

Site Description

| | |
|--|--|
| Study Name | CBWQ-Salmo |
| Site | NESHP01 |
| Sampling Date | Sep 20 2016 |
| Know Your Watershed Basin | Central Columbia |
| Province / Territory | British Columbia |
| Terrestrial Ecological Classification | Montane Cordillera EcoZone Selkirk-Bitterroot Foothills EcoRegion |
| Coordinates (decimal degrees) | 49.14128 N, 117.25862 W |
| Altitude | 2198 |
| Local Basin Name | Sheep Creek |
| | Columbia Basin |
| Stream Order | 4 |

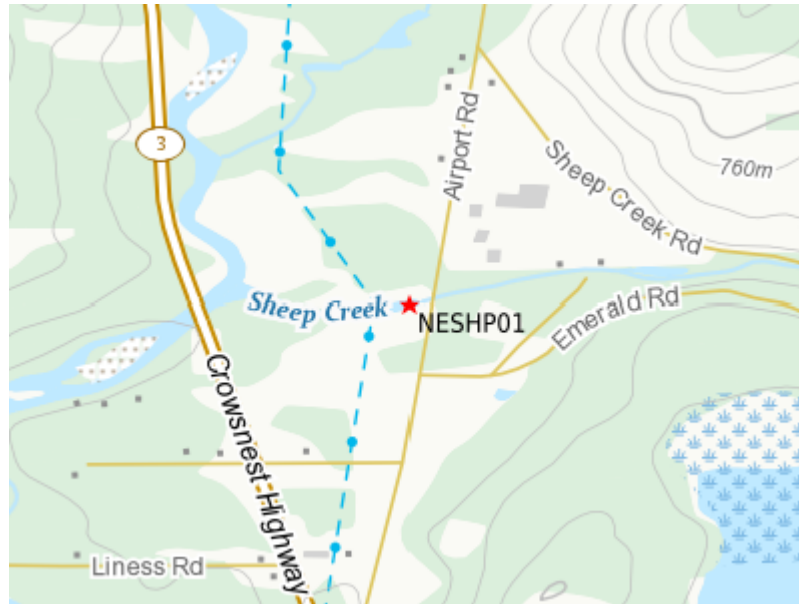
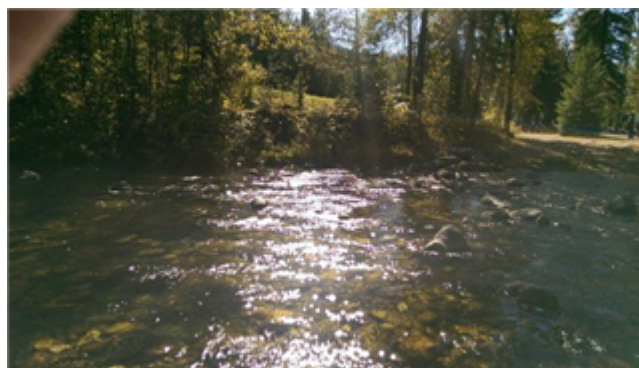


Figure 1. Location Map



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 | December 12, 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% | 7.6% | 8.0% | 82.0% | 2.4% |
| CABIN Assessment of NESHP01 on Sep 20, 2016 | Mildly Divergent | | | | |

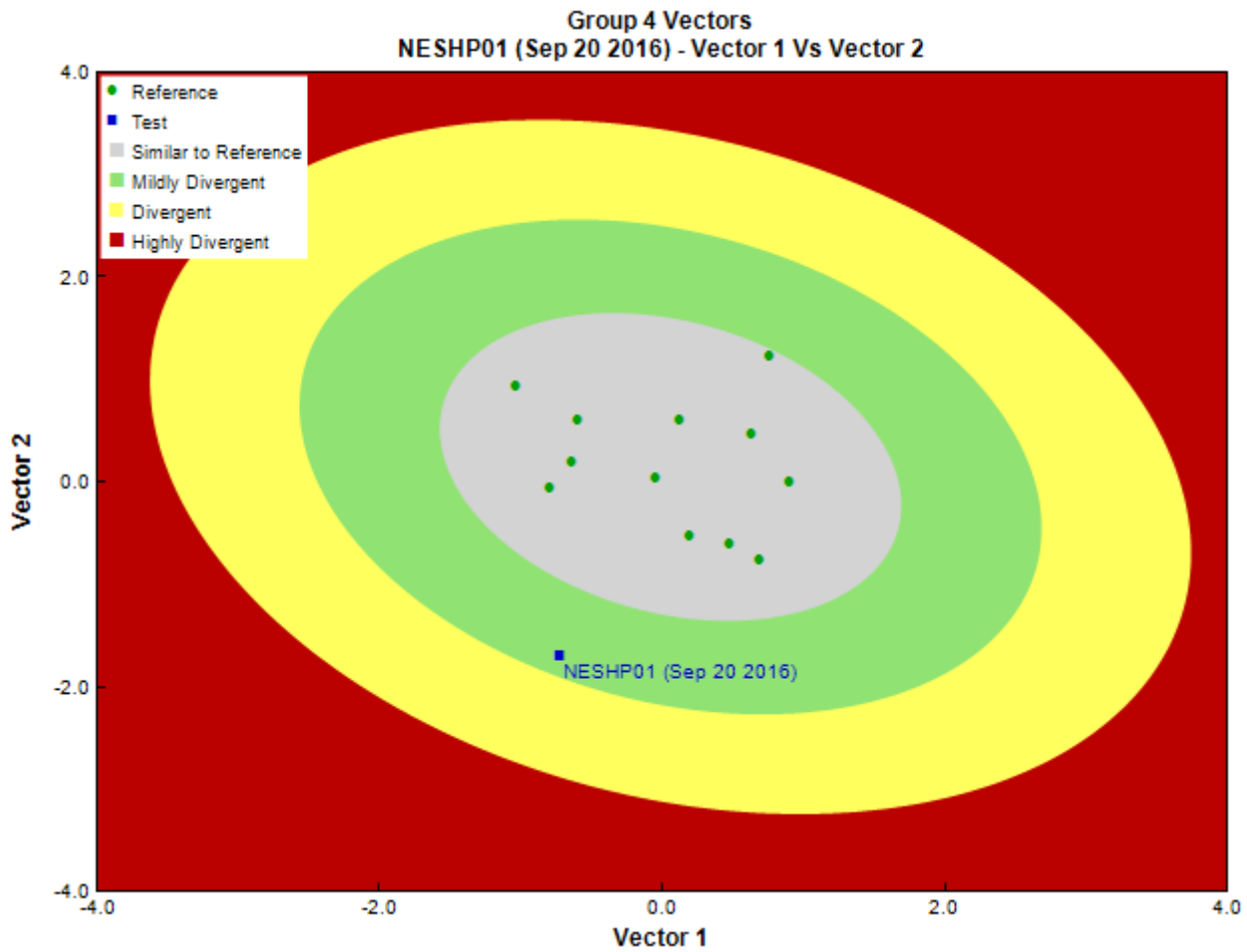


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

| | |
|--------------------------------|------------------------|
| Sampling Device | Kick Net |
| Mesh Size | 400 |
| Sampling Time | 3 |
| Taxonomist | Pina Viola, Consultant |
| Date Taxonomy Completed | October 22, 2016 |
| | Marchant Box |
| Sub-Sample Proportion | 8/100 |

Community Structure

| Phylum | Class | Order | Family | Raw Count | Total Count |
|------------|-------------|----------------|-----------------|-----------|-------------|
| Annelida | Oligochaeta | | | 3 | 37.5 |
| | | Lumbriculida | Lumbriculidae | 1 | 12.5 |
| Arthropoda | Arachnida | Trombidiformes | | 1 | 12.5 |
| | | | Hydryphantidae | 3 | 37.5 |
| | | | Hygrobatidae | 2 | 25.0 |
| | | | Lebertiidae | 8 | 100.0 |
| | | | Sperchontidae | 5 | 62.5 |
| | | | Torrenticolidae | 18 | 225.0 |
| | Insecta | Coleoptera | Dytiscidae | 1 | 12.5 |
| | | | Elmidae | 20 | 250.0 |
| | | Diptera | Ceratopogonidae | 1 | 12.5 |
| | | | Chironomidae | 82 | 1,025.0 |
| | | | Psychodidae | 16 | 200.0 |
| | | | Tipulidae | 10 | 125.0 |
| | | Ephemeroptera | Ameletidae | 7 | 87.5 |

Community Structure

| Phylum | Class | Order | Family | Raw Count | Total Count |
|--------|-------|-------------|------------------|-----------|-------------|
| | | | Baetidae | 10 | 125.0 |
| | | | EphemereIIDae | 40 | 500.0 |
| | | | Heptageniidae | 80 | 1,000.0 |
| | | | Leptophlebiidae | 9 | 112.5 |
| | | Plecoptera | Capniidae | 1 | 12.5 |
| | | | Chloroperlidae | 1 | 12.5 |
| | | | Nemouridae | 2 | 25.0 |
| | | | Perlodidae | 2 | 25.0 |
| | | Trichoptera | Brachycentridae | 24 | 300.0 |
| | | | Glossosomatidae | 2 | 25.0 |
| | | | Hydropsychidae | 1 | 12.5 |
| | | | Hydroptilidae | 1 | 12.5 |
| | | | Lepidostomatidae | 22 | 275.0 |
| | | | Limnephilidae | 2 | 25.0 |
| | | | Rhyacophilidae | 3 | 37.5 |
| | | | Total | 378 | 4,725.0 |

Metrics

| Name | NESHPO1 | Predicted Group Reference Mean \pm SD |
|---|---------|--|
| Bray-Curtis Distance | 0.86 | 0.4 \pm 0.1 |
| Biotic Indices | | |
| Hilsenhoff Family index (North-West) | 4.1 | 3.2 \pm 0.3 |
| Intolerant taxa | -- | |
| Long-lived taxa | 4.0 | 2.1 \pm 1.0 |
| Tolerant individuals (%) | 0.3 | 0.8 \pm 0.3 |
| Functional Measures | | |
| % Filterers | 6.6 | 2.2 \pm 1.8 |
| % Gatherers | 56.6 | 38.4 \pm 12.4 |
| % Predatores | 33.6 | 19.0 \pm 8.5 |
| % Scrapers | 31.0 | 63.2 \pm 19.7 |
| % Shredder | 21.4 | 27.6 \pm 15.2 |
| No. Clinger Taxa | 26.0 | 23.2 \pm 6.3 |
| Number Of Individuals | | |
| % Chironomidae | 21.9 | 7.4 \pm 6.4 |
| % Coleoptera | 5.6 | 1.5 \pm 3.9 |
| % Diptera + Non-insects | 39.0 | 10.8 \pm 7.6 |
| % Ephemeroptera | 39.0 | 51.7 \pm 18.8 |
| % Ephemeroptera that are Baetidae | 6.8 | 40.6 \pm 30.0 |
| % EPT Individuals | 55.3 | 87.7 \pm 7.4 |
| % Odonata | -- | 0.0 \pm 0.0 |
| % of 2 dominant taxa | 43.3 | 57.9 \pm 14.2 |
| % of 5 dominant taxa | 66.3 | 81.6 \pm 7.9 |
| % of dominant taxa | 21.9 | 39.8 \pm 14.9 |
| % Plecoptera | 1.6 | 31.4 \pm 15.4 |
| % Tribe Tanyatarisini | -- | |
| % Trichoptera that are Hydropsychida | 1.8 | 27.0 \pm 26.2 |
| % Tricoptera | 14.7 | 4.5 \pm 2.8 |
| No. EPT individuals/Chironomids+EPT Individuals | 0.7 | 0.9 \pm 0.1 |
| Total Abundance | 4725.0 | 587.4 \pm 299.1 |
| Richness | | |
| Chironomidae taxa (genus level only) | 1.0 | 1.0 \pm 0.0 |
| Coleoptera taxa | 2.0 | 0.4 \pm 0.5 |
| Diptera taxa | 4.0 | 3.3 \pm 1.0 |
| Ephemeroptera taxa | 5.0 | 3.8 \pm 0.8 |
| EPT Individuals (Sum) | 2587.5 | 526.0 \pm 285.8 |
| EPT taxa (no) | 16.0 | 13.3 \pm 2.7 |
| Odonata taxa | -- | 0.0 \pm 0.0 |
| Pielou's Evenness | 0.8 | 0.7 \pm 0.1 |
| Plecoptera taxa | 4.0 | 6.3 \pm 1.1 |
| Shannon-Wiener Diversity | 2.5 | 1.9 \pm 0.4 |
| Simpson's Diversity | 0.9 | 0.8 \pm 0.1 |

Metrics

| Name | NESHPO1 | Predicted Group Reference Mean \pm SD |
|--------------------|---------|---|
| Simpson's Evenness | 0.3 | 0.3 \pm 0.1 |
| Total No. of Taxa | 28.0 | 19.3 \pm 3.7 |
| Trichoptera taxa | 7.0 | 3.2 \pm 1.4 |

Frequency and Probability of Taxa Occurrence

| Reference Model Taxa | Frequency of Occurrence in Reference Sites | | | | | Probability Of Occurrence at NESHPO1 |
|----------------------|--|---------|---------|---------|---------|--------------------------------------|
| | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | |
| Baetidae | 100% | 100% | 100% | 100% | 97% | 1.00 |
| Capniidae | 78% | 55% | 50% | 92% | 68% | 0.85 |
| Chironomidae | 100% | 100% | 100% | 100% | 95% | 1.00 |
| Chloroperlidae | 78% | 88% | 94% | 100% | 100% | 0.99 |
| EphemereIIDae | 78% | 100% | 100% | 100% | 100% | 1.00 |
| Heptageniidae | 100% | 100% | 100% | 100% | 100% | 1.00 |
| Hydropsychidae | 11% | 92% | 78% | 92% | 86% | 0.90 |
| Nemouridae | 100% | 100% | 100% | 100% | 100% | 1.00 |
| Perlidae | 11% | 84% | 33% | 100% | 3% | 0.91 |
| Perlodidae | 78% | 78% | 89% | 92% | 81% | 0.90 |
| Rhyacophilidae | 100% | 92% | 100% | 100% | 95% | 0.99 |
| Taeniopterygidae | 89% | 49% | 100% | 92% | 97% | 0.89 |

RIVPACS Ratios

| | |
|--------------------------------|-------|
| RIVPACS : Expected taxa P>0.50 | 14.41 |
| RIVPACS : Observed taxa P>0.50 | 13.00 |
| RIVPACS : O:E (p > 0.5) | 0.90 |
| RIVPACS : Expected taxa P>0.70 | 11.43 |
| RIVPACS : Observed taxa P>0.70 | 10.00 |
| RIVPACS : O:E (p > 0.7) | 0.87 |

Habitat Description

| Variable | NESHPO1 | Predicted Group Reference Mean \pm SD |
|---|-----------|---|
| Channel | | |
| Depth-Avg (cm) | 25.8 | 23.6 \pm 11.1 |
| Depth-BankfullMinusWetted (cm) | 192.00 | 51.38 \pm 29.42 |
| Depth-Max (cm) | 40.0 | 34.6 \pm 12.3 |
| Macrophyte (PercentRange) | 1 | 0 \pm 0 |
| Reach-%CanopyCoverage (PercentRange) | 1.00 | 1.33 \pm 0.78 |
| Reach-DomStreamsideVeg (Category (1-4)) | 2 | 4 \pm 1 |
| Reach-Pools (Binary) | 1 | 1 \pm 0 |
| Reach-Riffles (Binary) | 1 | 1 \pm 0 |
| Reach-StraightRun (Binary) | 1 | 1 \pm 1 |
| Slope (m/m) | 0.0250000 | 0.0546683 \pm 0.0376269 |
| 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) | 0.50 | 0.48 \pm 0.22 |
| Velocity-Max (m/s) | 0.69 | 0.76 \pm 0.36 |
| Width-Bankfull (m) | 19.0 | 13.4 \pm 9.9 |
| Width-Wetted (m) | 15.0 | 8.5 \pm 5.8 |
| XSEC-VelInstrumentDirect (Category (1-3)) | 3 | 0 \pm 0 |
| XSEC-VelMethod (Category (1-3)) | 3 | 1 \pm 0 |
| Landcover | | |
| Reg-Ice (%) | 0.00000 | 0.02487 \pm 0.06034 |
| Substrate Data | | |
| %Bedrock (%) | 0 | 0 \pm 0 |
| %Boulder (%) | 11 | 9 \pm 9 |
| %Cobble (%) | 31 | 51 \pm 15 |
| %Gravel (%) | 9 | 3 \pm 3 |

Habitat Description

| Variable | NESHPO1 | Predicted Group Reference Mean \pm SD |
|-------------------------------------|------------|--|
| %Pebble (%) | 41 | 37 \pm 20 |
| %Sand (%) | 0 | 0 \pm 0 |
| %Silt+Clay (%) | 8 | 0 \pm 0 |
| D50 (cm) | 5.00 | 15.12 \pm 14.26 |
| Dg (cm) | 3.9 | 8.2 \pm 2.8 |
| Dominant-1st (Category(0-9)) | 6 | 7 \pm 1 |
| Dominant-2nd (Category(0-9)) | 5 | 7 \pm 1 |
| Embeddedness (Category(1-5)) | 5 | 5 \pm 1 |
| PeriphytonCoverage (Category(1-5)) | 2 | 1 \pm 0 |
| SurroundingMaterial (Category(0-9)) | 2 | 4 \pm 1 |
| Topography | | |
| Reg-SlopeLT30% (%) | 19.60980 | 18.88386 \pm 9.29866 |
| Water Chemistry | | |
| Ag (mg/L) | 0.0000100 | 0.0000050 |
| Al (mg/L) | 0.0137000 | 0.0049000 |
| As (mg/L) | 0.0001200 | 0.0002700 |
| B (mg/L) | 0.0250000 | 0.0500000 |
| Ba (mg/L) | 0.0228000 | 0.0682000 |
| Be (mg/L) | 0.0000500 | 0.0000100 |
| Bi (mg/L) | 0.0005000 | 0.0000050 |
| Ca (mg/L) | 17.3000000 | 21.1083333 \pm 16.8005659 |
| Cd (mg/L) | 0.0000950 | 0.0000050 |
| Chloride-Dissolved (mg/L) | 0.5000000 | 0.9750000 \pm 2.6309780 |
| Co (mg/L) | 0.0002500 | 0.0000100 |
| CO3 (mg/L) | 0.2500000 | 0.0000000 \pm 0.0000000 |
| Cr (mg/L) | 0.0005000 | 0.0001000 |
| Cu (mg/L) | 0.0002500 | 0.0001000 |
| Fe (mg/L) | 0.0050000 | 0.0080000 |
| General-Alkalinity (mg/L) | 46.7000000 | 71.7000000 \pm 53.9231440 |
| General-DO (mg/L) | 11.0000000 | 11.4175000 \pm 0.7986708 |
| General-Hardness (mg/L) | 54.5000000 | 84.2750000 \pm 70.6251066 |
| General-pH (pH) | 8.2 | 7.9 \pm 0.4 |
| General-SolidsTSS (mg/L) | 2.0000000 | 0.8849836 \pm 1.2378575 |
| General-TempAir (Degrees Celsius) | 12.0 | 26.0 |
| General-TempWater (Degrees Celsius) | 8.0000000 | 7.3183333 \pm 2.7240839 |
| General-Turbidity (NTU) | 0.4500000 | 0.2020000 |
| HCO3 (mg/L) | 56.9000000 | 0.0000000 \pm 0.0000000 |
| Hg (ng/L) | 5.0000000 | 0.0000000 \pm 0.0000000 |
| K (mg/L) | 0.5430000 | 0.6141667 \pm 0.4056971 |
| Li (mg/L) | 0.0025000 | 0.0011000 |
| Mg (mg/L) | 2.7100000 | 7.6666667 \pm 7.9748848 |
| Mn (mg/L) | 0.0005000 | 0.0006100 |
| Mo (mg/L) | 0.0005000 | 0.0006900 |
| Na (mg/L) | 0.8630000 | 1.5383333 \pm 1.2751459 |
| Ni (mg/L) | 0.0005000 | 0.0003000 |
| Nitrogen-NO2 (mg/L) | 0.0025000 | 0.0027500 \pm 0.0062831 |
| Nitrogen-NO2+NO3 (mg/L) | 0.0490000 | 0.0690000 |
| Nitrogen-NO3 (mg/L) | 0.0490000 | 0.0546667 \pm 0.0498148 |
| Nitrogen-TN (mg/L) | 0.1150000 | 0.0883333 \pm 0.0521943 |
| Pb (mg/L) | 0.0001000 | 0.0000520 |
| Phosphorus-OrthoP (mg/L) | 0.0063000 | 0.0002727 \pm 0.0004671 |
| Phosphorus-TP (mg/L) | 0.0095000 | 0.0045833 \pm 0.0049992 |
| S (mg/L) | 1.5000000 | 5.0000000 |
| Sb (mg/L) | 0.0002500 | 0.0000700 |
| Se (mg/L) | 0.0001600 | 0.0001200 |
| Si (mg/L) | 4.3800000 | 3.1516667 \pm 1.2277017 |
| Sn (mg/L) | 0.0025000 | 0.0000100 |
| Sr (mg/L) | 0.0545000 | 0.0443000 |
| Ti (mg/L) | 0.0025000 | 0.0005000 |
| Tl (mg/L) | 0.0000250 | 0.0000020 |
| U (mg/L) | 0.0004100 | 0.0011700 |
| V (mg/L) | 0.0025000 | 0.0002000 |

Habitat Description

| Variable | NESHP01 | Predicted Group Reference Mean \pmSD |
|------------------|----------------|--|
| Zn (mg/L) | 0.0054000 | 0.0010000 |
| Zr (mg/L) | 0.0002500 | 0.0000000 \pm 0.0000000 |