Site Description

Study Name	CBWQ-Lardeau
Site	NHLAR01
Sampling Date	Oct 23 2010
Know Your Watershed Basin	Lower Kootenay
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Columbia Mountains and Highlands EcoRegion
Coordinates (decimal degrees)	50.50889 N, 117.27028 W
Altitude	2355
Local Basin Name	Lardeau R
	Lardeau
Stream Order	6

Figure 1. Location Map

Across Reach
Aerial (No image found)

Down Stream
Field Sheet (No image found)
Miscellaneous (No image found)

Substrate

Up Stream

Cabin Assessment Results

Reference Model Summary	
Model	Columbia-Okanagan Preliminary March 2010
Analysis Date	August 29, 2017
Taxonomic Level	Family

Cabin Assessment Results

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	0.7%	1.3%	13.3%	40.4%	44.5%
CABIN Assessment of NHLAR01 on Oct 23, 2010	Divergent				

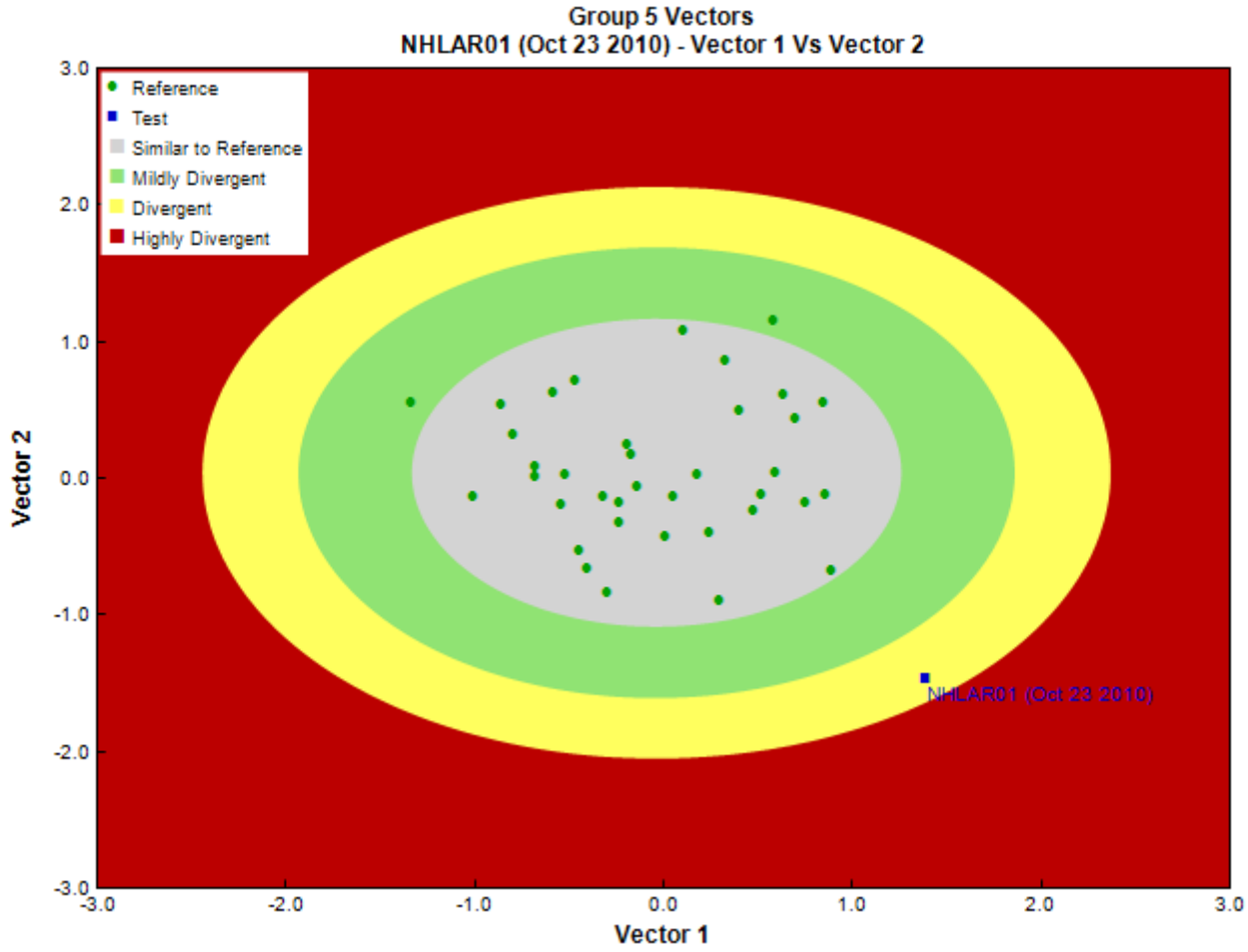

Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

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
Annelida	Oligochaeta	Enchytraeida	Enchytraeidae	28	28.0
		Lumbriculida	Lumbriculidae	1	1.0
		Tubificida		1	1.0
			Naididae	5	5.0
Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	1	1.0
	Insecta	Coleoptera	Elmidae	28	28.0
		Diptera	Ceratopogonidae	11	11.0
			Chironomidae	56	56.0
			Empididae	15	15.0
			Psychodidae	1	1.0
			Simuliidae	1	1.0
			Tabanidae	1	1.0
			Tipulidae	32	32.0
		Ephemeroptera	Baetidae	1	1.0
			Ephemerellidae	61	61.0
		Hemiptera	Corixidae	1	1.0
		Odonata	Aeshnidae	1	1.0
		Plecoptera	Chloroperlidae	4	4.0
			Perlodidae	2	2.0
		Trichoptera	Hydropsychidae	1	1.0
			Hydroptilidae	4	4.0
			Lepidostomatidae	17	17.0
			Leptoceridae	78	78.0
			Limnephilidae	34	34.0
			Polycentropodidae	2	2.0
Cnidaria	Hydrozoa	Anthoathecatae	Hydridae	7	7.0
Mollusca	Gastropoda	Basommatophora	Lymnaeidae	1	1.0
			Total	395	395.0

Metrics

Name	NHLAR01	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.85	0.4 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	4.3	2.8 ± 0.3
Intolerant taxa	--	1.0 ± 0.0
Long-lived taxa	1.0	1.0 ± 0.0
Tolerant individuals (%)	0.5	0.3
Functional Measures		
% Filterers	1.0	1.7 ± 1.7
% Gatherers	78.5	50.6 ± 14.6
% Predatores	26.1	15.3 ± 9.0
% Scrapers	21.3	67.2 ± 16.8
% Shredder	47.8	38.1 ± 18.2
No. Clinger Taxa	12.0	19.8 ± 3.4
Number Of Individuals		
% Chironomidae	14.2	4.6 ± 5.0
% Coleoptera	7.1	0.0 ± 0.0
% Diptera + Non-insects	40.9	6.3 ± 5.3
% Ephemeroptera	15.7	44.9 ± 17.3
% Ephemeroptera that are Baetidae	1.6	26.1 ± 20.5
% EPT Individuals	51.8	93.7 ± 5.3
% Odonata	0.3	0.0 ± 0.0
% of 2 dominant taxa	35.3	60.2 ± 11.4
% of 5 dominant taxa	66.2	84.5 ± 5.9
% of dominant taxa	19.8	39.3 ± 12.3
% Plecoptera	1.5	42.9 ± 17.2
% Tribe Tanyatarisini	--	
% Trichoptera that are Hydropsychida	0.7	27.4 ± 27.1
% Tricoptera	34.5	5.8 ± 5.7
No. EPT individuals/Chironomids+EPT Individuals	0.8	1.0 ± 0.1
Total Abundance	395.0	2163.6 ± 1274.4

Metrics

Name	NHLAR01	Predicted Group Reference Mean ±SD
Richness		
Chironomidae taxa (genus level only)	1.0	0.9 ± 0.2
Coleoptera taxa	1.0	0.1 ± 0.2
Diptera taxa	7.0	2.4 ± 1.0
Ephemeroptera taxa	2.0	3.7 ± 0.5
EPT Individuals (Sum)	204.0	2023.9 ± 1195.7
EPT taxa (no)	10.0	12.3 ± 1.9
Odonata taxa	1.0	0.0 ± 0.0
Pielou's Evenness	0.8	0.7 ± 0.1
Plecoptera taxa	2.0	5.5 ± 1.1
Shannon-Wiener Diversity	2.5	1.9 ± 0.3
Simpson's Diversity	0.9	0.8 ± 0.1
Simpson's Evenness	0.3	0.3 ± 0.1
Total No. of Taxa	26.0	16.0 ± 3.0
Trichoptera taxa	6.0	3.2 ± 1.0

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites					Probability Of Occurrence at NHLAR01
	Group 1	Group 2	Group 3	Group 4	Group 5	
Baetidae	100%	100%	100%	100%	97%	0.99
Capniidae	78%	55%	50%	92%	68%	0.75
Chironomidae	100%	100%	100%	100%	95%	0.98
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%	0.87
Nemouridae	100%	100%	100%	100%	100%	1.00
Perlodidae	78%	78%	89%	92%	81%	0.86
Rhyacophilidae	100%	92%	100%	100%	95%	0.97
Taeniopterygidae	89%	49%	100%	92%	97%	0.95

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	13.13
RIVPACS : Observed taxa P>0.50	8.00
RIVPACS : O:E (p > 0.5)	0.61
RIVPACS : Expected taxa P>0.70	10.36
RIVPACS : Observed taxa P>0.70	6.00
RIVPACS : O:E (p > 0.7)	0.58

Habitat Description

Variable	NHLAR01	Predicted Group Reference Mean ±SD
Bedrock Geology		
Alluvium (%)	0.00000	0.00000 ± 0.00000
Intrusive (%)	16.91766	0.46153 ± 2.09955
Metamorphic (%)	0.00000	0.17691 ± 0.85012
Sedimentary (%)	74.81858	99.36155 ± 2.22799
Ultramafic (%)	0.00000	0.00000 ± 0.00000
Volcanic (%)	8.26376	0.00000 ± 0.00000
Channel		
Depth-Avg (cm)	21.8	21.5 ± 9.7
Depth-BankfullMinusWetted (cm)	100.00	38.14 ± 36.11
Depth-Max (cm)	28.0	31.0 ± 16.5
Macrophyte (PercentRange)	1	0 ± 0
Reach-%CanopyCoverage (PercentRange)	1.00	1.54 ± 1.28
Reach-DomStreamsideVeg (Category (1-4))	4	3 ± 1
Reach-Pools (Binary)	1	1 ± 0
Reach-Rapids (Binary)	0	0 ± 0
Reach-Riffles (Binary)	0	1 ± 0

Habitat Description

Variable	NHLAR01	Predicted Group Reference Mean ±SD
Reach-StraightRun (Binary)	1	0 ± 1
Slope (m/m)	0.0050000	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)	0.47	0.51 ± 0.27
Velocity-Max (m/s)	0.63	0.78 ± 0.40
Width-Bankfull (m)	15.0	13.7 ± 16.4
Width-Wetted (m)	12.0	9.0 ± 13.1
XSEC-VelMethod (Category (1-3))	1	2 ± 1
Climate		
Precip01_JAN (mm)	167.66667	130.45668 ± 67.17180
Precip02_FEB (mm)	133.50000	102.48242 ± 52.12836
Precip03_MAR (mm)	111.75000	89.80929 ± 42.79174
Precip04_APR (mm)	167.66667	135.11134 ± 66.06707
Precip05_MAY (mm)	76.41667	70.51109 ± 13.79432
Precip06_JUN (mm)	94.16667	86.65922 ± 19.93623
Precip07_JUL (mm)	84.83333	79.11475 ± 19.88523
Precip08_AUG (mm)	83.25000	76.86606 ± 21.34619
Precip09_SEP (mm)	79.41667	71.16784 ± 23.11306
Precip10_OCT (mm)	109.58333	88.14083 ± 44.84739
Precip11_NOV (mm)	166.16667	134.64587 ± 63.61897
Precip12_DEC (mm)	179.33333	142.32359 ± 65.85239
PrecipTotal_ANNUAL (mm)	1366.75000	1143.02476 ± 453.62461
Temp01_JANMax (Degrees Celsius)	-5.66667	-6.18206 ± 1.69263
Temp01_JANmin (Degrees Celsius)	-11.91667	-13.62029 ± 2.05208
Temp02_FEBmax (Degrees Celsius)	-2.58333	-2.89816 ± 1.88421
Temp02_FEBmin (Degrees Celsius)	-9.75000	-11.14625 ± 1.99282
Temp03_MARmax (Degrees Celsius)	0.91667	0.98920 ± 2.35950
Temp03_MARmin (Degrees Celsius)	-7.08333	-7.98295 ± 1.94687
Temp04_APRmax (Degrees Celsius)	5.33333	5.37616 ± 3.02243
Temp04_APRmin (Degrees Celsius)	-3.33333	-3.74673 ± 1.66191
Temp05_MAYmax (Degrees Celsius)	10.25000	10.12548 ± 3.18022
Temp05_MAYmin (Degrees Celsius)	0.25000	0.09616 ± 1.15628
Temp06_JUNMax (Degrees Celsius)	14.16667	13.85415 ± 3.23839
Temp06_JUNMin (Degrees Celsius)	3.08333	2.79527 ± 1.60213
Temp07_JULmax (Degrees Celsius)	17.91667	17.45582 ± 3.27590
Temp07_JULmin (Degrees Celsius)	5.41667	4.99257 ± 1.52992
Temp08_AUGmax (Degrees Celsius)	17.66667	17.36896 ± 3.11866
Temp08_AUGmin (Degrees Celsius)	5.41667	4.84827 ± 1.46649
Temp09_SEPmax (Degrees Celsius)	12.41667	12.13974 ± 2.86510
Temp09_SEPmin (Degrees Celsius)	1.66667	1.12535 ± 1.20660
Temp10_OCTmax (Degrees Celsius)	4.83333	5.04078 ± 2.46521
Temp10_OCTmin (Degrees Celsius)	-1.50000	-2.41023 ± 1.18961
Temp11_NOVmax (Degrees Celsius)	-2.08333	-2.24818 ± 1.93047
Temp11_NOVmin (Degrees Celsius)	-7.41667	-8.35137 ± 1.96467
Temp12_DECmax (Degrees Celsius)	-6.00000	-6.49458 ± 1.76429
Temp12_DECmin (Degrees Celsius)	-11.58333	-12.72330 ± 1.87798
TempANNUALmax (Degrees Celsius)	5.33333	5.16639 ± 2.57569
TempANNUALmean (Degrees Celsius)	0.91667	0.71683 ± 1.81248
TempANNUALmin (Degrees Celsius)	-2.58333	-3.38604 ± 1.60598
Hydrology		
Drainage-Area (km^2)	772.73506	135.66658 ± 373.96803
Perimeter (Km)	206.81843	55.78285 ± 83.00734
StreamDensity (m/km^2)	2058.99207	2198.74079 ± 886.68339
StreamLength (m)	1591055.37	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 (%)	3.16174	1.35705 ± 2.04550

Habitat Description

Variable	NHLAR01	Predicted Group Reference Mean ±SD
Natl-BroadleafSparse (%)	0.00000	0.31953 ± 0.53788
Natl-Coniferous (%)	0.00000	0.00000 ± 0.00000
Natl-ConiferousDense (%)	0.31039	4.95677 ± 7.46543
Natl-ConiferousOpen (%)	42.08616	34.34335 ± 18.65764
Natl-ConiferousSparse (%)	1.95565	1.39163 ± 1.60111
Natl-Deciduous (%)	0.00000	0.00000 ± 0.00000
Natl-Developed (%)	0.00000	0.00002 ± 0.00009
Natl-ExposedLand (%)	22.55306	16.95282 ± 9.64125
Natl-Grassland (%)	0.27699	5.60615 ± 5.17505
Natl-Herb (%)	9.19869	2.04978 ± 2.79736
Natl-MixedForest (%)	0.00000	0.00000 ± 0.00000
Natl-MixedwoodDense (%)	0.00000	0.02636 ± 0.08976
Natl-MixedwoodOpen (%)	0.09376	2.10440 ± 2.63686
Natl-MixedwoodSparse (%)	0.00000	0.01817 ± 0.04448
Natl-PerennCropsPast (%)	0.00000	0.00000 ± 0.00000
Natl-Rock/Rubble (%)	0.66478	6.97447 ± 7.52078
Natl-Shrubland (%)	0.00000	0.00000 ± 0.00000
Natl-ShrubLow (%)	0.80711	4.49178 ± 5.44294
Natl-ShrubTall (%)	0.00000	0.33533 ± 1.14136
Natl-SnowIce (%)	1.18387	7.70046 ± 9.06096
Natl-Water (%)	3.75471	0.14384 ± 0.45543
Natl-Wetland (%)	0.00000	0.00000 ± 0.00000
Natl-WetlandHerb (%)	0.19387	0.00639 ± 0.02401
Natl-WetlandShrub (%)	0.04236	0.00868 ± 0.02574
Natl-WetlandTreed (%)	0.00000	0.00226 ± 0.00959
Reg-Ice (%)	0.77961	3.06094 ± 5.65390
Substrate Data		
%Bedrock (%)	0	1 ± 1
%Boulder (%)	2	3 ± 3
%Cobble (%)	57	64 ± 17
%Gravel (%)	4	2 ± 2
%Pebble (%)	37	31 ± 16
%Sand (%)	0	0 ± 0
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	7.75	19.61 ± 30.65
Dg (cm)	7.1	20.3 ± 30.8
Dominant-1st (Category(0-9))	6	7 ± 1
Dominant-2nd (Category(0-9))	5	6 ± 1
Embeddedness (Category(1-5))	5	4 ± 1
PeriphytonCoverage (Category(1-5))	2	2 ± 1
SurroundingMaterial (Category(0-9))	6	3 ± 1
Topography		
ElevationMax (m)	2855.00000	2829.64865 ± 315.67549
ElevationMin (m)	698.00000	1172.81081 ± 249.32284
ElevationStdev (m)	466.03423	342.56455 ± 77.02221
Reg-SlopeLT30% (%)	17.95613	16.26604 ± 8.50298
Slope30-50% (%)	28.51300	28.13773 ± 4.86732
Slope50-60% (%)	14.65308	14.11202 ± 1.82185
SlopeAvg (%)	51.87576	56.75540 ± 7.27461
SlopeGT60% (%)	35.44664	39.57775 ± 9.82818
SlopeLT30% (%)	21.38728	18.17250 ± 6.88627
SlopeMax (%)	417.85806	317.81636 ± 141.61151
SlopeMin (%)	0.00000	0.79557 ± 1.30240
SlopeStdev (%)	27.84970	29.56849 ± 5.64880
Water Chemistry		
General-DO (mg/L)	10.0000000	11.0635135 ± 0.9899052
General-pH (pH)	7.9	7.7 ± 0.7
General-SpCond (µS/cm)	108.7000000	160.3567568 ± 118.4083015
General-TempAir (Degrees Celsius)	11.5	10.5 ± 0.7
General-TempWater (Degrees Celsius)	10.9000000	5.5262162 ± 1.8860693
General-Turbidity (NTU)	0.6700000	0.1015000 ± 0.0459619