

Appendix F: Trending Summary Table

Table F1: Trending Summary for Battle River – Flow-Weighted Trend

Parameter	Z Critical = 1.960			Slope (Units/yr.)	Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05		
Nutrients (mg/L)					
Ammonia Dissolved	378	1.45	Not Sig	0.0001955	Yes
Nitrogen Dissolved NO ³ & NO ²	625	-4.861	Sig	-0.00001568	Yes
Nitrogen Total	294	-0.1803	Not Sig	-0.0005081	Yes
Phosphorous Total	540	8.252	Sig	0.0008427	Yes
Phosphorous Total Dissolved	513	4.553	Sig	0.0001729	Yes
Major Ions (mg/L)					
Chloride Dissolved	627	17.54	Sig	0.366	Yes
Fluoride Dissolved	573	0.595	Not Sig	0.00008244	Yes
Sodium Dissolved/Filtered	627	8.679	Sig	0.6045	Yes
Total Dissolved Solids	448	11.09	Sig	4.405	Yes
Sulphate Dissolved	626	7.556	Sig	0.6417	Yes
Physicals (Units)					
Oxygen Dissolved	531	0.678	Not Sig	0.004186	Yes
PH units	533	3.467	Sig	0.004252	Yes
Residue Non-filterable	556	4.708	Sig	0.1678	Yes
Sodium Adsorption Ratio	223	1.181	Not Sig	0.01064	Yes
Metals (µg/L)					
Aluminum Dissolved	188	-3.62	Sig	-0.1392	Yes
Aluminum Total	188	-4.072	Sig	-7.073	Yes
Arsenic Dissolved	188	0.00663	Not Sig	0.00002776	Yes
Arsenic Total	188	-1.726	Not Sig	-0.0227	Yes
Barium Dissolved	188	1.302	Not Sig	0.5127	Yes
Barium Total	188	-0.6431	Not Sig	-0.3385	Yes
Beryllium Dissolved	188	0.8161	Not Sig	0.00002305	Yes
Beryllium Total	188	-2.2	Not Sig	-0.0004364	Yes
Boron Dissolved	188	-1.403	Not Sig	-0.9139	Yes
Boron Total	188	-1.558	Not Sig	-1.135	Yes
Cadmium Dissolved	188	3.079	Sig	0.0006626	Yes
Cadmium Total	188	0.4884	Not Sig	0.0001067	Yes
Chromium Dissolved	188	0.4498	Not Sig	0.00014	Yes
Chromium Total	188	-1.95	Not Sig	-0.00611	Yes
Cobalt Dissolved	188	0.7616	Not Sig	0.001256	Yes
Cobalt Total	188	-1.83	Not Sig	-0.007146	Yes
Copper Dissolved	188	-0.7846	Not Sig	-0.006084	Yes
Copper Total	188	-2.291	Sig	-0.0309	Yes
Iron Dissolved	188	0.4486	Not Sig	0.1896	Yes
Iron Total	188	-1.125	Not Sig	-6.832	Yes
Lead Dissolved	188	-4.464	Sig	-0.001477	Yes
Lead Total	188	-2.417	Sig	-0.007157	Yes
Lithium Dissolved	188	1.184	Not Sig	0.3365	Yes
Lithium Total	188	1.362	Not Sig	0.3784	Yes
Manganese Dissolved	188	3.636	Sig	0.7405	Yes
Manganese Total	188	1.144	Not Sig	1.632	Yes
Molybdenum Dissolved	188	-1.311	Not Sig	-0.006418	Yes
Molybdenum Total	188	0.2968	Not Sig	0.001611	Yes
Nickel Dissolved	188	1.179	Not Sig	0.01647	Yes
Nickel Total	188	-0.5636	Not Sig	-0.01336	Yes
Selenium Dissolved	188	-0.5238	Not Sig	-0.0003513	Yes

Selenium Total	188	-0.6793	Not Sig	-0.000673	No
Silver Dissolved	188	-2.778	Sig	-0.00001895	Yes
Silver Total	188	-4.003	Sig	-0.0002422	Yes
Thallium Dissolved	188	3.05	Sig	0.0001782	Yes
Thallium Total	188	0.109	Not Sig	0.000009707	No
Uranium Dissolved	188	5.523	Sig	0.02647	Yes
Uranium Total	188	4.833	Sig	0.02456	Yes
Vanadium Dissolved	188	-0.6785	Not Sig	-0.00352	Yes
Vanadium Total	188	-3.588	Sig	-0.04092	Yes
Zinc Dissolved	188	-1.302	Not Sig	-0.009728	Yes
Zinc Total	188	-1.906	Not Sig	-0.0423	Yes

	No Seasonality
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Table F2: Trending Summary for Beaver River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	338	2.671	Sig	0.0004588	Yes
Nitrogen Dissolved NO ³ & NO ²	534	5.074	Sig	-0.0005409	Yes
Nitrogen Total	271	-0.5991	Not Sig	-0.001449	Yes
Phosphorous Total	504	-2.578	Sig	-0.0002704	Yes
Phosphorous Total Dissolved	476	-7.889	Sig	-0.0003333	Yes
Major Ions (mg/L)					
Chloride Dissolved	506	-0.5013	Not Sig	-0.001779	Yes
Fluoride Dissolved	492	-9.485	Sig	-0.0007507	Yes
Sodium Dissolved/Filtered	507	-4.588	Sig	-0.04839	Yes
Total Dissolved Solids	372	0.6703	Not Sig	0.08746	Yes
Sulphate Dissolved	506	-7.349	Sig	-0.1174	Yes
Physicals (Units)					
Oxygen Dissolved	487	-0.5996	Not Sig	-0.00793	Yes
PH units	487	3.033	Sig	0.003857	Yes
Residue Non-filterable	507	2.194	Sig	0.03577	Yes
Sodium Adsorption Ratio (units)	507	5.599	Sig	-0.001791	Yes
Metals (µg/L)					
Aluminum Dissolved	180	-3.01	Sig	-0.06613	Yes
Aluminum Total	180	-2.425	Sig	-1.389	Yes
Arsenic Dissolved	180	0.437	Not Sig	0.0008588	Yes
Arsenic Total	180	-0.659	Not Sig	-0.002424	Yes
Barium Dissolved	180	0.4134	Not Sig	0.05278	Yes
Barium Total	180	-0.2433	Not Sig	-0.04375	Yes
Beryllium Dissolved	180	-0.4701	Not Sig	-0.0000005	Yes
Beryllium Total	180	-0.01608	Not Sig	-0.000001324	Yes
Boron Dissolved	180	2.776	Sig	0.3468	Yes
Boron Total	180	3.286	Sig	0.4213	Yes
Cadmium Dissolved	180	6.365	Sig	0.001724	Yes
Cadmium Total	180	4.028	Sig	0.0006055	Yes
Chromium Dissolved	180	0.5604	Not Sig	0.00013	Yes
Chromium Total	179	0.3792	Not Sig	0.0008478	Yes
Cobalt Dissolved	179	0.2445	Not Sig	0.000136	Yes
Cobalt Total	179	-0.3368	Not Sig	-0.0006112	Yes
Copper Dissolved	179	-0.1871	Not Sig	-0.000373	Yes
Copper Total	179	0.04242	Not Sig	0.000226	Yes
Iron Dissolved	179	0.6684	Not Sig	1.023	Yes
Iron Total	179	0.1957	Not Sig	0.9327	Yes
Lead Dissolved	179	-2.495	Sig	-0.0005983	No
Lead Total	179	-0.9656	Not Sig	-0.001187	No
Lithium Dissolved	179	3.242	Sig	0.1413	Yes
Lithium Total	179	3.638	Sig	0.1512	Yes
Manganese Dissolved	179	1.58	Not Sig	0.5657	Yes
Manganese Total	179	-1.228	Not Sig	-1.445	Yes
Molybdenum Dissolved	178	-2.129	Sig	-0.004484	Yes
Molybdenum Total	179	-1.771	Not Sig	-0.004234	Yes
Nickel Dissolved	179	-0.771	Not Sig	-0.00202	Yes
Nickel Total	179	-0.6562	Not Sig	-0.002729	Yes

Selenium Dissolved	179	-0.9119	Not Sig	-0.00003484	Yes
Selenium Total	179	-2.201	Sig	-0.0006438	Yes
Silver Total	179	-1.922	Not Sig	-0.00007904	Yes
Thallium Dissolved	179	0.63	Not Sig	0.000006151	Yes
Thallium Total	179	1.01	Not Sig	0.00004326	Yes
Uranium Dissolved	179	1.719	Not Sig	0.001956	Yes
Uranium Total	179	2.038	Sig	0.002325	Yes
Vanadium Dissolved	179	-1.418	Not Sig	-0.0017	Yes
Vanadium Total	179	-1.356	Not Sig	-0.00476	No
Zinc Dissolved	179	0.6325	Not Sig	0.005369	Yes
Zinc Total	179	0.2071	Not Sig	0.003343	Yes

	No Seasonality
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Table F3: Trending Summary for Cold River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	147	-0.9848	Not Sig	-0.00003977	Yes
Nitrogen Dissolved NO ³ & NO ²	147	5.078	Sig	0.0002554	Yes
Nitrogen Total	144	-1.596	Not Sig	-0.001101	Yes
Phosphorous Total	147	-1.3	Not Sig	-0.00006088	Yes
Phosphorous Total Dissolved	147	0.3982	Not Sig	0.00001291	Yes
Major Ions (mg/L)					
			Sig		Yes
Chloride Dissolved	170	-10	Sig	-0.01238	Yes
Fluoride Dissolved	171	-6.699	Sig	-0.0009485	Yes
Sodium Dissolved/Filtered	171	-3.101	Sig	-0.01257	Yes
Total Dissolved Solids	162	-1.93	Not Sig	-0.09304	Yes
Sulphate Dissolved	170	-7.542	Sig	-0.04019	Yes
Physicals (Units)					
			Sig		Yes
Oxygen Dissolved	168	3.469	Sig	0.04303	No
PH units	166	-0.9872	Not Sig	-0.002964	Yes
Residue Non-filterable	147	-4.195	Sig	-0.02126	Yes
Sodium Adsorption Ratio (units)	171	-4.207	Sig	-0.000489	No
Metals (µg/L)					
Aluminum Dissolved	117	-1.574	Not Sig	-0.0193	No
Aluminum Total	117	-1.939	Not Sig	-0.04977	No
Arsenic Dissolved	117	-4.992	Sig	-0.007359	Yes
Arsenic Total	117	-6.431	Sig	-0.009891	Yes
Barium Dissolved	117	1.307	Not Sig	0.05545	Yes
Barium Total	116	-1.343	Not Sig	-0.0441	Yes
Boron Dissolved	117	-0.391	Not Sig	-0.01551	Yes
Boron Total	116	-2.49	Sig	-0.08833	Yes
Cadmium Dissolved	117	0.06831	Not Sig	0.00001793	Yes
Cadmium Total	117	1.631	Not Sig	0.00015	Yes
Chromium Dissolved	117	-0.841	Not Sig	-0.00007964	Yes
Chromium Total	117	2.286	Sig	0.0003497	Yes
Cobalt Dissolved	117	2.02	Sig	0.00011167	Yes
Cobalt Total	117	1.084	Not Sig	0.00001805	No
Copper Dissolved	117	-1.206	Not Sig	-0.001368	Yes
Copper Total	117	-1.154	Not Sig	-0.00117	No
Iron Dissolved	117	1.006	Not Sig	0.01939	Yes
Iron Total	117	-0.004711	Not Sig	-0.0001307	No
Lithium Dissolved	117	-2.862	Sig	-0.03913	Yes
Lithium Total	117	-4.29	Sig	-0.05653	Yes
Manganese Dissolved	117	0.2332	Not Sig	0.001456	Yes
Manganese Total	117	1.731	Not Sig	0.01815	No
Molybdenum Dissolved	117	-3.018	Sig	-0.002061	Yes
Molybdenum Total	117	-5.241	Sig	-0.003309	No
Nickel Dissolved	117	-0.3698	Not Sig	-0.0002943	Yes
Nickel Total	117	0.0212	Not Sig	0.000009351	Yes
Selenium Dissolved	117	2.763	Sig	0.0003578	Yes
Selenium Total	117	4.297	Sig	0.0004079	Yes
Uranium Dissolved	117	0.1131	Not Sig	0.00001246	Yes

Uranium Total	117	-3.036	Sig	-0.0002743	No
Vanadium Dissolved	117	-1.753	Not Sig	-0.0004867	Yes
Vanadium Total	117	-1.587	Not Sig	-0.0005018	Yes
Zinc Dissolved	117	-2.75	Sig	-0.01483	Yes

	No Seasonality
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Table F4: Trending Summary for North Saskatchewan River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	368	-3.282	Sig	-0.0003881	Yes
Nitrogen Dissolved NO ³ & NO ²	368	-4.945	Sig	-0.003659	Yes
Nitrogen Total	294	-7.699	Sig	-0.01574	Yes
Phosphorous Total	367	-12	Sig	-0.001815	Yes
Phosphorous Total Dissolved	367	-15.09	Sig	-0.0009814	Yes
Major Ions (mg/L)					
Chloride Dissolved	311	7.029	Sig	0.0528	Yes
Fluoride Dissolved	310	-12.27	Sig	-0.001918	Yes
Sodium Dissolved/Filtered	311	1.937	Not Sig	0.02268	Yes
Total Dissolved Solids	307	6.682	Sig	0.7063	Yes
Sulphate Dissolved	311	8.883	Sig	0.3037	Yes
Physicals (Units)					
Oxygen Dissolved	362	3.543	Sig	0.03304	Yes
PH units	352	-1.377	Not Sig	-0.002736	Yes
Residue Non-filterable	368	-4.979	Sig	-0.2609	Yes
Sodium Adsorption Ratio (units)	183	1.319	Not Sig	0.001166	Yes
Metals (µg/L)					
Aluminum Dissolved	188	-2.685	Sig	-0.6293	Yes
Aluminum Total	188	-4.529	Sig	-7.459	Yes
Arsenic Dissolved	188	-3.616	Sig	-0.00528	Yes
Arsenic Total	188	-4.339	Sig	-0.01314	Yes
Barium Dissolved	188	-0.9854	Not Sig	-0.1123	Yes
Barium Total	188	-2.4	Sig	-0.4855	No
Beryllium Dissolved	188	-1.72	Not Sig	-0.00002582	Yes
Beryllium Total	188	-2.722	Sig	-0.0003489	No
Boron Dissolved	188	-1.328	Not Sig	-0.06166	Yes
Boron Total	188	-1.022	Not Sig	-0.05057	Yes
Cadmium Dissolved	188	4.688	Sig	0.0009207	Yes
Cadmium Total	188	0.263	Not Sig	0.00005101	Yes
Chromium Dissolved	188	-1.56	Not Sig	-0.0003396	Yes
Chromium Total	188	-2.778	Sig	-0.008216	No
Cobalt Dissolved	188	-2.363	Sig	-0.001075	Yes
Cobalt Total	188	-3.922	Sig	-0.007667	No
Copper Dissolved	188	-2.306	Sig	-0.005799	Yes
Copper Total	188	-4.085	Sig	-0.03439	No
Iron Dissolved	186	-2.837	Sig	-0.3415	Yes
Iron Total	188	-3.558	Sig	-11.48	No
Lead Dissolved	188	-5.618	Sig	-0.001495	Yes
Lead Total	188	-3.854	Sig	-0.01156	No
Lithium Dissolved	188	-0.1348	Not Sig	-0.003037	Yes
Lithium Total	188	-1.306	Not Sig	-0.02579	Yes
Manganese Dissolved	188	-2.065	Sig	-0.05036	No
Manganese Total	188	-3.375	Sig	-0.5393	Yes
Molybdenum Dissolved	188	-3.545	Sig	-0.0102	Yes
Molybdenum Total	188	-2.33	Sig	-0.006297	Yes
Nickel Dissolved	188	-3.886	Sig	-0.01356	Yes

Nickel Total	188	-4.135	Sig	-0.04038	Yes
Selenium Dissolved	188	-5.986	Sig	-0.007651	Yes
Selenium Total	188	-5.486	Sig	-0.007957	Yes
Silver Total	188	-4.401	Sig	-0.0002725	Yes
Thallium Dissolved	188	0.8057	Not Sig	0.00002956	Yes
Thallium Total	188	-2.371	Sig	-0.0001973	No
Uranium Dissolved	188	2.816	Sig	0.003432	Yes
Uranium Total	188	2.371	Sig	0.003404	Yes
Vanadium Dissolved	188	-4.674	Sig	-0.005782	Yes
Vanadium Total	188	-4.889	Sig	-0.02764	Yes
Zinc Dissolved	188	0.1591	Not Sig	0.001579	Yes
Zinc Total	188	-2.778	Sig	-0.06453	No

	No Seasonality
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Table F5: Trending Summary for Red Deer River Near Bindloss - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	376	4.998	Sig	0.000241	Yes
Nitrogen Dissolved NO ³ & NO ²	625	-0.5312	Not Sig	-0.00000593	Yes
Nitrogen Total	290	3.263	Sig	0.007457	Yes
Phosphorous Total	553	-1.022	Not Sig	-0.0001206	Yes
Phosphorous Total Dissolved	522	-2.339	Sig	-0.0000464	Yes
Major Ions (mg/L)					
Chloride Dissolved	576	-17.14	Sig	0.115	Yes
Fluoride Dissolved	518	-3.229	Sig	-0.0002786	Yes
Sodium Dissolved/Filtered	577	5.753	Sig	0.1561	Yes
Total Dissolved Solids	383	9.668	Sig	1.812	Yes
Sulphate Dissolved	576	5.191	Sig	0.2453	Yes
Physicals (Units)					
Oxygen Dissolved	530	-0.2909	Not Sig	-0.002084	Yes
PH units	543	4.247	Sig	0.004278	Yes
Residue Non-filterable	571	-1.423	Not Sig	-0.1533	Yes
Sodium Adsorption Ratio (units)	576	1.873	Not Sig	0.001514	Yes
Metals (µg/L)					
Aluminum Dissolved	188	1.402	Not Sig	0.04798	Yes
Aluminum Total	188	-1.877	Not Sig	-12.49	No
Arsenic Dissolved	188	0.787	Not Sig	0.002046	Yes
Arsenic Total	188	-0.6724	Not Sig	-0.004565	No
Barium Dissolved	188	-1.631	Not Sig	-0.4071	Yes
Barium Total	188	-1.148	Not Sig	-0.6912	Yes
Beryllium Dissolved	188	-0.7079	Not Sig	-0.00008796	Yes
Beryllium Total	188	-0.7342	Not Sig	-0.0004838	No
Boron Dissolved	188	0.9216	Not Sig	0.08403	Yes
Boron Total	188	1.981	Sig	0.2012	Yes
Cadmium Dissolved	188	5.232	Sig	0.001159	Yes
Cadmium Total	188	2.215	Sig	0.00125	No
Chromium Dissolved	188	1.542	Not Sig	0.0007633	Yes
Chromium Total	188	-0.4092	Not Sig	-0.003113	No
Cobalt Dissolved	188	0.8277	Not Sig	0.0005949	Yes
Cobalt Total	188	-0.8002	Not Sig	-0.005875	No
Copper Dissolved	188	0.7755	Not Sig	0.004518	No
Copper Total	188	-0.08694	Not Sig	-0.001655	No
Iron Dissolved	188	1.631	Not Sig	0.1005	Yes
Iron Total	188	-0.887	Not Sig	-10.72	No
Lead Dissolved	188	-2.229	Sig	-0.000722	Yes
Lead Total	188	0.05276	Not Sig	0.0006141	No
Lithium Dissolved	188	0.8706	Not Sig	0.04801	Yes
Lithium Total	188	0.6063	Not Sig	0.04448	No
Manganese Dissolved	188	-0.9233	Not Sig	-0.023	Yes
Manganese Total	188	-1.152	Not Sig	-0.4849	No
Molybdenum Dissolved	188	-2.768	Sig	-0.01212	Yes
Molybdenum Total	188	-1.438	Not Sig	-0.006935	No
Nickel Dissolved	188	0.3698	Not Sig	0.002689	Yes

Nickel Total	188	-0.3049	Not Sig	-0.006806	No
Selenium Dissolved	188	1.64	Not Sig	0.002304	Yes
Selenium Total	188	2.172	Sig	0.003456	Yes
Silver Total	188	-0.6771	Not Sig	-0.00008514	No
Thallium Dissolved	188	-0.7918	Not Sig	-0.00004533	Yes
Thallium Total	188	-0.2678	Not Sig	-0.00005558	No
Uranium Dissolved	188	3.174	Sig	0.01626	Yes
Uranium Total	188	2.558	Sig	0.0206	Yes
Vanadium Dissolved	188	-0.3473	Not Sig	-0.0008735	Yes
Vanadium Total	188	-1.53	Not Sig	-0.02987	No
Zinc Dissolved	188	0.6727	Not Sig	0.005334	Yes
Zinc Total	188	0.2098	Not Sig	0.01209	No

	No Seasonality
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Table F6: Trending Summary for South Saskatchewan River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Van Neumann (alpha=0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	372	1.231	Not Sig	0.00005845	Yes
Nitrogen Dissolved NO ³ & NO ²	649	2.747	Sig	0.0001807	Yes
Nitrogen Total	321	1.711	Not Sig	0.003571	Yes
Phosphorous Total	627	-7.472	Sig	-0.0007437	Yes
Phosphorous Total Dissolved	586	-14.68	Sig	-0.0002731	Yes
Major Ions (mg/L)					
Chloride Dissolved	521	18.72	Sig	0.1467	Yes
Fluoride Dissolved	510	0.4547	Not Sig	0.00004447	Yes
Sodium Dissolved/Filtered	525	10.85	Sig	0.1675	Yes
Total Dissolved Solids	380	9.9	Sig	1.537	Yes
Sulphate Dissolved	521	9.435	Sig	0.3537	Yes
Physicals (Units)					
Oxygen Dissolved	531	1.604	Not Sig	0.009227	Yes
PH units	537	3.348	Sig	0.003219	Yes
Residue Non-filterable	620	-1.631	Not Sig	-0.1022	Yes
Sodium Adsorption Ratio (units)	521	7.931	Sig	0.003812	Yes
Metals (µg/L)					
Aluminum Dissolved	189	-0.3068	Not Sig	-0.02187	Yes
Aluminum Total	189	0.1284	Not Sig	0.4634	Yes
Arsenic Dissolved	189	-2.126	Sig	-0.003647	Yes
Arsenic Total	189	0.5984	Not Sig	0.001888	Yes
Barium Dissolved	189	3.695	Sig	0.6068	Yes
Barium Total	189	4.052	Sig	1.361	Yes
Beryllium Dissolved	189	-1.754	Not Sig	-0.00001177	Yes
Beryllium Total	189	1.787	Not Sig	0.0004038	Yes
Boron Dissolved	189	-3.236	Sig	-0.164	Yes
Boron Total	189	-2.365	Sig	-0.1401	Yes
Cadmium Dissolved	189	4.794	Sig	0.0008861	Yes
Cadmium Total	189	2.062	Sig	0.0005237	Yes
Chromium Dissolved	189	3.41	Sig	0.001656	Yes
Chromium Total	189	0.7982	Not Sig	0.00358	Yes
Cobalt Dissolved	189	-1.325	Not Sig	-0.0006429	Yes
Cobalt Total	189	1.458	Not Sig	0.004215	Yes
Copper Dissolved	189	1.025	Not Sig	0.004616	Yes
Copper Total	189	1.704	Not Sig	0.01966	Yes
Iron Dissolved	189	-0.8016	Not Sig	-0.04931	Yes
Iron Total	189	0.9597	Not Sig	5.477	Yes
Lead Dissolved	189	-3.584	Sig	-0.0008586	Yes
Lead Total	189	1.391	Not Sig	0.00671	Yes
Lithium Dissolved	189	-1.83	Not Sig	-0.04405	Yes
Lithium Total	189	-0.05005	Not Sig	-0.001476	Yes
Manganese Dissolved	189	-0.4505	Not Sig	-0.005604	Yes
Manganese Total	189	0.8596	Not Sig	0.1687	Yes
Molybdenum Dissolved	189	-5.413	Sig	-0.01699	Yes
Molybdenum Total	189	-6.168	Sig	-0.01951	Yes
Nickel Dissolved	189	2.509	Sig	0.009395	Yes

Nickel Total	189	1.882	Not Sig	0.02308	Yes
Selenium Dissolved	189	-0.2285	Not Sig	-0.0003924	Yes
Selenium Total	189	-0.1327	Not Sig	-0.0003443	Yes
Silver Dissolved	189	-1.321	Not Sig	-0.00000035	Yes
Silver Total	189	1.003	Not Sig	0.00006688	Yes
Thallium Dissolved	189	1.131	Not Sig	0.00004322	Yes
Thallium Total	189	2.413	Sig	0.0002648	Yes
Uranium Dissolved	189	1.206	Not Sig	0.003463	Yes
Uranium Total	189	2.876	Sig	0.01017	Yes
Vanadium Dissolved	189	-2.085	Sig	-0.002406	Yes
Vanadium Total	189	0.5549	Not Sig	0.004872	Yes
Zinc Dissolved	189	1.26	Not Sig	0.01103	Yes
Zinc Total	189	1.434	Not Sig	0.04472	Yes

	No Seasonality
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Table F7: Trending Summary for Assiniboine River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	393	3.304	Sig	0.0005378	Yes
Nitrate as N	584	-1.467	Not Sig	-0.00005541	Yes
Nitrogen Total	289	3.062	Sig	0.01008	Yes
Phosphorous Total	571	-0.3044	Not Sig	-0.00004983	Yes
Phosphorous Total Dissolved	533	-3.071	Sig	-0.0003383	Yes
Major Ions (mg/L)					
Chloride Dissolved	565	8.084	Sig	0.2251	Yes
Fluoride Dissolved	553	0.2638	Not Sig	0.00003764	Yes
Sodium Dissolved/Filtered	567	9.035	Sig	0.4329	Yes
Total Dissolved Solids	436	9.397	Sig	5.795	Yes
Sulphate Dissolved	567	8.468	Sig	1.917	Yes
Physicals (Units)					
Oxygen Dissolved	528	-3.022	Sig	-0.02381	Yes
PH units	551	2.472	Sig	0.00243	Yes
Residue Non-filterable	548	4.318	Sig	0.1233	Yes
Sodium Adsorption Ratio (units)	211	2.573	Sig	0.008116	Yes
Metals (µg/L)					
Aluminum Dissolved	188	-5.458	Sig	-0.142	Yes
Aluminum Total	189	1.062	Not Sig	1.975	No
Arsenic Dissolved	188	-1.919	Not Sig	-0.0255	Yes
Arsenic Total	189	-2.559	Sig	-0.03736	Yes
Barium Dissolved	188	3.423	Sig	0.5558	Yes
Barium Total	189	2.63	Sig	0.4798	Yes
Beryllium Dissolved	188	-1.453	Not Sig	-0.00002802	Yes
Beryllium Total	189	2.059	Sig	0.0002939	Yes
Boron Dissolved	188	0.82	Not Sig	0.2064	Yes
Boron Total	189	-0.3482	Not Sig	-0.07427	Yes
Cadmium Dissolved	188	-4.873	Sig	-0.0009834	Yes
Cadmium Total	189	0.6246	Not Sig	0.0001429	Yes
Chromium Dissolved	188	-1.983	Sig	-0.00088	Yes
Chromium Total	189	2.041	Sig	0.006275	No
Cobalt Dissolved	188	1.796	Not Sig	0.002536	Yes
Cobalt Total	189	2.955	Sig	0.008944	Yes
Copper Dissolved	188	3.106	Sig	0.0151	Yes
Copper Total	189	3.247	Sig	0.03169	Yes
Iron Dissolved	188	-1.515	Not Sig	-0.4292	Yes
Iron Total	189	1.428	Not Sig	7.114	Yes
Lead Dissolved	188	-4.372	Sig	-0.001484	Yes
Lead Total	189	1.854	Not Sig	0.006094	Yes
Lithium Dissolved	188	1.993	Sig	0.4799	Yes
Lithium Total	189	1.374	Not Sig	0.3333	Yes
Manganese Dissolved	188	1.682	Not Sig	1.8	Yes
Manganese Total	189	1.075	Not Sig	1.641	Yes
Molybdenum Dissolved	188	1.919	Not Sig	0.01886	Yes
Molybdenum Total	189	0.827	Not Sig	0.007937	Yes
Nickel Dissolved	188	2.135	Sig	0.01677	Yes
Nickel Total	189	2.733	Sig	0.0355	Yes
Selenium Dissolved	188	2.926	Sig	0.005426	Yes
Selenium Total	189	2.781	Sig	0.005619	Yes

Silver Total	189	0.5114	Not Sig	0.00002924	Yes
Thallium Dissolved	188	4.922	Sig	0.0003285	Yes
Thallium Total	189	5.584	Sig	0.000615	Yes
Uranium Dissolved	188	5.652	Sig	0.1279	Yes
Uranium Total	189	5.258	Sig	0.1157	Yes
Vanadium Dissolved	188	1.409	Not Sig	0.007234	Yes
Vanadium Total	189	1.206	Not Sig	0.01185	Yes
Zinc Dissolved	188	-2.561	Sig	-0.02301	Yes
Zinc Total	189	3.338	Sig	0.096	Yes

	No Seasonality
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Table F8: Trending Summary for Carrot River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	349	7.265	Sig	0.001925	Yes
Nitrogen Dissolved NO ³ & NO ²	504	1.61	Not Sig	0.00009355	Yes
Nitrogen Total	280	6.085	Sig	0.01866	Yes
Phosphorous Total	497	10	Sig	0.001288	Yes
Phosphorous Total Dissolved	479	8.726	Sig	0.0003603	Yes
Major Ions (mg/L)					
Chloride Dissolved	449	-9.104	Sig	-1.296	Yes
Fluoride Dissolved	451	0.6748	Not Sig	0.00008089	Yes
Sodium Dissolved/Filtered	451	-7.878	Sig	-0.6344	Yes
Total Dissolved Solids	360	0.7714	Not Sig	0.4167	Yes
Sulphate Dissolved	453	5.043	Sig	0.4737	Yes
Physicals (Units)					
Oxygen Dissolved	480	-3.464	Sig	-0.02691	Yes
PH units	499	1.66	Not Sig	0.001701	Yes
Residue Non-filterable	500	1.962	Sig	0.08207	Yes
Sodium Adsorption Ratio (units)	450	-11.18	Sig	-0.02481	Yes
Metals (µg/L)					
Aluminum Dissolved	164	-0.05615	Not Sig	-0.002683	Yes
Aluminum Total	165	-0.2669	Not Sig	-0.5166	Yes
Arsenic Dissolved	164	-0.4679	Not Sig	-0.004353	Yes
Arsenic Total	165	0.1612	Not Sig	0.002687	Yes
Barium Dissolved	164	2.634	Sig	0.6911	Yes
Barium Total	165	2.809	Sig	0.9286	Yes
Beryllium Dissolved	164	-1.045	Not Sig	-0.0000396	Yes
Beryllium Total	165	0.658	Not Sig	0.0001067	Yes
Boron Dissolved	164	0.2229	Not Sig	0.5909	Yes
Boron Total	165	0.1718	Not Sig	0.05061	Yes
Cadmium Dissolved	164	-4.836	Sig	-0.0009802	Yes
Cadmium Total	165	-1.131	Not Sig	-0.0003072	No
Chromium Dissolved	164	-3.203	Sig	-0.001521	Yes
Chromium Total	165	0.4043	Not Sig	0.002189	No
Cobalt Dissolved	164	2.398	Sig	0.005523	Yes
Cobalt Total	165	2.215	Sig	0.01099	Yes
Copper Dissolved	164	-0.238	Not Sig	-0.001916	Yes
Copper Total	165	1.239	Not Sig	0.01375	No
Iron Dissolved	164	-3.436	Sig	-4.543	Yes
Iron Total	165	1.165	Not Sig	11.79	Yes
Lead Dissolved	164	-5.425	Sig	-0.002506	Yes
Lead Total	165	0.5523	Not Sig	0.001751	No
Lithium Dissolved	164	0.6337	Not Sig	0.09055	Yes
Lithium Total	165	0.3937	Not Sig	0.05318	Yes
Manganese Dissolved	164	0.655	Not Sig	1.05	Yes
Manganese Total	165	1.641	Not Sig	3.68	Yes
Molybdenum Dissolved	164	2.129	Sig	0.02059	Yes
Molybdenum Total	165	1.808	Not Sig	0.01646	Yes
Nickel Dissolved	164	0.2754	Not Sig	0.002089	Yes
Nickel Total	165	1.879	Not Sig	0.02365	No

Selenium Dissolved	164	-2.196	Sig	-0.002562	Yes
Selenium Total	165	-1.212	Not Sig	-0.001651	Yes
Silver Total	165	-0.4175	Not Sig	-0.00001214	No
Thallium Dissolved	164	-0.4492	Not Sig	-0.00004413	Yes
Thallium Total	165	0.7901	Not Sig	0.0001124	No
Uranium Dissolved	164	6.157	Sig	0.06566	Yes
Uranium Total	165	6.165	Sig	0.06937	Yes
Vanadium Dissolved	164	-0.6604	Not Sig	-0.002599	Yes
Vanadium Total	165	-0.04492	Not Sig	-0.0005071	No
Zinc Dissolved	164	-1.901	Not Sig	-0.01636	Yes
Zinc Total	165	2.045	Sig	0.04173	No


 No Seasonality

Table F9: Trending Summary for Churchill River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	142	1.538	Not Sig	0.00007903	No
Nitrogen Dissolved NO ³ & NO ²	258	-2.295	Sig	-0.00001325	No
Nitrogen Total	97	-1.234	Not Sig	-0.001239	Yes
Phosphorous Total	257	1.757	Not Sig	0.00003318	No
Phosphorous Total Dissolved	239	1.9	Not Sig	0.00001004	No
Major Ions (mg/L)					
Chloride Dissolved	259	0.98	Not Sig	0.001536	Yes
Fluoride Dissolved	259	1.042	Not Sig	0.00007749	Yes
Sodium Dissolved/Filtered	259	2.113	Sig	0.008325	Yes
Total Dissolved Solids	190	2.068	Sig	0.1552	Yes
Sulphate Dissolved	259	-1.577	Not Sig	-0.005778	Yes
Physicals (Units)					
Oxygen Dissolved	246	-1.769	Not Sig	-0.01592	No
PH units	251	5.391	Sig	0.0126	Yes
Residue Non-filterable	253	1.733	Not Sig	0.008682	No
Sodium Adsorption Ratio (units)	63	-0.688	Not Sig	-0.00032	Yes
Metals (µg/L)					
Aluminum Dissolved	55	-0.1037	Not Sig	-0.01542	No
Aluminum Total	56	-2.854	Sig	-4.41	Yes
Arsenic Dissolved	55	0.5372	Not Sig	0.00096	No
Arsenic Total	56	-0.2898	Not Sig	-0.0006026	No
Barium Dissolved	55	1.975	Sig	0.1506	Yes
Barium Total	56	1.067	Not Sig	0.08742	Yes
Beryllium Dissolved	55	0.4148	Not Sig	0.00001999	No
Beryllium Total	56	-2.461	Sig	-0.0001992	No
Boron Dissolved	55	2.047	Sig	0.1135	Yes
Boron Total	56	1.463	Not Sig	0.1037	Yes
Cadmium Dissolved	55	-2.86	Sig	-0.0004996	No
Cadmium Total	56	-3.88	Sig	-0.0002949	Yes
Chromium Dissolved	55	-1.481	Not Sig	-0.001047	No
Chromium Total	56	-2.606	Sig	-0.008126	Yes
Cobalt Dissolved	55	2.987	Sig	0.0002465	No
Cobalt Total	56	-0.9926	Not Sig	-0.001012	No
Copper Dissolved	55	-1.887	Not Sig	-0.005679	No
Copper Total	56	-2.668	Sig	-0.008507	Yes
Iron Dissolved	55	-0.6534	Not Sig	-0.1991	No
Iron Total	56	-2.564	Sig	-5.059	Yes
Lead Dissolved	55	-2.846	Sig	-0.0007776	No
Lead Total	56	-3.329	Sig	-0.002306	Yes
Lithium Dissolved	55	1.263	Not Sig	0.02314	No
Lithium Total	56	0.6149	Not Sig	0.01178	No
Manganese Dissolved	55	-2.178	Sig	-0.02298	No
Manganese Total	56	0.1034	Not Sig	0.02998	No
Molybdenum Dissolved	55	2.73	Sig	0.002436	No
Molybdenum Total	56	2.141	Sig	0.002032	No
Nickel Dissolved	55	-1.141	Not Sig	-0.002144	No

Nickel Total	56	-2.812	Sig	-0.007315	No
Thallium Dissolved	55	0.2904	Not Sig	0.000009198	No
Thallium Total	56	-1.448	Not Sig	-0.00007846	No
Uranium Dissolved	55	2.136	Sig	0.001105	No
Uranium Total	56	1.096	Not Sig	0.0006249	Yes
Vanadium Dissolved	55	0.5393	Not Sig	0.0005165	No
Vanadium Total	56	-1.448	Not Sig	-0.005291	Yes
Zinc Dissolved	55	-1.722	Not Sig	-0.0117	No
Zinc Total	56	-0.6997	Not Sig	-0.005784	Yes

	No Seasonality
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Table F10: Trending Summary for Qu'Appelle River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	354	3.432	Sig	0.0003658	Yes
Nitrogen Dissolved NO ³ & NO ²	488	4.878	Sig	0	Yes
Nitrogen Total	267	3.008	Sig	0.007618	Yes
Phosphorous Total	487	0.2656	Not Sig	0.00004261	Yes
Phosphorous Total Dissolved	487	-0.3497	Not Sig	-0.00007142	Yes
Major Ions (mg/L)					
Chloride Dissolved	448	-7.001	Sig	-0.4303	Yes
Fluoride Dissolved	451	-9.209	Sig	-0.001264	Yes
Sodium Dissolved/Filtered	448	-7.672	Sig	-0.8826	Yes
Total Dissolved Solids	382	-0.4605	Not Sig	-0.2716	Yes
Sulphate Dissolved	450	3.294	Sig	0.7363	Yes
Physicals (Units)					
Oxygen Dissolved	478	-0.7301	Not Sig	-0.005286	Yes
PH units	482	2.103	Sig	0.001973	Yes
Residue Non-filterable	490	4.288	Sig	0.3605	Yes
Sodium Adsorption Ratio (units)	451	-7.998	Sig	-0.02332	Yes
Metals (µg/L)					
Aluminum Dissolved	164	-2.331	Sig	-0.0685	Yes
Aluminum Total	165	0.07765	Not Sig	0.3755	Yes
Arsenic Dissolved	164	0.2411	Not Sig	0.01031	Yes
Arsenic Total	165	0.7363	Not Sig	0.02763	Yes
Barium Dissolved	164	5.16	Sig	0.6328	Yes
Barium Total	165	4.137	Sig	0.9169	Yes
Beryllium Dissolved	164	-1.985	Sig	-0.00004022	Yes
Beryllium Total	165	1.341	Not Sig	0.0004713	Yes
Boron Dissolved	164	-3.926	Sig	-2.874	Yes
Boron Total	165	-4.466	Sig	-2.99	Yes
Cadmium Dissolved	164	-7.495	Sig	-0.001796	Yes
Cadmium Total	165	-1.159	Not Sig	-0.0003607	Yes
Chromium Dissolved	164	-0.2033	Not Sig	-0.0000735	Yes
Chromium Total	165	1.025	Not Sig	0.007554	Yes
Cobalt Dissolved	164	9.591	Sig	0.01785	Yes
Cobalt Total	165	4.801	Sig	0.02778	Yes
Copper Dissolved	164	-0.03792	Not Sig	-0.0002678	Yes
Copper Total	165	1.936	Not Sig	0.02955	Yes
Iron Dissolved	164	1.536	Not Sig	0.1179	Yes
Iron Total	165	1.518	Not Sig	13.61	Yes
Lead Dissolved	164	-1.119	Not Sig	-0.0003808	Yes
Lead Total	165	2.603	Sig	0.01848	Yes
Lithium Dissolved	164	0.4686	Not Sig	0.1035	No
Lithium Total	165	-0.713	Not Sig	-0.14	No
Manganese Dissolved	164	5.317	Sig	4.442	Yes
Manganese Total	165	6.471	Sig	12.21	Yes
Molybdenum Dissolved	164	-3.591	Sig	-0.04061	Yes
Molybdenum Total	165	-4.995	Sig	-0.05605	Yes
Nickel Dissolved	164	5.414	Sig	0.05957	Yes

Nickel Total	165	3.928	Sig	0.09494	Yes
Selenium Dissolved	164	6.824	Sig	0.01767	Yes
Selenium Total	165	6.262	Sig	0.01554	Yes
Silver Total	165	2.594	Sig	0.0001648	Yes
Thallium Dissolved	164	1.408	Not Sig	0.0001087	Yes
Thallium Total	165	2.637	Sig	0.0004469	Yes
Uranium Dissolved	164	9.125	Sig	0.1323	Yes
Uranium Total	165	9.042	Sig	0.1251	Yes
Vanadium Dissolved	164	3.713	Sig	0.05805	Yes
Vanadium Total	165	2.868	Sig	0.07346	Yes
Zinc Dissolved	164	-1.696	Not Sig	-0.0154	Yes
Zinc Total	165	2.672	Sig	0.121	Yes


 No Seasonality

Table F11: Trending Summary for Red Deer River at Erwood - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	255	3.836	Sig	0.0003036	Yes
Nitrogen Dissolved NO ³ & NO ²	190	3.106	Sig	0.00008054	Yes
Nitrogen Total	186	1.991	Sig	0.006019	Yes
Phosphorous Total	412	4.013	Sig	0.0002489	Yes
Phosphorous Total Dissolved	383	4.117	Sig	0.0001292	Yes
Major Ions (mg/L)					
Chloride Dissolved	459	7.028	Sig	0.03665	Yes
Fluoride Dissolved	431	2.53	Sig	0.0002425	Yes
Sodium Dissolved/Filtered	459	7.968	Sig	0.126	Yes
Total Dissolved Solids	320	9.55	Sig	4.233	Yes
Sulphate Dissolved	459	5.048	Sig	0.5795	Yes
Physicals (Units)					
Oxygen Dissolved	399	-0.7817	Not Sig	-0.005636	Yes
PH units	410	2.656	Sig	0.003352	Yes
Residue Non-filterable	412	-0.394	Not Sig	-0.005039	Yes
Sodium Adsorption Ratio (units)	452	3.738	Sig	0.001096	Yes
Metals (µg/L)					
Aluminum Dissolved	127	-0.5199	Not Sig	-0.02823	Yes
Aluminum Total	128	-3.413	Sig	-4.01	Yes
Arsenic Dissolved	127	-0.703	Not Sig	-0.003644	No
Arsenic Total	128	-2.393	Sig	-0.01933	No
Barium Dissolved	127	1.094	Not Sig	0.211	Yes
Barium Total	128	-0.4358	Not Sig	-0.08876	Yes
Beryllium Dissolved	127	-3.584	Sig	-0.0001289	Yes
Beryllium Total	128	3.4	Sig	-0.0003968	Yes
Boron Dissolved	127	1.33	Not Sig	0.2931	Yes
Boron Total	128	0.7353	Not Sig	0.1485	Yes
Cadmium Dissolved	127	-4.233	Sig	-0.0009469	Yes
Cadmium Total	129	-3.084	Sig	-0.001011	Yes
Chromium Dissolved	127	-1.884	Not Sig	-0.0009906	Yes
Chromium Total	128	-3.059	Sig	-0.009529	Yes
Cobalt Dissolved	127	-1.527	Not Sig	-0.001326	Yes
Cobalt Total	128	-2.779	Sig	-0.006649	Yes
Copper Dissolved	128	0.0411	Not Sig	0.0001713	Yes
Copper Total	128	-1.99	Sig	-0.02085	Yes
Iron Dissolved	127	-0.9359	Not Sig	-0.7941	No
Iron Total	128	-3.339	Sig	-13.29	Yes
Lead Dissolved	127	-5.056	Sig	-0.001855	Yes
Lead Total	128	-3.437	Sig	-0.007851	Yes
Lithium Dissolved	127	1.271	Not Sig	0.2112	Yes
Lithium Total	128	1.015	Not Sig	0.1448	Yes
Manganese Dissolved	127	-1.227	Not Sig	-0.2678	Yes
Manganese Total	128	-3.339	Sig	-2.369	Yes
Molybdenum Dissolved	127	-0.4451	Not Sig	-0.00317	Yes
Molybdenum Total	128	-1.131	Not Sig	-0.009503	Yes

Nickel Dissolved	127	-0.6919	Not Sig	-0.00766	Yes
Nickel Total	128	-1.62	Not Sig	-0.02676	No
Selenium Dissolved	127	-0.471	Not Sig	-0.0007542	Yes
Selenium Total	128	-1.242	Not Sig	-0.002028	Yes
Silver Total	128	-2.738	Sig	-0.0001043	Yes
Thallium Dissolved	127	1.373	Not Sig	0.00009518	Yes
Thallium Total	128	-0.02467	Not Sig	-0.000007021	Yes
Uranium Dissolved	127	3.49	Sig	0.05252	Yes
Uranium Total	128	3.207	Sig	0.04942	Yes
Vanadium Dissolved	127	-0.886	Not Sig	-0.002958	No
Vanadium Total	128	-3.108	Sig	-0.03193	Yes
Zinc Dissolved	127	-0.1123	Not Sig	-0.001125	No
Zinc Total	128	-1.604	Not Sig	-0.02942	Yes


 No Seasonality

Table F12: Trending Summary for Saskatchewan River - Flow-Weighted Trend

Parameter	Z Critical = 1.960				Rank Von Neumann (alpha = 0.05)
	n	Z Calc	P<0.05	Slope (units/yr)	
Nutrients (mg/L)					
Ammonia Dissolved	329	1.8	Not Sig	0.000123	Yes
Nitrogen Dissolved NO ³ & NO ²	472	-2.417	Sig	-0.0001904	Yes
Nitrogen Total	258	-0.9578	Not Sig	-0.001065	Yes
Phosphorous Total	472	-7.14	Sig	-0.0004438	Yes
Phosphorous Total Dissolved	453	-6.222	Sig	-0.00008284	Yes
Major Ions (mg/L)					
Chloride Dissolved	472	11.17	Sig	0.06568	Yes
Fluoride Dissolved	472	-2.432	Sig	-0.0002411	Yes
Sodium Dissolved/Filtered	472	7.98	Sig	0.08725	Yes
Total Dissolved Solids	381	8.761	Sig	1.107	Yes
Sulphate Dissolved	472	9.74	Sig	0.345	Yes
Physicals (Units)					
Oxygen Dissolved	457	1.583	Not Sig	0.01176	Yes
PH units	462	5.45	Sig	0.005895	Yes
Residue Non-filterable	471	-5.329	Sig	-0.2832	Yes
Sodium Adsorption Ratio (units)	471	5.745	Sig	0.001781	Yes
Metals (µg/L)					
Aluminum Dissolved	166	1.058	Not Sig	0.05568	No
Aluminum Total	169	-2.381	Sig	-9.261	Yes
Arsenic Dissolved	167	0.569	Not Sig	0.001657	Yes
Arsenic Total	169	-0.7718	Not Sig	-0.004103	Yes
Barium Dissolved	167	0.05126	Not Sig	0.01032	Yes
Barium Total	169	-3.291	Sig	-0.5931	Yes
Beryllium Dissolved	166	-0.9803	Not Sig	-0.00001462	Yes
Beryllium Total	169	-1.231	Not Sig	-0.0003185	Yes
Boron Dissolved	167	5.203	Sig	0.4002	Yes
Boron Total	169	4.822	Sig	0.3722	Yes
Cadmium Dissolved	167	-5.144	Sig	-0.0006375	Yes
Cadmium Total	169	-3.718	Sig	-0.0006539	No
Chromium Dissolved	167	-2.871	Sig	-0.0005274	No
Chromium Total	169	-1.975	Sig	-0.01593	Yes
Cobalt Dissolved	167	1.999	Sig	0.0004361	Yes
Cobalt Total	169	-0.686	Not Sig	-0.002559	Yes
Copper Dissolved	167	1.333	Not Sig	0.005422	Yes
Copper Total	169	-0.6911	Not Sig	-0.00603	Yes
Iron Dissolved	166	2.165	Sig	0.3716	Yes
Iron Total	169	-1.231	Not Sig	-8.643	Yes
Lead Dissolved	166	-3.092	Sig	-0.0005943	Yes
Lead Total	169	-1.766	Not Sig	-0.007479	Yes
Lithium Dissolved	167	5.68	Sig	0.2072	Yes
Lithium Total	169	5.009	Sig	0.188	Yes
Manganese Dissolved	166	0.9077	Not Sig	0.01634	Yes
Manganese Total	169	0.4365	Not Sig	0.1484	Yes
Molybdenum Dissolved	167	-2.261	Sig	-0.007032	Yes
Molybdenum Total	169	-3.324	Sig	-0.01065	Yes
Nickel Dissolved	167	-0.1487	Not Sig	-0.0003714	Yes
Nickel Total	169	-1.993	Sig	-0.02085	No

Selenium Dissolved	166	0.8445	Not Sig	0.0009921	Yes
Selenium Total	169	-0.4389	Not Sig	-0.0005259	Yes
Silver Total	169	-1.831	Not Sig	-0.0001299	No
Thallium Dissolved	166	-0.4804	Not Sig	-0.0000128	Yes
Thallium Total	169	-1.322	Not Sig	-0.0001558	No
Uranium Dissolved	167	5.188	Sig	0.01551	Yes
Uranium Total	169	4.671	Sig	0.01263	Yes
Vanadium Dissolved	167	-0.6152	Not Sig	-0.001434	Yes
Vanadium Total	169	-1.755	Not Sig	-0.01923	Yes
Zinc Dissolved	167	-1.722	Not Sig	-0.01008	Yes
Zinc Total	169	-0.6911	Not Sig	-0.02	Yes

	No Seasonality
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Appendix G: Magnitude of Trend Tables

Table G1: Trend Magnitude Table for Non-Metals on Alberta/Saskatchewan Border – Flow-Weighted Trend

	Battle River			Beaver River			Cold River			North Saskatchewan River			Red Deer River at Bindloss			South Saskatchewan River		
	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change
Nutrients																		
Ammonia Dissolved	0.000	0.377	0.753	0.000	1.963	3.927	0.000	-2.230	-4.460	0.000	-3.933	-7.867	0.000	3.983	7.967	0.000	0.555	1.110
Nitrate as N	0.000	-0.107	-0.215	-0.001	-2.355	-4.710	0.000	2.575	5.151	-0.004	-6.724	-13.448	0.000	-0.016	-0.031	0.000	0.178	0.356
Nitrogen Total	-0.001	-0.226	-0.453	-0.001	-0.708	-1.416	-0.001	-1.438	-2.875	-0.016	-15.502	-31.005	0.007	6.129	12.258	0.004	1.785	3.571
Phosphorous Total	0.001	3.508	7.016	0.000	-1.417	-2.833	0.000	-1.772	-3.543	-0.002	-34.462	-68.924	0.000	-1.196	-2.392	-0.001	-4.753	-9.506
Phosphorous Total Dissolved	0.000	2.601	5.201	0.000	-5.340	-10.680	0.000	0.652	1.304	-0.001	-94.365	-188.731	0.000	-3.697	-7.394	0.000	-12.311	-24.621
Major Ions																		
Chloride Dissolved	0.366	4.644	9.287	-0.002	-0.155	-0.309	-0.012	-11.498	-22.997	0.053	4.959	9.917	0.115	6.230	12.460	0.147	4.441	8.881
Fluoride Dissolved	0.000	0.206	0.412	-0.001	-3.603	-7.207	-0.001	-5.691	-11.382	-0.002	-8.852	-17.705	0.000	-1.045	-2.090	0.000	0.188	0.376
Sodium Dissolved/ Filtered	0.605	1.810	3.619	-0.048	-1.214	-2.428	-0.013	-0.742	-1.485	0.023	1.327	2.654	0.156	2.802	5.603	0.168	3.851	7.702
Sulphate Dissolved	0.642	1.713	3.426	-0.117	-3.507	-7.013	-0.040	-8.194	-16.387	0.304	2.900	5.800	0.245	1.583	3.166	0.354	2.767	5.534
Total Dissolved Solids (TDS)	4.405	2.633	5.266	0.087	0.190	0.380	-0.093	-0.321	-0.641	0.706	1.643	3.287	1.812	2.890	5.780	1.537	2.969	5.938
Physicals																		
Oxygen Dissolved	0.004	0.304	0.608	-0.008	-0.599	-1.197	0.043	1.800	3.601	0.033	1.524	3.049	-0.002	-0.113	-0.226	0.009	0.422	0.843
pH - Field	0.004	0.271	0.542	0.004	0.254	0.507	-0.003	-0.182	-0.363	-0.003	-0.173	-0.345	0.004	0.267	0.534	0.003	0.200	0.399
Sodium Adsorption Ratio (SAR)	0.011	1.427	2.853	-0.002	-1.359	-2.717	0.000	-0.734	-1.467	0.001	2.070	4.140	0.002	0.912	1.824	0.004	2.746	5.491
Total Suspended Solids (TSS)	0.168	2.165	4.330	0.036	0.832	1.664	-0.021	-12.149	-24.297	-0.261	-463.136	-926.272	-0.153	-1.713	-3.426	-0.102	-0.774	-1.548

Legend	
	Significant Increasing
	Significant Decreasing
	Not Significant Increasing
	Not Significant Decreasing
	No Trend

Table G2: Trend Magnitude Table for Metals on Alberta/Saskatchewan Border – Flow-Weighted Trend

	Battle River			Beaver River			Cold River			North Saskatchewan River			Red Deer River at Bindloss			South Saskatchewan River		
	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change
Aluminum Dissolved	-0.139	-12.790	-25.580	-0.066	-9.185	-18.369	-0.019	-21.055	-42.109	-0.629	-13.281	-26.562	0.048	10.172	20.345	-0.022	-1.106	-2.213
Aluminum Total	-7.073	-13.696	-27.393	-1.389	-3.445	-6.889	-0.050	-14.254	-28.508	-7.459	-21.597	-43.195	-12.490	-16.568	-33.137	0.463	0.408	0.816
Arsenic Dissolved	0.000	0.006	0.012	0.001	0.502	1.004	-0.007	-4.687	-9.375	-0.005	-8.186	-16.372	0.002	2.228	4.456	-0.004	-3.986	-7.972
Arsenic Total	-0.023	-3.949	-7.898	-0.002	-1.000	-1.999	-0.010	-5.853	-11.705	-0.013	-14.180	-28.360	-0.005	-2.997	-5.993	0.002	1.169	2.338
Barium Dissolved	0.513	2.070	4.139	0.053	0.577	1.153	0.055	0.786	1.573	-0.112	-0.904	-1.809	-0.407	-2.153	-4.305	0.607	3.694	7.388
Barium Total	-0.339	-1.206	-2.412	-0.044	-0.411	-0.822	-0.044	-0.602	-1.203	-0.486	-3.443	-6.886	-0.691	-2.992	-5.984	1.361	6.478	12.956
Beryllium Dissolved	0.000	4.853	9.705	0.000	-0.086	-0.171				0.000	-11.476	-22.951	0.000	-6.597	-13.194	0.000	-7.847	-15.693
Beryllium Total	0.000	-7.701	-15.402	0.000	-4.1E-02	-8.23E-02				0.000	-17.020	-34.039	0.000	-5.829	-11.658	0.000	4.342	8.684
Boron Dissolved	-0.914	-1.993	-3.986	0.347	3.746	7.493	-0.016	-0.305	-0.609	-0.062	-1.989	-3.978	0.084	1.801	3.603	-0.164	-4.133	-8.265
Boron Total	-1.135	-2.455	-4.909	0.421	4.420	8.840	-0.088	-1.695	-3.391	-0.051	-1.552	-3.104	0.201	4.099	8.198	-0.140	-3.336	-6.671
Cadmium Dissolved	0.001	8.317	16.634	0.002	15.914	31.828	0.000	1.005	2.011	0.001	13.674	27.348	0.001	10.364	20.727	0.001	10.784	21.568
Cadmium Total	0.000	1.011	2.023	0.001	3.902	7.805	0.000	11.057	22.113	0.000	0.565	1.129	0.001	6.276	12.552	0.001	4.013	8.026
Chromium Dissolved	0.000	1.151	2.301	0.000	1.013	2.026	0.000	-3.186	-6.371	0.000	-2.870	-5.740	0.001	7.046	14.092	0.002	8.420	16.841
Chromium Total	-0.006	-6.070	-12.139	0.001	0.831	1.662	0.000	4.561	9.123	-0.008	-10.579	-21.157	-0.003	-2.555	-5.110	0.004	2.168	4.335
Cobalt Dissolved	0.001	0.566	1.133	0.000	0.728	1.456	0.000	4.963	9.926	-0.001	-8.498	-16.996	0.001	3.236	6.472	-0.001	-3.351	-6.703
Cobalt Total	-0.007	-2.197	-4.394	-0.001	-1.064	-2.127	0.000	0.722	1.444	-0.008	-18.401	-36.802	-0.006	-5.708	-11.415	0.004	3.247	6.495
Copper Dissolved	-0.006	-2.367	-4.735	0.000	-0.494	-0.988	-0.001	-5.509	-11.017	-0.006	-4.766	-9.533	0.005	1.879	3.757	0.005	2.491	4.981
Copper Total	-0.031	-7.319	-14.639	0.000	0.121	0.242	-0.001	-4.179	-8.357	-0.034	-16.311	-32.623	-0.002	-0.356	-0.712	0.020	4.369	8.738
Iron Dissolved	0.190	0.181	0.363	1.023	2.075	4.150	0.019	6.573	13.146	-0.342	-13.118	-26.236	0.101	8.387	16.773	-0.049	-2.031	-4.061
Iron Total	-6.832	-2.209	-4.418	0.933	0.419	0.837	0.000	-0.009	-0.018	-11.480	-18.329	-36.659	-10.720	-8.013	-16.027	5.477	2.808	5.615
Lead Dissolved	-0.001	-22.322	-44.645	-0.001	-14.023	-28.045				-0.001	-39.000	-78.000	-0.001	-13.929	-27.859	-0.001	-13.593	-27.185
Lead Total	-0.007	-6.291	-12.582	-0.001	-2.215	-4.430				-0.012	-22.937	-45.873	0.001	0.437	0.873	0.007	3.812	7.624
Lithium Dissolved	0.337	1.922	3.845	0.141	4.841	9.682	-0.039	-2.493	-4.986	-0.003	-0.305	-0.610	0.048	2.120	4.240	-0.044	-2.971	-5.943
Lithium Total	0.378	2.099	4.197	0.151	4.924	9.848	-0.057	-3.484	-6.969	-0.026	-2.371	-4.743	0.044	1.813	3.626	-0.001	-0.087	-0.175
Manganese Dissolved	0.741	0.570	1.140	0.566	5.257	10.515	0.001	2.355	4.709	-0.050	-8.235	-16.471	-0.023	-4.110	-8.219	-0.006	-1.959	-3.919

Manganese Total	1.632	1.139	2.278	-1.445	-7.122	-14.245	0.018	6.764	13.528	-0.539	-17.317	-34.633	-0.485	-6.042	-12.084	0.169	2.314	4.628
Molybdenum Dissolved	-0.006	-1.884	-3.768	-0.004	-4.942	-9.885	-0.002	-2.368	-4.735	-0.010	-5.721	-11.442	-0.012	-4.632	-9.264	-0.017	-6.858	-13.716
Molybdenum Total	0.002	0.491	0.982	-0.004	-4.697	-9.393	-0.003	-3.718	-7.436	-0.006	-3.443	-6.886	-0.007	-2.778	-5.555	-0.020	-8.088	-16.176
Nickel Dissolved	0.016	1.901	3.802	-0.002	-1.649	-3.298	0.000	-1.083	-2.167	-0.014	-10.594	-21.188	0.003	1.066	2.131	0.009	4.617	9.233
Nickel Total	-0.013	-1.238	-2.476	-0.003	-1.290	-2.581	0.000	0.034	0.068	-0.040	-19.634	-39.267	-0.007	-1.447	-2.893	0.023	5.032	10.064
Selenium Dissolved	0.000	-1.065	-2.129	0.000	-0.327	-0.653	0.000	5.649	11.299	-0.008	-17.455	-34.910	0.002	3.716	7.432	0.000	-0.379	-0.757
Selenium Total	-0.001	-2.039	-4.079	-0.001	-5.3650	-10.7300	0.000	5.439	10.877	-0.008	-17.235	-34.471	0.003	5.290	10.580	0.000	-0.318	-0.637
Silver Dissolved	0.000	-4.738	-9.475													0.000	-0.263	-0.525
Silver Total	0.000	-21.690	-43.379	0.000	-5.855	-11.710				0.000	-35.934	-71.868	0.000	-5.321	-10.643	0.000	3.840	7.680
Thallium Dissolved	0.000	12.081	24.163	0.000	2.460	4.921				0.000	3.411	6.822	0.000	-3.091	-6.181	0.000	3.602	7.203
Thallium Total	0.000	0.329	0.658	0.000	3.762	7.523				0.000	-12.331	-24.663	0.000	-1.495	-2.991	0.000	6.790	13.579
Uranium Dissolved	0.026	8.571	17.142	0.002	3.961	7.922	0.000	0.076	0.151	0.003	3.205	6.410	0.016	6.820	13.640	0.003	1.756	3.512
Uranium Total	0.025	7.639	15.278	0.002	4.303	8.606	0.000	-1.655	-3.310	0.003	2.926	5.851	0.021	7.783	15.567	0.010	4.663	9.325
Vanadium Dissolved	-0.004	-2.560	-5.120	-0.002	-3.119	-6.239	0.000	-2.163	-4.326	-0.006	-12.524	-25.048	-0.001	-1.137	-2.274	-0.002	-4.483	-8.966
Vanadium Total	-0.041	-12.963	-25.926	-0.005	-2.717	-5.435	-0.001	-1.968	-3.936	-0.028	-23.391	-46.781	-0.030	-10.921	-21.843	0.005	1.571	3.142
Zinc Dissolved	-0.010	-3.840	-7.680	0.005	2.876	5.753	-0.015	-25.423	-50.846	0.002	0.718	1.435	0.005	2.388	4.777	0.011	3.963	7.926
Zinc Total	-0.042	-5.244	-10.488	0.003	0.563	1.127				-0.065	-11.733	-23.465	0.012	1.288	2.577	0.045	3.866	7.733

Legend	
	Significant Increasing
	Significant Decreasing
	Not Significant Increasing
	Not Significant Decreasing
	No Trend

Table G3: Trend Magnitude Table for Non-Metals on Saskatchewan/Manitoba Border – Flow-Weighted Trend

	Assiniboine			Carrot			Churchill			Qu'Appelle			Red Deer at Erwood			Saskatchewan		
	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change
Nutrients																		
Ammonia Dissolved	0.001	0.671	1.341	0.002	3.999	7.999	0.000	4.649	9.298	0.000	1.835	3.670	0.000	1.777	3.554	0.000	1.854	3.709
Nitrate as N	0.000	-0.102	-0.204	0.000	0.382	0.765	0.000	-0.178	-0.356	0.000	0.000	0.000	0.000	0.117	0.235	0.000	-0.709	-1.418
Nitrogen Total	0.010	3.082	6.164	0.019	8.129	16.258	0.002	2.917	5.835	0.008	2.991	5.982	0.006	2.201	4.403	-0.001	-0.905	-1.811
Phosphorous Total	0.000	-0.173	-0.345	0.001	5.009	10.017	0.000	0.755	1.510	0.000	0.086	0.171	0.000	1.619	3.238	0.000	-4.028	-8.057
Phosphorous Total Dissolved	0.000	-2.509	-5.017	0.000	6.390	12.780	0.000	0.690	1.380	0.000	-0.369	-0.738	0.000	1.940	3.881	0.000	-6.472	-12.944
Major Ions																		
Chloride Dissolved	0.225	6.244	12.488	-1.296	-6.519	-13.037	0.002	0.494	0.988	-0.430	-3.840	-7.679	0.037	3.795	7.591	0.066	3.382	6.764
Fluoride Dissolved	0.000	0.126	0.252	0.000	0.296	0.592	0.000	0.456	0.912	-0.001	-4.034	-8.068	0.000	1.078	2.156	0.000	-1.096	-2.192
Sodium Dissolved/ Filtered	0.433	5.391	10.782	-0.634	-4.614	-9.229	0.008	1.185	2.370	-0.883	-3.115	-6.230	0.126	4.249	8.498	0.087	2.214	4.427
Sulphate Dissolved	1.917	4.427	8.855	0.474	3.811	7.623	-0.006	-1.144	-2.288	0.736	0.796	1.591	0.580	3.654	7.308	0.345	2.894	5.788
Total Dissolved Solids (TDS)	5.795	4.468	8.935	0.417	0.425	0.850	0.155	1.350	2.700	-0.272	-0.128	-0.255	4.233	6.129	12.258	1.107	2.292	4.585
Physicals																		
Oxygen Dissolved	-0.024	-1.549	-3.097	-0.027	-2.052	-4.104	-0.016	-0.723	-1.446	-0.005	-0.269	-0.537	-0.006	-0.243	-0.487	0.012	0.544	1.087
pH - Field	0.002	0.152	0.304	0.002	0.112	0.223	0.013	0.814	1.627	0.002	0.120	0.240	0.003	0.206	0.411	0.006	0.365	0.730
Sodium Adsorption Ratio (SAR)	0.008	5.057	10.113	-0.025	-7.308	-14.616	0.000	-0.711	-1.422	-0.023	-4.516	-9.033	0.001	1.420	2.841	0.002	1.368	2.736
Total Suspended Solids (TSS)	0.123	1.840	3.681	0.082	1.034	2.069	0.009	0.992	1.984	0.361	1.577	3.153	-0.005	-0.064	-0.128	-0.283	-2.786	-5.571

Legend	
	Significant Increasing
	Significant Decreasing
	Not Significant Increasing
	Not Significant Decreasing
	No Trend

Table G4: Trend Magnitude Table for Metals on Saskatchewan/Manitoba Border – Flow-Weighted Trend

	Assiniboine River			Carrot River			Churchill River			Qu'Appelle River			Red Deer River at Erwood			Saskatchewan River		
	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change	Rate Δ (Units/yr)	5 yr % Change	10 yr % Change
Aluminum Dissolved	-0.142	-20.934	-41.867	-0.003	-0.206	-0.206	-0.015	-0.314	-0.314	-0.069	-8.337	-16.673	-0.028	-2.491	-2.491	0.056	4.454	4.454
Aluminum Total	1.975	3.037	6.075	-0.517	-0.837	-0.837	-4.410	-17.043	-17.043	0.376	0.175	0.175	-4.010	-7.894	-7.894	-9.261	-7.541	-7.541
Arsenic Dissolved	-0.026	-4.508	-9.016	-0.004	-1.645	-1.645	0.001	1.714	1.714	0.010	1.156	1.156	-0.004	-1.768	-1.768	0.002	1.134	1.134
Arsenic Total	-0.037	-5.289	-10.579	0.003	0.633	0.633	-0.001	-1.004	-1.004	0.028	2.280	2.280	-0.019	-7.133	-7.133	-0.004	-1.661	-1.661
Barium Dissolved	0.556	5.087	10.175	0.691	4.753	4.753	0.151	5.312	5.312	0.633	5.173	5.173	0.211	3.068	3.068	0.010	0.071	0.071
Barium Total	0.480	3.664	7.329	0.929	5.350	5.350	0.087	2.762	2.762	0.917	4.562	4.562	-0.089	-1.071	-1.071	-0.593	-3.424	-3.424
Beryllium Dissolved	0.000	-11.208	-22.416	0.000	-8.193	-8.193	0.000	3.635	3.635	0.000	-28.444	-56.888	0.000	-24.169	-24.169	0.000	-8.354	-8.354
Beryllium Total	0.000	6.123	12.246	0.000	2.192	2.192	0.000	-14.756	-14.756	0.000	3.135	3.135	0.000	-9.388	-18.776	0.000	-3.747	-3.747
Boron Dissolved	0.206	1.297	2.595	0.223	1.612	3.223	0.114	4.504	4.504	-2.874	-7.006	-14.012	0.293	3.341	3.341	0.400	7.077	7.077
Boron Total	-0.074	-0.456	-0.911	0.051	0.352	0.352	0.104	4.190	4.190	-2.990	-7.007	-14.015	0.149	1.636	1.636	0.372	6.277	6.277
Cadmium Dissolved	-0.001	-25.992	-51.985	-0.001	-16.113	-16.113	0.000	-16.936	-16.936	-0.002	-75.889	151.779	-0.001	-13.994	-13.994	-0.001	-13.612	-13.612
Cadmium Total	0.000	1.771	3.543	0.000	-4.199	-4.199	0.000	-42.129	-42.129	0.000	-3.164	-3.164	-0.001	-12.036	-12.036	-0.001	-13.311	-26.622
Chromium Dissolved	-0.001	-6.857	-13.714	-0.002	-13.226	-13.226	-0.001	-6.345	-6.345	0.000	-0.490	-0.980	-0.001	-7.338	-7.338	-0.001	-7.032	-7.032
Chromium Total	0.006	4.808	9.617	0.002	1.471	1.471	-0.008	-12.220	-12.220	0.008	2.001	2.001	-0.010	-7.533	-7.533	-0.016	-6.619	-6.619
Cobalt Dissolved	0.003	3.141	6.281	0.006	6.622	6.622	0.000	6.573	6.573	0.018	20.898	20.898	-0.001	-4.518	-4.518	0.000	3.238	3.238
Cobalt Total	0.009	5.598	11.195	0.011	7.174	7.174	-0.001	-6.133	-6.133	0.028	7.671	7.671	-0.007	-7.625	-7.625	-0.003	-1.866	-1.866
Copper Dissolved	0.015	5.308	10.615	-0.002	-1.159	-1.159	-0.006	-6.721	-6.721	0.000	-0.129	-0.129	0.000	0.080	0.080	0.005	2.248	2.248
Copper Total	0.032	6.179	12.359	0.014	3.897	3.897	-0.009	-8.637	-8.637	0.030	3.462	3.462	-0.021	-5.715	-5.715	-0.006	-1.226	-1.226
Iron Dissolved	-0.429	-4.779	-9.557	-4.543	-12.239	-12.239	-0.199	-3.715	-3.715	0.118	2.518	2.518	-0.794	-5.655	-5.655	0.372	7.929	7.929
Iron Total	7.114	3.636	7.272	11.790	3.685	3.685	-5.059	-14.384	-14.384	13.610	2.993	2.993	-13.290	-9.084	-9.084	-8.643	-3.387	-3.387
Lead Dissolved	-0.001	-28.723	-57.446	-0.003	-55.483	-55.483	-0.001	-29.908	-29.908	0.000	-7.230	-14.461	-0.002	-48.391	-48.391	-0.001	-19.485	-19.485
Lead Total	0.006	5.296	10.592	0.002	2.027	2.027	-0.002	-13.291	-13.291	0.018	5.032	5.032	-0.008	-10.227	-10.227	-0.007	-5.025	-5.025
Lithium Dissolved	0.480	4.494	8.988	0.091	1.673	1.673	0.023	2.852	2.852	0.104	0.493	0.493	0.211	4.398	4.398	0.207	9.067	9.067
Lithium Total	0.333	3.040	6.079	0.053	0.936	0.936	0.012	1.402	1.402	-0.140	-0.633	-1.267	0.145	2.865	2.865	0.188	7.465	7.465

Manganese Dissolved	1.800	3.848	7.695	1.050	0.931	0.931	-0.023	-11.265	-11.265	4.442	6.037	6.037	-0.268	-8.601	-8.601	0.016	1.117	1.117
Manganese Total	1.641	2.625	5.250	3.680	2.965	2.965	0.030	0.822	0.822	12.210	8.363	8.363	-2.369	-21.951	-21.951	0.148	1.415	2.830
Molybdenum Dissolved	0.019	3.106	6.212	0.021	4.932	4.932	0.002	7.207	7.207	-0.041	-5.356	-10.713	-0.003	-0.945	-0.945	-0.007	-3.181	-3.181
Molybdenum Total	0.008	1.316	2.633	0.016	3.907	3.907	0.002	6.176	6.176	-0.056	-7.633	-15.266	-0.010	-2.794	-2.794	-0.011	-5.104	-5.104
Nickel Dissolved	0.017	2.651	5.303	0.002	0.419	0.419	-0.002	-3.376	-3.376	0.060	7.821	7.821	-0.008	-2.135	-2.135	0.000	-0.145	-0.145
Nickel Total	0.036	4.122	8.243	0.024	3.345	3.345	-0.007	-8.760	-8.760	0.095	6.201	6.201	-0.027	-5.073	-5.073	-0.021	-3.654	-3.654
Selenium Dissolved	0.005	6.768	13.537	-0.003	-6.028	-6.028				0.018	18.798	37.596	-0.001	-1.740	-1.740	0.001	2.221	2.221
Selenium Total	0.006	6.483	12.967	-0.002	-3.392	-3.392				0.016	15.112	30.224	-0.002	-4.196	-4.196	-0.001	-1.092	-1.092
Silver Dissolved																		
Silver Total	0.000	2.658	5.316	0.000	-1.204	-1.204				0.000	6.484	6.484	0.000	-13.315	-13.315	0.000	-8.204	-8.204
Thallium Dissolved	0.000	15.045	30.091	0.000	-3.079	-3.079	0.000	2.628	2.628	0.000	7.328	7.328	0.000	4.840	4.840	0.000	-1.477	-1.477
Thallium Total	0.001	12.508	25.017	0.000	2.787	2.787	0.000	-10.461	-10.461	0.000	6.369	6.369	0.000	-0.147	-0.147	0.000	-4.192	-4.192
Uranium Dissolved	0.128	14.863	29.727	0.066	22.955	22.955	0.001	8.290	8.290	0.132	19.169	38.339	0.053	16.094	16.094	0.016	8.949	8.949
Uranium Total	0.116	13.051	26.103	0.069	22.757	22.757	0.001	4.068	4.068	0.125	16.993	33.987	0.049	14.215	14.215	0.013	6.766	6.766
Vanadium Dissolved	0.007	2.815	5.630	-0.003	-3.040	-3.040	0.001	1.542	1.542	0.058	15.052	15.052	-0.003	-2.360	-2.360	-0.001	-2.015	-2.015
Vanadium Total	0.012	2.306	4.612	-0.001	-0.151	-0.151	-0.005	-6.532	-6.532	0.073	6.380	6.380	-0.032	-9.336	-9.336	-0.019	-4.610	-4.610
Zinc Dissolved	-0.023	-11.902	-23.803	-0.016	-9.260	-9.260	-0.012	-14.625	-14.625	-0.015	-6.844	-6.844	-0.001	-0.711	-0.711	-0.010	-10.251	-10.251
Zinc Total	0.096	10.105	20.211	0.042	5.652	5.652	-0.006	-3.732	-3.732	0.121	4.660	4.660	-0.029	-4.380	-4.380	-0.020	-1.997	-1.997

Legend	
	Significant Increasing
	Significant Decreasing
	Not Significant Increasing
	Not Significant Decreasing
	No Trend

**Appendix H: 2008, 2013, and 2018 Trending Directional
Change Comparison**

Table H1: Trending Directional Changes for Non-Metals on Alberta/Saskatchewan Border

Parameter	Battle			Beaver			Cold			North Sask.			Red Deer (AB)			South Sask.		
	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018
Ammonia Dissolved	↓	↓	↔	↓	↓	↑	↑	↔	↔	↔	↔	↓	↓	↓	↑	↓	↓	↔
Nitrate as N	↓	↓	↓	↓	↓	↓	↔	↑	↑	↓	↓	↓	↓	↓	↔	↔	↔	↑
Nitrogen Total	↔	↔	↔	↔	↔	↔	↑	↑	↔	↓	↓	↓	↔	↑	↑	↑	↑	↔
Phosphorous Total	↑	↑	↑	↔	↔	↓	↔	↔	↔	↓	↓	↓	↓	↔	↔	↓	↓	↓
Phosphorous Total Dissolved	↔	↑	↑	↓	↓	↓	↔	↔	↔	↓	↓	↓	↓	↓	↓	↓	↓	↓
Major Ions																		
Chloride Dissolved	↑	↑	↑	↔	↓	↔	↓	↓	↓	↔	↑	↑	↑	↑	↑	↑	↑	↑
Fluoride Dissolved	↑	↑	↔	↓	↓	↓	↑	↔	↓	↓	↓	↑	↔	↓	↑	↑	↑	↔
Sodium Dissolved/Filtered	↑	↑	↑	↓	↓	↓	↔	↔	↓	↔	↔	↔	↔	↑	↑	↑	↑	↑
Sulphate Dissolved	↑	↑	↑	↓	↓	↓	↓	↓	↓	↑	↑	↑	↔	↔	↑	↑	↑	↑
Total Dissolved Solids (TDS)	↑	↑	↑	↔	↓	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑
Physicals																		
Oxygen Dissolved	↔	↔	↔	↔	↔	↔	↑	↑	↑	↔	↑	↑	↔	↔	↔	↔	↔	↔
pH – Field	↑	↑	↑	↑	↑	↑	↑	↔	↔	↑	↔	↔	↑	↑	↑	↑	↑	↑
Sodium Adsorption Ratio (SAR)	↑	↑	↔	↓	↓	↓	↔	↔	↓	↔	↔	↔	↔	↑	↔	↑	↑	↑
Total Suspended Solids (TSS)	↑	↑	↑	↑	↑	↑	↔	↓	↓	↔	↔	↓	↔	↔	↔	↔	↓	↔

No Seasonality

Table H2: Trending Directional Changes for Metals on Alberta/Saskatchewan Border

Parameter Metals	Battle			Beaver			Cold			North Sask.			Red Deer (AB)			South Sask.		
	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018
Aluminum Dissolved		↔	↓		↔	↓		↔	↔		↓	↓		↑	↔		↔	↔
Aluminum Total	↓	↔	↓	↔	↔	↓	↓	↔	↔	↓	↔	↓	↔	↔	↔	↓	↓	↔
Arsenic Dissolved		↔	↔		↔	↔		↔	↓		↓	↓		↔	↔		↓	↓
Arsenic Total		↔	↔		↔	↔		↓	↓		↓	↓		↔	↔		↓	↔
Barium Dissolved		↔	↔		↔	↔		↔	↔		↔	↔		↔	↔		↔	↑
Barium Total		↔	↔		↔	↔		↔	↔		↔	↓		↔	↔		↔	↑
Beryllium Dissolved		↔	↔		↑	↔	>20%	>20%		↑	↔		↑	↔		↔	↔	↔
Beryllium Total		↔	↓		↑	↔	>20%	>20%		↔	↓		↔	↔		>20%	↔	↔
Boron Dissolved	Step	↔	↔	↔	↔	↑	Step	↔	↔	Step	↓	↔	Step	↑	↔	Step	↔	↓
Boron Total		↔	↔		↔	↑		↔	↓		↔	↔		↑	↑		↔	↓
Cadmium Dissolved		↔	↑		↑	↑		↑	↔		↑	↑		↑	↑		↑	↑
Cadmium Total	>20%	↔	↔	>20%	↑	↑	>20%	↑	↔	>20%	↑	↔	>20%	↔	↑	>20%	↔	↑
Chromium Dissolved		↔	↔		↑	↔		↑	↔		↑	↔		↑	↔		↑	↑
Chromium Total	↔	↔	↔	↓	↔	↔	>20%	↔	↑	↓	↔	↓	↔	↔	↔	↓	↔	↔
Cobalt Dissolved	↓	↔	↔	↓	↔	↔	>20%	↑	↑	↓	↓	↓	↓	↔	↔	↓	↔	↔
Cobalt Total	↔	↔	↔	↓	↔	↔	>20%	↔	↔	↓	↔	↓	↔	↔	↔	↓	↓	↔
Copper Dissolved	↓	↔	↔	>20%	↑	↔	>20%	↑	↔	Step	↔	↓	↓	↔	↔	↓	↔	↔
Copper Total	↓	↔	↓	↓	↔	↔	>20%	↑	↔	↓	↔	↓	↔	↔	↔	↓	↔	↔
Iron Dissolved	↔	↔	↔	↔	↔	↔	>20%	↑	↔	↔	↔	↓	↓	↑	↔	↔	↑	↔
Iron Total	↔	↔	↔	Step	↔	↔	↔	↓	↔	↔	↔	↓	↓	↔	↔	↓	↓	↔
Lead Dissolved		↔	↓		↔	↓		>20%	>20%		↓	↓		↔	↓		↔	↓
Lead Total	>20%	↔	↓	>20%	↔	↔	>20%	>20%	>20%	>20%	↔	↓	↔	↔	↔	>20%	↓	↔
Lithium Dissolved	↑	↔	↔	↔	↔	↑	>20%	↓	↓	↔	↓	↔	↔	↔	↔	↔	↔	↔
Lithium Total	↓	↔	↔	↔	↔	↑	↔	↔	↓	↔	↔	↔	↔	↔	↔	↓	↔	↔
Manganese Dissolved	↔	↔	↑	↓	↔	↔	>20%	↑	↔	Step	↓	↓	↔	↔	↔	↔	↔	↔
Manganese Total	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↓	↔	↔	↔	↓	↓	↔
Molybdenum Dissolved	↓	↔	↔	↓	↔	↓	>20%	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Molybdenum Total	↔	↔	↔	↓	↔	↔	↔	↓	↓	↔	↓	↓	↔	↔	↔	Step	↓	↓
Nickel Dissolved		↔	↔		↔	↔		↑	↔		↔	↓		↔	↔		↔	↑

Nickel Total	↔	↔	↔	Step	↔	↔	>20%	↔	↔	↔	↔	↓	↔	↔	↔	↔	↓	↔
Selenium Dissolved		↔	↔		↔	↔		>20%	↑		↓	↓		↔	↔		↑	↔
Selenium Total		↔	↔		↔	↓		>20%	↑		↓	↓		↑	↑		↑	↔
Silver Dissolved		↔	↓		>20%	>20%		>20%	>20%		>20%	>20%		>20%	>20%		↔	↔
Silver Total		↔	↓		↓	↔		>20%	>20%		↔	↓		↔	↔		↔	↔
Thallium Dissolved		↔	↑		↑	↔		>20%	>20%		↑	↔		↔	↔		↑	↔
Thallium Total		↔	↔		↑	↔		>20%	>20%		↔	↓		↔	↔		↔	↑
Uranium Dissolved		↔	↑		↔	↔		↔	↔		↔	↑		↑	↑		↔	↔
Uranium Total		↔	↑		↔	↑		↓	↓		↔	↑		↑	↑		↔	↑
Vanadium Dissolved		↔	↔		↔	↔		↓	↔		↓	↓		↔	↔		↓	↓
Vanadium Total	↔	↔	↓	Step	↔	↔	Step	↓	↔	↔	↓	↓	↔	↔	↔	↓	↓	↔
Zinc Dissolved	>20%	↔	↔	>20%	↑	↔	>20%	↔	↓	>20%	↑	↔	>20%	↔	↔	>20%	↑	↔
Zinc Total	↔	↔	↔	↔	↔	↔	>20%	>20%	>20%	↔	↔	↓	↔	↔	↔	↔	↔	↔

	No Seasonality
>20%	>20% Censored Data
Step	Step In Data

Table H3: Trending Directional Changes for Non-Metals on Saskatchewan/Manitoba Border

Parameter	Assiniboine			Carrot			Churchill			Qu'Appelle			Red Deer MB			Sask. River		
	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018
Ammonia Dissolved	↔	↑	↑	↔	↑	↑	↓	↓	↔	↔	↔	↑	↓	↓	↑	↓	↓	↔
Nitrate as N	↓	↔	↔	↓	↔	↔	↔	↓	↓	↔	↔	↔	↓	↓	↑	↓	↓	↓
Nitrogen Total	↔	↑	↑	↑	↑	↑	↔	↔	↔	↔	↑	↑	↔	↑	↑	↔	↔	↔
Phosphorous Total	↔	↔	↔	↑	↑	↑	↔	↔	↔	↓	↓	↔	↑	↑	↑	↓	↓	↓
Phosphorous Total Dissolved	↔	↔	↓	↑	↑	↑	↔	↔	↔	↓	↔	↔	↑	↑	↑	↓	↓	↓
Major Ions																		
Chloride Dissolved	↑	↑	↑	↓	↓	↓	↔	↔	↔	↔	↔	↓	↑	↑	↑	↑	↑	↑
Fluoride Dissolved	↑	↑	↔	↑	↑	↔	↑	↑	↔	↔	↓	↓	↑	↑	↑	↑	↑	↓
Sodium Dissolved/Filtered	↑	↑	↑	↓	↓	↓	↔	↔	↑	↓	↓	↓	↑	↑	↑	↔	↑	↑
Sulphate Dissolved	↑	↑	↑	↔	↑	↑	↔	↔	↔	↔	↑	↑	↔	↔	↑	↑	↑	↑
Total Dissolved Solids (TDS)	↑	↑	↑	↔	↔	↔	↔	↔	↑	↔	↔	↔	↑	↑	↑	↑	↑	↑
Physicals																		
Oxygen Dissolved	↓	↓	↓	↔	↓	↓	↔	↔	↔	↓	↔	↔	↔	↔	↔	↔	↓	↔
pH – Field	↔	↑	↑	↑	↑	↔	↑	↑	↑	↔	↔	↑	↔	↑	↑	↑	↑	↑
Sodium Adsorption Ratio (SAR)	↑	↑	↑	↓	↓	↓	↑	↑	↔	↔	↓	↓	↑	↑	↑	↔	↑	↑
Total Suspended Solids (TSS)	↑	↑	↑	↑	↑	↑	↔	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔	↓

☐ No Seasonality

Table H4: Trending Directional Changes for Metals on Saskatchewan/Manitoba Border

Parameter	Assiniboine			Carrot			Churchill			Qu'Appelle			Red Deer MB			Sask. River		
	Metals	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013	2018	2008	2013
Aluminum Dissolved		↓	↓		↔	↔		↔	↔		↔	↓		↔	↔		↔	↔
Aluminum Total	↓	↔	↔	↔	↔	↔	Step	↓	↓	↓	↓	↔	Step	↔	↓	↓	↓	↓
Arsenic Dissolved		↔	↔		↔	↔		↔	↔		↑	↔		↔	↔		↔	↔
Arsenic Total		↔	↓		↔	↔		↔	↔		↑	↔		↔	↓		↓	↔
Barium Dissolved		↑	↑		↑	↑		↔	↑		↑	↑		↔	↔		↔	↔
Barium Total		↔	↑		↑	↑		↔	↔		↓	↑		↔	↔		↓	↓
Beryllium Dissolved		↑	↔		↑	↔		↑	↔		↑	↓		↑	↓		↑	↔
Beryllium Total		↑	↑		↔	↔		↓	↓		↔	↔		↔	↓		↓	↔
Boron Dissolved	Step	↔	↔	↔	↑	↔	Step	↔	↑	Step	↔	↓	↔	↑	↔	Step	↑	↑
Boron Total		↔	↔		↔	↔		↔	↔		↓	↓		↔	↔		↑	↑
Cadmium Dissolved		↓	↓		↓	↓		↔	↓		↓	↓		↔	↓		↔	↓
Cadmium Total	>20%	↔	↔	↓	↓	↔	>20%	↔	↓	↓	↓	↔	>20%	↔	↓	↓	↓	↓
Chromium Dissolved		↔	↓		↔	↓		↔	↔		↔	↔		↔	↔		↔	↓
Chromium Total	↔	↔	↑	↔	↓	↔	>20%	↓	↓	↓	↓	↔	>20%	↔	↓	↔	↓	↓
Cobalt Dissolved	↓	↔	↔	↓	↔	↑	>20%	↔	↑	↓	↑	↑	>20%	↔	↔	>20%	↔	↑
Cobalt Total	↔	↔	↑	↔	↔	↑	>20%	↓	↔	↔	↔	↑	↔	↔	↓	↓	↓	↔
Copper Dissolved	↔	↑	↑	↔	↔	↔	>20%	↔	↔	↔	↑	↔	↑	↔	↔	↔	↔	↔
Copper Total	↔	↔	↑	↓	↔	↔	↔	↔	↓	↔	↔	↔	↔	↔	↓	↓	↓	↔
Iron Dissolved	↔	↔	↔	Step	↓	↓	Step	↔	↔	↔	↔	↔	Step	↓	↔	Step	↔	↑
Iron Total	↔	↔	↔	↔	↔	↔	Step	↓	↓	↓	↓	↔	Step	↔	↓	↓	↓	↔
Lead Dissolved		↓	↓		↓	↓		↔	↓		↔	↔		↓	↓		↔	↓
Lead Total	>20%	↔	↔	↔	↔	↔	>20%	↓	↓	>20%	↓	↑	>20%	↔	↓	↓	↓	↔
Lithium Dissolved	↑	↑	↑	↔	↑	↔	Step	↔	↔	↔	↔	↔	↑	↔	↔	↑	↑	↑
Lithium Total	↔	↑	↔	↔	↑	↔	Step	↔	↔	↓	↔	↔	↔	↔	↔	↔	↔	↑
Manganese Dissolved	↔	↑	↔	↔	↔	↔	↔	↓	↓	↔	↑	↑	↔	↔	↔	↔	↔	↔
Manganese Total	↔	↑	↔	↔	↔	↔	↔	↓	↔	↔	↔	↑	Step	↔	↓	↓	↓	↔

Molybdenum Dissolved	↓	↔	↔	↔	↔	↑	>20%	↔	↑	↔	↔	↓	↑	↔	↔	↔	↔	↓
Molybdenum Total	↔	↓	↔	↔	↔	↔	↔	↔	↑	Step	↓	↓	↑	↔	↔	↓	↔	↓
Nickel Dissolved		↔	↑		↔	↔		↔	↔		↑	↑		↔	↔		↔	↔
Nickel Total	Step	↔	↑	Step	↔	↔	Step	↓	↓	Step	↔	↑	Step	↔	↔	↔	↓	↓
Selenium Dissolved		↑	↑		↔	↓		>20%	>20%		↑	↑		↑	↔		↑	↔
Selenium Total		↑	↑		↔	↔		>20%	>20%		↑	↑		↑	↔		↑	↔
Silver Dissolved		>20%	>20%		>20%	>20%		>20%	>20%		>20%	>20%		>20%	>20%		>20%	>20%
Silver Total		↔	↔		↔	↔		>20%	>20%		↔	↑		↔	↓		↓	↔
Thallium Dissolved		↑	↑		↑	↔		↔	↔		↑	↔		↔	↔		↑	↔
Thallium Total		↑	↑		↔	↔		↔	↔		↔	↑		↔	↔		↓	↔
Uranium Dissolved		↑	↑		↑	↑		↔	↑		↑	↑		↑	↑		↑	↑
Uranium Total		↑	↑		↑	↑		↔	↔		↑	↑		↑	↑		↑	↑
Vanadium Dissolved		↔	↔		↔	↔		↔	↔		↑	↑		↔	↔		↔	↔
Vanadium Total	↔	↔	↔	↔	↔	↔	Step	↓	↔	↔	↔	↑	Step	↔	↓		↓	↔
Zinc Dissolved	>20%	↓	↓	↔	↔	↔	>20%	↔	↔	↓	↓	↔	>20%	↔	↔	>20%	↔	↔
Zinc Total	↓	↔	↑	↔	↔	↑	↓	↓	↔	↓	↓	↑	↔	↔	↔	↓	↓	↔

	No Seasonality
>20%	>20% Censored Data
Step	Step In Data