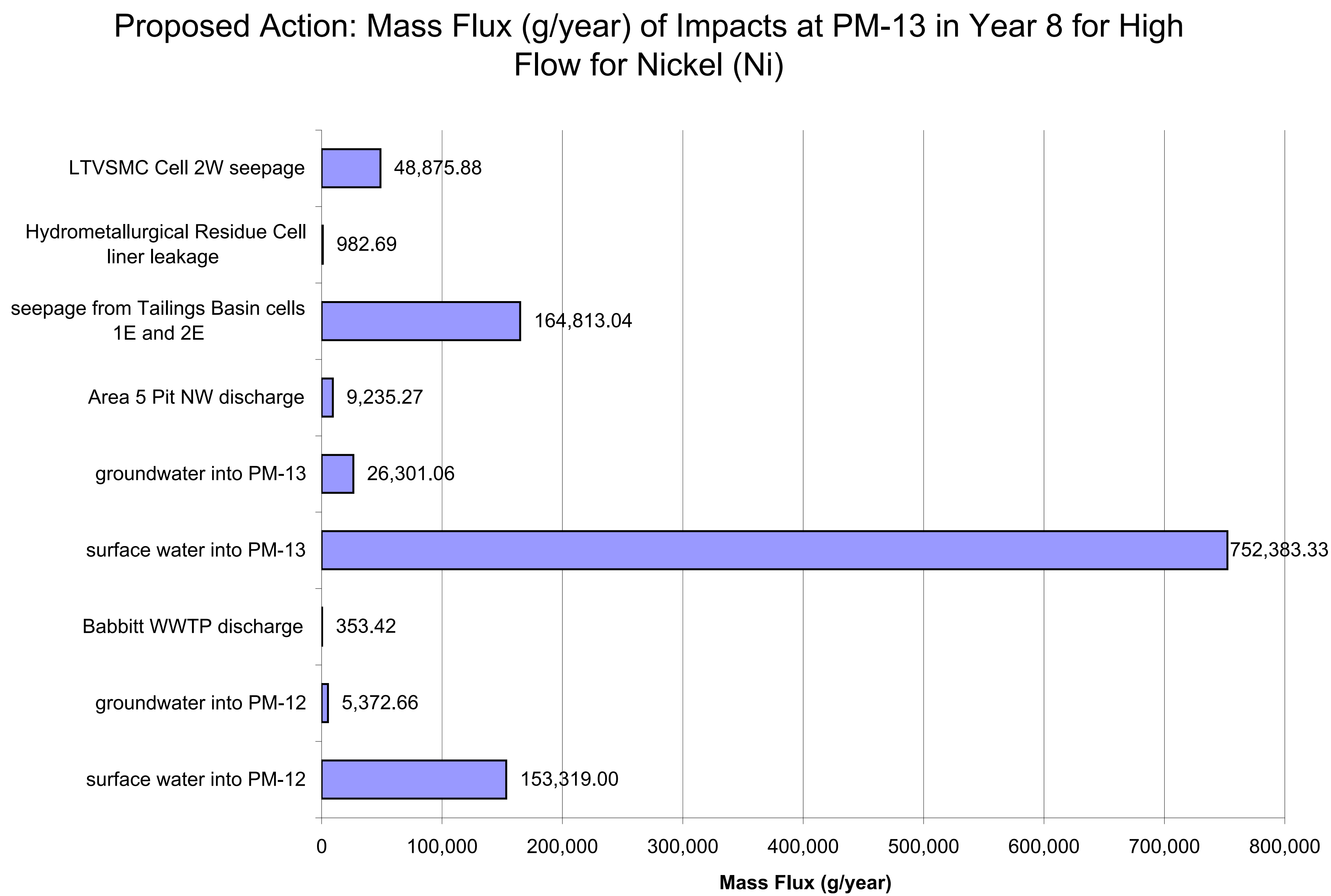
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Nickel (Ni)



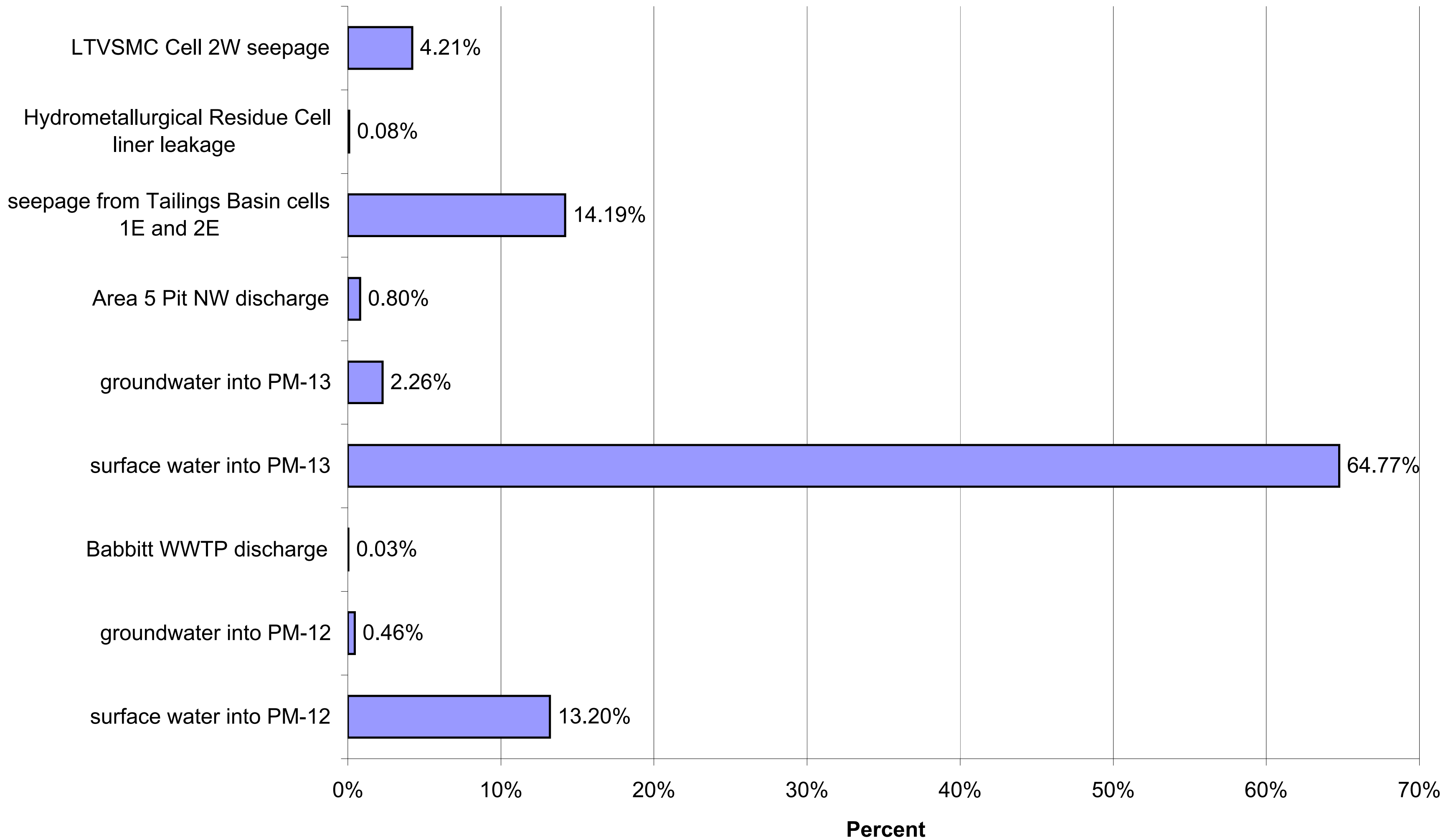

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
982.69
seepage from Tailings Basin cells 1E and 2E
164,813.04
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
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
180,000
Mass Flux (g/year)

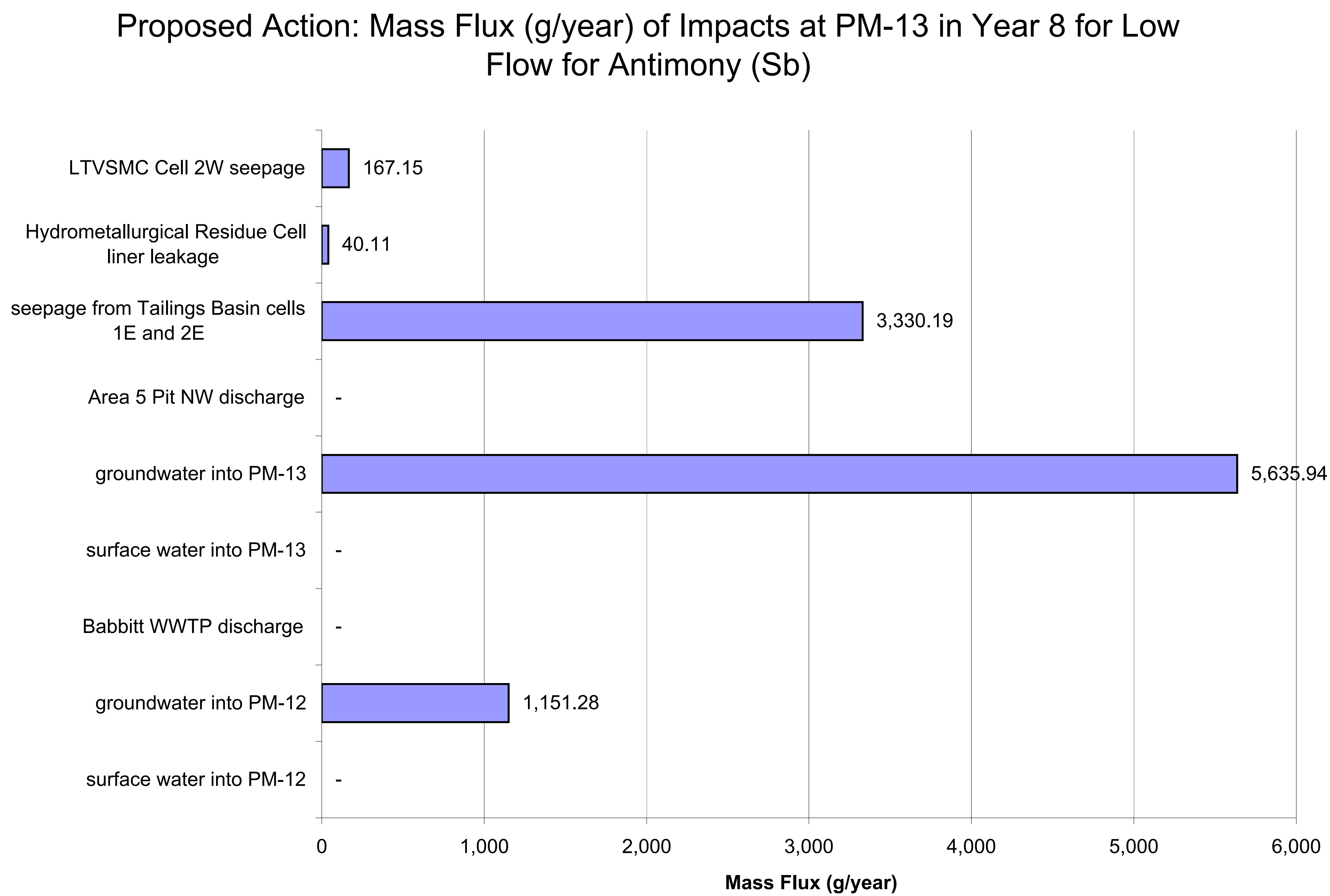
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Nickel (Ni)



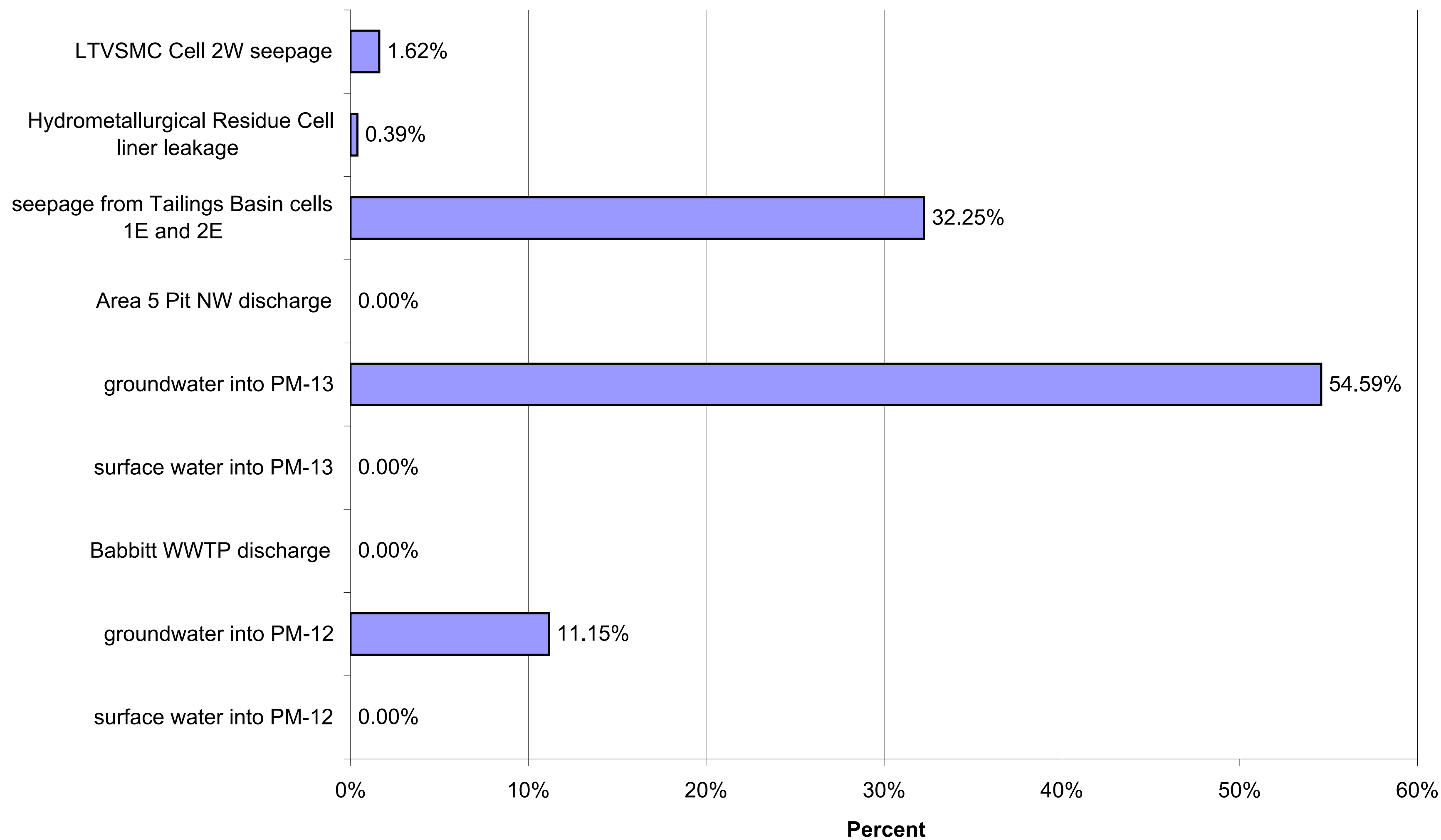

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
982.69
seepage from Tailings Basin cells 1E and 2E
164,813.04
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)

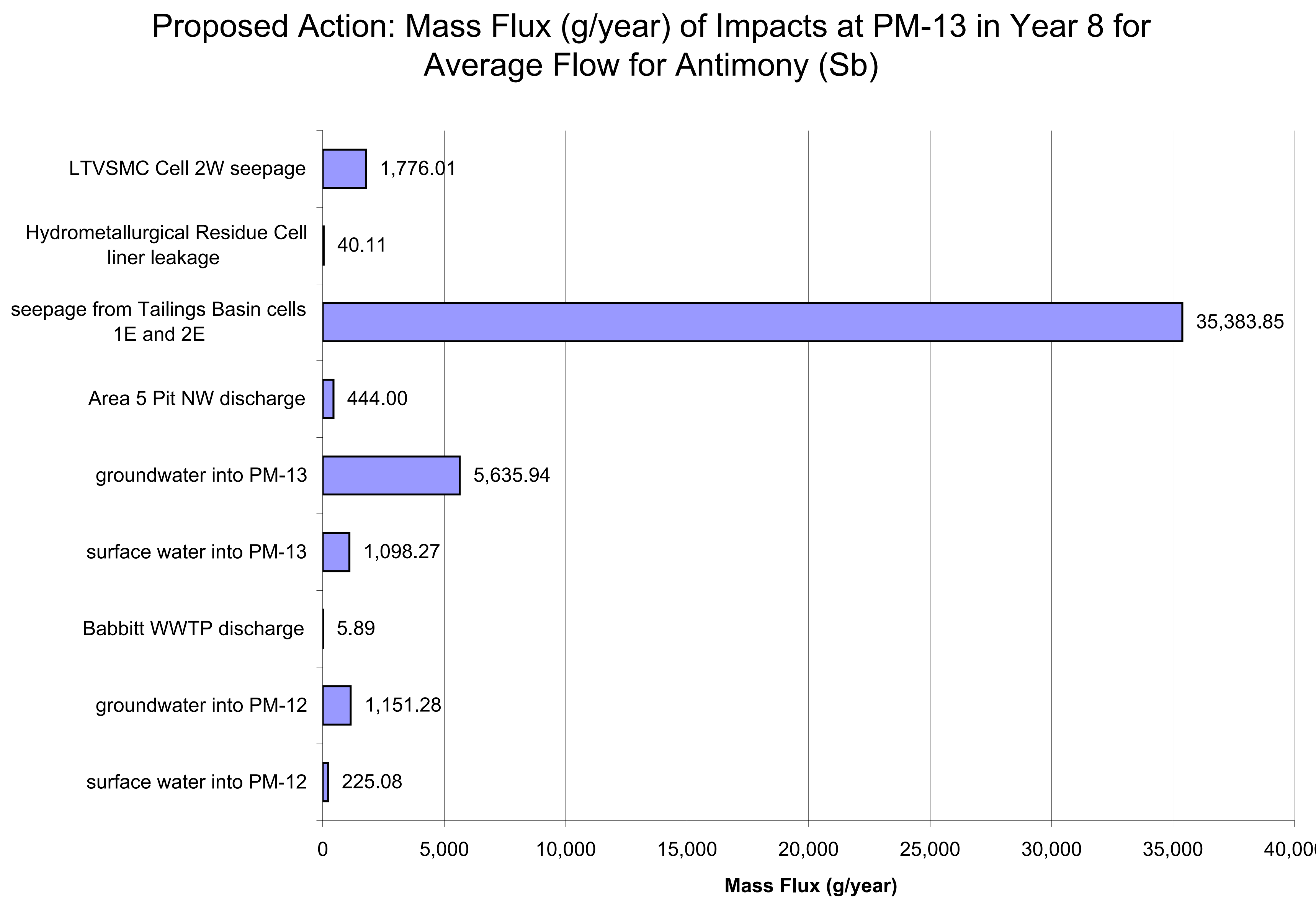
Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Nickel (Ni)



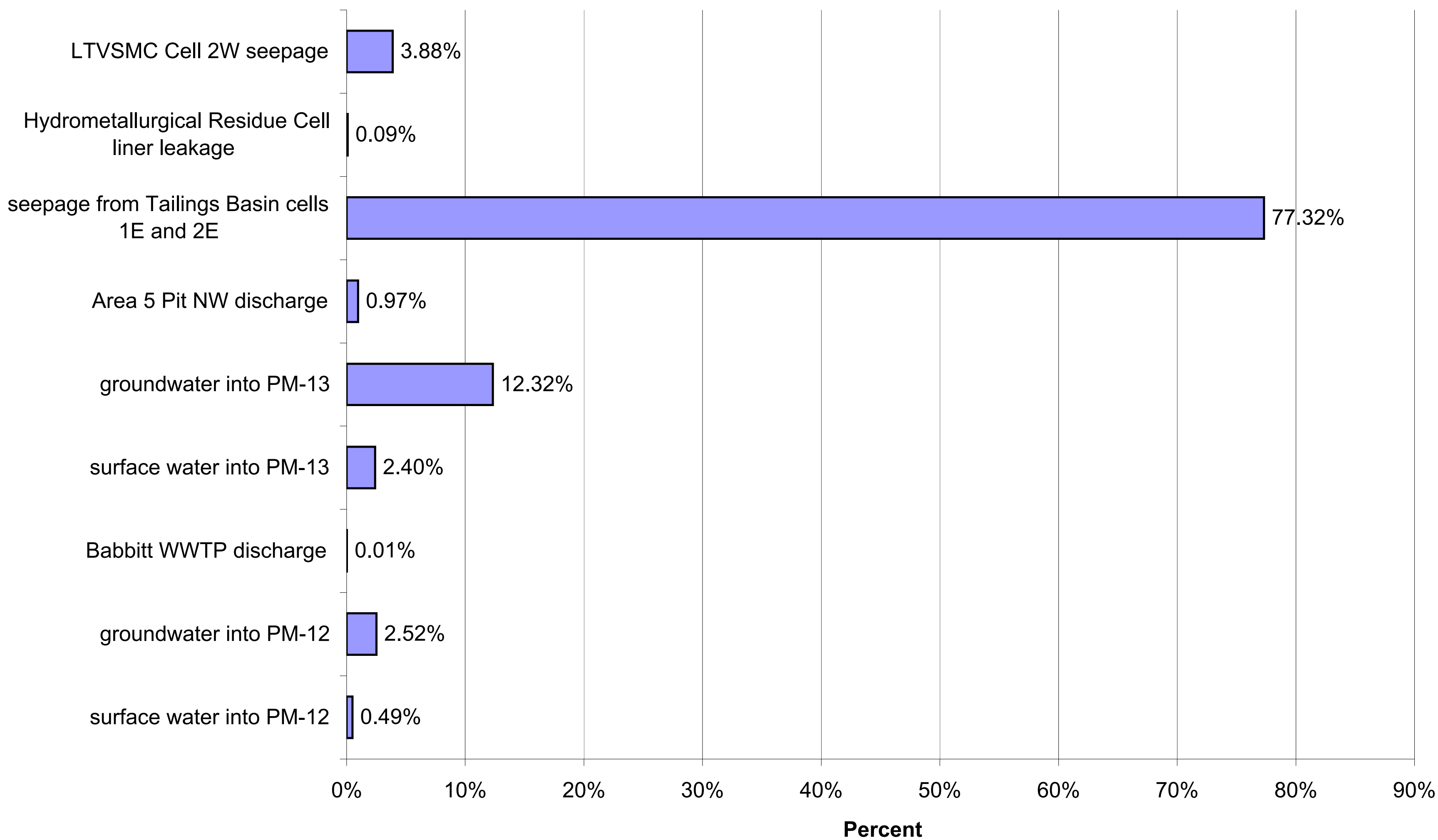

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
167.15
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
3,330.19
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

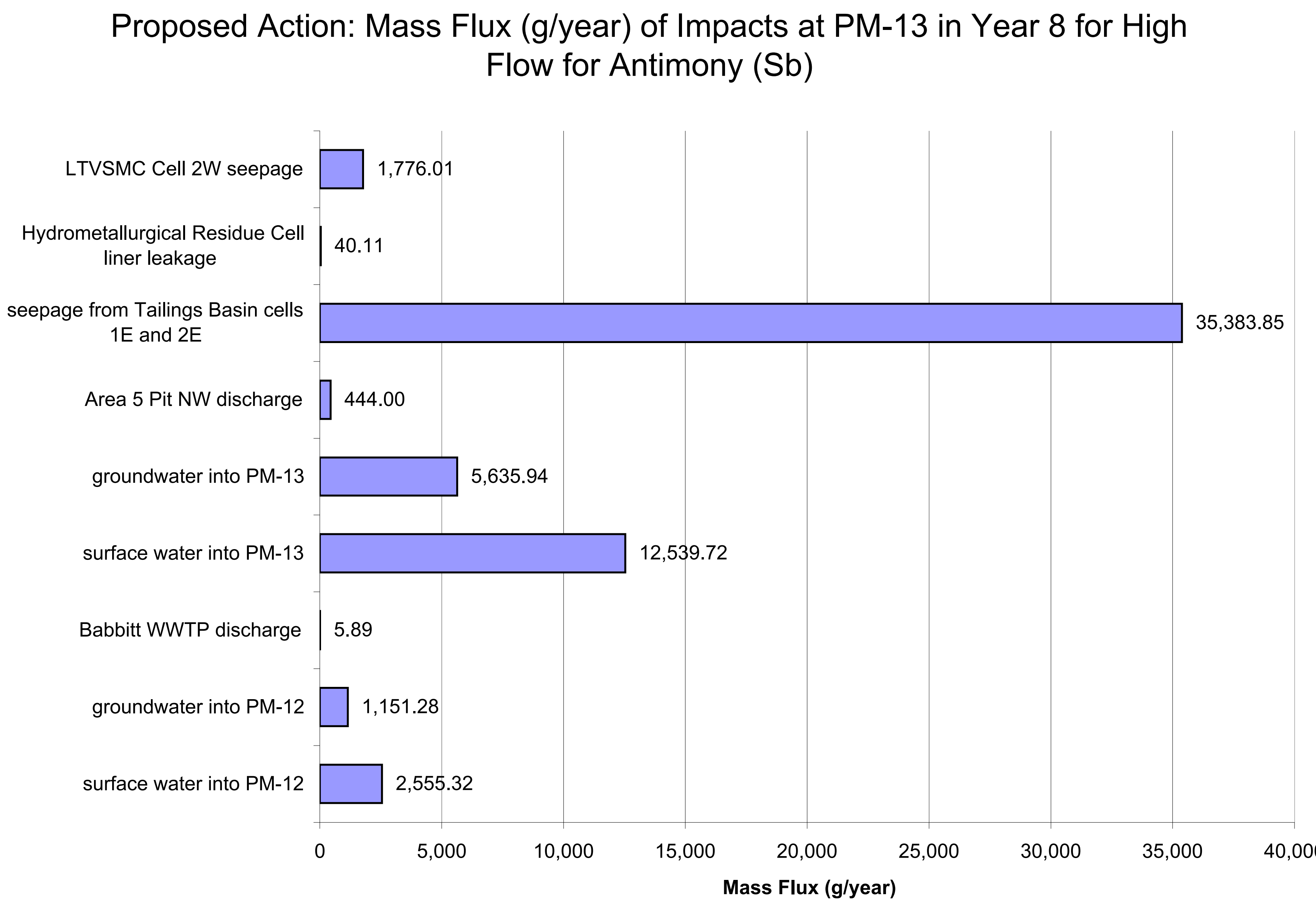
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Antimony (Sb)



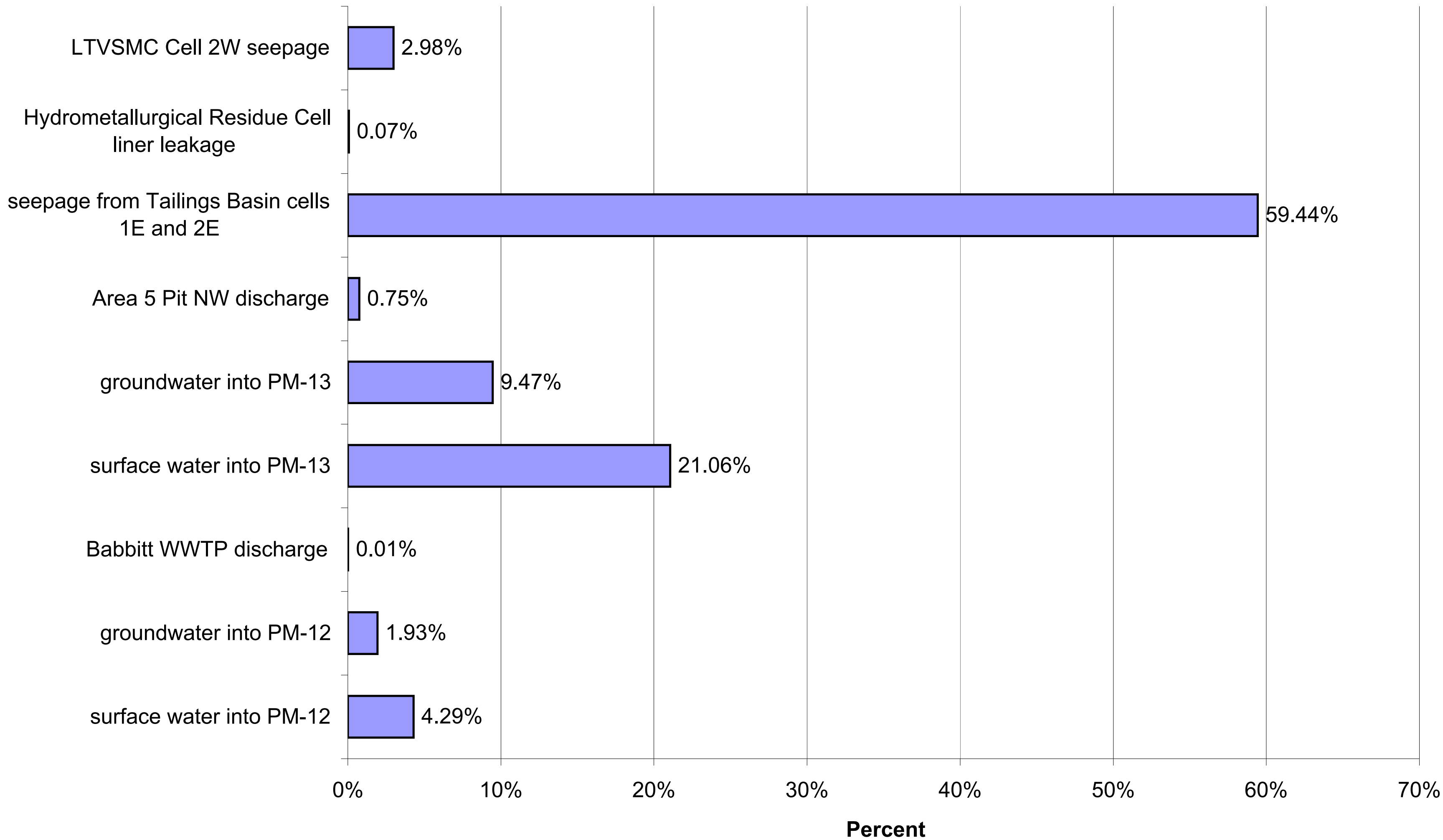

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
35,383.85
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
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)

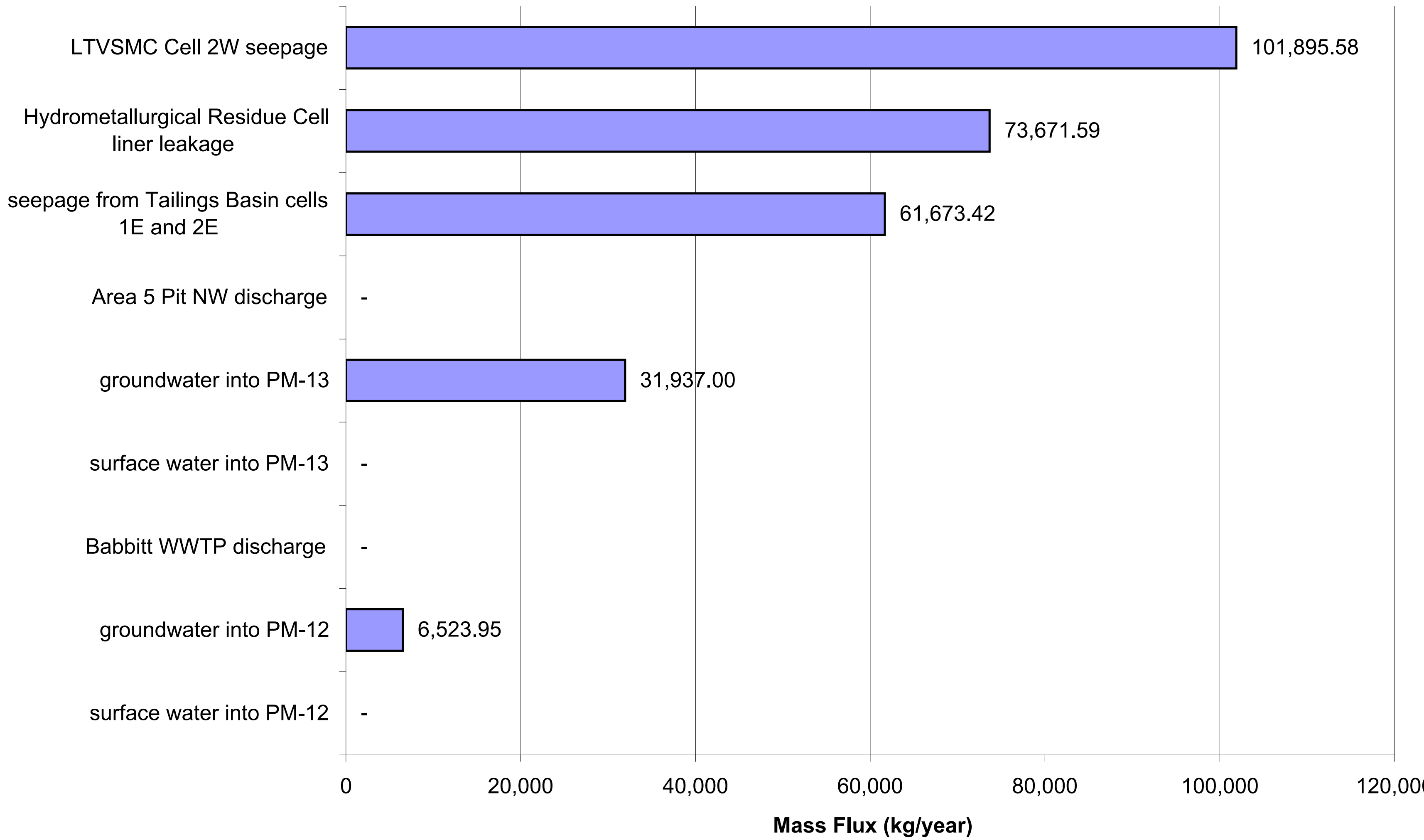



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 8 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
40.11
seepage from Tailings Basin cells 1E and 2E
35,383.85
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

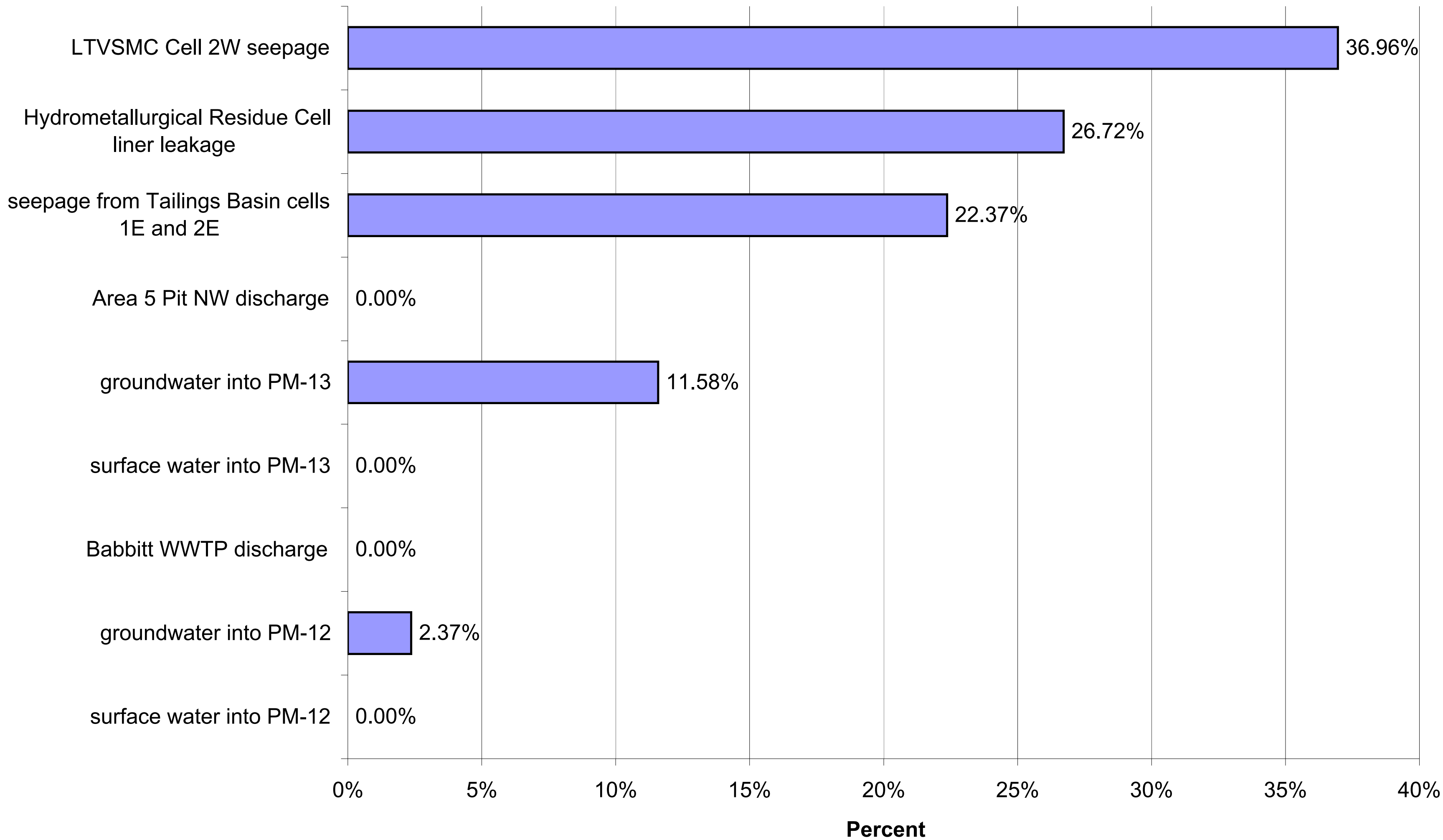
Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Antimony (Sb)



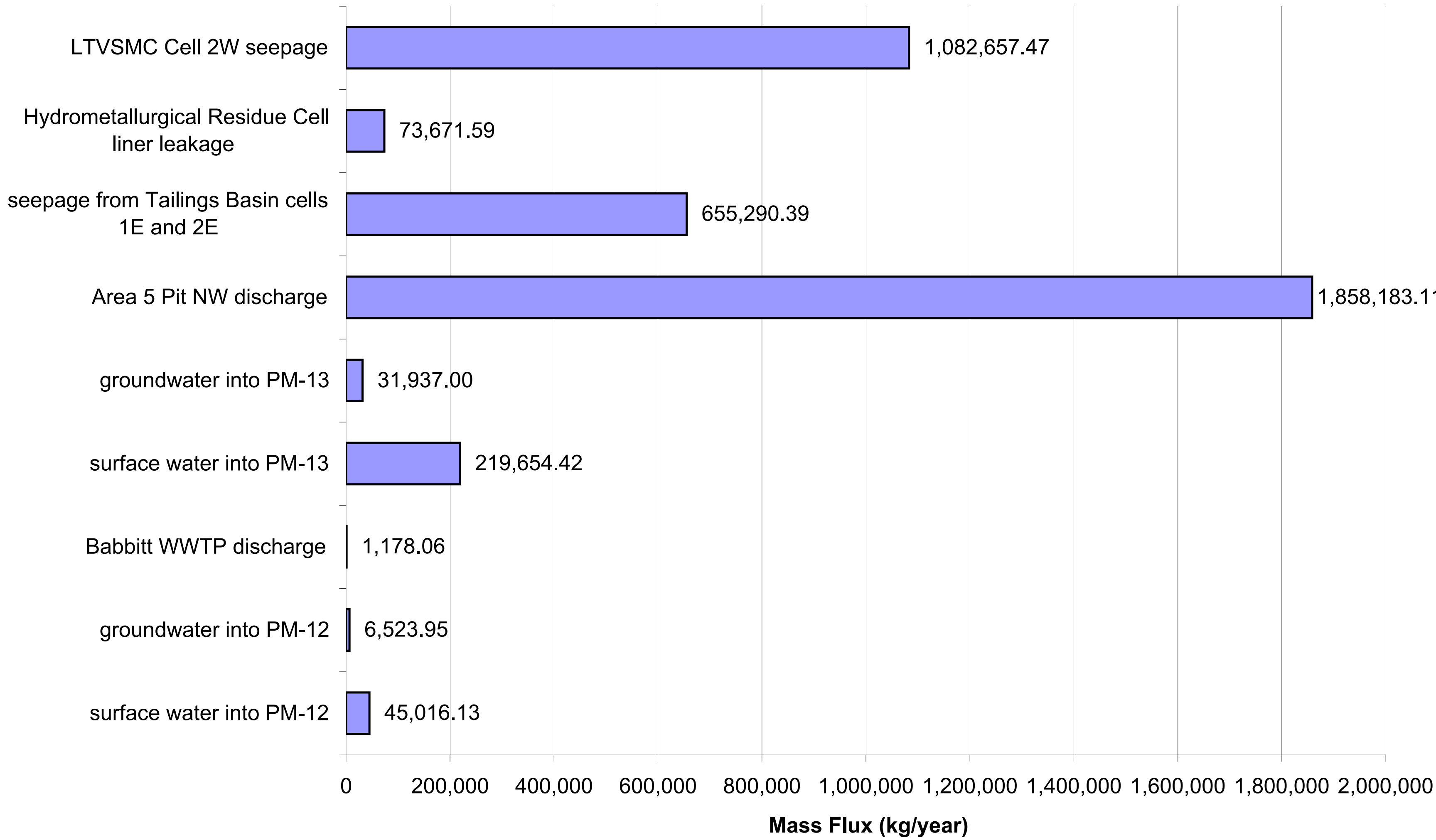
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 8 for Low Flow for Sulfate (SO_4)



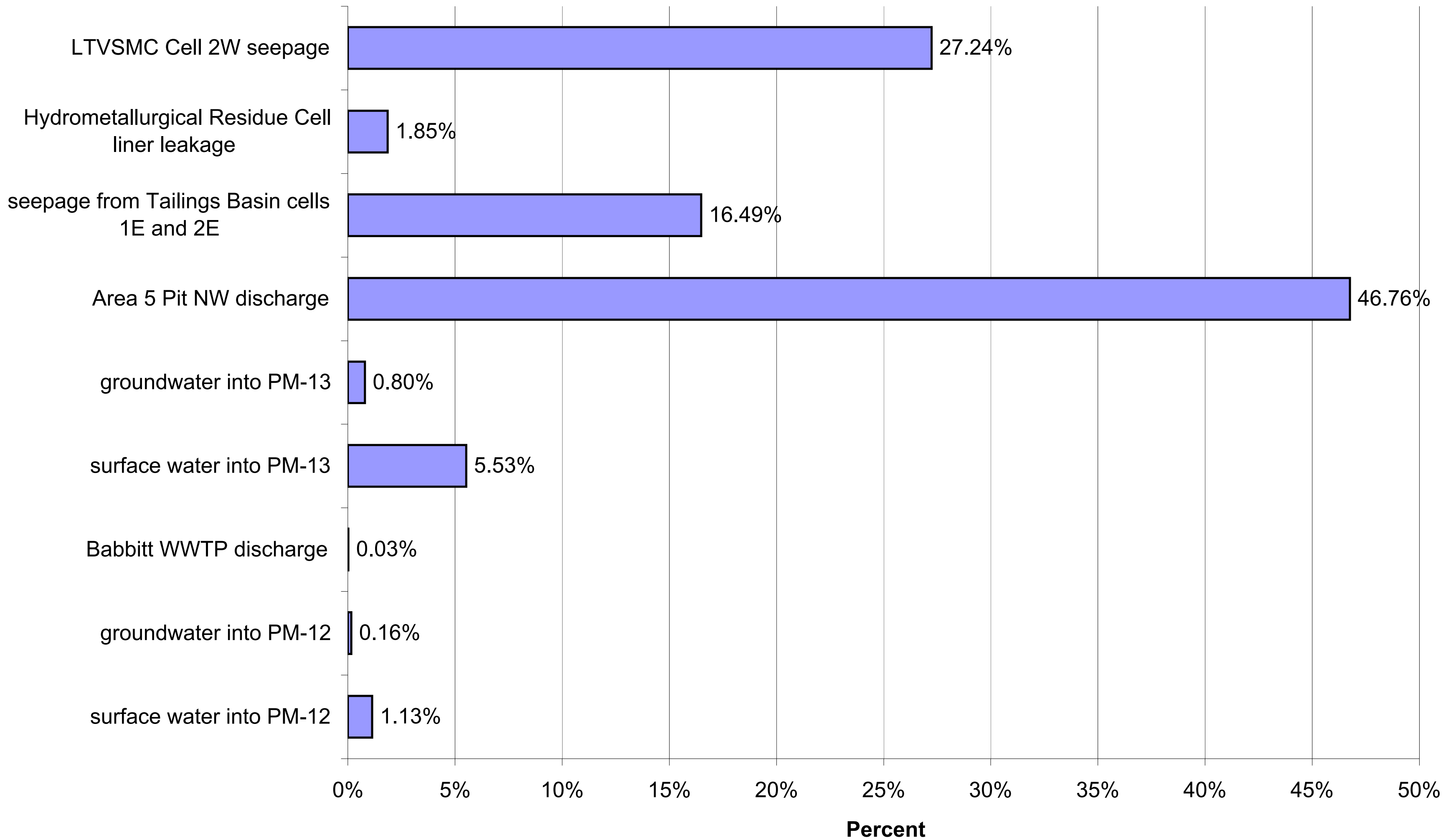
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Low Flow for Sulfate (SO_4)



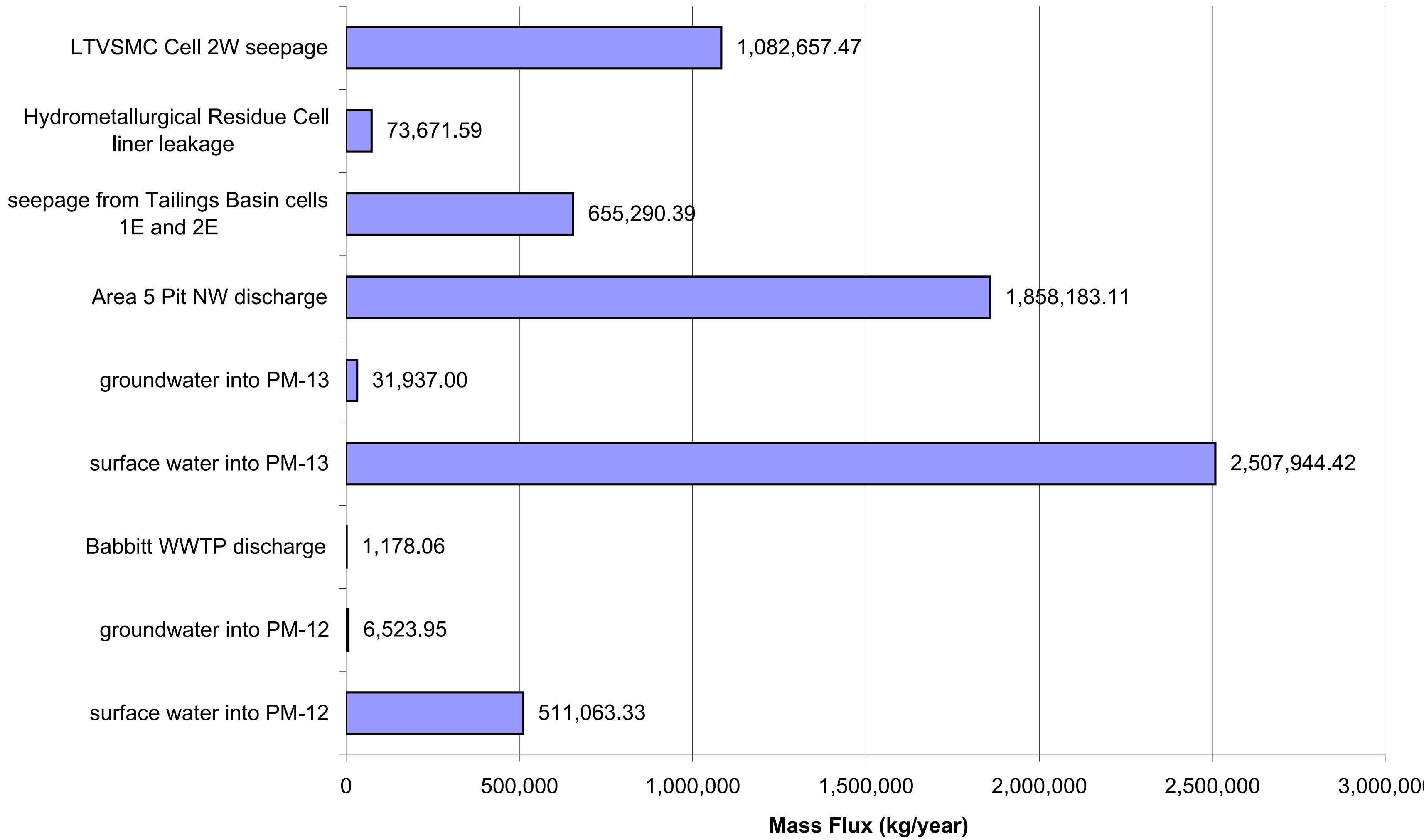
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 8 for Average Flow for Sulfate (SO_4)



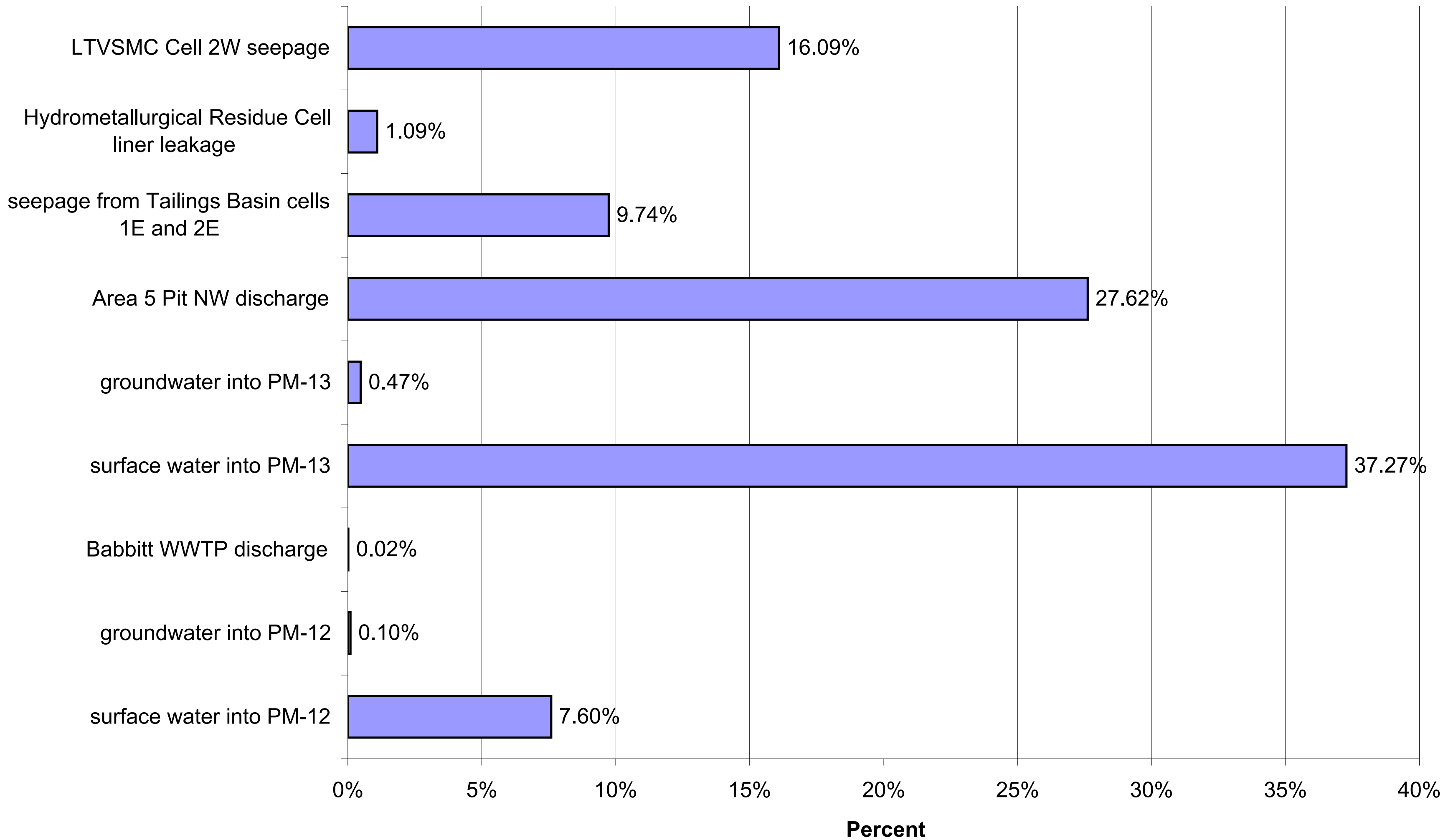
Proposed Action: Percent of Impacts at PM-13 in Year 8 for Average Flow for Sulfate (SO_4)

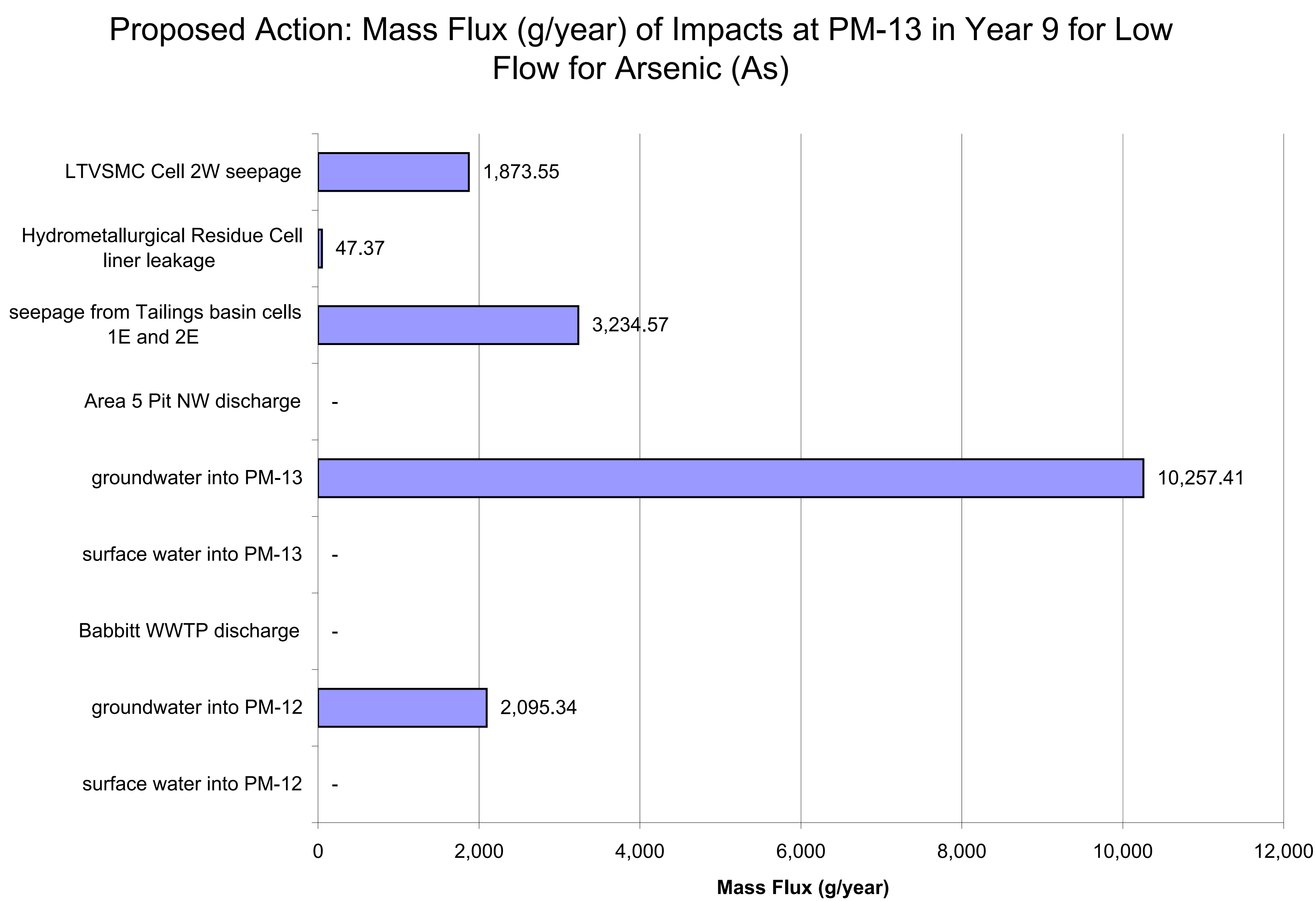


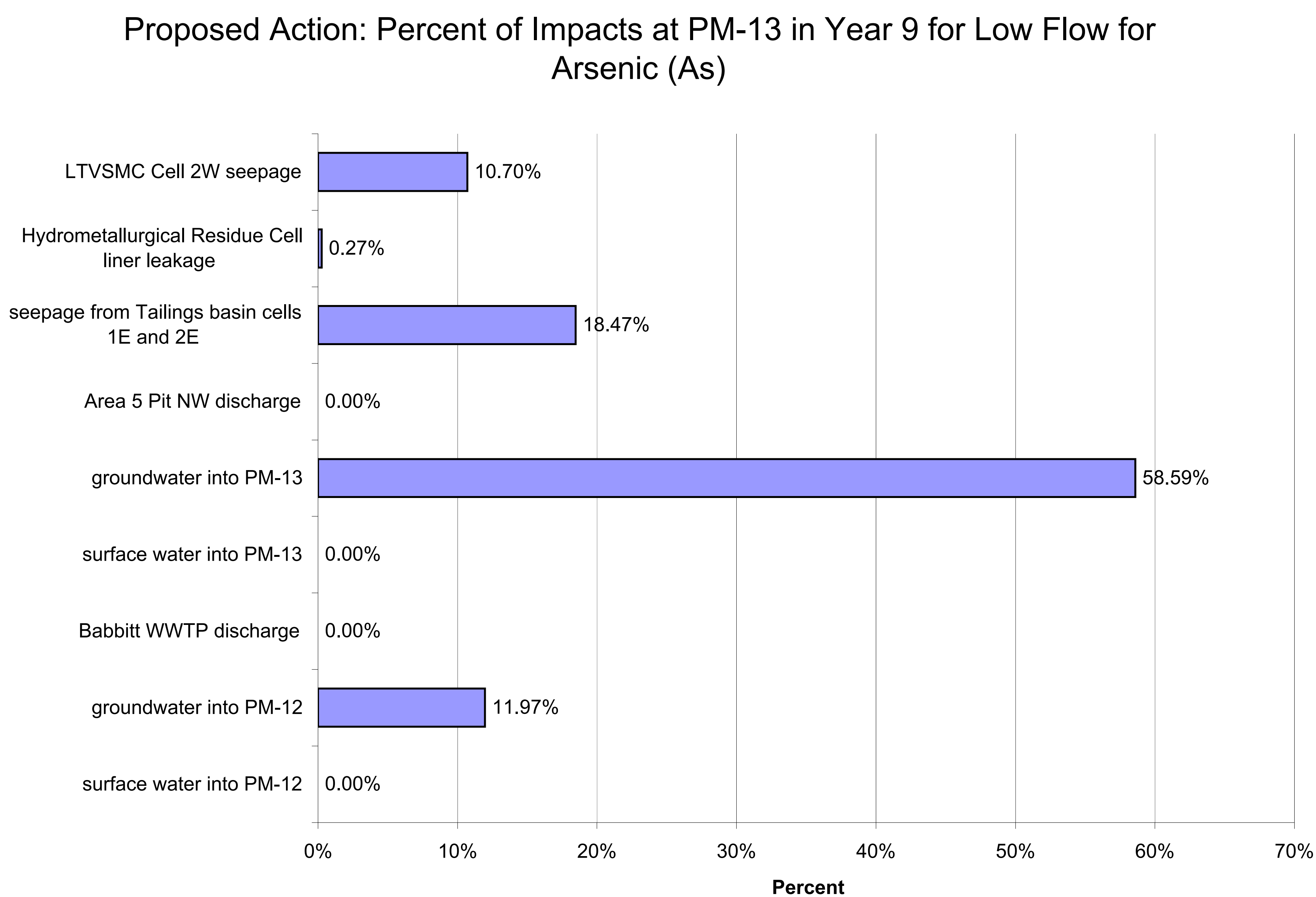
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 8 for High Flow for Sulfate (SO_4)

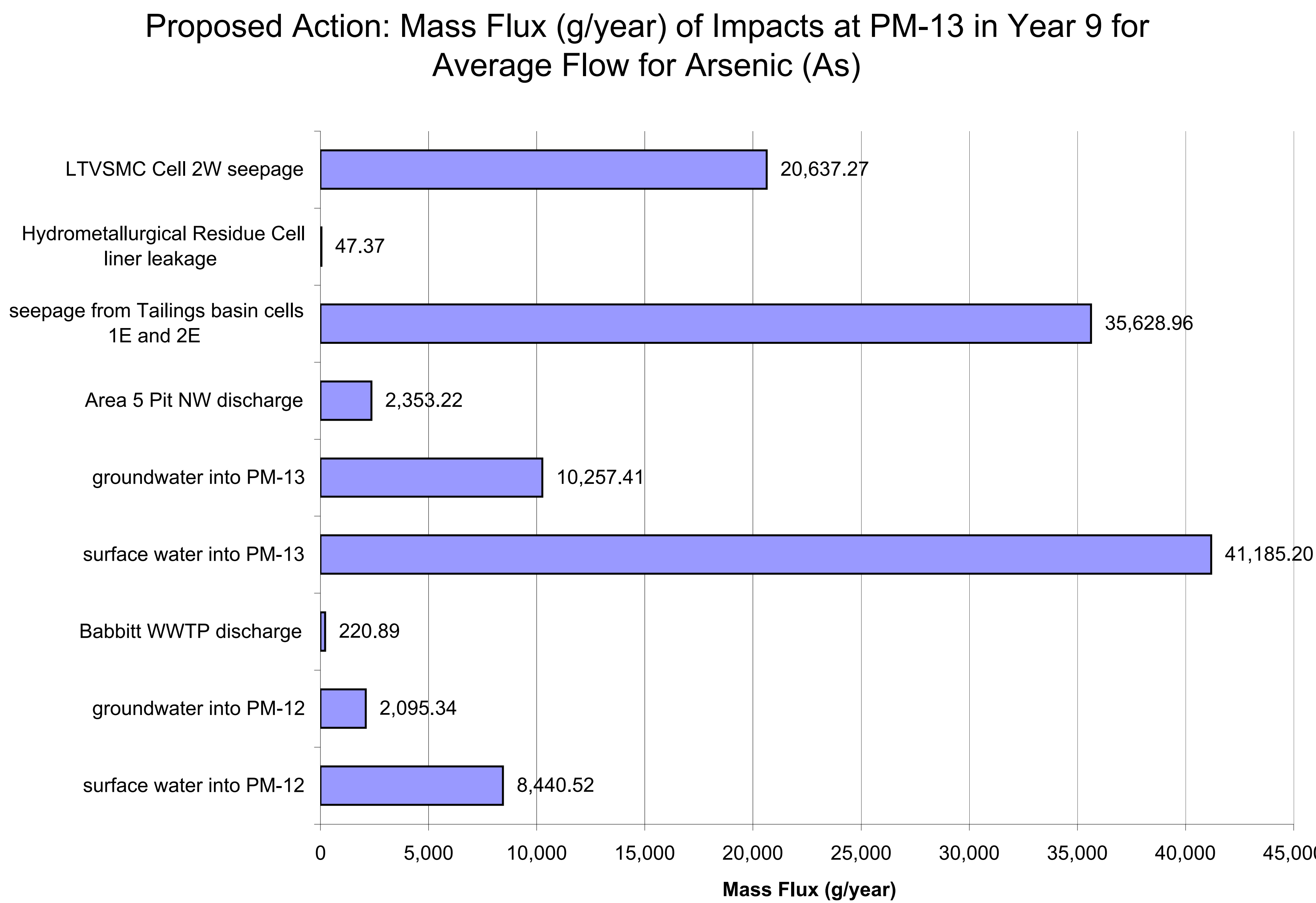


Proposed Action: Percent of Impacts at PM-13 in Year 8 for High Flow for Sulfate (SO_4)

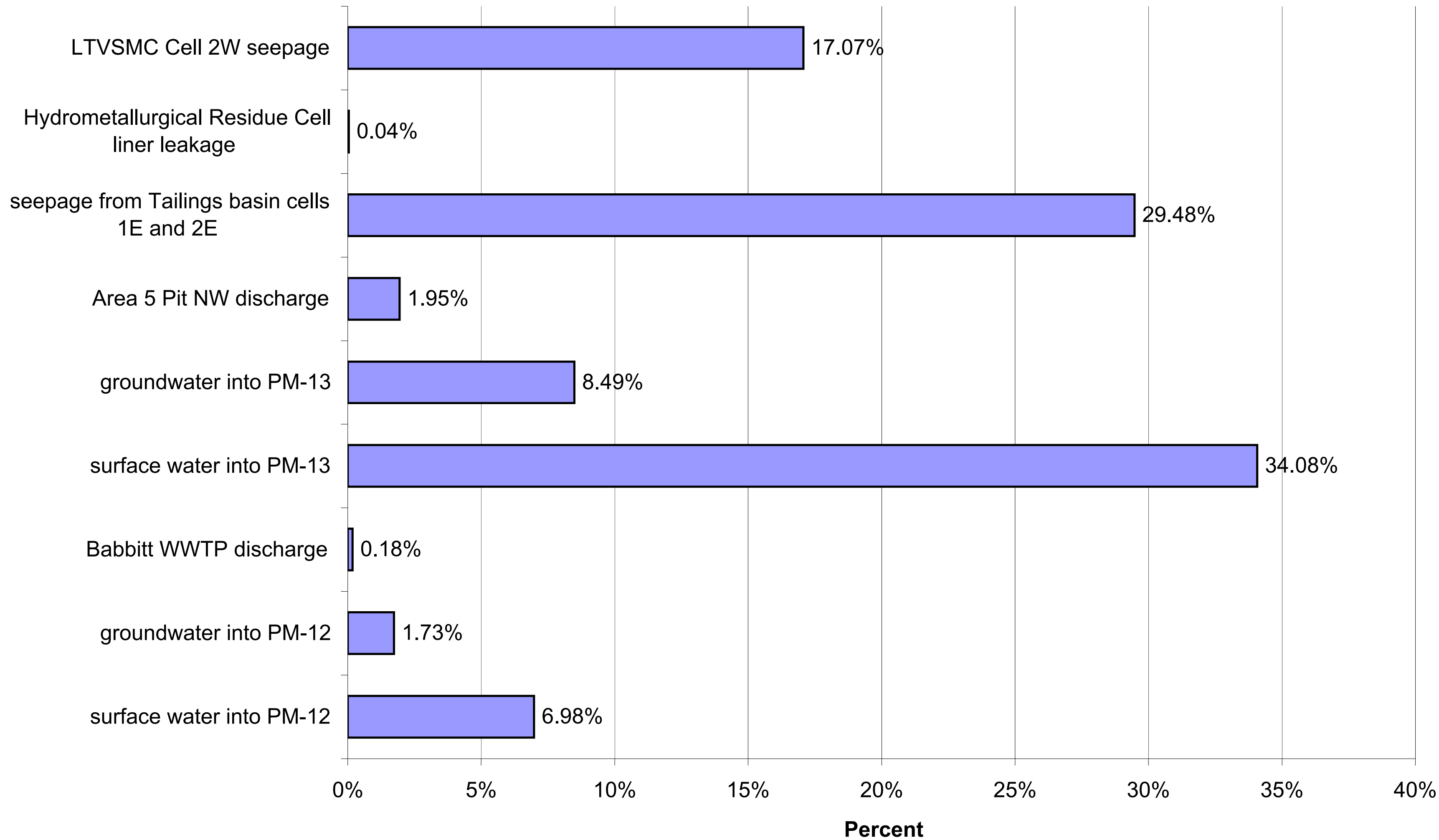



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1,873.55
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
3,234.57
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)

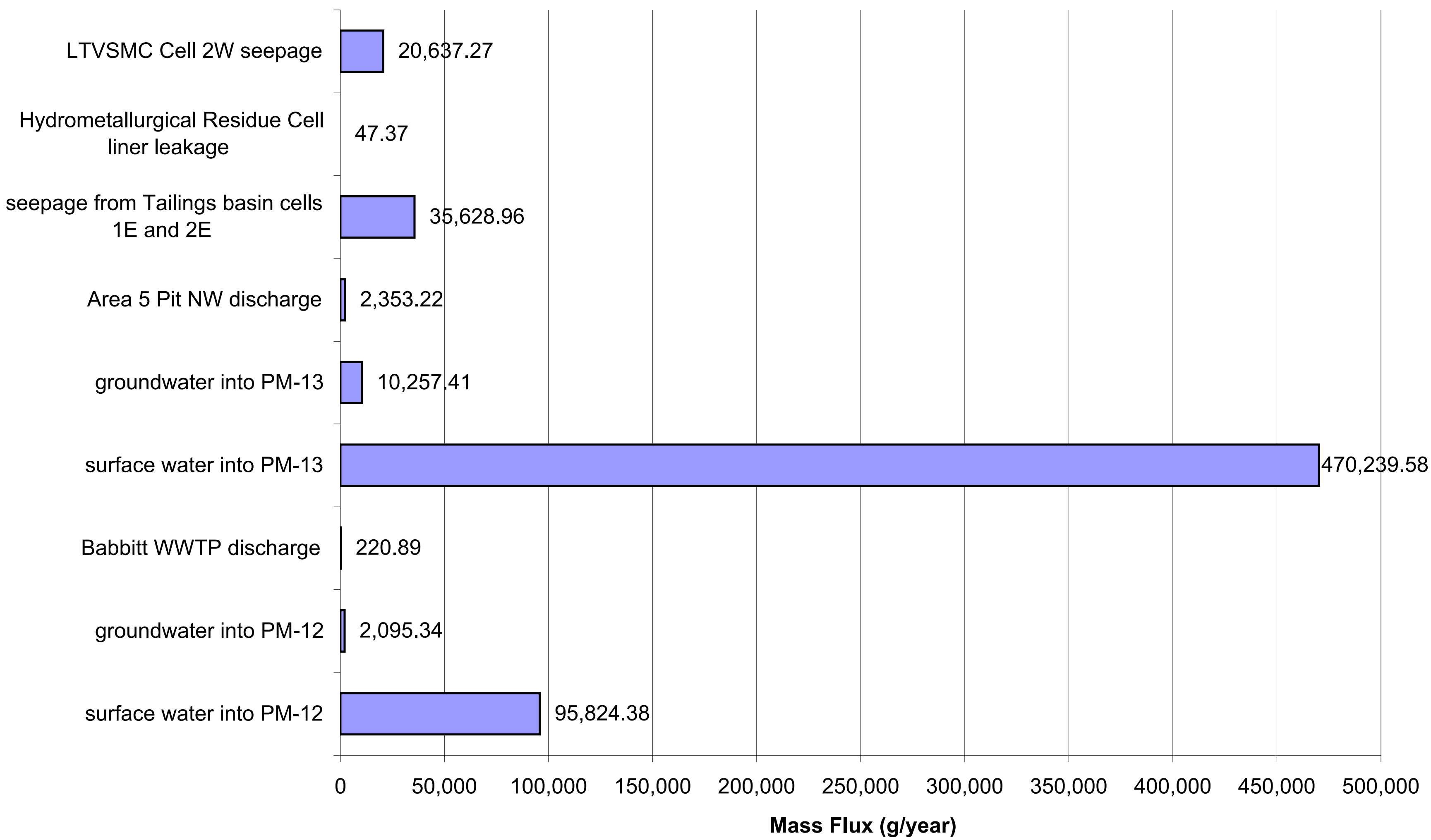

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
10.70%
Hydrometallurgical Residue Cell liner leakage
0.27%
seepage from Tailings basin cells 1E and 2E
18.47%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
58.59%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
11.97%
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
20,637.27
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)

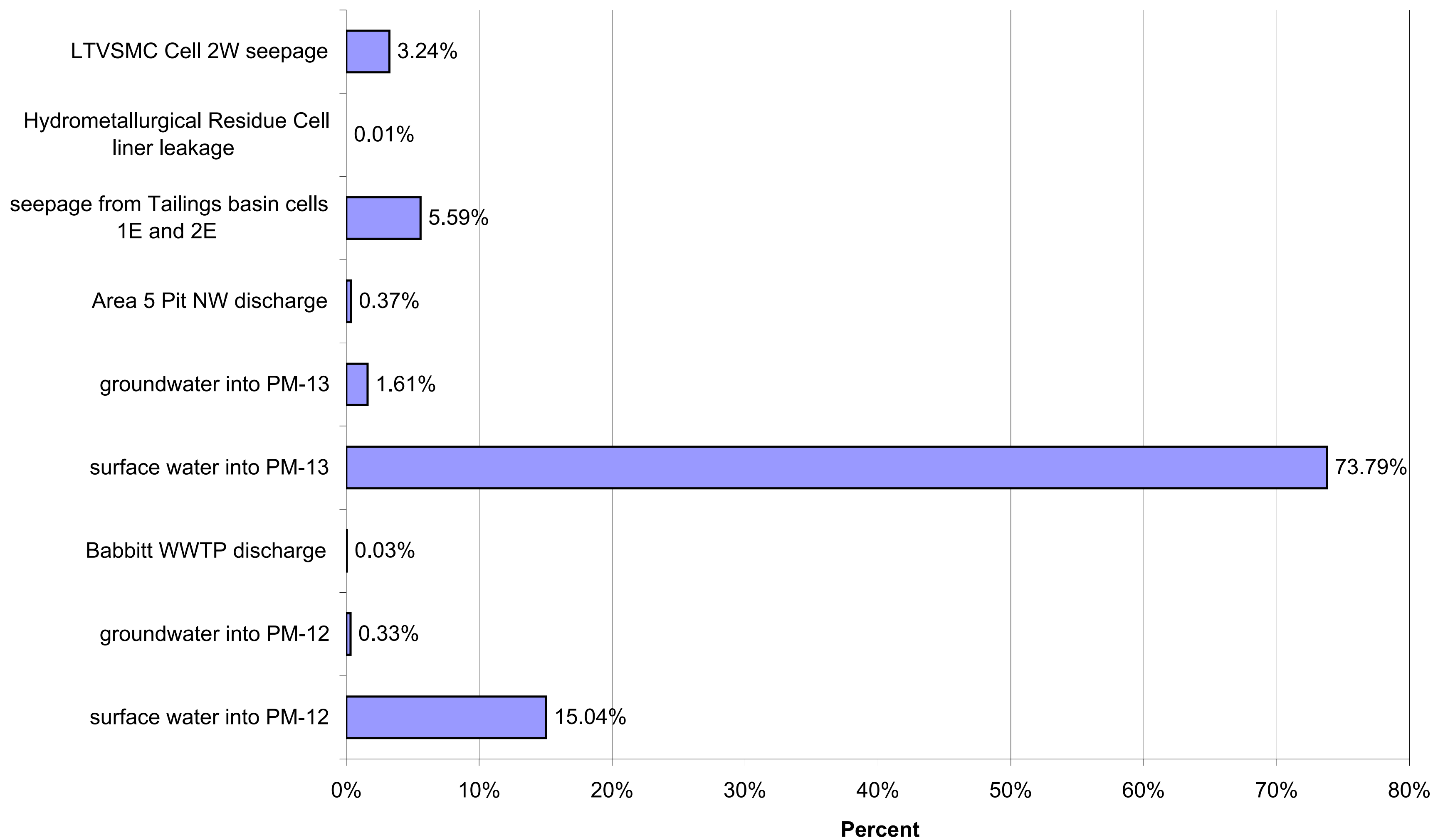
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Arsenic (As)



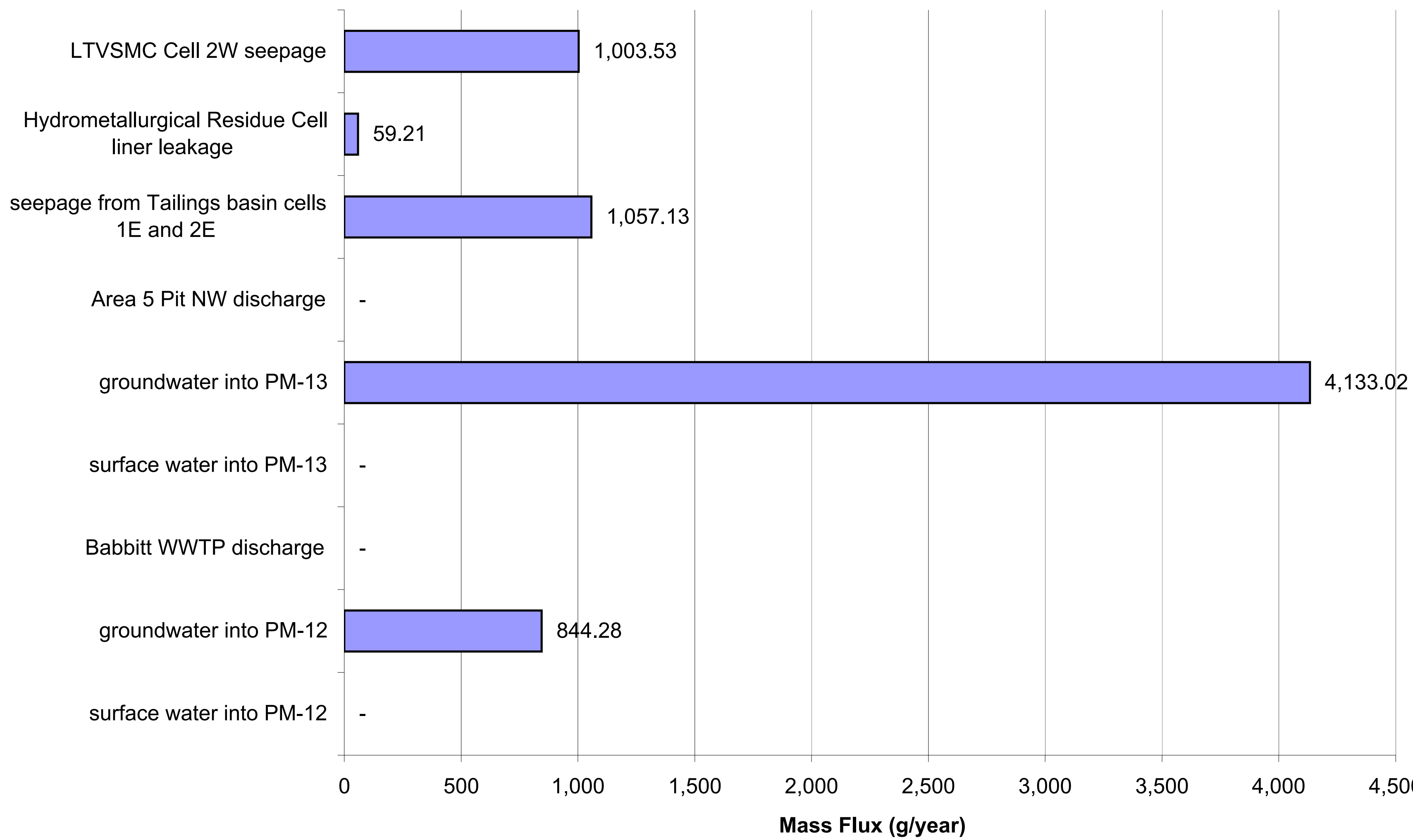
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Arsenic (As)



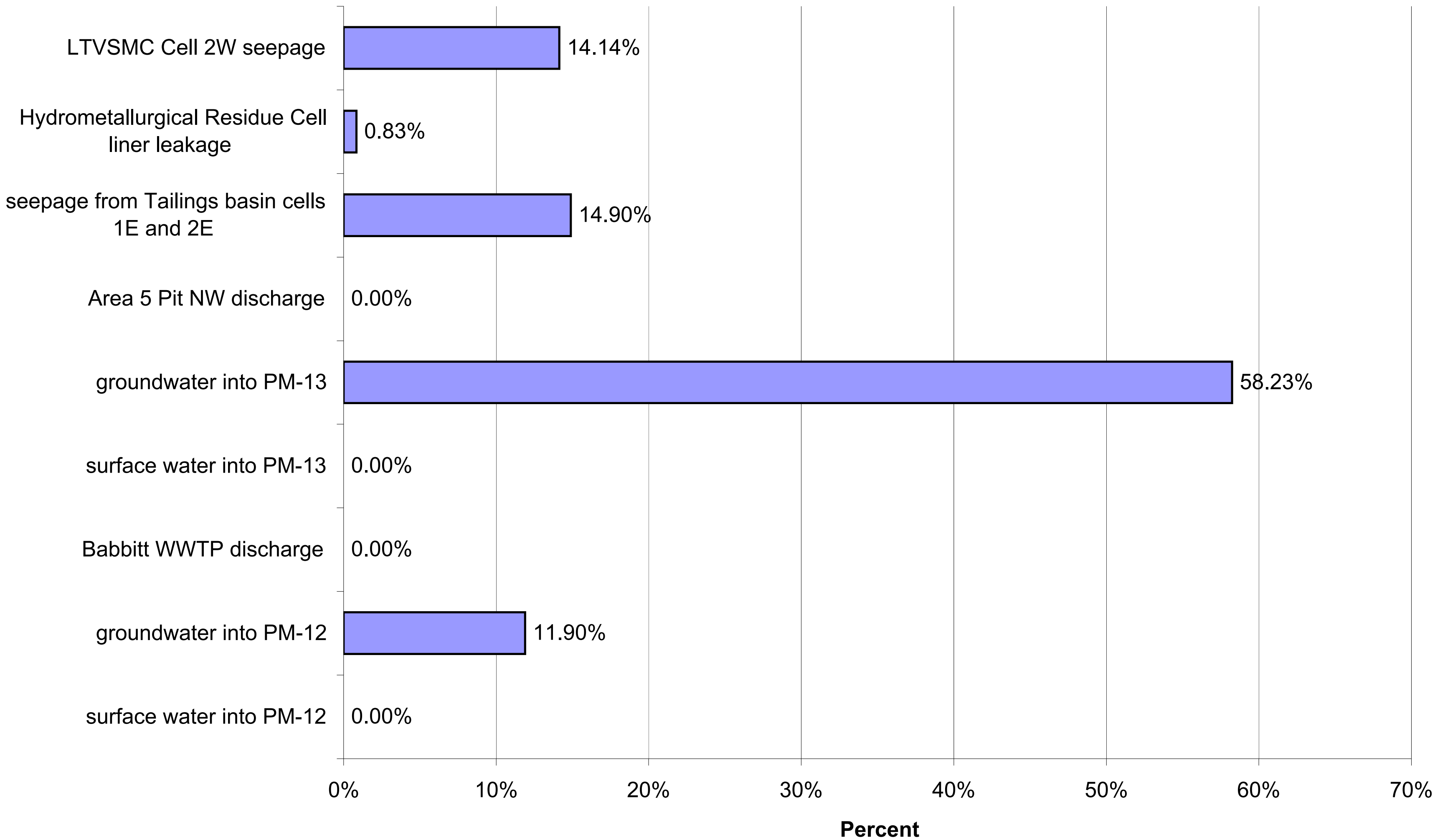
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Arsenic (As)

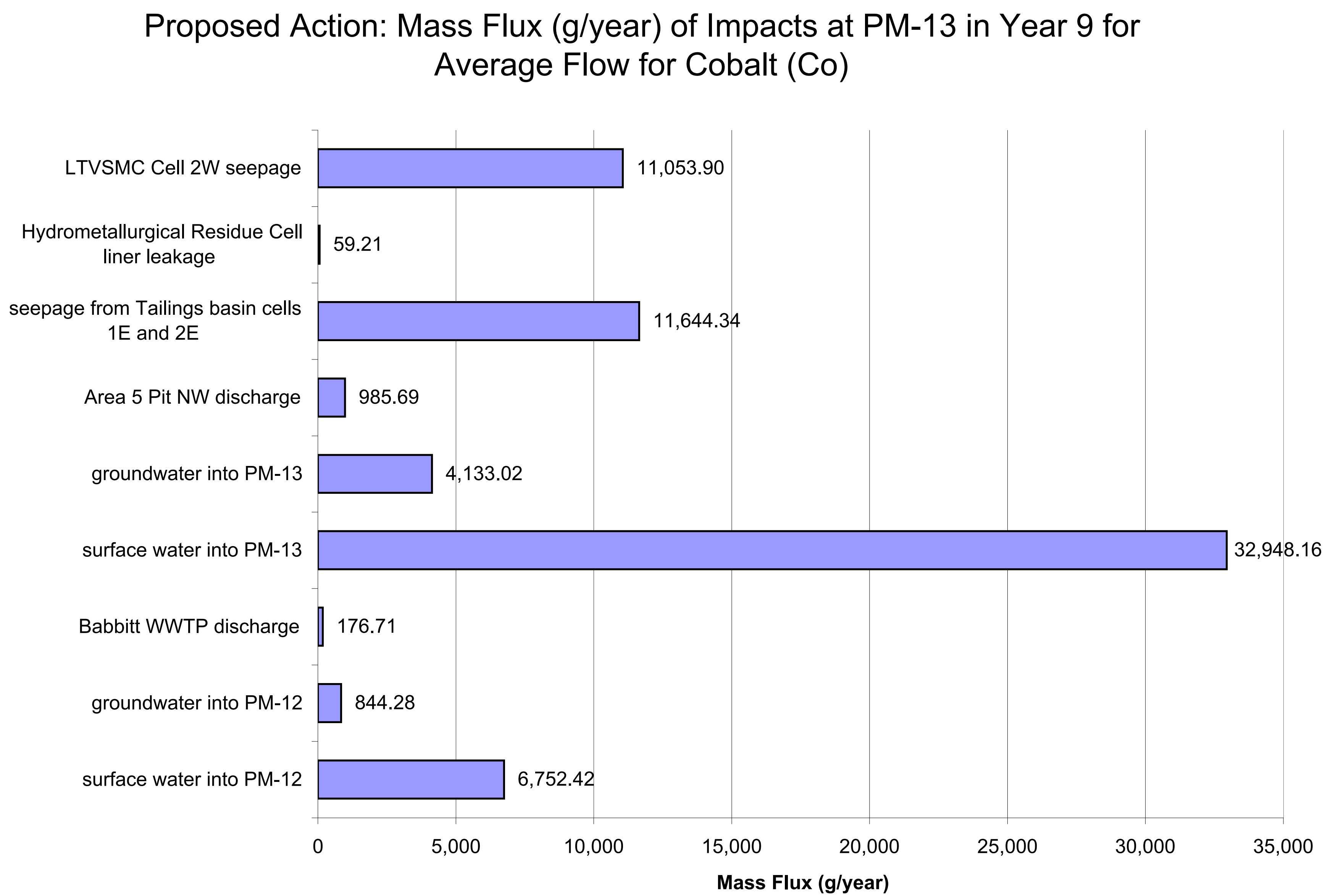


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Cobalt (Co)

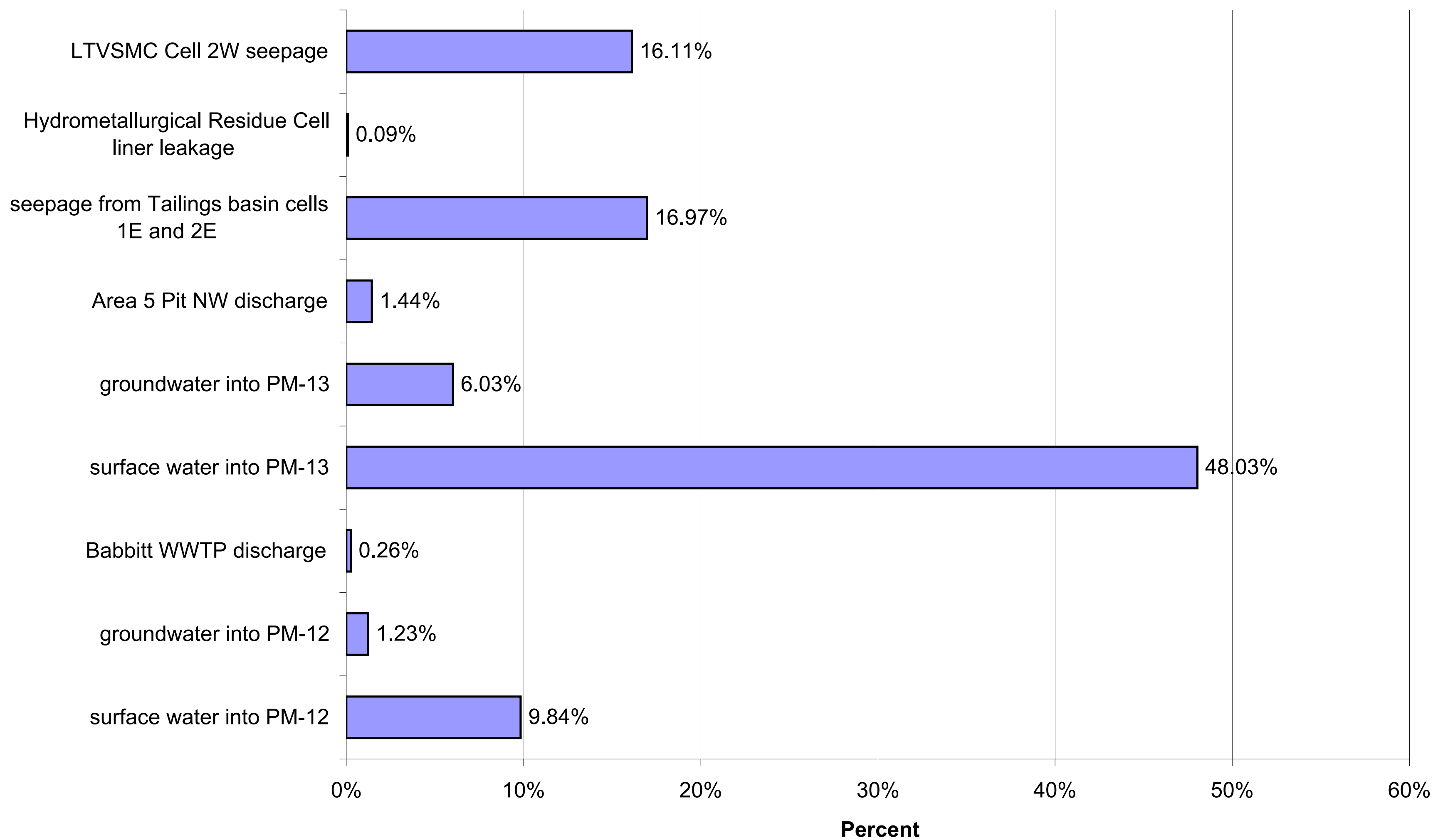


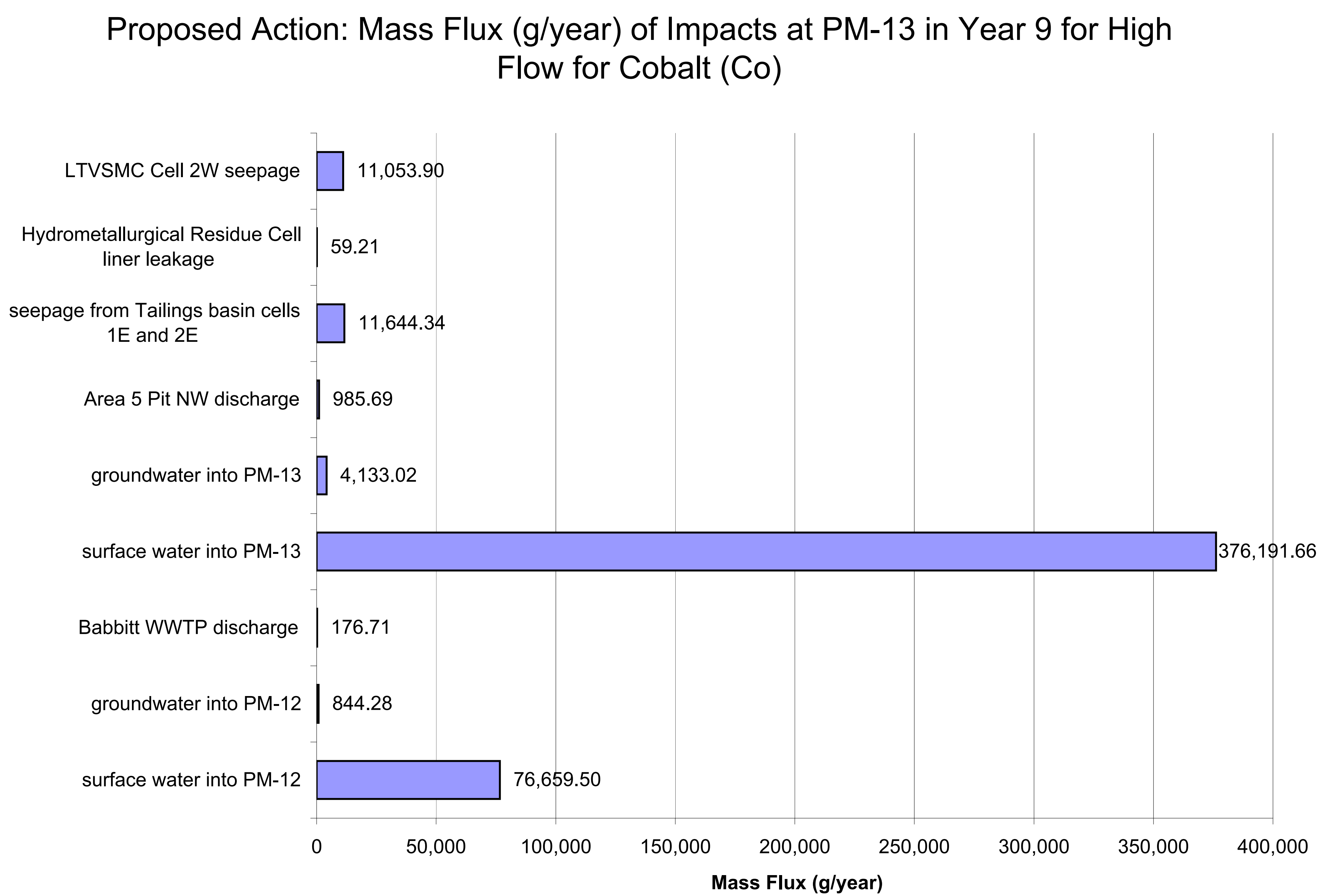
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Cobalt (Co)

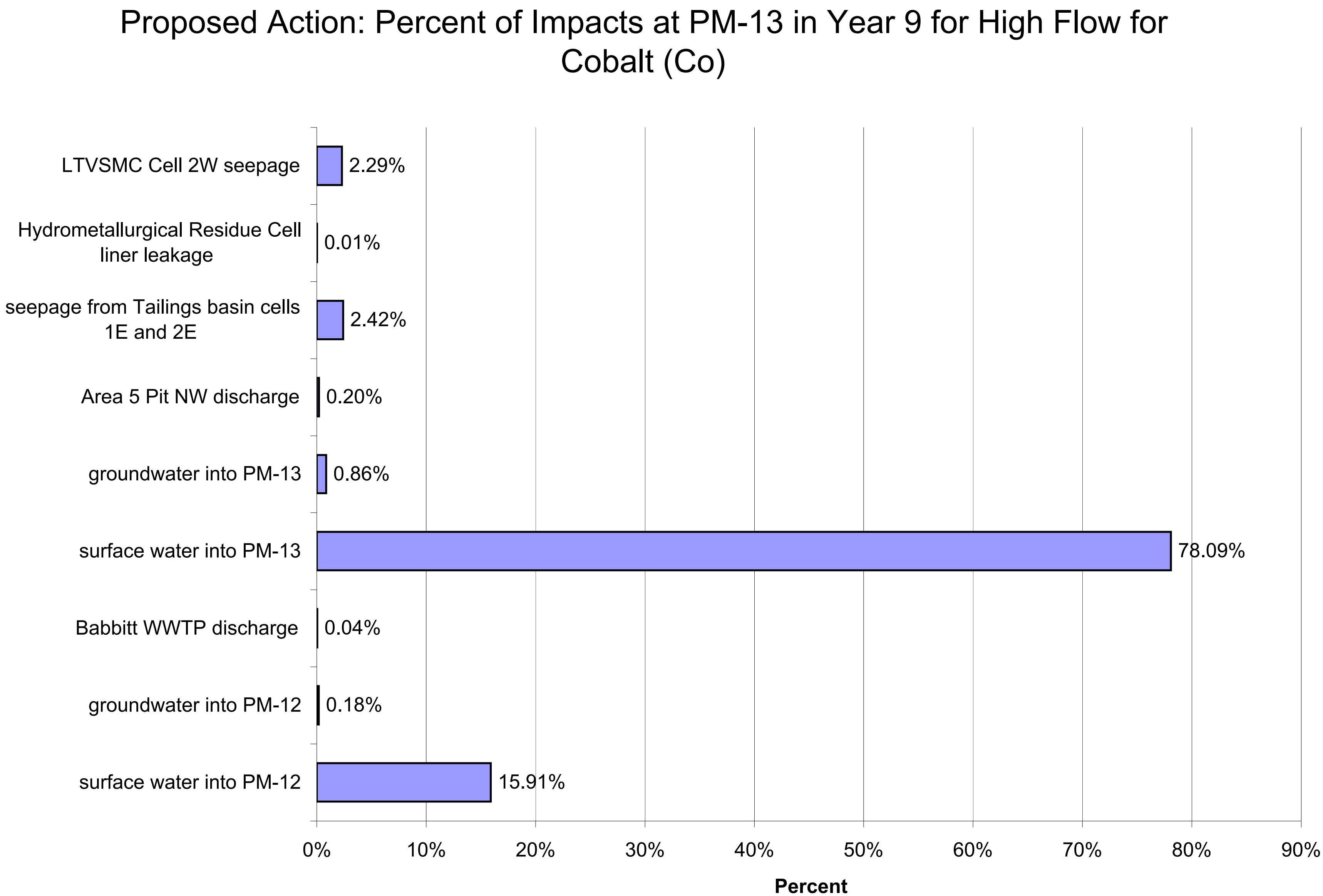



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
59.21
seepage from Tailings basin cells 1E and 2E
11,644.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
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)

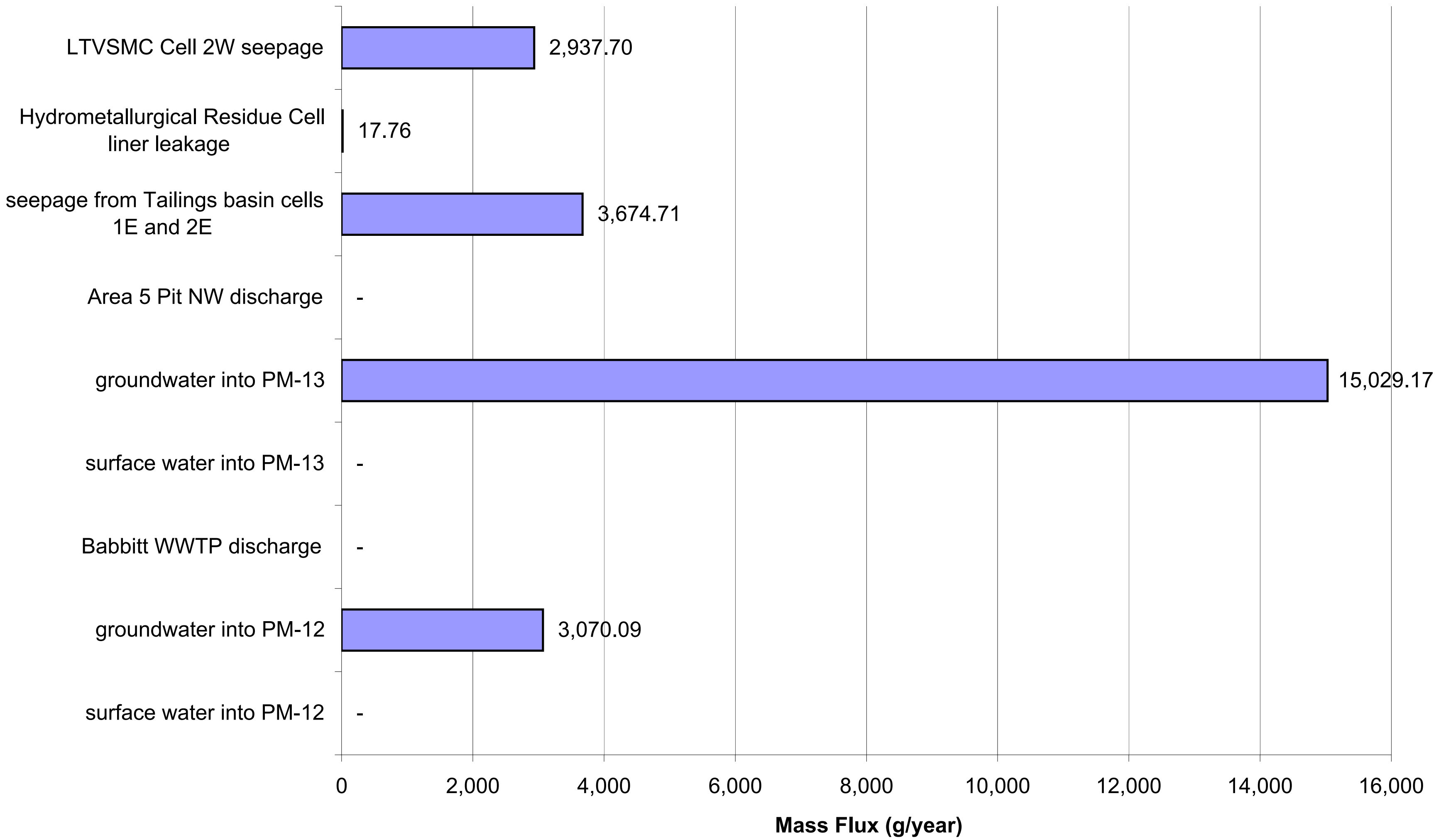
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Cobalt (Co)



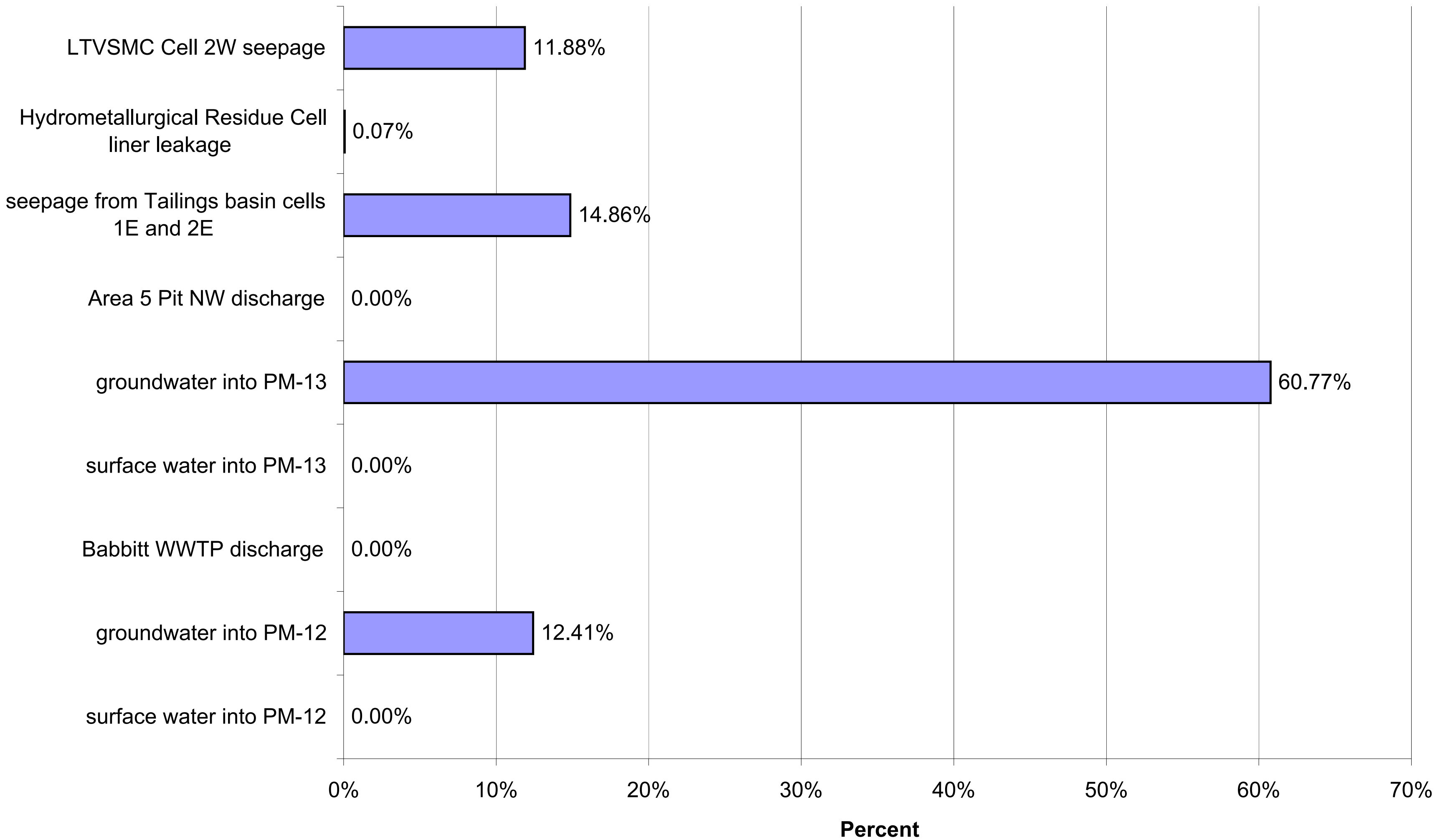

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
59.21
seepage from Tailings basin cells 1E and 2E
11,644.34
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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
2.29%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings basin cells 1E and 2E
2.42%
Area 5 Pit NW discharge
0.20%
groundwater into PM-13
0.86%
surface water into PM-13
78.09%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
15.91%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

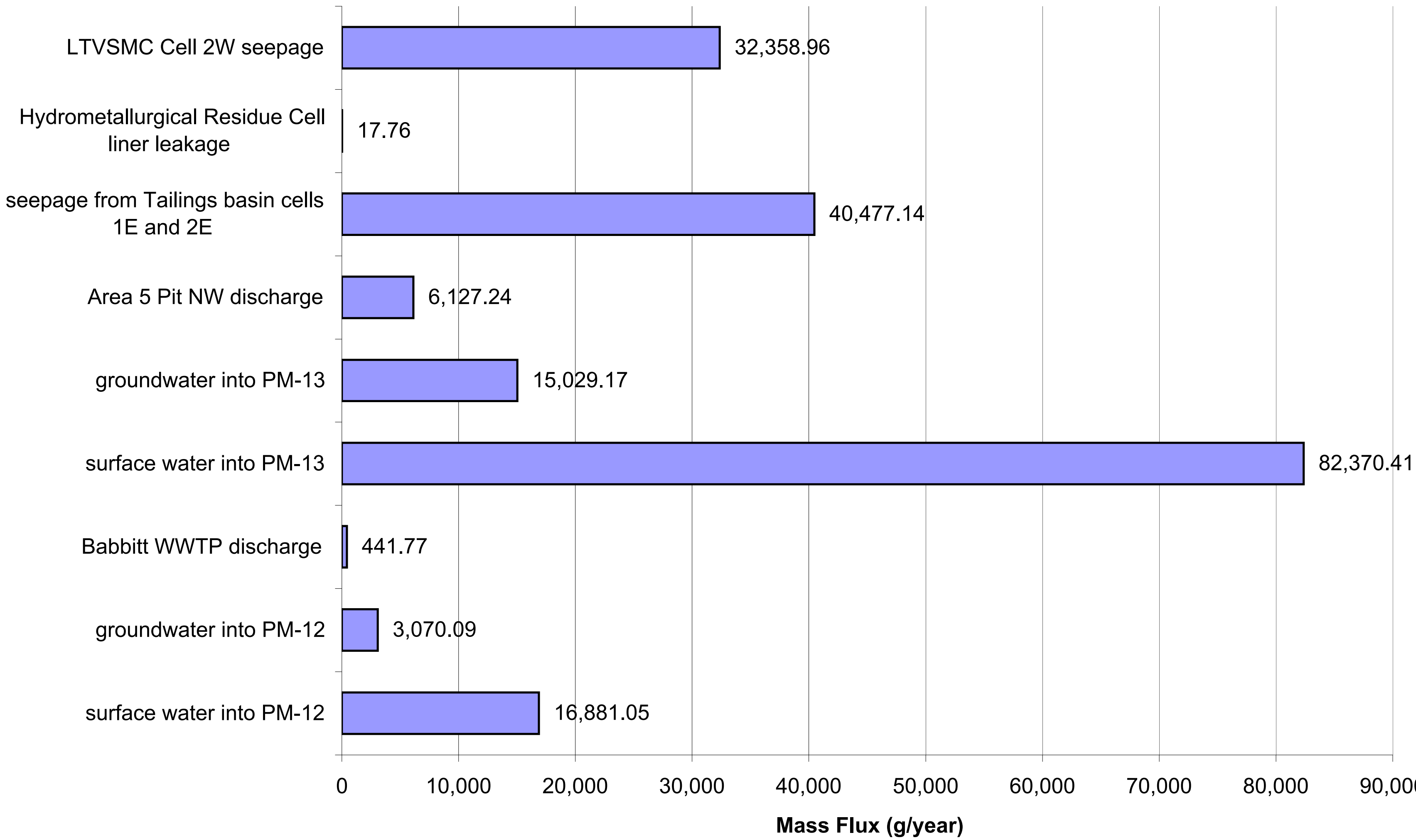
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Copper (Cu)



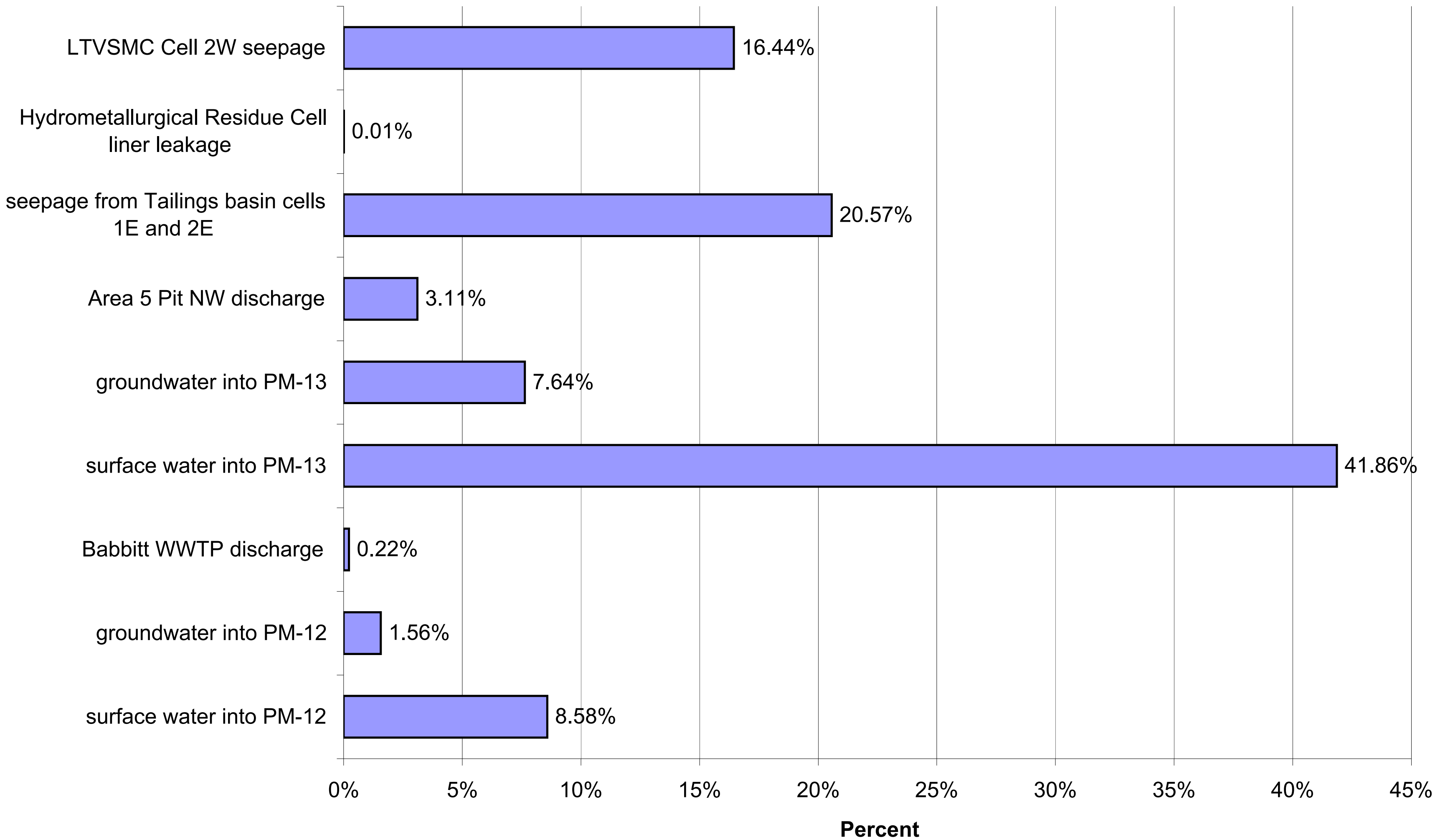
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Copper (Cu)

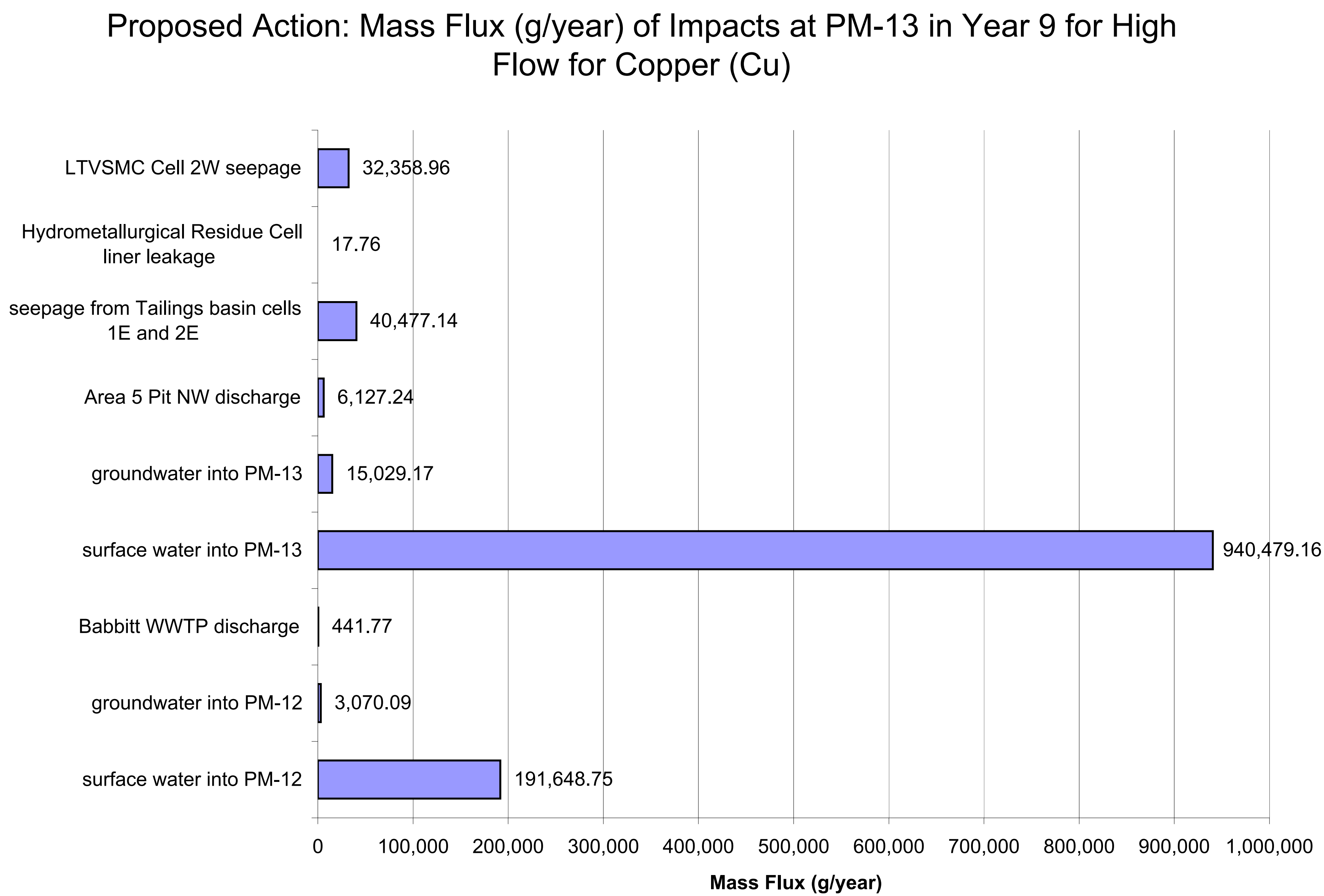


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Copper (Cu)

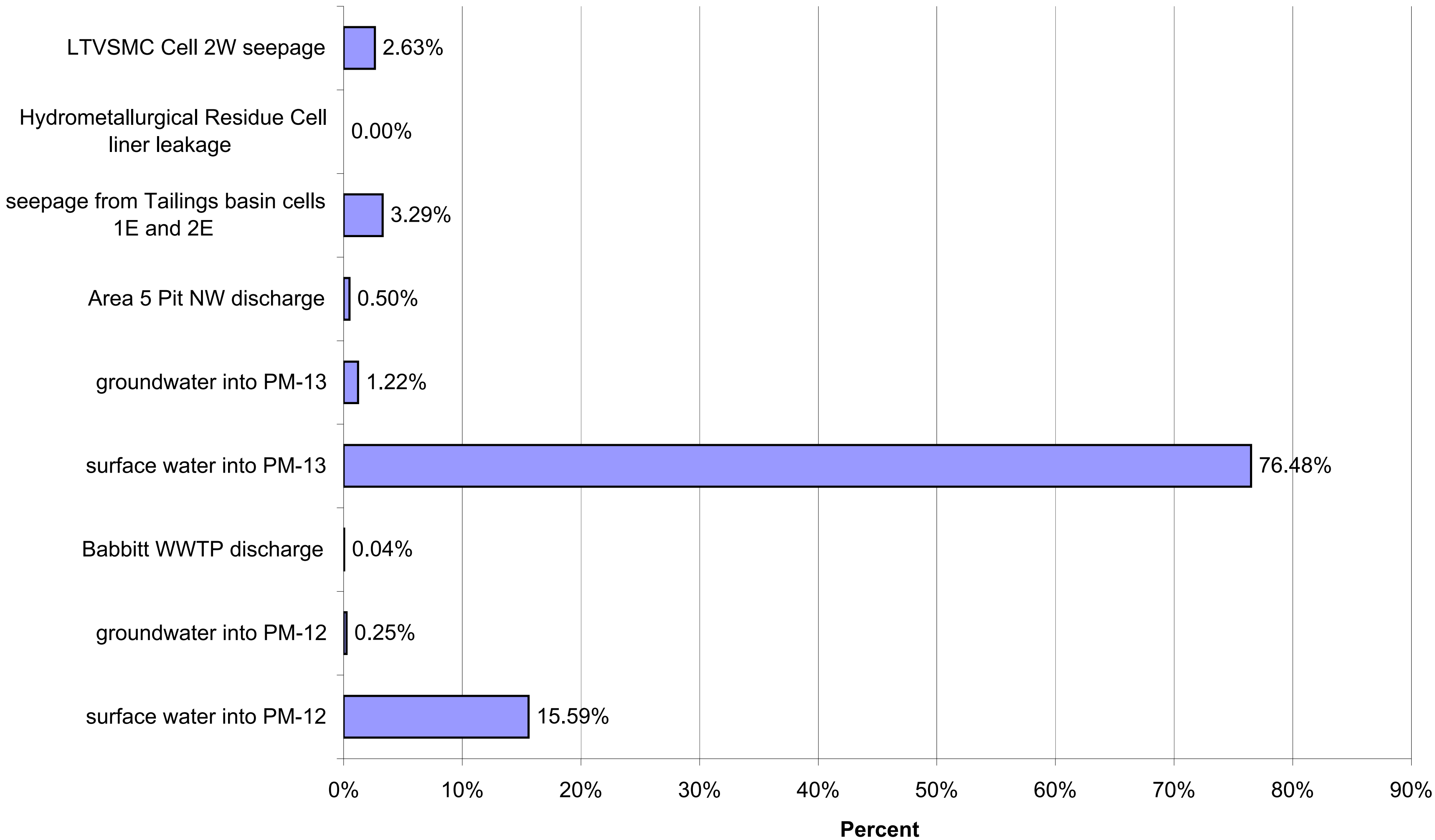


Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Copper (Cu)

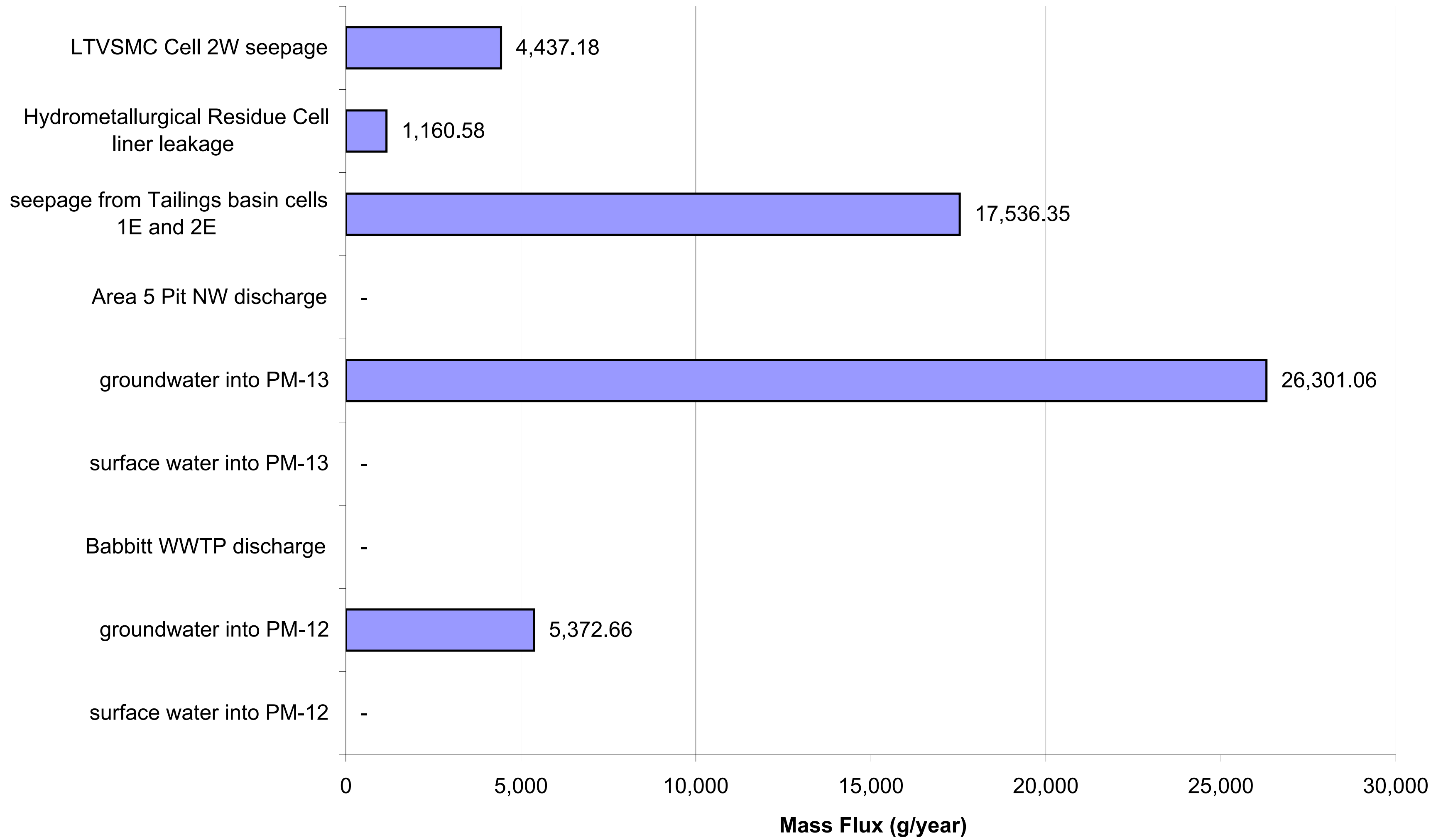



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
32,358.96
Hydrometallurgical Residue Cell liner leakage
17.76
seepage from Tailings basin cells 1E and 2E
40,477.14
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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)

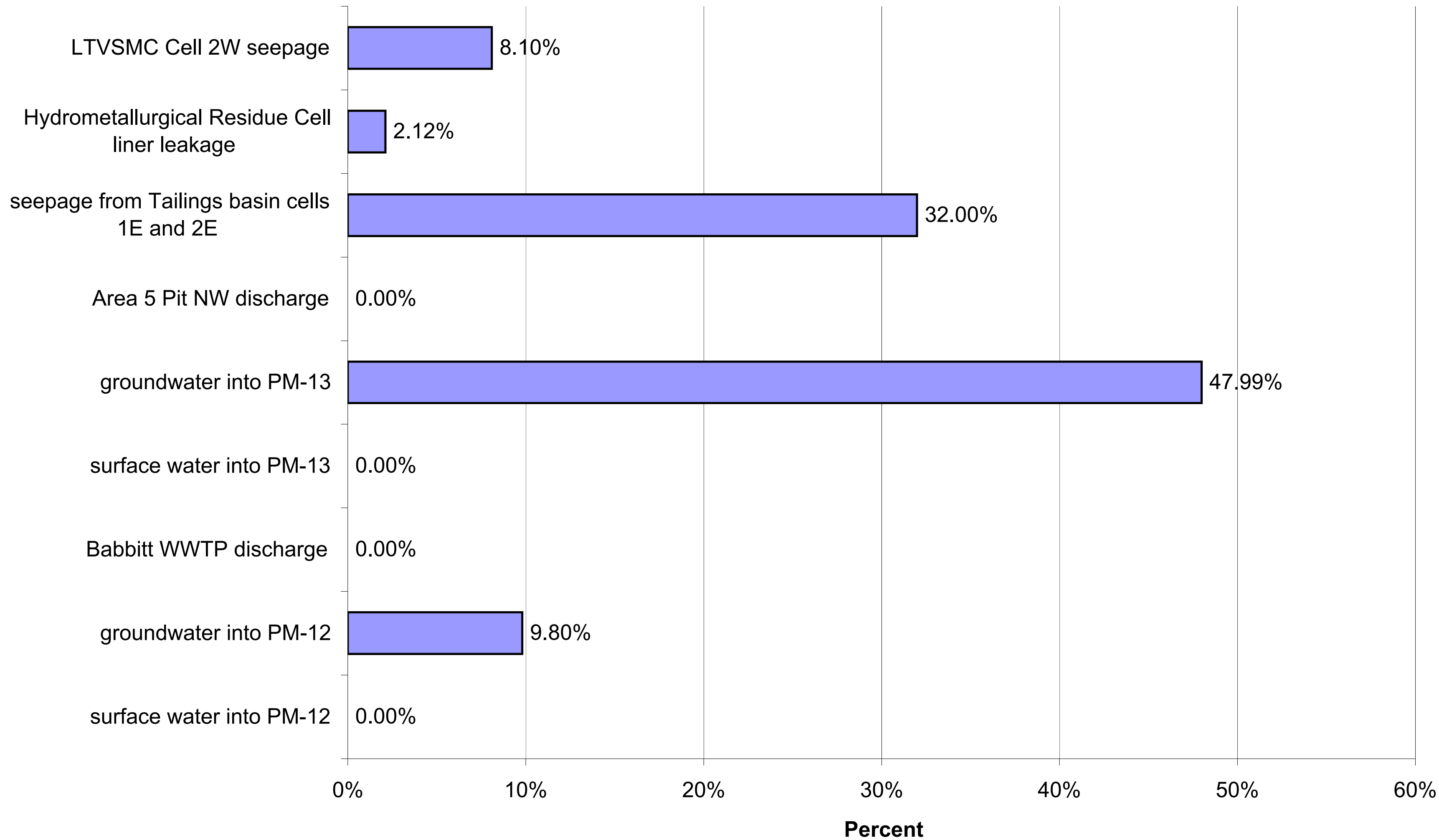
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Copper (Cu)

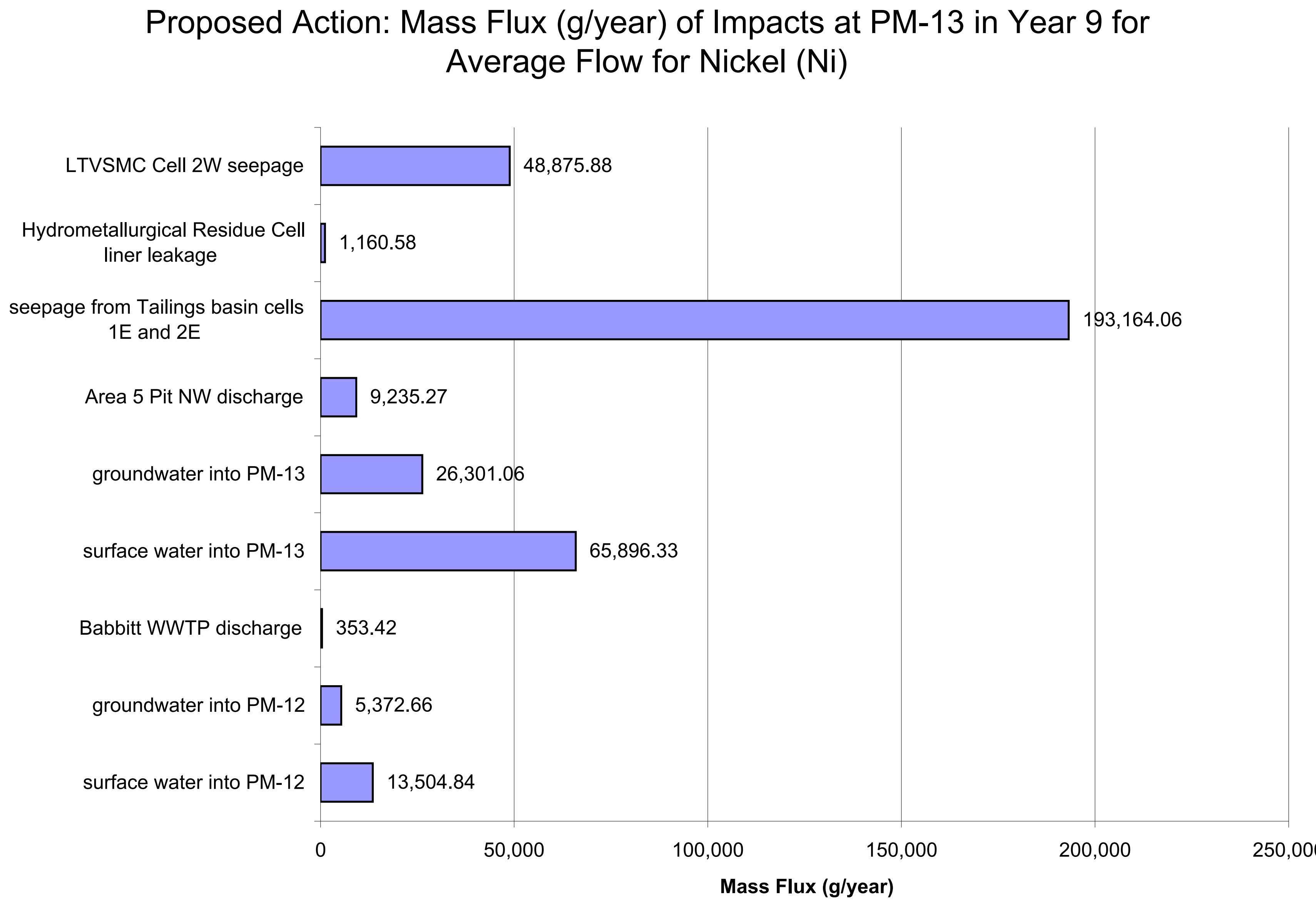


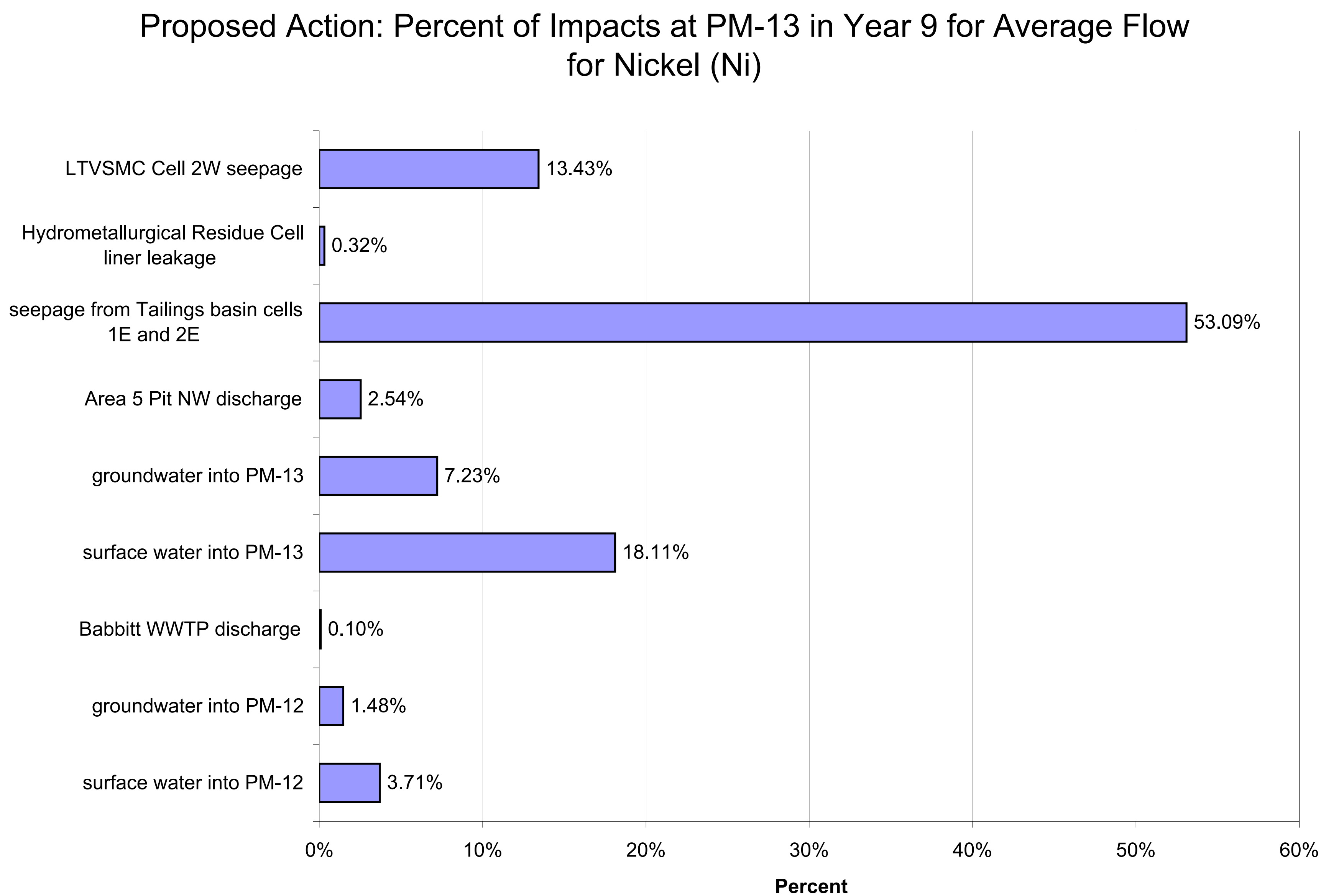
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Nickel (Ni)

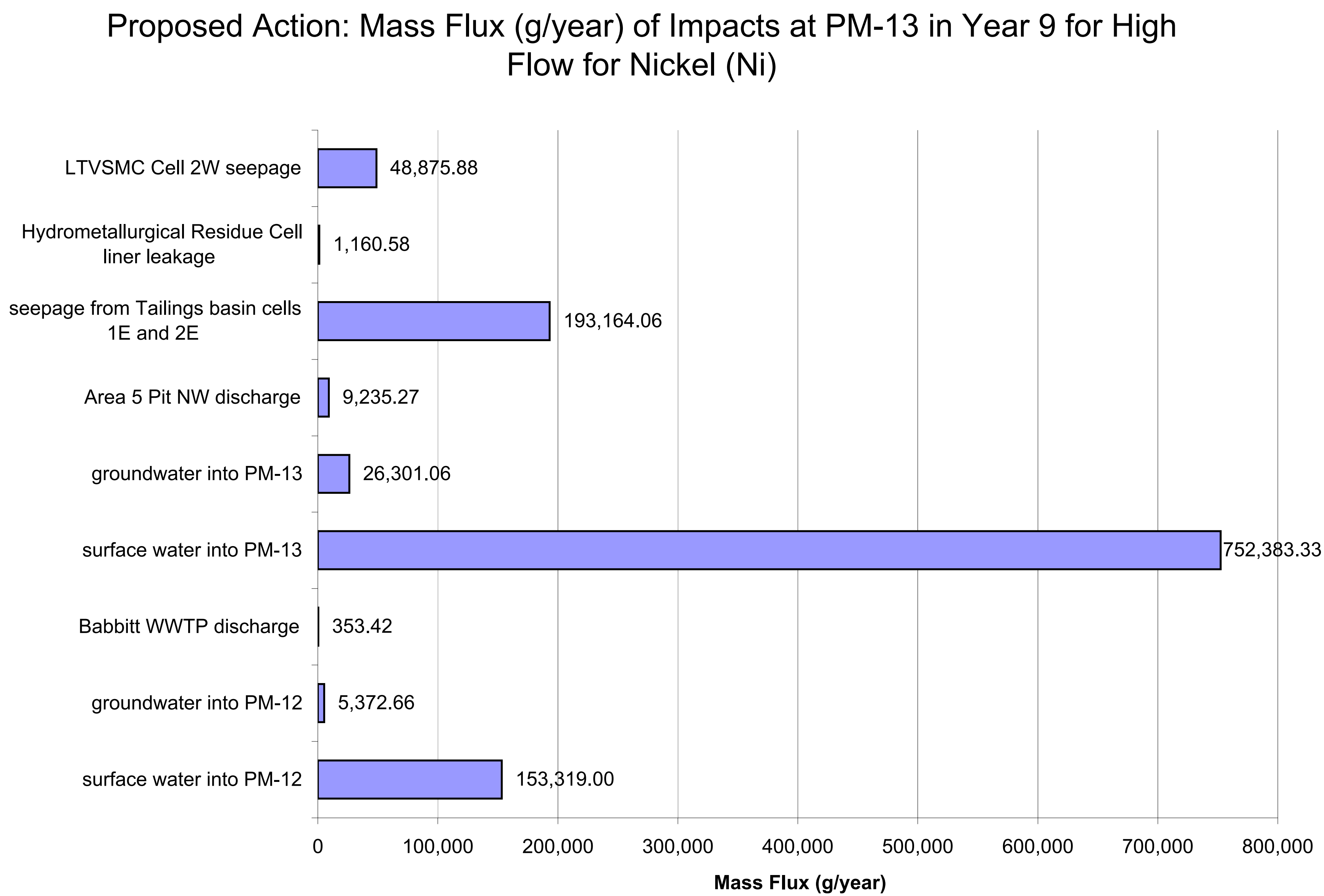


Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Nickel (Ni)

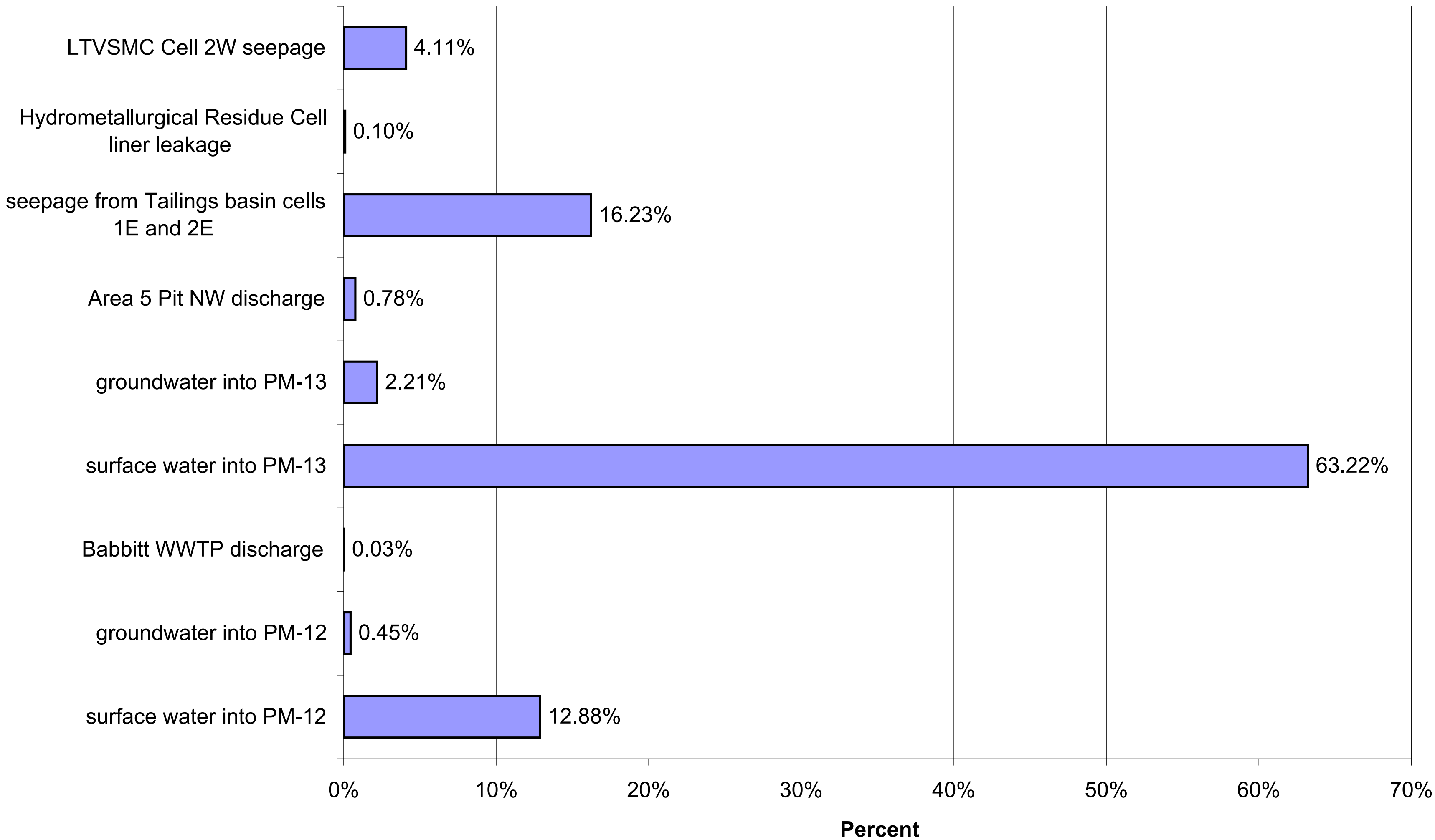


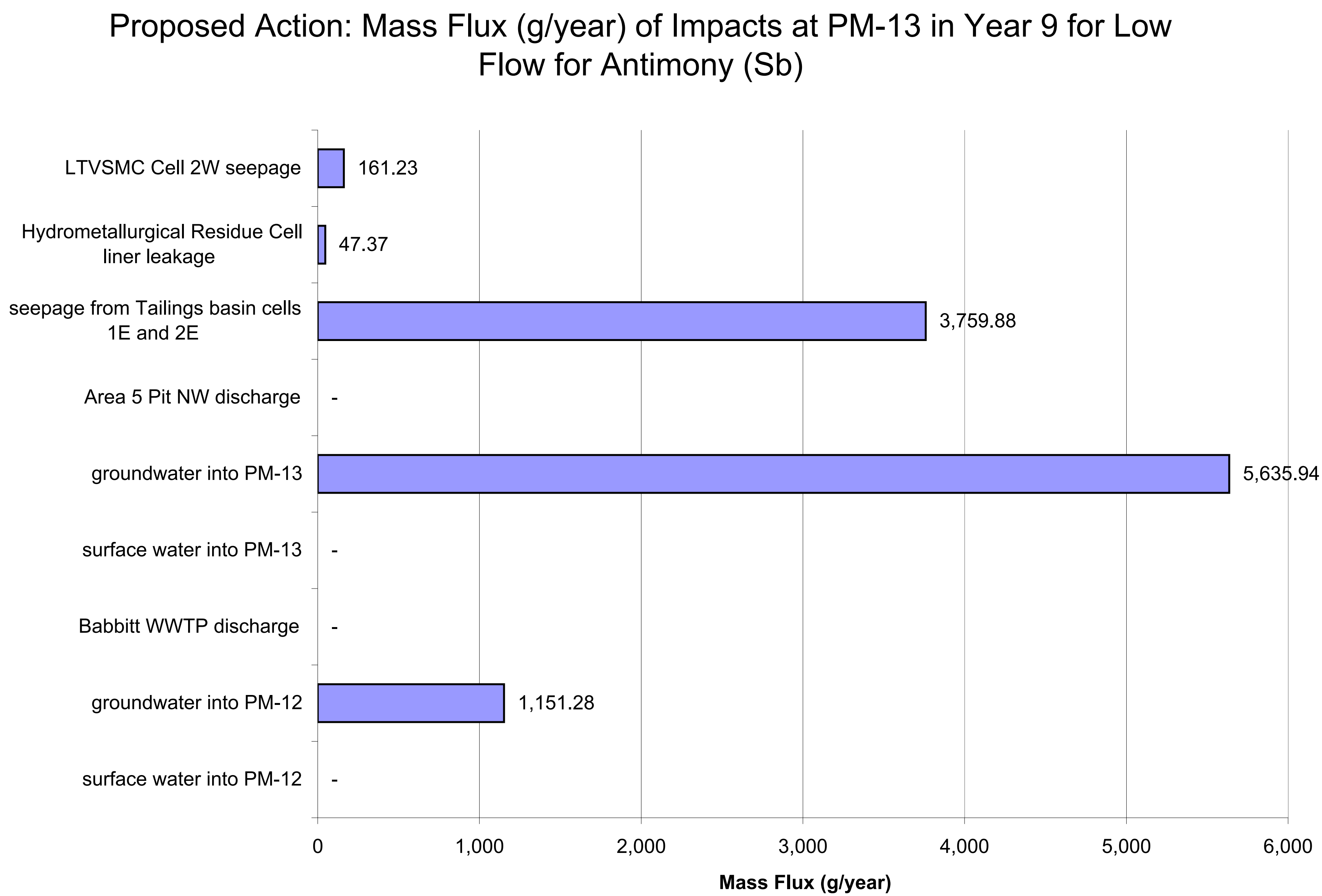

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,160.58
seepage from Tailings basin cells 1E and 2E
193,164.06
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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
13.43%
Hydrometallurgical Residue Cell liner leakage
0.32%
seepage from Tailings basin cells 1E and 2E
53.09%
Area 5 Pit NW discharge
2.54%
groundwater into PM-13
7.23%
surface water into PM-13
18.11%
Babbitt WWTP discharge
0.10%
groundwater into PM-12
1.48%
surface water into PM-12
3.71%
0%
10%
20%
30%
40%
50%
60%
Percent

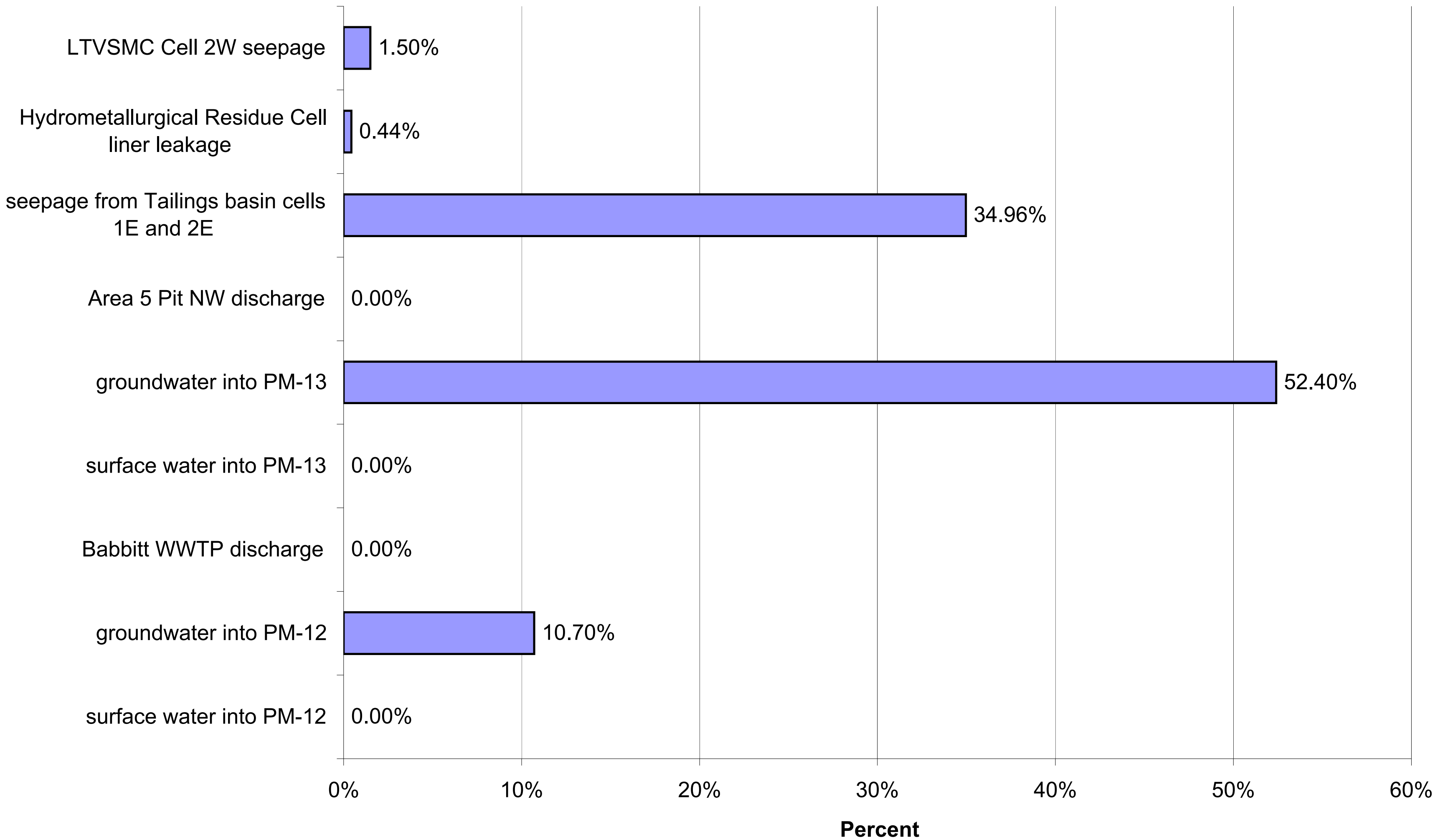

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,160.58
seepage from Tailings basin cells 1E and 2E
193,164.06
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)

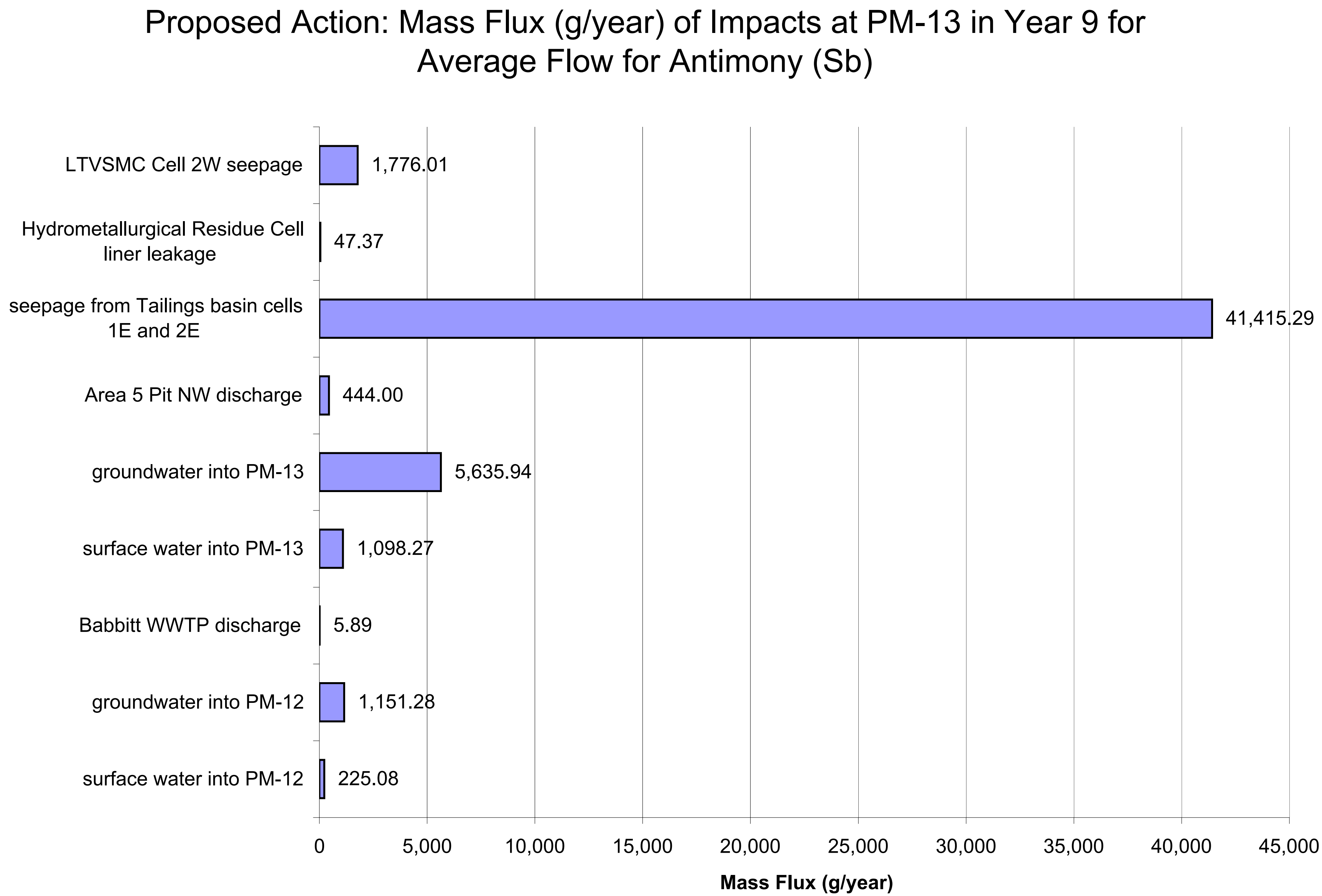
Proposed Action: Percent of Impacts at PM-13 in Year 9 for High Flow for Nickel (Ni)



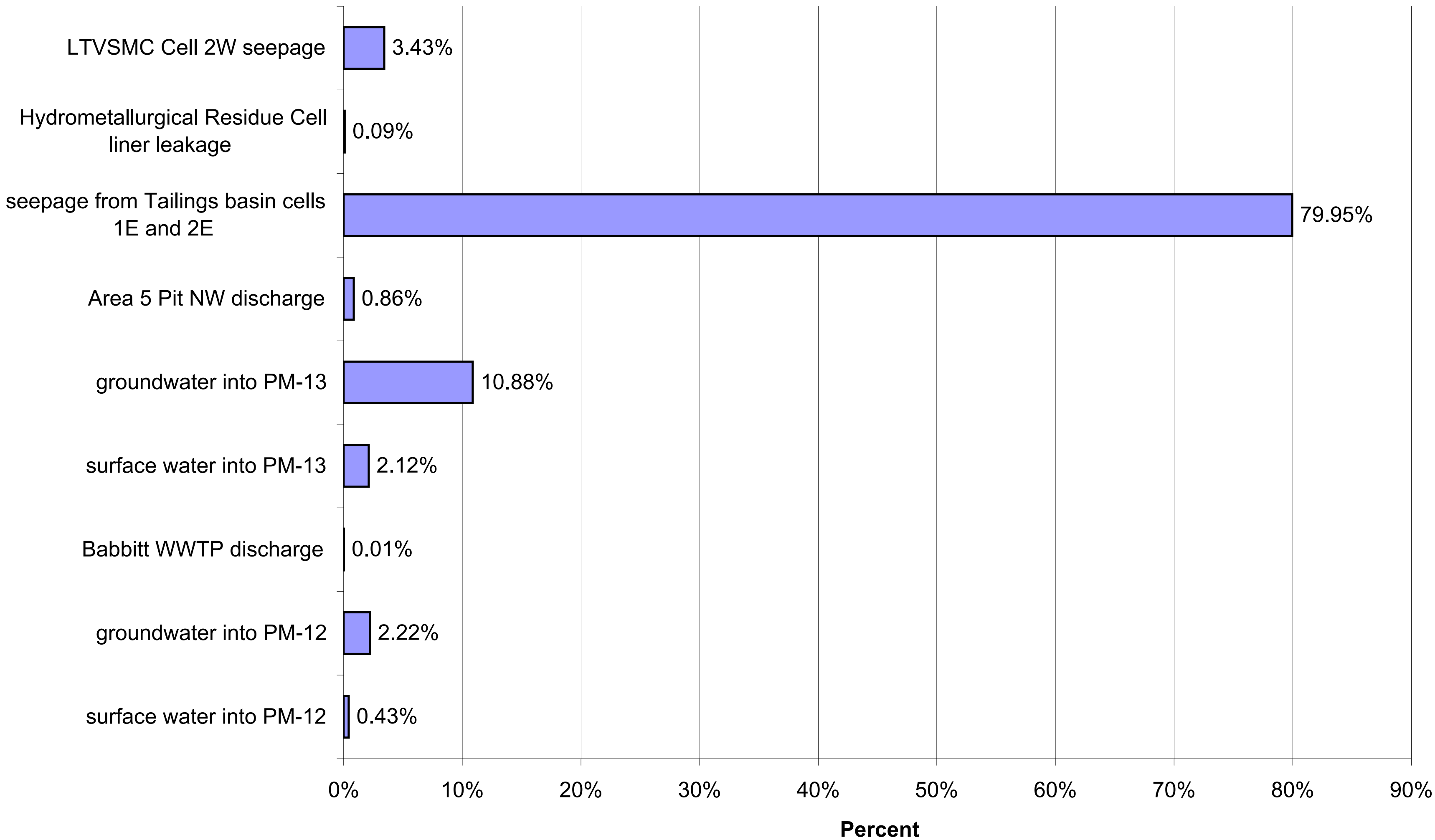

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
161.23
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
3,759.88
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

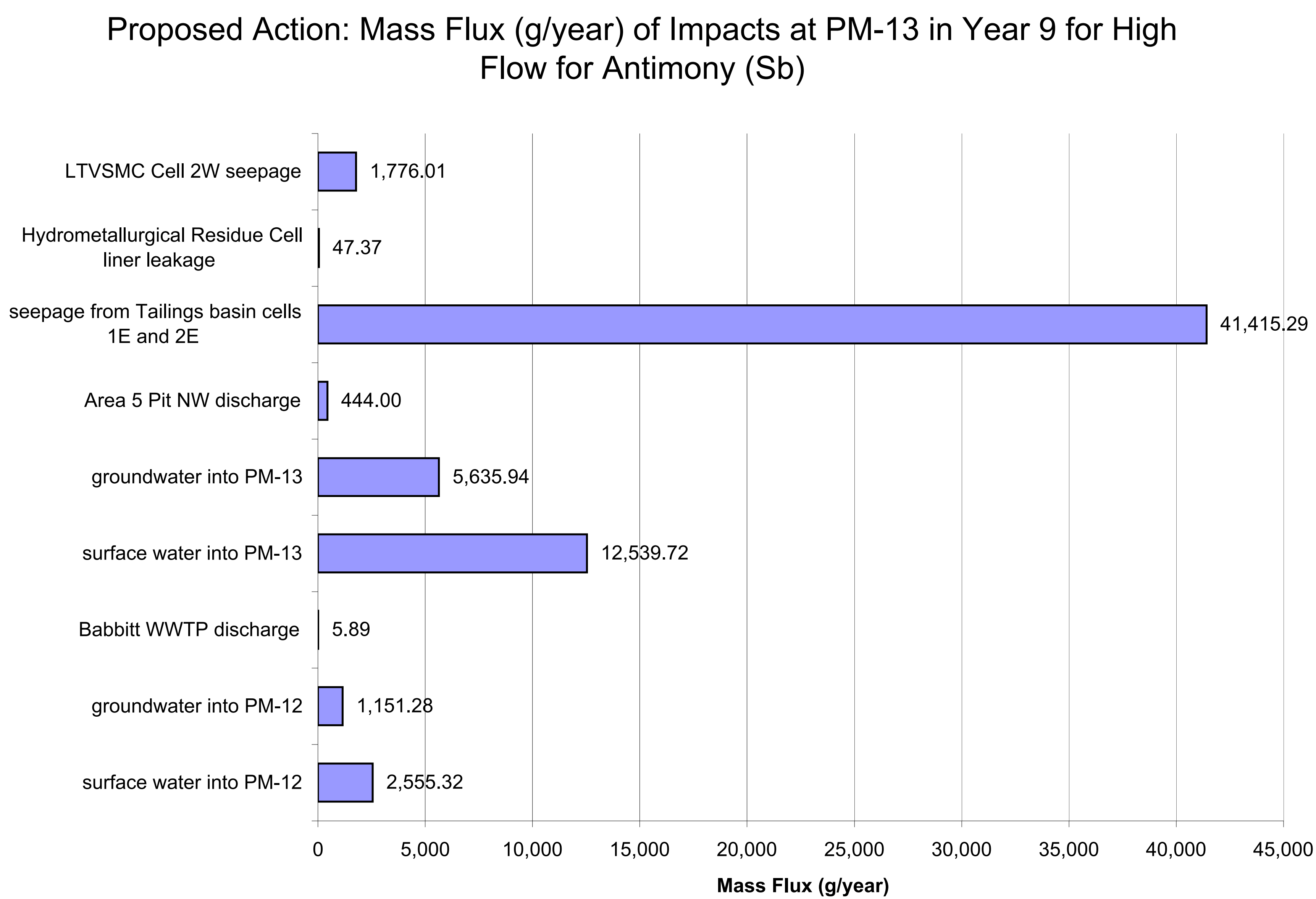
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Antimony (Sb)



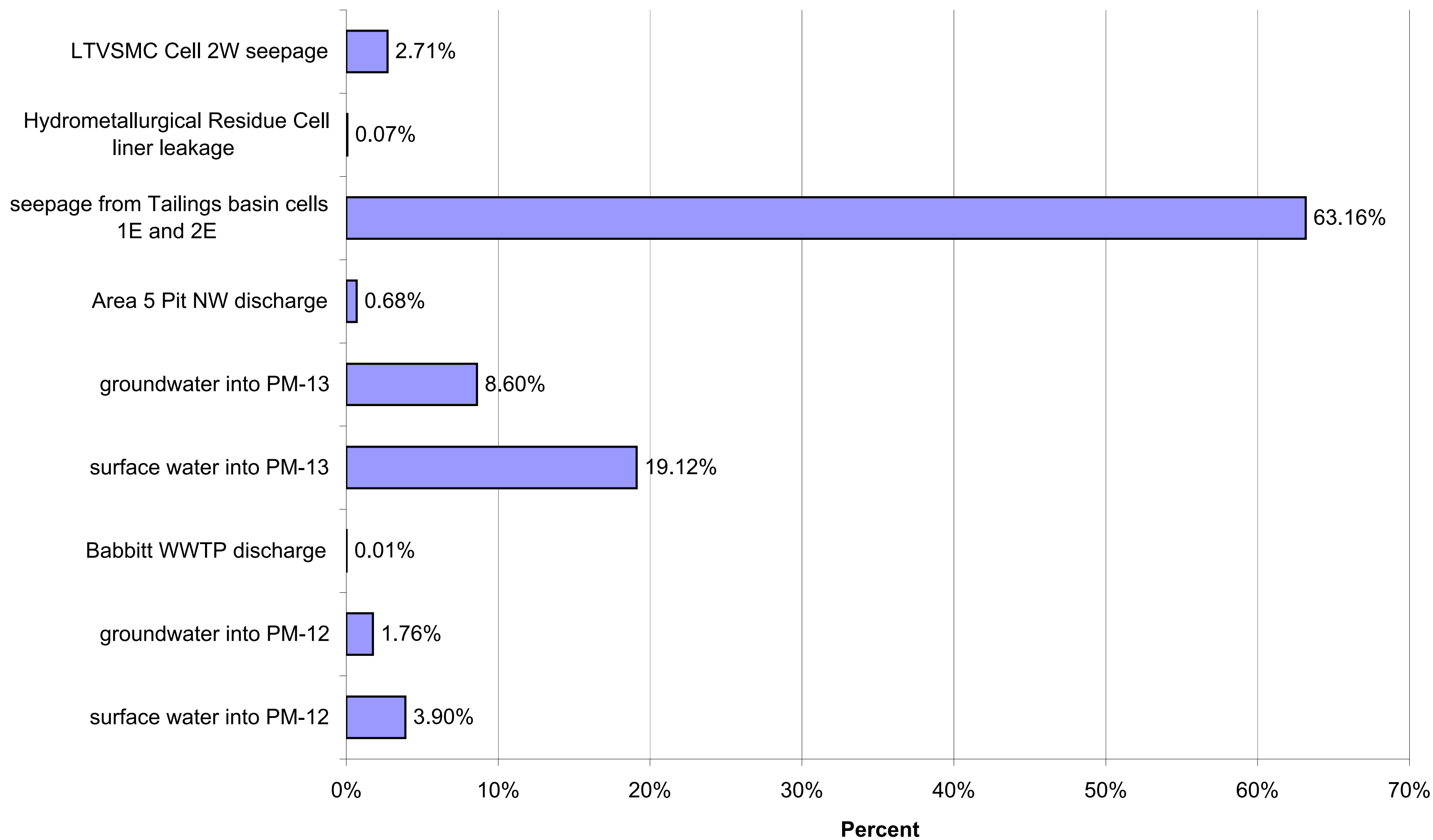

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
41,415.29
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
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 Antimony (Sb)

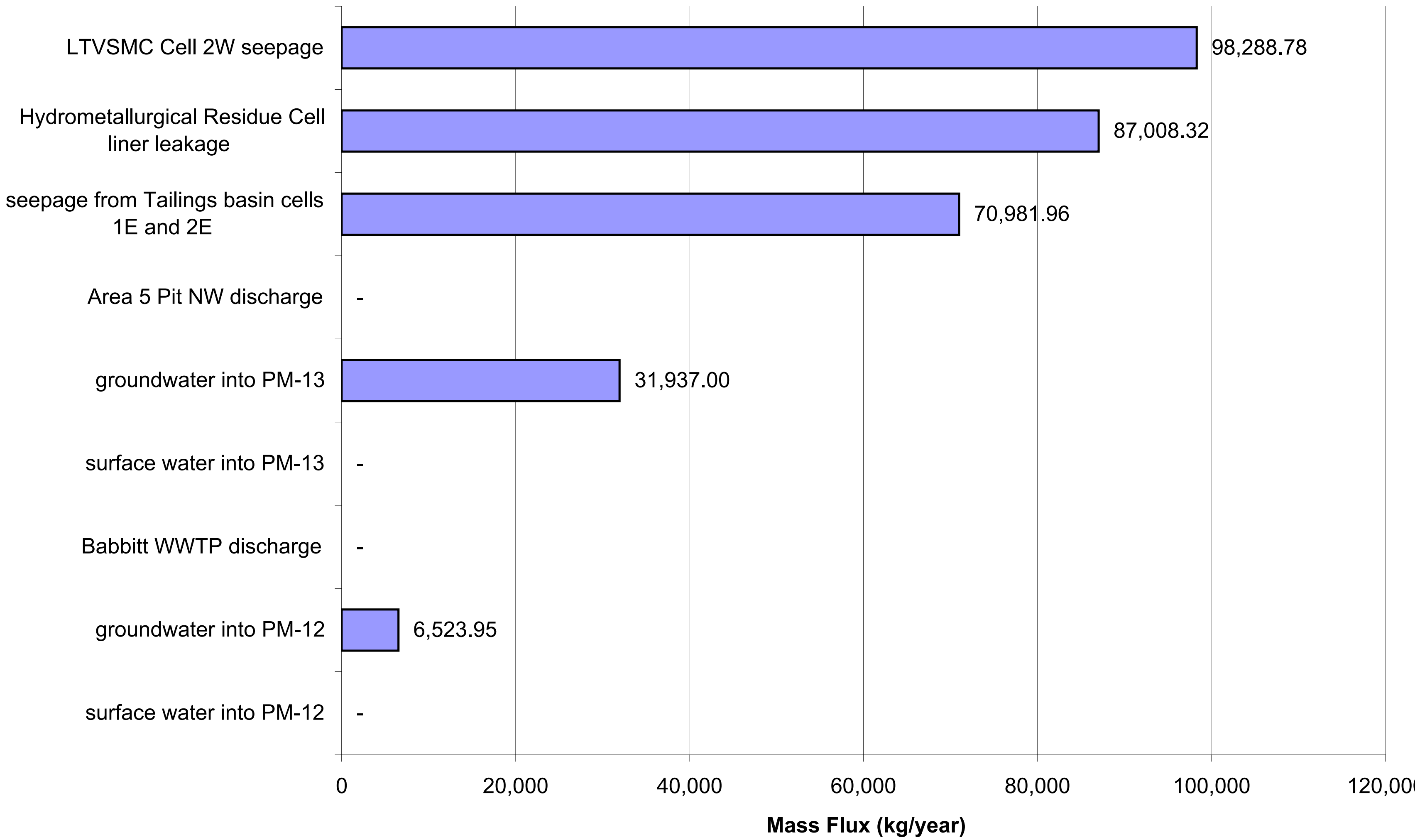


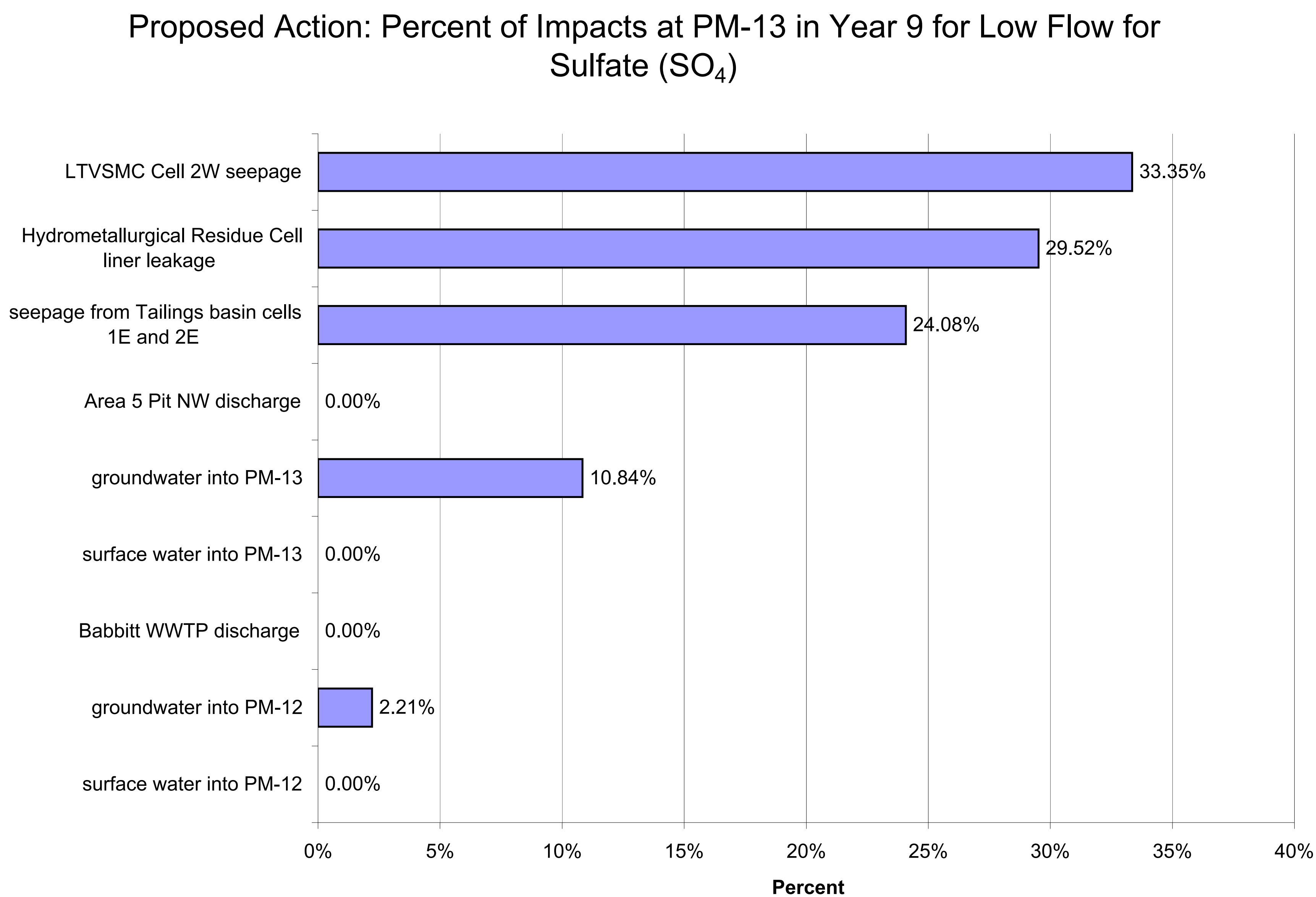

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 9 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
47.37
seepage from Tailings basin cells 1E and 2E
41,415.29
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
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 High Flow for Antimony (Sb)

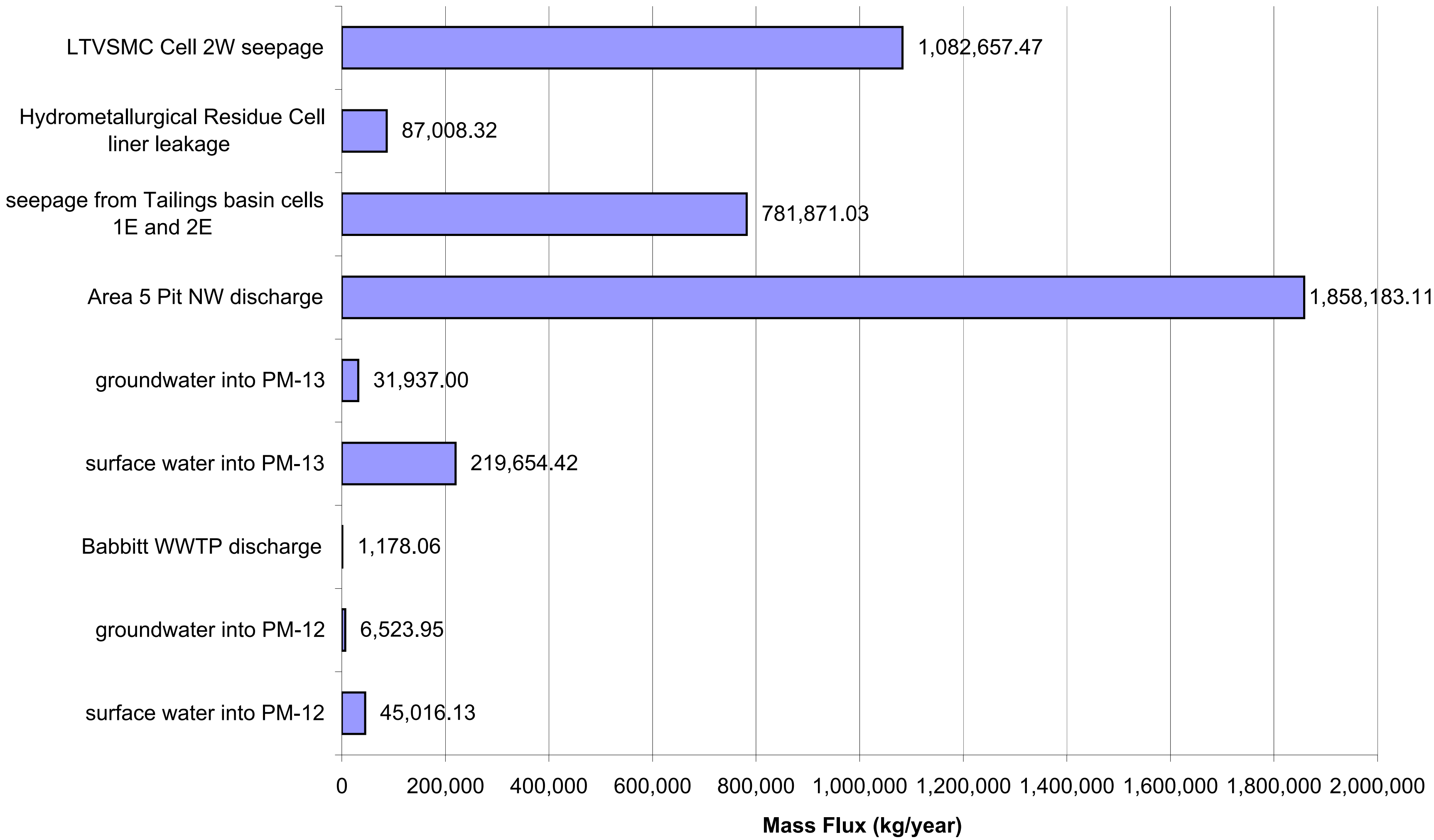


Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 9 for Low Flow for Sulfate (SO_4)

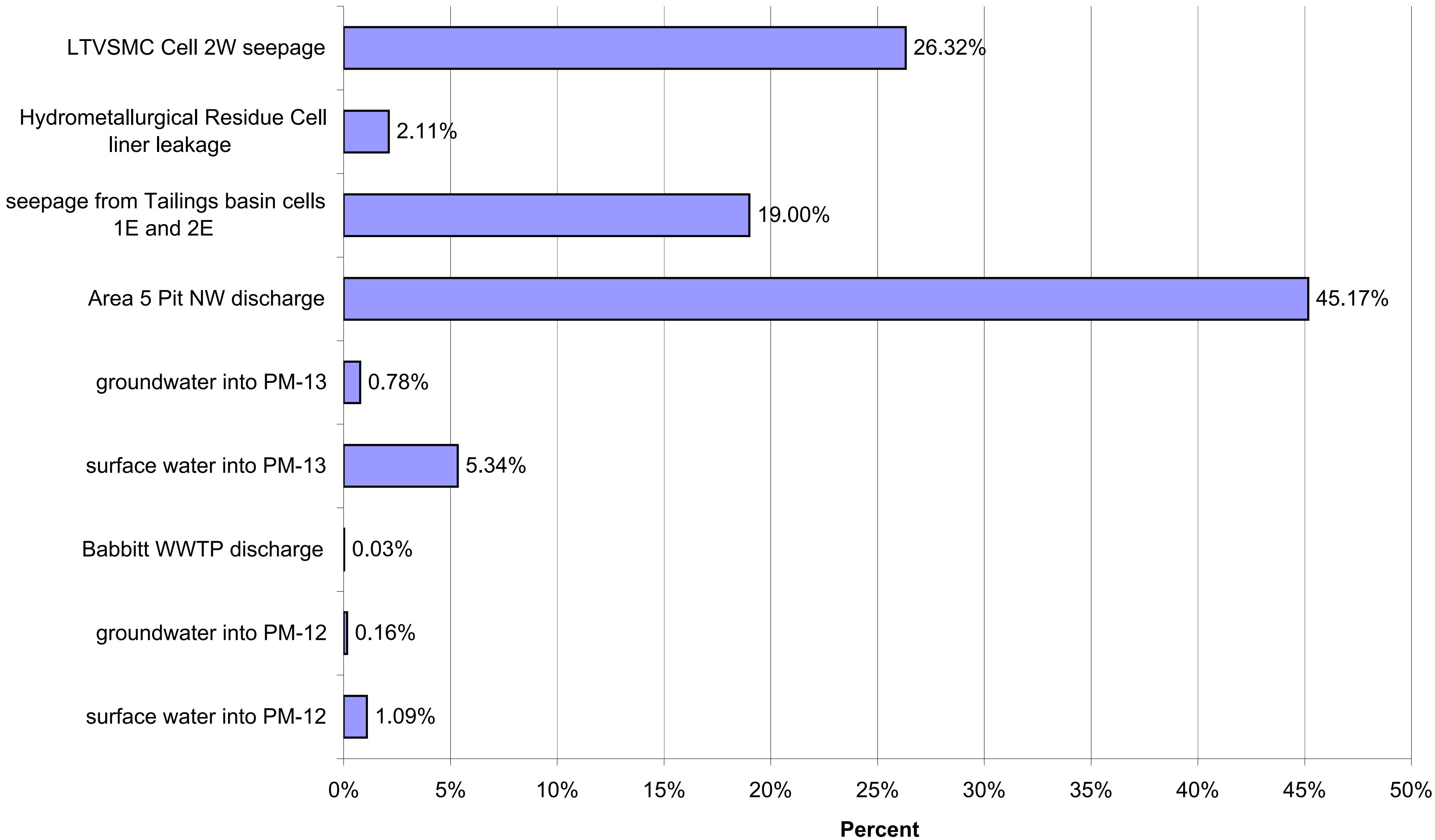


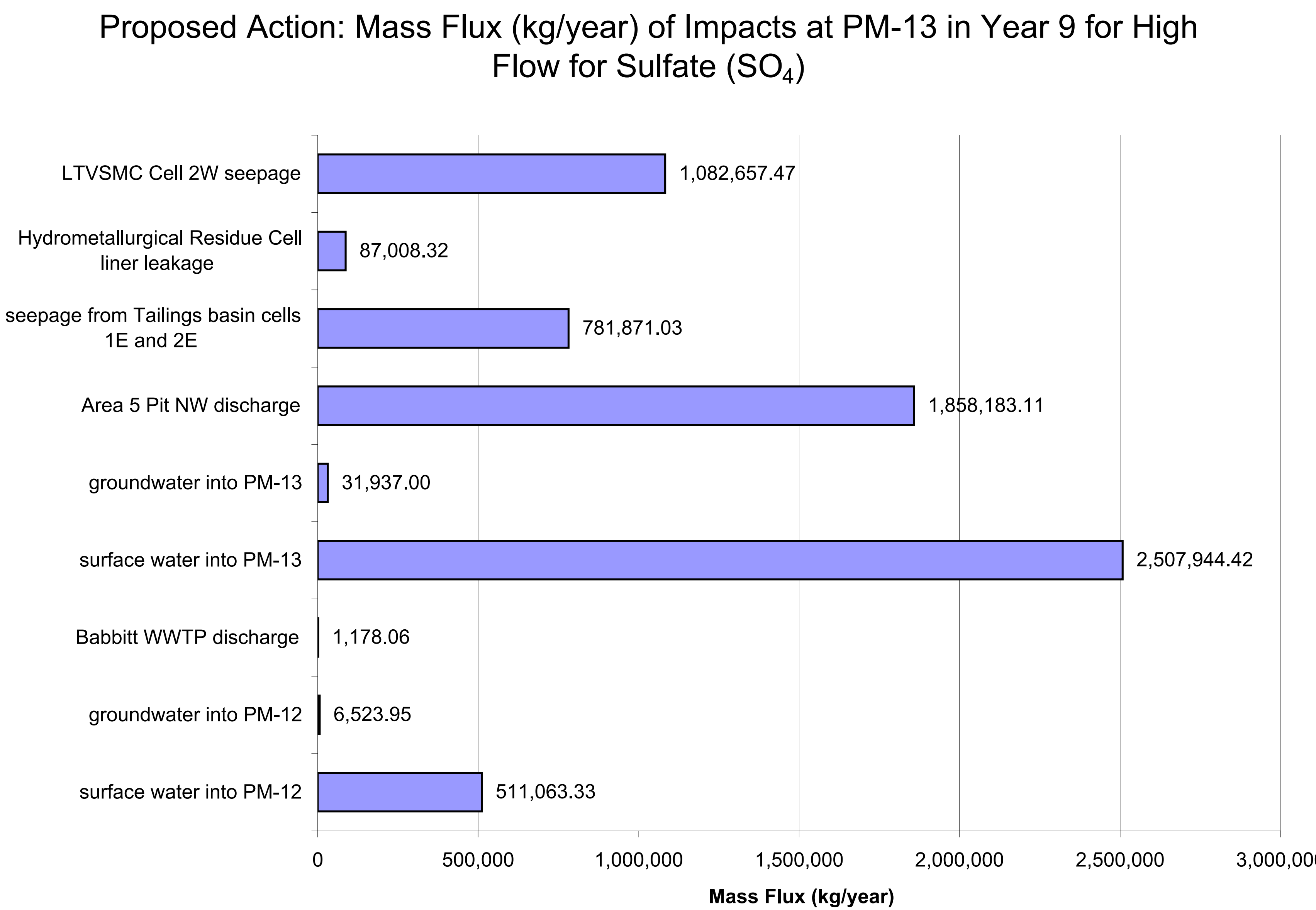

Proposed Action: Percent of Impacts at PM-13 in Year 9 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
33.35%
Hydrometallurgical Residue Cell liner leakage
29.52%
seepage from Tailings basin cells 1E and 2E
24.08%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
10.84%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
2.21%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 9 for Average Flow for Sulfate (SO_4)

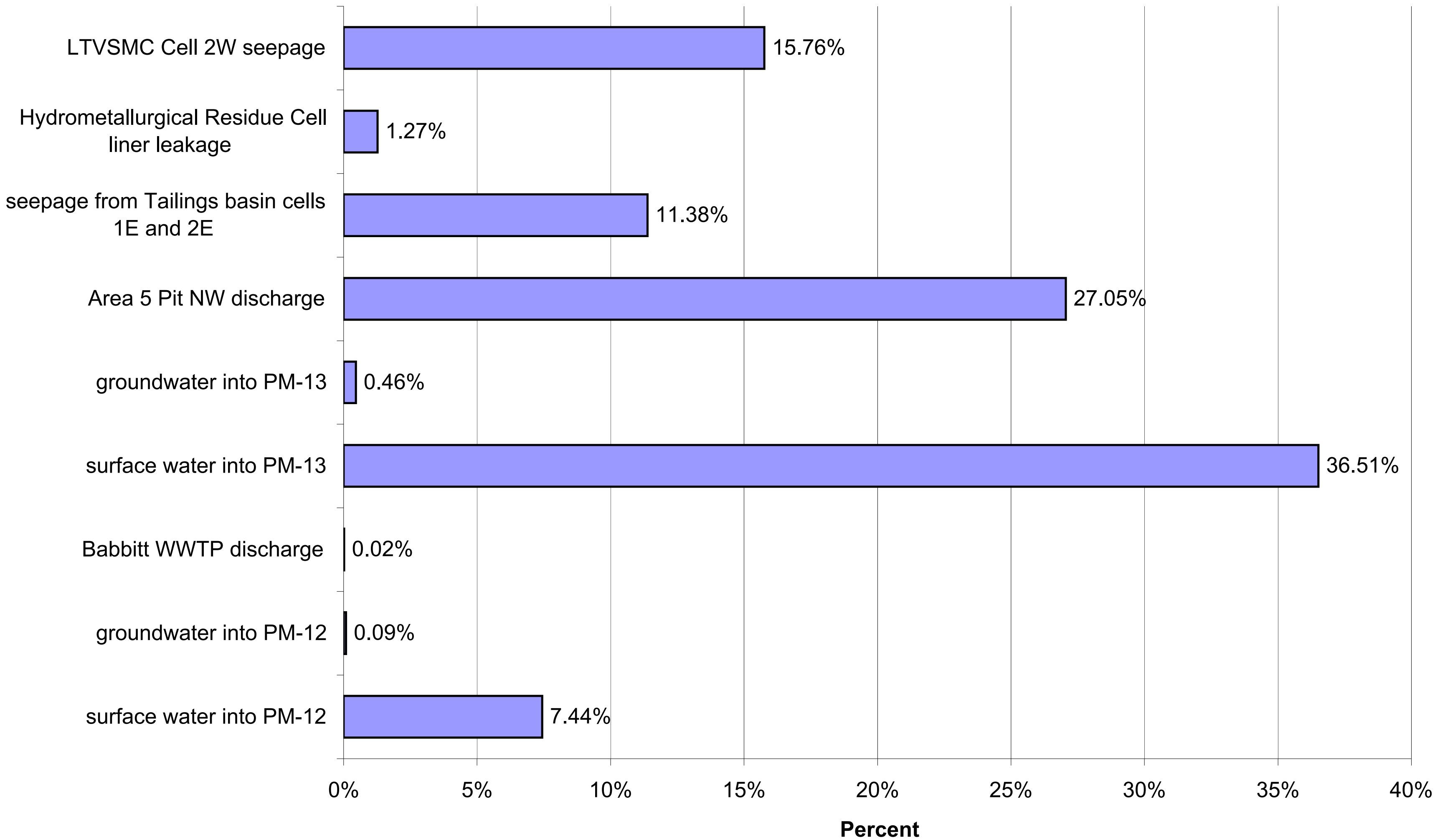


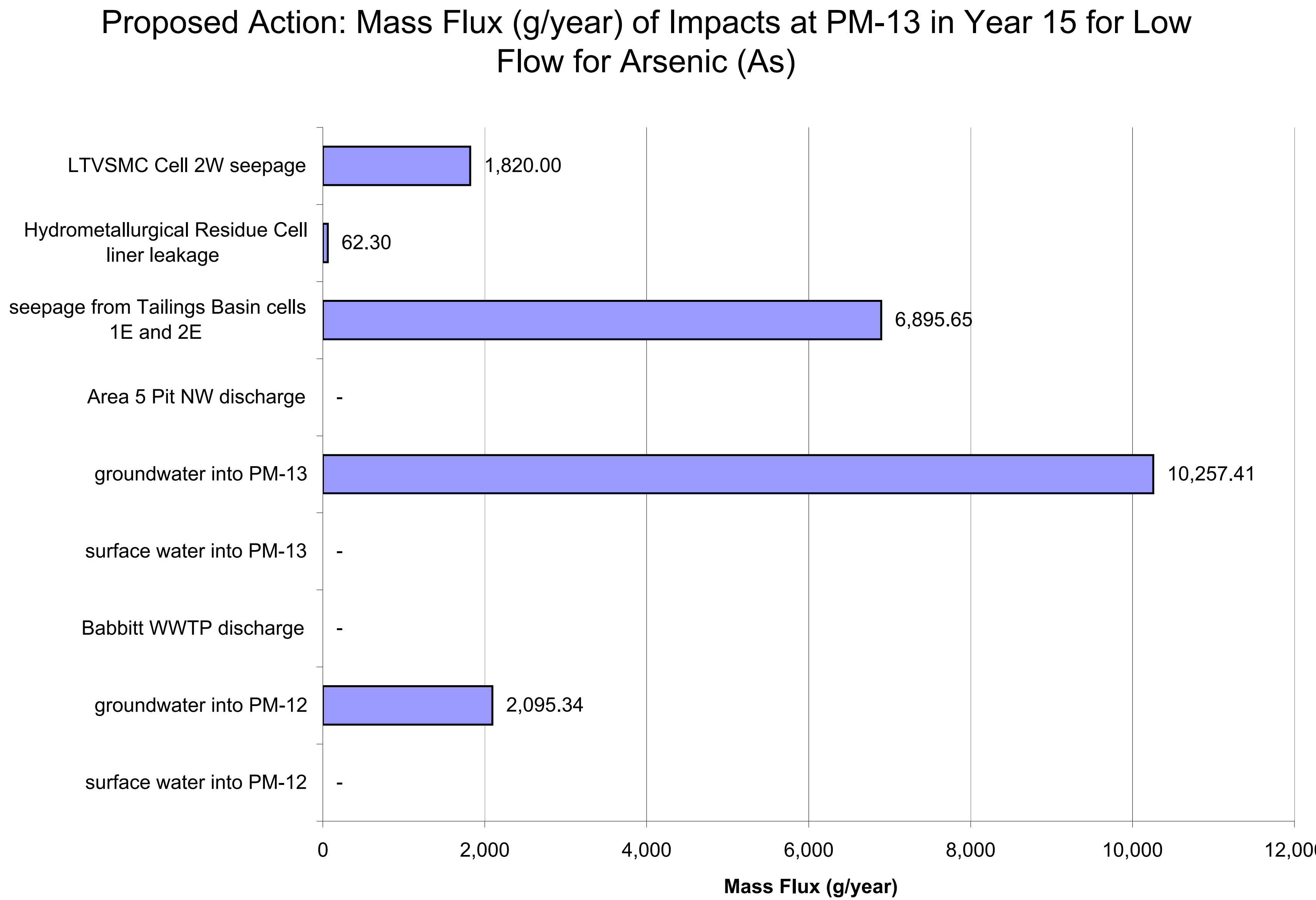
Proposed Action: Percent of Impacts at PM-13 in Year 9 for Average Flow for Sulfate (SO_4)



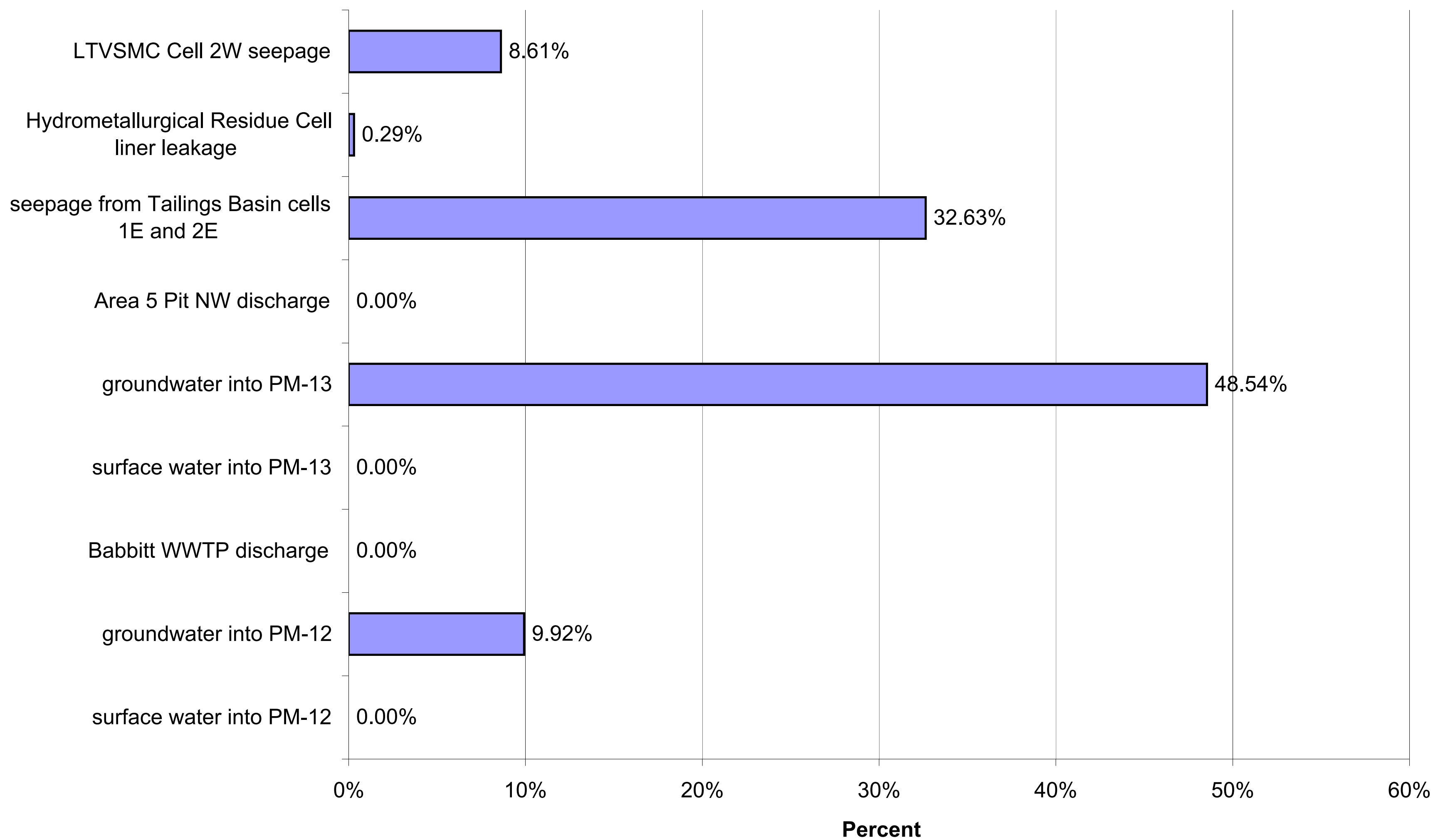

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 9 for High Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
1,082,657.47
Hydrometallurgical Residue Cell liner leakage
87,008.32
seepage from Tailings basin cells 1E and 2E
781,871.03
Area 5 Pit NW discharge
1,858,183.11
groundwater into 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 9 for High Flow for Sulfate (SO_4)

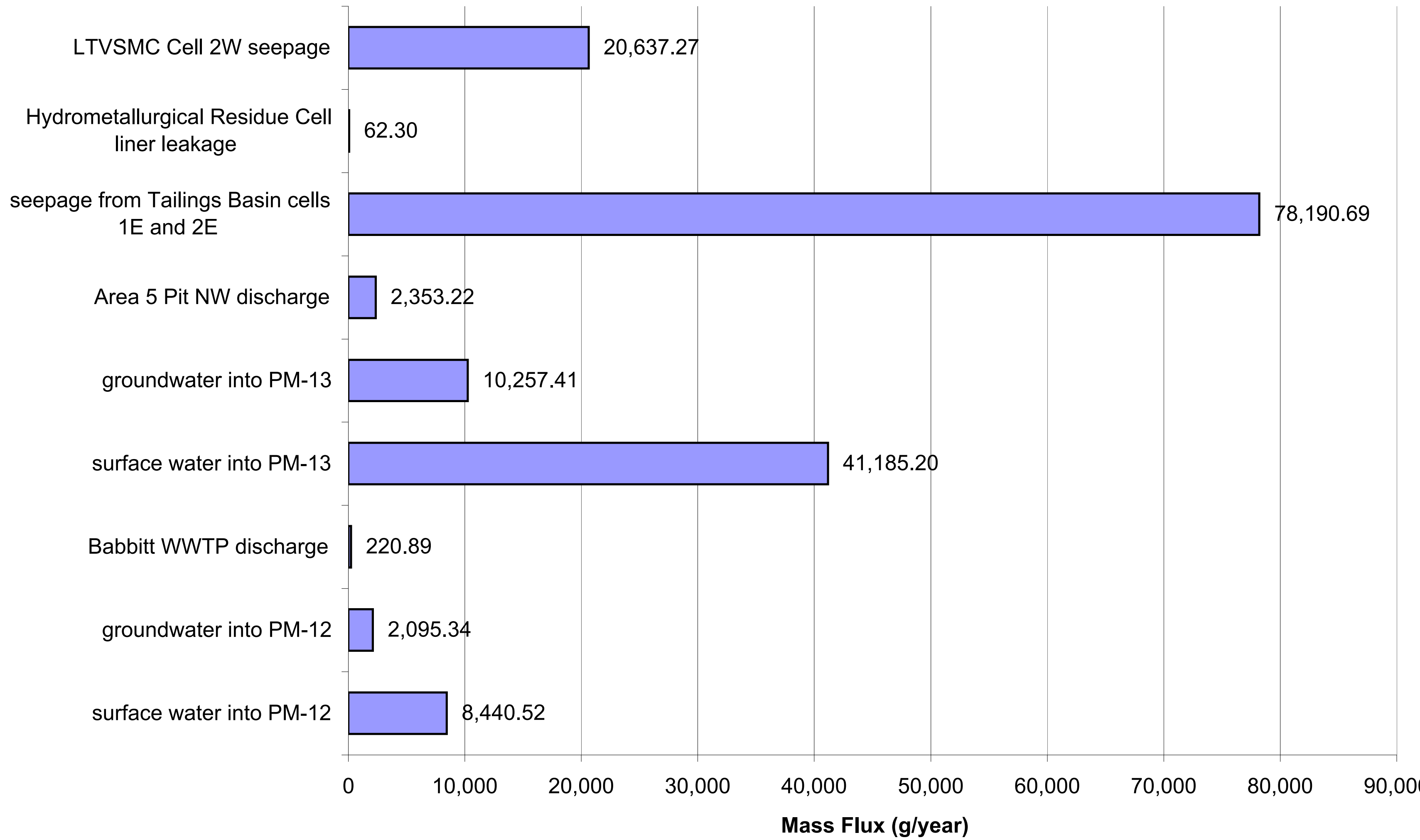


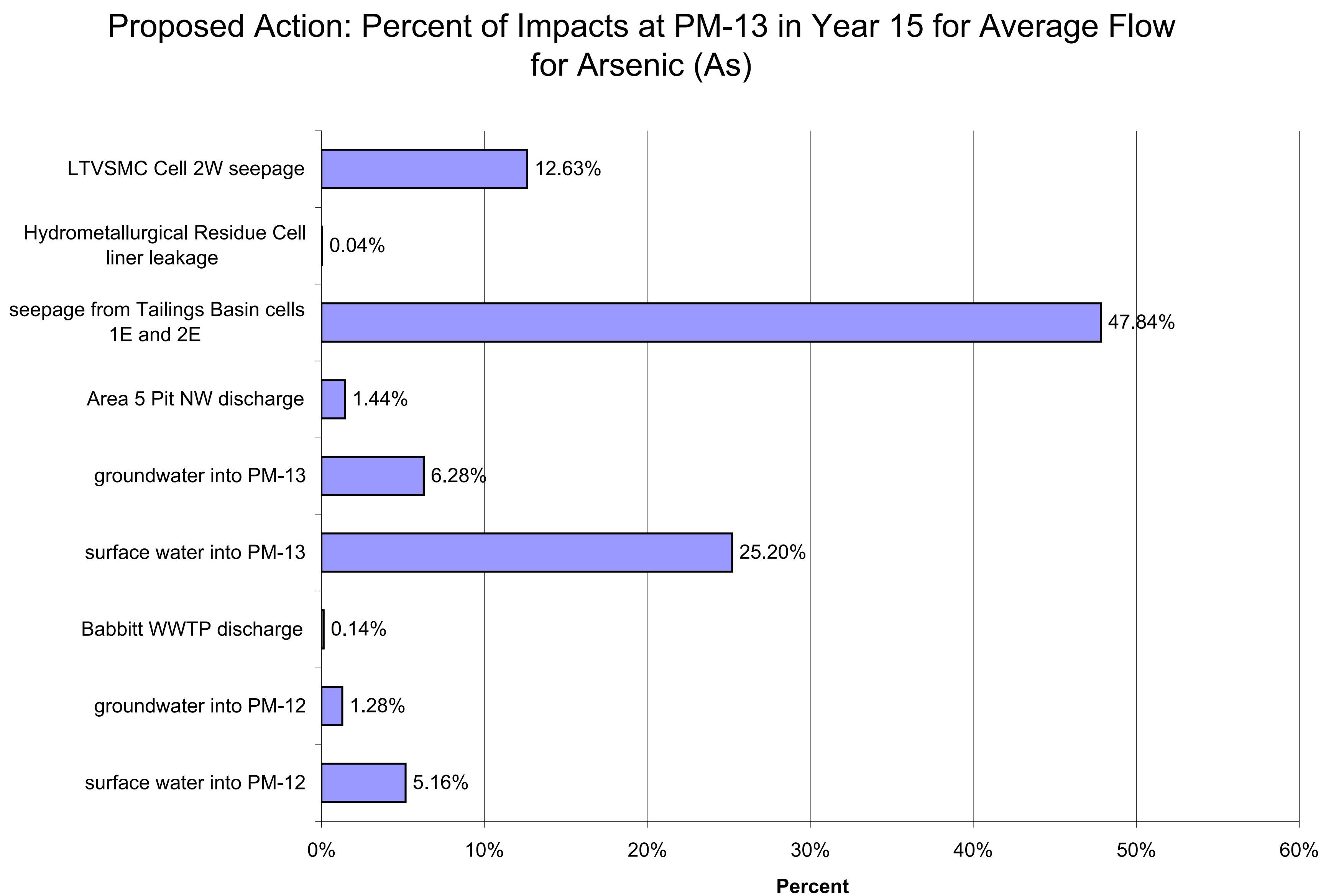

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1,820.00
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
6,895.65
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)

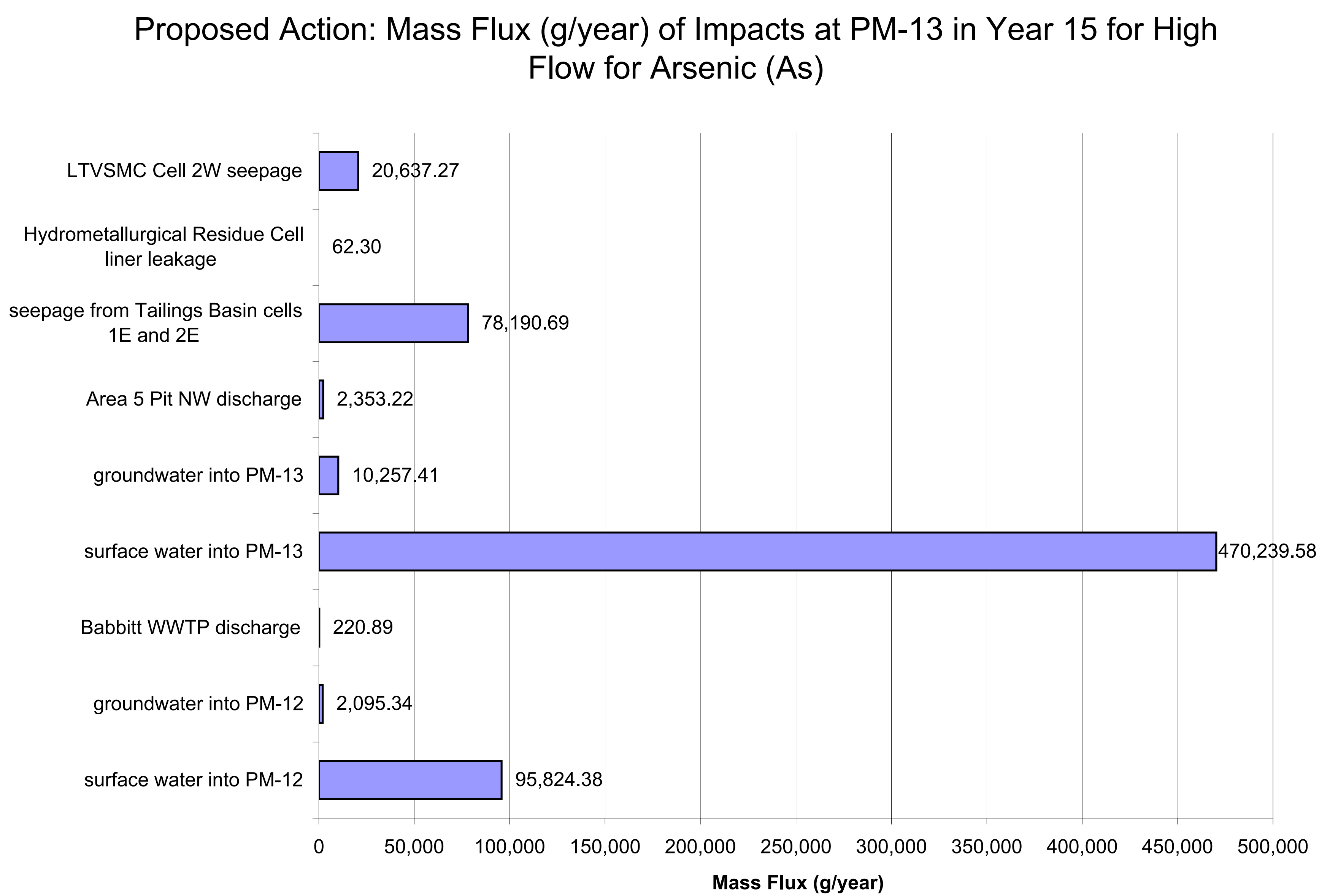
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)



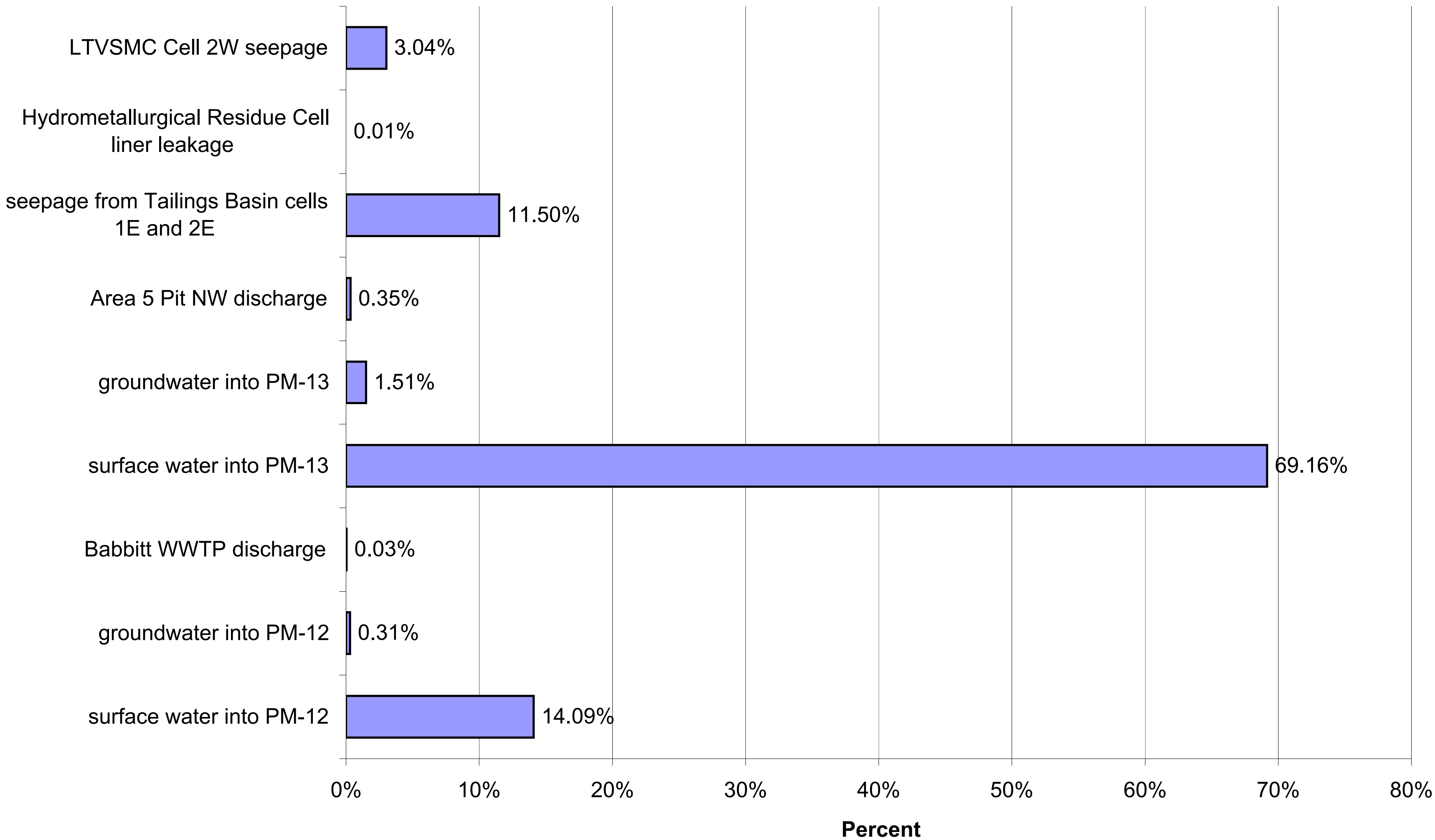
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)



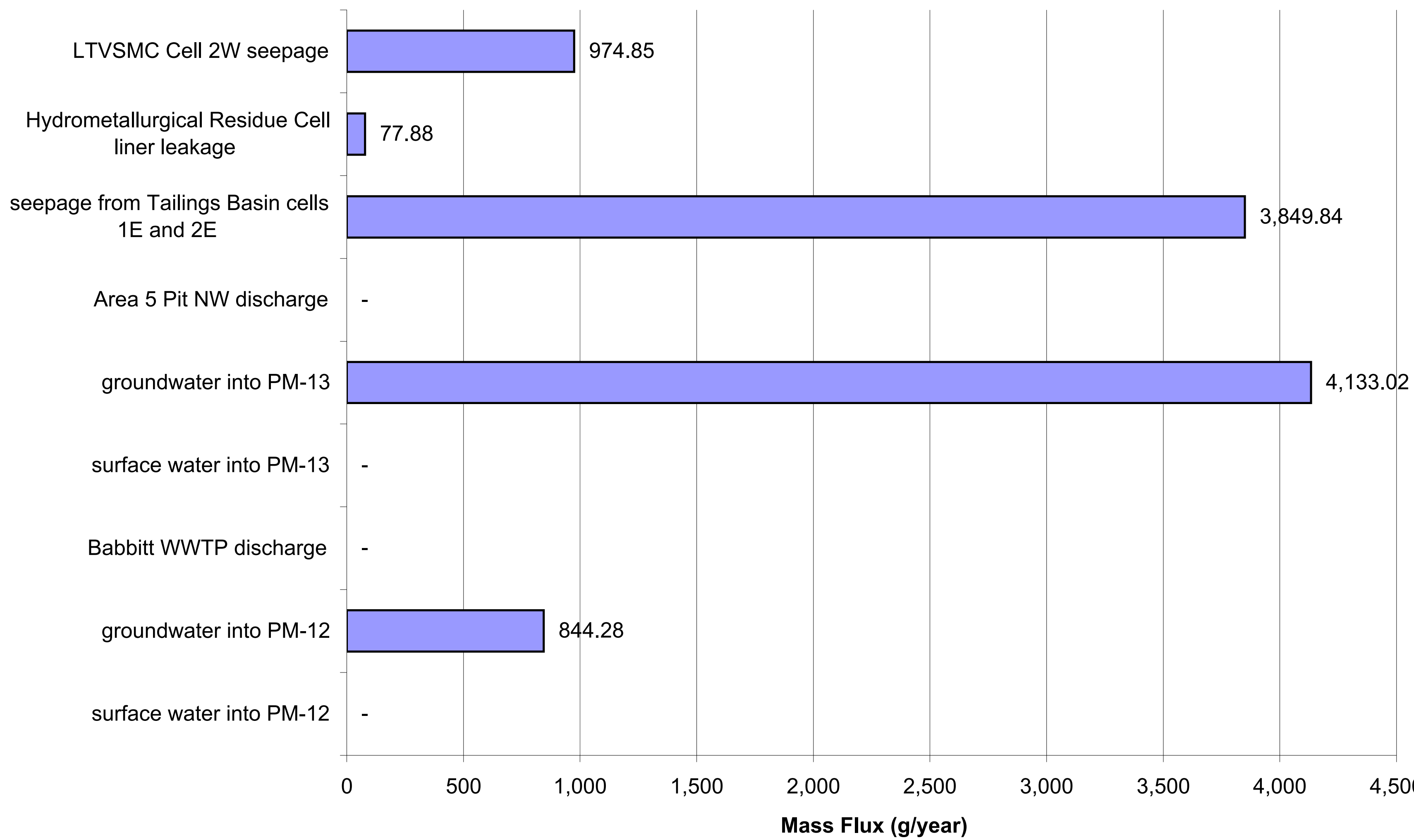

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
12.63%
Hydrometallurgical Residue Cell liner leakage
0.04%
seepage from Tailings Basin cells 1E and 2E
47.84%
Area 5 Pit NW discharge
1.44%
groundwater into PM-13
6.28%
surface water into PM-13
25.20%
Babbitt WWTP discharge
0.14%
groundwater into PM-12
1.28%
surface water into PM-12
5.16%
0%
10%
20%
30%
40%
50%
60%
Percent

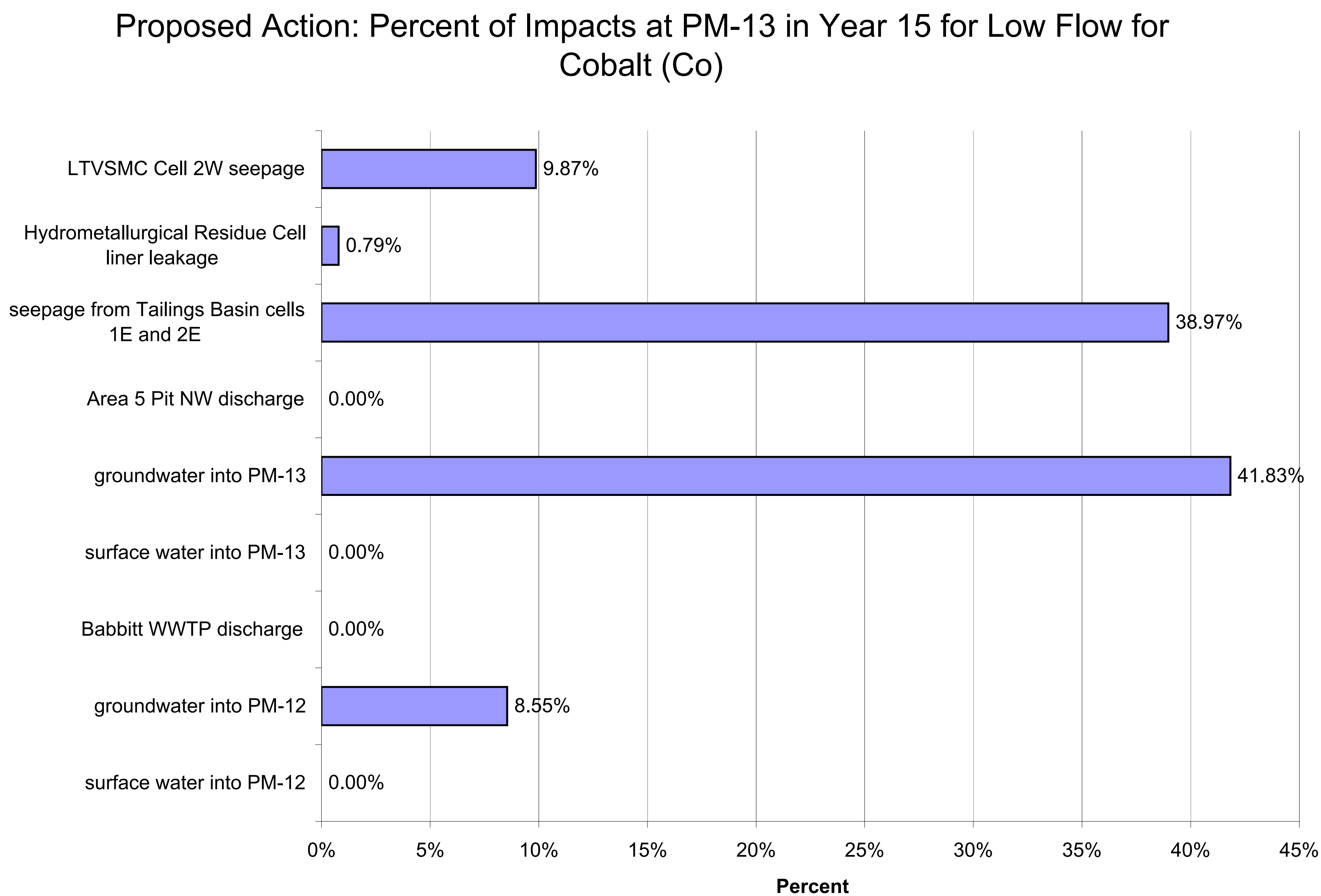

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
78,190.69
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
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)

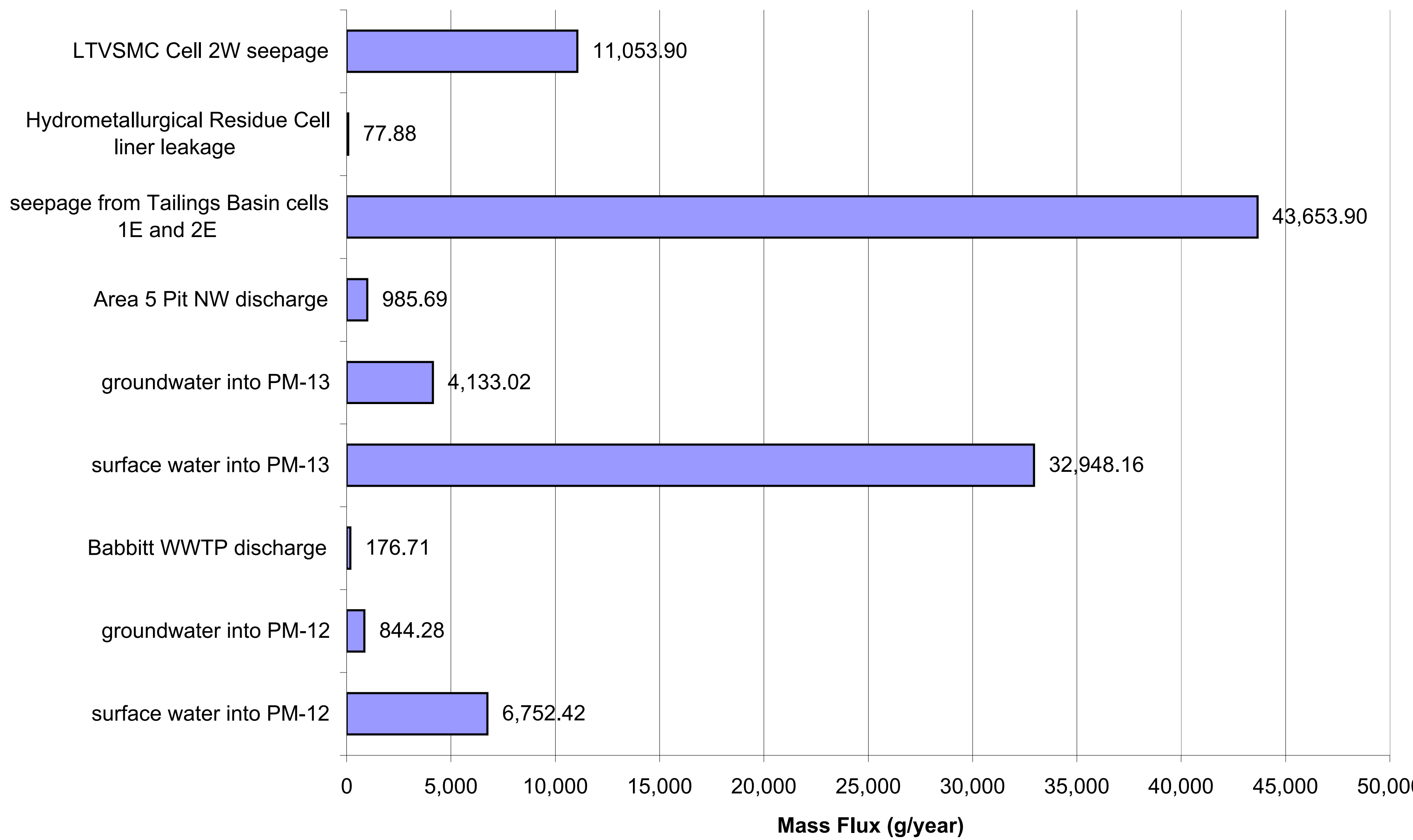


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Cobalt (Co)

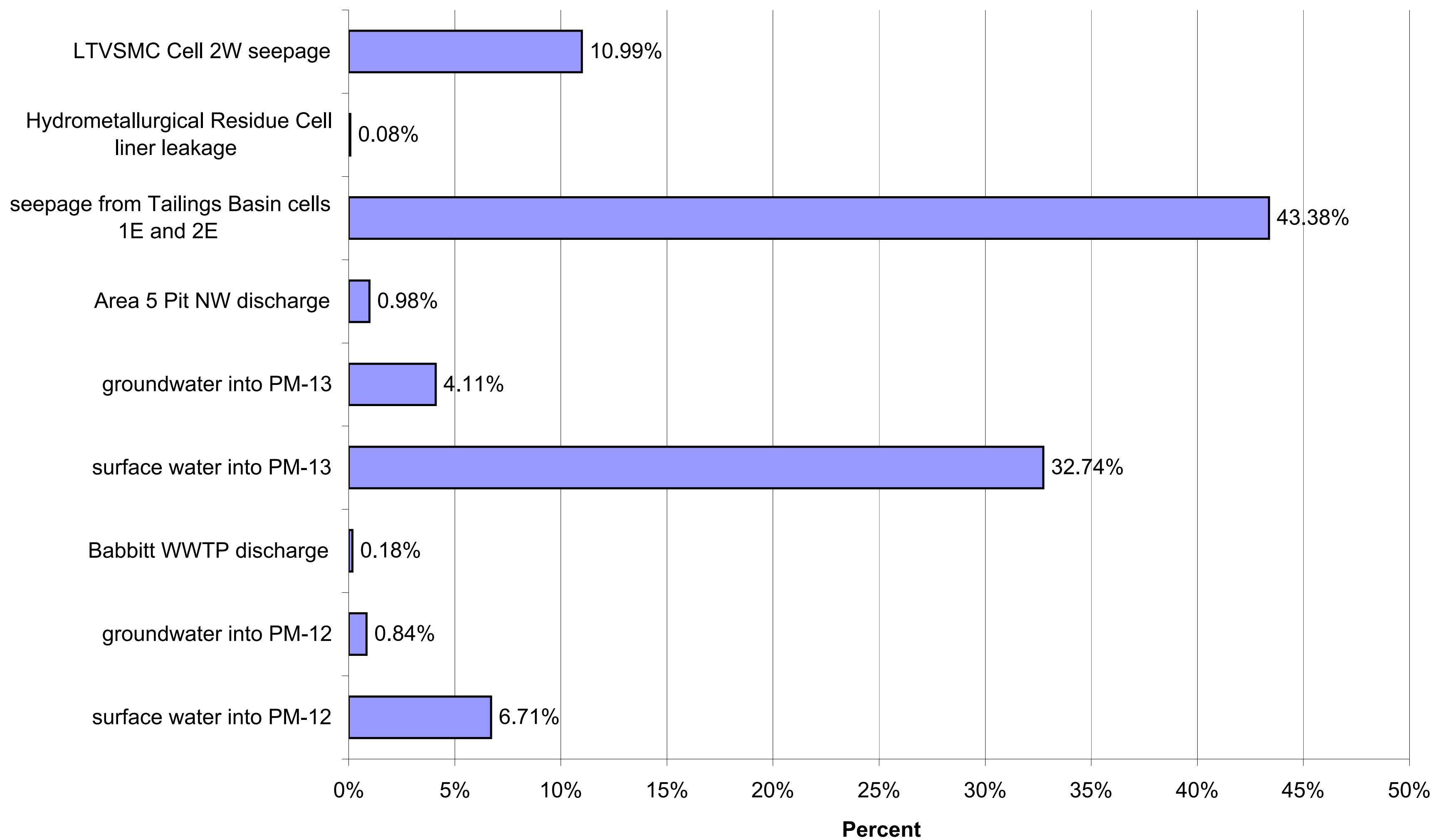



Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
9.87%
Hydrometallurgical Residue Cell liner leakage
0.79%
seepage from Tailings Basin cells 1E and 2E
38.97%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
41.83%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
8.55%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

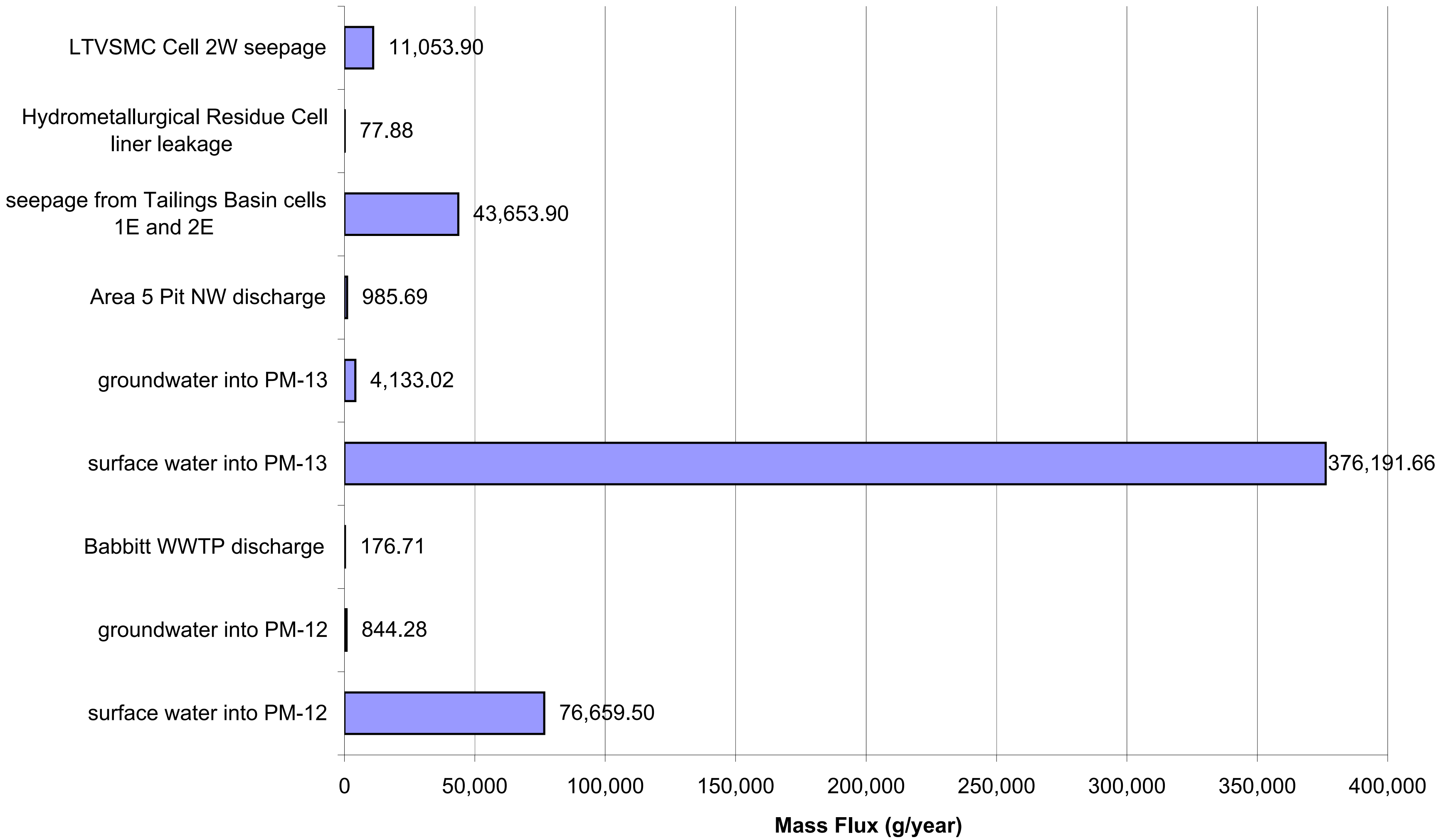
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)



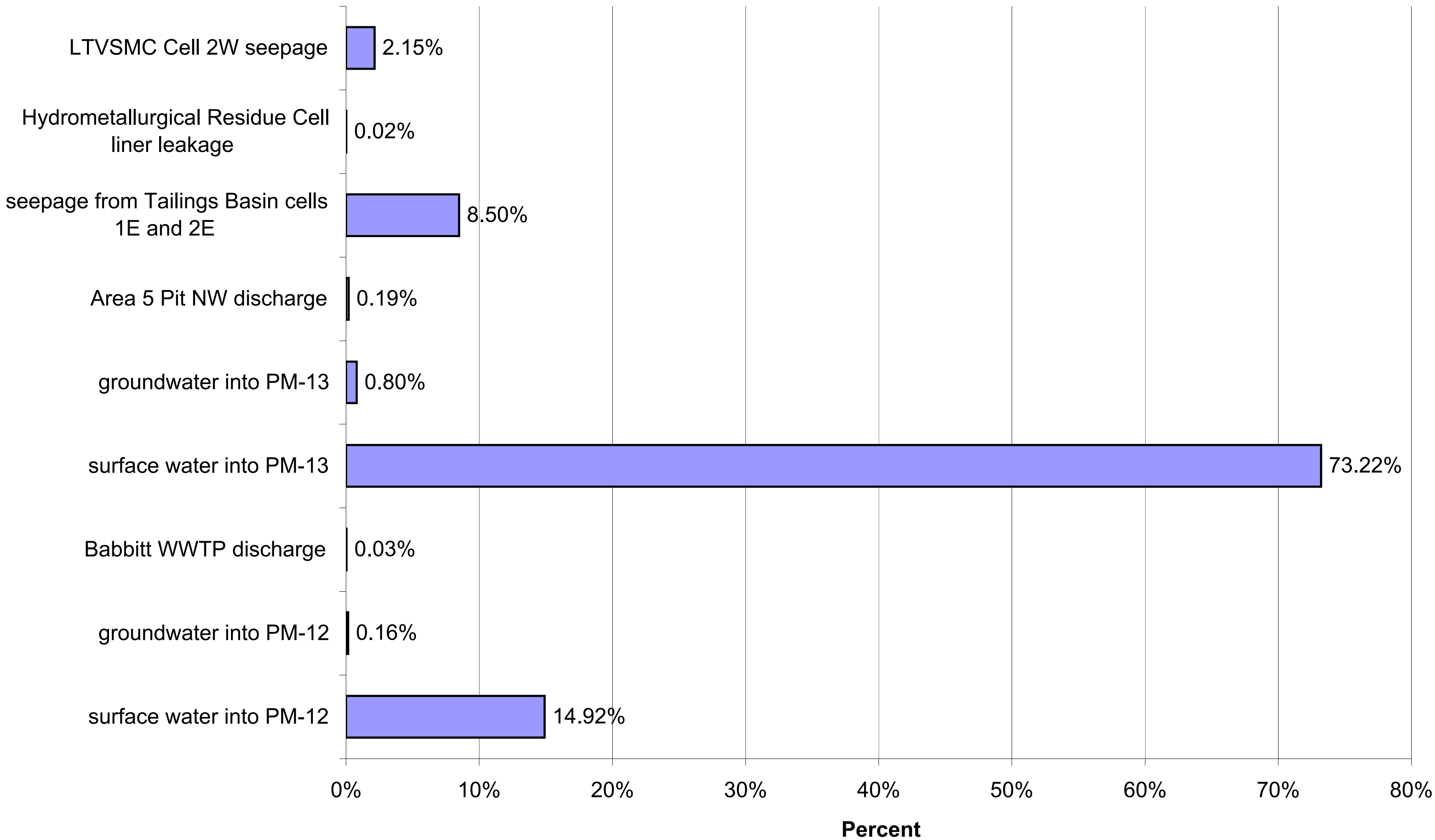
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)



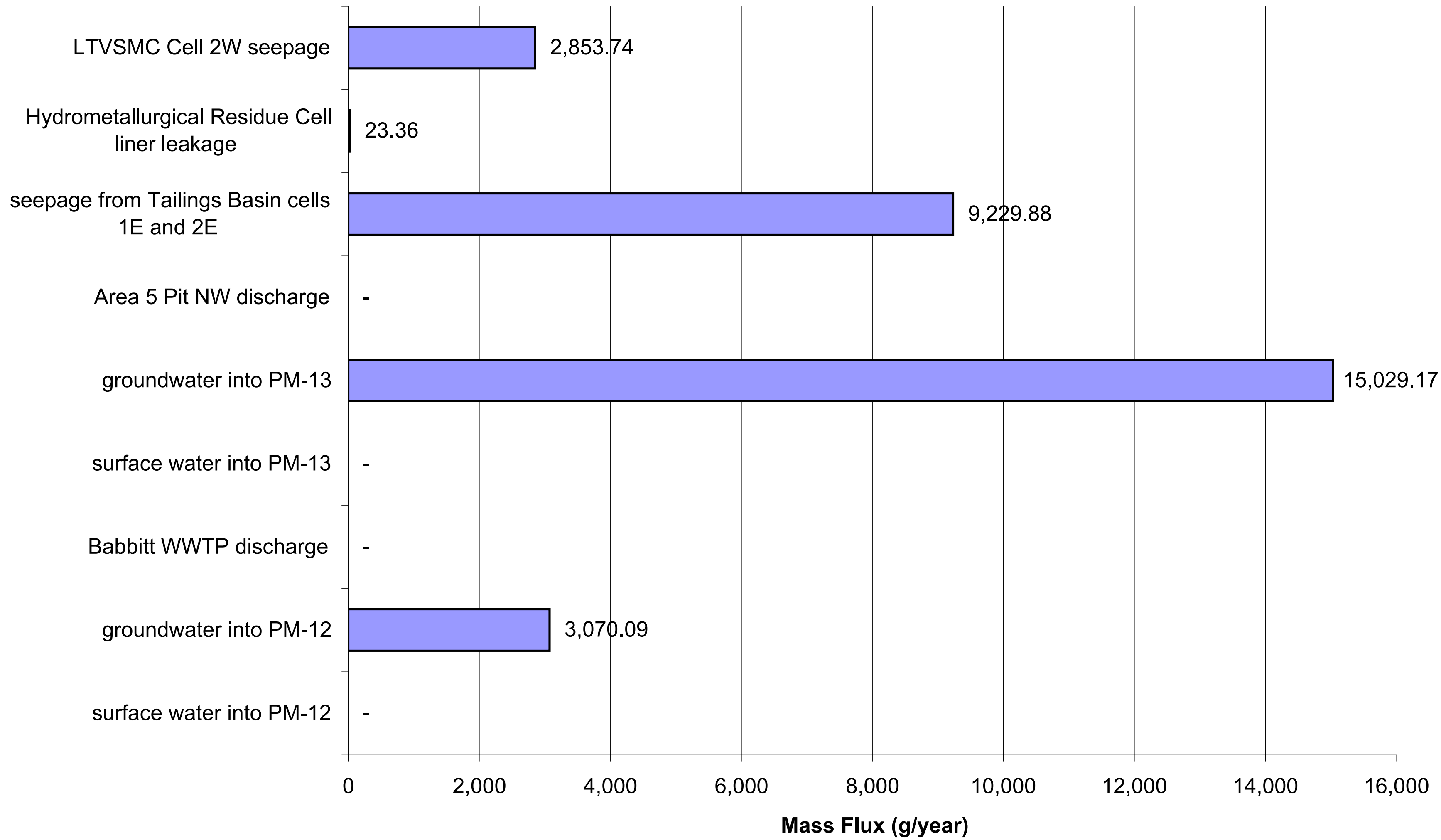
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)



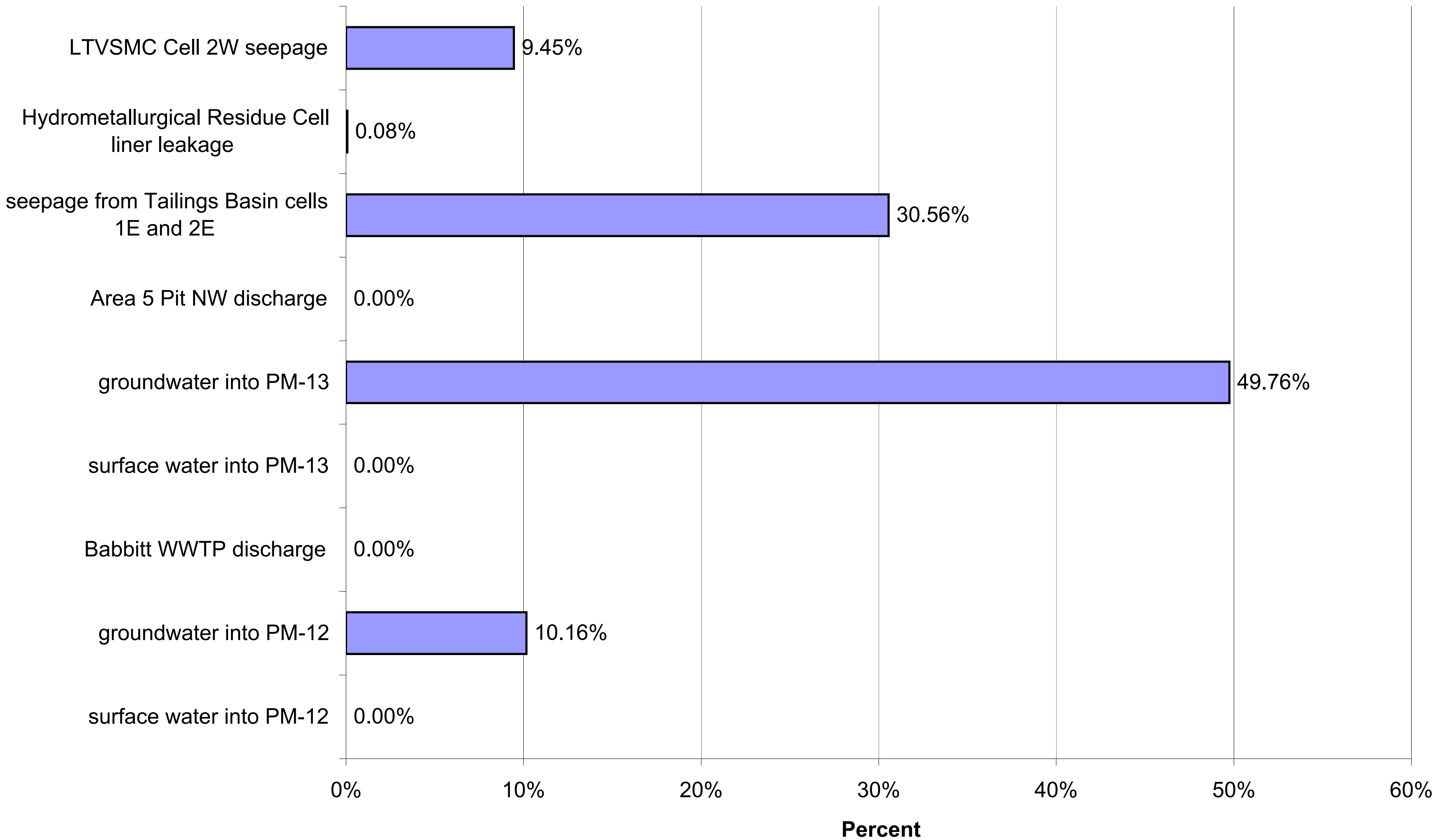
Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)

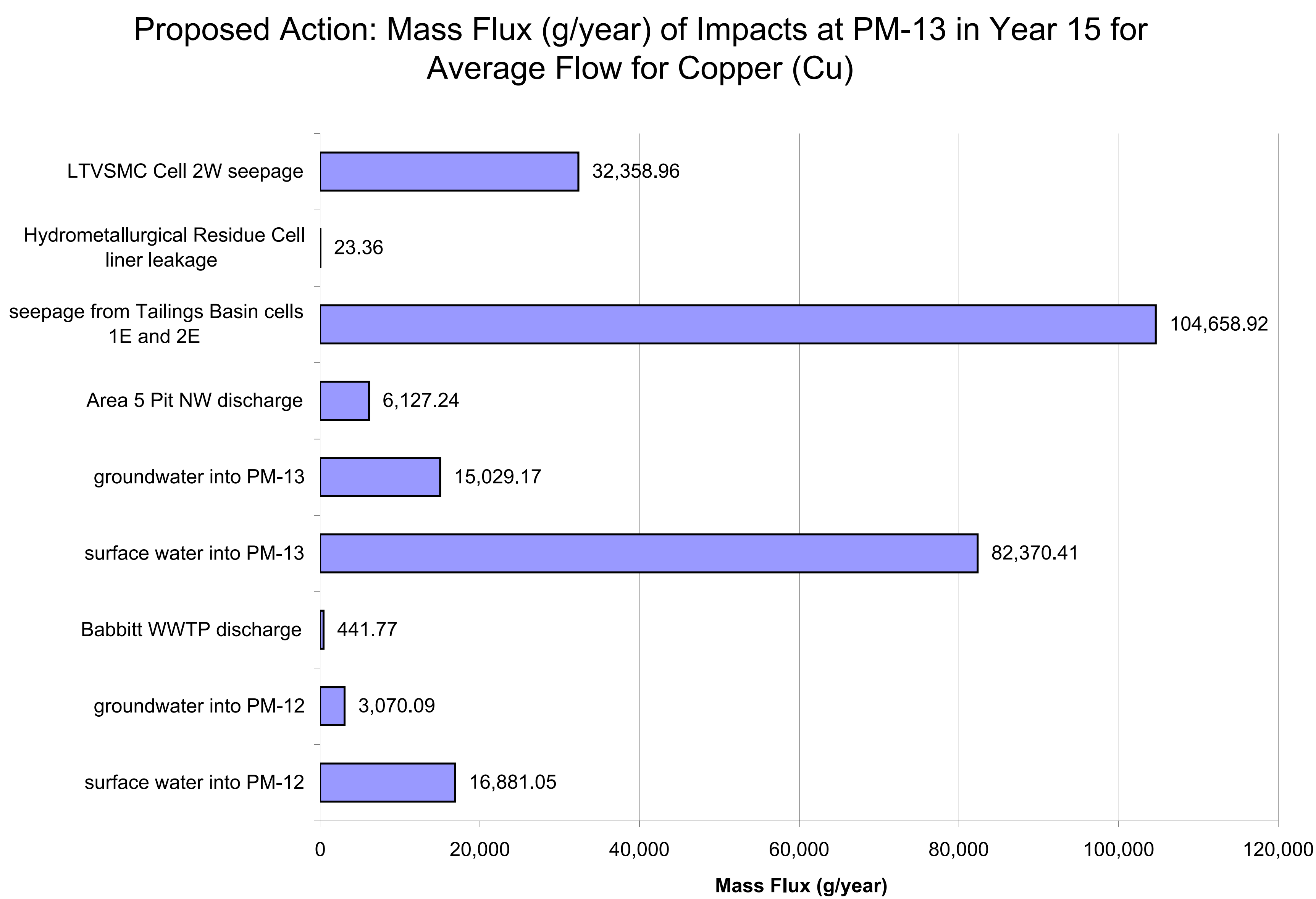


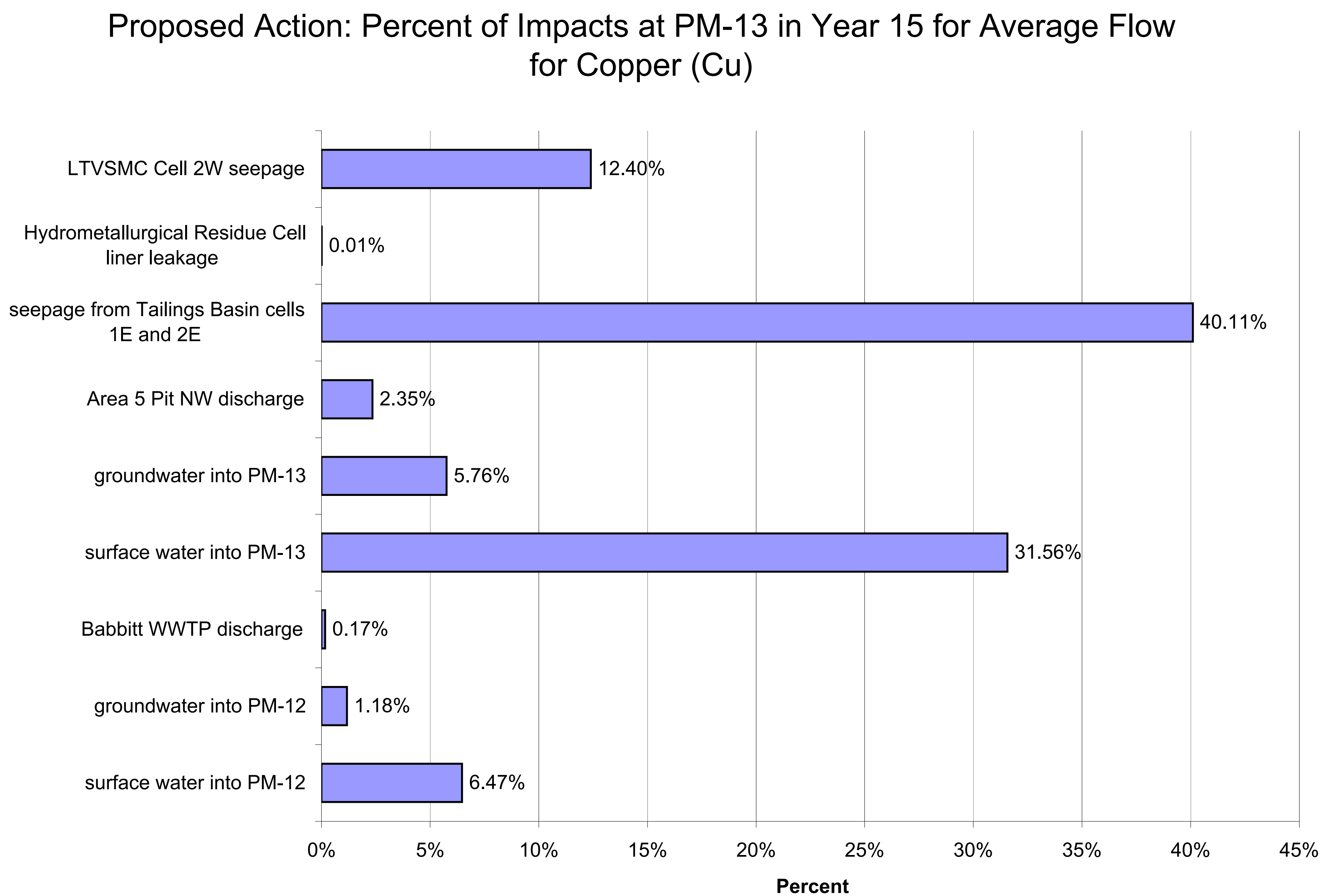
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)



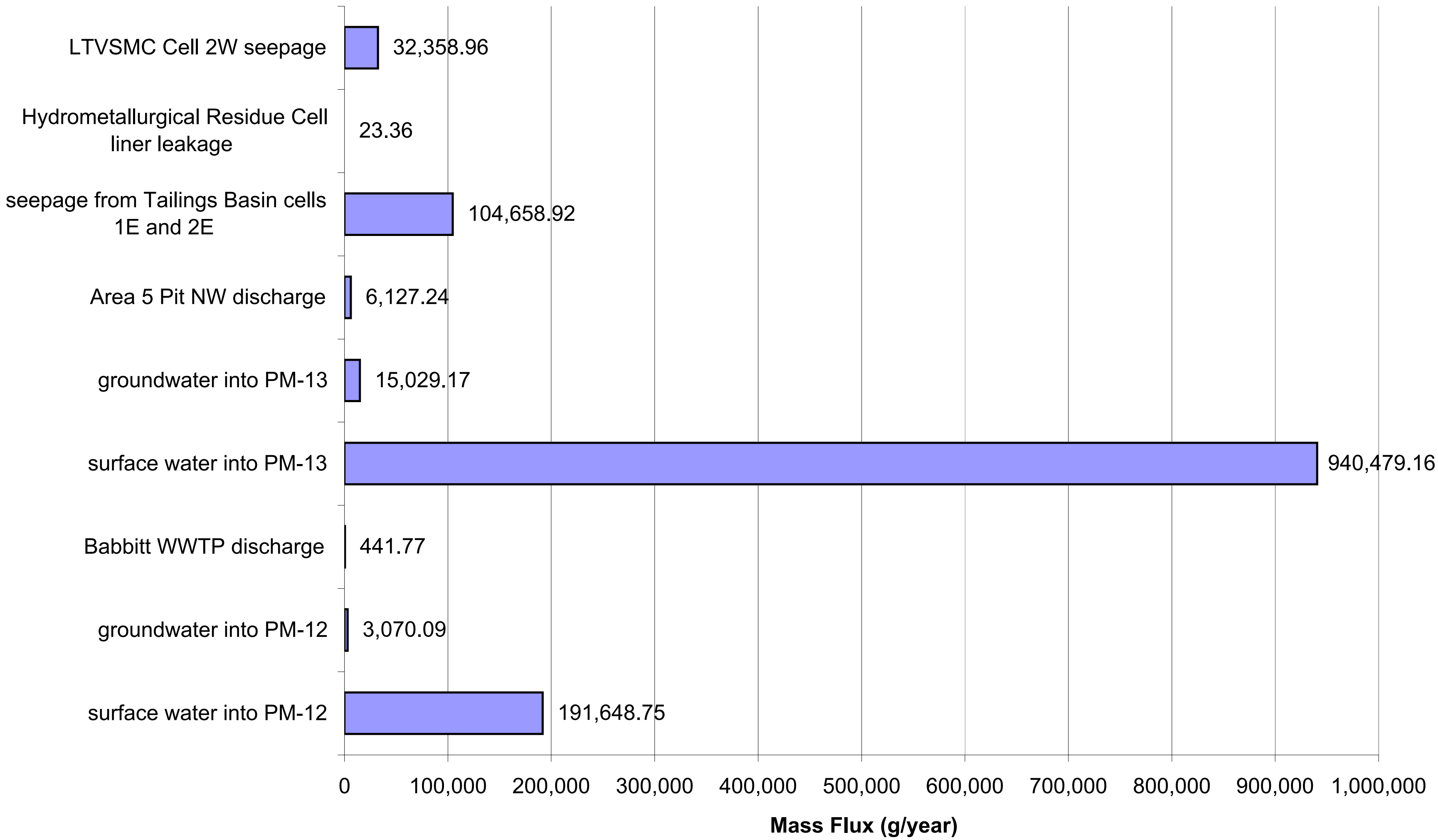
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)



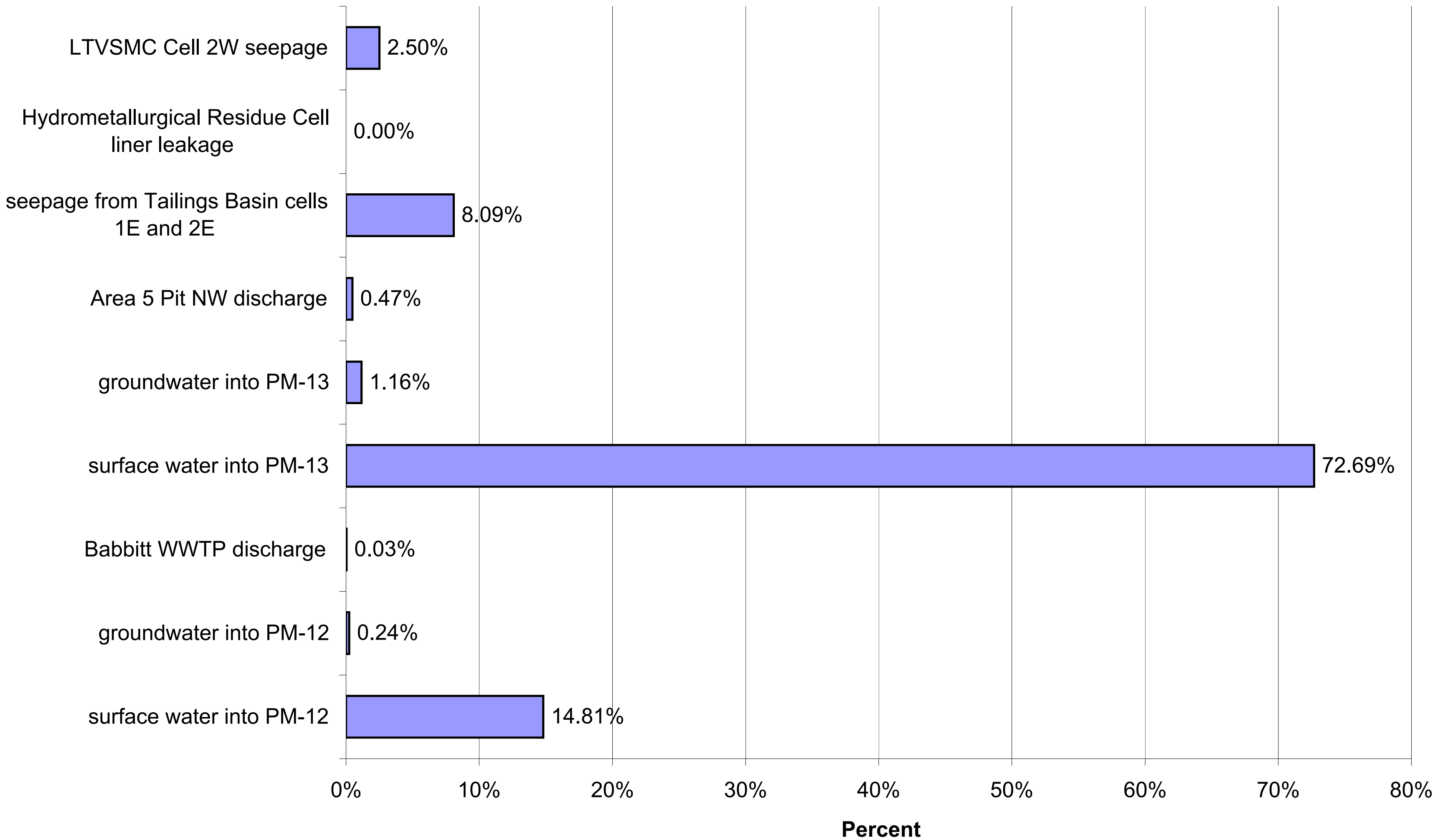

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
32,358.96
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
104,658.92
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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
12.40%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
40.11%
Area 5 Pit NW discharge
2.35%
groundwater into PM-13
5.76%
surface water into PM-13
31.56%
Babbitt WWTP discharge
0.17%
groundwater into PM-12
1.18%
surface water into PM-12
6.47%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

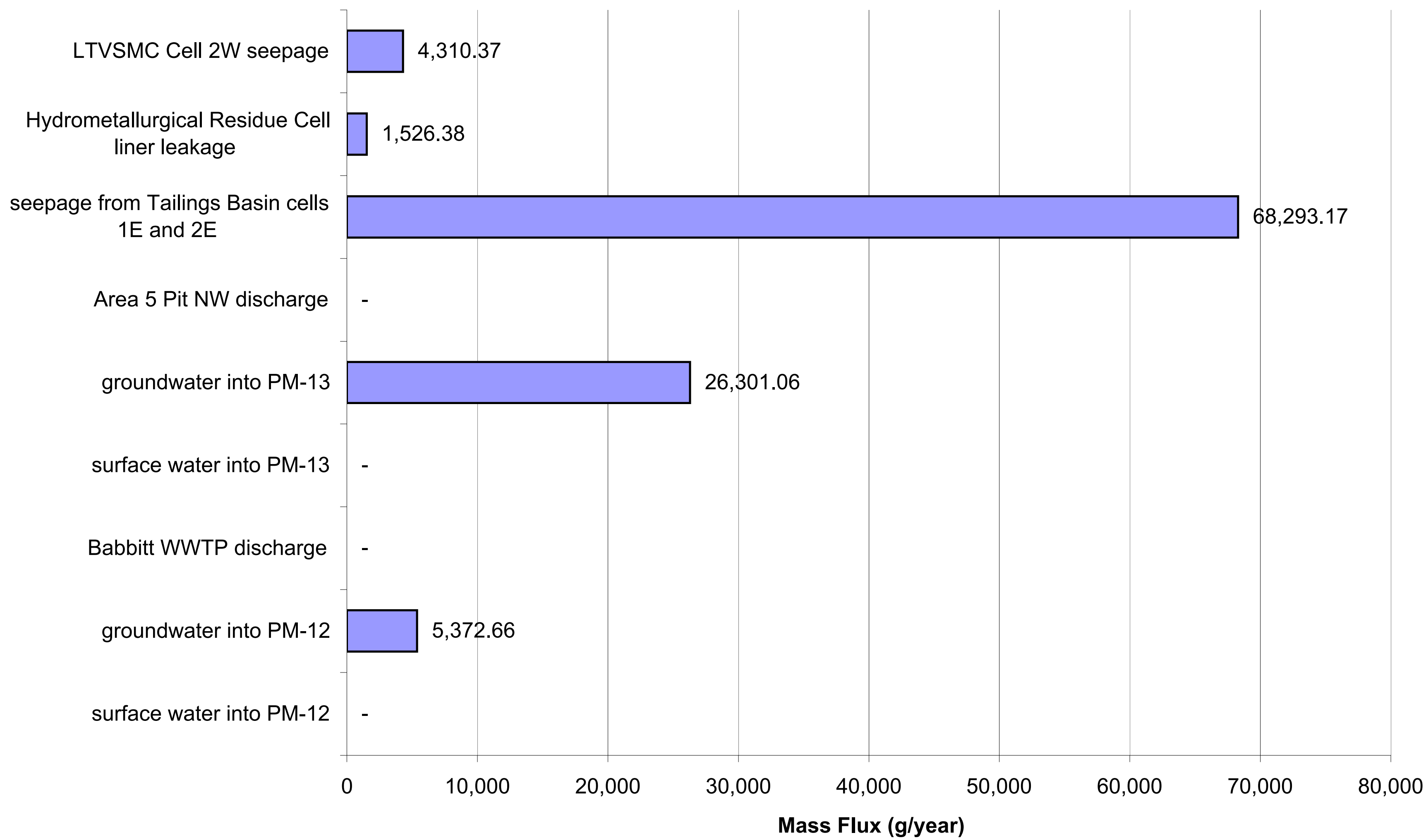
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)



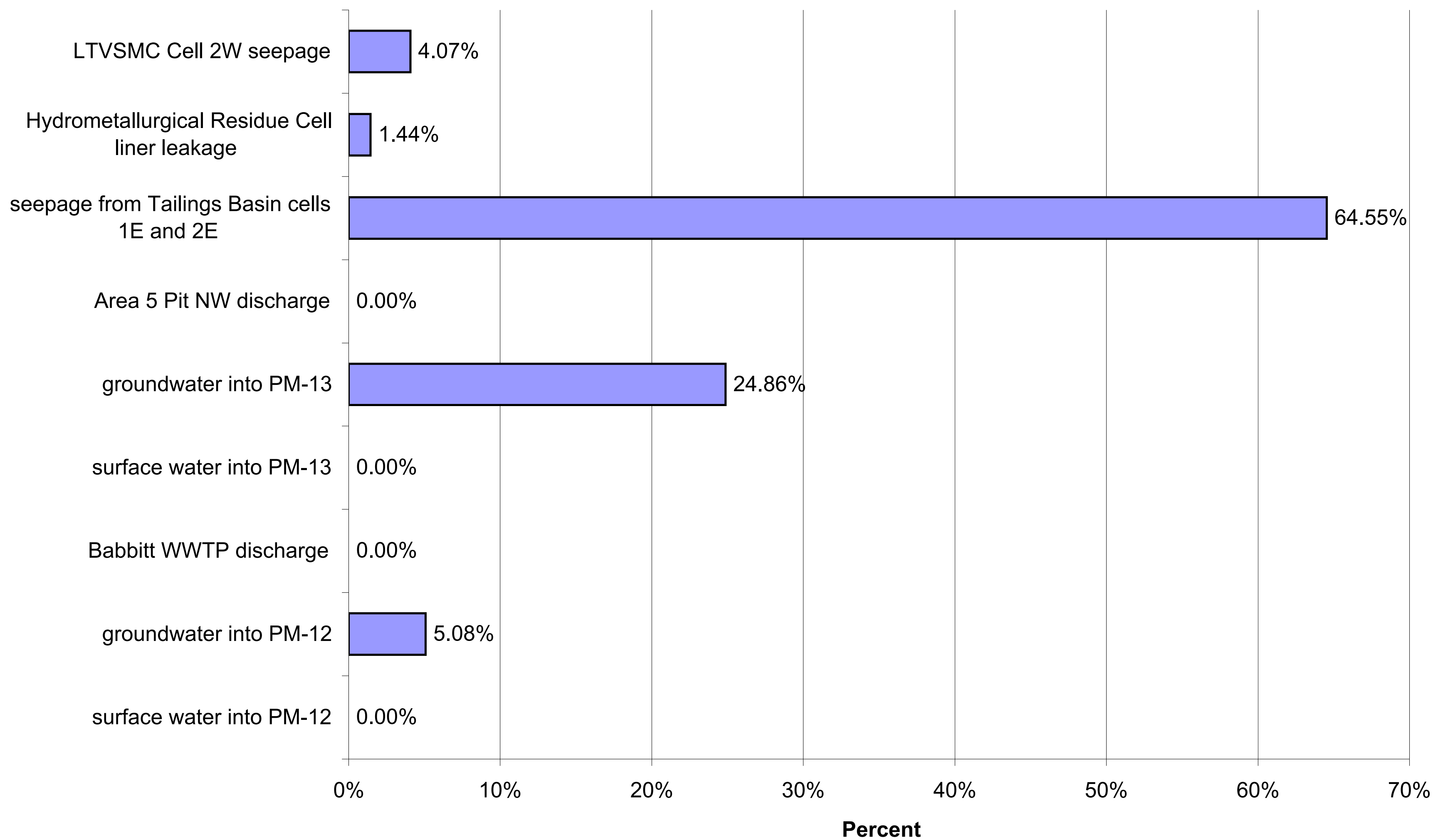
Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)

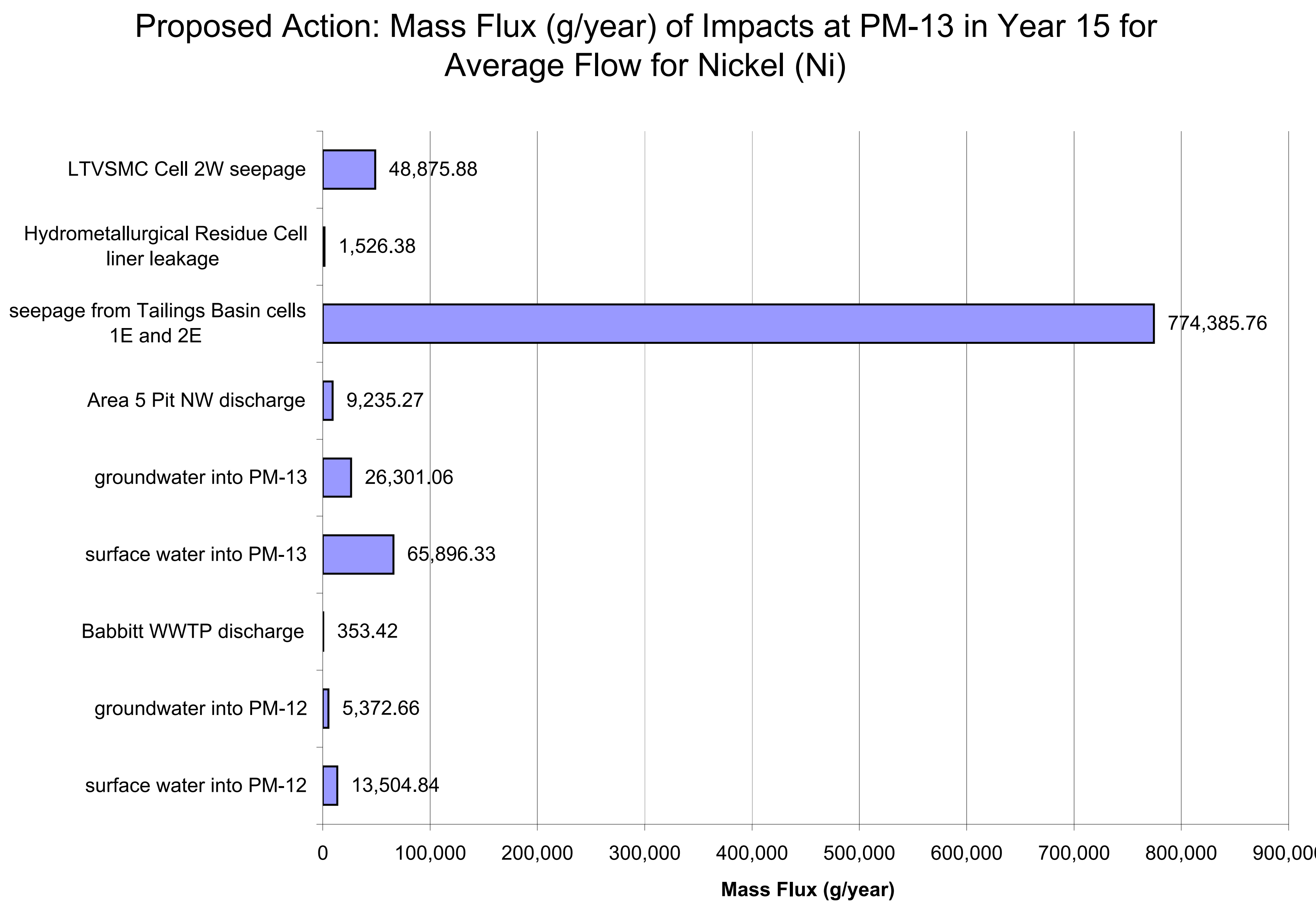


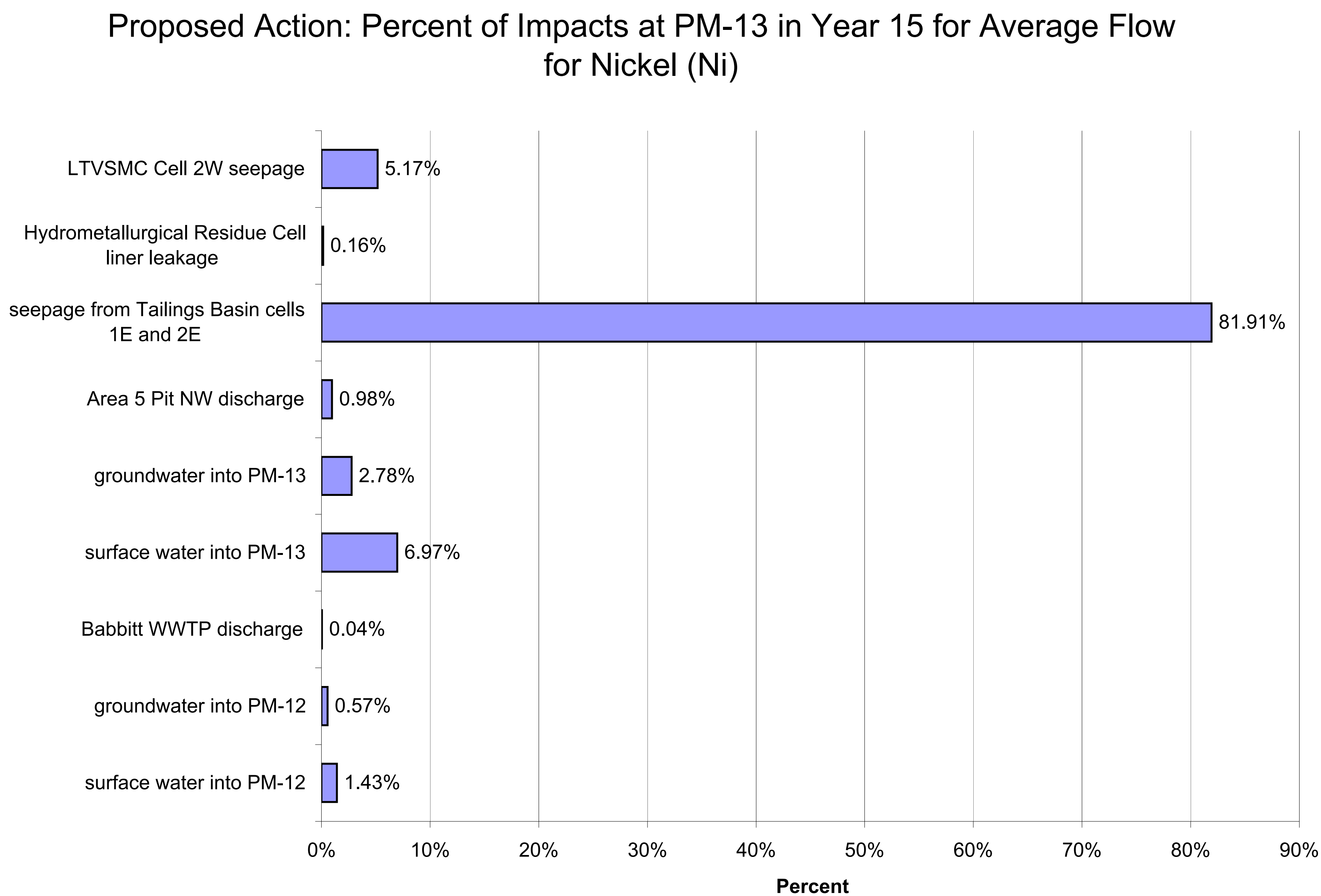
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)

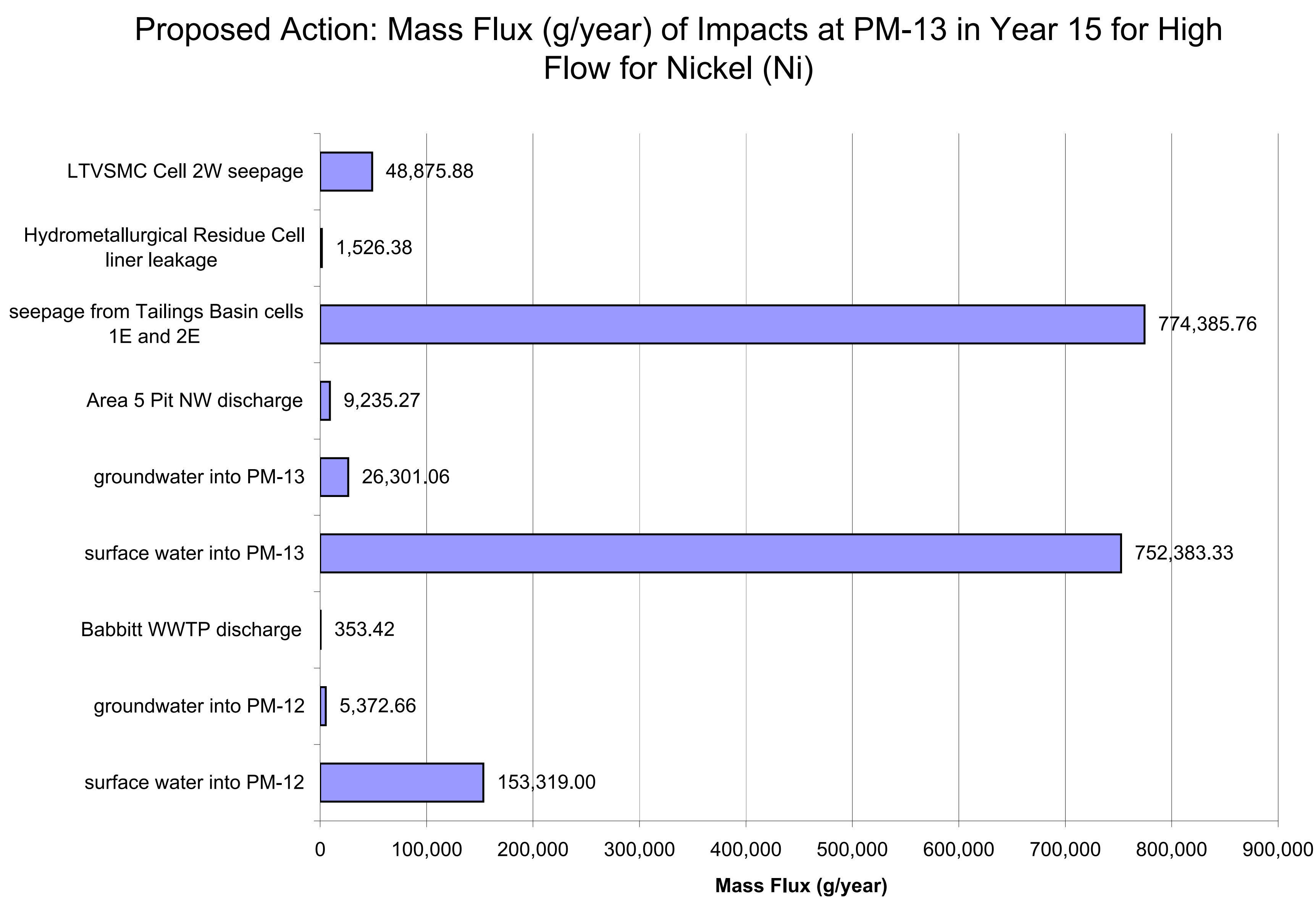


Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)

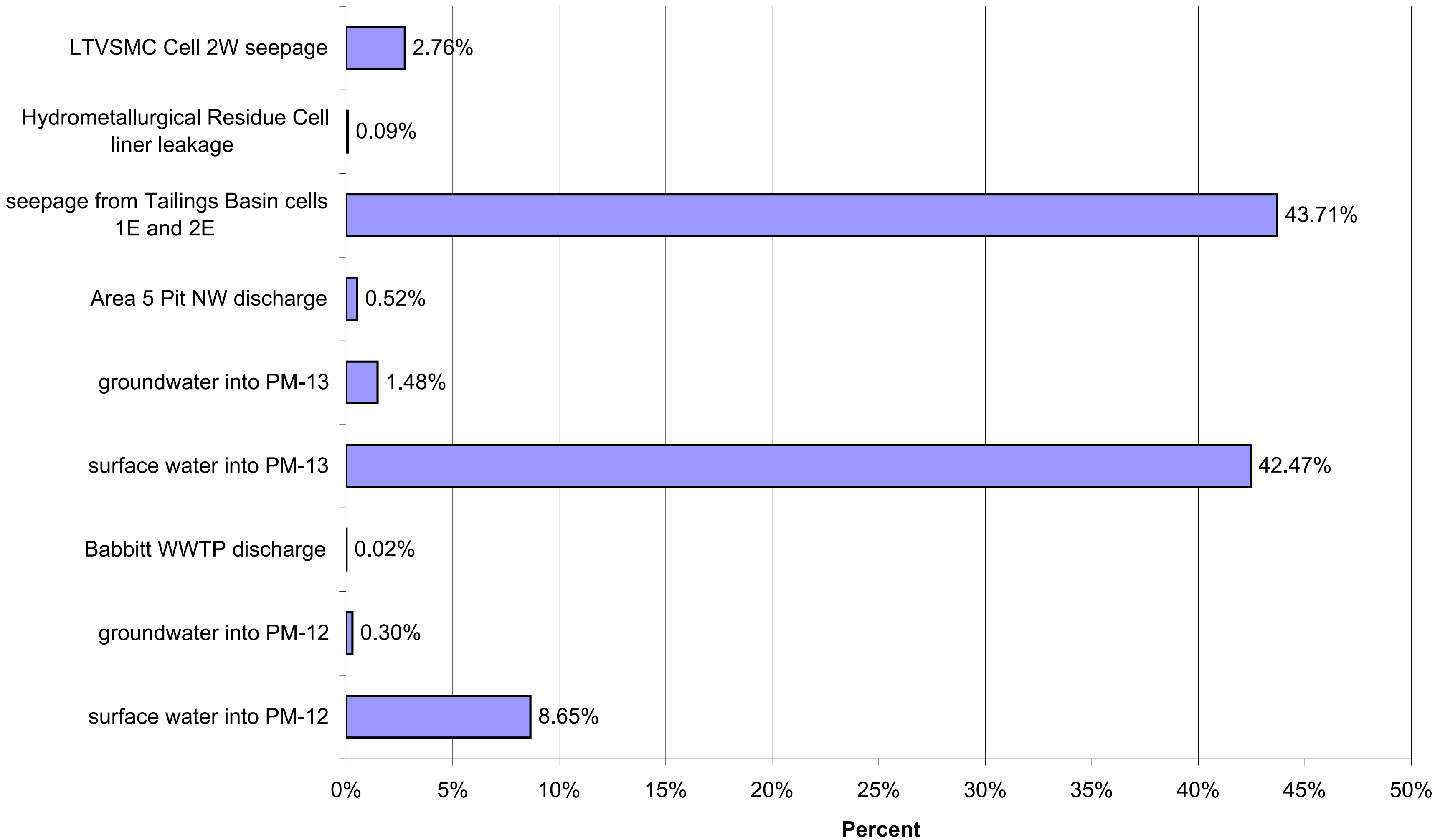


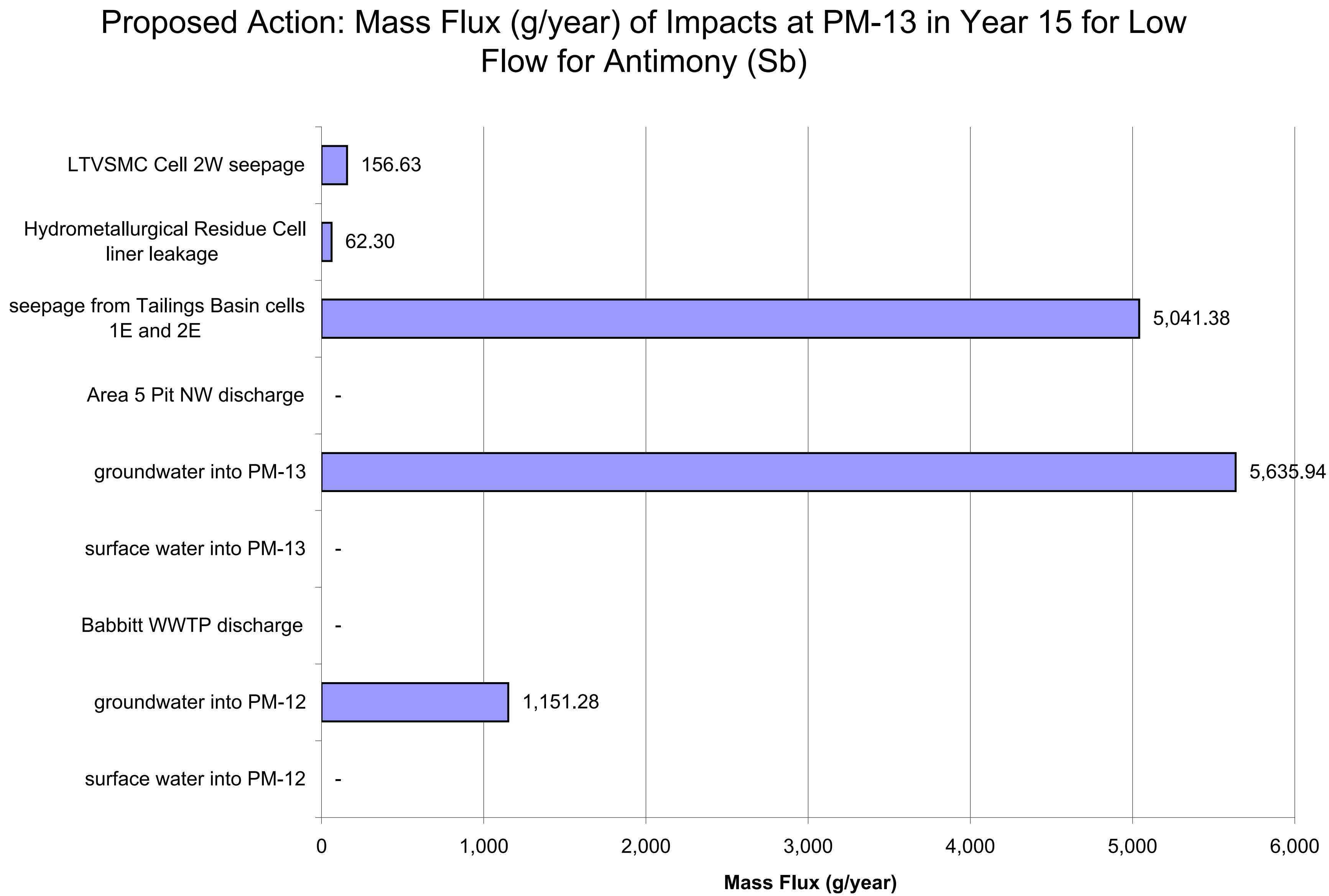

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
774,385.76
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)
LTVSMC Cell 2W seepage
5.17%
Hydrometallurgical Residue Cell liner leakage
0.16%
seepage from Tailings Basin cells 1E and 2E
81.91%
Area 5 Pit NW discharge
0.98%
groundwater into PM-13
2.78%
surface water into PM-13
6.97%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.57%
surface water into PM-12
1.43%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

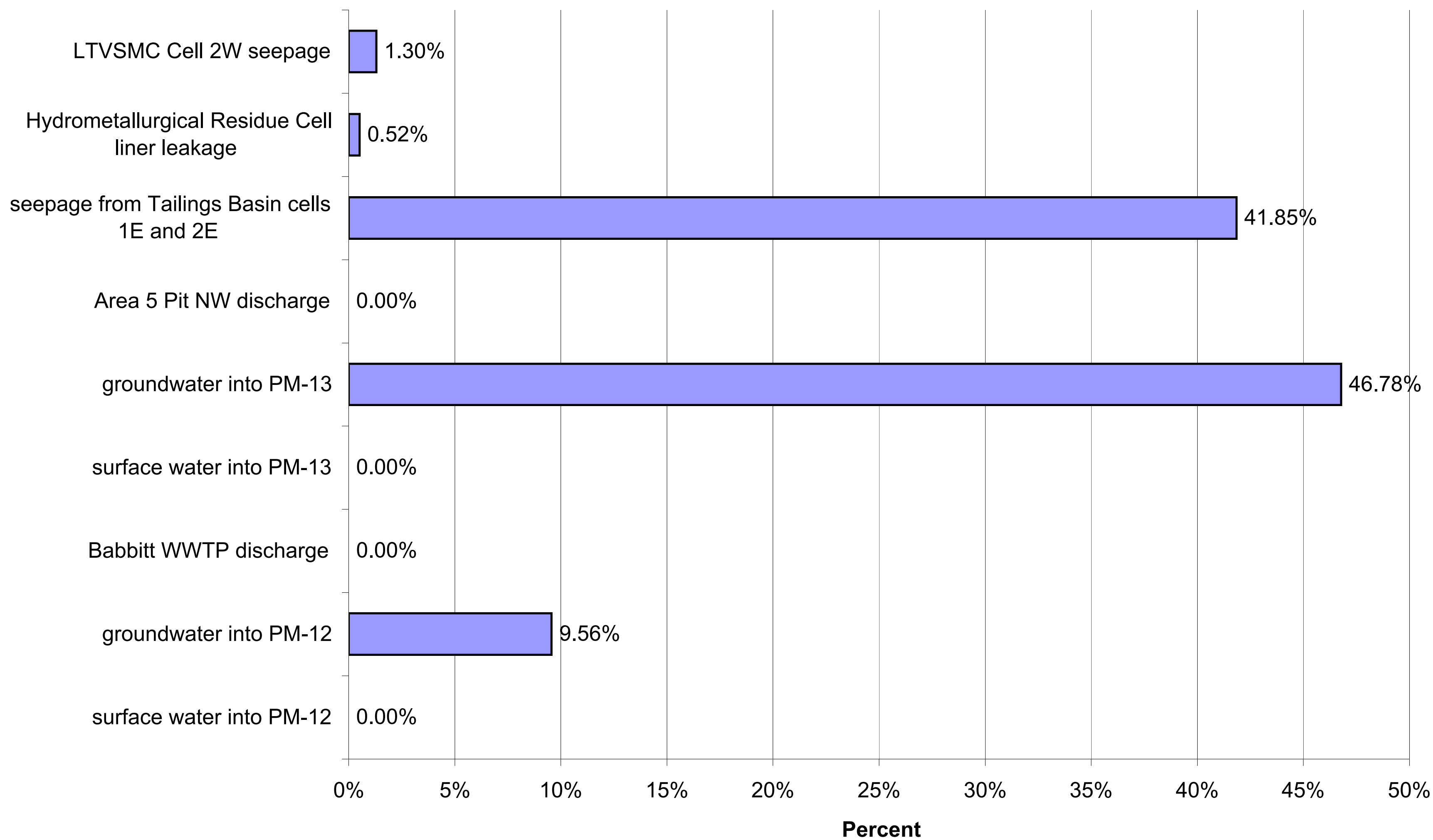

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
774,385.76
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)

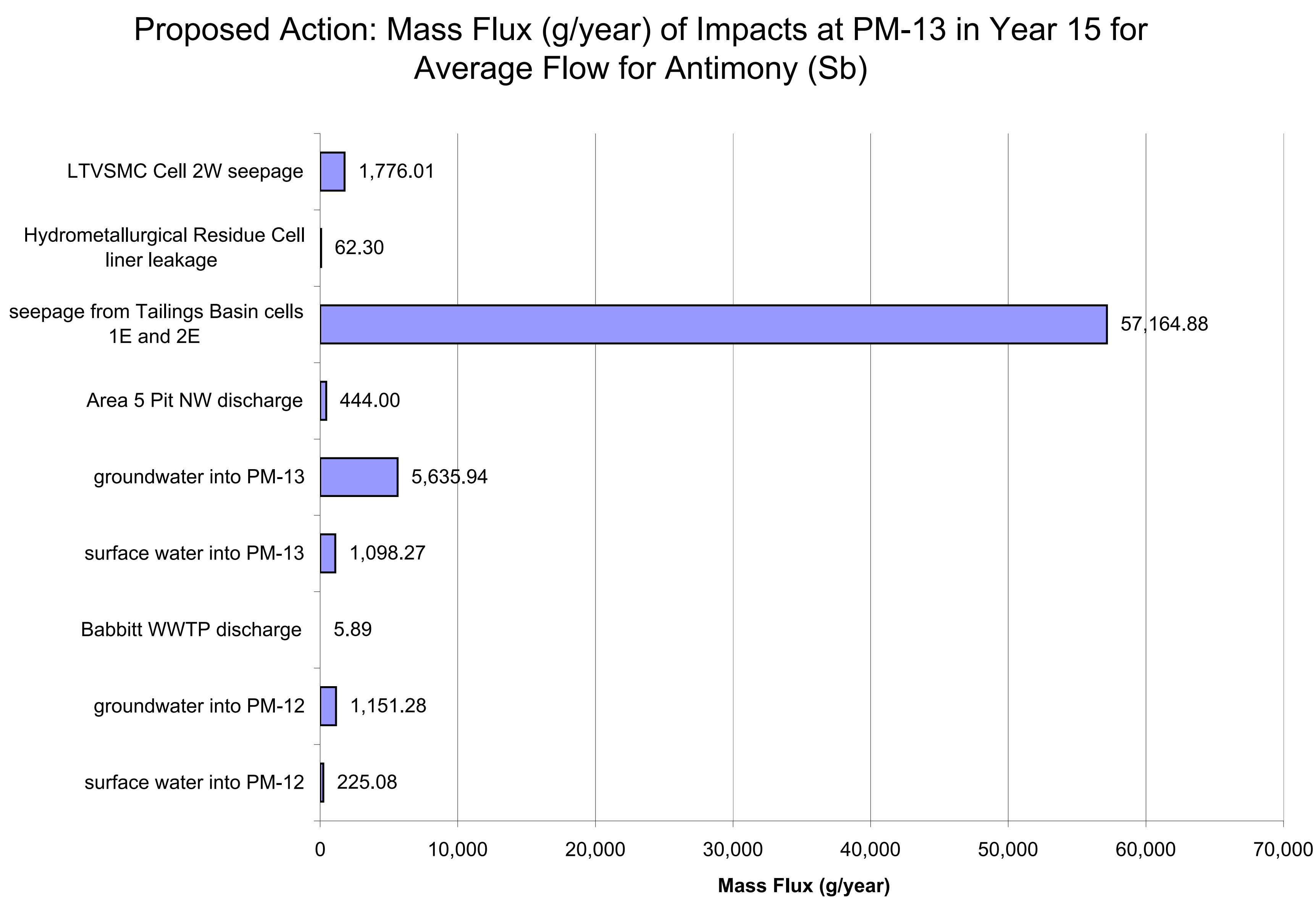
Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)

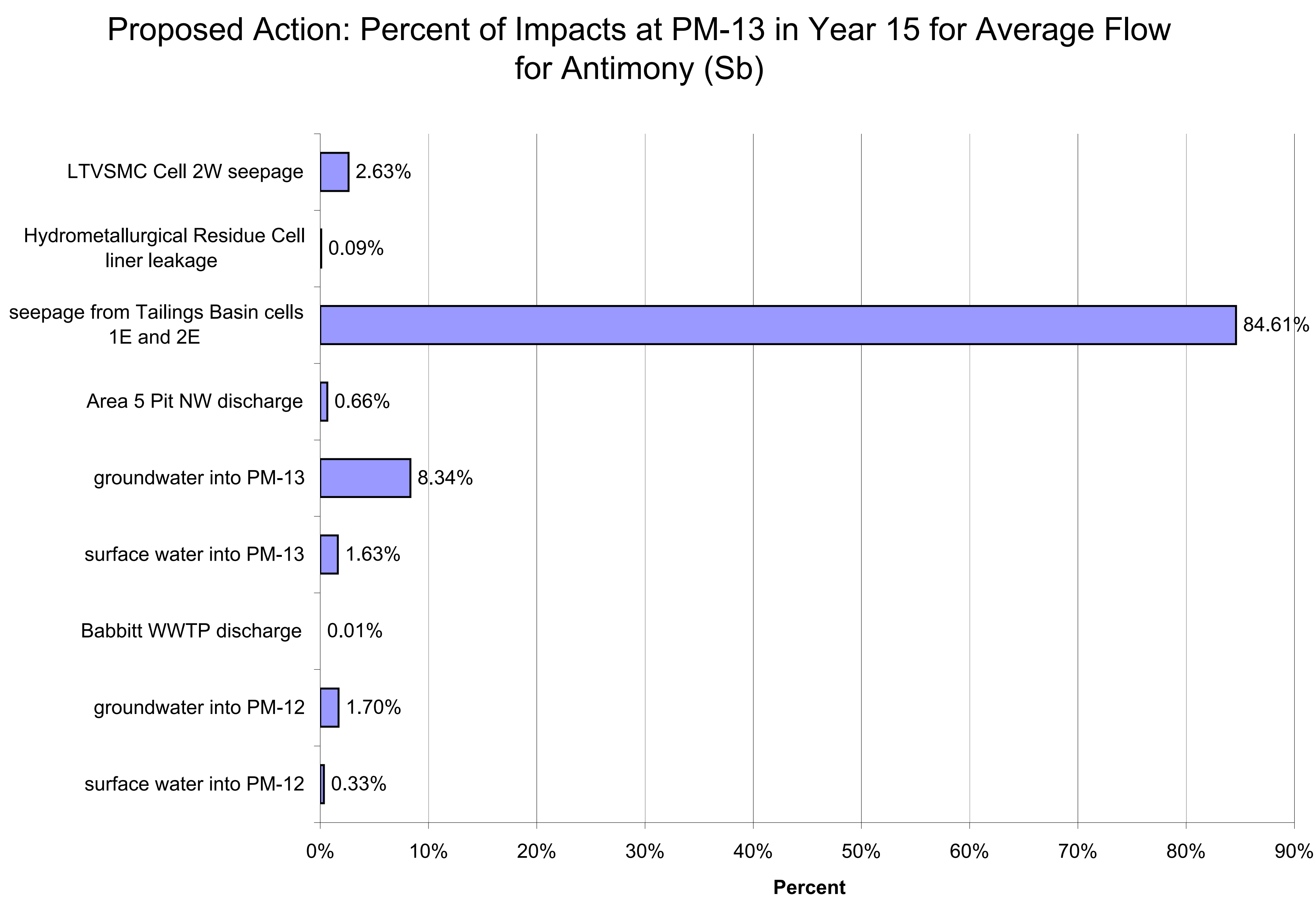


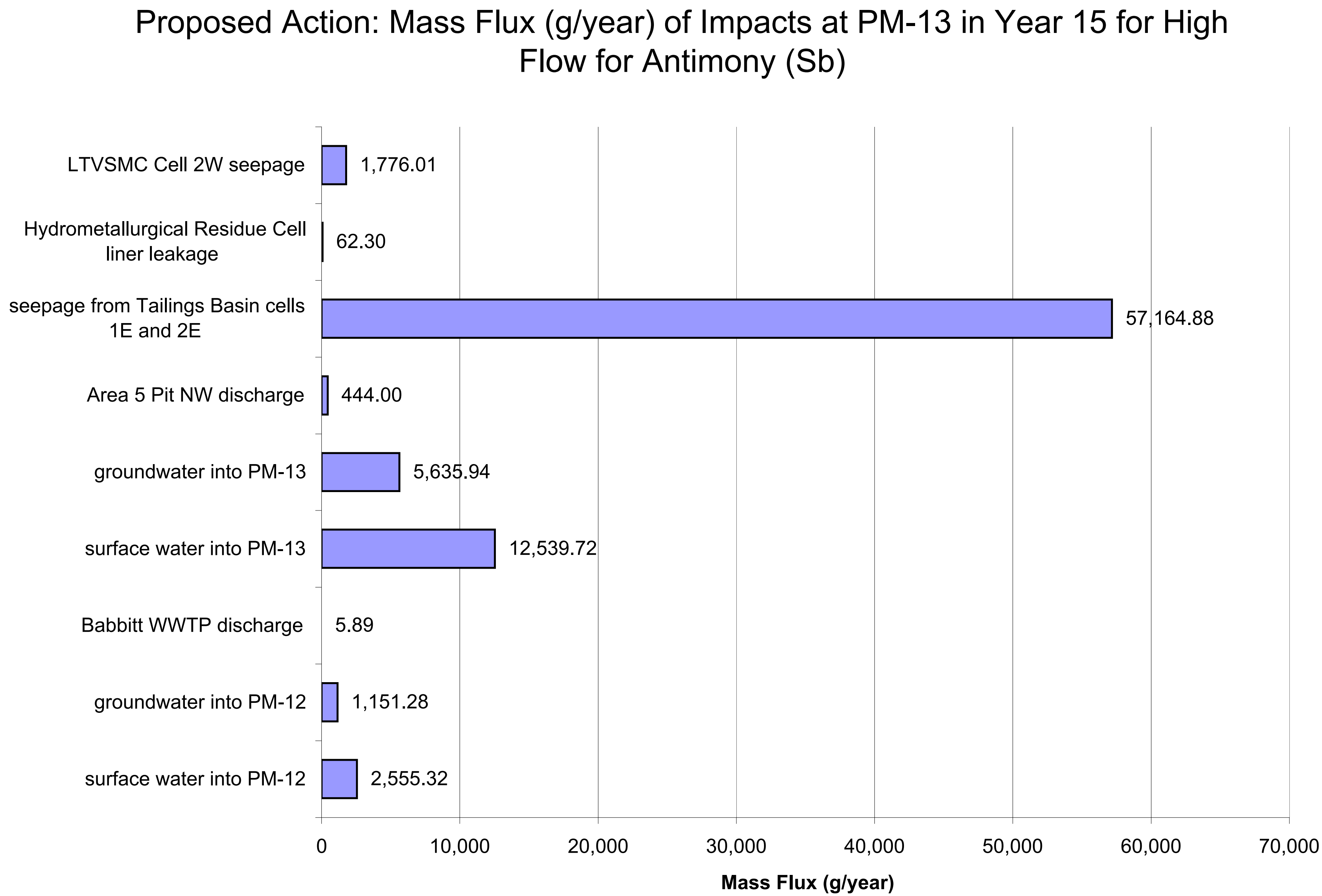

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
156.63
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
5,041.38
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)

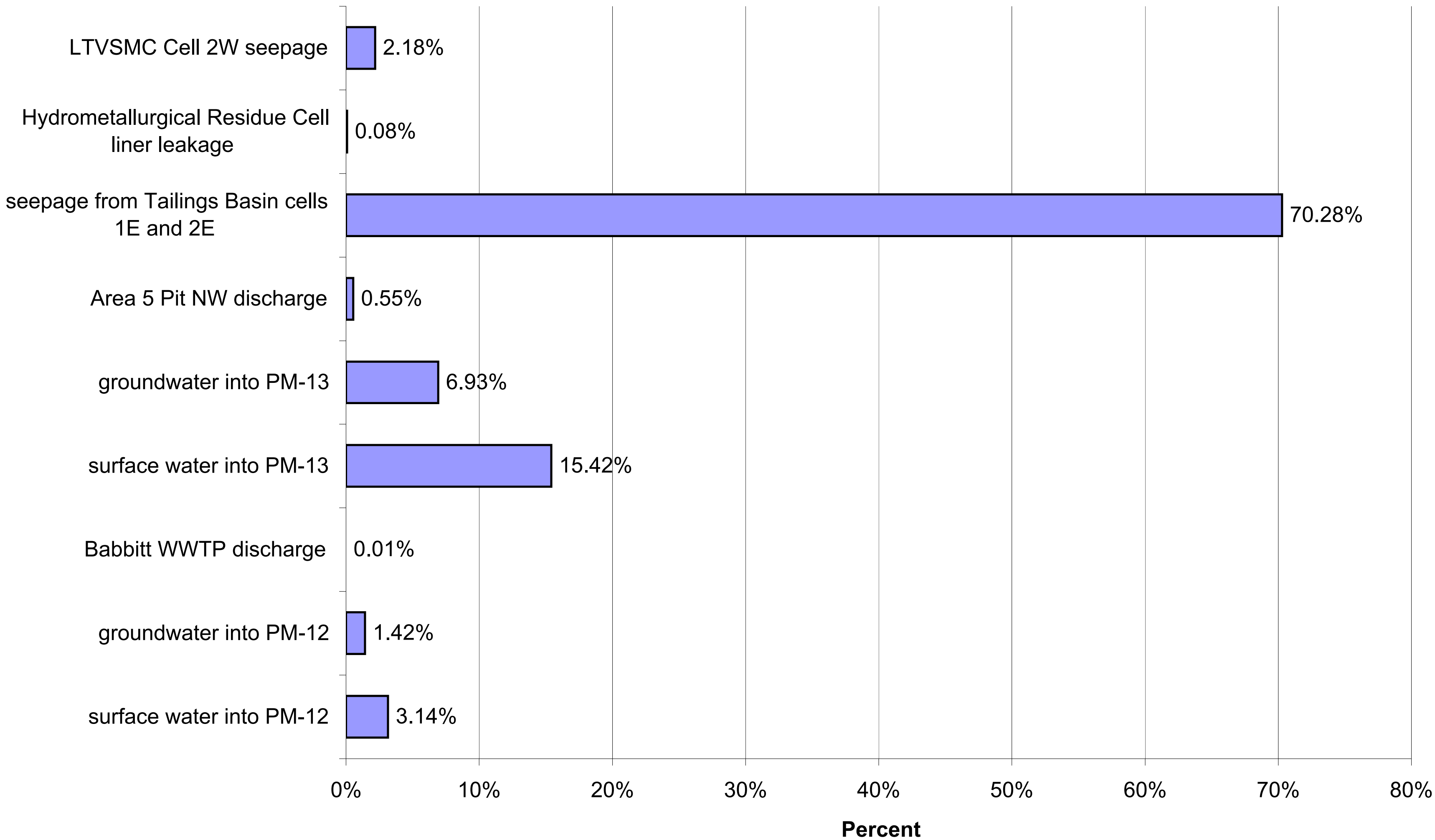



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
57,164.88
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

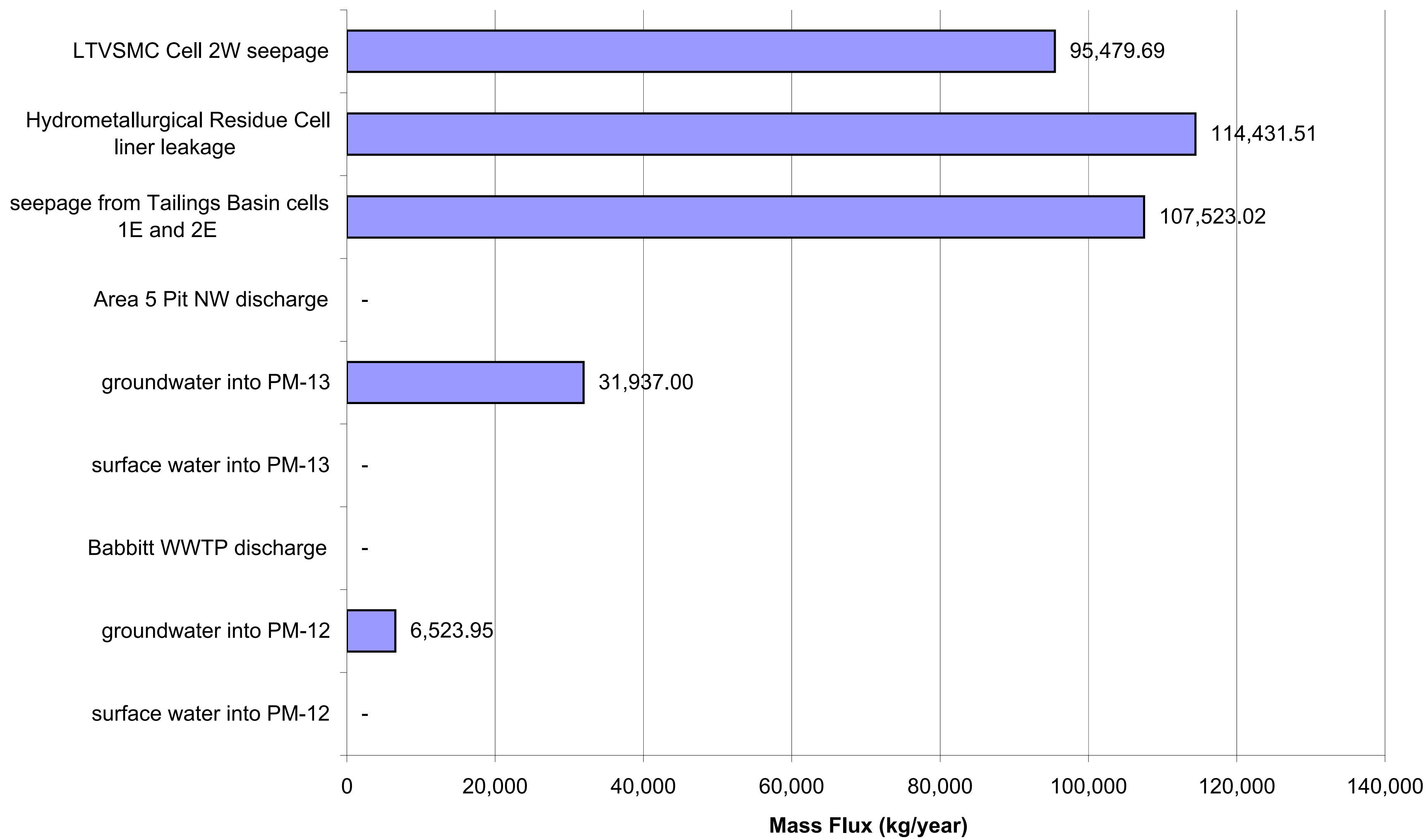

Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
2.63%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
84.61%
Area 5 Pit NW discharge
0.66%
groundwater into PM-13
8.34%
surface water into PM-13
1.63%
Babbitt WWTP discharge
0.01%
groundwater into PM-12
1.70%
surface water into PM-12
0.33%
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 High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
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
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

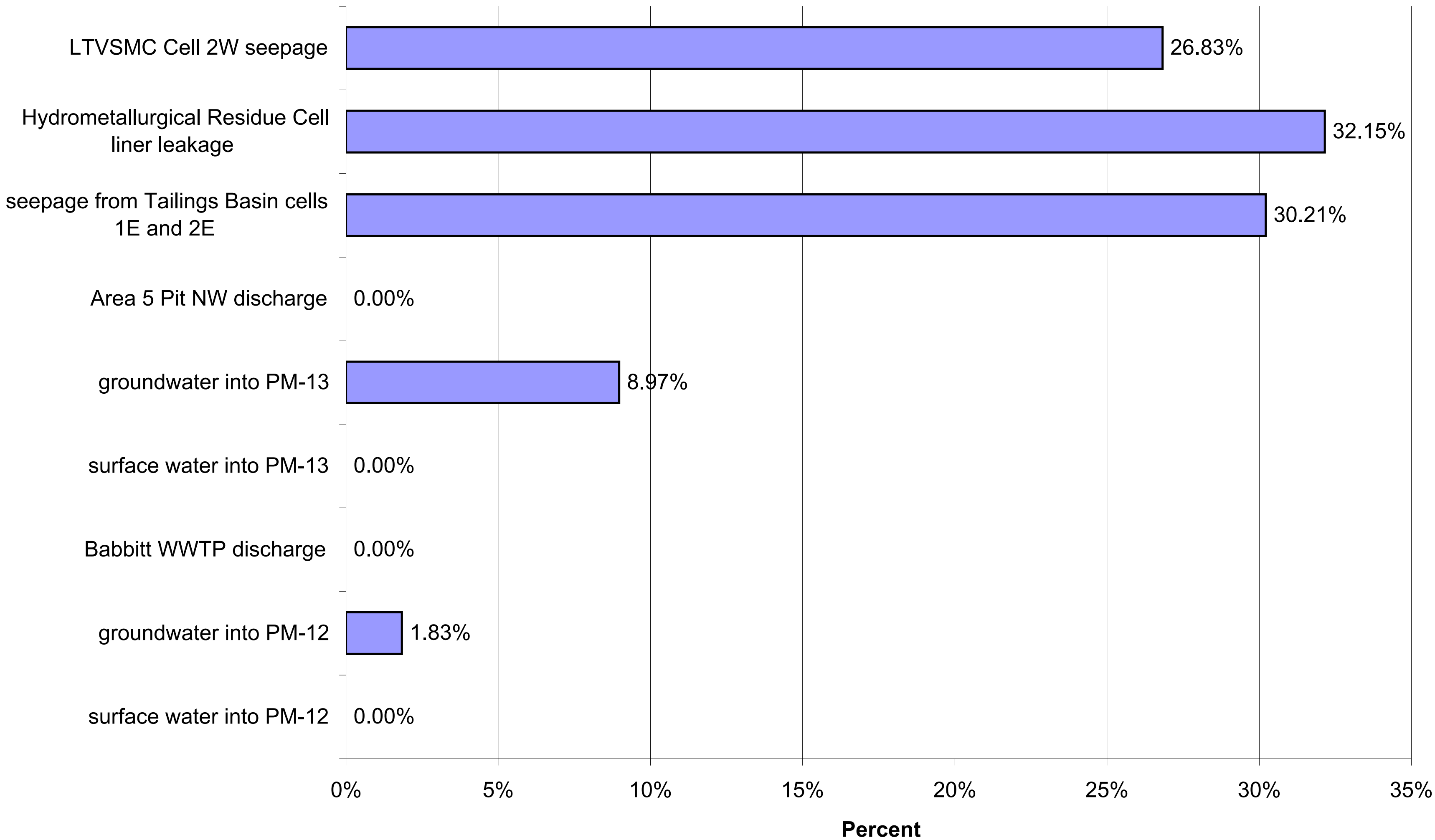
Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)



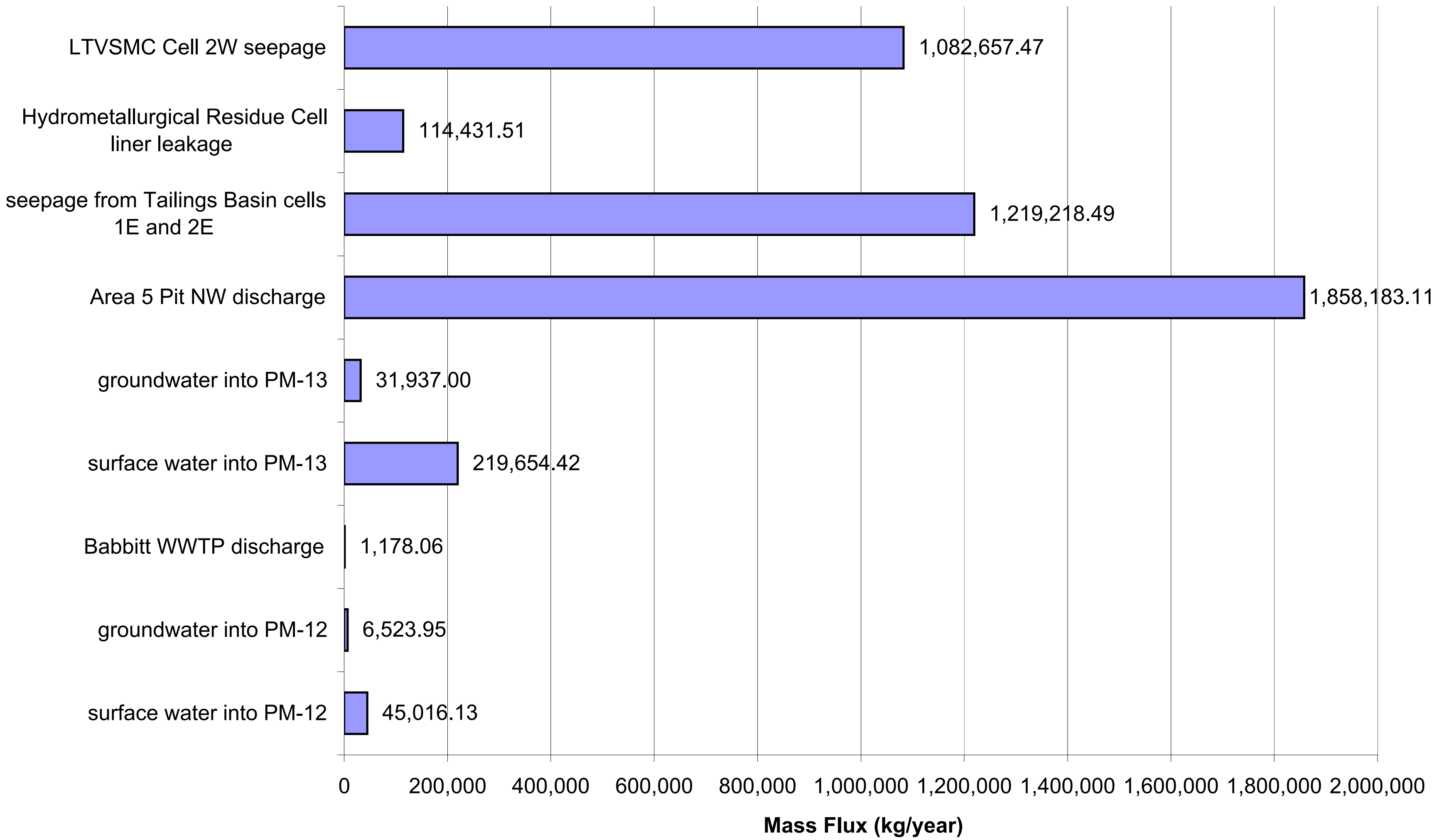
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)



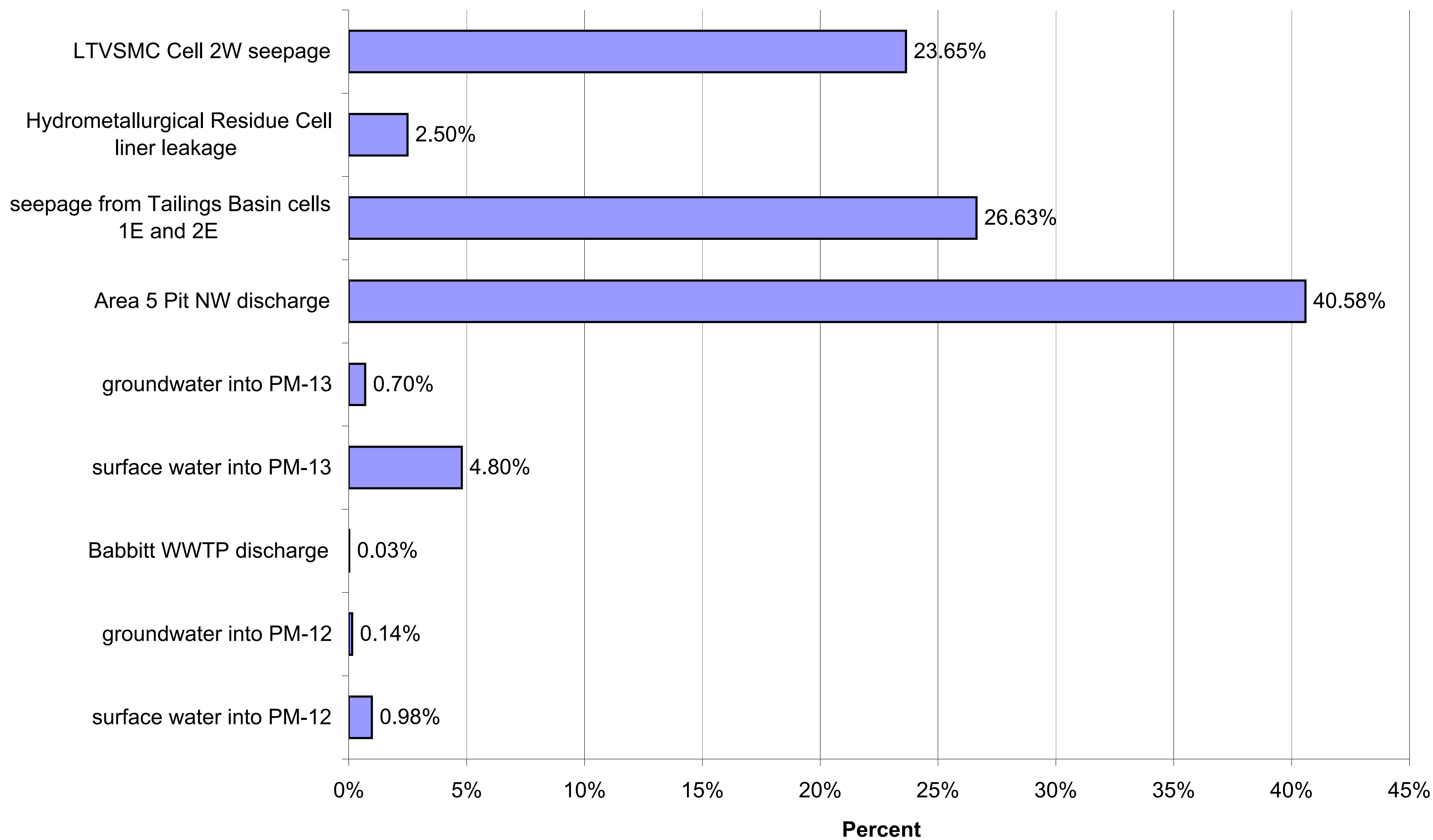
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)



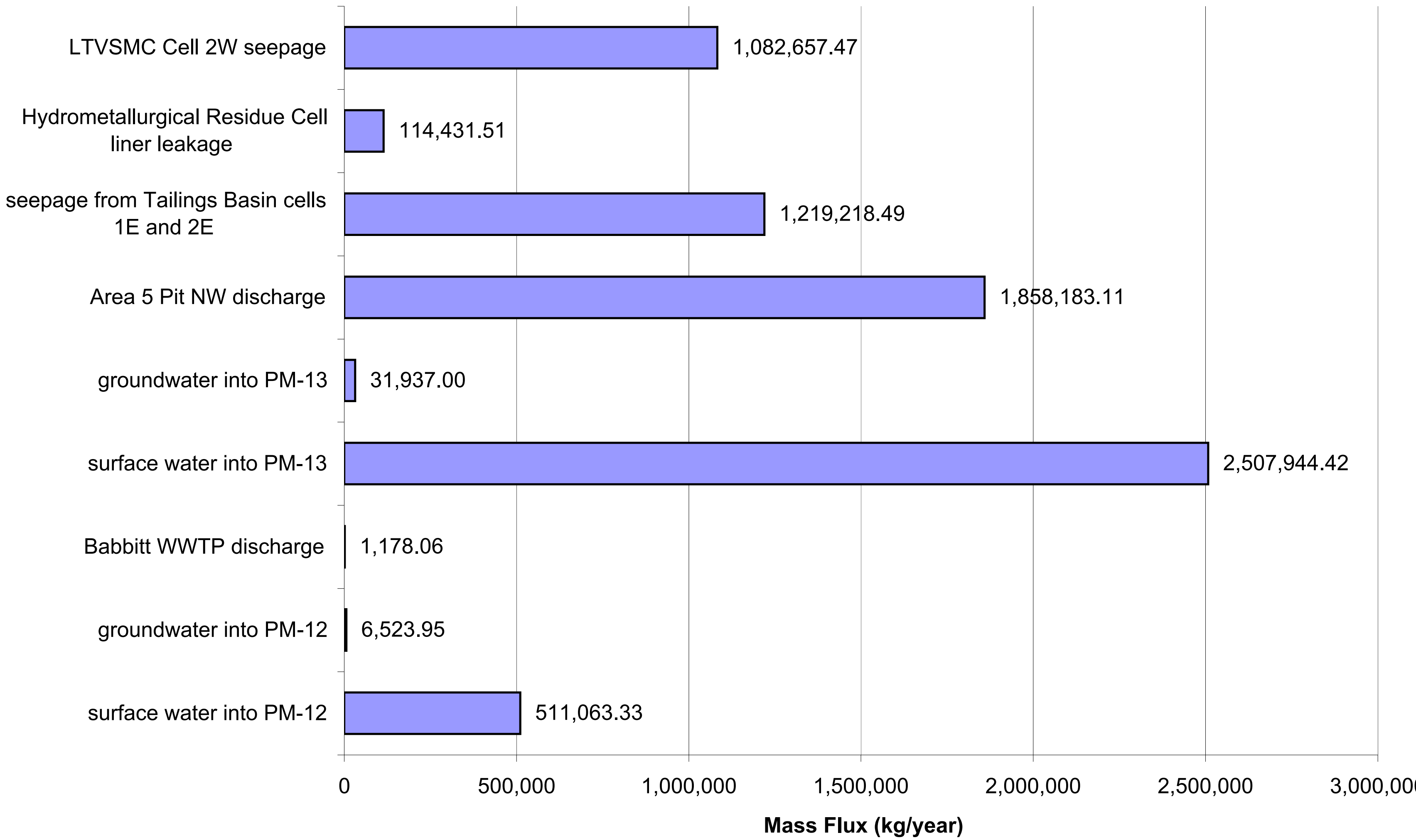
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)



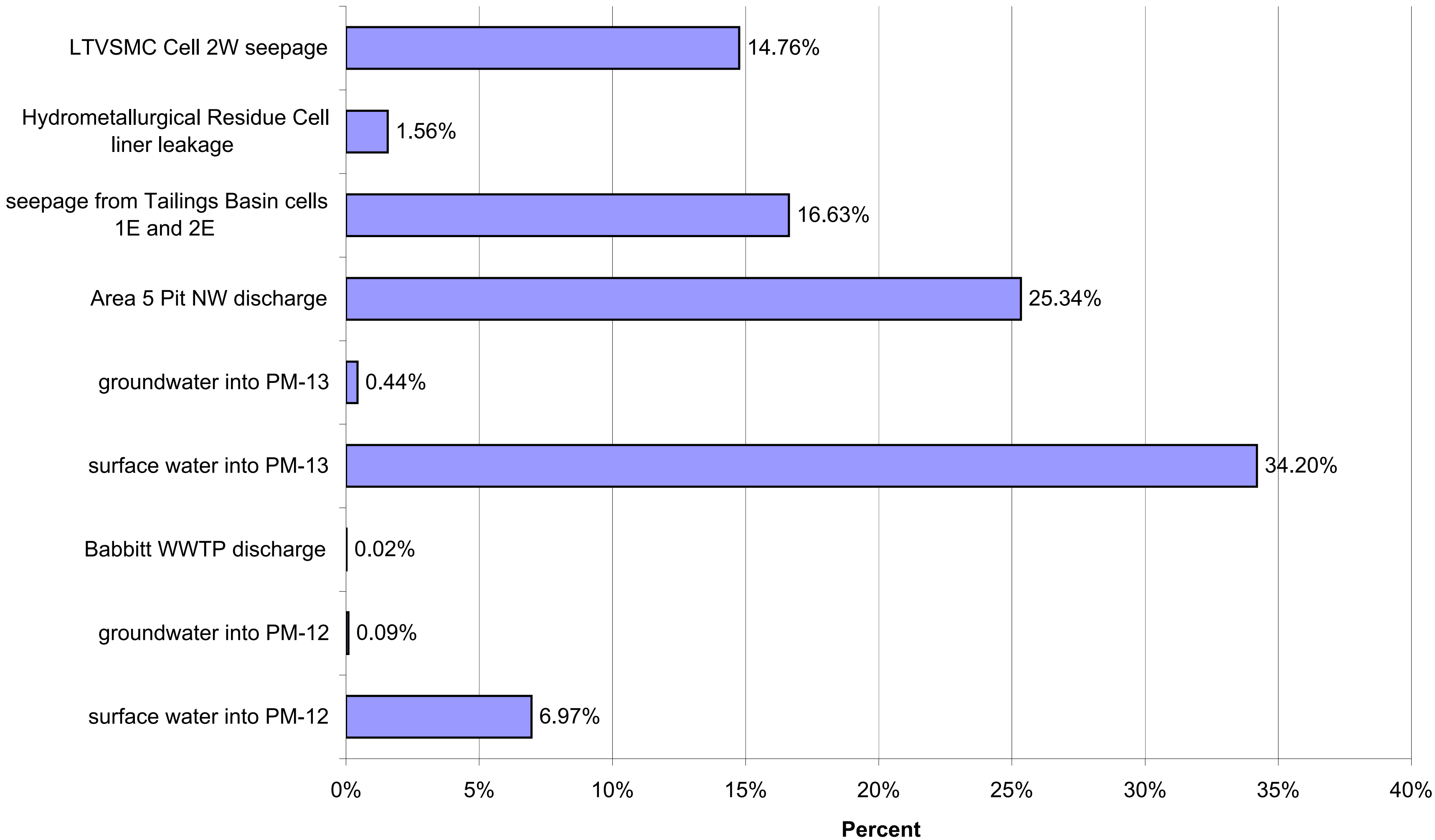
Proposed Action: Percent of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)

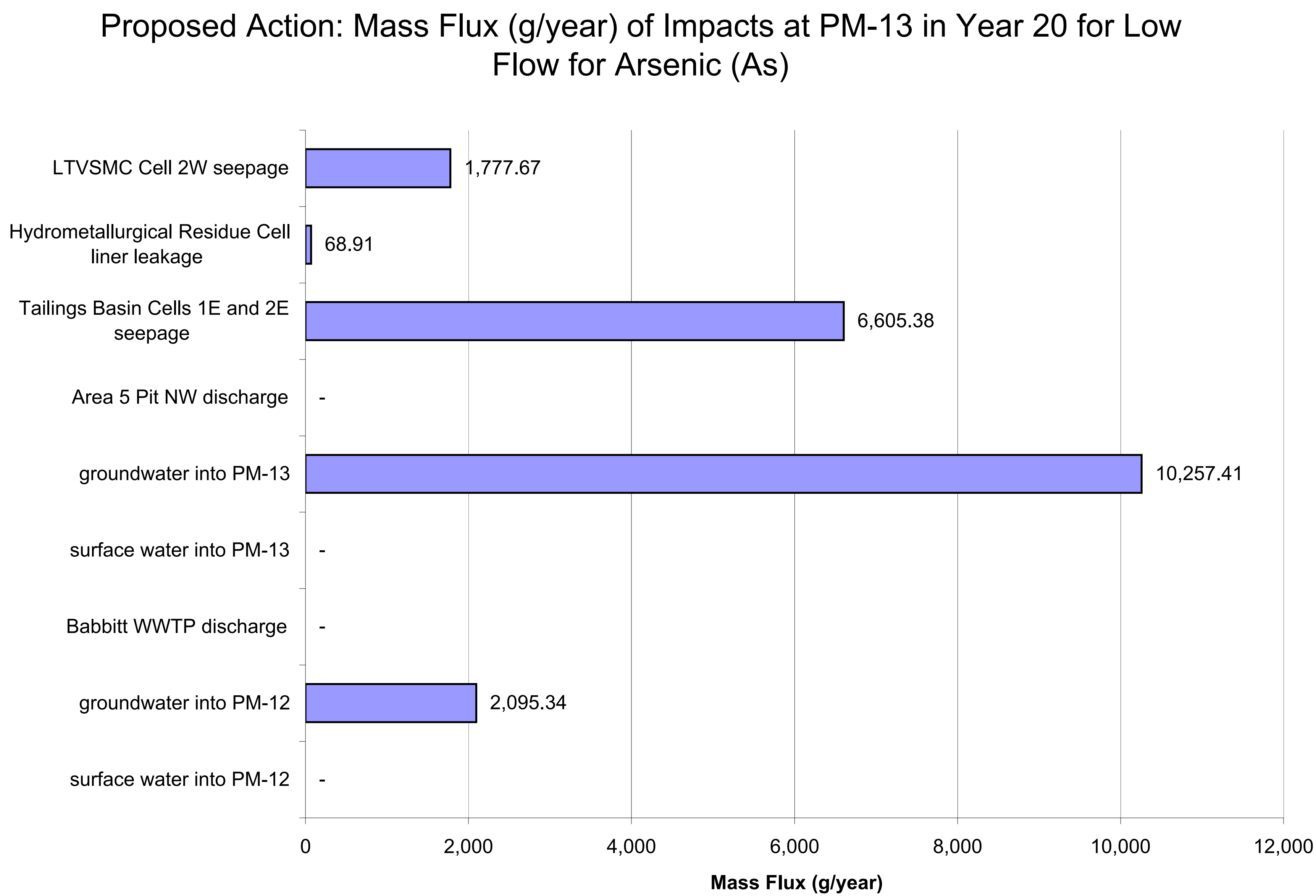


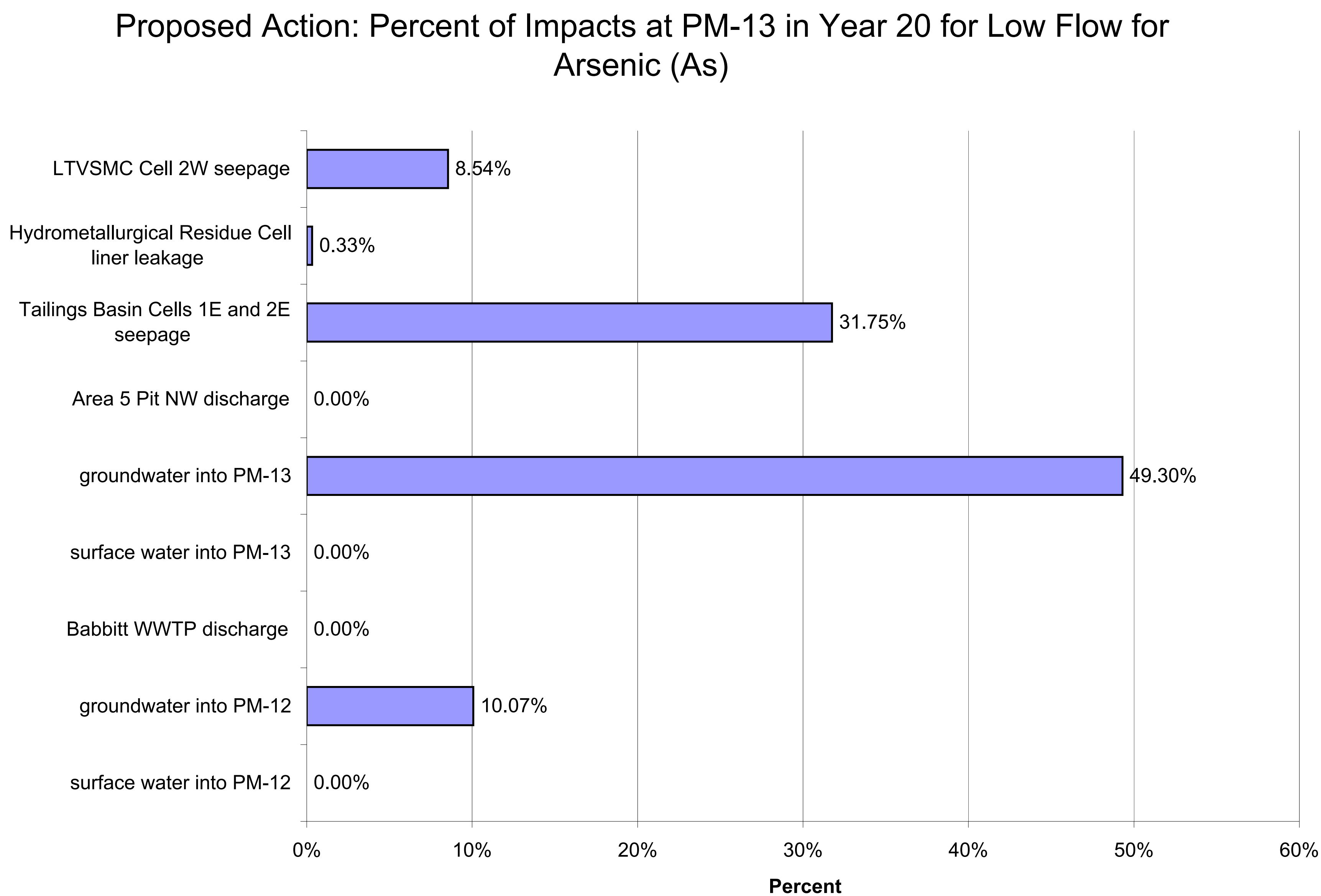
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)

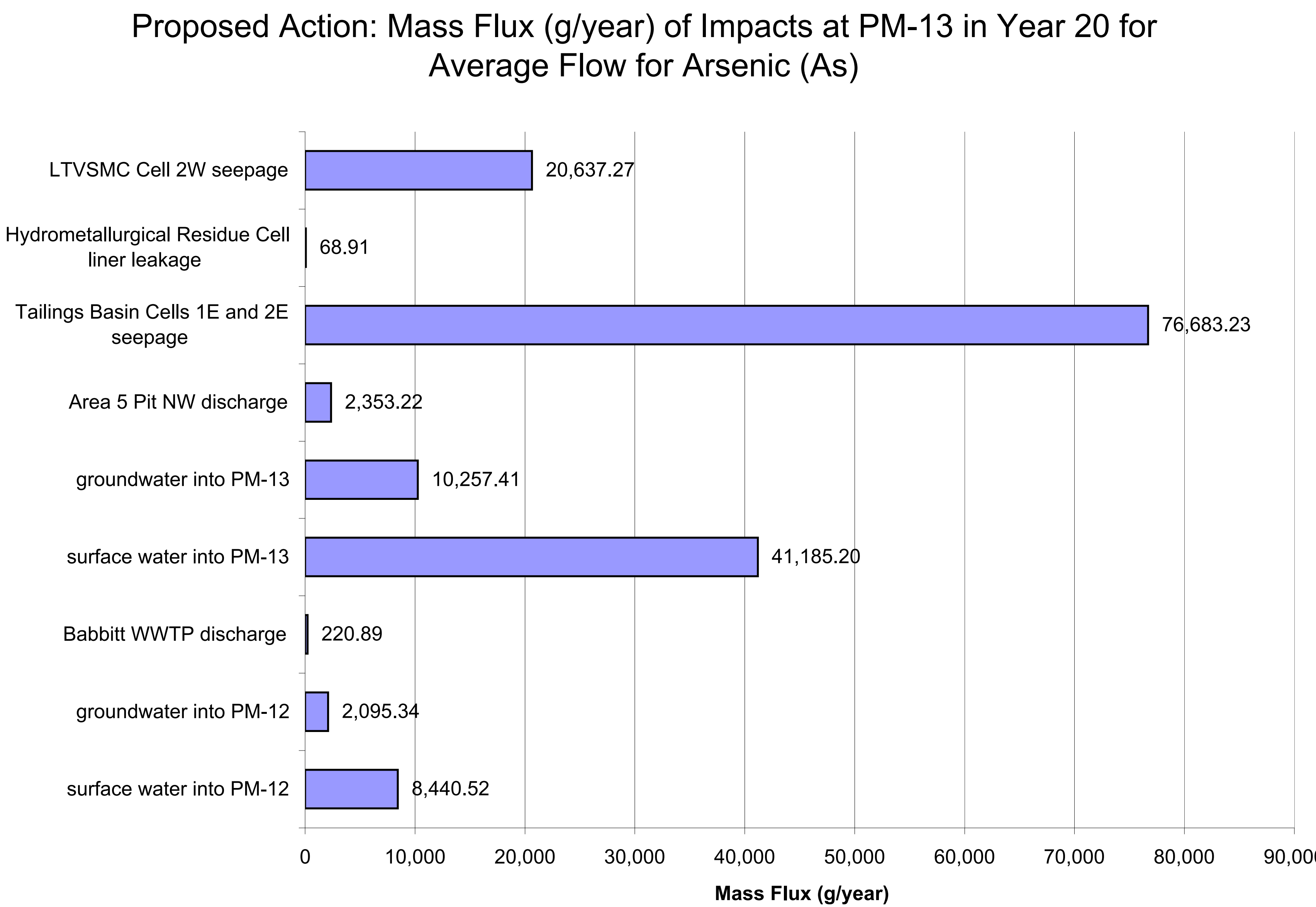


Proposed Action: Percent of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)

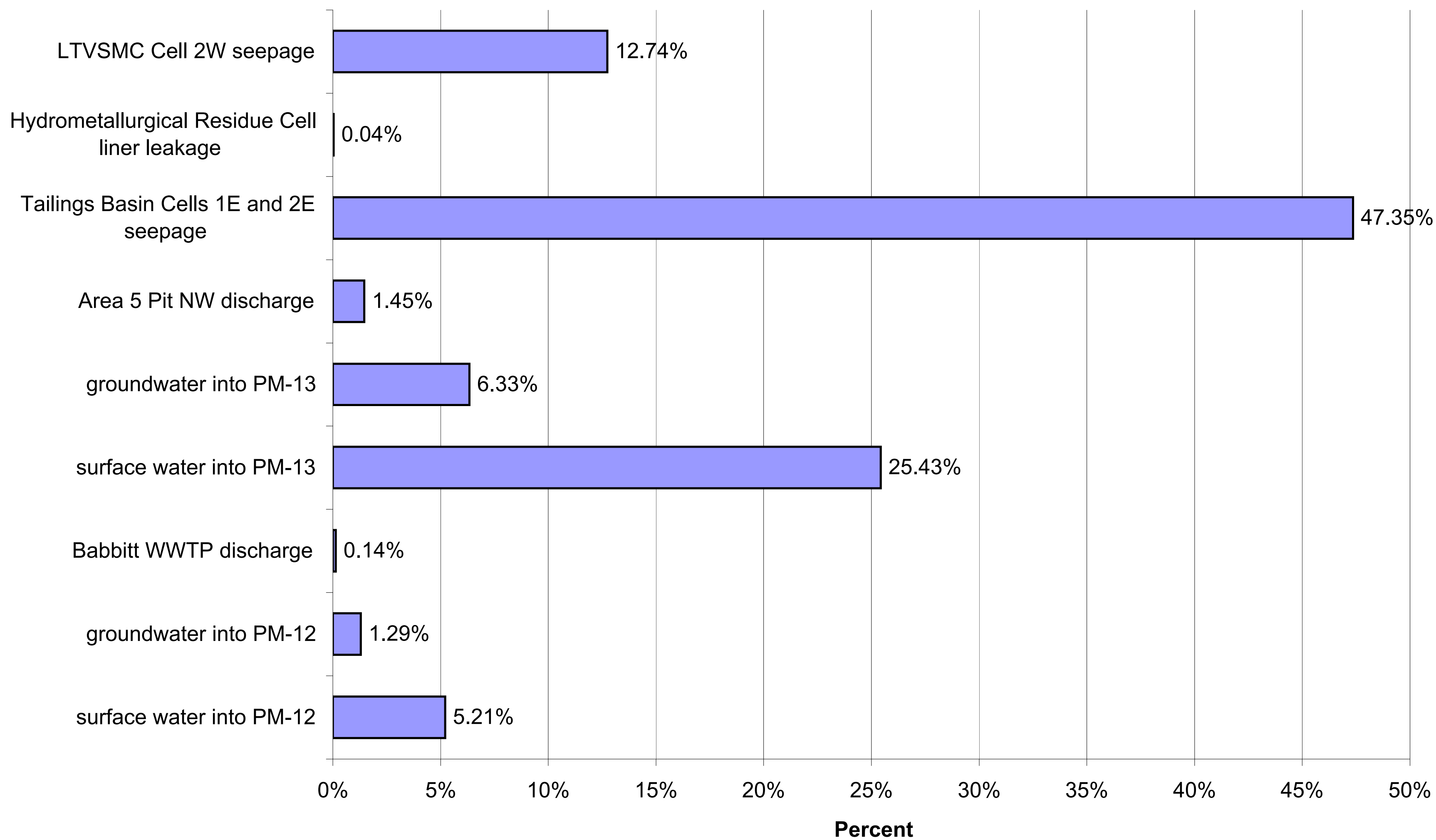


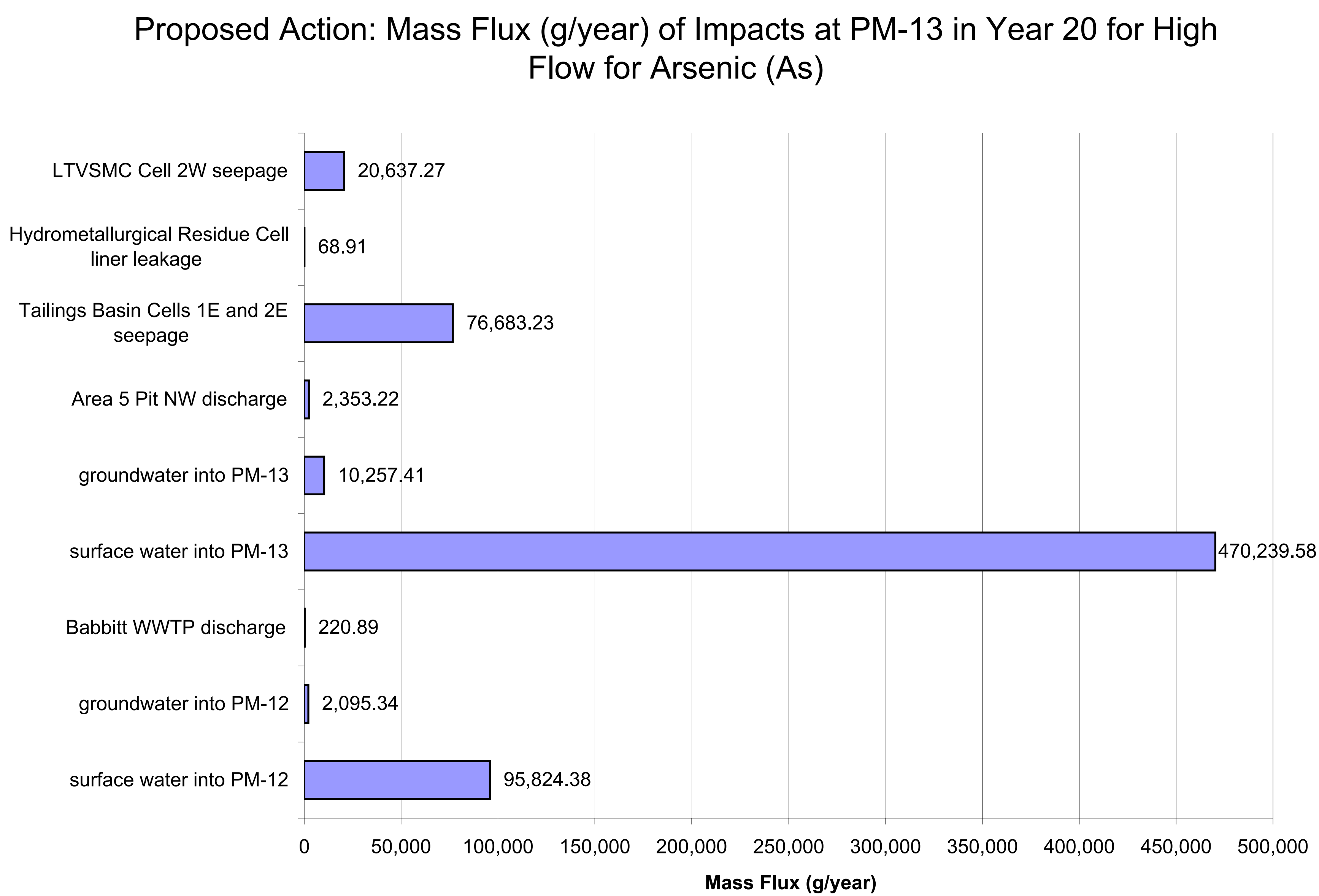

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1,777.67
Hydrometallurgical Residue Cell liner leakage
68.91
Tailings Basin Cells 1E and 2E seepage
6,605.38
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
8.54%
Hydrometallurgical Residue Cell liner leakage
0.33%
Tailings Basin Cells 1E and 2E seepage
31.75%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
49.30%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
10.07%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

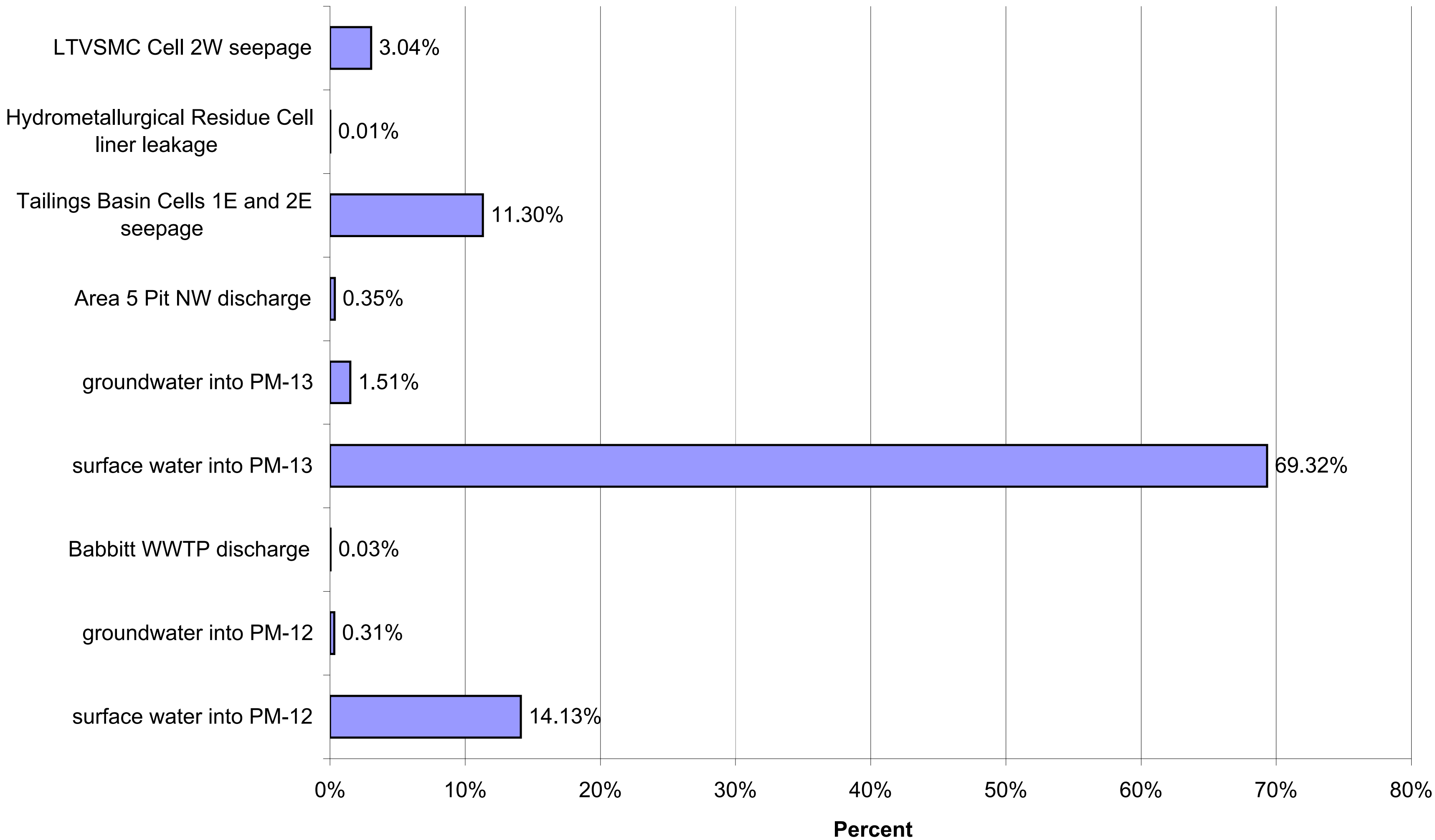

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
68.91
Tailings Basin Cells 1E and 2E seepage
76,683.23
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
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)

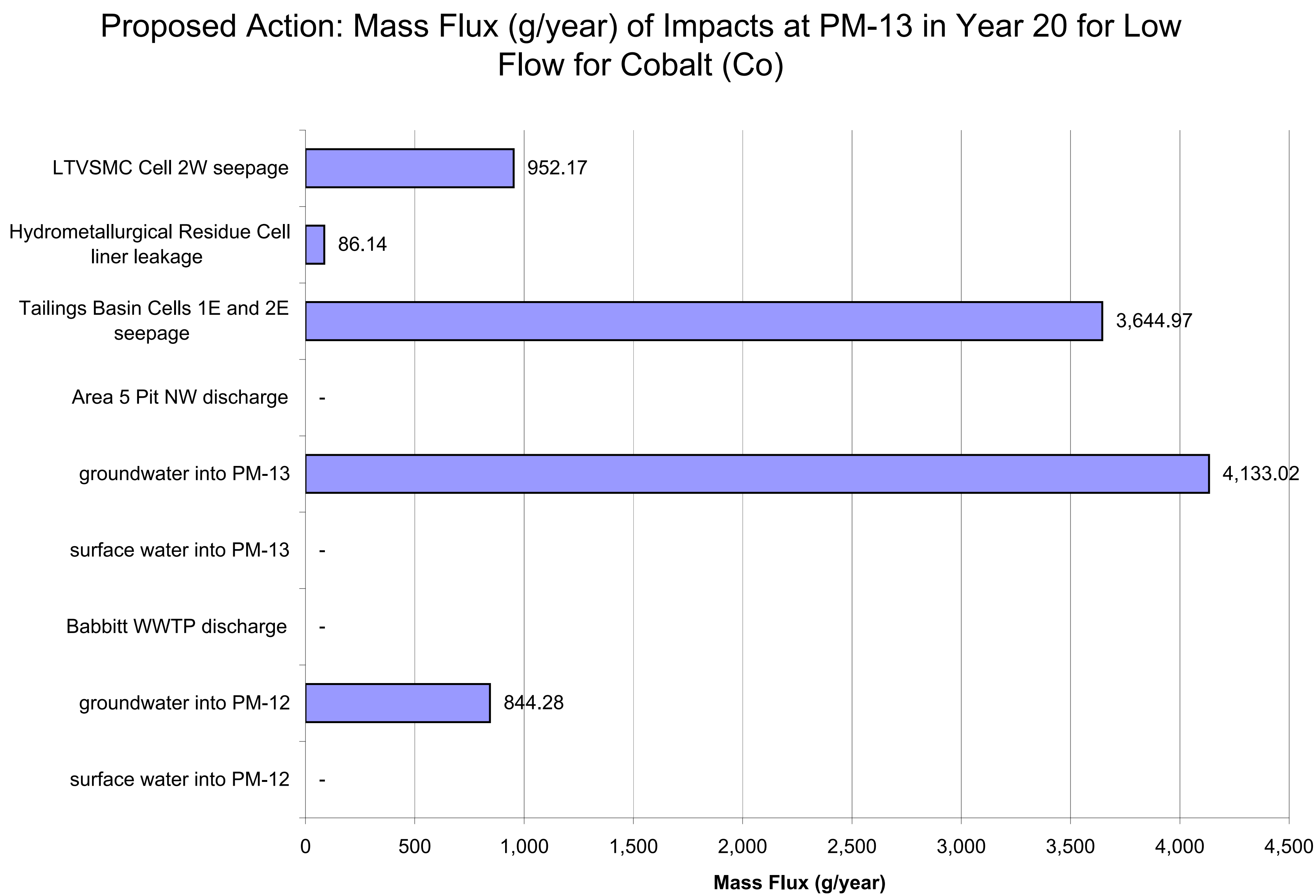
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)



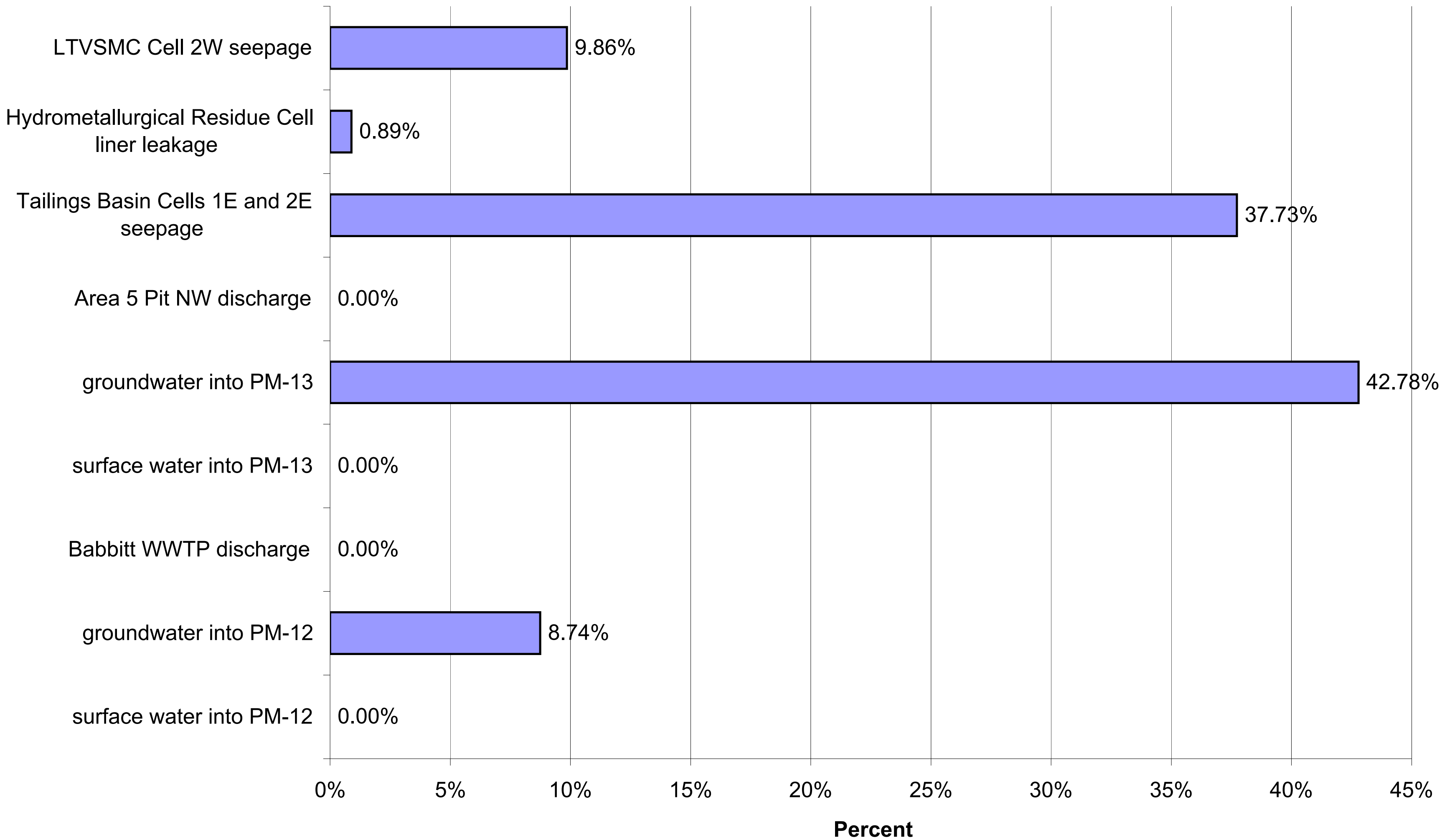

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
68.91
Tailings Basin Cells 1E and 2E seepage
76,683.23
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
10,257.41
surface 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 20 for High Flow for Arsenic (As)

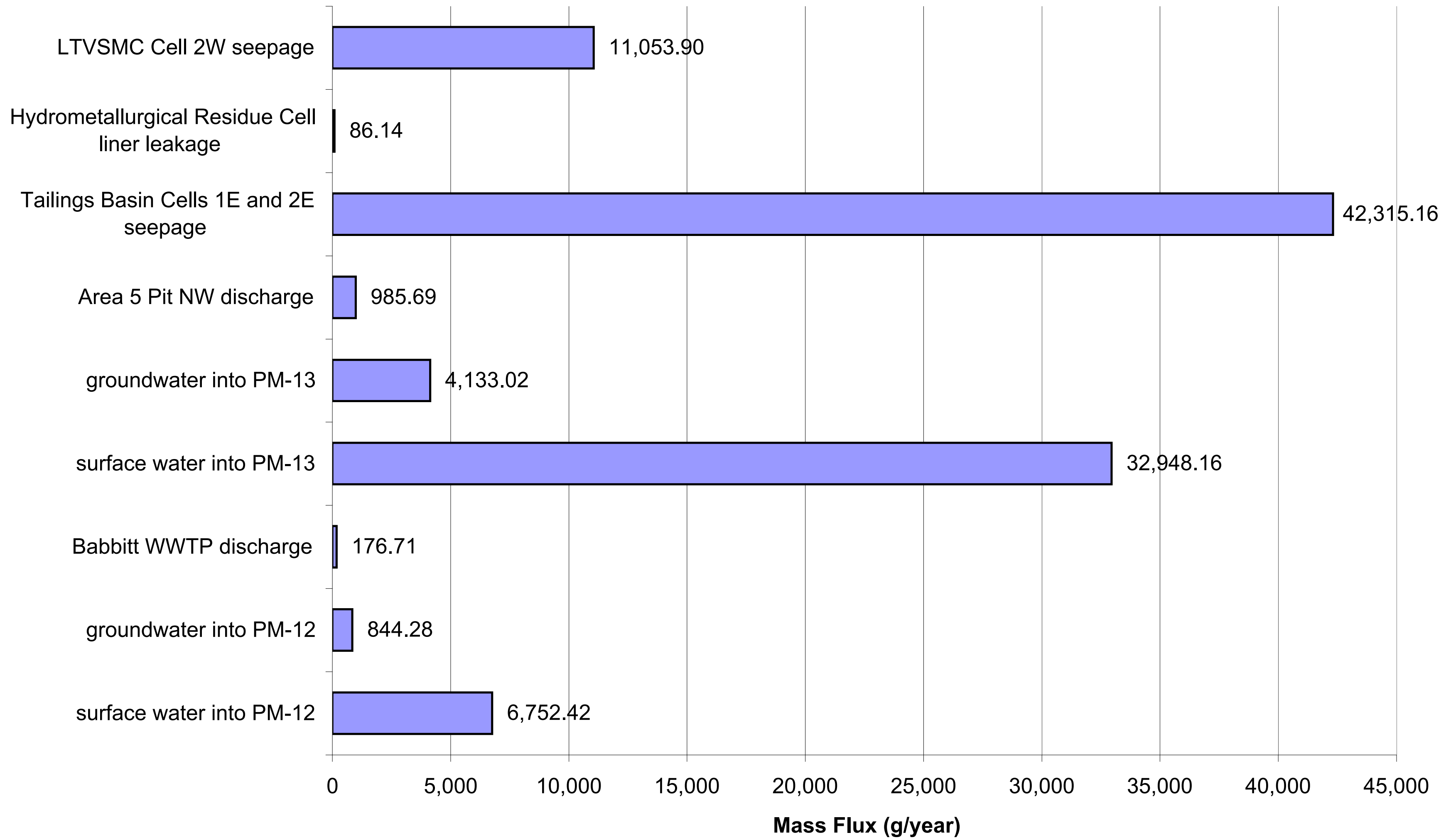



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
952.17
Hydrometallurgical Residue Cell liner leakage
86.14
Tailings Basin Cells 1E and 2E seepage
3,644.97
Area 5 Pit NW discharge
-
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

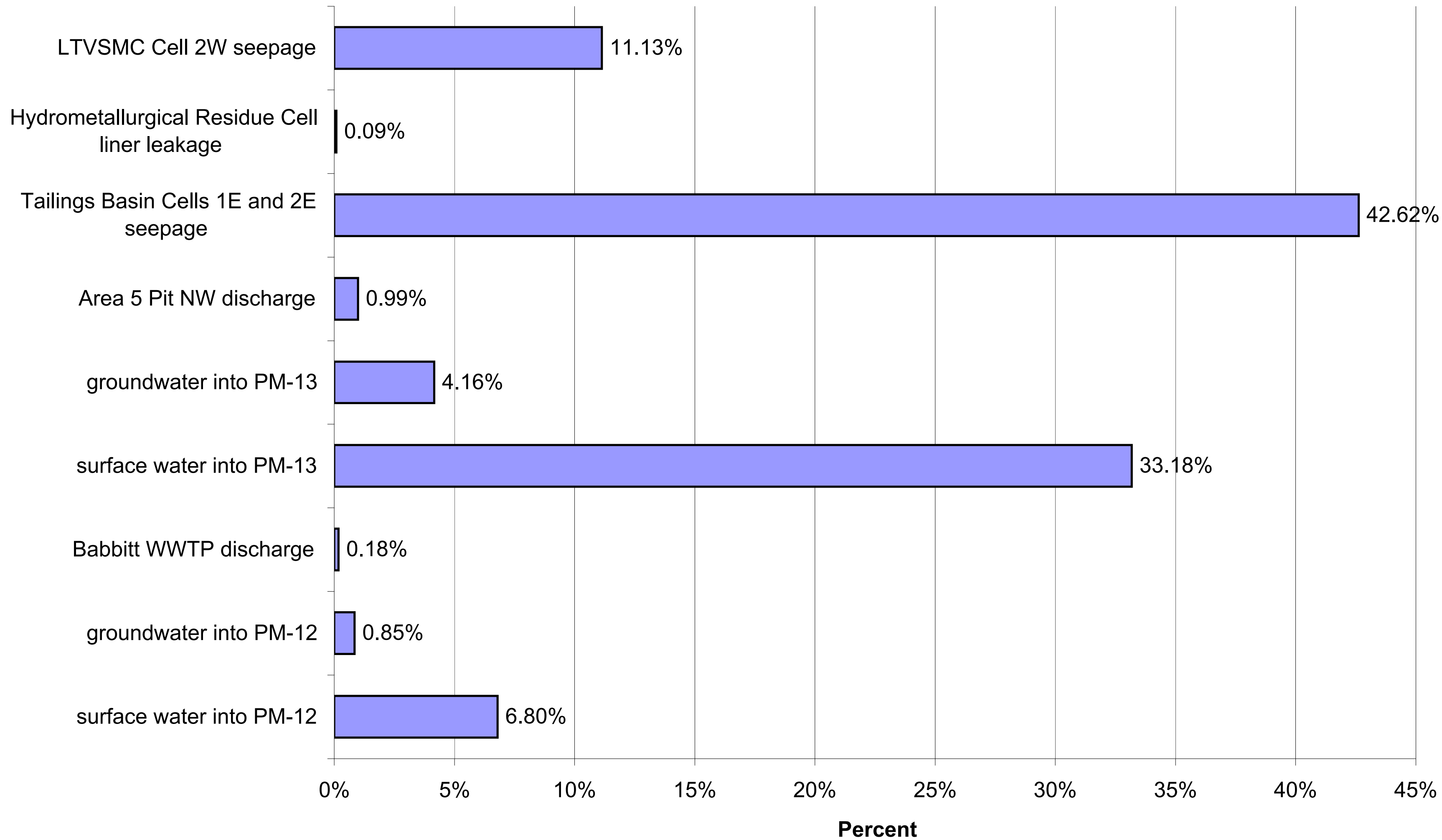
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)

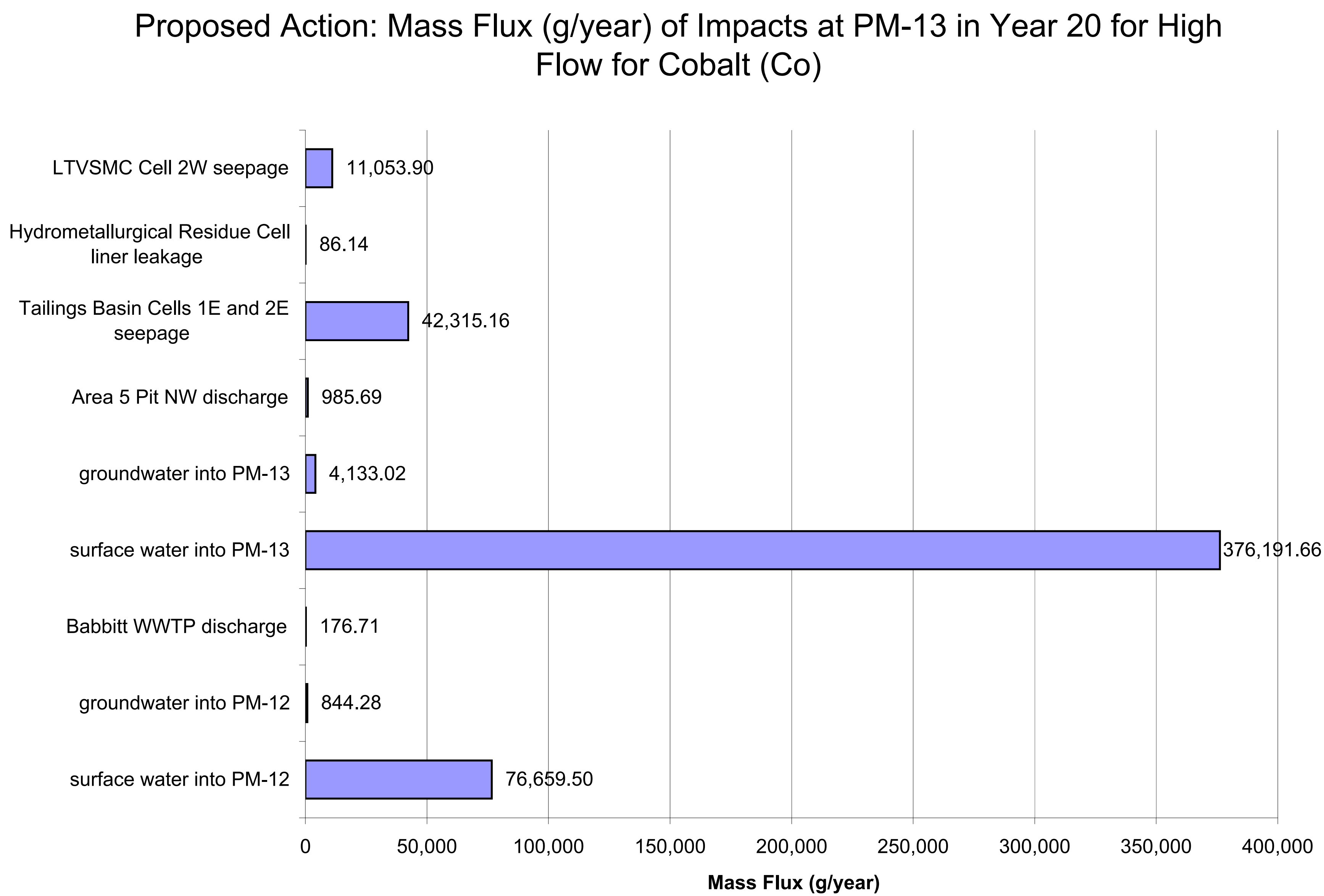


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)

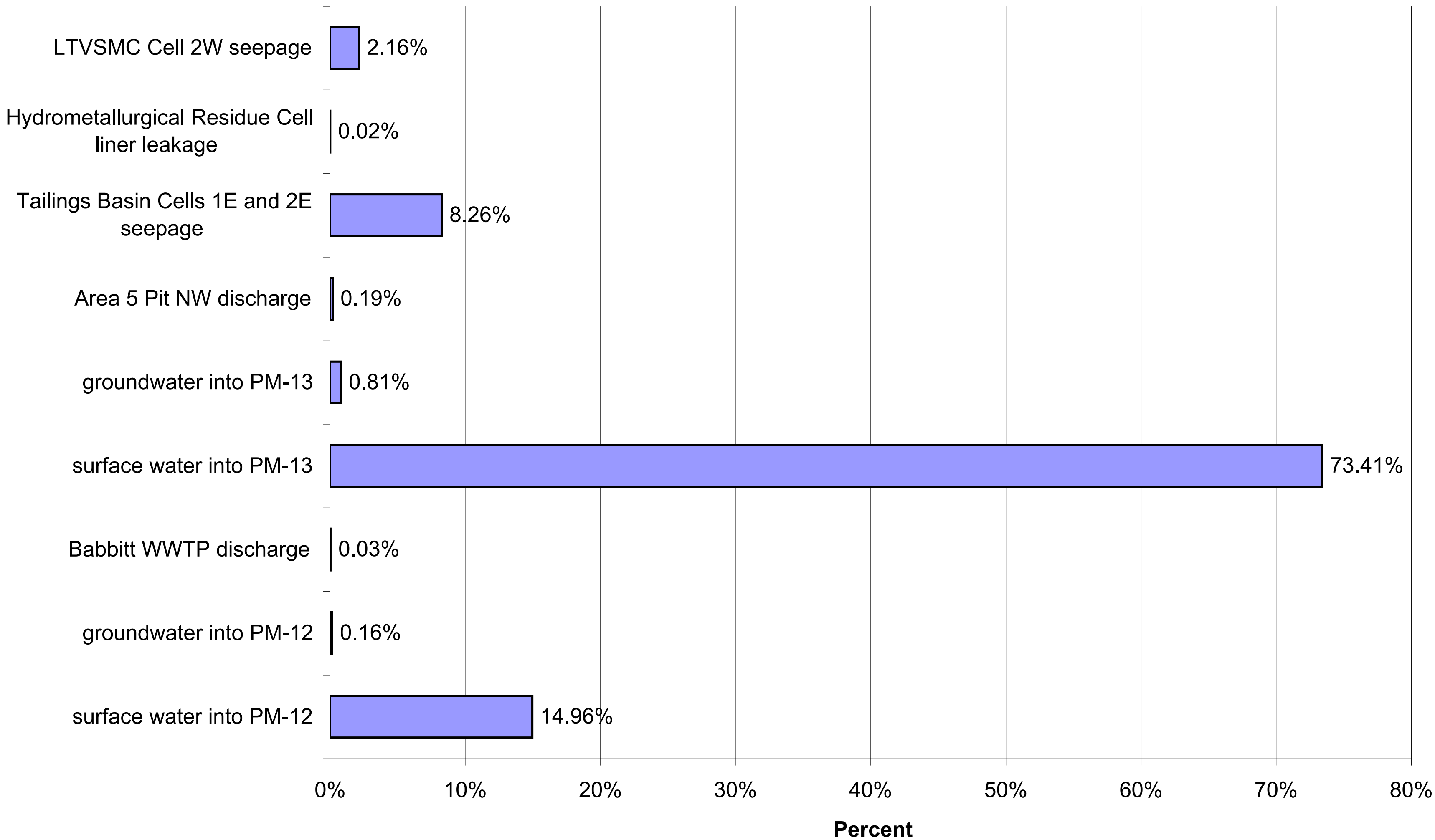


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)

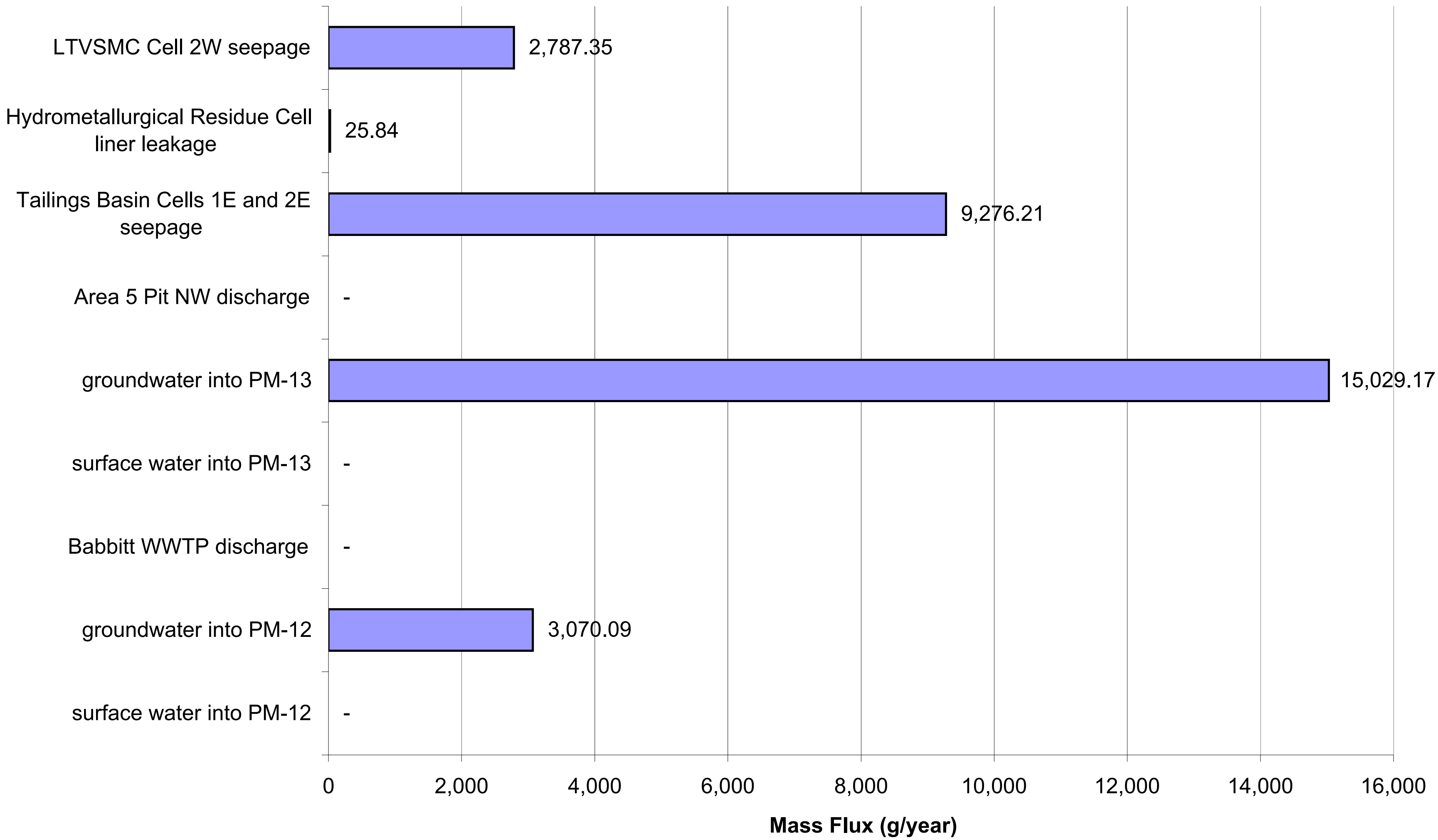



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
86.14
Tailings Basin Cells 1E and 2E seepage
42,315.16
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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)

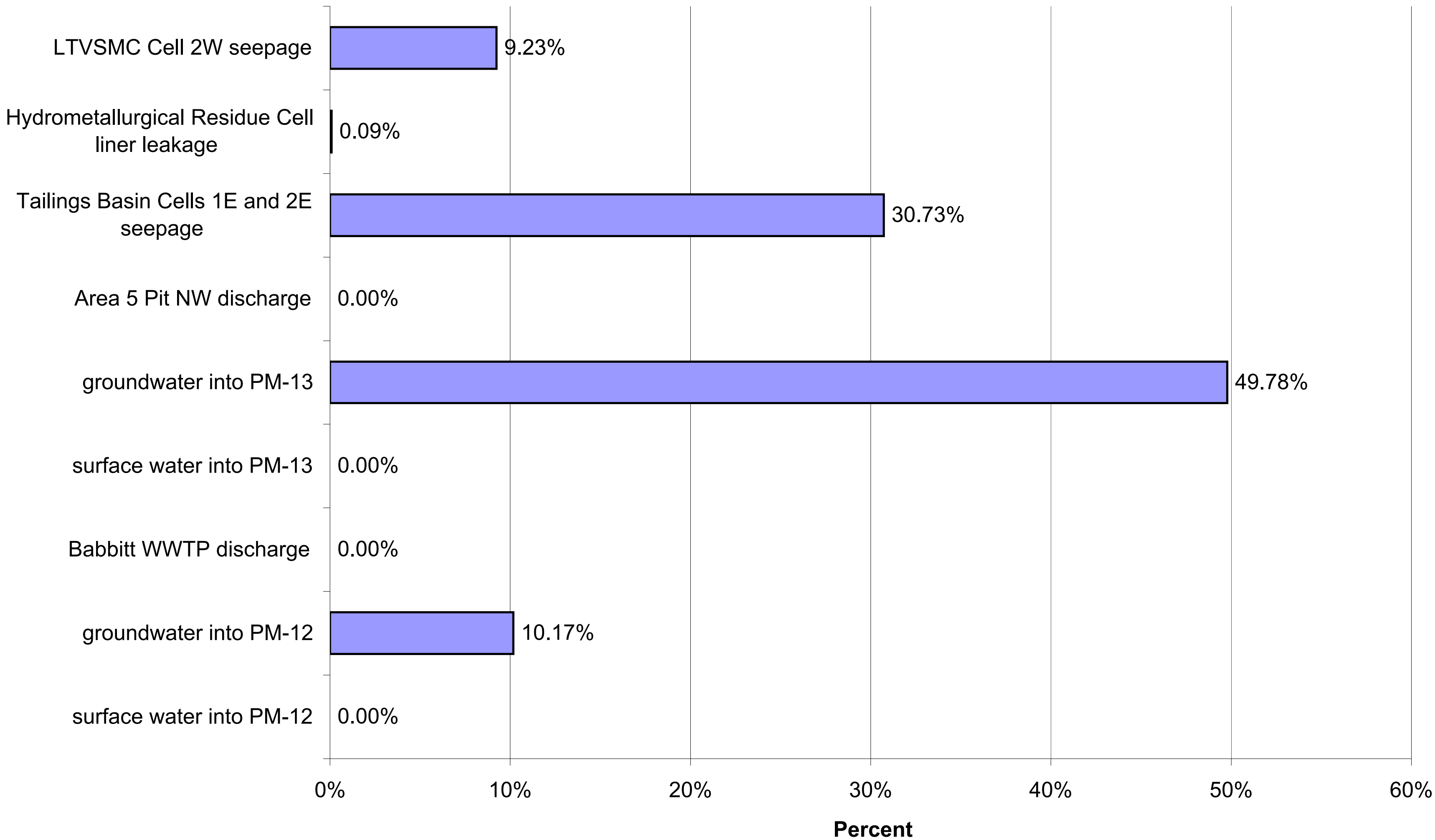
Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)

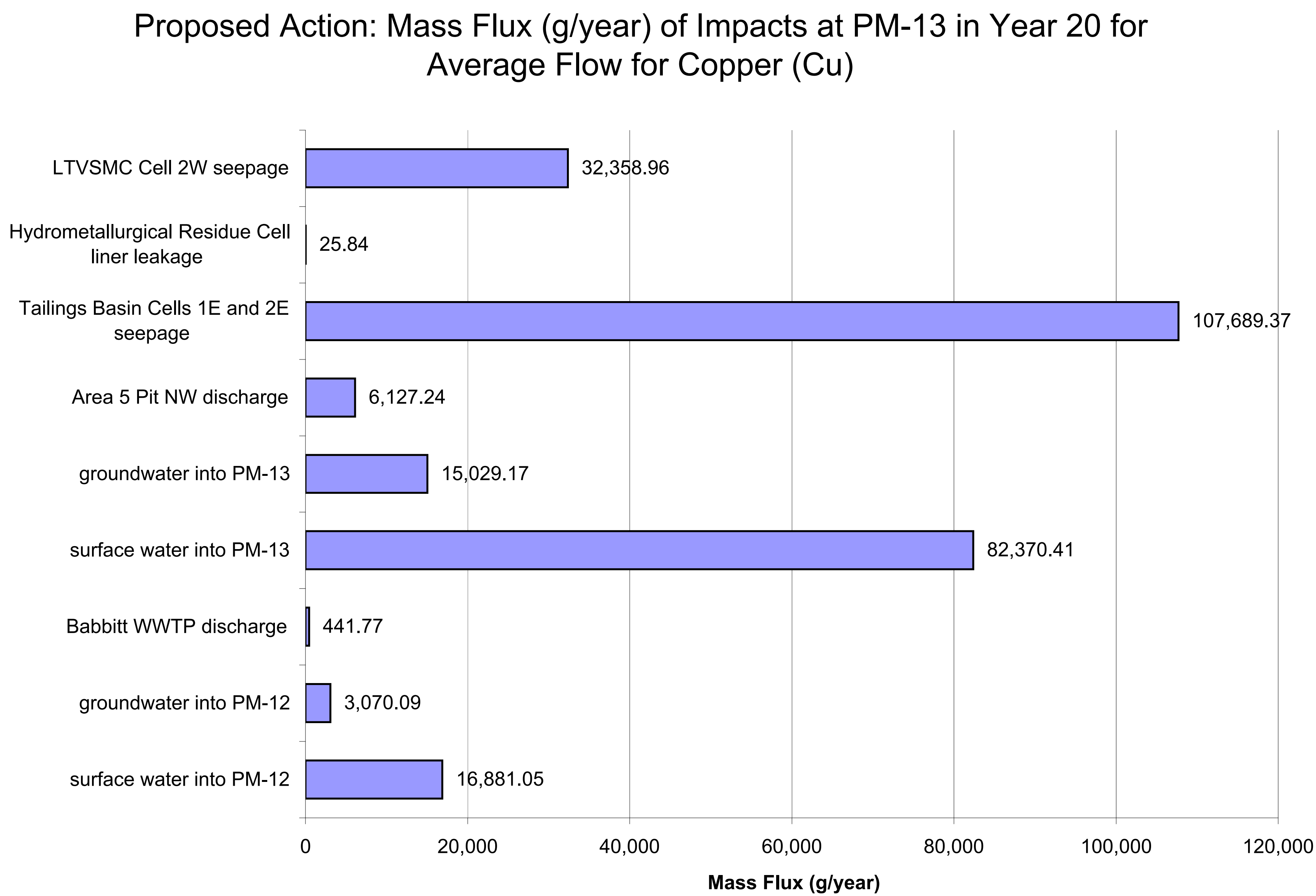


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)

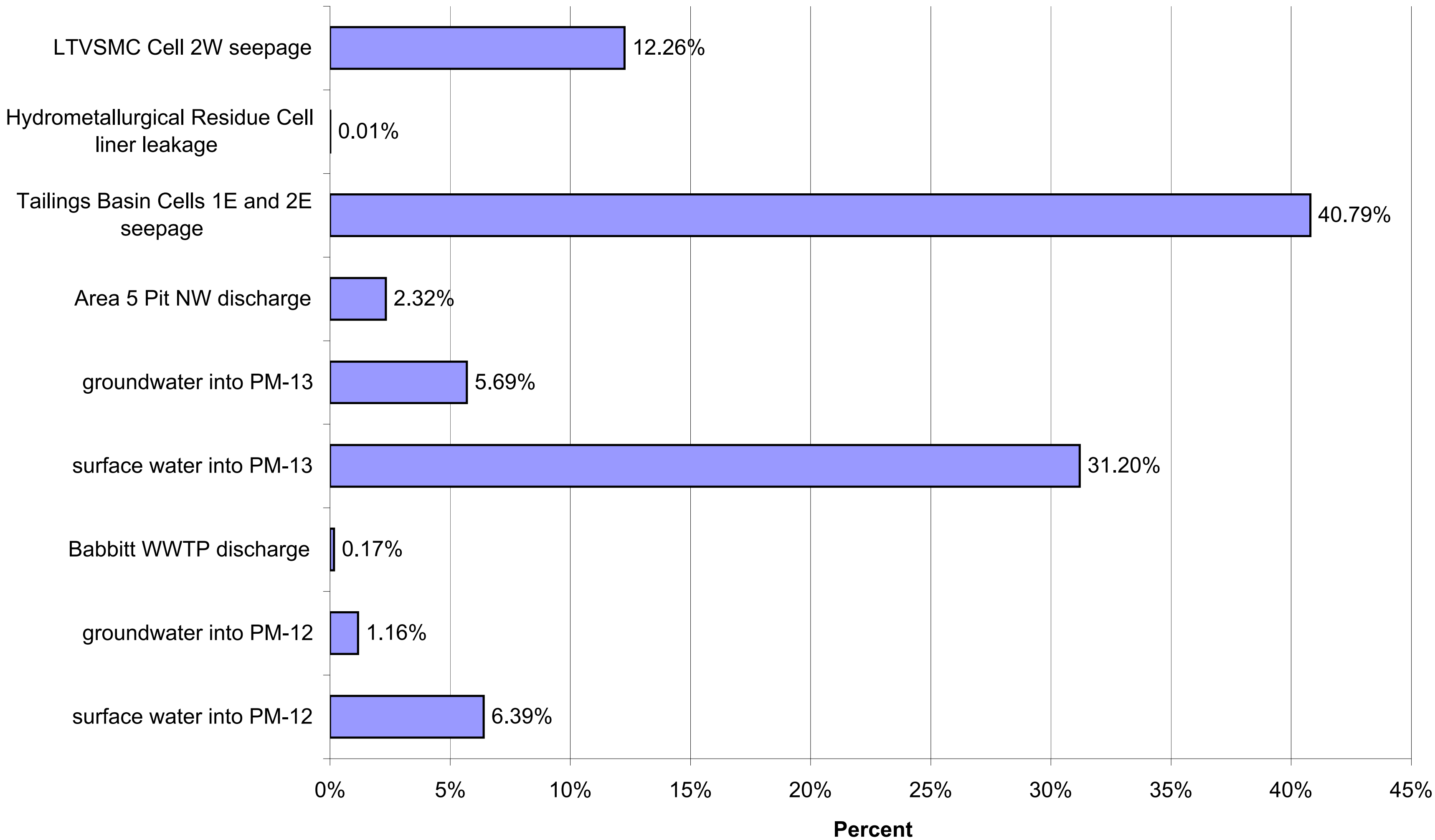


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)

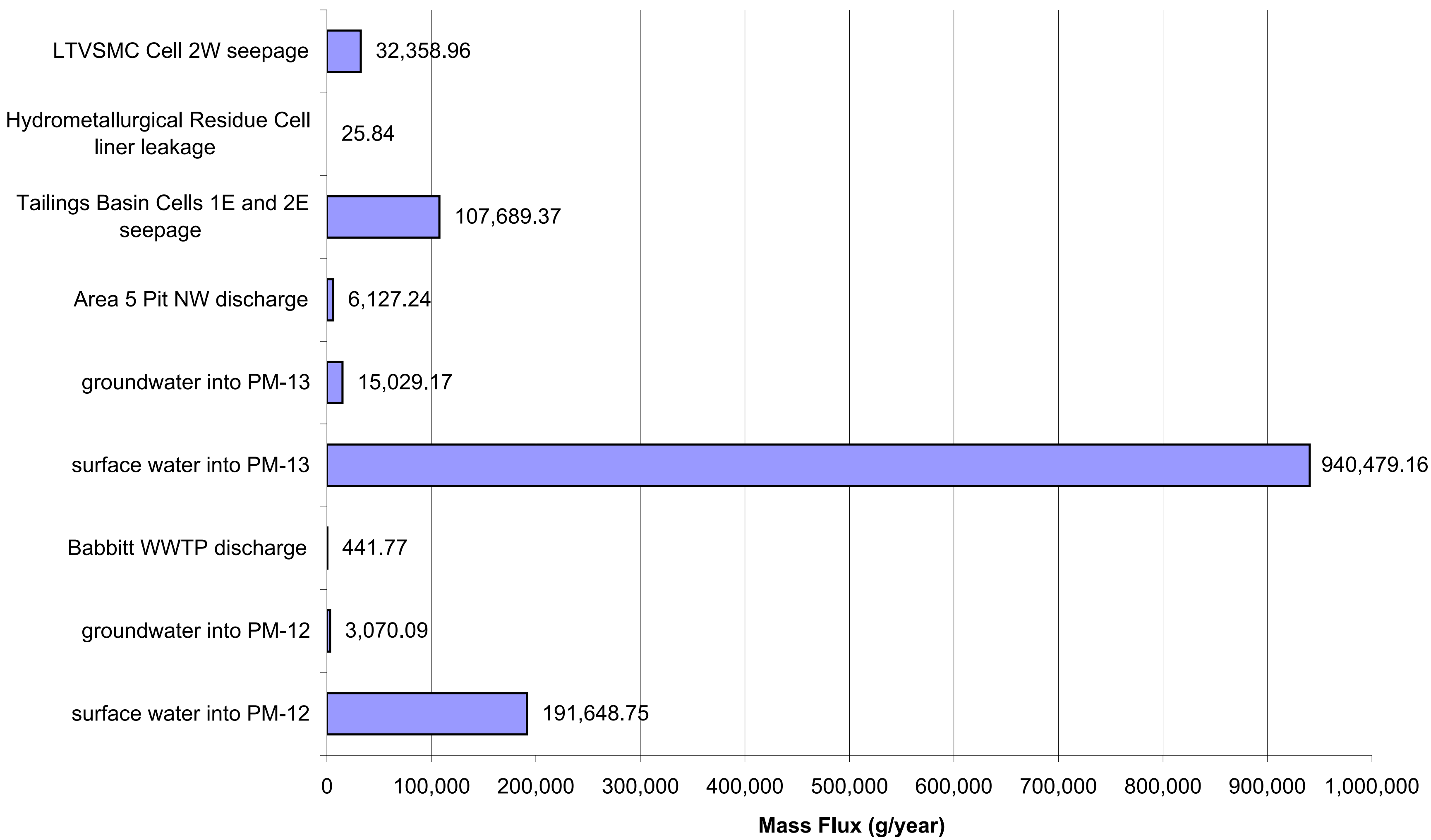


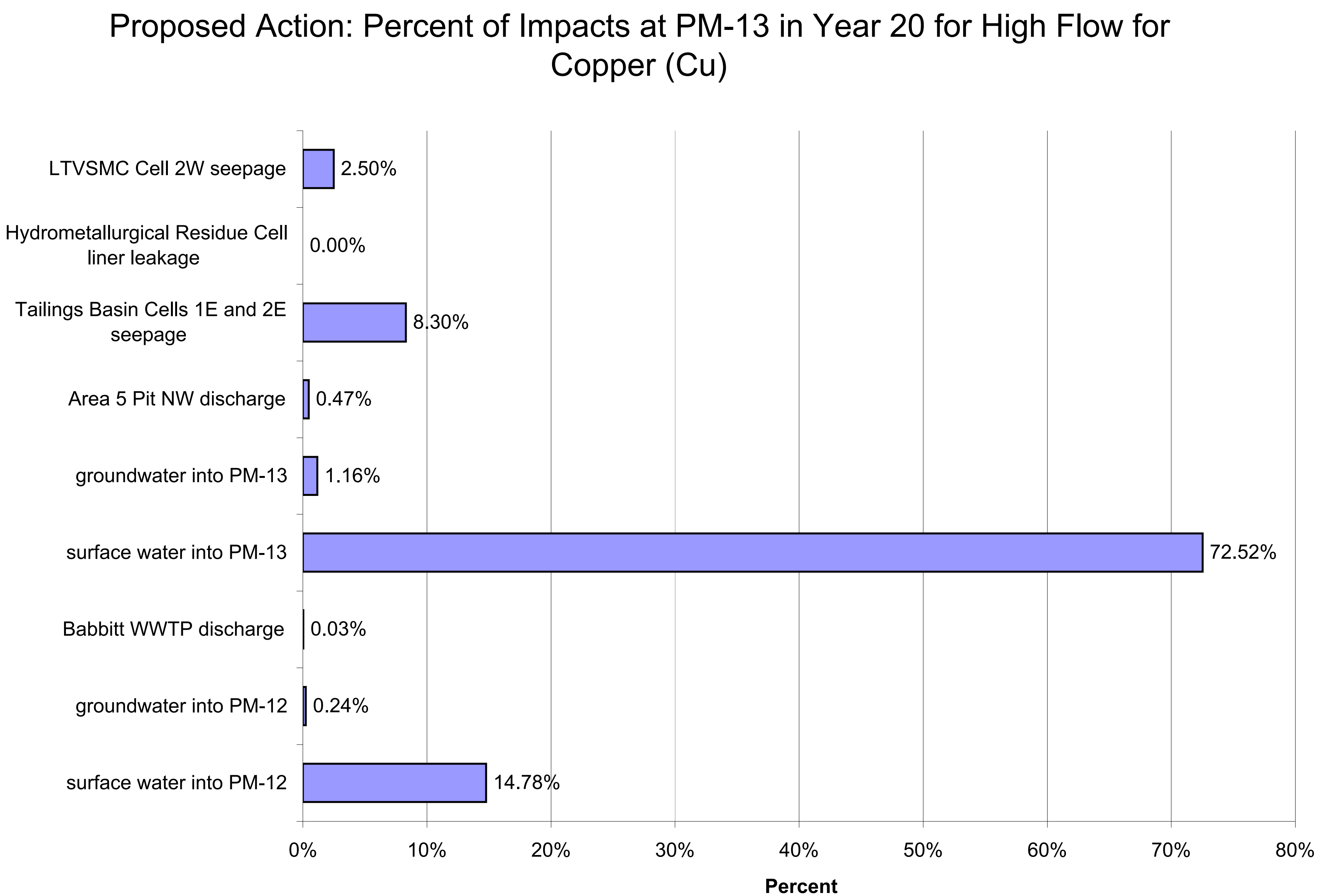

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
32,358.96
Hydrometallurgical Residue Cell liner leakage
25.84
Tailings Basin Cells 1E and 2E seepage
107,689.37
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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)

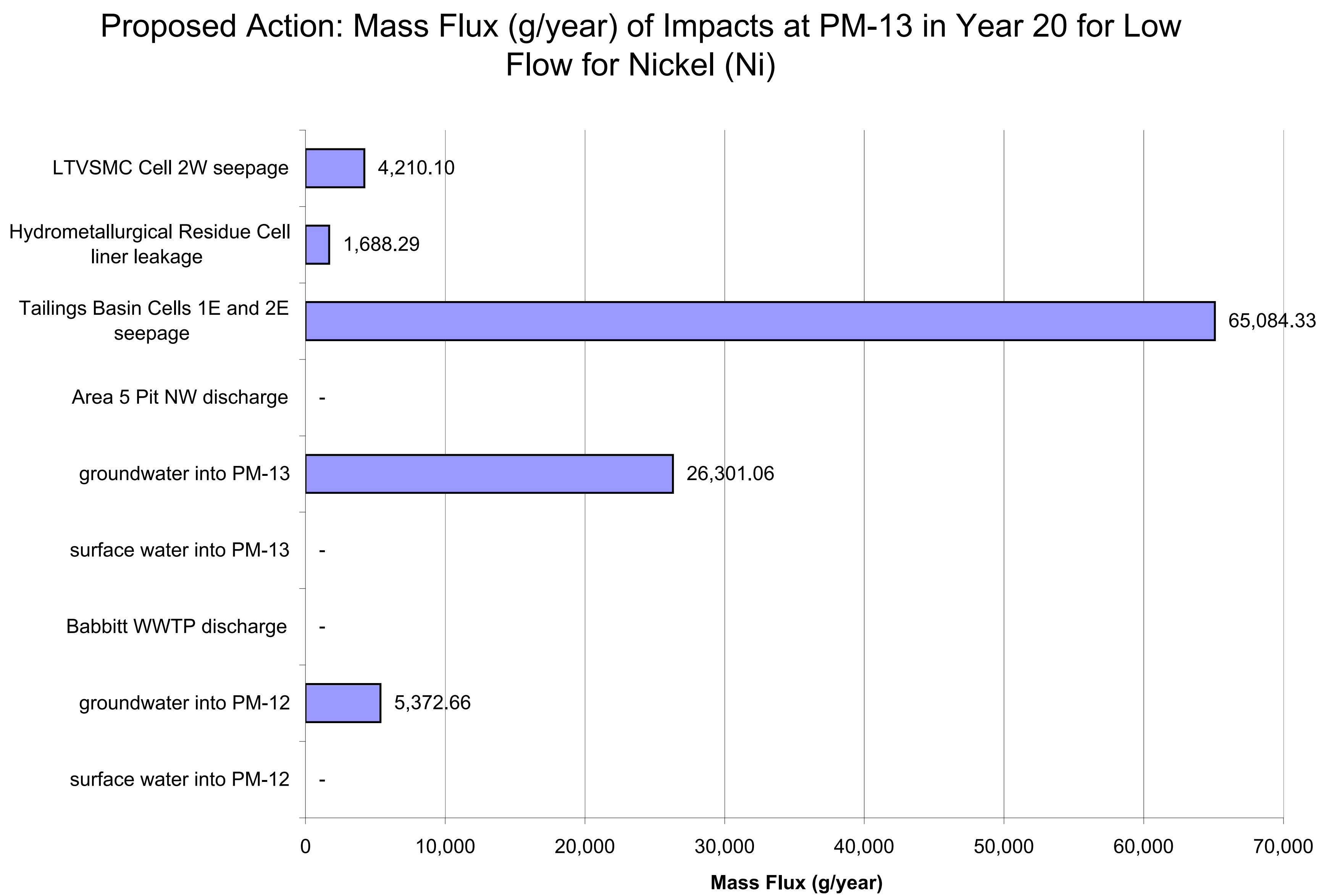
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)



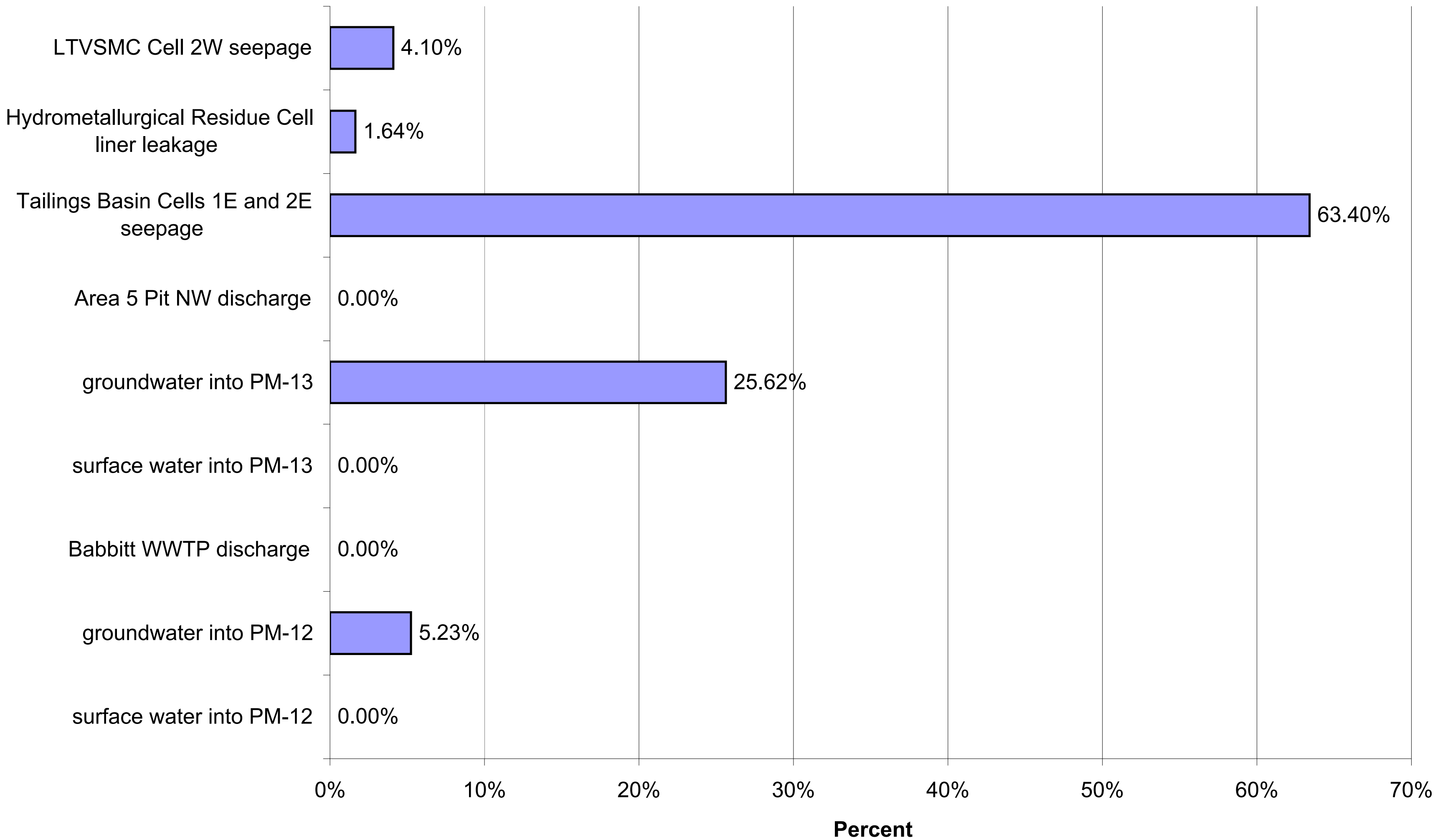
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)

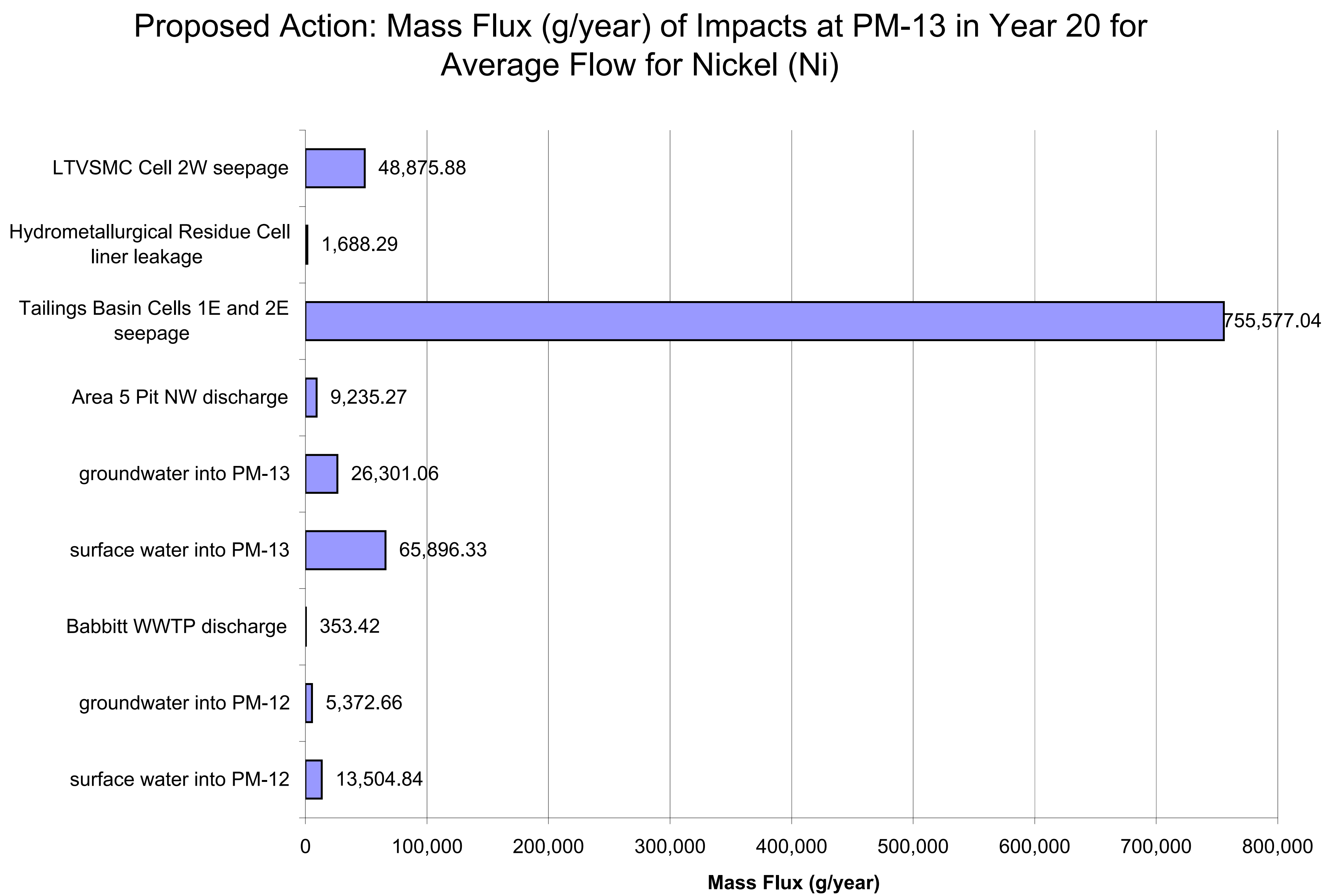


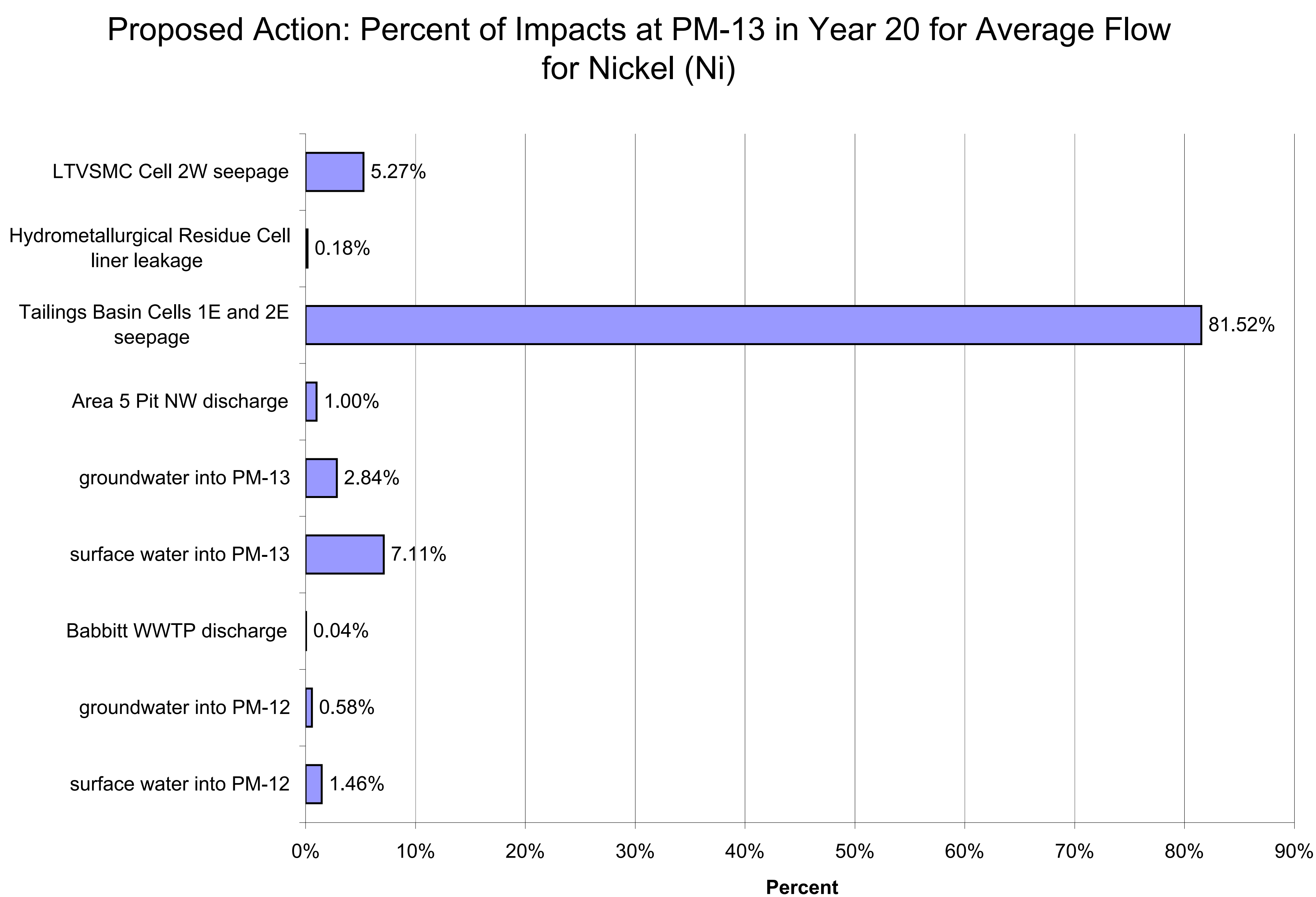

Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
2.50%
Hydrometallurgical Residue Cell liner leakage
0.00%
Tailings Basin Cells 1E and 2E seepage
8.30%
Area 5 Pit NW discharge
0.47%
groundwater into PM-13
1.16%
surface water into PM-13
72.52%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.24%
surface water into PM-12
14.78%
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 Nickel (Ni)
LTVSMC Cell 2W seepage
4,210.10
Hydrometallurgical Residue Cell liner leakage
1,688.29
Tailings Basin Cells 1E and 2E seepage
65,084.33
Area 5 Pit NW discharge
-
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

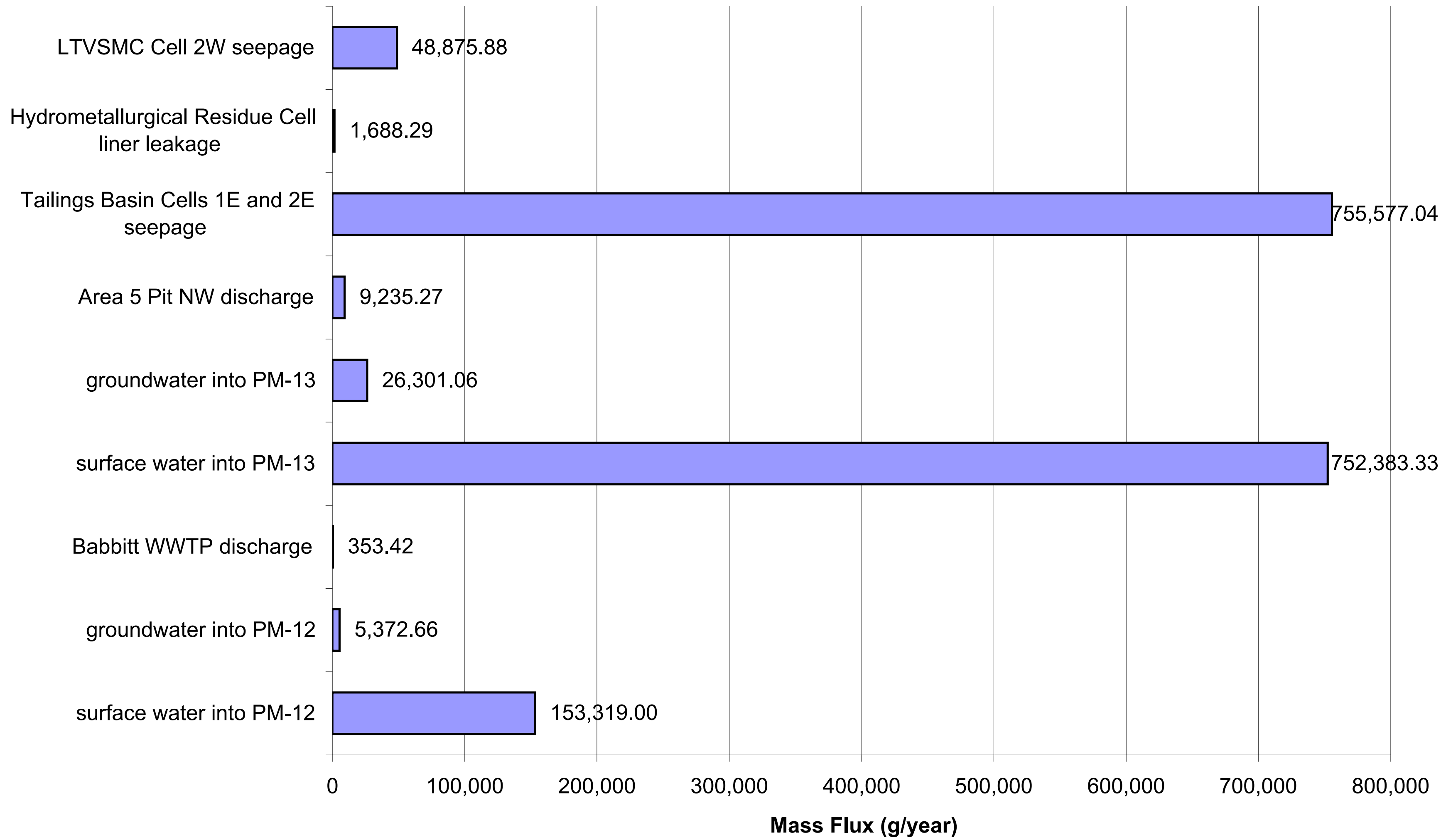
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Nickel (Ni)



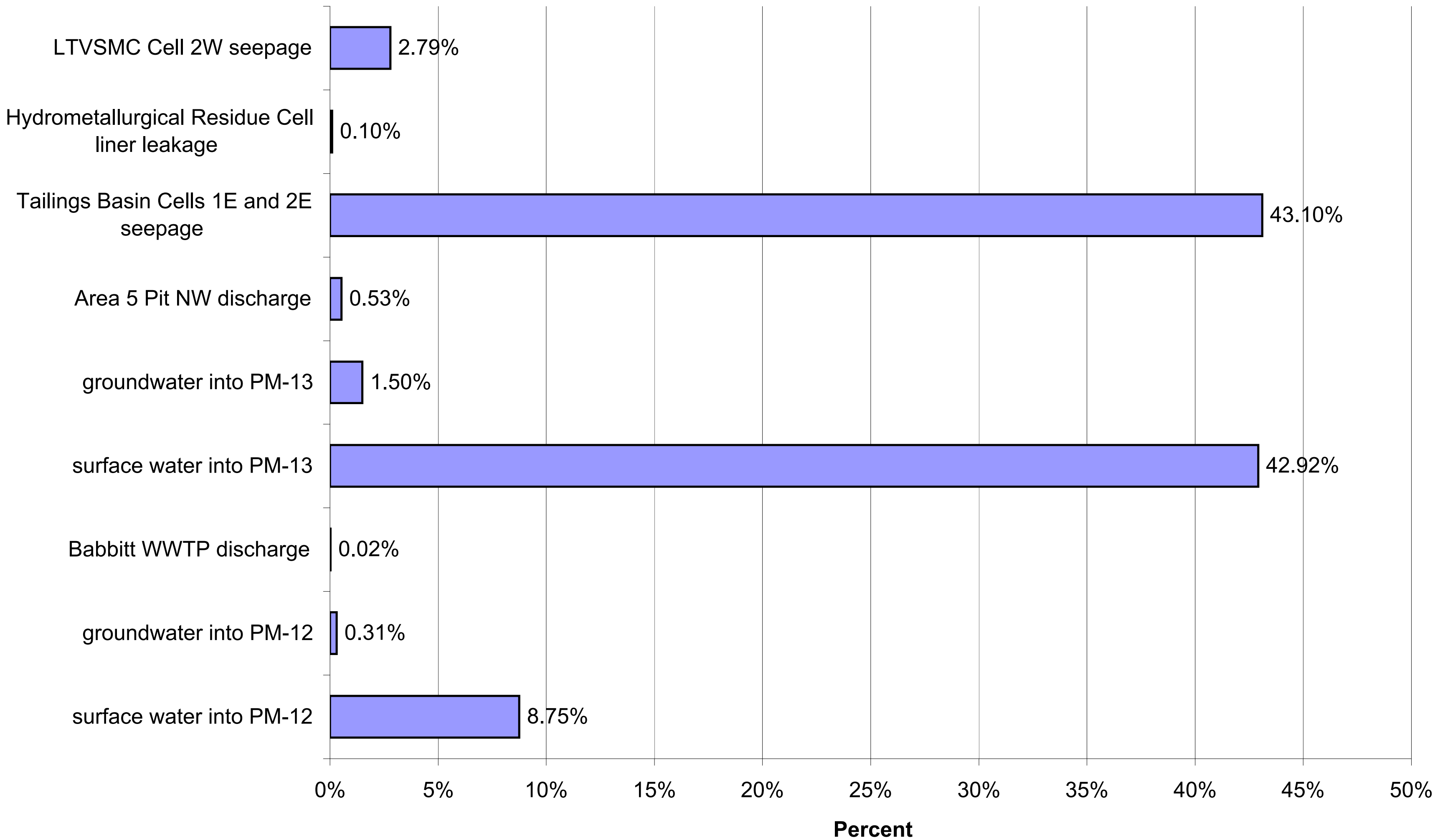

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,688.29
Tailings Basin Cells 1E and 2E seepage
755,577.04
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5.27%
Hydrometallurgical Residue Cell liner leakage
0.18%
Tailings Basin Cells 1E and 2E seepage
81.52%
Area 5 Pit NW discharge
1.00%
groundwater into PM-13
2.84%
surface water into PM-13
7.11%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.58%
surface water into PM-12
1.46%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

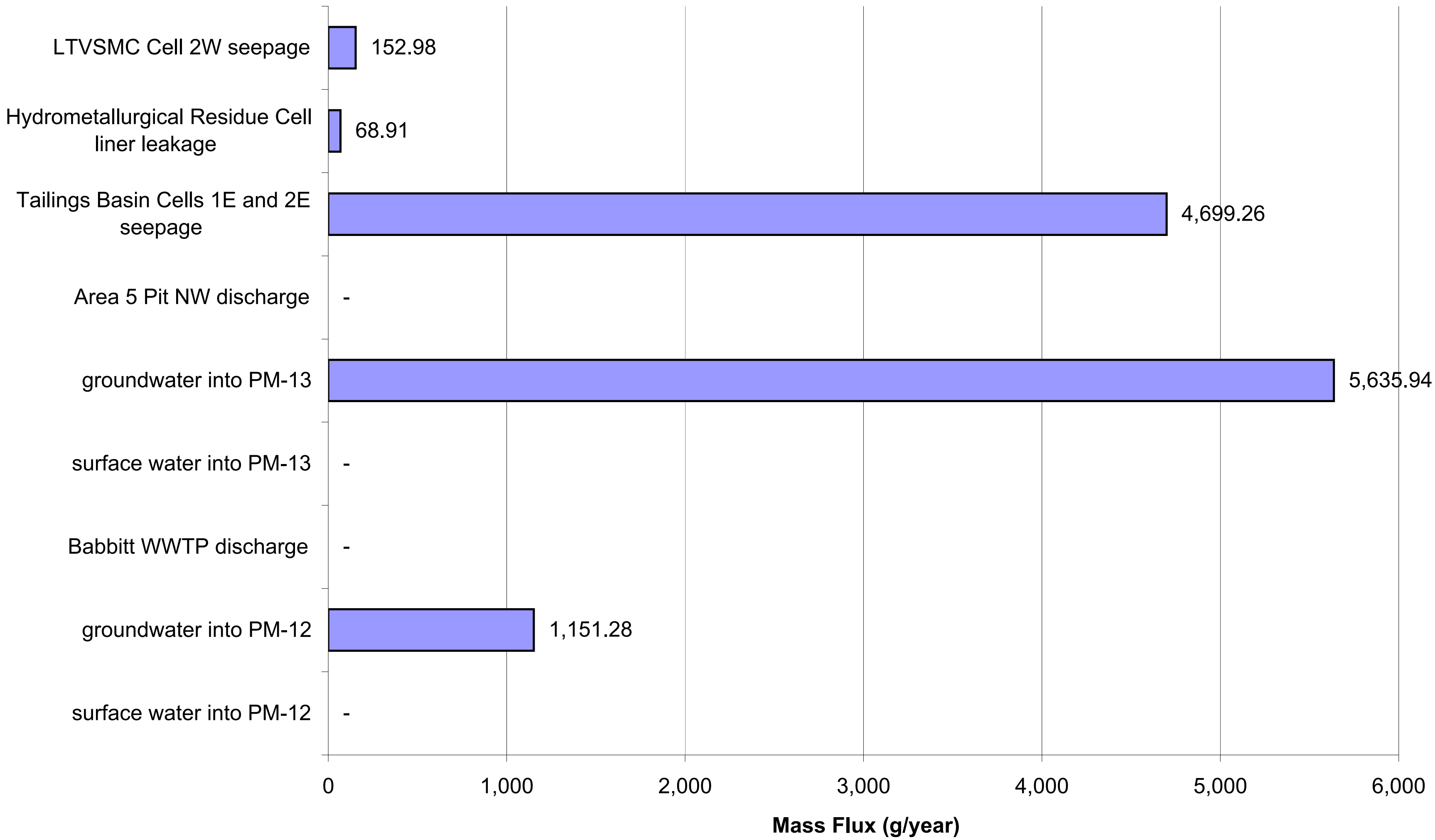
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)

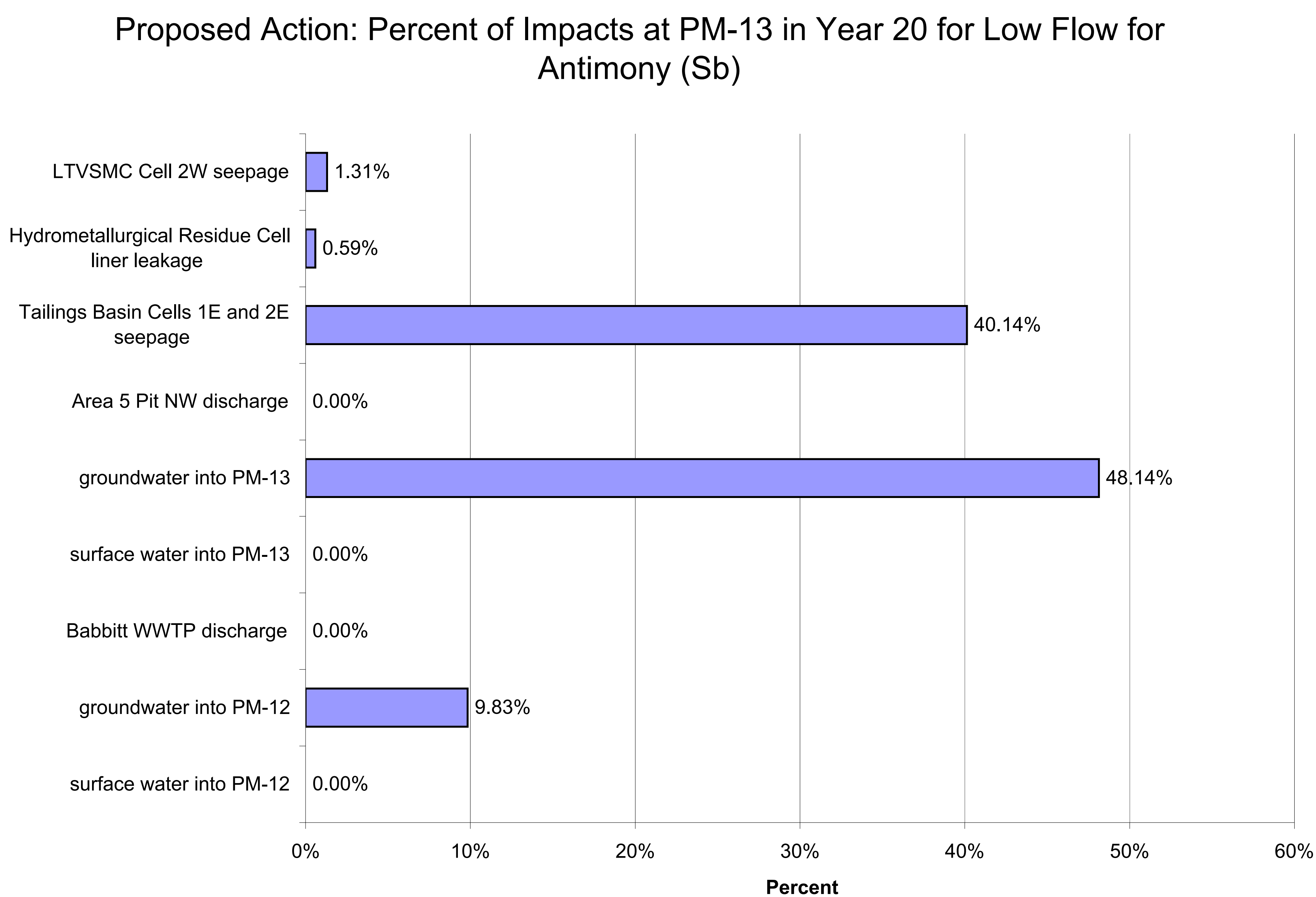


Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)

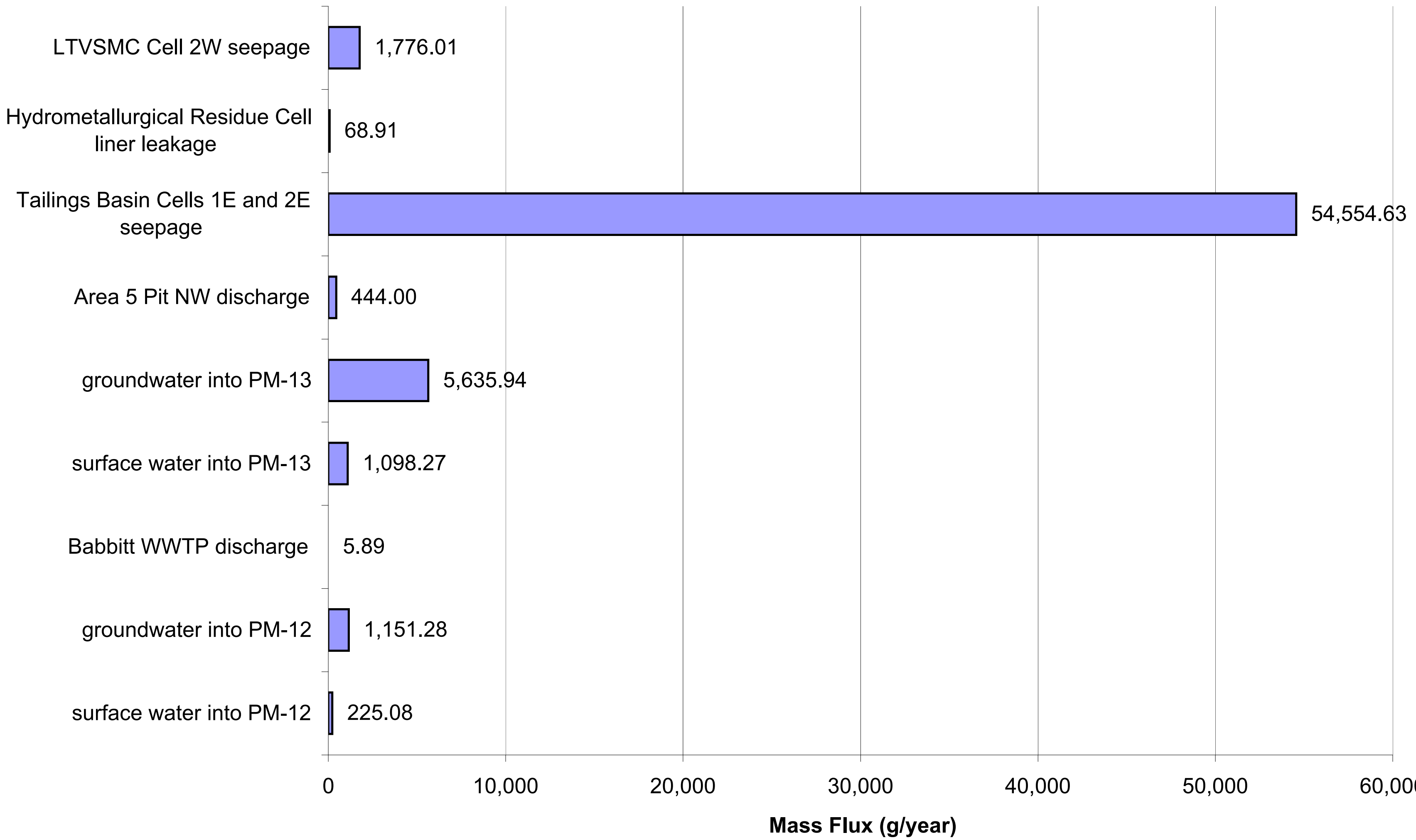


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)

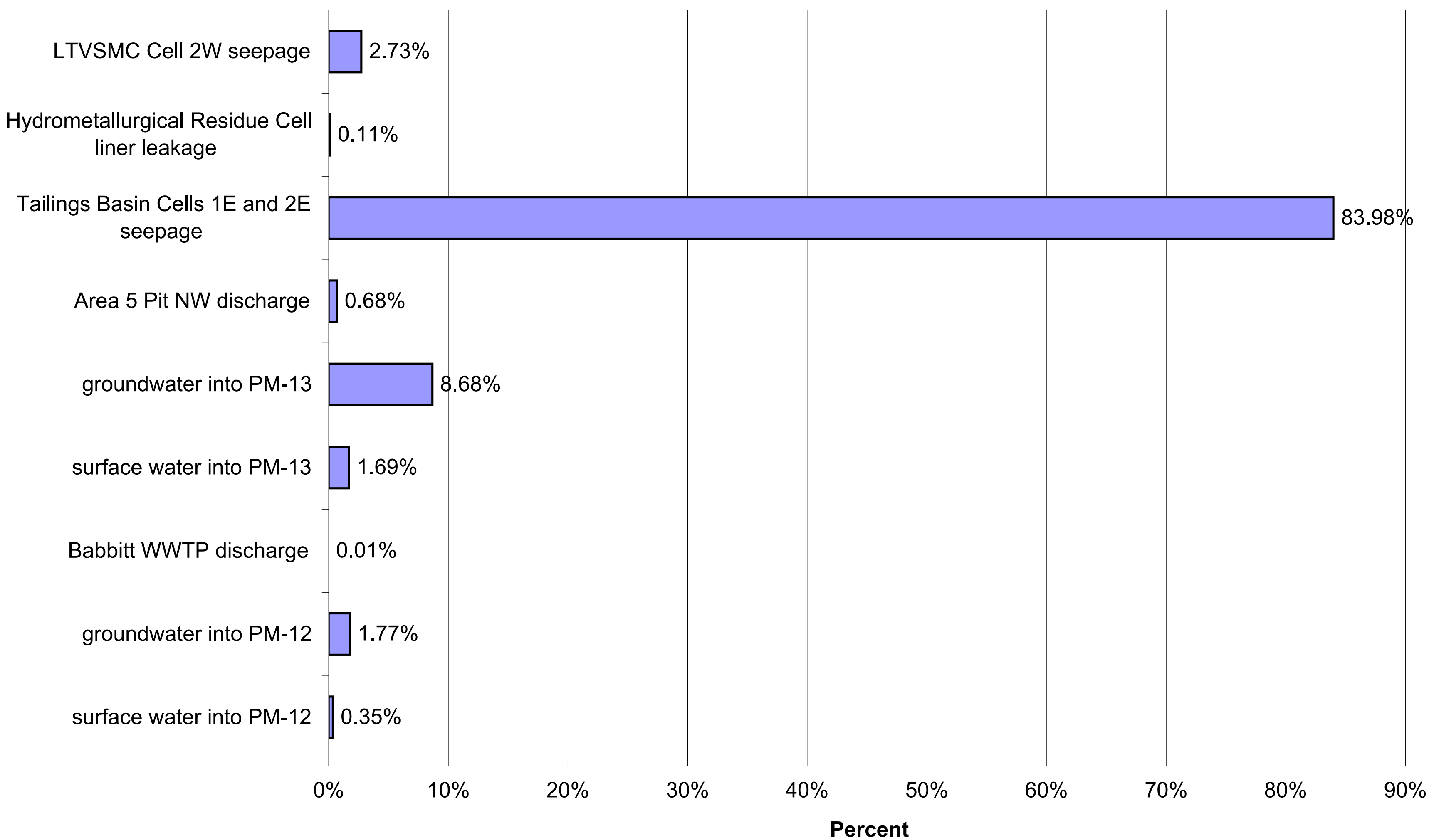


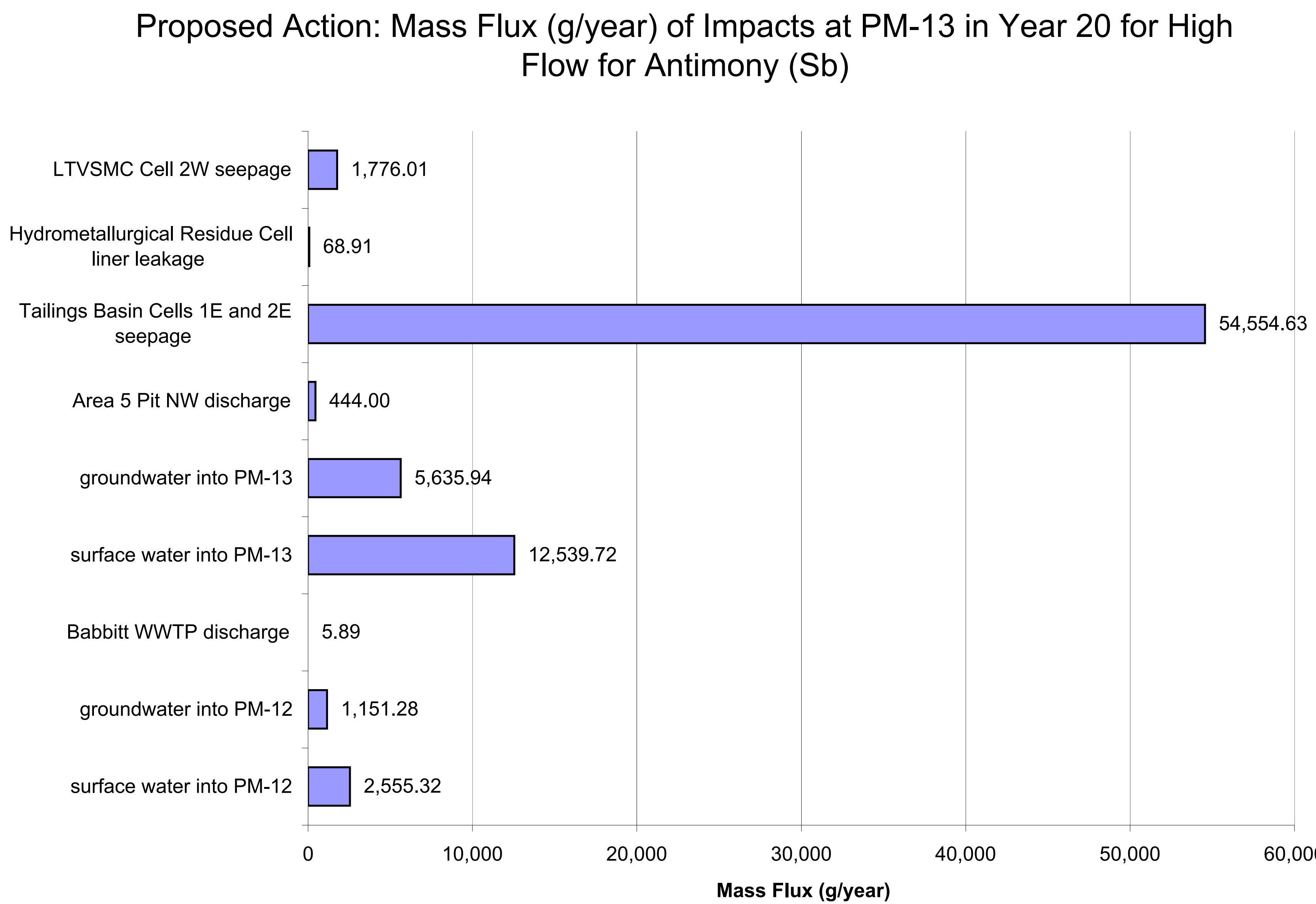

Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.31%
Hydrometallurgical Residue Cell liner leakage
0.59%
Tailings Basin Cells 1E and 2E seepage
40.14%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
48.14%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
9.83%
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 20 for Average Flow for Antimony (Sb)

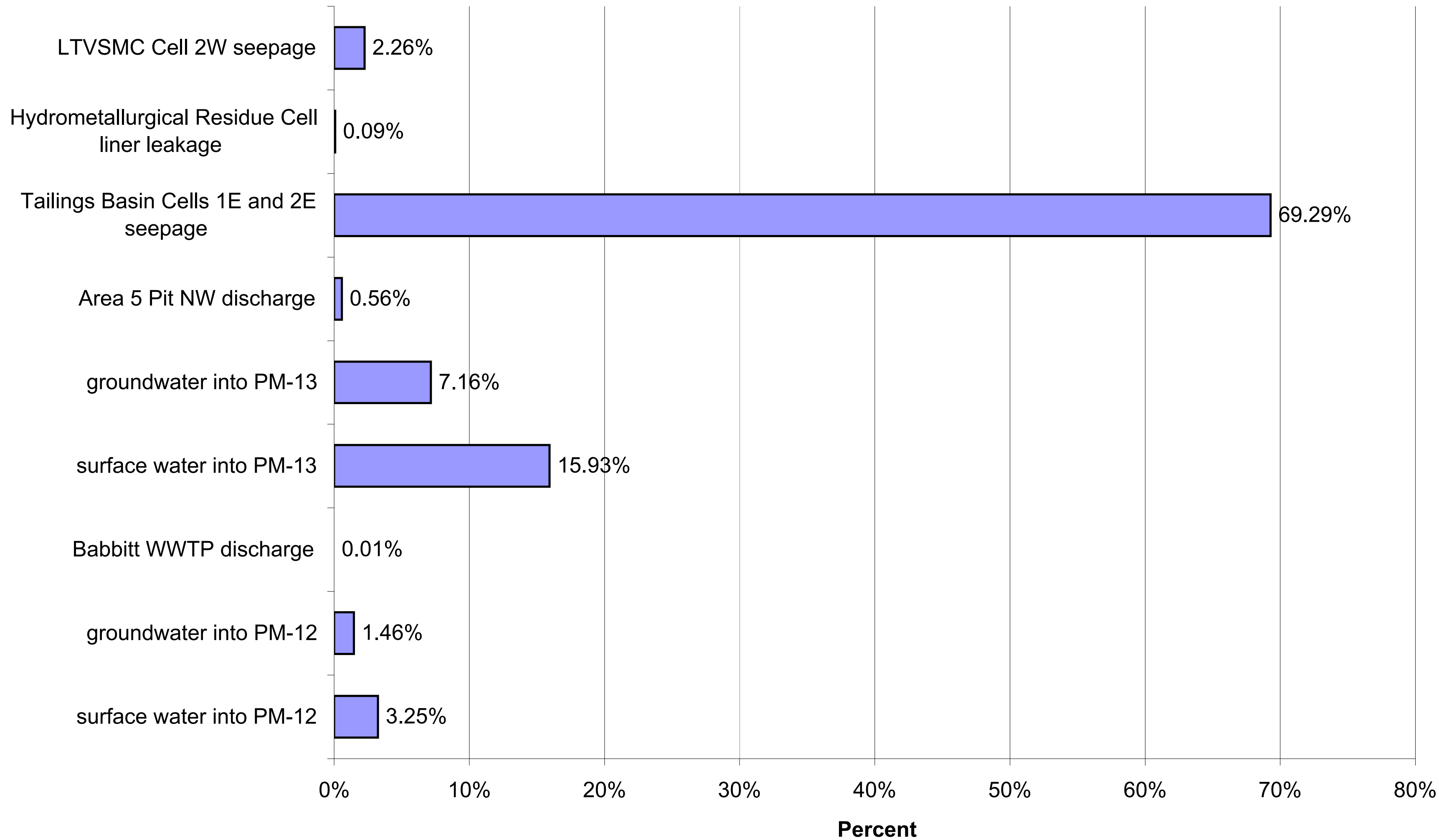


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Antimony (Sb)

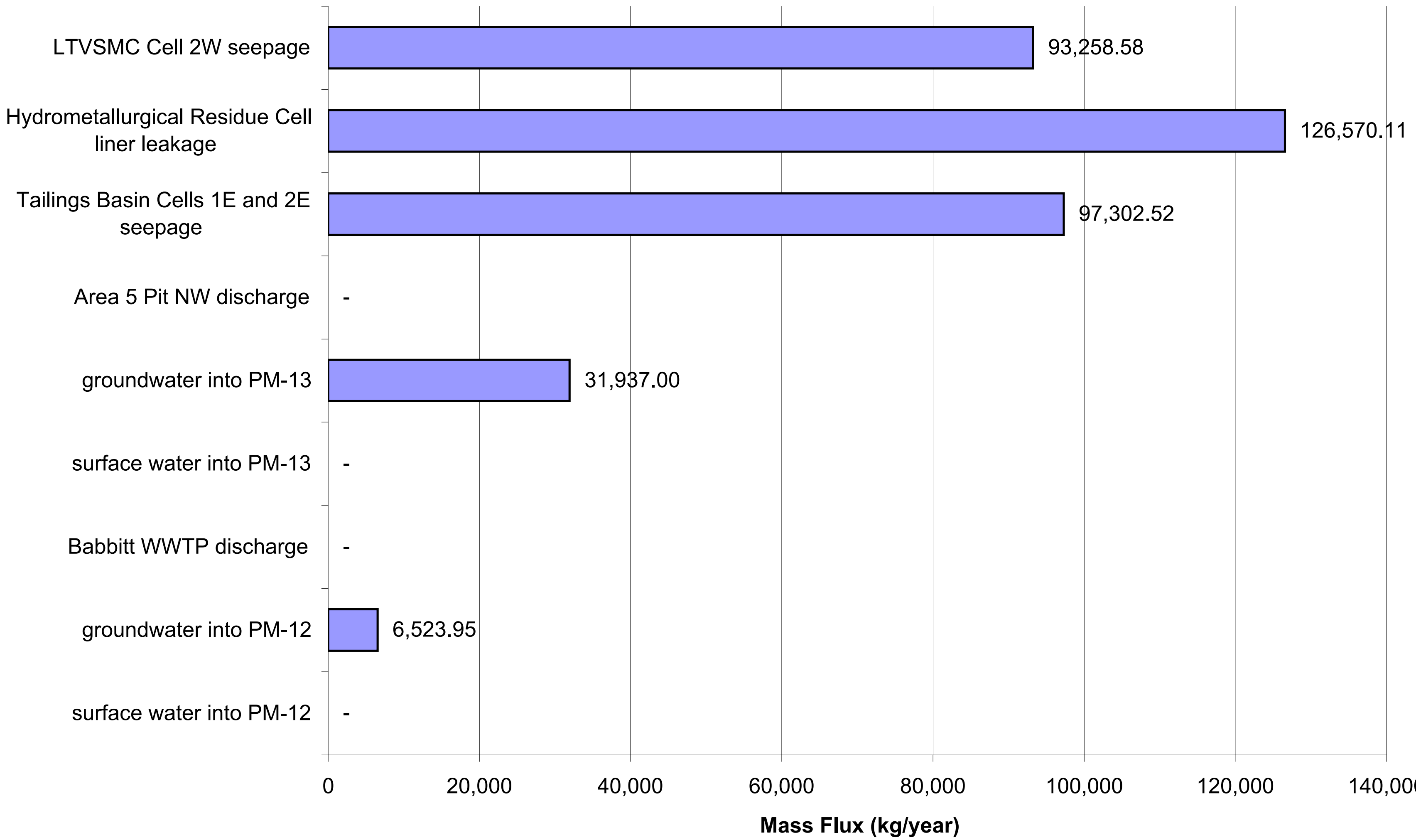



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
68.91
Tailings Basin Cells 1E and 2E seepage
54,554.63
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

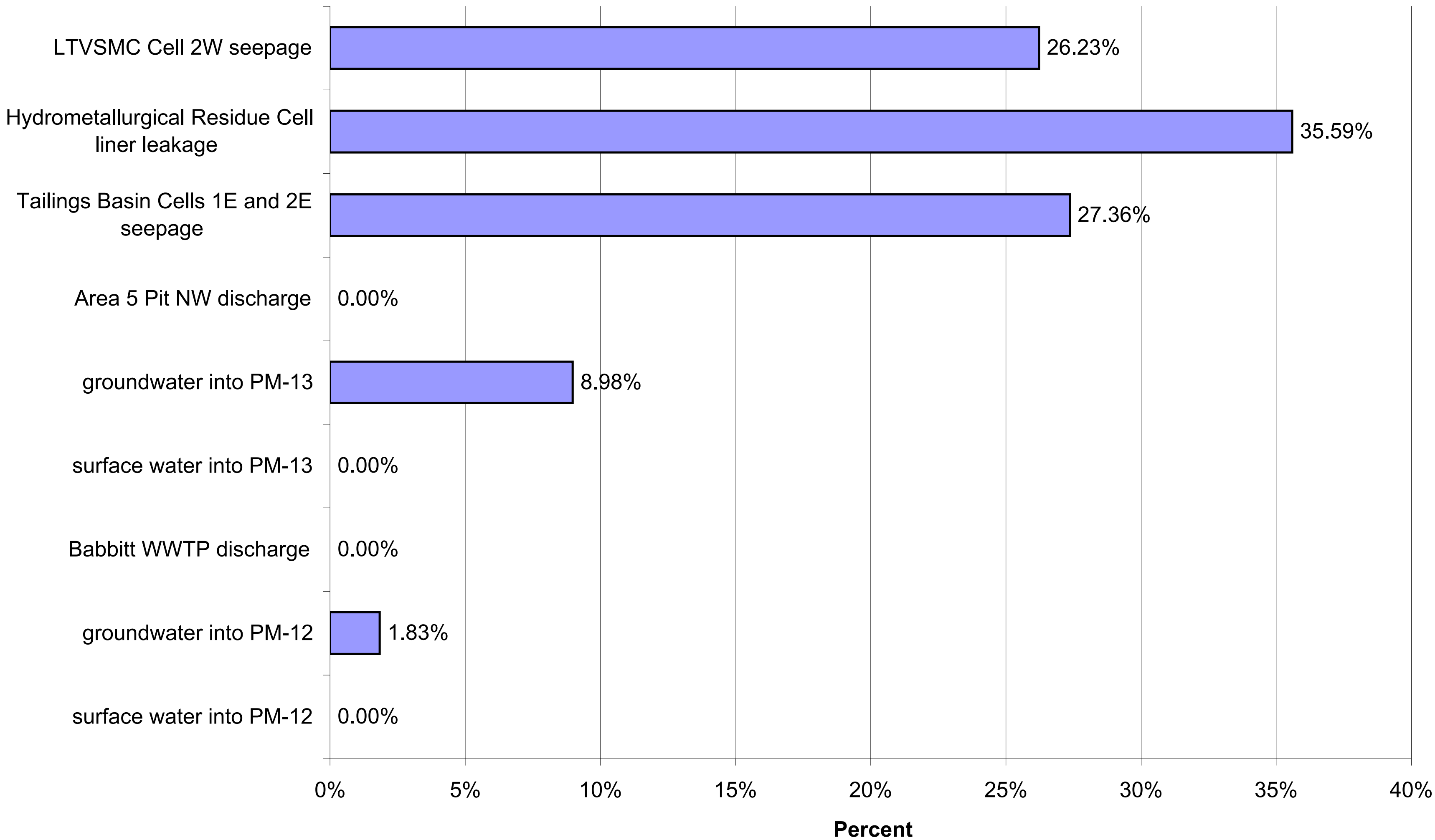
Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)

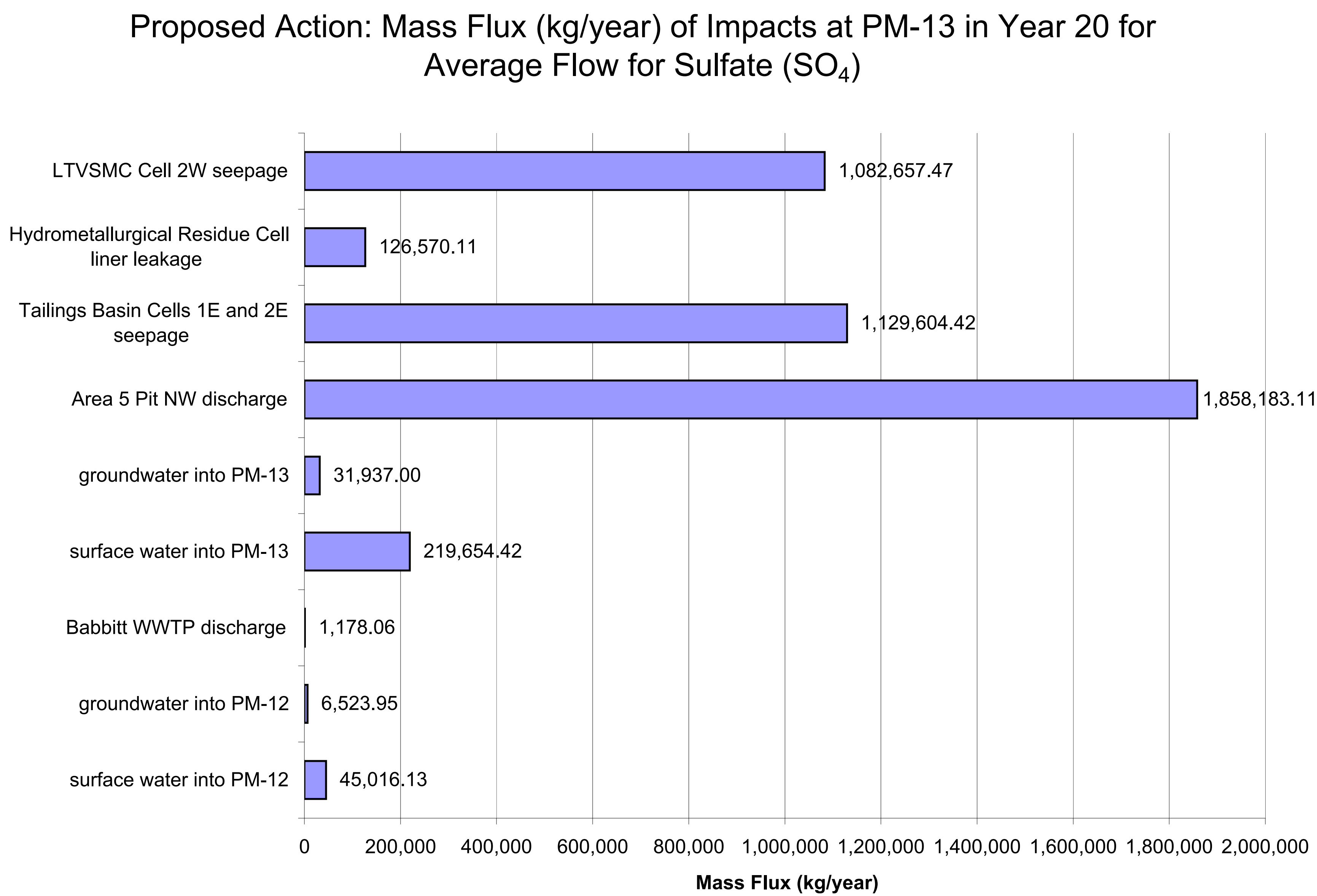


Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)

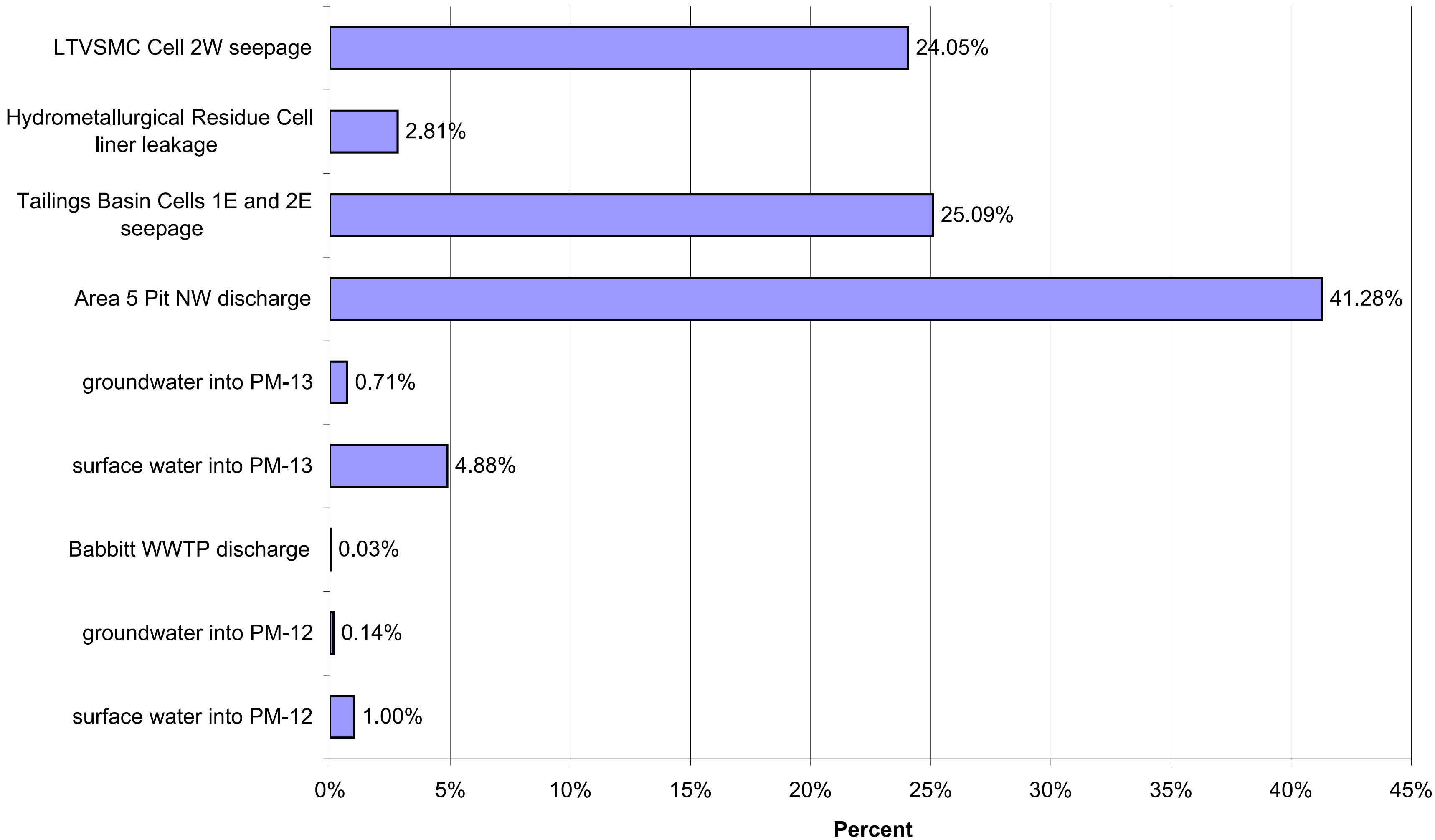


Proposed Action: Percent of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)

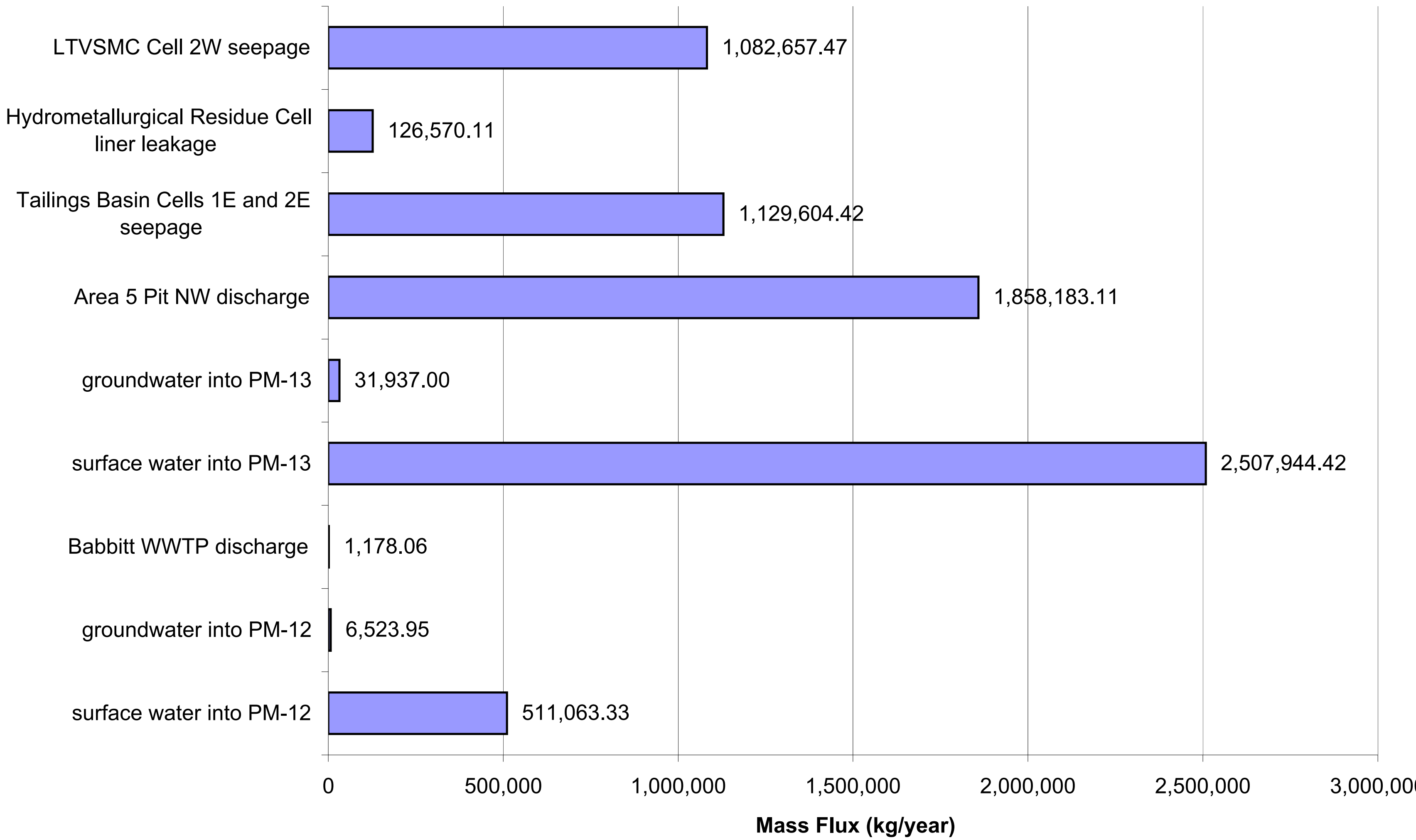



Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
1,082,657.47
Hydrometallurgical Residue Cell liner leakage
126,570.11
Tailings Basin Cells 1E and 2E seepage
1,129,604.42
Area 5 Pit NW discharge
1,858,183.11
groundwater into 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)

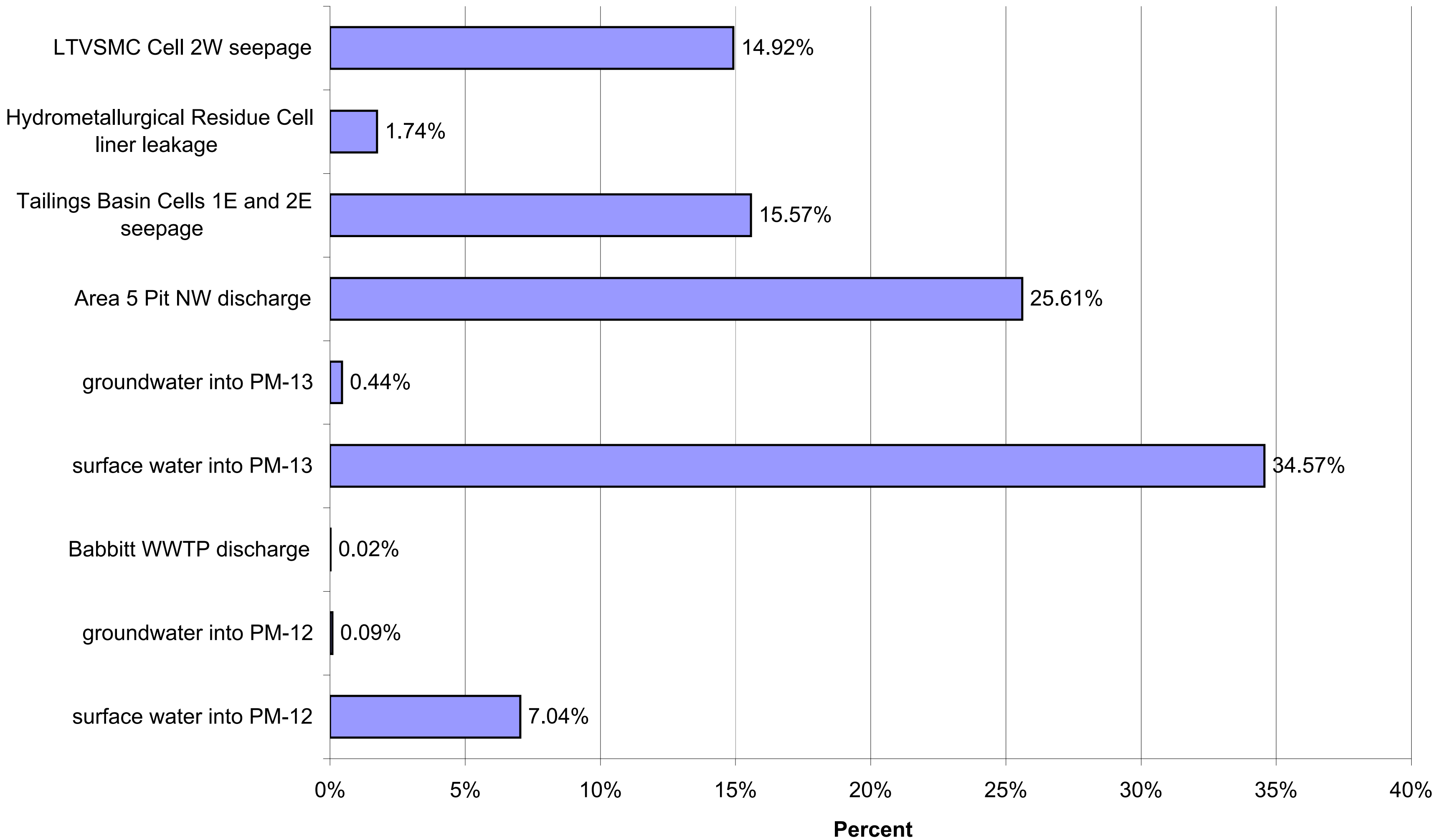
Proposed Action: Percent of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO_4)

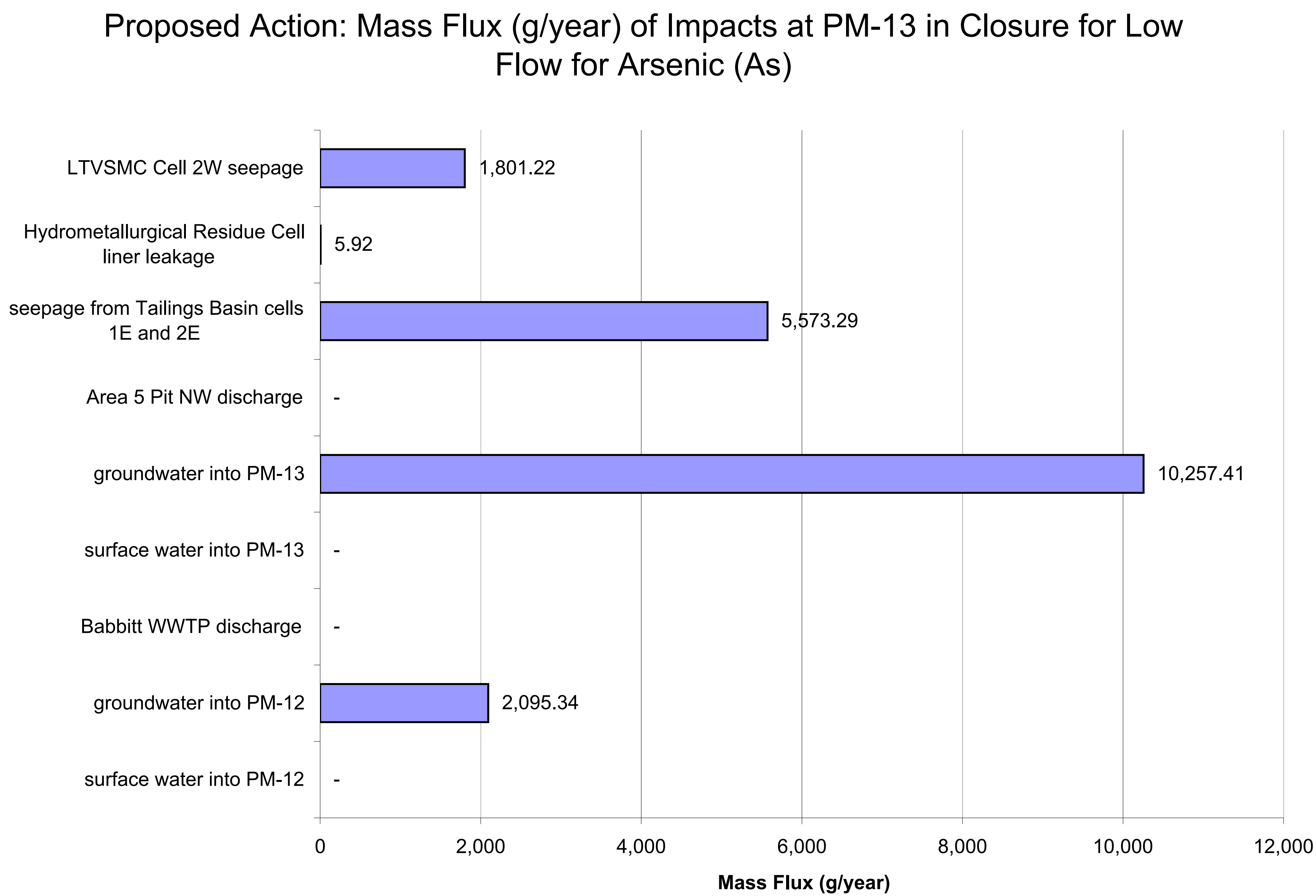


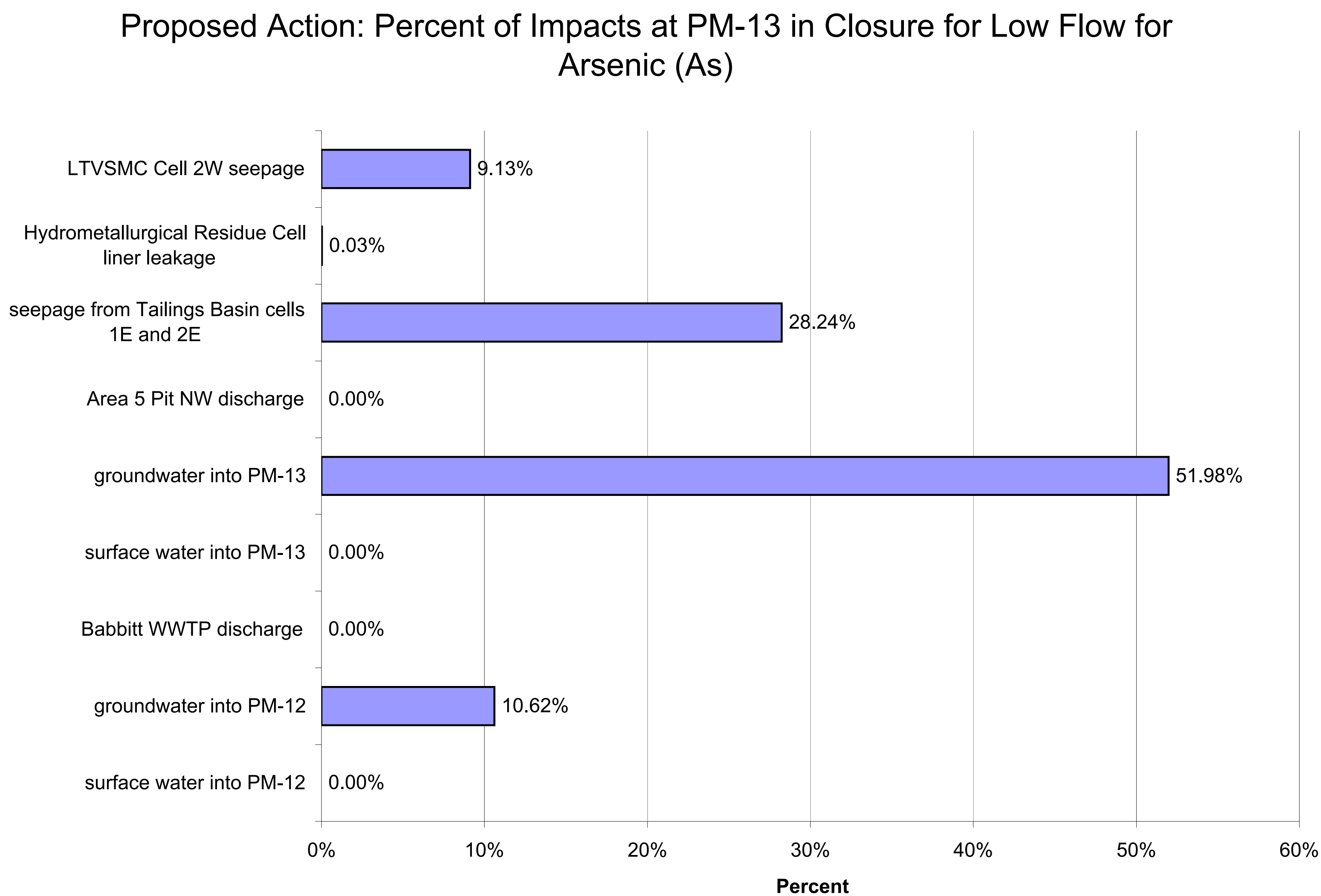
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)



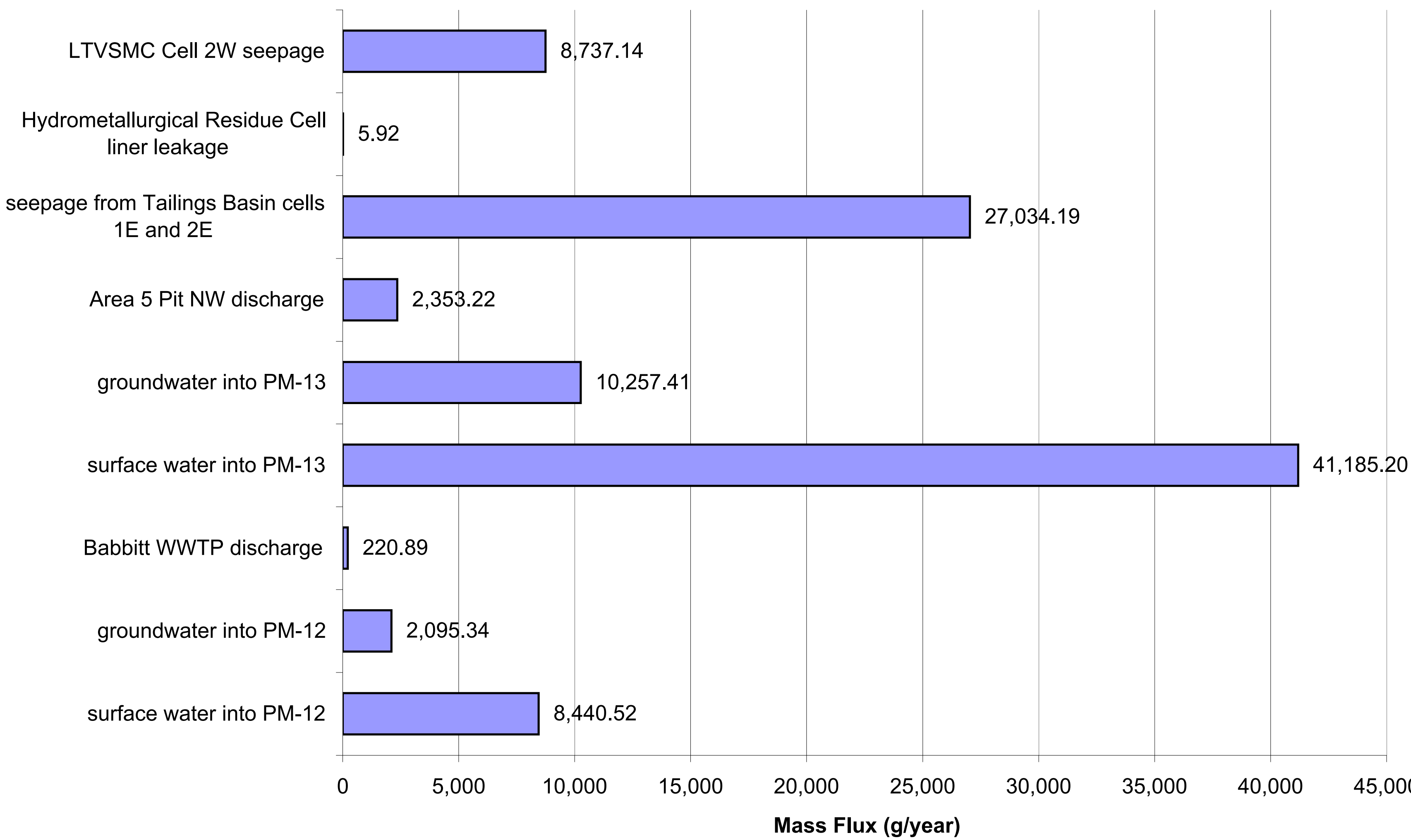
Proposed Action: Percent of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)



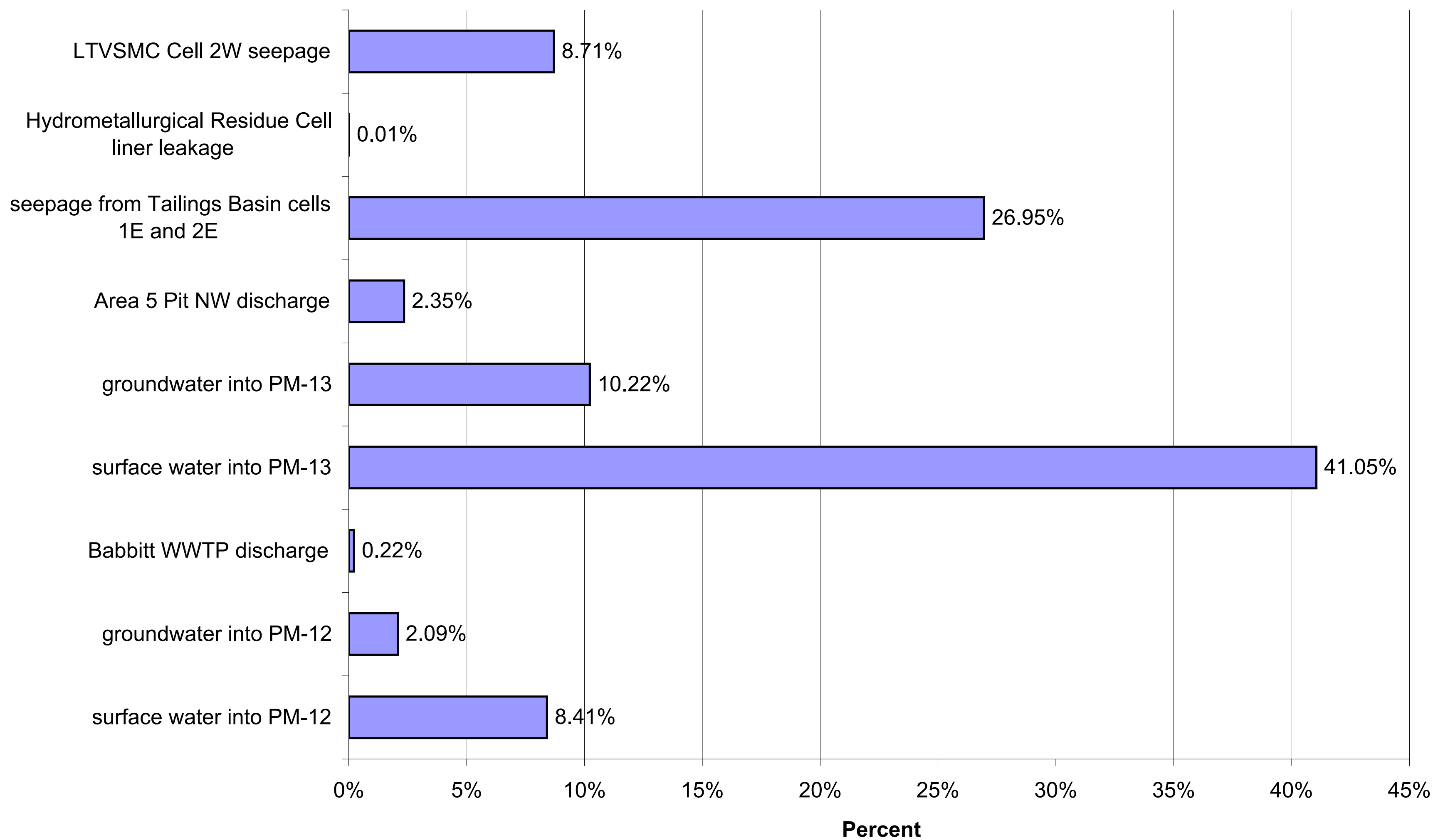

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1,801.22
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
5,573.29
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)


Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
9.13%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
28.24%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
51.98%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
10.62%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

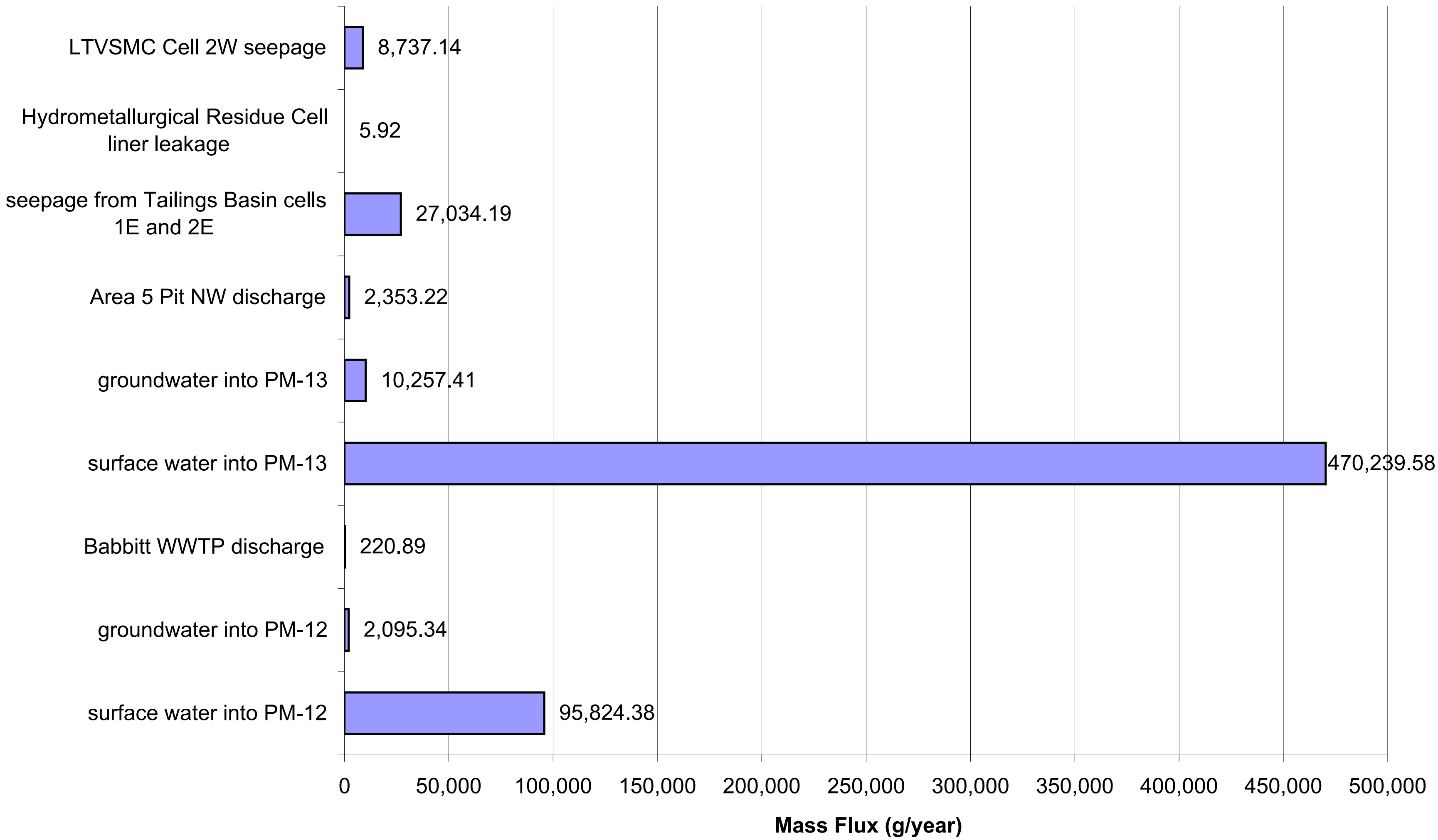
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)



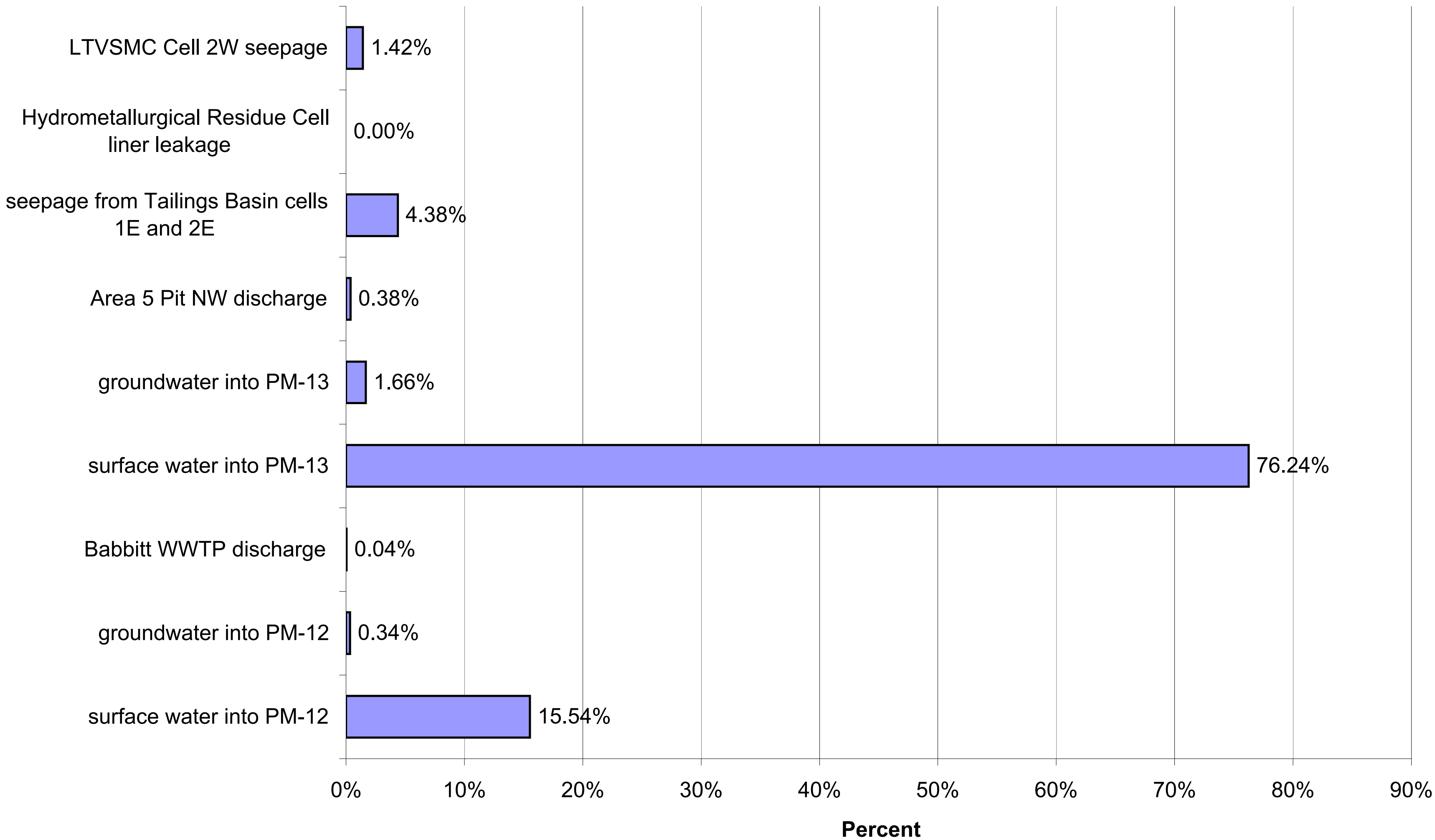
Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)



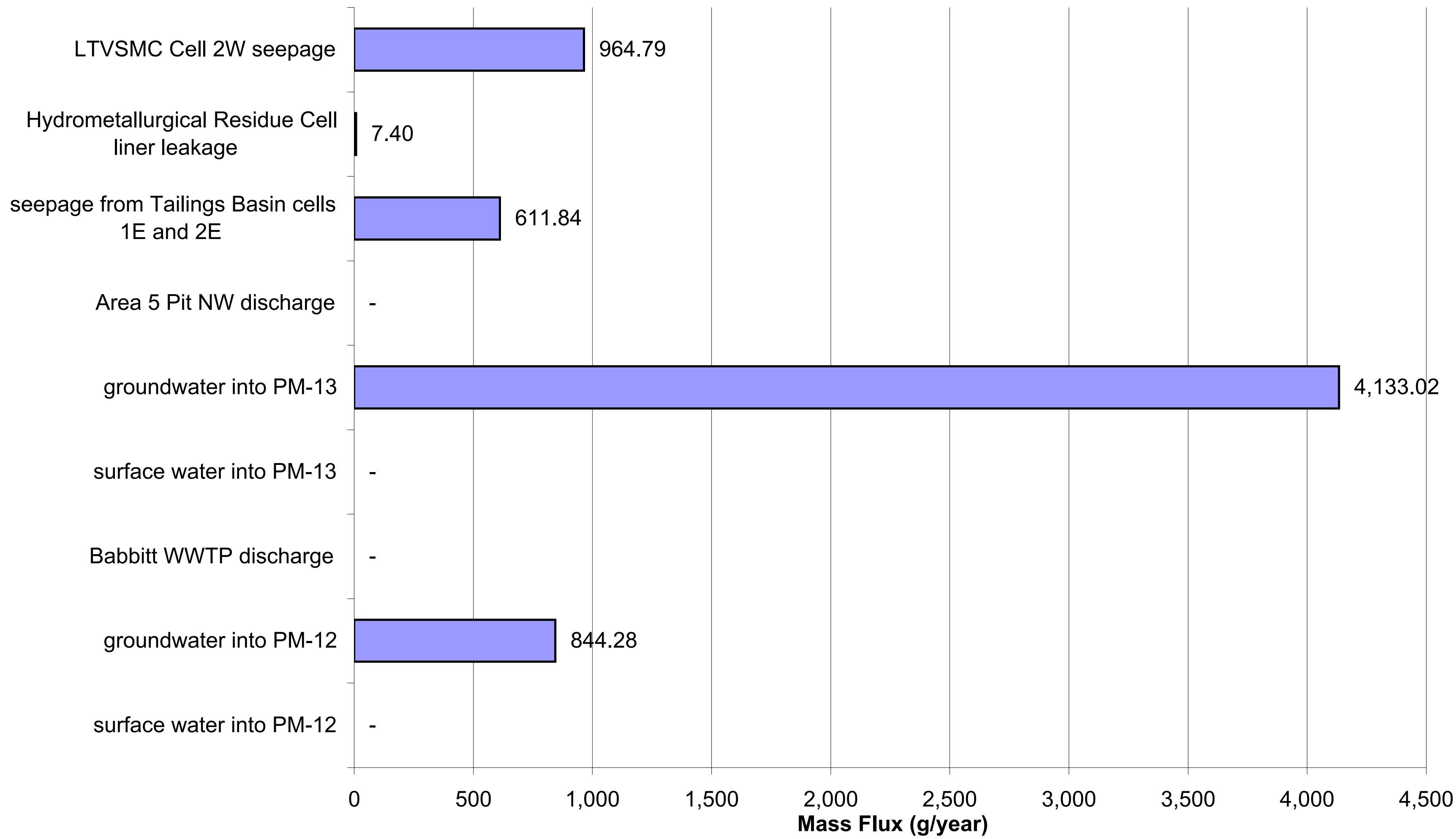
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Arsenic (As)



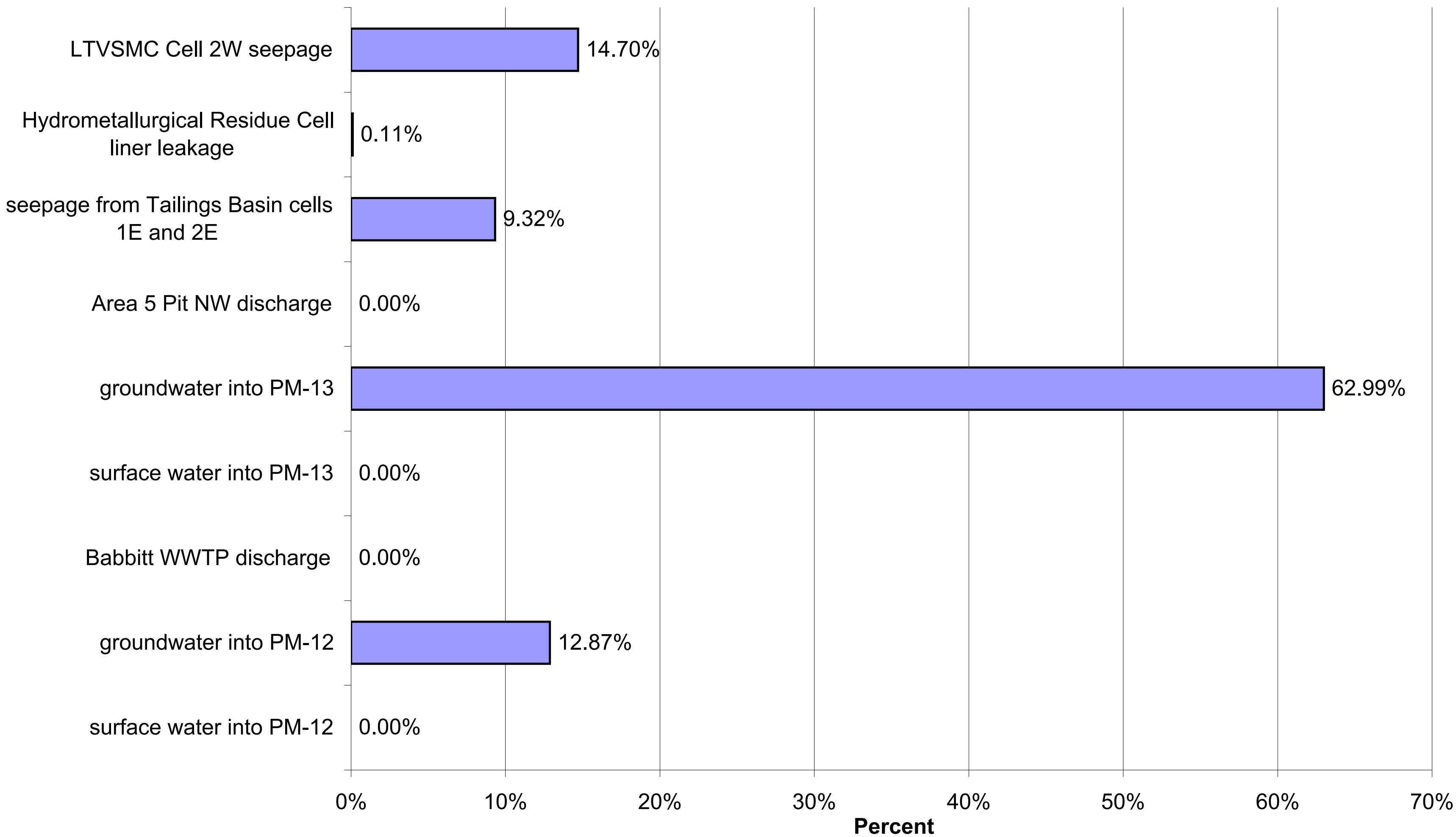
Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Arsenic (As)

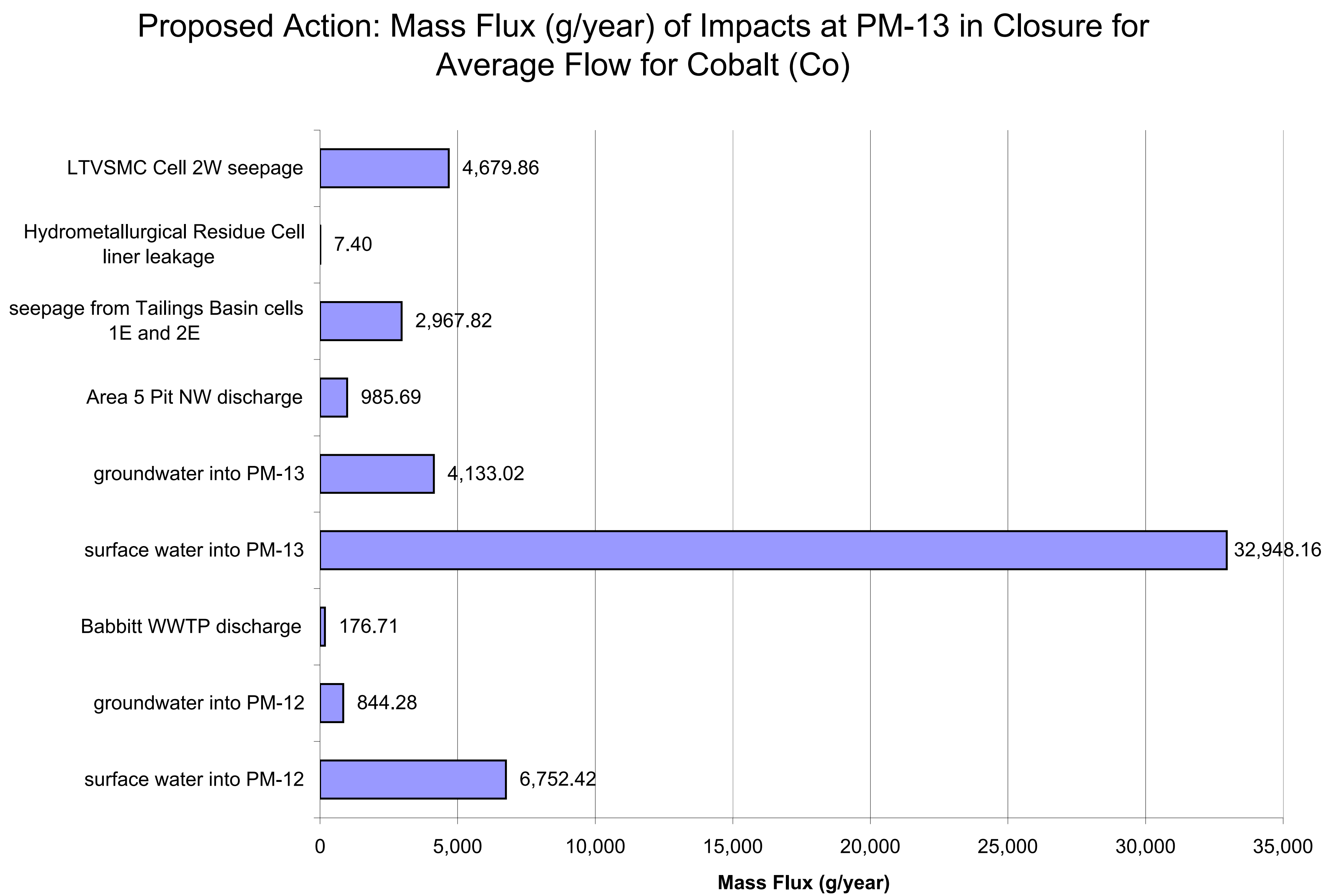


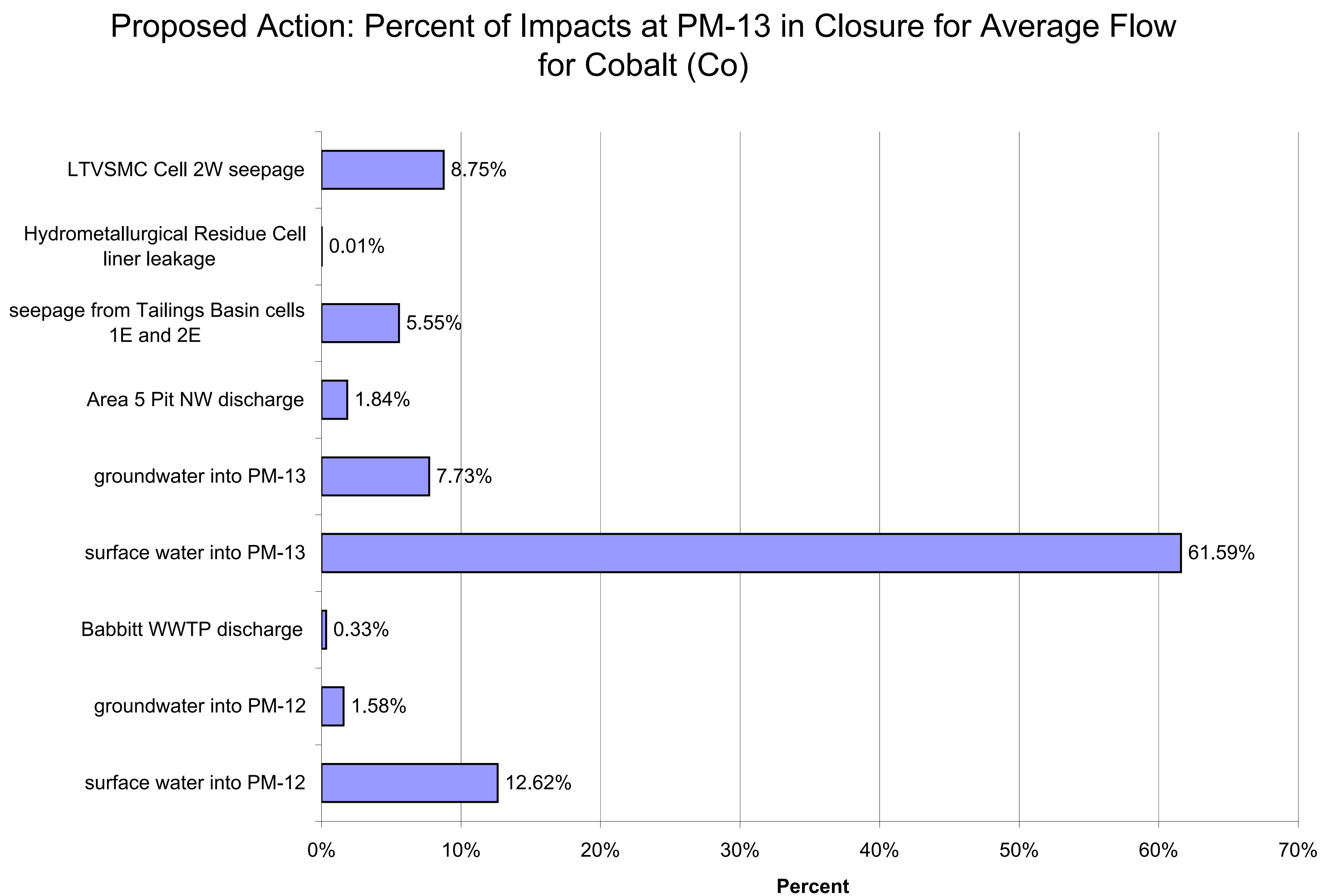
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)

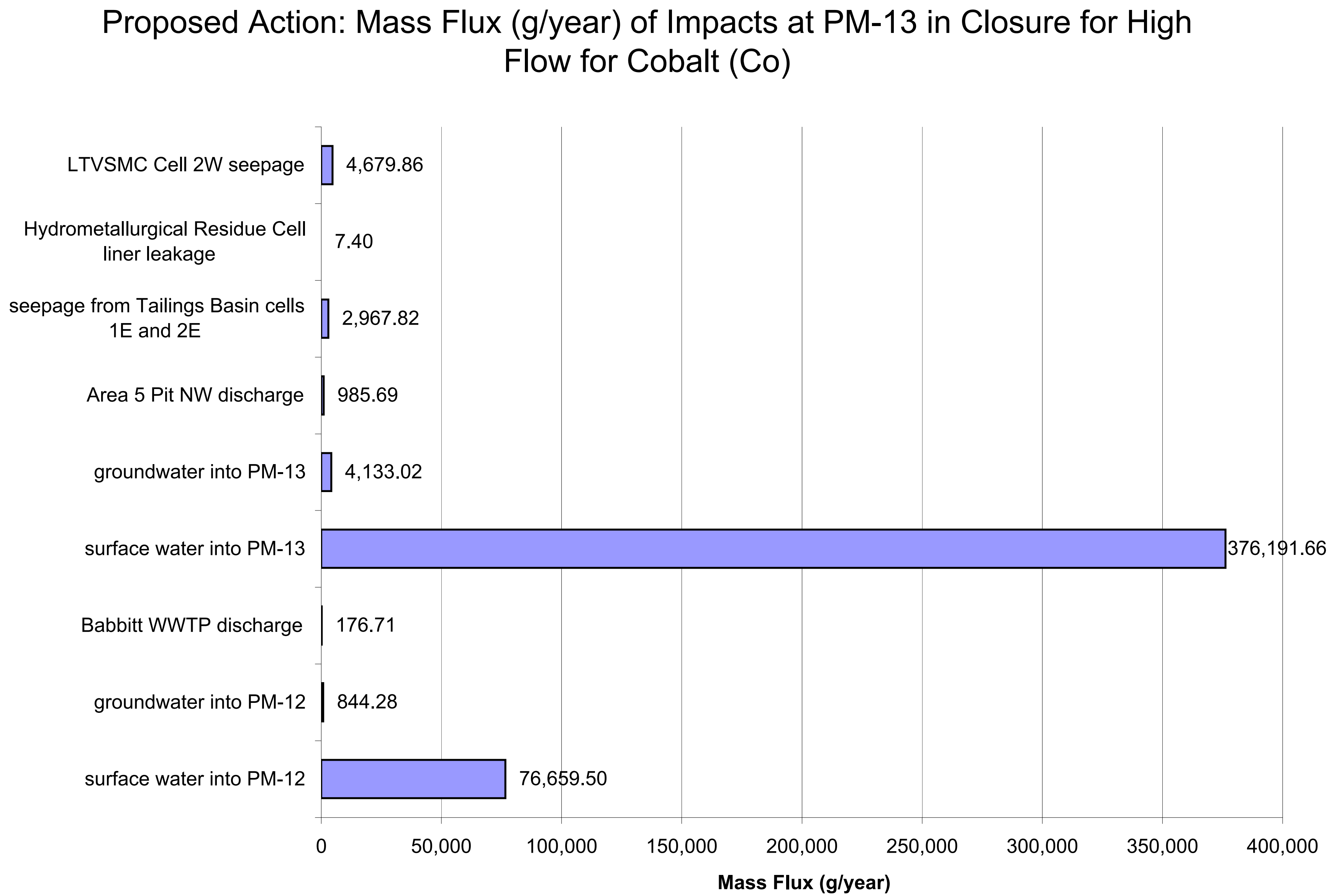


Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)

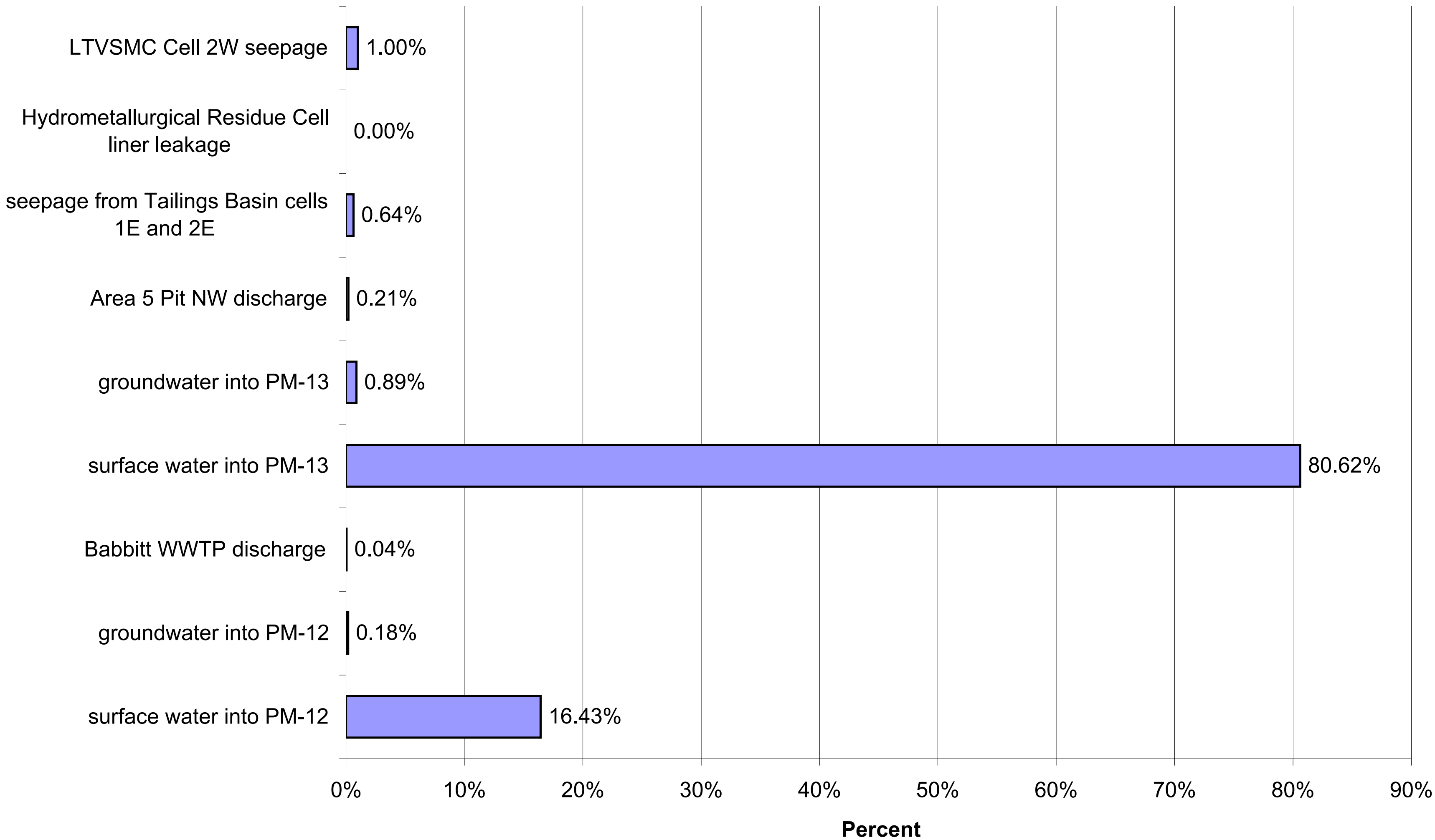



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
4,679.86
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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)

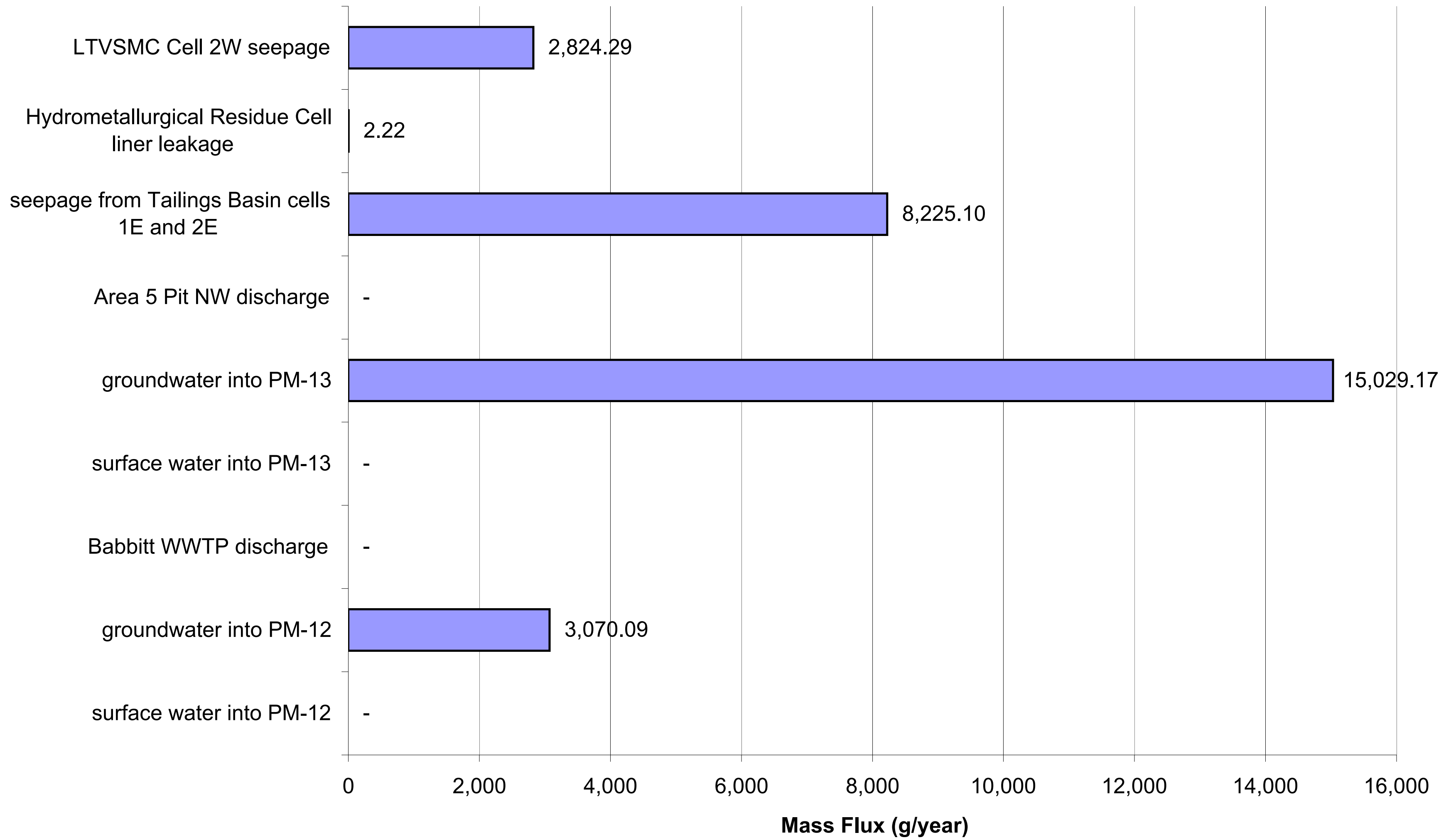

Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
8.75%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
5.55%
Area 5 Pit NW discharge
1.84%
groundwater into PM-13
7.73%
surface water into PM-13
61.59%
Babbitt WWTP discharge
0.33%
groundwater into PM-12
1.58%
surface water into PM-12
12.62%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

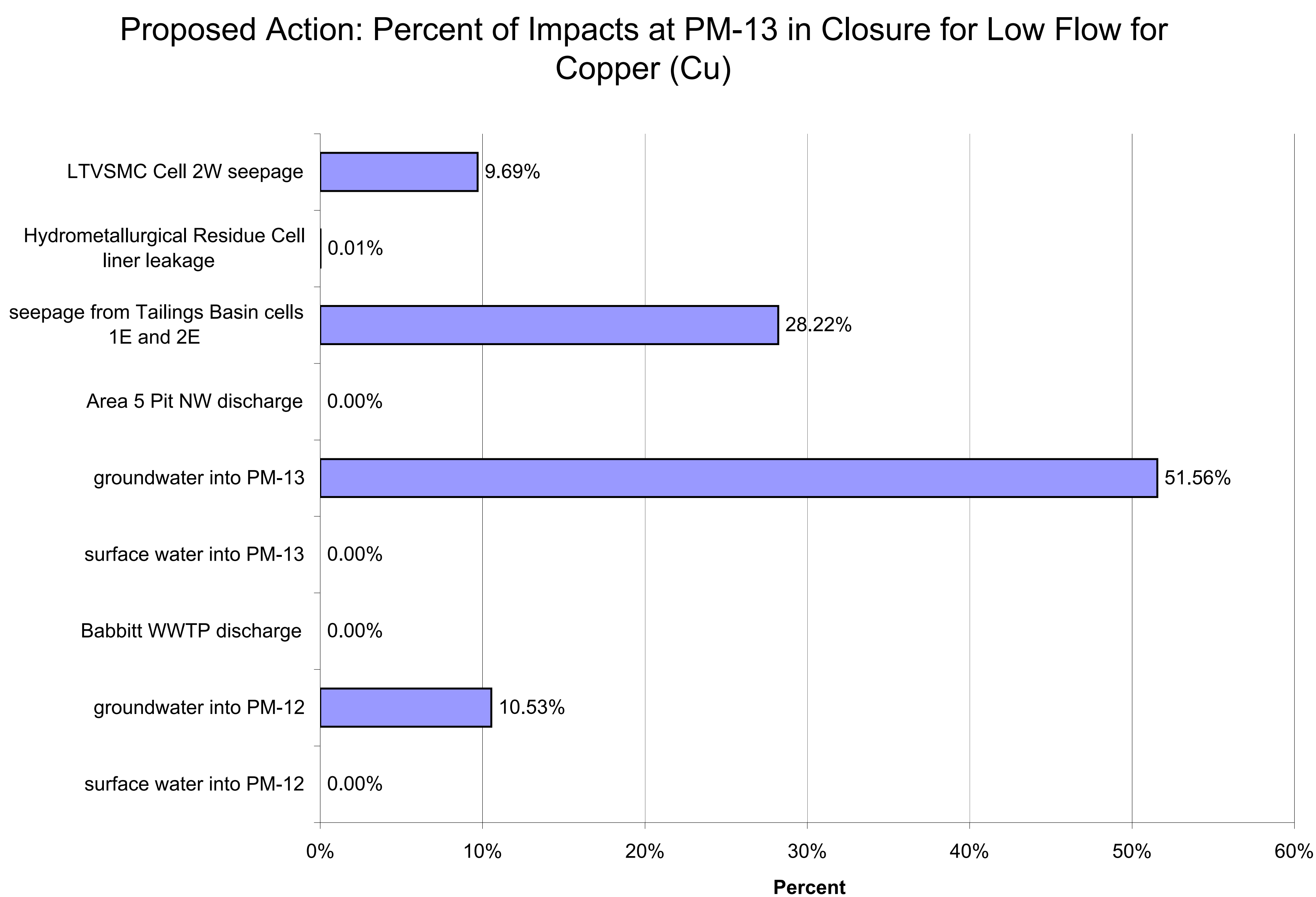

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
4,679.86
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
surface 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)

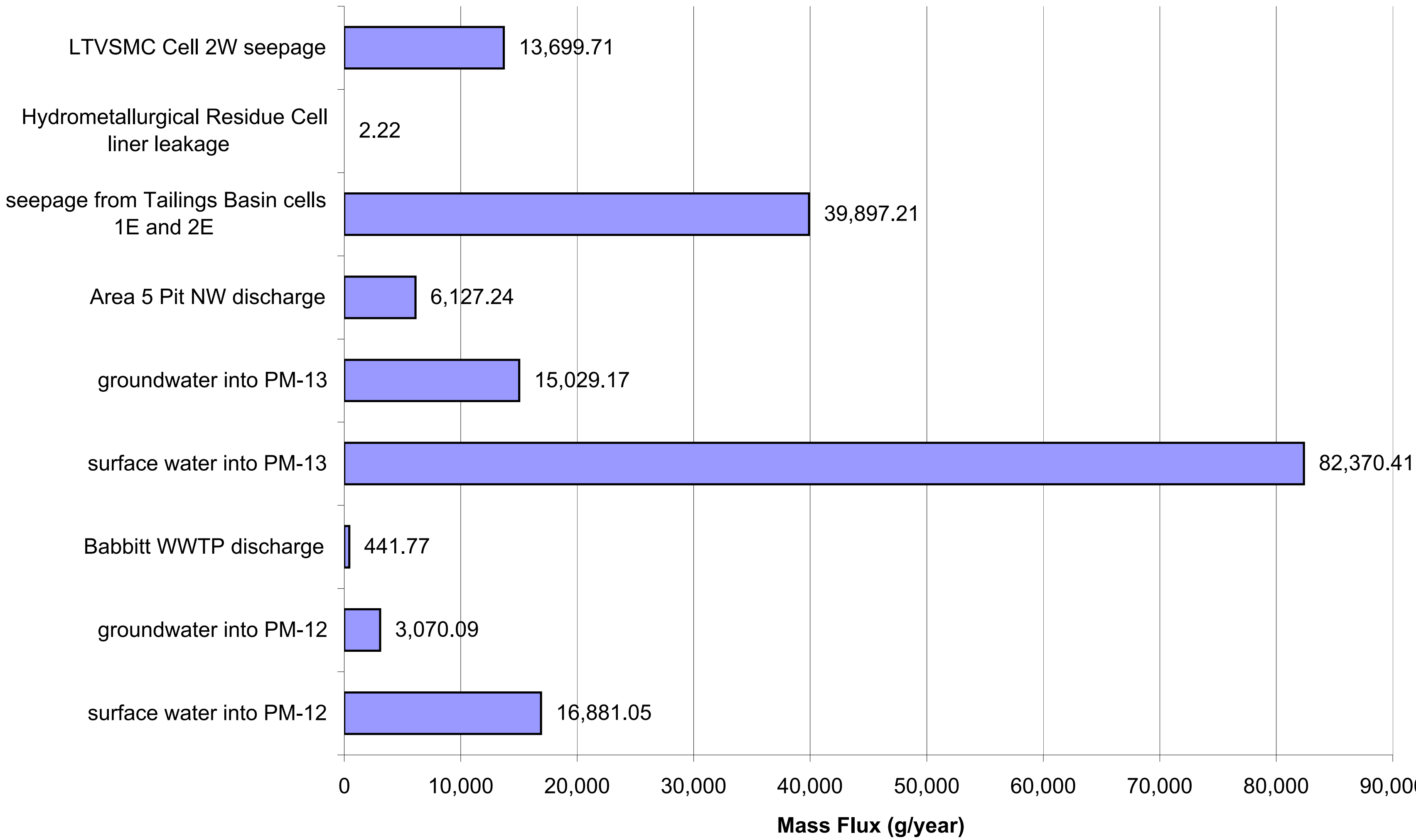


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)

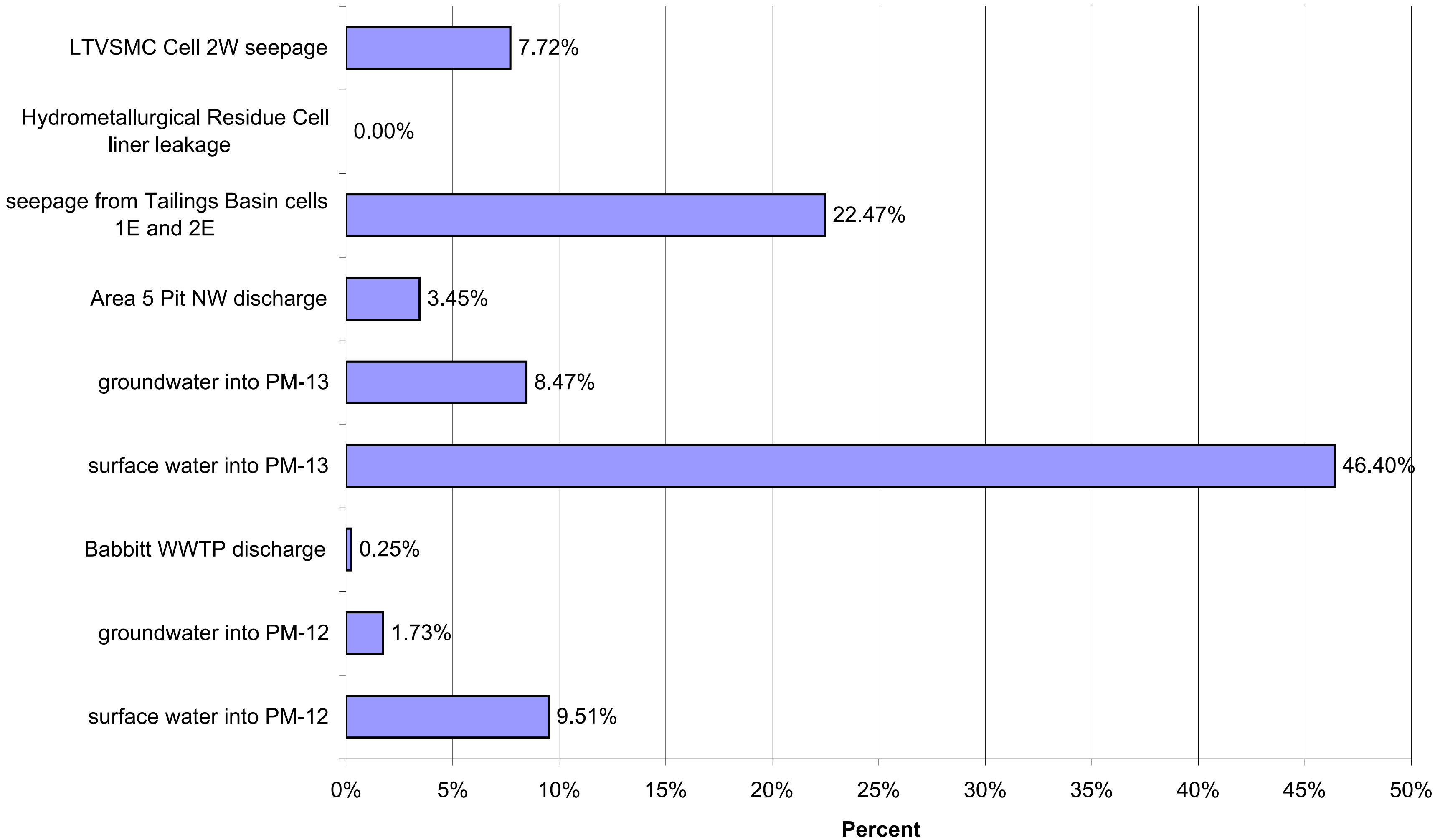



Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
9.69%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
28.22%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
51.56%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
10.53%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

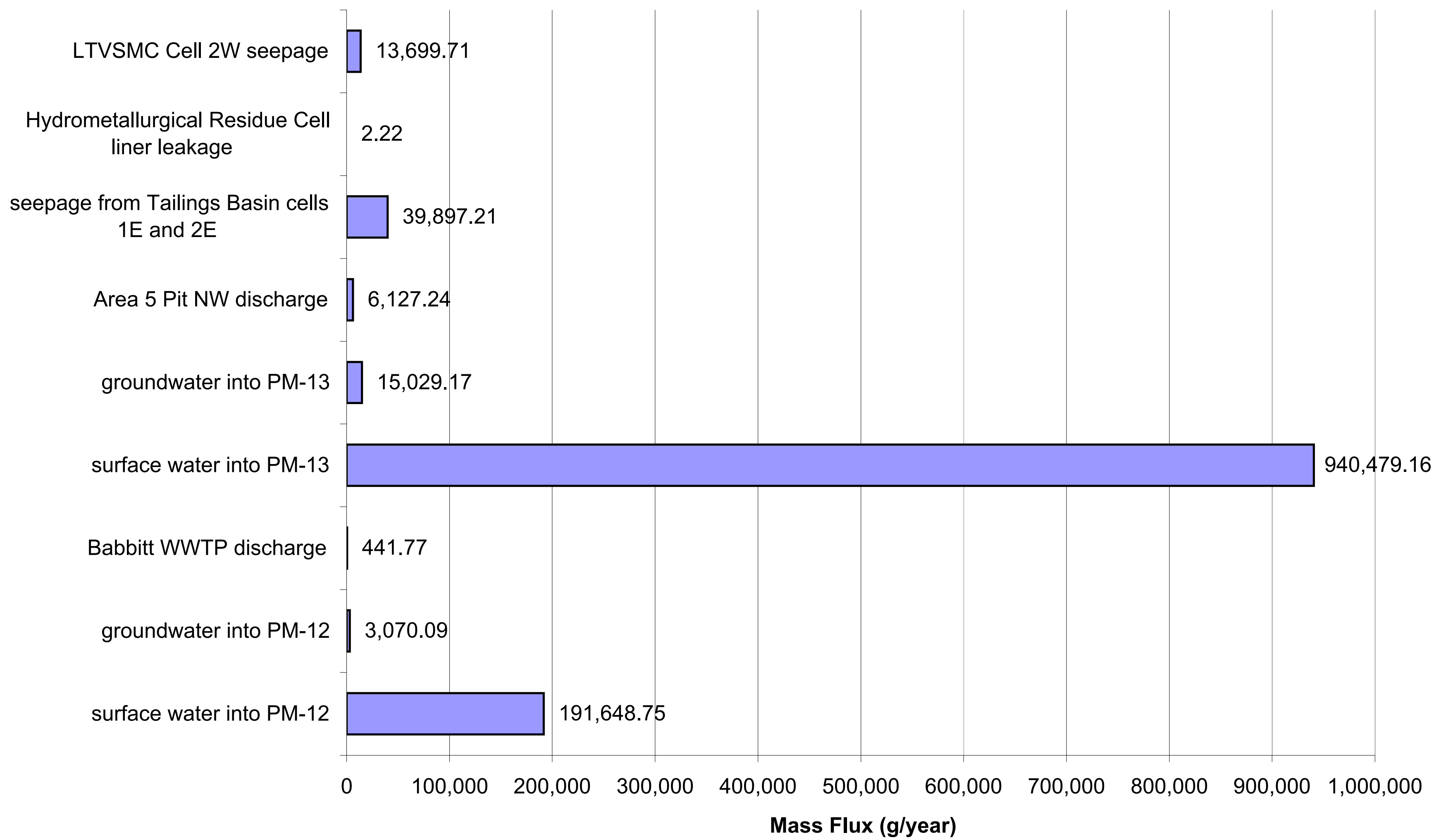
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)



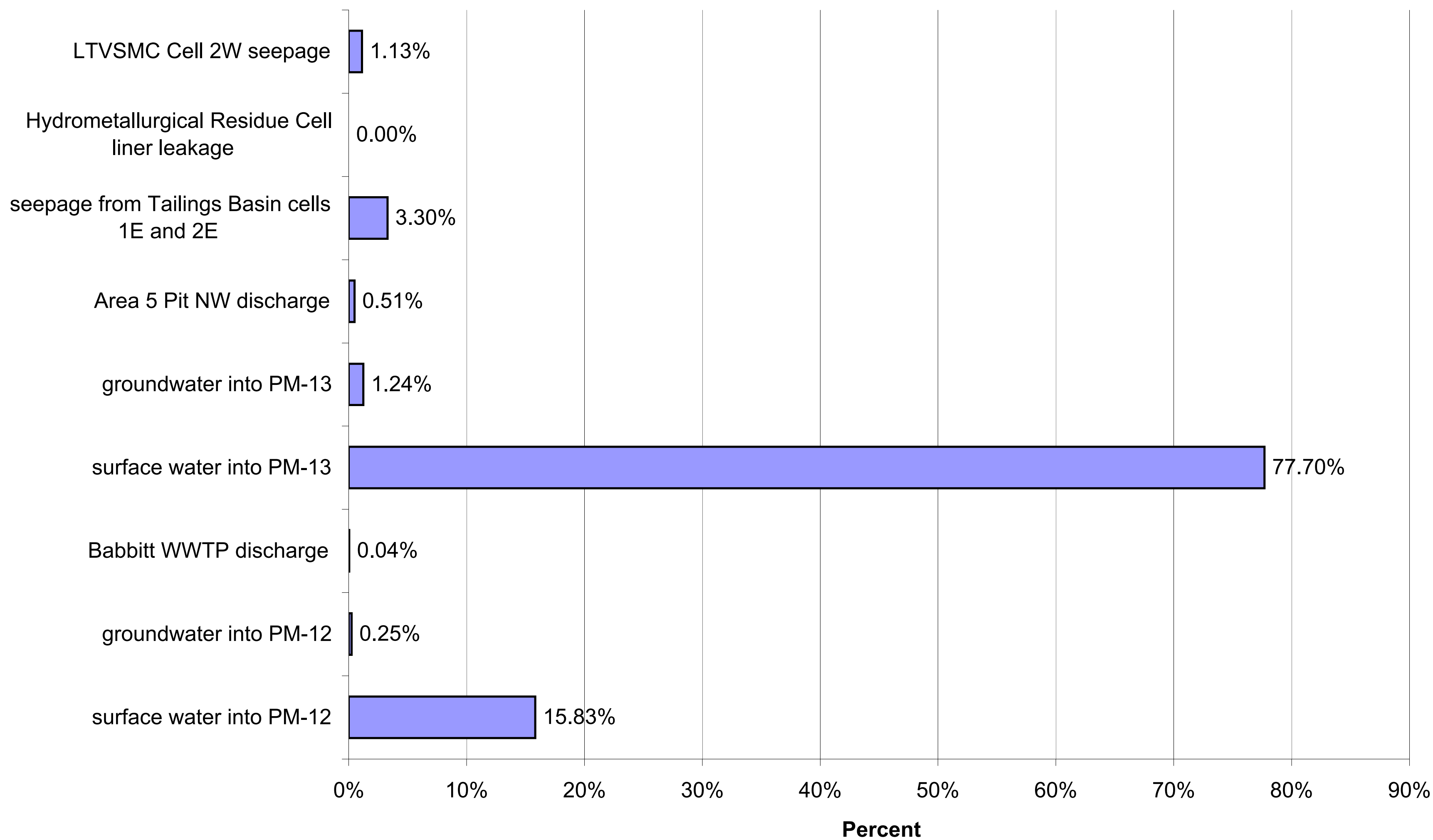
Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)



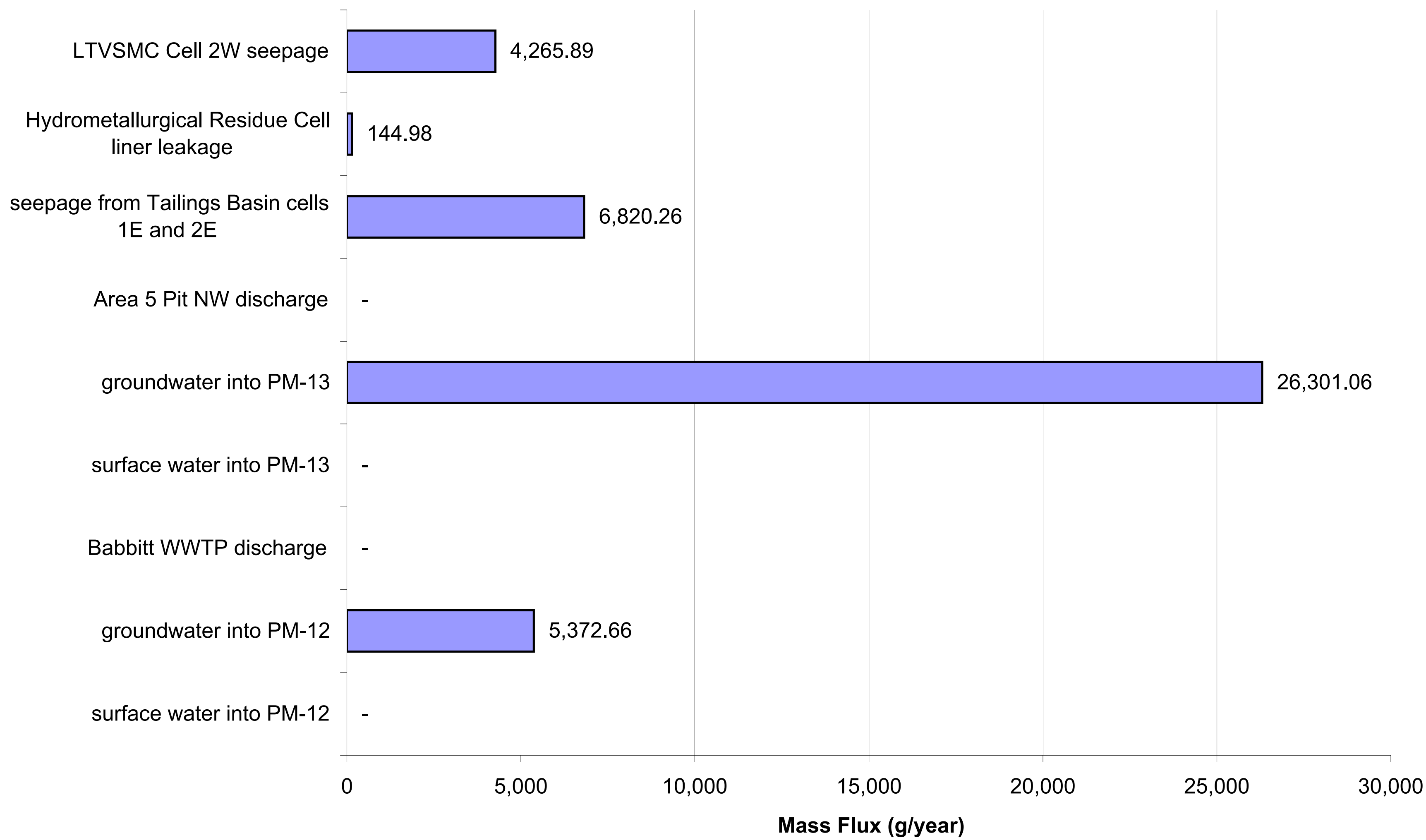
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Copper (Cu)



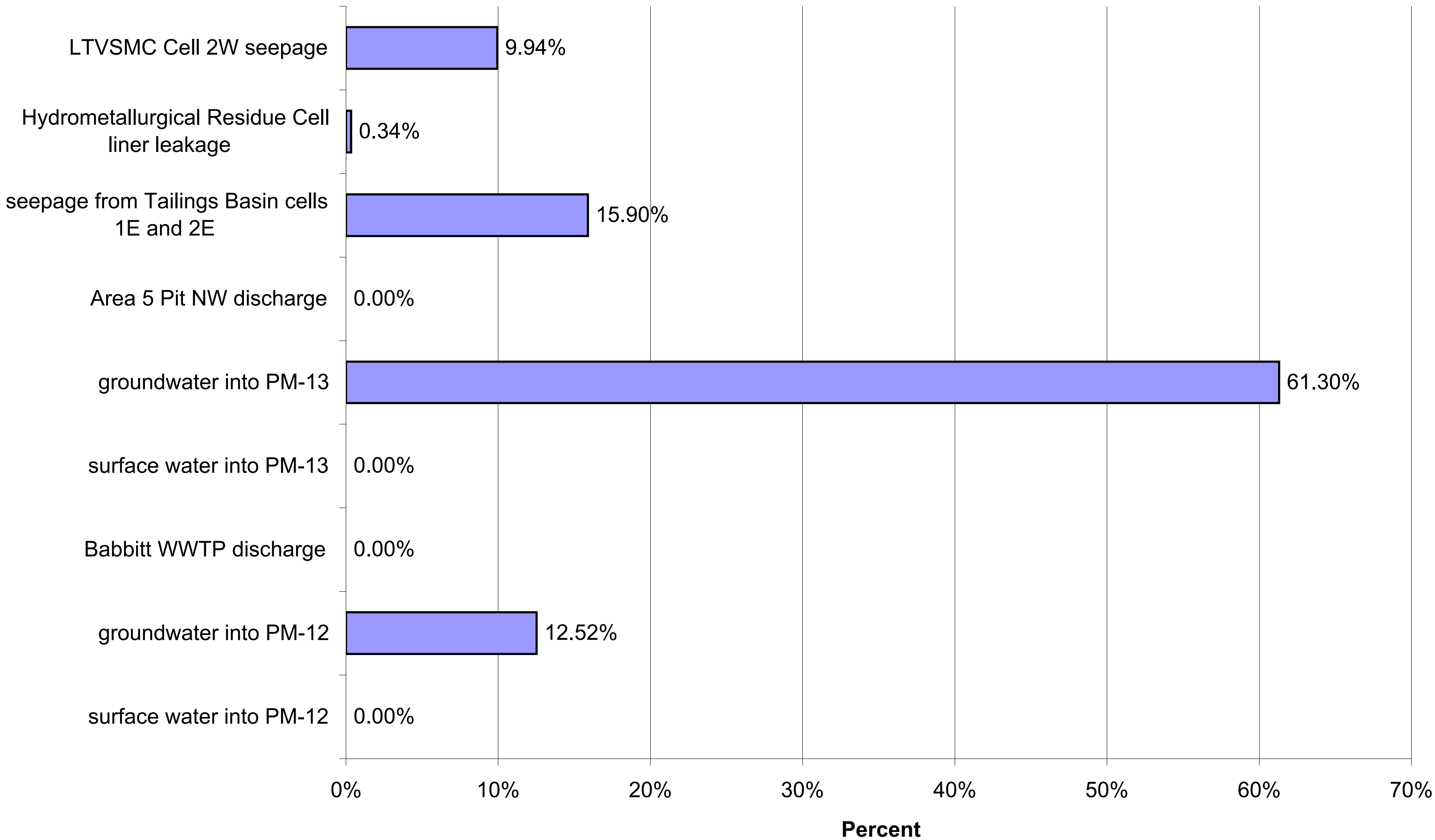
Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Copper (Cu)

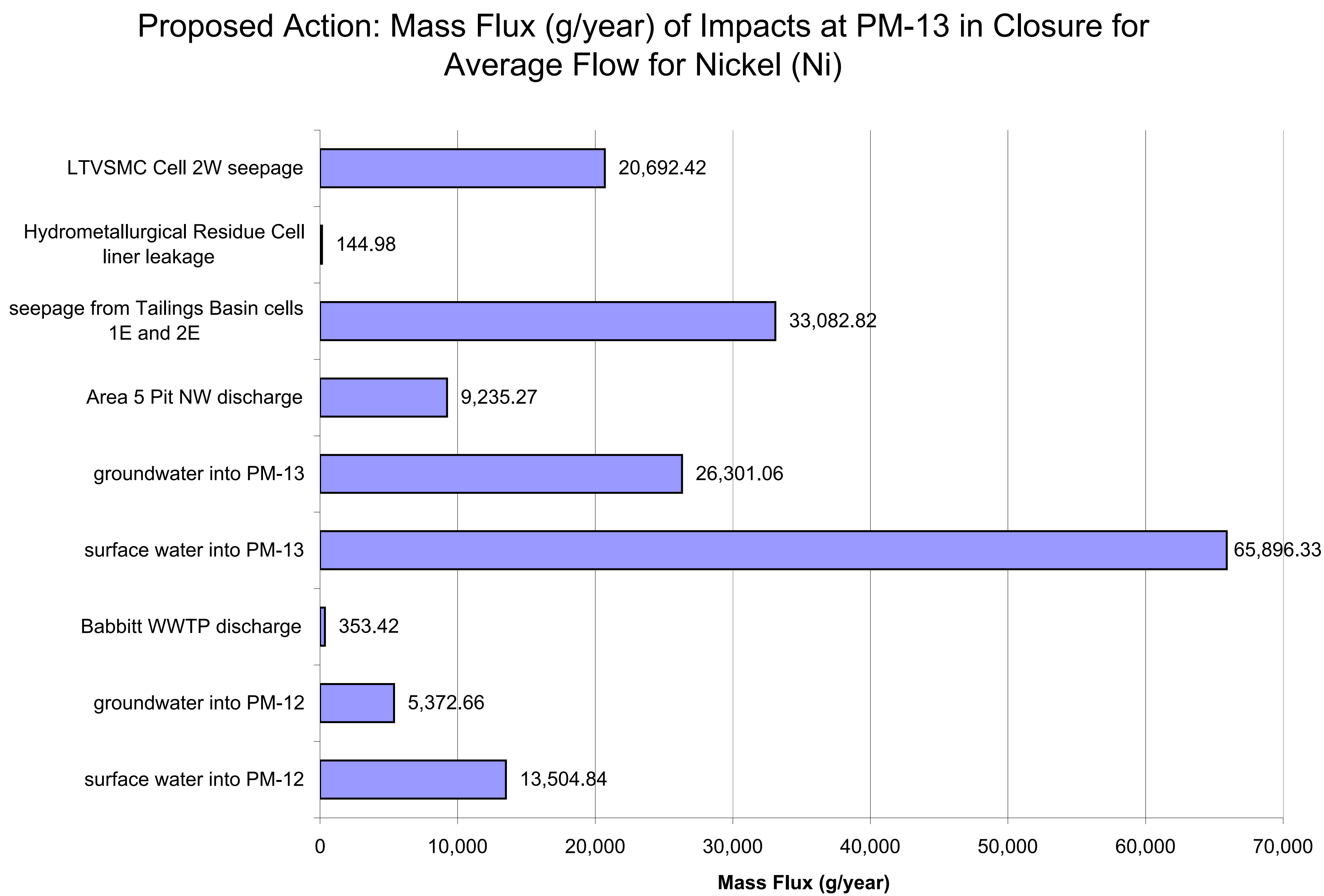


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)

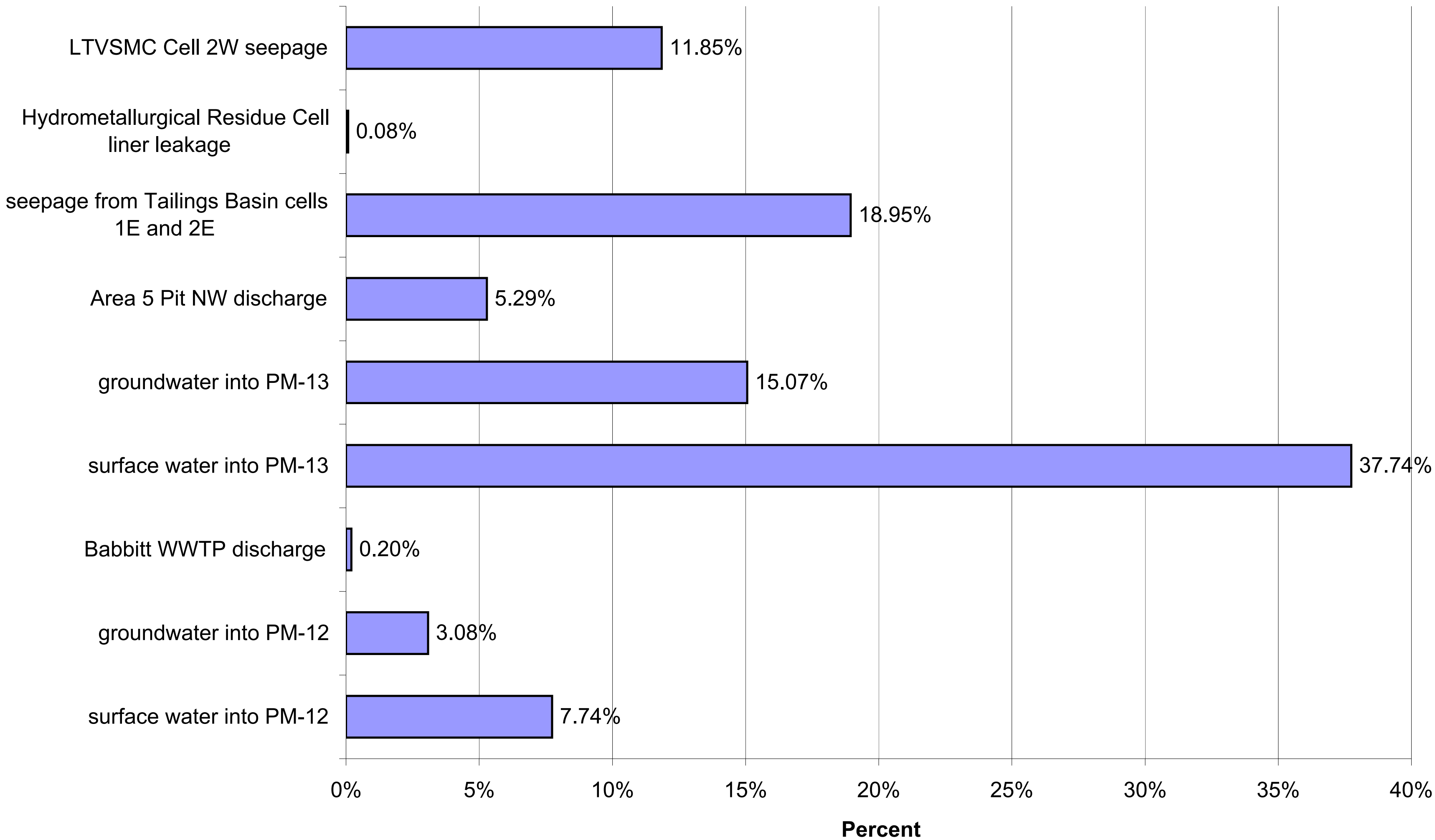


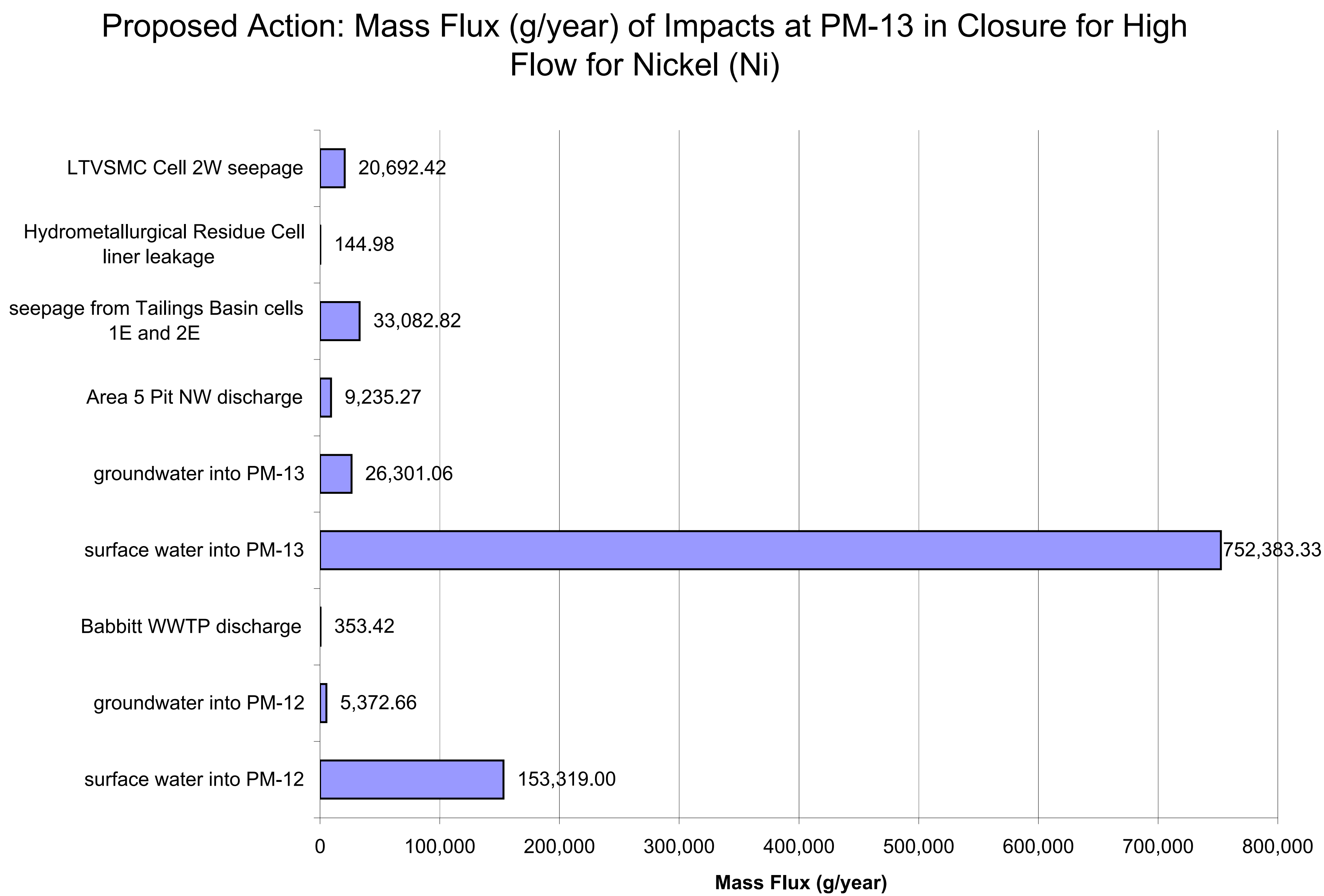
Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)



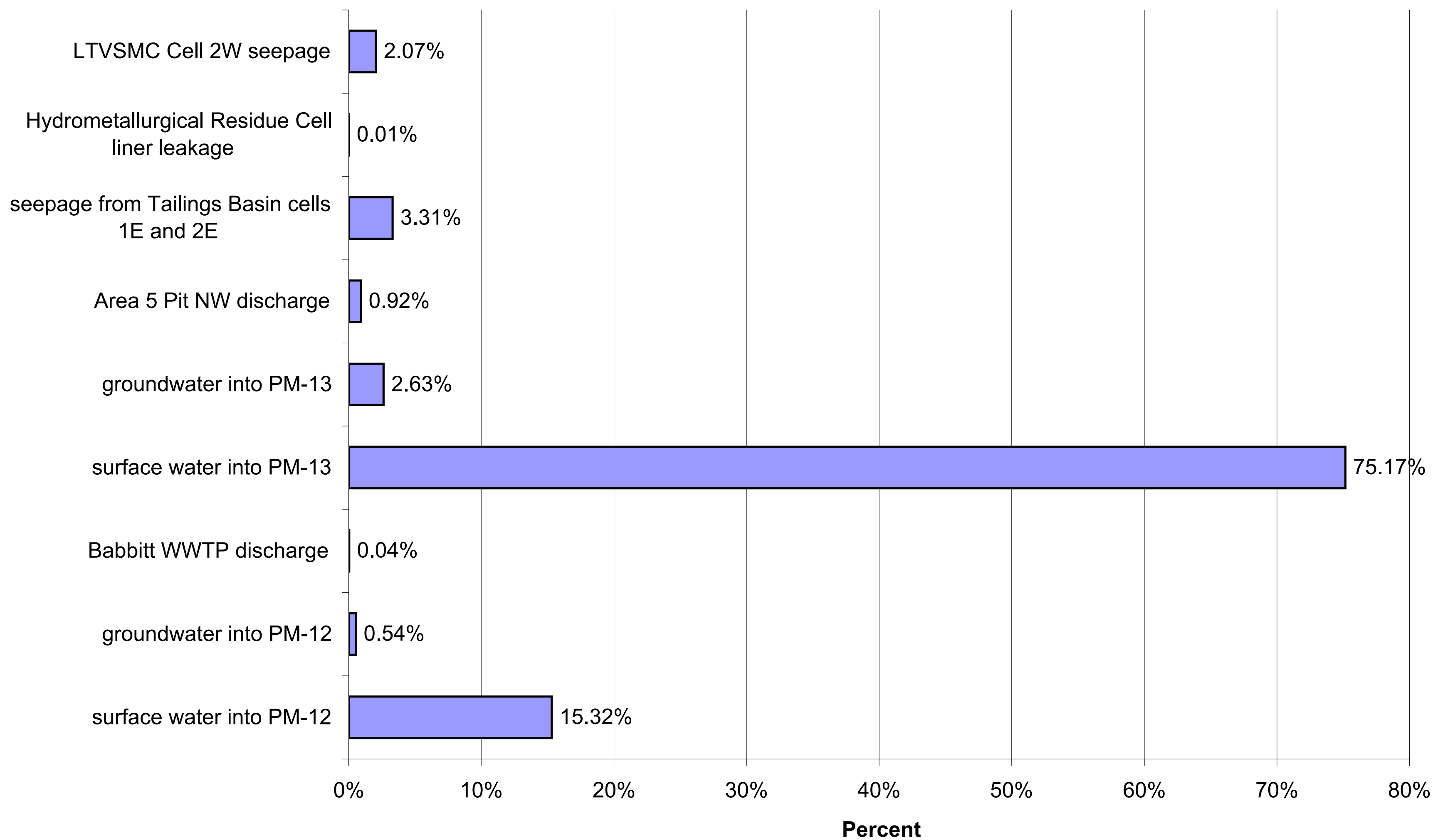

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
20,692.42
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin cells 1E and 2E
33,082.82
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
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 Closure for Average Flow for Nickel (Ni)

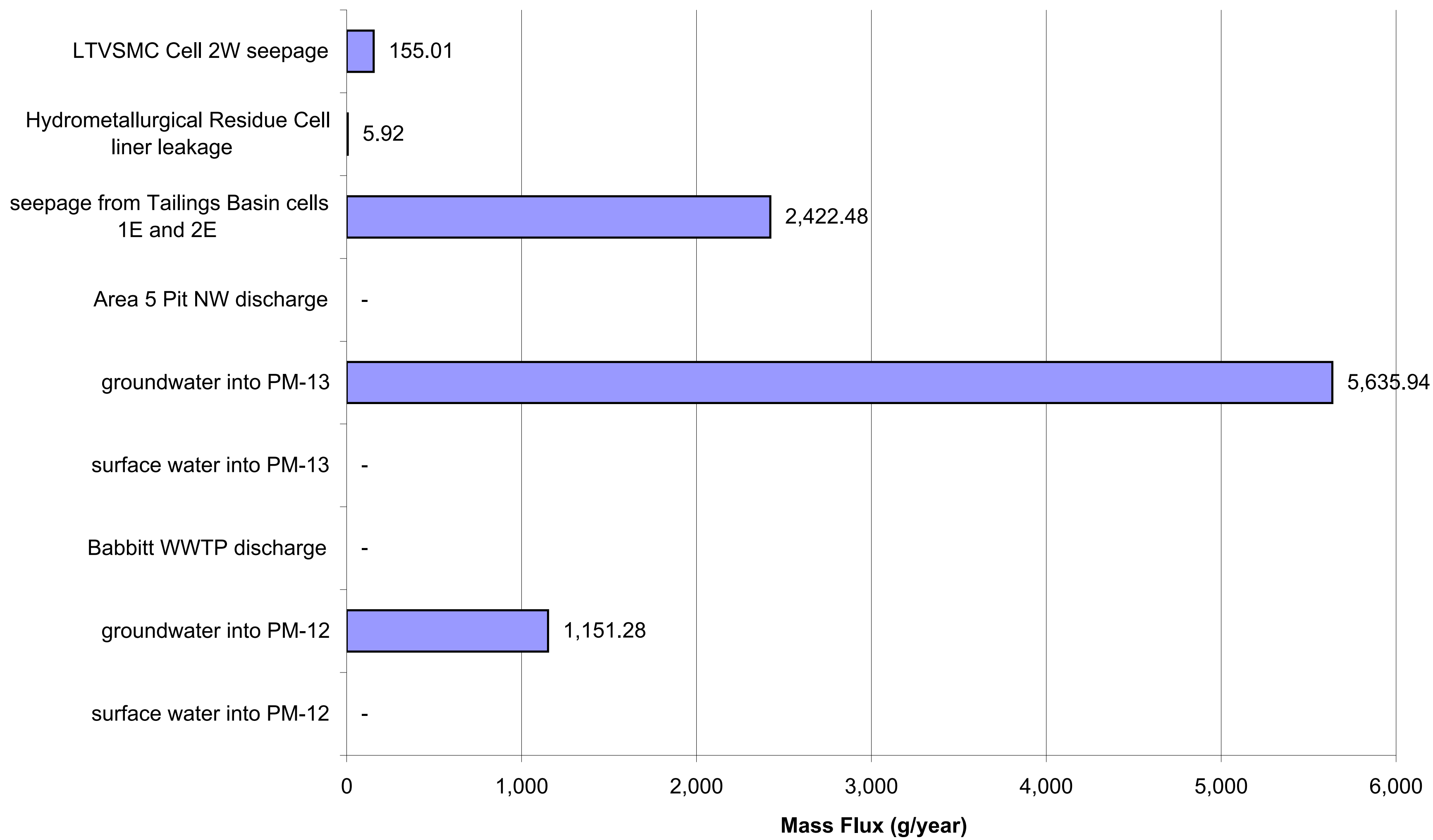


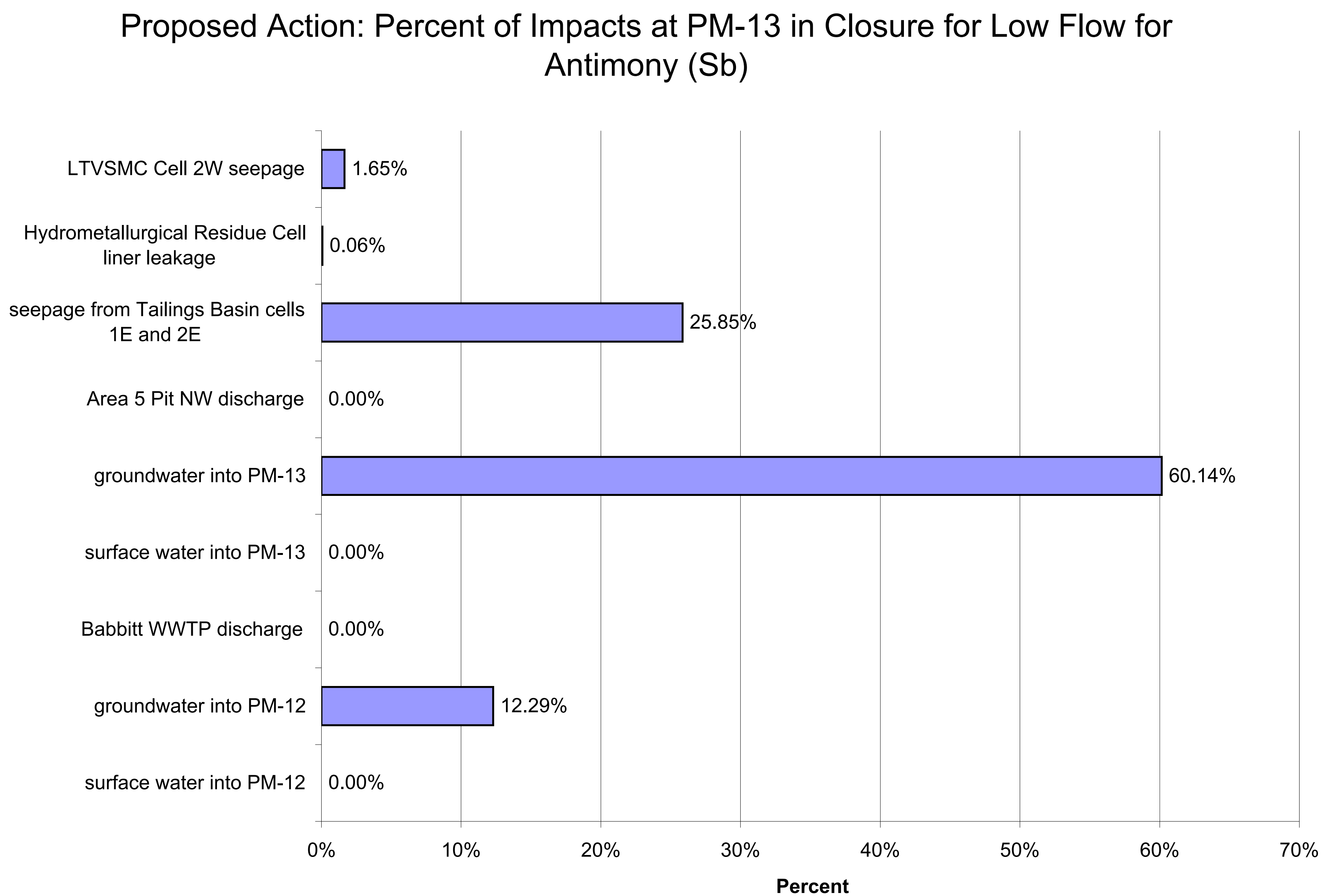

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
20,692.42
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin cells 1E and 2E
33,082.82
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)

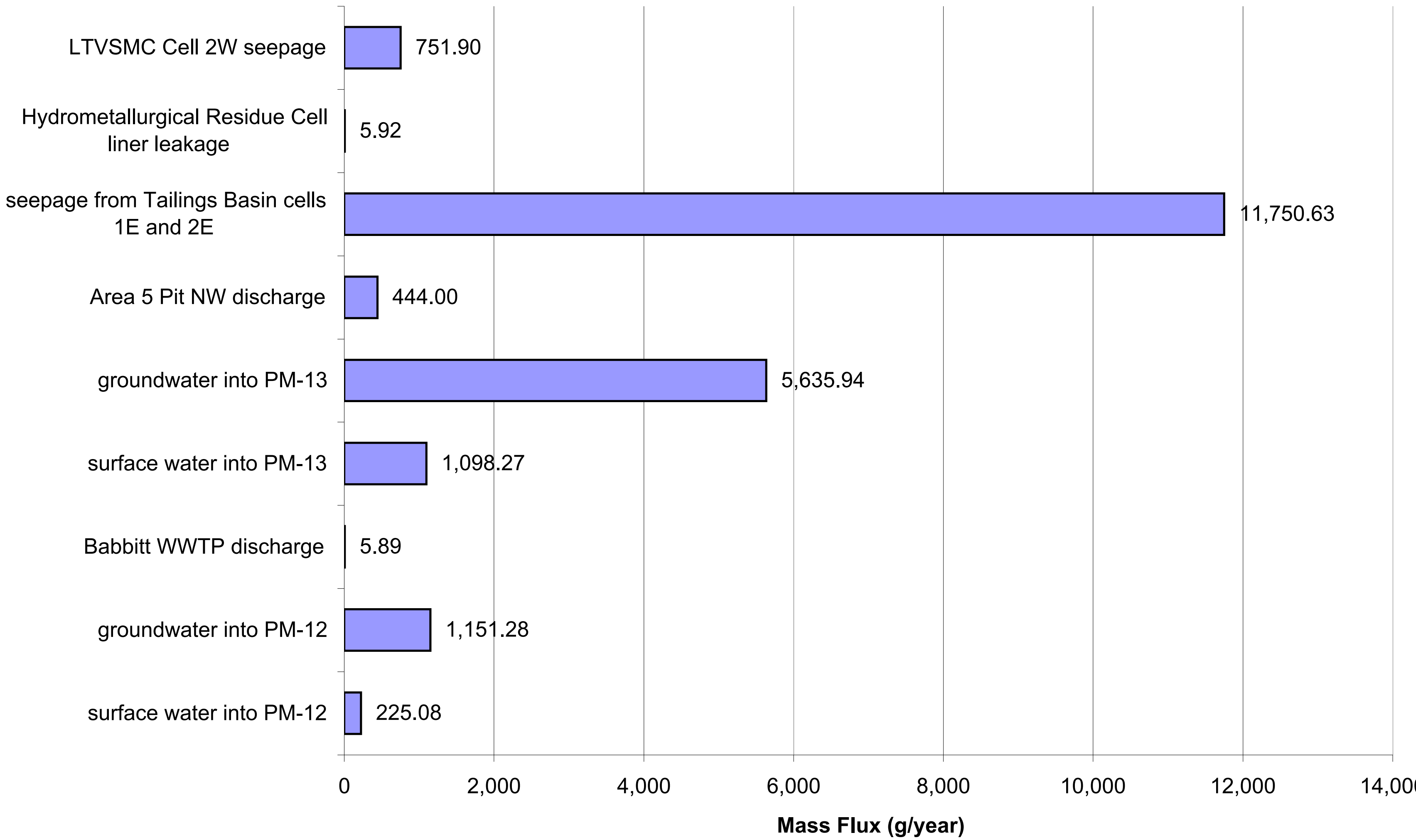


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)

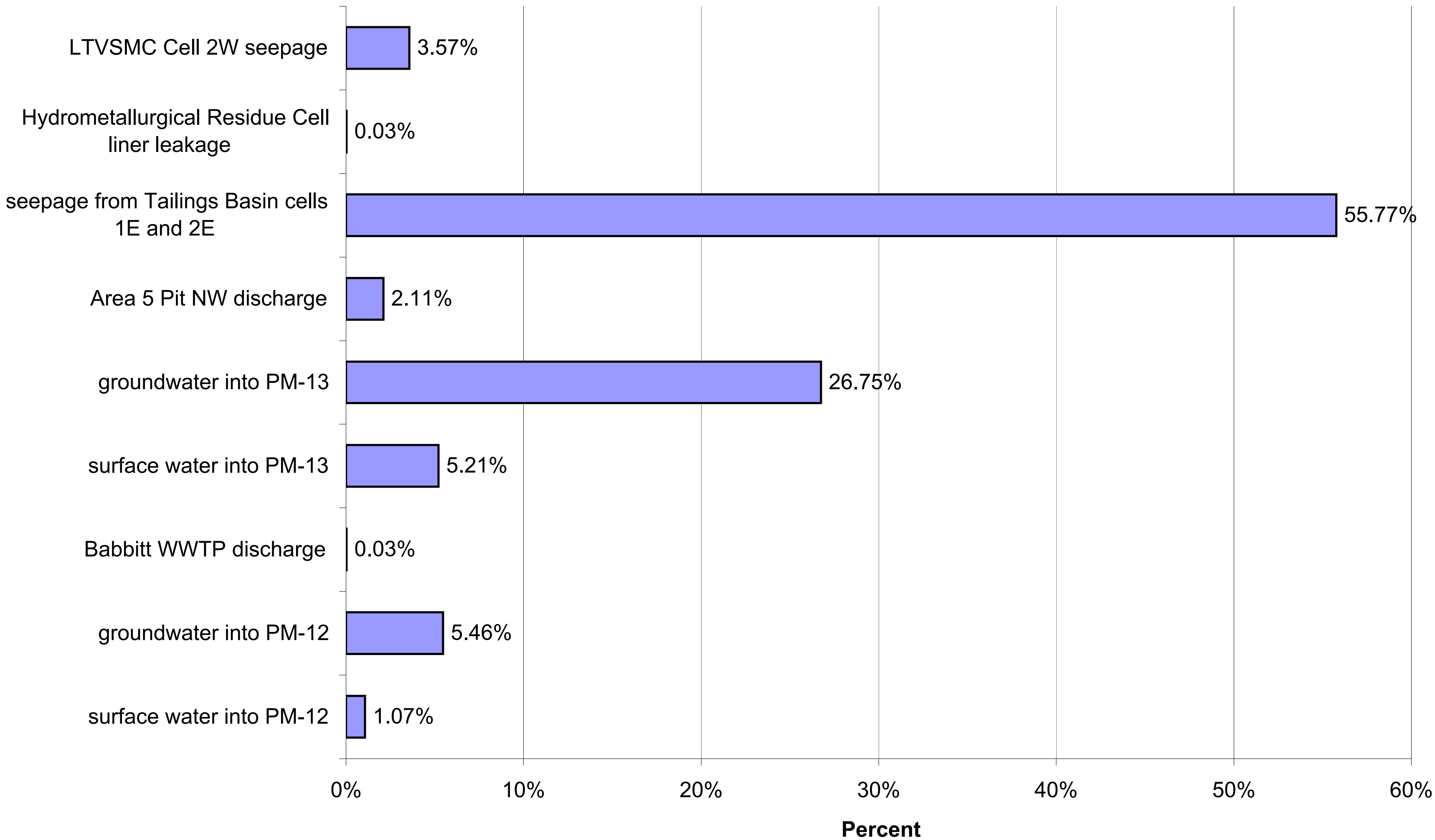


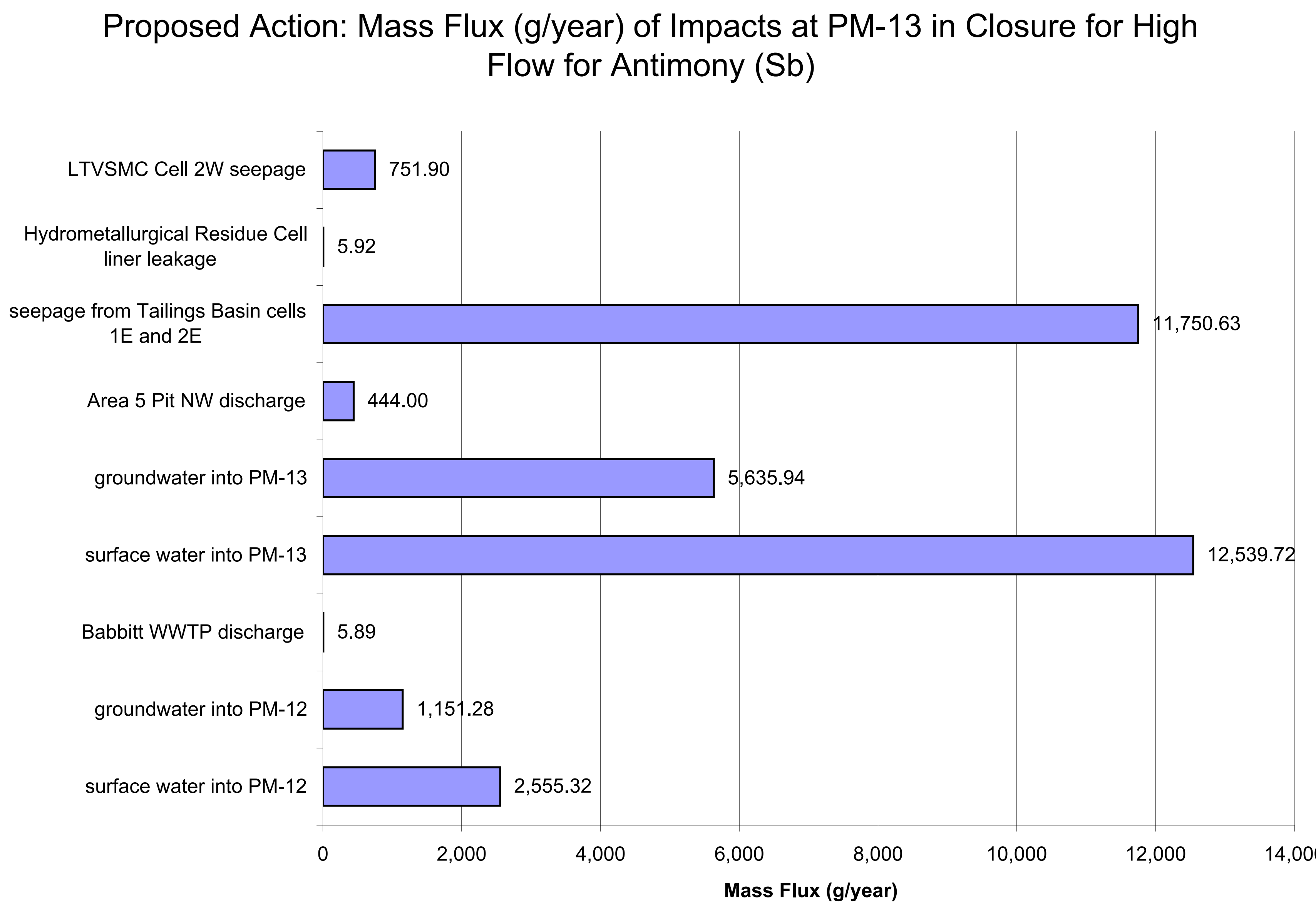

Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.65%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin cells 1E and 2E
25.85%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
60.14%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.29%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

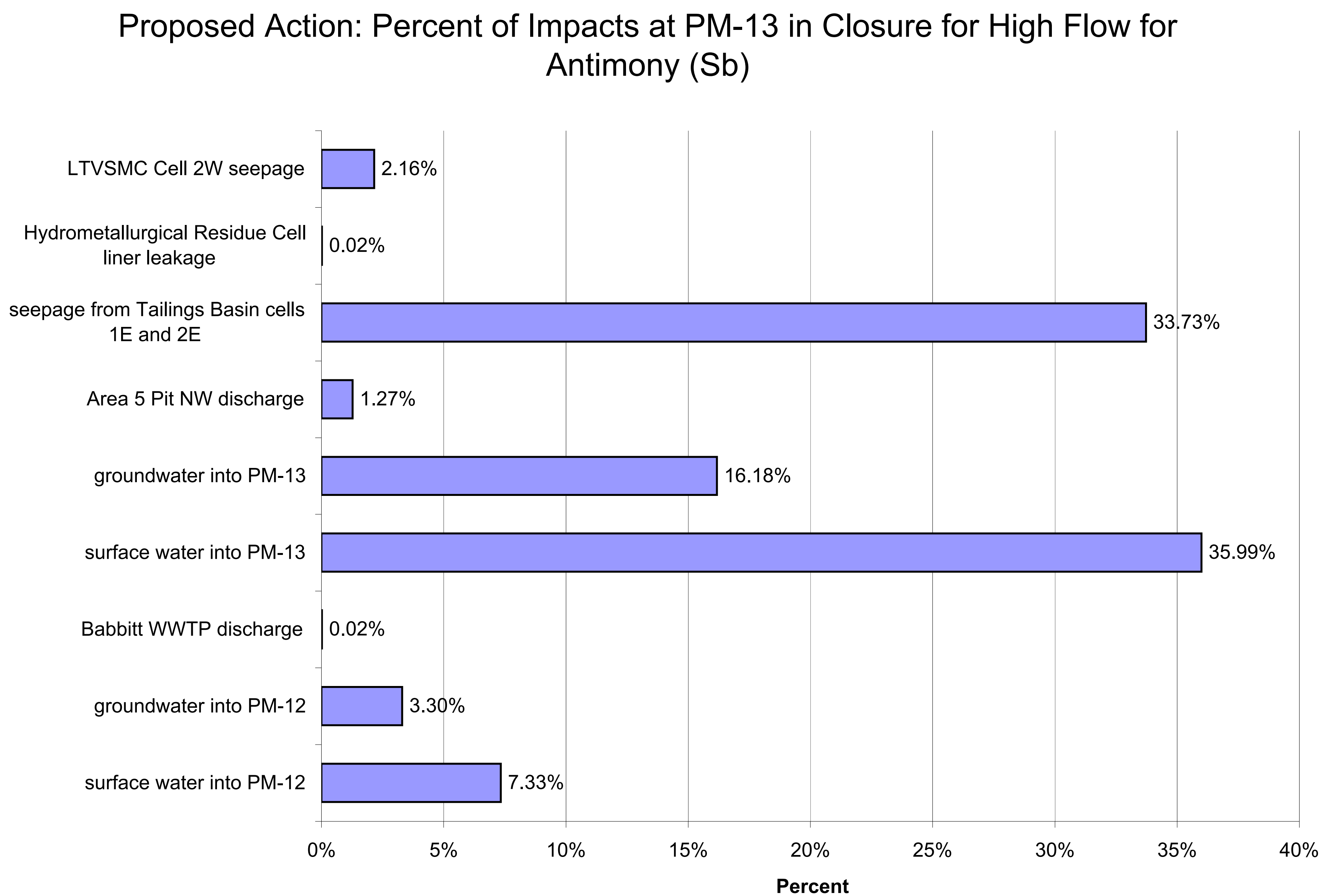
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)

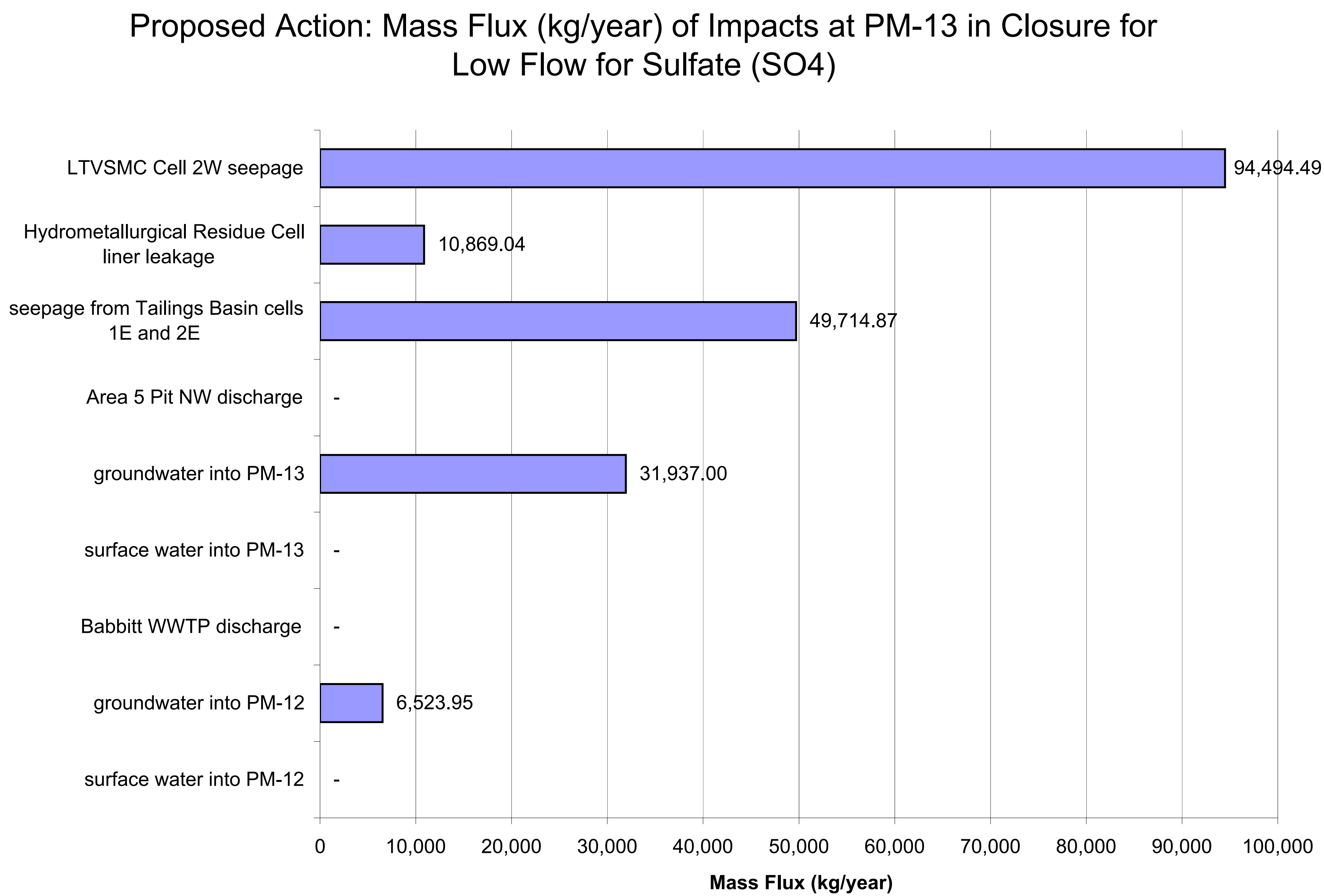


Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)

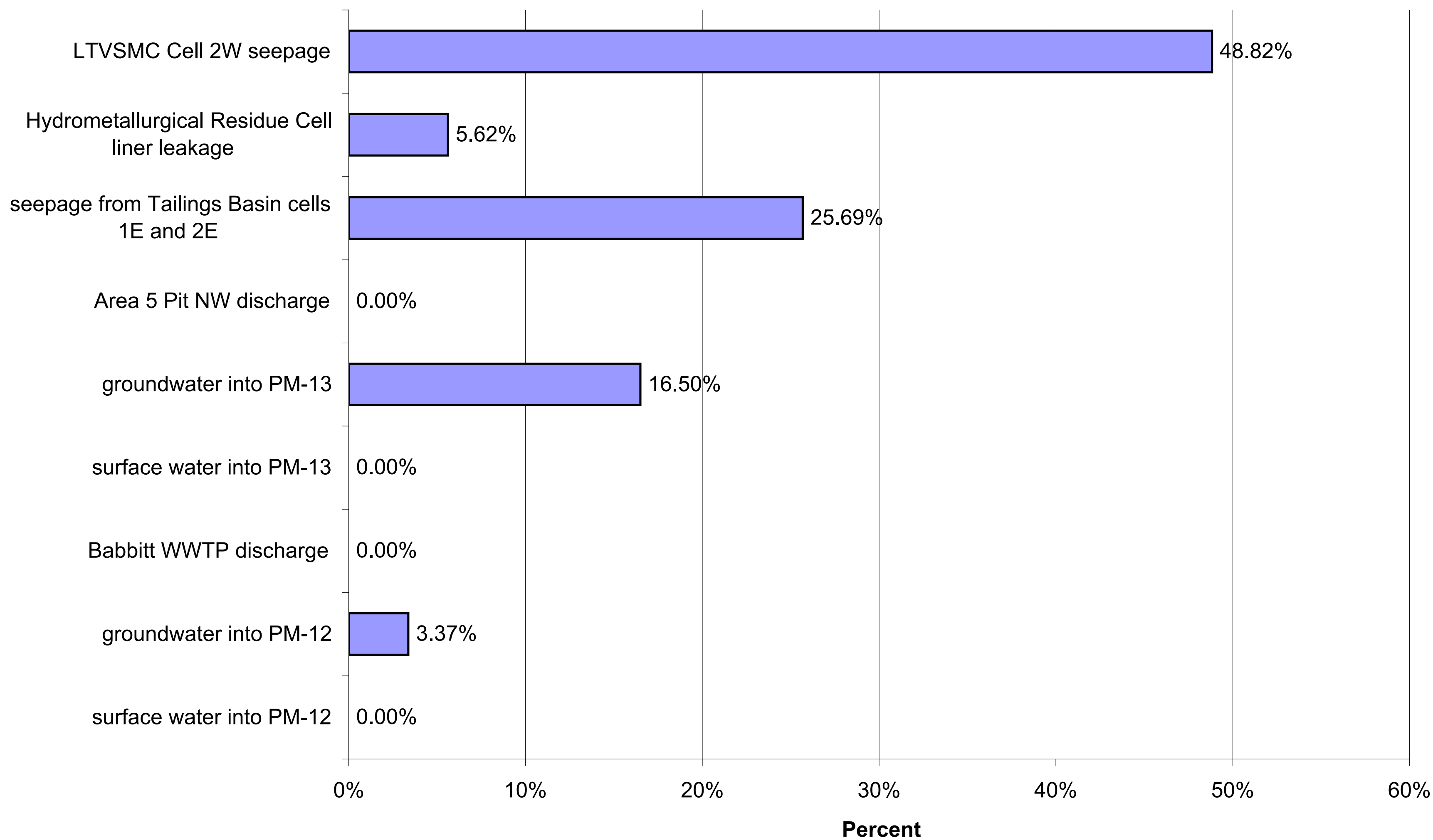


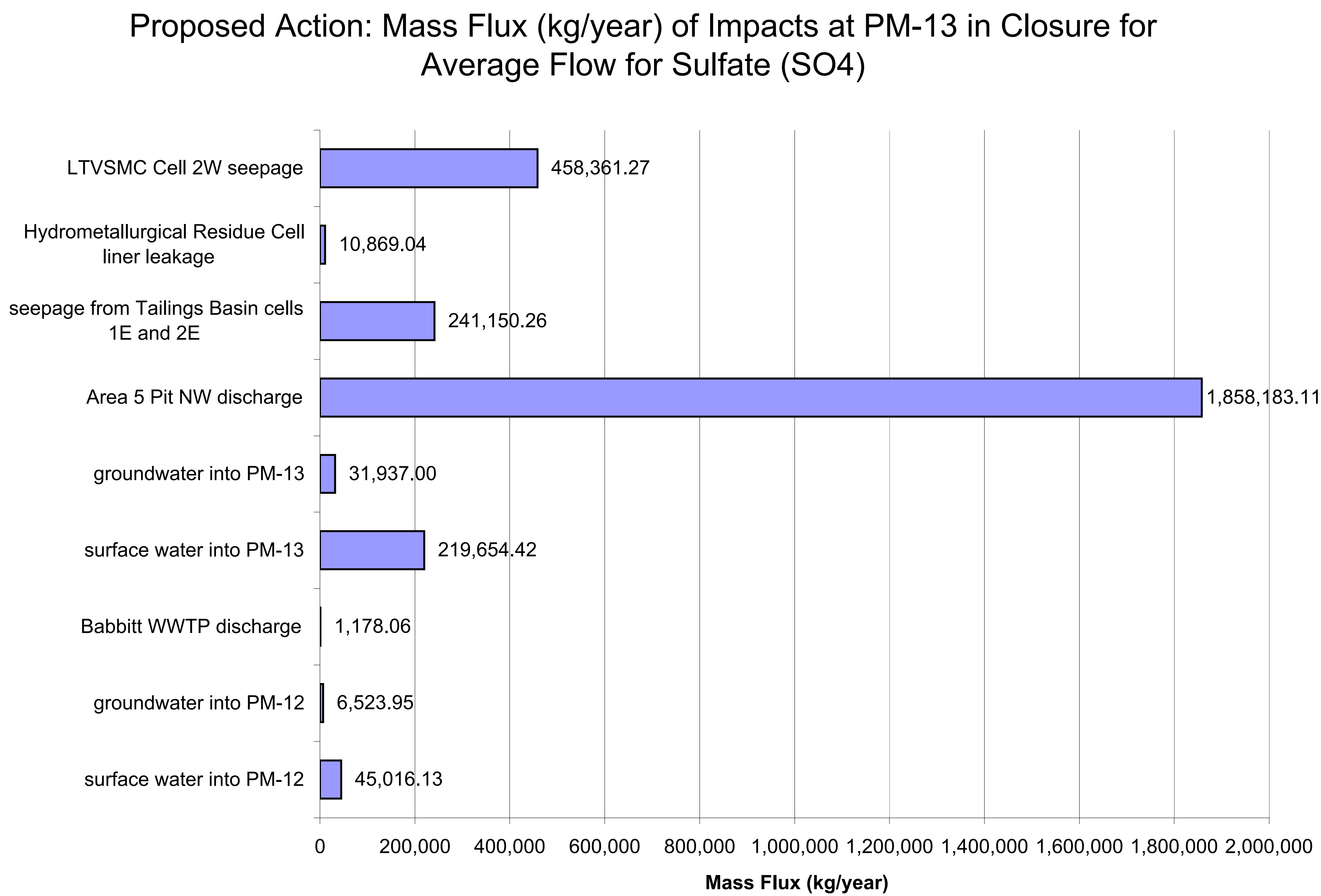

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
751.90
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
11,750.63
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
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 High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
2.16%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2E
33.73%
Area 5 Pit NW discharge
1.27%
groundwater into PM-13
16.18%
surface water into PM-13
35.99%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
3.30%
surface water into PM-12
7.33%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

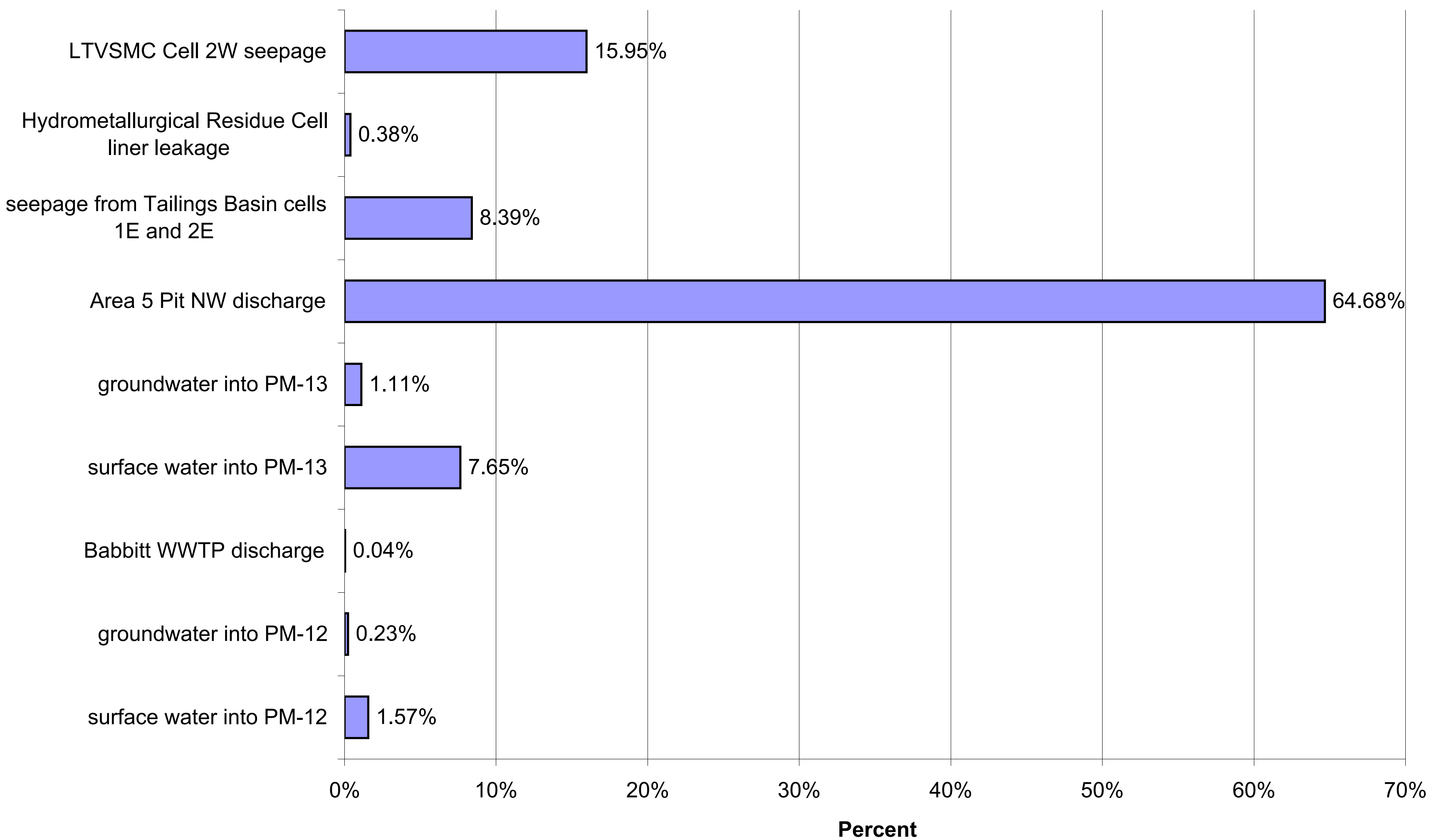

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
94,494.49
Hydrometallurgical Residue Cell liner leakage
10,869.04
seepage from Tailings Basin cells 1E and 2E
49,714.87
Area 5 Pit NW discharge
-
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
Mass Flux (kg/year)

Proposed Action: Percent of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO4)

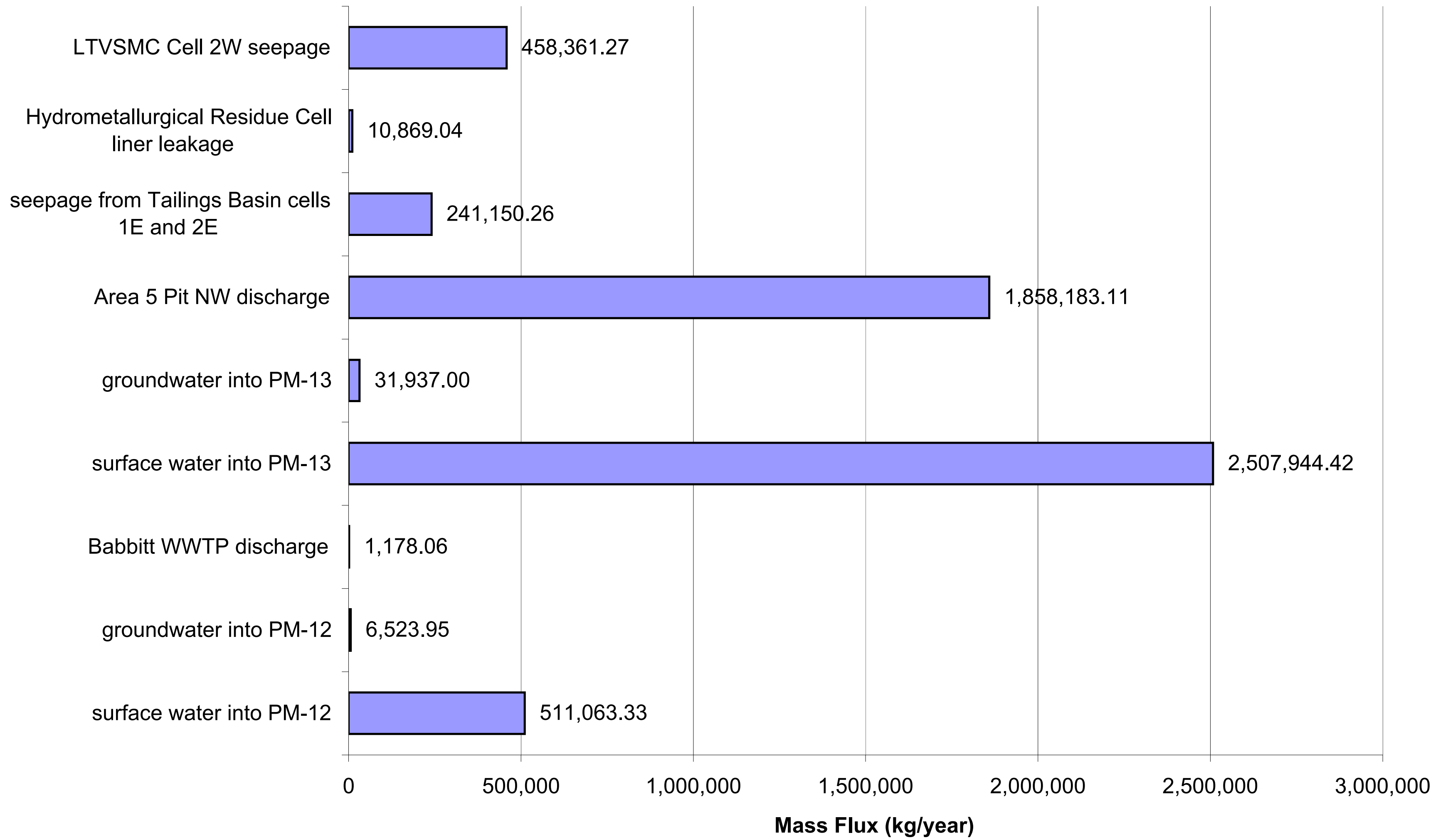


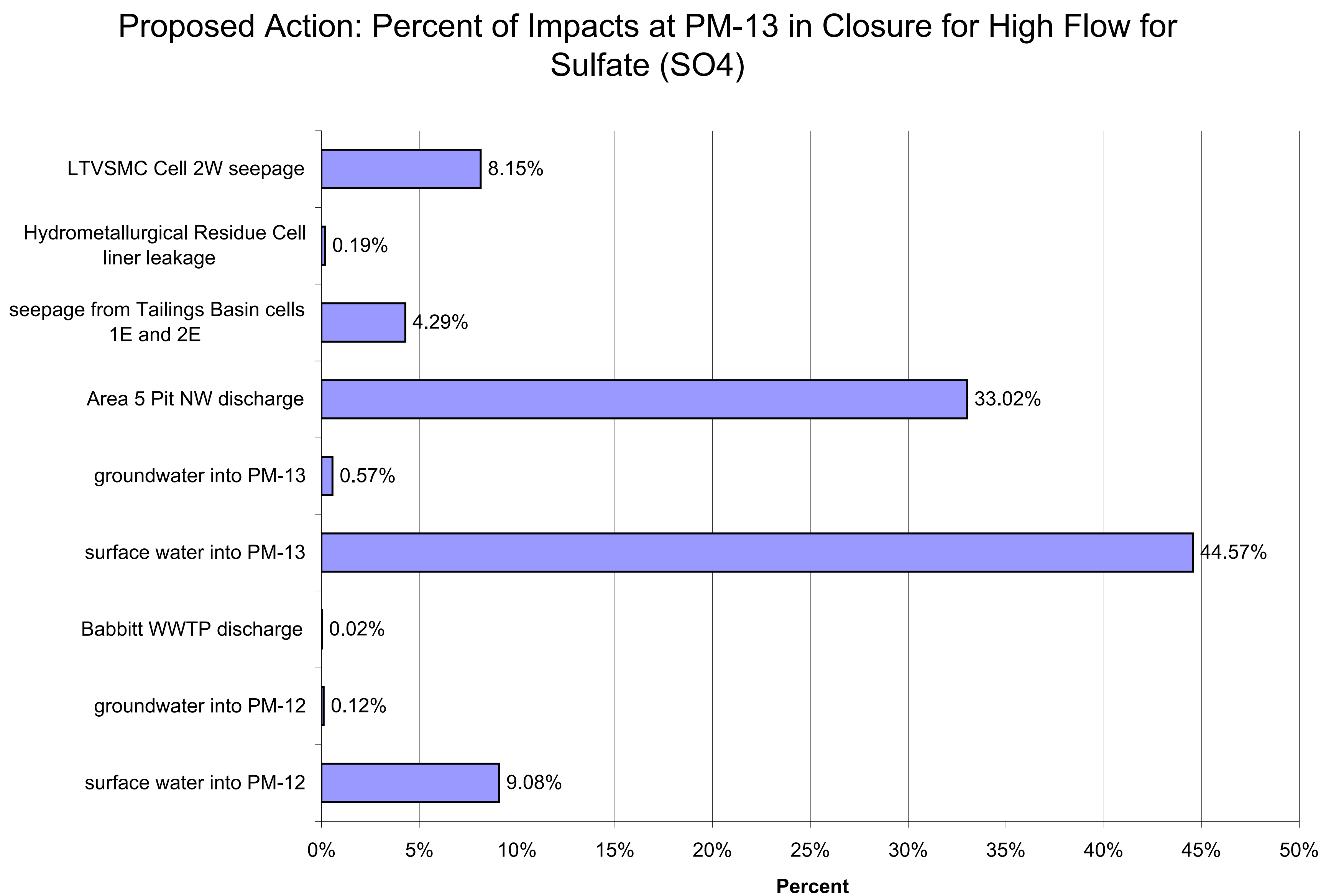

Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
458,361.27
Hydrometallurgical Residue Cell liner leakage
10,869.04
seepage from Tailings Basin cells 1E and 2E
241,150.26
Area 5 Pit NW discharge
1,858,183.11
groundwater into 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)

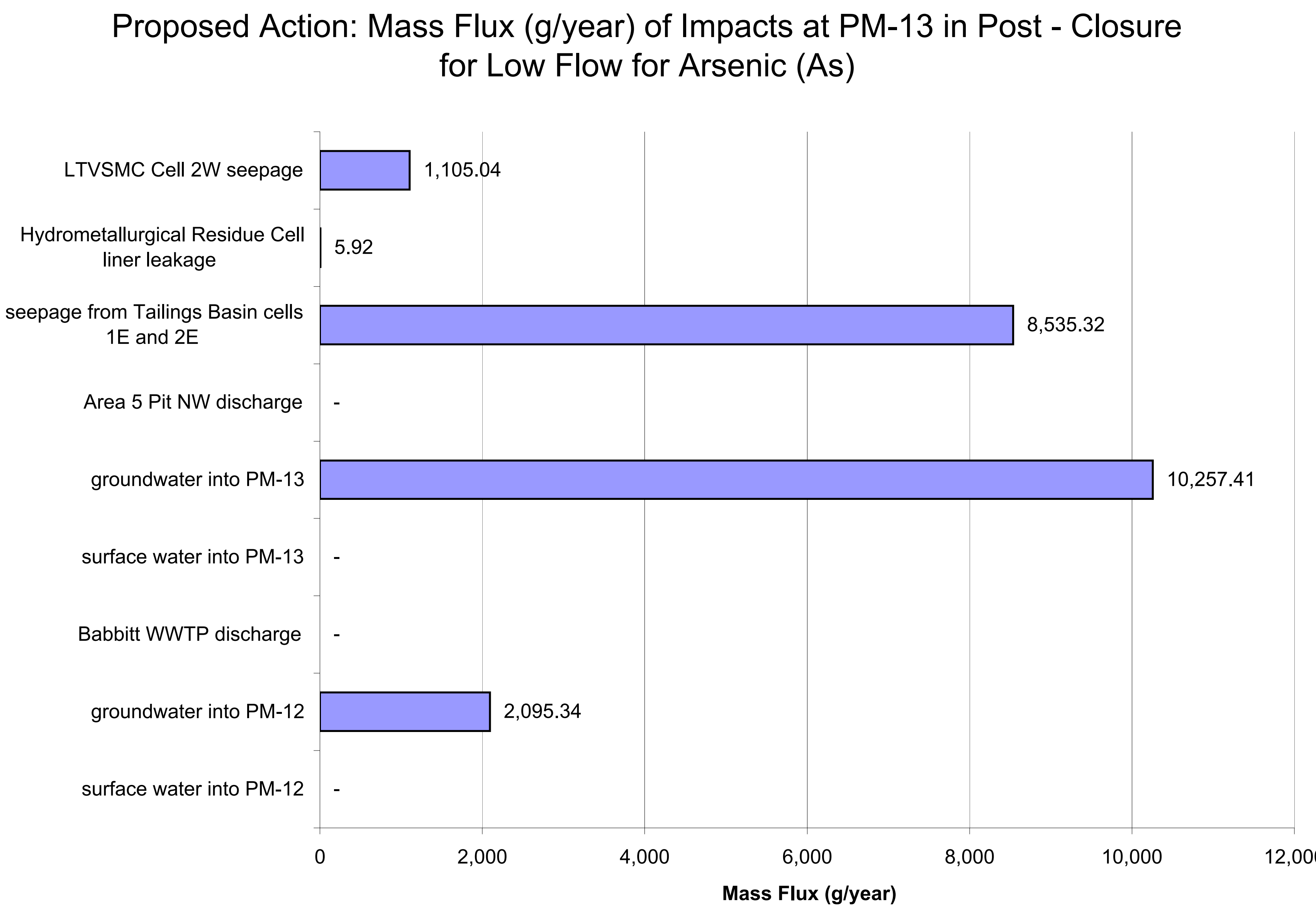
Proposed Action: Percent of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO4)

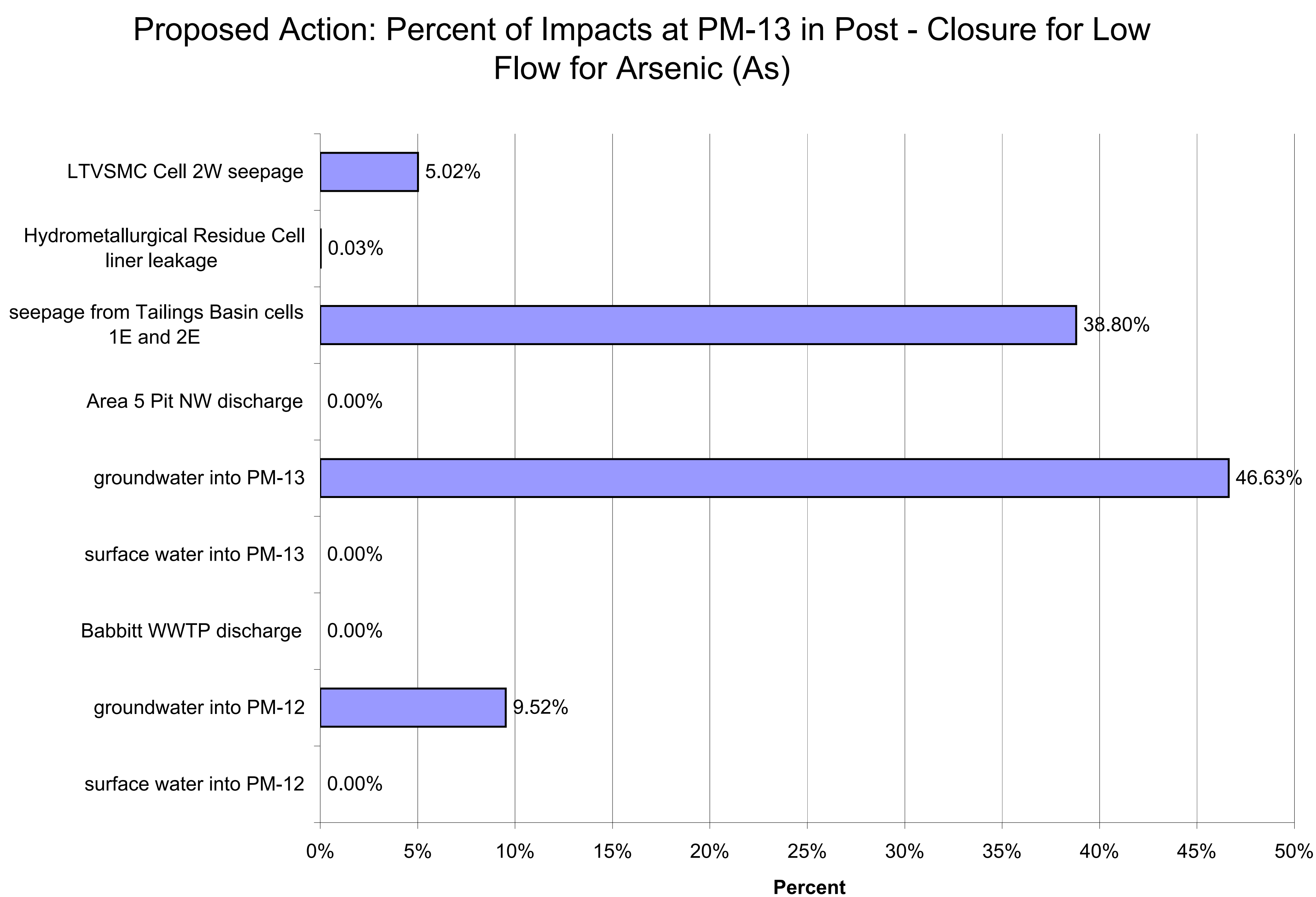


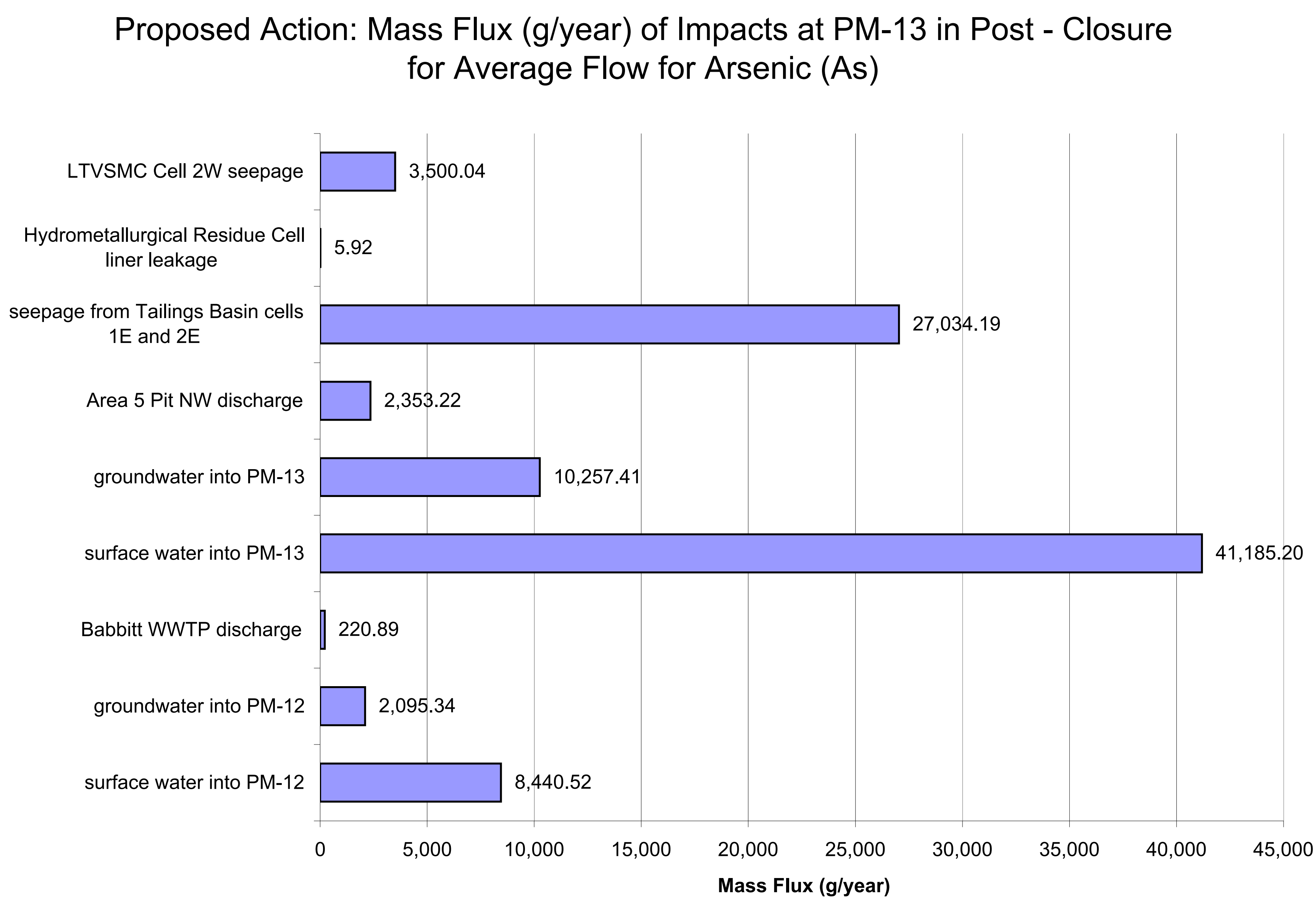
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Closure for High Flow for Sulfate (SO4)

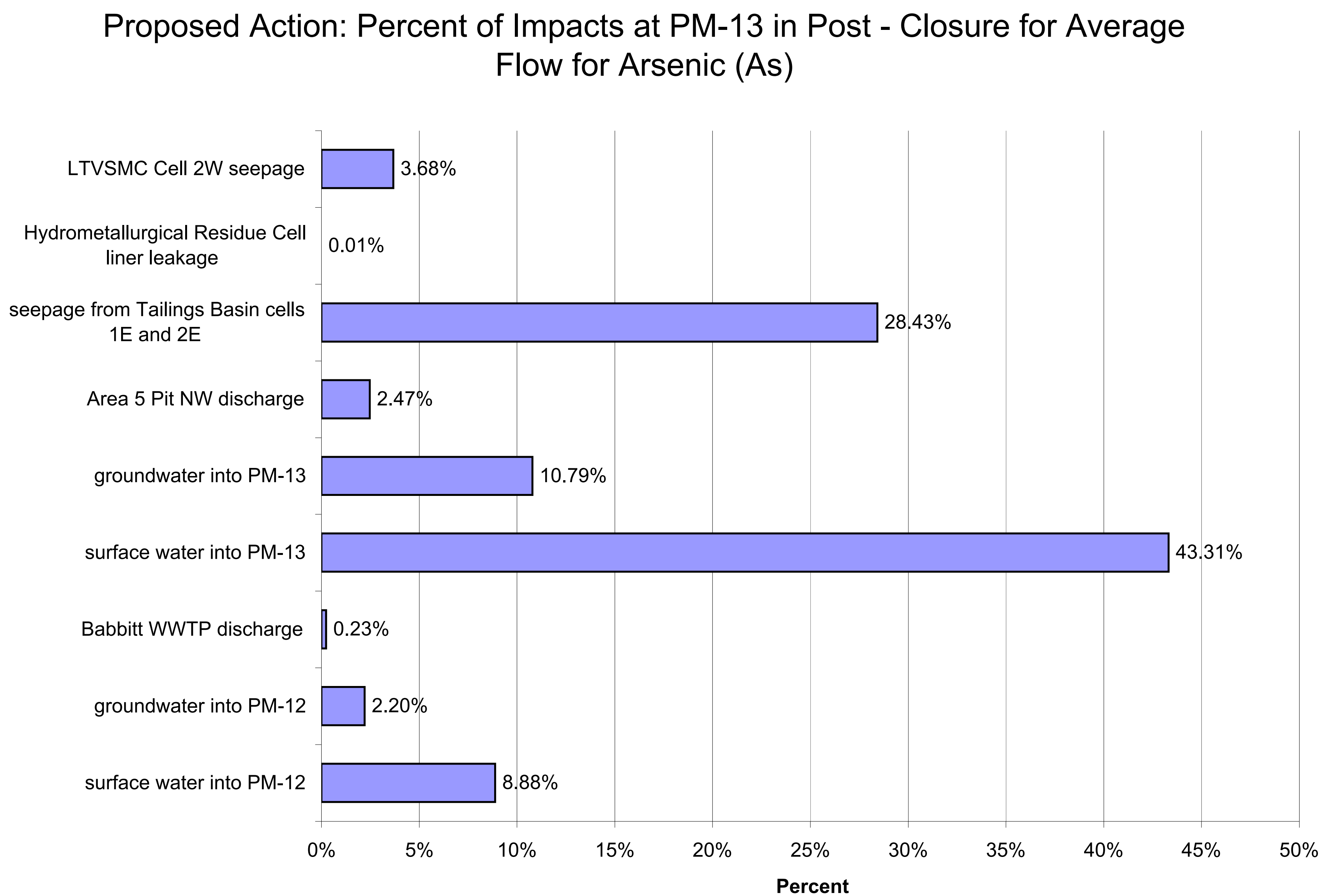


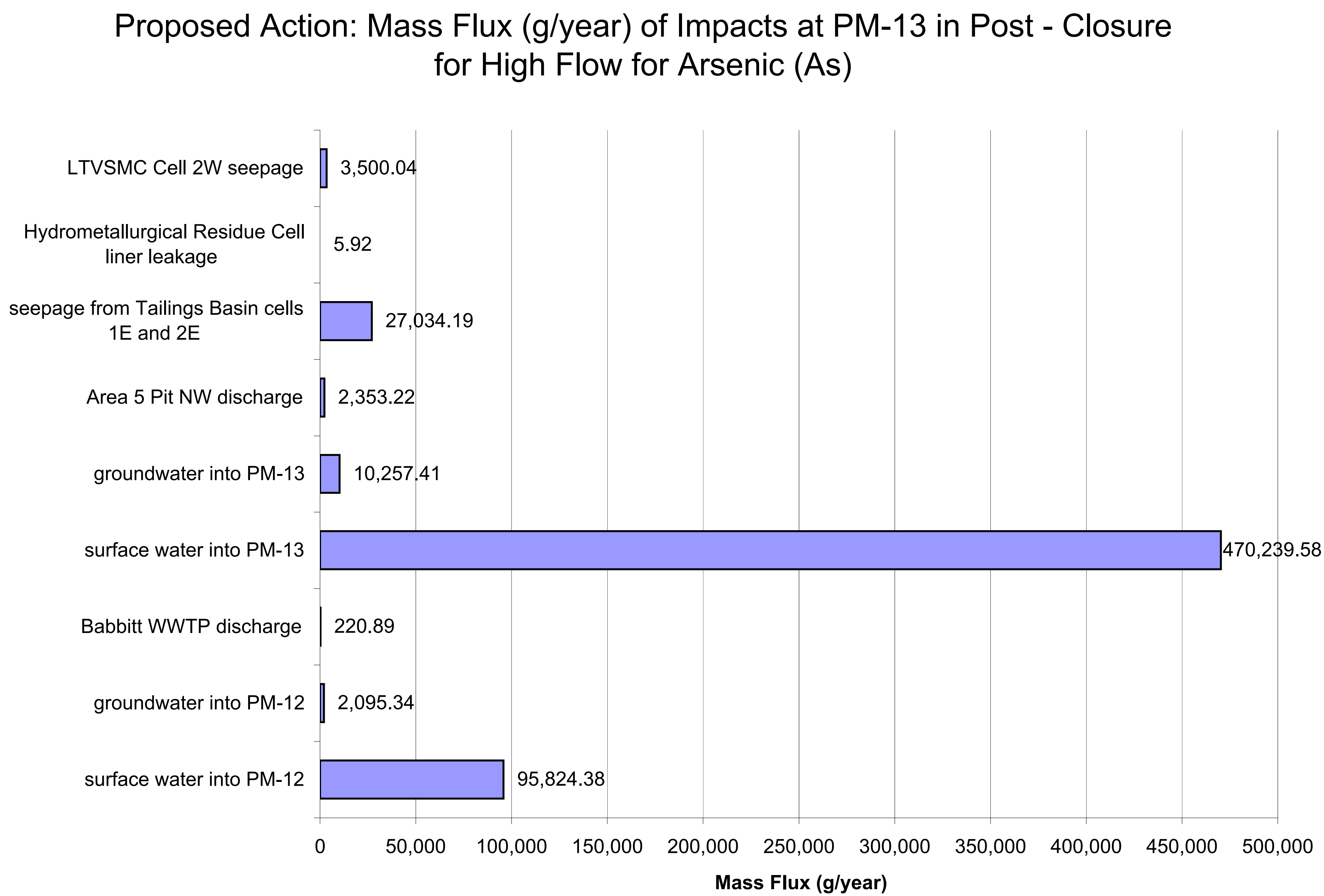

Proposed Action: Percent of Impacts at PM-13 in Closure for High Flow for Sulfate (SO4)
LTVSMC Cell 2W seepage
8.15%
Hydrometallurgical Residue Cell liner leakage
0.19%
seepage from Tailings Basin cells 1E and 2E
4.29%
Area 5 Pit NW discharge
33.02%
groundwater into PM-13
0.57%
surface water into PM-13
44.57%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
0.12%
surface water into PM-12
9.08%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

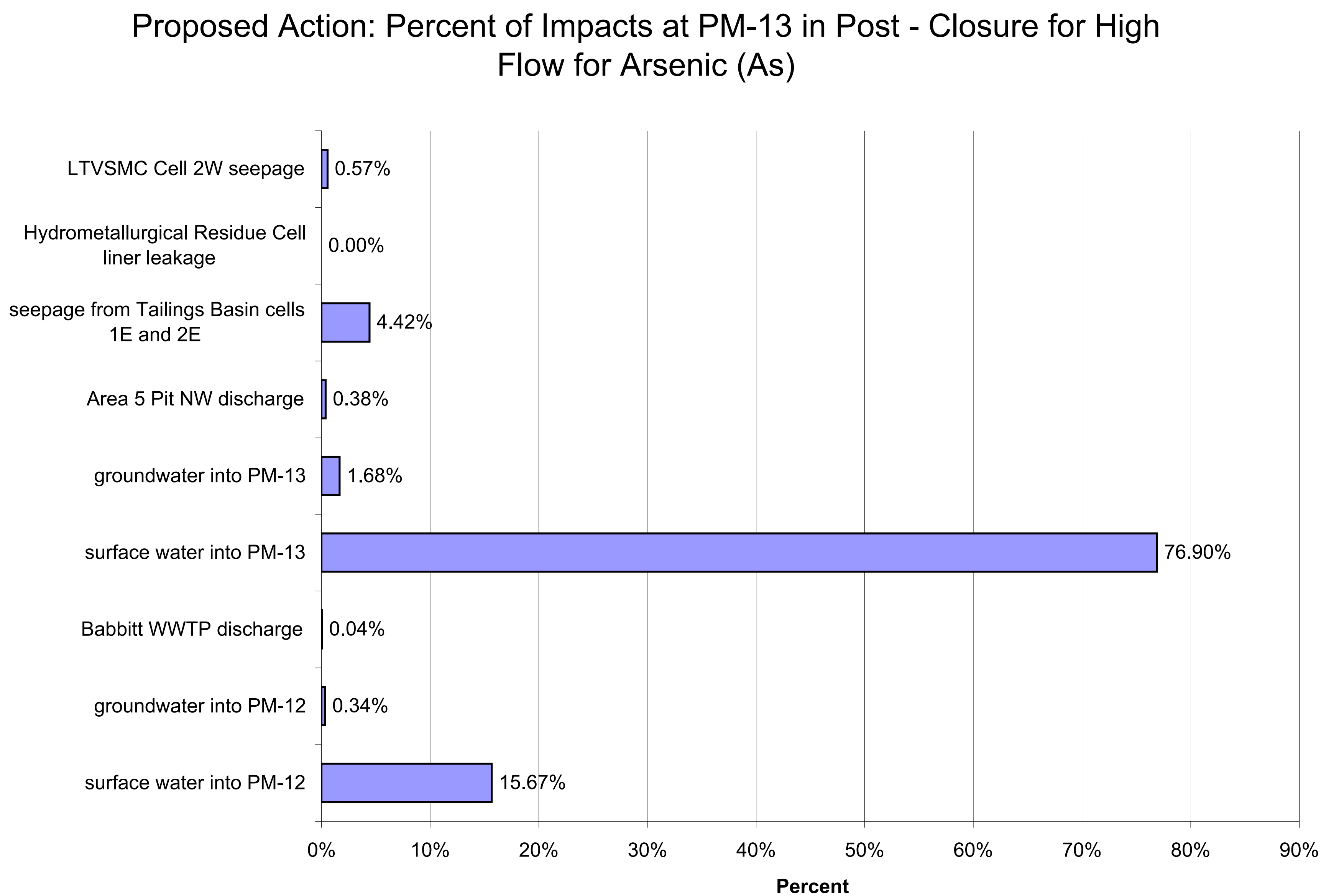

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1,105.04
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
8,535.32
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)

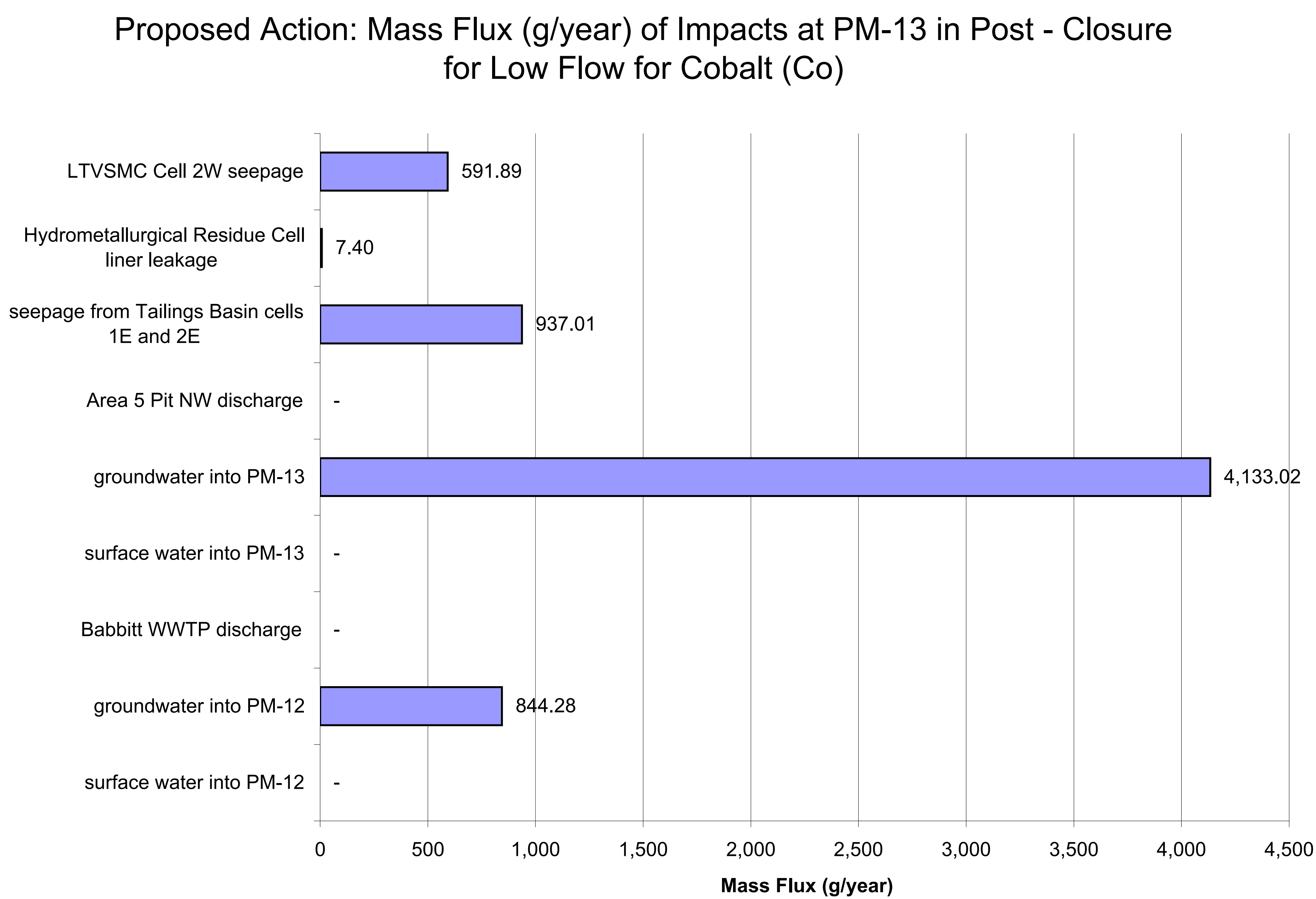

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
5.02%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
38.80%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
46.63%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
9.52%
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 Arsenic (As)
LTVSMC Cell 2W seepage
3,500.04
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)

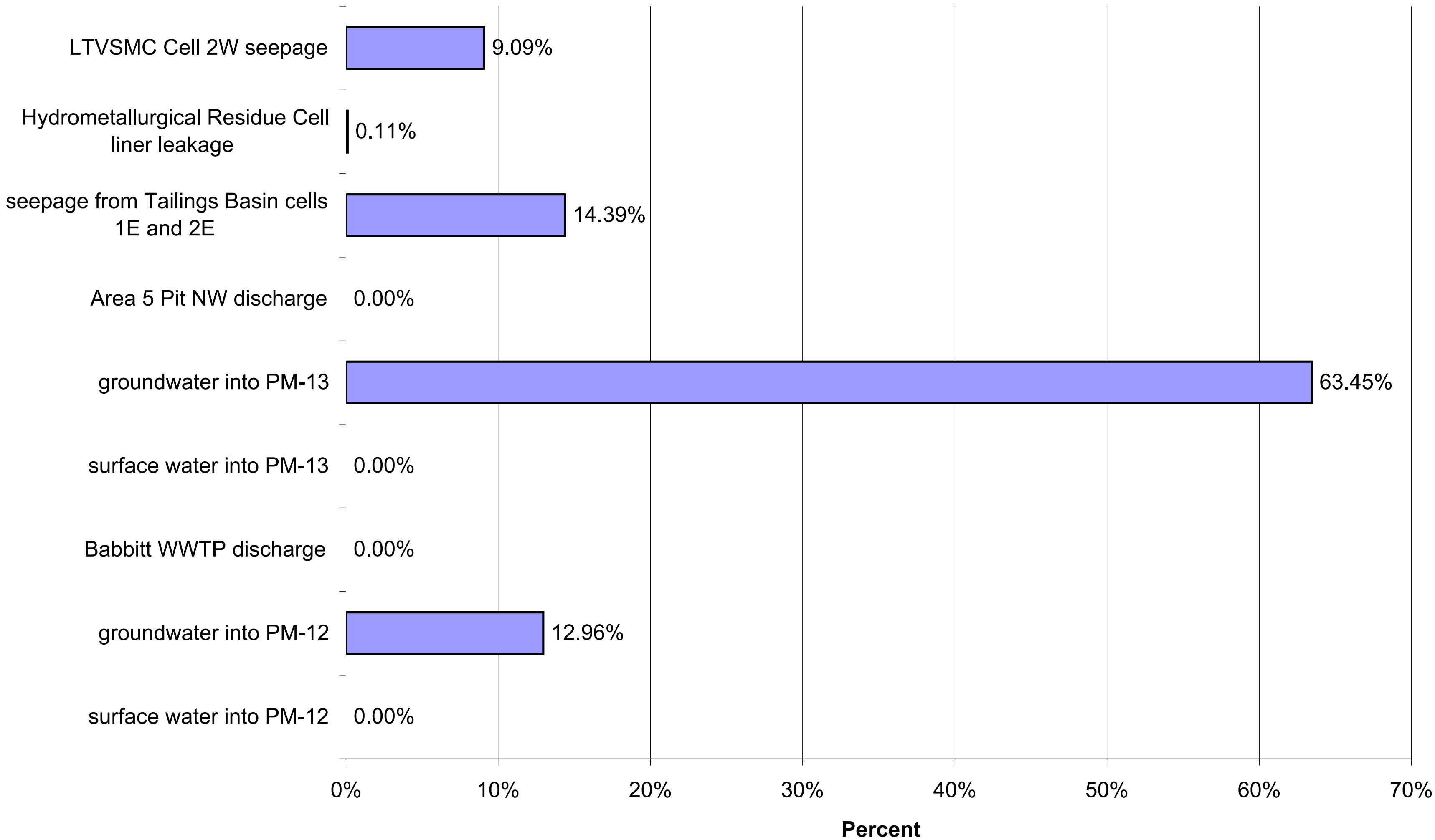

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.68%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
28.43%
Area 5 Pit NW discharge
2.47%
groundwater into PM-13
10.79%
surface water into PM-13
43.31%
Babbitt WWTP discharge
0.23%
groundwater into PM-12
2.20%
surface water into PM-12
8.88%
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 High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,500.04
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)

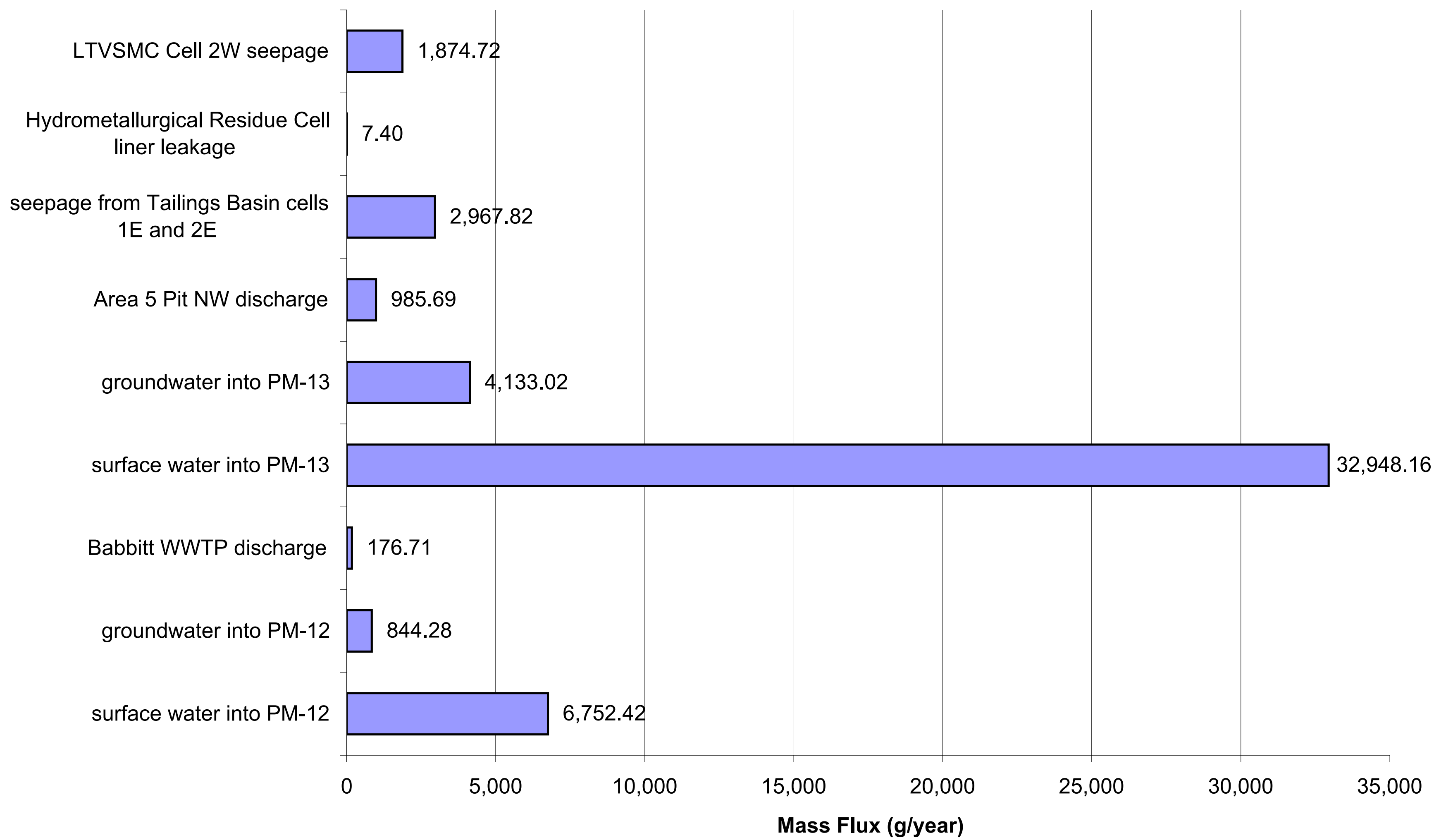

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
0.57%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
4.42%
Area 5 Pit NW discharge
0.38%
groundwater into PM-13
1.68%
surface water into PM-13
76.90%
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)
LTVSMC Cell 2W seepage
591.89
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
937.01
Area 5 Pit NW discharge
-
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

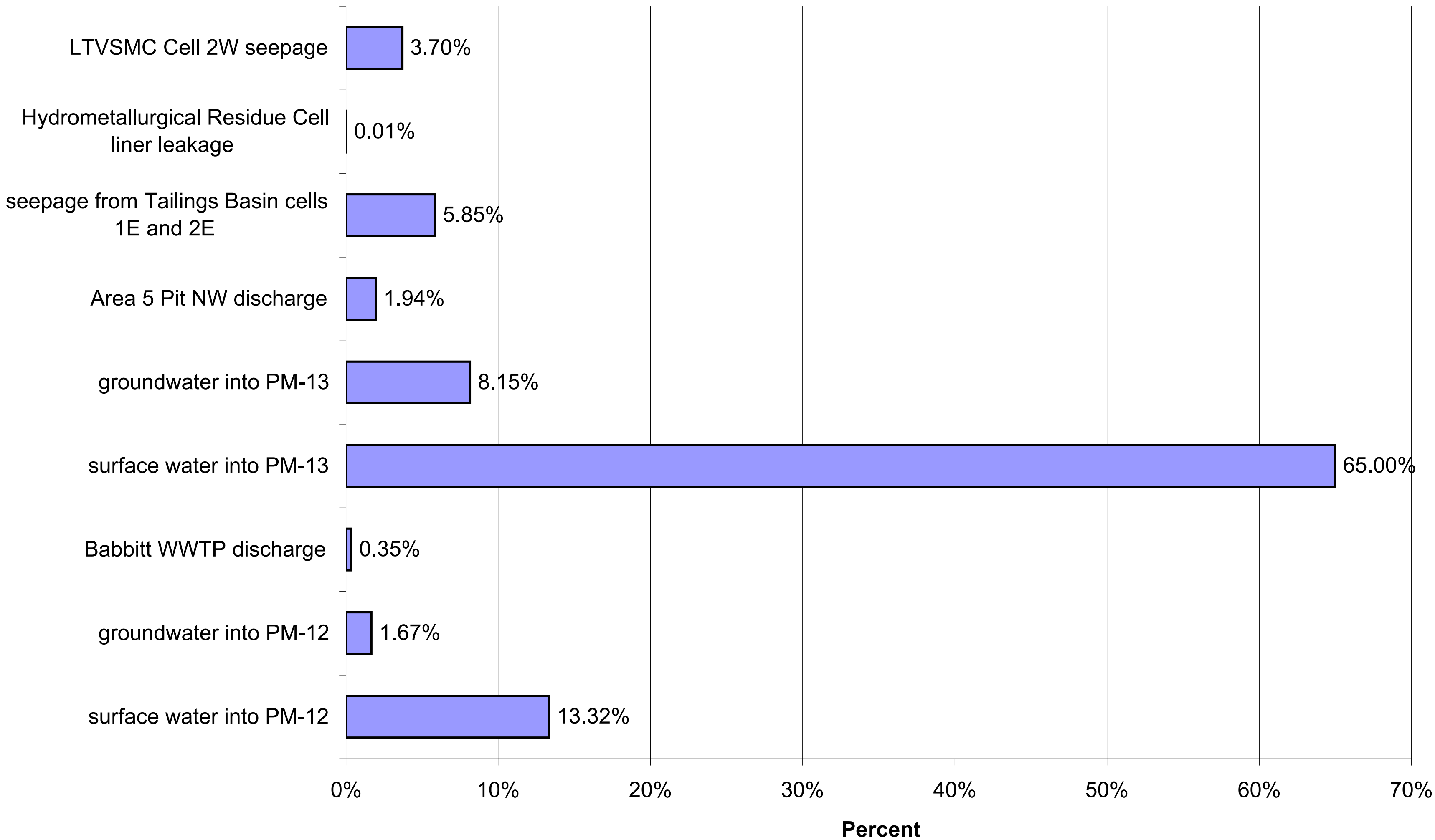
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)

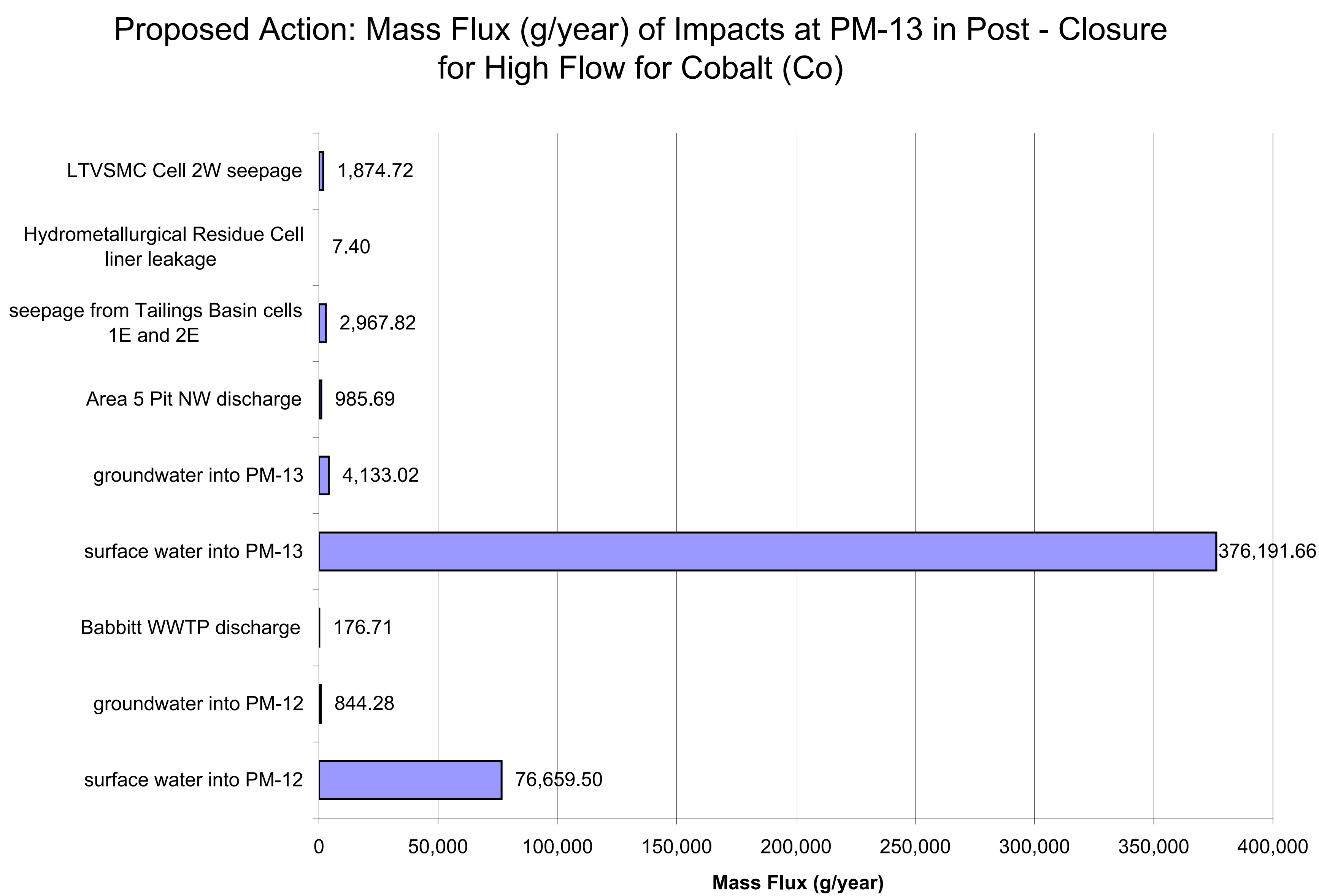


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)

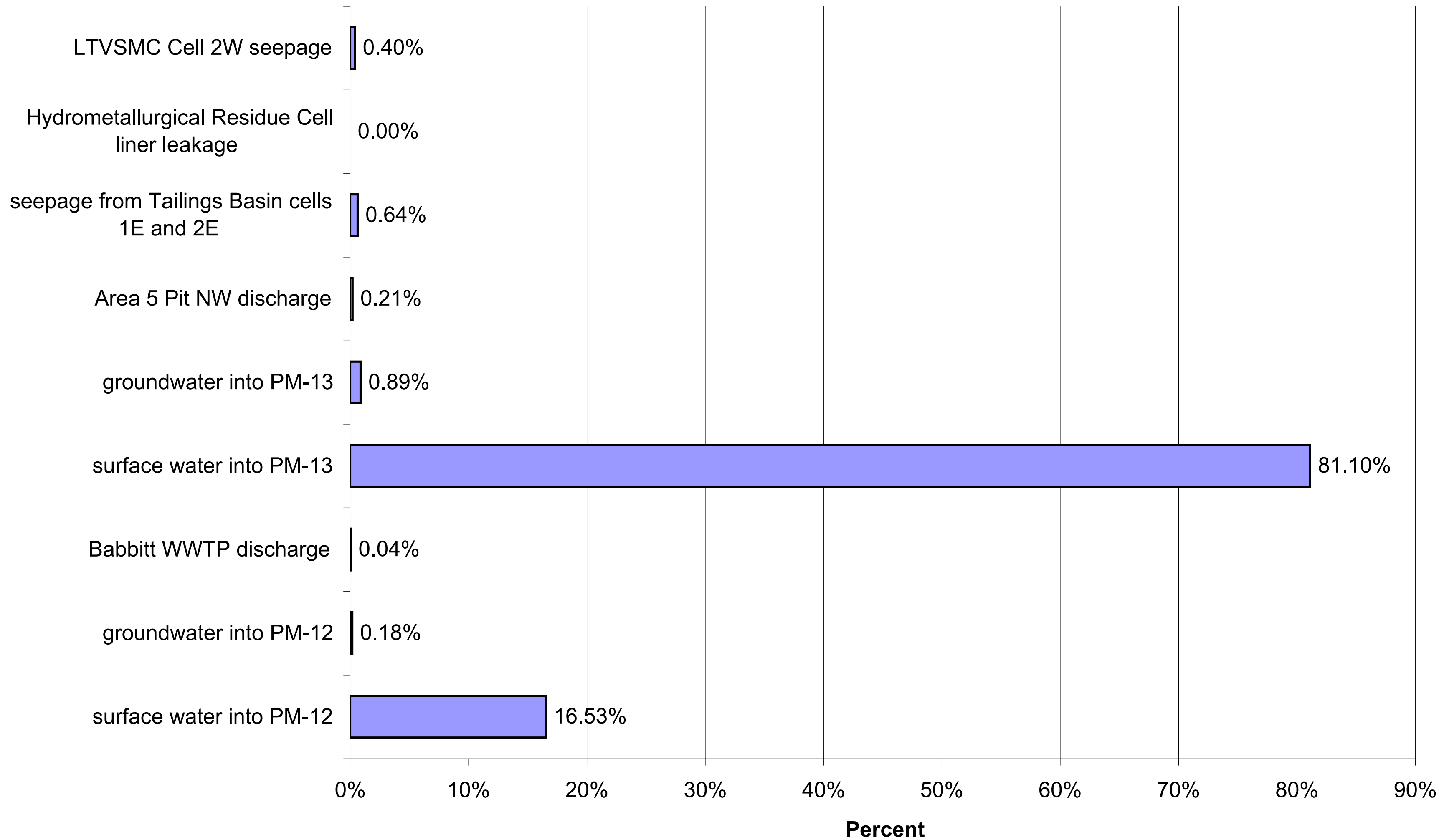


Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)

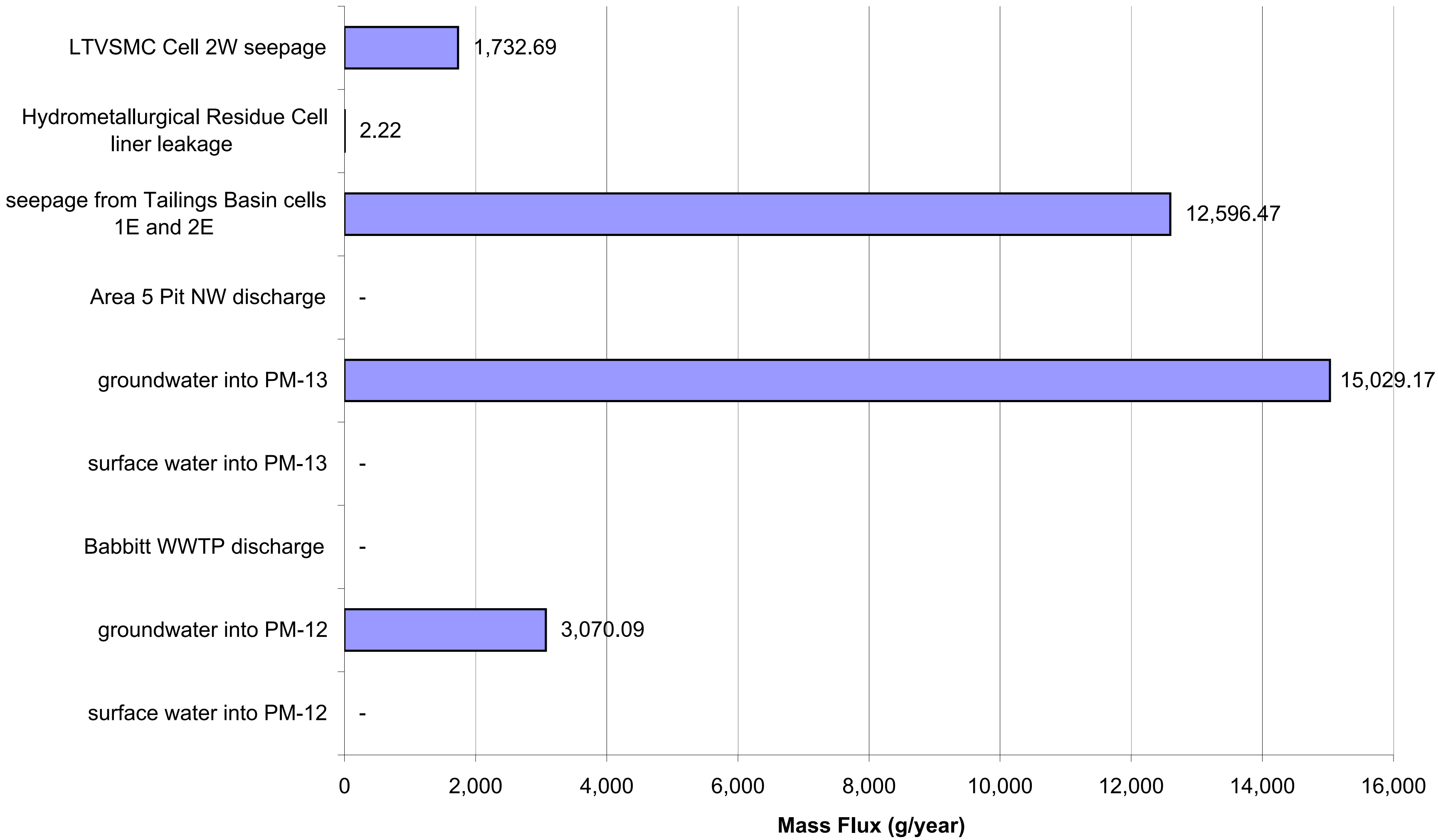



Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,874.72
Hydrometallurgical Residue Cell liner leakage
7.40
seepage from Tailings Basin cells 1E and 2E
2,967.82
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
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)

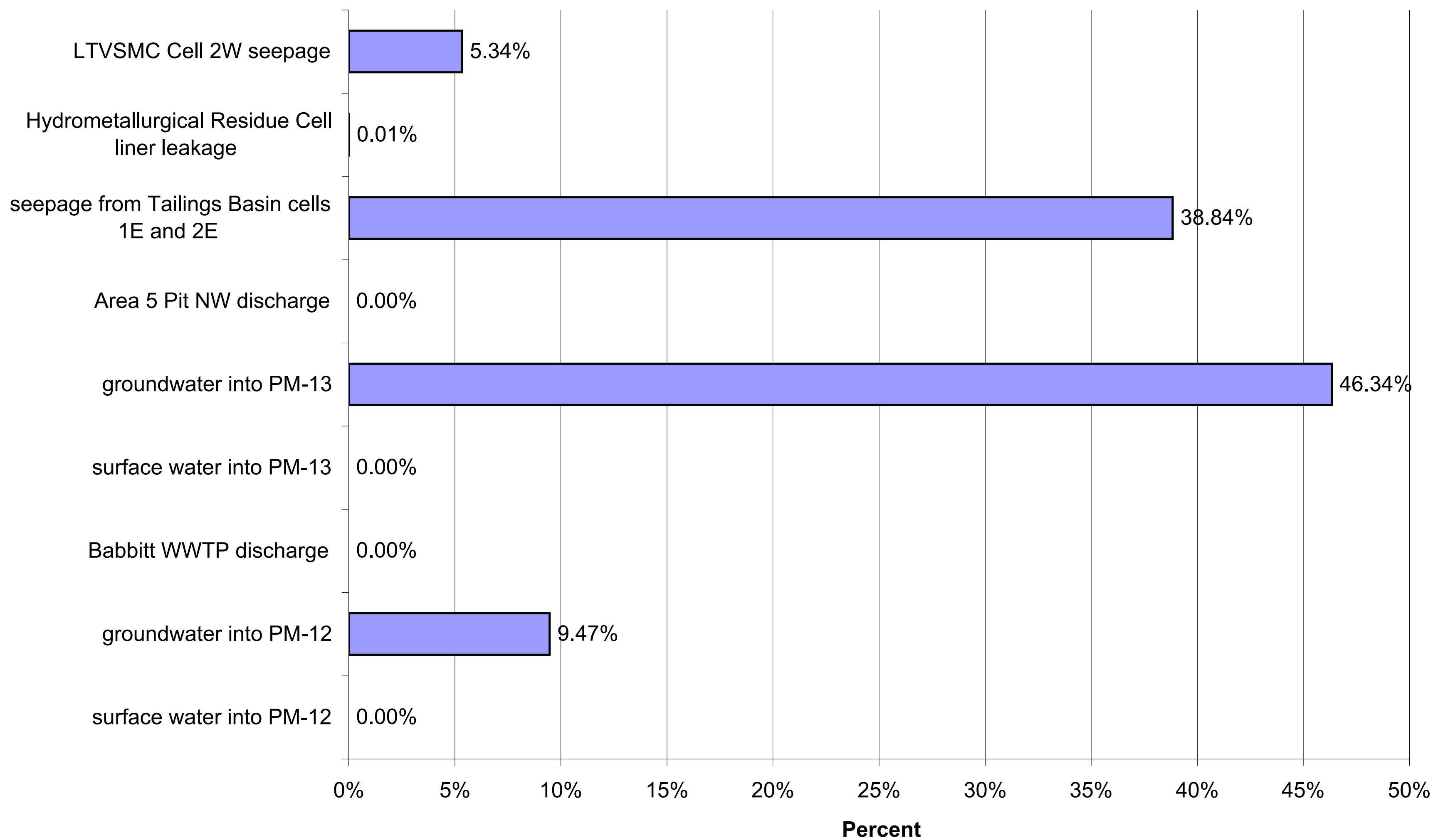
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)

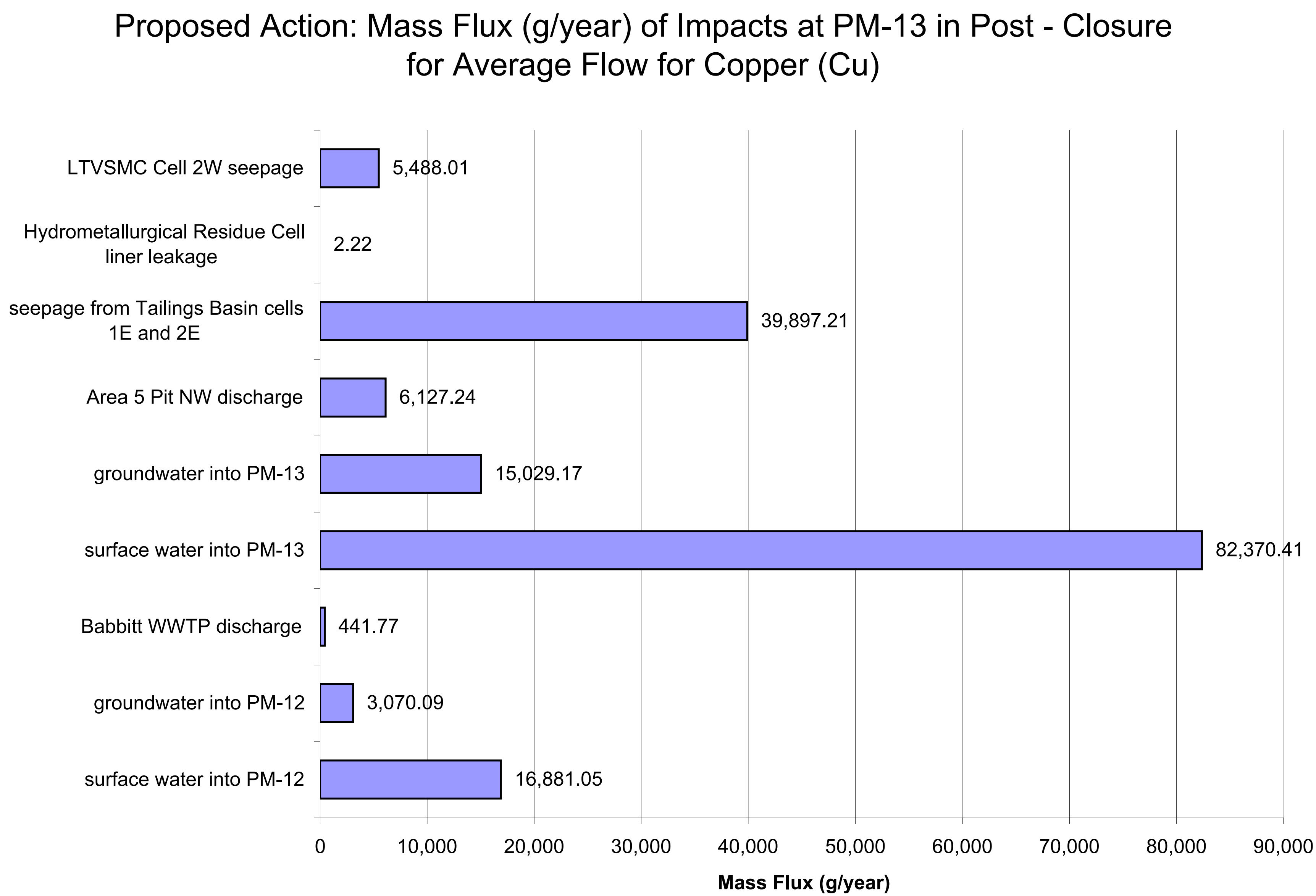


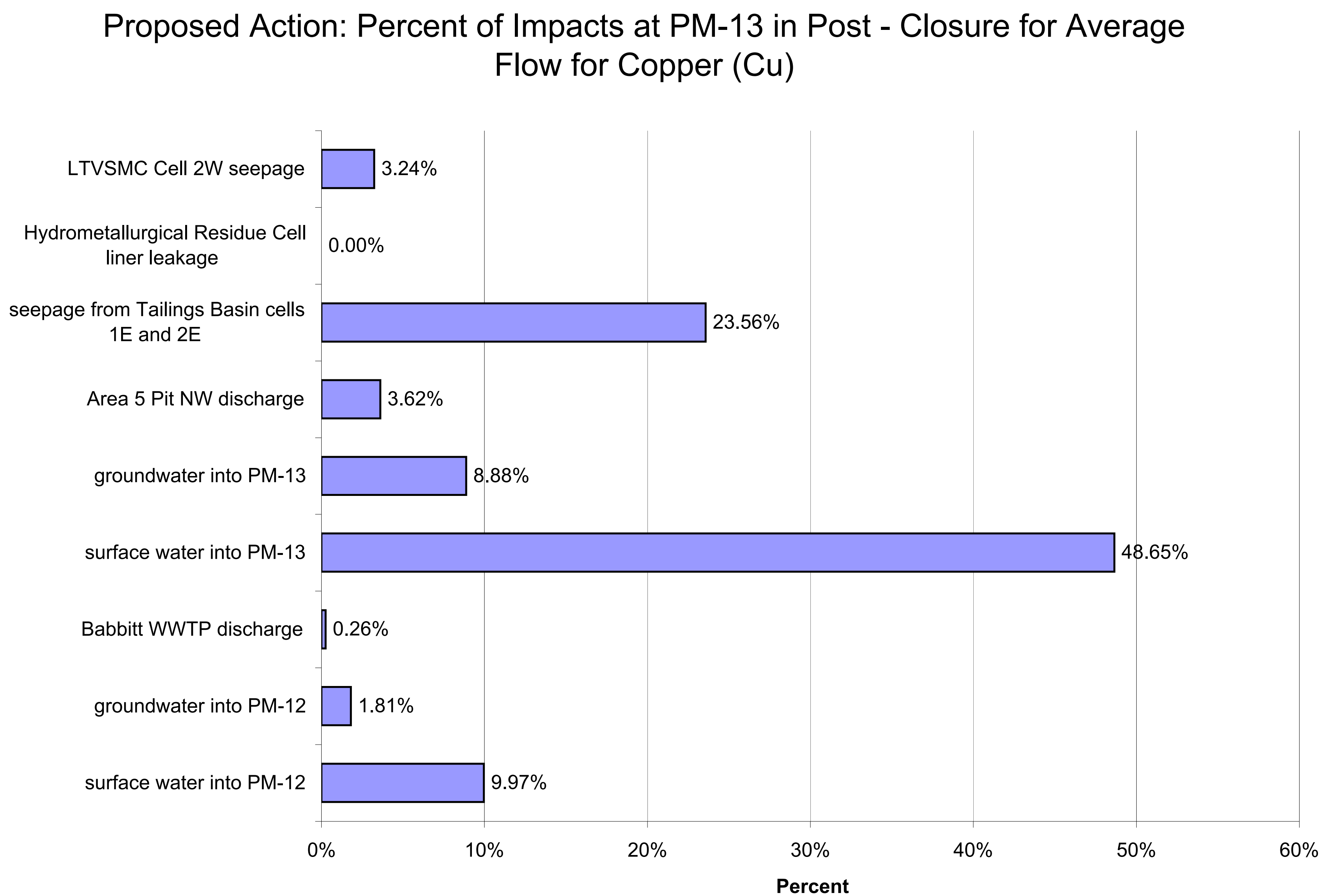
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)

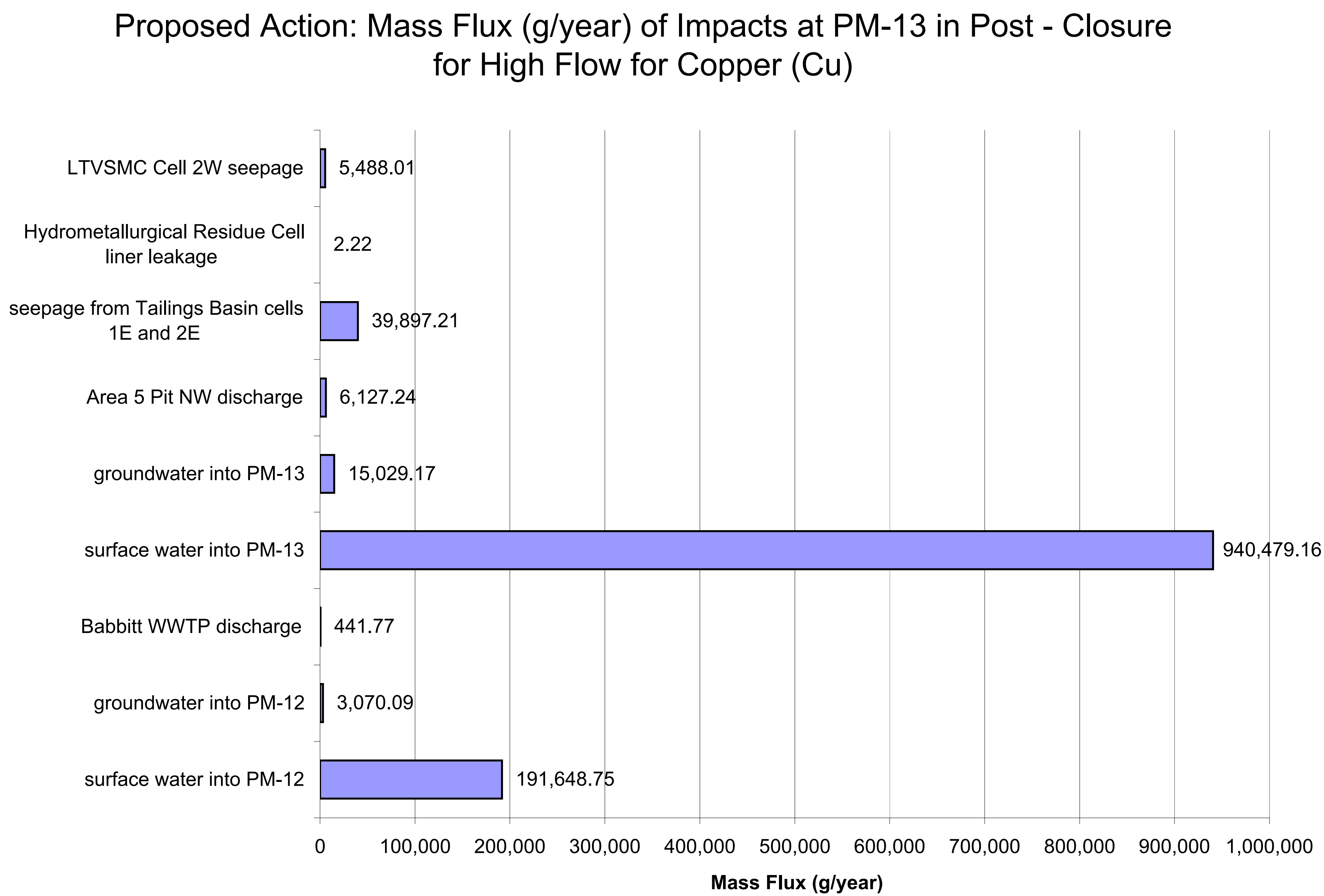


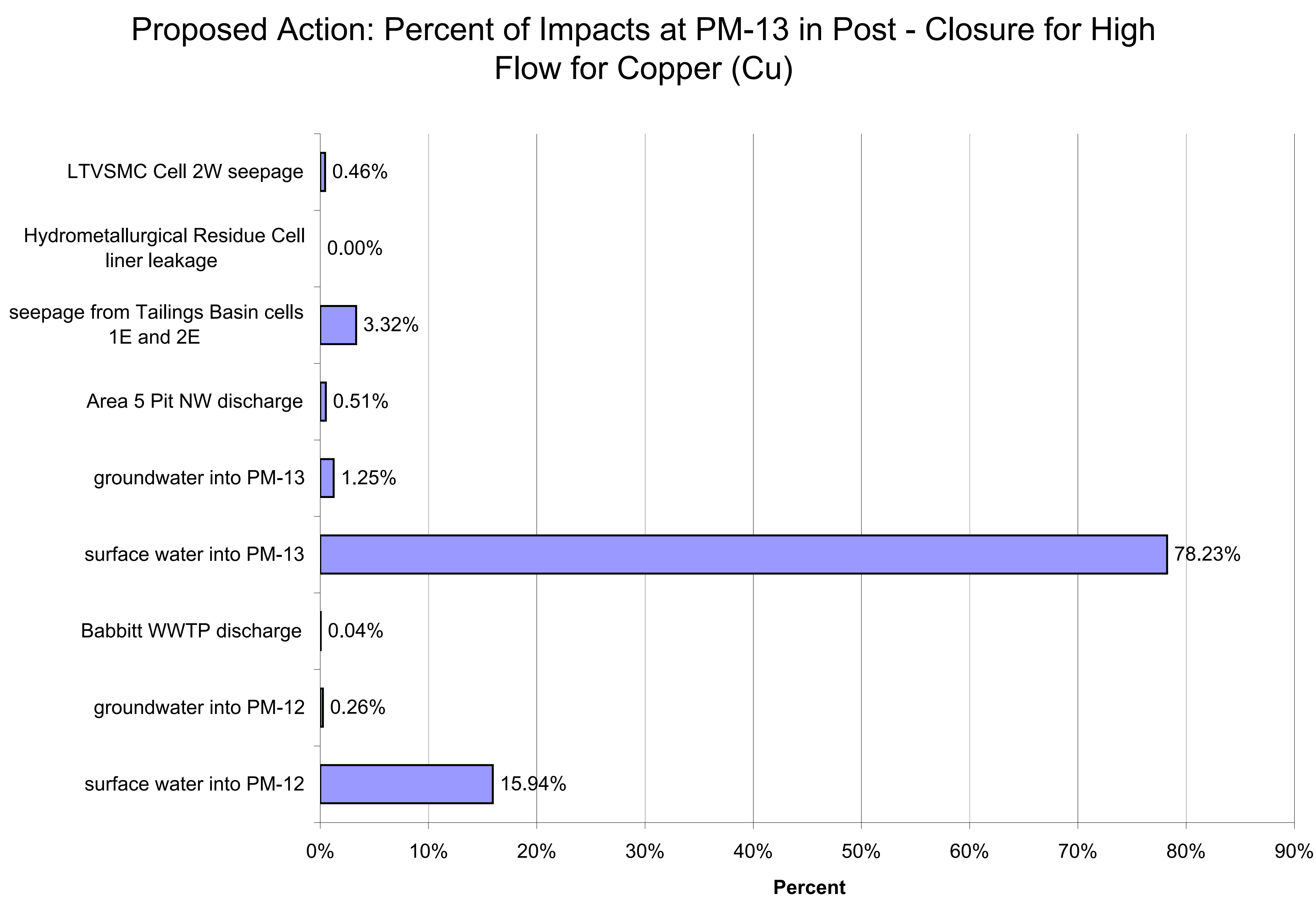
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)

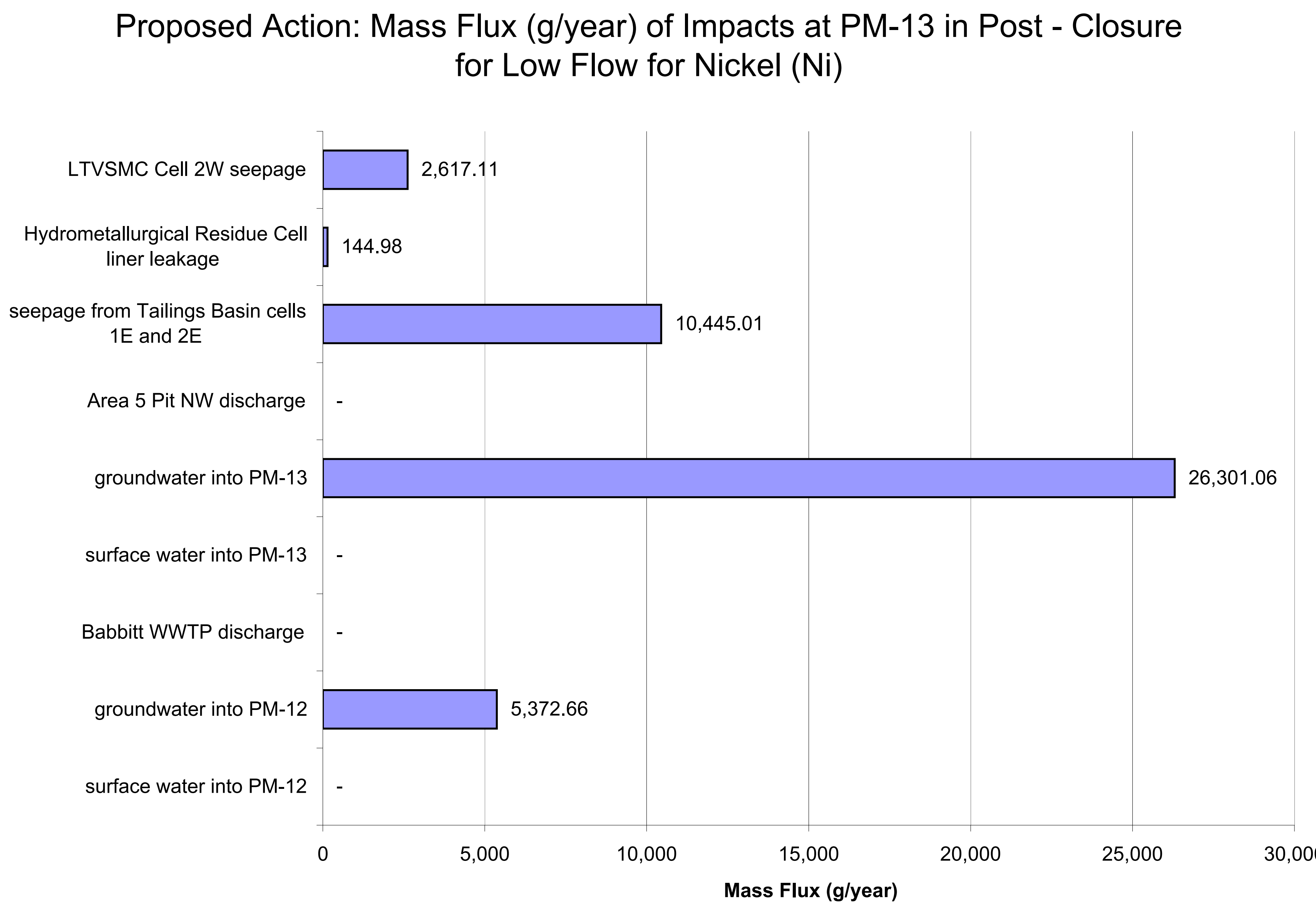


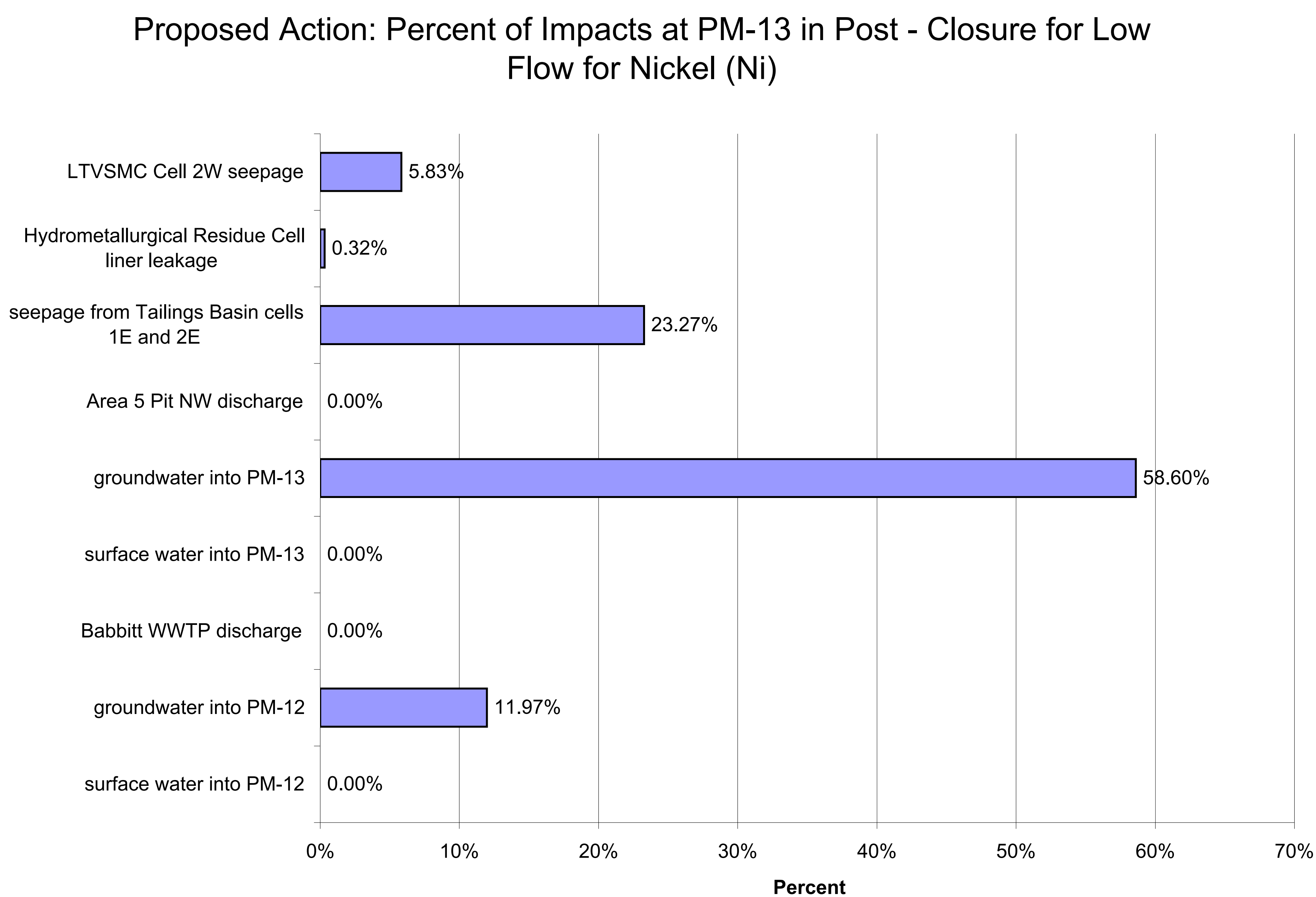

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,488.01
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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)
LTVSMC Cell 2W seepage
3.24%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
23.56%
Area 5 Pit NW discharge
3.62%
groundwater into PM-13
8.88%
surface water into PM-13
48.65%
Babbitt WWTP discharge
0.26%
groundwater into PM-12
1.81%
surface water into PM-12
9.97%
0%
10%
20%
30%
40%
50%
60%
Percent

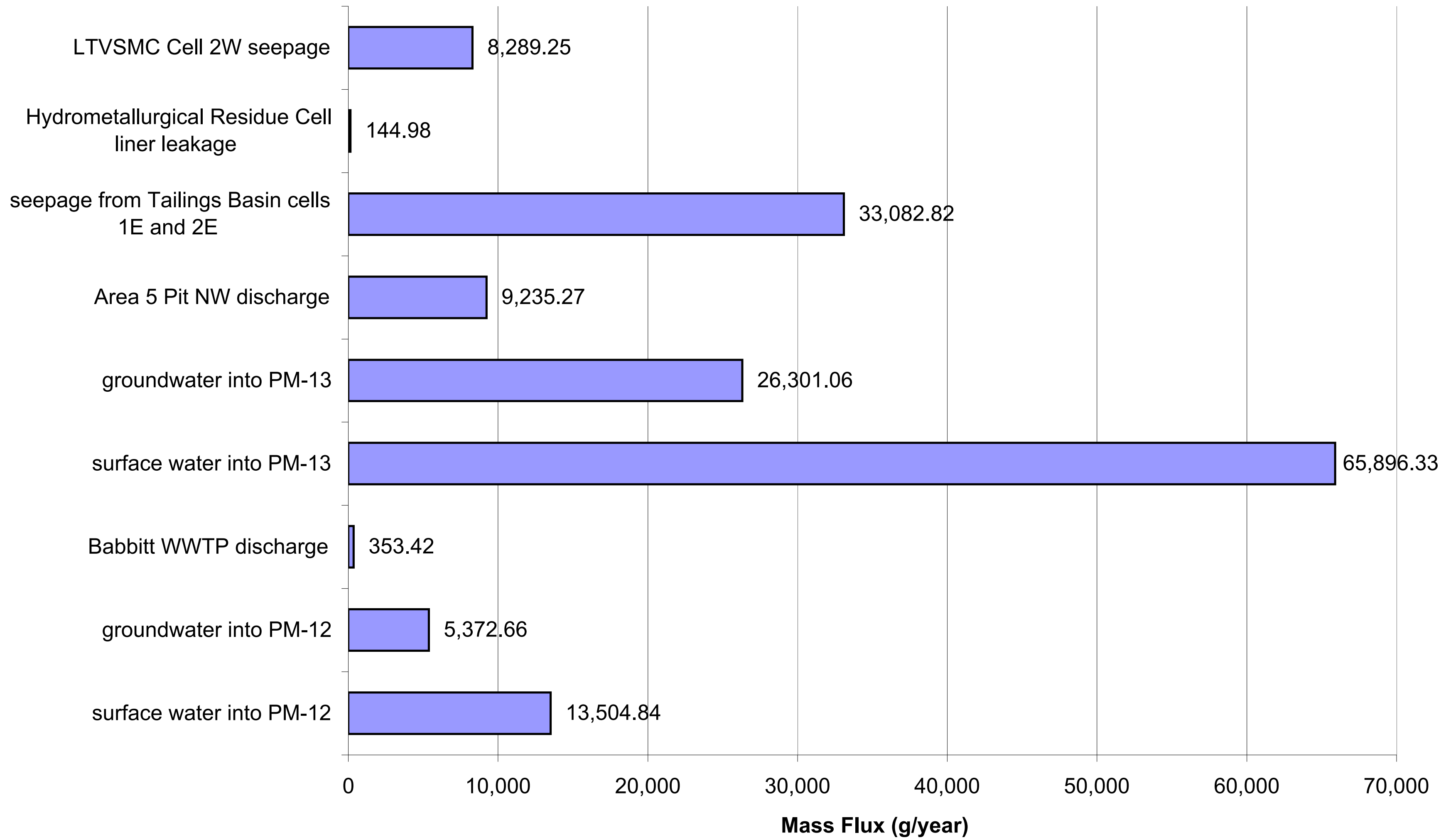

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,488.01
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin cells 1E and 2E
39,897.21
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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)

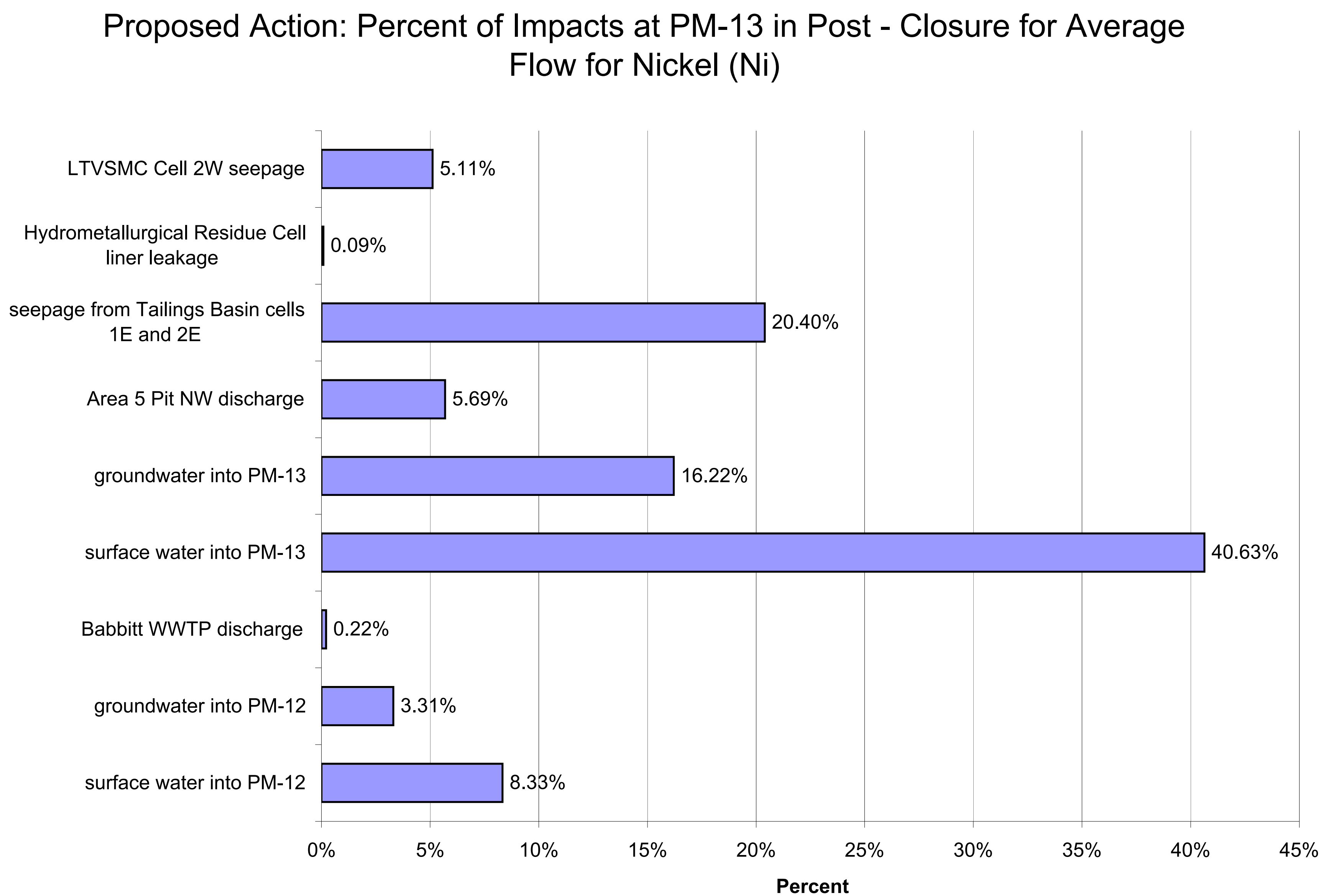

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
0.46%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
3.32%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.25%
surface water into 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)
LTVSMC Cell 2W seepage
2,617.11
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin cells 1E and 2E
10,445.01
Area 5 Pit NW discharge
-
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

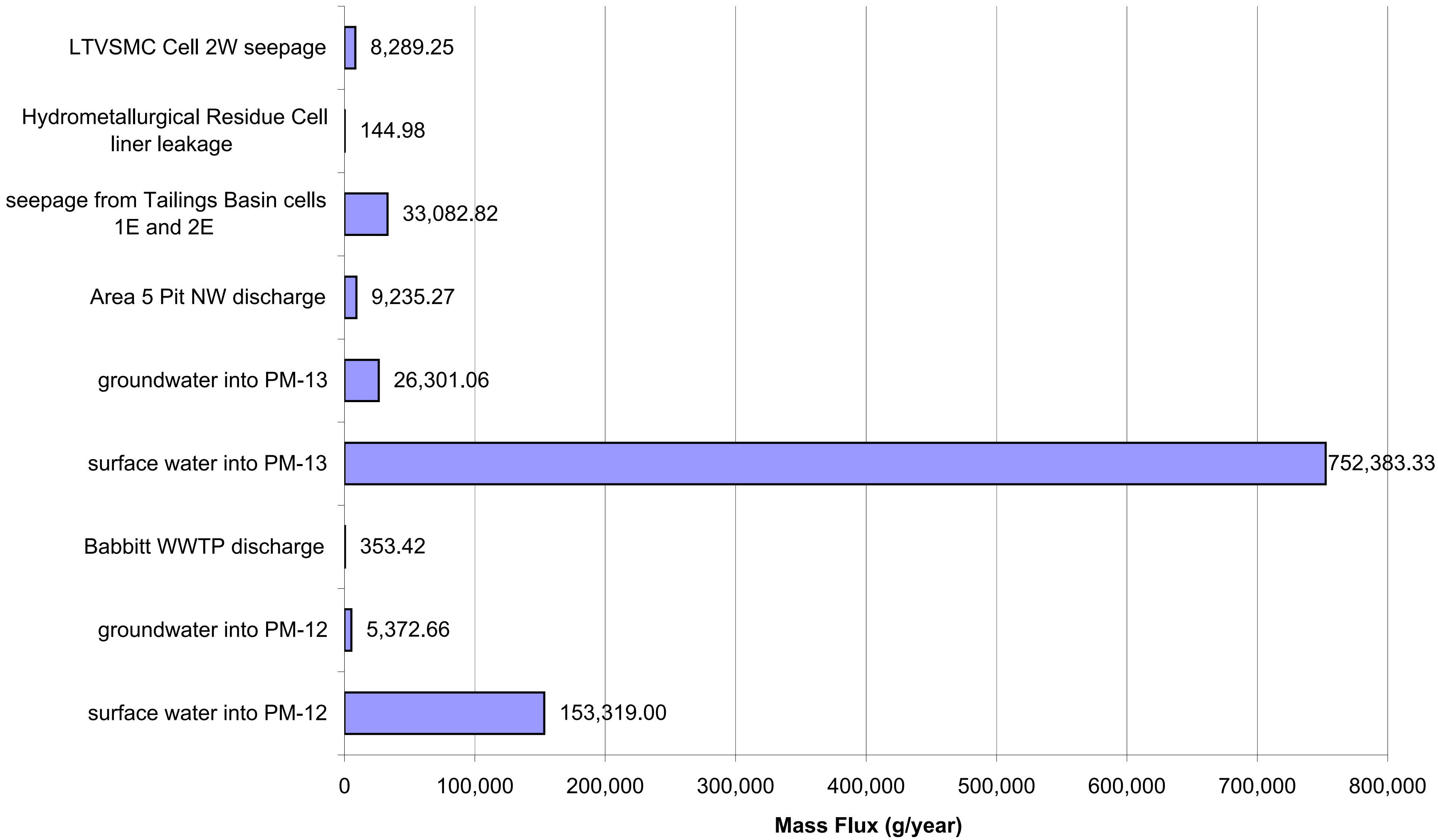

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5.83%
Hydrometallurgical Residue Cell liner leakage
0.32%
seepage from Tailings Basin cells 1E and 2E
23.27%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
58.60%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
11.97%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

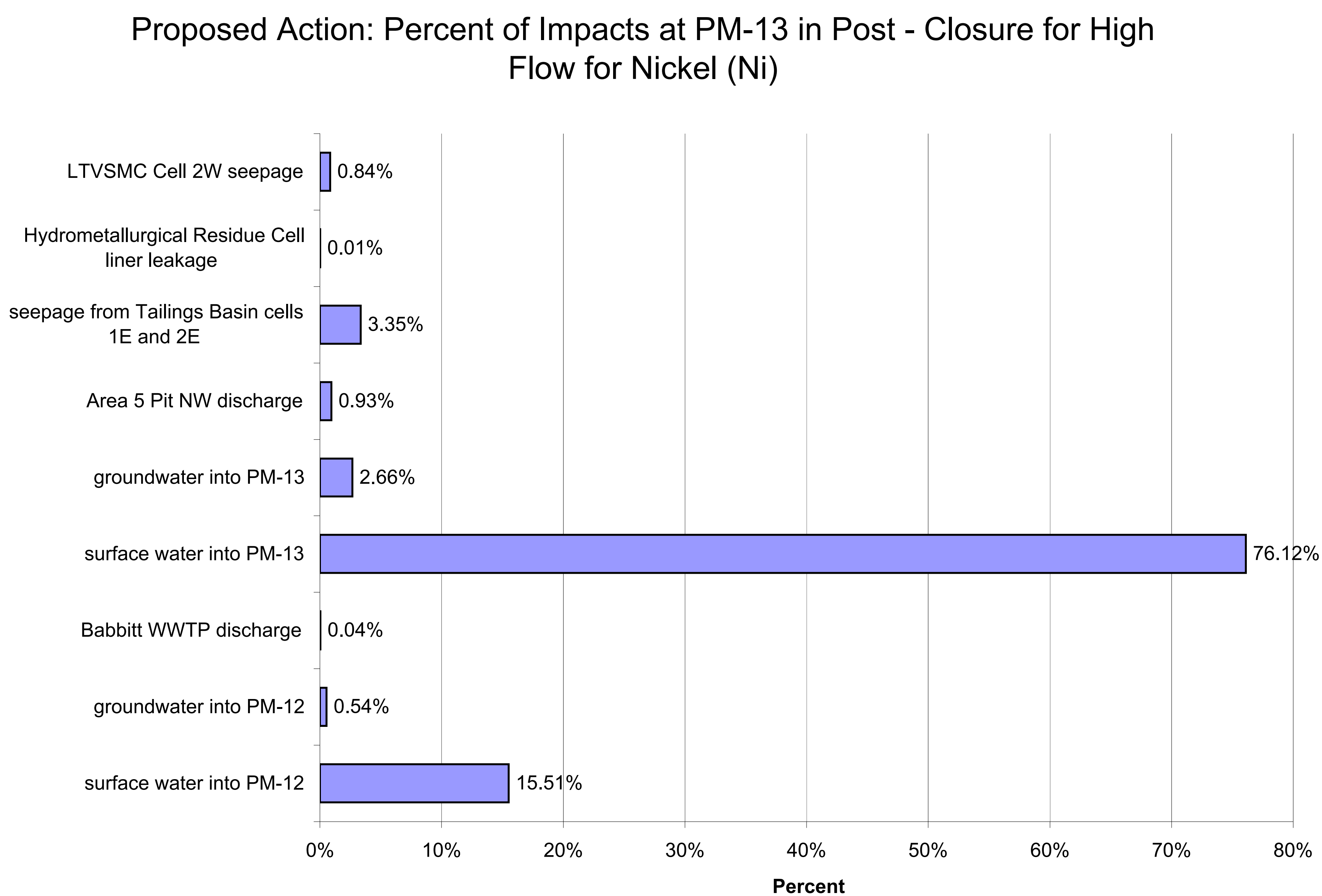
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)

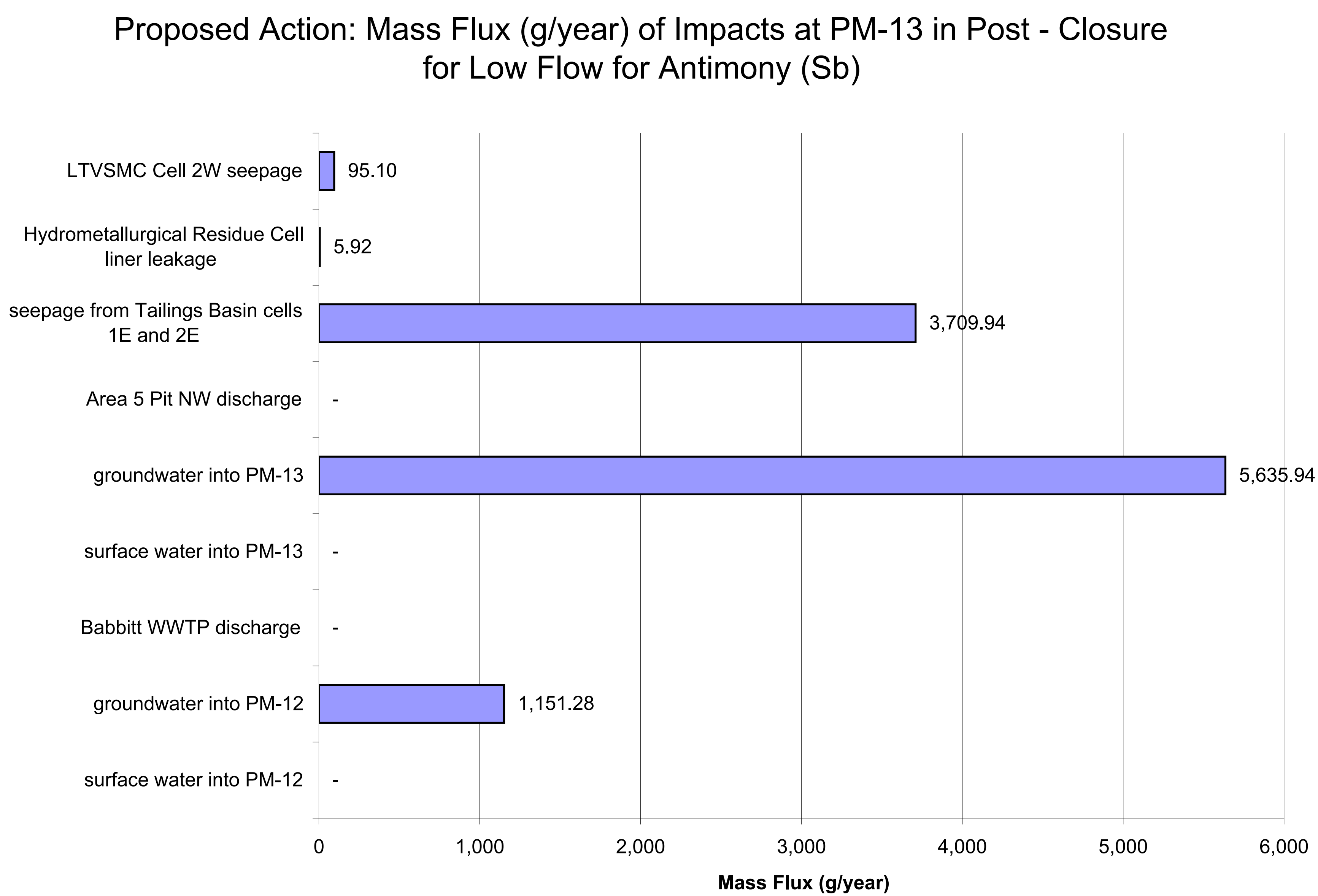



Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
5.11%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
20.40%
Area 5 Pit NW discharge
5.69%
groundwater into PM-13
16.22%
surface water into PM-13
40.63%
Babbitt WWTP discharge
0.22%
groundwater into PM-12
3.31%
surface water into PM-12
8.33%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

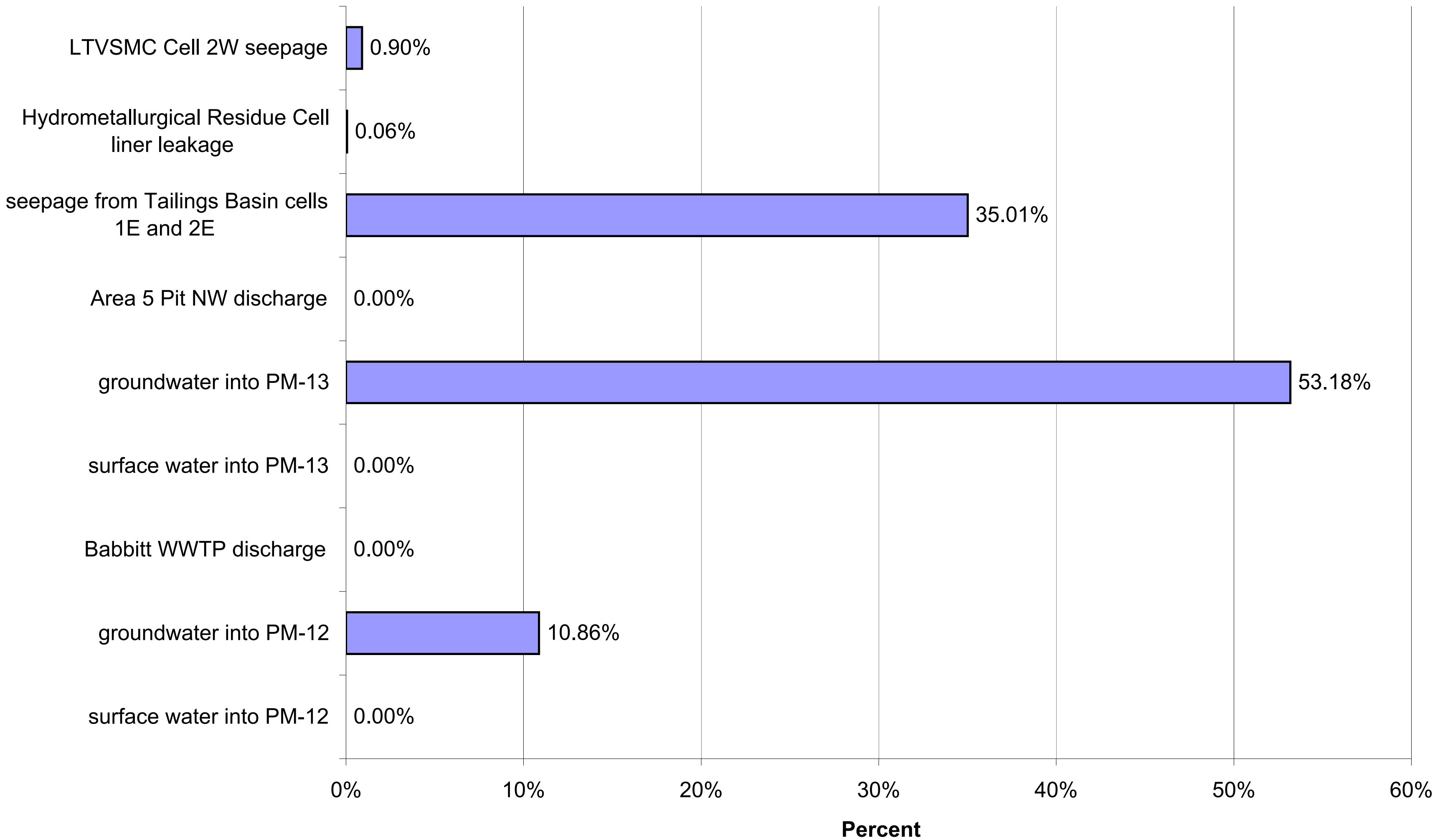
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)



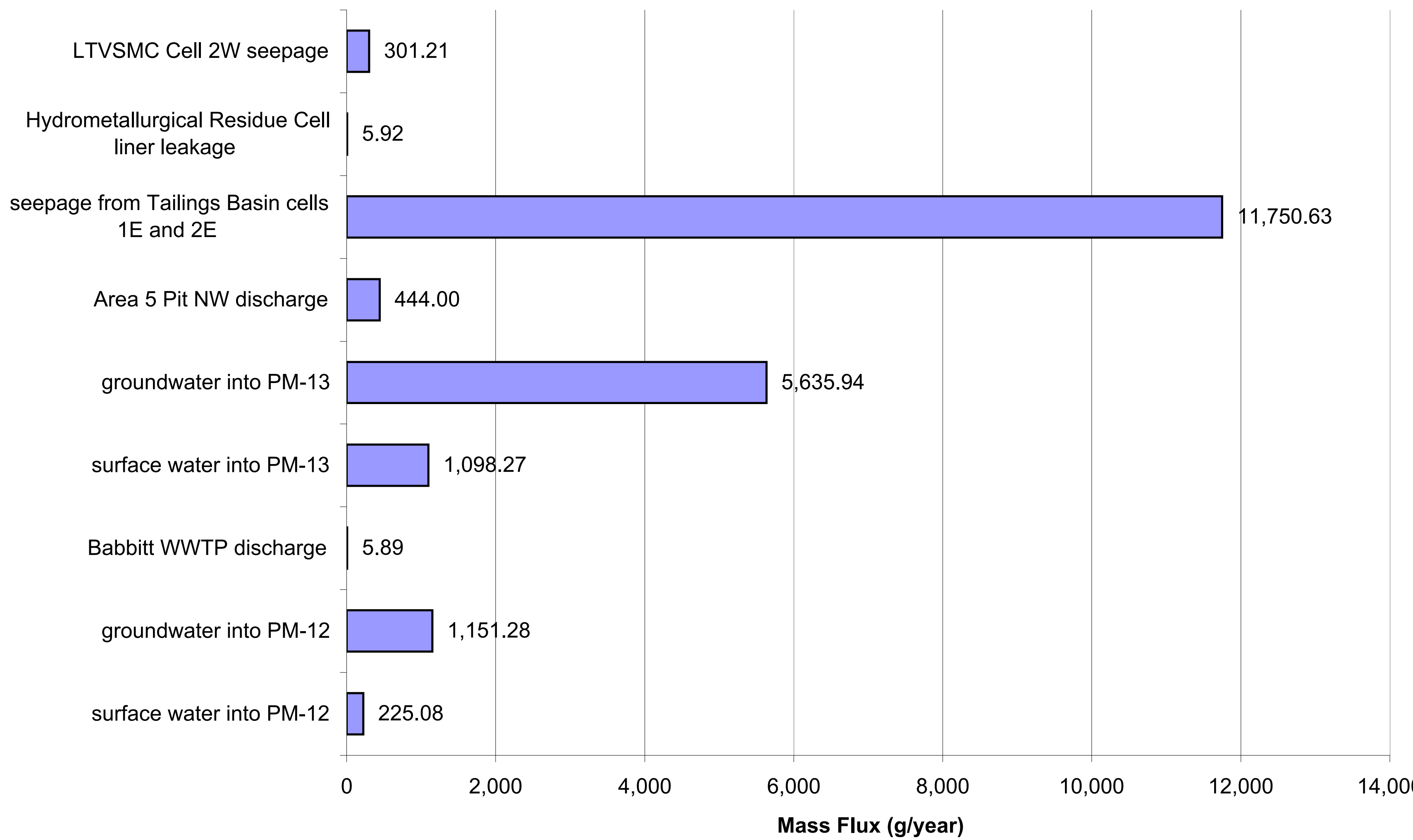

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
0.84%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
3.35%
Area 5 Pit NW discharge
0.93%
groundwater into PM-13
2.66%
surface water into PM-13
76.12%
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

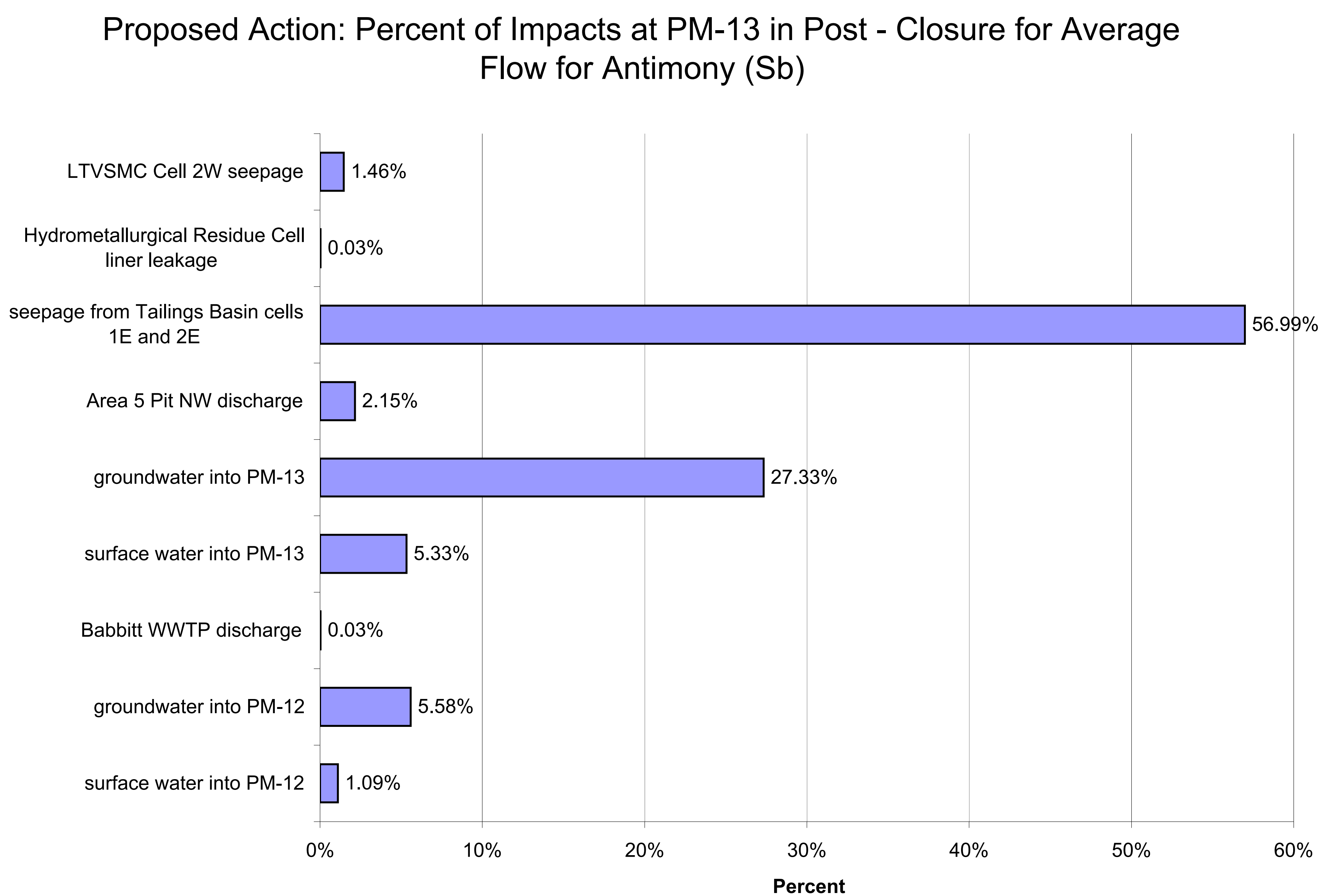

Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
95.10
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin cells 1E and 2E
3,709.94
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

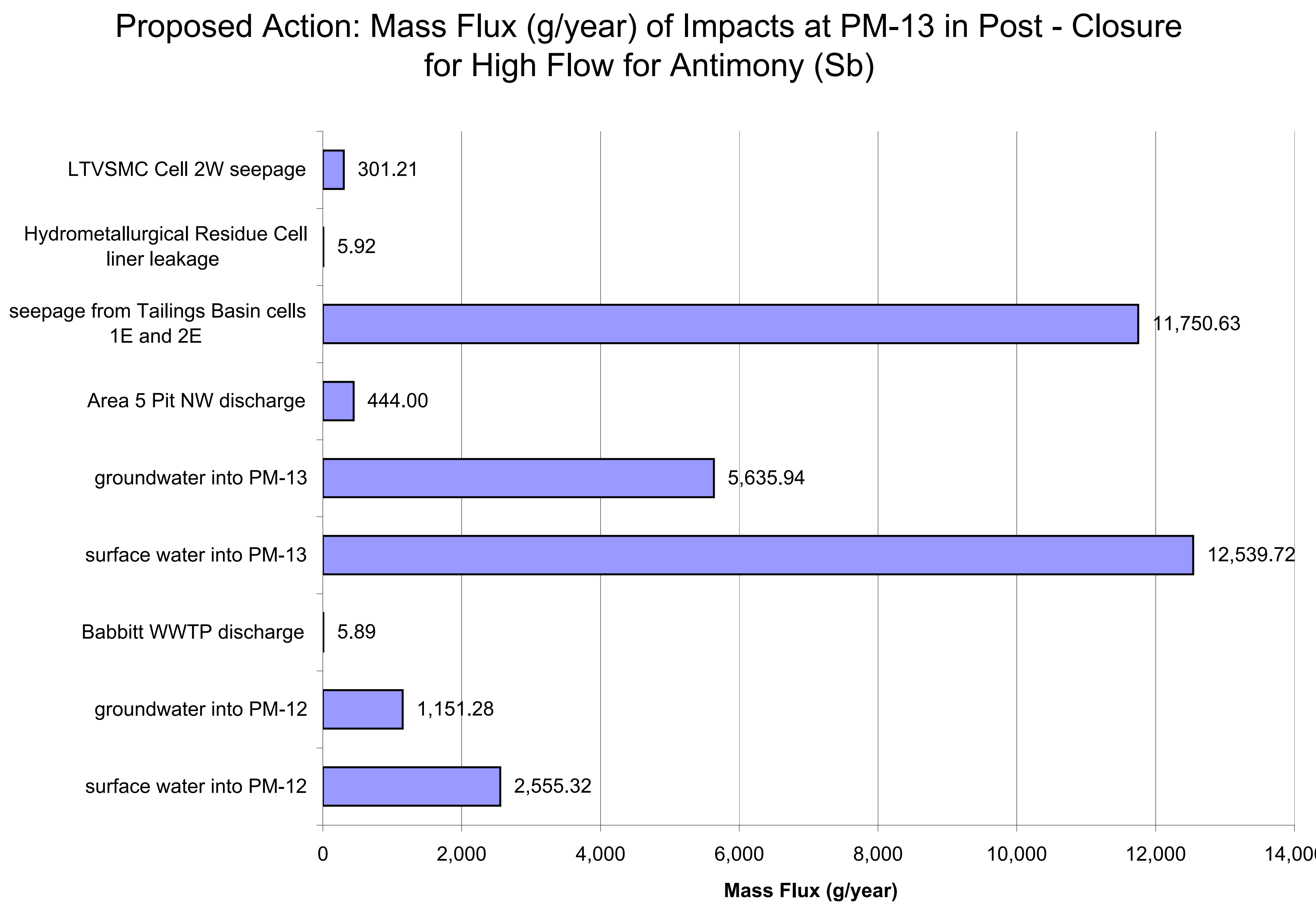
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)



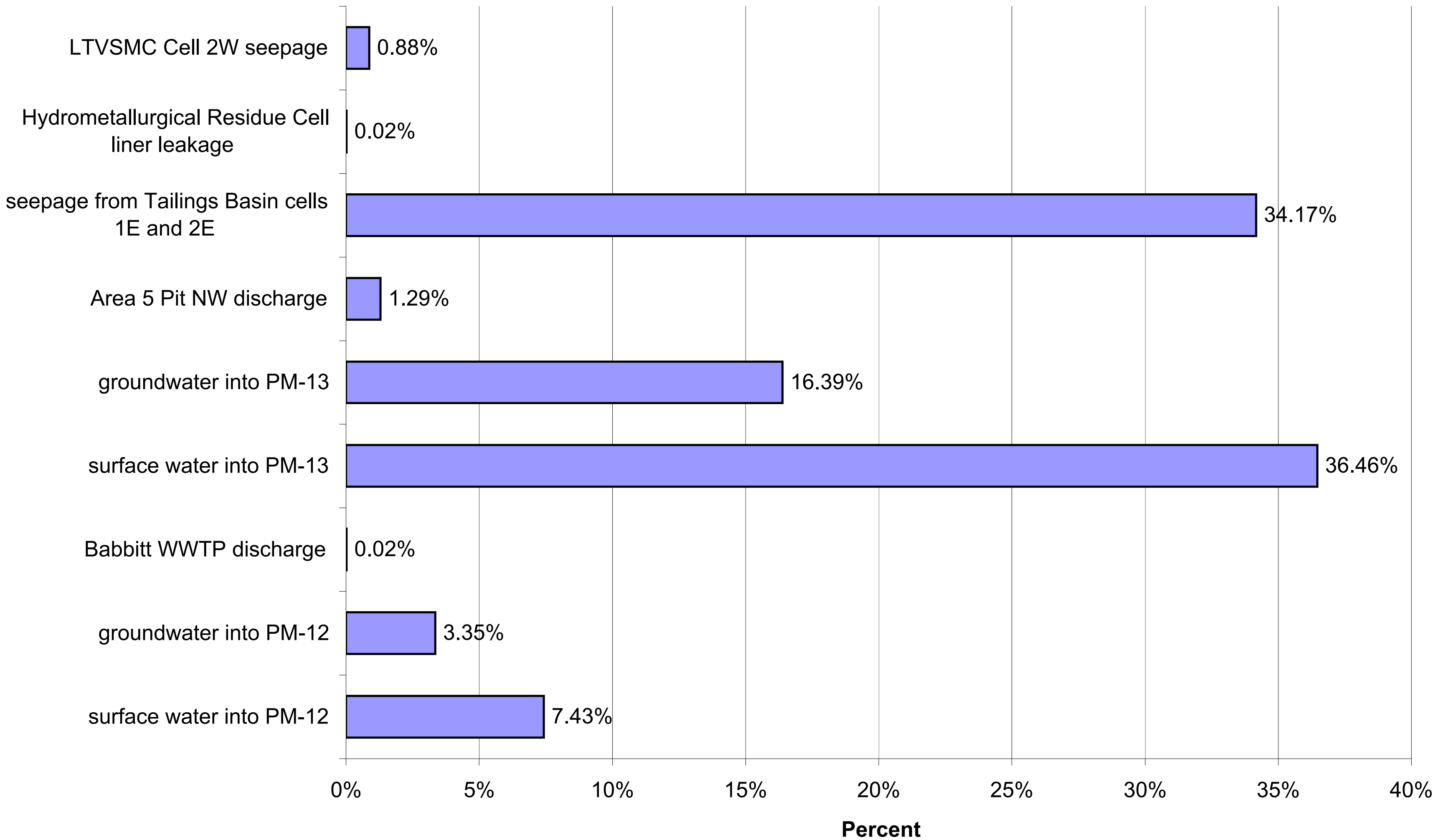
Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)



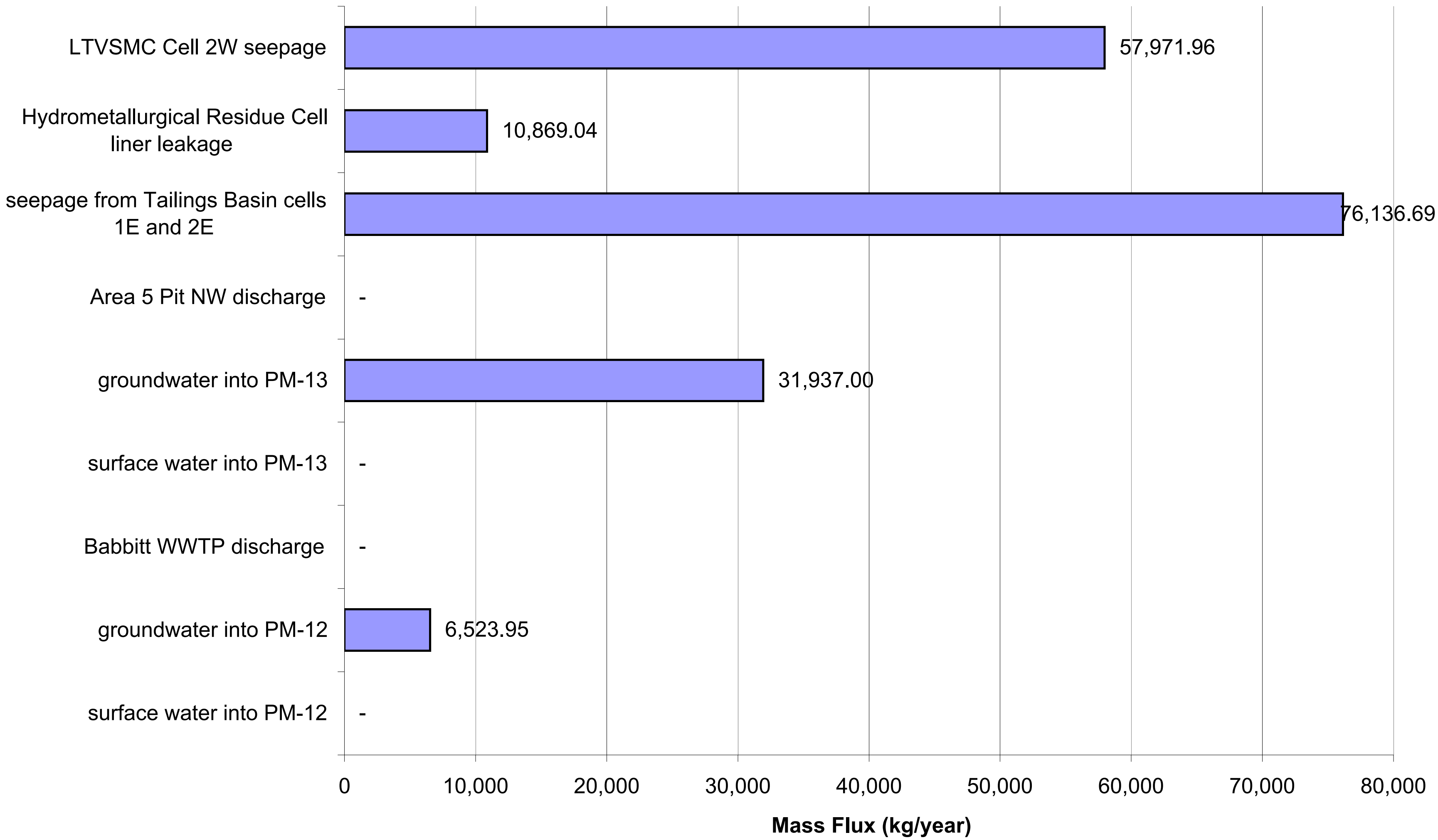

Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.46%
Hydrometallurgical Residue Cell liner leakage
0.03%
seepage from Tailings Basin cells 1E and 2E
56.99%
Area 5 Pit NW discharge
2.15%
groundwater into PM-13
27.33%
surface water into PM-13
5.33%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
5.58%
surface water into PM-12
1.09%
0%
10%
20%
30%
40%
50%
60%
Percent


Proposed Action: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
301.21
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
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
Mass Flux (g/year)

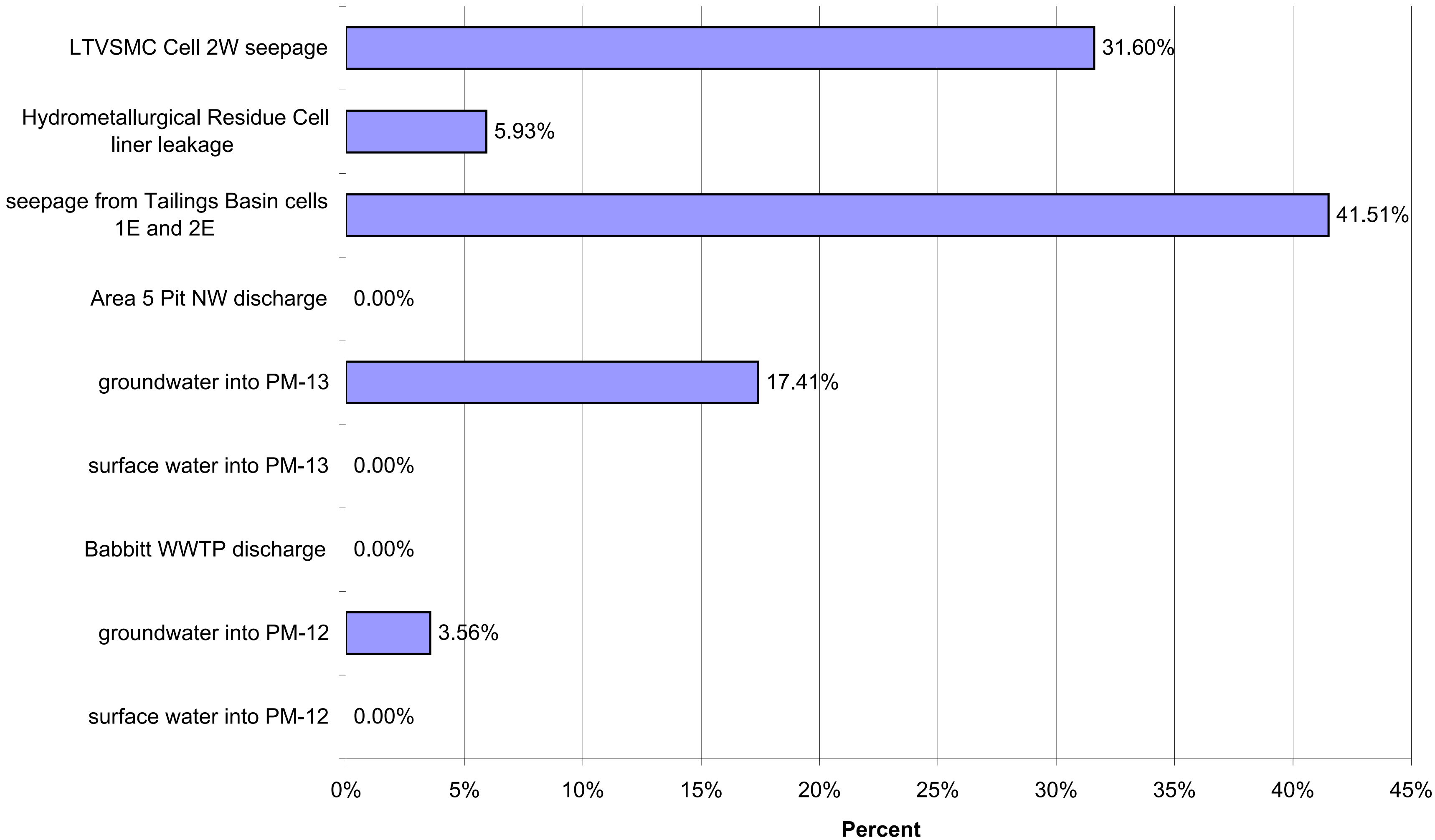
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)



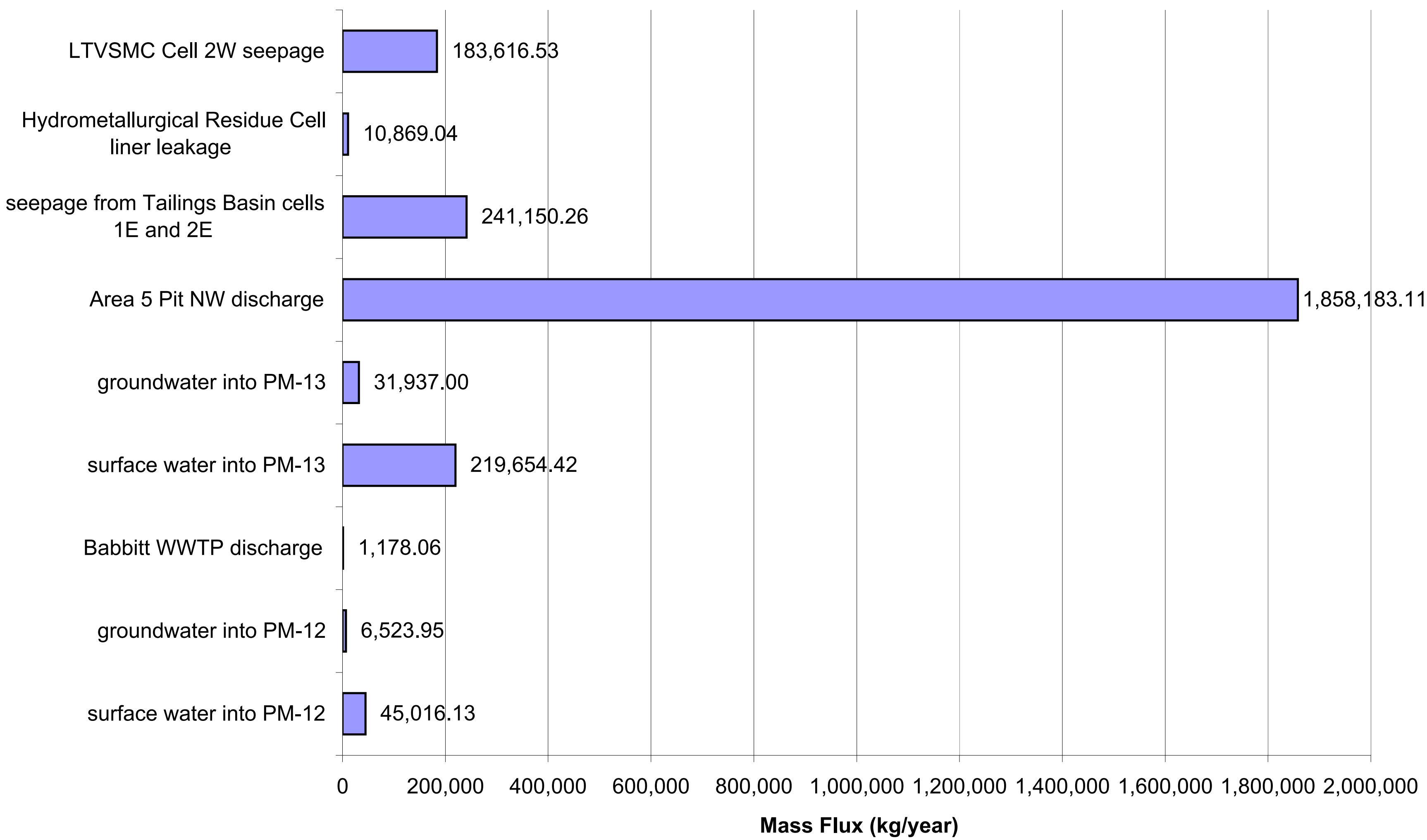
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)

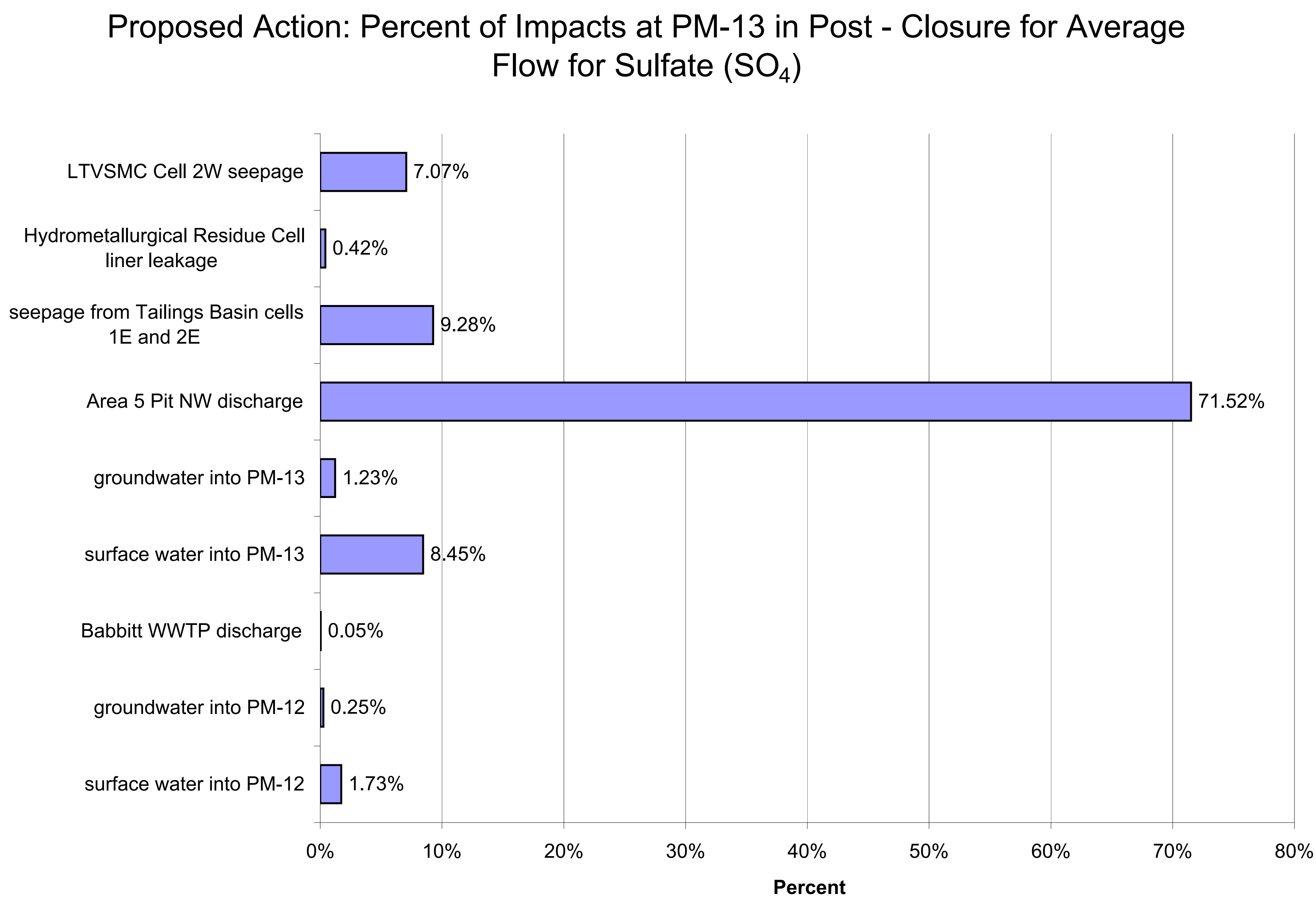


Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)

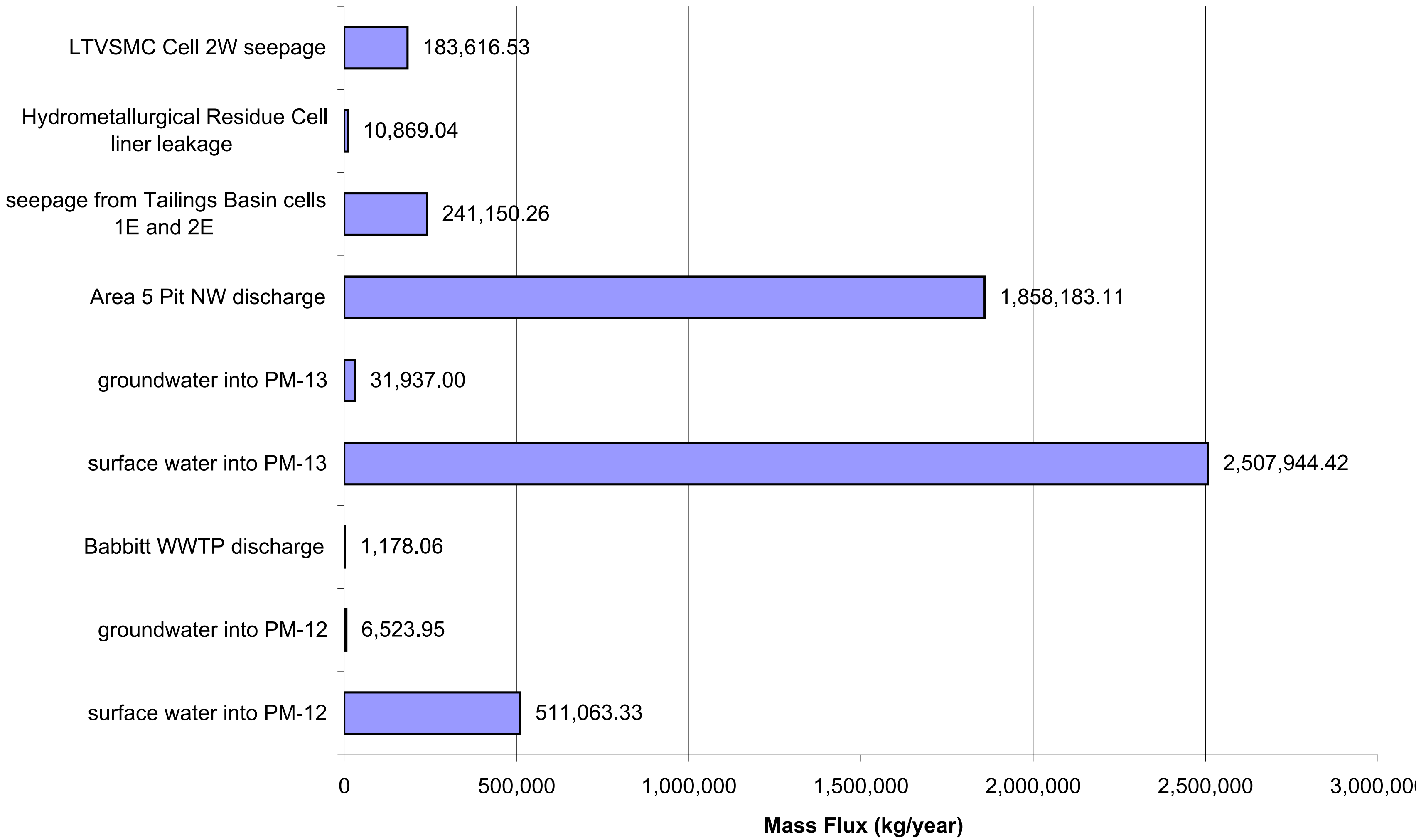


Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)

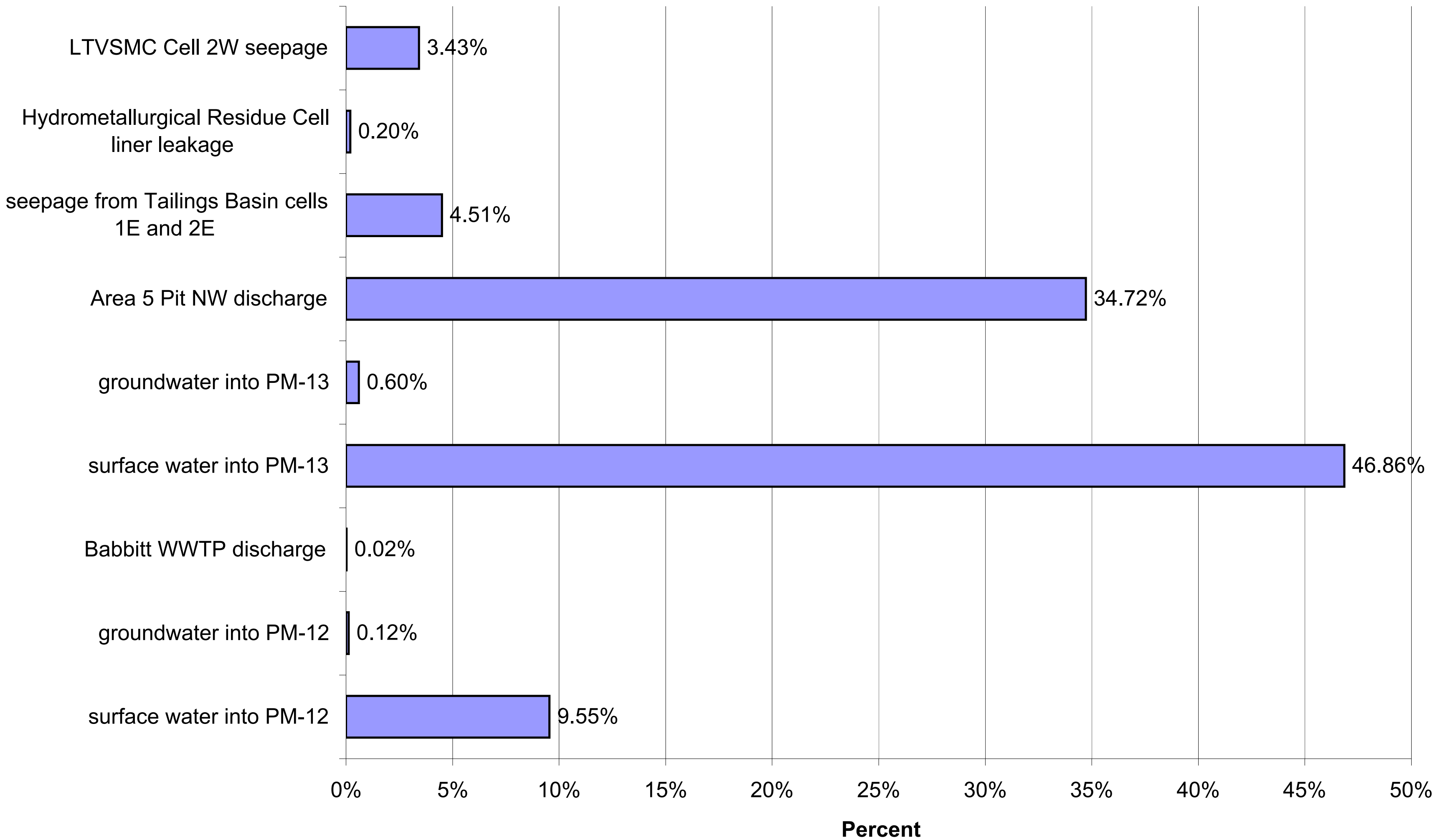



Proposed Action: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
7.07%
Hydrometallurgical Residue Cell liner leakage
0.42%
seepage from Tailings Basin cells 1E and 2E
9.28%
Area 5 Pit NW discharge
71.52%
groundwater into PM-13
1.23%
surface water into PM-13
8.45%
Babbitt WWTP discharge
0.05%
groundwater into PM-12
0.25%
surface water into PM-12
1.73%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

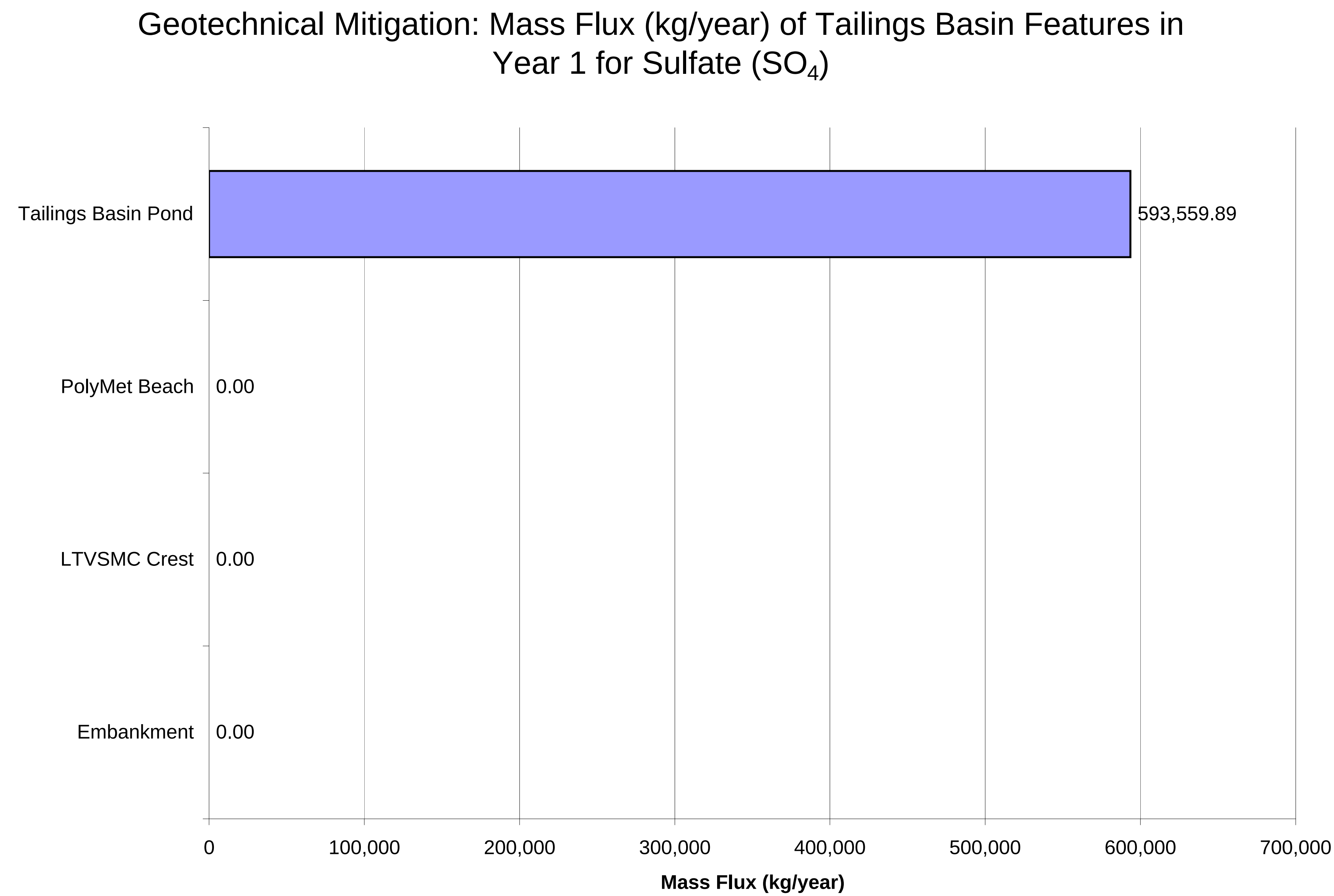
Proposed Action: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for High Flow for Sulfate (SO_4)



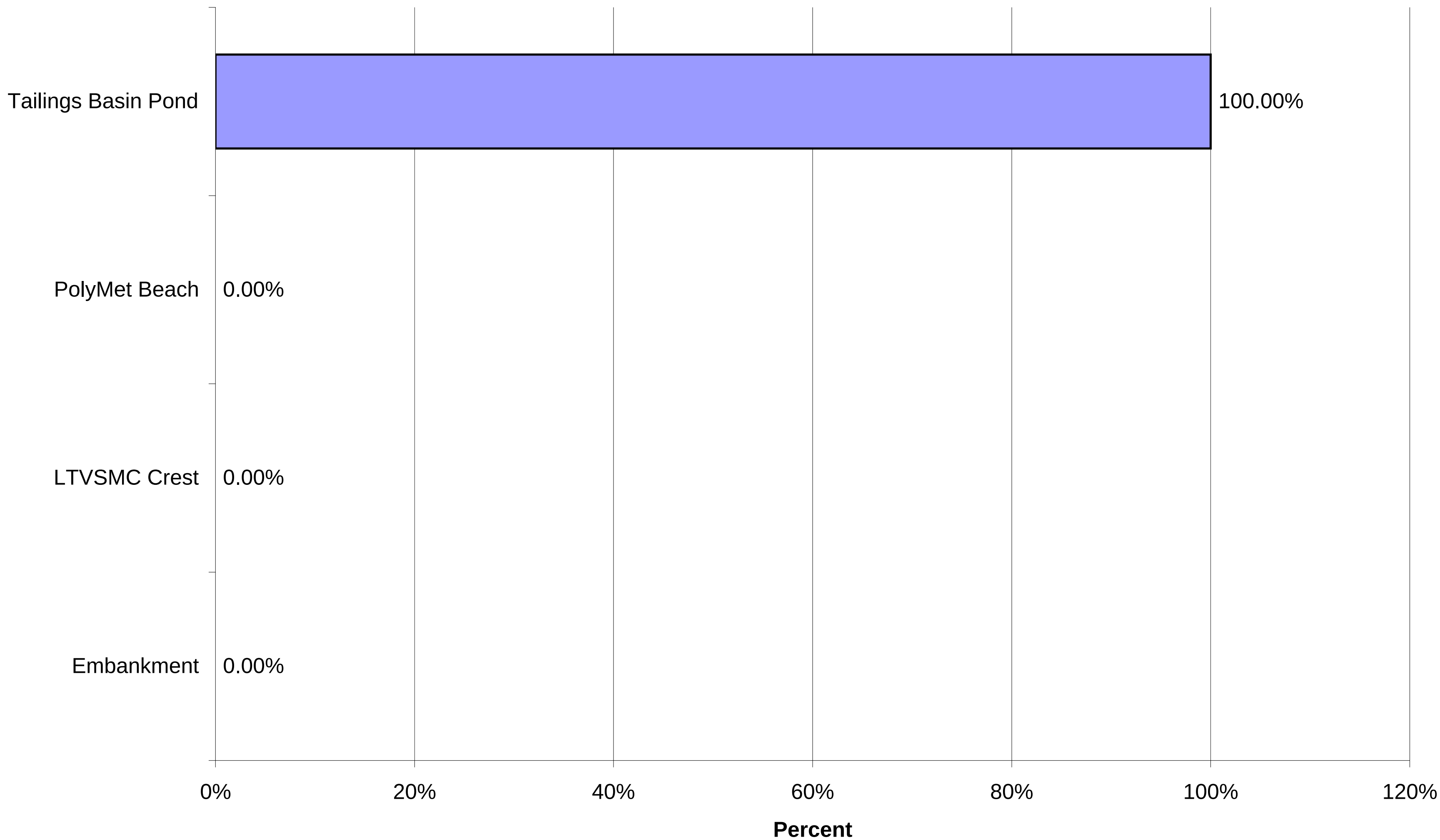
Proposed Action: Percent of Impacts at PM-13 in Post - Closure for High Flow for Sulfate (SO_4)

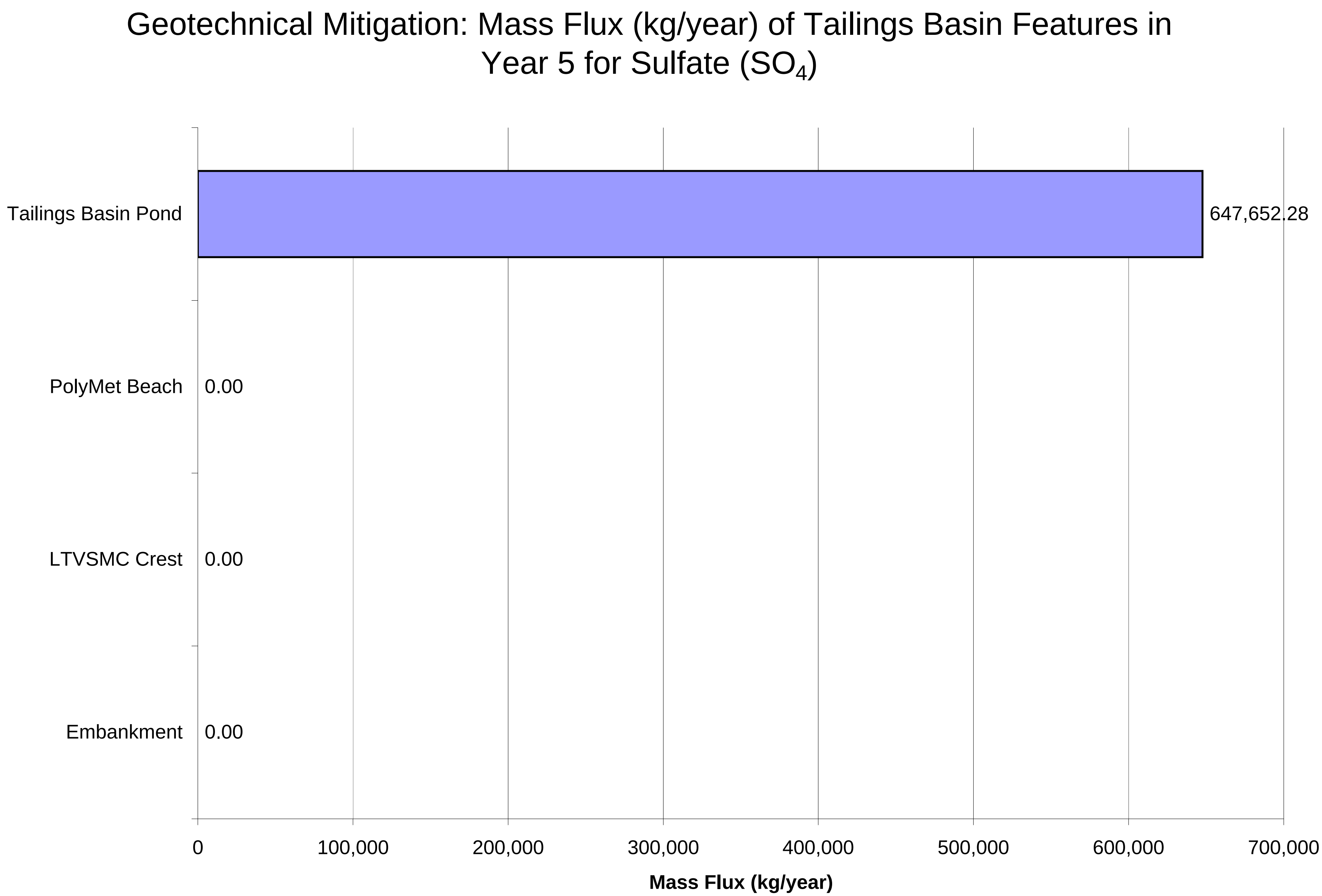


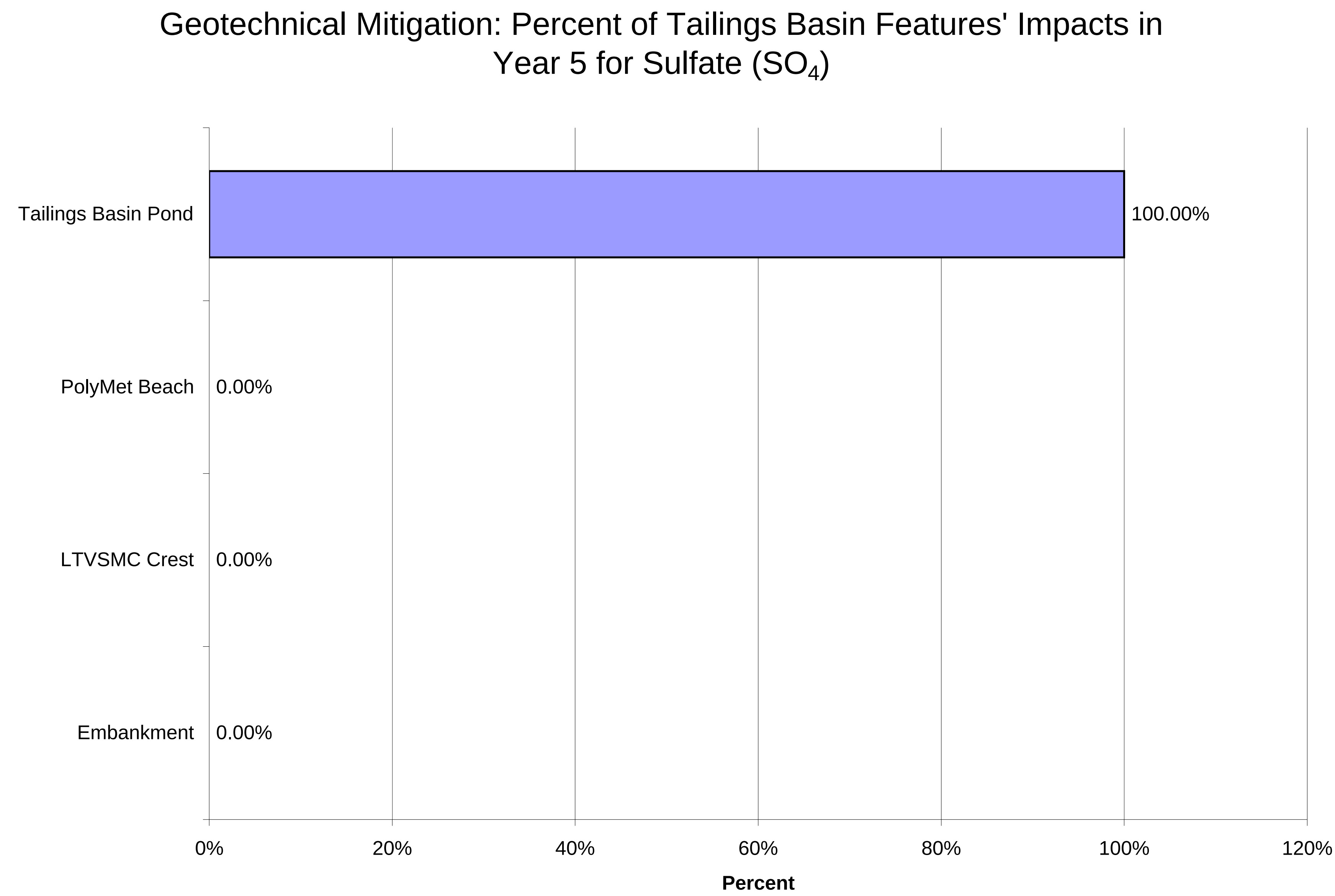
Appendix G.3
Tailings Basin
Geotechnical Mitigation


Geotechnical Mitigation: Mass Flux (kg/year) of Tailings Basin Features in Year 1 for Sulfate (SO_4)
Tailings Basin Pond
593,559.89
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Mass Flux (kg/year)

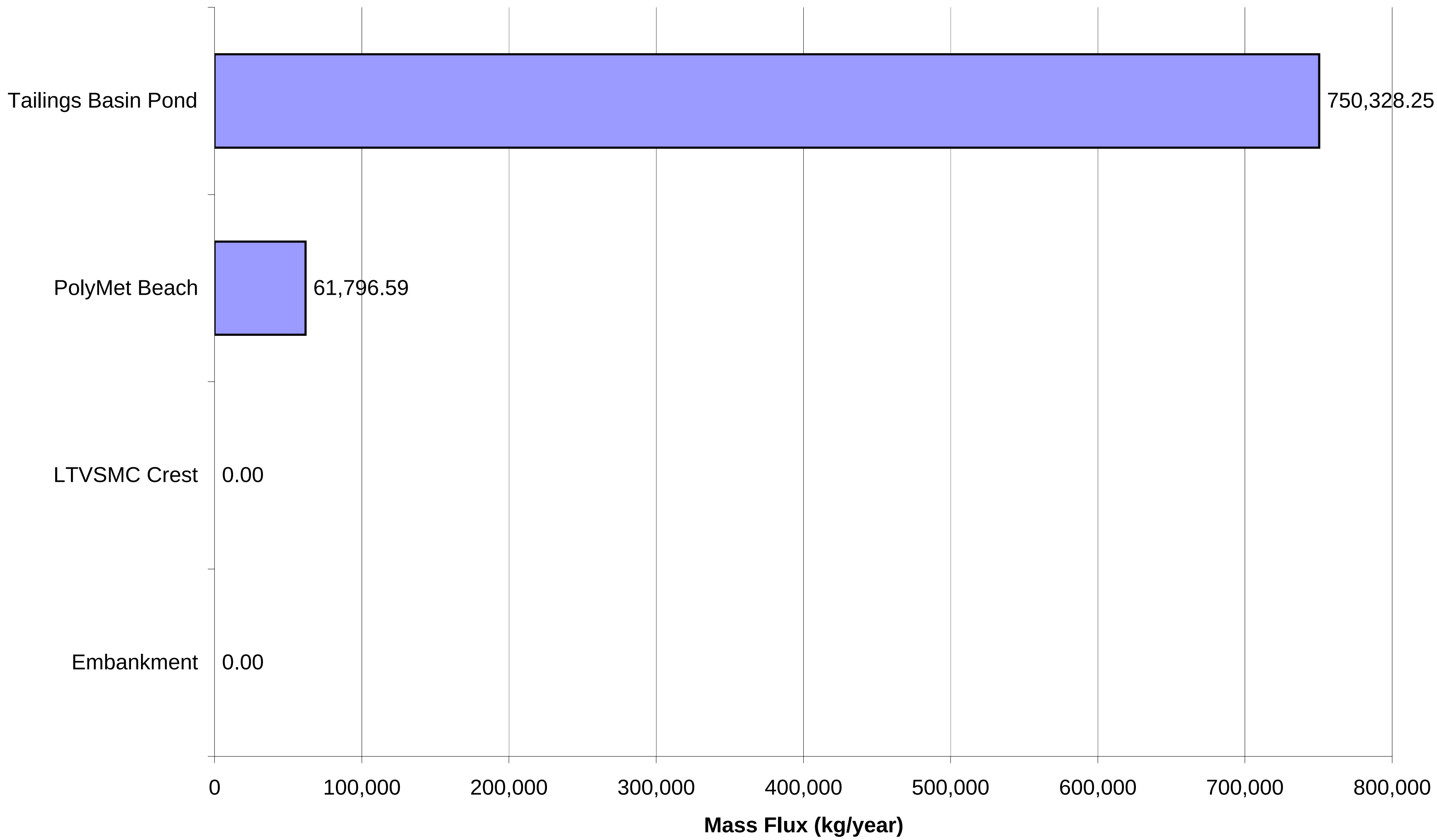
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 1 for Sulfate (SO_4)

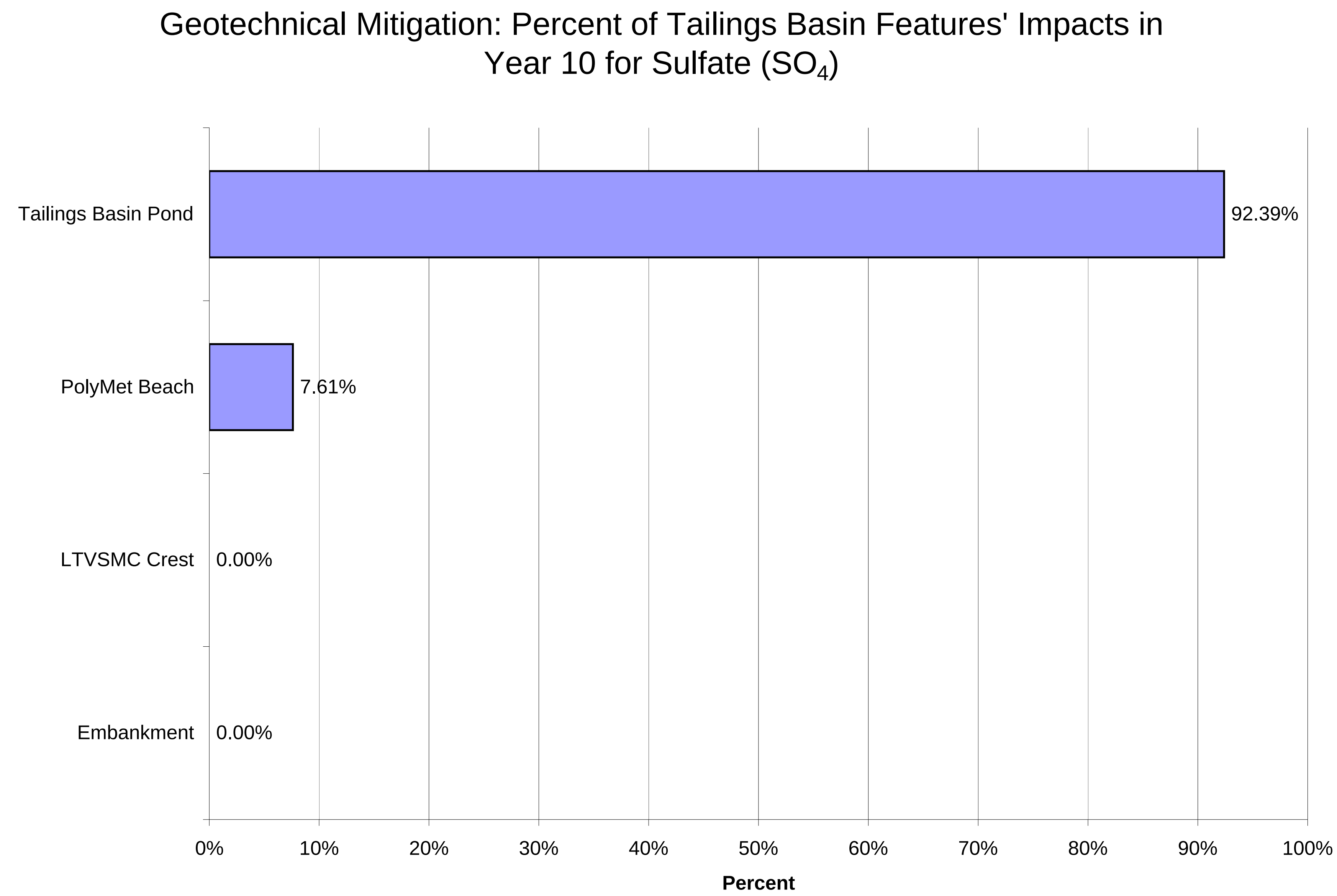


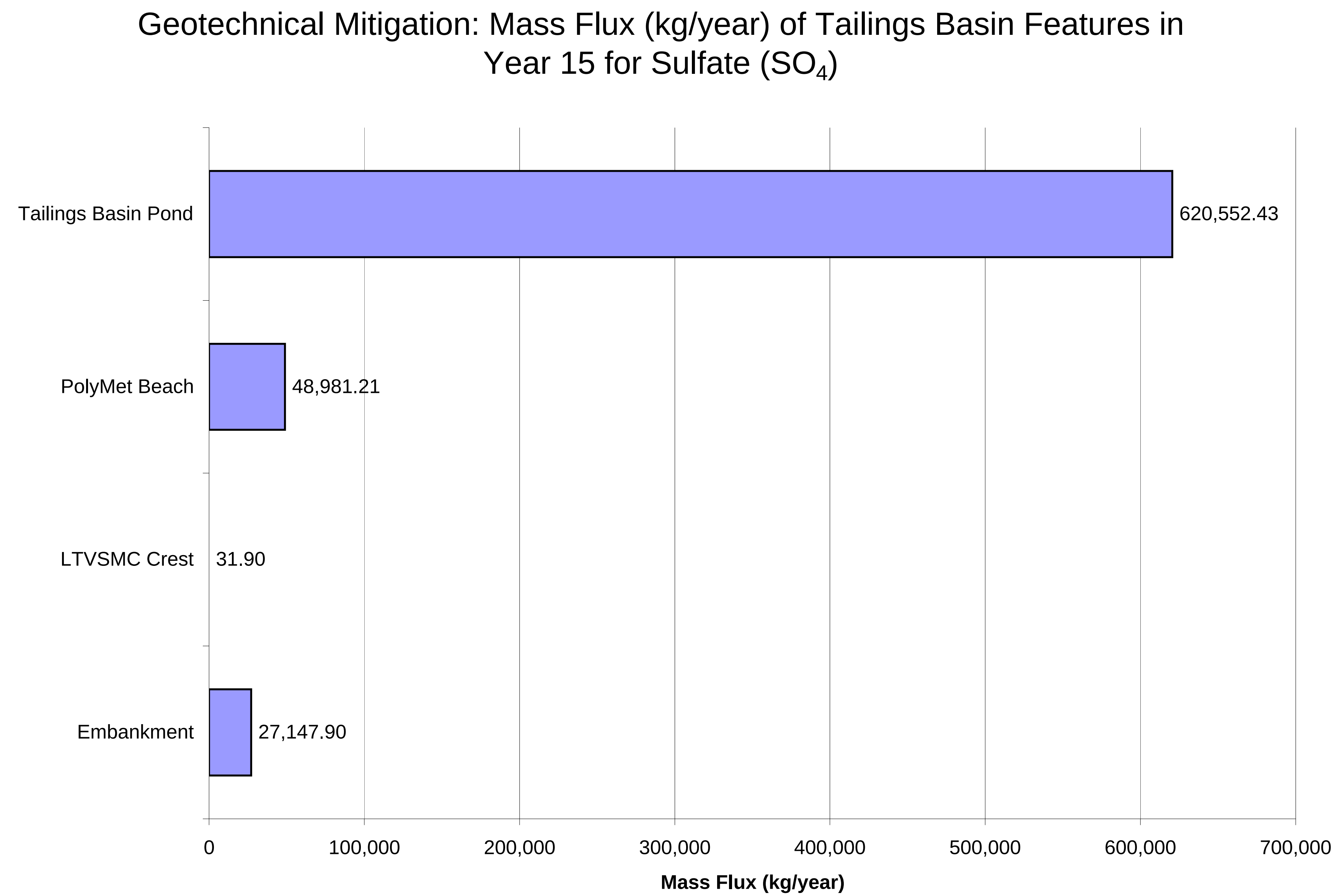

Geotechnical Mitigation: Mass Flux (kg/year) of Tailings Basin Features in Year 5 for Sulfate (SO4)
Tailings Basin Pond
647,652.28
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Mass Flux (kg/year)


Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 5 for Sulfate (SO_4)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

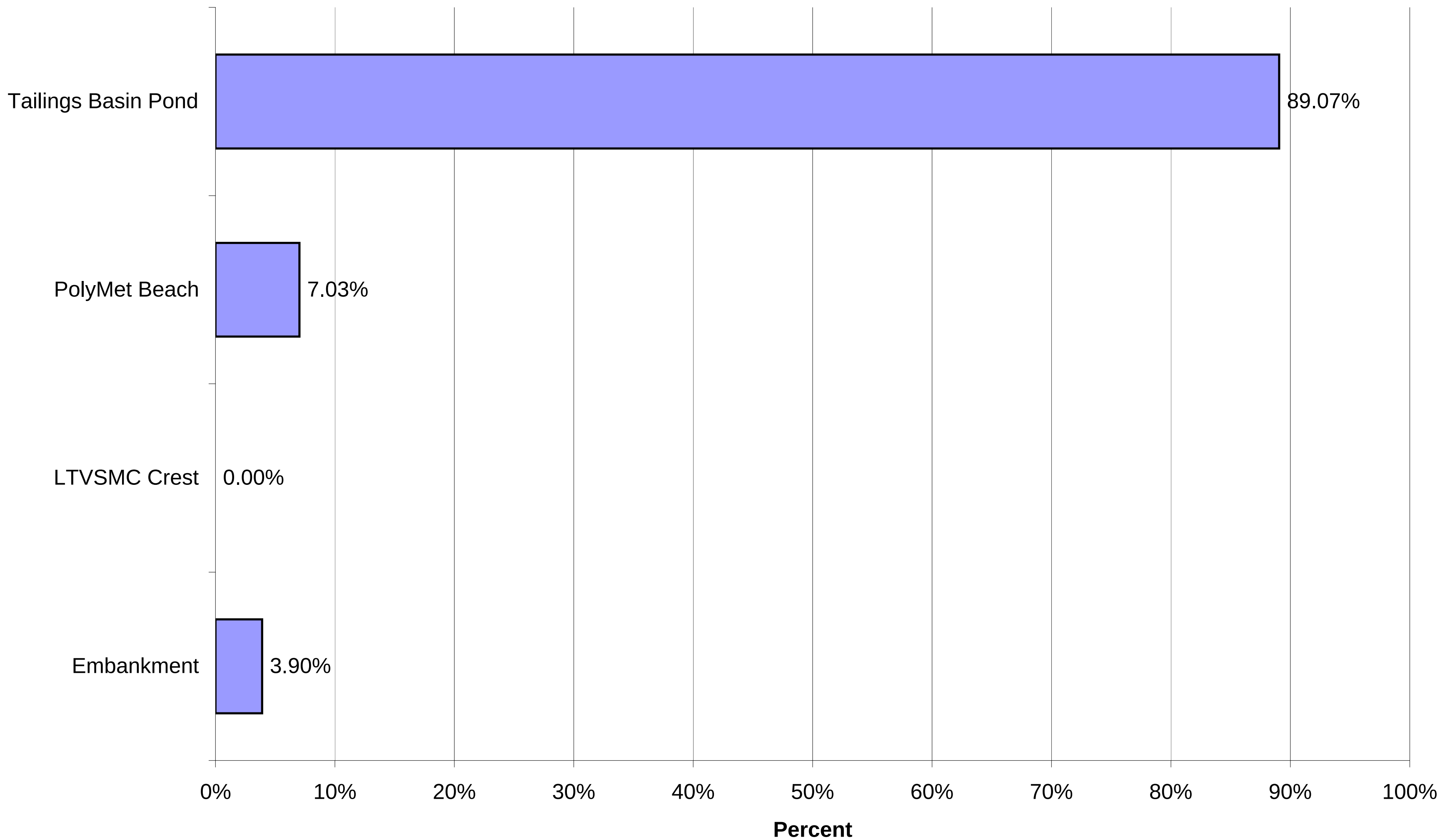
Geotechnical Mitigation: Mass Flux (kg/year) of Tailings Basin Features in Year 10 for Sulfate (SO_4)



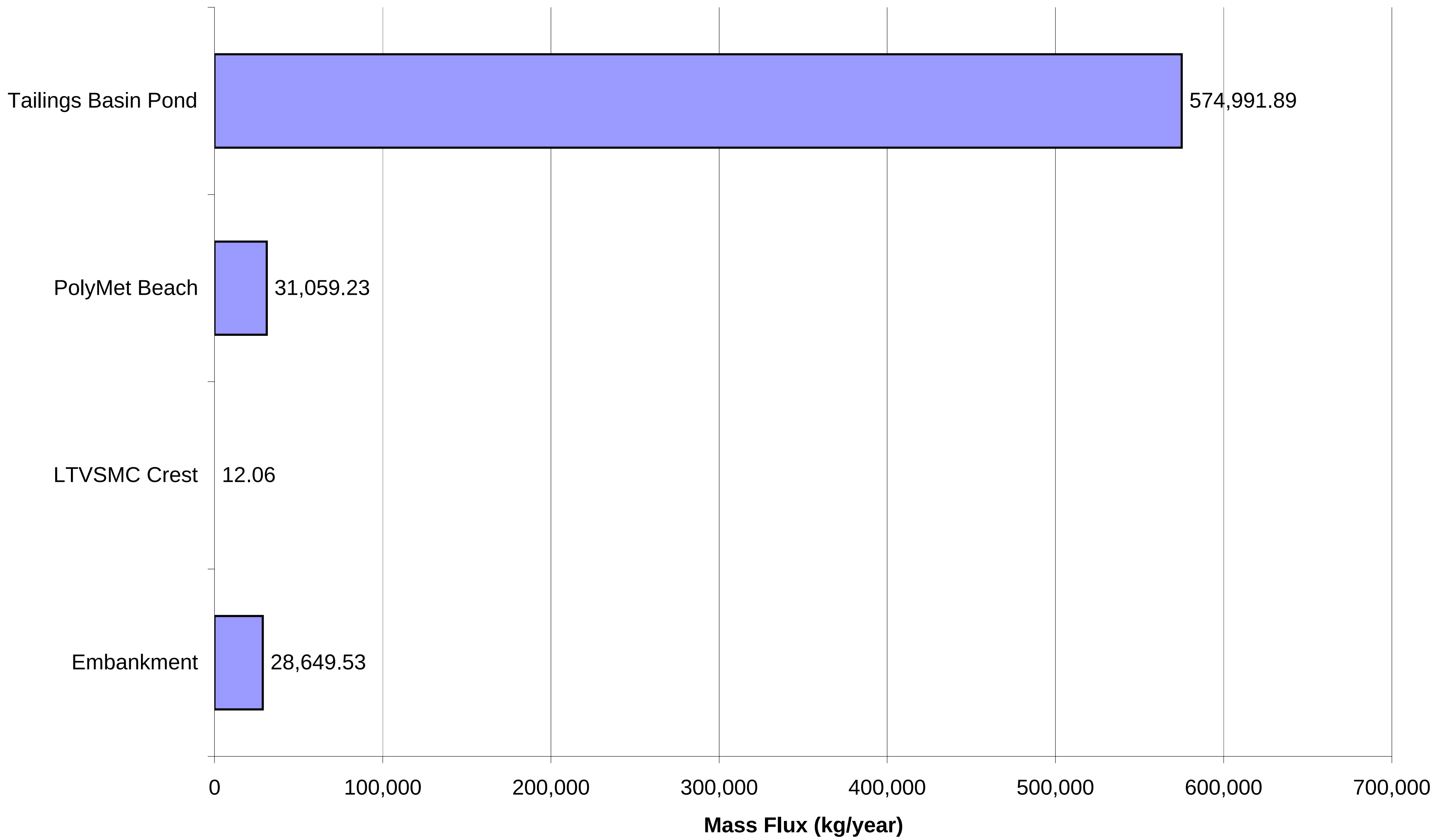

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 10 for Sulfate (SO_4)
Tailings Basin Pond
92.39%
PolyMet Beach
7.61%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent


Geotechnical Mitigation: Mass Flux (kg/year) of Tailings Basin Features in Year 15 for Sulfate (SO_4)
Tailings Basin Pond
620,552.43
PolyMet Beach
48,981.21
LTVSMC Crest
31.90
Embankment
27,147.90
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Mass Flux (kg/year)

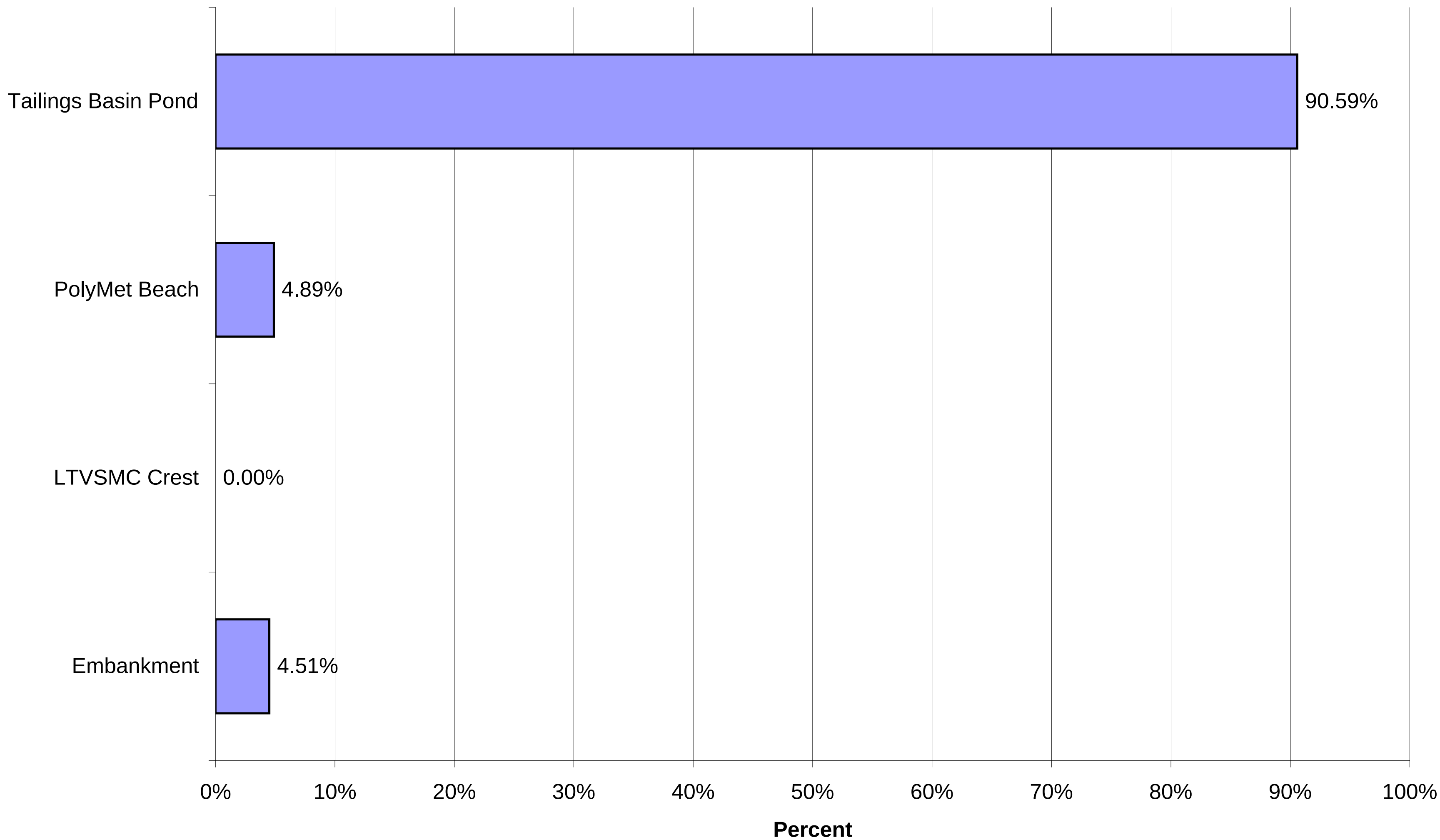
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 15 for Sulfate (SO_4)



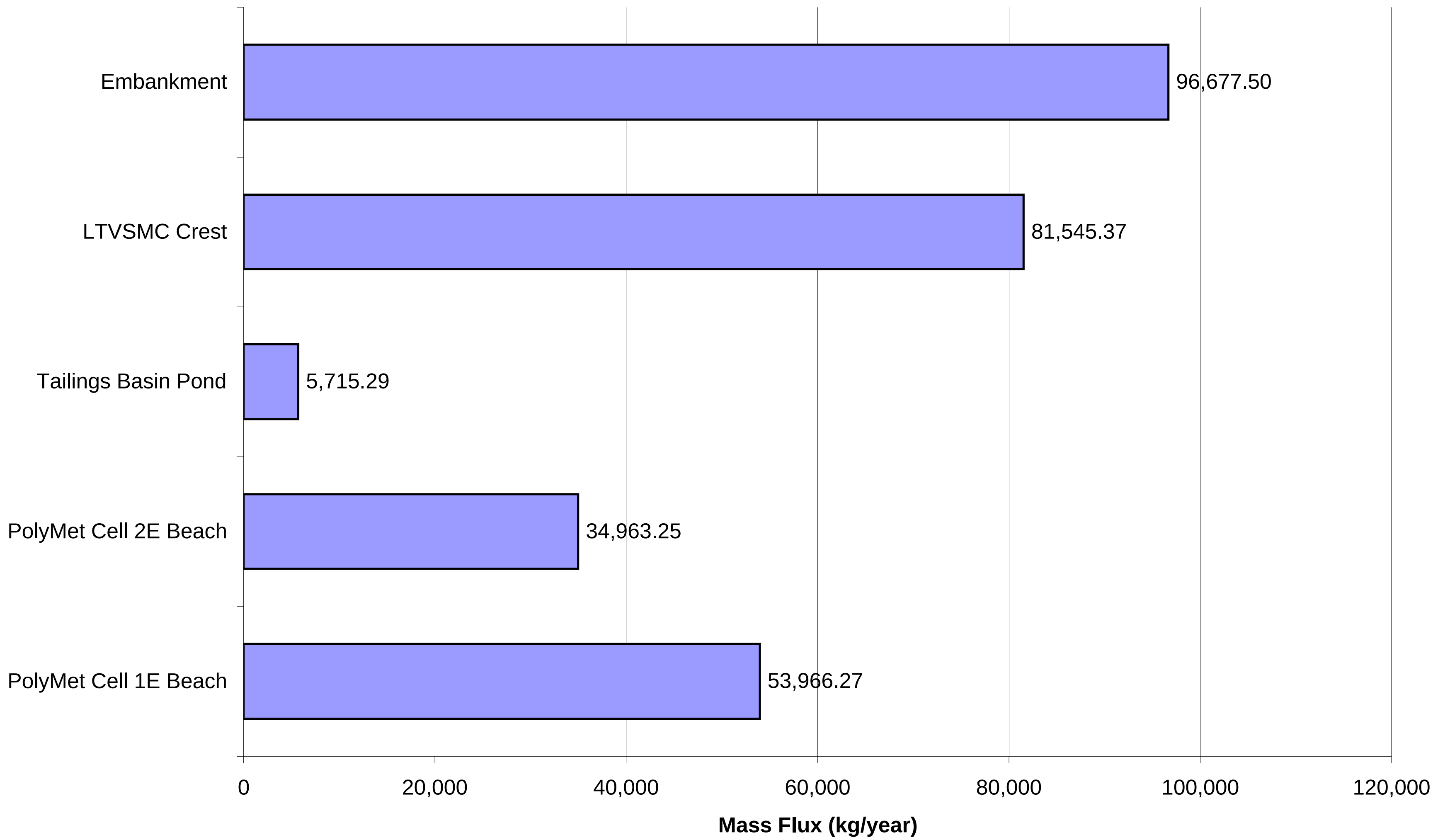
Geotechnical Mitigation: Mass Flux (kg/year) of Tailings Basin Features in Year 20 for Sulfate (SO_4)



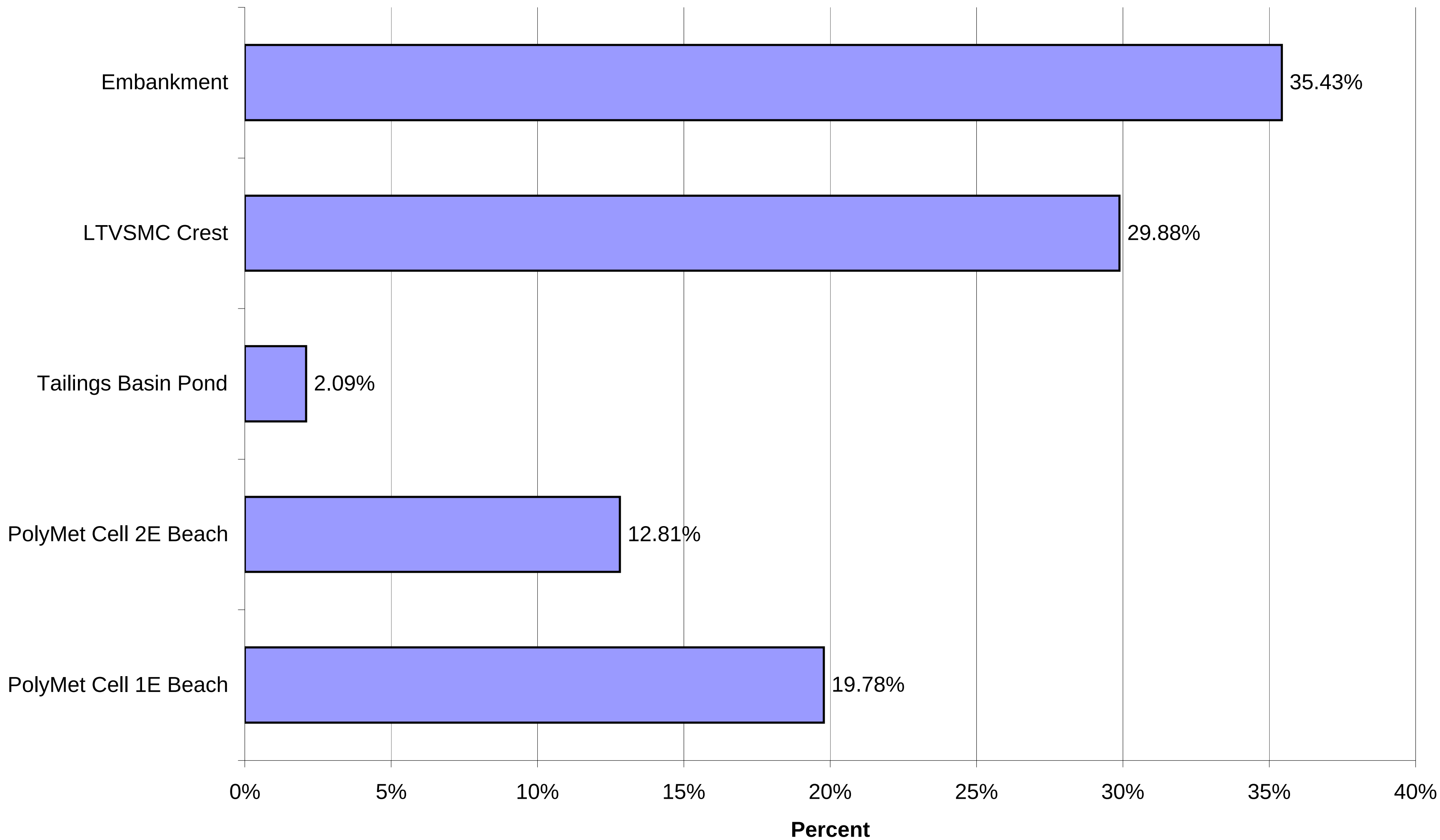
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 20 for Sulfate (SO_4)

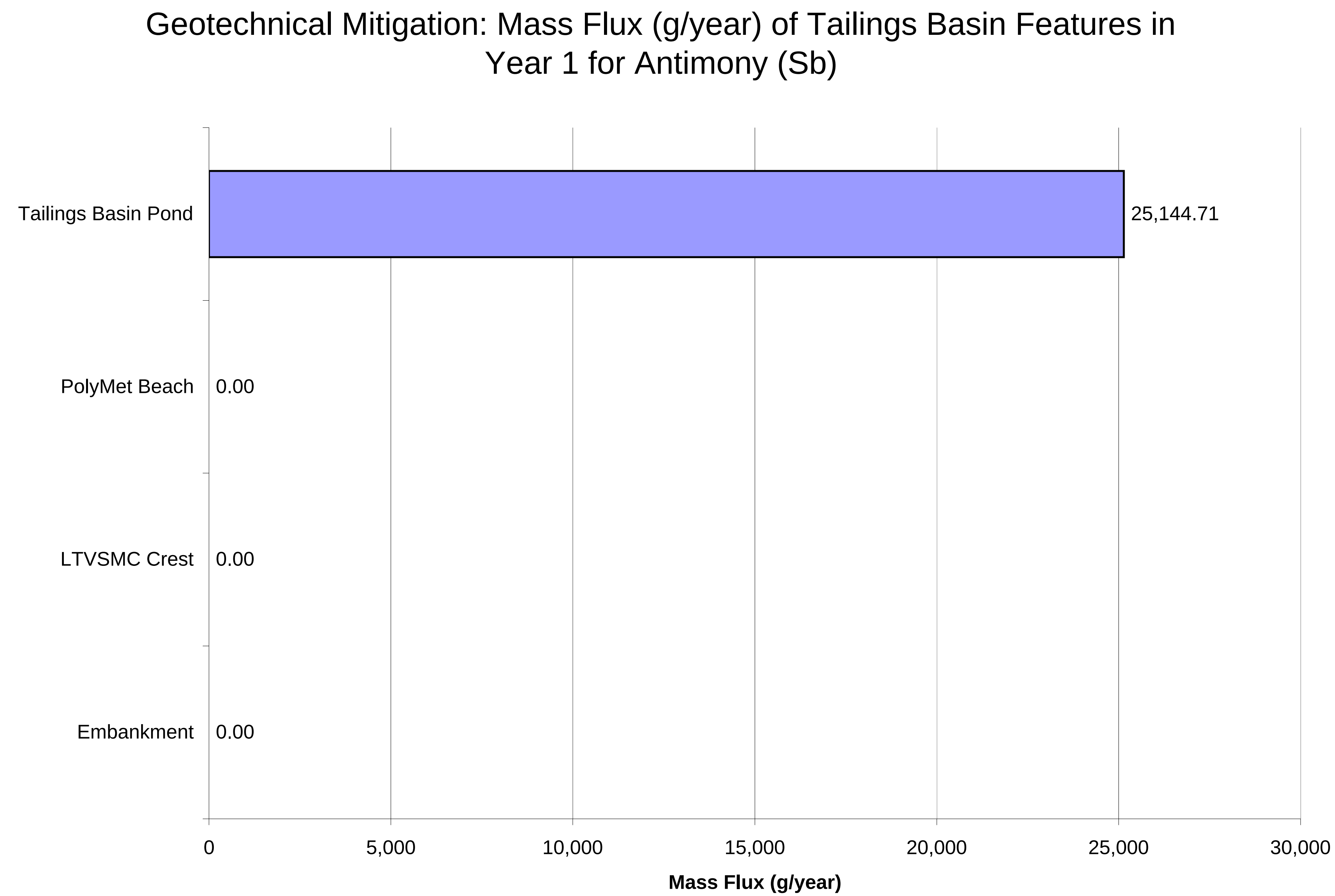


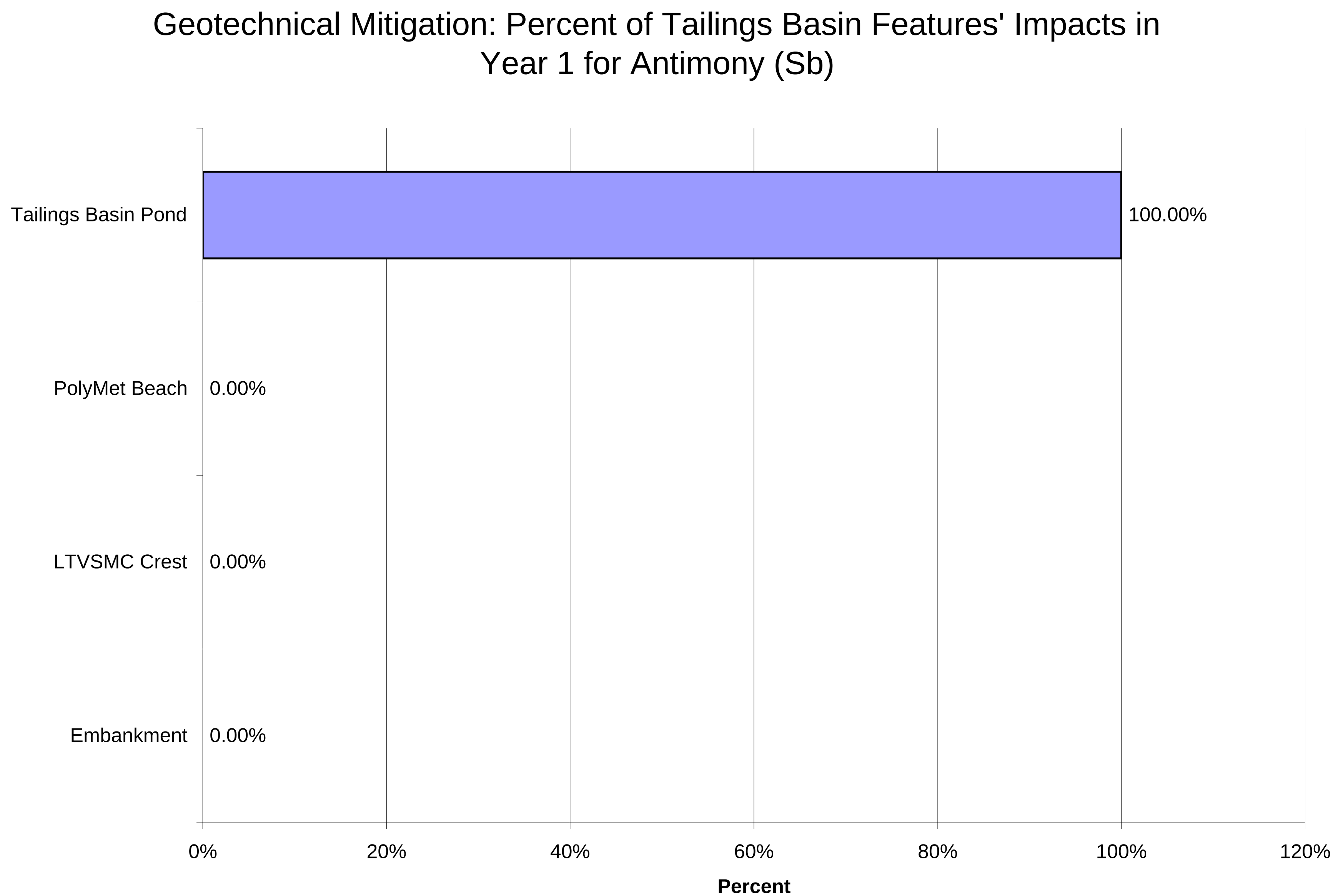
Geotechnical Mitigation: Mass Flux (kg/year) of Tailings Basin Features in Closure for Sulfate (SO_4)

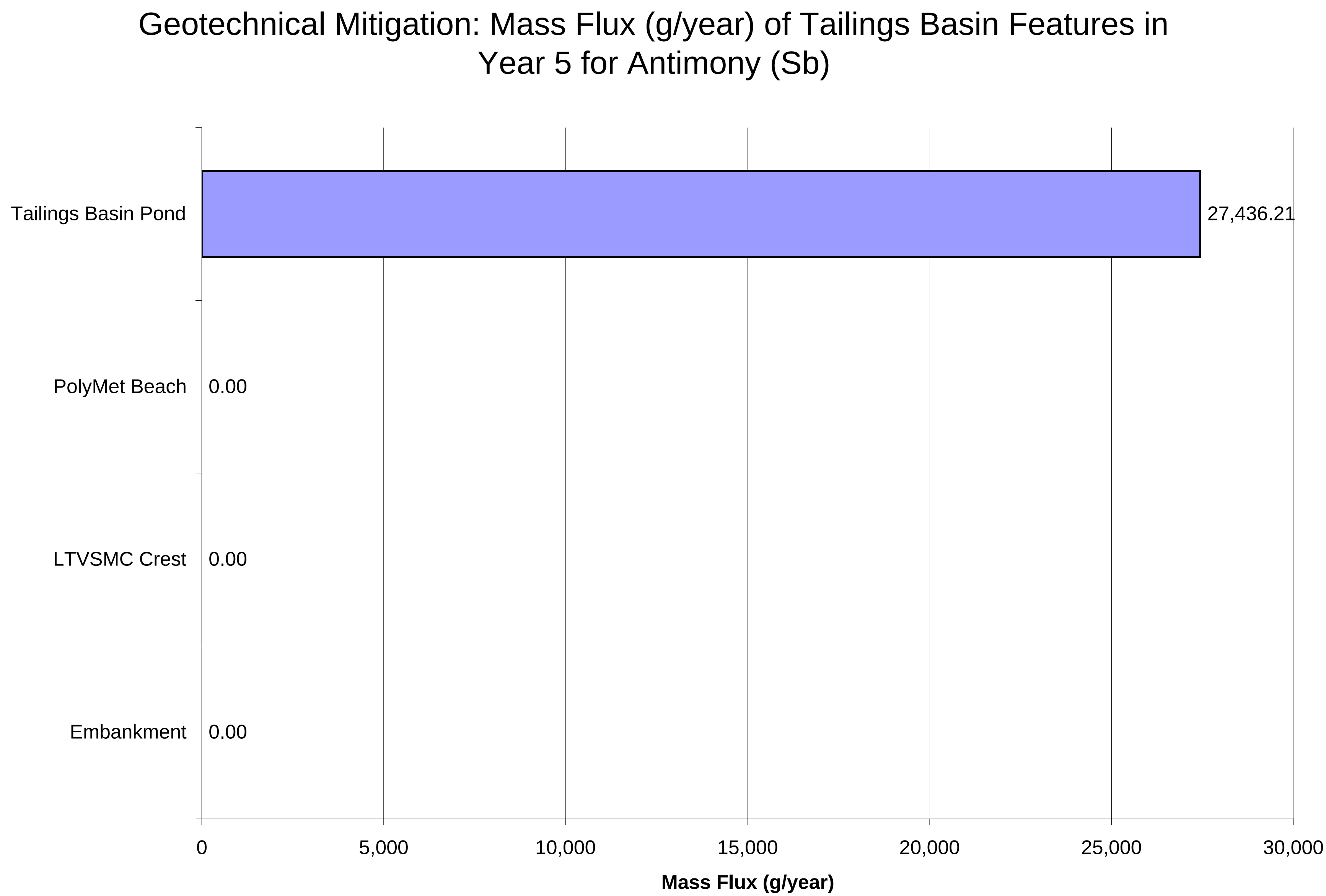


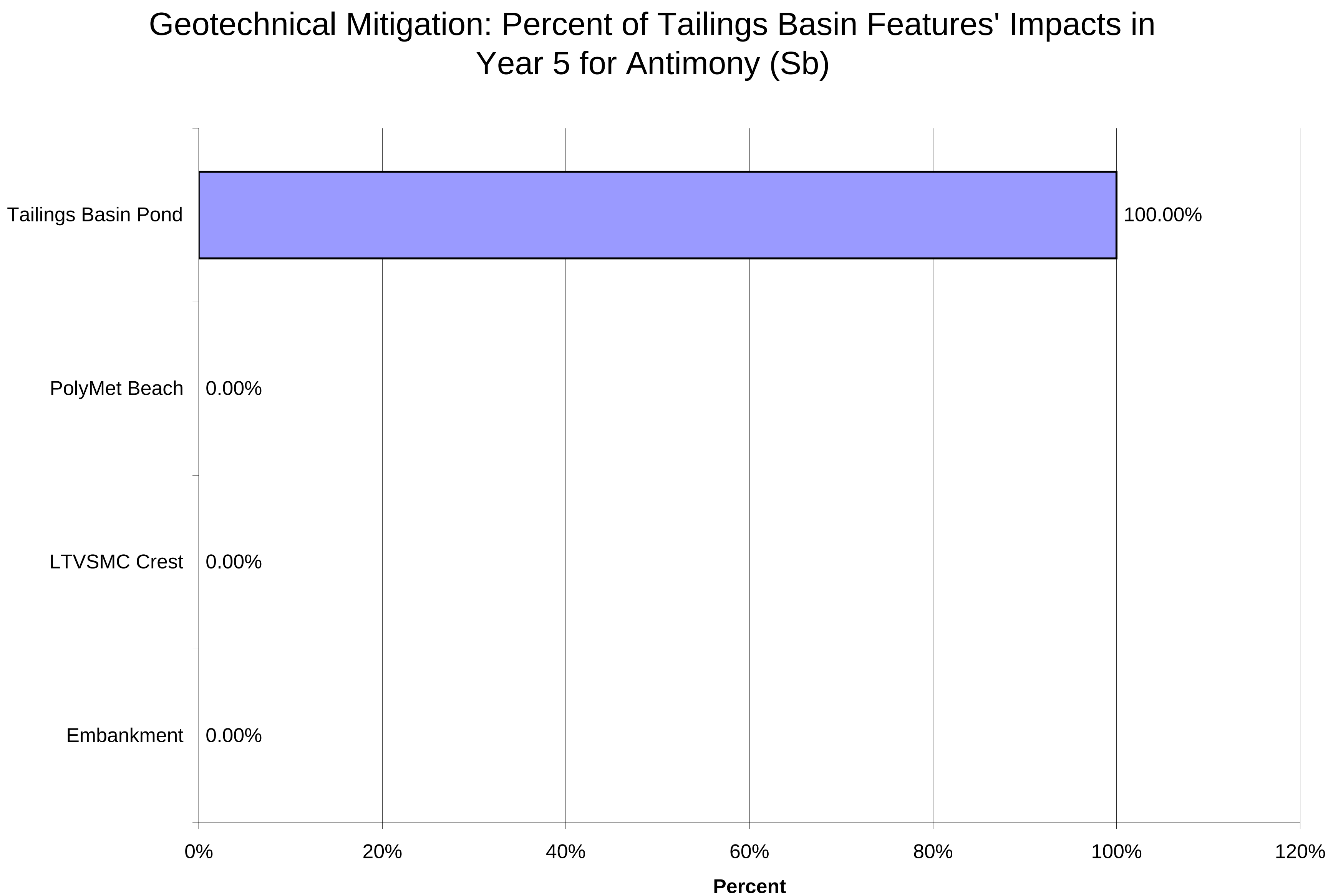
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Closure for Sulfate (SO_4)

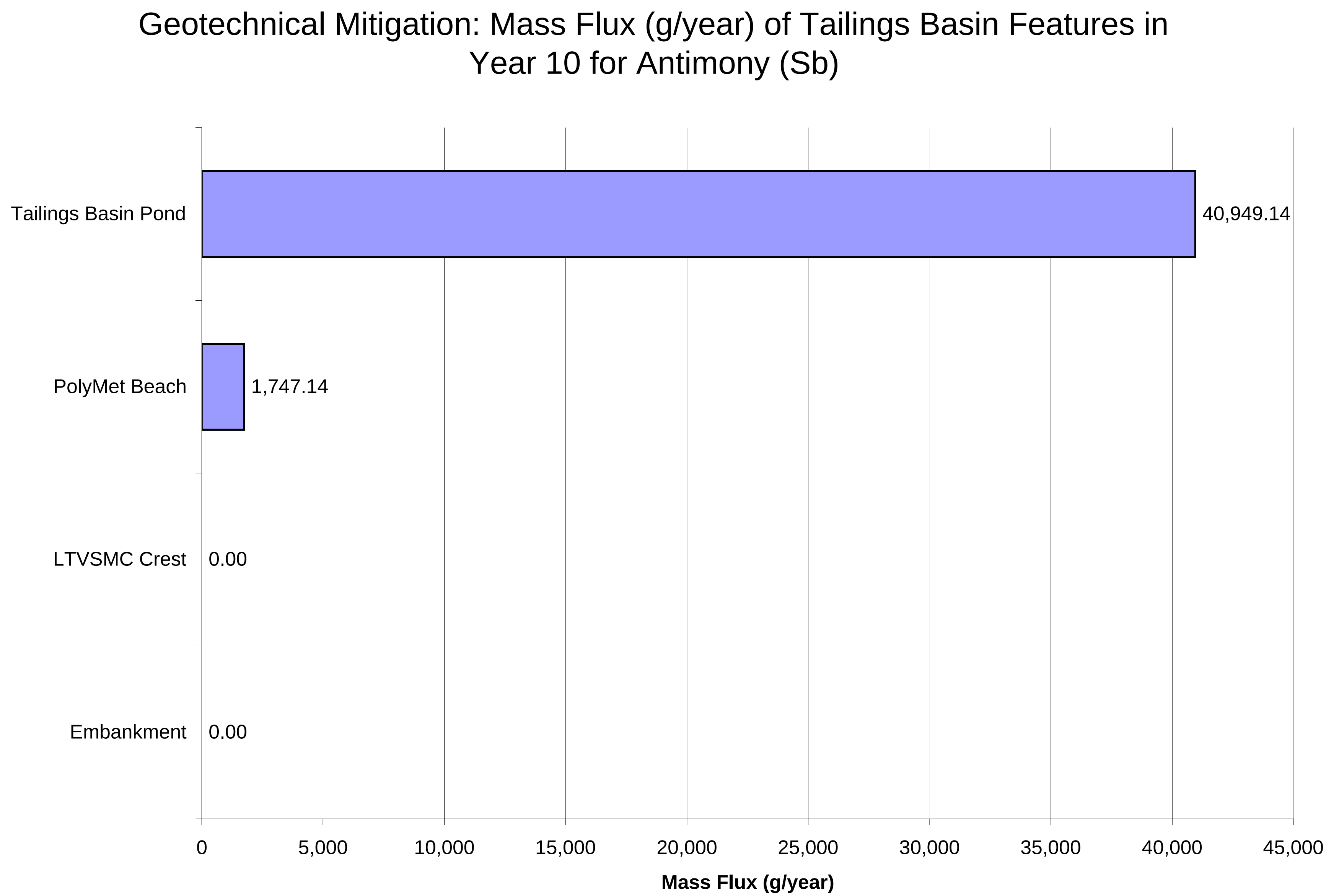



Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Antimony (Sb)
Tailings Basin Pond
25,144.71
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

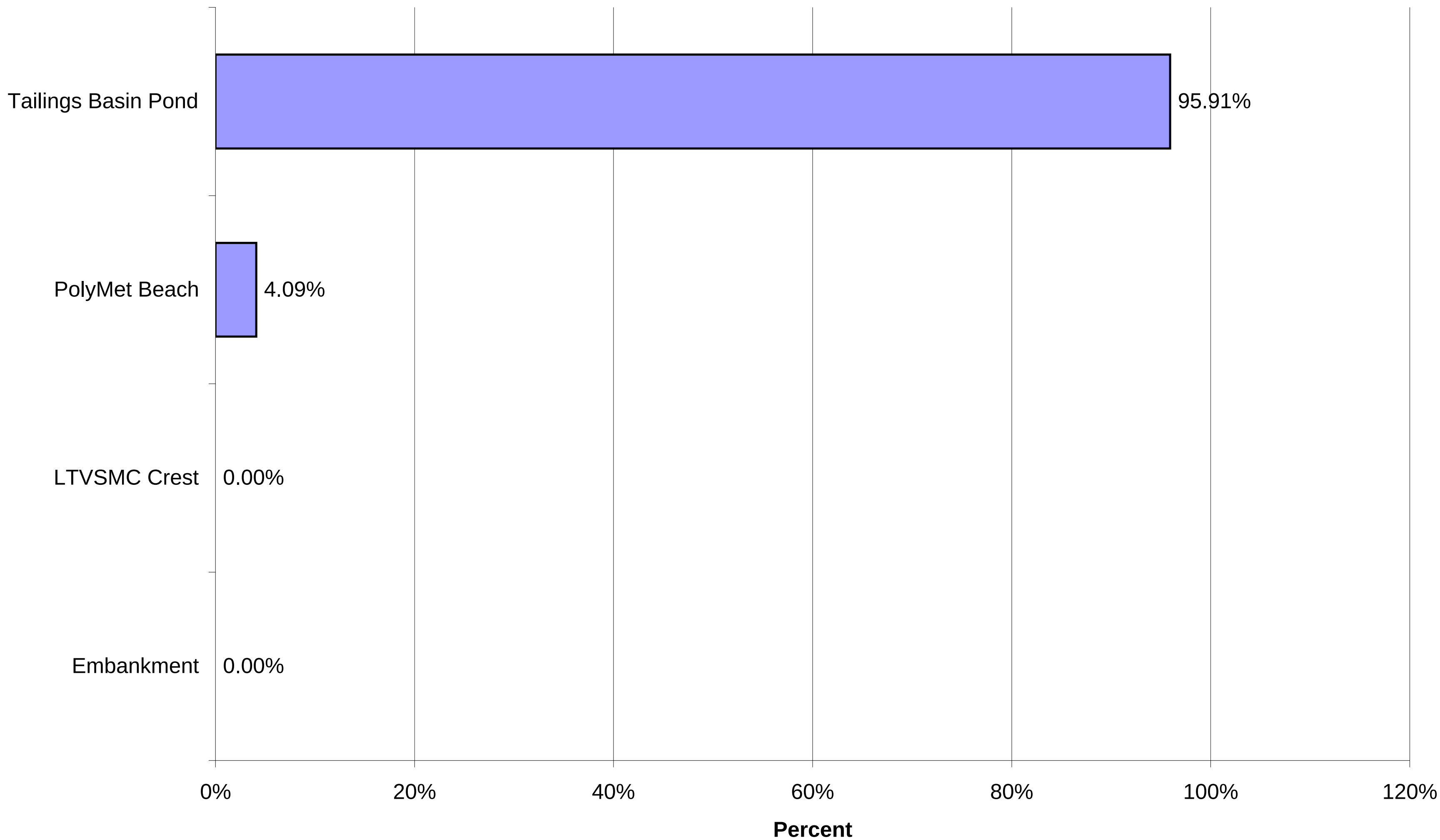

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 1 for Antimony (Sb)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

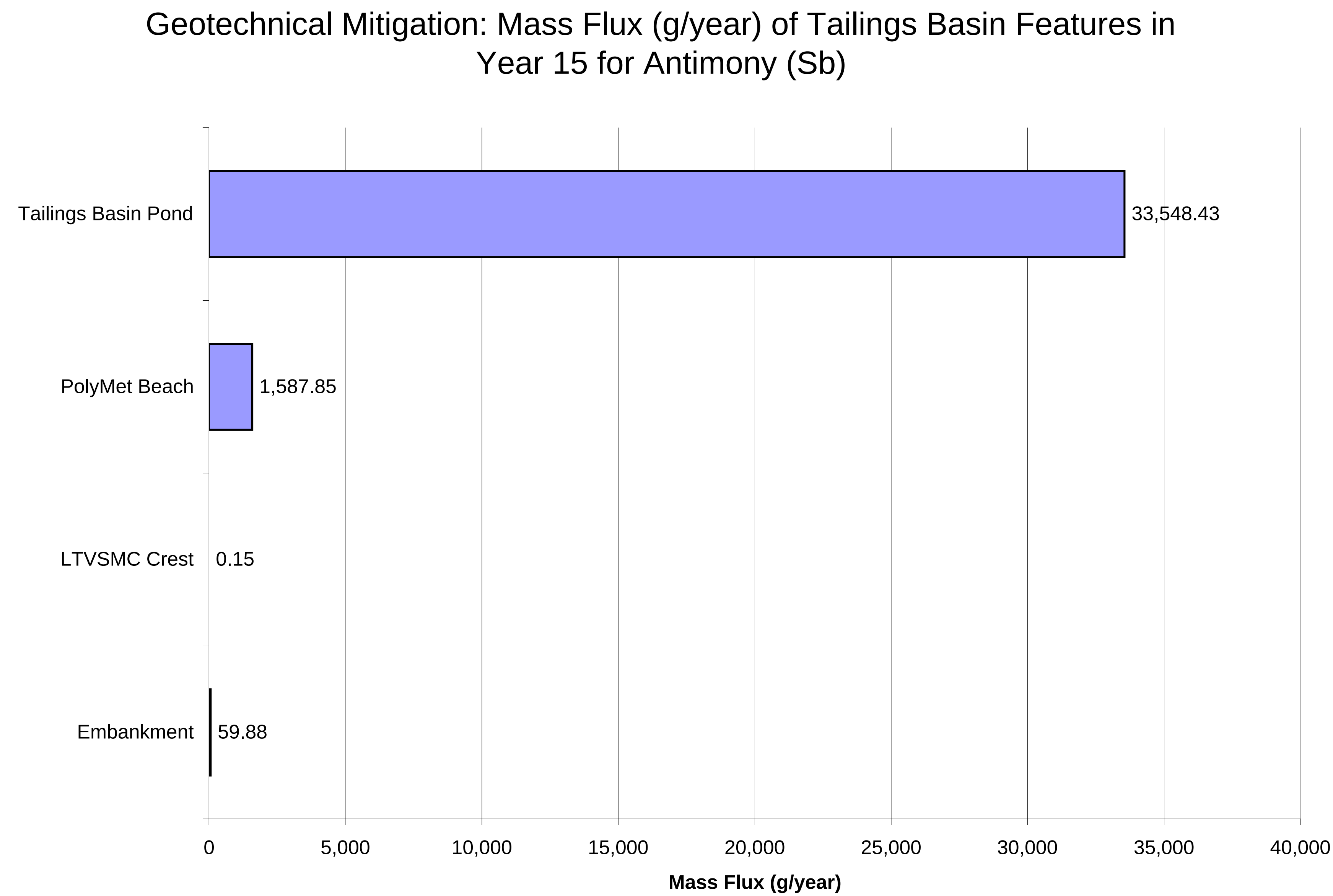

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Antimony (Sb)
Tailings Basin Pond
27,436.21
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

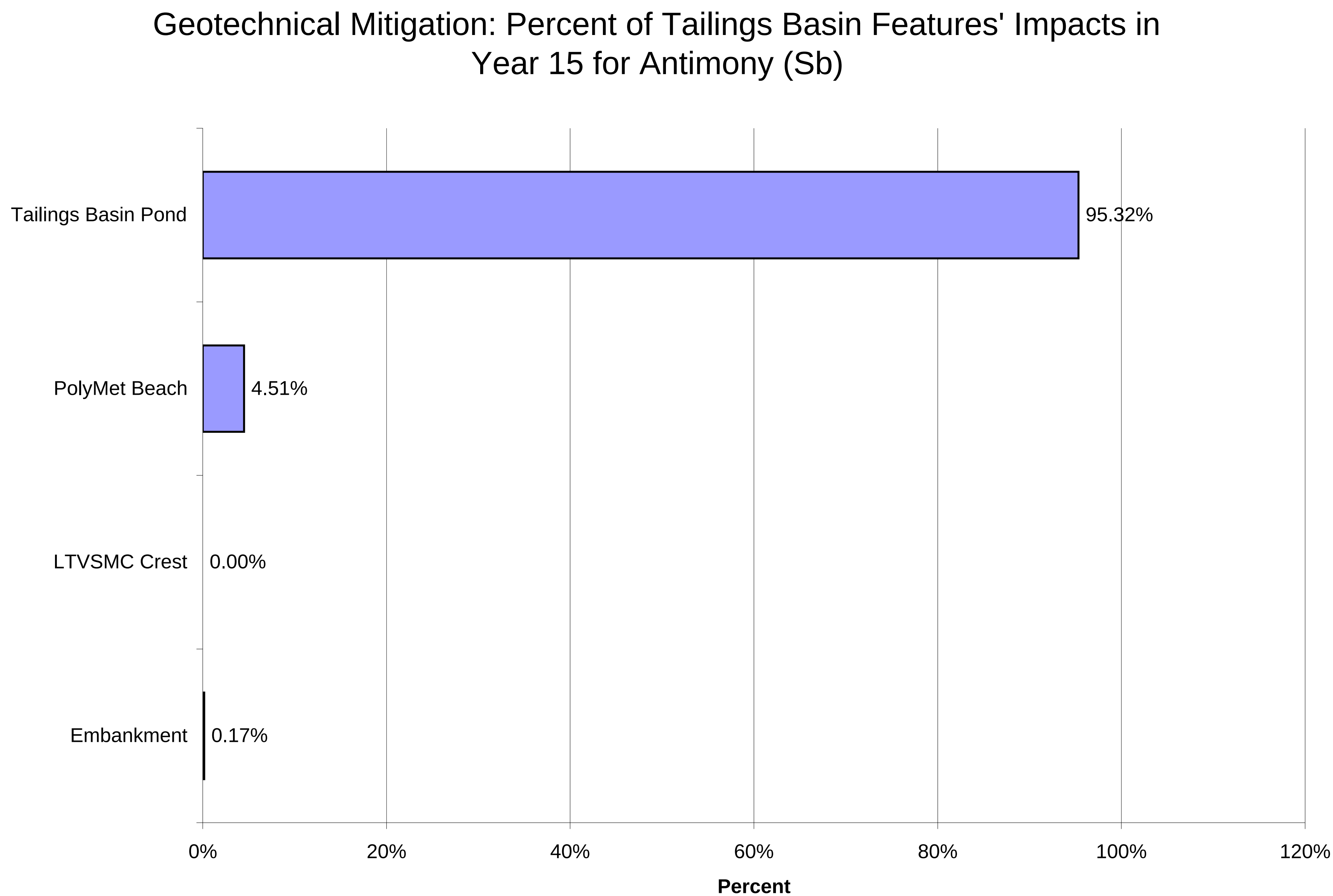

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 5 for Antimony (Sb)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

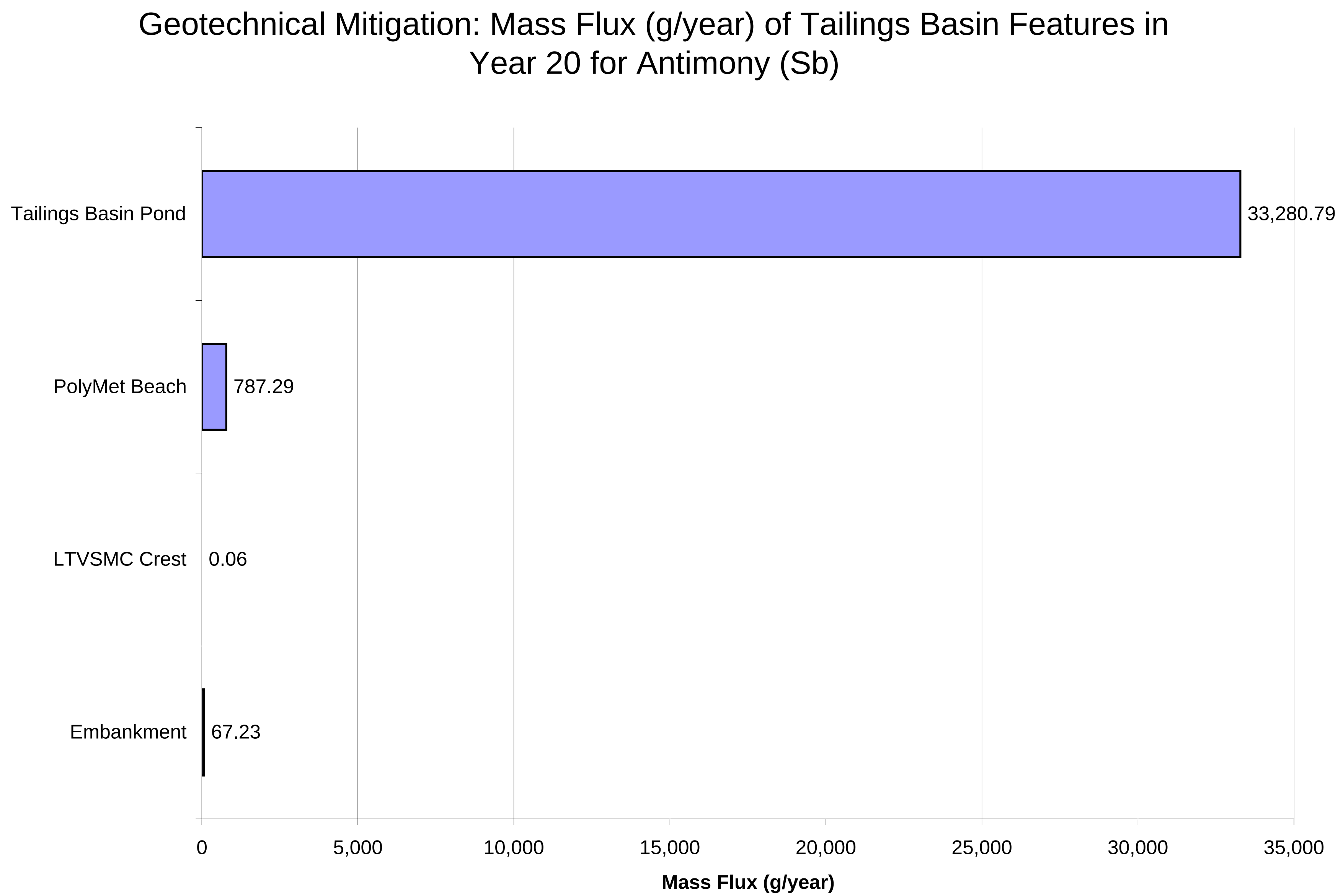

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Antimony (Sb)
Tailings Basin Pond
40,949.14
PolyMet Beach
1,747.14
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

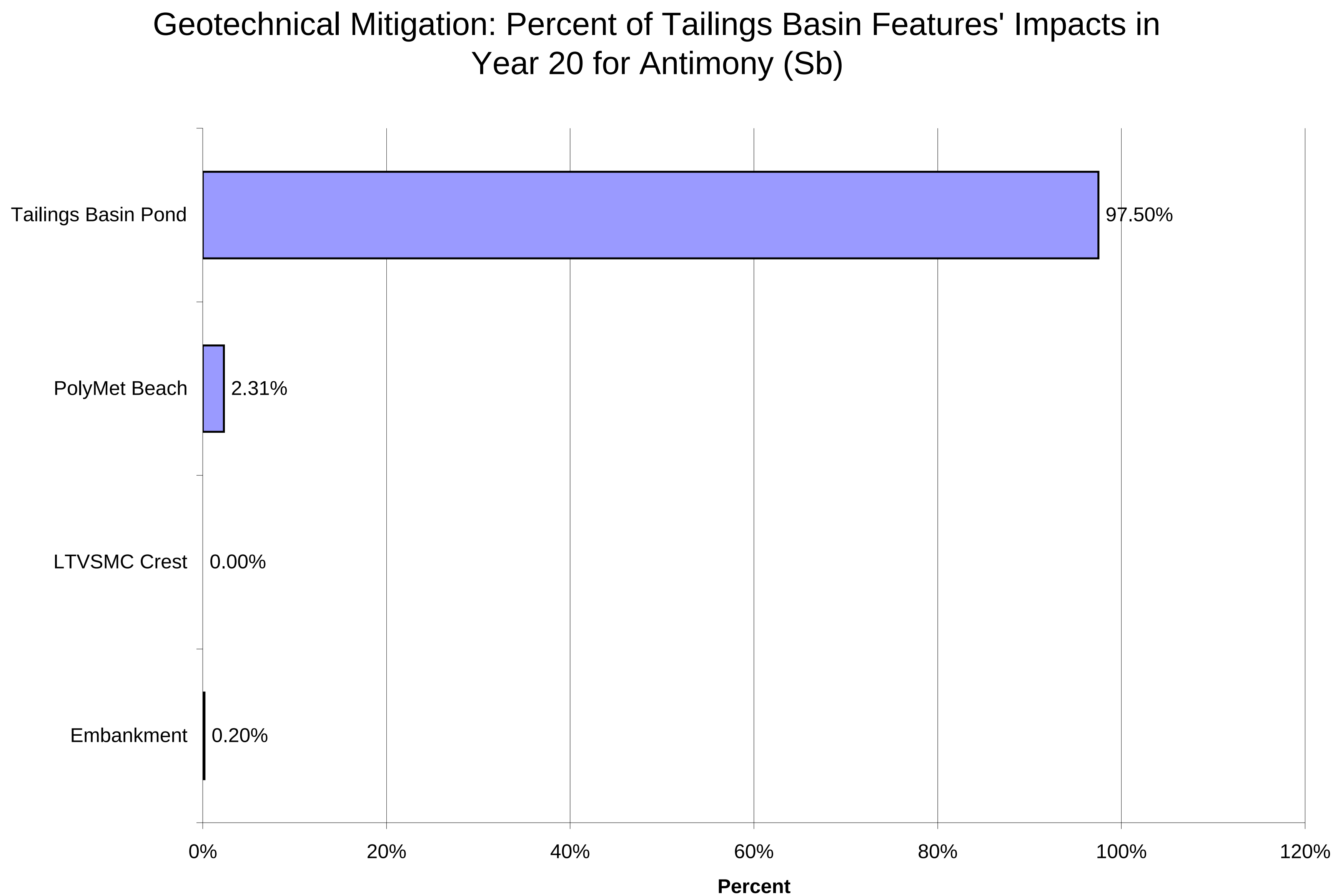
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 10 for Antimony (Sb)



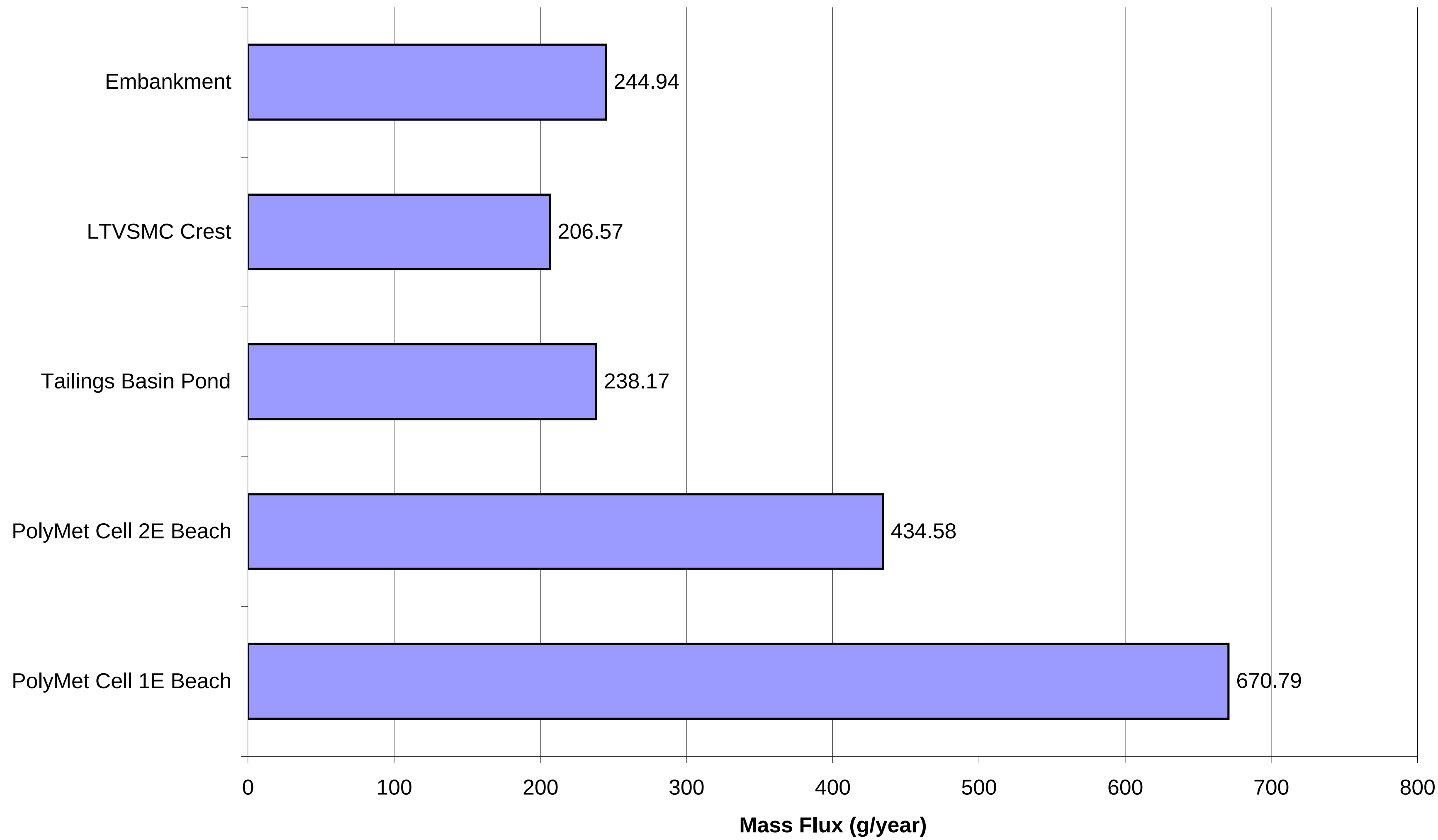

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Antimony (Sb)
Tailings Basin Pond
33,548.43
PolyMet Beach
1,587.85
LTVSMC Crest
0.15
Embankment
59.88
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Mass Flux (g/year)

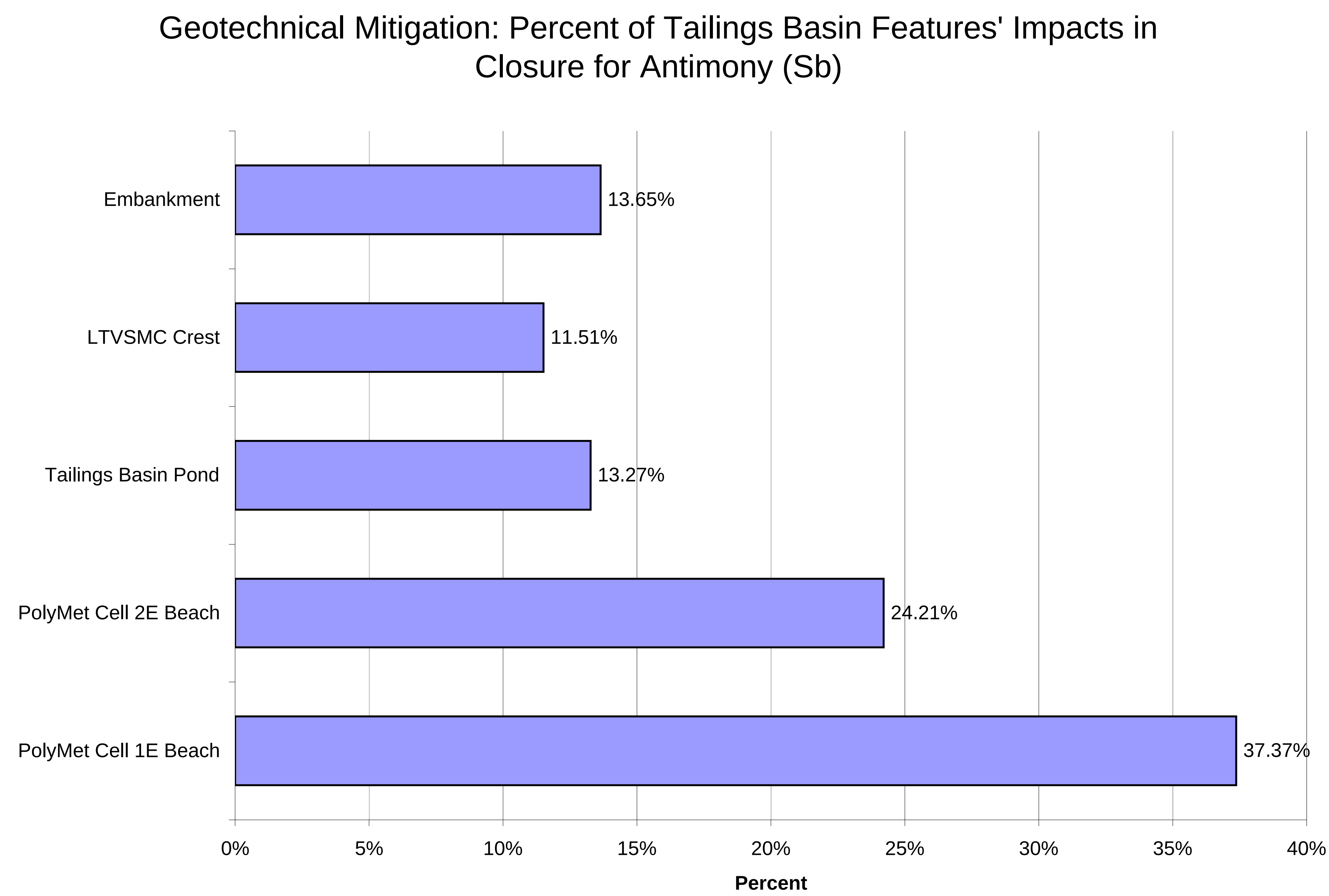

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 15 for Antimony (Sb)
Tailings Basin Pond
95.32%
PolyMet Beach
4.51%
LTVSMC Crest
0.00%
Embankment
0.17%
0%
20%
40%
60%
80%
100%
120%
Percent

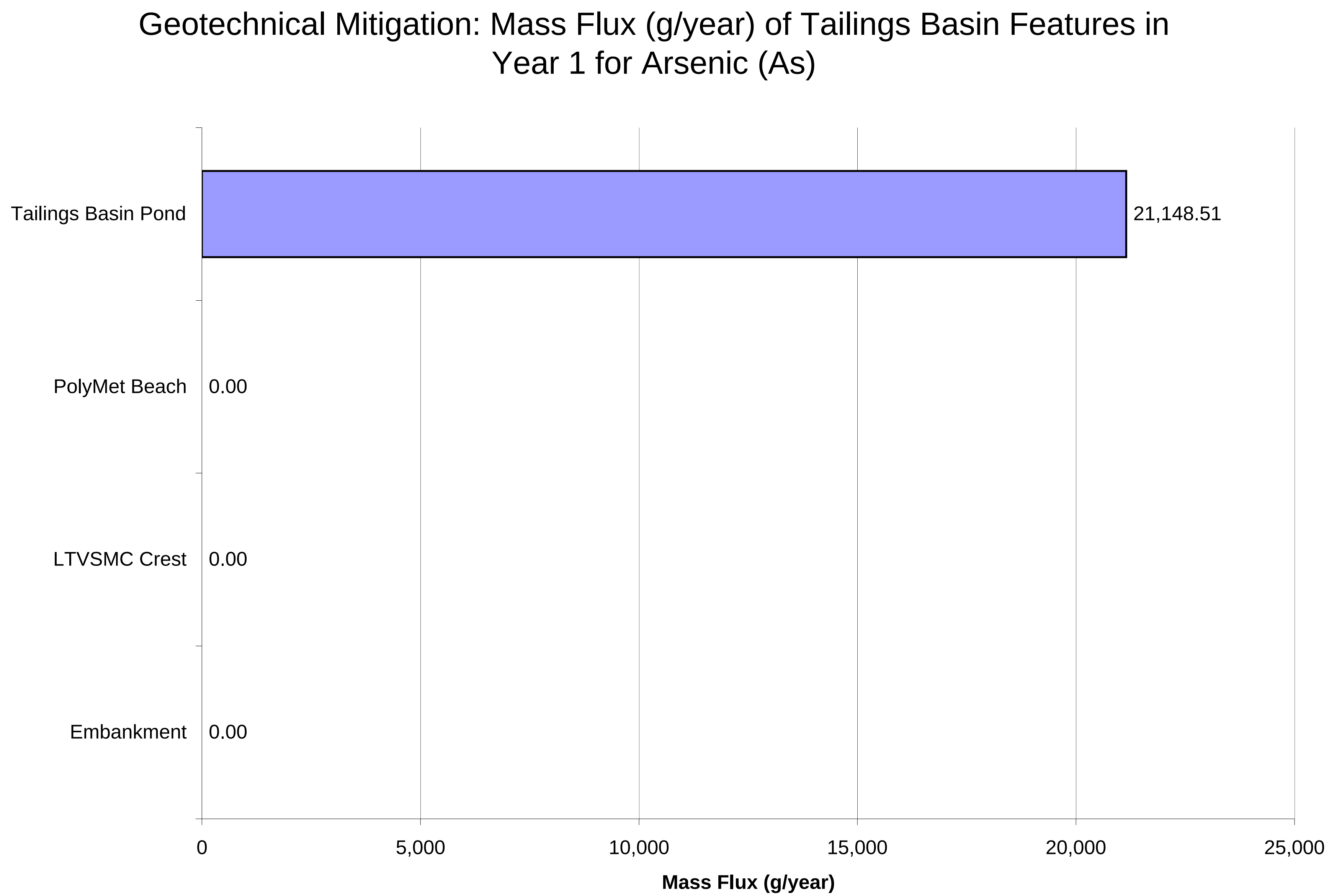

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Antimony (Sb)
Tailings Basin Pond
33,280.79
PolyMet Beach
787.29
LTVSMC Crest
0.06
Embankment
67.23
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

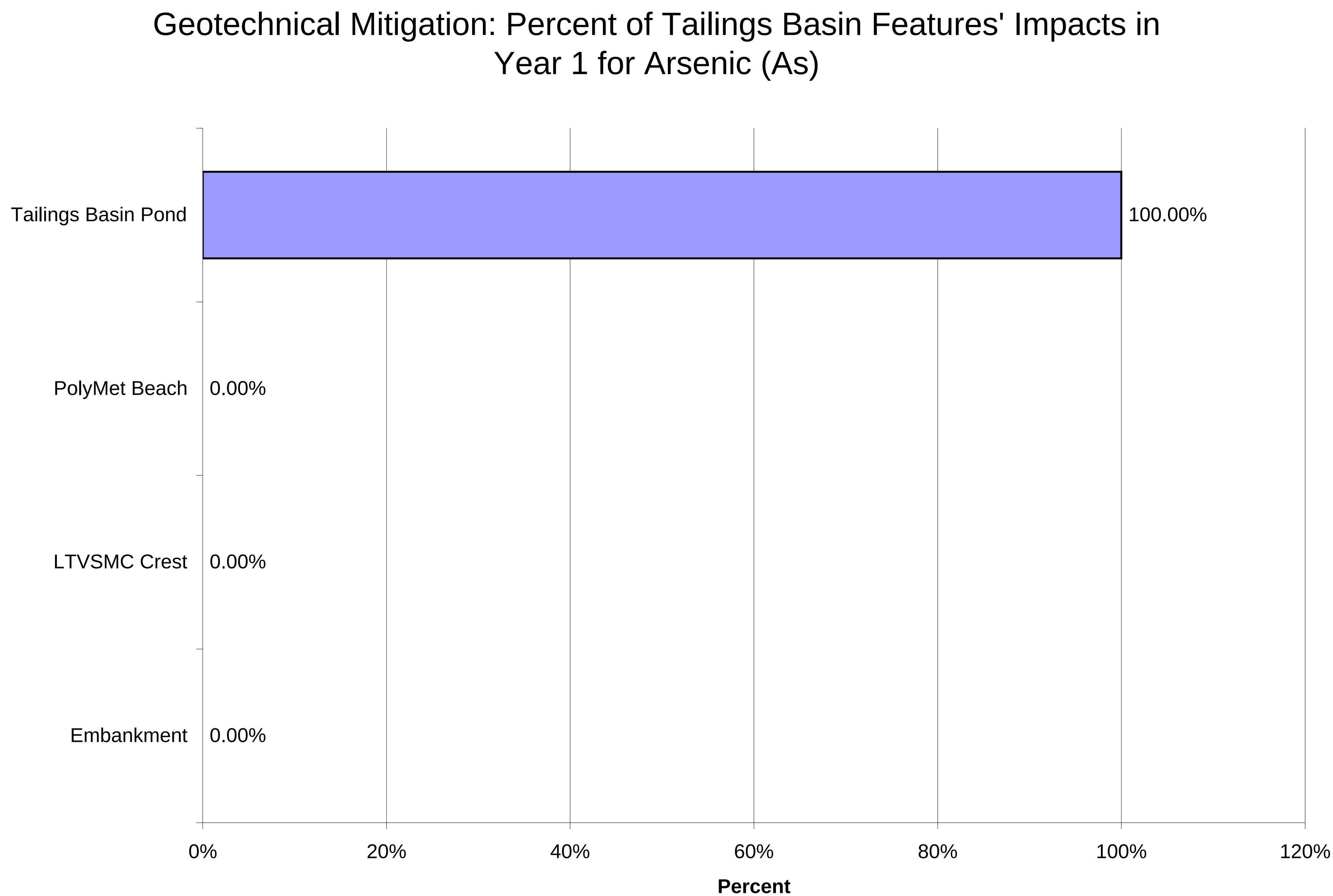

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 20 for Antimony (Sb)
Tailings Basin Pond
97.50%
PolyMet Beach
2.31%
LTVSMC Crest
0.00%
Embankment
0.20%
0%
20%
40%
60%
80%
100%
120%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Closure for Antimony (Sb)

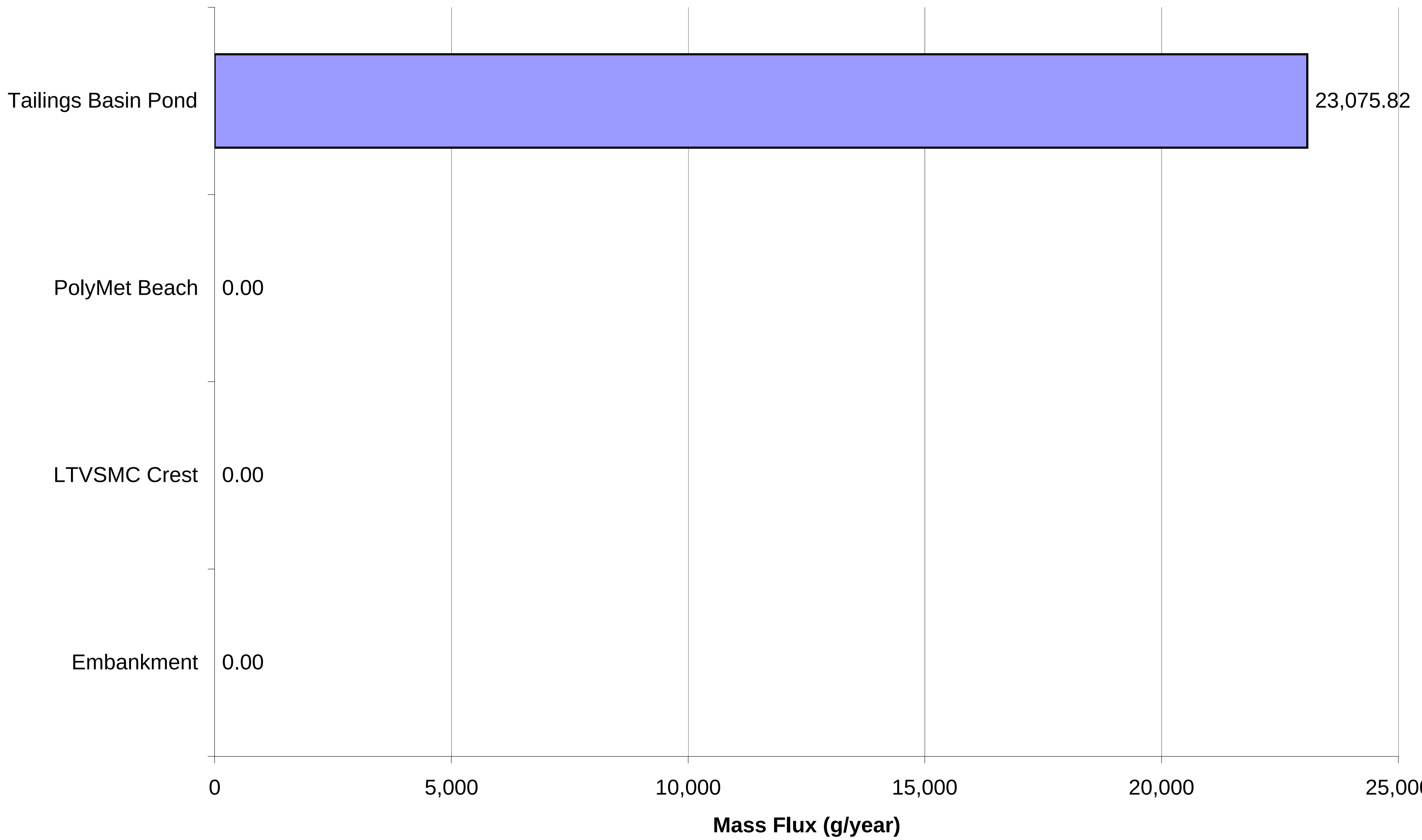



Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Closure for Antimony (Sb)
Embankment
13.65%
LTVSMC Crest
11.51%
Tailings Basin Pond
13.27%
PolyMet Cell 2E Beach
24.21%
PolyMet Cell 1E Beach
37.37%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

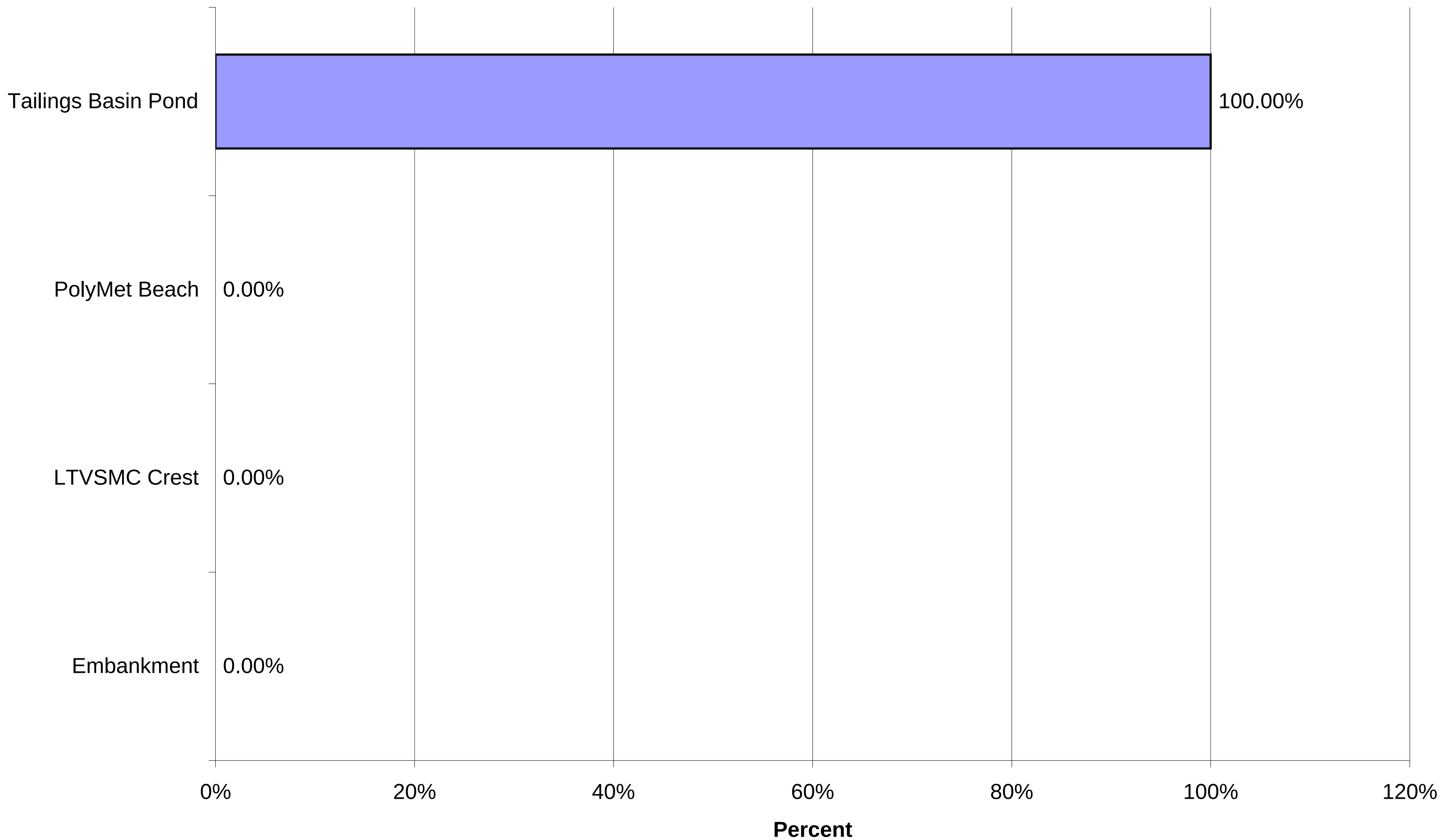

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Arsenic (As)
Tailings Basin Pond
21,148.51
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

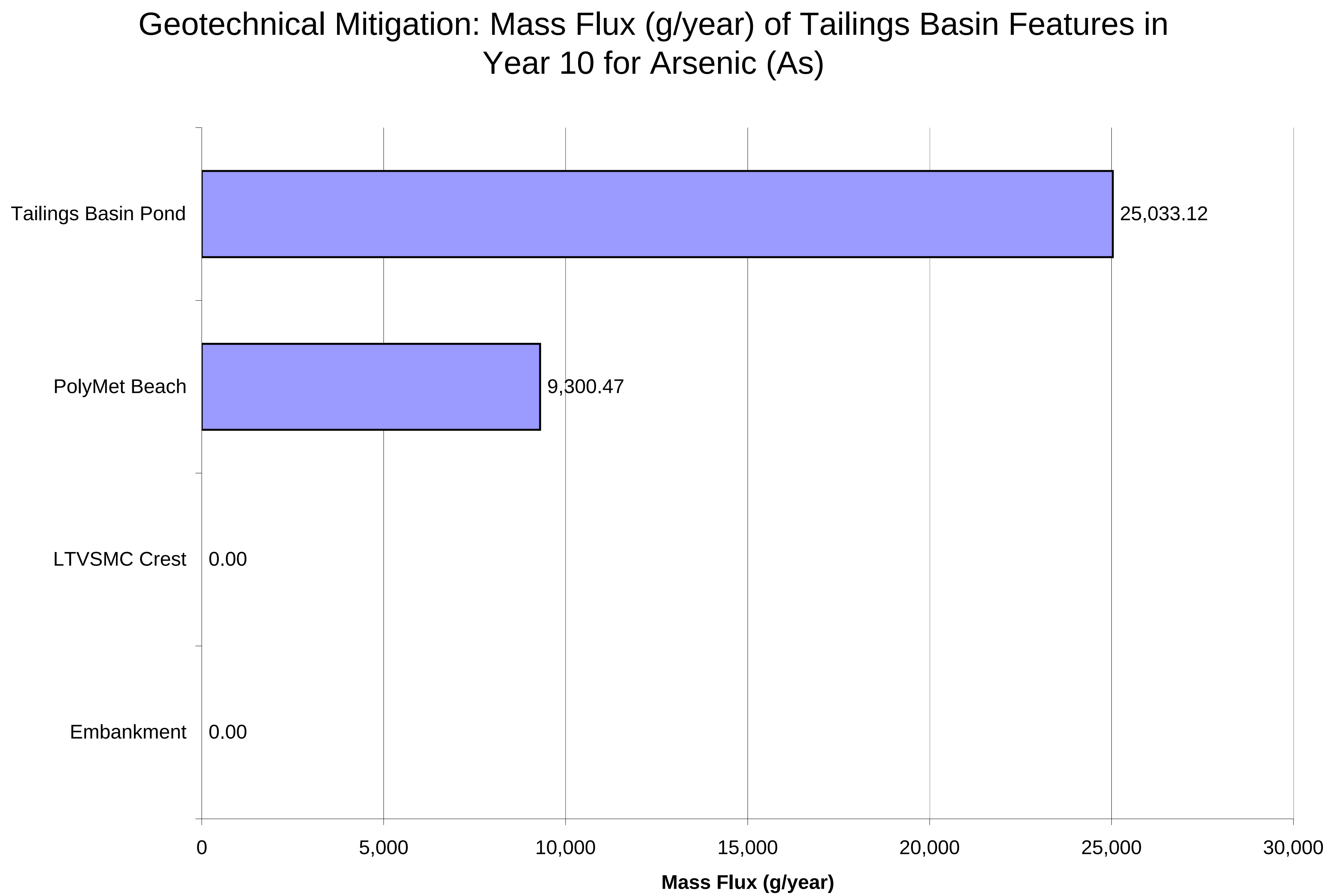

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 1 for Arsenic (As)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Arsenic (As)

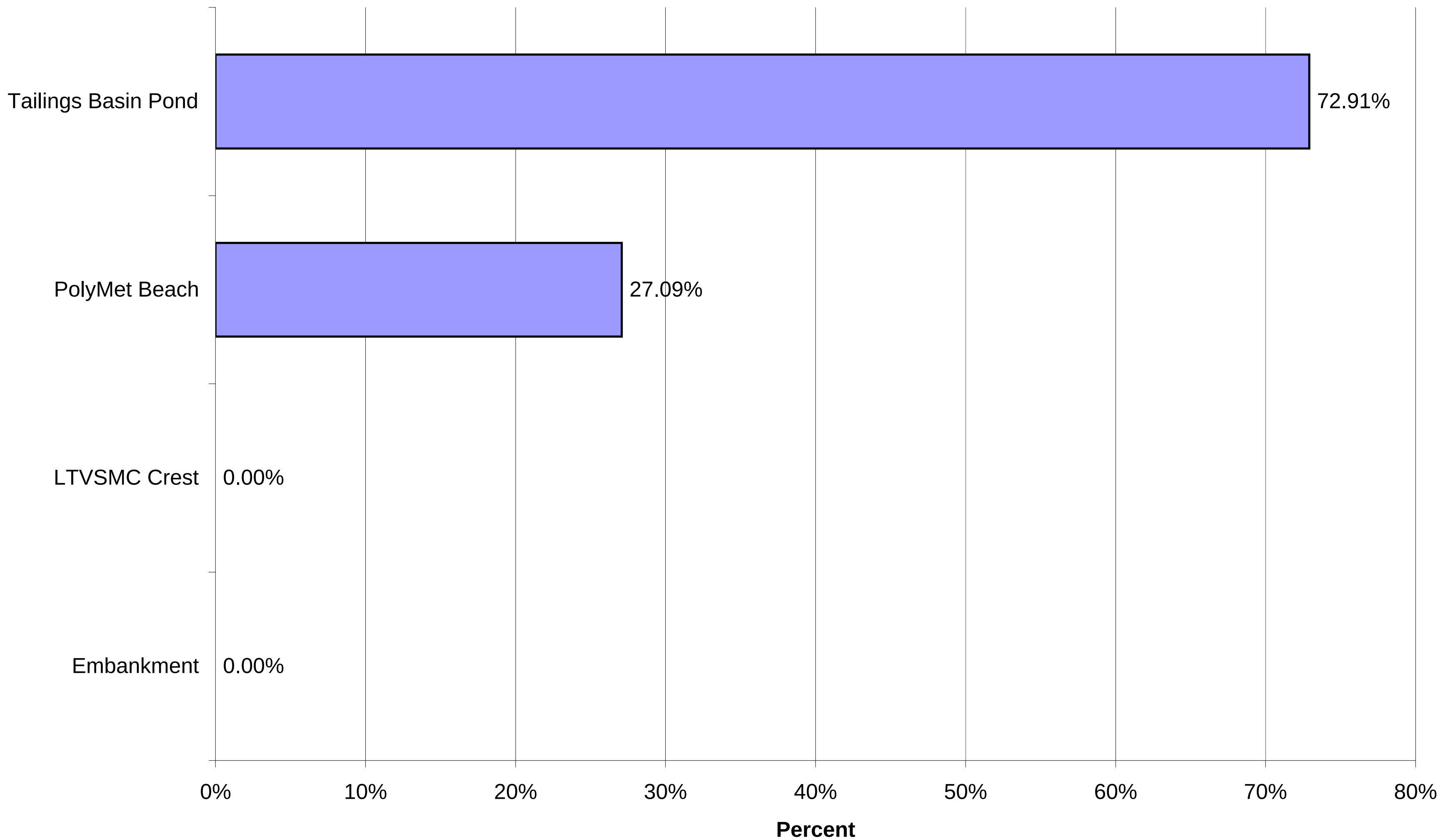


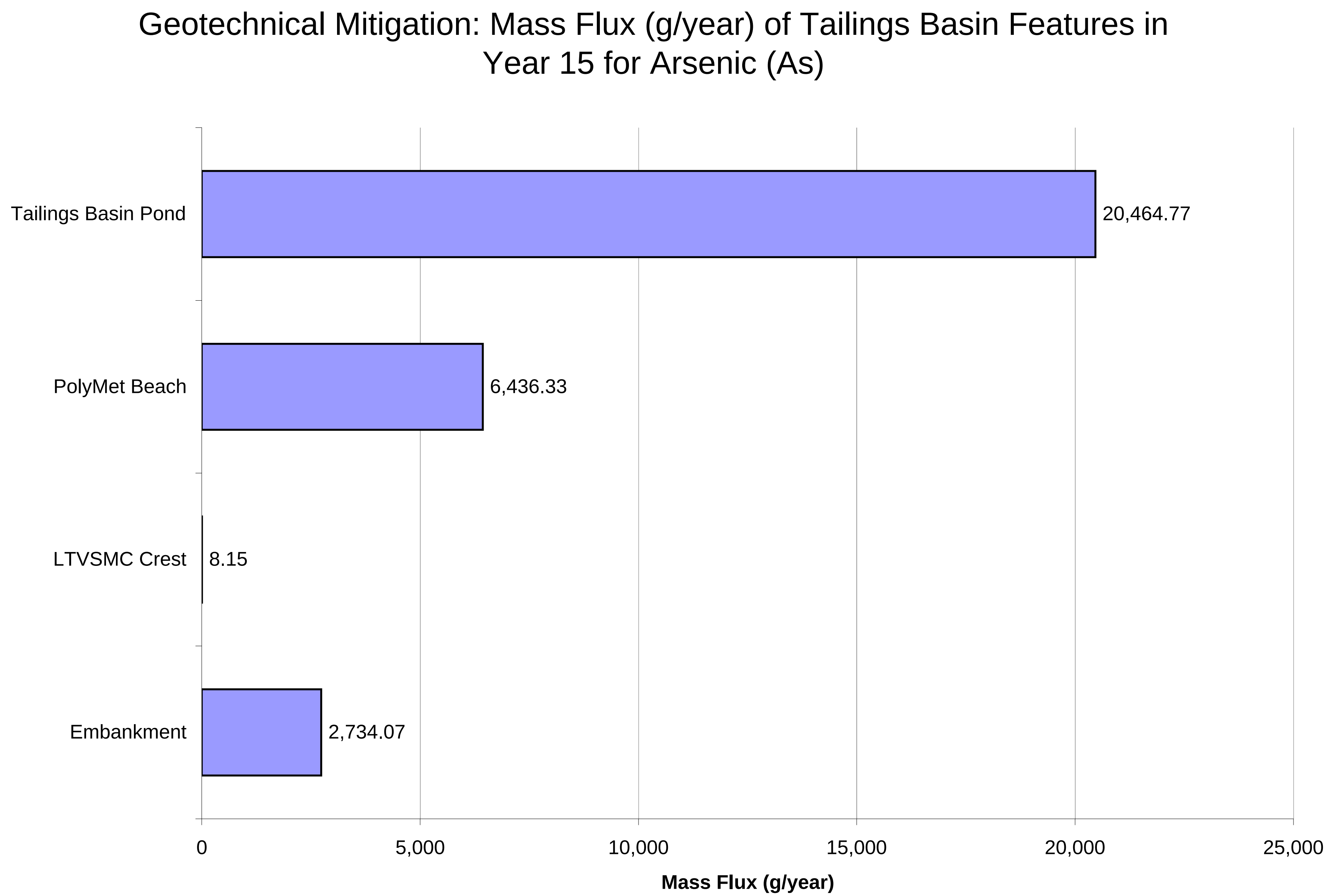
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 5 for Arsenic (As)

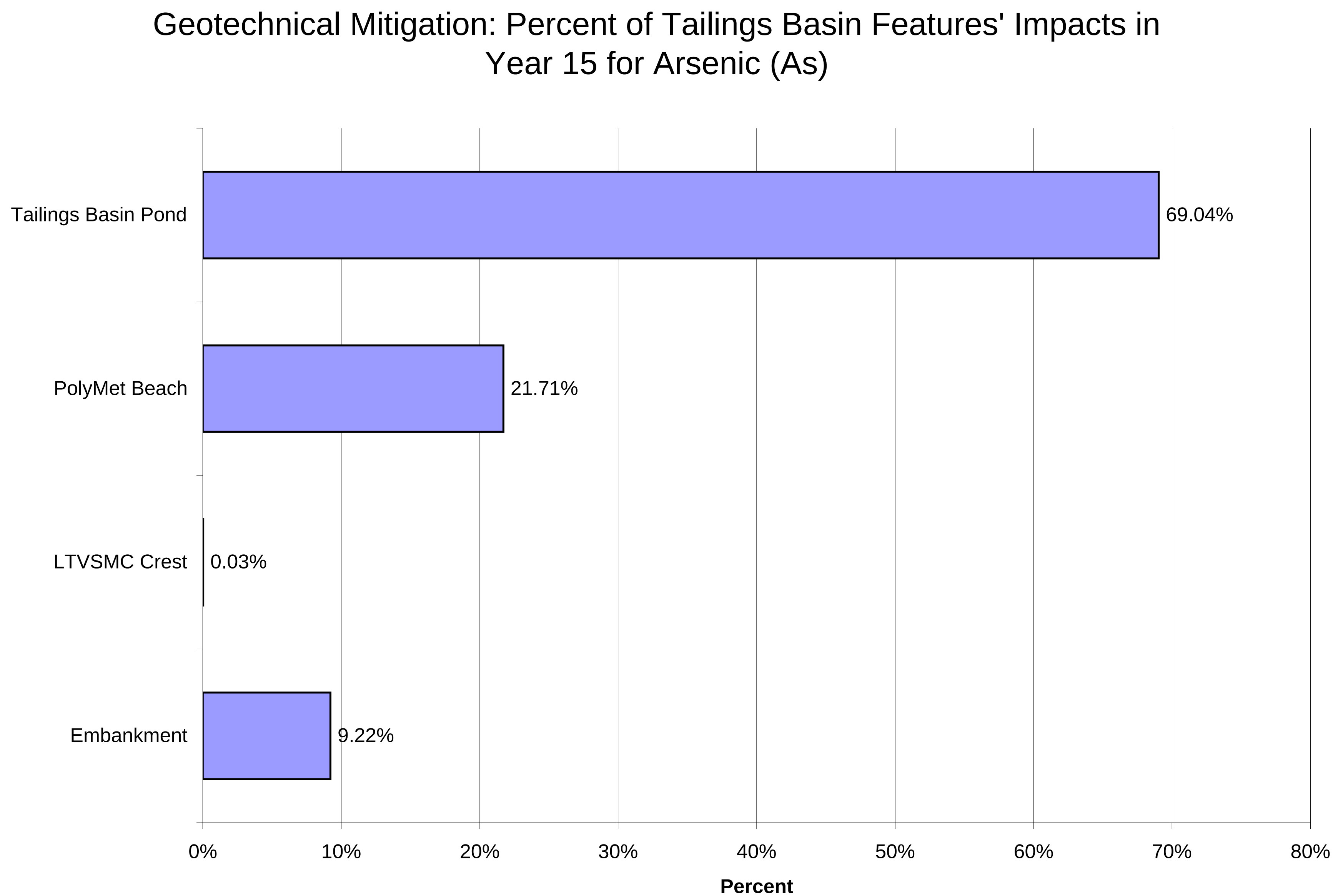


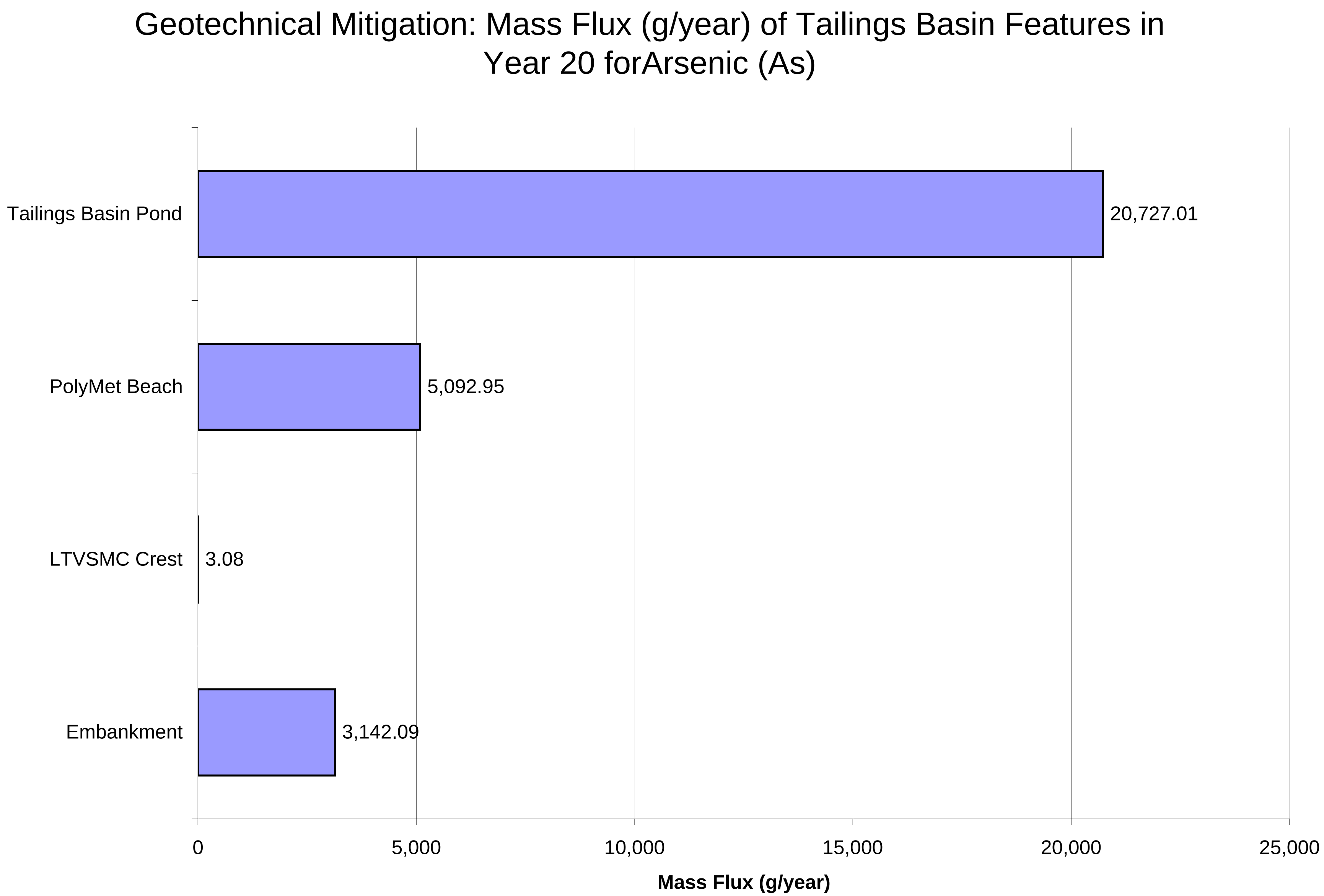

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Arsenic (As)
Tailings Basin Pond
25,033.12
PolyMet Beach
9,300.47
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

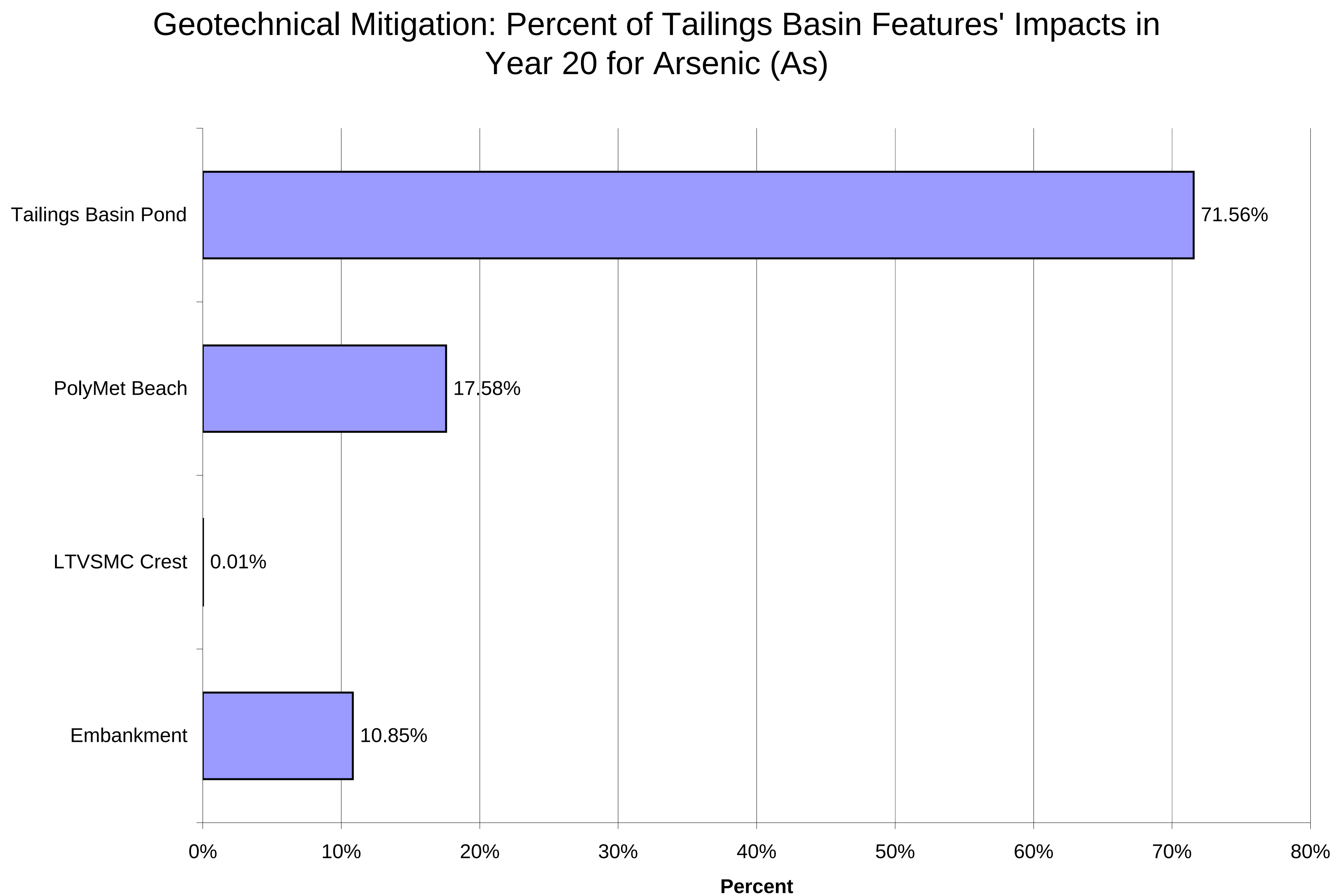
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 10 for Arsenic (As)



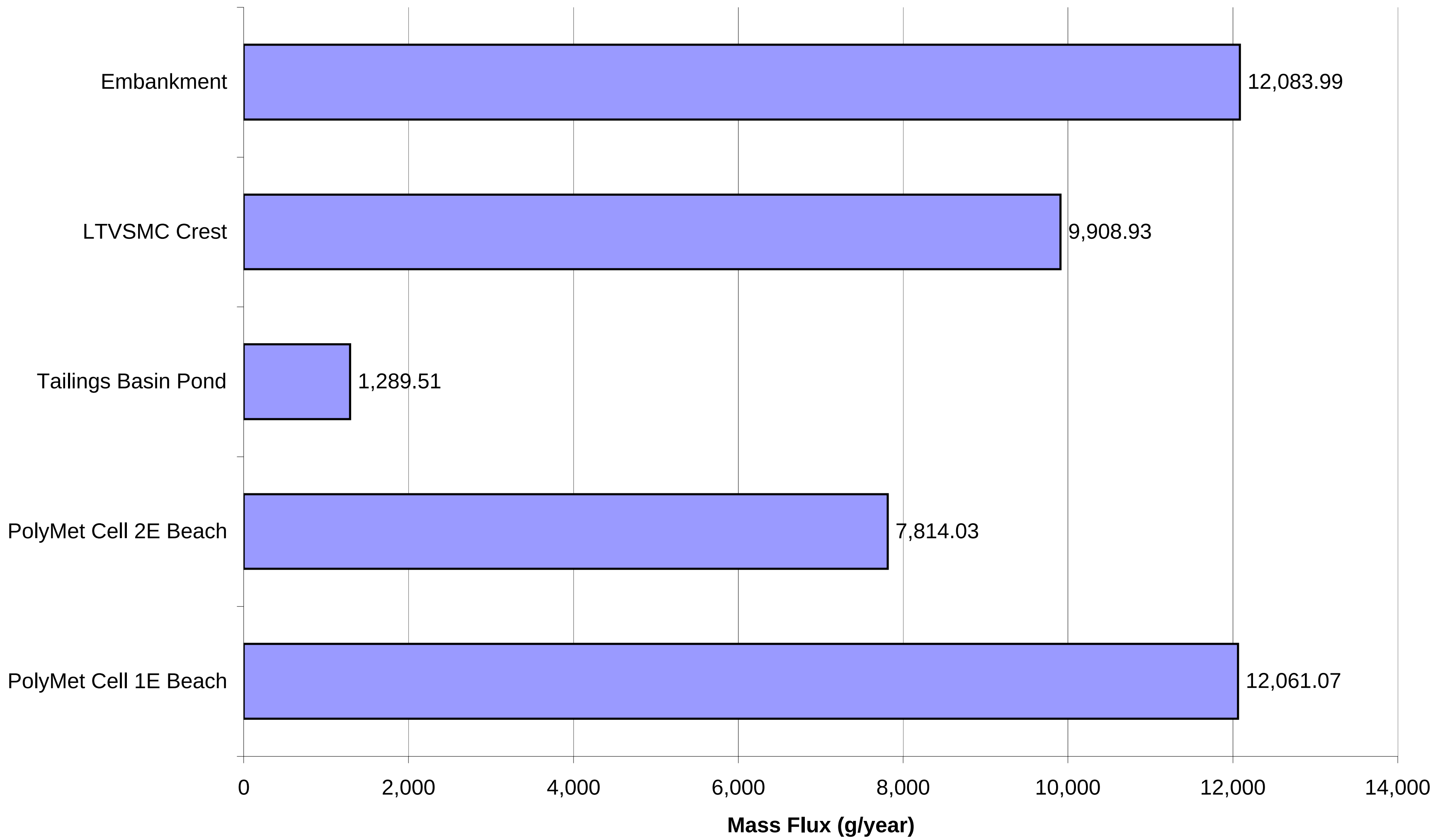

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Arsenic (As)
Tailings Basin Pond
20,464.77
PolyMet Beach
6,436.33
LTVSMC Crest
8.15
Embankment
2,734.07
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

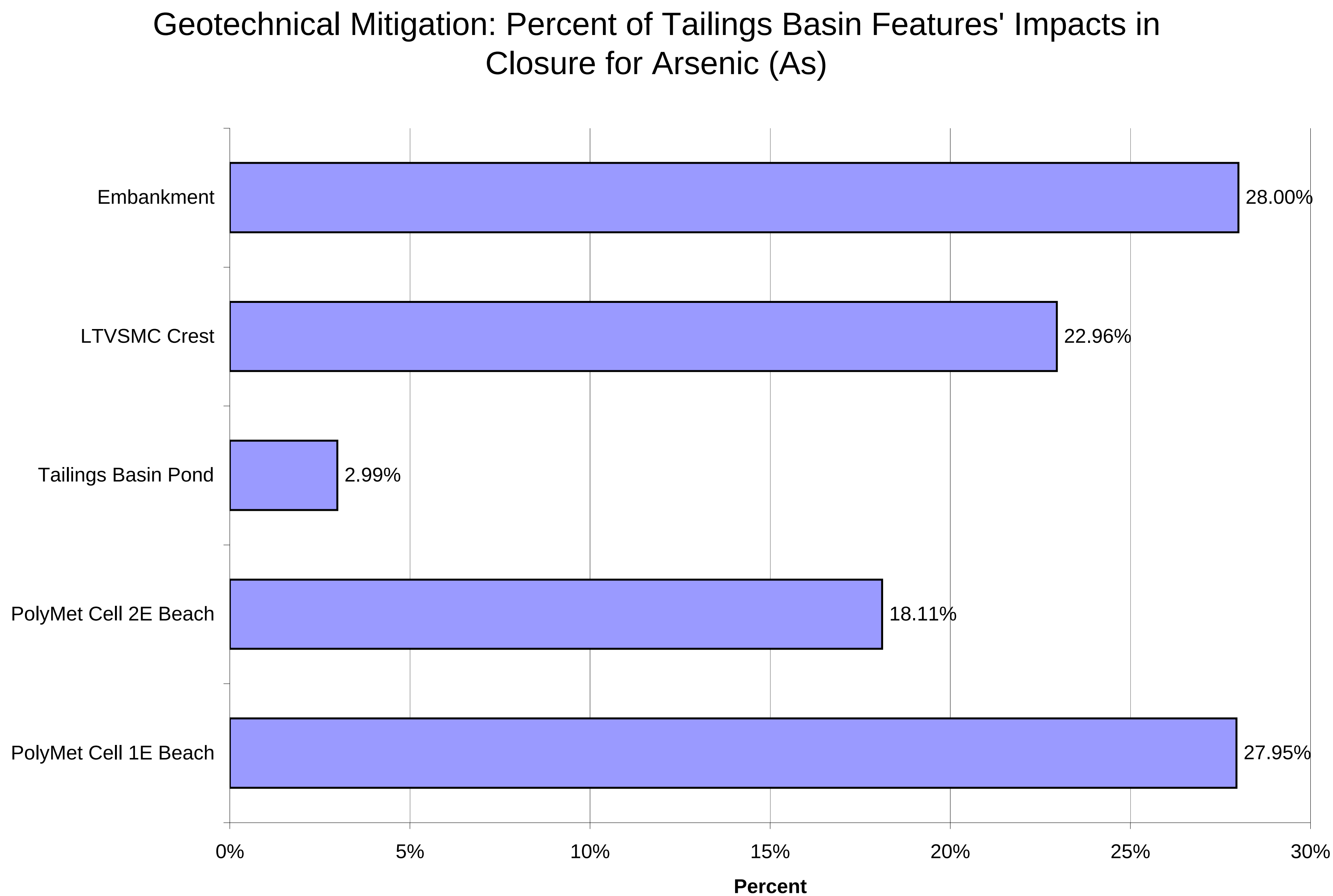

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 15 for Arsenic (As)
Tailings Basin Pond
PolyMet Beach
LTVSMC Crest
Embankment
69.04%
21.71%
0.03%
9.22%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

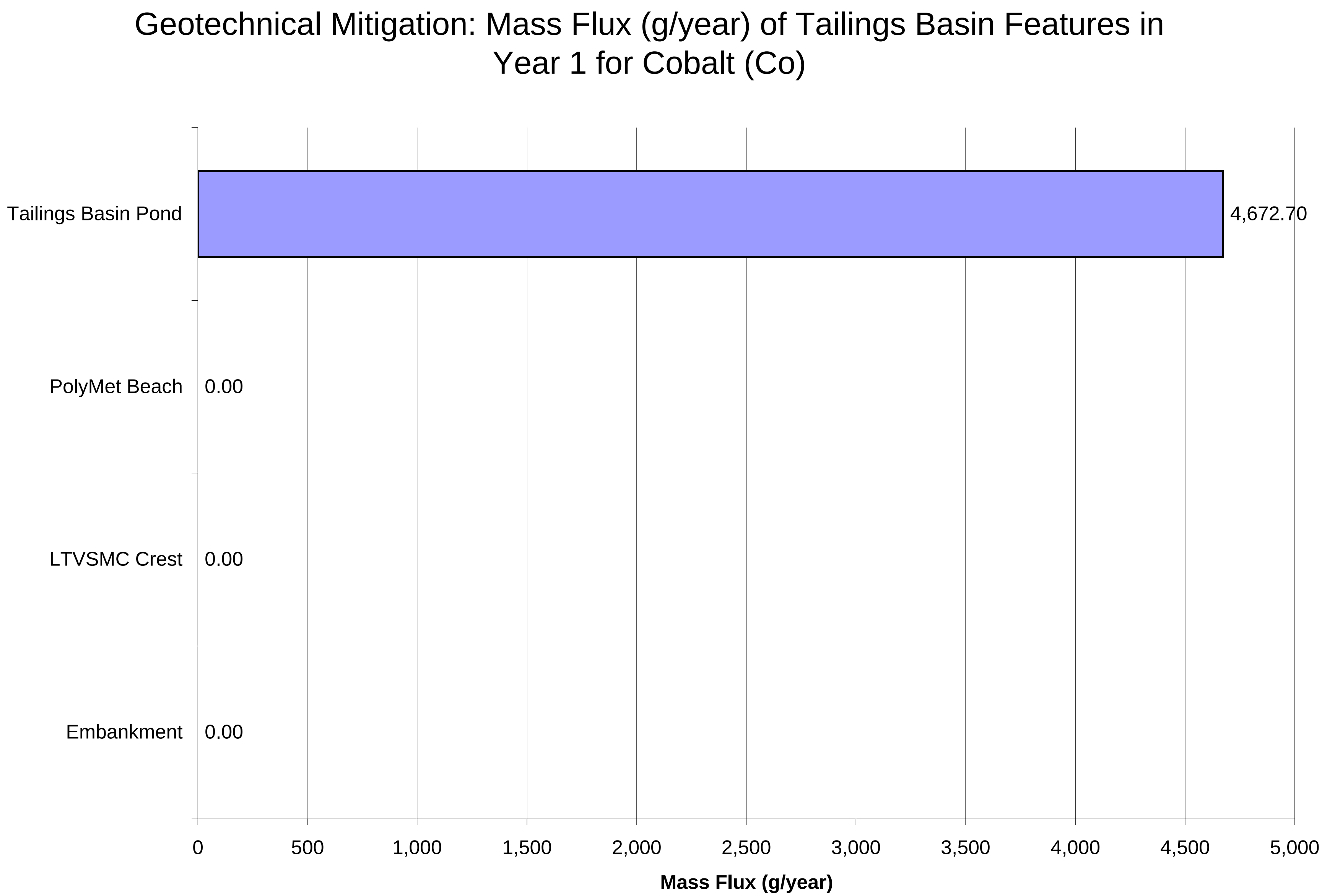

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 20 forArsenic (As)
Tailings Basin Pond
20,727.01
PolyMet Beach
5,092.95
LTVSMC Crest
3.08
Embankment
3,142.09
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

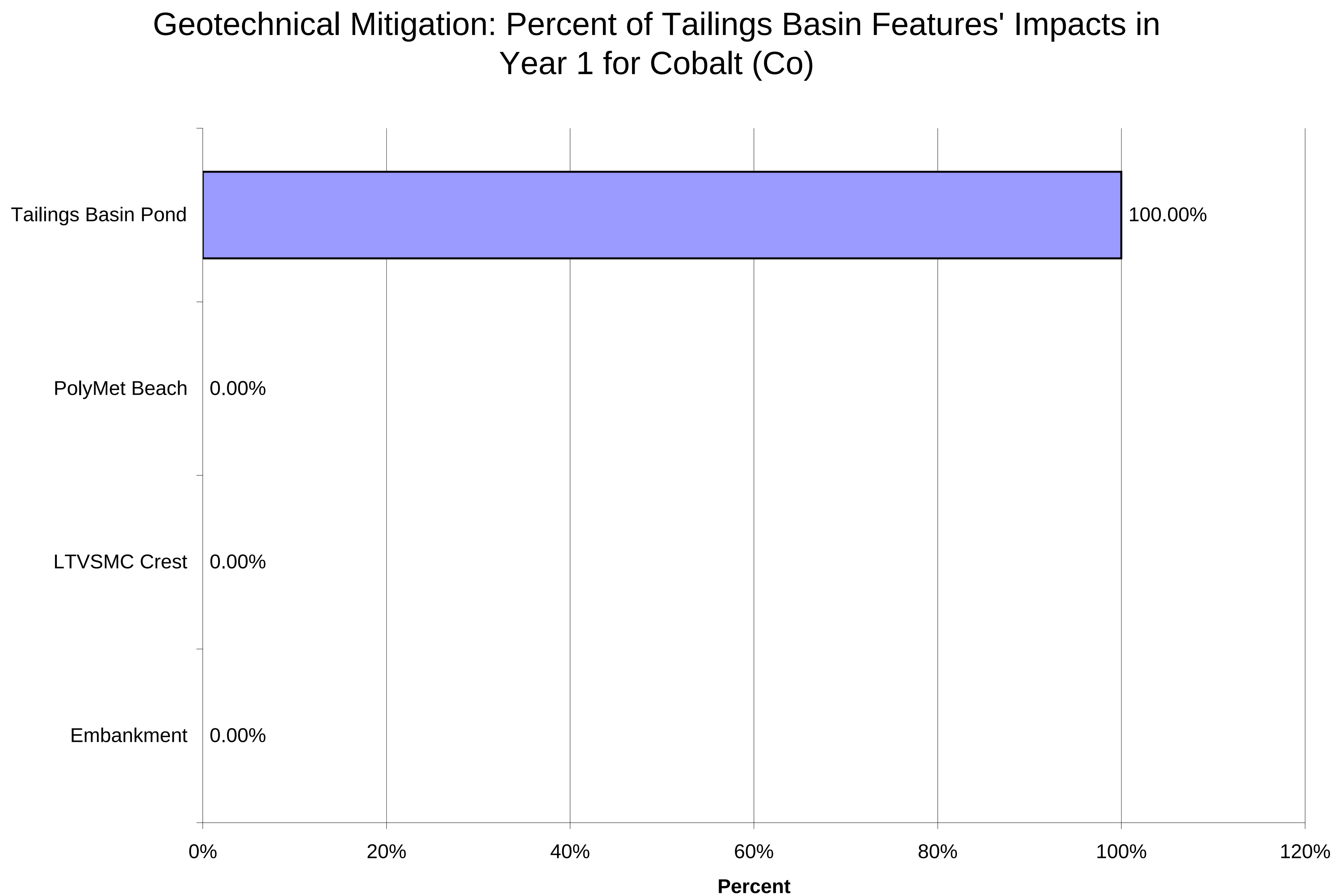

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 20 for Arsenic (As)
Tailings Basin Pond
71.56%
PolyMet Beach
17.58%
LTVSMC Crest
0.01%
Embankment
10.85%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Closure for Arsenic (As)

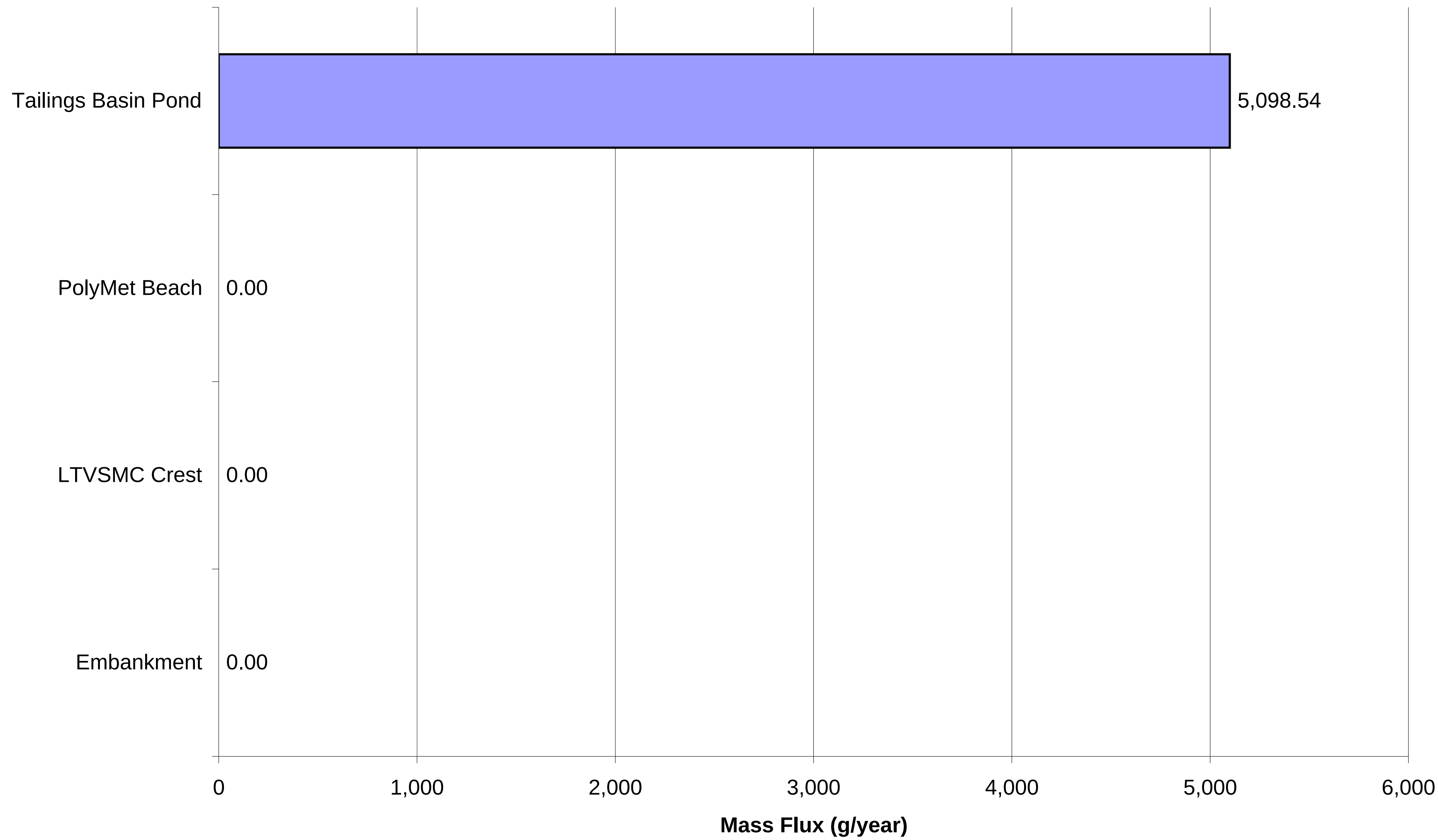


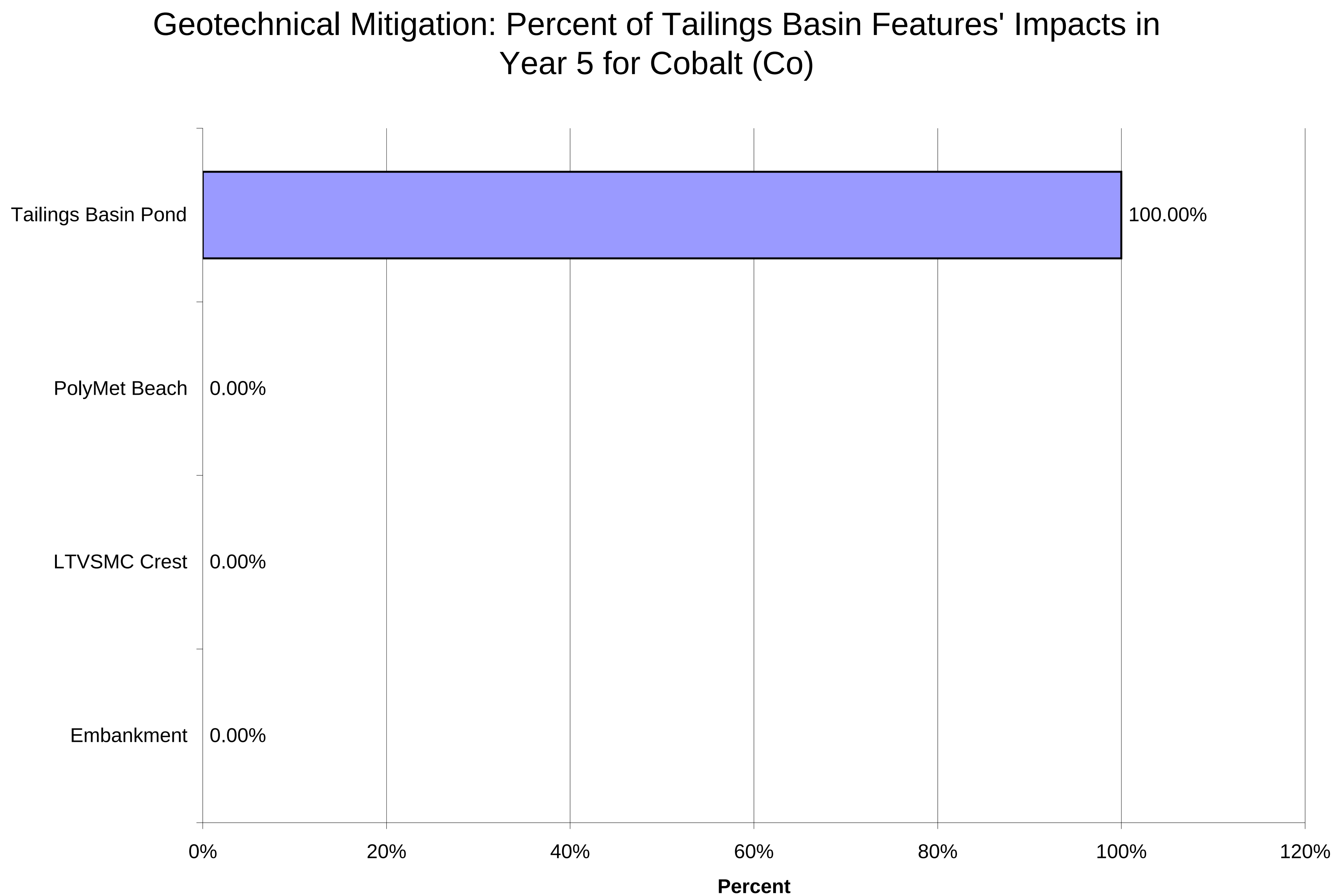

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Closure for Arsenic (As)
Embankment
28.00%
LTVSMC Crest
22.96%
Tailings Basin Pond
2.99%
PolyMet Cell 2E Beach
18.11%
PolyMet Cell 1E Beach
27.95%
0%
5%
10%
15%
20%
25%
30%
Percent

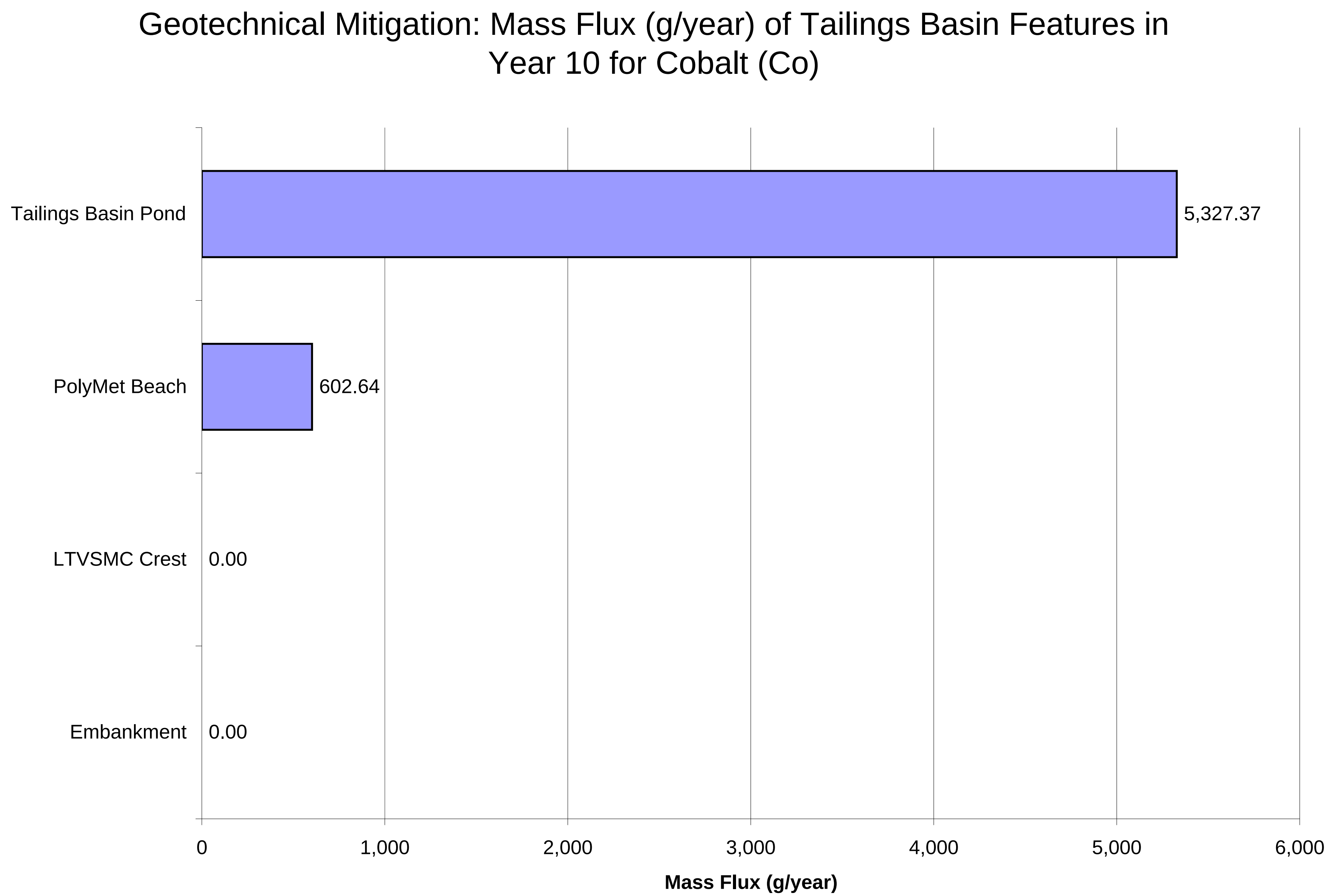

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Cobalt (Co)
Tailings Basin Pond
4,672.70
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Mass Flux (g/year)

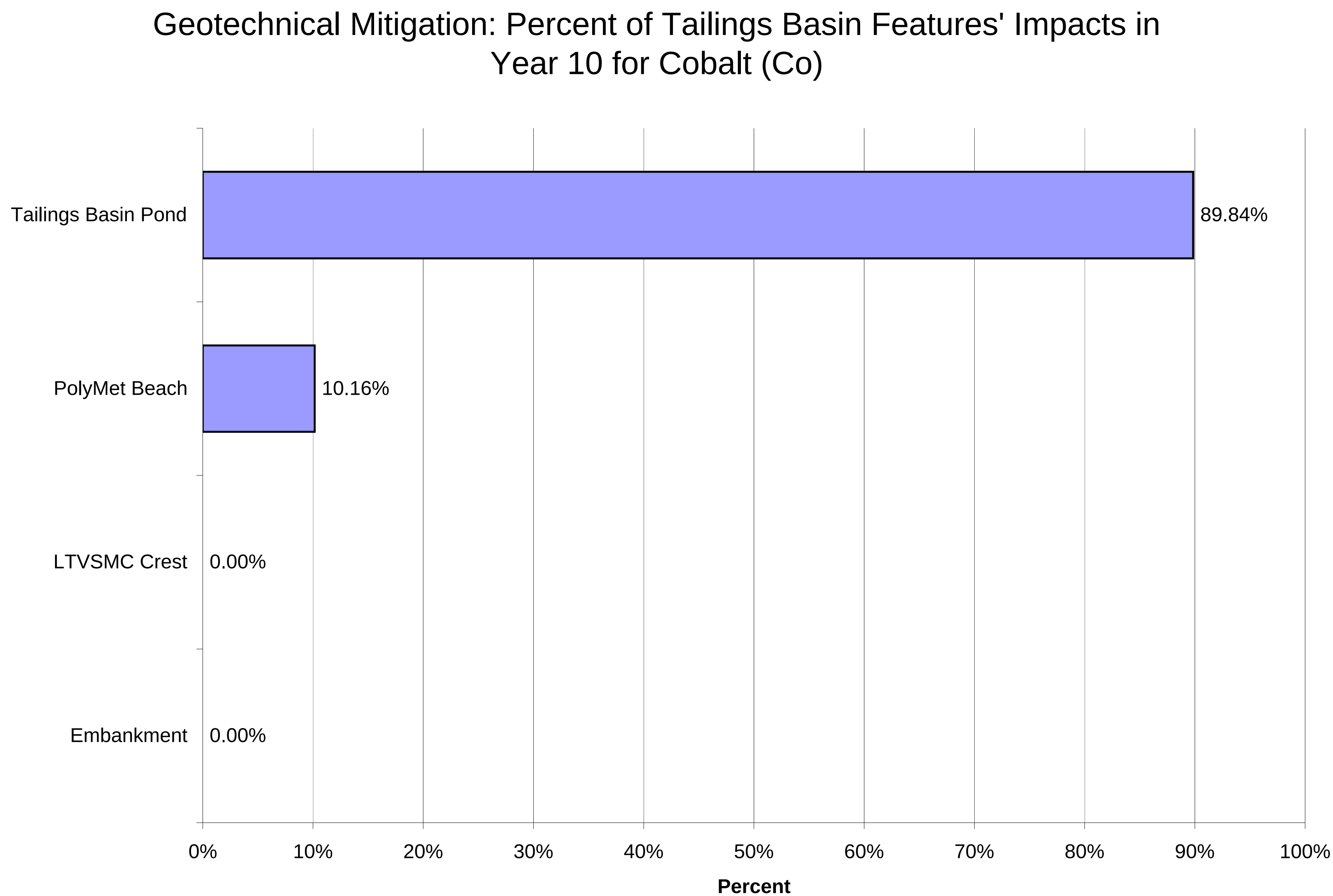

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 1 for Cobalt (Co)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

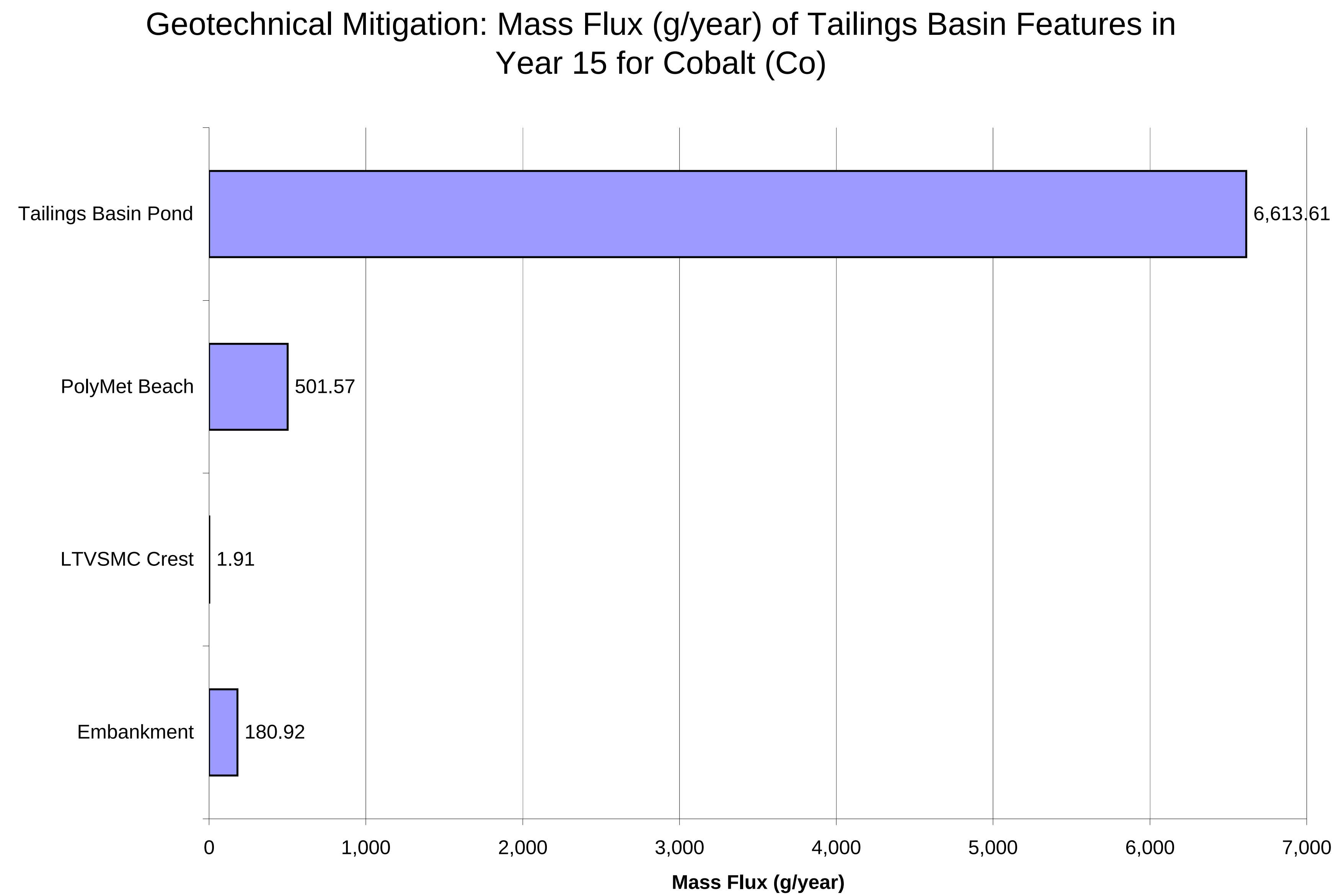
Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Cobalt (Co)

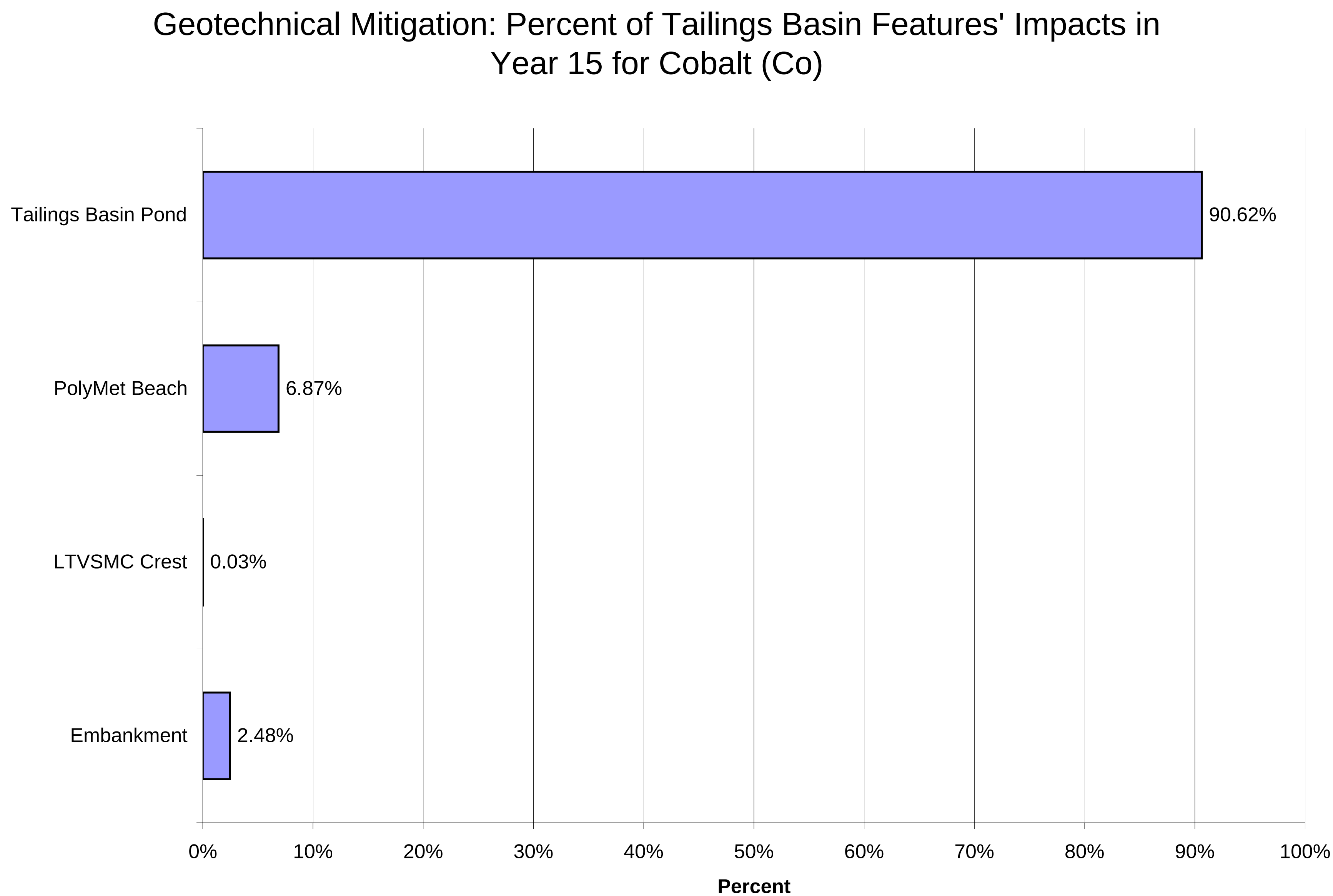



Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 5 for Cobalt (Co)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

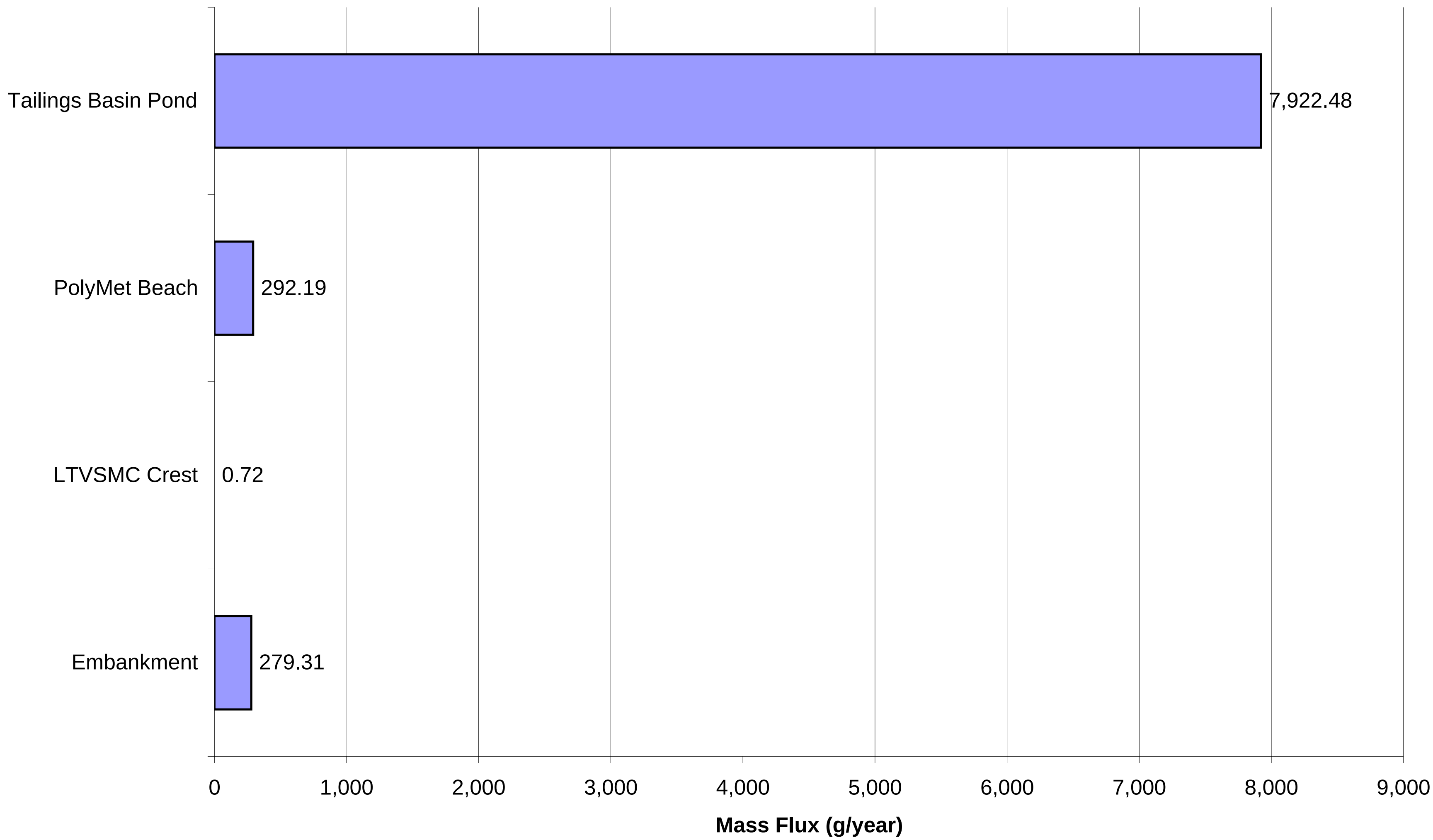

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Cobalt (Co)
Tailings Basin Pond
5,327.37
PolyMet Beach
602.64
LTVSMC Crest
0.00
Embankment
0.00
0
1,000
2,000
3,000
4,000
5,000
6,000
Mass Flux (g/year)

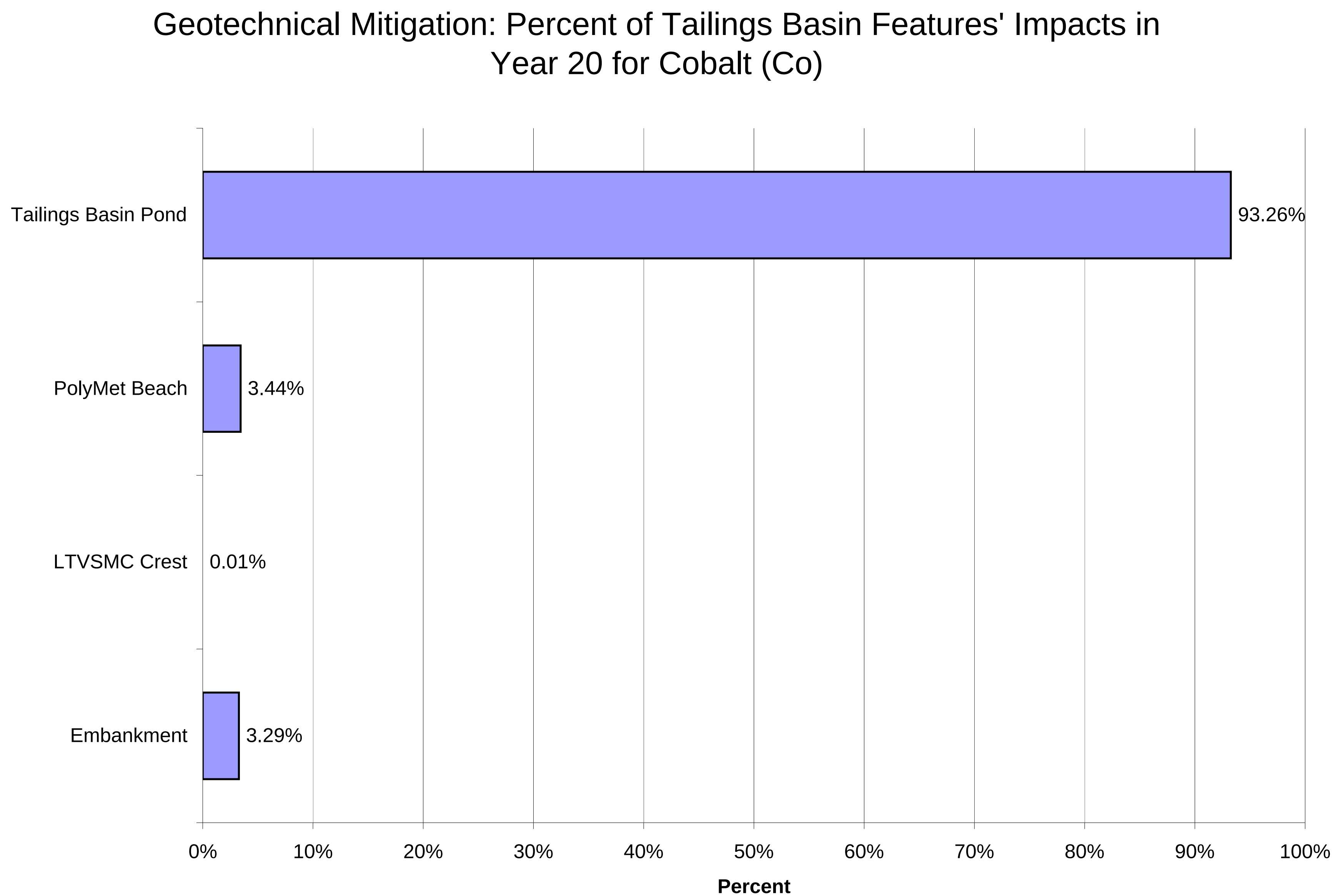

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 10 for Cobalt (Co)
Tailings Basin Pond
89.84%
PolyMet Beach
10.16%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

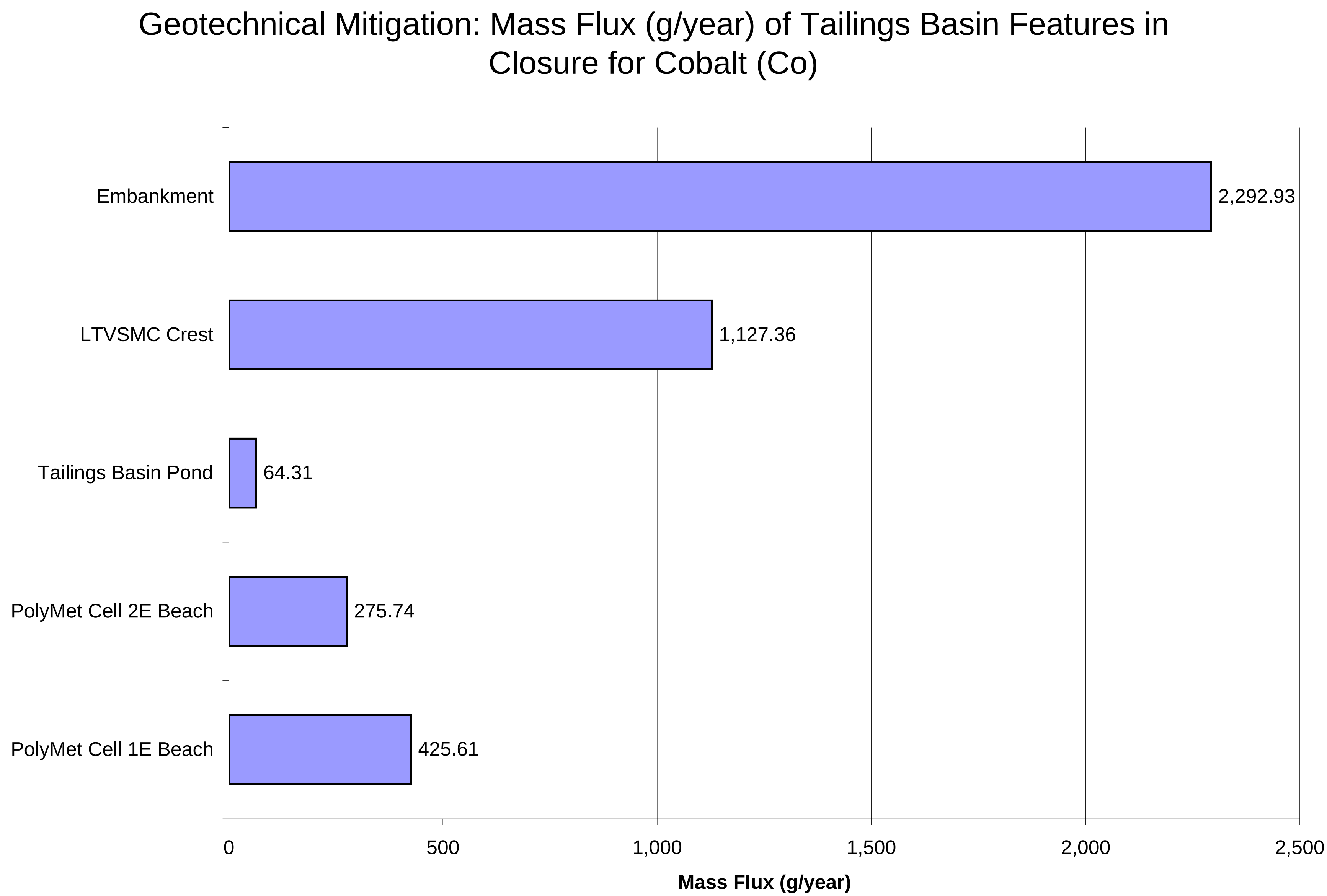

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Cobalt (Co)
Tailings Basin Pond
6,613.61
PolyMet Beach
501.57
LTVSMC Crest
1.91
Embankment
180.92
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
Mass Flux (g/year)

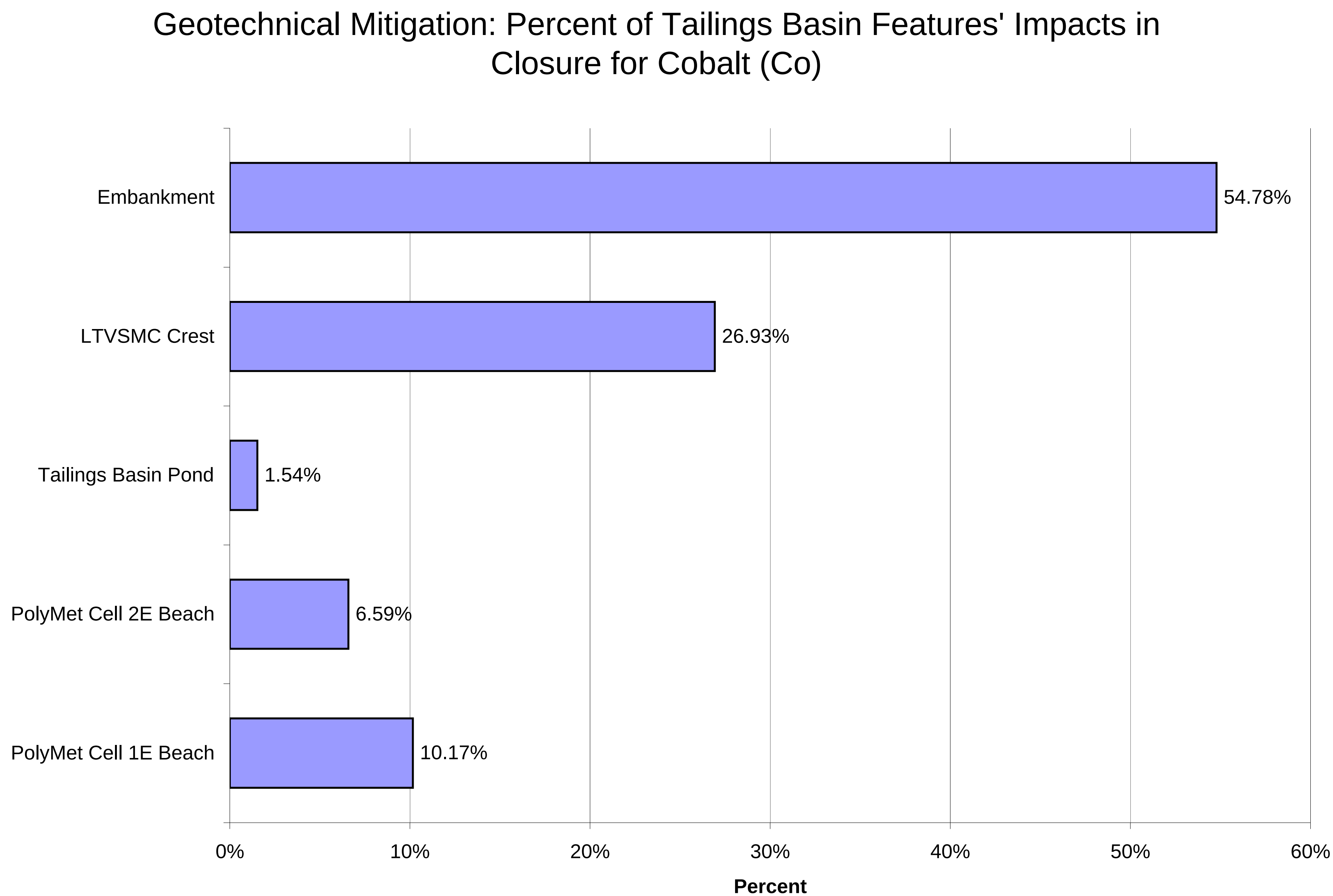

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 15 for Cobalt (Co)
Tailings Basin Pond
90.62%
PolyMet Beach
6.87%
LTVSMC Crest
0.03%
Embankment
2.48%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

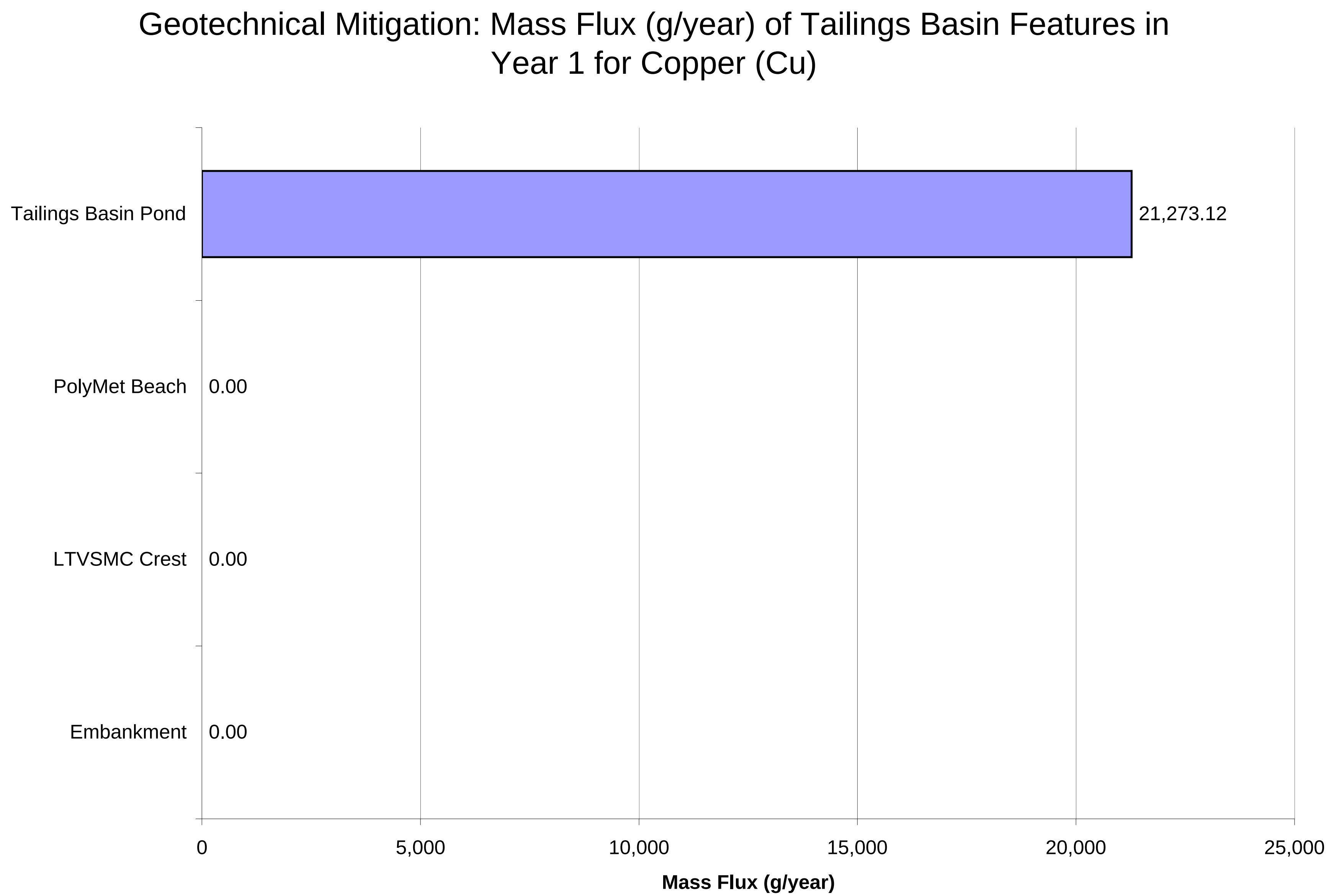
Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Cobalt (Co)



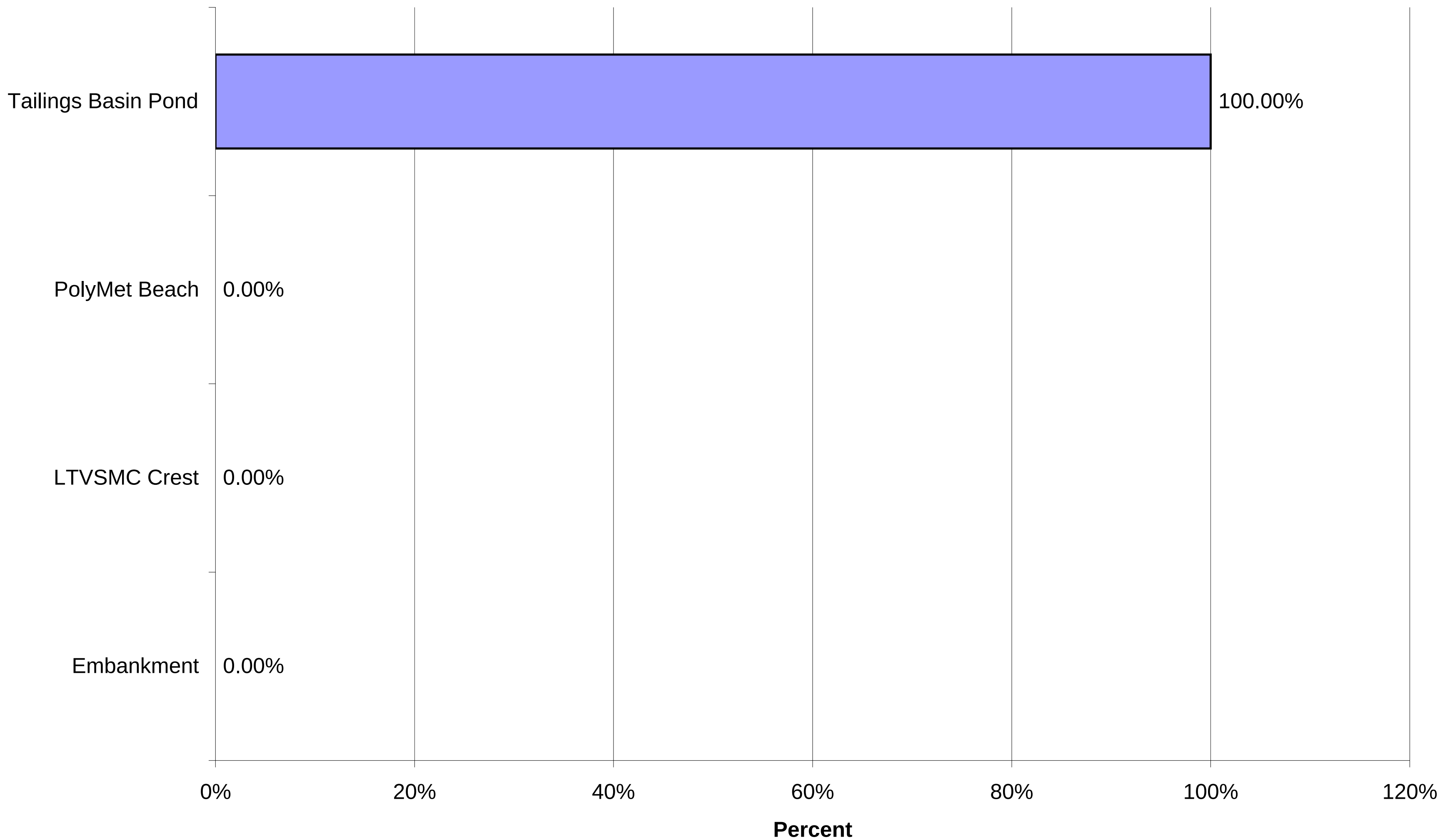

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 20 for Cobalt (Co)
Tailings Basin Pond
93.26%
PolyMet Beach
3.44%
LTVSMC Crest
0.01%
Embankment
3.29%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

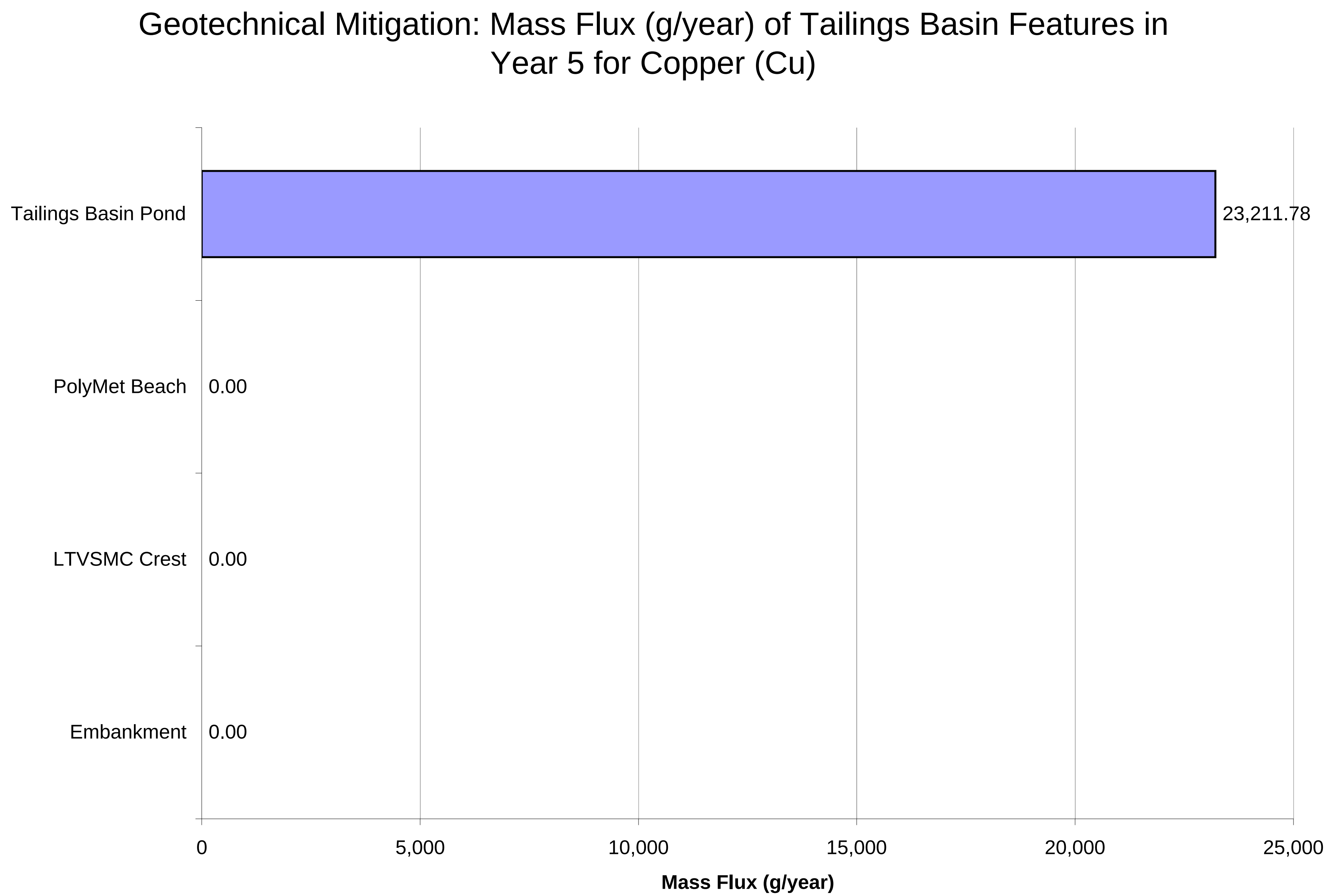

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Closure for Cobalt (Co)
Embankment
2,292.93
LTVSMC Crest
1,127.36
Tailings Basin Pond
64.31
PolyMet Cell 2E Beach
275.74
PolyMet Cell 1E Beach
425.61
0
500
1,000
1,500
2,000
2,500
Mass Flux (g/year)

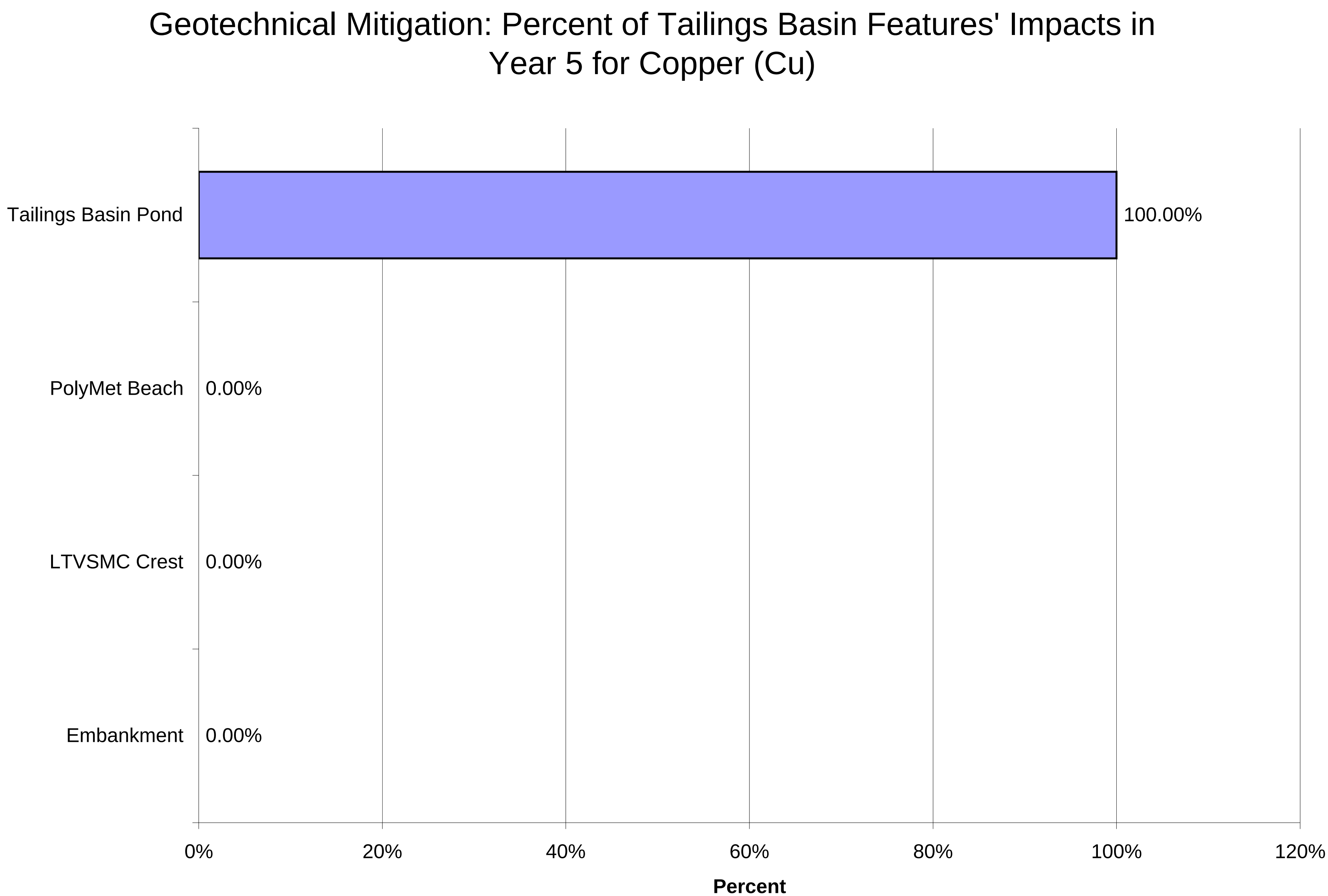

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Closure for Cobalt (Co)
Embankment
54.78%
LTVSMC Crest
26.93%
Tailings Basin Pond
1.54%
PolyMet Cell 2E Beach
6.59%
PolyMet Cell 1E Beach
10.17%
0%
10%
20%
30%
40%
50%
60%
Percent

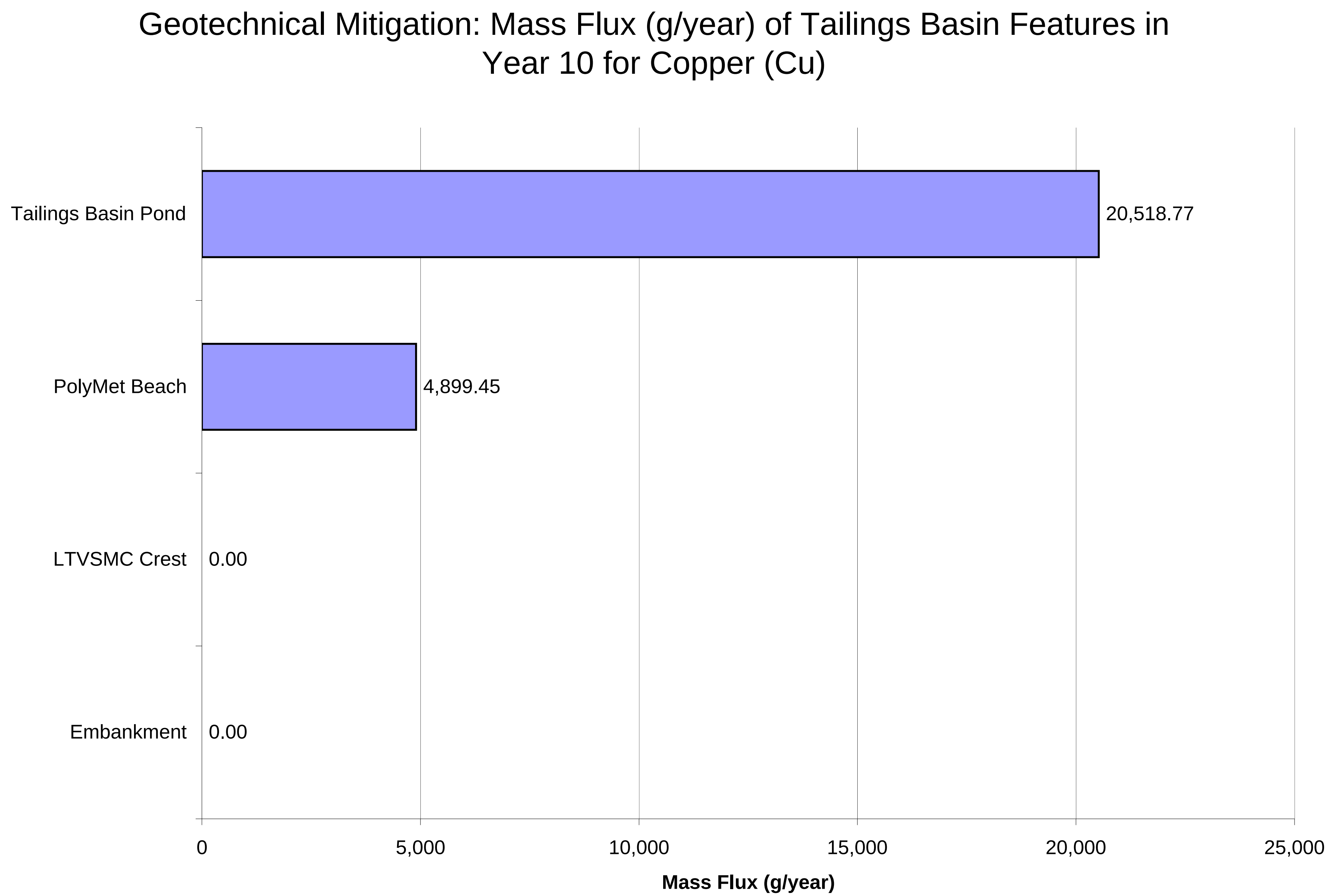

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Copper (Cu)
Tailings Basin Pond
21,273.12
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

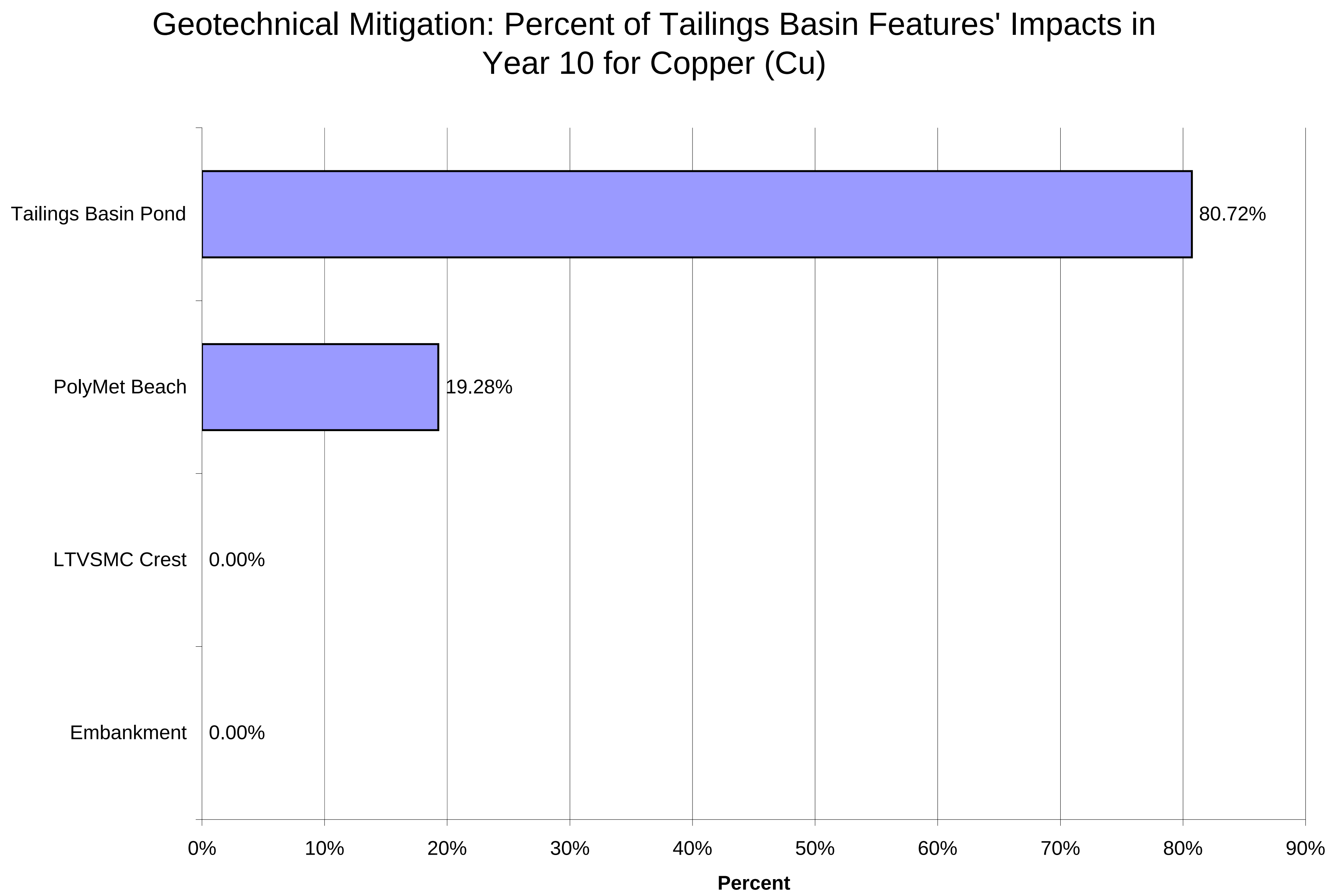
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 1 for Copper (Cu)

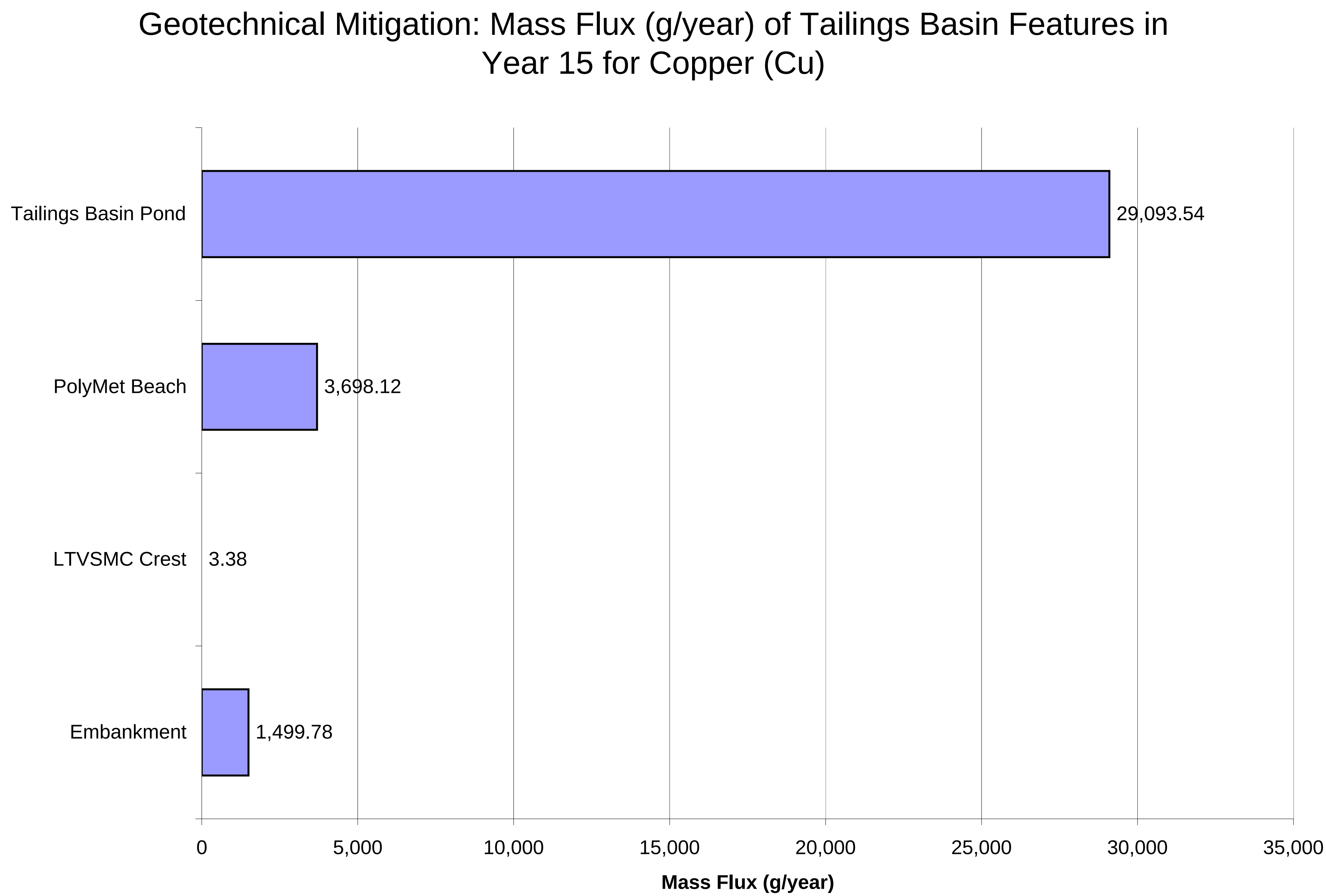


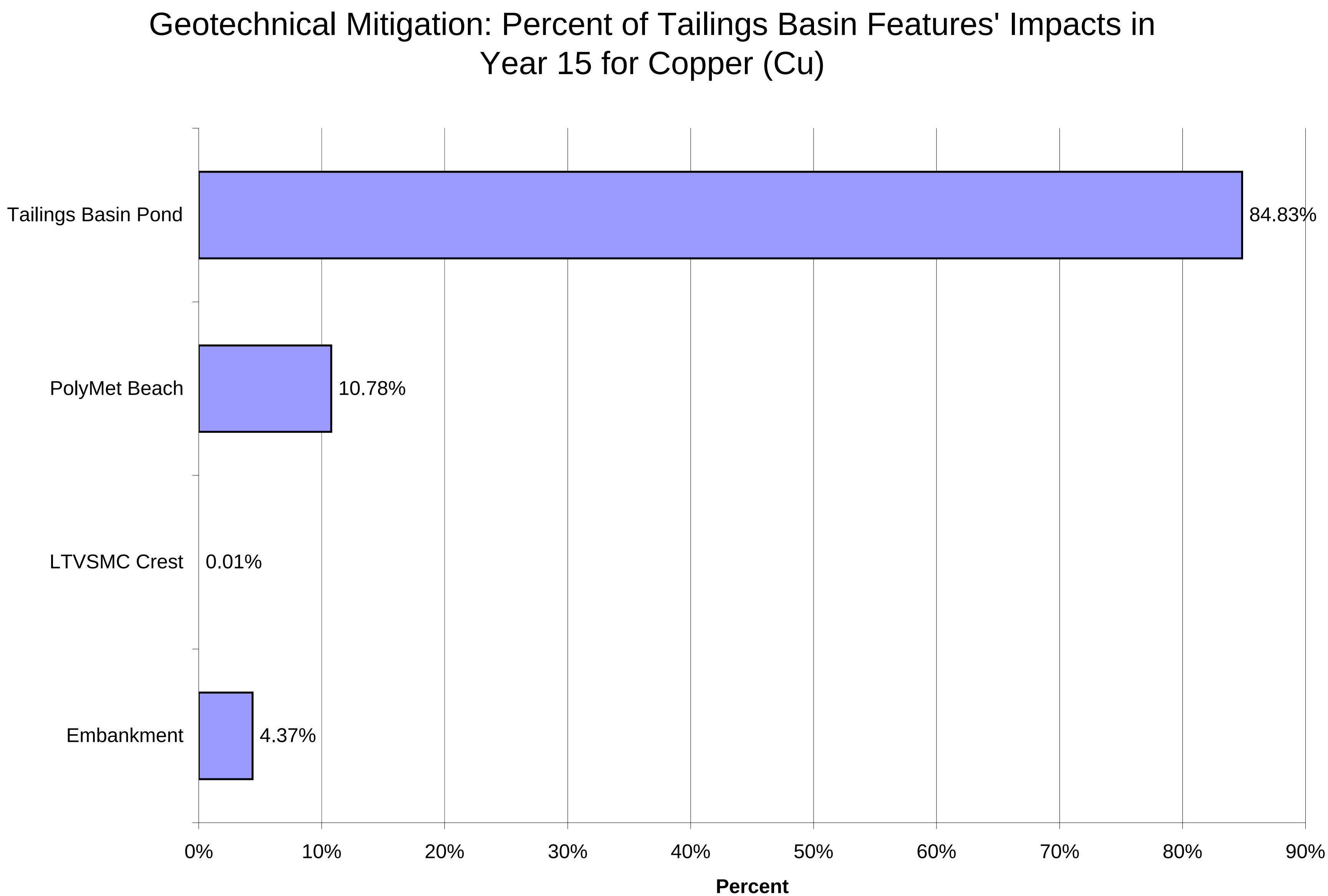

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Copper (Cu)
Tailings Basin Pond
23,211.78
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

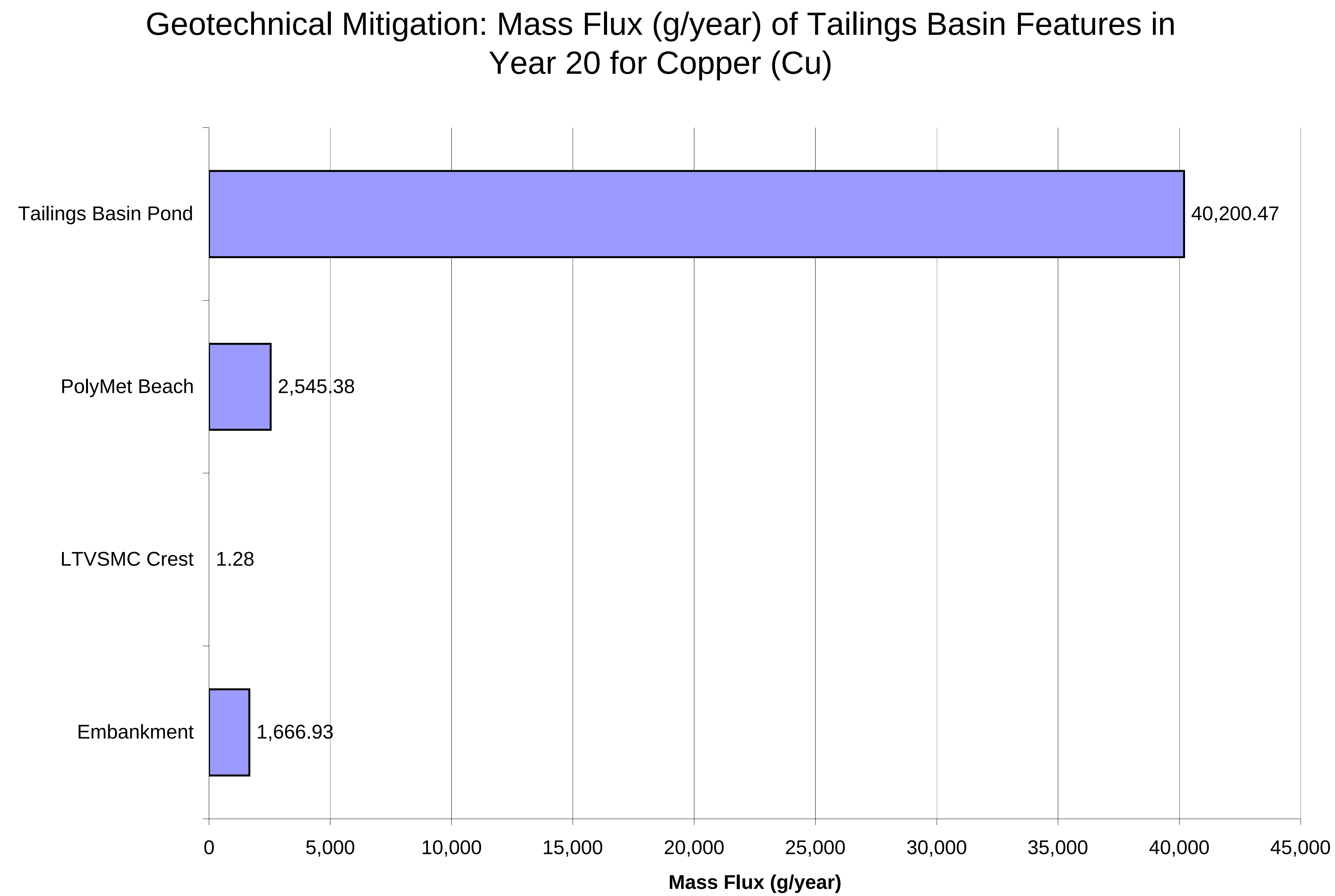

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 5 for Copper (Cu)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Copper (Cu)
Tailings Basin Pond
20,518.77
PolyMet Beach
4,899.45
LTVSMC Crest
0.00
Embankment
0.00
0
5,000
10,000
15,000
20,000
25,000
Mass Flux (g/year)

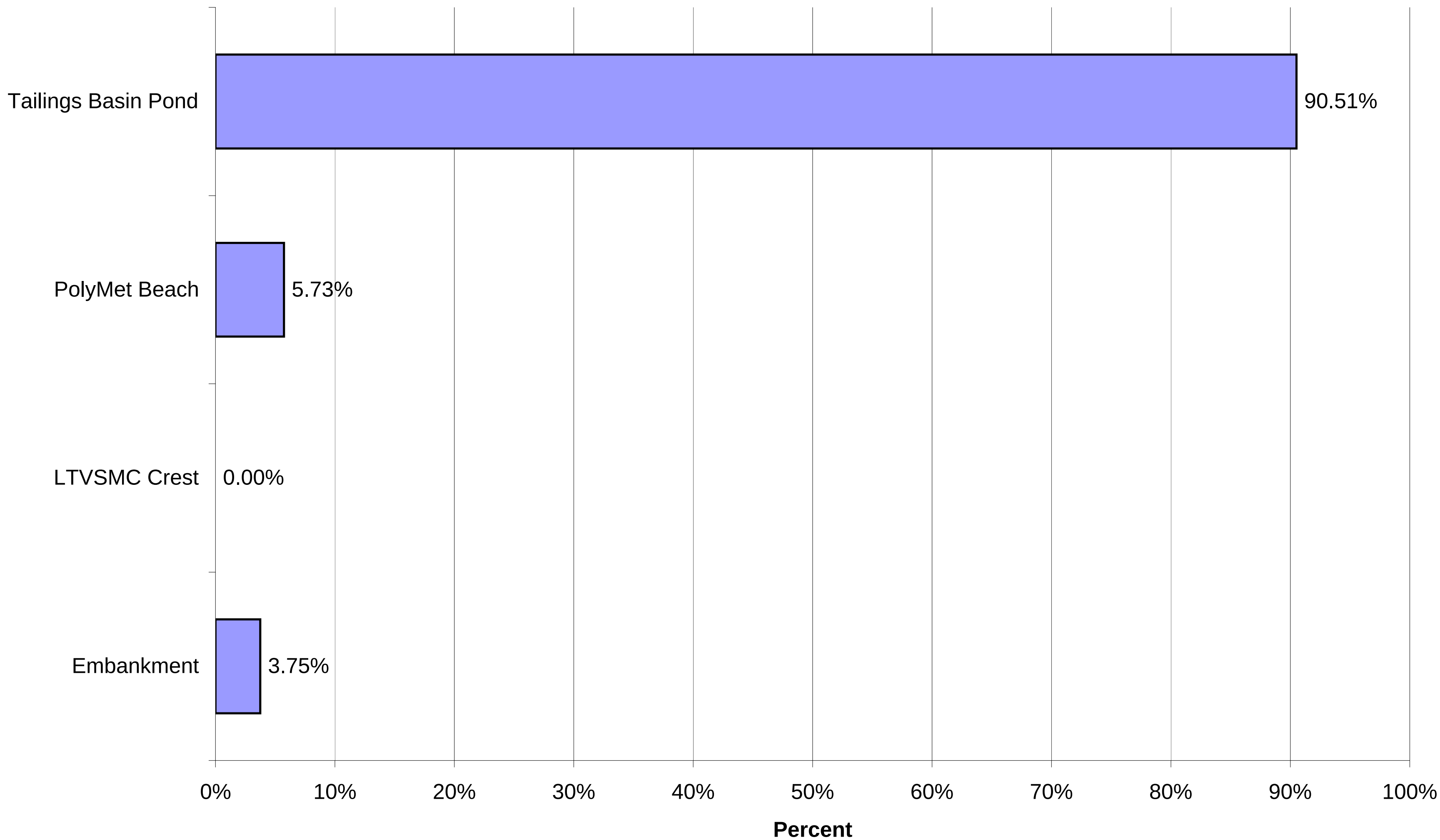

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 10 for Copper (Cu)
Tailings Basin Pond
80.72%
PolyMet Beach
19.28%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

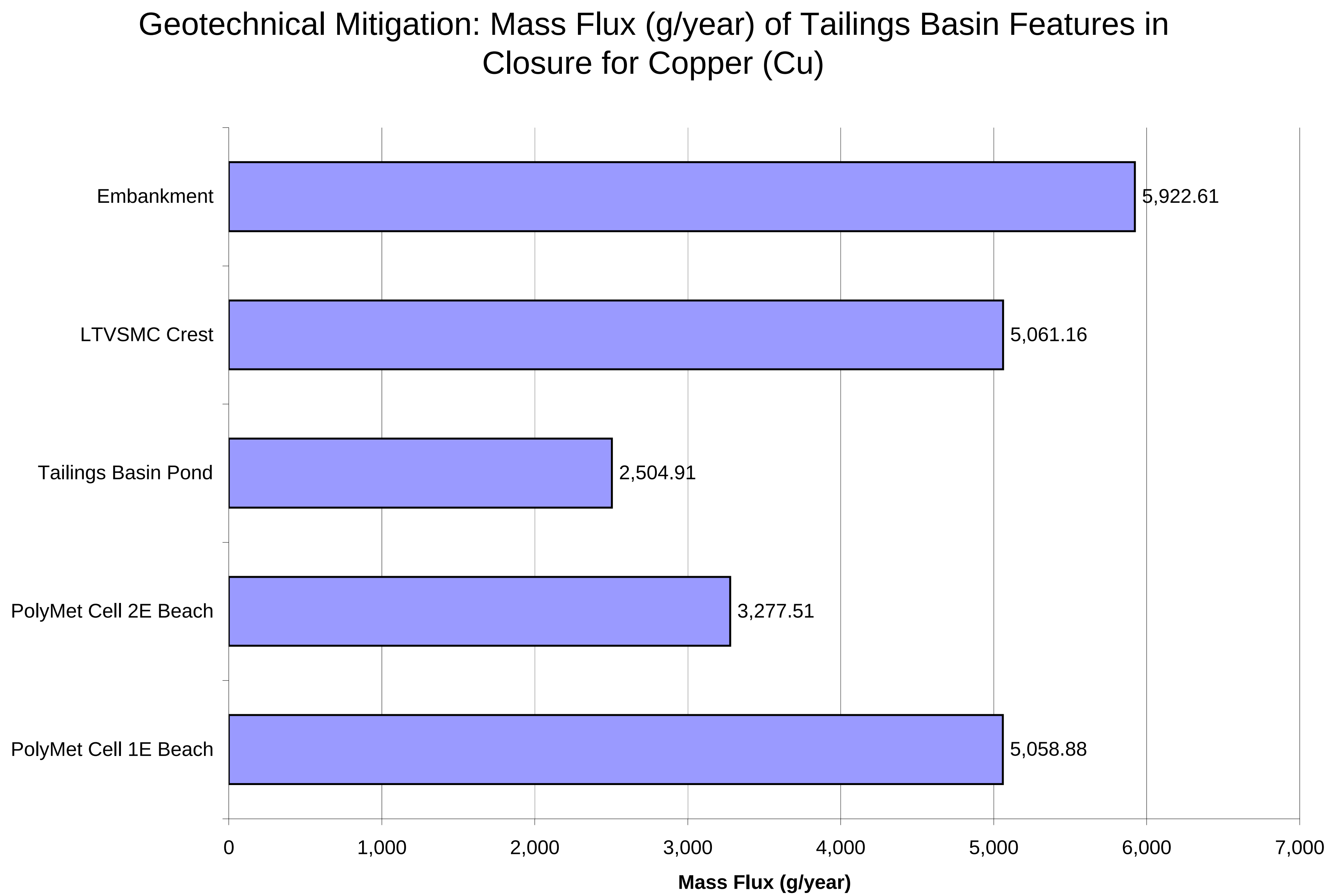

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Copper (Cu)
Tailings Basin Pond
29,093.54
PolyMet Beach
3,698.12
LTVSMC Crest
3.38
Embankment
1,499.78
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Mass Flux (g/year)

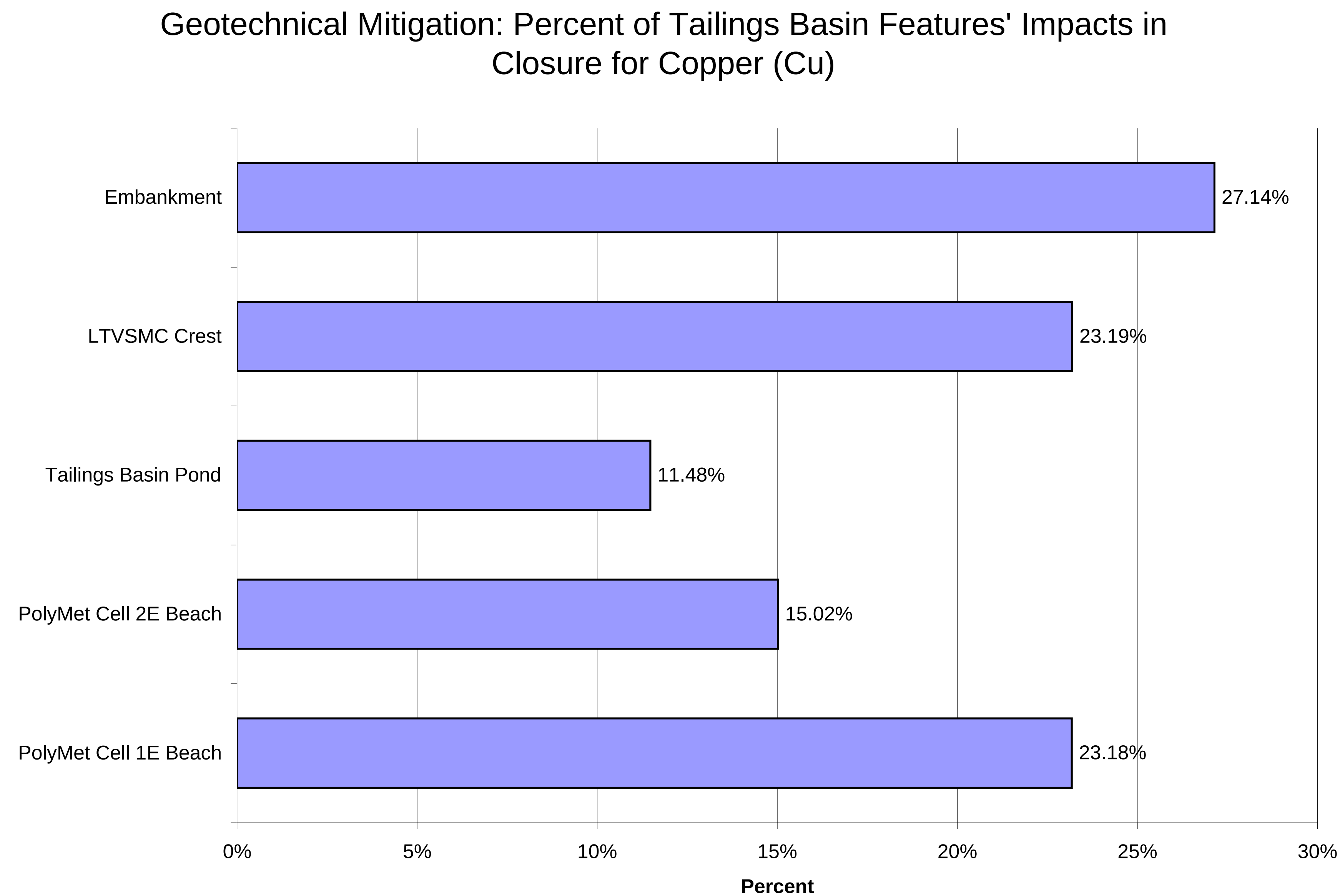

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 15 for Copper (Cu)
Tailings Basin Pond
84.83%
PolyMet Beach
10.78%
LTVSMC Crest
0.01%
Embankment
4.37%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

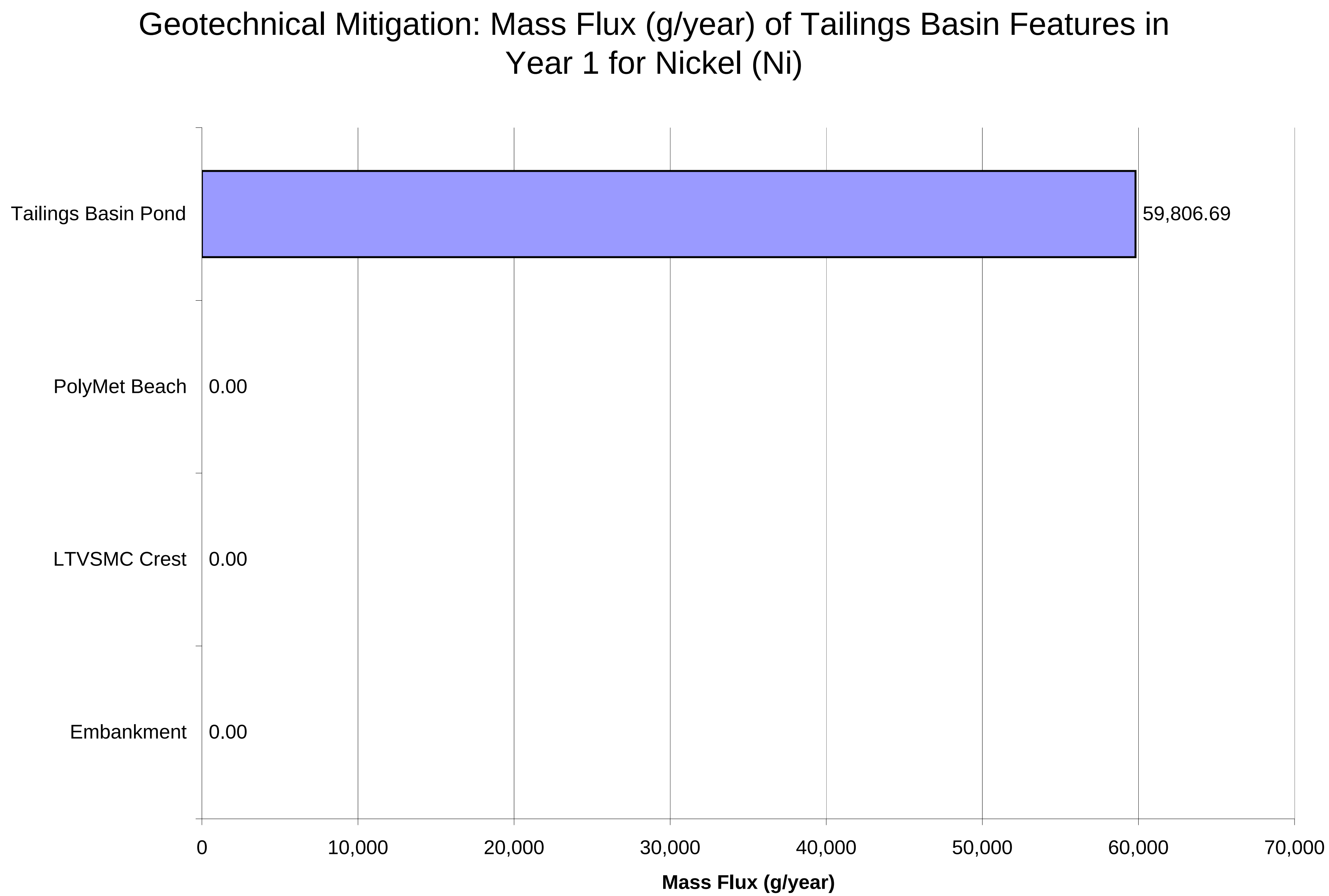

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Copper (Cu)
Tailings Basin Pond
40,200.47
PolyMet Beach
2,545.38
LTVSMC Crest
1.28
Embankment
1,666.93
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Mass Flux (g/year)

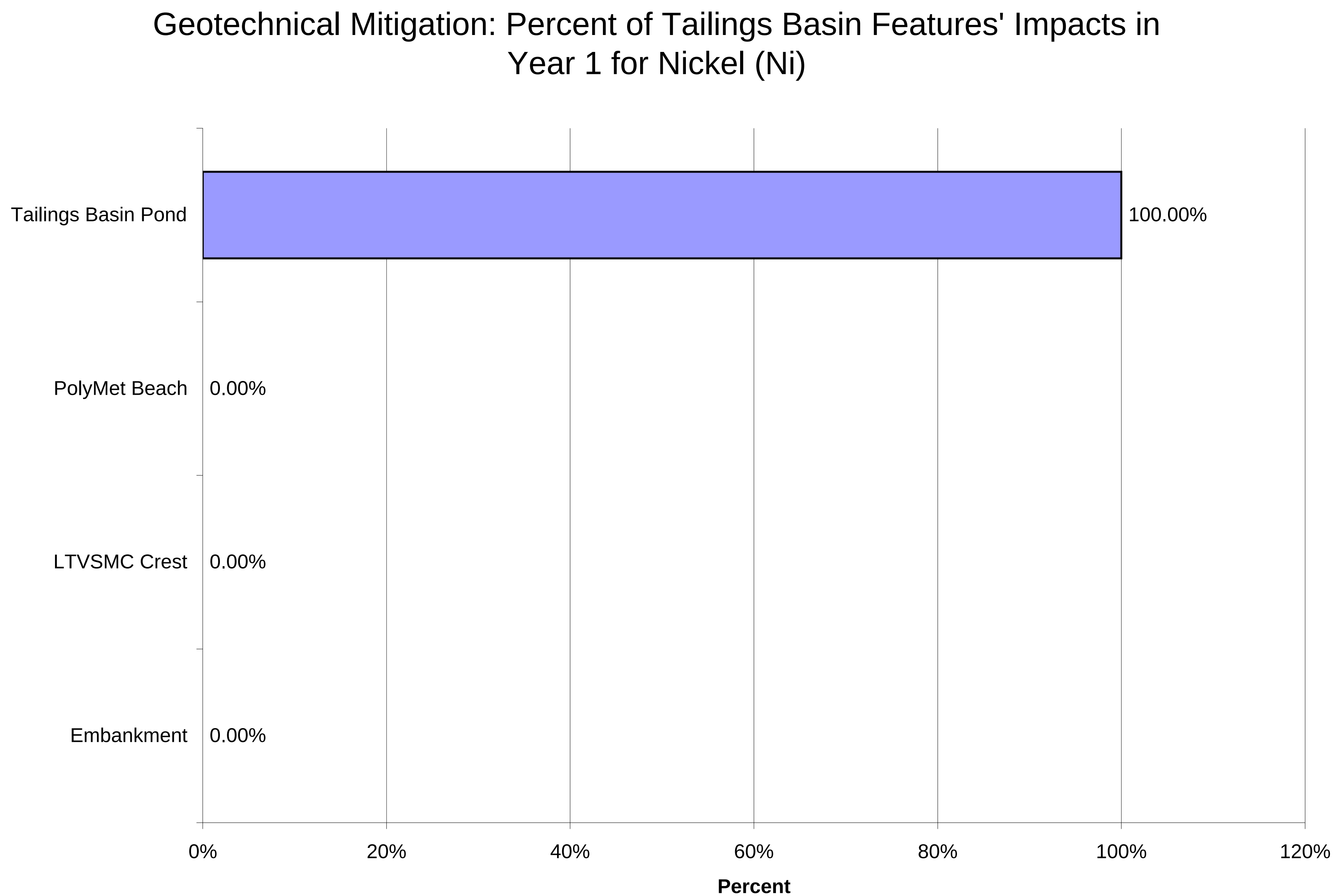
Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 20 for Copper (Cu)



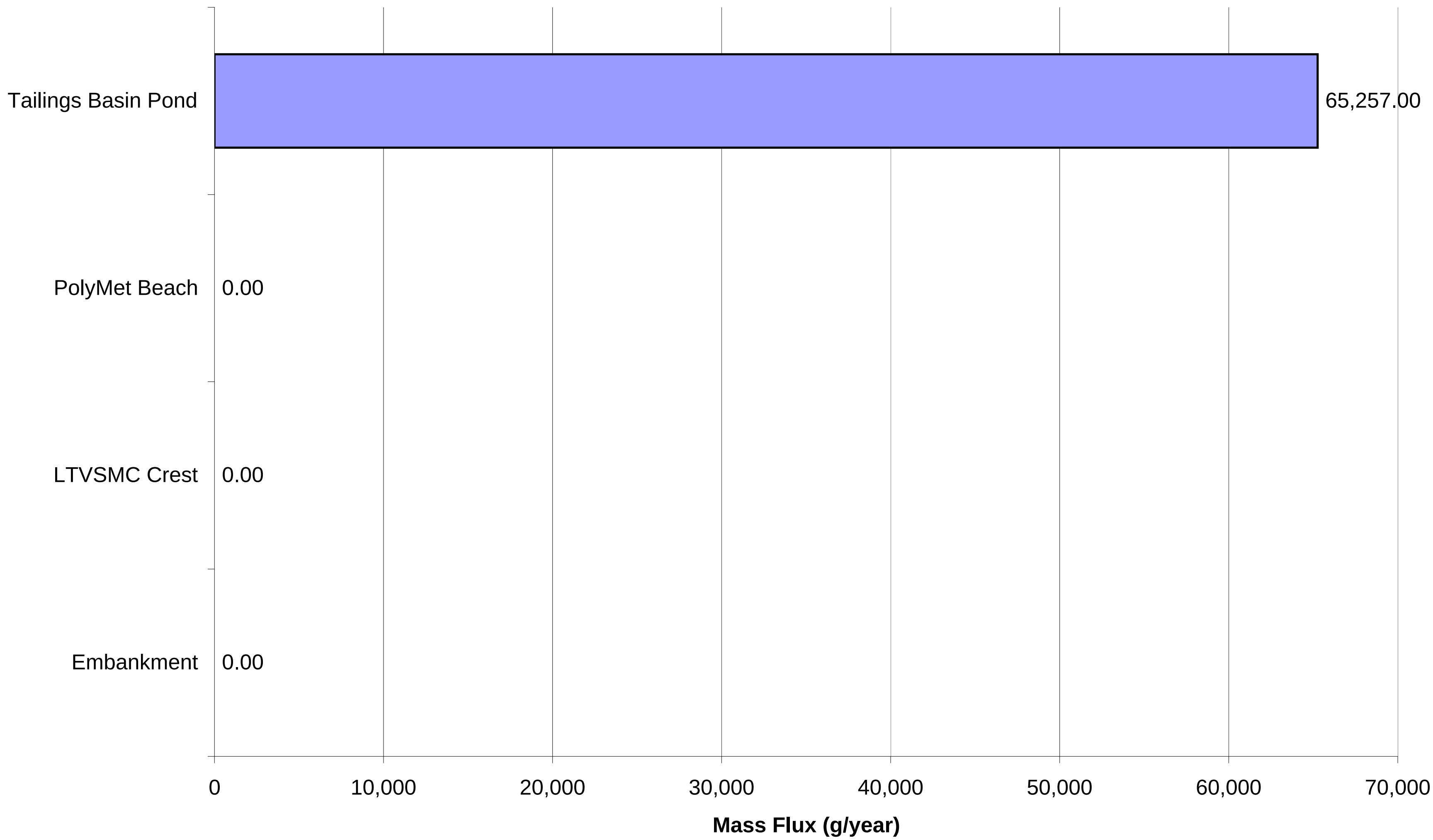

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Closure for Copper (Cu)
Embankment
5,922.61
LTVSMC Crest
5,061.16
Tailings Basin Pond
2,504.91
PolyMet Cell 2E Beach
3,277.51
PolyMet Cell 1E Beach
5,058.88
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
Mass Flux (g/year)

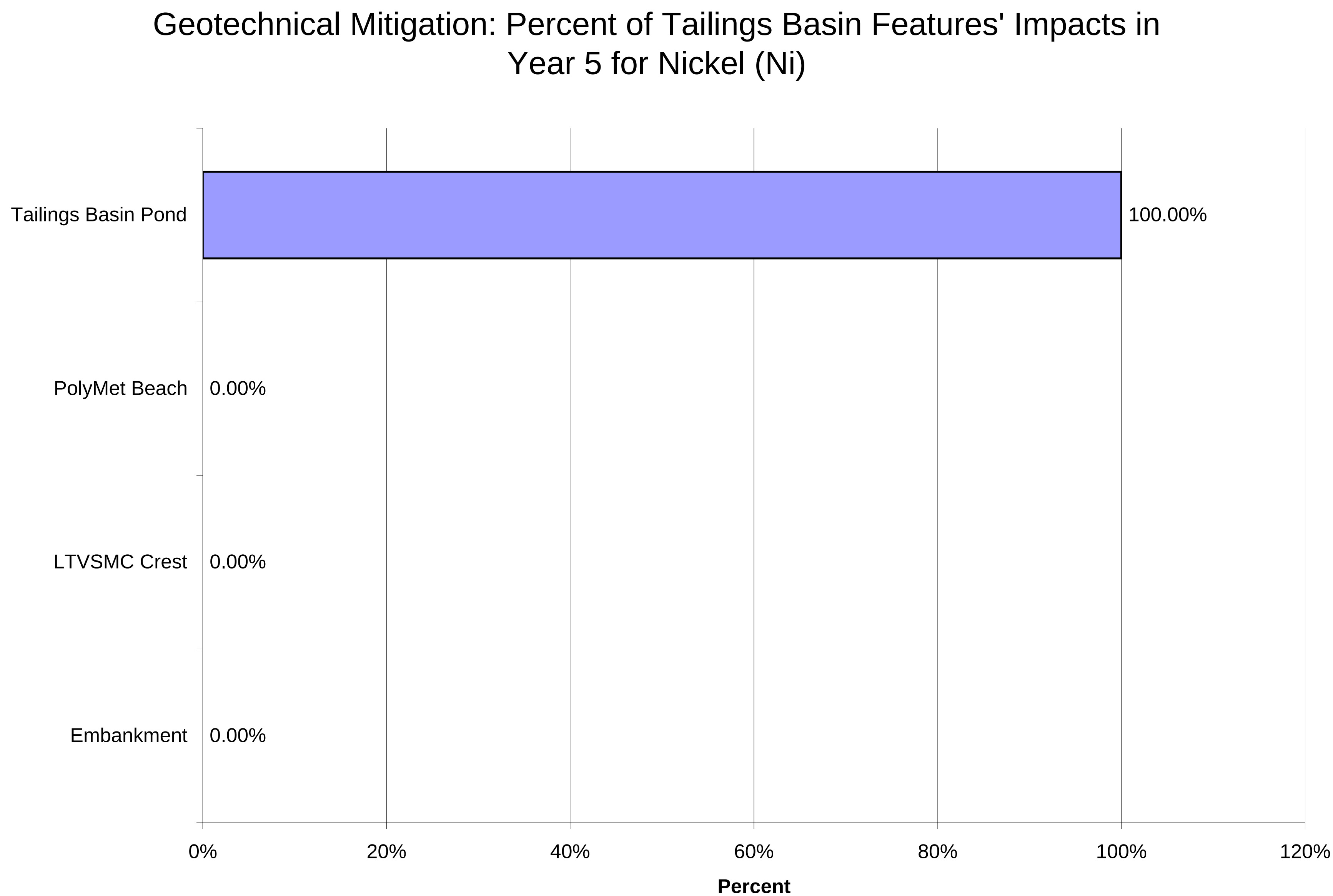

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Closure for Copper (Cu)
Embankment
27.14%
LTVSMC Crest
23.19%
Tailings Basin Pond
11.48%
PolyMet Cell 2E Beach
15.02%
PolyMet Cell 1E Beach
23.18%
0%
5%
10%
15%
20%
25%
30%
Percent

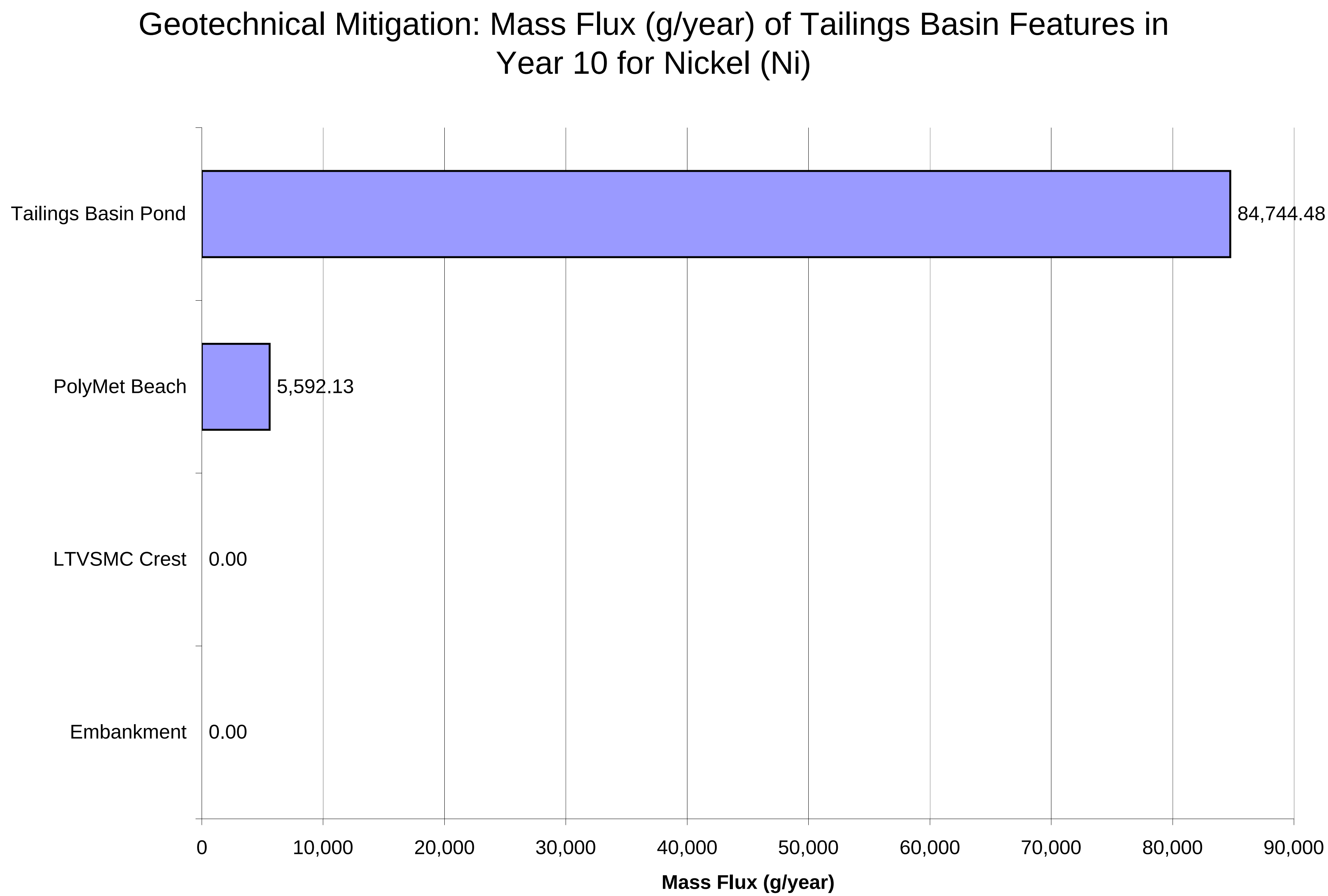

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 1 for Nickel (Ni)
Tailings Basin Pond
59,806.69
PolyMet Beach
0.00
LTVSMC Crest
0.00
Embankment
0.00
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

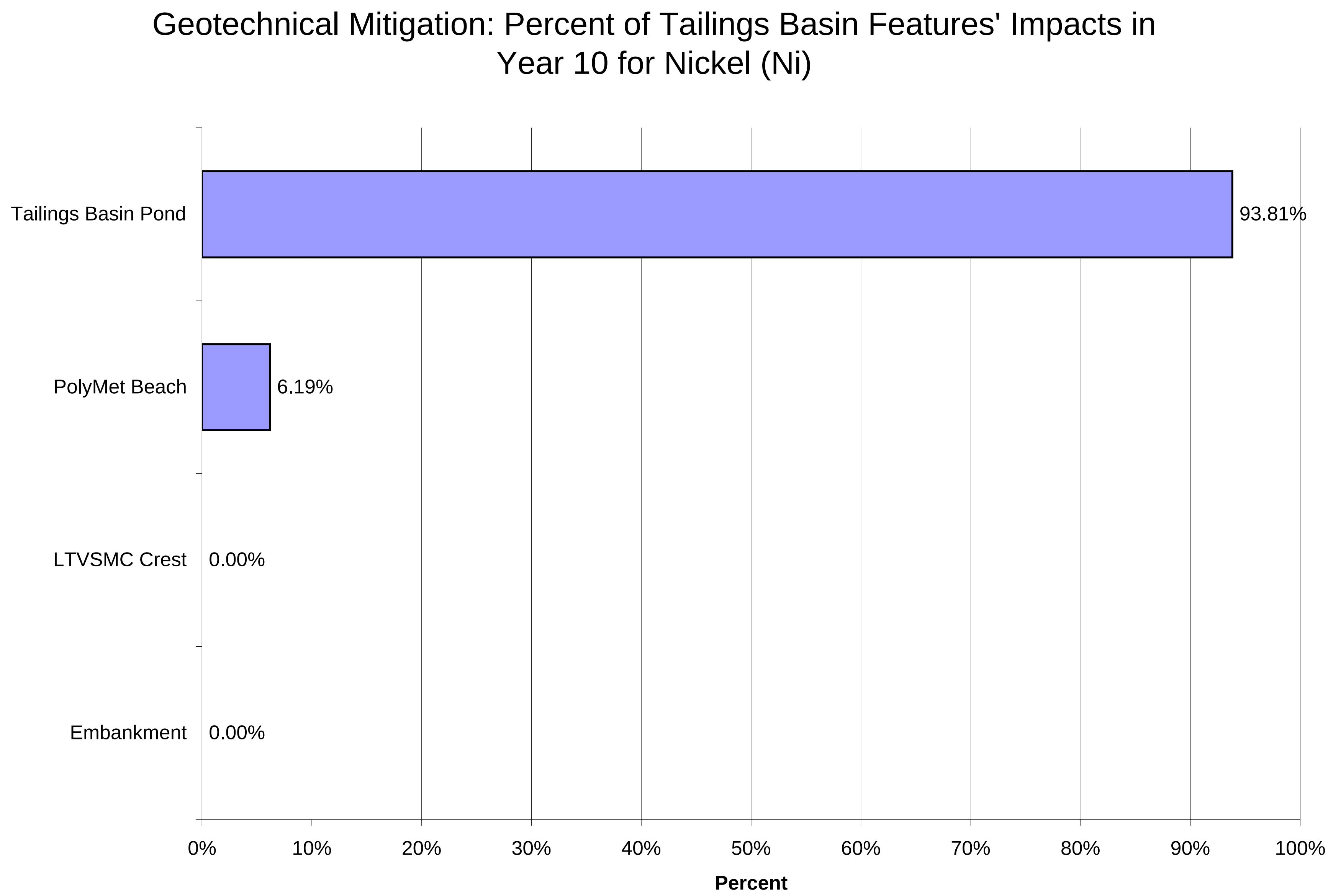

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 1 for Nickel (Ni)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 5 for Nickel (Ni)

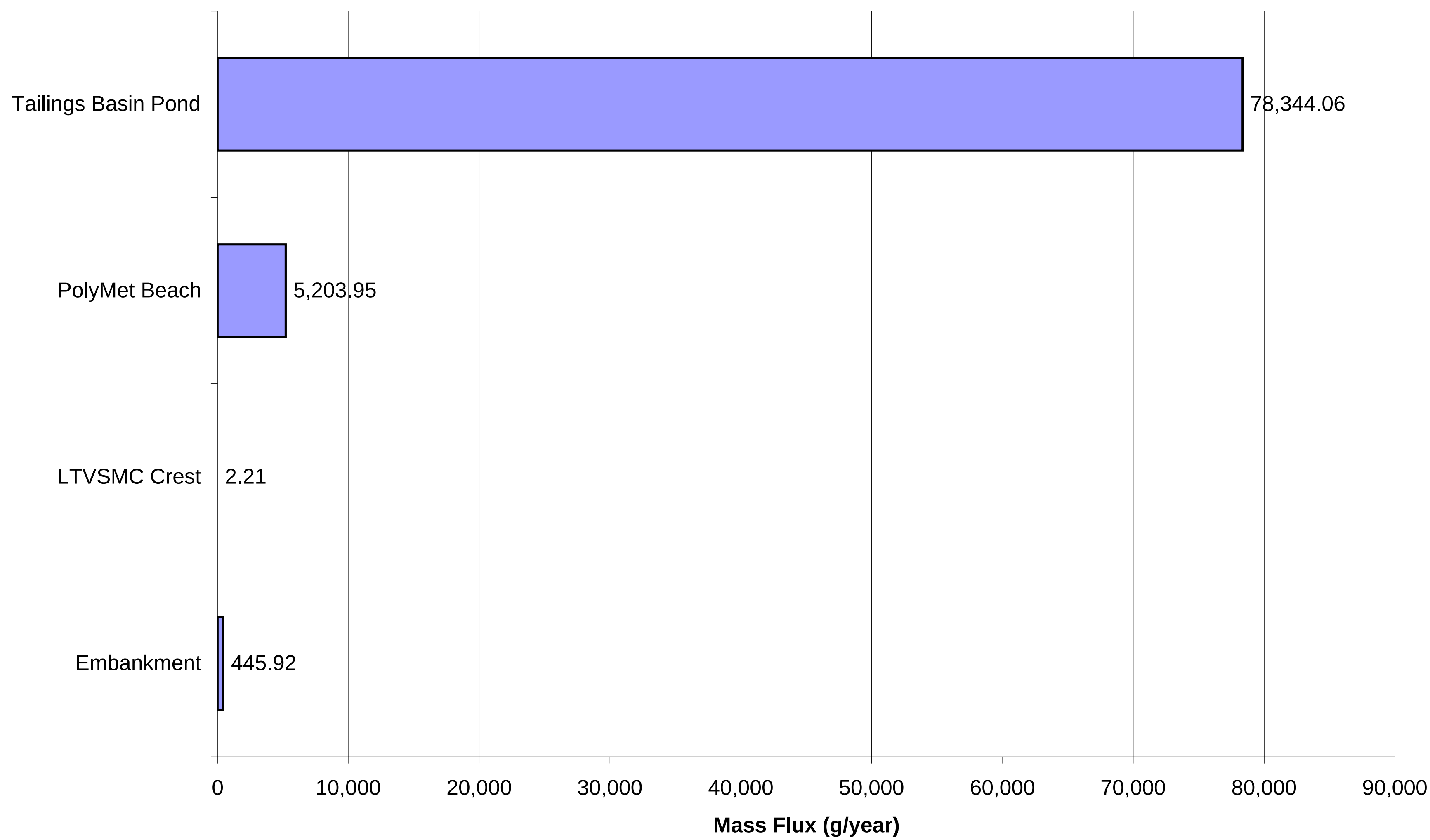


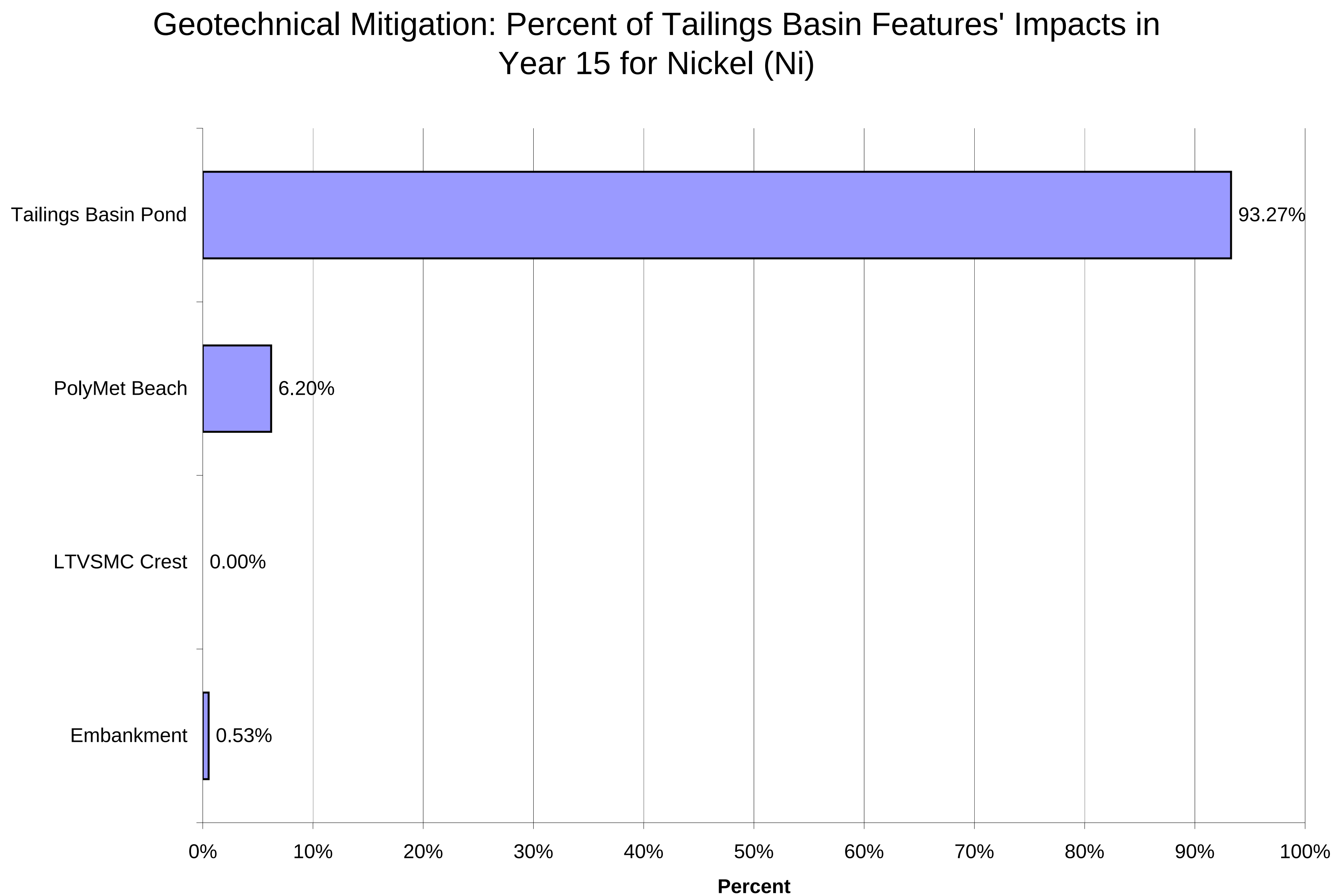

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 5 for Nickel (Ni)
Tailings Basin Pond
100.00%
PolyMet Beach
0.00%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
20%
40%
60%
80%
100%
120%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 10 for Nickel (Ni)
Tailings Basin Pond
84,744.48
PolyMet Beach
5,592.13
LTVSMC Crest
0.00
Embankment
0.00
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Mass Flux (g/year)

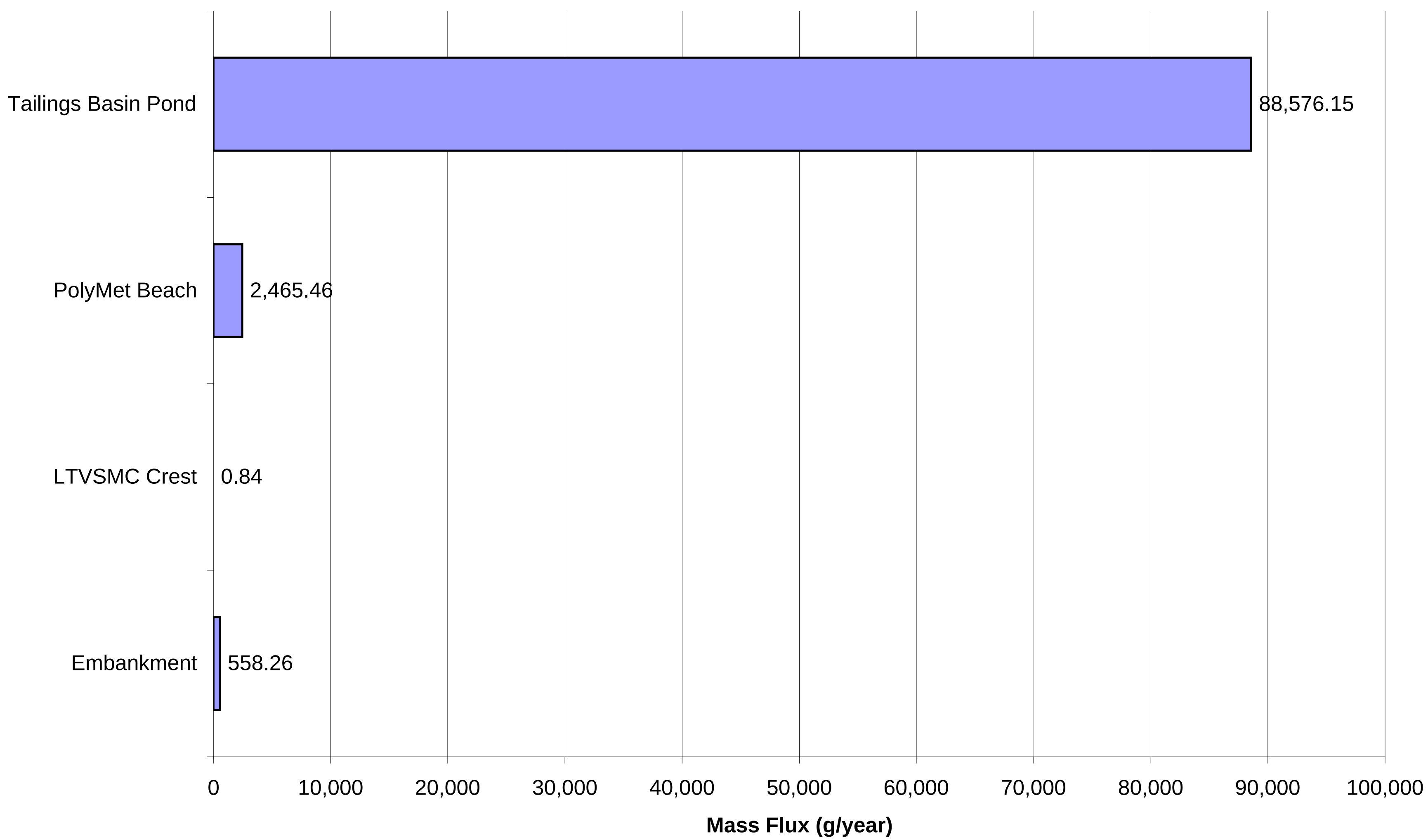

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 10 for Nickel (Ni)
Tailings Basin Pond
93.81%
PolyMet Beach
6.19%
LTVSMC Crest
0.00%
Embankment
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 15 for Nickel (Ni)

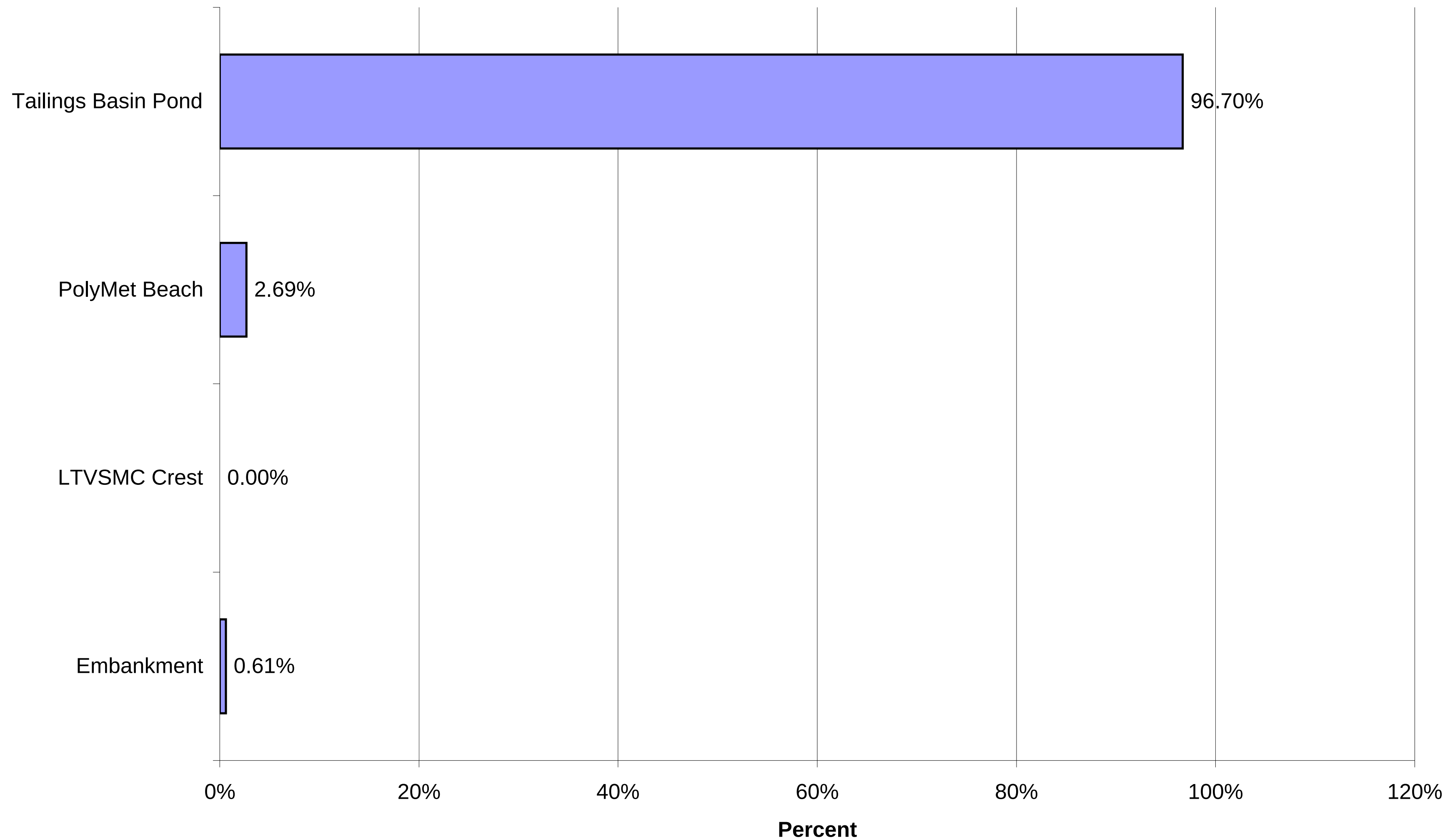


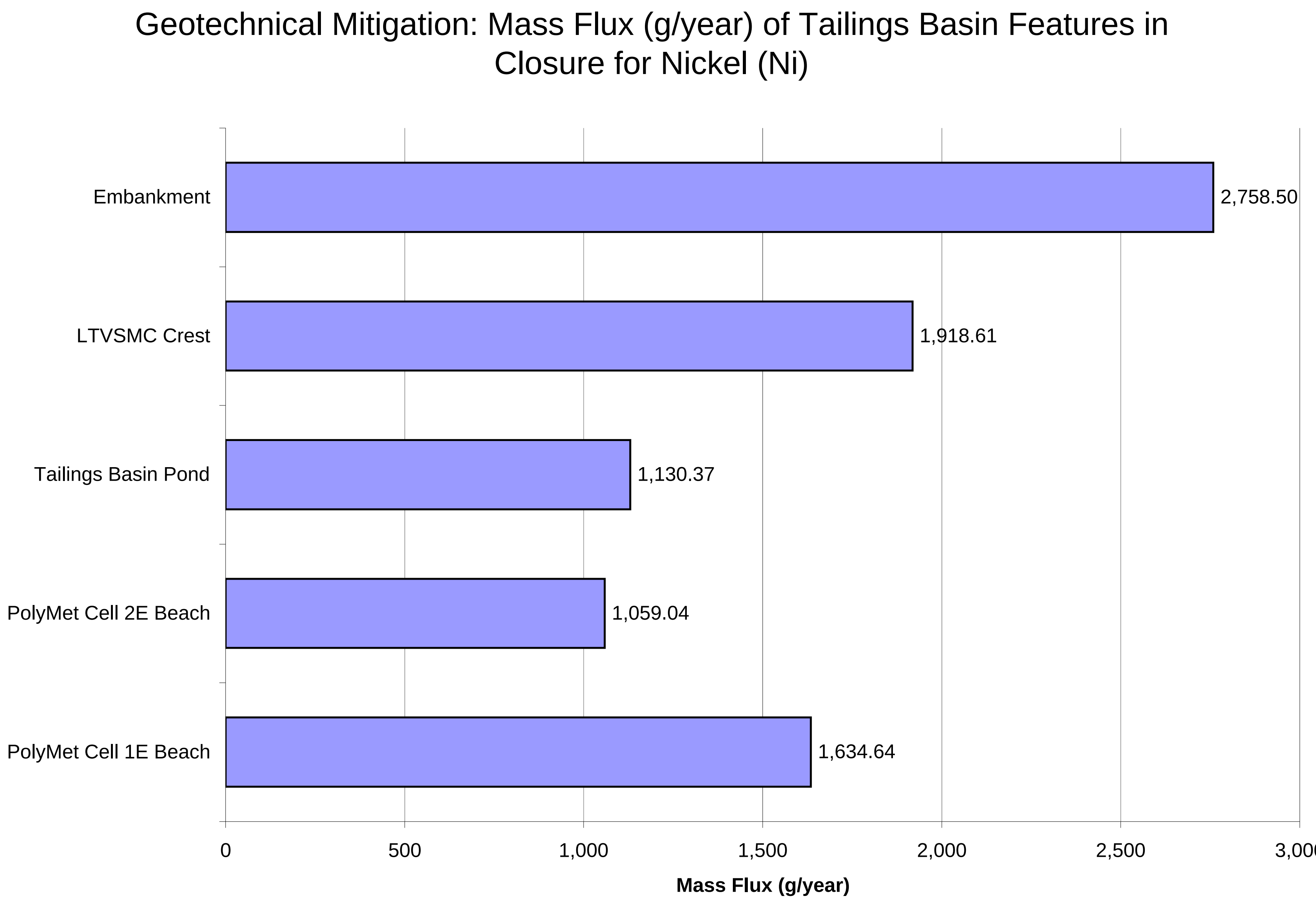

Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 15 for Nickel (Ni)
Tailings Basin Pond
93.27%
PolyMet Beach
6.20%
LTVSMC Crest
0.00%
Embankment
0.53%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent

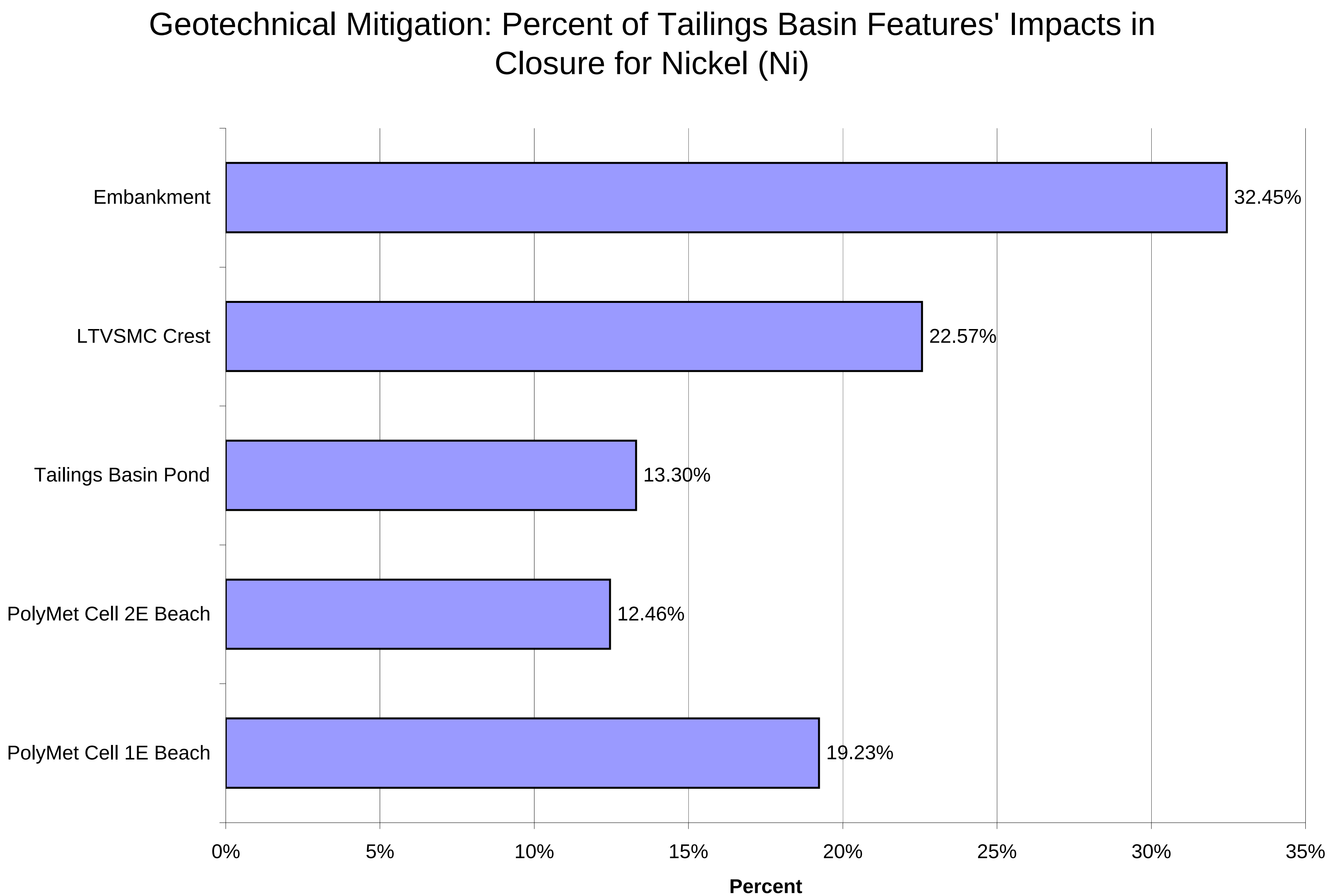
Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Year 20 for Nickel (Ni)



Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Year 20 for Nickel (Ni)

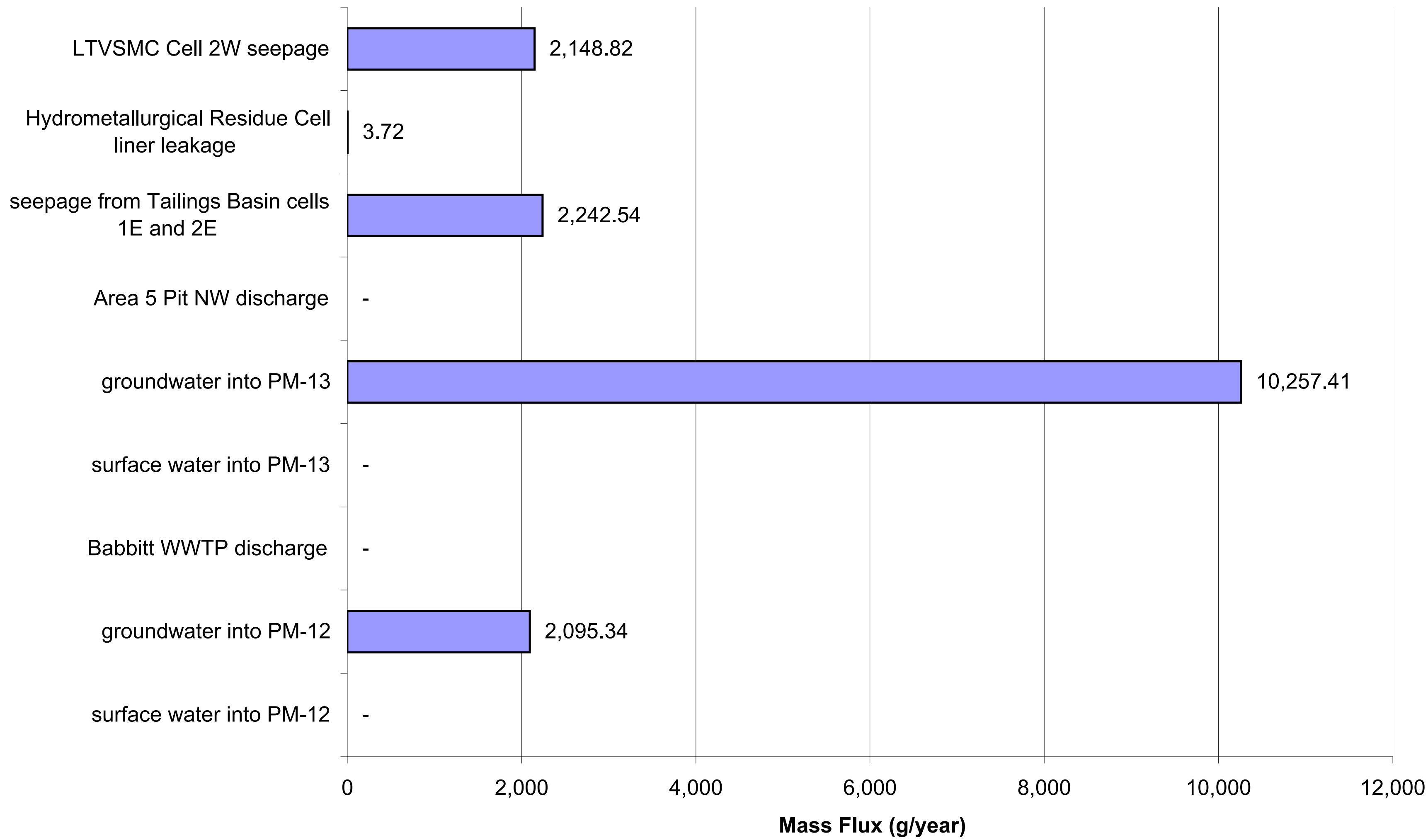



Geotechnical Mitigation: Mass Flux (g/year) of Tailings Basin Features in Closure for Nickel (Ni)
Embankment
2,758.50
LTVSMC Crest
1,918.61
Tailings Basin Pond
1,130.37
PolyMet Cell 2E Beach
1,059.04
PolyMet Cell 1E Beach
1,634.64
0
500
1,000
1,500
2,000
2,500
3,000
Mass Flux (g/year)


Geotechnical Mitigation: Percent of Tailings Basin Features' Impacts in Closure for Nickel (Ni)
Embankment
32.45%
LTVSMC Crest
22.57%
Tailings Basin Pond
13.30%
PolyMet Cell 2E Beach
12.46%
PolyMet Cell 1E Beach
19.23%
0%
5%
10%
15%
20%
25%
30%
35%
Percent

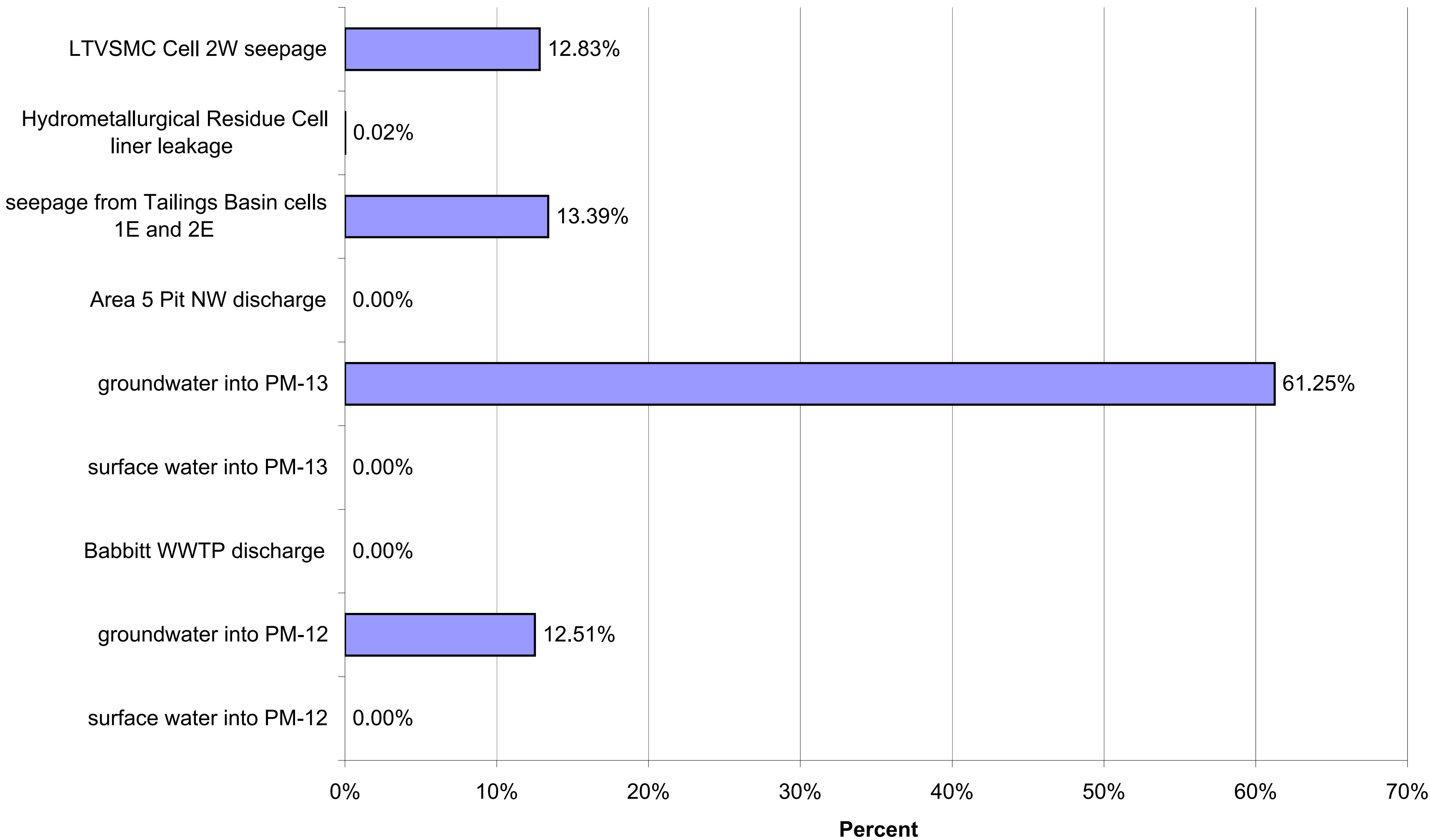
Appendix G.4
Embarass River Watershed
Geotechnical Mitigation

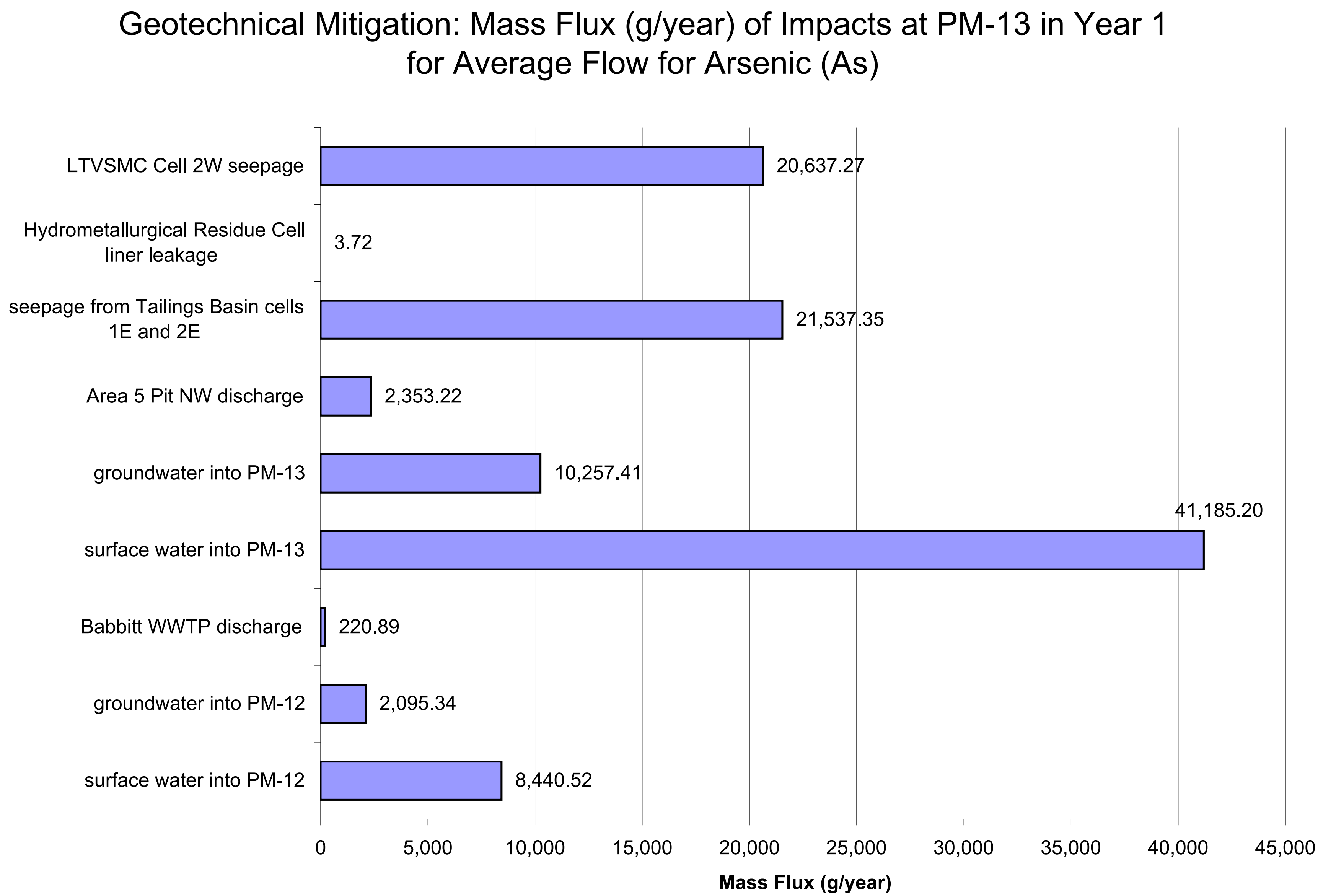
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)



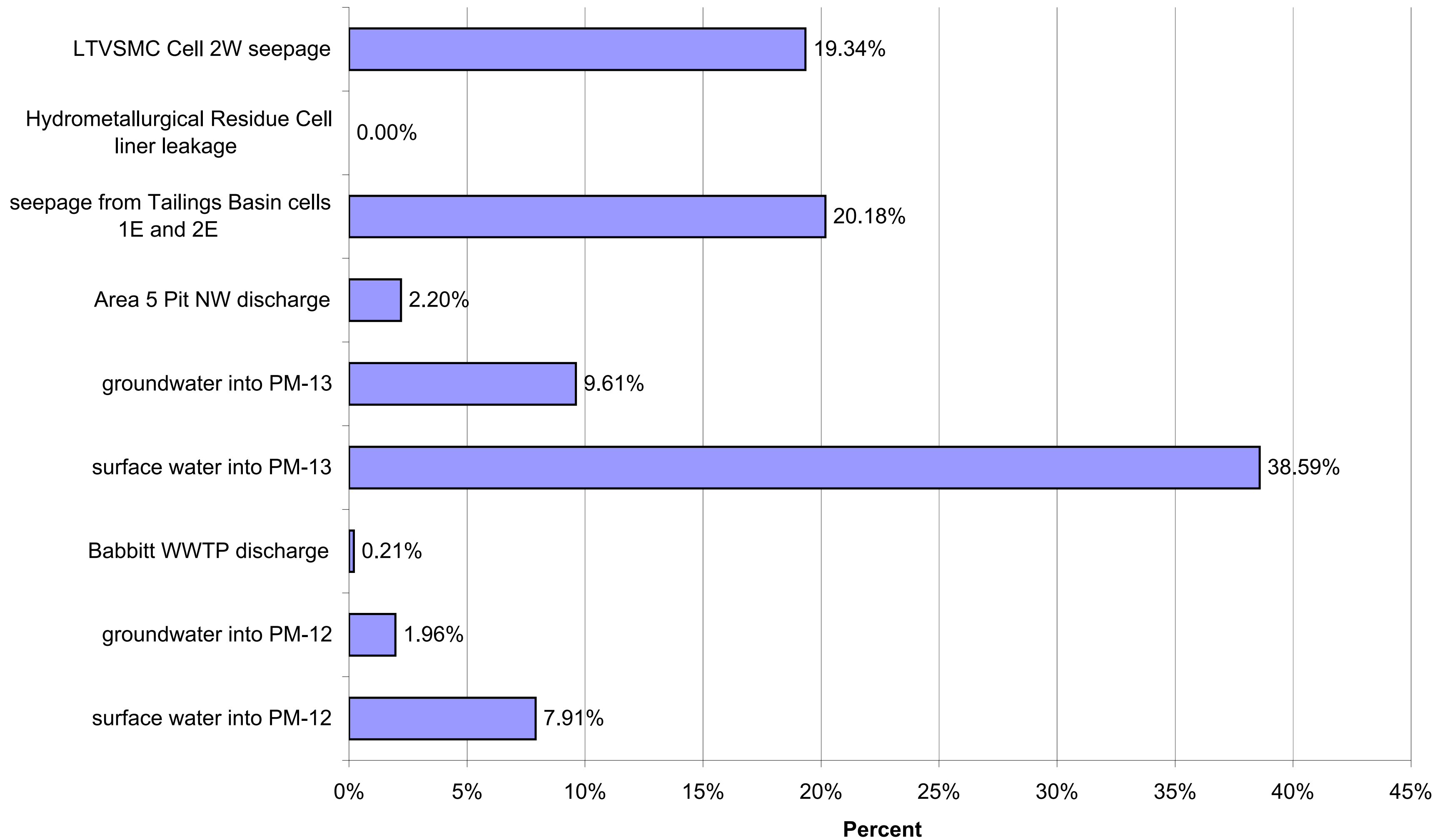
P:\Mpls\23 MN\69\2369862_MovedFromMpls_P\WO 015 EIS Rpts Studies\RS74 Water Quality Modeling\Model Predictions\Embarrass_v1_Mitigation\Sensitivity_Year1_TB_Mitigation
As, PM-13, low, percent

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Arsenic (As)

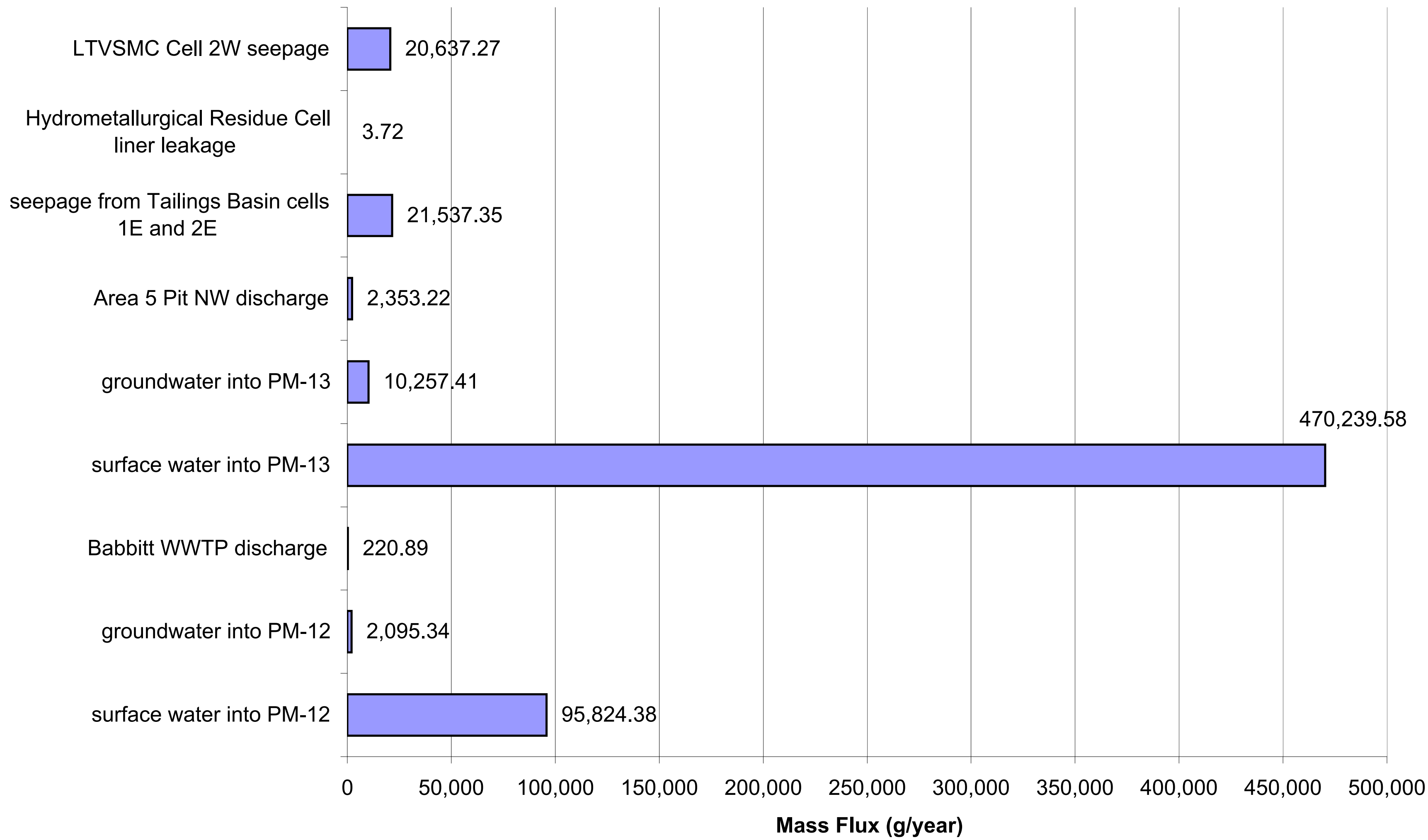



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1
for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
20,637.27
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
21,537.35
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
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)

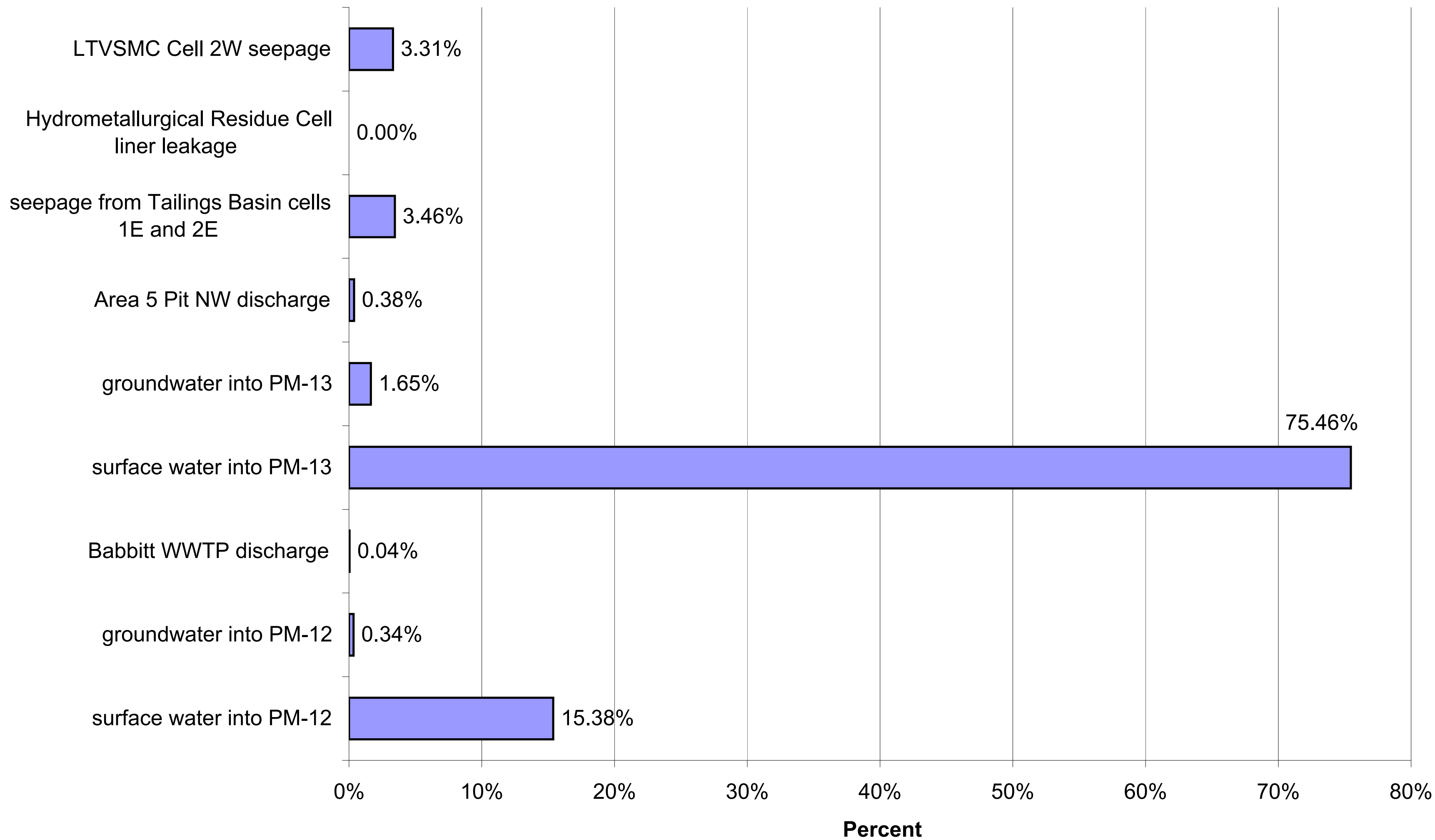
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Arsenic (As)

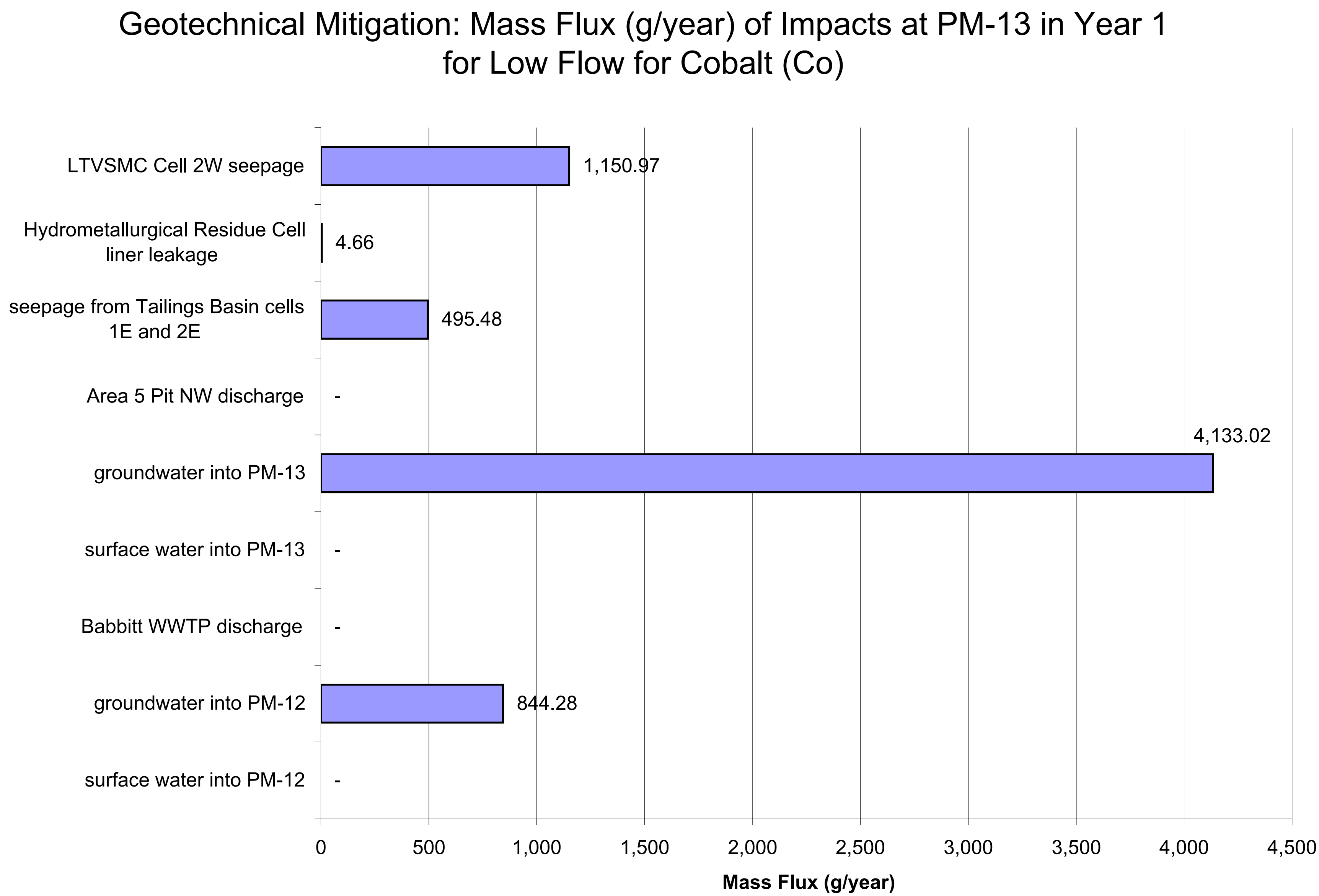


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)

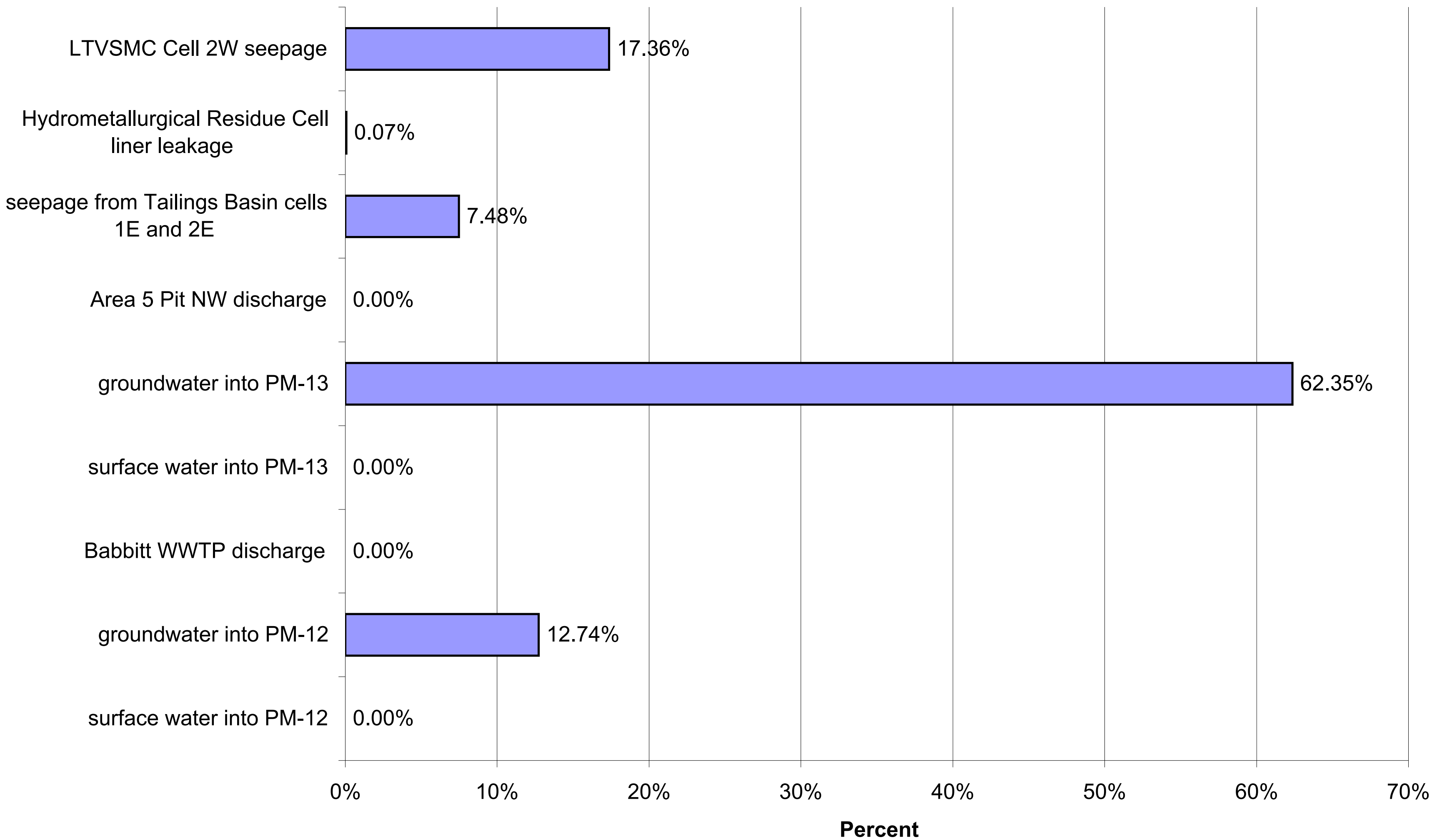


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Arsenic (As)

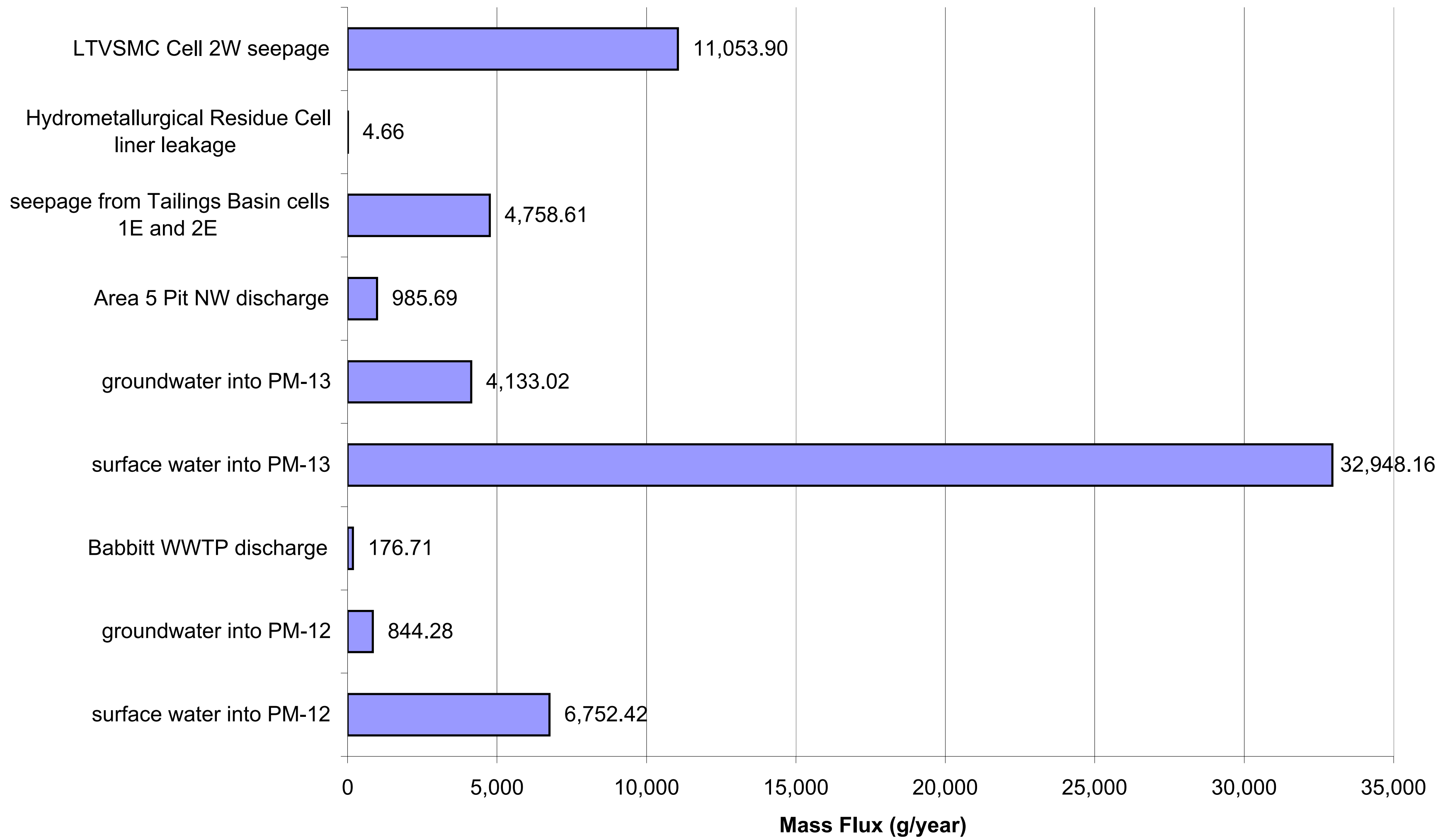


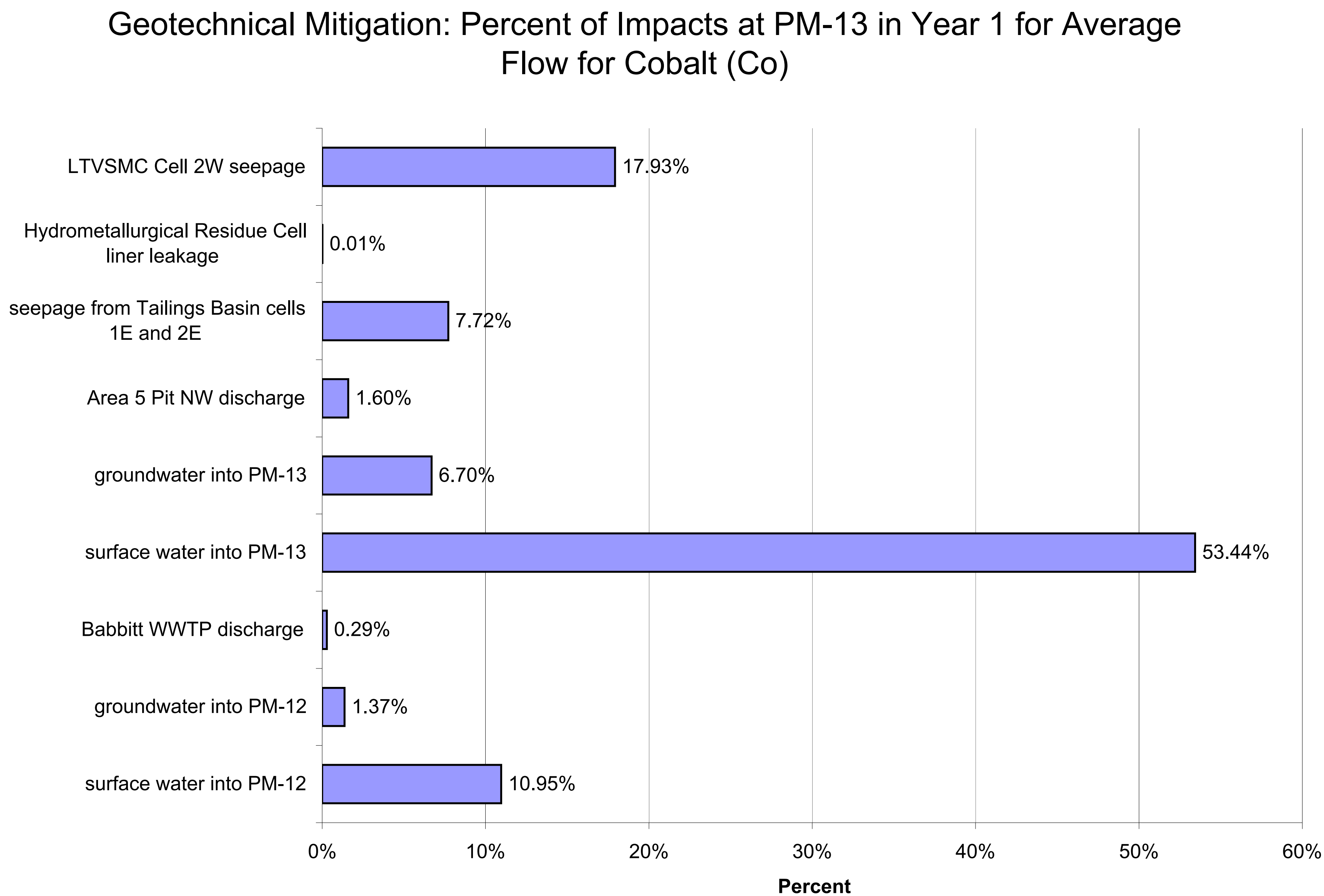

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
1,150.97
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2E
495.48
Area 5 Pit NW discharge
-
groundwater into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

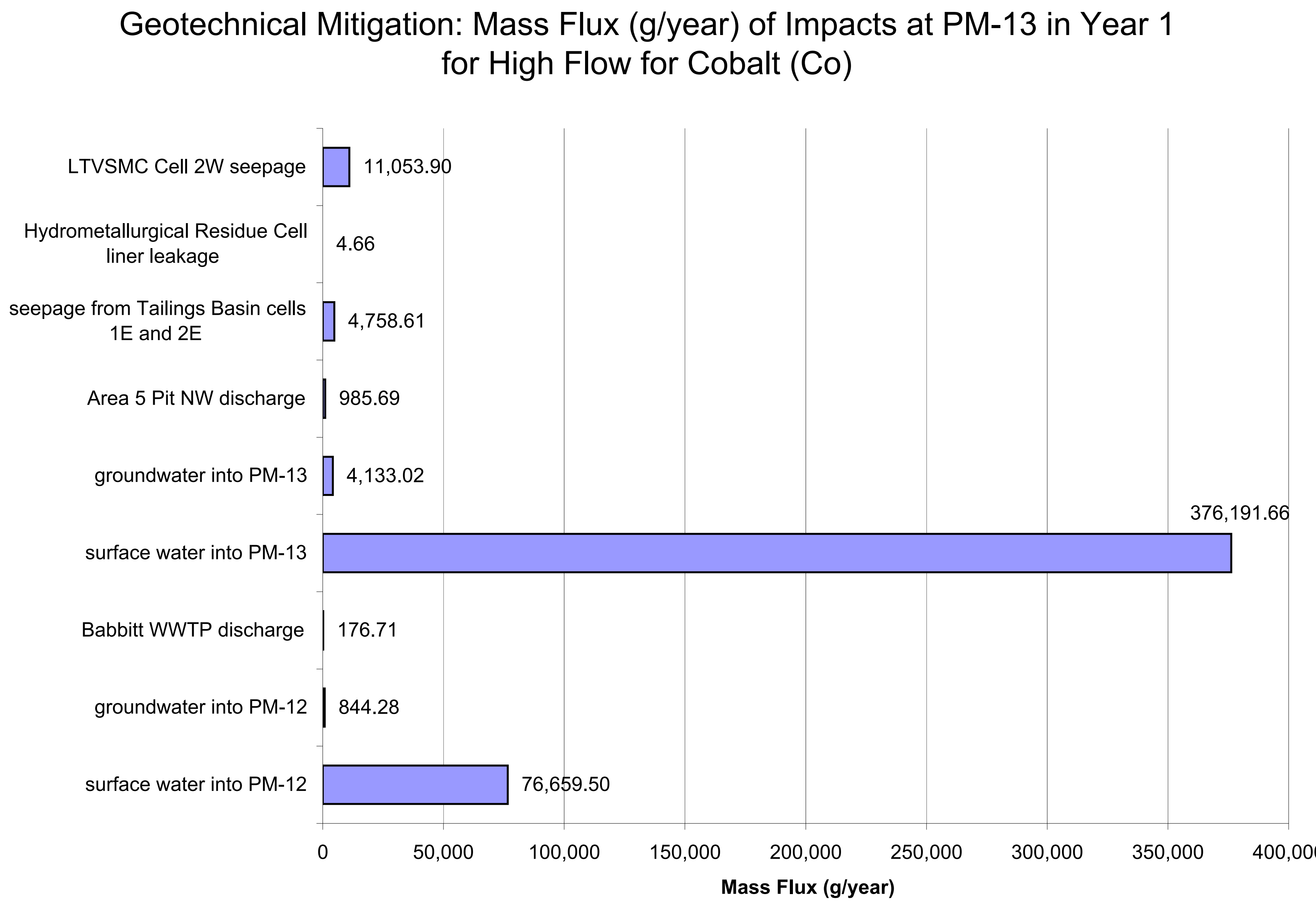
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Cobalt (Co)

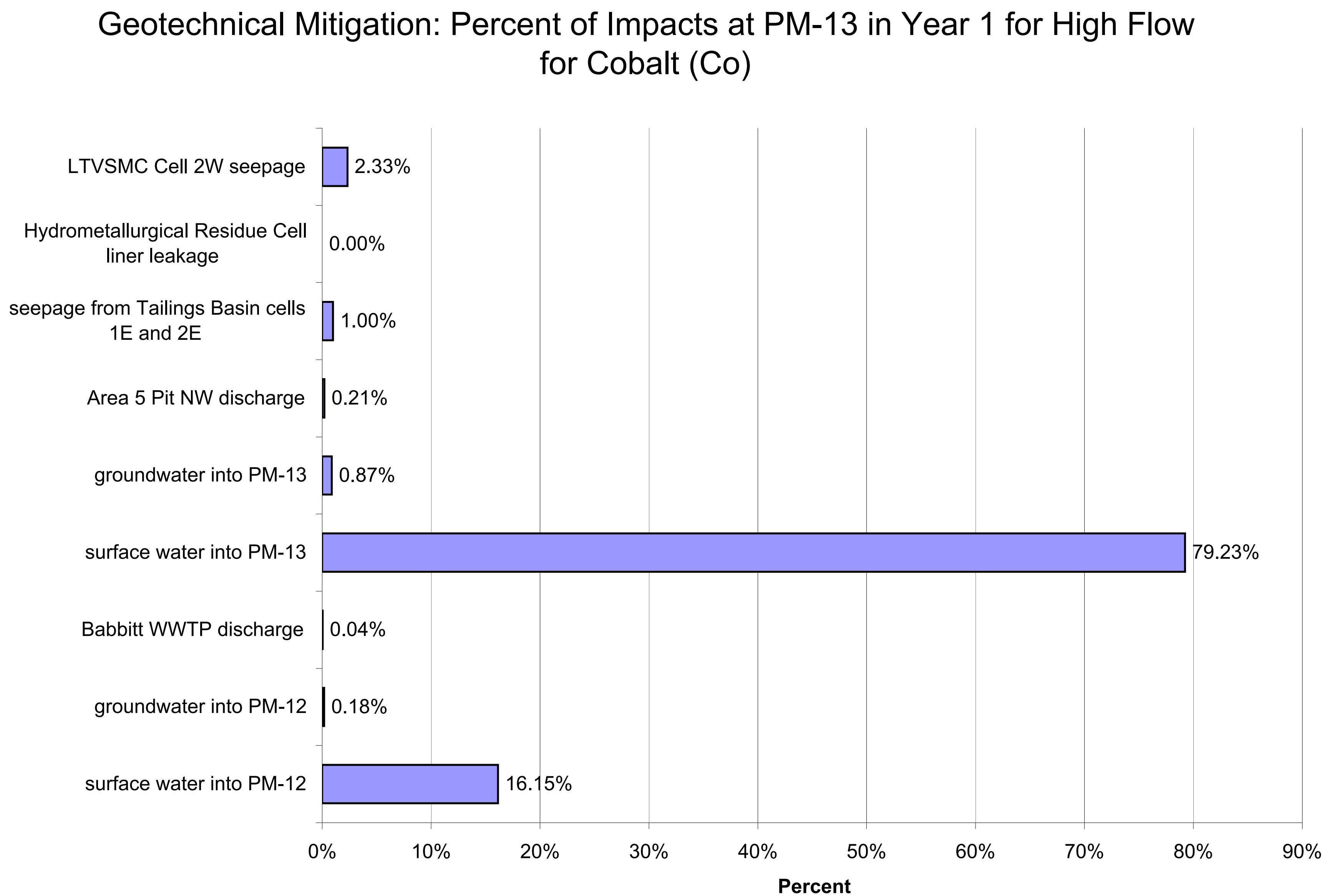


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)

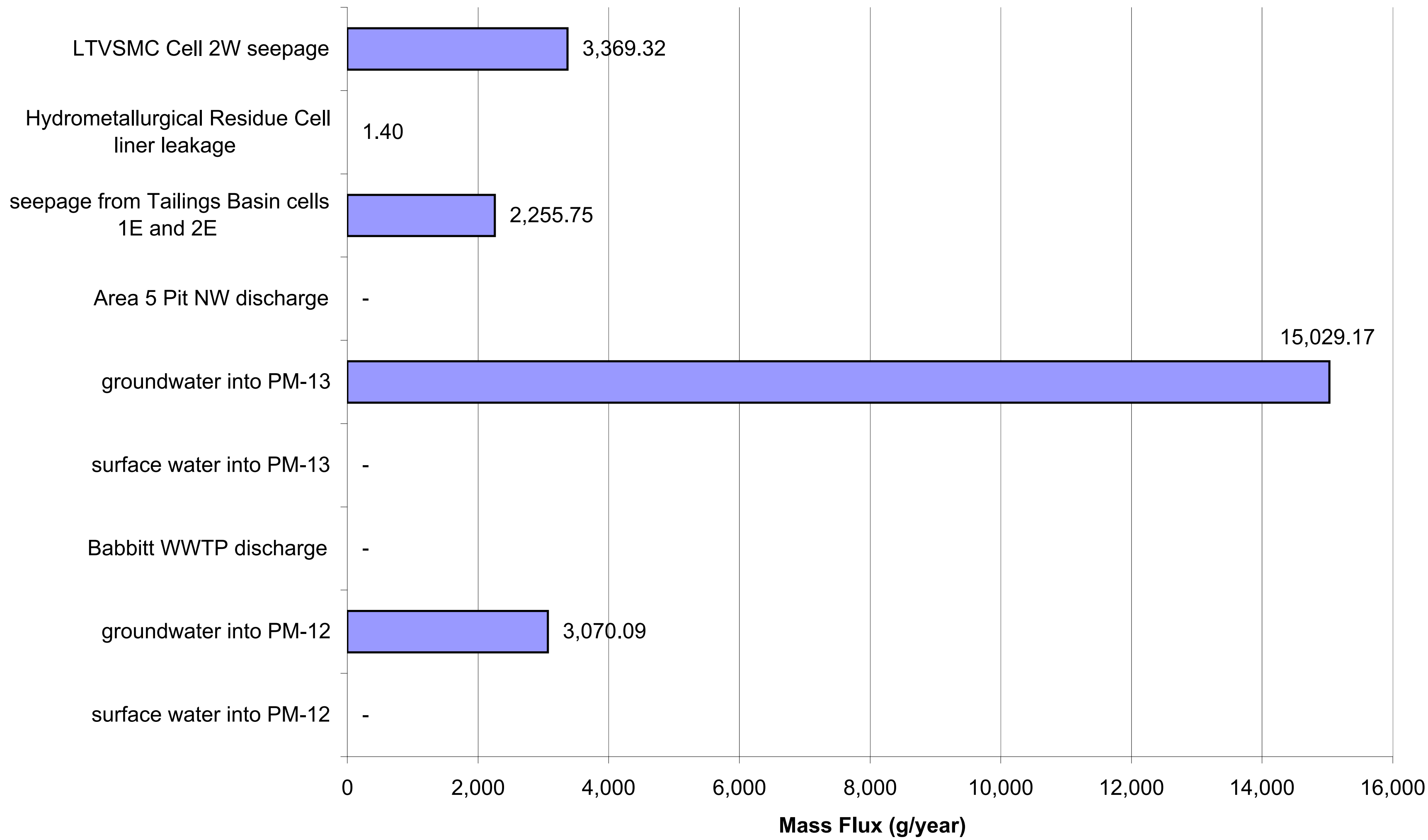



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
17.93%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
7.72%
Area 5 Pit NW discharge
1.60%
groundwater into PM-13
6.70%
surface water into PM-13
53.44%
Babbitt WWTP discharge
0.29%
groundwater into PM-12
1.37%
surface water into PM-12
10.95%
0%
10%
20%
30%
40%
50%
60%
Percent

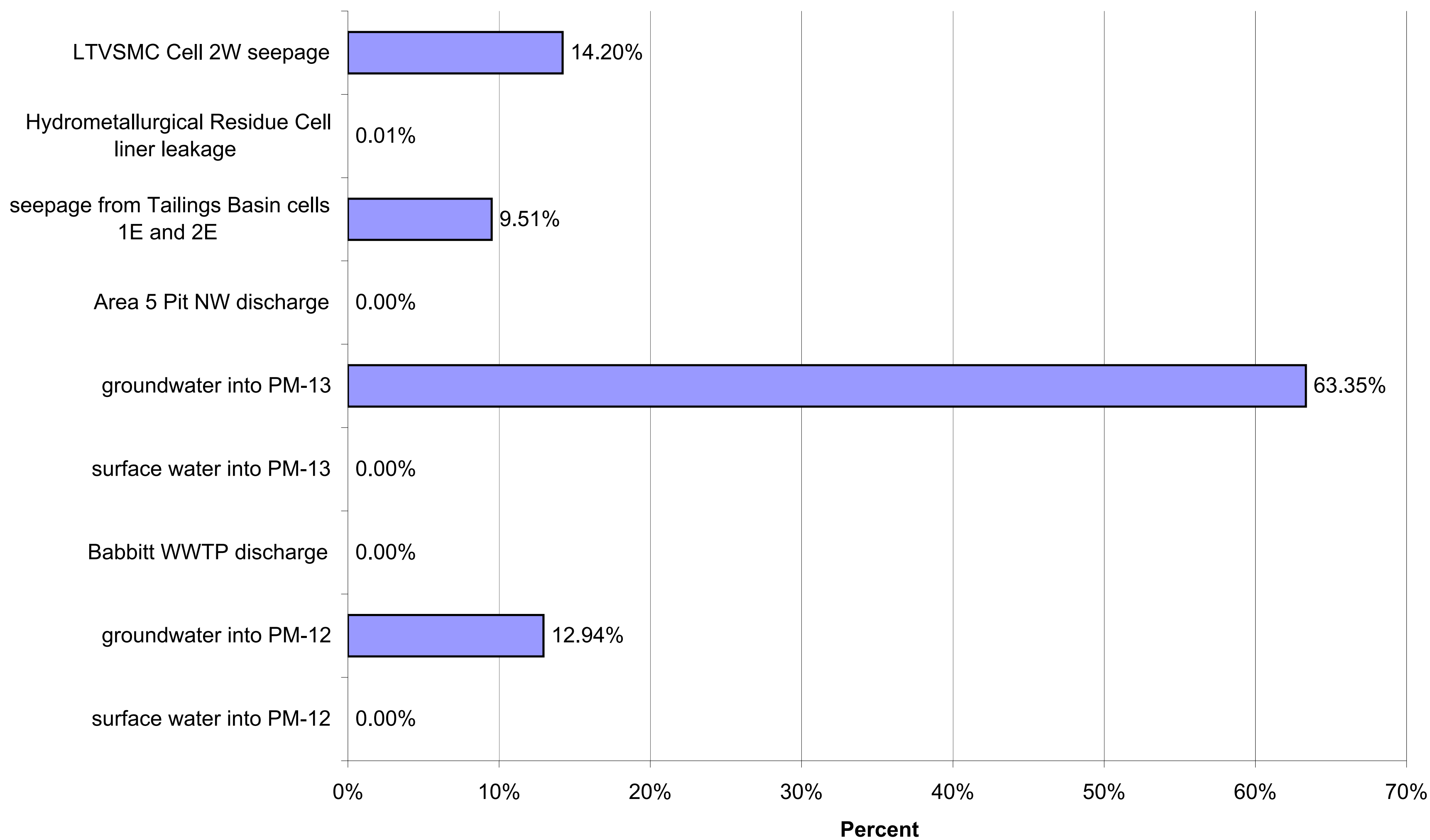

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
4.66
seepage from Tailings Basin cells 1E and 2E
4,758.61
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
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)

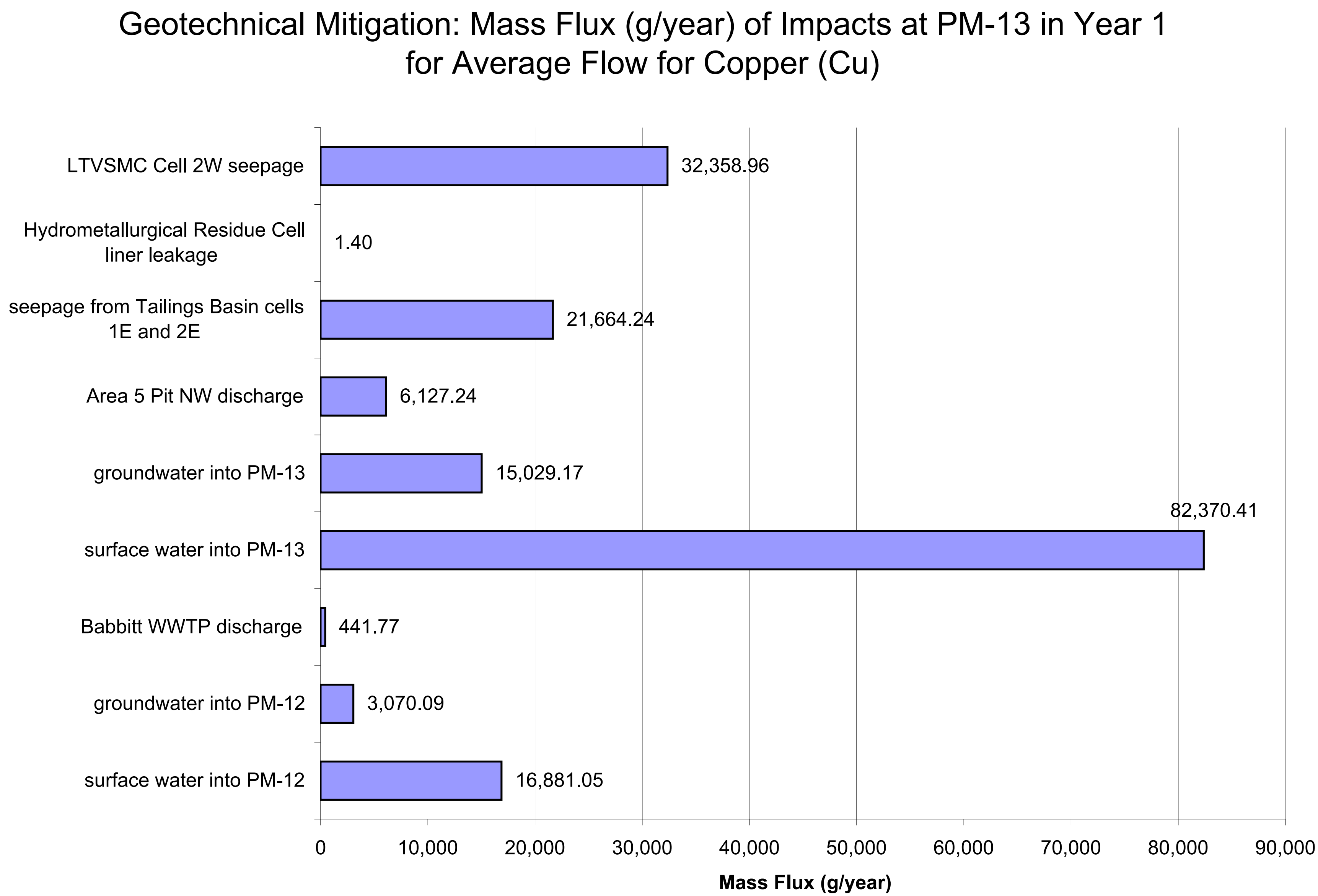

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2.33%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
1.00%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.87%
surface water into PM-13
79.23%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
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 Copper (Cu)

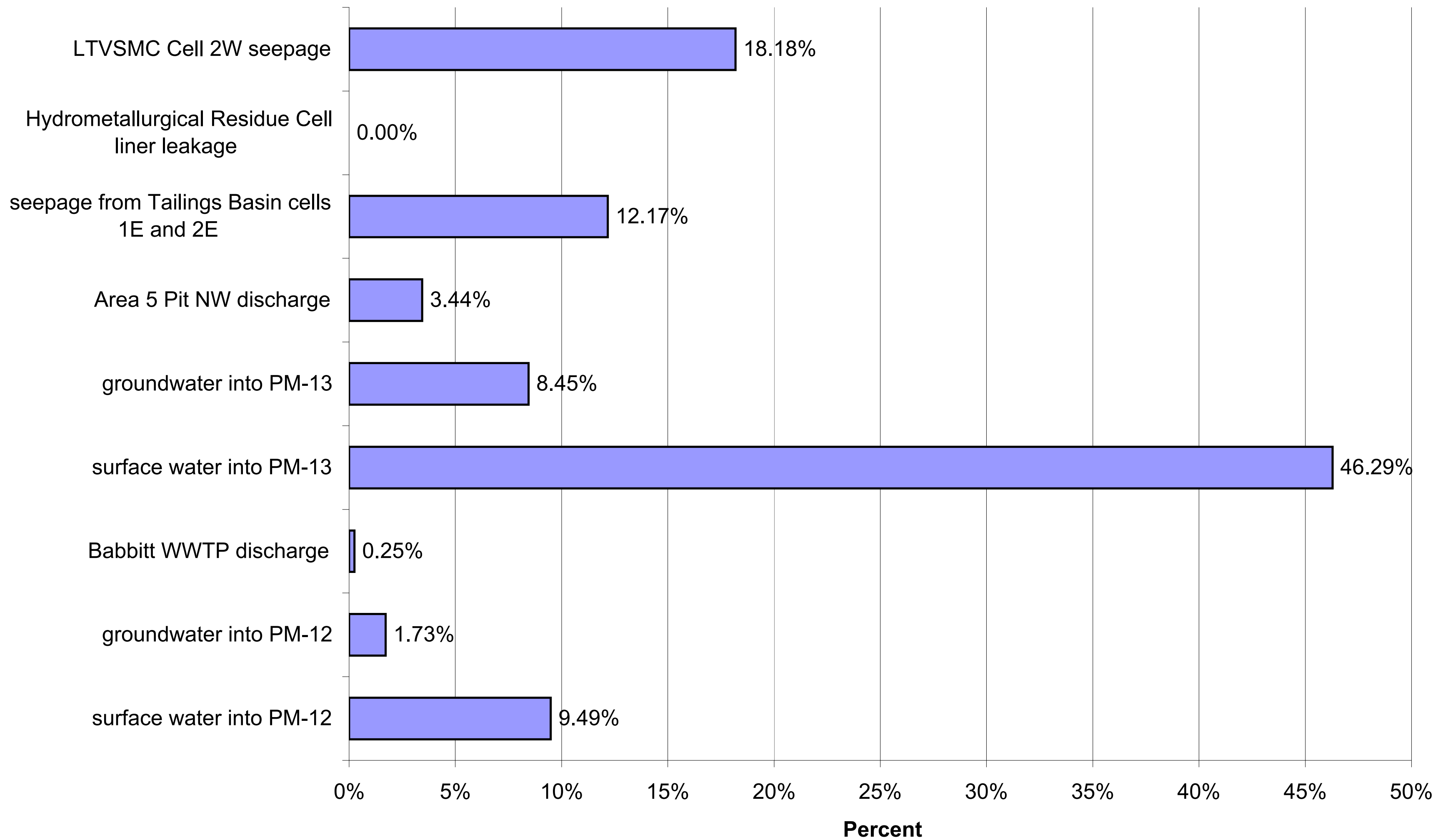


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Copper (Cu)

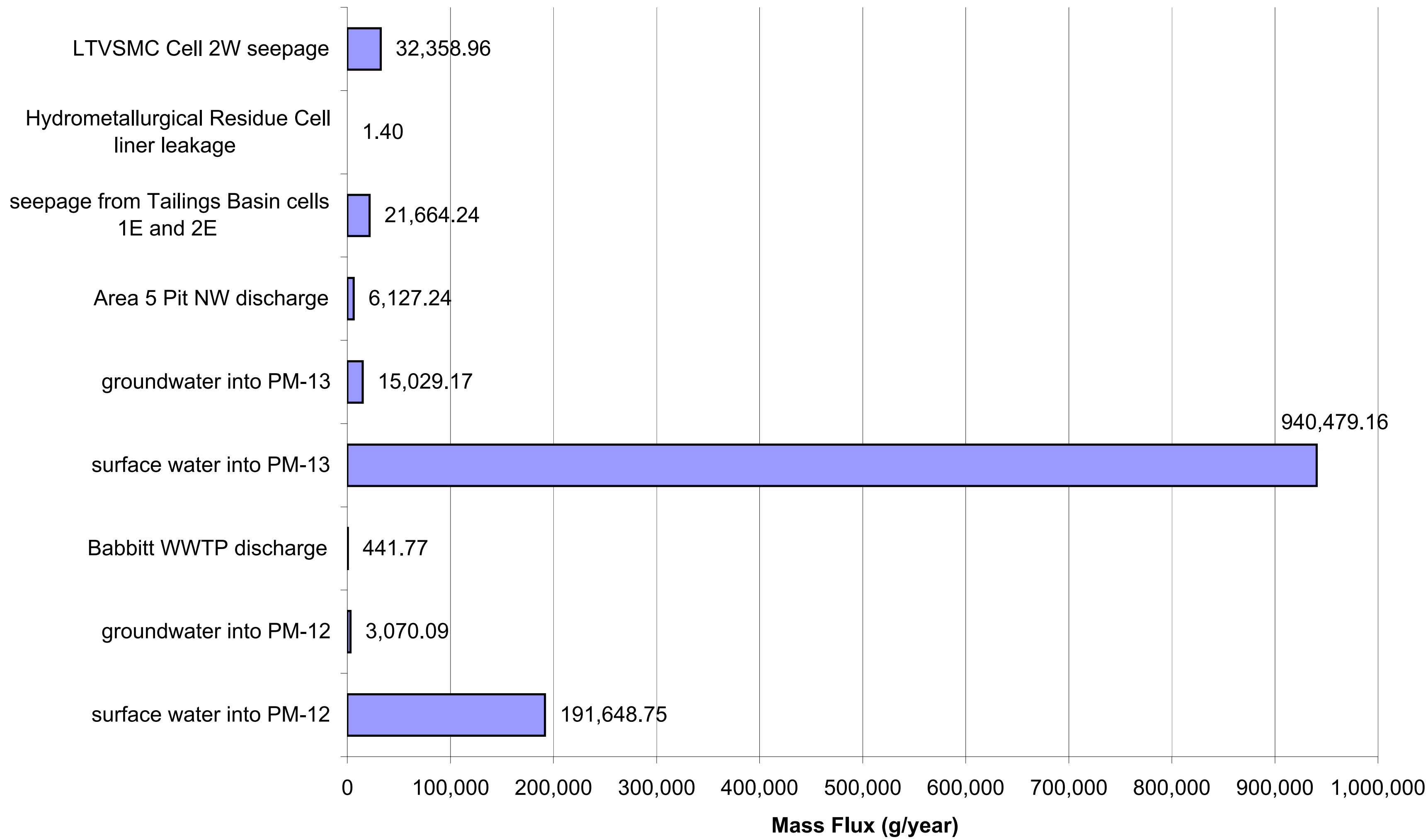


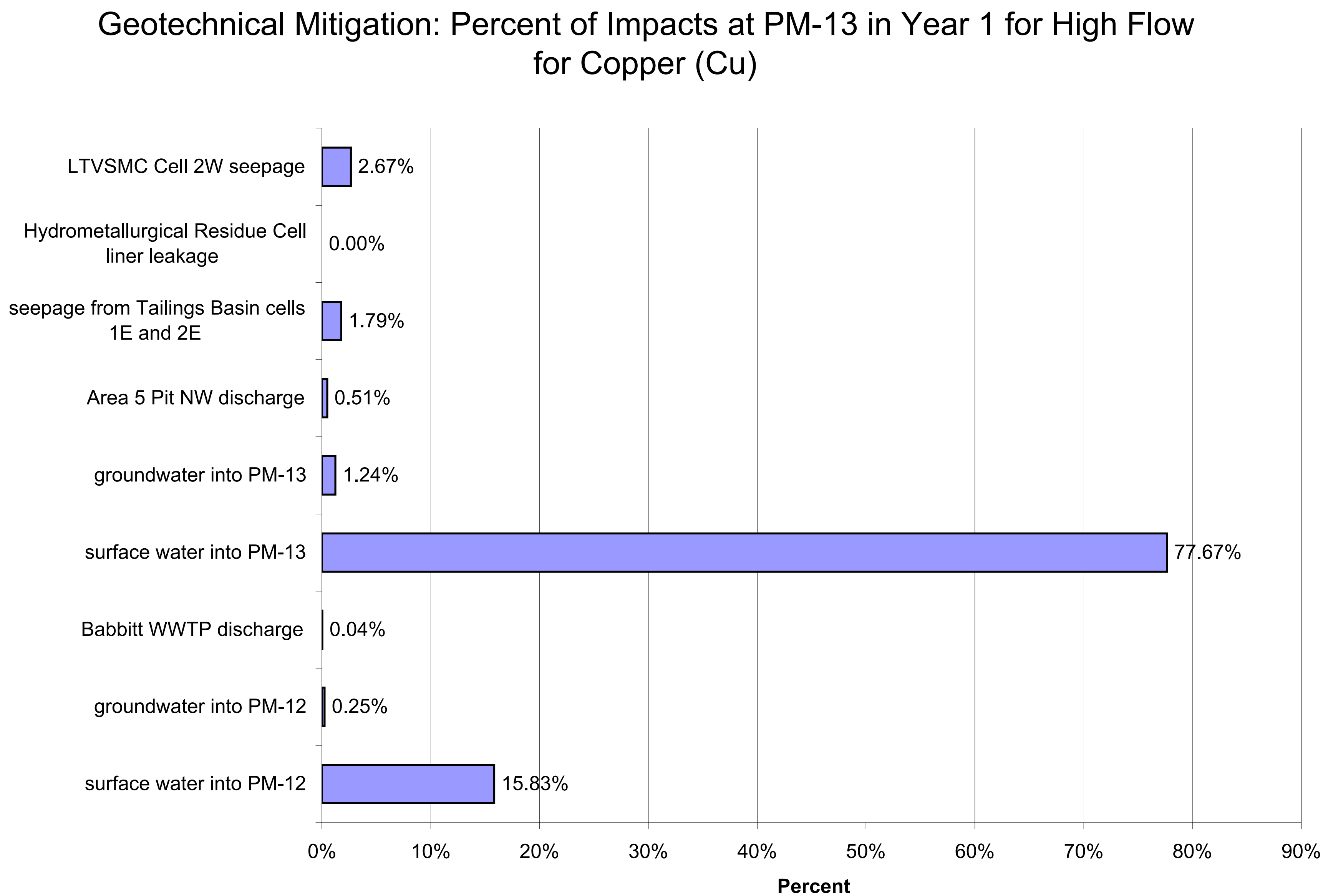

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
32,358.96
Hydrometallurgical Residue Cell liner leakage
1.40
seepage from Tailings Basin cells 1E and 2E
21,664.24
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
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)

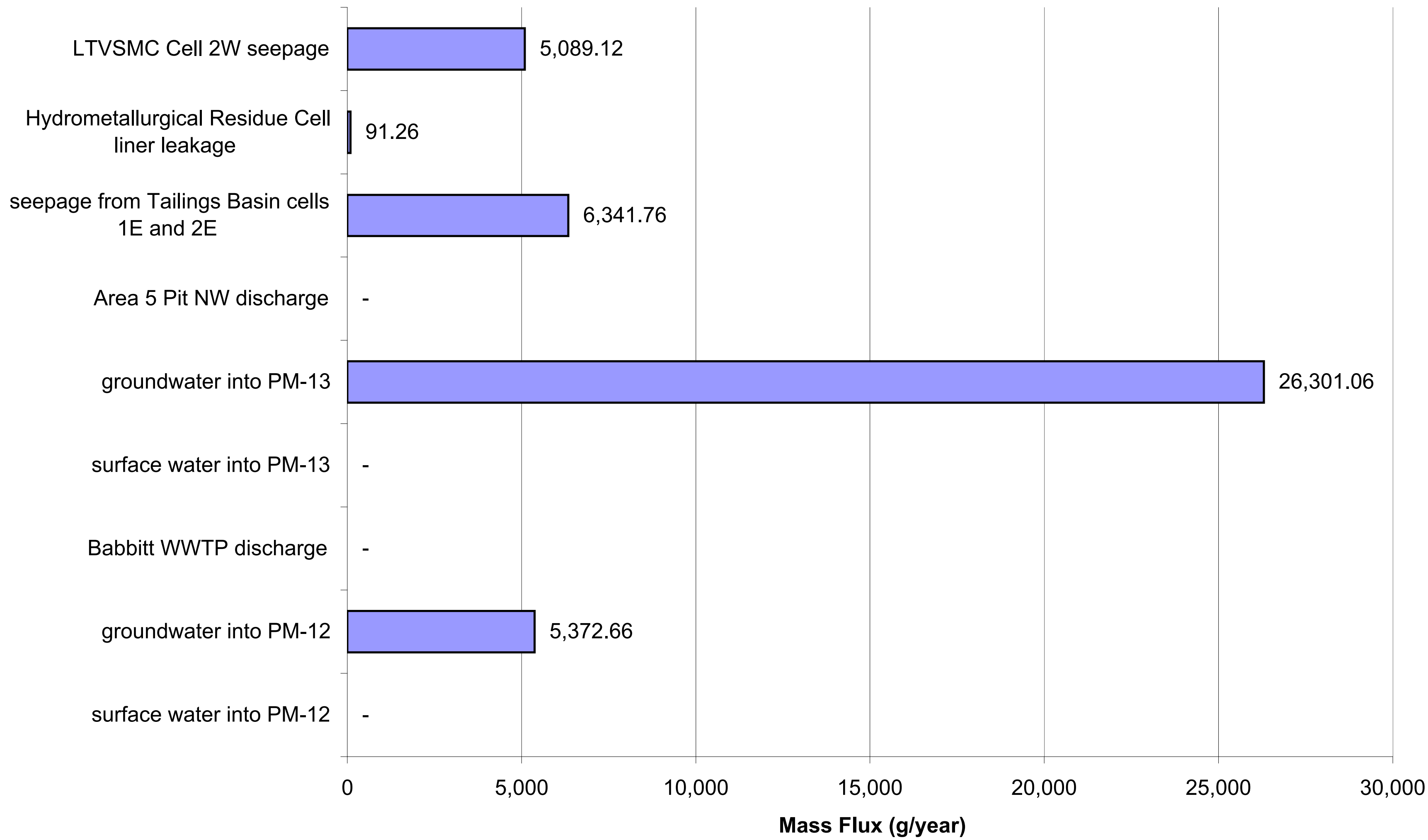


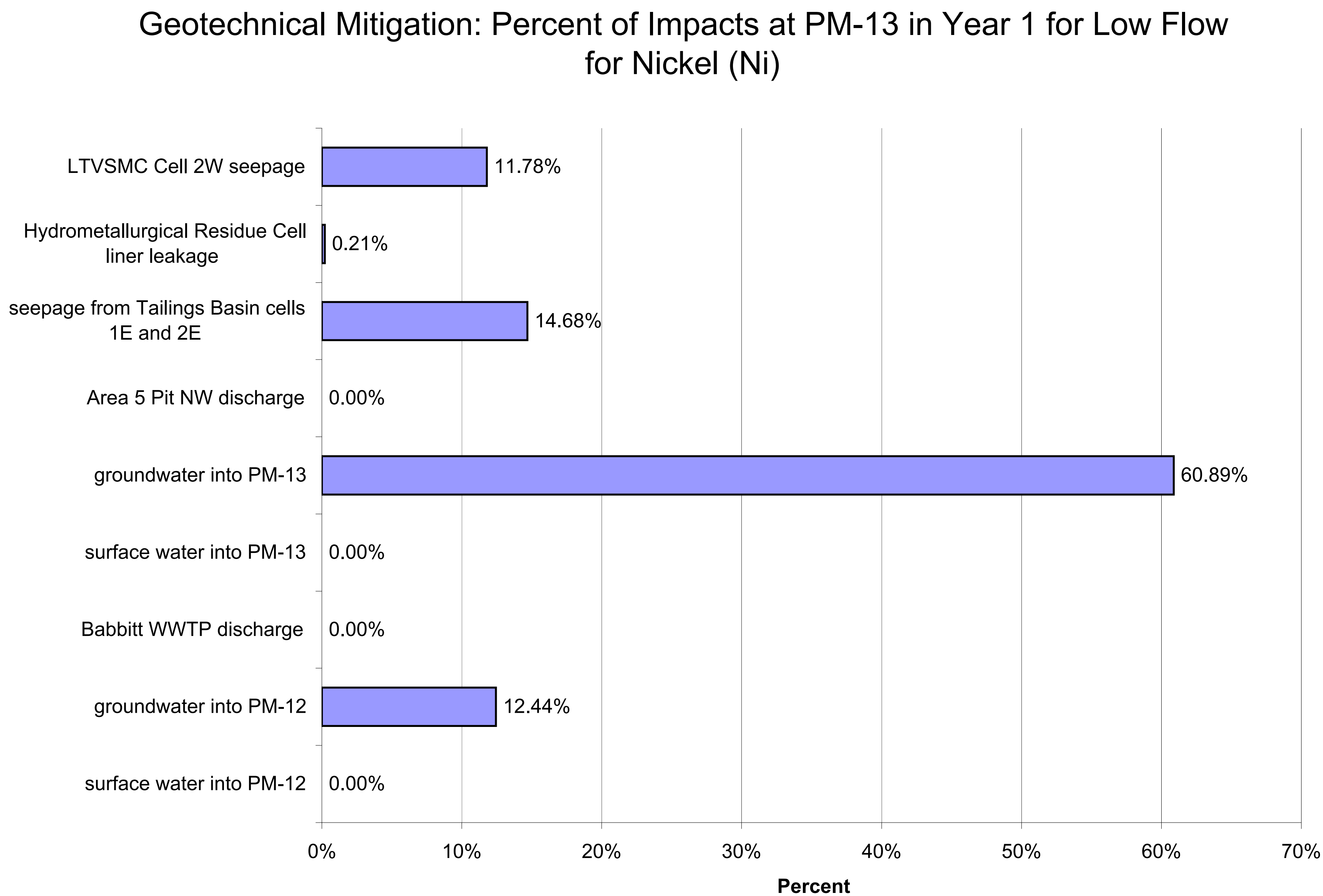
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)



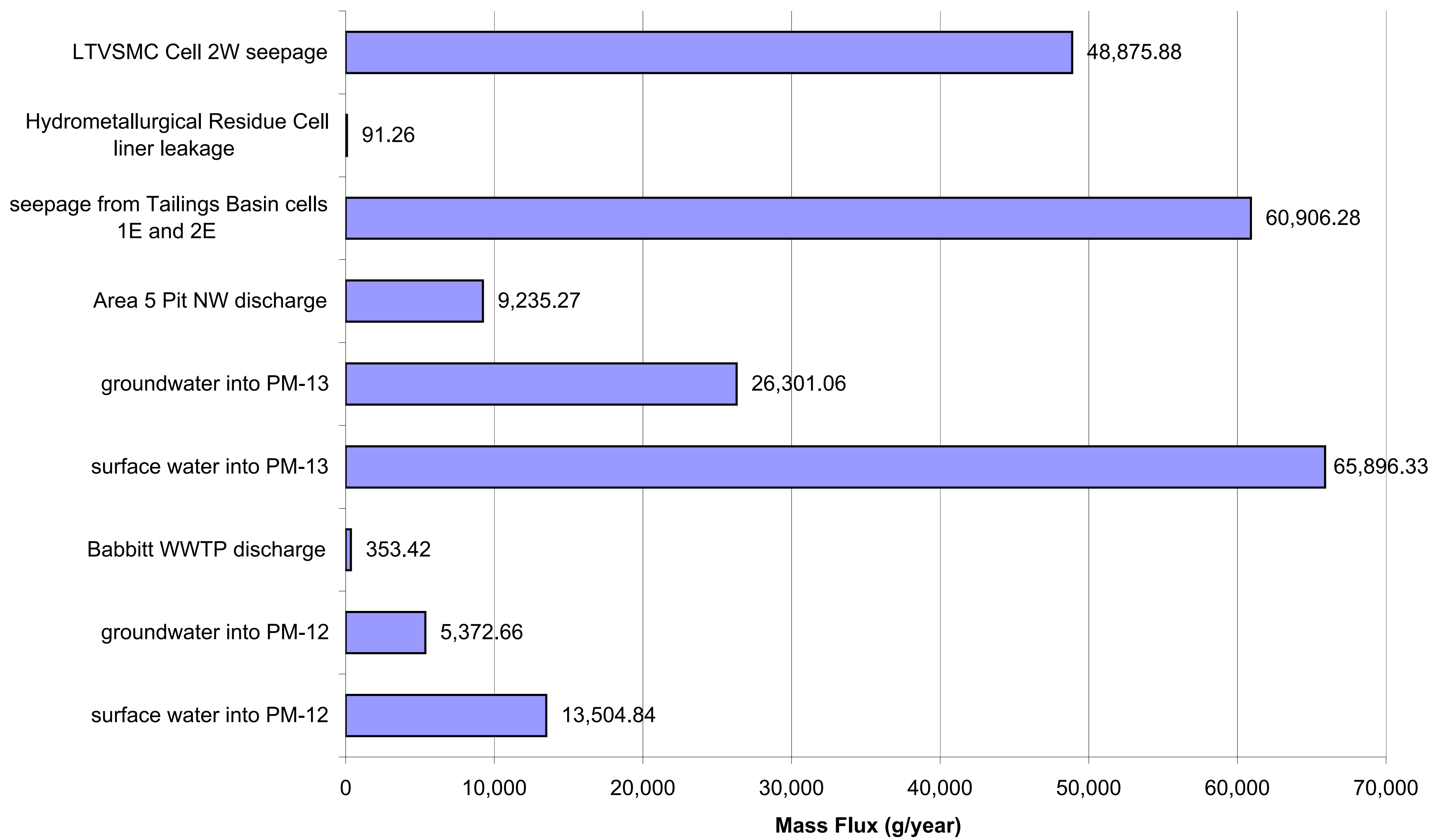

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
2.67%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
1.79%
Area 5 Pit NW discharge
0.51%
groundwater into PM-13
1.24%
surface water into PM-13
77.67%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.25%
surface water into PM-12
15.83%
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)

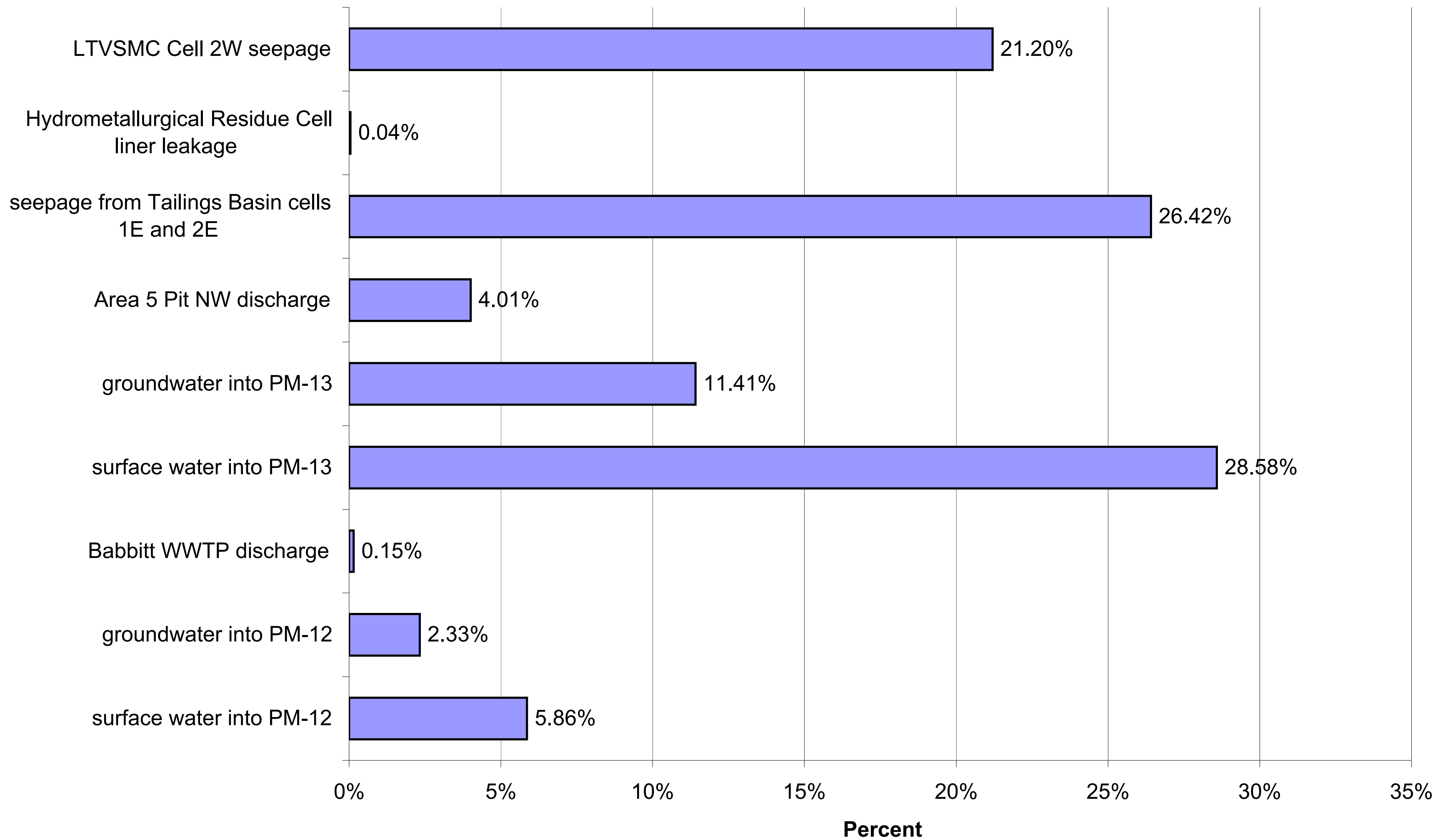


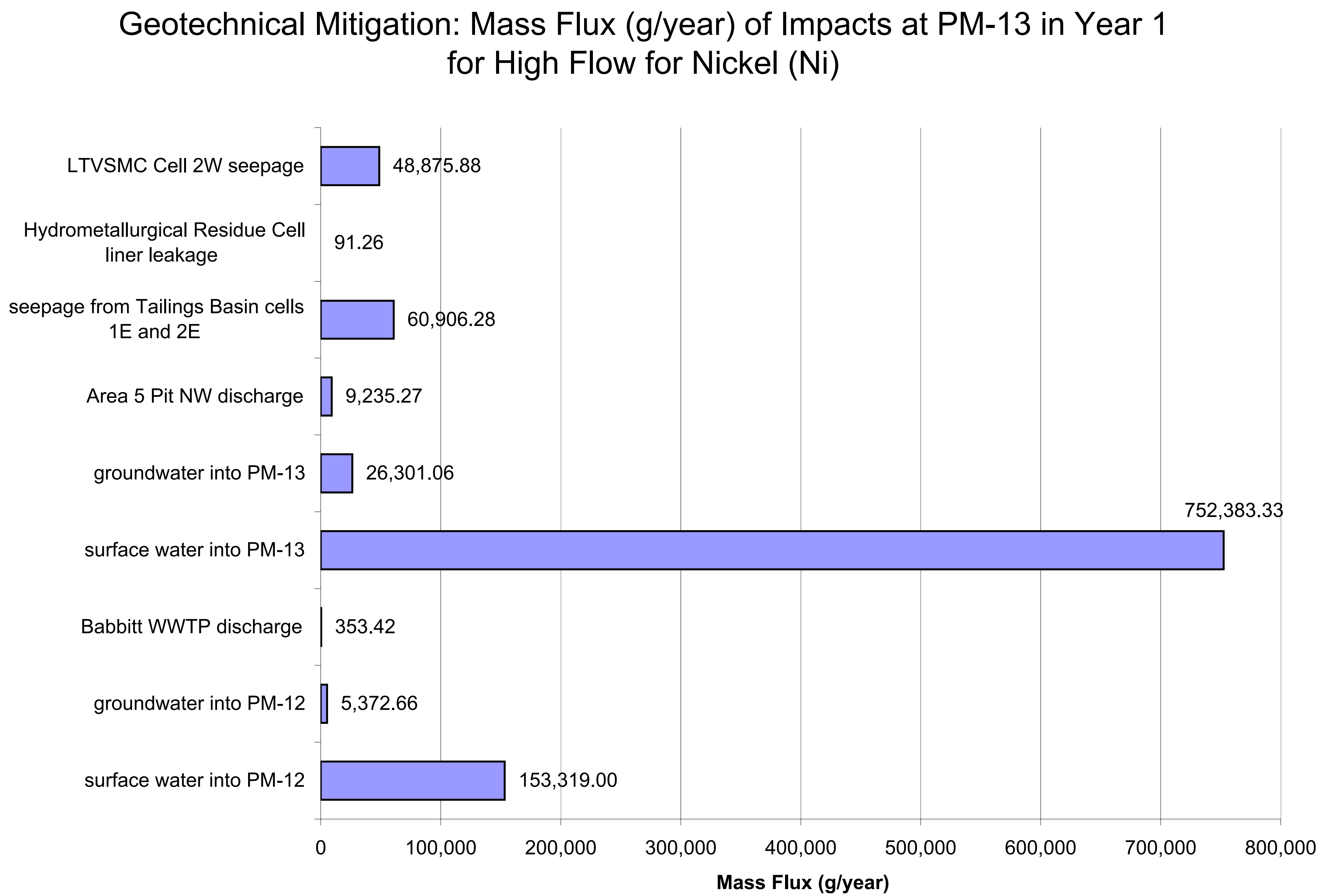

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
11.78%
Hydrometallurgical Residue Cell liner leakage
0.21%
seepage from Tailings Basin cells 1E and 2E
14.68%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
60.89%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.44%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

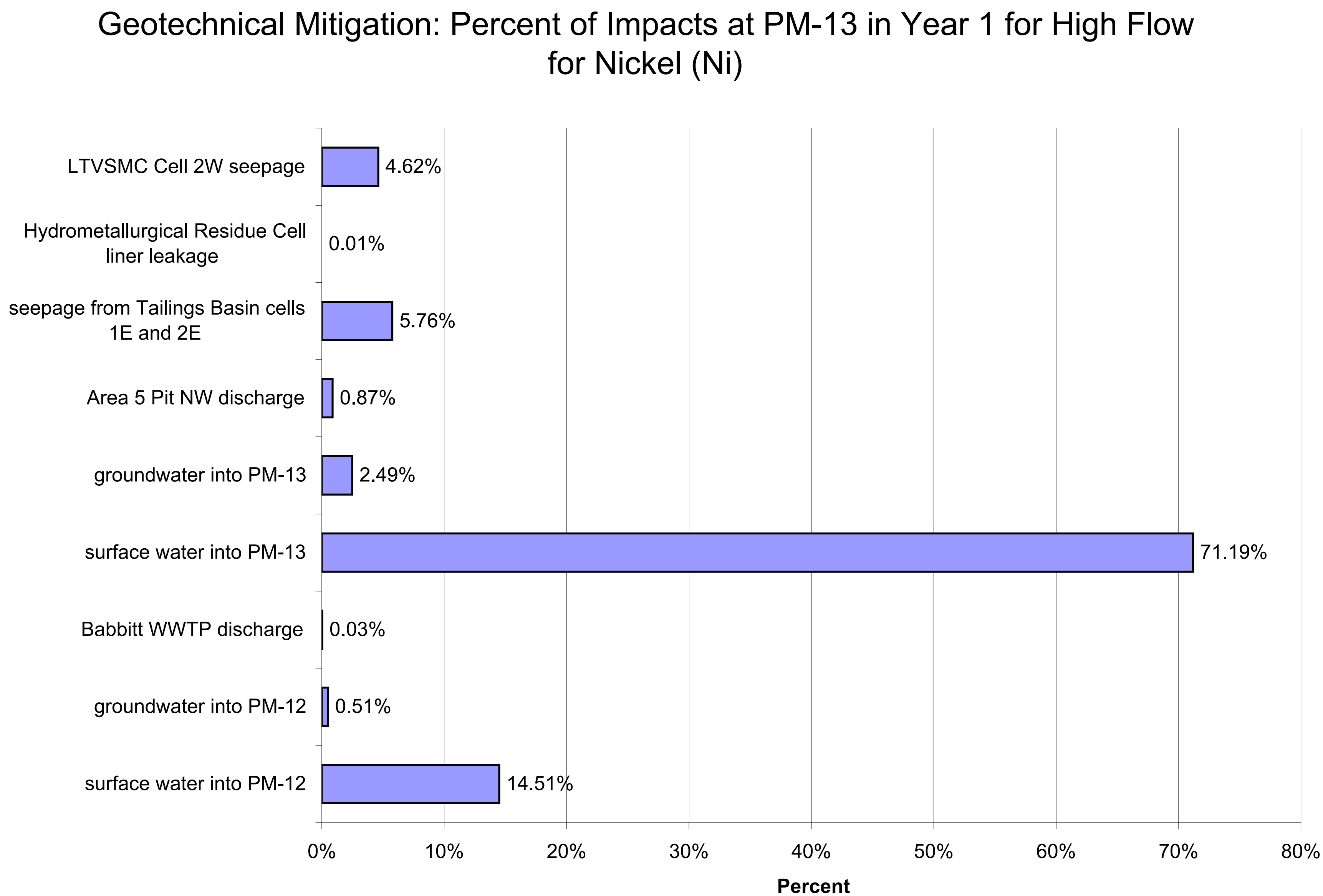
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)

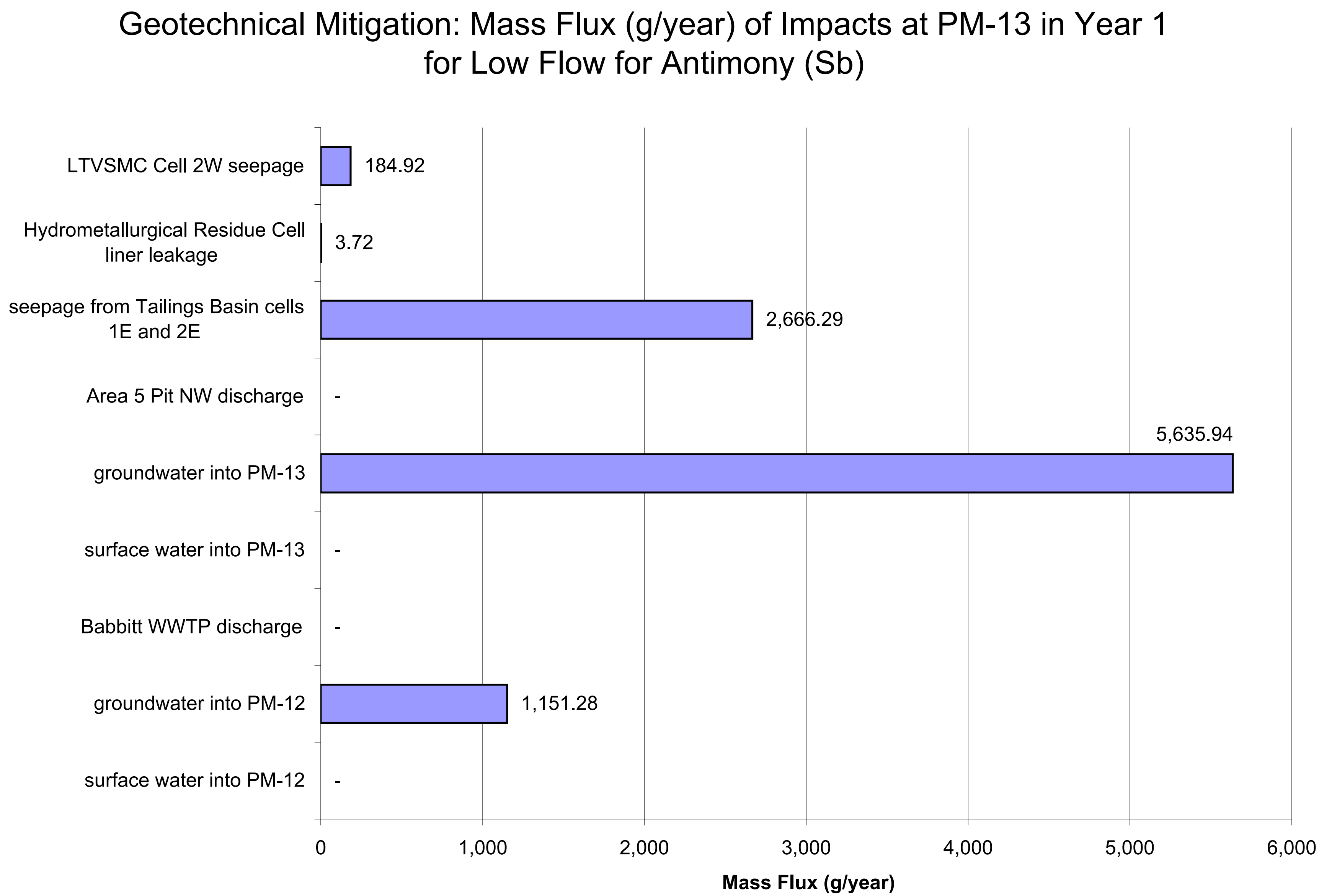


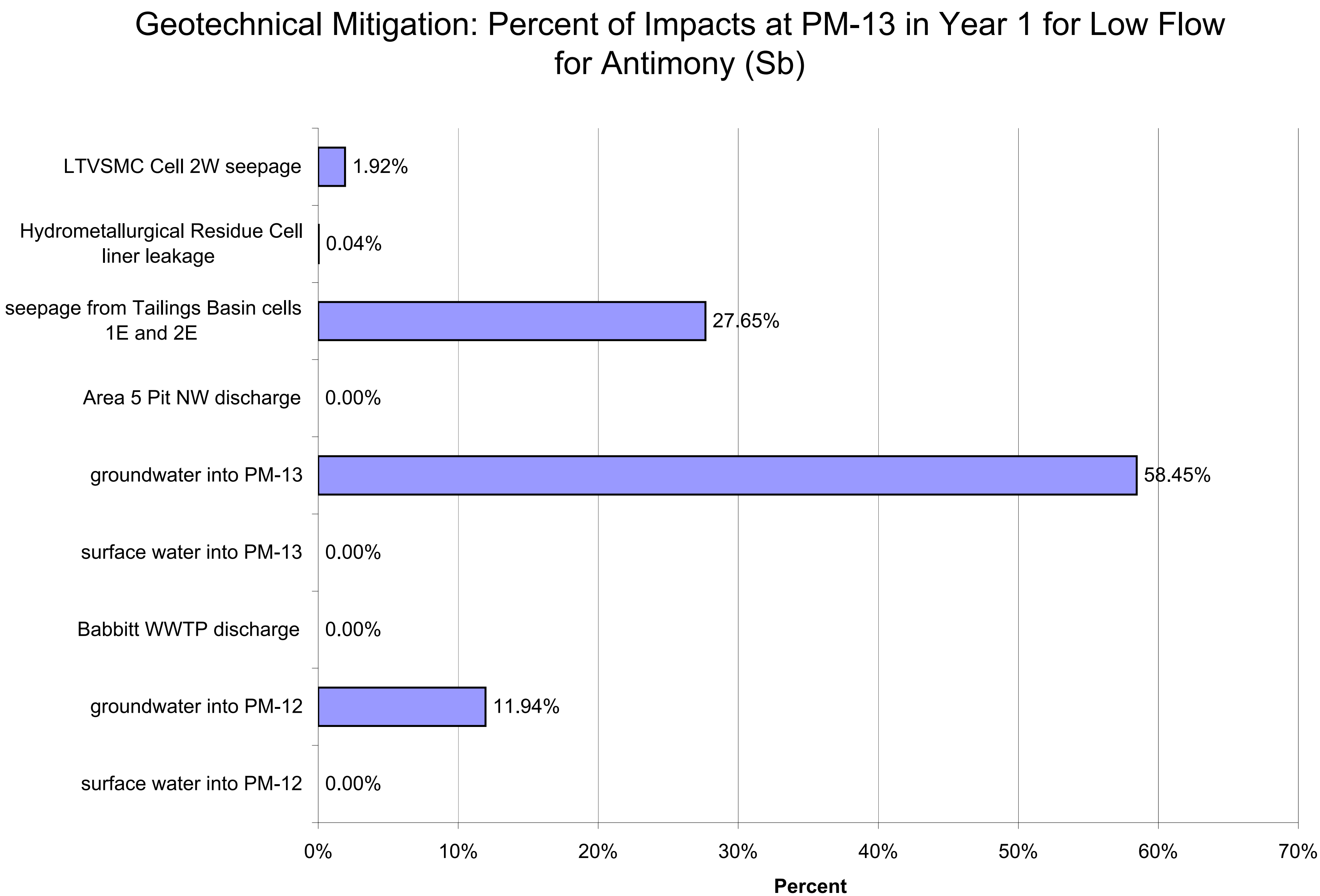
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Nickel (Ni)

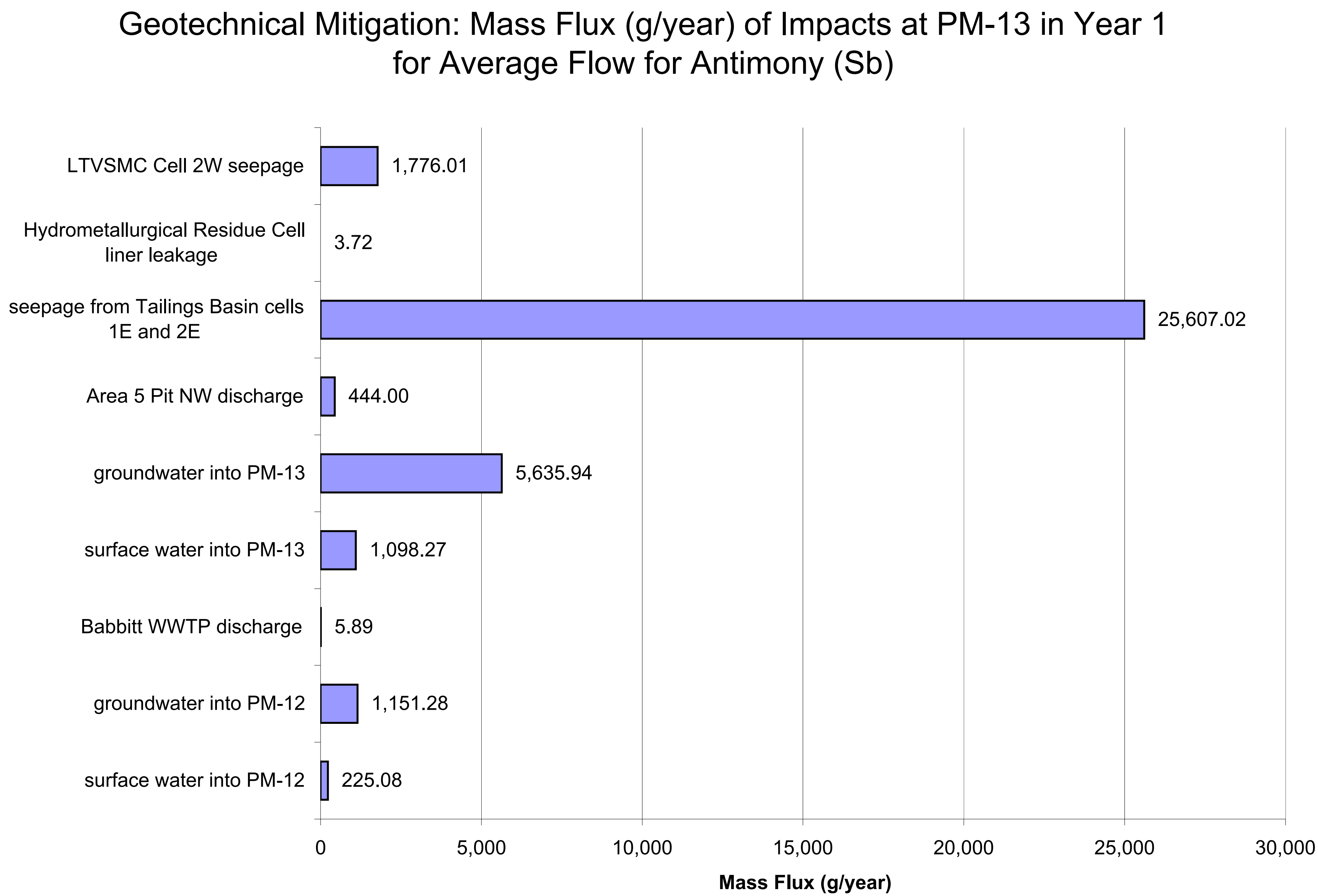



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
91.26
seepage from Tailings Basin cells 1E and 2E
60,906.28
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
surface water into PM-13
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)

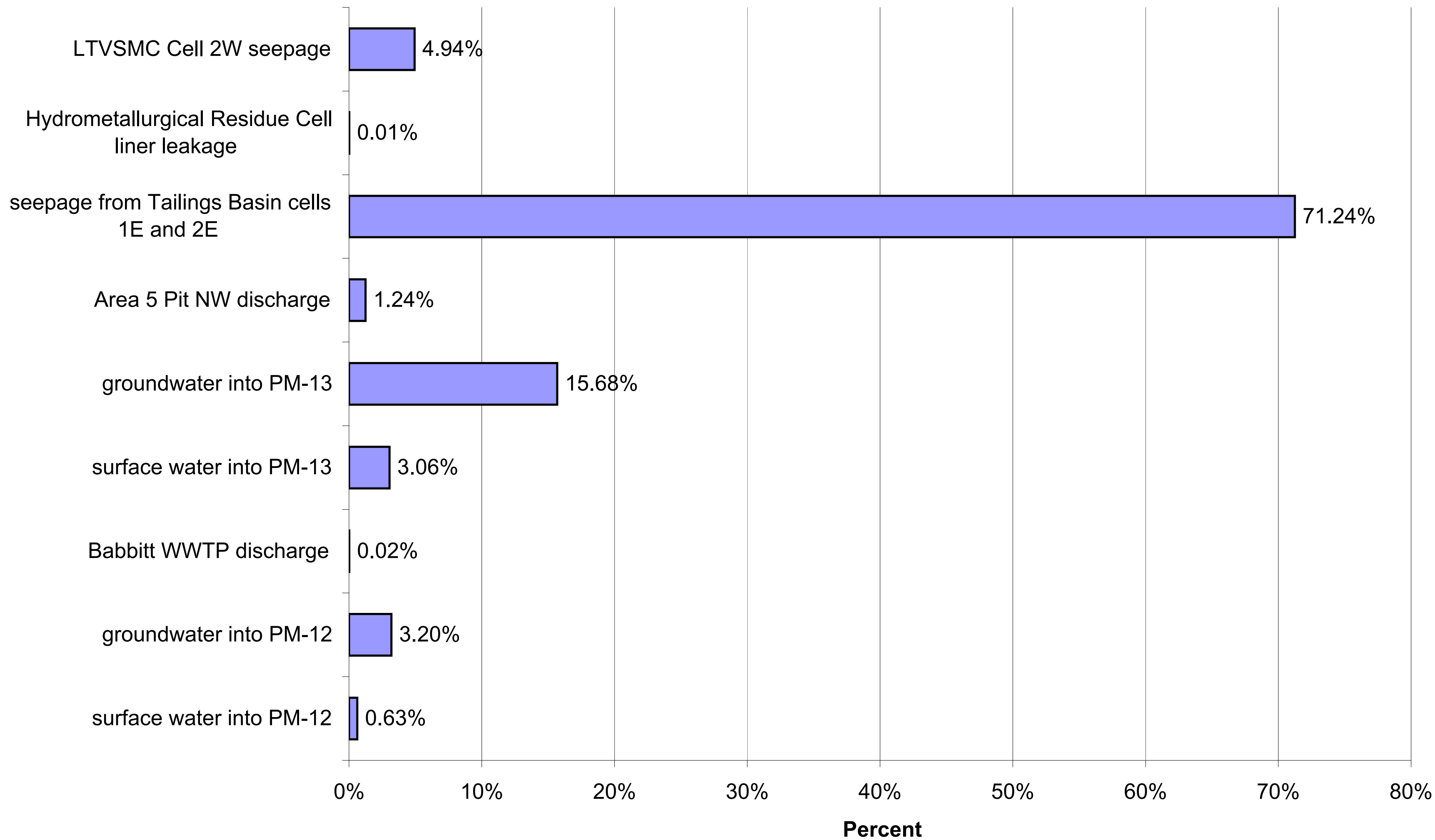

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
4.62%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
5.76%
Area 5 Pit NW discharge
0.87%
groundwater into PM-13
2.49%
surface water into PM-13
71.19%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.51%
surface water into PM-12
14.51%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

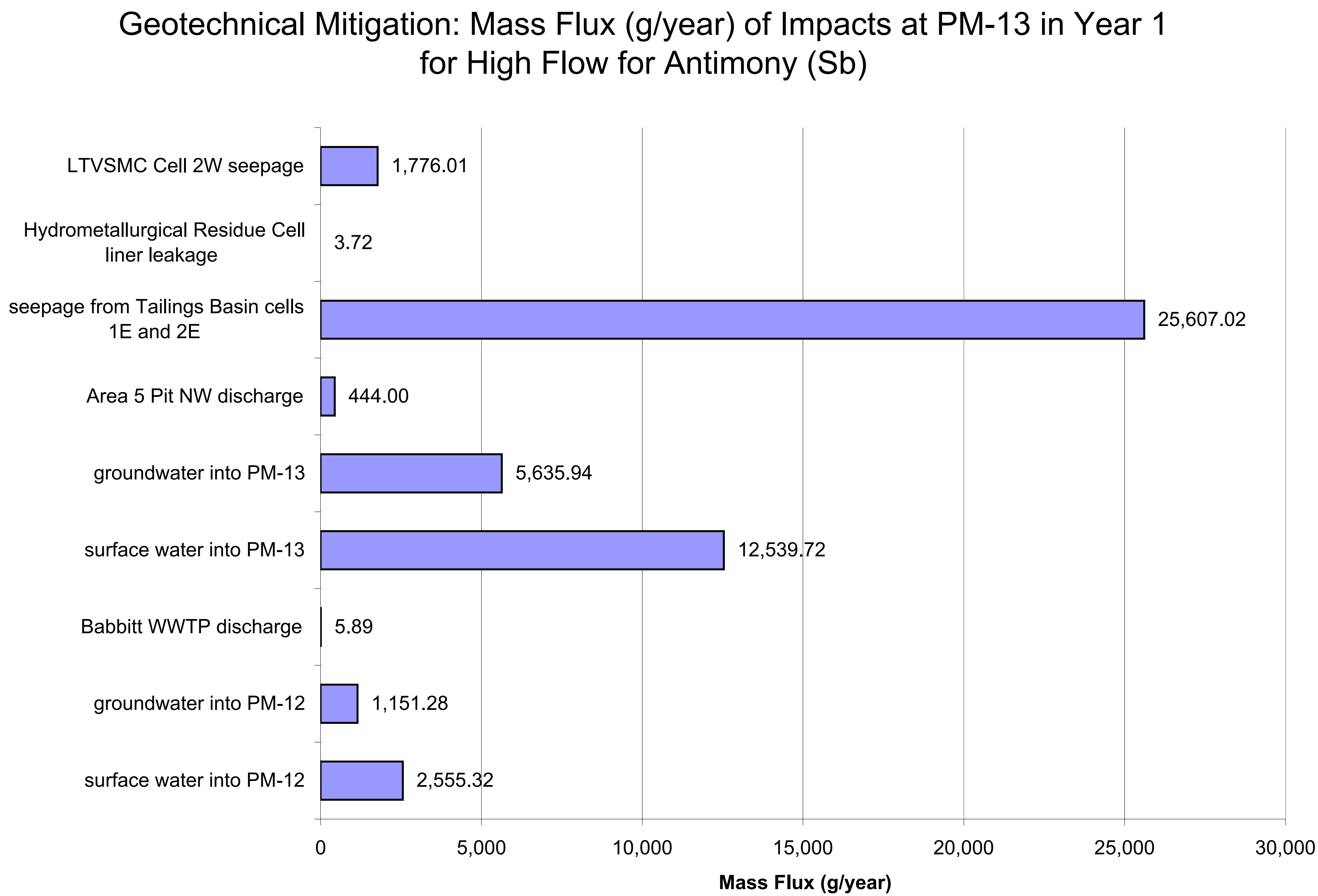

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
184.92
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
2,666.29
Area 5 Pit NW discharge
-
groundwater into PM-13
5,635.94
surface water into PM-13
-
Babbitt WWTP discharge
-
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 Year 1 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.92%
Hydrometallurgical Residue Cell liner leakage
0.04%
seepage from Tailings Basin cells 1E and 2E
27.65%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
58.45%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
11.94%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

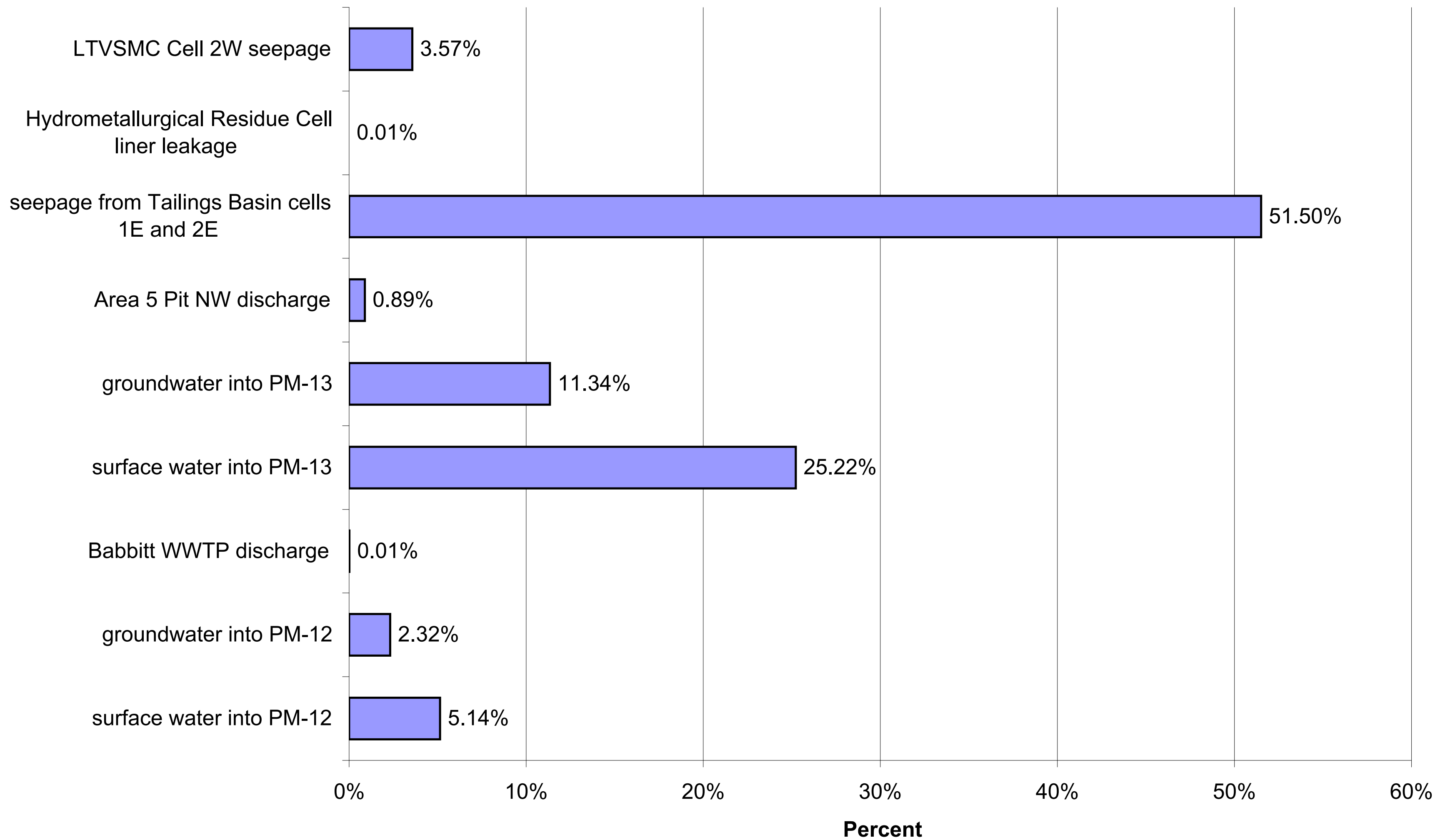

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
25,607.02
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
0
5,000
10,000
15,000
20,000
25,000
30,000
Mass Flux (g/year)

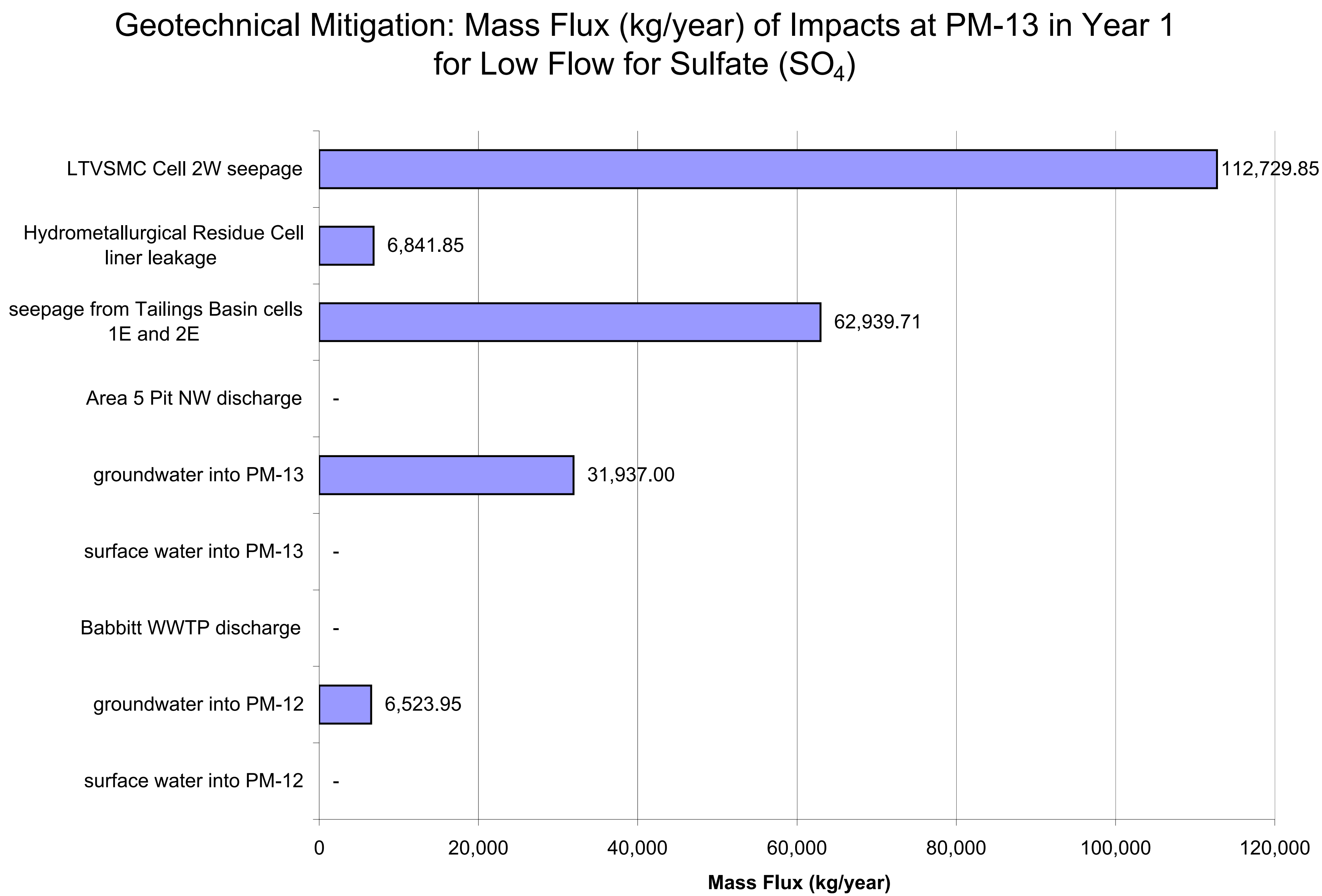
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Antimony (Sb)



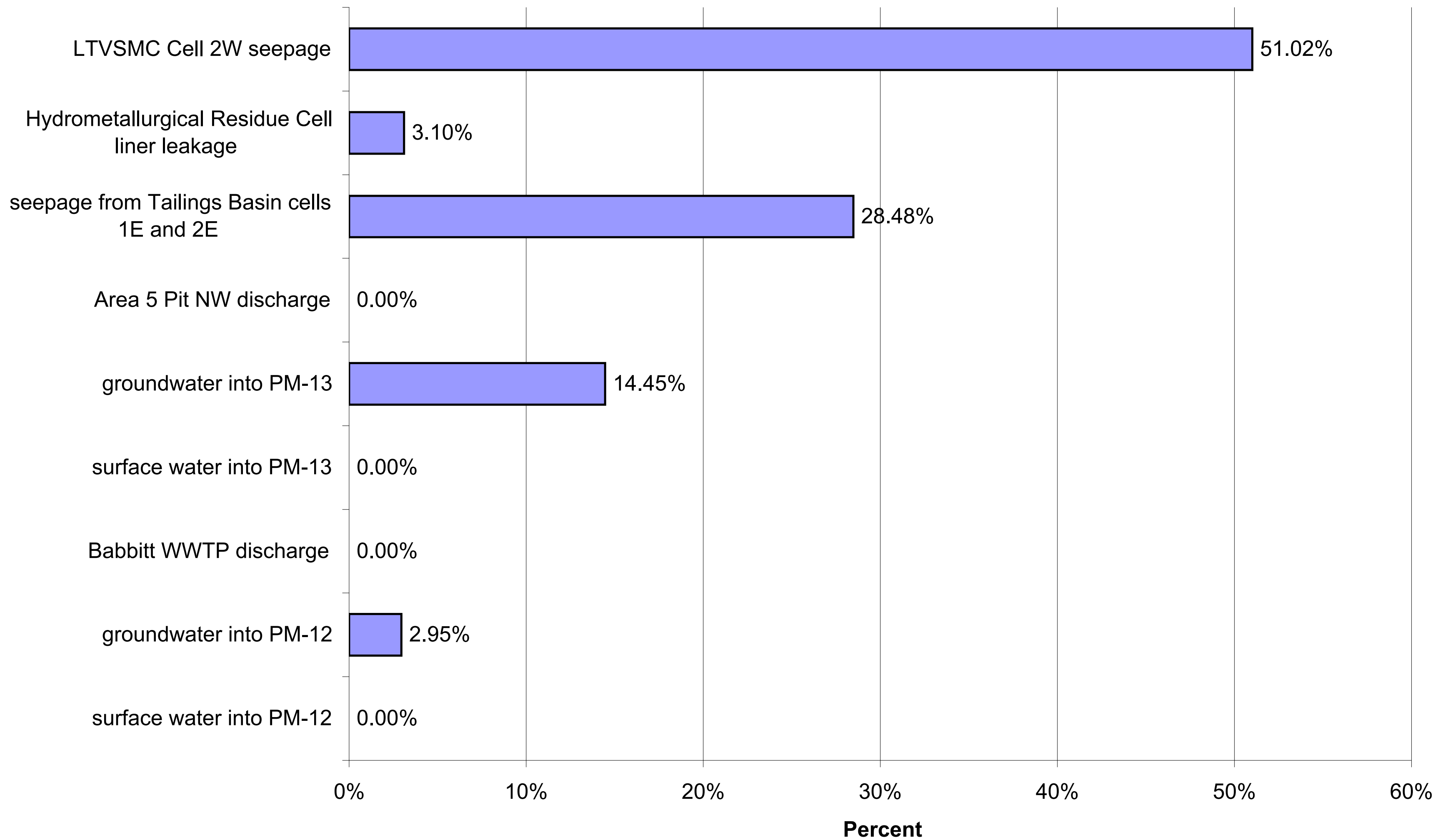

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 1 for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1,776.01
Hydrometallurgical Residue Cell liner leakage
3.72
seepage from Tailings Basin cells 1E and 2E
25,607.02
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
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)

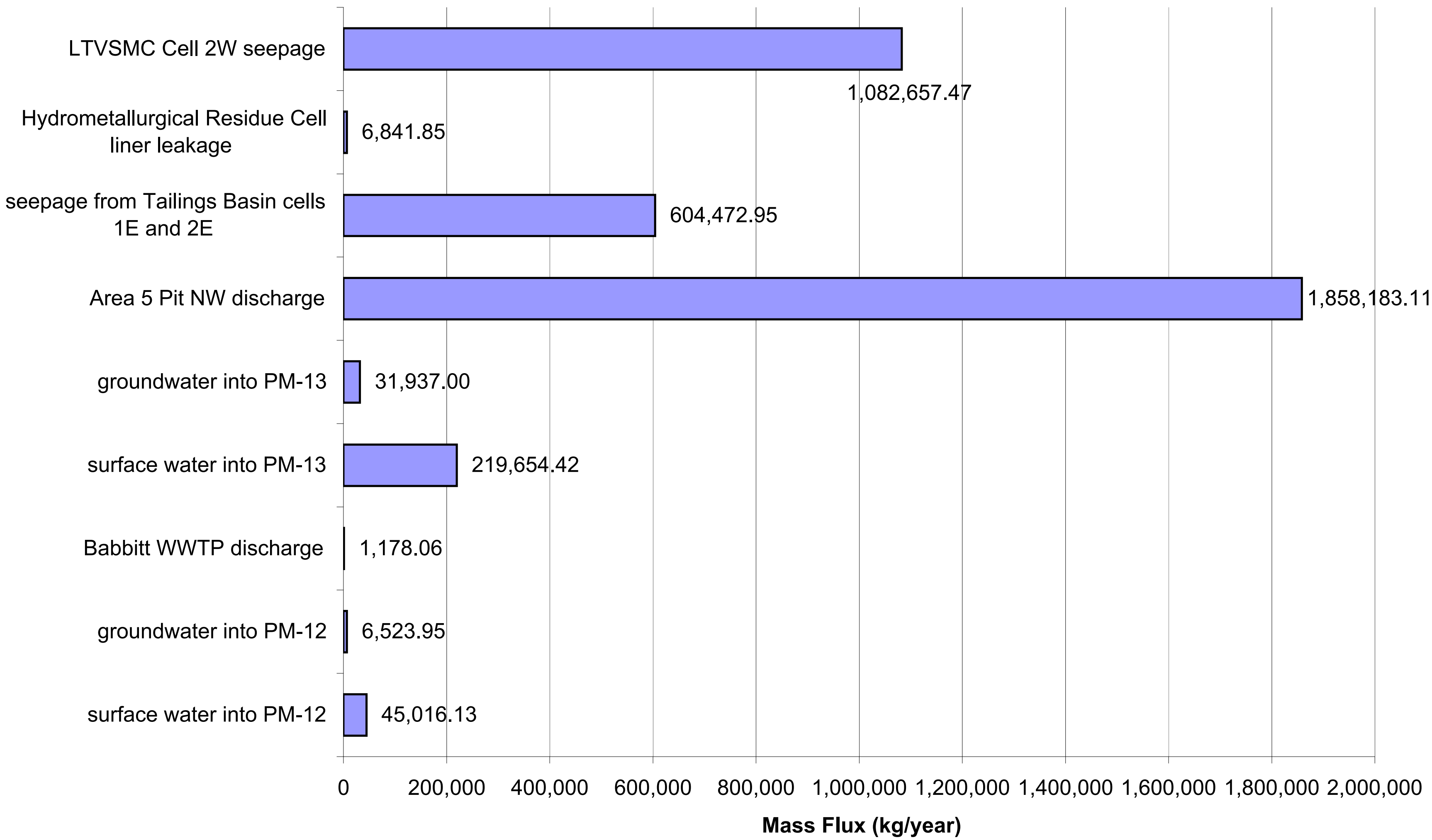



Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)
LTVSMC Cell 2W seepage
112,729.85
Hydrometallurgical Residue Cell liner leakage
6,841.85
seepage from Tailings Basin cells 1E and 2E
62,939.71
Area 5 Pit NW discharge
-
groundwater into PM-13
31,937.00
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwater into PM-12
6,523.95
surface water into PM-12
-
0
20,000
40,000
60,000
80,000
100,000
120,000
Mass Flux (kg/year)

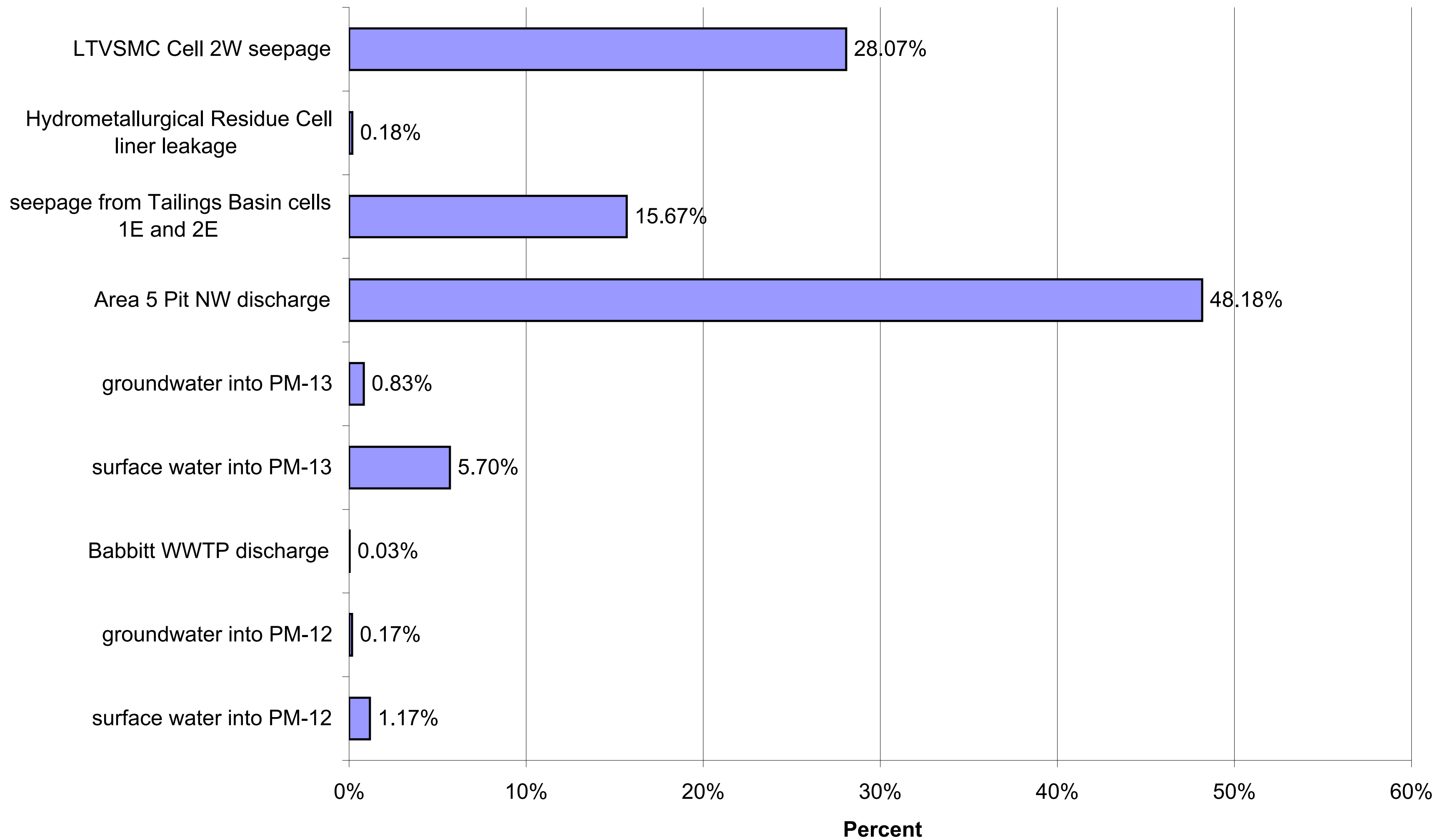
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Low Flow for Sulfate (SO_4)



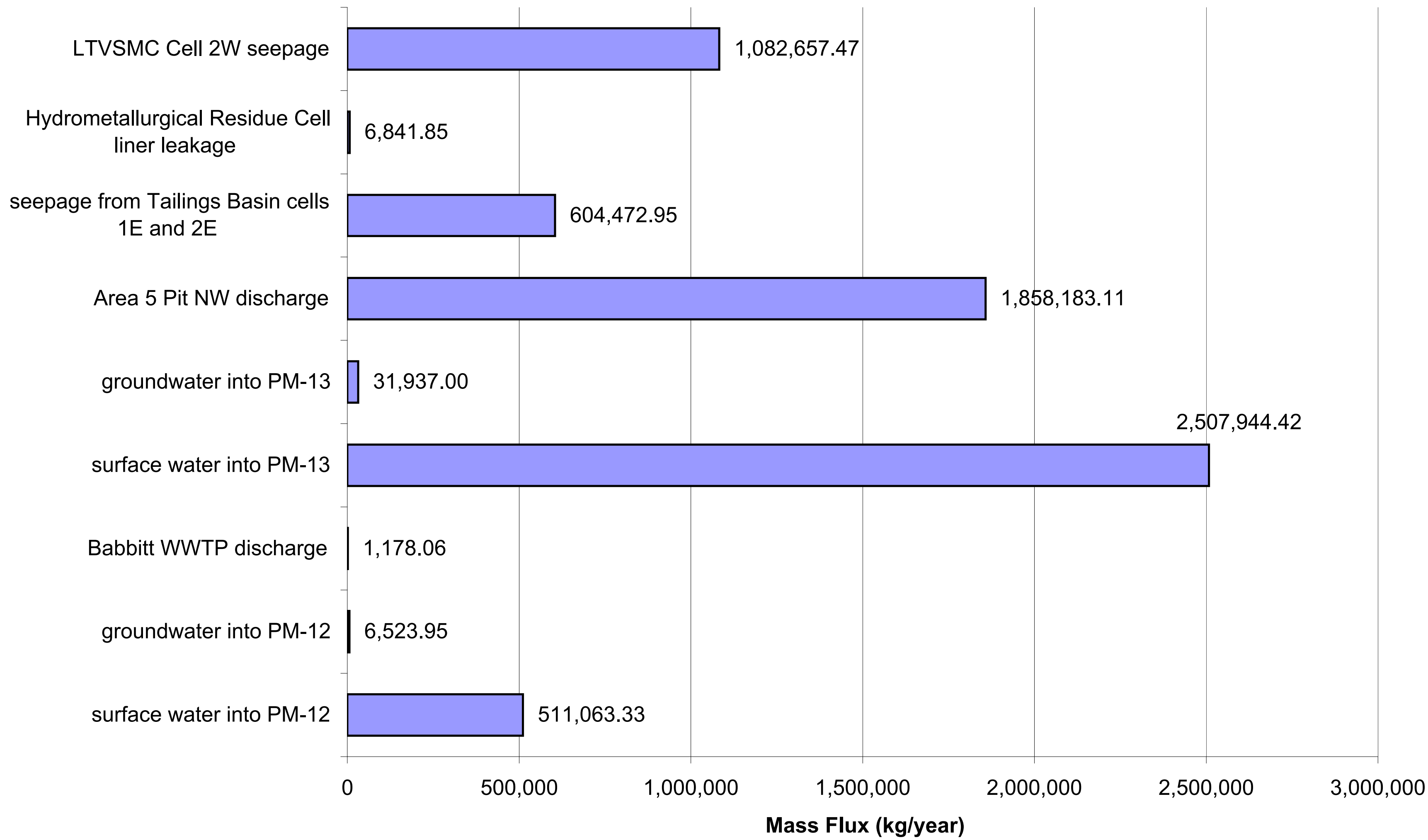
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)



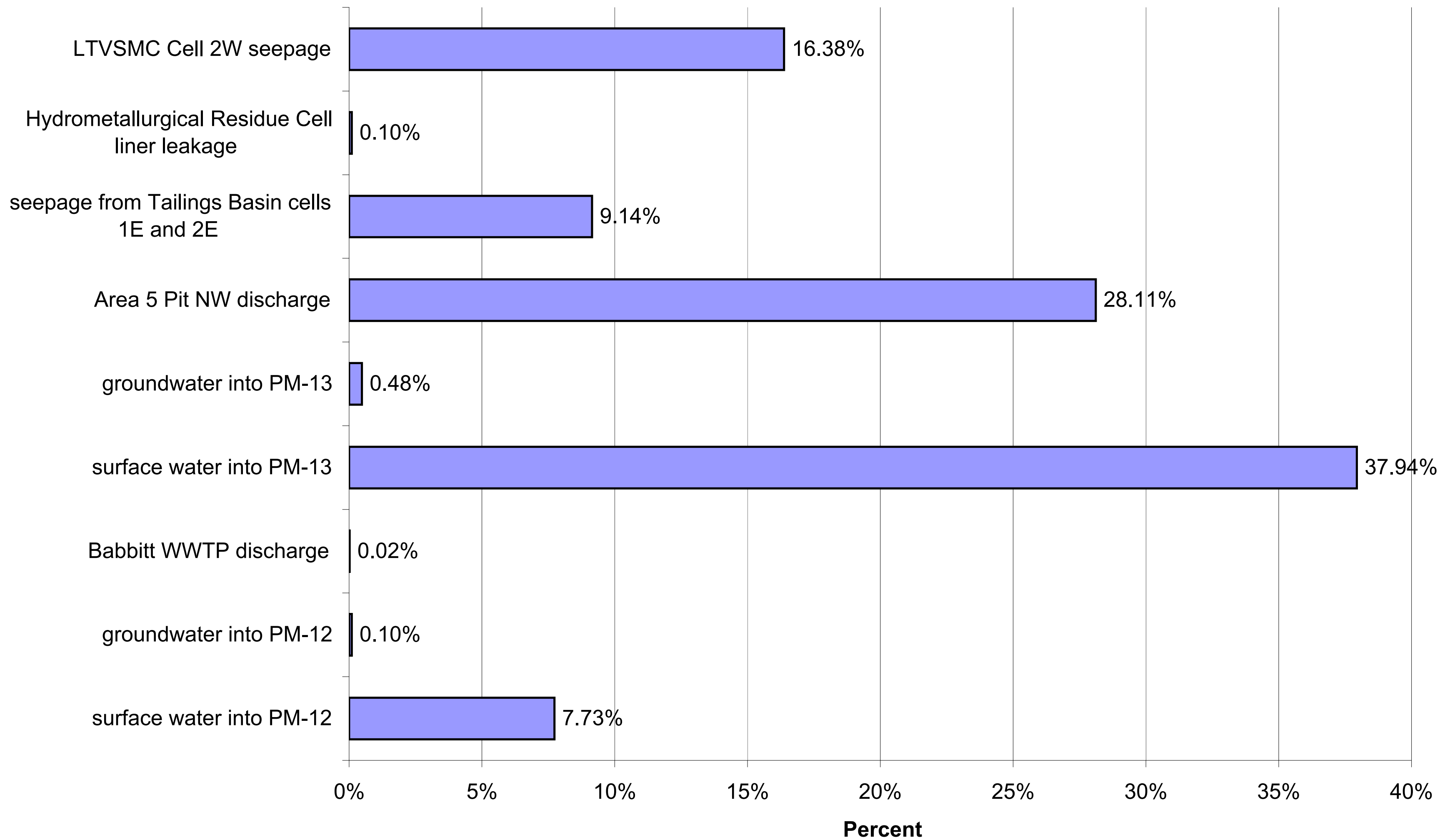
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for Average Flow for Sulfate (SO_4)



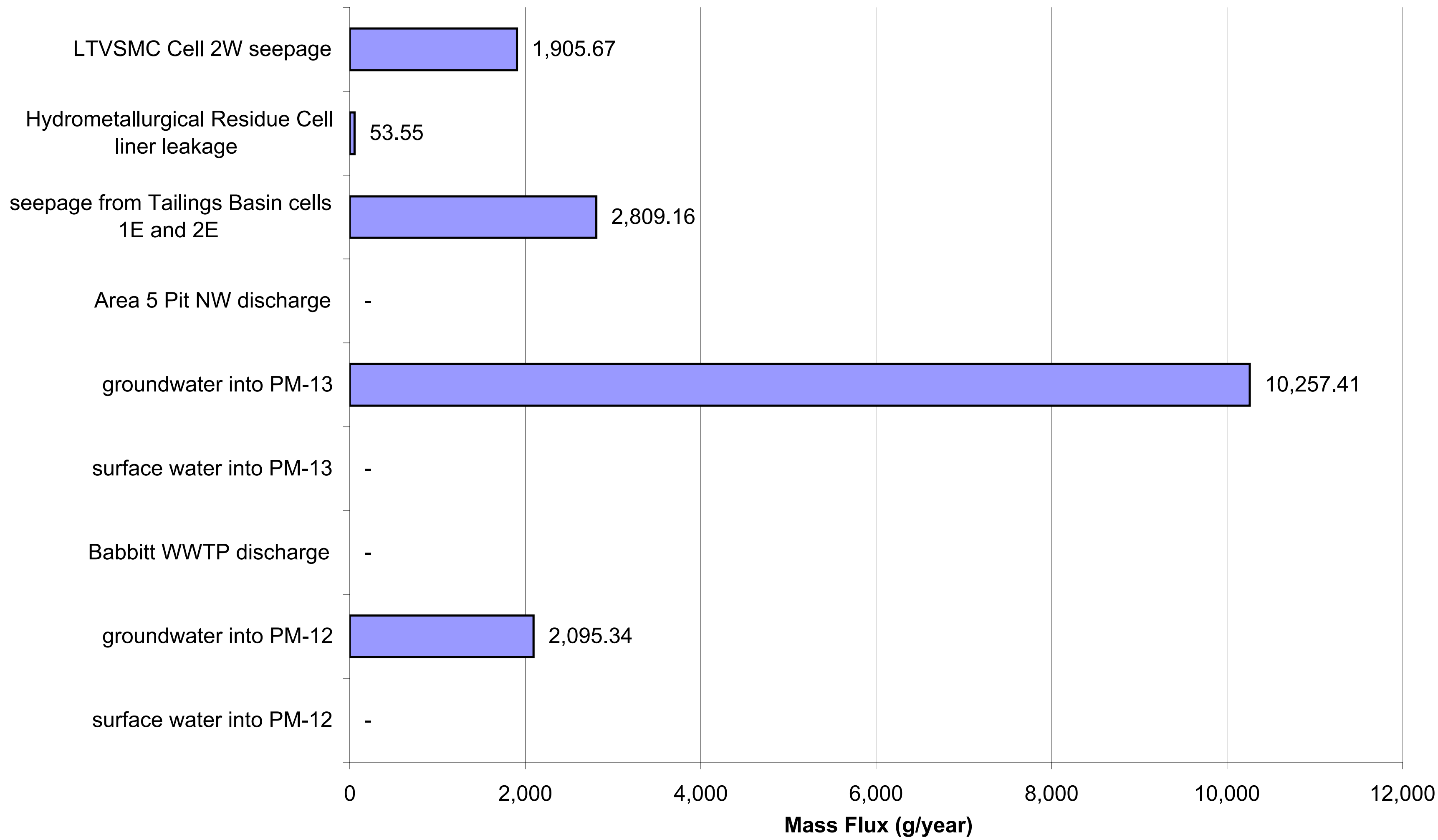
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)

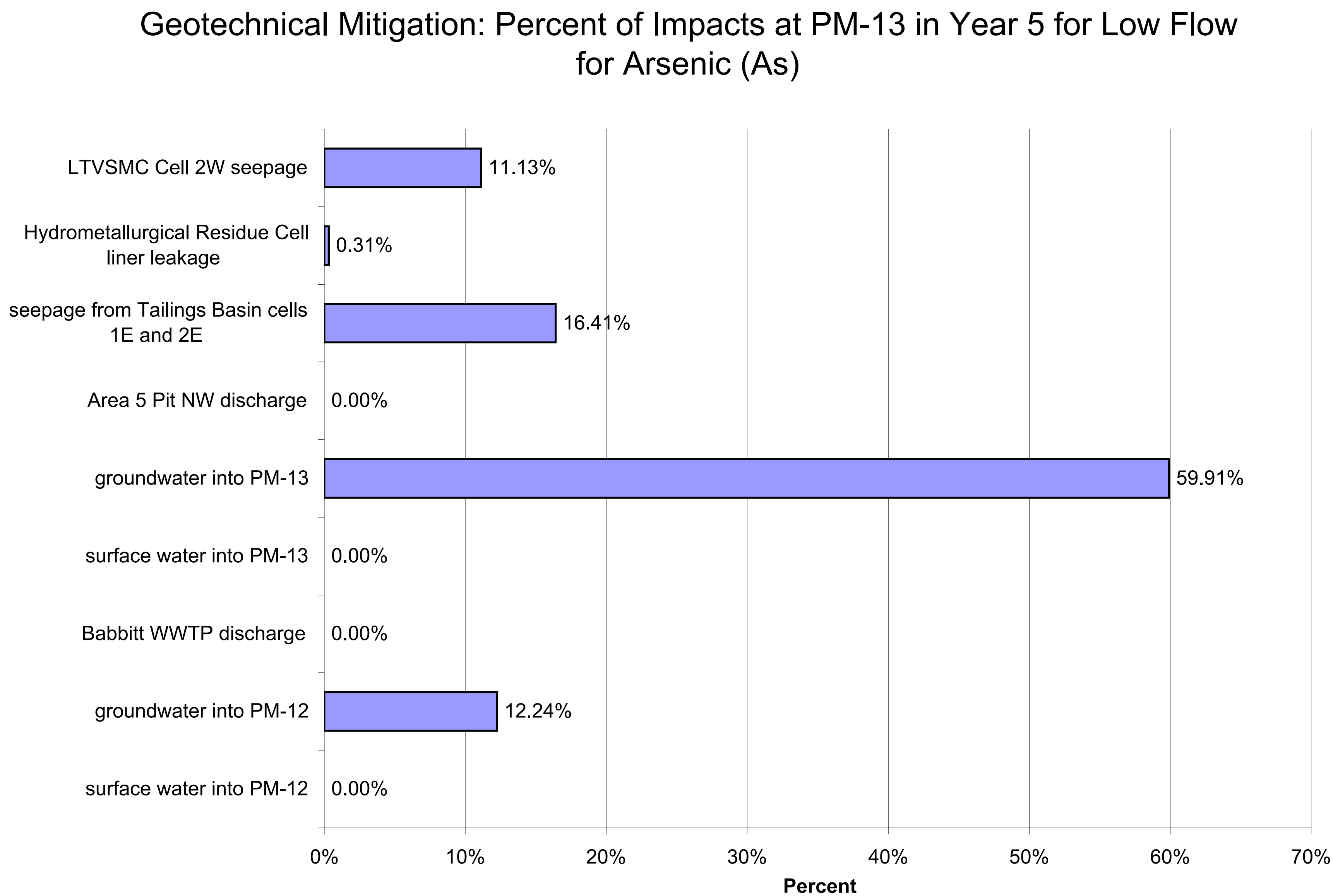


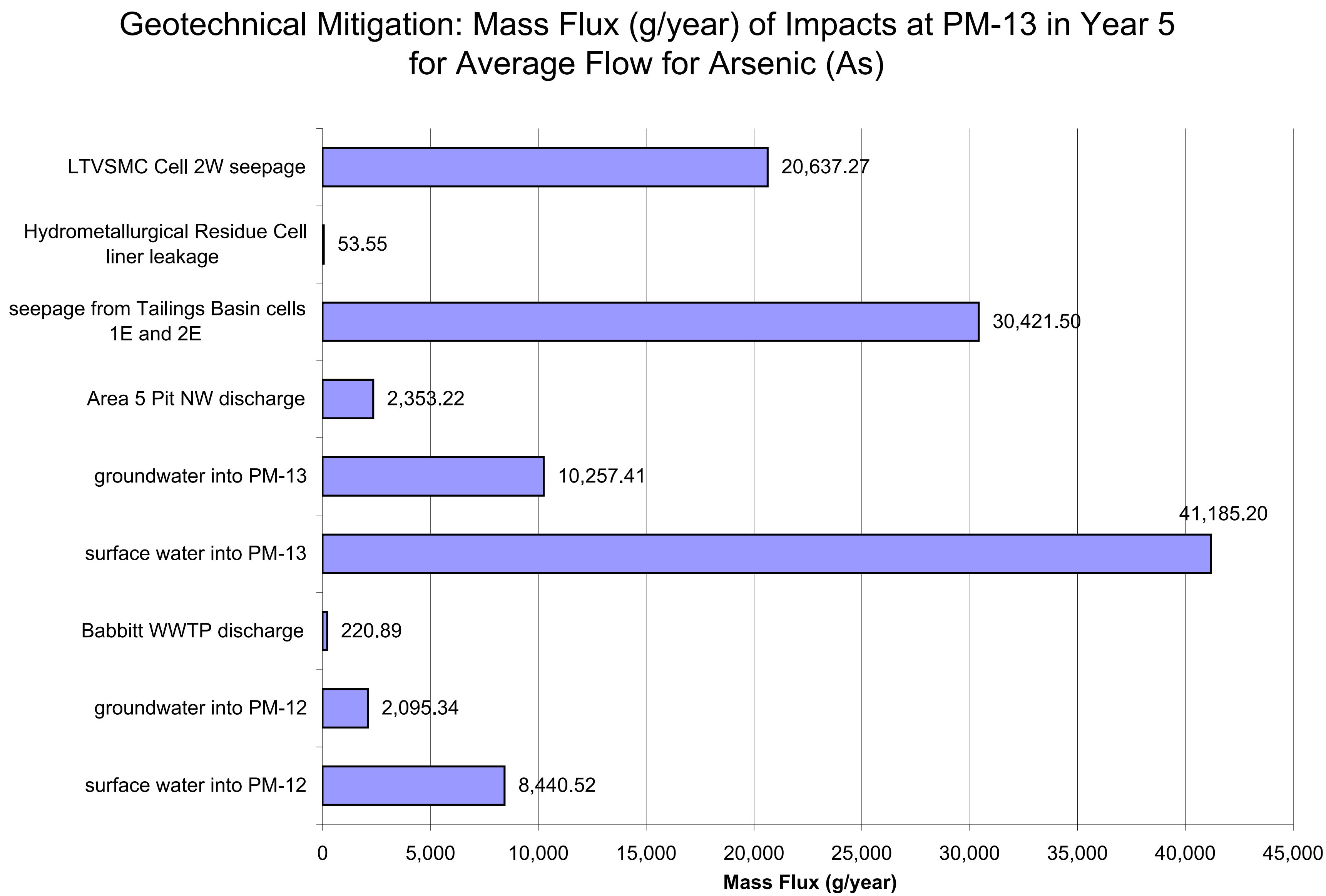
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 1 for High Flow for Sulfate (SO_4)

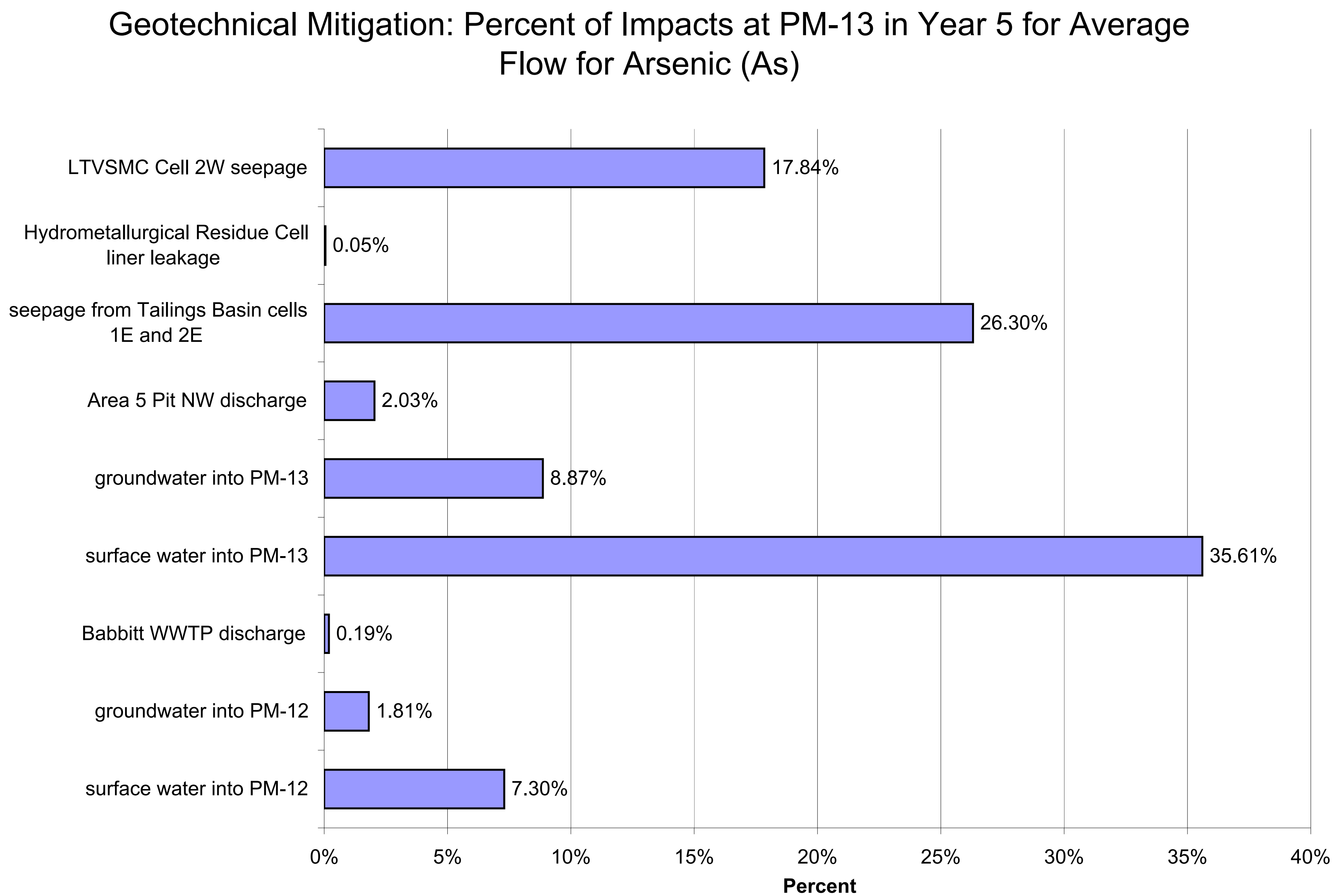


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)

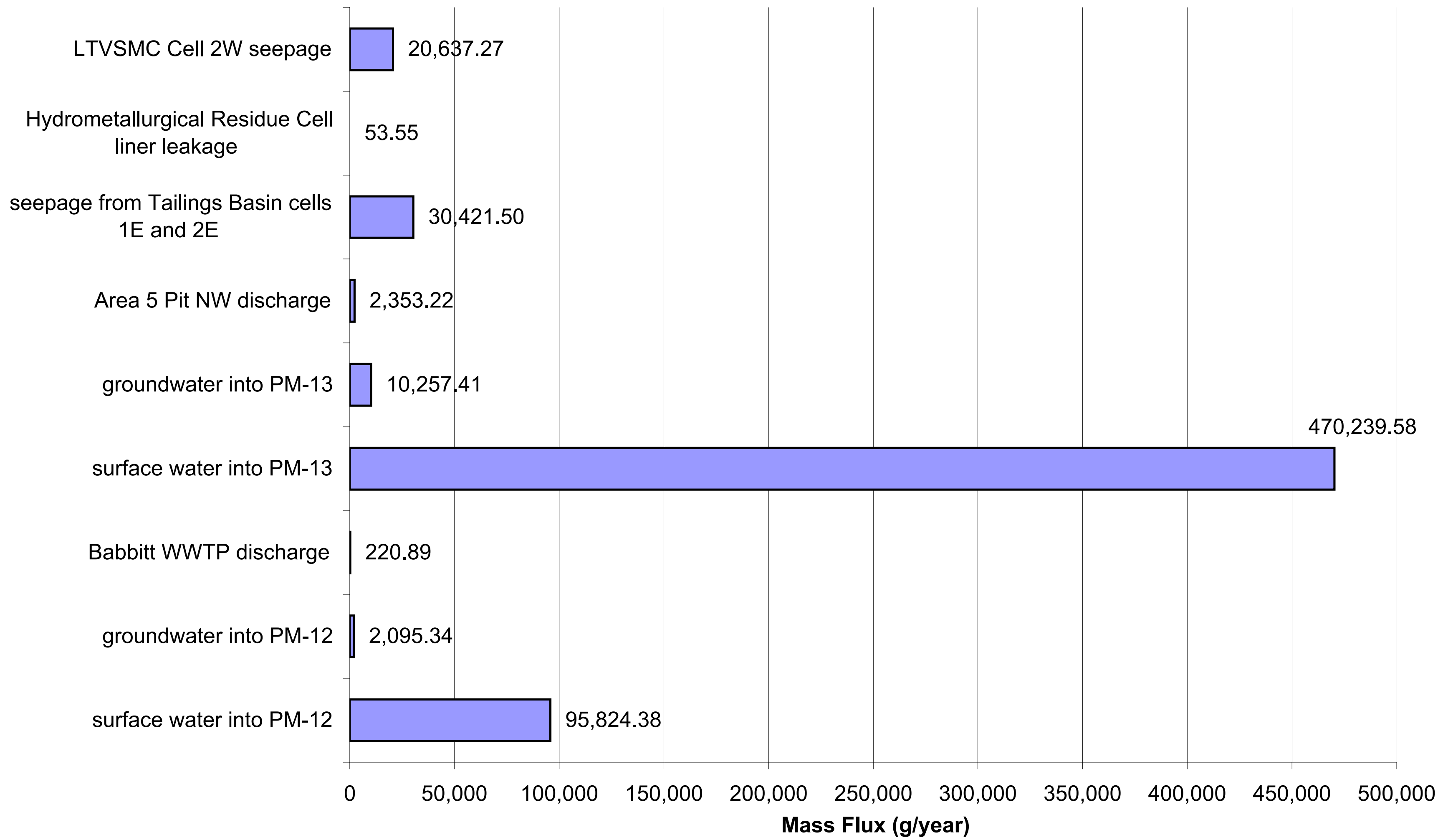


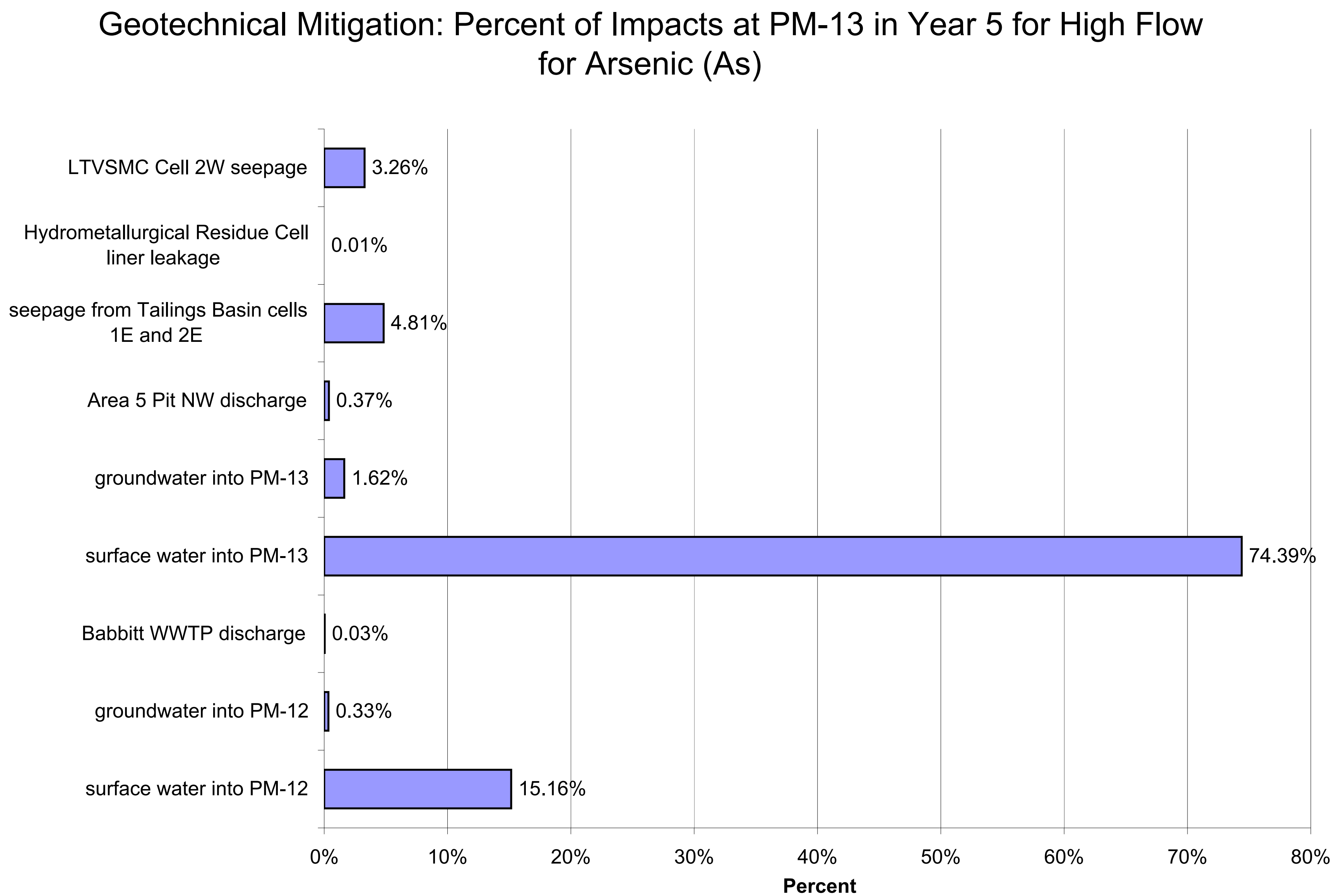

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
11.13%
Hydrometallurgical Residue Cell liner leakage
0.31%
seepage from Tailings Basin cells 1E and 2E
16.41%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
59.91%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.24%
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
20,637.27
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)

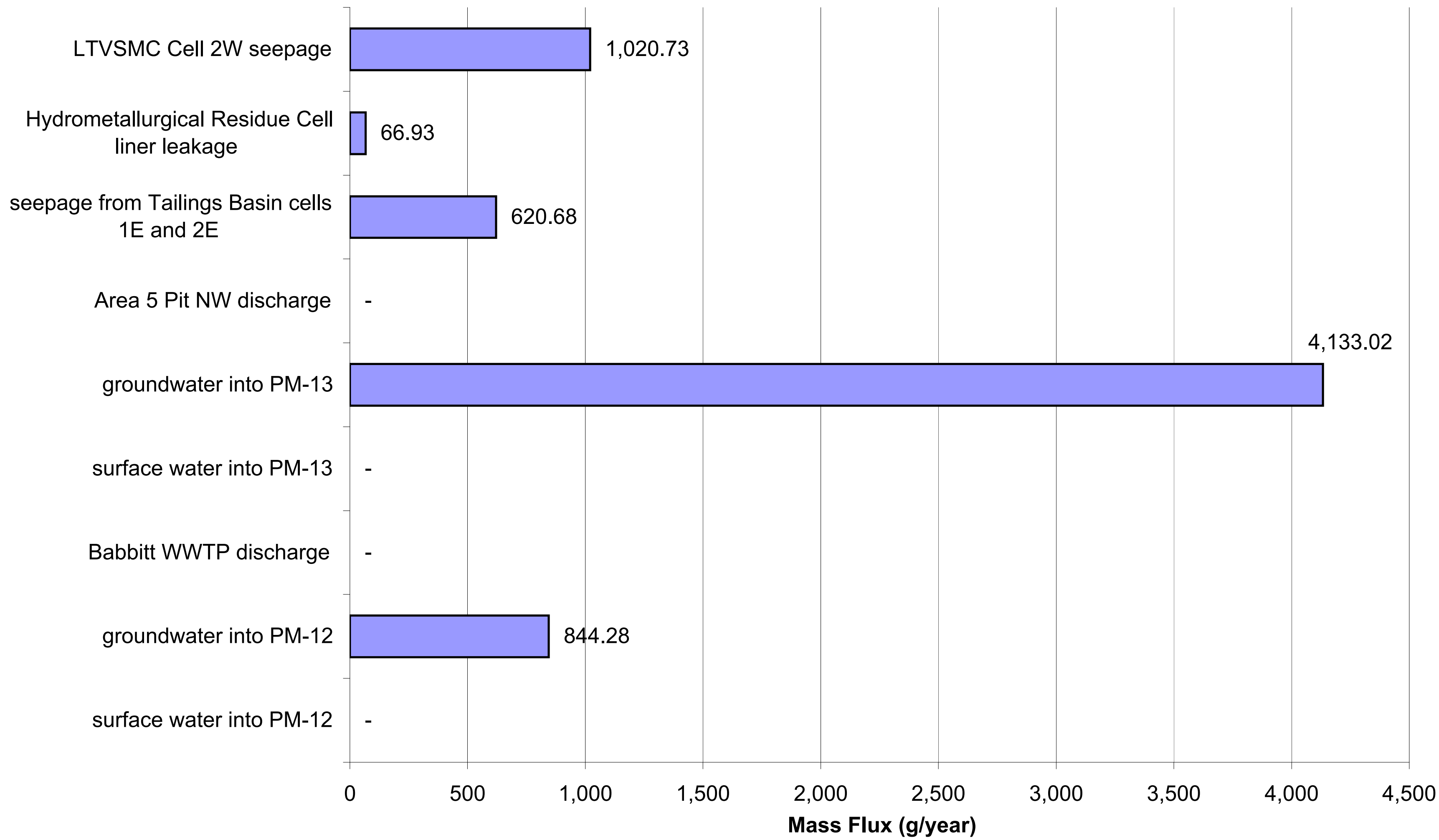

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
17.84%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
26.30%
Area 5 Pit NW discharge
2.03%
groundwater into PM-13
8.87%
surface water into PM-13
35.61%
Babbitt WWTP discharge
0.19%
groundwater into PM-12
1.81%
surface water into PM-12
7.30%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

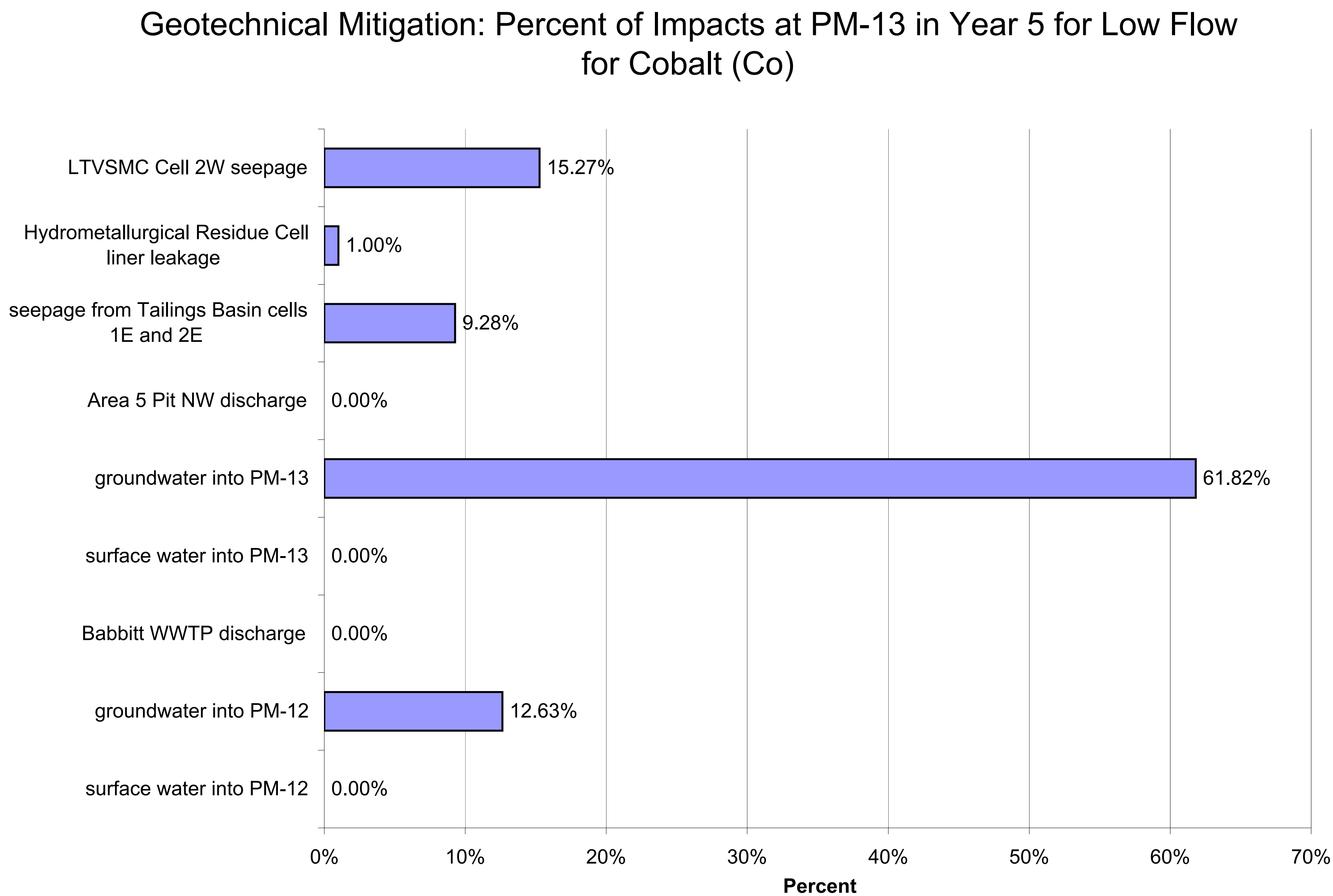
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)

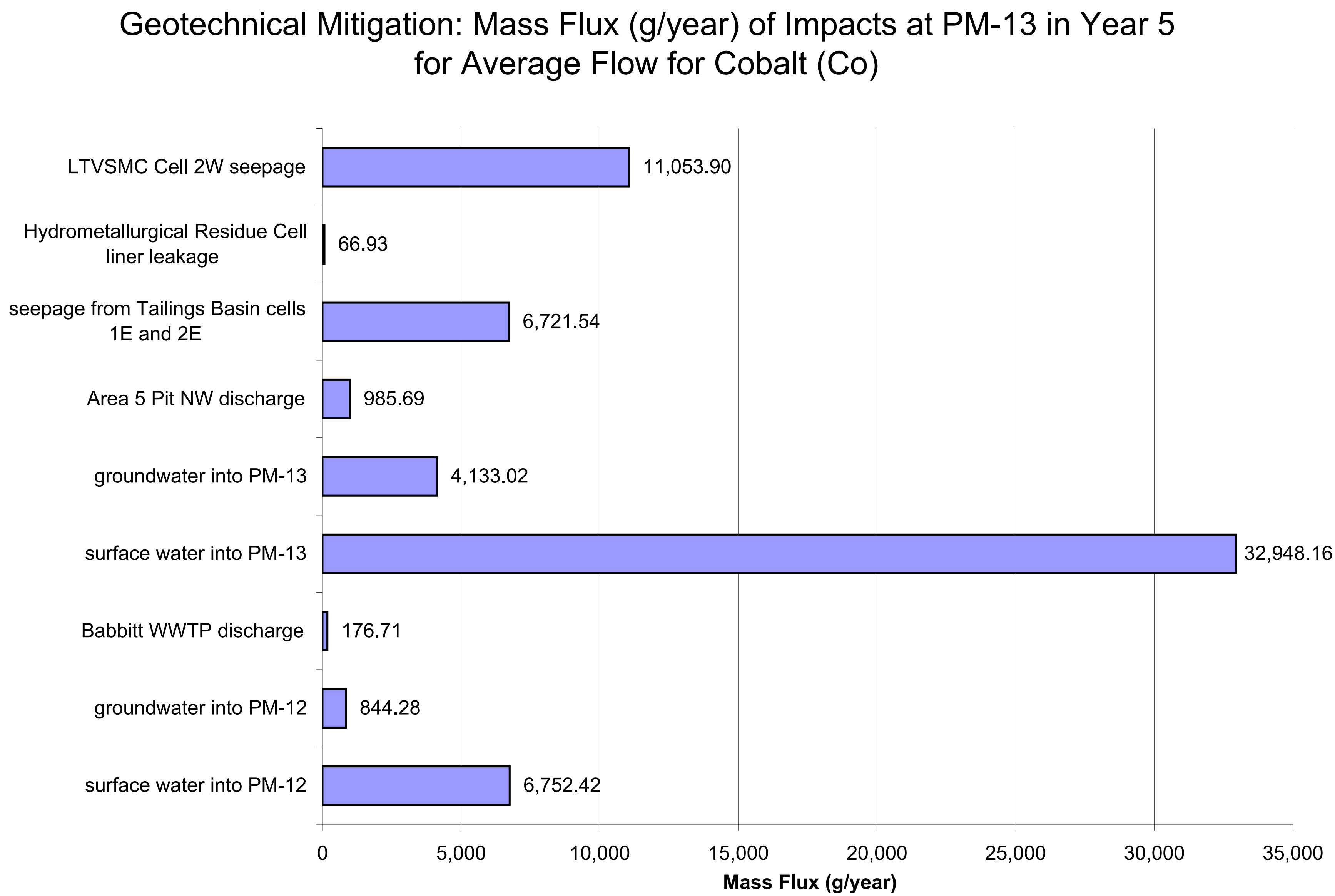



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.26%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
4.81%
Area 5 Pit NW discharge
0.37%
groundwater into PM-13
1.62%
surface water into PM-13
74.39%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.33%
surface water into PM-12
15.16%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

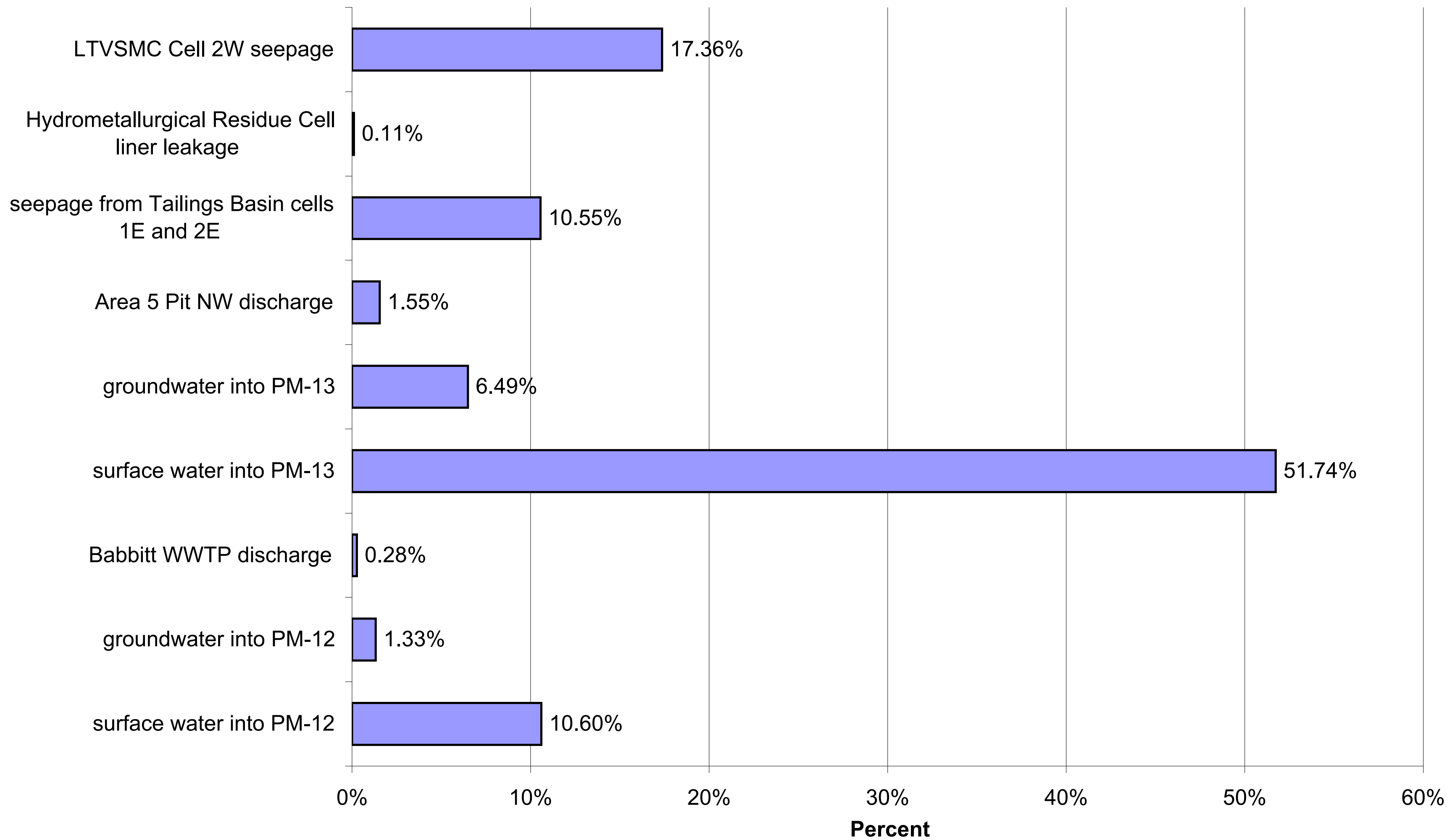
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)



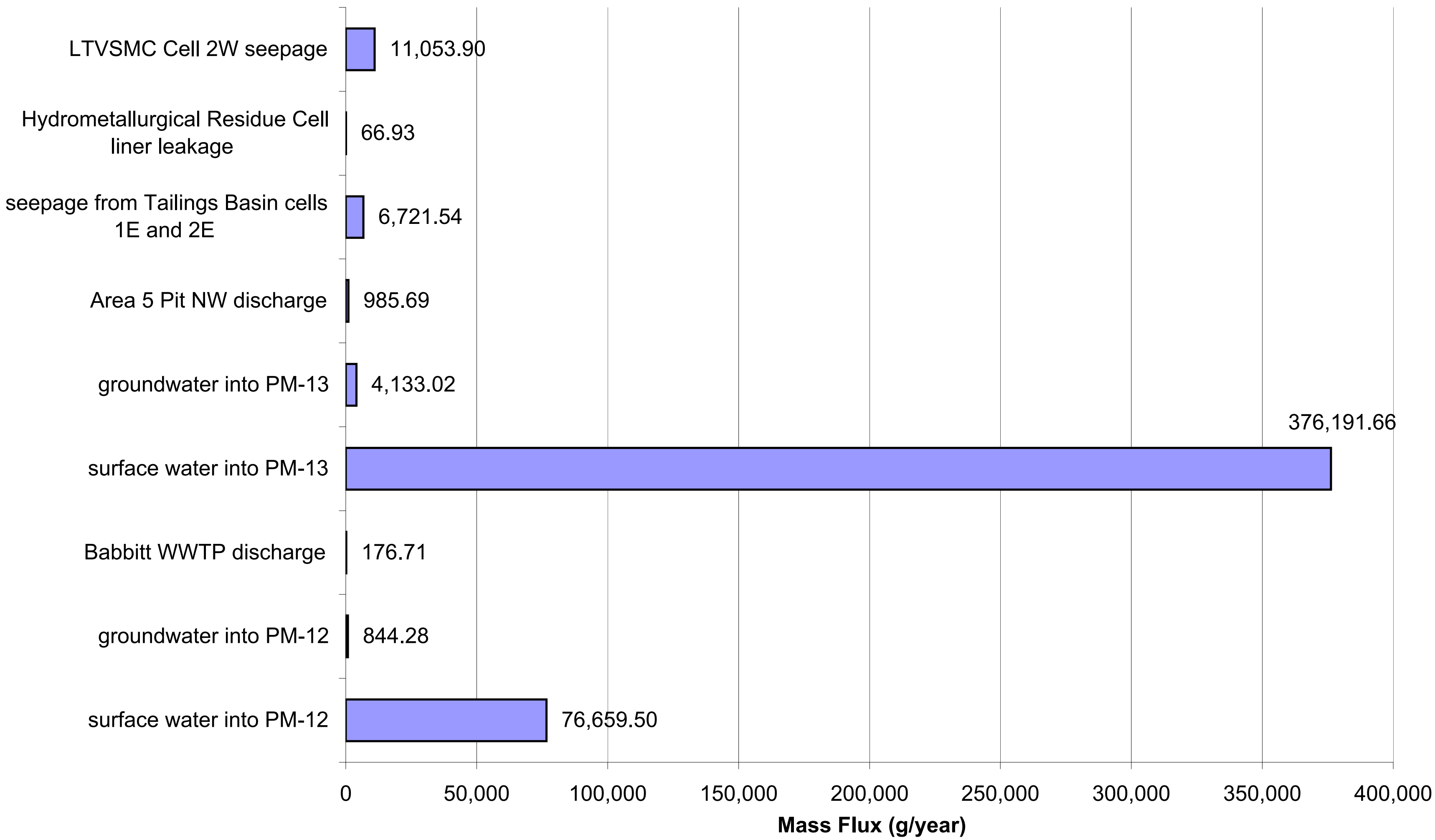

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
15.27%
Hydrometallurgical Residue Cell liner leakage
1.00%
seepage from Tailings Basin cells 1E and 2E
9.28%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
61.82%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.63%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

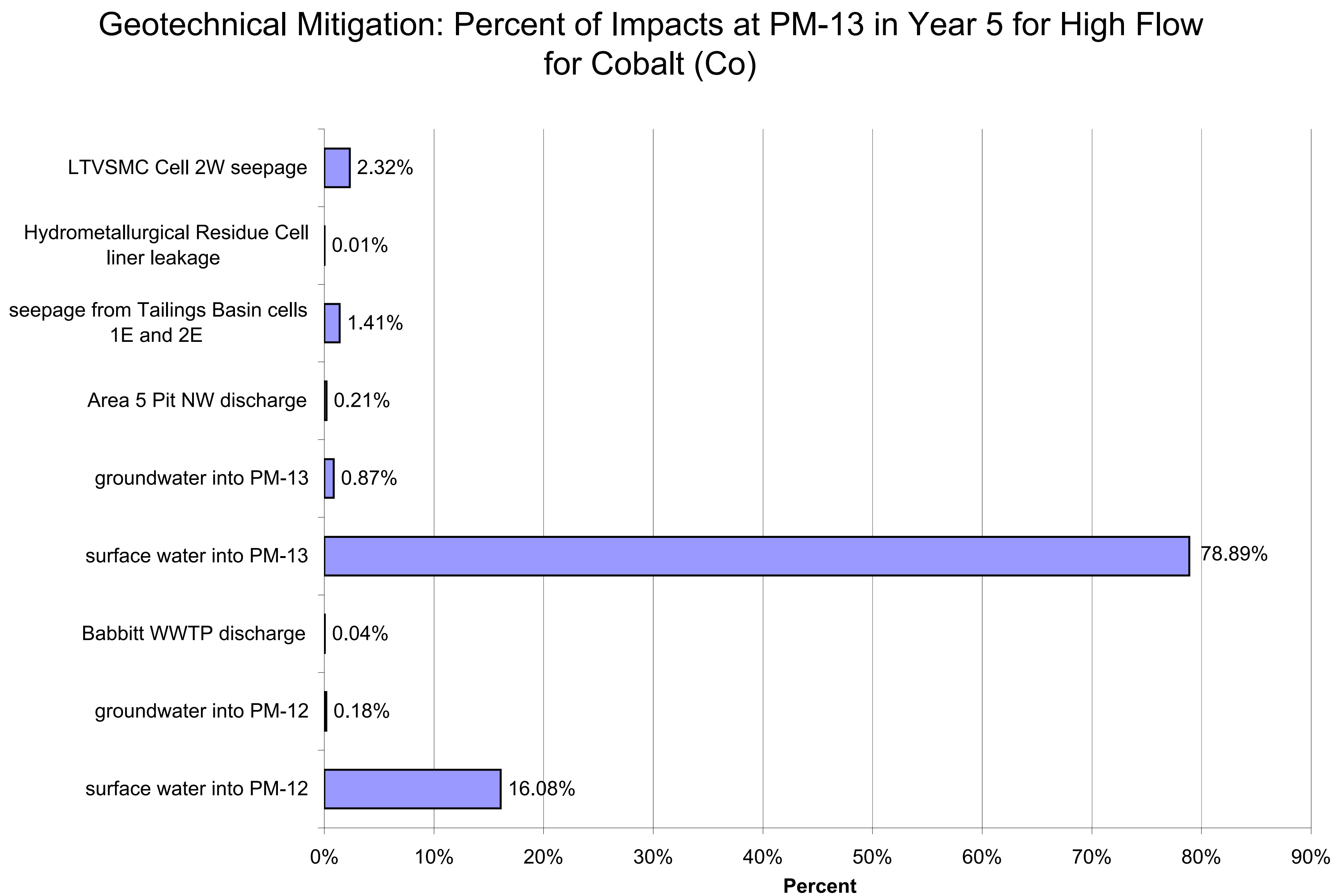

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
11,053.90
Hydrometallurgical Residue Cell liner leakage
66.93
seepage from Tailings Basin cells 1E and 2E
6,721.54
Area 5 Pit NW discharge
985.69
groundwater into PM-13
4,133.02
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)

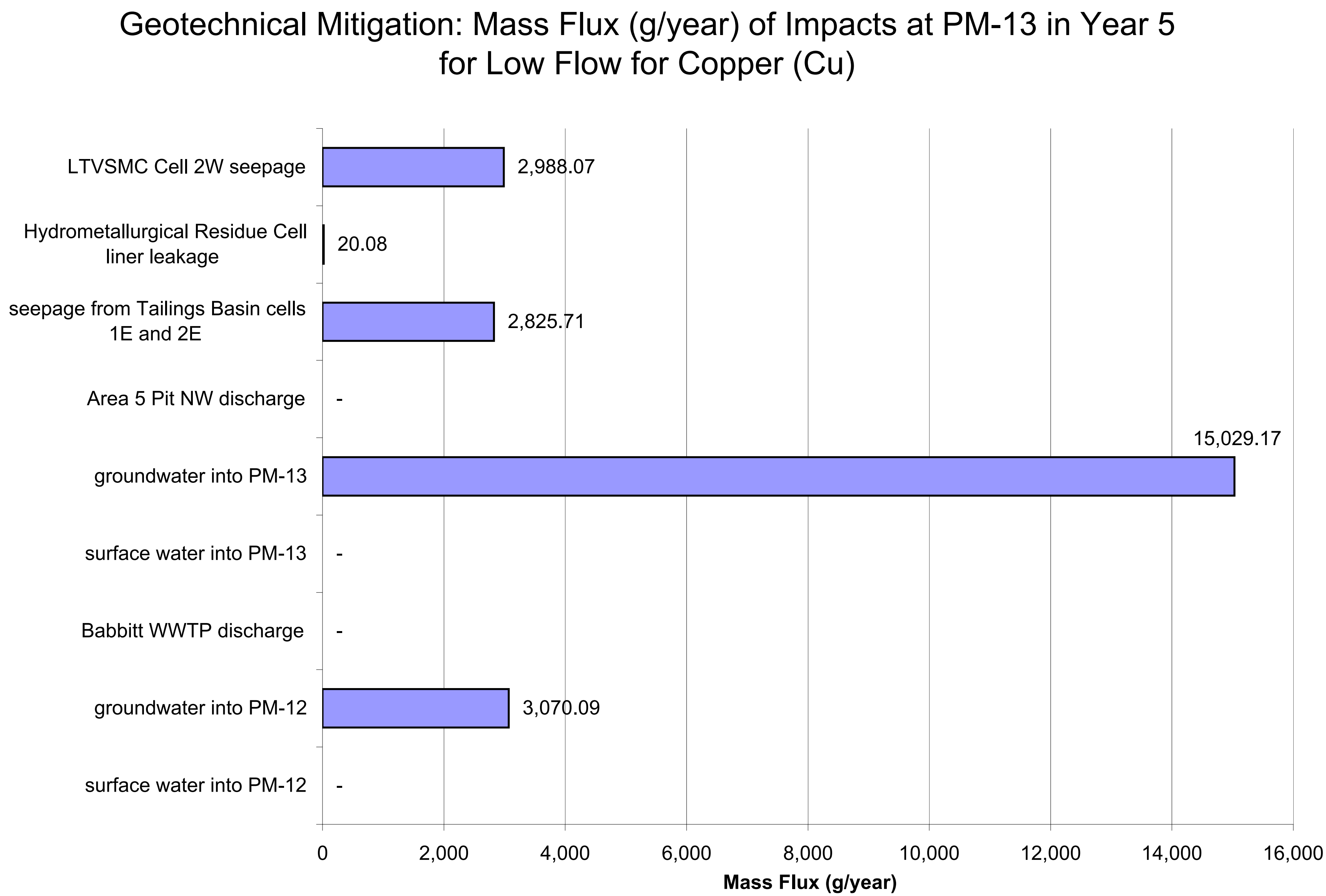
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Cobalt (Co)

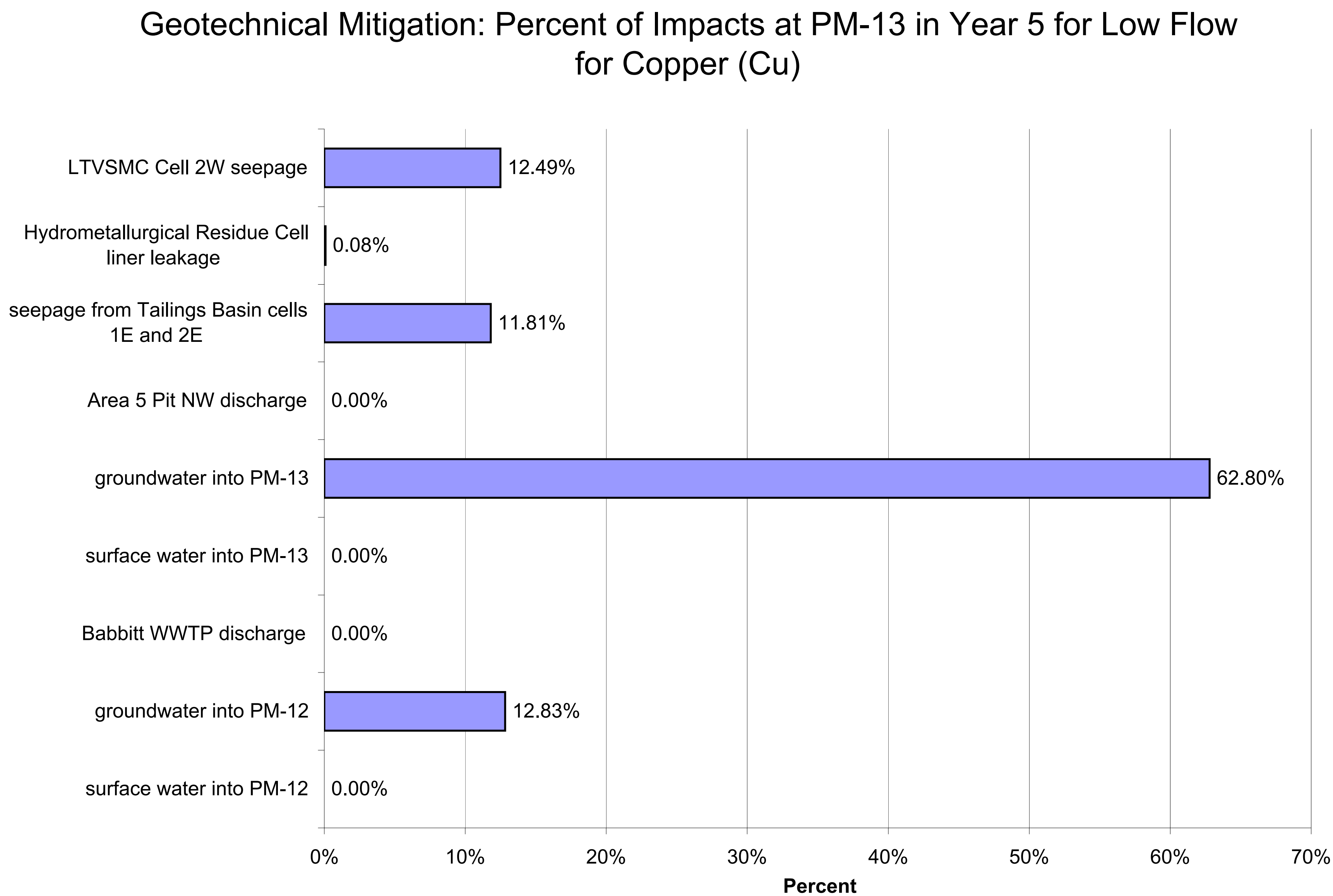


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)

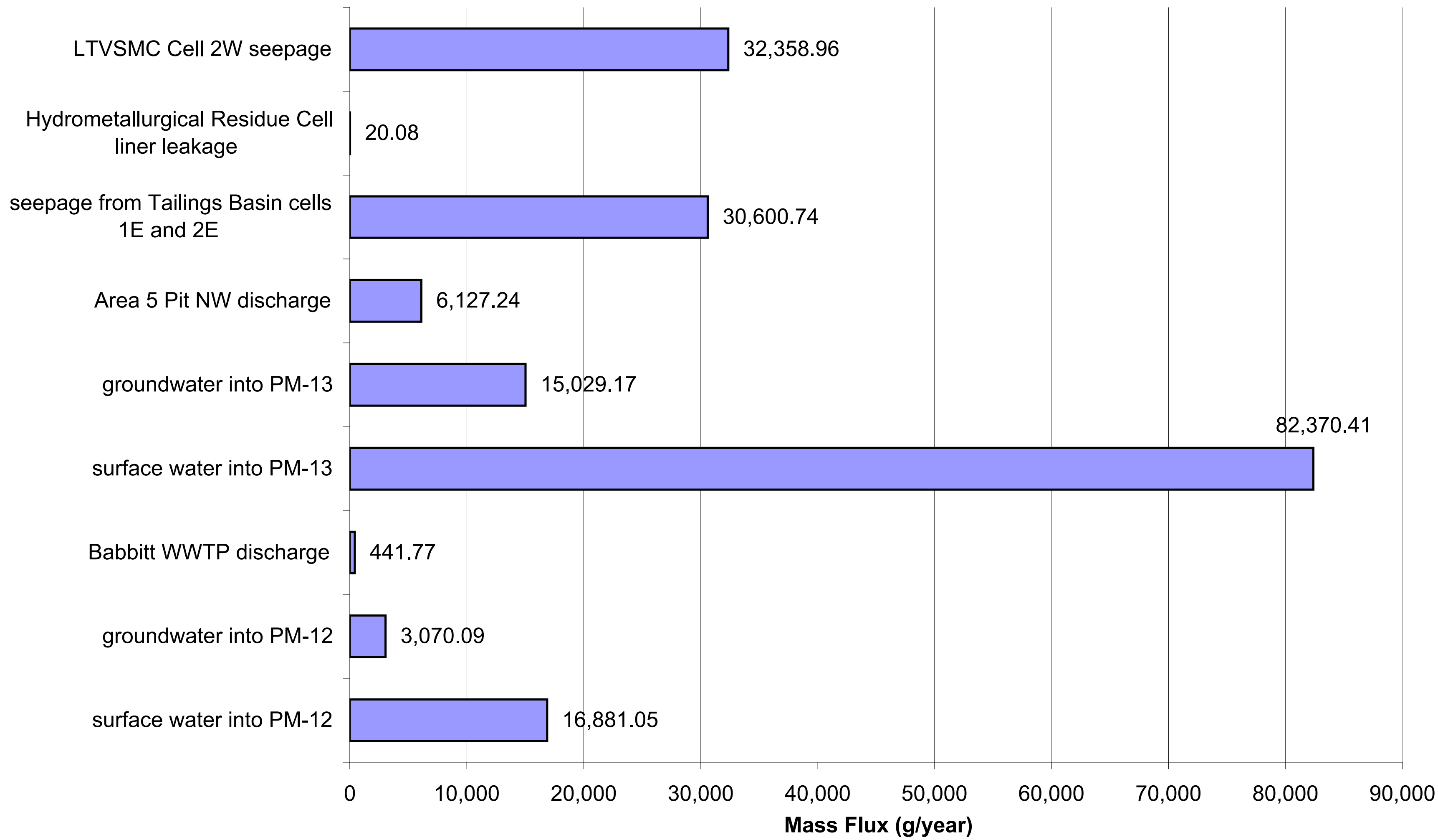


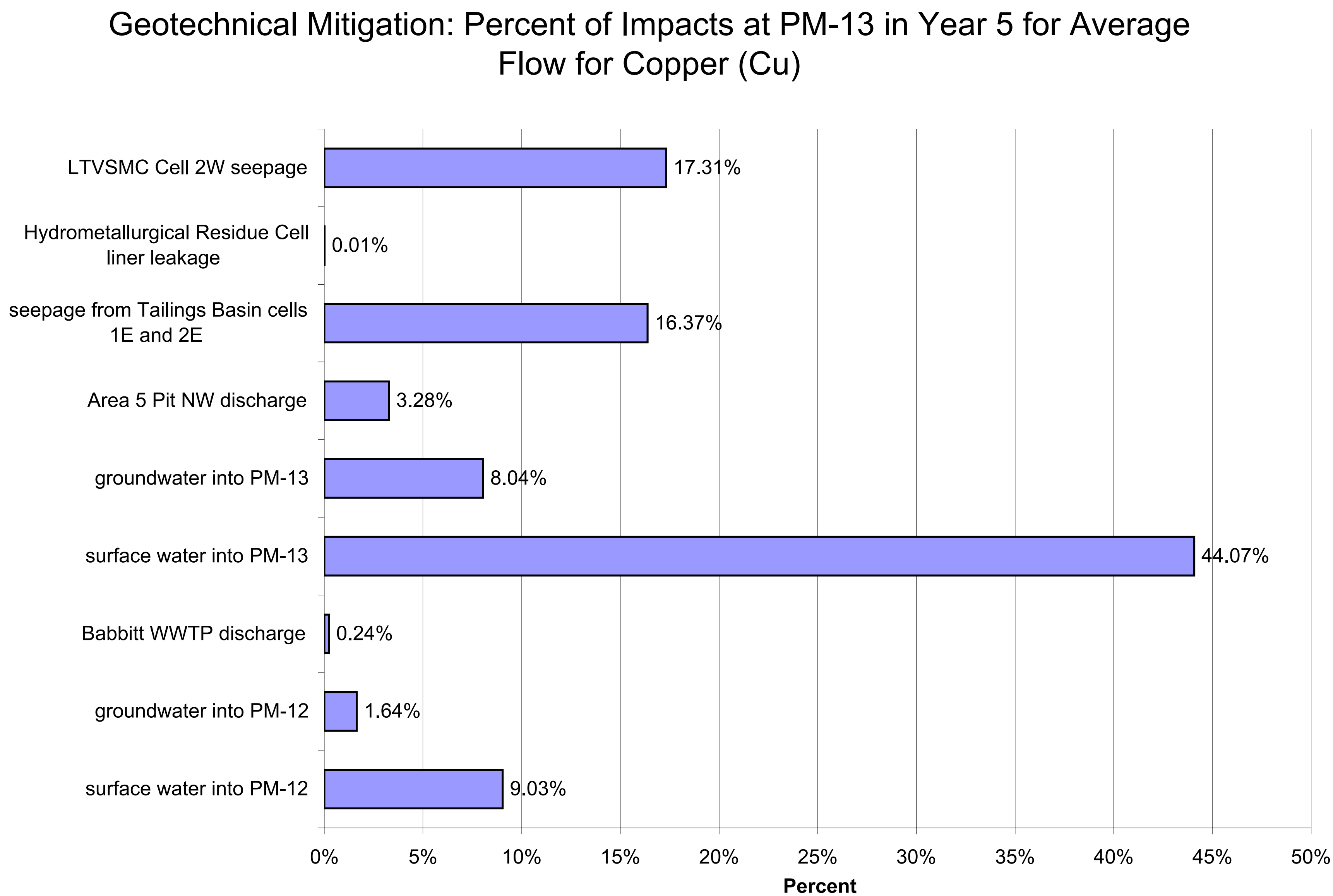

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
2.32%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
1.41%
Area 5 Pit NW discharge
0.21%
groundwater into PM-13
0.87%
surface water into PM-13
78.89%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.18%
surface water into PM-12
16.08%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

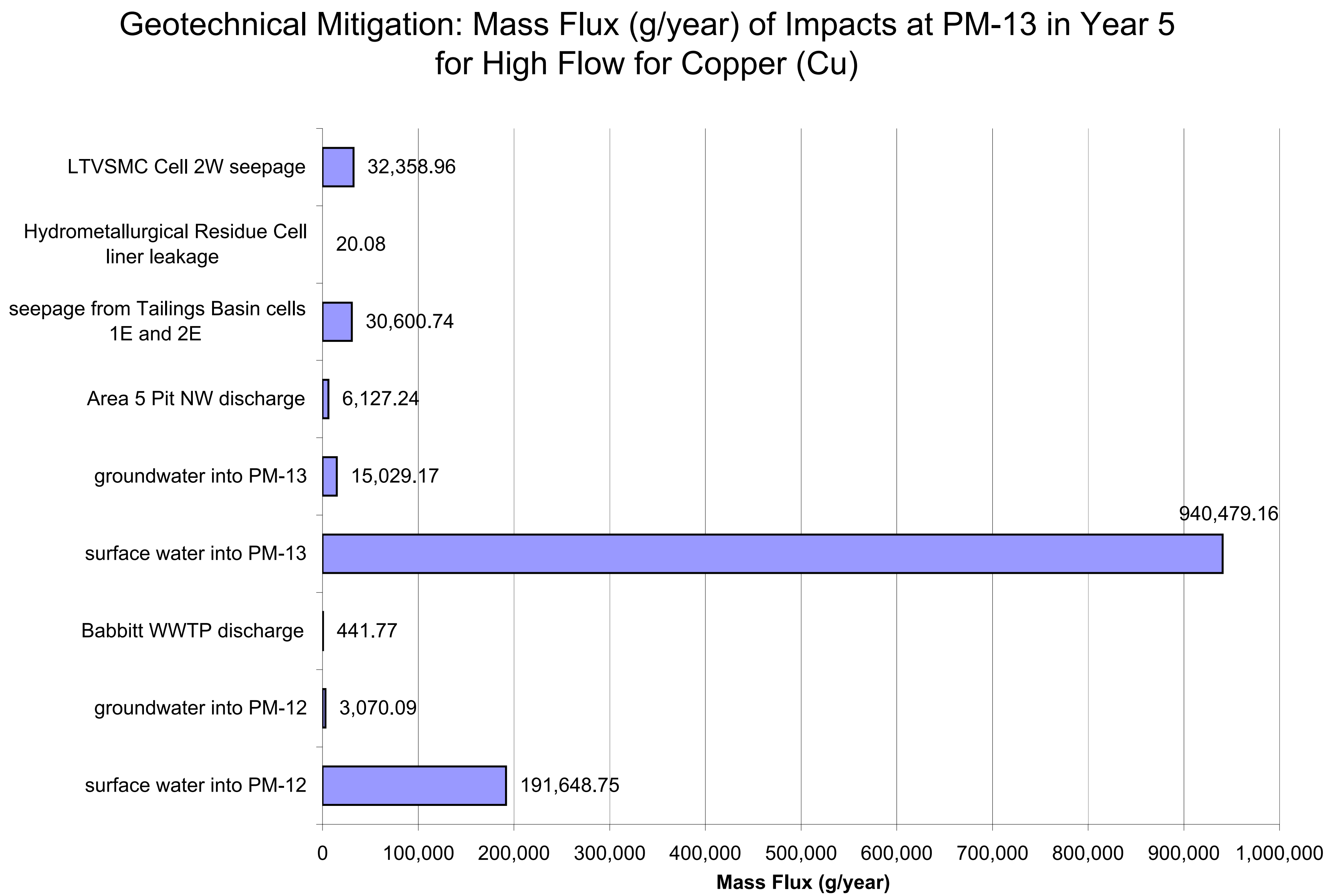

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
2,988.07
Hydrometallurgical Residue Cell liner leakage
20.08
seepage from Tailings Basin cells 1E and 2E
2,825.71
Area 5 Pit NW discharge
-
groundwater into PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwater into PM-12
3,070.09
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)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
12.49%
Hydrometallurgical Residue Cell liner leakage
0.08%
seepage from Tailings Basin cells 1E and 2E
11.81%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
62.80%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
12.83%
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 Copper (Cu)

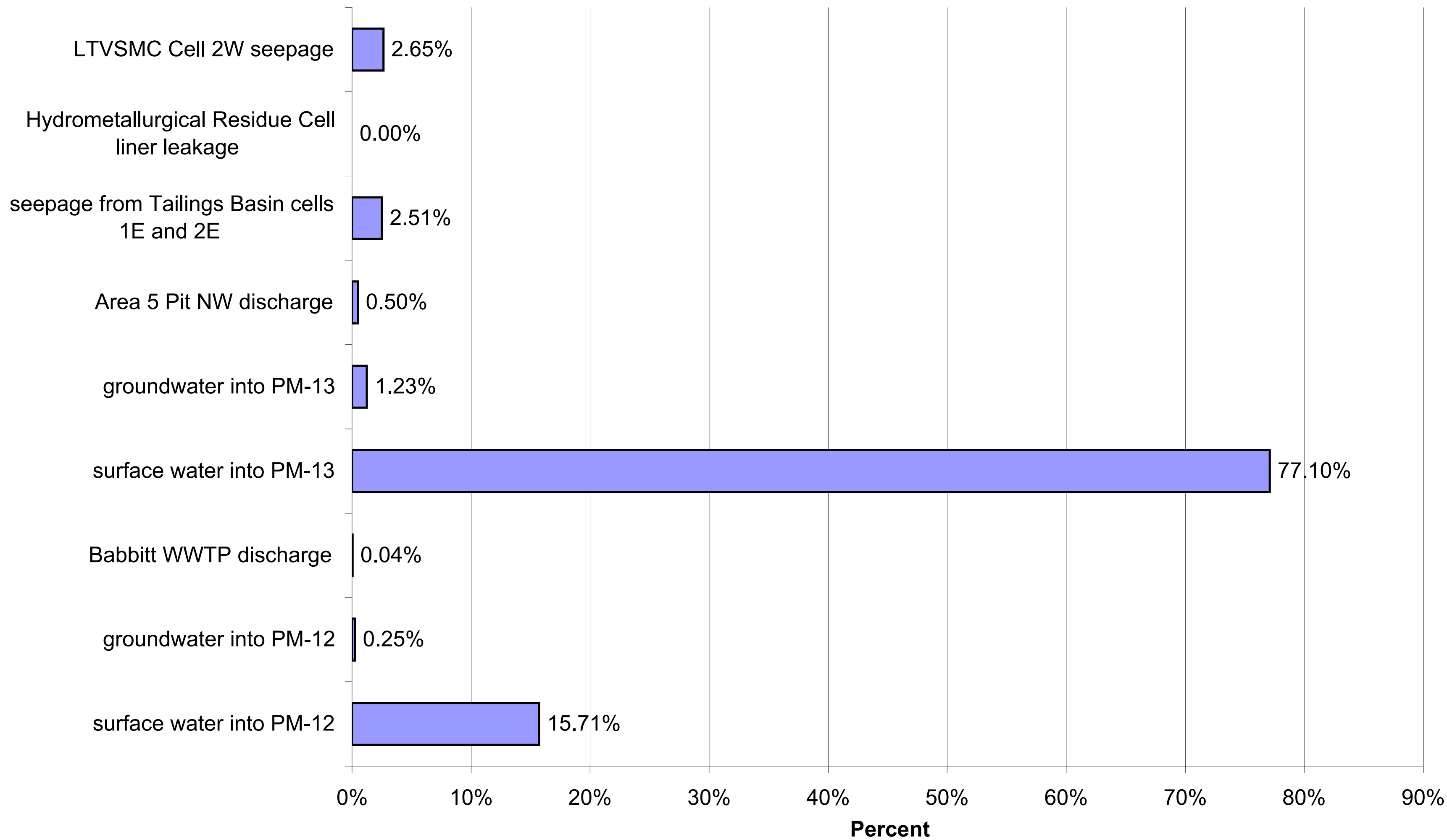


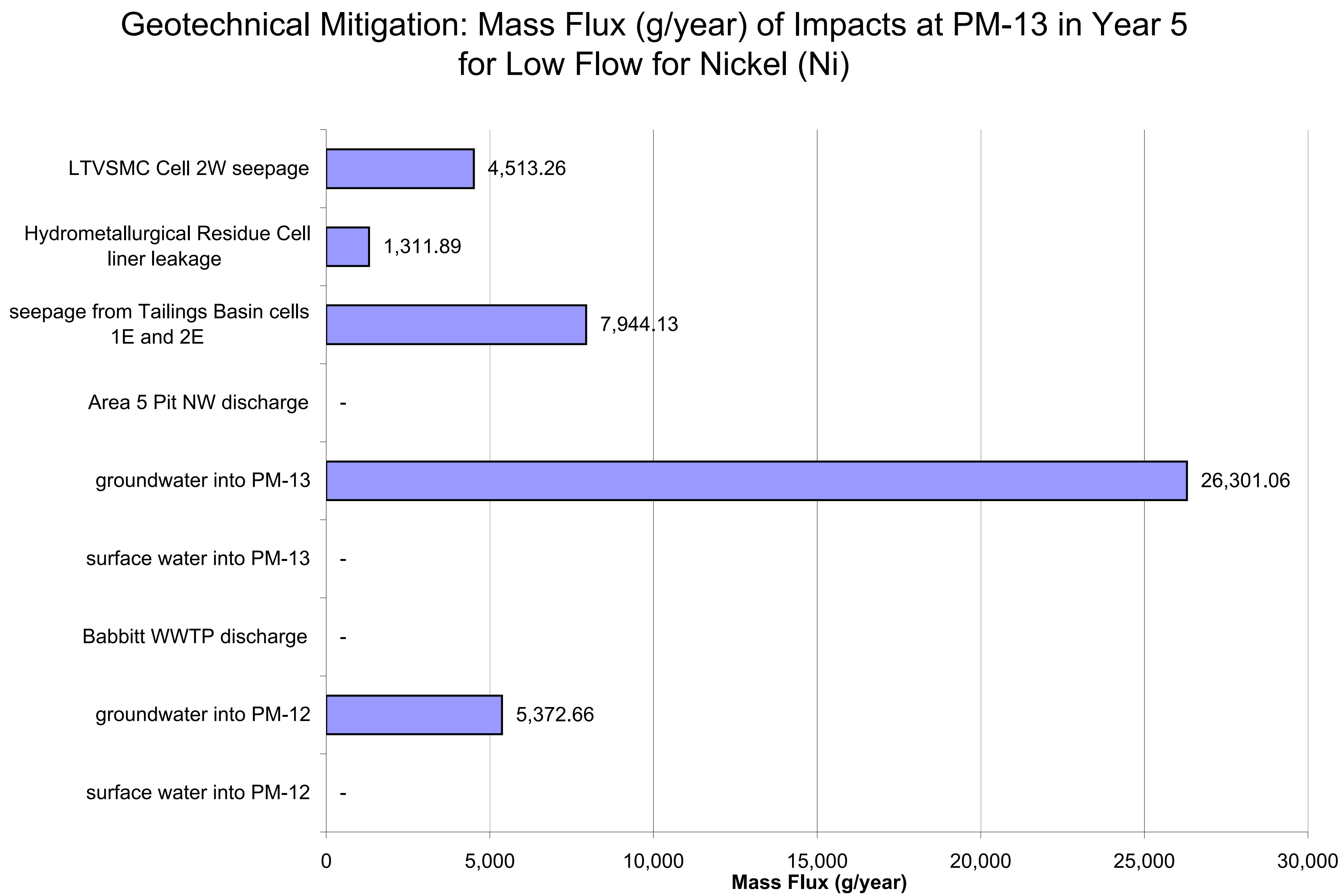

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
17.31%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
16.37%
Area 5 Pit NW discharge
3.28%
groundwater into PM-13
8.04%
surface water into PM-13
44.07%
Babbitt WWTP discharge
0.24%
groundwater into PM-12
1.64%
surface water into PM-12
9.03%
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 5 for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
32,358.96
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)

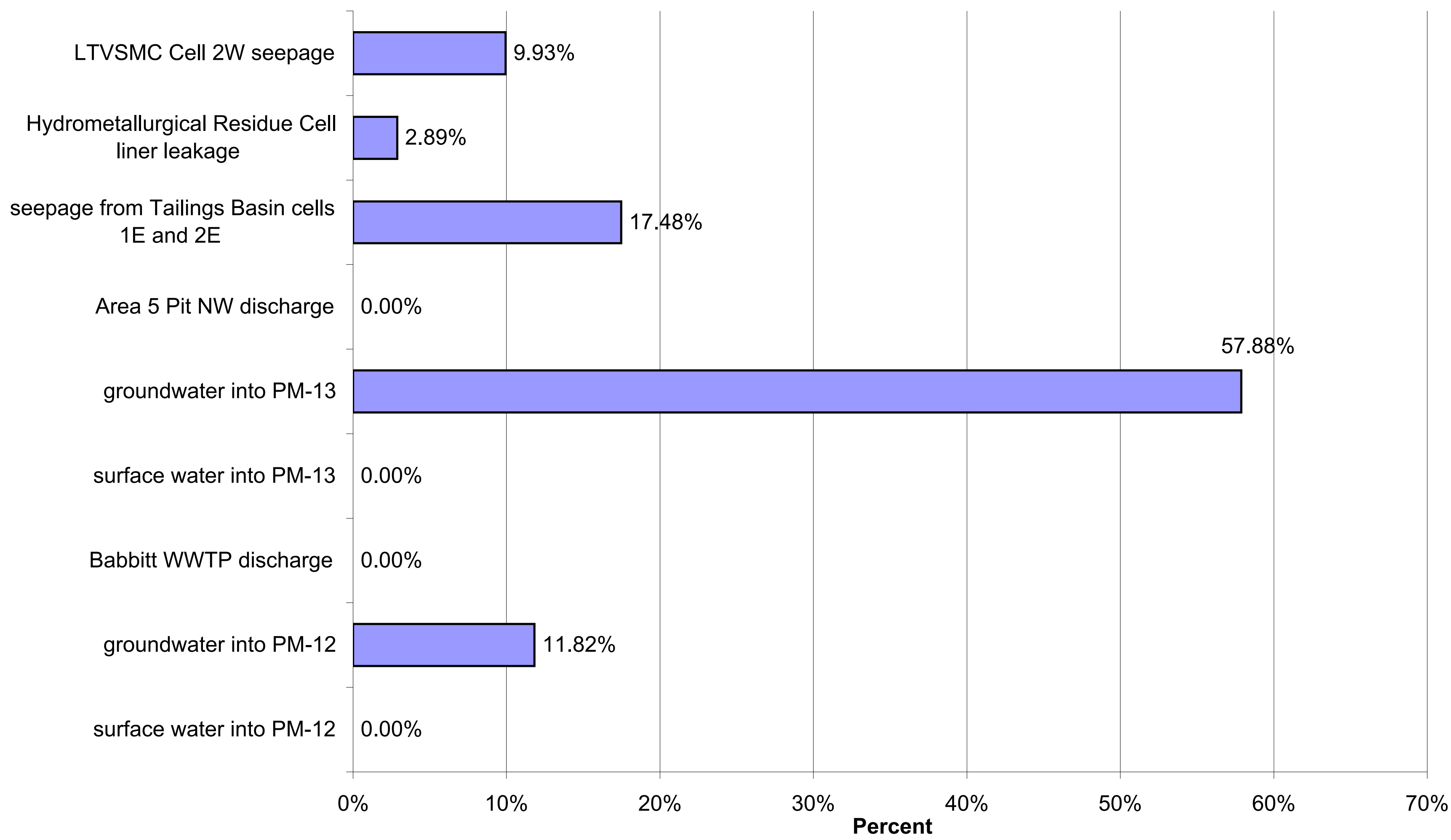
P:\Mpls\23 MN\69\2369862_MovedFromMpls_P\WO 015 EIS Rpts Studies\RS74 Water Quality Modeling\Model Predictions\Embarrass_v1_Mitigation\Sensitivity_Year5_TB_Mitigation
Cu, PM-13, high, percent

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Copper (Cu)

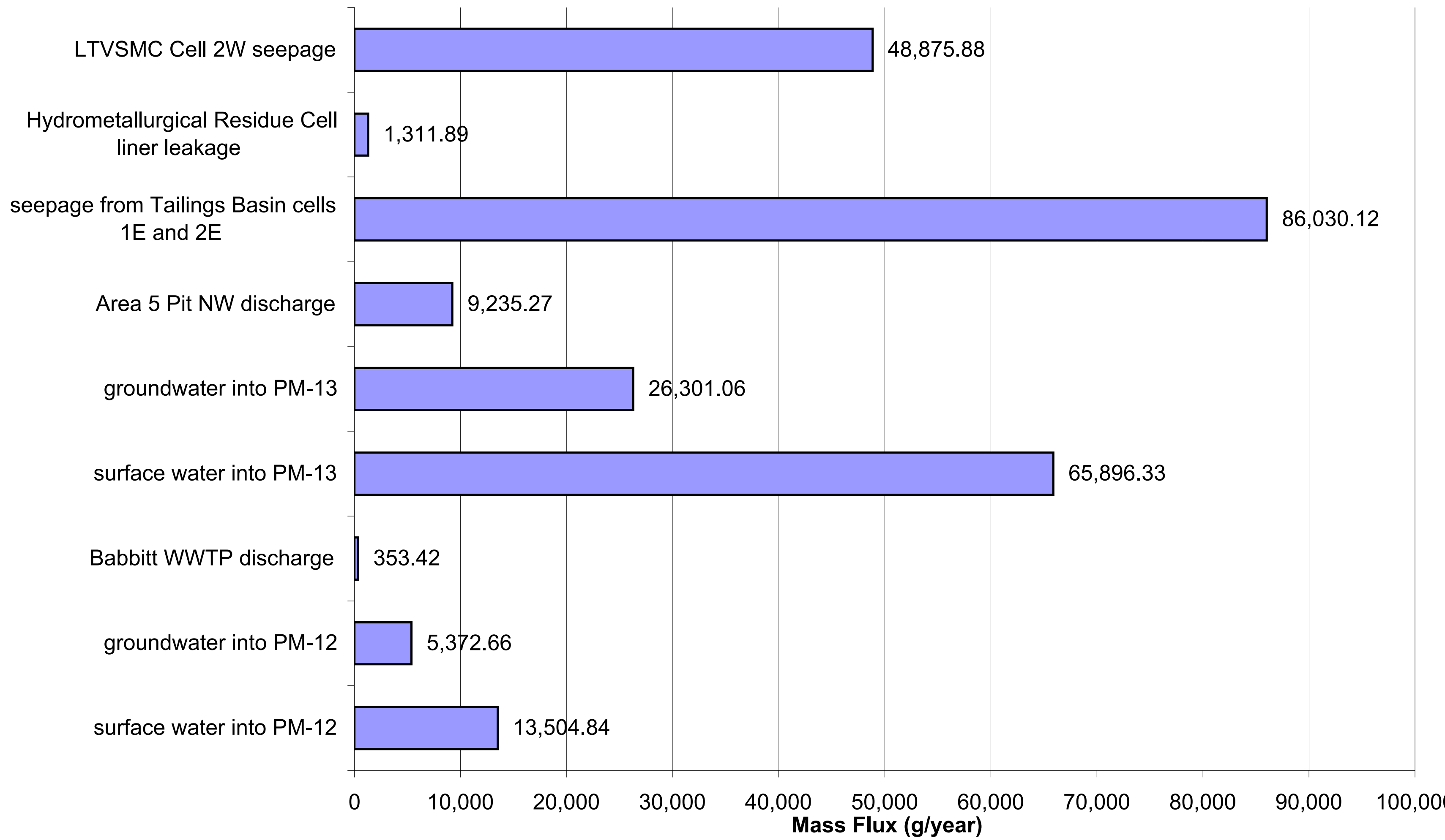



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
4,513.26
Hydrometallurgical Residue Cell liner leakage
1,311.89
seepage from Tailings Basin cells 1E and 2E
7,944.13
Area 5 Pit NW discharge
-
groundwater into PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
-
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)

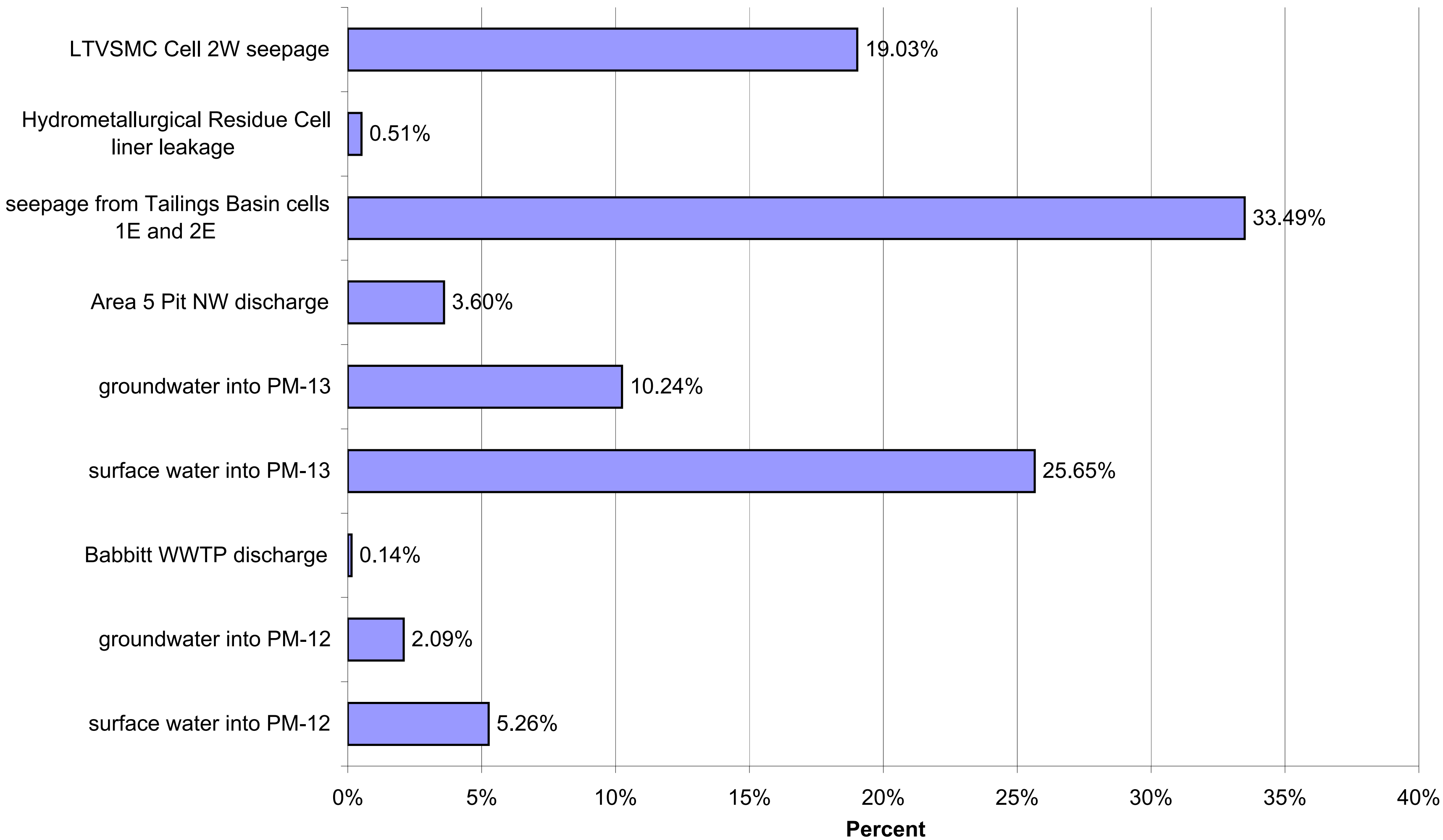
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Nickel (Ni)

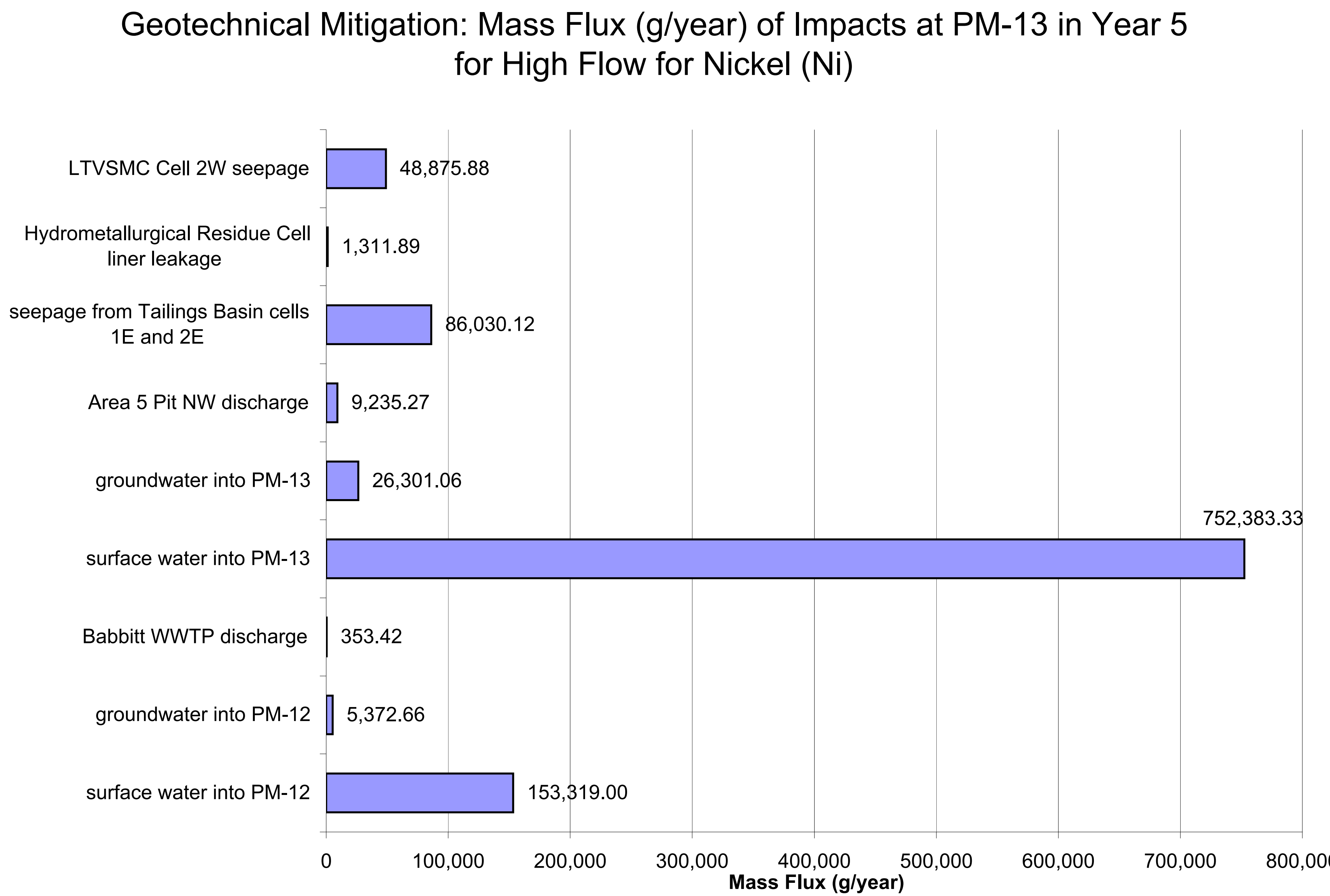


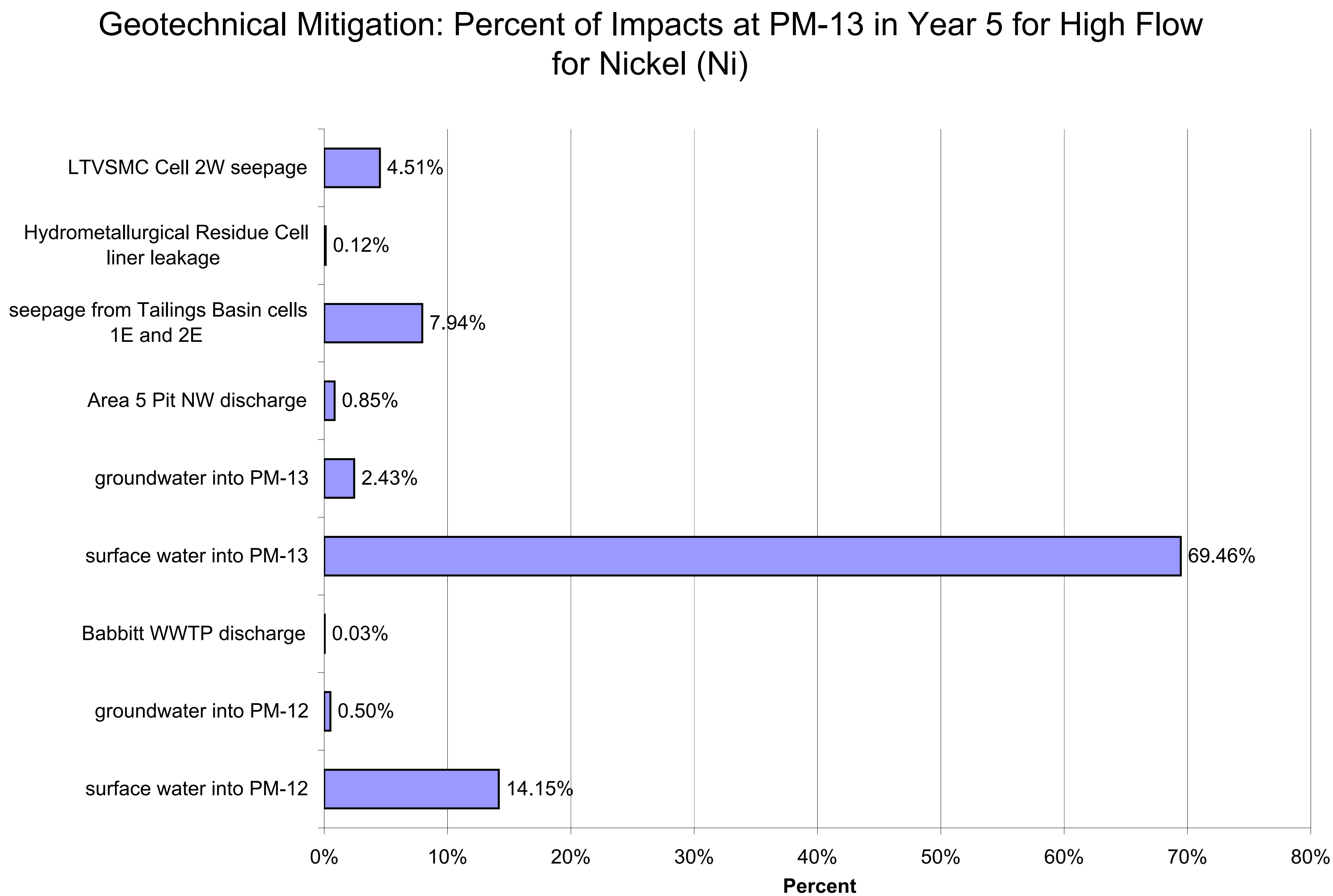
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)



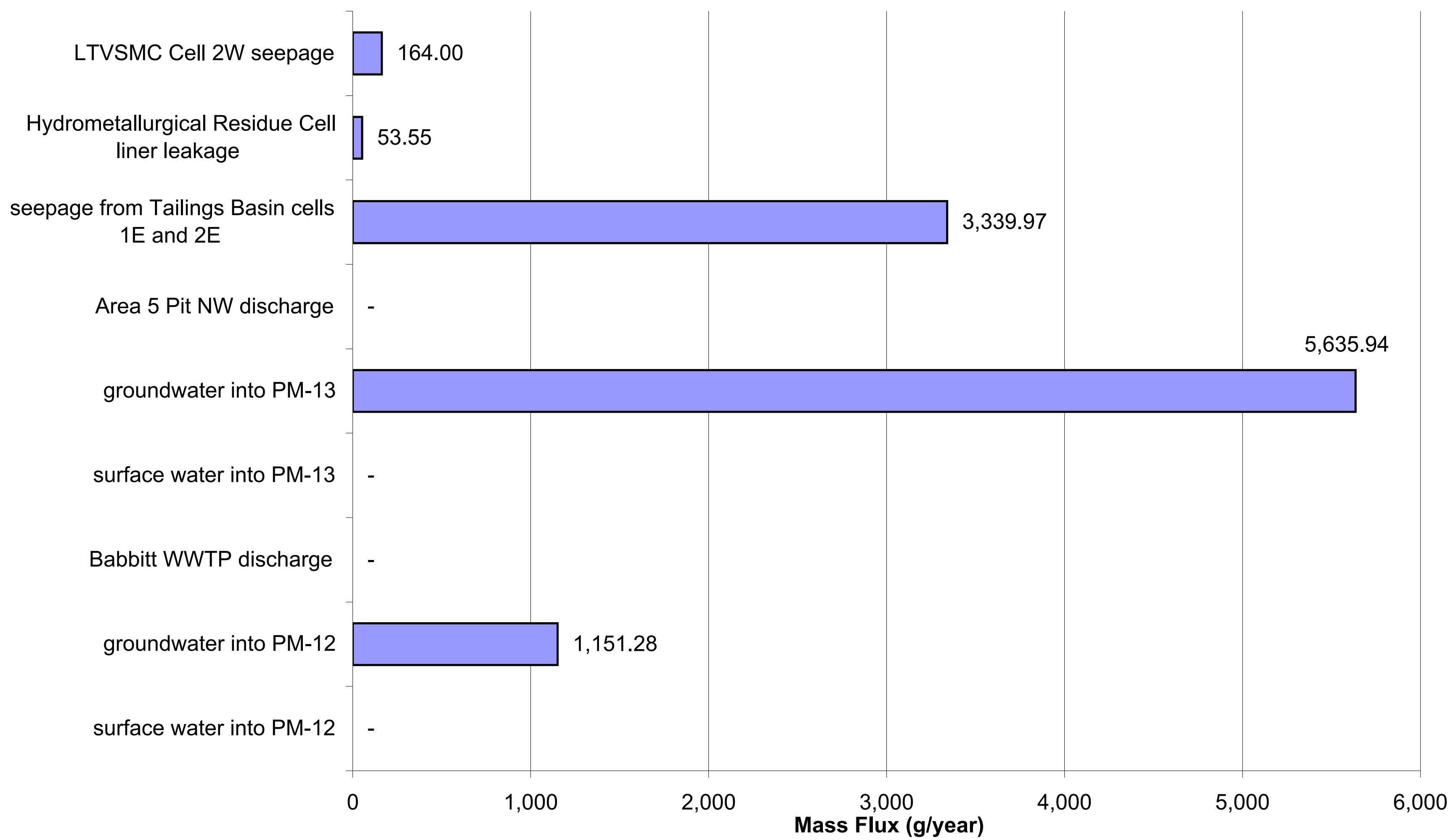
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Nickel (Ni)

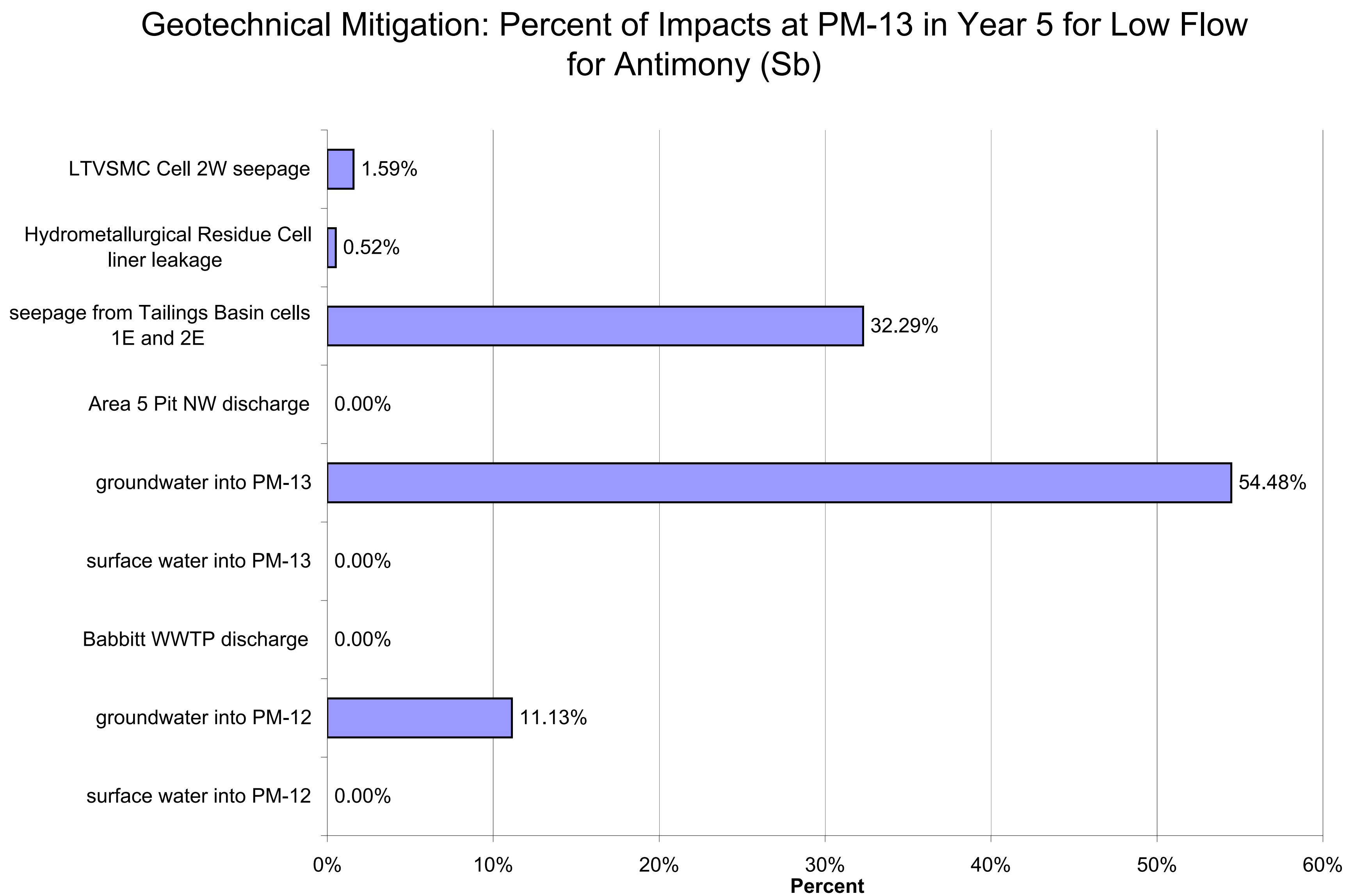



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,311.89
seepage from Tailings Basin cells 1E and 2E
86,030.12
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
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)

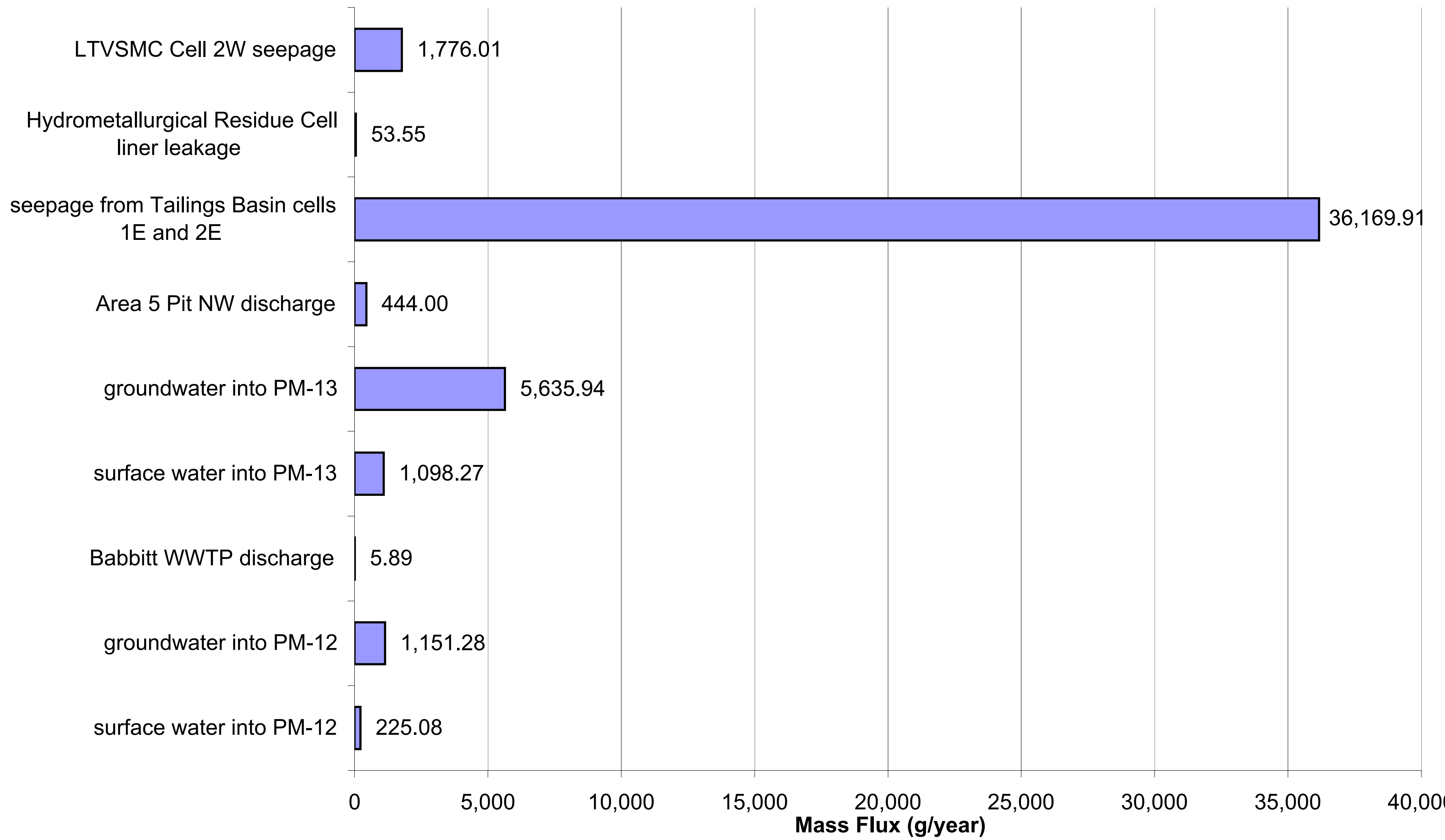

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
4.51%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
7.94%
Area 5 Pit NW discharge
0.85%
groundwater into PM-13
2.43%
surface water into PM-13
69.46%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.50%
surface water into PM-12
14.15%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

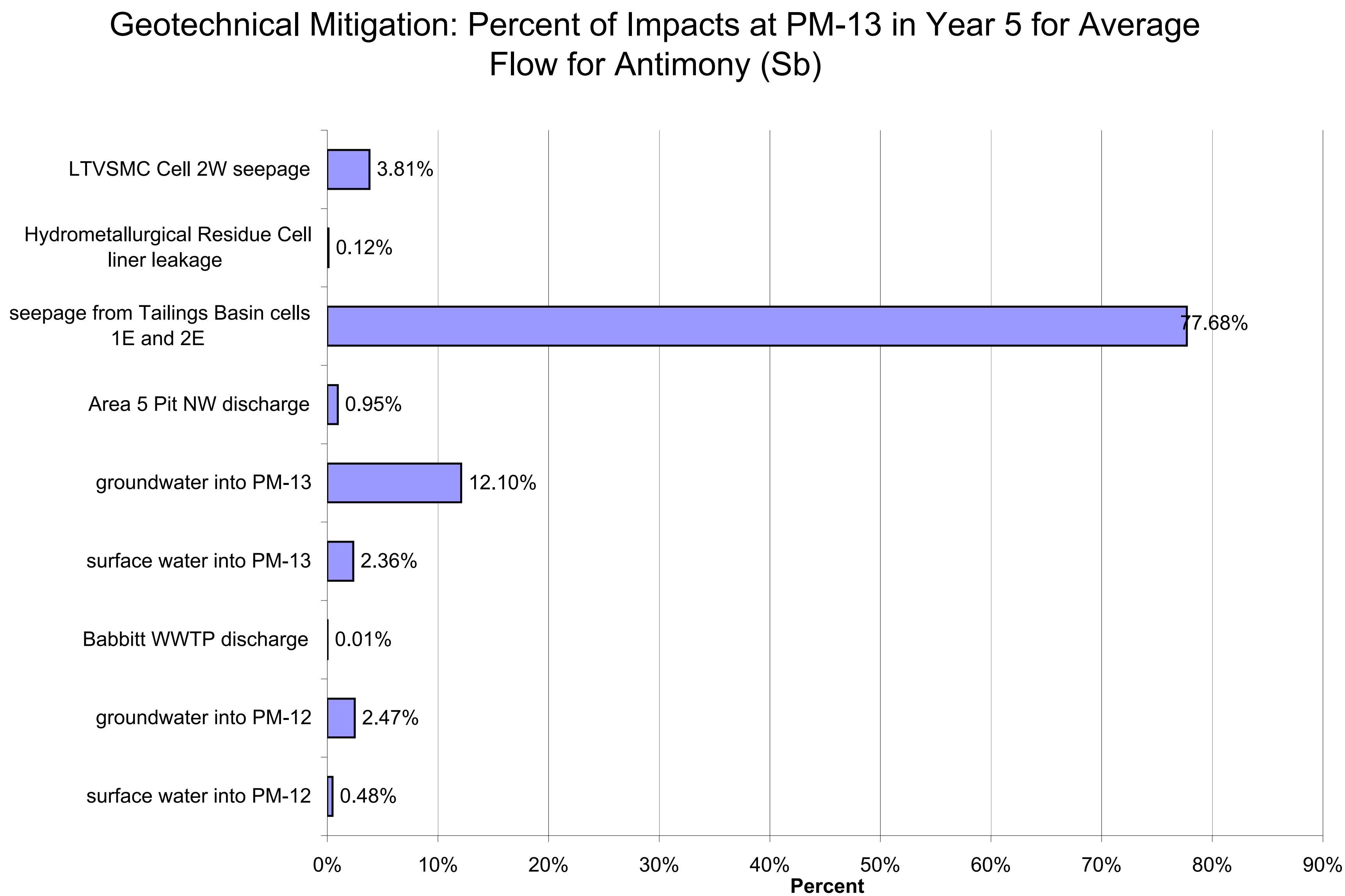
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)



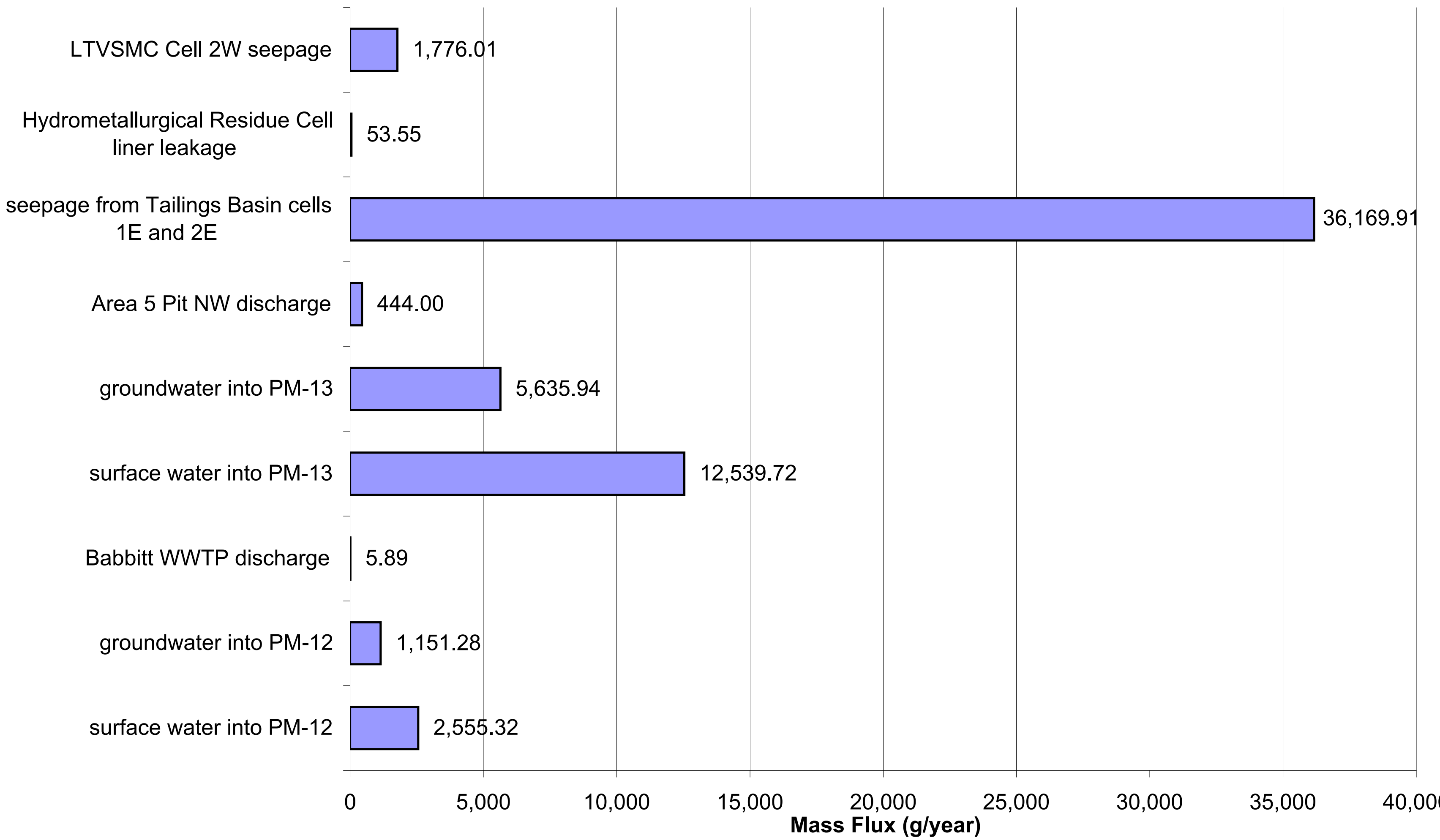

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.59%
Hydrometallurgical Residue Cell liner leakage
0.52%
seepage from Tailings Basin cells 1E and 2E
32.29%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
54.48%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
11.13%
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 Antimony (Sb)

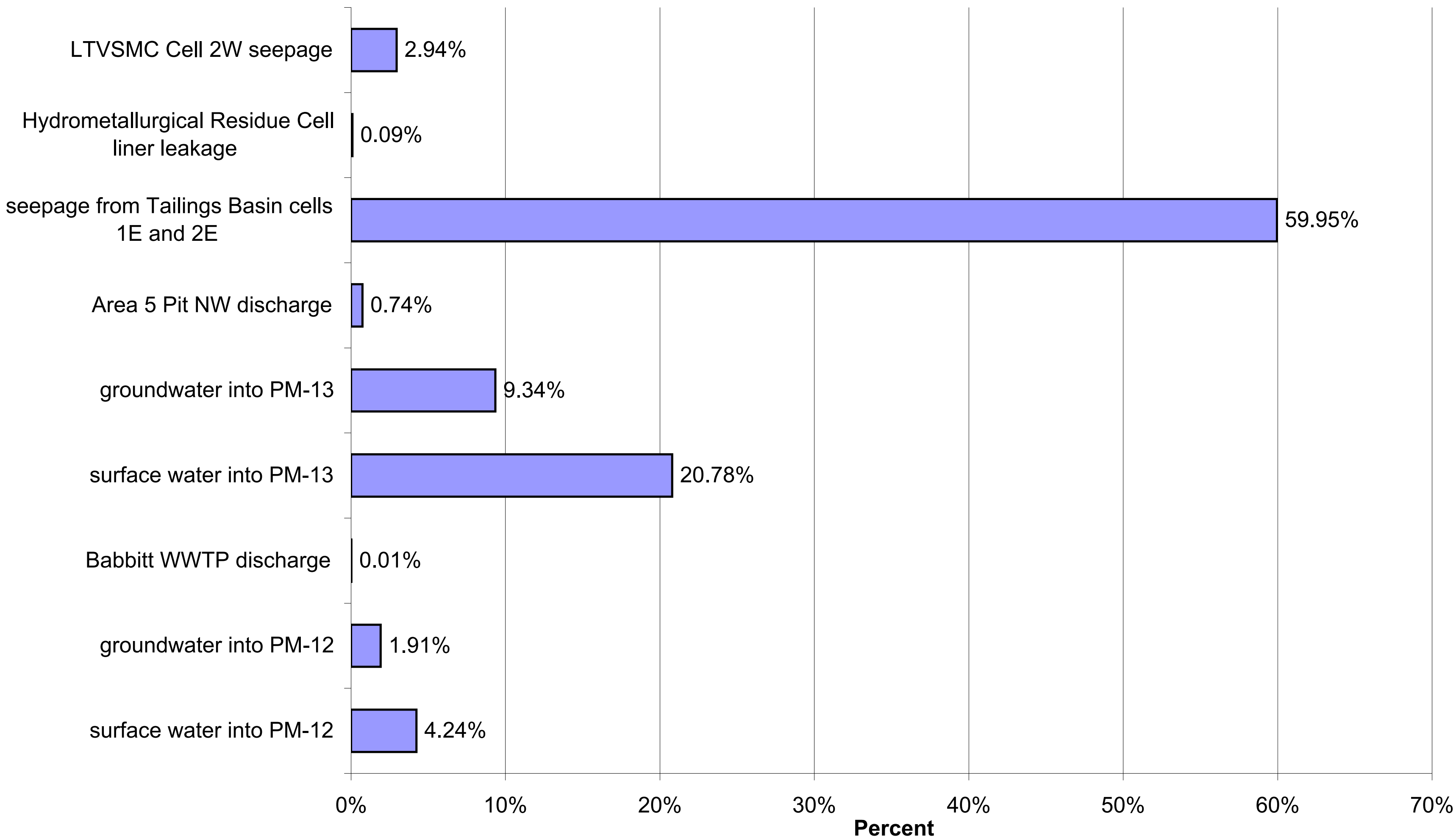



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
3.81%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
77.68%
Area 5 Pit NW discharge
0.95%
groundwater into PM-13
12.10%
surface water into PM-13
2.36%
Babbitt WWTP discharge
0.01%
groundwater into PM-12
2.47%
surface water into PM-12
0.48%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

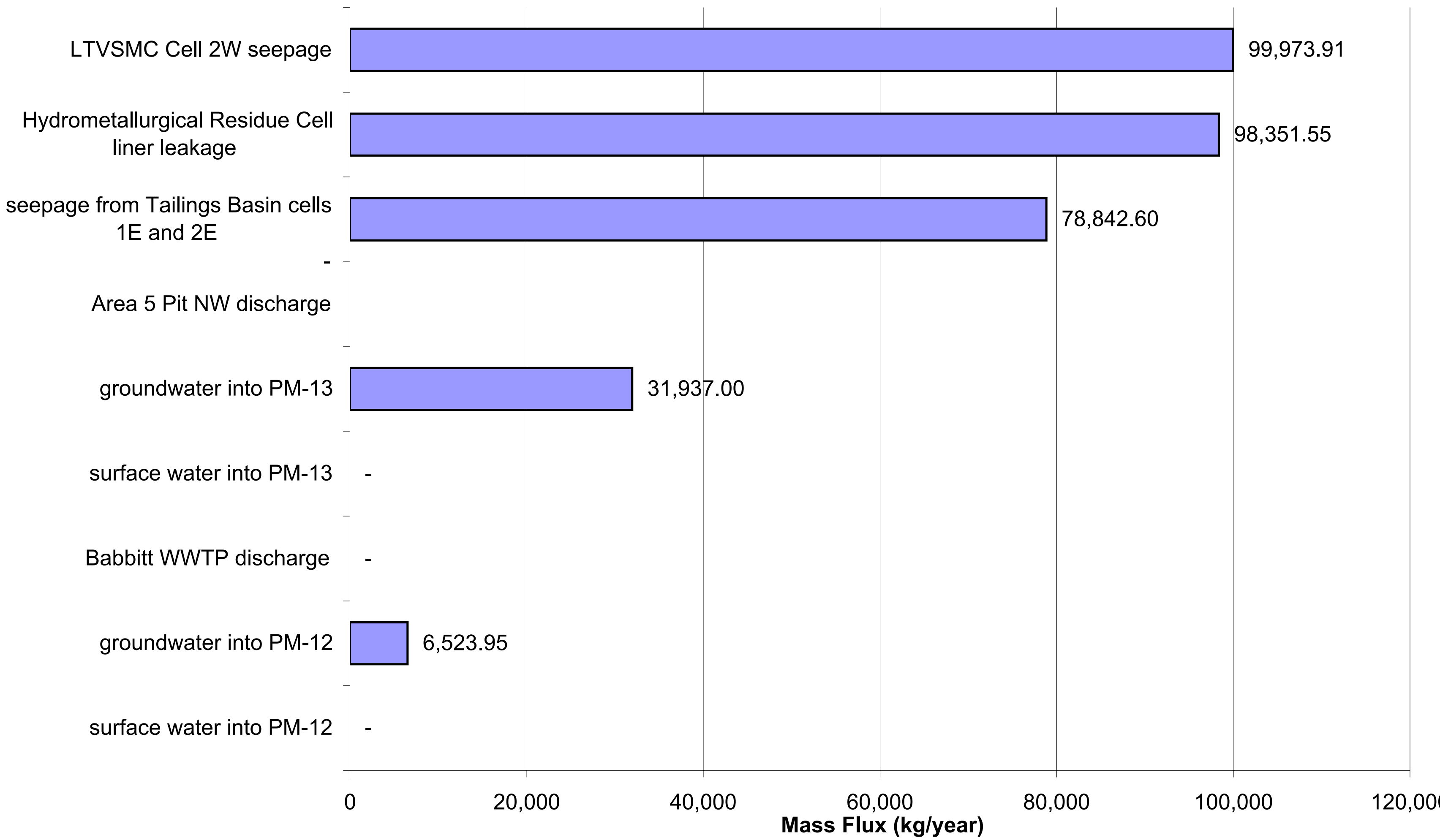
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)



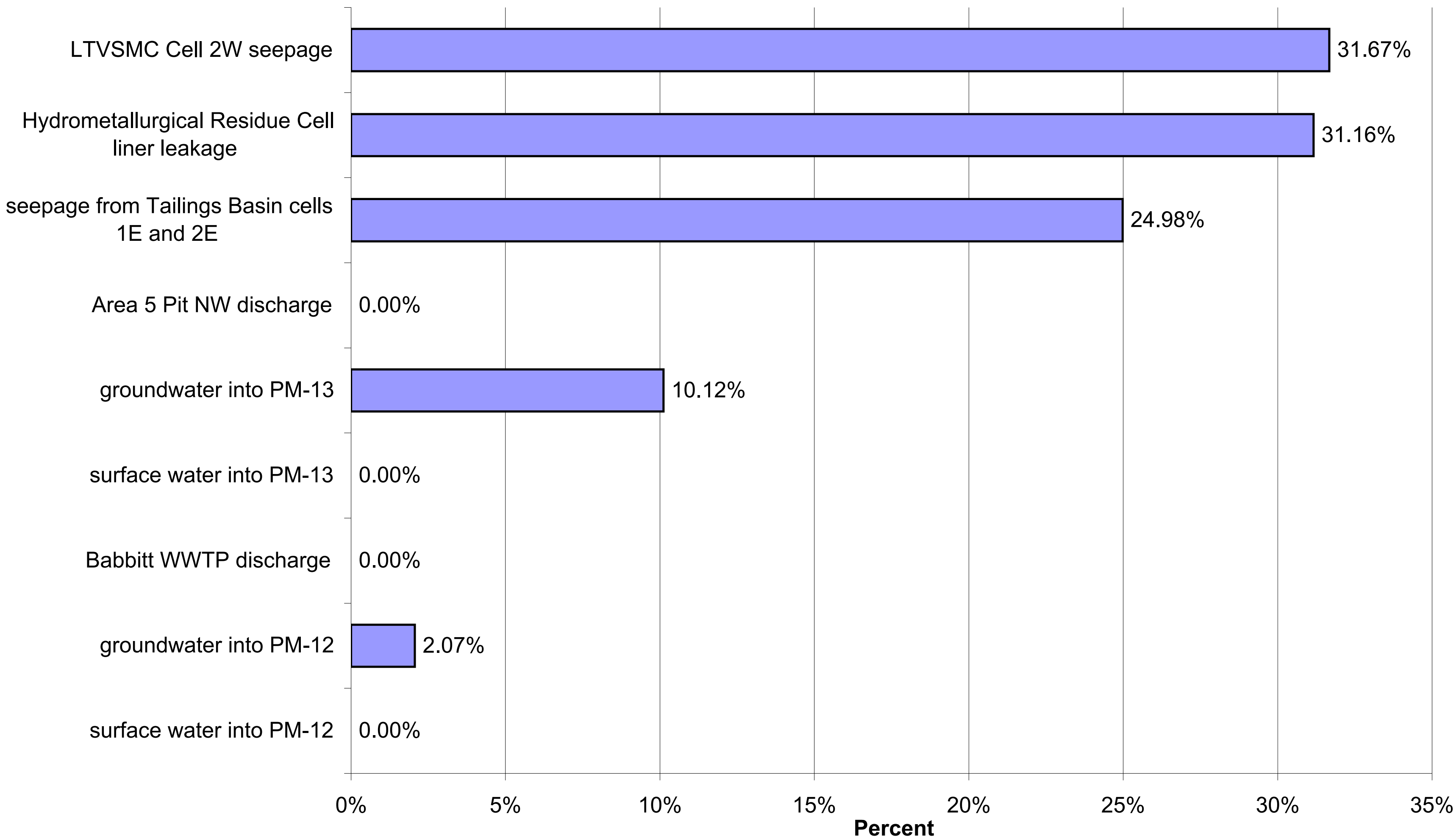
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Antimony (Sb)



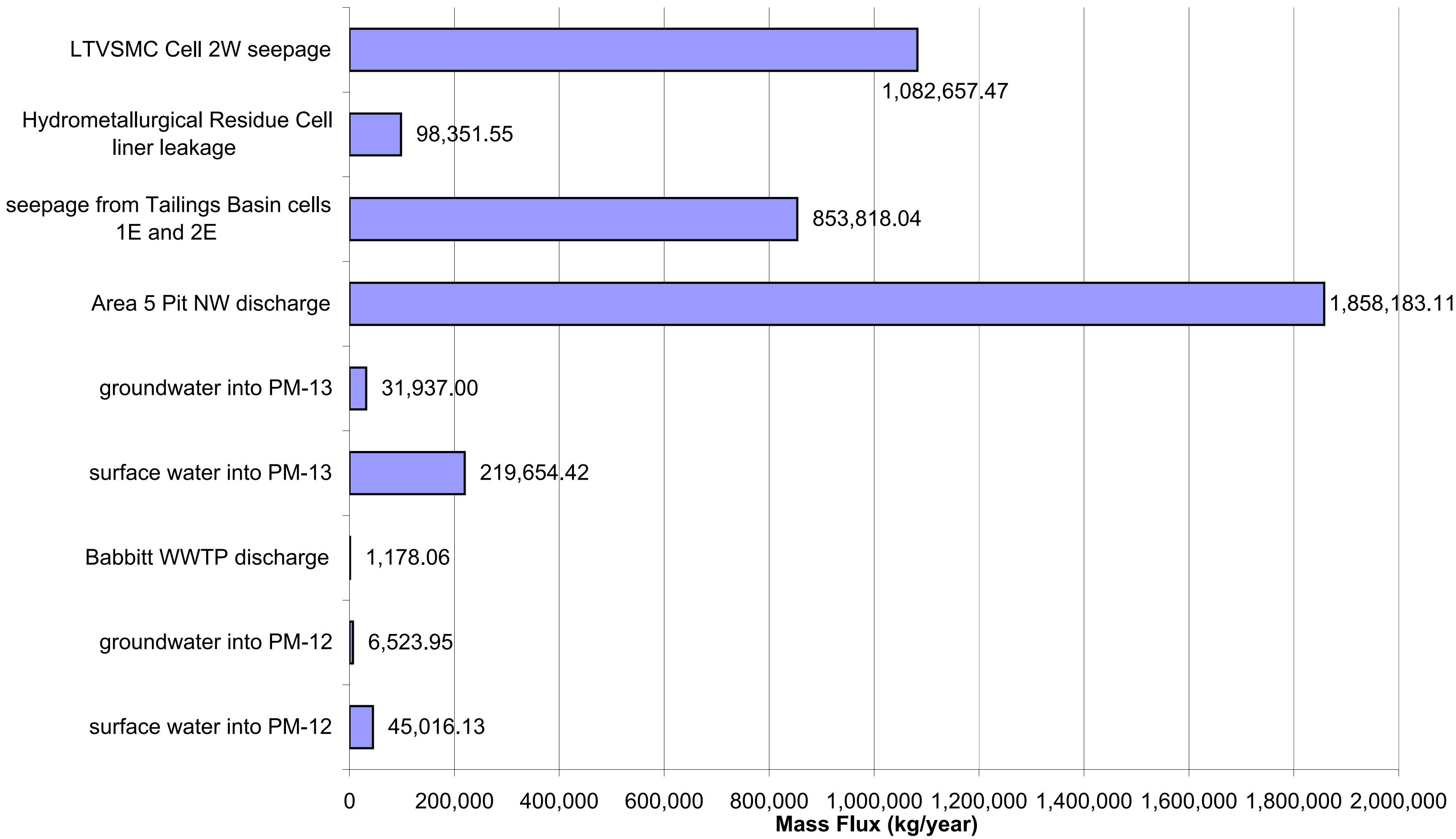
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)



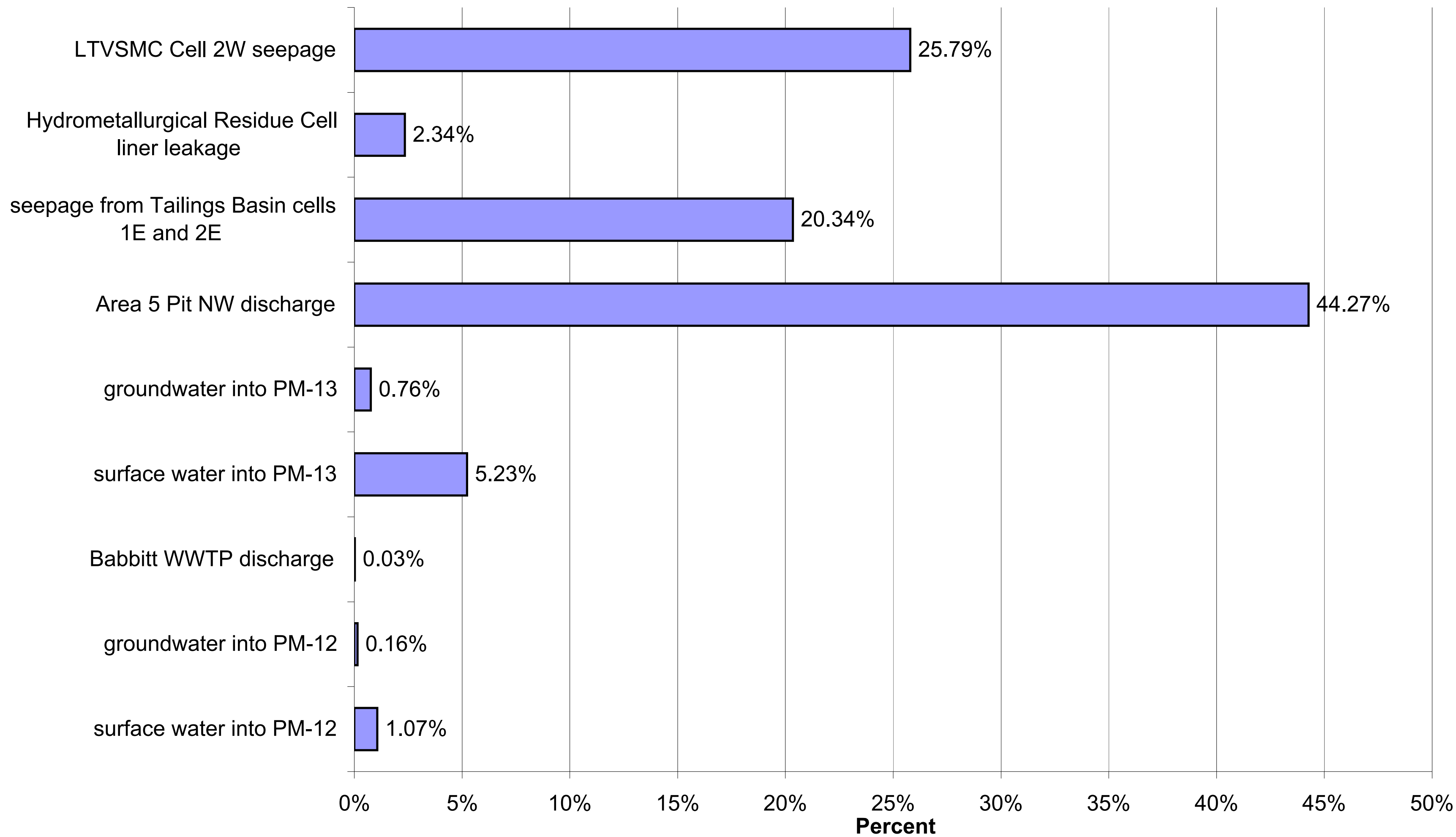
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Low Flow for Sulfate (SO_4)



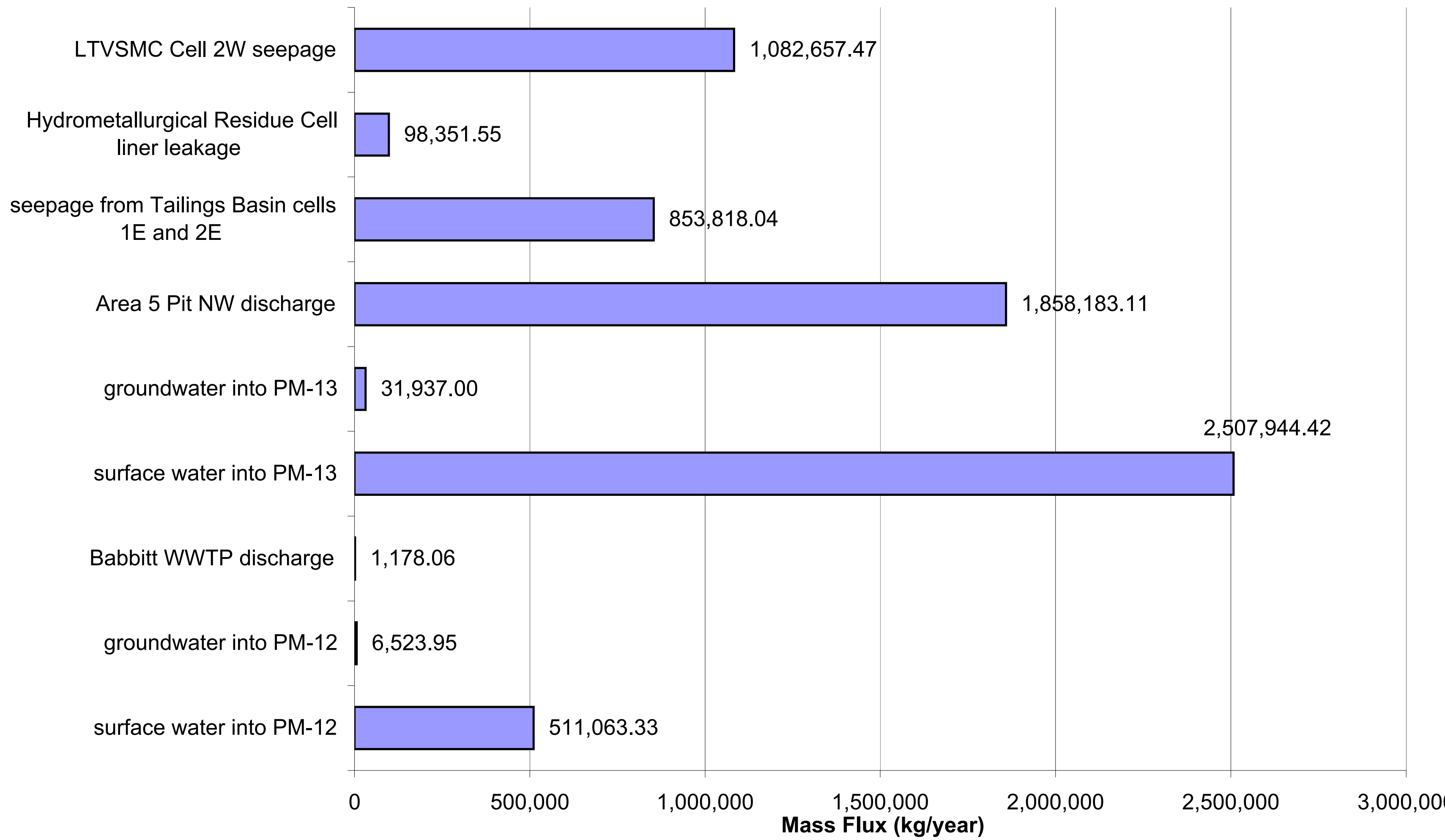
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)



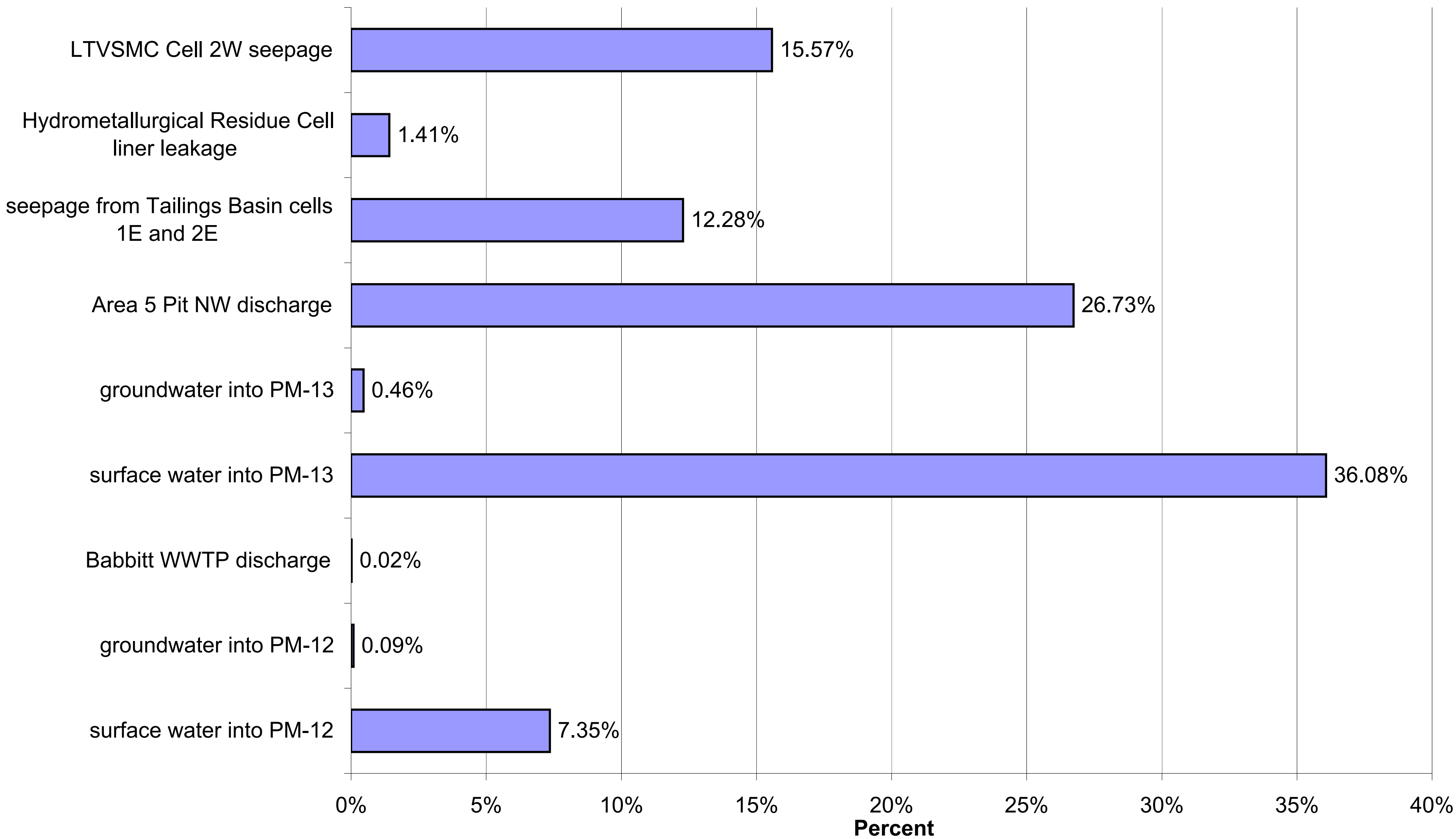
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for Average Flow for Sulfate (SO_4)



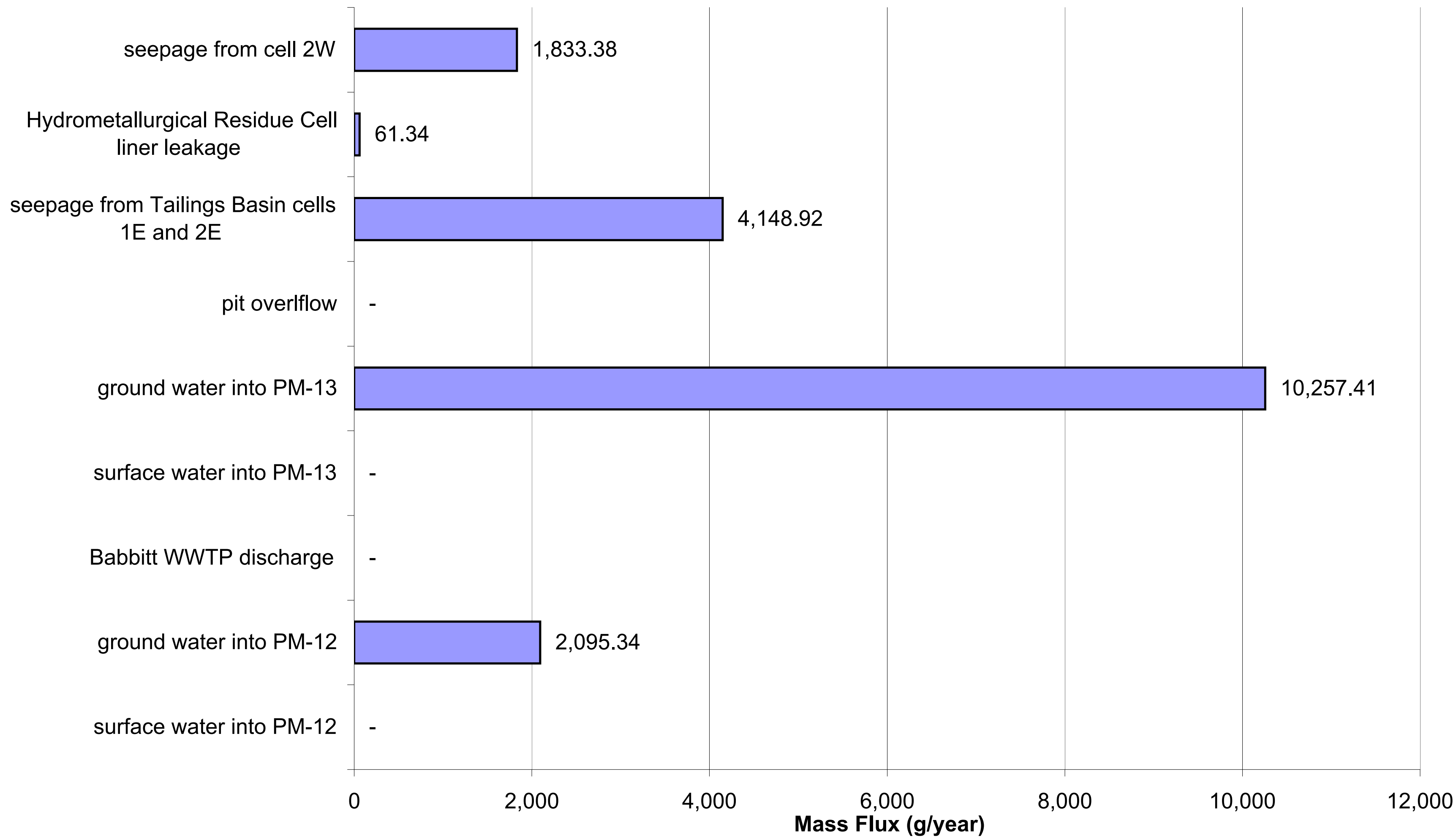
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)

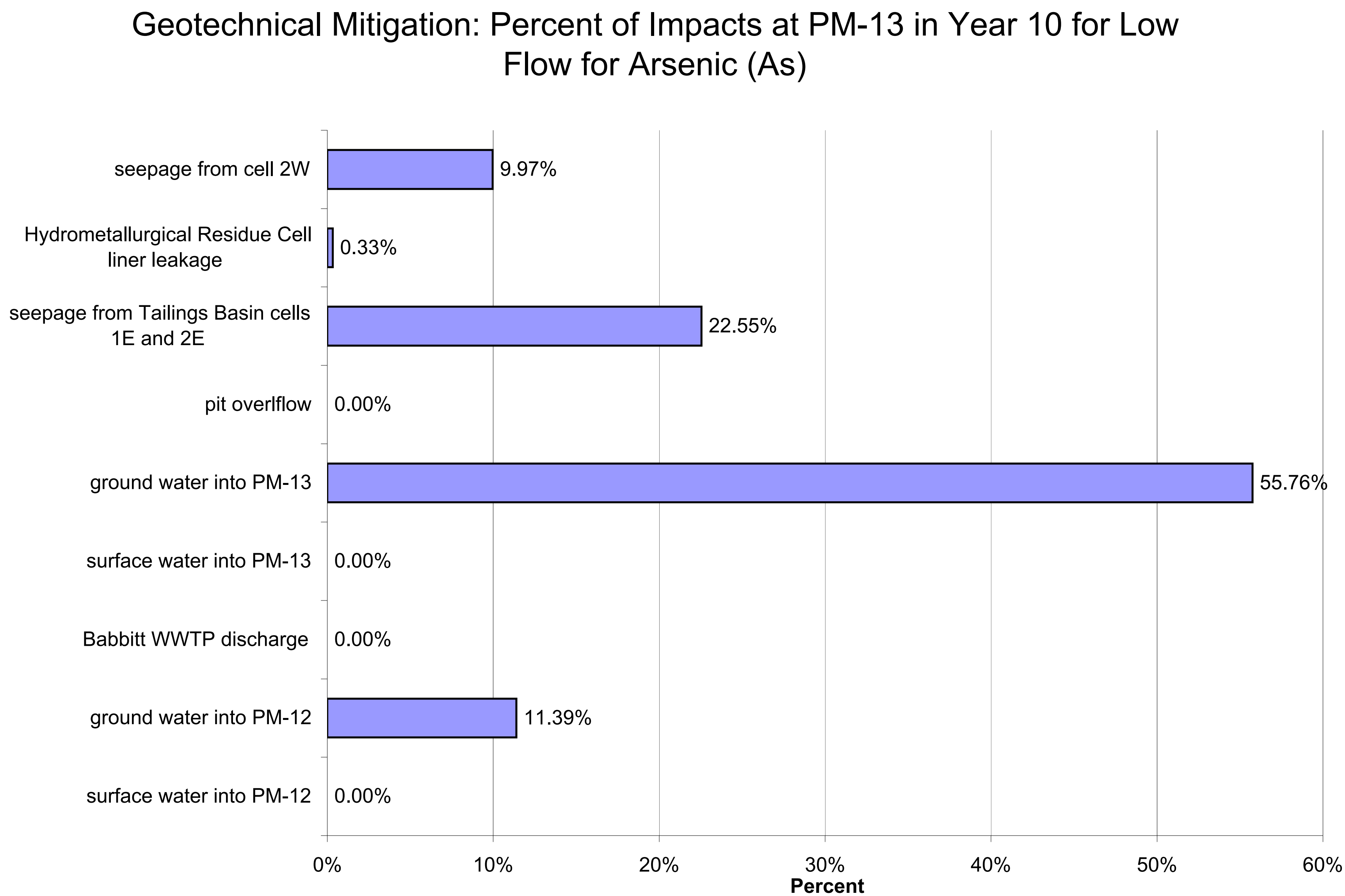


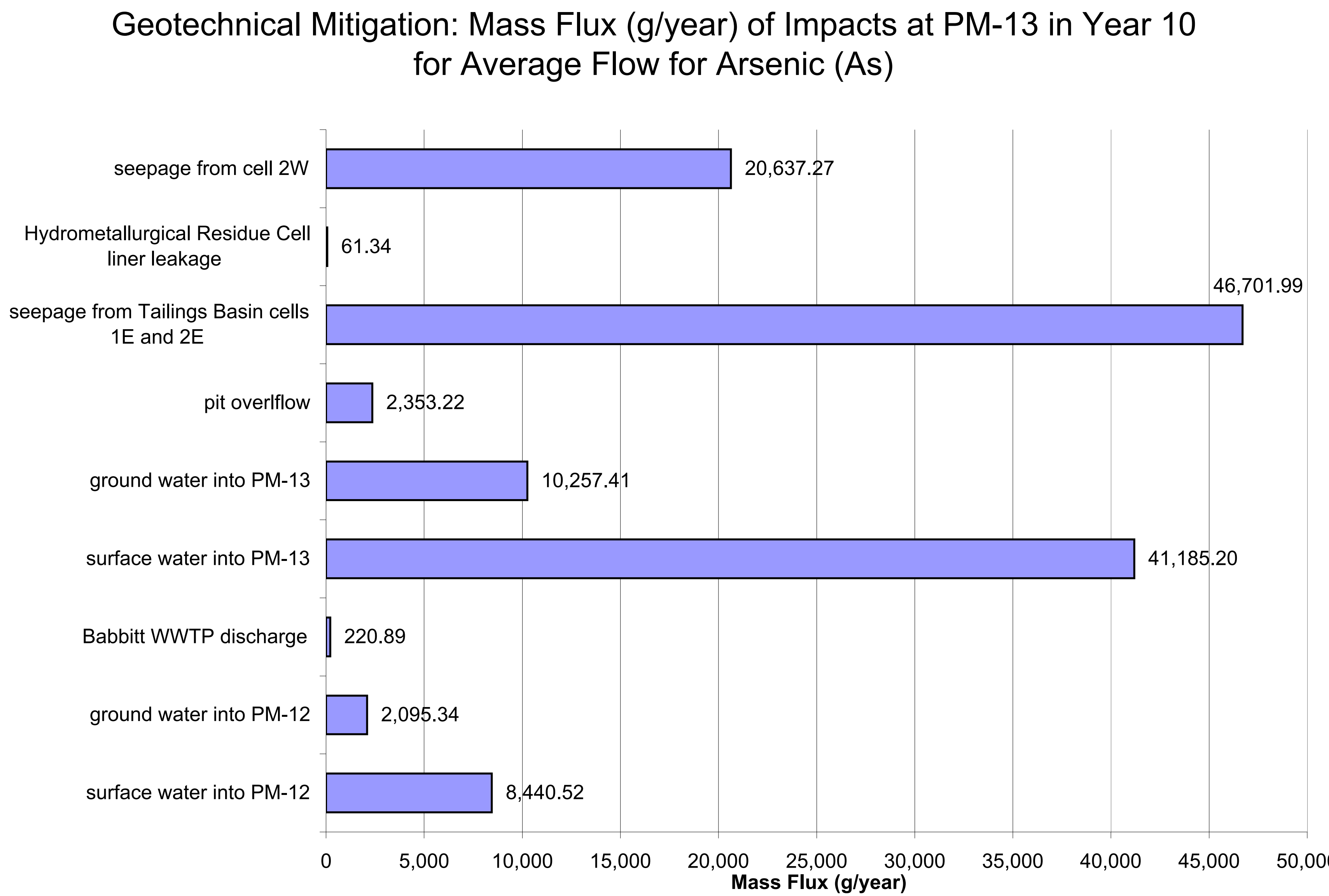
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 5 for High Flow for Sulfate (SO_4)



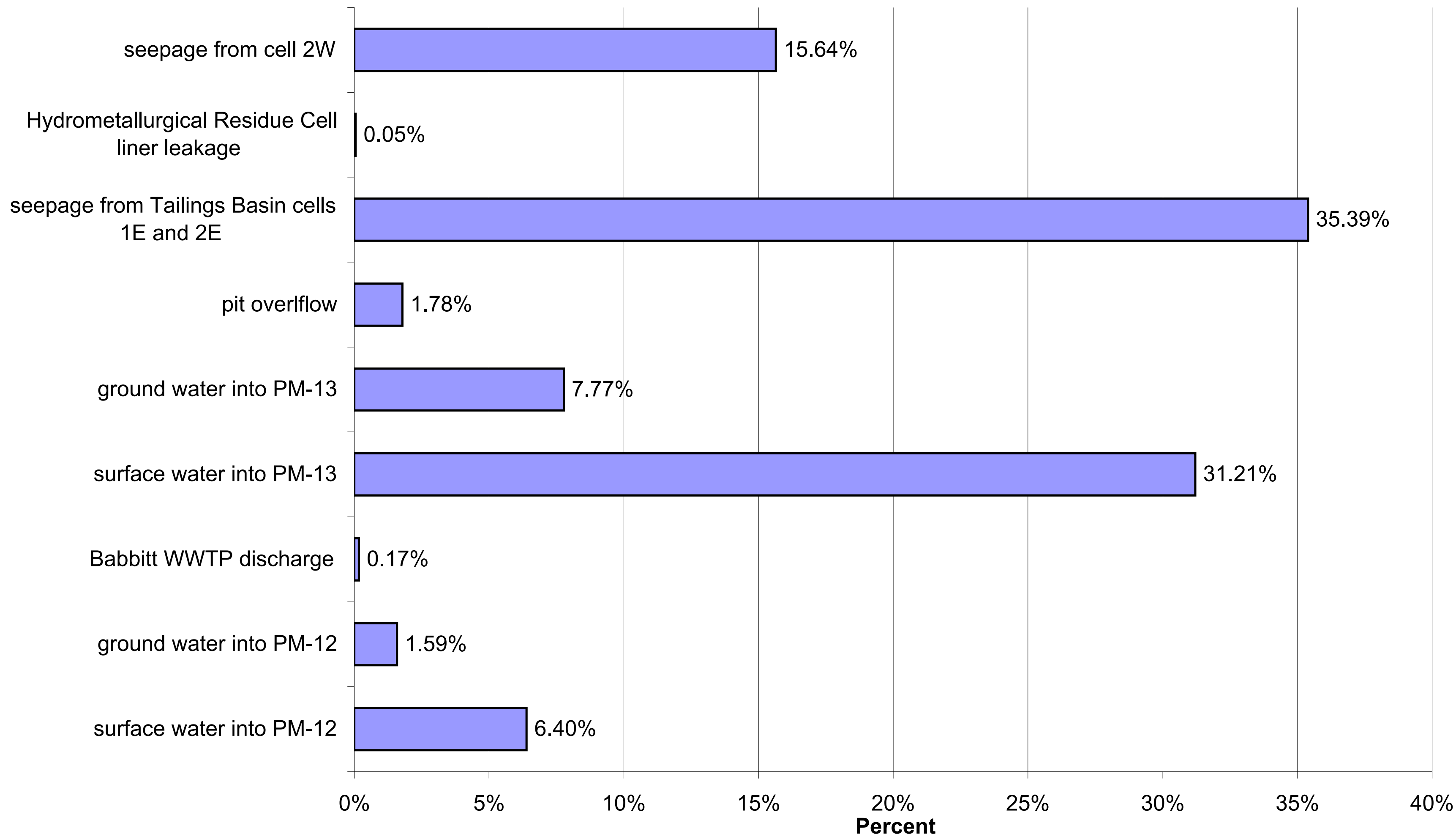
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Arsenic (As)

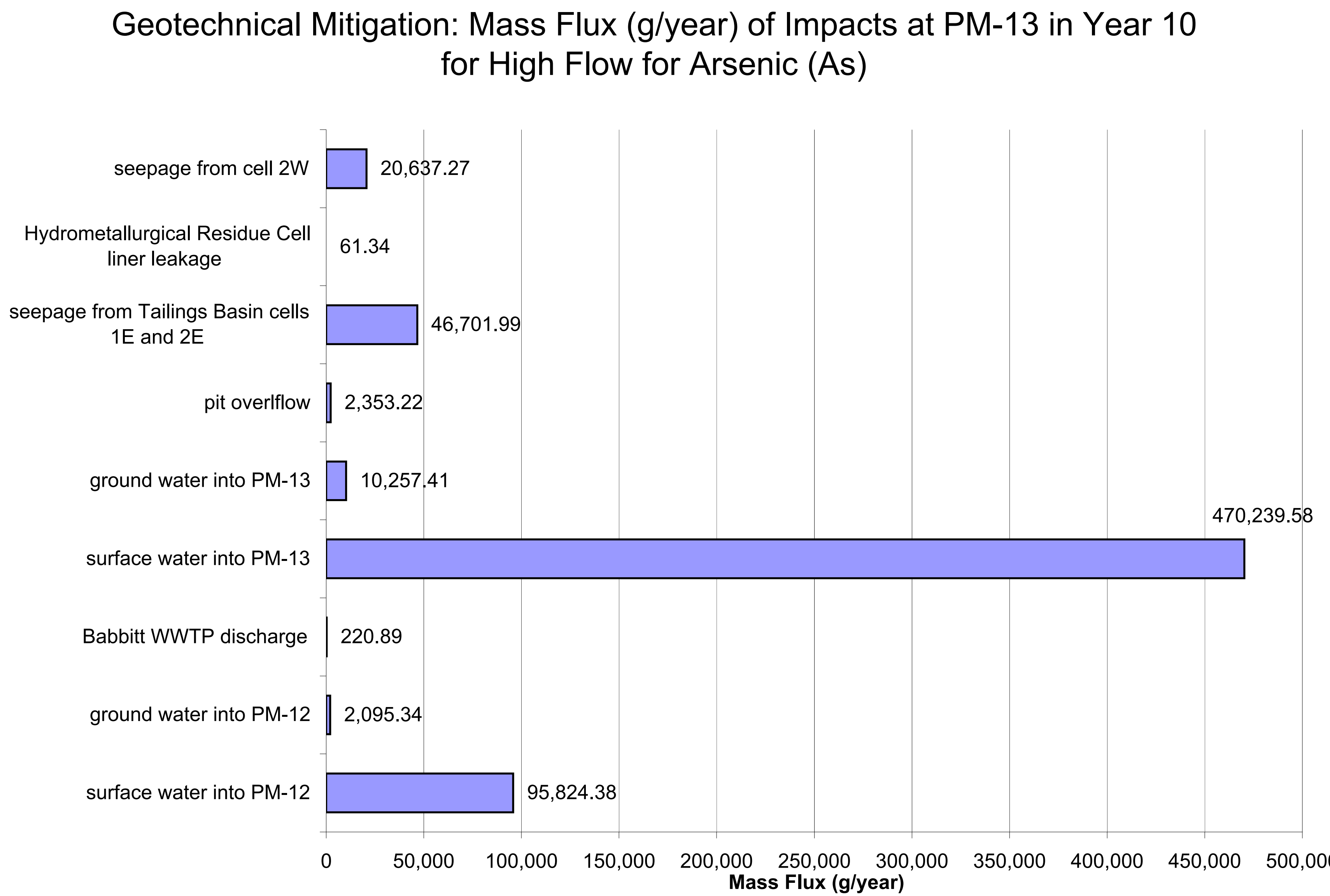



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Arsenic (As)
seepage from cell 2W
9.97%
Hydrometallurgical Residue Cell liner leakage
0.33%
seepage from Tailings Basin cells 1E and 2E
22.55%
pit overlflow
0.00%
ground water into PM-13
55.76%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
11.39%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

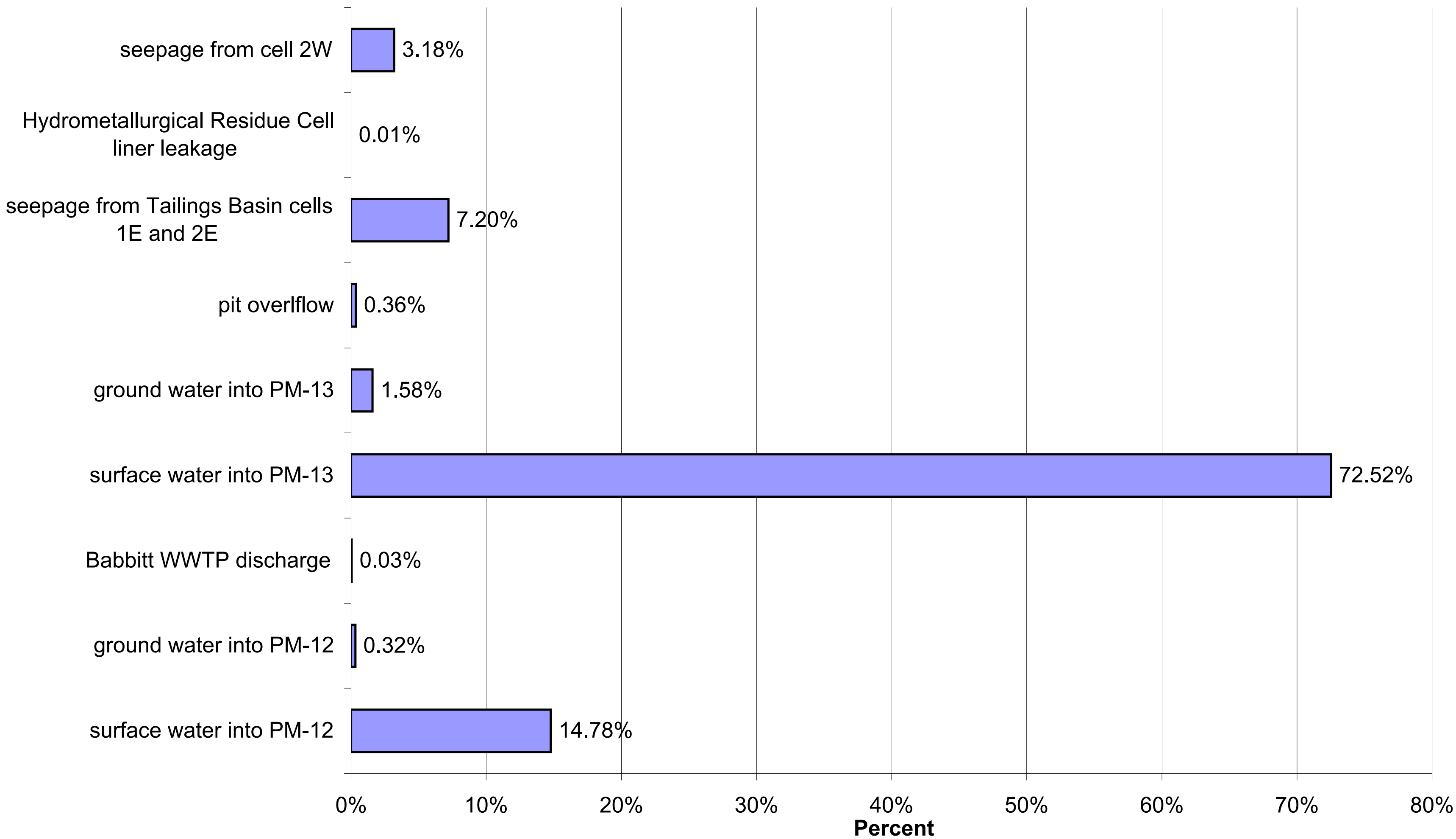

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Arsenic (As)
seepage from cell 2W
20,637.27
Hydrometallurgical Residue Cell liner leakage
61.34
seepage from Tailings Basin cells 1E and 2E
46,701.99
pit overlflow
2,353.22
ground water into PM-13
10,257.41
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
50,000
Mass Flux (g/year)

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Arsenic (As)

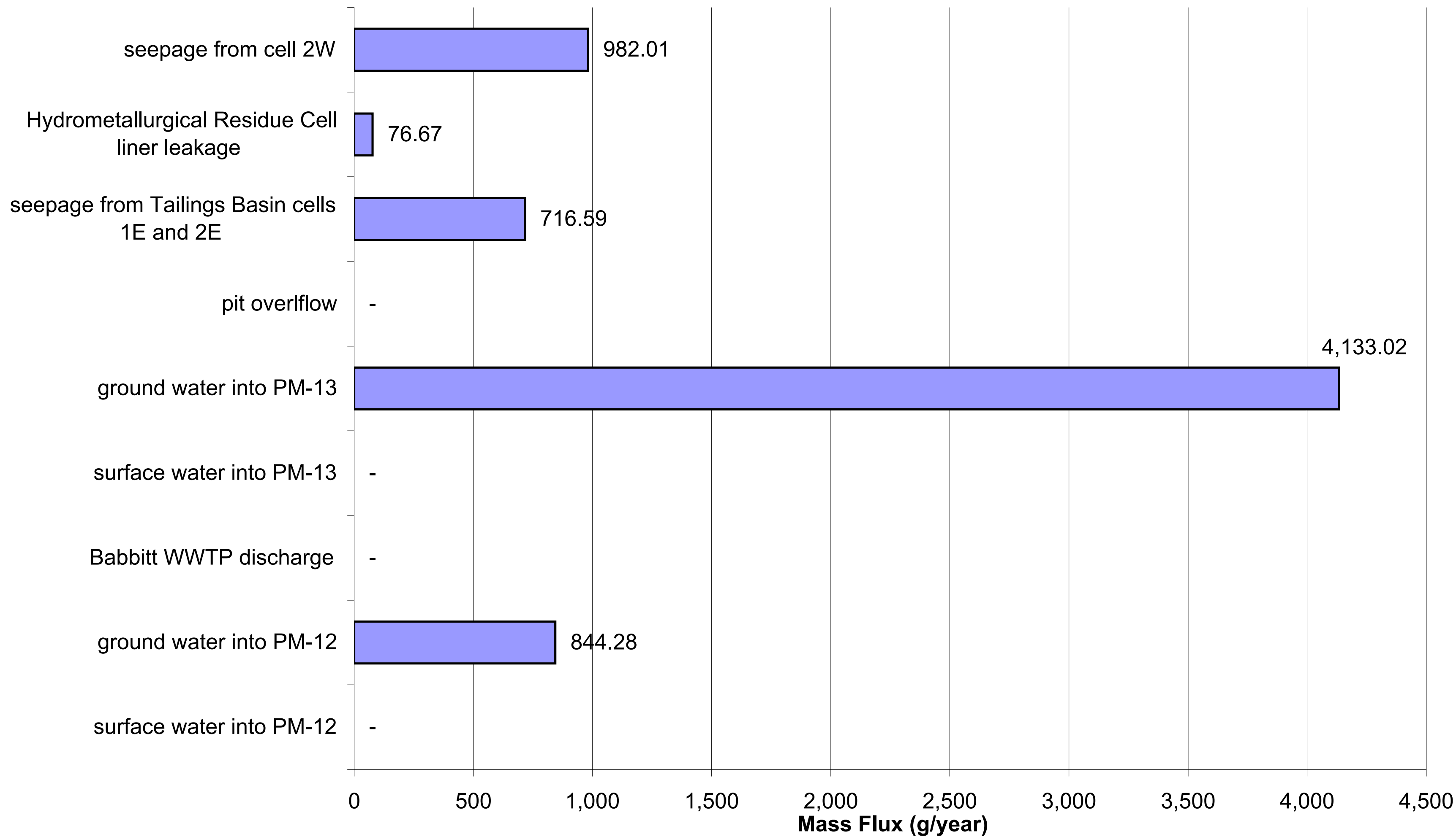



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Arsenic (As)
seepage from cell 2W
20,637.27
Hydrometallurgical Residue Cell liner leakage
61.34
seepage from Tailings Basin cells 1E and 2E
46,701.99
pit overlflow
2,353.22
ground water into PM-13
10,257.41
surface 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)

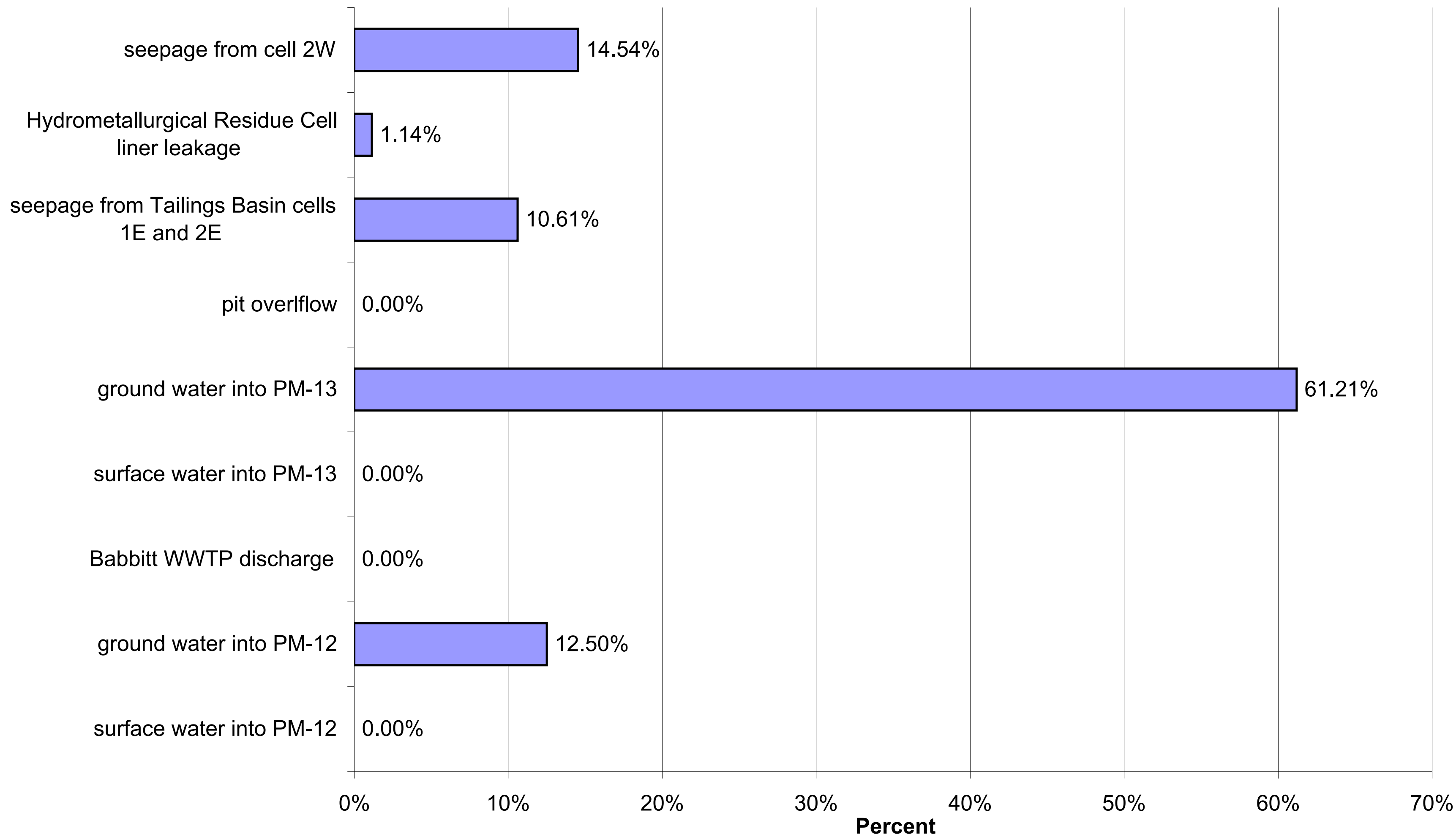
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Arsenic (As)



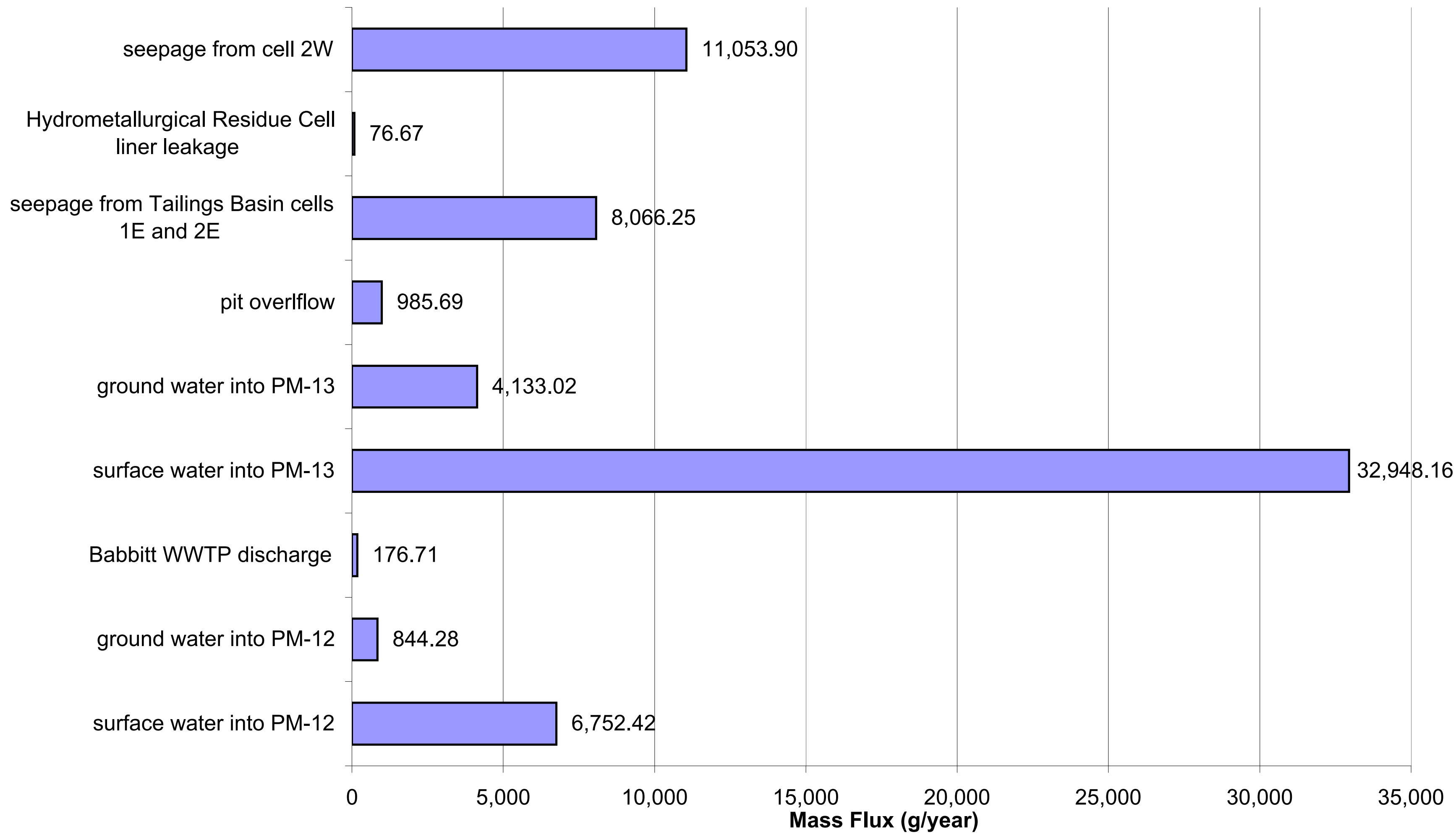
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Cobalt (Co)

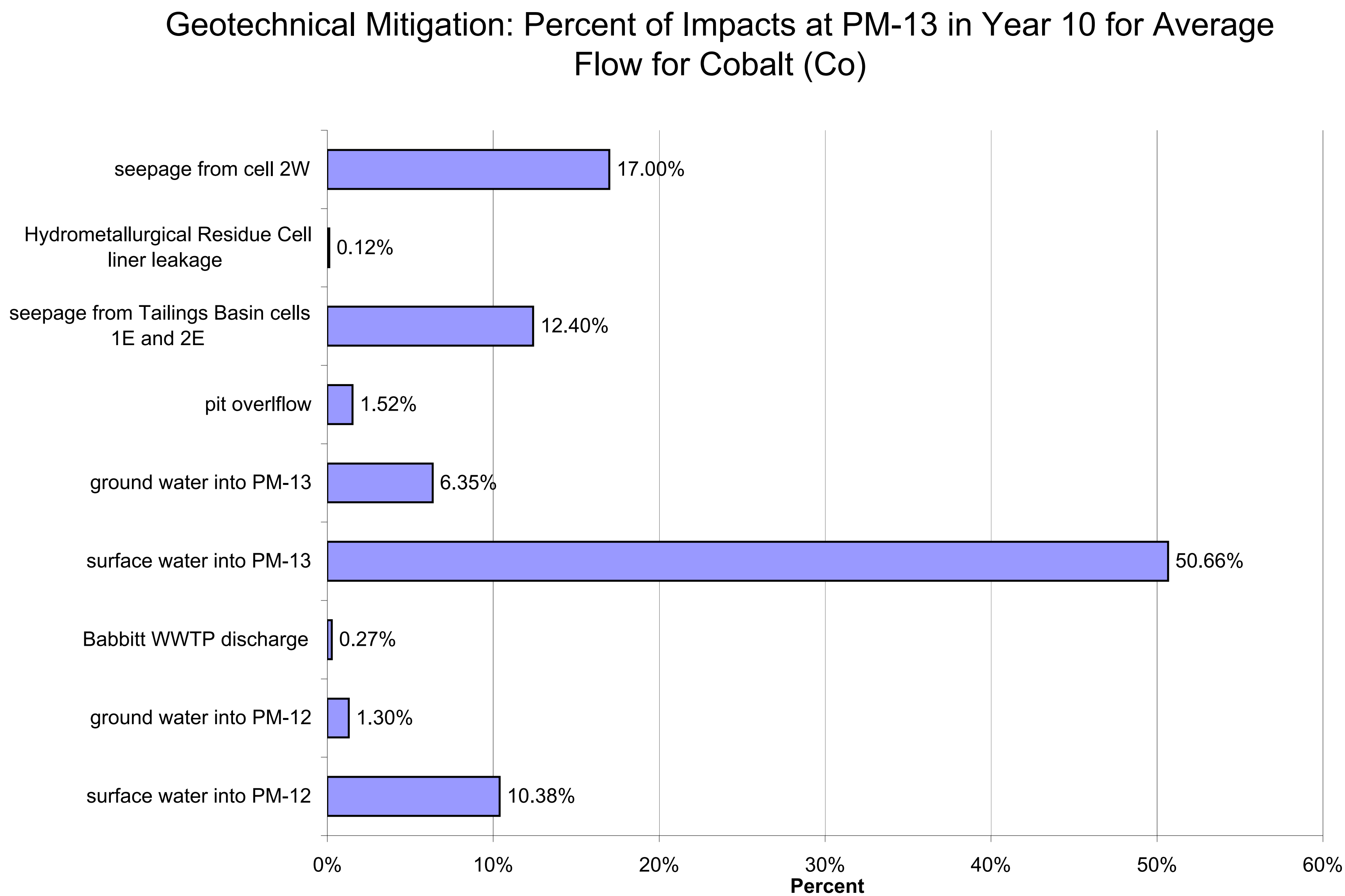


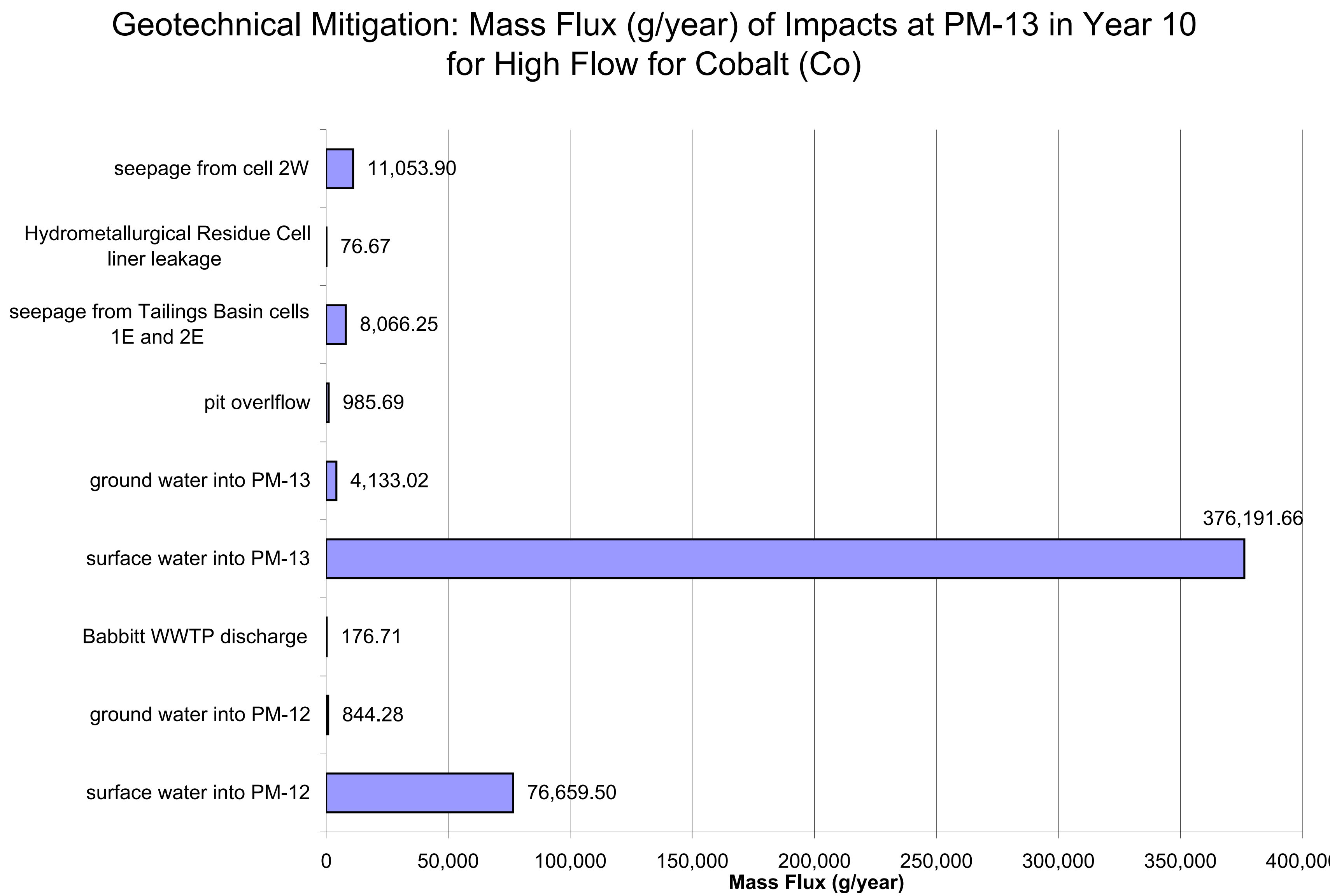
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Cobalt (Co)

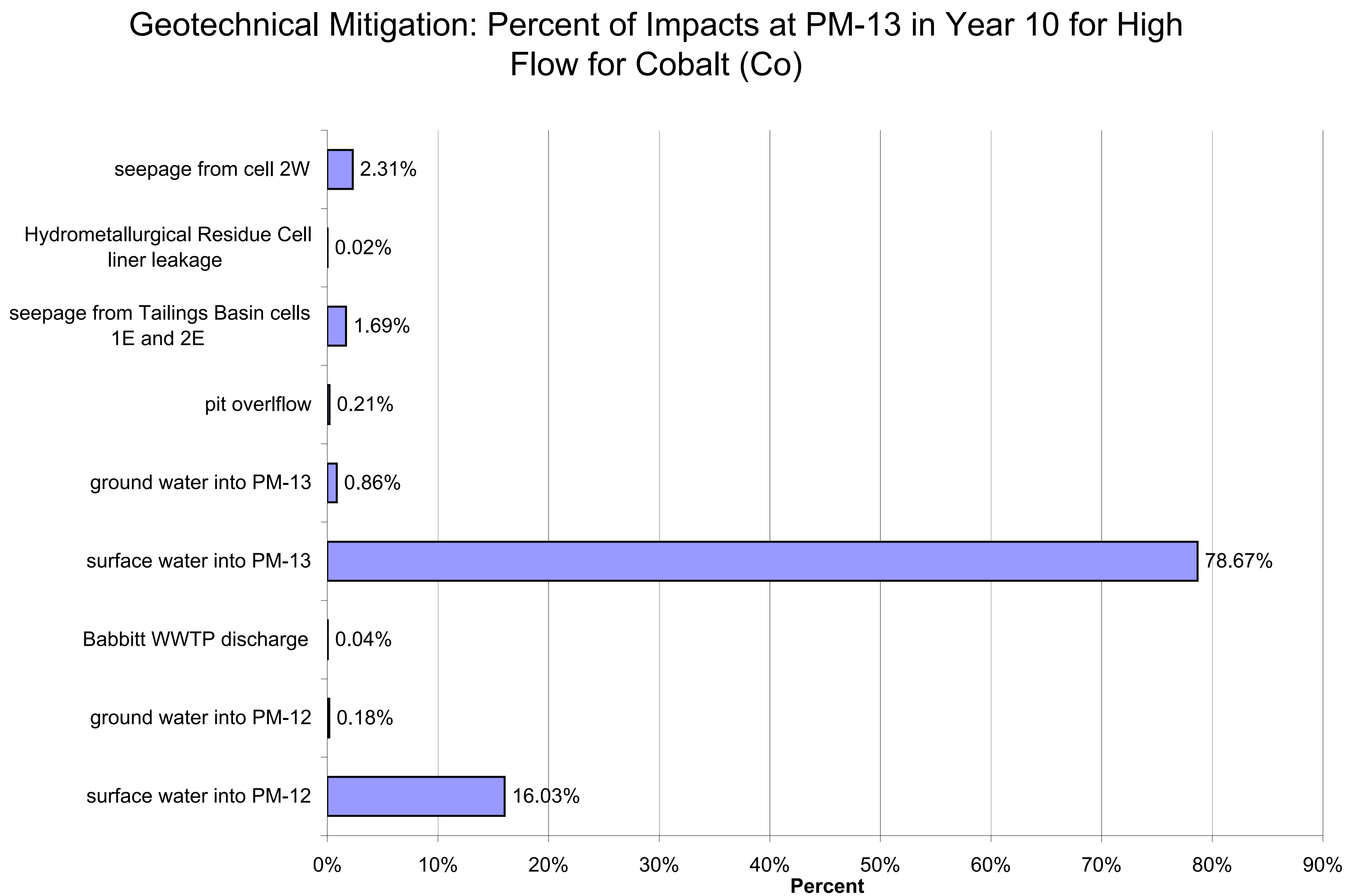


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Cobalt (Co)

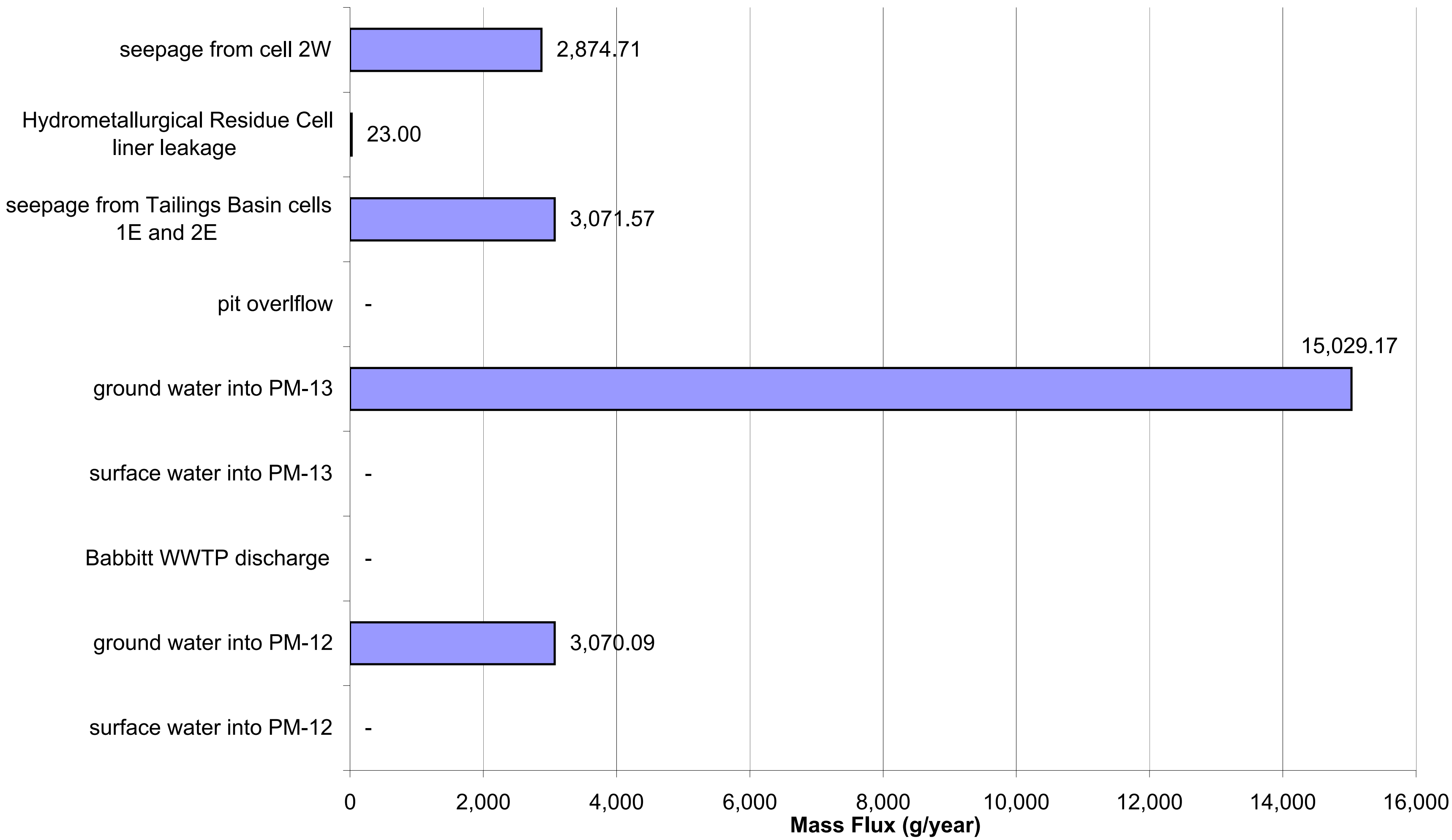


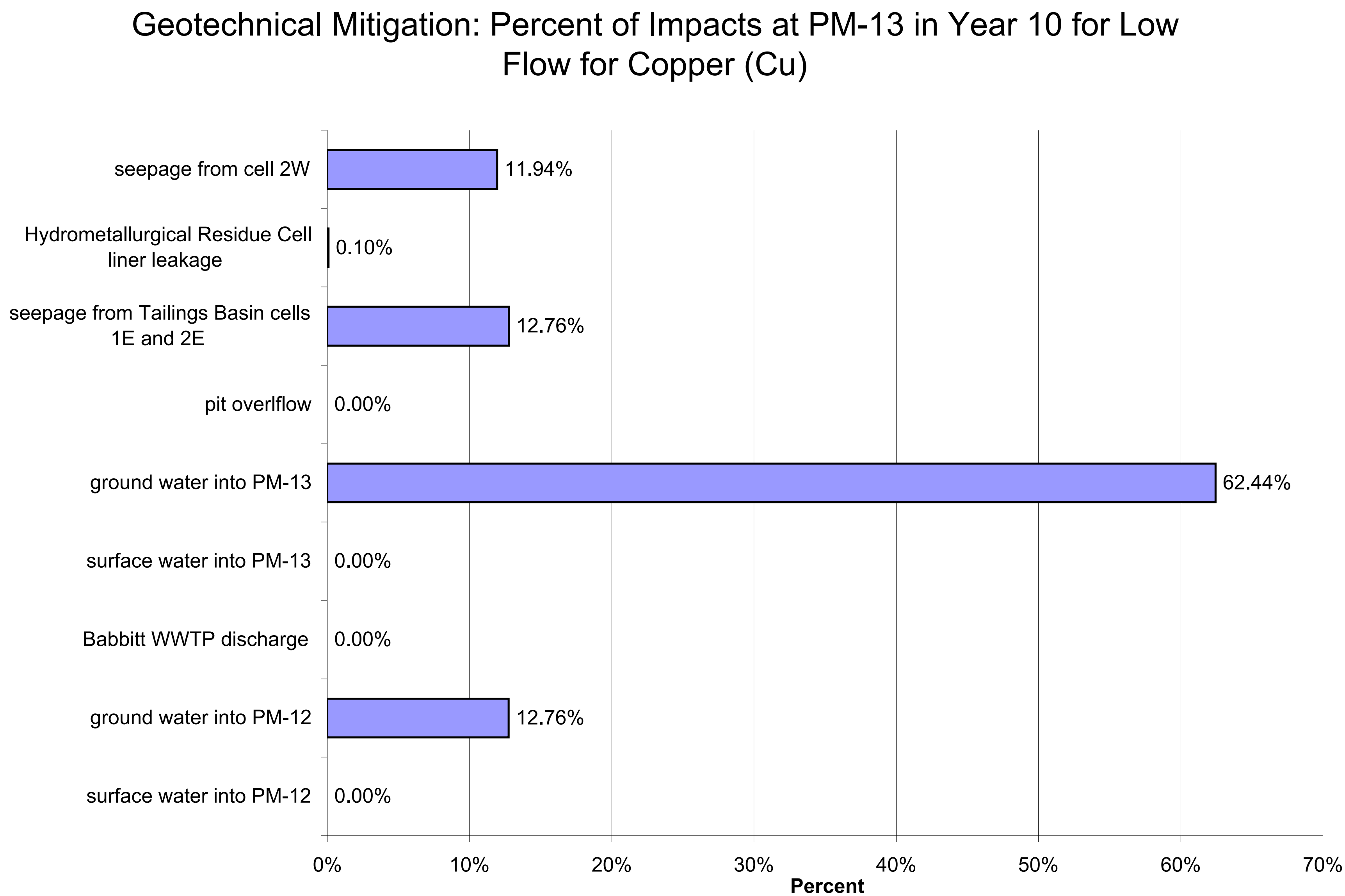

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Cobalt (Co)
seepage from cell 2W
17.00%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
12.40%
pit overlflow
1.52%
ground water into PM-13
6.35%
surface water into PM-13
50.66%
Babbitt WWTP discharge
0.27%
ground water into PM-12
1.30%
surface water into PM-12
10.38%
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 Cobalt (Co)
seepage from cell 2W
11,053.90
Hydrometallurgical Residue Cell liner leakage
76.67
seepage from Tailings Basin cells 1E and 2E
8,066.25
pit overlflow
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)

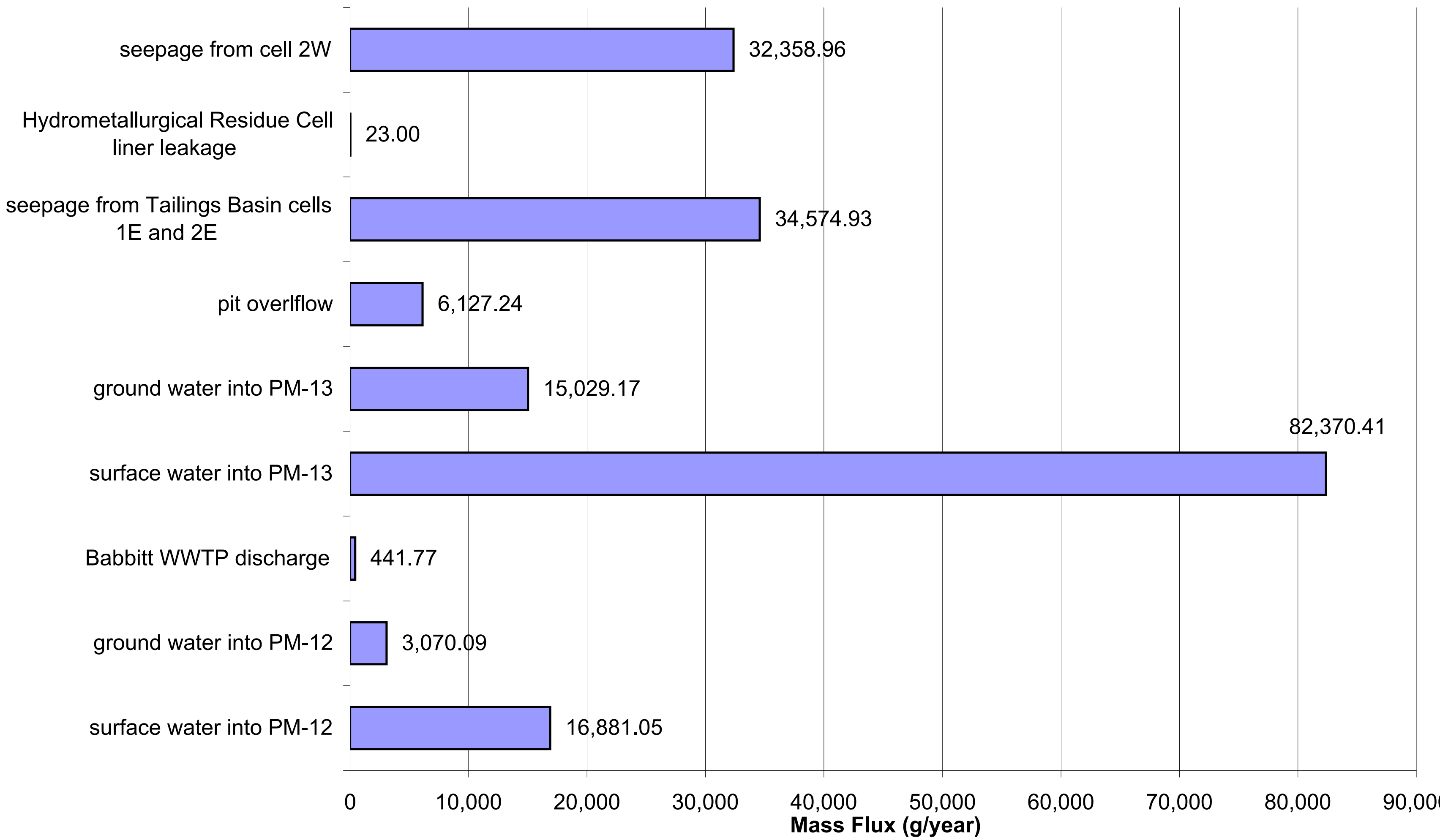

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Cobalt (Co)
seepage from cell 2W
2.31%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2E
1.69%
pit overlflow
0.21%
ground water into PM-13
0.86%
surface water into PM-13
78.67%
Babbitt WWTP discharge
0.04%
ground water into PM-12
0.18%
surface water into PM-12
16.03%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

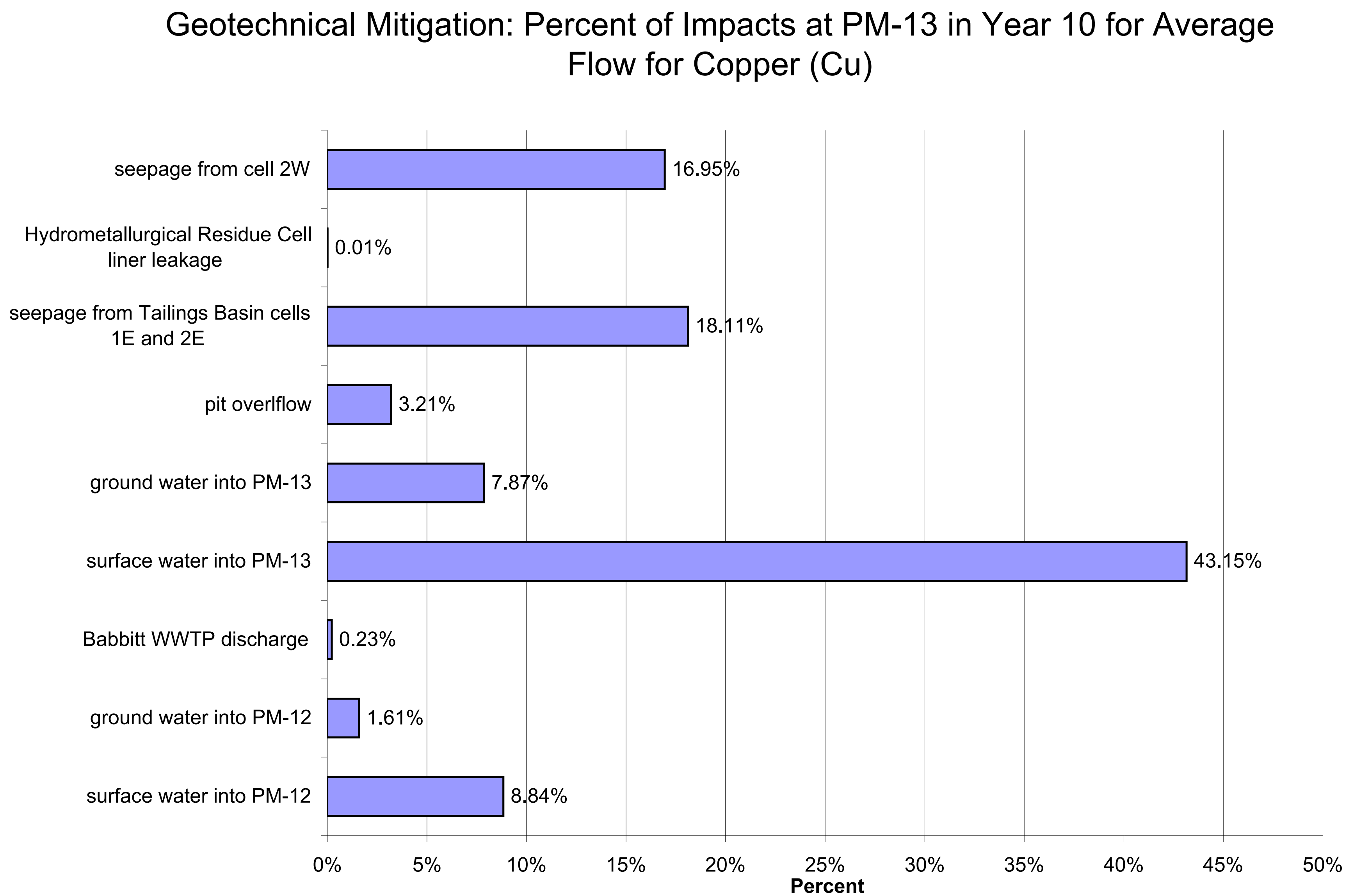
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Copper (Cu)

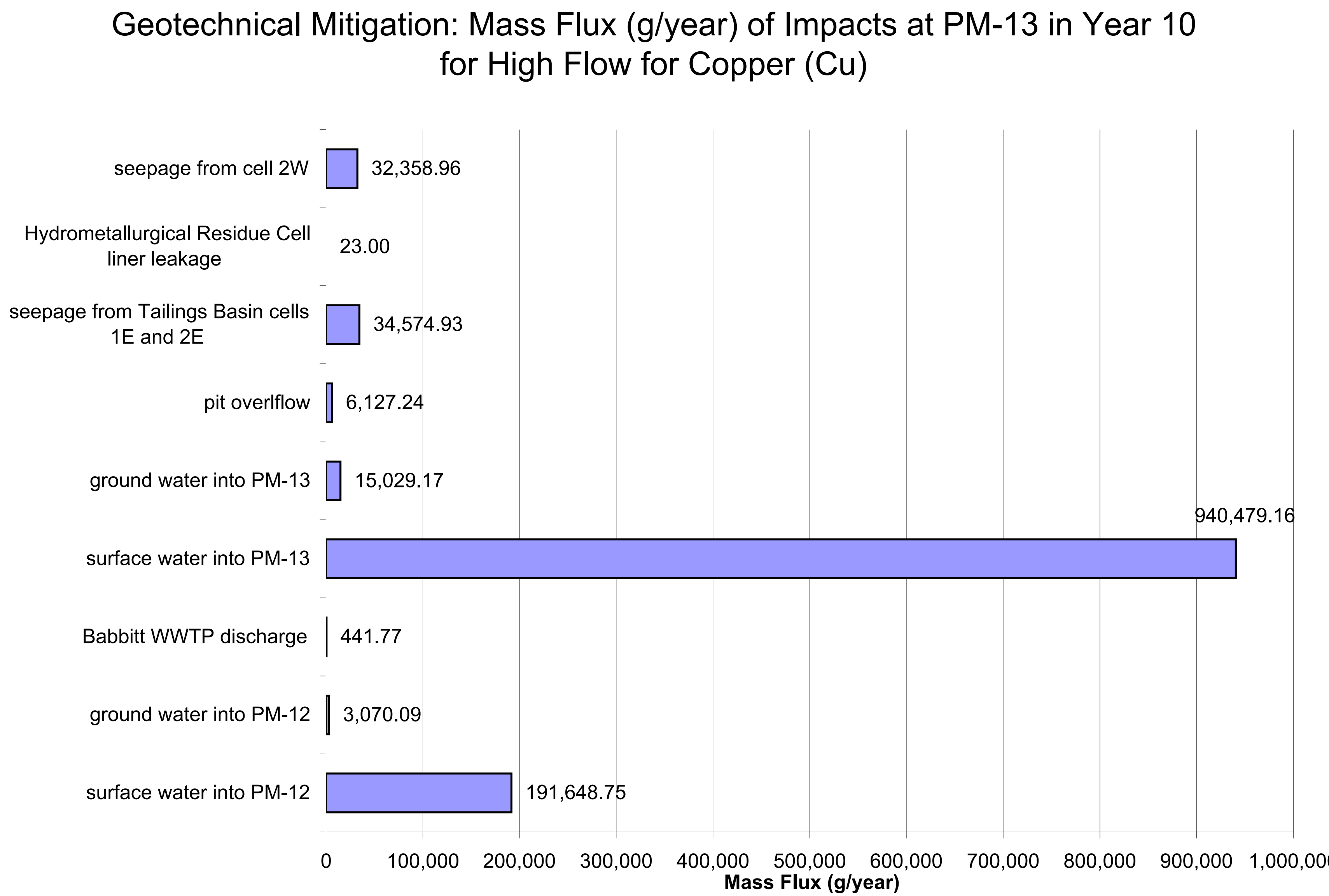



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Copper (Cu)
seepage from cell 2W
11.94%
Hydrometallurgical Residue Cell liner leakage
0.10%
seepage from Tailings Basin cells 1E and 2E
12.76%
pit overlflow
0.00%
ground water into PM-13
62.44%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
12.76%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

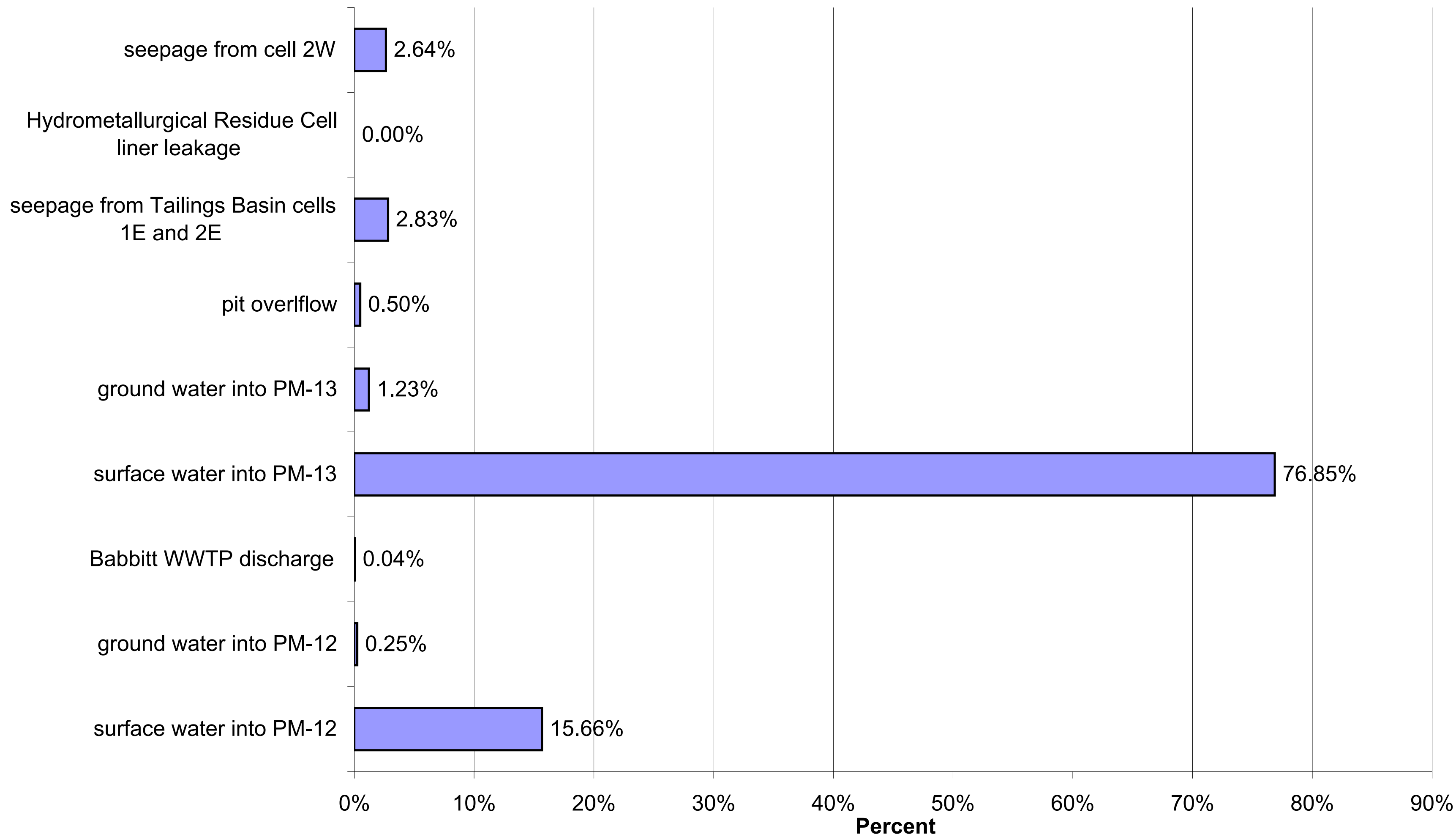
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Copper (Cu)



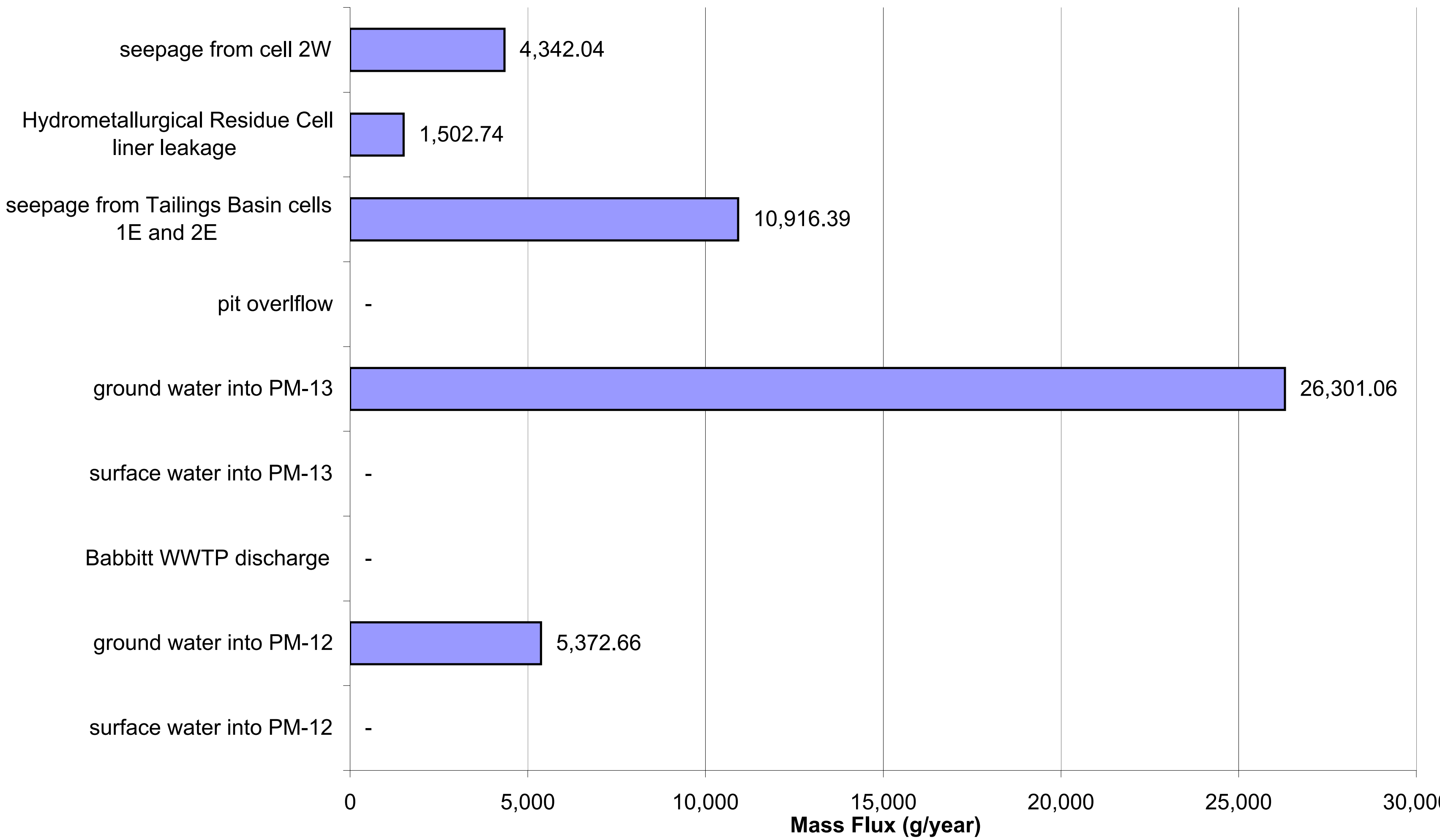

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Copper (Cu)
seepage from cell 2W
16.95%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
18.11%
pit overlflow
3.21%
ground water into PM-13
7.87%
surface water into PM-13
43.15%
Babbitt WWTP discharge
0.23%
ground water into PM-12
1.61%
surface water into PM-12
8.84%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Percent

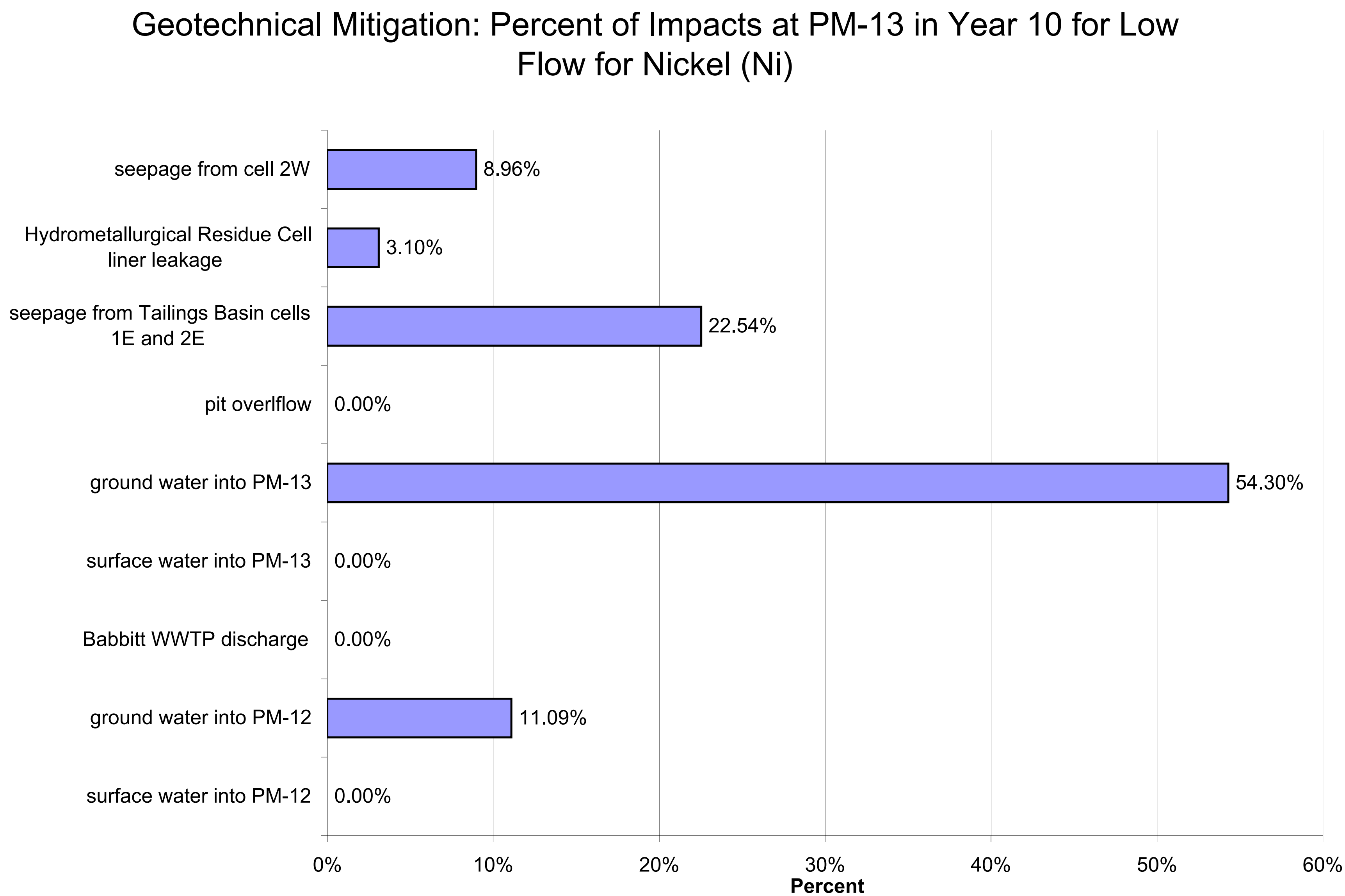

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Copper (Cu)
seepage from cell 2W
32,358.96
Hydrometallurgical Residue Cell liner leakage
23.00
seepage from Tailings Basin cells 1E and 2E
34,574.93
pit overlflow
6,127.24
ground water into PM-13
15,029.17
surface 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)

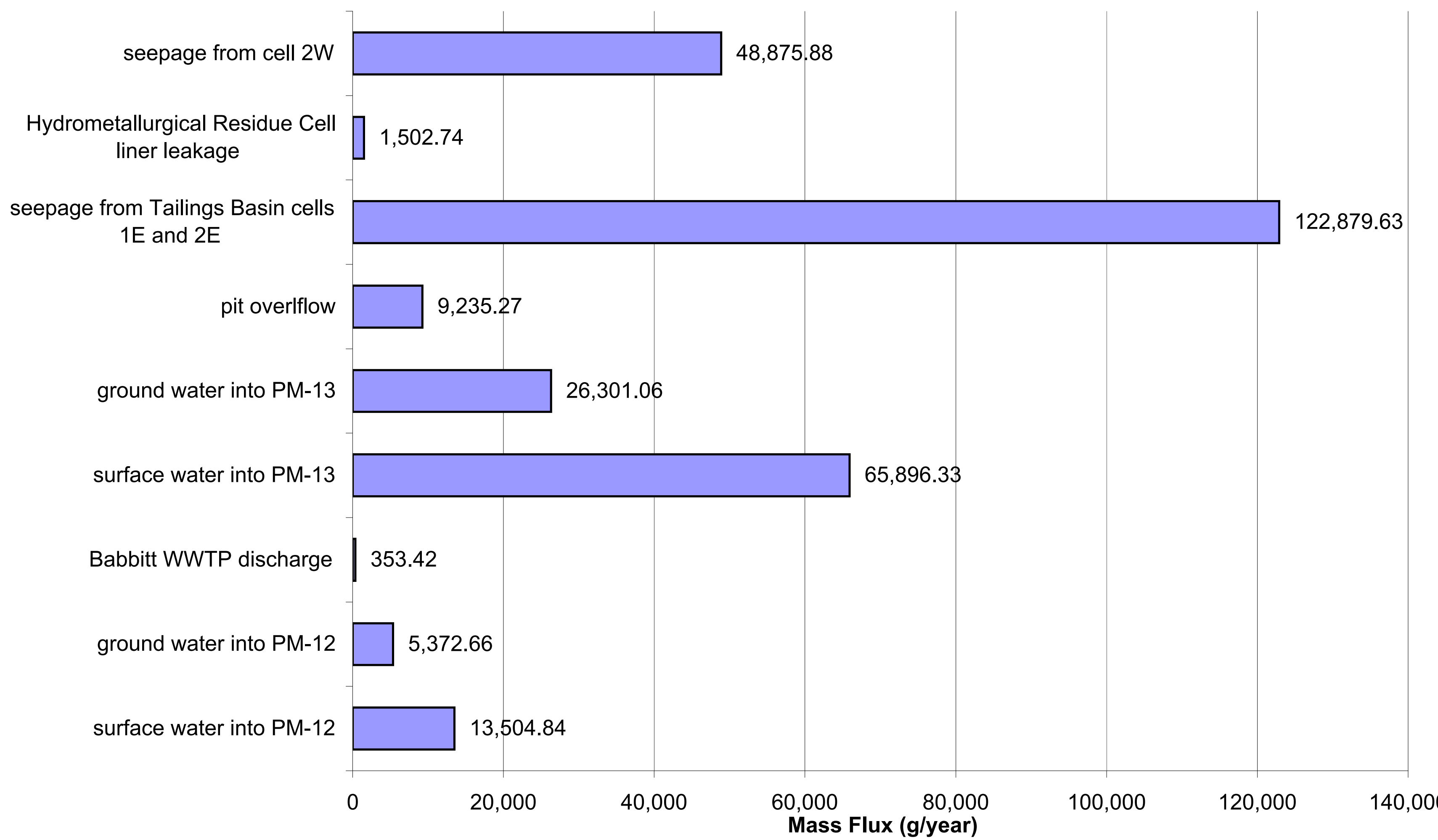


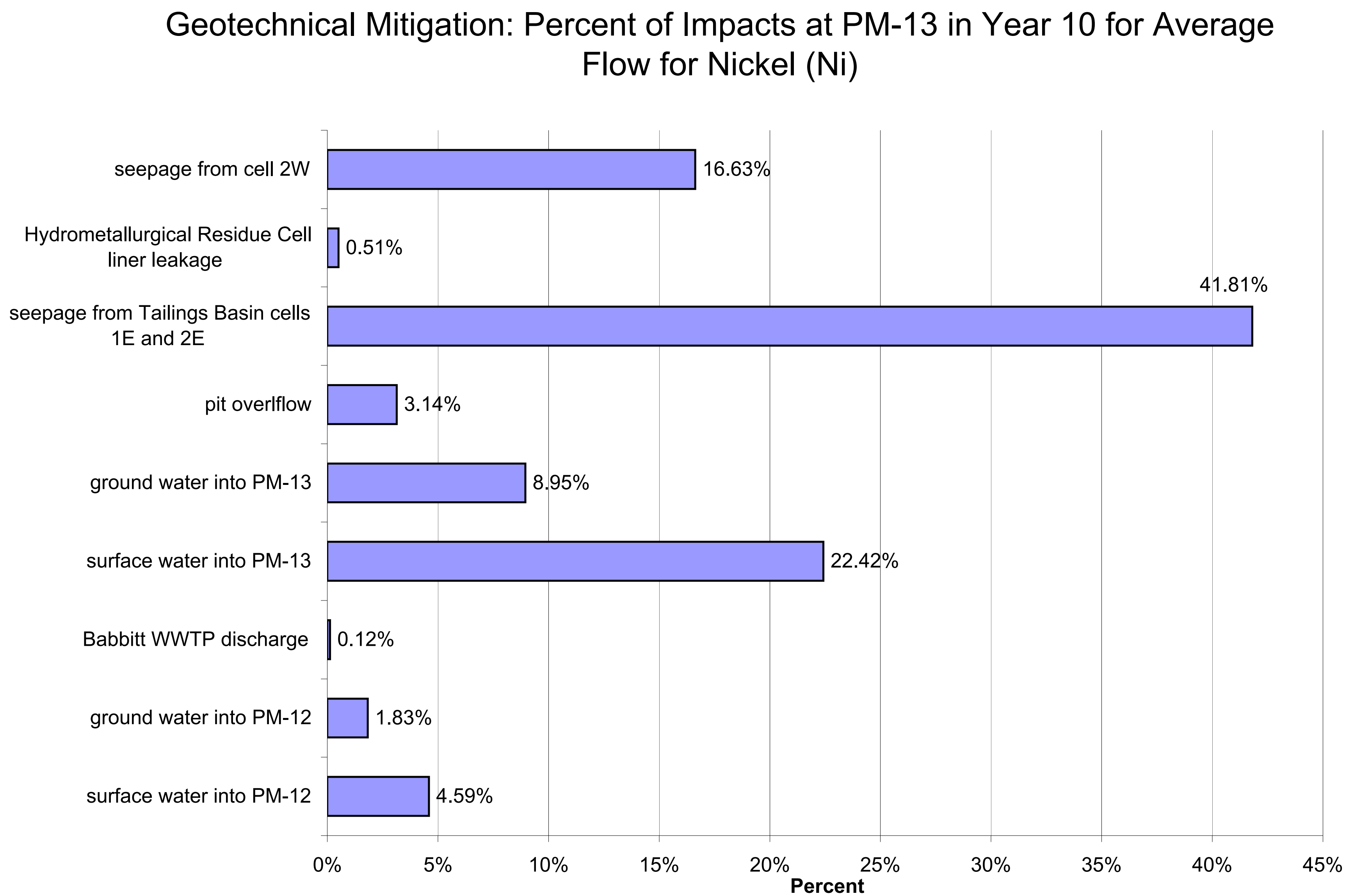
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Low Flow for Nickel (Ni)




Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Nickel (Ni)
seepage from cell 2W
8.96%
Hydrometallurgical Residue Cell liner leakage
3.10%
seepage from Tailings Basin cells 1E and 2E
22.54%
pit overlflow
0.00%
ground water into PM-13
54.30%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
11.09%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

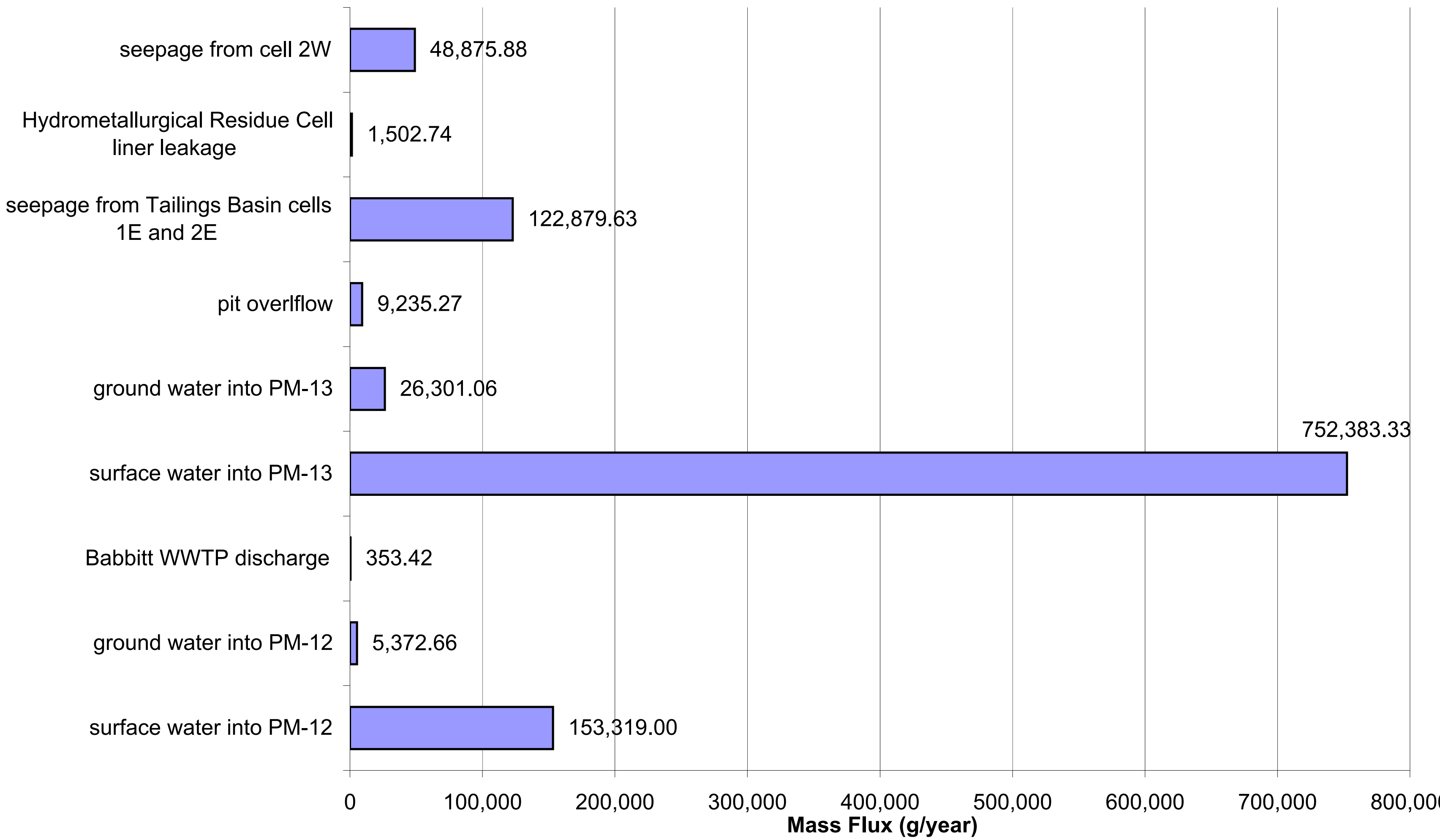
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for Average Flow for Nickel (Ni)

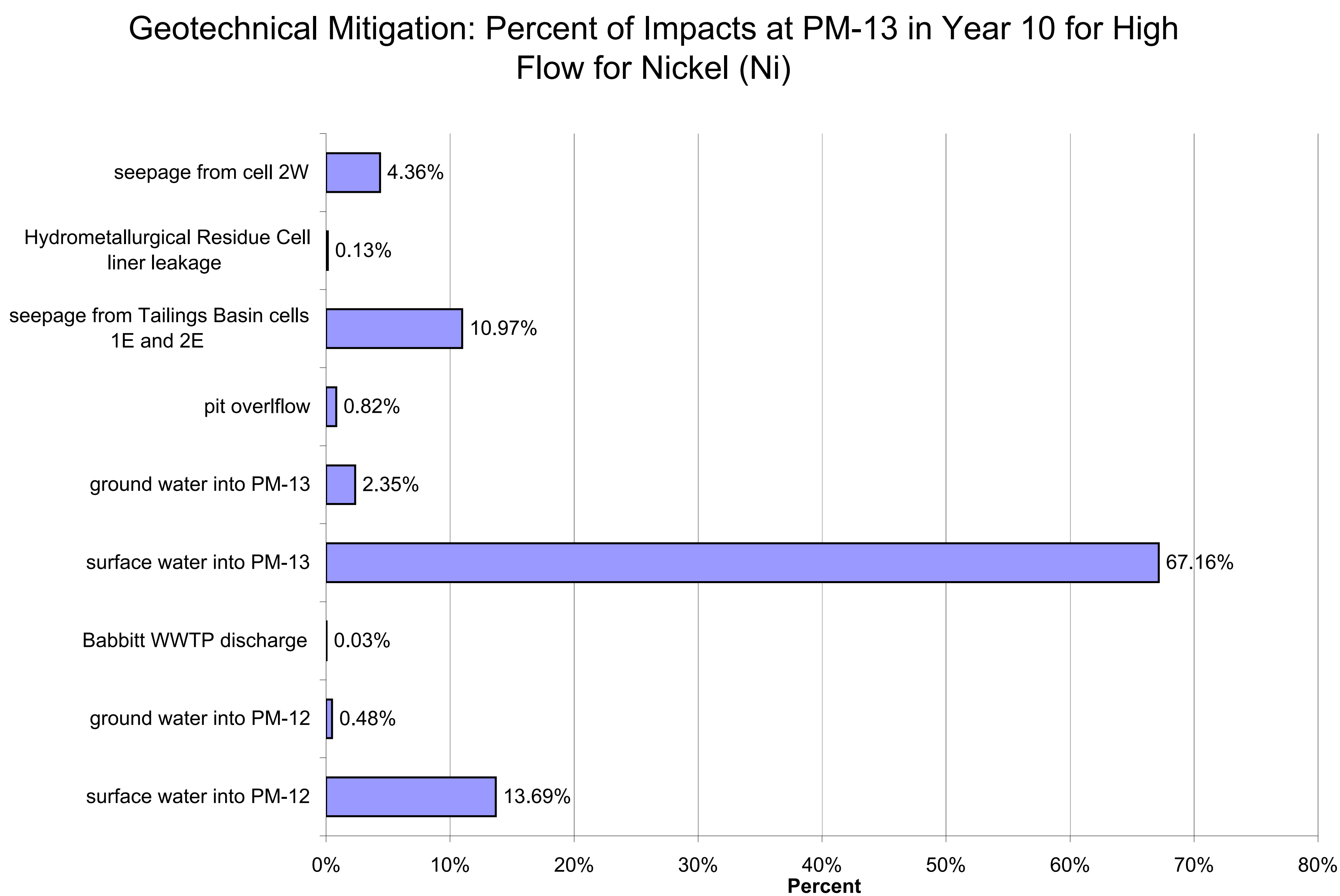



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Nickel (Ni)
seepage from cell 2W
16.63%
Hydrometallurgical Residue Cell liner leakage
0.51%
seepage from Tailings Basin cells 1E and 2E
41.81%
pit overlflow
3.14%
ground water into PM-13
8.95%
surface water into PM-13
22.42%
Babbitt WWTP discharge
0.12%
ground water into PM-12
1.83%
surface water into PM-12
4.59%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

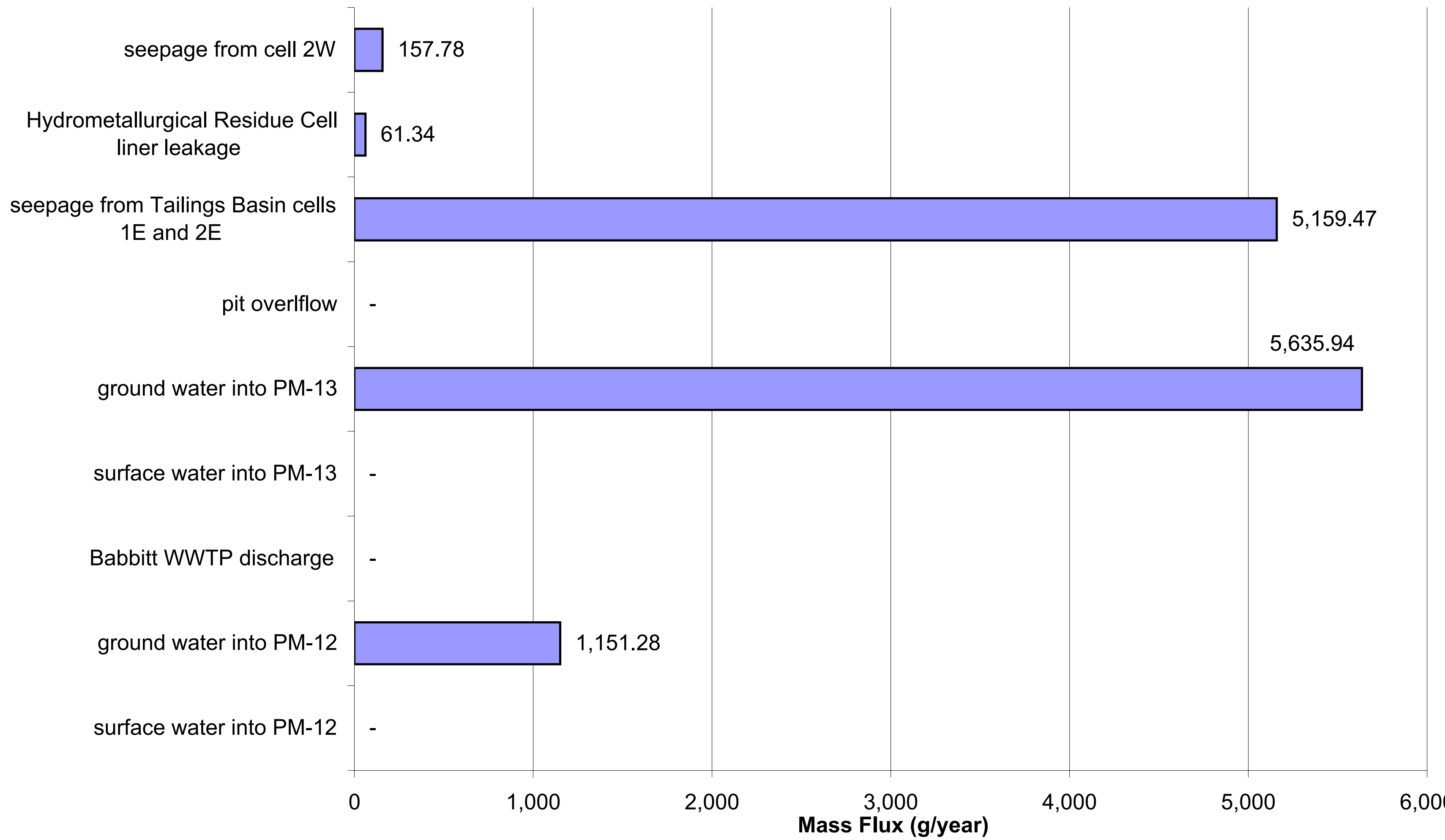
P:\Mpls\23 MN\69\2369862_MovedFromMpls_P\WO 015 EIS Rpts Studies\RS74 Water Quality Modeling\Model Predictions\Embarrass_v1_Mitigation\Sensitivity_Year10_TB_Mitigation
Ni, PM-13, high, mass flux

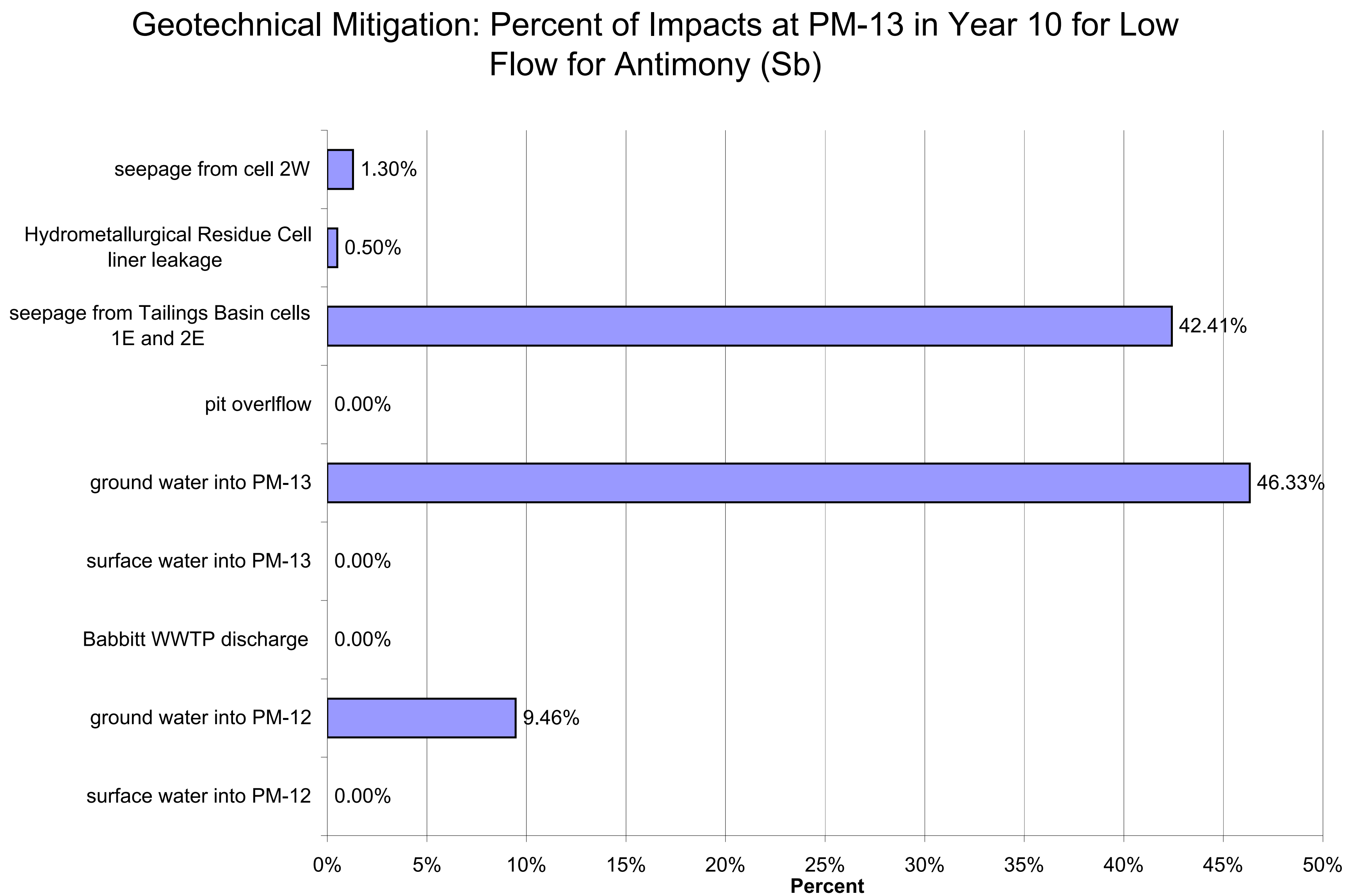
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 10 for High Flow for Nickel (Ni)

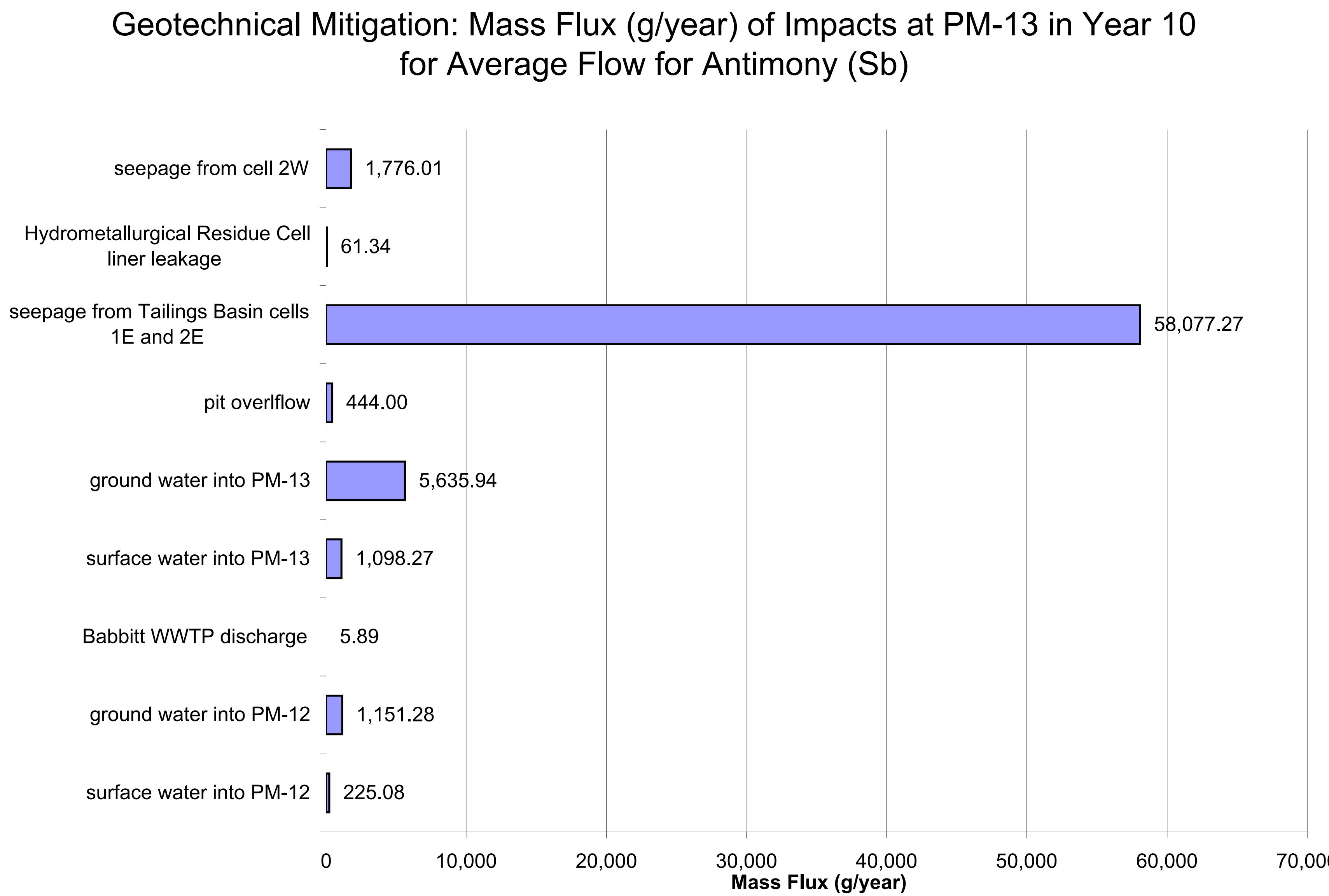


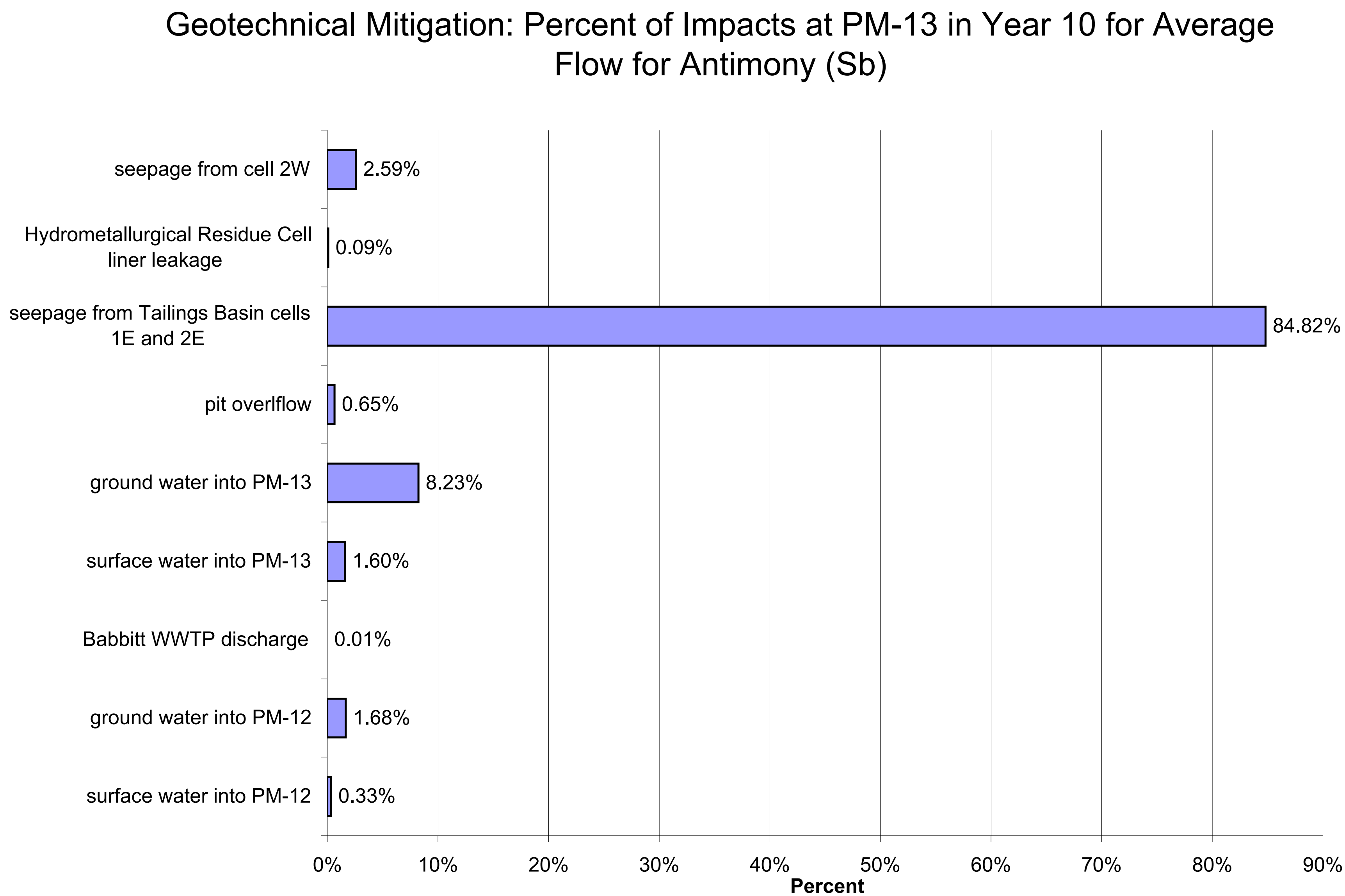

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Nickel (Ni)
seepage from cell 2W
4.36%
Hydrometallurgical Residue Cell liner leakage
0.13%
seepage from Tailings Basin cells 1E and 2E
10.97%
pit overlflow
0.82%
ground water into PM-13
2.35%
surface water into PM-13
67.16%
Babbitt WWTP discharge
0.03%
ground water into PM-12
0.48%
surface water into PM-12
13.69%
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)

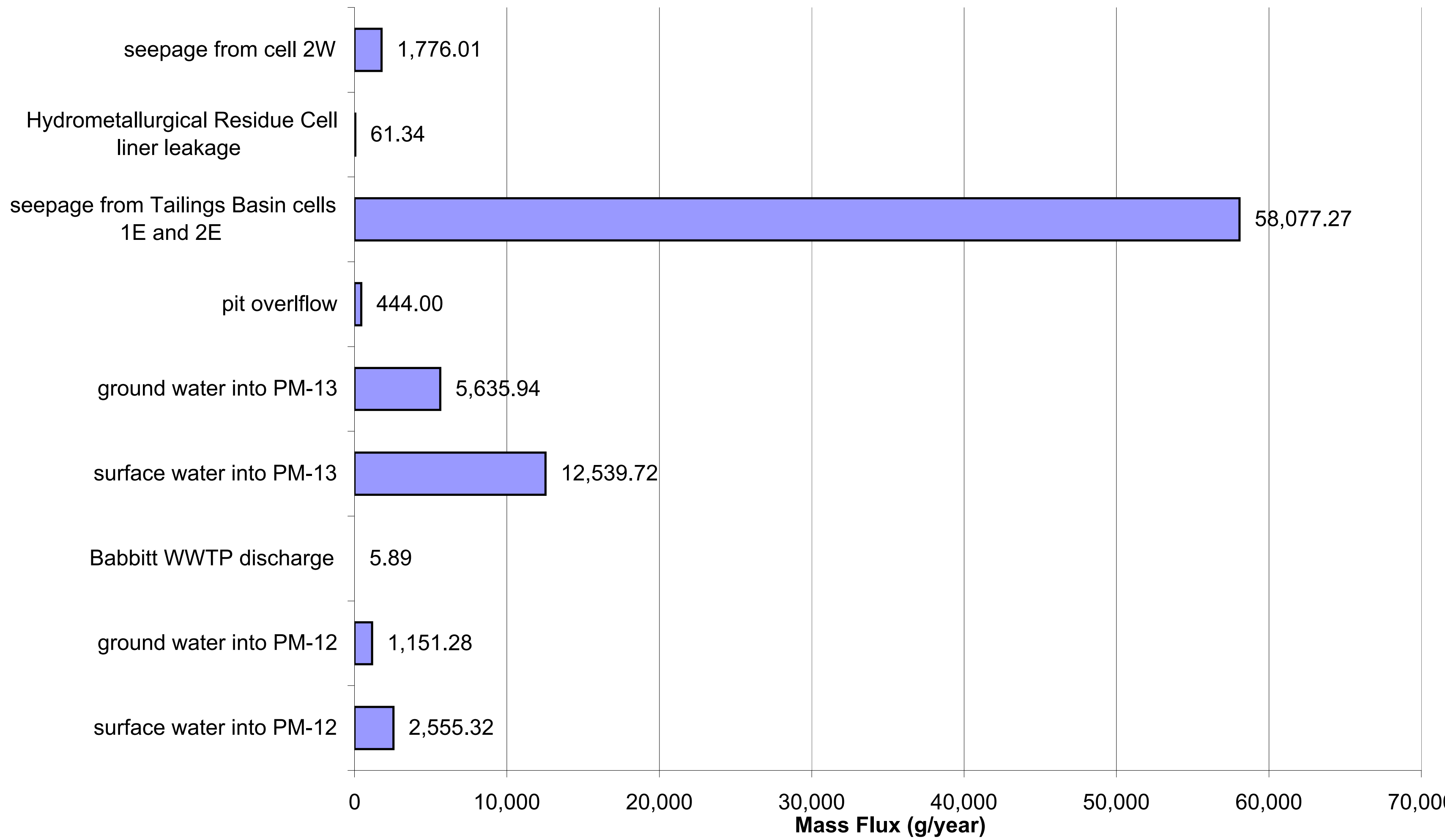


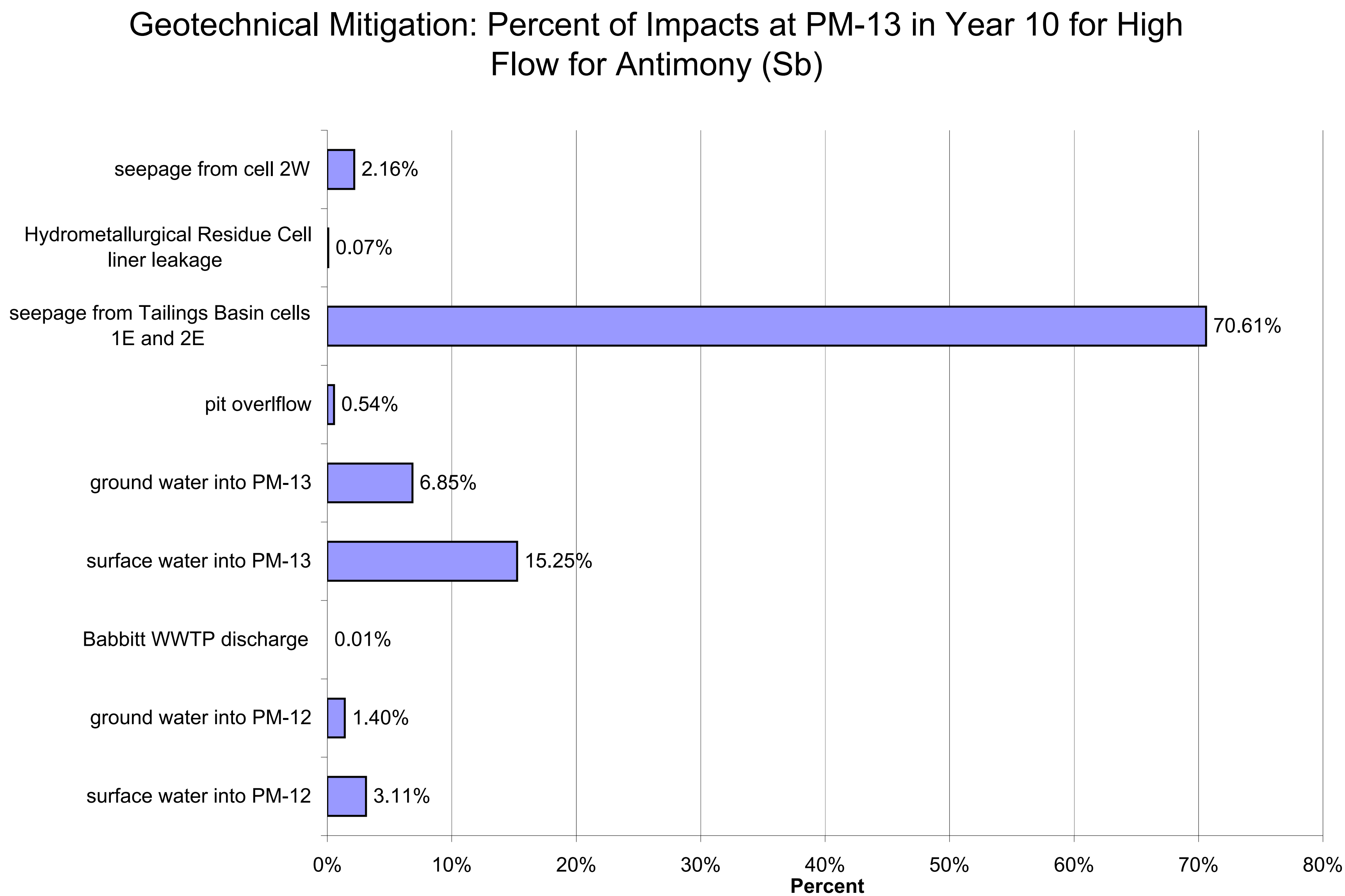

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Antimony (Sb)
seepage from cell 2W
1.30%
Hydrometallurgical Residue Cell liner leakage
0.50%
seepage from Tailings Basin cells 1E and 2E
42.41%
pit overlflow
0.00%
ground water into PM-13
46.33%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
9.46%
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 10 for Average Flow for Antimony (Sb)
seepage from cell 2W
1,776.01
Hydrometallurgical Residue Cell liner leakage
61.34
seepage from Tailings Basin cells 1E and 2E
58,077.27
pit overlflow
444.00
ground water into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
ground water into PM-12
1,151.28
surface water into PM-12
225.08
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Mass Flux (g/year)

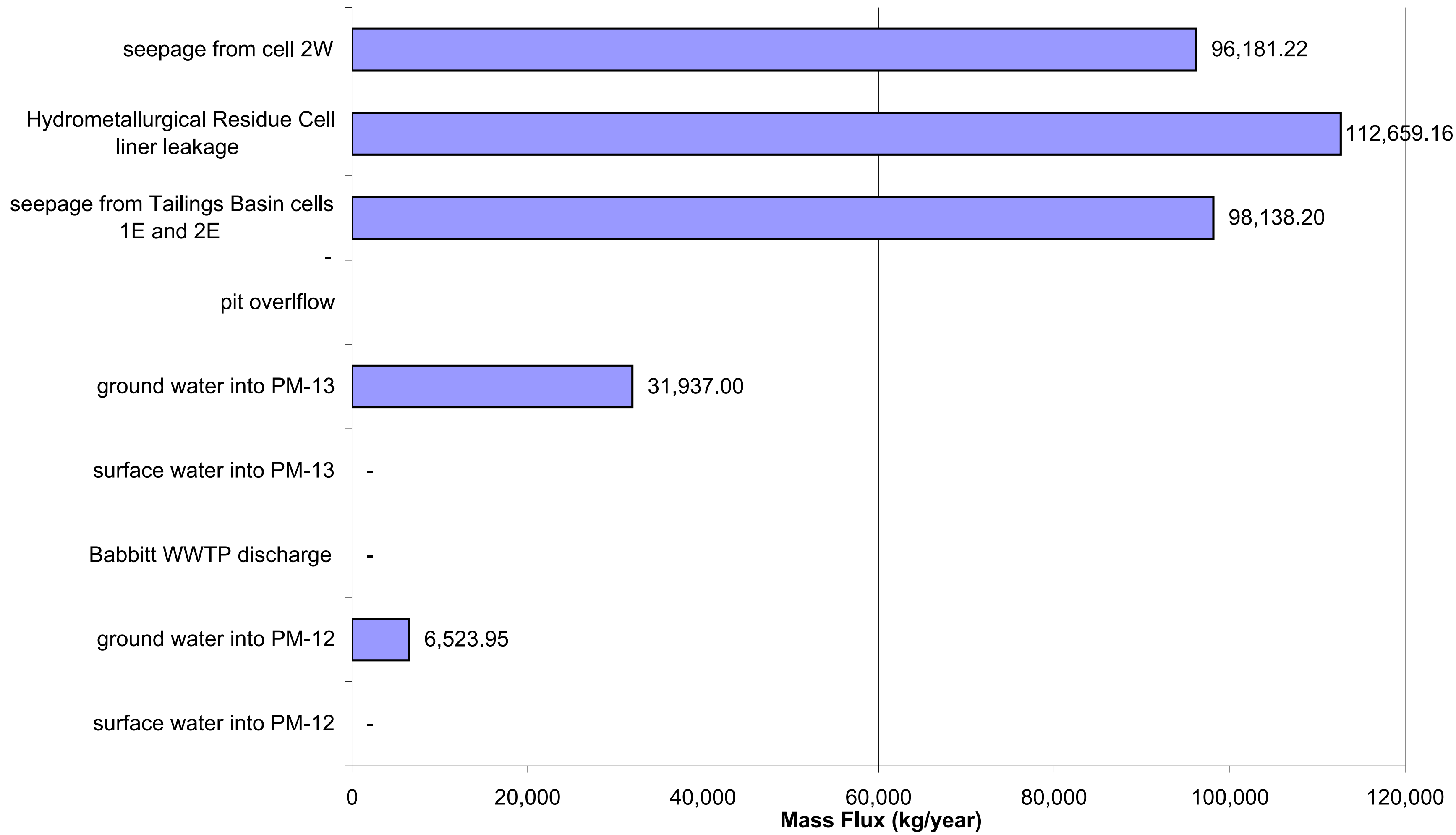

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Antimony (Sb)
seepage from cell 2W
2.59%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
84.82%
pit overlflow
0.65%
ground water into PM-13
8.23%
surface water into PM-13
1.60%
Babbitt WWTP discharge
0.01%
ground water into PM-12
1.68%
surface water into PM-12
0.33%
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)

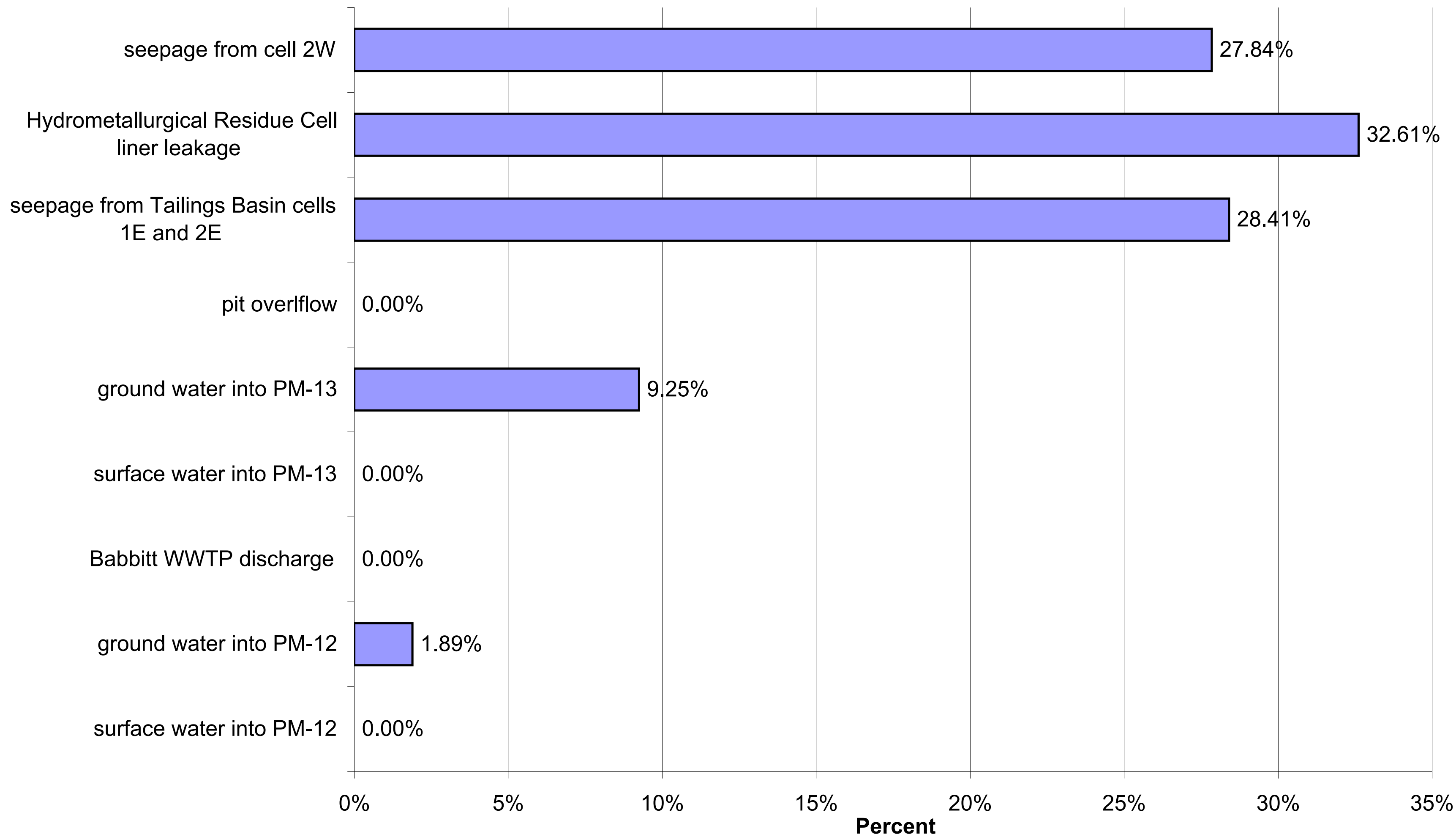



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for High Flow for Antimony (Sb)
seepage from cell 2W
2.16%
Hydrometallurgical Residue Cell liner leakage
0.07%
seepage from Tailings Basin cells 1E and 2E
70.61%
pit overlflow
0.54%
ground water into PM-13
6.85%
surface water into PM-13
15.25%
Babbitt WWTP discharge
0.01%
ground water into PM-12
1.40%
surface water into PM-12
3.11%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

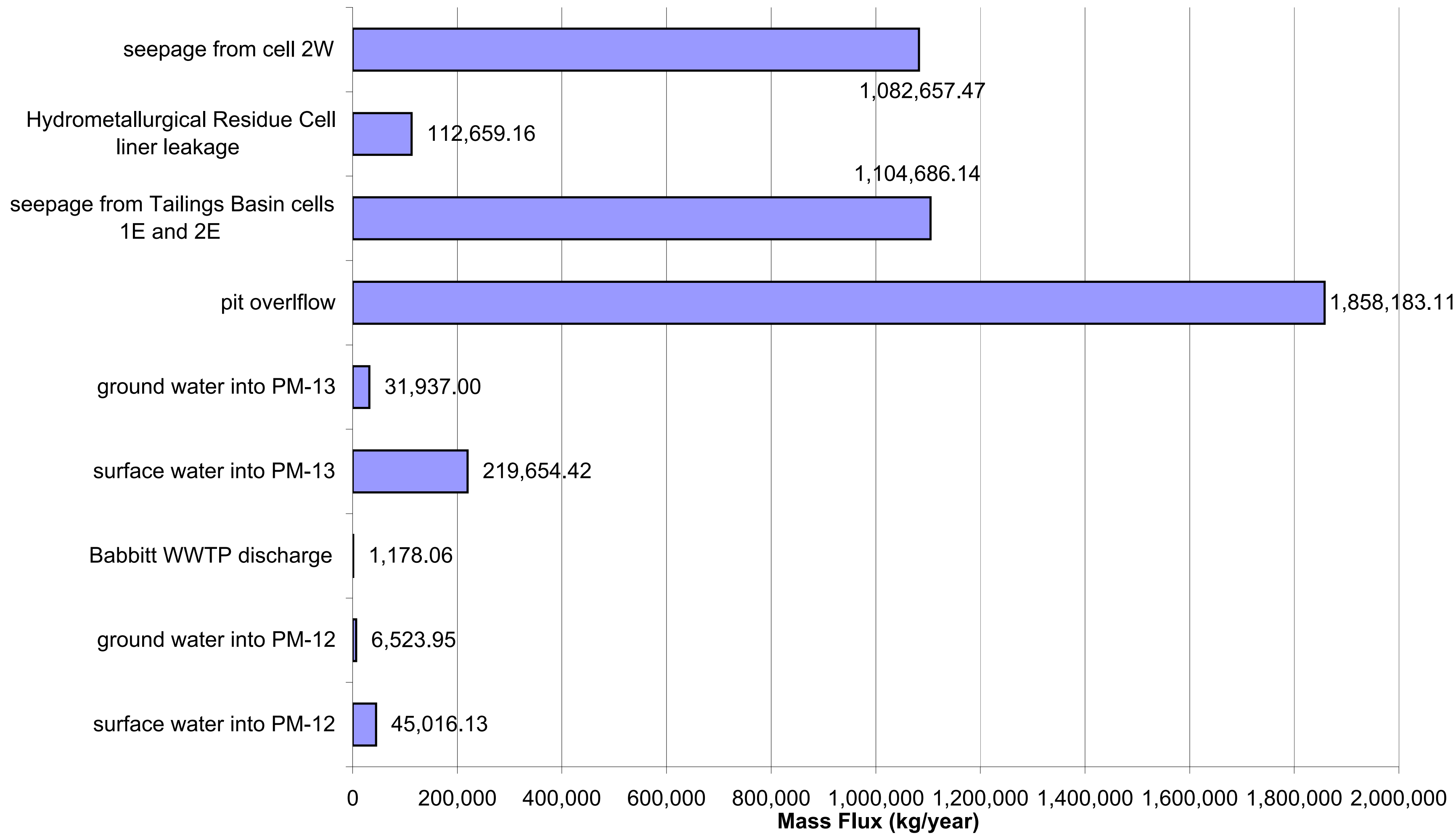
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 10 for Low Flow for Sulfate (SO_4)

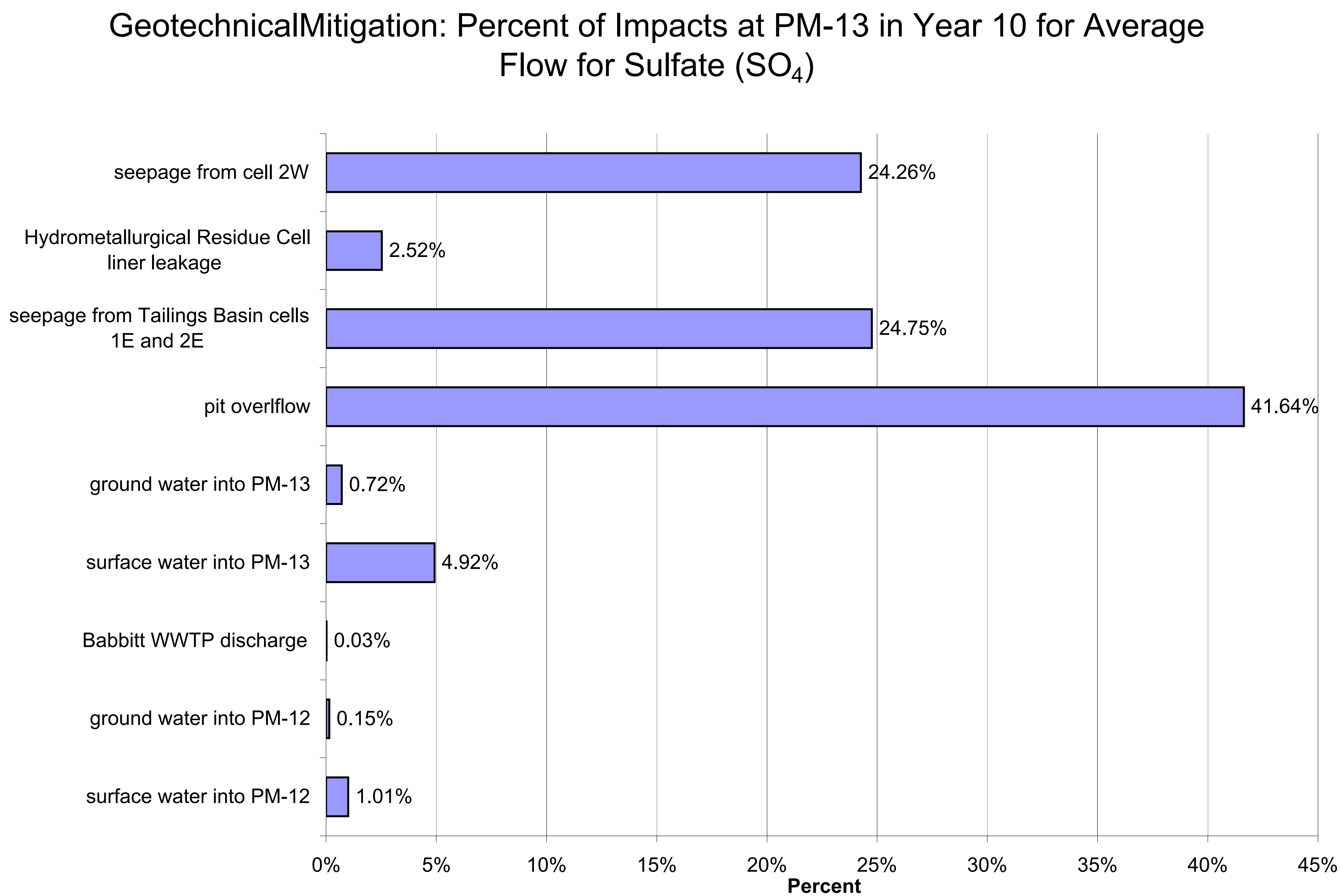


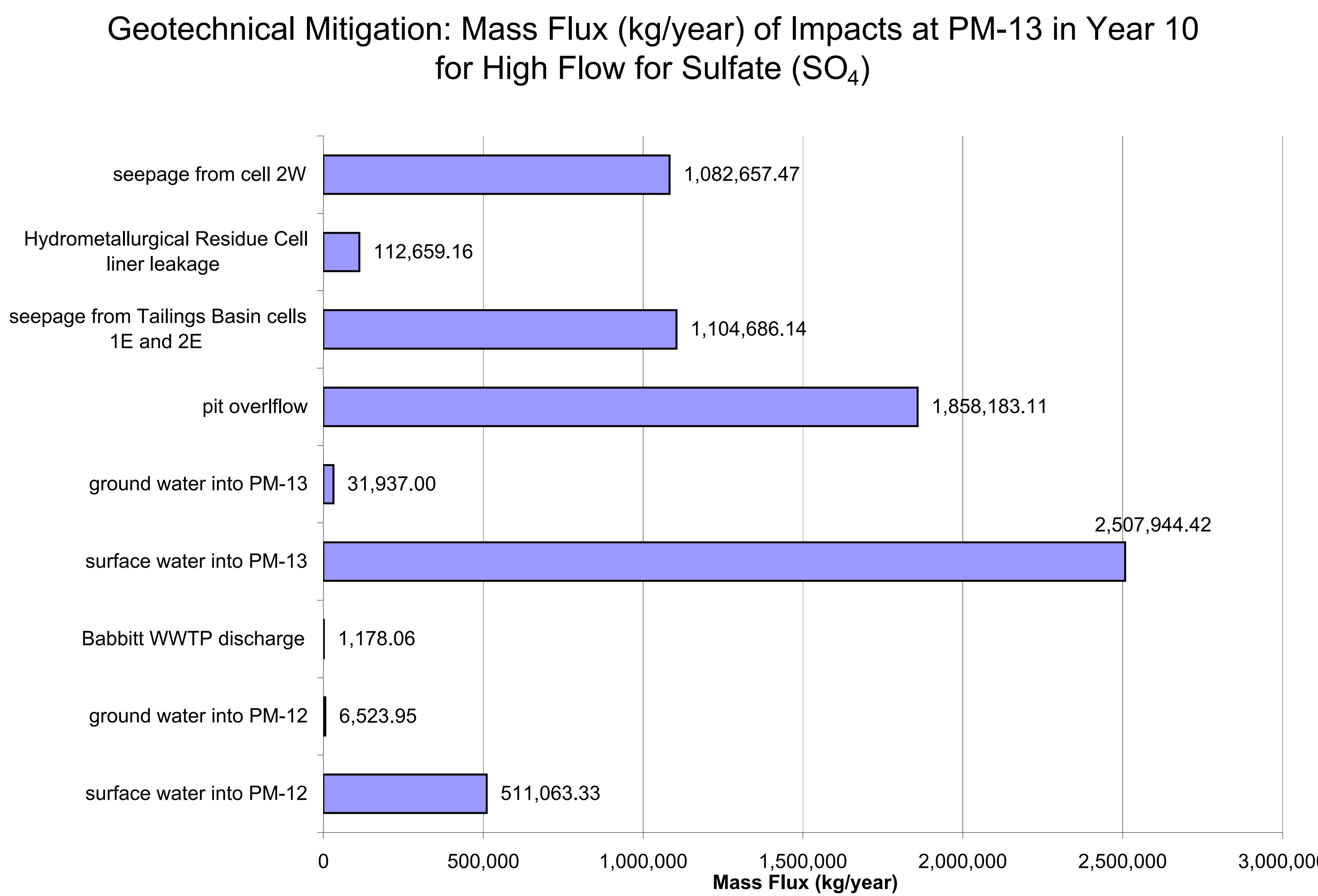
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 10 for Low Flow for Sulfate (SO_4)



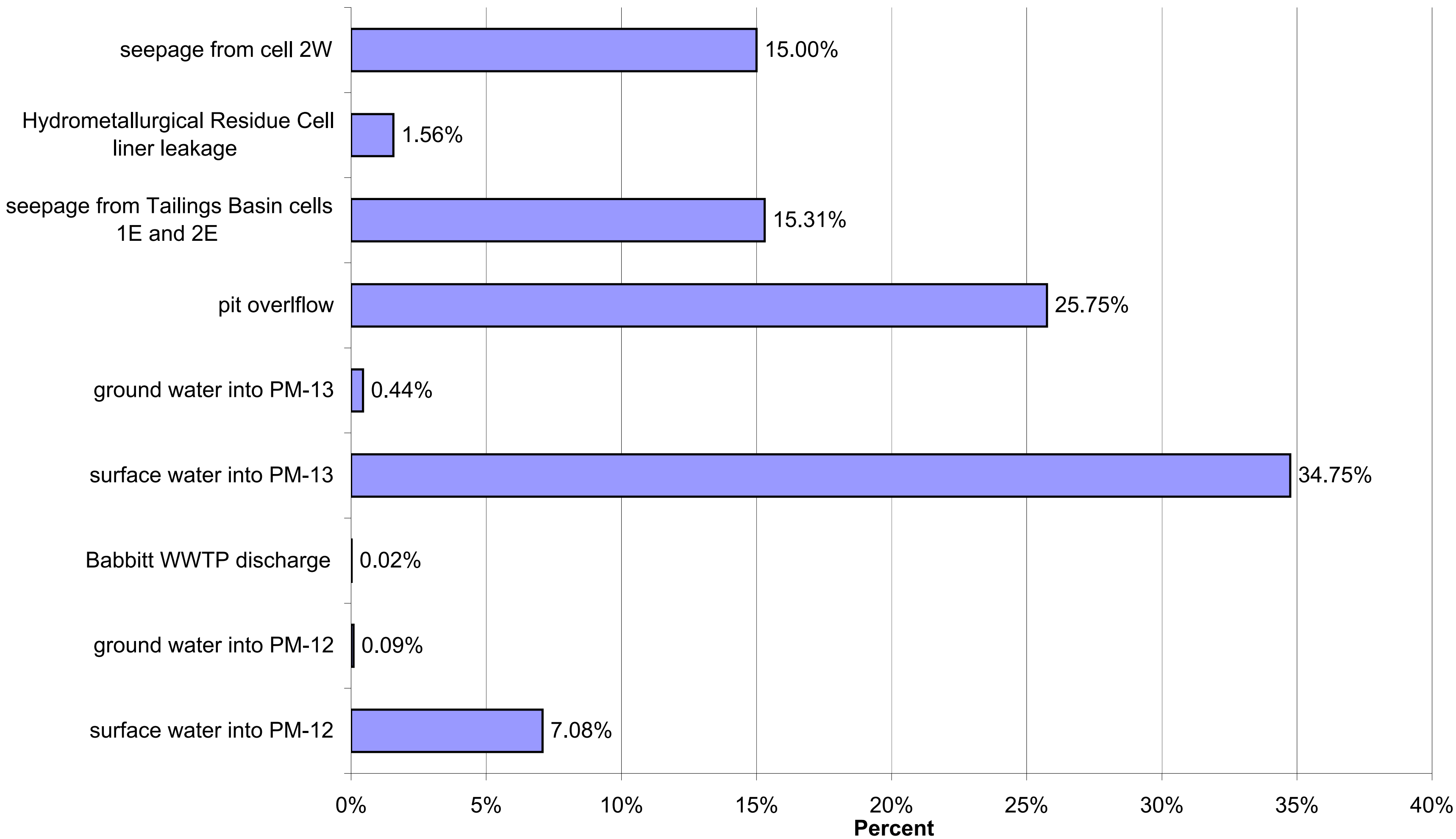
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 10 for Average Flow for Sulfate (SO_4)



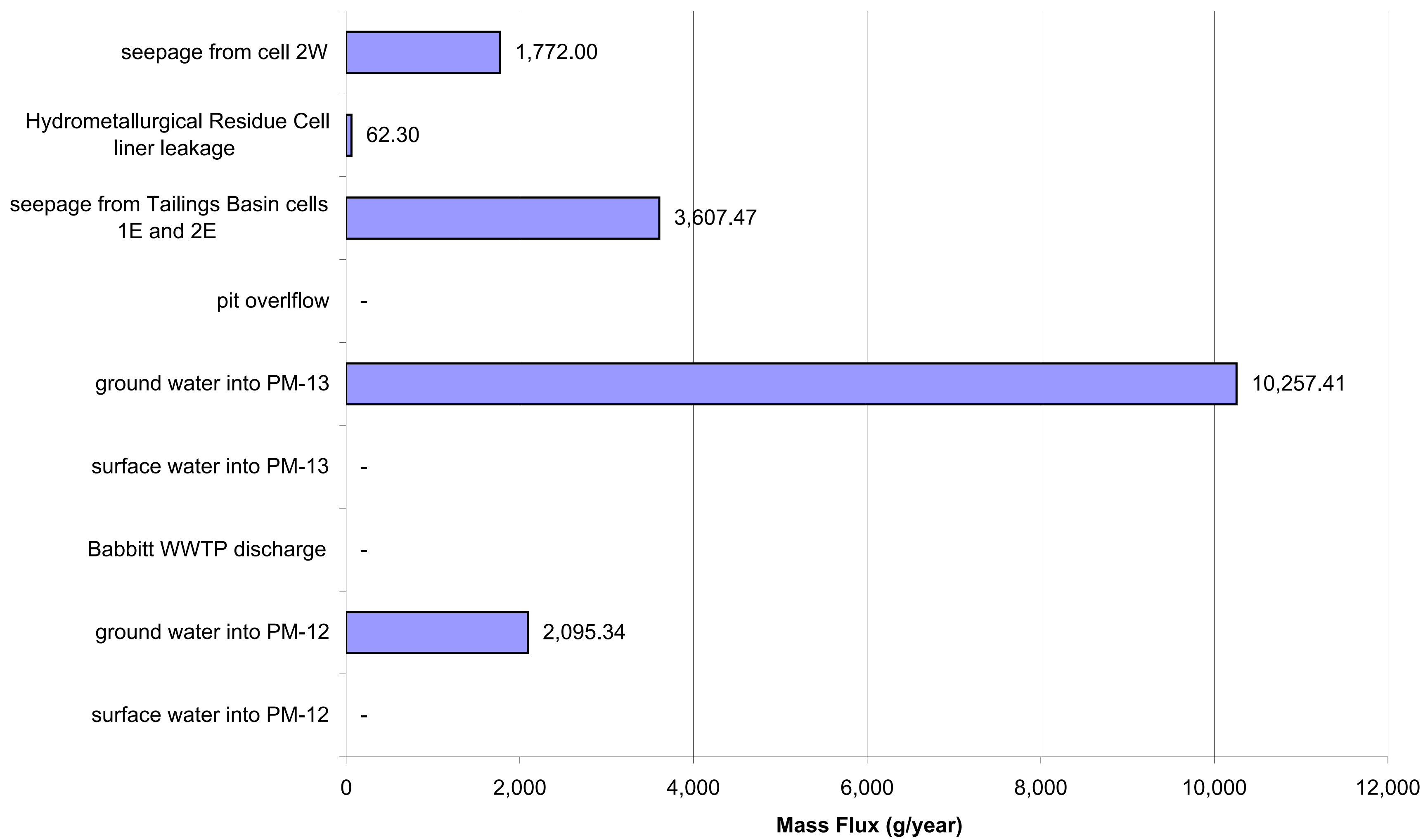

GeotechnicalMitigation: Percent of Impacts at PM-13 in Year 10 for Average Flow for Sulfate (SO_4)
seepage from cell 2W
24.26%
Hydrometallurgical Residue Cell liner leakage
2.52%
seepage from Tailings Basin cells 1E and 2E
24.75%
pit overlflow
41.64%
ground water into PM-13
0.72%
surface water into PM-13
4.92%
Babbitt WWTP discharge
0.03%
ground water into PM-12
0.15%
surface water into PM-12
1.01%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

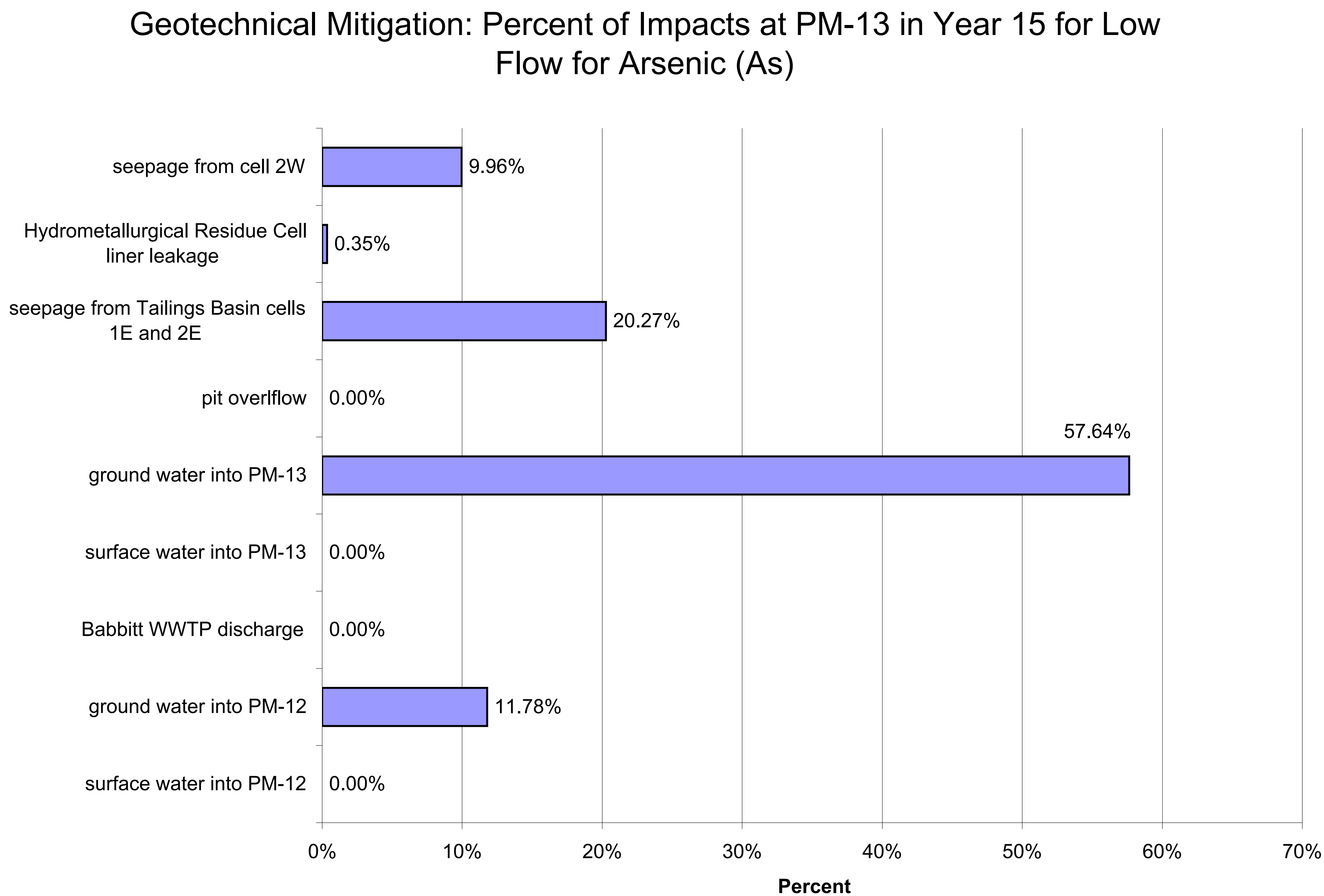

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 10 for High Flow for Sulfate (SO_4)
seepage from cell 2W
1,082,657.47
Hydrometallurgical Residue Cell liner leakage
112,659.16
seepage from Tailings Basin cells 1E and 2E
1,104,686.14
pit overlflow
1,858,183.11
ground water into 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)

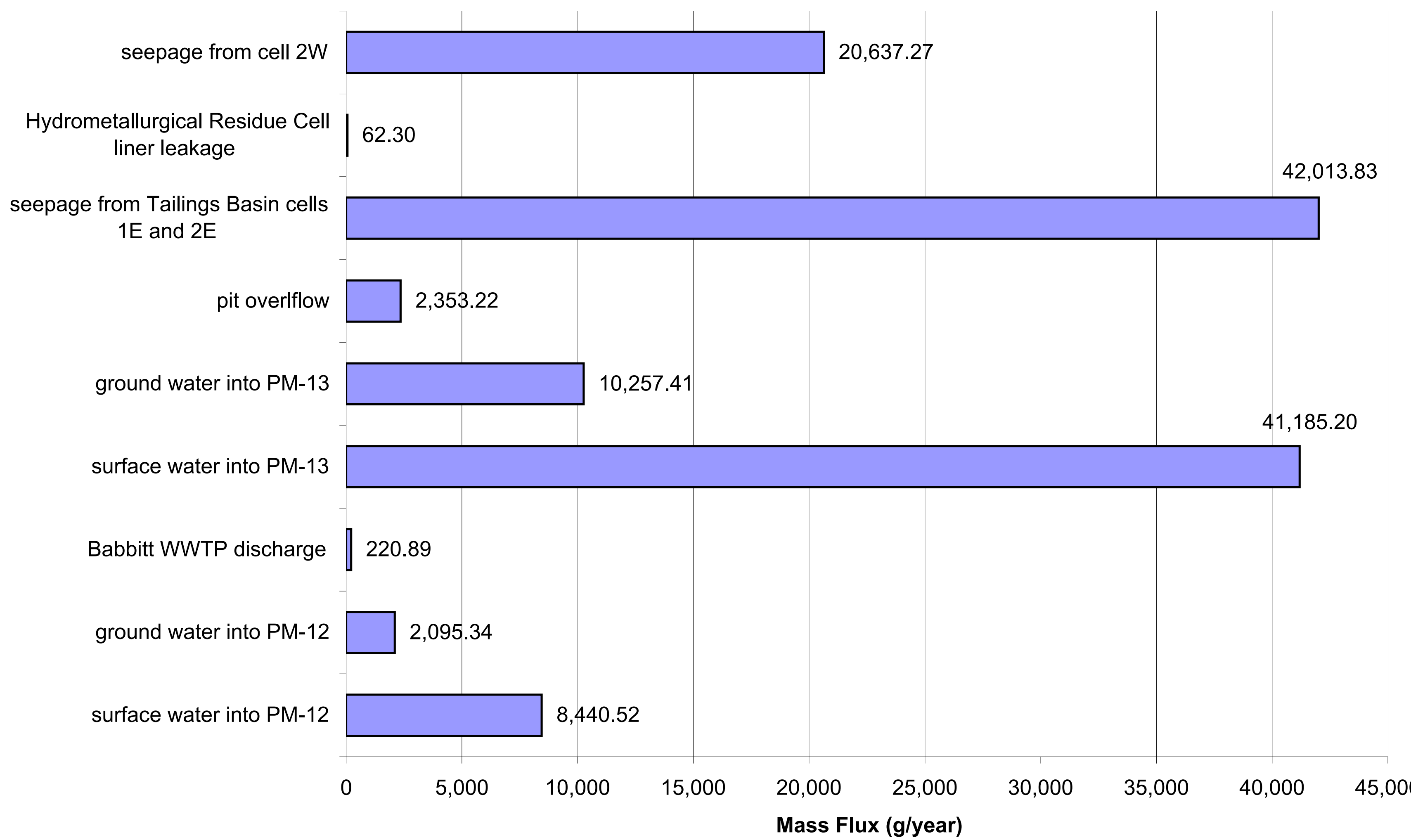


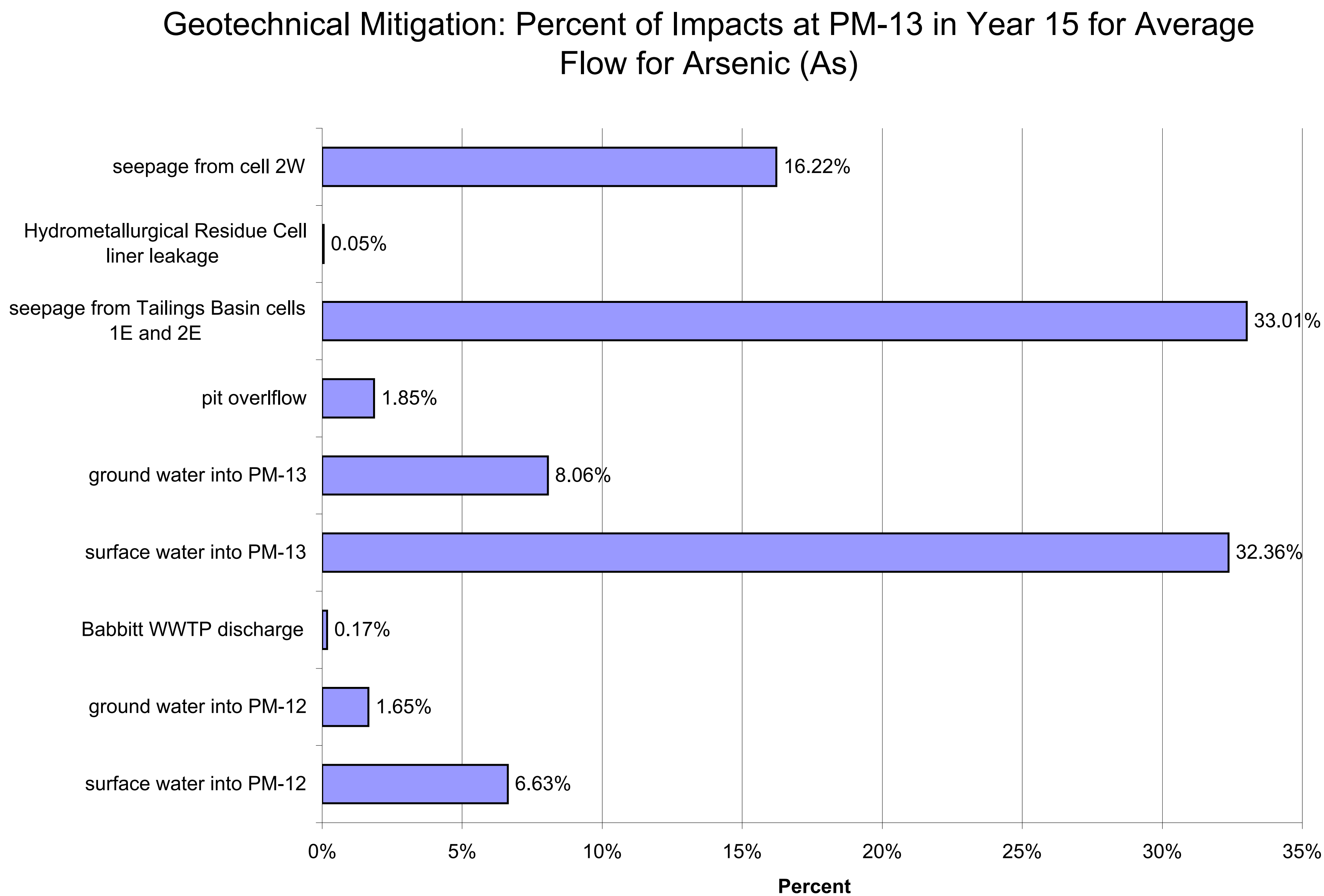
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)

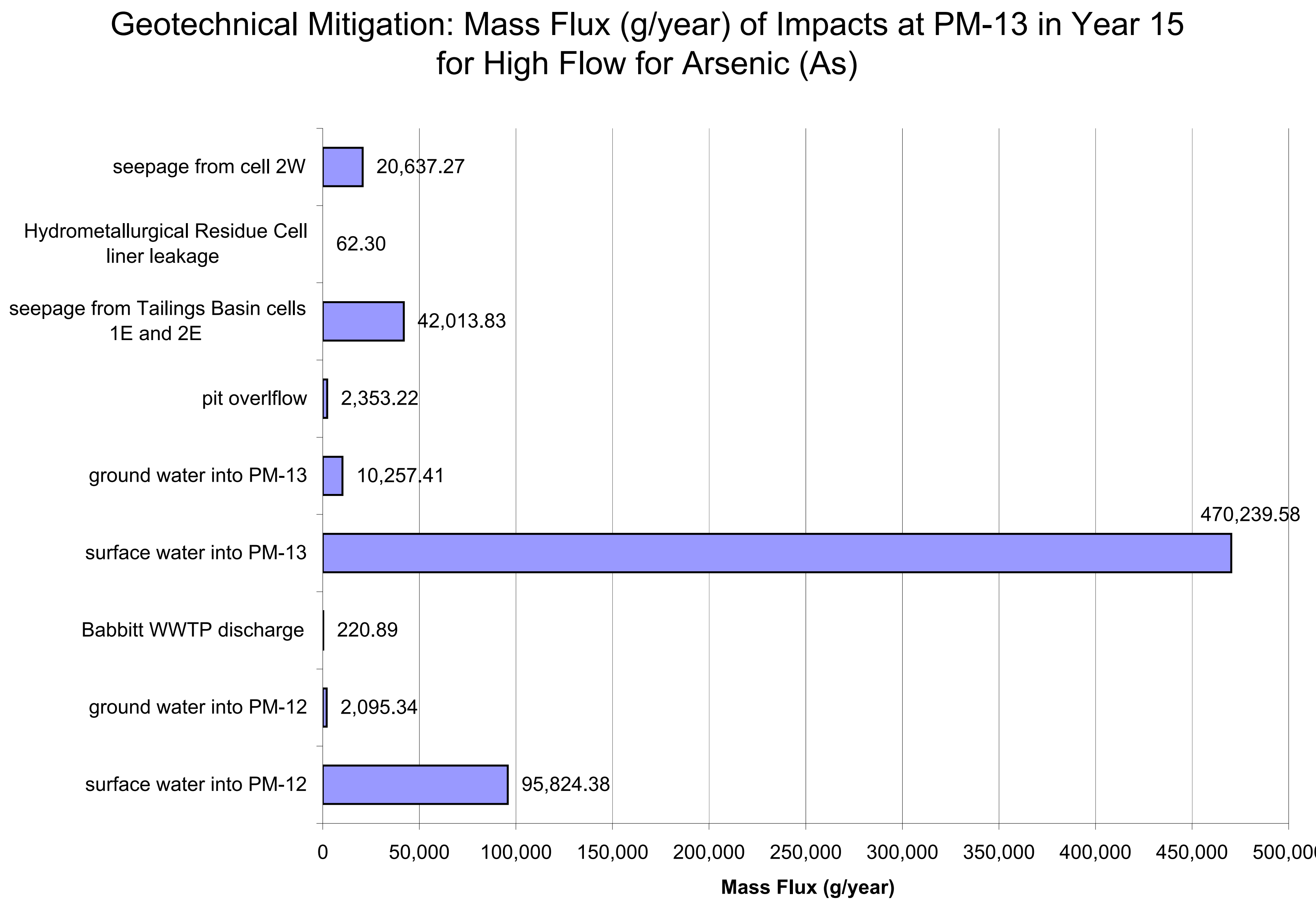



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Arsenic (As)
seepage from cell 2W
9.96%
Hydrometallurgical Residue Cell liner leakage
0.35%
seepage from Tailings Basin cells 1E and 2E
20.27%
pit overlflow
0.00%
ground water into PM-13
57.64%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
11.78%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

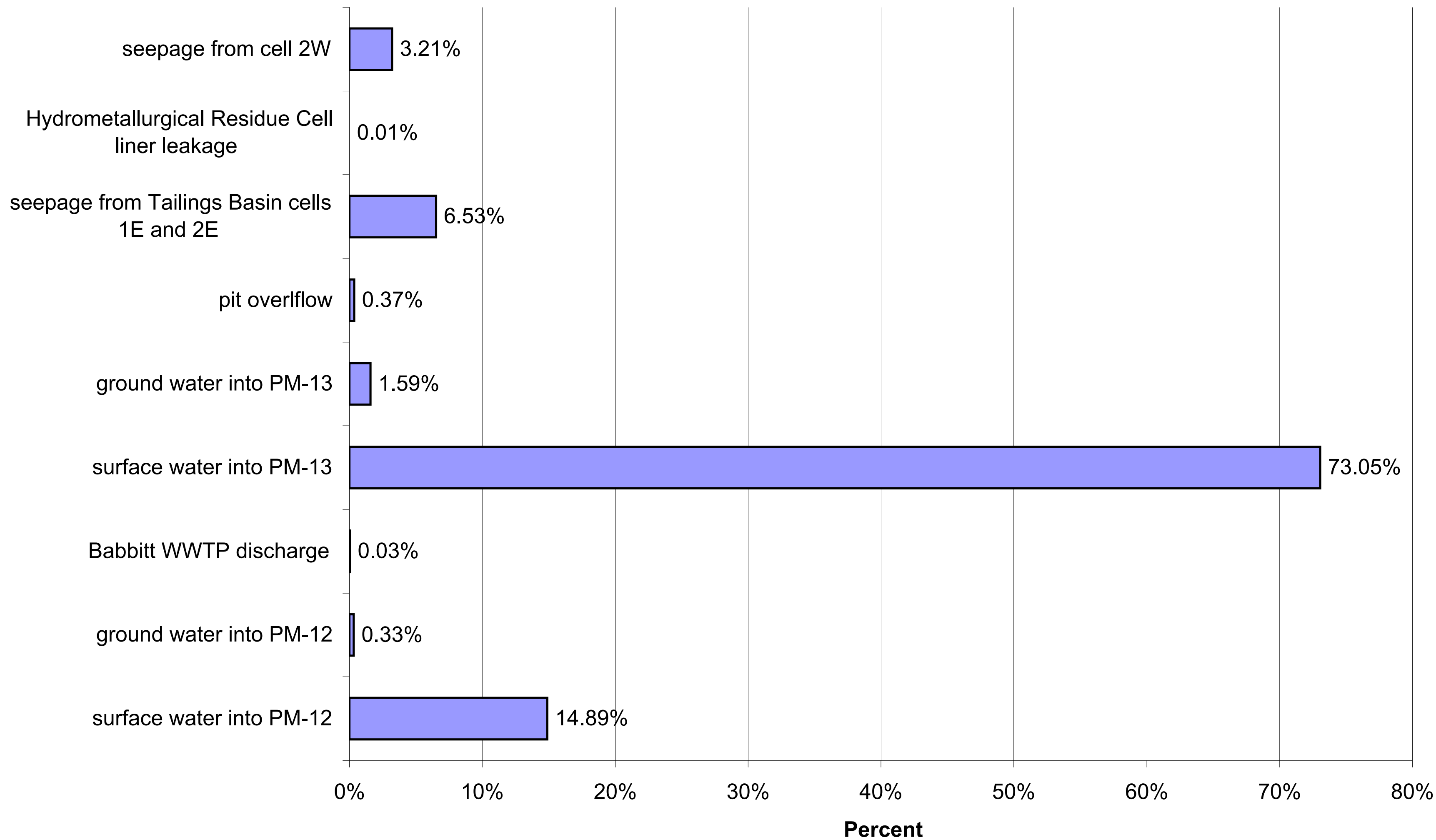
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)

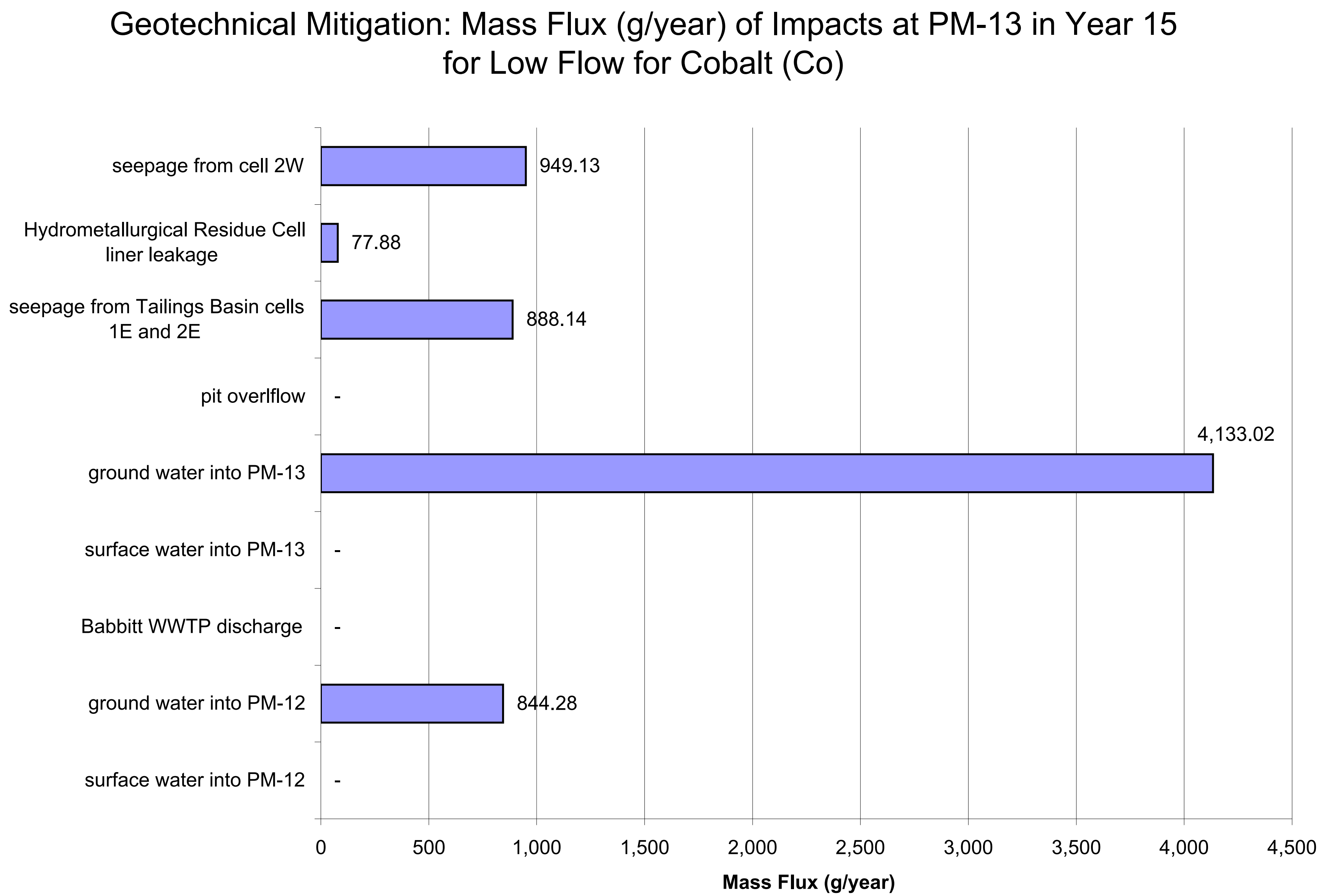


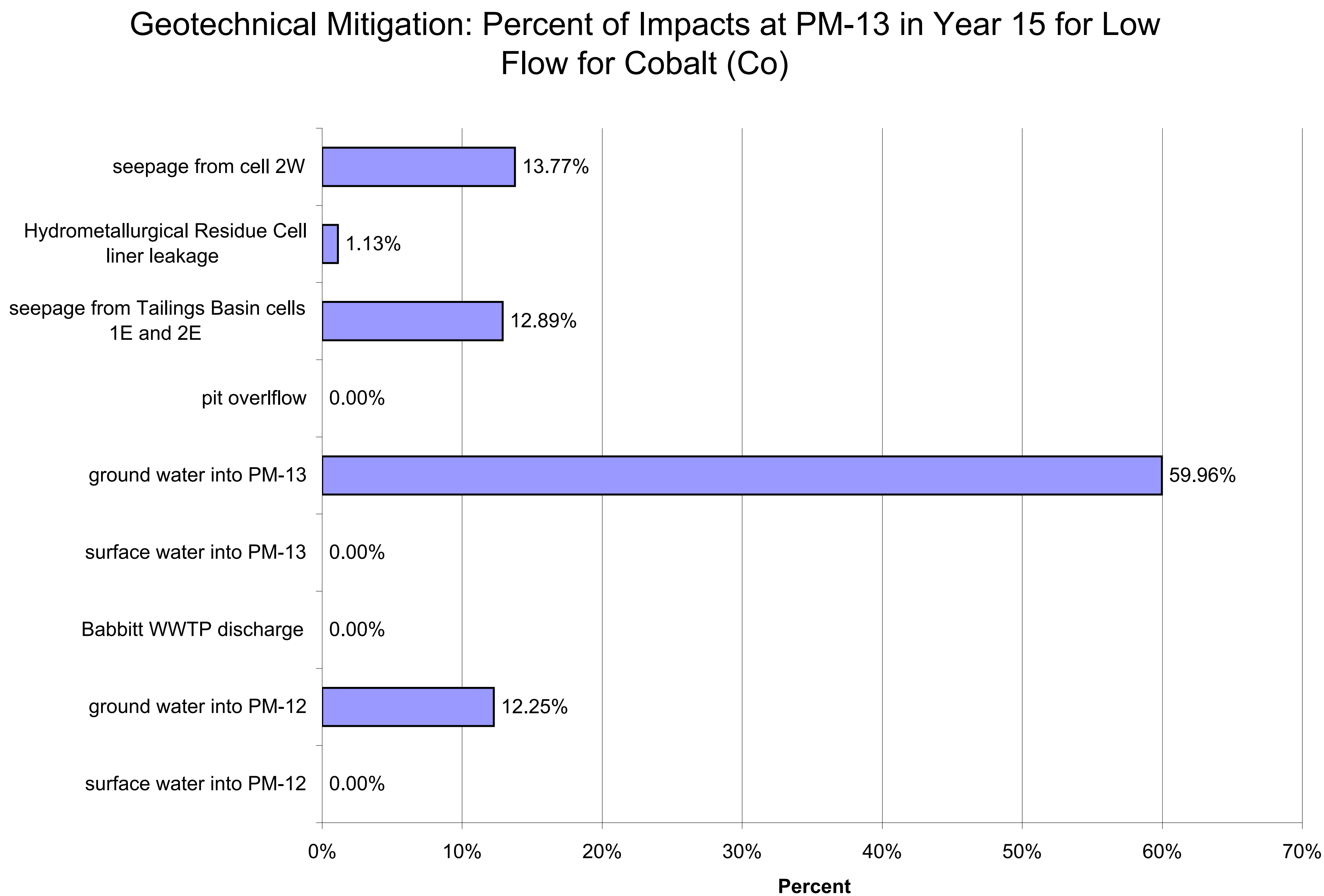

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Arsenic (As)
seepage from cell 2W
16.22%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin cells 1E and 2E
33.01%
pit overlflow
1.85%
ground water into PM-13
8.06%
surface water into PM-13
32.36%
Babbitt WWTP discharge
0.17%
ground water into PM-12
1.65%
surface water into PM-12
6.63%
0%
5%
10%
15%
20%
25%
30%
35%
Percent

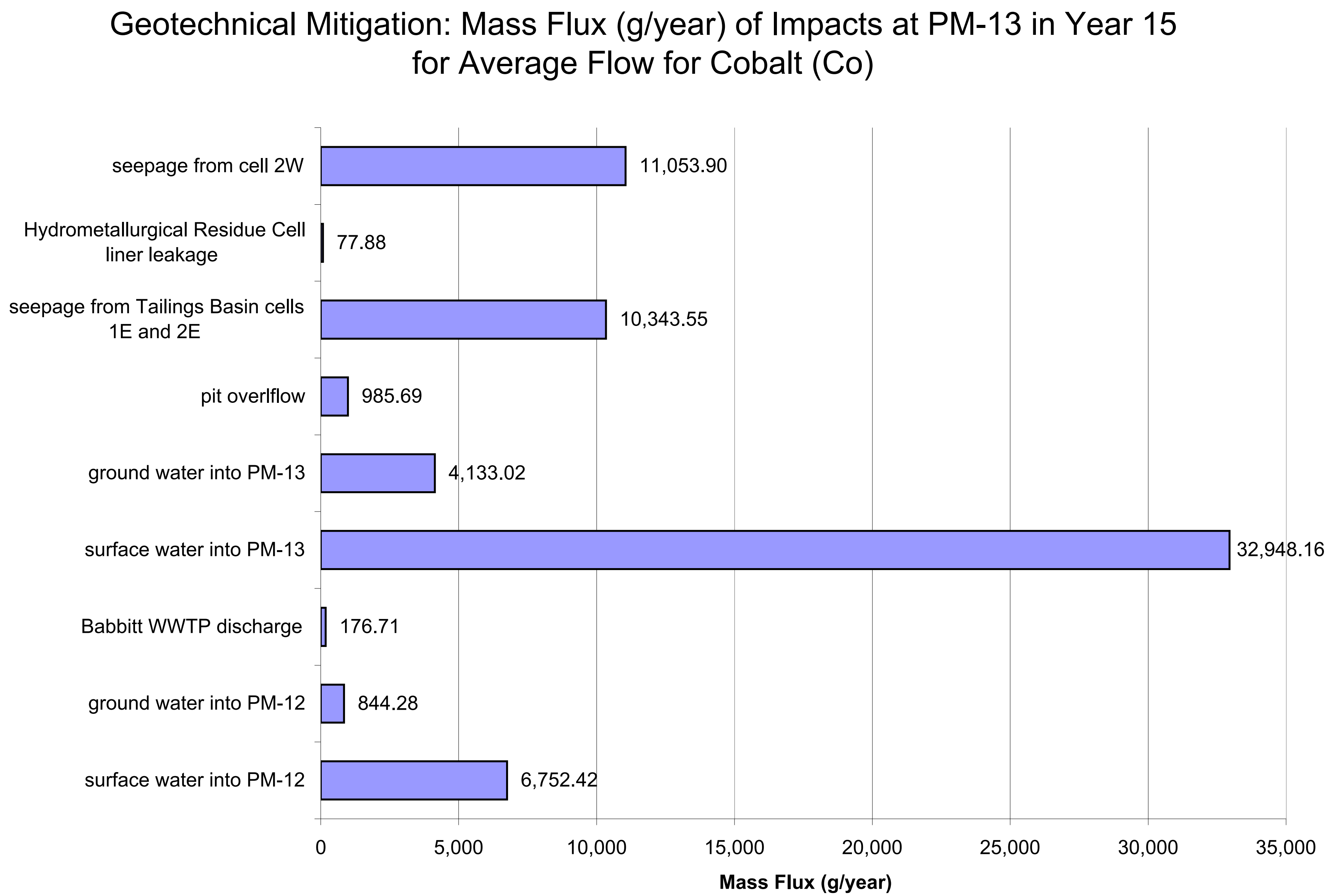

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)
seepage from cell 2W
20,637.27
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
42,013.83
pit overlflow
2,353.22
ground water into PM-13
10,257.41
surface 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)

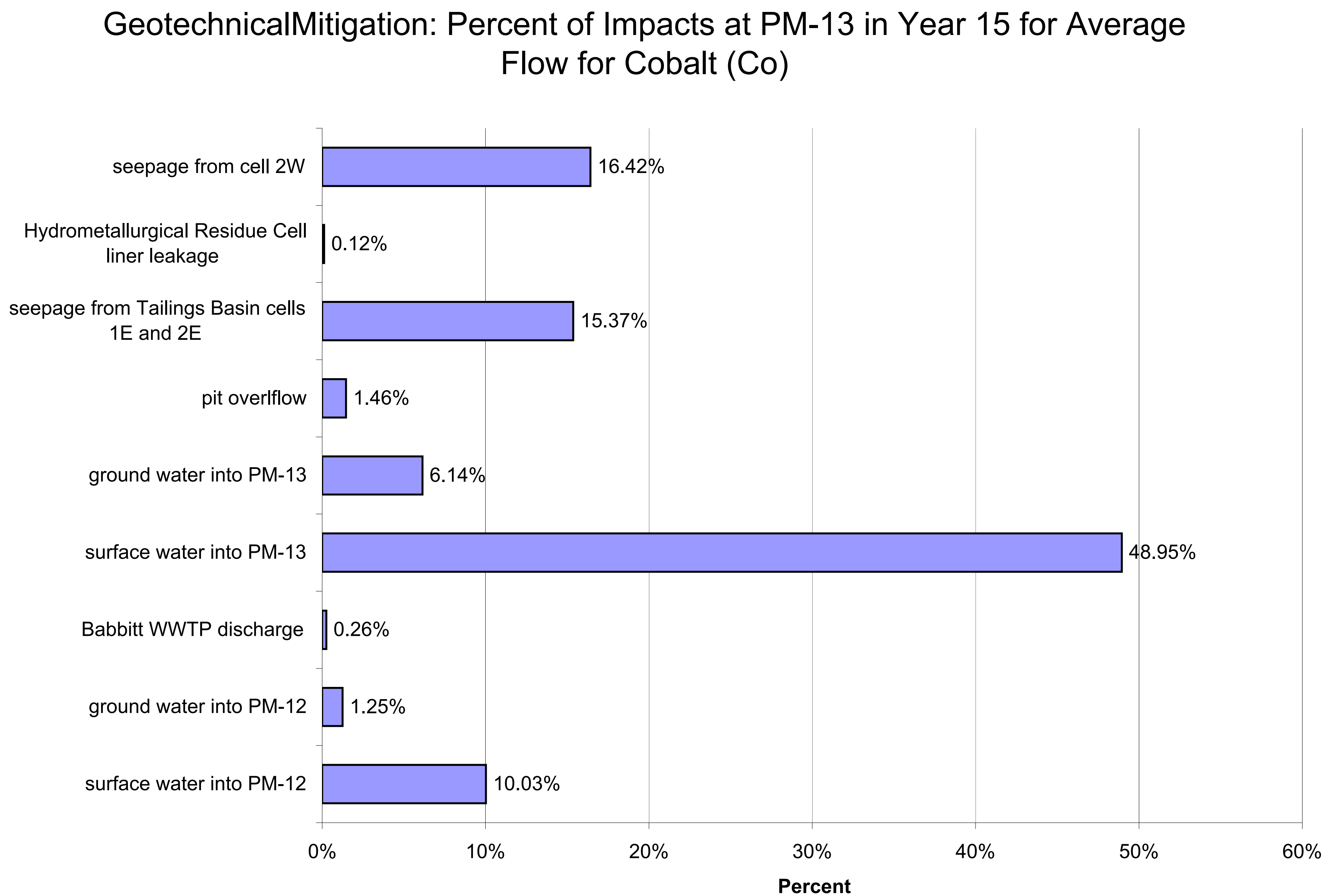
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Arsenic (As)

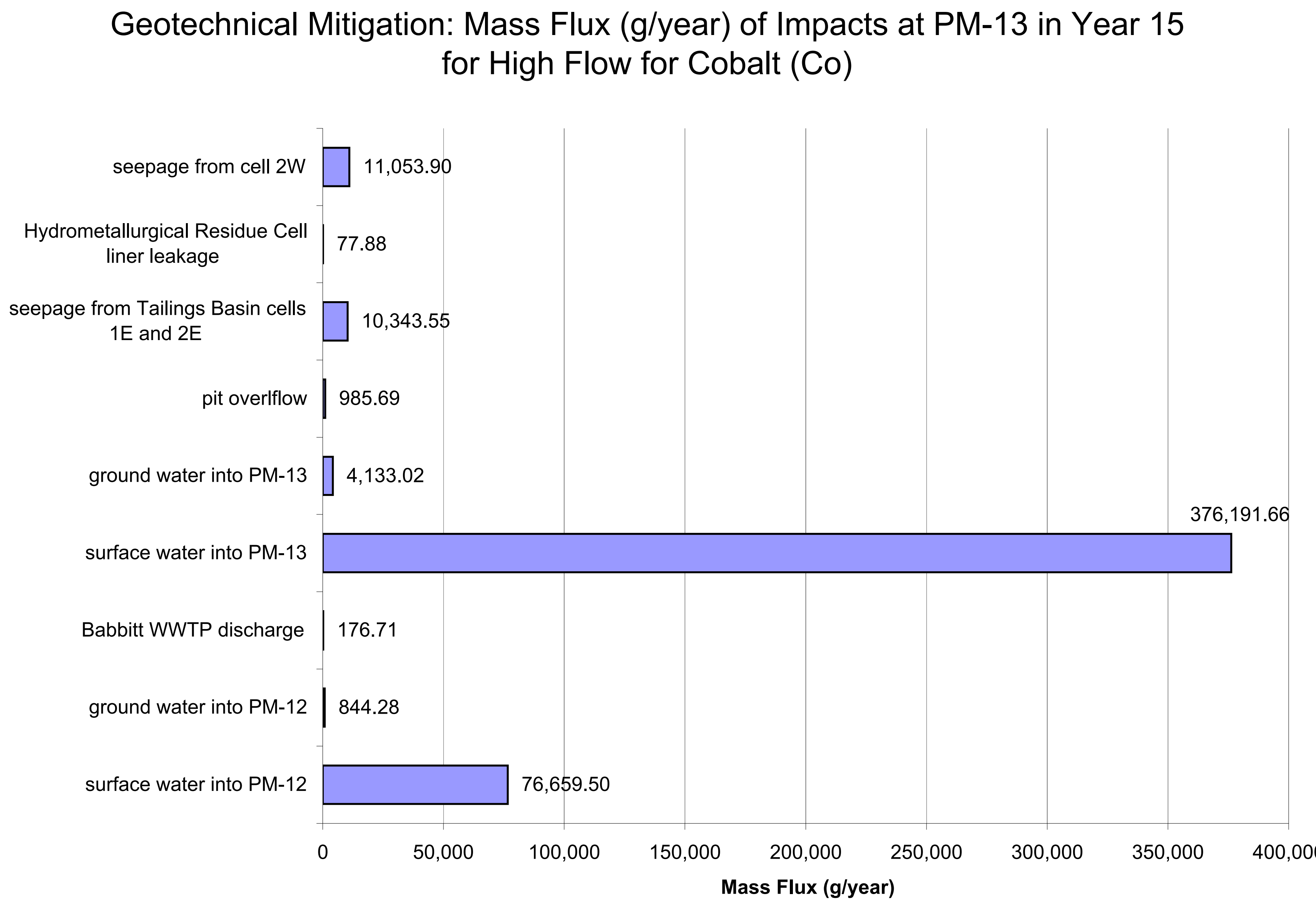


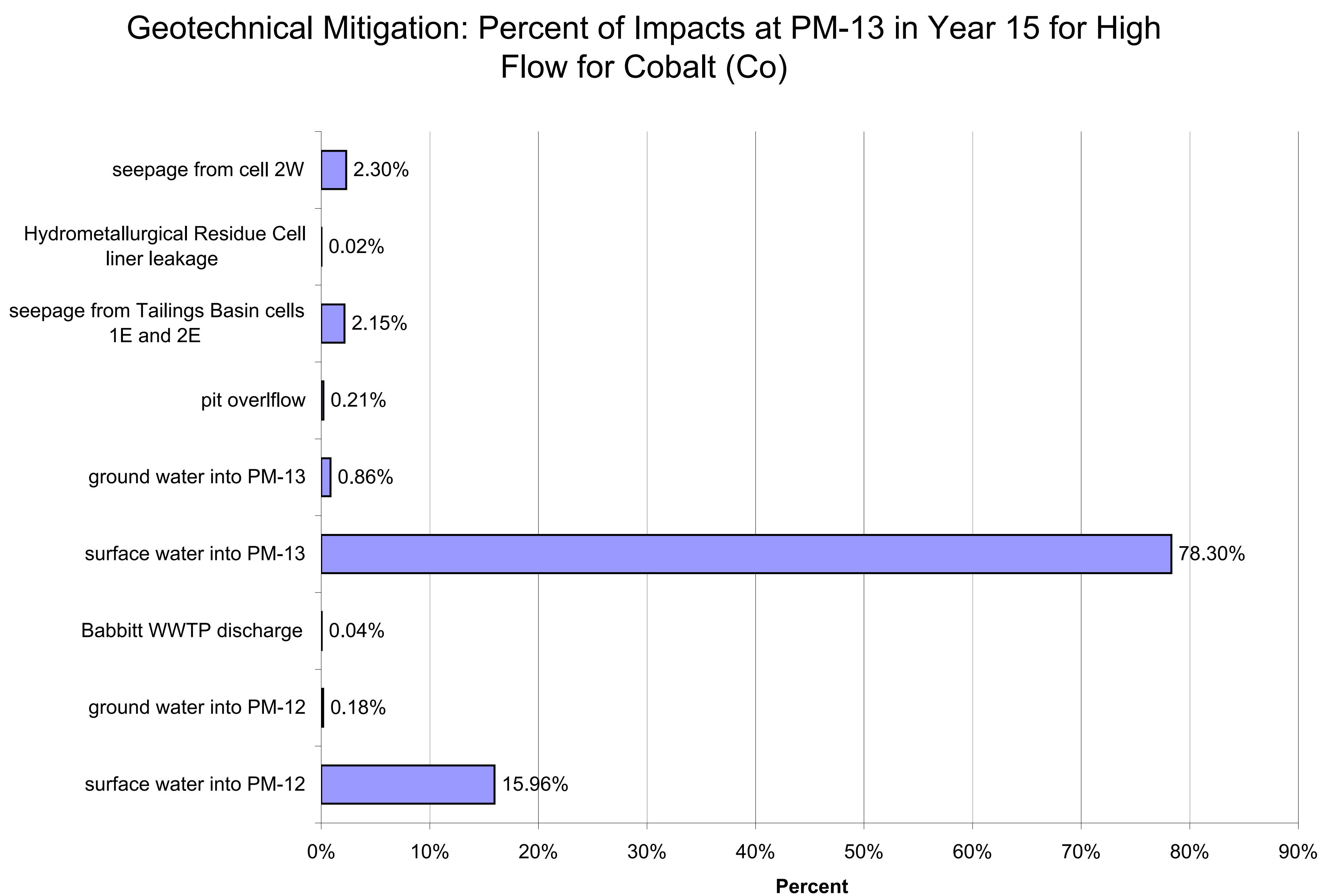

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15
for Low Flow for Cobalt (Co)
seepage from cell 2W
949.13
Hydrometallurgical Residue Cell liner leakage
77.88
seepage from Tailings Basin cells 1E and 2E
888.14
pit overlflow
-
ground water into PM-13
4,133.02
surface water into PM-13
-
Babbitt WWTP discharge
-
ground water 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 Year 15 for Low Flow for Cobalt (Co)
seepage from cell 2W
13.77%
Hydrometallurgical Residue Cell liner leakage
1.13%
seepage from Tailings Basin cells 1E and 2E
12.89%
pit overlflow
0.00%
ground water into PM-13
59.96%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
12.25%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

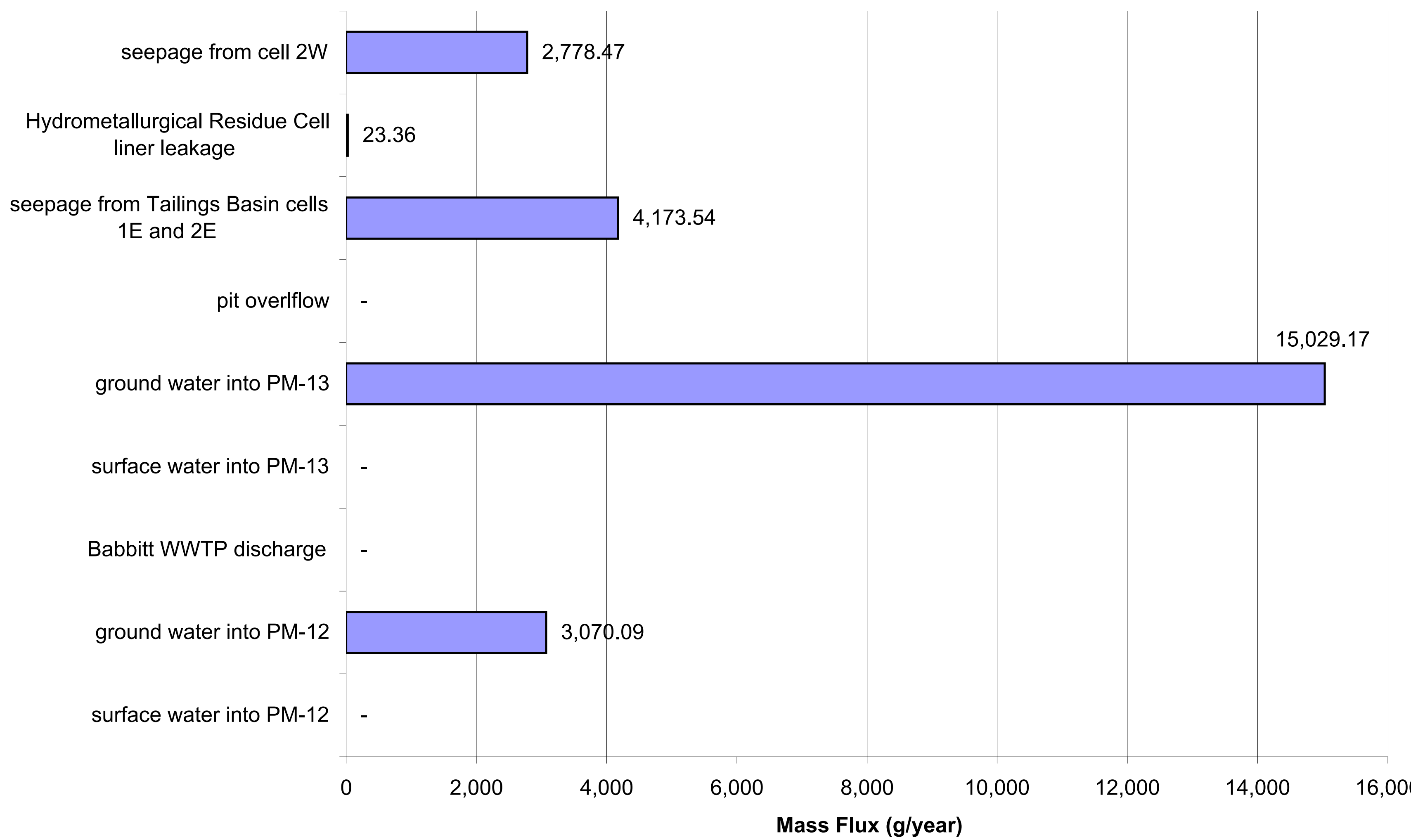

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15
for Average Flow for Cobalt (Co)
seepage from cell 2W
11,053.90
Hydrometallurgical Residue Cell liner leakage
77.88
seepage from Tailings Basin cells 1E and 2E
10,343.55
pit overlflow
985.69
ground water into PM-13
4,133.02
surface 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)

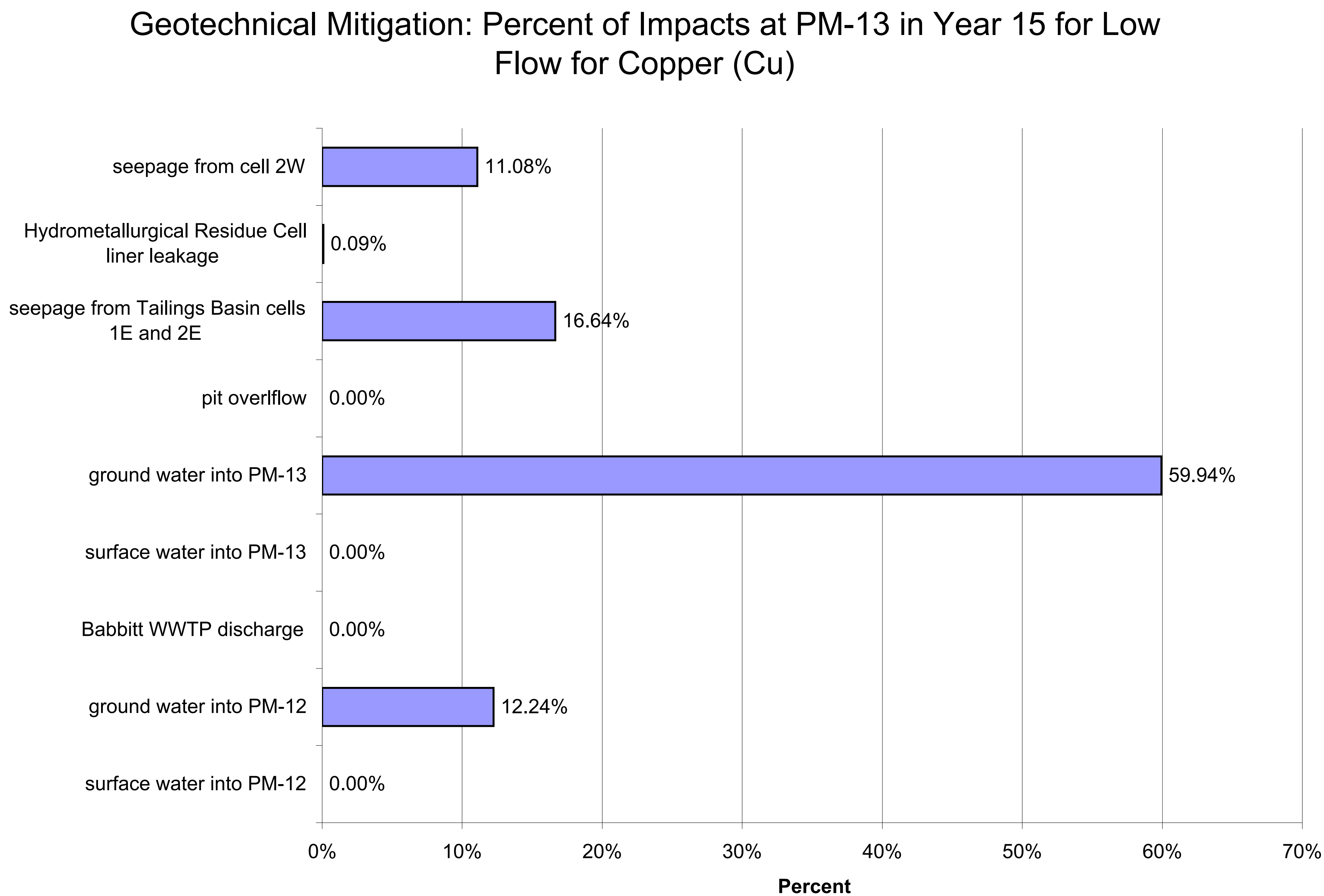

GeotechnicalMitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Cobalt (Co)
seepage from cell 2W
16.42%
Hydrometallurgical Residue Cell liner leakage
0.12%
seepage from Tailings Basin cells 1E and 2E
15.37%
pit overlflow
1.46%
ground water into PM-13
6.14%
surface water into PM-13
48.95%
Babbitt WWTP discharge
0.26%
ground water into PM-12
1.25%
surface water into PM-12
10.03%
0%
10%
20%
30%
40%
50%
60%
Percent

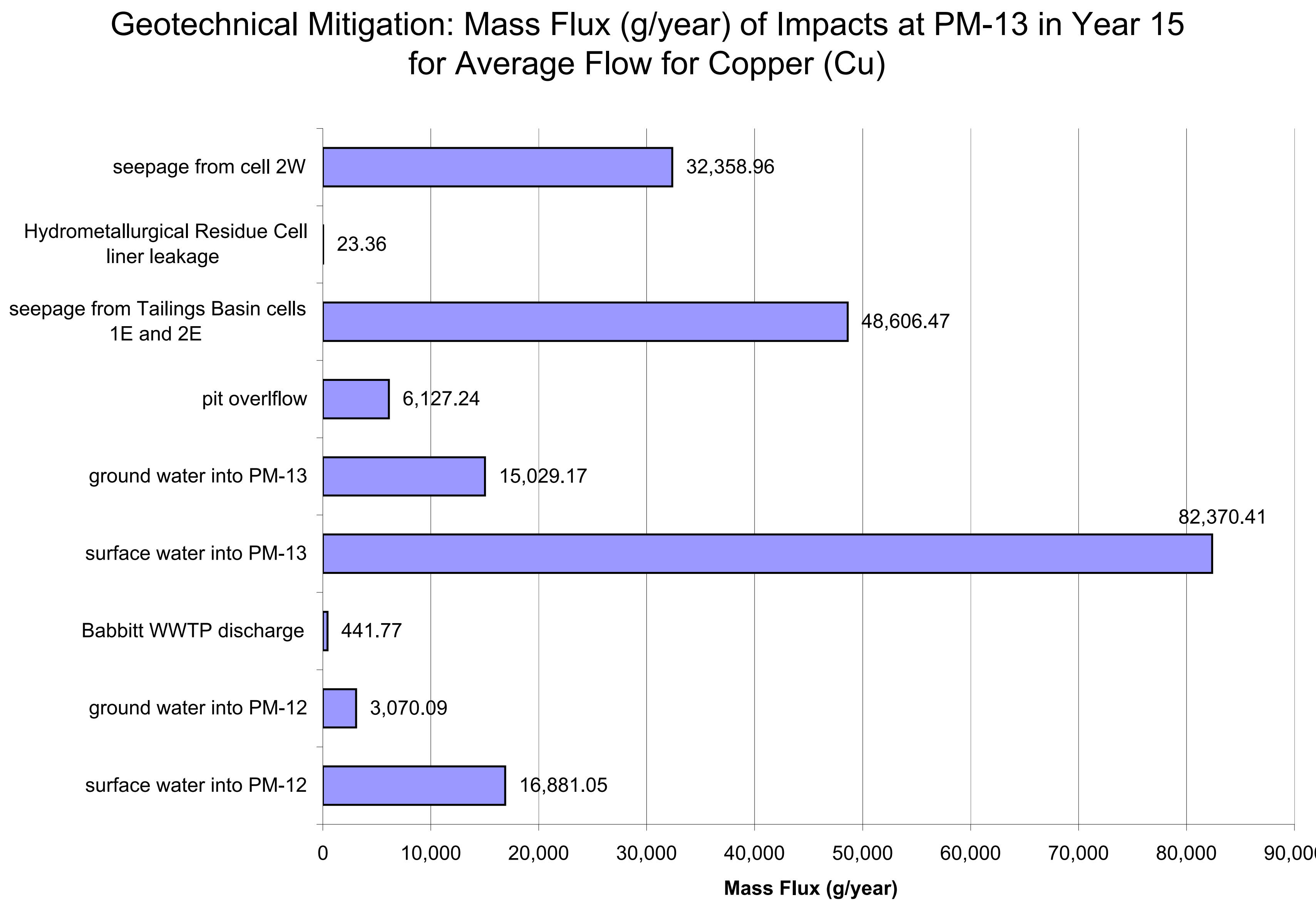

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Cobalt (Co)
seepage from cell 2W
11,053.90
Hydrometallurgical Residue Cell liner leakage
77.88
seepage from Tailings Basin cells 1E and 2E
10,343.55
pit overlflow
985.69
ground water into PM-13
4,133.02
surface 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)
seepage from cell 2W
2.30%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin cells 1E and 2E
2.15%
pit overlflow
0.21%
ground water into PM-13
0.86%
surface water into PM-13
78.30%
Babbitt WWTP discharge
0.04%
ground water into PM-12
0.18%
surface water into PM-12
15.96%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

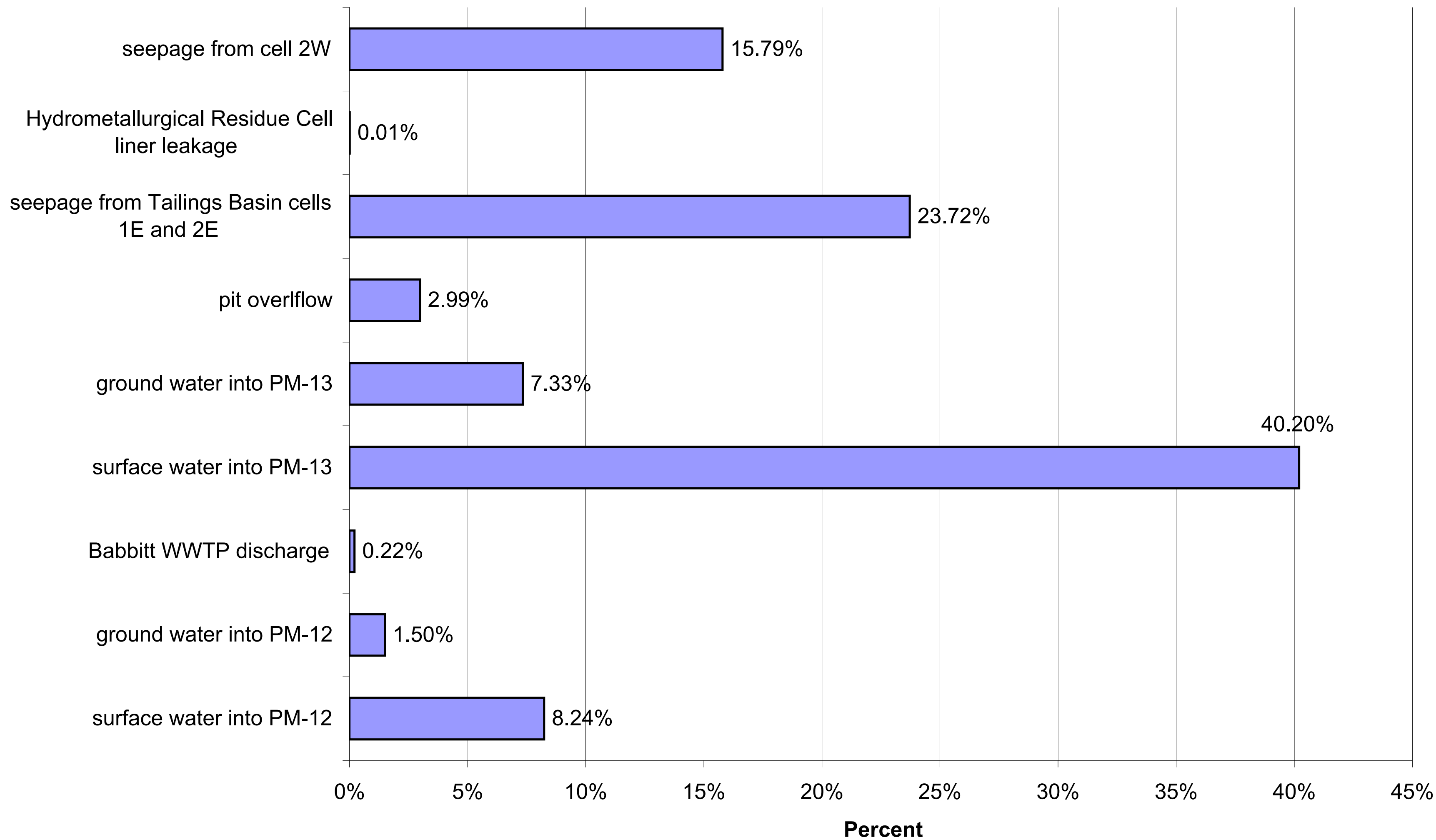
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)

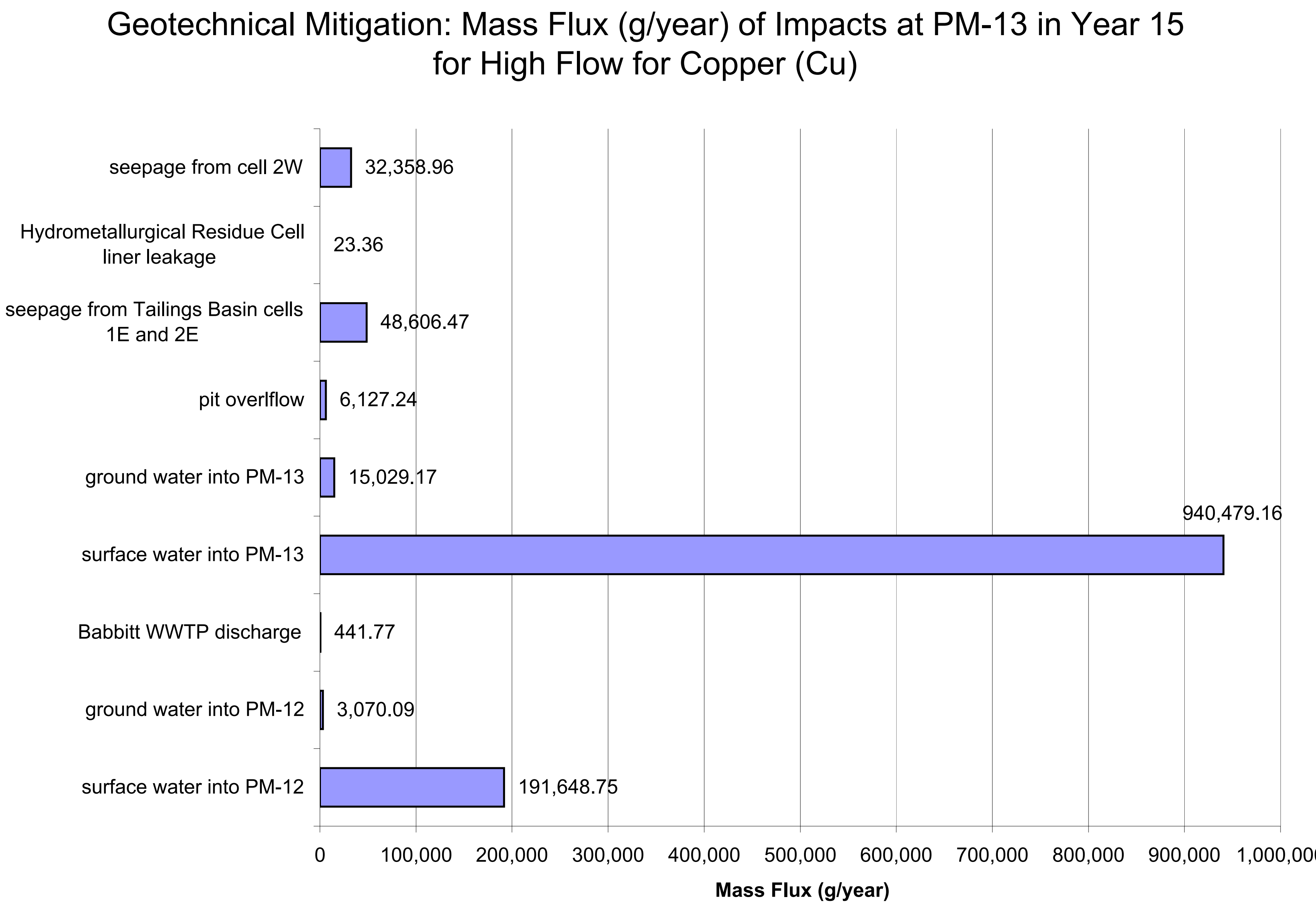


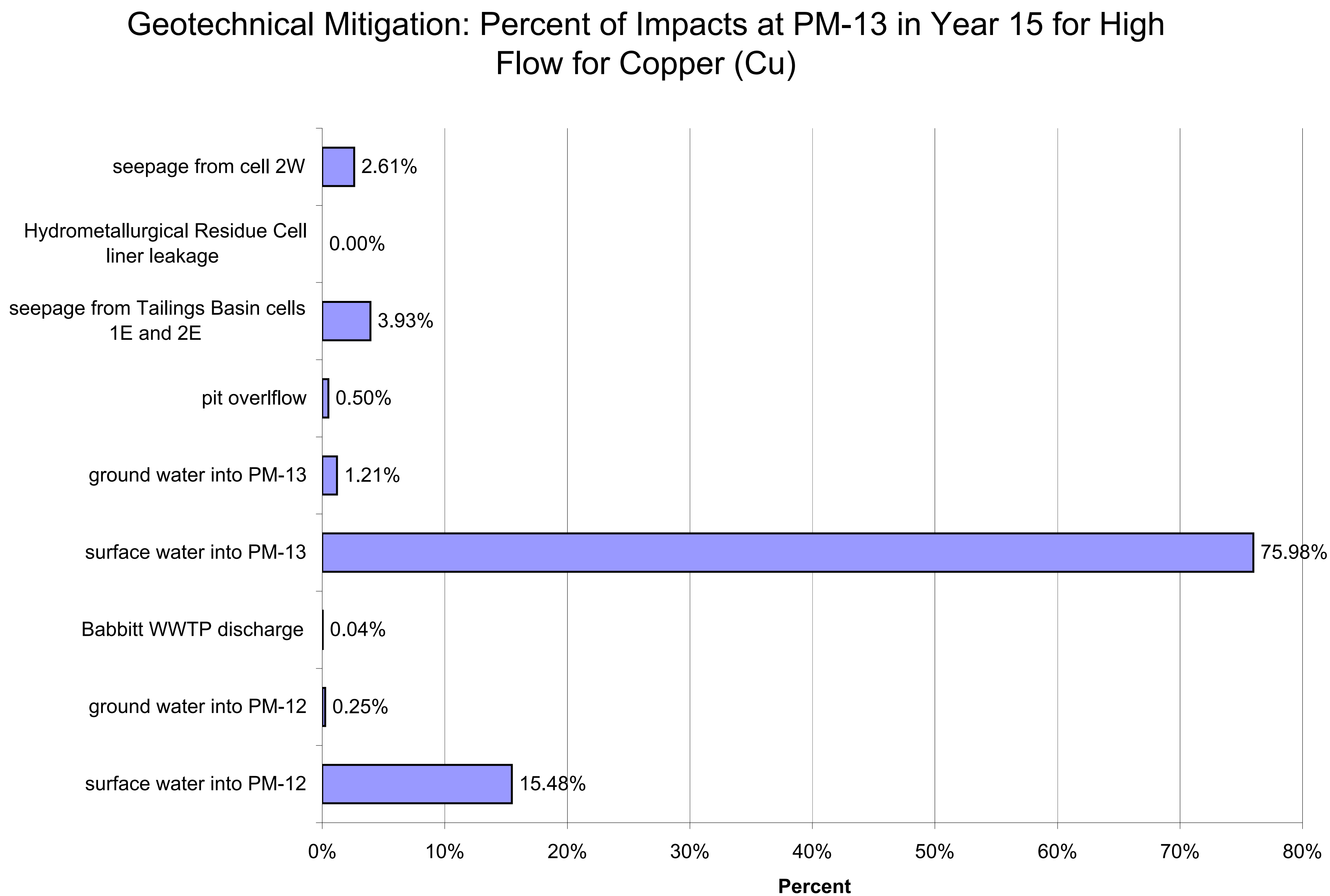

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Copper (Cu)
seepage from cell 2W
11.08%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
16.64%
pit overlflow
0.00%
ground water into PM-13
59.94%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
12.24%
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 15 for Average Flow for Copper (Cu)
seepage from cell 2W
32,358.96
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
48,606.47
pit overlflow
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)

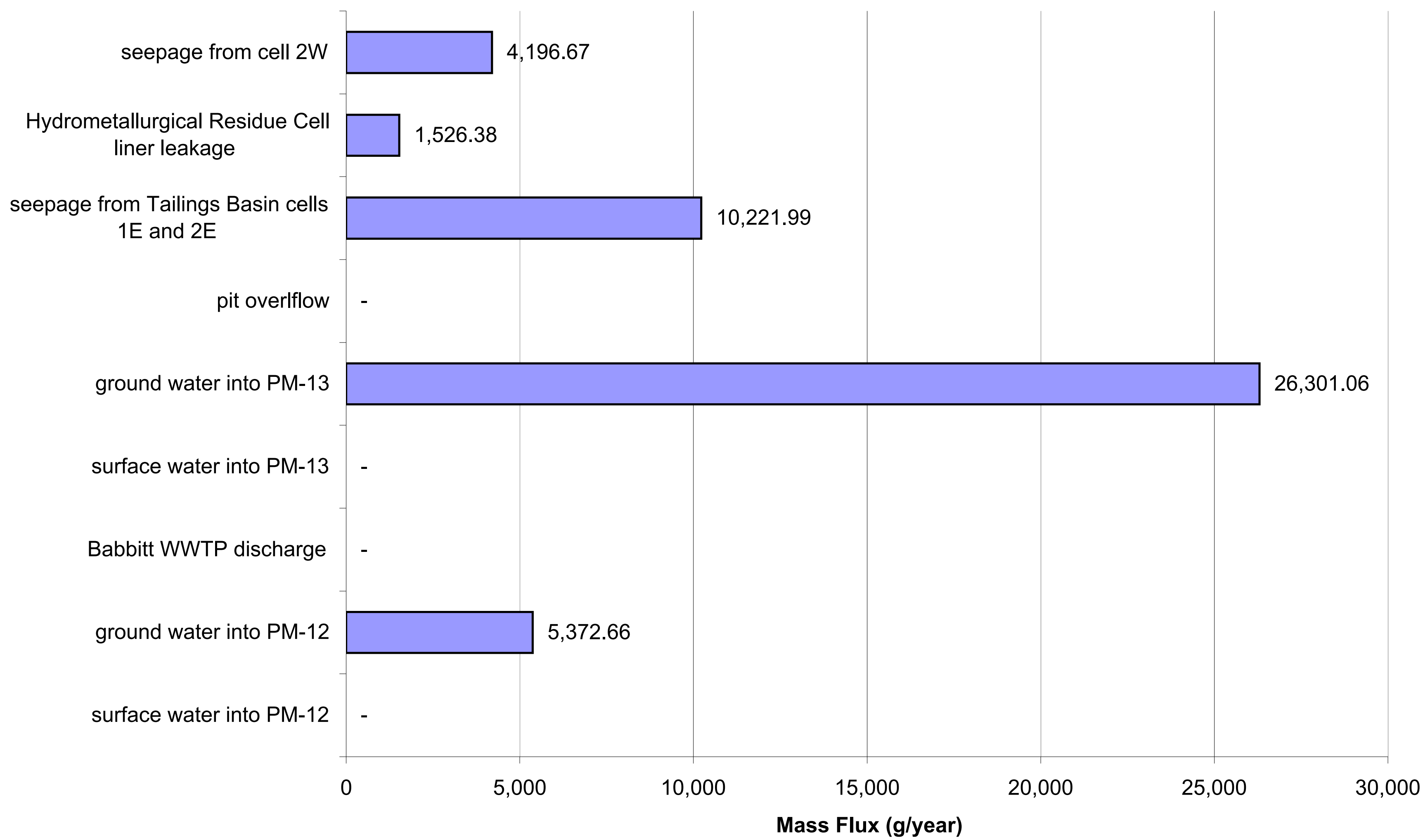
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Copper (Cu)

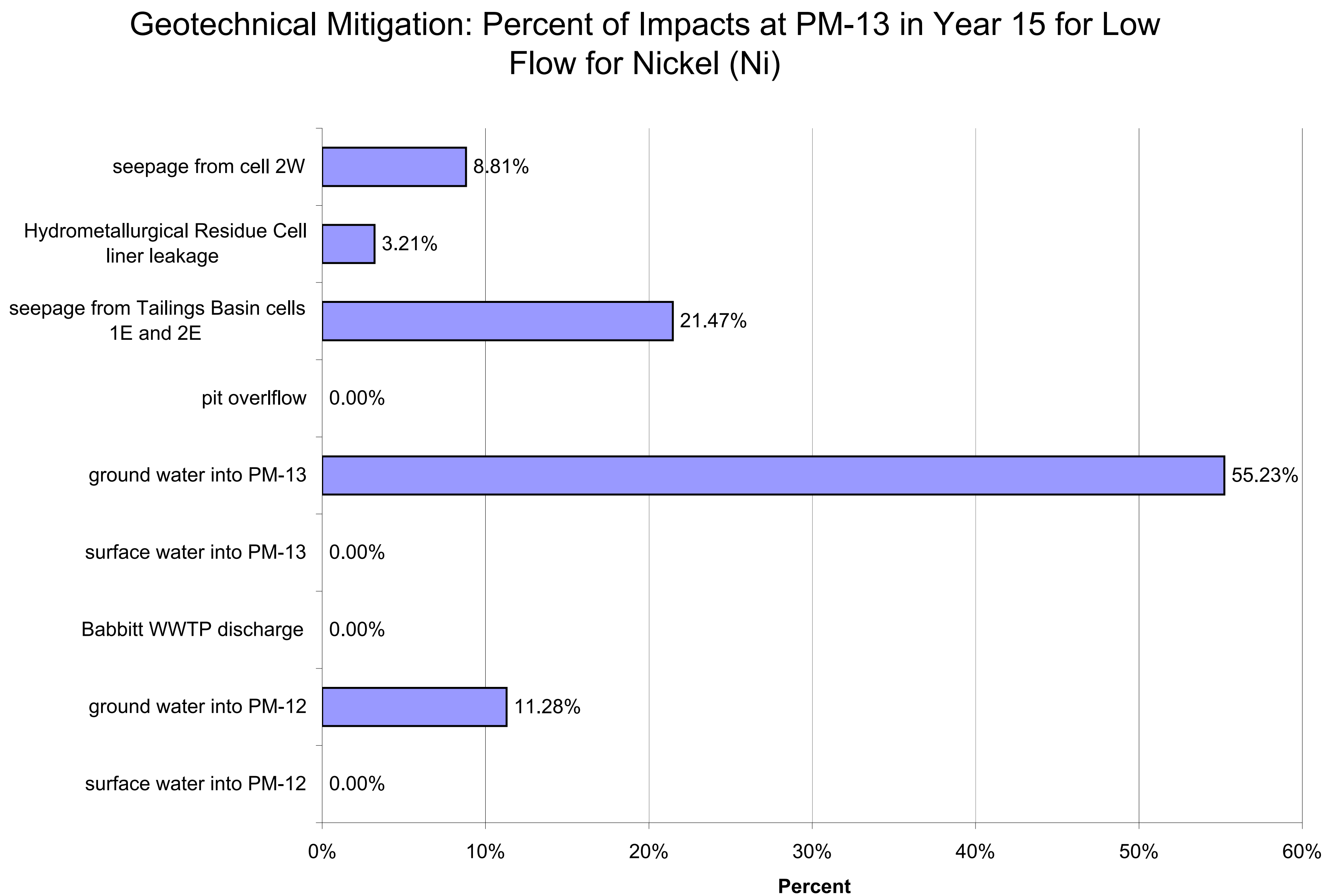


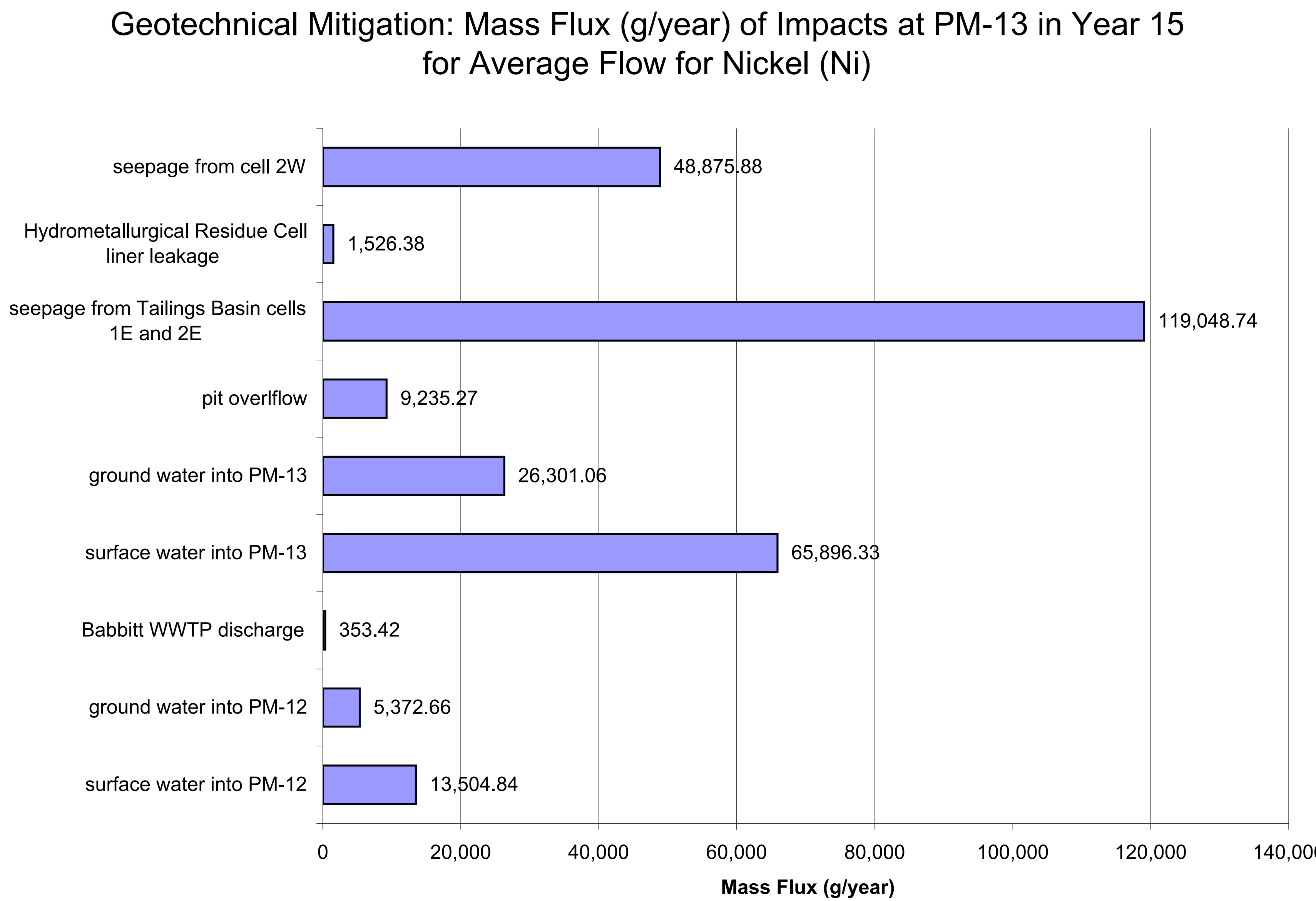

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Copper (Cu)
seepage from cell 2W
32,358.96
Hydrometallurgical Residue Cell liner leakage
23.36
seepage from Tailings Basin cells 1E and 2E
48,606.47
pit overlflow
6,127.24
ground water into PM-13
15,029.17
surface 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
2.61%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
3.93%
pit overlflow
0.50%
ground water into PM-13
1.21%
surface water into PM-13
75.98%
Babbitt WWTP discharge
0.04%
ground water into PM-12
0.25%
surface water into PM-12
15.48%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

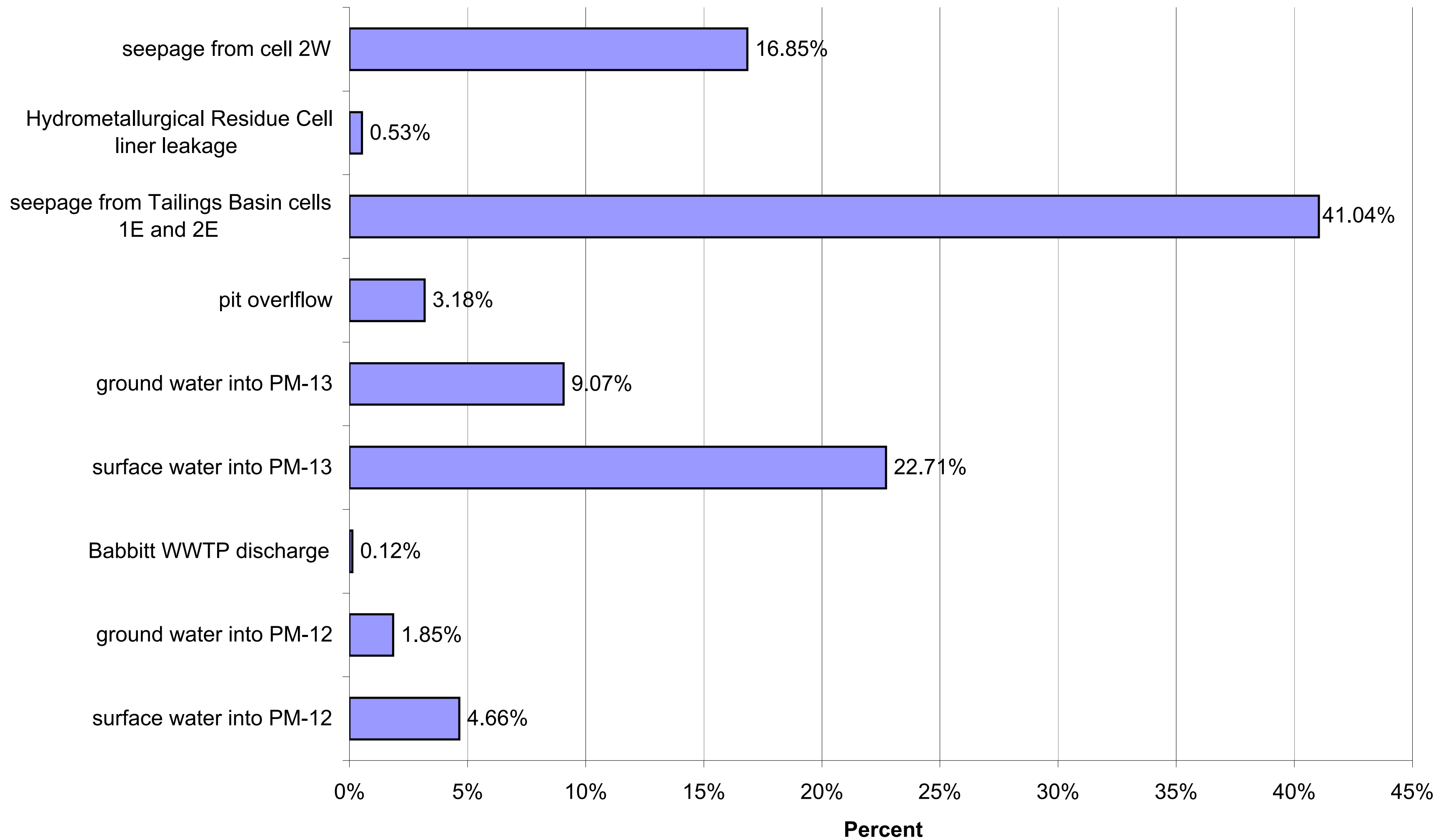
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)

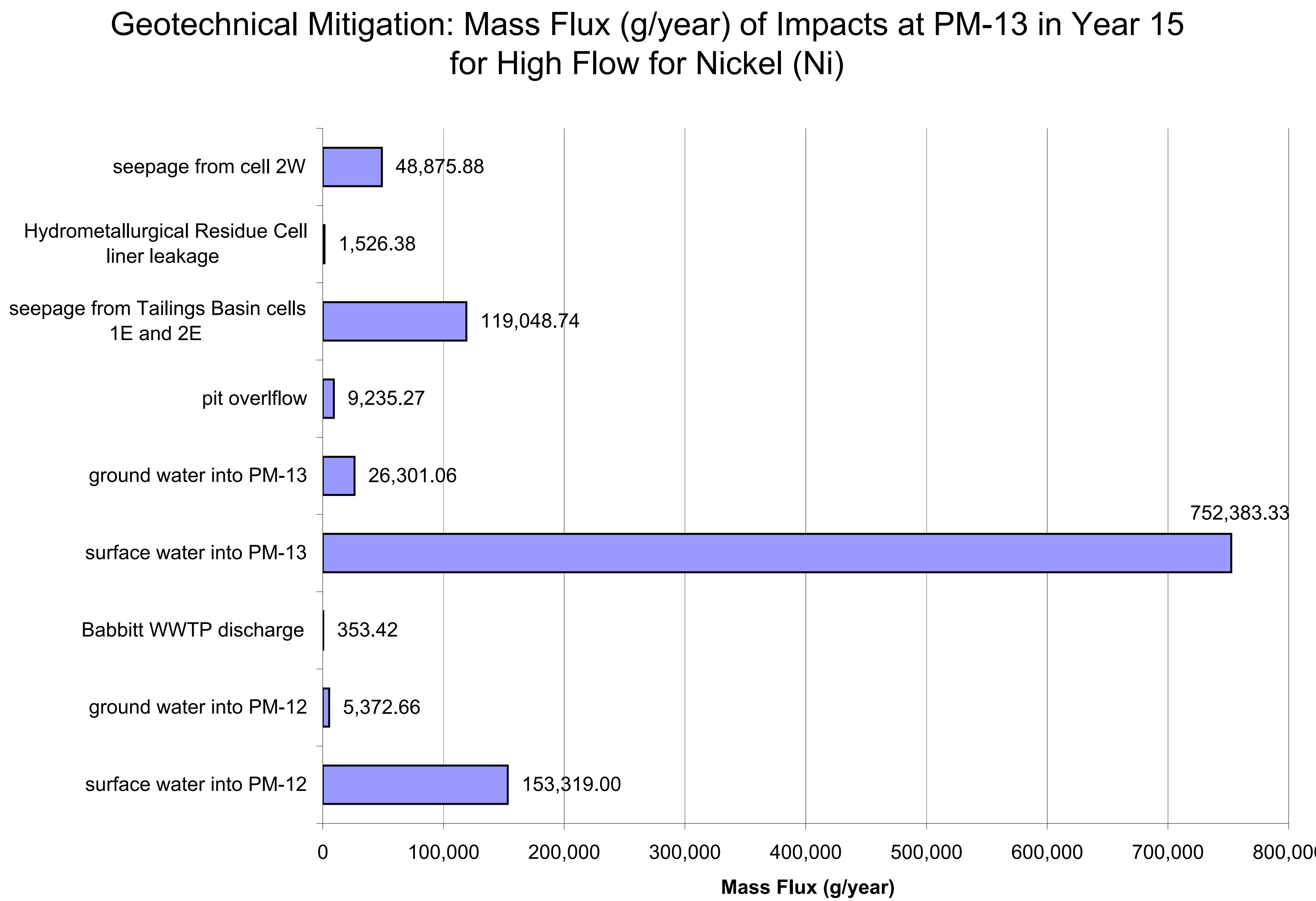


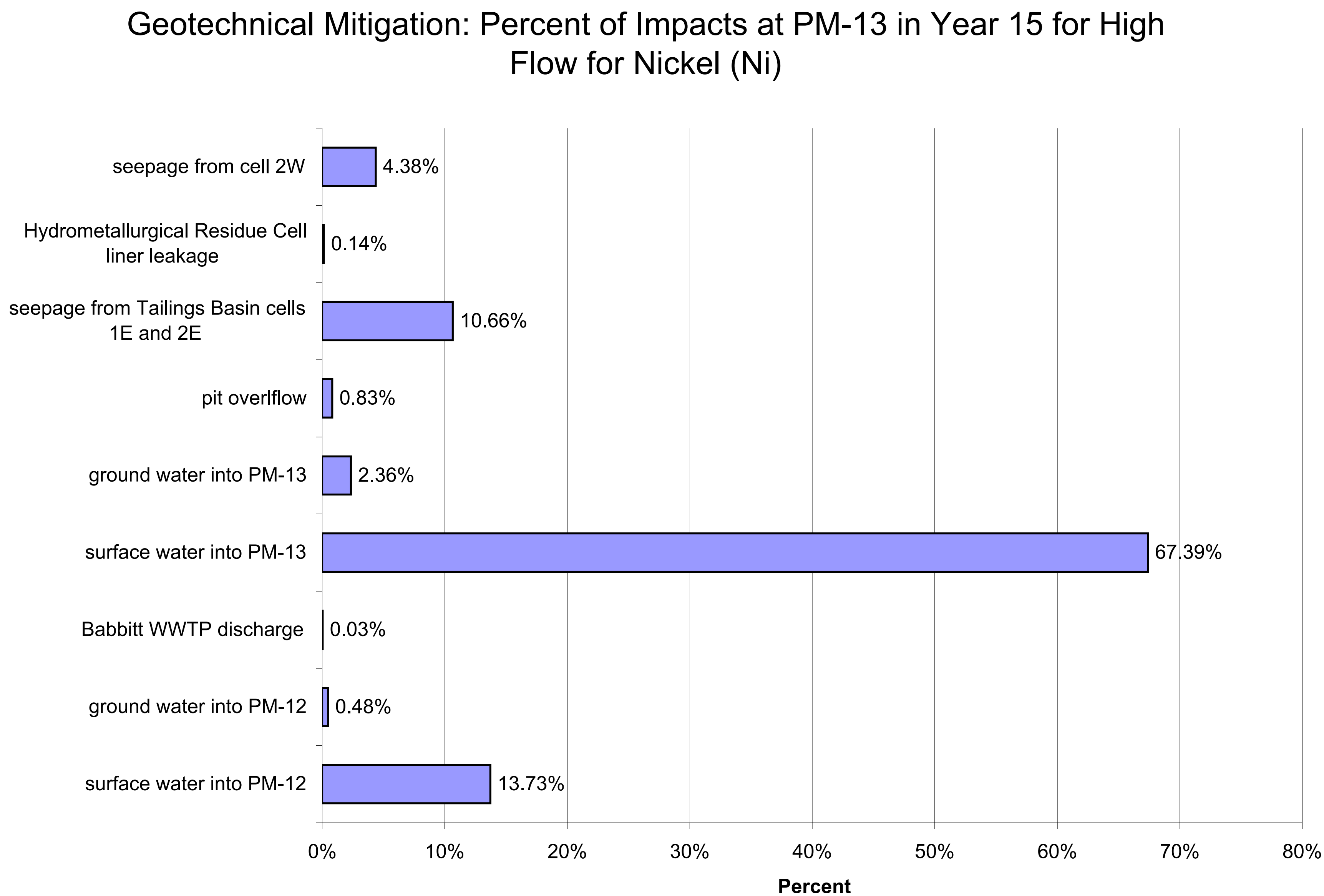

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Nickel (Ni)
seepage from cell 2W
8.81%
Hydrometallurgical Residue Cell liner leakage
3.21%
seepage from Tailings Basin cells 1E and 2E
21.47%
pit overlflow
0.00%
ground water into PM-13
55.23%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
ground water into PM-12
11.28%
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 15 for Average Flow for Nickel (Ni)
seepage from cell 2W
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
119,048.74
pit overlflow
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)

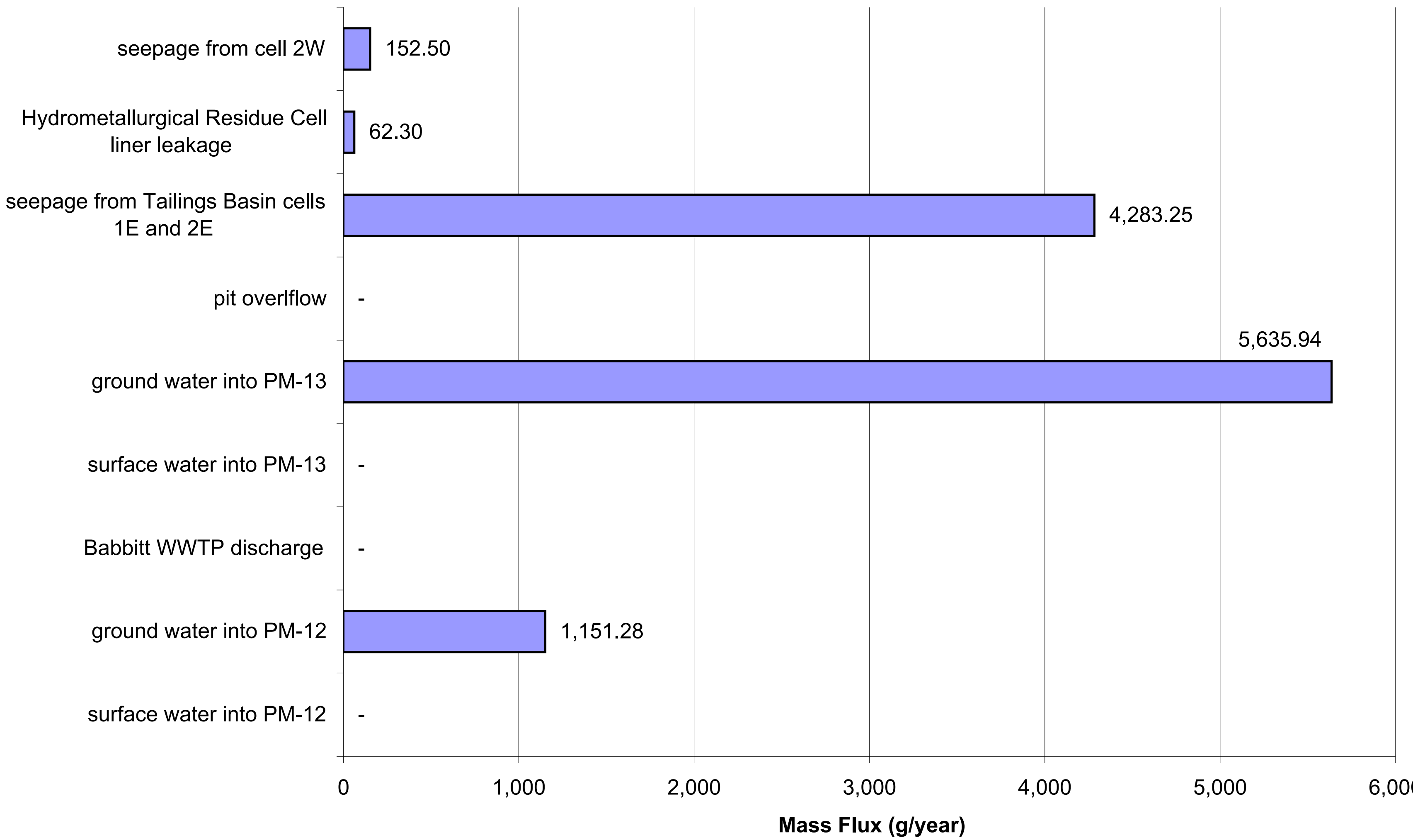
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Nickel (Ni)



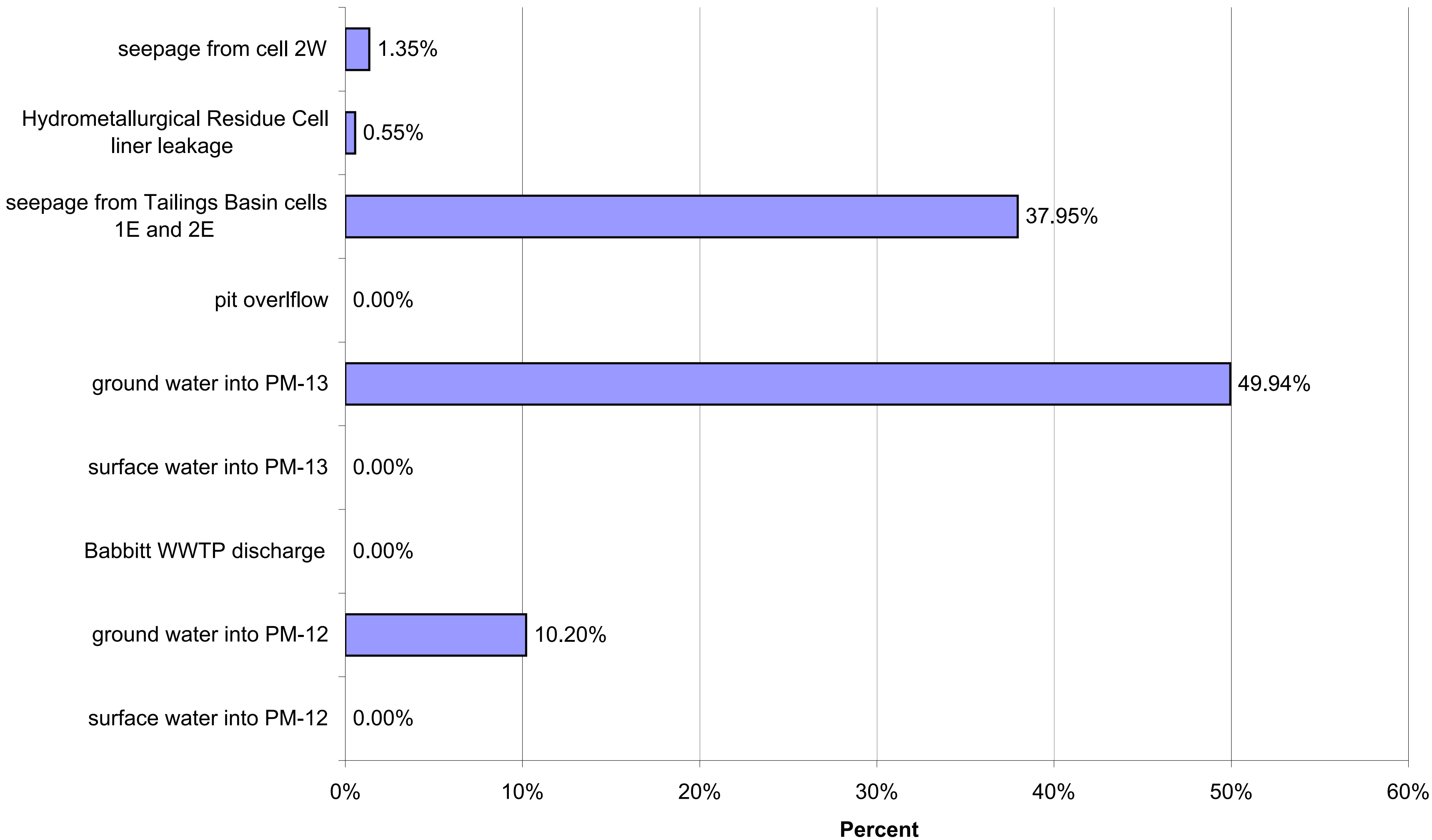

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)
seepage from cell 2W
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,526.38
seepage from Tailings Basin cells 1E and 2E
119,048.74
pit overlflow
9,235.27
ground water into PM-13
26,301.06
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)

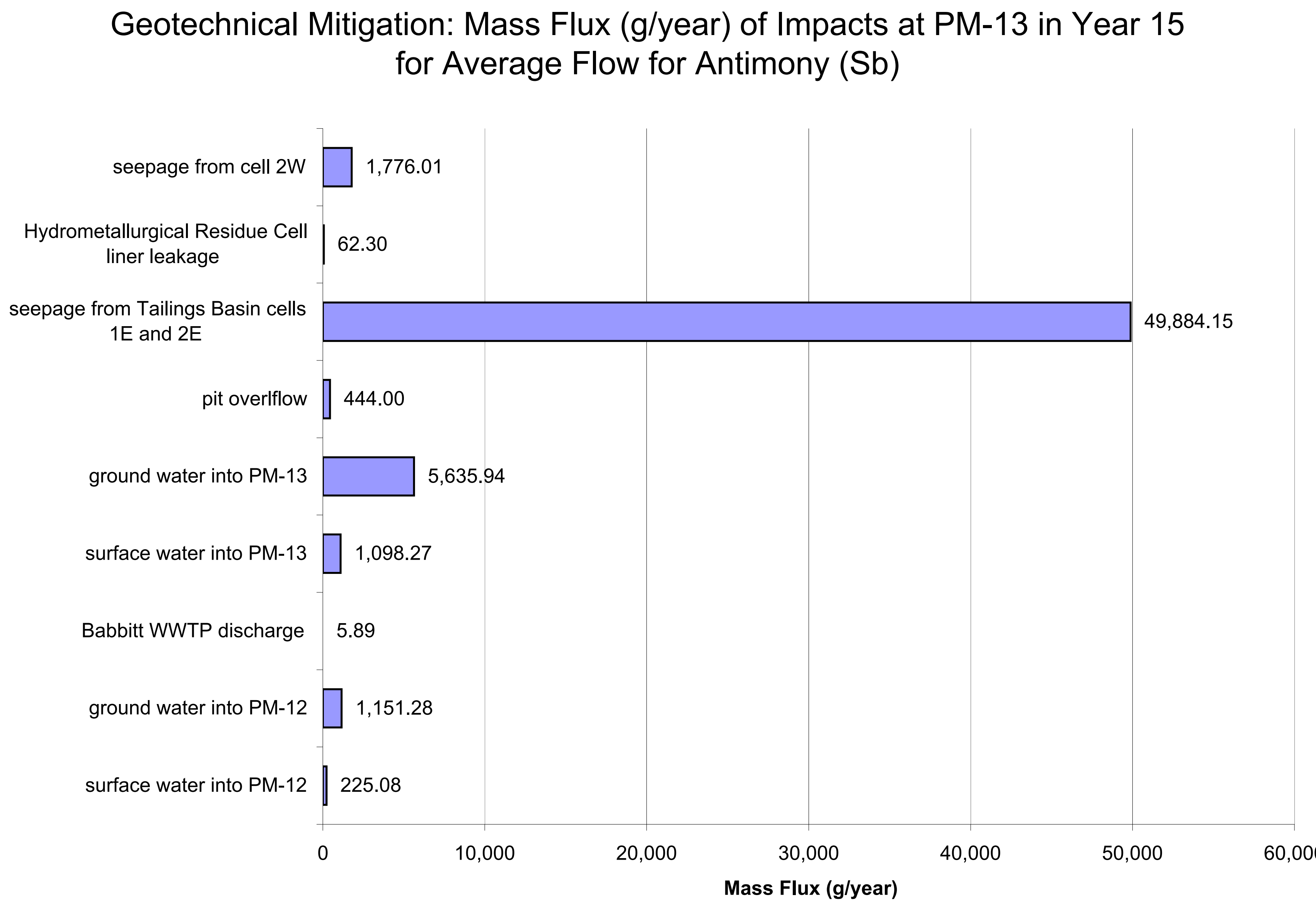

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Nickel (Ni)
seepage from cell 2W
4.38%
Hydrometallurgical Residue Cell liner leakage
0.14%
seepage from Tailings Basin cells 1E and 2E
10.66%
pit overlflow
0.83%
ground water into PM-13
2.36%
surface water into PM-13
67.39%
Babbitt WWTP discharge
0.03%
ground water into PM-12
0.48%
surface water into PM-12
13.73%
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 Low Flow for Antimony (Sb)

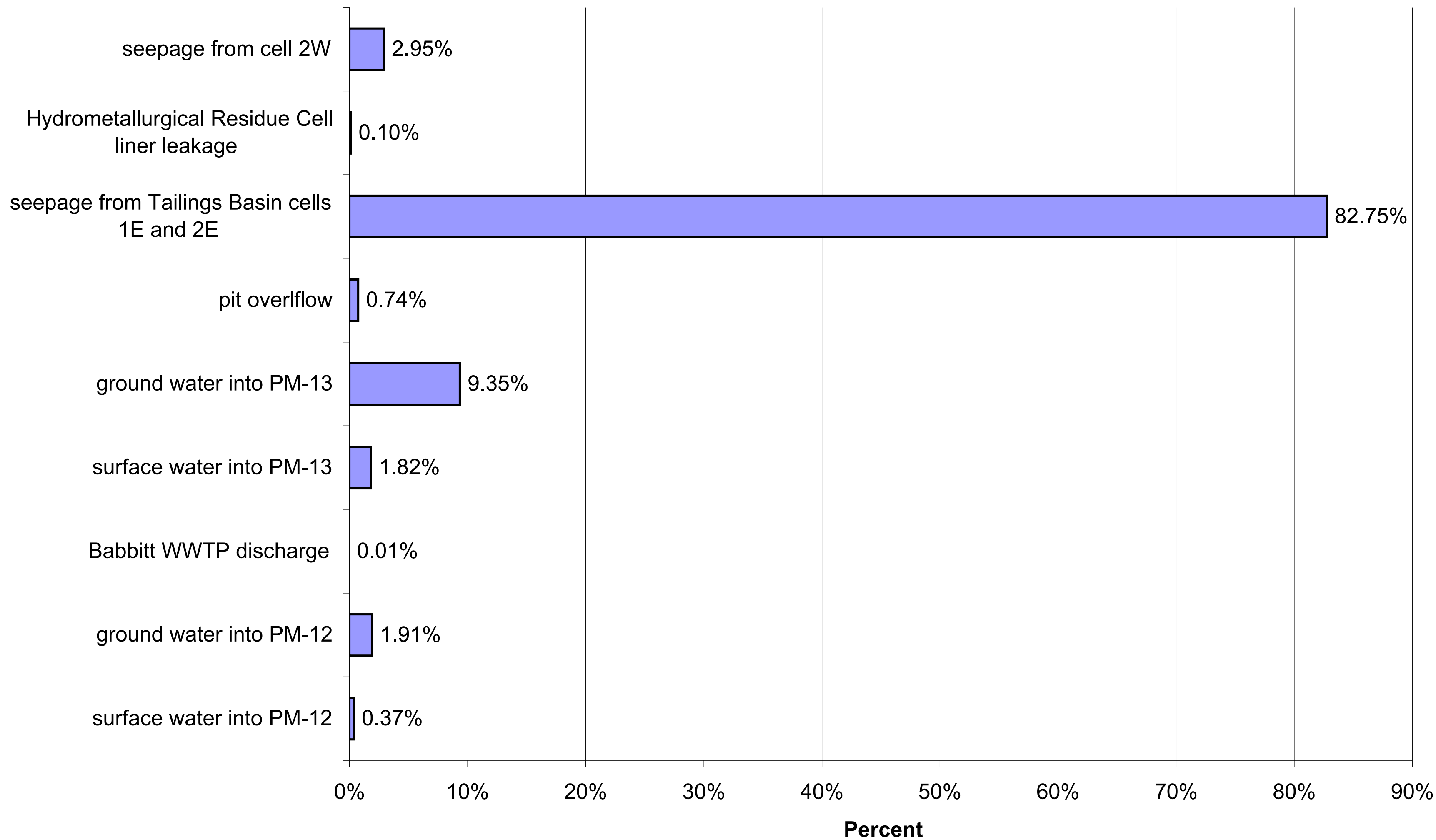


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Antimony (Sb)

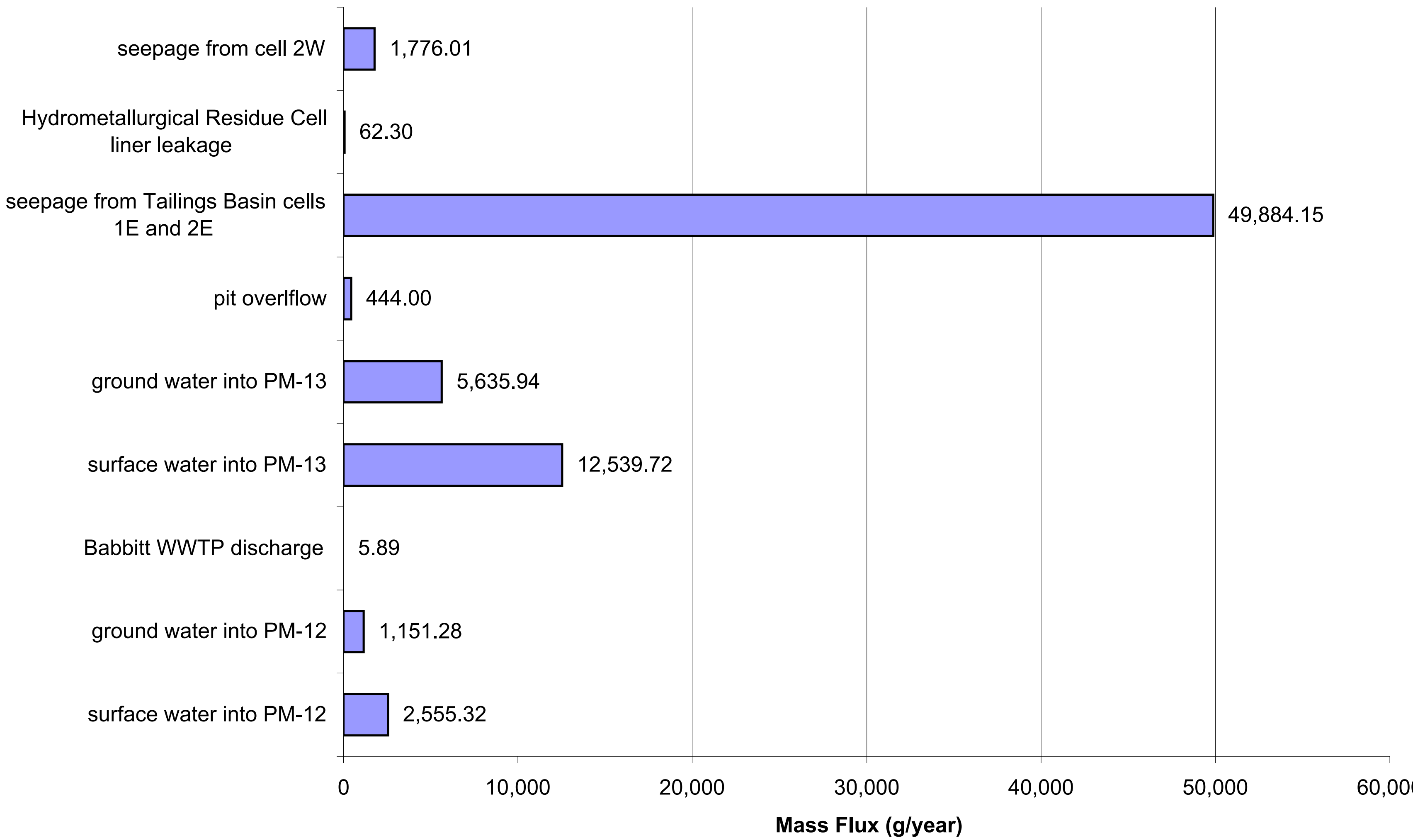


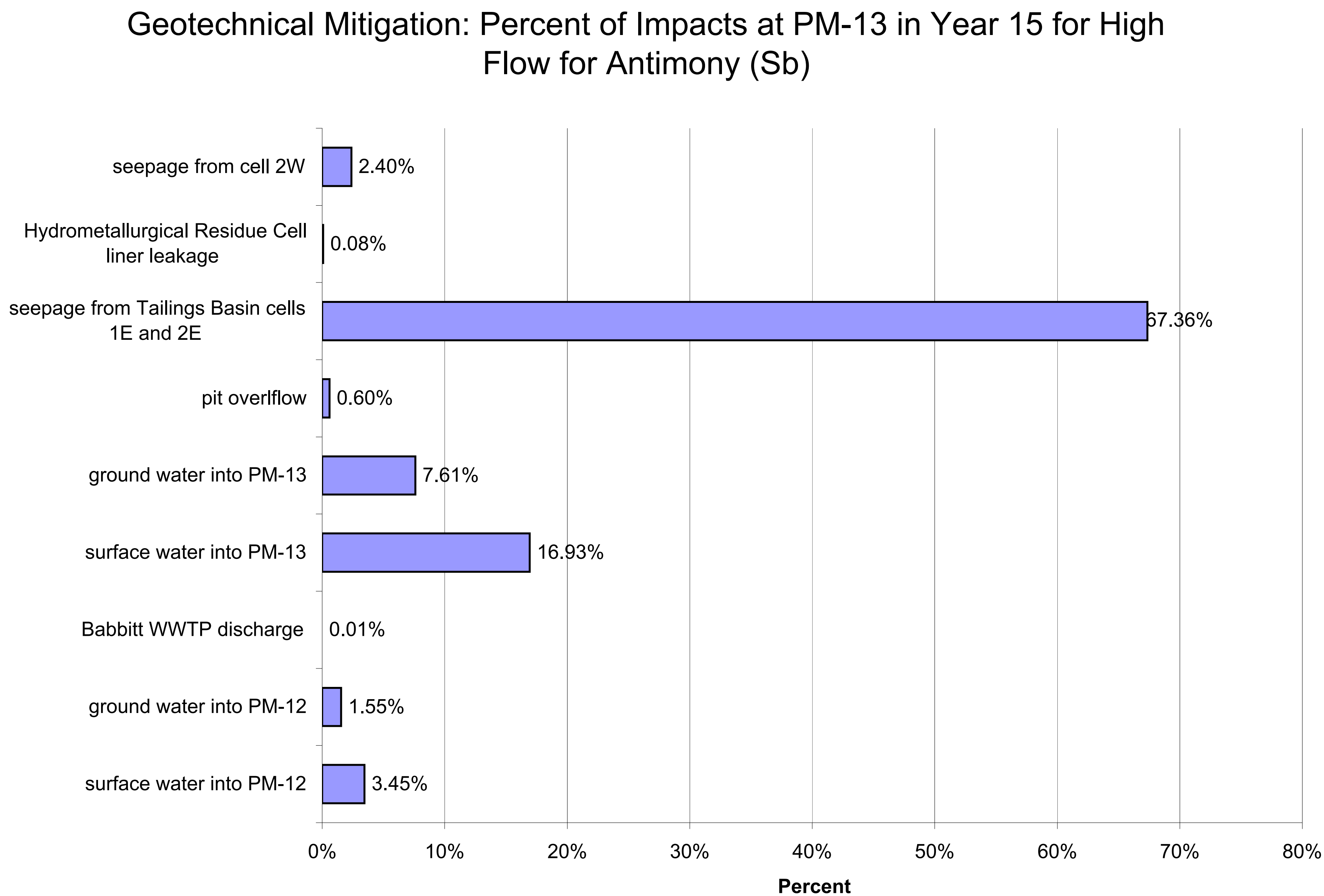

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for Average Flow for Antimony (Sb)
seepage from cell 2W
1,776.01
Hydrometallurgical Residue Cell liner leakage
62.30
seepage from Tailings Basin cells 1E and 2E
49,884.15
pit overlflow
444.00
ground water into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
ground water into PM-12
1,151.28
surface water into PM-12
225.08
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)

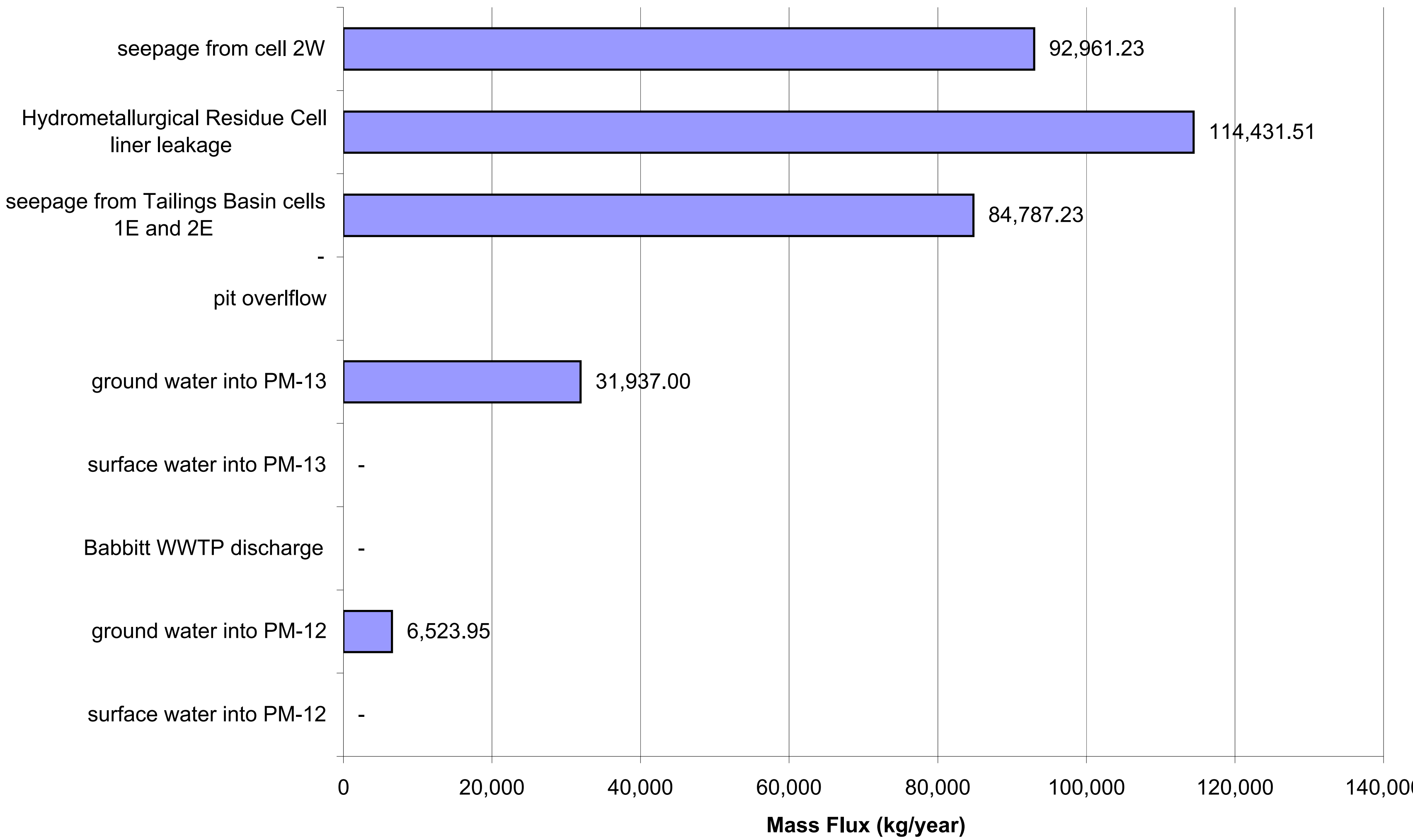


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)

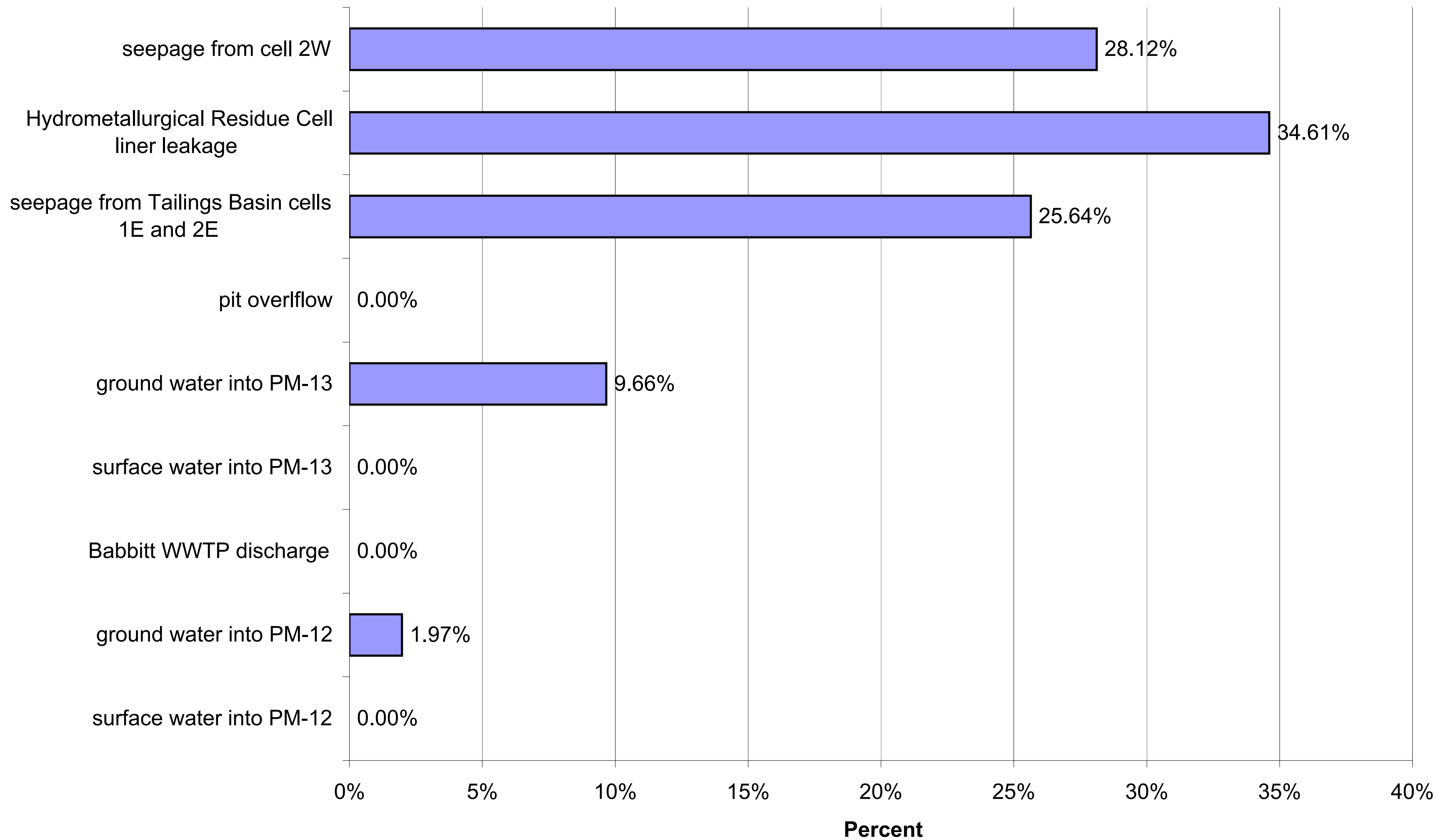



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Antimony (Sb)
seepage from cell 2W
2.40%
Hydrometallurgical Residue Cell liner leakage
0.08%
seepage from Tailings Basin cells 1E and 2E
67.36%
pit overlflow
0.60%
ground water into PM-13
7.61%
surface water into PM-13
16.93%
Babbitt WWTP discharge
0.01%
ground water into PM-12
1.55%
surface water into PM-12
3.45%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

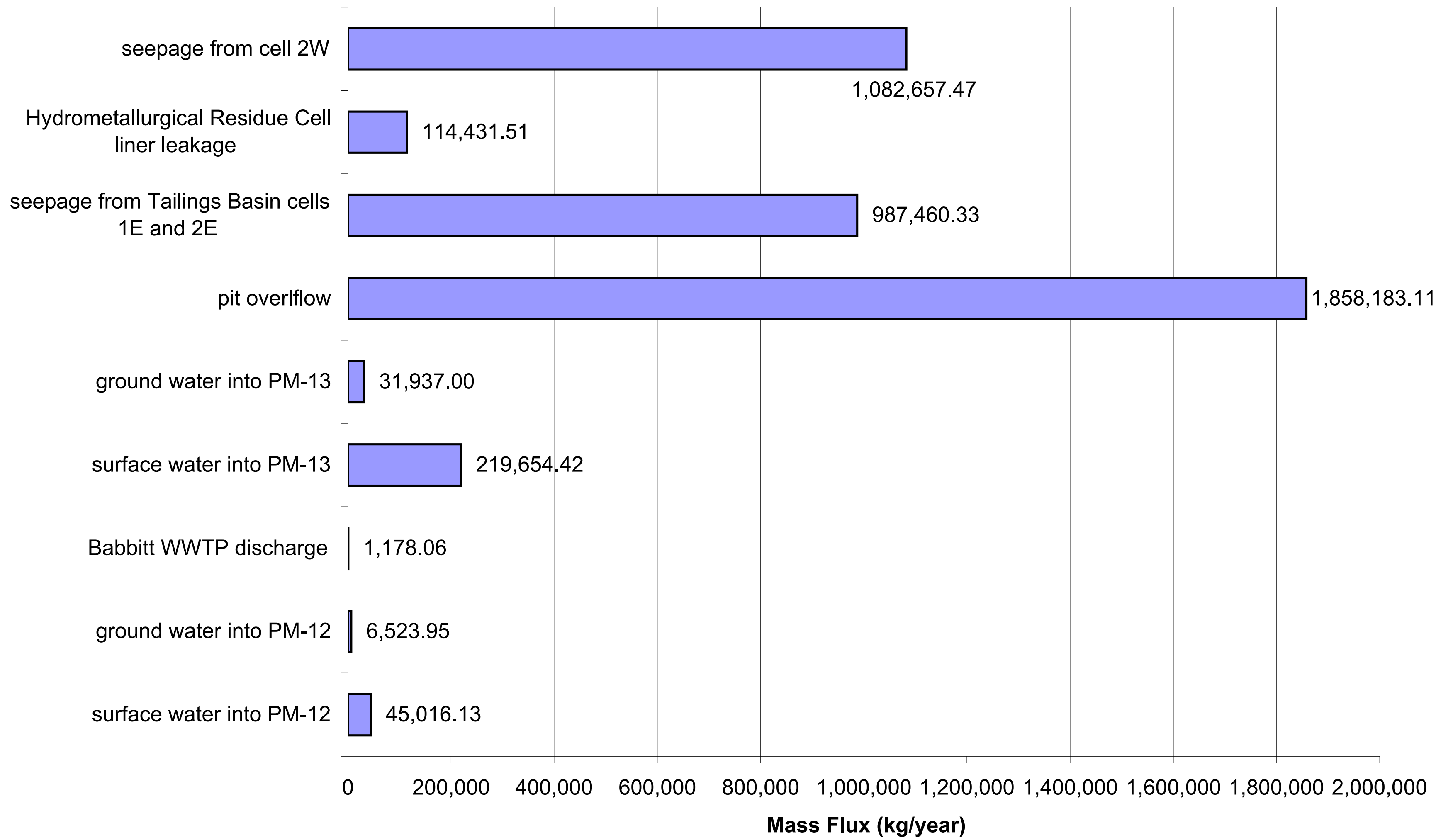
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)



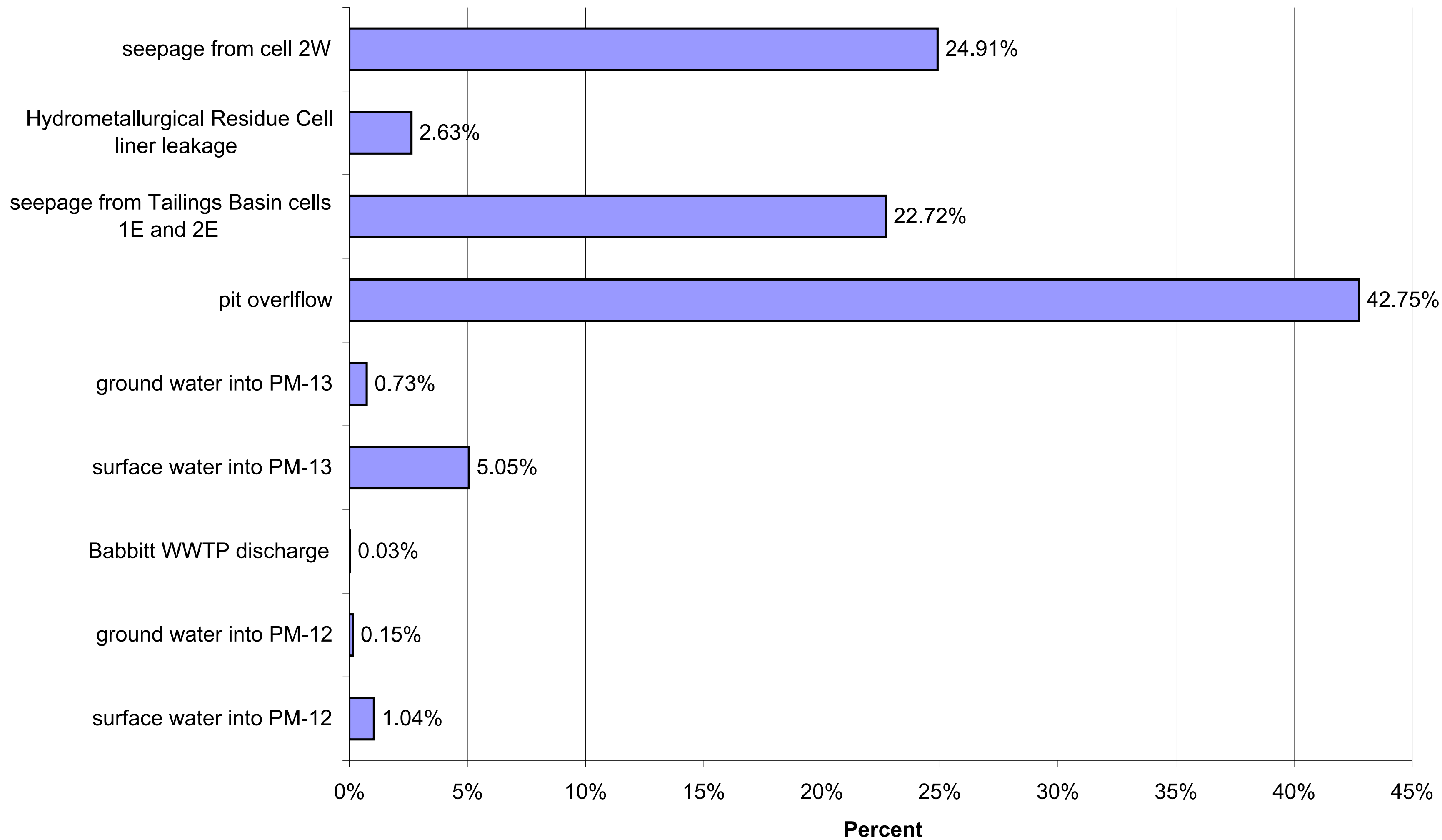
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Low Flow for Sulfate (SO_4)



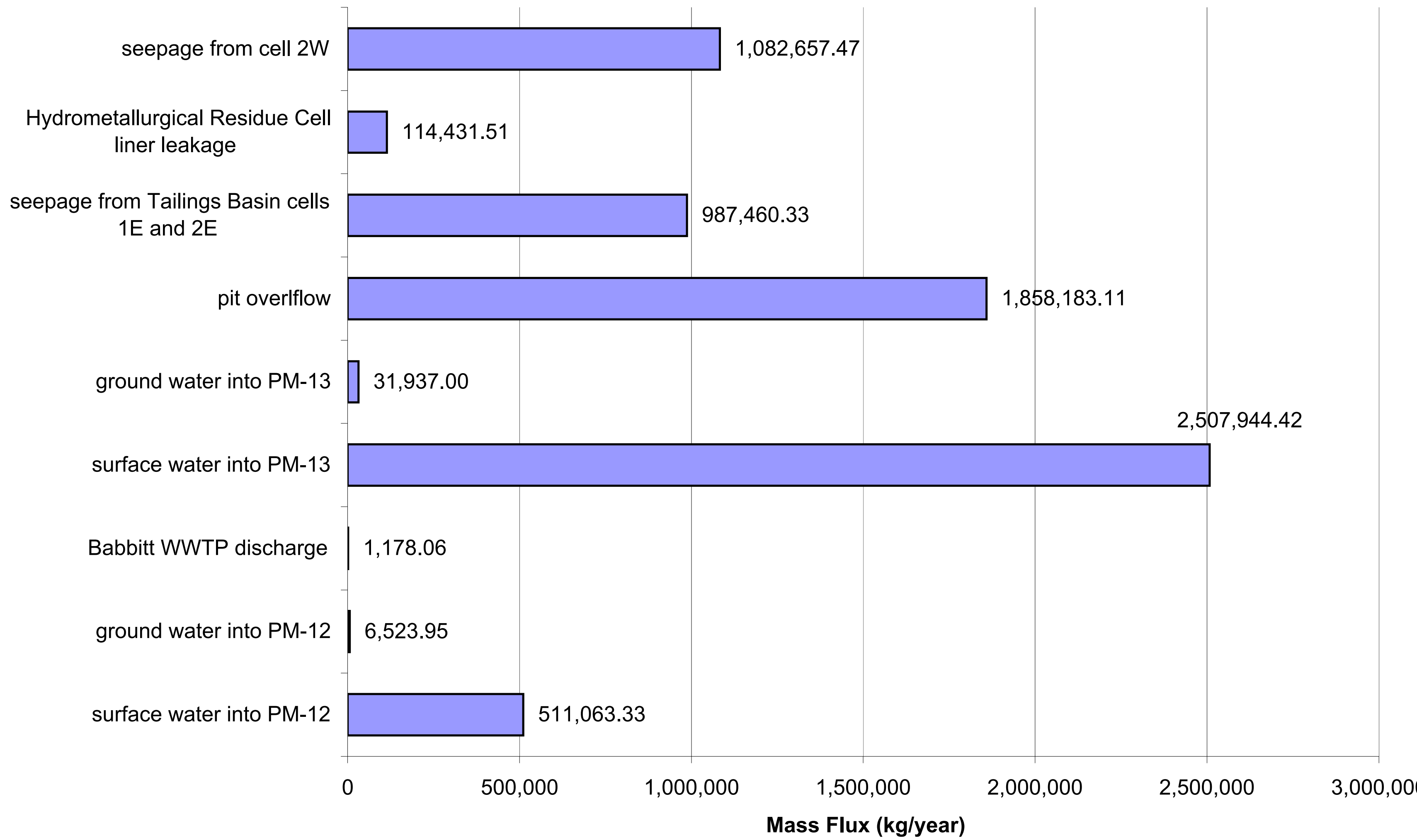
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)



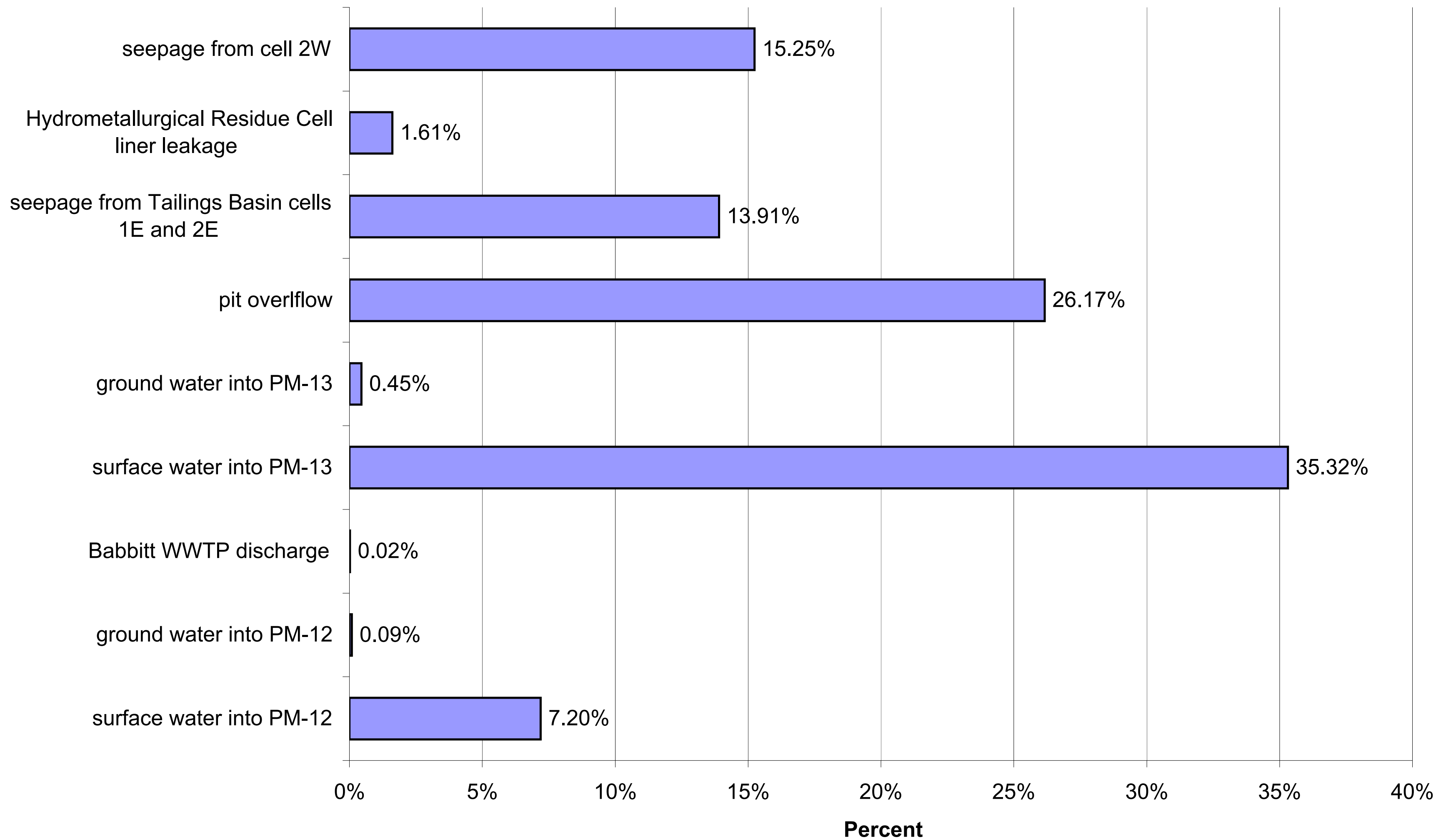
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for Average Flow for Sulfate (SO_4)



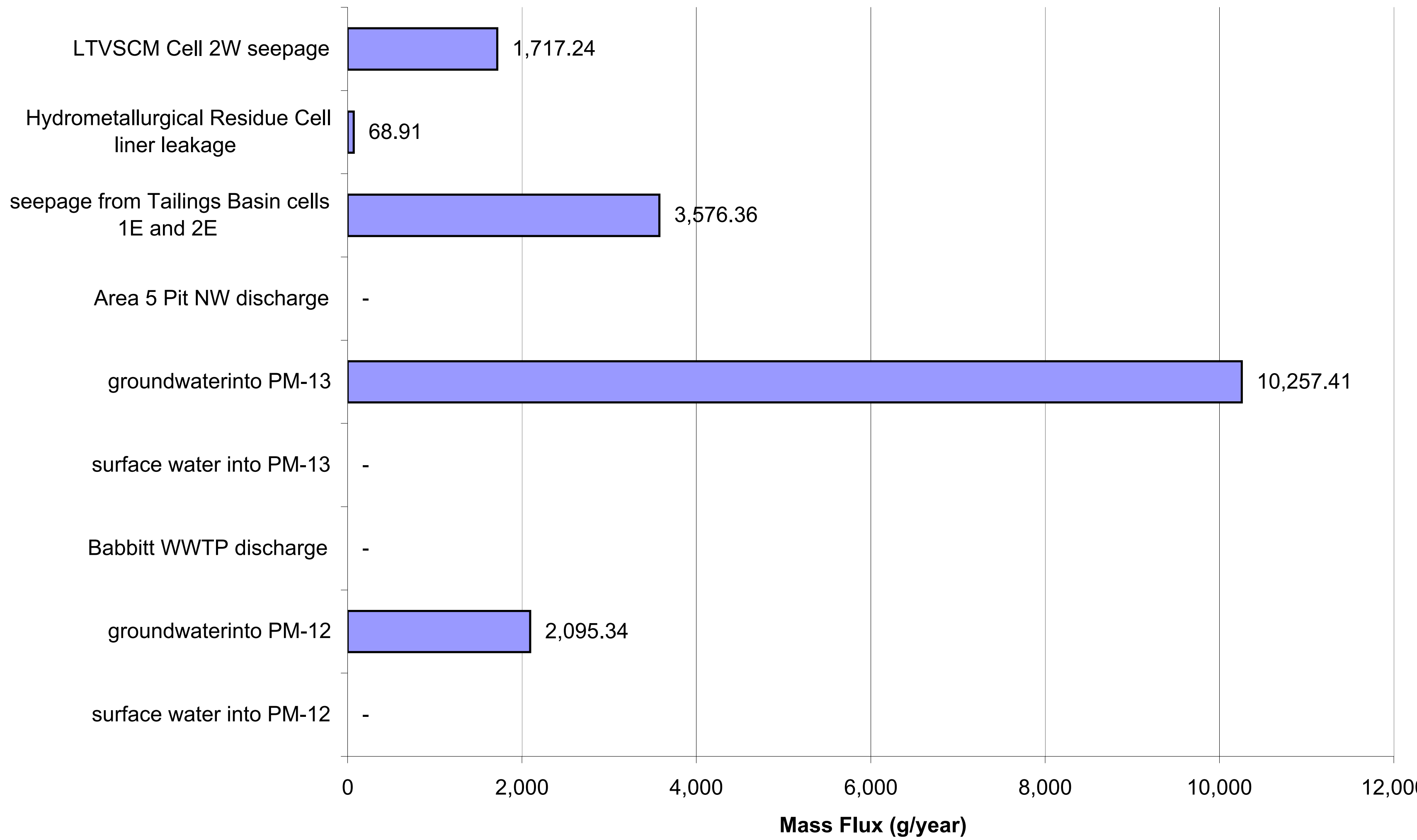
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)

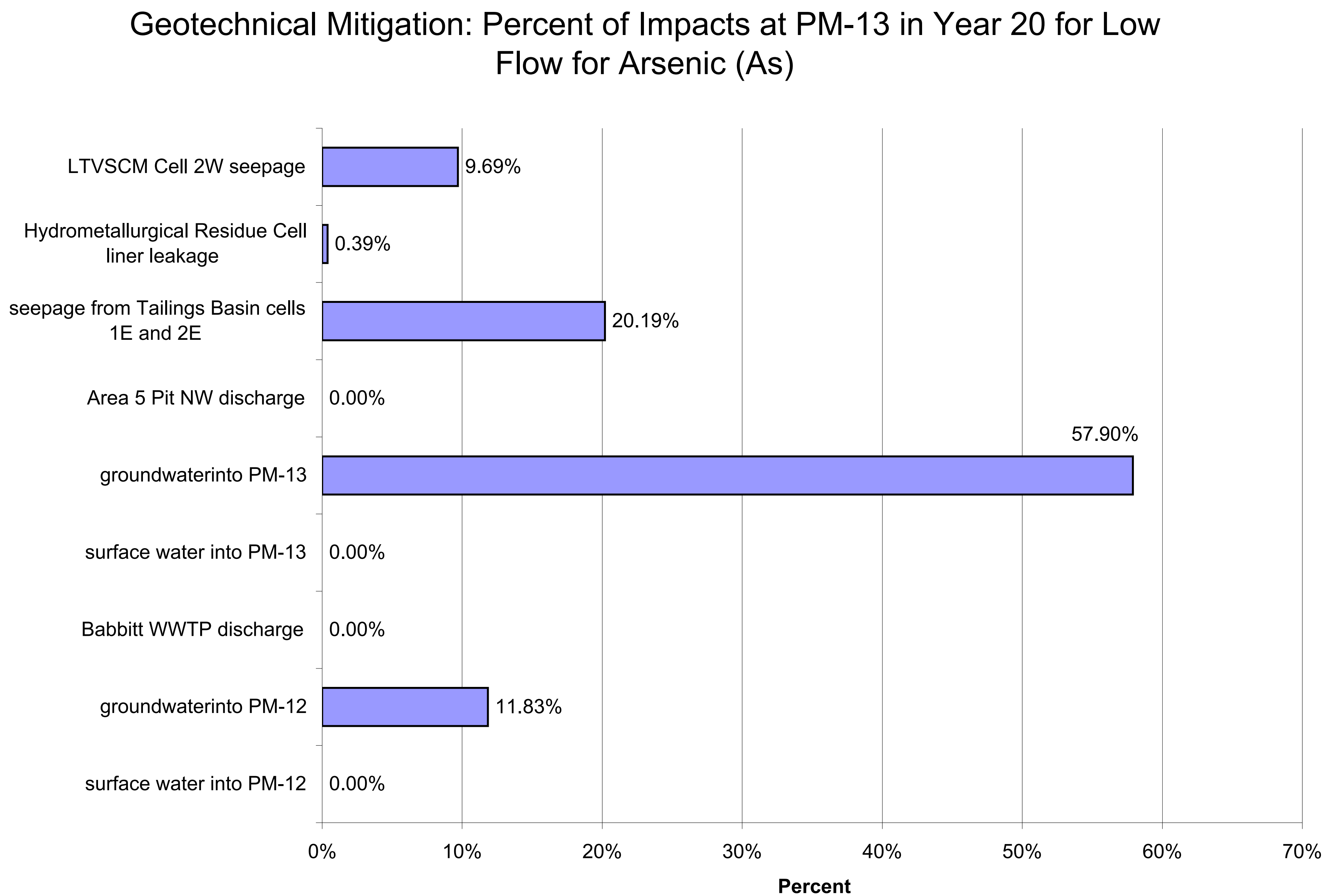


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 15 for High Flow for Sulfate (SO_4)

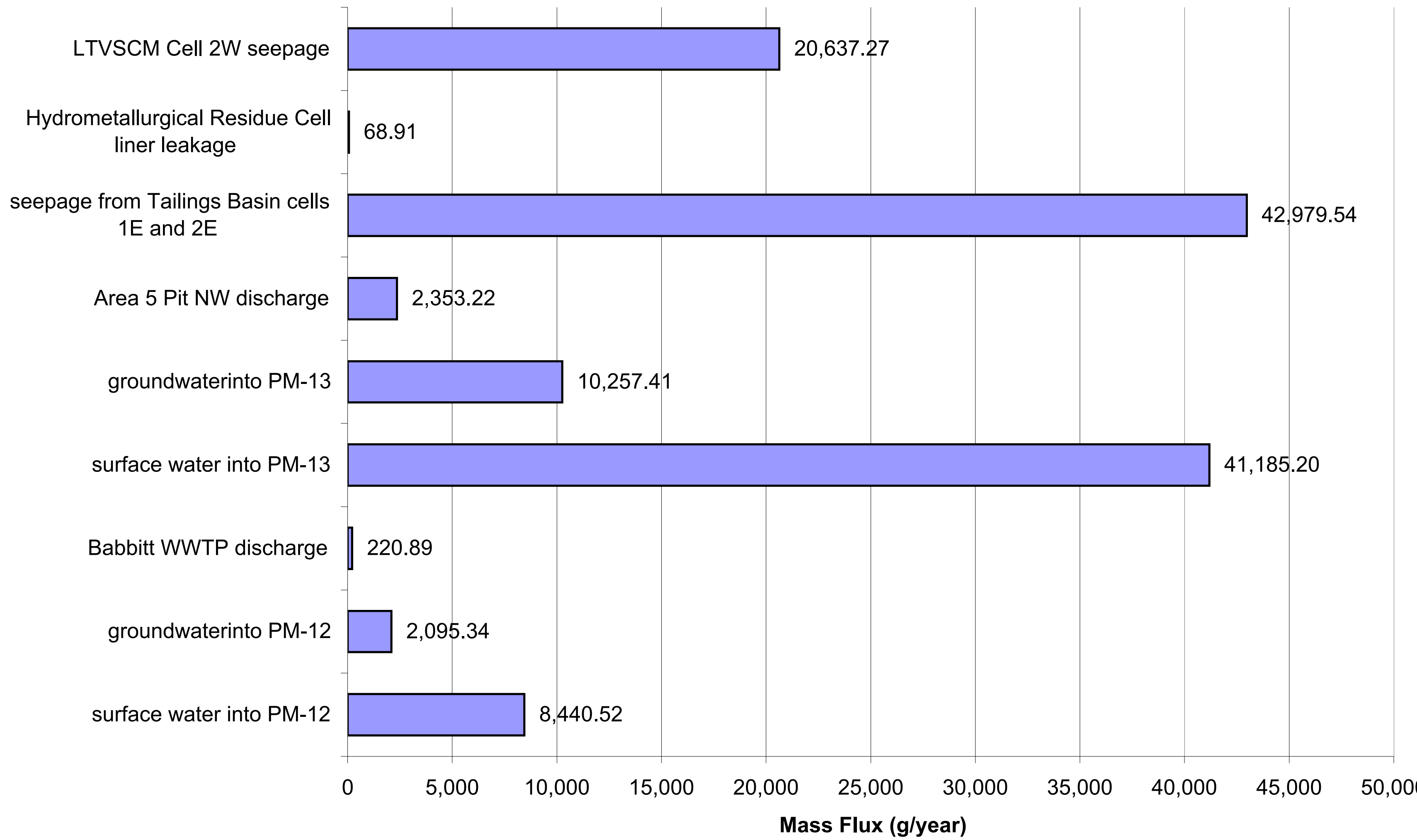


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)

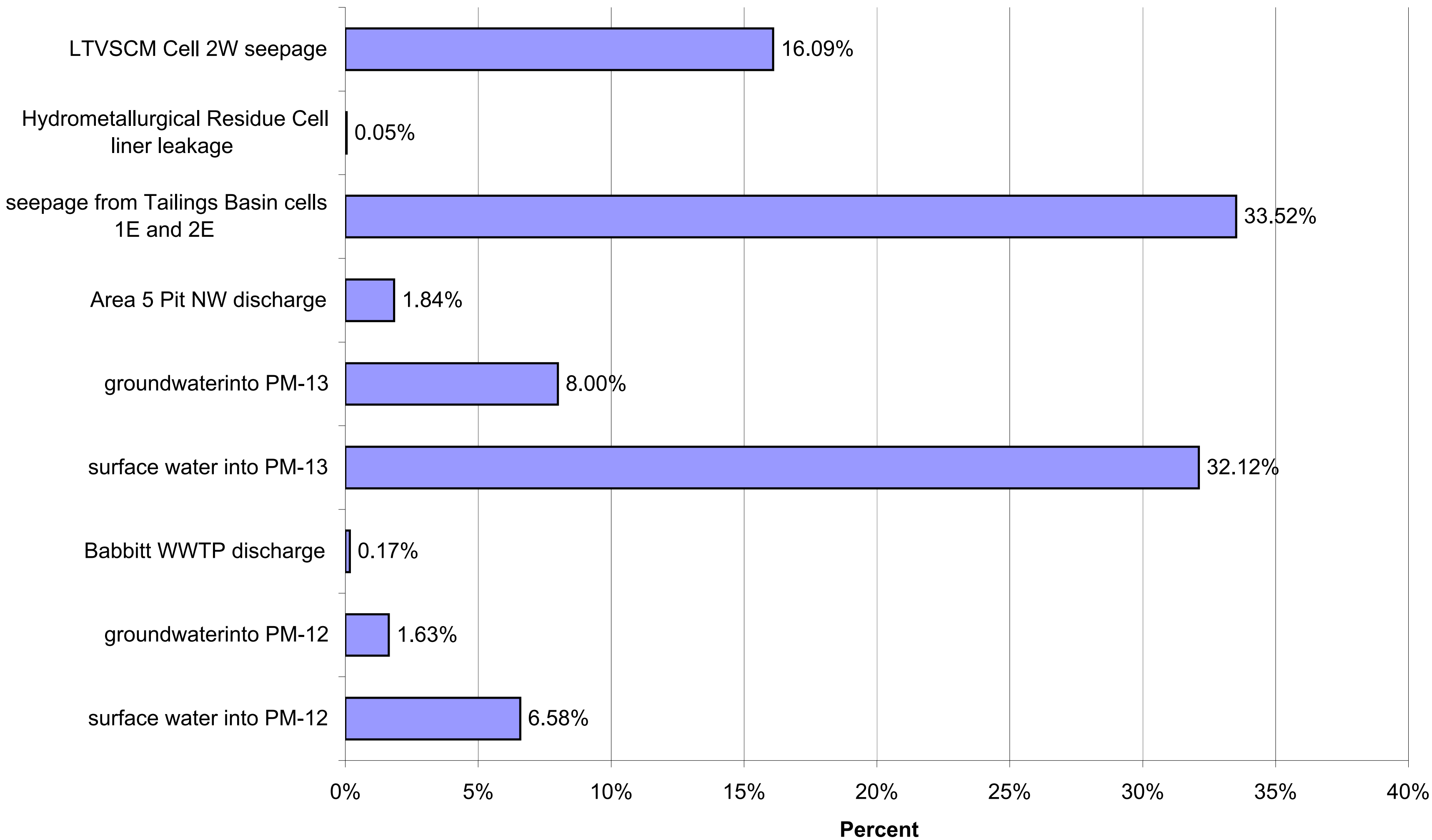



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Arsenic (As)
LTVSCM Cell 2W seepage
9.69%
Hydrometallurgical Residue Cell liner leakage
0.39%
seepage from Tailings Basin cells 1E and 2E
20.19%
Area 5 Pit NW discharge
0.00%
groundwaterinto PM-13
57.90%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwaterinto PM-12
11.83%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
Percent

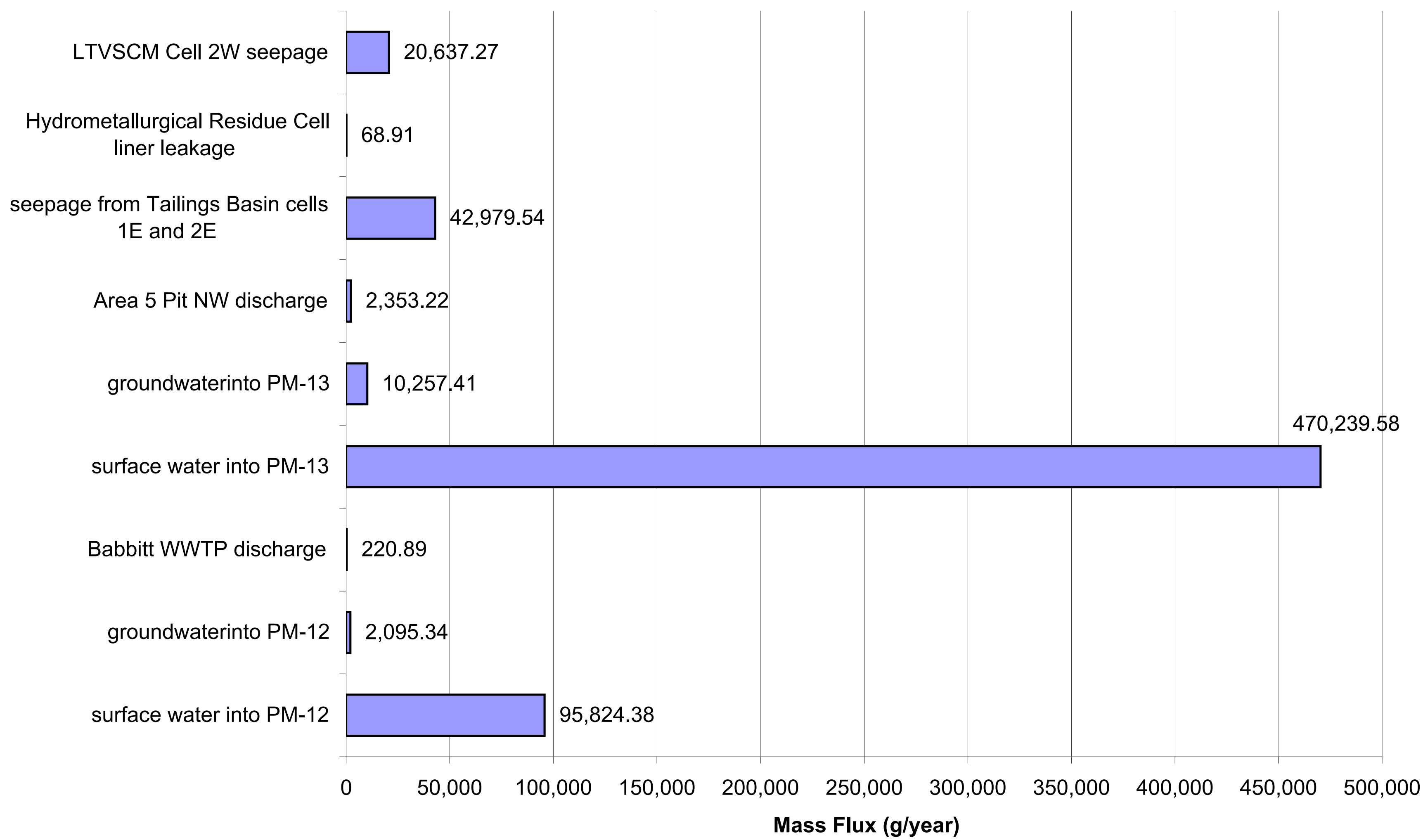
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)

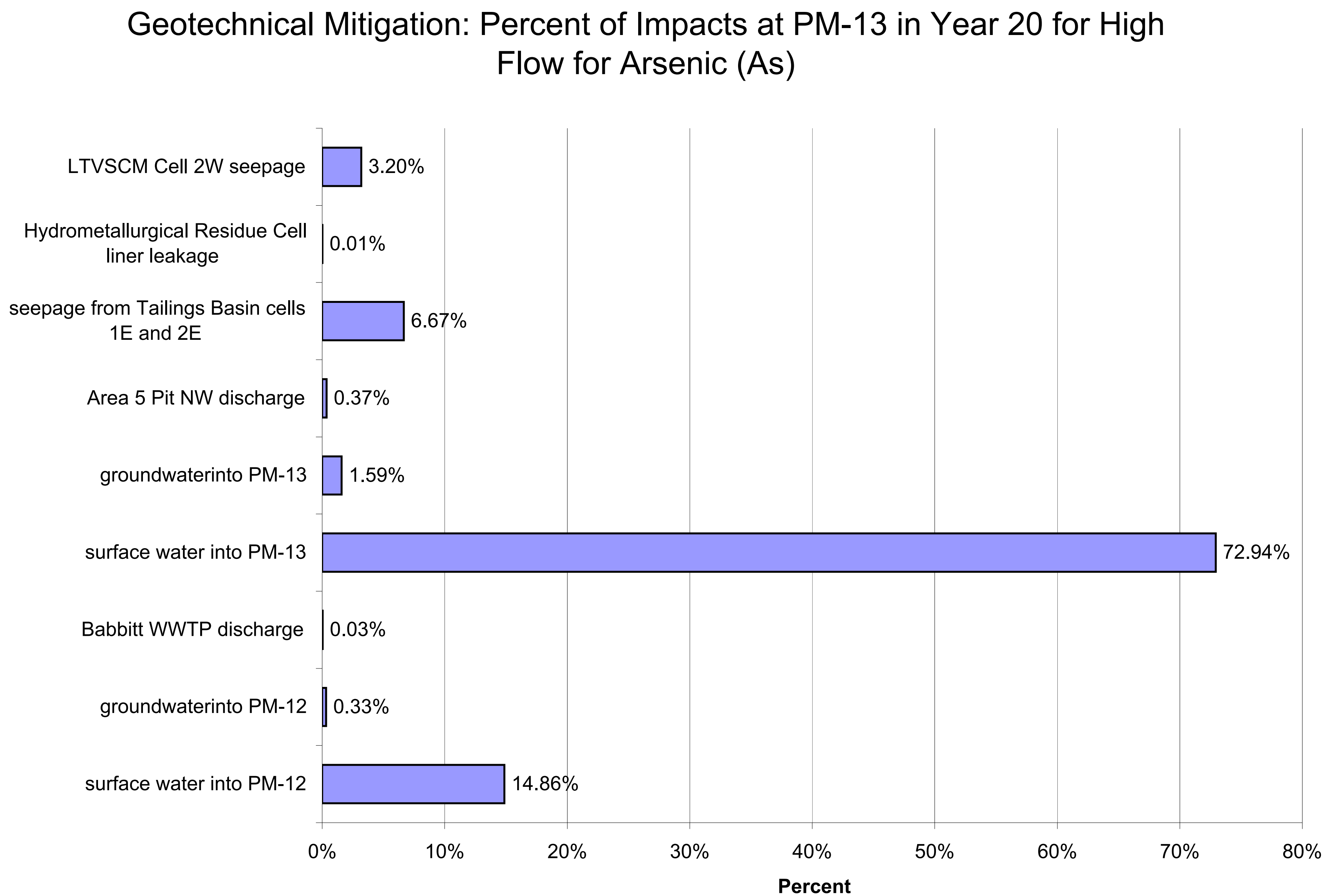


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Arsenic (As)

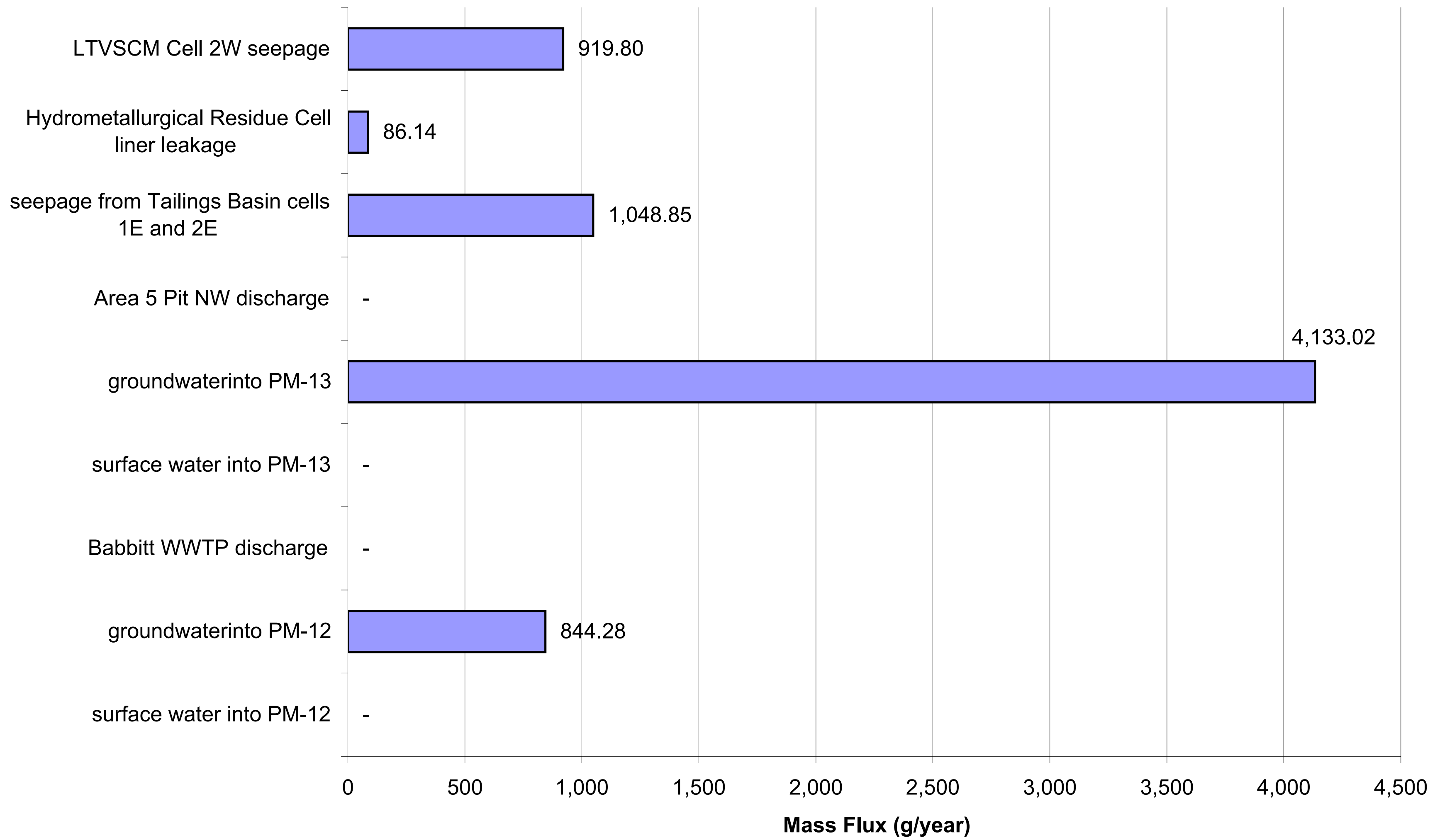


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)

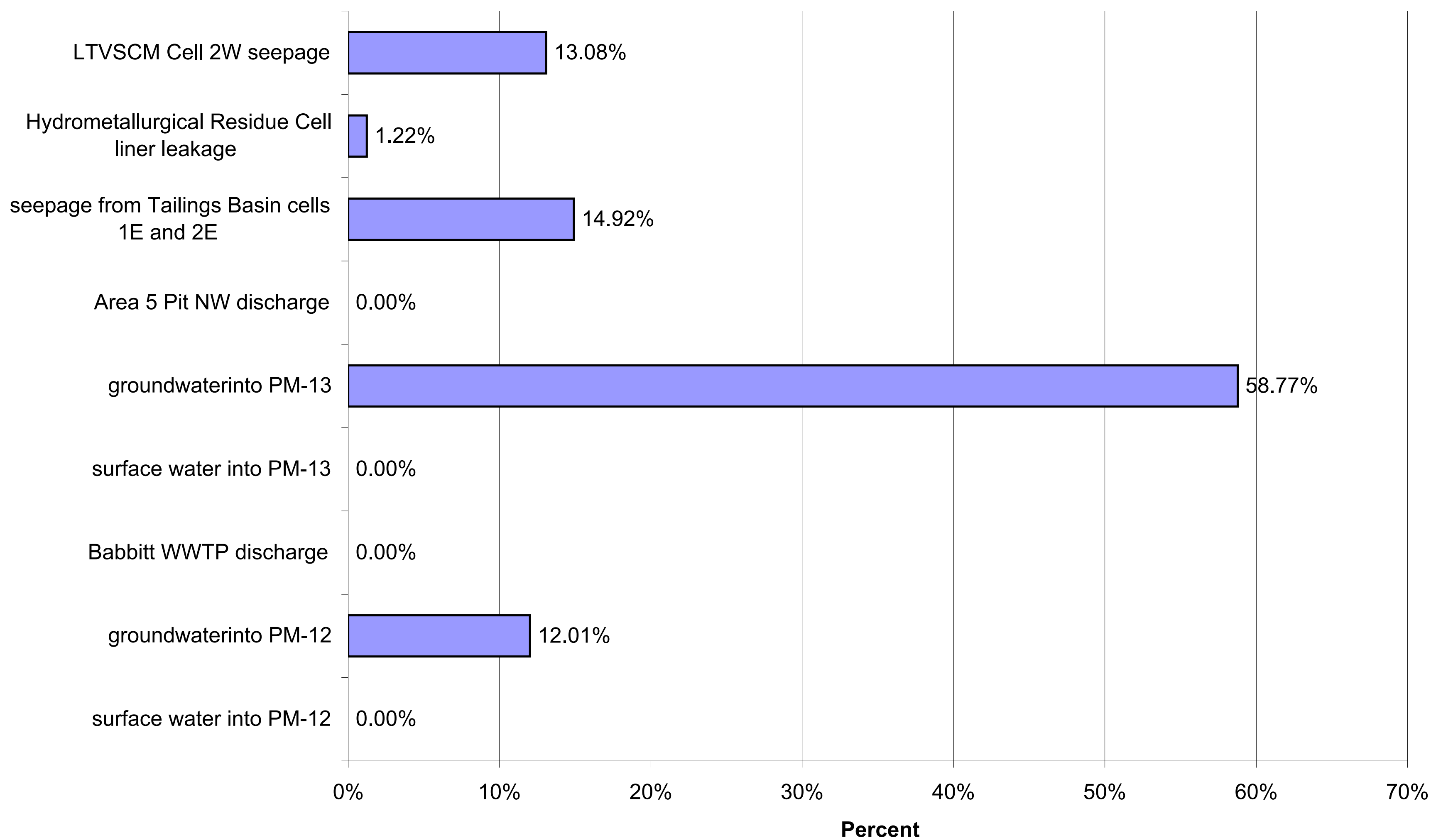



Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Arsenic (As)
LTVSCM Cell 2W seepage
3.20%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin cells 1E and 2E
6.67%
Area 5 Pit NW discharge
0.37%
groundwaterinto PM-13
1.59%
surface water into PM-13
72.94%
Babbitt WWTP discharge
0.03%
groundwaterinto PM-12
0.33%
surface water into PM-12
14.86%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

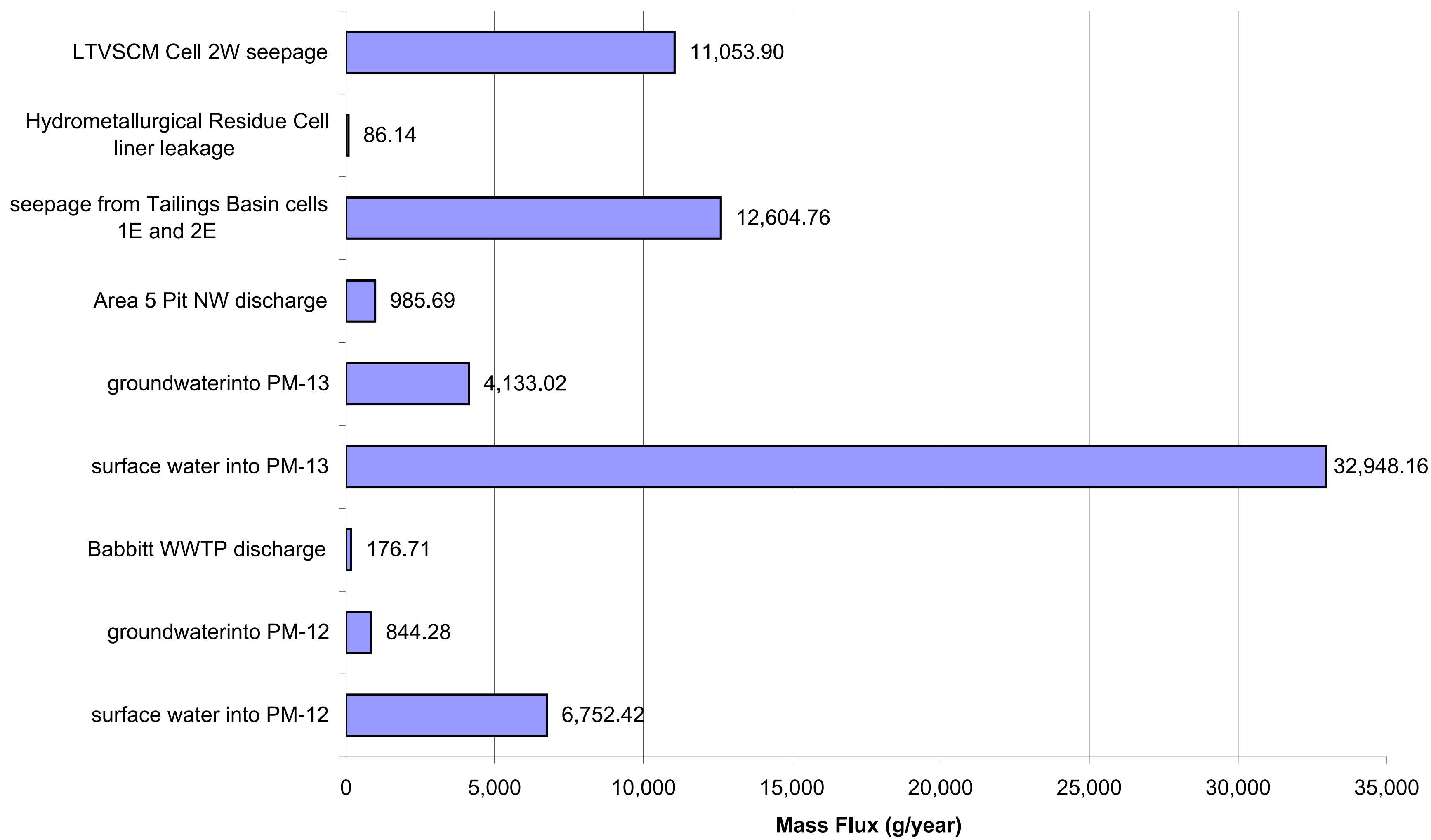
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)



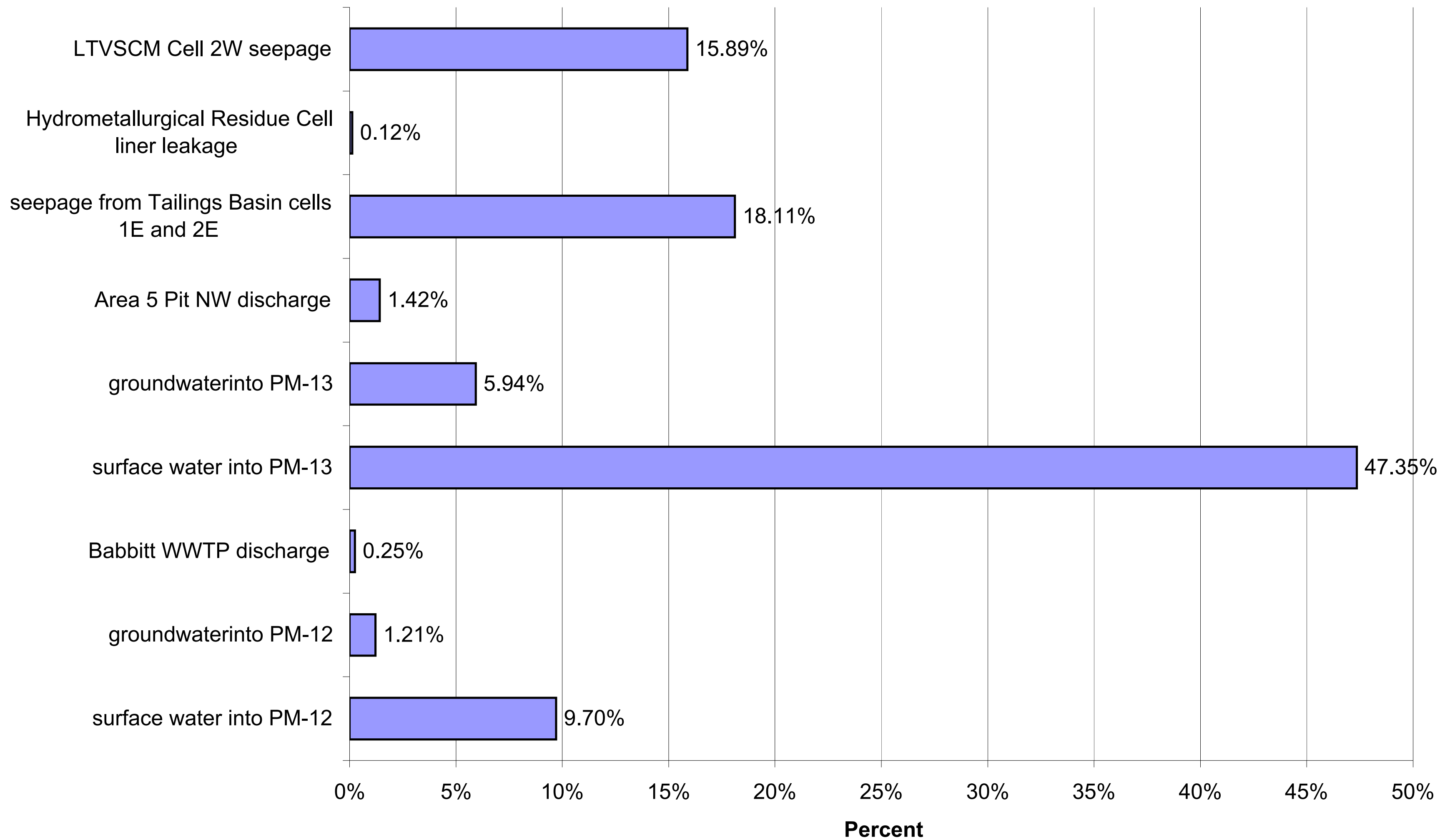
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Cobalt (Co)



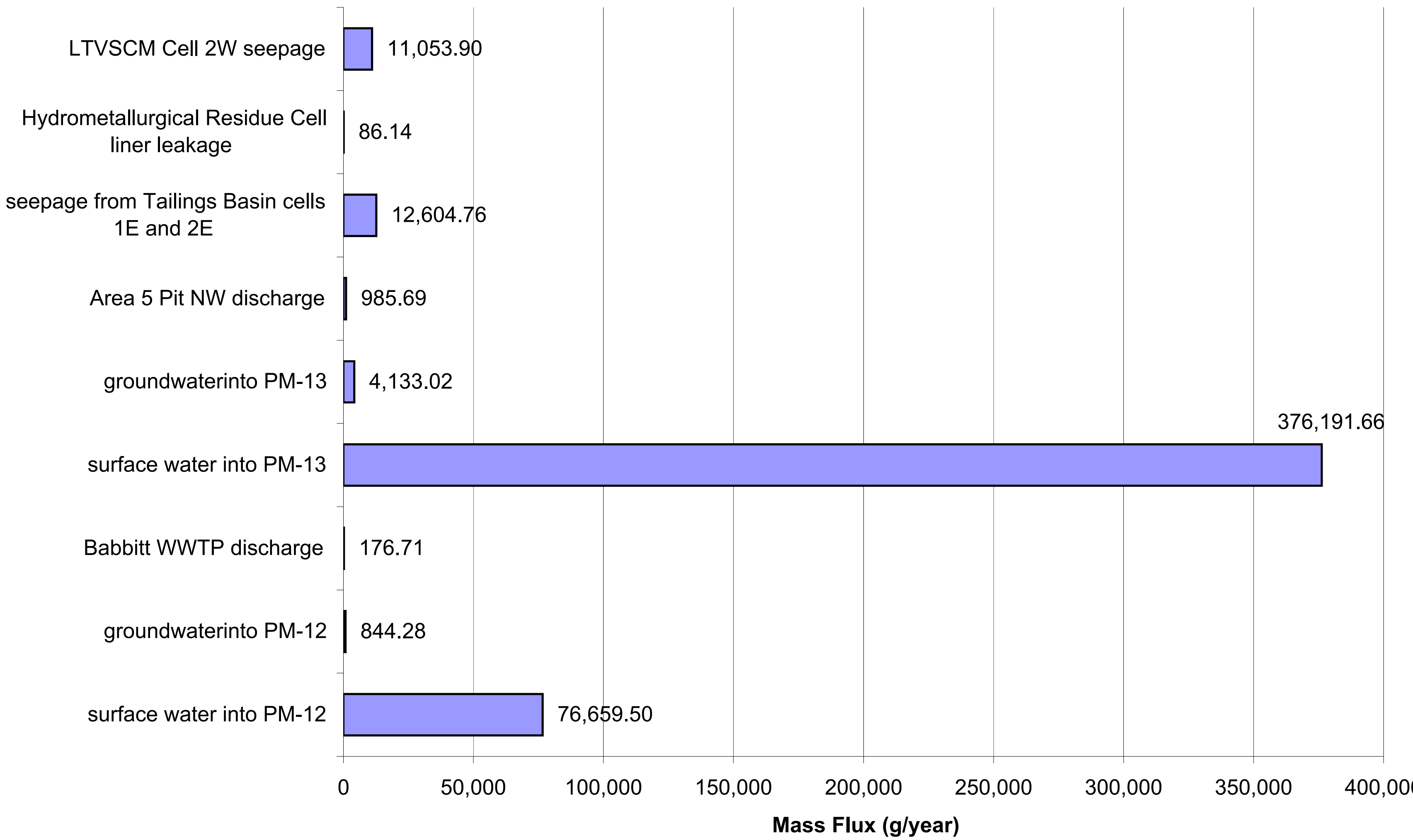
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)



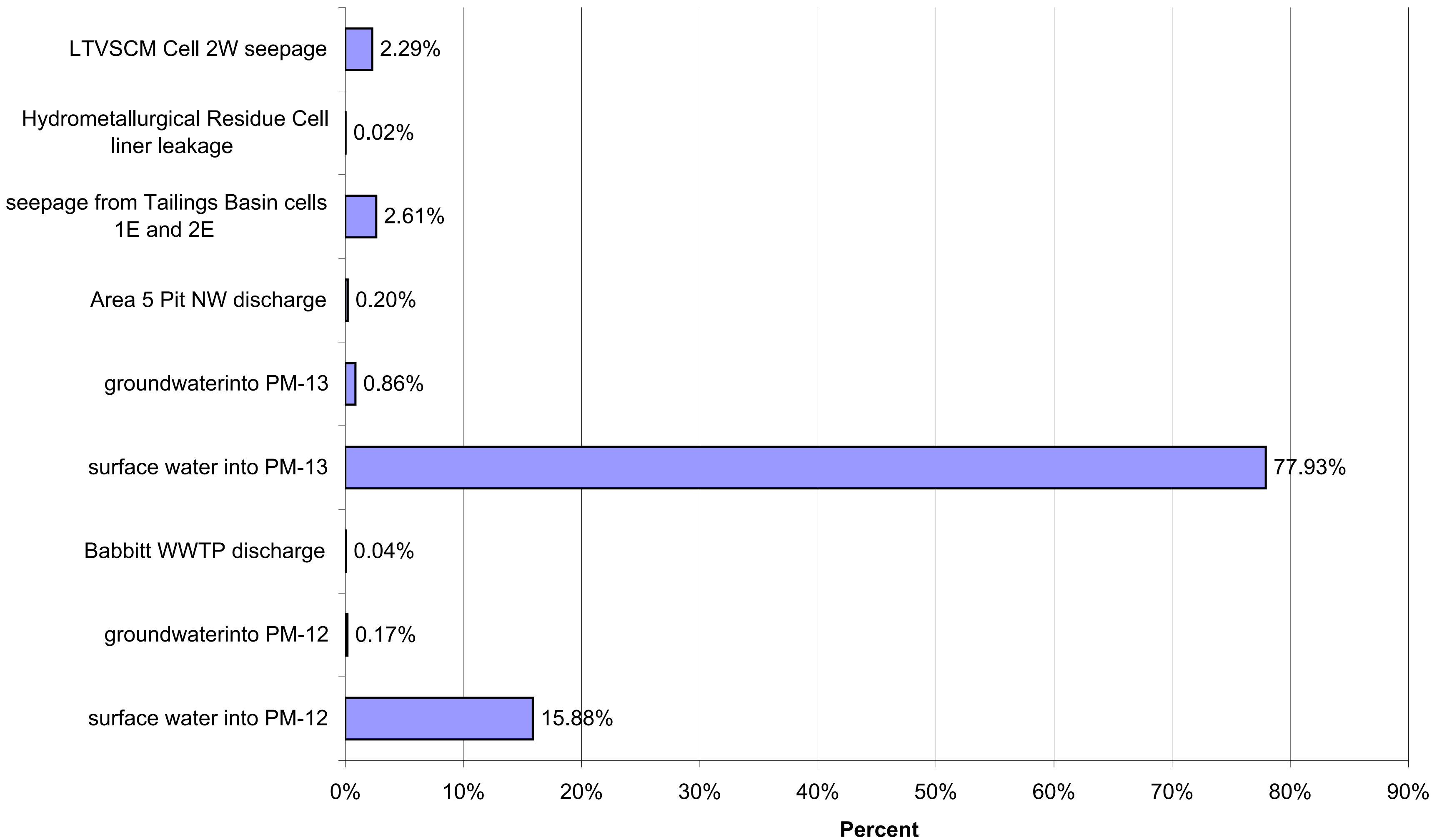
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Cobalt (Co)

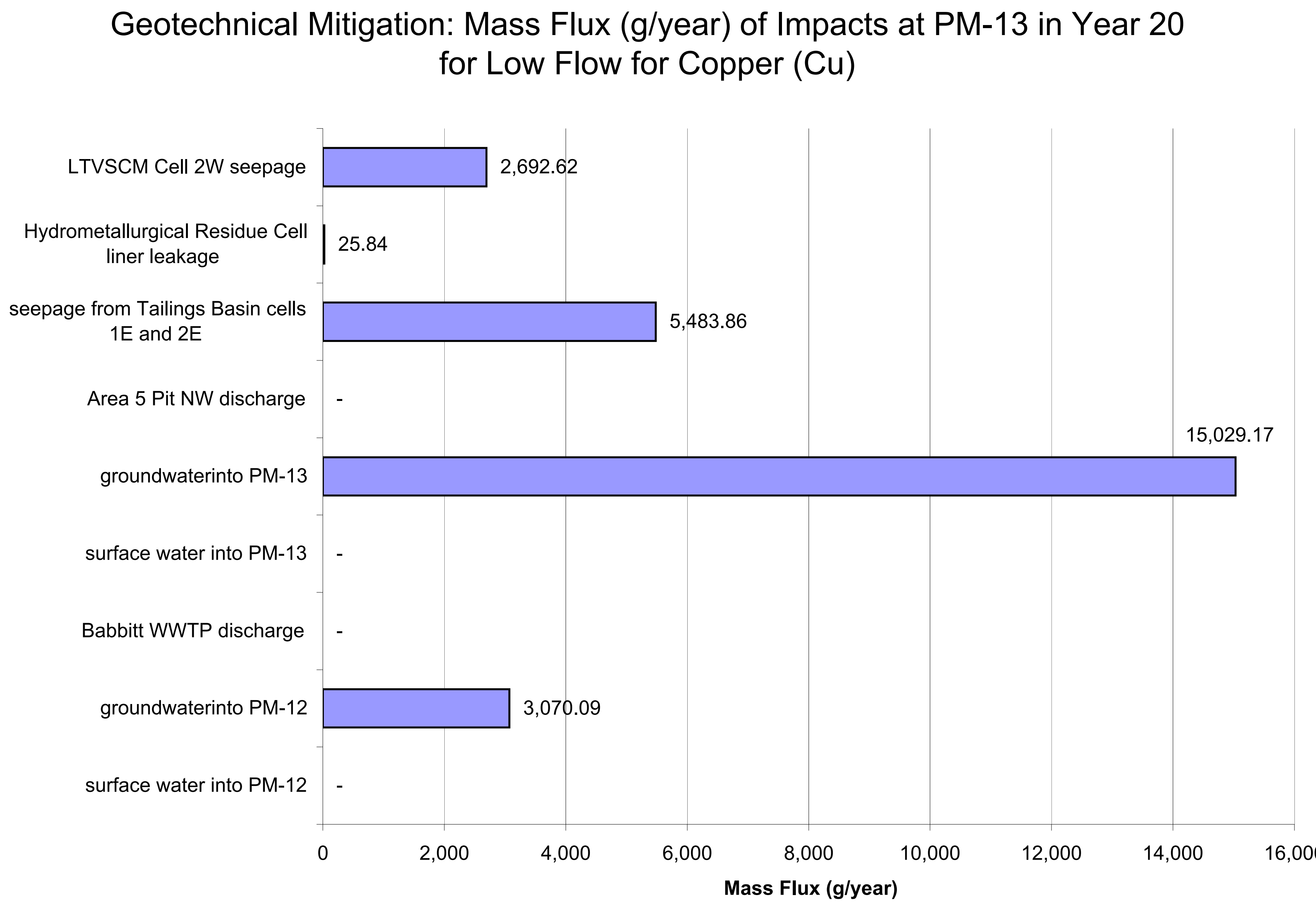


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)

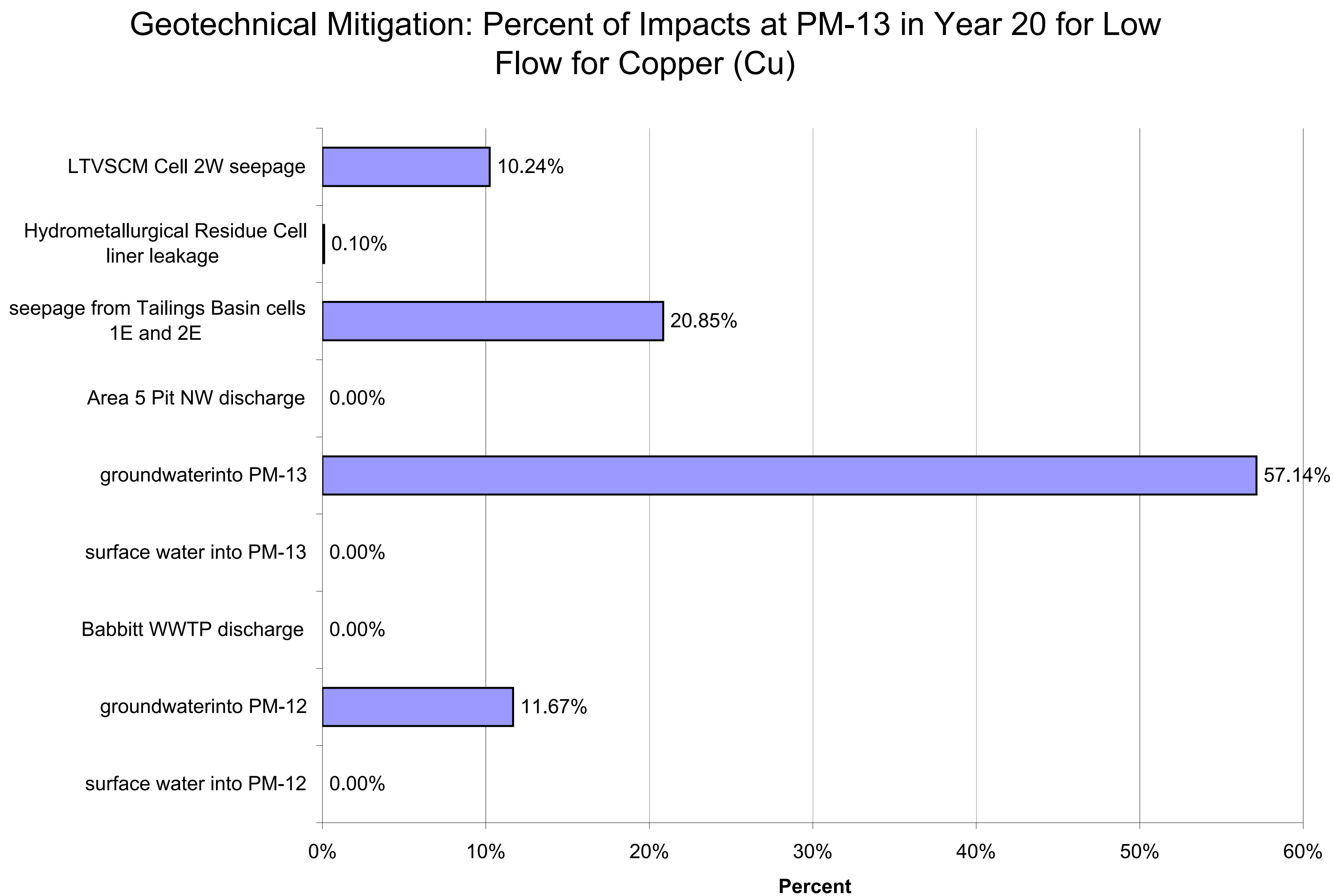


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Cobalt (Co)

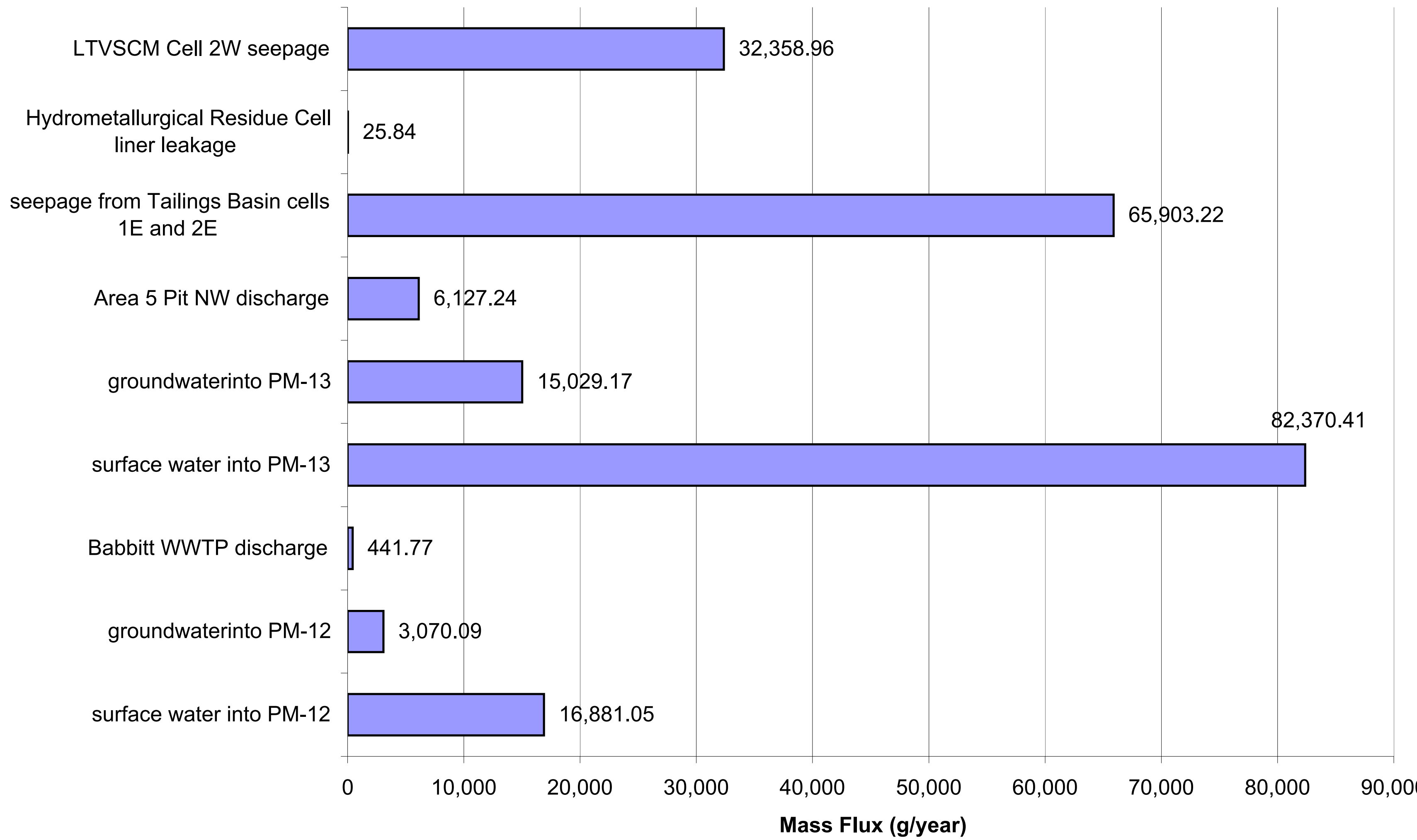



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Copper (Cu)
LTVSCM Cell 2W seepage
2,692.62
Hydrometallurgical Residue Cell liner leakage
25.84
seepage from Tailings Basin cells 1E and 2E
5,483.86
Area 5 Pit NW discharge
-
groundwaterinto PM-13
15,029.17
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwaterinto PM-12
3,070.09
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)

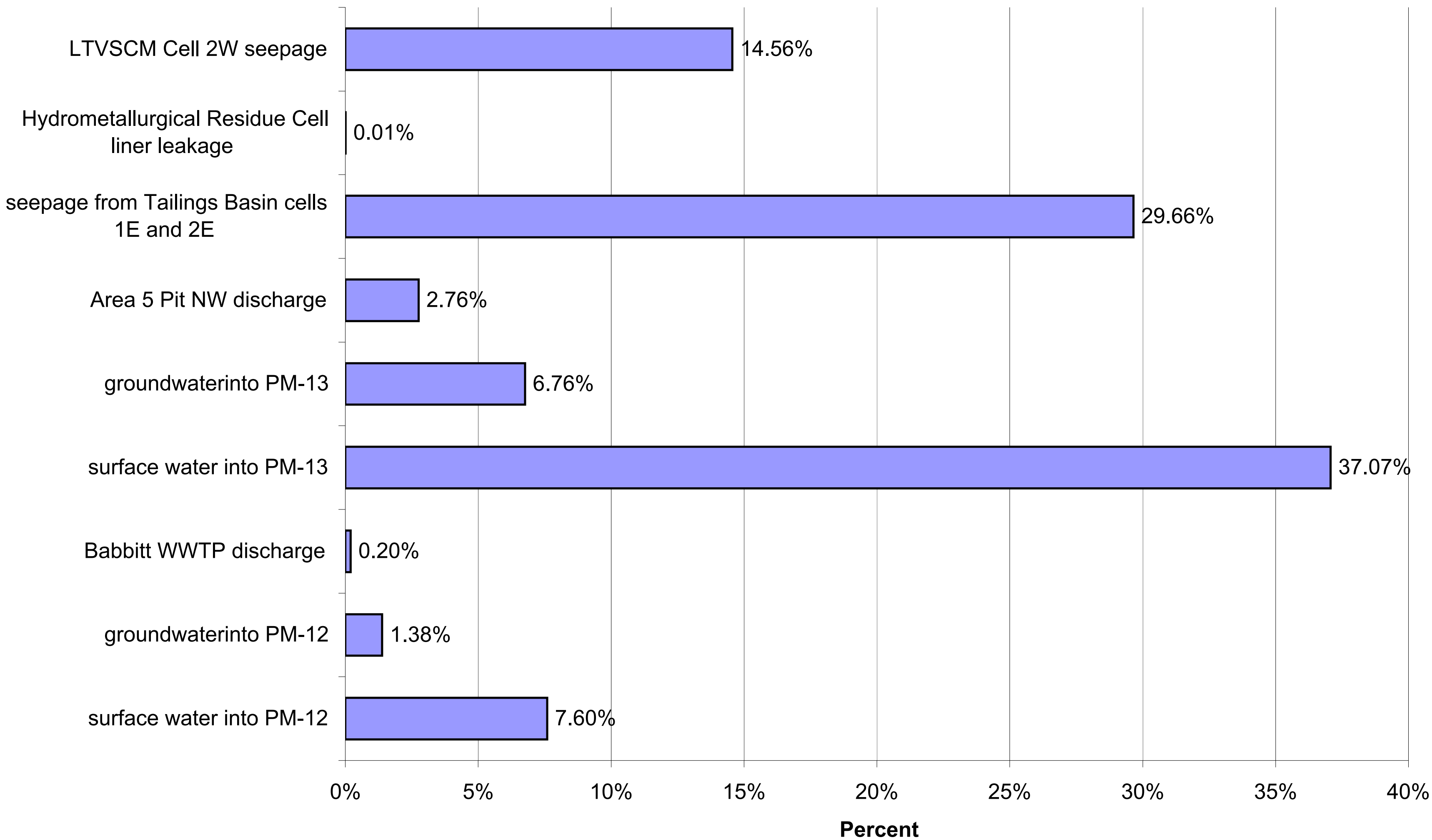
P:\Mpls\23 MN\69\2369862_MovedFromMpls_P\WO 015 EIS Rpts Studies\RS74 Water Quality Modeling\Model Predictions\Embarrass_v1_Mitigation\Sensitivity_Year20_TB_Mitigation
Cu, PM-13, low, percent



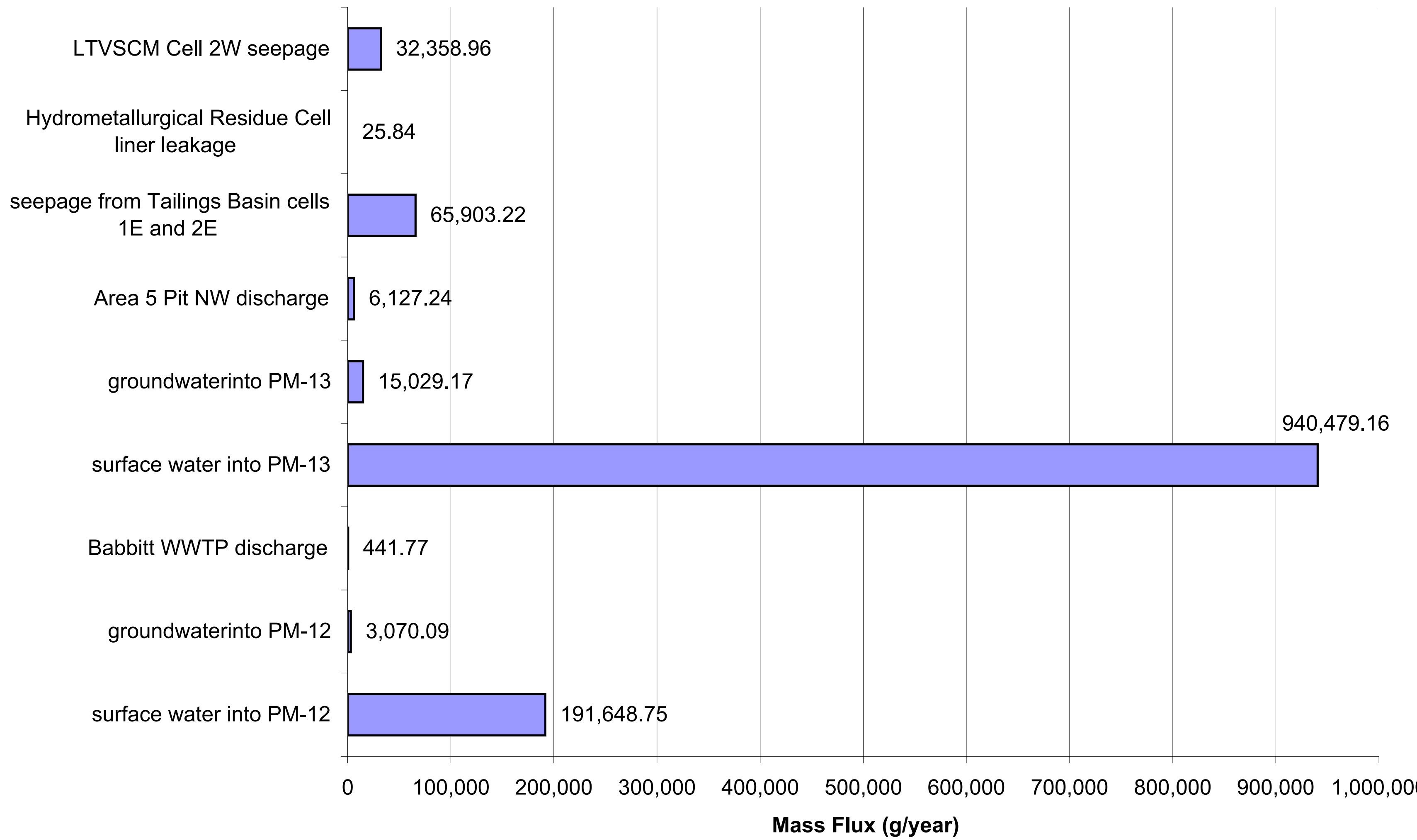
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)

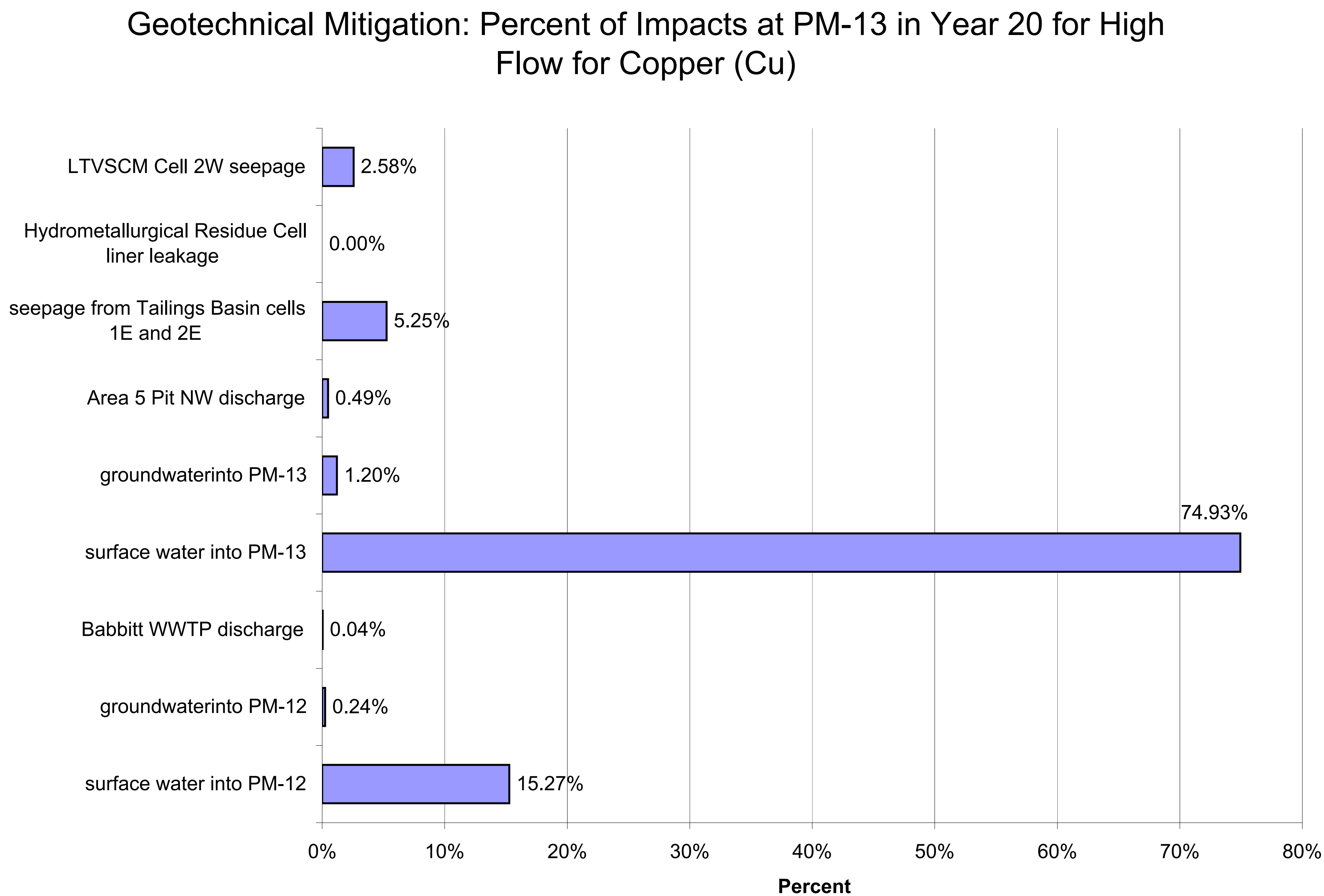


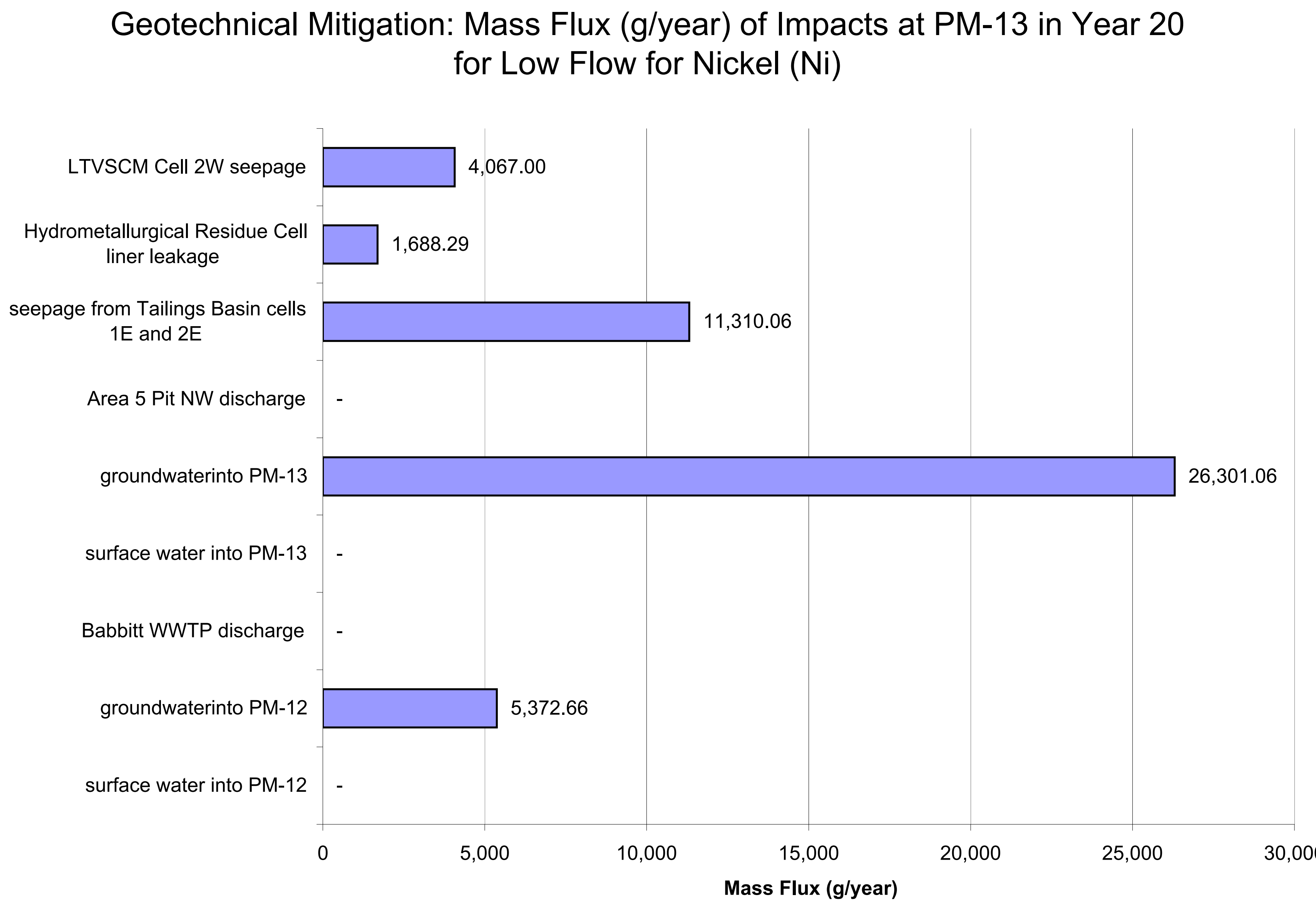
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Copper (Cu)

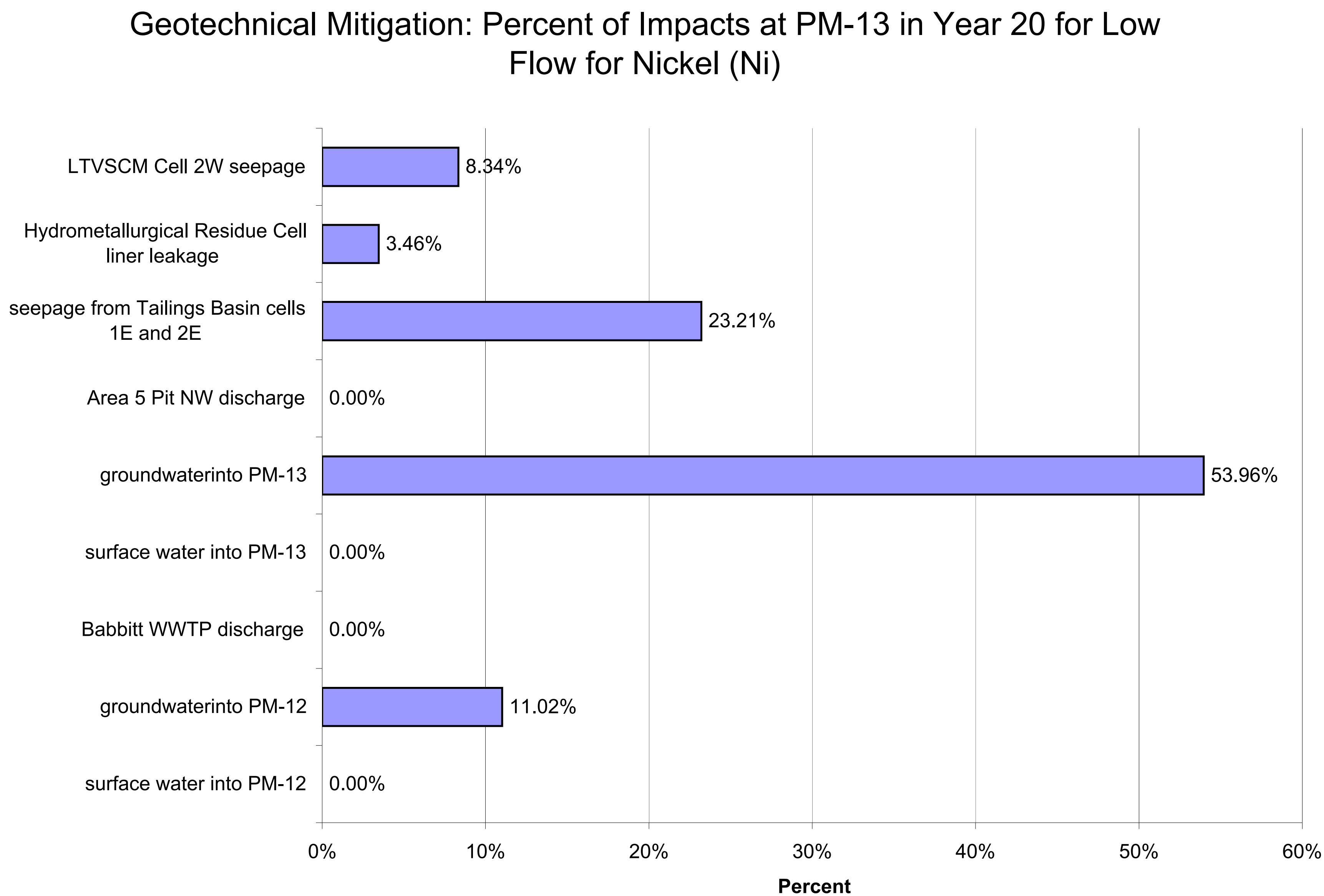


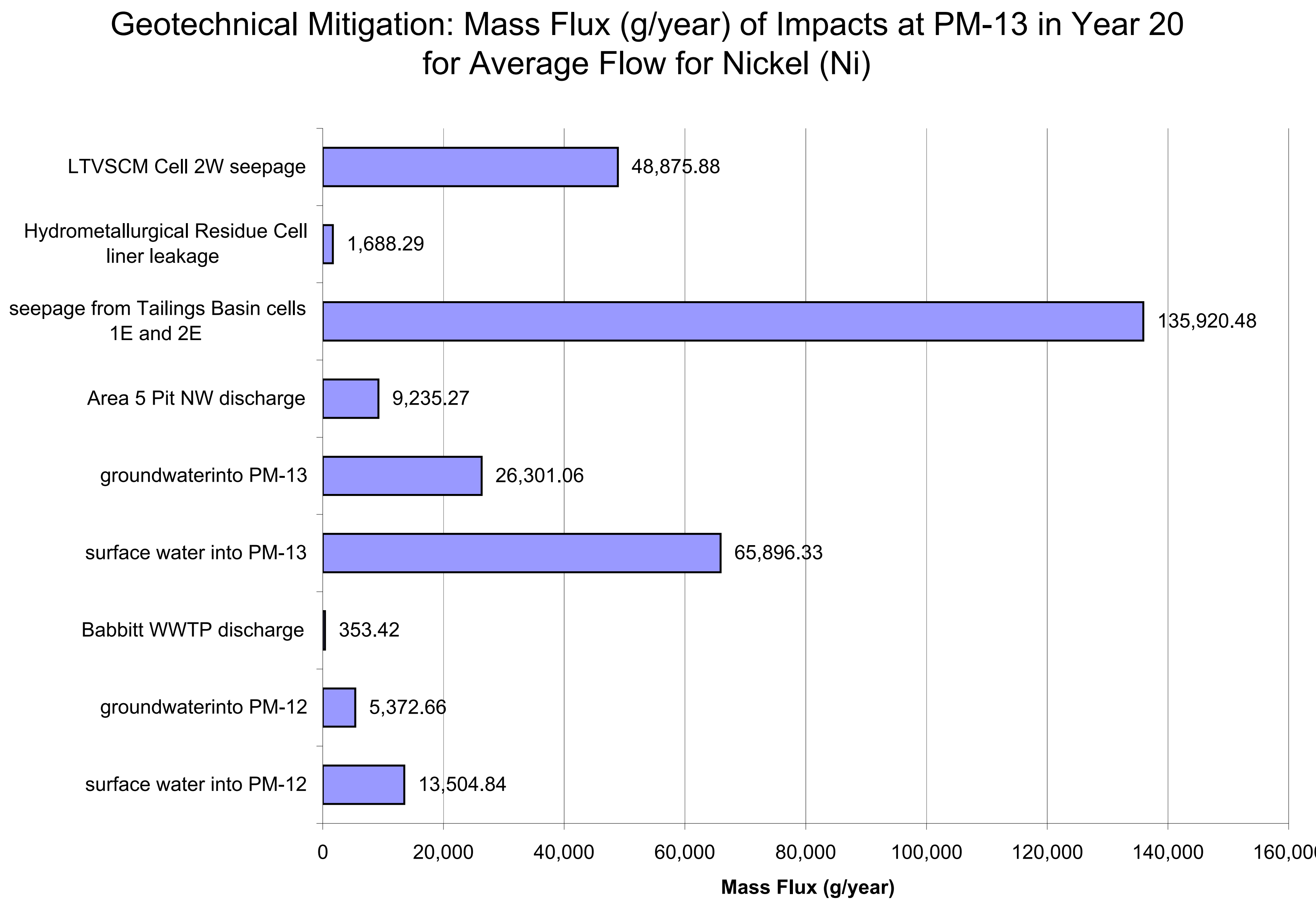
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)



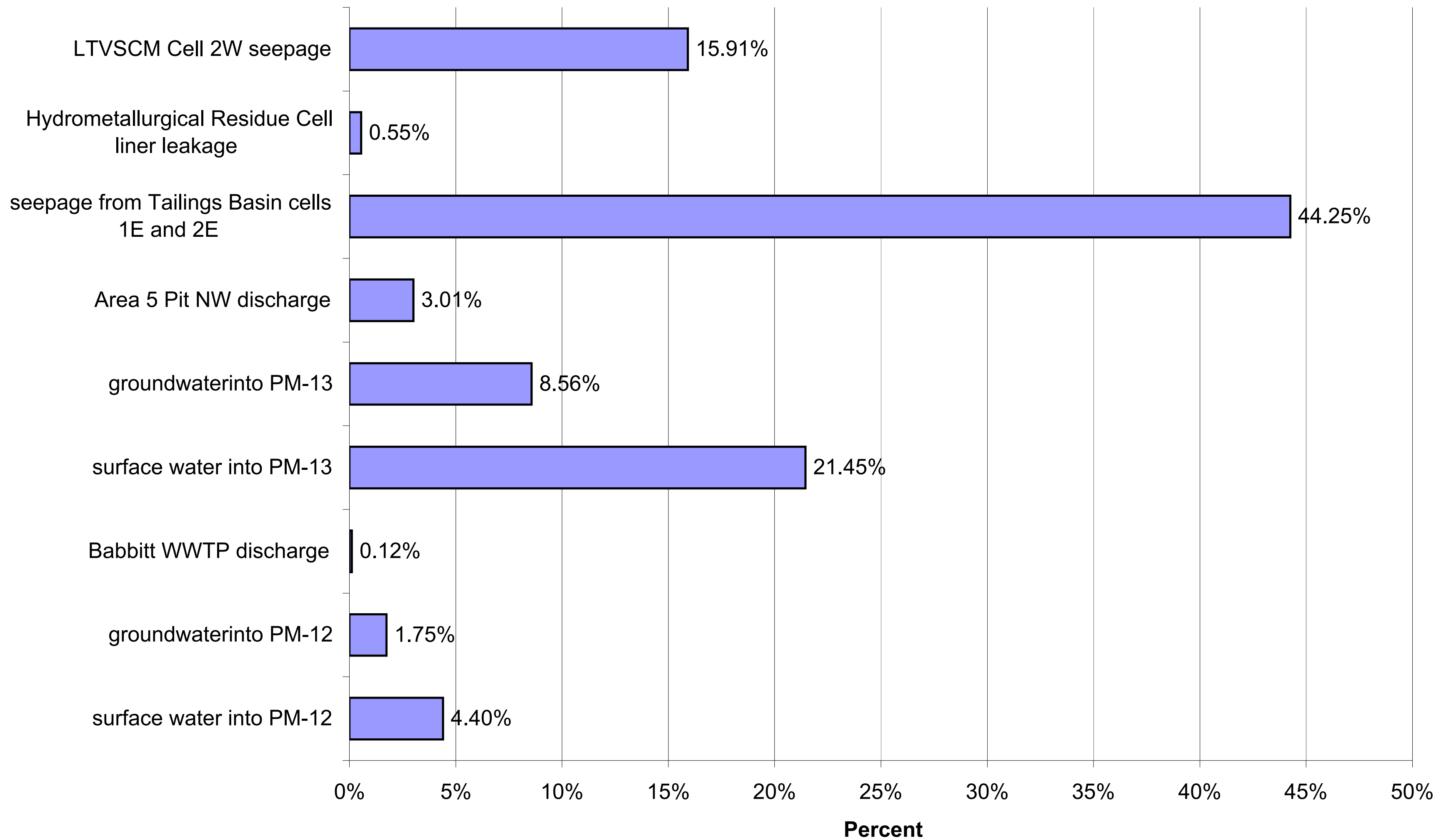

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Copper (Cu)
LTVSCM Cell 2W seepage
2.58%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin cells 1E and 2E
5.25%
Area 5 Pit NW discharge
0.49%
groundwaterinto PM-13
1.20%
surface water into PM-13
74.93%
Babbitt WWTP discharge
0.04%
groundwaterinto PM-12
0.24%
surface water into PM-12
15.27%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

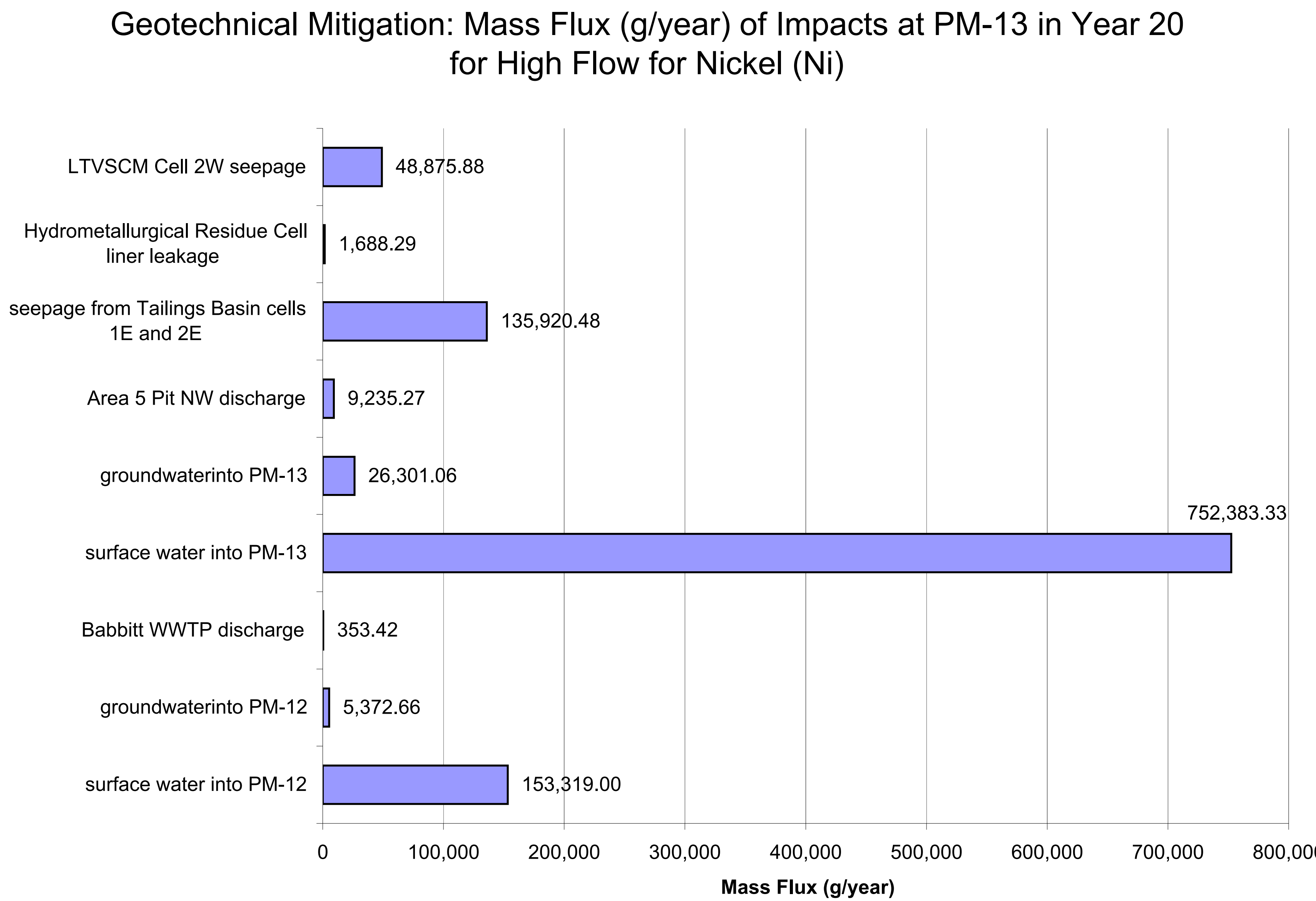

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20
for Low Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
4,067.00
Hydrometallurgical Residue Cell liner leakage
1,688.29
seepage from Tailings Basin cells 1E and 2E
11,310.06
Area 5 Pit NW discharge
-
groundwaterinto PM-13
26,301.06
surface water into PM-13
-
Babbitt WWTP discharge
-
groundwaterinto 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 Year 20 for Low Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
8.34%
Hydrometallurgical Residue Cell liner leakage
3.46%
seepage from Tailings Basin cells 1E and 2E
23.21%
Area 5 Pit NW discharge
0.00%
groundwaterinto PM-13
53.96%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwaterinto PM-12
11.02%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

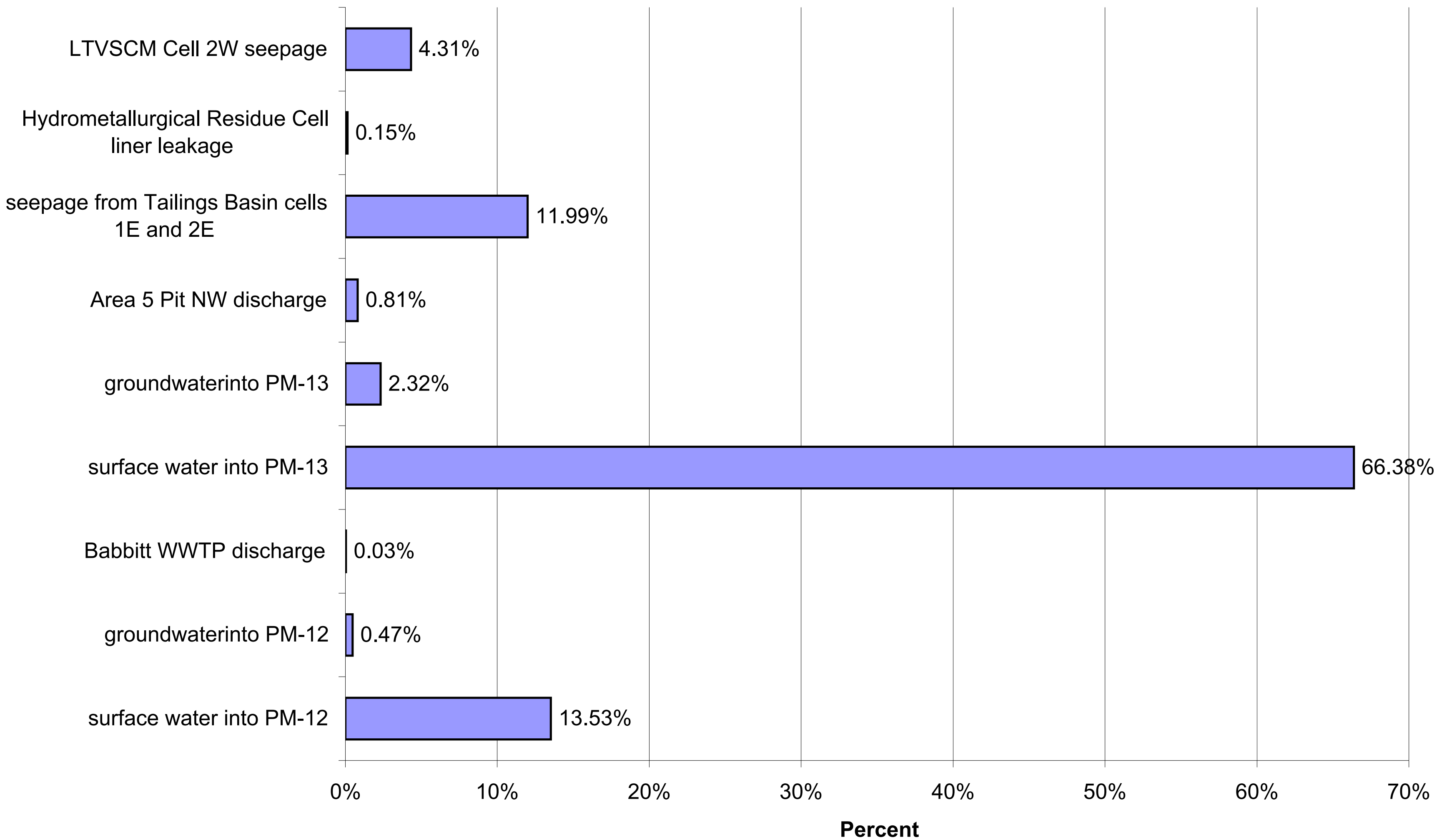

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Average Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,688.29
seepage from Tailings Basin cells 1E and 2E
135,920.48
Area 5 Pit NW discharge
9,235.27
groundwaterinto PM-13
26,301.06
surface water into PM-13
65,896.33
Babbitt WWTP discharge
353.42
groundwaterinto 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)

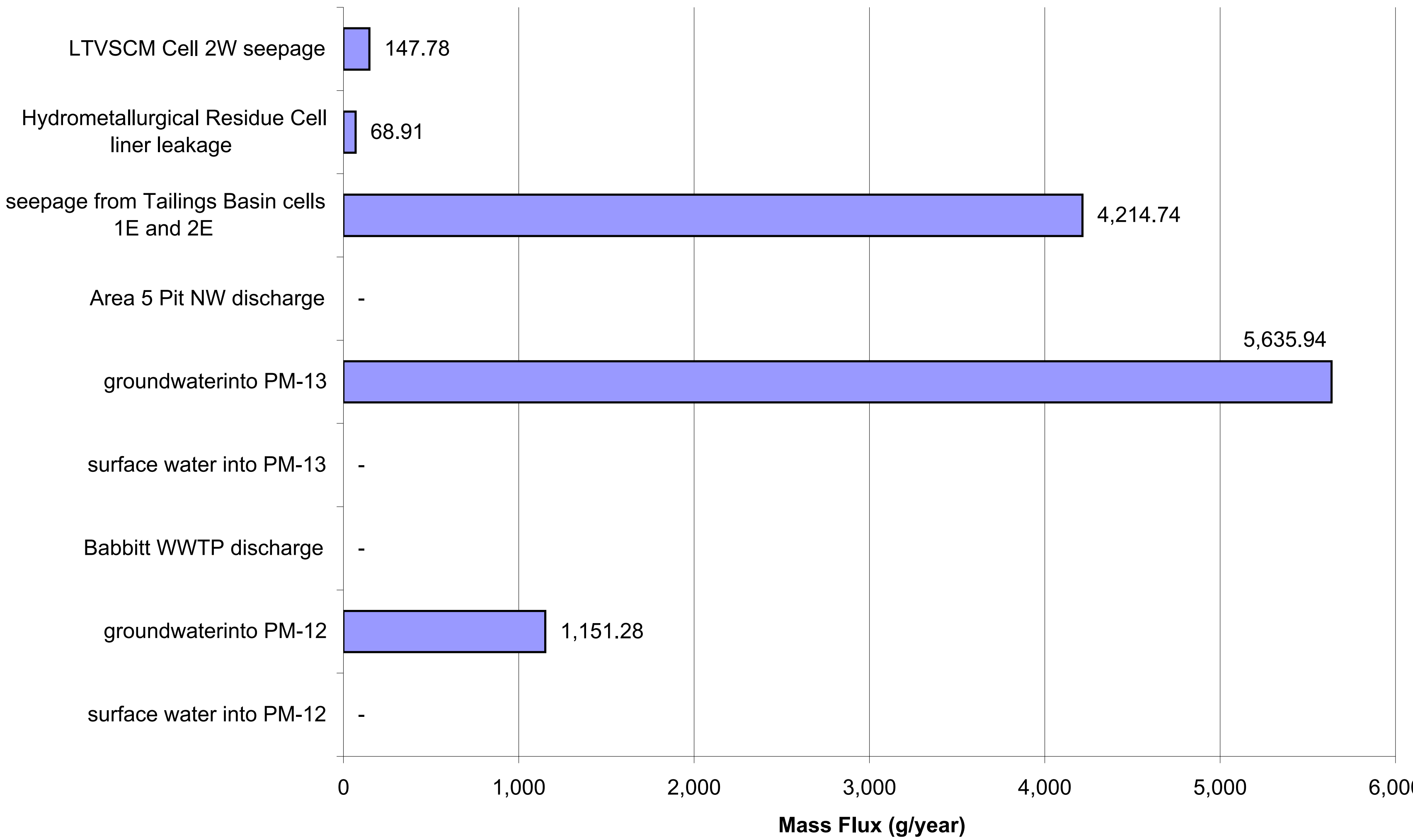


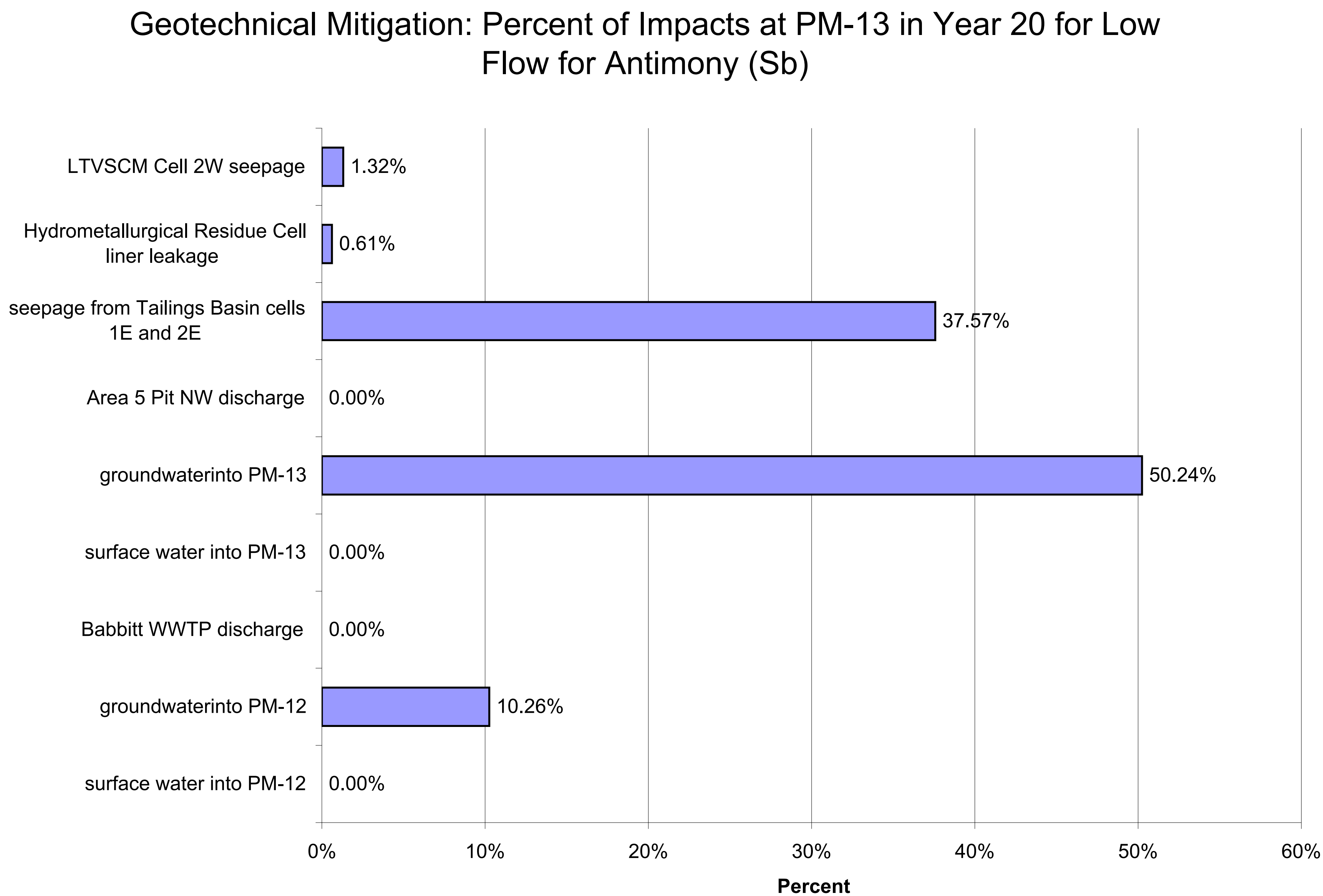

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)
LTVSCM Cell 2W seepage
48,875.88
Hydrometallurgical Residue Cell liner leakage
1,688.29
seepage from Tailings Basin cells 1E and 2E
135,920.48
Area 5 Pit NW discharge
9,235.27
groundwaterinto PM-13
26,301.06
surface water into PM-13
752,383.33
Babbitt WWTP discharge
353.42
groundwaterinto 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)

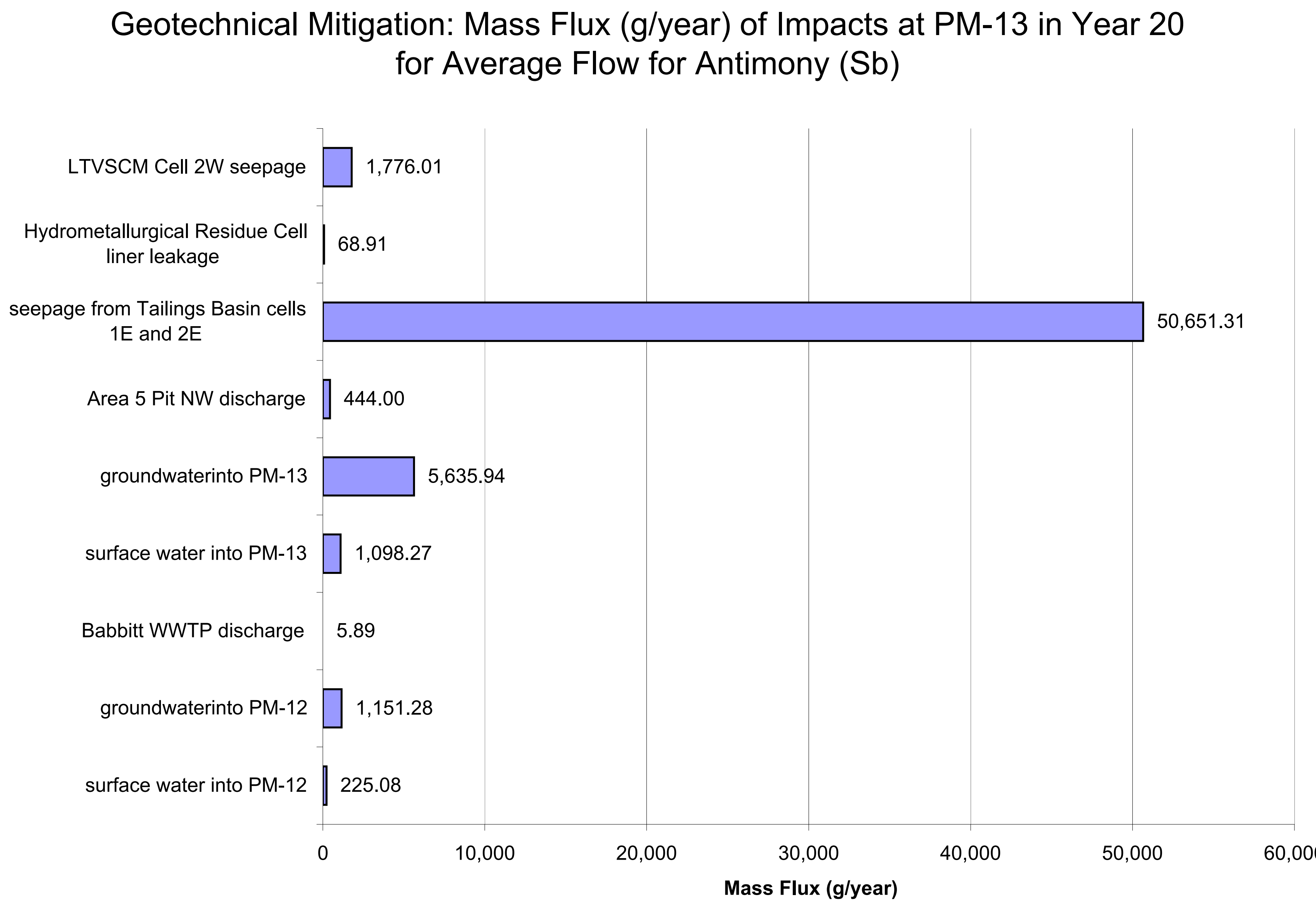
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Nickel (Ni)

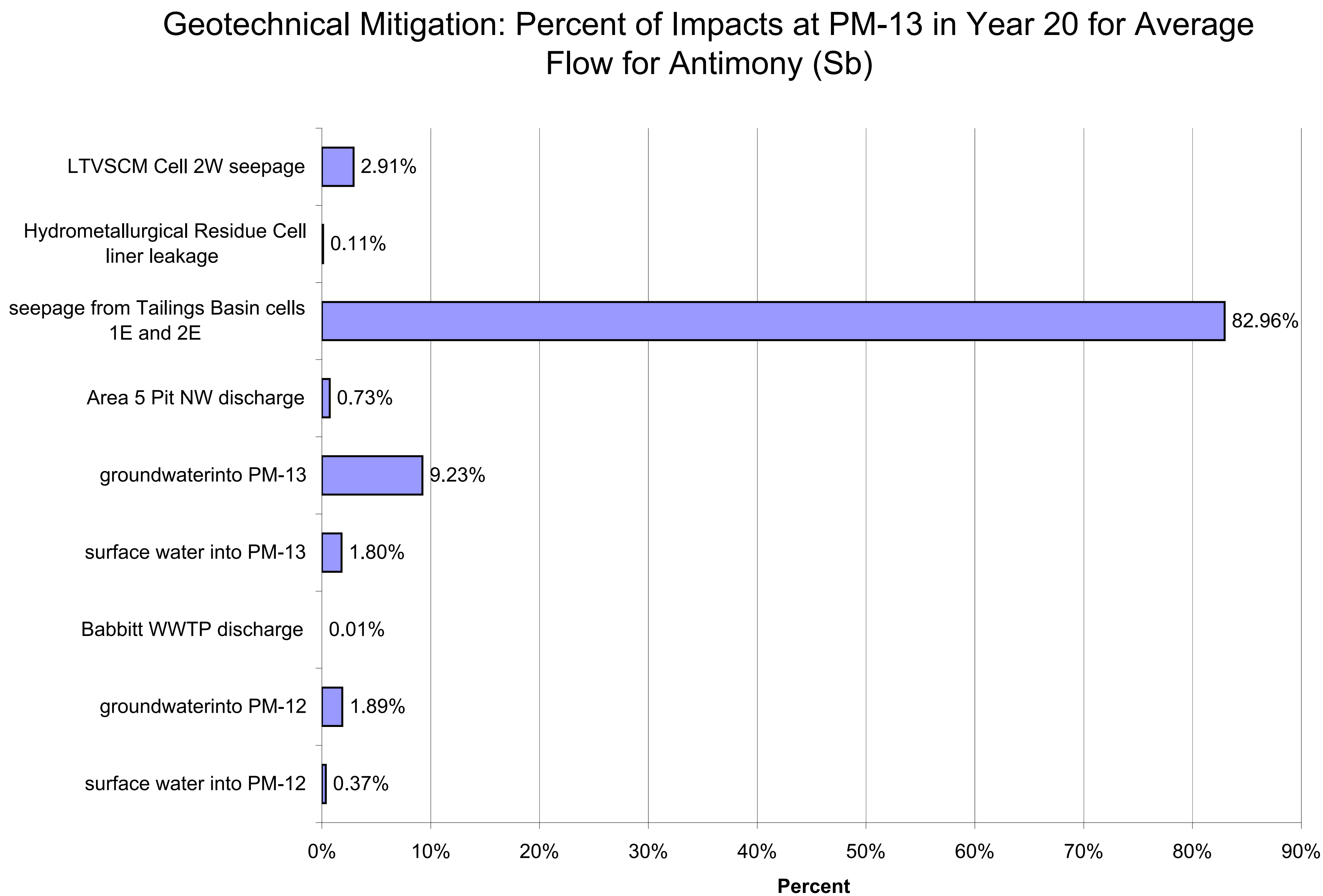


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)

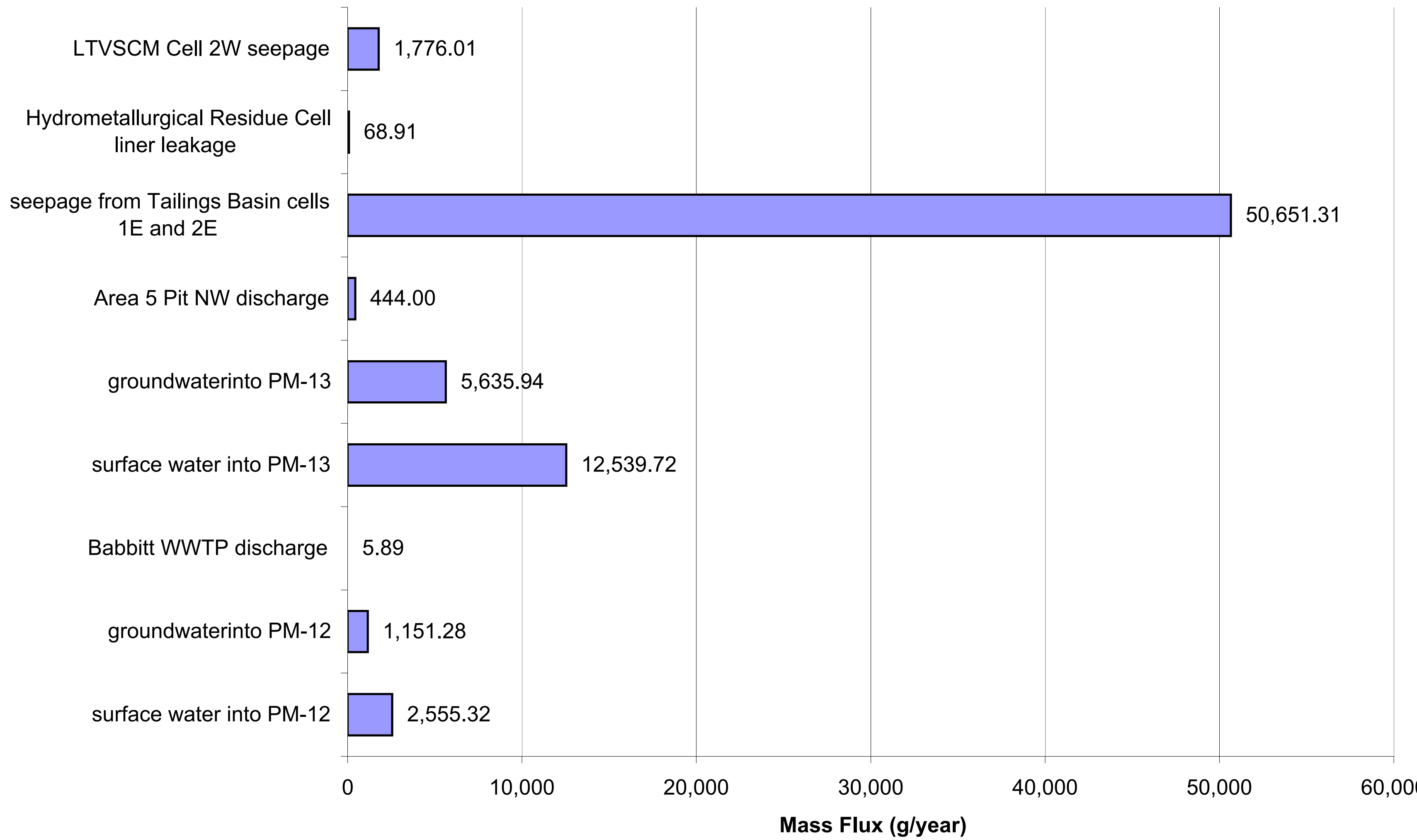


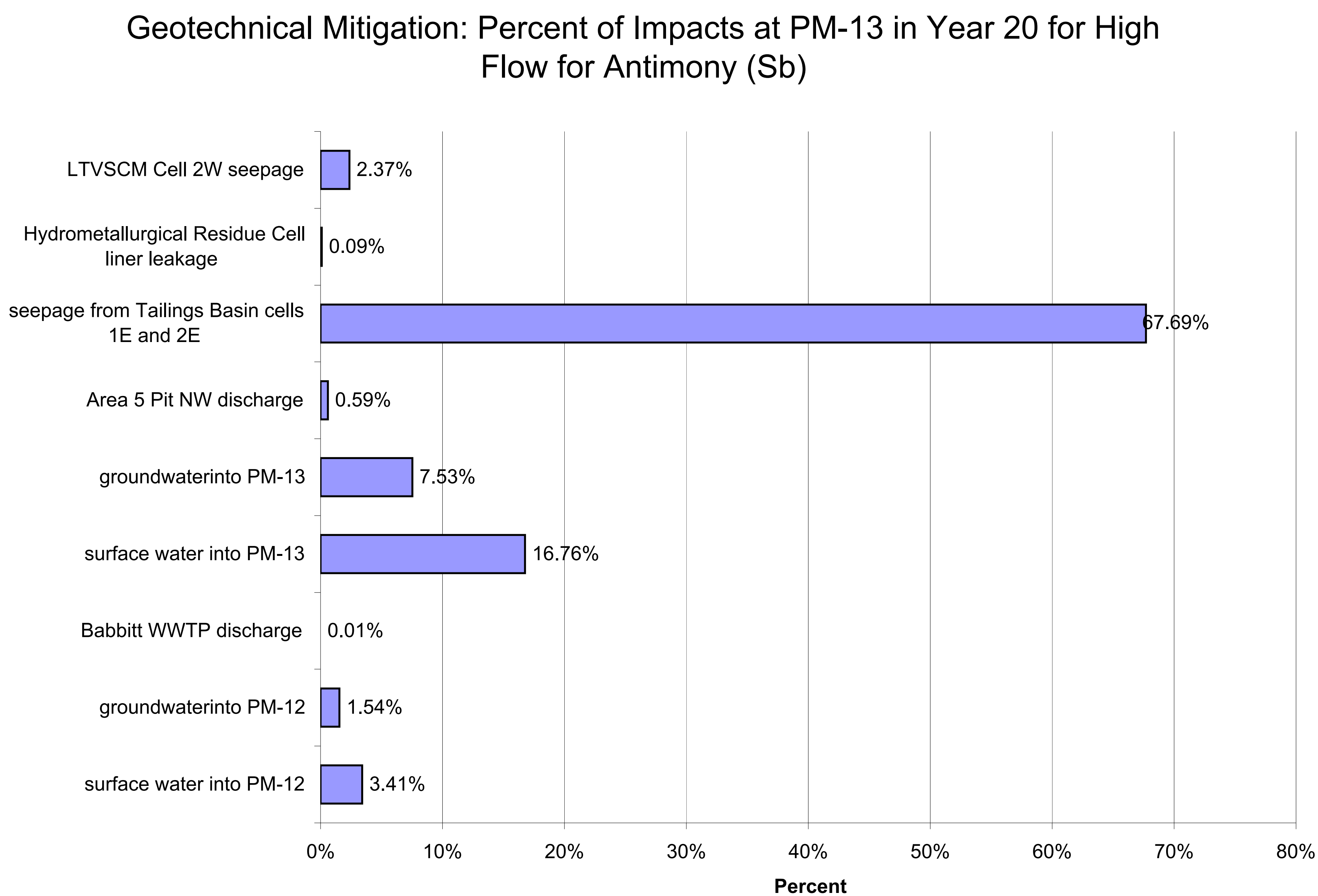

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
1.32%
Hydrometallurgical Residue Cell liner leakage
0.61%
seepage from Tailings Basin cells 1E and 2E
37.57%
Area 5 Pit NW discharge
0.00%
groundwaterinto PM-13
50.24%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwaterinto PM-12
10.26%
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 20 for Average Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
1,776.01
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
groundwaterinto PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwaterinto PM-12
1,151.28
surface water into PM-12
225.08
0
10,000
20,000
30,000
40,000
50,000
60,000
Mass Flux (g/year)

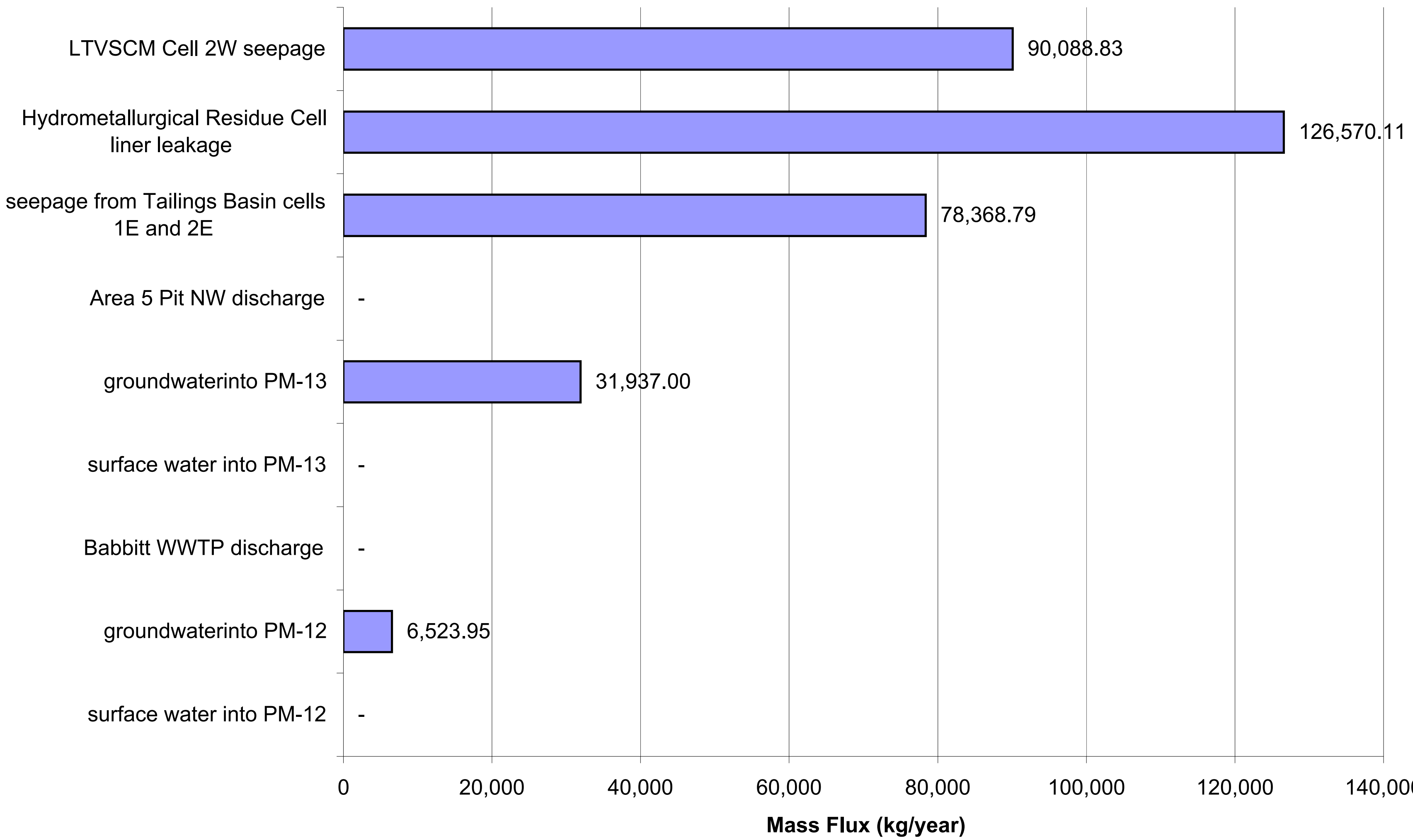

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
2.91%
Hydrometallurgical Residue Cell liner leakage
0.11%
seepage from Tailings Basin cells 1E and 2E
82.96%
Area 5 Pit NW discharge
0.73%
groundwaterinto PM-13
9.23%
surface water into PM-13
1.80%
Babbitt WWTP discharge
0.01%
groundwaterinto PM-12
1.89%
surface water into PM-12
0.37%
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)

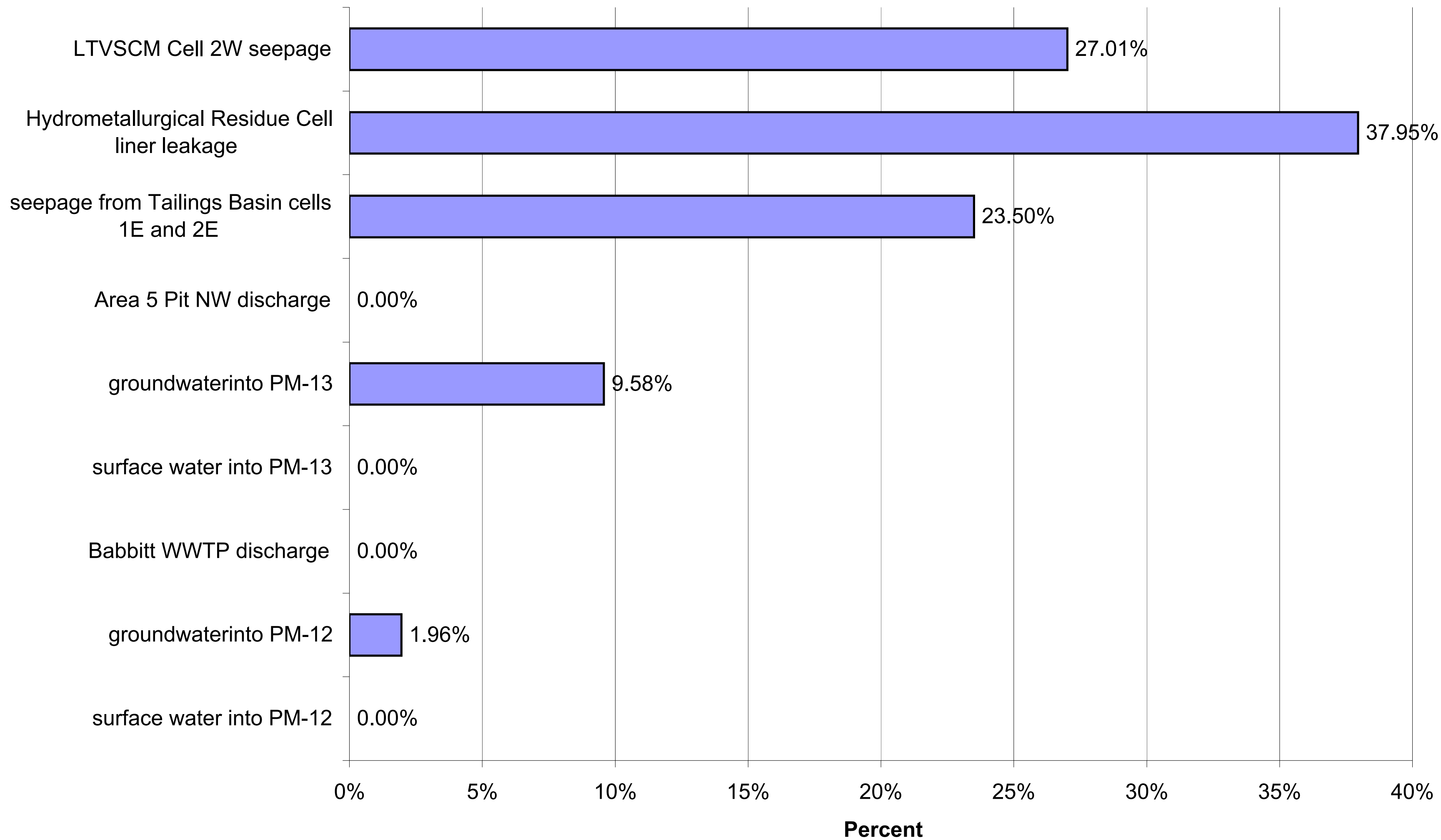


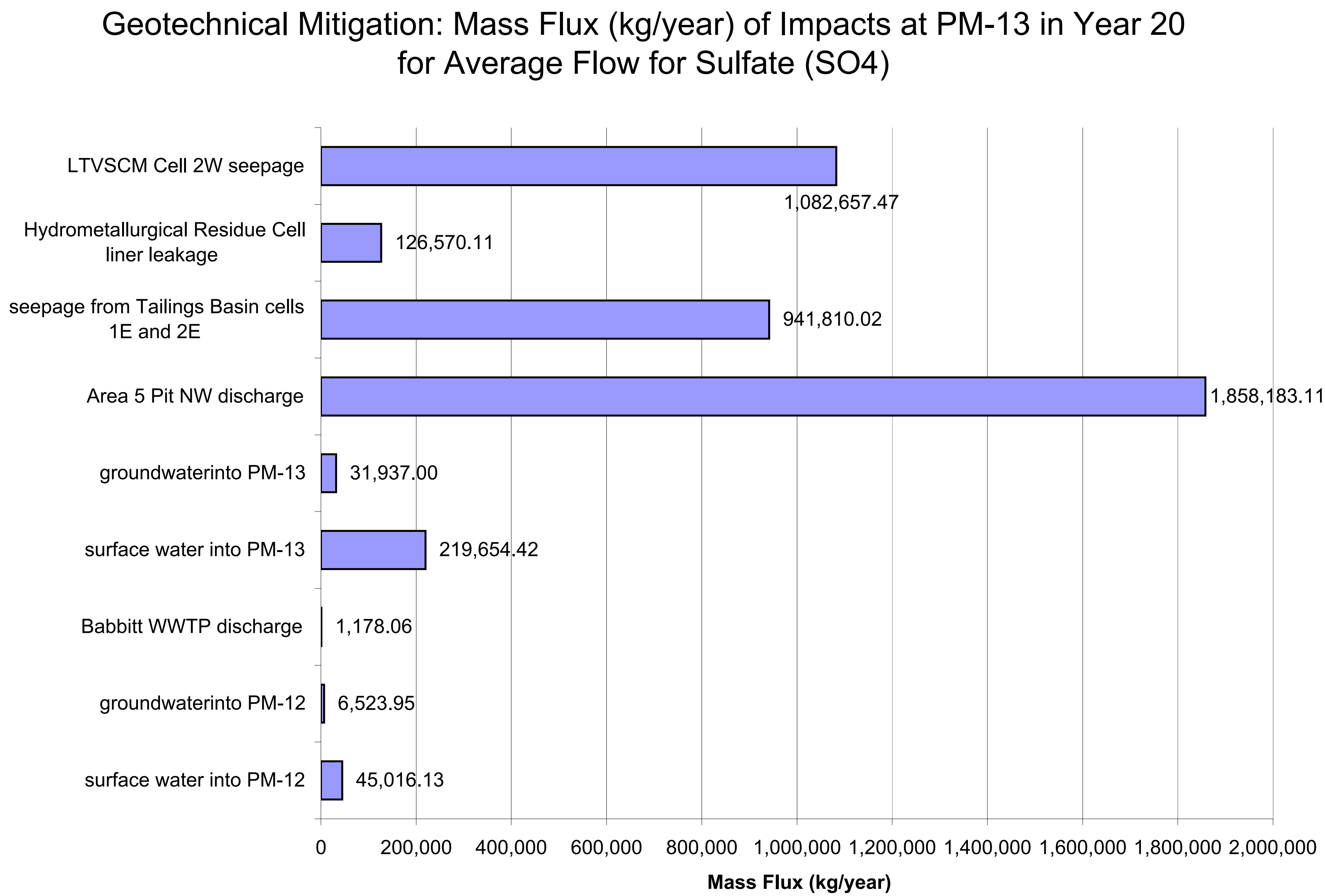

Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Antimony (Sb)
LTVSCM Cell 2W seepage
2.37%
Hydrometallurgical Residue Cell liner leakage
0.09%
seepage from Tailings Basin cells 1E and 2E
67.69%
Area 5 Pit NW discharge
0.59%
groundwaterinto PM-13
7.53%
surface water into PM-13
16.76%
Babbitt WWTP discharge
0.01%
groundwaterinto PM-12
1.54%
surface water into PM-12
3.41%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)

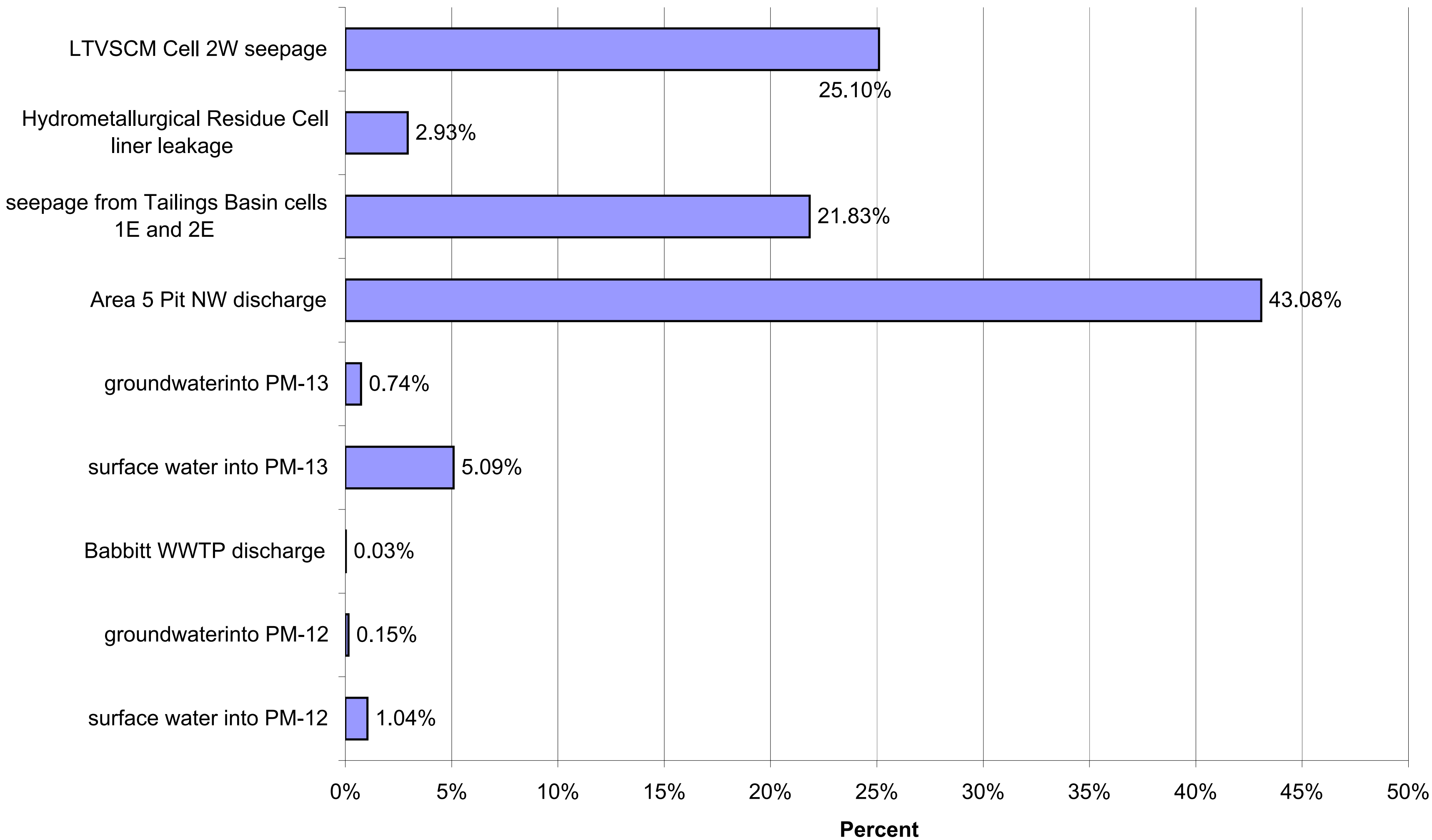


Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Low Flow for Sulfate (SO_4)

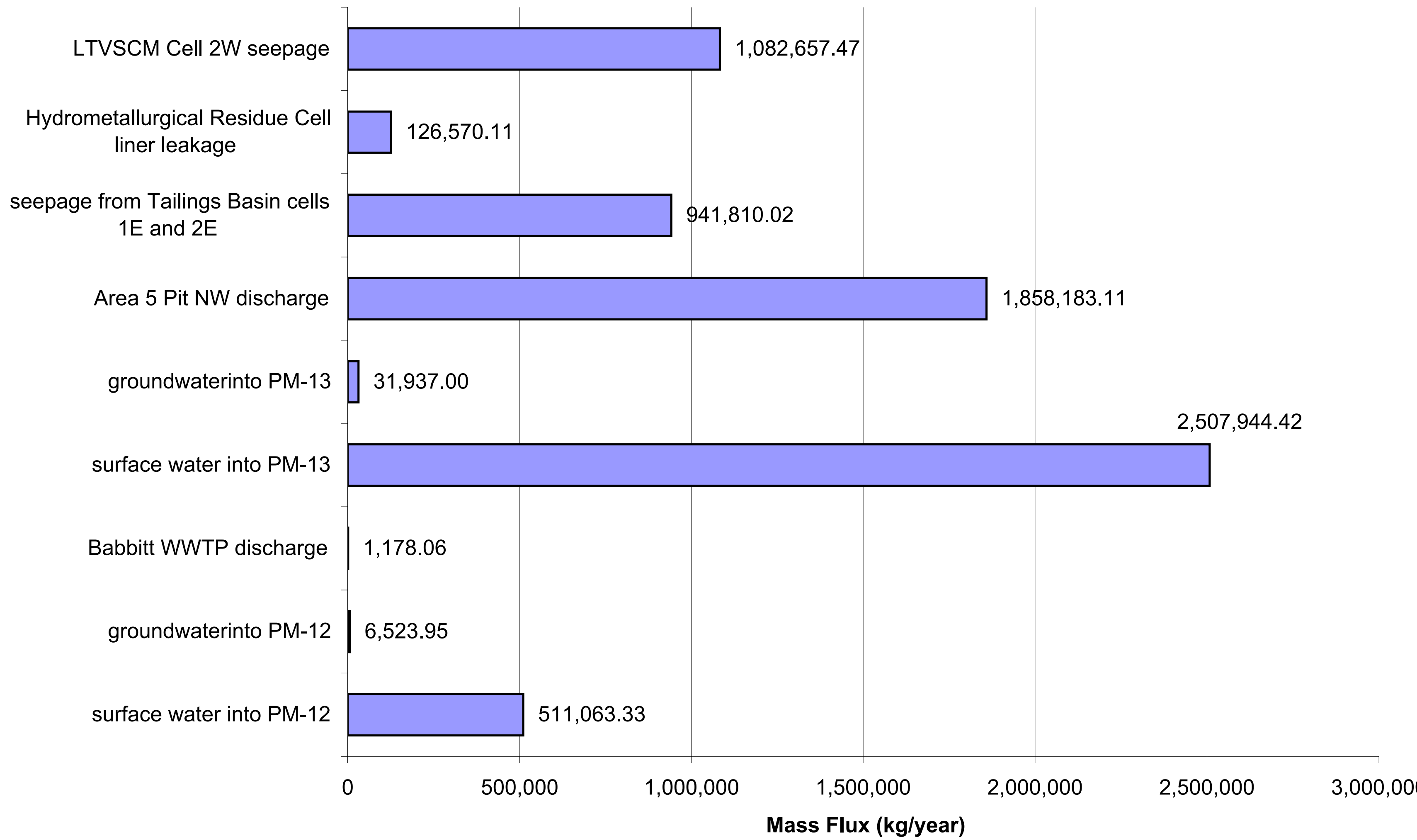



Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO4)
LTVSCM Cell 2W seepage
1,082,657.47
Hydrometallurgical Residue Cell liner leakage
126,570.11
seepage from Tailings Basin cells 1E and 2E
941,810.02
Area 5 Pit NW discharge
1,858,183.11
groundwaterinto PM-13
31,937.00
surface water into PM-13
219,654.42
Babbitt WWTP discharge
1,178.06
groundwaterinto 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)

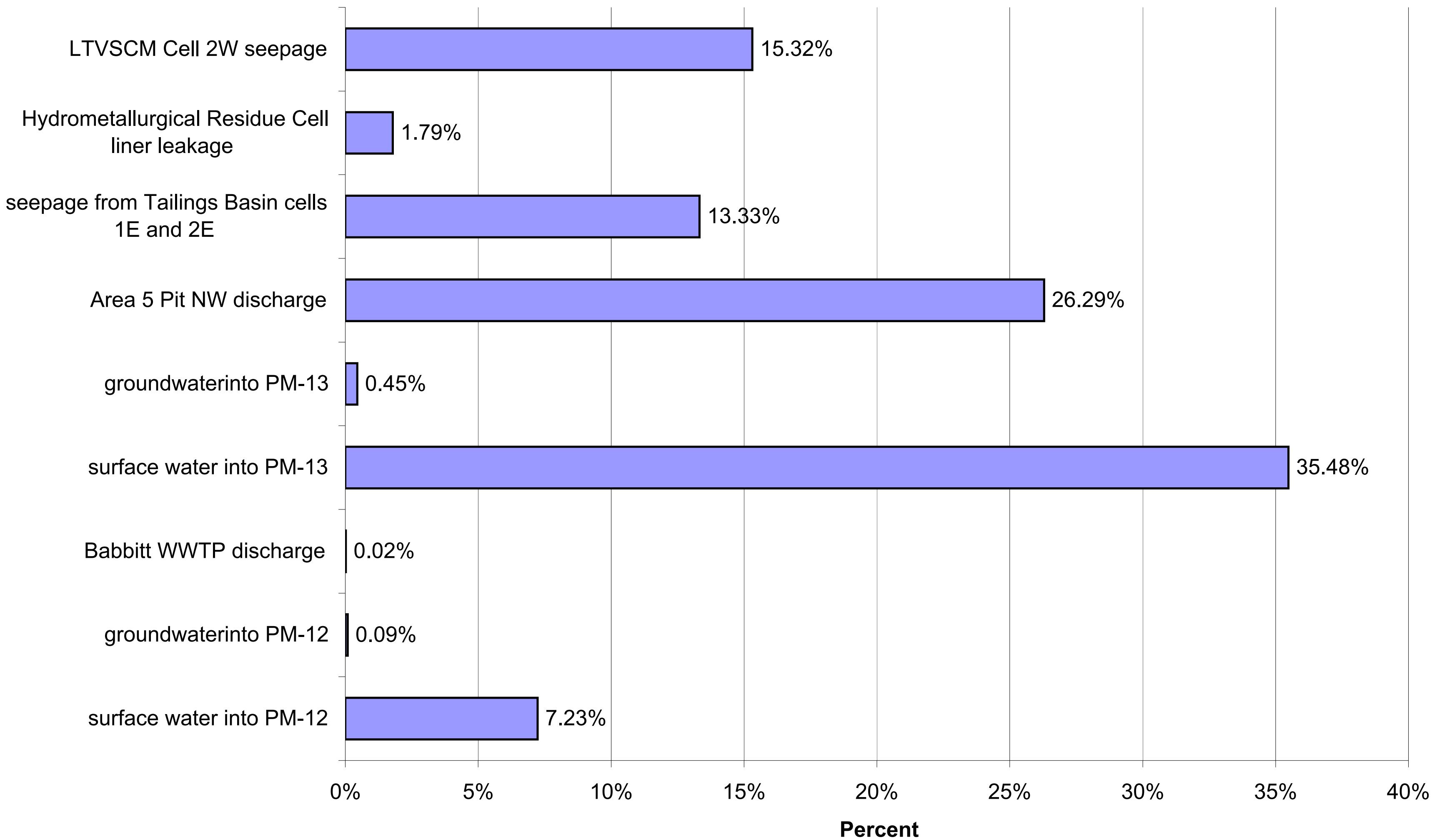
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for Average Flow for Sulfate (SO_4)

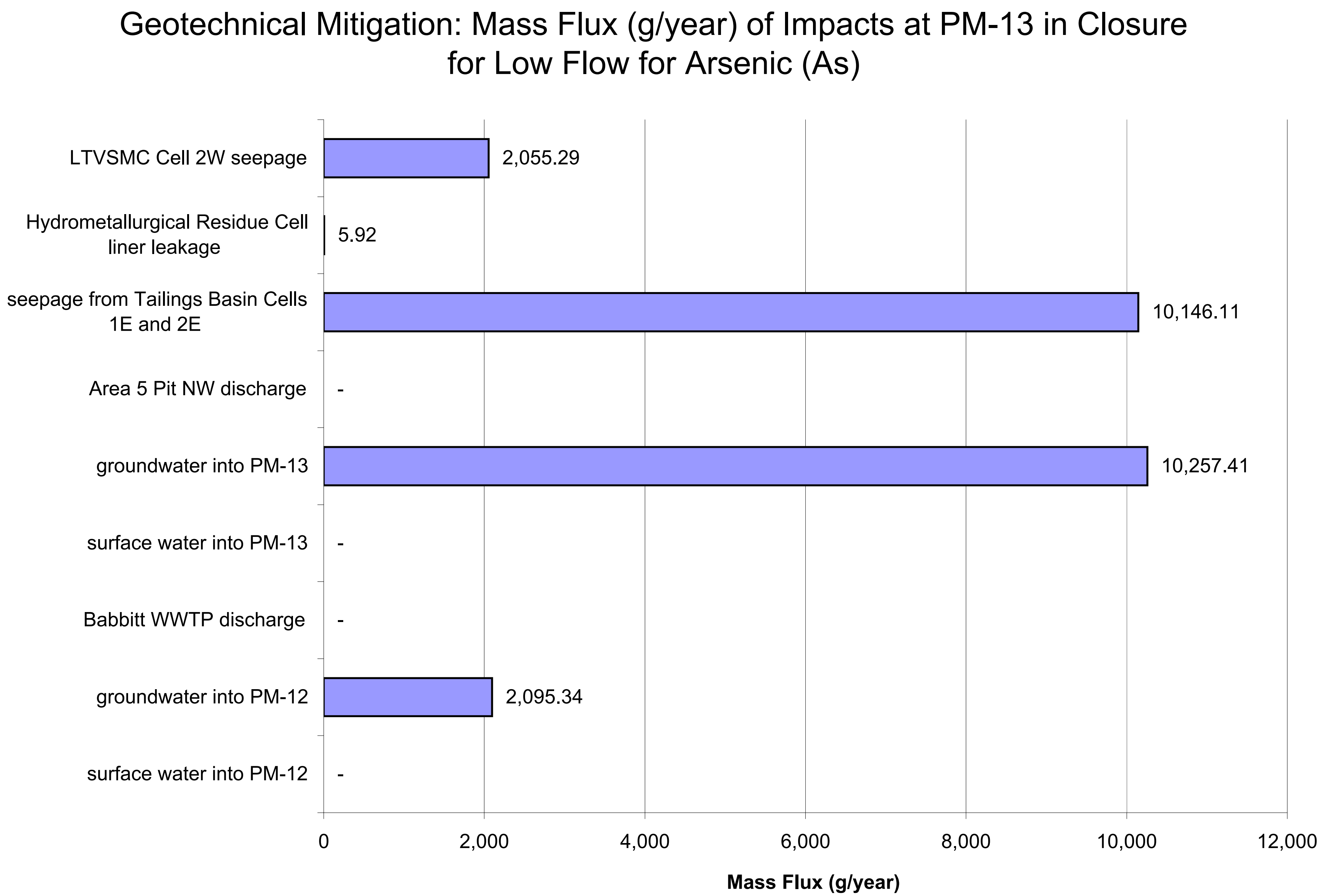


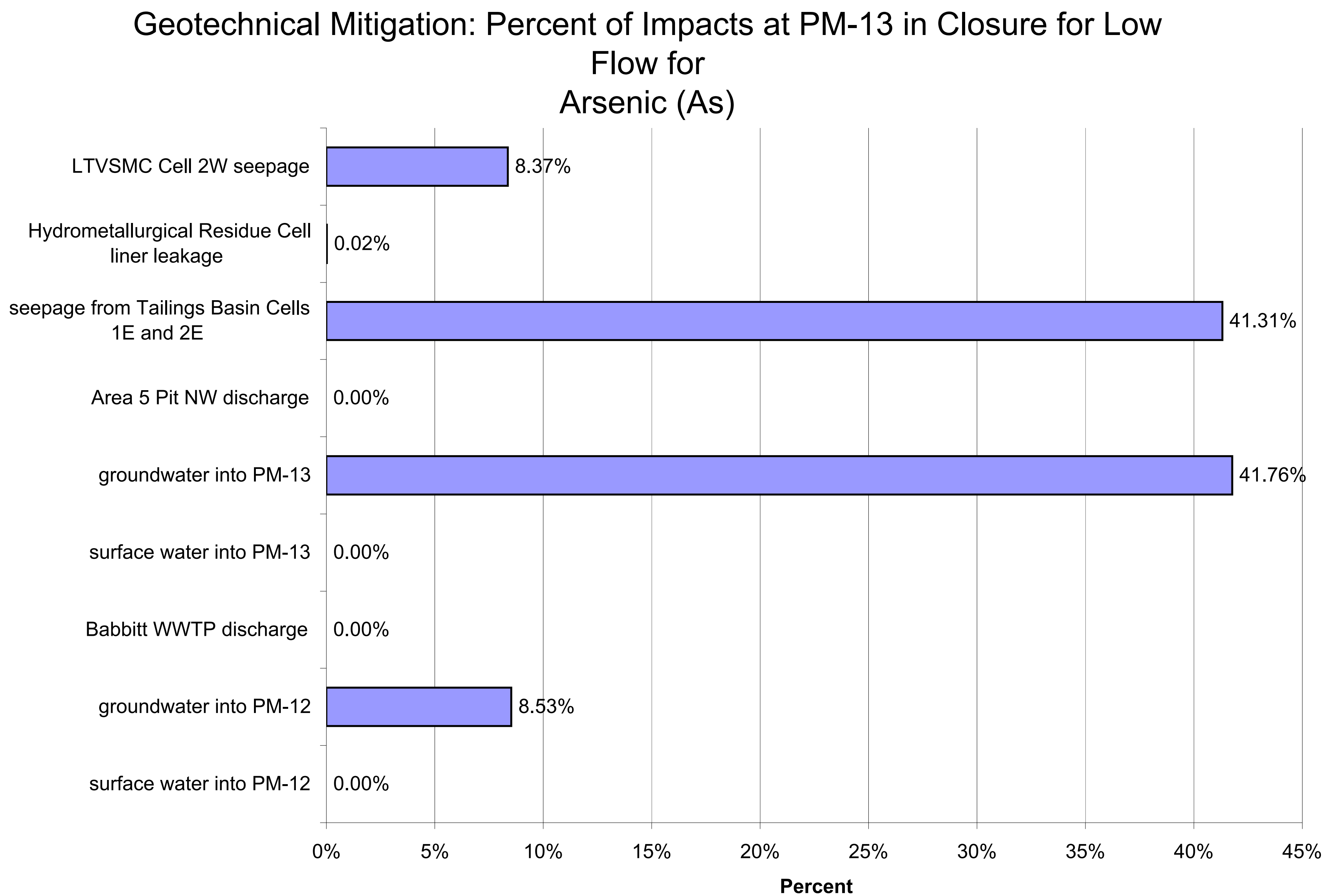
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)



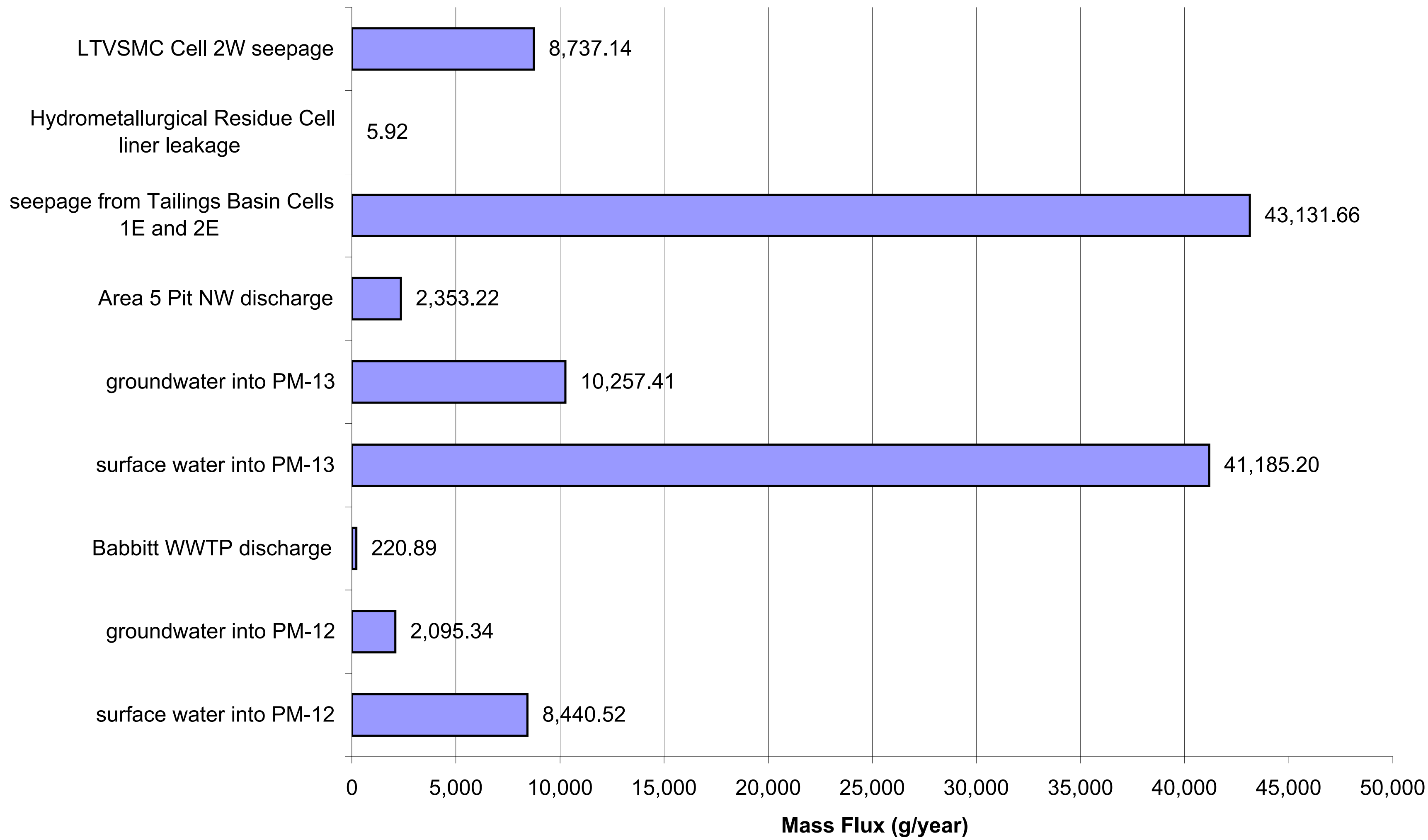
Geotechnical Mitigation: Percent of Impacts at PM-13 in Year 20 for High Flow for Sulfate (SO_4)

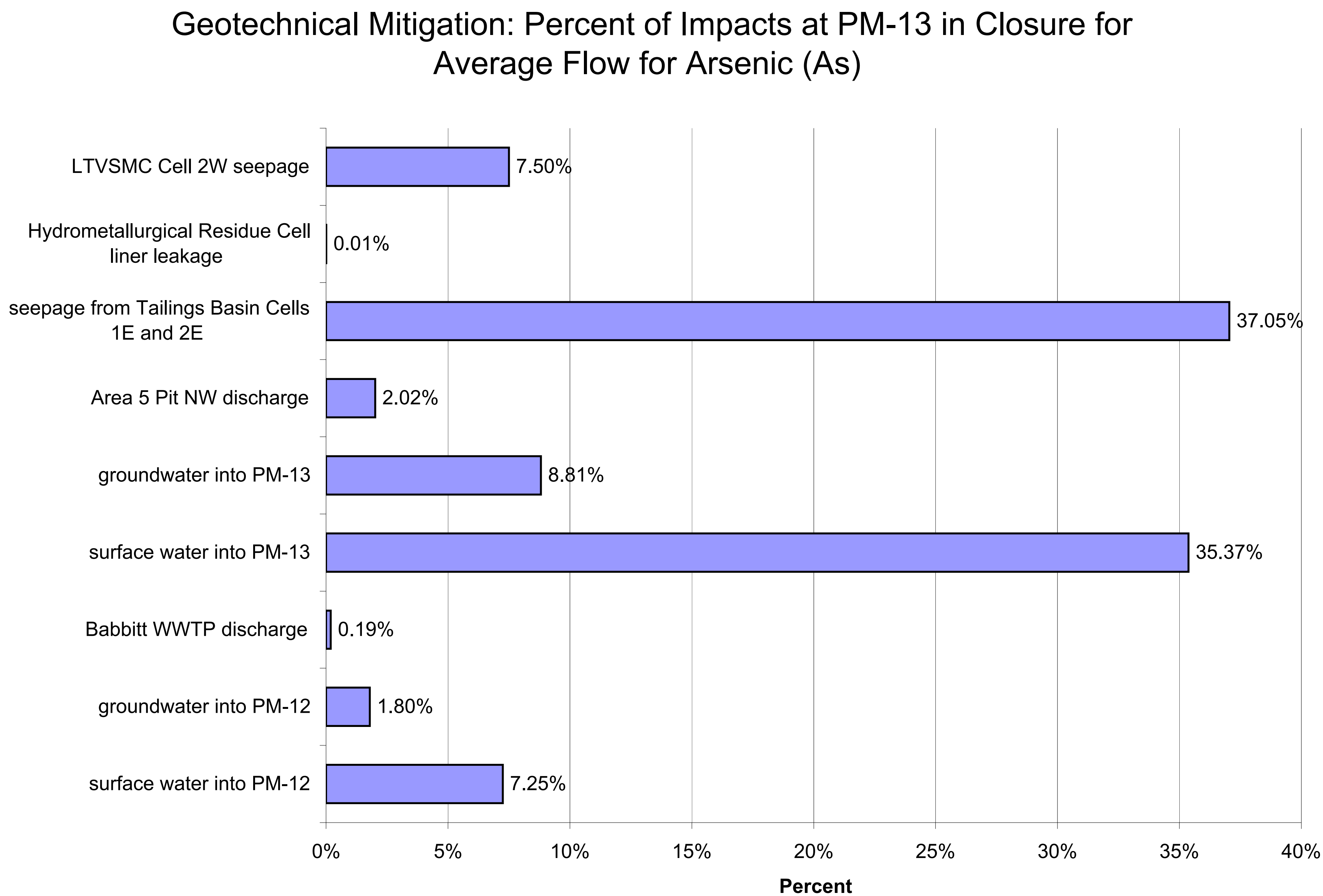



Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
2,055.29
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
10,146.11
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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
Mass Flux (g/year)

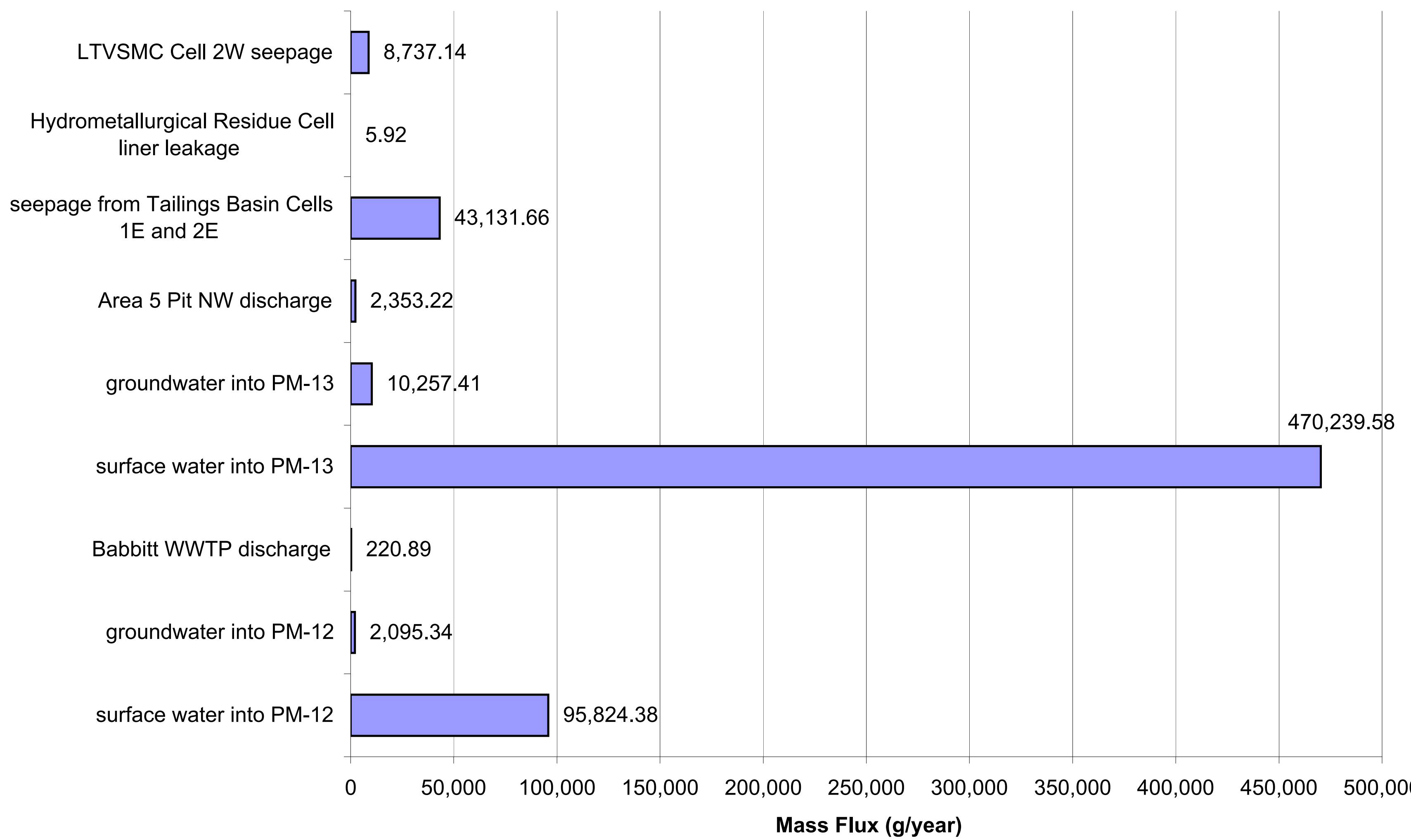

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
8.37%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin Cells 1E and 2E
41.31%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
41.76%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
8.53%
surface water into PM-12
0.00%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

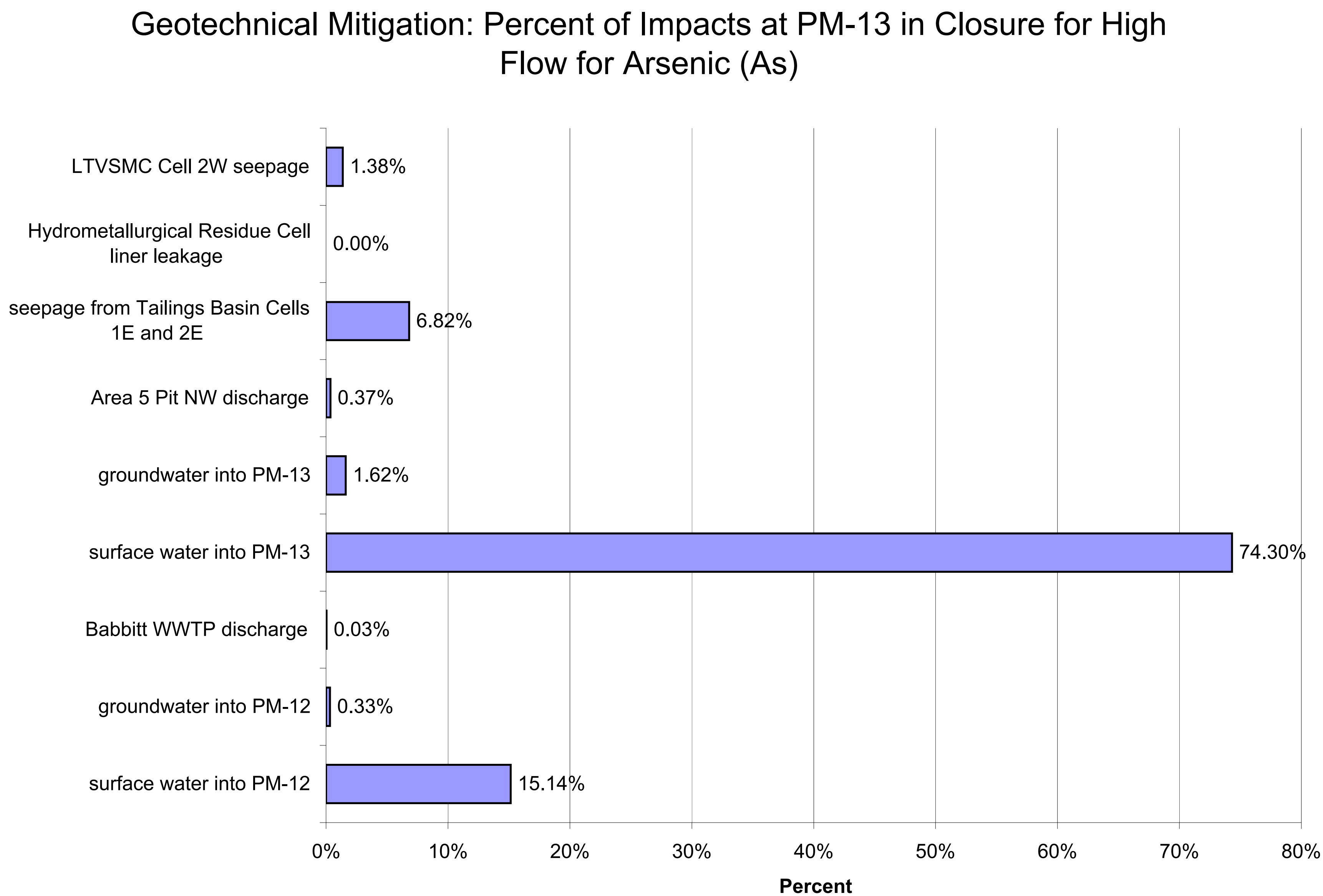
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)



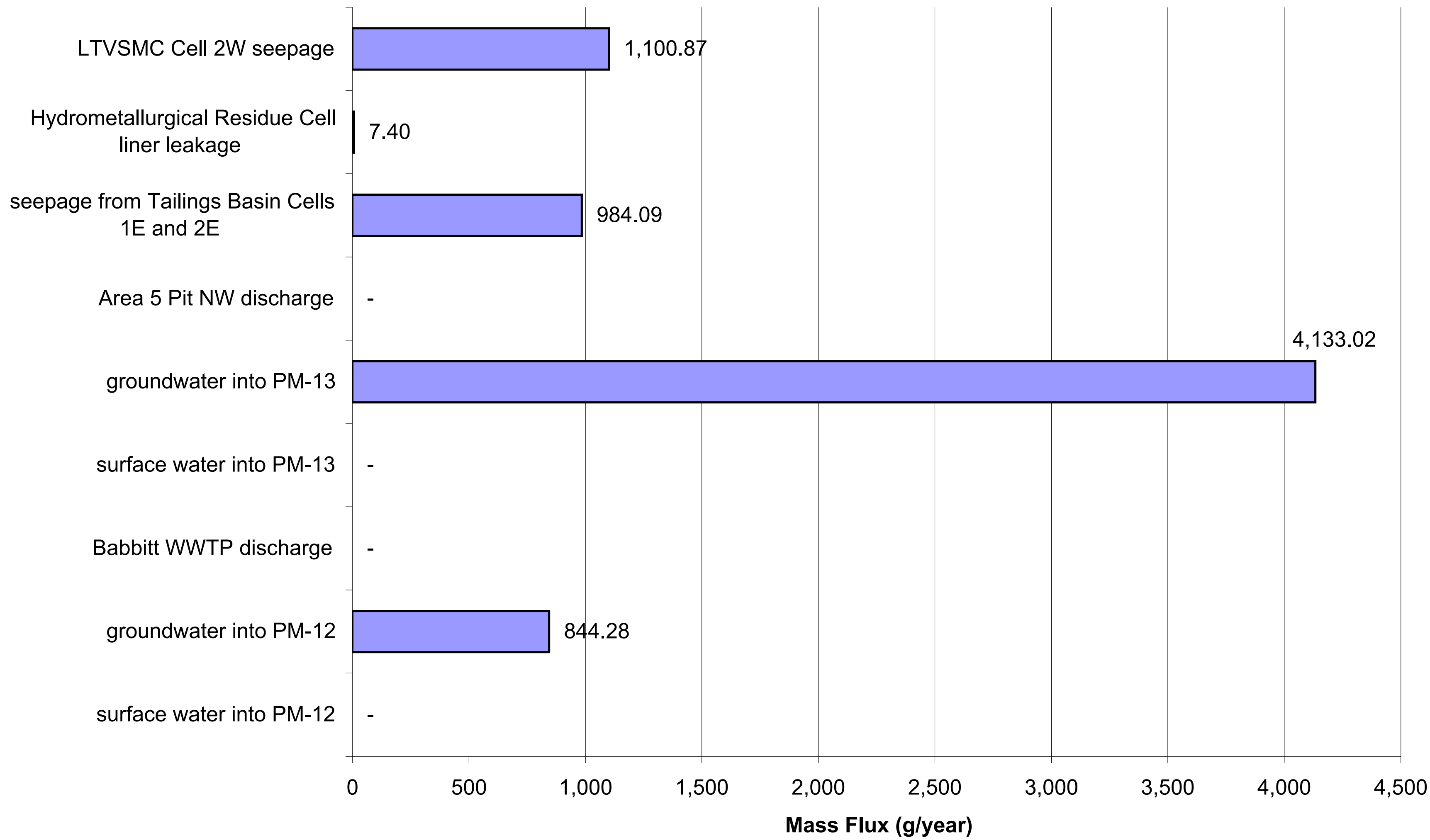

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
7.50%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
37.05%
Area 5 Pit NW discharge
2.02%
groundwater into PM-13
8.81%
surface water into PM-13
35.37%
Babbitt WWTP discharge
0.19%
groundwater into PM-12
1.80%
surface water into PM-12
7.25%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Percent

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Arsenic (As)

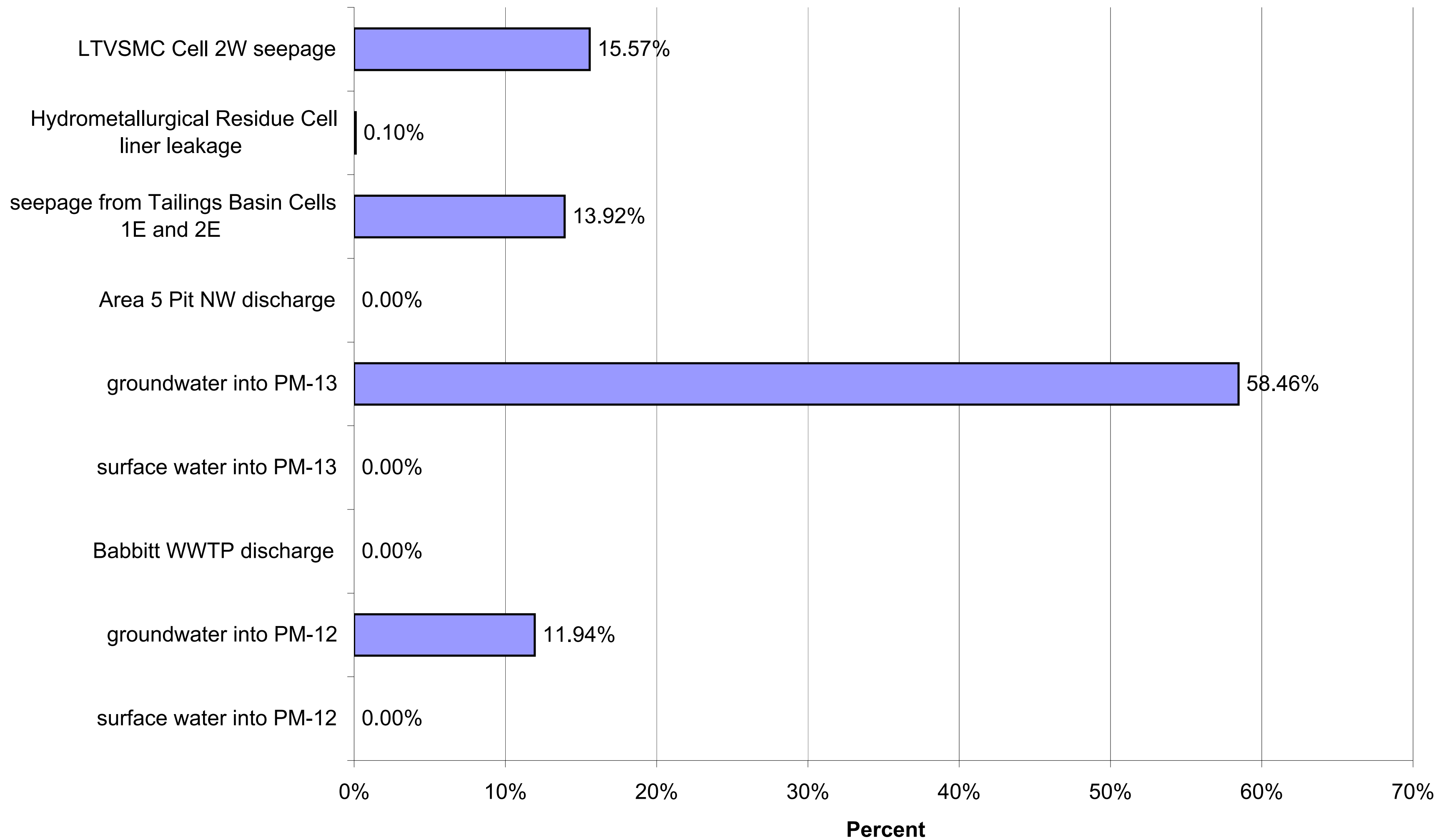



Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1.38%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
6.82%
Area 5 Pit NW discharge
0.37%
groundwater into PM-13
1.62%
surface water into PM-13
74.30%
Babbitt WWTP discharge
0.03%
groundwater into PM-12
0.33%
surface water into PM-12
15.14%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

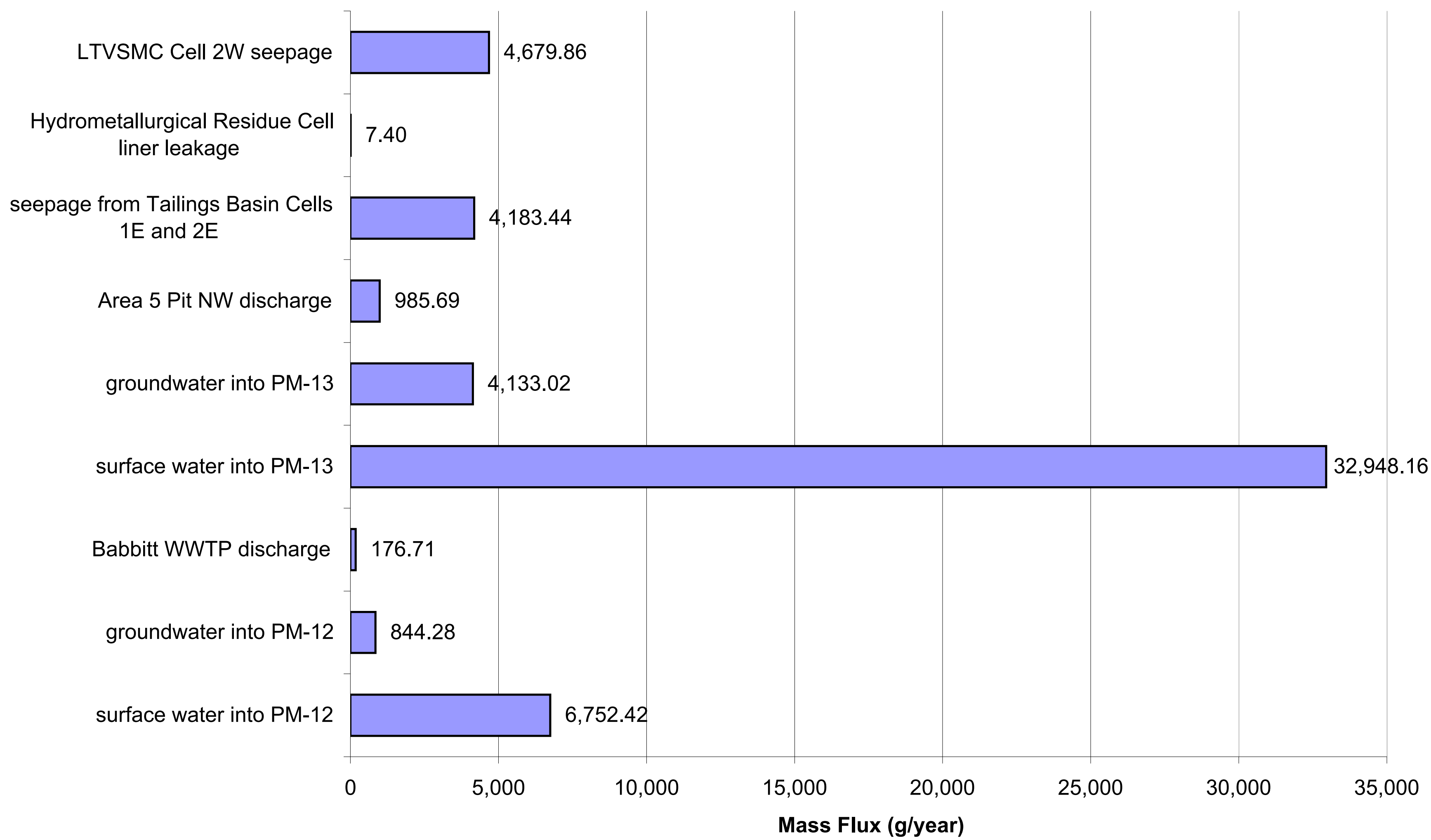
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)



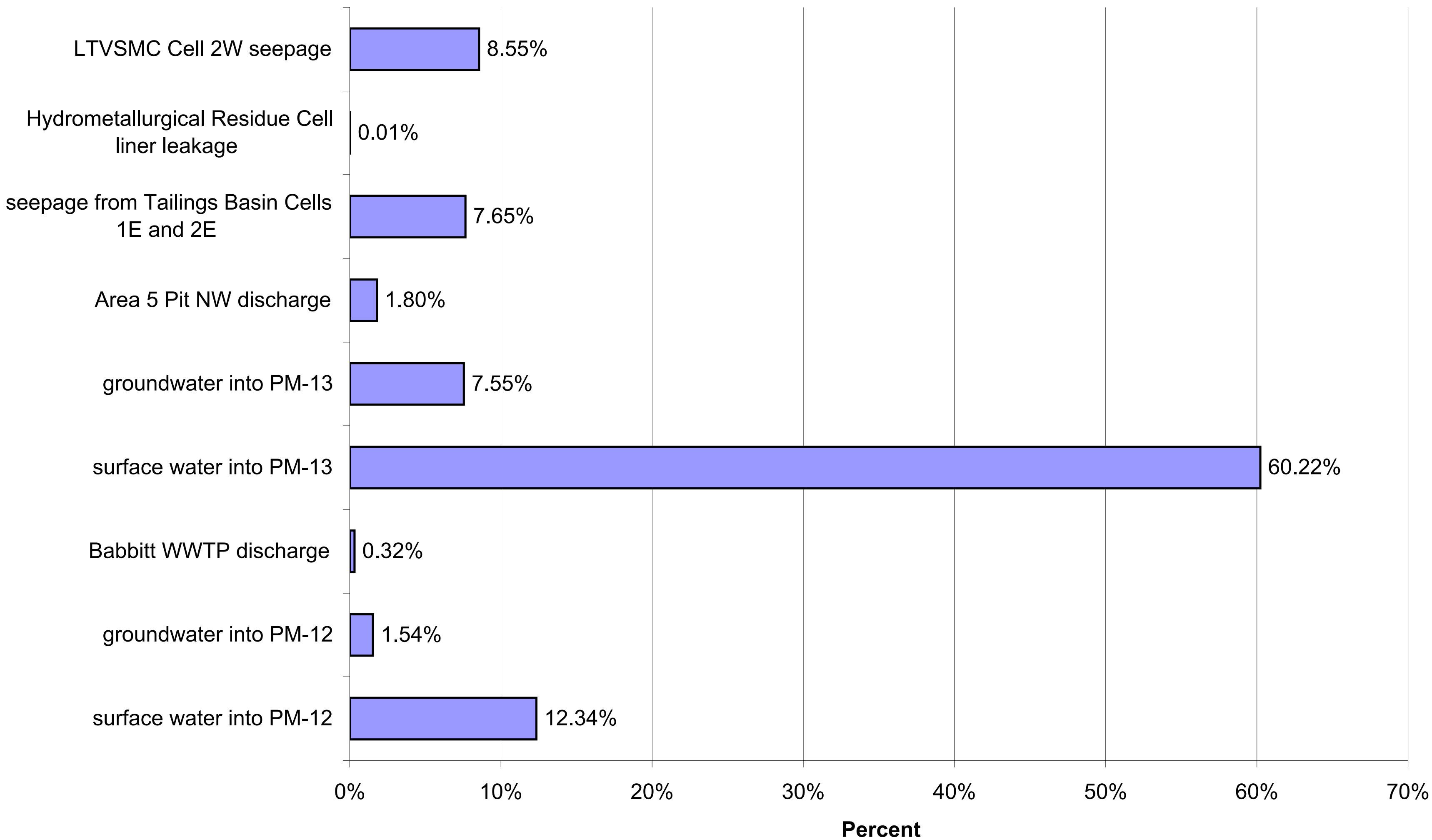
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Cobalt (Co)



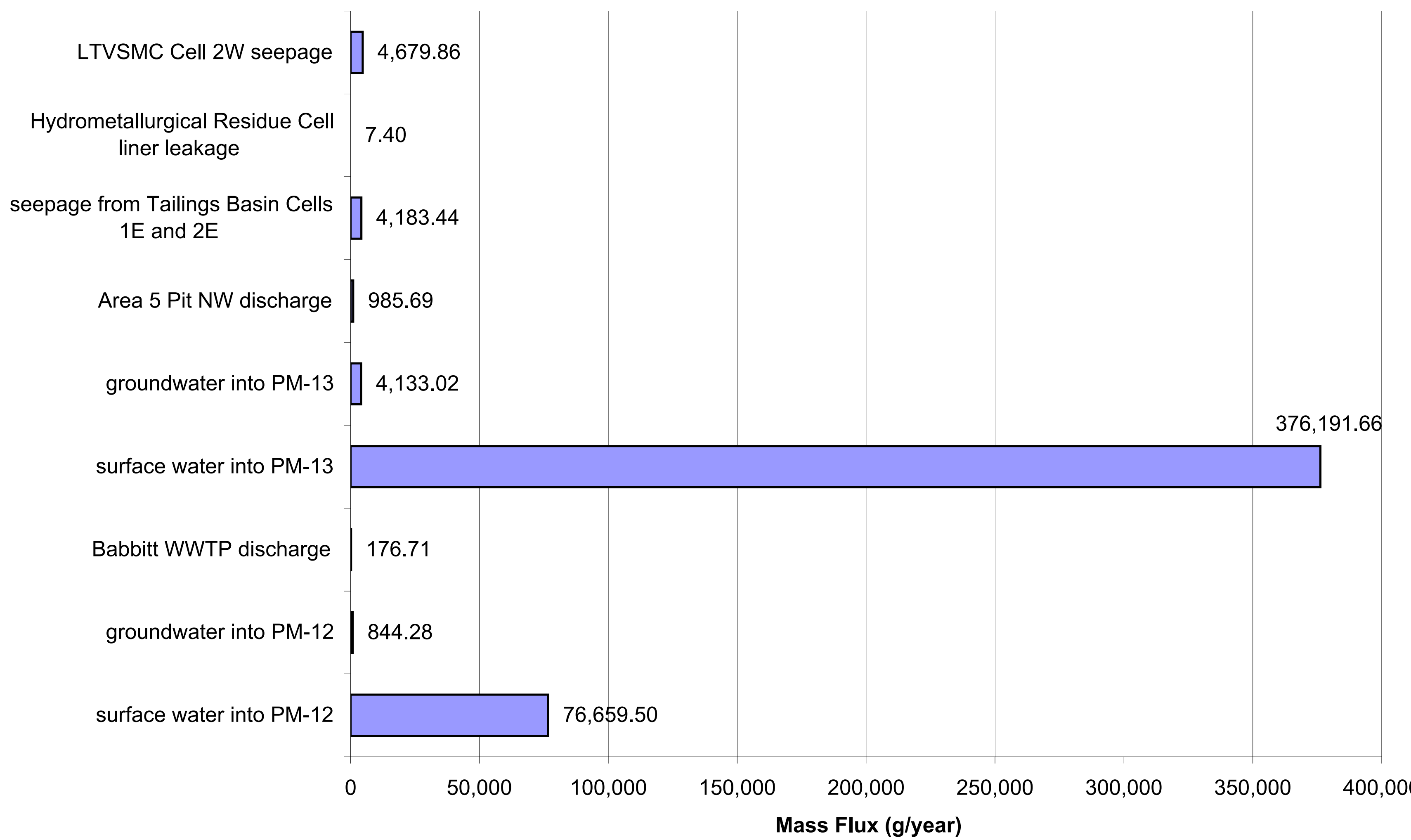
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)



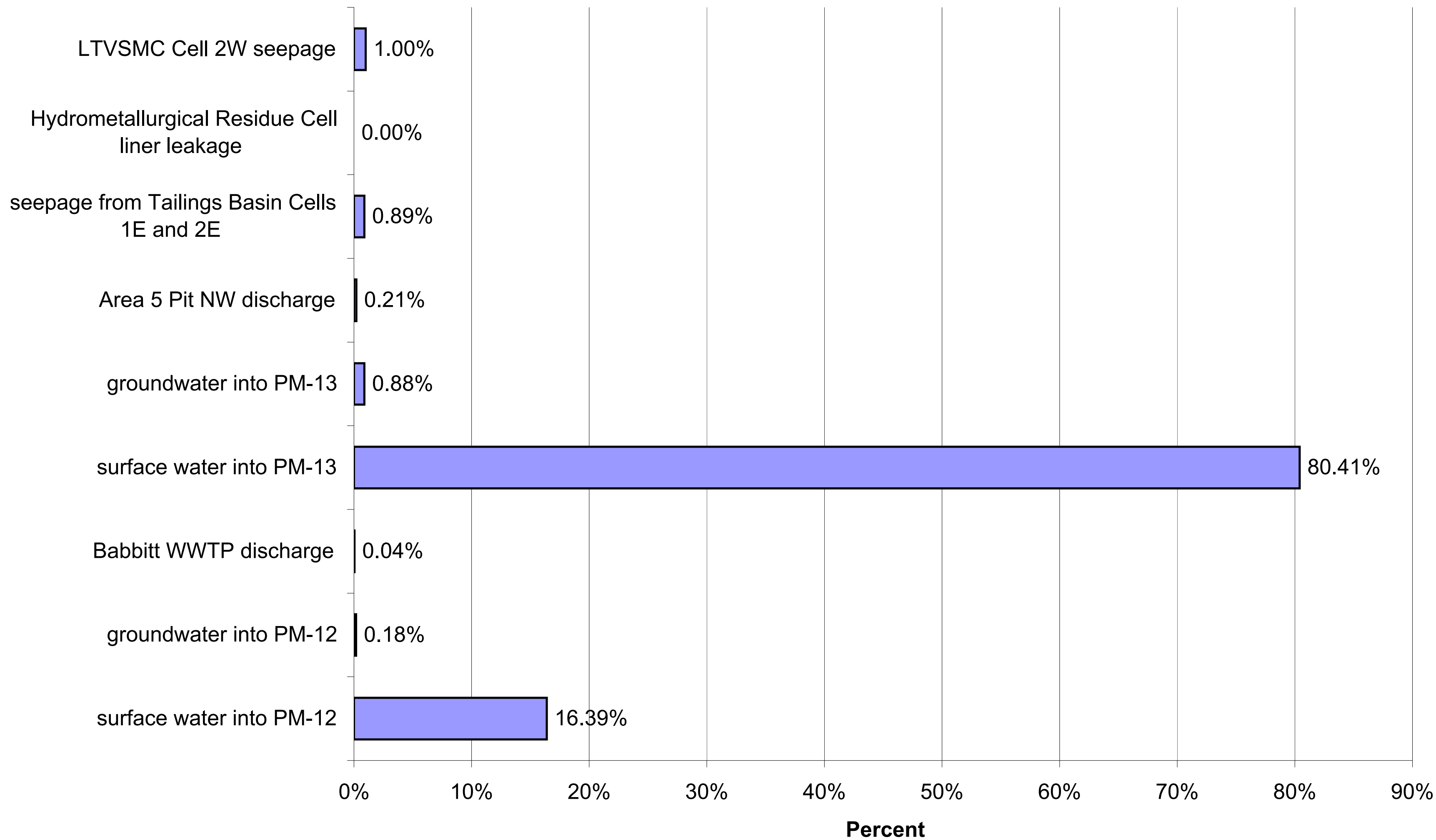
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Cobalt (Co)



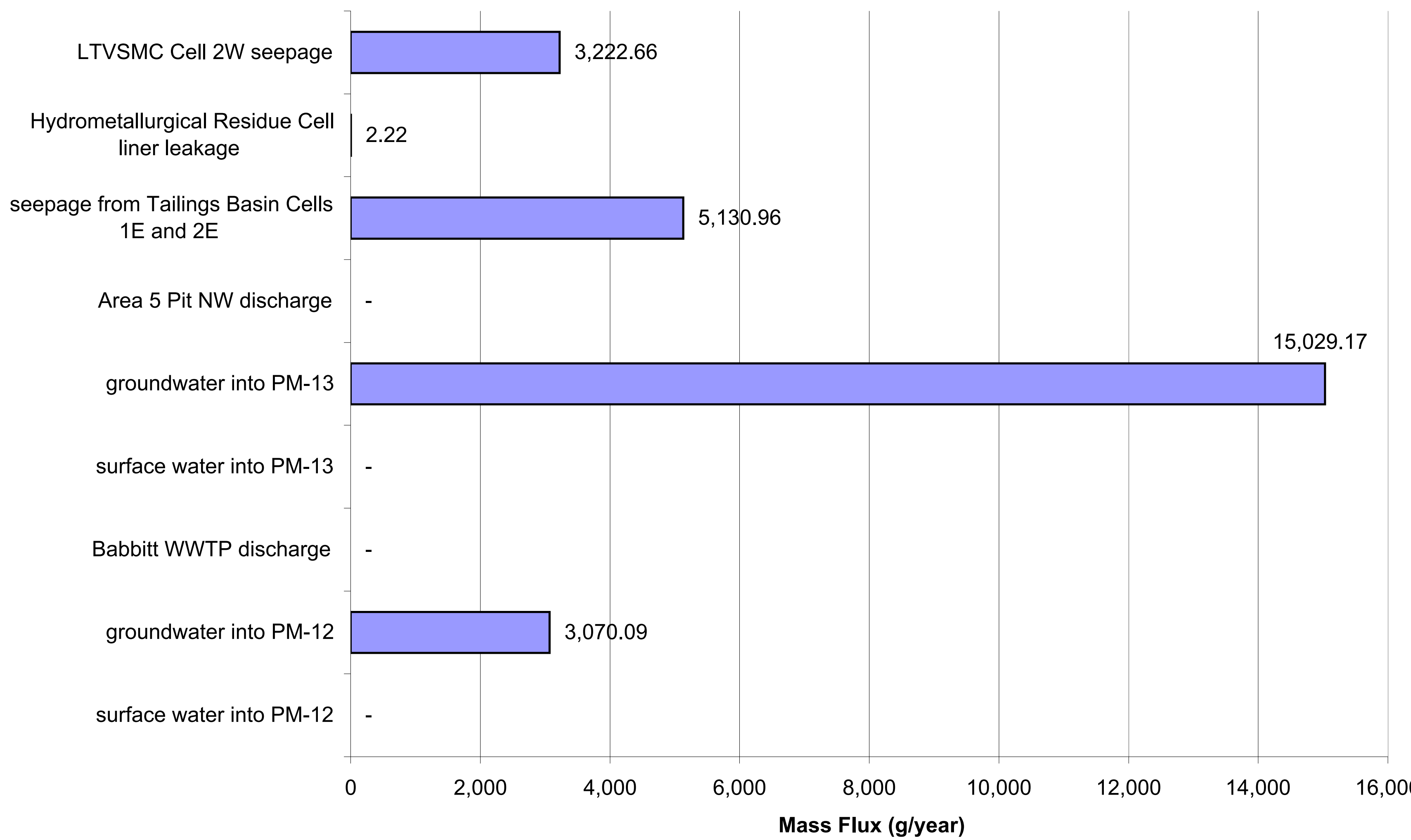
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)

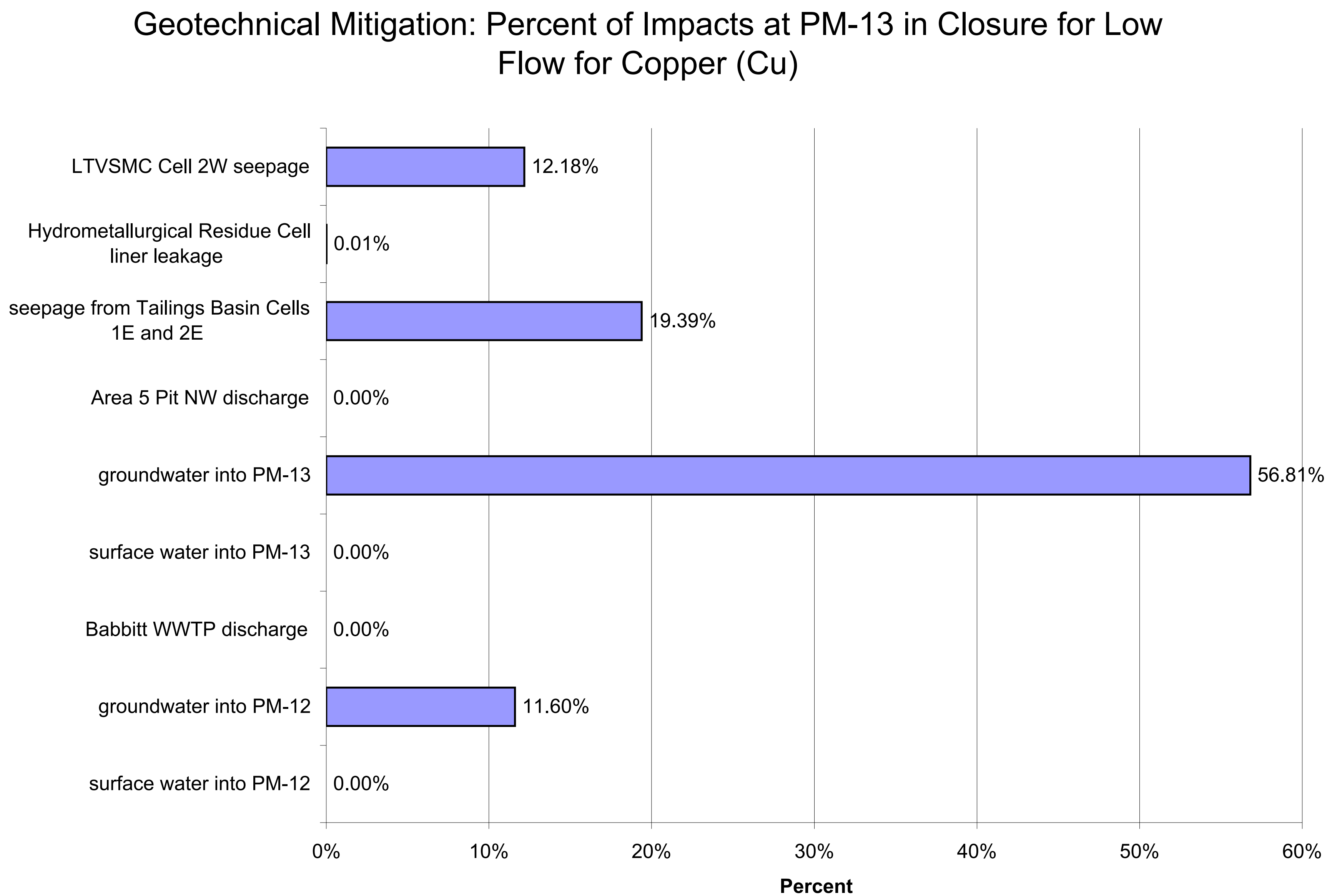


Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Cobalt (Co)

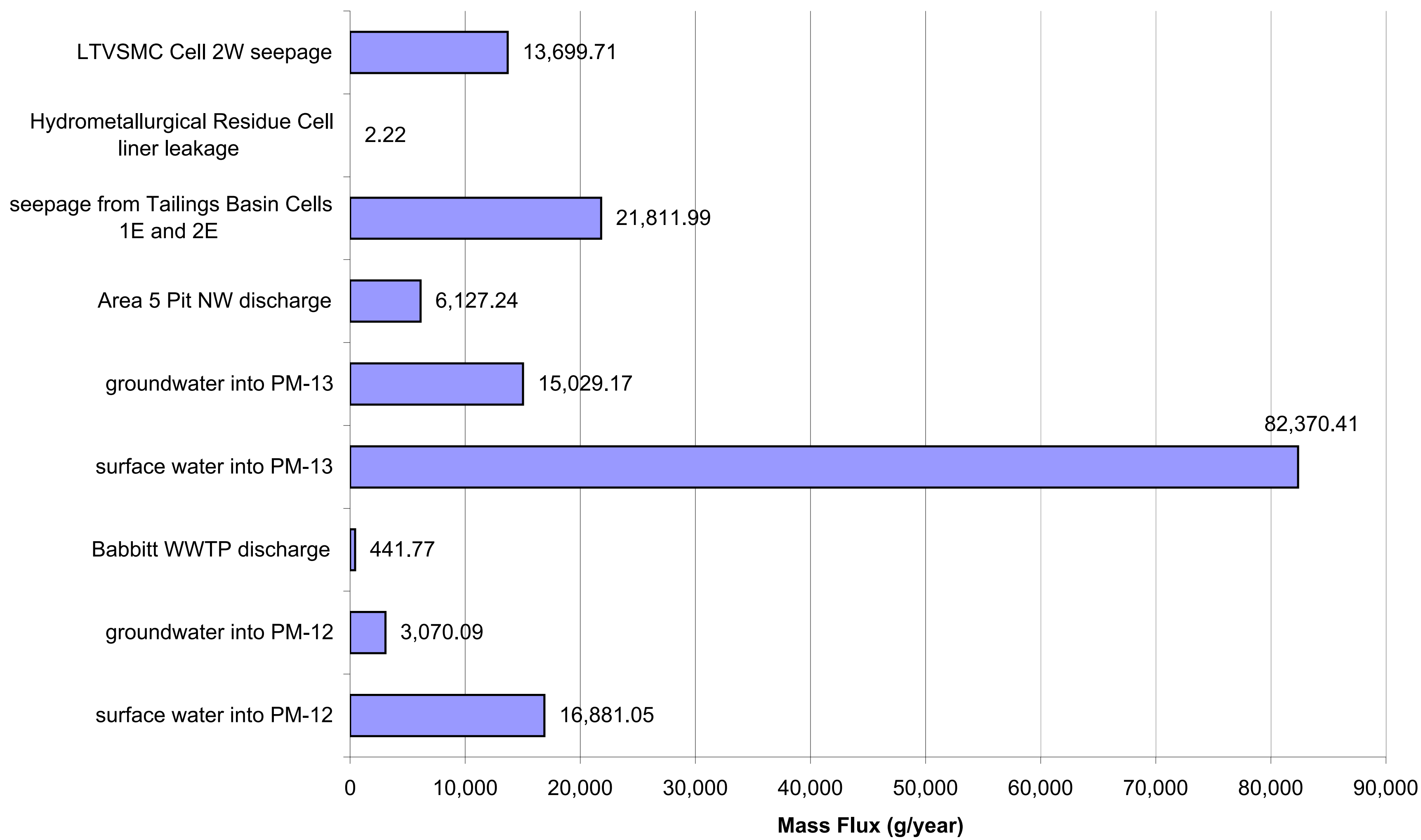


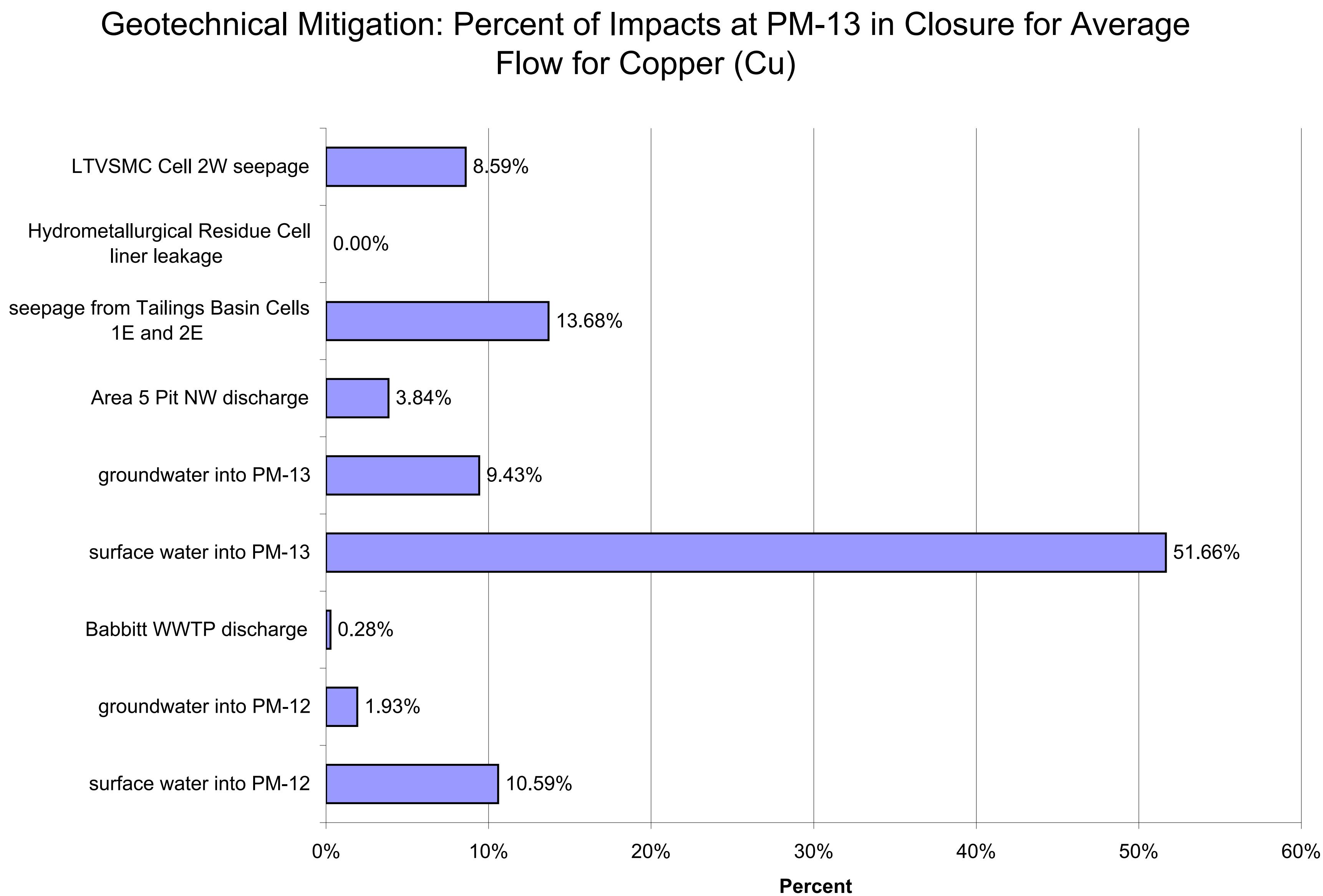
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)

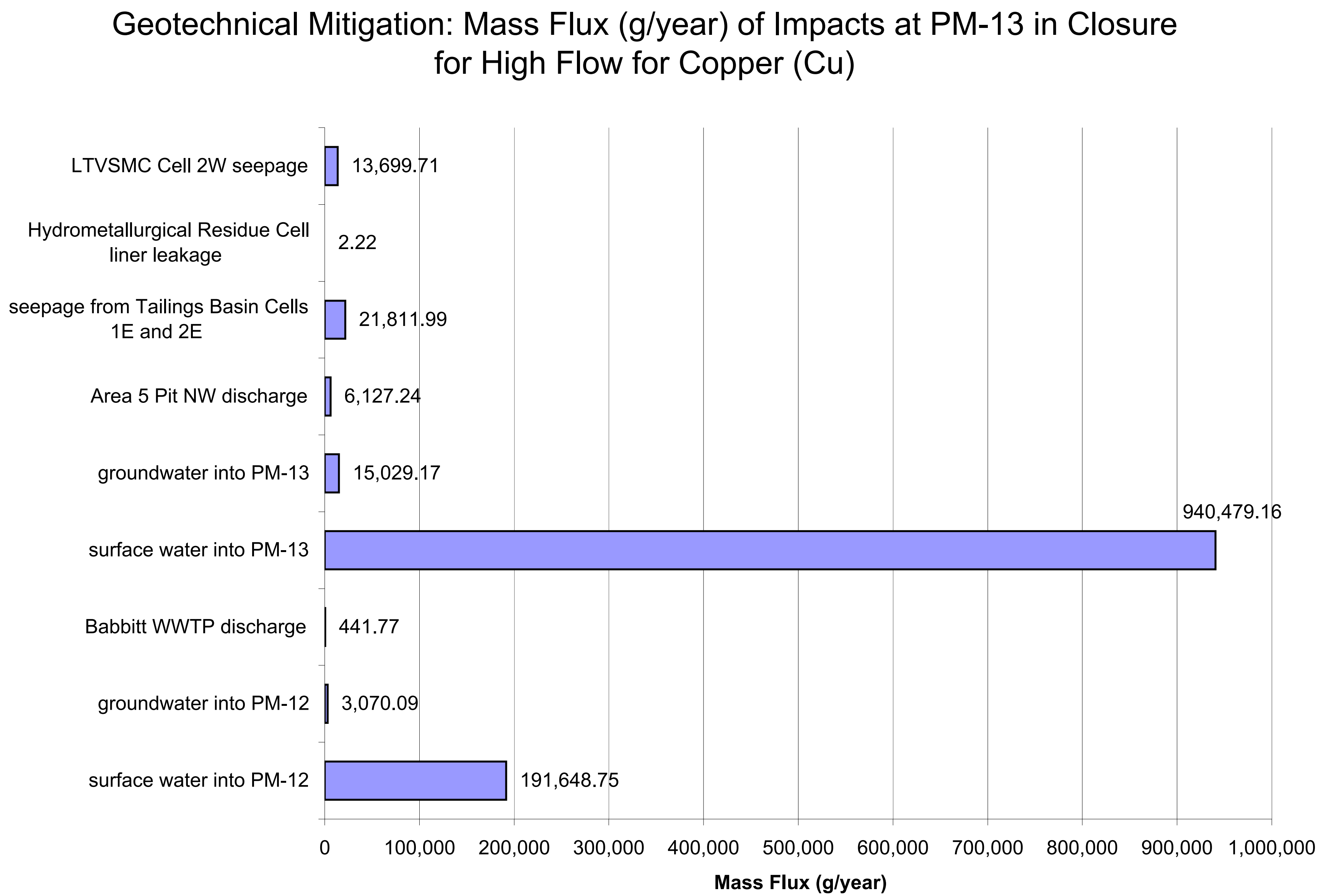



Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Copper (Cu)
LTVSMC Cell 2W seepage
12.18%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
19.39%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
56.81%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
11.60%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

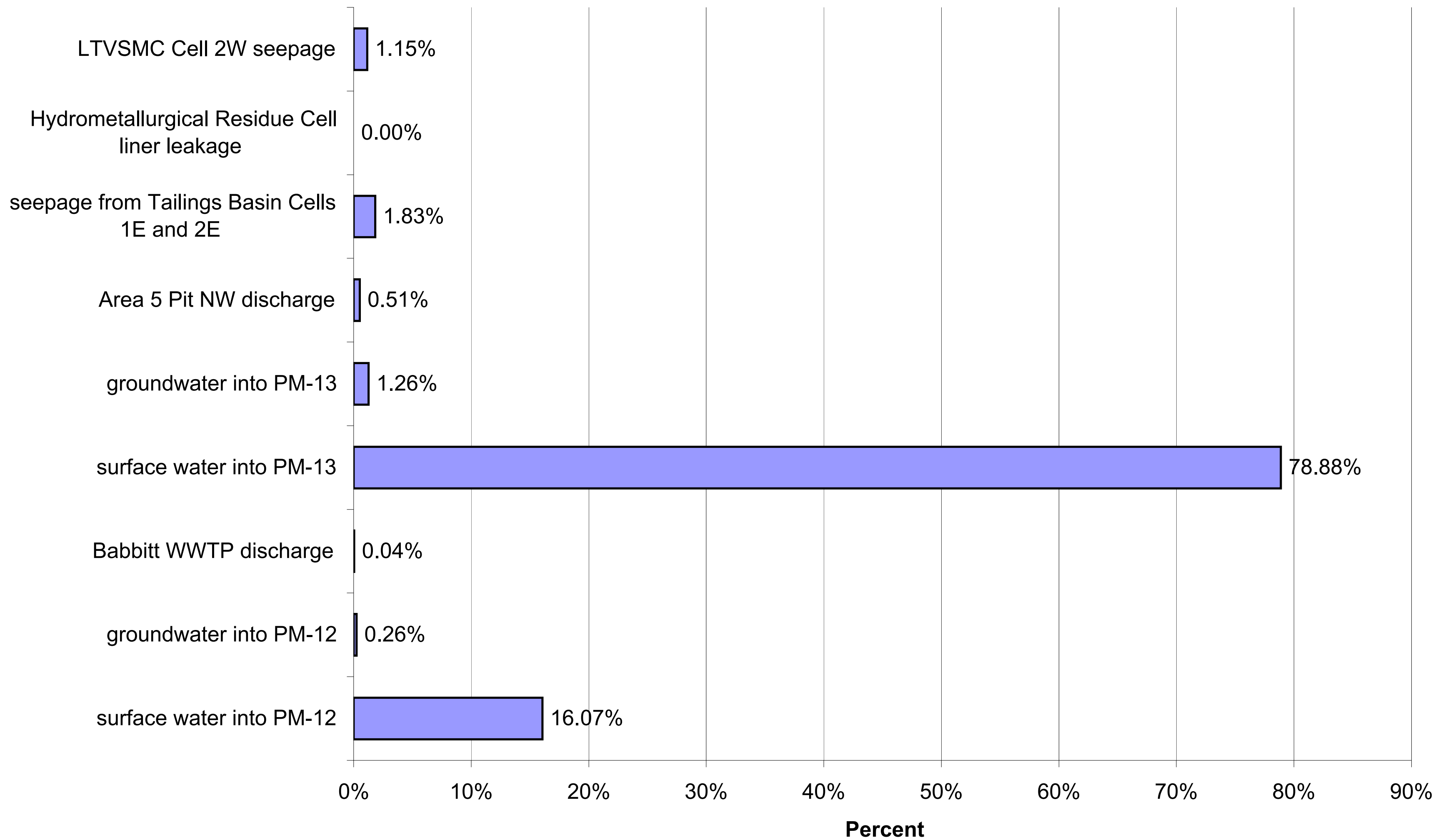
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)



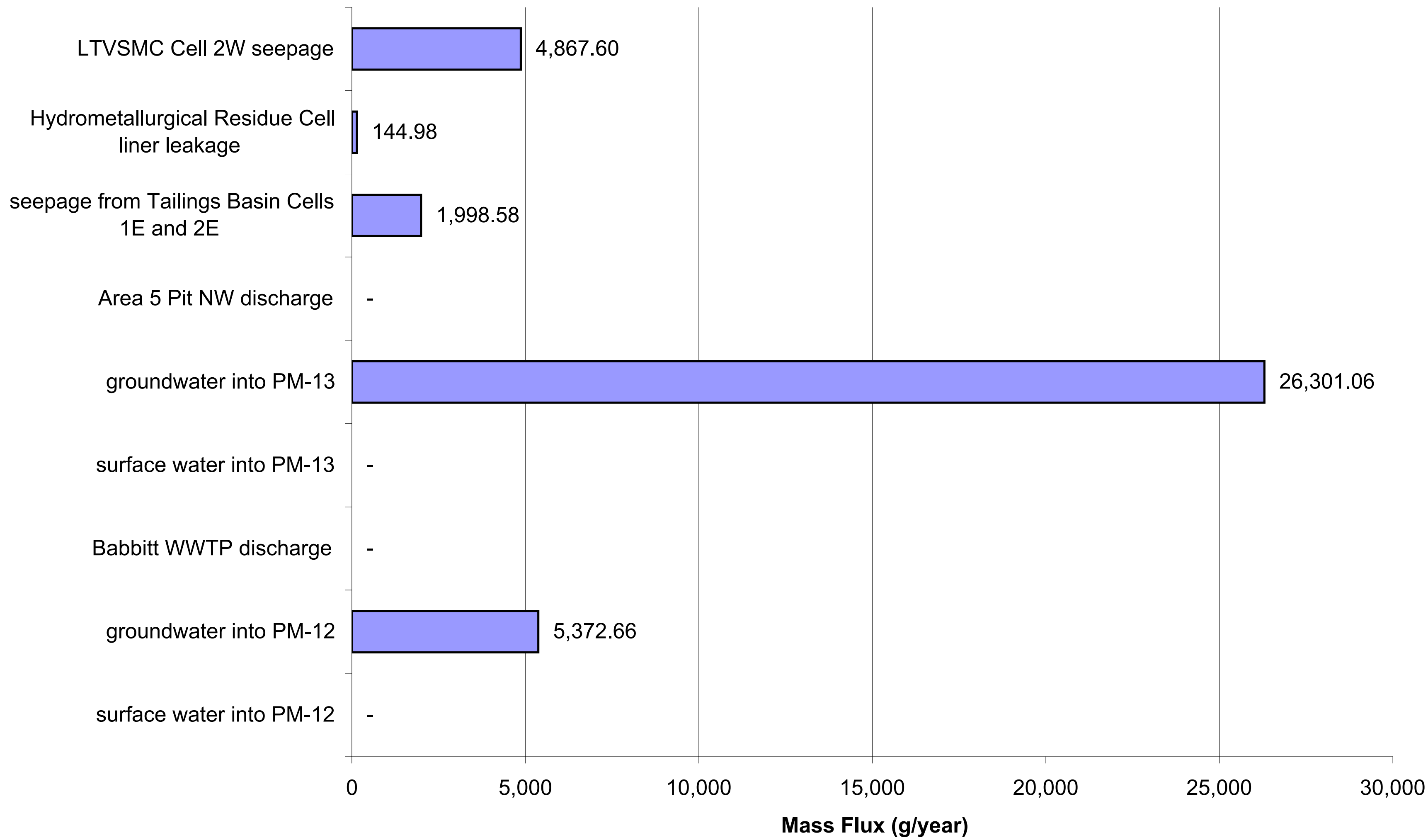

Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
8.59%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
13.68%
Area 5 Pit NW discharge
3.84%
groundwater into PM-13
9.43%
surface water into PM-13
51.66%
Babbitt WWTP discharge
0.28%
groundwater into PM-12
1.93%
surface water into PM-12
10.59%
0%
10%
20%
30%
40%
50%
60%
Percent

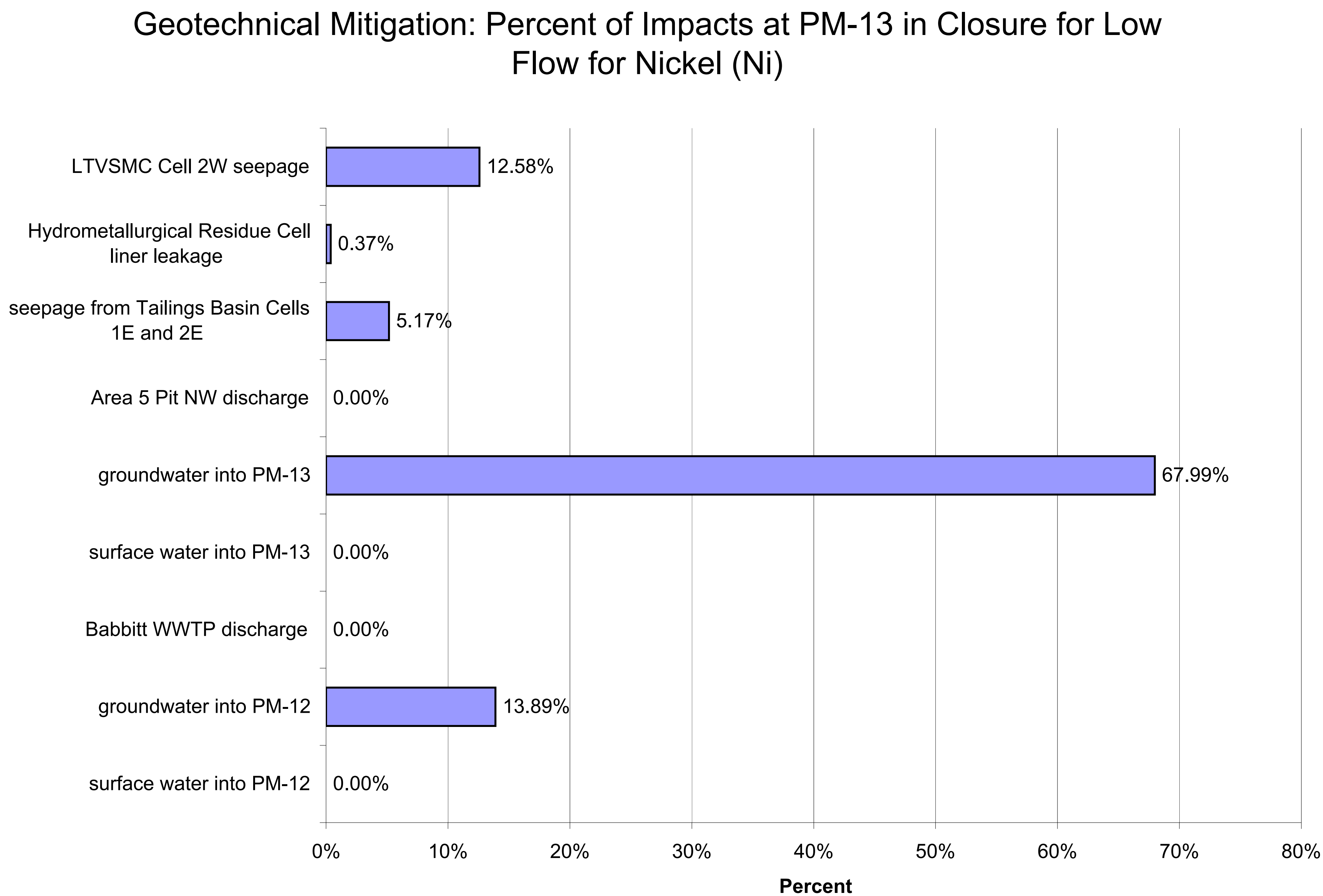

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
13,699.71
Hydrometallurgical Residue Cell liner leakage
2.22
seepage from Tailings Basin Cells 1E and 2E
21,811.99
Area 5 Pit NW discharge
6,127.24
groundwater into PM-13
15,029.17
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)

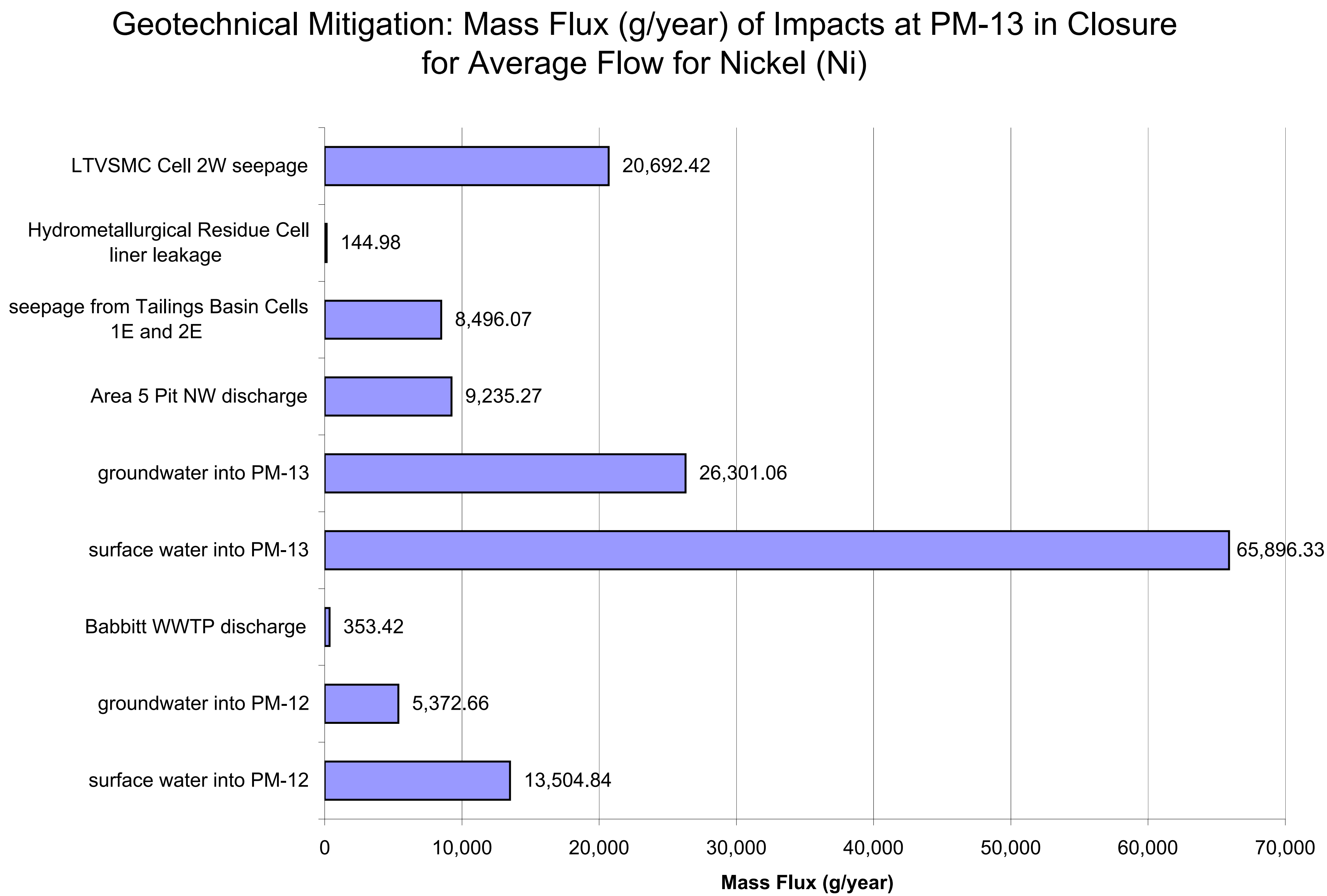
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Copper (Cu)



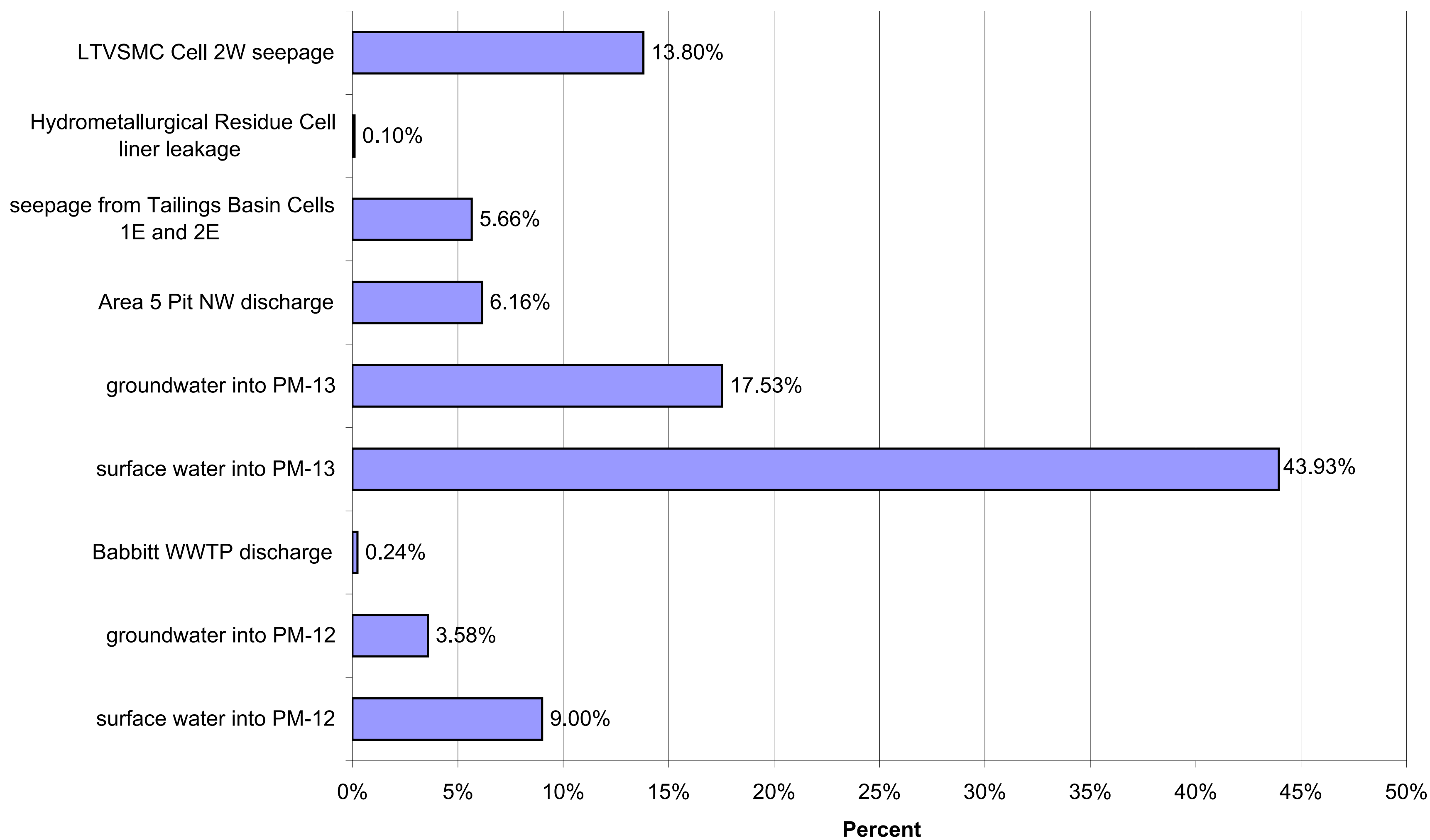
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)

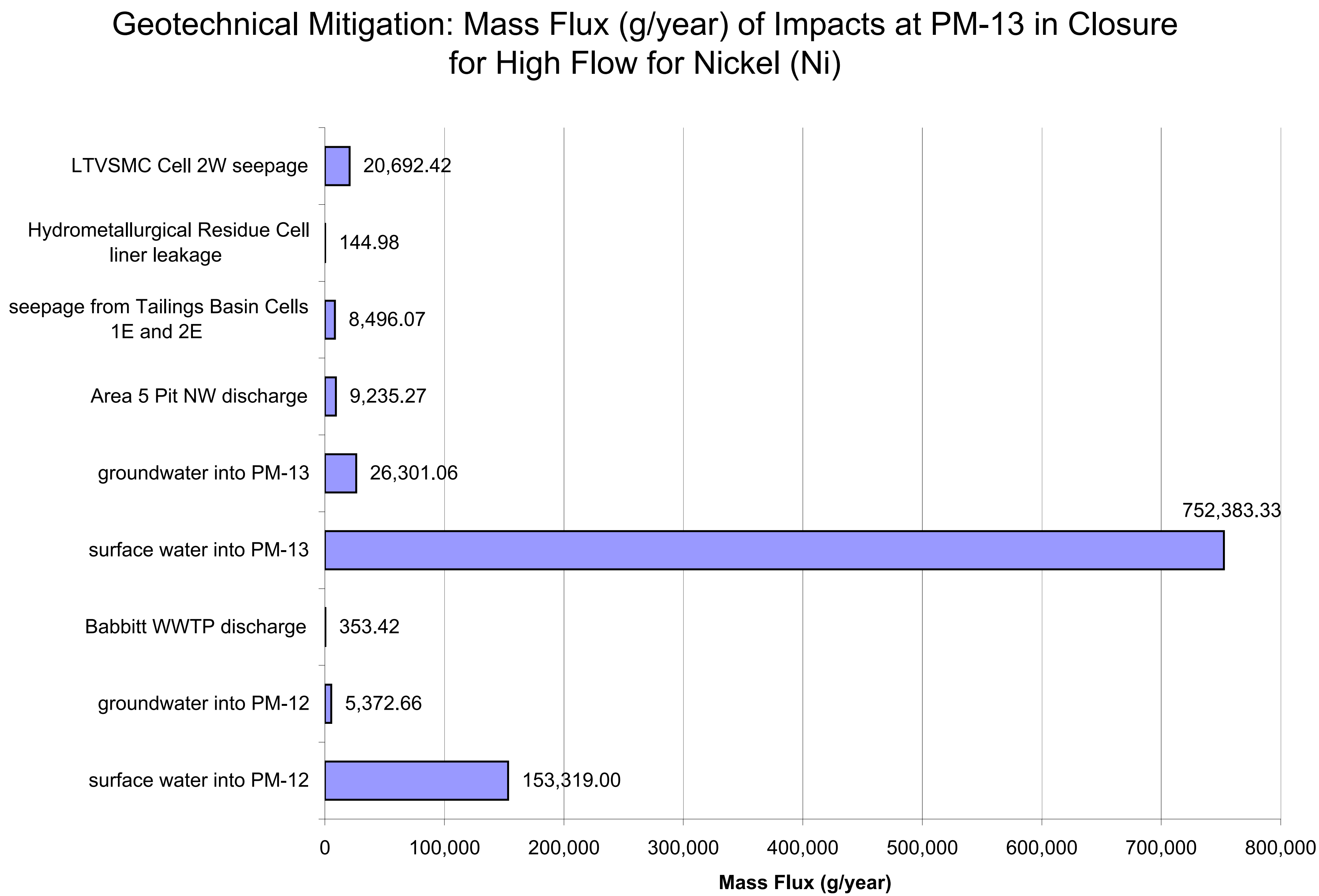



Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
12.58%
Hydrometallurgical Residue Cell liner leakage
0.37%
seepage from Tailings Basin Cells 1E and 2E
5.17%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
67.99%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
13.89%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Percent

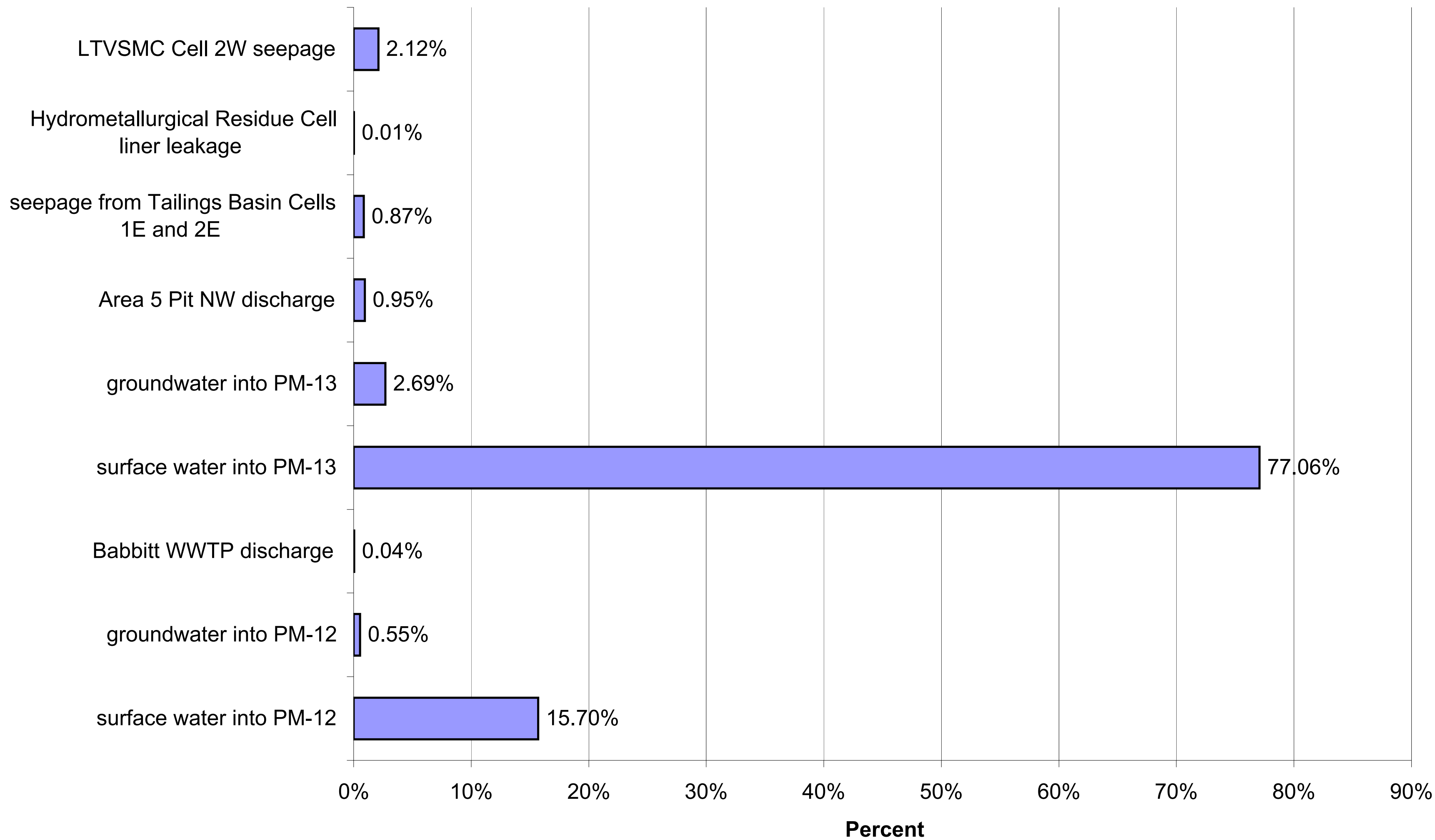

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
20,692.42
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
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)

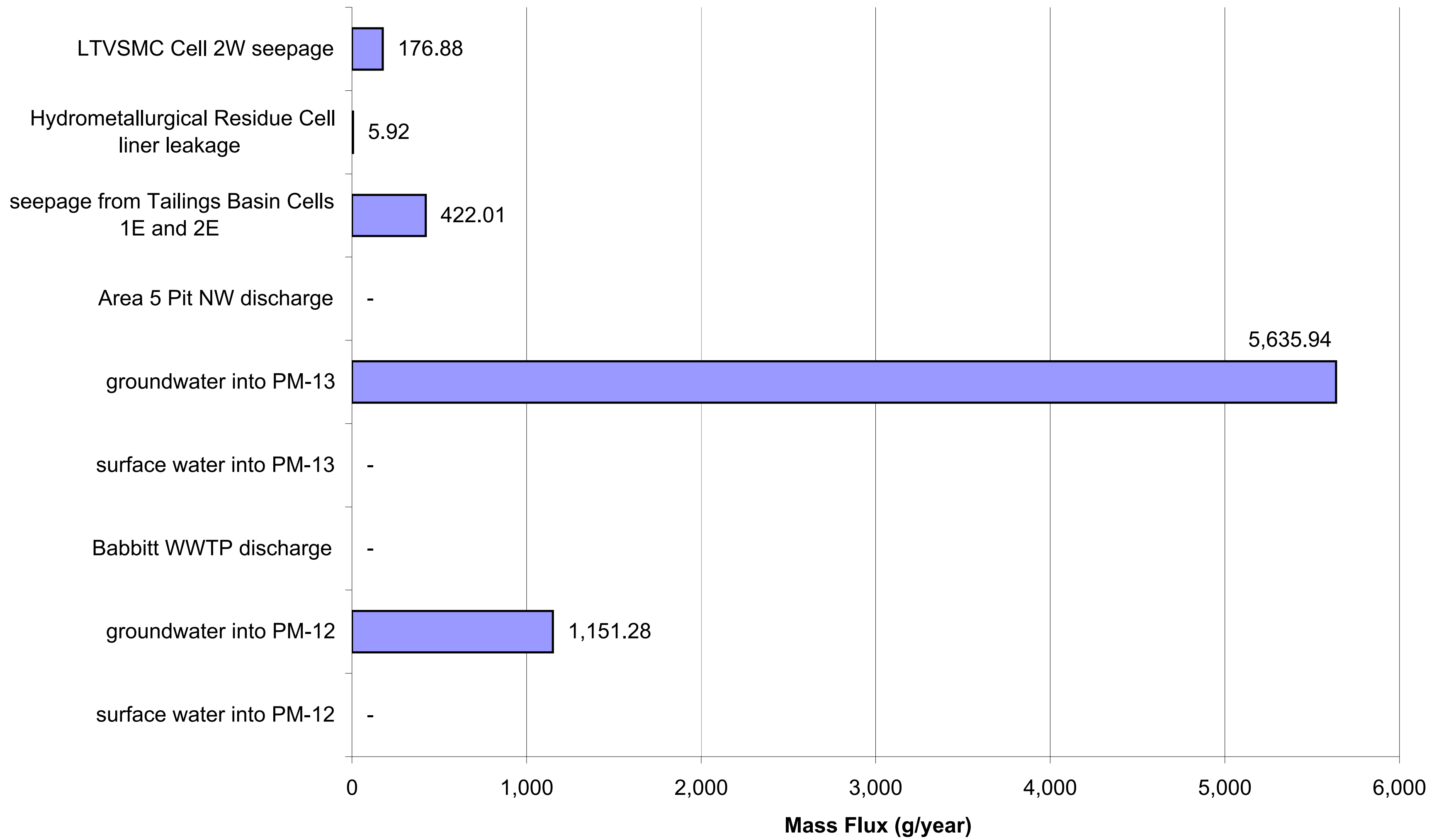


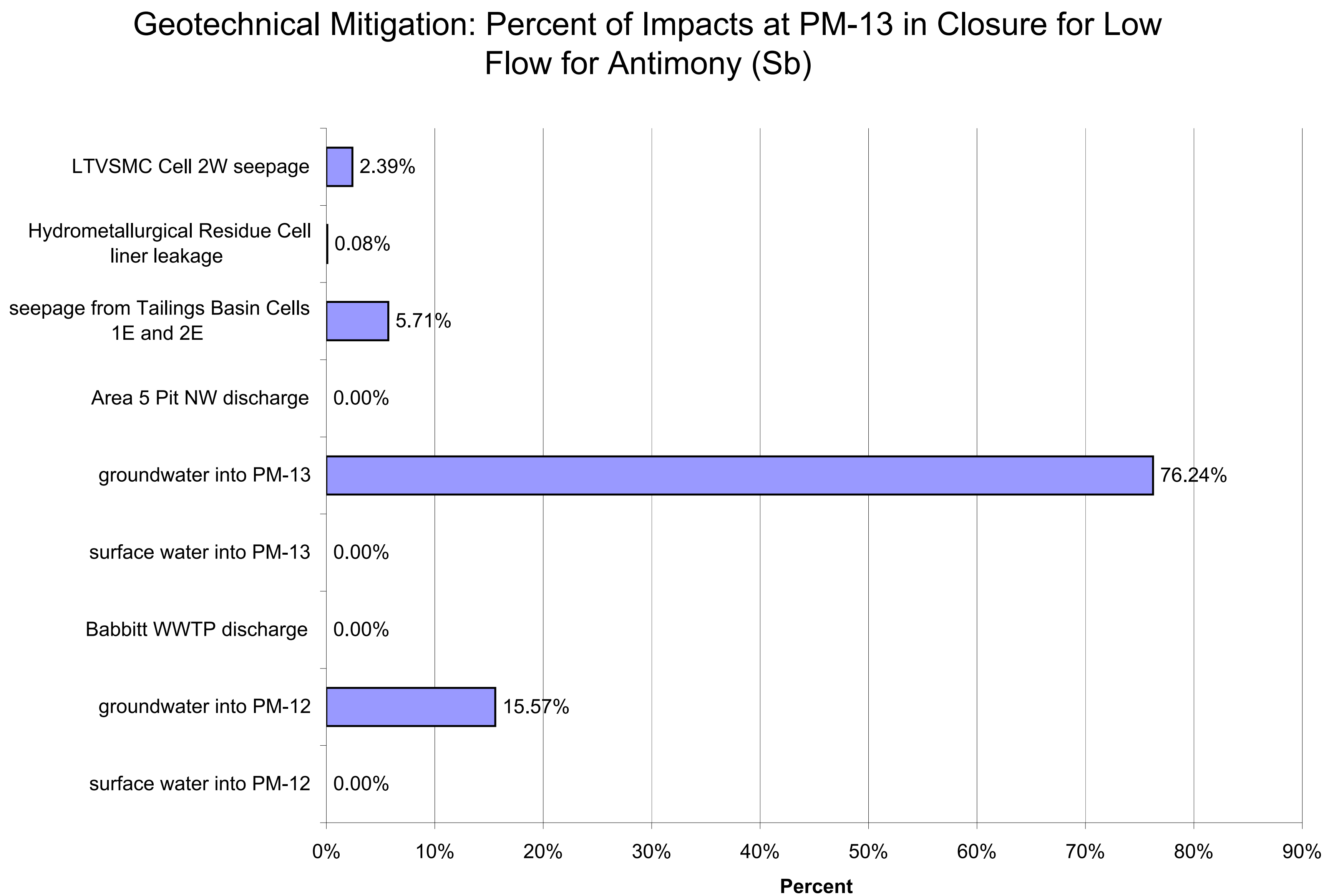

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
20,692.42
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
9,235.27
groundwater into PM-13
26,301.06
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)

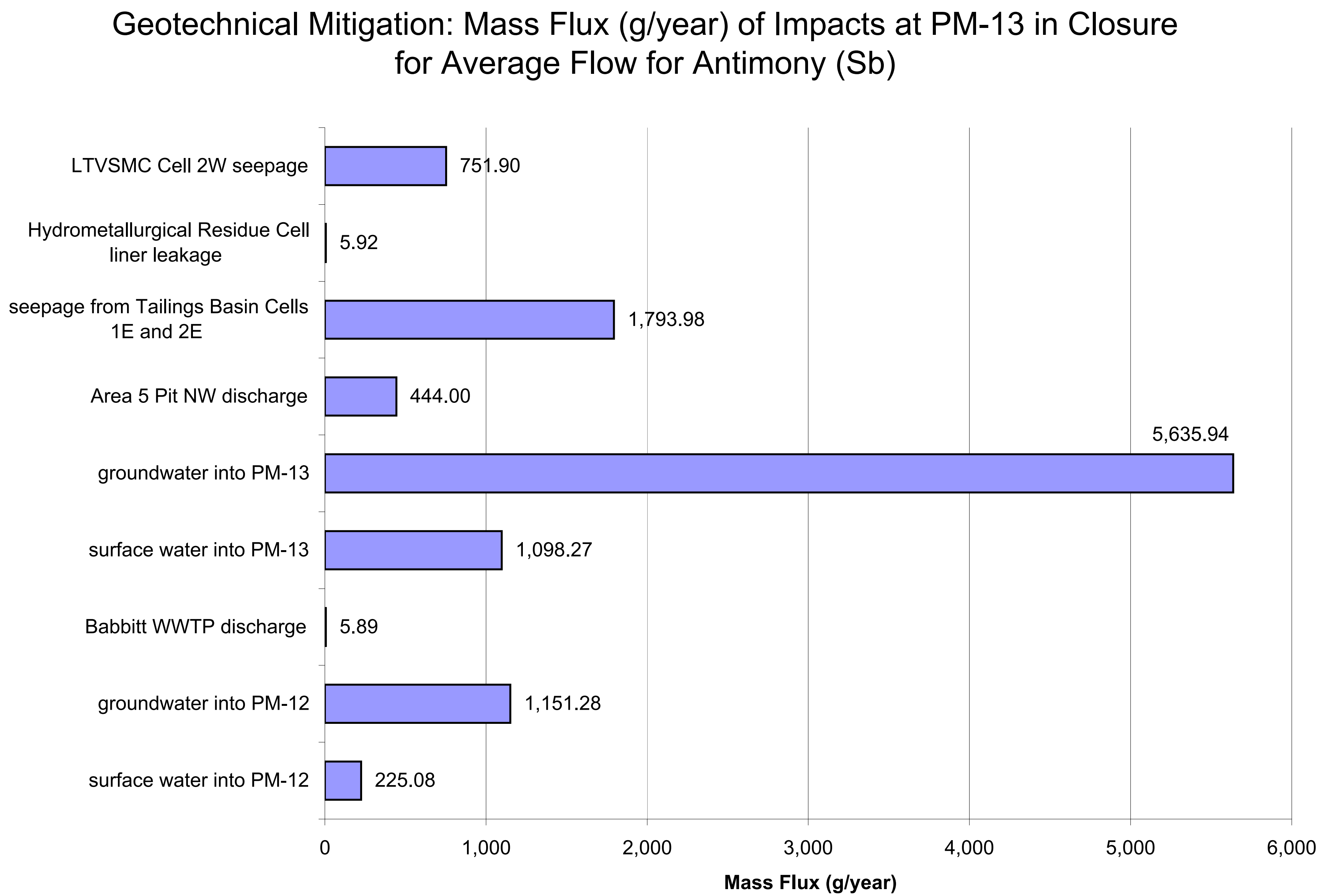
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Nickel (Ni)

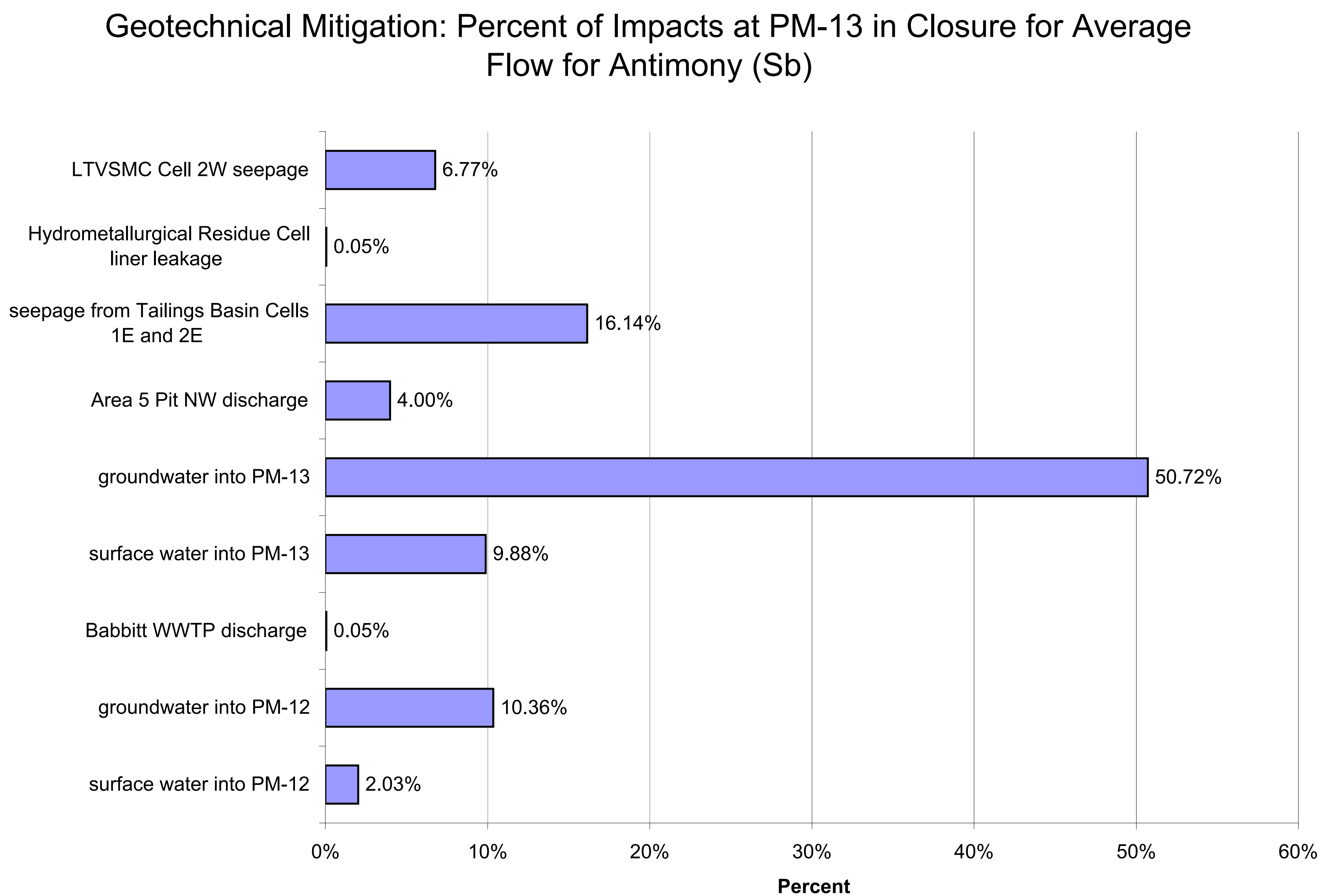


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)

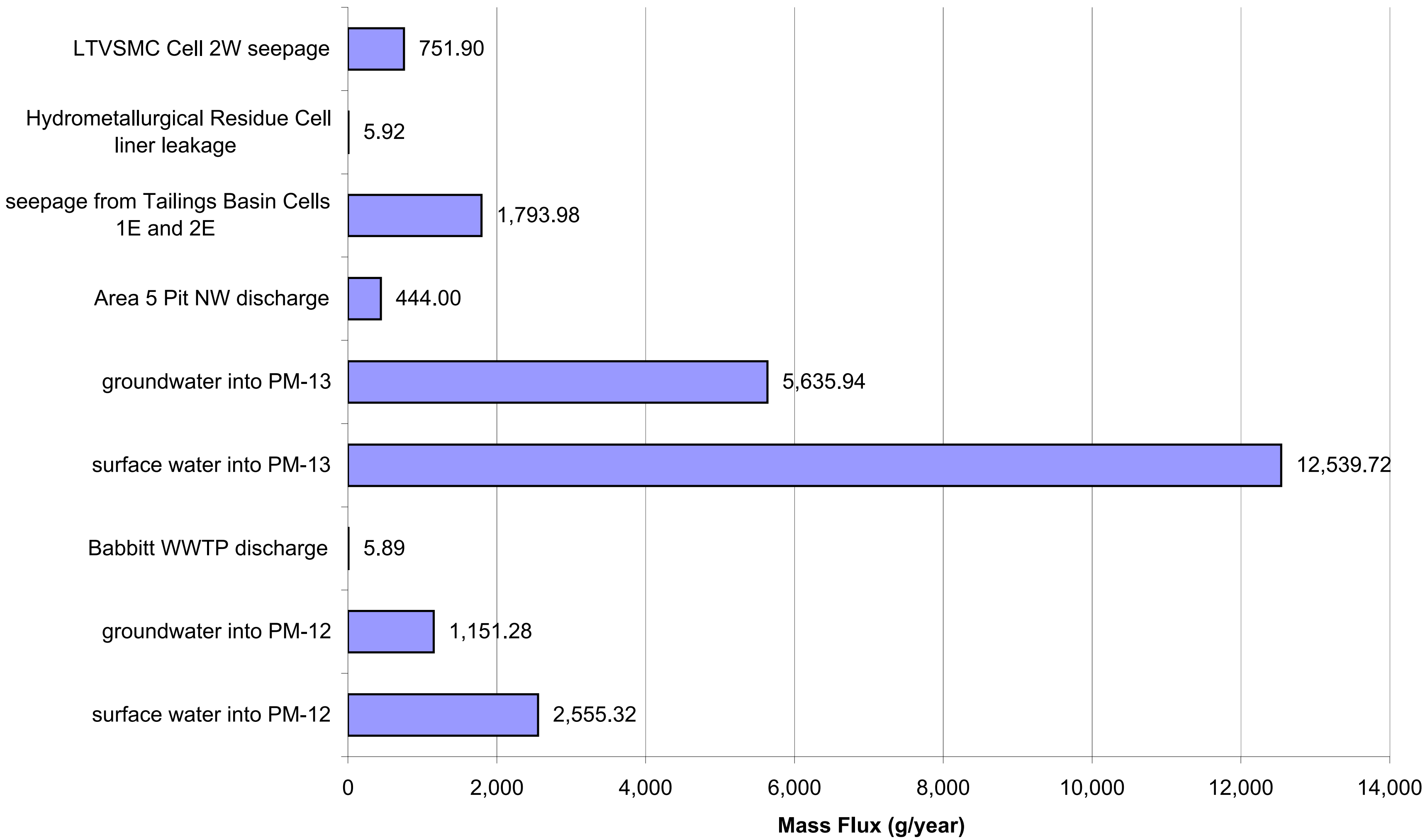



Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
2.39%
Hydrometallurgical Residue Cell liner leakage
0.08%
seepage from Tailings Basin Cells 1E and 2E
5.71%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
76.24%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
15.57%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

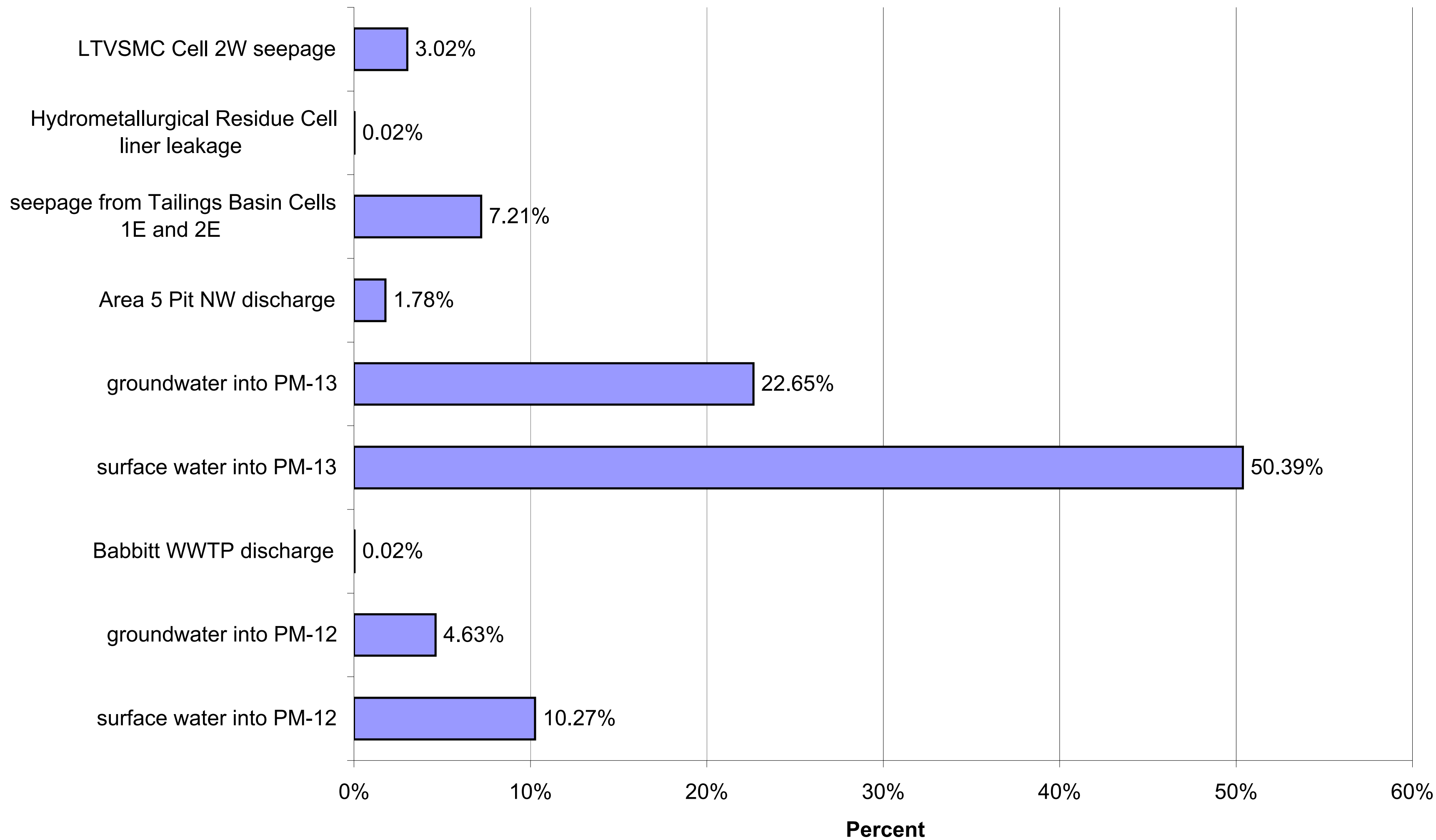

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
751.90
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
1,793.98
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
1,098.27
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
225.08
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
6.77%
Hydrometallurgical Residue Cell liner leakage
0.05%
seepage from Tailings Basin Cells 1E and 2E
16.14%
Area 5 Pit NW discharge
4.00%
groundwater into PM-13
50.72%
surface water into PM-13
9.88%
Babbitt WWTP discharge
0.05%
groundwater into PM-12
10.36%
surface water into PM-12
2.03%
0%
10%
20%
30%
40%
50%
60%
Percent

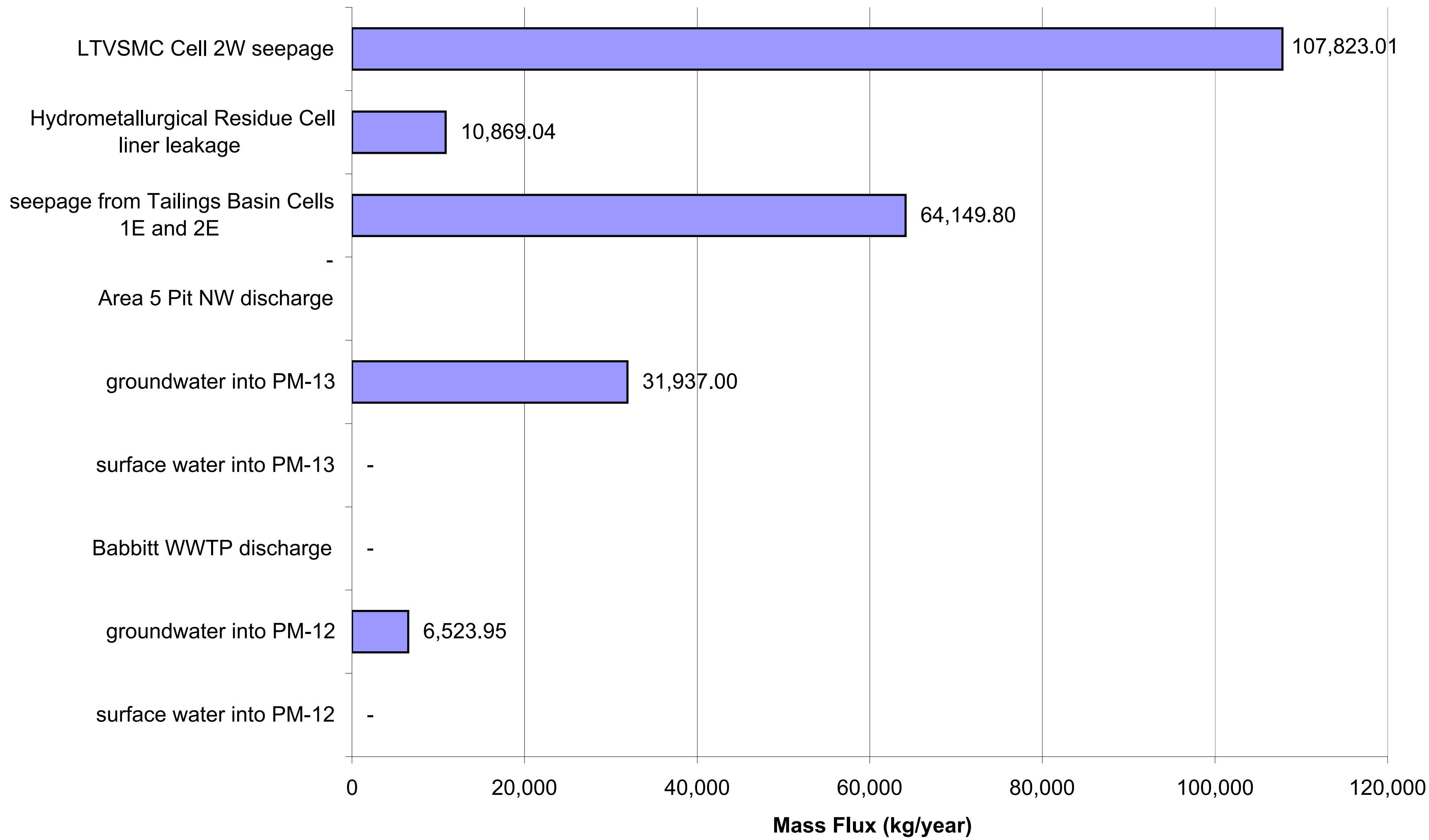
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)



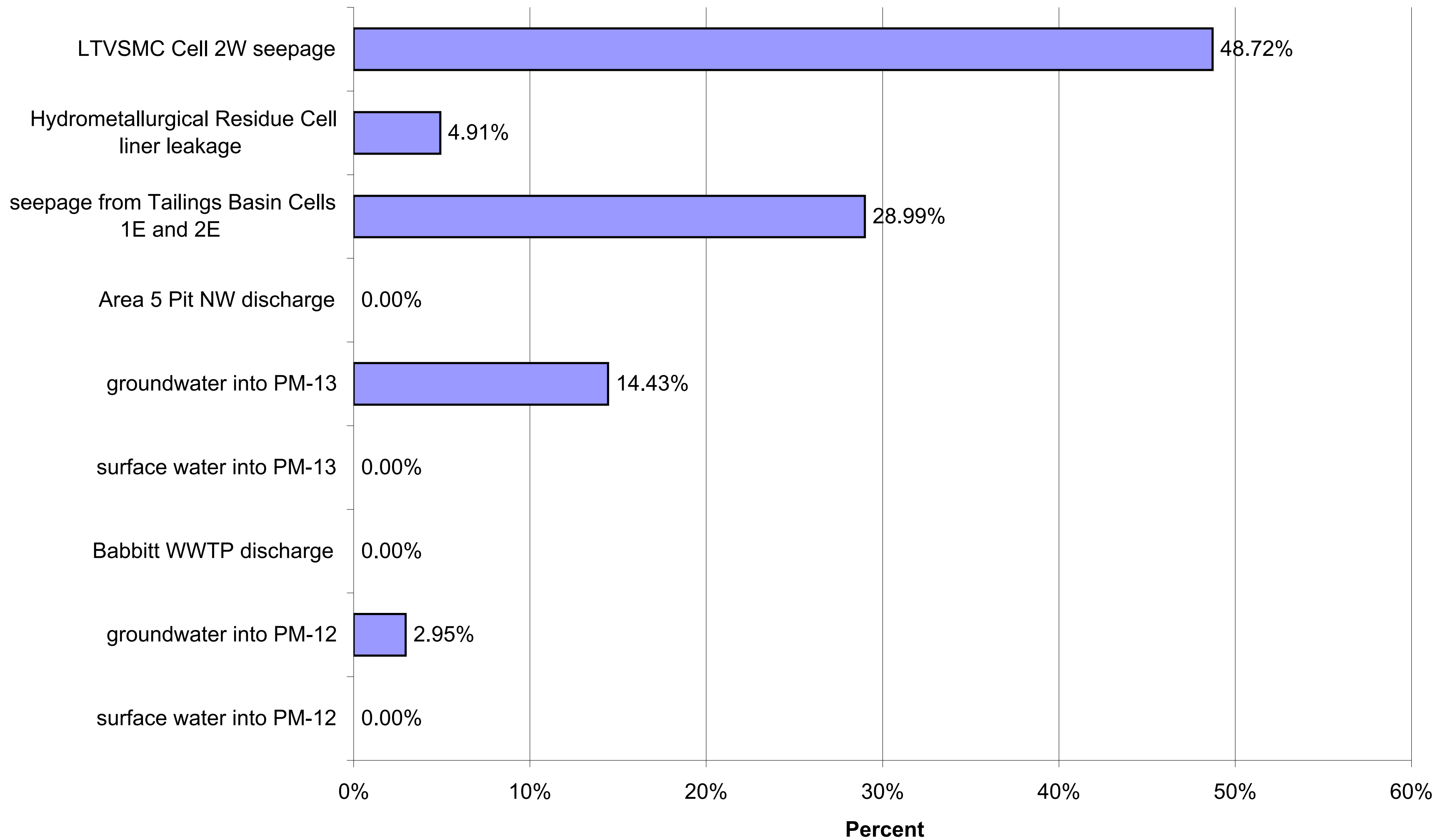
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Antimony (Sb)



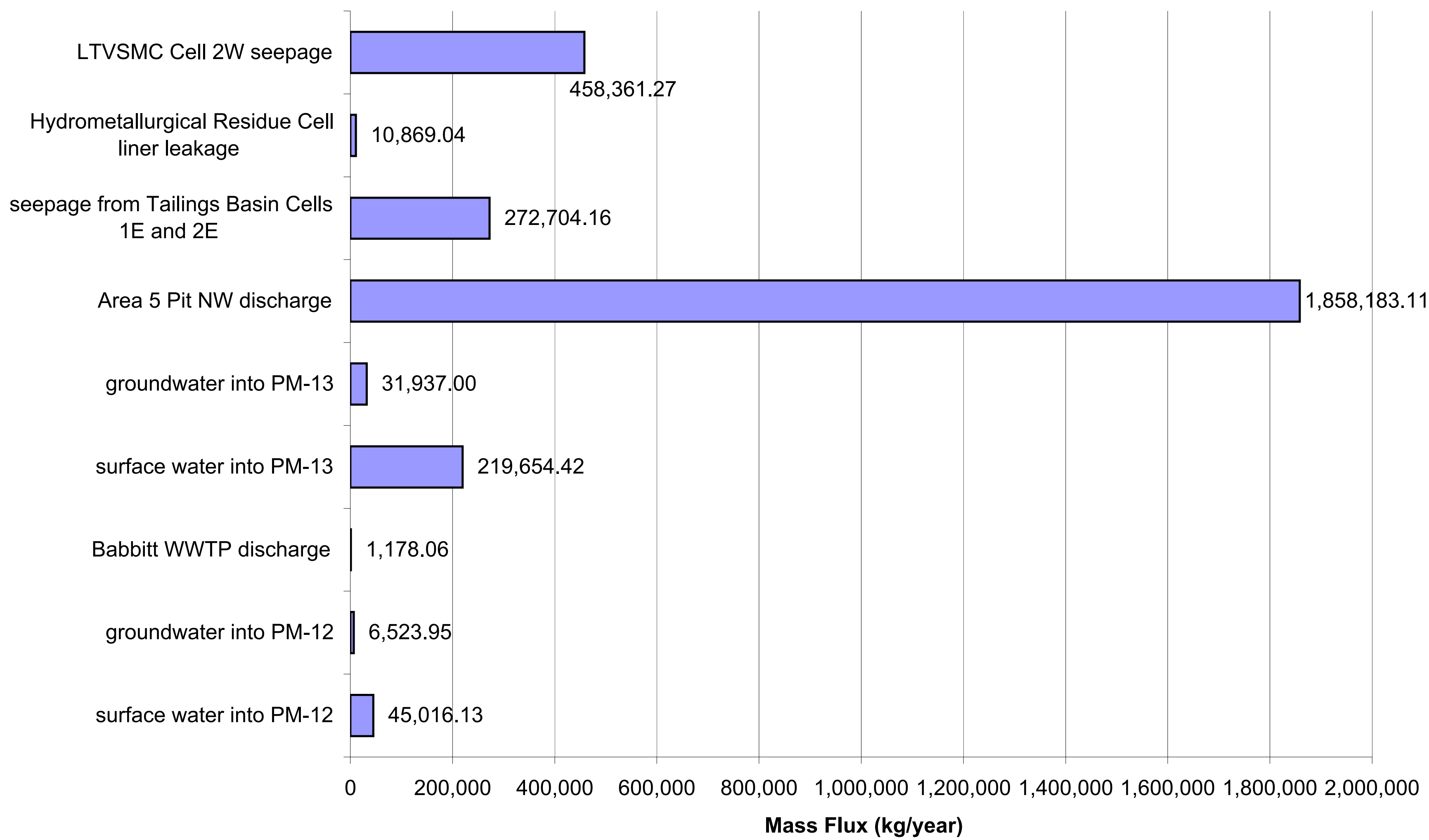
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO_4)



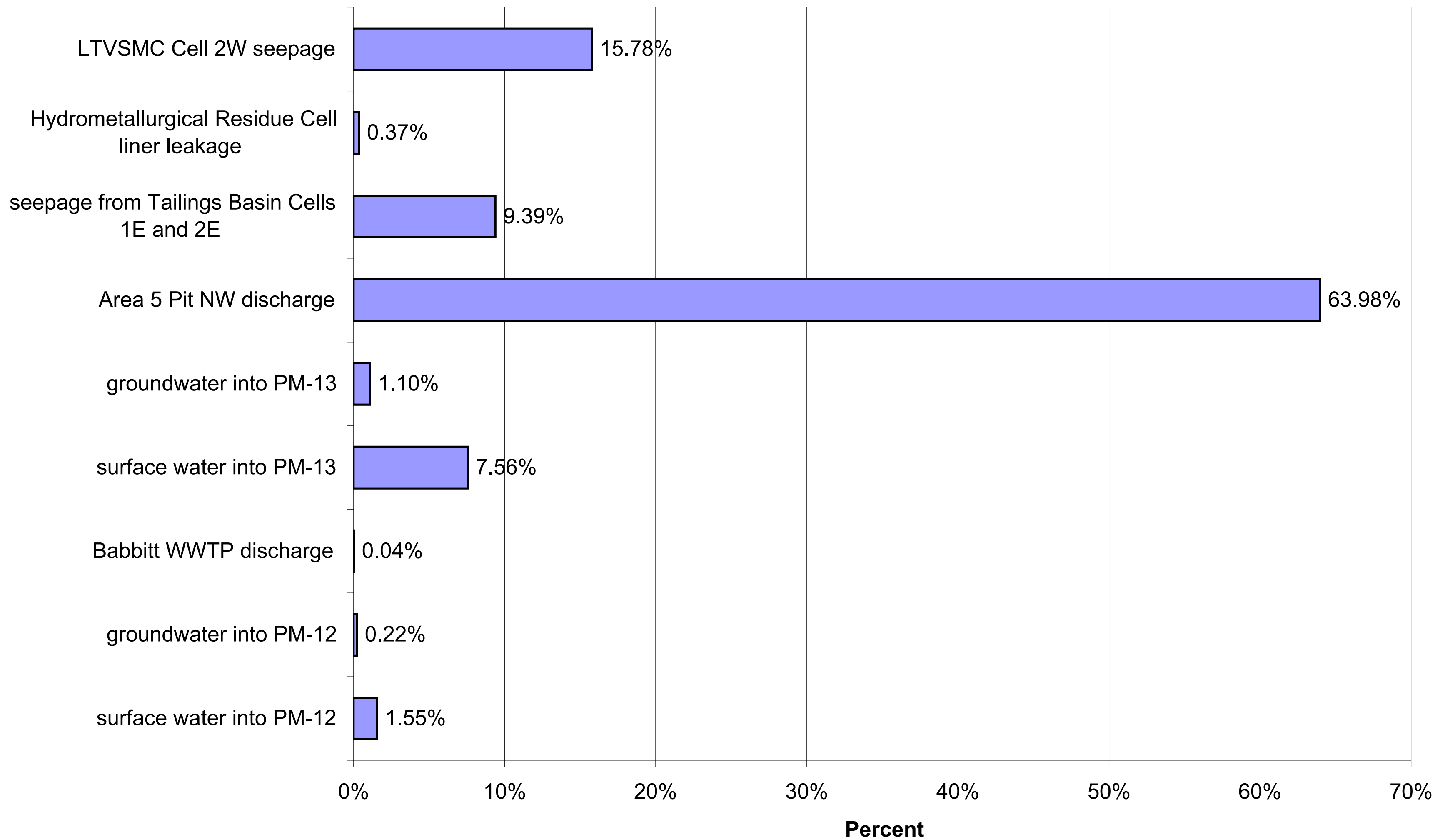
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Low Flow for Sulfate (SO_4)



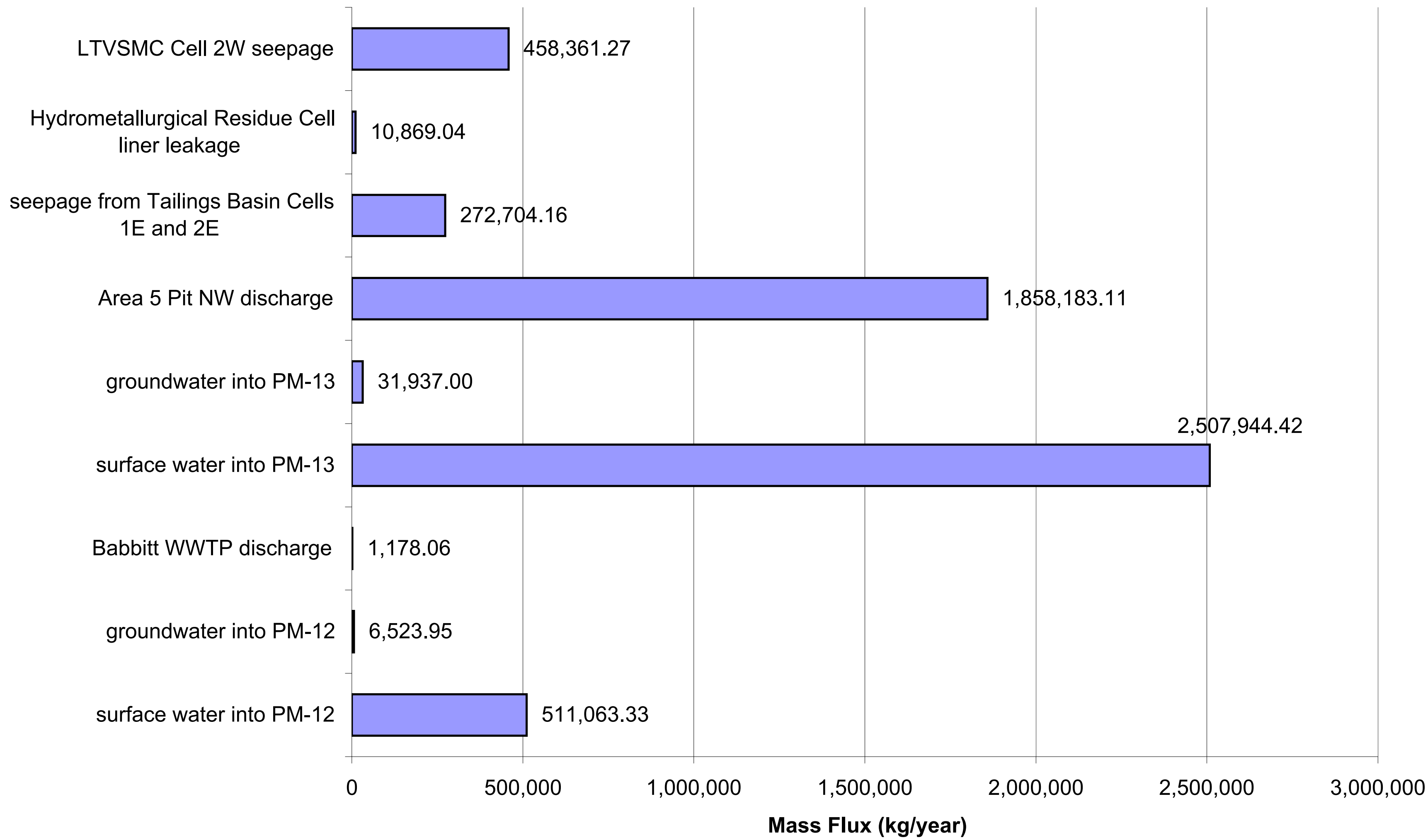
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO_4)



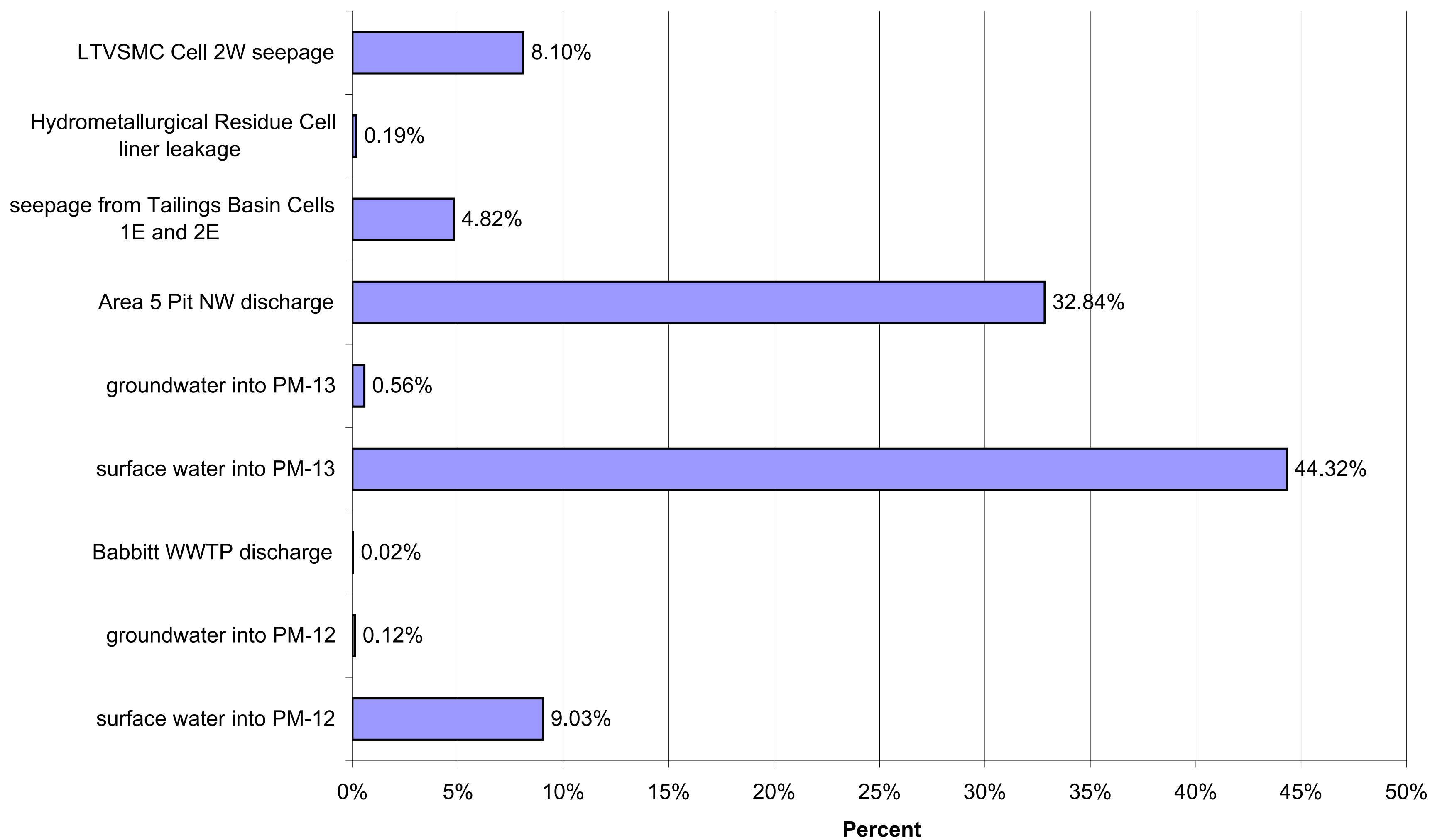
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for Average Flow for Sulfate (SO_4)

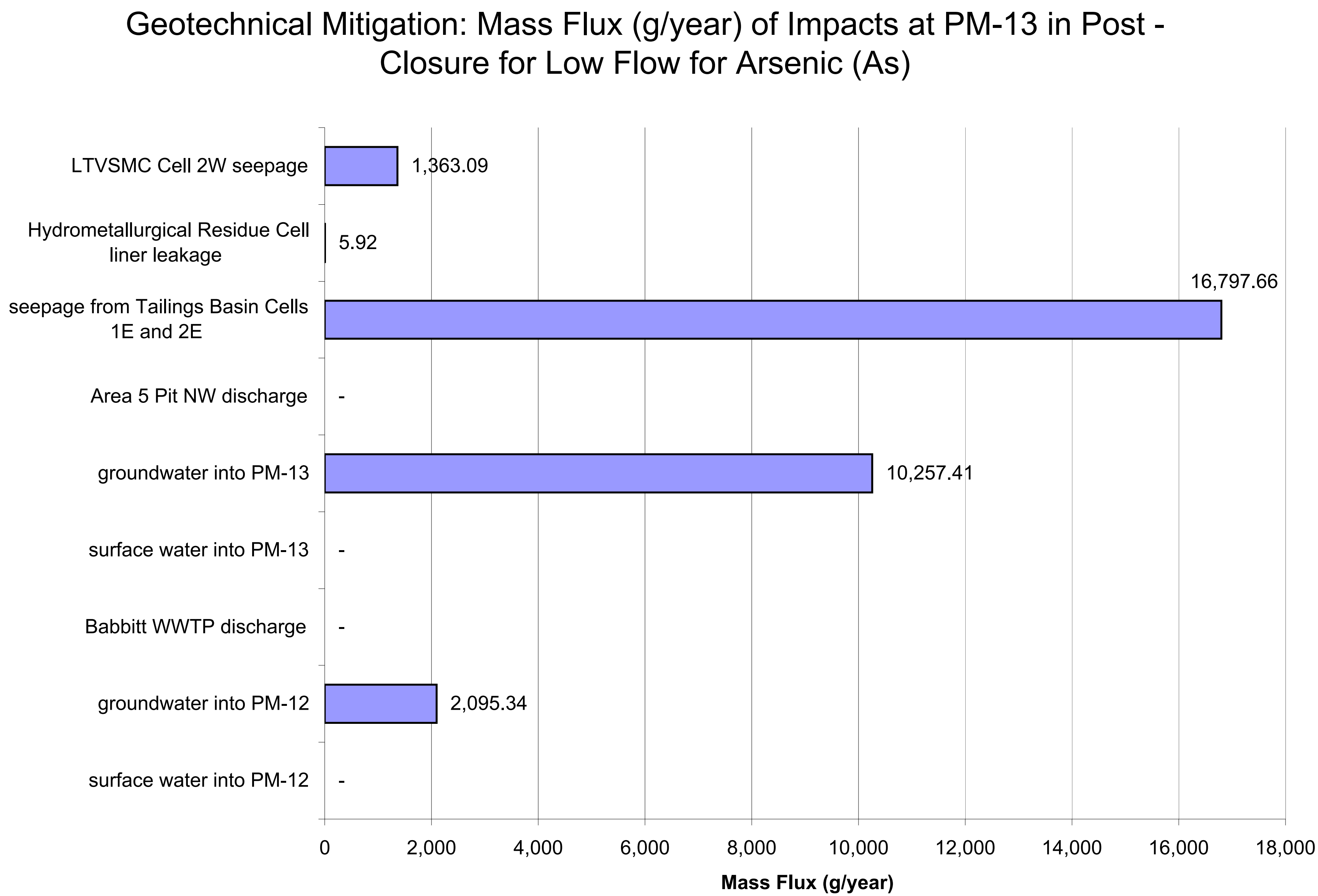


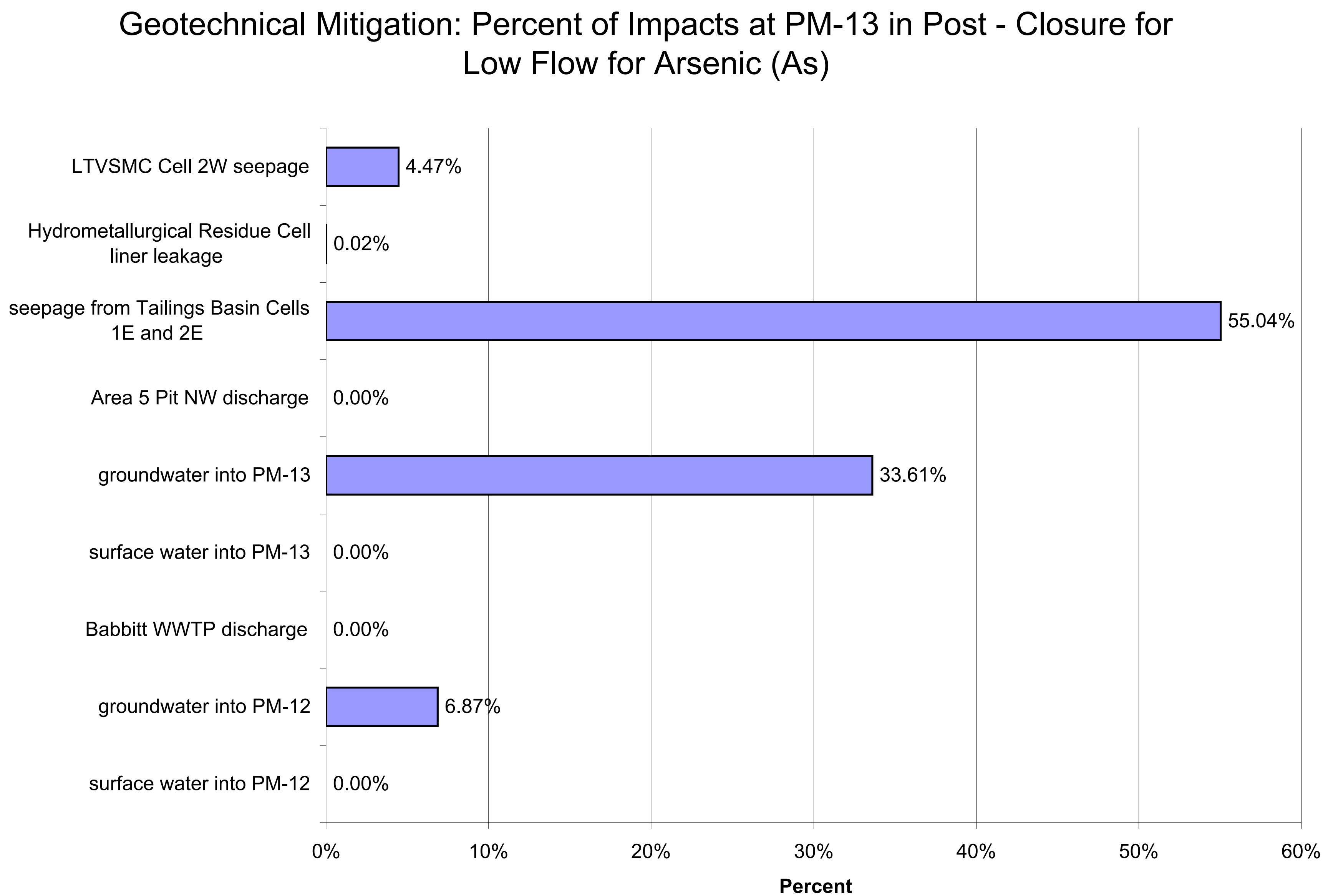
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Closure for High Flow for Sulfate (SO_4)



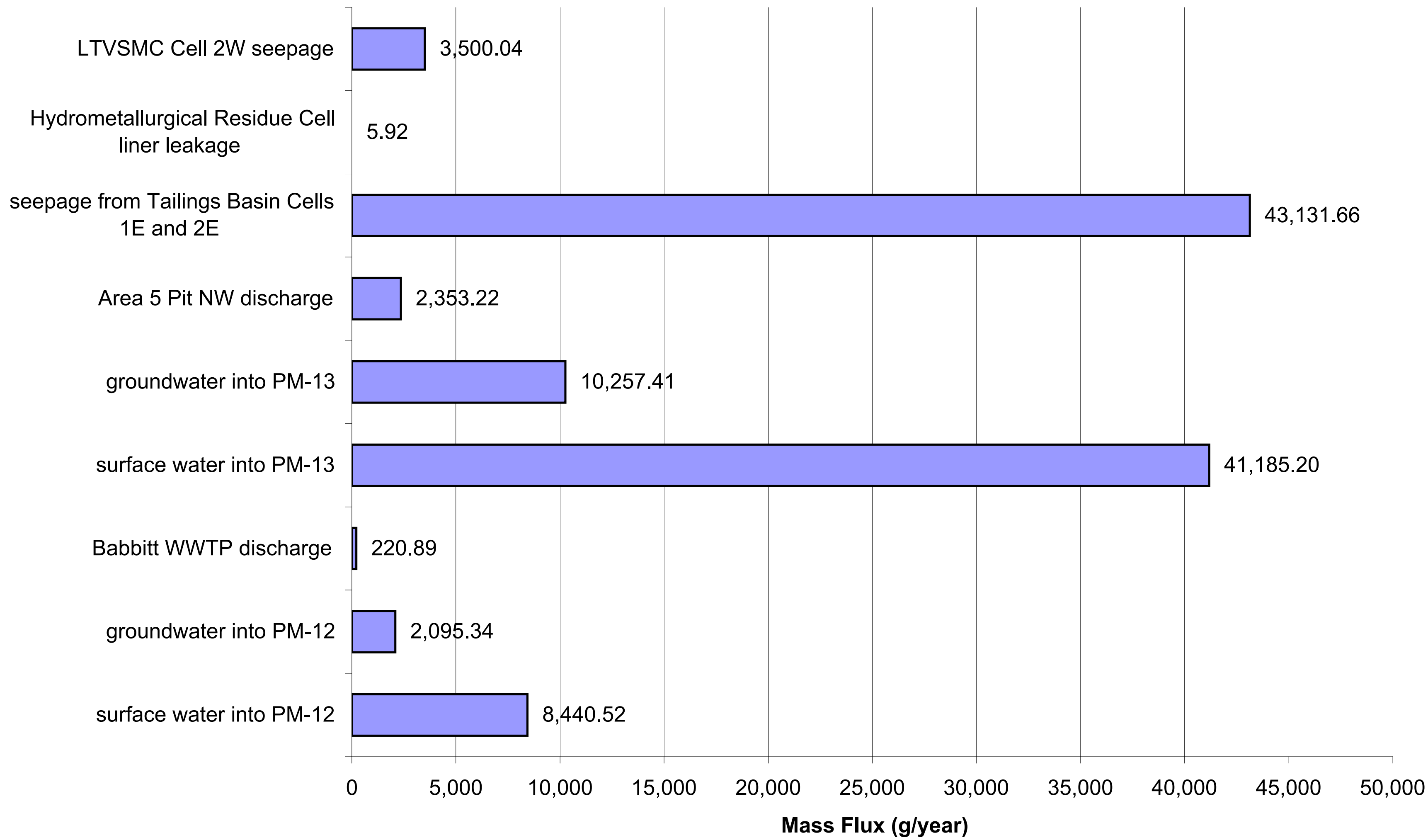
Geotechnical Mitigation: Percent of Impacts at PM-13 in Closure for High Flow for Sulfate (SO_4)

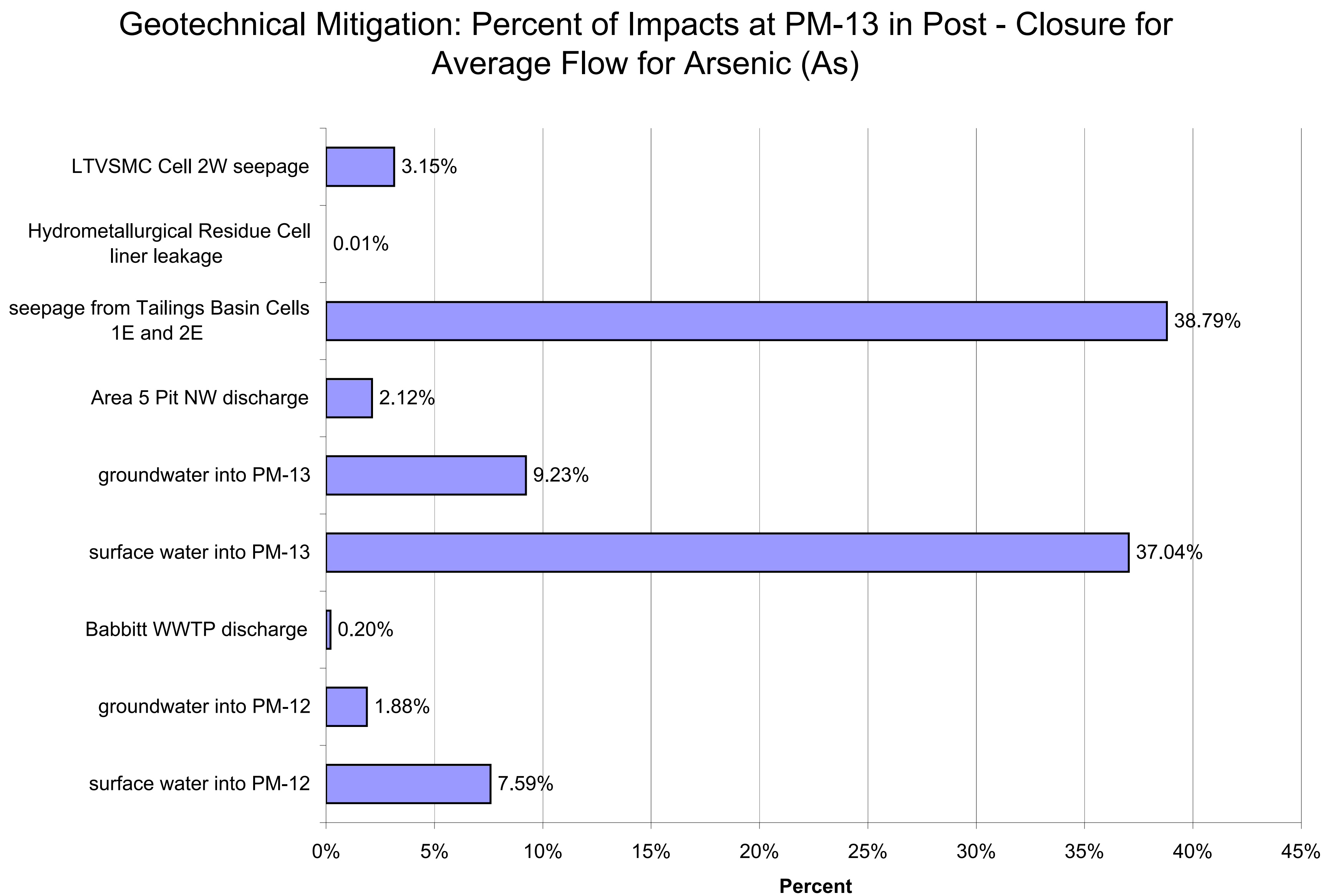


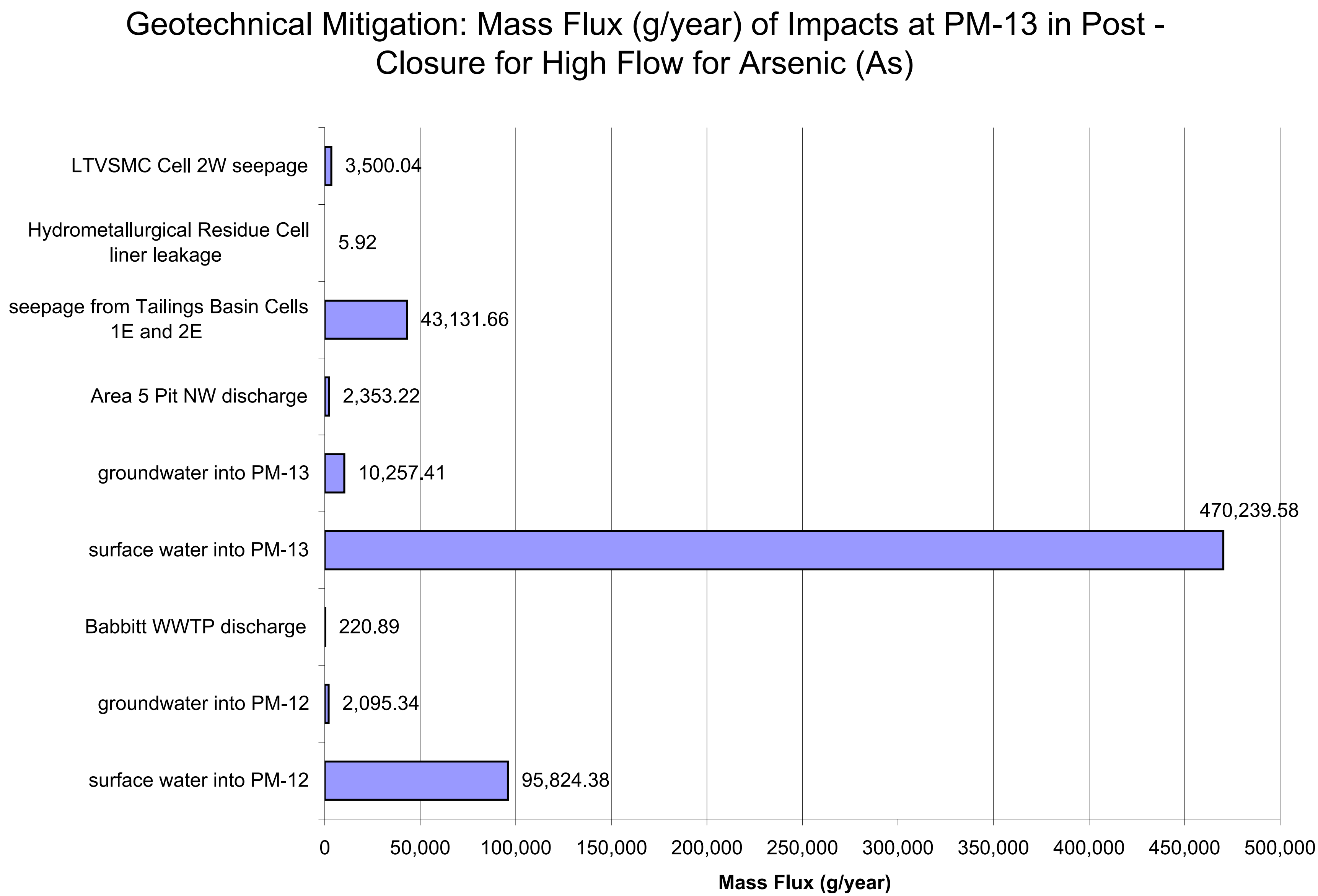

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
1,363.09
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
16,797.66
Area 5 Pit NW discharge
-
groundwater into PM-13
10,257.41
surface water into PM-13
-
Babbitt WWTP discharge
-
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)


Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Arsenic (As)
LTVSMC Cell 2W seepage
4.47%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin Cells 1E and 2E
55.04%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
33.61%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
6.87%
surface water into PM-12
0.00%
0%
10%
20%
30%
40%
50%
60%
Percent

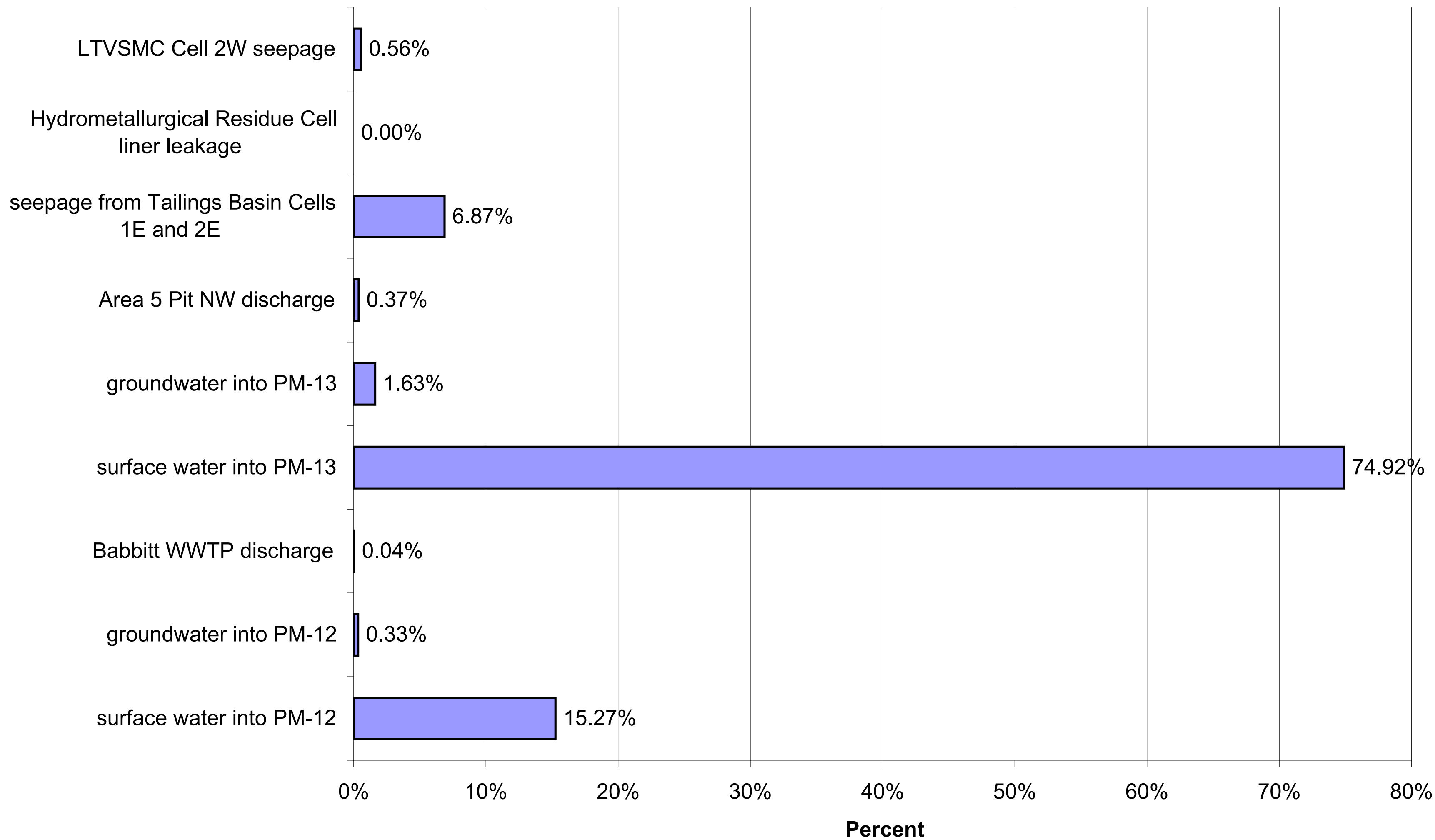
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)



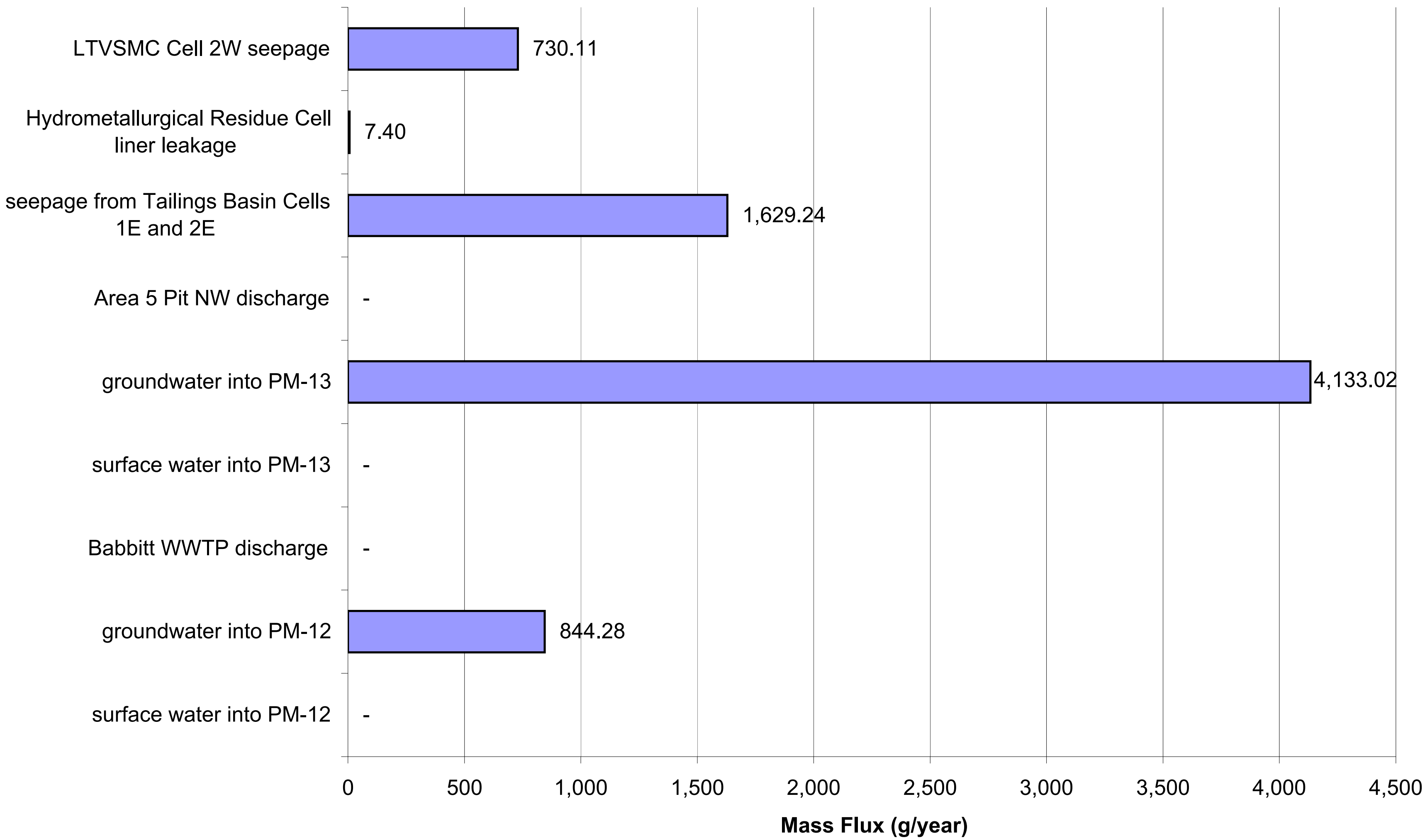

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3.15%
Hydrometallurgical Residue Cell liner leakage
0.01%
seepage from Tailings Basin Cells 1E and 2E
38.79%
Area 5 Pit NW discharge
2.12%
groundwater into PM-13
9.23%
surface water into PM-13
37.04%
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

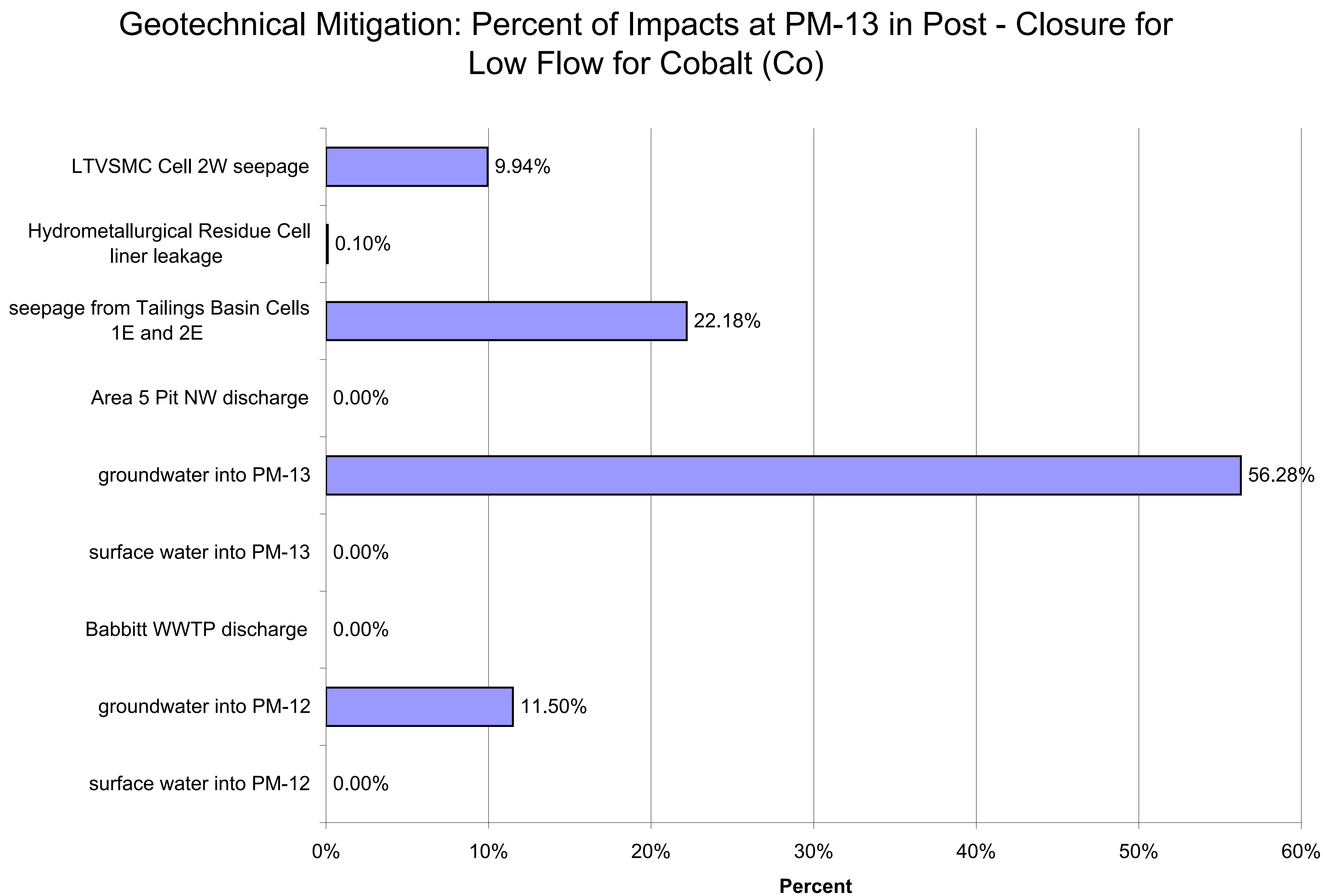

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)
LTVSMC Cell 2W seepage
3,500.04
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
43,131.66
Area 5 Pit NW discharge
2,353.22
groundwater into PM-13
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)

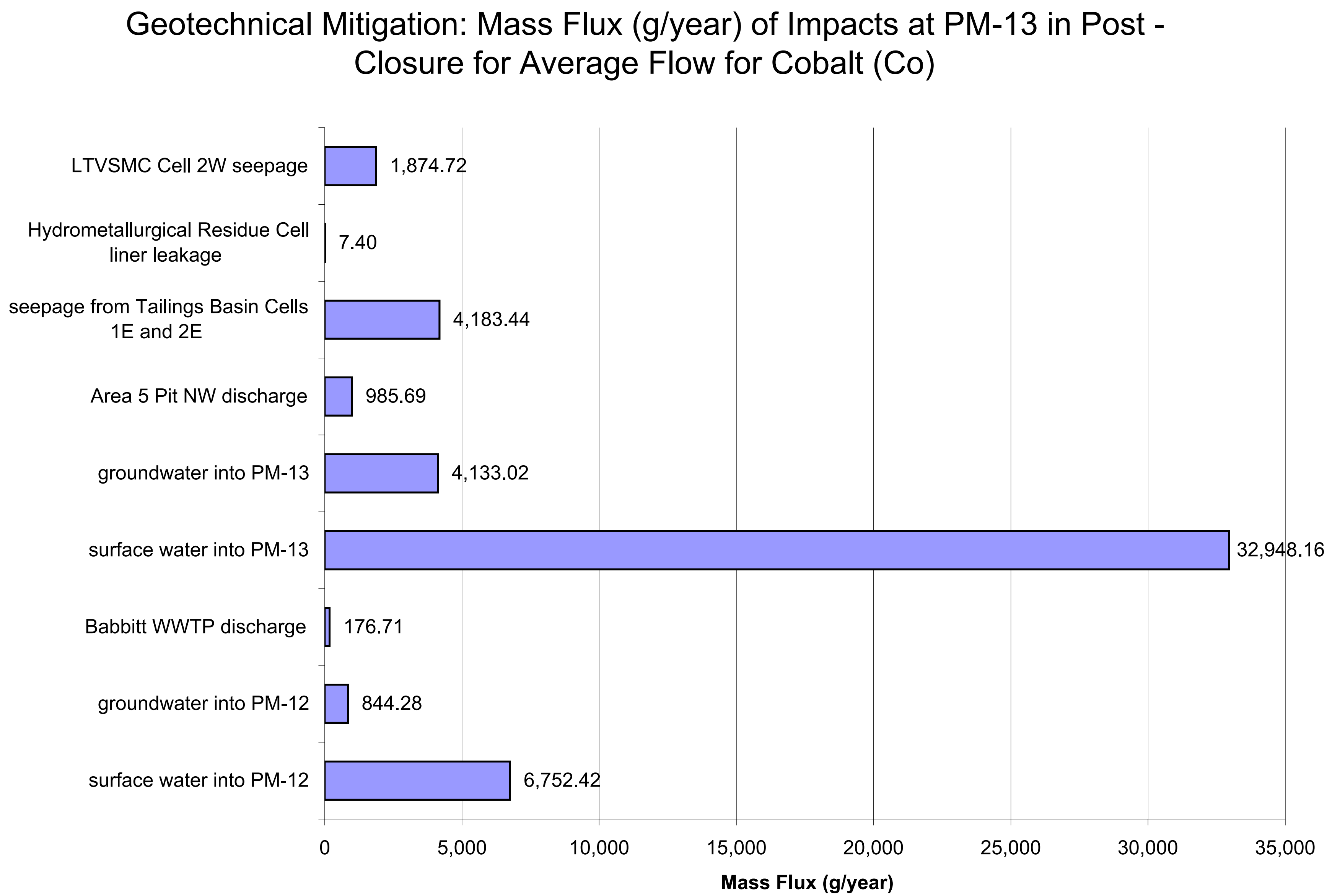
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Arsenic (As)



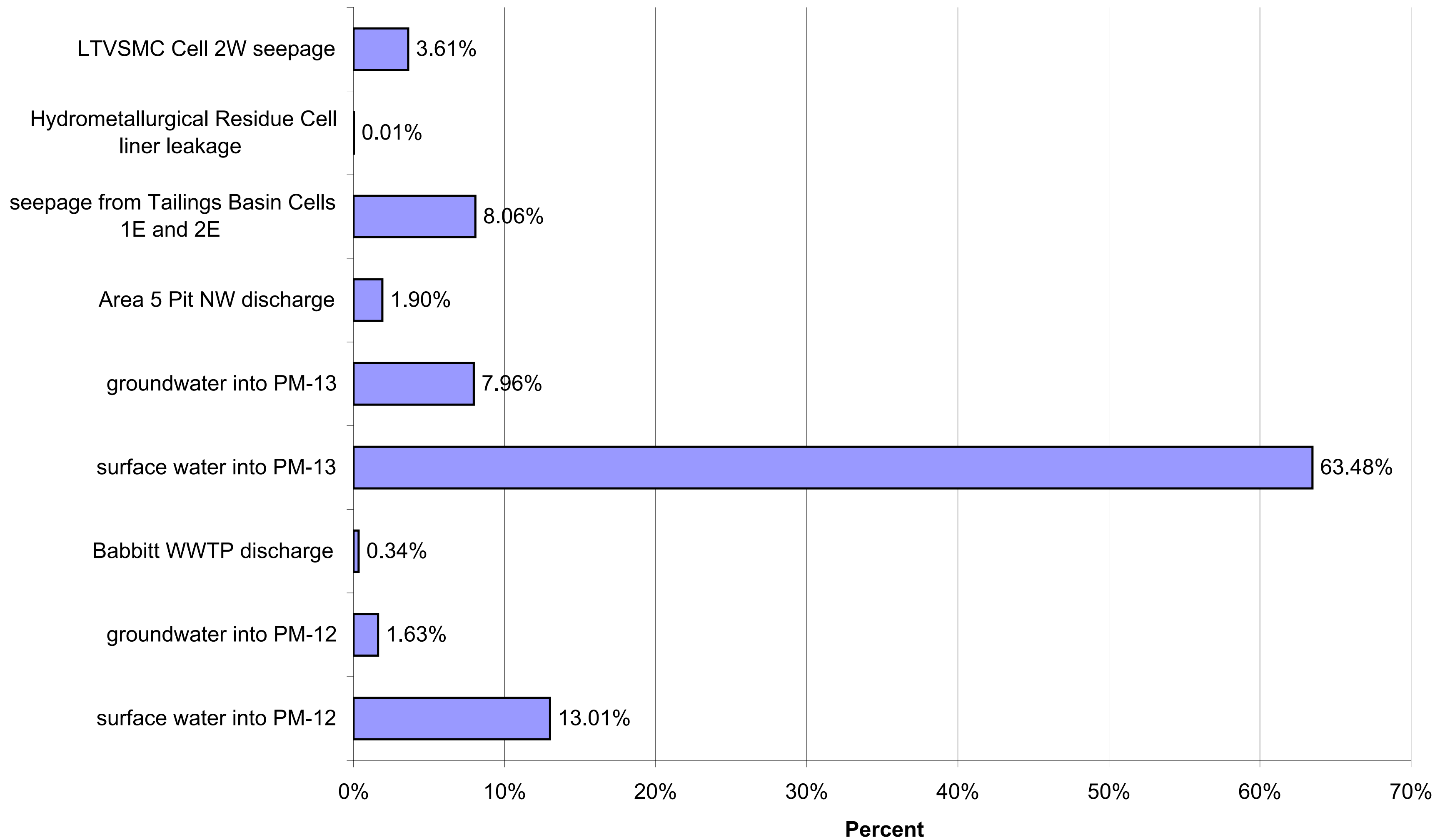
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)



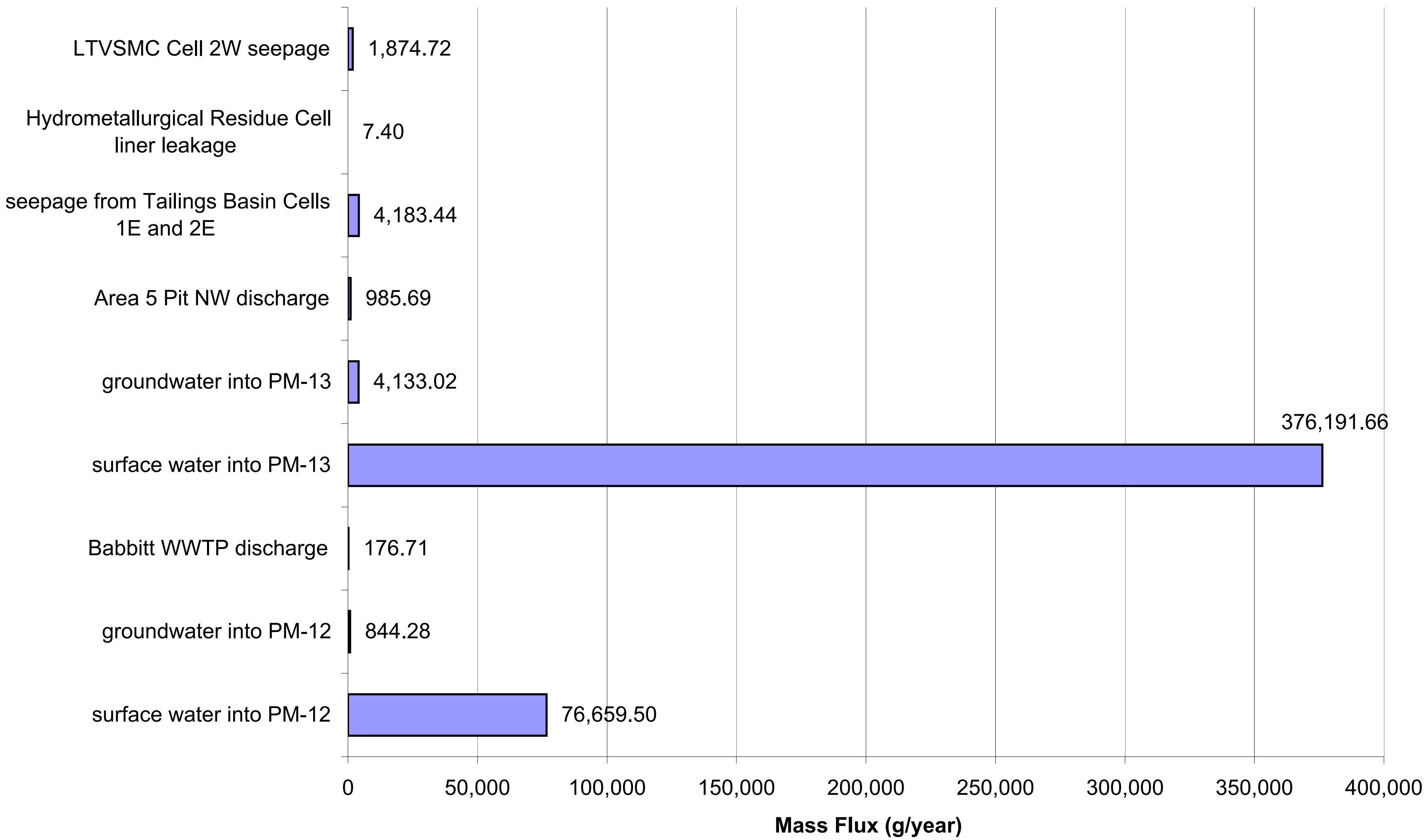

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Cobalt (Co)
LTVSMC Cell 2W seepage
9.94%
Hydrometallurgical Residue Cell liner leakage
0.10%
seepage from Tailings Basin Cells 1E and 2E
22.18%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
56.28%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
11.50%
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 Cobalt (Co)
LTVSMC Cell 2W seepage
1,874.72
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)

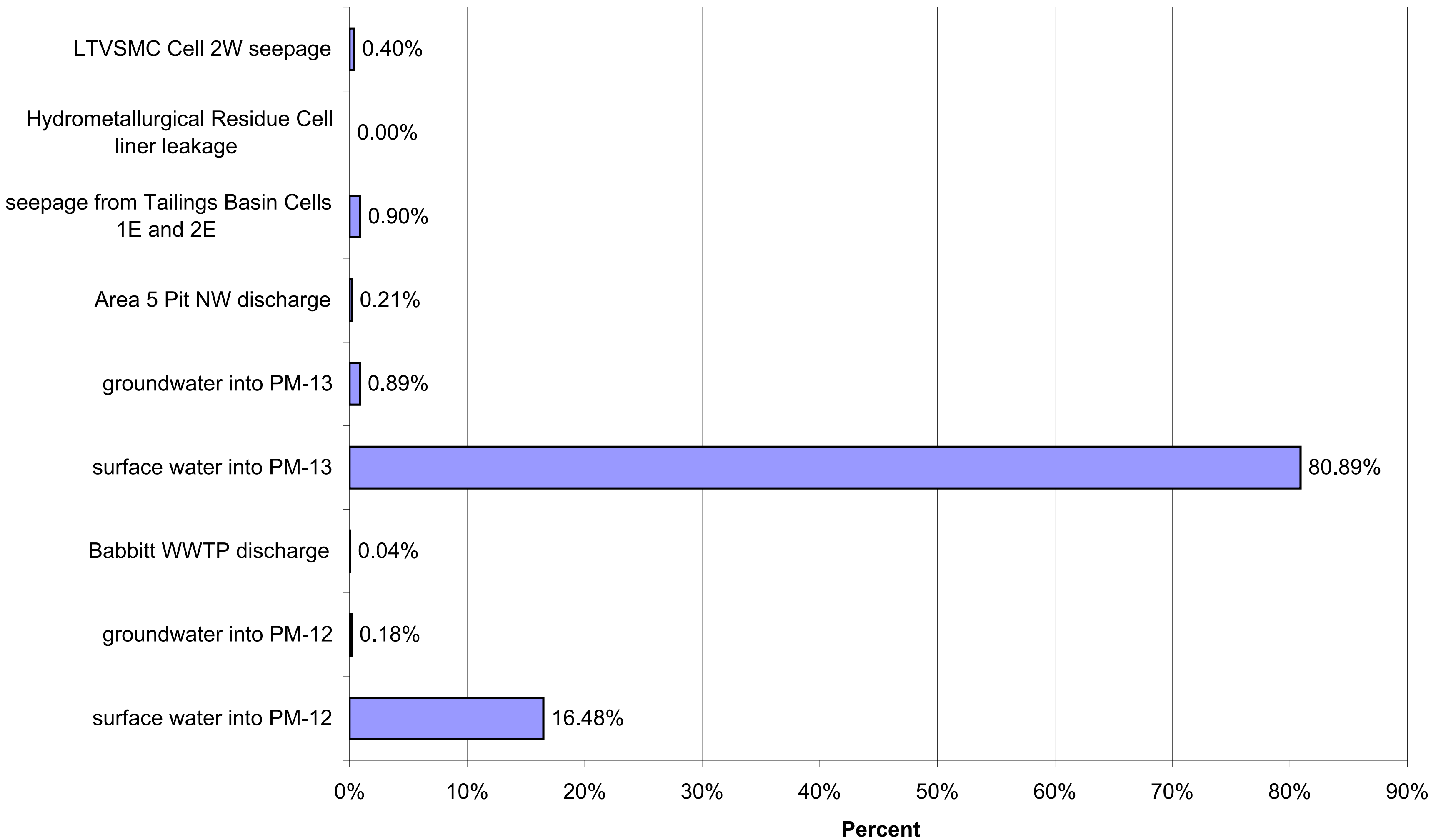
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Cobalt (Co)



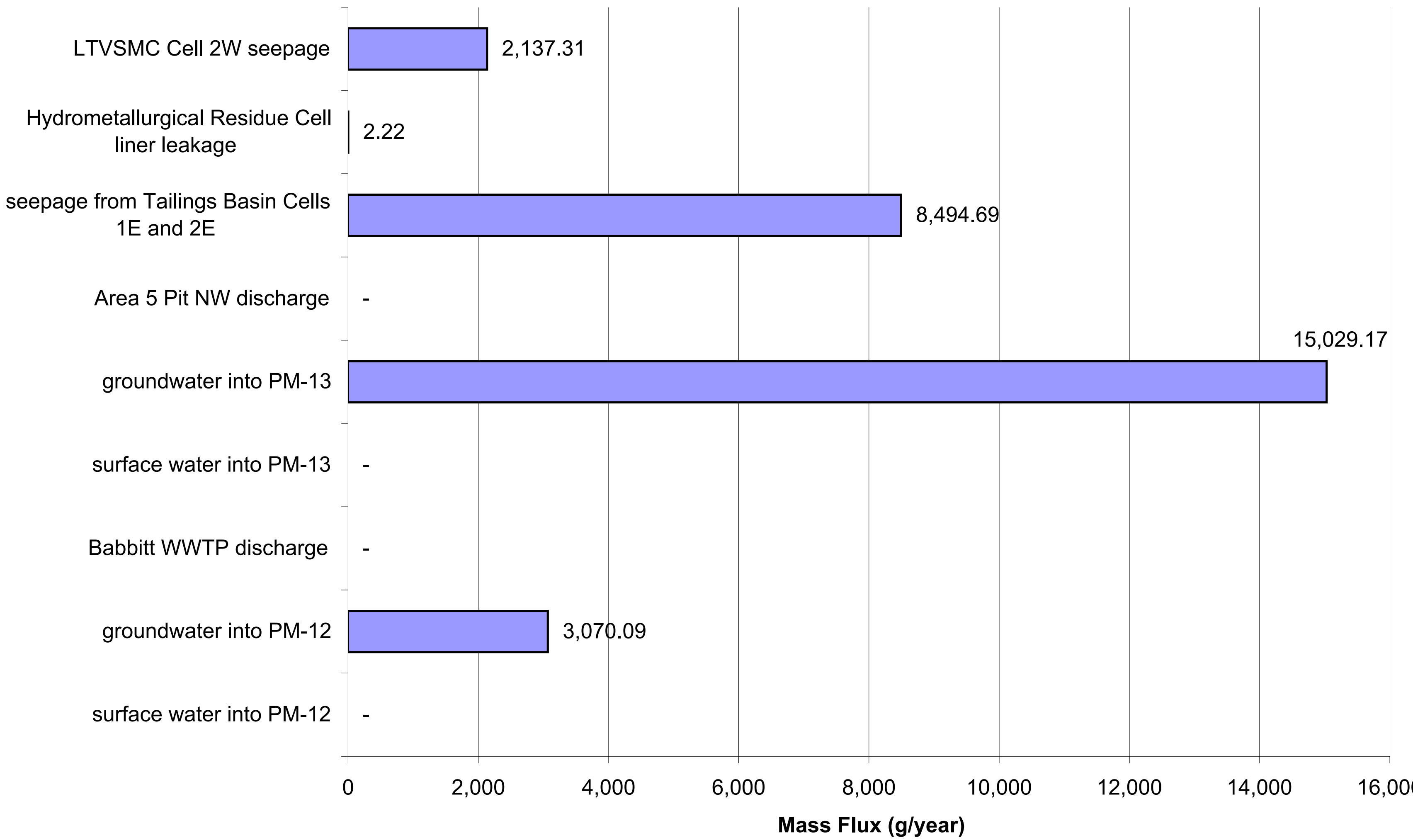
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)



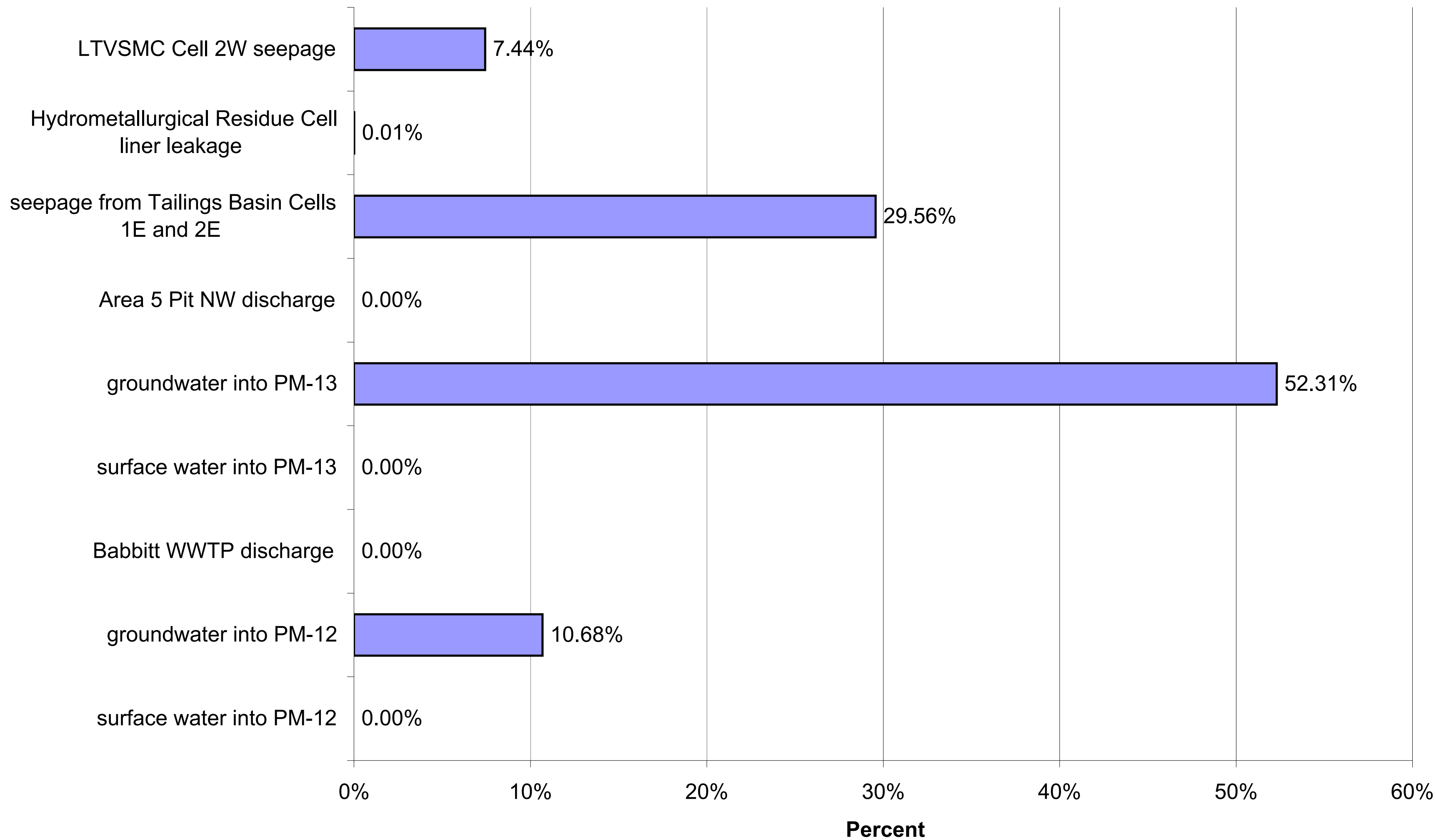
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Cobalt (Co)



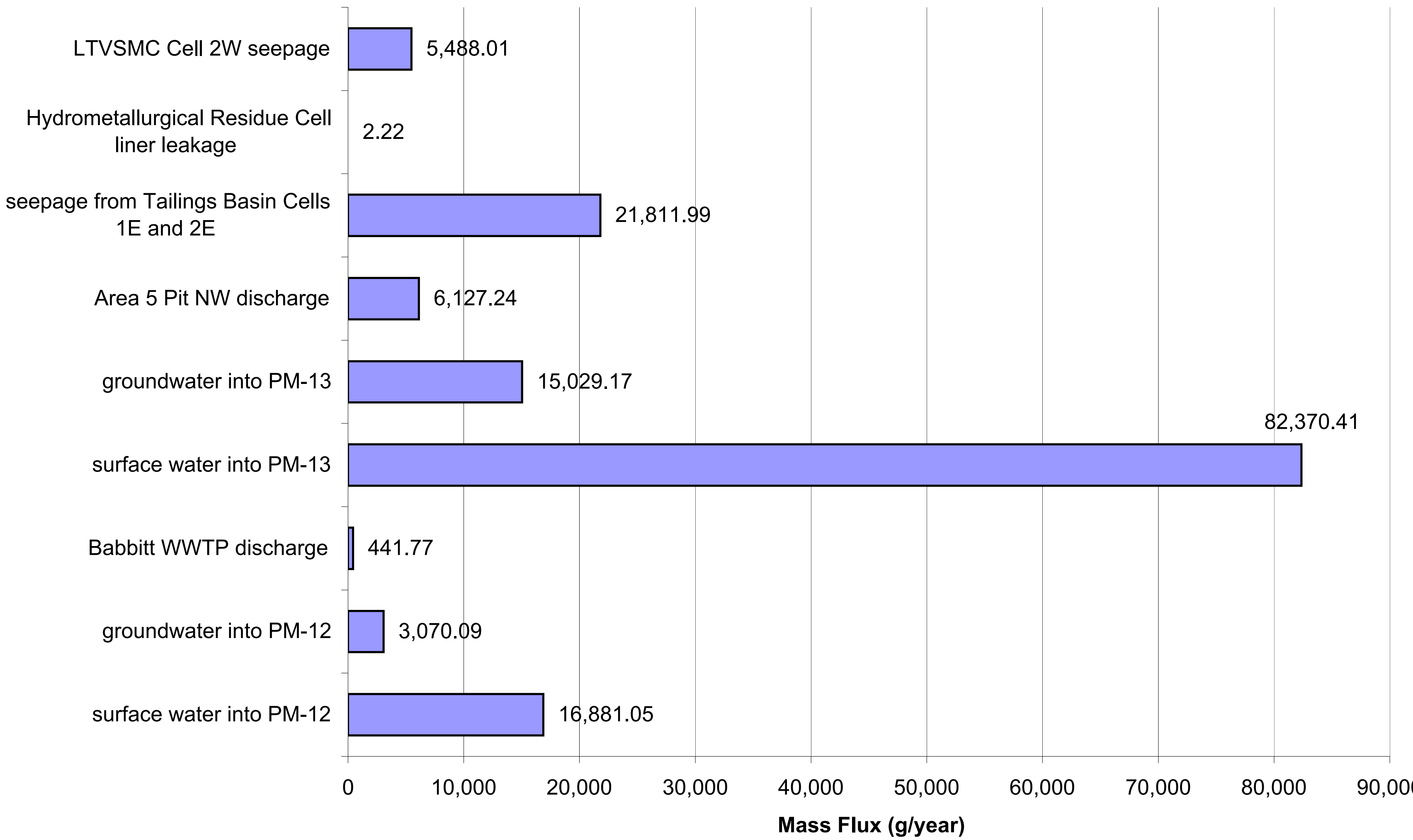
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)

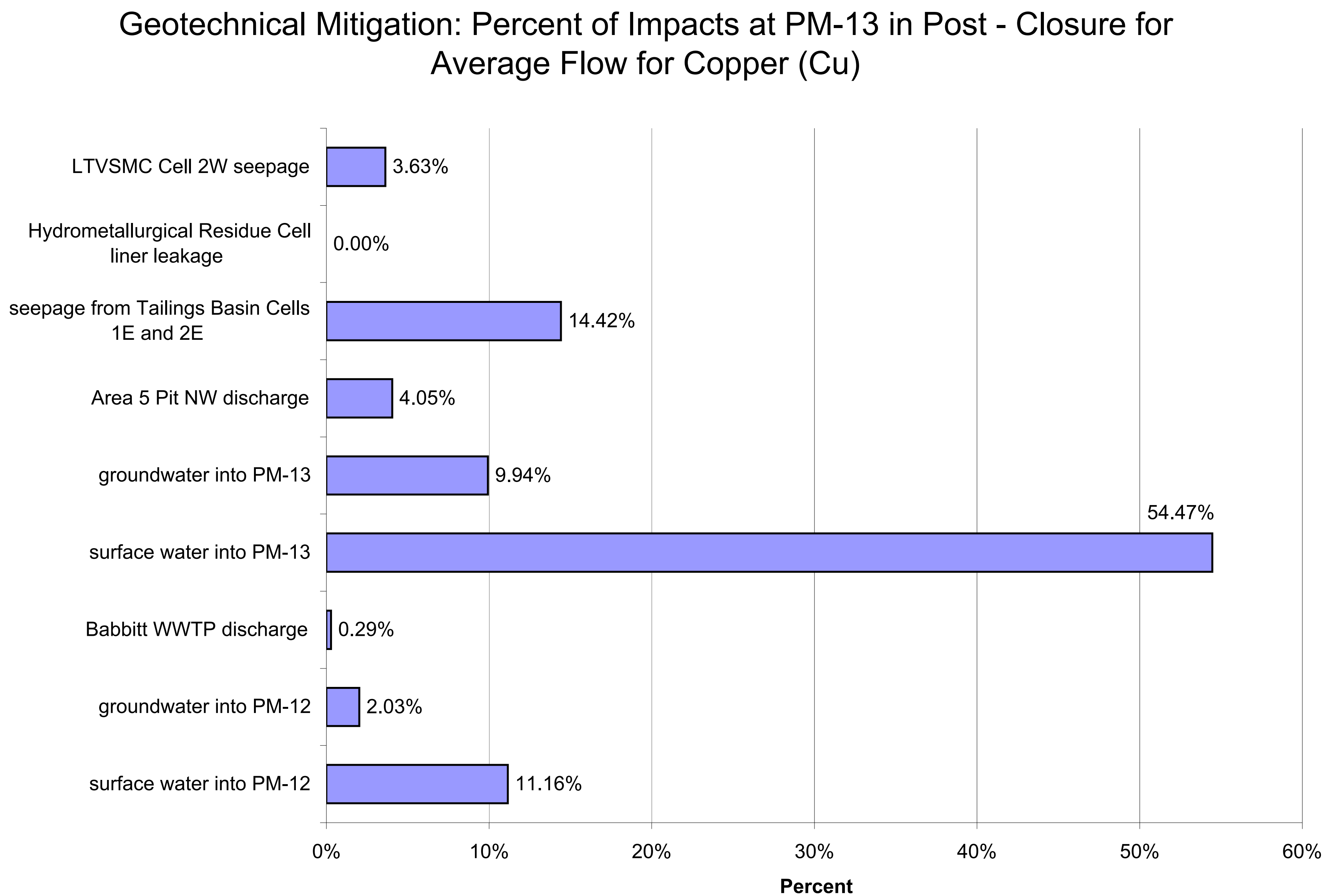


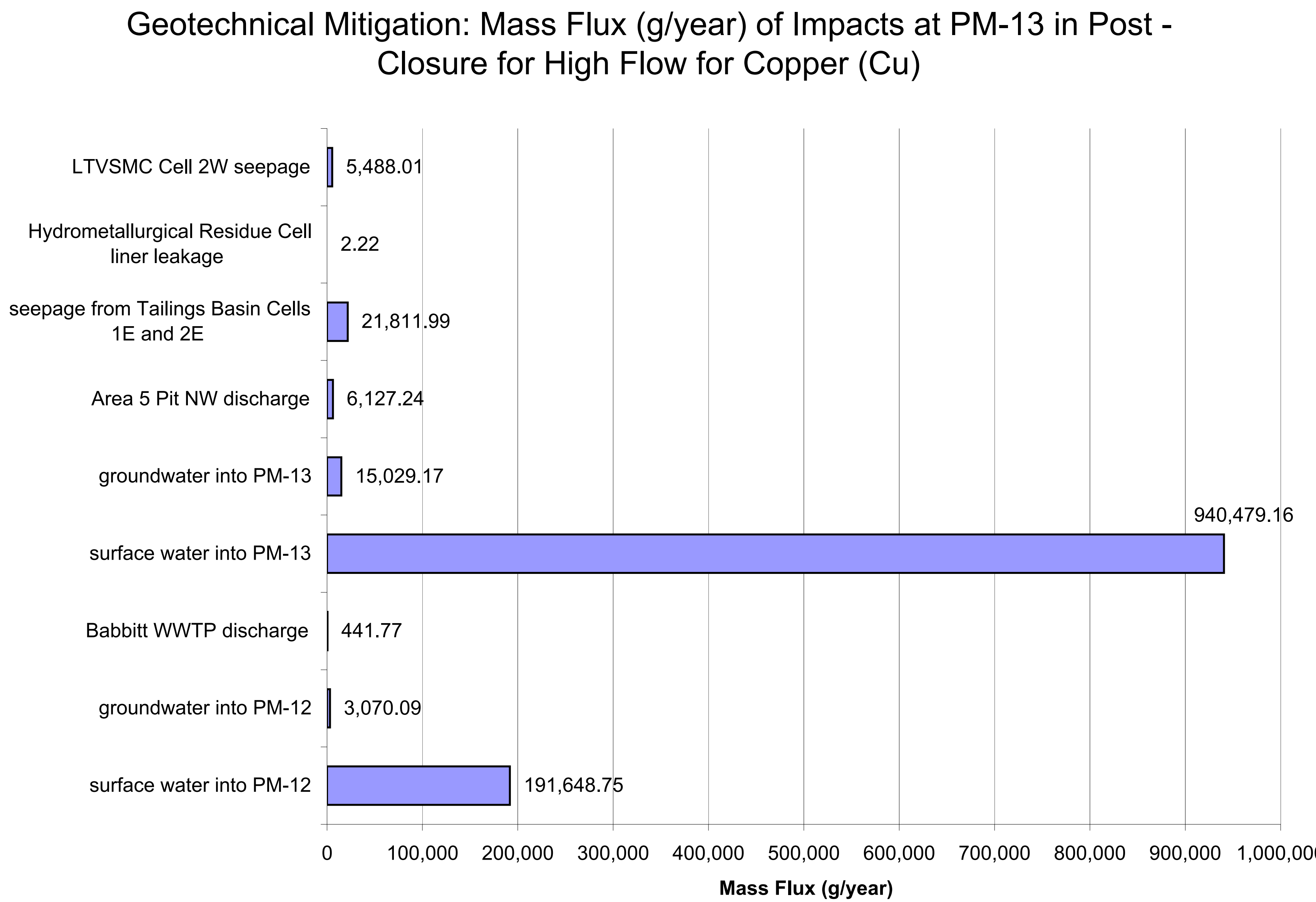
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Copper (Cu)



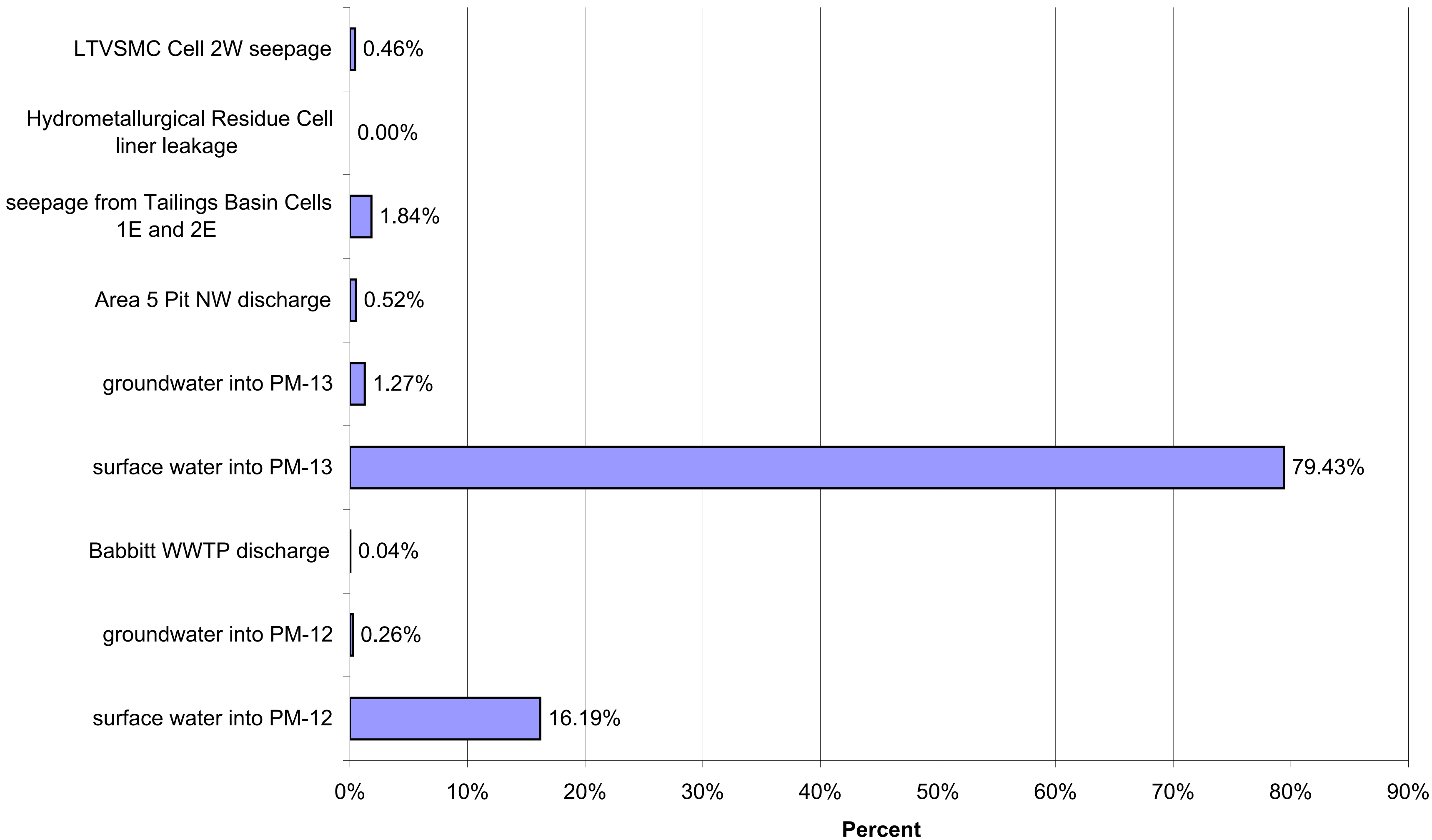
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)



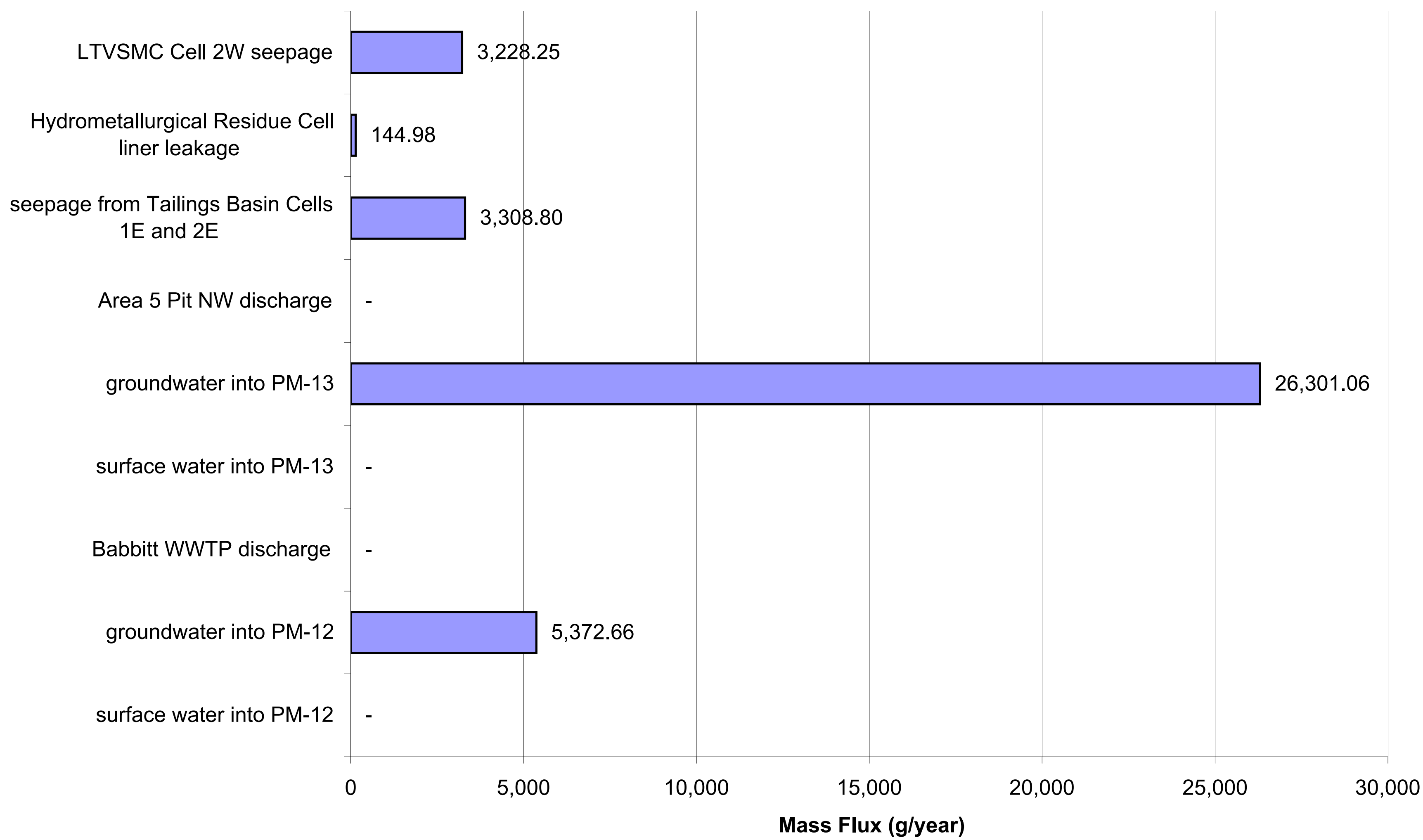

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Copper (Cu)
LTVSMC Cell 2W seepage
3.63%
Hydrometallurgical Residue Cell liner leakage
0.00%
seepage from Tailings Basin Cells 1E and 2E
14.42%
Area 5 Pit NW discharge
4.05%
groundwater into PM-13
9.94%
surface water into PM-13
54.47%
Babbitt WWTP discharge
0.29%
groundwater into PM-12
2.03%
surface water into PM-12
11.16%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)
LTVSMC Cell 2W seepage
5,488.01
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)

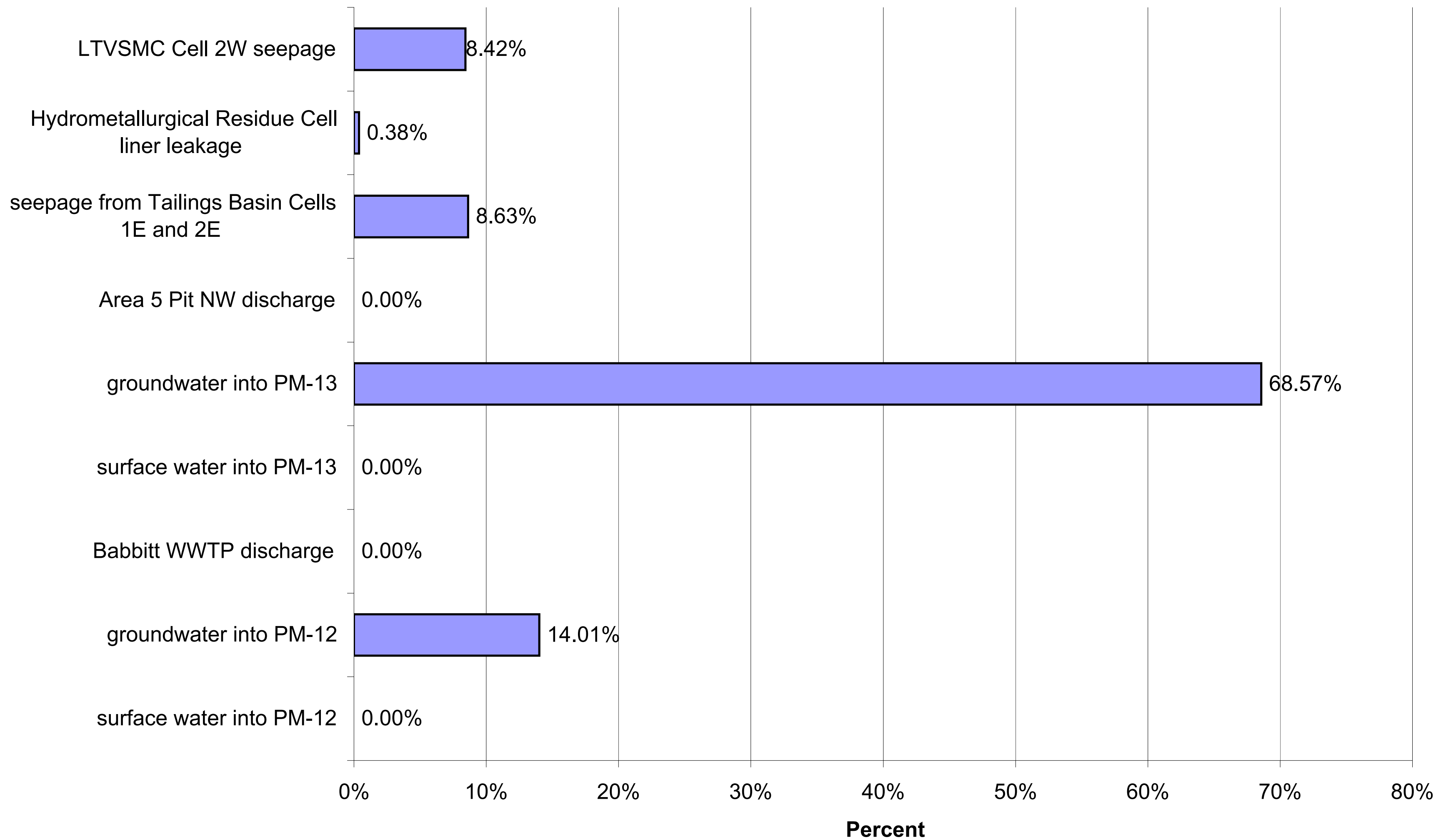
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Copper (Cu)

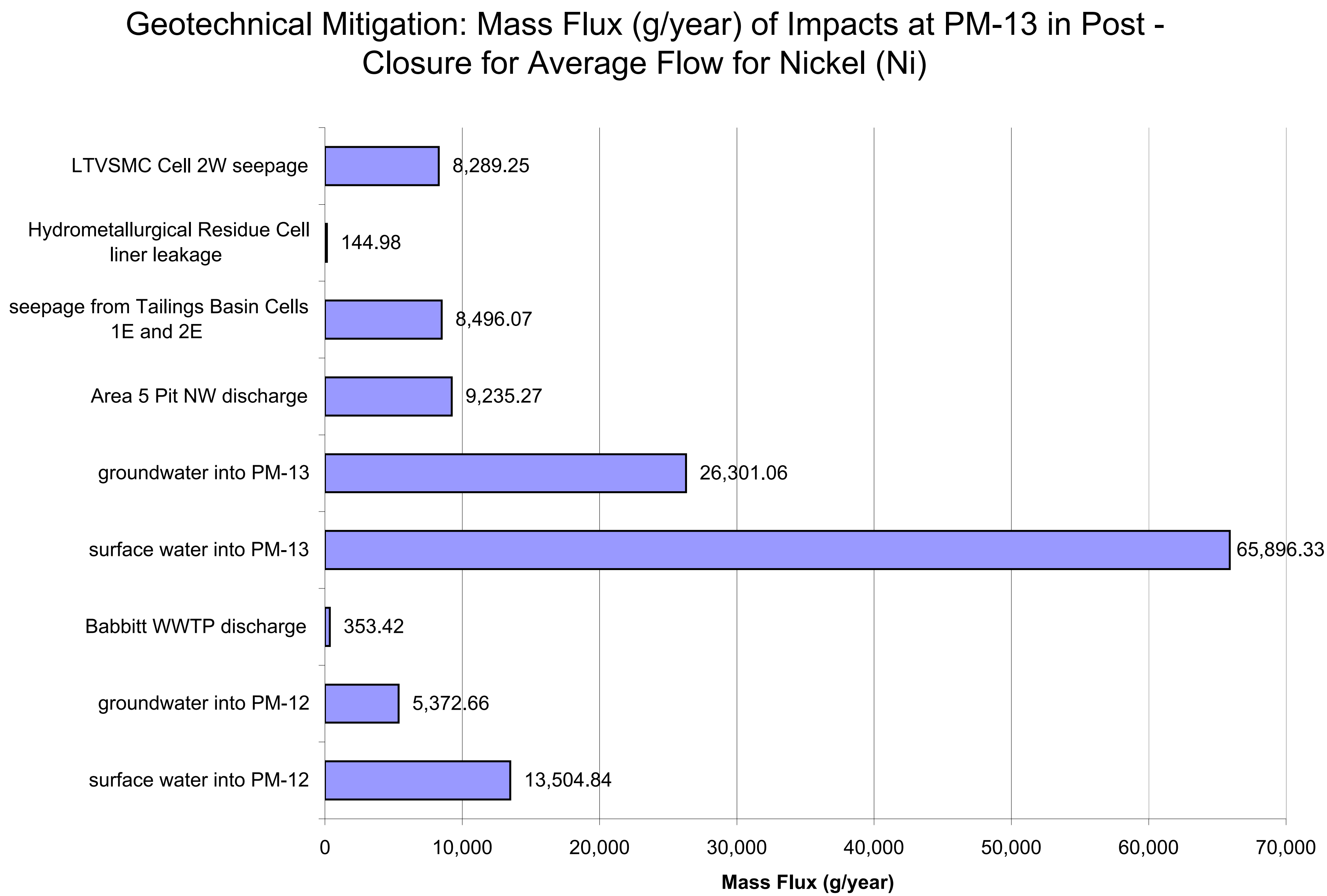


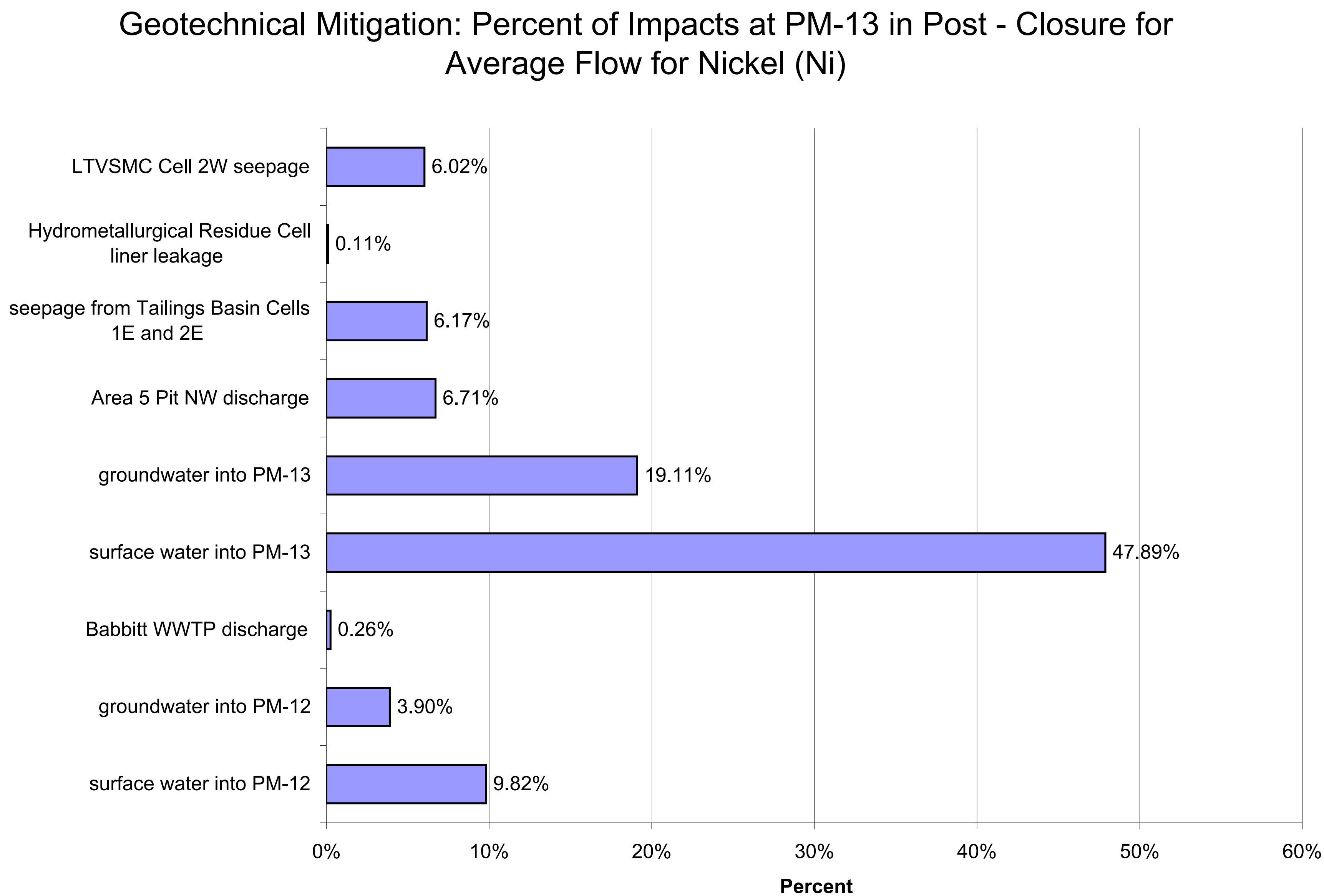
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)

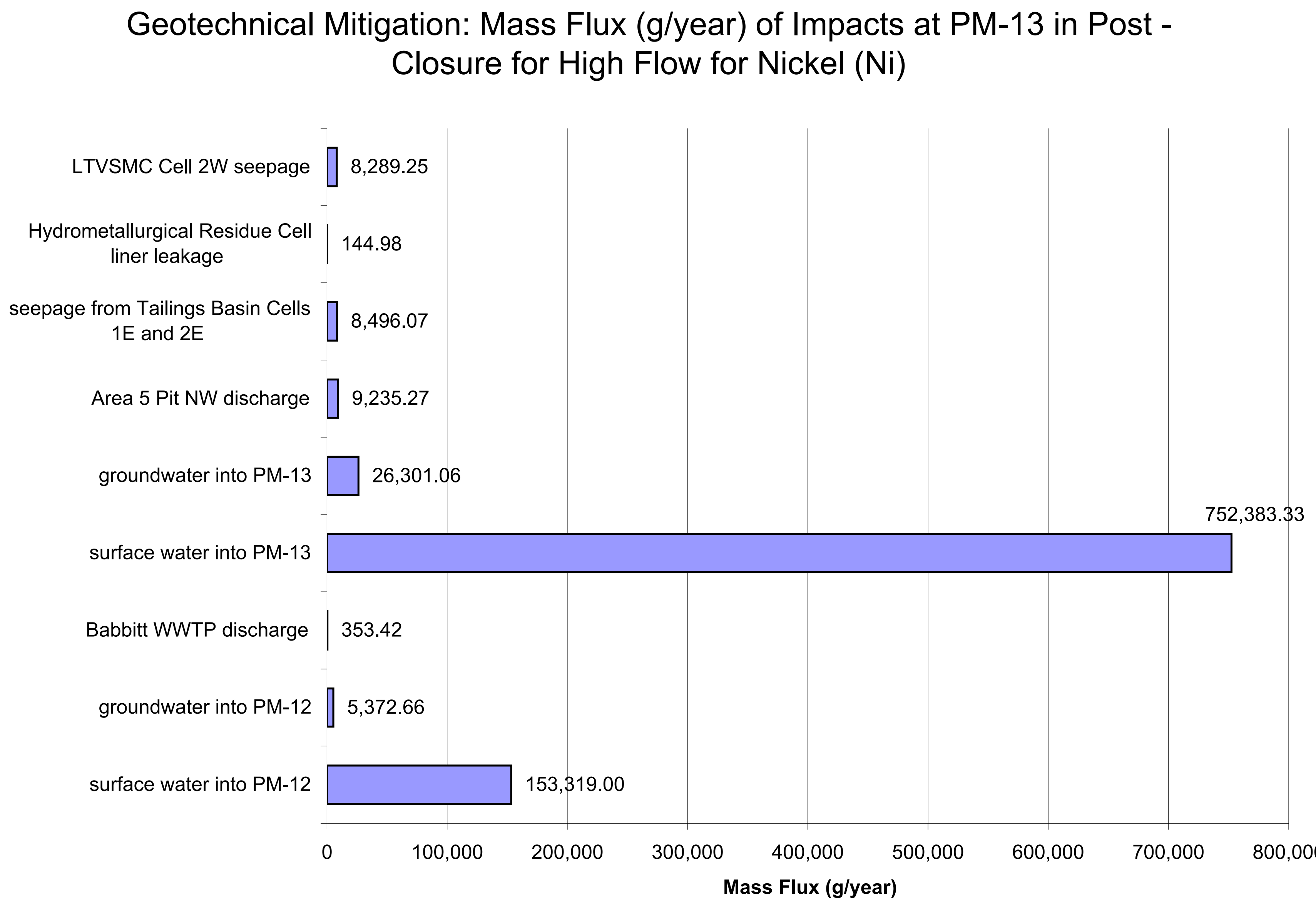


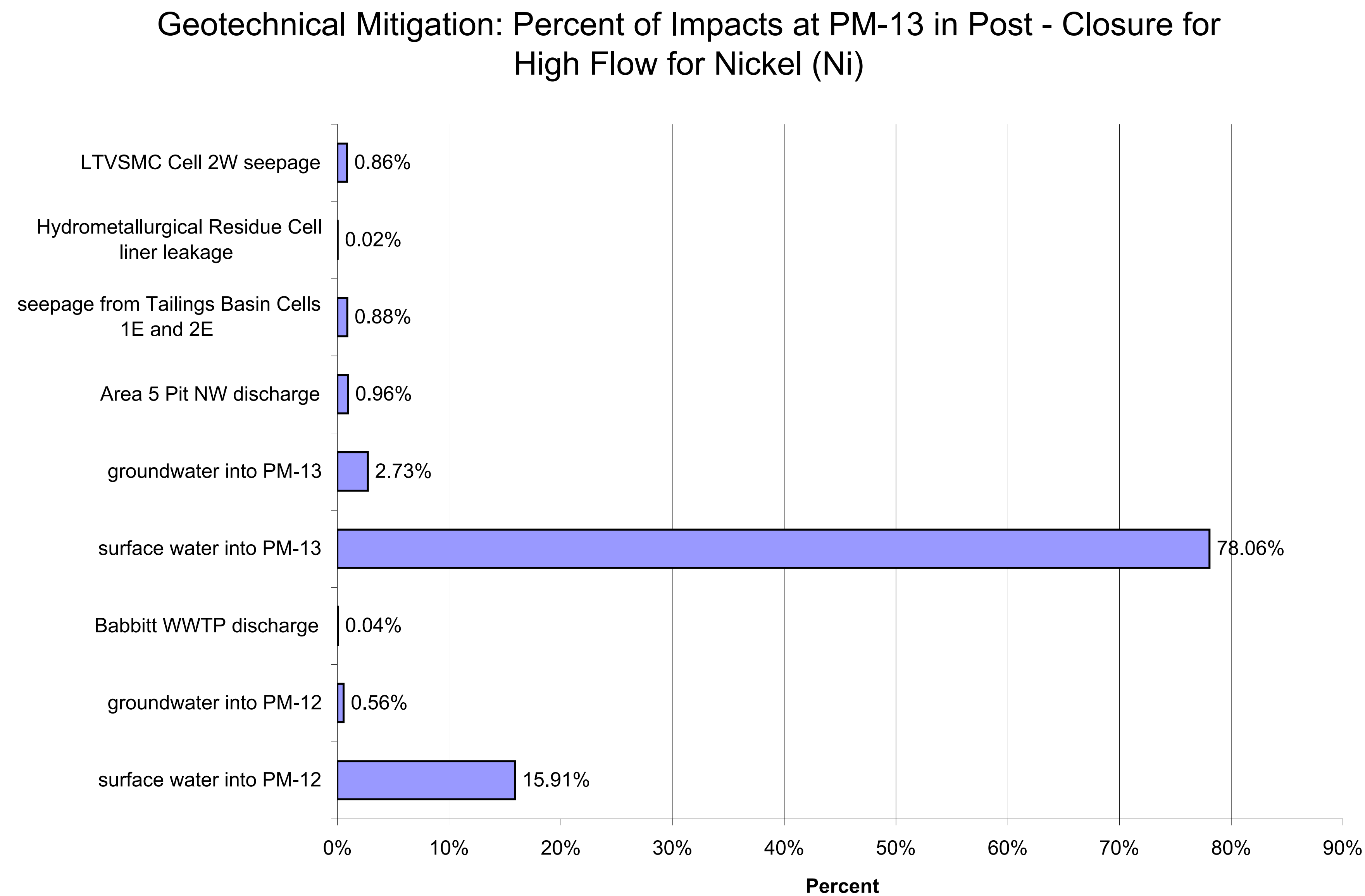
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Nickel (Ni)



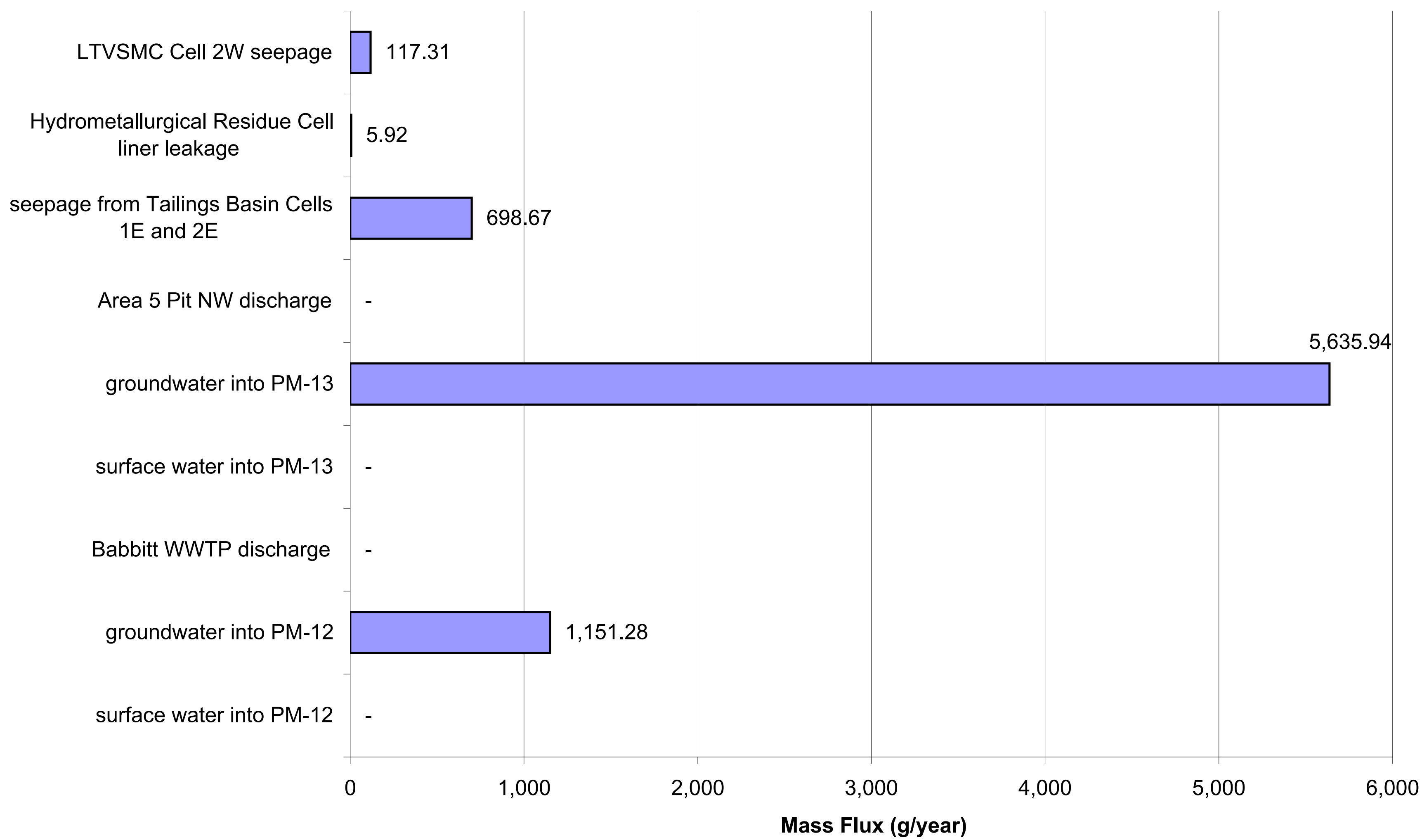

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
8,289.25
Hydrometallurgical Residue Cell liner leakage
144.98
seepage from Tailings Basin Cells 1E and 2E
8,496.07
Area 5 Pit NW discharge
9,235.27
groundwater into 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)

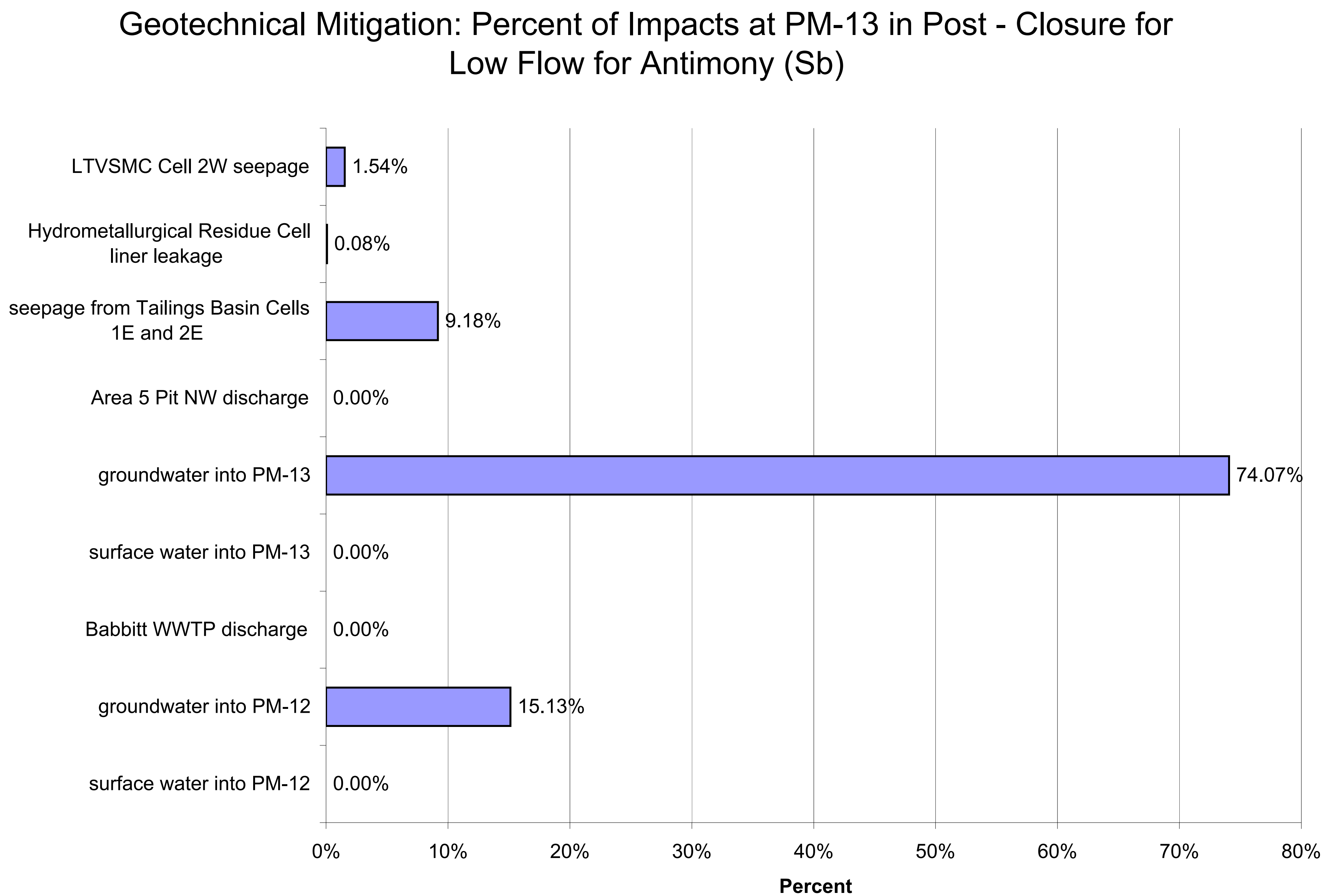

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
6.02%
Hydrometallurgical Residue Cell liner leakage
0.11%
seepage from Tailings Basin Cells 1E and 2E
6.17%
Area 5 Pit NW discharge
6.71%
groundwater into PM-13
19.11%
surface water into PM-13
47.89%
Babbitt WWTP discharge
0.26%
groundwater into PM-12
3.90%
surface water into PM-12
9.82%
0%
10%
20%
30%
40%
50%
60%
Percent


Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
8,289.25
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)

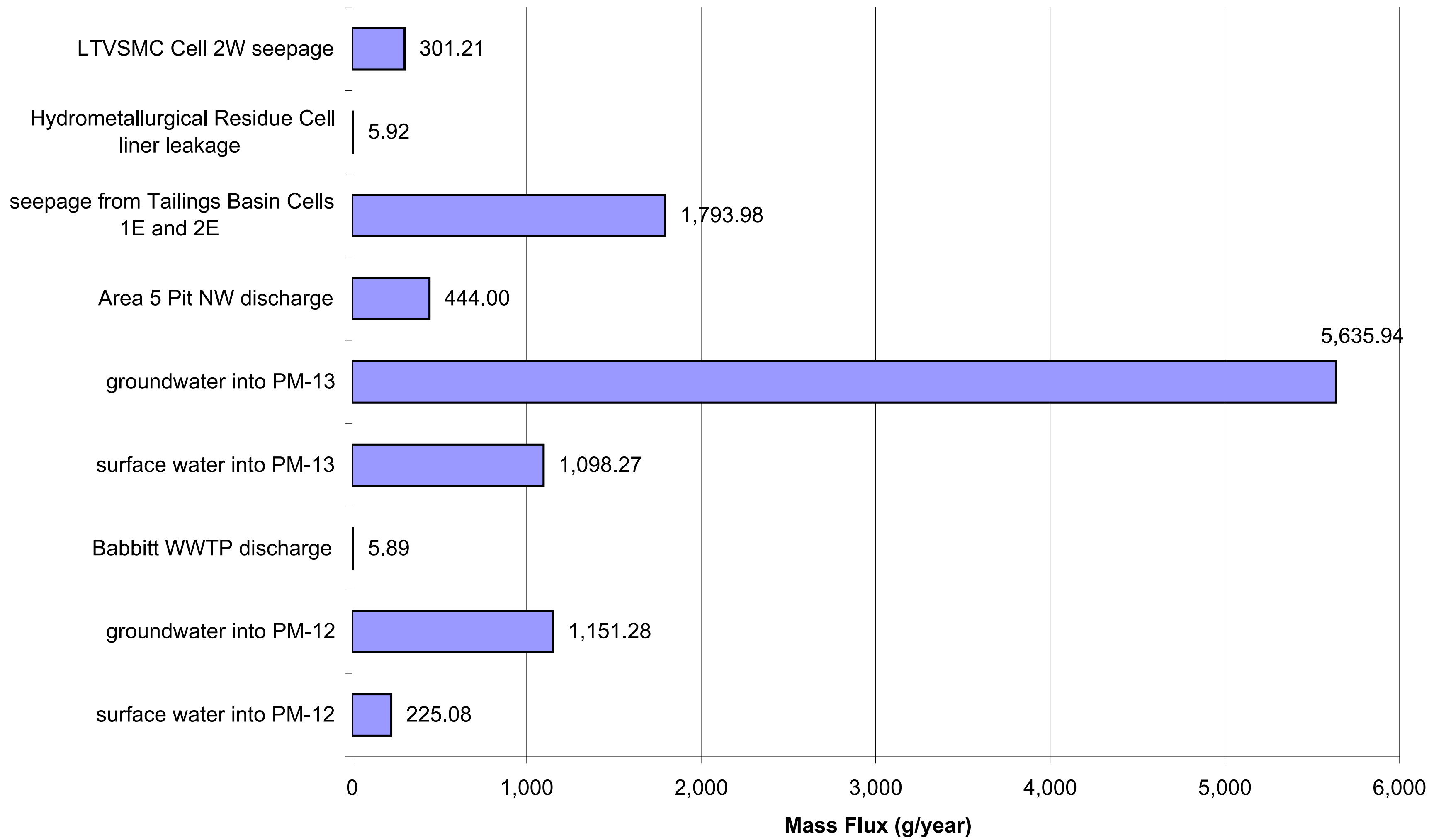

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for High Flow for Nickel (Ni)
LTVSMC Cell 2W seepage
0.86%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin Cells 1E and 2E
0.88%
Area 5 Pit NW discharge
0.96%
groundwater into PM-13
2.73%
surface water into PM-13
78.06%
Babbitt WWTP discharge
0.04%
groundwater into PM-12
0.56%
surface water into PM-12
15.91%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Percent

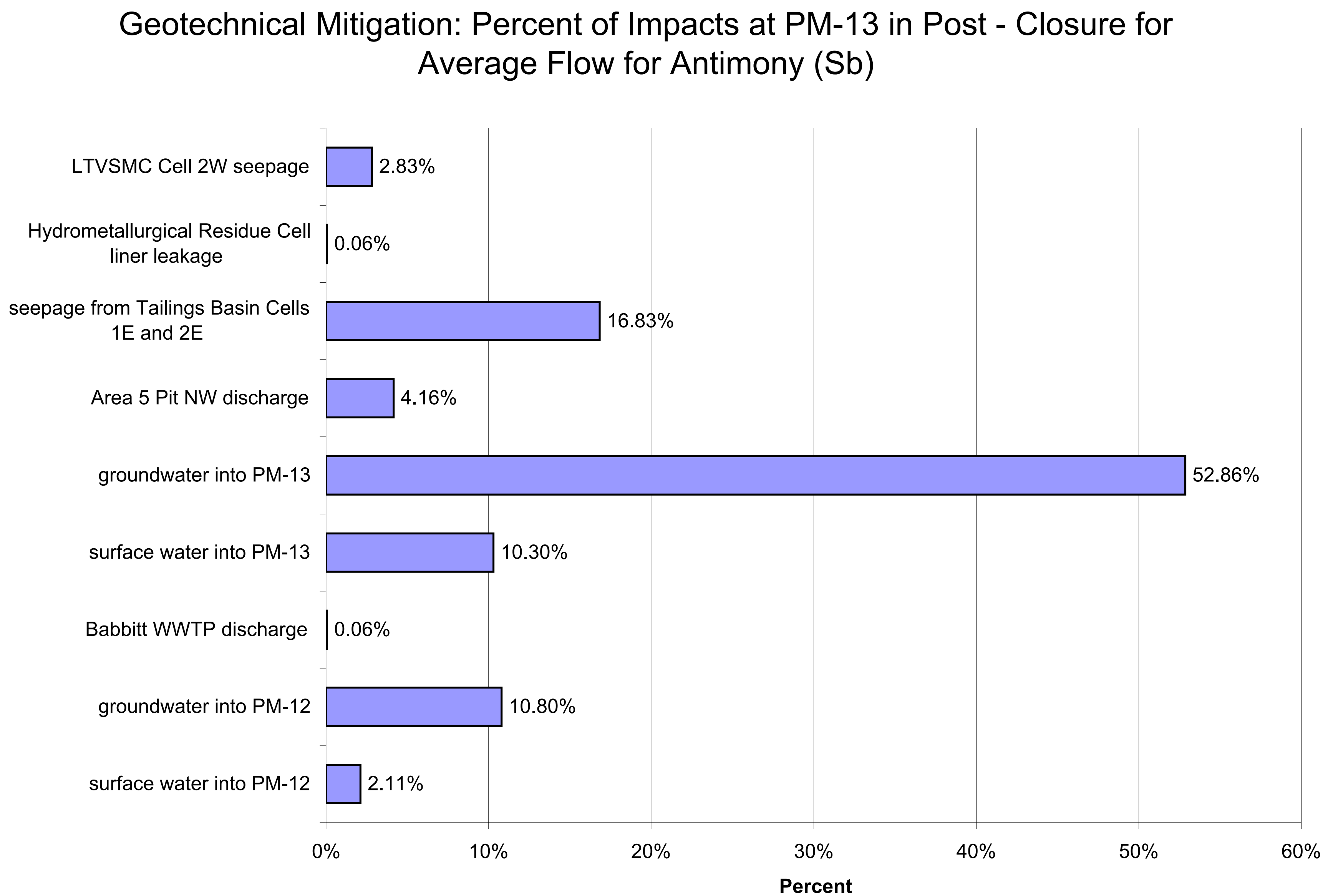
Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)

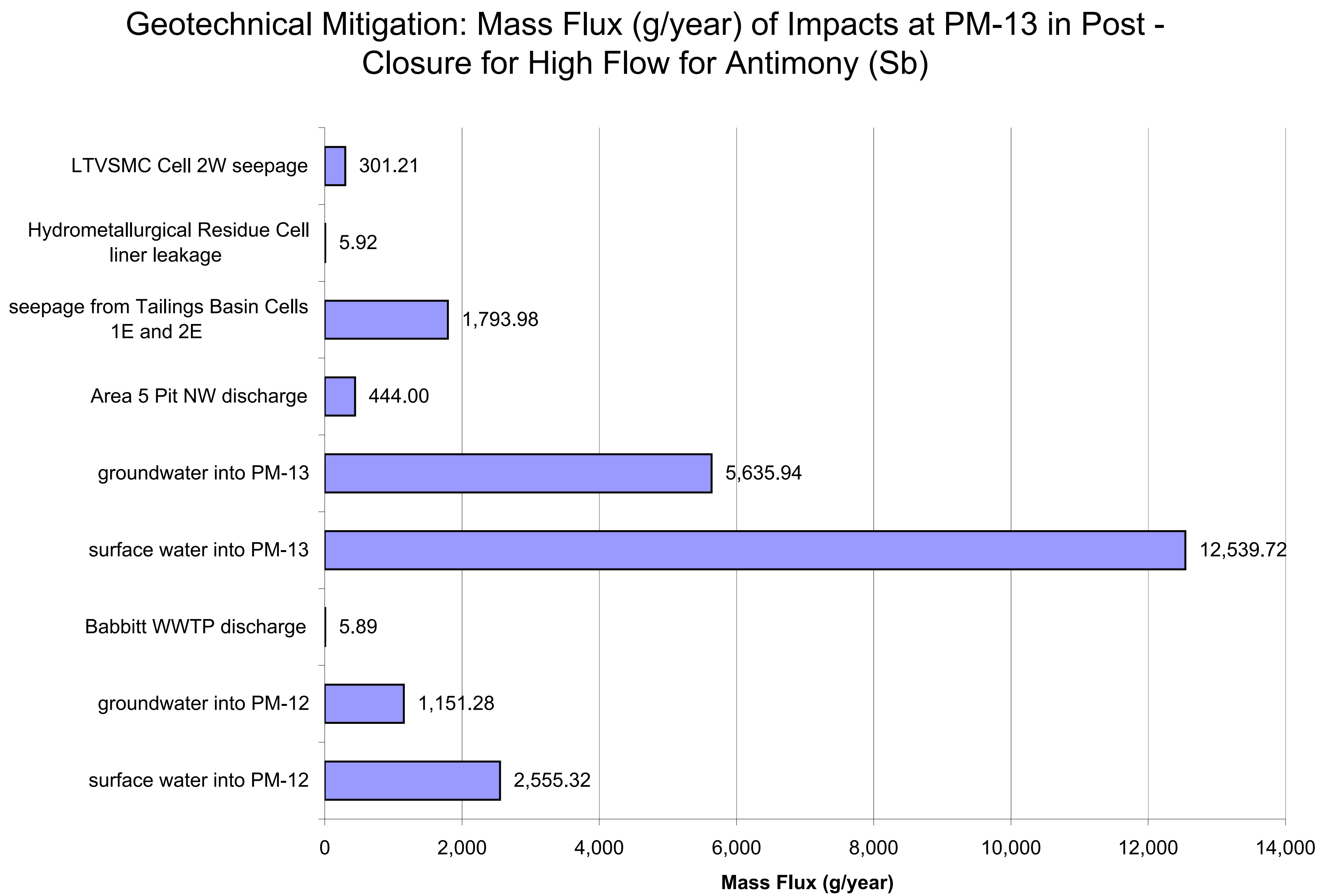


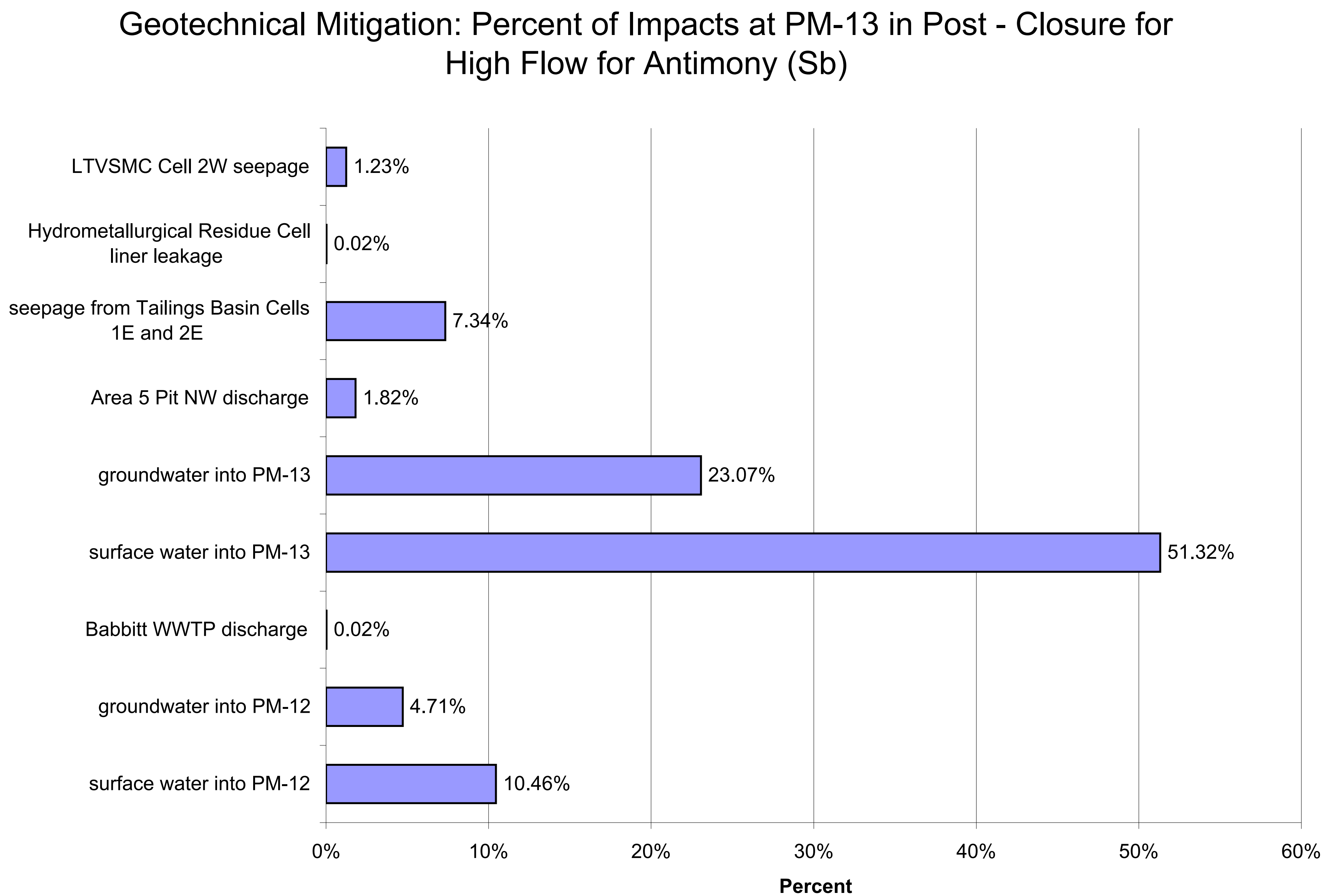

Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.54%
Hydrometallurgical Residue Cell liner leakage
0.08%
seepage from Tailings Basin Cells 1E and 2E
9.18%
Area 5 Pit NW discharge
0.00%
groundwater into PM-13
74.07%
surface water into PM-13
0.00%
Babbitt WWTP discharge
0.00%
groundwater into PM-12
15.13%
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 Antimony (Sb)

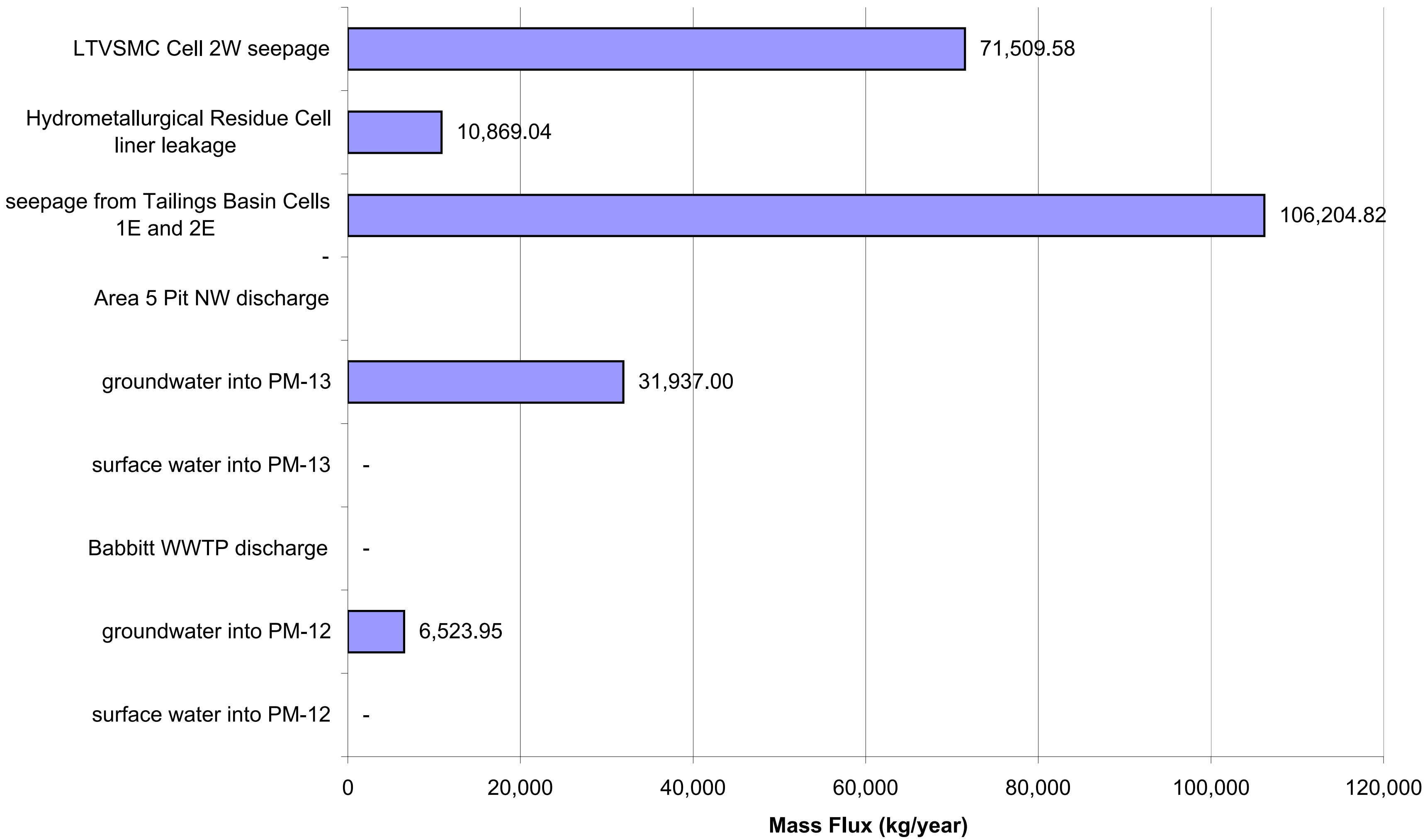



Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
2.83%
Hydrometallurgical Residue Cell liner leakage
0.06%
seepage from Tailings Basin Cells 1E and 2E
16.83%
Area 5 Pit NW discharge
4.16%
groundwater into PM-13
52.86%
surface water into PM-13
10.30%
Babbitt WWTP discharge
0.06%
groundwater into PM-12
10.80%
surface water into PM-12
2.11%
0%
10%
20%
30%
40%
50%
60%
Percent

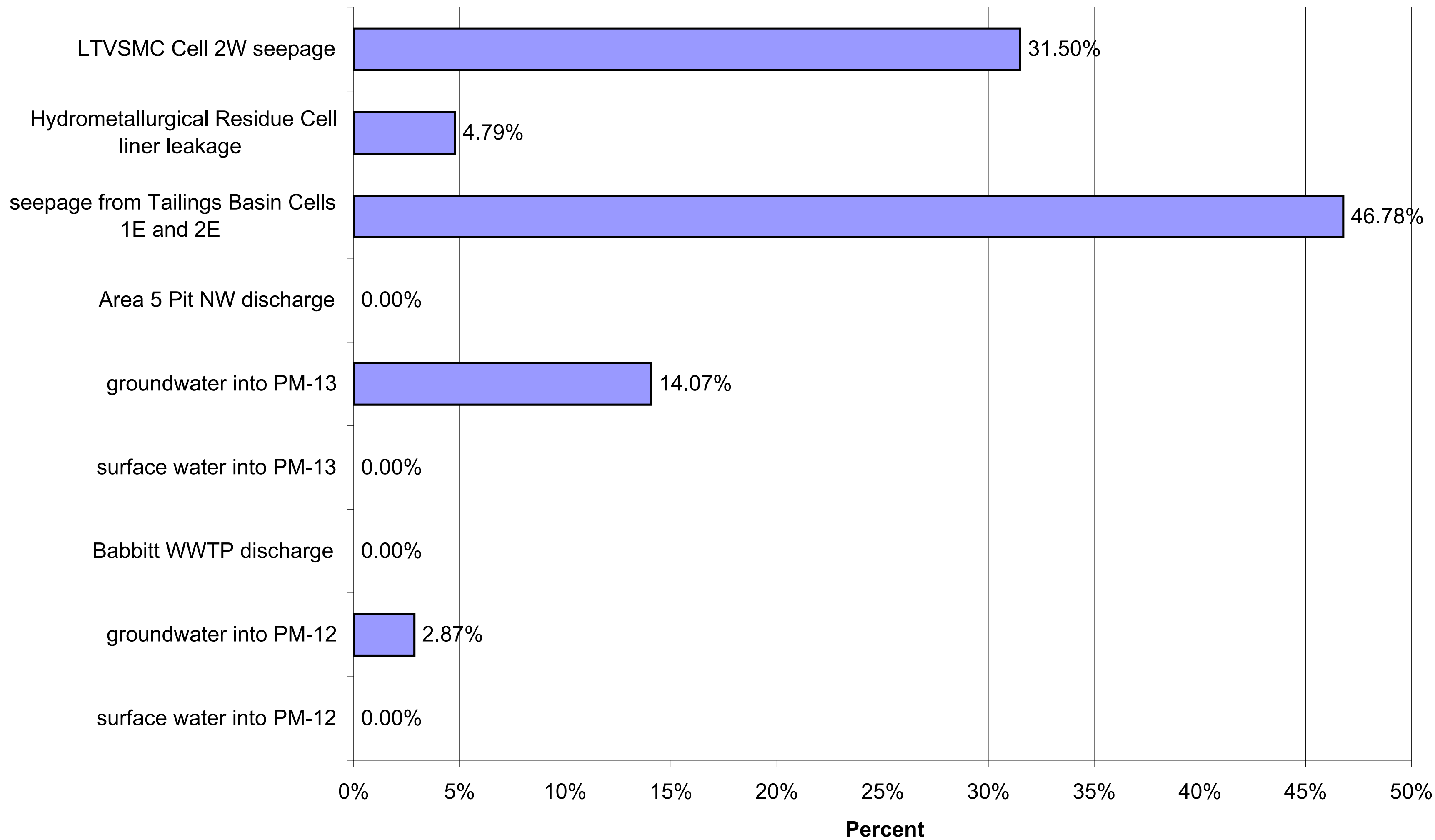

Geotechnical Mitigation: Mass Flux (g/year) of Impacts at PM-13 in Post - Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
301.21
Hydrometallurgical Residue Cell liner leakage
5.92
seepage from Tailings Basin Cells 1E and 2E
1,793.98
Area 5 Pit NW discharge
444.00
groundwater into PM-13
5,635.94
surface water into PM-13
12,539.72
Babbitt WWTP discharge
5.89
groundwater into PM-12
1,151.28
surface water into PM-12
2,555.32
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 Post - Closure for High Flow for Antimony (Sb)
LTVSMC Cell 2W seepage
1.23%
Hydrometallurgical Residue Cell liner leakage
0.02%
seepage from Tailings Basin Cells 1E and 2E
7.34%
Area 5 Pit NW discharge
1.82%
groundwater into PM-13
23.07%
surface water into PM-13
51.32%
Babbitt WWTP discharge
0.02%
groundwater into PM-12
4.71%
surface water into PM-12
10.46%
0%
10%
20%
30%
40%
50%
60%
Percent

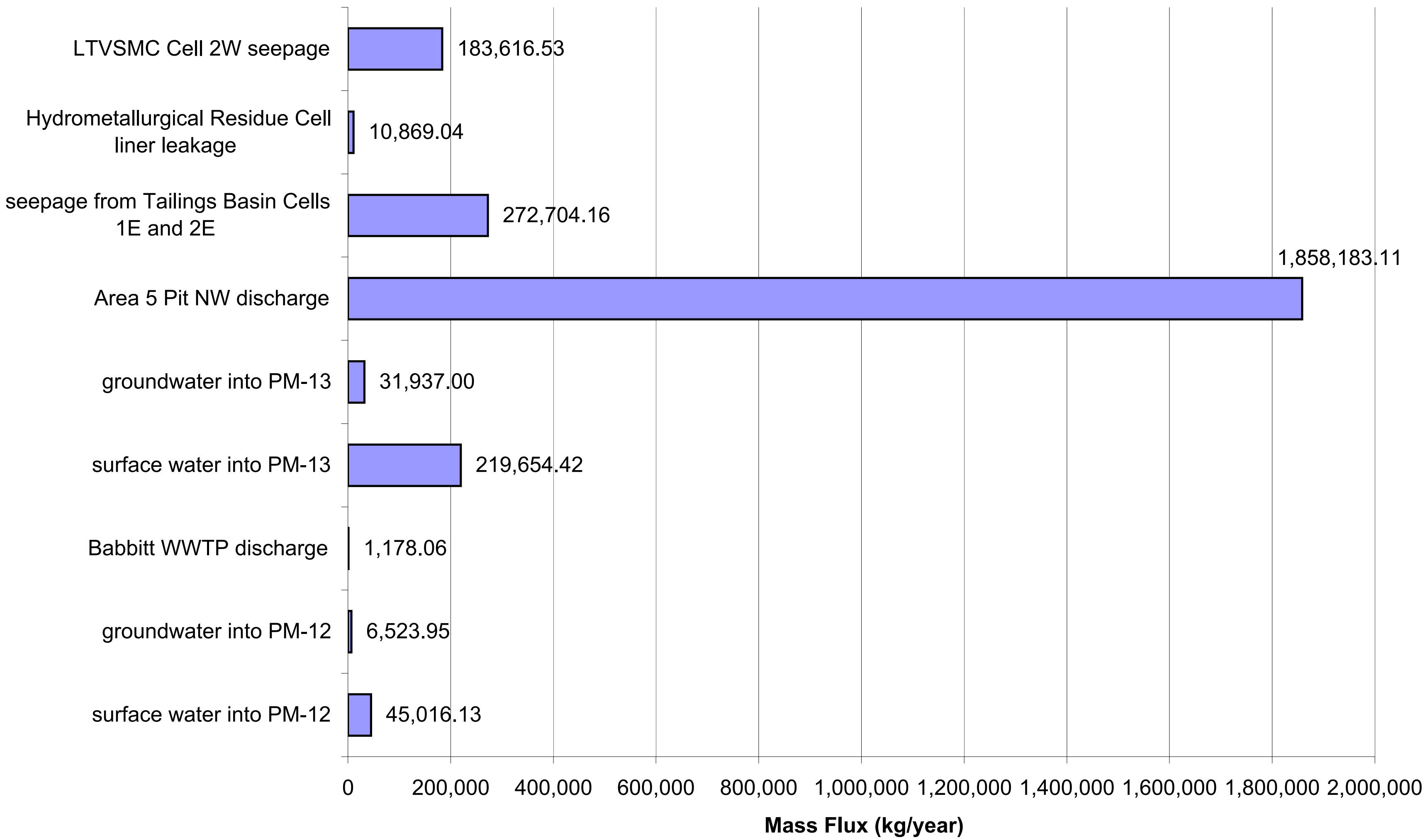
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)



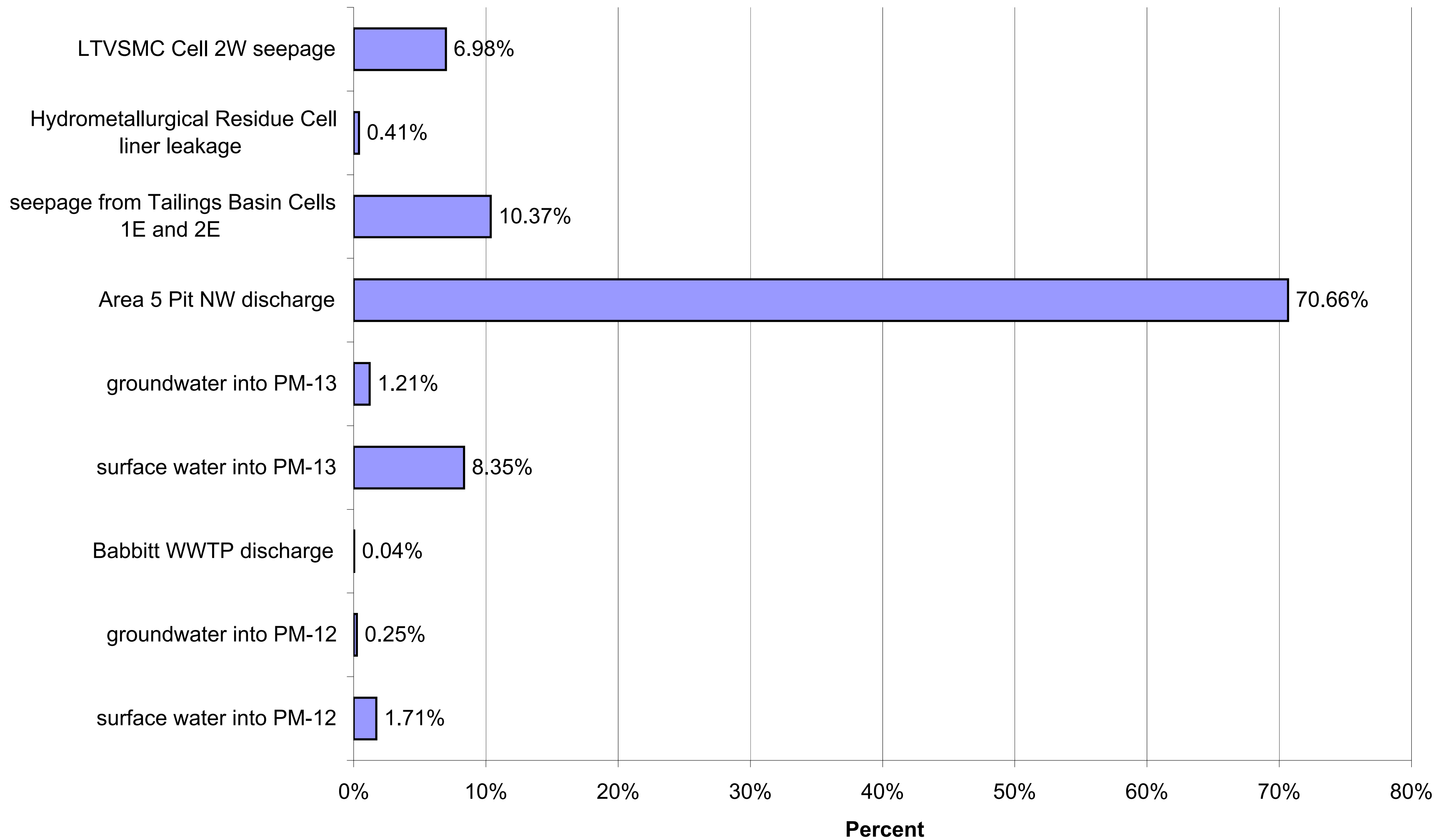
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Low Flow for Sulfate (SO_4)



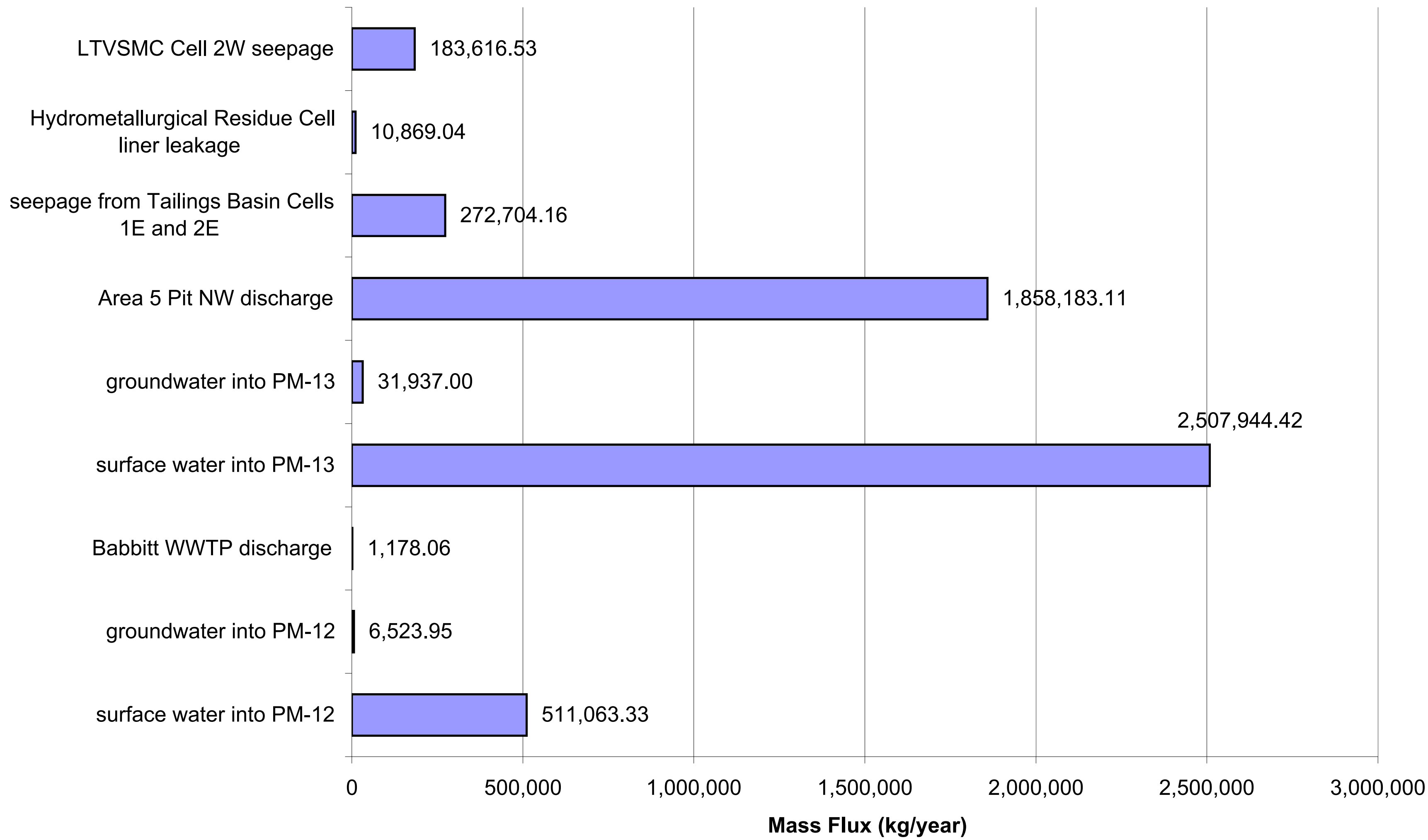
Geotechnical Mitigation: Mass Flux (kg/year) of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)



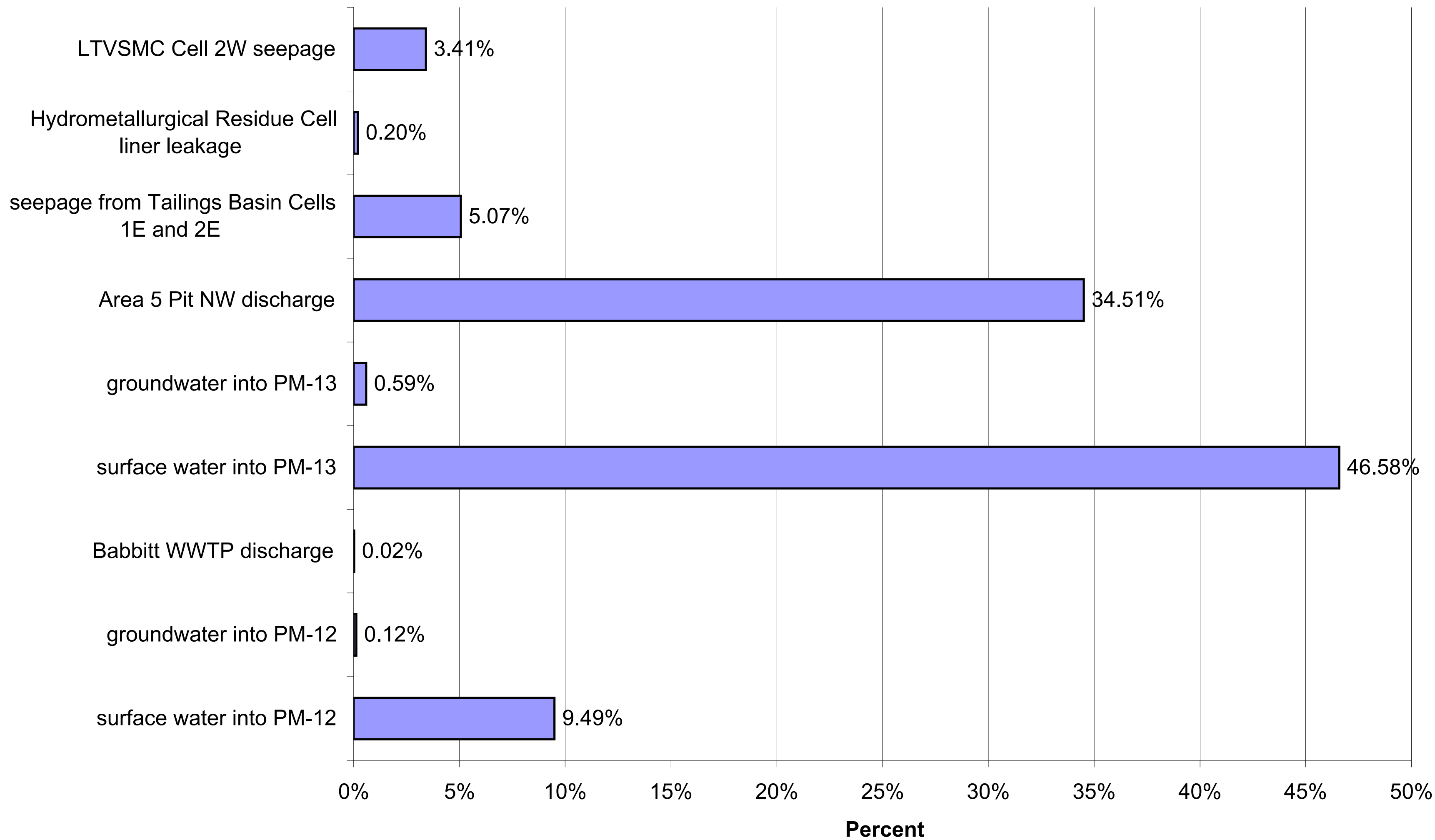
Geotechnical Mitigation: Percent of Impacts at PM-13 in Post - Closure for Average Flow for Sulfate (SO_4)



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 H

SRK Memorandum from Stephen Day to Miguel Wong

September 12, 2008

Updates to Water Quality Predictions
In support of Draft 02 - RS74

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Memo

To:	Miguel Wong, Barr Engineering	**Date:**	September 12, 2008
cc:	Jim Scott, PolyMet	**From:**	Stephen Day
Subject:	Updates to Water Quality Predictions in Support for RS74 (Draft 2) DRAFT	**Project #:**	1UP005.001

This memorandum summarizes methods used to produce updated source term water quality estimates for waste rock and lean ore stockpiles, open pits, tailings and hydrometallurgical residues at the NorthMet Project. These estimates are used as inputs to assessment of groundwater and surface water effects downstream of the project facilities and reported in RS74 (Draft 2) prepared by Barr Engineering (Barr).

The original basis for the source term predictions was provided in the Draft 1 versions of RS53/42 (Waste Rock, issued February 2007), RS31 (Pit Water, July 2007), RS46 (Tailings, July 2007) and RS65 (Hydrometallurgical Residues, February 2007). Subsequent to issuance of these draft reports, the agency review team have provided comments and discussion in writing and at several meetings. Partly as a result, a stochastic assessment of the uncertainties in the water chemistry predictions is ongoing. The current source term predictions are being used by Barr as input into a parallel deterministic assessment, and as a result are based on the same methodology as presented in the Draft 1 versions of the reports with revised inputs generated from ongoing laboratory testwork and other information.

The following sections of this memorandum describe any changes in modeling methodology and inputs to the calculations.

1 RS53/42 Waste Rock

1.1 Waste Rock and Lean Ore Stockpiles

The methodology used to predict average annual water chemistry for the waste rock and lean stockpiles is the same as that presented in RS53/42 (Draft 1).

The list of parameters was increased, as follows:

- Antimony – Predictions were not provided in Draft 1 due to quality problems with chemistry data from humidity cells. Predictions have been developed using information from the MDNR reactor experiments.

The methodology used to predict fluoride and vanadium was changed:

- Fluoride – Predictions in Draft 1 were directly scaled from humidity cells; however, calcium fluoride (fluorite) is a probable mineralogical control on fluoride concentrations. The relationship between calcium and fluoride activity for fluorite solubility was used to estimate fluoride from calcium. The resulting fluoride concentrations were well below the water quality standard (2 mg/L) and therefore the under-estimation resulting from use of concentrations in an activity relationship was not considered to be significant.

- Vanadium – Similarly, vanadium concentrations were directly scaled from humidity cells in Draft 1. However, vanadium has very low natural solubility due to its association with resistant oxides (e.g. magnetite) rather than sulphides and the postulated ferrous vanadate as a solubility control (Hem 1992). Concentrations have been re-calculated using the scale-up methodology but a concentration cap was applied. The highest observed concentration in PolyMet's testwork was 0.17 mg/L under initially strongly basic leachate from a Duluth Complex sample. This is well above natural background and in the same range as acid thermal waters summarized by Hem (1992).

Dissolution rates for each humidity cell were re-calculated to reflect data available to April 2008 (about 2½ years of data). 95th percentile rates for each rock category used in the calculations are provided in Table 1. Slightly different rates were used for the Proposed Project and Reasonable Alternative 1 (RA1). For the Proposed Project, the waste rock classification criteria used were those shown in Table 6-2 of RS42. In this classification system, both sulfur and copper to sulfur ratios were used to produce Categories 1/2, 3 and 4. For RA1, the classification system was revised to eliminate the use of copper to sulfur ratios resulting in new Categories 1, 2/3 and 4. The sulfur concentration of 0.12% provides the cutoff between Categories 1 and 2/3.

The quantity of rock used in the calculation for the proposed project was unchanged from RS53/42 Draft 01. For RA1, Barr provided resized quantities (email from Christie Kearney, May 22, 2008).

Infiltration inputs were provided for three climatic scenarios (low, average and high) by Barr (email from Miguel Wong, May 20, 2008).

1.2 Overburden Stockpiles

The RS53/42 report did not include predicted chemistry for water originating from the overburden stockpile. An overburden drilling program was completed in January 2008 and samples were tested according to a Sampling and Analysis Plan developed through discussion with MDNR. Field observations and subsequent analysis identified four types of overburden based on physical and chemical characteristics (Table 2):

- Peat – Organic soil.
- Unsaturated Mineral Overburden – This material was found to contain low concentrations of sulfur and leachates from Meteoric Water Mobility Procedures (MWMPs, NDEP 1996) were non-acidic and showed relatively low leachable metal concentrations.
- Saturated Mineral Overburden – A common observation during drilling was that saturated or unoxidized overburden appeared to contain iron sulfide that was not necessarily associated with Duluth Complex rock. Testing of this material confirmed that sulfur concentrations in the fine fraction were elevated compared to its coarse fraction and unsaturated overburden (Table 2). Based on the association with the fine fraction, it was concluded that the iron sulfide was formed by chemical processes occurring in the overburden after glacial deposition. The presence of chemically-reducing conditions was indicated by low oxidation-reduction potential. It is postulated that sulfate reduction is naturally occurring in these materials allowing iron sulfide to precipitate. MWMP leachates from two samples of this material were acidic (pH 3 to 4) and showed elevated concentrations (in or approaching the mg/L range) of cobalt, copper, nickel and zinc. Sulfate concentrations were near 200 mg/L. These results indicated that weathering of this material might cause it to acidify.

- Overburden Containing Duluth Complex – Some drill hole intersections contained Duluth Complex rock that was visibly mineralized.

Based on these findings, the need to mitigate potential for acid and metal leaching from the saturated mineral overburden was identified. The current plan is to compact the mixed overburden material as it is being placed to limit oxidation and infiltration and also enhance reaction of any acidic leachate with unsaturated materials. Mitigation measures will be designed so that water originating from the overburden stockpile will be non-acidic and mostly be storm water rather than seepage. Barr has calculated the resulting average water chemistry from the mass-weighted average of the median MWMP leachate chemistry for each group in Table 2.

2 RS31 – Pit Water

2.1 Proposed Project

The modeling approach for the Proposed Project was the same as that presented in RS31 Draft 01.

As for waste rock and lean ore, the list of parameters modeled was increased by adding antimony.

The geometry of the pits remained the same as RS31 Draft 01.

The following changes were made to the East Pit water balance as shown in Figure 6-3 of RS31 Draft 01 based on hydrological information provided by Barr Engineering:

- Water is occasionally removed from the East Pit during the flooding phase (year 12 to 20) in order to manage the water level in the pit during flooding. This water is sent to the waste water treatment facility (WWTF) and the tailings impoundment.
- Liner leakage from the Category 3 stockpile no longer reports to the East Pit. Liner leakage from the Category 1/2 and 1 Stockpiles continues to report to the East Pit.

Similarly, the West Pit model has the following changes:

- Tailings pond water is no longer directed to the West Pit after year 20.
- Liner leakage from the Category 3 stockpile no longer reports to the West Pit. Liner leakage from the Category 1/2 and 1 Stockpiles continues to report to the West Pit.

Updated water balance information was provided by Barr (email from Greg Williams, September 8, 2008) for low, average and high climatological conditions. In addition, the current calculations included a revised groundwater inflow model for the West Pit. Inflows are a function of pit water elevation.

Two aspects were changed in the geochemical calculations:

- Dissolution rates applied to the walls were updated using the rates indicated in Table 1 (Proposed Project).
- Groundwater and surface water inflow chemistry were updated using data provided by Barr (email from Miguel Wong May 20, 2008) (Table 3).

2.2 Reasonable Alternative 1

For RA1, the East Pit will be backfilled with oxidized Category 2/3 and 4 waste rock stockpiled during mining of the East Pit. Ongoing waste rock production in these categories from West Pit will also be backfilled to East Pit. Initial assessment of the concept considered the effect of dissolution of acidic weathering products as the rock was backfilled. The inventory of weathering products was found to create a very long term source of sulfate and metals in the pore water that would contribute to groundwater moving towards the Partridge River. To address this concern, addition of limestone to the stockpiles during mining has been proposed to prevent the onset of acidic conditions. While this will not eliminate generation of weathering products, the maintenance of non-acidic conditions will cause the rock to oxidize at a slower rate than under acidic conditions. This in turn will reduce the inventory of oxidation products available for dissolution when the rock is inundated in the East Pit. Nonetheless, water chemistry in the backfill will be driven by the dissolution of oxidation products formed under non-acidic conditions. Any water that comes into contact with the backfill is expected to acquire a chemistry that reflects equilibration with the weathering products.

The pollutant load discharging from the East Pit to the West Pit was therefore calculated from the sum of load in water flowing the wetland and load in water that seeps from the backfill. Both sources were assumed to have constant concentrations for the duration of filling the West Pit. The chemistry of water flowing through the wetland was provided by Barr and is the same chemistry used in RS31 (Draft 01). The chemistry of backfill pore water was based on a pH of 8 and was assigned the same chemistry as non-acidic drainage from the Category 1/2 and 3 waste rock in RS53/42 (Table 7-2). The assignment of this pH condition assumes that limestone addition to the stockpiles will ensure to a high degree of certainty that oxidation in the piles does not accelerate and cause rapid build-up of weathering products. In the event that pH depression does occur in the stockpiles prior to re-handling to the East Pit, additional pH modification using lime may be needed during backfilling to raise the pH of the pore water.

The discharge from the East Pit to the West Pit is then used to predict chemistry of water in the West Pit. Water balance information for three climatological scenarios under RA1were provided by Barr (email from Greg Williams, September 8, 2008).

3 RS54/46 – Tailings

3.1 Tailings Oxidation Model

The general methodology used to predict source water quality for the tailings is the same as that presented in RS54/46 (Draft 1). In RS54/46 the predictions were carried forward to provide predictions of chemistry of water captured in the horizontal drains and in groundwater downgradient of the tailings disposal area. In the current modeling, SRK predicted pore water chemistry and provided the results to Barr. Barr then used the pore water chemistry to estimate the chemistry of water in the drains and downgradient of the site.

Eighteen elements were modeled in RS46. The list was updated to include fluoride, chloride, barium, iron, manganese, molybdenum, and tin. Leaching of all these elements is assumed to be driven by sulfide oxidation. As described previously, water chemistry is calculated for sulfate by modeling sulfide oxidation. Leaching of other elements was modeled using the molar ratio element release to sulfate release observed in the kinetic testwork. Molar release ratios were updated based on recent testwork results.

3.2 Process Pond Model

The process pond water balance is the same as that presented in RS54/46 (Draft 01).

The process pond load balance was updated as follows:

- Initial pond chemistry in RS54/46 was assumed to be pure water. This input was replaced with actual monitoring data from the LTV process ponds since operation of the ponds stopped in 2001. The 95th percentile concentration was used as the input for the initial NorthMet Project tailings pond. Where data were not available, Colby Lake water chemistry data were used as the next best approximation because this source will be used as make-up water for the pond. Table 4 indicates the concentrations used and the data source.

- Beach runoff loadings were calculated using humidity cell data (Table 5). The calculation methodology was unchanged.

- In RS54/46, the feedback between seepage return and process pond was not incorporated. The portion of loading in the seepage originating as pond water and tailings stream supernatant were calculated from constant concentrations (Tables 7-14 and 7-17 in RS54/46). These constant concentrations were maximum values obtained during preliminary runs of the model. The modeling was improved by iterating between monthly seepage chemistry predictions and average process pond chemistry until median and highest concentrations in the process pond stabilized. This usually occurred after one or two iterations demonstrating that the loading in seepage originating from oxidation of the tailings was more significant than the loading carried by process pond water incorporated in the tailings and feeding seepage.

4 RS33/65 – Hydrometallurgical Residues

The predicted pore water chemistry for the hydrometallurgical residues presented in Table 6-2 RS33/65 was updated to include additional parameters required for modeling in RS74. The methodology used to obtain the values was the same as previously described. The complete list of parameters is shown in Table 6.

5 References

Hem J.D. 1992. Study and interpretation of the chemical characteristics of natural water. US Geological Survey Paper 2254.

Nevada Division of Environmental Protection. 1996. Meteoric Water Mobility Procedure (MWMP) Standardized Column Test Procedure. NDEP publication MWMP.ltr. May 3 1996. 6p

Table 1. 95th Percentile Dissolution Rates (in mg/kg/week) for Waste Rock and Lean Ore Stockpiles for Proposed Project and RA1

Category	Acidity	Alkalinity	F	Cl	SO_4	Al	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb	Mn	Mo	Ni	Se	Ag	Tl	V	Zn
Proposed Project																									
2	1.4	3.3	0.025	0.1	1.9	0.063	0.0015	0.0033	0.0056	0.00011	0.0027	0.00002	0.0001	0.000053	0.0009	0.0095	0.000041	0.0012	0.000042	0.00034	0.0001	0.000026	9.9E-06	0.0013	0.0012
3	1.8	3.7	0.024	0.12	9.9	0.036	0.0015	0.0034	0.0085	0.00011	0.0034	0.000064	0.0001	0.017	0.098	0.04	0.000056	0.028	0.000036	0.21	0.00027	0.0001	0.000011	0.00079	0.011
4	1.5	7.2	0.031	0.1	11	0.042	0.0015	0.0024	0.0054	0.000099	0.02	0.000029	0.00012	0.00064	0.001	0.019	0.000044	0.0085	0.000088	0.0077	0.00042	0.000062	0.00001	0.0051	0.0013
4 - Virginia	26	0.17	0.033	0.1	50	0.5	0.0002	0.00054	0.0042	0.00057	0.016	0.0032	0.00012	0.039	0.007	9.7	0.0006	0.088	0.000024	0.48	0.00051	0.000031	0.000012	0.000097	0.51
Ore	2.1	2.8	0.031	0.11	20	0.0081	0.0015	0.00077	0.0063	0.000098	0.011	0.00007	0.000098	0.037	0.059	0.006	0.000054	0.086	0.000029	0.62	0.00023	0.000025	0.000014	0.00011	0.015
RA1																									
2	1.4	6.3	0.025	0.11	1.3	0.063	0.0015	0.00035	0.0056	0.00011	0.0013	0.00002	0.0001	0.000053	0.00088	0.0069	0.000042	0.00081	0.000041	0.00035	0.000098	0.000024	9.9E-06	0.00021	0.0012
3	1.6	6.3	0.025	0.12	5.8	0.037	0.0015	0.009	0.0057	0.00011	0.0038	0.000035	0.0001	0.01	0.068	0.013	0.000036	0.019	0.00018	0.12	0.00012	0.00006	9.6E-06	0.0018	0.0097
4	19	3.3	0.2	0.11	50	0.12	0.0015	0.0042	0.0066	0.00017	0.28	0.00039	0.00011	0.056	0.0075	7.8	0.00016	0.18	0.00013	0.56	0.0007	0.00003	0.000017	0.00044	0.054
4- Virginia	21	3.2	0.033	0.1	42	0.48	0.0002	0.00048	0.0041	0.00055	0.016	0.0031	0.00012	0.027	0.0064	7.7	0.00058	0.068	0.000024	0.34	0.00043	0.000031	0.000011	0.0001	0.49
Ore	2.1	2.8	0.031	0.11	20	0.0081	0.0015	0.00077	0.0063	0.000098	0.011	0.00007	0.000098	0.037	0.059	0.006	0.000054	0.086	0.000029	0.62	0.00023	0.000025	0.000014	0.00011	0.015

Table 2. Characteristics of Overburden

Material Type / Tess Performed	Stat	Cu mg/kg	Ni mg/kg	Total S %,S	S as Sulfide %,S	pH	F mg/L	Cl mg/L	SO_4 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	B mg/L	Cd mg/L	Cr mg/L	Co mg/L	Cu mg/L	Fe mg/L	Pb mg/L	Mn mg/L	Mo mg/L	Ni mg/L	Se mg/L	Ag mg/L	Tl mg/L	V mg/L	Zn mg/L
Peat	P5	43	33	0.066	<0.01	6.8	0.083	3.4	27	0.2	<0.00006	0.0017	0.028	<0.0002	0.033	<0.00003	0.0011	0.00081	0.014	0.15	0.00036	0.2	0.0015	0.0074	0.00064	<0.00005	0.000072	0.0021	0.0043
6 Solid Analyses	Median	120	72	0.09	0.04	6.2	0.11	9.7	59	0.81	0.0003	0.003	0.032	<0.0002	0.10	0.000075	0.002	0.0018	0.042	0.45	0.0015	0.3	0.0053	0.014	0.001	<0.00005	0.00009	0.0032	0.0065
2 MWMPs	P95	240	110	0.15	0.25	5.7	0.14	16	90	1.4	0.00066	0.0043	0.035	<0.0002	0.17	0.00018	0.0029	0.0027	0.069	0.74	0.0027	0.39	0.0091	0.021	0.0014	<0.00005	0.00011	0.0042	0.0088
Unsaturated Mineral	P5	27	27	<0.02	<0.01	7.3	0.17	0.86	4.7	0.069	<0.00006	0.0004	0.0032	<0.0002	0.015	<0.00003	<0.0002	0.00051	0.005	0.041	<0.00005	0.046	0.0002	0.0016	<0.0002	<0.00005	<0.00002	0.00042	0.0021
13 Solid Analyses	Median	53	59	0.01	0.01	7.1	0.32	1.9	17	0.091	0.0003	0.0004	0.0051	<0.0002	0.03	0.00005	<0.0002	0.0006	0.0054	0.05	<0.00005	0.051	0.0024	0.0029	<0.0002	<0.00005	<0.00002	0.0006	0.003
4 MWMPs	P95	150	100	0.11	0.01	6.9	0.46	1.9	21	0.3	0.001	0.0029	0.013	<0.0002	0.035	0.00015	0.00097	0.0015	0.007	0.059	<0.00005	0.10	0.013	0.0033	0.00052	<0.00005	0.000025	0.0006	0.0057
Saturated Mineral	P5	32	23	<0.01	0.01	8	0.24	1.3	5.9	0.029	<0.0001	0.0016	0.0071	<0.0002	0.013	<0.00004	<0.0002	0.00011	0.0034	<0.001	<0.00005	0.044	0.00033	0.002	0.00055	<0.00005	<0.00002	<0.0002	<0.0004
19 Solid Analyses	Median	59	63	0.05	0.02	7.4	0.42	2.3	68	0.14	0.0004	0.0027	0.014	<0.0002	0.037	<0.00004	0.0003	0.0013	0.017	0.15	<0.00005	0.12	0.027	0.019	0.0019	<0.00005	<0.00002	0.0014	0.003
6 MWMPs	P95	560	230	0.32	0.11	3.5	1.0	7.6	220	0.61	0.0012	0.0032	0.041	0.0005	0.19	0.0054	0.0012	0.25	0.44	5.4	0.0012	1.2	0.032	2.2	0.0038	0.00096	0.000082	0.0025	0.86
OB with Mineralized Rock	P5	110	59	0.015	0.031	7.1	0.19	3.3	10	0.013	<0.00008	0.00053	0.0037	<0.0002	<0.001	0.000051	<0.0002	0.00016	0.008	<0.009	<0.00005	0.022	0.0054	0.0046	<0.00009	<0.00005	<0.00002	<0.0002	0.0021
3 Solid Analyses	Median	780	370	0.15	0.22	7.1	0.23	3.5	84	0.039	0.00015	0.0008	0.006	<0.0002	<0.001	0.00006	<0.0002	0.0025	0.0082	0.005	<0.00005	0.16	0.019	0.038	0.0009	<0.00005	<0.00002	0.00015	0.0025
2 MWMPs	P95	1100	500	0.45	0.41	7.1	0.28	3.6	160	0.065	0.00038	0.0011	0.0082	<0.0002	<0.001	0.000069	<0.0002	0.0048	0.0083	0.019	<0.00005	0.29	0.032	0.072	0.0019	<0.00005	<0.00002	0.00047	0.003
All	P5	29	24	<0.02	<0.003	7.8	0.11	1.1	2.8	0.019	<0.0001	0.0004	0.0033	<0.0002	<0.001	<0.00004	<0.0002	<0.0001	0.0038	<0.01	<0.00005	0.027	0.00017	0.0012	<0.0002	<0.00005	<0.00002	<0.0002	0.0003
41 Solid Analyses	Median	87	62	0.04	0.01	7.1	0.28	2.5	32	0.11	0.00035	0.0023	0.012	<0.0002	0.028	0.00005	0.00005	0.0013	0.0086	0.065	<0.00005	0.11	0.008	0.013	0.001	<0.00005	<0.00002	0.00065	0.003
14 MWMPs	P95	850	390	0.31	0.17	3.6	0.85	12	200	1.0	0.0011	0.0037	0.039	0.00015	0.2	0.0039	0.0019	0.19	0.28	3.2	0.0019	1.2	0.033	1.3	0.0037	0.00046	0.0001	0.0031	0.53
	Max	1600	520	0.61	0.43	3.4	1.1	17	230	1.5	0.0012	0.0044	0.046	0.0008	0.23	0.0066	0.003	0.31	0.58	7.3	0.0028	1.3	0.034	3.0	0.0038	0.0014	0.00011	0.0043	1.2

Notes:
Solids concentrations are on -200 mesh fraction
Solution concentrations are from MWMPs.

Table 3. Groundwater and Surface Water Inflow to Pits

	Acidity mg/L	Alkalinity mg/L	Hardness mg/L	F mg/L	Cl mg/L	SO_4 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	B mg/L	Cd mg/L	Cr mg/L	Co mg/L	Cu mg/L	Fe mg/L	Pb mg/L	Mn mg/L	Hg mg/L	Mo mg/L	Ni mg/L	Se mg/L	Ag mg/L	Tl mg/L	V mg/L	Zn mg/L
Groundwater	7.9	61	66	0.28	6.6	16	0.13	0.0015	0.0022	0.022	0.00015	0.087	0.0001	0.0055	0.0017	0.003	2.8	0.0011	0.12	3.4E-06	0.0084	0.016	0.0019	0.00055	0.000004	0.0043	0.028
Surface Water	4.7	70	110	0.07	8	9	0.07	0.0015	0	0	0	0.045	0	0.0011	0	0.0017	1.6	0.0005	0.15	0.000003	0	0	0	0	0.0004	0.0009	0.016

Table 4. Initial Process Pond Chemistry

	Alkalinity mg/L	Cl mg/L	F mg/L	Hardness mg/L	NO_3+NO_2 mg N/L	NH_3 mgN/L	SO_4 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	B mg/L	Cd mg/L	Ca mg/L	Cr mg/L	Co mg/L	Cu mg/L	Fe mg/L	Pb mg/L	Mg mg/L	Mn mg/L	Mo mg/L	Ni mg/L	Se mg/L	Ag mg/L	Na mg/L	Tl mg/L	V mg/L	Zn mg/L
Source	Pond	Pond	Pond	Pond	Colby	Colby	Pond	Colby	Colby	Pond	Colby	Colby	Colby	Colby	Pond	Colby	Pond	Colby	Pond	Colby	Pond	Colby	Colby	Colby	Colby	Colby	Pond	Colby	Hem	Colby
Concentration	340	26	7.7	350	0.1	0.1	130	0.31	0.003	0.0069	0.053	0.0002	0.14	0.000054	36	0.0035	0.001	0.0048	0.057	0.00049	63	0.28	0.017	0.0028	0.0009	0.001	100	0.001	0.0009	0.0069

Table 5. Dissolution Rates (mg/m^2 of beach/month) Used to Calculate Tailings Beach Runoff

Type	Acidity	Alkalinity	F	Cl	SO_4	Al	Sb	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb	Mn	Mo	Ni	Se	Ag	Tl	V	Zn
Coarse	140	2400	2.8	21	700	7.1	0.029	0.16	0.063	0.011	2.1	0.0022	0.015	0.0079	0.31	1.4	0.0097	0.73	0.049	0.14	0.012	0.0028	0.0011	0.043	0.067
Fine	140	2300	2.8	22	1000	8.0	0.029	0.097	0.087	0.011	2.0	0.0022	0.016	0.014	0.12	2.1	0.0071	0.65	0.045	0.16	0.012	0.0028	0.0011	0.042	0.15

Table 6. Predicted Pore Water Concentrations in Hydrometallurgical Residues

pH Range	Ag mg/L	Al mg/L	As mg/L	B mg/L	Ba mg/L	Be mg/L	Cd mg/L	Co mg/L	Cr mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Ni mg/L	Pb mg/L	Sb mg/L	Se mg/L	SO_4 mg/L	Tl mg/L	V mg/L	Zn mg/L
6.6 to 8.5	0.0005	0.18	0.004	0.14	0.005	0.002	0.0004	0.005	0.05	0.015	0.4	0.0023	0.14	0.098	0.0005	0.004	0.054	7347	0.0002	0.002	0.01