

WWF-CANADA

FRESHWATER HEALTH ASSESSMENT

Yukon River Watershed



November 2015

YUKON RIVER WATERSHED REPORT

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WWF-Canada Freshwater Health Assessment and Freshwater Threats Assessment for the Yukon River Watershed.

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

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FRESHWATER HEALTH ASSESSMENT

SUMMARY

OVERALL RIVER HEALTH SCORING

	Indicator		Sub-Basin								Basin
			09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	
Overall River Health	Hydrology	Hydrology Health Category	Good	Good	Data deficient	Data Deficient	Good	Data Deficient	Data Deficient	Data Deficient	Data Deficient
		Hydrology Score	4	4	Data deficient	Data Deficient	4	0	Data Deficient	Data Deficient	0
	Water Quality	Water Quality Health Category	Good	Good	Fair	Good	Fair	Data Deficient	Data Deficient	Data Deficient	Fair
		Water Quality Health Score	4	4	3	4	3	Data Deficient	Data Deficient	Data Deficient	3
	Benthic Macro-Invertebrates	Benthic Health Category	Very Good	Very Good	Good	Very Good	Good	Fair	Fair	Data deficient	Good
		Benthic Health Score	5	5	4	5	4	3	3	Data deficient	4
	Fish	Fish Health Category	Good	Good	Data deficient	Good	Good	Data deficient	Data deficient	Data deficient	Good
		Fish Health Score	4	4	0	4	4	0	0	0	4
	Total Score		17	17	7	13	15	4	3	0	11
	Total Available Score		20	20	10	15	20	10	5	0	15
	Percentage of Maximum Score		85.0%	85.0%	70.0%	86.7%	75.0%	40.0%	60.0%	0.0%	73.3%
	Overall Health Category		Good	Good	Data deficient	Good	Good	Data deficient	Data deficient	Data deficient	Good

OVERALL DATA SUFFICIENCY SCORING

Indicator		Sub-Basin								Basin
		09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H – Tanana	09M – Copper	
Hydrology	Data Sufficiency Category	Moderately Sufficient	Partially Sufficient	Insufficient	Insufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Insufficient
	Data Sufficiency Score	2	1	0	0	1	0	0	0	0
Water Quality	Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Partially Sufficient
	Data Sufficiency Score	1	1	1	1	1	0	0	0	1
Benthic Macro-Invertebrates	Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Moderately Sufficient	Insufficient	Partially Sufficient
	Data Sufficiency Score	1	1	1	1	1	1	2	0	1
Fish	Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Insufficient	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Partially Sufficient
	Data Sufficiency Score	1	1	0	1	1	0	0	0	1
Total Score		5	4	2	3	4	2	2	0	3
Total Available Score		12	12	12	12	12	12	12	12	12
Percentage of Maximum Score		41.7%	33.3%	16.7%	25.0%	33.3%	16.7%	16.7%	0.0%	25%
Overall Data Sufficiency Category		Partially Sufficient	Partially Sufficient	Insufficient	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Partially Sufficient

OVERALL HYDROLOGY RIVER HEALTH SCORING

											Basin
Indicator			09A - Headwater s Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	
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	1950-2013	1960-2013	-	1963-2013	1965-2013	-	-	-	Various
		Number of Stations	3	2	-	1	1	-	-	-	7
		Value	0.04	0.80	-	0.70	0.15	-	-	-	0.37
		Health Category	Very Good	Good	-	Good	Good	-	-	-	Good
		Health Score	5	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	1982-2013	1972-2013	1981-2013	1979-2013	1983-2013	1976-2013	-	-	Various
		Number of Stations	8	3	3	2	4	1	-	-	21
		Value	0.03	0	0.06	0.17	0.00	1.96	-	-	0.1
		Health Category	Very Good	Very Good	Very Good	Good	Very Good	Fair	-	-	Good
		Health Score	5	5	5	4	5	3	-	-	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	1950-2013	1960-2013	-	1963-2013	1965-2013	-	-	-	Various
		Number of Stations	3	2	-	1	1	-	-	-	7
		Value	0.24	0.64	-	0.62	0.74	-	-	-	0.5
		Health Category	Very Poor	Very Poor	-	Very Poor	Very Poor	-	-	-	Very Poor
		Health Score	4	4	-	4	4	-	-	-	1
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	1950-2013	1960-2013	-	1963-2013	1965-2013	1976-2013	-	-	Various
		Number of Stations	3	2	-	1	1	1	-	-	8
		Value	58.33%	75.00%	-	83.33%	58.33%	100.00%	-	-	70.8%
		Health Category	Poor	Very Poor	-	Very Poor	Poor	Very Poor	-	-	Very Poor
		Health Score	2	1	-	1	2	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	1950-2013	1960-2013	-	1963-2013	1965-2013	1976-2013	-	-	Various
		Number of Stations	3	2	-	1	1	1	-	-	8
		Value	23.19%	29.28%	-	21.34%	23.96%	166.53%	-	-	42.5%
		Health Category	Good	Good	-	Good	Good	Very Poor	-	-	Fair
		Health Score	4	4	-	4	4	1	-	-	3
Hydrology Score		Total Score	20	18	5	17	19	5	-	-	13
		Maximum Available Score	25	25	5	25	25	15	-	-	25
		Percentage of Maximum Score	80.00%	72.00%	100.0%	68.0%	76.0%	33.3%	-	-	52.0%
		Hydrology Health Category	Good	Good	Data Deficient	Data Deficient	Good	Data Deficient	Data Deficient	Data Deficient	Data Deficient
		Hydrology Score	4	4	Data Deficient	Data Deficient	4	Data Deficient	Data Deficient	Data Deficient	Data Deficient

Data Sufficiency Indicator	Yukon								Basin
	09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	
Total number of sub-sub-basins	8	3	4	4	4	5	1	1	28
Total number of dams (>10m)	1	1	0	2	0	0	0	0	4
Year of earliest dam operation	1958	1969	-	1952	-	-	-	-	1952
Year of earliest available continuous flow monitoring	1950	1960	1981	1963	1965	1976	-	-	1950
Number of monitoring stations available for earliest, continuous flow monitoring	3	2	1	1	1	1	0	0	9
Number of sub-sub-basins with monitoring stations	3	2	1	1	1	1	0	0	9
Number of monitoring stations on river downstream of dams	1	0	0	0	-	0	-	-	1
Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Partially Sufficient
Year of long-term continuous flow monitoring	1950	1960	-	1963	1965	-	-	-	1950
Number of monitoring stations available for continuous flow monitoring analysis	3	2	-	1	1	-	-	-	7
Number of sub-sub-basins with monitoring stations	3	2	-	1	1	-	-	-	7
Number of monitoring stations on river downstream of dams	1	0	-	0	-	-	-	-	1
Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Insufficient
Year of widespread, continuous flow monitoring	1982	1972	1981	1979	1983	1976	-	-	1972
Number of monitoring stations available for continuous flow monitoring analysis	8	3	3	2	4	1	-	-	21
Number of sub-sub-basins with monitoring stations	5	2	3	1	3	1	-	-	15
Number of monitoring stations on river downstream of dams	1	0	-	0	-	-	-	-	1
Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
Overall Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Insufficient
Data Sufficiency Score	1	1	0	0	1	0	0	0	0

MAP. RESULTS OF A SERIES OF LONG-TERM TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE YUKON RIVER FOR THE PERIOD <1965-2013.

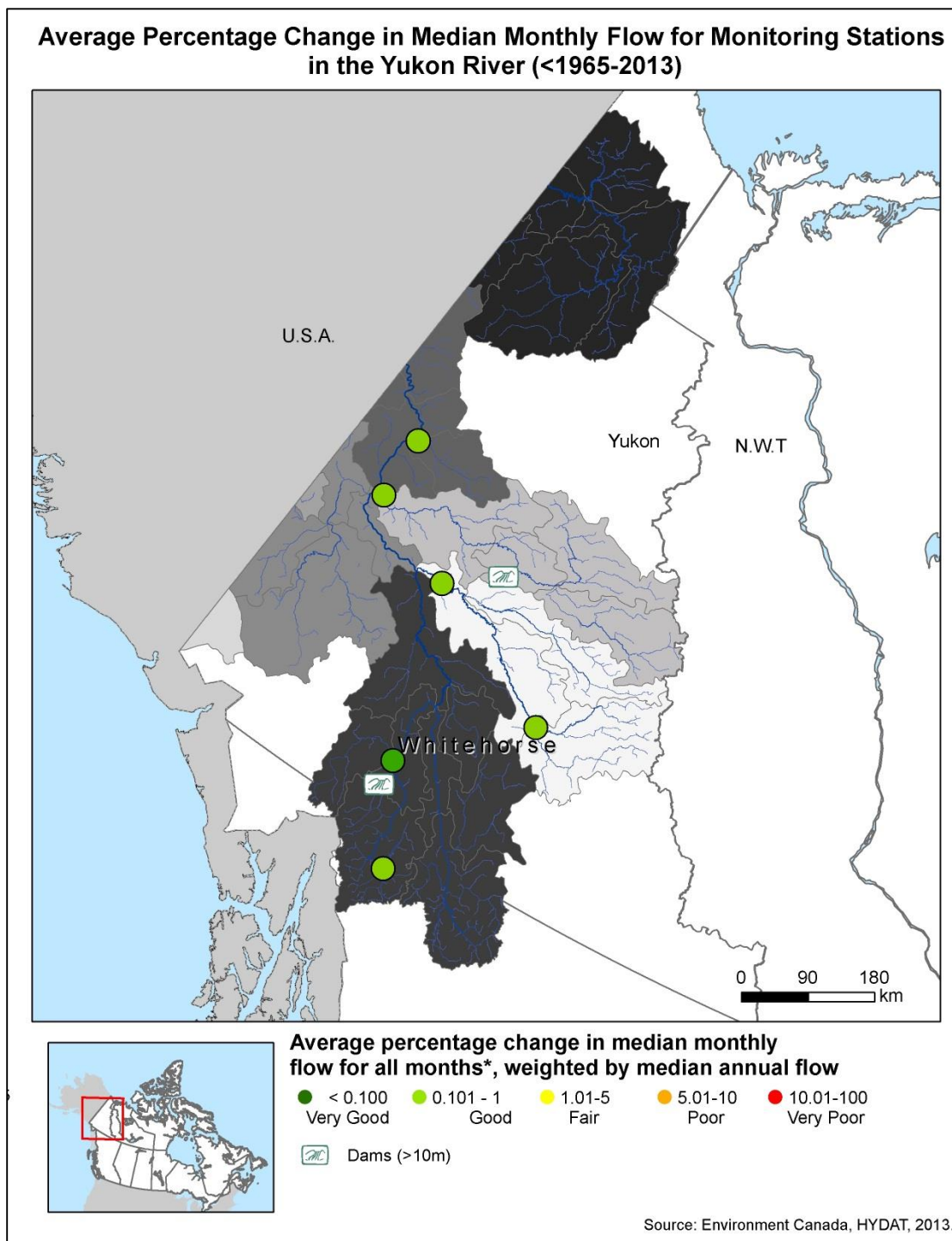


TABLE. RESULTS OF LONG-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

09A - Headwaters Yukon												
09AA006					09AB001				09AC001			
Start Year for Analysis		1950			Start Year for Analysis		1950		Start Year for Analysis		1950	
Median Annual Flow (m ³ /s)		73.93			Median Annual Flow (m ³ /s)		173.97		Median Annual Flow (m ³ /s)		31.24	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.204	0.012 *	73.590	0.28	0.200	0.382	176.044		0.067	0.082	31.788	
November	0.218	0.012 *	73.734	0.30	0.218	0.434	176.332		0.074	0.065	31.400	
December	0.237	0.008 **	73.692	0.32	0.186	0.385	176.838		0.084	0.041 *	30.981	0.27
January	0.133	0.111	74.891		0.191	0.360	174.723		0.050	0.434	33.905	
February	0.131	0.119	74.700		0.303	0.175	176.095		0.049	0.401	34.074	
March	0.129	0.123	74.512		0.266	0.173	176.335		0.058	0.302	33.815	
April	0.128	0.092	74.285		0.213	0.348	176.262		0.052	0.292	33.715	
May	0.131	0.092	74.164		0.375	0.135	176.607		0.055	0.268	33.588	
June	0.142	0.065	74.002		0.250	0.300	177.780		0.062	0.230	33.501	
July	0.149	0.047 *	73.894	0.20	0.229	0.385	177.091		0.067	0.163	33.265	
August	0.164	0.030 *	73.783	0.22	0.267	0.273	177.053		0.068	0.115	32.736	
September	0.181	0.020 *	73.578	0.25	0.313	0.224	176.713		0.066	0.102	32.295	
Average for all months, for each station	0.16		74.07	0.13	0.25		176.49	0.00	0.06		32.92	0.02
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.04									

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

TABLE. RESULTS OF LONG-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHEDS 09B – PELLY, 09D – STEWART, AND 09E – CENTRAL YUKON.

	09B - Pelly								09D - Stewart				09E - Central Yukon			
	09BA001				09BC001				09DD003				09EA003			
	Start Year for Analysis		1960		Start Year for Analysis		1960		Start Year for Analysis		1963		Start Year for Analysis		1965	
	Median Annual Flow (m ³ /s)		26.80		Median Annual Flow (m ³ /s)		189.00		Median Annual Flow (m ³ /s)		210.72		Median Annual Flow (m ³ /s)		32.09	
Month	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*	Theil-Sen Slope	Mann-Kendall p-value	Average Median Monthly Flow	Average Percentage Change in Median Monthly Flow*
October	0.319	0.001 ***	33.208	0.96	1.636	0.002 **	220.244	0.74	1.773	0.024 *	255.750	0.69	0.154	0.115	36.296	
November	0.274	0.002 **	33.902	0.81	1.667	0.002 **	225.555	0.74	1.700	0.026 *	261.718	0.65	0.175	0.121	36.029	
December	0.263	0.008 **	34.480	0.76	1.524	0.003 **	229.157	0.67	1.719	0.019 *	262.574	0.65	0.162	0.103	35.477	
January	0.216	0.000 ***	25.650	0.84	0.896	0.029 *	185.806	0.48	1.289	0.024 *	208.355	0.62	0.308	0.001 ***	32.855	0.94
February	0.259	0.000 ***	26.406	0.98	1.219	0.004 **	187.681	0.65	1.321	0.026 *	214.588	0.62	0.294	0.012 *	34.221	0.86
March	0.276	0.000 ***	27.097	1.02	1.380	0.001 ***	189.350	0.73	1.421	0.027 *	219.603	0.65	0.235	0.043 *	35.178	0.67
April	0.283	0.000 ***	27.436	1.03	1.575	0.001 ***	193.648	0.81	1.540	0.028 *	226.016	0.68	0.184	0.085	35.429	
May	0.268	0.001 **	29.485	0.91	1.684	0.002 **	197.101	0.85	1.571	0.027 *	229.317	0.69	0.175	0.157	35.564	
June	0.294	0.000 ***	29.686	0.99	1.900	0.001 **	202.111	0.94	1.708	0.015 *	234.920	0.73	0.170	0.094	35.557	
July	0.311	0.000 ***	30.599	1.02	1.986	0.001 ***	206.093	0.96	2.042	0.008 **	242.436	0.84	0.175	0.113	35.789	
August	0.335	0.000 ***	31.621	1.06	1.864	0.001 **	211.083	0.88	2.000	0.006 **	247.734	0.81	0.156	0.208	36.073	
September	0.326	0.000 ***	32.527	1.00	1.769	0.001 ***	215.185	0.82	1.875	0.015 *	251.391	0.75	0.118	0.224	36.129	
Average for all months, for each station	0.29		30.17	0.95	1.59		205.25	0.77	1.66		237.87	0.70	0.19		35.38	0.21
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.80						0.70				0.15			

* 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.

MAP. RESULTS OF A SERIES OF TREND ANALYSES OF MEDIAN MONTHLY FLOW IN THE YUKON RIVER FOR THE PERIOD >1972-2013.

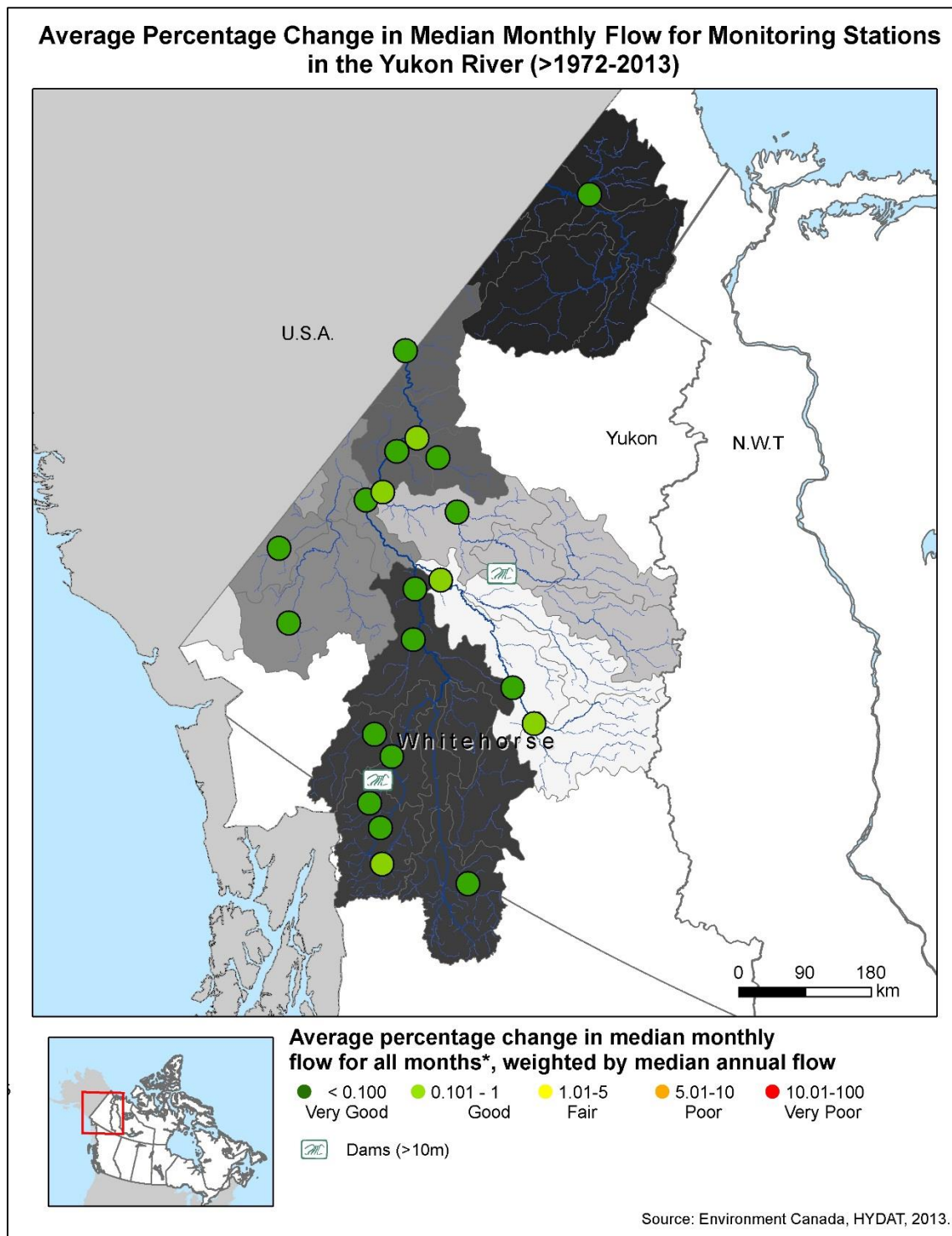


TABLE. RESULTS OF RECENT-TERM TREND ANALYSES FOR MEDIAN MONTHLY FLOW IN THE YUKON RIVER.

		09A - Headwaters Yukon																							
		09AA006				09AA012				09AA013				09AB001				09AC001				09AE003			
		Start Year for Analysis		1982		Start Year for Analysis		1982		Start Year for Analysis		1982		Start Year for Analysis		1982		Start Year for Analysis		1982		Start Year for Analysis		1982	
		Median Annual Flow (m³/s)		76.82		Median Annual Flow (m³/s)		3.66		Median Annual Flow (m³/s)		8.48		Median Annual Flow (m³/s)		174.50		Median Annual Flow (m³/s)		29.56		Median Annual Flow (m³/s)		26.93	
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	0.122	0.661	76.731		0.011	0.733	3.664		-0.032	0.388	8.357		0.200	0.485	176.094		0.134	0.284	30.766		0.238	0.059	27.468		
November	0.171	0.570	77.003		0.004	0.884	3.647		-0.042	0.320	8.328		0.199	0.592	175.328		0.115	0.218	30.475		0.200	0.074	27.465		
December	0.197	0.475	77.150		0.004	0.884	3.645		-0.050	0.302	8.382		0.189	0.526	175.125		0.129	0.112	30.195		0.172	0.227	27.727		
January	-0.270	0.355	76.864		0.009	0.570	3.788		-0.016	0.666	9.207		0.271	0.615	174.406		0.195	0.149	32.273		0.193	0.174	26.892		
February	-0.284	0.263	76.720		0.008	0.638	3.777		-0.016	0.511	9.091		0.449	0.330	176.219		0.206	0.163	32.383		0.193	0.202	26.948		
March	-0.253	0.270	76.472		0.011	0.538	3.797		-0.027	0.486	8.754		0.364	0.284	176.516		0.207	0.089	32.064		0.190	0.185	26.985		
April	-0.225	0.372	76.294		0.015	0.364	3.781		-0.024	0.432	8.827		0.200	0.399	175.953		0.212	0.140	31.777		0.182	0.196	27.115		
May	-0.161	0.427	76.350		0.017	0.408	3.789		-0.033	0.358	8.750		0.386	0.299	177.484		0.179	0.154	31.756		0.198	0.179	27.102		
June	-0.185	0.408	76.458		0.014	0.399	3.761		-0.034	0.544	10.972		0.230	0.516	178.359		0.138	0.307	32.109		0.186	0.234	27.176		
July	-0.115	0.559	76.564		0.016	0.323	3.714		-0.041	0.488	8.604		0.105	0.833	177.922		0.089	0.408	32.133		0.204	0.221	27.292		
August	-0.022	0.910	76.706		0.012	0.486	3.699		-0.036	0.431	8.511		0.245	0.465	178.016		0.125	0.339	31.630		0.222	0.174	27.440		
September	0.045	0.922	76.611		0.008	0.638	3.699		-0.032	0.420	8.409		0.357	0.144	177.891		0.139	0.307	31.202		0.229	0.118	27.476		
Average for all months, for each station	-0.08		76.66	0.00	0.01		3.73	0.00	-0.03		8.85	0.00	0.27		176.61	0.00	0.16		31.56	0.00	0.20		27.26	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.

09A - Headwaters Yukon										09B - Pelly											
09AH003					09AH004					09BA001				09BC001				09BC004			
Start Year for Analysis		1982			Start Year for Analysis		1982			Start Year for Analysis		1972		Start Year for Analysis		1972		Start Year for Analysis		1972	
Median Annual Flow (m³/s)		2.59			Median Annual Flow (m³/s)		9.78			Median Annual Flow (m³/s)		28.56		Median Annual Flow (m³/s)		199.82		Median Annual Flow (m³/s)		89.64	
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	0.106	0.001 ***	2.915	3.65	0.016	0.884	10.273			0.221	0.109	35.573		1.000	0.225	233.004		0.429	0.308	109.495	
November	0.113	0.001 ***	2.806	4.02	0.011	0.897	10.332			0.183	0.126	36.023		1.058	0.221	238.130		0.413	0.288	110.504	
December	0.105	0.000 ***	2.786	3.76	0.003	0.974	10.264			0.195	0.186	36.206		1.152	0.201	241.499		0.510	0.293	112.287	
January	0.086	0.005 **	2.852	3.02	0.012	0.858	10.052			0.117	0.156	27.566		0.500	0.448	196.480		-0.308	0.217	85.410	
February	0.101	0.002 **	2.918	3.45	0.011	0.808	10.145			0.203	0.075	28.535		0.875	0.260	199.649		-0.184	0.558	88.669	
March	0.112	0.002 **	2.894	3.87	0.011	0.820	10.104			0.225	0.075	29.390		1.000	0.149	202.125		0.007	0.983	91.498	
April	0.117	0.002 **	2.888	4.05	0.018	0.783	10.057			0.230	0.052	29.738		1.125	0.153	207.512		0.065	0.828	95.311	
May	0.114	0.002 **	2.929	3.90	0.030	0.685	10.155			0.210	0.085	30.668		1.063	0.186	210.829		0.000	1.000	97.515	
June	0.117	0.002 **	3.002	3.91	0.039	0.638	10.202			0.172	0.179	31.874		1.038	0.237	217.449		-0.126	0.837	101.611	
July	0.110	0.002 **	3.063	3.58	0.040	0.615	10.316			0.189	0.153	32.911		1.052	0.229	222.369		0.035	0.948	101.501	
August	0.113	0.001 ***	3.051	3.71	0.038	0.570	10.297			0.171	0.156	34.167		1.146	0.255	225.452		0.042	0.905	105.033	
September	0.111	0.001 ***	2.963	3.75	0.025	0.795	10.264			0.216	0.099	35.023		1.109	0.172	228.810		0.208	0.537	107.980	
Average for all months, for each station	0.11		2.92	3.72	0.02		10.21	0.00		0.19		32.31	0.00	1.01		218.61	0.00	0.09		100.57	0.00
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.03							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.

	09C - Upper Yukon												09D - Stewart							
	09CA004				09CB001				09CD001				09DD003				09DD004			
	Start Year for Analysis		1981		Start Year for Analysis		1981		Start Year for Analysis		1981		Start Year for Analysis		1979		Start Year for Analysis		1979	
	Median Annual Flow (m³/s)		2.48		Median Annual Flow (m³/s)		32.09		Median Annual Flow (m³/s)		861.17		Median Annual Flow (m³/s)		229.10		Median Annual Flow (m³/s)		20.92	
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	0.013	0.256	2.667		0.506	0.005 **	34.020	1.49	5.131	0.299	925.797		0.441	0.766	274.600		0.269	0.039 *	22.784	1.18
November	0.012	0.206	2.641		0.537	0.004 **	33.748	1.59	3.979	0.323	933.500		0.227	0.865	281.557		0.264	0.029 *	22.519	1.17
December	0.010	0.330	2.606		0.505	0.002 **	33.909	1.49	1.304	0.808	940.531		0.500	0.691	281.671		0.245	0.067	22.027	
January	0.007	0.615	2.555		0.522	0.007 **	33.053	1.58	3.544	0.292	841.156		-0.043	0.977	226.993		0.655	0.196	21.101	
February	0.007	0.548	2.554		0.504	0.007 **	33.367	1.51	3.252	0.355	836.484		-0.278	0.842	236.000		0.812	0.122	21.704	
March	0.010	0.436	2.547		0.537	0.008 **	33.505	1.60	3.054	0.355	843.406		-0.429	0.865	242.729		0.817	0.112	22.428	
April	0.011	0.496	2.561		0.543	0.004 **	33.994	1.60	4.128	0.250	851.125		-0.362	0.887	247.107		0.891	0.067	22.454	
May	0.014	0.339	2.534		0.553	0.004 **	34.239	1.61	4.674	0.263	858.109		-0.333	0.820	249.971		1.097	0.069	22.433	
June	0.013	0.315	2.509		0.556	0.004 **	34.559	1.61	5.282	0.168	870.781		0.000	1.000	255.650		1.252	0.033 *	22.634	5.53
July	0.012	0.330	2.528		0.590	0.003 **	34.809	1.70	6.066	0.178	880.313		0.676	0.670	263.957		1.341	0.020 *	22.991	5.83
August	0.013	0.263	2.584		0.556	0.004 **	34.894	1.59	6.867	0.127	902.500		0.833	0.619	268.286		1.302	0.029 *	23.047	5.65
September	0.012	0.408	2.653		0.517	0.006 **	34.473	1.50	6.272	0.136	918.422		0.800	0.691	270.786		1.266	0.032 *	22.886	5.53
Average for all months, for each station	0.01		2.58	0.00	0.54		34.05	1.57	4.46		883.51	0.00	0.17		258.28	0.00	0.85		22.42	2.07
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.06										0.17							

	09E - Central Yukon																09F - Porcupine				
	09EA003				09EA004				09EB003				09ED001				09FC001				
	Start Year for Analysis		1983		Start Year for Analysis		1983		Start Year for Analysis		1983		Start Year for Analysis		1983		Start Year for Analysis		1976		
	Median Annual Flow (m³/s)		33.31		Median Annual Flow (m³/s)		6.48		Median Annual Flow (m³/s)		2.16		Median Annual Flow (m³/s)		1,534.23		Median Annual Flow (m³/s)		6.42		
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	0.080	0.518	36.979		0.008	0.973	7.151		0.061	0.023 *	2.515	2.44	14.038	0.139	1784.210		0.129	0.062	6.587		
November	0.130	0.434	36.684		0.014	0.852	7.123		0.064	0.045 *	2.429	2.64	15.192	0.135	1790.823		0.130	0.079	6.777		
December	0.146	0.316	36.045		0.016	0.659	7.125		0.062	0.016 *	2.336	2.66	15.000	0.055	1792.339		0.141	0.070	6.969		
January	0.289	0.086	34.400		0.020	0.529	6.771		0.087	0.021 *	2.531	3.43	2.500	0.919	1435.871		0.223	0.011 *	6.985	3.19	
February	0.283	0.234	35.900		0.039	0.475	6.833		0.088	0.011 *	2.537	3.48	-0.269	0.973	1466.371		0.208	0.010 *	6.745	3.08	
March	0.237	0.341	36.844		0.034	0.552	6.849		0.092	0.010 **	2.557	3.58	3.448	0.786	1501.758		0.215	0.007 **	6.554	3.29	
April	0.173	0.465	36.966		0.031	0.587	6.856		0.086	0.012 *	2.690	3.18	6.500	0.563	1539.048		0.206	0.007 **	6.387	3.22	
May	0.177	0.444	36.881		0.028	0.518	6.927		0.080	0.030 *	2.647	3.02	8.000	0.465	1581.806		0.200	0.009 **	6.271	3.19	
June	0.171	0.269	36.687		0.019	0.610	6.931		0.075	0.021 *	2.599	2.89	10.000	0.415	1649.452		0.184	0.011 *	6.567	2.80	
July	0.148	0.405	37.024		0.014	0.683	6.932		0.067	0.032 *	2.547	2.64	15.167	0.234	1702.242		0.159	0.025 *	6.577	2.42	
August	0.064	0.696	37.271		0.020	0.659	7.046		0.063	0.025 *	2.496	2.53	15.625	0.185	1743.565		0.151	0.036 *	6.498	2.33	
September	0.064	0.634	37.179		0.017	0.812	7.147		0.064	0.035 *	2.592	2.45	14.688	0.169	1769.613		0.138	0.058	6.510		
Average for all months, for each station	0.16		36.57	0.00	0.02		6.97	0.00	0.07		2.54	2.91	9.99		1646.42	0.00	0.17		6.62	1.96	
Average percentage change in median monthly flow for all months, weighted by median annual flow			0.00																	1.96	

TRENDS IN ANNUAL FLOW FOR THE YUKON RIVER WATERSHED

TABLE. RESULTS OF LINEAR REGRESSION ANALYSES FOR LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW IN THE YUKON RIVER.

Sub-Basin	Station	Start Year	Intercept	Intercept Standard Error	Intercept T-Test Statistic	Intercept T-Test p-value	Slope	Slope Standard Error	Slope T-Test Statistic	Slope T-Test p-value	Adjusted R-Squared	F-Test Static	F-Test p-value
09A - Headwaters Yukon	09AA006	1950	-199.044	224.672	-0.886	0.379	0.138	0.113	1.215	0.229	0.008	1.476	0.229
	09AB001	1950	219.838	585.429	0.376	0.709	-0.023	0.295	-0.078	0.938	-0.016	0.006	0.938
	09AC001	1950	198.324	187.826	1.056	0.295	-0.084	0.095	-0.890	0.377	-0.003	0.791	0.377
09B - Pelly	09BA001	1960	-467.731	135.504	-3.452	0.001	0.249	0.068	3.650	0.001 ***	0.189	13.320	0.001 ***
	09BC001	1960	-2561.888	1090.267	-2.350	0.023	1.385	0.549	2.523	0.015 *	0.092	6.367	0.015 *
09D - Stewart	09DD003	1963	-2966.256	1049.327	-2.827	0.007	1.598	0.528	3.028	0.004 *	0.140	9.167	0.004
09E - Central Yukon	09EA003	1965	-199.480	243.769	-0.818	0.417	0.116	0.123	0.950	0.347	-0.002	0.902	0.347

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

Sub-Basin	Station	Start Year	Theil -Sen Slope	Mann-Kendall Test Statistic	Mann-Kendall Test p-value	Median Annual Flow (m³/s)	Average Percentage Change in Median Annual Flow (%)	Weighted Averaged Between Stations
09A - Headwaters Yukon	09AA006	1950	0.175	362.000	0.036 *	73.925	0.24	0.24
	09AB001	1950	0.220	188.000	0.278	173.970		
	09AC001	1950	0.054	198.000	0.254	31.239		
09B - Pelly	09BA001	1960	0.247	465.000	0.001 ***	26.805	0.920	0.64
	09BC001	1960	1.125	354.000	0.008 **	189.000	0.595	
09D - Stewart	09DD003	1963	1.300	366.000	0.003 **	210.721	0.617	0.62
09E - Central Yukon	09EA003	1965	0.238	305.000	0.009 **	32.087	0.742	0.74

FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON, BY STATION.

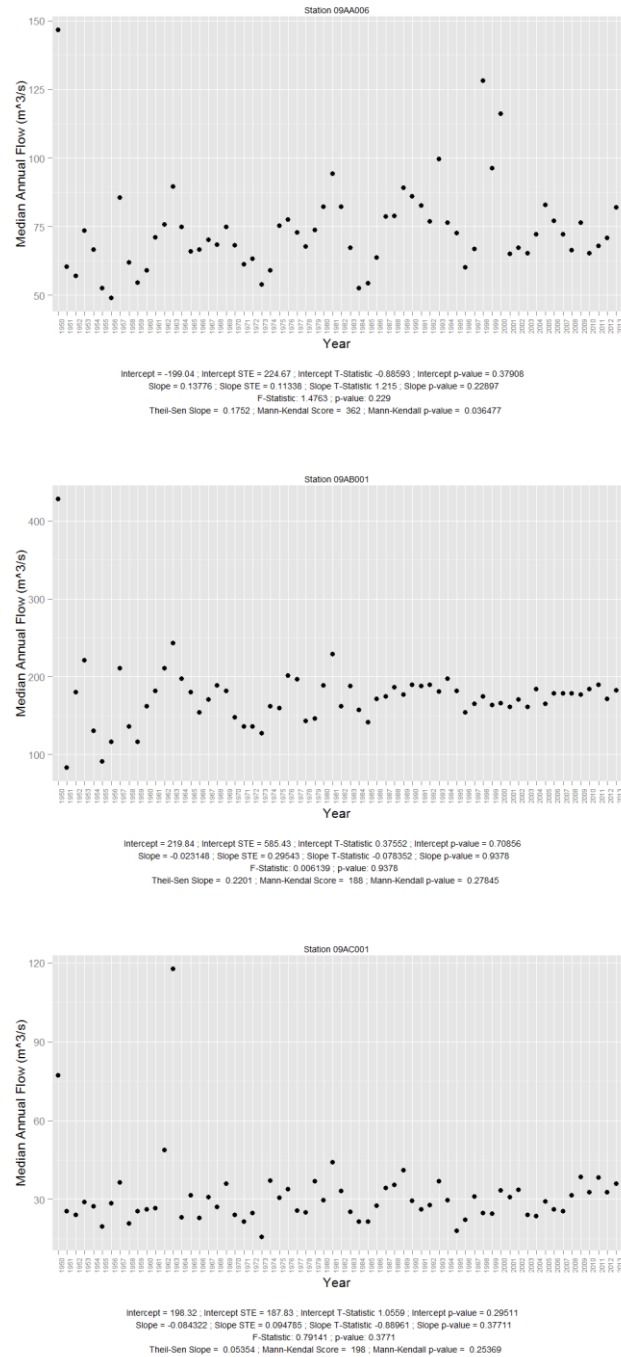


FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE YUKON RIVER, SUB-WATERSHED 09B – PELLY, BY STATION.

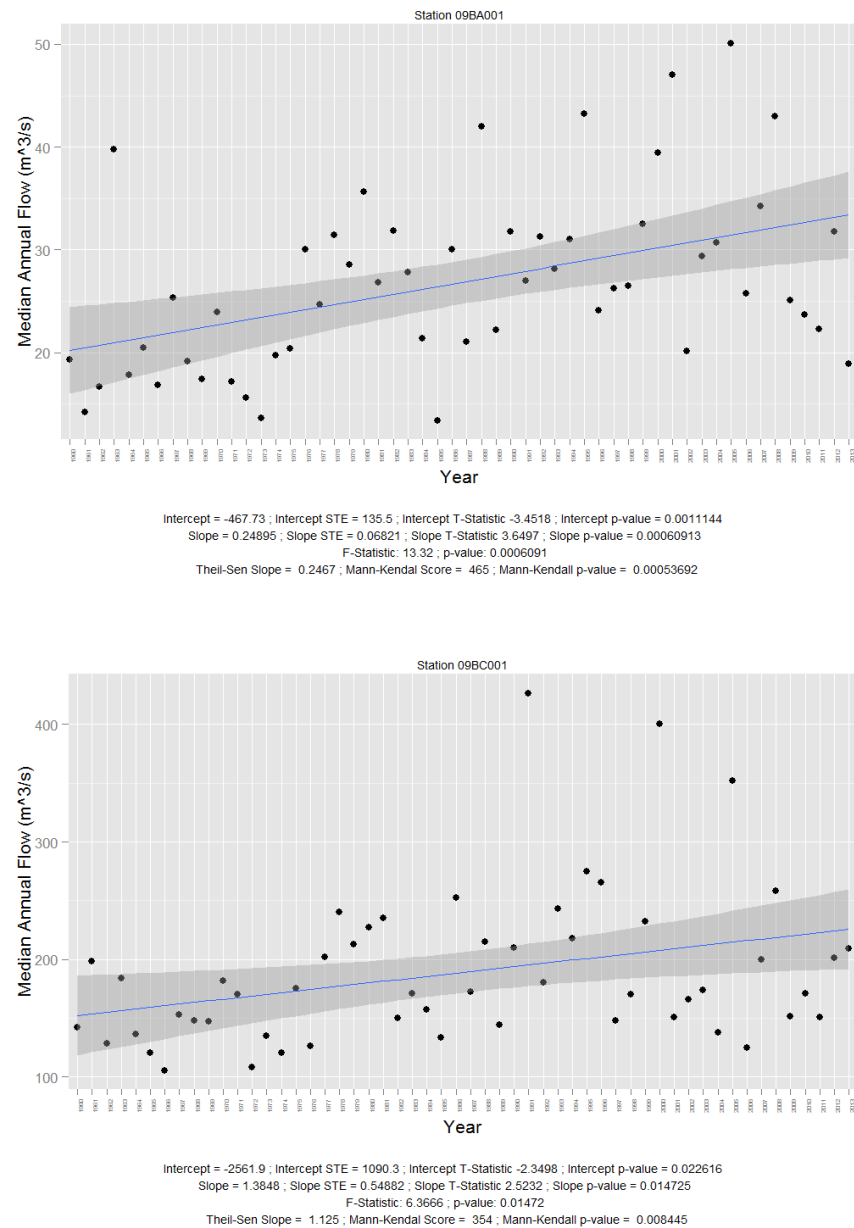


FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE YUKON RIVER, SUB-WATERSHED 09D – STEWART, BY STATION.

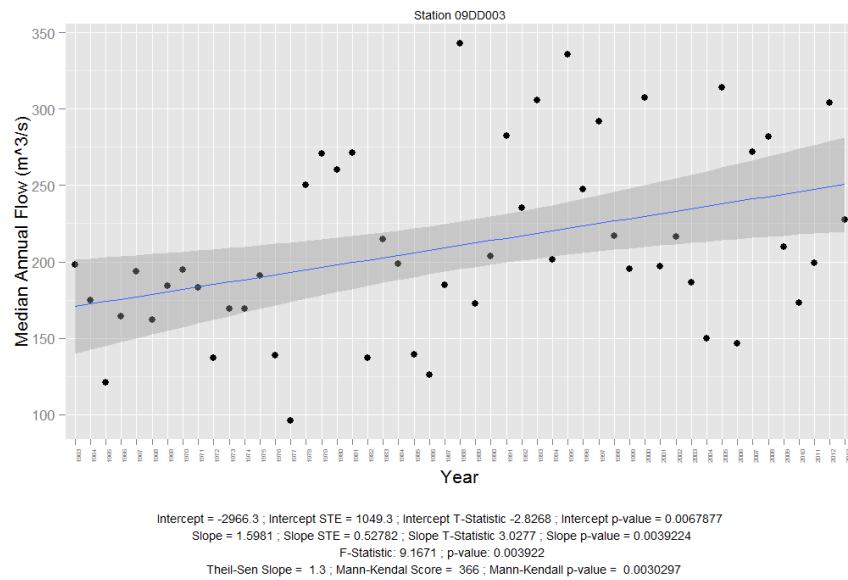
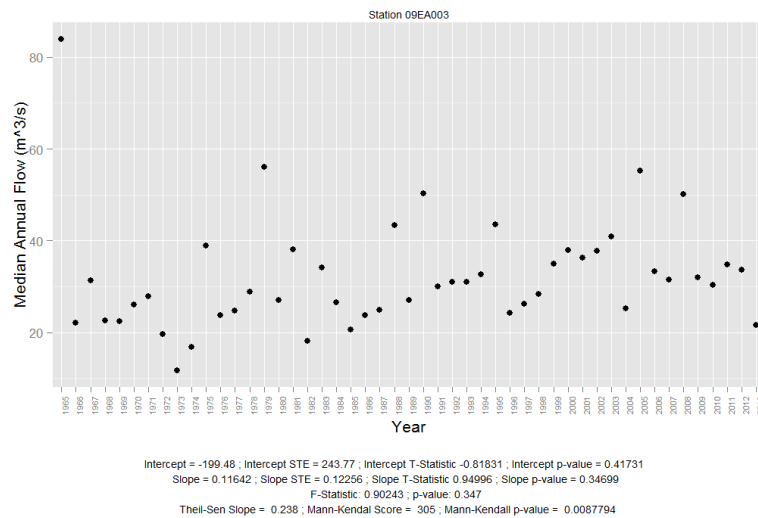


FIGURE. TIME-SERIES OF LONG-TERM TRENDS IN MEDIAN ANNUAL FLOW FOR THE YUKON RIVER, SUB-WATERSHED 09E – CENTRAL YUKON, BY STATION.



HYDROLOGICAL ALTERATION IN THE YUKON RIVER WATERSHED

TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR RECENT (1982-2013) VS. HISTORICAL (1950-1981) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

		Historical			Recent			Fligner-Killeen		Mann-Whitney					
Station	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	Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m²/s)	Weighted average across sub-watershed
09AA006	October	31	68.500	54.560	33	75.900	60.638	5.571	0.018 *	63739.000	0.043 *	10.8	9.16%	73.93	7.19%
	November	31	68.500	54.560	33	75.200	59.823	5.182	0.023 *	63695.500	0.041 *	9.8			
	December	31	68.000	54.263	33	74.500	58.785	5.020	0.025 *	63622.000	0.039 *	9.6			
	January	31	71.400	55.894	33	74.900	58.711	3.751	0.053	63829.000	0.046 *	4.9			
	February	31	71.400	56.339	33	74.050	57.525	3.404	0.065	63846.500	0.047 *	3.7			
	March	31	70.500	55.894	33	74.600	58.192	3.807	0.051	63840.500	0.046 *	5.8			
	April	31	69.900	55.004	33	75.750	59.378	4.954	0.026 *	63881.000	0.048 *	8.4			
	May	31	68.800	54.560	33	75.400	59.304	5.125	0.024 *	63759.500	0.043 *	9.6			
	June	31	69.100	55.449	33	76.200	60.416	5.128	0.024 *	63709.000	0.042 *	10.3			
	July	31	68.500	54.115	33	76.550	60.638	5.739	0.017 *	63744.000	0.043 *	11.8			
	August	31	68.000	53.374	33	76.600	61.157	6.066	0.014 *	63707.500	0.042 *	12.6			
	September	31	67.400	53.522	33	76.000	60.712	5.987	0.014 *	63756.000	0.043 *	12.8			
09AC001	October	31	27.500	26.954	33	28.250	26.390	0.057	0.812	67301.000	0.251	2.7	2.52%	31.24	
	November	31	27.500	26.835	33	29.450	28.169	0.053	0.817	67314.000	0.253	7.1			
	December	31	27.800	27.235	33	29.450	28.169	0.024	0.876	67283.000	0.249	5.9			
	January	31	30.000	29.785	33	29.400	27.873	0.805	0.370	67479.500	0.277	2.0			
	February	31	30.000	29.874	33	30.250	29.207	0.166	0.684	67374.500	0.261	0.8			
	March	31	30.600	30.542	33	30.300	29.281	0.360	0.548	67403.500	0.266	1.0			
	April	31	30.900	30.986	33	29.700	28.540	0.880	0.348	67469.000	0.275	3.9			
	May	31	30.900	30.986	33	29.750	28.540	0.963	0.326	67356.500	0.259	3.7			
	June	31	29.700	29.756	33	29.650	28.540	0.251	0.616	67268.500	0.247	0.2			
	July	31	29.400	29.103	33	29.800	28.540	0.060	0.807	67239.000	0.243	1.4			
	August	31	29.400	29.237	33	29.100	27.576	0.285	0.594	67280.500	0.248	1.0			
	September	31	28.300	27.888	33	28.450	26.687	0.224	0.636	67347.500	0.258	0.5			

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1982-2013) VS. HISTORICAL (1950-1981) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

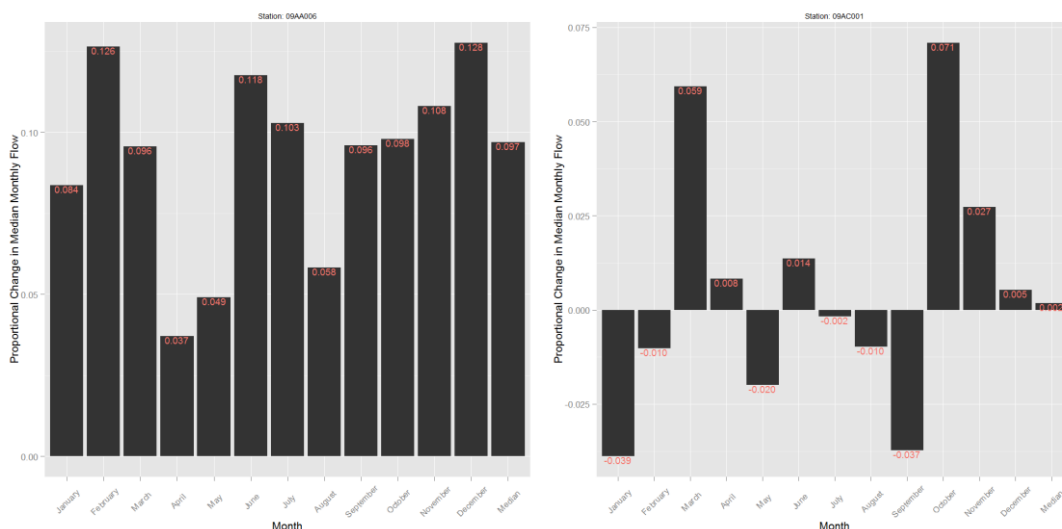


FIGURE. MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

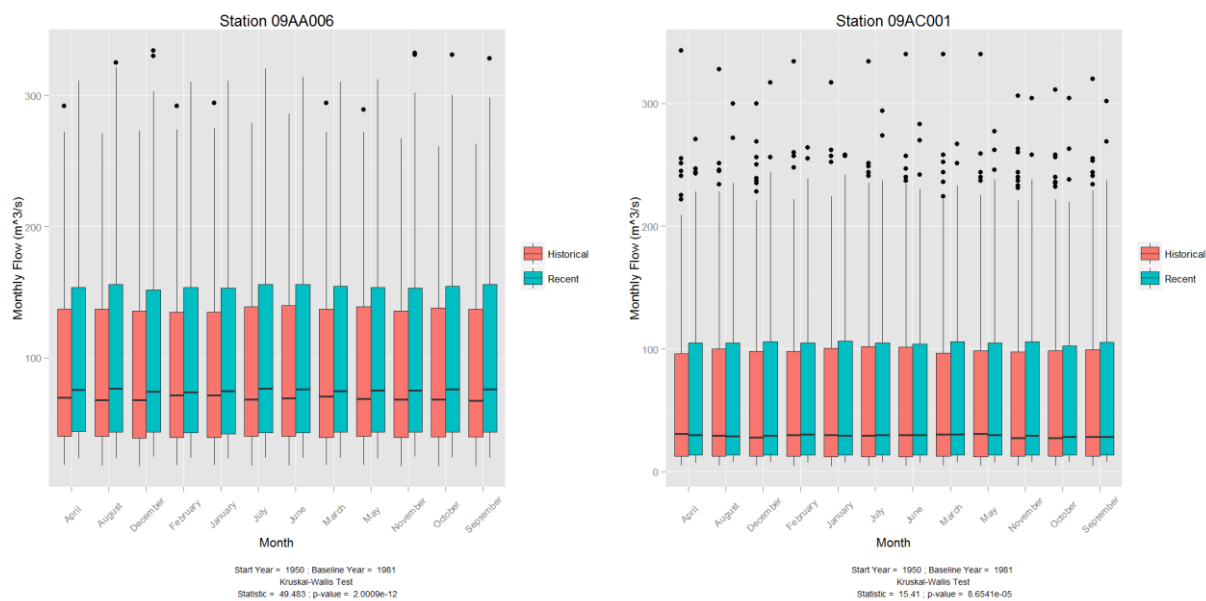


TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR POST-OPERATION OF THE WHITEHORSE DAM (1958-2013) VS. PRE-DAM (1950-1957) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

Station	Month	Pre-Dam			Post-Dam			Fligner-Killeen		Mann-Whitney		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m³/s)
		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			
09AB001	October	8	125.000	97.555	56	170.500	79.319	16.421	0.000 ***	23893.000	0.002 **	36.4	32.87%	173.97
	November	8	120.000	90.142	56	172.000	81.543	14.070	0.000 ***	23756.000	0.002 **	43.3		
	December	8	116.000	84.212	56	173.000	83.767	11.880	0.001 ***	23655.500	0.002 **	49.1		
	January	8	135.000	113.715	56	171.000	77.095	17.702	0.000 ***	24359.000	0.005 **	26.7		
	February	8	143.000	125.131	56	172.000	78.578	18.961	0.000 ***	24180.000	0.004 **	20.3		
	March	8	134.000	111.343	56	172.000	77.095	18.759	0.000 ***	24069.500	0.003 **	28.4		
	April	8	133.000	109.416	56	171.000	77.095	19.608	0.000 ***	24117.500	0.004 **	28.6		
	May	8	132.000	107.489	56	170.000	77.095	19.485	0.000 ***	24112.500	0.004 **	28.8		
	June	8	131.000	105.709	56	172.000	81.543	18.287	0.000 ***	23974.500	0.003 **	31.3		
	July	8	130.000	104.227	56	172.000	80.060	17.758	0.000 ***	23947.500	0.003 **	32.3		
	August	8	129.000	103.041	56	173.000	83.026	17.242	0.000 ***	23893.500	0.002 **	34.1		
	September	8	128.000	101.558	56	173.000	81.543	17.390	0.000 ***	23917.500	0.002 **	35.2		

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR THE PERIOD POST-OPERATION OF THE WHITEHORSE DAM (1958-2013) VS. PRE-DAM (1950-1957) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

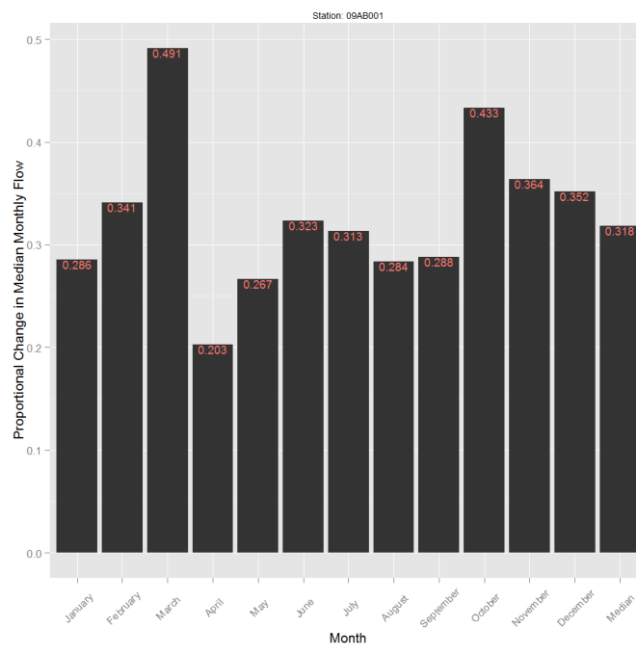


FIGURE. MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE YUKON RIVER, SUB-WATERSHED 09A – HEADWATERS YUKON.

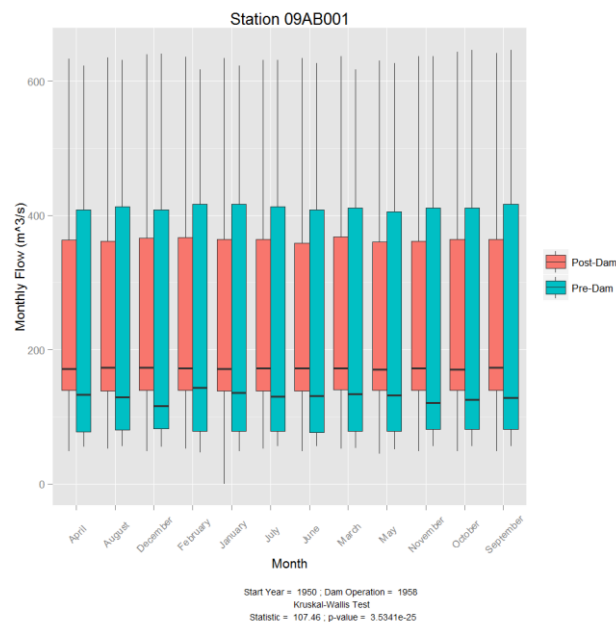


TABLE. NON-PARAMETRIC COMPARISON OF VARIANCE FOR RECENT (1986-2013) VS. HISTORICAL (1960-1985) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09B – PELLY.

		Historical			Recent			Fligner-Killeen		Mann-Whitney					
Station	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	Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m³/s)	Weighted average across sub-watershed
09BA001	October	26	21.650	23.974	28	30.550	35.145	6.439	0.011 *	43353.000	0.036 *	41.1	39.72%	26.80	29.28%
	November	26	22.700	25.471	28	30.050	34.604	5.291	0.021 *	43212.500	0.036 *	32.4			
	December	26	24.800	28.407	28	30.700	35.375	3.668	0.055	43520.500	0.050	23.8			
	January	26	18.950	19.696	28	26.050	28.206	5.449	0.020 *	43308.000	0.048 *	37.5			
	February	26	19.300	20.200	28	27.600	30.527	7.449	0.006 **	43169.500	0.041 *	43.0			
	March	26	19.800	20.831	28	27.900	31.060	6.433	0.011 *	43425.000	0.046 *	40.9			
	April	26	20.400	21.765	28	28.850	32.410	6.486	0.011 *	43343.000	0.042 *	41.4			
	May	26	20.800	22.254	28	30.300	34.426	6.303	0.012 *	43544.000	0.044 *	45.7			
	June	26	21.300	22.980	28	30.300	34.433	6.164	0.013 *	43495.500	0.049 *	42.3			
	July	26	21.400	23.336	28	30.800	35.286	6.534	0.011 *	43567.500	0.053	43.9			
	August	26	21.400	23.336	28	31.050	35.738	6.553	0.010 *	43678.000	0.050	45.1			
	September	26	22.100	24.329	28	30.850	35.508	6.078	0.014 *	43367.500	0.043 *	39.6			
09BC001	October	26	168.000	179.395	28	218.000	238.476	5.575	0.018 *	45647.500	0.034 *	29.8	27.80%	189.00	
	November	26	173.000	189.328	28	218.000	239.440	4.875	0.027 *	45671.500	0.035 *	26.0			
	December	26	176.000	194.221	28	217.500	237.587	4.025	0.045 *	45721.000	0.037 *	23.6			
	January	26	144.000	148.408	28	194.500	202.078	2.551	0.110	45923.000	0.045 *	35.1			
	February	26	158.000	167.089	28	189.000	194.740	1.282	0.258	45911.500	0.045 *	19.6			
	March	26	155.000	161.010	28	189.000	197.260	2.013	0.156	45785.500	0.039 *	21.9			
	April	26	152.000	158.193	28	193.000	204.302	3.111	0.078	45664.000	0.034 *	27.0			
	May	26	156.000	164.124	28	198.000	211.715	3.526	0.060	45665.500	0.035 *	26.9			
	June	26	157.000	165.606	28	203.000	218.758	3.995	0.046 *	45631.000	0.033 *	29.3			
	July	26	155.000	163.086	28	203.000	219.870	4.294	0.038 *	45597.000	0.032 *	31.0			
	August	26	159.000	168.572	28	209.500	227.208	5.029	0.025 *	45734.500	0.037 *	31.8			
	September	26	164.000	175.985	28	216.000	236.401	5.381	0.020 *	45722.000	0.037 *	31.7			

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1986-2013) VS. HISTORICAL (1960-1985) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09B – PELLY.

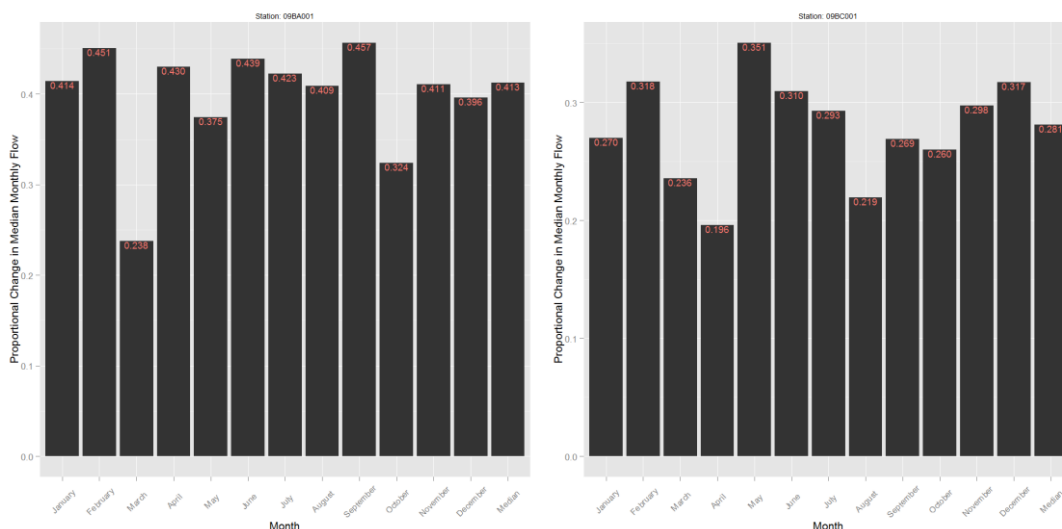


FIGURE. MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE YUKON RIVER, SUB-WATERSHED 09B – PELLY.

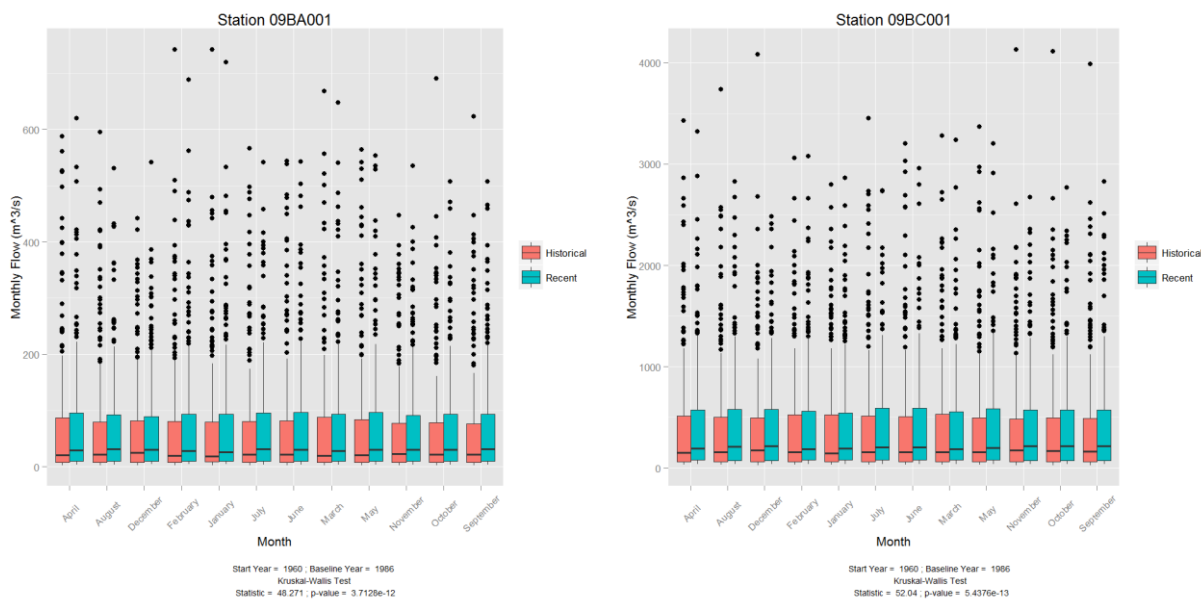


TABLE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1988-2013) VS. HISTORICAL (1963-1987) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09D – STEWART.

Station	Month	Historical			Recent			Fligner-Killeen		Mann-Whitney		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m³/s)
		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			
09DD003	October	25	188.000	194.814	26	224.500	237.290	6.234	0.013 *	41246.500	0.070	19.4	21.34%	210.72
	November	25	198.000	209.195	26	228.000	241.812	5.306	0.021 *	41359.500	0.078	15.2		
	December	25	198.000	205.340	26	227.000	241.071	4.490	0.034 *	41512.000	0.091	14.6		
	January	25	163.000	153.894	26	212.000	219.647	6.828	0.009 **	41486.500	0.089	30.1		
	February	25	163.000	153.894	26	208.500	213.420	6.163	0.013 *	41419.000	0.083	27.9		
	March	25	170.000	163.827	26	210.500	215.718	5.308	0.021 *	41359.500	0.078	23.8		
	April	25	184.000	185.028	26	211.500	218.832	3.403	0.065	41317.000	0.075	14.9		
	May	25	185.000	186.511	26	217.000	227.060	3.689	0.055	41357.500	0.078	17.3		
	June	25	185.000	186.066	26	229.500	244.110	5.331	0.021 *	41357.000	0.078	24.1		
	July	25	187.000	189.476	26	232.000	248.632	6.490	0.011 *	41322.500	0.075	24.1		
	August	25	190.000	193.479	26	233.000	249.670	6.783	0.009 **	41274.500	0.072	22.6		
	September	25	188.000	194.517	26	229.500	245.000	6.954	0.008 **	41240.500	0.069	22.1		

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1986-2013) VS. HISTORICAL (1960-1985) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09B – PELLY [LEFT] AND MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE YUKON RIVER, SUB-WATERSHED 09B – PELLY [RIGHT].

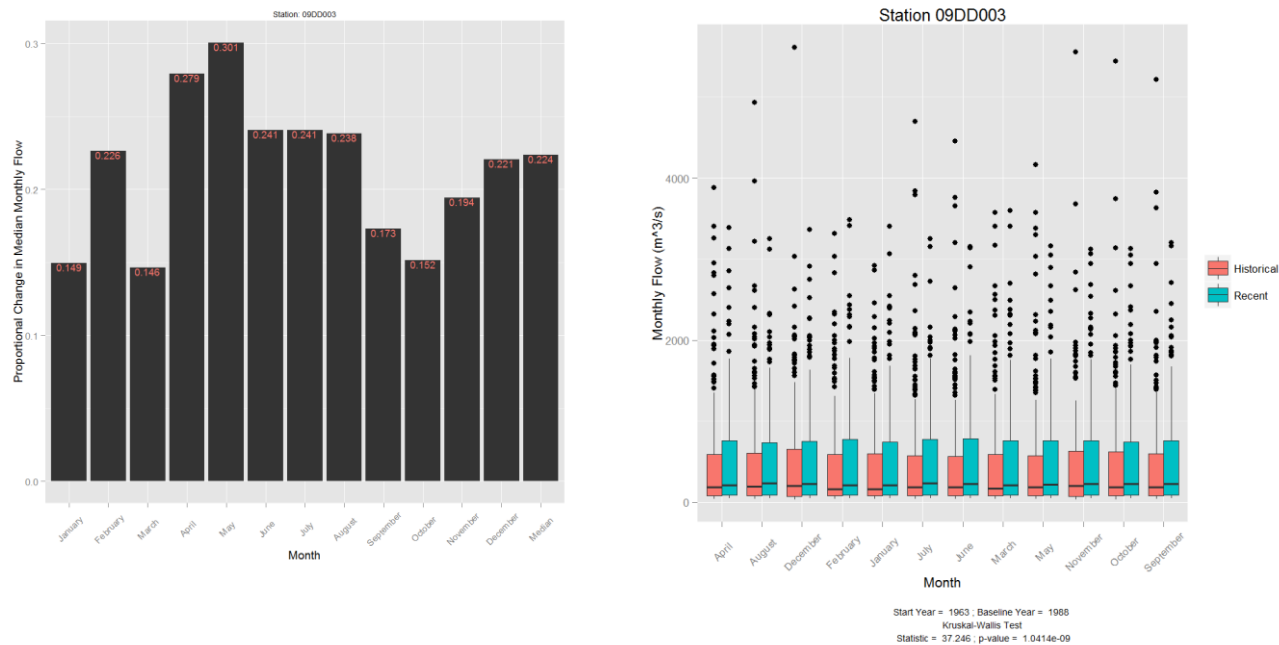


TABLE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1989-2013) VS. HISTORICAL (1965-1988) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09E – CENTRAL YUKON.

Station	Month	Historical			Recent			Fligner-Killeen		Mann-Whitney		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m³/s)
		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			
09EA003	October	24	27.000	27.562	25	33.800	34.248	6.002	0.014 *	37080.000	0.018 *	25.2	23.96%	32.09
	November	24	27.100	27.873	25	33.800	34.248	5.539	0.019 *	37230.500	0.022 *	24.7		
	December	24	28.300	29.652	25	33.800	34.545	3.125	0.077	37385.500	0.026 *	19.4		
	January	24	28.200	29.548	25	33.850	34.545	2.616	0.106	37570.000	0.028 *	20.0		
	February	24	28.500	29.674	25	34.100	34.545	2.746	0.097	37603.000	0.029 *	19.6		
	March	24	28.600	29.845	25	33.300	33.655	1.557	0.212	37435.000	0.028 *	16.4		
	April	24	28.300	29.830	25	32.900	32.914	1.271	0.260	37479.000	0.030 *	16.3		
	May	24	25.200	24.315	25	30.750	30.097	7.382	0.007 **	36445.500	0.007 **	22.0		
	June	24	25.500	25.204	25	34.700	35.138	10.710	0.001 **	36761.500	0.011 *	36.1		
	July	24	26.400	26.168	25	35.150	35.805	8.572	0.003 **	36890.000	0.014 *	33.1		
	August	24	26.600	26.627	25	33.950	34.322	6.230	0.013 *	37018.000	0.016 *	27.6		
	September	24	27.100	27.458	25	34.400	34.841	6.038	0.014 *	36955.000	0.015 *	26.9		

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1986-2013) VS. HISTORICAL (1960-1985) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09C – CENTRAL YUKON [LEFT] AND MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE YUKON RIVER, SUB-WATERSHED 09C – CENTRAL YUKON [RIGHT].

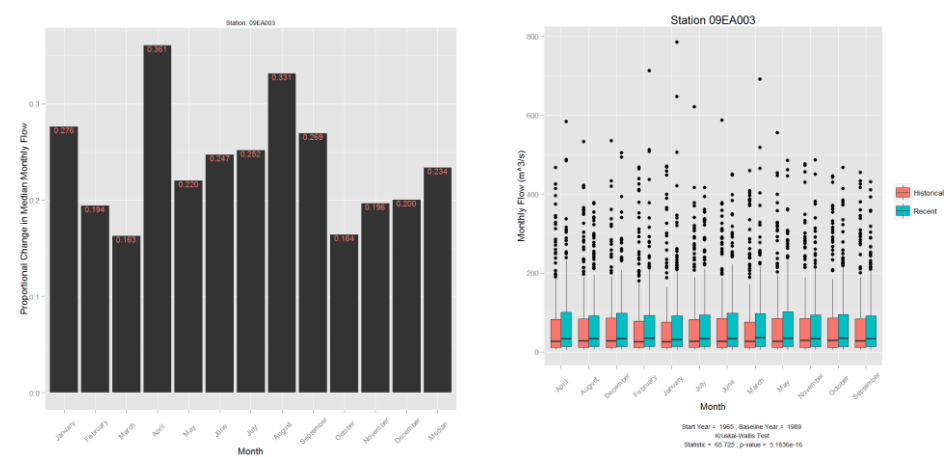
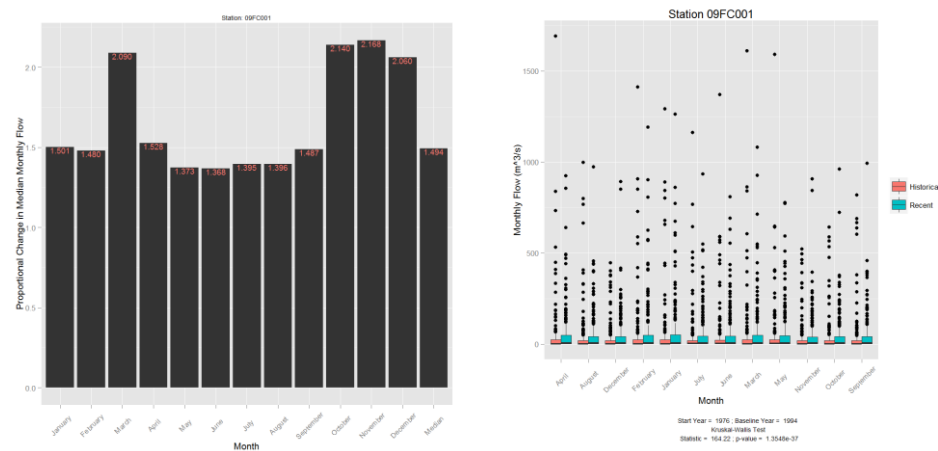


TABLE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1994-2013) VS. HISTORICAL (1976-1993) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09F – PORCUPINE.

Station	Month	Historical			Recent			Fligner-Killeen		Mann-Whitney		Percentage Change in Monthly Flow Between the Two Time Periods	Average Percentage Change Across Months*	Median Annual Flow (m³/s)
		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			
09FC001	October	16	2.295	3.210	20	7.270	9.690	22.184	0.000 ***	16246.000	0.000 ***	216.8	166.53%	6.42
	November	16	2.290	3.113	20	7.190	9.626	21.613	0.000 ***	16366.000	0.000 ***	214.0		
	December	16	2.290	3.204	20	7.075	9.437	22.830	0.000 ***	16300.500	0.000 ***	209.0		
	January	16	2.660	3.662	20	6.370	8.437	17.577	0.000 ***	16581.500	0.000 ***	139.5		
	February	16	2.550	3.618	20	6.050	8.049	18.073	0.000 ***	16571.000	0.000 ***	137.3		
	March	16	2.540	3.588	20	6.420	8.598	19.868	0.000 ***	16453.500	0.000 ***	152.8		
	April	16	2.510	3.447	20	6.015	8.008	19.455	0.000 ***	16428.500	0.000 ***	139.6		
	May	16	2.495	3.406	20	6.240	8.284	19.306	0.000 ***	16492.500	0.000 ***	150.1		
	June	16	2.610	3.566	20	6.490	8.566	19.601	0.000 ***	16443.000	0.000 ***	148.7		
	July	16	2.610	3.610	20	6.180	8.160	17.623	0.000 ***	16354.000	0.000 ***	136.8		
	August	16	2.520	3.533	20	6.250	8.222	17.772	0.000 ***	16321.000	0.000 ***	148.0		
	September	16	2.405	3.371	20	7.360	9.790	20.350	0.000 ***	16300.500	0.000 ***	206.0		

FIGURE. PERCENTAGE CHANGE IN MEDIAN MONTHLY FLOW FOR RECENT (1986-2013) VS. HISTORICAL (1960-1985) MONTHLY FLOW IN THE YUKON RIVER, SUB-WATERSHED 09C – CENTRAL YUKON [LEFT] AND MONTHLY FLOW FOR RECENT VS. HISTORICAL TIME PERIODS IN THE YUKON RIVER, SUB-WATERSHED 09C – CENTRAL YUKON [RIGHT].



WATER QUALITY

OVERALL WATER QUALITY HEALTH SCORING

Water Quality	Indicator			09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	Basin
	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	2009-2012	2009-2012	2009-2013	2009-2013	2009-2013	-	2013	-	2009-2013
			Number of Stations	21	6	17	10	17	-	2	-	71
			Value	0.12	0.11	0.21	0.13	0.14	-	-	-	0.15
		Water Quality Health Category	Water Quality Health Score	Good	Good	Fair	Good	Fair	Data Deficient	Data Deficient	Data Deficient	Fair
			Water Quality Health Score	4	4	3	4	3	Data Deficient	Data Deficient	Data Deficient	3
			Value	0.159	0.162	0.188	0.206	0.139	0.135	-	-	0.182
		Significant Mann-Kendal time-series test to determine directional trend in proportion of exceedance of water quality thresholds.	Time Period	1972 - 2012	2004 - 2012	2004 - 2013	1986 - 2013	1989 - 2010	-	-	-	1972 - 2013
			Trend	No trend	No trend	No trend	No trend	No trend	-	-	-	No trend

WATER QUALITY DATA SUFFICIENCY

Data Sufficiency Indicator	09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	Basin
Total number of sub-sub-basins	8	3	4	4	4	5	1	1	28
Year of earliest available monitoring	1972	2004	2004	1986	1989	1988	2006	-	1972
Number of monitoring stations available for earliest monitoring	2	1	4	2	1	1	3	-	2
Number of sub-sub-basins with earliest available monitoring stations	1	1	1	1	1	1	1	-	6
Year of most recently available monitoring	2014	2014	2014	2013	2013	2008	2013	-	2013
Number of monitoring stations available within last five years	32	9	23	11	25	0	2	-	102
Number of sub-sub-basins within last five years	7	2	4	3	3	0	1	-	20
Percentage of samples with at least 10 elements measured within last 5 years.	32.80%	72.70%	53.80%	30.95%	68.09%	-	50.00%	-	51.67%
Number of years of sampling in last 10 years	10	8	9	10	10	3	2	-	10
Overall Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Partially Sufficient
Data Sufficiency Score	1	1	1	1	1	0	0	0	1

MAP. EXCEEDANCE OF WATER QUALITY THRESHOLDS AS REPORTED FOR MONITORING STATIONS IN THE YUKON RIVER FOR THE FIVE MOST RECENT YEARS AVAILABLE.

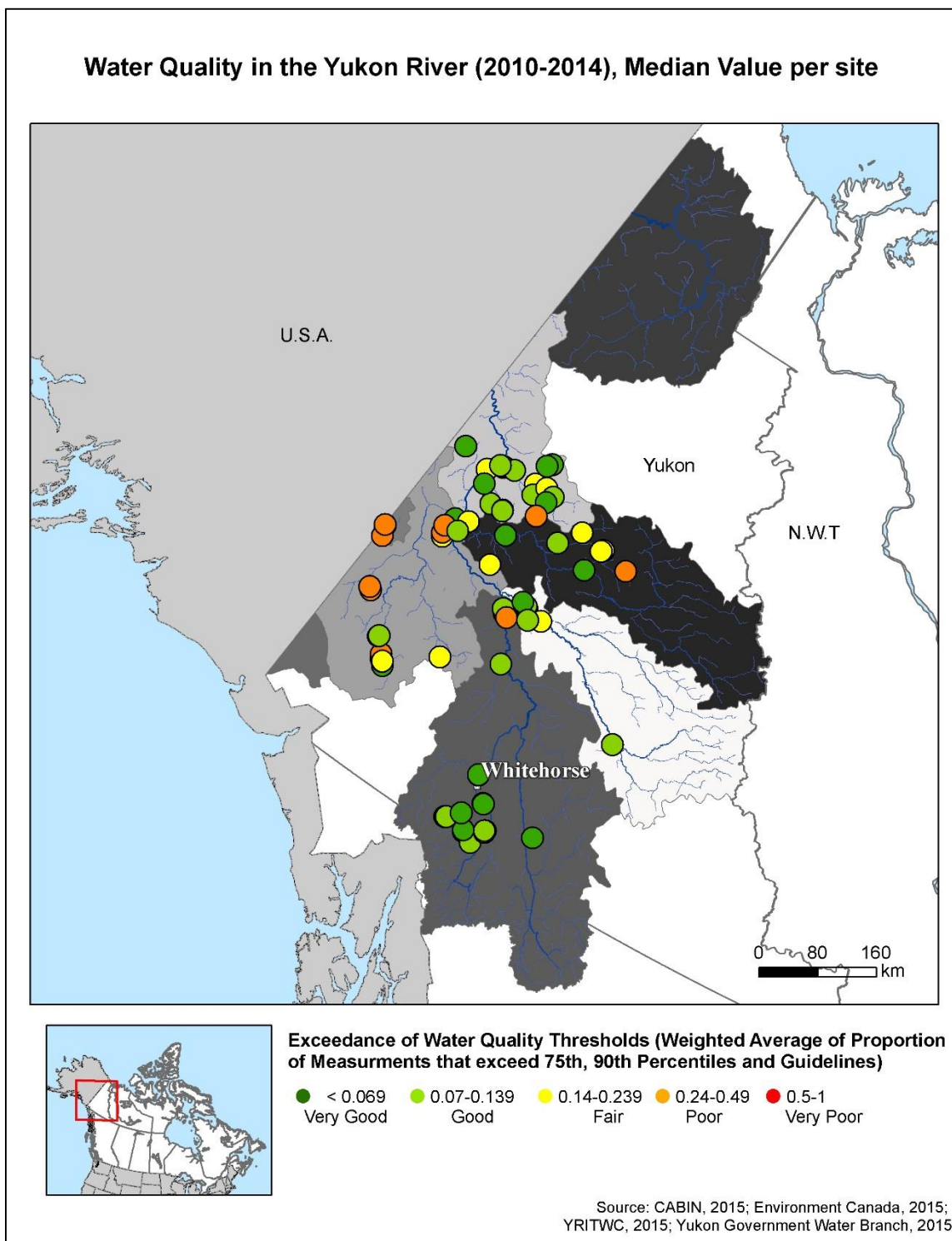


TABLE. WATER QUALITY IN THE YUKON RIVER BASED ON PROPORTION OF EXCEEDANCE OF THREE THRESHOLDS: PROVINCIAL WATER QUALITY GUIDELINES, 75TH PERCENTILE OF HISTORICAL DISTRIBUTION, AND 90TH PERCENTILE OF HISTORICAL DISTRIBUTION. REPORTED BY YEAR AND DATA SOURCE.

WSCSDA	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-Years Weighted Average Exceedance by Sub-Basin	5-Years Weighted Average Exceedance by Basin
09A – Headwaters Yukon	CABIN	2012	15	1	15	1	0.067	1	0.067	1	0.067	0.067	0.223	0.208
	ENVCanada	2010	12	2	34	1	0.029	2	0.059	2	0.059	0.044		
	YRITWC	2010	5	5	198	0	0.000	14	0.071	52	0.263	0.067		
	YukonGovWB	2010	16	2	285	23	0.081	57	0.200	85	0.298	0.157		
	CABIN	2009	16	7	107	11	0.103	5	0.047	15	0.140	0.090		
	ENVCanada	2009	13	2	310	4	0.013	47	0.152	54	0.174	0.086		
	YRITWC	2009	5	7	244	0	0.000	8	0.033	63	0.258	0.054		
	YukonGovWB	2009	17	3	2218	649	0.293	511	0.230	943	0.425	0.294		
09B – Pelly	CABIN	2012	15	4	56	8	0.143	2	0.036	12	0.214	0.119	0.139	
	CABIN	2009	15	2	30	4	0.133	4	0.133	12	0.400	0.178		
	YRITWC	2009	4	1	5	0	0.000	1	0.200	2	0.400	0.133		
09C – Upper Yukon	CABIN	2013	2	1	2	0	0.000	0	0.000	0	0.000	0.000	0.317	
	CABIN	2012	15	6	83	23	0.277	10	0.120	23	0.277	0.225		
	CABIN	2009	16	4	64	29	0.453	25	0.391	34	0.531	0.445		
09D – Stewart	CABIN	2013	2	2	4	0	0.000	0	0.000	0	0.000	0.000	0.189	
	CABIN	2012	14	1	14	5	0.357	2	0.143	5	0.357	0.286		
	CABIN	2011	14	3	34	5	0.147	3	0.088	5	0.147	0.127		
	CABIN	2010	6	2	12	2	0.167	1	0.083	3	0.250	0.153		
	ENVCanada	2010	9	1	18	2	0.111	2	0.111	7	0.389	0.157		
	YRITWC	2010	5	1	24	0	0.000	1	0.042	7	0.292	0.063		
	YukonGovWB	2010	5	1	45	3	0.067	4	0.089	12	0.267	0.107		
	CABIN	2009	16	1	16	1	0.063	0	0.000	2	0.125	0.052		
	ENVCanada	2009	12	1	219	46	0.210	49	0.224	98	0.447	0.254		
	YRITWC	2009	5	1	52	2	0.038	7	0.135	18	0.346	0.122		
	YukonGovWB	2009	5	1	70	10	0.143	16	0.229	22	0.314	0.200		
09E – Central Yukon	CABIN	2013	2	6	12	0	0.000	0	0.000	0	0.000	0.000	0.128	
	CABIN	2012	14	2	27	5	0.185	3	0.111	5	0.185	0.160		
	CABIN	2011	14	9	125	25	0.200	14	0.112	33	0.264	0.181		
	ENVCanada	2010	13	1	26	0	0.000	2	0.077	4	0.154	0.051		
	YRITWC	2010	5	1	42	0	0.000	4	0.095	22	0.524	0.119		
	CABIN	2009	16	11	175	18	0.103	10	0.057	32	0.183	0.101		
	ENVCanada	2009	14	1	209	14	0.067	39	0.187	56	0.268	0.140		
	YRITWC	2009	5	1	58	1	0.017	5	0.086	24	0.414	0.106		

FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE YUKON RIVER.

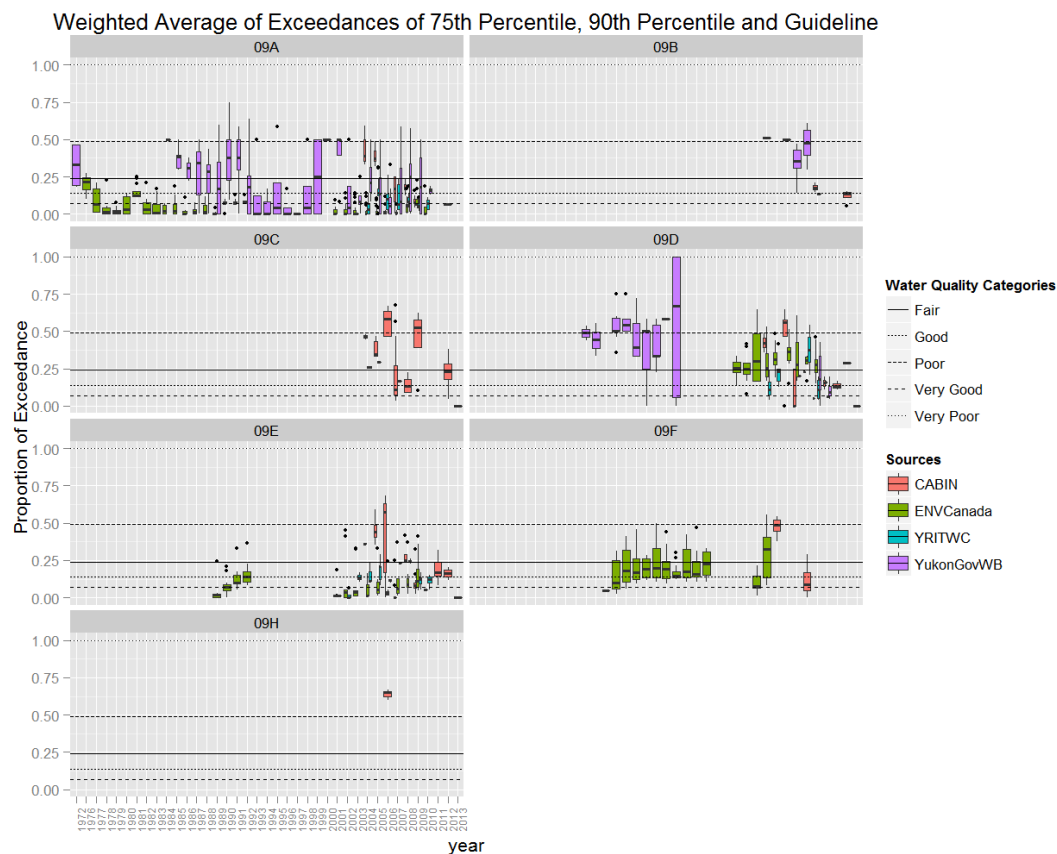
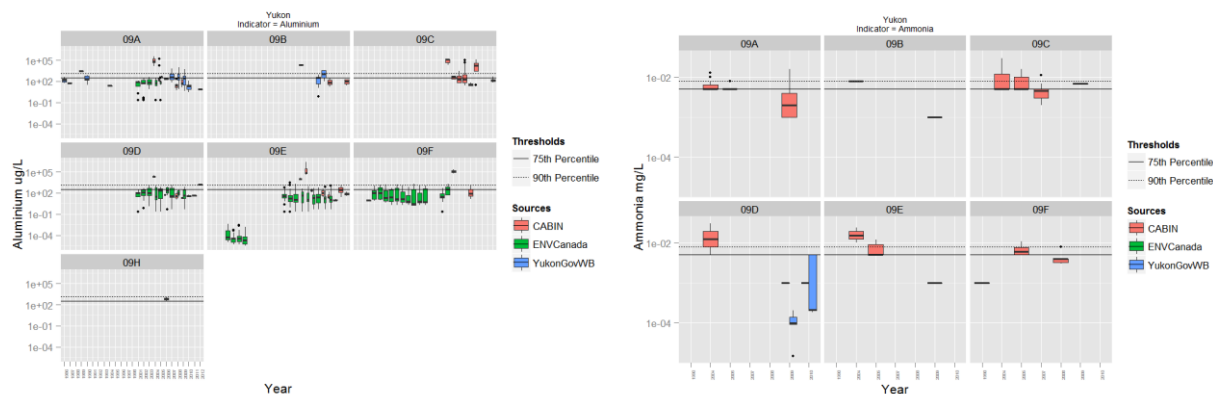
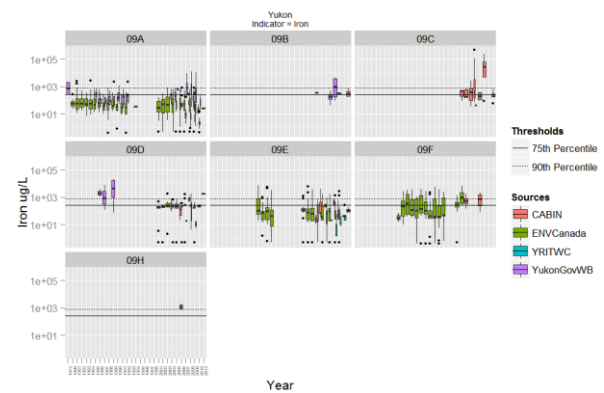
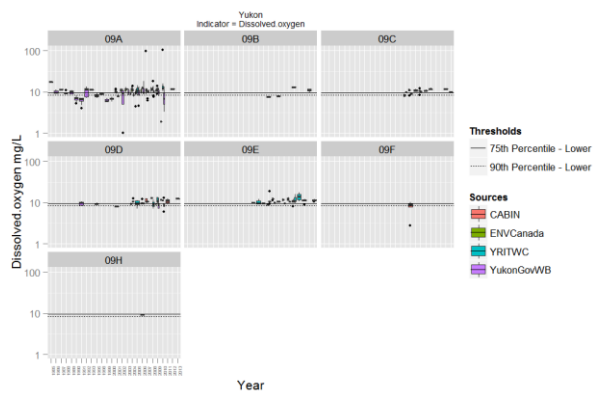
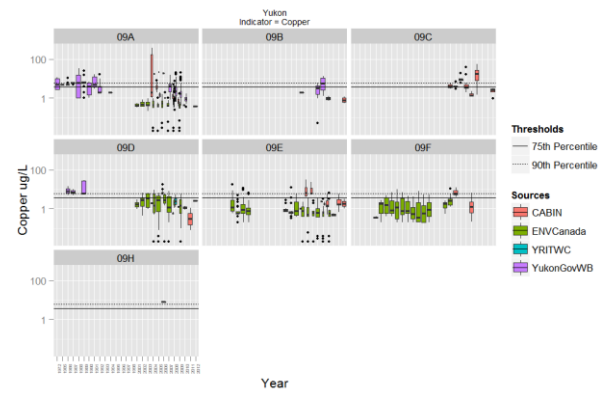
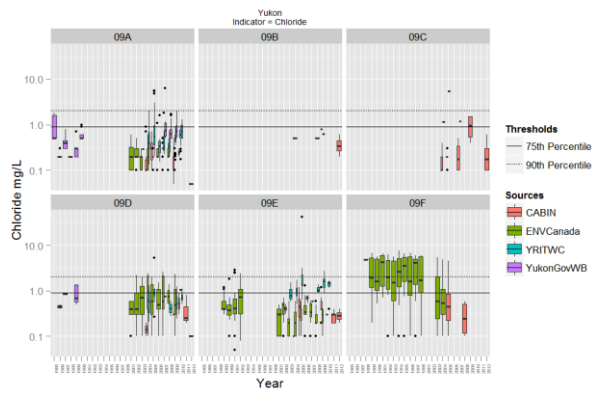
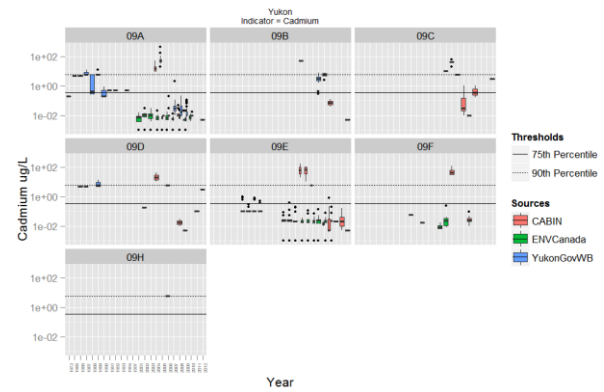
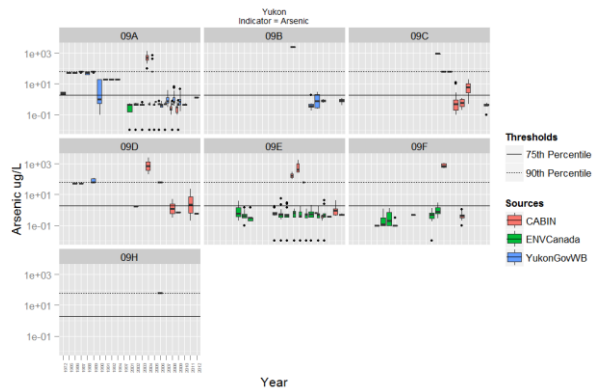
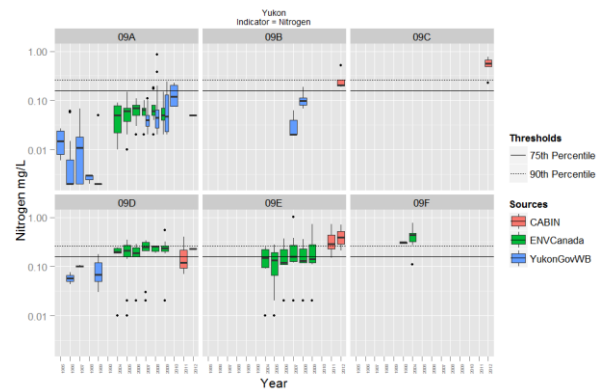
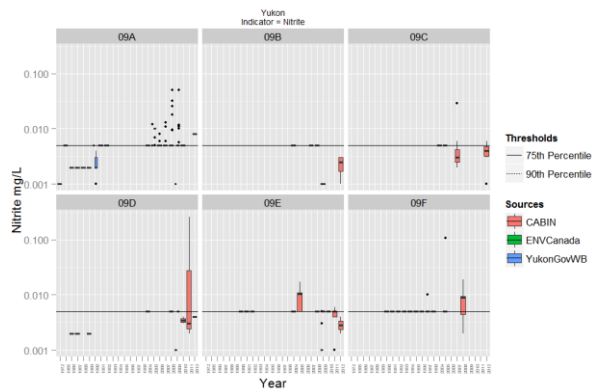
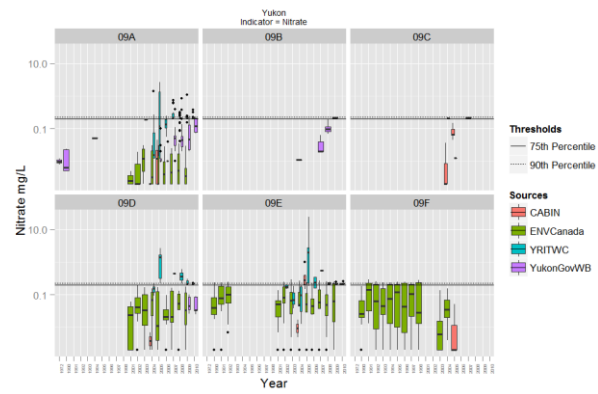
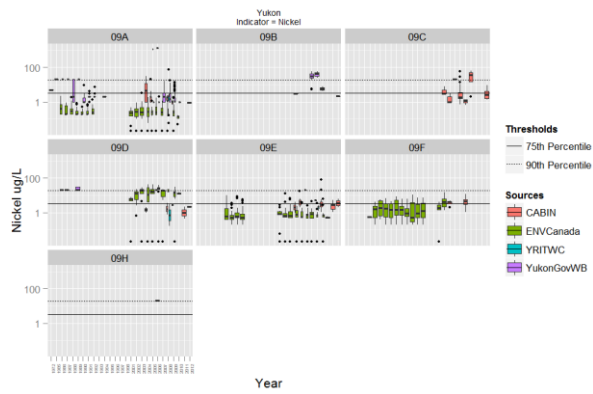
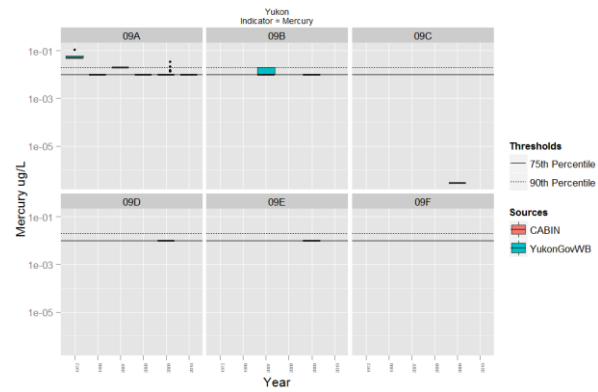
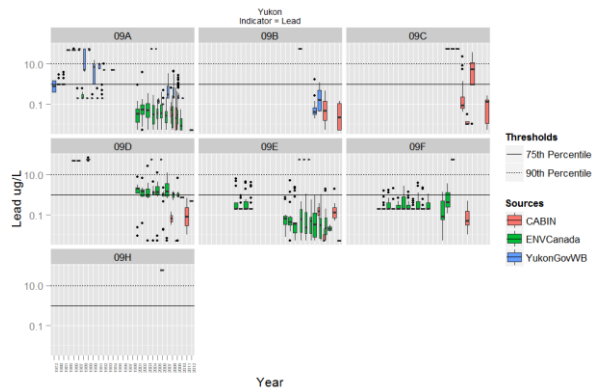


FIGURE. ANALYSIS OF VARIANCE IN EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME FOR MONITORING STATIONS IN THE YUKON RIVER BY CONTAMINANT.







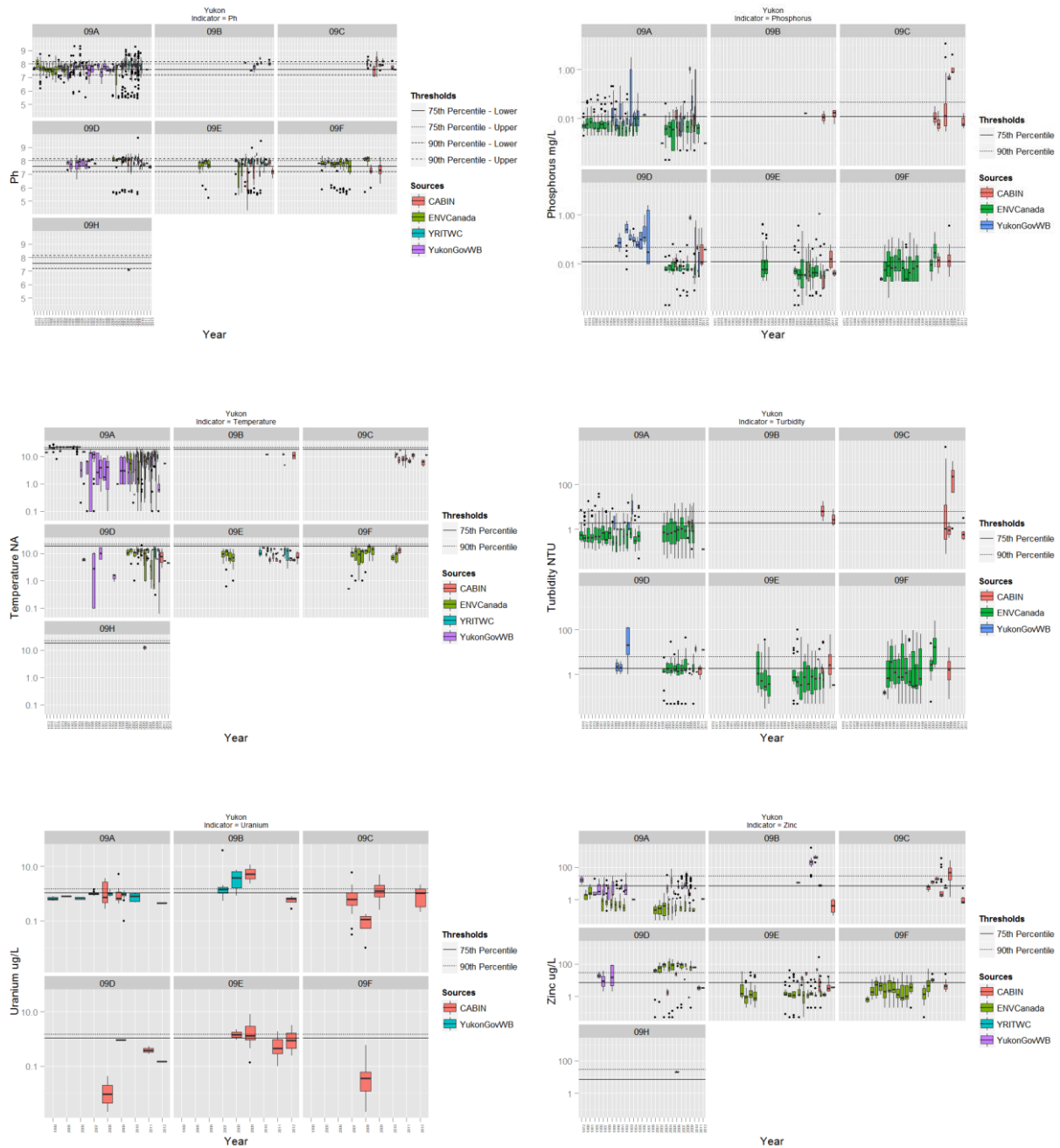


TABLE . RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF ANNUAL EXCEEDANCE OF WATER QUALITY THRESHOLDS OVER TIME IN THE YUKON RIVER.

Scale	Source	Start Year	End Year	Number of Years	Number of Sites	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
Basin	All	1972	2013	39	293	0.001345	94	0.31337
	CABIN	2004	2013	10	255	-0.0373583	-14	0.24303
	ENVCANADA	1976	2010	33	6	0.0011927	119	0.09347
	YRITWC	2002	2010	9	17	0.0017361	3	0.83394
	YukonGovWB	1972	2010	28	15	0	-15	0.86513
09A – Headwaters Yukon	All	1972	2012	37	87	0.0001765	35	0.70183
	CABIN	2004	2012	6	66	-0.0138889	-9	0.39644
	ENVCANADA	1976	2010	27	2	0	-41	0.56539
	YRITWC	2003	2010	8	11	0.0052315	4	0.71052
	YukonGovWB	1972	2010	28	8	0	1	1
09B – Pelly	All	2004	2012	6	13	-0.0111111	-9	0.39644
	CABIN	2004	2012	4	8	-0.0011111	-6	0.58832
	YRITWC	2009	2009	1	1	NA	NA	NA
	YukonGovWB	2007	2008	2	4	NA	NA	NA
09C – Upper Yukon	All	2004	2013	8	58	-0.0213492	-7	0.58851
	CABIN	2004	2013	8	56	-0.0194444	-7	0.58851
	YRITWC	2004	2007	3	2	NA	NA	NA
09D – Stewart	All	1986	2013	22	41	-0.004935	-62	0.22699
	CABIN	2004	2013	9	36	-0.0170139	-5	0.71835
	ENVCANADA	2001	2010	10	1	0.0021368	3	0.85803
	YRITWC	2004	2010	6	1	-0.0229167	-6	0.44752
	YukonGovWB	1986	2010	11	3	0	-13	0.77744
09E – Central Yukon	All	1989	2013	17	53	0	-2	0.98129
	CABIN	2004	2013	9	50	-0.029304	-13	0.27925
	ENVCANADA	1989	2010	14	1	0	-2	0.97742
	YRITWC	2002	2010	9	2	0.0118056	13	0.20841
09F – Porcupine	All	1988	2008	15	38	0.0017695	30	0.37988
	CABIN	2005	2008	2	36	NA	NA	NA
	ENVCANADA	1988	2004	13	2	0.0010606	8	0.77233
09H - Tanana	All	2006	2006	1	3	NA	NA	NA
	CABIN	2006	2006	1	3	NA	NA	NA

FISH

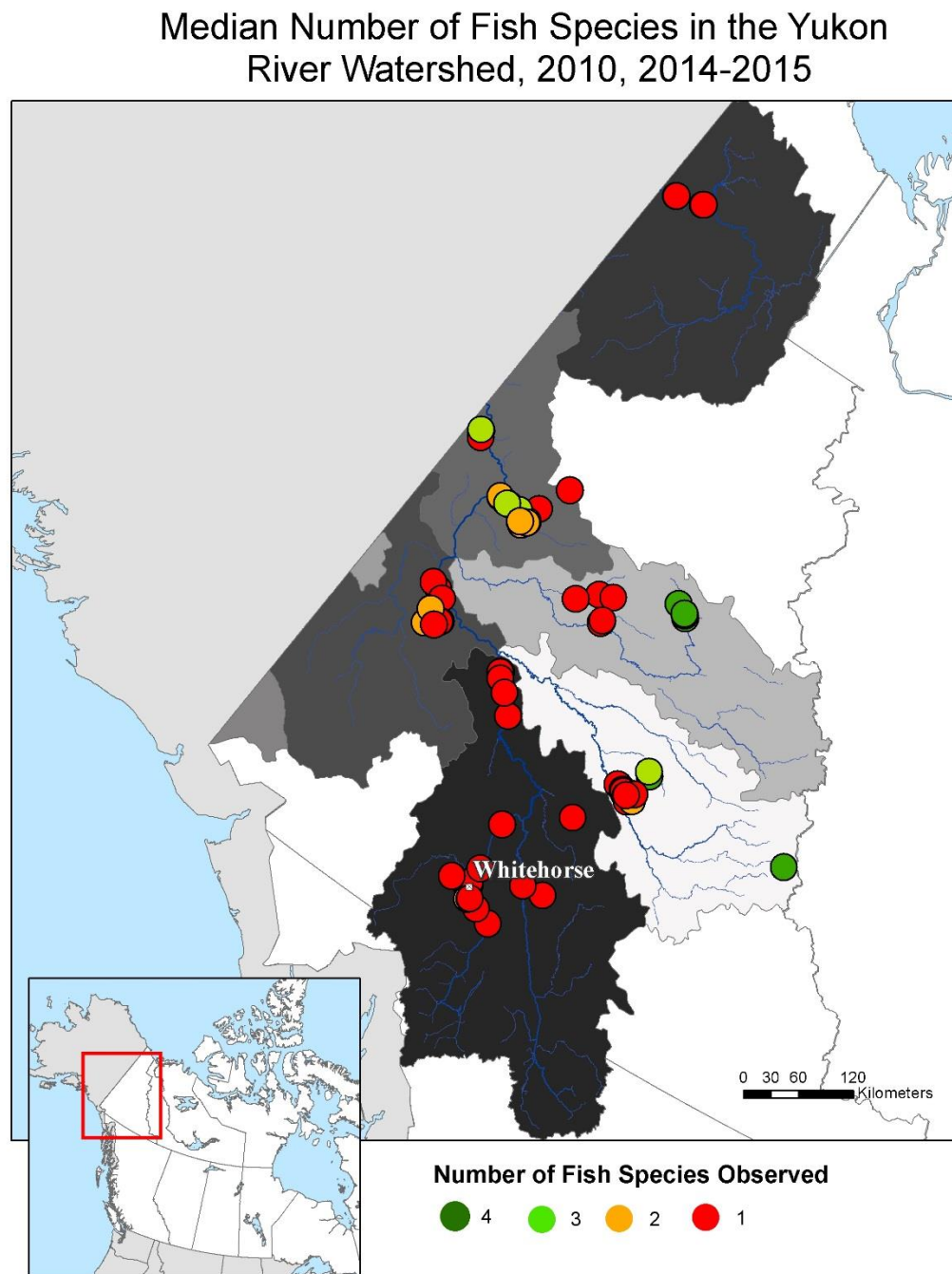
OVERALL FISH HEALTH SCORING

Fish	Indicator			09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	Watershed
	Change in Native Fish Species Richness		Period of Study	2005-2014	2010-2014	2013	2013-2014	2013-2014	2013-2014	-	-	2005-2014
			Number of Sites	100	108	17	386	51	131	-	-	793
		Presence of statistically significant decline in median species richness for the basin.	Trend	None	None	None	None	None	None	-	-	None
		Presence of statistically significant decline in total species richness for the basin.	Trend	None	None	None	None	None	None	-	-	None
			Fish Health Category	Good	Good	Data deficient	Good	Good	Data deficient	Data deficient	Data deficient	Good
			Fish Health Score	4	4	0	4	4	0	0	0	4

FISH DATA SUFFICIENCY

Data Sufficiency Indicator	09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	Yukon
Total number of sub-sub-basins	8	3	4	4	4	5	1	1	30
Year of earliest available monitoring	2005	2010	2013	2013	2013	2013	-	-	2013
Number of sampling locations available for earliest monitoring	3	15	17	392	28	121	0	0	576
Number of sub-sub-basins with earliest available sampling locations	1	1	2	2	2	1	0	0	9
Earliest year of continuous monitoring	2013	2013	2013	2013	2013	2013	-	-	2013
Number of sampling locations available for first year of continuous monitoring	52	50	17	392	28	121	0	0	660
Number of sub-sub-basins for first year of continuous monitoring	4	2	2	2	2	1	0	0	13
Year of most recently available monitoring	2014	2014	2013	2014	2014	2014	-	-	2014
Number of monitoring stations available within last five years	95	107	17	408	50	132	0	0	809
Number of sub-sub-basins within last five years	5	2	2	3	2	1	0	0	15
Number of years of sampling in last 10 years	4	3	1	3	2	2	0	0	4
Overall Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Insufficient	Partially Sufficient	Partially Sufficient	Insufficient	Insufficient	Insufficient	Partially Sufficient
Data Sufficiency Score	1	1	0	1	1	0	0	0	1

MAP. MEDIAN NUMBER OF NATIVE FISH SPECIES OBSERVED IN THE YUKON RIVER WATERSHED.



Source: FISS-Yukon (2015).

FIGURE. NON-PARAMETRIC ANALYSIS OF VARIANCE IN FISH SPECIES RICHNESS IN THE YUKON RIVER WATERSHED (2005-2014)

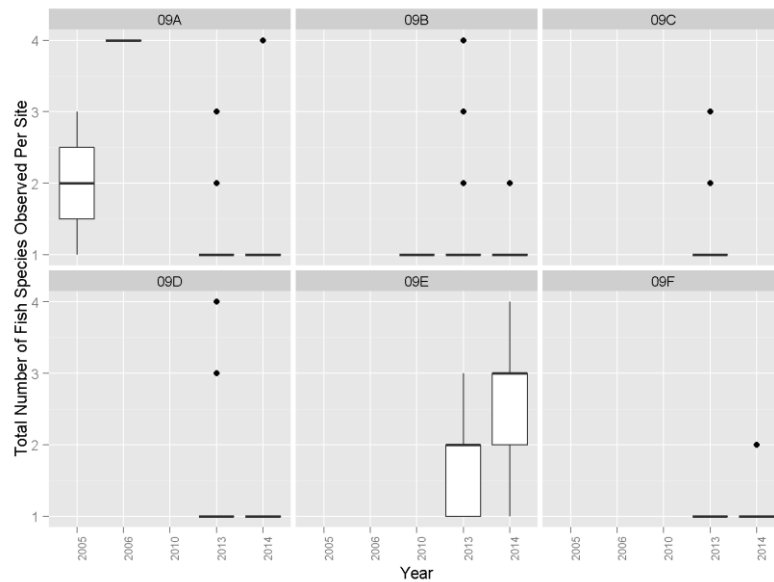


FIGURE. TIME-SERIES OF MEDIAN OBSERVED NATIVE FISH SPECIES RICHNESS IN THE YUKON RIVER WATERSHED.

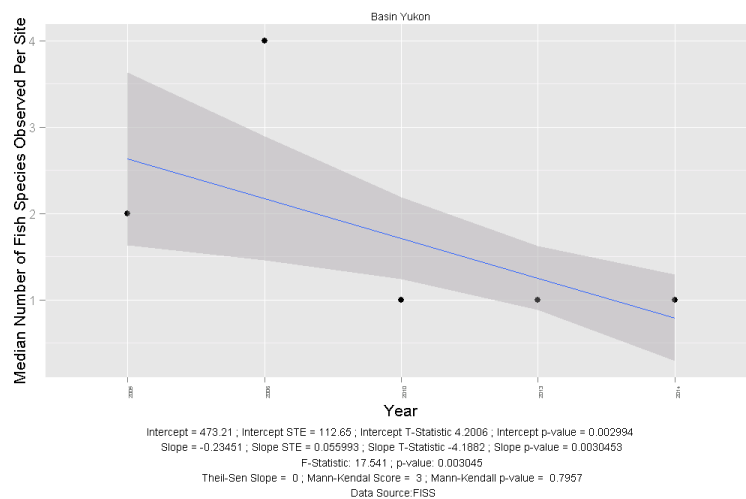


FIGURE.TIME-SERIES OF TOTAL OBSERVED NATIVE FISH SPECIES RICHNESS IN THE YUKON RIVER WATERSHED.

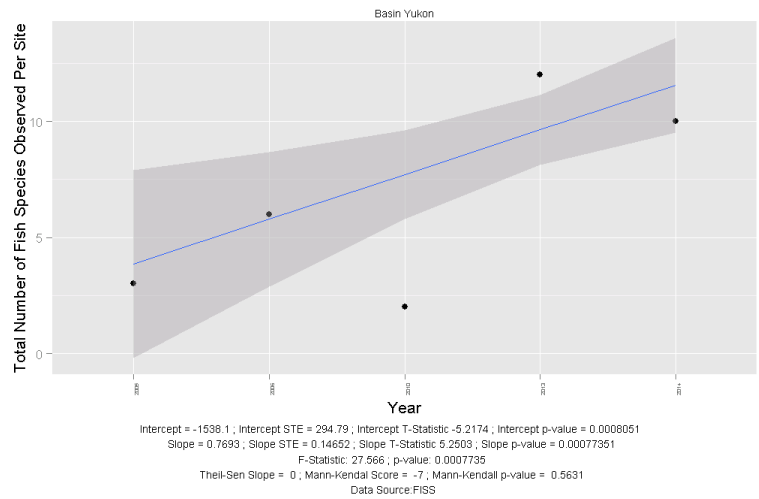


TABLE . RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF FISH SPECIES RICHNESS OVER TIME IN THE YUKON RIVER WATERSHED.

	Source	WSCSDA	Start Year	End Year	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
Median Species Richness	FISS	Yukon	2005	2014	0	3	0.795698
Total Species Richness	FISS	Yukon	2005	2014	0	-7	0.5631

BENTHICS

OVERALL BENTHIC HEALTH SCORING

				Sub-Basin								
Benthic Macro-Invertebrates	Indicator			09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	Basin
	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	2009 - 2012	2009-2012	2009-2013	2009-2013	2009-2013	2005-2008	2006	-	2009-2013
			Number of Sites	18	6	11	9	28	36	3	-	111
			Value	3.86	4.03	4.48	3.90	4.57	5.17	5.10	-	4.57
			Benthic Health Category	Very Good	Very Good	Good	Very Good	Good	Fair	Fair	Data deficient	Good
			Benthic Health Score	5	5	4	5	4	3	3	Data deficient	4
		Variance of annual HBI scores	Value	0.832	0.588	0.149	0.653	0.323	NA	NA	-	0.049
		Significant Mann-Kendal time-series test to determine directional trend in HBI over time.	Time Period	2004-2012	2004-2012	2004-2013	2004-2013	2004-2013	2005-2008	2006	-	2004-2013
			Trend	No trend	No trend	No trend	No trend	No trend	NA	NA	-	Negative

BENTHIC DATA SUFFICIENCY

Data Sufficiency Indicator	Sub-Basin								Basin
	09A - Headwaters Yukon	09B - Pelly	09C - Upper Yukon	09D - Stewart	09E - Central Yukon	09F - Porcupine	09H - Tanana	09M - Copper	
Total number of sub-sub-basins	8	3	4	4	4	5	1	1	28
Year of earliest available monitoring	2004	2004	2004	2004	2004	2005	2006	-	2006
Number of monitoring stations available for earliest monitoring	14	1	3	2	2	9	3	-	34
Number of sub-sub-basins with earliest available monitoring stations	6	1	1	1	1	2	1	-	13
Year of most recently available monitoring	2012	2012	2013	2013	2013	2008	2006	-	2013
Number of monitoring stations available within last five years	8	6	13	11	29	26	3	-	96
Number of sub-sub-basins with most recent available monitoring	3	1	3	1	3	3	1	-	15
Number of years of sampling in last 10 years	6	5	8	9	9	2	1	-	9
Overall Data Sufficiency Category	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Partially Sufficient	Moderately Sufficient	Insufficient	Partially Sufficient
Data Sufficiency Score	1	1	1	1	1	1	2	0	1

MAP. HILSENHOFF'S BIOTIC INDEX SCORES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES IN THE YUKON RIVER WATERSHED (2009-2013).

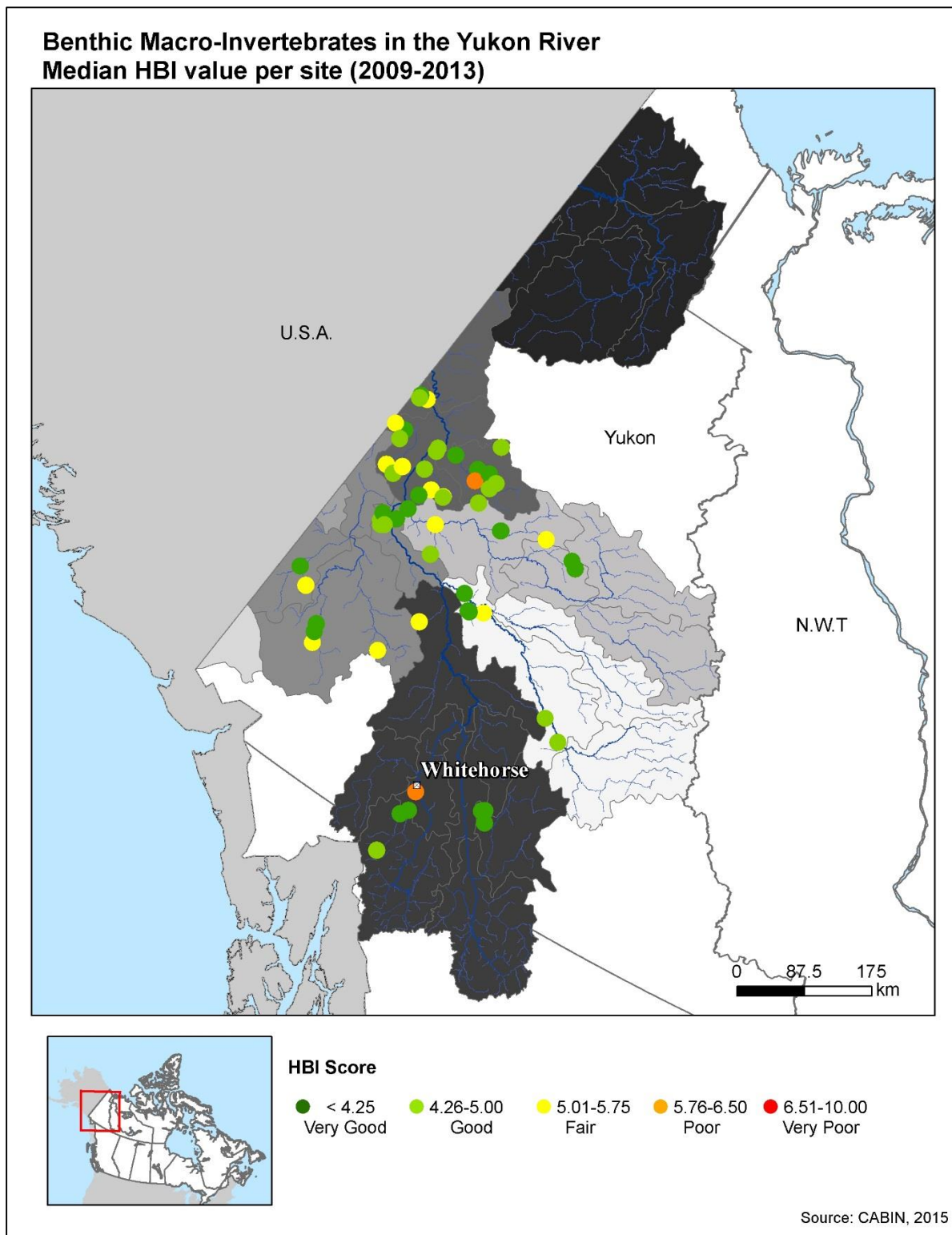


FIGURE. ANALYSIS OF VARIANCE FOR HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE YUKON RIVER WATERSHED.

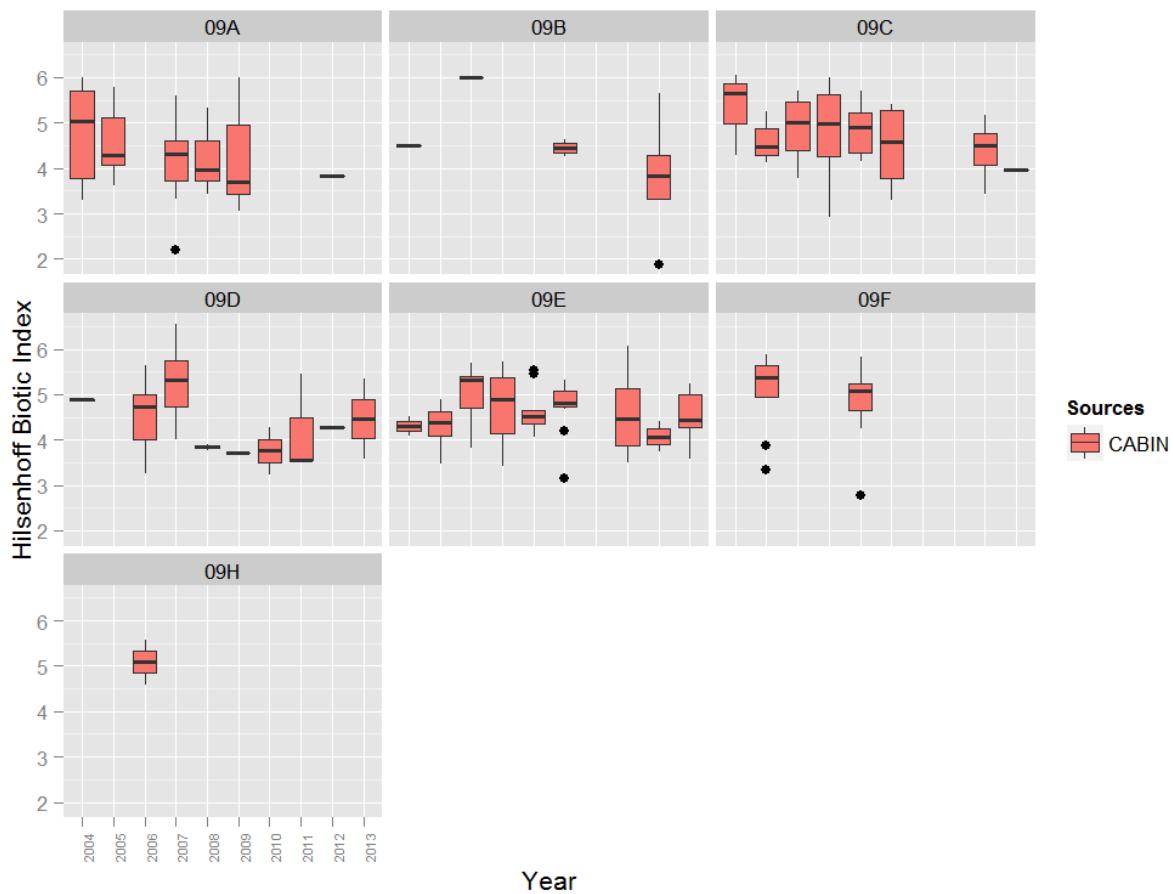


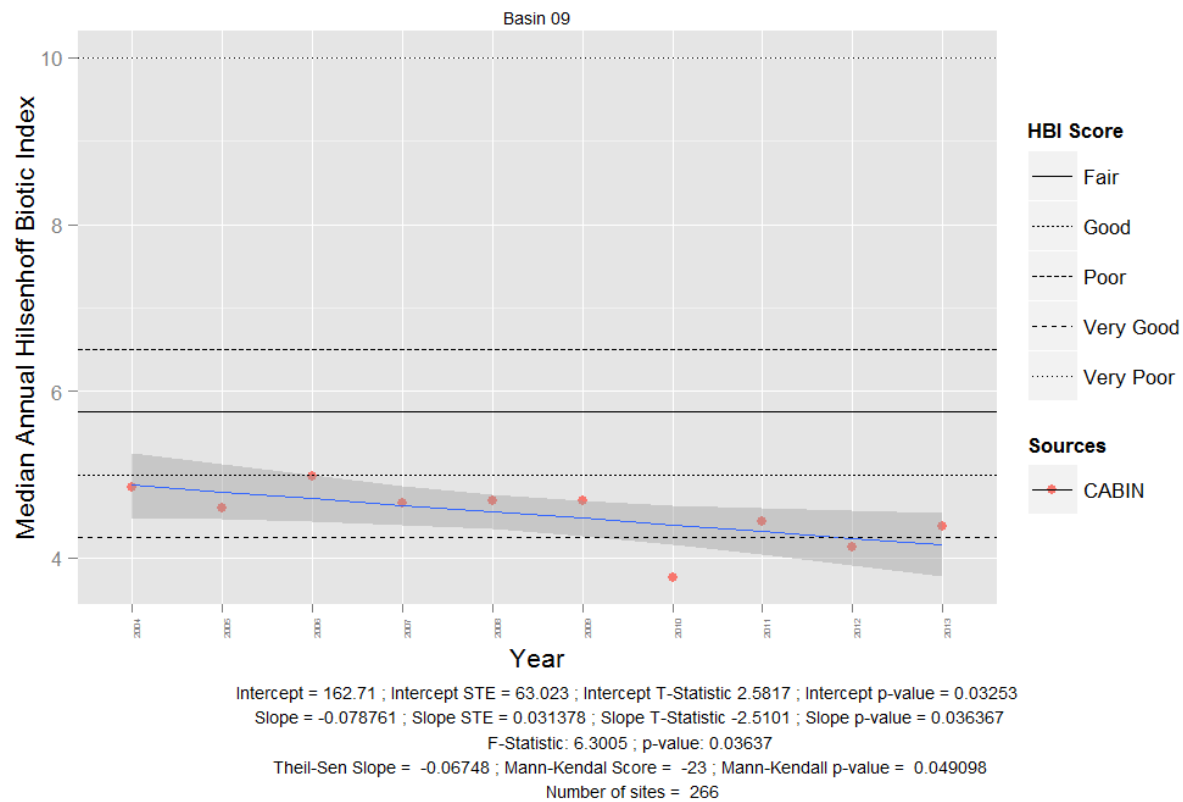
TABLE . RESULTS OF MANN-KENDALL NON-PARAMETRIC TREND ANALYSIS OF HILSENHOFF'S BIOTIC INDEX OVER TIME IN THE YUKON RIVER WATERSHED.

Sub-Basin	Data Source	Start Year	End Year	Number of Sites	Theil-Sen Slope	Mann-Ken Score	Mann-Ken p-value
09A	CABIN	2004	2012	68	-0.00275	-3	0.832107
09B	CABIN	2004	2012	8	-0.00494	-6	0.588324
09C	CABIN	2004	2013	58	-0.0825	-17	0.149113
09D	CABIN	2004	2013	38	-0.05232	-6	0.653422
09E	CABIN	2004	2013	55	-0.03305	-12	0.323236
Basin	CABIN	2004	2013	266	-0.06748	-23	0.049098 *

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

Sub-Watershed	Year	Data Source	Number of Sites	HBI Value	5-Years Weighted Average by sub-watershed	5-Years Weighted Average for entire basin					
09A - Headwaters Yukon	2012	CABIN	1	3.84	3.86	4.01					
	2009	CABIN	7	3.71							
	2008	CABIN	10	3.96							
	2007	CABIN	20	4.32							
	2005	CABIN	16	4.30							
	2004	CABIN	14	5.04							
09B - Pelly	2012	CABIN	4	3.82	4.03		4.01				
	2009	CABIN	2	4.45							
	2006	CABIN	1	6.00							
	2004	CABIN	1	4.51							
09C - Upper Yukon	2013	CABIN	1	3.96	4.48			4.01			
	2012	CABIN	6	4.51							
	2009	CABIN	4	4.58							
	2008	CABIN	6	4.91							
	2007	CABIN	26	4.97							
	2006	CABIN	9	5.00							
	2005	CABIN	5	4.48							
	2004	CABIN	3	5.66							
09D - Stewart	2013	CABIN	2	4.46	3.90				4.01		
	2012	CABIN	1	4.28							
	2011	CABIN	3	3.56							
	2010	CABIN	2	3.76							
	2009	CABIN	1	3.71							
	2008	CABIN	4	3.84							
	2007	CABIN	12	5.32							
	2006	CABIN	14	4.73							
	2004	CABIN	2	4.88							
09E - Central Yukon	2013	CABIN	6	4.44	4.57					4.01	
	2012	CABIN	2	4.07							
	2011	CABIN	9	4.47							
	2009	CABIN	11	4.82							
	2008	CABIN	8	4.53							
	2007	CABIN	9	4.88							
	2006	CABIN	7	5.32							
	2005	CABIN	8	4.38							
	2004	CABIN	2	4.30							
09F - Porcupine	2008	CABIN	26	5.09	5.17						4.01
	2005	CABIN	10	5.37							
09H - Tanana	2006	CABIN	3	5.10	5.10						

FIGURE. ANNUAL REGRESSION OF HILSENHOFF'S BIOTIC INDEX VALUES FOR BENTHIC MACRO-INVERTEBRATE COMMUNITIES SAMPLED IN THE YUKON RIVER WATERSHED.



SUMMARY

TABLE. OVERALL SCORING RESULTS OF THE FRESHWATER THREATS ASSESMENT FOR THE YUKON RIVER WATERSHED, BY SUB-WATERSHED AND PEARSE WATERSHED

PEARSE BASIN	SUB WATERSHED SCORE			
	WSCSDA	SUB WATERSHED NAME	SCORE	FINAL SCORE (MEDIAN)
Yukon	09A	Headwaters Yukon	THREAT CLASSIFICATION	Moderate
			SCORE	50
	09B	Pelly	THREAT CLASSIFICATION	Low
			SCORE	22.5
	09C	Upper Yukon	THREAT CLASSIFICATION	Low
			SCORE	25
	09D	Stewart	THREAT CLASSIFICATION	Low
			SCORE	35
	09E	Central Yukon	THREAT CLASSIFICATION	Low
			SCORE	25
	09F	Porcupine	THREAT CLASSIFICATION	Low
			SCORE	20
	09H	Tanana	THREAT CLASSIFICATION	Low
			SCORE	20
	09M	Copper	THREAT CLASSIFICATION	Very low
			SCORE	0
OVERALL PEARSE BASIN SCORE				
		THREAT CLASSIFICATION	Low	
		SCORE	25	

TABLE. SCORING RESULTS FOR FRESHWATER THREAT INDICATORS FOR THE YUKON RIVER WATERSHED, BY SUB-WATERSHED AND 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
Yukon	09A	Headwaters Yukon	THREAT CLASSIFICATION	Moderate	Moderate	No threat reported	Very low	Moderate	Low	Moderate	91,183,369,028	27.80%
			SCORE	60	66.67	0	20	50	25	60		
	09B	Pelly	THREAT CLASSIFICATION	Very low	Moderate	No threat reported	Unknown	Very low	Low	Moderate	49,011,650,268	14.94%
			SCORE	20	66.67	0	-9999	20	25	60		
	09C	Upper Yukon	THREAT CLASSIFICATION	No threat reported	Moderate	No threat reported	Very low	Low	Low	Very High	42,897,842,716	13.08%
			SCORE	0	66.67	0	20	40	25	100		
	09D	Stewart	THREAT CLASSIFICATION	No threat reported	Moderate	Low	Unknown	Low	Low	High	49,954,241,139	15.23%
			SCORE	0	66.67	40	-9999	30	25	80		
	09E	Central Yukon	THREAT CLASSIFICATION	Very low	Moderate	No threat reported	Very low	Moderate	Low	High	29,046,763,768	8.85%
			SCORE	20	66.67	0	20	60	25	80		
	09F	Porcupine	THREAT CLASSIFICATION	No threat reported	Moderate	No threat reported	Very low	Very low	Low	High	60,544,367,164	18.46%
			SCORE	0	66.67	0	20	10	25	80		
	09H	Tanana	THREAT CLASSIFICATION	No threat reported	High	No threat reported	Very low	Low	Low	Very low	1,427,441,122	0.44%
			SCORE	0	100	0	20	30	25	20		
	09M	Copper	THREAT CLASSIFICATION	No threat reported	High	No threat reported	Unknown	No threat reported	Low	No threat reported	3,987,254,671	1.22%
			SCORE	0	100	0	-9999	0	25	0		
OVERALL PEARSE BASIN SCORE												
			THREAT CLASSIFICATION	Low	High	Very low	Very low	Low	Low	High		
			SCORE	21.44	67.22	6.09	13.72	33.97	25	72.83		

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		
		Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification	Value	Score	Threat Classification
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
09A	Headwaters Yukon	1464.73	60	Moderate	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None
09B	Pelly	2.91	20	Very Low	0	0	None	2	20	Very Low	0	0	None	0	0	None	0	0	None
09C	Upper Yukon	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None
09D	Stewart	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None
09E	Central Yukon	0	20	Very Low	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None
09F	Porcupine	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None
09H	Tanana	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None
09M	Copper	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None	0	0	None

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
09A	Headwaters Yukon	-0.16	66.67	Moderate	-0.73	66.67	Moderate	0.13	33.33	Low	0.14	66.67	Moderate
09B	Pelly	-0.14	66.67	Moderate	-0.69	66.67	Moderate	0.11	33.33	Low	0.09	33.33	Low
09C	Upper Yukon	-0.17	66.67	Moderate	-0.61	66.67	Moderate	0.27	66.67	Moderate	0.27	66.67	Moderate
09D	Stewart	-0.13	66.67	Moderate	-0.46	66.67	Moderate	0.1	33.33	Low	0.07	33.33	Low
09E	Central Yukon	-0.2	66.67	Moderate	-0.47	66.67	Moderate	0.09	33.33	Low	0.12	33.33	Low
09F	Porcupine	-0.25	66.67	Moderate	-0.3	33.33	Low	0.03	33.33	Low	0.16	33.33	Low
09H	Tanana	0	100	Very High	0	100	Very High	0	100	Very High	0	100	Very High
09M	Copper	-0.22	66.67	Moderate	-0.66	66.67	Moderate	0.37	100	Very High	0.39	33.33	Low

ALTERATION OF WATER FLOWS

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

WSCSDA	SUB WATERSHED NAME	SUB-INDICATOR		
		Area of Reservoirs/Dams		
		Value	Score	Threat Classification
09A	Headwaters Yukon	0	0	None
09B	Pelly	0	0	None
09C	Upper Yukon	0	0	None
09D	Stewart	92.5	40	Low
09E	Central Yukon	0	0	None
09F	Porcupine	0	0	None
09H	Tanana	0	0	None
09M	Copper	0	0	None

INVASIVE SPECIES

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

WSCSDA	SUB WATERSHED NAME	SUB-INDICATOR		
		Presence of Invasive Species		
		Value	Score	Threat Classification
09A	Headwaters Yukon	2	20	Very Low
09B	Pelly	-9999	-9999	Unknown
09C	Upper Yukon	2	20	Very Low
09D	Stewart	-9999	-9999	Unknown
09E	Central Yukon	2	20	Very Low
09F	Porcupine	2	20	Very Low
09H	Tanana	2	20	Very Low
09M	Copper	-9999	-9999	Unknown

WATER USE

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

WSCSDA	SUB WATERSHED NAME	SUB-INDICATOR		
		Water Use		
		Value	Score	Threat Classification
09A	Headwaters Yukon	N/A	25	Low
09B	Pelly	N/A	25	Low
09C	Upper Yukon	N/A	25	Low
09D	Stewart	N/A	25	Low
09E	Central Yukon	N/A	25	Low
09F	Porcupine	N/A	25	Low
09H	Tanana	N/A	25	Low
09M	Copper	N/A	25	Low

FRAGMENTATION

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

WSCSDA	SUB WATERSHED NAME	SUB-INDICATOR					
		Fragmentation by dams			Fragmentation by roads and rail		
		Value	Score	Threat Classification	Value	Score	Threat Classification
09A	Headwaters Yukon	0.54	60	Moderate	0	40	Low
09B	Pelly	0	0	None	0	40	Low
09C	Upper Yukon	0.4	40	Low	0	40	Low
09D	Stewart	0.15	20	Very Low	0	40	Low
09E	Central Yukon	0.51	60	Moderate	0	60	Moderate
09F	Porcupine	0	0	None	0	20	Very Low
09H	Tanana	0	0	None	0	60	Moderate
09M	Copper	0	0	None	0	0	None

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

WSCSDA	SUB WATERSHED NAME	SUB-INDICATOR					
		Land use/Land cover			Forest loss		
		Value	Score	Threat Classification	Value	Score	Threat Classification
09A	Headwaters Yukon	0.16	20	Very Low	4.37	60	Moderate
09B	Pelly	0.07	20	Very Low	7.01	60	Moderate
09C	Upper Yukon	0.04	20	Very Low	29.35	100	Very High
09D	Stewart	0.03	20	Very Low	12.57	80	High
09E	Central Yukon	0.13	20	Very Low	11.31	80	High
09F	Porcupine	0.01	20	Very Low	8.34	80	High
09H	Tanana	0.05	20	Very Low	0	0	None
09M	Copper	0	0	None	0	0	None