

APPENDIX B

Field Survey Sites and Field Data, 2008

APPENDIX B

Table B - 1: Field Survey Sites, GPS Coordinates (UTM WGS84) and Watershed Size

Location	ID	NORTHING	EASTING	ZONE	Watershed Size Category Range (km ²)	Measured Watershed Size (km ²) ^a
Southeastern Labrador	P7	5859616	615611	20	50 to 200	88.8
	P10	5858849	624702	20	2.6 to 50	15.2
	P29	5850966	666835	20	200 to 500	436.3
	P30	5851130	666911	20	2.6 to 50	6.2
	P36	5838282	680625	20	1000 to 10000	1092.4
	P37	5838001	681066	20	500 to 1000	574.5
	P43	5832541	692226	20	2.6 to 50	6.1
	P52	5829925	304676	21	2.6 to 50	9.7
	P55	5824537	311934	21	200 to 500	221.6
	P108	5787687	425516	21	2.6 to 50	27.7
	P120	5777637	451548	21	2.6 to 50	6.3
	P121	5776618	452805	21	200 to 500	491.5
	P139	5766072	490818	21	2.6 to 50	2.8
	P142	5764435	495926	21	2.6 to 50	6.4
	P143	5763490	496837	21	50 to 200	61.2
Northern Peninsula	P200	5648883	524469	21	2.6 to 50	15.3
	P204	5646323	521792	21	2.6 to 50	2.8
	P205	5643335	519469	21	50 to 200	65.6
	P228	5607630	498892	21	200 to 500	447.4
	P238	5587856	485192	21	200 to 500	331.6
	P239	5585918	482993	21	200 to 500	265.7
	P243	5568305	470853	21	2.6 to 50	19.6
	P245	5560327	467855	21	200 to 500	427.3
	P246	5557735	466846	21	2.6 to 50	3.2
	P259	5540832	472027	21	2.6 to 50	15.9
	P267	5532432	470447	21	2.6 to 50	6
	P270	5528434	470281	21	2.6 to 50	7.5
	P308	5493197	496830	21	50 to 200	52.3
	P311	5486870	498973	21	50 to 200	57.2
	P313	5486690	499846	21	2.6 to 50	12.1
	P1005	5567128	466417	21	200 to 500	345.3
Central and Eastern Newfoundland	P326	5470203	506715	21	2.6 to 50	14.7
	P343	5457077	527357	21	50 to 200	194.1
	P346	5459347	536111	21	2.6 to 50	10.8
	P352	5458339	541788	21	2.6 to 50	35.2
	P369	5443372	554717	21	200 to 500	272.6
	P397	5418711	580613	21	2.6 to 50	2.6
	P399	5418968	588487	21	500 to 1000	598
	P401	5419692	597152	21	50 to 200	161.2
	P403	5418285	598036	21	2.6 to 50	3.8
	P408	5416238	600770	21	50 to 200	79.8
	P413	5413684	603075	21	2.6 to 50	21.8

	P416	5409415	607828	21	500 to 1000	605.9
	P421	5403183	619572	21	2.6 to 50	3.7
	P430	5397212	635190	21	500 to 1000	989.4
	P437	5395089	646447	21	500 to 1000	989.4
	P441	5392220	656396	21	50 to 200	53.3
	P469	5350698	708947	21	2.6 to 50	15.2
Avalon Peninsula	A110	5244054	331405	22	200 to 500	405.1
	P529	5259065	307968	22	2.6 to 50	11.2
	P533	5250460	326109	22	2.6 to 50	24.7
	P534	5250322	326427	22	2.6 to 50	24.7
	P541	5247533	334877	22	50 to 200	50.9
^a Watershed size was calculated upstream of crossing						

APPENDIX C

Field Electrofishing Data, 2008

Field Survey Electrofishing Results, 2008 - All regions

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
SE Labrador	P7	14/08/08	n/r	309	76	800	25	n/r	PD	48	1.2	
									PD	48	1.1	
									PD	91	9.1	
									PD	85	7.9	
									PD	100	10.3	
SE Labrador	P10	12/08/08	n/r	357	70	700	25	n/r	Bur	151	22.2	
									Bur	171	31.7	
									Bur	124	11.6	
									Bur	192	43.2	
									Bur	155	26.6	
									PD	55	1.9	
									PD	53	1.3	
									PD	86	6.4	
SE Labrador	P29	12/08/08	n/r	302	70	800	25	n/r	WS	160	48.1	
									AS	45	0.4	
									AS	120	16.6	
									AS	82	5.1	
									AS	65	2.6	
									AS	72	3.6	
									AS	59	2.4	
									AS	58	2.2	
									AS	43	0.8	
									AS	38	0.5	
									AS	32	0.4	
									AS	43	0.5	
									AS	42	0.8	
									AS	105	12.2	
									AS	33	0.3	
									AS	34	0.4	
									AS	58	1.7	
									AS	43	0.7	
									AS	37	0.4	
									AS	39	0.6	
									AS	37	0.3	
									AS	39	0.7	
									AS	38	0.5	
									AS	38	0.5	
									AS	41	0.5	
									AS	40	0.4	
									Bur	60	1.2	
									LND	86	6.3	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									LND	71	3.5	
SE Labrador	P29	12/08/08	n/r	302	70	800	25	n/r	LND	79	4.7	
									LND	95	8.1	
									LND	55	1.5	
									LND	57	1.9	
									LND	99	9.1	
									LND	93	7.6	
									LND	53	1.6	
									LND	70	2.5	
									LND	79	4.7	
									LND	64	2.6	
									PD	57	2.6	
SE Labrador	P30	14/08/08	n/r	315	76	800	25	n/r	AS	121	17.2	
									AS	98	9.7	
									BT	150	36.2	
									BT	150	35.4	
									BT	124	20.2	
									BT	124	18.8	
									BT	118	17.3	
									BT	178	59.4	
									BT	142	29.6	
									BT	105	14.1	
									LND	89	8.2	
SE Labrador	P36	15/08/08	n/r	322	76	800	25	n/r	AS	98	8.4	
									AS	109	10.8	
									AS	121	16.0	
									AS	109	12.5	
									AS	79	4.6	
									AS	110	13.1	
									AS	107	11.0	
									AS	43	0.5	
									AS	95	8.6	
									AS	39	0.3	
									AS	36	0.3	
									AS	86	5.8	
									AS	40	0.5	
									AS	63	1.5	
									AS	42	0.7	
									AS	39	0.3	
									AS	190	76.5	
									LND	89	8.7	
									LND	88	8.5	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									PD	109	13.9	
SE Labrador	P37	15/08/08	n/r	319	76	800	25	n/r	AS	81	6.1	
SE Labrador	P37	15/08/08	n/r	319	76	800	25	n/r	AS	76	4.4	
									AS	120	18.9	
									AS	71	3.9	
									AS	123	18.2	
									AS	91	7.3	
									AS	84	5.7	
									AS	76	4.1	
									AS	134	23.9	
									AS	82	5.8	
									AS	91	8.2	
									AS	49	1.1	
									MS	71	4.2	
SE Labrador	P43	17/08/08	n/r	344	76	800	25	n/r	BT	47	1.0	
									BT	63	3.0	
									BT	44	0.8	
									BT	123	17.4	
									BT	140	28.0	
									BT	86	6.9	
									BT	112	14.5	
									BT	65	2.4	
									BT	36	0.4	
									BT	129	21.9	
									BT	64	2.2	
									BT	68	3.3	
									BT	83	5.1	
									BT	82	5.3	
									BT	79	5.3	
									BT	69	2.7	
									BT	55	1.8	
									BT	161	45.5	
									BT	77	4.1	
									BT	41	0.4	
									BT	42	0.5	
									BT	87	6.6	
									BT	85	5.5	
									BT	63	2.4	
									BT	43	0.8	
									BT	65	2.7	
									BT	45	0.8	
									BT	120	19.1	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	92	6.8	
									BT	102	12.3	
									BT	74	3.7	
SE Labrador	P43	17/08/08	n/r	344	76	800	25	n/r	BT	80	4.9	
									BT	72	3.2	
									BT	67	3.2	
									BT	62	2.1	
									BT	53	1.4	
									BT	64	2.2	
									BT	86	6.1	
									BT	66	2.6	
									BT	39	0.5	
									BT	40	0.6	
									BT	42	0.6	
									BT	76	4.4	
									BT	39	0.7	
									BT	46	0.8	
SE Labrador	P52	17/08/08	n/r	304	76	800	25	n/r	BT	175	67.6	
									BT	32	0.5	
									BT	80	5.9	
									BT	117	17.0	
									BT	160	47.9	
									BT	170	56.9	
									BT	41	0.6	
									BT	119	14.2	
									BT	51	1.6	
									BT	46	0.9	
									BT	42	0.7	
									BT	37	0.3	
									BT	46	1.0	
									BT	82	5.8	
									BT	53	1.6	
									BT	52	1.3	
									BT	150	39.0	
									BT	187	66.9	
									BT	52	1.6	
									BT	51	1.5	
									BT	49	1.0	
									BT	49	1.1	
									BT	45	1.0	
									BT	44	0.8	
									BT	40	0.6	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
SE Labrador	P55	16/08/08	n/r	340	76	800	25	n/r	BT	152	39.6	
									WS	27	0.1	
									WS	91	11.6	
									WS	68	2.8	
SE Labrador	P55	16/08/08	n/r	340	76	800	25	n/r	WS	26	0.1	
									WS	58	2.1	
									WS	25	0.1	
SE Labrador	P108	18/08/08	n/r	315	78	800-900	25	n/r	BT	154	40.1	
									WS	64	3.1	
SE Labrador	P120	18/08/08	n/r	327	78	800	25	n/r	BT	96	10.1	
									BT	109	12.9	
									BT	87	7.8	
									BT	84	6.4	
									BT	106	13.3	
									BT	110	13.9	
SE Labrador	P121	19/08/08	n/r	322	80	900	25	n/r	BT	115	14.9	
									BT	145	31.6	
									BT	120	16.5	
SE Labrador	P139	18/08/08	n/r	324	80	800	25	n/r	BT	115	11.8	
									BT	177	57.1	
									BT	150	36.6	
									BT	88	7.7	
									BT	94	8.7	
									BT	99	10.0	
									BT	87	7.0	
									BT	130	24.6	
									BT	79	5.7	
									BT	64	2.8	
SE Labrador	P142	19/08/08	n/r	340	80	900	25	n/r	BT	71	3.4	Lice on adipose
									BT	173	53.4	
									BT	155	35.3	
									BT	115	16.4	
									BT	125	19.4	
									BT	60	2.0	
									BT	134	25.1	
									BT	123	21.7	
SE Labrador	P143	16/08/08	n/r	362	76	800-900	25	n/r	BT	89	6.0	
									BT	160	42.5	
									BT	43	0.4	
									BT	41	0.4	
									BT	40	0.3	
									WS	270	247.6	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
Northern Peninsula	P200	22/08/08	~25	307	80	300	25	3.1	BT	132	22.0	
									BT	118	18.4	
									BT	136	26.0	
									BT	100	10.4	
									BT	89	7.5	
Northern Peninsula	P200	22/08/08	~25	307	80	300	25	3.1	BT	159	43.3	
									BT	119	21.3	
									BT	54	1.7	
									BT	60	2.5	
									BT	104	11.3	
									BT	75	5.1	
									BT	53	1.7	
									AS	48	1.4	
									AS	132	24.4	
									AS	129	22.3	
									AS	102	10.8	
									AS	144	30.8	
									AS	93	8.2	
									AS	93	7.7	
									AS	86	7.2	
									AS	52	1.6	
Northern Peninsula	P204	22/08/08	0	314	80	300	25	3.1	no fish caught			
Northern Peninsula	P205	22/08/08	5	325	80	550	25	3.1	AS	32	0.2	
									AS	41	0.6	
									AS	40	0.6	
									AS	45	0.8	
									AS	43	0.8	
									AS	41	0.6	
									AS	40	0.5	
									AS	42	0.7	
									AS	43	0.8	
									AS	40	0.6	
									AS	43	0.7	
Northern Peninsula	P228	23/08/08		305	80	650	25	3.1	AS	84	5.5	
									AS	87	7.5	
									AS	90	7.0	
									AS	60	1.6	
									AS	141	28.1	
									AS	131	21.9	
									AS	97	9.9	
									AS	71	4.2	
									AS	107	12.5	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									AS	70	4.1	
									AS	56	2.1	
									AS	57	2.0	
									AS	58	1.8	
									AS	65	3.1	
									AS	85	5.8	
Northern Peninsula	P228	23/08/08		305	80	650	25	3.1	AS	67	3.1	
									AS	40	0.7	
									AS	41	0.7	
									AS	56	1.7	
									AS	36	0.5	
									AS	43	0.7	
									AS	43	0.8	
									AS	35	0.6	
									AS	36	0.5	
									AS	36	0.5	
									AS	36	0.5	
Northern Peninsula	P238	23/08/08	20	301	80	650	25	3.1	AS	85	7.1	
									AS	54	1.8	
									3SB	58	1.8	
									AS	43	0.7	
									AS	34	-	
									AS	46	1.3	
									3SB	52	1.2	
									AS	43	0.5	
									AS	48	1.3	
									AS	42	0.9	
									AS	40	0.8	
									AS	42	0.8	
									AS	121	19.6	
									AS	78	5.0	
									AS	39	0.5	
									AS	75	4.5	
									AS	44	1.1	
									AS	90	8.9	
									AS	48	1.1	
									AS	44	1.2	
									AS	43	0.7	
									AS	140	28.8	
									AS	47	1.5	
									AS	45	0.9	
									AS	36	-	mortality

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									AS	40	0.8	
									AS	43	-	
									AS	107	13.0	
									AS	77	4.6	
									AS	41	0.7	
									AS	92	8.5	
									AS	53	-	
Northern Peninsula	P238	23/08/08	20	301	80	650	25	3.1	AS	50	1.1	
									AS	68	3.6	
									AS	44	-	
									AS	42	0.7	
									AS	52	1.5	
									AS	41	0.7	
									AS	49	1.6	
									AS	41	0.9	
									A.Eel	450	173.8	10cm girth
									A.Eel	544	292.3	10cm girth
									A.Eel	490	310.1	10cm girth
									A.Eel	327	55.7	5cm girth
Northern Peninsula	P239	24/08/08	5	309	80	550	25	3.1	AS	53	2.6	
									AS	59	2.9	
									AS	94	11.1	
									AS	106	13.6	
									AS	190	37.2	
									AS	95	11.1	
									AS	81	6.7	
									AS	56	2.3	
									AS	53	2.0	
									AS	49	1.3	
									AS	52	1.8	
									AS	53	2.5	
									AS	84	6.9	
									AS	51	1.5	
									AS	51	2.4	
									AS	91	9.1	
									BT	63	3.0	
									AS	91	8.2	
									AS	51	2.1	
									AS	54	2.0	
									AS	49	1.5	
									AS	53	2.1	
									AS	46	1.4	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									AS	52	1.9	
									AS	53	1.7	
									AS	52	1.7	
Northern Peninsula	P243	25/08/08	~40	343	80	400	25	3.1	BT	62	2.5	
									BT	100	11.3	
									BT	129	20.9	
									BT	71	4.2	
									BT	113	16.8	
Northern Peninsula	P243	25/08/08	~40	343	80	400	25	3.1	BT	65	3.7	
									BT	114	12.1	
									BT	112	14.2	
									BT	123	21.8	
									BT	70	3.6	
									BT	110	14.4	
									BT	72	4.5	
									BT	120	15.4	
									BT	64	3.1	
									BT	111	14.7	
									BT	100	11.3	
									BT	113	14.5	
									BT	123	18.8	
									BT	129	22.9	
									BT	85	7.0	
									BT	59	2.0	
									BT	123	22.1	
									BT	111	13.5	
									BT	112	14.1	
									BT	74	5.1	
									BT	56	1.8	
									BT	76	5.0	
									BT	64	2.8	
									BT	59	2.4	
									BT	56	2.1	
									BT	70	3.9	
									BT	62	2.8	
									BT	62	2.4	
									BT	57	2.1	
									BT	51	1.7	
									BT	69	3.4	
									BT	55	1.8	
									BT	59	2.4	
									BT	53	1.6	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	60	2.4	
									BT	64	3.0	
									BT	67	3.5	
									BT	61	2.2	
									BT	54	1.7	
									BT	54	1.8	
									BT	97	9.8	
									BT	110	14.7	
									BT	129	18.8	
Northern Peninsula	P243	25/08/08	~40	343	80	400	25	3.1	BT	69	3.8	
									BT	109	13.3	
									BT	117	18.6	
									BT	110	15.1	
									BT	50	1.2	
									BT	112	16.0	
									BT	116	16.4	
									BT	105	115.0	
									BT	61	2.3	
									BT	68	3.0	
									BT	82	7.1	
									BT	62	2.5	
									BT	63	2.5	
									BT	61	2.3	
									BT	72	5.1	
									BT	62	2.5	
									BT	71	4.0	
									BT	61	2.5	
									BT	62	3.9	
									BT	74	4.3	
									BT	64	2.6	
									BT	59	2.2	
									BT	52	1.7	
									BT	52	1.5	
									BT	63	2.9	
									BT	67	3.3	
									BT	52	1.7	
									BT	55	2.1	
									BT	55	2.0	
									BT	68	3.1	
									BT	57	2.2	
									BT	45	0.9	
									BT	60	2.4	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	56	2.1	
									BT	62	2.5	
									BT	51	1.4	
									BT	48	1.1	
									BT	57	2.2	
									BT	52	1.4	
									BT	59	2.4	
									BT	52	1.3	
									3SB	38	0.3	
									3SB	38	0.3	
Northern Peninsula	P243	25/08/08	~40	343	80	400	25	3.1	3SB	42	0.8	
									3SB	54	0.9	
									3SB	54	1.1	
									3SB	37	0.2	
Northern Peninsula	P245	24/08/08	4	303	80	550	25	3.1	BT	206	91.2	
									BT	197	84.3	
									BT	239	145.7	
									BT	149	36.1	
									BT	110	15.3	
									BT	111	16.6	
									BT	106	15.6	
									BT	120	19.5	
									BT	108	14.2	
									BT	54	1.9	
									BT	61	2.5	
									BT	96	11.7	
									BT	58	2.5	
									BT	53	1.9	
									BT	54	1.8	
									BT	59	2.7	
									BT	111	14.1	
									BT	56	1.7	Bottom lobe of caudal missing
Northern Peninsula	P246	25/08/08	~20	300	50	400-500	25	3.1	BT	224	113.3	
									BT	161	41.0	
									BT	227	124.8	
									BT	195	74.0	
									BT	126	19.6	
									BT	123	17.9	
									BT	173	51.0	
									BT	187	70.3	
									BT	180	61.0	
									BT	129	25.1	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	107	11.9	
									BT	210	100.8	
									BT	170	54.0	
									BT	187	79.5	
									BT	179	53.3	
									BT	168	50.1	
									BT	165	44.5	
									BT	156	38.5	
									BT	130	19.6	
									BT	163	41.3	
									BT	177	52.5	
Northern Peninsula	P246	25/08/08	~20	300	50	400-500	25	3.1	BT	168	52.4	
									BT	124	82.3	
									BT	163	44.0	
									BT	134	24.8	
									BT	152	32.7	
									BT	139	42.2	
									BT	170	45.0	
									BT	198	91.3	
									BT	154	40.2	
									BT	119	17.8	
									BT	141	22.2	
									BT	216	110.4	
									BT	167	54.7	top caudal ripped
									BT	156	39.5	
									BT	181	58.3	
									BT	195	73.7	
									BT	198	80.6	
									BT	186	79.0	
									BT	162	40.0	left operculum missing
									BT	130	20.1	
									BT	182	57.2	
									BT	165	45.0	
									BT	163	42.5	
									BT	149	31.1	
									BT	142	26.9	
									BT	159	38.9	
									BT	127	19.5	
									BT	128	21.2	
									BT	43	0.9	
									BT	148	37.2	
									BT	124	19.8	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	167	50.3	
									BT	158	45.8	
									BT	43	0.9	
									BT	51	1.3	
									BT	58	1.8	
Northern Peninsula	P259	26/08/08	0	307	50	650	25	5	BT	61	2.5	
									BT	115	15.6	
									BT	93	8.5	
									BT	47	1.1	
									BT	48	0.9	
									BT	108	12.5	
									BT	123	18.2	
Northern Peninsula	P259	26/08/08	0	307	50	650	25	5	BT	94	8.7	
									BT	104	12.6	
									BT	98	9.7	
									BT	110	13.4	
									BT	77	4.6	
									BT	86	6.8	
									BT	44	0.8	
Northern Peninsula	P267	26/08/08	21	307	50	600	25	3.1	AS	59	2.0	
									AS	75	-	
									AS	108	11.7	
									AS	40	0.5	
									AS	62	2.4	
									AS	58	2.0	
									AS	74	4.2	
									AS	37	0.5	
									AS	86	6.0	
									BT	108	11.7	
									AS	64	2.5	
									AS	57	2.0	
									AS	79	5.4	
									AS	96	11.1	
									BT	83	5.3	
									AS	115	15.2	
									AS	97	9.6	
									AS	70	3.3	
									AS	79	4.8	
									AS	58	1.9	
									AS	58	1.9	
									AS	35	0.4	
									AS	62	2.5	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
Northern Peninsula	P267	26/08/08	21	307	50	600	25	3.1	AS	37	0.4	
									AS	36	0.4	
									AS	35	0.4	
									AS	36	0.3	
									AS	58	1.9	
									AS	57	1.8	
									AS	36	0.4	
									AS	38	0.4	
									AS	35	0.2	
									AS	38	0.4	
									AS	37	0.4	
Northern Peninsula	P270	28/08/08	0	300	50	650	25	3.1	No fish caught			3 index sites completed, no fish
			1	300	50	750-800	25	3.1				
Northern Peninsula	P270	28/08/08	0	300	80	900	25	3.1	No fish caught			3 index sites completed, no fish
Northern Peninsula	P1005	24/08/08	2	314	80	500	25	3.1	A.Eel	416	124.5	6.5 girth 6 girth
									A.Eel	415	113.5	
									A.Eel	240	24.3	
									A.Eel	455	161.4	
									A.Eel	~405	~200	
Central & Eastern NL	P308	21/08/08	3	323	80	700	25	3.1	BT	56	2.2	
									BT	88	8.7	
									BT	54	2.0	
									BT	65	3.8	
									BT	56	1.7	
									BT	53	1.5	
Central & Eastern NL	P311	21/08/08	6	315	80	505	25	3.1	BT	45	1.2	
									AS	38	0.6	
									AS	55	1.8	
									AS	85	6.7	
									AS	36	0.1	
									AS	40	0.2	
									AS	51	1.4	
									AS	37	0.6	
									AS	113	3.8	
									AS	40	0.8	
									AS	95	8.2	
									AS	130	23.8	
									AS	85	6.5	
									AS	58	1.9	
									AS	80	4.8	
									AS	76	4.8	
									AS	55	1.9	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									AS	40	0.4	
									AS	58	2.0	
									AS	39	0.5	
									AS	55	1.3	
									AS	52	2.3	
Central & Eastern NL	P313	21/08/08	n/r	325	80	500	n/r	n/r	BT	150	37.5	
									BT	189	64.2	
									BT	132	24.8	
									BT	155	40.6	
									BT	110	14.4	
									BT	139	30.0	
									BT	116	16.0	
									BT	139	28.5	
									BT	90	8.8	
Central & Eastern NL	P313	21/08/08	n/r	325	80	500	n/r	n/r	BT	162	43.9	
									BT	128	21.7	
									BT	110	16.1	
									BT	134	27.0	
									BT	91	9.2	
									BT	80	5.7	
									BT	120	20.5	
									BT	89	7.6	
									BT	41	0.8	
									AS	60	2.1	
									AS	95	8.8	
									AS	83	6.1	
									AS	56	2.0	
									3SB	44	0.8	
Central & Eastern NL	P326	27/08/08	1	323	80	900	25	3.1	BT	39	0.5	
									BT	117	19.6	
									BT	73	4.5	
									BT	42	0.8	
									BT	124	21.8	
									BT	47	0.8	
									BT	48	1.4	
									BT	44	1.0	
									BT	41	0.6	
									BT	47	1.0	
									BT	45	1.0	
									BT	47	0.8	
Central & Eastern NL	P343	28/08/08	3	307	80	900	25	3.1	BT	50	1.6	
Central & Eastern NL	P346	28/08/08	4	303	80	900-950	25	3.1	BT	48	1.1	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	49	1.3	
									BT	33	0.2	
									BT	83	5.9	
Central & Eastern NL	P352	28/08/08	2	304	50	900	25	5.0	BT	102	98.0	right eye opaque
									BT	90	78.0	
Central & Eastern NL	P369	29/08/08	1	301	50	900	25	5.0	no fish caught			
Central & Eastern NL	P397	09/09/08	12	382	J8	600	n/r	n/r	AS	71	4.0	
									AS	75	4.4	
									AS	109	14.5	
									AS	77	50.0	
									AS	80	5.5	
									AS	70	3.6	
									BT	158	46.8	BSD
									BT	67	3.0	
									BT	74	4.6	
Central & Eastern NL	P397	09/09/08	12	382	J8	600	n/r	n/r	BT	72	4.4	
									BT	49	1.3	
									BT	135	26.2	
									BT	130	21.7	
									BT	160	41.7	Male
									BT	78	4.6	
									BT	88	6.7	
									BT	76	4.4	
									BT	69	3.2	
									BT	79	4.5	
									BT	140	25.8	BSD
									BT	107	12.2	
									BT	88	6.8	
									BT	86	6.3	
									BT	91	7.3	
									BT	49	1.2	
									BT	144	35.6	
Central & Eastern NL	P399	09/09/08	0	316	J8	600	n/r	n/r	AS	45	1.0	
									AS	37	0.5	
									AS	45	1.0	
									AS	75	4.3	
									AS	69	3.2	
									3SB	39	0.4	
Central & Eastern NL	P401	03/09/08	10	327	80	750	25	3.1	AS	59	2.3	
									AS	109	13.9	
									AS	41	0.7	
									AS	36	0.5	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									AS	99	10.6	
									AS	71	3.5	
									AS	67	2.8	
									AS	63	2.6	
									AS	80	5.1	
									AS	87	6.0	
									AS	100	10.3	
									AS	73	4.2	
									AS	40	0.6	
									AS	74	4.1	
									AS	41	0.8	
									AS	45	1.0	
									AS	39	0.5	
									AS	42	0.8	
									AS	34	0.4	
									AS	39	0.5	
Central & Eastern NL	P401	03/09/08	10	327	80	750	25	3.1	AS	38	0.5	
									3SB	35	0.3	
Central & Eastern NL	P403	02/09/08	12	364	80	750	25	3.1	AS	60	2.3	
									AS	61	2.8	
									AS	75	5.4	
									AS	67	3.4	
									AS	75	4.3	
									AS	110	13.8	
									AS	116	20.4	
									AS	88	7.6	
									AS	94	11.4	
									AS	117	17.3	
									AS	71	4.5	
									AS	84	6.6	
									AS	90	8.9	
									AS	77	5.8	
									AS	67	3.6	
									AS	75	4.6	
									AS	73	4.4	
									AS	94	9.6	
									AS	82	6.1	
									AS	66	3.0	
									AS	72	4.6	
									BT	89	7.0	
									BT	100	11.8	
									BT	112	13.5	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	128	22.9	
									BT	96	9.1	
									BT	50	1.5	
									BT	80	5.3	
Central & Eastern NL	P408	02/09/08	3	307	80	850-900	25	3.1	AS	39	0.6	
									AS	49	1.3	
									AS	54	1.4	
									AS	31	0.2	
									AS	47	1.1	
									AS	31	0.3	
									3SB	27	0.2	
									3SB	29	0.2	
									3SB	52	0.9	
Central & Eastern NL	P413	02/09/08	1	307	80	850-900	25	3.1	AS	85	7.3	
Central & Eastern NL	P416	29/08/08	7	313	80	900	25	3.1	AS	72	3.4	
									AS	129	18.2	
									AS	107	12.4	top caudal cut
Central & Eastern NL	P416	29/08/08	7	313	80	900	25	3.1	AS	42	0.8	
									AS	44	0.9	
									AS	42	0.8	
									AS	43	1.0	
									AS	66	3.2	
									AS	107	12.4	
									3SB	37	0.4	
									3SB	22	-	too small for scale
									3SB	23	-	too small for scale
									3SB	29	0.1	
									3SB	32	0.2	
Central & Eastern NL	P421	29/08/08	2	342	80	850	25	3.1	AS	57	2.4	
									AS	53	2.1	
									AS	48	1.3	
									AS	73	4.3	
									BT	47	1.1	
									BT	52	1.8	
									BT	138	24.6	
Central & Eastern NL	P430	30/08/08	1	312	80	850	25	3.1	3SB	22	-	too small to weigh
									3SB	38	0.5	
									AS	51	1.4	
									AS	80	4.7	
Central & Eastern NL	P437	30/08/08	2	380	80	850	25	3.1	AS	61	2.4	
									AS	91	7.4	
									BT	49	1.2	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BT	55	1.8	
Central & Eastern NL	P441	31/08/08	1	312	n/r	n/r	n/r	n/r	BT	50	2.8	1 mortality seen downstream of site
									BT	55	1.8	
									BT	57	2.4	
Central & Eastern NL	P469	31/08/08	3	327	80	450-500	25	3.1	AS	67	1.9	Questionable Weight
									AS	78	6.0	
									AS	53	1.7	
Avalon Peninsula	A110	14/08/08	5	302	J8	500-700	n/r	n/r	BrnT	56	2.2	
									BT	90	8.2	
									BT	106	11.7	
									BT	140	29.1	
									BT	100	10.5	
									BT	47	0.9	
									BrnT	57	2.3	
									AS	103	11.9	
Avalon Peninsula	P529	10/09/08	17	307	J8	500	n/r	n/r	BrnT	167	55.0	
									BrnT	134	26.2	
									BrnT	139	30.6	
Avalon Peninsula	P529	10/09/08	17	307	J8	500	n/r	n/r	BrnT	119	20.5	
									BrnT	126	21.9	
									BrnT	108	13.5	
									BrnT	107	16.2	
									BrnT	98	10.7	
									BrnT	119	18.6	
									BrnT	106	14.1	
									BrnT	101	11.6	
									BrnT	93	7.9	
									BrnT	58	2.2	
									BrnT	72	4.2	
									BrnT	125	23.1	
									BrnT	56	1.7	
									BrnT	75	4.6	
									BrnT	69	3.7	
									BrnT	64	2.9	
									BrnT	60	2.6	
									BrnT	52	1.6	
									BrnT	53	1.5	
									BrnT	59	2.3	
									BrnT	60	2.5	
									BrnT	77	4.8	
									BrnT	66	3.4	
									BrnT	68	3.7	

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
									BrnT	80	5.3	
									BrnT	60	2.5	
									BrnT	50	1.6	
									BrnT	54	1.6	
									BrnT	58	2.2	
									BrnT	62	2.7	
									BrnT	64	2.9	
									BrnT	69	3.6	
									BrnT	62	2.8	
									BrnT	58	2.3	
									BrnT	50	1.4	
									BrnT	63	2.8	
									BrnT	55	1.7	
									BT	57	2.3	
									AS	67	3.6	
Avalon Peninsula	P533	18/08/08	3	322	J8	700	n/r	n/r	BT	131	25.8	
									BT	130	24.1	
									BT	142	33	
									BT	76	5.3	
Avalon Peninsula	P533	18/08/08	3	322	J8	700	n/r	n/r	BT	56	2.2	
									3SB	45	1.5	
									AS	60	2.8	
									AS	65	3.1	
									AS	68	3.8	
									AS	52	1.9	
									AS	55	1.7	
									AS	63	3.2	weight questionable
Avalon Peninsula	P534	18/08/08	12	~300	J8	700	n/r	n/r	BT	60	2.5	
									BT	110	14.9	
									BT	114	17.3	
									BT	64	3.3	
									BT	56	2.1	
									BT	175	54.5	
									BT	117	18.1	BSD

Region	Site ID	Date	Misses	Time(sec)	Hertz	Volts	Duty Cycle (%)	Pulse Width (mS)	Species	Length (mm)	Weight (g)	Notes
Avalon Peninsula	P534	18/08/08	12	~300	J8	700	n/r	n/r	BT	104	12.1	BSD
									BT	118	17.2	
									BT	129	23.5	
									BT	48	1.1	
									BT	56	2.0	
									BT	67	2.9	
									BT	58	1.9	
									BT	51	1.2	
									BT	153	44.4	
									BT	76	5.3	
									BT	60	2.8	
									BT	48	1.0	
									BT	66	3.4	
									BT	67	4.0	
									BT	52	1.2	
									BT	110	16.6	
									AS	65	3.6	
									AS	59	2.5	
									AS	64	3.5	
									AS	54	2.0	
									AS	136	28.5	
									3SB	62	1.8	
									3SB	28	0.1	
									3SB	33	0.1	
Avalon Peninsula	P541	19/08/08	2	307	J8	400	n/r	n/r	3SB	49	1.1	
									3SB	51	1.2	
									AS	91	8.5	
									AS	85	7.2	
									AS	46	1.2	
									AS	41	0.8	
									AS	43	0.8	

n/r = not recorded

BSD = Black Spot Disease

PD - Pearl Dace

Bur - Burbot

WS - White Sucker

LND - Longnose Dace

AS - Atlantic Salmon

BT - Brook Trout

MS - Mottled Sculpin

3SB - Threespine Stickleback

A.Eel - American Eel

BrnT - Brown Trout

APPENDIX D

Laboratory Water / Sediment Results

In Situ Water Quality Measurements (Hydrolab), Aquatic Environment, 2008

Region	Stream #	Habitat Type	Time of day sample taken	Water Quality Measurements (Hydrolab)							
				Temp. °C	pH	Spc (m/sec)	Salinity	Turbidity	DO%	DO	Depth
Southeastern Labrador	P7	Riffle/Run	11:15	17.50	7.38	-	0.00	0.00	98.6	9.16	-
	P10	Steady	11:45	17.65	6.43	16.2	0.00	17.20	78.1	7.33	-
	P29	Riffle/Run	17:15	17.00	7.32	16.1	0.00	0.00	98.9	9.18	-
	P30	Steady	14:25	12.95	6.66	14.0	0.00	0.40	89.7	9.32	-
	P36	Riffle/Run	10:30	14.80	7.40	19.0	0.00	0.00	95.9	9.57	-
	P37	Riffle/Run	13:45	16.40	7.37	17.7	0.00	0.00	97.1	9.37	-
	P43	Riffle/Run	15:30	11.16	6.86	21.6	0.00	0.90	85.9	9.30	-
	P52	Steady	18:30	11.17	6.87	21.7	0.00	0.80	85.1	9.19	-
	P55	Steady	9:30	14.50	6.97	23.0	0.00	0.00	89.4	8.96	-
	P108	Steady	8:45	15.60	6.53	15.1	0.00	1.50	79.3	7.75	-
	P120	Steady	11:20	10.75	6.15	19.2	0.00	2.50	75.5	8.25	-
	P121	Riffle/Run	11:00	15.48	6.21	16.7	0.00	2.50	88.2	8.72	-
	P139	Steady	15:45	13.90	6.21	16.7	0.00	3.20	89.1	9.05	-
	P142	Riffle/Run	15:00	11.96	6.72	14.4	0.00	1.10	89.3	9.46	-
Northern Peninsula	P143	Riffle	14:15	16.24	6.06	13.9	0.00	0.00	95.1	9.17	-
	P200	Riffle	9:30	14.74	7.83	171.4	0.08	0.00	90.9	9.05	-0.06
	P204	Steady	12:30	14.22	5.93	143.4	0.06	104.30	2.7	0.23	0.38
	P205	Riffle	15:45	21.37	6.33	27.8	0.00	0.07	102.9	8.98	0.17
	P228	Riffle	9:16	16.48	6.89	26.9	0.00	0.00	95.7	9.21	0.17
	P238	Riffle	13:12	16.46	6.92	26.7	0.00	0.00	96.1	9.24	0.17
	P239	Run	9:11	18.46	7.73	67.1	0.02	0.50	95.8	8.86	0.02
	P243	Riffle	9:16	17.68	8.25	177	0.08	0.50	94.9	8.43	-0.11
	P245	Run	12:27	19.97	7.69	70.8	0.02	0.00	97.4	8.75	0.18
	P246	Steady	12:14	17.46	7.83	182.2	0.08	0.00	96.8	9.10	-0.07
	P259	Riffle	11:47	16.07	6.48	15.3	-0.01	1.70	85.5	8.30	-0.60
	P267	Riffle	9:30	16.86	6.99	22.4	0.00	0.00	88.9	8.48	-0.50
	P270	Riffle	15:10	18.39	5.93	16.6	-0.01	0.00	92.6	8.56	-0.41
	P1005	Steady	15:27	19.59	5.64	18.2	-0.01	0.00	101.2	9.28	0.01
Central and Eastern Labrador	P308	Run	14:53	19.51	7.48	41.4	0.01	0.00	93.7	8.46	-0.16
	P311	Run	11:45	16.09	7.33	40.3	-	-	94.5	9.16	0.21
	P313	Run	9:15	13.38	7.08	47.2	-	-	88.2	9.06	-
	P326	Riffle	14:11	20.11	5.98	14.9	-0.01	0.00	93.4	8.60	-0.29
	P343	Riffle	8:38	20.07	5.87	15.0	-0.01	0.00	96.9	8.63	-0.28
	P346	Riffle	11:15	16.24	6.45	14.0	-0.01	0.00	95.7	9.23	-0.11
	P352	Riffle/Run	13:28	17.60	6.68	12.8	-0.01	0.00	94.3	8.86	-0.02
	P369	Steady	9:07	13.77	6.73	20.2	0.00	0.00	93.5	9.52	0.08
	P397	Run	11:35	21.65	7.25	44.3	0.01	0.00	94.5	8.19	-0.02
	P399	Run	8:20	21.65	7.25	44.3	0.01	0.00	94.5	8.19	-0.02
	P401	Riffle	7:43	21.65	7.25	44.3	0.01	0.00	94.5	8.19	-0.02
	P403	Riffle	15:00	21.62	7.27	44.0	0.01	0.00	94.7	8.20	-0.02
	P408	Riffle	11:30	18.01	6.66	30.2	0.00	0.00	87.7	8.17	0.13
	P413	Riffle	8:52	18.58	4.83	14.4	-0.01	0.00	90.5	8.33	-0.13
	P416	Run	12:39	16.68	6.98	24.9	0.00	0.00	94.3	9.02	0.22
	P421	Riffle	15:52	16.67	6.62	24.7	0.00	0.10	92.9	8.89	-0.09
	P430	Run	12:29	18.44	6.50	19.5	0.00	0.00	95.3	8.80	-0.04
	P437	Run	15:14	19.87	6.36	19.6	0.00	1.90	93.1	8.33	-0.16
	P441	Steady	16:22	18.57	5.00	14.4	-0.01	0.50	90.5	8.33	-0.12
	P469	Riffle	13:18	20.22	6.48	18.8	-0.01	0	96.3	8.59	-0.01
Avalon Peninsula	A110	Riffle	13:44	21.28	6.11	36.3	0	-	90.9	8.01	0.5
	P529	Riffle	12:25	17.24	6.37	64.4	0.02	1.9	87.7	8.29	0.01
	P533	Run	9:40	18.48	6.2	17.3	-0.01	-	86.6	8.05	0.5
	P534	Run	11:55	19.41	6.48	17.4	-0.01	-	90.3	8.27	0.4
	P541	Run	10:00	17.67	7.44	61.3	0.02	-	89.0	8.44	0.7

ICP Metals Results for Water, Freshwater Environment, 2008

LAB ID REPORT ID		DATA											GUIDELINES CCME-CEQGs (REVISED 2007) PAL
		Lab Blank	S2008-11123 P29	S2008-11124 P10	S2008-11334 P55	S2008-11335 P52	S2008-11336 P43	S2008-11337 P108	S2008-11338 P139	S2008-11339 P120	S2008-11340 P143	S2008-11341 P7	
			12-Aug-08	12-Aug-08	16-Aug-08	17-Aug-08	17-Aug-08	18-Aug-08	18-Aug-08	18-Aug-08	16-Aug-08	14-Aug-08	
PARAMETERS	MDL (ug/L)												
Aluminum	1	<1	53	115	75	127	50	83	137	211	108	133	5.0 - 100
Antimony	1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	-
Arsenic	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5
Barium	0.5	<0.5	6.5	7.8	8.3	13.4	13.7	14.1	12.4	17.3	19.1	6.5	-
Beryllium	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Bismuth	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Boron	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	-
Cadmium	0.015	<0.015	0.081	0.086	0.031	0.057	0.024	0.030	0.058	0.082	0.027	0.028	0.017
Calcium	500	<500	1850	1620	3250	3040	3120	3150	1570	2680	1680	1440	-
Chromium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Cobalt	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Copper	1	<1	4	<1	<1	<1	<1	<1	<1	<1	<1	1	2.0 - 4.0
Iron	1	<1	608	730	816	1750	598	1510	1870	2700	1260	1100	300
Lead	1	<1	<1	<1	<1	37	<1	<1	19	<1	<1	<1	1.0 - 7.0
Magnesium	20	<20	755	609	858	634	809	812	545	583	480	606	-
Manganese	1	<1	12	17	10	30	18	27	21	42	20	20	-
Mercury	0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.02	<0.02	<0.02	0.02	<0.02	<0.02	0.026
Molybdenum	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-
Nickel	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	25 - 150
Phosphorus	2	<2	9	15	10	15	55	26	15	20	12	19	-
Potassium	20	<20	212	296	313	331	512	514	118	228	78	265	-
Rubidium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Silicon	2	<2	1240	2120	2440	2310	3320	3340	3830	3990	2150	1410	-
Silver	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Sodium	500	<500	969	1010	1430	927	1290	1290	1700	1580	1300	1060	-
Strontium	1	<1	16	14	21	19	26	20	14	20	13	14	-
Sulphur	2	<2	275	283	409	265	363	199	287	253	290	261	-
Tellurium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Tin	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-
Titanium	2	<2	<2	4	<2	2	<2	2	3	4	<2	3	-
Uranium	1	<1	<1	<1	<1	2	<1	1	2	2	<1	<1	-
Vanadium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-
Zinc	1	<1	3	3	3	6	2	2	4	6	4	3	30

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01

Aluminum Guideline = 5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = 2 ug/L at [CaCO3] = 0-120 mg/L
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = 1 µg/L at [CaCO3] = 0-60 mg/L
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = 25 ug/L at [CaCO3] = 0-60 mg/L
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L



ICP Metals Results for Water, Freshwater Environment, 2008

LAB ID REPORT ID		DATA										GUIDELINES CCME-CEQGs (REVISED 2007) PAL
		S2008-11342 P30	S2008-11343 P37	S2008-11344 P36	S2008-11344 P36	S2008-11362 Stream A-110	S2008-11363 P533	S2008-11364 P534	S2008-11364 P534	S2008-11445 P541	S2008-11460 P142	
		14-Aug-08	14-Aug-08	15-Aug-08	15-Aug-08 (Replicate)	14-Aug-08	18-Aug-08	18-Aug-08	18-Aug-08 (Replicate)	19-Aug-08	19-Aug-08	
PARAMETERS	MDL (ug/L)											
Aluminum	1	87	53	58	NR	181	54	46	NR	51	81	5.0 - 100
Antimony	1	<1	<1	2	NR	1	<1	<1	<1	<1	<1	-
Arsenic	1	<1	<1	<1	NR	<1	<1	<1	<1	<1	<1	5
Barium	0.5	7.3	4.8	7.6	NR	3.0	0.7	0.6	NR	12.2	16.6	-
Beryllium	0.1	<0.1	<0.1	<0.1	NR	<0.1	<0.1	<0.1	NR	<0.1	<0.1	-
Bismuth	0.5	<0.5	<0.5	<0.5	NR	<0.5	<0.5	<0.5	NR	<0.5	<0.5	-
Boron	20	<20	<20	<20	NR	<20	<20	<20	NR	<20	<20	-
Cadmium	0.015	0.053	0.018	0.016	NR	0.039	<0.015	<0.015	NR	0.036	0.659	0.017
Calcium	500	1630	2240	2320	NR	2120	825	761	NR	5610	1620	-
Chromium	1	<1	<1	<1	NR	<1	<1	<1	NR	<1	<1	1
Cobalt	1	<1	<1	<1	NR	<1	<1	<1	NR	<1	<1	-
Copper	1	<1	<1	<1	NR	<1	<1	<1	NR	<1	<1	2.0 - 4.0
Iron	1	977	331	633	NR	750	83	76	NR	171	1430	300
Lead	1	5	<1	<1	NR	<1	<1	<1	NR	<1	<1	1.0 - 7.0
Magnesium	20	791	730	875	NR	689	491	491	NR	771	467	-
Manganese	1	12	7	11	NR	100	7	7	NR	76	28	-
Mercury	0.02	<0.02	0.03	<0.02	NR	0.02	<0.02	<0.02	NR	<0.02	<0.02	0.026
Molybdenum	2	<2	<2	<2	NR	<2	<2	<2	NR	<2	<2	-
Nickel	1	<1	<1	<1	NR	<1	<1	<1	NR	<1	<1	25 - 150
Phosphorus	2	17	5	9	NR	11	4	3	NR	2	12	-
Potassium	20	242	211	245	NR	213	211	206	NR	332	80	-
Rubidium	5	<5	<5	<5	<5	<5	<5	<5	NR	<5	<5	-
Selenium	1	<1	<1	<1	<1	<1	<1	<1	NR	<1	<1	1
Silicon	2	1110	1890	1960	NR	837	289	296	NR	1060	2940	-
Silver	0.1	<0.1	<0.1	<0.1	NR	<0.1	<0.1	<0.1	NR	<0.1	<0.1	0.1
Sodium	500	943	1150	1230	NR	6820	3560	3550	NR	8840	1360	-
Strontium	1	13	19	23	NR	9	4	4	NR	<1	15	-
Sulphur	2	248	340	335	NR	382	427	344	NR	<2	881	-
Tellurium	5	<5	<5	<5	NR	<5	<5	<5	NR	<5	<5	-
Thallium	1	<1	<1	<1	NR	<1	<1	<1	NR	<1	<1	-
Tin	2	<2	<2	<2	NR	<2	<2	<2	NR	<2	<2	-
Titanium	2	2	<2	<2	NR	4	<2	<2	NR	<2	<2	-
Uranium	1	<1	<1	<1	NR	<1	<1	<1	NR	1	<1	-
Vanadium	5	<5	<5	<5	NR	<5	<5	<5	NR	<5	<5	-
Zinc	1	2	2	2	NR	3	3	3	NR	2	6	30

Notes:

MDL: Method Detection Limit

<X: Below MDL

CCME: Canadian Council of Ministers of the Environment

CEQGs: Canadian Environment Quality Guidelines

PAL: Protection of (Freshwater) Aquatic Life

Bold faced guidelines reflect those most applicable to current land use designation

-: VALUE NOT ESTABLISHED

Shaded and bold data exceeds the CCME PAL Criteria

WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01

Aluminum Guideline = 5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = 2 ug/L at [CaCO3] = 0-120 mg/L
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = 1 µg/L at [CaCO3] = 0-60 mg/L
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = 25 ug/L at [CaCO3] = 0-60 mg/L
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L



ICP Metals Results for Water, Freshwater Environment, 2008

LAB ID REPORT ID		DATA										GUIDELINES CCME-CEQGs (REVISED 2007) PAL
		S2008-11461 P121	S2008-11908 P430	S2008-11909 P326	S2008-11910 P421	S2008-11910 P421	S2008-11911 P416	S2008-11912 P437	S2008-11912 P437	S2008-11913 P369	S2008-11914 P343	
		19-Aug-08	30-Aug-08	27-Aug-08	29-Aug-08	29-Aug-08 (Replicate)	29-Aug-08	30-Aug-08	30-Aug-08 (Replicate)	29-Aug-08	28-Aug-08	
PARAMETERS	MDL (ug/L)											
Aluminum	1	171	115	189	180	NR	77	163	NR	99	74	5.0 - 100
Antimony	1	<1	<1	<1	<1	NR	<1	<1	NR	<1	<1	-
Arsenic	1	<1	<1	<1	3	NR	<1	2	2	<1	<1	5
Barium	0.5	15.8	1.3	4.8	0.8	NR	2.1	1.5	NR	4.8	5.7	-
Beryllium	0.1	<0.1	<0.1	<0.1	<0.1	NR	<0.1	<0.1	NR	<0.1	<0.1	-
Bismuth	0.5	<0.5	<0.5	<0.5	<0.5	NR	<0.5	<0.5	NR	<0.5	<0.5	-
Boron	20	<20	<20	<20	<20	NR	<20	<20	NR	<20	<20	-
Cadmium	0.015	0.162	0.045	0.061	0.089	NR	<0.015	0.050	NR	0.031	0.030	0.017
Calcium	500	2670	1920	1350	3270	NR	3060	2130	NR	2810	1090	-
Chromium	1	<1	<1	<1	<1	NR	<1	<1	NR	<1	<1	1
Cobalt	1	<1	<1	<1	<1	NR	<1	<1	NR	<1	<1	-
Copper	1	<1	<1	<1	<1	NR	1	<1	NR	<1	<1	2.0 - 4.0
Iron	1	2420	519	735	2230	NR	411	906	NR	481	514	300
Lead	1	<1	<1	<1	<1	NR	<1	<1	NR	<1	<1	1.0 - 7.0
Magnesium	20	644	965	382	880	NR	853	839	NR	426	280	-
Manganese	1	19	23	19	97	NR	26	106	NR	12	13	-
Mercury	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NR	<0.02	<0.02	0.026
Molybdenum	2	<2	<2	<2	<2	NR	<2	<2	NR	<2	<2	-
Nickel	1	<1	1	<1	<1	NR	<1	1	NR	<1	<1	25 - 150
Phosphorus	2	24	6	5	8	NR	4	10	NR	3	<2	-
Potassium	20	166	160	166	225	NR	160	217	NR	144	150	-
Rubidium	5	<5	<5	<5	<5	NR	<5	<5	NR	<5	<5	-
Selenium	1	<1 (<1)	<1	<1	<1	NR	<1	<1	NR	<1	3	1
Silicon	2	2760	965	670	1900	NR	1100	1250	NR	1430	1240	-
Silver	0.1	<0.1	<0.1	<0.1	<0.1	NR	<0.1	<0.1	NR	<0.1	<0.1	0.1
Sodium	500	1390	1640	1570	1850	NR	1640	1650	NR	1620	1640	-
Strontium	1	24	10	11	9	NR	12	12	NR	9	5	-
Sulphur	2	828	209	215	174	NR	172	199	NR	218	179	-
Tellurium	5	<5	<5	<5	<5	NR	<5	<5	NR	<5	<5	-
Thallium	1	<1	<1	<1	<1	NR	<1	<1	NR	<1	<1	-
Tin	2	<2	<2	<2	<2	NR	<2	<2	NR	<2	<2	-
Titanium	2	3	<2	3	<2	NR	<2	3	NR	<2	<2	-
Uranium	1	2	<1	<1	3	NR	<1	1	NR	<1	<1	-
Vanadium	5	<5	<5	<5	<5	NR	<5	<5	NR	<5	<5	-
Zinc	1	6	3	4	2	NR	2	5	NR	4	4	30

Notes:

MDL: Method Detection Limit

<X: Below MDL

CCME: Canadian Council of Ministers of the Environment

CEQGs: Canadian Environment Quality Guidelines

PAL: Protection of (Freshwater) Aquatic Life

Bold faced guidelines reflect those most applicable to current land use designation

-: VALUE NOT ESTABLISHED

Shaded and bold data exceeds the CCME PAL Criteria

WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01

Aluminum Guideline = 5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = 2 ug/L at [CaCO3] = 0-120 mg/L
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = 1 µg/L at [CaCO3] = 0-60 mg/L
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = 25 ug/L at [CaCO3] = 0-60 mg/L
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L



ICP Metals Results for Water, Freshwater Environment, 2008

LAB ID REPORT ID		DATA										GUIDELINES CCME-CEQGs (REVISED 2007) PAL
		S2008-11915 P267	S2008-11918 P352	S2008-11919 P346	S2008-11916 P270	S2008-11917 P259	S2008-11689 P311	S2008-11690 P1005	S2008-11691 P204	S2008-11692 P313	S2008-11693 P205	
		26-Aug-08	28-Aug-08	28-Aug-08	26-Aug-08	26-Aug-08	21-Aug-08	24-Aug-08	22-Aug-08	21-Aug-08	22-Aug-08	
PARAMETERS	MDL (ug/L)											
Aluminum	1	147	57	124	137	105	73	124	149	69	178	5.0 - 100
Antimony	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Arsenic	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5
Barium	0.5	1.9	6.7	8.8	2.1	3.9	7.9	2.6	45.5	8.1	9.3	-
Beryllium	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Bismuth	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Boron	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	-
Cadmium	0.015	0.036	0.047	0.025	<0.015	0.029	0.055	0.048	1.8	0.075	0.54	0.017
Calcium	500	1770	1140	1190	562	916	5230	784	3770	6360	1950	-
Chromium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Cobalt	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Copper	1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	2.0 - 4.0
Iron	1	427	369	393	235	388	563	159	4990	809	760	300
Lead	1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1.0 - 7.0
Magnesium	20	627	262	299	351	474	802	392	877	1180	555	-
Manganese	1	10	23	21	7	7	27	8	103	94	10	-
Mercury	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.026
Molybdenum	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-
Nickel	1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	25 - 150
Phosphorus	2	7	2	<2	3	6	4	2	88	7	10	-
Potassium	20	148	210	163	212	92	255	196	494	382	256	-
Rubidium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Silicon	2	1530	1110	1630	675	905	1550	707	1970	2060	286	-
Silver	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Sodium	500	2660	1750	1890	2570	2060	3280	2880	4120	3500	3460	-
Strontium	1	8	4	6	3	7	18	5	18	14	17	-
Sulphur	2	259	167	164	224	265	313	308	348	317	611	-
Tellurium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Tin	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-
Titanium	2	<2	<2	<2	<2	<2	<2	<2	3	<2	4	-
Uranium	1	<1	<1	<1	<1	<1	2	<1	8	2	1	-
Vanadium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-
Zinc	1	4	5	4	2	4	1	6	8	2	4	30

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = 5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = 2 ug/L at [CaCO3] = 0-120 mg/L
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = 1 µg/L at [CaCO3] = 0-60 mg/L
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = 25 ug/L at [CaCO3] = 0-60 mg/L
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

ICP Metals Results for Water, Freshwater Environment, 2008

LAB ID REPORT ID		DATA									GUIDELINES CCME-CEQGs (REVISED 2007) PAL
		S2008-11694 P200	S2008-11695 P238	S2008-11695 P238	S2008-11696 P239	S2008-11697 P245	S2008-11698 P243	S2008-11699 P228	S2008-11700 P246	S2008-11701 P308	
		22-Aug-08	23-Aug-08	23-Aug-08 (Replicate)	24-Aug-08	24-Aug-08	25-Aug-08	23-Aug-08	25-Aug-08	21-Aug-08	
PARAMETERS	MDL (ug/L)										
Aluminum	1	22	81	NR	67	83	29	98	101	104	5.0 - 100
Antimony	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Arsenic	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5
Barium	0.5	51.6	5.6	NR	4.9	5.7	17	6.5	8.6	6.8	-
Beryllium	0.1	<0.1	<0.1	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Bismuth	0.5	<0.5	<0.5	NR	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Boron	20	<20	<20	NR	<20	<20	<20	<20	<20	<20	-
Cadmium	0.015	8.81	0.103	NR	0.052	0.035	0.045	0.065	0.069	0.075	0.017
Calcium	500	29200	4690	NR	7630	7860	24400	3020	19200	5910	-
Chromium	1	<1	<1	NR	<1	<1	<1	<1	<1	<1	1
Cobalt	1	<1	<1	NR	<1	<1	<1	<1	<1	<1	-
Copper	1	<1	<1	NR	<1	<1	<1	<1	<1	<1	2.0 - 4.0
Iron	1	59	89	NR	138	170	58	95	303	198	300
Lead	1	<1	<1	NR	<1	<1	<1	<1	<1	<1	1.0 - 7.0
Magnesium	20	3650	1660	NR	3090	3040	7280	622	10500	1060	-
Manganese	1	11	6	NR	21	12	7	10	14	10	-
Mercury	0.02	<0.02	<0.02	NR	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.026
Molybdenum	2	<2	<2	NR	<2	<2	<2	<2	<2	<2	-
Nickel	1	<1	<1	NR	<1	<1	<1	<1	<1	<1	25 - 150
Phosphorus	2	10	3	NR	9	7	9	<2	8	2	-
Potassium	20	807	274	NR	278	301	484	219	817	283	-
Rubidium	5	<5	<5	NR	<5	<5	<5	<5	<5	<5	-
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Silicon	2	1430	1430	NR	417	824	1060	403	2830	733	-
Silver	0.1	<0.1	<0.1	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Sodium	500	4110	3450	NR	3130	3830	5480	2290	7210	2430	-
Strontium	1	93	12	NR	11	11	23	13	23	12	-
Sulphur	2	3260	457	NR	404	419	716	428	1040	320	-
Tellurium	5	<5	<5	NR	<5	<5	<5	<5	<5	<5	-
Thallium	1	<1	<1	NR	<1	<1	<1	<1	<1	<1	-
Tin	2	<2	<2	NR	<2	<2	<2	<2	<2	<2	-
Titanium	2	<2	<2	NR	<2	<2	<2	<2	<2	<2	-
Uranium	1	3	2	NR	2	2	3	1	3	2	-
Vanadium	5	<5	<5	NR	<5	<5	<5	<5	<5	<5	-
Zinc	1	3	3	NR	4	3	4	5	2	2	30

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = 5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = 2 ug/L at [CaCO3] = 0-120 mg/L
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = 1 µg/L at [CaCO3] = 0-60 mg/L
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = 25 ug/L at [CaCO3] = 0-60 mg/L
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA								GUIDELINES
LAB ID REPORT ID		Lab Blank	S2008-11123 P29	S2008-11123 P29	S2008-11124 P10	S2008-11334 P55	S2008-11335 P52	S2008-11336 P43	S2008-11337 P108	CCME-CEQGs (REVISED 2007) FAL
DATE			12-Aug-08	12-Aug-08	12-Aug-08	16-Aug-08	17-Aug-08	17-Aug-08	18-Aug-08	
PARAMETERS	MDL (ug/L)			(Replicate)						
Ammonia as N	(µg/L)	<10	26	NR	21	34	13	<10 (<10)	15	-
Bicarbonate	(µg/L)	<6000	11600	NR	6470	11900	7940	12100	6690	-
Carbonate	(µg/L)	<3000	<3000	NR	<3000	<3000	<3000	<3000	<3000	-
Chloride	(µg/L)	<100	326	334	262	629	355	355	513	-
Colour	(TCU)	<5	50	NR	53	58	120	36	120	-
Conductivity	(µS/cm)	<5	24	NR	21	29	22	26	20	-
Dissolved Inorganic Carbon	(µg/L)	<500	1740	NR	1680	2360	1930	2520	1390	-
Dissolved Organic Carbon	(µg/L)	<500	5830	NR	6390	6960	11500	4000	11600	-
Hardness as CaCO3	(µg/L)	<300	7750	NR	6560	11600	10200	11100	11200	-
Nitrate as N	(µg/L)	<50	<50	<50	<50	<50	<50	<50	<50	13000
Nitrite as N	(µg/L)	<15	<15	<15	<15	<15	<15	<15	<15	60
Nitrate + Nitrite	(µg/L)	<65	<65	<65	<65	<65	<65	<65	<65	-
pH	-	6.36	7.40	NR	6.69	6.99	6.50	6.92	6.54	6.5-9
Reactive Silica	(µg/L)	<10.7	2650	NR	4580	5220	4940	7100	7150	-
Sulphate	(µg/L)	<100	722	725	791	1250	626	1100	442	-
Total Alkalinity (CaCO3)	(µg/L)	<5000	9540	NR	5300	9730	6510	9930	5480	-
Total Dissolved Solids (Theo)	(µg/L)	<10000	15800	NR	13300	19100	14400	17000	13100	-
Total Inorganic Carbon	(µg/L)	<500	1750	NR	1840	2430	2070	2640	1450	-
Total Organic Carbon	(µg/L)	<500	5880	NR	6950	7070	12700	4020	11900	-
Turbidity	(NTU)	<0.1	1.9	NR	2.2	2.0	0.7	1.0	2.3	-
Cations										-
Calcium	(µg/L)	<500	1850	NR	1620	3250	3040	3120	3150	-
Magnesium	(µg/L)	<20	755	NR	609	858	634	809	812	-
Potassium	(µg/L)	<20	212	NR	296	313	331	512	514	-
Sodium	(µg/L)	<500	969	NR	1010	1430	927	1290	1290	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01

Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L



General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA							GUIDELINES
LAB ID		S2008-11338	S2008-11339	S2008-11340	S2008-11341	S2008-11342	S2008-11343	S2008-11344	CCME-CEQGs (REVISED 2007) FAL
REPORT ID		P139	P120	P143	P7	P30	P37	P36	
DATE		18-Aug-08	18-Aug-08	16-Aug-08	14-Aug-08	14-Aug-08	14-Aug-08	15-Aug-08	
PARAMETERS	MDL (ug/L)								
Ammonia as N	(µg/L)	<10	38	10	24	32	26	<10	-
Bicarbonate	(µg/L)	<6000	<6000	<6000	6760	<6000	8280	9350	-
Carbonate	(µg/L)	<3000	<3000	<3000	<3000	<3000	<3000	<3000	-
Chloride	(µg/L)	1150	954	1090	215	503	246	457	-
Colour	(TCU)	110	130	84	62	110	50	53 (53)	-
Conductivity	(µS/cm)	19	24	18	18	18	21	23	-
Dissolved Inorganic Carbon	(µg/L)	1380	1950	890	1360	1130	1580	1830	-
Dissolved Organic Carbon	(µg/L)	11100	15200	12200	7950	11100	6440	6610	-
Hardness as CaCO3	(µg/L)	6160	9090	6170	6090	7330	8600	9400	-
Nitrate as N	(µg/L)	<50	384	<50	<50	<50	<50	<50	13000
Nitrite as N	(µg/L)	<15	<15	<15	<15	<15	<15	<15	60
Nitrate + Nitrite	(µg/L)	<65	<399	<65	<65	<65	<65	<65	-
pH	-	6.07	6.03	6.18	6.66	6.47	6.98	6.96	6.5-9
Reactive Silica	(µg/L)	8200	8540	4600	3020	2380	4040	4190	-
Sulphate	(µg/L)	721	569	683	486	584	1080	862	-
Total Alkalinity (CaCO3)	(µg/L)	<5000	<5000	<5000	5540	<5000	6790	7660	-
Total Dissolved Solids (Theo)	(µg/L)	12600	15700	11700	12000	11900	13800	14800	-
Total Inorganic Carbon	(µg/L)	1510	2250	894	1420	1250	1660	1850	-
Total Organic Carbon	(µg/L)	12100	16900	12300	8040	11600	6820	6990	-
Turbidity	(NTU)	2.0 (2.1)	2.3	1.5	1.7	2.0	0.8	1.2	-
Cations									-
Calcium	(µg/L)	1570	2680	1680	1440	1630	2240	2320	-
Magnesium	(µg/L)	545	583	480	606	791	730	875	-
Potassium	(µg/L)	118	228	78	265	242	211	245	-
Sodium	(µg/L)	1700	1580	1300	1060	943	1150	1230	-

Notes:

MDL: Method Detection Limit

<X: Below MDL

CCME: Canadian Council of Ministers of the Environment

CEQGs: Canadian Environment Quality Guidelines

PAL: Protection of (Freshwater) Aquatic Life

Bold faced guidelines reflect those most applicable to current land use designation

-: VALUE NOT ESTABLISHED

Shaded and bold data exceeds the CCME PAL Criteria

WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA								GUIDELINES
LAB ID	REPORT ID	S2008-11362 Stream A-110	S2008-11363 P533	S2008-11364 P534	S2008-11364 P534	S2008-11445 P541	S2008-11460 P142	S2008-11461 P121	S2008-11908 P430	CCME-CEQGs (REVISED 2007) FAL
DATE		14-Aug-08	18-Aug-08	18-Aug-08	18-Aug-08	19-Aug-08	19-Aug-08	19-Aug-08	30-Aug-08	
PARAMETERS	MDL (ug/L)				(Replicate)					
Ammonia as N	(µg/L)	21	20	<10	NR	26	22	21	16	-
Bicarbonate	(µg/L)	<6000	<6000	<6000	<6000	17200	<6000	<6000	6400	-
Carbonate	(µg/L)	<3000	<3000	<3000	<3000	<3000	<3000	<3000	<3000	-
Chloride	(µg/L)	8330	4330	4290	NR	9820	1080	739	1350	-
Colour	(TCU)	130	31	26	29	38	53	130	96	-
Conductivity	(µS/cm)	48	27	25	26	72	18	20	22	-
Dissolved Inorganic Carbon	(µg/L)	1150	800	769	NR	3660	1300	1060	1500	-
Dissolved Organic Carbon	(µg/L)	16900	4980	4890	NR	6330	6680	16900	10800	-
Hardness as CaCO3	(µg/L)	8130	4080	3920	NR	17200	5970	9320	8770	-
Nitrate as N	(µg/L)	<50	<50	<50	NR	<50	<50	<50	<50	13000
Nitrite as N	(µg/L)	<15	<15	<15	NR	<15	<15	<15	<15	60
Nitrate + Nitrite	(µg/L)	<65	<65	<65	NR	<65	<65	<65	<65	-
pH	-	6.28	6.58	6.33	6.45	6.98	6.37	6.22	6.58	6.5-9
Reactive Silica	(µg/L)	1790	618	633	NR	2270	6290	5900	2070	-
Sulphate	(µg/L)	854	1140	1180	NR	1260	677	517	417	-
Total Alkalinity (CaCO3)	(µg/L)	<5000	<5000	<5000	<5000	14100	<5000	<5000	5210	-
Total Dissolved Solids (Theo)	(µg/L)	31000	17600	16400	17100	46500	11600	13100	14500	-
Total Inorganic Carbon	(µg/L)	1230	800	775	837	3770	1410	1160	1500	-
Total Organic Carbon	(µg/L)	17600	5040	4960	NR	6370	7270	18200	11000	-
Turbidity	(NTU)	1.8	0.5	0.6	NR	1.5	1.7	3.0 (3.0)	0.6	-
Cations										-
Calcium	(µg/L)	2120	825	761	NR	5610	1620	2670	1920	-
Magnesium	(µg/L)	689	491	491	NR	771	467	644	965	-
Potassium	(µg/L)	213	211	206	NR	332	80	166	160	-
Sodium	(µg/L)	6820	3560	3550	NR	8840	1360	1390	1640	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA								GUIDELINES
LAB ID		S2008-11909	S2008-11910	S2008-11911	S2008-11912	S2008-11912	S2008-11913	S2008-11914	S2008-11915	CCME-CEQGs (REVISED 2007) FAL
REPORT ID		P326	P421	P416	P437	P437	P369	P343	P267	
DATE		27-Aug-08	29-Aug-08	29-Aug-08	30-Aug-08	30-Aug-08	29-Aug-08	28-Aug-08	26-Aug-08	
PARAMETERS	MDL (ug/L)					(Replicate)				
Ammonia as N	(µg/L)	10	<10	18	20	NR	13	13	15	-
Bicarbonate	(µg/L)	<6000	8560	11900	<6000	NR	6610	<6000	7380	-
Carbonate	(µg/L)	<3000	<3000	<3000	<3000	NR	<3000	<3000	<3000	-
Chloride	(µg/L)	1770	2000	1320	1680	NR	1480	1160	2600	-
Colour	(TCU)	110	130	72	120	NR	72	41	77	-
Conductivity	(µS/cm)	17	29	29	23	NR	23	15	27	-
Dissolved Inorganic Carbon	(µg/L)	704	1610	2340	1500	NR	1530	1110	1590	-
Dissolved Organic Carbon	(µg/L)	14000	17800	8920	14400	NR	10400	5180	8540	-
Hardness as CaCO3	(µg/L)	4940	11800	11200	8770	NR	8770	3870	7000	-
Nitrate as N	(µg/L)	<50	<50	<50	<50	NR	<50	<50	<50	13000
Nitrite as N	(µg/L)	<15	<15	<15	<15	NR	<15	<15	<15	60
Nitrate + Nitrite	(µg/L)	<65	<65	<65	<65	NR	<65	<65	<65	-
pH	-	5.49	6.61	6.94	6.34	NR	6.57	6.49	6.75	6.5-9
Reactive Silica	(µg/L)	1430	4070	2350	2680	NR	3060	2650	3270	-
Sulphate	(µg/L)	397	152	354	310	NR	461	403	647	-
Total Alkalinity (CaCO3)	(µg/L)	<5000	7020	9810	<5000	NR	5420	<5000	6050	-
Total Dissolved Solids (Theo)	(µg/L)	11300	19100	19000	14800	NR	14800	<10000	17300	-
Total Inorganic Carbon	(µg/L)	759	1680	2450	1500	1510	1750	1250	1870	-
Total Organic Carbon	(µg/L)	14400	18900	9350	14700	NR	10500	5300	9800	-
Turbidity	(NTU)	0.7	2.0	0.6	1.4	NR	0.6	1.1	0.5	-
Cations										-
Calcium	(µg/L)	1350	3270	3060	2130	NR	2810	1090	1770	-
Magnesium	(µg/L)	382	880	853	839	NR	426	280	627	-
Potassium	(µg/L)	166	225	160	217	NR	144	150	148	-
Sodium	(µg/L)	1570	1850	1640	1650	NR	1620	1640	2660	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA						GUIDELINES
LAB ID	REPORT ID	S2008-11908 P430	S2008-11916 P270	S2008-11917 P259	S2008-11917 P259	S2008-11918 P352	S2008-11918 P352	CCME-CEQGs (REVISED 2007) FAL
DATE		30-Aug-08	26-Aug-08	26-Aug-08	26-Aug-08	28-Aug-08	28-Aug-08	
PARAMETERS	MDL (ug/L)	(Replicate)			(Replicate)		(Replicate)	
Ammonia as N	(µg/L)	NR	<10	<10	NR	12	NR	-
Bicarbonate	(µg/L)	NR	<6000	<6000	NR	<6000	<6000	-
Carbonate	(µg/L)	NR	<3000	<3000	NR	<3000	<3000	-
Chloride	(µg/L)	NR	2980	1970	NR	1260	NR	-
Colour	(TCU)	96	62	48	NR	34	NR	-
Conductivity	(µS/cm)	NR	19	17	NR	16	15	-
Dissolved Inorganic Carbon	(µg/L)	NR	480	1120	NR	1310	NR	-
Dissolved Organic Carbon	(µg/L)	NR	7410	6770	NR	5110	NR	-
Hardness as CaCO3	(µg/L)	NR	2850	4240	NR	3930	NR	-
Nitrate as N	(µg/L)	NR	<50	<50	NR	<50	NR	13000
Nitrite as N	(µg/L)	NR	<15	<15	NR	<15	NR	60
Nitrate + Nitrite	(µg/L)	NR	<65	<65	NR	<65	NR	-
pH	-	NR	5.76	6.14	NR	6.51	6.45	6.5-9
Reactive Silica	(µg/L)	NR	1440	1940	NR	2370	NR	-
Sulphate	(µg/L)	NR	787	651	NR	384	NR	-
Total Alkalinity (CaCO3)	(µg/L)	NR	<5000	<5000	NR	<5000	<5000	-
Total Dissolved Solids (Theo)	(µg/L)	NR	12400	11200	NR	10200	<10000	-
Total Inorganic Carbon	(µg/L)	NR	480	1180	1220	1330	NR	-
Total Organic Carbon	(µg/L)	NR	7470	7010	NR	5170	NR	-
Turbidity	(NTU)	NR	1.4	0.7	0.7	0.6	NR	-
Cations								-
Calcium	(µg/L)	NR	562	916	NR	1140	NR	-
Magnesium	(µg/L)	NR	351	474	NR	262	NR	-
Potassium	(µg/L)	NR	212	92	NR	210	NR	-
Sodium	(µg/L)	NR	2570	2060	NR	1750	NR	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA							GUIDELINES
LAB ID		S2008-11919	S2008-11914	S2008-11689	S2008-11689	S2008-11690	S2008-11690	S2008-11691	CCME-CEQGs (REVISED 2007) FAL
REPORT ID		P346	P343	P311	P311	P1005	P1005	P204	
DATE		28-Aug-08	28-Aug-08	21-Aug-08	21-Aug-08	24-Aug-08	24-Aug-08	22-Aug-08	
PARAMETERS	MDL (ug/L)		(Replicate)		(Replicate)		(Replicate)		
Ammonia as N	(µg/L)	<10	13	<10	NR	<10	NR	55	-
Bicarbonate	(µg/L)	<6000	NR	15400	NR	<6000	NR	9080	-
Carbonate	(µg/L)	<3000	NR	<3000	NR	<3000	NR	<3000	-
Chloride	(µg/L)	1420	NR	4110	NR	3440	3470	5060	-
Colour	(TCU)	53	NR	62	62	46	NR	250	-
Conductivity	(µS/cm)	17	NR	48	NR	23	NR	44	-
Dissolved Inorganic Carbon	(µg/L)	1050	NR	2840	NR	<500	NR	4480	-
Dissolved Organic Carbon	(µg/L)	7470	NR	8870	NR	5660	NR	20800	-
Hardness as CaCO3	(µg/L)	4200	NR	16400	NR	3570	NR	13000	-
Nitrate as N	(µg/L)	<50	NR	<50	NR	<50	<50	<50	13000
Nitrite as N	(µg/L)	<15	NR	<15	NR	<15	<15	<15	60
Nitrate + Nitrite	(µg/L)	<65	NR	<65	NR	<65	<65	<65	-
pH	-	6.33	NR	7.29	NR	6.06	NR	6.02	6.5-9
Reactive Silica	(µg/L)	3490	NR	3320	NR	1510	NR	4220	-
Sulphate	(µg/L)	330	NR	755	NR	849	854	365	-
Total Alkalinity (CaCO3)	(µg/L)	<5000	NR	12600	NR	<5000	NR	7440	-
Total Dissolved Solids (Theo)	(µg/L)	10900	NR	31100	NR	14700	NR	28300	-
Total Inorganic Carbon	(µg/L)	1070	NR	2930	NR	<500	NR	4760	-
Total Organic Carbon	(µg/L)	7830	NR	9110	NR	5950	NR	23000	-
Turbidity	(NTU)	0.5	NR	2.6	NR	3	NR	12.4	-
Cations									-
Calcium	(µg/L)	1190	NR	5230	NR	784	NR	3770	-
Magnesium	(µg/L)	299	NR	802	NR	392	NR	877	-
Potassium	(µg/L)	163	NR	255	NR	196	NR	494	-
Sodium	(µg/L)	1890	NR	3280	NR	2880	NR	4120	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA						GUIDELINES
LAB ID		S2008-11692	S2008-11693	S2008-11694	S2008-11695	S2008-11696	S2008-11697	CCME-CEQGs (REVISED 2007) FAL
REPORT ID		P313	P205	P200	P238	P239	P245	
DATE		21-Aug-08	22-Aug-08	22-Aug-08	23-Aug-08	24-Aug-08	24-Aug-08	
PARAMETERS	MDL (ug/L)							
Ammonia as N	(µg/L)	<10	10	31	15	<10	<10	-
Bicarbonate	(µg/L)	20600	<6000	96100	18900	36300	36300	-
Carbonate	(µg/L)	<3000	<3000	<3000	<3000	<3000	<3000	-
Chloride	(µg/L)	3390	3530	4180	4110	3600	4390	-
Colour	(TCU)	58	58	19	38	29	38	-
Conductivity	(µS/cm)	53	30	184	53	74	76	-
Dissolved Inorganic Carbon	(µg/L)	4080	722	18000	3400	6540	6470	-
Dissolved Organic Carbon	(µg/L)	9640	10800	2550	6090	5040	5720	-
Hardness as CaCO3	(µg/L)	20700	7150	87900	18500	31800	32100	-
Nitrate as N	(µg/L)	<50	<50	<50	<50	<50	<50	13000
Nitrite as N	(µg/L)	<15	<15	<15	<15	<15	<15	60
Nitrate + Nitrite	(µg/L)	<65	<65	<65	<65	<65	<65	-
pH	-	7.14	6.33	7.83	7.45	7.64	7.63	6.5-9
Reactive Silica	(µg/L)	4410	612	3060	3060	892	1760	-
Sulphate	(µg/L)	679	1630	8580	1370	1150	1300	-
Total Alkalinity (CaCO3)	(µg/L)	16900	<5000	78700	15500	29700	29800	-
Total Dissolved Solids (Theo)	(µg/L)	34300	19600	119000	34500	47800	49300	-
Total Inorganic Carbon	(µg/L)	4250	755	18800	3480	6730	6640	-
Total Organic Carbon	(µg/L)	14600	12800	2840	6530	12900	7630	-
Turbidity	(NTU)	1.6	2.2	2.5	0.5	0.6	0.9	-
Cations								-
Calcium	(µg/L)	6360	1950	29200	4690	7630	7860	-
Magnesium	(µg/L)	1180	555	3650	1660	3090	3040	-
Potassium	(µg/L)	382	256	807	274	278	301	-
Sodium	(µg/L)	3500	3460	4110	3450	3130	3830	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

General Chemistry + Cations Results for Water, Freshwater Environment, 2008

		DATA						GUIDELINES
LAB ID	REPORT ID	S2008-11698 P243	S2008-11698 P243	S2008-11699 P228	S2008-11700 P246	S2008-11700 P246	S2008-11701 P308	CCME-CEQGs (REVISED 2007) FAL
DATE		25-Aug-08	25-Aug-08	23-Aug-08	25-Aug-08	25-Aug-08	21-Aug-08	
PARAMETERS	MDL (ug/L)		(Replicate)			(Replicate)		
Ammonia as N	(µg/L)	23	21	<10	46	NR	<10	-
Bicarbonate	(µg/L)	106000	NR	9320	105000	NR	19100	-
Carbonate	(µg/L)	<3000	NR	<3000	<3000	NR	<3000	-
Chloride	(µg/L)	7400	NR	2270	9020	NR	2220	-
Colour	(TCU)	22	NR	41	41	NR	58	-
Conductivity	(µS/cm)	189	NR	31	191	NR	46	-
Dissolved Inorganic Carbon	(µg/L)	19300	NR	1910	19400	NR	3840	-
Dissolved Organic Carbon	(µg/L)	5190	NR	5140	5770	NR	7730	-
Hardness as CaCO3	(µg/L)	90900	NR	10100	91200	NR	19100	-
Nitrate as N	(µg/L)	<50	NR	<50	<50	NR	<50	13000
Nitrite as N	(µg/L)	<15	NR	<15	<15	NR	<15	60
Nitrate + Nitrite	(µg/L)	<65	NR	<65	<65	NR	<65	-
pH	-	8.04	NR	7.01	7.89	NR	7.35	6.5-9
Reactive Silica	(µg/L)	2270	NR	862	6060	NR	1570	-
Sulphate	(µg/L)	2040	NR	1330	3310	NR	843	-
Total Alkalinity (CaCO3)	(µg/L)	86900	NR	7640	86300	NR	15700	-
Total Dissolved Solids (Theo)	(µg/L)	123000	NR	20100	124000	NR	30000	-
Total Inorganic Carbon	(µg/L)	20100	NR	1970	20200	NR	3880	-
Total Organic Carbon	(µg/L)	5790	NR	7920	26100	NR	12400	-
Turbidity	(NTU)	1.1	NR	2.3	3	2.9	0.5	-
Cations								-
Calcium	(µg/L)	24400	NR	3020	19200	NR	5910	-
Magnesium	(µg/L)	7280	NR	622	10500	NR	1060	-
Potassium	(µg/L)	484	NR	219	817	NR	283	-
Sodium	(µg/L)	5480	NR	2290	7210	NR	2430	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
CEQGs: Canadian Environment Quality Guidelines
PAL: Protection of (Freshwater) Aquatic Life
Bold faced guidelines reflect those most applicable to current land use designation
-: VALUE NOT ESTABLISHED
Shaded and bold data exceeds the CCME PAL Criteria
WHAD-08SW06-08SW-01 DUPA is a blind field duplicate of WHAD-08SW06-08SW-01



Aluminum Guideline = **5 µg/L at pH <6.5; [Ca2+] <4 mg/L; DOC <2 mg/L**
= 100 µg/L at pH ≥6.5; [Ca2+] ≥ 4 mg/L; DOC ≥2 mg/L

Copper Guideline = **2 ug/L at [CaCO3] = 0-120 mg/L**
= 3 ug/L at [CaCO3] = 120-180 mg/L
= 4 ug/L at [CaCO3] > 180 mg/L

Lead Guideline = **1 µg/L at [CaCO3] = 0-60 mg/L**
= 2 µg/L at [CaCO3] = 60-120 mg/L
= 4 µg/L at [CaCO3] = 120-180 mg/L
= 7 µg/L at [CaCO3] = > 180 mg/L

Nickel Guideline = **25 ug/L at [CaCO3] = 0-60 mg/L**
= 65 ug/L at [CaCO3] = 60-120 mg/L
= 110 ug/L at [CaCO3] = 120-180 mg/L
= 150 ug/L at [CaCO3] > 180 mg/L

Volatile Organic Compound Results for Water, Freshwater Environment, 2008

LAB ID REPORT ID		DATA																	GUIDELINES	
		Lab Blank	S2008-11123 P29	S2008-11124 P10	S2008-11334 P55	S2008-11335 P52	S2008-11335 P52	S2008-11336 P43	S2008-11336 P43	S2008-11337 P108	S2008-11338 P139	S2008-11339 P120	S2008-11340 P143	S2008-11341 P7	S2008-11342 P30	S2008-11343 P37	S2008-11344 P36	S2008-11460 P142	S2008-11461 P121	CCME-CEQGs (REVISED 2007)
DATE			12-Aug-08	12-Aug-08	16-Aug-08	17-Aug-08	17-Aug-08	17-Aug-08	17-Aug-08	18-Aug-08	18-Aug-08	18-Aug-08	16-Aug-08	14-Aug-08	14-Aug-08	14-Aug-08	15-Aug-08	19-Aug-08	19-Aug-08	PAL
PARAMETERS	MDL (µg/L)						(Replicate)		(Replicate)											(µg/L)
Methyl Chloride	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
Vinyl Chloride	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-
Bromomethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
Chloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
Trichlorofluoromethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
1,1-Dichloroethene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
Methylene Chloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	98.1
Methyl-t-butyl ether	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
T1,2-Dichloroethylene	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-
1,1-Dichloroethane	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	-
C1,2-Dichloroethylene	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	-
Chloroform	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.8
1,1,1-Trichloroethane	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-
Carbontetrachloride	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	13.3
Benzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	370
1,2-Dichloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	100
Trichloroethylene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
1,2-Dichloropropane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
Bromodichloromethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
C1,3-Dichloropropene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
Toluene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	2
T1,3-Dichloropropene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
1,1,2-Trichloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	21
Tetrachloroethylene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
Dibromochloromethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
Ethylene Dibromide	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
Chlorobenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
1,1,1,2-Tetrachloroethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
Ethylbenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	90
Bromoform	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	5
1,1,2,2,-Tetrachloroethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
1,3-Dichlorobenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	150
1,4-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	26
1,2-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.7
m/p-Xylene	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	-
o-Xylene	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-
Styrene	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	72
1,2,4-Trichlorobenzene	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	24
Acetone	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	18	<10	<10	<10	<10	<10	<10	<10	-
Methyl Ethyl Ketone	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
MIBK	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
2-Chloroethylvinyl ether	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
Surrogate Recovery (%)																				
Dibromofluoromethane		101	106	107	103	106	110	100	76	109	106	107	109	106	109	106	108	108	107	-
Toluene-d8		94	108	101	104	102	105	101	101	106	98	104	108	98	107	105	102	104	107	-
4-Bromofluorobenzene		80	104	107	109	105	106	102	97	110	110	105	105	107	108	106	109	101	106	-

Notes:
MDL: Method detection limit
<X: Below MDL
CCME: Canadian Council of Ministers of the Environment
ISQG: Interim freshwater sediment quality guidelines (dry weight)
PAL: Protection of (Freshwater) Aquatic Life
-: VALUE NOT ESTABLISHED
Bold and underlined data exceed the CCME ISQG criteria/guideline(s)
Shaded and bold data exceeds the CCME PAL Criteria



BTEX, TPH Results for Water, Freshwater Environment, 2008

		Data														GUIDELINES	
LAB ID		S2008-11123	S2008-11124	S2008-11362	S2008-11362	S2008-11363	S2008-11364	S2008-11445	S2008-11908	S2008-11908	S2008-11909	S2008-11910	S2008-11911	S2008-11912	S2008-11913	S2008-11914	CCME - CEQGs
FIELD SAMPLE ID		P29	P10	Stream A-110	Stream A-110	P533	P534	P541	P430	P430	P326	P421	P416	P437	P369	P343	(REVISED 2007)
REPORT SAMPLE ID																	
DATE (D/M/Y)		12-Aug-08	12-Aug-08	14-Aug-08	14-Aug-08	18-Aug-08	18-Aug-08	19-Aug-08	30-Aug-08	30-Aug-08	27-Aug-08	29-Aug-08	29-Aug-08	30-Aug-08	29-Aug-08	28-Aug-08	PAL
PARAMETERS	MDL (ug/L)				(Replicate)					(Replicate)							
Benzene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	370
Toluene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2
Ethylbenzene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	90
m/p-Xylene	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
o-Xylene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-
TPH (C6-C10)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-
TPH (C6-C10) less BTEX	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-
TPH (>C10-C21)	50	<50	<50	<50	NR	<50	<50	192	<50	NR	<50	<50	<50	<50	<50	<50	-
TPH (>C21-<C32)	50	<50	<50	<50	NR	<50	<50	1500	<50	NR	<50	<50	<50	<50	<50	<50	-
Modified TPH (Tier 1)		<150	<150	<150	-	<150	<150	<1740	<150	<150	<150	<150	<150	<150	<150	<150	-
Hydrocarbon Identification		-	-	-	-	-	-	Chromatogram resembles heavy oil	-	-	-	-	-	-	-	-	-
BTEX, TPH Purgeable																	
Surrogate Recovery (%)																	
Difluorobenzene		88	92	98	101	101	109	98	92	99	98	97	97	100	91	92	-
4-Bromofluorobenzene		104	101	100	98	100	101	98	102	96	105	102	104	111	102	101	-
TPH Extractable																	
Surrogate Recovery (%)																	
O-Terphenyl		63	72	62	NR	67	68	65	92	NR	77	84	83	69	106	83	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
-: VALUE NOT ESTABLISHED
BTEX: Benzene, Toluene, Ethylbenzene, and Xylene
TPH: Total Petroleum Hydrocarbons
Shaded and bold data exceeds the CCME PAL Criteria



BTEX, TPH Results for Water, Freshwater Environment, 2008

		DATA															GUIDELINES
LAB ID		S2008-11915 P267	S2008-11916 P270	S2008-11917 P259	S2008-11918 P352	S2008-11919 P346	S2008-11689 P311	S2008-11689 P311	S2008-11690 P1005	S2008-11691 P204	S2008-11692 P313	S2008-11693 P205	S2008-11694 P200	S2008-11695 P238	S2008-11696 P239	S2008-11697 P245	CCME - CEQGs (REVISED 2007)
FIELD SAMPLE ID		26-Aug-08	26-Aug-08	26-Aug-08	28-Aug-08	28-Aug-08	21-Aug-08	21-Aug-08	24-Aug-08	22-Aug-08	21-Aug-08	22-Aug-08	22-Aug-08	23-Aug-08	24-Aug-08	24-Aug-08	
REPORT SAMPLE ID																	
DATE (D/M/Y)		26-Aug-08	26-Aug-08	26-Aug-08	28-Aug-08	28-Aug-08	21-Aug-08	21-Aug-08	24-Aug-08	22-Aug-08	21-Aug-08	22-Aug-08	22-Aug-08	23-Aug-08	24-Aug-08	24-Aug-08	PAL
PARAMETERS	MDL (ug/L)	(Replicate)															
Benzene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	370
Toluene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2
Ethylbenzene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	90
m/p-Xylene	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
o-Xylene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-
TPH (C6-C10)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-
TPH (C6-C10) less BTEX	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-
TPH (>C10-C21)	50	<50	<50	<50	<50	<50	<50	NR	<50	<50	<50	<50	<50	<50	<50	<50	-
TPH (>C21-<C32)	50	<50	<50	<50	<50	<50	<50	NR	<50	<50	<50	<50	<50	<50	<50	<50	-
Modified TPH (Tier 1)		<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	-
Hydrocarbon Identification		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX, TPH Purgeable																	
Surrogate Recovery (%)																	
Diffluorobenzene		97	93	96	101	104	109	104	103	101	101	102	101	104	107	102	-
4-Bromofluorobenzene		99	108	104	106	103	102	104	102	106	106	99	98	93	98	102	-
TPH Extractable																	
Surrogate Recovery (%)																	
O-Terphenyl		81	81	79	78	93	64	NR	67	66	64	61	60	66	66	67	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
-: VALUE NOT ESTABLISHED
BTEX: Benzene, Toluene, Ethylbenzene, and Xylene
TPH: Total Petroleum Hydrocarbons
Shaded and bold data exceeds the CCME PAL Criteria



BTEX, TPH Results for Water, Freshwater Environment, 2008

		DATA				GUIDELINES
LAB ID		S2008-11698	S2008-11699	S2008-11700	S2008-11701	CCME - CEQGs
FIELD SAMPLE ID		P243	P228	P246	P308	(REVISED 2007)
REPORT SAMPLE ID						
DATE (D/M/Y)		25-Aug-08	23-Aug-08	25-Aug-08	21-Aug-08	PAL
PARAMETERS	MDL (ug/L)					
Benzene	0.2	<0.2	<0.2	<0.2	<0.2	370
Toluene	0.2	<0.2	<0.2	<0.2	<0.2	2
Ethylbenzene	0.2	<0.2	<0.2	<0.2	<0.2	90
m/p-Xylene	0.4	<0.4	<0.4	<0.4	<0.4	-
o-Xylene	0.2	<0.2	<0.2	<0.2	<0.2	-
TPH (C6-C10)	50	<50	<50	<50	<50	-
TPH (C6-C10) less BTEX	50	<50	<50	<50	<50	-
TPH (>C10-C21)	50	<50	<50	<50	ANR	-
TPH (>C21-<C32)	50	<50	<50	<50	ANR	-
Modified TPH (Tier 1)		<150	<150	<150	-	-
Hydrocarbon Identification		-	-	-	-	-
BTEX, TPH Purgeable						
Surrogate Recovery (%)						
Diffuorobenzene		103	100	104	102	-
4-Bromofluorobenzene		101	99	105	95	-
TPH Extractable						
Surrogate Recovery (%)						
O-Terphenyl		64	66	67	ANR	-

Notes:
MDL: Method Detection Limit
<X: Below MDL
-: VALUE NOT ESTABLISHED
BTEX: Benzene, Toluene, Ethylbenzene, and Xylene
TPH: Total Petroleum Hydrocarbons
Shaded and bold data exceeds the CCME PAL Criteria



General Chemistry Results for Sediment, Freshwater Environment, 2008

			DATA							GUIDELINES	
LAB ID FIELD ID			Lab Blank	S2008-11345 P55	S2008-11346 P29	S2008-11346 P29	S2008-11347 P10	S2008-11348 P120	S2008-11349 P108	1999 CCME RECOMMENDED SEDIMENT QUALITY GUIDELINES (REVISED 2007)	
DATE (D/M/Y)				16-Aug-08	12-Aug-08	12-Aug-08	12-Aug-08	18-Aug-08	18-Aug-08	ISQG	PEL
PARAMETERS	Units	MDL (µg/g)				(Replicate)					
Ammonia as N	(µg/g)	0.2	<0.2	1.7	1.3	NR	14.9	72.1	25.1	-	-
Chloride	(µg/g)	1	<1	6	<1	NR	5	5	<1	-	-
Conductivity	(µS/cm)	10	<10	29	21	21	147	127	103	-	-
Nitrate as N	(µg/g)	1	<1	<1	<1	NR	<1	<1	<1	-	-
Nitrite as N	(µg/g)	1	<1	<1	<1	NR	<1	<1	<1	-	-
Nitrate + Nitrite	(µg/g)	2	<2	<2	<2	NR	<2	<2	<2	-	-
pH	-	-	6.8	6.1	6.3	NR	4.9	4.3	4.8	-	-
Sulphate	(µg/g)	1	<1	3	1	NR	55	3	1	-	-



General Chemistry Results for Sediment, Freshwater Environment, 2008

			DATA									GUIDELINES	
LAB ID FIELD ID			S2008-11350 P43	S2008-11350 P43	S2008-11351 P139	S2008-11352 P143	S2008-11353 P7	S2008-11354 P30	S2008-11355 P37	S2008-11356 P52	S2008-12873 P413	1999 CCME RECOMMENDED SEDIMENT QUALITY GUIDELINES (REVISED 2007)	
DATE (D/M/Y)			17-Aug-08	17-Aug-08	18-Aug-08	16-Aug-08	14-Aug-08	14-Aug-08	15-Aug-08	16-Aug-08	02-Sep-08	ISQG	PEL
PARAMETERS	Units	MDL (µg/g)		(Replicate)									
Ammonia as N	(µg/g)	0.2	0.6	NR	51.4	3.5	2.8	22.4	6.0	10.0	42.6	-	-
Chloride	(µg/g)	1	<1	<1	2	<1	<1	<1	<1	<1	12	-	-
Conductivity	(µS/cm)	10	17	17	247	29	22	123	57	318	132	-	-
Nitrate as N	(µg/g)	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-
Nitrite as N	(µg/g)	1	<1	<1	<1	<1	<1	<1	<	<1	<1	-	-
Nitrate + Nitrite	(µg/g)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-
pH	-	-	5.7	5.7	4.3	4.3	5.3	4.3	5.1	5.1	4.5 (4.5)	-	-
Sulphate	(µg/g)	1	<1	<1	5	<1	<1	5	2	28	136	-	-



ICP Metals Results for Sediment, Freshwater Environment, 2008

LAB ID FIELD ID		DATA			GUIDELINES	
		Lab Blank	S2008-12873 P413	S2008-12873 P413	1999 CCME RECOMMENDED SEDIMENT QUALITY GUIDELINES (REVISED 2007)	
					ISQG	PEL
DATE (D/M/Y)			02-Sep-08	02-Sep-08		
PARAMETERS	MDL (µg/g)			(Replicate)		
Aluminum	(µg/g)	<5	6940	7100	-	-
Antimony	(µg/g)	<0.5	0.7	0.5	-	-
Arsenic	(µg/g)	<0.5	4.5	4.6	5.9	17
Barium	(µg/g)	<0.5	22.0	22.3	-	-
Beryllium	(µg/g)	<0.2	0.5	0.5	-	-
Bismuth	(µg/g)	<0.2	0.2	<0.2	-	-
Boron	(µg/g)	<1	689	711	-	-
Cadmium	(µg/g)	<0.5	<0.5	<0.5	0.6	3.5
Calcium	(µg/g)	<25	3540	3560	-	-
Chromium	(µg/g)	<1	9	9	37.3	90
Cobalt	(µg/g)	<1	5	5	-	-
Copper	(µg/g)	<1	5	5	35.7	197
Iron	(µg/g)	<5	12400	12500		
Lead	(µg/g)	<5	16	17	35	91.3
Magnesium	(µg/g)	<10	918	930	-	
Manganese	(µg/g)	<1	268	271	-	-
Mercury	(µg/g)	<0.01	0.13	0.13	0.17	0.486
Molybdenum	(µg/g)	<2	<2	<2	-	-
Nickel	(µg/g)	<5	<5	<5	-	-
Phosphorous	(µg/g)	<5	395	405	-	-
Potassium	(µg/g)	<10	276	279	-	-
Rubidium	(µg/g)	<2	4	4	-	-
Selenium	(µg/g)	<0.1	0.3	0.2	-	-
Silicon	(µg/g)	<5	32	33	-	-
Silver	(µg/g)	<0.25	<0.25	<0.25	-	-
Sodium	(µg/g)	<25	189	189	-	-
Strontium	(µg/g)	<2	16	17	-	-
Sulphur	(µg/g)	<5	2160	2580	-	-
Tellurium	(µg/g)	<2	3	3	-	-
Thallium	(µg/g)	<0.5	<0.5	<0.5	-	-
Tin	(µg/g)	<2	<2	<2	-	-
Titanium	(µg/g)	<2	140	143	-	-
Uranium	(µg/g)	<0.5	25.1	25.6	-	-
Vanadium	(µg/g)	<5	16	16	-	-
Zinc	(µg/g)	<2	18	18	123	315

Total Organic Carbon (TOC) Results for Sediment, Freshwater Environment, 2008

		Data	GUIDELINES	
LAB ID		S2008-12873 P413	1999 CCME RECOMMENDED SEDIMENT QUALITY GUIDELINES (REVISED 2007)	
FIELD ID				
DATE (D/M/Y)		02-Sep-08	ISQG	PEL
PARAMETERS	MDL (mg/g)			
TOC (Total Organic Carbon)	500	240000	-	-



Labrador – Island Transmission Link

Freshwater Environment: Fish and Fish Habitat, Water Resources *Component Study: Supplementary Report*

Labrador Transmission Corridor Option: Muskrat Falls to the Strait of Belle Isle

Prepared for:

**Nalcor Energy
Hydro Place, 500 Columbus Drive, PO Box 12800
St. John's, Newfoundland and Labrador
Canada A1B 0C9**

WTO TBR0050, WO 659826

Prepared by:

**AMEC Earth & Environmental
133 Crosbie Road
St. John's, Newfoundland and Labrador
Canada A1B 4A5**

Project # TF1010493

March 7, 2011

Table of Contents

1.0	INTRODUCTION.....	1
2.0	APPROACH AND METHODS.....	1
2.1	Watercourse Database.....	3
2.1.1	Spatial Imagery Utilized	3
2.1.2	Water Crossing Identification	3
2.1.3	Water Crossing Delineation and Drainage Area	3
2.1.4	Parameter Calibration	4
2.2	Literature Review	4
3.0	RESULTS AND ANALYSIS.....	5
3.1	Watercourse Database.....	5
3.2	Literature Review	5
4.0	SUMMARY	14
5.0	REFERENCES.....	14

List of Figures

Figure 1.1: Labrador – Island Transmission Link: Labrador Transmission Corridor Options	2
Figure 3.1: Watercourse Crossings Identified Through Air Photo Interpretation	6
Figure 3.2: Watercourse Crossings – Trans Labrador Highway (Phase 3).....	10

List of Tables

Table 3.1 Summary of Watercourse Crossing Characteristics from Air Photo Interpretation and GIS Analysis	7
Table 3.2 Individual Watercourse Crossing Air Photo Interpretation and GIS Analysis Results	8
Table 3.3 Summary of TLH3 Freshwater Field and Air Photo Survey Results (Reproduced from JWEL, 2003)	11
Table 3.4 Summary of TLH3 Water Quality Field and Laboratory Results (Reproduced from JWEL, 2003).....	13

Appendices

Appendix A	Transmission Corridor Watercourse Crossings
------------	---

1.0 INTRODUCTION

Nalcor Energy is proposing to develop the *Labrador – Island Transmission Link* (the Project), a High Voltage Direct Current (HVdc) transmission system extending from Central Labrador to the Island of Newfoundland's Avalon Peninsula.

The environmental assessment (EA) process for the Project was initiated in January 2009 and is in progress. An Environmental Impact Statement (EIS) is being prepared by Nalcor Energy, which will be submitted for review by governments, Aboriginal and stakeholder groups and the public. In preparation for and support of the Project's EA, a series of environmental studies have been completed to provide information on the existing biophysical and socioeconomic environments in and near the Project area.

At the time of the commencement of the EA and these associated environmental studies, the Labrador component of the Project included a converter station facility at Gull Island on the lower Churchill River, as well as a proposed transmission corridor extending from Gull Island to the Strait of Belle Isle. In mid-November 2010, Nalcor Energy advised the provincial and federal governments that it would also be assessing the potential option of locating the Project's Labrador converter station at or near the Muskrat Falls site on the lower Churchill River. If that were to be the case, the Labrador transmission corridor would potentially extend from Muskrat Falls to the Trans Labrador Highway (Phase 3), and then follow generally along the south side of the highway to approximately its southernmost point before meeting and continuing along the previously identified corridor from that location to the Strait of Belle Isle (Figure 1.1).

The purpose of this Supplementary Report is to expand and update the scope of the *Freshwater Environment: Fish and Fish Habitat, Water Resources Component Study* (AMEC 2010) completed for the EA to provide similar environmental information for this additional transmission corridor option, for eventual use in Project planning and in the EIS.

In doing so, it focuses solely on the section of this Labrador corridor option from the Muskrat Falls area and along a portion of the Trans Labrador Highway, to the point where it meets the previously identified transmission corridor that extends on to the Strait of Belle Isle.

2.0 APPROACH AND METHODS

The following sections provide an overview of the design and conduct of this *Freshwater Environment – Supplementary Report*, including the development and use of the watercourse GIS database, literature reviews and the associated air photo interpretation.

The above noted Labrador transmission corridor option from Muskrat Falls parallels the Trans Labrador Highway (Phase 3, TLH3) for a large portion of its length (as shown in Figure 1.1). The previous EA for the TLH3 included the collection of environmental baseline information on the existing freshwater environment, including each of the watercourses crossed by the proposed highway. An extensive dataset of information was obtained during those baseline surveys which were also incorporated into this supplemental report to assist in describing the freshwater environment.



Figure 1.1 Labrador - Island Transmission Link: Labrador Transmission Corridor Options.

2.1 Watercourse Database

Similar to the previous characterization of transmission corridor watercourse crossings (AMEC 2010), data collected through air photograph interpretation, topographic mapping and GIS applications as well as during previous studies within the transmission corridor area were used to generate an information database. This database characterizes each watercourse crossing along the Muskrat Falls corridor segment. As stated previously, the dataset associated with the TLH3 has been incorporated into the database. For the purpose of this study, the identified watercourse crossing locations located along the centerline of the transmission line corridor were analyzed.

The approach used in describing the freshwater environment of the Muskrat Falls transmission corridor is similar to that applied to the corridor options within the *Freshwater Environment: Fish and Fish Habitat, Water Resources Component Study* (AMEC 2010).

2.1.1 Spatial Imagery Utilized

Nalcor Energy collected high quality spatial imagery covering the areas along the proposed Labrador – Island Transmission Link in the Fall of 2010, for eventual use in detailed Project planning and design. This included undertaking LiDAR (Light Detection and Ranging) and orthophoto surveys within the identified proposed and alternative transmission corridors (2 km wide study area) including the Muskrat Falls corridor segment that is the focus of this study. Digital aerial photography, 1:30,000 scale, with a spatial resolution of 20 cm from that survey was provided to AMEC for use in the watercourse crossing identification and analysis exercise reported herein.

2.1.2 Watercourse Crossing Identification

For the purpose of the study, a watercourse was defined as any stream which could be discerned on a 1:50,000 topographic map. GIS applications were used to identify and label all watercourses intersecting the transmission corridor. Each crossing was given a unique identification number within the transmission database. For the purpose of this study, the identified watercourse crossing locations located along the centerline of the transmission line corridor were analyzed.

2.1.3 Water Crossing Delineation and Drainage Area

As in past similar linear assessments, watercourse crossings within the transmission corridor have been classified based upon the estimated watershed drainage area (where drainage area is defined as that watershed area upgradient of the crossing). Each watercourse crossing was then assigned to watershed size intervals: intermittent (N), small (S1, S2, S3), intermediate (I1, I2) and large (L). The TLH3 crossing dataset included information regarding drainage area. This information was used to place each crossing into its appropriate watercourse drainage classification.

2.1.4 Parameter Calibration

In order to ensure consistent air photo interpretation with the *Freshwater Environment: Fish and Fish Habitat, Water Resources Component Study*, one interpreter from the previous interpretation team completed all interpretations within this supplement. Therefore, calibration between interpreters was not required.

Additional baseline field data has not been collected for this supplement. The accuracy assessment completed in the *Freshwater Environment: Fish and Fish Habitat, Water Resources Component Study* is assumed to remain valid as similar assessors and methods were used in this supplement.

2.2 Literature Review

The regional literature review completed as part of the *Freshwater Environment: Fish and Fish Habitat, Water Resources Component Study* remains relevant and valid for this additional transmission corridor. In addition to regional information, site-specific survey information from the TLH3 component study is considered relevant to the parallel portion of the transmission corridor and has been reproduced within this supplemental report. Stream identification numbers have been replicated from the TLH3 dataset such that any cross-reference between the two studies is simplified.

3.0 RESULTS AND ANALYSIS

The results of the air photo interpretation, GIS analysis and literature review for the Muskrat Falls transmission corridor are summarized below.

3.1 Watercourse Database

A GIS watercourse database was developed which combines all data for each watercourse from air photo interpretation and GIS analysis.

Figure 3.1 presents an overview of the transmission corridor with each identified watercourse crossing. Adjacent to each stream crossing on the map is its stream identification number. Table 3.1 presents a summary of results from the GIS analysis for individual crossings. Detailed information on the identified characteristics of each watercourse crossing within the additional transmission corridor is provided in Table 3.2. A detailed series of topographic maps to illustrate each potential watercourse crossing within the transmission corridor are presented at the end of this report (Appendix A).

Table 3.1 presents a summary of results of the air photo interpretation for individual crossings. Detailed information of each watercourse crossing within the corridor is provided below in Table 3.2. The Muskrat Falls corridor segment contains a total of 70 watercourse crossings. The most common occurring flow morphologies within this region were flats (38.6 percent), followed by riffle habitat (20.0 percent). Of the remaining, 32.9 percent were unable to be interpreted primarily due to heavy vegetative cover and 8.6 percent were discontinuous habitat. Within the 70 crossings, 42.9 percent of them were dominated by fine substrate material and 24.3 percent by coarse substrate material. The remaining 32.9 percent were unable to be interpreted primarily due to heavy vegetative cover (Table 3.1). Channel width and wetted width averaged 29.9 m and 11.7 m respectively.

3.2 Literature Review

A summary of the general literature reviewed for both fish species presence and water quality for the Labrador portion of the project area is provided in the previous report (AMEC 2010). A summary of the relevant data collected as part of the TLH3 studies (JWEL 2003) is provided below. This data augments the information generated from air photo interpretation and GIS analysis. It is particularly useful in areas where centerline crossings are not visible due to heavy vegetation cover. Figure 3.2 presents an overview of the TLH3 survey locations near/within the transmission corridor. Adjacent to each stream crossing on the map is its stream identification number.

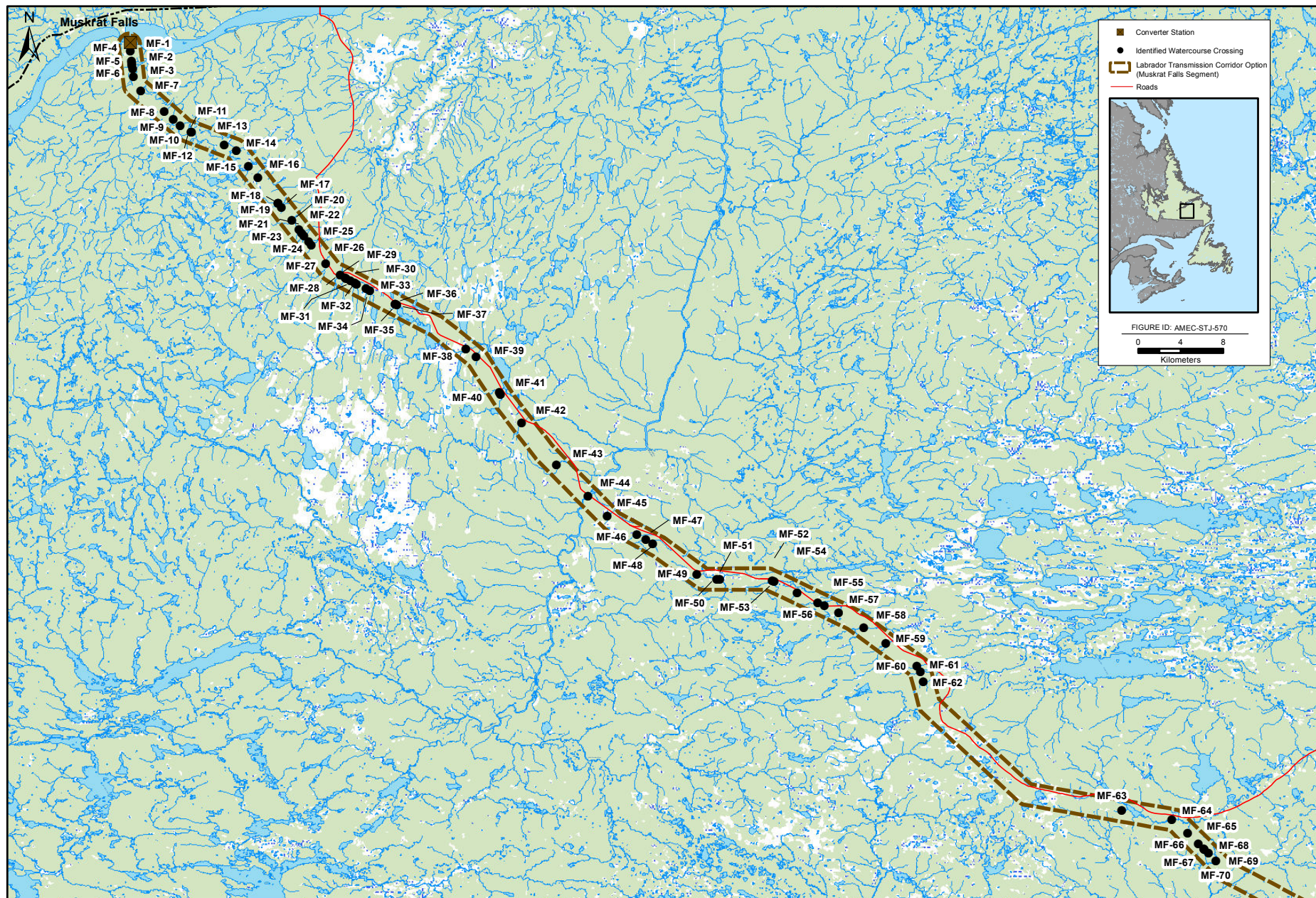


Figure 3.1 Watercourse Crossings Identified Through Air Photo Interpretation.

Table 3.1 Summary of Watercourse Crossing Characteristics from Air Photo Interpretation and GIS Analysis

Watercourse Crossing Characteristics Identified	Number of Observations
Watershed Size Category	
< 2.6 km ²	41 (58.6%)
2.6 - 50 km ²	22 (31.4%)
50 - 200 km ²	5 (7.1%)
200 - 500 km ²	1 (1.4%)
500 - 1,000 km ²	0 (0%)
1,000 - 10,000 km ²	1 (1.4%)
Total	70
Dominant Substrate	
Fine	30 (42.9 %)
Coarse	17 (24.3 %)
Unclassified*	23 (32.9%)
Total	70
Flow Morphology	
Riffle	14 (20.0 %)
Flat	27 (38.6 %)
Discontinuous	6 (8.6 %)
Unclassified*	23 (32.9 %)
Total	70
Channel Width (m): Average / Range	28.7 / 3.5 – 156.3
Wetted Width (m): Average / Range	11.3 / <1.0 – 138.3
* Unclassified refers to data not classified during air photo interpretation. Reasons include: cloud cover or stream not visible.	

Table 3.2 Individual Watercourse Crossing Air Photo Interpretation and GIS Analysis Results

#	Stream ID	Watershed Size (km ²)	Slope (%)	Channel / Wetted Width (m)	Dominant Substrate	Flow Morphology	Riparian Vegetation
1	MF-1 ¹	0.1	12	12.5 / -	-	-	Coniferous Tree
2	MF-2	0.1	21	10.4 / 1.2	Fine	Flat	Coniferous Tree
3	MF-3 ¹	0.2	24	-	-	-	Coniferous Tree
4	MF-4 ¹	1.8	31	-	-	-	Coniferous Tree
5	MF-5 ¹	0.9	41	-	-	-	Coniferous Tree
6	MF-6 ¹	3.1	10	-	-	-	Coniferous Tree
7	MF-7	201.9	4	22.8 / 10.3	Coarse	Riffle	Coniferous Tree
8	MF-8 ¹	0.2	14	4.6 / -	-	-	Coniferous Tree
9	MF-9	24.7	10	9.6 / 4.4	Coarse	Riffle	Coniferous Tree
10	MF-10	1.8	7	8.3 / 2.3	Fine	Riffle	Coniferous Tree
11	MF-11	0.4	8	5.1 / 2.5	Fine	Discontinuous	Tree Bog
12	MF-12	3.2	11	5.1 / 2.5	Fine	Discontinuous	Tree Bog
13	MF-13	0.6	2	96.6 / 1.1	Fine	Flat	Bog
14	MF-14	0.1	2	11.2 / <1.0	Fine	Discontinuous	Bog
15	MF-15	12.5	6	3.5 / 2.0	Coarse	Riffle	Tree Bog
16	MF-16	1.5	34	10.6 / 1.8	Fine	Discontinuous	Bog
17	MF-17 ¹	1.1	31	-	-	-	Coniferous Tree
18	MF-18	7.7	16	9.9 / 1.6	Fine	Flat	Coniferous Tree
19	MF-19 ¹	0.7	12	-	-	-	Coniferous Tree
20	MF-20	2.6	20	13.5 / 1.2	Fine	Flat	Coniferous Tree
21	MF-21	32.4	7	9.9 / 6.5	Coarse	Riffle	Coniferous Tree
22	MF-22 ¹	0.3	6	-	-	-	Coniferous Tree
23	MF-23 ¹	0.4	11	-	-	-	Coniferous Tree
24	MF-24 ¹	0.3	11	-	-	-	Coniferous Tree
25	MF-25 ¹	1.4	11	-	-	-	Coniferous Tree
26	MF-26	83.3	5	55.4 / 19.4	Coarse	Riffle	Coniferous Tree
27	MF-27	199.7	10	31.6 / 24.6	Coarse	Riffle	Coniferous Tree
28	MF-28	1.8	5	9.8 / 9.8	Coarse	Riffle	Coniferous Tree
29	MF-29	30.9	7	18.9 / 5.3	Coarse	Riffle	Coniferous Tree
30	MF-30	30.4	4	18.2 / 4.2	Coarse	Riffle	Coniferous Tree
31	MF-31	1.0	4	4.8 / 1.3	Fine	Discontinuous	Tree Bog
32	MF-32	1.6	6	17.7 / 2.3	Fine	Flat	Coniferous Shrub
33	MF-33 ²	1.1	5	-	-	-	Tree Bog
34	MF-34	18.4	5	26.4 / 4.7	Coarse	Riffle	Coniferous Tree
35	MF-35	0.9	-	42.5 / 2.3	Fine	Flat	Bog
36	MF-36	0.9	-	18.0 / 6.0	Fine	Flat	Bog
37	MF-37	0.9	-	16.4 / 10.9	Coarse	Flat	Tree Bog
38	MF-38	73.1	4	19.2 / 16.8	Coarse	Riffle	Coniferous Tree
39	MF-39	1.7	5	18.7 / 1.4	Fine	Flat	Tree Bog
40	MF-40	4.1	3	49.9 / 6.7	Fine	Flat	Bog
41	MF-41	9.6	2	34.2 / 24.2	Fine	Flat	Bog
42	MF-42	3.1	4	73.4 / 3.7	Fine	Flat	Deciduous Shrub
43	MF-43	9.1	4	28.4 / 1.3	Fine	Flat	Deciduous Shrub
44	MF-44	2090.4	2	156.3 / 138.3	Coarse	Flat	Coniferous Tree

#	Stream ID	Watershed Size (km ²)	Slope (%)	Channel / Wetted Width (m)	Dominant Substrate	Flow Morphology	Riparian Vegetation
45	MF-45 ²	0.7	1	-	-	-	Coniferous Tree
46	MF-46 ²	1.3	3	-	-	-	Coniferous Tree
47	MF-47 ²	4.8	50	-	-	-	Coniferous Tree
48	MF-48 ¹	0.8	20	-	-	-	Coniferous Tree
49	MF-49 ¹	0.1	19	-	-	-	Coniferous Tree
50	MF-50	29.5	3	22.4 / 14.1	Coarse	Flat	Coniferous Tree
51	MF-51	29.5	3	28.5 / 10.1	Fine	Flat	Tree Bog
52	MF-52	5.0	4	118.3 / 82.4	Fine	Flat	Coniferous Tree
53	MF-53	38.5	16	14.8 / 5.8	Fine	Flat	Coniferous Tree
54	MF-54	1.3	20	5.3 / 1.3	Fine	Flat	Coniferous Tree
55	MF-55	1.0	5	39.2 / <1.0	Fine	Flat	Deciduous Shrub
56	MF-56	5.9	8	7.8 / 3.8	Coarse	Riffle	Coniferous Tree
57	MF-57	2.2	8	15.5 / <1.0	Fine	Flat	Tree Bog
58	MF-58	24.9	9	138.5 / 19.6	Fine	Flat	Bog
59	MF-59	12.1	8	16.5 / 5.4	Fine	Flat	Deciduous Shrub
60	MF-60 ¹	2.2	8	-	-	-	Coniferous Tree
61	MF-60	0.8	9	32.1 / <1.0	Fine	Flat	Bog
62	MF-62	0.7	26	13.2 / <1.0	Fine	Discontinuous	Bog
63	MF-63 ¹	0.8	19	-	-	-	Coniferous Tree
64	MF-64	59.2	5	36.0 / 24.6	Coarse	Riffle	Coniferous Tree
65	MF-65 ²	0.7	9	-			Coniferous Tree
66	MF-66	0.5	20	12.5 / 1.5	Fine	Flat	Coniferous Tree
67	MF-67 ³	0.9	20	11.2 / -	-	-	Coniferous Tree
68	MF-68 ³	0.9	20	11.2 / -	-	-	Coniferous Tree
69	MF-69	1.3	4	11.9 / 1.1	Fine	Flat	Deciduous Shrub
70	MF-70	86.1	8	54.4 / 35.5	Coarse	Flat	Tree Bog

Note: See Map Atlas (Appendix A) for information on watercourse crossing numbers / IDs and locations, and definitions.

¹ Crossing not visible through tree/vegetation cover

² Stream not visibly present; GIS data presented for watershed size and slope (based on 1:50,000 topo mapping). Riparian vegetation, as indicated, represents dominant vegetation in area where crossing was marked on 1:50,000 topo mapping.

³ Crossing channel identified but stream was dry on imagery

Table 3.3 presents a summary of the relevant fish species presence and habitat measurement information reported from TLH3 field studies (JWEL 2003). As shown, typical species such as brook trout and sucker species were captured. Brook trout were captured by electrofishing at all sites sampled within the corridor.

Table 3.4 presents a summary of water quality data collected as part of the TLH3 studies. As shown, water quality is typical of the region. Laboratory analysis shows that many of the metals are below the Estimated Quantitation Limit (EQL). It should be noted that aluminum values are typically high in Newfoundland and Labrador waters (with similar findings reported in AMEC 2010).



Figure 3.2 Watercourse Crossings - Trans Labrador Highway Phase 3.

Table 3.3 Summary of TLH3 Freshwater Field and Air Photo Survey Results (Reproduced from JWEL 2003)

Stream ID	Stream / Watershed Name	Measured Watershed Size (km ²)	Gradient (%)	Average Wetted Width (m)	Max. Depth (m)	Surface Velocity (m/s)	Habitat Type	Substrate	Species Captured ⁴
20 ¹	Traverspine R.	2.1	-	2-5	<1	-	U (R)	F	
21 ¹	Traverspine R.	0.7	-	<2	-	-	U (U)	U	
22	Traverspine R.	77	2.5	10	0.5 – 1.0	0.33	III (RA)	Bo/Br/R	
23	Traverspine R.	191	1.5	15	0.58	0.44	II (R)	Bo/C/R/G	
24	Traverspine R.	29	4	5	0.46	0.28	III (RA)	Bo/R/C/G	
25 ¹	Traverspine R.	0.4	-	<2	-	-	U (U)	U	
26 ¹	Traverspine R.	0.15	-	<2	-	-	U (U)	U	
27 ¹	Traverspine R.	0.25	-	<2	-	-	U (U)	U	
28	Kenamu R.	72.3	1	<20	0.7 – 1.0	0.49	II (R)	Bo/R/C/G	
29 ¹	Kenamu R.	0.78	-	5-20	-	-	II (R)	U	
30 ¹	Kenamu R.	11.9	-	5-20	<1	-	IV (S)	F/B	
31 ¹	Kenamu R.	2.7	-	<2	-	-	U (U)	U	
32 ¹	Kenamu R.	6.3	-	<2	-	-	II (R)	U	
33 ¹	Kenamu R.	1.5	-	<2	-	-	II (R)	U	
34 ¹	Kenamu R.	9.95	-	<2	<1	-	II (R)	F/G/C/R	
35 ²	Kenamu R.	1	-	-	-	-	-	-	
36	Kenamu R.	2,026	1	~100	0.4	0.24	II (R)	C/R/Bo/F/G	
37	Kenamu R.	4.75	<1	1.5	0.30 – 0.60	0.14	IV (S)	F	
38-O ¹	Salmon R.	0.9	-	0-2	<1	-	IV (S)	F	
39-O	Kenamu R.	38.4	2	8.0 – 8.5	0.35 – 0.80	0.41	II (R)	Bo/C/R/F	
40-O ¹	Salmon R.	3.4	-	2-5	<1	-	IV (S)	F	
41-O ³	Eagle R.	44.3	-	-	-	-	-	-	
42-O ¹	Eagle R.	0.9	-	0-2	<1	-	IV (S)	F/C/R	
43-O ¹	Eagle R.	1.2	-	0-2	<1	-	II (R)	F/B	
44-O ¹	Eagle R.	1.1	-	0-2	<1	-	II (R)	F/B/C/R	
45-O ³	Eagle R.	7.6	-	-	-	-	-	-	
46-O ¹	Eagle R.	3.4	-	2-5	<1	-	IV (S)	F/B	
47-O ³	Eagle R.	26.1	-	-	-	-	-	-	BT
48-O ¹	Eagle R.	14.9	-	2-5	<1	-	IV (S)	F/B	
49-O ¹	Eagle R.	3.4	-	0-2	<1	-	II (R)	U	
50-O ³	Eagle R.	2.7	-	-	-	-	-	-	
51-O ³	Eagle R.	5.5	-	-	-	-	-	-	BT
52-O ³	Eagle R.	3.2	-	-	-	-	-	-	
53-O ¹	Eagle R.	6.7	-	2-5	<1	-	IV (S)	F/B	
54-O ¹	St. Augustin R.	2.1	-	2-5	<1	-	IV (S)	F/C/R/G	
55-O ³	St. Augustin R.	6	-	-	-	-	-	-	BT
56-O ¹	St. Augustin R.	32.5	-	5-20	<1	-	IV (S)	F/B	
57-O ³	St. Augustin R.	3.8	-	-	-	-	-	-	
58-O ¹	St. Augustin R.	2.9	-	<2	<1	-	II (R)	F/B	
59-O ³	St. Augustin R.	3.1	-	-	-	-	-	-	
60-O ³	St. Augustin R.	46	-	-	-	-	-	-	BT/LNS/WS

Stream ID	Stream / Watershed Name	Measured Watershed Size (km ²)	Gradient (%)	Average Wetted Width (m)	Max. Depth (m)	Surface Velocity (m/s)	Habitat Type	Substrate	Species Captured ⁴
¹	Stream characteristics based on Aerial Surveys								
²	Stream dry during Aerial Surveys								
³	No habitat characterization presented								
⁴	Only those sites where fish sampling occurred have fish data presented (blank cells indicate no fish sampling effort)								
⁵	Stream ID values are similar to those from TLH survey reports (JWEL 2003)								
Habitat Type		Beak Habitat Types (I, II, III, IV). Riffle/Run (R), Steady (S), Pool (P), Rapids (RA), Unknown (U)							
Substrate		Bedrock (Br), Boulder (Bo), Rubble (R), Cobble (C), Gravel (G), Fines (F), Unknown (U)							
Species		Brn- Brown Trout, BT- Brook Trout, AS- Atlantic Salmon, 3SB- Threespine Stickleback, LND- Longnose dace, PD-Pearl Dace, Bur- Burbot, MS- Mottled Sculpin, A. Eel- American Eel, WS- White Sucker							
-		Unknown							

Table 3.4 Summary of TLH3 Water Quality Field and Laboratory Results (Reproduced from JWEL 2003)

Parameter	EQL ¹	Unit	Stream Crossing			Average	CCME Guideline ²
			#28	#36	#37		
Field Measurements							
Temperature		°C	6.33	6.72	6.95	6.67	narrative
pH		Units	7.73	8.6	8.39	8.24	6.5-9.0
Conductivity		µS/cm	5.6	8.6	4.6	6.3	
Dissolved O ₂		mg/L	12.72	10.86	8.93	10.84	5.5-9.5
Turbidity	0.1	NTU	9.7	0.6	6.1	5.5	narrative
Laboratory Analysis							
Alkalinity (as CaCO ₃)	5	mg/L	7	11	6	8.0	
Total Dissolved Solids	10	mg/L	30	30	30	30.0	
Aluminum	10	µg/L	210	110	120	146.7	100 ³
Antimony	2	µg/L	<2	<2	<2	<2	
Arsenic	2	µg/L	<2	<2	<2	<2	5
Barium	5	µg/L	9	8	7	8.0	
Beryllium	5	µg/L	<5	<5	<5	<5	
Bismuth	2	µg/L	<2	<2	<2	<2	
Boron	5	µg/L	<5	<5	<5	<5	
Cadmium	0.3	µg/L	<0.3	<0.3	<0.3	<0.3	0.017
Chromium	2	µg/L	<2	<2	<3	<3	8.9
Cobalt	1	µg/L	<1	<1	1	1.0	
Copper	2	µg/L	2	2	2	2.0	2.4
Iron	20	µg/L	850	520	3200	1523.3	300
Lead	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	1.7
Manganese	2	µg/L	28	10	100	46.0	
Molybdenum	2	µg/L	<2	<2	<2	<2	
Nickel	2	µg/L	<2	<2	<2	<2	25-150
Selenium	2	µg/L	<2	<2	<2	<2	1.0
Silver	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	0.1
Strontium	5	µg/L	19	19	11	16.3	
Thallium	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	0.8
Tin	2	µg/L	<2	<2	<2	<2	
Titanium	2	µg/L	6	2	2	3.3	
Uranium	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	
Vanadium	2	µg/L	<2	<2	<2	<2	
Zinc	2	µg/L	2	2	4	2.7	30

¹ Estimated Quantitation Limit, typically 5 to 10x the Method Detection Limit (MDL)
² Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Freshwater Aquatic Life (FAL)
³ CCME Guideline based on pH >6.5

4.0 SUMMARY

The identified Muskrat Falls transmission corridor segment contains a total of 70 watercourse crossings. Air photo interpretation of each indicates that the most common occurring flow morphologies within this region were flats (38.6 percent), followed by riffle habitat (20.0 percent). Of the remaining, 32.9 percent were unable to be interpreted primarily due to heavy vegetative cover and 8.6 percent were discontinuous habitat. Of those visible on air photos, 42.9 percent of them were dominated by fine substrate material while 24.3 percent by coarse substrate material. Channel width and wetted width averaged 29.9 m and 11.7 m respectively.

Sampling completed as part of the baseline studies for the nearby TLH3 augments the data relative to the watersheds crossed by the centerline of the corridor. Fish captured included brook trout and sucker species; brook trout were captured at all sites sampled within the corridor.

Water quality results are typical of the region with no parameters exceeding CCME guidelines. The exception is aluminum values, which are typically elevated in Newfoundland and Labrador waters.

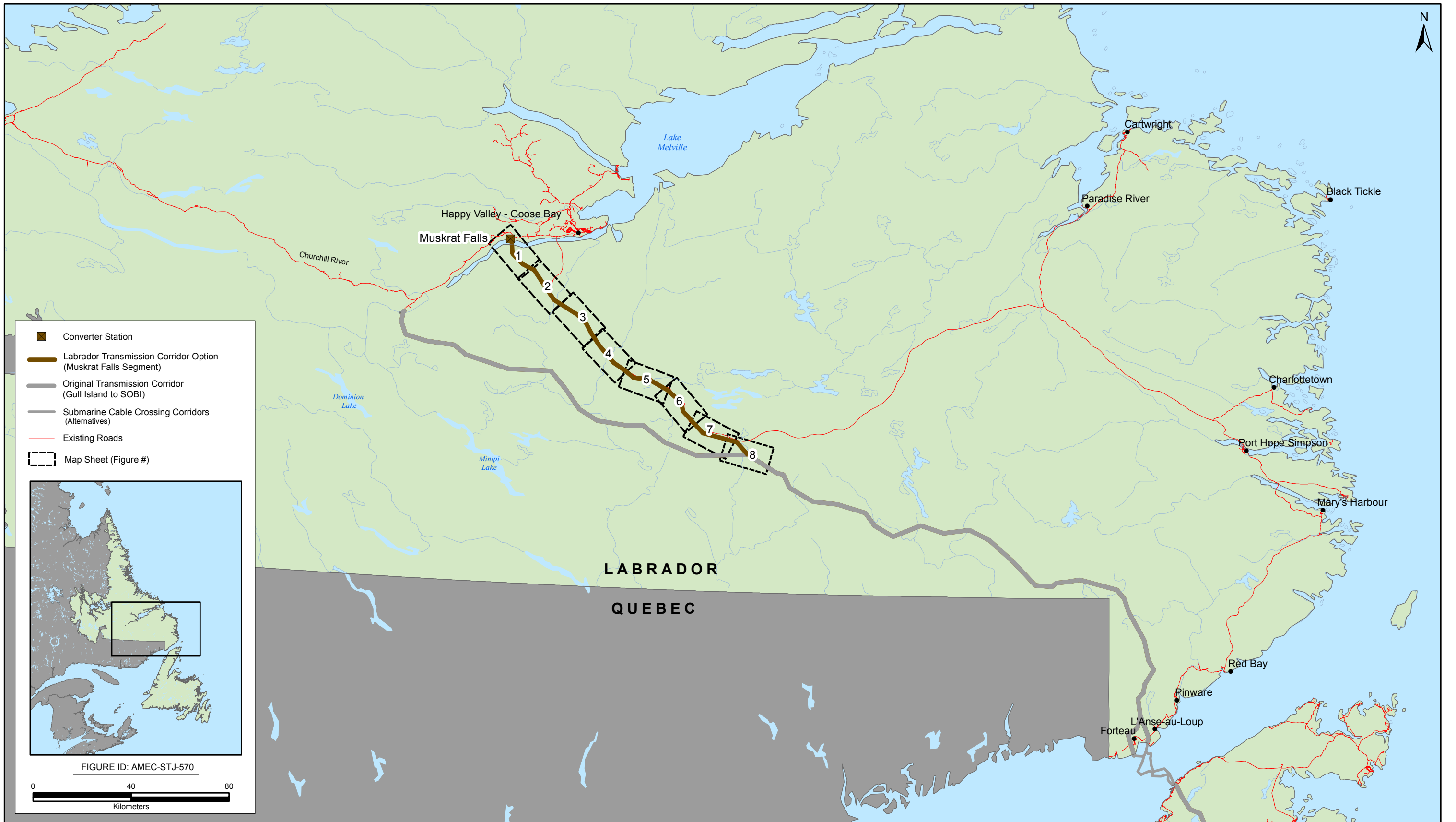
5.0 REFERENCES

AMEC. 2010. Labrador-Island Transmission Link: Freshwater Environment: Fish and Fish Habitat, Water Resources Component Study. Prepared for Nalcor Energy, St. John's, NL.

JWEL (Jacques Whitford Environment Ltd). TLH – Phase III Alternative (Outfitter) Route EIS/CSR, October 6, 2003. Prepared for Department of Transportation and Works, St. John's, NL

APPENDIX A

Transmission Corridor Watercourse Crossings



INDEX

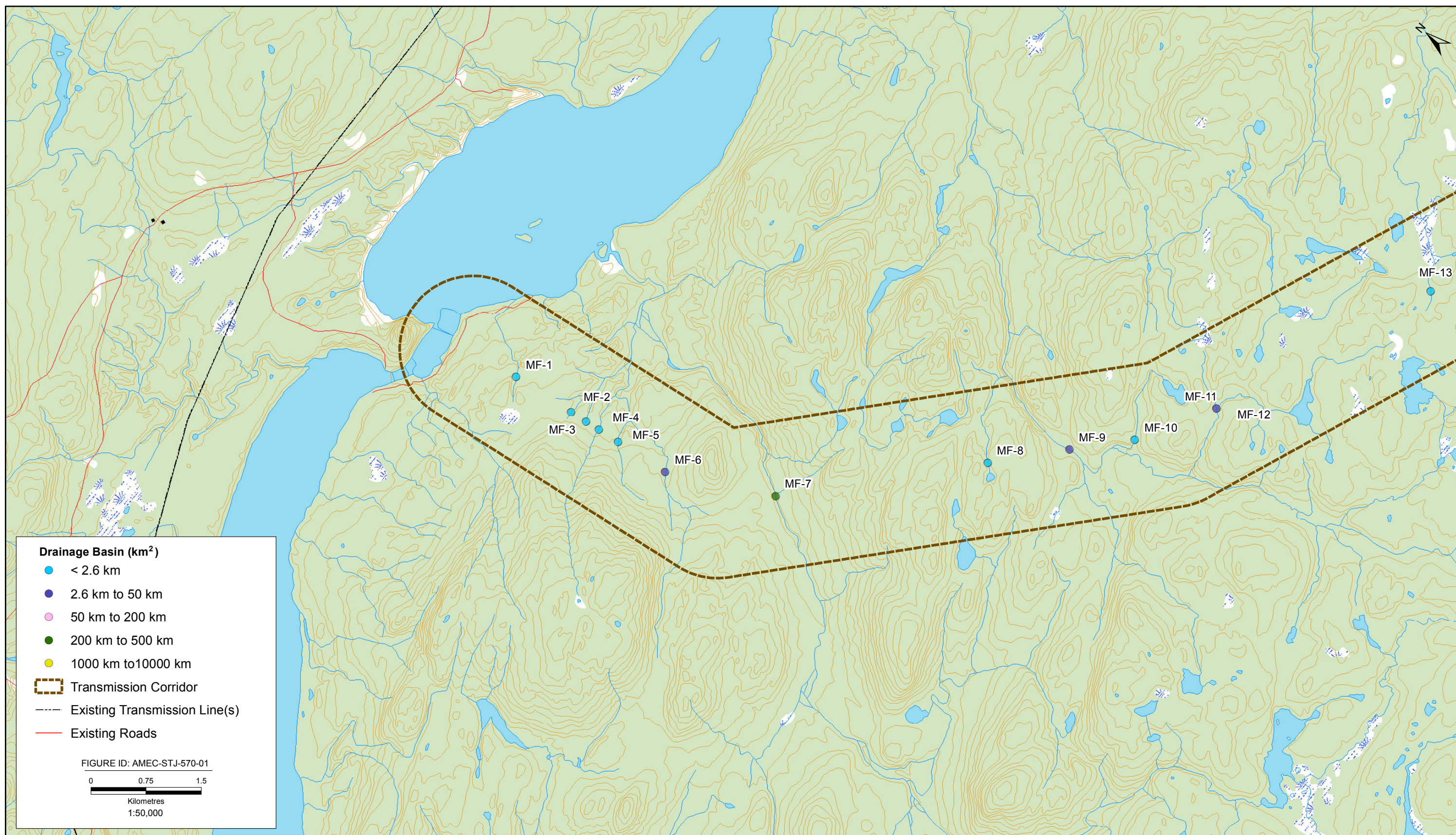


FIGURE 1

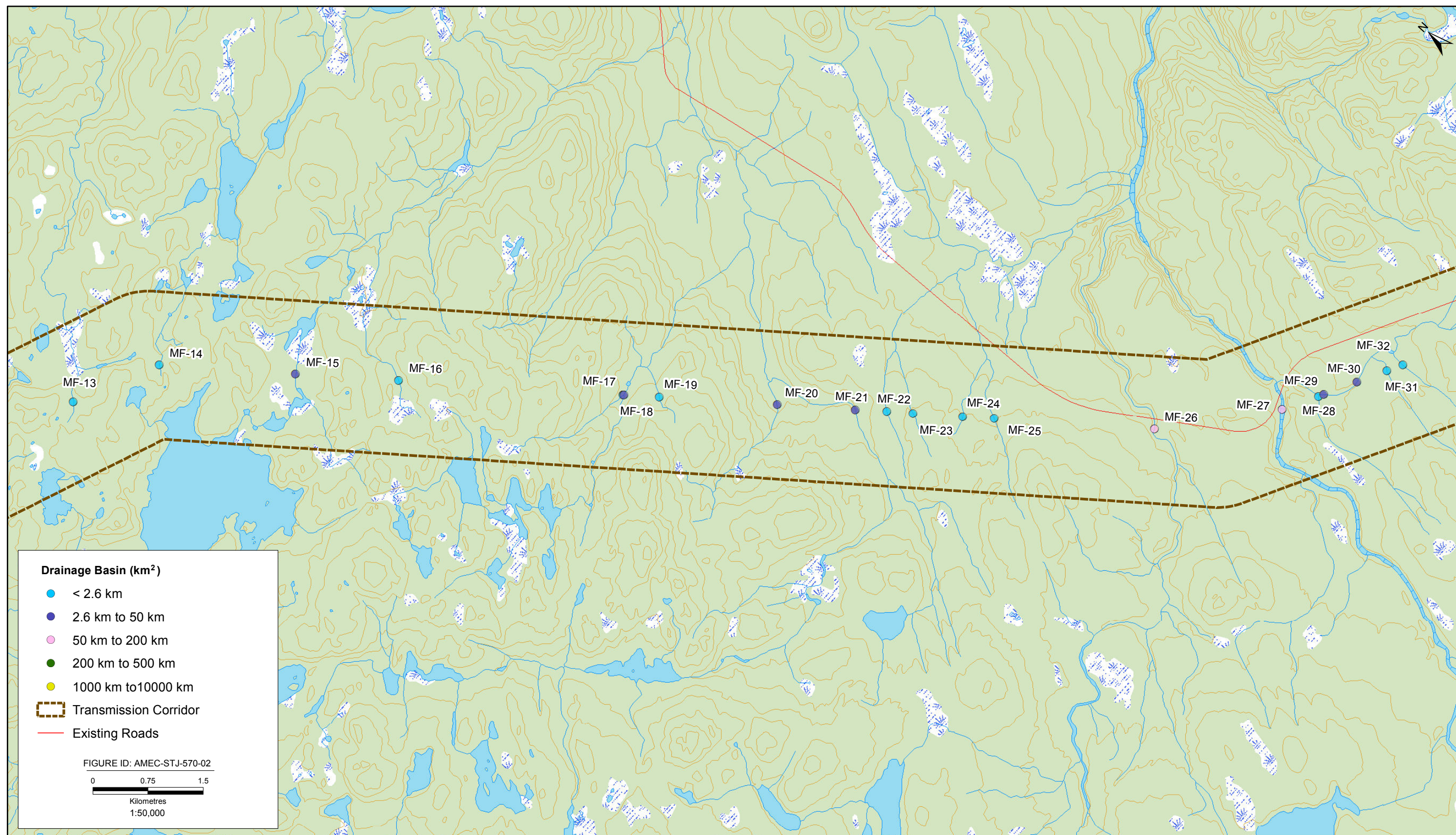


FIGURE 2



FIGURE 3

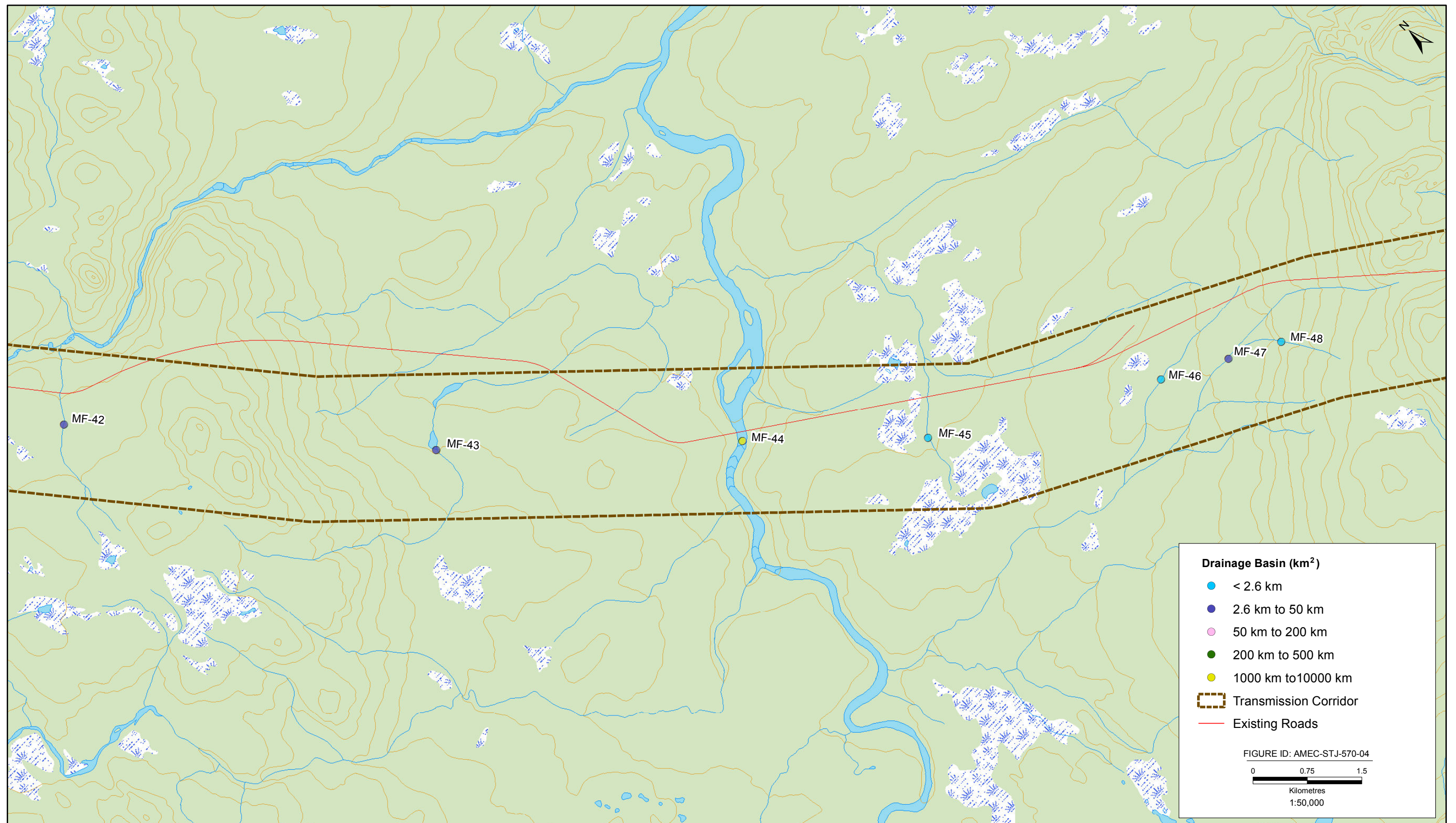


FIGURE 4

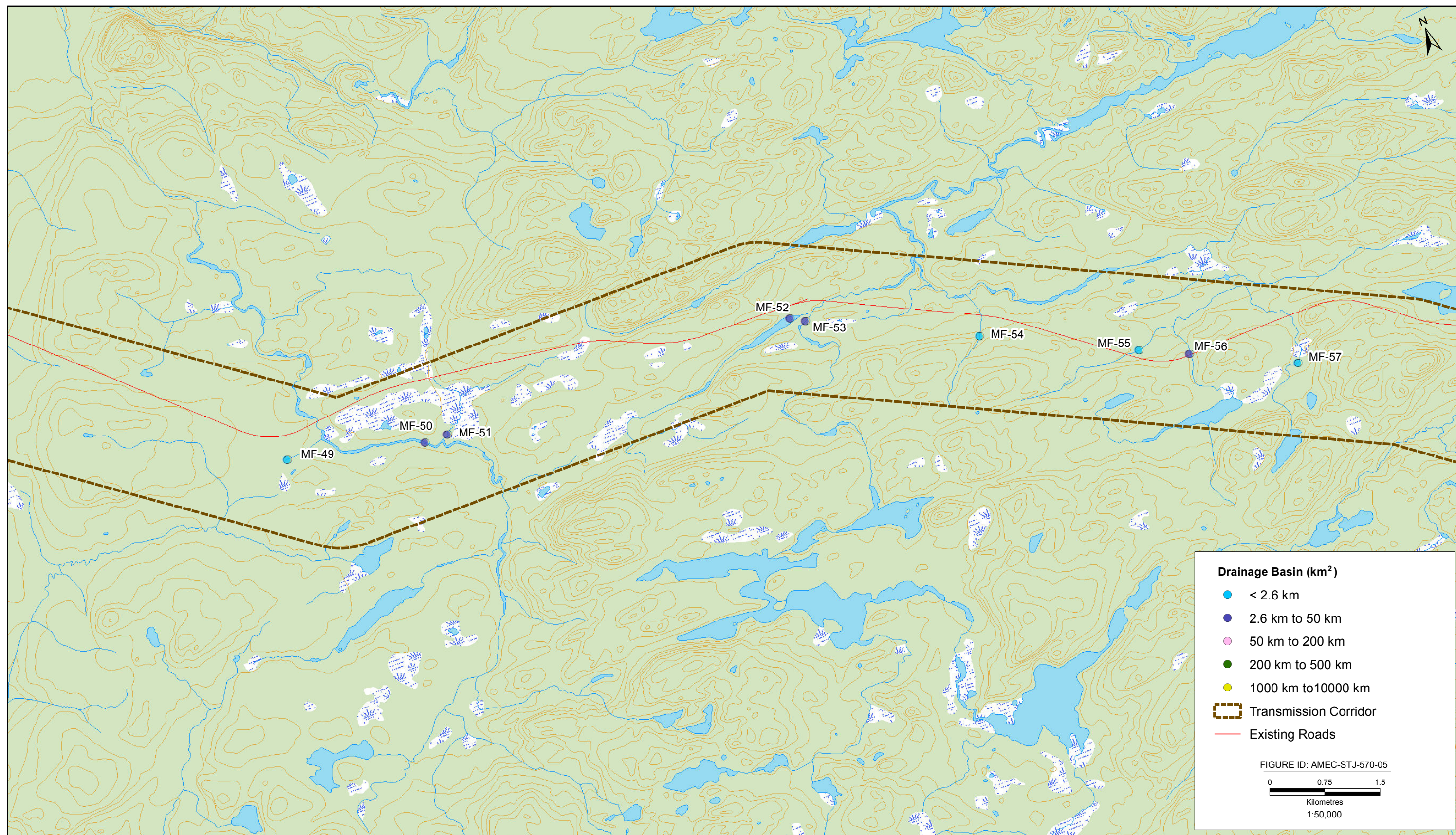


FIGURE 5

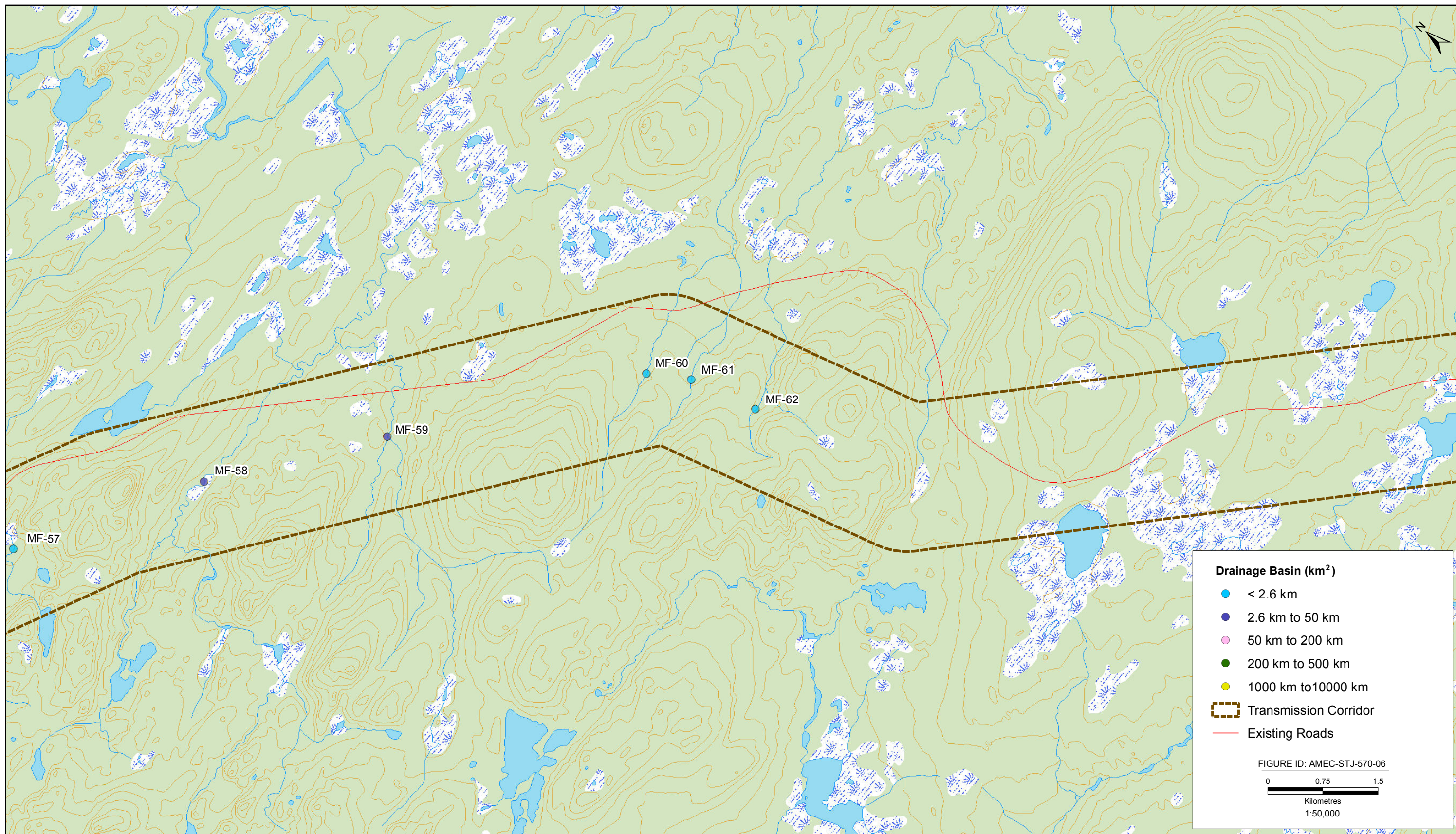
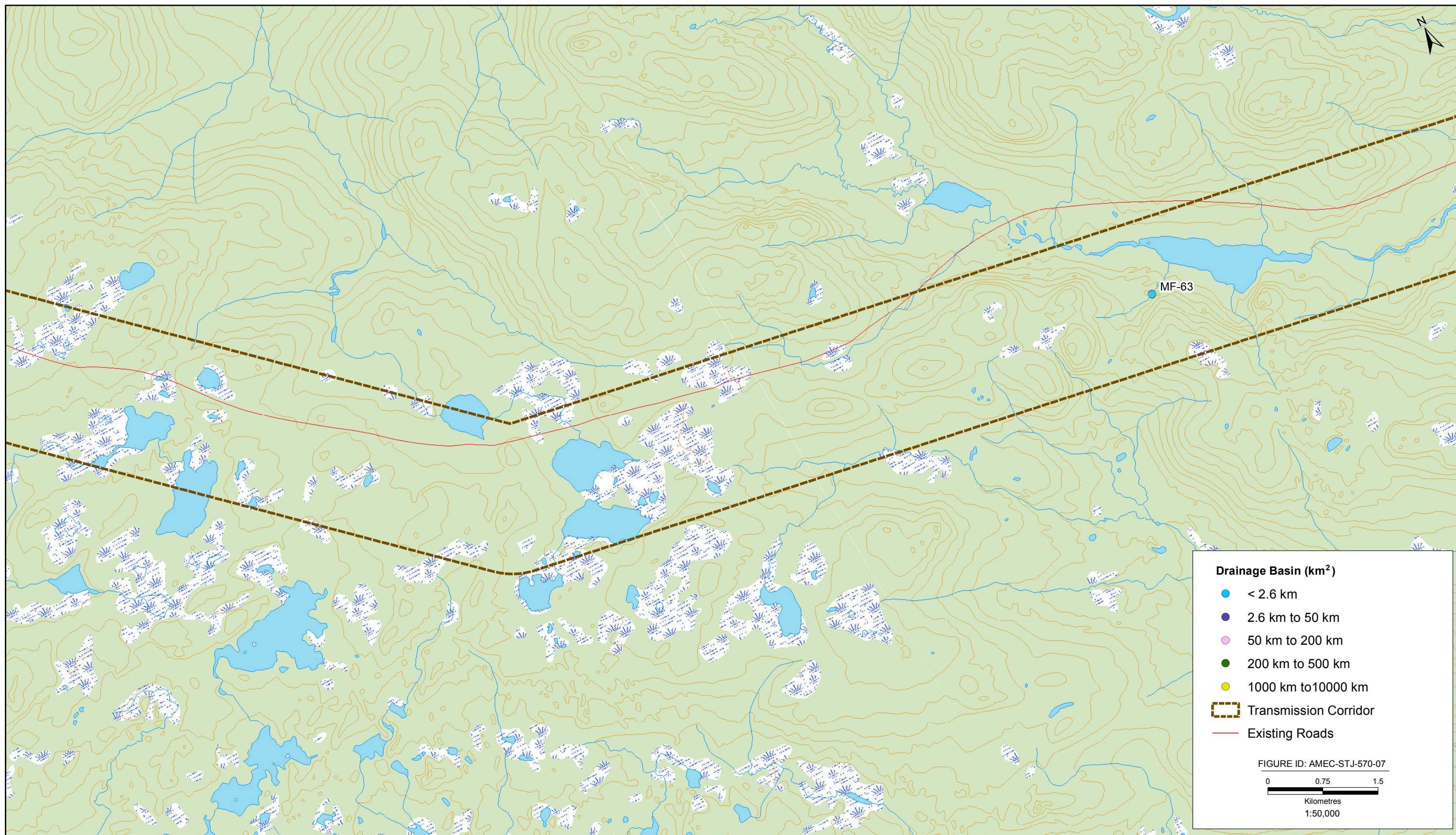


FIGURE 6



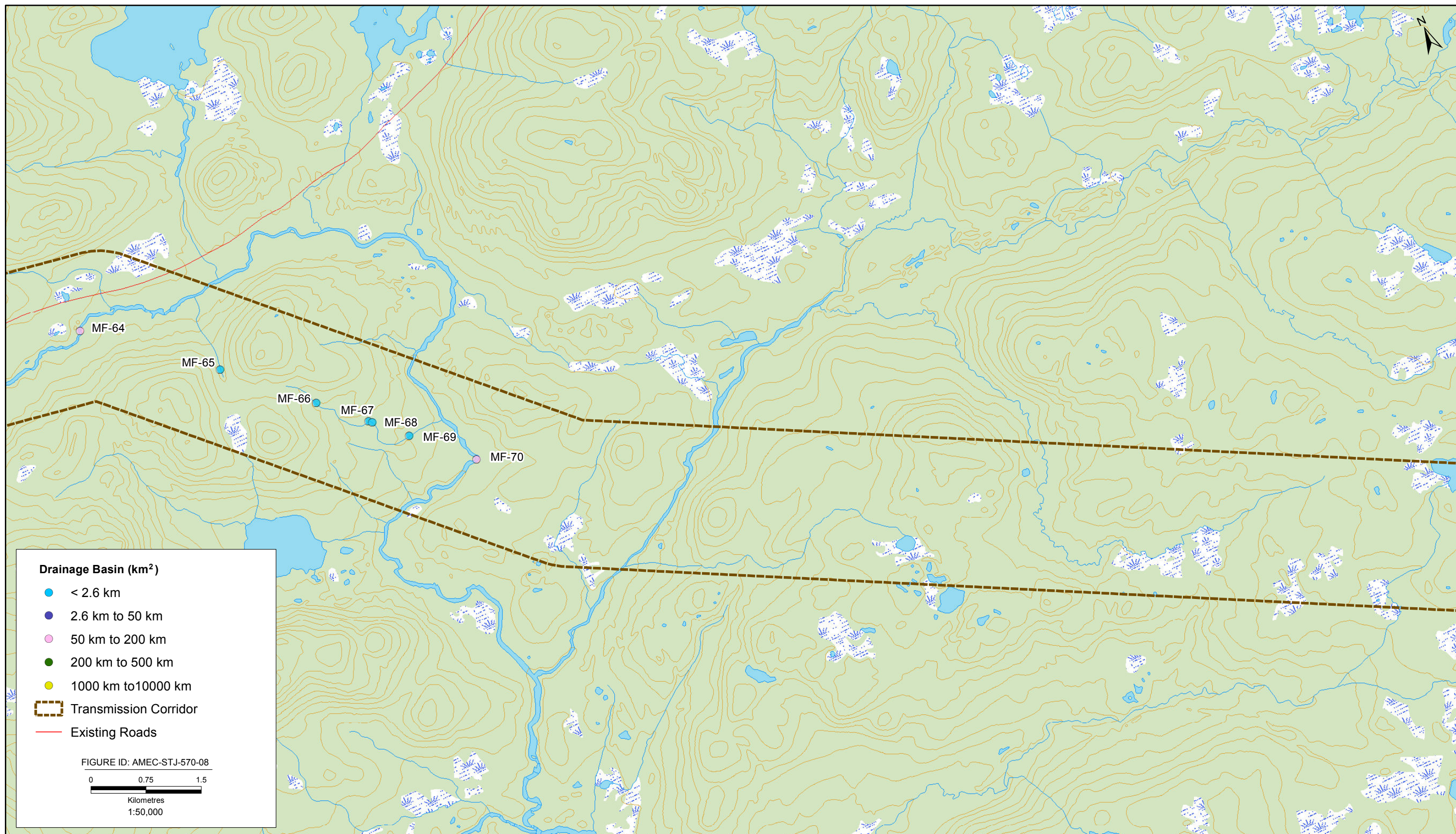


FIGURE 8