SRK Consulting (U.S.), Inc.
5250 Neil Road, Suite 300
Reno, NV 89502

T: (775) 828-6800
F: (775) 828-6820
reno@srk.com
www.srk.com

Memo

To:	Gene Bosley, Alan Haslam, Dale Kerner	**Date:**	March 14, 2018
Company:	Midas Gold Idaho Inc.	**From:**	Ruth Warrender, Amy Prestia, Rob Bowell
Copy to:	Todd Glindeman, Annika Deutsch, Kelly Donohue, Brown and Caldwell	**Project #:**	200900.040
Subject:	**Stibnite Gold Project - August 2017 Seep Sampling**		

1 Introduction

SRK Consulting U.S. Inc. (SRK) is currently assisting Midas Gold Idaho, Inc. (Midas Gold) with the geochemical characterization study for the Stibnite Gold Project (the Project) in central Idaho. The primary purpose of the study is to develop geochemical characterization data that will ultimately form part of the planning and impact assessment for the Project. The geochemical characterization study includes static and kinetic testing of representative development rock, ore and tailings materials, and predictions of future water quality associated with the Project.

Two SRK geochemists visited the Project on August 2, 2017 for an overview of the site and to identify potential areas for additional data collection. As a result of this site visit, SRK made recommendations for the collection of additional surface water quality samples from four locations. These additional samples are intended to supplement the data collected as part of the Surface Water Quality Baseline Study (HDR, 2017b) and provide additional data to support the Site-Wide Water Chemistry (SWWC) modeling currently underway. The purpose of this memorandum is to outline the sample collection methods and rationale, and to present the results of this additional sampling.

2 Rationale

Regular sampling of surface water, springs and seeps in the Project area has taken place since 2012 as part of the Surface Water Quality Baseline Study (HDR, 2017b). These baseline samples provide a comprehensive dataset that is being used in the SWWC modeling currently underway to predict existing and future water quality at key points in the East Fork of the South Fork of the Salmon River (EFSFSR) and associated tributaries. Preliminary model runs demonstrated that there are diffuse sources of constituent loading in the system that are not currently accounted for in the baseline dataset. A site reconnaissance was undertaken on August 2, 2017 to identify potential additional seeps or diffuse sources of loading that are not currently sampled as part of the Surface Water Quality Baseline Study. As a result of this reconnaissance, four additional sample locations were identified and recommended for sampling (Figure 1).

3 Methodology

The four additional surface samples were collected during the week of August 21, 2017 by Midas Gold personnel in accordance with the Quality Assurance Project Plan and Surface Water Quality Sampling Plan for the Stibnite Gold Project 2017 QAPP-SWQSP (HDR, 2017a). The methodology applied to the sample collection and subsequent data assessment was consistent with the Surface Water Quality Baseline Study (HDR, 2017a-b). Samples were analyzed by ALS in Kelso, Washington, for total and dissolved metals and metalloids. The laboratory data underwent review, verification and validation by HDR the QAPP-SWQSP (HDR, 2017a).

The sample locations are shown in Figure 1, and details are provided in Table 1. Location identifiers are consistent with the Phase II Environmental Analysis and Review (Millennium Science and Engineering [MSE], 2011) and the Surface Water Quality Baseline Study (HDR, 2017b).

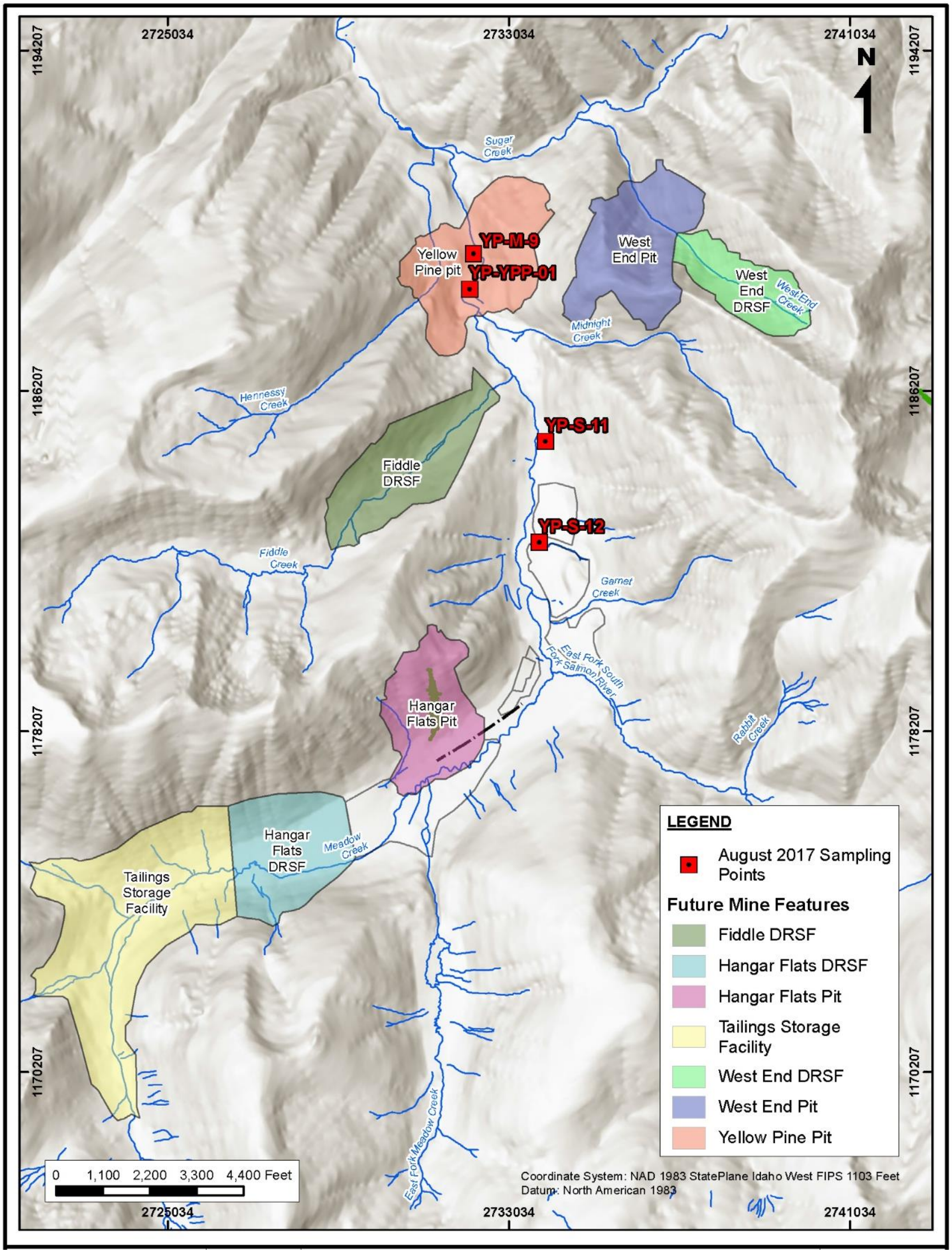

Figure 1: August 2017 Surface Water Samples Locations

Table 1: **August 2017 Surface Water Sample Details**

Location ID	Northing	Easting	Site Description	Legacy Upgradient Activities	Potential Future Upgradient Stibnite Gold Project Activities	Additional Rationale	Watershed	Natural (N) or Man-made (M)*
YP-YPP-01	4976199	631382	Yellow Pine pit lake	Southeast Bradley Mining Company (BMC) Development Rock Storage Facilities (DRSFs), Bailey Tunnel Collar	Hangar Flats DRSF, Hangar Flats pit, Tailings Storage Facility (TSF), Fiddle DRSF, future Yellow Pine pit**	Existing Yellow Pine pit lake not sampled as part of Surface Water Quality Baseline Study (HDR, 2017).	EFSFSR	M
YP-M-9	4976453	631406	Pond west of EFSFSR and north of Yellow Pine pit lake	Yellow Pine pit, northwest and southeast BMC DRSFs, Bailey Tunnel Collar	Hangar Flats DRSF, Hangar Flats pit, TSF, Fiddle DRSF, future Yellow Pine pit**	Represents medium-sized body of water in EFSFSR drainage that was not sampled as part of Surface Water Quality Baseline Study (HDR, 2017).	EFSFSR	M
YP-S-11	4975115	631941	North wetland on lower haul road	None	None	Represents seep on east side of EFSFSR that was not sampled as part of Surface Water Quality Baseline Study (HDR, 2017).	EFSFSR	N
YP-S-12	4974393	631907	South wetland on lower haul road	Superior Pilot Plant	None	Represents seep on east side of EFSFSR that was not sampled as part of Surface Water Quality Baseline Study (HDR, 2017).	EFSFSR	N

Naming convention source: MSE, 2011

* (M) Man-made ground includes mine dumps, tailings piles, spent ore piles, and disturbed glacial and stream deposits (Brown and Caldwell, 2017). (N) Natural seeps and springs typically relate to natural geologic features or stratigraphy in ground that shows no apparent large-scale disturbance by mining, where water is observed to be emerging from the ground and flowing to the surface from either a clearly-defined point (spring) or a more diffuse source (seep).

** Sample location will be within the footprint of the future Yellow Pine pit.

4 Results

The results of the August 2017 seep sampling are presented in Table 2. Results have been compared to the strictest potentially applicable water quality criteria (HDR, 2017a-b). This comparison demonstrates that the following constituents were elevated relative to their respective water quality criteria in the surface water quality samples collected in August 2017:

- Total antimony – elevated in three out of the four samples (YP-S-12, YP-YPP-01 and YP-M-9);
- Dissolved antimony – elevated in three out of the four samples (YP-S-12, YP-YPP-01 and YP-M-9);
- Total arsenic – elevated in all four samples (YP-S-11, YP-S-12, YP-YPP-01 and YP-M-9);
- Dissolved arsenic – elevated in all four samples (YP-S-11, YP-S-12, YP-YPP-01 and YP-M-9);
- pH – below the lower pH limit of 6.5 in two samples (YP-YPP-01 and YP-S-12); and
- Temperature – above the maximum temperature limit of 13ºC in three out of the four samples (YP-S-11, YP-S-12 and YP-M-9).

The following parameters were below analytical reporting limits in all samples collected in August 2017:

- Ammonia
- Total boron
- Dissolved boron
- Total cadmium
- Dissolved cadmium
- Carbonate
- Total chromium
- Dissolved chromium
- Total cyanide
- Fluoride
- Nitrate + nitrite
- Total phosphorus
- Dissolved phosphorus
- Total selenium
- Dissolved selenium
- Total silver
- Dissolved silver
- Total suspended solids (TSS)
- Dissolved thallium
- Total zinc

The relationship between total and dissolved concentrations of arsenic, antimony and mercury in the samples is shown in Figure 2, Figure 3 and Figure 4, respectively. This demonstrates that ratios of dissolved to total arsenic and antimony are close to one, indicating they are primarily in the dissolved phase. The only exception is the sample collected from the Yellow Pine pit lake (YP-YPP-01), for which total concentrations of arsenic and antimony are higher than the dissolved fraction, demonstrating there may be some adsorption of these constituents to particulates.

Total mercury concentrations at all sample locations are higher than the dissolved fraction. This is consistent with the results of the Surface Water Quality Baseline Study (HDR, 2017b) and the USGS (2015) study into the occurrence and transport of constituents in the Project area, which demonstrated that concentrations of mercury were lower in filtered samples compared to unfiltered samples, suggesting surface runoff as a potential contributing source of mercury.

5 Summary

Four additional surface water quality samples were collected in August 2017 to supplement the Surface Water Quality Baseline Study and provide additional data to support the SWWC modeling currently underway. The results demonstrate that arsenic, antimony, pH and temperature were elevated with respect to the most stringent potentially applicable water quality criteria in one or more of the samples. The results of the additional sampling have been incorporated into the SWWC model currently underway to assess water quality for existing conditions (SRK, 2017) and for the proposed future action (SRK, 2018, in progress)

6 References

Brown and Caldwell, 2017, Water Resources Summary Report, June 2017.

HDR, 2017a, Quality Assurance Project Plan and Surface Water Quality Sampling Plan for the Stibnite Gold Project 2017 QAPP-SWQSP, Prepared for Midas Gold Idaho, Inc., July 2017.

HDR, 2017b, Surface Water Quality Baseline Study, Stibnite Gold Project. Report Prepared for Midas Gold Idaho, Inc., December 2016, Revised May 2017.

Millennium Science and Engineering, Inc. (MSE), 2011, Phase II Environmental Analysis and Review. January 14.

SRK Consulting, Inc., 2017, Stibnite Gold Project – Existing Conditions Site-Wide Water Chemistry (SWWC) Memo - Draft. November 22, 2017.

SRK Consulting, Inc., 2018 (in progress), Stibnite Gold Project – Proposed Action Modelling Report.

US EPA, 2016, National Functional Guideline for Inorganic Superfund Methods Data Review.

USGS, 2015, Occurrence and Transport of Selected Constituents in Streams near the Stibnite Mining Area, Central Idaho, 2012-2014. Scientific Investigations Report 2015-5166.

Table 2: **August 2017 Surface Water Sample Results**

Site	Strictest Potentially Applicable Regulatory Criteria (HDR, 2017b)	Units	Count of Detects	YP-S-11	YP-S-12	YP-YPP-01	YP-M-9
Conductivity	--	mS/cm	4	0.304	0.116	0.126	0.223
Dissolved Oxygen (DO)	> 6	mg/L	4	8.8	6.1	8.0	6.7
pH	≥ 6.5 and ≤ 9.0	pH units	4	7.1	6.4	6.4	6.9
Temperature, Water	< 13	deg C	4	19.8	13.2	10.5	20.1
Turbidity	--	NTU	4	0.7	5.9	0	0
Alkalinity as $CaCO_3$, Total	>20	mg/L	4	155	49	56	26
Aluminum, Total	50	µg/L	4	4.3	18.2	15.1	20.4
Aluminum, Dissolved	50	µg/L	2	< 4	< 4	6.3	12.4
Ammonia as Nitrogen	--	mg/L	0	< 0.05	< 0.05	< 0.05	< 0.05
Antimony, Total	5.6	µg/L	4	5.34	27.4	69.6	153
Antimony, Dissolved	5.6	µg/L	4	5.46	27.8	35.3	155
Arsenic (III)	--	µg/L	4	2.09	0.309	3.29	8.19
Arsenic, Total	10	µg/L	4	113	83.7	111	582
Arsenic, Dissolved	10	µg/L	4	109	83.2	84.9	558
Barium, Total	2000	µg/L	4	21.2	12	14.3	14.4
Barium, Dissolved	2000	µg/L	4	20.6	11.7	12.7	12.9
Beryllium, Total	4	µg/L	1	< 0.02	< 0.02	< 0.02	0.049
Beryllium, Dissolved	4	µg/L	1	< 0.02	< 0.02	< 0.02	0.036
Bicarbonate as $CaCO_3$	--	mg/L	4	155	49	56	26
Boron, Total	120000	µg/L	0	< 21	< 21	< 21	< 21
Boron, Dissolved	120000	µg/L	0	< 21	< 21	< 21	< 21
Cadmium, Total	0.25	µg/L	0	< 0.02	< 0.02	< 0.02	< 0.02
Cadmium, Dissolved	0.25	µg/L	0	< 0.02	< 0.02	< 0.02	< 0.02
Calcium, Total	--	µg/L	4	37200	12900	17100	24700
Calcium, Dissolved	--	µg/L	4	38300	12700	15000	24000
Carbonate as $CaCO_3$	--	mg/L	0	< 15	< 15	< 15	< 15
Chloride	230	mg/L	3	0.24	< 0.2	0.5	1.02
Chromium, Total	100	µg/L	0	< 0.2	< 0.2	< 0.2	< 0.2
Chromium, Dissolved	100	µg/L	0	< 0.2	< 0.2	< 0.2	< 0.2
Cobalt, Total	--	µg/L	4	0.097	0.039	0.075	0.072
Cobalt, Dissolved	--	µg/L	4	0.074	0.03	0.079	0.049
Copper, Total	9	µg/L	4	0.35	0.15	0.4	0.41
Copper, Dissolved	9	µg/L	4	0.32	0.43	0.38	2.65
Cyanide, Total	0.0052	mg/L	0	< 0.0047	< 0.0047	< 0.0027	< 0.0047
Fluoride	2	mg/L	0	< 0.2	< 0.2	< 0.2	< 0.2
Hardness as $CaCO_3$	--	mg/L	4	149	47.1	59.9	82.8
Iron, Total	300	µg/L	2	< 42	< 42	94	88
Iron, Dissolved	300	µg/L	1	< 42	< 42	48	< 42
Lead, Total	2.5	µg/L	4	< 0.02	0.026	0.036	0.021
Lead, Dissolved	2.5	µg/L	1	< 0.02	< 0.02	< 0.02	0.043
Magnesium, Total	--	µg/L	4	13700	3610	4170	5120
Magnesium, Dissolved	--	µg/L	4	13900	3530	3490	4980
Manganese, Total	50	µg/L	4	20	2.8	21.8	13.3
Manganese, Dissolved	50	µg/L	3	5.7	< 1.1	16.4	9.3
Mercury, Total	12	ng/L	4	1.9	1.7	3	1.9
Mercury, Dissolved	12	ng/L	4	1.6	1.1	2.1	1.6

Site	Strictest Potentially Applicable Regulatory Criteria (HDR, 2017b)	Units	Count of Detects	YP-S-11	YP-S-12	YP-YPP-01	YP-M-9
Methyl Mercury	--	ng/L	2	0.3	< 0.1	< 0.1	0.2
Molybdenum, Total	600	µg/L	4	0.251	1.14	1.01	0.062
Molybdenum, Dissolved	600	µg/L	4	0.261	1.2	0.925	0.188
Nickel, Total	52	µg/L	3	0.58	0.27	< 0.2	0.4
Nickel, Dissolved	52	µg/L	3	0.53	0.36	< 0.2	0.45
Nitrate + Nitrite as Nitrogen	--	mg/L	0	< 0.05	< 0.05	< 0.05	< 0.05
Nitrogen, Total	--	mg/L	4	0.4	0.34	0.39	1.97
Nitrogen, Total Kjeldahl (TKN)	--	mg/L	4	0.4	0.33	0.39	1.97
Phosphorus, Total	--	µg/L	0	< 42	< 42	< 42	< 42
Phosphorus, Dissolved	--	µg/L	0	< 42	< 42	< 42	< 42
Potassium, Total	--	µg/L	4	1440	970	1150	1370
Potassium, Dissolved	--	µg/L	4	1480	950	1130	2490
Selenium, Total	5	µg/L	0	< 1	< 1	< 1	< 1
Selenium, Dissolved	5	µg/L	0	< 1	< 1	< 1	< 1
Silver, Total	3.4	µg/L	0	< 0.02	< 0.02	< 0.02	< 0.02
Silver, Dissolved	3.4	µg/L	0	< 0.02	< 0.02	< 0.02	< 0.02
Sodium, Total	--	µg/L	4	1930	1930	2260	5410
Sodium, Dissolved	--	µg/L	4	1960	1890	2520	5360
Solids, Total Dissolved (TDS)	500	mg/L	4	178	82.2	76.5	155
Solids, Total Suspended (TSS)	--	mg/L	0	< 5	< 5	< 5	< 5
Sulfate	250	mg/L	4	2.78	4.43	10.1	78.3
Thallium, Total	0.24	µg/L	1	< 0.02	< 0.02	< 0.02	0.028
Thallium, Dissolved	0.24	µg/L	0	< 0.02	< 0.02	< 0.02	< 0.02
Vanadium, Total	835	µg/L	2	< 0.2	0.21	0.23	< 0.2
Vanadium, Dissolved	835	µg/L	1	< 0.2	< 0.2	0.21	< 0.2
Zinc, Total	120	µg/L	0	< 2	< 2	< 2	< 2
Zinc, Dissolved	120	µg/L	2	< 2	3.2	< 2	3

Indicates concentration exceeds strictest potentially applicable water quality criterion

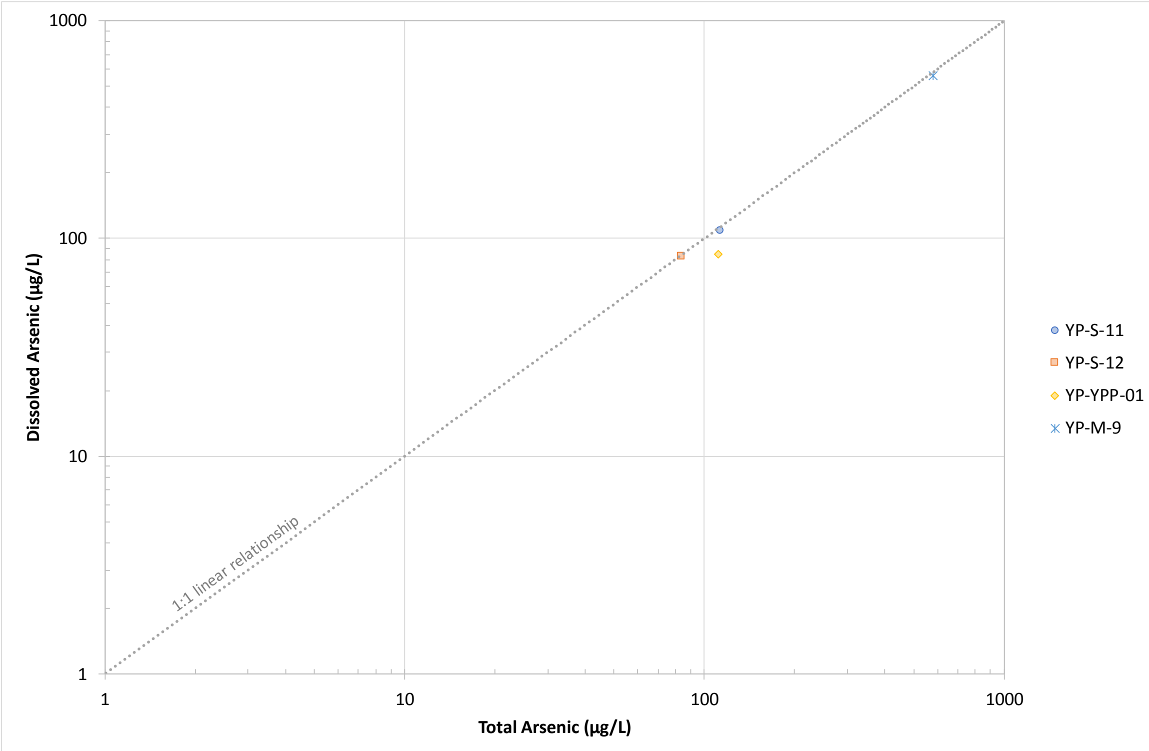

Figure 2: August 2017 Samples Total versus Dissolved Arsenic

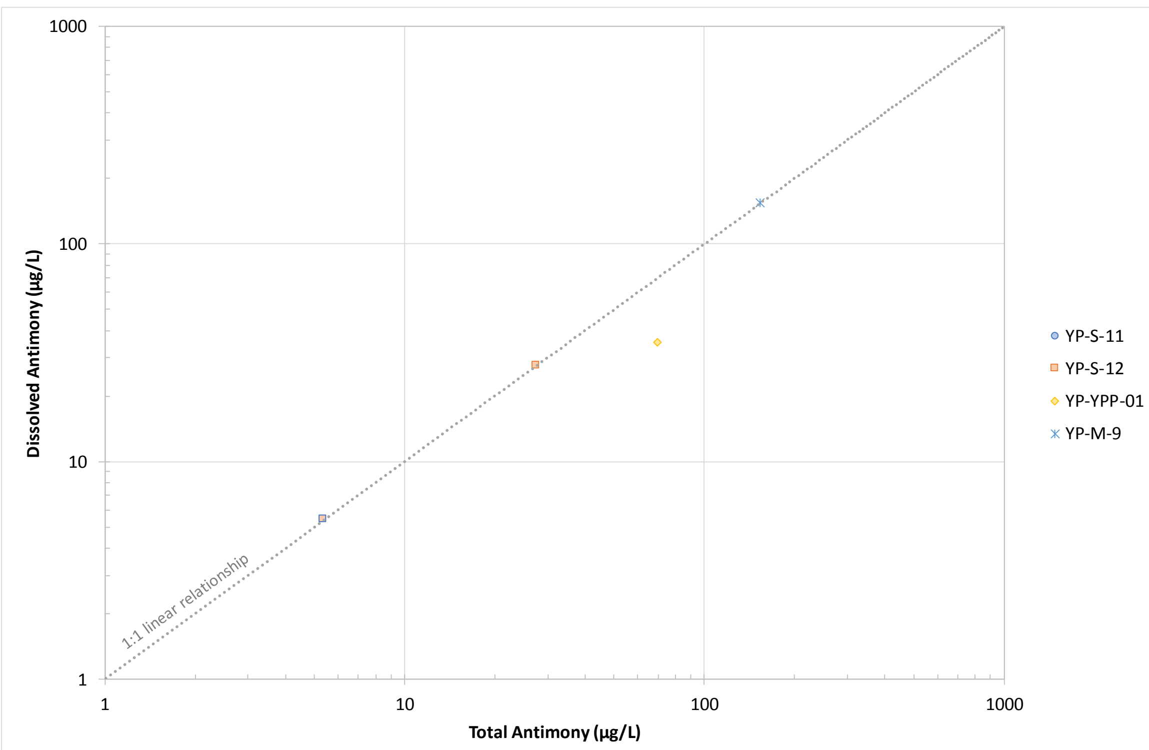

Figure 3: August 2017 Samples Total versus Dissolved Antimony

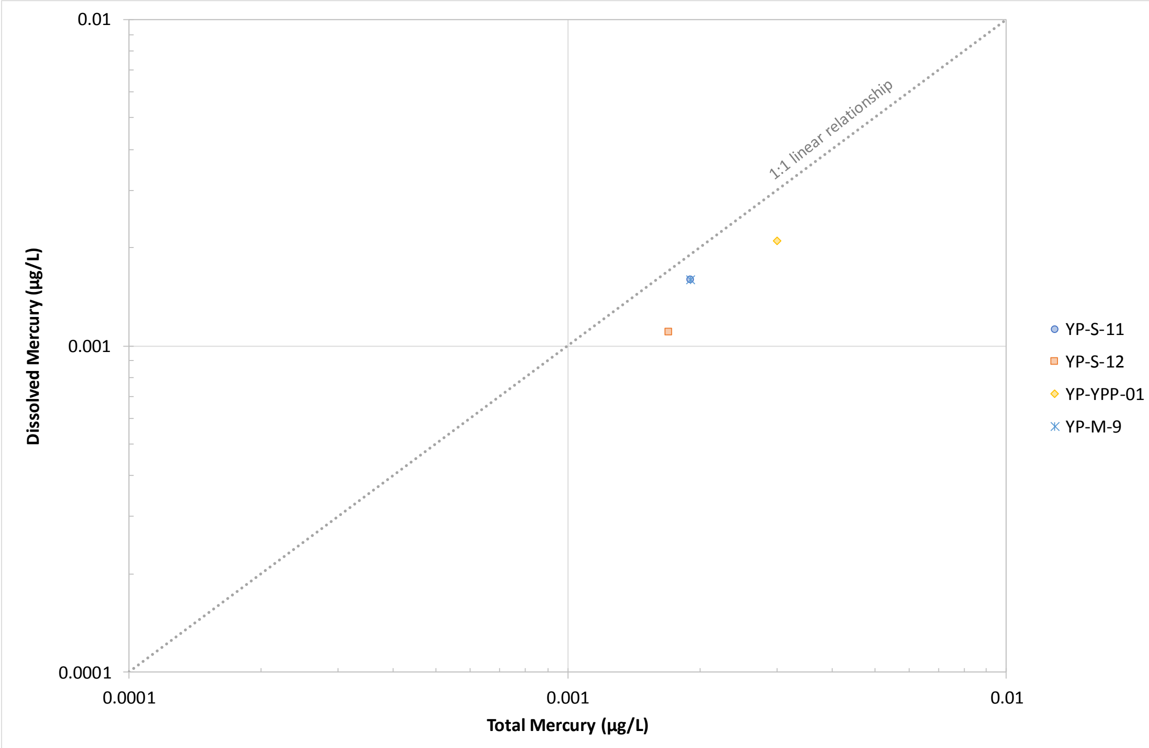

Figure 4: August 2017 Samples Total versus Dissolved Mercury

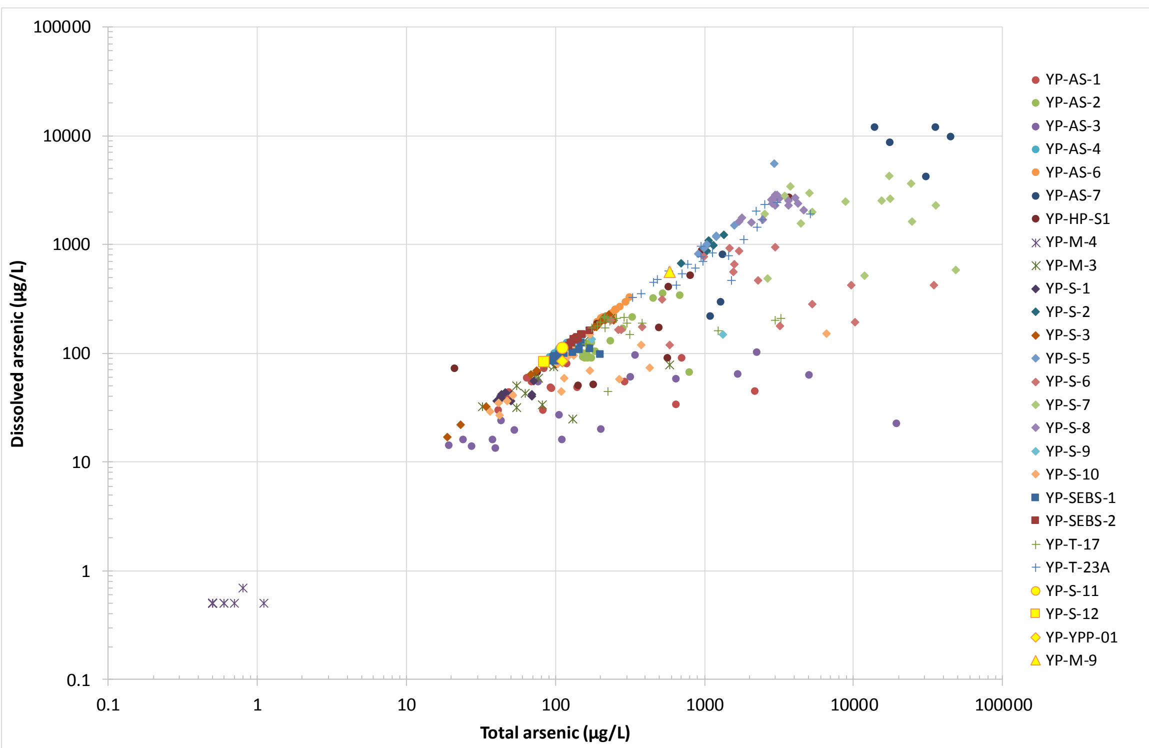

Figure 5: Total versus Dissolved Arsenic showing August 2017 Samples in Context of Baseline Water Quality Data for Seeps (HDR, 2017)

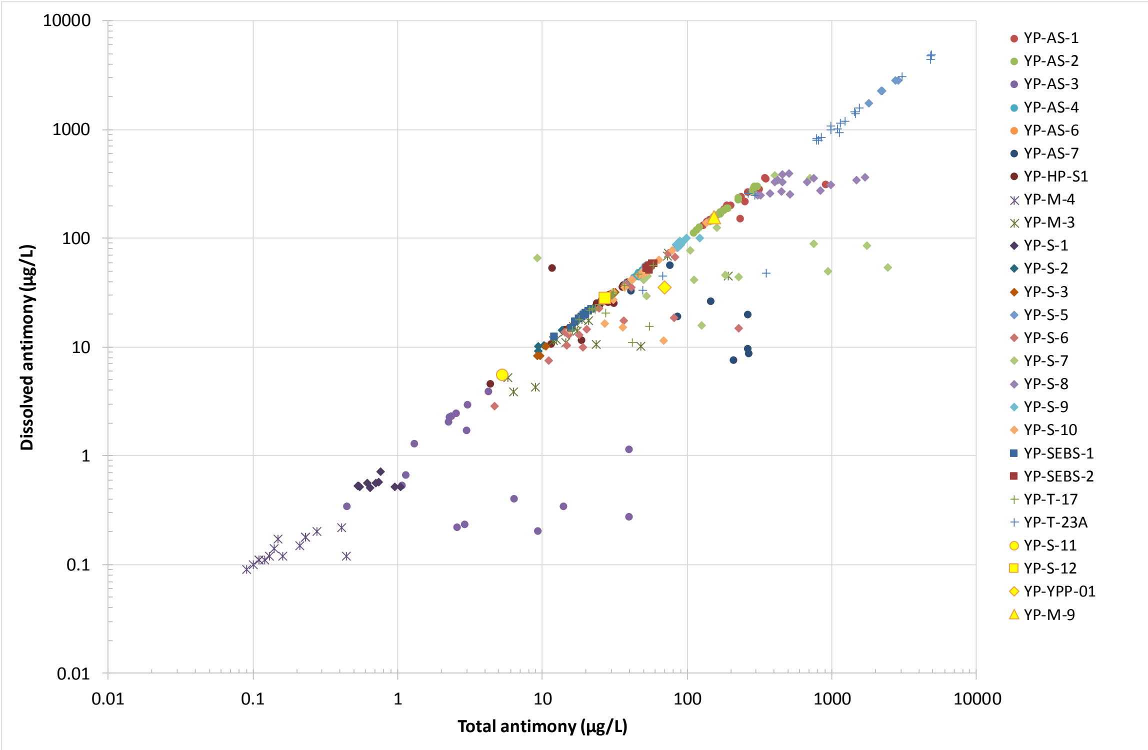

Figure 6: Total versus Dissolved Antimony showing August 2017 Samples in Context of Baseline Water Quality Data for Seeps (HDR, 2017)

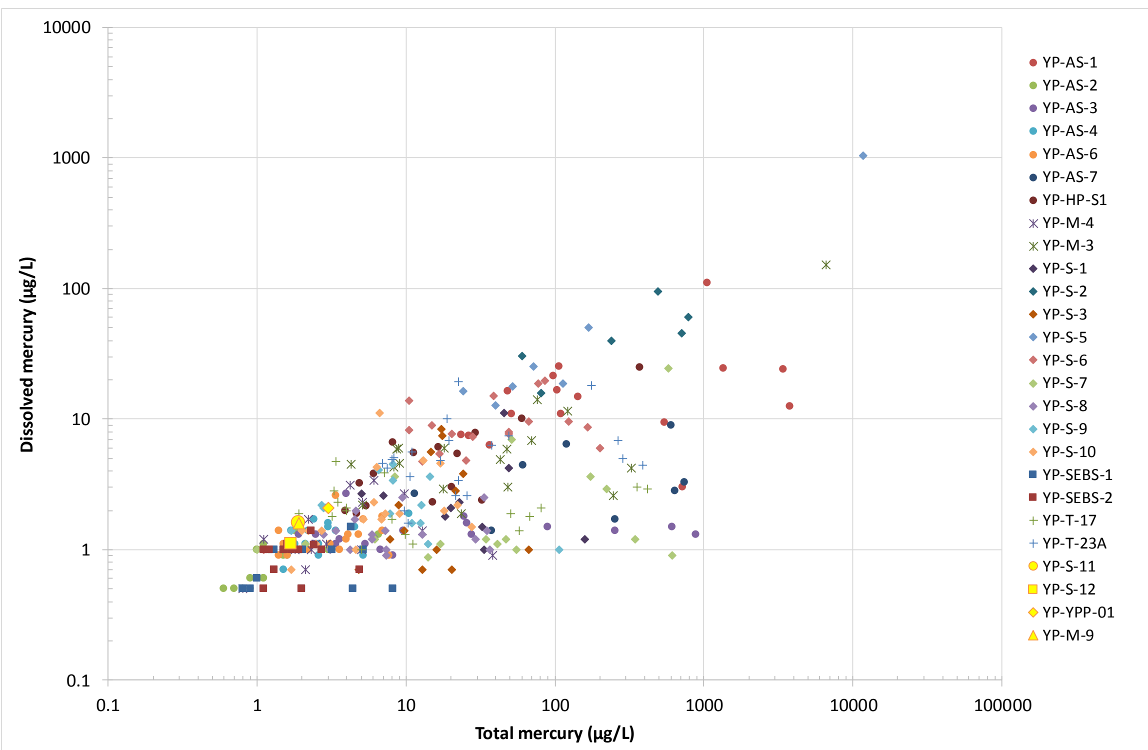

Figure 7: Total versus Dissolved Mercury showing August 2017 Samples in Context of Baseline Water Quality Data for Seeps (HDR, 2017)