## Site Description

| | |
|---|---|
| **Study Name** | BC NGO-Goat River Ecological Monitoring |
| **Site** | GOA01 |
| **Sampling Date** | Sep 05 2022 |
| **Know Your Watershed Basin** | Lower Kootenay |
| **Province / Territory** | British Columbia |
| **Terrestrial Ecological Classification** | Montane Cordillera EcoZone<br>Columbia Mountains and Highlands EcoRegion |
| **Coordinates (decimal degrees)** | 49.08070 N, 116.51907 W |
| **Altitude** | 545 |
| **Local Basin Name** | Goat River |
| | Kootenay River |
| **Stream Order** | 5 |

Up Stream

## Cabin Assessment Results

| **Reference Model Summary** | |
|---|---|
| **Model** | Columbia Basin 2020 |
| **Analysis Date** | October 22, 2024 |
| **Taxonomic Level** | Family |
| **Predictive Model Variables** | Altitude<br>Drainage-Area<br>Longitude<br>Natl-Grassland<br>Natl-ShrubLow<br>Natl-Water<br>Precip10_Oct<br>Reach-%CanopyCoverage<br>Sedimentary<br>Slope<br>SlopeMax<br>Temp12_DECmin |

| **Reference Groups** | **1** | **2** | **3** | **4** | **5** | **6** |
|---|---|---|---|---|---|---|
| **Number of Reference Sites** | 13 | 24 | 28 | 35 | 32 | 15 |
| **Group Error Rate** | 53.8% | 55.2% | 34.1% | 52.2% | 23.1% | 29.4% |
| **Overall Model Error Rate** | 39.4% | | | | | |
| **Probability of Group Membership** | 13.4% | 53.7% | 13.3% | 12.1% | 2.7% | 4.8% |
| **CABIN Assessment of GOA01 on Sep 05, 2022** | Mildly Divergent | | | | | |

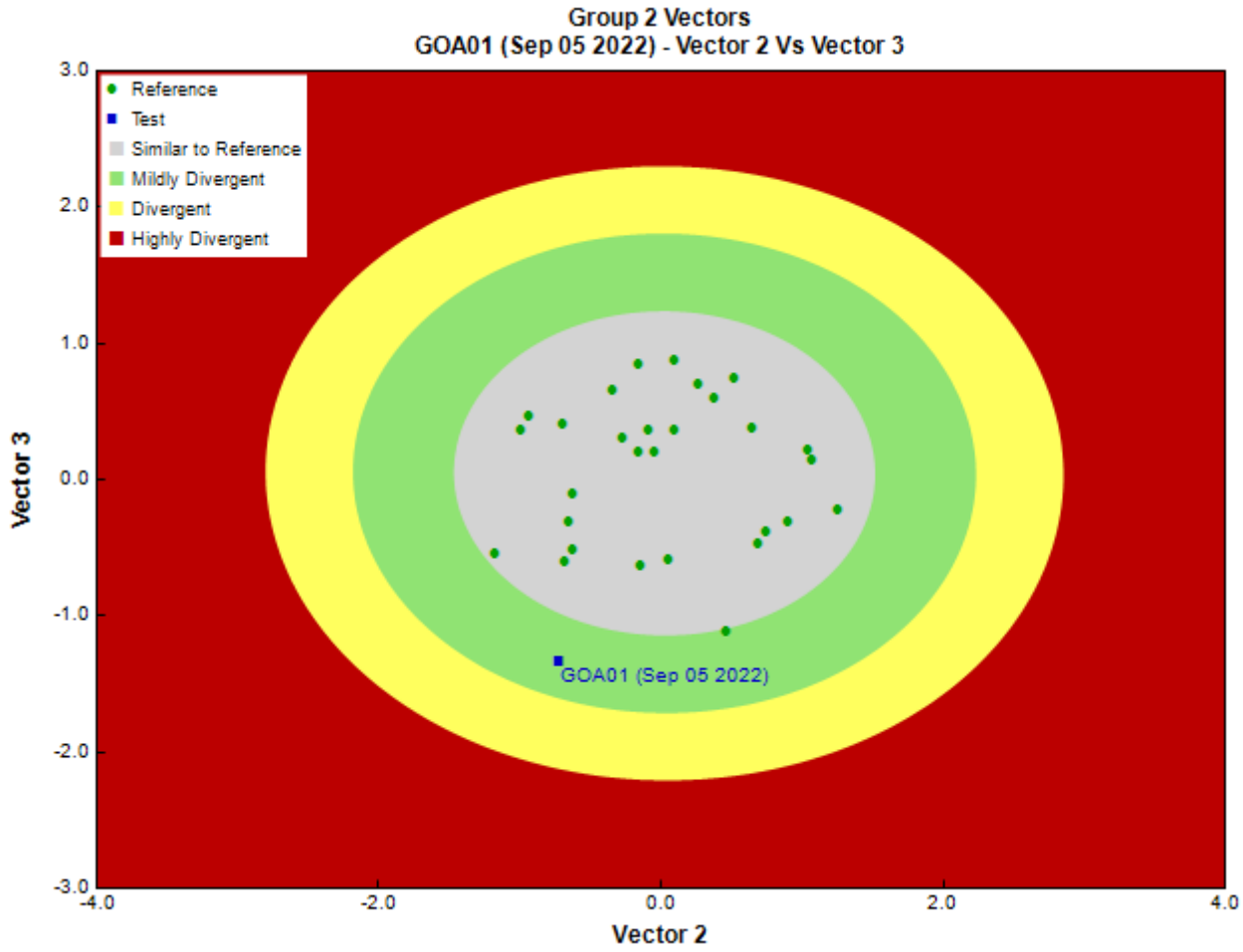


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

## Sample Information

| | |
|---|---|
| **Sampling Device** | Kick Net |
| **Mesh Size** | 400 |
| **Sampling Time** | 3 |
| **Taxonomist** | Pina Viola, Consultant |
| | Marchant Box |
| **Sub-Sample Proportion** | 24/100 |

## Community Structure

| Phylum | Class | Order | Family | Raw Count | Total Count |
|---|---|---|---|---|---|
| Arthropoda | Arachnida | Trombidiformes | | 1 | 4.2 |
| | | | Hygrobatidae | 1 | 4.2 |
| | | | Lebertiidae | 8 | 33.3 |
| | | | Sperchontidae | 2 | 8.3 |
| | | | Torrenticolidae | 26 | 108.3 |
| | Insecta | Coleoptera | Dytiscidae | 1 | 4.2 |
| | | | Elmidae | 7 | 29.2 |
| | | Diptera | Chironomidae | 38 | 158.3 |
| | | | Tipulidae | 5 | 20.9 |
| | | Ephemeroptera | Ameletidae | 2 | 8.3 |
| | | | Baetidae | 38 | 158.3 |
| | | | Ephemerellidae | 70 | 291.7 |
| | | | Heptageniidae | 91 | 379.3 |
| | | | Leptohyphidae | 1 | 4.2 |
| | | | Leptophlebiidae | 4 | 16.7 |
| | | Plecoptera | Chloroperlidae | 3 | 12.5 |

## Community Structure

| Phylum | Class | Order | Family | Raw Count | Total Count |
|---|---|---|---|---|---|
| | | | Perlidae | 2 | 8.3 |
| | | | Perlodidae | 2 | 8.3 |
| | | Trichoptera | Apataniidae | 1 | 4.2 |
| | | | Hydropsychidae | 6 | 25.0 |
| | | | Hydroptilidae | 4 | 16.7 |
| | | | Lepidostomatidae | 9 | 37.5 |
| | | | Total | 322 | 1,341.9 |

## Metrics

| Name | GOA01 | Predicted Group Reference Mean ±SD |
|---|---|---|
| **Bray-Curtis Distance** | 0.62 | 0.3 ± 0.1 |
| **Biotic Indices** | | |
| **Hilsenhoff Family index (North-West)** | 3.5 | 3.2 ± 0.3 |
| **Number Of Individuals** | | |
| **% Chironomidae** | 11.8 | 6.0 ± 5.6 |
| **% EPT Individuals** | 72.6 | 88.1 ± 9.3 |
| **% of 2 dominant taxa** | 50.2 | 54.4 ± 11.4 |
| **No. EPT individuals/Chironomids+EPT Individuals** | 0.9 | 0.9 ± 0.1 |
| **Total Abundance** | 1341.7 | 1083.1 ± 932.3 |
| **Richness** | | |
| **EPT taxa (no)** | 13.0 | 12.4 ± 2.4 |
| **Simpson's Diversity** | 0.8 | 0.8 ± 0.1 |
| **Simpson's Evenness** | 0.3 | 0.3 ± 0.1 |
| **Total No. of Taxa** | 21.0 | 18.2 ± 4.7 |

## Frequency and Probability of Taxa Occurrence

| Reference Model Taxa | Frequency of Occurrence in Reference Sites | | | | | | Probability Of Occurrence at GOA01 |
|---|---|---|---|---|---|---|---|
| | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 | |
| Baetidae | 100% | 100% | 100% | 100% | 100% | 100% | 1.00 |
| Capniidae | 77% | 79% | 63% | 74% | 63% | 76% | 0.76 |
| Chironomidae | 100% | 100% | 100% | 93% | 100% | 88% | 0.99 |
| Chloroperlidae | 77% | 93% | 88% | 93% | 96% | 82% | 0.90 |
| Ephemerellidae | 85% | 97% | 98% | 98% | 98% | 82% | 0.95 |
| Heptageniidae | 92% | 100% | 100% | 100% | 100% | 100% | 0.99 |
| Hydropsychidae | 46% | 72% | 71% | 91% | 79% | 53% | 0.70 |
| Nemouridae | 85% | 100% | 98% | 98% | 98% | 100% | 0.97 |
| Perlodidae | 77% | 97% | 85% | 83% | 90% | 82% | 0.90 |
| Rhyacophilidae | 69% | 100% | 83% | 91% | 98% | 82% | 0.92 |
| Taeniopterygidae | 69% | 97% | 88% | 100% | 100% | 88% | 0.92 |

## RIVPACS Ratios

| | |
|---|---|
| **RIVPACS : Expected taxa P>0.50** | 12.33 |
| **RIVPACS : Observed taxa P>0.50** | 10.00 |
| **RIVPACS : O:E (p > 0.5)** | 0.81 |
| **RIVPACS : Expected taxa P>0.70** | 9.99 |
| **RIVPACS : Observed taxa P>0.70** | 7.00 |
| **RIVPACS : O:E (p > 0.7)** | 0.70 |

## Habitat Description

| Variable | GOA01 | Predicted Group Reference Mean ±SD |
|---|---|---|
| **Bedrock Geology** | | |
| **Sedimentary (%)** | 90.91000 | 91.25558 ± 24.81348 |
| **Channel** | | |
| **Depth-Avg (cm)** | 20.0 | 31.4 ± 15.4 |
| **Depth-BankfullMinusWetted (cm)** | 185.00 | 54.15 ± 36.59 |
| **Depth-Max (cm)** | 37.5 | 46.8 ± 23.7 |

## Habitat Description

| Variable | GOA01 | Predicted Group Reference Mean ±SD |
|---|---|---|
| **Macrophyte (PercentRange)** | 0 | 0 ± 0 |
| **Reach-%CanopyCoverage (PercentRange)** | 0.00 | 1.00 ± 0.96 |
| **Reach-DomStreamsideVeg (Category(1-4))** | 3 | 3 ± 1 |
| **Reach-Pools (Binary)** | 0 | 1 ± 1 |
| **Reach-Rapids (Binary)** | 0 | 0 ± 0 |
| **Reach-Riffles (Binary)** | 1 | 1 ± 0 |
| **Reach-StraightRun (Binary)** | 1 | 1 ± 1 |
| **Slope (m/m)** | 0.0070000 | 0.0435622 ± 0.0544263 |
| **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)** | 0.44 | 0.63 ± 0.23 |
| **Velocity-Max (m/s)** | 0.71 | 0.95 ± 0.33 |
| **Width-Bankfull (m)** | 98.0 | 23.6 ± 18.9 |
| **Width-Wetted (m)** | 24.5 | 14.0 ± 9.6 |
| **XSEC-VelInstrumentDirect (Category(1-3))** | 3 | 2 ± 0 |
| **XSEC-VelMethod (Category(1-3))** | 3 | 2 ± 1 |
| **Climate** | | |
| **Precip10_OCT (mm)** | 65.43328 | 93.78954 ± 37.73803 |
| **Temp12_DECmin (Degrees Celsius)** | -10.60250 | -12.77499 ± 1.90440 |
| **Hydrology** | | |
| **Drainage-Area (km^2)** | 1256.53600 | 267.49128 ± 347.95771 |
| **Perimeter (Km)** | 193.03860 | 107.09622 ± 85.97364 |
| **Landcover** | | |
| **Natl-Grassland (%)** | 5.43000 | 4.84000 ± 3.39798 |
| **Natl-ShrubLow (%)** | 0.07000 | 4.94988 ± 4.53147 |
| **Natl-Water (%)** | 0.29000 | 0.22026 ± 0.32058 |
| **Substrate Data** | | |
| **%Bedrock (%)** | 0 | 0 ± 1 |
| **%Boulder (%)** | 0 | 6 ± 7 |
| **%Cobble (%)** | 34 | 51 ± 23 |
| **%Gravel (%)** | 0 | 4 ± 6 |
| **%Pebble (%)** | 66 | 39 ± 23 |
| **%Sand (%)** | 0 | 0 ± 0 |
| **%Silt+Clay (%)** | 0 | 0 ± 0 |
| **D50 (cm)** | 5.60 | 8.79 ± 6.32 |
| **Dg (cm)** | 5.2 | 7.7 ± 3.1 |
| **Dominant-1st (Category(0-9))** | 5 | 6 ± 1 |
| **Dominant-2nd (Category(0-9))** | 6 | 6 ± 1 |
| **Embeddedness (Category(1-5))** | 4 | 4 ± 1 |
| **PeriphytonCoverage (Category(1-5))** | 3 | 2 ± 1 |
| **SurroundingMaterial (Category(0-9))** | 3 | 3 ± 1 |
| **Topography** | | |
| **SlopeMax (%)** | 923.50000 | 475.68167 ± 413.51912 |
| **Water Chemistry** | | |
| **Ag (mg/L)** | 0.0000250 | 0.0000038 ± 0.0000018 |
| **Al (mg/L)** | 0.0096000 | 0.0064450 ± 0.0021850 |
| **As (mg/L)** | 0.0025000 | 0.0002615 ± 0.0000120 |
| **B (mg/L)** | 0.0250000 | 0.0262500 ± 0.0335876 |
| **Ba (mg/L)** | 0.0127000 | 0.0683500 ± 0.0002121 |
| **Be (mg/L)** | 0.0000500 | 0.0000075 ± 0.0000035 |
| **Bi (mg/L)** | 0.0000500 | 0.0000038 ± 0.0000018 |
| **Ca (mg/L)** | 9.4400000 | 24.6363636 ± 20.0629852 |
| **Cd (mg/L)** | 0.0000050 | 0.0000038 ± 0.0000018 |
| **Co (mg/L)** | 0.0000500 | 0.0000114 ± 0.0000019 |
| **Cr (mg/L)** | 0.0002500 | 0.0000750 ± 0.0000354 |
| **Cu (mg/L)** | 0.0002000 | 0.0001155 ± 0.0000219 |
| **Fe (mg/L)** | 0.0270000 | 0.0105500 ± 0.0036062 |
| **General-Alkalinity (mg/L)** | 46.2000000 | 74.2125000 ± 53.9915558 |
| **General-Conductivity (µS/cm)** | 82.8000000 | 121.7600000 ± 104.0053005 |
| **General-DO (mg/L)** | 9.9300000 | 11.0129630 ± 0.8955266 |

## Habitat Description

| Variable | GOA01 | Predicted Group Reference Mean ±SD |
|---|---|---|
| **General-Hardness (mg/L)** | 35.7000000 | 95.8956522 ± 77.3576081 |
| **General-pH (pH)** | 6.7 | 7.7 ± 0.8 |
| **General-SolidsTSS (mg/L)** | 1.0000000 | 5.9463636 ± 8.6422279 |
| **General-SpCond (µS/cm)** | 81.2000000 | 165.1777778 ± 128.4575336 |
| **General-TempAir (Degrees Celsius)** | 26.0 | 11.5 ± 5.9 |
| **General-TempWater (Degrees Celsius)** | 17.2000000 | 6.4451852 ± 2.2997548 |
| **General-Turbidity (NTU)** | 0.1700000 | 5.7154545 ± 6.9690564 |
| **K (mg/L)** | 0.4700000 | 0.4604091 ± 0.2737828 |
| **Li (mg/L)** | 0.0004500 | 0.0011000 ± 0.0000000 |
| **Mg (mg/L)** | 2.9400000 | 8.6045455 ± 7.5439965 |
| **Mn (mg/L)** | 0.0023300 | 0.0007470 ± 0.0001937 |
| **Mo (mg/L)** | 0.0004400 | 0.0006780 ± 0.0000170 |
| **Na (mg/L)** | 1.9000000 | 1.0881818 ± 0.7163042 |
| **Ni (mg/L)** | 0.0002000 | 0.0001625 ± 0.0001945 |
| **Nitrogen-NO2 (mg/L)** | 0.0050000 | 0.0034091 ± 0.0048394 |
| **Nitrogen-NO2+NO3 (mg/L)** | 0.0050000 | 0.0789333 ± 0.0140433 |
| **Nitrogen-NO3 (mg/L)** | 0.0050000 | 0.0719000 ± 0.0408583 |
| **Nitrogen-TKN (mg/L)** | 0.0250000 | 0.0200000 |
| **Nitrogen-TN (mg/L)** | 0.0250000 | 0.0929091 ± 0.0373336 |
| **Pb (mg/L)** | 0.0001000 | 0.0000337 ± 0.0000259 |
| **Phosphorus-OrthoP (mg/L)** | 0.0050000 | 0.0005167 ± 0.0006974 |
| **Phosphorus-TDP (mg/L)** | 0.0025000 | 0.0010200 ± 0.0007879 |
| **Phosphorus-TP (mg/L)** | 0.0250000 | 0.0049864 ± 0.0043795 |
| **S (mg/L)** | 1.5000000 | 5.0000000 |
| **Sb (mg/L)** | 0.0002000 | 0.0000635 ± 0.0000092 |
| **Se (mg/L)** | 0.0002500 | 0.0001105 ± 0.0000134 |
| **Si (mg/L)** | 4.3000000 | 2.5681818 ± 1.4562562 |
| **Sn (mg/L)** | 0.0001000 | 0.0000075 ± 0.0000035 |
| **Sr (mg/L)** | 0.0340000 | 0.0445000 ± 0.0002828 |
| **Te (mg/L)** | 0.0002500 | 0.0000000 ± 0.0000000 |
| **Th (mg/L)** | 0.0000500 | 0.0000000 ± 0.0000000 |
| **Ti (mg/L)** | 0.0025000 | 0.0005000 |
| **Tl (mg/L)** | 0.0000100 | 0.0000015 ± 0.0000007 |
| **U (mg/L)** | 0.0003750 | 0.0012050 ± 0.0000495 |
| **V (mg/L)** | 0.0025000 | 0.0001500 ± 0.0000707 |
| **Zn (mg/L)** | 0.0020000 | 0.0006400 ± 0.0005091 |
| **Zr (mg/L)** | 0.0000500 | 0.0000000 ± 0.0000000 |