

Site Description

Study Name	CBWQ-St. Mary
Site	NGSTM03
Sampling Date	Oct 04 2010
Know Your Watershed Basin	Central Kootenay
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Columbia Mountains and Highlands EcoRegion
Coordinates (decimal degrees)	49.60821 N, 116.16878 W
Altitude	3215
Local Basin Name	St, Mary River
	St. Mary
Stream Order	2



Figure 1. Location Map



Across Reach
Aerial (No image found)



Up Stream

Cabin Assessment Results

Reference Model Summary					
Model	Columbia-Okanagan Preliminary March 2010				
Analysis Date	October 25, 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	75.2%	0.1%	5.7%	17.9%	1.2%
CABIN Assessment of NGSTM03 on Oct 04, 2010	Divergent				

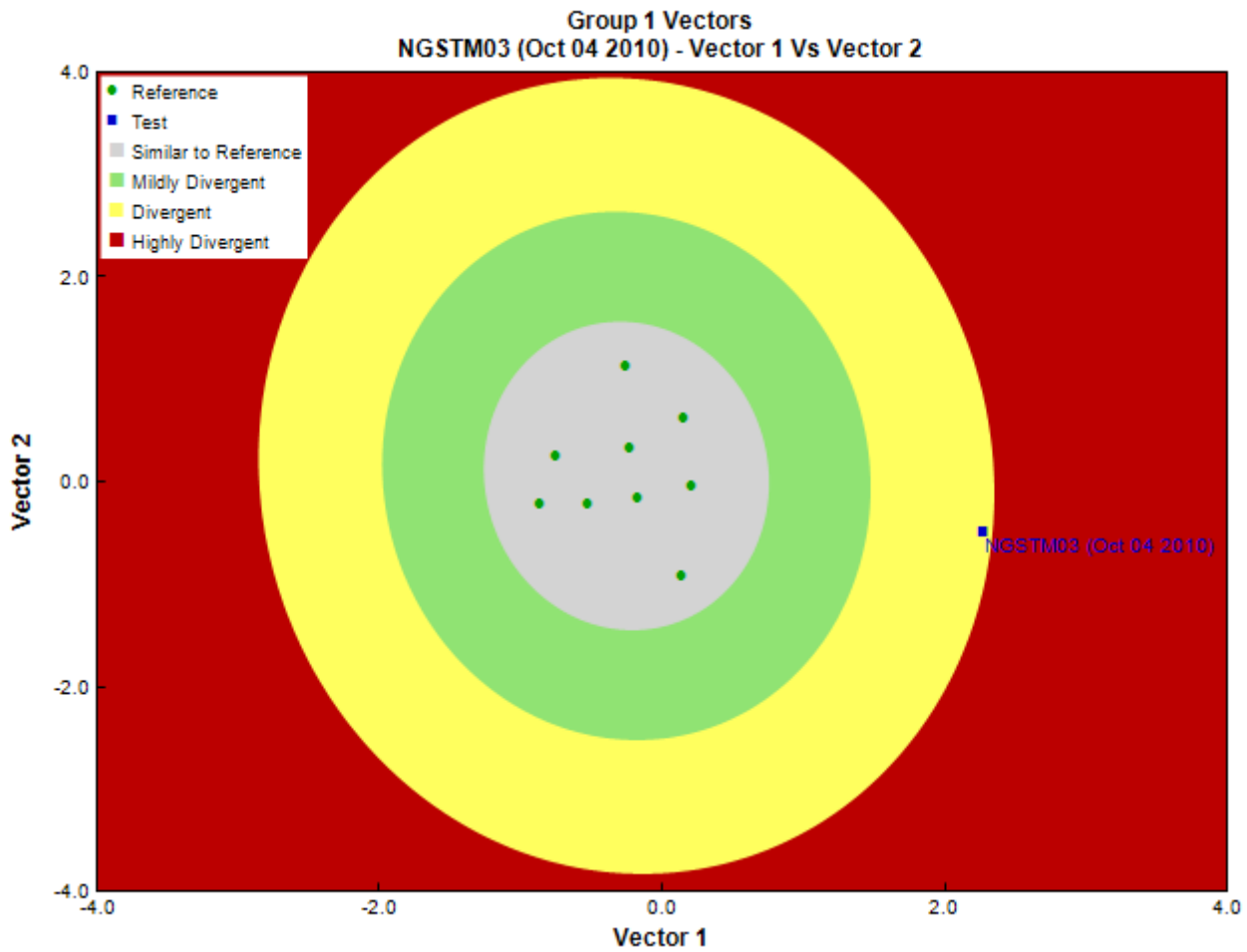


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	Gary Lester, Ecoanalysts Inc.
Date Taxonomy Completed	March 09, 2011
	Marchant Box
Sub-Sample Proportion	11/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count	
Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	4	36.4	
			Torrenticolidae	2	18.2	
	Insecta	Diptera	Chironomidae	148	1,345.4	
			Empididae	2	18.2	
		Ephemeroptera	Ameletidae	3	27.3	
			Ephemerellidae	134	1,218.2	
		Plecoptera	Capniidae	11	100.0	
			Nemouridae	18	163.6	
			Perlidae	14	127.3	
				Perlodidae	9	81.8
		Trichoptera		Brachycentridae	1	9.1
				Hydropsychidae	6	54.5
			Hydroptilidae	3	27.3	
			Lepidostomatidae	8	72.7	
			Leptoceridae	2	18.2	

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
			Total	365	3,318.2

Metrics

Name	NGSTM03	Predicted Group Reference Mean \pm SD
Bray-Curtis Distance	0.96	0.4 \pm 0.2
Biotic Indices		
Hilsenhoff Family index (North-West)	3.4	3.3 \pm 0.5
Intolerant taxa	--	1.0
Long-lived taxa	1.0	2.3 \pm 1.5
Tolerant individuals (%)	--	
Functional Measures		
% Filterers	1.9	1.1 \pm 1.5
% Gatherers	84.7	35.2 \pm 11.4
% Predators	50.7	16.9 \pm 7.6
% Scrapers	0.8	60.6 \pm 17.9
% Shredder	11.0	19.4 \pm 13.9
No. Clinger Taxa	10.0	18.6 \pm 4.2
Number Of Individuals		
% Chironomidae	40.5	8.1 \pm 6.9
% Coleoptera	0.0	0.5 \pm 1.7
% Diptera + Non-insects	42.7	11.2 \pm 7.6
% Ephemeroptera	37.5	61.6 \pm 17.6
% Ephemeroptera that are Baetidae	0.0	50.3 \pm 24.0
% EPT Individuals	57.3	88.3 \pm 7.4
% Odonata	--	0.0 \pm 0.0
% of 2 dominant taxa	77.3	59.1 \pm 14.3
% of 5 dominant taxa	89.0	84.1 \pm 7.1
% of dominant taxa	40.5	41.5 \pm 15.1
% Plecoptera	14.2	23.9 \pm 14.1
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	30.0	12.9 \pm 23.9
% Tricoptera	5.5	2.8 \pm 2.9
No. EPT individuals/Chironomids+EPT Individuals	0.6	0.9 \pm 0.1
Total Abundance	3318.1	1453.9 \pm 1355.4
Richness		
Chironomidae taxa (genus level only)	1.0	1.0 \pm 0.0
Coleoptera taxa	0.0	0.2 \pm 0.4
Diptera taxa	2.0	2.9 \pm 1.0
Ephemeroptera taxa	2.0	3.6 \pm 0.6
EPT Individuals (Sum)	1900.0	1288.9 \pm 1149.7
EPT taxa (no)	11.0	11.1 \pm 2.1
Odonata taxa	--	0.0 \pm 0.0
Pielou's Evenness	0.6	0.7 \pm 0.1
Plecoptera taxa	4.0	5.1 \pm 1.2
Shannon-Wiener Diversity	1.6	1.8 \pm 0.4
Simpson's Diversity	0.7	0.7 \pm 0.1
Simpson's Evenness	0.2	0.3 \pm 0.1
Total No. of Taxa	15.0	16.3 \pm 3.2
Trichoptera taxa	5.0	2.3 \pm 1.3

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NGSTM03
	Group 1	Group 2	Group 3	Group 4	Group 5	
Heptageniidae	100%	100%	100%	100%	100%	1.00
Lebertiidae	78%	65%	39%	58%	5%	0.71
Nemouridae	100%	100%	100%	100%	100%	1.00
Perlodidae	78%	78%	89%	92%	81%	0.81
Rhyacophilidae	100%	92%	100%	100%	95%	1.00
Taeniopterygidae	89%	49%	100%	92%	97%	0.90

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	12.31
RIVPACS : Observed taxa P>0.50	7.00
RIVPACS : O:E (p > 0.5)	0.57
RIVPACS : Expected taxa P>0.70	9.87
RIVPACS : Observed taxa P>0.70	5.00
RIVPACS : O:E (p > 0.7)	0.51

Habitat Description

Variable	NGSTM03	Predicted Group Reference Mean \pm SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 \pm 0.00000
Intrusive (%)	15.76457	13.40132 \pm 26.65230
Metamorphic (%)	0.00000	0.73186 \pm 1.11377
Sedimentary (%)	84.20771	85.86682 \pm 26.25895
Ultramafic (%)	0.02772	0.00000 \pm 0.00000
Volcanic (%)	0.00000	0.00000 \pm 0.00000
Channel		
Depth-Avg (cm)	73.3	39.4 \pm 23.6
Depth-BankfullMinusWetted (cm)	150.00	33.28 \pm 13.75
Depth-Max (cm)	120.0	55.6 \pm 30.6
Macrophyte (PercentRange)	1	0 \pm 0
Reach-%CanopyCoverage (PercentRange)	1.00	0.67 \pm 1.00
Reach-DomStreamsideVeg (Category (1-4))	4	3 \pm 1
Reach-Pools (Binary)	1	0 \pm 1
Reach-Riffles (Binary)	1	1 \pm 1
Reach-StraightRun (Binary)	1	1 \pm 1
Slope (m/m)	0.0100000	0.0440367 \pm 0.0734738
Veg-Coniferous (Binary)	1	1 \pm 0
Veg-Deciduous (Binary)	1	1 \pm 0
Veg-Shrubs (Binary)	1	1 \pm 0
Width-Bankfull (m)	42.9	27.7 \pm 17.6
Width-Wetted (m)	34.0	17.6 \pm 11.6
XSEC-VelMethod (Category (1-3))	1	1 \pm 1
Climate		
Precip01_JAN (mm)	119.29167	135.62744 \pm 42.73491
Precip02_FEB (mm)	99.83333	109.88064 \pm 33.20254
Precip03_MAR (mm)	91.16667	99.70303 \pm 25.98060
Precip04_APR (mm)	119.29167	135.62744 \pm 42.73491
Precip05_MAY (mm)	77.41667	73.20589 \pm 7.25987
Precip06_JUN (mm)	82.95833	90.96448 \pm 10.81805
Precip07_JUL (mm)	67.16667	86.58283 \pm 13.49738
Precip08_AUG (mm)	62.54167	84.09596 \pm 14.12059
Precip09_SEP (mm)	60.16667	75.27542 \pm 14.70704
Precip10_OCT (mm)	70.54167	93.43771 \pm 28.45319
Precip11_NOV (mm)	121.58333	147.35253 \pm 38.45018
Precip12_DEC (mm)	133.16667	151.46044 \pm 42.16075
PrecipTotal_ANNUAL (mm)	1059.62500	1223.65219 \pm 273.62669
Temp01_JANMax (Degrees Celsius)	-6.08333	-6.88199 \pm 1.93195
Temp01_JANmin (Degrees Celsius)	-12.41667	-13.71414 \pm 2.38881
Temp02_FEBmax (Degrees Celsius)	-3.04167	-3.85034 \pm 2.06368
Temp02_FEBmin (Degrees Celsius)	-10.50000	-11.56330 \pm 2.44788
Temp03_MARmax (Degrees Celsius)	0.45833	0.01768 \pm 2.47627
Temp03_MARmin (Degrees Celsius)	-7.37500	-8.72492 \pm 2.28722
Temp04_APRmax (Degrees Celsius)	4.62500	3.78081 \pm 3.17957
Temp04_APRmin (Degrees Celsius)	-3.75000	-4.54360 \pm 1.94670
Temp05_MAYmax (Degrees Celsius)	9.58333	8.77003 \pm 3.36878
Temp05_MAYmin (Degrees Celsius)	0.00000	-0.39933 \pm 1.33596
Temp06_JUNMax (Degrees Celsius)	13.41667	12.51111 \pm 3.51659
Temp06_JUNMin (Degrees Celsius)	2.79167	2.15774 \pm 1.71410
Temp07_JULmax (Degrees Celsius)	17.16667	15.97172 \pm 3.60230
Temp07_JULmin (Degrees Celsius)	5.20833	4.26852 \pm 1.68829
Temp08_AUGmax (Degrees Celsius)	17.08333	15.95404 \pm 3.61582

Habitat Description

Variable	NGSTM03	Predicted Group Reference Mean \pm SD
Temp08_AUGmin (Degrees Celsius)	4.95833	4.26852 \pm 1.68829
Temp09_SEPmax (Degrees Celsius)	12.00000	10.75690 \pm 3.16095
Temp09_SEPmin (Degrees Celsius)	0.91667	0.82828 \pm 1.34778
Temp10_OCTmax (Degrees Celsius)	5.08333	3.78199 \pm 2.61196
Temp10_OCTmin (Degrees Celsius)	-2.37500	-2.86650 \pm 1.41557
Temp11_NOVmax (Degrees Celsius)	-2.54167	-3.03434 \pm 2.15061
Temp11_NOVmin (Degrees Celsius)	-8.04167	-9.02744 \pm 2.23762
Temp12_DECmax (Degrees Celsius)	-6.62500	-7.12424 \pm 2.04773
Temp12_DECmin (Degrees Celsius)	-12.25000	-13.10724 \pm 2.40381
TempANNUALmax (Degrees Celsius)	4.70833	3.82054 \pm 2.80061
TempANNUALmean (Degrees Celsius)	0.50000	0.08754 \pm 2.10549
TempANNUALmin (Degrees Celsius)	-3.25000	-4.01465 \pm 1.92102
Hydrology		
Drainage-Area (km ²)	1478.62249	248.05797 \pm 212.27501
Perimeter (Km)	293.13794	115.90189 \pm 79.39444
StreamDensity (m/km ²)	2011.64305	1641.77078 \pm 689.92032
StreamLength (m)	2974460.65	386293.17 \pm 275066.40
Landcover		
Natl-AnnCrops (%)	0.00000	0.00000 \pm 0.00000
Natl-Barren (%)	0.00000	0.00000 \pm 0.00000
Natl-BroadleafDense (%)	0.00000	0.00000 \pm 0.00000
Natl-BroadleafOpen (%)	0.26307	1.11783 \pm 1.18871
Natl-BroadleafSparse (%)	0.00000	0.05014 \pm 0.07576
Natl-Coniferous (%)	0.00000	0.00000 \pm 0.00000
Natl-ConiferousDense (%)	0.39922	6.38699 \pm 4.34837
Natl-ConiferousOpen (%)	52.63976	40.47833 \pm 22.06760
Natl-ConiferousSparse (%)	0.00000	1.22915 \pm 1.10282
Natl-Deciduous (%)	0.00000	0.00000 \pm 0.00000
Natl-Developed (%)	0.00000	0.00000 \pm 0.00000
Natl-ExposedLand (%)	12.62143	10.56536 \pm 3.88369
Natl-Grassland (%)	2.08998	4.29128 \pm 3.56936
Natl-Herb (%)	5.50468	1.97139 \pm 2.48389
Natl-MixedForest (%)	0.00000	0.00000 \pm 0.00000
Natl-MixedwoodDense (%)	0.00000	0.02198 \pm 0.03299
Natl-MixedwoodOpen (%)	0.00000	0.99757 \pm 1.29290
Natl-MixedwoodSparse (%)	0.00000	0.00671 \pm 0.01007
Natl-PerennCropsPast (%)	0.00000	0.00000 \pm 0.00000
Natl-Rock/Rubble (%)	1.04945	6.91669 \pm 6.91715
Natl-Shrubland (%)	0.00000	0.00000 \pm 0.00000
Natl-ShrubLow (%)	5.84066	3.03173 \pm 2.25077
Natl-ShrubTall (%)	0.00000	0.01289 \pm 0.02622
Natl-SnowIce (%)	0.17731	12.85833 \pm 16.61270
Natl-Water (%)	0.85693	0.57284 \pm 0.84888
Natl-Wetland (%)	0.00000	0.00000 \pm 0.00000
Natl-WetlandHerb (%)	0.02784	0.00632 \pm 0.00950
Natl-WetlandShrub (%)	0.04207	0.00789 \pm 0.01184
Natl-WetlandTreed (%)	0.00000	0.00063 \pm 0.00125
Reg-Ice (%)	0.05012	11.04418 \pm 12.39512
Sediment Chemistry		
Ag (ppm)	0.000	0.000
As (ppm)	9.700	0.001
Ba (ppm)	73.700	0.016
Be (ppm)	0.200	0.000
Bi (ppm)	0.100	0.000
Cd (ppm)	0.200	0.000
Co (ppm)	10.600	0.005
Cr (ppm)	8.000	0.006
Cu (ppm)	12.700	0.007
Hg (ppm)	0.000	0.000 \pm 0.000
Li (ppm)	15.000	0.012
Mn (ppm)	1160.000	0.201
Mo (ppm)	1.800	0.000

Habitat Description

Variable	NGSTM03	Predicted Group Reference Mean \pm SD
Ni (ppm)	11.900	0.011
Pb (ppm)	9.600	0.005
Sb (ppm)	0.100	0.000
Se (ppm)	0.000	0.000
Sn (ppm)	0.200	0.000 \pm 0.000
Sr (ppm)	7.000	0.094
Ti (ppm)	333.000	0.000 \pm 0.000
Tl (ppm)	0.240	0.000
TP (ppm)	248.000	0.000 \pm 0.000
U (ppm)	4.080	0.001
V (ppm)	13.000	0.003
Zn (ppm)	38.000	0.015
Zr (ppm)	0.000	0.000 \pm 0.000
Substrate Data		
%Bedrock (%)	0	1 \pm 2
%Boulder (%)	1	1 \pm 2
%Cobble (%)	64	55 \pm 30
%Gravel (%)	4	2 \pm 2
%Pebble (%)	31	40 \pm 28
%Sand (%)	0	0 \pm 0
%Silt+Clay (%)	0	0 \pm 1
D50 (cm)	8.50	8.05 \pm 3.69
Dg (cm)	7.7	7.5 \pm 3.2
Dominant-1st (Category(0-9))	6	6 \pm 2
Dominant-2nd (Category(0-9))	5	6 \pm 1
Embeddedness (Category(1-5))	4	4 \pm 1
PeriphytonCoverage (Category(1-5))	4	3 \pm 1
SurroundingMaterial (Category(0-9))	5	3 \pm 3
Topography		
ElevationMax (m)	2912.00000	3078.00000 \pm 457.09463
ElevationMin (m)	946.00000	930.22222 \pm 360.76162
ElevationStdev (m)	381.05012	413.05115 \pm 88.46112
Reg-SlopeLT30% (%)	17.42750	27.80144 \pm 15.50843
Slope30-50% (%)	27.17441	29.30660 \pm 5.70051
Slope50-60% (%)	14.95758	12.36184 \pm 3.15640
SlopeAvg (%)	53.90626	48.95258 \pm 9.21336
SlopeGT60% (%)	38.03792	29.36303 \pm 11.20971
SlopeLT30% (%)	19.83009	28.96853 \pm 14.39762
SlopeMax (%)	384.10376	415.78743 \pm 182.64978
SlopeMin (%)	0.00000	0.39554 \pm 1.18662
SlopeStdev (%)	27.77107	29.25364 \pm 5.81334
Water Chemistry		
General-Alkalinity (mg/L)	26.0000000	50.0555556 \pm 32.0615467
General-DO (mg/L)	13.0000000	11.4277778 \pm 1.0113454
General-pH (pH)	6.1	7.6 \pm 0.6
General-SpCond (μ S/cm)	47.7000000	121.1777778 \pm 70.2563659
General-TempAir (Degrees Celsius)	15.0	4.2
General-TempWater (Degrees Celsius)	10.1000000	5.7844444 \pm 2.4754197
General-Turbidity (NTU)	0.6100000	67.5295000 \pm 95.4176962
Nitrogen-NO2 (mg/L)	0.0000000	0.0052222 \pm 0.0048677
Nitrogen-NO2+NO3 (mg/L)	0.0500000	0.0000000 \pm 0.0000000
Nitrogen-NO3 (mg/L)	0.0500000	0.1022222 \pm 0.0873138