

Site Description

Study Name	CBWQ-Windermere
Site	NAWIN04
Sampling Date	Sep 18 2014
Know Your Watershed Basin	Upper Columbia
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Western Continental Ranges EcoRegion
Coordinates (decimal degrees)	50.49400 N, 115.91589 W
Altitude	3582
Local Basin Name	Windermere Creek
	Columbia River
Stream Order	4



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 10, 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%	0.1%	37.3%	27.9%	34.7%	
CABIN Assessment of NAWIN04 on Sep 18, 2014	Similar to Reference					

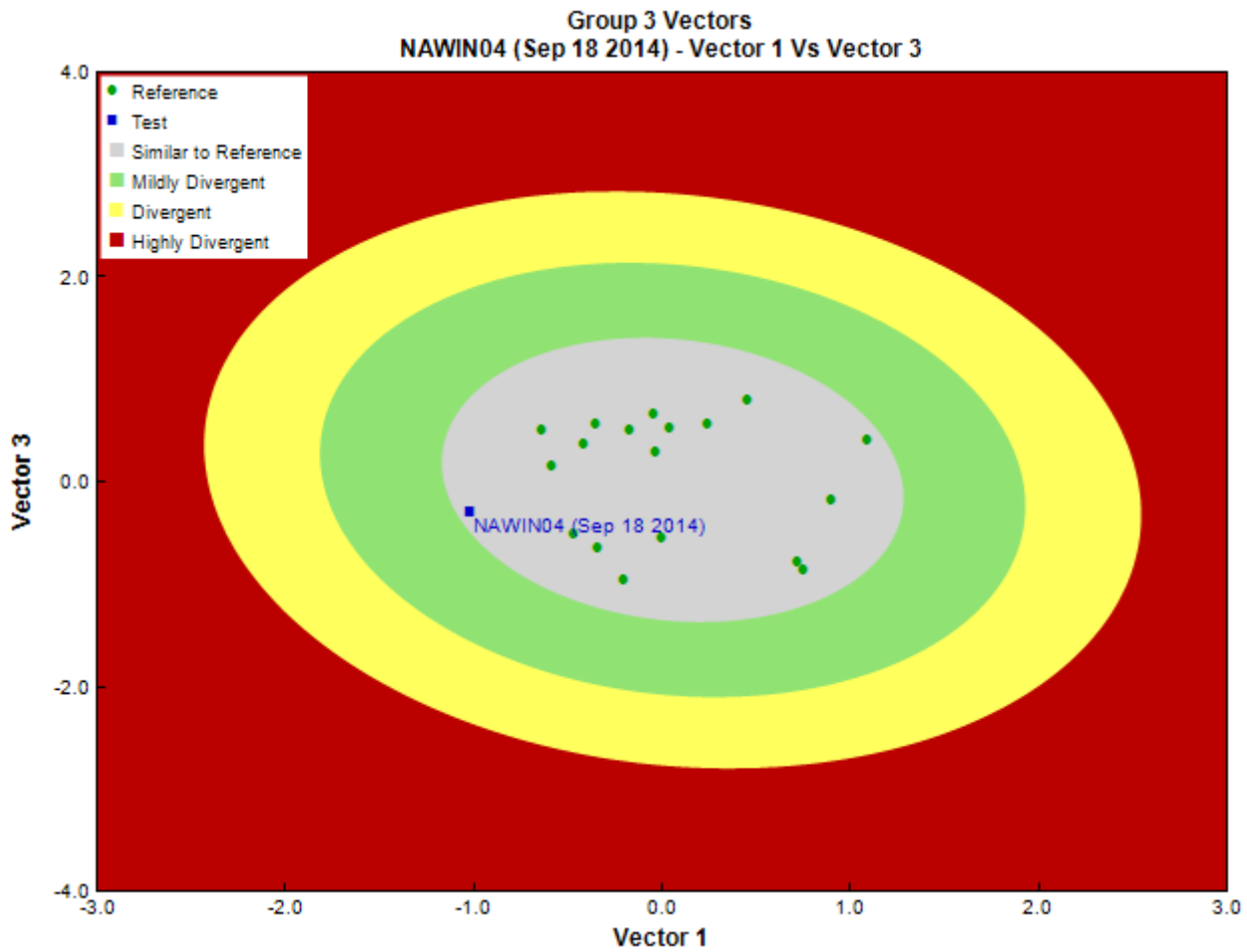


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	Pina Viola, Consultant
Date Taxonomy Completed	November 25, 2014
	Marchant Box
Sub-Sample Proportion	20/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count	
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae	5	25.0	
		Tubificida		3	15.0	
Arthropoda	Insecta	Coleoptera	Elmidae	1	5.0	
			Diptera	Chironomidae	14	70.0
				Empididae	1	5.0
				Psychodidae	4	20.0
			Ephemeroptera	Baetidae	48	240.0
				Ephemerellidae	20	100.0
				Heptageniidae	161	805.0
			Plecoptera		2	10.0
				Chloroperlidae	2	10.0
				Nemouridae	18	90.0
				Perlidae	2	10.0
		Perlodidae	25	125.0		
		Taeniopterygidae	16	80.0		

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
		Trichoptera	Glossosomatidae	10	50.0
			Hydropsychidae	4	20.0
			Philopotamidae	1	5.0
			Rhyacophilidae	2	10.0
Mollusca	Bivalvia	Veneroida	Pisidiidae	1	5.0
			Total	340	1,700.0

Metrics

Name	NAWIN04	Predicted Group Reference Mean \pm SD
Bray-Curtis Distance	0.37	0.4 \pm 0.2
Biotic Indices		
Hilsenhoff Family index (North-West)	3.5	3.2 \pm 0.7
Intolerant taxa	--	
Long-lived taxa	2.0	1.9 \pm 1.3
Tolerant individuals (%)	--	0.3
Functional Measures		
% Filterers	1.5	1.8 \pm 1.6
% Gatherers	23.8	52.4 \pm 14.6
% Predatores	14.7	18.3 \pm 13.3
% Scrapers	70.0	61.8 \pm 17.2
% Shredder	10.3	30.3 \pm 18.6
No. Clinger Taxa	23.0	19.8 \pm 3.9
Number Of Individuals		
% Chironomidae	4.2	8.2 \pm 13.6
% Coleoptera	0.3	0.8 \pm 1.9
% Diptera + Non-insects	7.5	14.3 \pm 14.2
% Ephemeroptera	68.4	43.3 \pm 15.7
% Ephemeroptera that are Baetidae	21.0	33.9 \pm 27.7
% EPT Individuals	92.2	84.9 \pm 14.3
% Odonata	--	0.0 \pm 0.0
% of 2 dominant taxa	62.4	58.9 \pm 10.0
% of 5 dominant taxa	81.2	83.8 \pm 7.3
% of dominant taxa	48.1	39.5 \pm 10.9
% Plecoptera	18.8	34.7 \pm 17.8
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	23.5	27.8 \pm 25.2
% Tricoptera	5.1	6.9 \pm 8.6
No. EPT individuals/Chironomids+EPT Individuals	1.0	0.9 \pm 0.1
Total Abundance	1700.0	5780.5 \pm 4895.3
Richness		
Chironomidae taxa (genus level only)	1.0	1.0 \pm 0.0
Coleoptera taxa	1.0	0.4 \pm 0.6
Diptera taxa	3.0	3.4 \pm 1.0
Ephemeroptera taxa	3.0	3.4 \pm 0.5
EPT Individuals (Sum)	1545.0	4527.1 \pm 3161.8
EPT taxa (no)	12.0	11.5 \pm 1.2
Odonata taxa	--	0.0 \pm 0.0
Pielou's Evenness	0.6	0.7 \pm 0.1
Plecoptera taxa	5.0	5.3 \pm 0.9
Shannon-Wiener Diversity	1.9	1.9 \pm 0.3
Simpson's Diversity	0.7	0.8 \pm 0.1
Simpson's Evenness	0.2	0.3 \pm 0.1
Total No. of Taxa	18.0	17.7 \pm 2.6
Trichoptera taxa	4.0	2.8 \pm 1.0

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NAWIN04
	Group 1	Group 2	Group 3	Group 4	Group 5	
Baetidae	100%	100%	100%	100%	97%	0.99
Chironomidae	100%	100%	100%	100%	95%	0.98

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NAWIN04
	Group 1	Group 2	Group 3	Group 4	Group 5	
Chloroperlidae	78%	88%	94%	100%	100%	0.98
Ephemereididae	78%	100%	100%	100%	100%	1.00
Heptageniidae	100%	100%	100%	100%	100%	1.00
Hydropsychidae	11%	92%	78%	92%	86%	0.85
Nemouridae	100%	100%	100%	100%	100%	1.00
Perlodidae	78%	78%	89%	92%	81%	0.87
Rhyacophilidae	100%	92%	100%	100%	95%	0.98
Taeniopterygidae	89%	49%	100%	92%	97%	0.97

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	11.97
RIVPACS : Observed taxa P>0.50	11.00
RIVPACS : O:E (p > 0.5)	0.92
RIVPACS : Expected taxa P>0.70	9.61
RIVPACS : Observed taxa P>0.70	10.00
RIVPACS : O:E (p > 0.7)	1.04

Habitat Description

Variable	NAWIN04	Predicted Group Reference Mean \pm SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 \pm 0.00000
Intrusive (%)	0.00000	4.80136 \pm 20.34839
Metamorphic (%)	0.00000	1.91481 \pm 8.12386
Sedimentary (%)	100.00000	92.18813 \pm 22.65908
Ultramafic (%)	0.00000	0.00000 \pm 0.00000
Volcanic (%)	0.00000	1.09569 \pm 2.57323
Channel		
Depth-Avg (cm)	16.5	22.5 \pm 10.5
Depth-BankfullMinusWetted (cm)	26.00	67.33 \pm 71.65
Depth-Max (cm)	28.0	32.9 \pm 17.9
Macrophyte (PercentRange)	0	0 \pm 0
Reach-%CanopyCoverage (PercentRange)	2.00	0.94 \pm 0.80
Reach-DomStreamsideVeg (Category (1-4))	2	3 \pm 1
Reach-Pools (Binary)	1	0 \pm 1
Reach-Rapids (Binary)	0	0 \pm 1
Reach-Riffles (Binary)	1	1 \pm 0
Reach-StraightRun (Binary)	1	1 \pm 0
Slope (m/m)	0.0270000	0.0235102 \pm 0.0284557
Veg-Coniferous (Binary)	1	1 \pm 0
Veg-Deciduous (Binary)	1	1 \pm 0
Veg-GrassesFerns (Binary)	1	1 \pm 0
Veg-Shrubs (Binary)	1	1 \pm 0
Velocity-Avg (m/s)	0.84	0.50 \pm 0.25
Velocity-Max (m/s)	1.08	0.75 \pm 0.28
Width-Bankfull (m)	5.8	15.6 \pm 12.8
Width-Wetted (m)	5.1	10.2 \pm 7.0
XSEC-VelMethod (Category (1-3))	1	2 \pm 1
Climate		
Precip01_JAN (mm)	78.00000	86.74590 \pm 34.16045
Precip02_FEB (mm)	63.00000	69.04735 \pm 26.39011
Precip03_MAR (mm)	61.00000	64.57566 \pm 18.91423
Precip04_APR (mm)	78.00000	86.74590 \pm 34.16045
Precip05_MAY (mm)	63.00000	67.06098 \pm 7.34190
Precip06_JUN (mm)	70.00000	73.16508 \pm 8.19897
Precip07_JUL (mm)	64.00000	59.23624 \pm 10.43324
Precip08_AUG (mm)	64.00000	57.24656 \pm 12.22117
Precip09_SEP (mm)	52.00000	50.72037 \pm 11.15833
Precip10_OCT (mm)	51.00000	52.92857 \pm 22.22704
Precip11_NOV (mm)	83.00000	87.53373 \pm 31.98739

Habitat Description

Variable	NAWIN04	Predicted Group Reference Mean \pm SD
Precip12_DEC (mm)	91.00000	93.52725 \pm 32.58764
PrecipTotal_ANNUAL (mm)	795.00000	818.18624 \pm 207.74339
Temp01_JANMax (Degrees Celsius)	-6.00000	-5.23929 \pm 1.38664
Temp01_JANmin (Degrees Celsius)	-16.00000	-13.71495 \pm 2.15775
Temp02_FEBmax (Degrees Celsius)	-3.00000	-2.11812 \pm 1.36153
Temp02_FEBmin (Degrees Celsius)	-13.00000	-11.26786 \pm 1.82315
Temp03_MARmax (Degrees Celsius)	0.00000	0.95304 \pm 1.72292
Temp03_MARmin (Degrees Celsius)	-9.00000	-7.99378 \pm 1.86235
Temp04_APRmax (Degrees Celsius)	5.00000	5.89775 \pm 2.29856
Temp04_APRmin (Degrees Celsius)	-5.00000	-3.52196 \pm 1.40541
Temp05_MAYmax (Degrees Celsius)	10.00000	10.80516 \pm 2.26497
Temp05_MAYmin (Degrees Celsius)	0.00000	0.15132 \pm 0.77159
Temp06_JUNMax (Degrees Celsius)	14.00000	14.89775 \pm 2.29856
Temp06_JUNMin (Degrees Celsius)	2.00000	2.98532 \pm 1.30119
Temp07_JULmax (Degrees Celsius)	17.00000	18.39881 \pm 2.25732
Temp07_JULmin (Degrees Celsius)	4.00000	5.51058 \pm 1.28471
Temp08_AUGmax (Degrees Celsius)	17.00000	18.26442 \pm 2.32790
Temp08_AUGmin (Degrees Celsius)	4.00000	5.11071 \pm 1.22615
Temp09_SEPmax (Degrees Celsius)	12.00000	13.01495 \pm 2.08648
Temp09_SEPmin (Degrees Celsius)	0.00000	1.09127 \pm 1.16620
Temp10_OCTmax (Degrees Celsius)	6.00000	6.62235 \pm 1.52687
Temp10_OCTmin (Degrees Celsius)	-3.00000	-1.89907 \pm 1.00747
Temp11_NOVmax (Degrees Celsius)	-3.00000	-1.28638 \pm 1.23662
Temp11_NOVmin (Degrees Celsius)	-10.00000	-8.37103 \pm 1.70714
Temp12_DECmax (Degrees Celsius)	-7.00000	-5.50172 \pm 1.56005
Temp12_DECmin (Degrees Celsius)	-15.00000	-12.82063 \pm 2.01422
TempANNUALmax (Degrees Celsius)	5.00000	5.95278 \pm 1.80268
TempANNUALmean (Degrees Celsius)	0.00000	0.92011 \pm 1.31158
TempANNUALmin (Degrees Celsius)	-5.00000	-3.49114 \pm 1.47732
Hydrology		
Drainage-Area (km ²)	46.02225	166.32560 \pm 185.60049
Perimeter (Km)	38.68460	75.52547 \pm 54.66392
StreamDensity (m/km ²)	2680.65734	2635.49639 \pm 656.67294
StreamLength (m)	123369.89	398904.91 \pm 414313.30
Landcover		
Natl-AnnCrops (%)	0.00000	0.00000 \pm 0.00000
Natl-Barren (%)	0.00000	0.00000 \pm 0.00000
Natl-BroadleafDense (%)	0.00000	0.53318 \pm 1.35704
Natl-BroadleafOpen (%)	0.26402	0.81233 \pm 2.68694
Natl-BroadleafSparse (%)	0.00000	0.00053 \pm 0.00223
Natl-Coniferous (%)	0.00000	0.00000 \pm 0.00000
Natl-ConiferousDense (%)	1.80438	9.07482 \pm 13.04849
Natl-ConiferousOpen (%)	58.68357	46.52170 \pm 20.90683
Natl-ConiferousSparse (%)	0.00000	0.88302 \pm 1.79706
Natl-Deciduous (%)	0.00000	0.00000 \pm 0.00000
Natl-Developed (%)	0.00000	0.00000 \pm 0.00000
Natl-ExposedLand (%)	5.28715	14.05381 \pm 9.29865
Natl-Grassland (%)	0.21517	4.92979 \pm 5.99508
Natl-Herb (%)	2.47884	6.99262 \pm 5.00471
Natl-MixedForest (%)	0.00000	0.00000 \pm 0.00000
Natl-MixedwoodDense (%)	0.00000	0.00129 \pm 0.00548
Natl-MixedwoodOpen (%)	0.00000	0.90796 \pm 2.58154
Natl-MixedwoodSparse (%)	0.00000	0.00000 \pm 0.00000
Natl-PerennCropsPast (%)	0.00000	0.00000 \pm 0.00000
Natl-Rock/Rubble (%)	0.12767	2.56296 \pm 3.90199
Natl-Shrubland (%)	0.00000	0.00000 \pm 0.00000
Natl-ShrubLow (%)	3.59173	1.89085 \pm 1.59075
Natl-ShrubTall (%)	0.00000	1.09076 \pm 2.22843
Natl-SnowIce (%)	0.00000	0.50588 \pm 1.17001
Natl-Water (%)	0.01284	0.22269 \pm 0.34683
Natl-Wetland (%)	0.00000	0.00000 \pm 0.00000
Natl-WetlandHerb (%)	0.00000	0.03577 \pm 0.04831

Habitat Description

Variable	NAWIN04	Predicted Group Reference Mean \pm SD
Natl-WetlandShrub (%)	0.00000	0.05535 \pm 0.09516
Natl-WetlandTreed (%)	0.00000	0.00268 \pm 0.01136
Reg-Ice (%)	0.00000	0.46949 \pm 1.15785
Substrate Data		
%Bedrock (%)	0	0 \pm 0
%Boulder (%)	0	6 \pm 7
%Cobble (%)	7	61 \pm 27
%Gravel (%)	2	1 \pm 2
%Pebble (%)	88	31 \pm 28
%Sand (%)	0	0 \pm 0
%Silt+Clay (%)	3	0 \pm 1
D50 (cm)	4.00	79.45 \pm 47.98
Dg (cm)	3.5	73.9 \pm 48.0
Dominant-1st (Category(0-9))	5	6 \pm 1
Dominant-2nd (Category(0-9))	4	6 \pm 2
Embeddedness (Category(1-5))	5	4 \pm 1
PeriphytonCoverage (Category(1-5))	1	2 \pm 1
SurroundingMaterial (Category(0-9))	3	3 \pm 1
Topography		
ElevationMax (m)	2554.00000	2690.61111 \pm 390.38324
ElevationMin (m)	1146.00000	1251.33333 \pm 280.98168
ElevationStdev (m)	310.31368	287.70131 \pm 73.20073
Reg-SlopeLT30% (%)	15.45000	27.92073 \pm 14.83033
Slope30-50% (%)	28.79136	27.15573 \pm 3.09032
Slope50-60% (%)	17.03675	12.76339 \pm 3.54018
SlopeAvg (%)	53.37591	48.68089 \pm 8.41381
SlopeGT60% (%)	37.32420	30.74349 \pm 11.05846
SlopeLT30% (%)	16.84769	29.33739 \pm 12.62448
SlopeMax (%)	229.16554	616.97887 \pm 680.88955
SlopeMin (%)	0.59331	0.03296 \pm 0.13984
SlopeStdev (%)	23.62728	28.19409 \pm 6.96382
Water Chemistry		
CO3 (mg/L)	2.1500000	0.0000000 \pm 0.0000000
General-Alkalinity (mg/L)	166.0000000	121.5944444 \pm 36.7225924
General-DO (mg/L)	9.5000000	10.4922222 \pm 0.8833463
General-pH (pH)	7.9	8.0 \pm 0.6
General-SpCond (μ S/cm)	890.0000000	214.2437500 \pm 77.1891440
General-TempAir (Degrees Celsius)	17.0	10.5 \pm 4.2
General-TempWater (Degrees Celsius)	8.3000000	6.6716667 \pm 2.0277755
General-Turbidity (NTU)	1.3800000	0.0000000 \pm 0.0000000
HCO3 (mg/L)	198.0000000	0.0000000 \pm 0.0000000
Nitrogen-NO2 (mg/L)	0.0025000	0.0023889 \pm 0.0063351
Nitrogen-NO2+NO3 (mg/L)	0.1260000	0.0130000 \pm 0.0088111
Nitrogen-NO3 (mg/L)	0.1260000	0.0245003 \pm 0.0229452
Phosphorus-OrthoP (mg/L)	0.0025000	0.0035000 \pm 0.0018292
Phosphorus-TP (mg/L)	0.0025000	0.0032778 \pm 0.0061816