

ASSESSMENT FIELD

SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Long Fork  
RIVERMILE 1

STREAM @ Buckhorn cr. Rd

# LD JM, JA SW  
LD

REASON FOR SURVEY PM

Parameters to be evaluated in subrating reach

Habitat	Condition Category		
	Suboptimal	Marginal	Poor
1. Substrate/epifaunal fish cover; banks, other stable at stage to allow full (i.e., logs/snags that are fall and transient).	40-70% mix of stable habitat; well-suited for recolonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the new fall, yet prepared end of scale).	20-40% mix of stable habitat; habitat less suitable; substrate frequently disturbed or removed.	Less than 20% stable lack of habitat substrate unstable
SCORE <u>18</u>	20 19 (18) 17 16	12 11 10 9	5 4 3 2 1 0
2. Embeddedness and Layering of niche space	boulder and 0- particles and surrounded	Gravel, cobble, and boulder particles 75% or fine sediment.	more than particles fine sediment.
SCORE <u>18</u>	20 (18) 16 15 14	11 10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	velocity/depth regimes present (slow-shallow, fast-shallow, < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).
SCORE <u>17</u>	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6 5 4 3 2 1 0
4. Little enlargement less the bottom deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom almost absent deposition.
SCORE <u>15</u>	20 19 18 17 16 (15)	14 13 12 11	10 9 8 7 6 5 4 3 2 1 0
5. Status reaches lower substrate exposed.	Water fills >75% of available <25% channel substrate exposed.	Water 25-75% of and/or riffle substrates	little water channel and as
SCORE <u>18</u>	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6 5 4 3 2 1 0



STREAM NAME	Long Fork	LOCATION	2 Buckhorn cr. Rd
STATION #	1 RIVERMILE	STREAM CLASS	
LAT	LONG	RIVER BASIN	
STORET #			
INVESTIGATORS	LD, JM, JA, SW		
	LD	DATE	5-2-00 AM (PM)

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

photo #3 up  
photo #4 down

HABITAT TYPES

Indicate the percentage of each habitat type present

Cobble 70%  Snags 10%  Undercut Banks 10%  Sand 5%  
 Submerged Macrophytes \_\_\_\_\_%  Other (CPOM) 5% LD

STREAM CHARACTERIZATION

Subsystem Classification  Perennial  Intermittent  Tidal Stream Type  Coldwater  Warmwater

S	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential		Local Water Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy		
	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources		Estimated Stream Width <u>0</u> m Estimated Stream Depth <input type="checkbox"/> Riffle <u>2</u> m <input checked="" type="checkbox"/> Run <u>5</u> m <input checked="" type="checkbox"/> Pool <u>17</u> m Velocity <u>1.3</u> m/sec		
	Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded		Estimated Reach Length <u>100</u> m Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
ION	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous dominant species present <u>iron wood, sycamore, Hackberry</u>				
ON	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae dominant species present _____ Portion of the reach with vegetative cover <u>0</u> %				
SEDIMENT/SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____		Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____		
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse		Looking at stones which are not deeply embedded, are the undersides black in color? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
WATER QUALITY	Temperature _____ °C Specific Conductance _____ Dissolved Oxygen _____ pH _____ Turbidity _____ WQ Instrument Used _____		Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Stick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____		
INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")		Muck-Mud	black, very fine organic (FPOM)	
Cobble	64-256 mm (2.5"-10")	20			
Gravel	2-64 mm (0.1"-2.5")	75			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (stick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAM NAME <i>Croquetine Cr</i>	LOCATION <i>above Clear Fork ~ 700'</i>	
STATION # <i>2</i> RIVERMILE _____	STREAM CLASS _____	
LAT _____ LONG _____	RIVER BASIN _____	
STORET # _____	AGENCY <i>EPA / KY DOW</i>	
INVESTIGATORS _____		
FORM COMPLETED BY <i>Howard</i>	DATE <i>5/4/02</i> <i>0845</i> AM PM	REASON FOR SURVEY <i>MTM/UF</i>

SITE LOCATION/MAP	draw a map of the site and indicate the areas sampled  <i>PIX 25, 26, 27</i>
	<p>HABITAT TYPES</p> <p>Indicate the percentage of each habitat type present</p> <p><input checked="" type="checkbox"/> Cobble _____%   <input type="checkbox"/> Snags _____%   <input type="checkbox"/> Undercut Banks _____%   <input type="checkbox"/> Sand _____%</p> <p><input type="checkbox"/> Submerged Macrophytes _____%   <input type="checkbox"/> Other ( _____ ) _____%</p>
STREAM CHARACTERIZATION	<p>Subsystem Classification      Stream Type</p> <p><input checked="" type="checkbox"/> Perennial   <input type="checkbox"/> Intermittent   <input type="checkbox"/> Tidal      <input type="checkbox"/> Coldwater   <input checked="" type="checkbox"/> Warmwater</p>

\* Water too deep & current too swift to conduct RBP.

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other <i>major highway</i> <input checked="" type="checkbox"/> Residential <i>(29) left bank</i>  <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources  <b>Canopy Cover</b> <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded  <b>High Water Mark</b> <i>1'</i>	<b>Local Water Erosion</b> <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy  <b>Estimated Stream Width</b> <i>12'</i> <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <i>16"</i> <input type="checkbox"/> Run <i>1'</i> <input type="checkbox"/> Pool _____ m  <b>Velocity</b> <i>2.5 m/sec</i> <i>ft/sec</i>  <b>Estimated Reach Length</b> _____ m  <b>Channelized</b> <input type="checkbox"/> Yes <input type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes <input type="checkbox"/> No																																																						
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous  <b>dominant species present</b> _____																																																							
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<b>WATER QUALITY</b>	<b>Temperature</b> <i>14.73c</i> <b>Specific Conductance</b> <i>363</i> <b>Dissolved Oxygen</b> <i>9.12</i> <b>pH</b> <i>7.75</i>  <b>Turbidity</b> _____ <b>WQ Instrument Used</b> <i>Hydrolab</i>	<b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____  <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b> <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)</th> <th colspan="3" style="text-align: center;">ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)</th> </tr> <tr> <th style="width:15%;">Substrate Type</th> <th style="width:15%;">Diameter</th> <th style="width:15%;">% Composition in Sampling Reach</th> <th style="width:15%;">Substrate Type</th> <th style="width:15%;">Characteristic</th> <th style="width:15%;">% Composition in Sampling Area</th> </tr> </thead> <tbody> <tr> <td>Bedrock</td> <td></td> <td></td> <td>Detritus</td> <td>sticks, wood, coarse plant materials (CPOM)</td> <td></td> </tr> <tr> <td>Boulder</td> <td>&gt; 256 mm (10")</td> <td><i>30</i></td> <td>Muck/Mud</td> <td>black, very fine organic (FPOM)</td> <td></td> </tr> <tr> <td>Cobble</td> <td>64-256 mm (2.5"-10")</td> <td><i>40</i></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gravel</td> <td>2-64 mm (0.1"-2.5")</td> <td><i>10</i></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sand</td> <td>0.06-2mm (gritty)</td> <td><i>10</i></td> <td>Marl</td> <td>grey, shell fragments</td> <td></td> </tr> <tr> <td>Silt</td> <td>0.004-0.06 mm</td> <td><i>10</i></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Clay</td> <td>&lt; 0.004 mm (stick)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)		Boulder	> 256 mm (10")	<i>30</i>	Muck/Mud	black, very fine organic (FPOM)		Cobble	64-256 mm (2.5"-10")	<i>40</i>				Gravel	2-64 mm (0.1"-2.5")	<i>10</i>				Sand	0.06-2mm (gritty)	<i>10</i>	Marl	grey, shell fragments		Silt	0.004-0.06 mm	<i>10</i>				Clay	< 0.004 mm (stick)				
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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

Buffalo Creek  
3 RIVERMILE

076 Hwy 1096 just east of Hwy 15 bridge

STREAM  
RIVER

mands

J. Mandley

1

5/13/00  
1:50 PM

AM (PM)

ALSO SURVEY

Habitat	Condition		Category	
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available	Greater substrate favorable epifaunal cover; submerged undercut stable habitat to colonization potential (i.e., logs/snags that are <u>not</u> transient).	of stable habitat; well-suited for full adequate for maintenance presence substrate of new fall. yet prepared (may rate of scale).	20-40% mix of stable habitat desirable; substrate frequently removed.	Less than 20% stable habitat; of habitat substrate unstable
2. Embeddedness	Gravel, surrounded	particles 25-fine	cobble, particles are surrounded	particles are than surrounded sediment.
3. Velocity/Depth Regime	All velocity/depth regimes deep, slow-shallow, fast-fast-shallow). (Slow < m/s, deep is > 0.5 m.)	of the regimes other regimes).	2 habitat regimes present fast-are	1 velocity/ slow-deep).
4. Sediment	Little less the bottom affected sediment deposition.	Some new increase mostly fine from gravel, sediment; 5-30% pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5.	Water reaches base of both lower minimal substrate exposed.	Water fills >75% of the available channel; or <25% of channel substrate exposed.	Water fills 25-75% of the and/or riffle substrates mostly exposed.	Very little water in channel standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameter to evaluate in sample

# HABITAT ASSESSMENT FIELD DATA SHEET--HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Optimal	Suboptimal	Category			
6.	Channelization absent stream with normal pattern.	channelization areas of bridge abutments; evidence of channelization, i.e., (greater than past yr) be channelization not present.	Channelization extensive; embankments shoring structures banks; 40% of stream reach channelized and	Banks gabion	stream reach	Instream habitat greatly altered removed entirely.
	20 19	15 14 (13) 12 11	10 8	5 4	2	
7. Riffles (or	Occurrence of relatively frequent; of distance divided width stream <7:1 (generally to 7); variety of habitat streams placement boulders ; obstruction is important.	of infrequent; distance the of the stream is between to 15.	occasional riffle bottom contours provide some habitat; distance between the	Generally riffles; habitat; riffles width the stream	between	
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 8 6	5	1 0	
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately small areas of mostly healed 5-30% reach areas of erosion.	Moderately unstable; 30-60% areas of erosion; high erosion potential during	areas; areas frequent along straight and sloughing; of bank has erosional scars.		
SCORE (LB)	(10) 9	8 7 6	4 1	2 1 0		
SCORE (RB)	Right Bank 10	7 6	5 4 3	2 1 0		
9. Vegetative (score bank)	More than the streambank surfaces immediate native zone covered native vegetation, including trees, understory nonwoody macrophytes; vegetative grazing evident; almost plants naturally.	the streambank native vegetation, of plants disruption affecting potential growth more great one-the potential plant	50-70% of the streambank surfaces vegetation; obvious; soil closely vegetation common; one-half of potential plant stubble remaining.	Less than 50% of the streambank vegetation; streambank vegetation been removed centimeters stubble height.		
SCORE (LB)	Left Bank 10	(8) 6	5 4 3	2 1 0		
SCORE (RB)	Right Bank	(8) 7	5 4 3	2 1 0		
Vegetative (score each riparian)	>1 meters; (i.e., lots, cuts, lawns, not clear-zone)	riparian meters; zone	meters; human activities a great deal.	<6 meters; little vegetation due activities.		
SCORE (LB)	Left Bank 10 9 8 7			2 1		
SCORE (RB)	Bank 10 9					

PARAMETERS TO BE EVALUATED BEFORE STREAM MONITORING

STREAM NAME <u>Buffalo Creek</u>	LOCATION <u>off 1096 just east of Hwy 15 bridge</u>	
STATION # <u>3</u> RIVERMILE _____	STREAM CLASS _____	
LAT _____ LONG _____	RIVER BASIN _____	
STORET # _____	AGENCY _____	
INVESTIGATORS <u>Dorn / Maudsley / Acharman / RLW</u>		
FORM COMPLETED BY <u>J. Maudsley</u>	DATE <u>5/3/00</u> <u>10:00</u> AM <input checked="" type="checkbox"/> PM	REASON FOR SURVEY _____

SITE	Draw a map of the site and indicate the areas sampled
	<p>photo 14 (upstream)</p> <p>photo 15 (downstream)</p>



HABITAT TYPES	Indicate the percentage of each habitat type present
	<input checked="" type="checkbox"/> Cobble <u>90%</u> <input checked="" type="checkbox"/> Snags <u>5%</u> <input type="checkbox"/> Undercut Banks <u>0%</u> <input type="checkbox"/> Sand <u>0%</u> <input type="checkbox"/> Submerged Macrophytes _____% <input type="checkbox"/> Other ( <u>CPM</u> ) <u>5%</u>
STREAM CHARACTERIZATION	Subsystem Classification <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal
	Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater

322  
 1.5  
 6.5  
 ---  
 7.0  
 9.0  
 ---  
 10.5 9

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Commercial <input checked="" type="checkbox"/> Field/Pasture <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input checked="" type="checkbox"/> Residential	<b>Local Water Erosion</b> <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <b>Estimated Stream Width</b> <u>4</u> m <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <u>2</u> m <input type="checkbox"/> Run <u>2</u> m <input type="checkbox"/> Pool <u>3</u> m <b>Velocity</b> <u>1.5 ft/sec</u> <b>Estimated Reach Length</b> <u>100</u> m <b>Channelized</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																					
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<b>SEDIMENT/SUBSTRATE</b>	<b>Odors</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ <b>Oils</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other <u>None</u> <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																					
<b>WATER QUALITY</b>	<b>Temperature</b> _____ °C <b>Specific Conductance</b> _____ <b>Dissolved Oxygen</b> _____ <b>pH</b> _____ <b>Turbidity</b> _____ <b>WQ Instrument Used</b> _____ <b>Water Odors</b> <input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> None <input type="checkbox"/> Other _____ <b>Turbidity (if not measured)</b> <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: left;">INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)</th> <th colspan="3" style="text-align: left;">ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)</th> </tr> <tr> <th style="width: 15%;">Substrate Type</th> <th style="width: 15%;">Diameter</th> <th style="width: 15%;">% Composition in Sampling Reach</th> <th style="width: 15%;">Substrate Type</th> <th style="width: 15%;">Characteristic</th> <th style="width: 15%;">% Composition in Sampling Area</th> </tr> </thead> <tbody> <tr> <td>Bedrock</td> <td></td> <td></td> <td>Detritus</td> <td>sticks, wood, coarse plant materials (CPOM)</td> <td rowspan="2">100</td> </tr> <tr> <td>Boulder</td> <td>&gt; 256 mm (10")</td> <td>15</td> <td>Muck-Mud</td> <td>black, very fine organic (FPOM)</td> </tr> <tr> <td>Cobble</td> <td>64-256 mm (2.5"-10")</td> <td>45</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gravel</td> <td>2-64 mm (0.1"-2.5")</td> <td>40</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sand</td> <td>0.06-2mm (gritty)</td> <td></td> <td>Marl</td> <td>grey, shell fragments</td> <td></td> </tr> <tr> <td>Silt</td> <td>0.004-0.06 mm</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Clay</td> <td>&lt; 0.004 mm (slick)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100	Boulder	> 256 mm (10")	15	Muck-Mud	black, very fine organic (FPOM)	Cobble	64-256 mm (2.5"-10")	45				Gravel	2-64 mm (0.1"-2.5")	40				Sand	0.06-2mm (gritty)		Marl	grey, shell fragments		Silt	0.004-0.06 mm					Clay	< 0.004 mm (slick)				
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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME <i>Laurel Fork</i>	LOCATION <i>@ Upper Laurel Fork Rd</i>
STATION # <i>4</i> RIVERMILE	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN
STORET #	AGENCY <i>EPA</i>
FORM COMPLETED BY <i>Howard Wedel</i>	
<i>5/3/00</i> <i>0915</i> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">AM</span>	REASON FOR SURVEY <i>KY NTRM/UF</i>

Habitat Parameter	Condition Category																				
	Optimal				Suboptimal				Marginal												
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of <del>snags</del> submerged logs, <del>undercut banks</del> , cobbles or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).																				
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.																				
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
3. Velocity/Depth Regime	All four velocity/depth regimes present ( <del>slow-deep, slow-shallow, fast-deep, fast-shallow</del> ). (Slow is < 0.3 m/s, deep is > 0.5 m.)																				
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
4.	Little or enlargement point less than affected sediment deposition.																				
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Status	Water reaches base channel substrate is exposed.																				
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Parameters to be evaluated in sampling reach

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category													
	Optimal			Marginal			Poor							
	Channelization dredging absent stream normal pattern.	Some channelization areas of bridge abutments; of past i.e., (greater than yr) present.	Channelization may be extensive; embankments or shoring structures present both and 40 80% stream reach disrupted.	Banks shored with gabion cement stream channelized disrupted. habitat greatly removed entirely.				5	4	3	2	1	0	
7. Riffles	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width stream <7:1 (5-7); of habitat key. streams riffles are continuous. placement boulders other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream between 7 to 10.	Occasional riffle or bottom contours provide some habitat; distance between riffles divided the of the stream between 15 25.	water riffles; poor habitat; riffles between the width of >25.										
	20 19 13 (17)	15 14 11	10 9 8	6	5	4	3	2	1	0				
Bank (bank)	Banks evidence failure absent little potential for future problems. <5% of affected.	Moderately stable; areas of healed erosion. 5-30% of bank in reach areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.										
Note: determine left downstream.														
SCORE (LB)	Left Bank 10 9	(8) 7 6	4	2	1	0								
SCORE (RB)	Right Bank 10	7 (6)		2										
Vegetative each	than 90% streambank surfaces immediate riparian native vegetation nonwoody vegetative disruption grazing not allowed to grow naturally.	of the streambank surfaces native vegetation, plants evident growth great extent; more one-the potential height	the streambank surfaces vegetation; disruption of bare soil vegetation common; less than of the potential plant stubble height remaining.	than the streambank covered vegetation; streambank vegetation is very high; vegetation been 5 centimeters less average height.										
SCORE (LB)	Left Bank 10 (9)													
SCORE (RB)		8 7 (6)	5 4 3	2	1	0								
Zone each	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone meters; human activities have only	Width of riparian zone 6-12 meters; activities have impacted zone great deal.	Width of riparian zone <6 little riparian vegetation to activities.										
SCORE (LB)	Left Bank (10) 9	6	5	2										
SCORE (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2	1	0								

Total Score 128

STREAM NAME <i>Laurel Fork</i>	LOCATION <i>@ Upper Laurel Fork Rd.</i>	
RIVERMILE	CLASS	
LAT	RIVER	
STORE #	EPA	
INVESTIGATORS <i>Howard Weller</i>		
FORM COMPLETED BY <i>Howard Weller</i>	DATE <i>5/3/00</i> <i>8:15 AM</i> PM	REASON FOR SURVEY <i>KY MTR/VF</i>

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

pix # *14, 15, 16*

HABITAT TYPES	Indicate the percentage of each habitat type present	
	<input type="checkbox"/> Cobble _____% <input type="checkbox"/> Snags _____% <input type="checkbox"/> Undercut Banks _____% <input type="checkbox"/> Sand _____%	
	<input type="checkbox"/> Submerged Macrophytes _____% <input type="checkbox"/> Other ( _____ ) _____%	
STREAM CHARACTERIZATION	Subsystem Classification <input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal	Stream Type <input type="checkbox"/> Coldwater <input type="checkbox"/> Warmwater

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential  <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources  <b>Canopy Cover</b> <input type="checkbox"/> Partly open <input checked="" type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded  <b>High Water Mark</b> <u>2 ft</u>	<b>Local Water Erosion</b> <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy  <b>Estimated Stream Width</b> <u>11 ft</u>  <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <u>3-10" deep</u> <input type="checkbox"/> Run <u>10"</u> <input type="checkbox"/> Pool _____  <b>Velocity</b> <u>1.67 m/sec</u> ft/sec _____  <b>Estimated Reach Length</b> <u>100 m</u>  <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>RIPARIAN VEGETATION (13 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous  <b>dominant species present</b> <u>beech, hornwood, maple, dogwood</u>	
<b>AQUATIC VEGETATION</b>  <u>N/A</u>	<b>Indicate the dominant type and record the dominant species present</b> <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae  <b>dominant species present</b> _____  <b>Portion of the reach with vegetative cover</b> _____ %	
<b>SEDIMENT/SUBSTRATE</b>	<b>Odors</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Oils</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input checked="" type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input checked="" type="checkbox"/> Other <u>coal fines</u>  <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>WATER QUALITY</b>	<b>Temperature</b> <u>13.66°C</u>  <b>Specific Conductance</b> <u>1550</u>  <b>Dissolved Oxygen</b> <u>9.54</u>  <b>pH</b> <u>7.64</u>  <b>Turbidity</b> _____  <b>WQ Instrument Used</b> <u>HydroLab</u>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	15
Boulder	> 256 mm (10")	20	Muck-Mud	black, very fine organic (FPOM)	10
Cobble	64-256 mm (2.5"-10")	40	Marl	grey, shell fragments	coal fines
Gravel	2-64 mm (0.1"-2.5")	20			
Sand	0.06-2mm (gritty)	20 10 10			
Silt	0.004-0.06 mm	10			
Clay	< 0.004 mm (stick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

## HABITAT

## FIELD

## SHEET—HIGH

(FRONT)

STREAM NAME <i>Fugate Fork</i>	LOCATION <i>Fugate Fork Rd</i>
STATION # <i>25</i> RIVERMILE _____	STREAM CLASS _____
LAT _____ LONG _____	RIVER BASIN _____
STORET # _____	AGENCY <i>EPA/KDOW</i>
INVESTIGATORS <i>Howard/Weldon/Call</i>	
FORM COMPLETED BY <i>Howard et al</i>	DATE <i>5/2/00</i> TIME <i>1305</i> AM <input type="radio"/> PM <input checked="" type="radio"/>
	REASON FOR SURVEY <i>KY NTM/UF</i>

Parameter	Optimal	Category																				
		Marginal																				
Epifaunal Substrate/	Greater than substrate favorable epifaunal and cover of snags, submerged undercut banks, other stable habitat allow full colonization (i.e., logs/snags not fall not transient).	40-70% of stable habitat; potential; habitat for populations; of additional substrate the yet colonization rate of scale).	20-40% stable availability desirable; substrate disturbed removed.	stable	lack of habitat substrate unstable lacking.																	
SCORE		20	19	18	16	13	12	11	10	8	5	4	2	0								
2. Embeddedness											Gravel,		and									
SCORE																						
3. Velocity/Depth Regime	deep, slow shallow, deep, fast shallow. (Slow is < 0.5 m/s, deep is > 0.5 m.)	regimes).																				
SCORE		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. 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 gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; 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
5. 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; or <25% 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

Parameters to be evaluated in sampling reaches

Alteration	Habitat		Category															
	Optimal	Suboptimal	Marginal				Poor											
	absent or stream normal pattern.	channelization usually abutments of past i.e., (greater past yr) recent	Channelization extensive; embankments structures both banks; 40 to 80% of stream reach channelized and				with gabion cement the stream and instream habitat greatly altered entirely.											
	20 19 (18) 17	13 12 11	10 9	6	5	4												
of	Occurrence of riffles relatively frequent; distance between riffles width of stream <7:1 generally 5 to 7); artery of habitat streams	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.				Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.											
	placement boulders other large, natural obstruction important.																	
	10 (18) 17	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0														
8. determine left right side facing downstream.	Banks stable; evidence of erosion or siltation or minimal; little potential problems. <5% of bank affected.	Moderately infrequent, erosion healed over. has areas of erosion	unstable; 30- reach erosion during floods.				Unstable; eroded areas; "raw" areas straight bends; of bank has erosional scars.											
SCORE __ (RB)	Left Bank 10	3 (7)																
SCORE __ (RB)	Right Bank 10 (9)																	
9. Vegetative Protection (score each bank)	More than the streambank surfaces immediate riparian covered native vegetation, trees, understory nonwoody macrophytes; vegetative disruption grazing mowing evident; plants allowed grow naturally.	70-90% the streambank surfaces vegetation, one class plants well-represented; disruption to any great extent; more of the potential stubble	50-70% of the streambank surfaces vegetation; obvious; of bare soil or cropped				streambank covered vegetation; disruption streambank vegetation is very vegetation been											
SCORE __ (LB)	Left Bank	3 6 5 3																
SCORE __ (RB)	Right Bank 10 (9)																	
Vegetative each riparian	> meters; riparian zone activities (i.e., lots, roadbeds, clear- impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.				Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.											
SCORE __ (LB)	Left Bank 9	8 7 6	5 4 3	2 (2) 1 0														
SCORE __ (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0														

Total

138

STREAM NAME <u>Fugate Fork</u>	LOCATION <u>Fugate Fork Rd</u>
STATION # <u>5</u> RIVERMILE	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN
STORET #	AGENCY <u>EPA / KY DOW</u>
INVESTIGATORS <u>Howard/Weldon</u>	
FORM COMPLETED BY <u>Howard/Weldon</u>	DATE <u>5/2/00</u> <u>1305</u> AM <input checked="" type="checkbox"/> PM
	REASON FOR SURVEY <u>MTM/VE - Ky</u>

SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled  <u>PIX 7, 8</u>
HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble _____ % <input checked="" type="checkbox"/> Snags _____ % <input checked="" type="checkbox"/> Undercut Banks _____ % <input type="checkbox"/> Sand _____ % <input type="checkbox"/> Submerged Macrophytes _____ % <input checked="" type="checkbox"/> Other ( <u>CPOM</u> ) _____ %
STREAM CHARACTERIZATION	Subsystem Classification      Stream Type <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Agricultural <input type="checkbox"/> Other <u>road / left</u> <input type="checkbox"/> Residential <u>garden / pasture</u>  <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources  <b>Canopy Cover</b> <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded  <b>High Water Mark</b> <u>2' of</u>	<b>Local Water Erosion:</b> <input type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy  <b>Estimated Stream Width</b> <u>8 ft</u>  <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <u>6-10" deep</u> <input type="checkbox"/> Run <u>1 ft</u> <input type="checkbox"/> Pool <u>1-2 ft</u>  <b>Velocity</b> <u>.77 m/sec</u>  <b>Estimated Reach Length</b> <u>100 m</u>  <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																						
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous  <b>dominant species present</b> _____																																																							
<b>AQUATIC VEGETATION</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae  <b>dominant species present</b> _____  <b>Portion of the reach with vegetative cover</b> _____%																																																							
<b>SEDIMENT/SUBSTRATE</b>	<b>Odors</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Oil</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input checked="" type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input checked="" type="checkbox"/> Other <u>silt</u>  <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No																																																						
<b>WATER QUALITY</b>	<b>Temperature</b> <u>15</u> °C <b>Specific Conductance</b> <u>836</u> <b>Dissolved Oxygen</b> <u>9.58</u> <b>pH</b> <u>7.19</u> <b>Turbidity</b> _____ <b>WQ instrument Used</b> <u>HydroLab</u>	<b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____  <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globes <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b> <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)</th> <th colspan="3" style="text-align: center;">ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)</th> </tr> <tr> <th style="width:15%;">Substrate Type</th> <th style="width:20%;">Diameter</th> <th style="width:25%;">% Composition in Sampling Reach</th> <th style="width:15%;">Substrate Type</th> <th style="width:25%;">Characteristic</th> <th style="width:20%;">% Composition in Sampling Area</th> </tr> </thead> <tbody> <tr> <td>Bedrock</td> <td></td> <td></td> <td>Detritus</td> <td>sticks, wood, coarse plant materials (CPOM)</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Boulder</td> <td>&gt; 256 mm (10")</td> <td style="text-align: center;">15</td> <td>Muck-Mud</td> <td>black, very fine organic (FPOM)</td> <td></td> </tr> <tr> <td>Cobble</td> <td>64-256 mm (2.5"-10")</td> <td style="text-align: center;">40</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gravel</td> <td>2-64 mm (0.1"-2.5")</td> <td style="text-align: center;">15</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sand</td> <td>0.06-2mm (gritty)</td> <td style="text-align: center;">30</td> <td>Mari</td> <td>grey, shell fragments</td> <td></td> </tr> <tr> <td>Silt</td> <td>0.004-0.06 mm</td> <td style="text-align: center;">5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Clay</td> <td>&lt; 0.004 mm (slick)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	20	Boulder	> 256 mm (10")	15	Muck-Mud	black, very fine organic (FPOM)		Cobble	64-256 mm (2.5"-10")	40				Gravel	2-64 mm (0.1"-2.5")	15				Sand	0.06-2mm (gritty)	30	Mari	grey, shell fragments		Silt	0.004-0.06 mm	5				Clay	< 0.004 mm (slick)				
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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT

SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME <u>Sims Fork</u>	LOCATION <u>@ Sims Fork Rd</u>
STATION # <u>6</u> RIVERMILE	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN
STORET #	AGENCY <u>EPA / KY Dow</u>
FORM COMPLETED BY <u>Howard TW-10</u>	<u>5/31/00</u> AM <u>PM</u> REASON FOR SURVEY <u>Ky MTR/VF</u>

Habitat Parameter	Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of undercut stable habitat at stage to allow colonization potential (i.e., logs/snags <u>not</u> transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of substrate form of newfall, but yet prepared for colonization (may rate at of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable substrate
	20 19 18 17 <u>16</u>	14 12 11	10 9 8	4 2 1 0
2. Embeddedness	boulder 0- surrounded fine Layering diversity niche	Gravel, 50% by fine	Gravel, cobble,	Gravel, sediment.
	20 19 18 17 <u>16</u>	15 <u>13</u> 11	8 7 6	5 4 3 2 1 0
Velocity/Depth	velocity/depth regimes (slow-deep, <del>fast-shallow</del> ) (Slow is > m/s, > m.)	of regimes score	2 the habitat present shallow missing, score	Dominated 1 velocity/ regime
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	<u>5</u> 4 3 2 1 0
4.	Little enlargement less of the bottom affected deposition.	from gravel, 5-30% fine the bottom	Moderate deposition new sand fine sediment of the bottom affected; deposits obstructions,	Heavy deposits material, increased development; 50% of the frequently; almost due to substantial sediment
	20 19 18 17 16	15 14 13 12 <u>11</u>	10 9 8 7 6	5 4 3 2 1 0
5. 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; or <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.
	20 19 18 <u>17</u> 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																			
	Optimal				Suboptimal				Marginal				Poor							
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.				Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.				Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% at stream reach channelized and disrupted.				Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or remove: entirely.							
	20	19	18	(17)	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.				Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.				Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.				Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.							
	20	19	18	17	(16)	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SCORE																				
8. Bank Stability (score each bank)  Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.				Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.				Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.				Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.							
	SCORE (LB)	Left Bank	10	(9)		8	7	6		5	4	3		2	1	0				
	SCORE (RB)	Right Bank	10	9		(8)	7	6		5	4	3		2	1	0				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.				70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.				50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half 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 5 centimeters or less in average stubble height.							
	SCORE (LB)	Left Bank	10	9		(8)	7	6		5	4	3		2	1	0				
	SCORE (RB)	Right Bank	10	9		(8)	7	6		5	4	3		2	1	0				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.				Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.				Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.				Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.							
	SCORE (LB)	Left Bank	10	(9)		8	7	6		5	4	3		2	1	0				
	SCORE (RB)	Right Bank	10	9		8	(7)	6		5	4	3		2	1	0				

Total Score 144



S

**Predominant Surrounding Landuse**  
 Forest  Commercial  
 Field/Pasture  Industrial  
 Agricultural  Other *rd along rt bank*  
 Residential

**Local Watershed NPS Pollution**  
 No evidence  Some potential sources  
 Obvious sources

**Canopy Cover**  
 Partly open  Partly shaded  Shaded

**High Water Mark** *1 ft*

**Local Water Erosion**  
 None  Moderate  Heavy *\* logging off left bank*

**Estimated Stream Width** *20 ft*

**Estimated Stream Depth**  
 Riffle *0.10 m*  Run *1'*  
 Pool *\_\_\_\_\_ m*

**Velocity** *1.25 m/sec*

**Estimated Reach Length** *100 m*

**Channelized**  Yes  No

**Dam Present**  Yes  No

**RIPARIAN VEGETATION**  
(18 meter buffer)

Indicate the dominant type and record the dominant species present  
 Trees  Shrubs  Grasses  Herbaceous

dominant species present \_\_\_\_\_

**AQUATIC VEGETATION**  
*N/A*

Indicate the dominant type and record the dominant species present  
 Rooted emergent  Rooted submergent  Rooted floating  Free Floating  
 Floating Algae  Attached Algae

dominant species present \_\_\_\_\_

Portion of the reach with vegetative cover \_\_\_\_\_%

**SEDIMENT/SUBSTRATE**

**Odors**  
 Normal  Sewage  Petroleum  
 Chemical  Anaerobic  None  
 Other \_\_\_\_\_

**Deposits**  
 Sludge  Sawdust  Paper fiber  Sand  
 Relic shells  Other \_\_\_\_\_

**Oils**  
 Absent  Slight  Moderate  Profuse

Looking at stones which are not deeply embedded, are the undersides black in color?  
 Yes  No

**WATER QUALITY**

Temperature *18.5°C*

Specific Conductance *42.0*

Dissolved Oxygen *4.52*

pH *9.14*

Turbidity \_\_\_\_\_

WQ Instrument Used *HydroLab*

**Water Odors**  
 Normal/None  Sewage  
 Petroleum  Chemical  
 Fishy  Other \_\_\_\_\_

**Water Surface Oils**  
 Slick  Sheen  Globbs  Flecks  
 None  Other \_\_\_\_\_

**Turbidity (if not measured)**  
 Clear  Slightly turbid  Turbid  
 Opaque  Water color  Other \_\_\_\_\_

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	<i>210</i>
✓ Boulder	> 256 mm (10")	<i>30</i>	Muck-Mud	black, very fine organic (FPOM)	
✓ Cobble	64-256 mm (2.5"-10")	<i>30</i>			
✓ Gravel	2-64 mm (0.1"-2.5")	<i>15</i>			
✓ Sand	0.06-2mm (gritty)	<i>15</i>	Marl	grey, shell fragments	
Silt	0.004-0.06 mm	<i>10</i>			
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME <i>Spring Fk / Quicksand</i>	LOCATION <i>at confluence with Hughes Cr.</i>	
STATION # <i>7</i> RIVERMILE _____	STREAM CLASS _____	
LAT _____ LONG _____	RIVER BASIN _____	
STORET # _____	AGENCY <i>EPA / KY DOW</i>	
INVESTIGATORS <i>Howard / Weldon / Cull</i>		
FORM COMPLETED BY <i>Howard Weldon</i>	DATE <i>5/2/00</i> TIME <i>10:00</i> AM PM	REASON FOR SURVEY <i>MMA/UF</i>

Habitat Parameter	Condition Category																	
	Suboptimal				Marginal				Poor									
<b>1. Epifaunal Substrate/Available</b> than 70% substrate epifaunal and submerged cobble other habitat to full potential (i.e., logs/snags that new and not)	40-70% of stable well-suited for full colonization potential; adequate habitat for of additional substrate the form of newtail, prepared for at of scale).				20-40% of stable habitat; availability less desirable; substrate disturbed or				Less habitat; 20% of habitat; lacking									
	20	18	17	16	15	12	11	10	8	6	5	4	1					
<b>2. Embeddedness</b> Gravel, cobble, and boulder particles are 0-25% surrounded by provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.				Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.				Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.									
	20	19	18	16	14	(10)	(11)	10	8	6			2	1				
<b>3. Velocity/Depth Regime</b> four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow-deep < 0.5 m/s, fast-deep > 0.5 m/s)	of the 4 score if missing other				the 4 present slow-shallow				Dominated 1 velocity/depth regime									
<b>SCORE</b>	20	19	18	17	1	15	13	12	11	(9)	8	6		4	3	2	1	
<b>4. Sediment</b> Little islands point and less than 5% affected sediment	increase formation, mostly from sand fine 5-30% of the affected;				Moderate new gravel, sediment 30-50% of the sediment deposits at obstructions, constrictions, prevalent.				Heavy deposits of fine material, increased more than of the changing frequently; almost to substantial sediment deposition.									
	20	19	18	16	15	14	11	10	(8)	7	6		3	2	1	0		
<b>5. Channel Flow</b> Water both lower channel exposed.	Water >75% of or <25% channel				25-75% of the available and/or riffle substrates				little water channel and pools.									
	20	19	18	(17)	15		12	11	10	9	8	6	5	4	3	2	1	0

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively infrequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	3	3	2	1
8. Bank Stability (score each bank) <small>Note: determine left or right side by facing downstream.</small>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
	SCORE (LB)	Left Bank		10	9	8	7	6	5	4	3	2	1	0							
	SCORE (RB)	Right Bank		10	9	8	7	6	5	4	3	2	1	0							
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.					
	SCORE (LB)	Left Bank		10	9	8	7	6	5	4	3	2	1	0							
	SCORE (RB)	Right Bank		10	9	8	7	6	5	4	3	2	1	0							
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadways, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
	SCORE (LB)	Left Bank		10	9	8	7	6	5	4	3	2	1	0							
	SCORE (RB)	Right Bank		10	9	8	7	6	5	4	3	2	1	0							

Total score **131**

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME <i>Spring Fk / Quizesand</i>	LOCATION <i>@ Confl. with Hughes Cr</i>	
STATION # <i>7</i>	RIVERMILE _____	STREAM CLASS _____
LAT _____	LONG _____	RIVER BASIN _____
STORET # _____	AGENCY <i>EPA / KYDOW</i>	
INVESTIGATORS <i>Howard/Weldon/Cull</i>		
FORM COMPLETED BY <i>Howard/Weldon</i>	DATE <i>5/2/00</i> <i>1000</i> <del>AM</del> PM	REASON FOR SURVEY <i>MTM/UF</i>

<p><b>SITE LOCATION/MAP</b></p>	<p>Draw a map of the site and indicate the areas sampled</p> <p style="font-size: 2em; text-align: center;">PIX 2, 3</p>
<p><b>HABITAT TYPES</b></p>	<p>Indicate the percentage of each habitat type present</p> <p> <input type="checkbox"/> Cobble _____%                   <input type="checkbox"/> Snags _____%                   <input type="checkbox"/> Undercut Banks _____%                   <input type="checkbox"/> Sand _____%  <input type="checkbox"/> Submerged Macrophytes _____%                   <input type="checkbox"/> Other ( _____ ) _____%             </p>
<p><b>STREAM CHARACTERIZATION</b></p>	<p>Subsystem Classification      Stream Type</p> <p> <input checked="" type="checkbox"/> Perennial                   <input type="checkbox"/> Intermittent                   <input type="checkbox"/> Tidal                      <input type="checkbox"/> Coldwater                   <input checked="" type="checkbox"/> Warmwater             </p>

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other <u>road/RM</u> <input type="checkbox"/> Residential <u>either side</u>  <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources  <b>Canopy Cover</b> <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded  <b>High Water Mark</b> <u>1</u> m	<b>Local Water Erosion</b> <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy  <b>Estimated Stream Width</b> <u>15</u> ft  <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <u>0.5</u> ft <input type="checkbox"/> Run <u>1</u> ft <input type="checkbox"/> Pool _____ m  <b>Velocity</b> <u>2.5</u> m/sec ft/sec  <b>Estimated Reach Length</b> <u>100</u> m  <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																						
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous  <b>dominant species present</b> _____																																																							
<b>AQUATIC VEGETATION</b>	<b>Indicate the dominant type and record the dominant species present</b> <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae  <b>dominant species present</b> _____  <b>Portion of the reach with vegetative cover</b> _____ %																																																							
<b>SEDIMENT/SUBSTRATE</b>	<b>Odors</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Oils</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Refect shells <input type="checkbox"/> Other _____  <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																						
<b>WATER QUALITY</b>	<b>Temperature</b> <u>15.0</u> °C <b>Specific Conductance</b> <u>480</u> <b>Dissolved Oxygen</b> <u>9.17</u> <b>pH</b> <u>7.15</u> <b>Turbidity</b> _____ <b>WQ Instrument Used</b> <u>HydroLab</u>  <b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____  <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b> <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____																																																							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: left;">INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)</th> <th colspan="3" style="text-align: left;">ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)</th> </tr> <tr> <th style="width:15%;">Substrate Type</th> <th style="width:15%;">Diameter</th> <th style="width:20%;">% Composition in Sampling Reach</th> <th style="width:15%;">Substrate Type</th> <th style="width:20%;">Characteristic</th> <th style="width:25%;">% Composition in Sampling Area</th> </tr> </thead> <tbody> <tr> <td>Bedrock</td> <td></td> <td></td> <td>Detritus</td> <td>sticks, wood, coarse plant materials (CPOM)</td> <td style="text-align: center;">10</td> </tr> <tr> <td>Boulder</td> <td>&gt; 256 mm (10")</td> <td></td> <td>Muck-Mud</td> <td>black, very fine organic (FPOM)</td> <td style="text-align: center;">10</td> </tr> <tr> <td>Cobble</td> <td>64-256 mm (2.5"-10")</td> <td style="text-align: center;">50</td> <td></td> <td>(coal fines)</td> <td></td> </tr> <tr> <td>Gravel</td> <td>2-64 mm (0.1"-2.5")</td> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sand</td> <td>0.06-2mm (gritty)</td> <td style="text-align: center;">30</td> <td>Mart</td> <td>grey, shell fragments</td> <td></td> </tr> <tr> <td>Silt</td> <td>0.004-0.06 mm</td> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Clay</td> <td>&lt; 0.004 mm (slick)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	10	Boulder	> 256 mm (10")		Muck-Mud	black, very fine organic (FPOM)	10	Cobble	64-256 mm (2.5"-10")	50		(coal fines)		Gravel	2-64 mm (0.1"-2.5")	10				Sand	0.06-2mm (gritty)	30	Mart	grey, shell fragments		Silt	0.004-0.06 mm	10				Clay	< 0.004 mm (slick)				
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<b>CHARACTERIZATION/WATER</b>																																																								

STREAM NAME Lost Creek  
 STATION # 9 RIVERMILE  
 LAT LONG

LOCATION @ 1446  
 STREAM CLASS  
 RIVER BASIN  
 AGENCY

INVESTIGATORS LJ JM, JA, SW  
 FORM COMPLETED BY LJD

DATE 5-2-00 REASON FOR SURVEY  
 TIME 15:30 AM PM

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
(SCORE <u>17</u> )	20 19 18 ( <u>17</u> ) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 ( <u>17</u> ) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present ( <u>slow-deep</u> , <u>slow-shallow</u> , <u>fast-deep</u> , <u>fast-shallow</u> ). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 or 4 regimes present (if <u>fast-shallow</u> is missing, score lower than if missing <u>other</u> regimes).	Only 2 of the 4 habitat regimes present (if <u>fast-shallow</u> or <u>slow-shallow</u> are missing, score low).	Dominated by 1 velocity/ depth regime (usually <u>slow-deep</u> ).
SCORE <u>15</u>	20 19 18 17 16	( <u>15</u> ) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. 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 <u>gravel, sand or fine sediment</u> ; 5-30% of the bottom affected; slight deposition in <u>pools</u> .	Moderate deposition of new gravel, sand or fine sediment on <u>old and new bars</u> ; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends moderate deposition of <u>pools</u> prevalent.	Heavy deposits of <u>fine material</u> , increased bar development; more than 50% of the bottom changing frequently; <u>pools</u> almost absent due to substantial sediment deposition.
SCORE <u>14</u>	20 19 18 17 16	15 ( <u>14</u> ) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. 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; or <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 <u>pools</u> .
SCORE <u>18</u>	20 19 ( <u>18</u> ) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
			Marginal	Poor
Alteration	Channelization absent minimal; stream normal pattern.	Some channelization present, usually in areas of bridge	Channelization may be extensive; embankments or staking structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 50% of the stream reach channelized and disrupted. Instream habitat greatly altered or entirely.

Riffles	Occurrence of riffles ratio distance between riffles the stream <7:1 generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles distance between riffles the stream between 7 to 15.	rifle or contours some habitat; the riffles of the stream between 15 to 25.	Generally all flat water riffles; habitat between riffles of the stream is a ratio of >25.
SCORE <u>18</u>	10 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

8. Bank Stability (score each bank)	Banks stable; evidence erosion failure absent or minimal; little potential for problems. <5% affected.	Moderately stable; infrequent, small areas mostly healed 5-30% reach areas of erosion.	Moderately unstable; 30- high potential	Unstable; many eroded areas; "raw" areas straight of bank
Note: determine left right side facing downstream.				
SCORE <u>8</u> (LB)	Left Bank 10	(8) 7 6		
SCORE <u>10</u> (RB)	Right Bank (10)			

9. Vegetative Protection (score each bank)	More 90% of immediate riparian zone covered native vegetation, understory macrophytes; vegetative grazing evident; almost plants allowed grow naturally.	the streambank surfaces native vegetation, of plants well-represented; disruption evident not affecting growth to great extent; of potential	50-70% of the streambank surfaces covered vegetation; obvious; soil closely vegetation common; than one-half the potential remaining.	streambank surfaces vegetation; disruption of streambank vegetation very vegetation has to 5 centimeters average stubble height.
SCORE <u>9</u> (LB)	Left Bank 10 9	8 7		1 0
SCORE <u>10</u> (RB)	Right Bank 10	9	7	5 1

10. Vegetative each	>18 meters; (i.e., lots, clear-cuts, lawns, impacted	Width meters; activities impacted	of riparian zone meters; human activities impacted zone great deal.	<6 riparian zone little no vegetation
SCORE <u>10</u> (LB)	Left Bank 9	8 7		3 2
SCORE <u>6</u> (RB)	Right Bank 10	9	8 7 (6)	5

171

STREAM NAME Last Creek  
RIVERMILE

LOCATION

D 1446

STREAM CLASS

RIVER BASIN

LAT

STORET #

COMPLETED BY

W. J. M. O. A. Sw.

WP

5-2-00

PM

REASON FOR SURVEY

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

photo #5 down  
photo #6 up

HABITAT TYPES

Indicate the percentage of each habitat type present

Cobble 45 %  Shags 15 %  Undercut Banks 10 %  Sand 20 %

Submerged Macrophytes \_\_\_\_\_ %  Other ( CPOM ) 10 %

STREAM CHARACTERIZATION

Subsystem Classification

Perennial  Intermittent  Tidal

Stream Type

Coldwater  Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input checked="" type="checkbox"/> Residential	Local Water Erosion <input type="checkbox"/> None <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy Estimated Stream Width <u>7</u> m Estimated Stream Depth <input checked="" type="checkbox"/> Riffle <u>2</u> m <input checked="" type="checkbox"/> Run <u>.5</u> m <input checked="" type="checkbox"/> Pool <u>7</u> m Velocity <u>1.34</u> m/sec
	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded High Water Mark <u>2</u> m	Estimated Reach Length <u>100</u> m Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous dominant species present <u>ragweed, iron weed, sycamore, magnolia</u>	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input checked="" type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input checked="" type="checkbox"/> Attached Algae dominant species present _____ Portion of the reach with vegetative cover <u>70%</u>	
SEDIMENT/SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
WATER QUALITY	Temperature _____ °C Specific Conductance _____ Dissolved Oxygen _____ pH _____ Turbidity _____ WQ Instrument Used _____	Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")		Muck-Mud	black, very fine organic (FPOM)	
Cobble	64-256 mm (2.5"-10")	10	Marl	grey, shell fragments	
Gravel	2-64 mm (0.1"-2.5")	75			
Sand	0.06-2mm (graty)	15			
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAMNAME Clemens Fork  
 STATIONS 10 RIVERMILE  
 LAT \_\_\_\_\_ LONG \_\_\_\_\_  
 STORET# \_\_\_\_\_  
 INVESTIGATORS \_\_\_\_\_  
 FORM COMPLETED BY  
Howard Twelder

LOCATION <u>nsr 4</u>	
STREAM CLASS _____	
RIVER BASIN _____	
AGENCY <u>EPA / KYDOW</u>	
DATE <u>5/2/00</u>	REASON FOR SURVEY
TIME <u>1500</u> AM <input checked="" type="checkbox"/>	<u>MTM / VF</u>

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover: mix of <del>snags/submerged logs</del> undercut banks, cobble or other stable habitat and at srage to allow full colonization potential (i.e., logs/snags that are nor new fall and not transient)					40-70% mix of stable habitat: well-suited for full colonization potential; adquate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat: habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or 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	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder pamcles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder pamcles are more than 75% surrounded by fine sediment.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regime	All four veiocitydepth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or low-shallow are missing, score low).					Dominated by 1 velocity/ depth regime (usually slow-deep).					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. 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 gravel, sand or line sediment: 5-30% of the bottom affected; slight deposition in pools.					Moderate cosition of new gravel, sand or fine sediment on old and neu bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends moderate deposition of					Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; 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
5. 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; or <25% of channel substrate is exposed.					Water fills 25-75% of the mailable 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

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
<b>Channel Alteration</b>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shading structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream reach habitat greatly altered or removed entirely.					
<b>SCORE</b>	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>7. Frequency of Riffles (or bends)</b>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 19.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
<b>SCORE</b>	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>8. Bank Stability (score each bank)</b>	Ranks stable; evidenced of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
Note: determine left or right side by facing downstream.																					
<b>SCORE (LB)</b>	Left Bank	10	9	8	7	6	8	7	6	5	4	3	2	1	0	Left Bank	10	9	8	7	6
<b>SCORE (RB)</b>	Right Bank	10	9	8	7	6	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6
<b>9. Vegetative Protection (score each bank)</b>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					30-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.					
<b>SCORE (LB)</b>	Left Bank	10	9	8	7	6	8	7	6	5	4	3	2	1	0	Left Bank	10	9	8	7	6
<b>SCORE (RB)</b>	Right Bank	10	9	8	7	6	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
<b>SCORE (LB)</b>	Left Bank	10	9	8	7	6	8	7	6	5	4	3	2	1	0	Left Bank	10	9	8	7	6
<b>SCORE (RB)</b>	Right Bank	10	9	8	7	6	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6

Total Score 169

STREAM NAME <i>Clemens Fork</i>	LOCATION in <i>Robinson Forest</i>
STATION # <i>10</i> RIVERMILE _____	STREAM CLASS _____
LAT _____ LONG _____	RIVER BASIN _____
STORET # _____	AGENCY <i>EPA / KyDow</i>
INVESTIGATORS <i>Howard Wilder / Carl</i>	DATE <i>5/2/00</i>
FORM COMPLETED BY <i>Howard Wilder</i>	<i>15:00</i> AM <input checked="" type="radio"/> PM REASON FOR SURVEY <i>MTM / VF</i>

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

*Pix 11, 12, 13*

HABITAT TYPES

Indicate the percentage of each habitat type present

Cobble \_\_\_\_\_ %  Snags \_\_\_\_\_ %  Undercut Banks \_\_\_\_\_ %  Sand \_\_\_\_\_ %  
 Submerged Macrophytes \_\_\_\_\_ %  Other (*leaf packs*) \_\_\_\_\_ %

STREAM

Subsystem Classification

Perennial  Intermittent  Tidal

Stream Type

Coldwater  Warmwater

Forest  Commercial  
 Field/Pasture  Industrial  
 Agricultural  Other \_\_\_\_\_  
 Residential

Local Watershed NPS Pollution  
 No evidence  Some potential sources  
 Obvious sources

Canopy Cover  
 Partly open  Partly-shaded  Shaded

High Water Mark 1.5 m ft

Local Water Erosion  
 None  Moderate  Heavy

Estimated Stream Width 15-18 ft

Estimated Stream Depth  
 Riffle 10" - 1.0 m  Run 1 m ft  
 Pool 2-3 m ft

Velocity 1.25 m sec ft/sec

Estimated Reach Length 100 m

Channelized  Yes  No

Dam Present  Yes  No

**RIPARIAN VEGETATION**  
 (18 meter buffer)

Indicate the dominant type and record the dominant species present  
 Trees  Shrubs  Grasses  Herbaceous

dominant species present \_\_\_\_\_

**AQUATIC VEGETATION**  
N/A

Indicate the dominant type and record the dominant species present  
 Rooted emergent  Rooted submergent  Rooted floating  Free Floating  
 Floating Algae  Attached Algae

dominant species present \_\_\_\_\_

Portion of the reach with vegetative cover \_\_\_\_\_%

**SEDIMENT/SUBSTRATE**

Odors  
 Normal  Sewage  Petroleum  
 Chemical  Anaerobic  None  
 Other \_\_\_\_\_

Deposits  
 Sludge  Sawdust  Paper fiber  Sand  
 Refract shells  Other \_\_\_\_\_

Oils  
 Absent  Slight  Moderate  Profuse

Looking at stones which are not deeply embedded, are the undersides black in color?  
 Yes  No

**WATER QUALITY**

Temperature 15.4°C

Specific Conductance 65.8

Dissolved Oxygen 9.50

pH 7.08

Turbidity \_\_\_\_\_

WQ Instrument Used HydroLab

Water Odors  
 Normal/None  Sewage  
 Petroleum  Chemical  
 Fishy  Other \_\_\_\_\_

Water Surface Oils  
 Slick  Sheen  Globbs  Flecks  
 None  Other \_\_\_\_\_

Turbidity (if not measured)  
 Clear  Slightly turbid  Turbid  
 Opaque  Water color  Other \_\_\_\_\_

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	15
Boulder	> 256 mm (10")	30	Muck-Mud	black, very fine organic (FPOM)	
Cobble	64-256 mm (2.5"-10")	40	Mud	grey, shell fragments	
Gravel	2-64 mm (0.1"-2.5")	20			
Sand	0.06-2mm (gritty)	10			
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	<u>Coles Fork</u>	LOCATION	<u>@ Buckhorn Cr. Rd</u>
STATION #	<u>11-R</u> RIVERMILE	STREAM CLASS	
LAT	LONG	RIVER BASIN	
STORET #		AGENCY	
INVESTIGATORS	<u>LD, JM, JA, SW</u>	DATE	<u>5-2-00</u>
FORM COMPLETED BY	<u>LD</u>	TIME	<u>AM</u> PM
		REASON FOR SURVEY	

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE <u>17</u>	20 19 18 <u>17</u> 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE <u>18</u>	20 19 <u>18</u> 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE <u>16</u>	20 19 18 17 <u>16</u>	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	and less than 5% of the bottom affected by sediment deposition.	from gravel, sand or line sediment: 5-30% of the bottom affected; slight deposition in pools.	sediment on old and new bars: 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development: more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE <u>15</u>	20 19 18 17 16	<u>15</u> 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. 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; or <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 <u>17</u>	20 19 18 <u>17</u> 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Aabimt Parameter	Condition		Category	
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE <u>20</u>	<u>20</u> 19 18 17 16	15 14 13 12 11	0 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	relatively frequent; ratio of distance between riffles divided by width in the stream <7:1; generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Infrequent; distance between riffles divided by the width of the stream is between 7 to 5.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 1.5 to 2.5.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >2.5.
SCORE <u>19</u>	20 <u>(19)</u> 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) <small>Note: determine left or right side by facing downstream.</small>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% oibank in reach has areas of erosion.	Moderately unstable; 30-50% oibank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 50-100% oibank has erosional scars.
SCORE <u>8</u> (LB)	Left Bank <u>10</u> 9	<u>(8)</u> 7 6	5 4 3	2 1 0
SCORE <u>8</u> (RB)	Right Bank <u>10</u> 9	<u>(8)</u> 7		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.
SCORE <u>9</u> (LB)	Left Bank <u>10</u> <u>(9)</u>	8 7 6	5 4 3	2 1 0
SCORE <u>9</u> (RB)	Right Bank <u>10</u> <u>(9)</u>			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-11 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE <u>9</u> (LB)	Left Bank <u>(10)</u> 9	8 7 6	5 4 3	2 1 0
SCORE <u>8</u> (RB)	Right Bank <u>10</u> 9	<u>(8)</u> 7		

Total Score 174

STREAM NAME	K	LOCATION	Backham Cr. Rd.
STATION# 11-R <sup>0</sup>	RIVERMILE	STREAM CLASS	
LAT	LONG	RIVER BASIN	
STORET #		AGMCIY	
INVESTIGATORS (1) J.M. (A, S)		DATE	5-2-00 (AM) PM
FORM COMPLETED BY		REASON FOR SURVEY	

TE LOCATION/MAP

draw a map of the site and indicate the areas sampled

photo # 1 upstream  
photo # 2 downstream

HABITAT TYPES

Indicate the percentage of each habitat type present

Cobble 40%  Shags 15%  Undercut Banks 10%  Sand 30%  
 Submerged Macrophytes 5%  Other (CPOM) 5%

STREAM CHARACTERIZATION

Subsystem Classification  Perennial  Intermittent  Tidal  
 Stream Type  Coldwater  Warmwater

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources <b>Canopy Cover</b> <input type="checkbox"/> Partly open <input checked="" type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded <b>High Water Mark</b> <u>1</u> m	<b>Local Water Erosion</b> <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <b>Estimated Stream Width</b> <u>9</u> m <b>Estimated Stream Depth</b> <input checked="" type="checkbox"/> Riffle <u>2</u> m <input type="checkbox"/> Run <u>5</u> m <input type="checkbox"/> Pool <u>1</u> m <b>Velocity</b> <u>1 ft/sec</u> /sec <b>Estimated Reach Length</b> <u>100</u> m <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous dominant species present <u>Maple, Hemlock, Birch, Cherry, Poplar, Sycamore</u>	
<b>AQUATIC VEGETATION</b>	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae dominant species present <u>grass</u> Portion of the reach with vegetative cover <u>3</u> %	
<b>SEDIMENT/SUBSTRATE</b>	<b>Odgers</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ <b>Oils</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____ Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>WATER QUALITY</b>	<b>Temperature</b> _____ °C <b>Specific Conductance</b> _____ <b>Dissolved Oxygen</b> _____ <b>pH</b> _____ <b>Turbidity</b> _____ <b>WQ Instrument Used</b> _____ <b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <b>Turbidity (if not measured)</b> <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		50	Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")		Muck-Mud	black, very fine organic (FPOM)	
Cobble	64-256 mm (2.5"-10")	25	Marl	grey, shell fragments	
Gravel	2-64 mm (0.1"-2.5")				
Sand	0.06-2mm (gritty)	25			
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAMNAME Double  
 STATION # 12-R RIVERMILE  
 LAT LONG  
 STORET #  
 INVESTIGATORS L.D., J.M., J.A., R.W.  
 FORM COMPLETED BY LD

LOCATION <u>Q 1501</u>
STREAM CLASS
RIVER BASIN
AGENCY
DATE <u>5-3-00</u>
TIME <u>1345</u> AM PM <input checked="" type="checkbox"/>
REASON FOR SURVEY

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 <u>19</u> 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% of sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% of sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 <u>19</u> 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	<u>15</u> 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. 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 gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 <u>18</u> 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. 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; or <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 <u>18</u> 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																							
	Optimal				Suboptimal				Marginal				Poor											
<b>Channel Iteration</b>	Channelization or dredging absent or minimal; stream with normal pattern.				Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.				Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.				Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.											
<b>CORE</b>	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0		
<b>Frequency of riffles (or bends)</b>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream (C7); (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.				Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.				Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.				Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.											
<b>CORE</b>	20	19	18	17	16	15	14	13	12	11	10	10	9	8	7	6	5	4	3	2	1	0		
<b>1. Bank Stability (score each bank)</b>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.				Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.				Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.				Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.											
Note: determine left or right side by facing downstream.																								
<b>SCORE (LB)</b>	Left Bank	10	9	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6	5	4	3	2	1	0
<b>SCORE (RB)</b>	Right Bank	10	9	8	7	6	5	4	3	2	1	0	Left Bank	10	9	8	7	6	5	4	3	2	1	0
<b>3. Vegetative Protection (score each bank)</b>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.				70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.				50-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.											
<b>SCORE (LB)</b>	Left Bank	10	9	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6	5	4	3	2	1	0
<b>SCORE (RB)</b>	Right Bank	10	9	8	7	6	5	4	3	2	1	0	Left Bank	10	9	8	7	6	5	4	3	2	1	0
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.				Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.				Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.				Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.											
<b>SCORE (LB)</b>	Left Bank	10	9	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6	5	4	3	2	1	0
<b>SCORE (RB)</b>	Right Bank	10	9	8	7	6	5	4	3	2	1	0	Left Bank	10	9	8	7	6	5	4	3	2	1	0

Total Score **IS**

STREAM NAME <u>Big Double</u>	LOCATION <u>@ 1501</u>
STATION # <u>12-R</u> RIVERMILE _____	STREAM CLASS _____
LAT _____ LONG _____	RIVER BASIN _____
STORET # _____	AGENCY _____
INVESTIGATORS <u>LD JM TA RW</u>	
FORM COMPLETED BY <u>LD</u>	DATE <u>3-3-00</u> AM ( <input checked="" type="checkbox"/> ) PM ( <input type="checkbox"/> )
REASON FOR SURVEY _____	

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

photo # 12 up  
photo # 13 down

HABITAT TYPES

Indicate the percentage of each habitat type present

Cobble 70%  Snags 15%  Undercut Banks 5%  Sand 5%  
 Submerged Macrophytes \_\_\_\_\_%  Other ( CPOM ) 5%

STREAM CHARACTERIZATION

Subsystem Classification  Perennial  Intermittent  Tidal  
Stream Type  Coldwater  Warmwater

<b>PARIAN ZONE/ STREAM FEATURES</b>	<b>Dominant Surrounding Landuse</b> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ Residential _____	<b>Local Water Erosion</b> <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <b>Estimated Stream Width</b> <u>7</u> m <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <u>2</u> m <input type="checkbox"/> Run <u>5</u> m <input type="checkbox"/> Pool <u>1</u> m <b>Velocity</b> <u>1.2</u> m/sec <b>Estimated Reach Length</b> <u>100</u> m <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																					
<b>PARIAN VEGETATION (.8 meter buffer)</b>	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous <b>dominant species present</b> <u>Birch, Sycamore</u>																																																						
<b>AQUATIC VEGETATION</b>	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input checked="" type="checkbox"/> Attached Algae <b>dominant species present</b> _____ <b>Portion of the reach with vegetative cover</b> <u>5</u> %																																																						
<b>WATER QUALITY</b>	<b>Odors</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ <b>Oil</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____ <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																					
<b>WATER QUALITY</b>	<b>Temperature</b> _____ °C <b>Specific Conductance</b> _____ <b>Dissolved Oxygen</b> _____ <b>pH</b> _____ <b>Turbidity</b> _____ <b>WQ Instrument Used</b> _____	<b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ <b>Water Surface Gils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <b>Turbidity (if not measured)</b> <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____																																																					
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: left;">INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)</th> <th colspan="3" style="text-align: left;">ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)</th> </tr> <tr> <th style="width:15%;">Substrate Type</th> <th style="width:20%;">Diameter</th> <th style="width:25%;">% Composition in Sampling Reach</th> <th style="width:15%;">Substrate Type</th> <th style="width:25%;">Characteristic</th> <th style="width:20%;">% Composition in Sampling Area</th> </tr> </thead> <tbody> <tr> <td>Bedrock</td> <td></td> <td></td> <td>Debris</td> <td>sticks, wood, coarse plant materials (CPOM)</td> <td rowspan="2" style="text-align: center; vertical-align: middle;"><u>100</u></td> </tr> <tr> <td>Boulder</td> <td>&gt; 256 mm (10")</td> <td style="text-align: center;"><u>5</u></td> <td>Muck-Mud</td> <td>black, very fine organic (FPOM)</td> </tr> <tr> <td>Cobble</td> <td>64-256 mm (2.5"-10")</td> <td style="text-align: center;"><u>50</u></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gravel</td> <td>2-64 mm (0.1"-2.5")</td> <td style="text-align: center;"><u>40</u></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sand</td> <td>0.06-2mm (gritty)</td> <td style="text-align: center;"><u>5</u></td> <td>Mari</td> <td>grey, shell fragments</td> <td></td> </tr> <tr> <td>Silt</td> <td>0.004-0.06 mm</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Clay</td> <td>&lt; 0.004 mm (slick)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	Bedrock			Debris	sticks, wood, coarse plant materials (CPOM)	<u>100</u>	Boulder	> 256 mm (10")	<u>5</u>	Muck-Mud	black, very fine organic (FPOM)	Cobble	64-256 mm (2.5"-10")	<u>50</u>				Gravel	2-64 mm (0.1"-2.5")	<u>40</u>				Sand	0.06-2mm (gritty)	<u>5</u>	Mari	grey, shell fragments		Silt	0.004-0.06 mm					Clay	< 0.004 mm (slick)				
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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAM NAME *Sugar Cr*  
 STATION # *13-R* RIVERMILE  
 LAT LONG  
 STORET # *(19) JAJM RLJ*  
 INVESTIGATORS  
 FORM COMPLETED BY *WD*

LOCATION *@ Redbird*  
 STREAM CLASS  
 RIVER BASIN  
 AGENCY  
 DATE *5-3-00* REASON FOR SURVEY  
 TIME *1:00* (AM) PM

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-10% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE <i>19</i>	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE <i>18</i>	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE <i>17</i>	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. 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 gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE <i>15</i>	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of banks, 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 <i>17</i>	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach.

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																							
	Optimal					Suboptimal					Marginal					Poor								
<b>6. Channel Alteration</b>  <div style="text-align: right; font-size: 2em; margin-right: 20px;">19</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.								
SCORE																					20	18	17	16
<b>7. Frequency of Riffles (or bends)</b>  <div style="text-align: right; font-size: 2em; margin-right: 20px;">19</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.								
SCORE																					20	18	17	16
<b>8. Bank Stability (score each bank)</b>  Note: determine left or right side by facing downstream.  SCORE <u>9</u> (LB) SCORE <u>9</u> (RB)	Bank stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-10% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.								
SCORE																					Left Bank	10	9	8
<b>9. Vegetative Protection (score each bank)</b>  SCORE ___ (LB) SCORE <u>10</u> (RB)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.								
SCORE																					Left Bank	10	9	8
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>  SCORE <u>10</u> (LB) SCORE <u>9</u> (RB)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone Only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.								
SCORE																					Left Bank	10	9	8

Total Score 181

STREAM NAME <u>Sugar Cr.</u>	LOCATION <u>@ Red Bird</u>
STATION # <u>13-R</u> RIVERMILE _____	STREAM CLASS _____
LAT _____ LONG _____	RIVER BASIN _____
STORET # _____	AGENCY _____
INVESTIGATORS <u>LD, JA, JM, RW</u>	
FORM COMPLETED BY <u>LD</u>	DATE <u>5-3-00</u> <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM
REASON FOR SURVEY _____	

SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled  <u>photo #7 down</u> <u>photo #8 up</u>
HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble <u>65</u> % <input checked="" type="checkbox"/> Snags <u>5</u> % <input checked="" type="checkbox"/> Undercut Banks <u>10</u> % <input checked="" type="checkbox"/> Sand <u>5</u> % <input type="checkbox"/> Submerged Macrophytes _____ % <input type="checkbox"/> Other ( <u>CAOM</u> ) <u>15</u> %
STREAM CHARACTERIZATION	Subsystem Classification <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential  <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources  <b>Canopy Cover</b> <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded  <b>High Water Mark</b> <u>1</u> m	<b>Local Water Erosion</b> <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy  <b>Estimated Stream Width</b> <u>6</u> m  <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle <u>1.2</u> m <input type="checkbox"/> Run <u>5</u> m <input type="checkbox"/> Pool <u>1.75</u> m <b>Velocity</b> <u>1.2</u> m/sec  <b>Estimated Reach Length</b> <u>100</u> m  <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous  <b>dominant species present</b> <u>Hemlock, sycamore, ironwood, magnolia</u>	
<b>AQUATIC VEGETATION</b>	<b>Indicate the dominant type and record the dominant species present</b> <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating Algae <input checked="" type="checkbox"/> Attached Algae  <b>dominant species present</b> _____  <b>Portion of the reach with vegetative cover</b> <u>5</u> %	
<b>SEDIMENT/SUBSTRATE</b>	<b>Odors</b> <input type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Oils</b> <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<b>Deposits</b> <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____  <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>WATER QUALITY</b>	<b>Temperature</b> _____ °C <b>Specific Conductance</b> _____ <b>Dissolved Oxygen</b> _____ <b>pH</b> _____ <b>Turbidity</b> _____ <b>WQ Instrument Used</b> _____	<b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____  <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globes <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b> <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")	10			
Cobble	64-256 mm (2.5"-10")	50			
Gravel	2-64 mm (0.1"-2.5")	25	Muck-Mud	black, very fine organic (FPOM)	
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAM NAME Sugar Cr  
 STATION # 13-R-Dup RIVERMILE  
 LAT \_\_\_\_\_ LONG \_\_\_\_\_  
 STORET # \_\_\_\_\_

LOCATION @ Redbird  
 STREAM CLASS \_\_\_\_\_  
 RIVER BASIN \_\_\_\_\_  
 AGENCY \_\_\_\_\_

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover  19  SCORE	Greater than 70% of substrate favorable for epifaunal colonization and fish cover: mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).  20 19 18 17 16	40-70% mix of stable habitat: well-suited for full colonization potential; adequate habitat for maintenance populations: presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).  15 14 13 12 11	20-40% mix of stable habitat; habitat availability less than desirable; substrate irregularly disturbed or removed.  10 9 8 7 6	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 0
2. Embeddedness  SCORE 19	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of obble provides diversity of niche space.  20 19 18 17 16	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.  15 14 13 12 11	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.  10 9 8 7 6	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.  5 4 3 2 1 0
3. Velocity/Depth Regime  SCORE 16	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)  20 19 18 17 16	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).  15 14 13 12 11	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).  10 9 8 7 6	Dominated by 1 velocity/ depth regime (usually slow-deep).  5 4 3 2 1 0
4. Sediment Deposition  SCORE 15	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.  20 19 18 17 16	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.  15 14 13 12 11	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.  10 9 8 7 6	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.  5 4 3 2 1 0
5. Channel Flow Status  SCORE 18	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.  20 19 18 17 16	Water fills >75% of the available channel; or <25% of channel substrate is exposed.  15 14 13 12 11	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.  10 9 8 7 6	Very little water in channel and mostly present as standing pools.  5 4 3 2 1 0

Parameters to be evaluated in sampling reach

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition C																				
	Optimal					Suboptimal					Marginal					Poor					
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, <b>usually</b> in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
	SCORE <u>19</u>	20	(19)	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream > 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 1 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
	SCORE <u>19</u>	20	(19)	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
8. Bank Stability (score each bank)	Banks stable; evident of erosion or bank failure absent or minimal; little potential for future problems. % of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 50-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
	SCORE <u>9</u> (LB)	Left Bank 10 (9)					8	7	6	5	4	3	2	1	0						
	SCORE <u>9</u> (RB)	Right Bank 10 (9)					8	7	6	5	4	3	2	1	0						
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.					
	SCORE <u>10</u> (LB)	Left Bank (10) 9					8	7	6	5	4	3	2	1	0						
	SCORE <u>9</u> (RB)	Right Bank (10) 9					8	7	6	5	4	3	2	1	0						
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
	SCORE <u>8</u> (LB)	Left Bank 10 9 (8)					8	7	6	5	4	3	2	1	0						
	SCORE <u>8</u> (RB)	Right Bank 10 9 (8)					8	7	6	5	4	3	2	1	0						

Total Score 179

STREAM NAME Sugar Cr.  
STATION # B-Rd up RIVERMILE  
LAT \_\_\_\_\_ LONG \_\_\_\_\_  
STORET # \_\_\_\_\_

INVESTIGATORS W, JM, JA -W  
FORM COMPLETED BY W

LOCATION <u>D Redbird</u>
STREAM CUSS _____
RIVER BASIN _____
AGENCY _____
DATE <u>5-3-00</u> <u>AM</u> PM
REASON FOR SURVEY _____

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

photo # 10 up  
photo # 11 down

HABITAT TYPES

Indicate the percentage of each habitat type present

Cobble 80 %  Slugs 5 %  Undercut Banks 5 %  Sand 5 %  
 Submerged Macrophytes \_\_\_\_\_ %  Other ( CPOM ) 5 %

STREAM CHARACTERIZATION

Subsystem Classification  Perennial  Intermittent  Tidal  
Stream Type  Coldwater  Warmwater

ES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential	Local Water Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy Estimated Stream Width <u>6</u> m Estimated Stream Depth <input type="checkbox"/> Riffle <u>2</u> m <input type="checkbox"/> Run <u>5</u> m <input type="checkbox"/> Pool <u>7</u> m Velocity <u>1.2</u> m/sec
	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Canopy Cover <input type="checkbox"/> Partly open <input type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded High Water Mark _____ m	Estimated Reach Length <u>100</u> m Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous dominant species present <u>hemlock, gum, poplar, sycamore, magnolia</u>	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input checked="" type="checkbox"/> Attached Algae dominant species present _____ Portion of the reach with vegetative cover <u>5</u> %	
SEDIMENT/SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____ Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
WATER QUALITY	Temperature _____ °C Specific Conductance _____ Dissolved Oxygen _____ pH _____ Turbidity _____ WQ Instrument Used _____	Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Sljak <input type="checkbox"/> Sheen <input type="checkbox"/> Globes <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		5	Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")	20			
Cobble	64-256 mm (2.5"-10")	35	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	35			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME <u>Licks Br</u>		LOCATION @ <u>Cyprus Amax Rd</u>	
STATION # <u>14</u> RIVERMILE		STREAM CLASS	
LAT _____ LONG _____		RIVER BASIN	
STORET #		AGENCY <u>EPA / KY DOW</u>	
INVESTIGATORS <u>Howard Tweldon / Cal</u>			
FORM COMPLETED BY <u>Howard et al</u>		DATE <u>5/4/00</u> TIME <u>10:05</u> <u>AM</u> PM	REASON FOR SURVEY <u>KY MTR / UF</u>

	Habitat Parameter	Condition Category																				
		Optimal				Suboptimal				Marginal				Poor								
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut bank, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).				40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).				20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or 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	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.				Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.				Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.				Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.								
	SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	3. Velocity/Depth Regime	All four velocity/depth regimes present ( <u>slow-deep, slow-shallow, fast-deep, fast-shallow</u> ). (Slow is < 0.3 m/s, deep is > 0.5 m.)				Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).				Only 2 of the 4 regimes present (if fast-shallow or _____ are missing, score low).				Dominated by 1 velocity/ depth regime (usually slow-deep).								
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.				Same new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; 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	
5. 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; or <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	

# HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
<b>Channel Iteration</b>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement over 10% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
<b>CORE</b>	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>Frequency of riffles (or bends)</b>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
<b>SCORE</b>	obstruction is important.																				
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>8. Bank Stability (score each bank)</b>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable: Infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable: 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable: many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
<b>Note:</b> determine left or right side by facing downstream.																					
<b>SCORE (LB)</b>	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
<b>SCORE (RB)</b>	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
<b>9. Vegetative Protection (score each bank)</b>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; 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 5 centimeters or less in average stubble height.					
<b>SCORE (LB)</b>	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
<b>SCORE (RB)</b>	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>	Width of riparian zone activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) >18 meters; human activities have not impacted zone.					Width of riparian zone activities have impacted zone only minimally.					Width of riparian zone activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
<b>SCORE (LB)</b>																					
<b>SCORE (RB)</b>																					
	Left Bank	10	9			8	7	6			5	4	3			2	1	0			

Total Score

STREAM NAME	<i>Licks Br</i>	LOCATION	<i>@ Cypress Amax Rd</i>
STATION #	<i>14</i>	RIVERMILE	
LAT		LONG	
STORET #		AGENCY	<i>EPA/KY DOW</i>
INVESTIGATORS	<i>Howard / Wilson / Call</i>		
FORM COMPLETED BY	<i>Howard et al</i>	DATE	<i>5/4/00</i> <i>1025</i> (AM) PM
		REASON FOR SURVEY	<i>KY MTR/UF</i>

SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled
	<p><i>Sta 14</i></p> <p><i>pix # 29 upstream - mid-pt</i> <i>30 downstream mid-pt</i></p> <p><i>Sta. 14-D</i> <i>(Duplicate Benthos)</i></p> <p><i>pix # 31 upstream, mid pt</i> <i>32 downstream, mid pt</i></p>
HABITAT TYPES	<p>Indicate the percentage of each habitat type present</p> <p><input checked="" type="checkbox"/> Cobble _____ %   <input type="checkbox"/> Snags _____ %   <input type="checkbox"/> Undercut Banks _____ %   <input type="checkbox"/> Sand _____ %</p> <p><input type="checkbox"/> Submerged Macrophytes _____ %   <i>Other (Leaf Packs)</i> _____ %</p>
STREAM CHARACTERIZATION	<p>Subsystem Classification      Stream Type</p> <p><input checked="" type="checkbox"/> Perennial   <input type="checkbox"/> Intermittent   <input type="checkbox"/> Tidal      <input type="checkbox"/> Coldwater   <input checked="" type="checkbox"/> Warmwater</p>

<b>RIPARIAN ZONE/ INSTREAM FEATURES</b>	<b>Predominant Surrounding Landuse</b> <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential  <b>Local Watershed NPS Pollution</b> <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources (adjacent) <input type="checkbox"/> Obvious sources  <b>Canopy Cover</b> <input type="checkbox"/> Partly open <input checked="" type="checkbox"/> Partly-shaded <input type="checkbox"/> Shaded  <b>High Water Mark</b> 61' m	<b>Local Water Erosion</b> <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy  <b>Estimated Stream Width</b> 12' m  <b>Estimated Stream Depth</b> <input type="checkbox"/> Riffle 6-10' m <input type="checkbox"/> Run 1' m <input type="checkbox"/> Pool _____ m  <b>Velocity</b> 1.67 m/sec ft/sec  <b>Estimated Reach Length</b> 100 m  <b>Channelized</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																						
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<b>AQUATIC VEGETATION</b>  N/A	<b>Indicate the dominant type and record the dominant species present</b> <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae dominant species present _____ Portion of the reach with vegetative cover _____%																																																							
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<b>WATER QUALITY</b>	<b>Temperature</b> _____ °C <b>Specific Conductance</b> _____ <b>Dissolved Oxygen</b> _____ <b>pH</b> _____ <b>Turbidity</b> _____ <b>WQ Instrument Used</b> _____	<b>Water Odors</b> <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____  <b>Water Surface Oils</b> <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globes <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b> <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Water color <input type="checkbox"/> Other _____																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: left;">INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)</th> <th colspan="3" style="text-align: left;">ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)</th> </tr> <tr> <th style="width:15%;">Substrate Type</th> <th style="width:15%;">Diameter</th> <th style="width:20%;">% Composition in Sampling Reach</th> <th style="width:15%;">Substrate Type</th> <th style="width:20%;">Characteristic</th> <th style="width:25%;">% Composition in Sampling Area</th> </tr> </thead> <tbody> <tr> <td>Bedrock</td> <td></td> <td></td> <td>Detritus</td> <td>sticks, wood, coarse plant materials (CPOM)</td> <td>10</td> </tr> <tr> <td>Boulder</td> <td>&gt; 256 mm (10")</td> <td>5</td> <td>Muck-Mud</td> <td>black, very fine organic (FFOM)</td> <td></td> </tr> <tr> <td>Cobble</td> <td>64-256 mm (2.5"-10")</td> <td>41.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gravel</td> <td>2-64 mm (0.1"-2.5")</td> <td>20.25</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sand</td> <td>0.06-2mm (gritty)</td> <td>20</td> <td>Mari</td> <td>grey, shell fragments</td> <td></td> </tr> <tr> <td>Silt</td> <td>0.004-0.06 mm</td> <td>10</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Clay</td> <td>&lt; 0.004 mm (slick)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	10	Boulder	> 256 mm (10")	5	Muck-Mud	black, very fine organic (FFOM)		Cobble	64-256 mm (2.5"-10")	41.0				Gravel	2-64 mm (0.1"-2.5")	20.25				Sand	0.06-2mm (gritty)	20	Mari	grey, shell fragments		Silt	0.004-0.06 mm	10				Clay	< 0.004 mm (slick)				
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