WWF-CANADA

Watershed Reports

Okanagan-Similkameen

March 2020

OKANAGAN-SIMILKAMEEN WATERSHED REPORT

CONTENTS

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

FRESHWATER HEALTH ASSESSMENT

SUMMARY

OVERALL RIVER HEALTH SCORING

			Basin
Overall River Health	**Indicator**		
	Hydrology	***Hydrology Health Category***	Good
		Hydrology Score	4
	Water Quality	***Water Quality Health Category***	Fair
		Water Quality Health Score	3
	Benthic Macro-Invertebrates	***Benthic Health Category***	Very Good
		Benthic Health Score	5
	Fish	***Fish Health Category***	Good
		Fish Health Score	4
	Total Score		16
	Total Available Score		20
	Percentage of Maximum Score		80.00%
	Overall Health Category		**Good**

OVERALL DATA SUFFICIENCY SCORING

			Basin
Overall Data Sufficiency	**Indicator**		
	Hydrology	Data Sufficiency Category	Partially Sufficient
		Data Sufficiency Score	1
	Water Quality	Data Sufficiency Category	Partially Sufficient
		Data Sufficiency Score	1
	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		66.67%
	Overall Data Sufficiency Category		**Moderately Sufficient**

WWF-Canada Watershed Report for the Okanagan-Similkameen Watershed
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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*	1914-2017
			Number of Stations	5
			Value	0.10
			Health Category	**Good**
			Health Score	4
	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 - 2018
			Number of Stations	28
			Value	0.20
			Health Category	**Good**
			Health Score	4
	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*	1914-2017
			Number of Stations	5
			Value	0.00
			Health Category	**Very Good**
			Health Score	5
	Pre- vs. Post-Dam or Recent vs. Historical Analsis 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	90
			Health Category	**Very Poor**
			Health Score	1
		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	16.0
			Health Category	**Good**
			Health Score	4
	Hydrology Score		*Total Score*	18
			Maximum Available Score	25
			Percentage of Maximum Score	72.0%
			Hydrology Health Category	**Good**
			Hydrology Score	4

HYDROLOGY DATA SUFFICIENCY

	Data Sufficiency Indicator	Basin
Hydrology	Total number of sub-sub-basins	2
	Total number of dams (>10m)	12
	Year of earliest dam operation	1912
	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	Insufficient
	Year of long-term continuous flow monitoring	1970
	Number of monitoring stations available for continuous flow monitoring analysis	18
	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	28
	Number of sub-sub-basins with monitoring stations	2
	Number of monitoring stations on river downstream of dams	0
	Data Sufficiency Category	Insufficient
	Overall Data Sufficiency Category	Partially Sufficient
	Data Sufficiency Score	1

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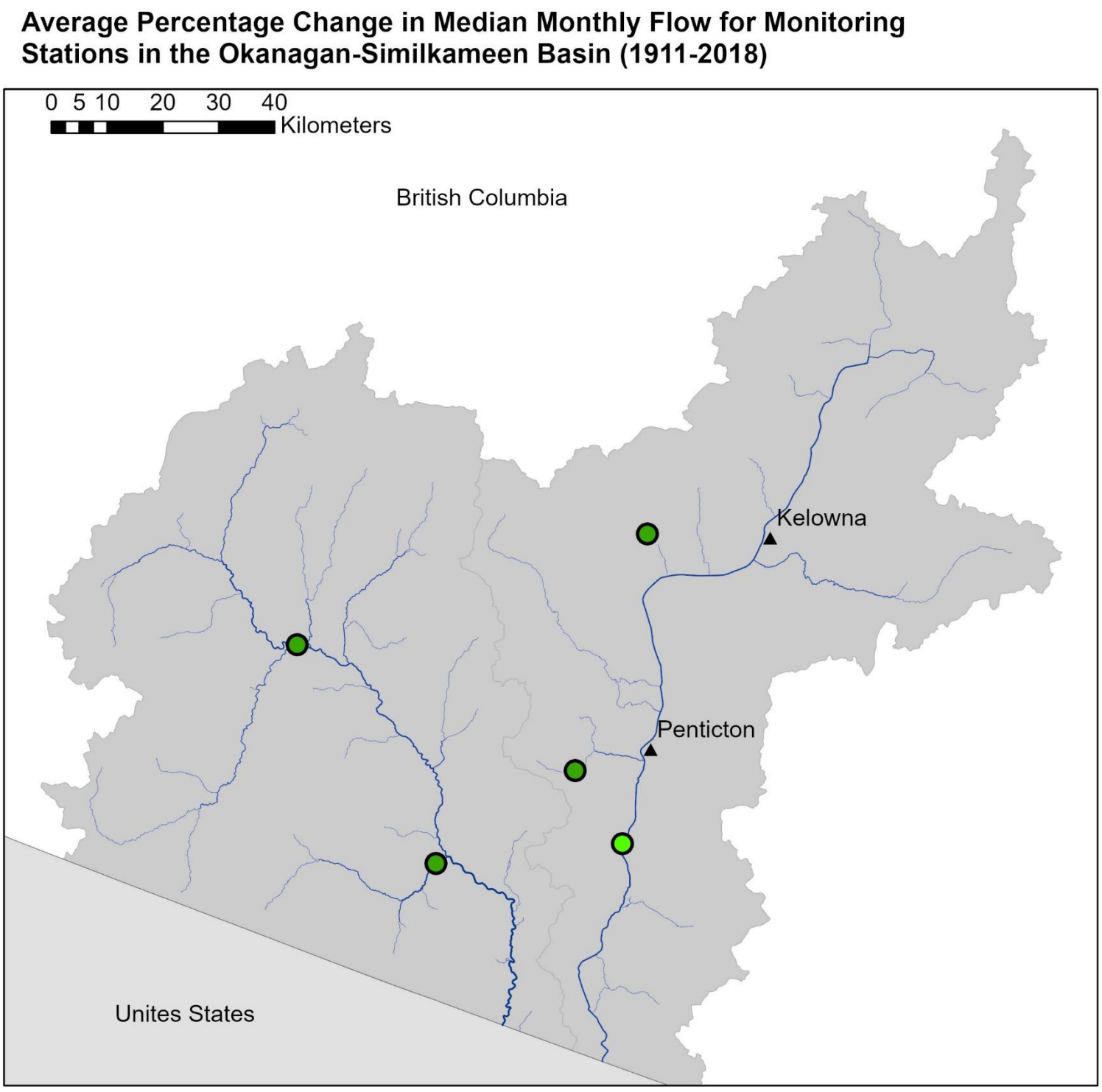
MAP. RESULTS OF A SERIES OF LONG-TERM TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE OKANAGAN-SIMILKAMEEN WATERSHED FOR THE PERIOD 1911-2018.



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 (2020).

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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)		2.44		Median Annual Flow (m^3/s)		7.54	
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*
January	0.00	0.46	1.38		0.02	0.07	5.49	
February	0.00	0.34	1.32		0.02	0.10	5.77	
March	0.00	0.45	1.47		0.02	0.04 *	6.99	0.31
April	0.00	0.80	3.08		0.02	0.63	18.00	
May	0.01	0.79	21.06		-0.11	0.52	74.26	
June	-0.09	0.26	32.70		-0.19	0.34	86.44	
July	-0.06	0.07	11.69		-0.08	0.27	29.76	
August	-0.02	0.06	4.09		-0.01	0.41	7.96	
September	-0.01	0.14	2.65		-0.01	0.33	5.21	
October	0.00	0.35	2.32		-0.01	0.18	5.72	
November	0.00	0.66	2.15		0.01	0.64	7.72	
December	-0.01	0.05	1.71		0.00	0.73	6.45	
Average for all months, for each station	-0.01		7.13	0.00	-0.03		21.65	0.03

	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)		14.10		Median Annual Flow (m^3/s)		0.13		Median Annual Flow (m^3/s)		0.41	
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*
January	0.00	0.94	10.50		0.00	0.12	0.06		0.00	0.92	0.21	
February	0.04	0.08	13.14		0.00	0.15	0.06		0.00	0.96	0.20	
March	0.06	0.03 *	15.17	0.38	0.00	0.25	0.07		0.00	0.54	0.26	
April	0.07	0.01 *	16.95	0.43	0.00	0.48	0.15		0.00	0.63	0.92	
May	0.18	0.00 **	25.63	0.69	0.00	0.46	1.30		-0.01	0.39	4.22	
June	0.07	0.15	27.43		0.00	0.89	1.49		0.00	0.62	2.20	
July	0.11	0.02 *	24.33	0.44	0.00	0.29	0.38		0.00	0.10	0.66	
August	0.05	0.07	18.66		0.00	0.05 *	0.13	0.85	0.00	0.22	0.32	
September	0.04	0.06	14.09		0.00	0.22	0.09		0.00	0.09	0.26	
October	0.01	0.66	11.63		0.00	0.60	0.08		0.00	0.07	0.27	
November	-0.02	0.14	10.13		0.00	0.38	0.09		0.00	0.56	0.25	
December	-0.02	0.19	9.87		0.00	0.10	0.07		0.00	0.88	0.22	
Average for all months, for each station	0.05		16.46	0.16	0.00		0.33	0.07	0.00		0.83	0.00
Average percentage change in median monthly flow for all months, weighted by median annual flow				0.10								

* 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.

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MAP. RESULTS OF A SERIES OF TREND ANALYSES OF MEDIAN MONTHLY FLOW IN OKANAGAN-SIMILKAMEEN WATERSHED FOR THE PERIOD 1985-2018.

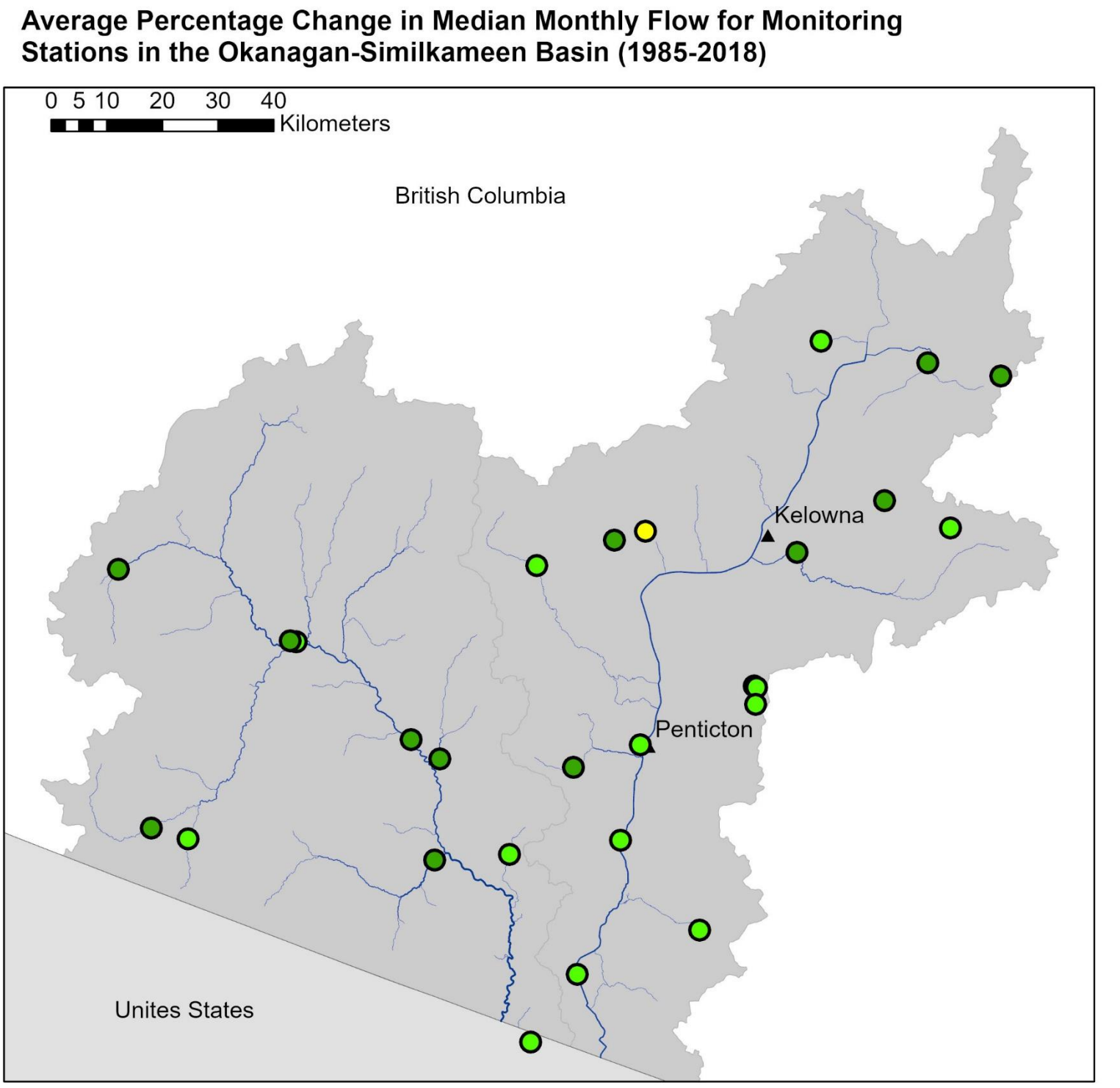

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TABLE. RESULTS OF RECENT-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE OKANAGAN-SIMILKAMEEN WATERSHED.

	08N – Okanagan-Similkameen													
	08NL004					08NL007					08NL022				
	Start Year for Analysis			1985		Start Year for Analysis			1985		Start Year for Analysis			1985	
	Median Annual Flow (m^3/s)			2.20		Median Annual Flow (m^3/s)			7.53		Median Annual Flow (m^3/s)			24.60	
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*
January	0.01	0.04	*	1.31	1.08	0.11	0.00	**	5.49	2.04	0.28	0.01	*	19.01	1.48
February	0.01	0.12		1.28		0.11	0.03	*	6.32	1.70	0.23	0.04	*	22.06	1.03
March	0.01	0.45		1.59		0.07	0.29		8.99		0.16	0.30		28.78	
April	-0.01	0.72		3.68		-0.30	0.18		22.07		0.02	0.98		68.99	
May	0.32	0.12		21.67		0.45	0.49		69.99		3.08	0.09		215.92	
June	0.08	0.71		28.76		0.12	0.84		73.12		-0.11	0.96		194.34	
July	0.00	1.00		10.48		0.02	0.73		24.52		-0.03	0.95		64.64	
August	0.00	0.93		3.51		0.03	0.63		7.21		-0.02	0.89		20.50	
September	0.00	0.96		2.21		0.04	0.20		4.65		0.00	1.00		13.57	
October	0.01	0.31		2.06		0.05	0.21		5.20		0.03	0.83		15.81	
November	0.02	0.29		2.11		0.11	0.18		9.07		0.37	0.09		29.94	
December	0.02	0.07		1.52		0.06	0.30		6.61		0.36	0.07		23.00	
Average for all months, for each station	0.04			6.68	0.09	0.07			20.27	0.31	0.36			59.71	0.21

	08N – Okanagan-Similkameen													
	08NL024					08NL038					08NL045				
	Start Year for Analysis			1985		Start Year for Analysis			1985		Start Year for Analysis			1985	
	Median Annual Flow (m^3/s)			6.97		Median Annual Flow (m^3/s)			16.89		Median Annual Flow (m^3/s)			0.23	
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*
January	0.07	0.19		5.61		0.21	0.06		12.81		0.00	0.10		0.17	
February	0.07	0.18		6.93		0.13	0.06		15.29		0.00	0.02	*	0.17	1.41
March	0.04	0.53		10.82		0.10	0.57		23.07		0.00	0.12		0.20	
April	-0.27	0.50		29.79		-0.51	0.53		58.05		0.00	0.77		0.40	
May	0.22	0.69		71.64		1.25	0.25		162.18		0.02	0.22		1.71	
June	-0.04	0.96		52.86		1.05	0.41		136.70		0.02	0.46		2.42	
July	-0.03	0.78		13.13		0.03	0.93		43.40		0.01	0.29		0.77	
August	-0.03	0.32		3.19		0.01	0.96		12.89		0.00	0.18		0.32	
September	0.00	0.90		2.37		-0.01	0.95		8.84		0.00	0.20		0.21	
October	0.01	0.77		4.39		0.03	0.76		11.31		0.00	0.20		0.21	
November	0.11	0.28		11.22		0.23	0.23		22.29		0.00	0.36		0.22	
December	0.06	0.42		7.20		0.22	0.16		16.08		0.00	0.18		0.19	
Average for all months, for each station	0.02			18.26	0.00	0.23			43.58	0.00	0.01			0.58	0.12

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	08N – Okanagan-Similkameen											
	08NL050				08NL069				08NL070			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m^3/s)		0.71		Median Annual Flow (m^3/s)		2.76		Median Annual Flow (m^3/s)		2.96	
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*
January	0.00	0.96	0.35		0.03	0.02 *	1.87	1.78	0.03	0.12	2.12	
February	0.00	0.76	0.36		0.03	0.02 *	1.88	1.35	0.02	0.22	2.21	
March	0.00	0.87	0.48		0.03	0.20	2.80		0.00	0.93	3.06	
April	-0.01	0.71	2.01		0.02	0.81	6.55		-0.15	0.06	6.59	
May	0.15	0.08	9.24		0.32	0.09	24.64		0.15	0.48	23.38	
June	0.08	0.39	7.04		0.22	0.40	27.50		0.20	0.55	25.54	
July	0.00	0.87	2.24		0.04	0.73	10.54		-0.01	0.95	8.91	
August	0.00	0.57	0.98		0.02	0.52	3.30		0.00	1.00	2.35	
September	0.00	0.56	0.73		0.01	0.26	2.02		0.01	0.50	1.50	
October	0.00	0.72	0.60		0.02	0.12	2.12		0.02	0.23	1.92	
November	0.00	1.00	0.60		0.05	0.16	3.26		0.05	0.27	3.74	
December	0.00	1.00	0.47		0.04	0.12	2.57		0.03	0.27	2.72	
Average for all months, for each station	0.02		2.09	0.00	0.07		7.42	0.26	0.03		7.00	0.00

	08N – Okanagan-Similkameen											
	08NL071				08NM002				08NM037			
	Start Year for Analysis		1985		Start Year for Analysis		1985		Start Year for Analysis		1985	
	Median Annual Flow (m^3/s)		2.18		Median Annual Flow (m^3/s)		13.52		Median Annual Flow (m^3/s)		0.09	
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*
January	0.03	0.16	1.76		0.03	0.50	9.64		0.00	0.92	0.06	
February	0.01	0.37	2.01		0.03	0.70	13.21		0.00	0.89	0.06	
March	0.00	0.88	2.55		0.08	0.57	16.33		0.00	0.73	0.07	
April	-0.11	0.12	6.84		0.33	0.08	18.67		0.00	0.32	0.17	
May	0.04	0.81	21.05		0.87	0.01 *	32.92	2.65	0.01	0.49	1.22	
June	0.09	0.82	19.27		0.48	0.08	32.90		0.02	0.28	1.42	
July	-0.01	0.77	4.81		0.29	0.16	30.58		0.00	0.65	0.38	
August	-0.01	0.49	0.94		-0.10	0.41	21.88		0.00	0.60	0.13	
September	0.00	0.77	0.72		0.04	0.46	14.93		0.00	0.88	0.08	
October	0.01	0.77	1.86		0.06	0.03 *	11.03	0.52	0.00	0.81	0.08	
November	0.01	0.65	3.92		0.03	0.23	7.18		0.00	0.66	0.09	
December	0.01	0.47	2.22		0.04	0.04 *	7.50	0.56	0.00	0.85	0.07	
Average for all months, for each station	0.01		5.66	0.00	0.18		18.06	0.31	0.00		0.32	0.00

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	08N – Okanagan-Similkameen															
	08NM041					08NM050					08NM065					
	Start Year for Analysis			1985		Start Year for Analysis			1985		Start Year for Analysis			1985		
	Median Annual Flow (m^3/s)			0.35		Median Annual Flow (m^3/s)			12.82		Median Annual Flow (m^3/s)			0.53		
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*
January	0.00	0.01	*	0.20	1.70	0.03	0.59		9.12		0.00	0.22		0.53	
February	0.00	0.08		0.20		0.03	0.62		12.87		0.01	0.07		0.57	
March	0.00	0.29		0.26		0.07	0.62		15.70		0.00	1.00		0.81	
April	-0.01	0.41		0.91		0.34	0.07		17.04		0.00	0.62		1.16	
May	0.05	0.28		3.92		0.73	0.02	*	26.50	2.74	0.00	1.00		2.21	
June	0.05	0.01	*	1.89	2.75	0.57	0.10		28.35		0.00	0.37		2.10	
July	0.02	0.00	**	0.70	3.19	0.28	0.19		31.09		0.00	0.31		1.17	
August	0.01	0.01	*	0.33	2.63	-0.16	0.17		23.08		0.00	0.49		0.60	
September	0.01	0.00	***	0.27	3.50	0.02	0.77		15.68		0.00	0.65		0.52	
October	0.01	0.00	***	0.27	3.56	0.03	0.26		10.85		0.00	0.29		0.47	
November	0.00	0.03	*	0.23	1.43	0.02	0.39		6.61		0.00	0.08		0.37	
December	0.00	0.05	*	0.21	1.66	0.06	0.05	*	6.91	0.81	0.00	0.11		0.40	
Average for all months, for each station	0.01			0.78	1.70	0.17			16.98	0.30	0.00			0.91	0.00

	08N – Okanagan-Similkameen															
	08NM085					08NM116					08NM127				08NM134			
	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)			14.20		Median Annual Flow (m^3/s)			1.84		Median Annual Flow (m^3/s)			13.88	Median Annual Flow (m^3/s)			0.05
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*
January	0.02	0.63		10.32		0.00	0.78		1.11		0.01	0.95		11.35		0.00	0.16		0.04	
February	0.01	0.91		13.60		0.00	0.63		1.11		-0.03	0.79		14.25		0.00	0.53		0.04	
March	0.04	0.80		17.43		-0.01	0.64		1.72		-0.06	0.74		17.42		0.00	0.54		0.05	
April	0.22	0.27		19.91		-0.08	0.36		7.42		0.34	0.19		20.97		-0.01	0.01	**	0.21	2.84
May	0.88	0.04	*	40.25	2.19	0.27	0.12		22.56		1.26	0.01	**	39.07	3.24	0.00	0.52		0.56	
June	0.52	0.13		35.81		0.21	0.26		20.48		0.73	0.15		35.95		0.00	0.63		0.28	
July	0.22	0.31		29.96		-0.05	0.26		4.41		0.25	0.17		27.39		0.00	0.32		0.10	
August	-0.05	0.61		21.24		0.00	0.85		1.64		-0.07	0.46		17.41		0.00	0.34		0.06	
September	0.06	0.46		14.59		0.00	0.79		1.72		-0.01	0.85		13.14		0.00	0.28		0.04	
October	0.00	0.86		11.17		0.00	0.68		1.84		0.07	0.16		12.08		0.00	0.29		0.04	
November	0.02	0.39		7.96		-0.01	0.63		1.81		0.21	0.00	***	11.35	1.83	0.00	0.09		0.05	
December	0.03	0.39		8.09		-0.01	0.56		1.21		0.03	0.48		9.92		0.00	0.08		0.05	
Average for all months, for each station	0.17			19.19	0.18	0.03			5.59	0.00	0.23			19.19	0.42	0.00			0.13	0.24

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	08NM142				08NM145				08NM171				08NM173			
	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)		0.09		Median Annual Flow (m^3/s)		0.02		Median Annual Flow (m^3/s)		0.18		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*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
January	0.00	0.34	0.06		0.00	0.39	0.01		0.00	0.74	0.13		0.00	0.58	0.03	
February	0.00	0.64	0.07		0.00	0.42	0.01		0.00	0.43	0.12		0.00	0.52	0.02	
March	0.00	0.91	0.12		0.00	0.84	0.01		0.00	0.91	0.17		0.00	0.77	0.03	
April	-0.01	0.41	0.72		0.00	0.54	0.08		-0.01	0.55	0.89		0.00	0.11	0.09	
May	0.01	0.41	0.94		0.00	0.95	0.20		0.04	0.16	3.72		0.00	0.08	0.29	
June	0.00	0.30	0.46		0.00	0.30	0.11		0.02	0.39	2.53		0.00	0.12	0.16	
July	0.00	0.55	0.19		0.00	0.94	0.10		0.00	0.40	0.63		0.00	0.14	0.07	
August	0.00	0.91	0.09		0.00	0.31	0.07		0.00	0.07	0.19		0.00	0.21	0.04	
September	0.00	0.75	0.07		0.00	0.60	0.04		0.00	0.05 *	0.14	1.69	0.00	0.22	0.03	
October	0.00	0.52	0.07		0.00	0.34	0.04		0.00	0.74	0.19		0.00	0.26	0.03	
November	0.00	0.32	0.08		0.00	0.47	0.01		0.00	0.68	0.20		0.00	0.20	0.03	
December	0.00	0.18	0.07		0.00	0.11	0.01		0.00	0.54	0.14		0.00	0.41	0.03	
Average for all months, for each station	0.00		0.24	0.00	0.00		0.06	0.00	0.00		0.75	0.14	0.00		0.07	0.00

	08N – Okanagan-Similkameen																			
	08NM174				08NM232				08NM240				08NM241				08NM242			
	Start Year for Analysis		1985		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)		0.13		Median Annual Flow (m^3/s)		0.20		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*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
January	0.00	0.50	0.08		-0.01	0.05	0.15		0.00	0.27	0.01		0.00	0.10	0.01		0.00	0.76	0.01	
February	0.00	0.67	0.10		-0.01	0.03 *	0.15	3.70	0.00	0.23	0.01		0.00	0.05	0.01		0.00	0.44	0.01	
March	0.00	0.67	0.18		0.00	0.24	0.20		0.00	0.32	0.01		0.00	0.07	0.01		0.00	0.41	0.01	
April	-0.01	0.41	0.82		0.00	0.45	0.45		0.00	0.64	0.03		0.00	0.50	0.05		0.00	0.56	0.02	
May	0.05	0.04 *	2.91	1.72	0.01	0.86	2.08		0.01	0.01 *	0.26	2.03	0.00	0.04 *	0.27	1.75	0.01	0.00 **	0.21	2.90
June	0.03	0.07	1.25		0.01	0.40	1.18		0.00	0.17	0.19		0.00	0.47	0.13		0.00	0.38	0.18	
July	0.00	0.68	0.39		0.01	0.29	0.49		0.00	0.80	0.05		0.00	0.97	0.03		0.00	0.25	0.04	
August	0.00	0.67	0.11		0.00	0.73	0.35		0.00	0.72	0.01		0.00	0.25	0.01		0.00	0.04 *	0.01	2.50
September	0.00	0.32	0.07		0.00	0.34	0.20		0.00	0.17	0.01		0.00	0.61	0.01		0.00	0.04 *	0.01	2.08
October	0.00	0.13	0.10		0.00	0.21	0.15		0.00	0.29	0.01		0.00	0.88	0.01		0.00	0.48	0.01	
November	0.00	0.15	0.12		0.00	0.09	0.12		0.00	0.65	0.01		0.00	0.52	0.01		0.00	0.63	0.01	
December	0.00	0.07	0.10		-0.01	0.09	0.15		0.00	0.58	0.01		0.00	0.43	0.01		0.00	0.50	0.01	
Average for all months, for each station	0.01		0.52	0.14	0.00		0.47	0.31	0.00		0.05	0.17	0.00		0.05	0.15	0.00		0.04	0.62

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Average percentage change in median monthly flow for all months, weighted by median annual flow	0.20

* 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.

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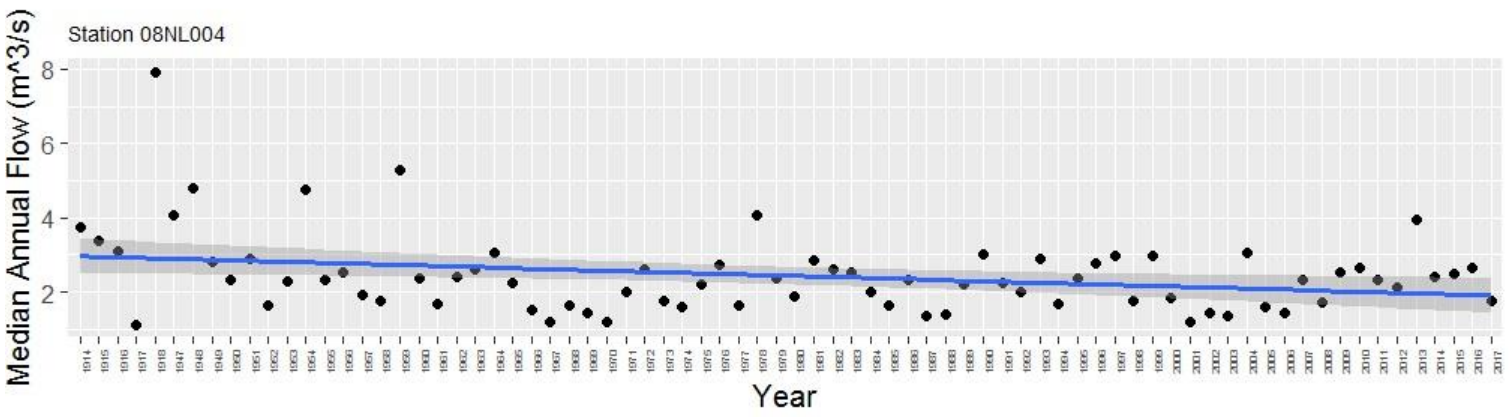
TABLE. RESULTS OF LINEAR REGRESSION ANALYSES FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE OKANAGAN-SIMILKAMEEN BASIN, BY SUB-BASIN.

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	35.24	8.12	4.34	0.00	-0.02	0.00	-4.03	0.00	***	0.13	16.21	0.00	***
	08NL007	1914	16.30	18.88	0.86	0.39	0.00	0.01	-0.46	0.64		-0.01	0.22	0.64	
	08NM002	1915	-40.36	49.94	-0.81	0.42	0.03	0.03	1.09	0.28		0.00	1.19	0.28	
	08NM037	1919	5.15	0.85	6.05	0.00	0.00	0.00	-5.90	0.00	***	0.26	34.78	0.00	***
	08NM041	1919	5.15	1.54	3.35	0.00	0.00	0.00	-3.07	0.00	**	0.08	9.42	0.00	**

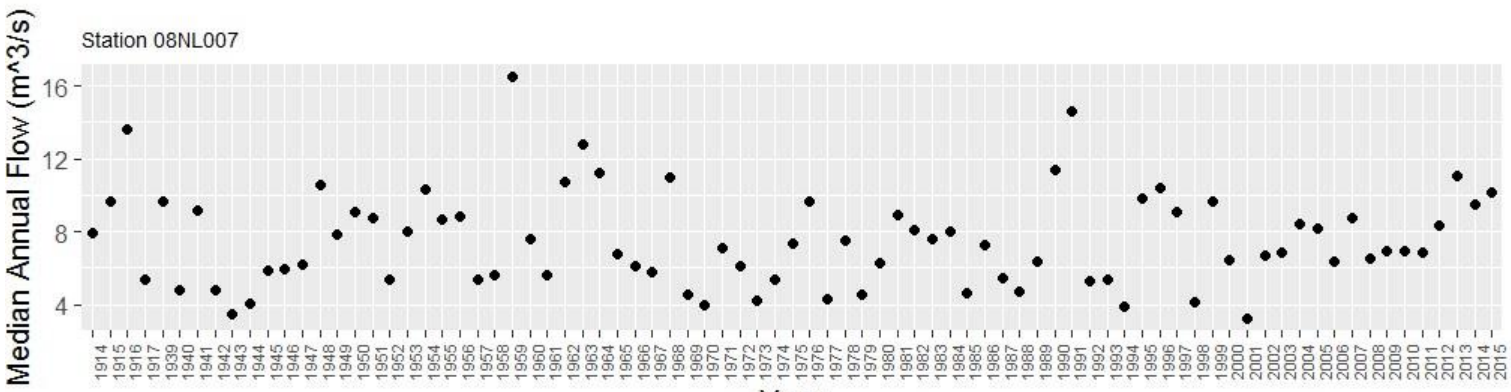
TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE OKANAGAN-SIMILKAMEEN BASIN, BY SUB-BASIN.

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	0.00	-216	0.55		2.44	0.00	0.00
	08NL007	1914	0.00	162	0.64		7.54	0.00	
	08NM002	1915	0.02	275	0.44		14.10	0.00	
	08NM037	1919	0.00	-273	0.40		0.13	0.00	
	08NM041	1919	0.00	-144	0.65		0.41	0.00	

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



Intercept = 35.238 ; Intercept STE = 8.121 ; Intercept T-Statistic 4.3391 ; Intercept p-value = 3.3734e-05
Slope = -0.016593 ; Slope STE = 0.0041212 ; Slope T-Statistic -4.0263 ; Slope p-value = 0.00010909
F-Statistic: 16.211 ; p-value: 0.0001091
Theil-Sen Slope = -0.00155 ; Mann-Kendal Score = -216 ; Mann-Kendall p-value = 0.54582



Intercept = 16.304 ; Intercept STE = 18.883 ; Intercept T-Statistic 0.8634 ; Intercept p-value = 0.38998
Slope = -0.0044521 ; Slope STE = 0.0095983 ; Slope T-Statistic -0.46384 ; Slope p-value = 0.64377
F-Statistic: 0.21515 ; p-value: 0.6438
Theil-Sen Slope = 0.004096 ; Mann-Kendal Score = 162 ; Mann-Kendall p-value = 0.6415

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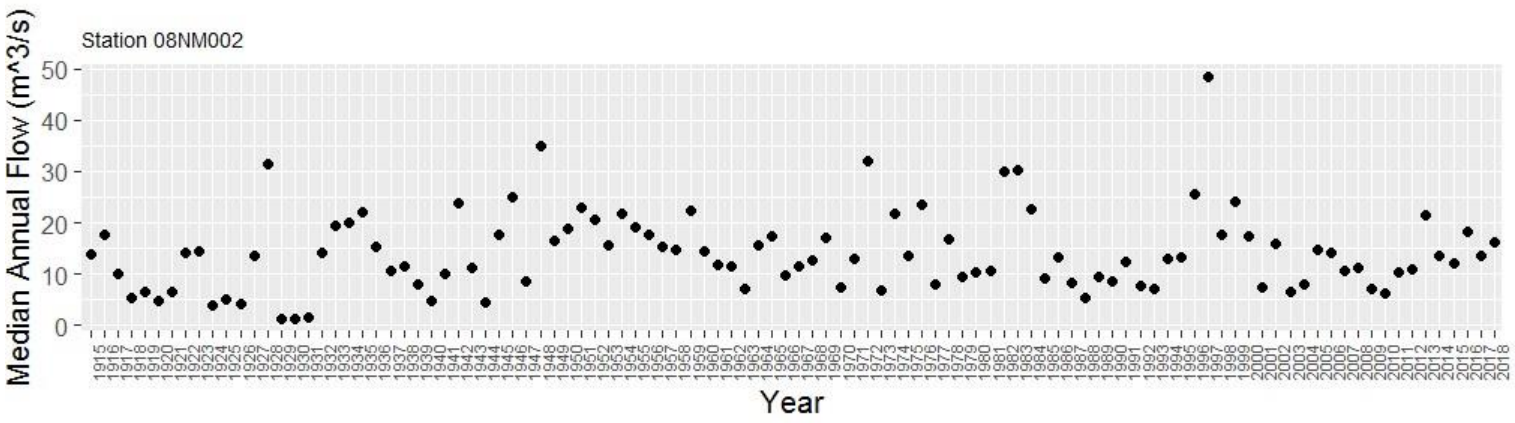
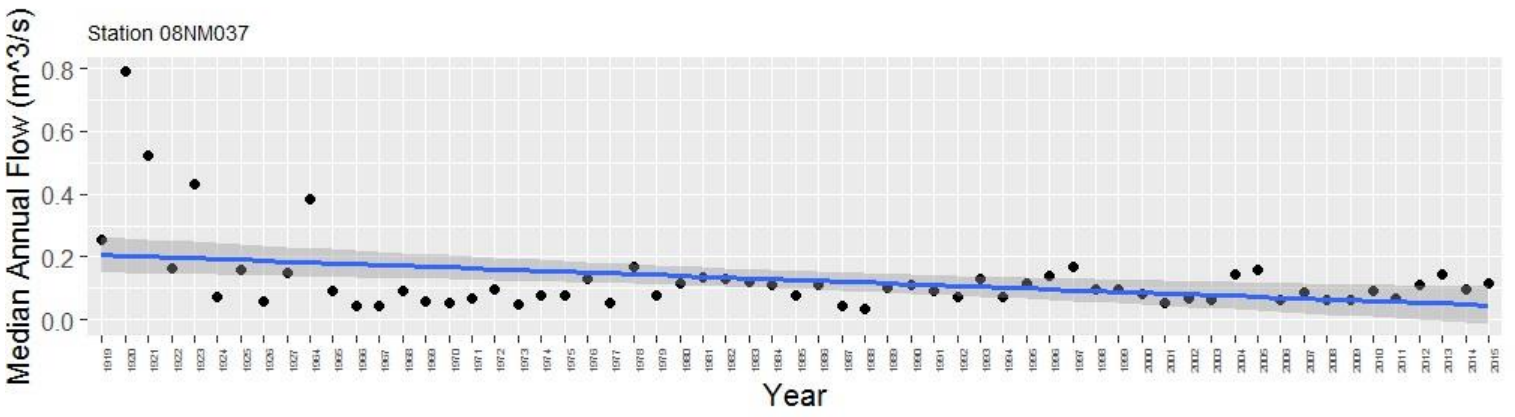
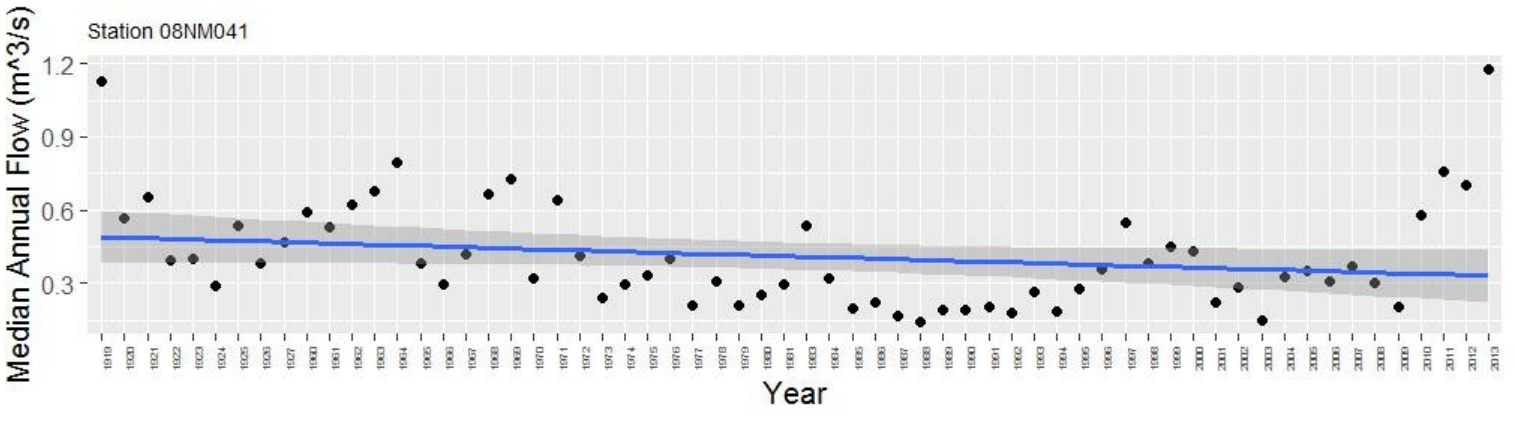


Intercept = -40.358 ; Intercept STE = 49.938 ; Intercept T-Statistic -0.80817 ; Intercept p-value = 0.42088
Slope = 0.027695 ; Slope STE = 0.025391 ; Slope T-Statistic 1.0907 ; Slope p-value = 0.27797
F-Statistic: 1.1897 ; p-value: 0.278
Theil-Sen Slope = 0.02 ; Mann-Kendal Score = 275 ; Mann-Kendall p-value = 0.44151



Intercept = 5.1508 ; Intercept STE = 0.85083 ; Intercept T-Statistic 6.0538 ; Intercept p-value = 2.807e-08
Slope = -0.002542 ; Slope STE = 0.00043105 ; Slope T-Statistic -5.8972 ; Slope p-value = 5.6404e-08
F-Statistic: 34.777 ; p-value: 5.64e-08
Theil-Sen Slope = -0.0001545 ; Mann-Kendal Score = -273 ; Mann-Kendall p-value = 0.39639



Intercept = 5.1481 ; Intercept STE = 1.5375 ; Intercept T-Statistic 3.3483 ; Intercept p-value = 0.0011751
Slope = -0.0023945 ; Slope STE = 0.00078009 ; Slope T-Statistic -3.0695 ; Slope p-value = 0.0028102
F-Statistic: 9.4218 ; p-value: 0.00281
Theil-Sen Slope = -0.0002708 ; Mann-Kendal Score = -144 ; Mann-Kendall p-value = 0.6456

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

			Historical			Recent			Fligner-Killeen			Mann-Whitney					
Sub-Basin	**Station**	**Month**	**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**		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m3/s)
08N - Okanagan Similkameen	**08NM037**	January	19	0.05	0.02	31	0.05	0.02	3.16	0.08		251086	0.00	***	10.4	10.76	0.13
		February	19	0.05	0.02	31	0.05	0.02	13.02	0.00	***	208483.5	0.00	***	4.2		
		March	19	0.05	0.03	31	0.06	0.02	0.92	0.34		249500.5	0.00	***	16.7		
		April	26	0.10	0.07	31	0.13	0.10	26.01	0.00	***	279541.5	0.00	***	29.9		
		May	30	1.18	0.98	31	1.08	0.92	0.64	0.42		455566	0.05	*	8.1		
		June	30	1.40	1.15	31	1.18	0.99	9.66	0.00	**	450539	0.00	**	15.4		
		July	30	0.31	0.30	31	0.31	0.22	17.06	0.00	***	416425.5	0.19				
		August	30	0.09	0.09	31	0.12	0.08	26.80	0.00	***	357658	0.00	***	29.7		
		September	28	0.07	0.06	31	0.08	0.04	37.51	0.00	***	351436	0.06				
		October	21	0.08	0.03	31	0.08	0.04	25.43	0.00	***	270557	0.29				
		November	20	0.08	0.04	31	0.08	0.04	10.37	0.00	**	292389.5	0.49				
		December	20	0.05	0.02	31	0.06	0.03	39.57	0.00	***	240809.5	0.00	***	14.8		
	08NM041	January	9	0.20	0.04	26	0.18	0.06	30.93	0.00	***	121722.5	0.00	***	11.8	13.86	0.41
		February	9	0.20	0.03	27	0.18	0.05	60.64	0.00	***	94978	0.01	*	9.3		
		March	9	0.22	0.04	28	0.24	0.11	136.03	0.00	***	87542.5	0.00	***	12.2		
		April	29	0.58	0.38	31	0.82	0.69	55.81	0.00	***	251805.5	0.00	***	42.4		
		May	29	4.22	2.77	31	3.67	2.42	0.06	0.81		434901	0.31				
		June	31	1.98	1.60	31	1.79	1.16	49.84	0.00	***	453061.5	0.00	**	9.8		
		July	30	0.54	0.30	31	0.63	0.41	44.17	0.00	***	379070	0.00	***	17.7		
		August	31	0.29	0.11	30	0.31	0.17	109.04	0.00	***	407999	0.03	*	6.9		
		September	30	0.24	0.09	30	0.26	0.14	136.70	0.00	***	357611.5	0.00	***	10.3		
		October	10	0.28	0.07	30	0.24	0.13	57.59	0.00	***	120603	0.48				
		November	9	0.28	0.06	27	0.22	0.08	14.27	0.00	***	128855	0.00	***	22.5		
		December	10	0.25	0.05	25	0.19	0.07	13.12	0.00	***	129257	0.00	***	23.4		

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			Historical			Recent			Fligner-Killeen			Mann-Whitney					
Sub-Basin	**Station**	**Month**	**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**		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m3/s)
08N - Okanagan Similkameen	08NL004	January	33	1.33	0.46	38	1.32	0.47	2.91	0.09		645161.5	0.00	**	0.8	7.51	2.44
		February	34	1.29	0.42	38	1.26	0.47	9.35	0.00	**	536774	0.01	**	2.3		
		March	36	1.35	0.37	38	1.41	0.55	52.22	0.00	***	585410	0.00	***	4.4		
		April	36	2.29	1.14	38	2.7	1.94	130.61	0.00	***	558807.5	0.00	***	17.9		
		May	37	19.5	15.98	38	19.8	19.32	9.00	0.00	**	664948.5	0.63				
		June	38	33.4	18.53	38	27.9	18.24	15.08	0.00	***	719244	0.00	***	16.5		
		July	38	10.9	7.24	38	9.52	6.34	9.58	0.00	**	744064	0.00	***	12.7		
		August	38	3.91	2.48	38	3.285	1.88	51.69	0.00	***	784163	0.00	***	16.0		
		September	38	2.38	1.30	38	2.18	1.10	55.22	0.00	***	707336	0.00	***	8.4		
		October	37	2.08	0.82	38	2.04	0.80	22.49	0.00	***	689859	0.01	*	1.9		
		November	37	1.95	0.67	38	1.955	0.87	21.64	0.00	***	634344	0.43				
		December	37	1.63	0.65	38	1.48	0.56	33.03	0.00	***	794679.5	0.00	***	9.2		
	08NL007	January	37	4.81	2.39	39	5	2.46	14.83	0.00	***	650497.5	0.01	**	4.0	12.85	7.54
		February	37	4.59	1.97	39	4.67	2.19	4.34	0.04	*	569701	0.70				
		March	39	5.04	1.85	39	5.69	3.17	167.52	0.00	***	580674	0.00	***	12.9		
		April	39	12.5	9.64	39	17.55	15.93	113.31	0.00	***	552509.5	0.00	***	40.4		
		May	40	76.2	57.52	39	63.8	41.51	83.46	0.00	***	813181.5	0.00	***	16.3		
		June	40	89.9	60.93	39	71.05	43.66	81.59	0.00	***	848561	0.00	***	21.0		
		July	40	24.95	18.46	39	19.5	15.12	35.01	0.00	***	854890	0.00	***	21.8		
		August	40	7.76	4.28	39	6.27	3.29	42.72	0.00	***	871357	0.00	***	19.2		
		September	40	4.84	1.97	39	4.515	2.08	2.11	0.15		813740	0.00	***	6.7		
		October	39	5.38	2.48	39	4.74	2.25	20.21	0.00	***	852506.5	0.00	***	11.9		
		November	40	5.8	3.37	39	5.645	3.61	6.85	0.01	**	703316.5	0.45				
		December	39	4.87	3.10	39	4.83	2.70	26.87	0.00	***	746734	0.17				
	08NM002	January	50	11.2	9.34	53	6.53	3.04	171.65	0.00	***	1381864	0.00	***	41.7	19.29	14.10
		February	50	11.4	8.93	53	8.95	6.30	31.37	0.00	***	922830.5	0.00	***	21.5		
		March	51	12.7	10.01	53	14.9	13.94	352.71	0.00	***	975277.5	0.00	***	17.3		
		April	51	14.15	10.07	53	16.2	13.91	238.12	0.00	***	1012276.5	0.00	***	14.5		
		May	51	19.7	11.86	53	24.9	25.62	715.53	0.00	***	1044008	0.00	***	26.4		
		June	51	23.95	14.16	53	22.8	20.82	297.38	0.00	***	1079816	0.00	***	4.8		

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		July	51	19.3	12.90	53	18.9	13.28	133.88	0.00	***	1038732.5	0.00	***	2.1		
		August	51	15.5	9.50	53	14	5.97	8.51	0.00	**	1029183	0.00	***	9.7		
		September	51	13.2	8.54	53	12.9	4.00	98.89	0.00	***	1025854	0.00	***	2.3		
		October	51	12.1	7.44	53	10.8	2.37	536.41	0.00	***	1356847	0.03	*	10.7		
		November	51	10.3	7.41	53	6.43	2.28	383.55	0.00	***	1508180	0.00	***	37.6		
		December	51	11.2	8.63	53	6.39	2.09	572.62	0.00	***	1656282.5	0.00	***	42.9		

Average Change in entire Okanagan-Similkameen basin	16.01

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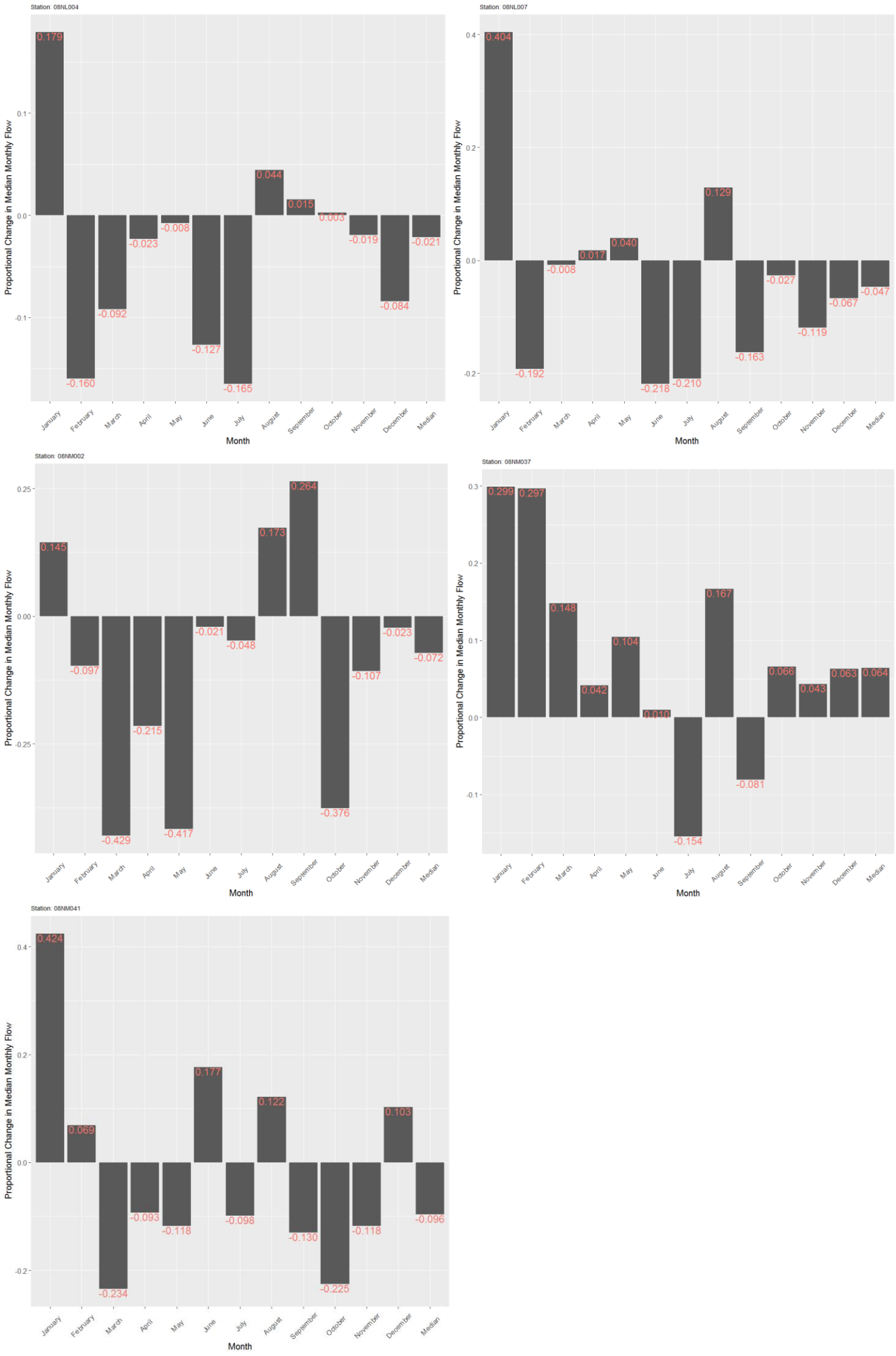
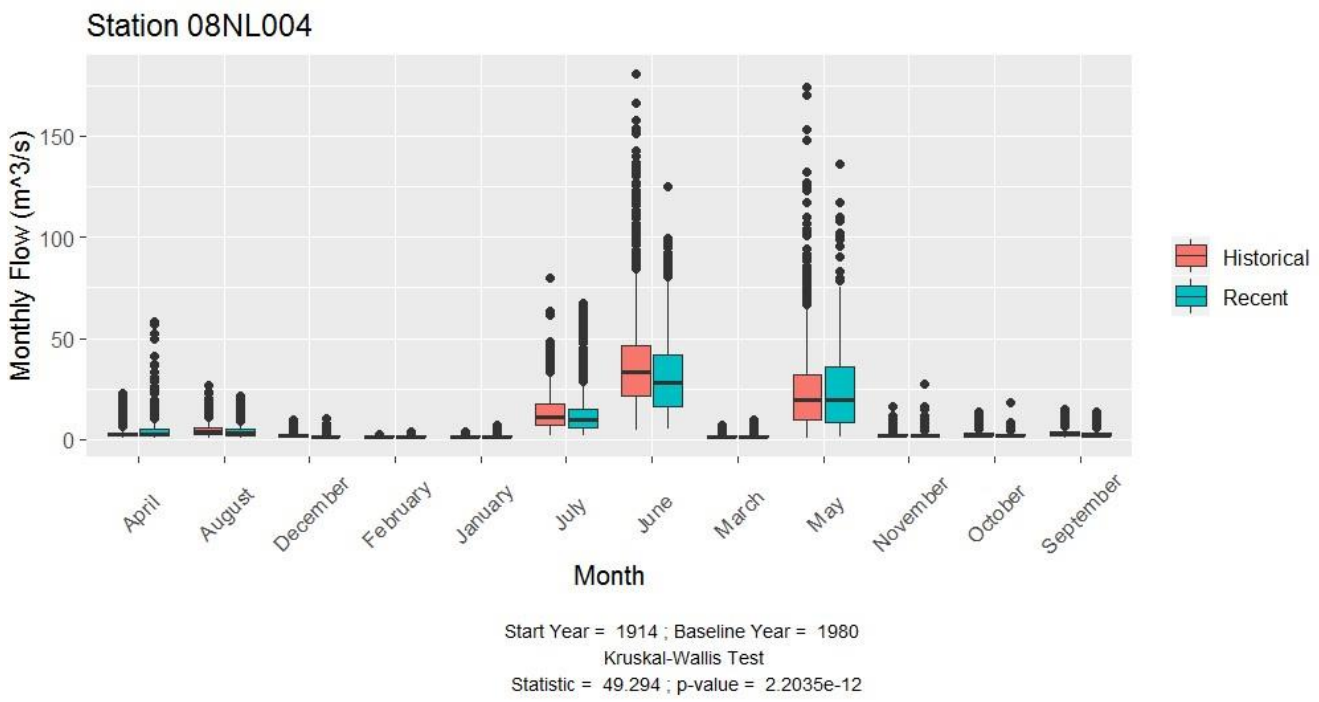
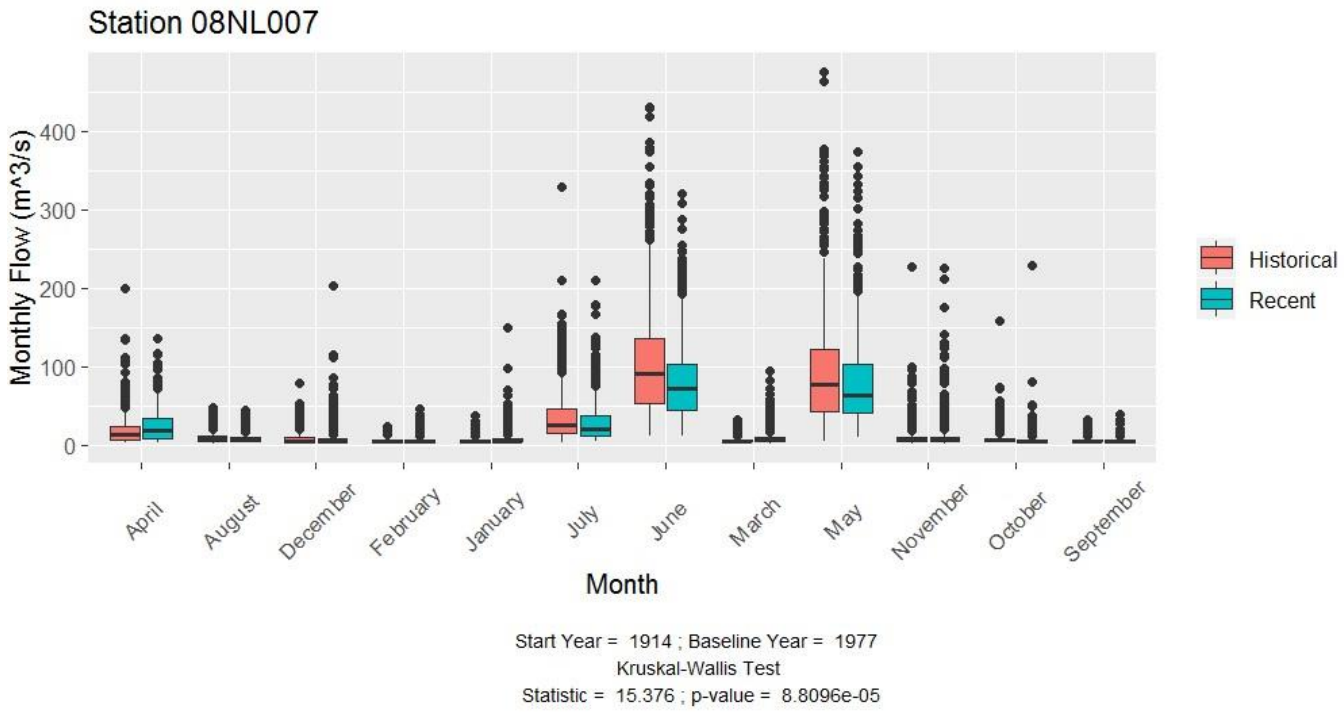
FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT VS. HISTORICAL PERIODS IN OKANAGAN-SIMILKAMEEN BASIN

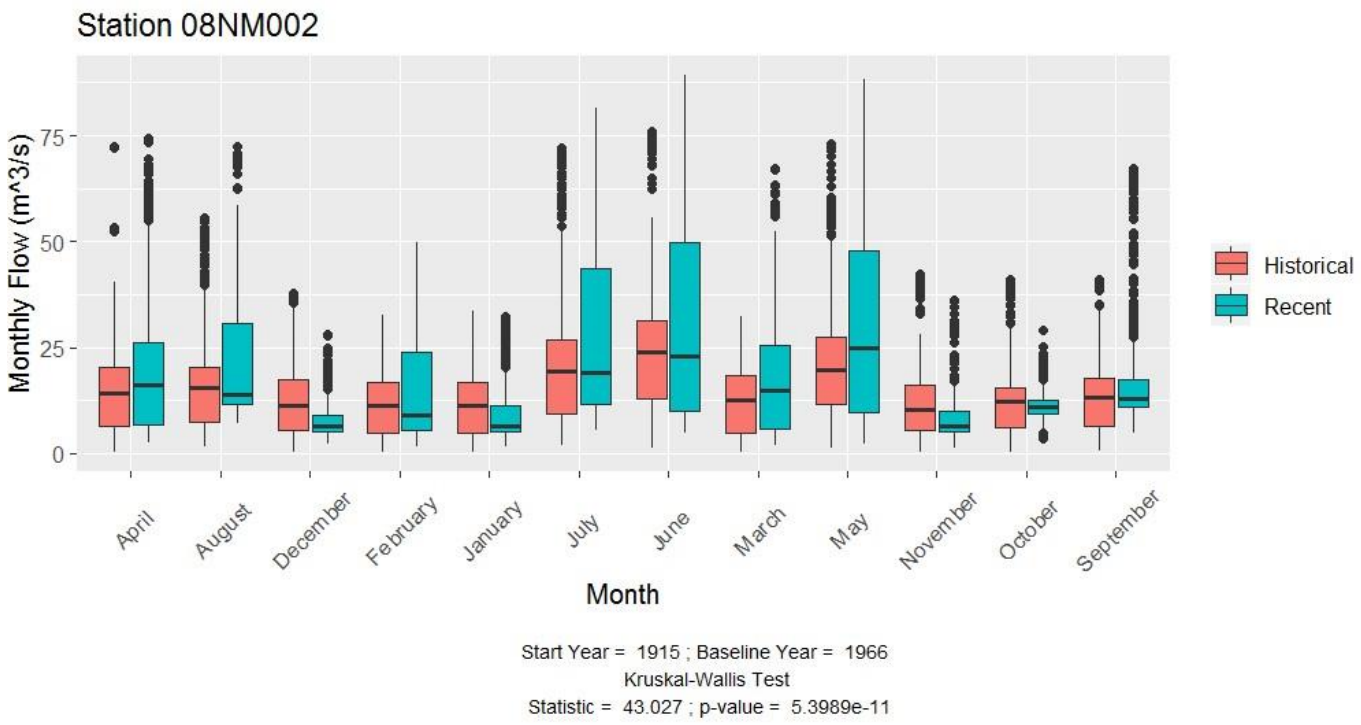


Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

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







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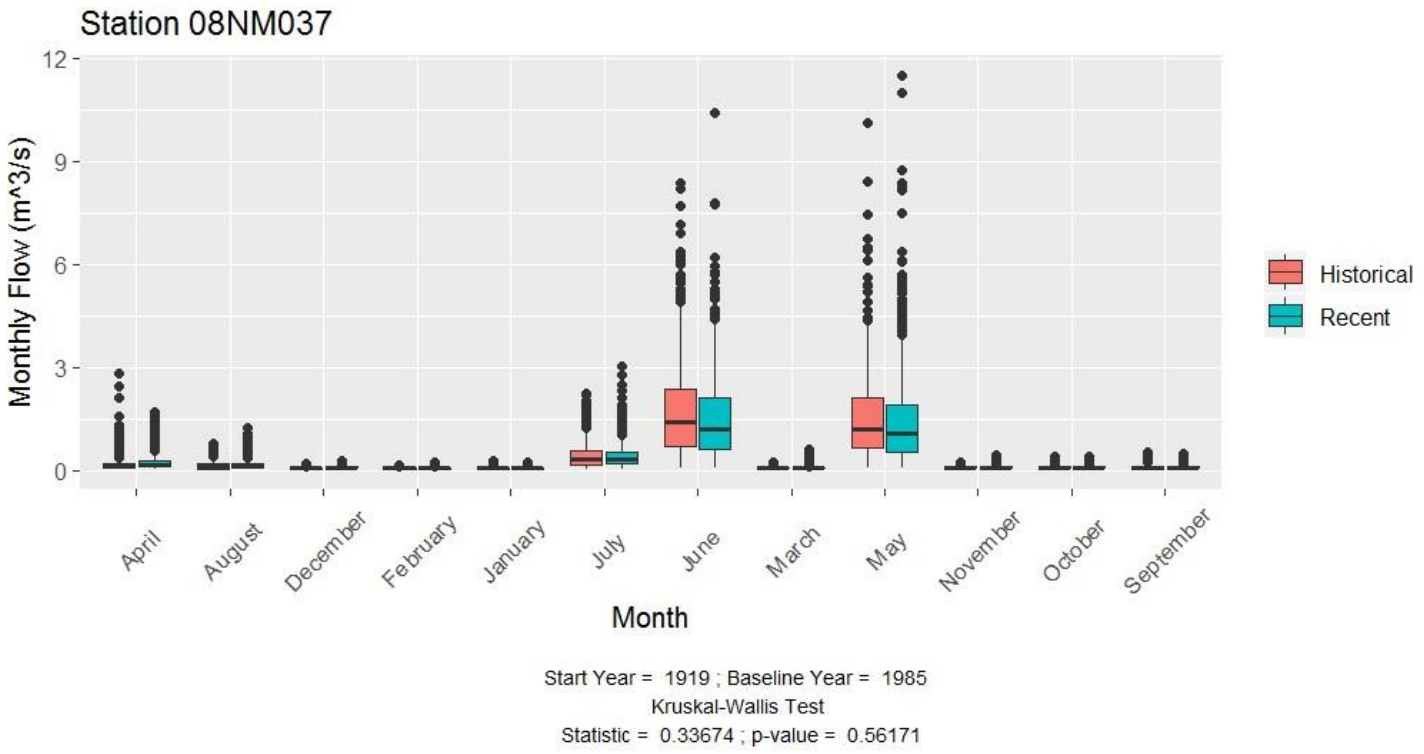
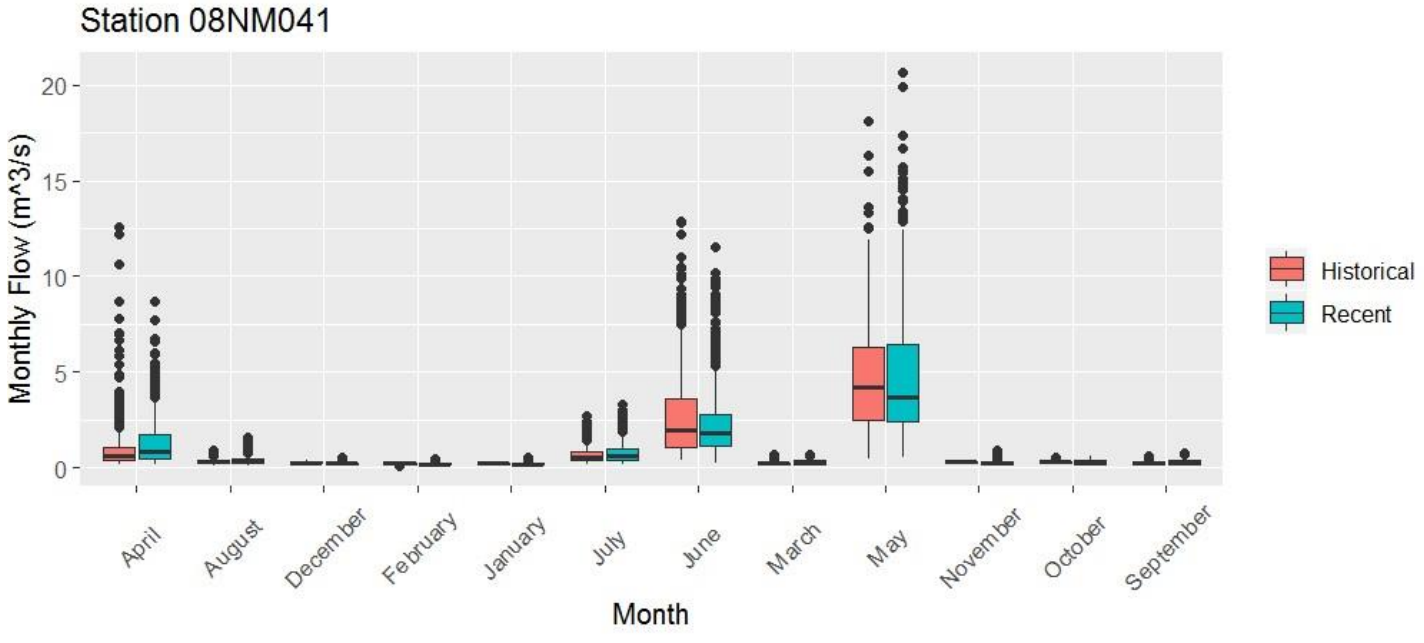


Start Year = 1919 ; Baseline Year = 1985
Kruskal-Wallis Test
Statistic = 0.33674 ; p-value = 0.56171



Start Year = 1919 ; Baseline Year = 1982
Kruskal-Wallis Test
Statistic = 285.46 ; p-value = 4.8477e-64

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

WATER QUALITY

OVERALL WATER QUALITY HEALTH SCORING

				Basin
	Indicator			**Value**
Water Quality	**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 77th percentile. Expressed as a proportion of total measurements. Reported as a weighted average for the last five years.	*Year*	2015-2020
			Number of Stations	126
			Value	0.170
			Water Quality Health Category	**Fair**
			Water Quality Health Score	3
		Variance of annual water quality scores	*Value*	0.117
		Significant Mann-Kendal time-series test to determine directional trend in proportion of exceedance of water quality thresholds.	*Time Period*	2000-2020
			Trend	No trend

WATER QUALITY DATA SUFFICIENCY

	Data Sufficiency Indicator	**Basin**
Water Quality	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	2020
	Number of monitoring stations available within last five years	103
	Number of sub-sub-basins within last five years	2
	Percentage of samples with at least 10 elements measured within last 5 years.	46.85%
	Number of years of sampling in last 10 years	10
	Overall Data Sufficiency Category	Partially Sufficient
	Data Sufficiency Score	1

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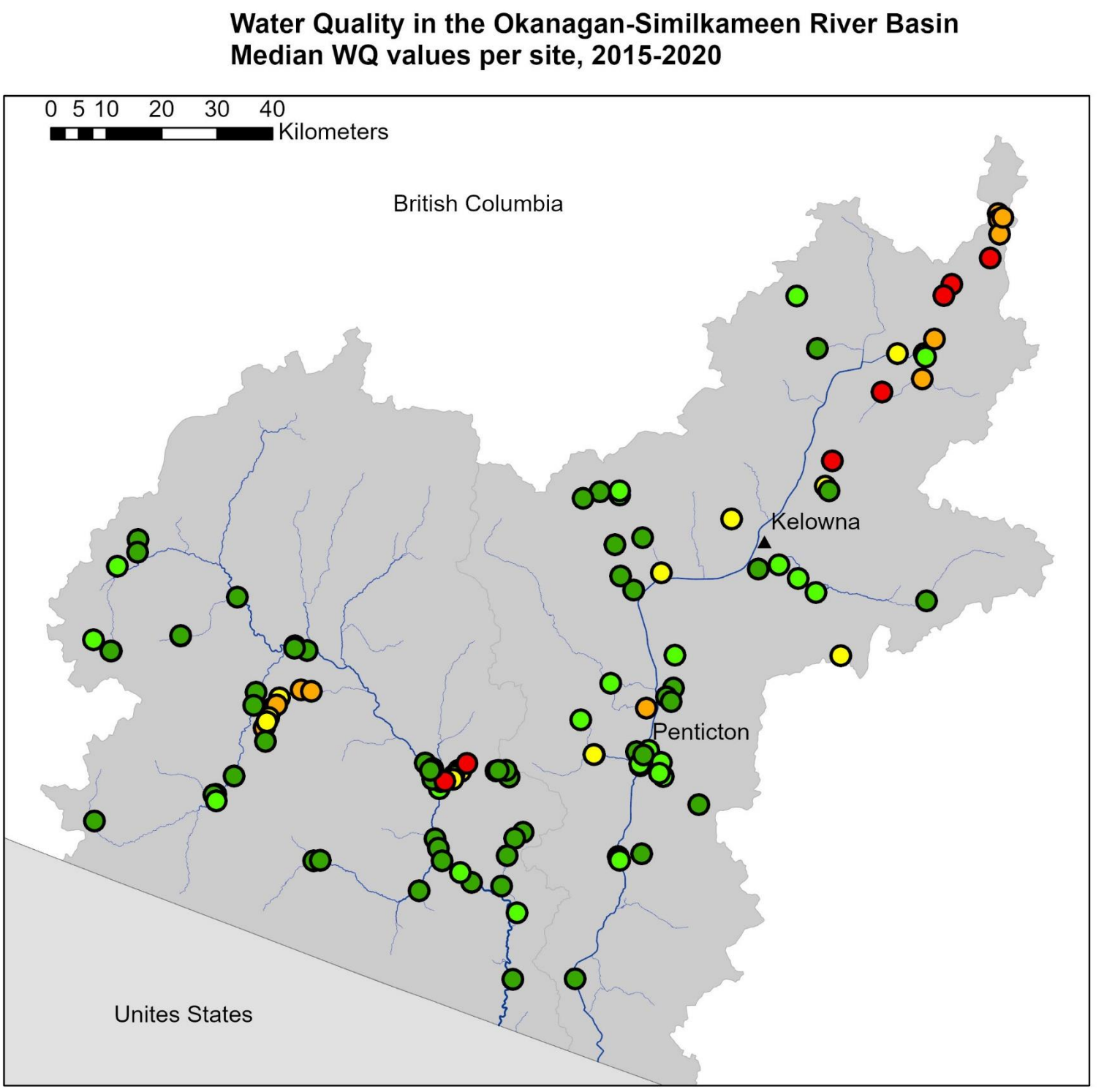
MAP. EXCEEDANCE OF WATER QUALITY THRESHOLDS AS REPORTED FOR MONITORING STATIONS IN THE OKANAGAN-SIMILKAMEEN BASIN FOR THE FIVE MOST RECENT YEARS AVAILABLE.



Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

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	2020	12	14	79	10	0.13	9	0.11	18	0.23	0.14	0.17
	BCEMS	2019	15	53	1986	285	0.14	209	0.11	528	0.27	0.15	
	EC	2019	14	3	543	39	0.07	37	0.07	106	0.20	0.09	
	BCEMS	2018	15	66	3544	579	0.16	564	0.16	1266	0.36	0.19	
	EC	2018	14	3	823	75	0.09	82	0.10	182	0.22	0.12	
	BCEMS	2017	15	64	3622	544	0.15	494	0.14	1117	0.31	0.17	
	EC	2017	14	3	822	77	0.09	72	0.09	182	0.22	0.11	
	BCEMS	2016	15	45	2980	504	0.17	269	0.09	891	0.30	0.16	
	EC	2016	14	3	840	77	0.09	44	0.05	147	0.18	0.09	

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OKANAGAN-SIMILKAMEEN BASIN (2000-2020).

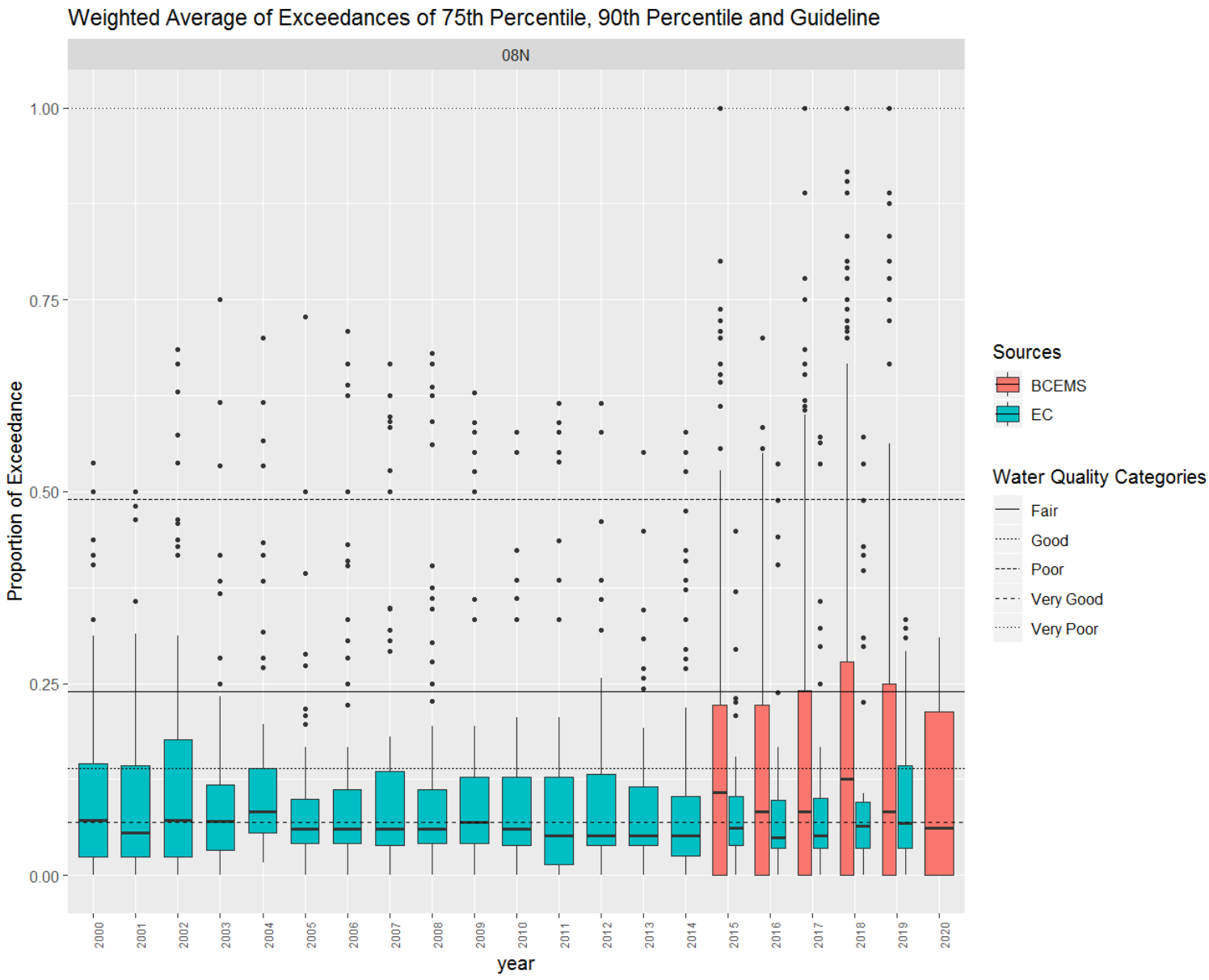


TABLE. PROPROTION OF MEASUREMENTS EXCEEDING THE WATER QUALITY THRESHOLDS, IN THE OKANAGAN-SIMILKAMEEN BASIN, BY PARAMETER MEASURED.

Variable	Total Measurements	Total Guideline Exceedances	Ratio
Aluminum	1677	538	0.32
Ammonia	359	122	0.34
Arsenic	2875	134	0.05
Cadmium	1967	166	0.08
Chloride	269	0	0.00
Copper	3062	144	0.05
Dissolved Oxygen	1658	13	0.01
Iron	3280	554	0.17
Lead	2018	4	0.00
Mercury	24	2	0.08
Nickel	2221	1	0.00
Nitrite	10	10	1.00
Nitrogen	2490	651	0.26
pH	2054	18	0.01
Phosphorus	2809	737	0.26
Uranium	3100	37	0.01
Zinc	1889	887	0.47
TOTAL	31762	4018	0.13

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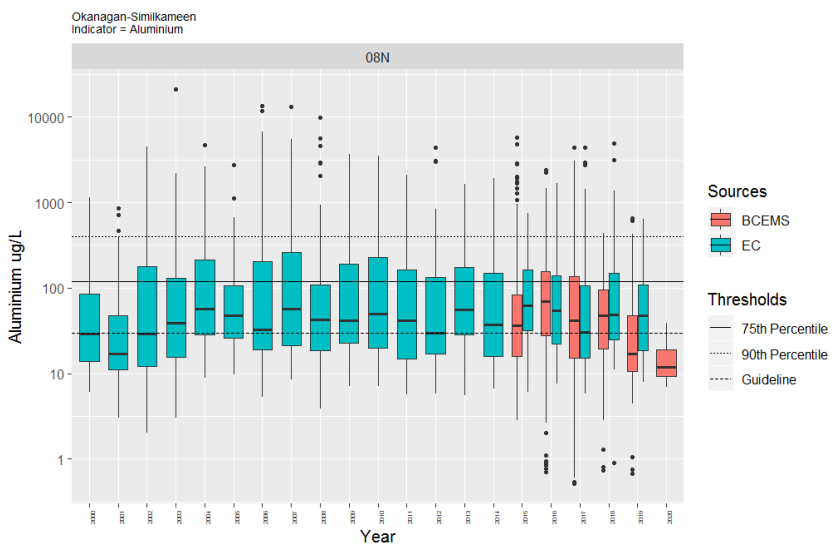
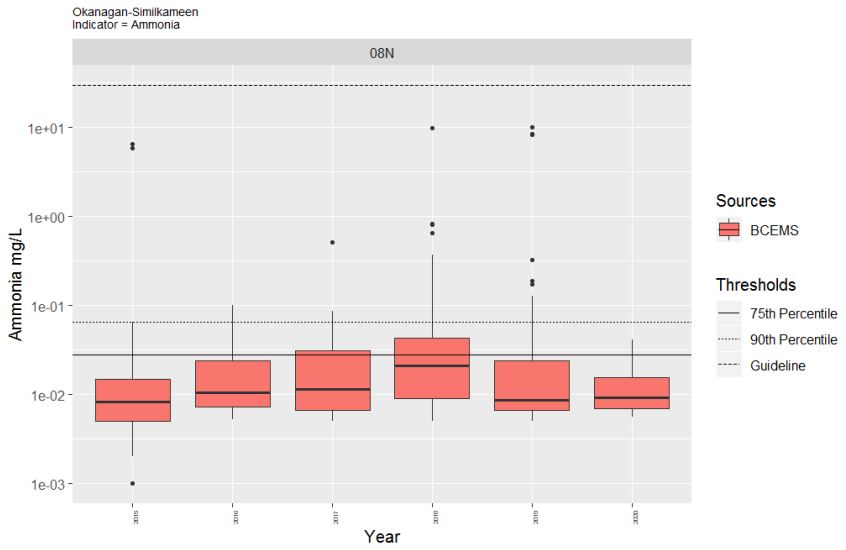
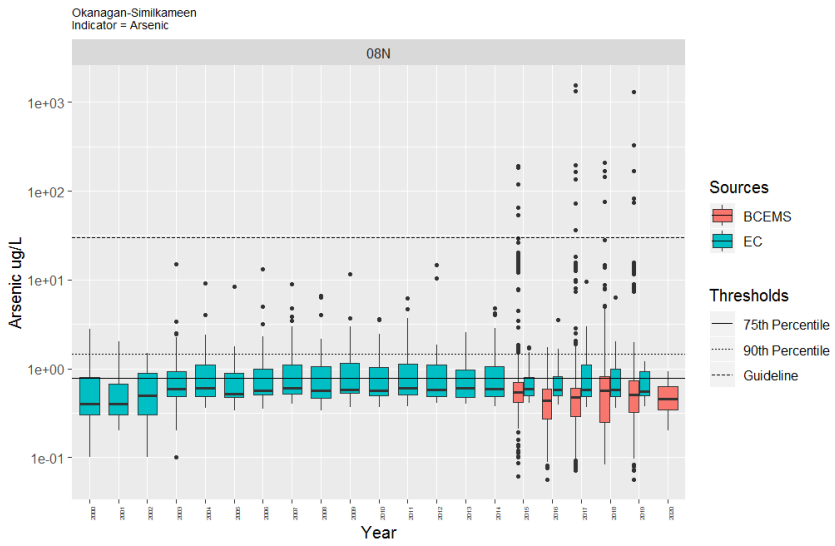
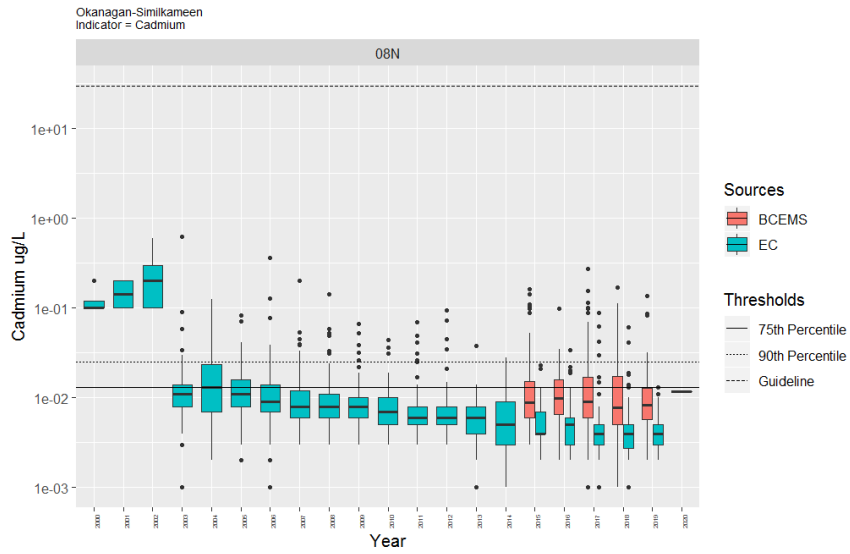
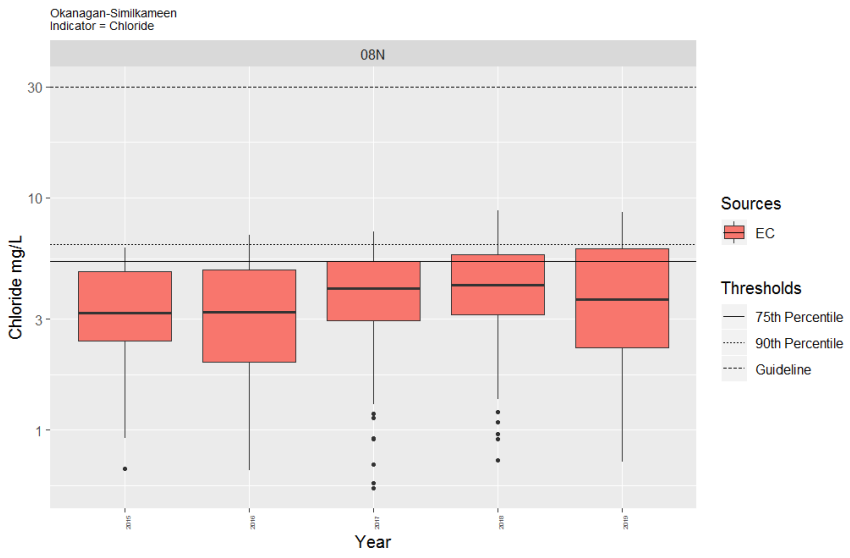
FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OKANAGAN-SIMILKAMEEN BASIN, BY CONTAMINANT.

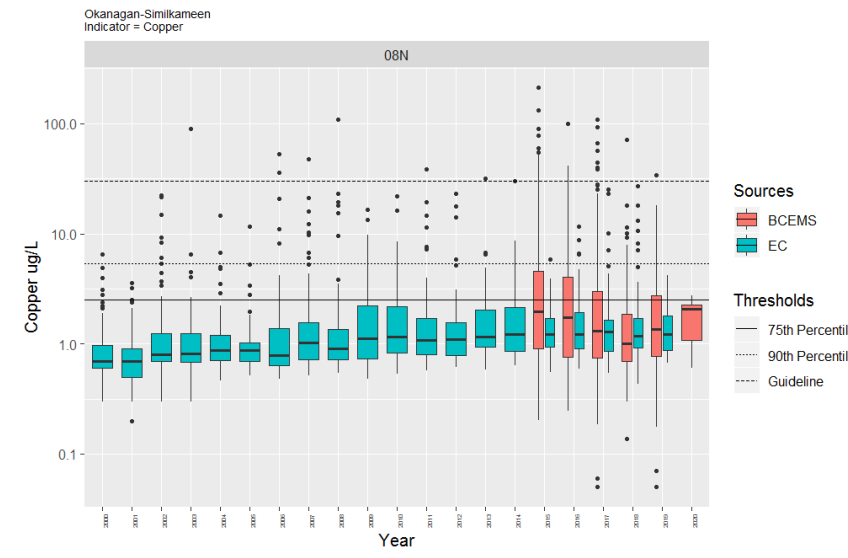












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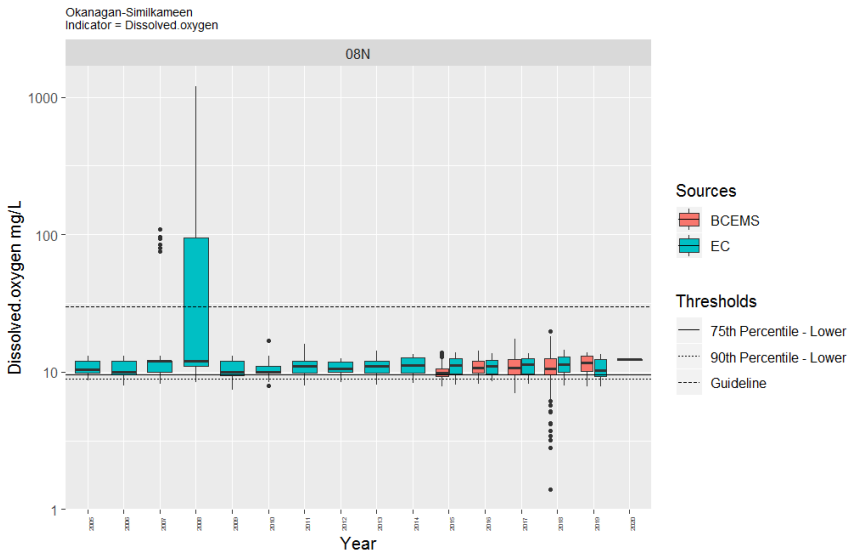

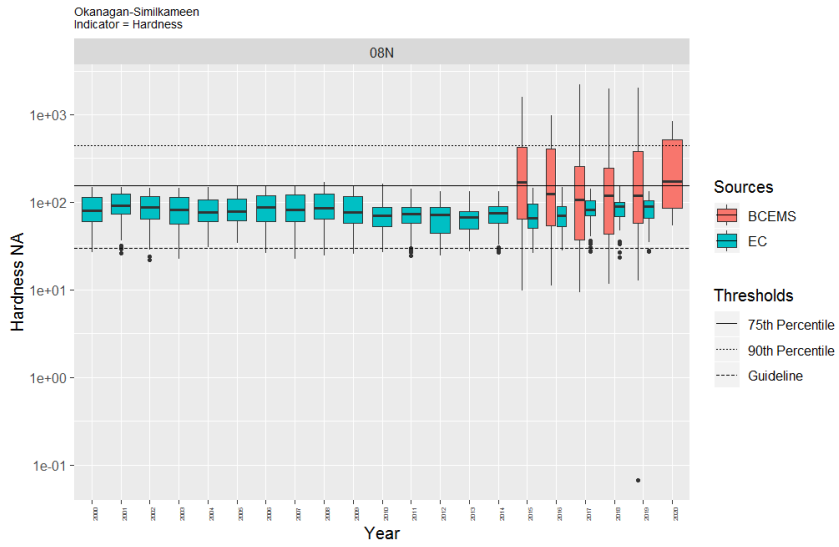

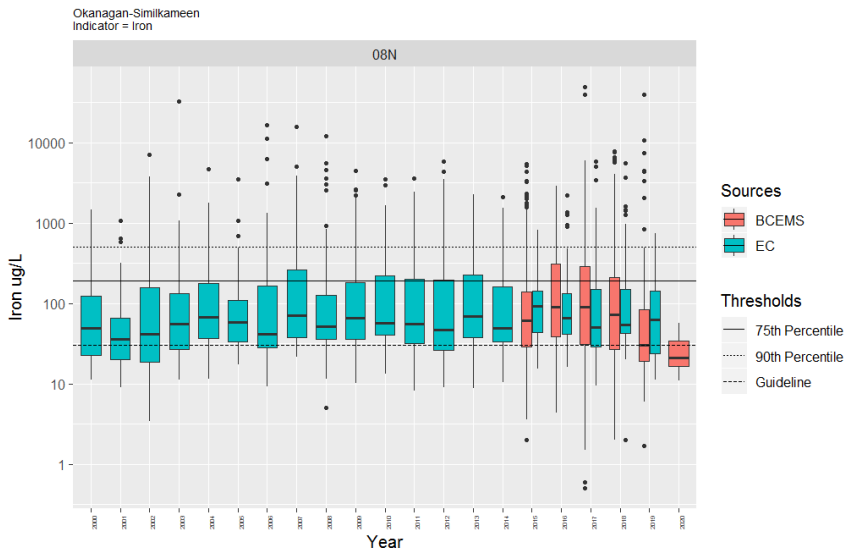

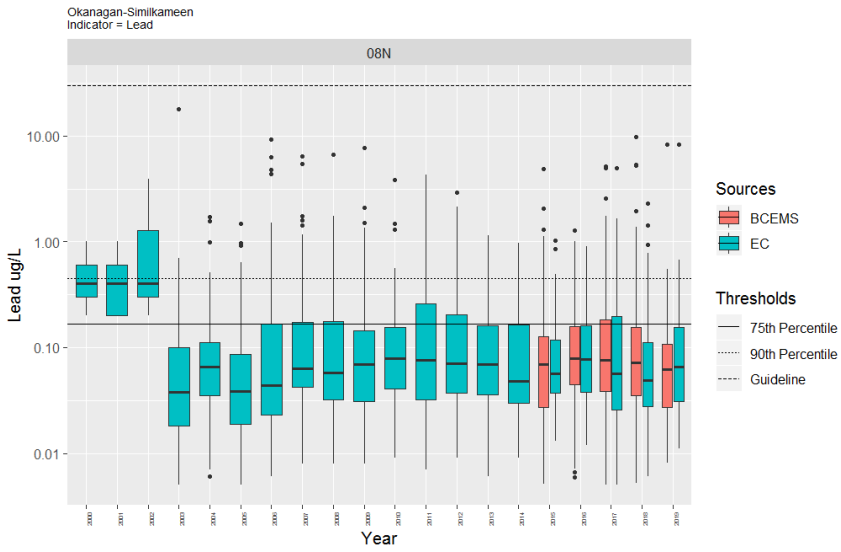

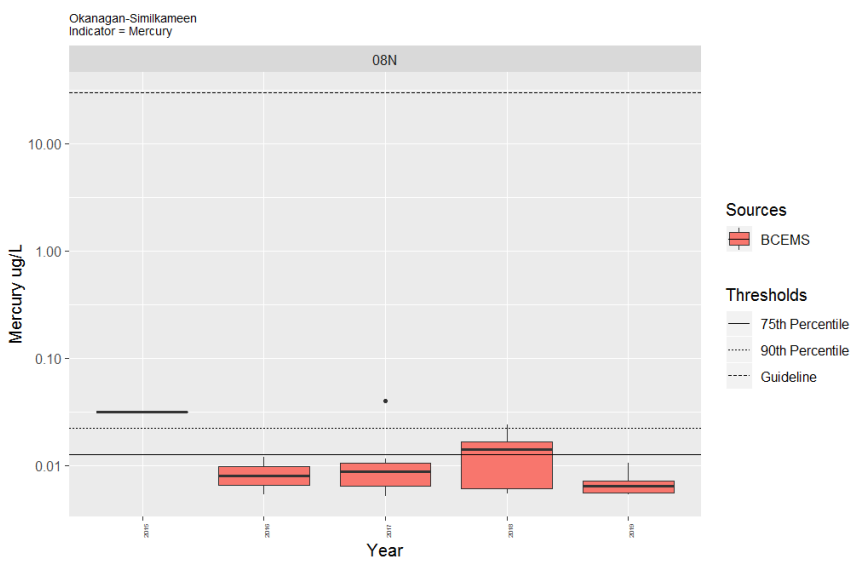

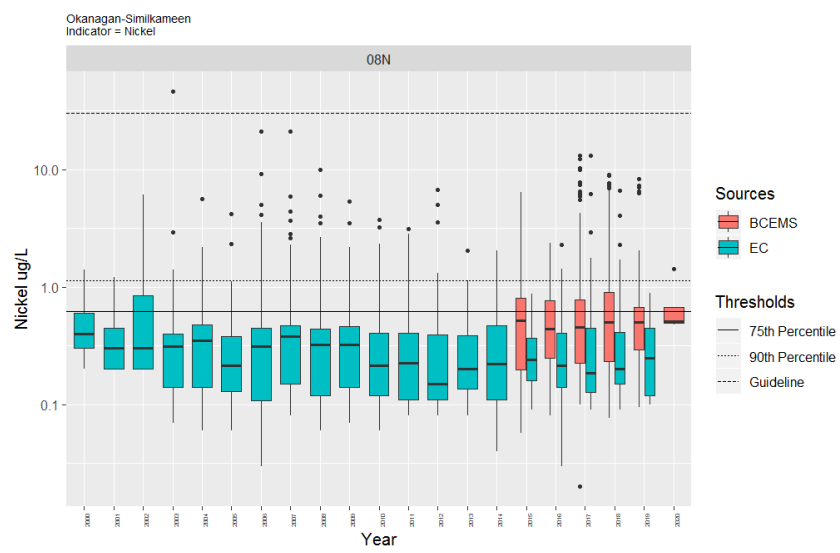

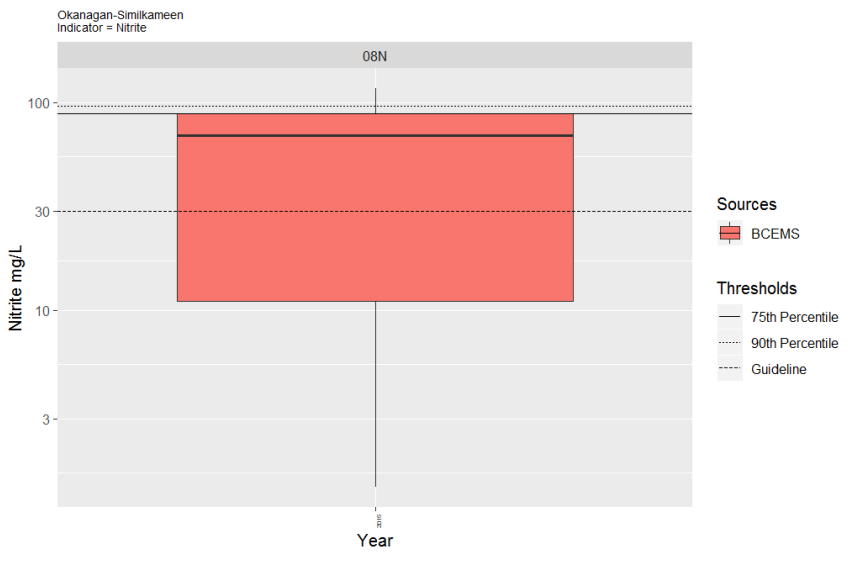

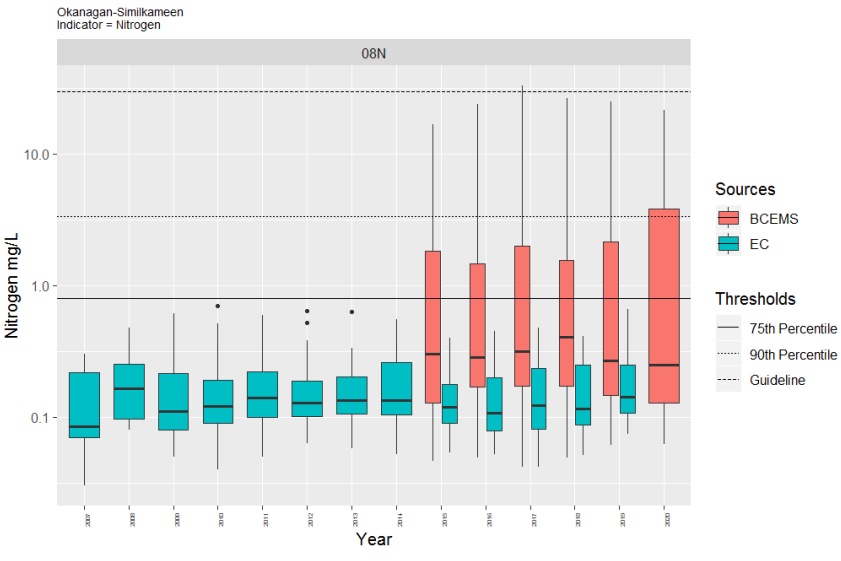

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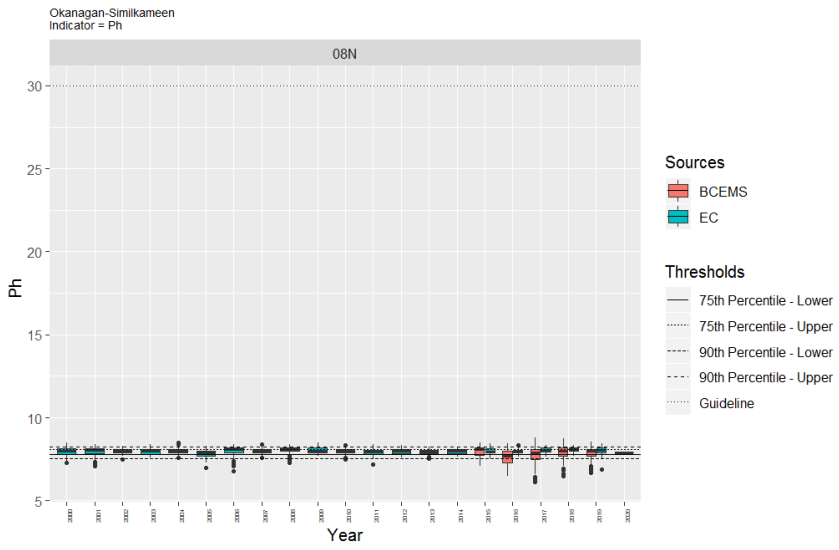

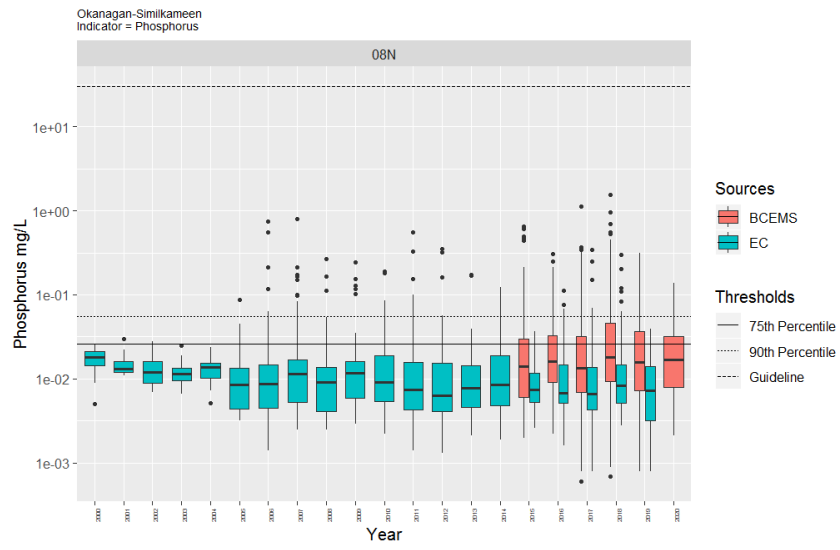

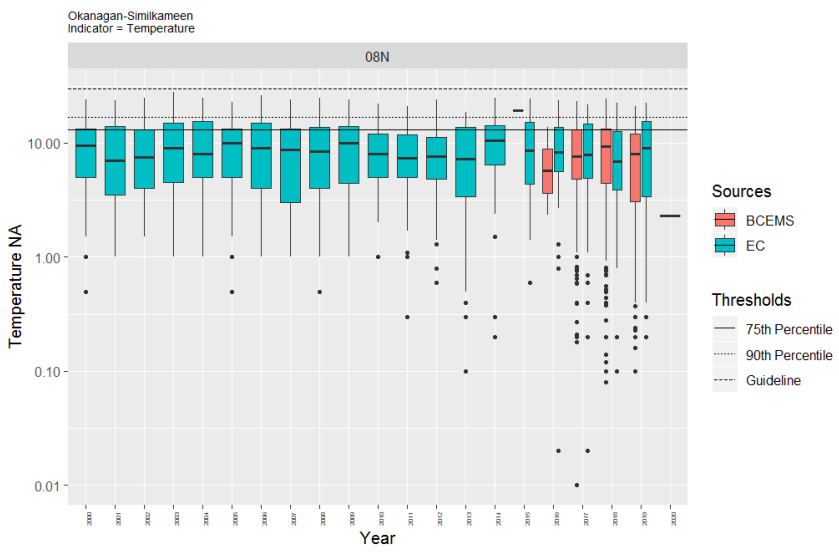

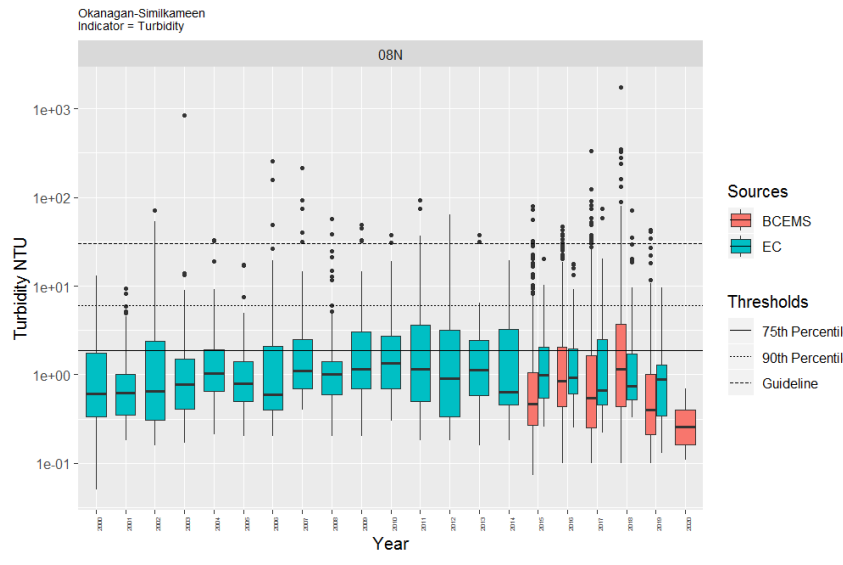

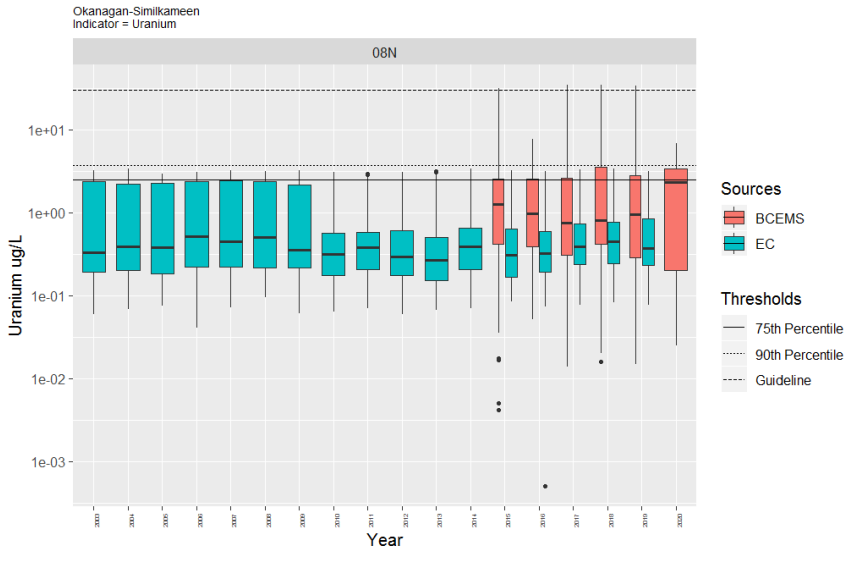

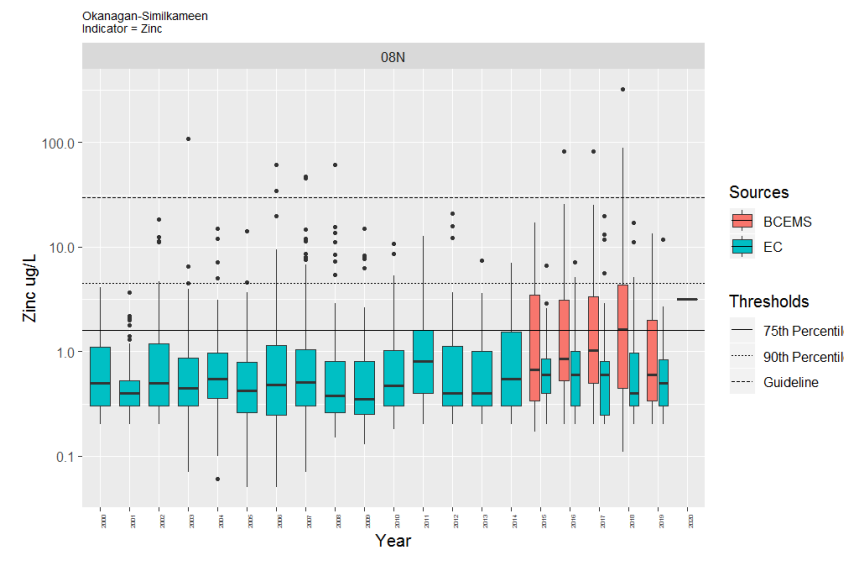

TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF ANNUAL EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME IN THE OKANAGAN-SIMILKAMEEN WATERSHED.

WSCSDA	Data Source	Start Year	End Year	Number of Years	Number of Sites	Theil-Sen Slope	Mann-Kendall Test Statistic	Mann-Kendall Test p-value	
08N - Okanagan-Similkameen	All	2000	2020	21	122	0	11	0.76	
	BCEMS	2015	2020	6	119	-0.01	-6	0.31	
	EC	2000	2019	20	3	0.00	-65	0.04	*

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

FISH

OVERALL FISH HEALTH SCORING

				Basin
Fish	Indicator			
	Change in Native Fish Species Richness		Period of Study	1915-2019
			Number of Sites	1294
		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	2
	Year of earliest available monitoring	1915
	Number of sampling locations available for earliest monitoring	1
	Number of sub-sub-basins with earliest available sampling locations	1
	Earliest year of continuous monitoring	1923
	Number of sampling locations available for first year of continuous monitoring	1
	Number of sub-sub-basins for first year of continuous monitoring	1
	Year of most recently available monitoring	2019
	Number of monitoring stations available within last five years	128
	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

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MAP. NUMBER OF NATIVE FISH SPECIES OBSERVED IN THE OKANAGAN-SIMILKAMEEN BASIN (2014-2019).

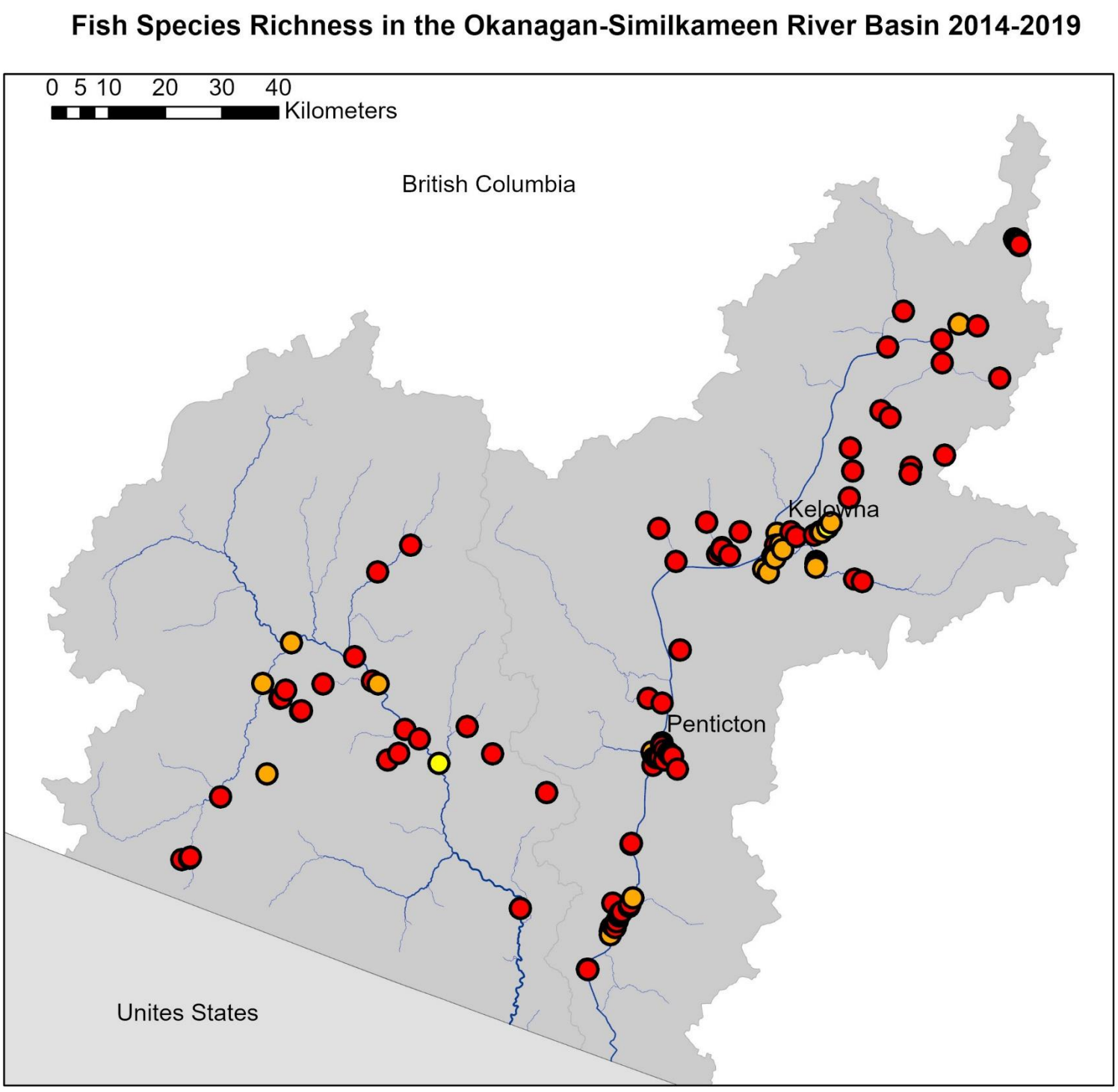

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FIGURE.NON-PARAMETRIC ANALYSIS OF VARIANCE IN ANNUAL FISH SPECIES RICHNESS IN THE OKANAGAN-SIMILKAMEEN BASIN (1915-2019), BY SUB-BASIN.

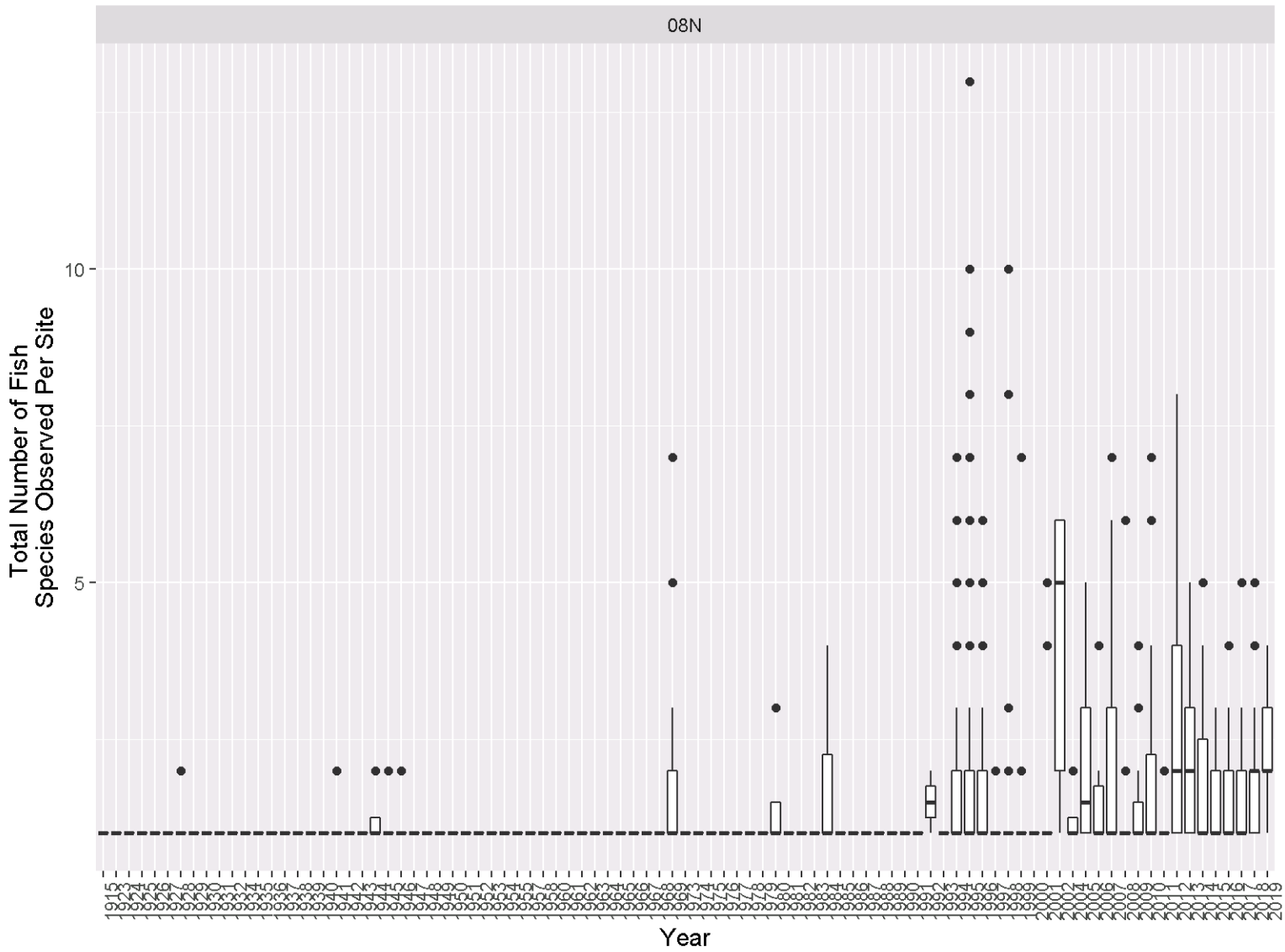

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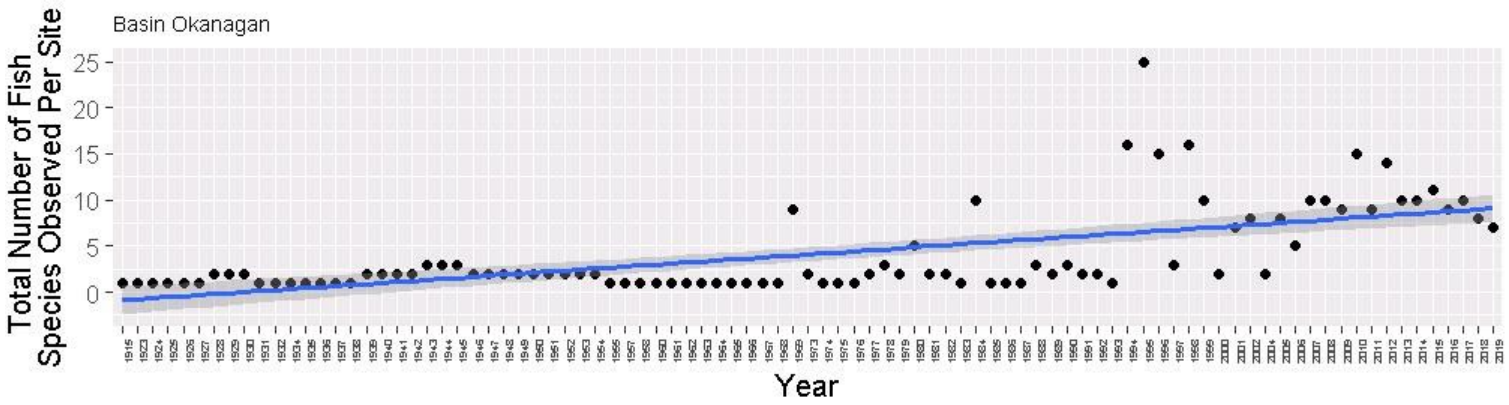
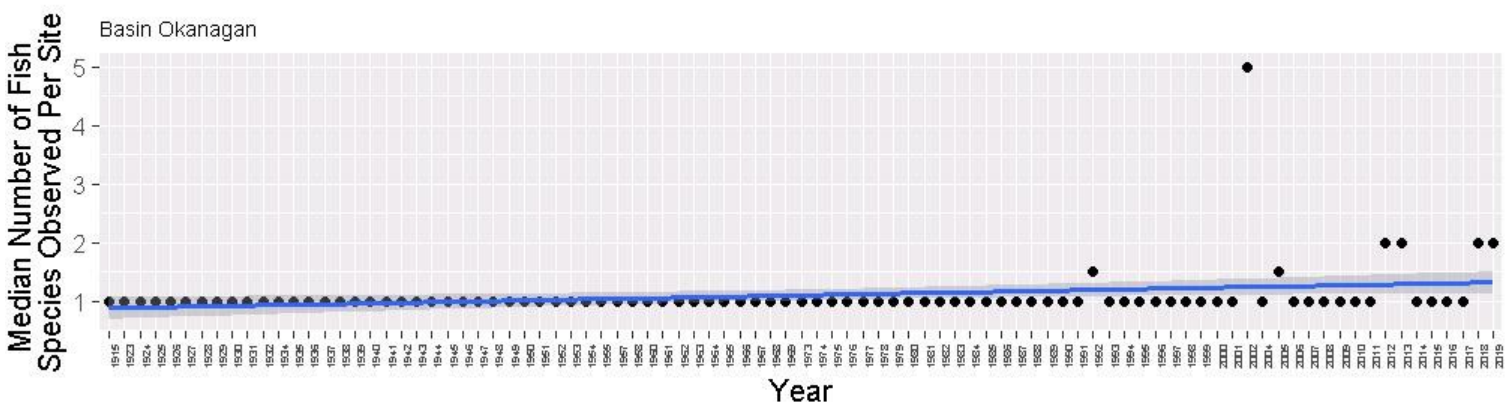
FIGURE.TIME-SERIES OF TOTAL (TOP) AND MEDIAN (BOTTOM) NATIVE FISH SPECIES RICHNESS IN THE OKANAGAN-SIMILKAMEEN BASIN.



Intercept = -213.94 ; Intercept STE = 27.844 ; Intercept T-Statistic -7.6835 ; Intercept p-value = 9.3966e-12
Slope = 0.11082 ; Slope STE = 0.014098 ; Slope T-Statistic 7.8605 ; Slope p-value = 3.8943e-12
F-Statistic: 61.787 ; p-value: 3.894e-12
Theil-Sen Slope = 0 ; Mann-Kendal Score = -862 ; Mann-Kendall p-value = 0.014225
Data Source:FISS



Intercept = -8.7555 ; Intercept STE = 3.7576 ; Intercept T-Statistic -2.3301 ; Intercept p-value = 0.021751
Slope = 0.0050076 ; Slope STE = 0.0019026 ; Slope T-Statistic 2.632 ; Slope p-value = 0.0097931
F-Statistic: 6.9274 ; p-value: 0.009793
Theil-Sen Slope = 0 ; Mann-Kendal Score = -78 ; Mann-Kendall p-value = 0.65981
Data Source:FISS

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	FISS	08N - Okanagan-Similkameen	1915	0	-862	0.01	*
Median Richness	FISS	08N - Okanagan-Similkameen	1915	0	-78	0.66	

Data source FISS represents the Ministry of Environment and Climate Change Strategy, British Columbia Government, Known BC Fish Observations and BC Fish Distributions (includes official provincial databases and FISS).

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BENTHICS

OVERALL BENTHIC HEALTH SCORING

				Basin
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.	*Year*	2015-2019
			Number of Sites	53
			Value	3.39
			Benthic Health Category	**Very Good**
			Benthic Health Score	5
		Variance of annual HBI scores	*Value*	0.860
		Significant Mann-Kendal time-series test to determine directional trend in **HBI** over time.	*Time Period*	1999-2019
			Trend	Significant decreasing trend

BENTHIC DATA SUFFICIENCY

	Data Sufficiency Indicator	**Basin**
Benthic Macro-Invertebrates	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	2019
	Number of monitoring stations available within last five years	53
	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

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of March 2020.

MAP. HILSENHOFF'S BIOTIC INDEX SCORES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES IN THE OKANAGAN-SIMILKAMEEN BASIN (2014-2019).

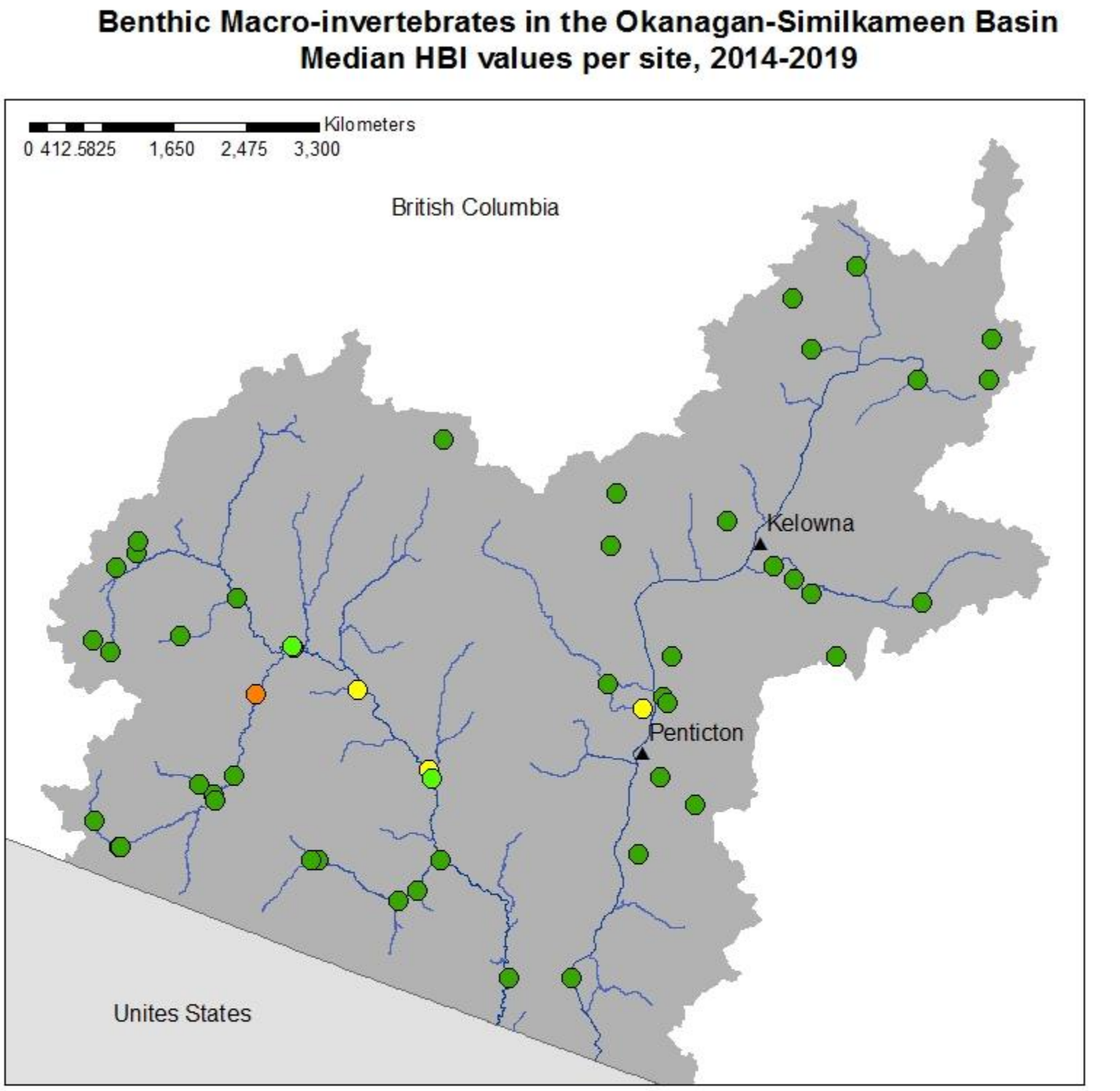

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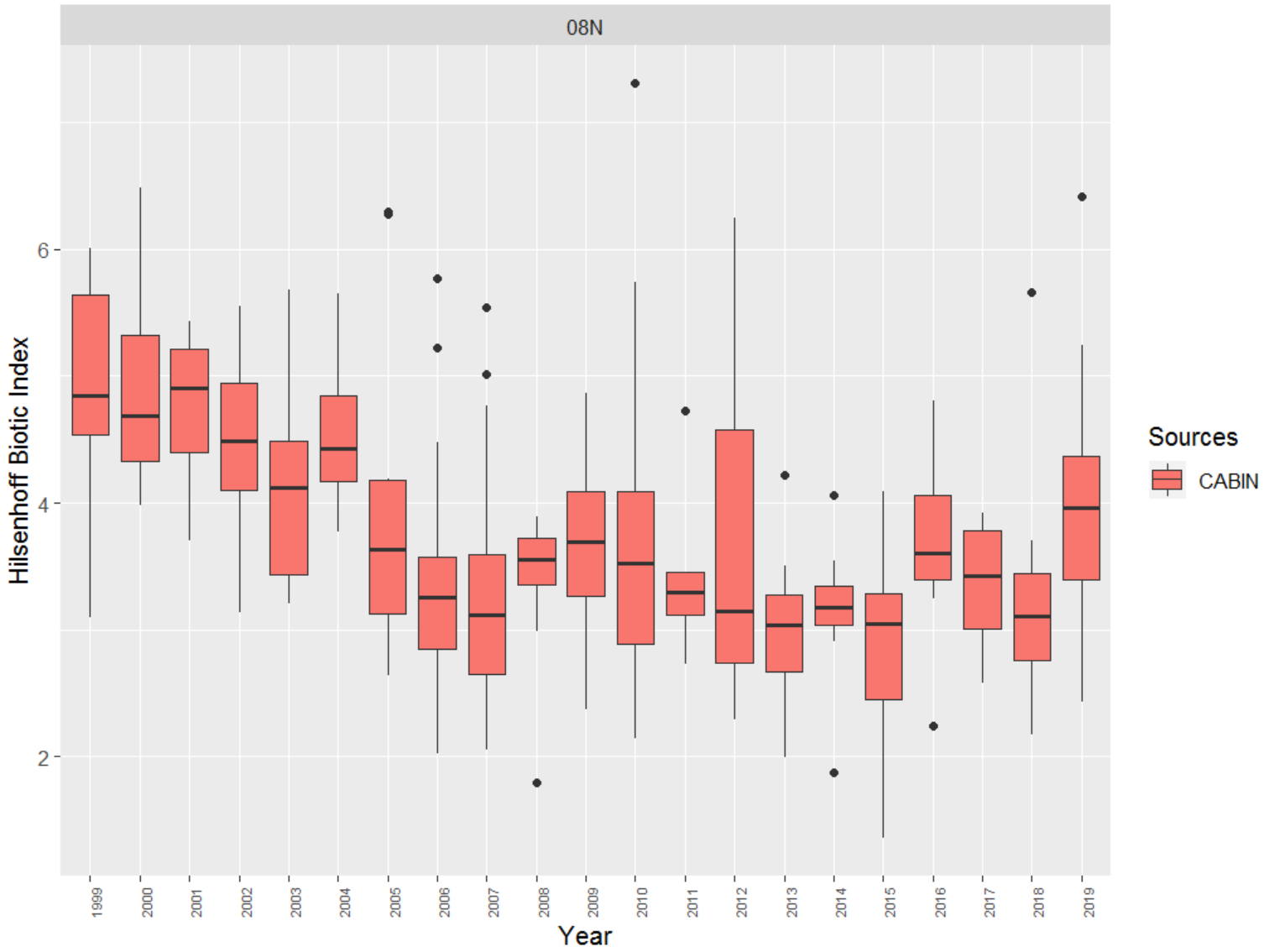
FIGURE. ANALYSIS OF VARIANCE FOR HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE OKANAGAN-SIMILKAMEEN BASIN (1999-2019).



*Source: CABIN, 2020 (incl.studies from BC-MOE Okanagan Studies, Environment Canada, Michel Creek, Silverstar Mtn Tributaries).

TABLE. HILSENHOFF'S BIOTIC INDEX VALUSES 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*	2019	15	3.96	
		2018	14	3.10	
		2017	9	3.42	
		2016	12	3.60	
		2015	21	3.04	3.39
		2014	8	3.17	
		2013	11	3.04	
		2012	11	3.15	
		2011	5	3.29	
		2010	20	3.52	
		2009	10	3.70	
		2008	7	3.55	
		2007	28	3.11	
		2006	29	3.25	
		2005	11	3.63	
		2004	8	4.43	
		2003	16	4.12	
		2002	15	4.49	
		2001	13	4.90	
		2000	22	4.69	
		1999	16	4.84	

*Source: CABIN, 2020 (incl.studies from BC-MOE Okanagan Studies, Environment Canada, Michel Creek, Silverstar Mtn Tributaries).

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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	2019	115	-0.08	-110	0.00	***

*Source: CABIN, 2020 (incl.studies from BC-MOE Okanagan Studies, Environment Canada, Michel Creek, Silverstar Mtn Tributaries).

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FRESHWATER THREATS ASSESSMENT

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		

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

SUB-INDICATOR SCORES BY SUB-WATERSHED

POLLUTION

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

		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		
WSCSDA	SUB WATERSHED NAME	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

		SUB-INDICATOR											
		Spring Precipitation Anomaly			Summer Maximum Temperature Anomaly			Summer Precipiation Anamoly			Winter Mean Temperature Anamoly		
WSCSDA	SUB WATERSHED NAME	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

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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