Narrative Water Quality Standard
Benthic Sampling & Reporting Requirements
Topics

• NPDES Permit Requirements for Benthic Sampling
• Expectations for Benthic Sampling Reports
• Benthic Sampling Methodology & Comparability
• Report Submittal Requirements & Procedure
NPDES Permit Language for Bio Monitoring

- Benthic survey must be conducted between April 15 & October 15
  - Data outside this window is not comparable
- Annual survey as close to baseline survey date as possible (rule of thumb - 30 day window)
  - 15 days on either side of baseline anniversary date
- Survey to be conducted in accordance with Standard Conditions for Environmental Assessments on Wadeable Streams provided with WVDNR Scientific Collection Permit and WVDEP’s WVSCI protocol
  - Standard Conditions refers to EPA 1999 RBP Manual “in general” (good secondary reference)
  - **2009 or more recent WVDEP-WAB SOP** (WVSCI protocol & Narrative Guidance)
    - Provides specific details for producing comparable samples for WVSCI calculation
    - This is the primary reference
NPDES Permit Language for Bio Monitoring (ctd.)

• Within 90 days provide:
  – RBP scores
  – Chemical data (Specific Conductance, TDS, pH, SO$_4$, alkalinity, Ca, Mg, Na, K) from same time & locations as benthic macroinvertebrate samples
  – Benthic macroinvertebrate data:
    • **Must report the following:** WVSCI score & metrics, raw data (IDs and count), # of grids picked to reach 200 count subsample
    • Entered into WVDEP-DNR database and submitted via export queries (ensure you are using most recent version of database)
    • Submit habitat and WQ data by export queries
  – Representative legible photographs of survey sites
  – Narrative Executive Summary
  – Information sent to Regional NPDES Supervisor & ERA and Headquarters ERA
Gridded Sorting Tray
Gridded Sorting Tray with sample

Report number of grids picked to get 200 organism subsample:
Minimum of 4 grids must be picked (randomly re-subsample if necessary)
Generic Benthic Report Outline

• Introduction
• Methods and Procedures
• Site Locations and Descriptions
• Results
• Discussion and Conclusions
• References
• Figures
• Appendices
Generic Benthic Report

• Introduction
  – Description of mining operation, large scale geographic location, etc.

• Methods & Procedures: What, How & Who
  – Bio: Net type & size, sieve size, # of kicks, sample area, reference texts, identification keys used, who collected & who identified
  – Chem: who collected, who analyzed, what suites analyzed (make sure MDLs below criteria; pH, Temp & SpCond need to be taken in the field; TDS needs to be lab analyzed)
  – Habitat: method & parameter description

• Site Locations & Descriptions
  – Table with BAS nomenclature, coordinates, & sample date
  – Physical description of BASs (why is the site at that location - include relationship to outlets, confluences, residential areas, & other BASs where applicable)
  – Document significant influences within 100 m reach of each BAS when they exist
Generic Benthic Report (ctd.)

• Results
  – Tables and/or narrative with site by site summaries

• Discussion & Conclusions (Executive Summary)
  – tie ALL data together with influences, activities, geology, land use, etc. to develop big picture analysis of information
  – Should NOT be a wordy regurgitation of results
  – Site comparisons – where significant differences exist attempt to make sense of them with respect to natural cycles, sample variation, sample error, and surrounding impacts. Oddities and excursions should be examined.
  – Annual reports should have cumulative discussions of changes in impacts and results (gas well, residential construction, logging, mining construction, natural effects)
Generic Benthic Report Outline (ctd.)

• Appendices, Figures, & References
  – **Photos**: upstream, downstream, & typical sample substrate
    • Should be from appropriate visit, in focus, & well lit
    • Should represent conditions at the time of the sample represented
  – **Field Forms**: field verified coordinates, field notes
    • Good for verification when data conflicts, is absent, or is nebulous
  – **Taxa Lists, Metric calculations**, Database Screenshots
  – **Maps**
  – **Chemical Analyses**: data verification, unit ?s
  – **Reference Text List**
Typical sample substrate picture example
Box And Whisker Plot Example

- 95th percentile
- 75th percentile
- Median
- 25th percentile
- 5th percentile

n = 145
Methodology & Comparability

• Follow methods to ensure repeatable, comparable benthic samples
  – Annual surveys for years into the future
• Reference pgs. 190-192 in 2011 WAB SOP for restrictions on calculating WVSCI
• Reference pgs. 159-164 in 2011 WAB SOP for Benthic Sampling Protocols
• Reference pgs. 169-175 in 2011 WAB SOP for Sample Processing Protocols
Methodology and Comparability

- 595-600 μm mesh net and #30 (600 μm) sieve for all new baseline surveys
  - 500 μm mesh net and #30 (600 μm) sieve acceptable on projects that have already used this equipment for baseline
- Rectangular kicknet (0.5 m) $\rightarrow$ 4 kicks x 0.25 m$^2$ = 1.0 m$^2$
- D-frame kicknet (0.33 m) $\rightarrow$ 9 kicks x 0.109 m$^2$ = 1.0 m$^2$
Methodology and Comparability (ctd.)

• Taxonomic resolution for the WVSCI is family level except for Nematoda & Collembola. However, all taxa should be identified to the genus level or lowest practical taxon. (2011 WAB SOP p. 176)
  – Chironomids to family

• WVSCI on properly subsampled, riffle/run samples only
  – Inappropriate to calculate WVSCI on multihabitat or total picks >240 organisms
  – Inappropriate to calculate WVSCI on samples taken in non-flowing conditions

• Total # organisms: 200 ± 20% (160 ≤ x ≤ 240)
  – If there are > 240 organisms a manual random re-subsample or WVDEP performed electronic re-subsample must be performed in order to maintain comparability. This is NOT rarefaction, which is inappropriate for this use.
  – If there are < 100 organisms, the samples will be scrutinized for comparability
WVDEP WAB grid counts to get 200 organism subsample

$n = 3638$
Methodology and Comparability (ctd.)

• Take care when sampling:
  – After high water events (scour)
  – After periods of drought or very low flows (areas that were recently dry)
  – During very high flows (bugs washed over/around or out of net)
  – During very low flows (bugs not washed into net efficiently)

• Do not sample during turbid conditions
  – If you can’t see the bottom, don’t sample
  – Unrepresentative chemical samples (high TSS & total metals)
  – Cannot effectively perform several important RBP measures
    • Epifaunal Substrate, Embeddedness, Sediment Deposition
  – Cannot effectively select best available habitat for benthic sample
Enter the Benthic Collection Info

Enter the Benthic Collection Comparability Info

Enter the Benthic Picking and Identification Info

Sample Comparability Information
Methodology and Comparability (ctd.)

• RBP done independently at each site for each visit and over the entire 100m reach

• Do not calculate total RBP for dry streams
  – Cannot realistically evaluate Epifaunal Substrate/Available Fish Cover, Velocity/Depth Regimes, Riffle Frequency, Channel Flow Status

• BASs must be sampled within days of each other to maintain ability to compare sites
Recommendations

• Sampling at very end of index period not recommended (<1% WVDEP samples, egg hatches, recently dry streams = short colonization, fresh leaf fall)

• Sample watershed reference when available (yearly variation control sites)

• Perform duplicate benthic sampling (WVDEP-WAB does 2.5%)

• Get duplicate identifications (WVDEP-WAB gets 5%)

• Perform duplicate chemical sampling and field blank analyses
Field Training

- No large-scale field training as in the past
- Available by appointment by organization
- WAB representative will lead
- ≤10 active participants per training
- Manager must be present
- Will cover field-based assessments & sampling techniques in interactive format
WVDEP-DNR Scientific Collection Permit Database

- Format 2 fields as outlined to standardize submittal and streamline import & export of data
- **New Station Code** = Permit# + BASname with no spaces or punctuation (ensures unique identifier)
  - Example: WV10xxxxxBASUS001
- **Project Name** = Permit# (WV10xxxxx)
- Submit export queries by project (permit#) with digital copy of report to WVDEP headquarters ERA via email
  - kevin.d.seagle@wv.gov
- Submit written copies to Region and HQ for review and archival
- Submission of these queries to WVDEP does **NOT** satisfy Scientific Collection Permit requirements to submit data to WVDNR at the end of sample year
Select Open New Sample Button to Reach Sample Info Form

Permit # + BASname with no spaces or dashes

WARNING! The data in this subform applies to multiple samples/records. Do not modify data on this form unless you are:
1) Adding new info
2) Expanding out Any additional map location information to existing SATELITE DATABASE BUT SHOULD BE FILLED IN IF KNOWN.

Station Data Entry Form

Enter the Station Info First

New Station Code: WY3009121BASUS001
Date Added: 3/7/2012

Permit # + BASname with no spaces or dashes

Select Open New Sample Button to Reach Sample Info Form
Then Select Create New Project Button to Reach Project Info Tab

Enter the Sample Date, Time, & Survey Type

Then Enter the Sample Results in each of the applicable data types below

- Go to Benthic Macroinvertebrates
- Go to Fish
- Go to RBP Habitat
- Go to Water Quality
Enter Permit # here
Required Data For Query Submittal

Database and WVSCI Questions can be directed to:
Michael J. Whitman
Environmental Resource Specialist III
West Virginia Department of Environmental Protection
Division of Water and Waste Management
Watershed Branch-Watershed Assessment Section
601 57th Street S.E.
Charleston, WV 25304-2345
Phone: (304) 926-0499 ext. 1088 Fax: (304) 926-0463
Email: michael.j.whitman@wv.gov

To enter Station Information (Including Stream Name, Location, Coordinates, Watershed, County), Sample Data (Including Project, RBP Habitat, Benthic, Fish, and Water Quality Data) select:
- Data Entry Form

To enter (one time only) your Organization Information (Including Addresses, Electronic Addresses, and Phone Numbers) select:
- Organization Info

To export data into multiple Excel flat files (Project, Station, RBP Habitat, Water Quality, Raw Benthic, WVSCI Benthic, and Raw Fish) at a location of your choosing select one of the below:
- Export All Data
- Browse Projects
- Export Data by Project

Note: Select Yes for the first 8 prompts (this is updating the WVSCI scores into a fixed table), and then select the location to which you wish to export the Excel files.

To export by project, you must type in the exact name of the project as documented in the DATA ENTRY FORM. You will be prompted for this before exporting each of the Excel files.

Elkins, WV 26241
Phone: (304) 637-0245 Fax: (304) 637-0250
Email: barbara.d.sargent@wv.gov
Web: http://www.wvdrn.gov/wildlife/scollectpermit.shtml

EXIT DATABASE
Version 4.01 20110705
**Important:** You must enter the Benthic Collection Info before entering the Benthic Identifications Below!

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<th>Benthic Comments</th>
<th>Sample Methodology</th>
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<th>Larvae</th>
<th>Adults</th>
<th>Pupae</th>
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Enter the RBP Habitat Data

1. Epifaunal Substrate/Available Fish Cover
2. Embeddedness/Pond Substrate Characterization
3. Velocity Depth/Pond Variability
4. Channel Alteration
5. Sediment Deposition
6. Riffle Frequency/Channel Sinuosity
7. Channel Flow Status
8. Total Bank Stability
9. Total Bank Vegetative Protection
10. Total Width of Undisturbed Vegetative Zone

| Sample ID | 1 |

**RBP Habitat Data**

All Left vs. Right Bank data is based on Left/Right as you look downstream (e.g., Left Descending Bank).

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<td>3. Velocity Depth/Pond Variability</td>
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<td>5. Sediment Deposition</td>
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<td>6. Riffle Frequency/Channel Sinuosity</td>
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<td>7. Channel Flow Status</td>
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<td>8. Total Bank Stability</td>
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<td>9. Total Bank Vegetative Protection</td>
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<td>10. Total Width of Undisturbed Vegetative Zone</td>
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**Total RBP Score**: 135
**Calculated Narrative RBP Score**: Sub-Optimal

**WVDEP Narrative RBP Ranges**
- Optimal = >160
- Sub-Optimal = 110-159
- Marginal = 60-109
- Poor = <=59

**Then move on to other data types**

- Go to Benthic Macroinvertebrate
- Go to Fish
- Go to Water Quality

**Or**

- Go Back to Samples
- Go Back to Stations
- Go Back to MAIN MENU
## Water Quality Data

### Enter the Water Quality Data

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<th>Analysis Time</th>
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<td>0.389</td>
<td>mg/L or ppm</td>
<td></td>
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<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
</tr>
<tr>
<td>Fe Dissolved</td>
<td></td>
<td>0.155</td>
<td>mg/L or ppm</td>
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<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
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<tr>
<td>Ca Total</td>
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<td>mg/L or ppm</td>
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<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
</tr>
<tr>
<td>Mn Total</td>
<td></td>
<td>0.116</td>
<td>mg/L or ppm</td>
<td></td>
<td></td>
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<td>9/14/2021</td>
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<tr>
<td>Mn Dissolved</td>
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<td>0.01</td>
<td>mg/L or ppm</td>
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<td>9/14/2021</td>
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<td>3/7</td>
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<td>Mg Total</td>
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<td>6.37</td>
<td>mg/L or ppm</td>
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<td></td>
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<td>9/14/2021</td>
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<td>3/7</td>
</tr>
<tr>
<td>K Total</td>
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<td>mg/L or ppm</td>
<td></td>
<td></td>
<td></td>
<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
</tr>
<tr>
<td>Se Total</td>
<td>Yes</td>
<td>0.001</td>
<td>mg/L or ppm</td>
<td></td>
<td></td>
<td></td>
<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
</tr>
<tr>
<td>Na Total</td>
<td></td>
<td>4.33</td>
<td>mg/L or ppm</td>
<td></td>
<td></td>
<td></td>
<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
</tr>
<tr>
<td>Flow</td>
<td></td>
<td>0.583</td>
<td>s</td>
<td></td>
<td></td>
<td></td>
<td>9/14/2021</td>
<td>10:00</td>
<td>ABC Chem</td>
<td>3/7</td>
</tr>
</tbody>
</table>

*Then move on to other data types*  
Go to Benthic Macroinvertebrate  Go to Fish  Go to RBP Habitat

**or**  
Go Back to Samples  Go Back to Stations  Go Back to MAIN MENU
Export by Project (Permit#) Must match exactly as entered in project info.
Export queries to be e-mailed to me with electronic copy of report upon submittal of hard copies to Regional NPDES Supervisor & ERA and Headquarters ERA
Database version 4.02

- Database will compact and repair on close, speeding up performance of databases with large data sets
- Requires ANCode and coordinates
- Color coded impairment or threshold status for WVSCI and RBP
- Has QA/QC color coding for data entry forms
- “No Fish” option for fish surveys
- Instruction manual includes station and project naming conventions for NPDES benthic sampling
- HQ ERA contact info on Main Menu
- Available for download online at: 
  http://www.dep.wv.gov/WWE/watershed/bio_fish/Pages/Bio_Fish.aspx
WV DEP/DNR Scientific Collection Permit Database for Stream Benthic Macroinvertebrates and Fish

To enter Station Information (Including Stream Name, Location, Coordinates, Watershed, County), Sample Data (including Project, RBP Habitat, Benthic, Fish, and Water Quality Data) select:

- Data Entry Form

To enter one time only your Organization Information (Including Addresses, Electronic Addresses, and Phone Numbers) select:

- Organization Info

DMR Permit Submission Requirement, General DB, and Narrative Water Quality Permit Guidance Questions can be directed to:
Kevin D. Seagle
Environmental Resource Analyst
West Virginia Department of Environmental Protection
Division of Mining and Reclamation-NPDES Permit Development
601 57th Street S.E.
Charleston, WV 25304-2345
Phone: (304) 926-0499 ext. 1512  Fax: (304) 926-0456
Email: kevin.d.seagle@wv.gov
Web Link: WVDEP Narrative WQ Guidance

WVDEP WAB SOP and WVSCI Questions can be directed to:
Michael J. Whitman
Environmental Resource Analyst
West Virginia Department of Environmental Protection
Division of Water and Waste Management
Watershed Branch-Watershed Assessment Section
601 57th Street S.E.
Charleston, WV 25304-2345
Phone: (304) 926-0499 ext. 1088  Fax: (304) 926-0463
Email: michael.j.whitman@wv.gov
Web Link: WVDEP Division of Water and Waste Management

Scientific Collection Permit Questions can be directed to:
Barbara Sargent
West Virginia Division of Natural Resources
Wildlife Resources
Scientific Collecting Permit/Endangered Species Program
P.O. Box 67, Ward Road
Elkins, WV 26241
Phone: (304) 637-0245  Fax: (304) 637-0250
Email: barbara.d.sargent@wv.gov
Web Link: WVNR Scientific Collection Permit

To export data into multiple Excel flat files (Project, Station, RBP Habitat, Water Quality, Raw Benthic, WVSCI Benthic, and Raw Fish) at a location of your choosing select one of the below:
- Export All Data
- Browse Projects
- Export Data by Project

To EXPORT ALL DATA, simply choose a location to which you want the 8 Excel files saved.

To EXPORT PROJECT DATA, you must first choose a location to which you want the 8 Excel files saved. Then you must type in the exact name of the project as documented in the PROJECT DATA ENTRY FORM. You will be prompted for this before exporting all but the very first Excel files.

Important Links:
- WVSCI Document.pdf
- WVSCI Addendum.doc
- EPA RBP Download Page
- WVDEP WAB SOP (2011 or newer)

DNR Scientific Collection Permit Database and Training Materials (at bottom of WVDEP Hosted Page)

EXIT DATABASE
### Enter Benthic Final ID by Genus

**IMPORTANT:** You must enter the Benthic Collection Info before entering the Benthic Identifications Below!

<table>
<thead>
<tr>
<th>Family</th>
<th>Genus</th>
<th>Count</th>
<th>Benthic Comments</th>
<th>Sample Methodology</th>
<th>Voucherd</th>
<th>Larvae</th>
<th>Adults</th>
<th>Pupae</th>
<th>Exclude BI?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dytiscidae</td>
<td>Dytiscus</td>
<td>1</td>
<td></td>
<td>200 Count Subsample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulidae</td>
<td>Simulidae</td>
<td>2</td>
<td></td>
<td>200 Count Subsample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croninidae</td>
<td>Ablabesia</td>
<td>3</td>
<td></td>
<td>200 Count Subsample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croninidae</td>
<td>Linneaphyes</td>
<td>4</td>
<td></td>
<td>200 Count Subsample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croninidae</td>
<td>Polycystum</td>
<td>5</td>
<td></td>
<td>200 Count Subsample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Then**
- View VWSCI Score and Data
- View Benthic Life Histories
- Enter Family Level Benthic IDs
- Go back BENTHIC COLLECTION DATA ENTRY

**Then move on to other data types**
- Go to Fish
- Go to RBP Habitat
- Go to Water Quality

**or**
- Go Back to Samples
- Go Back to Stations
- Go Back to MAIN MENU
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Non Detect</th>
<th>Value</th>
<th>Default Units</th>
<th>Water Quality Notes</th>
<th>Analysis Method</th>
<th>NDL</th>
<th>Analysis Date</th>
<th>Analysis Time</th>
<th>Lab</th>
<th>Enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>No</td>
<td>14.33</td>
<td>°C</td>
<td></td>
<td>Field</td>
<td>10/2/2006</td>
<td>16:40</td>
<td></td>
<td>11/1</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>No</td>
<td>2.95</td>
<td>S.U.</td>
<td>pH probe was slow to resp</td>
<td>Field</td>
<td>10/2/2006</td>
<td>16:40</td>
<td></td>
<td>11/1</td>
<td></td>
</tr>
<tr>
<td>DO</td>
<td>No</td>
<td>10.3</td>
<td>mg/L or ppm</td>
<td></td>
<td>Field</td>
<td>10/2/2006</td>
<td>16:40</td>
<td></td>
<td>11/1</td>
<td></td>
</tr>
<tr>
<td>Specific Conductance</td>
<td>No</td>
<td>940</td>
<td>µS or umhos/cm</td>
<td></td>
<td>Field</td>
<td>10/2/2006</td>
<td>16:40</td>
<td></td>
<td>11/1</td>
<td></td>
</tr>
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<td>Hot Acidity</td>
<td>No</td>
<td>206</td>
<td>mg/L or ppm</td>
<td></td>
<td>EPA305.1</td>
<td>5.0000</td>
<td>10/10/2006</td>
<td>10:43</td>
<td>Biochem</td>
<td>11/1</td>
</tr>
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<td>Al Total</td>
<td>No</td>
<td>1.25</td>
<td>mg/L or ppm</td>
<td></td>
<td>EPA310.1</td>
<td>0.1500</td>
<td>11/10/2006</td>
<td>12:45</td>
<td>Biochem</td>
<td>11/1</td>
</tr>
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<td>AI Dissolved</td>
<td>Yes</td>
<td></td>
<td>mg/L or ppm</td>
<td></td>
<td></td>
<td>0.1500</td>
<td>11/10/2006</td>
<td>12:45</td>
<td>Biochem</td>
<td>11/1</td>
</tr>
<tr>
<td>Alkinity</td>
<td>Yes</td>
<td></td>
<td>mg/L or ppm</td>
<td></td>
<td></td>
<td>5.0000</td>
<td>10/10/2006</td>
<td>15:03</td>
<td>Biochem</td>
<td>11/1</td>
</tr>
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<td>No</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Then move on to other data types: Go to Benthic Macroinvertebrate, Go to Fish, Go to RBP Habitat
OR Go Back to Samples
OR Go Back to Stations
OR Go Back to MAIN MENU
**West Virginia Stream Condition Index (WVSCI)**

**IMPORTANT:** A blank screen below means that you have not entered the Benthic Identifications correctly! All individuals that are part of the 200-count subsample must be designated as such in the Sample Methodology column on the Benthic ID forms (Family or Genus).

**WVSCI Metrics and Scores**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>% 2 Dominant Taxa (Family)</td>
<td>100.00</td>
<td>37.3</td>
</tr>
<tr>
<td>% Chironomidae</td>
<td>86.67</td>
<td>1.7</td>
</tr>
<tr>
<td>% EPT (Family)</td>
<td>0.00</td>
<td>89.3</td>
</tr>
<tr>
<td>HHI (Family)</td>
<td>5.87</td>
<td>2.61</td>
</tr>
<tr>
<td># EPT Taxa (Family)</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td># Total Taxa (Family)</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

**WVSCI Score w/ BSV 1996-2001**

13.10

**WVSCI Category**

Impaired - Severely

**WVSCI Thresholds**

Unimpaired = >68.00
Gray Zone = 60.61 to 68.00
Impaired = <60.61

**Benthic Density**

<table>
<thead>
<tr>
<th># of grids Picked</th>
<th>Total # of grids</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

**Total Individuals**

15

**# of Organisms per Grid**

1.50

**Organisms per Sq cm**

0.0150

**Organisms per Sq m**

150.00

---

Enter Family Level Benthic IDs  Enter Genus Level Benthic IDs  View Benthic Life Histories  Go back BENTHIC COLLECTION DATA ENTRY

Then move on to other data types  Go to Fish  Go to RBP Habitat  Go to Water Quality

or  Go Back to Samples  or  Go Back to Stations  or  Go Back to MAIN MENU
Enter the RBP Habitat Data

1. Epifaunal Substrate/ Available Fish Cover
2. Embeddedness/ Pool Substrate Characterization
3. Velocity Depth/ Pool Variability
4. Channel Alteration
5. Sediment Deposition
6. Riffle Frequency/ Channel Sinuosity
7. Channel Flow Status
8. Total Bank Stability
9. Total Bank Vegetative Protection
10. Total Width of Undisturbed Vegetative Zone

All Left vs. Right Bank data is based on Left/Right as you look downstream (e.g., Left Descending Bank).

RBP Habitat Data

<table>
<thead>
<tr>
<th>RBP Habitat Data</th>
<th>Left</th>
<th>Right</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epifaunal Substrate/ Available Fish Cover</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embeddedness/ Pool Substrate Characterization</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Velocity Depth/ Pool Variability</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel Alteration</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sediment Deposition</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riffle Frequency/ Channel Sinuosity</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel Flow Status</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Bank Stability</td>
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<td></td>
</tr>
<tr>
<td>Left</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Bank Vegetative Protection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Width of Undisturbed Vegetative Zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
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</tr>
<tr>
<td>Total</td>
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<td></td>
</tr>
</tbody>
</table>

Total RBP Score: 105
Calculated Narrative RBP Score: Marginal

WVDEP Narrative RBP Ranges
Optimal = >160
Sub-Optimal = 110-159
Marginal = 60-109
Poor = <59

RBP Habitat Notes
Bugs-5, Fish-11. Velocity Depth-barely had one fast deep pool.

Then move on to other data types

Go to Benthic Macroinvertebrate
Go to Fish
Go to Water Quality

or
Go Back to Samples
Go Back to Stations
Go Back to MAIN MENU
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Count</th>
<th>Voucher</th>
<th>Max Fish Length (mm)</th>
<th>Min Fish Length (mm)</th>
<th>Min Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Fish</td>
<td>No Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IMPORTANT:** You must enter the Fish Collection Info before entering the Fish Identifications Below!

Then move on to other data types: [Benthic Macroinvertebrates], [RBP Habitat], [Water Quality] or [Go back to FISH DATA ENTRY FORM]

or [Go Back to Samples] or [Go Back to Stations] or [Go Back to MAIN MENU]