

Supplementary Materials: Quantifying Spatial Changes in the Structure of Water Quality Constituents in a Large Prairie River within Two Frameworks of a Water Quality Model

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A. Temporal Forcing Data

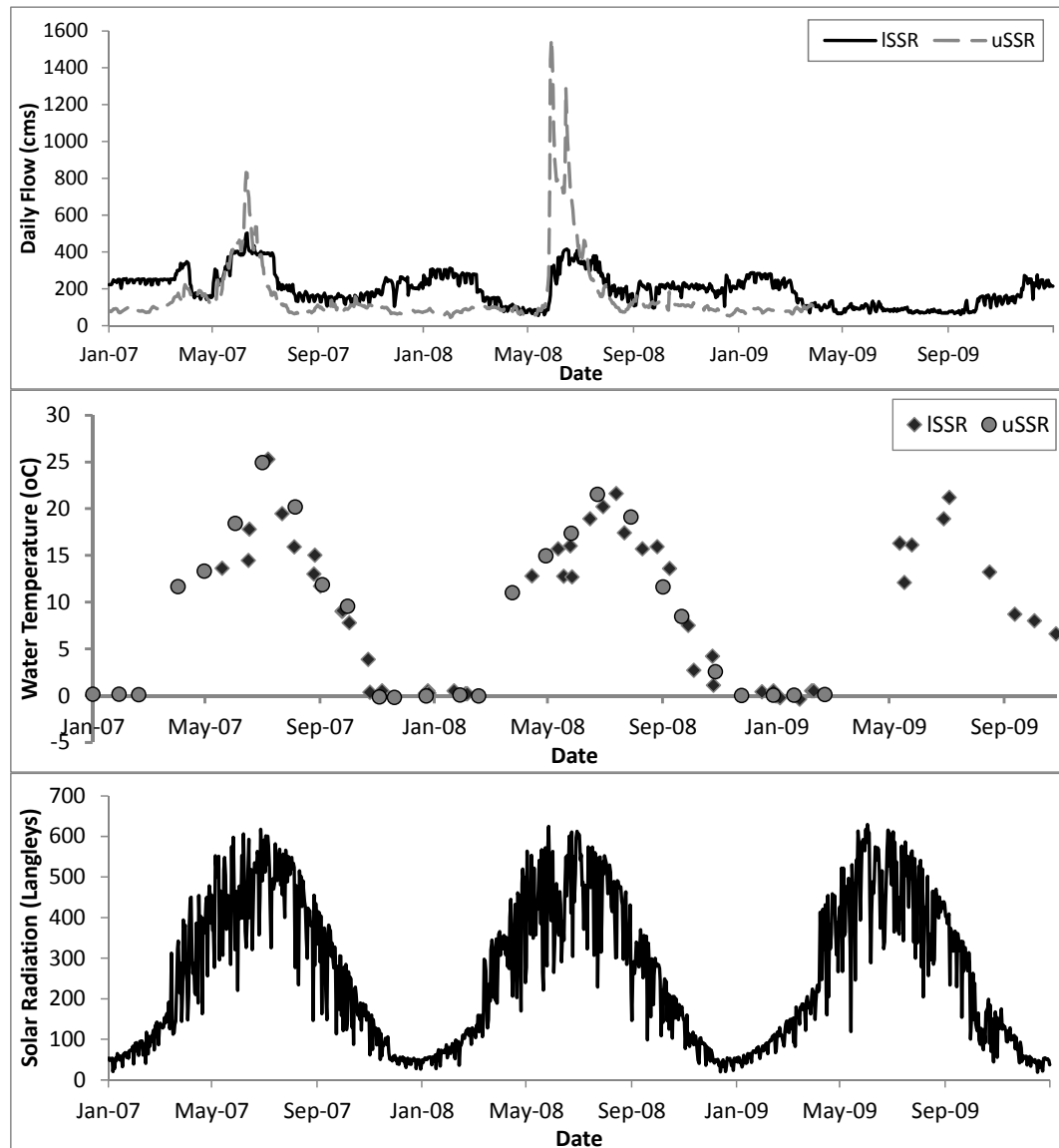


Figure S1. (a) daily measured flow at the Medicine Hat gauging station in uSSR the Saskatoon gauging station in ISSR; (b) measured water temperature, and (c) daily measured solar radiation.

B. Boundaries**Table S1.** Upstream boundary conditions of ISSR.

Date	NH4	NO3	DON	OPO4	OP	CHLA	DO
6/11/2007	0.02	0.15	0.3	0.01	0.01	9.18	11.03
7/9/2007	0.02	0.2	0.14	0.01	0.01	3.49	9.7
8/14/2007			0.23				
9/17/2007	0.02	0.18	0.36	0.01	0.01	6.4	10.84
10/17/2007	0.02	0.16	0.26	0.01	0.01	7.29	11.31
11/14/2007	0.06	0.12	0.36	0.04	0.35	37.18	12.62
1/14/2008	0.04	0.23	0.33	0.01	0.01	1.83	12.95
2/28/2008	0.02	0.3	0.28	0.01	0.01	1.83	12.97
6/10/2008	0.02	0.28	0.2	0.01	0.01	3.66	10.2
6/19/2008	0.02	0.25	0.23	0.01	0.01	3.66	9.56
9/18/2008	0.02	0.2	0.18	0.01	0.01	4.14	8.89
11/16/2008	0.02	0.24	0.24				
12/9/2008	0.02	0.24	0.24	0.01	0.06	5.91	11.66
1/20/2009			0.11				
1/27/2009	0.02	0.24		0.01	0.01	1.36	
2/17/2009	0.03	0.25		0.01	0.01	0.95	11.93
3/4/2009			0.29				
6/4/2009			0.46				
6/17/2009	0.02	0.23		0.01	0.01	4.14	10.43
7/27/2009			0.05				
9/8/2009	0.03			0.01	0.01	2.24	9.78
10/26/2009			0.19				
11/18/2009	0.02	0.15		0.01	0.01	5.97	

Table S2. Upstream boundary conditions at upstream (confluence of Bow and Old Rivers) of uSSR.

Date	NH4	NO3	DON	OPO4	OP	CHLA	DO
1/24/2007	0.27	1.02	0.20	0.006	0.002	1.65	15.65
2/21/2007	0.64	0.95	0.54	0.040	0.002	2.26	14.86
3/14/2007	0.55	0.84	0.45	0.020	0.002	4.27	14.60
4/25/2007	0.49	0.34	0.46	0.004	0.002	16.43	10.63
5/23/2007	0.47	0.22	0.34	0.003	0.002	13.79	9.97
6/25/2007	0.33	0.28	0.26	0.007	0.002	2.72	8.78
7/24/2007	0.41	0.03	0.35	0.004	0.002	1.21	11.05
8/28/2007	0.25	0.27	0.20	0.005	0.002	2.35	9.86
9/26/2007	0.29	0.46	0.24	0.003	0.002	1.11	10.41
10/23/2007	0.42	0.60	0.37	0.005	0.002	1.67	10.94
11/26/2007	0.34	1.11	0.29	0.004	0.002	2.62	14.30
12/12/2007	0.58	1.31	0.30	0.005	0.002	1.49	13.36
1/15/2008	0.33	1.19	0.19	0.004	0.002	0.87	13.82
2/20/2008	0.35	1.17	0.25	0.006	0.002	2.33	14.43
3/11/2008	0.21	1.23	0.16	0.006	0.002	2.56	16.40
4/16/2008	0.26	0.77	0.21	0.005	0.002	2.58	11.13
5/22/2008	0.42	0.54	0.34	0.004	0.002	20.20	9.48
6/18/2008	0.33	0.28	0.19	0.019	0.002	1.74	9.02
7/16/2008	0.29	0.18	0.24	0.004	0.002	4.71	8.17
8/21/2008	0.29	0.05	0.22	0.003	0.002	1.00	9.44
9/24/2008	0.17	0.31	0.12	0.004	0.002	1.81	10.01
10/14/2008	0.24	0.61	0.19	0.004	0.002	0.27	12.41
11/19/2008	0.19	0.72	0.14	0.006	0.002	1.15	13.22
12/17/2008	0.32	1.16	0.26	0.003	0.002	5.19	13.63
1/20/2009	0.27	0.88	0.17	0.006	0.002	0.47	12.52
2/11/2009	0.26	1.36	0.20	0.003	0.002	0.81	12.66
3/16/2009	1.35	0.51	1.24	0.104	0.002	1.42	13.96

Table S3. Boundary conditions at confluence Red Deer River at uSSR.

Date	NH4	DON	CHLA	Date	OPO4	OP	DO
1/29/2007	0.17	0.14	0.34	1/10/2007	0.002	0.015	4.7
2/20/2007	0.23	0.2	0.45	2/7/2007	0.002	0.01	6.81
3/12/2007	0.54	0.4	0.66	3/14/2007	0.019	0.165	13.02
4/16/2007	0.86	0.76	2.76	4/18/2007	0.022	0.639	9.16
5/22/2007	0.57	0.52	4.68	5/30/2007	0.014	0.351	7.75
6/27/2007	0.73	0.58	1.52	6/5/2007	0.012	0.124	6.49
7/25/2007	0.6	0.45	3.82	7/9/2007	0.017	0.188	7.07
8/27/2007	0.22	0.17	1.22	8/13/2007	0.003	0.11	7.45
9/25/2007	0.23	0.18	1.29	9/17/2007	0.002	0.185	8.5
10/11/2007	0.41	0.36	1.18	10/29/2007	0.002	0.029	10.7
11/20/2007	0.21	0.16	2.45	11/19/2007	0.002	0.034	14.1
12/11/2007	0.22	0.17	0.47	12/10/2007	0.002	0.022	11.3
1/14/2008	0.2	0.15	0.95	1/28/2008	0.002	0.007	8.92
2/21/2008	0.15	0.1	0.59	2/12/2008	0.002	0.008	7.85
3/17/2008	0.38	0.33	1.11	3/11/2008	0.002	0.013	10.75
4/23/2008	0.57	0.52	1.46	4/21/2008	0.002	0.112	12.55
5/26/2008	0.96	0.89	8.2	5/26/2008	0.007	1.013	9.97
6/23/2008	0.45	0.4	1.26	6/16/2008	0.012	0.776	8.16
7/14/2008	0.07	0.11	3.66	7/14/2008	0.003	0.192	8.76
8/25/2008	0.16	0.12	1.97	8/25/2008	0.005	0.072	9.02
9/29/2008	0.17	0.05	0.98	9/22/2008	0.002	0.057	10.58
10/20/2008	0.1	0.12		10/22/2008	0.002	0.155	12.55
11/24/2008	0.17	0.09	1.68	11/3/2008	0.002	0.044	11.29
12/15/2008	0.14	0.03	2.34	12/8/2008	0.002	0.021	15.31
1/26/2009	0.12	0.1	1.42	1/12/2009	0.002	0.006	3.99
2/17/2009	0.16	0	0.93	2/17/2009	0.002	0.007	7.81
3/9/2009	0.05	0	0.8	3/17/2009	0.004	0.011	8.12