

Table S3. Geochemical Data for the CAA-Rivers Project Time Series at the Coppermine River, NU, and Freshwater Creek, NU, collected from 2014 - 2016

River	Date Sampled	Chloride [μM]	Sulphate [μM]	Calcium [μM]	Magnesium [μM]	Sodium [μM]	Potassium [μM]	Strontium [nM]	Barium [nM]	DOC [mgC L ⁻¹]	δ ¹⁸ O-H ₂ O [‰]	δ ² H-H ₂ O [‰]
Coppermine River [#16] ^a	2014-08-05	17.7	21.7	256	192	32.1	12.8	136	174	3.7	-18.6	-152
	2014-08-05	22.6	22.0	253	192	35.5	12.7	134	182	3.3	-18.5	-151
	2015-03-25	20.7	24.8	192	124	36.2	12.7	121	126	2.7	-18.8	-153
	2015-03-25	20.1	24.7	192	124	36.1	12.7	123	126	2.6	-18.8	-153
	2015-04-20	19.6	24.0	180	114	33.7	12.2	114	121	2.2	-18.7	-153
	2015-05-29	28.1	19.8	250	192	39.1	15.3	114	135	9.3	-21.4	-168
	2015-06-06	61.3	22.6	264	210	72	14.1	129	147	6.4	-20.5	-163
	2015-06-11	75.7	22.3	283	230	79	13.8	133	179	6.4	-20.9	-166
	2015-07-14	14.6	23.3	250	186	32.7	12.6	126	165		-18.8	-153
	2015-07-30	13.6	23.9	205	145	31.5	12.9	116	137		-18.4	-151
	2015-08-06	13.4	22.1	199	142	32.2	12.9	116	132		-18.3	-151
	2015-08-22 ^b	169	25.5	239	190	161	14.1	146	150	3.7	-18.3	-150
	2015-09-03	17.4	25.9	237	164	33.5	12.3	116	156	3.5	-18.4	-151
	2015-10-30	19.3	33.4	269	174	39.3	14.3	137	149	3.7	-18.4	-150
	2015-11-12	17.9	30.8	253	158	41.1	15.0	136	119	3.7	-18.4	-151
	2015-11-26	17.6	32.0	222	138	36.7	14.2	122	117	3.7	-18.4	-151
	2015-12-16	15.7	29.6	223	136	39.1	15.4	128	114	3.6	-18.1	-150
	2016-01-03	14.8	27.1	201	120	36.5	14.1	121	111	3.3	-18.5	-151
	2016-01-07	14.6	26.3	200	122	35.0	14.2	114	105	3.3	-18.3	-150
	2016-01-20	16.0	28.0	203	124	37.1	15.0	118	107	3.3	-18.6	-152
	2016-02-18	16.6	28.8	207	127	39.2	15.9	126	119	3.3	-18.4	-151
	2016-03-16	15.6	26.7	192	115	36.5	15.2	115	114	3.1	-18.5	-153
	2016-03-31	17.6	29.9	213	126	42.0	18.4	128	126	3.2		
	2016-04-13	19.6	24.5	190	100	36.7	16.5	113	117	3.8	-18.9	-154
	2016-04-26	18.2	27.3	191	116	38.1	15.2	113	114	3.0	-18.6	-152
	2016-05-02	19.5	20.6	151	86	32.3	16.1	96	98	3.3	-18.5	-151
	2016-05-08	9.5	13.3	121	70	18.2	8.8	71	97	3.7		
	2016-05-27	33.2	22.4	259	188	48.1	18.7	112	108	6.4	-21.0	-167
	2016-06-02	33.1	20.5	280	191	57.6	19.3	121	95	6.6	-20.7	-164
	2016-06-20	31.6	24.0	303	214	48.0	14.4	128	188	4.1	-19.7	-158
2016-07-21	12.5	23.1	208	134	29.5	13.4	106	133	3.4	-18.2	-150	
2016-08-15	12.1	21.6	168	109	28.4	12.5	96	110	3.1			
2016-08-23	12.3	21.6	170	114	30.9	13.1	103	122		-18.2	-148	
2016-08-23	24.7	22.2	169	116	43.4	13.3	106	125				
2016-08-23	14.9	21.8	173	116	33.3	13.6	105	126				
Freshwater Creek [#17]	6/19/2014	390	245.0	203	239	730	18.7	133	57	5.1	-23.1	-181
	6/23/2014	1670	160.0	802	1040	1140	40.2	377	78	6.1	-19.1	-154
	6/27/2014	1320	161.0	690	950	1120	37.5	311	87	5.5	-18.7	-153
	6/30/2014	990	129.0	487	620	730	25.9	233	54	4.8	-19.1	-154
	7/7/2014	910	83.0	480	720	710	27.7	209	43.2	5.0	-18.0	-149
	7/15/2014	901	81.3	441	600	640	24.1	203	41.1	5.1	-17.6	-147
	7/25/2014	933	86.6	469	660	680	25.2	212	49.9	4.6	-18.7	-150
	7/25/2014	945	81.3	482	650	700	25.9	215	45.3	4.1	-18.8	-150
	7/28/2014	875	74.4	395	512	586	21.5	189	47.8	4.7	-17.9	-145
	8/3/2014	873	73.7	430	630	630	23.3	192	43.1	4.5	-18.5	-148
	8/5/2014	872	72.5	414	572	600	21.5	192	38.2		-17.8	-144
	8/18/2014	906	83.3	462	680	700	24.0	201	44.7		-17.9	-145
	6/29/2015	1120	90.3	494	566	730	25.9	233	55	5.2	-17.2	-144
	7/6/2015	1060	80.5	474	559	710	24.3	219	43.2	5.6	-18.7	-150
	7/15/2015	823	64.5	361	427	548	19.5	169	42.8	4.8	-18.6	-148
	7/21/2015	928	70.9	403	460	589	19.8	190	38.1	5.1	-18.5	-148
	7/26/2015	923	71.2	414	485	620	21.0	191	44.4	4.9	-18.4	-147
	6/22/2015	1320	102.0	629	760	920	33.3	279	85	4.8	-17.1	-145
	8/24/2015	1030	75.9	475	575	700	23.3	203	36.6	3.0	-17.0	-141
	9/1/2015	1030	75.7	486	582	700	23.7	209	39.7	3.4	-17.0	-140
	9/8/2015	1110	92.6	519	630	760	24.5	227	47.7	4.4	-17.1	-140
	9/14/2015	1110	96.3	536	642	780	25.4	232	48.6	4.1	-16.9	-139
	8/17/2016	1060	81.5	501	587	720	26.2	227	46.4		-17.4	-139
8/15/2016			503	604	730	25.7	220	41.1	4.5			
8/22/2016			511	616	750	26.4	222	40.7	4.6			
9/16/2016 ^c			1170	1630	2500	54.0	551	74	8.4			
9/16/2016			522	620	740	25.3	230	28.2	4.3			

a - Coppermine River sampling took place between two locations depending on seasonal site access either by boat, ATV, or from shore. The main sampling site was up river: 67.7633°N, -115.2538°E, and the secondary site was closer to the river mouth: 67.8173°N, -115.0765°E. When travel on the river was dangerous (ice break-up, freeze-up) samples were collected from a shoreline intake for the water plant adjacent to the secondary sampling site (67.8203°N, -115.0848°E).

b - The sample collected on August 22, 2015 appears to have higher dissolved salt concentrations than usual for this river (in particular for Cl and Na). Strong winds required that this sampling event be carried out by ATV, so the sample was collected from shore near the primary site. Although this sample has been included in the presented analyses, it should be treated as potentially contaminated.

c - This sample collected on September 16th, 2016 has remarkably high dissolved ion concentrations for this river, and in particular, much higher than a second sample collected on the same day. Although this sample has been included in the presented analyses, it should be treated as potentially contaminated.