Site Description

Study Name	CBWQ-Salmo
Site	NESLM02
Sampling Date	Oct 24 2013
Know Your Watershed Basin	Central Columbia
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Selkirk-Bitterroot Foothills EcoRegion
Coordinates (decimal degrees)	49.24207 N, 117.23455 W
Altitude	2286
Local Basin Name	Salmo River
	Columbia
Stream Order	6

Figure 1. Location Map

Across Reach (No image found)
Aerial (No image found)
Down Stream (No image found)
Field Sheet (No image found)
Miscellaneous (No image found)
Substrate (No image found)
Up Stream (No image found)

Cabin Assessment Results

Reference Model Summary	
Model	Columbia-Okanagan Preliminary March 2010
Analysis Date	August 28, 2017
Taxonomic Level	Family
Predictive Model Variables	Depth-Avg Latitude Longitude Reg-Ice Reg-SlopeLT30%

Reference Groups	**1**	**2**	**3**	**4**	**5**
Number of Reference Sites	9	43	17	12	33
Group Error Rate	22.2%	24.5%	22.2%	25.0%	32.4%
Overall Model Error Rate	26.4%				
Probability of Group Membership	1.2%	7.2%	9.7%	79.4%	2.5%
CABIN Assessment of NESLM02 on Oct 24, 2013	Mildly Divergent				

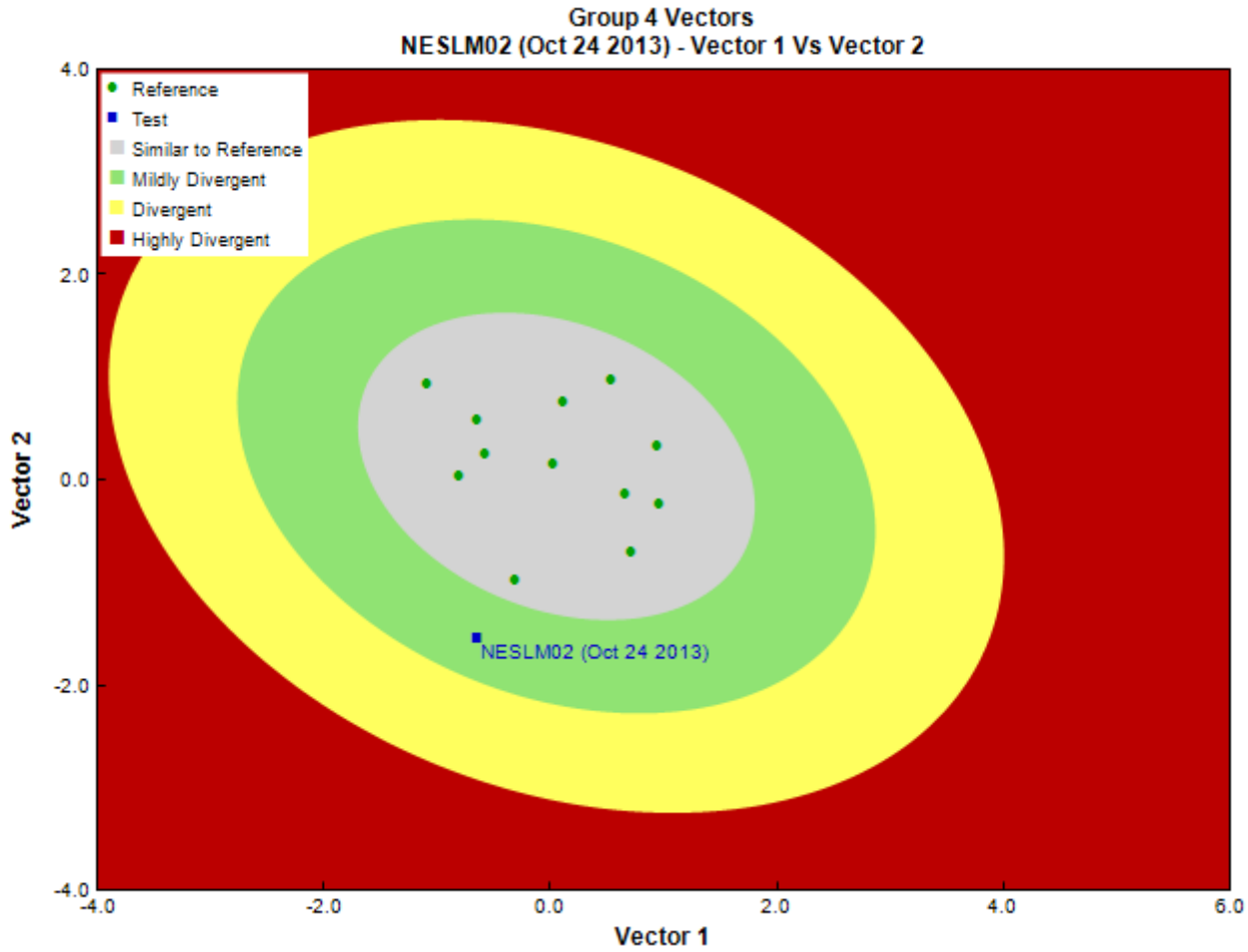

Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	Pina Viola, Consultant
Date Taxonomy Completed	January 27, 2014
	Marchant Box
Sub-Sample Proportion	6/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
Annelida	Oligochaeta	Tubificida		2	33.3
Arthropoda	Arachnida	Trombidiformes	Hydryphantidae	1	16.7
			Lebertiidae	2	33.3
			Torrenticolidae	1	16.7
	Insecta	Diptera	Ceratopogonidae	1	16.7
			Chironomidae	85	1,416.7
			Psychodidae	24	400.0
			Tipulidae	3	50.0
		Ephemeroptera	Ameletidae	1	16.7
			Baetidae	24	400.0
			Ephemerellidae	24	400.0
			Heptageniidae	107	1,783.4
			Leptophlebiidae	1	16.7
		Plecoptera		3	50.0
			Capniidae	4	66.7

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
			Chloroperlidae	10	166.7
			Nemouridae	2	33.3
			Perlidae	3	50.0
			Taeniopterygidae	2	33.3
		Trichoptera	Apataniidae	1	16.7
			Glossosomatidae	10	166.7
			Hydropsychidae	1	16.7
			Lepidostomatidae	18	300.0
			Rhyacophilidae	2	33.3
			Total	332	5,533.6

Metrics

Name	NESLM02	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.86	0.4 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	4.4	3.2 ± 0.3
Intolerant taxa	--	
Long-lived taxa	1.0	2.1 ± 1.0
Tolerant individuals (%)	--	0.8 ± 0.3
Functional Measures		
% Filterers	0.3	2.2 ± 1.8
% Gatherers	46.1	38.4 ± 12.4
% Predatores	31.9	19.0 ± 8.5
% Scrapers	46.7	63.2 ± 19.7
% Shredder	9.0	27.6 ± 15.2
Number Of Individuals		
% Chironomidae	26.0	7.4 ± 6.4
% Coleoptera	0.0	1.5 ± 3.9
% Diptera + Non-insects	35.8	10.8 ± 7.6
% Ephemeroptera	48.0	51.7 ± 18.8
% Ephemeroptera that are Baetidae	15.3	40.6 ± 30.0
% EPT Individuals	64.2	87.7 ± 7.4
% Odonata	--	0.0 ± 0.0
% of 2 dominant taxa	58.7	57.9 ± 14.2
% of 5 dominant taxa	80.7	81.6 ± 7.9
% of dominant taxa	32.7	39.8 ± 14.9
% Plecoptera	6.4	31.4 ± 15.4
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	3.1	27.0 ± 26.2
% Tricoptera	9.8	4.5 ± 2.8
No. EPT individuals/Chironomids+EPT Individuals	0.7	0.9 ± 0.1
Total Abundance	5533.3	587.4 ± 299.1
Richness		
Chironomidae taxa (genus level only)	1.0	1.0 ± 0.0
Coleoptera taxa	0.0	0.4 ± 0.5
Diptera taxa	4.0	3.3 ± 1.0
Ephemeroptera taxa	5.0	3.8 ± 0.8
EPT Individuals (Sum)	3500.0	526.0 ± 285.8
EPT taxa (no)	15.0	13.3 ± 2.7
Odonata taxa	--	0.0 ± 0.0
Pielou's Evenness	0.7	0.7 ± 0.1
Plecoptera taxa	5.0	6.3 ± 1.1
Shannon-Wiener Diversity	2.1	1.9 ± 0.4
Simpson's Diversity	0.8	0.8 ± 0.1
Simpson's Evenness	0.2	0.3 ± 0.1
Total No. of Taxa	22.0	19.3 ± 3.7
Trichoptera taxa	5.0	3.2 ± 1.4

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NESLM02
	Group 1	Group 2	Group 3	Group 4	Group 5	
Baetidae	100%	100%	100%	100%	97%	1.00
Capniidae	78%	55%	50%	92%	68%	0.84
Chironomidae	100%	100%	100%	100%	95%	1.00
Chloroperlidae	78%	88%	94%	100%	100%	0.98
Ephemerellidae	78%	100%	100%	100%	100%	1.00
Heptageniidae	100%	100%	100%	100%	100%	1.00
Hydropsychidae	11%	92%	78%	92%	86%	0.89
Nemouridae	100%	100%	100%	100%	100%	1.00
Perlidae	11%	84%	33%	100%	3%	0.89
Perlodidae	78%	78%	89%	92%	81%	0.90
Rhyacophilidae	100%	92%	100%	100%	95%	0.99
Taeniopterygidae	89%	49%	100%	92%	97%	0.89

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	14.34
RIVPACS : Observed taxa P>0.50	13.00
RIVPACS : O:E (p > 0.5)	0.91
RIVPACS : Expected taxa P>0.70	11.39
RIVPACS : Observed taxa P>0.70	11.00
RIVPACS : O:E (p > 0.7)	0.97

Habitat Description

Variable	NESLM02	Predicted Group Reference Mean ±SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 ± 0.00000
Intrusive (%)	39.10051	11.07346 ± 28.63466
Metamorphic (%)	0.00000	17.96649 ± 35.53463
Sedimentary (%)	37.68921	70.96005 ± 44.90394
Ultramafic (%)	0.00000	0.00000 ± 0.00000
Volcanic (%)	23.21029	0.00000 ± 0.00000
Channel		
Depth-Avg (cm)	41.8	23.6 ± 11.1
Depth-BankfullMinusWetted (cm)	125.00	51.38 ± 29.42
Depth-Max (cm)	64.0	34.6 ± 12.3
Macrophyte (PercentRange)	0	0 ± 0
Reach-%CanopyCoverage (PercentRange)	1.00	1.33 ± 0.78
Reach-DomStreamsideVeg (Category (1-4))	3	4 ± 1
Reach-Pools (Binary)	0	1 ± 0
Reach-Rapids (Binary)	1	0 ± 0
Reach-Riffles (Binary)	1	1 ± 0
Reach-StraightRun (Binary)	1	1 ± 1
Slope (m/m)	0.0200000	0.0546683 ± 0.0376269
Veg-Coniferous (Binary)	1	1 ± 0
Veg-Deciduous (Binary)	1	1 ± 0
Veg-GrassesFerns (Binary)	1	1 ± 0
Veg-Shrubs (Binary)	1	1 ± 0
Velocity-Avg (m/s)	0.42	0.48 ± 0.22
Velocity-Max (m/s)	0.75	0.76 ± 0.36
Width-Bankfull (m)	54.0	13.4 ± 9.9
Width-Wetted (m)	20.0	8.5 ± 5.8
XSEC-VelInstrumentDirect (Category (1-3))	3	0 ± 0
XSEC-VelMethod (Category (1-3))	3	1 ± 0
Climate		
Precip01_JAN (mm)	129.75000	104.85000 ± 26.28129
Precip02_FEB (mm)	111.25000	83.66667 ± 27.10278
Precip03_MAR (mm)	105.00000	77.23611 ± 27.15950
Precip04_APR (mm)	129.75000	104.85000 ± 26.28129
Precip05_MAY (mm)	94.62500	71.65833 ± 17.81753
Precip06_JUN (mm)	96.00000	78.56667 ± 15.58521

Habitat Description

Variable	NESLM02	Predicted Group Reference Mean ±SD
Precip07_JUL (mm)	71.62500	64.39167 ± 10.41611
Precip08_AUG (mm)	66.12500	60.53056 ± 10.43373
Precip09_SEP (mm)	67.75000	56.91944 ± 10.91783
Precip10_OCT (mm)	80.25000	65.08056 ± 14.41229
Precip11_NOV (mm)	134.00000	105.93889 ± 25.04104
Precip12_DEC (mm)	146.00000	116.84444 ± 29.80954
PrecipTotal_ANNUAL (mm)	1191.62500	952.64722 ± 226.04690
Temp01_JANMax (Degrees Celsius)	-4.25000	-4.39167 ± 2.51268
Temp01_JANmin (Degrees Celsius)	-10.00000	-11.40833 ± 3.53951
Temp02_FEBmax (Degrees Celsius)	-1.62500	-1.70000 ± 2.12945
Temp02_FEBmin (Degrees Celsius)	-8.25000	-9.17500 ± 3.33361
Temp03_MARmax (Degrees Celsius)	1.75000	2.50556 ± 2.87525
Temp03_MARmin (Degrees Celsius)	-5.62500	-6.14167 ± 2.98556
Temp04_APRmax (Degrees Celsius)	6.62500	7.12222 ± 3.48771
Temp04_APRmin (Degrees Celsius)	-2.25000	-2.71667 ± 2.22785
Temp05_MAYmax (Degrees Celsius)	11.37500	12.03889 ± 3.55434
Temp05_MAYmin (Degrees Celsius)	1.00000	1.04722 ± 2.08663
Temp06_JUNMax (Degrees Celsius)	15.00000	15.72500 ± 3.40030
Temp06_JUNMin (Degrees Celsius)	4.25000	4.00278 ± 2.41085
Temp07_JULmax (Degrees Celsius)	19.00000	19.56111 ± 3.47275
Temp07_JULmin (Degrees Celsius)	6.87500	6.35833 ± 2.28332
Temp08_AUGmax (Degrees Celsius)	19.00000	19.52222 ± 3.51100
Temp08_AUGmin (Degrees Celsius)	6.62500	6.19167 ± 2.34422
Temp09_SEPmax (Degrees Celsius)	13.50000	14.04444 ± 3.03456
Temp09_SEPmin (Degrees Celsius)	2.37500	2.04722 ± 2.37208
Temp10_OCTmax (Degrees Celsius)	6.37500	6.88889 ± 2.71577
Temp10_OCTmin (Degrees Celsius)	-1.12500	-1.46111 ± 1.64316
Temp11_NOVmax (Degrees Celsius)	-1.00000	-0.79722 ± 2.43512
Temp11_NOVmin (Degrees Celsius)	-6.12500	-6.68056 ± 2.97163
Temp12_DECmax (Degrees Celsius)	-4.50000	-4.66389 ± 2.69757
Temp12_DECmin (Degrees Celsius)	-9.50000	-10.65833 ± 3.71739
TempANNUALmax (Degrees Celsius)	6.37500	6.96389 ± 3.06157
TempANNUALmean (Degrees Celsius)	2.12500	2.25278 ± 2.66574
TempANNUALmin (Degrees Celsius)	-1.62500	-2.18056 ± 2.41152
Hydrology		
Drainage-Area (km^2)	420.29652	124.42081 ± 200.99192
Perimeter (Km)	146.56897	64.71360 ± 56.15436
StreamDensity (m/km^2)	1881.59468	2246.06682 ± 604.89962
StreamLength (m)	790827.69	302226.63 ± 500983.26
Landcover		
Natl-AnnCrops (%)	0.00000	0.00000 ± 0.00000
Natl-Barren (%)	0.00000	0.00000 ± 0.00000
Natl-BroadleafDense (%)	0.00000	0.00000 ± 0.00000
Natl-BroadleafOpen (%)	0.93300	1.19263 ± 2.03874
Natl-BroadleafSparse (%)	0.00000	0.00000 ± 0.00000
Natl-Coniferous (%)	0.00000	0.00000 ± 0.00000
Natl-ConiferousDense (%)	0.24499	0.64845 ± 0.37668
Natl-ConiferousOpen (%)	69.37592	54.62780 ± 18.30692
Natl-ConiferousSparse (%)	0.00000	0.94121 ± 1.53621
Natl-Deciduous (%)	0.00000	0.00000 ± 0.00000
Natl-Developed (%)	0.00000	0.00000 ± 0.00000
Natl-ExposedLand (%)	2.99208	13.20054 ± 11.11850
Natl-Grassland (%)	0.00000	1.87556 ± 1.68508
Natl-Herb (%)	9.76779	5.75738 ± 2.89836
Natl-MixedForest (%)	0.00000	0.00000 ± 0.00000
Natl-MixedwoodDense (%)	0.00000	0.00000 ± 0.00000
Natl-MixedwoodOpen (%)	0.00000	0.04060 ± 0.10208
Natl-MixedwoodSparse (%)	0.00000	0.00000 ± 0.00000
Natl-PerennCropsPast (%)	0.00000	0.00000 ± 0.00000
Natl-Rock/Rubble (%)	0.06490	1.56403 ± 2.75979
Natl-Shrubland (%)	0.00000	0.00000 ± 0.00000
Natl-ShrubLow (%)	9.44371	4.98298 ± 3.22579

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Variable	NESLM02	Predicted Group Reference Mean ±SD
Natl-ShrubTall (%)	0.00000	0.00000 ± 0.00000
Natl-SnowIce (%)	0.00000	0.08491 ± 0.15475
Natl-Water (%)	0.11508	0.22916 ± 0.36834
Natl-Wetland (%)	0.00000	0.00000 ± 0.00000
Natl-WetlandHerb (%)	0.00420	0.12918 ± 0.35193
Natl-WetlandShrub (%)	0.00950	0.00000 ± 0.00000
Natl-WetlandTreed (%)	0.00000	0.00000 ± 0.00000
Reg-Ice (%)	0.00000	0.02487 ± 0.06034
Sediment Chemistry		
Ag (ppm)	0.259	0.000
Al (ppm)	10400.000	0.005
As (ppm)	7.330	0.000
Ba (ppm)	65.200	0.068
Be (ppm)	0.200	0.000
Bi (ppm)	0.270	0.000
Ca (ppm)	4000.000	21.108 ± 16.801
Cd (ppm)	2.000	0.000
Co (ppm)	8.890	0.000
Cr (ppm)	24.500	0.000
Cu (ppm)	19.800	0.000
Fe (ppm)	21200.000	0.008
Hg (ppm)	0.025	0.000 ± 0.000
K (ppm)	1480.000	0.614 ± 0.406
Li (ppm)	17.000	0.001
Mg (ppm)	6730.000	7.667 ± 7.975
Mn (ppm)	310.000	0.001
Mo (ppm)	1.190	0.001
Na (ppm)	131.000	1.538 ± 1.275
Ni (ppm)	21.300	0.000
Pb (ppm)	65.000	0.000
Sb (ppm)	0.510	0.000
Se (ppm)	0.250	0.000
Sn (ppm)	0.050	0.000
Sr (ppm)	28.700	0.044
Ti (ppm)	676.000	0.001
Tl (ppm)	0.135	0.000
U (ppm)	0.886	0.001
V (ppm)	42.900	0.000
Zn (ppm)	233.000	0.001
Zr (ppm)	0.990	0.000 ± 0.000
Substrate Data		
%Bedrock (%)	0	0 ± 0
%Boulder (%)	8	9 ± 9
%Cobble (%)	34	51 ± 15
%Gravel (%)	16	3 ± 3
%Pebble (%)	42	37 ± 20
%Sand (%)	0	0 ± 0
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	5.35	15.12 ± 14.26
Dg (cm)	5.2	8.2 ± 2.8
Dominant-1st (Category(0-9))	5	7 ± 1
Dominant-2nd (Category(0-9))	6	7 ± 1
Embeddedness (Category(1-5))	5	5 ± 1
PeriphytonCoverage (Category(1-5))	4	1 ± 0
SurroundingMaterial (Category(0-9))	3	4 ± 1
Topography		
ElevationMax (m)	2356.00000	2634.66667 ± 309.54023
ElevationMin (m)	686.00000	913.41667 ± 271.25180
ElevationStdev (m)	344.34665	349.02363 ± 92.12445
Reg-SlopeLT30% (%)	23.42000	18.88386 ± 9.29866
Slope30-50% (%)	35.27680	29.00215 ± 6.33837
Slope50-60% (%)	14.55723	13.91808 ± 1.91315

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Variable	NESLM02	Predicted Group Reference Mean ±SD
SlopeAvg (%)	45.11876	52.79851 ± 8.68755
SlopeGT60% (%)	23.65401	35.47207 ± 13.39684
SlopeLT30% (%)	26.51196	21.60770 ± 8.54172
SlopeMax (%)	204.50665	298.94390 ± 146.30679
SlopeMin (%)	0.00000	0.19777 ± 0.29213
SlopeStdev (%)	21.96144	26.57529 ± 4.62351
Water Chemistry		
General-DO (mg/L)	10.0000000	11.4175000 ± 0.7986708
General-pH (pH)	8.3	7.9 ± 0.4
General-SpCond (µS/cm)	98.0000000	168.9833333 ± 123.7858182
General-TempAir (Degrees Celsius)	3.9	26.0
General-TempWater (Degrees Celsius)	3.5000000	7.3183333 ± 2.7240839
General-Turbidity (NTU)	0.2900000	0.2020000
Nitrogen-NO2 (mg/L)	0.0025000	0.0027500 ± 0.0062831
Nitrogen-NO2+NO3 (mg/L)	0.0220000	0.0690000
Nitrogen-NO3 (mg/L)	0.0220000	0.0546667 ± 0.0498148
Phosphorus-OrthoP (mg/L)	0.0094000	0.0002727 ± 0.0004671