

APPENDIX B: 2007 RCWD SHEP DATA WORKSHEETS

Attached are sample data worksheets used by Rice Creek Watershed District volunteers during the 2007 SHEP season. These data worksheets include the following:

- 1. Habitat Assessment Field Data Sheets (5 pages)
- 2. Biological Survey Lab Data Sheet (1 page)
- 3. Macroinvertebrate Identification Lab Data Sheet (5 pages)

Habitat Assessment Field Data Sheet



| SITE (include county) | SITE NUMBER |
|--|---|
| INVESTIGATOR | DATE TIME |
| LOCAL COORDINATOR / ORGANIZATION | GPS GPS COORDINATES |
| WEATHER In past 24 hours: Now: Storm (heavy rain) Storm (heavy rain) Rain (steady) Rain (steady) Showers (intermittent) Showers (intermittent) Overcast Overcast Clear/Sunny Clear/Sunny TEMPERATURE READINGS (Take in the shade) Water temperature: Air temperature: WATER APPEARANCE (check one) | TYPE OF SAMPLING (check one) ROCKY BOTTOM MUDDY BOTTOM Record the number of jabs taken in each habitat type: Vegetated bank margins Snags and logs Aquatic vegetation beds Silt/sand/gravel substrate STREAM WIDTH 3 Measurements (in feet) 1 Average Stream Width: |
| ClearGreenBrownBlue-greenYellowMilky | 2 |
| WATER ODOR (check one) | STREAM DEPTH Minimum of 10 measurements (in feet) Measure the depth across the stream, from right bank to left bank in one-foot intervals for a minimum of 10 measurements. |
| LOCAL LAND USE Land use in the local watershed within approx.1/4 mile of the site. Check all that apply. Circle the dominant feature. | 1 2 3 4 5 6 7 8 9 10 11 12 |
| Residential Paved roads or bridges Commercial Unpaved roads Agricultural Construction Natural/Preserve Recreational use Lawns Industry | 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 |
| Wooded Land fill Crop land Waste treatment plant Grazing land Evidence of past alteration Feed lot Feed lot | 29 30 31 32 33 34 35 36 37 38 39 40 |

NOTE: Conduct all habitat assessments IN THE FIELD. Complete all data sheets before leaving the site.

SKETCH OF SITE

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, tributaries, landscape features, vegetation, and roads. Include all pipes draining directly into the stream and indicate direction of flow.

Were photos taken?

FIELD NOTES

Include notable observations such as any major landscape changes (including construction projects, bridge projects, etc.) upstream or adjacent to your site.

Rocky Bottom Sampling



DATE

| HABITAT PARAMETER | Optimal | CATE Suboptimal | GORY Marginal | Poor |
|---|---|--|--|--|
| 1 ATTACHMENT SITES FOR MACRO- INVERTEBRATES | Well-developed riffle and run; riffle is as wide as stream and length extends 2 times the width of the stream; cobble predominate; boulders and gravel common. | Riffle is as wide as stream but length is less than 2 times width; cobble less abundant; boulders and gravel common. | Run maybe be lacking; riffle not as wide as stream and its length is less than 2 times the stream width; gravel or large boulders and bedrock prevalent; some cobble present. | Riffle or run virtually nonexistent; large boulders and bedrock prevalent; cobble lacking. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 2 EMBEDDEDNESS | Fine sediment surrounds and fills in 0-25% of the living spaces around and in between the gravel, cobble, and boulders. | Fine sediment surrounds and fills in 25-50% of the living spaces around and in between the gravel, cobble, and boulders. | Fine sediment surrounds and fills in 50-70% of the living spaces around and in between the gravel, cobble, and boulders. | Fine sediment surrounds and fills in more than 75% of the living spaces around and in between the gravel, cobble, and boulders. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 3 SHELTER FOR FISH | Snags and submerged logs, undercut banks, cobble and large rocks or other stable habitat are found in over 50% of the site. | Snags and submerged logs, undercut banks, cobble and large rocks or other stable habitat are found in over 30- 50% of the site. | Snags and submerged logs, undercut banks, cobble and large rocks or other stable habitat are found in over 10- 30% of the site. | Snags and submerged logs, undercut banks, cobble and large rocks or other stable habitat are found in less than 10% of the site. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 4 CHANNEL ALTERATION | Stream straightening, dredging, artificial embankments, dams or bridge abutments absent or minimal; stream with meandering pattern. | Some stream straightening, dredging, artificial embankments or dams present, usually in areas of bridge abutments; no evidence of recent channel alteration activity. | Artificial embankments present to some extent on both banks; and 40- 80% of stream site straightened, dredged, or otherwise altered. | Banks shored with gabion or cement; over 80% of the stream site straightened and disrupted. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 5 SEDIMENT DEPOSITION | Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from coarse gravel; 5- 30% of the bottom affected, slight deposition in pools. | Moderate deposition of new gravel, coarse sand on old and new bars; 30-50% of the bottom affected; sediment deposits at stream obstructions and bends; moderate deposition in pools. | Heavy deposits of fine material, increased bar development; more than 50% of the bottom affected; pools almost absent due to substantial sediment deposition. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |

NOTE: Conduct all habitat assessments IN THE FIELD. Complete all data sheets before leaving the site. For complete directions and definitions, refer to the EPA, *Volunteer Stream Monitoring: A Methods Manual*, Section 4.3

SITE (include county)

Rocky Bottom Sampling

| HABITAT PARAMETER | Optimal | CATE Suboptimal | GORY Marginal | Poor |
|---|---|--|--|--|
| 6 STREAM VELOCITY AND DEPTH COMBINATION | Slow (<1 ft/s)/deep (>1.5 ft); slow/shallow; fast/shallow; fast/deep; combinations all present. | 3 of the 4 velocity/depth combinations are present; fast current areas generally dominate. | Only 2 of the 4 velocity/depth combinations present. Score lower if fast current areas missing. | Dominated by 1 velocity/depth category (usually slow/shallow areas) |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 7 CHANNEL FLOW STATUS | Water reaches base of both lower banks and minimal amount of channel substrate is exposed. | Water fills >75% of the available channel; <25% of channel substrate is exposed. | Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 8 BANK VEGETATIVE PROTECTION (score each bank) Note: Determine left or right side by facing downstream) | More than 90% of the streambank surfaces covered by natural vegetation, including trees, shrubs, or other plants; vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally. | 75-90% of the streambank surfaces covered by natural vegetation; some vegetative disruption evident; more than one-half of the potential plant stubble height remaining. | 50-75% of the streambank surfaces covered by vegetation; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height. |
| Score (LB) Score (RB) | 20 19 18 17 16 20 19 18 17 16 | 15 14 13 12 11 15 14 13 12 11 | 10 9 8 7 6 10 9 8 7 6 | 5 4 3 2 1 0 5 4 3 2 1 0 |
| 9 CONDITION OF BANKS (score each bank) Note: Determine left or right side by facing downstream) | Banks stable; no evidence of erosion or bank failure; little potential for future problems. | Moderately stable; infrequent, small areas of erosion mostly healed over. | Moderately unstable; up to 60% of banks in site have areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank collapse or failure; 60-100% of bank has erosional scars. |
| Score (LB) Score (RB) | 20 19 18 17 16 20 19 18 17 16 | 15 14 13 12 11 15 14 13 12 11 | 10 9 8 7 6 10 9 8 7 6 | 5 4 3 2 1 0 5 4 3 2 1 0 |
| 10 RIPARIAN VEGETATIVE ZONE WIDTH (Score each bank riparian zone) | Width of riparian zone >50 feet; no evidence of human activities (i.e. parking lots, road beds, clear-outs, mowed areas, or crops) within the riparian zone. | Width of riparian zone 35-50 feet. | Width of riparian zone 20-35 feet | Width of riparian zone <20 feet. |
| Score (LB) Score (RB) | 20 19 18 17 16 20 19 18 17 16 | 15 14 13 12 11 15 14 13 12 11 | 10 9 8 7 6 10 9 8 7 6 | 5 4 3 2 1 0 5 4 3 2 1 0 |

Muddy Bottom Sampling

SITE (include county)



Volunteer Stream Monitoring Partnership

DATE

| HABITAT PARAMETER | Optimal | CATE Suboptimal | GORY Marginal | Poor |
|---|---|--|---|---|
| 1 SHELTER FOR FISH AND MACRO- INVERTEBRATES | Snags, submerged logs, undercut banks, rubble or other stable habitat found over 50% of the site; logs/snags are old fall. | Snags, submerged logs, undercut banks, rubble or other stable habitat found over 30-50 % of the site; some old fall, but preponderance of new fall. | Snags, submerged logs, undercut banks, rubble or other stable habitat found over 10-30 % of the site; appears unstable; some new fall. | Snags, submerged logs, undercut banks, rubble or other stable habitat found less than 10% of the site; appears unstable; no old or new fall. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 2 POOL SUBSTRATE CHARACTERIZATION | Pools have mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common. | Pools have mixture of soft sand, mud, or clay substrate; mud may be dominant; some root mats and submerged vegetation present. | Pools have all mud or clay or sand substrate; little or no root mat; no submerged vegetation. | Pools have hard-pan clay or bedrock substrate; no root mat or vegetation. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 3 POOL VARIABILITY | Even mix of large- shallow, large-deep, small-shallow, small- deep pools. | Majority of pools large- deep; very few shallow. | Shallow pools much more prevalent than deep pools. | Majority of pools small-shallow or pools absent. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 4 CHANNEL ALTERATION | Stream straightening, dredging, artificial embankments, dams or bridge abutments absent or minimal; stream with meandering pattern. | Some stream straightening, dredging, artificial embankments or dams present, usually in areas of bridge abutments; no evidence of recent channel alteration activity. | Artificial embankments present to some extent on both banks; and 40- 80% of stream site straightened, dredged, or otherwise altered. | Banks shored with gabion or cement; over 80% of the stream site straightened and disrupted. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 5 SEDIMENT DEPOSITION | Less than 20% of stream bottom affected by extensive sediment deposition; minor accumulation of fine and coarse material at snags and submerged vegetation; little or no enlargement of islands or point bars. | 20-50% of stream bottom affected by extensive sediment deposition; moderate accumulation; substantial sediment movement only during major storm event; increase in bar formation. | 50-80% of stream bottom affected by extensive sediment deposition; pools shallow, heavily silted; embankments may be present on both banks; frequent and substantial sediment movement during storm events. | Greater than 80% of stream bottom affected by extensive sediment deposition; heavy deposits; mud, silt, and/or sand in braided or non-braided channels; pools almost absent due to deposition. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |

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Muddy Bottom Sampling

| HABITAT PARAMETER | Optimal | CATE Suboptimal | GORY Marginal | Poor |
|---|---|--|--|--|
| 6 CHANNEL SINUOSITY | The bends in the stream would increase the stream length 3 to 4 times longer than if it was in a straight line. | The bends in the stream would increase the stream length 2 to 3 times longer than if it was in a straight line. | The bends in the stream would increase the stream length 1 to 2 times longer than if it was in a straight line. | Channel straight; waterway has been channelized. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 7 CHANNEL FLOW STATUS | Water reaches base of both lower banks and minimal amount of channel substrate is exposed. | Water fills >75% of the available channel; <25% of channel substrate is exposed. | Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| Score | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| 8 BANK VEGETATIVE PROTECTION (score each bank) Note: Determine left or right side by facing downstream) | More than 90% of the streambank surfaces covered by natural vegetation, including trees, shrubs, or other plants; vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally. | 75-90% of the streambank surfaces covered by natural vegetation, but one class of plant is not well represented; some vegetative disruption evident; more than one-half of the potential plant stubble height remaining. | 50-75% of the streambank surfaces covered by vegetation; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. | Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height. |
| Score (LB) Score (RB) | 20 19 18 17 16 20 19 18 17 16 | 15 14 13 12 11 15 14 13 12 11 | 10 9 8 7 6 10 9 8 7 6 | 5 4 3 2 1 0 5 4 3 2 1 0 |
| 8 CONDITION OF BANKS (score each bank) Note: Determine left or right side by facing downstream) | Banks stable; no evidence of erosion or bank failure; little potential for future problems. | Moderately stable; infrequent, small areas of erosion mostly healed over. | Moderately unstable; up to 60% of banks in site have areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank collapse or failure; 60-100% of bank has erosional scars. |
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| 10 RIPARIAN VEGETATIVE ZONE WIDTH (Score each bank riparian zone) | Width of riparian zone >50 feet; no evidence of human activities (i.e. parking lots, road beds, clear-outs, mowed areas, or crops) within the riparian zone. | Width of riparian zone 35-50 feet. | Width of riparian zone 20-35 feet | Width of riparian zone <20 feet. |
| Score (LB) Score (RB) | 20 19 18 17 16 20 19 18 17 16 | 15 14 13 12 11 15 14 13 12 11 | 10 9 8 7 6 10 9 8 7 6 | 5 4 3 2 1 0 5 4 3 2 1 0 |

TOTAL SCORE

| Biological Su | rvey Lab Data Sheet | | Volunteer Stream Monitoring Partnership |
|-----------------------|-------------------------|-----------------|--|
| SITE (include county) | | | SITE NUMBER |
| INVESTIGATOR | | DATE | ΤΙΜΕ |
| LOCAL COORDINATOR | R / ORGANIZATION | GPS | GPS COORDINATES |
| PROTOCOL USED: | Multi-Habitat (Dip net) | □ Riffles (Net) | Artificial Multi-Plate Sampler |

Subsampling Procedure

Randomly sample a square making sure ALL organisms have been picked from that square before you move to the next. Mark the estimated total number of individual organisms taken from each square. DO NOT STOP UNTIL YOU HAVE AT LEAST 100 INDIVIDUALS.

| 1 | 4 | 7 | 10 |
|---|---|---|----|
| | | | |
| 2 | 5 | 8 | 11 |
| | | | |
| 3 | 6 | 9 | 12 |
| | | | |

- A. Total number of organisms picked: _____
- B. Number of squares selected: _____
- C. Average organisms per square: ______ (# of organisms / # of squares)
- D. Estimated organisms in tray (C x 12): _____ (organisms / tray)



| SITE (include county) | | SITE NUMBER |
|----------------------------------|------|-----------------|
| INVESTIGATOR | DATE | ΤΙΜΕ |
| LOCAL COORDINATOR / ORGANIZATION | GPS | GPS COORDINATES |

| Order Ephemeroptera (Mayflies) | | |
|--------------------------------|-----------------|-------|
| Family | Tolerance Value | Total |
| Baetidae | 4 | |
| Baetiscidae | 3 | |
| Caenidae | 7 | |
| Ephemerellidae | 1 | |
| Ephemeridae | 4 | |
| Heptageniidae | 4 | |
| Isonychiidae | 2 | |
| Leptohyphidae (Tricorythidae) | 4 | |
| Leptophlebiidae | 2 | |
| Metretopodidae | 2 | |
| Oligoneuriidae | 2 | |
| Polymitarcyidae | 2 | |
| Potamanthidae | 4 | |
| Siphlonuridae | 7 | |
| Tricorythidae | 4 | |
| Unidentified | | |
| Unidentified | | |
| Unidentified | | |

Order Megaloptera (Fishflies, Dobsonflies, Alderflies)

| Family | Tolerance Value | Total |
|--------------|-----------------|-------|
| Corydalidae | 0 | |
| Sialidae | 4 | |
| Unidentified | | |
| Unidentified | | |
| Unidentified | | |

Macroinvertebrate Identification

| Order Odonata (Dragonflies, Damselflies) | | |
|--|-------------------------------|-------|
| Family | Tolerance Value | Total |
| Aeshnidae | 3 | |
| Calopterygidae | 5 | |
| Coenagrionidae | 9 | |
| Cordulergastridae | 3 | |
| Corduliidae | 5 | |
| Gomphidae | 1 | |
| Lestidae | 9 | |
| Libellulidae | 9 | |
| Macromiidae | 3 | |
| Unidentified | | |
| C | order Plecoptera (Stoneflies) |) |
| Family | Tolerance Value | Total |
| Capniidae | 1 | |
| Chloroperlidae | 1 | |
| Leutridae | 0 | |
| Nemouridae | 2 | |
| Perlidae | 1 | |
| Perlodidae | 2 | |
| Pteronarcidae | 0 | |
| Taeniopterygidae | 2 | |
| Unidentified | | |
| Ord | er Coleoptera (Water Beetl | es) |
| Family | Tolerance Value | Total |
| Dryopidae | 5 | |
| Dytiscidae | 5 | |
| Elmidae (adults and larvae) | 4 | |
| Gyrinidae | 4 | |
| Haliplidae | 7 | |
| Hydrophilidae | 5 | |
| Psephenidae | 4 | |
| Scirtidae | 7 | |
| Unidentified | | |
| Unidentified | | |

Macroinvertebrate Identification

| Order Hemiptera | | |
|-------------------|--------------------------|--------|
| Family | Tolerance Value | Total |
| Belostomatidae | 10 | |
| Corixidae | 9 | |
| Gelastocoridae | ** | |
| Gerridae | ** | |
| Hebridae | ** | |
| Hydrometridae | ** | |
| Mesoveliidae | ** | |
| Naucoridae | 5 | |
| Notonectidae | ** | |
| Pleidae | ** | |
| Saldidae | ** | |
| Veliidae | 6 | |
| Unidentified | | |
| Or | der Trichoptera (Caddist | flies) |
| Family | Tolerance Value | Total |
| Brachycentridae | 1 | |
| Glossosomatidae | 0 | |
| Helicopsychidae | 3 | |
| Hydropsychidae | 4 | |
| Hydroptilidae | 4 | |
| Lepidosomatidae | 1 | |
| Leptoceridae | 4 | |
| Limnephilidae | 4 | |
| Molannidae | 6 | |
| Odontoceridae | 0 | |
| Philopotamidae | 3 | |
| Phryganeidae | 4 | |
| Polycentropodidae | 6 | |
| Psychomyiidae | 2 | |
| Rhyacophilidae | 0 | |
| Sericostomatidae | 3 | |
| Uenoidae | 3 | |
| Unidentified | | |

** Tolerance values have not been determined. These should NOT be included in calculations and do not count toward the 100 count needed for a usable sample.

| Order Diptera (Midges, Gnats, Mosquitoes, and Flies) | | | | |
|--|-----------------|-------|--|--|
| Family | Tolerance Value | Total | | |
| Athericidae | 2 | | | |
| Blephariceridae | 0 | | | |
| Ceratopogonidae | 6 | | | |
| Chaoboridae | 8 | | | |
| Chironomidae (Red) | 8 | | | |
| Chironomidae (Other) | 6 | | | |
| Culicidae | 8 | | | |
| Dixidae | 1 | | | |
| Dolichopodidae | 4 | | | |
| Empididae | 6 | | | |
| Ephydridae | 6 | | | |
| Muscidae | 6 | | | |
| Psychodidae | 10 | | | |
| Ptychopteridae | 8 | | | |
| Sciomyzidae | 6 | | | |
| Simuliidae | 6 | | | |
| Stratiomyidae | 8 | | | |
| Syrphidae | 10 | | | |
| Tabanidae | 6 | | | |
| Tipulidae | 3 | | | |
| Unidentified | | | | |
| Unidentified | | | | |
| Order Lepidoptera (Aquatic Moths) | | | | |
| Family | Tolerance Value | Total | | |
| Pyralidae | 5 | | | |
| Unidentified | | | | |
| Unidentified | | | | |
| Order Amphipoda (Scuds) | | | | |
| Family | Tolerance Value | Total | | |
| Gammaridae | 4 | | | |
| Hyaliellidae | 8 | | | |
| Unidentified | | | | |

| Order Isopoda (Aquatic Sowbugs) | | | | |
|-----------------------------------|-----------------|-------|-------|--|
| Family | Tolerance Value | | Total | |
| Asellidae | 8 | | | |
| Unidentified | | | | |
| Unidentified | | | | |
| Other | | | | |
| Family | Tolerance Value | | Total | |
| Decapoda - Cambaridae (Crayfish) | 6 | | | |
| Class Oligochaeta (Aquatic Worms) | 8 | | | |
| Class Hirundinea (Leeches) | 10 | | | |
| Class Gastropoda (Snails) | 7 | | | |
| Class Pelecypoda (Clams) | 7 | | | |
| Family Hydracarina | | | | |
| Class Arachnida | | | | |
| Phylum Nematoda | | | | |
| Unidentified | | | | |
| | | TOTAL | | |