WWF-CANADA

WATERSHED REPORT

SKEENA SUB-WATERSHED

June 2015

SKEENA SUB-WATERSHED HEALTH AND THREATS REPORT

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WWF-Canada Freshwater Report for the Skeena sub-watershed.
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FRESHWATER HEALTH ASSESSMENT

SUMMARY

OVERALL RIVER HEALTH SCORING

	Indicator		*08E – Sub-watershed*
Overall River Health	*Hydrology*	***Hydrology Health Category***	Good
		Hydrology Score	4
	Water Quality	***Water Quality Health Category***	Good
		Water Quality Health Score	4
	Benthic Macro-Invertebrates	***Benthic Health Category***	Very Good
		Benthic Health Score	5
	Fish	***Fish Health Category***	Good
		Fish Health Score	4
	Total Score		17
	Total Available Score		20
	Percentage of Maximum Score		85.0%
	Overall Health Category		**Very Good**

OVERALL DATA SUFFICIENCY SCORING

	Indicator		*08E – Sub-watershed*
Overall Data Sufficiency	*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	Partially Sufficient
		Data Sufficiency Score	1
	Total Score		6
	Total Available Score		12
	Percentage of Maximum Score		50.0%
	Overall Data Sufficiency Category		**Moderately Sufficient**

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HYDROLOGY

OVERALL HYDROLOGY RIVER HEALTH SCORING

	Indicator			*08E – Sub-watershed*
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*	1936-2011
			Number of Stations	2
			Value	0.07
			Health Category	**Very Good**
			Health Score	5
	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*	1974-2011
			Number of Stations	13
			Value	0.04
			Health Category	**Very Good**
			Health Score	5
	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*	1936-2011
			Number of Stations	2
			Value	0.5%
			Health Category	**Very Good**
			Health Score	5
	Pre- vs. Post-Dam or Historical vs. Recent Analysis of Monthly Flow	Percentage of total months, for all stations analyzed, with significantly different variance in monthly flow pre- vs. post-dam operation or for historical vs. recent time periods in undammed systems.	*Period of Study*	Various
			Number of Stations	3
			Value	80.6%
			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	3
			Value	12%
			Health Category	**Good**
			Health Score	4
	Hydrology Score		*Total Score*	19
			Maximum Available Score	25
			Percentage of Maximum Score	76.0%
			Hydrology Health Category	**Good**
			Hydrology Score	4

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HYDROLOGY DATA SUFFICIENCY

	Data Sufficiency Indicator	08E - Sub-watershed
Hydrology	Total number of sub-sub-watersheds	7
	Total number of dams (>10m)	5
	Year of earliest dam operation	1914
	Year of earliest available continuous flow monitoring	1930
	Number of monitoring stations available for earliest, continuous flow monitoring	1
	Number of sub-sub-watersheds 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	1936
	Number of monitoring stations available for continuous flow monitoring analysis	2
	Number of sub-sub-watersheds 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	1974
	Number of monitoring stations available for continuous flow monitoring analysis	14
	Number of sub-sub-watersheds with monitoring stations	6
	Number of monitoring stations on river downstream of dams	0
	Data Sufficiency Category	Partially Sufficient
	Overall Data Sufficiency Category	Partially Sufficient
	Data Sufficiency Score	1

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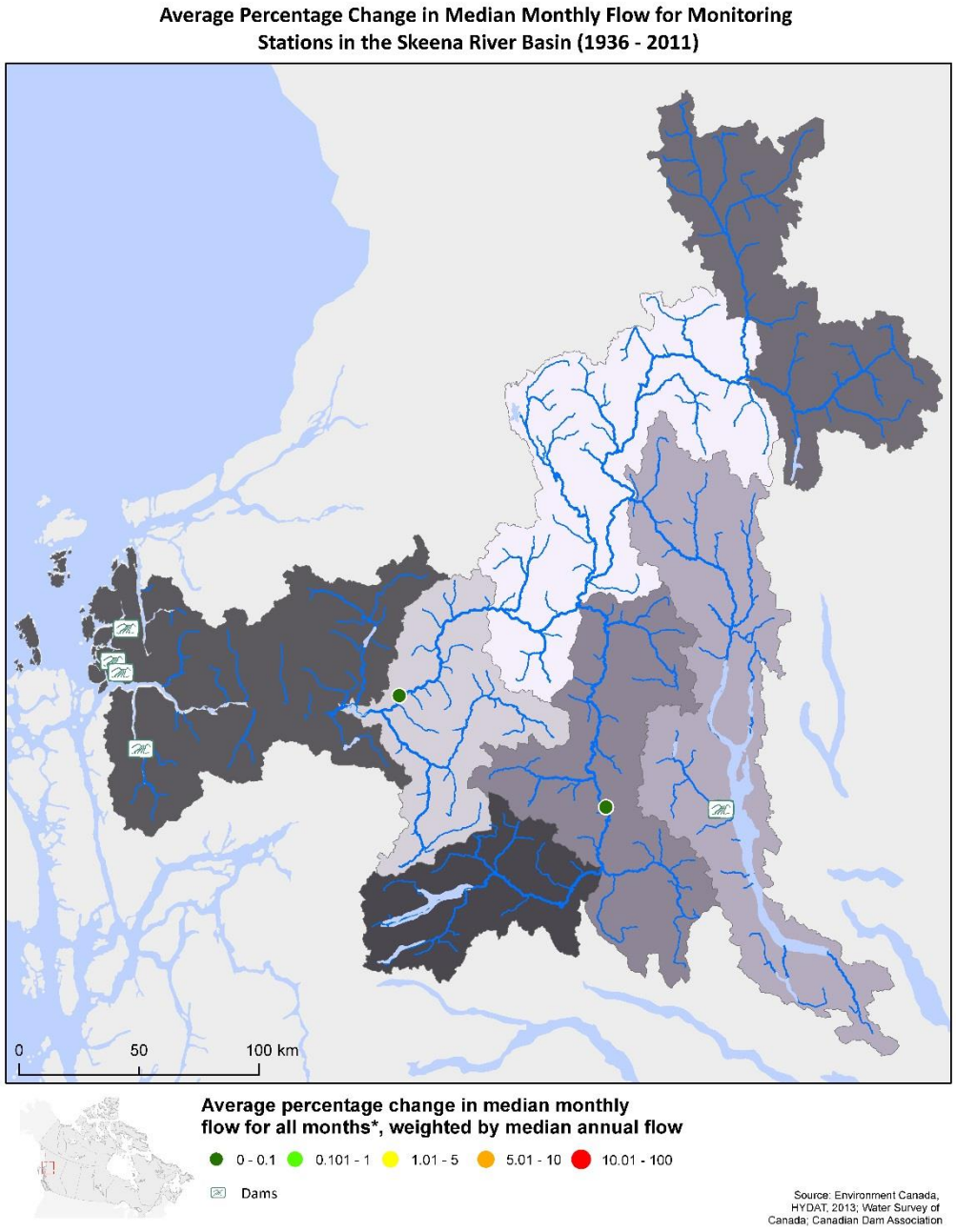
LONG-TERM TRENDS IN MONTHLY FLOW FOR THE SKEENA SUB-WATERSHED

MAP. RESULTS OF A SERIES OF LONG-TERM TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE SKEENA SUB-WATERSHED (1936-2011).



WWF-Canada Freshwater Report for the Skeena sub-watershed.
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TABLE. RESULTS OF LONG-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE SKEENA SUB-WATERSHED.

	Skeena							
	08EE004				08EF001			
	Start Year for Analysis		1936		Start Year for Analysis		1936	
	Median Annual Flow (m^3/s)		95.4		Median Annual Flow (m^3/s)		407.6	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	-0.13	0.52	100.4		-0.29	0.82	579.8	
November	-0.10	0.61	92.3		0.00	1.00	373.5	
December	-0.21	0.03 *	56.2	0.38	-1.05	0.03 *	221.0	0.47
January	-0.07	0.49	37.7		-0.19	0.45	157.5	
February	0.01	0.91	31.0		0.26	0.35	132.8	
March	0.02	0.54	28.4		0.59	0.01 *	120.9	0.49
April	-0.16	0.41	68.4		0.64	0.48	255.2	
May	-0.44	0.41	297.4		-0.77	0.82	1272.6	
June	-0.13	0.73	360.1		3.60	0.26	2070.0	
July	-0.05	0.83	226.6		-0.49	0.85	1284.7	
August	-0.33	0.02 *	141.5	0.24	-0.97	0.32	731.4	
September	-0.19	0.05	97.0		1.39	0.22	544.3	
Average for all months, for each station	-0.15		128.08	0.05	0.23		645.30	0.08
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.07					

* 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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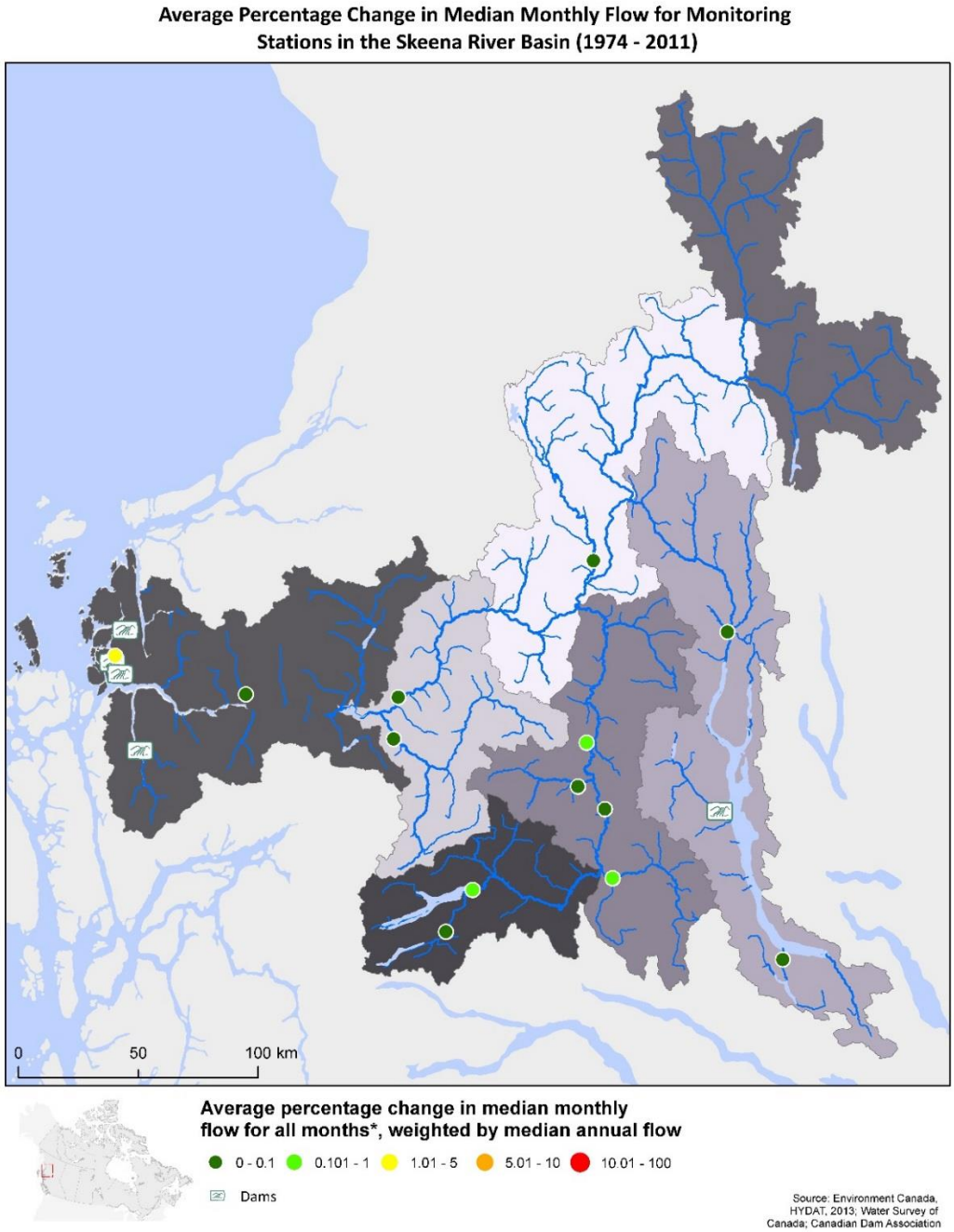
RECENT-TERM TRENDS IN MONTHLY FLOW FOR THE SKEENA SUB WATERSHED.

MAP. RESULTS OF A SERIES OF TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE SKEENA SUB-WATERSHED FOR THE PERIOD OF 1974-2011.



WWF-Canada Freshwater Report for the Skeena sub-watershed.

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

	Skeena															
	08EB004				08EC004				08EC013				08ED001			
	Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974	
	Median Annual Flow (m^3/s)		27.4		Median Annual Flow (m^3/s)		2.5		Median Annual Flow (m^3/s)		32.5		Median Annual Flow (m^3/s)		18.1	
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*
October	-0.16	0.38	41.1		0.00	0.50	2.5		0.00	1.00	33.1		-0.04	0.85	23.9	
November	0.09	0.44	23.9		0.01	0.50	2.7		0.09	0.43	29.5		0.08	0.51	20.0	
December	0.07	0.19	11.4		0.01	0.59	2.4		0.04	0.76	25.1		0.02	0.70	12.0	
January	0.08	0.04 *	8.0	1.03	0.01	0.15	2.2		0.01	0.93	22.7		0.04	0.25	8.3	
February	0.06	0.14	7.5		0.01	0.18	2.1		0.01	0.91	21.7		0.03	0.39	6.7	
March	0.09	0.11	9.2		0.00	0.89	2.2		0.01	0.82	20.8		0.01	0.58	5.6	
April	0.14	0.60	37.5		0.00	0.69	2.7		0.05	0.56	23.8		0.02	0.44	6.7	
May	-0.07	0.88	95.0		0.19	0.30	18.4		0.16	0.62	83.6		-0.05	0.88	44.2	
June	-0.11	0.76	110.2		-0.03	0.64	13.8		0.55	0.30	123.2		0.30	0.25	82.9	
July	-0.22	0.67	63.7		-0.03	0.50	5.2		0.12	0.72	92.9		-0.17	0.35	58.3	
August	-0.03	0.82	30.9		-0.02	0.09	2.8		0.08	0.81	58.6		-0.26	0.10	33.2	
September	0.36	0.18	32.5		0.00	0.92	2.7		-0.01	0.97	41.2		0.03	0.83	22.1	
Average for all months, for each station	0.03		39.23	0.09	0.01		4.97	0.00	0.09		48.02	0.00	0.00		27.00	0.00

* 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.

	Skeena															
	08ED002				08EE004				08EE008				08EE012			
	Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974	
	Median Annual Flow (m^3/s)		53.2		Median Annual Flow (m^3/s)		85.7		Median Annual Flow (m^3/s)		0.9		Median Annual Flow (m^3/s)		0.1	
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*
October	0.04	0.94	70.7		0.05	0.92	97.3		-0.01	0.17	1.1		0.00	0.43	0.1	
November	0.07	0.82	59.8		0.37	0.50	86.4		0.00	0.69	0.7		0.00	0.35	0.1	
December	0.06	0.76	37.0		0.20	0.44	49.6		0.00	0.82	0.3		0.00	0.01 **	0.0	1.98
January	0.04	0.59	25.7		0.38	0.01 **	34.9	1.08	0.00	0.26	0.2		0.00	0.00 **	0.0	2.43
February	0.05	0.69	20.9		0.28	0.05	29.1		0.00	0.11	0.2		0.00	0.19	0.0	
March	0.02	0.74	16.7		0.17	0.12	28.9		0.00	0.61	0.2		0.00	0.31	0.0	
April	0.03	0.58	16.8		0.31	0.47	67.2		0.00	0.20	0.9		0.00	0.66	0.1	
May	-0.06	0.93	76.3		0.67	0.60	286.1		0.00	0.96	4.4		0.00	0.52	0.4	
June	1.20	0.04 *	190.5	0.63	0.93	0.39	347.9		0.00	0.99	4.8		0.00	0.62	0.8	
July	-0.20	0.74	157.7		-0.30	0.72	220.9		-0.01	0.28	3.0		0.00	0.23	0.5	
August	-0.65	0.04 *	109.2	0.59	-0.59	0.12	134.6		-0.01	0.12	1.6		0.00	0.03 *	0.3	1.35
September	-0.01	0.98	74.0		0.02	0.95	91.9		-0.01	0.40	1.1		0.00	0.23	0.2	
Average for all months, for each station	0.05		71.29	0.10	0.21		122.89	0.09	0.00		1.55	0.00	0.00		0.23	0.48

* 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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	Skeena																			
	08EE013				08EF001				08EF005				08EG012				08EG016			
	Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974		Start Year for Analysis		1974	
	Median Annual Flow (m^3/s)		1.0		Median Annual Flow (m^3/s)		236.0		Median Annual Flow (m^3/s)		68.7		Median Annual Flow (m^3/s)		32.8		Median Annual Flow (m^3/s)		4.7	
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*
October	0.00	0.95	1.6		-2.54	0.50	401.9		-0.50	0.21	86.7		-0.10	0.68	42.7		0.12	0.05 *	9.3	1.33
November	0.02	0.07	1.7		0.91	0.70	249.9		0.30	0.36	56.6		0.07	0.44	21.3		0.12	0.10	8.6	
December	0.01	0.03 *	0.8	1.37	-0.64	0.64	154.9		0.06	0.83	33.4		-0.02	0.81	12.4		0.07	0.27	7.4	
January	0.01	0.04 *	0.5	1.61	0.50	0.32	122.6		0.15	0.20	24.6		0.05	0.54	9.7		0.18	0.00 ***	5.6	3.26
February	0.00	0.59	0.5		0.40	0.62	104.4		0.05	0.58	21.6		0.06	0.34	9.0		0.09	0.01 **	4.9	1.81
March	0.00	0.85	0.7		0.31	0.47	98.5		0.01	0.82	21.8		0.05	0.47	11.0		0.13	0.00 ***	5.1	2.65
April	0.02	0.29	4.2		0.83	0.67	182.9		0.19	0.57	46.3		0.03	0.81	24.8		0.00	1.00	6.0	
May	0.05	0.71	20.0		3.64	0.55	797.2		0.87	0.37	184.9		0.16	0.34	54.8		0.06	0.16	4.7	
June	-0.06	0.56	9.6		8.13	0.41	1404.8		-0.60	0.67	262.3		0.03	0.81	73.8		0.04	0.19	3.5	
July	-0.01	0.73	2.6		-5.65	0.44	879.0		-1.33	0.12	184.8		-0.21	0.39	69.8		0.07	0.00 **	2.7	2.49
August	0.00	0.68	0.8		-3.58	0.27	500.8		-0.65	0.17	117.7		-0.24	0.19	56.0		0.07	0.02 *	2.7	2.51
September	0.00	0.55	0.9		2.16	0.45	369.0		0.20	0.54	85.3		0.29	0.18	47.6		0.16	0.00 ***	5.5	2.94
Average for all months, for each station	0.00		3.65	0.25	0.37		438.83	0.00	-0.10		93.84	0.00	0.02		36.07	0.00	0.09		5.50	1.42

* 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	0.04

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TABLE . RESULTS OF LINEAR REGRESSION ANALYSES FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE SKEENA SUB-WATERSHED.

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
Skeena	08EE004	1936	1069.208	219.7103	4.86644	6.2E-06	-0.493	0.11132	-4.428	3.2E-05 ***	0.19882	19.61	3.2E-05 ***
	08EF001	1936	760.1523	1231.584	0.61722	0.53899	-0.094	0.62402	-0.15	0.88098	-0.0132	0.023	0.88098

TABLE . RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE SKEENA SUB-WATERSHED.

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
Skeena	08EE004	1936	-0.4563859	-805	0.0003109 ***	95.427632	0.4782534	0.4782534
	08EF001	1936	-0.032563	-14	0.9535043	407.60693	0	

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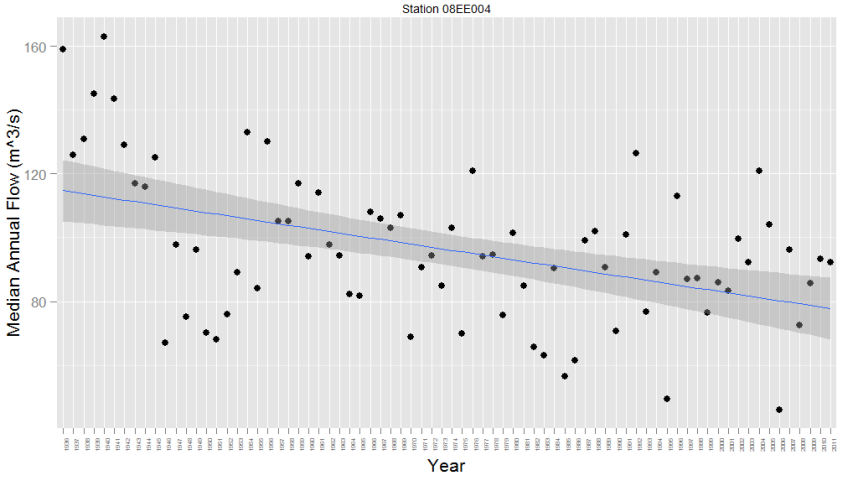
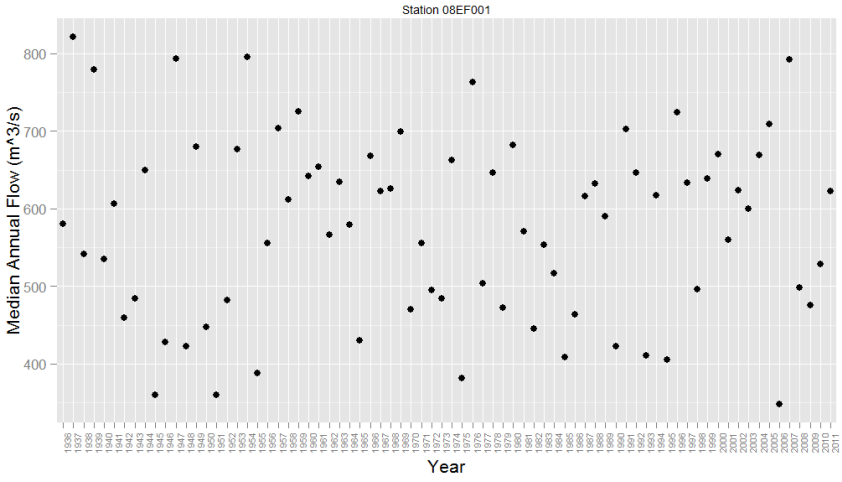
FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE SKEENA SUB-WATERSHED.



Intercept = 1069.2 ; Intercept STE = 219.71 ; Intercept T-Statistic 4.8664 ; Intercept p-value = 6.2459e-06
Slope = -0.49299 ; Slope STE = 0.11132 ; Slope T-Statistic -4.4285 ; Slope p-value = 3.223e-05
F-Statistic: 19.611 ; p-value: 3.223e-05
Theil-Sen Slope = -0.4564 ; Mann-Kendal Score = -805 ; Mann-Kendall p-value = 0.00031085



Intercept = 760.15 ; Intercept STE = 1231.6 ; Intercept T-Statistic 0.61722 ; Intercept p-value = 0.53899
Slope = -0.093753 ; Slope STE = 0.62402 ; Slope T-Statistic -0.15024 ; Slope p-value = 0.88098
F-Statistic: 0.022572 ; p-value: 0.881
Theil-Sen Slope = -0.03256 ; Mann-Kendal Score = -14 ; Mann-Kendall p-value = 0.9535

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TABLE . NON-PARAMETRIC COMPARISON OF VARIANCE FOR HISTORICAL VS. RECENT MONTHLY FLOW IN THE SKEENA SUB-WATERSHED.

		Historical			Recent			Fligner-Killeen		Mann-Whitney				
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****
08EC001	January	29	24.2	7.26474	5	19.8	1.4826	134.99165	3.316E-31 ***	96786.5	9.43E-15 ***	18.2%	13.7%	
	February	29	21.8	4.89258	5	19.2	3.26172	54.472446	1.58E-13 ***	78495	1.08769E-11 ***	11.9%		
	March	29	19.2	4.29954	5	18.8	2.52042	57.565639	3.269E-14 ***	82414	0.000272222 ***	2.1%		
	April	29	18.75	5.26323	5	18.7	2.2239	64.853002	8.07E-16 ***	69437	2.09E-01	0.3%		
	May	30	54.3	37.065	5	51	27.27984	26.414897	2.754E-07 ***	77231.5	0.058160162	6.1%		
	June	30	118	45.9606	5	88.05	30.17091	66.625625	3.28E-16 ***	95317	5.97513E-16 ***	25.4%		
	July	30	95.25	37.50978	5	75.6	11.8608	112.06589	3.456E-26 ***	96776.5	7.98E-12 ***	20.6%		
	August	30	65.7	23.57334	5	55.4	10.52646	78.831744	6.76E-19 ***	94045.5	1.18E-09 ***	15.7%		
	September	29	45	13.04688	5	39.4	6.81996	73.787178	8.701E-18 ***	89048	9.21E-13 ***	12.4%		
	October	29	36.5	11.56428	5	30.6	2.66868	142.19188	8.829E-33 ***	100452.5	1.44039E-18 ***	16.2%		
	November	30	32	11.93493	5	25.35	1.85325	170.22189	6.62E-39 ***	99183.5	8.41E-22 ***	20.8%		
	December	29	26.7	9.93342	5	20.9	1.33434	187.92366	9.03E-43 ***	109654	3.20E-30 ***	21.7%		
08EE004	January	29	37.4	16.75338	31	33	8.74734	50.47282	1.21E-12 ***	471723	5.94E-04 ***	11.8%	12.6%	12%
	February	29	30.6	13.3434	31	28.8	8.00604	65.934142	4.66E-16 ***	371677	1.84E-01	5.9%		
	March	29	24.1	8.8956	31	26.8	5.48562	24.730041	6.59E-07 ***	370893	1.32E-07 ***	11.2%		
	April	30	46.4	32.02416	31	63.25	47.81385	93.014015	5.19E-22 ***	328170	1.32E-15 ***	36.3%		
	May	30	283	126.021	31	296	128.9862	0.2427262	6.22E-01	429388	0.140950986	4.6%		
	June	30	351	109.7124	31	342.5	108.2298	0.0005121	9.82E-01	438673.5	0.074246764	2.4%		
	July	30	235	74.13	31	212	63.7518	2.3145719	1.28E-01	528269	6.99864E-12 ***	9.8%		
	August	30	146	38.5476	31	126	31.1346	47.772696	4.79E-12 ***	591798	2.75022E-34 ***	13.7%		
	September	30	101	25.9455	31	88.5	21.4977	1.5768196	2.09E-01	524649.5	5.83E-21 ***	12.4%		
	October	30	103	34.24806	31	84.4	39.14064	6.4151558	1.13E-02 *	553122.5	3.51E-19 ***	18.1%		
	November	30	93.3	44.77452	31	77.1	40.62324	15.718721	7.35E-05 ***	515081.5	1.27E-17 ***	17.4%		
	December	29	56.6	20.90466	31	45	16.60512	40.364014	2.11E-10 ***	556180	7.29E-27 ***	20.5%		
08EF001	January	29	180	60.7866	31	177	51.891	6.5043459	1.08E-02 *	436363.5	0.704261719	1.7%	11.1%	
	February	29	147.5	55.5975	31	160	31.1346	106.51067	5.70E-25 ***	325872	1.09E-03 **	8.5%		
	March	30	136	42.9954	31	163	37.065	0.344032	0.557511	294726.5	1.32E-37 ***	19.9%		
	April	30	283	169.0164	31	373	238.6986	93.684014	3.701E-22 ***	314803	4.47745E-20 ***	31.8%		
	May	30	1680	882.147	31	1810	1037.82	3.5579295	0.0592616	400070.5	8.07944E-05 ***	7.7%		
	June	30	2735	919.212	31	2745	926.625	1.7325736	0.1880826	439280	6.60E-02	0.4%		
	July	30	1825	659.757	31	1620	637.518	1.2977894	0.2546174	534385	1.66954E-13 ***	11.2%		
	August	30	966	332.1024	31	832	278.7288	19.644046	9.329E-06 ***	568420	1.3114E-24 ***	13.9%		
	September	30	742	277.2462	31	700.5	298.7439	4.6855633	0.0304171 *	447808	0.009504042 **	5.6%		
	October	30	805.5	377.3217	31	691	271.3158	36.975344	1.196E-09 ***	531739.5	8.68E-13 ***	14.2%		
	November	30	463	228.3204	31	445.5	206.8227	30.277237	3.745E-08 ***	468388.5	1.01E-05 ***	3.8%		
	December	29	258	99.3342	31	214	84.5082	6.5250383	1.06E-02 *	524102.5	1.73E-15 ***	17.1%		

* 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.

** Sub-watershed value is weighted average based on median annual flow per station.

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FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR HISTORICAL VS. RECENT PERIODS IN SKEENA SUB-WATERSHED.

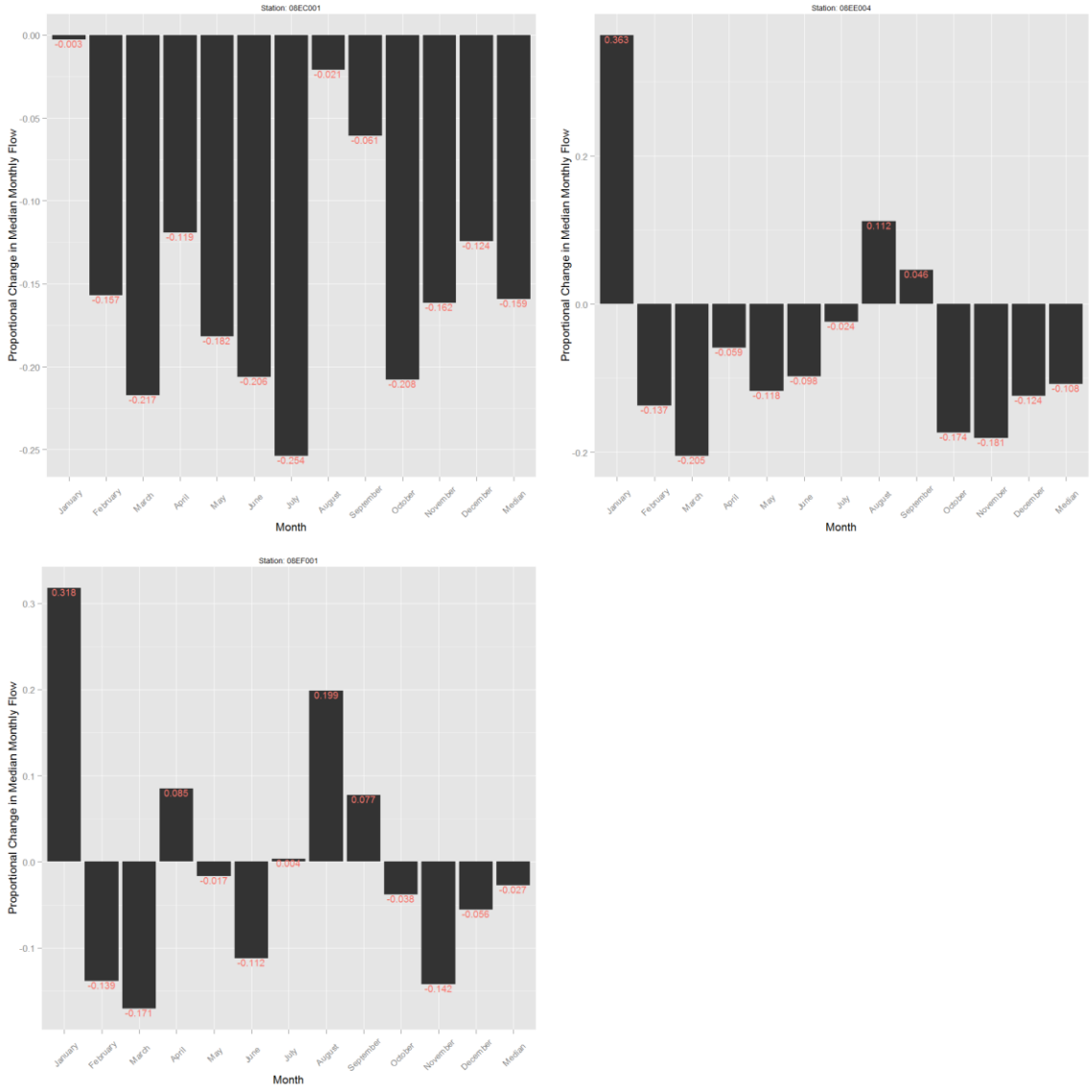

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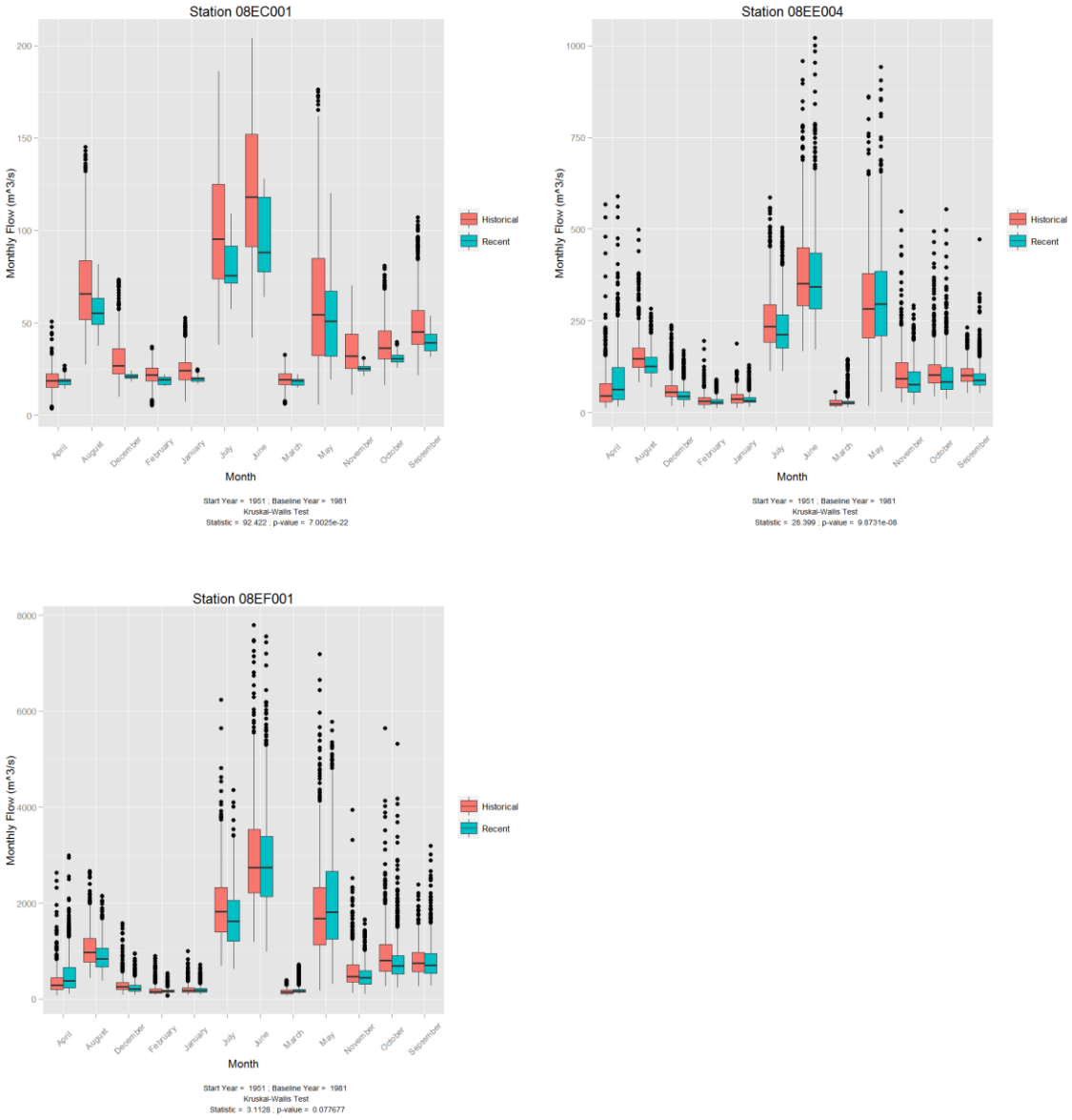
FIGURE. MONTHLY FLOW FOR HISTORICAL VS. RECENT TIME PERIODS IN THE SKEENA SUB-WATERSHED.



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WATER QUALITY

OVERALL WATER QUALITY HEALTH SCORING

	Indicator			*08E – Sub-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 for the last five years of monitoring.	*Year*	2010 - 2014
			Number of Stations	78
			Value	0.106
			Water Quality Health Category	**Good**
			Water Quality Health Score	4
		Variance of annual water quality scores	*Value*	0.045
		Significant Mann-Kendal time-series test to determine directional trend in proportion of exceedance of water quality thresholds.	*Time Period*	1966-2014
			Trend	No trend

WATER QUALITY DATA SUFFICIENCY

	Data Sufficiency Indicator	**Basin**
Water Quality	Total number of sub-sub-watersheds	7
	Year of earliest available monitoring	1966
	Number of monitoring stations available for earliest monitoring	2
	Number of sub-sub-watersheds with earliest available monitoring stations	2
	Year of most recently available monitoring	2014
	Number of monitoring stations available within last five years	97
	Number of sub-sub-watersheds within last five years	6
	Percentage of samples with at least 10 elements measured within last 5 years.	55.51%
	Number of years of sampling in last 10 years	10
	Overall Data Sufficiency Category	Partially Sufficient
	Data Sufficiency Score	1

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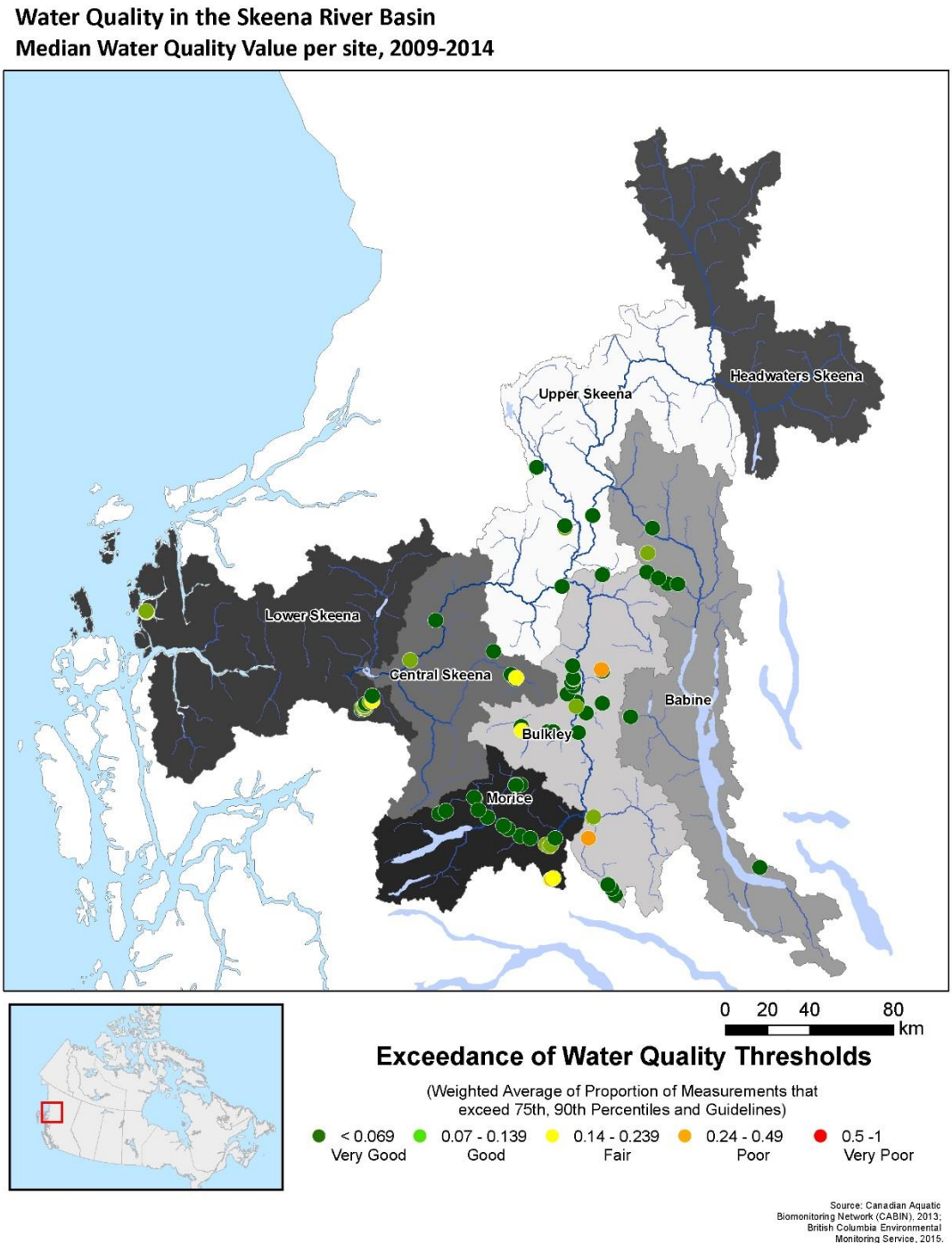
MAP. EXCEEDANCE OF WATER QUALITY THRESHOLDS AS REPORTED FOR MONITORING STATIONS IN THE SKEENA SUB-WATERSHED FOR THE FIVE MOST RECENT YEAR AVAILABLE.



WWF-Canada Freshwater Report for the Skeena sub-watershed.
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TABLE. WATER QUALITY IN THE SKEENA SUB-WATERSHED BASED ON PROPORTION OF EXCEEDANCE OF THREE THRESHOLDS: PROVINCIAL WATER QUALITY GUIDELINES, 75TH PERCENTILE OF HISTORICAL DISTRIBUTION, AND 90TH PERCENTILE OF HISTORICAL DISTRIBUTION.

Sub-watershed	Year	Source	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-year weighted average
08E - Skeena	2014	BC.EMS	13	17	867	56	0.065	44	0.051	87	0.100	0.066	0.106
	2013	BC.EMS	14	20	2512	164	0.065	152	0.061	266	0.106	0.070	
		EC	16	2	402	40	0.100	57	0.142	168	0.418	0.167	
	2012	BC.EMS	14	20	223	18	0.081	30	0.135	43	0.193	0.117	
		EC	16	2	699	85	0.122	57	0.082	148	0.212	0.123	
	2011	BC.EMS	13	22	514	49	0.095	34	0.066	58	0.113	0.089	
		CABIN	6	5	41	0	0.000	0	0.000	3	0.073	0.012	
		EC	16	2	434	95	0.219	55	0.127	134	0.309	0.203	
	2010	BC.EMS	13	17	437	13	0.030	21	0.048	27	0.062	0.041	
		CABIN	8	7	116	15	0.129	6	0.052	12	0.103	0.099	
		EC	4	1	369	54	0.146	58	0.157	132	0.358	0.185	
	2009	BC.EMS	13	19	220	7	0.032	19	0.086	35	0.159	0.071	
		CABIN	10	8	158	24	0.152	0	0.000	26	0.165	0.103	
		EC	4	1	621	120	0.193	88	0.142	246	0.396	0.210	

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FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE SKEENA SUB-WATERSHED.

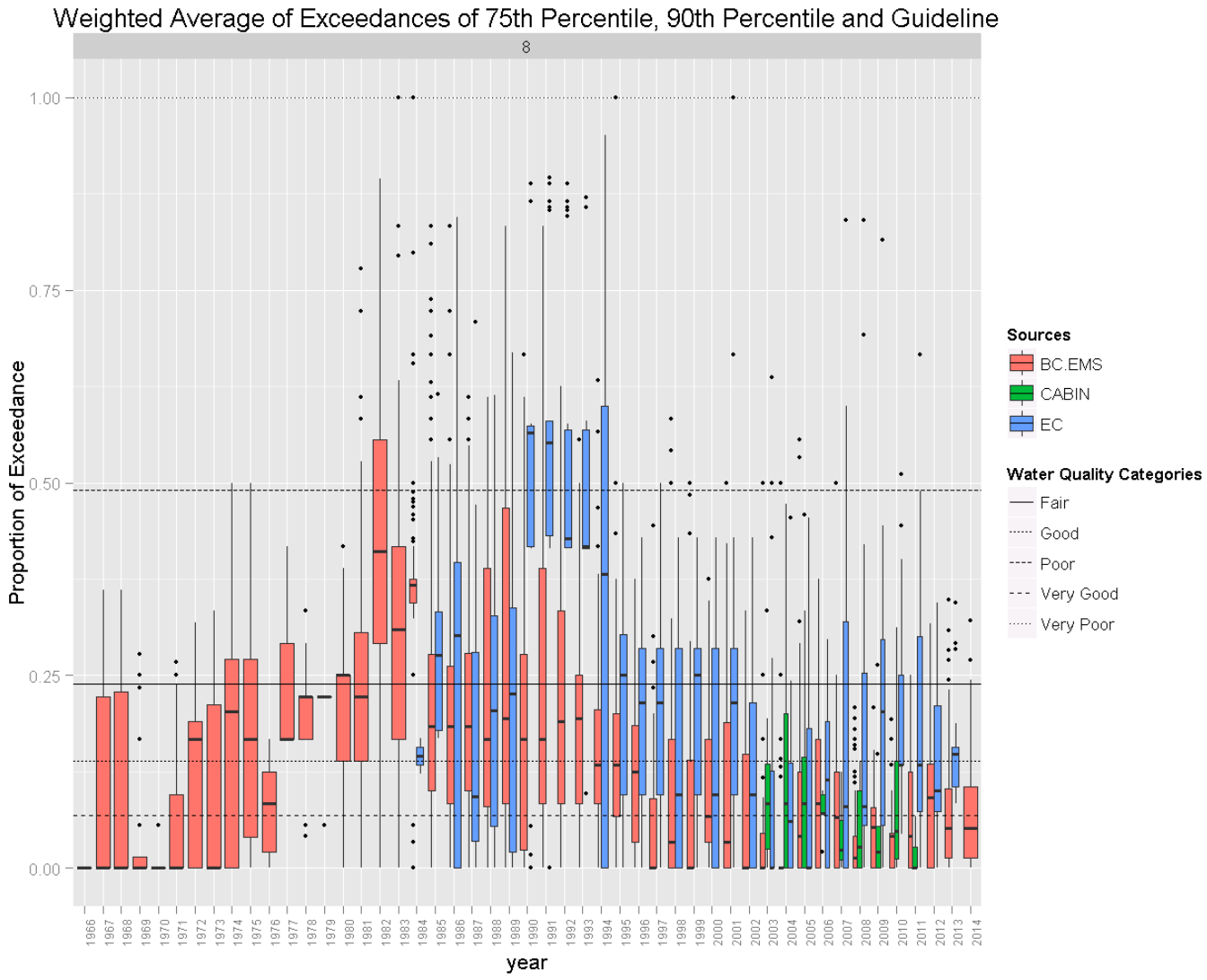

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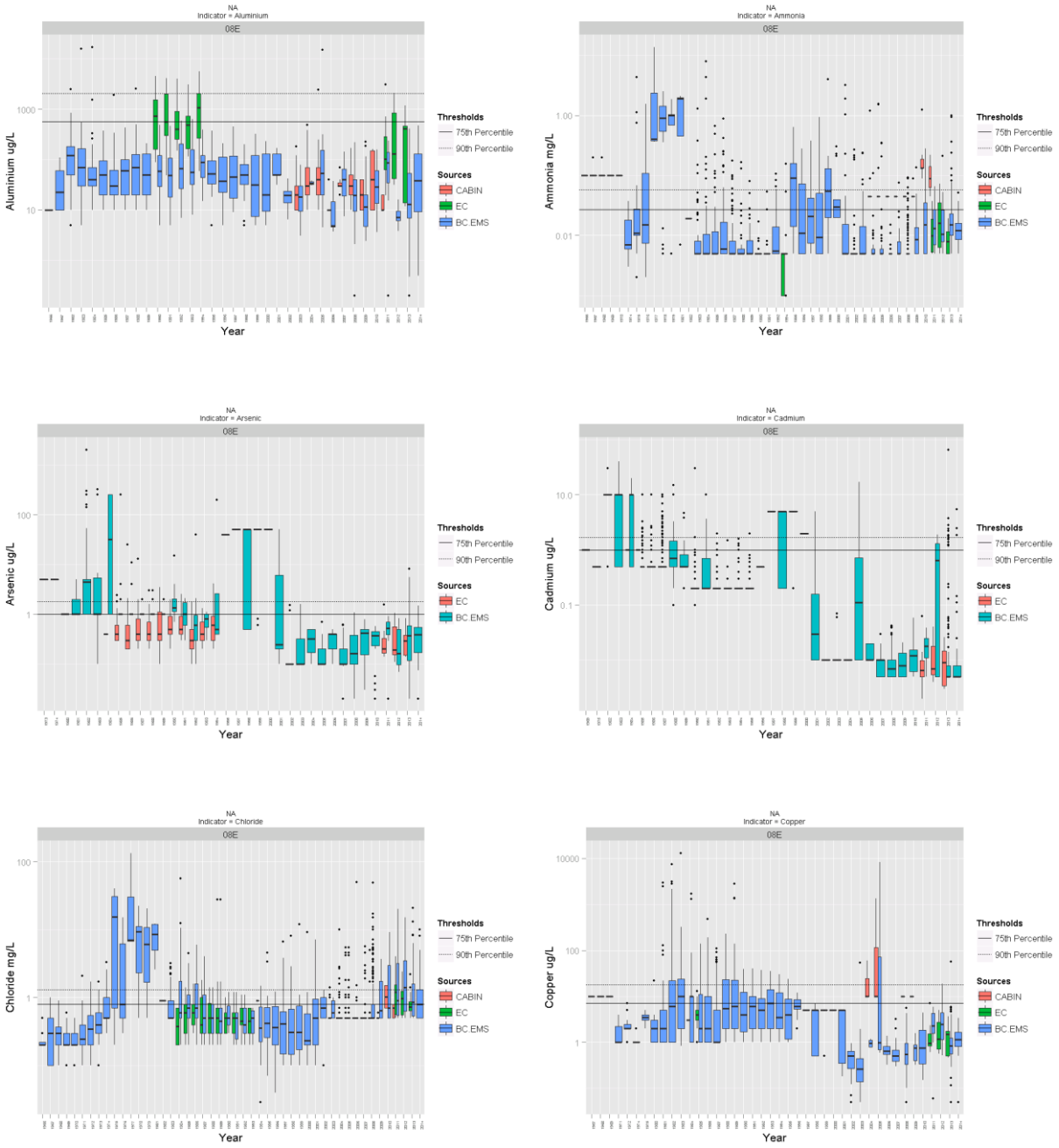
FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE SKEENA SUB-WATERSHED, BY CONTAMINANT.



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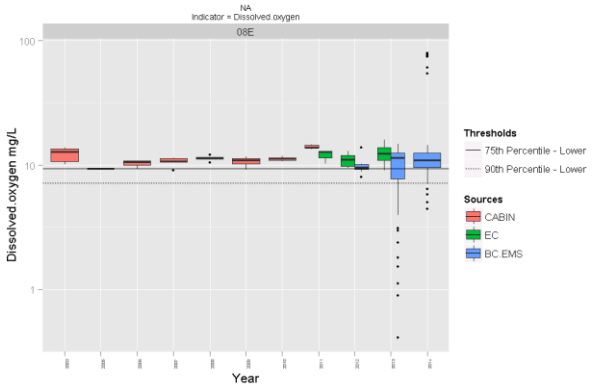

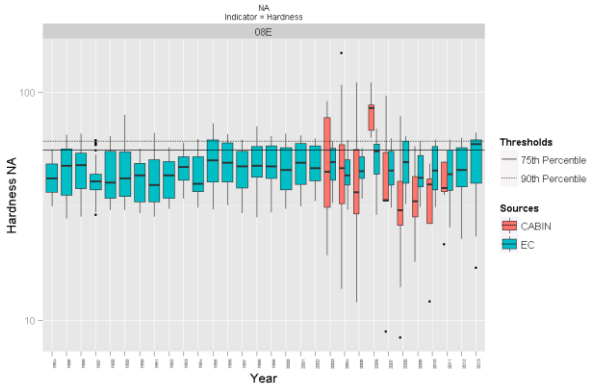

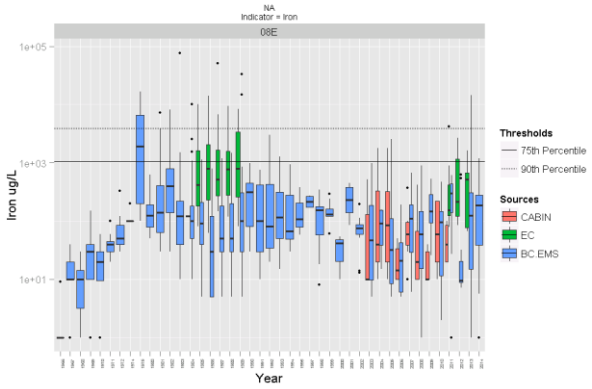

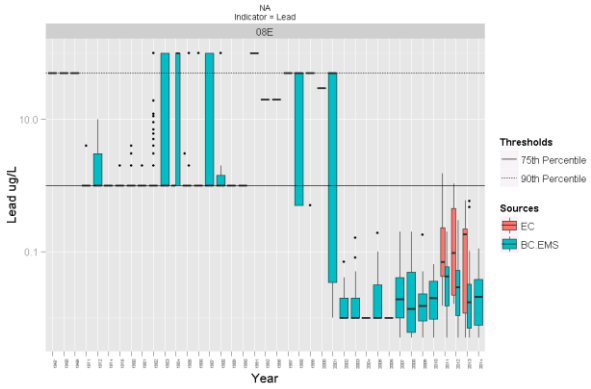

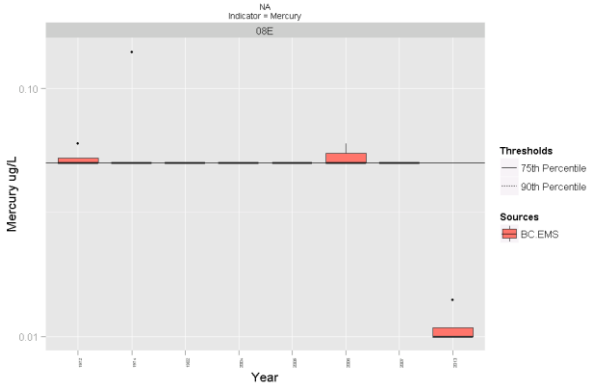

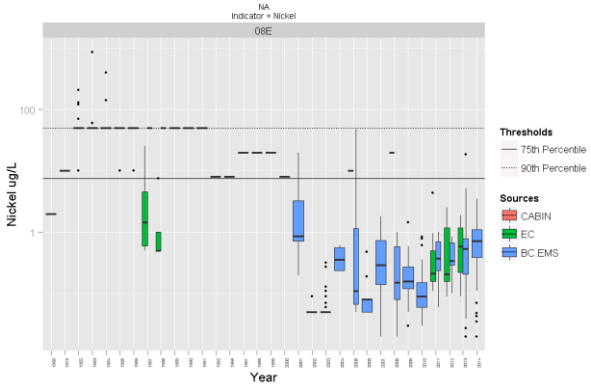

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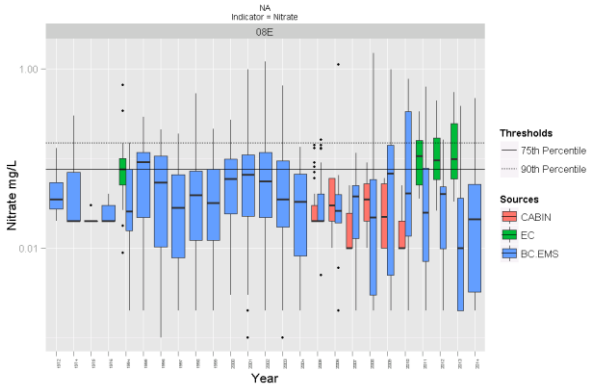

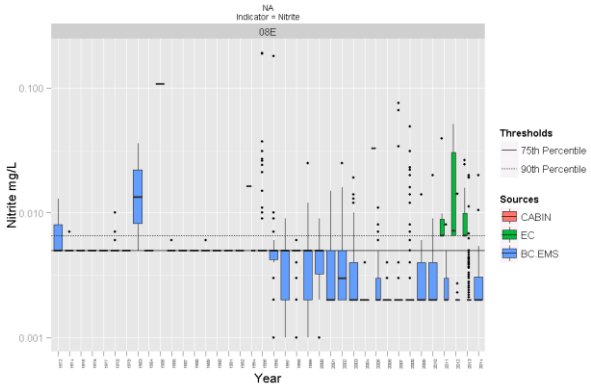

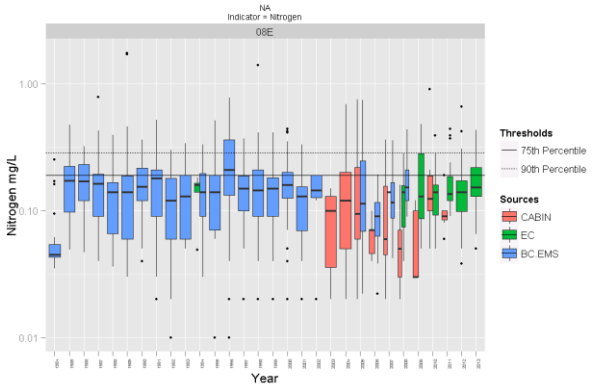

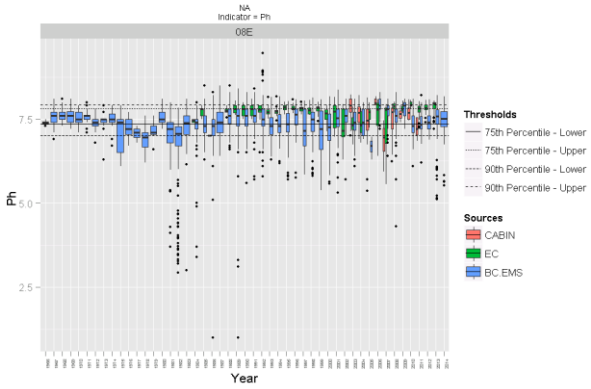

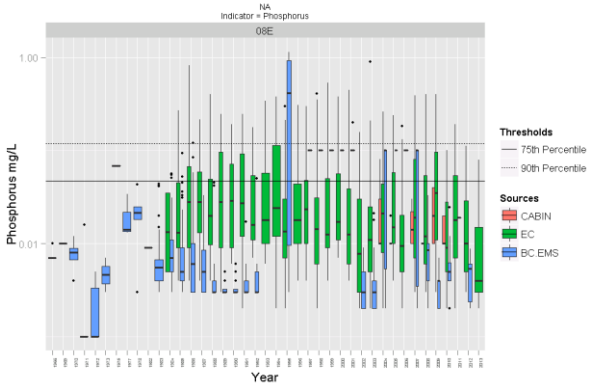

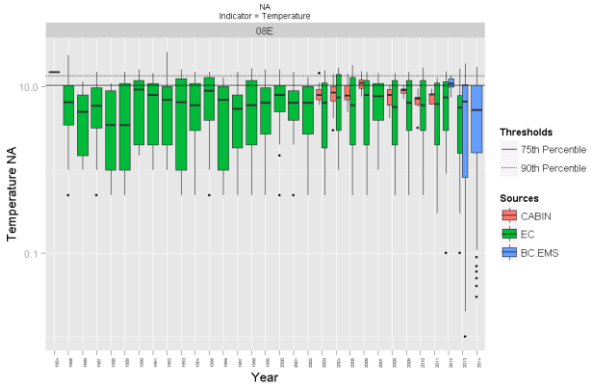

WWF-Canada Freshwater Report for the Skeena sub-watershed.

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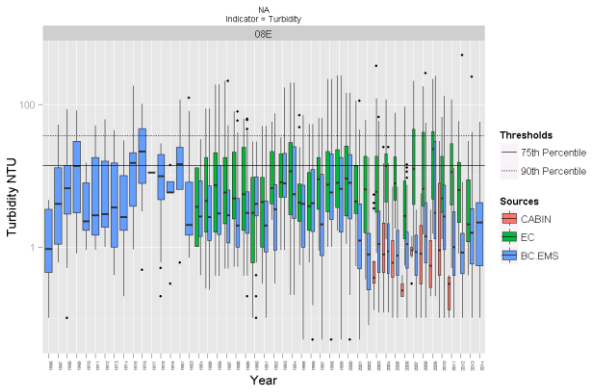

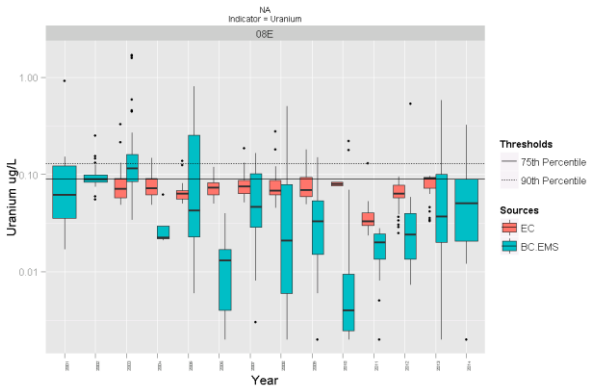

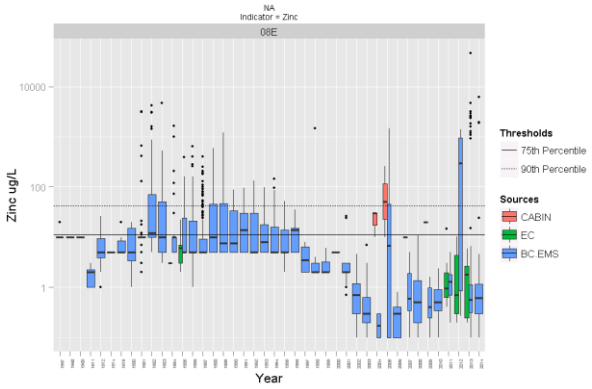

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TABLE . RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF ANNUAL EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME IN THE SKEENA SUB-WATERSHED.

WSCSDA	Source	Start Year	End Year	Number of Years	Number of Sites	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
08E - Skeena	All	1966	2014	49	435	-0.002	-162	0.162
	BC.EMS	1966	2014	49	312	-0.002	-172	0.137
	CABIN	2003	2011	9	121	-0.010	-25	0.011 *
	EC	1984	2013	30	2	-0.008	-163	0.004 **

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FISH

OVERALL FISH HEALTH SCORING

	Indicator			*08E – Sub-watershed*
Fish	**Change in Native Fish Species Richness**		*Period of Study*	1926 - 2012
			Number of Sites	8741
		Presence of statistically significant decline in median species richness for the Sub-watershed.	*Trend*	None
		Presence of statistically significant decline in total species richness for the sub-watershed.	*Trend*	None
			Fish Health Category	**Good**
			Fish Health Score	4

FISH DATA SUFFICIENCY

	Data Sufficiency Indicator	**08E - Sub-watershed**
Fish	Total number of sub-sub-watersheds	7
	Year of earliest available monitoring	1926
	Number of sampling locations available for earliest monitoring	1
	Number of sub-sub-watersheds with earliest available sampling locations	1
	Earliest year of continuous monitoring	1972
	Number of sampling locations available for first year of continuous monitoring	7
	Number of sub-sub-watersheds for first year of continuous monitoring	1
	Year of most recently available monitoring	2012
	Number of monitoring stations available within last five years	26
	Number of sub-sub-watersheds within last five years	3
	Number of years of sampling in last 10 years	8
	Overall Data Sufficiency Category	Partially Sufficient
	Data Sufficiency Score	1

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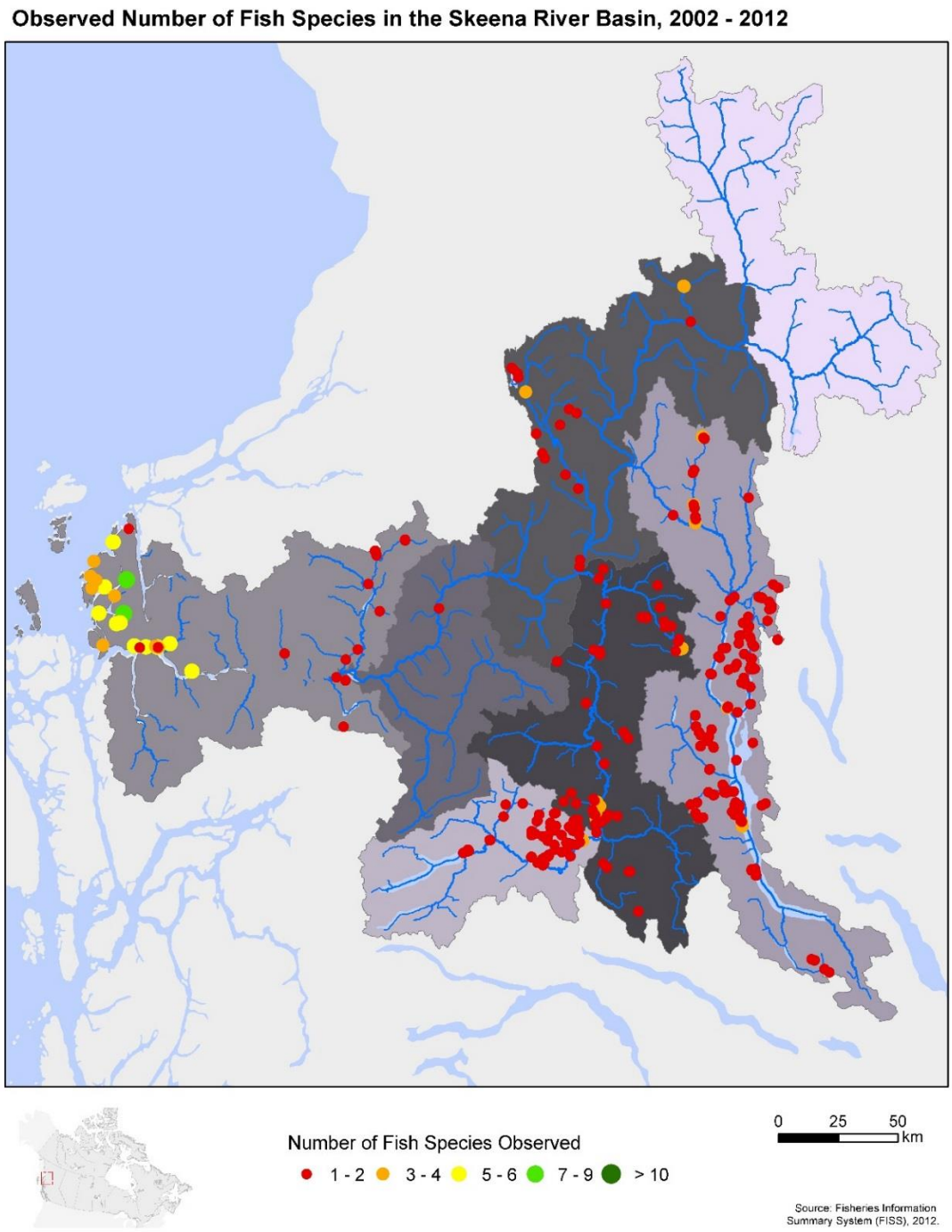

FIGURE.NON-PARAMETRIC ANALYSIS OF VARIANCE IN FISH SPECIES RICHNESS IN THE SKEENA SUB-WATERSHED (1926-2012).

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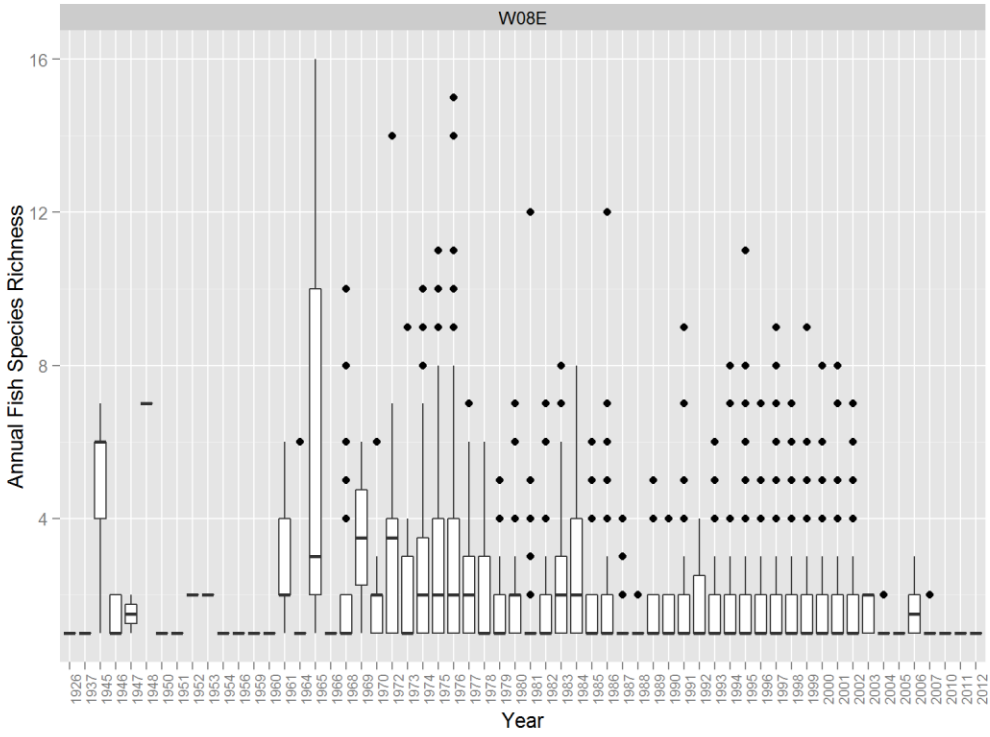

FIGURE.TIME-SERIES OF NATIVE FISH SPECIES RICHNESS IN THE SKEENA SUB-WATERSHED (1926-2012).

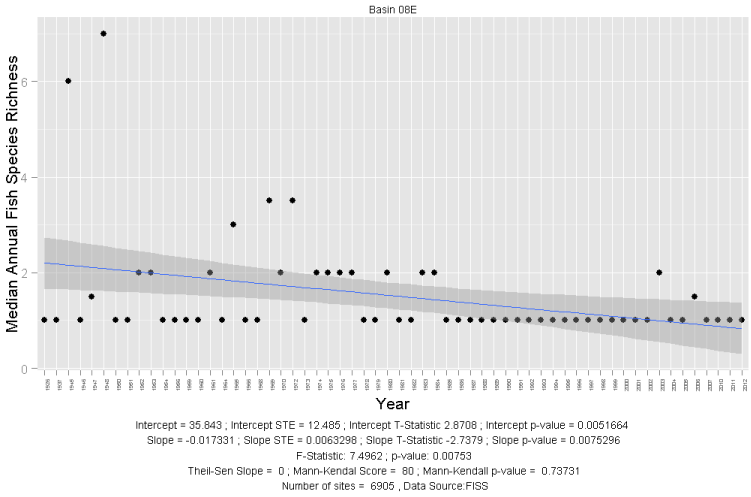

FIGURE. TIME-SERIES OF TOTAL FISH SPECIES RICHNESS IN THE SKEENA SUB-WATERSHED (1926-2012).

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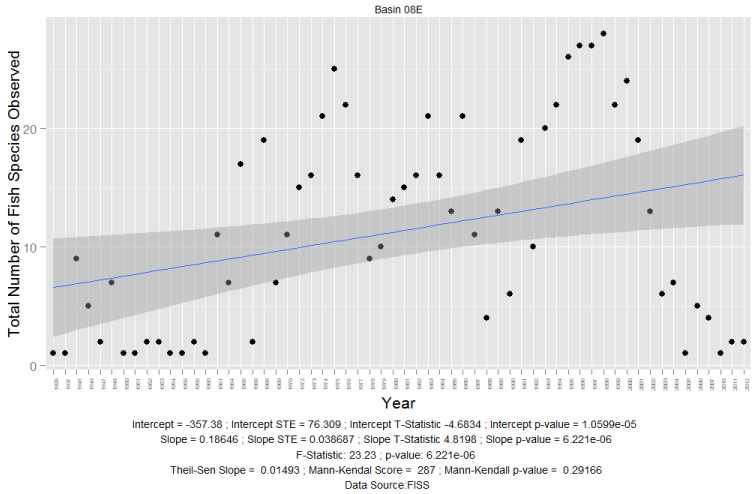

TABLE . RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF FISH SPECIES RICHNESS OVER TIME IN THE SKEENA SUB-WATERSHED.

Indicator	Data Source	Start Year	End Year	Theil-Sen Slope	Mann-Kendall Test Score	Mann-Kendal Test p-value
Total Species Richness	Fisheries Information Summary System (FISS)	1926	2012	0.0149	287	0.29166
Median Species Richness	Fisheries Information Summary System (FISS)	1926	2012	0.0000	80	0.73731

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BENTHICS

OVERALL BENTHIC HEALTH SCORING

	Indicator			*08E - Sub-watershed*
Benthic Macro-Invertebrates	**Index of benthic community composition based on sensitivity to disturbance**	Median Hilsenhoff Biotic Index (HBI) score for the sub-watershed, based on the five most recent years of monitoring.	*Year*	2007- 2012
			Number of Sites	38
			Value	3.14
			Benthic Health Category	**Very Good**
			Benthic Health Score	5
		Variance of annual HBI scores	*Value*	0.911
		Significant Mann-Kendal time-series test to determine directional trend in **HBI** over time.	*Time Period*	1999-2010
			Trend	Negative

BENTHIC DATA SUFFICIENCY

	Data Sufficiency Indicator	08E - Sub-watershed
Benthic Macro-Invertebrates	Total number of sub-sub-watersheds	7
	Year of earliest available monitoring	1999
	Number of monitoring stations available for earliest monitoring	39
	Number of sub-sub-watersheds with earliest available monitoring stations	2
	Year of most recently available monitoring	2011
	Number of monitoring stations available within last five years	46
	Number of sub-sub-watersheds within last five years	7
	Number of years of sampling in last 10 years	8
	Overall Data Sufficiency Category	Sufficient
	Data Sufficiency Score	3

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MAP. HILSENHOFF'S BIOTIC INDEX SCORES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES IN THE SKEENA SUB-WATERSHED (2007-2011).

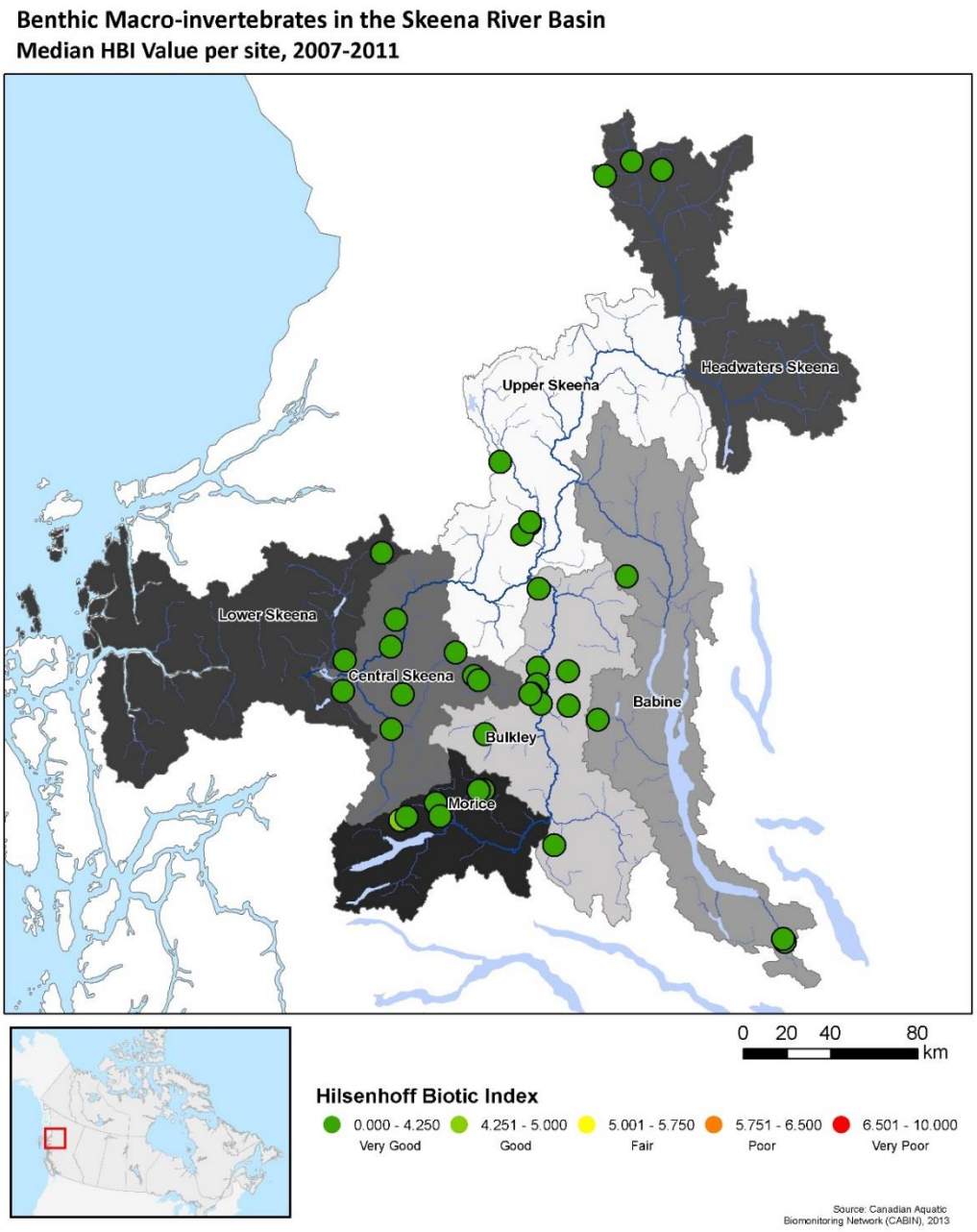

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FIGURE. ANALYSIS OF VARIANCE FOR HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE SKEENA SUB-WATERSHED.

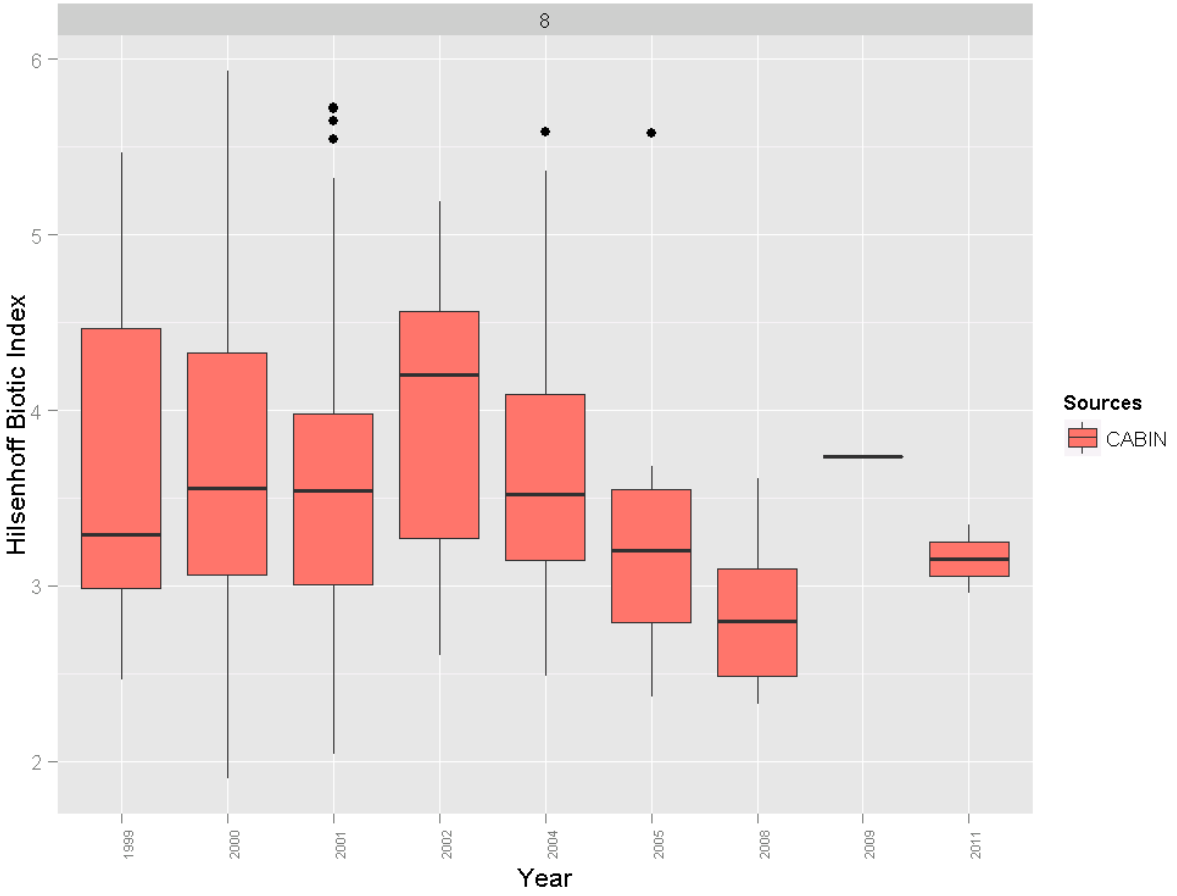

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Table . hilsenhoff's biotic index valuses for benthic macro-invertebrate communities sampled in the Skeena Sub-watershed, by year and data source.

Sub-watershed	Year	Data Source	Number of Sites	HBI Value	3-Years Weighted Average
08E - Skeena	2011	CABIN	2	3.152038	3.004
	2009	CABIN	1	3.734244	
	2008	CABIN	5	2.79802	
	2005	CABIN	12	3.204659	
	2004	CABIN	28	3.522066	
	2002	CABIN	3	4.201177	
	2001	CABIN	10	3.540832	
	2000	CABIN	20	3.553333	
	1999	CABIN	5	3.294014	

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

WSCSDA	Data Source	Start Year	End Year	Number of Sites	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
Skeena	All (CABIN)	1999	2011	63	0.002	6	0.759

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FRESHHWATEHREATS ASSESSMENT

SUMMARY

TABLE. OVERALL SCORING RESULTS FRESHWATER THREATS ASSESSMENT OF SKEENA SUB-WATERSHED, BY SUB-WATERSHED AND PEARSE WATERSHED

SUB WATERSHED SCORE			
WSCSDA	**SUB WATERSHED NAME**	**SCORE**	**FINAL SCORE (*MEDIAN*)**
08E	Skeena - Coast	THREAT CLASSIFICATION	Moderate
		SCORE	40

TABLE. SCORING RESULTS FRESHWATER THREAT INDICATORS OF SKEENA SUB-WATERSHED, BY SUB-WATERSHED AND PEARSE WATERSHED

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**
08E	Skeena - Coast	THREAT CLASSIFICATION	Low	Moderate	Low	Unknown	Moderate	Low	Very low	54,328,824,641	17.02%
		SCORE	40	66.67	40	-9999	50	25	20		

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SUB-INDICATOR SCORES BY SUB-WATERSHED

POLLUTION

TABLE 16. 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
08E	Skeena - Coast	35.21	20	Very Low	0	0	None	0	0	None	0.11	40	Low	0.07	20	Very Low	0	20	Very Low

CLIMATE CHANGE

TABLE 17. 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
08E	Skeena - Coast	0.05	33.33	Low	-0.91	66.67	Moderate	-0.07	66.67	Moderate	-0.09	66.67	Moderate

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ALTERATION OF WATER FLOWS

TABLE 18. 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
08E	Skeena - Coast	19.5	40	Low

INVASIVE SPECIES

TABLE 19. 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
08E	Skeena - Coast	-9999	-9999	Unknown

WATER USE

TABLE 20. SCORING RESULTS OF WATER USE THREAT BY SUB-INDICATOR AND SUB-WATERSHED

		SUB-INDICATOR		
		Water Use		
WSCSDA	**SUB WATERSHED NAME**	Value	Score	Threat Classification
08E	Skeena - Coast	N/A	25	Low

FRAGMENTATION

TABLE 21. 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
08E	Skeena - Coast	0.41	40	Low	0	60	Moderate

TABLE 22. 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
08E	Skeena - Coast	0.39	20	Very Low	-1.65	0	None

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