

Site Description

Study Name	CBWQ-Windermere
Site	NAWIN02
Sampling Date	Sep 30 2009
Know Your Watershed Basin	Upper Columbia
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Western Continental Ranges EcoRegion
Coordinates (decimal degrees)	50.49381 N, 115.91586 W
Altitude	3579
Local Basin Name	Windermere Creek
	Windermere Creek
Stream Order	4



Figure 1. Location Map

Across Reach
Aerial (No image found)



Down Stream



Field Sheet

Miscellaneous (No image found)



Substrate



Up Stream

Cabin Assessment Results

Reference Model Summary					
Model	Columbia-Okanagan Preliminary March 2010				
Analysis Date	November 07, 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	0.0%	0.1%	33.9%	28.6%	37.3%
CABIN Assessment of NAWIN02 on Sep 30, 2009	Mildly Divergent				

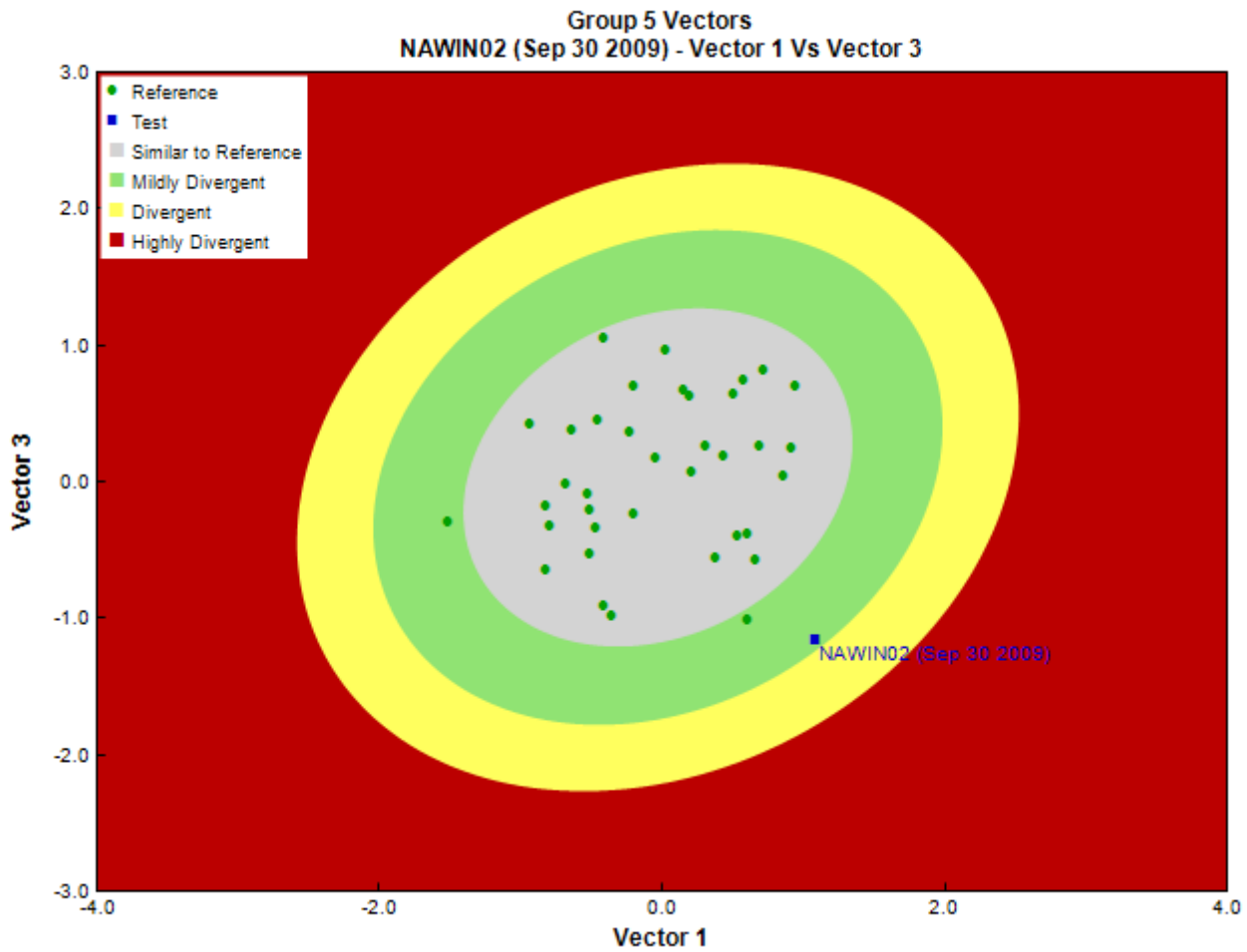


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	Eco Analysts, EcoAnalysts
Date Taxonomy Completed	February 26, 2010
	Marchant Box
Sub-Sample Proportion	17/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count			
Annelida	Oligochaeta	Enchytraeida	Enchytraeidae	1	5.9			
Arthropoda	Arachnida	Trombidiformes	Lebertiidae	1	5.9			
			Sperchontidae	1	5.9			
			Torrenticolidae	1	5.9			
	Insecta	Diptera	Chironomida	Chironomidae	12	70.6		
				Dixidae	1	5.9		
				Empididae	6	35.3		
				Tipulidae	1	5.9		
				Ephemeroptera	Baetidae	206	1,211.8	
					Heptageniidae	6	35.3	
					Plecoptera	Capniidae	3	17.6
						Nemouridae	55	323.5
						Perlidae	1	5.9
						Perlodidae	13	76.5
		Taeniopterygidae	1	5.9				

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
		Trichoptera	Rhyacophilidae	5	29.4
			Total	314	1,847.2

NAWIN04 2013 and 2014 - question of Group Placement. will run separate Reports

Metrics

Name	NAWIN02	Predicted Group Reference Mean \pm SD
Bray-Curtis Distance	0.74	0.4 \pm 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	3.6	2.8 \pm 0.3
Intolerant taxa	--	1.0 \pm 0.0
Long-lived taxa	1.0	1.0 \pm 0.0
Tolerant individuals (%)	--	0.3
Functional Measures		
% Filterers	--	1.7 \pm 1.7
% Gatherers	22.6	50.6 \pm 14.6
% Predatores	12.7	15.3 \pm 9.0
% Scrapers	67.8	67.2 \pm 16.8
% Shredder	19.1	38.1 \pm 18.2
No. Clinger Taxa	8.0	19.8 \pm 3.4
Number Of Individuals		
% Chironomidae	3.8	4.6 \pm 5.0
% Coleoptera	0.0	0.0 \pm 0.0
% Diptera + Non-insects	7.6	6.3 \pm 5.3
% Ephemeroptera	67.5	44.9 \pm 17.3
% Ephemeroptera that are Baetidae	97.2	26.1 \pm 20.5
% EPT Individuals	92.4	93.7 \pm 5.3
% Odonata	--	0.0 \pm 0.0
% of 2 dominant taxa	83.1	60.2 \pm 11.4
% of 5 dominant taxa	93.0	84.5 \pm 5.9
% of dominant taxa	65.6	39.3 \pm 12.3
% Plecoptera	23.2	42.9 \pm 17.2
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	0.0	27.4 \pm 27.1
% Tricoptera	1.6	5.8 \pm 5.7
No. EPT individuals/Chironomids+EPT Individuals	1.0	1.0 \pm 0.1
Total Abundance	1847.0	2163.6 \pm 1274.4
Richness		
Chironomidae taxa (genus level only)	1.0	0.9 \pm 0.2
Coleoptera taxa	0.0	0.1 \pm 0.2
Diptera taxa	4.0	2.4 \pm 1.0
Ephemeroptera taxa	2.0	3.7 \pm 0.5
EPT Individuals (Sum)	1705.9	2023.9 \pm 1195.7
EPT taxa (no)	8.0	12.3 \pm 1.9
Odonata taxa	--	0.0 \pm 0.0
Pielou's Evenness	0.4	0.7 \pm 0.1
Plecoptera taxa	5.0	5.5 \pm 1.1
Shannon-Wiener Diversity	1.2	1.9 \pm 0.3
Simpson's Diversity	0.5	0.8 \pm 0.1
Simpson's Evenness	0.1	0.3 \pm 0.1
Total No. of Taxa	16.0	16.0 \pm 3.0
Trichoptera taxa	1.0	3.2 \pm 1.0

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NAWIN02
	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
Chloroperlidae	78%	88%	94%	100%	100%	0.98

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NAWIN02
	Group 1	Group 2	Group 3	Group 4	Group 5	
Ephemerellidae	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	11.98
RIVPACS : Observed taxa P>0.50	10.00
RIVPACS : O:E (p > 0.5)	0.83
RIVPACS : Expected taxa P>0.70	9.61
RIVPACS : Observed taxa P>0.70	7.00
RIVPACS : O:E (p > 0.7)	0.73

Habitat Description

Variable	NAWIN02	Predicted Group Reference Mean \pm SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 \pm 0.00000
Intrusive (%)	0.00000	0.46153 \pm 2.09955
Metamorphic (%)	0.00000	0.17691 \pm 0.85012
Sedimentary (%)	100.00000	99.36155 \pm 2.22799
Ultramafic (%)	0.00000	0.00000 \pm 0.00000
Volcanic (%)	0.00000	0.00000 \pm 0.00000
Channel		
Depth-Avg (cm)	13.8	21.5 \pm 9.7
Depth-Max (cm)	18.5	31.0 \pm 16.5
Macrophyte (PercentRange)	0	0 \pm 0
Reach-%CanopyCoverage (PercentRange)	2.00	1.54 \pm 1.28
Reach-Pools (Binary)	1	1 \pm 0
Reach-Rapids (Binary)	0	0 \pm 0
Reach-Riffles (Binary)	1	1 \pm 0
Reach-StraightRun (Binary)	0	0 \pm 1
Slope (m/m)	0.0490000	0.0581357 \pm 0.0554952
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)	0.67	0.51 \pm 0.27
Velocity-Max (m/s)	0.89	0.78 \pm 0.40
Width-Bankfull (m)	4.4	13.7 \pm 16.4
Width-Wetted (m)	3.0	9.0 \pm 13.1
XSEC-VelMethod (Category (1-3))	1	2 \pm 1
Climate		
Precip01_JAN (mm)	78.00000	130.45668 \pm 67.17180
Precip02_FEB (mm)	63.00000	102.48242 \pm 52.12836
Precip03_MAR (mm)	61.00000	89.80929 \pm 42.79174
Precip04_APR (mm)	78.00000	135.11134 \pm 66.06707
Precip05_MAY (mm)	63.00000	70.51109 \pm 13.79432
Precip06_JUN (mm)	70.00000	86.65922 \pm 19.93623
Precip07_JUL (mm)	64.00000	79.11475 \pm 19.88523
Precip08_AUG (mm)	64.00000	76.86606 \pm 21.34619
Precip09_SEP (mm)	52.00000	71.16784 \pm 23.11306
Precip10_OCT (mm)	51.00000	88.14083 \pm 44.84739
Precip11_NOV (mm)	83.00000	134.64587 \pm 63.61897
Precip12_DEC (mm)	91.00000	142.32359 \pm 65.85239
PrecipTotal_ANNUAL (mm)	795.00000	1143.02476 \pm 453.62461
Temp01_JANMax (Degrees Celsius)	-6.00000	-6.18206 \pm 1.69263

Habitat Description

Variable	NAWIN02	Predicted Group Reference Mean \pm SD
Temp01_JANmin (Degrees Celsius)	-16.00000	-13.62029 \pm 2.05208
Temp02_FEBmax (Degrees Celsius)	-3.00000	-2.89816 \pm 1.88421
Temp02_FEBmin (Degrees Celsius)	-13.00000	-11.14625 \pm 1.99282
Temp03_MARmax (Degrees Celsius)	0.00000	0.98920 \pm 2.35950
Temp03_MARmin (Degrees Celsius)	-9.00000	-7.98295 \pm 1.94687
Temp04_APRmax (Degrees Celsius)	5.00000	5.37616 \pm 3.02243
Temp04_APRmin (Degrees Celsius)	-5.00000	-3.74673 \pm 1.66191
Temp05_MAYmax (Degrees Celsius)	10.00000	10.12548 \pm 3.18022
Temp05_MAYmin (Degrees Celsius)	0.00000	0.09616 \pm 1.15628
Temp06_JUNMax (Degrees Celsius)	14.00000	13.85415 \pm 3.23839
Temp06_JUNMin (Degrees Celsius)	2.00000	2.79527 \pm 1.60213
Temp07_JULmax (Degrees Celsius)	17.00000	17.45582 \pm 3.27590
Temp07_JULmin (Degrees Celsius)	4.00000	4.99257 \pm 1.52992
Temp08_AUGmax (Degrees Celsius)	17.00000	17.36896 \pm 3.11866
Temp08_AUGmin (Degrees Celsius)	4.00000	4.84827 \pm 1.46649
Temp09_SEPmax (Degrees Celsius)	12.00000	12.13974 \pm 2.86510
Temp09_SEPmin (Degrees Celsius)	0.00000	1.12535 \pm 1.20660
Temp10_OCTmax (Degrees Celsius)	6.00000	5.04078 \pm 2.46521
Temp10_OCTmin (Degrees Celsius)	-3.00000	-2.41023 \pm 1.18961
Temp11_NOVmax (Degrees Celsius)	-3.00000	-2.24818 \pm 1.93047
Temp11_NOVmin (Degrees Celsius)	-10.00000	-8.35137 \pm 1.96467
Temp12_DECmax (Degrees Celsius)	-7.00000	-6.49458 \pm 1.76429
Temp12_DECmin (Degrees Celsius)	-15.00000	-12.72330 \pm 1.87798
TempANNUALmax (Degrees Celsius)	5.00000	5.16639 \pm 2.57569
TempANNUALmean (Degrees Celsius)	0.00000	0.71683 \pm 1.81248
TempANNUALmin (Degrees Celsius)	-5.00000	-3.38604 \pm 1.60598
Hydrology		
Drainage-Area (km^2)	77.44616	135.66658 \pm 373.96803
Perimeter (Km)	60.97029	55.78285 \pm 83.00734
StreamDensity (m/km^2)	2864.27930	2198.74079 \pm 886.68339
StreamLength (m)	221827.44	293250.33 \pm 851854.38
Landcover		
Natl-AnnCrops (%)	0.00000	0.00000 \pm 0.00000
Natl-Barren (%)	0.00000	0.00000 \pm 0.00000
Natl-BroadleafDense (%)	0.00000	0.00523 \pm 0.02638
Natl-BroadleafOpen (%)	0.33171	1.35705 \pm 2.04550
Natl-BroadleafSparse (%)	0.00000	0.31953 \pm 0.53788
Natl-Coniferous (%)	0.00000	0.00000 \pm 0.00000
Natl-ConiferousDense (%)	1.21787	4.95677 \pm 7.46543
Natl-ConiferousOpen (%)	59.37856	34.34335 \pm 18.65764
Natl-ConiferousSparse (%)	0.00000	1.39163 \pm 1.60111
Natl-Deciduous (%)	0.00000	0.00000 \pm 0.00000
Natl-Developed (%)	0.00000	0.00002 \pm 0.00009
Natl-ExposedLand (%)	5.81594	16.95282 \pm 9.64125
Natl-Grassland (%)	0.57498	5.60615 \pm 5.17505
Natl-Herb (%)	3.36076	2.04978 \pm 2.79736
Natl-MixedForest (%)	0.00000	0.00000 \pm 0.00000
Natl-MixedwoodDense (%)	0.00000	0.02636 \pm 0.08976
Natl-MixedwoodOpen (%)	0.00000	2.10440 \pm 2.63686
Natl-MixedwoodSparse (%)	0.00000	0.01817 \pm 0.04448
Natl-PerennCropsPast (%)	0.00000	0.00000 \pm 0.00000
Natl-Rock/Rubble (%)	0.11474	6.97447 \pm 7.52078
Natl-Shrubland (%)	0.00000	0.00000 \pm 0.00000
Natl-ShrubLow (%)	4.46906	4.49178 \pm 5.44294
Natl-ShrubTall (%)	0.00000	0.33533 \pm 1.14136
Natl-SnowIce (%)	0.00000	7.70046 \pm 9.06096
Natl-Water (%)	0.00763	0.14384 \pm 0.45543
Natl-Wetland (%)	0.00000	0.00000 \pm 0.00000
Natl-WetlandHerb (%)	0.00000	0.00639 \pm 0.02401
Natl-WetlandShrub (%)	0.00000	0.00868 \pm 0.02574
Natl-WetlandTreed (%)	0.00000	0.00226 \pm 0.00959
Reg-Ice (%)	0.00000	3.06094 \pm 5.65390

Habitat Description

Variable	NAWIN02	Predicted Group Reference Mean \pm SD
Substrate Data		
%Bedrock (%)	0	1 \pm 1
%Boulder (%)	2	3 \pm 3
%Cobble (%)	10	64 \pm 17
%Gravel (%)	31	2 \pm 2
%Pebble (%)	53	31 \pm 16
%Sand (%)	4	0 \pm 0
%Silt+Clay (%)	0	0 \pm 0
D50 (cm)	2.30	19.61 \pm 30.65
Dg (cm)	2.0	20.3 \pm 30.8
Dominant-1st (Category(0-9))	4	7 \pm 1
Dominant-2nd (Category(0-9))	3	6 \pm 1
Embeddedness (Category(1-5))	3	4 \pm 1
PeriphytonCoverage (Category(1-5))	2	2 \pm 1
SurroundingMaterial (Category(0-9))	1	3 \pm 1
Topography		
ElevationMax (m)	2629.00000	2829.64865 \pm 315.67549
ElevationMin (m)	1090.00000	1172.81081 \pm 249.32284
ElevationStdev (m)	330.62363	342.56455 \pm 77.02221
Reg-SlopeLT30% (%)	12.99897	16.26604 \pm 8.50298
Slope30-50% (%)	28.94501	28.13773 \pm 4.86732
Slope50-60% (%)	16.96705	14.11202 \pm 1.82185
SlopeAvg (%)	53.50064	56.75540 \pm 7.27461
SlopeGT60% (%)	37.46527	39.57775 \pm 9.82818
SlopeLT30% (%)	16.62266	18.17250 \pm 6.88627
SlopeMax (%)	249.34370	317.81636 \pm 141.61151
SlopeMin (%)	0.59331	0.79557 \pm 1.30240
SlopeStdev (%)	23.81016	29.56849 \pm 5.64880
Water Chemistry		
General-Alkalinity (mg/L)	0.5000000	68.5944444 \pm 52.1098452
General-Conductivity (μ S/cm)	940.0000000	110.5428571 \pm 89.3409737
General-DO (mg/L)	11.0000000	11.0635135 \pm 0.9899052
General-pH (pH)	8.7	7.7 \pm 0.7
General-SolidsTSS (mg/L)	2.0000000	2.8140173 \pm 7.8143482
General-TempAir (Degrees Celsius)	14.5	10.5 \pm 0.7
General-TempWater (Degrees Celsius)	9.5000000	5.5262162 \pm 1.8860693
Nitrogen-TN (mg/L)	0.1400000	0.0983333 \pm 0.0651811
Phosphorus-TP (mg/L)	0.0025000	0.0025000 \pm 0.0041986

Landslide Upstream of NAWIN03 in 2011 smothered site in fine sediment, no macro-invertebrates found