

WWF-CANADA

Watershed Report

Okanagan-Similkameen



March 2016

OKANAGAN-SIMILKAMEEN WATERSHED REPORT

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SUMMARY

OVERALL RIVER HEALTH SCORING

	Indicator		Basin
	Overall River Health	Hydrology	Hydrology Health Category
Hydrology Score			5
Water Quality		Water Quality Health Category	Data deficient
		Water Quality Health Score	0
Benthic Macro-Invertebrates		Benthic Health Category	Very Good
		Benthic Health Score	5
Fish		Fish Health Category	Good
		Fish Health Score	4
Total Score		14	
Total Available Score		15	
Percentage of Maximum Score		93.3%	
Overall Health Category		Very Good	

OVERALL DATA SUFFICIENCY SCORING

	Indicator		Basin
	Overall Data Sufficiency	Hydrology	Data Sufficiency Category
Data Sufficiency Score			2
Water Quality		Data Sufficiency Category	Insufficient
		Data Sufficiency Score	0
Benthic Macro-Invertebrates		Data Sufficiency Category	Sufficient
		Data Sufficiency Score	3
Fish		Data Sufficiency Category	Sufficient
		Data Sufficiency Score	3
Total Score		8	
Total Available Score		12	
Percentage of Maximum Score		66.7%	
Overall Data Sufficiency Category		Moderately Sufficient	

HYDROLOGY

OVERALL HYDROLOGY RIVER HEALTH SCORING

Indicator			Basin	
Hydrology	Long-Term Trends in Monthly Flow	Average percentage change in median monthly flow, measured as the relative change in median monthly flow per year, reported as an average across studied stations and weighted by the median annual flow per station.	Period of Study	<1920 - 2014
			Number of Stations	5
			Value	0.04
			Health Category	Very Good
	Recent-Term Trends in Monthly Flow	Average percentage change in median monthly flow, measured as the relative change in median monthly flow per year, reported as an average across studied stations and weighted by the median annual flow per station.	Period of Study	1985 - 2014
			Number of Stations	25
			Value	0.01
			Health Category	Very Good
	Long-Term Trends in Annual Flow	Average percentage change in median annual flow, reported as an average across studied stations and weighted by the median annual flow per station.	Period of Study	<1920 - 2014
			Number of Stations	5
			Value	0.00%
			Health Category	Very Good
	Pre- vs. Post-Dam or Recent vs. Historical Analysis of Monthly Flow	Percentage of total months, for all stations analyzed, with significantly different variance in monthly flow pre- vs. post-dam operation or for historical vs. Recent time periods in undammed systems.	Period of Study	Various
			Number of Stations	5
			Value	21.7%
			Health Category	Good
		Percentage change in median monthly flow pre- and post-dam or for historical vs. Recent time periods in undammed systems, averaged across studied stations by mean annual flow.	Period of Study	Various
			Number of Stations	5
			Value	12.1%
			Health Category	Good
Hydrology Score		Health Score	4	
		Total Score	23	
		Maximum Available Score	25	
		Percentage of Maximum Score	92.0%	
		Hydrology Health Category	Very Good	
		Hydrology Score	5	

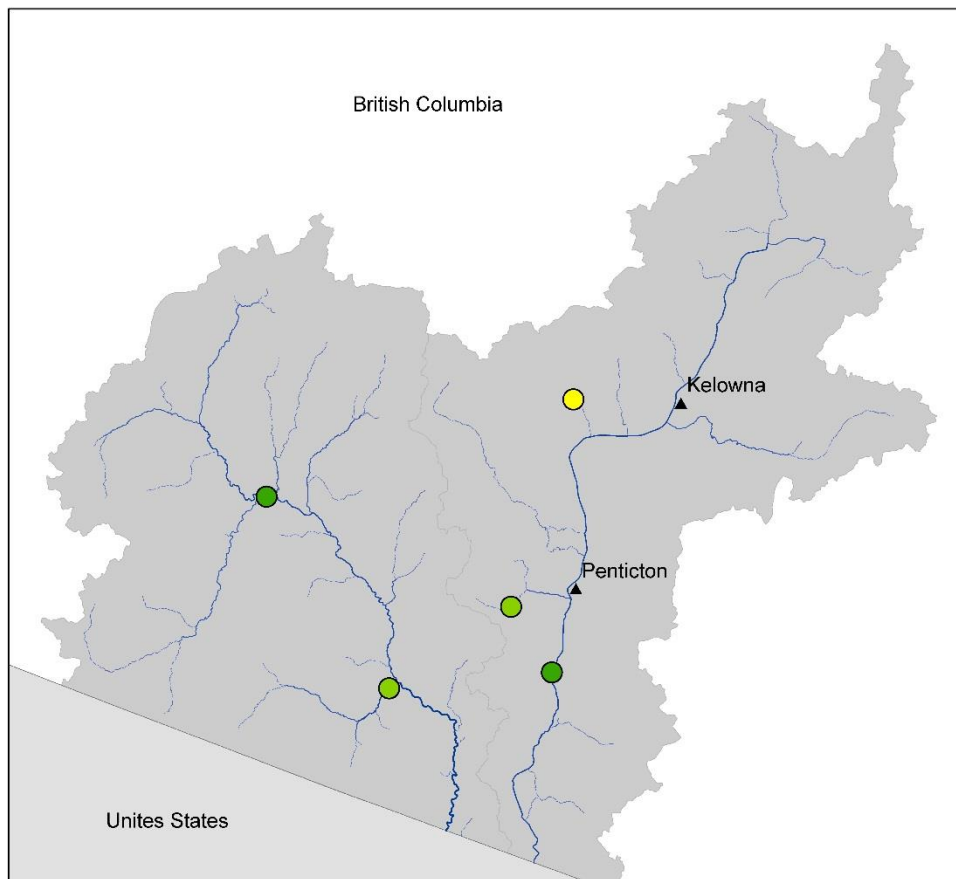
HYDROLOGY DATA SUFFICIENCY

Data Sufficiency Indicator		Basin
Hydrology	Total number of sub-sub-basins	2
	Total number of dams (>10m)	0
	Year of earliest dam operation	-
	Year of earliest available continuous flow monitoring	1914
	Number of monitoring stations available for earliest, continuous flow monitoring	2
	Number of sub-sub-basins with monitoring stations	1
	Number of monitoring stations on river downstream of dams	0
	Data Sufficiency Category	Moderately Sufficient
	Year of long-term continuous flow monitoring	1970
	Number of monitoring stations available for continuous flow monitoring analysis	15
	Number of sub-sub-basins with monitoring stations	2
	Number of monitoring stations on river downstream of dams	0
	Data Sufficiency Category	Partially Sufficient
	Year of widespread, continuous flow monitoring	1985
	Number of monitoring stations available for continuous flow monitoring analysis	25
	Number of sub-sub-basins with monitoring stations	2
	Number of monitoring stations on river downstream of dams	0
	Data Sufficiency Category	Partially Sufficient
	Overall Data Sufficiency Category	Moderately Sufficient
	Data Sufficiency Score	2

LONG-TERM TRENDS IN MONTHLY FLOW FOR THE OKANAGAN-SIMILKAMEEN WATERSHED

MAP. RESULTS OF A SERIES OF LONG-TERM TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE OKANAGAN-SIMILKAMEEN WATERSHED FOR THE PERIOD <1920-2014

Average Percentage Change in Median Monthly Flow for Monitoring Stations in the Okanagan-Similkameen Basin (<1920 - 2014)



Average percentage change in median monthly flow for all months*, weighted by median annual flow

● 0-0.099 Very Good ● 0.101 - 0.99 Good ● 1.00-4.99 Fair ● 5.00-9.99 Poor ● 10.00-100.00 Very Poor

Sources: Environment Canada, HYDAT (2015).

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WWF-Canada Watershed Report for the Okanagan-Similkameen Watershed

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of February 2016.

TABLE. RESULTS OF LONG-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE OKANAGAN-SIMILKAMEEN WATERSHED.

08N - Okanagan and Similkameen								
08NL004					08NL007			
Start Year for Analysis		1914			Start Year for Analysis		1914	
Median Annual Flow (m ³ /s)		2.48			Median Annual Flow (m ³ /s)		7.58	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	-0.009	0.079	2.54		0.005	0.767	7.72	
November	-0.010	0.055	2.57		-0.005	0.751	7.86	
December	-0.01	0.044 *	2.44	0.39	0.00	0.919	7.72	
January	-0.011	0.041 *	2.57	0.42	-0.002	0.856	7.85	
February	-0.014	0.017 *	2.88	0.48	-0.003	0.862	7.75	
March	-0.010	0.065	2.59		-0.005	0.748	7.81	
April	-0.012	0.020 *	2.74	0.44	-0.009	0.594	7.73	
May	-0.010	0.027 *	2.58	0.39	-0.009	0.514	7.74	
June	-0.010	0.068	2.60		-0.013	0.367	7.81	
July	-0.009	0.058	2.70		-0.011	0.496	7.75	
August	-0.010	0.065	2.57		0.000	0.973	7.68	
September	-0.010	0.065	2.74		0.006	0.751	7.79	
Average for all months, for each station	-0.01		2.63	0.18	0.00		7.77	0.00

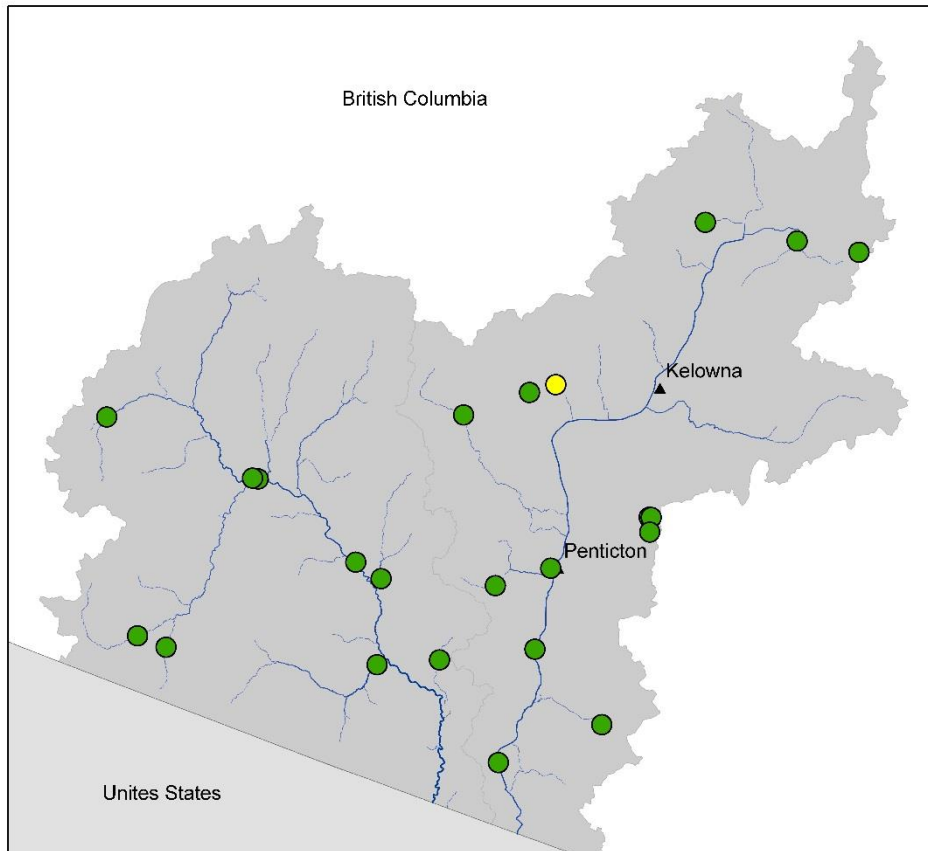
08N - Okanagan and Similkameen												
08NM002					08NM037				08NM041			
Start Year for Analysis		1915			Start Year for Analysis		1919		Start Year for Analysis		1919	
Median Annual Flow (m ³ /s)		14.26			Median Annual Flow (m ³ /s)		0.13		Median Annual Flow (m ³ /s)		0.43	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.025	0.307	14.61		-0.001	0.166	0.12		-0.007	0.000 ***	0.43	1.58
November	0.029	0.301	14.71		-0.001	0.118	0.13		-0.007	0.000 ***	0.43	1.50
December	0.03	0.291	14.78		0.00	0.080	0.13		-0.01	0.000 ***	0.43	1.48
January	0.014	0.514	13.92		-0.001	0.025 *	0.14	0.64	-0.007	0.000 ***	0.46	1.55
February	0.013	0.578	14.00		-0.001	0.034 *	0.14	0.58	-0.007	0.000 ***	0.46	1.55
March	0.013	0.629	14.03		-0.001	0.088	0.14		-0.007	0.000 ***	0.46	1.57
April	0.013	0.626	14.09		-0.001	0.202	0.13		-0.007	0.000 ***	0.46	1.55
May	0.015	0.558	14.17		-0.001	0.219	0.14		-0.007	0.000 ***	0.45	1.56
June	0.017	0.518	14.35		-0.001	0.152	0.14		-0.007	0.000 ***	0.45	1.62
July	0.020	0.421	14.46		-0.001	0.075	0.14		-0.007	0.000 ***	0.45	1.61
August	0.026	0.333	14.60		-0.001	0.172	0.13		-0.007	0.000 ***	0.45	1.59
September	0.027	0.290	14.62		0.000	0.182	0.13		-0.007	0.000 ***	0.45	1.53
Average for all months, for each station	0.02		14.36	0.00	0.00		0.13	0.10	-0.01		0.45	1.56
Average percentage change in median monthly flow for all months, weighted by median annual flow, in the entire Okanagan-Similkameen Basin			0.04									

* Percentage change in median monthly flow is only calculated for months with a statistically significant trend over time. For months without a significant trend, a value of zero is assigned for calculation of the overall station score.

RECENT-TERM TRENDS IN MONTHLY FLOW FOR THE OKANAGAN-SIMILKAMEEN WATERSHED

MAP. RESULTS OF A SERIES OF TREND ANALYSES OF MEDIAN MONTHLY FLOW IN OKANAGAN-SIMILKAMEEN WATERSHED FOR THE PERIOD 1985-2014.

Average Percentage Change in Median Monthly Flow for Monitoring Stations in the Okanagan-Similkameen Basin (1985 - 2014)



Average percentage change in median monthly flow for all months*, weighted by median annual flow

- 0-0.099 Very Good
- 0.101 - 0.99 Good
- 1.00-4.99 Fair
- 5.00-9.99 Poor
- 10.00-100.00 Very Poor

Sources: Environment Canada, HYDAT (2015).

TABLE. RESULTS OF RECENT-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE OKANAGAN-SIMILKAMEEN WATERSHED.

	08NL004				08NL007				08NL022			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		2.48		Median Annual Flow (m ³ /s)		7.58		Median Annual Flow (m ³ /s)		23.53	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.016	0.378	2.54		0.062	0.388	7.72		0.138	0.453	23.63	
November	0.015	0.293	2.57		0.059	0.420	7.86		0.146	0.477	23.72	
December	0.01	0.586	2.44		0.07	0.329	7.72		0.16	0.353	23.85	
January	0.019	0.268	2.57		0.034	0.499	7.85		0.163	0.580	23.59	
February	0.020	0.223	2.88		0.037	0.420	7.75		0.140	0.418	23.76	
March	0.021	0.183	2.59		0.018	0.750	7.81		0.104	0.580	23.71	
April	0.016	0.302	2.74		0.034	0.626	7.73		0.066	0.489	23.59	
May	0.019	0.285	2.58		0.039	0.420	7.74		0.083	0.752	23.89	
June	0.015	0.442	2.60		0.053	0.320	7.81		0.123	0.514	24.06	
July	0.014	0.420	2.70		0.061	0.245	7.75		0.129	0.477	23.88	
August	0.014	0.378	2.57		0.060	0.196	7.68		0.150	0.51	23.74	
September	0.014	0.358	2.74		0.060	0.378	7.79		0.155	0.396	23.74	
Average for all months, for each station	0.02		2.63	0.00	0.05		7.77	0.00	0.13		23.76	0.00

	08NL024				08NL038				08NL045			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		7.01		Median Annual Flow (m ³ /s)		16.54		Median Annual Flow (m ³ /s)		0.25	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.027	0.722	7.16		0.163	0.368	17.07		0.001	0.511	0.25	
November	0.022	0.722	7.25		0.172	0.293	17.08		0.001	0.653	0.25	
December	0.01	0.837	7.24		0.13	0.329	16.94		0.00	0.561	0.25	
January	-0.013	0.750	7.02		0.028	0.807	16.14		0.002	0.268	0.25	
February	0.004	0.925	6.97		0.037	0.793	16.35		0.001	0.285	0.25	
March	0.004	0.985	6.89		0.049	0.666	16.58		0.001	0.488	0.25	
April	0.004	0.940	7.21		0.023	0.925	16.85		0.001	0.548	0.25	
May	0.007	0.896	7.23		0.034	0.793	16.98		0.001	0.586	0.25	
June	-0.012	0.778	7.16		0.043	0.639	16.71		0.001	0.378	0.25	
July	0.009	0.807	7.19		0.041	0.586	16.79		0.001	0.358	0.25	
August	0.021	0.837	7.08		0.114	0.431	16.76		0.001	0.488	0.25	
September	0.017	0.639	7.16		0.161	0.293	17.00		0.001	0.639	0.25	
Average for all months, for each station	0.01		7.13	0.00	0.08		16.77	0.00	0.00		0.25	0.00

	08NL050				08NL069				08NL070			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		0.73		Median Annual Flow (m ³ /s)		2.76		Median Annual Flow (m ³ /s)		2.84	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	-0.002	0.778	0.72		0.028	0.245	2.87		0.007	0.778	2.95	
November	-0.003	0.750	0.70		0.034	0.149	2.89		0.017	0.488	2.95	
December	0.00	0.613	0.72		0.04	0.061	2.86		0.02	0.536	2.91	
January	-0.002	0.896	0.74		0.024	0.111	2.71		0.004	0.778	2.74	
February	0.002	0.925	0.76		0.019	0.329	2.78		-0.005	0.750	2.82	
March	-0.003	0.985	0.76		0.015	0.268	2.78		-0.008	0.837	2.81	
April	-0.004	0.722	0.77		0.022	0.320	2.77		0.005	0.750	2.90	
May	-0.005	0.750	0.77		0.023	0.285	2.77		0.006	0.764	2.83	
June	-0.003	0.694	0.78		0.022	0.237	2.81		0.003	0.793	2.91	
July	-0.002	0.837	0.75		0.032	0.209	2.88		0.010	0.736	2.98	
August	-0.002	0.837	0.71		0.032	0.171	2.90		0.013	0.707	2.98	
September	0.001	0.985	0.72		0.027	0.302	2.92		0.007	0.793	2.96	
Average for all months, for each station	0.00		0.74	0.00	0.03		2.83	0.00	0.01		2.89	0.00

	08NL071				08NM002				08NM037			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		2.11		Median Annual Flow (m ³ /s)		14.26		Median Annual Flow (m ³ /s)		0.13	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.006	0.868	2.25		-0.024	0.881	14.61		0.000	0.807	0.12	
November	0.004	0.884	2.27		-0.016	0.896	14.71		0.000	0.561	0.13	
December	-0.01	0.602	2.25		0.02	0.955	14.78		0.00	0.707	0.13	
January	0.002	0.934	2.07		0.008	0.851	13.92		0.000	1.000	0.14	
February	-0.003	0.900	2.08		0.005	0.940	14.00		0.000	0.822	0.14	
March	0.000	1.000	2.08		0.020	0.837	14.03		0.000	0.837	0.14	
April	0.000	0.983	2.14		0.025	0.778	14.09		0.000	1.000	0.13	
May	-0.016	0.440	2.15		0.046	0.807	14.17		0.000	0.910	0.14	
June	-0.018	0.370	2.14		0.042	0.778	14.35		0.000	0.881	0.14	
July	-0.007	0.739	2.15		0.036	0.807	14.46		0.000	0.807	0.14	
August	0.005	0.739	2.18		-0.016	0.896	14.60		0.000	0.940	0.13	
September	0.000	1.000	2.16		0.006	1.000	14.62		0.000	0.851	0.13	
Average for all months, for each station	0.00		2.16	0.00	0.01		14.36	0.00	0.00		0.13	0.00

	08NM041				08NM050				08NM065			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		0.43		Median Annual Flow (m ³ /s)		13.59		Median Annual Flow (m ³ /s)		0.54	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.008	0.003 **	0.43	1.87	0.000	1.000	13.83		-0.001	0.750	0.57	
November	0.008	0.002 **	0.43	1.89	0.007	1.000	13.84		-0.001	0.851	0.57	
December	0.01	0.006 **	0.43	1.87	0.00	1.000	13.92		0.00	0.778	0.57	
January	0.008	0.002 **	0.46	1.74	0.007	0.925	13.33		-0.001	0.666	0.55	
February	0.008	0.004 **	0.46	1.84	0.007	0.985	13.23		-0.001	0.548	0.55	
March	0.008	0.006 **	0.46	1.70	0.013	0.896	13.28		-0.001	0.680	0.54	
April	0.007	0.008 **	0.46	1.62	0.014	0.851	13.26		-0.001	0.750	0.53	
May	0.008	0.006 **	0.45	1.68	0.020	0.866	13.36		-0.001	0.722	0.53	
June	0.008	0.002 **	0.45	1.78	0.026	0.822	13.55		0.000	0.910	0.53	
July	0.008	0.002 **	0.45	1.78	0.029	0.822	13.70		-0.001	0.612	0.55	
August	0.008	0.001 **	0.45	1.72	0.026	0.837	13.87		-0.001	0.807	0.57	
September	0.008	0.002 **	0.45	1.68	0.008	1.000	13.90		0.000	0.955	0.56	
Average for all months, for each station	0.01		0.45	1.76	0.01		13.59	0.00	0.00		0.55	0.00

	08NM085				08NM127				08NM134			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		15.62		Median Annual Flow (m ³ /s)		16.17		Median Annual Flow (m ³ /s)		0.06	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	-0.016	0.943	15.99		0.023	0.925	16.68		0.000	0.285	0.06	
November	-0.006	0.943	15.95		0.014	0.736	16.66		-0.001	0.202	0.06	
December	-0.01	0.915	16.22		0.03	0.722	16.73		0.00	0.107	0.06	
January	0.028	0.643	15.15		0.036	0.561	15.66		-0.001	0.143	0.06	
February	0.021	0.803	15.17		0.069	0.420	15.63		-0.001	0.154	0.06	
March	0.020	0.858	15.17		0.082	0.442	15.66		-0.001	0.159	0.06	
April	0.028	0.708	15.35		0.072	0.420	15.68		-0.001	0.165	0.06	
May	0.026	0.803	15.38		0.102	0.358	15.90		-0.001	0.209	0.06	
June	0.032	0.789	15.74		0.050	0.442	16.04		0.000	0.223	0.06	
July	0.014	0.915	15.83		0.040	0.750	16.32		0.000	0.230	0.06	
August	-0.007	0.972	16.03		-0.013	0.896	16.58		-0.001	0.230	0.06	
September	-0.009	0.957	16.02		0.024	0.736	16.62		0.000	0.268	0.06	
Average for all months, for each station	0.01		15.67	0.00	0.04		16.18	0.00	0.00		0.06	0.00

	08NM142				08NM171				08NM173			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		0.09		Median Annual Flow (m ³ /s)		0.19		Median Annual Flow (m ³ /s)		0.03	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	-0.001	0.478	0.09		-0.001	0.677	0.19		0.000	0.195	0.03	
November	-0.001	0.478	0.09		-0.001	0.835	0.20		0.000	0.203	0.03	
December	0.00	0.288	0.09		0.00	0.900	0.19		0.00	0.243	0.03	
January	-0.001	0.453	0.09		-0.001	0.545	0.19		0.000	0.251	0.03	
February	0.000	0.646	0.09		-0.002	0.404	0.19		0.000	0.250	0.03	
March	-0.001	0.739	0.09		-0.002	0.348	0.19		0.000	0.226	0.03	
April	-0.001	0.466	0.09		-0.002	0.359	0.19		0.000	0.251	0.03	
May	-0.001	0.632	0.09		-0.002	0.288	0.19		0.000	0.144	0.03	
June	-0.001	0.545	0.09		-0.001	0.297	0.19		0.000	0.083	0.03	
July	-0.001	0.348	0.09		-0.002	0.211	0.19		0.000	0.211	0.03	
August	-0.001	0.288	0.09		-0.002	0.226	0.19		0.000	0.144	0.03	
September	-0.001	0.428	0.09		-0.001	0.453	0.19		0.000	0.181	0.03	
Average for all months, for each station	0.00		0.09	0.00	0.00		0.19	0.00	0.00		0.03	0.00

	08NM174				08NM240				08NM241				08NM242			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m ³ /s)		0.14		Median Annual Flow (m ³ /s)		0.01		Median Annual Flow (m ³ /s)		0.01		Median Annual Flow (m ³ /s)		0.01	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	-0.001	0.739	0.14		0.000	0.497	0.01		0.000	0.648	0.01		0.000	1.000	0.01	
November	0.000	0.967	0.14		0.000	0.334	0.01		0.000	0.921	0.01		0.000	0.932	0.01	
December	0.00	0.573	0.15		0.00	0.260	0.01		0.00	0.796	0.01		0.00	0.864	0.01	
January	-0.001	0.573	0.14		0.000	0.816	0.01		0.000	0.322	0.01		0.000	0.658	0.01	
February	-0.001	0.545	0.14		0.000	0.915	0.01		0.000	0.405	0.01		0.000	0.540	0.01	
March	-0.001	0.632	0.14		0.000	0.694	0.01		0.000	0.566	0.01		0.000	0.609	0.01	
April	-0.001	0.416	0.14		0.000	0.748	0.01		0.000	0.513	0.01		0.000	0.683	0.01	
May	0.000	0.677	0.14		0.000	0.580	0.01		0.000	0.827	0.01		0.000	0.694	0.01	
June	-0.001	0.219	0.14		0.000	0.497	0.01		0.000	0.984	0.01		0.000	0.444	0.01	
July	-0.002	0.050	0.15		0.000	0.520	0.01		0.000	0.953	0.01		0.000	0.495	0.01	
August	-0.001	0.196	0.14		0.000	0.556	0.01		0.000	0.874	0.01		0.000	0.485	0.01	
September	-0.001	0.404	0.14		0.000	0.543	0.01		0.000	0.937	0.01		0.000	0.733	0.01	
Average for all months, for each station	0.00		0.14	0.00	0.00		0.01	0.00	0.00		0.01	0.00	0.00		0.01	0.00
Average percentage change in median monthly flow for all months, weighted by median annual flow									0.01							

* Percentage change in median monthly flow is only calculated for months with a statistically significant trend over time. For months without a significant trend, a value of zero is assigned for calculation of the overall station score.

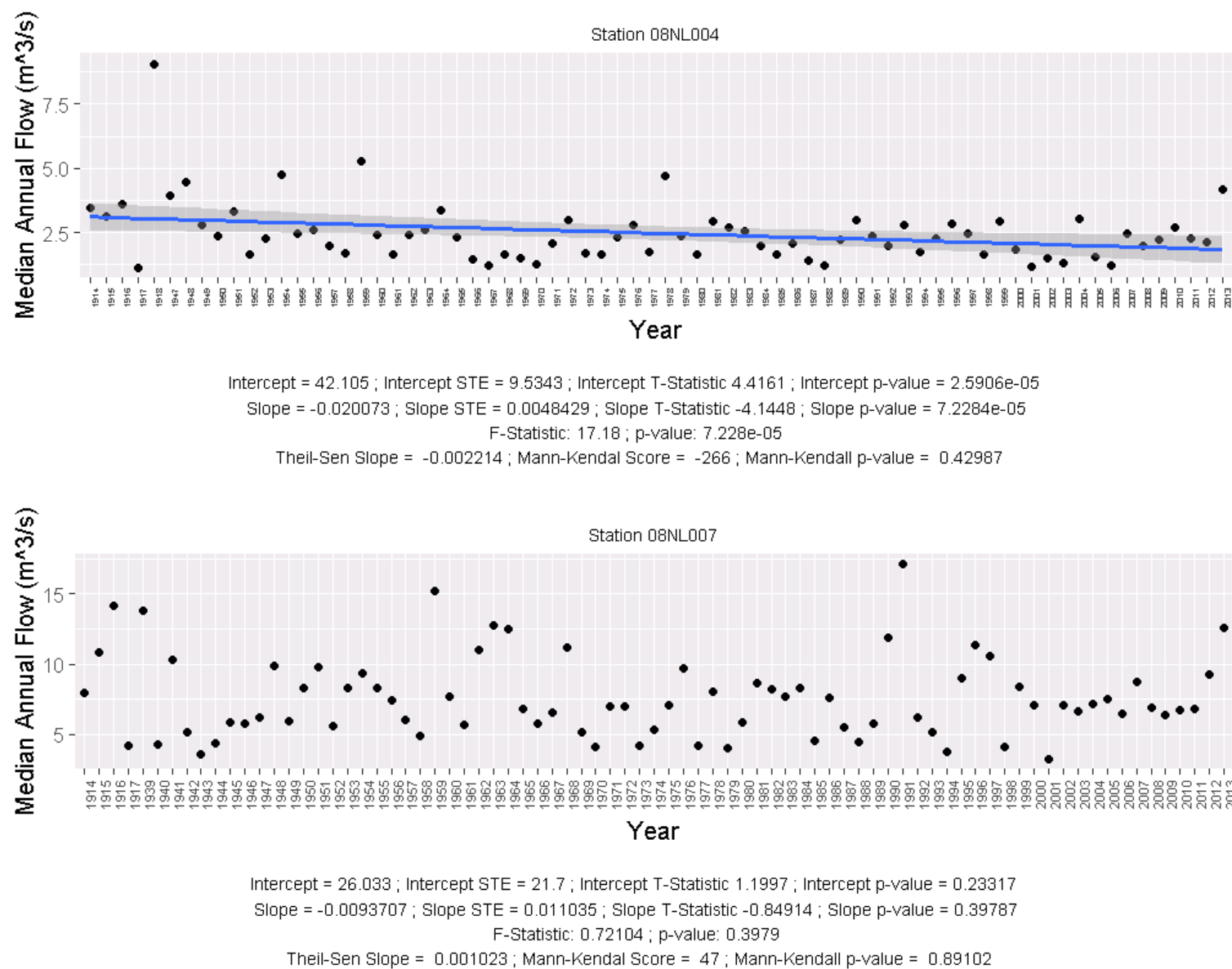
TABLE. RESULTS OF LINEAR REGRESSION ANALYSES FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE OKANAGAN-SIMILKAMEEN BASIN, BY SUB-BASIN.

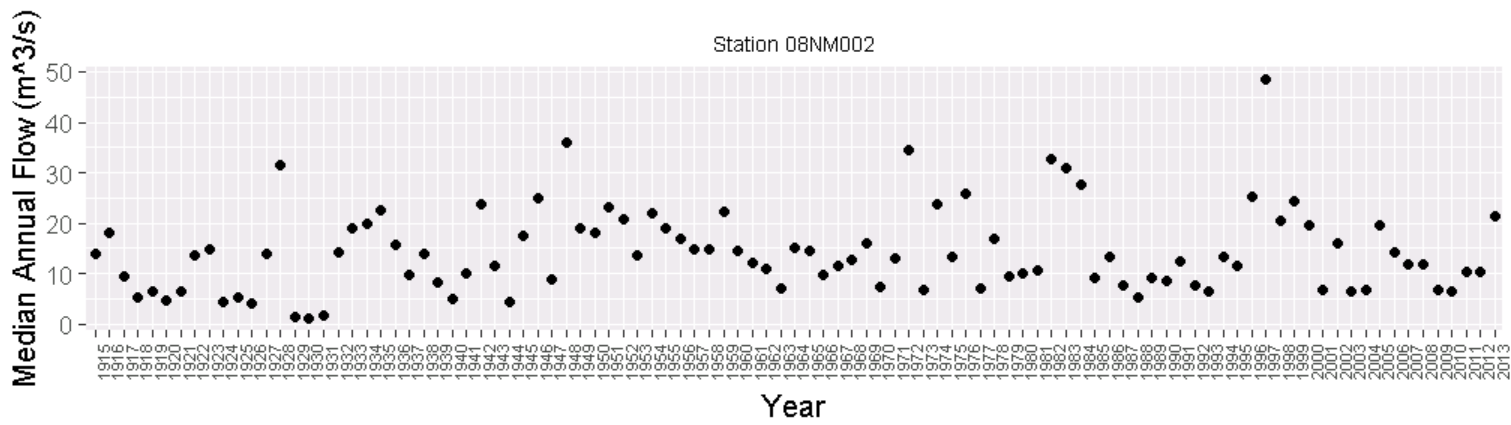
Sub-Basin	Station	Start Year	Intercept	Intercept Standard Error	Intercept T-Test Statistic	Intercept T-Test p-value	Slope	Slope Standard Error	Slope T-Test Statistic	Slope T-Test p-value	Adjusted R-Squared	F-Test Static	F-Test p-value
08N - Okanagan Similkameen	08NL004	1914	42.10	9.53	4.42	0.000	-0.020	0.005	-4.14	0.000 ***	0.14	17.18	0.000 ***
	08NL007	1914	26.03	21.70	1.20	0.233	-0.009	0.011	-0.85	0.398	0.00	0.72	0.398
	08NM002	1915	-53.19	57.26	-0.93	0.355	0.034	0.029	1.18	0.242	0.00	1.39	0.242
	08NM037	1919	4.85	0.75	6.45	0.000	-0.002	0.000	-6.27	0.000 ***	0.29	39.32	0.000 ***
	02NM041	1919	10.24	1.70	6.04	0.000	-0.005	0.001	-5.76	0.000 ***	0.26	33.22	0.000 ***

TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE OKANAGAN-SIMILKAMEEN BASIN, BY SUB-BASIN.

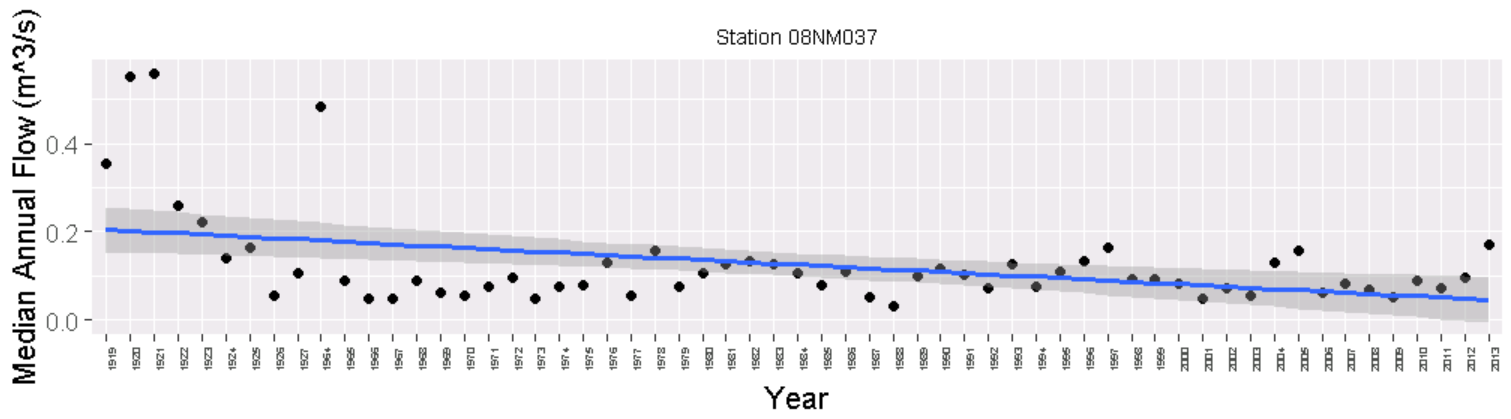
Sub-Basin	Station	Start Year	Theil -Sen Slope	Mann-Kendall Test Statistic	Mann-Kendall Test p-value	Median Annual Flow (m ³ /s)	Average Percentage Change in Median Annual Flow	Weighted Averaged Between Stations
08N - Okanagan Similkameen	08NL004	1914	-0.002	-266	0.43	2.48	Not significant	Not significant
	08NL007	1914	0.001	47	0.89	7.58	Not significant	
	08NM002	1915	0.017	190	0.57	14.26	Not significant	
	08NM037	1919	0.000	-331	0.29	0.13	Not significant	
	02NM041	1919	-0.001	-341	0.26	0.43	Not significant	

FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE OKANAGAN-SIMILKAMEEN BASIN.

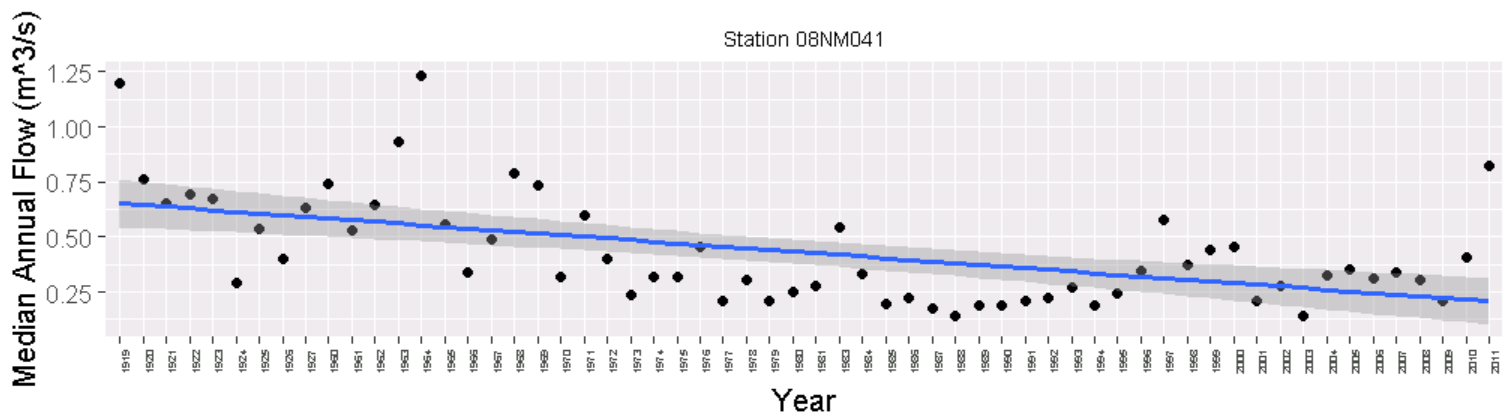




Intercept = -53.194 ; Intercept STE = 57.256 ; Intercept T-Statistic -0.92905 ; Intercept p-value = 0.35517
 Slope = 0.034347 ; Slope STE = 0.02915 ; Slope T-Statistic 1.1783 ; Slope p-value = 0.24156
 F-Statistic: 1.3884 ; p-value: 0.2416
 Theil-Sen Slope = 0.01691 ; Mann-Kendal Score = 190 ; Mann-Kendall p-value = 0.56774



Intercept = 4.8504 ; Intercept STE = 0.75244 ; Intercept T-Statistic 6.4462 ; Intercept p-value = 5.0455e-09
 Slope = -0.0023915 ; Slope STE = 0.00038137 ; Slope T-Statistic -6.2707 ; Slope p-value = 1.118e-08
 F-Statistic: 39.322 ; p-value: 1.118e-08
 Theil-Sen Slope = -0.0001912 ; Mann-Kendal Score = -331 ; Mann-Kendall p-value = 0.2885



Intercept = 10.237 ; Intercept STE = 1.6953 ; Intercept T-Statistic 6.0385 ; Intercept p-value = 3.3365e-08
 Slope = -0.0049599 ; Slope STE = 0.00086056 ; Slope T-Statistic -5.7635 ; Slope p-value = 1.1134e-07
 F-Statistic: 33.218 ; p-value: 1.113e-07
 Theil-Sen Slope = -0.0009322 ; Mann-Kendal Score = -341 ; Mann-Kendall p-value = 0.25904

TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR RECENT VS. HISTORICAL MONTHLY FLOW IN THE OKANAGAN-SIMILKAMEEN WATERSHED, BY STATION.

Station	Month	Historical			Recent			Fligner-Killeen		Mann-Whitney		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m ³ /s)
		Number of Years of Sampling	Median Monthly Flow (m ³ /s)	Median Absolute Deviation in Monthly Flow (m ³ /s)	Number of Years of Sampling	Median Monthly Flow (m ³ /s)	Median Absolute Deviation in Monthly Flow (m ³ /s)	Test Statistic	p-value	Test Statistic	p-value			
08NL004	October	35	2.35	1.70	37	2.14	1.52	2.97	0.085	94466.5	0.05	8.9	7.87	2.48
	November	35	2.28	1.66	37	2.14	1.51	2.55	0.110	93988	0.06	6.1		
	December	35	2.28	1.69	37	2.13	1.51	2.24	0.135	93858	0.08	6.6		
	January	35	2.28	1.71	37	2.1	1.50	2.30	0.129	92404	0.19	7.9		
	February	35	2.29	1.72	37	2.15	1.56	2.04	0.153	92328.5	0.13	6.1		
	March	35	2.305	1.67	37	2.18	1.60	1.27	0.260	92754	0.15	5.4		
	April	35	2.415	1.80	37	2.18	1.60	2.89	0.089	92384	0.15	9.7		
	May	35	2.44	1.81	37	2.14	1.56	3.61	0.057	93376	0.10	12.3		
	June	35	2.38	1.76	37	2.15	1.59	2.43	0.119	93451.5	0.08	9.7		
	July	35	2.33	1.65	37	2.16	1.60	1.25	0.263	93496	0.08	7.3		
	August	35	2.31	1.66	37	2.16	1.57	1.44	0.230	93605	0.08	6.5		
September	35	2.3	1.63	37	2.12	1.51	2.64	0.104	93159	0.07	7.8			
08NL007	October	38	7.265	5.59	41	7.09	5.62	0.14	0.708	106875.5	0.20	2.4	7.35	7.58
	November	38	7.36	5.54	41	7.11	5.67	0.15	0.700	107399	0.16	3.4		
	December	38	7.335	5.58	41	7.095	5.79	0.00	0.960	106679.5	0.22	3.3		
	January	38	7.775	6.12	41	6.77	5.21	2.84	0.092	108338.5	0.10	12.9		
	February	38	7.5	5.92	41	6.875	5.54	1.34	0.246	107315	0.16	8.3		
	March	38	7.705	6.22	41	7.03	5.63	2.10	0.147	107411.5	0.16	8.8		
	April	38	7.915	6.40	41	6.9	5.63	3.22	0.073	106964.5	0.19	12.8		
	May	38	7.915	6.50	41	6.725	5.44	4.77	0.029 *	107712.5	0.13	15.0		
	June	38	7.76	6.14	41	6.855	5.49	1.99	0.159	107783	0.13	11.7		
	July	38	7.39	5.65	41	6.86	5.41	0.45	0.501	108285	0.12	7.2		
	August	38	7.175	5.50	41	7.03	5.49	0.02	0.885	106835	0.20	2.0		
September	38	7.405	5.77	41	7.38	6.11	0.14	0.706	106548.5	0.23	0.3			
08NM002	October	49	13.3	10.53	50	11.7	9.19	2.91	0.088	164667.5	0.11	12.0	15.22	14.26
	November	49	13.3	10.53	50	11.7	9.19	2.60	0.107	164899.5	0.12	12.0		
	December	49	13.4	10.38	50	11.5	8.91	2.55	0.110	164930	0.12	14.2		
	January	49	13.9	10.87	50	11.4	8.08	0.04	0.837	170872	0.59	18.0		
	February	49	13.8	10.81	50	11.4	8.17	0.07	0.797	171212	0.63	17.4		
	March	49	13.9	10.82	50	11.5	8.38	0.07	0.788	170405.5	0.53	17.3		
	April	49	13.9	10.67	50	11.6	8.72	0.08	0.778	169011	0.39	16.5		
	May	49	13.8	10.82	50	11.5	8.69	0.39	0.534	168162	0.27	16.7		
	June	49	13.9	10.96	50	11.5	8.82	1.30	0.255	166527	0.20	17.3		
	July	49	13.6	10.82	50	11.7	9.04	1.42	0.234	166137	0.18	14.0		
	August	49	13.6	10.59	50	11.7	9.16	2.68	0.102	165222	0.13	14.0		
September	49	13.5	10.41	50	11.7	9.18	2.77	0.096	165266	0.13	13.3			

Station	Month	Historical			Recent			Fligner-Killeen		Mann-Whitney		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m ³ /s)
		Number of Years of Sampling	Median Monthly Flow (m ³ /s)	Median Absolute Deviation in Monthly Flow (m ³ /s)	Number of Years of Sampling	Median Monthly Flow (m ³ /s)	Median Absolute Deviation in Monthly Flow (m ³ /s)	Test Statistic	p-value	Test Statistic	p-value			
08NM037	October	28	0.088	0.08	31	0.096	0.07	1.52	0.22	46602.00	0.54	9.1	6.67	0.13
	November	28	0.088	0.08	31	0.0955	0.07	1.59	0.21	46747.00	0.53	8.5		
	December	28	0.082	0.07	31	0.096	0.07	1.14	0.29	46706.50	0.51	17.1		
	January	28	0.092	0.08	31	0.094	0.07	2.05	0.15	47799.00	0.87	2.2		
	February	28	0.0905	0.08	31	0.095	0.08	1.94	0.16	47405.00	0.80	5.0		
	March	28	0.092	0.08	31	0.095	0.07	2.61	0.11	47198.00	0.73	3.3		
	April	28	0.091	0.08	31	0.097	0.08	2.63	0.10	46779.50	0.59	6.6		
	May	28	0.091	0.08	31	0.095	0.07	3.37	0.07	46585.50	0.53	4.4		
	June	28	0.091	0.08	31	0.0945	0.07	2.60	0.11	46608.50	0.54	3.8		
	July	28	0.091	0.08	31	0.096	0.07	2.79	0.09	46767.50	0.53	5.5		
	August	28	0.091	0.08	31	0.095	0.07	3.04	0.08	46710.50	0.52	4.4		
	September	28	0.088	0.08	31	0.097	0.08	1.92	0.17	46416.00	0.44	10.2		
08NM041	October	30	0.368	0.27	30	0.315	0.22	10.09	0.00 **	42775	0.00 ***	14.4	15.66	0.43
	November	30	0.375	0.29	29	0.317	0.23	10.81	0.00 **	42704	0.00 ***	15.5		
	December	30	0.375	0.31	29	0.311	0.22	11.34	0.00 ***	42463.5	0.00 ***	17.1		
	January	30	0.385	0.29	29	0.3155	0.22	8.95	0.00 **	42200.5	0.00 ***	18.1		
	February	30	0.375	0.28	29	0.31	0.22	8.36	0.00 **	42231	0.00 ***	17.3		
	March	30	0.38	0.28	29	0.313	0.23	9.28	0.00 **	42188	0.00 ***	17.6		
	April	30	0.382	0.30	29	0.309	0.22	10.61	0.00 **	42298	0.00 ***	19.1		
	May	30	0.374	0.29	29	0.318	0.23	8.07	0.00 **	42574.5	0.00 ***	15.0		
	June	30	0.368	0.27	29	0.3145	0.22	8.23	0.00 **	42380	0.00 ***	14.5		
	July	30	0.357	0.26	29	0.3145	0.21	6.72	0.01 **	42240	0.00 ***	11.9		
	August	30	0.365	0.28	30	0.309	0.21	10.20	0.00 **	42476.5	0.00 ***	15.3		
	September	30	0.361	0.28	29	0.3175	0.22	8.36	0.00 **	42316	0.00 ***	12.0		

Average Change in entire Okanagan-Similkameen basin	12.05
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FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT VS. HISTORICAL PERIODS IN OKANAGAN-SIMILKAMEEN BASIN

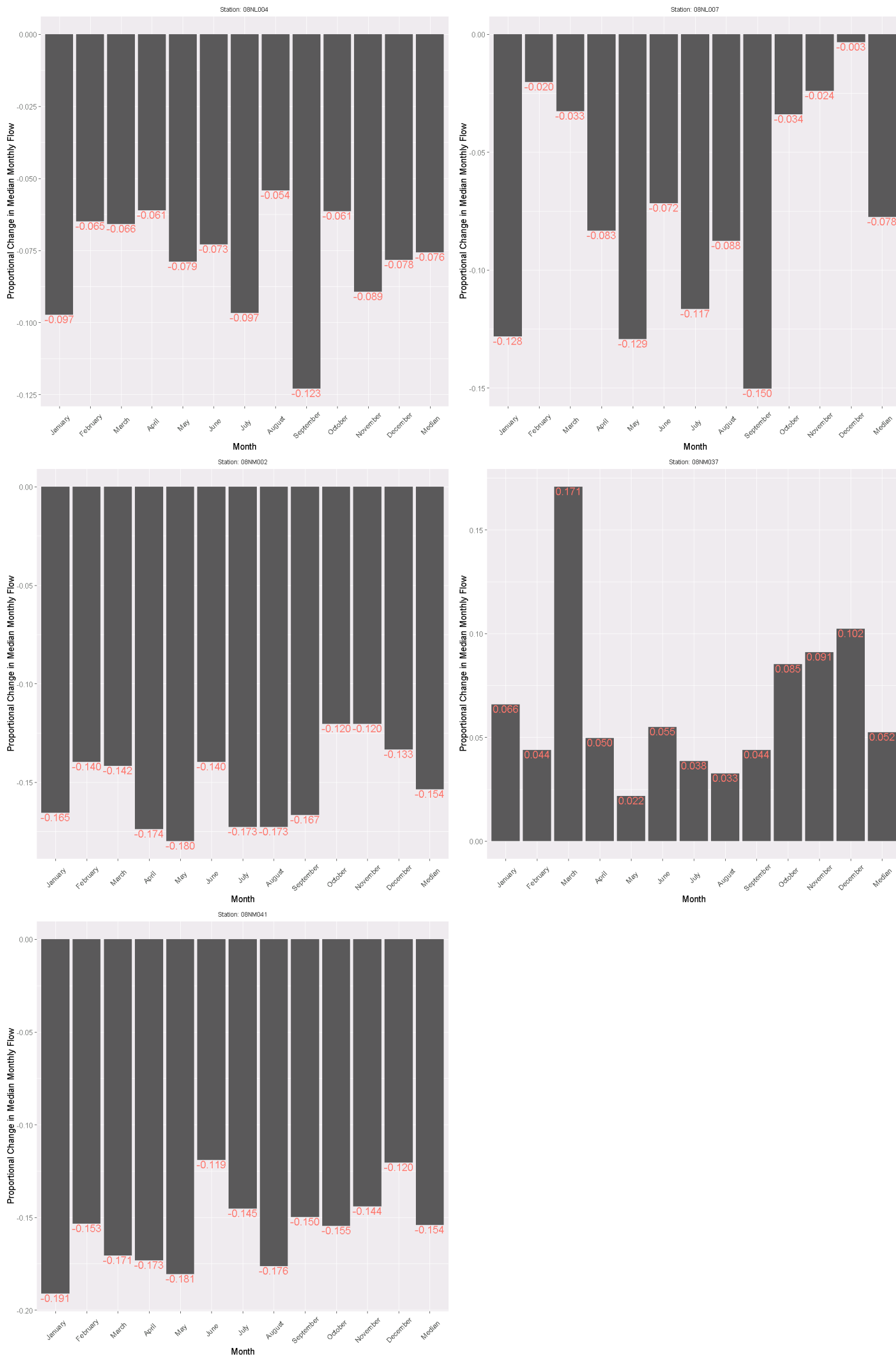
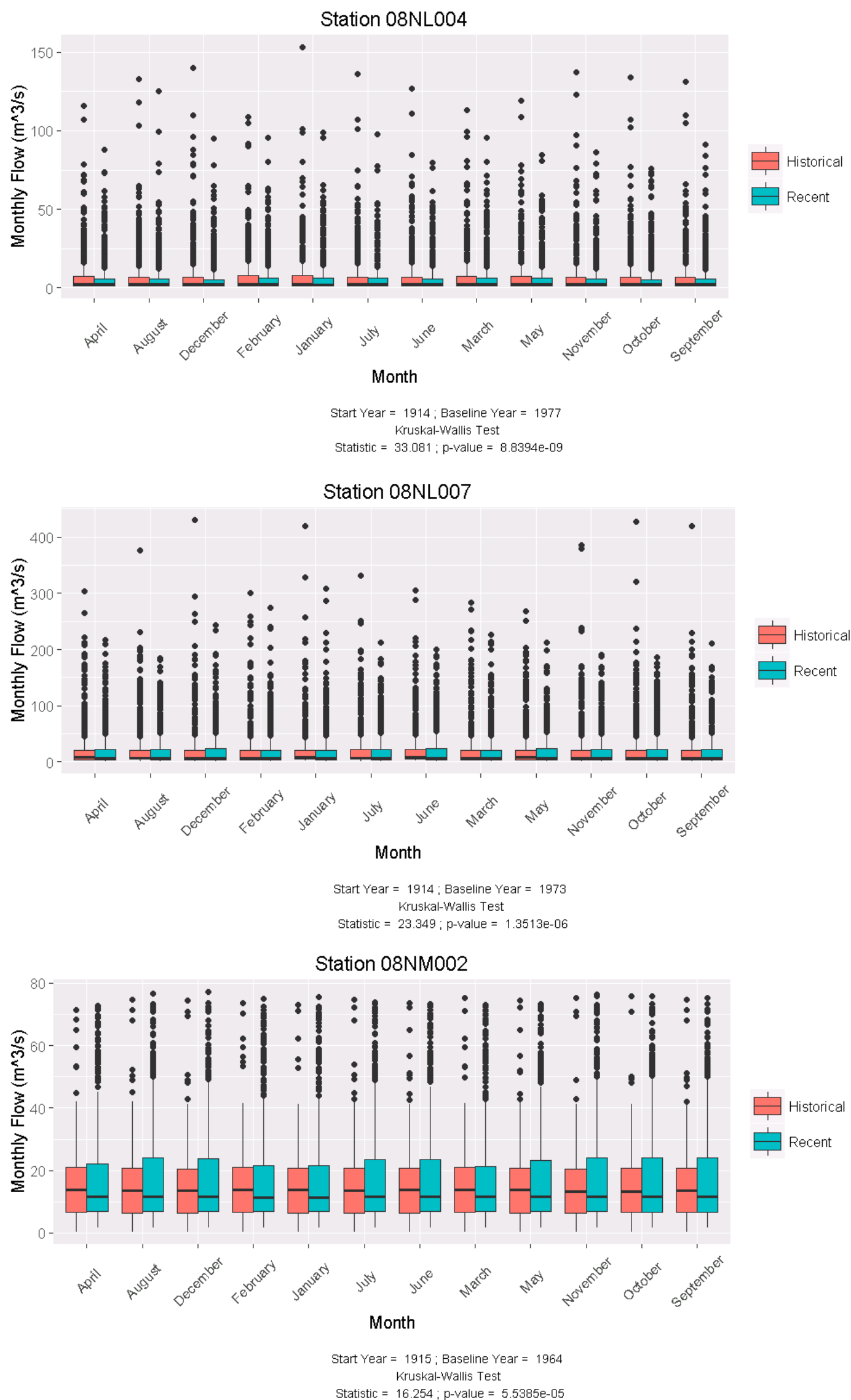
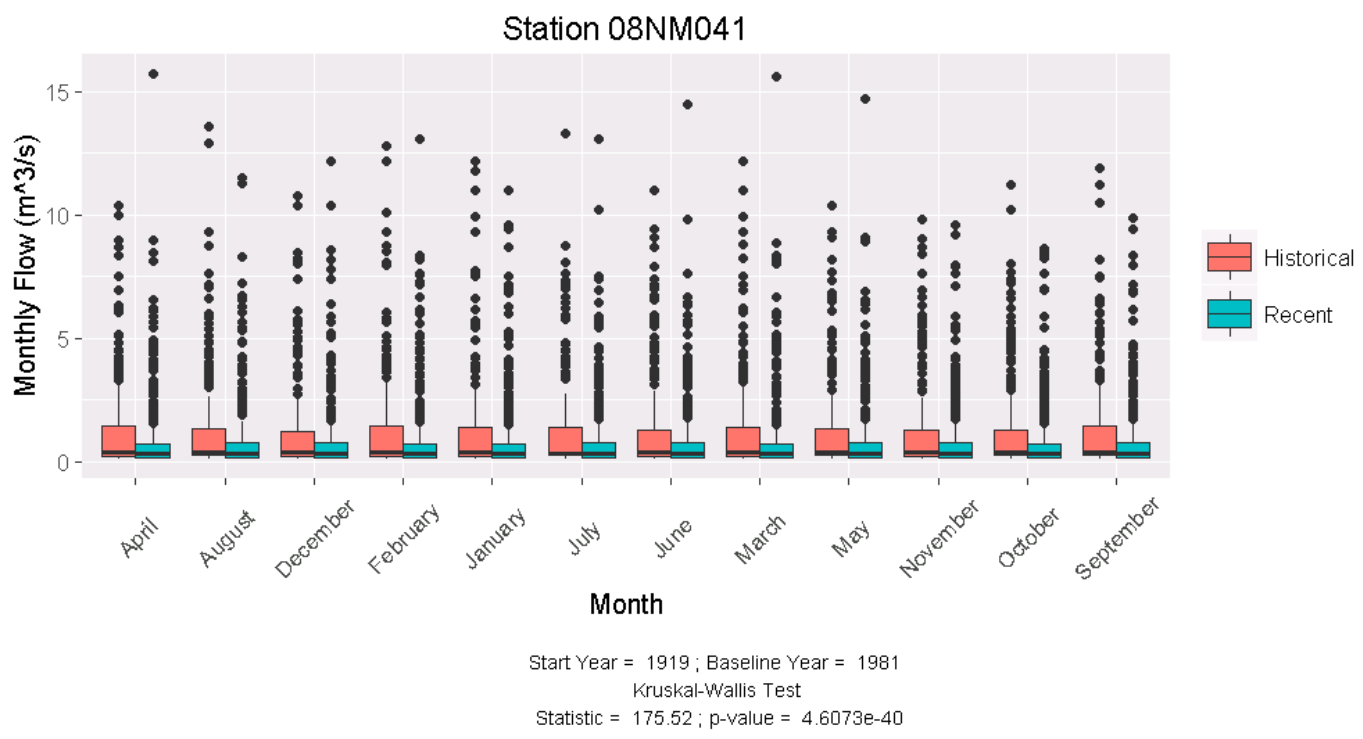
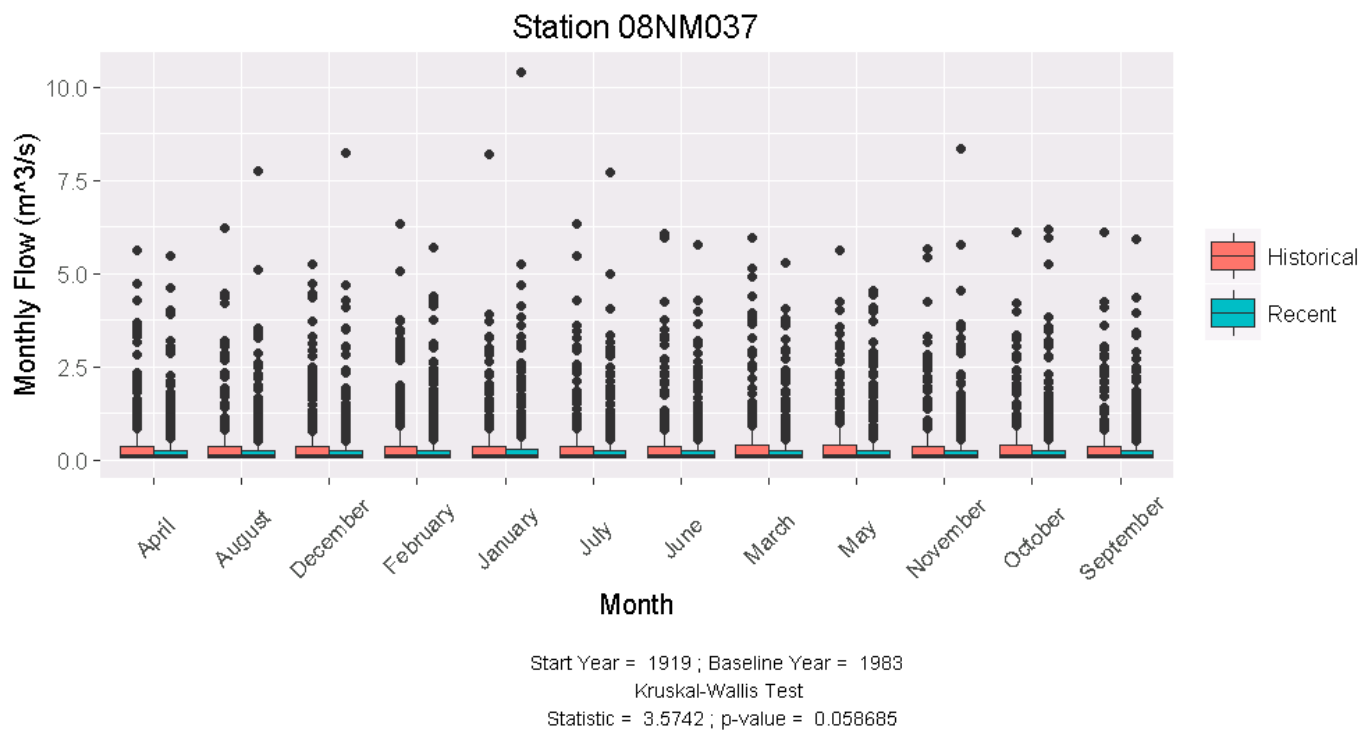


FIGURE. MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE OKANAGAN-SIMILKAMEEN BASIN.





WATER QUALITY

OVERALL WATER QUALITY HEALTH SCORING

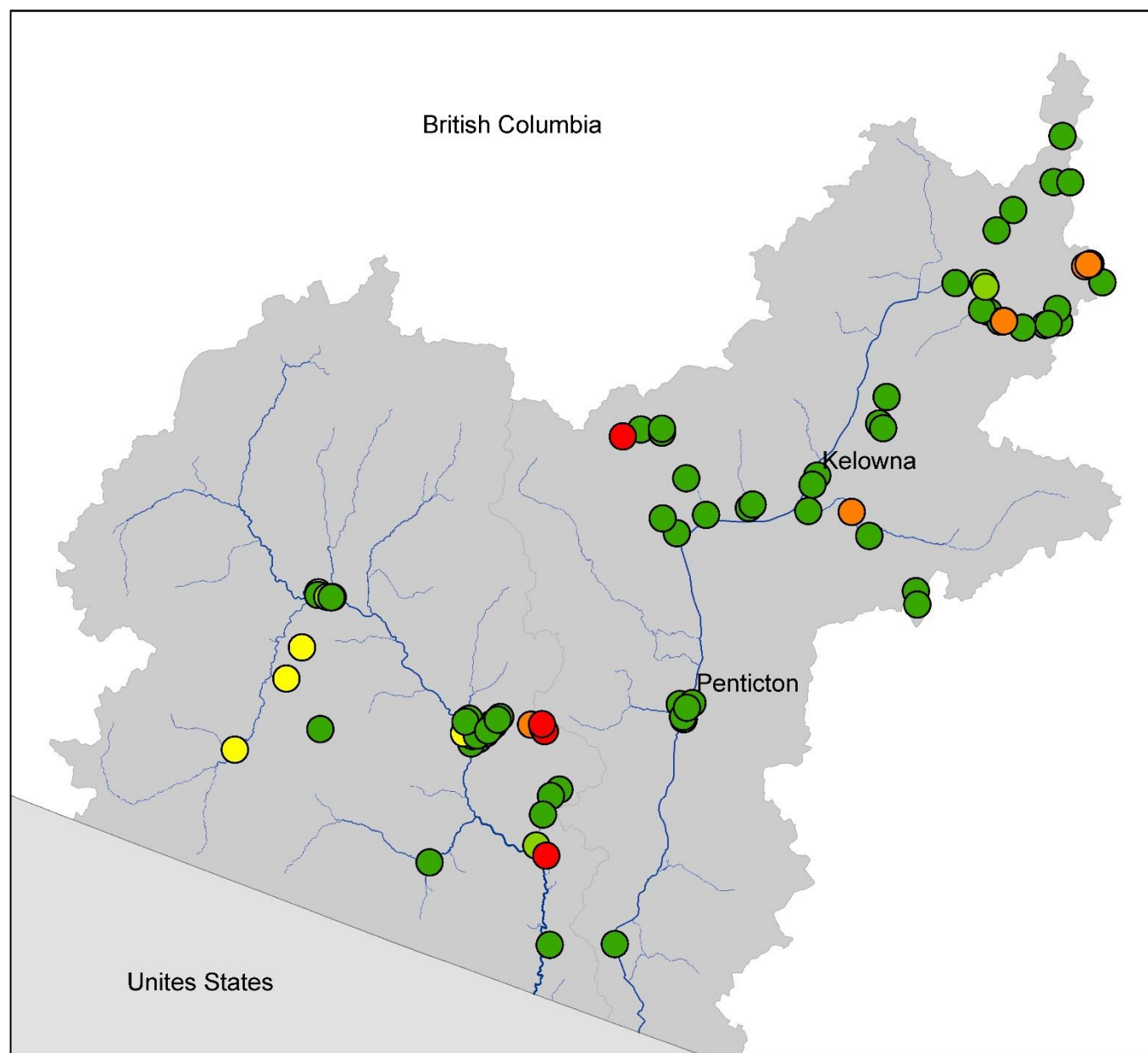
				Basin
Water Quality	Indicator			Value
	Exceedance of water quality guidelines for aquatic life	Exceedance of water quality thresholds. Weighted average of exceedances of three thresholds: water quality guidelines, 90th percentile and 75th percentile. Expressed as a proportion of total measurements. Reported as a weighted average for the last five years.	Year	2011 - 2015
Number of Stations			99	
Value			0.110	
Water Quality Health Category			Good	
Water Quality Health Score			4	
Variance of annual water quality scores			Value	0.285
Significant Mann-Kendal time-series test to determine directional trend in proportion of exceedance of water quality thresholds.			Time Period	1967 - 2015
	Trend	No trend		

WATER QUALITY DATA SUFFICIENCY

		Basin	
Water Quality	Data Sufficiency Indicator		
	Total number of sub-sub-basins		2
	Year of earliest available monitoring		1967
	Number of monitoring stations available for earliest monitoring		1
	Number of sub-sub-basins with earliest available monitoring stations		1
	Year of most recently available monitoring		2015
	Number of monitoring stations available within last five years		90
	Number of sub-sub-basins within last five years		2
	Percentage of samples with at least 10 elements measured within last 5 years.		0.00%
	Number of years of sampling in last 10 years		10
	Overall Data Sufficiency Category		Insufficient
	Data Sufficiency Score		0

MAP. EXCEEDANCE OF WATER QUALITY THRESHOLDS AS REPORTED FOR MONITORING STATIONS IN THE OKANAGAN-SIMILKAMEEN BASIN FOR THE FIVE MOST RECENT YEARS AVAILABLE.

**Water Quality in the Okanagan-Similkameen Basin
Median WQ values per site, 2011-2015**



Exceedance of Water Quality Thresholds
(Weighted Average of Proportion of Measurements that exceed 75th, 90th Percentiles and Guidelines) *

- < 0.069 ● 0.07-0.139 ● 0.14-0.239 ● 0.24-0.49 ● 0.50-1.00
- Very Good Good Fair Poor Very Poor

Sources: BC.EMS, 2015.

TABLE. WATER QUALITY IN THE OKANAGAN-SIMILKAMEEN BASIN BASED ON PROPORTION OF EXCEEDANCE OF THREE THRESHOLDS: PROVINCIAL WATER QUALITY GUIDELINES, 75TH PERCENTILE OF HISTORICAL DISTRIBUTION, AND 90TH PERCENTILE OF HISTORICAL DISTRIBUTION.

WSCSDA	Source	Year	Number of Contaminants Measured	Total Number of Sites	Number of Measurements	Total Number of Guidelines Exceedances	Proportion of Guideline Exceedance	Total Number of 90th Percentile Exceedances	Proportion of 90th Percentile Exceedance	Total Number of 75th Percentile Exceedances	Proportion of 75th Percentile Exceedance	Weighted Average Exceedance	5-Years Weighted Average
08N - Okanagan Similkameen	BCEMS	2015	16	26	1032	138	0.13	63	0.06	217	0.21	0.12	0.11
		2014	15	30	2007	178	0.09	74	0.04	216	0.11	0.07	
		2013	16	42	4645	152	0.03	196	0.04	1423	0.31	0.08	
		2012	16	36	3734	508	0.14	290	0.08	717	0.19	0.13	
		2011	17	46	4033	841	0.21	206	0.05	739	0.18	0.15	

FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OKANAGAN-SIMILKAMEEN BASIN (1967-2015).

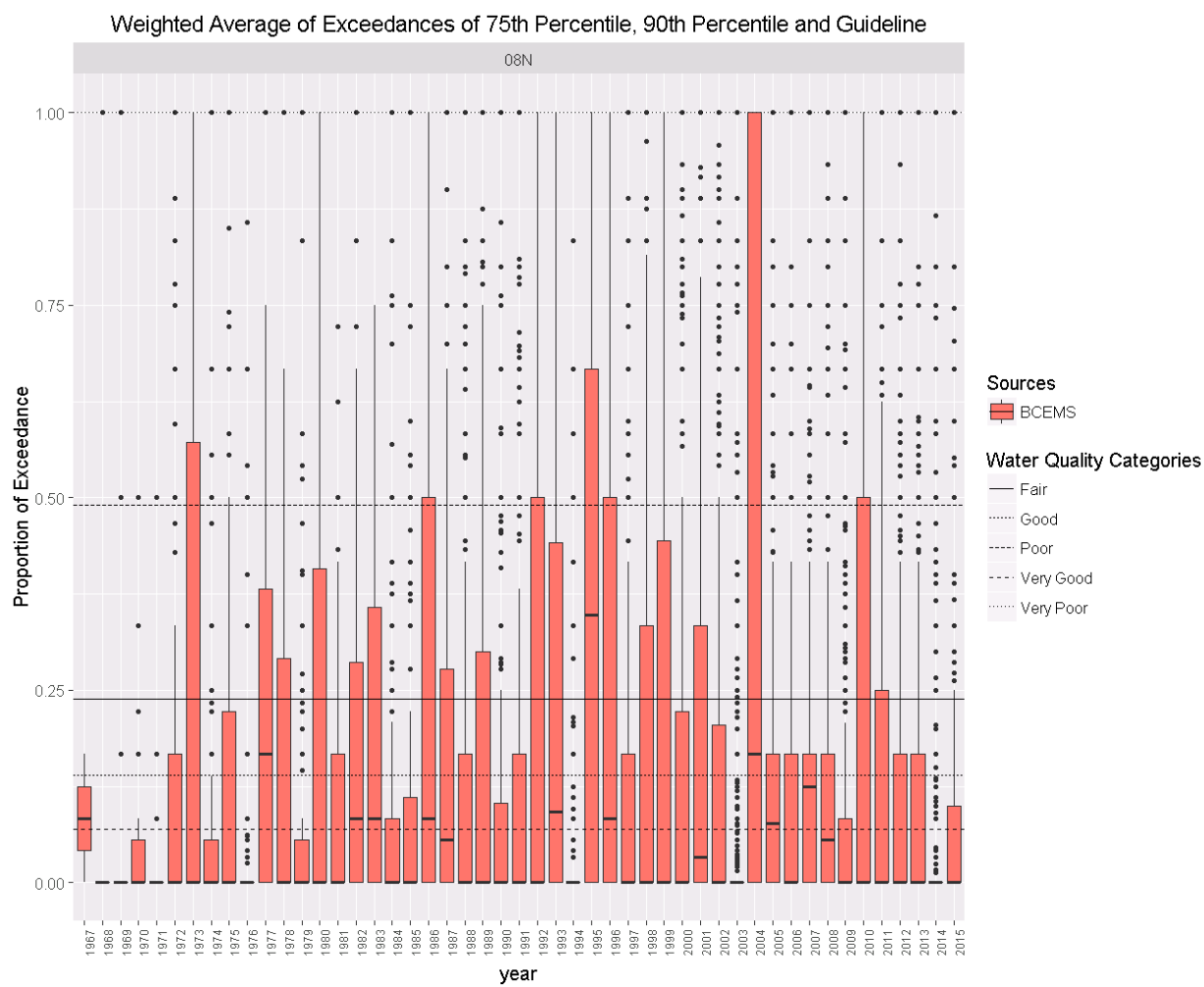
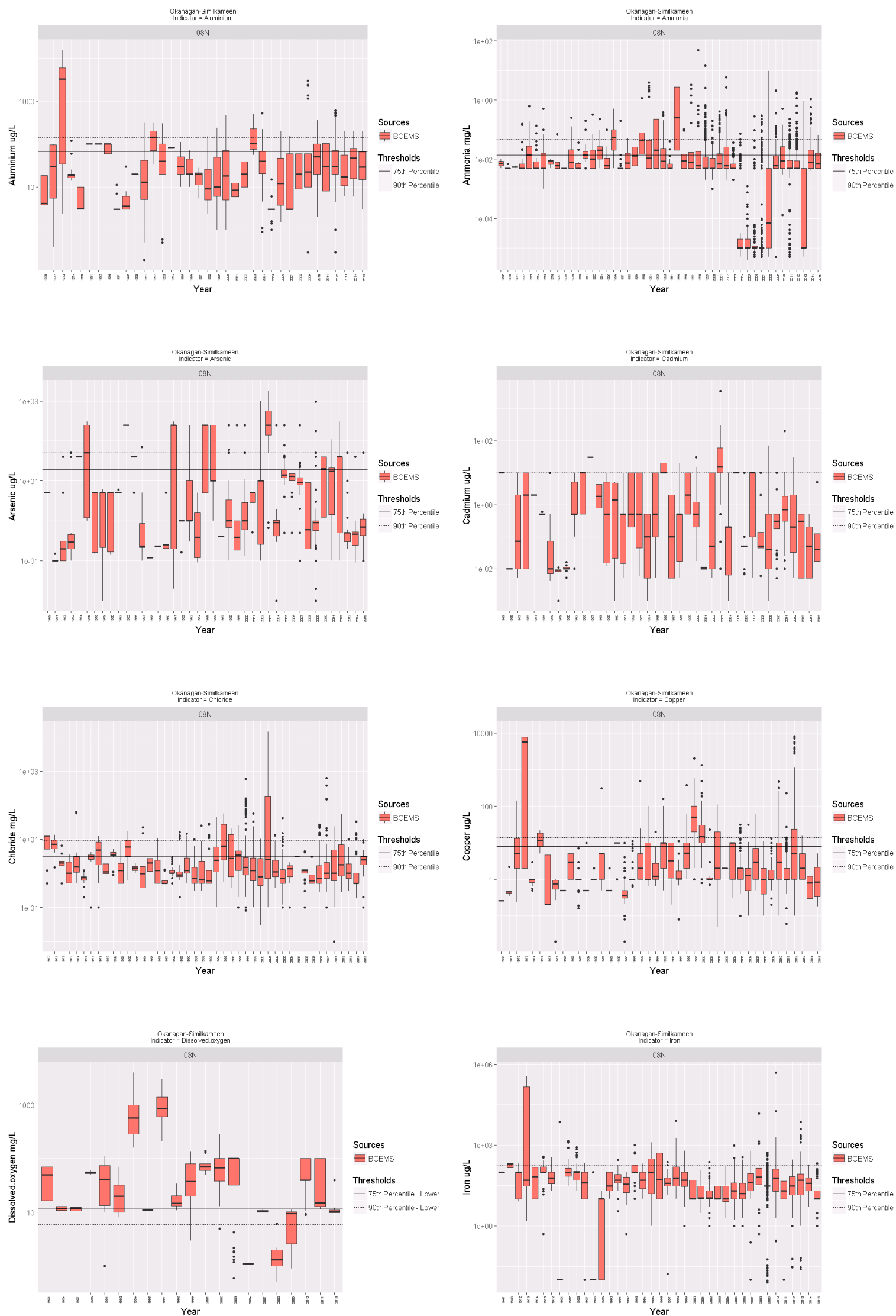
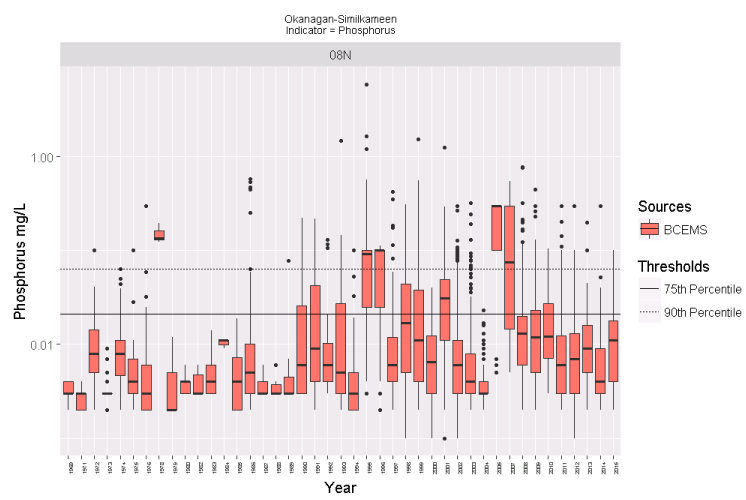
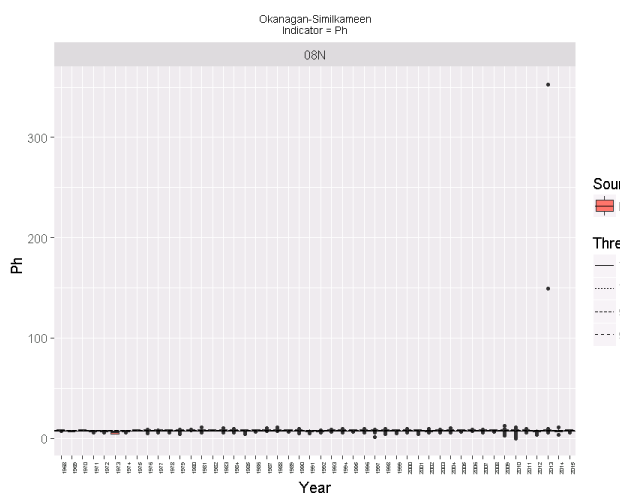
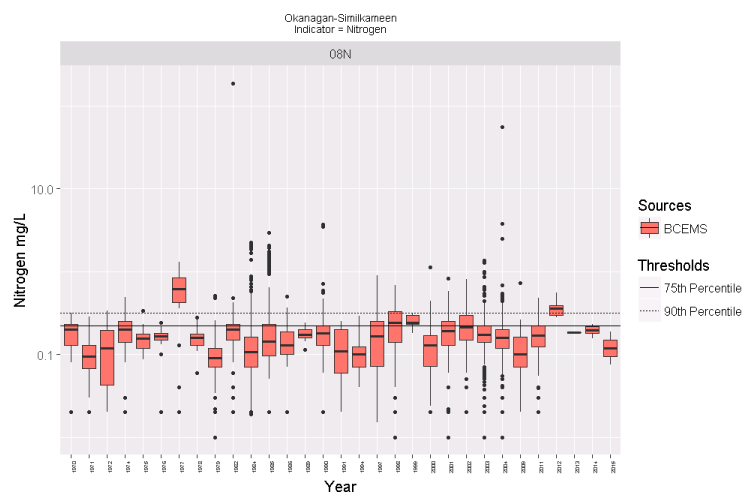
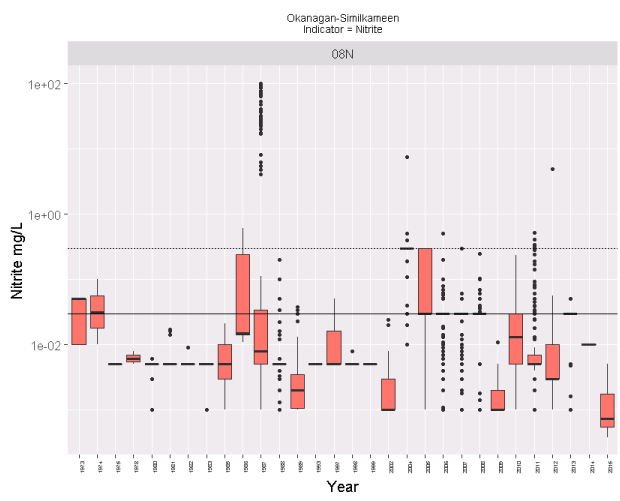
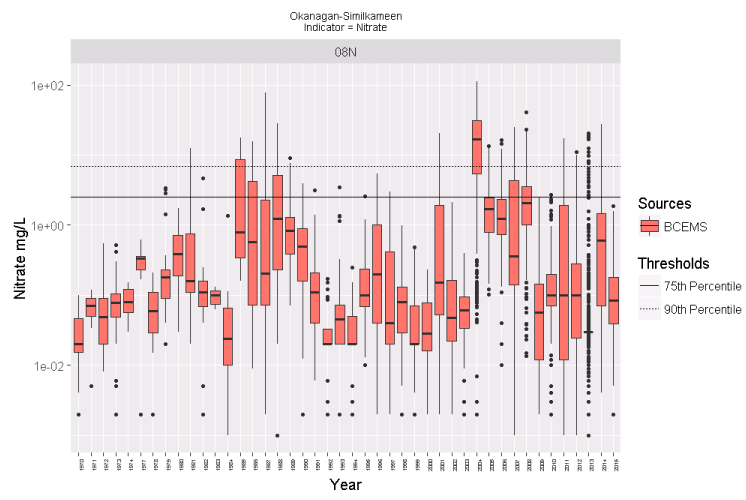
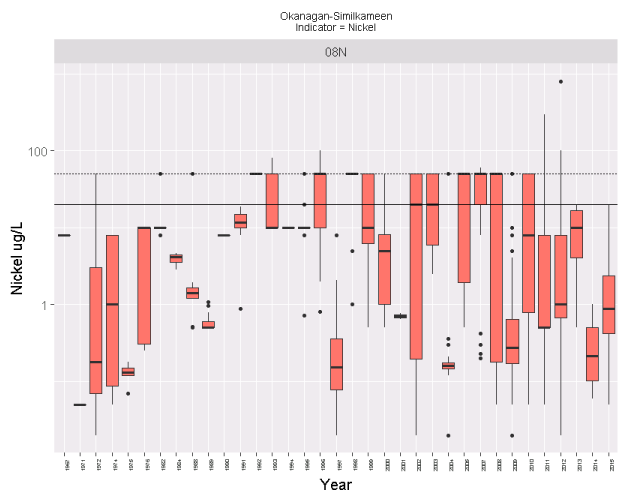
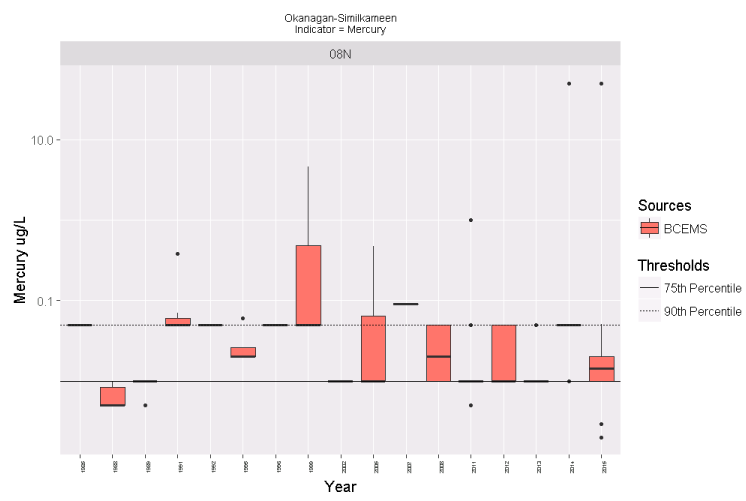
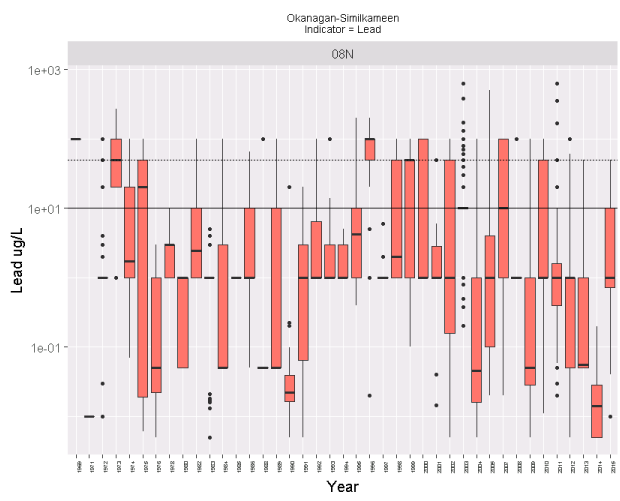


TABLE. PROPORTION OF MEASUREMENTS EXCEEDING THE WATER QUALITY THRESHOLDS, IN THE OKANAGAN-SIMILKAMEEN BASIN, BY PARAMETER MEASURED.

Variable	Total Measurements	Total Guideline Exceedances	Ratio
Aluminum	29	0	0
Ammonia	1413	226	0.160
Arsenic	651	292	0.449
Cadmium	617	214	0.347
Chloride	632	0	0
Copper	1274	472	0.370
Dissolved Oxygen	28	0	0
Iron	967	20	0.021
Lead	898	545	0.607
Mercury	143	31	0.217
Nickel	388	5	0.013
Nitrate	2246	13	0.006
Nitrite	1197	17	0.014
Nitrogen	94	0	0
pH	3709	79	0.021
Phosphorus	890	124	0.139
Uranium	175	71	0.406
Zinc	751	0	0
TOTAL	15176	2038	0.134

FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OKANAGAN-SIMILKAMEEN BASIN, BY CONTAMINANT.





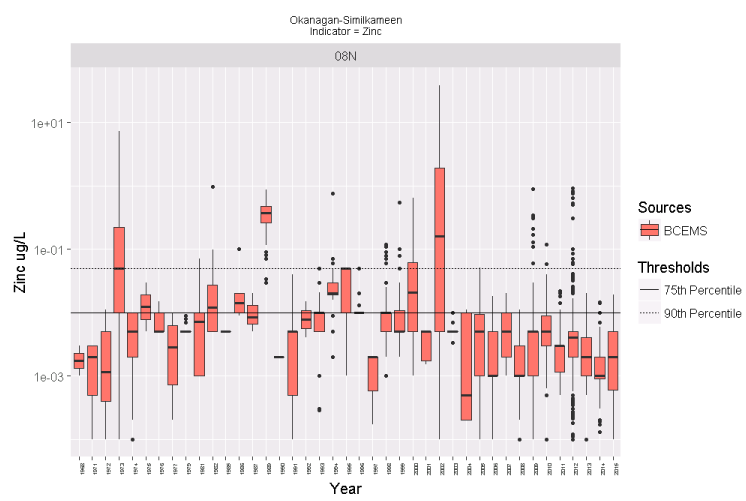
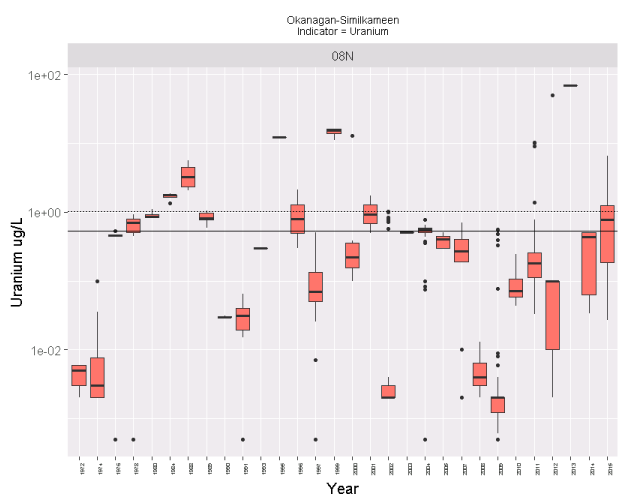
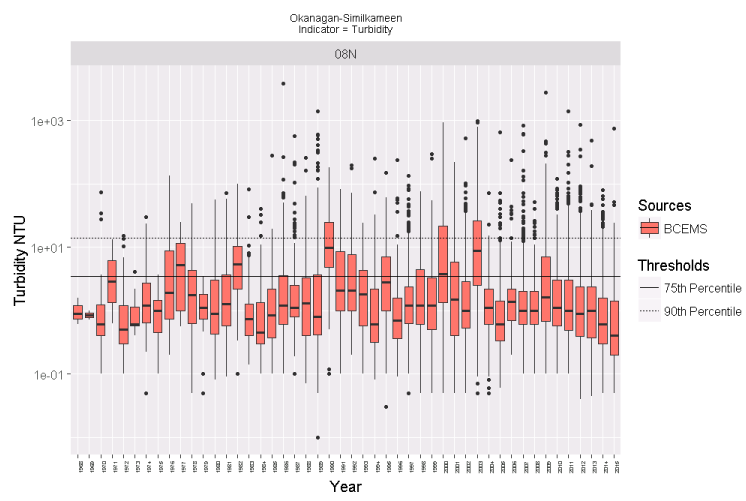
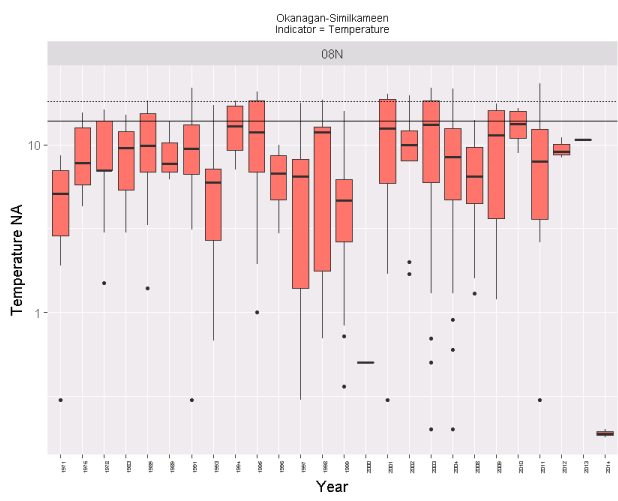


TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF ANNUAL EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME IN THE OKANAGAN-SIMILKAMEEN WATERSHED.

WCSDA	Data Source	Start Year	End Year	Number of Years	Number of Sites	Theil-Sen Slope	Mann-Kendall Test Statistic	Mann-Kendall Test p-value
O8N - Okanagan Similkameen	BCEMS	1967	2015	49	356	0	23	0.811198

FISH

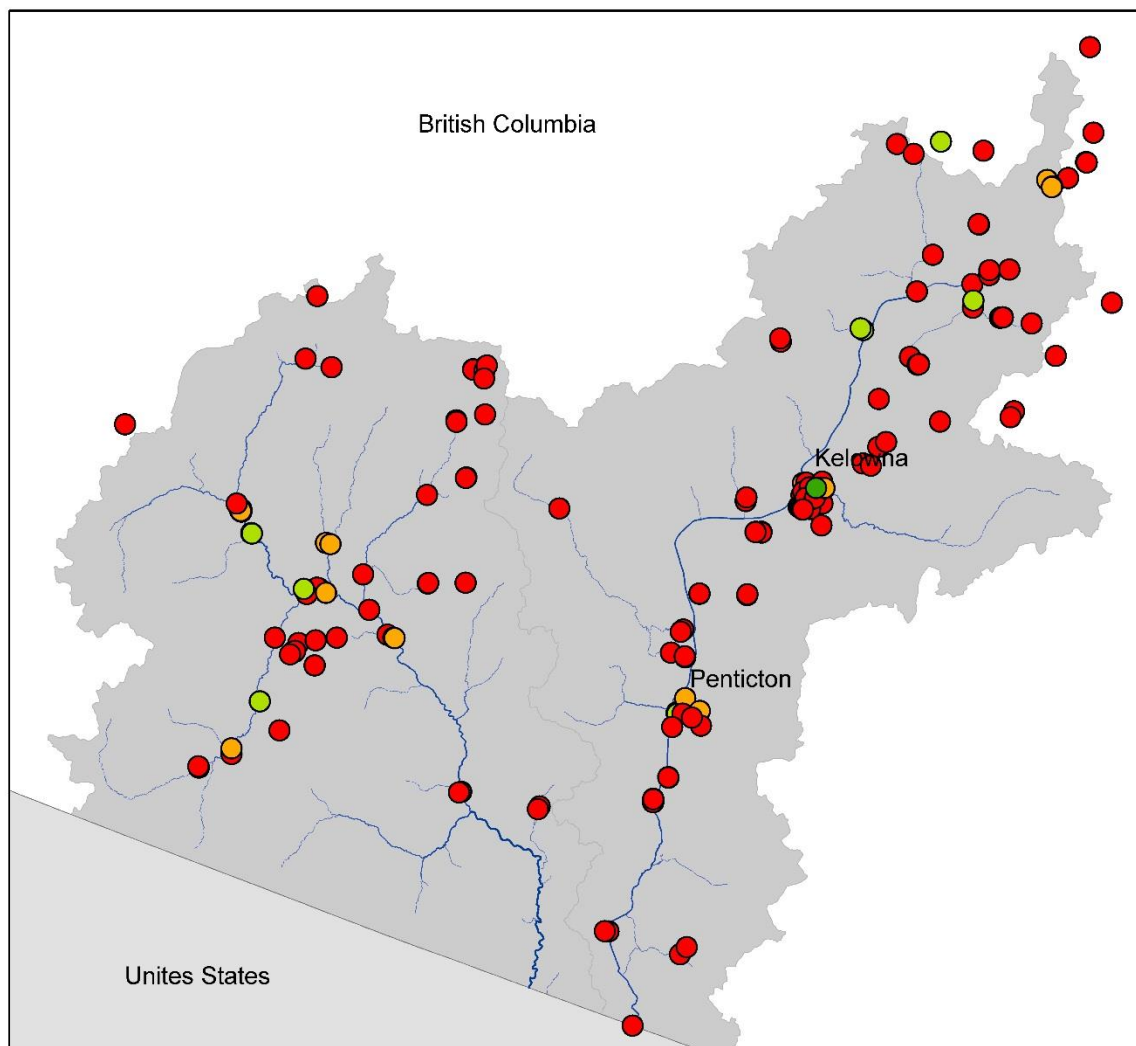
OVERALL FISH HEALTH SCORING

	Indicator			Basin
	Fish	Change in Native Fish Species Richness		Period of Study
			Number of Sites	1586
Presence of statistically significant decline in number of total species observed per year.			Trend	No
Presence of statistically significant decline in median species richness for the basin.			Trend	No
			Fish Health Category	Good
		Fish Health Score	4	

FISH DATA SUFFICIENCY

	Data Sufficiency Indicator	Basin
	Fish	Total number of sub-sub-basins
Year of earliest available monitoring		1930
Number of sampling locations available for earliest monitoring		6
Number of sub-sub-basins with earliest available sampling locations		2
Earliest year of continuous monitoring		1930
Number of sampling locations available for first year of continuous monitoring		6
Number of sub-sub-basins for first year of continuous monitoring		2
Year of most recently available monitoring		2015
Number of monitoring stations available within last five years		160
Number of sub-sub-basins within last five years		2
Number of years of sampling in last 10 years		10
Overall Data Sufficiency Category		Sufficient
Data Sufficiency Score		3

Fish species richness in the Okanagan-Similkameen Basin (2011-2015)



Fish Species Richness
Median Number of Fish Species
 ● 1 - 2 ● 3 - 4 ● 5 - 6 ● 7 - 8

Sources: FIDQ, 2015.

FIGURE. NON-PARAMETRIC ANALYSIS OF VARIANCE IN ANNUAL FISH SPECIES RICHNESS IN THE OKANAGAN-SIMILKAMEEN BASIN (1930-2015), BY SUB-BASIN.

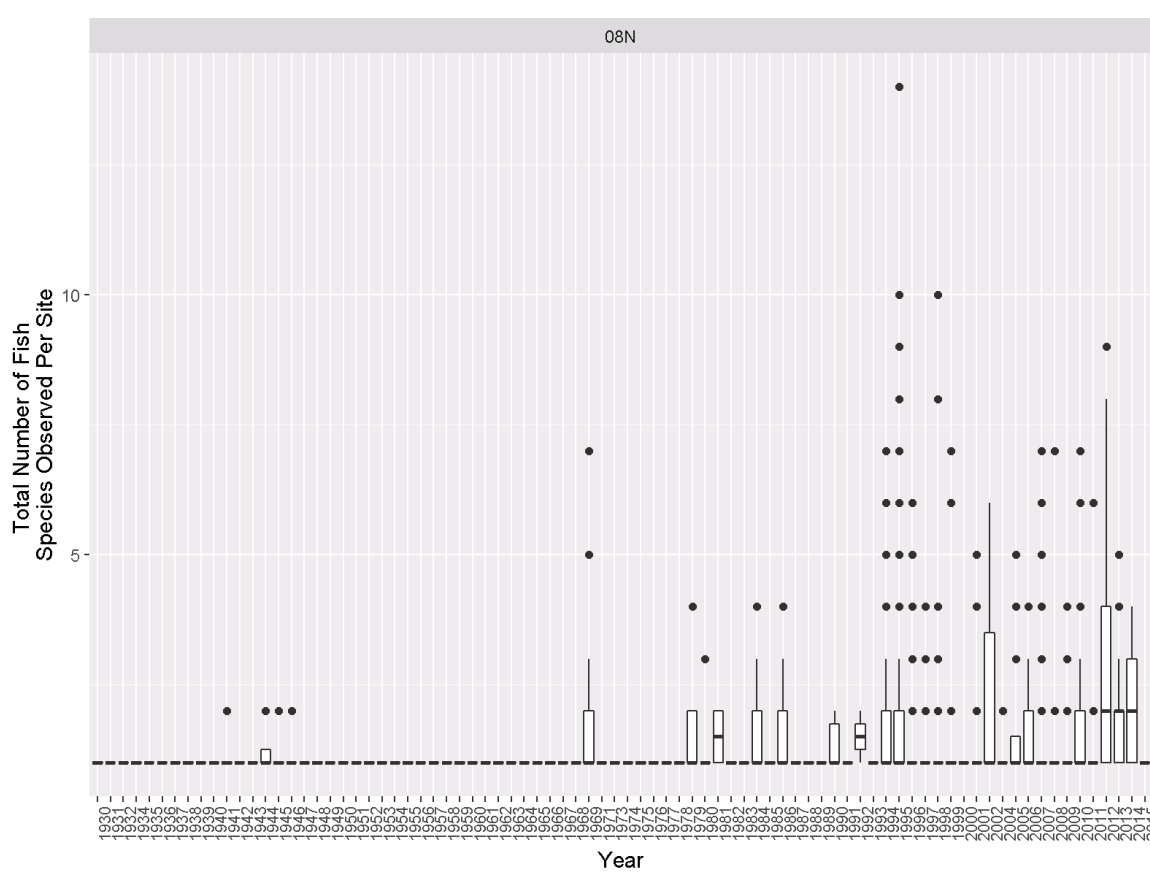


FIGURE. TIME-SERIES OF TOTAL (TOP) AND MEDIAN (BOTTOM) NATIVE FISH SPECIES RICHNESS IN THE OKANAGAN-SIMILKAMEEN BASIN.

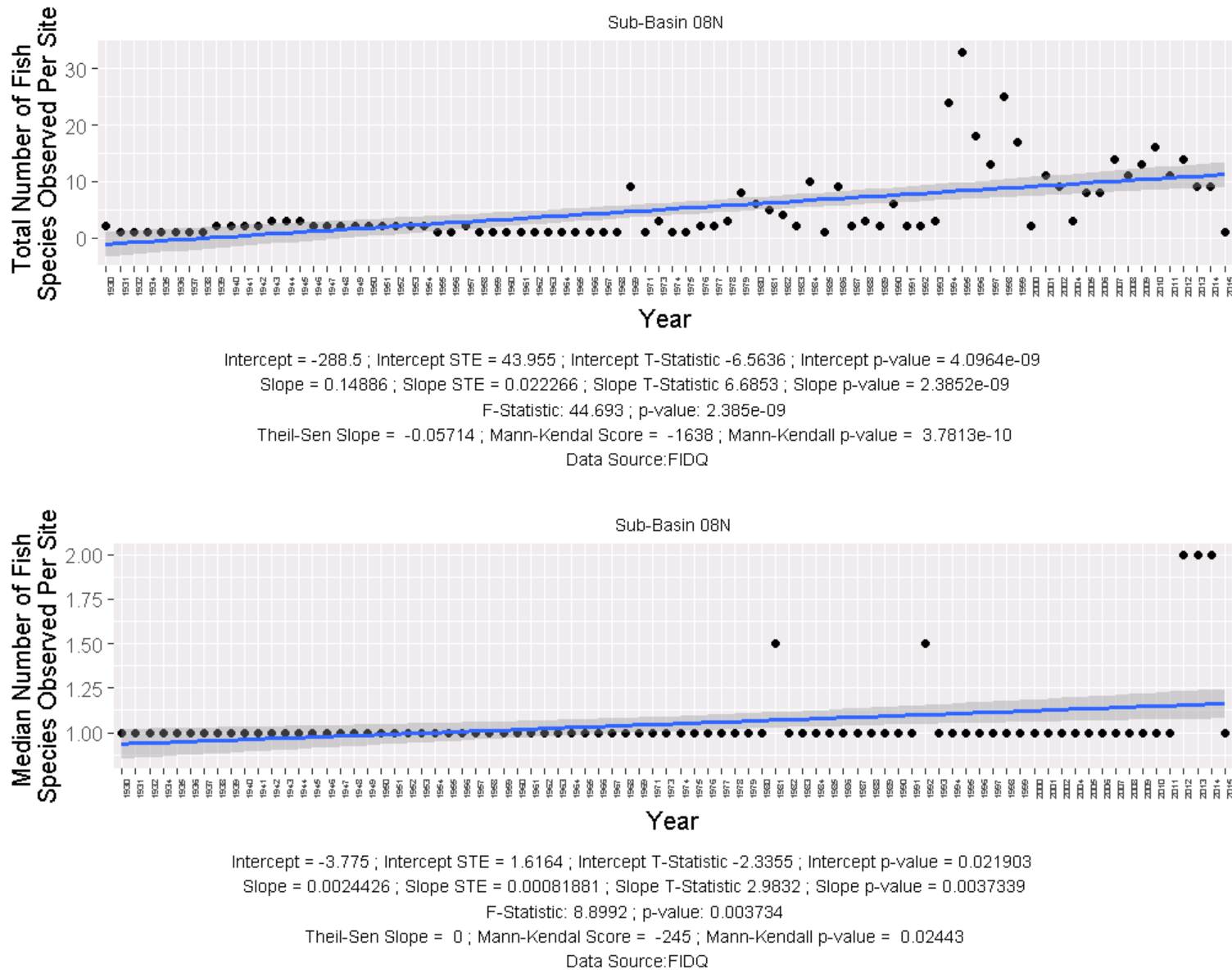


TABLE. RESULTS OF MANN-KENDALL NON-OARAMETRIC TREND ANALYSIS OF FISH SPECIES RICHNESS OVER TIME IN THE OKANAGAN-SIMILKAMEEN BASIN.

Analysis	Source	WSCSDA	Start Year	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
Total Richness	FIDQ	08N - Okanagan-Similkameen	1930	-0.057	-1638	0.000 ***
Median Richness	FIDQ	08N - Okanagan-Similkameen	1930	0	-245	0.024 *

BENTHICS

OVERALL BENTHIC HEALTH SCORING

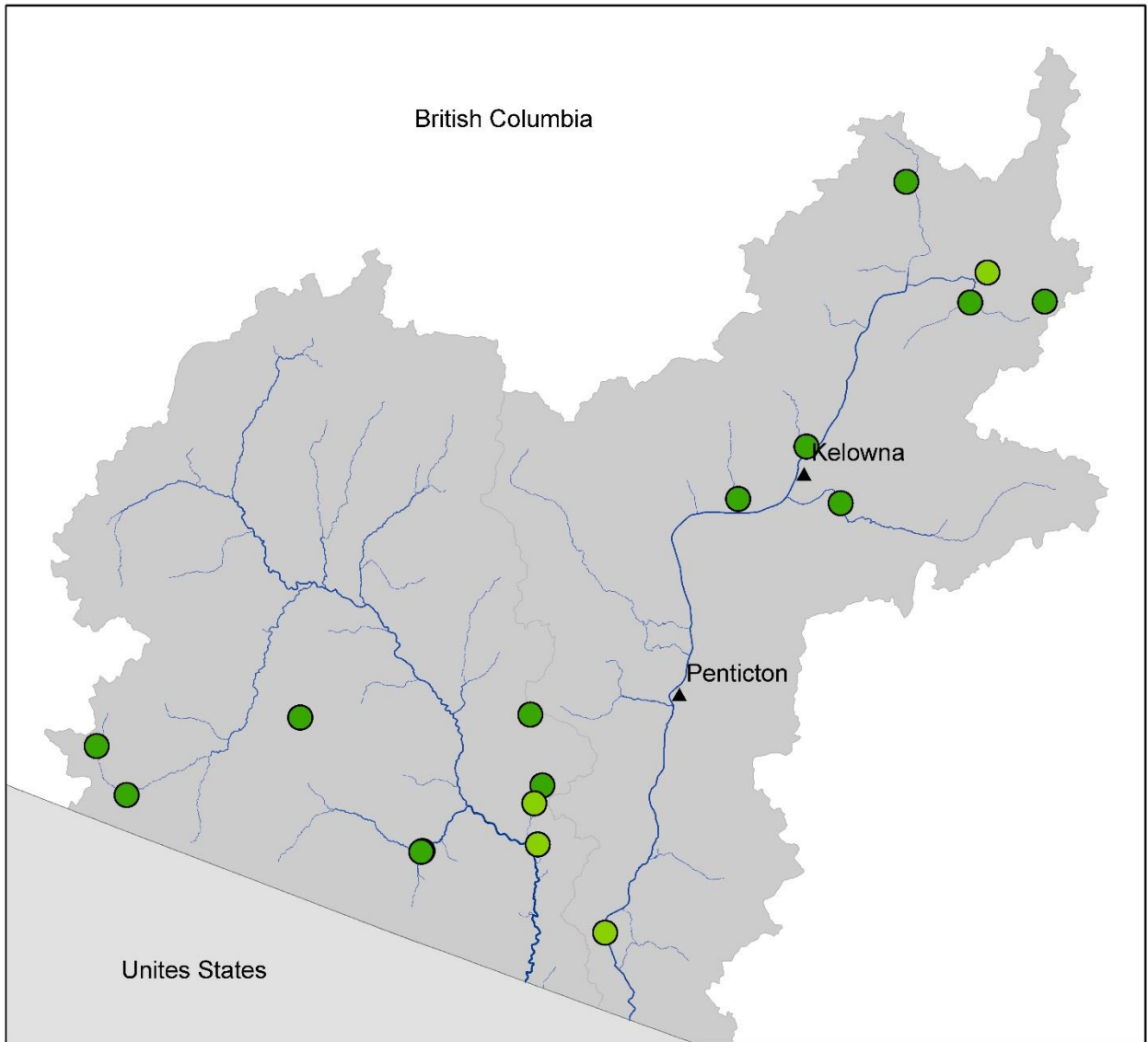
			<i>Basin</i>		
Benthic Macro-Invertebrates	Indicator			Value	
	Index of benthic community composition based on sensitivity to disturbance	Median Hilsenhoff Biotic Index (HBI) score for the basin. Reported as a weighted average for the most recent five years.	<i>Year</i>	2009 - 2014	
			<i>Number of Sites</i>	12	
			<i>Value</i>	3.50	
			<i>Benthic Health Category</i>	Very Good	
			<i>Benthic Health Score</i>	5	
		Variance of annual HBI scores	<i>Value</i>	1.218	
		Significant Mann-Kendal time-series test to determine directional trend in HBI over time.	<i>Time Period</i>	1999 – 2014	
			<i>Trend</i>	Significant increasing trend	

BENTHIC DATA SUFFICIENCY

		Basin	
Benthic Macro-Invertebrates	Data Sufficiency Indicator		
	Total number of sub-sub-basins		2
	Year of earliest available monitoring		1999
	Number of monitoring stations available for earliest monitoring		3
	Number of sub-sub-basins with earliest available monitoring stations		2
	Year of most recently available monitoring		2014
	Number of monitoring stations available within last five years		14
	Number of sub-sub-basins within last five years		2
	Number of years of sampling in last 10 years		10
	Overall Data Sufficiency Category		Sufficient
	Data Sufficiency Score		3

MAP. HILSENHOFF'S BIOTIC INDEX SCORES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES IN THE OKANAGAN-SIMILKAMEEN BASIN (2010-2014).

Benthic Macro-invertebrates in the Okanagan-Similkameen Basin Median HBI values per site, 2010 - 2014



Hilsenhoff's Biotic Index

- 0.000 - 4.250
Very Good
- 4.251 - 5.000
Good
- 5.001 - 5.750
Fair
- 5.751 - 6.500
Poor
- 6.501 - 10.000
Very Poor

Source: CABIN, 2015 (incl. BC-MOE Okanagan Studies and Environment Canada Okanagan Studies).

FIGURE. ANALYSIS OF VARIANCE FOR HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE OKANAGAN-SIMILKAMEEN BASIN (1999-2014).

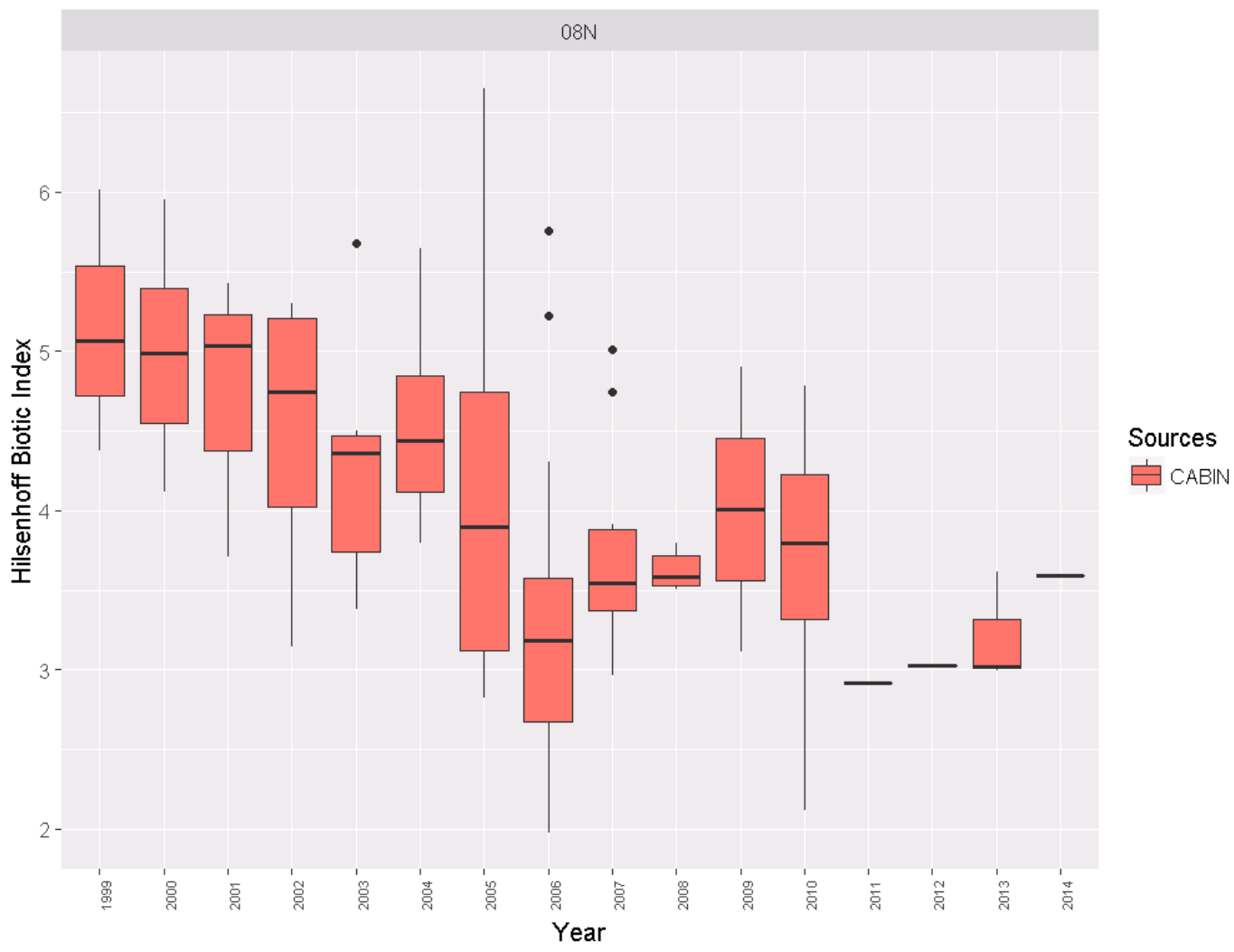


TABLE. HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE OKANAGAN-SIMILKAMEEN BASIN BY YEAR, AND DATA SOURCE.

Sub-watershed	Data Source	Year	Number of Sites	HBI	5-Years Weighted Average by sub-watershed
08N - Okanagan Similkameen	CABIN	2014	1	3.59	3.50
		2013	3	3.02	
		2012	1	3.02	
		2011	1	2.91	
		2010	8	3.79	
		2009	2	4.01	
		2008	5	3.58	
		2007	10	3.55	
		2006	20	3.18	
		2005	8	3.90	
		2004	8	4.43	
		2003	8	4.36	
		2002	4	4.74	
		2001	3	5.04	
		2000	15	4.99	
		1999	3	5.06	

TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF HILSENHOFF'S BIOTIC INDEX OVER TIME IN THE OKANAGAN-SIMILKAMEEN BASIN.

WSCSDA	Data Source	Start Year	End Year	Number of Sites	Theil-Sen Slope	Mann-Kendall Test Statistic	Mann-Kendall Test p-value
08N - Okanagan-Similkameen	CABIN	1999	2014	49	-0.143	-80	0.000 ***

SUMMARY

TABLE. OVERALL SCORING RESULTS FRESHWATER THREATS ASSESSMENT OF THE OKANAGAN-SIMILKAMEEN AND COLUMBIA WATERSHEDS.

PEARSE BASIN	SUB WATERSHED SCORE			
	WSCSDA	SUB WATERSHED NAME	INDICATOR	FINAL - MEDIAN
Okanagan-Similkameen and Columbia**	08N	Okanagan-Similkameen - U.S.A.	THREAT CLASSIFICATION	High
			SCORE	70
	OVERALL PEARSE BASIN SCORE			
	THREAT CLASSIFICATION			High
	SCORE			70

**These threat results reflect an assessment for an area larger than the Okanagan-Similkameen. The area reflected in this threat assessment (WSCSDA 08N) includes the Columbia basin as well.

TABLE. SCORING RESULTS FRESHWATER THREAT INDICATORS OF THE OKANAGAN-SIMILKAMEEN AND OKANAGACOLUMBIAN-SIMILKAMEEN WATERSHEDS.

PEARSE BASIN	SUB WATERSHED SCORE											
	WSCSDA	SUB WATERSHED NAME	INDICATOR	POLLUTION	CLIMATE CHANGE	ALTERATION OF WATER FLOWS	INVASIVE SPECIES	FRAGMENTATION	WATER USE	HABITAT LOSS	WATERSHED AREA (m2)	RELATIVE WATERSHED AREA
Okanagan-Similkameen and Columbia	08N	Okanagan-Similkameen - U.S.A.	THREAT CLASSIFICATION	Very High	Low	High	High	High	Low	Low	15,511,789,369	100.00%
			SCORE	100	33.33	80	80	70	25	40		
	OVERALL PEARSE BASIN SCORE											
	THREAT CLASSIFICATION			Very High	Low	High	High	High	Low	Low		
	SCORE			100	33.33	80	80	70	25	40		

SUB-INDICATOR SCORES BY SUB-WATERSHED

POLLUTION

TABLE. SCORING RESULTS OF POLLUTION THREAT BY SUB-INDICATOR AND SUB-WATERSHED

WSCSDA		SUB WATERSHED NAME		SUB-INDICATOR															
				Point Source Pollution			Pipeline incidents			Transporation Incidents			Agricultural Contamination						
				SUB-SUB-INDICATOR															
													Risk of Water Contamination by N			Risk of Water Contamination by Pesticides			Risk of Water Contamination by P
		Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	30760.63	100	Very High	1008	20	Very Low	30	60	Moderate	0.43	60	Moderate	0.35	60	Moderate	0.17	40	Low

CLIMATE CHANGE

TABLE. SCORING RESULTS OF CLIMATE CHANGE THREAT BY SUB-INDICATOR AND SUB-WATERSHED

WSCSDA		SUB WATERSHED NAME		SUB-INDICATOR											
				Spring Precipitation Anomaly			Summer Maximum Temperature Anomaly			Summer Precipiation Anamoly			Winter Mean Temperature Anamoly		
				Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	0.05	33.33	Low	0.25	33.33	Low	0.05	33.33	Low	-0.14	33.33	Low		

ALTERATION OF WATER FLOWS

TABLE. SCORING RESULTS OF ALTERATION OF WATER FLOWS THREAT BY SUB-INDICATOR AND SUB-WATERSHED

		SUB-INDICATOR		
		Area of Reservoirs/Dams		
WSCSDA	SUB WATERSHED NAME	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	1474.1	80	High

INVASIVE SPECIES

TABLE. SCORING RESULTS OF INVASIVE SPECIES THREAT BY SUB-INDICATOR AND SUB-WATERSHED

		SUB-INDICATOR		
		Presence of Invasive Species		
WSCSDA	SUB WATERSHED NAME	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	31	80	High

WATER USE

TABLE. SCORING RESULTS OF WATER USE THREAT BY SUB-INDICATOR AND SUB-WATERSHED

		SUB-INDICATOR		
		Water Use		
WSCSDA	SUB WATERSHED NAME	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	N/A	25	Low

FRAGMENTATION

TABLE. SCORING RESULTS OF FRAGMENTATION THREAT BY SUB-INDICATOR AND SUB-WATERSHED

		SUB-INDICATOR					
		Fragmentation by dams			Fragmentation by roads and rail		
WSCSDA	SUB WATERSHED NAME	Value	Score	Threat Classification	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	0.73	60	Moderate	0.01	80	High

HABITAT LOSS

TABLE. SCORING RESULTS OF HABITAT LOSS THREAT BY SUB-INDICATOR AND SUB-WATERSHED

		SUB-INDICATOR					
		Land use/Land cover			Forest loss		
WSCSDA	SUB WATERSHED NAME	Value	Score	Threat Classification	Value	Score	Threat Classification
08N	Okanagan-Similkameen - U.S.A.	1.3	20	Very Low	2.46	40	Low