Macroinvertebrate Sampling:

Metrics and Results

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Preliminary Results – Not for Attribution
Biomonitoring Background
Why monitor Benthic Macroinvertebrates?

- Relatively high number of species
- Evolved with specific adaptations to the environment
- Relatively long aquatic life-stage
- Information is available for most species
- Differing levels of sensitivity
*Heptagenia solitaria*: Scraper, Clinger
Bibiocephala grandis: Scraper, Clinger
Capnura wanica: Shredder, Clinger
Hexatoma sp.: Predator, Burrower
Simulium vittatum: Collector-Filterer, Clinger
Pseudodiamesa sp.: Collector-Gatherer, Sprawler
Macroinvertebrate Identification and Enumeration

Diptera/Misc.

Trichoptera
Sampling methods

- Variety of different methods
- Quantitative Sampling (Hess and Surber)
- USFS
- USGS
- CDPHE (WQCD)
Sampling Methods:

ERWSD
- Three replicate samples at each site
- Quantitative Samples at each site

WQCD
- One sample per site
- Semi-Quantitative (Qualitative) Samples
Differences: ERWSD vs WQCD

1. Sampling Method
2. Sample Processing
3. Metric Calculations
Sample Processing:

ERWSD

- Three replicate samples (~ .30 m$^2$)
- All specimens sorted and identified (n=22,716)

WQCD

- One sample at each site (~ 1.0 m$^2$)
- 300-count Sorting and Identification (n=5,004)
- Large and Rare Taxa
Data Analysis = Metrics

- Tools used to Measure Aquatic Conditions
- Specific Design – examples: EPT, HBI, Shredders
- Accuracy as stress indicators
- Multiple Metric Design (WQCD - MMI v3)
MMI v3 (Multi-Metric Index):

- Combines 5-6 equally weighted metric values
- Scores based on relative percent comparison to a reference condition
- Values range from 0.0 to 100.0
- Higher values indicate better conditions

<table>
<thead>
<tr>
<th>MMI  Biotype 2</th>
<th>100.0 - 50.1</th>
<th>Attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50.0 - 42.0</td>
<td>Grey Zone</td>
</tr>
<tr>
<td></td>
<td>41.9 - 0.0</td>
<td>Impaired</td>
</tr>
</tbody>
</table>
Results

ERWSD

Biomonitoring (Fall 2009)
Gore Creek – MMI (ERWSD vs WQCD)

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Gore Creek – MMI (ERWSD vs WQCD)

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Eagle R – MMI (ERWSD vs WQCD)

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Eagle R - MMI v3 (ERWSD vs WQCD)
More Results:

Other Metrics
DAT

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Functional Feeding Groups – Gore Creek

Preliminary Results – Not for Attribution
Functional Feeding Groups – Eagle River

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Summary:

- Stressed conditions exist within the study area (particularly in Gore creek)
- Problem areas at this time appear to be more strongly associated with non-point sources
- Rapid decline in aquatic conditions is persistent in Gore Creek
- Does not appear to be a strong relationship between metric scores and nutrients