

Appendix D: Arsenic and PAH Methods and Data Results

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APPENDIX D – ARSENIC AND PAH METHODS AND DATA RESULTS

Four environmental samples from this study were analyzed for arsenic and polycyclic aromatic hydrocarbons (PAHs). These results were not used to answer the study questions, but could be useful for future water quality characterizations in the basin. Laboratory methods and results are included in this appendix. These results were included in the data validation presented in Appendix C.

Laboratory Methods

Total and dissolved arsenic samples were analyzed by EPA Method 200.8 (Inductively Coupled Plasma-Mass Spectrometry [ICP-MS]), King County Environmental Laboratory (KCEL) Standard Operating Procedure (SOP) 624.

Samples were prepared by liquid-liquid extraction as detailed in EPA Method 3520C. Samples were analyzed according to EPA Method 8270D; Gas Chromatography/ Mass Spectrometry with Selected Ion Monitoring and Large Volume Injection Method (GC/MS-SIM LVI), following KCEL SOP 772v0. The specific PAHs analyzed included: 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, benzo(b,j,k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno (1,2,3-cd)perylene, naphthalene, phenanthrene, and pyrene.

References

- EPA. 2008. USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. OSWER 9240.1-48, USEPA-540-R-08-01. United States Environmental Protection Agency. Washington, D.C. June 2001.
- EPA. 2010. Method 1668C Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS. US EPA, Office of Water, Office of Science and Technology, Washington DC. EPA-820-R-10-005.
- KCEL SOP #624. King County Environmental Laboratory Standard Operating Procedure for ICPMS Analysis of Water, Wastes, Sediments, Sludges, and Tissues by the Thermo X II CCT Instrument. King County Water and Land Resources Division. Seattle, Washington.
- KCEL SOP #772v0. King County Environmental Laboratory Standard Operating Procedure for Analysis of PAHs and Phthalates by GC/MS-SIM-LVI. King County Water and Land Resources Division. Seattle, Washington.

Table D-1. Conventional Parameters, Arsenic, and PAH for Green River Samples Collected October 2016
King County Environmental Lab Analytical Report

Parameters	Locator: FL319 Descrip: GREEN RIVER, DOWNS Sample: L66333-1 Matrix: LG STORM WTR ColDate: 10/6/16 20:00 TimeSpan: 15 WET Weight Basis						Locator: KP319 Descrip: GREEN RIVER MAIN S Sample: L66333-2 Matrix: LG STORM WTR ColDate: 10/6/16 20:00 TimeSpan: 15 WET Weight Basis						Locator: FL319 Descrip: GREEN RIVER, DOWNS Sample: L66408-1 Matrix: LG STORM WTR ColDate: 10/13/16 0:00 TimeSpan: 14 WET Weight Basis					
	Value	Lab Qual	DV Qual	MDL	RDL	Units	Value	Lab Qual	DV Qual	MDL	RDL	Units	Value	Lab Qual	DV Qual	MDL	RDL	Units
CV SM2540-D																		
Total Suspended Solids	7.6			1	2	mg/L	3.3			0.5	1	mg/L	172			1.3	2.5	mg/L
CV SM5310-B																		
Dissolved Organic Carbon	1.32			0.5	1	mg/L	0.92	<RDL		0.5	1	mg/L	1.61			0.5	1	mg/L
Total Organic Carbon	1.74			0.5	1	mg/L	0.97	<RDL		0.5	1	mg/L	3.42			0.5	1	mg/L
ES NONE																		
Field Personnel	JP						JD/BB						JP					
Sample Code	COMP						COMP						COMP					
Sample Function	SAMP						SAMP						SAMP					
Sample Information	Collected 31 - 400ml samples of stormwater via autosampler over a 15-hour period through 20ft of teflon line and 4 feet of non-platinum cured						Collected 31 - 400ml samples of stormwater via autosampler over a 15-hour period through 20ft of teflon line and 4 feet of non-platinum cured						Collected 28 - 450ml samples of stormwater via autosampler over a 14-hour period through 20ft of teflon tubing and 4ft of non-platinum cured silicone					
Sampling Method	01012						01012						01012					
Storm Or Non-Storm	S						S						S					
MT EPA 200.8*SW846 6020A																		
Arsenic, Dissolved, ICP-MS	0.735	H	J	0.1	0.5	ug/L	0.687	H	J	0.1	0.5	ug/L	0.566	H	J	0.1	0.5	ug/L
Arsenic, Total, ICP-MS	0.944			0.1	0.5	ug/L	0.701			0.1	0.5	ug/L	2.99			0.1	0.5	ug/L
OR SW846 3520C*8270D SIM																		
1-Methylnaphthalene	0.00145	B	U	0.00047	0.000943	ug/L	0.00133	B	U	0.00047	0.000943	ug/L	0.00222			0.00047	0.000943	ug/L
2-Methylnaphthalene	0.00196	B	U	0.00047	0.000943	ug/L	0.00172	B	U	0.00047	0.000943	ug/L	0.00225	B	U	0.00047	0.000943	ug/L
Acenaphthene	0.00147			0.00047	0.000943	ug/L	0.00118			0.00047	0.000943	ug/L	0.00114			0.00047	0.000943	ug/L
Acenaphthylene	0.00053	<RDL	J	0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00086	<RDL	J	0.00047	0.000943	ug/L	
Anthracene	<MDL	U	0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00064	<RDL	J	0.00047	0.000943	ug/L		
Benzo(a)anthracene	0.00075	<RDL	J	0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00125	JG	J	0.00047	0.000943	ug/L	
Benzo(a)pyrene	0.0007	<RDL	J	0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.0015			0.00047	0.000943	ug/L	
Benzo(b,j,k)fluoranthene	0.00231			0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00409			0.00047	0.000943	ug/L	
Benzo(g,h,i)perylene	0.00151			0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00266			0.00047	0.000943	ug/L	
Chrysene	0.00139			0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00261	JG	J	0.00047	0.000943	ug/L	
Dibenzo(a,h)anthracene	0.00081	<RDL	J	0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00165			0.00047	0.000943	ug/L	
Fluoranthene	0.00279			0.00047	0.000943	ug/L	0.00232			0.00047	0.000943	ug/L	0.00454			0.00047	0.000943	ug/L
Fluorene	0.00079	<RDL	J	0.00047	0.000943	ug/L	0.000959			0.00047	0.000943	ug/L	0.00085	<RDL	J	0.00047	0.000943	ug/L
Indeno(1,2,3-Cd)Pyrene	0.0009	<RDL	J	0.00047	0.000943	ug/L	<MDL	U	0.00047	0.000943	ug/L	0.00197			0.00047	0.000943	ug/L	
Naphthalene	0.00421	B	U	0.0012	0.00236	ug/L	0.00409	B	U	0.0012	0.00236	ug/L	0.00492	B	U	0.0012	0.00236	ug/L
Phenanthrene	0.00235			0.00047	0.000943	ug/L	0.00278			0.00047	0.000943	ug/L	0.00387			0.00047	0.000943	ug/L
Pyrene	0.00207			0.00047	0.000943	ug/L	0.0012			0.00047	0.000943	ug/L	0.00314			0.00047	0.000943	ug/L

Table D-1. Conventional Parameters, Arsenic, and PAH for Green River Samples Collected October 2016
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	Locator: KP319					
	Descrip: GREEN RIVER MAIN S					
	Sample: L66408-2					
	Matrix: LG STORM WTR					
	ColDate: 10/13/16 0:00					
	TimeSpan: 13.5					
	WET Weight Basis					
Parameters	Value	Lab Qual	DV Qual	MDL	RDL	Units
CV SM2540-D						
Total Suspended Solids	5.1			0.5	1	mg/L
CV SM5310-B						
Dissolved Organic Carbon	1.3			0.5	1	mg/L
Total Organic Carbon	1.27			0.5	1	mg/L
ES NONE						
Field Personnel	BB					none
Sample Code	COMP					none
Sample Function	SAMP					none
Sample Information	Collected 28 - 450ml samples of stormwater via autosampler over a 13.5-hour period through 20ft of teflon tubing and 4ft of non-platinum cured silicone					none
Sampling Method	02012					none
Storm Or Non-Storm	S					none
MT EPA 200.8*SW846 6020A						
Arsenic, Dissolved, ICP-MS	0.49	<RDL,H	J	0.1	0.5	ug/L
Arsenic, Total, ICP-MS	0.648			0.1	0.5	ug/L
OR SW846 3520C*8270D SIM						
1-Methylnaphthalene	0.00106			0.00047	0.000943	ug/L
2-Methylnaphthalene	0.000963	B	U	0.00047	0.000943	ug/L
Acenaphthene	0.0009	<RDL	J	0.00047	0.000943	ug/L
Acenaphthylene		<MDL	U	0.00047	0.000943	ug/L
Anthracene		<MDL	U	0.00047	0.000943	ug/L
Benzo(a)anthracene		<MDL,JG	UJ	0.00047	0.000943	ug/L
Benzo(a)pyrene		<MDL	U	0.00047	0.000943	ug/L
Benzo(b,j,k)fluoranthene		<MDL	U	0.00047	0.000943	ug/L
Benzo(g,h,i)perylene		<MDL	U	0.00047	0.000943	ug/L
Chrysene		<MDL,JG	UJ	0.00047	0.000943	ug/L
Dibenzo(a,h)anthracene		<MDL	U	0.00047	0.000943	ug/L
Fluoranthene	0.00223			0.00047	0.000943	ug/L
Fluorene	0.00082	<RDL	J	0.00047	0.000943	ug/L
Indeno(1,2,3-Cd)Pyrene		<MDL	U	0.00047	0.000943	ug/L
Naphthalene	0.00282	B	U	0.0012	0.00236	ug/L
Phenanthrene	0.00224			0.00047	0.000943	ug/L
Pyrene	0.00117			0.00047	0.000943	ug/L