Appendix C

MBSS SPRING INDEX PERIOD DATA SHEET

SITE (Watershed Code) P AX (Segment) WB-M1 (Type) ___ (Year) 2008

Reviewer: (First) A Davis / (Second) R. Sain

DATE (Year) 08 (Month) 04 (Day) 15

CREW: R. Sain / A. Davis

STREAM: Woodland Branch

TIME 1045 (Military)

LOCALITY: CCNPP

SAMPLEABILITY

- ✓ Benthos
- ✓ Habitat Assessment
- ✓ Water Quality
- ___ Vernal Pool ___ PRESENT/ABSENT

OTHER (SPECIFY): ___

SITE ACCESS ROUTE

Unpaved road off of Calvert Cliffs Pkwy to the North.

SAMPLE LABELS

Verified by: ___

QC LABEL

Watershed Code: P AX (Letters only) Segment: ___ Type: ___ Year: ___

Dup. (D) or Blank (B): ___ Verified by: ___

TEMP. LOGGER

WATER (Y/N) Y NUM. ___

AIR ✓ NUM. ___

LOCATION ___

PH = 7.2
Cond = .23 m/s
Turb = <10
D.O = 11.9 mg/l
Temp = 10.9 °C
Sal. = 0%

PHOTODOCUMENTATION

Time	Number	Title	Voucher (Y/N)
		N/A Representative Photos taken of the site	

HERPETOFAUNA

✓ None Observed

	Lifestage: Adult	Juv	Larval	Egg	SEEN	HEARD Y/N	RETAINED

BENTHIC HABITAT SAMPLED

- ___ Riffle
- ✓ Rootwad/Woody Debris
- ✓ Leaf Pack
- ✓ Macrophytes
- ✓ Undercut Banks
- ✓ Other Job

SAMPLING CONSID.: (___ NUM. ANODES)

STREAM WIDTH (m) 0.9 (0 m) 75.0 (75 m)

MBSS SPRING HABITAT DATA SHEET

SITE — Watershed Code: PAX; Segment: WB-M1; Type: ___; Year: 2008

Reviewer: First: A. Davis; Second: R. Sai

DATE — Year: 08; Month: 04; Day: 15

1000 Dist. from Nearest (concrete) Road to Site (m)

0 Trash Rating 0 - 20

LANDUSE (Y/N)

- [ ] Old Field
- [ ] Deciduous Forest
- [ ] Coniferous Forest
- [ ] Wetland
- [ ] Surface Mine
- [ ] Landfill
- [ ] Residential
- [ ] Commercial/Industrial
- [ ] Cropland
- [ ] Pasture
- [ ] Orchard/Vineyard/Nursery
- [ ] Golf Course

RIPARIAN VEGETATION
(facing upstream)

	LEFT BANK	RIGHT BANK
Width (50m max)	50	50
Adjacent Land Cover	>50	>50
Vegetation Type	see guidance	
Buffer Breaks (Y/N)	N	N

- [ ] Storm Drain
- [ ] Tile Drain
- [ ] Impervious Drainage
- [ ] Gully
- [ ] Orchard
- [ ] Crop
- [ ] Pasture
- [ ] New Construction
- [ ] Dirt Road
- [ ] Gravel Road
- [ ] Raw Sewage
- [ ] Railroad

Buffer Break Types
(M = minor; S = severe)

ROAD CULVERT

Present in Segment? (Y/N): N

Sampleable? (Y/N): N/A

Width of Culvert (m): N/A

Length of Culvert (m): N/A

STREAM GRADIENT

	Location (m)	Height (m)
1		
2		
3		

CHANNELIZATION

[N] Evidence of Channel Straightening or Dredging (Y/N)

TYPE	EXTENT (m)		
	LEFT BANK	BOTTOM	RIGHT BANK
Concrete			
Gabion			
Rip-Rap			
Earthen Berm		N/A	
Dredge Spoil Off Channel		N/A	
Pipe Culvert			

Actual Coordinates
(If >30m distance between original coordinates and stream)

Lat

Lon

Stream Block Ht. (m)

Stream Block Type

Lat

Lon

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME Woodland Branch	LOCATION WB - M1 (SR-1)	
STATION # _____ RIVERMILE _____	STREAM CLASS C	
LAT _____ LONG _____	RIVER BASIN Patuxent	
STORET # N/A	AGENCY N/A	
INVESTIGATORS R. Sain / A. Davis		
FORM COMPLETED BY R Sain	DATE 4/15/08 TIME 10:45 AM PM	REASON FOR SURVEY NRC-USACE-MDE

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 8	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 4	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 12	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0

WB-M1

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

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 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 8	20 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 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 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 3 (LB)	Left Bank 10 9	8 7 6	5 4 (3)	2 1 0
SCORE 3 (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 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 87

MBSS SPRING INDEX PERIOD DATA SHEET

SITE PAX (Watershed Code) WB-M2 (Segment) ___ (Type) 2008 (Year)

Reviewer: A. Davis (First) R. Sain (Second)

DATE 08 (Year) 04 (Month) 14 (Day)

CREW: R Sain

STREAM: Woodland Branch

TIME 1320 (Military)

LOCALITY: CCNPP

SAMPLEABILITY

- ✓ Benthos
- ✓ Habitat Assessment
- ✓ Water Quality
- ___ Vernal Pool N PRESENT/ABSENT

OTHER (SPECIFY) ___

SITE ACCESS ROUTE

C.C. Parkway – near visitors center

SAMPLE LABELS

Verified by: N/A

QC LABEL

Watershed Code ___ Segment ___ (Letters only) Type ___ Year ___

Dup. (D) or Blank (B): ___ Verified by: ___

TEMP. LOGGER

WATER (Y/N) ✓ NUM. ___

AIR ✓ 15.2°C NUM. ___

LOCATION 10 meters from d.s. pt.

Temp = 14.1°C
Sal. = 0.01 %
pH = 7.2
Cond. = .32 m/s
Turb = < 10 NTU
D.O. = 10.8 mg/L

PHOTODOCUMENTATION

Time	Number	Title	Voucher (Y/N)
		N/A Representative Photos were taken	

HERPETOFAUNA

✓ None Observed

	Lifestage: Adult	Juv.	Larval	Egg	SEEN	HEARD Y/N	RETAINED

BENTHIC HABITAT SAMPLED

- ___ Riffle
- ✓ Rootwad/Woody Debris
- ✓ Leaf Pack
- ___ Macrophytes
- ✓ Undercut Banks
- ✓ Other Job

SAMPLING CONSID.: (___ NUM. ANODES)

STREAM WIDTH (m) 0.3 (0 m) 7.5.0 (75 m)

MBSS SPRING HABITAT DATA SHEET

SITE — Watershed Code: PAX; Segment: WB-M2; Type: ___; Year: 2008

Reviewer: First: A. Davis; Second: R. Sai-

DATE — Year: 08; Month: 04; Day: 15

~1200 Dist. from Nearest Road to Site (m)

0 Trash Rating 0 - 20

LANDUSE (Y/N)

- [ ] Old Field
- [x] Deciduous Forest
- [ ] Coniferous Forest
- [ ] Wetland
- [ ] Surface Mine
- [ ] Landfill
- [ ] Residential
- [ ] Commercial/Industrial
- [ ] Cropland
- [ ] Pasture
- [ ] Orchard/Vineyard/Nursery
- [ ] Golf Course

RIPARIAN VEGETATION
(facing upstream)

	LEFT BANK	RIGHT BANK
Width (50m max)	5.0	5.0
Adjacent Land Cover	>50	>50
Vegetation Type	See guide	
Buffer Breaks (Y/N)	N	N

- [ ] Storm Drain
- [ ] Tile Drain
- [ ] Impervious Drainage
- [ ] Gully
- [ ] Orchard
- [ ] Crop
- [ ] Pasture
- [ ] New Construction
- [ ] Dirt Road
- [ ] Gravel Road
- [ ] Raw Sewage
- [ ] Railroad

Buffer Break Types
(M = minor; S = severe)

ROAD CULVERT

Present in Segment? (Y/N) ✓

Sampleable? (Y/N) N/A

Width of Culvert (m) N/A

Length of Culvert (m) N/A

STREAM GRADIENT

	Location (m)	Height (m)
1		
2		
3		

CHANNELIZATION

[N] Evidence of Channel Straightening or Dredging (Y/N)

TYPE	EXTENT (m)		
	LEFT BANK	BOTTOM	RIGHT BANK
Concrete			
Gabion			
Rip-Rap			
Earthen Berm		N/A	
Dredge Spoil Off Channel		N/A	
Pipe Culvert			

Actual Coordinates
(If >30m distance between original coordinates and stream)

Lat

Lon

Stream Block Ht. (m)

Stream Block Type

Lat

Lon

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME Woodland Branch	LOCATION WB - M2 (SR-2)
STATION #_____ RIVERMILE_____	STREAM CLASS 6c
LAT _____ LONG _____	RIVER BASIN Patuxent
STORET # N/A	AGENCY N/A
INVESTIGATORS R. Sain / A. Davis	
FORM COMPLETED BY R. Sain	DATE 4/15/08 TIME 13:40 AM (PM) — REASON FOR SURVEY NRC-USACE-MDE

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 2	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 5	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 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0

WB-M2

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

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 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 7	20 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 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 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 2 (LB)	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
SCORE 2 (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 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 71

MBSS SPRING INDEX PERIOD DATA SHEET

Page 1 of 2

SITE: Watershed Code CHES, Segment LC-M3, Type ___, Year 2008

Reviewer: First A. Davis / Second R. Sain

DATE: Year 08, Month 04, Day 14

CREW: R. Sain / A. Davis

STREAM: Love Creek

TIME: 0930 (Military)

LOCALITY: CCNPP

SAMPLEABILITY

- ✓ Benthos
- ✓ Habitat Assessment
- ✓ Water Quality
- ___ Vernal Pool A PRESENT/ABSENT

OTHER (SPECIFY)

SITE ACCESS ROUTE

Access road northwest of Camp Canoy.

SAMPLE LABELS

Verified by: N/A

QC LABEL

Watershed Code	Segment	Type	Year
CHES	(Letters only)		

Dup. (D) or Blank (B): ☐ Verified by: ___

TEMP. LOGGER

WATER (Y/N) Y NUM. Cond = .562 m/s Turb. = 10

AIR ___ NUM. D.O. = 10.57 mg/liter

LOCATION Temp = 11.3°C Salinity = .02% PH = 7.0

PHOTODOCUMENTATION

Time	Number	Title	Voucher (Y/N)
		N/A Representative Photos taken	

HERPETOFAUNA

☑ None Observed

	Lifestage Adult	Juv.	Larval	Egg	SEEN	HEARD Y/N	RETAINED

BENTHIC HABITAT SAMPLED

- ✓ Riffle
- ✓ Rootwad/Woody Debris
- ✓ Leaf Pack
- ✓ Macrophytes
- ✓ Undercut Banks
- ___ Other ___

SAMPLING CONSID.: (☐ NUM. ANODES)

STREAM WIDTH (m) 1.0 (0 m) 75.0 (75 m)

MBSS SPRING HABITAT DATA SHEET

SITE — Watershed Code: CHES; Segment: LC-M3; Type: ; Year: 2008

Reviewer: First: A. Davis; Second: R. Sain

DATE — Year: 08; Month: 04; Day: 14

200 Dist. from Nearest Road to Site (m)

0 Trash Rating 0 - 20

LANDUSE (Y/N)

- [ ] Old Field
- [x] Deciduous Forest
- [ ] Coniferous Forest
- [ ] Wetland
- [ ] Surface Mine
- [ ] Landfill
- [ ] Residential
- [ ] Commercial/Industrial
- [ ] Cropland
- [ ] Pasture
- [ ] Orchard/Vineyard/Nursery
- [ ] Golf Course

RIPARIAN VEGETATION
(facing upstream)

	LEFT BANK	RIGHT BANK
Width (50m max)	50	50
Adjacent Land Cover	>50	>50
Vegetation Type	FR	FR
Buffer Breaks (Y/N)	N	N

- [ ] Storm Drain
- [ ] Tile Drain
- [ ] Impervious Drainage
- [ ] Gully
- [ ] Orchard
- [ ] Crop
- [ ] Pasture
- [ ] New Construction
- [ ] Dirt Road
- [ ] Gravel Road
- [ ] Raw Sewage
- [ ] Railroad

Buffer Break Types
(M = minor; S = severe)

ROAD CULVERT

Present in Segment? (Y/N) N

Sampleable? (Y/N) N/A

Width of Culvert (m) N/A

Length of Culvert (m) N/A

STREAM GRADIENT

	Location (m)	Height (m)
1		
2		
3		

CHANNELIZATION

[N] Evidence of Channel Straightening or Dredging (Y/N)

TYPE	EXTENT (m)		
	LEFT BANK	BOTTOM	RIGHT BANK
Concrete			
Gabion			
Rip-Rap			
Earthen Berm		N/A	
Dredge Spoil Off Channel		N/A	
Pipe Culvert			

Actual Coordinates
(If >30m distance between original coordinates and stream)

Lat

Lon

Stream Block Ht. (m)

Stream Block Type

Lat

Lon

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME Long Creek	LOCATION LC-M-03 (SR-3)	
STATION #_____ RIVERMILE_____	STREAM CLASS 6-4 (Rosgen)	
LAT See GPS LONG _____	RIVER BASIN Chesapeake Bay	
STORET # N/A	AGENCY N/A	
INVESTIGATORS R. Seib / A. Davis		
FORM COMPLETED BY R. Seib	DATE 4/14/08 TIME 11:15 (AM) PM	REASON FOR SURVEY NRC - USACE - MDE

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 10	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 10	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 12	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0

LC-M1

LC-M-1

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

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 14	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 16	20 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 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 4 (LB)	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 5 (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE 5 (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 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

Total Score 130

MBSS SPRING INDEX PERIOD DATA SHEET

SITE JC-M4 (Watershed Code) ____ (Segment) ____ (Type) 2008 (Year)

Reviewer: A. Davis (First) / R. Sain (Second)

DATE 08 (Year) 04 (Month) 16 (Day)

CREW: R. Sain / A. Davis

STREAM: John's Cr.

TIME 1223 (Military)

LOCALITY: CCNPP

SAMPLEABILITY

- ✓ Benthos
- ✓ Habitat Assessment
- ✓ Water Quality
- ___ Vernal Pool ___ PRESENT/ABSENT

OTHER (SPECIFY) ____

SITE ACCESS ROUTE

CCNPP - UT - JC

SAMPLE LABELS

Verified by: N/A

QC LABEL

Watershed Code ____ Segment (Letters only) ____ Type ____ Year ____

Dup. (D) or Blank (B): ____ Verified by: ____

TEMP. LOGGER

Temp = 12.8

Sal = .01%

PH = 7.3

Cond. = .3

Turb = <10 NTU

D.O. = 11.5

	(Y/N)		
WATER	Y	NUM.	
AIR	___	NUM.	

LOCATION 30 meters into site

PHOTODOCUMENTATION

Time	Number	Title	Voucher (Y/N)
		N/A Representative Photos were taken	N

HERPETOFAUNA

☐ None Observed

	Adult	Juv.	Larval	Egg	SEEN	HEARD Y/N	RETAINED
Salamander spp?	☐	✓	☐	☐	✓	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐

BENTHIC HABITAT SAMPLED

- ___ Riffle
- ✓ Rootwad/Woody Debris
- ✓ Leaf Pack
- ✓ Macrophytes
- ✓ Undercut Banks
- ✓ Other Job

SAMPLING CONSID.: (☐ NUM. ANODES) N/A

STREAM WIDTH (m) 1.0 (0 m) 75.0 (75 m)

MBSS SPRING HABITAT DATA SHEET

SITE: Watershed Code JC-M4 | Segment | Type | Year 2008

Reviewer: First / Second

DATE: Year 08 Month 04 Day 16

.6 KM Dist. from Nearest Road to Site (m)

0 Trash Rating 0 - 20

LANDUSE (Y/N)

- [ ] Old Field
- [ ] Deciduous Forest
- [x] Coniferous Forest
- [ ] Wetland
- [x] Surface Mine
- [ ] Landfill
- [ ] Residential
- [ ] Commercial/Industrial
- [ ] Cropland
- [ ] Pasture
- [ ] Orchard/Vineyard/Nursery
- [ ] Golf Course

RIPARIAN VEGETATION
(facing upstream)

	LEFT BANK	RIGHT BANK
Width (50m max)	50	50
Adjacent Land Cover	> 50	> 50
Vegetation Type	see table	
Buffer Breaks (Y/N)	N	N

ROAD CULVERT

Present in Segment? (Y/N) N

Sampleable? (Y/N) N/A

Width of Culvert (m) N/A

Length of Culvert (m) N/A

STREAM GRADIENT

	Location (m)	Height (m)
1		
2		
3		

Storm Drain
Tile Drain
Impervious Drainage
Gully
Orchard
Crop
Pasture
New Construction
Dirt Road
Gravel Road
Raw Sewage
Railroad

Buffer Break Types
(M = minor; S = severe)

CHANNELIZATION

[x] Evidence of Channel Straightening or Dredging (Y/N)

TYPE	EXTENT (m) LEFT BANK	BOTTOM	RIGHT BANK
Concrete			
Gabion			
Rip-Rap			
Earthen Berm	✓	N/A	✓
Dredge Spoil Off Channel		N/A	
Pipe Culvert			

Actual Coordinates
(If >30m distance between original coordinates and stream)
Lat
Lon

Stream Block Ht. (m)
Stream Block Type
Lat
Lon

Primarily found upstream

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME Johns Creek	LOCATION JC-M4	
STATION # _____ RIVERMILE _____	STREAM CLASS GL5	
LAT _____ LONG _____	RIVER BASIN Patuxent	
STORET # N/A	AGENCY N/A	
INVESTIGATORS R Soin / A. Davis		
FORM COMPLETED BY R. Soin	DATE 7/16/08 TIME 12:30 AM PM	REASON FOR SURVEY NRC-USACE-MDE

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 9	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 7	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 7	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 10	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—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

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 12	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 7	20 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 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 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 4 (LB)	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
SCORE 4 (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 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 89

MBSS SPRING INDEX PERIOD DATA SHEET

SITE PAX UTJC-M5 2008 (Watershed Code / Segment / Type / Year)

Reviewer: A. Davis / R. Sain (First / Second)

DATE 08 04 16 (Year / Month / Day)

CREW: RSain / A. Davis

STREAM: UT to John's Creek

TIME 1040 (Military)

LOCALITY: CCWPP

SAMPLEABILITY

- ✓ Benthos
- ✓ Habitat Assessment
- ✓ Water Quality
- Vernal Pool A PRESENT/ABSENT

OTHER (SPECIFY)

SITE ACCESS ROUTE

From CCWPP to John's Creek, downstream to Cole Channel — Alt. Route access from South Property line

SAMPLE LABELS

Verified by: N/A

QC LABEL

Watershed Code | Segment (Letters only) | Type | Year

Dup. (D) or Blank (B): Verified by:

TEMP. LOGGER

Temp = 8.8°C
pH = 7.2
Cond = .06
Sal. = .0%
D.O = 13.3
Turb. = 1.0

	(Y/N)		
WATER	Y	NUM.	
AIR		NUM.	
LOCATION			

PHOTODOCUMENTATION

Time	Number	Title	Voucher (Y/N)
		N/A Representative Photos taken	N

HERPETOFAUNA

☐ None Observed

	Lifestage: Adult	Juv.	Larval	Egg	SEEN	HEARD Y/N	RETAINED
Leopard Frog		✓			✓		

BENTHIC HABITAT SAMPLED

- Riffle
- ✓ Rootwad/Woody Debris
- ✓ Leaf Pack
- ✓ Macrophytes
- ✓ Undercut Banks
- ✓ Other Jab method

SAMPLING CONSID.: (NUM. ANODES)

STREAM WIDTH (m) 1.1 (0 m) 7.5.0 (75 m)

MBSS SPRING HABITAT DATA SHEET

SITE — Watershed Code: PAX; Segment: UT JCMS; Type: ___; Year: 2008

Reviewer: First: A. Davis; Second: R Sein

DATE — Year: 08; Month: 04; Day: 16

1 KM Dist. from Nearest Road to Site (m)

0 Trash Rating 0 - 20

LANDUSE (Y/N)

- [ ] Old Field
- [x] Deciduous Forest
- [ ] Coniferous Forest
- [x] Wetland
- [ ] Surface Mine
- [ ] Landfill
- [ ] Residential
- [ ] Commercial/Industrial
- [ ] Cropland
- [ ] Pasture
- [ ] Orchard/Vineyard/Nursery
- [ ] Golf Course

RIPARIAN VEGETATION
(facing upstream)

	LEFT BANK	RIGHT BANK
Width (50m max)	5.0	5.0
Adjacent Land Cover	>50	>50
Vegetation Type	see guidance	
Buffer Breaks (Y/N)	N	N

- [ ] Storm Drain
- [ ] Tile Drain
- [ ] Impervious Drainage
- [ ] Gully
- [ ] Orchard
- [ ] Crop
- [ ] Pasture
- [ ] New Construction
- [ ] Dirt Road
- [ ] Gravel Road
- [ ] Raw Sewage
- [ ] Railroad

Buffer Break Types
(M = minor; S = severe)

ROAD CULVERT

Present in Segment? (Y/N): N

Sampleable? (Y/N): N/A

Width of Culvert (m): N/A

Length of Culvert (m): N/A

STREAM GRADIENT

	Location (m)	Height (m)
1		
2		
3		

CHANNELIZATION

[Y] Evidence of Channel Straightening or Dredging (Y/N) — Primarily upstream

TYPE	EXTENT (m)		
	LEFT BANK	BOTTOM	RIGHT BANK
Concrete			
Gabion			
Rip-Rap			
Earthen Berm	✓	N/A	✓
Dredge Spoil Off Channel		N/A	
Pipe Culvert			

Actual Coordinates
(If >30m distance between original coordinates and stream)
Lat
Lon

Stream Block Ht. (m)
Stream Block Type
Lat
Lon

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME UT to John's Creek	LOCATION UT JC - MS (SR 5)
STATION # – RIVERMILE .6 KM	STREAM CLASS B_5
LAT _____ LONG _____	RIVER BASIN Potomac
STORET # N/A	AGENCY N/A
INVESTIGATORS R. Soin / A. Davis	
FORM COMPLETED BY R. Soin	DATE 4/16/08 TIME 11:13 AM PM / REASON FOR SURVEY NRC - USACE - MDE

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 14	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 16	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 12	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 18	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

UT JC-M5

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

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 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 15	20 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 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 7 (LB)	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
SCORE 7 (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 3 (LB)	Left Bank 10 9	8 7 6	5 4 (3)	2 1 0
SCORE 3 (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 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 149