Site Description

Study Name	CBWQ-Upper Columbia
Site	NAHOR03
Sampling Date	Sep 24 2014
Know Your Watershed Basin	Upper Columbia
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Southern Rocky Mountain Trench EcoRegion
Coordinates (decimal degrees)	51.21306 N, 116.89211 W
Altitude	787
Local Basin Name	Horse Creek
	Upper Columbia
Stream Order	3

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	November 01, 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	0.1%	0.2%	11.3%	10.7%	77.7%
CABIN Assessment of NAHOR03 on Sep 24, 2014	Similar to Reference				

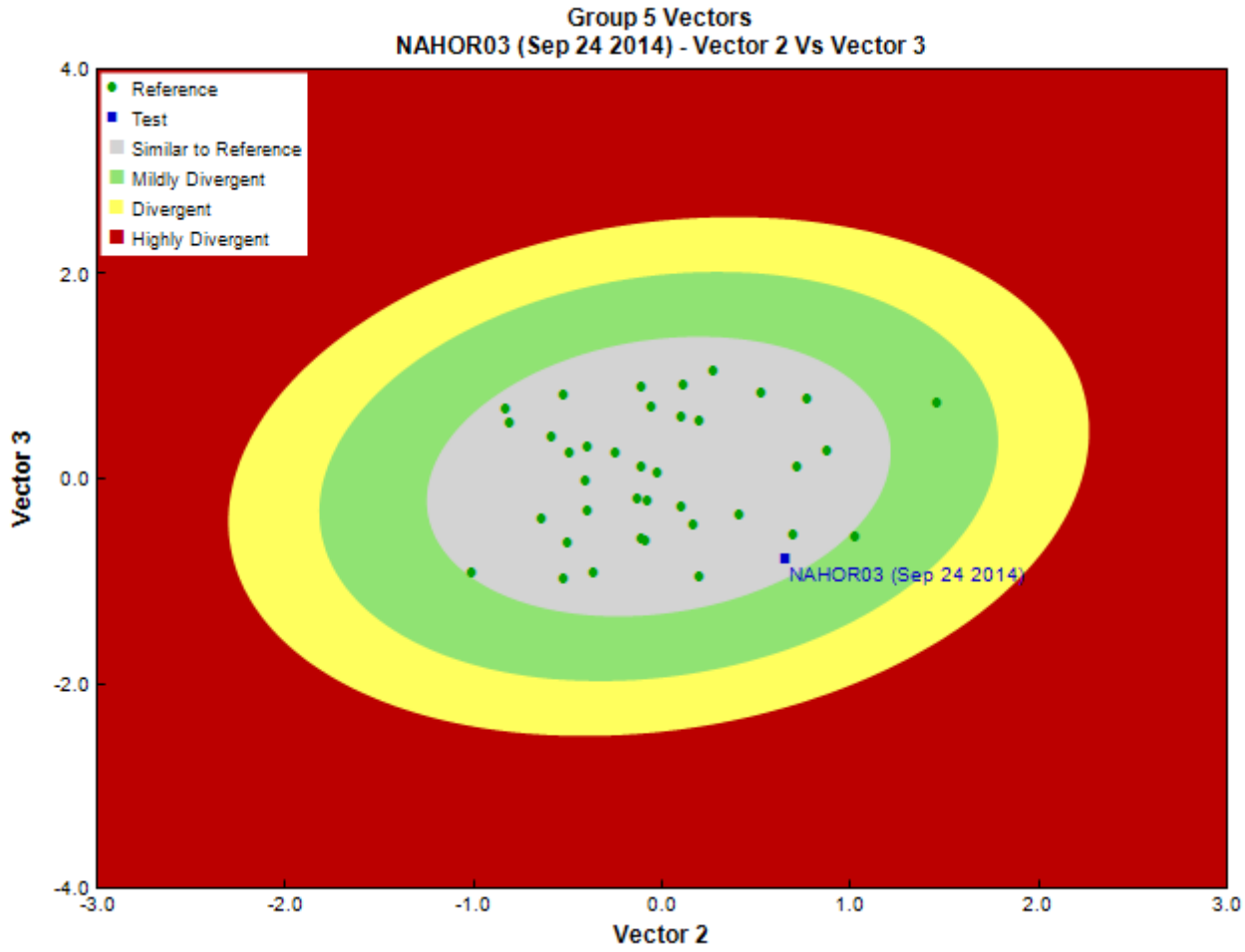

Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	-
Taxonomist	-
Date Taxonomy Completed	-
	-
Sub-Sample Proportion	10/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
Annelida	Oligochaeta	Tubificida	Naididae	1	10.0
Arthropoda	Insecta	Diptera	Chironomidae	16	160.0
			Empididae	2	20.0
			Tipulidae	2	20.0
		Ephemeroptera	Baetidae	9	90.0
			Ephemerellidae	1	10.0
			Heptageniidae	13	130.0
		Plecoptera		14	140.0
			Capniidae	10	100.0
			Chloroperlidae	10	100.0
			Nemouridae	105	1,050.0
			Perlodidae	2	20.0
			Taeniopterygidae	139	1,390.0
		Trichoptera	Rhyacophilidae	1	10.0
Mollusca	Gastropoda	Basommatophora	Physidae	1	10.0

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
			Total	326	3,260.0

Metrics

Name	NAHOR03	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.6	0.4 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	2.3	2.8 ± 0.3
Intolerant taxa	--	1.0 ± 0.0
Long-lived taxa	--	1.0 ± 0.0
Tolerant individuals (%)	0.3	0.3
Functional Measures		
% Filterers	--	1.7 ± 1.7
% Gatherers	84.0	50.6 ± 14.6
% Predatores	9.5	15.3 ± 9.0
% Scrapers	52.8	67.2 ± 16.8
% Shredder	78.5	38.1 ± 18.2
No. Clinger Taxa	14.0	19.8 ± 3.4
Number Of Individuals		
% Chironomidae	5.1	4.6 ± 5.0
% Coleoptera	0.0	0.0 ± 0.0
% Diptera + Non-insects	7.1	6.3 ± 5.3
% Ephemeroptera	7.4	44.9 ± 17.3
% Ephemeroptera that are Baetidae	39.1	26.1 ± 20.5
% EPT Individuals	92.9	93.7 ± 5.3
% Odonata	--	0.0 ± 0.0
% of 2 dominant taxa	78.2	60.2 ± 11.4
% of 5 dominant taxa	90.7	84.5 ± 5.9
% of dominant taxa	44.6	39.3 ± 12.3
% Plecoptera	85.3	42.9 ± 17.2
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	0.0	27.4 ± 27.1
% Tricoptera	0.3	5.8 ± 5.7
No. EPT individuals/Chironomids+EPT Individuals	0.9	1.0 ± 0.1
Total Abundance	3260.0	2163.6 ± 1274.4
Richness		
Chironomidae taxa (genus level only)	1.0	0.9 ± 0.2
Coleoptera taxa	0.0	0.1 ± 0.2
Diptera taxa	3.0	2.4 ± 1.0
Ephemeroptera taxa	3.0	3.7 ± 0.5
EPT Individuals (Sum)	2900.0	2023.9 ± 1195.7
EPT taxa (no)	9.0	12.3 ± 1.9
Odonata taxa	--	0.0 ± 0.0
Pielou's Evenness	0.6	0.7 ± 0.1
Plecoptera taxa	5.0	5.5 ± 1.1
Shannon-Wiener Diversity	1.5	1.9 ± 0.3
Simpson's Diversity	0.7	0.8 ± 0.1
Simpson's Evenness	0.2	0.3 ± 0.1
Total No. of Taxa	14.0	16.0 ± 3.0
Trichoptera taxa	1.0	3.2 ± 1.0

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NAHOR03
	Group 1	Group 2	Group 3	Group 4	Group 5	
Baetidae	100%	100%	100%	100%	97%	0.98
Chironomidae	100%	100%	100%	100%	95%	0.96
Chloroperlidae	78%	88%	94%	100%	100%	0.99
Ephemerellidae	78%	100%	100%	100%	100%	1.00
Heptageniidae	100%	100%	100%	100%	100%	1.00
Hydropsychidae	11%	92%	78%	92%	86%	0.86
Nemouridae	100%	100%	100%	100%	100%	1.00

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NAHOR03
	Group 1	Group 2	Group 3	Group 4	Group 5	
Perlodidae	78%	78%	89%	92%	81%	0.83
Rhyacophilidae	100%	92%	100%	100%	95%	0.96
Taeniopterygidae	89%	49%	100%	92%	97%	0.97

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	12.57
RIVPACS : Observed taxa P>0.50	11.00
RIVPACS : O:E (p > 0.5)	0.88
RIVPACS : Expected taxa P>0.70	9.55
RIVPACS : Observed taxa P>0.70	9.00
RIVPACS : O:E (p > 0.7)	0.94

Habitat Description

Variable	NAHOR03	Predicted Group Reference Mean ±SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 ± 0.00000
Intrusive (%)	0.00000	0.46153 ± 2.09955
Metamorphic (%)	0.00000	0.17691 ± 0.85012
Sedimentary (%)	100.00000	99.36155 ± 2.22799
Ultramafic (%)	0.00000	0.00000 ± 0.00000
Volcanic (%)	0.00000	0.00000 ± 0.00000
Channel		
Depth-Avg (cm)	11.4	21.5 ± 9.7
Depth-BankfullMinusWetted (cm)	57.00	38.14 ± 36.11
Depth-Max (cm)	25.5	31.0 ± 16.5
Macrophyte (PercentRange)	0	0 ± 0
Reach-%CanopyCoverage (PercentRange)	1.00	1.54 ± 1.28
Reach-DomStreamsideVeg (Category (1-4))	2	3 ± 1
Reach-Pools (Binary)	0	1 ± 0
Reach-Rapids (Binary)	0	0 ± 0
Reach-Riffles (Binary)	1	1 ± 0
Reach-StraightRun (Binary)	1	0 ± 1
Slope (m/m)	0.0085000	0.0581357 ± 0.0554952
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)	0.23	0.51 ± 0.27
Velocity-Max (m/s)	0.44	0.78 ± 0.40
Width-Bankfull (m)	8.5	13.7 ± 16.4
Width-Wetted (m)	2.5	9.0 ± 13.1
XSEC-VelMethod (Category (1-3))	1	2 ± 1
Climate		
Precip01_JAN (mm)	83.00000	130.45668 ± 67.17180
Precip02_FEB (mm)	54.00000	102.48242 ± 52.12836
Precip03_MAR (mm)	40.00000	89.80929 ± 42.79174
Precip04_APR (mm)	83.00000	135.11134 ± 66.06707
Precip05_MAY (mm)	46.00000	70.51109 ± 13.79432
Precip06_JUN (mm)	60.00000	86.65922 ± 19.93623
Precip07_JUL (mm)	61.00000	79.11475 ± 19.88523
Precip08_AUG (mm)	58.00000	76.86606 ± 21.34619
Precip09_SEP (mm)	51.00000	71.16784 ± 23.11306
Precip10_OCT (mm)	56.00000	88.14083 ± 44.84739
Precip11_NOV (mm)	78.00000	134.64587 ± 63.61897
Precip12_DEC (mm)	87.00000	142.32359 ± 65.85239
PrecipTotal_ANNUAL (mm)	714.00000	1143.02476 ± 453.62461
Temp01_JANMax (Degrees Celsius)	-6.00000	-6.18206 ± 1.69263
Temp01_JANmin (Degrees Celsius)	-13.00000	-13.62029 ± 2.05208
Temp02_FEBmax (Degrees Celsius)	-1.00000	-2.89816 ± 1.88421

Habitat Description

Variable	NAHOR03	Predicted Group Reference Mean ±SD
Temp02_FEBmin (Degrees Celsius)	-10.00000	-11.14625 ± 1.99282
Temp03_MARmax (Degrees Celsius)	4.00000	0.98920 ± 2.35950
Temp03_MARmin (Degrees Celsius)	-6.00000	-7.98295 ± 1.94687
Temp04_APRmax (Degrees Celsius)	10.00000	5.37616 ± 3.02243
Temp04_APRmin (Degrees Celsius)	-2.00000	-3.74673 ± 1.66191
Temp05_MAYmax (Degrees Celsius)	15.00000	10.12548 ± 3.18022
Temp05_MAYmin (Degrees Celsius)	1.00000	0.09616 ± 1.15628
Temp06_JUNMax (Degrees Celsius)	19.00000	13.85415 ± 3.23839
Temp06_JUNMin (Degrees Celsius)	5.00000	2.79527 ± 1.60213
Temp07_JULmax (Degrees Celsius)	22.00000	17.45582 ± 3.27590
Temp07_JULmin (Degrees Celsius)	7.00000	4.99257 ± 1.52992
Temp08_AUGmax (Degrees Celsius)	22.00000	17.36896 ± 3.11866
Temp08_AUGmin (Degrees Celsius)	6.00000	4.84827 ± 1.46649
Temp09_SEPmax (Degrees Celsius)	16.00000	12.13974 ± 2.86510
Temp09_SEPmin (Degrees Celsius)	2.00000	1.12535 ± 1.20660
Temp10_OCTmax (Degrees Celsius)	8.00000	5.04078 ± 2.46521
Temp10_OCTmin (Degrees Celsius)	-1.00000	-2.41023 ± 1.18961
Temp11_NOVmax (Degrees Celsius)	0.00000	-2.24818 ± 1.93047
Temp11_NOVmin (Degrees Celsius)	-7.00000	-8.35137 ± 1.96467
Temp12_DECmax (Degrees Celsius)	-6.00000	-6.49458 ± 1.76429
Temp12_DECmin (Degrees Celsius)	-12.00000	-12.72330 ± 1.87798
TempANNUALmax (Degrees Celsius)	8.00000	5.16639 ± 2.57569
TempANNUALmean (Degrees Celsius)	3.00000	0.71683 ± 1.81248
TempANNUALmin (Degrees Celsius)	-2.00000	-3.38604 ± 1.60598
Hydrology		
Drainage-Area (km^2)	24.57533	135.66658 ± 373.96803
Perimeter (Km)	37.06273	55.78285 ± 83.00734
StreamDensity (m/km^2)	2697.83586	2198.74079 ± 886.68339
StreamLength (m)	66300.21	293250.33 ± 851854.38
Landcover		
Natl-AnnCrops (%)	0.00000	0.00000 ± 0.00000
Natl-Barren (%)	0.00000	0.00000 ± 0.00000
Natl-BroadleafDense (%)	0.00000	0.00523 ± 0.02638
Natl-BroadleafOpen (%)	1.66897	1.35705 ± 2.04550
Natl-BroadleafSparse (%)	0.00000	0.31953 ± 0.53788
Natl-Coniferous (%)	0.00000	0.00000 ± 0.00000
Natl-ConiferousDense (%)	2.02127	4.95677 ± 7.46543
Natl-ConiferousOpen (%)	44.86883	34.34335 ± 18.65764
Natl-ConiferousSparse (%)	5.62257	1.39163 ± 1.60111
Natl-Deciduous (%)	0.00000	0.00000 ± 0.00000
Natl-Developed (%)	0.00000	0.00002 ± 0.00009
Natl-ExposedLand (%)	11.70340	16.95282 ± 9.64125
Natl-Grassland (%)	8.00197	5.60615 ± 5.17505
Natl-Herb (%)	0.23684	2.04978 ± 2.79736
Natl-MixedForest (%)	0.00000	0.00000 ± 0.00000
Natl-MixedwoodDense (%)	0.15016	0.02636 ± 0.08976
Natl-MixedwoodOpen (%)	9.55596	2.10440 ± 2.63686
Natl-MixedwoodSparse (%)	0.00000	0.01817 ± 0.04448
Natl-PerennCropsPast (%)	0.00000	0.00000 ± 0.00000
Natl-Rock/Rubble (%)	3.21404	6.97447 ± 7.52078
Natl-Shrubland (%)	0.00000	0.00000 ± 0.00000
Natl-ShrubLow (%)	7.23614	4.49178 ± 5.44294
Natl-ShrubTall (%)	0.00000	0.33533 ± 1.14136
Natl-SnowIce (%)	0.00000	7.70046 ± 9.06096
Natl-Water (%)	0.00000	0.14384 ± 0.45543
Natl-Wetland (%)	0.00000	0.00000 ± 0.00000
Natl-WetlandHerb (%)	0.00000	0.00639 ± 0.02401
Natl-WetlandShrub (%)	0.00000	0.00868 ± 0.02574
Natl-WetlandTreed (%)	0.00000	0.00226 ± 0.00959
Reg-Ice (%)	0.00000	3.06094 ± 5.65390
Sediment Chemistry		
Ag (ppm)	0.025	0.000 ± 0.000

Habitat Description

Variable	NAHOR03	Predicted Group Reference Mean ±SD
Al (ppm)	2380.000	0.007 ± 0.007
As (ppm)	2.230	0.001 ± 0.001
Ba (ppm)	619.000	0.111 ± 0.082
Be (ppm)	0.200	0.000 ± 0.000
Bi (ppm)	0.050	0.000 ± 0.000
Ca (ppm)	181000.000	23.071 ± 17.129
Cd (ppm)	0.114	0.000 ± 0.000
Co (ppm)	1.530	0.000 ± 0.000
Cr (ppm)	4.600	0.000 ± 0.000
Cu (ppm)	3.260	0.000 ± 0.000
Fe (ppm)	7740.000	0.005 ± 0.003
Hg (ppm)	0.025	0.000 ± 0.000
K (ppm)	402.000	0.325 ± 0.299
Li (ppm)	6.100	0.001 ± 0.001
Mg (ppm)	57400.000	7.667 ± 6.332
Mn (ppm)	230.000	0.000 ± 0.000
Mo (ppm)	1.060	0.001 ± 0.000
Na (ppm)	50.000	0.889 ± 0.729
Ni (ppm)	5.610	0.000 ± 0.000
Pb (ppm)	9.150	0.000 ± 0.000
Sb (ppm)	0.230	0.000 ± 0.000
Se (ppm)	0.250	0.000 ± 0.000
Sn (ppm)	0.110	0.000 ± 0.000
Sr (ppm)	188.000	0.082 ± 0.102
Ti (ppm)	6.200	0.001 ± 0.000
Tl (ppm)	0.025	0.000 ± 0.000
U (ppm)	0.403	0.000 ± 0.000
V (ppm)	6.300	0.000 ± 0.000
Zn (ppm)	20.200	0.001 ± 0.001
Zr (ppm)	1.800	0.000 ± 0.000
Substrate Data		
%Bedrock (%)	0	1 ± 1
%Boulder (%)	0	3 ± 3
%Cobble (%)	31	64 ± 17
%Gravel (%)	10	2 ± 2
%Pebble (%)	59	31 ± 16
%Sand (%)	0	0 ± 0
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	4.90	19.61 ± 30.65
Dg (cm)	4.4	20.3 ± 30.8
Dominant-1st (Category(0-9))	5	7 ± 1
Dominant-2nd (Category(0-9))	6	6 ± 1
Embeddedness (Category(1-5))	5	4 ± 1
PeriphytonCoverage (Category(1-5))	1	2 ± 1
SurroundingMaterial (Category(0-9))	2	3 ± 1
Topography		
ElevationMax (m)	2586.00000	2829.64865 ± 315.67549
ElevationMin (m)	783.00000	1172.81081 ± 249.32284
ElevationStdev (m)	400.02801	342.56455 ± 77.02221
Reg-SlopeLT30% (%)	17.54107	16.26604 ± 8.50298
Slope30-50% (%)	26.90016	28.13773 ± 4.86732
Slope50-60% (%)	15.69958	14.11202 ± 1.82185
SlopeAvg (%)	54.55784	56.75540 ± 7.27461
SlopeGT60% (%)	39.85918	39.57775 ± 9.82818
SlopeMax (%)	229.09795	317.81636 ± 141.61151
SlopeMin (%)	0.00000	0.79557 ± 1.30240
SlopeStdev (%)	25.78493	29.56849 ± 5.64880
Water Chemistry		
CO3 (mg/L)	0.2500000	0.0000000 ± 0.0000000
General-Alkalinity (mg/L)	161.0000000	68.5944444 ± 52.1098452
General-Conductivity (µS/cm)	376.6000000	110.5428571 ± 89.3409737
General-DO (mg/L)	9.0000000	11.0635135 ± 0.9899052

Habitat Description

Variable	NAHOR03	Predicted Group Reference Mean ±SD
General-pH (pH)	8.5	7.7 ± 0.7
General-TempAir (Degrees Celsius)	14.0	10.5 ± 0.7
General-TempWater (Degrees Celsius)	11.0000000	5.5262162 ± 1.8860693
General-Turbidity (NTU)	1.0900000	0.1015000 ± 0.0459619
HCO3 (mg/L)	196.0000000	0.0000000 ± 0.0000000
Nitrogen-NO2 (mg/L)	0.0025000	0.0074306 ± 0.0217095
Nitrogen-NO2+NO3 (mg/L)	0.0390000	0.0315000 ± 0.0316491
Nitrogen-NO3 (mg/L)	0.0390000	0.0699722 ± 0.0547511
Phosphorus-OrthoP (mg/L)	0.0025000	0.0008750 ± 0.0012583
Phosphorus-TP (mg/L)	0.0196000	0.0025000 ± 0.0041986