Table 1: Slave River Water Quality Data (Hydrocarbons and Suspended Sediment): July, August and September 2020 compared to Historical Data

Parameter	Centrifugate Water (ng/L)					Suspended Sediment (ng/g)				
	2010-2019		Jul-20	Aug-20	Sep-20	2010-2019		Jul-20	Aug-20	Sep-20
	Minimum	Maximum				Minimum	Maximum			
1,2,6-Trimethylphenanthrene	0.017	0.669	2.1	0.15	0.071	3.35	12.4	8.91	4.15	4.84
1,2-Dimethylnaphthalene	0.045	4.49	3.22	0.108	0.219	8.35	32.8	23.7	14.9	16.9
1,4,6,7-Tetramethylnaphthalene	0.031	2.33	4.1	0.1	0.152	6.58	36.8	20.1	12.7	13.6
1,7-Dimethylphenanthrene	0.026	3.55	8.43	0.069	0.26	12.6	55	33.1	18.3	22.8
1,8-Dimethylphenanthrene	0.018	0.918	1.97	0.06	0.073	2.91	11.5	7.08	3.84	4.98
1-Methylchrysene	0.01	1.01	4.17	0.079	0.125	7.61	20.1	15.4	7.55	9.94
1-Methylnaphthalene	0.618	20.5	11.6	1.19	0.901	25	191	105	77.9	80.1
1-Methylphenanthrene	0.047	6.37	12.9	0.22	0.494	19	88	61.8	33.2	39.5
2,3,5-Trimethylnaphthalene	0.091	10.6	12.6	0.425	0.591	25.3	136	74.6	45.3	48.4
2,3,6-Trimethylnaphthalene	0.107	9.35	15	0.509	0.698	27.6	162	86.9	49.6	51.8
2,4-Dimethyldibenzothiophene	0.028	0.819	2.19	0.16	0.097	3.71	13.2	7.29	4.11	6.09
2,6-Dimethylnaphthalene	0.309	9.44	12.5	0.43	0.723	33.6	133	90.1	52	60.1
2,6-Dimethylphenanthrene	0.019	2.4	5.88	0.06	0.143	6.36	38.1	22.4	9.05	11.2
2/3-Methyldibenzothiophenes	0.027	1.31	4.25	0.071	0.098	5.59	22.8	16.1	7.45	10.1
2-Methyl naphthalene	0.896	27.4	15.9	2.13	1.46	31	249	134	100	104
2-Methylanthracene	0.031	1.1	1.08	0.145	0.374	1.02	3.78	4.25	2.33	3.09

Table 1: Slave River Water Quality Data (Hydrocarbons and Suspended Sediment): July, August and September 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)					Suspended Sediment (ng/g)				
	2010-2019		Jul-20	Aug-20	Sep-20	2010-2019		Jul-20	Aug-20	Sep-20
	Minimum	Maximum				Minimum	Maximum			
2-Methylfluorene	0.042	3.55	1.92	0.225	0.087	3.79	17	11.7	4.28	5.07
2-Methylphenanthrene	0.049	9.22	20.6	0.342	0.578	27.1	139	96.7	46	53.9
3,6-Dimethylphenanthrene	0.03	2.1	4.85	0.06	0.141	8.19	29.6	19.6	8.92	11.1
3-Methylfluoranthene/Benzo(a)fluorene	0.029	6.38	15.2	0.295	0.244	25.7	107	56.9	26.5	33.7
3-Methylphenanthrene	0.048	7.08	15.4	0.262	0.437	20.4	99.4	72	33.5	41.2
5,9-Dimethylchrysene	0.024	1.29	5.79	0.085	0.08	7.25	37.4	20.8	8.61	11.2
5/6-Methylchrysene	0.01	0.788	2.57	0.056	0.079	4.62	13.1	9.94	4.58	6.2
7-Methylbenzo(a)pyrene	0.035	0.564	1.6	0.184	0.086	1.88	10.3	4.7	1.95	4.57
9/4-Methylphenanthrene	0.048	9.1	18.5	0.337	0.583	23.5	113	81.6	41	49.6
Acenaphthene	0.057	1.2	0.927	0.134	0.09	0.917	8	5.53	2.87	3.31
Acenaphthylene	0.027	1	0.232	0.157	0.098	0.069	5	1.82	0.247	0.112
Anthracene	0.023	3.37	0.29	0.049	0.043	0.805	66.7	1.84	65.1	0.753
Benz(a)anthracene	0.017	1.21	3.46	0.087	0.092	4.9	14.6	15.3	6.95	8.54
Benzo(a)pyrene	0.036	1.14	4.05	0.098	0.1	7	50	16.6	8.21	11.8
Benzo(b)fluoranthene	0.023	3.49	13.1	0.223	0.274	1.71	46.3	38.1	18.7	23.7
Benzo(e)pyrene	0.034	4.72	18.5	0.281	0.393	19	59.7	57.2	25.4	31.3

Table 1: Slave River Water Quality Data (Hydrocarbons and Suspended Sediment): July, August and September 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)					Suspended Sediment (ng/g)				
	2010-2019		Jul-20	Aug-20	Sep-20	2010-2019		Jul-20	Aug-20	Sep-20
	Minimum	Maximum				Minimum	Maximum			
Benzo(g,h,i)perylene	0.037	4.03	14.3	0.278	0.352	16	65.8	56	25.2	34.2
Benzo(j,k)fluoranthene	0.025	1.25	2.36	0.067	0.085	4.59	27.2	11.5	5.86	7.13
Biphenyl	0.36	2.89	3.78	0.673	0.628	10	60.8	26.5	16.9	19.6
C1-Acenaphthenes	0.028	4	0.358	0.144	0.08	0.623	40	1.85	0.968	1.09
C1-Benz(a)Anthracenes/Chrysenes	0.035	8.02	32.4	0.466	0.812	45.9	150	116	50.9	66.8
C1-Benzofluoranthenes/Benzopyrenes	0.059	9.73	41.5	0.364	1.08	43	195	166	71.2	99
C1-Biphenyls	0.364	5.97	8.53	0.404	0.778	21.9	138	60.9	33.7	35.2
C1-Dibenzothiophenes	0.027	4.48	11.6	0.141	0.301	17	68.3	49.3	23.2	28.9
C1-Fluoranthenes/Pyrenes	0.038	17.4	38.5	0.691	1.14	44	284	144	64.8	92.9
C1-Fluorenes	0.192	14.1	10.9	0.225	0.665	15	95	55.9	22	28.8
C1-Naphthalenes	1.51	47.9	27.6	3.31	2.36	94	440	239	178	184
C1-Phenanthrenes/Anthracenes	0.047	32.1	67.4	1.16	2.09	91	1660	316	156	187
C2-Benz(a)Anthracenes/Chrysenes	0.024	6.47	26.6	0.353	0.65	36.8	148	101	39.1	58.5
C2-Benzofluoranthenes/Benzopyrenes	0.035	5.74	16.7	0.092	0.456	19.1	90.6	52.9	20.7	45.4
C2-Biphenyls	0.462	24.8	13.1	1.57	1.32	15.9	151	58.9	31.1	30.3
C2-Dibenzothiophenes	0.13	7.47	18.8	0.403	1	27	113	76.8	37.4	57.4

Table 1: Slave River Water Quality Data (Hydrocarbons and Suspended Sediment): July, August and September 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)					Suspended Sediment (ng/g)				
	2010-2019		Jul-20	Aug-20	Sep-20	2010-2019		Jul-20	Aug-20	Sep-20
	Minimum	Maximum				Minimum	Maximum			
C2-Fluoranthenes/Pyrenes	0.021	23.5	55.3	0.906	1.79	59	360	187	73.4	124
C2-Fluorenes	0.204	14.1	28.9	0.326	1.17	27	175	128	45.7	85.7
C2-Naphthalenes	1.67	54.5	55.2	2.6	3.82	121	603	420	253	291
C2-Phenanthrenes/Anthracenes	0.155	26.9	63.4	0.563	1.7	86.5	1340	234	104	138
C3-Benzanthracenes/Chrysenes	0.023	4	4.66	0.032	0.179	8.48	51	14.4	6.35	22.9
C3-Dibenzothiophenes	0.089	8.27	13.2	0.18	0.976	28.6	82.2	50.6	29.9	45.1
C3-Fluoranthenes/Pyrenes	0.013	13.2	30.2	0.217	0.892	42.5	247	96	30	78.4
C3-Fluorenes	0.247	15.2	36.7	0.308	3.11	35	178	142	53.5	99.1
C3-Naphthalenes	0.802	48	62.5	1.8	3.3	97	651	373	229	238
C3-Phenanthrenes/Anthracenes	0.096	12.3	40.4	0.602	1.32	57.1	1020	142	64.5	83.4
C4-Benzanthracenes/Chrysenes	0.027	4	1.72	0.04	0.343	2.38	40	6.61	2.71	7.26
C4-Dibenzothiophenes	0.081	5.56	6.23	0.058	0.721	16	64.2	21.3	14	34.4
C4-Fluoranthenes/Pyrenes	0.01	5.13	9.54	0.106	0.322	16.4	108	35.1	13	24.4
C4-Naphthalenes	0.031	28.9	39.6	0.733	1.56	64	370	178	123	145
C4-Phenanthrenes/Anthracenes	0.175	24.9	103	1.61	2.94	50	570	320	234	297
Chrysene	0.043	7.09	20.9	0.375	0.561	14	85.7	64.7	29.6	36.7

Table 1: Slave River Water Quality Data (Hydrocarbons and Suspended Sediment): July, August and September 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)					Suspended Sediment (ng/g)				
	2010-2019		Jul-20	Aug-20	Sep-20	2010-2019		Jul-20	Aug-20	Sep-20
	Minimum	Maximum				Minimum	Maximum			
Dibenz(a,h)anthracene	0.039	1	2.78	0.086	0.085	3.87	10.3	8.77	3.74	5.02
Dibenzothiophene	0.04	2.37	2.71	0.123	0.135	6	20	14.5	6.98	8.42
Fluoranthene	0.149	2.2	6.1	0.227	0.327	8.91	26	22.7	10.7	13.6
Fluorene	0.098	4.56	2.98	0.062	0.188	5	28	18.1	6.24	8.48
Indeno(1,2,3-c,d)pyrene	0.036	1.22	3.95	0.129	0.162	6.19	15.9	14.8	7.07	9.59
Naphthalene	1.37	23.5	7.41	2.12	1.83	12	178	53	50.9	50.4
Perylene	0.035	15.8	53.5	1.47	2.08	133	253	222	146	211
Phenanthrene	0.445	20.5	21.6	0.753	1.06	37	187	125	65.1	79.3
Pyrene	0.134	3.7	10.9	0.401	0.555	15.7	42.9	38	18.1	24.1
Retene	0.07	6.98	25.8	0.769	0.971	49	186	107	128	114

Table 2: Hay River Water Quality Data (Hydrocarbons and Suspended Sediment): July 2020 compared to Historical Data

Parameter	Centrifugate Water (ng/L)			Suspended Sediment (ng/g)		
	2010-2019		Jul-20	2010-2019		July 2020
	Minimum	Maximum		Minimum	Maximum	
1,2,6-Trimethylphenanthrene	0.021	0.564	0.109	1.02	3.23	1.57
1,2-Dimethylnaphthalene	0.232	0.34	0.255	1.91	4.24	3.18
1,4,6,7-Tetramethylnaphthalene	0.088	0.26	0.188	2.45	5.13	4.34
1,7-Dimethylphenanthrene	0.029	0.675	0.11	2.82	9.25	4
1,8-Dimethylphenanthrene	0.026	0.038	0.064	0.949	1.87	1.52
1-Methylchrysene	0.019	0.099	0.237	3.7	7.42	6.97
1-Methylnaphthalene	0.798	47	2.7	5.08	11	7.45
1-Methylphenanthrene	0.104	0.573	0.351	4.02	9.11	6.87
2,3,5-Trimethylnaphthalene	0.222	0.95	0.598	5.87	10.9	8.44
2,3,6-Trimethylnaphthalene	0.259	1.16	0.656	5.76	12.5	9.89
2,4-Dimethyldibenzothiophene	0.029	0.506	0.191	1.31	2.3	2
2,6-Dimethylnaphthalene	0.413	1.3	0.713	3.58	263	4.49
2,6-Dimethylphenanthrene	0.033	0.234	0.064	1.2	3.21	1.62
2/3-Methyldibenzothiophenes	0.036	0.308	0.157	1.34	3.53	1.57
2-Methyl naphthalene	1.27	98	4.61	3.39	10	4.09

Table 2: Hay River Water Quality Data (Hydrocarbons and Suspended Sediment): July 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)			Suspended Sediment (ng/g)		
	2010-2019		Jul-20	2010-2019		July 2020
	Minimum	Maximum		Minimum	Maximum	
2-Methylfluorene	0.07	0.136	0.186	0.827	2.62	1
2-Methylphenanthrene	0.136	0.643	0.194	3.91	9.15	5.42
3,6-Dimethylphenanthrene	0.03	0.607	0.116	2.03	2.97	2.52
3-Methylfluoranthene/Benzo(a)fluorine	0.11	0.995	0.536	11	29	14.7
3-Methylphenanthrene	0.123	0.506	0.216	3.13	6.47	4.26
5,9-Dimethylchrysene	0.049	0.109	0.158	3.1	6.95	6.1
5/6-Methylchrysene	0.047	0.069	0.078	1.45	3.09	2.59
9/4-Methylphenanthrene	0.087	0.456	0.378	5.57	10.8	10
Acenaphthene	0.104	2	0.327	1.42	10	3.73
Acenaphthylene	0.084	0.44	0.417	0.051	10	0.225
Anthracene	0.033	0.068	0.089	0.232	10	0.518
Benz(a)anthracene	0.036	0.083	0.129	1.43	10	2
Benzo(a)pyrene	0.039	0.11	0.096	2.5	50	5.11
Benzo(b)fluoranthene	0.07	0.265	0.47	15	17	11.1
Benzo(e)pyrene	0.1	0.333	0.65	10	17	13.5

Table 2: Hay River Water Quality Data (Hydrocarbons and Suspended Sediment): July 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)			Suspended Sediment (ng/g)		
	2010-2019		Jul-20	2010-2019		July 2020
	Minimum	Maximum		Minimum	Maximum	
Benzo(g,h,i)perylene	0.098	3	0.532	13.1	21.5	17.3
Benzo(j,k)fluoranthene	0.023	0.172	0.114	2.05	5.11	3.37
Biphenyl	0.424	4	0.717	1	10	1.01
C1-Acenaphthenes	0.037	4	0.152	0.383	40	1.02
C1-Benz(a)Anthracenes/Chrysenes	0.05	0.572	1	19	40	32
C1-Benzofluoranthenes/Benzopyrenes	0.158	3.24	1.56	38	74.7	60.3
C1-Biphenyls	0.48	6.87	0.992	1.68	40	1.69
C1-Dibenzothiophenes	0.077	0.387	0.191	4.97	61	6.76
C1-Fluoranthenes/Pyrenes	0.301	2.58	1.56	29	87.2	39.8
C1-Fluorenes	0.26	4.09	0.318	5.41	40	5.85
C1-Naphthalenes	2.07	14.3	7.31	8.81	17.4	11.5
C1-Phenanthrenes/Anthracenes	0.191	12	1.14	17.5	147	26.2
C2-Benz(a)Anthracenes/Chrysenes	0.111	0.929	0.693	19.7	46.4	31.7
C2-Benzofluoranthenes/Benzopyrenes	0.094	4.53	0.159	11	40	15.7
C2-Biphenyls	0.634	39	3.65	2.27	42	3.57

Table 2: Hay River Water Quality Data (Hydrocarbons and Suspended Sediment): July 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)			Suspended Sediment (ng/g)		
	2010-2019		Jul-20	2010-2019		July 2020
	Minimum	Maximum		Minimum	Maximum	
C2-Dibenzothiophenes	0.211	1.84	0.893	15	202	21.1
C2-Fluoranthenes/Pyrenes	0.315	2.98	1.84	37.5	135	44
C2-Fluorenes	0.275	4.09	0.911	10.3	57.3	19.3
C2-Naphthalenes	1.95	25	4.31	19.5	819	32.9
C2-Phenanthrenes/Anthracenes	0.3	13	0.865	21.7	135	29.2
C3-Benzanthracenes/Chrysenes	0.042	0.766	0.078	3.97	40	5.1
C3-Dibenzothiophenes	0.176	2.67	0.508	17.1	60	27.2
C3-Fluoranthenes/Pyrenes	0.195	1.35	0.456	0.029	107	24.5
C3-Fluorenes	0.347	13	0.887	12	271	30.4
C3-Naphthalenes	1.27	45	2.96	27.4	155	49.4
C3-Phenanthrenes/Anthracenes	0.141	1.52	0.866	12	791	32.5
C4-Benzanthracenes/Chrysenes	0.097	4.83	0.087	1.5	40	1.17
C4-Dibenzothiophenes	0.202	2.52	0.063	12	66	15.3
C4-Fluoranthenes/Pyrenes	0.117	1.18	0.128	9.24	41.9	15
C4-Naphthalenes	0.646	7	1.82	15.8	188	36.9

Table 2: Hay River Water Quality Data (Hydrocarbons and Suspended Sediment): July 2020 compared to Historical Data (cont.)

Parameter	Centrifugate Water (ng/L)			Suspended Sediment (ng/g)		
	2010-2019		Jul-20	2010-2019		July 2020
	Minimum	Maximum		Minimum	Maximum	
C4-Phenanthrenes/Anthracenes	0.395	6.58	6.58	62	387	315
Chrysene	0.118	1	0.595	5	17.7	12.1
Dibenz(a,h)anthracene	0.046	0.088	0.178	1.62	10	2.05
Dibenzothiophene	0.084	1	0.137	1.41	10	1.86
Fluoranthene	0.219	3	0.585	4.33	14	6.29
Fluorene	0.119	6	0.264	1.18	13	1.63
Indeno(1,2,3-c,d)pyrene	0.061	0.122	0.214	3	10	5.55
Naphthalene	1.68	382	8.79	1.9	50	1.97
Perylene	0.379	5.74	13.1	164	391	392
Phenanthrene	0.593	9	0.957	6.28	36	6.97
Pyrene	0.213	9	1.03	5	16	10.5
Retene	0.257	5	4.79	50.8	340	261

Figure 1: Toxicity Units Calculation for hydrocarbons in suspended sediment of the Slave River at Fort Smith (2010 - 2020). This is one method to assess the toxicity of hydrocarbons to bottom dwelling aquatic organisms. When ∑ESB-TUs exceed 1.0, toxicity to benthic organisms is predicted. The toxicity indicator of 1.0 was not exceeded in any sample.

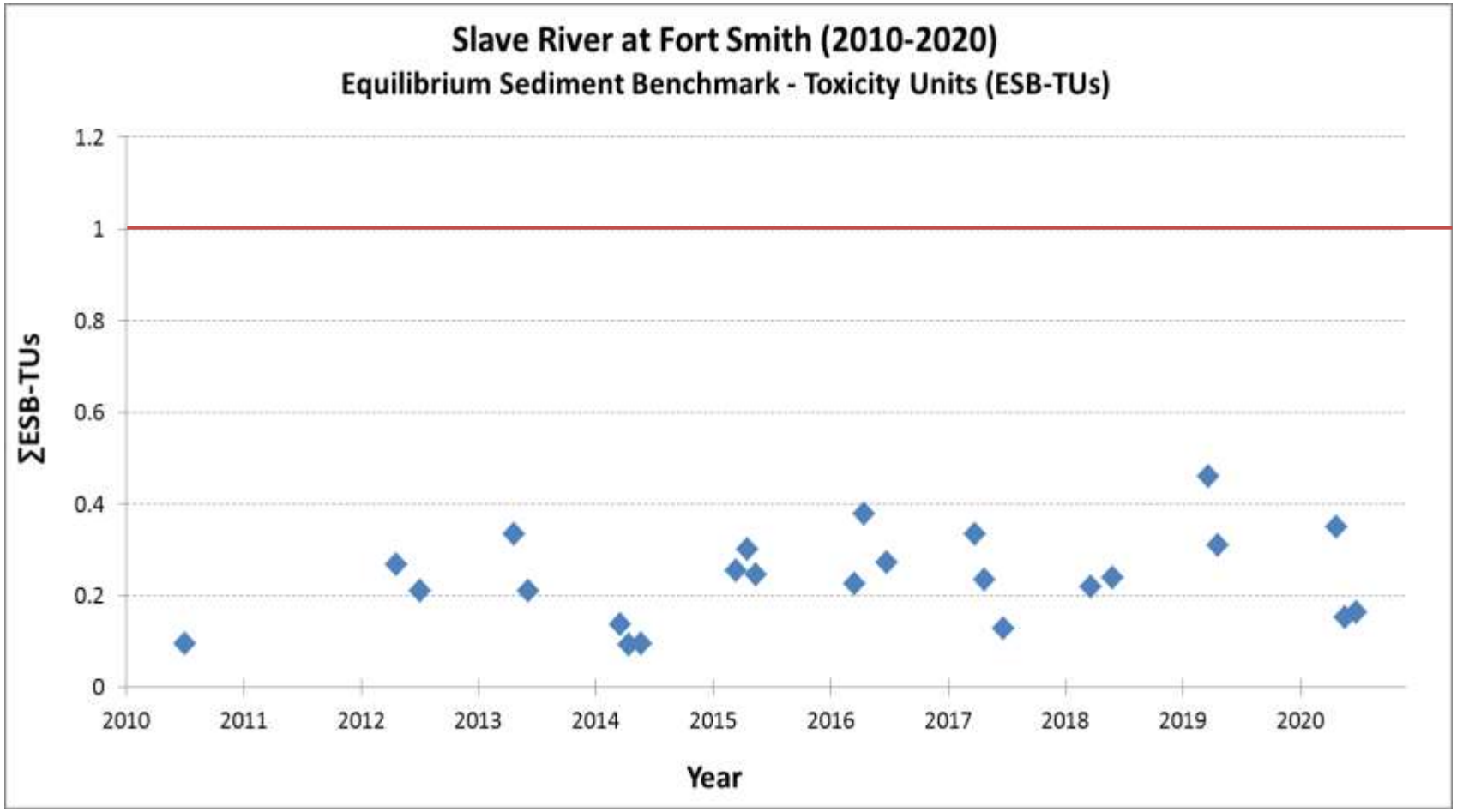

Figure 2: Toxicity Unit Calculation for hydrocarbons in suspended sediment of the Hay River (2011 - 2020). This is one method to assess the toxicity of hydrocarbons to bottom dwelling aquatic organisms. When ∑ESB-TUs exceed 1.0, toxicity to benthic invertebrates is predicted. The toxicity indicator of 1.0 was not exceeded in any sample.