



**King County**

Department of Natural Resources and Parks  
Water and Land Resources Division

**Environmental Laboratory**

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To: Brandi Lubliner, WDOE  
From: Colin Elliott  
Subject: Narrative for RSMP Interlab comparison study for IAA No. 1500077  
Project #: SIC: F92AA

The following narrative summarizes the lab results of the water and sediment samples split between the King County Environmental Lab (KCEL) and the Manchester Environmental Lab (MEL). This interlab comparison study was conducted as part of the Regional Stormwater Monitoring Program (RSMP) Status and Trends of Small Streams Project to verify that data generated by both labs would be comparable.

1. Study Design

The Quality Assurance Project Plan (QAPP) defined the following scope for the interlab study:

- Waters: Ammonia (NH3), nitrate+nitrite (NO23), turbidity (Turb), dissolved metals (metals) and PAHs with 6 samples collected twice a year (only 4 tested for PAHs per event)
- Sediments: 10 samples for Metals and 6 samples for PAHs

2. Collection/Preservation Methods and Sampling Sites and Schedule

2.1 Water Samples:

Separate containers for nutrients, turbidity, PAHs and dissolved metals (including separate filtration units) were obtained from MEL. The samples for Ammonia and Nitrate/Nitrite were collected as a single grab using the 250 mL KCEL nutrients bottle. This sample was mixed multiple times by inverting the bottle then used to quickly fill the 125 mL MEL sample container, pre-preserved with sulfuric acid. The remaining sample in the 250 mL bottle was used for the KCEL testing. Two separate 500 mL bottles for turbidity were hand-dipped simultaneously. Dissolved metals was sampled by dipping 2 unpreserved 500 mL metals bottles simultaneously. These containers were used to fill separate filtration units (one from MEL and one from KCEL). After filtration, the filtrate from the MEL unit was poured into a clean 500 mL MEL metals bottle. The dissolved metals sample for KCEL was left in the filtration unit for transport to the lab. No acid preservation of the dissolved metals samples was done until the samples arrived at the each lab. The 2 separate 1L amber bottles were collected simultaneously as individual grab samples.

Site Name	Collection Dates	Parameters
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0072-OUGA	2/24/15, 7/28/15	Turb, NH3, NO23, Diss Metals, PAHs - 2/24/15 event only)
0024-OUGA	2/24/15, 7/28/15	Turb, NH3, NO23, Diss Metals, PAHs- both events
0045-OUGA	2/24/15, 7/28/15	Turb, NH3, NO23, Diss Metals, PAHs – 7/28/15 event only
0036-WUGA	2/24/15, 7/28/15	Turb, NH3, NO23, Diss Metals, PAHs – both events
0002-WUGA	2/24/15, 7/28/15	Turb, NH3, NO23, Diss Metals, PAHs – both events
0042-WUGA	2/24/15, 7/28/15	Turb, NH3, NO23, Diss Metals

## 2.2 Sediment samples

Sediments were collected by King County staff from 10 random sites during the WHM sampling events. Sediments for PAHs were split into 8 oz glass jars obtained from MEL immediately following sieving in the field to 2 mm. Samples for metals were split from the sediment sieved at KCEL using either a 2 mm Teflon sieve or 63 um Nitex fabric. The samples sent to MEL were subsampled into 4 oz glass jars. The samples selected for splitting between labs was based on having sufficient amounts of sieved material for both labs.

Site Name	Collection Date	Parameters	sieve size for metals
0003-WUGA	9/1/2015	Metals	63 um
0008-OUGA	8/12/15	PAHs	
0018-WUGA	7/29/2015	Metals and PAHs	63 um
0024-OUGA	9/22/2015	Metals and PAHs	2 mm
0039-OUGA	9/10/2015	Metals	63 um
0040-WUGA	7/16/2015	Metals	63 um
0048-WUGA	7/7/15	PAHs	
0050-WUGA	7/8/2015	Metals	63 um
0077-WUGA	9/14/2015	Metals	63 um
0080-WUGA	8/18/2015	Metals	2 mm
0082-WUGA	7/22/2015	Metals and PAHs	63 um
0098-OUGA	8/31/2015	Metals and PAHs	63 um

## 3. Summary of Results

The results reported by each lab are summarized in the attached tables. For sediments, the metals and PAH data from both labs are compared on a dry weight basis. The relative percent difference (RPD) between the values was calculated when both labs reported numeric values that were above the quantitation limit for at least one lab. The resulting RPD for water samples was compared to the field replicate acceptance limits listed in Table 20 of the QAPP. No such limits were listed in the QAPP for sediments so the acceptance limits listed for lab replicates (in Table 21) were used to evaluate the results.

### 3.1 Water Samples

#### a. Turbidity:

Two samples collected in February and one sample from July showed RPD values slightly above the 25% limit. The results with the highest RPD values were near the reporting limit for both labs so greater imprecision would be expected. No particular trend was observed between labs so the data sets can be considered comparable, within the variability expected between different grab samples and different analysis batches.

#### b. Ammonia as Nitrogen:

Nearly all results were below the reporting limit for both labs so possible bias could not be fully evaluated. For the single sample where both labs had reportable values, the RPD was well within the 20% limit in Table 20.

#### c. Nitrate/Nitrite as Nitrogen:

Results for all samples were well above the reporting limit for all labs and the resulting RPD values were all well below the 20% limit. No particular trend was observed between labs so the data sets can be considered comparable.

d. Dissolved Metals:

- i. Arsenic values were all well above the reporting limits and the resulting RPDs were well within the 20% limit plus no particular trend was observed between lab results. Arsenic results between the labs should be considered directly comparable.
- ii. Cadmium and Silver values in all samples were below the reporting limits for both labs so results can be considered comparable since no bias was observed.
- iii. Chromium values were below reporting limits for either MEL or KCEL for all except 4 samples. Of these 4 sets of results, the RPD was within the 20% limit for all but one, which showed an RPD of 29%. The one high RPD is likely due to a small difference in the separate grabs for that sample rather than a bias between labs.
- iv. Lead and Zinc values were below reporting limits for either MEL or KCEL for all except 4 sets of results. Of these 4 sets of results, the RPD was within the 20% limit and no trend was observed. Results between the labs should be considered directly comparable.
- v. Copper values were above the reporting limits for both labs in 5 of the 12 samples. Two of these 5 sets, which were collected in July, showed RPD values slightly above the 20% limit (-29% and 21%). The slightly elevated RPDs are likely due to small differences in the separate grabs for those samples rather than a bias between labs.

e. PAHs:

No PAHs were detected in any of the 8 samples except for Naphthalene. Seven of the 8 samples analyzed by KCEL showed results just above the detection limit but below the quantitation limit. Naphthalene was detected by MEL in only 2 of those samples, both results also being below the MEL reporting limit but above the detection limit. Because all measured levels were less than the quantitation/reporting limit for both labs, the precision between labs for Naphthalene were not evaluated. These low levels observed by both labs were likely due to contamination occurring during sampling, shipment and storage since the field blank tested at KCEL showed similar levels of Naphthalene. Results between the labs should be considered comparable for PAHs.

### 3.2 Sediments

a. Total Metals:

Overall, the metals results for sediments can be considered comparable, within the variability expected between split samples and different analysis batches. Sample 0098-OUGA showed the most significant difference where MEL results were typically half of the value measured by KCEL. This sample is discussed separately rather than in the discussions of individual metals below.

- i. Arsenic values were all well above the reporting limits for both labs. Nearly all RPDs were well within the 20% lab replicate limit plus no particular trend was observed between lab results. Arsenic results between the labs should be considered directly comparable.
- ii. Cadmium values in all samples were above the reporting limits for both labs. The RPDs for 2 of the 9 samples slightly exceeded the 20% lab replicate limit. One of these samples had Cadmium levels just above the

reporting limit. Cadmium results for sediments can be considered comparable, within the variability expected between different grab samples and different analysis batches.

- iii. Chromium values in all samples were well above the reporting limits for both labs. The RPDs for 4 of the 9 samples exceeded the 20% lab replicate limit. MEL results were routinely higher than the KCEL value.
- iv. Copper and Lead values in all samples were well above the reporting limits for both labs. The RPDs for only 1 of the 9 samples slightly exceeded the 20% lab replicate limit and no consistent trends were observed. Copper and Lead results for sediments can be considered comparable, within the variability expected between different grab samples and different analysis batches.
- v. Silver values were below reporting limits for either MEL or KCEL for all except 2 of the 9 comparable samples. For one of these 2 sets, the RPD slightly exceeded the 20% limit, likely due to the expected variability for levels measured near the reporting limit. Results between the labs should be considered comparable.
- vi. Zinc values in all samples were well above the reporting limits for both labs. The RPDs for only 2 of the 9 samples slightly exceeded the 20% lab replicate limit and no consistent trends were observed. Zinc results for sediments can be considered comparable, within the variability expected between different grab samples and different analysis batches.
- vii. The MEL results for Sample 0098-OUGA were significantly higher for all 7 metals compared to the KCEL results. This particular sample had the lowest level of total solids of all 10 sediments, as measured by KCEL. The small amount of sediment collected after sieving and the low level of total solids made it difficult to accurately split the sample and was the likely cause of the bias seen between labs.

b. PAHs:

Overall, the PAH results for the 6 sediments were equivalent, within the variability expected between split samples, different analysis batches and the low levels of those PAHs that were detected. Two of the 6 samples had no reportable levels of PAHs by either lab. One or more PAHs were detected above the quantitation limit by one or both labs in the remaining 4 samples, allowing an RPD to be calculated for 11 sets of results. The RPD for 8 of those 11 sets were within the 40% limit for lab replicates.

For the Benzofluoranthenes, MEL and KCEL report results in a slightly different manner. KCEL reports the combined concentration of all 3 isomers (b, j and k) while MEL reports the b and j isomers together as Benzo(b)fluoranthene and Benzo(k)fluoranthene as a separate parameter. It is therefore necessary to sum the 2 MEL results prior to comparison with the KCEL value. Only 2 of the 6 samples had sufficient levels of the Benzofluoranthene isomers to be detected. For the 2 samples where KCEL reported measureable results, small instrument responses were also observed by MEL but did not meet other method criteria so were reported as less than the MEL reporting limit. The RPD values for the Benzofluoranthenes were calculated using the value reported by KCEL and the sum of the reporting limits for the 2 MEL parameters, to approximate what may have been reported if all method criteria had been met.

## Interlab Results for Stream Water - February 2015

Sample ID:	RSM06600-011399			RSM06600-000451			RSM06600-013054		
	'0036-WUGA			'0002-WUGA			'0042-WUGA		
KCEL Sample #	L62191-1			L62191-2			L62191-3		
Collect Date	2/24/15 8:48			2/24/15 9:58			2/24/15 11:02		
MEL Sample #	1502031-1			1502031-2			1502031-3		
Parameters (units)	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD
Turbidity (NTU)	5.13	5	2.6	1.65	1	49.1	1.45	1.1	27.5
Ammonia Nitrogen (mg/L)	0.019	0.02	-5.1	0.01 U	0.01 U		0.013	0.01 U	
Nitrite + Nitrate Nitrogen (mg/L)	1.34	1.36	-1.5	0.603	0.621	-2.9	1.92	1.84	4.3
Arsenic, Dissolved (ug/L)	1.04	1.04	0.0	1.03	1.06	-2.9	1.42	1.44	-1.4
Cadmium, Dissolved (ug/L)	0.05 U	0.1 (U)		0.05 U	0.1 (U)		0.05 U	0.1 (U)	
Chromium, Dissolved (ug/L)	0.38	0.5 (U)		0.2	0.5 (U)		0.628	0.53	16.9
Copper, Dissolved (ug/L)	0.855	0.72	17.1	0.999	1.06	-5.9	1.16	1.04	10.9
Lead, Dissolved (ug/L)	0.15	0.17	-12.5	0.1 U	0.12		0.15	0.17	-12.5
Silver, Dissolved (ug/L)	0.04 U	0.1 (U)		0.04 U	0.1 (U)		0.04 U	0.1 (U)	
Zinc, Dissolved (ug/L)	6.15	5.7	7.6	2.8	5 (U)		4.9	5 (U)	
2-Methylnaphthalene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Acenaphthene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Acenaphthylene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Anthracene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Benzo(a)anthracene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Benzo(a)pyrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Benzo(b,j,k)fluoranthene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Benzo(g,h,i)perylene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Chrysene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Dibenzo(a,h)anthracene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Fluoranthene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Fluorene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Indeno(1,2,3-Cd)Pyrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Naphthalene (ug/L)	0.014 (J)	0.011 (J)		0.0079 (JT)	0.041 (J)				
Phenanthrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				
Pyrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.051 (U)				

## Interlab Results for Stream Water - February 2015

Sample ID:	RSM06600-004615			RSM06600-001415			RSM06600-002259		
	'0072-OUGA			'0024-OUGA			'0045-OUGA		
KCEL Sample #	L62192-1			L62192-2			L62192-4		
Collect Date	2/24/15 9:10			2/24/15 10:02			2/24/15 12:20		
MEL Sample #	1502031-4			1502031-5			1502031-6		
Parameters (units)	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD
Turbidity (NTU)	0.74	0.7	5.6	3.91	3.8	2.9	0.597	0.5 U	
Ammonia Nitrogen (mg/L)	0.01 U	0.01 U		0.01 U	0.01 U		0.01 U	0.01 U	
Nitrite + Nitrate Nitrogen (mg/L)	0.537	0.551	-2.6	0.709	0.716	-1.0	1.27	1.26	0.8
Arsenic, Dissolved (ug/L)	0.354	0.35	1.1	0.558	0.57	-2.1	0.1	0.1	0.0
Cadmium, Dissolved (ug/L)	0.05 U	0.1 (U)		0.05 U	0.1 (U)		0.05 U	0.1 (U)	
Chromium, Dissolved (ug/L)	0.2 U	0.5 (U)		0.871	0.84	3.6	0.2 U	0.5 (U)	
Copper, Dissolved (ug/L)	0.4 U	0.36		0.4 U	0.65		0.4 U	0.31	
Lead, Dissolved (ug/L)	0.1 U	0.1 (U)		0.1 U	0.1 (U)		0.1 U	0.1 (U)	
Silver, Dissolved (ug/L)	0.04 U	0.1 (U)		0.04 U	0.1 (U)		0.04 U	0.1 (U)	
Zinc, Dissolved (ug/L)	1.1	5 (U)		1 U	5 (U)		1 U	5 (U)	
2-Methylnaphthalene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Acenaphthene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Acenaphthylene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Anthracene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Benzo(a)anthracene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Benzo(a)pyrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Benzo(b,j,k)fluoranthene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Benzo(g,h,i)perylene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Chrysene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Dibenzo(a,h)anthracene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Fluoranthene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Fluorene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Indeno(1,2,3-Cd)Pyrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Naphthalene (ug/L)	0.0064 (JT)	0.051 (U)		0.028 (JT)	0.052 (U)				
Phenanthrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				
Pyrene (ug/L)	0.0047 U	0.051 (U)		0.0047 U	0.052 (U)				

### Interlab Results for Stream Water - July 2015

Sample ID:	RSM06600-011399			RSM06600-000451			RSM06600-013054		
	'0036-WUGA			'0002-WUGA			'0042-WUGA		
KCEL Sample #	L63097-1			L63097-2			L63097-3		
Collect Date	7/28/15 8:15			7/28/15 9:22			7/28/15 10:17		
MEL Sample #	1507066-01			1507066-02			1507066-03		
Parameters (units)	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD
Turbidity (NTU)	2.42	2.4	0.8	0.609	0.5U		1.32	0.9	37.8
Ammonia Nitrogen (mg/L)	0.01 (U)	0.016		0.01 (U)	0.01 U		0.01 (U)	0.01 U	
Nitrite + Nitrate Nitrogen (mg/L)	0.996	1.01	-1.4	0.316	0.346	-9.1	3.28	3.47	-5.6
Arsenic, Dissolved (ug/L)	1.5	1.57	-4.6	1.46	1.58	-7.9	1.57	1.63	-3.7
Cadmium, Dissolved (ug/L)	0.05 (U)	0.2 U		0.05 (U)	0.2 U		0.05 (U)	0.2 U	
Chromium, Dissolved (ug/L)	0.25	0.5 U		0.2 (U)	0.5 U		0.526	0.63	-18.0
Copper, Dissolved (ug/L)	0.86	1.15	-28.9	0.595	0.48	21.4	0.22	0.5 U	
Lead, Dissolved (ug/L)	0.233	0.24	-3.0	0.1 (U)	0.2 U		0.1 (U)	0.2 U	
Silver, Dissolved (ug/L)	0.04 (U)	0.2 U		0.04 (U)	0.2 U		0.04 (U)	0.2 U	
Zinc, Dissolved (ug/L)	2.3	5 U		0.6	5 U		0.5 (U)	5 U	
2-Methylnaphthalene (ug/L)	0.0049 (U)	0.051 (U)		0.005 (U)	0.053 (U)				
Acenaphthene (ug/L)	0.0049 (U)	0.051 (U)		0.005 (U)	0.053 (U)				
Acenaphthylene (ug/L)	0.0049 (U)	0.051 (U)		0.005 (U)	0.053 (U)				
Anthracene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(a)anthracene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(a)pyrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(b,j,k)fluoranthene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(g,h,i)perylene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Chrysene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Dibenzo(a,h)anthracene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Fluoranthene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Fluorene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Indeno(1,2,3-Cd)Pyrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Naphthalene (ug/L)	0.017 (JT)	0.051 (U)		0.016 (JT)	0.053 (U)				
Phenanthrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Pyrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				

### Interlab Results for Stream Water - July 2015

Sample ID:	RSM06600-002259			RSM06600-001415			RSM06600-004615		
	'0045-OUGA			'0024-OUGA			'0072-OUGA		
	L63098-2			L63098-4			L63098-5		
	7/28/15 11:47			7/28/15 9:50			7/28/15 9:12		
KCEL Sample #	1507066-04			1507066-05			1507066-06		
Collect Date									
MEL Sample #									
Parameters (units)	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD
Turbidity (NTU)	0.33	0.5 U		4.23	3.6	16.1	1.18	0.5 U	
Ammonia Nitrogen (mg/L)	0.01 (U)	0.01 U		0.01 (U)	0.01 U		0.01 (U)	0.01	
Nitrite + Nitrate Nitrogen (mg/L)	0.938	0.969	-3.3	0.506	0.53	-4.6	0.185	0.202	-8.8
Arsenic, Dissolved (ug/L)	0.12	0.20 U		0.75	0.79	-5.2	1.02	1.13	-10.2
Cadmium, Dissolved (ug/L)	0.05 (U)	0.2 U		0.05 (U)	0.2 U		0.05 (U)	0.2 U	
Chromium, Dissolved (ug/L)	0.2 (U)	0.5 U		0.803	1.08	-29.4	0.2 (U)	0.5 U	
Copper, Dissolved (ug/L)	0.22	0.5 U		0.28	0.5 U		0.48	0.5 U	
Lead, Dissolved (ug/L)	0.1 (U)	0.2 U		0.1 (U)	0.2 U		0.1 (U)	0.2 U	
Silver, Dissolved (ug/L)	0.04 (U)	0.2 U		0.04 (U)	0.2 U		0.04 (U)	0.2 U	
Zinc, Dissolved (ug/L)	0.5 (U)	5 U		0.5 (U)	5 U		0.5 (U)	5 U	
2-Methylnaphthalene (ug/L)	0.0049 (U)	0.051 (U)		0.005 (U)	0.053 (U)				
Acenaphthene (ug/L)	0.0049 (U)	0.051 (U)		0.005 (U)	0.053 (U)				
Acenaphthylene (ug/L)	0.0049 (U)	0.051 (U)		0.005 (U)	0.053 (U)				
Anthracene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(a)anthracene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(a)pyrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(b,j,k)fluoranthene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Benzo(g,h,i)perylene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Chrysene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Dibenzo(a,h)anthracene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Fluoranthene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Fluorene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Indeno(1,2,3-Cd)Pyrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Naphthalene (ug/L)	0.0049 (U)	0.051 (U)		0.015 (JT)	0.053 (U)				
Phenanthrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				
Pyrene (ug/L)	0.0097 (U)	0.051 (U)		0.0099 (U)	0.053 (U)				

### Interlab Metals Results for Stream Sediment

Sample ID:	RSM06600-015391			RSM06600-012807			RSM06600-019815			RSM06600-006123			RSM06600-020819		
	'0050-WUGA			'0040-WUGA			'0082-WUGA			'0018-WUGA			'0080-WUGA		
KCEL Sample #	L63168-2			L63214-2			L63217-2			L63355-2			L63426-2		
Collect Date:	7/8/15 9:00			7/16/15 9:30			7/22/15 9:30			7/29/15 9:30			8/18/15 9:30		
MEL Sample #	1507068-07			1507068-17			1507068-25			1507068-31			1508084-11		
KCEL Total Solids %	78.8			25.8			25.8			21.1			75.1		
Sieve Size	2 mm			63 um			63 um			63 um			2 mm		
Units = mg/Kg (dw)	KCEL Result	MEL Result	RPD												
<b>Parameters</b>															
Arsenic	2.26	2.35	-4	14.1	14.7	-4	8.06	8.56	-6	19.1	19.7	-3	2	2.29	-14
Cadmium	0.0834	0.084	-1	0.191	0.256	-29	0.318	0.348	-9	0.388	0.413	-6	0.06	0.085	-34
Chromium	27.7	36	-26	32.8	40	-20	33.3	47.7	-36	46.8	56.4	-19	23.6	27.6	-16
Copper	10.7	11	-3	29	32.3	-11	34.7	41.5	-18	64	71.8	-11	8.1	9.01	-11
Lead	2.59	2.88	-11	10.5	11	-5	28.7	30	-4	16	15.6	3	4.46	4.92	-10
Silver	0.025	0.1 U	NA	0.0736	0.1 U	NA	0.0814	0.107 U	NA	0.115	0.119 U	NA	0.013 U	0.1 U	NA
Zinc	51.4	57.2	-11	76	86.1	-12	151	184	-20	77.3	90.1	-15	28.5	31.2	-9

### Interlab Metals Results for Stream Sediment

Sample ID:	RSM06600-001415			RSM06600-005879			RSM06600-000859			RSM06600-002027			RSM06600-030971		
	'0024-OUGA			'0098-OUGA			'0003-WUGA			'0039-OUGA			'0077-WUGA		
KCEL Sample #	L63431-2			L63432-2			L63618-2			L63625-2			L63626-2		
Collect Date:	9/22/15 9:35			8/31/15 10:00			9/1/15 9:20			9/10/15 9:30			9/14/15 9:00		
MEL Sample #	1509073-19			1508084-21			1509073-01			1507073-11			1509073-13		
KCEL Total Solids %	74.4			5.11			9.11			31.2			23.4		
Sieve Size	2 mm			63 um											
Units = mg/Kg (dw)	KCEL Result	MEL Result	RPD												
<b>Parameters</b>															
Arsenic	2.65	3.19	-18	16.5	8.25	67	36.6	31.4	15	13.4	13.3	1	19.3	20.1	-4
Cadmium	0.065	0.072	-10	0.92	0.42	75	0.536	0.443	19	0.305	0.275	10	0.3	0.299	0
Chromium	23.9	35.7	-40	53	30.5	54	53.6	55.5	-3	69.6	71.1	-2	40.4	50.6	-22
Copper	12	15.2	-24	45.6	25.4	57	30.1	28.5	5	102	88.2	15	17.4	19.9	-13
Lead	2.42	2.67	-10	143	62.5	78	31.8	24.6	26	16	14.5	10	38.7	36.5	6
Silver	0.032	0.10 U	NA	0.237	0.108	75	0.143	0.102	33	0.145	0.119	20	0.108	0.10 U	NA
Zinc	37.8	36.7	3	147	62	81	286	215	28	138	110	23	157	143	9

### Interlab PAH Results for Stream Sediments

Sample ID:	RSM06600-015067			RSM06600-019815			RSM06600-006123			RSM06600-000814			RSM06600-001415			RSM06600-005879		
	'0048-WUGA			'0082-WUGA			'0018-WUGA			'0008-OUGA			'0024-OUGA			'0098-OUGA		
KCEL Sample #:	L63167-1			L63217-3			L63355-1			L63422-1			L63431-1			L63432-3		
Collect Date:	7/7/15 10:00			7/22/15 9:30			7/29/15 9:30			8/12/15 10:00			9/22/15 9:35			8/31/15 10:00		
MEL Sample #	1507068-05			1507068-25			1507068-31			1508084-01			1509073-19			1508084-21		
KCEL Total Solids %	49.4			25.6			52.3			18.2			74.8			64.4		
MEL % Solids	46.2			38.6			37.0			19.1			76.4			67.5		
Units = mg/Kg (dry weight)	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD	KCEL Result	MEL Result	RPD									
<b>Parameters</b>																		
1-Methylnaphthalene	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
2-Chloronaphthalene	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
2-Methylnaphthalene	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
Acenaphthene	11U	27U		21U	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Acenaphthylene	11U	27U		21U	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Anthracene	11U	27U		21U	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Benzo(a)anthracene	11U	27U		21U	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Benzo(a)pyrene	20	27U		38	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Benzo(b,j,k)fluoranthene*	53.2	54U **	-2	83.2	64U **	26	10U	68U		29U	130U		7.1U	32U		8.2U	38U	
Benzo(g,h,i)perylene	20	54U		31	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
Carbazole	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
Chrysene	14	27U		39	28 J	33	10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Dibenzo(a,h)anthracene	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
Dibenzofuran	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
Fluoranthene	21.9	29	-28	63.7	42	41	10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Fluorene	11U	27U		21U	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Indeno(1,2,3-Cd)Pyrene	16	27U		31	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Naphthalene	11U	54U		21U	64U		10U	68U		29U	130U		7.1U	33U		8.2U	37U	
Phenanthrene	11U	27U		26	32U		10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Pyrene	22	28	-24	60.9	35	54	10U	34U		29U	65U		7.1U	16U		8.2U	19U	
Retene	26.5	28	-6	51.2	37	32	166	210	-23	2020	790	87.5	7.1U	16U		26.6	19U	
*The sum of the reporting limits for Benzo(b)fluoranthene and Benzo(k)fluoranthene is shown for the MEL result																		
** Responses for benzo(b+j) and benzo(k) fluoranthene were observed by MEL but method reporting criteria were not met so the measured values were not reported																		