WWF-CANADA

WATERSHED REPORT

OTTAWA RIVER WATERSHED

JUNE 2015

OTTAWA RIVER WATERSHED REPORT

CONTENTS

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of June 2015.

FRESHWATER HEALTH ASSESSMENT

SUMMARY

OVERALL WATERSHED HEALTH SCORING

			Sub-Watershed			*Watershed*
	Indicator		**02J - Upper Ottawa**	**02K - Central Ottawa**	**02L - Lower Ottawa**	
Overall Watershed Health	*Hydrology*	***Hydrology Health Category***	**Very Good**	**Good**	**Good**	**Good**
		Hydrology Score	5	4	4	4
	Water Quality	***Water Quality Health Category***	**Good**	**Data Deficient**	**Fair**	**Fair**
		Water Quality Health Score	4	Data Deficient	3	3
	Benthic Macro-Invertebrates	***Benthic Health Category***	**Data Deficient**	**Data Deficient**	**Poor**	**Data Deficient**
		Benthic Health Score	Data Deficient	Data Deficient	2	Data Deficient
	Fish	***Fish Health Category***	**Data Deficient**	**Good**	**Good**	**Good**
		Fish Health Score	Data Deficient	4	4	4
	Total Score		9	8	13	11
	Total Available Score		10	10	20	15
	Percentage of Maximum Score		90.0%	80.0%	65.0%	73.3%
	Overall Health Category		**Data Deficient**	**Data Deficient**	**Fair**	**Data Deficient**

OVERALL DATA SUFFICIENCY SCORING

			Sub-Watershed			*Watershed*
	Indicator		**02J - Upper Ottawa**	**02K - Central Ottawa**	**02L - Lower Ottawa**	
Overall Watershed Health	*Hydrology*	Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient
		Data Sufficiency Score	1	1	1	1
	Water Quality	Data Sufficiency Category	Partially Sufficient	Insufficient	Partially Sufficient	Partially Sufficient
		Data Sufficiency Score	1	0	1	1
	Benthic Macro-Invertebrates	Data Sufficiency Category	Insufficient	Insufficient	Partially Sufficient	Insufficient
		Data Sufficiency Score	0	0	1	0
	Fish	Data Sufficiency Category	Insufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient
		Data Sufficiency Score	0	1	1	1
	Total Score		2	2	4	3
	Total Available Score		12	12	12	12
	Percentage of Maximum Score		16.7%	16.7%	33.3%	25.0%
	Overall Data Sufficiency Category		**Insufficient**	**Insufficient**	**Partially Sufficient**	**Insufficient**

WWF-Canada Freshwater Watershed Report for the Ottawa River Watershed
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HYDROLOGY

OVERALL HYDROLOGY WATERSHED HEALTH SCORING

	Indicator			Sub-Watershed			*Watershed*
				02J - Upper Ottawa	**02K - Central Ottawa**	**02L - Lower Ottawa**	
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*	1965-2013	1918-2013	1915-2013	1965-2013
			Number of Stations	1	2	1	4
			Value	0.19	0.48	0.39	0.39
			Health Category	**Good**	**Good**	**Good**	**Good**
			Health Score	4	4	4	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*	1977-2013	1971-2013	1971-2013	1971-2013
			Number of Stations	3	10	11	24
			Value	0.14	0.54	0.16	0.32
			Health Category	**Good**	**Good**	**Good**	**Good**
			Health Score	4	4	4	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*	1965-2013	1918-2013	1915-2013	1965-2013
			Number of Stations	1	2	1	4
			Value	0.0%	0.2%	0.5%	0.23%
			Health Category	**Very Good**	**Good**	**Good**	**Good**
			Health Score	5	4	4	4
	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	Various	Various	Various
			Number of Stations	1	2	1	4
			Value	0.0%	85.4%	81.7%	63.13%
			Health Category	**Very Good**	**Very Poor**	**Very Poor**	**Very Poor**
			Health Score	5	1	1	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	Various	Various	Various
			Number of Stations	1	2	1	4
			Value	0.0%	0.5%	0.5%	0.3%
			Health Category	**Very Good**	**Very Good**	**Very Good**	**Very Good**
			Health Score	5	5	5	5
	Hydrology Score		*Total Score*	23	18	18	18
			Maximum Available Score	25	25	25	25
			Percentage of Maximum Score	92.0%	72.0%	72.0%	72.0%
			Hydrology Health Category	**Very Good**	**Good**	**Good**	**Good**
			Hydrology Score	5	4	4	4

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HYDROLOGY DATA SUFFICIENCY

	Data Sufficiency Indicator	Sub-Watershed			Watershed
		02J - Upper Ottawa	02K - Central Ottawa	02L - Lower Ottawa	
Hydrology	Total number of sub-sub-watersheds	5	9	8	22
	Total number of dams (>10m)	17	17	30	64
	Year of earliest dam operation	1910	1925	1830	1925
	Year of earliest available continuous flow monitoring	1965	1915	1915	1915
	Number of monitoring stations available for earliest, continuous flow monitoring	1	1	1	3
	Number of sub-sub-watersheds with monitoring stations	1	1	1	3
	Number if monitoring stations on river downstream of dams	0	0	0	0
	Data Sufficiency Category	Insufficient	Insufficient	Insufficient	Partially Sufficient
	Year of long-term continuous flow monitoring	1965	1918	1915	1965
	Number of monitoring stations available for continuous flow monitoring analysis	1	2	1	4
	Number of sub-sub-watersheds with monitoring stations	1	2	1	4
	Number of monitoring stations on river downstream of dams	0	0	0	0
	Data Sufficiency Category	Insufficient	Partially Sufficient	Insufficient	Partially Sufficient
	Year of widespread, continuous flow monitoring	1977	1971	1971	1977
	Number of monitoring stations available for continuous flow monitoring analysis	3	10	11	24
	Number of sub-sub-watersheds with monitoring stations	2	5	3	10
	Number of monitoring stations on river downstream of dams	0	1	1	2
	Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient
	Overall Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient
	Data Sufficiency Score	1	1	1	1

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MAP. RESULTS OF A SERIES OF TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE OTTAWA RIVER WATERSHED (1915 TO 2011).

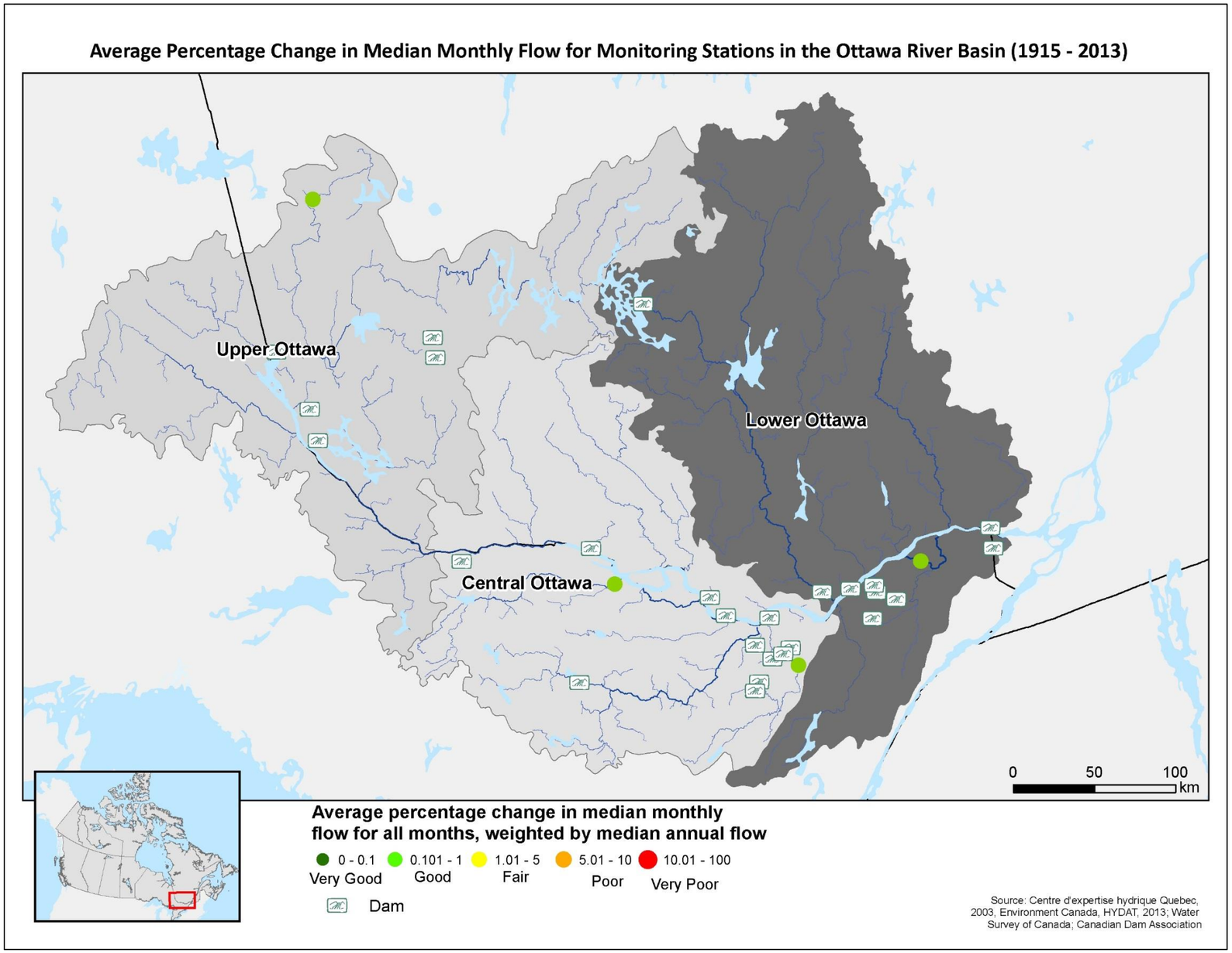

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TABLE. RESULTS OF LONG-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE OTTAWA RIVER WATERSHED.

	Ottawa River Watershed															
	02J - Upper Ottawa				**02K - Central Ottawa**								**02L - Lower Ottawa**			
	02JB013				02KB001				02KF006				02LB005			
	Start Year for Analysis		1965		Start Year for Analysis		1918		Start Year for Analysis		1918		Start Year for Analysis		1915	
	Median Annual Flow (m^3/s)		26.6		Median Annual Flow (m^3/s)		28.9		Median Annual Flow (m^3/s)		17.9		Median Annual Flow (m^3/s)		19.4	
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	-0.02	0.94	32.6		0.05	0.20	20.9		0.01	0.70	11.3		0.05	0.01 **	10.2	0.52
November	0.15	0.32	31.5		0.21	0.00 **	32.2	0.65	0.08	0.03 *	18.4	0.43	0.17	0.00 **	20.0	0.84
December	0.23	0.27	22.9		0.30	0.00 ***	35.3	0.86	0.24	0.00 ***	25.1	0.97	0.24	0.00 ***	18.7	1.26
January	0.06	0.12	18.5		0.19	0.00 ***	28.3	0.67	0.25	0.00 ***	25.2	1.00	0.09	0.00 **	12.6	0.75
February	0.00	0.91	16.4		0.12	0.00 **	24.7	0.48	0.18	0.00 ***	25.1	0.73	0.07	0.02 *	10.9	0.62
March	-0.01	0.82	17.5		0.16	0.00 ***	25.5	0.64	0.23	0.00 **	35.0	0.66	0.09	0.58	75.5	
April	0.58	0.46	52.9		0.74	0.00 **	99.1	0.75	-0.08	0.63	88.6		0.01	0.96	131.0	
May	-0.57	0.16	65.7		-0.23	0.20	109.9		-0.29	0.01 **	56.3	0.52	0.08	0.08	24.1	
June	-0.33	0.05 *	39.9	0.84	-0.34	0.00 ***	58.0	0.58	-0.06	0.15	24.1		0.07	0.00 ***	9.1	0.72
July	-0.06	0.62	28.5		-0.37	0.00 ***	37.5	0.98	-0.03	0.12	12.3		0.01	0.45	5.8	
August	-0.14	0.09	25.1		-0.16	0.00 ***	22.5	0.72	-0.02	0.08	9.7		0.01	0.54	4.0	
September	-0.36	0.00 **	25.1	1.45	-0.06	0.03 *	17.1	0.34	-0.01	0.36	9.9		0.00	0.65	4.3	
Average for all months, for each station	-0.04		31.38	0.19	0.05		42.59	0.56	0.04		28.40	0.36	0.07		27.19	0.39
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.19				0.48								0.39	

* 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 THE OTTAWA RIVER WATERSHED FOR THE PERIOD 1971 TO 2013.

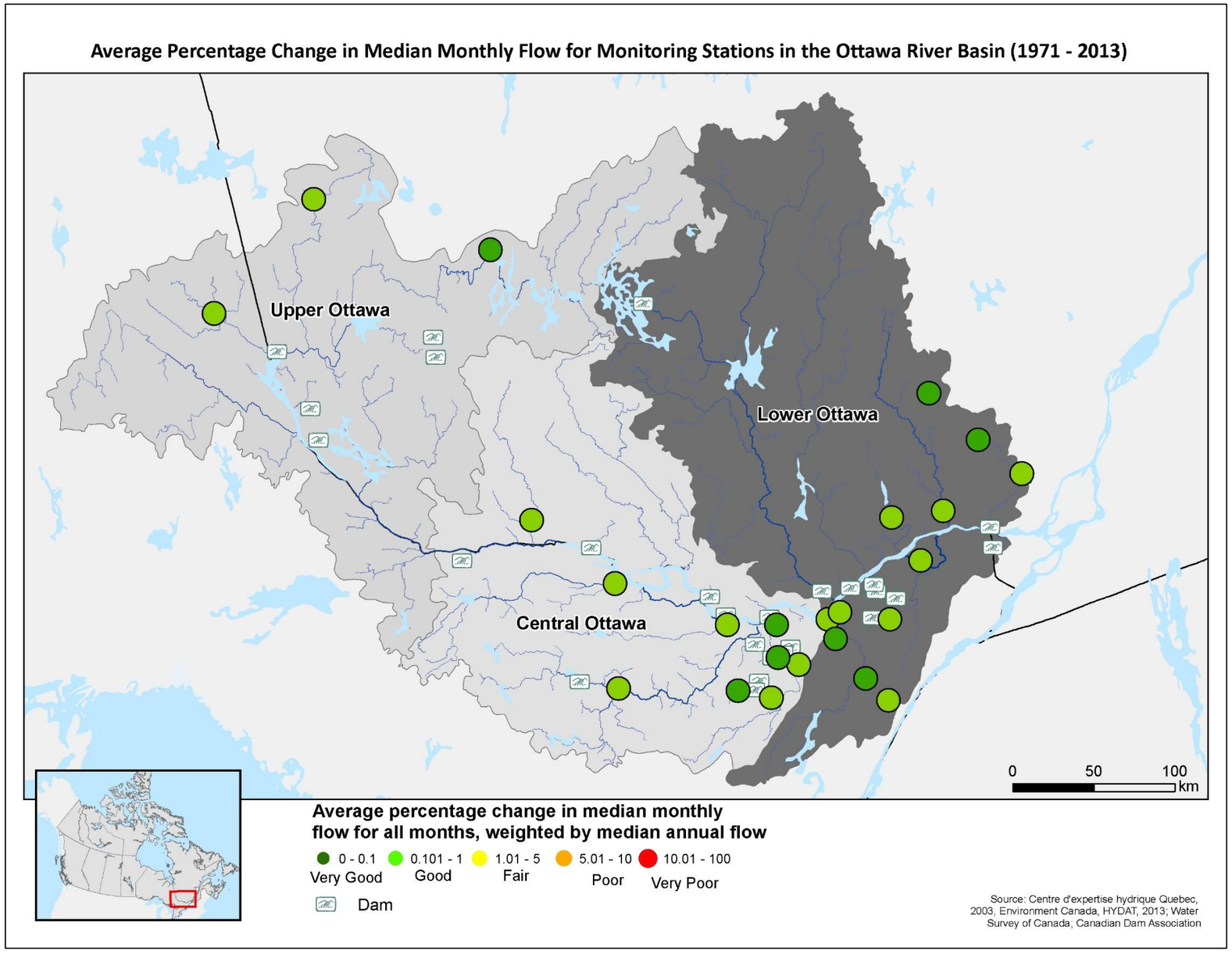

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TABLE. RESULTS OF RECENT-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE UPPER-OTTAWA RIVER SUB-WATERSHED.

	02J - Upper Ottawa											
	02JB009				02JB013				02JC008			
	Start Year for Analysis		1977		Start Year for Analysis		1977		Start Year for Analysis		1977	
	Median Annual Flow (m^3/s)		46.7		Median Annual Flow (m^3/s)		26.3		Median Annual Flow (m^3/s)		15.5	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Change in Median Monthly Flow * (%)	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Change in Median Monthly Flow * (%)	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Change in Median Monthly Flow * (%)
October	-0.14	0.75	92.38		-0.02	0.94	31.64		-0.01	0.97	19.01	
November	0.10	0.94	105.83		0.15	0.32	30.81		0.17	0.14	22.83	
December	0.94	0.67	121.51		0.23	0.01 **	24.51	0.92	0.17	0.03 *	17.12	0.97
January	0.71	0.59	130.59		0.06	0.12	19.98		0.10	0.00 **	10.76	0.97
February	1.01	0.53	115.75		0.00	0.91	17.72		0.06	0.00 **	8.67	0.67
March	0.98	0.45	51.24		-0.01	0.82	18.79		0.05	0.07	11.17	
April	-0.09	0.97	39.78		0.58	0.46	48.82		0.70	0.12	47.27	
May	-0.54	0.58	57.61		-0.57	0.16	58.41		-0.23	0.33	55.10	
June	0.70	0.54	80.73		-0.33	0.05 *	36.57	0.91	-0.24	0.05 *	23.17	1.03
July	-0.30	0.78	81.75		-0.06	0.62	28.01		-0.09	0.32	14.41	
August	0.90	0.20	80.04		-0.14	0.09	25.33		-0.01	0.83	11.17	
September	-0.12	0.85	90.30		-0.36	0.00 **	23.93	1.52	-0.02	0.66	11.32	
Average for all months, for each station	0.58		87.29	0.00	0.23		30.38	0.28	0.17		21.00	0.30
Average percentage change in median monthly flow for all months, weighted by median annual flow	0.14											

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TABLE. RESULTS OF RECENT-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE CENTRAL-OTTAWA RIVER SUB-WATERSHED.

	Central Ottawa																			
	02KB001				02KC009				02KD004				02KF005				02KF006			
	Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971	
	Median Annual Flow (m^3/s)		27.3		Median Annual Flow (m^3/s)		10.7		Median Annual Flow (m^3/s)		49.5		Median Annual Flow (m^3/s)		372.7		Median Annual Flow (m^3/s)		17.4	
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*
October	0.05	0.20	21.52		-0.01	0.44	7.18		0.06	0.59	33.19		-2.92	0.34	384.29		0.01	0.70	11.91	
November	0.21	0.00 **	36.34	0.58	0.02	0.14	11.15		0.39	0.00 **	55.10	0.71	3.65	0.40	552.02		0.08	0.03 *	18.68	0.42
December	0.30	0.00 ***	38.56	0.78	0.09	0.00 ***	13.71	0.66	0.74	0.00 ***	74.70	0.99	7.72	0.02 *	660.08	1.17	0.24	0.00 ***	28.92	0.84
January	0.19	0.00 ***	29.19	0.65	0.10	0.00 ***	13.25	0.78	1.31	0.00 ***	99.34	1.32	10.59	0.00 ***	650.35	1.63	0.25	0.00 ***	28.52	0.88
February	0.12	0.00 **	25.03	0.47	0.10	0.00 ***	13.54	0.70	0.88	0.00 ***	86.08	1.02	10.24	0.00 ***	646.91	1.58	0.18	0.00 ***	27.51	0.67
March	0.16	0.00 ***	28.54	0.58	0.12	0.00 ***	19.94	0.60	0.37	0.01 *	70.53	0.53	8.10	0.00 **	643.23	1.26	0.23	0.00 **	39.68	0.58
April	0.74	0.00 **	101.78	0.73	0.13	0.20	51.46		0.23	0.49	121.83		12.38	0.06	926.39		-0.08	0.63	79.62	
May	-0.23	0.20	100.33		0.00	0.98	39.71		-0.52	0.09	100.24		-12.16	0.19	822.15		-0.29	0.01 **	46.79	0.62
June	-0.34	0.00 ***	44.91	0.75	-0.06	0.09	14.13		-0.15	0.31	50.74		-2.22	0.64	554.56		-0.06	0.15	17.48	
July	-0.37	0.00 ***	26.28	1.40	-0.01	0.62	7.82		-0.09	0.18	26.63		-1.59	0.62	443.07		-0.03	0.12	10.51	
August	-0.16	0.00 ***	16.80	0.97	-0.01	0.36	6.76		-0.04	0.46	20.48		-3.91	0.07	343.05		-0.02	0.08	9.09	
September	-0.06	0.03 *	15.04	0.39	-0.02	0.02 *	6.27	0.37	-0.13	0.03 *	23.21	0.57	-4.31	0.00 **	301.32	1.43	-0.01	0.36	10.05	
Average for all months, for each station	0.24		40.36	0.61	0.06		17.08	0.26	0.41		63.50	0.43	6.65		577.29	0.59	0.12		27.40	0.34

* 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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	02K - Central Ottawa																			
	02KF010				02KF011				02KF012				02KF013				02KJ004			
	Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971	
	Median Annual Flow (m^3/s)		4.9		Median Annual Flow (m^3/s)		1.8		Median Annual Flow (m^3/s)		3.6		Median Annual Flow (m^3/s)		1.9		Median Annual Flow (m^3/s)		28.8	
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*
October	0.01	0.49	2.75		0.01	0.23	1.56		-0.01	0.28	2.59		0.00	0.86	0.85		-0.48	0.14	28.86	
November	0.03	0.37	4.67		0.01	0.59	2.25		0.01	0.70	3.19		0.02	0.33	1.79		-0.29	0.52	34.21	
December	0.07	0.16	6.46		0.02	0.12	2.20		0.01	0.58	3.57		0.03	0.24	2.67		0.07	0.88	33.63	
January	0.09	0.04 *	5.94	1.47	0.01	0.30	1.68		0.02	0.28	3.46		0.03	0.09	2.65		0.11	0.39	29.65	
February	0.06	0.13	5.17		0.01	0.43	1.33		0.01	0.45	3.11		0.01	0.27	2.31		0.06	0.47	26.64	
March	0.05	0.59	8.63		0.02	0.51	3.59		0.00	0.93	4.80		0.01	0.60	3.72		-0.04	0.63	26.49	
April	-0.01	0.88	21.19		-0.01	0.84	8.32		0.00	0.99	8.14		-0.03	0.59	9.13		0.79	0.21	38.38	
May	-0.08	0.23	10.77		0.00	1.00	2.87		-0.01	0.54	4.85		-0.03	0.30	4.76		-1.23	0.01 *	53.97	2.28
June	0.05	0.09	5.05		0.01	0.51	1.70		0.01	0.63	3.13		0.01	0.48	2.26		-0.58	0.06	39.38	
July	0.02	0.14	3.08		0.01	0.04 *	1.30	0.57	0.00	0.50	2.55		0.01	0.35	1.24		-0.39	0.05	31.63	
August	0.00	0.73	2.18		0.00	0.15	0.94		0.00	0.53	2.36		0.00	0.90	0.87		-0.56	0.00 ***	27.67	2.02
September	0.00	0.89	2.01		0.00	0.11	1.04		0.00	0.46	2.42		0.00	0.60	0.71		-0.42	0.00 **	26.58	1.58
Average for all months, for each station	0.04		6.49	0.12	0.01		2.40	0.05	0.01		3.68	0.00	0.02		2.75	0.00	0.42		33.09	0.49

* 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.

Average percentage change in median monthly flow for all months, weighted by median annual flow	0.54

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TABLE. RESULTS OF RECENT-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE LOWER-OTTAWA RIVER SUB-WATERSHED.

	Lower Ottawa																			
	02LA004				02LA006				02LA007				02LB005				02LB006			
	Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971	
	Median Annual Flow (m^3/s)		18.9		Median Annual Flow (m^3/s)		2.7		Median Annual Flow (m^3/s)		3.1		Median Annual Flow (m^3/s)		11.5		Median Annual Flow (m^3/s)		2.1	
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*
October	0.18	0.00 ***	19.47	0.92	0.01	0.39	2.21		0.00	0.97	2.67		0.05	0.01 **	13.08	0.41	0.01	0.17	1.95	
November	0.27	0.00 **	29.85	0.91	0.01	0.67	4.00		-0.01	0.75	4.51		0.17	0.00 **	24.28	0.69	0.01	0.45	3.18	
December	0.47	0.00 **	35.71	1.32	0.04	0.36	4.78		0.05	0.26	4.76		0.24	0.00 ***	24.09	0.98	0.03	0.38	3.49	
January	0.31	0.01 *	29.21	1.06	0.04	0.20	3.53		0.04	0.11	3.46		0.09	0.00 **	14.14	0.67	0.03	0.09	2.25	
February	0.13	0.25	26.83		0.01	0.65	3.54		0.02	0.25	2.98		0.07	0.02 *	12.53	0.54	0.01	0.44	2.29	
March	0.43	0.10	55.83		0.06	0.43	8.14		0.13	0.19	7.80		0.09	0.58	54.58		0.03	0.39	6.48	
April	-0.28	0.55	105.98		-0.16	0.18	14.66		-0.20	0.20	18.86		0.01	0.96	114.90		-0.03	0.56	12.27	
May	0.08	0.46	33.70		-0.01	0.88	4.69		-0.03	0.66	5.62		0.08	0.08	24.68		0.02	0.08	3.50	
June	0.08	0.01 **	15.39	0.51	0.02	0.09	2.24		0.02	0.11	2.76		0.07	0.00 ***	10.30	0.64	0.02	0.00 **	1.76	1.20
July	0.04	0.06	9.87		0.01	0.06	1.58		0.01	0.05 *	1.90	0.42	0.01	0.45	6.04		0.01	0.00 **	1.20	0.86
August	0.01	0.60	8.80		0.00	0.11	1.40		0.00	0.22	1.42		0.01	0.54	4.53		0.01	0.01 *	1.12	0.53
September	0.01	0.34	12.28		0.00	0.18	1.35		0.00	0.39	1.61		0.00	0.65	4.66		0.00	0.22	1.15	
Average for all months, for each station	0.19		31.91	0.39	0.03		4.34	0.00	0.04		4.86	0.04	0.07		25.65	0.33	0.02		3.39	0.22

* 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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	Lower Ottawa																							
	02LB007				02LC008				02LC021				02LC029				02LC043				02LD005			
	Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971		Start Year for Analysis		1971	
	Median Annual Flow (m^3/s)		3.4		Median Annual Flow (m^3/s)		11.0		Median Annual Flow (m^3/s)		16.4		Median Annual Flow (m^3/s)		50.0		Median Annual Flow (m^3/s)		10.8		Median Annual Flow (m^3/s)		21.7	
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*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.00	0.00 **	2.51	0.20	0.06	0.06	12.64		-0.01	0.75	14.70		0.21	0.71	58.52		0.01	0.42	10.92		0.05	0.63	16.61	
November	0.02	0.01 **	3.75	0.61	0.10	0.07	16.10		0.03	0.41	15.99		0.65	0.16	71.90		0.01	0.26	9.10		0.29	0.10	22.29	
December	0.02	0.02 *	4.12	0.60	0.09	0.00 ***	12.93	0.69	0.00	0.83	14.10		0.53	0.17	57.00		0.00	0.93	9.05		0.35	0.08	23.30	
January	0.01	0.16	3.37		0.01	0.35	9.94		0.01	0.49	11.58		0.32	0.15	44.39		0.00	0.38	6.92		0.17	0.03 *	20.49	0.84
February	0.01	0.16	3.28		0.02	0.34	10.00		0.00	0.93	11.23		0.11	0.58	38.50		0.00	0.86	8.02		0.07	0.27	17.98	
March	0.01	0.70	6.43		0.08	0.00 **	12.85	0.60	0.02	0.37	13.80		0.15	0.54	49.57		0.00	0.96	8.37		0.04	0.54	20.62	
April	-0.03	0.38	9.06		0.12	0.43	38.95		0.22	0.04 *	22.04	1.00	2.05	0.09	151.24		0.02	0.32	12.52		0.39	0.30	42.51	
May	-0.01	0.46	4.17		-0.05	0.36	26.68		-0.11	0.24	18.98		-1.78	0.03 *	137.81	1.29	-0.02	0.18	11.53		-0.72	0.01 *	44.84	1.62
June	0.00	0.53	2.70		0.02	0.53	12.59		-0.01	0.76	14.62		-0.52	0.22	70.77		0.00	0.50	9.57		-0.22	0.16	25.75	
July	0.00	0.98	2.06		0.00	0.96	9.64		-0.01	0.57	13.03		-0.06	0.91	51.60		0.00	0.44	9.74		0.02	0.89	19.63	
August	0.00	0.75	2.04		-0.02	0.24	8.01		-0.01	0.28	12.16		-0.48	0.07	40.69		0.00	0.37	8.63		0.02	0.72	15.75	
September	0.00	0.17	1.78		-0.03	0.15	8.16		-0.02	0.18	12.40		-0.35	0.17	38.87		0.00	0.17	8.58		0.01	0.82	14.57	
Average for all months, for each station	0.01		3.77	0.12	0.05		14.87	0.11	0.04		14.55	0.08	0.60		67.57	0.11	0.01		9.41	0.00	0.20		23.70	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.

Average percentage change in median monthly flow for all months, weighted by median annual flow	0.16

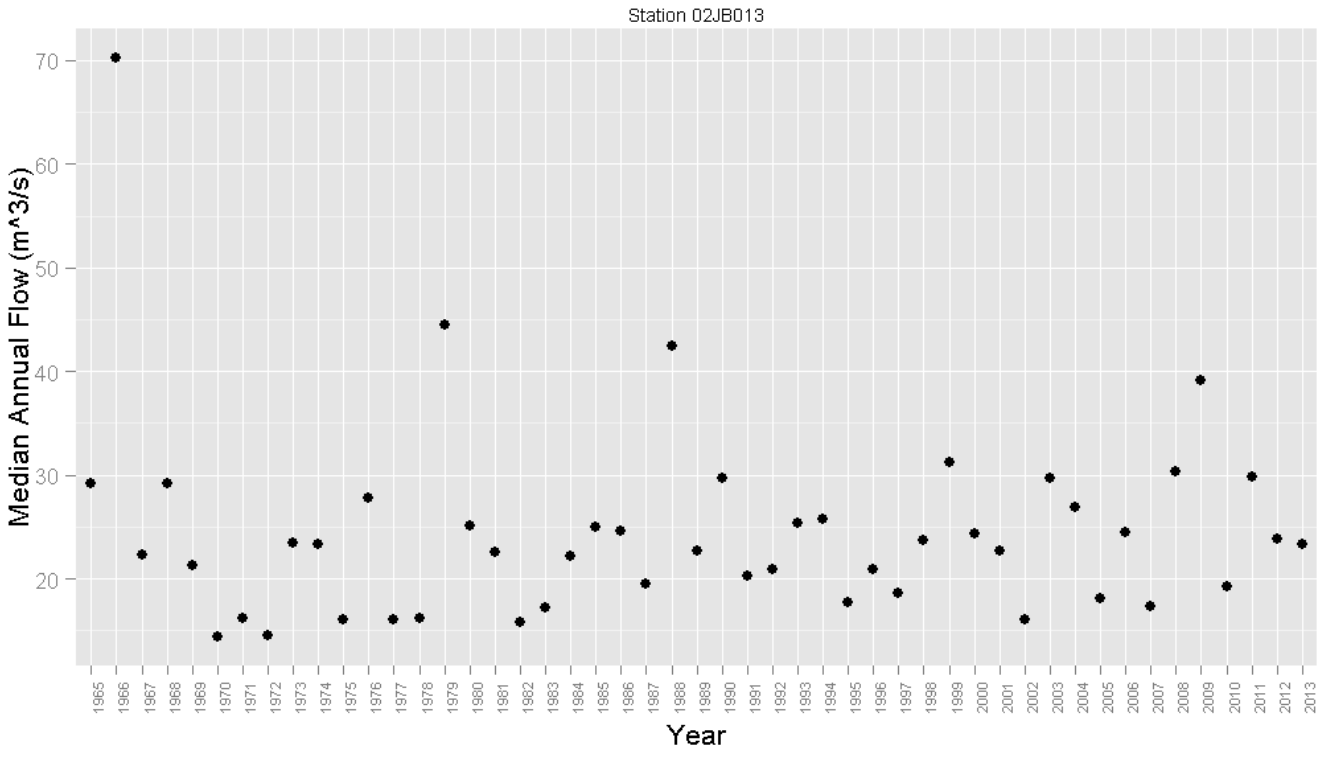
TABLE. RESULTS OF LINEAR REGRESSION ANALYSES OF MEDIAN ANNUAL FLOW IN THE OTTAWA RIVER WATERSHED, FOR THE PERIOD 1915 - 2011.

Sub-Watershed	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
Upper Ottawa	02JB013	1965	388.16505	222.12034	1.74754393	0.08803	-0.1830784	0.1118409	-1.6369539	0.1092942	0.0384531	2.679618	0.1092942
Central Ottawa	02KB001	1918	-112.3431	82.652224	-1.3592266	1.77E-01	0.0734183	0.0420689	1.7451931	8.43E-02	0.0215233	3.045699	8.43E-02
	02KF006	1918	-147.185	60.190941	-2.44530151	1.64E-02	0.0853194	0.0306364	2.7849021	6.50E-03 **	0.0677223	7.7556799	6.50E-03 **
Lower Ottawa	02LB005	1915	294.00067	370.82473	0.79282918	0.429853	-0.1389661	0.1888879	-0.7357064	0.463722	-0.0048014	0.5412639	0.463722

TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF MEDIAN ANNUAL FLOW IN THE OTTAWA RIVER WATERSHED, FOR THE PERIOD 1915 – 2011.

Sub-Watershed	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
Upper Ottawa	02JB013	1965	-0.0172222	-27	0.78552149	26.64		
Central Ottawa	02KB001	1918	0.1	804	8.71E-03 **	28.88	0.35	0.21
	02KF006	1918	0.0951613	861	4.97E-03 **	17.89	0.53	
Lower Ottawa	02LB005	1915	0.0927739	1265	8.1524E-05 ***	19.40	0.48	0.48

FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE OTTAWA RIVER WATERSHED, BY STATION.



Intercept = 99.57 ; Intercept STE = 190.42 ; Intercept T-Statistic 0.5229 ; Intercept p-value = 0.6035
Slope = -0.037739 ; Slope STE = 0.095733 ; Slope T-Statistic -0.39421 ; Slope p-value = 0.69521
F-Statistic: 0.1554 ; p-value: 0.6952
Theil-Sen Slope = 0.05819 ; Mann-Kendal Score = 127 ; Mann-Kendall p-value = 0.27742

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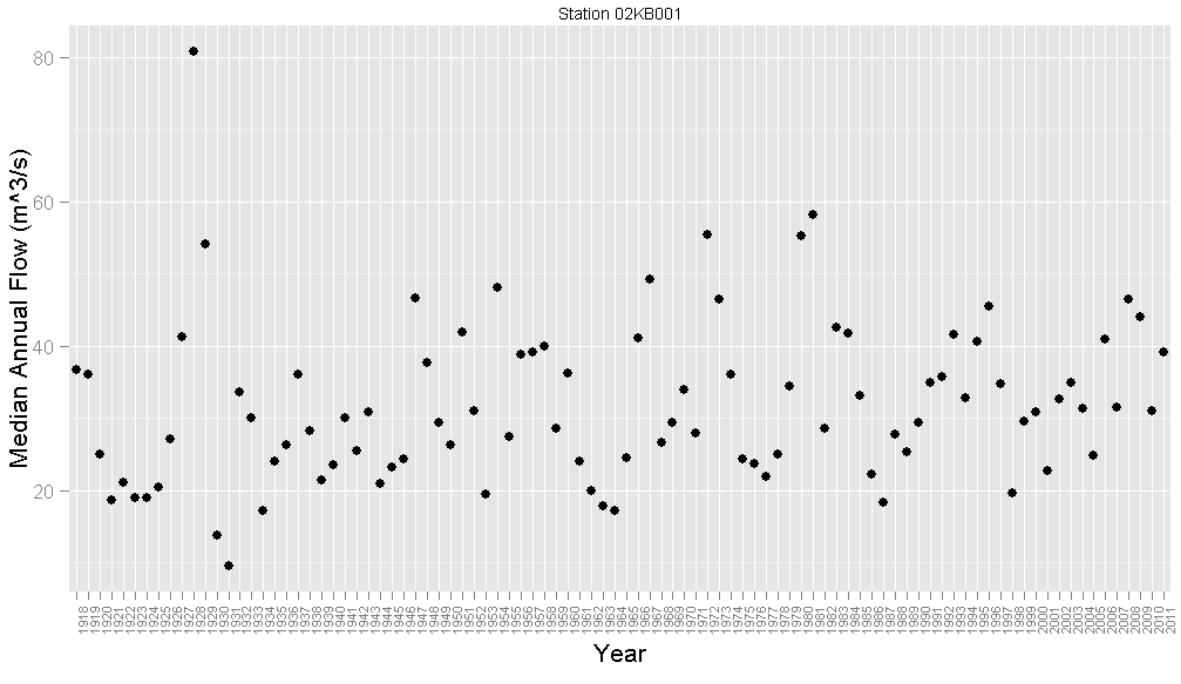
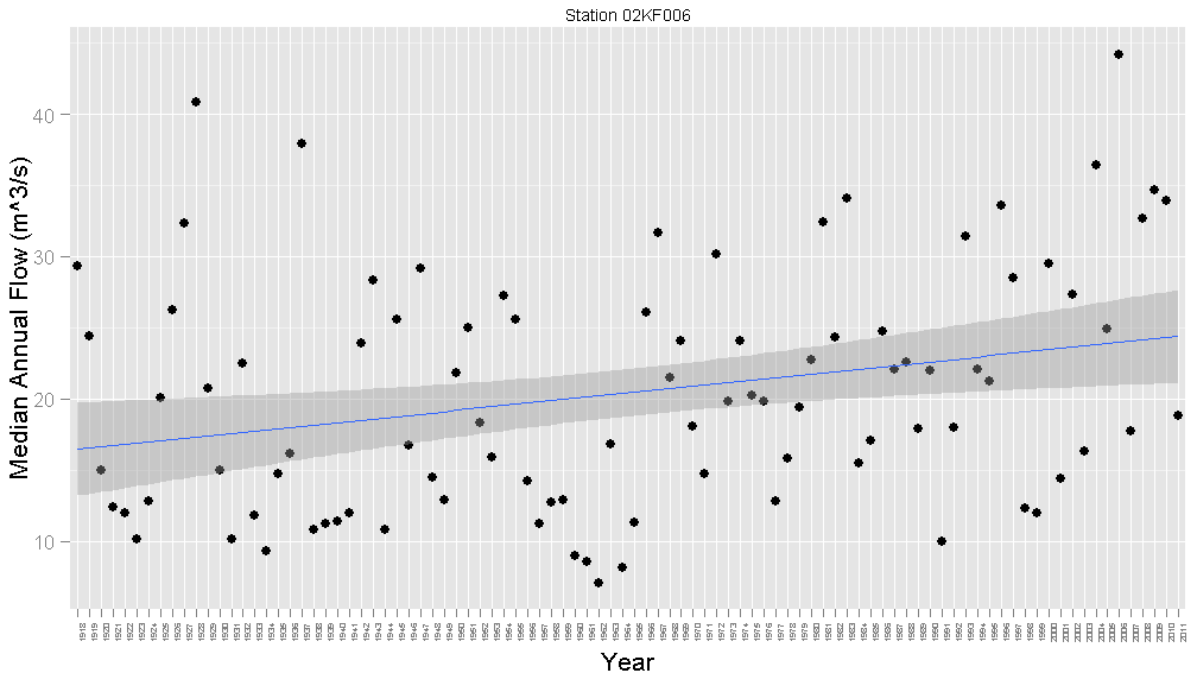
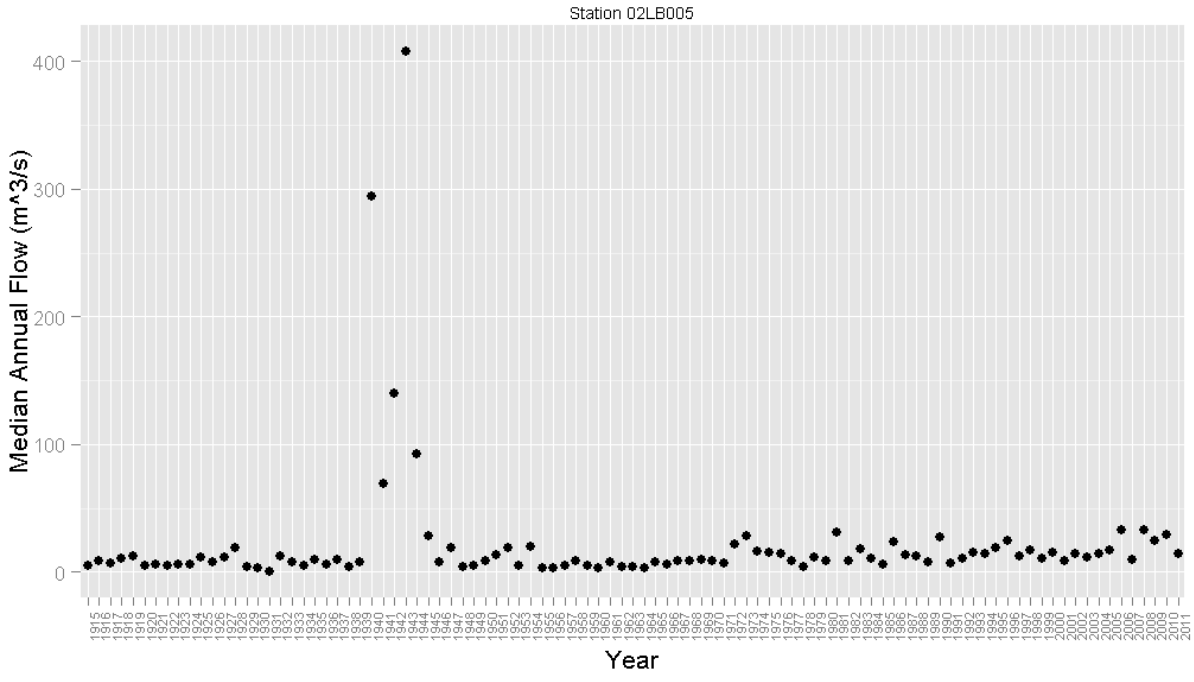


Intercept = -112.34 ; Intercept STE = 82.652 ; Intercept T-Statistic -1.3592 ; Intercept p-value = 0.1774
Slope = 0.073418 ; Slope STE = 0.042069 ; Slope T-Statistic 1.7452 ; Slope p-value = 0.08429
F-Statistic: 3.0457 ; p-value: 0.08429
Theil-Sen Slope = 0.1 ; Mann-Kendal Score = 804 ; Mann-Kendall p-value = 0.0087148



Intercept = -147.19 ; Intercept STE = 60.191 ; Intercept T-Statistic -2.4453 ; Intercept p-value = 0.016377
Slope = 0.085319 ; Slope STE = 0.030636 ; Slope T-Statistic 2.7849 ; Slope p-value = 0.0065008
F-Statistic: 7.7557 ; p-value: 0.006501
Theil-Sen Slope = 0.09516 ; Mann-Kendal Score = 861 ; Mann-Kendall p-value = 0.0049663



Intercept = 294 ; Intercept STE = 370.82 ; Intercept T-Statistic 0.79283 ; Intercept p-value = 0.42985
Slope = -0.13897 ; Slope STE = 0.18889 ; Slope T-Statistic -0.73571 ; Slope p-value = 0.46372
F-Statistic: 0.54126 ; p-value: 0.4637
Theil-Sen Slope = 0.09277 ; Mann-Kendal Score = 1265 ; Mann-Kendall p-value = 8.1524e-05

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TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE IN MONTHLY FLOW POST-DAM OPERATION VS. PRE-DAM MONTHLY FLOW IN THE OTTAWA RIVER WATERSHED.

				Pre-Dam			Post-Dam			Fligner-Killeen		Mann-Whitney			
Sub-Watershed	**Station**	**Dam**	**Month**	**Number of Years of Sampling**	**Median Monthly Flow (m3/s)**	**Median Absolute Deviation in Monthly Flow (m3/s)**	**Number of Years of Sampling**	**Median Monthly Flow (m3/s)**	**Median Absolute Deviation in Monthly Flow (m3/s)**	**Test Statistic**	**p-value**	**Test Statistic**	**p-value**	**Magnitude of Change in Monthly Flow (%)**	**Average Change Across Months (%)***
Central Ottawa	**02KD004**	**Bark Lake**	January	12	35.4	22.68378	69	96.7	38.99238	61.447257	4.55E-15 ***	89493.5	3.60E-126 ***	173.2%	0.6
			February	12	35.1	18.5325	69	88.4	29.05896	54.02154	1.98E-13 ***	70195.5	8.20E-119 ***	151.9%	
			March	12	39.65	15.93795	69	70.1	34.54458	85.012902	2.96E-20 ***	145961.5	7.80E-85 ***	76.8%	
			April	12	127	108.52632	69	121	71.53545	9.8097385	1.74E-03 **	357333.5	2.14E-01	4.7%	
			May	12	152	70.4235	69	98.2	66.42048	0.0088143	9.25E-01	543131.5	2.15E-29 ***	35.4%	
			June	12	71.95	32.98785	69	55.2	35.5824	2.7410193	9.78E-02	469633	2.85E-15 ***	23.3%	
			July	12	32.6	11.56428	69	28.6	15.34491	16.24915	5.55E-05 ***	476805	5.54E-10 ***	12.3%	
			August	12	21.1	3.92889	69	22.1	10.67472	135.91829	2.08E-31 ***	401653.5	5.77E-01	4.7%	
			September	12	20.7	4.89258	69	26.8	16.60512	244.55701	3.99E-55 ***	298715	1.82E-09 ***	29.5%	
			October	12	22.25	6.74583	69	36.4	23.27682	211.15293	7.70E-48 ***	240772	4.42E-34 ***	63.6%	
			November	12	28.6	12.30558	69	53.2	29.05896	117.7142	2.00E-27 ***	166582	4.22E-63 ***	86.0%	
			December	12	37.9	20.60814	69	69.7	35.28588	113.76722	1.47E-26 ***	129544	5.38E-96 ***	83.9%	
Lower Ottawa	**02LA004**	**Long Island Control Dam**	May	45	29.7	25.64898	33	31.1	24.01812	0.1752377	6.75E-01	665363.5	4.50E-03 **	4.7%	0.4
			June	45	10.9	5.63388	33	17.5	13.032054	146.71919	9.04E-34 ***	496163	1.60E-26 ***	60.6%	
			July	45	8.55	3.03933	33	10	5.426316	95.873015	1.22E-22 ***	625591	2.15E-07 ***	17.0%	
			August	45	8.27	1.971858	33	8.09	3.602718	156.52202	6.51E-36 ***	718500	7.70E-01	2.2%	
			September	45	8.55	2.29803	33	9.305	5.248404	333.904	1.36E-74 ***	610322	3.33E-04 ***	8.8%	
			October	45	10.3	4.773972	33	20	13.3434	288.13605	1.27E-64 ***	386335	6.11E-83 ***	94.2%	
			November	45	19.85	15.04839	33	34.5	28.76244	109.48388	1.27E-25 ***	448153	2.62E-42 ***	73.8%	
			April	32	107	95.6277	33	116	85.69428	20.027652	7.63E-06 ***	488498.5	2.85E-01	8.4%	
			December	31	24.9	21.64596	33	42	34.54458	138.18494	6.64E-32 ***	327186.5	5.19E-38 ***	68.7%	
			January	30	14.6	11.801496	33	31.5	23.42508	78.414492	8.35E-19 ***	293701.5	2.03E-48 ***	115.8%	
			February	30	19	14.855652	33	27.15	15.19665	3.1183845	7.74E-02	297869	3.59E-19 ***	42.9%	
			March	30	43.6	36.17544	33	61.9	45.07104	1.2782679	2.58E-01	401232.5	2.20E-09 ***	42.0%	

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F **IGURE**. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR THE PERIOD POST-OPERATION OF THE BARK LAKE DAM (1942 - 2011) VS. PRE-DAM (>= 1930 - 1942) IN THE CENTRAL OTTAWA RIVER SUB-WATERSHED, FOR STATION 02KD004 (MADAWASKA RIVER AT PALMER RAPIDS).

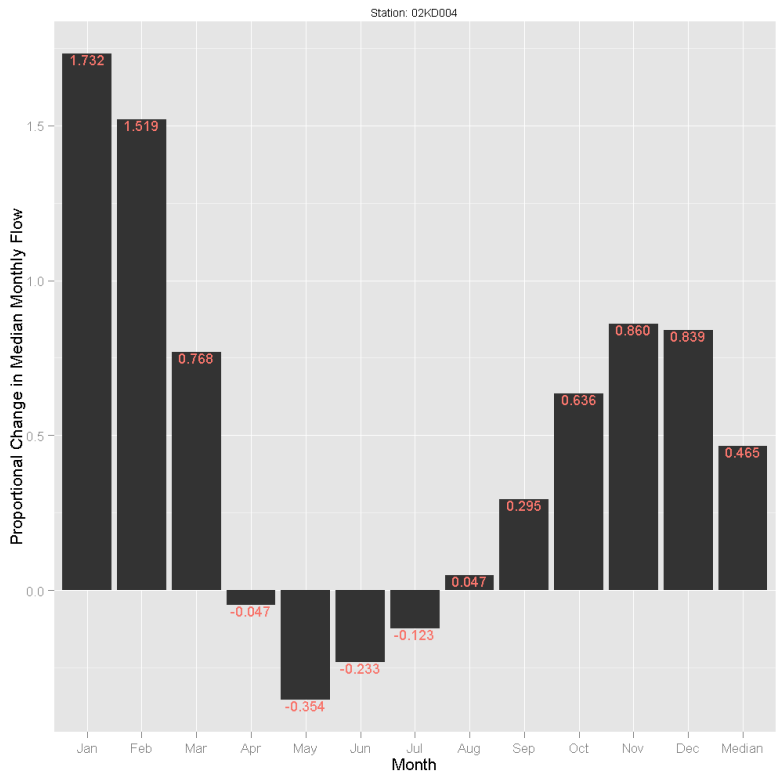
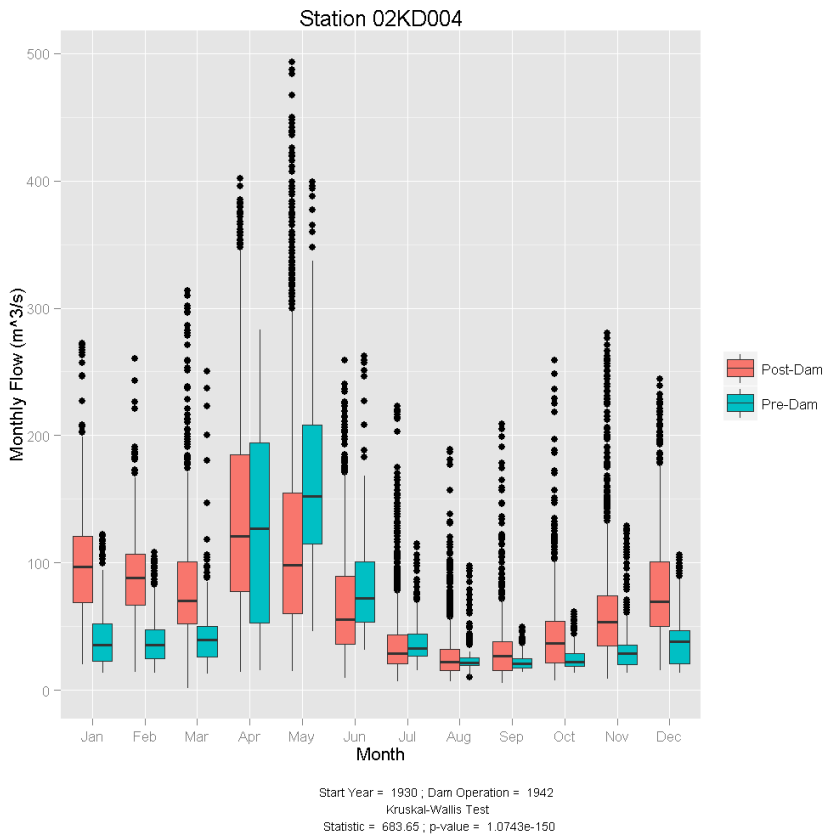


FIGURE. MONTHLY FLOW FOR THE PERIOD POST-OPERATION OF THE BARK LAKE DAM (1942 - 2011) VS. PRE-DAM (>= 1930 - 1942) IN THE CENTRAL OTTAWA RIVER SUB-WATERSHED, FOR STATION 02KD004 (MADAWASKA RIVER AT PALMER RAPIDS).



Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of June 2015.

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR THE PERIOD POST-OPERATION OF THE LONG ISLAND CONTROL DAM (1978 - 2011) VS. PRE-DAM (>= 1933 - 1978) IN THE LOWER OTTAWA RIVER SUB-WATERSHED, FOR STATION 02LA004 (RIDEAU RIVER AT OTTAWA).

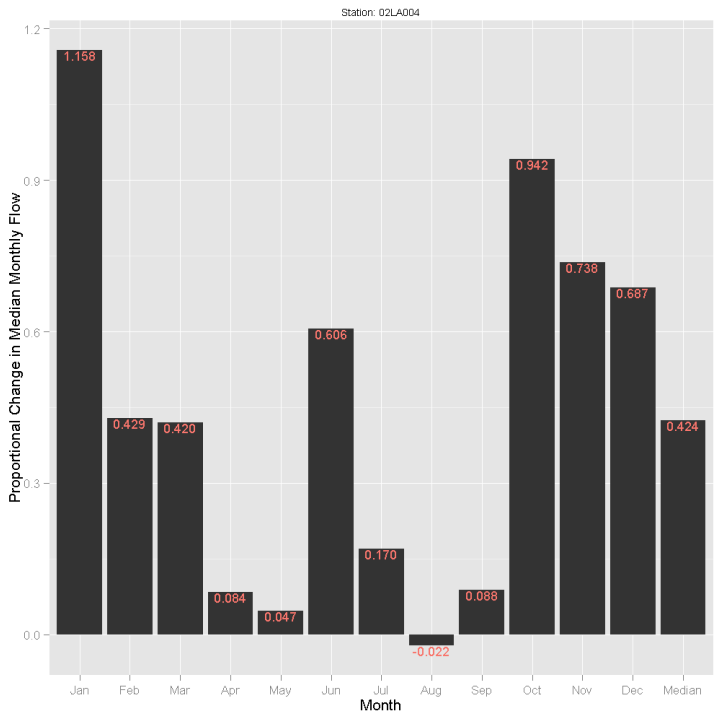


FIGURE. MONTHLY FLOW FOR THE PERIOD POST-OPERATION OF THE LONG ISLAND CONTROL DAM (1978 - 2011) VS. PRE-DAM (>= 1933 - 1978) IN THE LOWER OTTAWA RIVER SUB-WATERSHED, FOR STATION 02LA004 (RIDEAU RIVER AT OTTAWA).

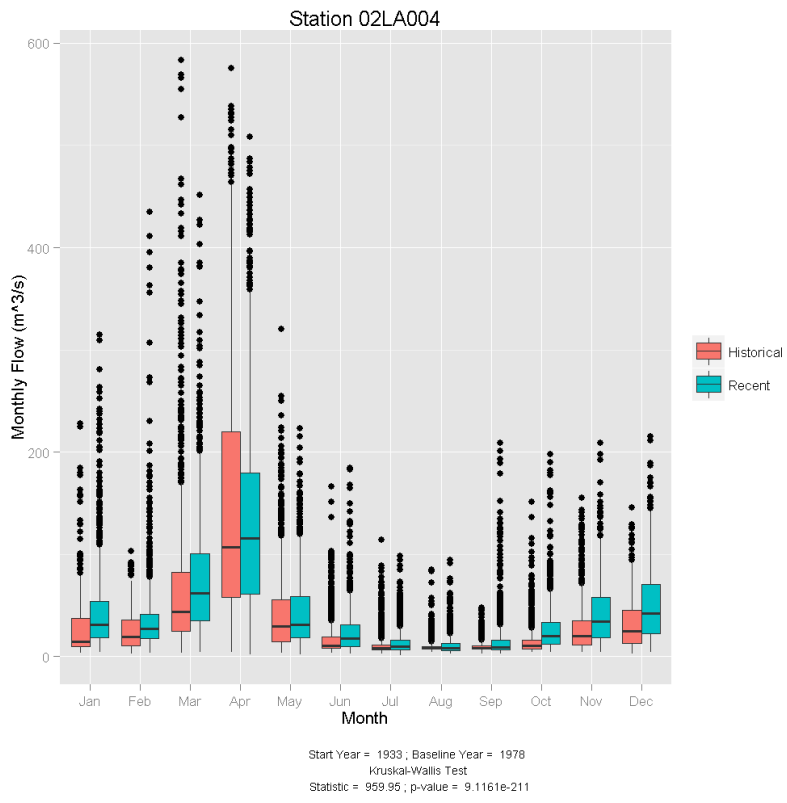


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TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR RECENT (1988 - 2011) VS. HISTORICAL (>=1965 - 1980) MONTHLY FLOW IN THE UPPER OTTAWA RIVER SUB-WATERSHED.

			Historical			Recent			Fligner-Killeen		Mann-Whitney			
Sub-Watershed	**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**	**Magnitude of Change in Monthly Flow (%)**	**Average Change Across Months (%)***
Upper Ottawa	**02JB013**	October	23	21	14.38122	26	24.35	17.27229	1.280472	0.2578113	35293.5	3.15E-01	16.0%	0.0
		May	22	21.85	14.15883	26	25	18.347175	1.9552	1.62E-01	35203.5	3.22E-01	14.4%	
		June	22	21.5	14.67774	26	25.305	18.984693	3.0263733	8.19E-02	35010.5	2.74E-01	17.7%	
		January	22	21.5	13.78818	26	23.5	16.75338	2.7882361	9.50E-02	34401.5	1.59E-01	9.3%	
		February	22	21.3	13.78818	26	24.15	17.7912	2.9826533	8.42E-02	34441.5	1.65E-01	13.4%	
		March	22	21.3	14.0847	26	23.95	17.42055	2.4224803	1.20E-01	34667	2.06E-01	12.4%	
		April	22	21.6	14.52948	26	24	17.34642	1.5474958	2.14E-01	34978	2.73E-01	11.1%	
		July	22	21.5	15.12252	26	24.99	18.473196	2.8903664	8.91E-02	34654.5	2.27E-01	16.2%	
		August	22	21.1	14.60361	26	24.83	17.776374	2.2646569	0.1323555	34586	2.19E-01	17.7%	
		September	22	21.4	14.826	26	24.21	16.90164	0.8968098	0.3436386	35054.5	2.92E-01	13.1%	
		November	22	20.8	14.23296	26	24.265	17.19816	1.7937104	0.1804747	34983	0.303184443	16.7%	
		December	22	20.5	14.23296	26	23.69	16.738554	1.1656079	0.2803055	34881.5	3.15E-01	15.6%	

* 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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FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1988 - 2011) VS. HISTORICAL (>=1965 - 1988) TIME PERIODS IN THE UPPER OTTAWA RIVER SUB-WATERSHED.

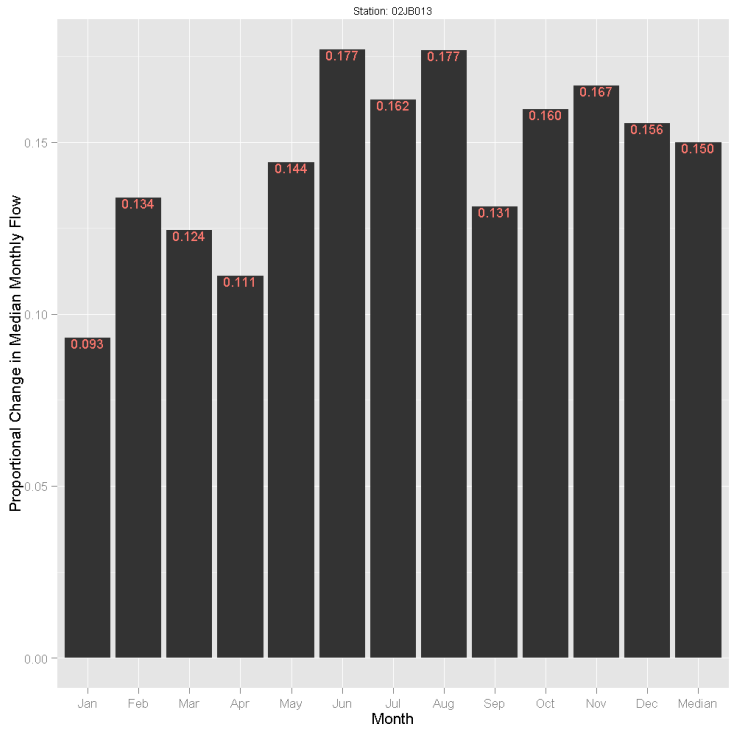

FIGURE. MONTHLY FLOW FOR RECENT (1988 - 2011) VS. HISTORICAL (>=1965 - 1988) TIME PERIODS IN THE UPPER OTTAWA RIVER SUB-WATERSHED.

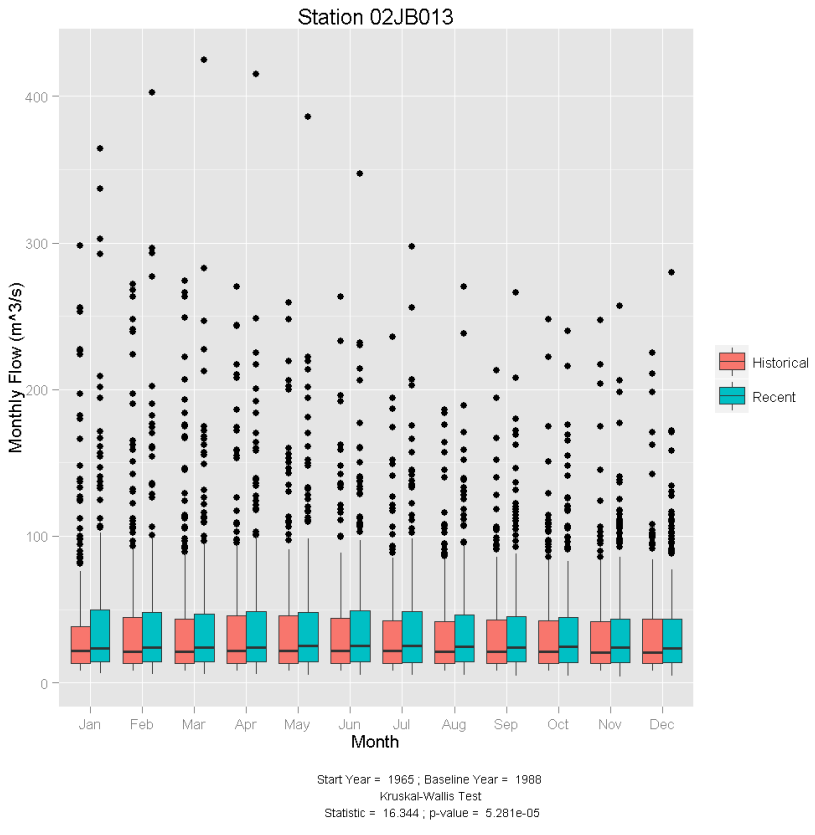

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TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR RECENT (1981 - 2011) VS. HISTORICAL (>=1951 - 1980) MONTHLY FLOW IN THE CENTRAL OTTAWA RIVER SUB-WATERSHED.

			Historical			Recent			Fligner-Killeen			Mann-Whitney					
Sub-Watershed	**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**		**Magnitude of Change in Monthly Flow (%)**	**Average Change Across Months (%)***	**Average Change Per Sub-Watershed****
Upper Ottawa	02KB001	December	66	26.9	17.64294	31	44.2	20.90466	19.587867	9.608E-06	***	605122.5	1.75E-63	***	64.3%	0.4	0.460213
		January	65	25.4	11.8608	31	34.2	14.23296	36.103023	1.87E-09	***	610836	9.05787E-60	***	34.6%		
		February	65	22.6	9.78516	31	28.7	8.59908	0.2475631	0.6187962		536821	1.57053E-44	***	27.0%		
		March	65	23.1	10.22994	31	32.4	16.75338	185.9824	2.40E-42	***	585353	2.51E-68	***	40.3%		
		April	65	86.9	76.79868	31	129	72.86979	0.5463522	0.459812		646465.5	1.03342E-35	***	48.4%		
		May	65	112	53.3736	31	98.6	41.80932	13.675893	2.17E-04	***	1128633.5	2.48929E-13	***	12.0%		
		June	65	63.4	27.72462	31	52.75	23.64747	18.696276	1.533E-05	***	1137259	2.26E-28	***	16.8%		
		July	65	43.9	23.12856	31	27.1	13.63992	178.12712	1.24E-40	***	1389360	2.76E-82	***	38.3%		
		August	65	22.9	12.6021	31	14.6	9.251424	68.476501	1.284E-16	***	1348916	1.39E-67	***	36.2%		
		September	65	16.15	7.78365	31	12.4	6.81996	4.7327892	0.0295929	*	1168966	3.21473E-36	***	23.2%		
		October	65	16.7	10.22994	31	19.3	12.00906	12.797034	3.47E-04	***	922890.5	3.87E-02	*	15.6%		
		November	65	21.8	15.5673	31	37.4	23.27682	58.672439	1.86E-14	***	627722	8.76E-41	***	71.6%		
	02KC009	November	60	7.79	3.024504	31	8.165	4.67019	71.083026	3.43E-17	***	818906	3.54E-01		4.8%	0.2	
		December	59	8.5	4.29954	31	12.9	6.879264	44.038095	3.22E-11	***	567151	8.80E-48	***	51.8%		
		January	55	9.34	4.610886	31	14	6.271398	32.974444	9.34E-09	***	489956	9.96E-67	***	49.9%		
		February	55	9.91	5.085318	31	14.8	5.48562	2.0442561	1.53E-01		355986.5	7.48E-85	***	49.3%		
		March	55	14.7	8.776992	31	23	13.49166	27.092016	1.94E-07	***	549534.5	2.33286E-45	***	56.5%		
		April	56	51.8	27.72462	31	54	25.9455	7.6514754	5.67E-03	**	742504	0.067078602		4.2%		
		May	58	43.9	25.05594	31	41.5	29.05896	9.378363	2.20E-03	**	936109.5	1.35458E-05	***	5.5%		
		June	59	17.35	12.394536	31	14.9	11.475324	9.8138231	1.73E-03	**	946637.5	1.35747E-10	***	14.1%		
		July	59	7.67	3.85476	31	7.75	4.640538	0.0594721	8.07E-01		952574.5	2.65E-04	***	1.0%		
		August	59	6.46	1.971858	31	5.9	3.85476	99.287061	2.18E-23	***	1006497.5	2.72E-10	***	8.7%		
		September	59	6.68	1.971858	31	4.755	2.750223	59.829964	1.03E-14	***	1154916.5	1.30E-66	***	28.8%		
		October	59	6.91	2.060814	31	5.56	3.26172	66.802011	3.00E-16	***	1118075.5	2.65E-32	***	19.5%		
	02KF006	October	63	9.43	2.683506	31	11.6	7.353696	417.56822	8.26E-93	***	800206	9.60212E-11	***	23.0%	0.3	
		November	63	12	6.397419	31	20.7	14.826	113.47858	1.70E-26	***	648960	1.18E-29	***	72.5%		
		December	63	19.1	12.75036	31	35	19.71858	172.86455	1.752E-39	***	531829	7.61E-81	***	83.2%		
		January	62	22.1	13.12101	31	32.6	18.08772	137.31007	1.032E-31	***	513082.5	1.58465E-84	***	47.5%		
		February	62	22.1	12.6021	31	32.5	14.0847	50.577871	1.145E-12	***	440227.5	6.18642E-71	***	47.1%		
		March	62	30.6	19.2738	31	45.5	25.9455	12.487869	0.0004096	***	664716.5	1.11E-34	***	48.7%		
		April	62	91.2	51.29796	31	81.95	41.58693	6.3983108	0.0114229	*	936159.5	0.000381339	***	10.1%		
		May	62	59.05	38.47347	31	43.4	29.80026	56.298099	6.228E-14	***	1156093	2.48977E-28	***	26.5%		
		June	62	21.8	12.52797	31	23.3	12.6021	9.0609558	0.0026113	**	877083.5	0.543589592		6.9%		
		July	62	11.2	5.026014	31	11.1	6.30105	45.262133	1.723E-11	***	961664.5	7.02E-02		0.9%		
		August	62	9.51	3.009678	31	8.69	3.573066	75.545886	3.57E-18	***	983017	4.74E-03	**	8.6%		
		September	62	9.15	2.438877	31	9.245	4.544169	314.39365	2.41E-70	***	857902	7.27E-01		1.0%		

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FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1981 - 2011) VS. HISTORICAL (>=1951 - 1988) TIME PERIODS IN THE CENTRAL OTTAWA RIVER SUB-WATERSHED, BY STATION.

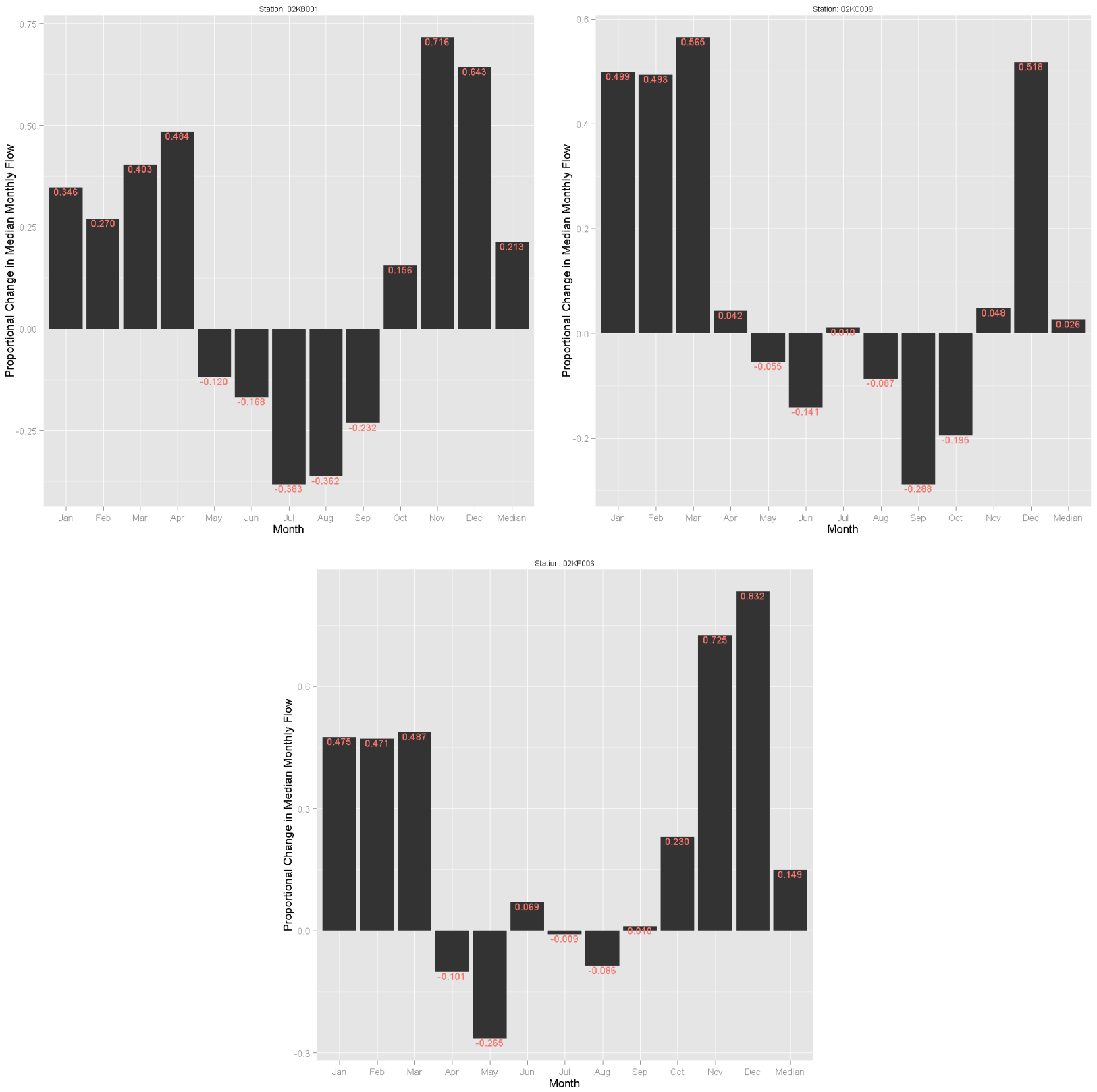
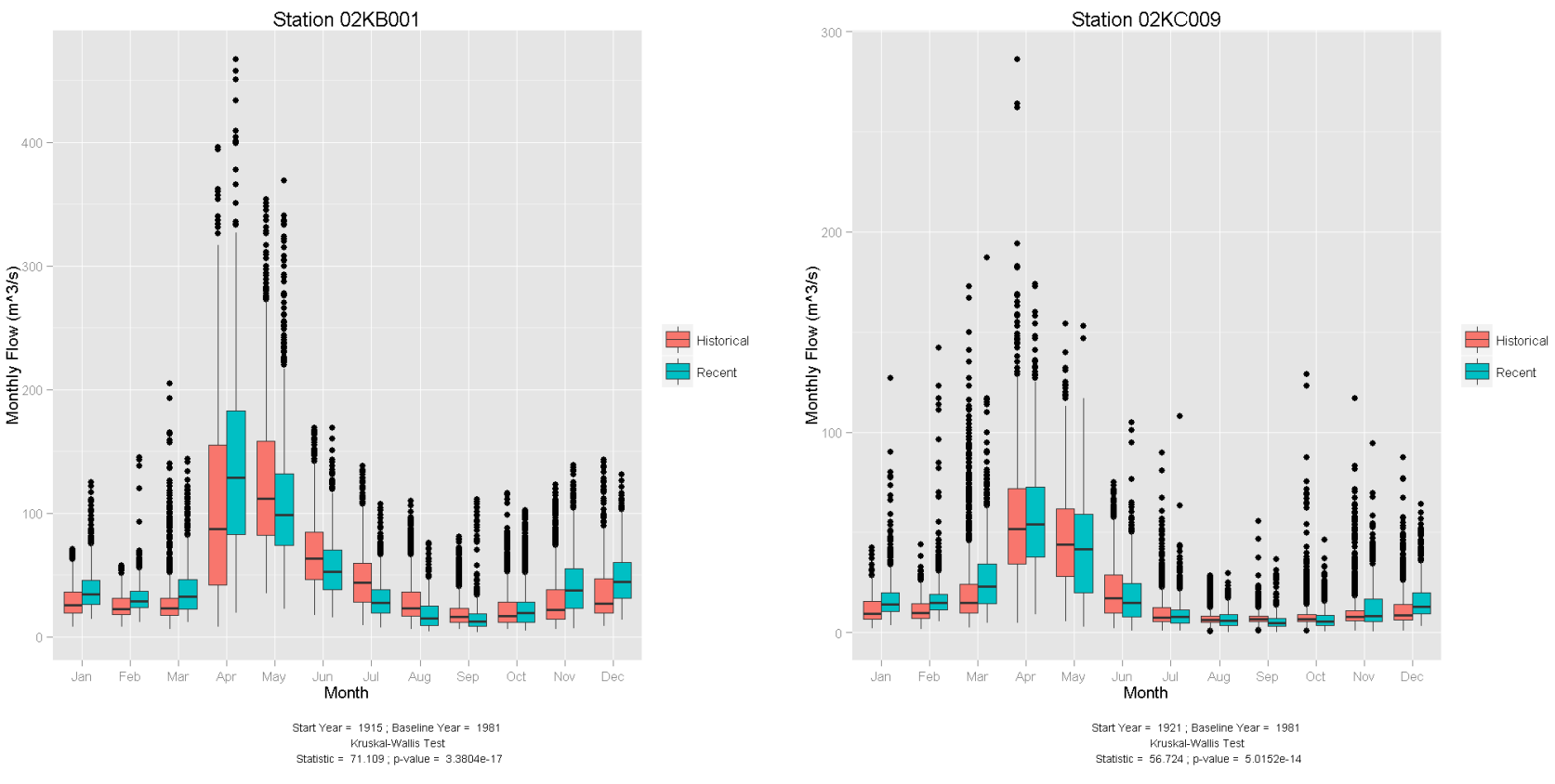


FIGURE. MONTHLY FLOW FOR RECENT (1981 - 2011) VS. HISTORICAL (>=1951 - 1981) TIME PERIOD IN THE CENTRAL OTTAWA RIVER SUB-WATERSHED, BY STATION.



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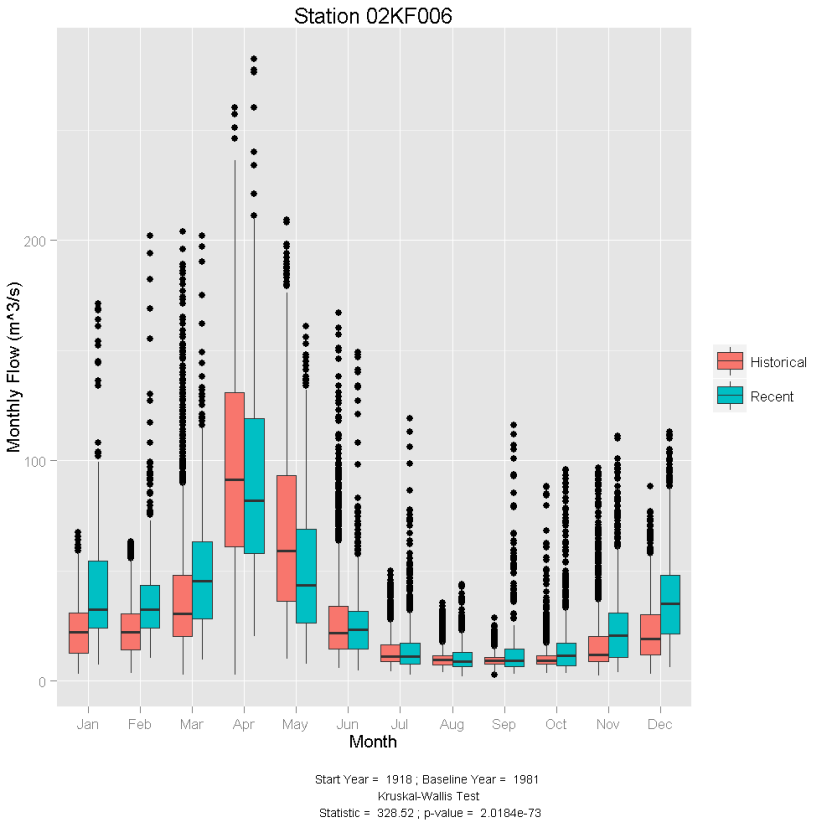

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TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR RECENT (1981 - 2011) VS. HISTORICAL (>=1951 - 1981) MONTHLY FLOW IN THE LOWER OTTAWA RIVER SUB-WATERSHED.

			Historical			Recent			Fligner-Killeen			Mann-Whitney				
Sub-Watershed	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		Magnitude of Change in Monthly Flow (%)	Average Change Across Months (%)*	Average Change Per Sub-Watershed**
Lower Ottawa	02LB005	April	66	110	114.75324	31	111.5	110.4537	16.70653	4.363E-05	***	936880	3.01E-01		1.4%	0.6	0.45
		May	61	19	16.204818	31	25	17.93946	4.8598822	2.75E-02	*	750223	2.52247E-14	***	31.6%		
		June	61	6.23	4.811037	31	12.5	11.527215	267.43986	4.101E-60	***	554025.5	6.76327E-51	***	100.6%		
		July	61	3.96	3.26172	31	5.17	5.070492	107.09011	4.25E-25	***	732367	2.25E-17	***	30.6%		
		August	61	2.92	2.312856	31	3.51	3.321024	103.63246	2.436E-24	***	776881	2.32049E-10	***	20.2%		
		September	61	3.26	2.698332	31	3.19	2.802114	23.529152	1.23E-06	***	805992.5	0.023084081	*	2.1%		
		October	60	3.96	4.15128	31	8.48	8.925252	205.01104	1.684E-46	***	616426.5	1.10E-41	***	114.1%		
		November	60	12.75	14.811174	31	28.2	26.83506	77.857668	1.11E-18	***	549994	6.04E-49	***	121.2%		
		December	58	12.45	13.41753	31	25	22.239	93.259235	4.587E-22	***	533877.5	1.43E-61	***	100.8%		
		January	51	7.36	8.688036	31	13.2	11.1195	39.811136	2.797E-10	***	527051	1.12763E-36	***	79.3%		
		February	50	7.08	7.146132	31	9.75	8.999382	82.382627	1.12E-19	***	443041	3.94E-30	***	37.7%		
		March	58	28.3	37.8063	31	60	78.5778	12.435513	4.21E-04	***	719388.5	3.45E-07	***	112.0%		
	02LB006	March	32	3.34	4.3647744	29	7.24	8.82147	14.898667	1.13E-04	***	332701	1.84E-12	***	116.8%	0.4	
		April	33	10.95	10.963827	29	11.3	9.888942	21.444912	3.64E-06	***	411226.5	6.06E-01		3.2%		
		May	20	2.38	1.971858	29	3.09	2.283204	10.049051	1.52E-03	**	189924.5	4.88E-13	***	29.8%		
		June	15	0.7405	0.6256572	29	1.29	1.074885	61.173872	5.23E-15	***	126883	5.76E-24	***	74.2%		
		July	15	0.343	0.237216	28	0.6185	0.4848102	46.3519	9.88E-12	***	131463.5	8.4669E-26	***	80.3%		
		August	15	0.292	0.2134944	30	0.424	0.3380328	38.2626	6.18E-10	***	151027	7.69394E-15	***	45.2%		
		September	15	0.377	0.2579724	29	0.4155	0.3202416	15.921484	6.60E-05	***	180926.5	0.023949693	*	10.2%		
		October	15	0.804	0.8243256	30	0.897	0.8198778	0.5817787	4.46E-01		174591.5	4.40874E-07	***	11.6%		
		November	17	1.76	1.7909808	30	2.89	2.8436268	32.325838	1.30E-08	***	157150	6.55E-11	***	64.2%		
		December	16	2.97	3.11346	30	2.9	2.676093	0.3070784	5.79E-01		190981	4.30E-02	*	2.4%		
		January	14	1.145	1.2364884	29	1.55	1.230558	2.7096188	9.97E-02		152862.5	1.37E-06	***	35.4%		
		February	15	0.85	0.756126	29	1.18	1.0333722	50.980456	9.33E-13	***	110313.5	6.89E-14	***	38.8%		
	02LB007	March	33	4.87	6.1112772	30	4.675	4.722081	52.758282	3.77E-13	***	468810	0.580177002		4.0%	0.8	
		April	33	7.53	6.197268	30	7.04	5.952639	12.757934	3.55E-04	***	486385	5.60E-04	***	6.5%		
		May	33	2.29	1.70499	31	2.1	1.9318278	16.822571	4.104E-05	***	502423.5	3.53E-02	*	8.3%		
		June	33	0.651	0.5663532	30	0.9565	0.9555357	92.092379	8.272E-22	***	368698.5	9.07936E-11	***	46.9%		
		July	33	0.269	0.3573066	30	0.2235	0.3128286	0.1488638	0.6996235		480450.5	0.702420904		16.9%		
		August	33	0.051	0.066717	31	0.0625	0.0852495	57.732788	3.003E-14	***	466036	3.48E-01		22.5%		
		September	33	0.028	0.0415128	31	0.061	0.0845082	89.520687	3.034E-21	***	407152	2.30182E-05	***	117.9%		
		October	33	0.057	0.0830256	30	0.3615	0.4848102	146.28494	1.125E-33	***	324718	6.86957E-34	***	534.2%		
		November	33	0.987	1.438122	30	2.08	2.312856	31.559342	1.934E-08	***	304328	9.93306E-33	***	110.7%		
		December	33	1.64	1.5582126	30	2.3	2.0126295	35.459095	2.605E-09	***	380730	2.35E-14	***	40.2%		
		January	31	0.934	0.8732514	30	1.26	1.1593932	8.1211024	0.0043753	**	387233	5.07E-07	***	34.9%		
		February	31	0.906	0.8991969	30	1.07	1.0407852	14.441022	1.45E-04	***	314587	4.69E-08	***	18.1%		
	02LC008	January	51	12.8	7.70952	33	15.77	11.386368	20.406199	6.26E-06	***	108401	0.025899427	*	23.2%	0.2	
		February	51	13	7.56126	33	15.3	11.709575	17.144526	3.46E-05	***	108145	2.23E-02	*	17.7%		
		March	51	13	7.724346	33	15.7	12.194385	22.520786	2.079E-06	***	107291.5	1.58E-02	*	20.8%		
		April	51	12.6	7.26474	33	15.785	12.364884	26.1471	3.164E-07	***	105744.5	0.005716239	**	25.3%		
		May	51	12.5	7.11648	33	15.8	12.16325	28.736053	8.295E-08	***	105988	0.005571016	**	26.4%		
		June	51	12.8	7.309218	33	15.7	11.356716	23.863244	1.034E-06	***	106865	1.00E-02	*	22.7%		
		July	51	12.6	7.383348	33	15.39	11.075022	20.844487	4.981E-06	***	108019.5	0.020680203	*	22.1%		
		August	51	12.6	7.413	33	15.4	10.274418	15.478907	8.343E-05	***	109781	0.055310205		22.2%		
		September	51	12.5	7.279566	33	15.26	9.814812	9.6695189	0.0018735	**	109633.5	0.05121149		22.1%		
		October	51	12.6	7.26474	33	15.3	9.918594	6.8518744	0.0088548	**	109457.5	4.67E-02	*	21.4%		
		November	51	12.5	7.19061	33	15.2	10.060924	5.1246783	0.0235879	*	110154.5	6.69E-02		21.6%		
		December	51	12.5	7.279566	33	15	9.733269	5.4954956	1.91E-02	*	110777.5	9.07E-02		20.0%		

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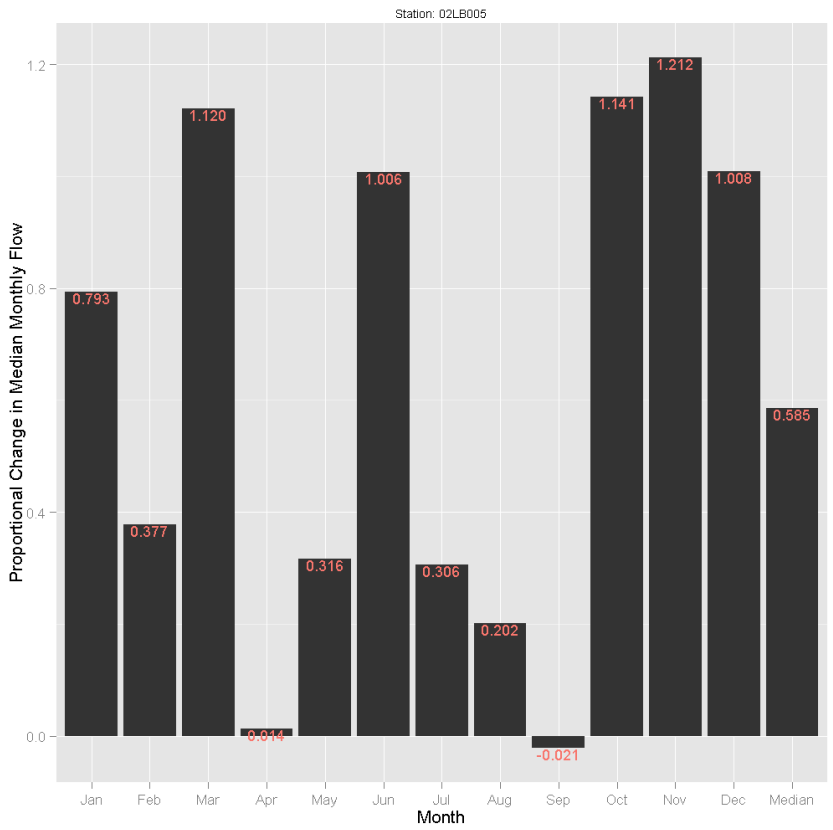
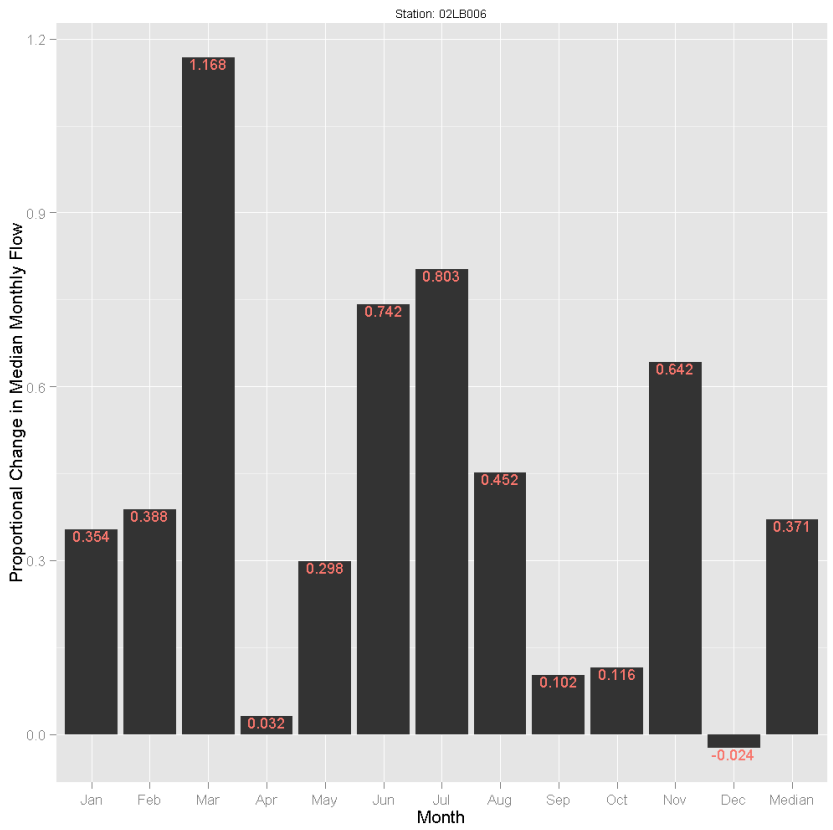
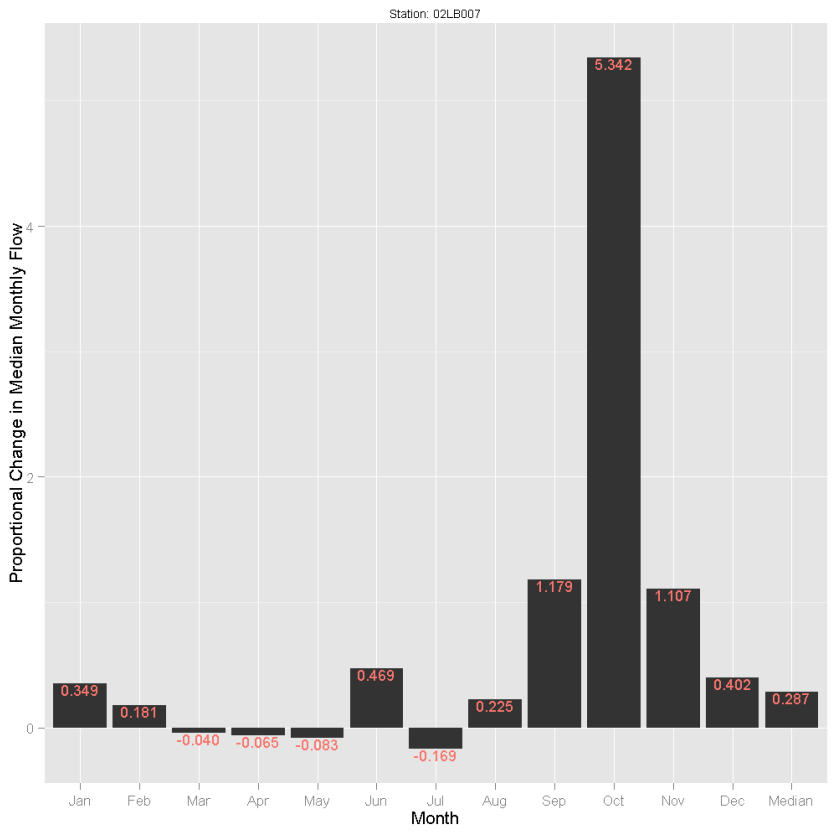
FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1981 - 2011) VS. HISTORICAL (>=1951 - 1981) TIME PERIODS IN THE LOWER OTTAWA RIVER SUB-WATERSHED, BY STATION.







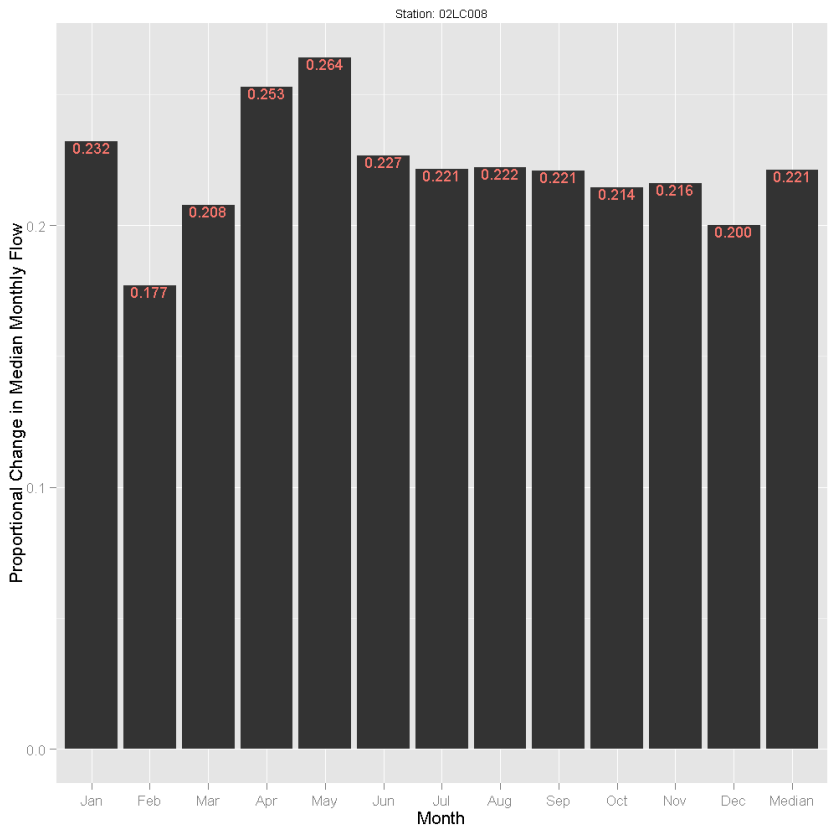
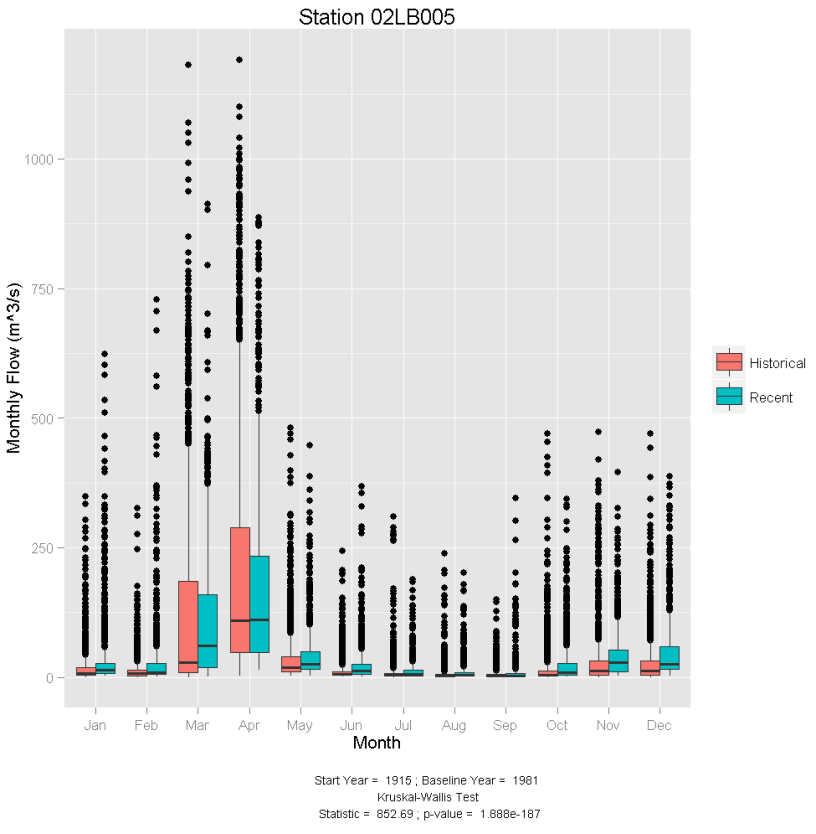
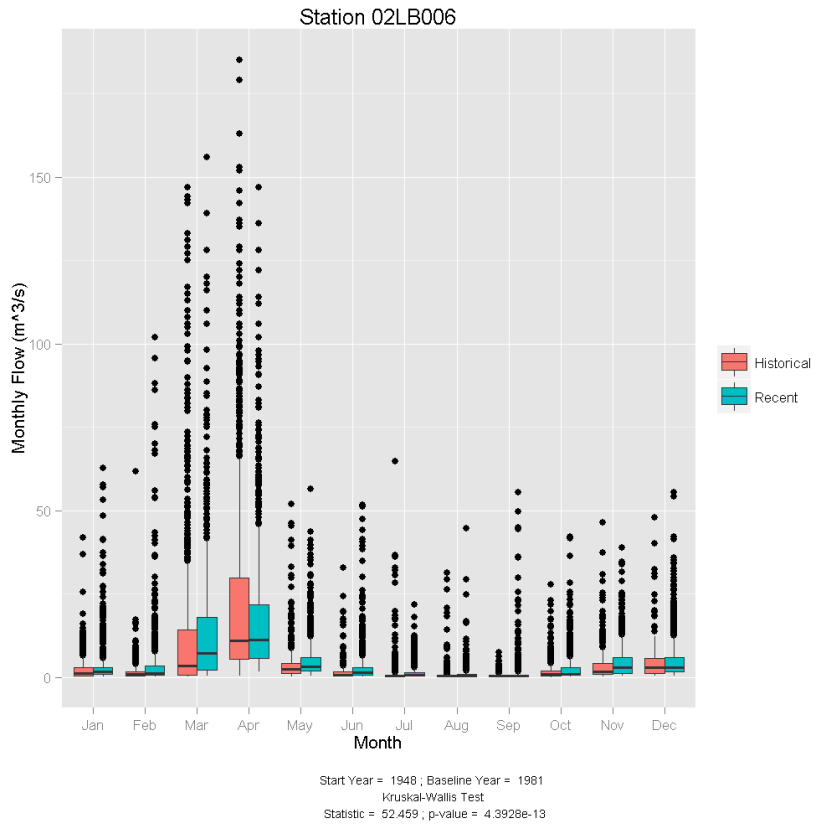


FIGURE. MONTHLY FLOW FOR RECENT (1981 - 2011) VS. HISTORICAL (>=1951 - 1981) TIME PERIODS IN THE LOWER OTTAWA RIVER SUB-WATERSHED, BY STATION.





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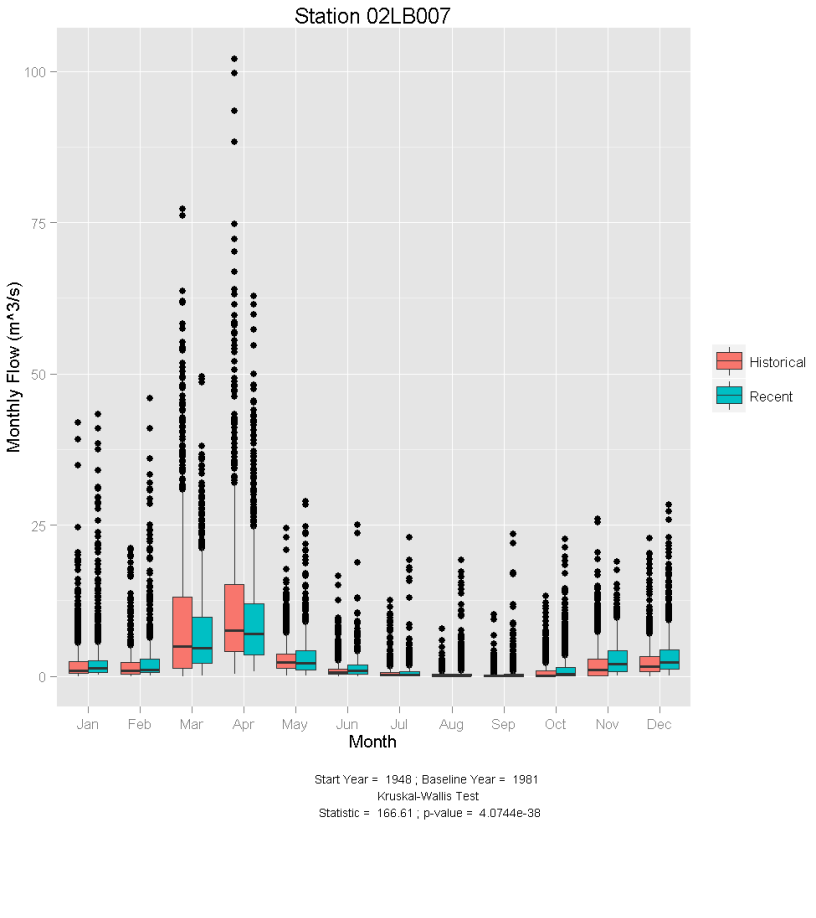

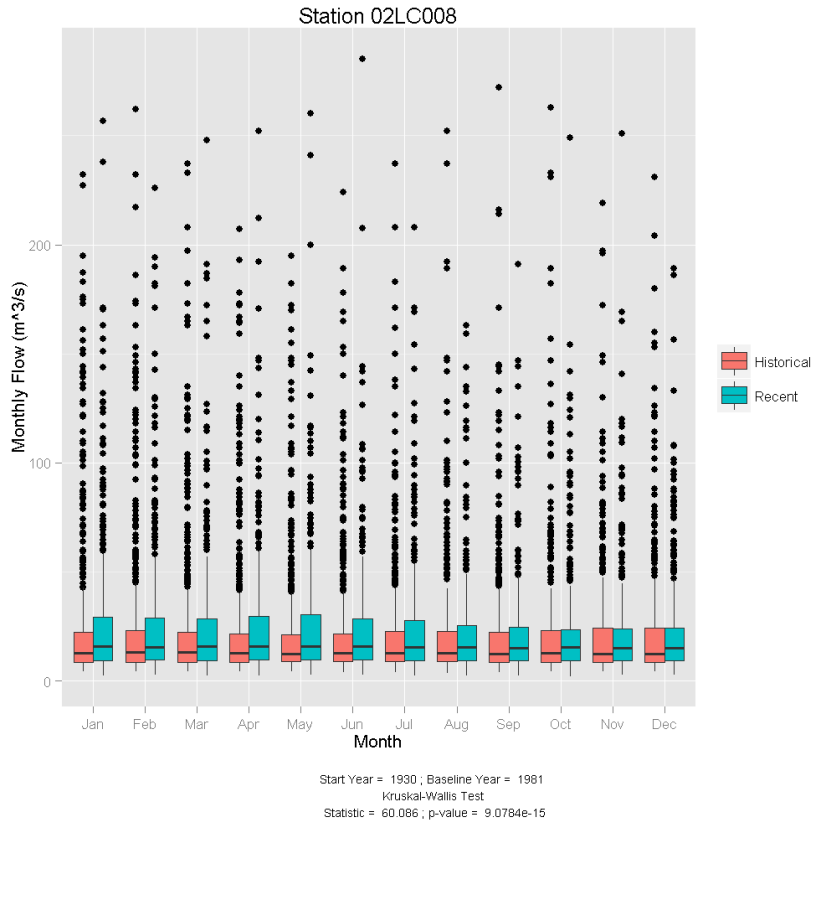

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OVERALL WATER QUALITY HEALTH SCORING

				Sub-Watershed			Watershed
	Indicator			**02J - Upper Ottawa**	**02K - Central Ottawa**	**02L - Lower Ottawa**	*Watershed*
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 75th percentile. Expressed as a proportion of total measurements. Reported as a weighted average for the last five years.	*Year*	2008 - 2012	2008 - 2012	2008 - 2012	2008 - 2012
			Number of Stations	8	16	39	63
			Value	0.11	0.14	0.20	0.17
			Water Quality Health Category	**Good**	**Data Deficient**	**Fair**	**Fair**
			Water Quality Health Score	4	Data Deficient	3	3
		Variance of annual water quality scores	*Value*	0.231	0.107	0.154	0.160
		Significant Mann-Kendal time-series test to determine directional trend in proportion of exceedance of water quality thresholds.	*Time Period*	1979-2012	1979-2012	1979-2012	1979-2012
			Trend	Positive trend in proportion of exceedance	Positive trend in proportion of exceedance	No trend	Positive trend in proportion of exceedance

WATER QUALITY DATA SUFFICIENCY

		Sub-Watershed			**Watershed**
	Data Sufficiency Indicator	**02J - Upper Ottawa**	**02K - Central Ottawa**	**02L - Lower Ottawa**	
Water quality	Total number of sub-sub-watersheds	5	9	8	22
	Year of earliest available monitoring	1979	1979	1979	1979
	Number of monitoring stations available for earliest monitoring	5	2	14	21
	Number of sub-sub-watersheds with earliest available monitoring stations	2	2	7	9
	Year of most recently available monitoring	2012	2012	2012	2012
	Number of monitoring stations available within last five years	8	16	40	64
	Number of sub-sub-watersheds within last five years	2	2	5	9
	Percentage of samples with at least 10 elements measured within last 5 years.	48%	54%	20%	29%
	Number of years of sampling in last 10 years	9	9	9	9
	Overall Data Sufficiency Category	Partially Sufficient	Insufficient	Partially Sufficient	Partially Sufficient
	Data Sufficiency Score	1	0	1	1

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MAP. ADHERENCE TO WATER GUIDELINES FOR ENVIRONMENT CANADA MONITORING STATIONS IN THE OTTAWA RIVER WATERSHED.

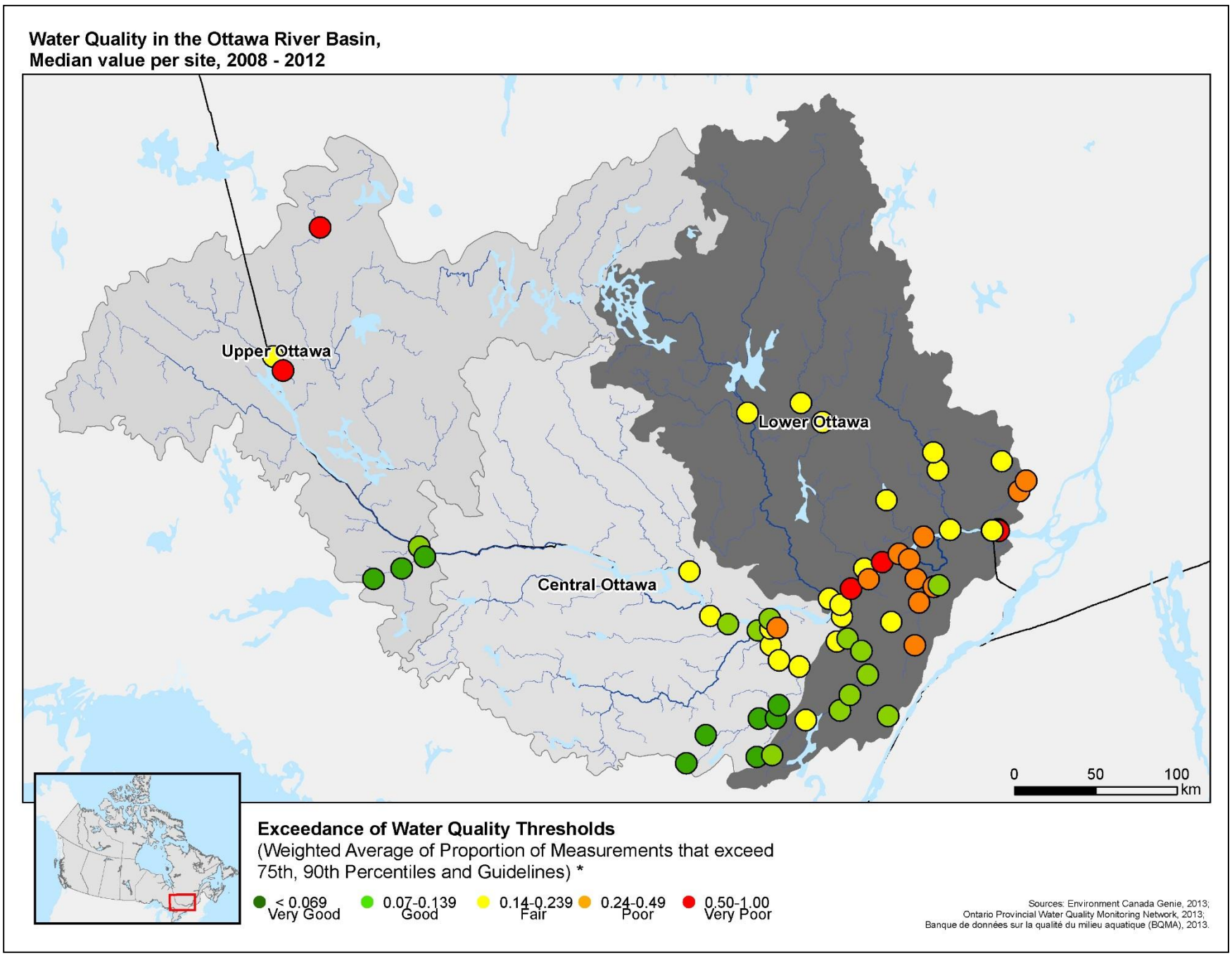

TABLE. WATER QUALITY IN THE OTTAWA RIVER WATERSHEDBASED ON PROPORTION OF EXCEEDANCE OF THREE THRESHOLDS: PROVINCIAL WATER QUALITY GUIDELINES, 75TH PERCENTILE OF HISTORICAL DISTRIBUTION, AND 90TH PERCENTILE OF HISTORICAL DISTRIBUTION.

Source	Sub-Watershed	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
BQMA	**Ottawa River Watershed**	2012	5	26	1022	299	0.29	119	0.12	253	0.25	0.23
	Upper	2012	5	4	122	50	0.41	22	0.18	45	0.37	0.33
	Central	2012	5	2	75	8	0.11	0	0.00E+00	2	0.03	0.06
	Lower	2012	5	20	825	241	0.29	97	0.12	206	0.25	0.23
BQMA	**Ottawa River Watershed**	2011	5	17	868	274	0.32	115	0.13	239	0.28	0.25
	Upper	2011	5	2	109	43	0.39	16	0.15	41	0.38	0.31
	Central	2011	5	1	50	5	0.10	1	0.02	2	0.04	0.06
	Lower	2011	5	14	709	226	0.32	98	0.14	196	0.28	0.25
ON.MOE	**Ottawa River Watershed**	2011	15	36	2775	398	0.14	411	0.15	859	0.31	0.17
	Upper	2011	15	4	415	21	0.05	1	0.002	38	0.09	0.04
	Central	2011	15	14	848	129	0.15	117	0.14	208	0.25	0.16
	Lower	2011	15	18	1512	248	0.16	293	0.19	613	0.41	0.21
BQMA & MOE	**Ottawa River Watershed**	2011	16	53	3643	672	0.18	526	0.14	1098	0.30	0.19
	Upper	2011	16	6	524	64	0.12	17	0.03	79	0.15	0.10
	Central	2011	16	15	898	134	0.15	118	0.13	210	0.23	0.16
	Lower	2011	16	32	2221	474	0.21	391	0.18	809	0.36	0.23

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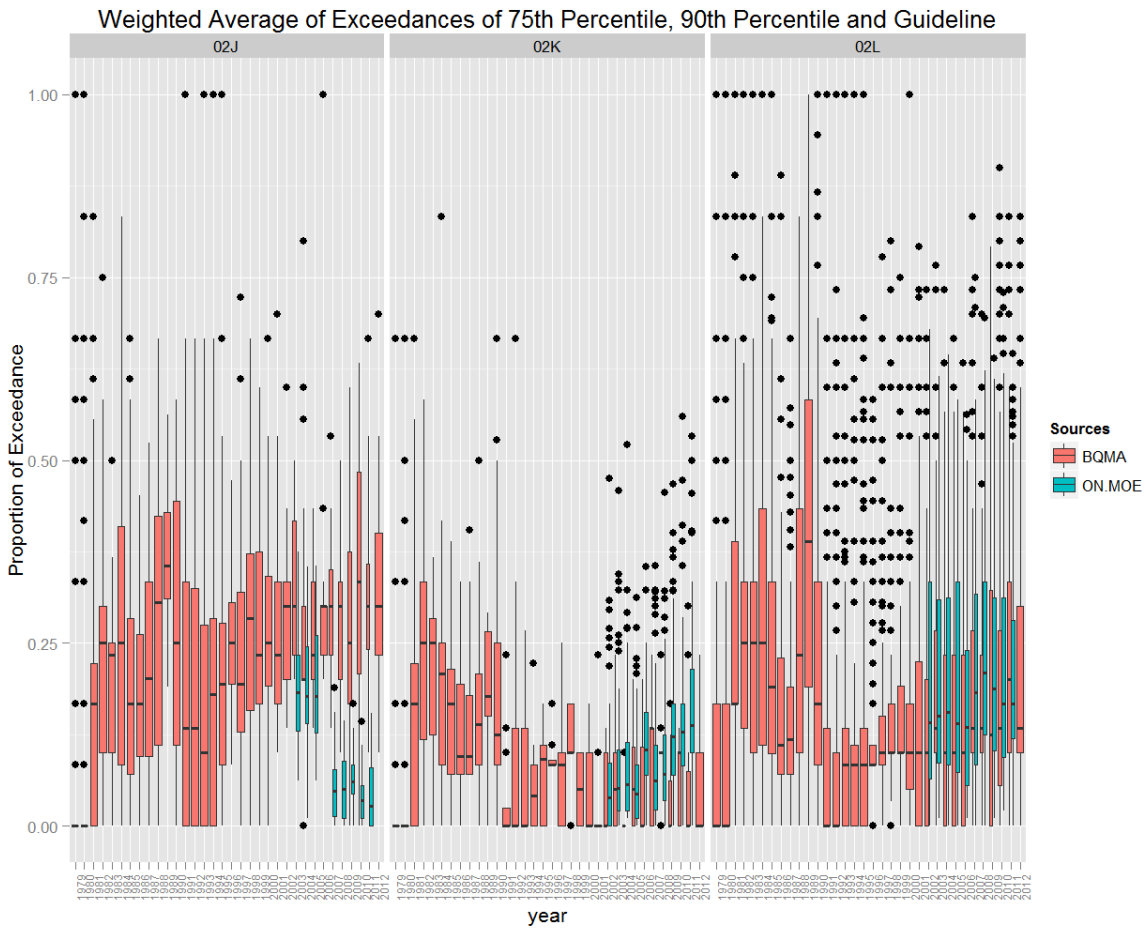
FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OTTAWA RIVER WATERSHED, BY SUB-WATERSHED.



Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of June 2015.

TABLE. PROPORTION OF MEASUREMENTS EXCEEDING THE WATER QUALITY THRESHOLDS, IN THE OTTAWA BASIN (QUÉBEC), BY SUB-WATERSHED AND BY PARAMETER.

	02J - Upper Ottawa			02K - Central Ottawa			02L - Lower Ottawa		
Variable	Number of Measurements	Number of Exceedances	Ratio	Number of Measurements	Number of Exceedances	Ratio	Number of Measurements	Number of Exceedances	Ratio
Aluminium	0	0	NA	0	0	NA	1	0	0.000
Ammonia	62	56	0.903	25	22	0.880	404	364	0.901
Arsenic	0	0	NA	0	0	NA	26	0	0.000
Cadmium	0	0	NA	0	0	NA	26	0	0.000
Copper	0	0	NA	0	0	NA	26	1	0.038
Lead	0	0	NA	0	0	NA	26	0	0.000
Mercury	0	0	NA	0	0	NA	18	0	0.000
Nickel	0	0	NA	0	0	NA	26	0	0.000
pH	62	0	0.000	25	0	0.000	420	0	0.000
Phosphorus	13	0	0.000	4	0	0.000	94	1	0.011
Turbidity	60	44	0.733	25	1	0.040	408	48	0.118
Zinc	0	0	NA	0	0	NA	26	0	0.000
TOTAL	197	100	0.508	79	23	0.291	1501	414	0.276

TABLE. PROPORTION OF MEASUREMENTS EXCEEDING THE WATER QUALITY THRESHOLDS, IN THE OTTAWA BASIN (ONTARIO), BY SUB-WATERSHED AND BY PARAMETER.

	02J - Upper Ottawa			02K - Central Ottawa			02L - Lower Ottawa		
Variable	Number of Parameters	Number of Measurements	Ratio	Number of Parameters	Number of Measurements	Ratio	Number of Parameters	Number of Measurements	Ratio
Aluminium	20	4	0.200	39	10	0.256	42	11	0.262
Ammonia	20	0	0.000	56	0	0.000	90	1	0.011
Cadmium	20	0	0.000	39	3	0.077	50	4	0.080
Chloride	20	0	0.000	62	2	0.032	103	0	0.000
Copper	20	2	0.100	39	2	0.051	50	21	0.420
Dissolved Oxygen	20	0	0.000	45	0	0.000	91	7	0.077
Iron	20	1	0.050	34	6	0.176	50	9	0.180
Lead	20	4	0.200	39	11	0.282	50	24	0.480
Nickel	20	0	0.000	39	0	0.000	50	0	0.000
Nitrate	17	0	0.000	58	0	0.000	102	0	0.000
Nitrite	20	0	0.000	58	0	0.000	102	0	0.000
pH	20	0	0.000	61	19	0.311	92	8	0.087
Phosphorus	20	0	0.000	40	3	0.075	102	53	0.520
Zinc	20	0	0.000	39	0	0.000	50	0	0.000
TOTAL	277	11	0.040	648	56	0.086	1024	138	0.135

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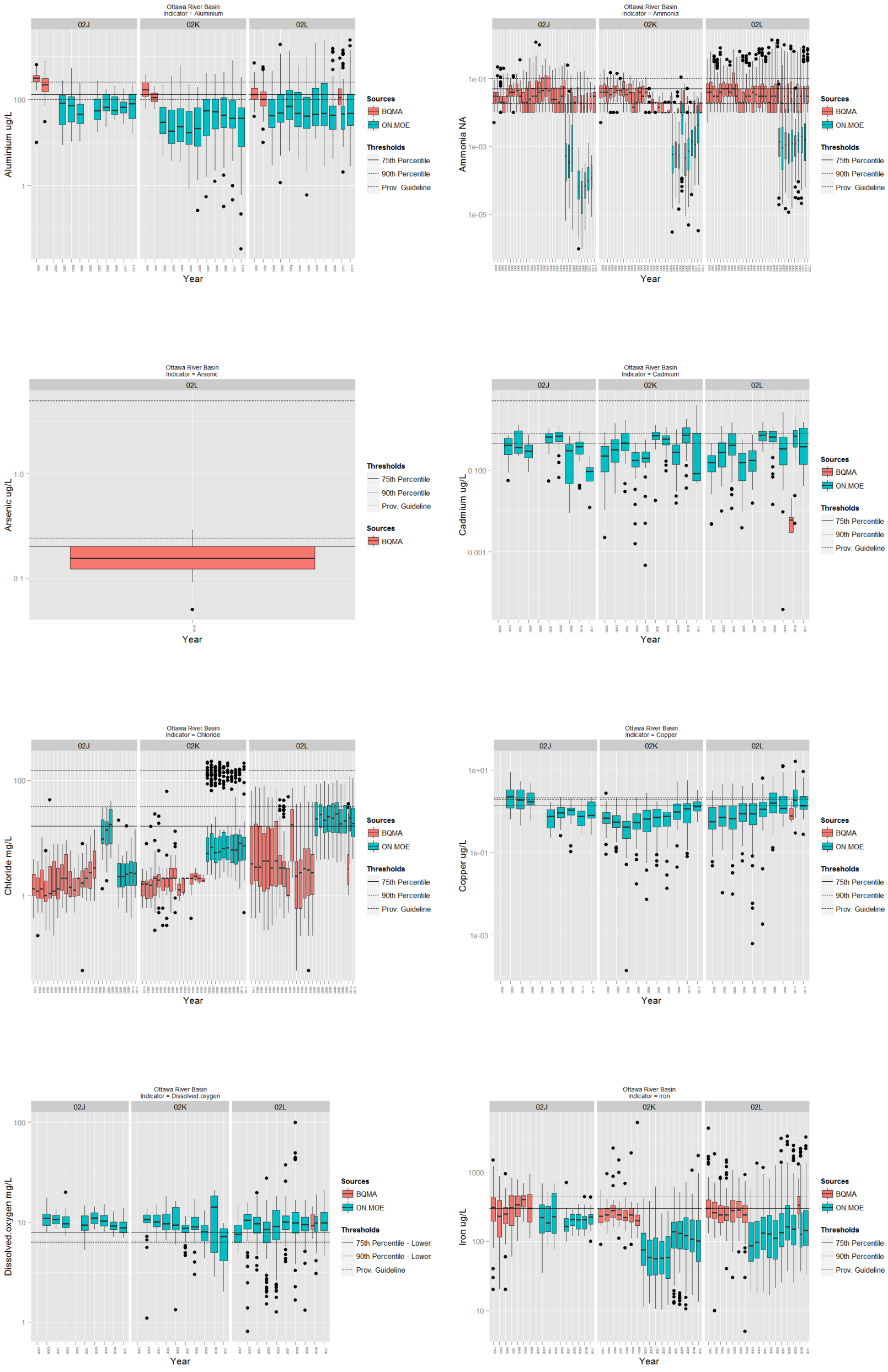
FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OTTAWA RIVER WATERSHED, BY CONTAMINANT.



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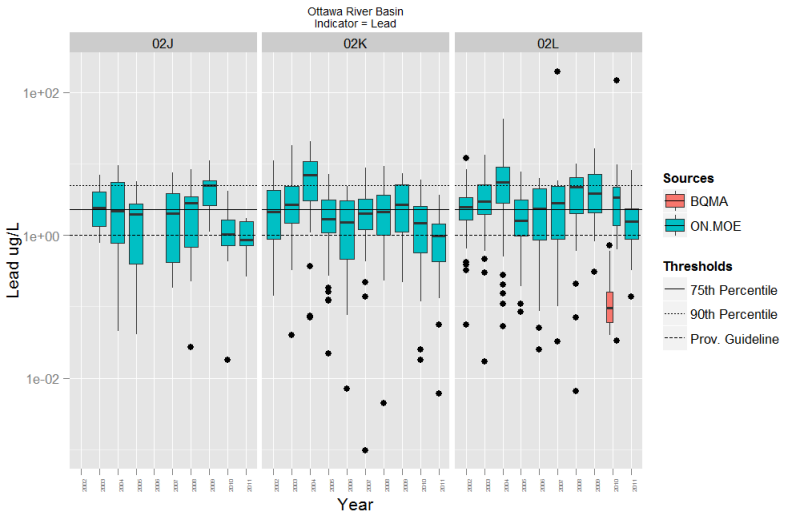

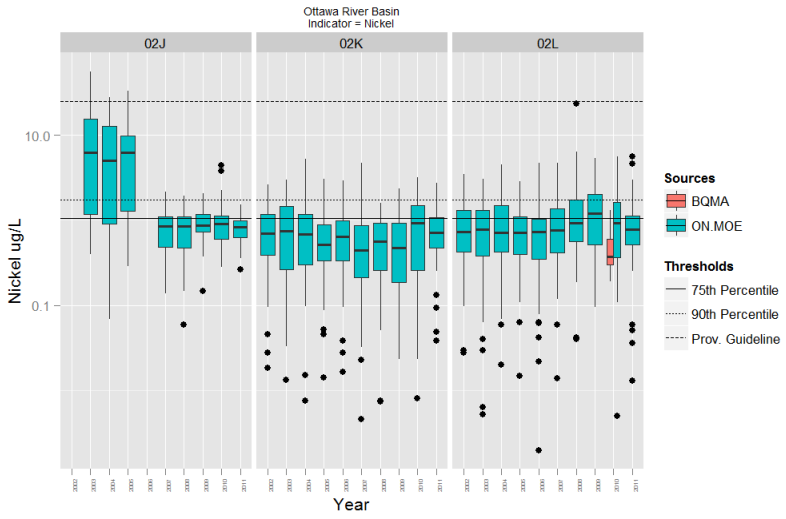

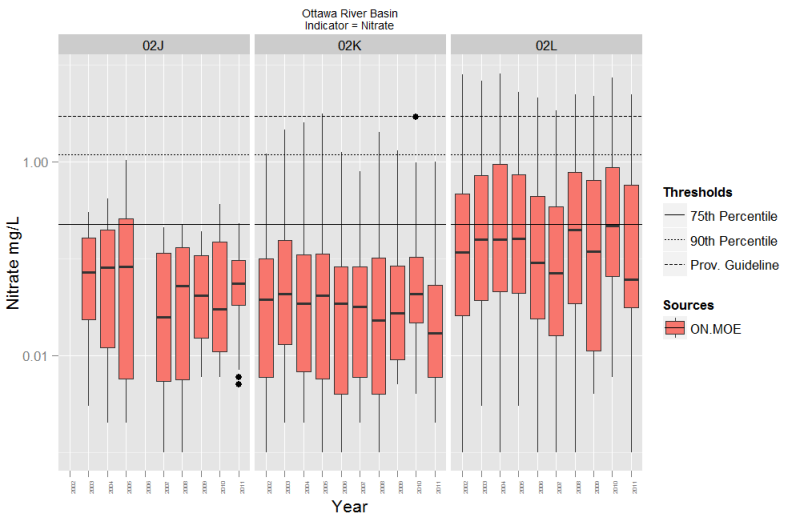

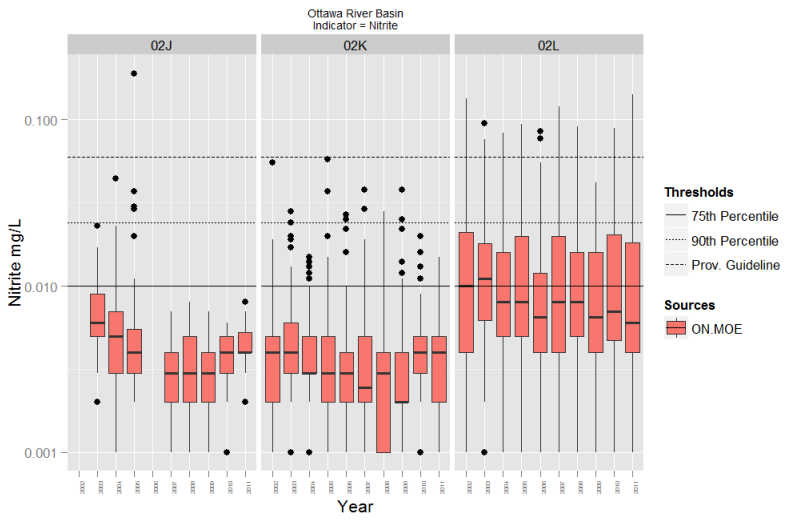

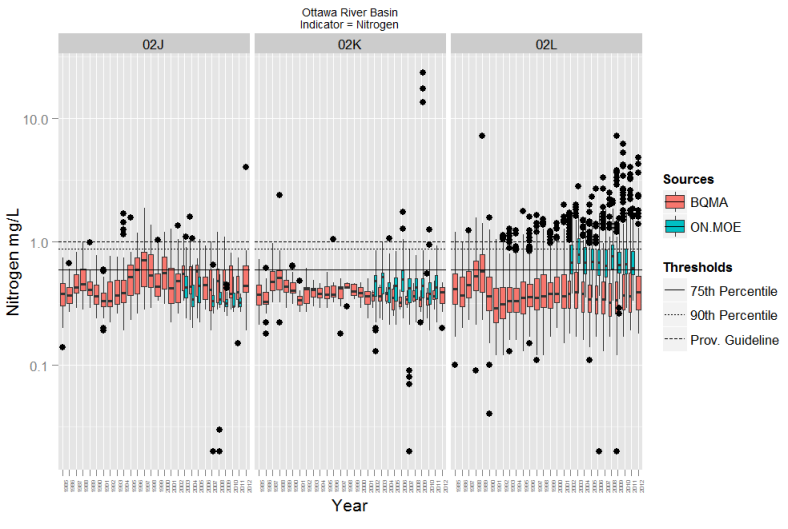

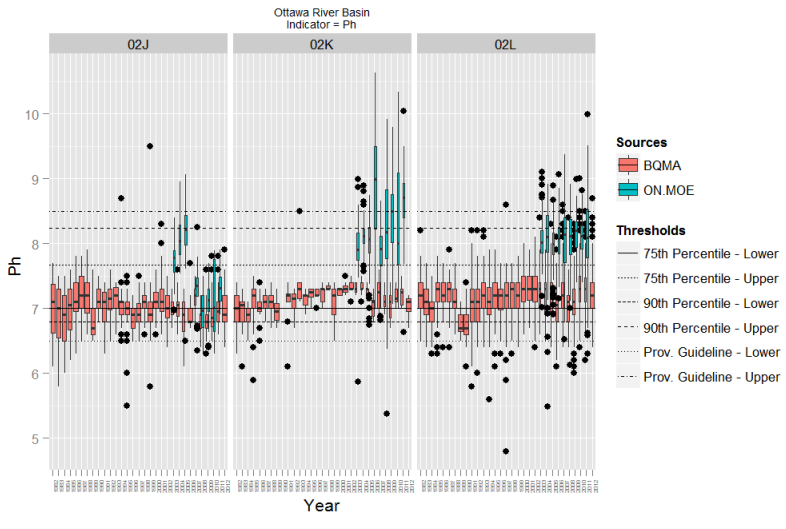

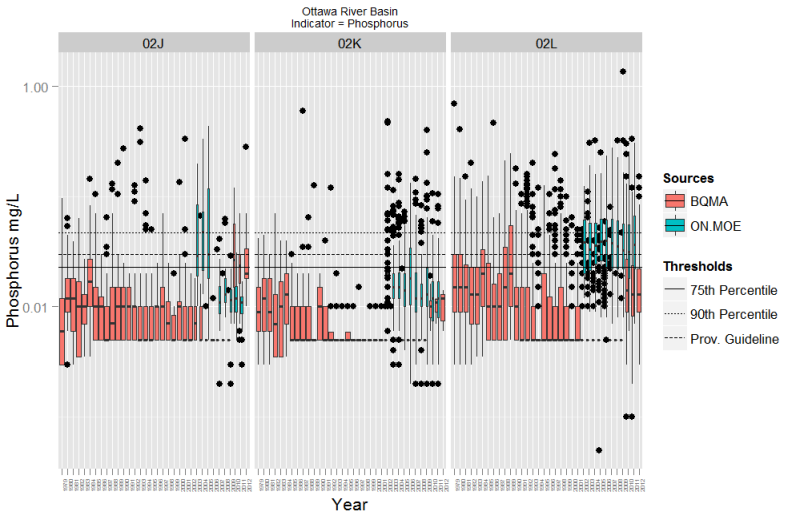

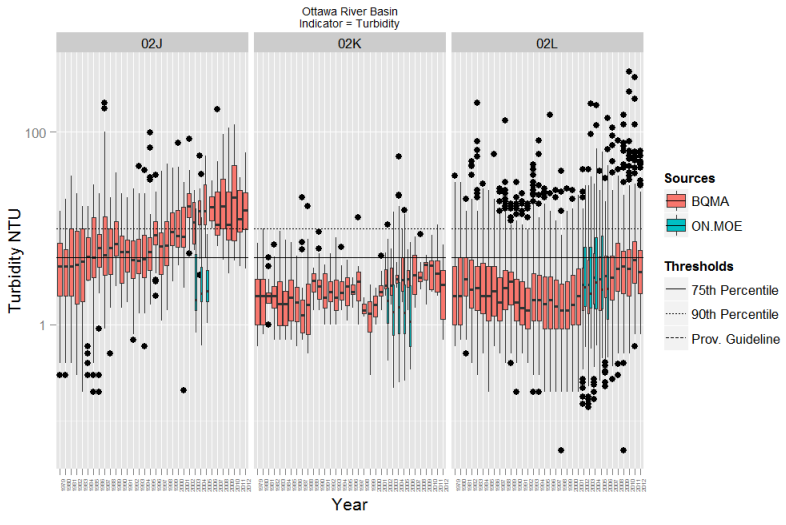

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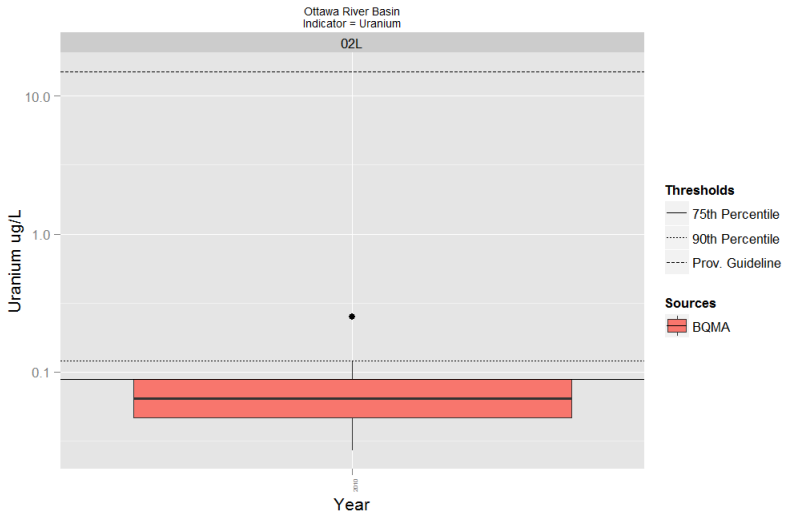

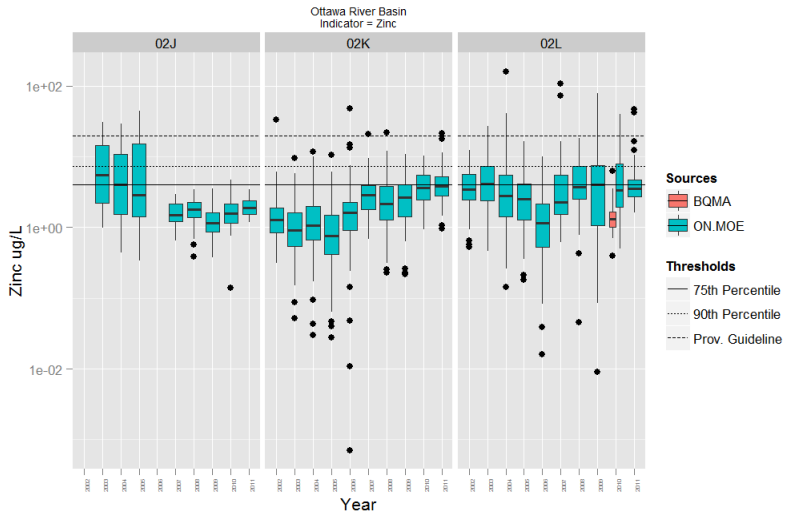

TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF ANNUAL EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE OTTAWA RIVER WATERSHED.

Sub-Watershed	Data Source	Start Year	End Year	Number of Monitoring Stations	Theil-Sen Slope	Mann-Kendall Test Score	Mann-Kendal Test p-value	
Lower	**All**	1979	2012	16	0	8	0.92	
	BQMA	1979	2012	7	0.0045	239	3.67E-04	***
	OMOE	2003	2011	9	-0.0076	-14	0.17	
Central	**All**	1979	2012	19	-0.001563	-80	0.24	
	BQMA	1979	2012	2	-0.0041	-171	0.009	**
	OMOE	2002	2011	17	0.0108	37	0.001	**
Upper	**All**	1979	2012	50	0.0007937	62	0.36	
	BQMA	1979	2012	30	0.0000	35	6.09E-01	
	OMOE	2002	2011	20	0.0043	16	0.18	
Ottawa River Watershed Overall	**All**	1979	2012	85	0	2	0.99	
	BQMA	1979	2012	39	0.00000	-4	0.96	
	OMOE	2002	2011	46	0.0059	28	0.02	*

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FISH

OVERALL FISH HEALTH SCORING

	Indicator			02J - Upper Ottawa	02K - Central Ottawa	02L - Lower Ottawa	*Basin*
Fish	**Change in Native Fish Species Richness**		*Period of Study*	-	1999-2015	1999-2014	1999-2015
			Number of Sites	0	87	126	213
		Presence of statistically significant decline in number of total species observed per year.	*Trend*	-	None	Increasing Trend	None
		Presence of statistically significant decline in median species richness for the basin.	*Trend*	-	None	None	None
			Fish Health Category	**Data Deficient**	**Good**	**Good**	**Good**
			Fish Health Score	0	4	4	4

FISH DATA SUFFICIENCY

	Data Sufficiency Indicator	02J - Upper Ottawa	02K - Central Ottawa	02L - Lower Ottawa	Basin
Fish	Total number of sub-sub-basins	5	9	8	22
	Year of earliest available monitoring	-	1999	1999	1999
	Number of sampling locations available for earliest monitoring	0	1	9	10
	Number of sub-sub-basins with earliest available sampling locations	0	1	2	3
	Earliest year of continuous monitoring	-	2002	2000	2002
	Number of sampling locations available for first year of continuous monitoring	0	8	19	27
	Number of sub-sub-basins for first year of continuous monitoring	0	2	2	4
	Year of most recently available monitoring	-	2015	2014	2015
	Number of sampling locations available for most recent monitoring	0	61	52	61
	Number of sub-sub-basins with most recent available monitoring	0	1	2	3
	Number of years of continuous monitoring	0	10	14	4
	Overall Data Sufficiency Category	Insufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient
	Data Sufficiency Score	0	1	1	1

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MAP. FISH SPECIES RICHNESS IN THE OTTAWA RIVER WATERSHED (2011-2015).

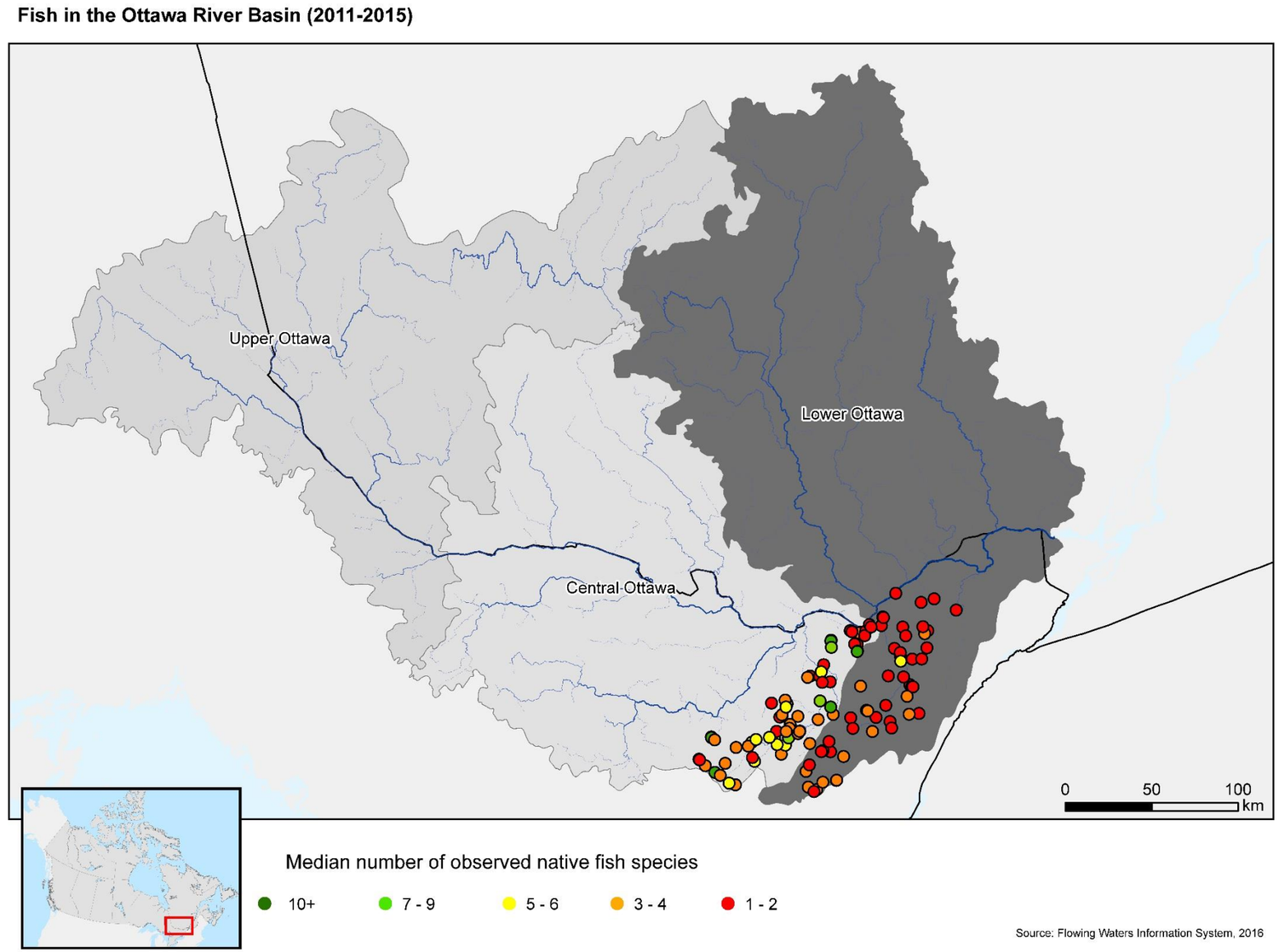

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FIGURE.NON-PARAMETRIC ANALYSIS OF VARIANCE IN FISH SPECIES RICHNESS IN THE OTTAWA RIVER WATERSHED (1999-2015), BY SUB-WATERSHED.

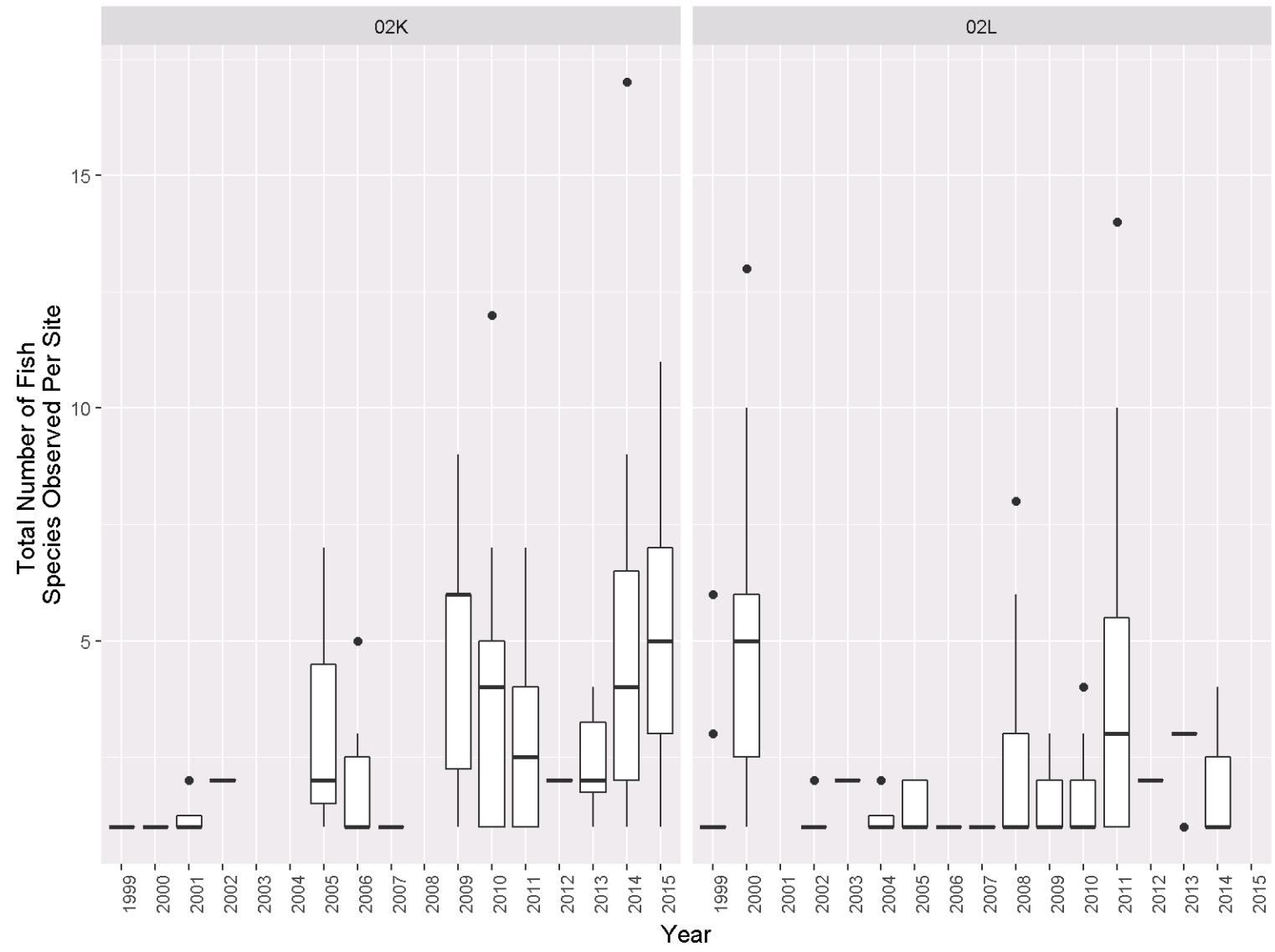
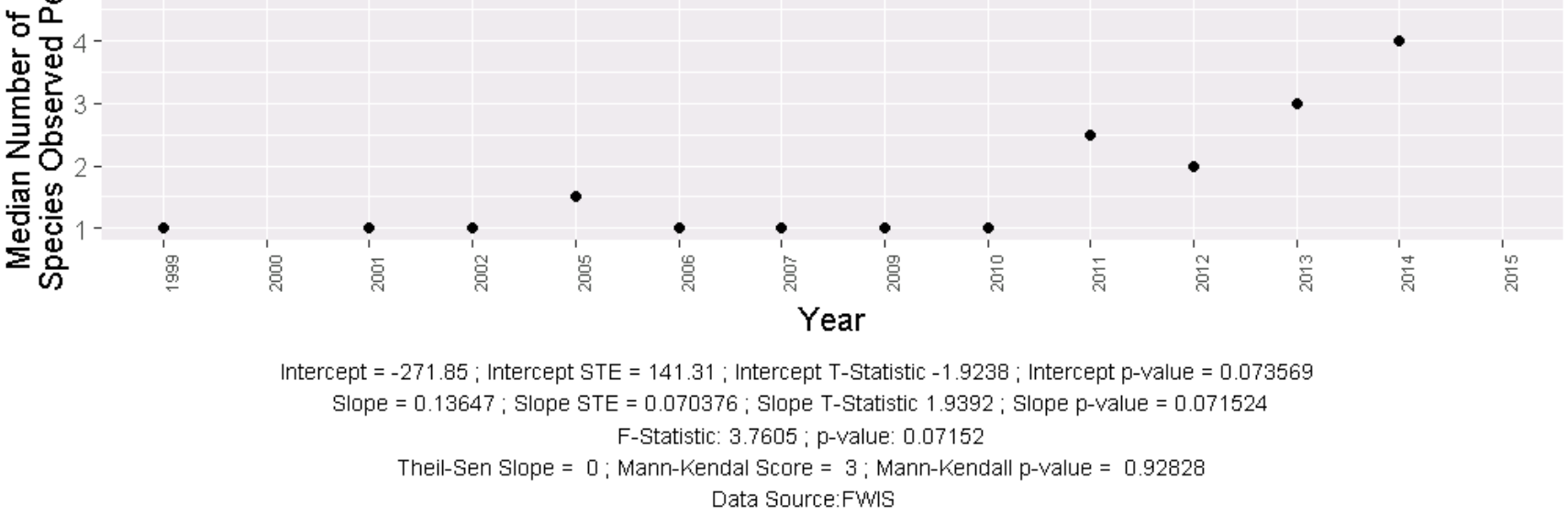
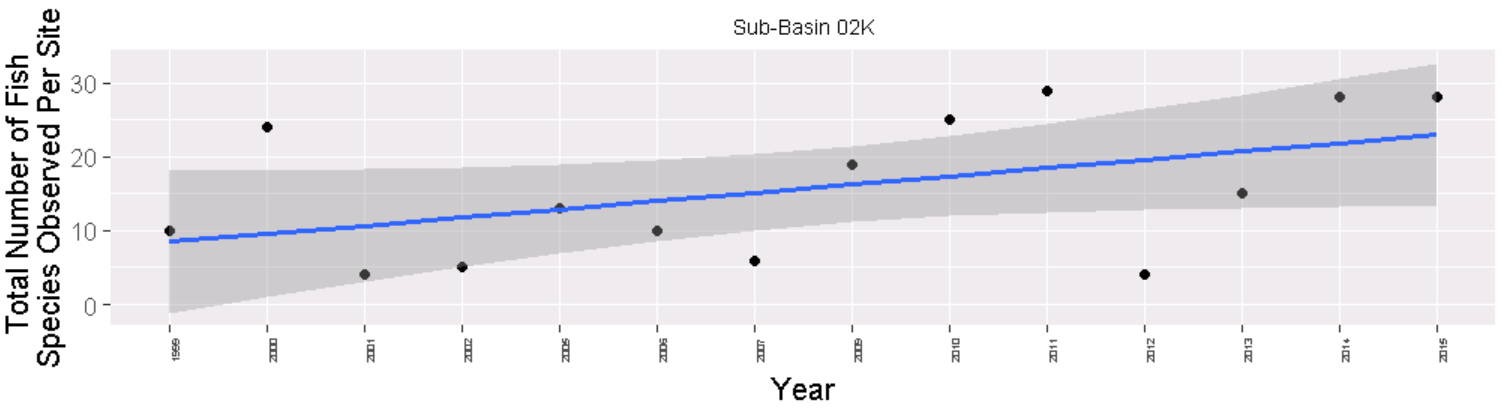


FIGURE.TIME-SERIES OF MEDIAN (TOP) AND TOTAL (BOTTOM) FISH SPECIES RICHNESS IN THE CENTRAL OTTAWA RIVER WATERSHED (1999 -2015).



Intercept = -271.85 ; Intercept STE = 141.31 ; Intercept T-Statistic -1.9238 ; Intercept p-value = 0.073569
Slope = 0.13647 ; Slope STE = 0.070376 ; Slope T-Statistic 1.9392 ; Slope p-value = 0.071524
F-Statistic: 3.7605 ; p-value: 0.07152
Theil-Sen Slope = 0 ; Mann-Kendal Score = 3 ; Mann-Kendall p-value = 0.92828
Data Source:FWIS



Intercept = -2026.4 ; Intercept STE = 780.52 ; Intercept T-Statistic -2.5962 ; Intercept p-value = 0.020252
Slope = 1.0175 ; Slope STE = 0.38872 ; Slope T-Statistic 2.6175 ; Slope p-value = 0.019409
F-Statistic: 6.8515 ; p-value: 0.01941
Theil-Sen Slope = 0 ; Mann-Kendal Score = -2 ; Mann-Kendall p-value = 0.96688
Data Source:FWIS

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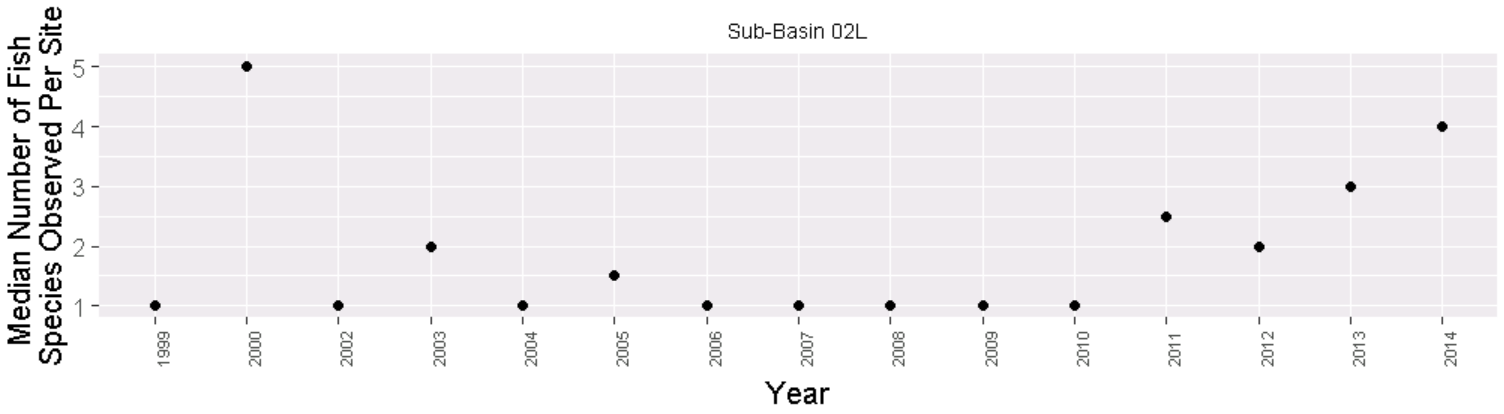
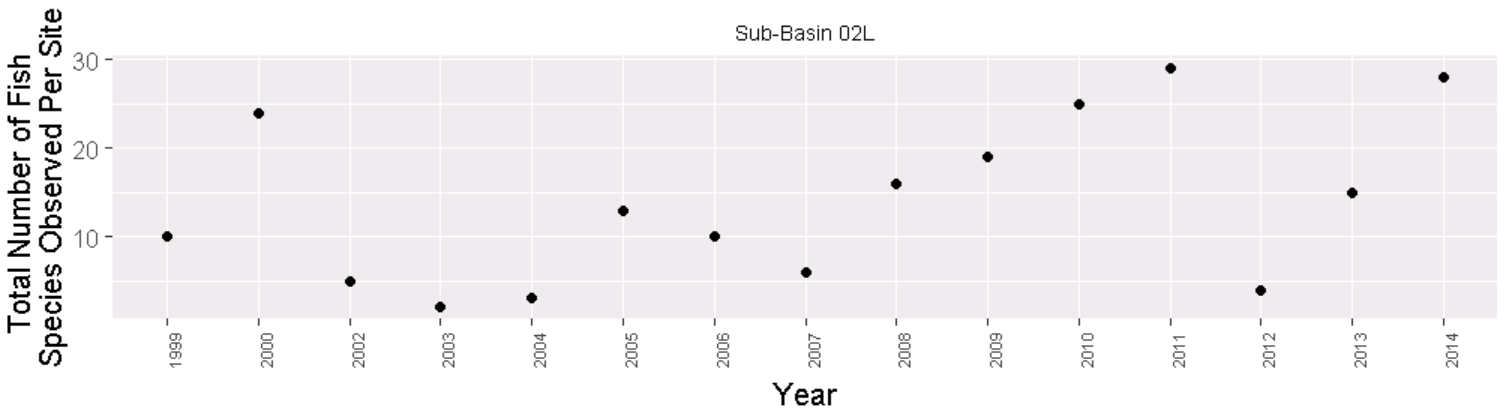
FIGURE.TIME-SERIES OF MEDIAN (TOP) AND TOTAL (BOTTOM) FISH SPECIES RICHNESS IN THE LOWER OTTAWA RIVER WATERSHED (1999 -2014).



Intercept = -110.71 ; Intercept STE = 136.96 ; Intercept T-Statistic -0.80836 ; Intercept p-value = 0.43241
Slope = 0.056122 ; Slope STE = 0.068233 ; Slope T-Statistic 0.82251 ; Slope p-value = 0.42458
F-Statistic: 0.67652 ; p-value: 0.4246
Theil-Sen Slope = 0 ; Mann-Kendal Score = -10 ; Mann-Kendall p-value = 0.6628
Data Source:FWIS



Intercept = -1501.7 ; Intercept STE = 925.3 ; Intercept T-Statistic -1.6229 ; Intercept p-value = 0.1269
Slope = 0.7551 ; Slope STE = 0.46098 ; Slope T-Statistic 1.638 ; Slope p-value = 0.12368
F-Statistic: 2.6832 ; p-value: 0.1237
Theil-Sen Slope = -0.8393 ; Mann-Kendal Score = -46 ; Mann-Kendall p-value = 0.042343
Data Source:FWIS

TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF FISH SPECIES RICHNESS OVER TIME IN THE OTTAWA RIVER WATERSHED.

Indicator	Sub-watershed	Data Source	Start Year	End Year	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
Total Species Richness	Entire Basin	FWIS	1999	2015	0.146	13	0.619
	02K - Central Ottawa	FWIS	1999	2015	0.000	-2	0.967
	02L - Lower Ottawa	FWIS	1999	2014	-0.839	-46	0.042 *
Median Species Richness	Entire Basin	FWIS	1999	2015	0.023	25	0.302
	02K - Central Ottawa	FWIS	1999	2015	0.000	3	0.928
	02L - Lower Ottawa	FWIS	1999	2014	0.000	-10	0.663

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BENTHICS

OVERALL BENTHIC HEALTH SCORING

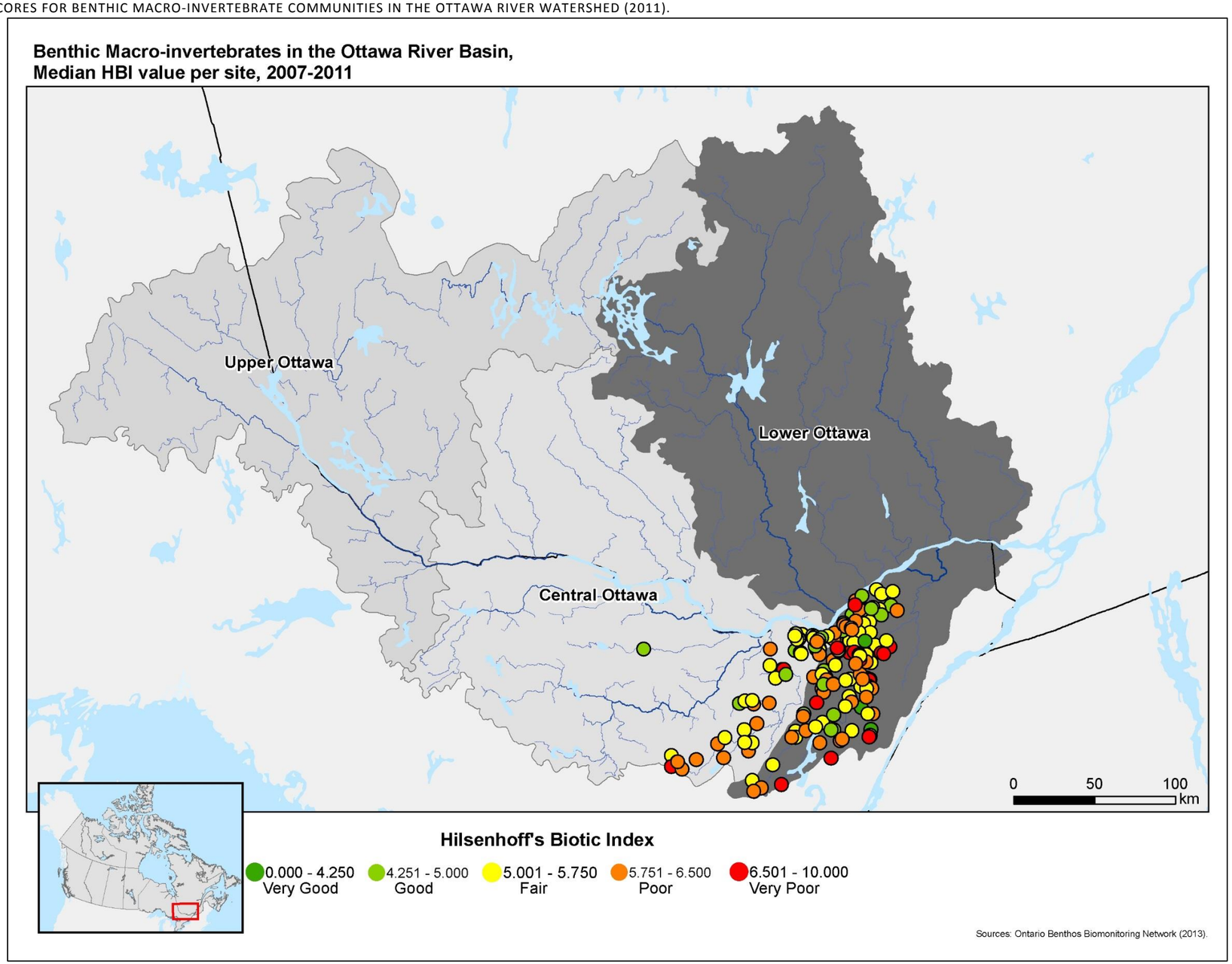
				Sub-Basin			*Basin*
	Indicator			**02J - Upper Ottawa**	**02K - Central Ottawa**	**02L - Lower Ottawa**	**Value**
Benthic Macro-Invertebrates	**Index of benthic community composition based on sensitivity to disturbance**	Median Hilsenhoff Biotic Index (HBI) score for the basin. Reported as a weighted average for the most recent five years.	*Year*	-	2007-2012	2007-2011	2007-2012
			Number of Sites	-	59	138	197
			Value	-	5.54	5.76	5.69
			Benthic Health Category	**Data Deficient**	**Data Deficient**	**Poor**	**Data Deficient**
			Benthic Health Score	0	0	2	0
		Variance of annual HBI scores	*Value*	NA	0.592	0.810	0.749
		Significant Mann-Kendal time-series test to determine directional trend in **HBI** over time.	*Time Period*	-	2008 - 2012	2008-2011	2008-2012
			Trend	-	None	None	None

BENTHIC DATA SUFFICIENCY

		Sub-Basin			**Basin**
	Data Sufficiency Indicator	**02J - Upper Ottawa**	**02K - Central Ottawa**	**02L - Lower Ottawa**	
Benthic Macro-inertebrates	Total number of sub-sub-basins	5	9	8	22
	Year of earliest available monitoring	-	2006	2003	2007
	Number of monitoring stations available for earliest monitoring	-	1	15	16
	Number of sub-sub-basins with earliest available monitoring stations	-	1	1	2
	Year of most recently available monitoring	-	2012	2011	2012
	Number of monitoring stations available within last five years	-	59	138	197
	Number of sub-sub-basins within last five years	-	2	2	4
	Number of years of sampling in last 10 years	-	7	9	9
	Overall Data Sufficiency Category	Insufficient	Insufficient	Partially Sufficient	Insufficient
	Data Sufficiency Score	0	0	1	0

Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of June 2015.

MAP. HILSENHOFF'S BIOTIC INDEX SCORES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES IN THE OTTAWA RIVER WATERSHED (2011).



Disclaimer: This analysis reflects currently accessible and available data that aligns with our nationally consistent suite of indicators, as of June 2015.

FIGURE. ANALYSIS OF VARIANCE FOR HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE OTTAWA RIVER WATERSHED.

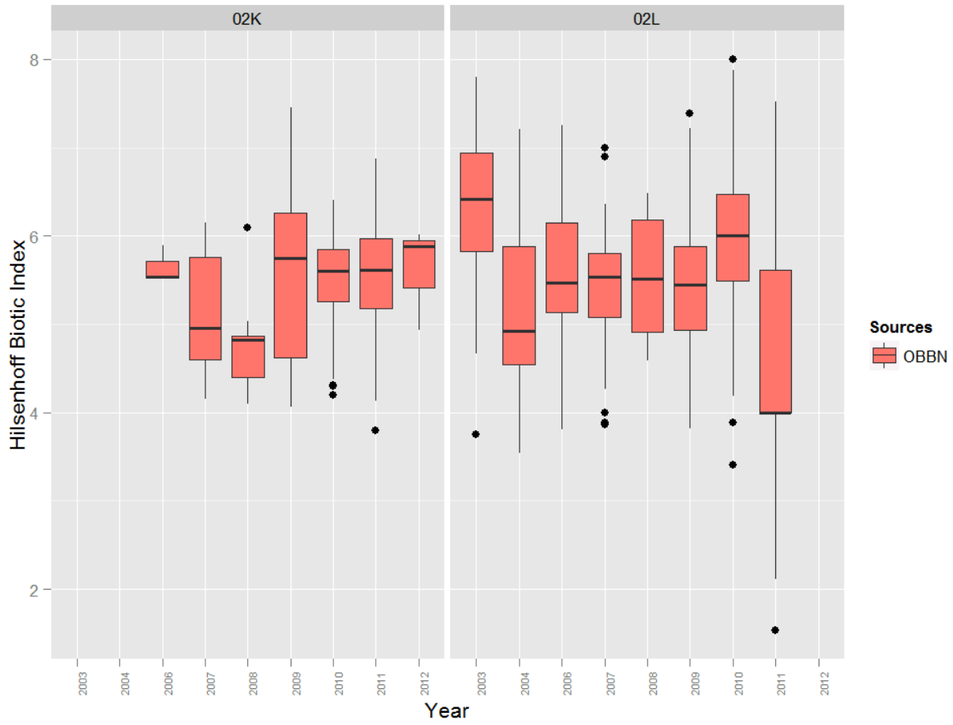


TABLE. RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF HILSENHOFF'S BIOTIC INDEX OVER TIME IN THE OTTAWA RIVER WATERSHED, BY SUB-WATERSHED.

Sub-Watershed	Data Source	Start Year	End Year	Number of Measurements	Theil-Sen Slope	Mann-Kendall Test Statistic	Mann-Kendal Test p-value
Overall Ottawa River Watershed	Ontario Benthos Biomonitoring Program (OBBN)	2003	2012	63	0.07	10	0.42

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SUMMARY

TABLE. OVERALL SCORING RESULTS FRESHWATER THREATS ASSESMENT OF OTTAWA RIVER WATERSHED, BY SUB-WATERSHEDAND PEARSE WATERSHED

PEARSE BASIN	SUB WATERSHED SCORE			
	WSCSDA	SUB WATERSHED NAME	SCORE	FINAL SCORE (MEDIAN)
Ottawa	02J	Upper Ottawa	THREAT CLASSIFICATION	High
			SCORE	60
	02K	Central Ottawa	THREAT CLASSIFICATION	High
			SCORE	60
	02L	Lower Ottawa	THREAT CLASSIFICATION	Very High
			SCORE	80
	OVERALL PEARSE BASIN SCORE			
			THREAT CLASSIFICATION	High
			SCORE	67.51

TABLE. SCORING RESULTS FRESHWATER THREAT INDICATORS OF OTTAWA RIVER WATERSHED, BY SUB-WATERSHEDAND PEARSE WATERSHED

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
Ottawa	02J	Upper Ottawa	THREAT CLASSIFICATION	Very High	Moderate	Moderate	Moderate	Very High	Low	Low	51,594,674,978	34.50%
			SCORE	100	66.67	60	60	90	25	40		
	02K	Central Ottawa	THREAT CLASSIFICATION	Very High	Low	Moderate	High	Very High	Low	Low	41,800,052,930	27.95%
			SCORE	100	33.33	60	80	100	25	40		
	02L	Lower Ottawa	THREAT CLASSIFICATION	Very High	Low	High	High	Very High	Low	Moderate	56,135,669,574	37.54%
			SCORE	100	33.33	80	80	100	25	60		
	OVERALL PEARSE BASIN SCORE											
			THREAT CLASSIFICATION	Very High	Moderate	High	High	Very High	Low	Moderate		
			SCORE	100	44.83	67.51	73.1	96.55	25	47.51		

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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			Transportation 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
02J	Upper Ottawa	20286.76	80	High	-9999	-9999	Unknown	98	100	Very High	0.45	60	Moderate	0.14	40	Low	0.13	40	Low
02K	Central Ottawa	4838.13	60	Moderate	100000	40	Low	9	20	Very Low	1.9	100	Very High	0.3	40	Low	0.31	40	Low
02L	Lower Ottawa	147714.3	100	Very High	3000	20	Very Low	2	20	Very Low	0.77	60	Moderate	0.47	60	Moderate	0.47	60	Moderate

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 Precipitation Anomaly			Winter Mean Temperature Anomaly		
WSCSDA	SUB WATERSHED NAME	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification
02J	Upper Ottawa	0.12	33.33	Low	-0.04	33.33	Low	-0.06	66.67	Moderate	0.07	33.33	Low
02K	Central Ottawa	0.13	33.33	Low	-0.07	33.33	Low	0.1	33.33	Low	0	33.33	Low
02L	Lower Ottawa	0.05	33.33	Low	0.12	33.33	Low	0.06	33.33	Low	-0.01	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
02J	Upper Ottawa	616.5	60	Moderate
02K	Central Ottawa	226.4	60	Moderate
02L	Lower Ottawa	798.8	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
02J	Upper Ottawa	17	60	Moderate
02K	Central Ottawa	44	80	High
02L	Lower Ottawa	45	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
02J	Upper Ottawa	N/A	25	Low
02K	Central Ottawa	N/A	25	Low
02L	Lower Ottawa	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
02J	Upper Ottawa	1	100	Very High	0	80	High
02K	Central Ottawa	1	100	Very High	0.01	100	Very High
02L	Lower Ottawa	0.99	100	Very High	0.01	100	Very 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
02J	Upper Ottawa	3.8	40	Low	2.68	40	Low
02K	Central Ottawa	7.28	40	Low	2.64	40	Low
02L	Lower Ottawa	13.08	60	Moderate	2.18	40	Low