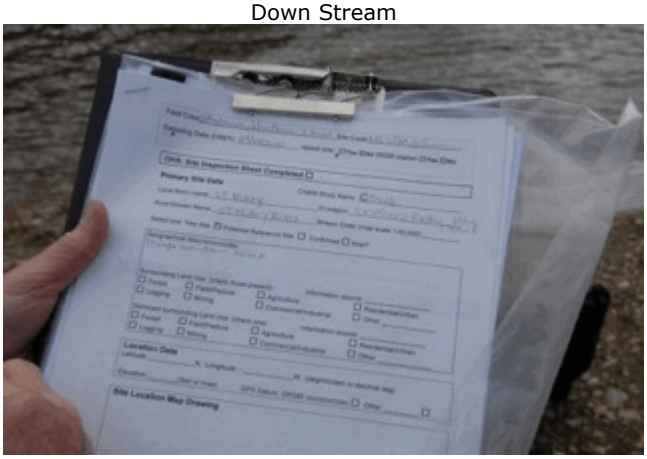
Site Description

Study Name	CBWQ-St. Mary
Site	NGSTM02
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)	49.62702 N, 116.29541 W
Altitude	3248
Local Basin Name	St. Mary River
	St. Mary
Stream Order	2

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	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	5.1%	0.5%	22.0%	66.4%	6.0%
CABIN Assessment of NGSTM02 on Oct 04, 2010	Divergent				

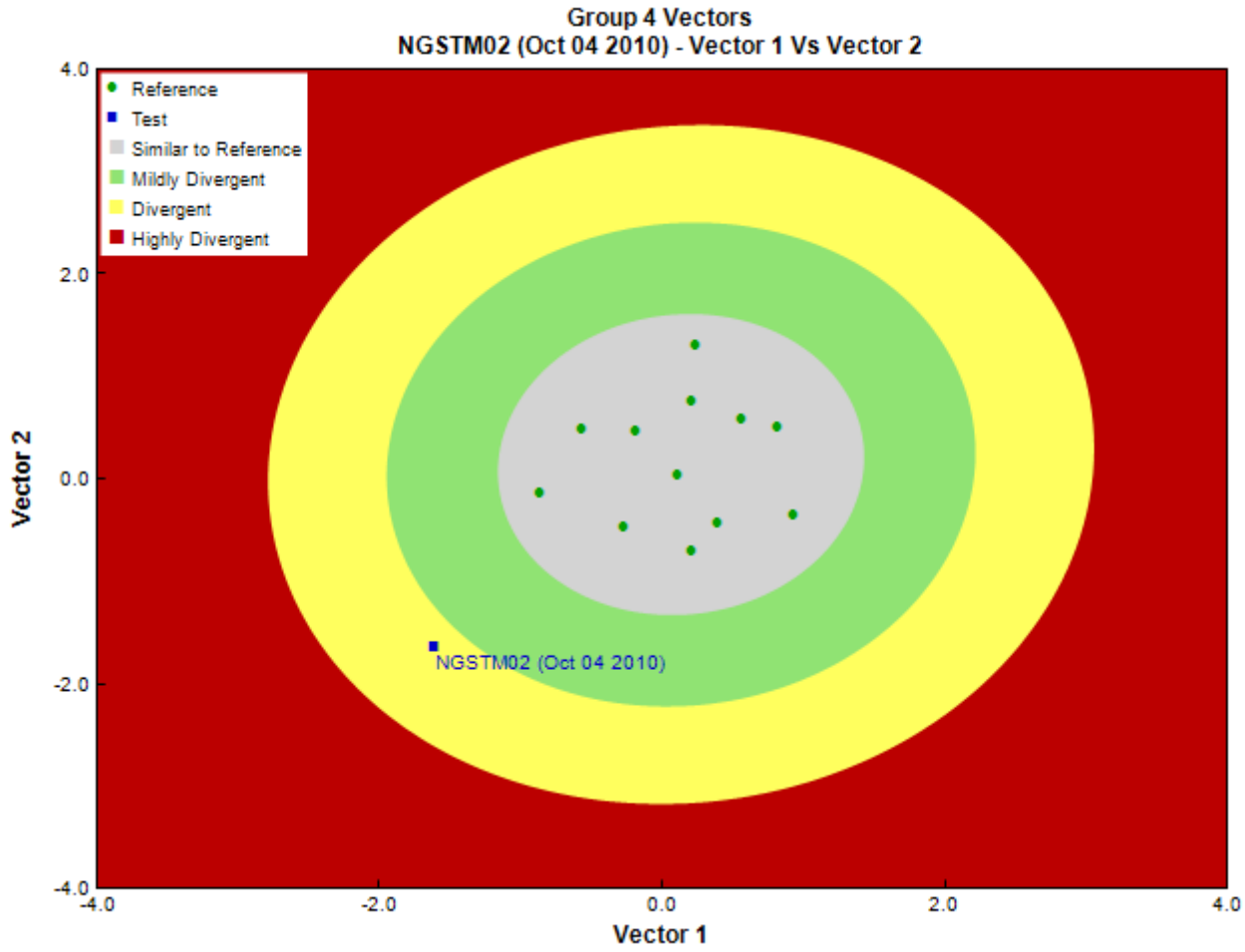


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

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	100/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
Arthropoda	Arachnida	Trombidiformes	Hydryphantidae	4	4.0
			Hygrobatidae	8	8.0
			Lebertiidae	200	200.0
			Torrenticolidae	2	2.0
	Insecta	Coleoptera	Dytiscidae	2	2.0
			Elmidae	3	3.0
		Diptera	Ceratopogonidae	4	4.0
			Chironomidae	15	15.0
			Empididae	2	2.0
			Tipulidae	3	3.0
		Plecoptera	Capniidae	2	2.0
			Chloroperlidae	28	28.0
			Nemouridae	1	1.0
			Perlodidae	37	37.0
		Trichoptera	Apataniidae	3	3.0

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
			Hydroptilidae	1	1.0
			Total	315	315.0

Metrics

Name	NGSTM02	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.9	0.4 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	6.3	3.2 ± 0.3
Intolerant taxa	--	
Long-lived taxa	2.0	2.1 ± 1.0
Tolerant individuals (%)	0.6	0.8 ± 0.3
Functional Measures		
% Filterers	--	2.2 ± 1.8
% Gatherers	17.5	38.4 ± 12.4
% Predatores	95.9	19.0 ± 8.5
% Scrapers	12.4	63.2 ± 19.7
% Shredder	3.8	27.6 ± 15.2
No. Clinger Taxa	6.0	23.2 ± 6.3
Number Of Individuals		
% Chironomidae	4.8	7.4 ± 6.4
% Coleoptera	1.6	1.5 ± 3.9
% Diptera + Non-insects	75.6	10.8 ± 7.6
% Ephemeroptera	0.0	51.7 ± 18.8
% Ephemeroptera that are Baetidae	--	40.6 ± 30.0
% EPT Individuals	22.9	87.7 ± 7.4
% Odonata	--	0.0 ± 0.0
% of 2 dominant taxa	75.2	57.9 ± 14.2
% of 5 dominant taxa	91.4	81.6 ± 7.9
% of dominant taxa	63.5	39.8 ± 14.9
% Plecoptera	21.6	31.4 ± 15.4
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	0.0	27.0 ± 26.2
% Tricoptera	1.3	4.5 ± 2.8
No. EPT individuals/Chironomids+EPT Individuals	0.8	0.9 ± 0.1
Total Abundance	315.0	587.4 ± 299.1
Richness		
Chironomidae taxa (genus level only)	1.0	1.0 ± 0.0
Coleoptera taxa	2.0	0.4 ± 0.5
Diptera taxa	4.0	3.3 ± 1.0
Ephemeroptera taxa	0.0	3.8 ± 0.8
EPT Individuals (Sum)	72.0	526.0 ± 285.8
EPT taxa (no)	6.0	13.3 ± 2.7
Odonata taxa	--	0.0 ± 0.0
Pielou's Evenness	0.5	0.7 ± 0.1
Plecoptera taxa	4.0	6.3 ± 1.1
Shannon-Wiener Diversity	1.4	1.9 ± 0.4
Simpson's Diversity	0.6	0.8 ± 0.1
Simpson's Evenness	0.1	0.3 ± 0.1
Total No. of Taxa	16.0	19.3 ± 3.7
Trichoptera taxa	2.0	3.2 ± 1.4

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NGSTM02
	Group 1	Group 2	Group 3	Group 4	Group 5	
Heptageniidae	100%	100%	100%	100%	100%	1.00
Hydropsychidae	11%	92%	78%	92%	86%	0.84
Nemouridae	100%	100%	100%	100%	100%	1.00
Perlidae	11%	84%	33%	100%	3%	0.75
Perlodidae	78%	78%	89%	92%	81%	0.90
Rhyacophilidae	100%	92%	100%	100%	95%	1.00

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NGSTM02
	Group 1	Group 2	Group 3	Group 4	Group 5	
Taeniopterygidae	89%	49%	100%	92%	97%	0.93

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	13.49
RIVPACS : Observed taxa P>0.50	8.00
RIVPACS : O:E (p > 0.5)	0.59
RIVPACS : Expected taxa P>0.70	11.18
RIVPACS : Observed taxa P>0.70	5.00
RIVPACS : O:E (p > 0.7)	0.45

Habitat Description

Variable	NGSTM02	Predicted Group Reference Mean ±SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 ± 0.00000
Intrusive (%)	18.71992	11.07346 ± 28.63466
Metamorphic (%)	0.00000	17.96649 ± 35.53463
Sedimentary (%)	81.24714	70.96005 ± 44.90394
Ultramafic (%)	0.03293	0.00000 ± 0.00000
Volcanic (%)	0.00000	0.00000 ± 0.00000
Channel		
Depth-Avg (cm)	48.5	23.6 ± 11.1
Depth-BankfullMinusWetted (cm)	100.00	51.38 ± 29.42
Depth-Max (cm)	91.0	34.6 ± 12.3
Macrophyte (PercentRange)	1	0 ± 0
Reach-%CanopyCoverage (PercentRange)	1.00	1.33 ± 0.78
Reach-DomStreamsideVeg (Category (1-4))	2	4 ± 1
Reach-Pools (Binary)	1	1 ± 0
Reach-Riffles (Binary)	1	1 ± 0
Reach-StraightRun (Binary)	1	1 ± 1
Slope (m/m)	0.0200000	0.0546683 ± 0.0376269
Veg-Deciduous (Binary)	1	1 ± 0
Veg-Shrubs (Binary)	1	1 ± 0
Velocity-Avg (m/s)	1.18	0.48 ± 0.22
Velocity-Max (m/s)	1.77	0.76 ± 0.36
Width-Bankfull (m)	40.0	13.4 ± 9.9
Width-Wetted (m)	33.0	8.5 ± 5.8
XSEC-VelMethod (Category (1-3))	1	1 ± 0
Climate		
Precip01_JAN (mm)	119.05000	104.85000 ± 26.28129
Precip02_FEB (mm)	99.50000	83.66667 ± 27.10278
Precip03_MAR (mm)	90.85000	77.23611 ± 27.15950
Precip04_APR (mm)	119.05000	104.85000 ± 26.28129
Precip05_MAY (mm)	76.85000	71.65833 ± 17.81753
Precip06_JUN (mm)	82.70000	78.56667 ± 15.58521
Precip07_JUL (mm)	67.35000	64.39167 ± 10.41611
Precip08_AUG (mm)	62.85000	60.53056 ± 10.43373
Precip09_SEP (mm)	60.10000	56.91944 ± 10.91783
Precip10_OCT (mm)	70.50000	65.08056 ± 14.41229
Precip11_NOV (mm)	121.35000	105.93889 ± 25.04104
Precip12_DEC (mm)	132.95000	116.84444 ± 29.80954
PrecipTotal_ANNUAL (mm)	1057.20000	952.64722 ± 226.04690
Temp01_JANMax (Degrees Celsius)	-6.15000	-4.39167 ± 2.51268
Temp01_JANmin (Degrees Celsius)	-12.50000	-11.40833 ± 3.53951
Temp02_FEBmax (Degrees Celsius)	-3.05000	-1.70000 ± 2.12945
Temp02_FEBmin (Degrees Celsius)	-10.55000	-9.17500 ± 3.33361
Temp03_MARmax (Degrees Celsius)	0.45000	2.50556 ± 2.87525
Temp03_MARmin (Degrees Celsius)	-7.40000	-6.14167 ± 2.98556
Temp04_APRmax (Degrees Celsius)	4.60000	7.12222 ± 3.48771
Temp04_APRmin (Degrees Celsius)	-3.75000	-2.71667 ± 2.22785

Habitat Description

Variable	NGSTM02	Predicted Group Reference Mean ±SD
Temp05_MAYmax (Degrees Celsius)	9.55000	12.03889 ± 3.55434
Temp05_MAYmin (Degrees Celsius)	0.00000	1.04722 ± 2.08663
Temp06_JUNMax (Degrees Celsius)	13.45000	15.72500 ± 3.40030
Temp06_JUNMin (Degrees Celsius)	2.75000	4.00278 ± 2.41085
Temp07_JULmax (Degrees Celsius)	17.15000	19.56111 ± 3.47275
Temp07_JULmin (Degrees Celsius)	5.20000	6.35833 ± 2.28332
Temp08_AUGmax (Degrees Celsius)	17.05000	19.52222 ± 3.51100
Temp08_AUGmin (Degrees Celsius)	4.90000	6.19167 ± 2.34422
Temp09_SEPmax (Degrees Celsius)	11.95000	14.04444 ± 3.03456
Temp09_SEPmin (Degrees Celsius)	0.85000	2.04722 ± 2.37208
Temp10_OCTmax (Degrees Celsius)	5.05000	6.88889 ± 2.71577
Temp10_OCTmin (Degrees Celsius)	-2.40000	-1.46111 ± 1.64316
Temp11_NOVmax (Degrees Celsius)	-2.55000	-0.79722 ± 2.43512
Temp11_NOVmin (Degrees Celsius)	-8.10000	-6.68056 ± 2.97163
Temp12_DECmax (Degrees Celsius)	-6.60000	-4.66389 ± 2.69757
Temp12_DECmin (Degrees Celsius)	-12.30000	-10.65833 ± 3.71739
TempANNUALmax (Degrees Celsius)	4.70000	6.96389 ± 3.06157
TempANNUALmean (Degrees Celsius)	0.50000	2.25278 ± 2.66574
TempANNUALmin (Degrees Celsius)	-3.35000	-2.18056 ± 2.41152
Hydrology		
Drainage-Area (km^2)	1244.45368	124.42081 ± 200.99192
Perimeter (Km)	274.87689	64.71360 ± 56.15436
StreamDensity (m/km^2)	1994.08598	2246.06682 ± 604.89962
StreamLength (m)	2481547.63	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 (%)	0.27190	1.19263 ± 2.03874
Natl-BroadleafSparse (%)	0.00000	0.00000 ± 0.00000
Natl-Coniferous (%)	0.00000	0.00000 ± 0.00000
Natl-ConiferousDense (%)	0.40221	0.64845 ± 0.37668
Natl-ConiferousOpen (%)	52.32813	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 (%)	11.57502	13.20054 ± 11.11850
Natl-Grassland (%)	2.28696	1.87556 ± 1.68508
Natl-Herb (%)	5.92017	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 (%)	1.23619	1.56403 ± 2.75979
Natl-Shrubland (%)	0.00000	0.00000 ± 0.00000
Natl-ShrubLow (%)	5.93469	4.98298 ± 3.22579
Natl-ShrubTall (%)	0.00000	0.00000 ± 0.00000
Natl-SnowIce (%)	0.20660	0.08491 ± 0.15475
Natl-Water (%)	0.59086	0.22916 ± 0.36834
Natl-Wetland (%)	0.00000	0.00000 ± 0.00000
Natl-WetlandHerb (%)	0.01794	0.12918 ± 0.35193
Natl-WetlandShrub (%)	0.03060	0.00000 ± 0.00000
Natl-WetlandTreed (%)	0.00000	0.00000 ± 0.00000
Reg-Ice (%)	0.05967	0.02487 ± 0.06034
Substrate Data		
%Bedrock (%)	0	0 ± 0
%Boulder (%)	1	9 ± 9
%Cobble (%)	25	51 ± 15
%Gravel (%)	12	3 ± 3
%Pebble (%)	62	37 ± 20
%Sand (%)	0	0 ± 0

Habitat Description

Variable	NGSTM02	Predicted Group Reference Mean ±SD
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	4.00	15.12 ± 14.26
Dg (cm)	3.9	8.2 ± 2.8
Dominant-1st (Category(0-9))	5	7 ± 1
Dominant-2nd (Category(0-9))	6	7 ± 1
Embeddedness (Category(1-5))	4	5 ± 1
PeriphytonCoverage (Category(1-5))	1	1 ± 0
SurroundingMaterial (Category(0-9))	4	4 ± 1
Topography		
ElevationMax (m)	2912.00000	2634.66667 ± 309.54023
ElevationMin (m)	946.00000	913.41667 ± 271.25180
ElevationStdev (m)	372.86221	349.02363 ± 92.12445
Reg-SlopeLT30% (%)	17.10000	18.88386 ± 9.29866
Slope30-50% (%)	27.43328	29.00215 ± 6.33837
Slope50-60% (%)	15.01458	13.91808 ± 1.91315
SlopeAvg (%)	53.99074	52.79851 ± 8.68755
SlopeGT60% (%)	38.02037	35.47207 ± 13.39684
SlopeLT30% (%)	19.53177	21.60770 ± 8.54172
SlopeMax (%)	384.10376	298.94390 ± 146.30679
SlopeMin (%)	0.00000	0.19777 ± 0.29213
SlopeStdev (%)	27.51166	26.57529 ± 4.62351
Water Chemistry		
General-Alkalinity (mg/L)	30.0000000	71.7000000 ± 53.9231440
General-DO (mg/L)	10.5000000	11.4175000 ± 0.7986708
General-pH (pH)	6.9	7.9 ± 0.4
General-SpCond (µS/cm)	50.3000000	168.9833333 ± 123.7858182
General-TempAir (Degrees Celsius)	17.0	26.0
General-TempWater (Degrees Celsius)	9.5000000	7.3183333 ± 2.7240839
General-Turbidity (NTU)	1.3400000	0.2020000
Nitrogen-NO2 (mg/L)	0.0000000	0.0027500 ± 0.0062831
Nitrogen-NO2+NO3 (mg/L)	0.0700000	0.0690000
Nitrogen-NO3 (mg/L)	0.0700000	0.0546667 ± 0.0498148
Phosphorus-OrthoP (mg/L)	0.0000000	0.0002727 ± 0.0004671