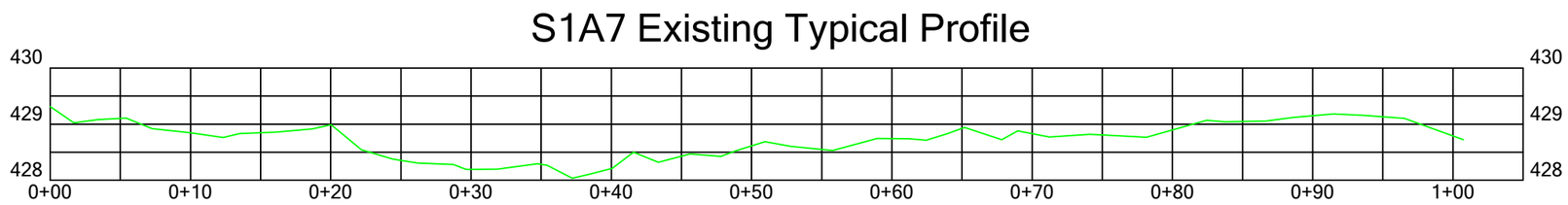
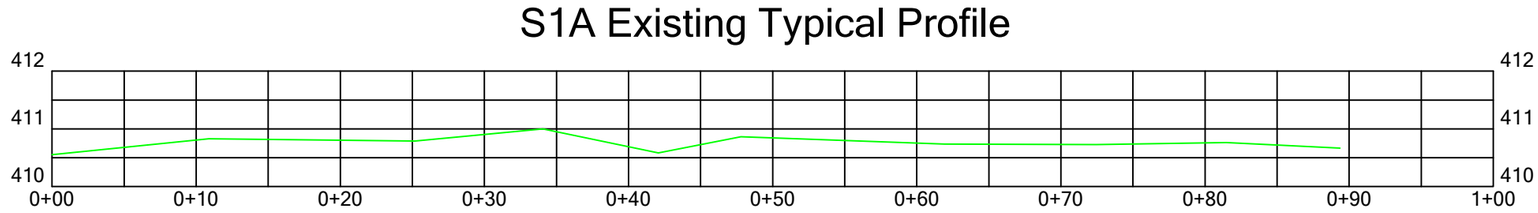
Existing Profiles





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Lexington, KY 40504
(859) 388-9595

Stream S1A and S1A7
Permit No. 889-0130
for
Oxford Mining Company - Kentucky, LLC
P.O.Box 427, 544 Chestnut St. Coshocton, OH 43812

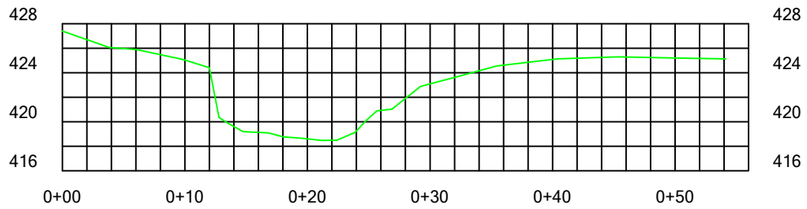
REVISIONS

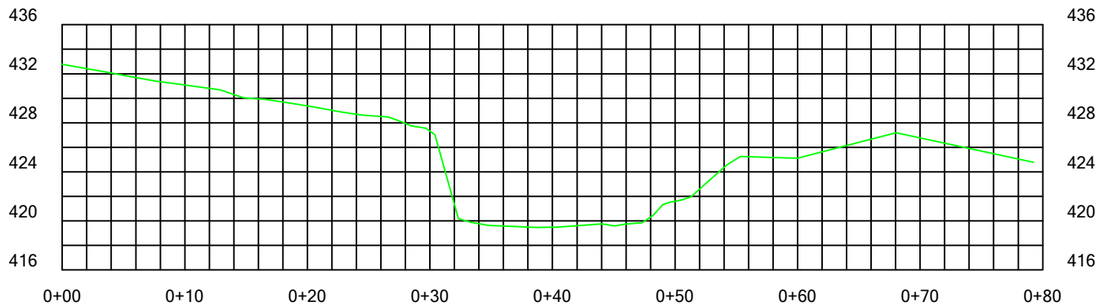
SCALE:	As Shown
JOB #:	080-502
DESIGNED BY:	NKB
DETAILED BY:	NKB
CHECKED BY:	JDH
DATE:	2/2/12

SHEET: 7

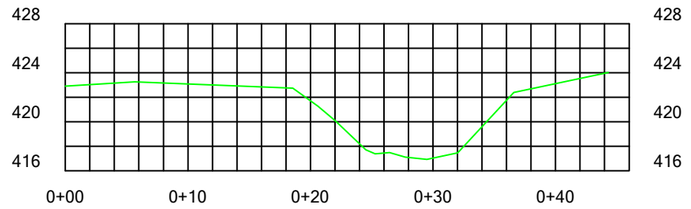
Existing Cross Sections

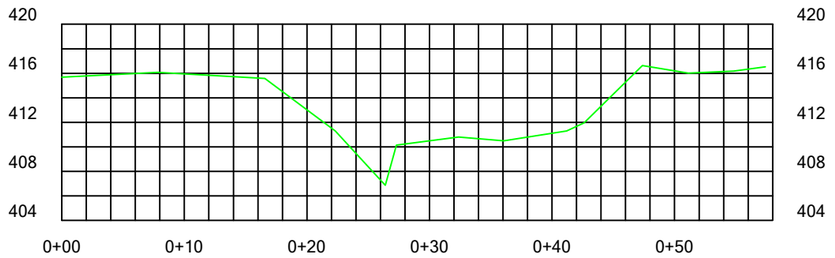
S1A Existing Cross Sections





S1A7 Existing Cross Sections





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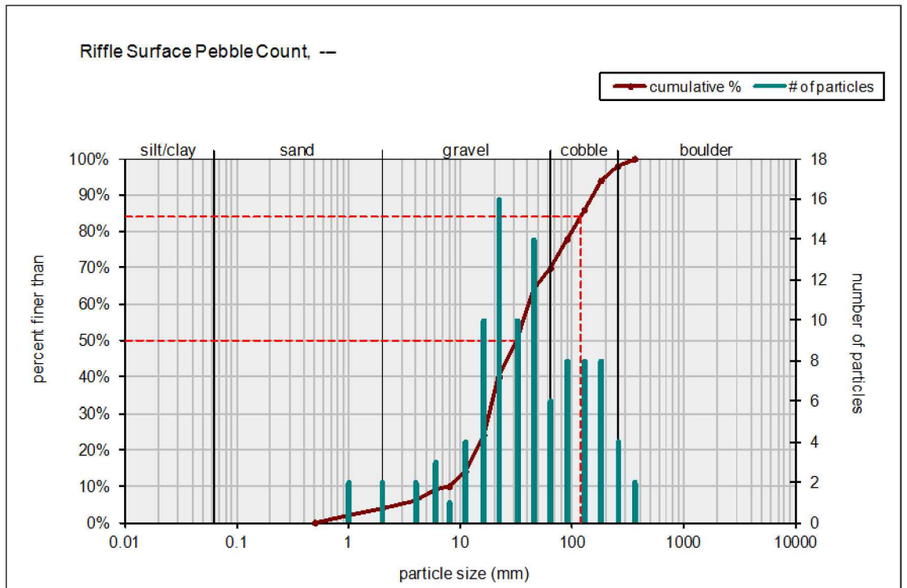
DATE:	2/2/12

SHEET: 8

Pavement and Sub-Pavement Analysis

Pavement Analysis

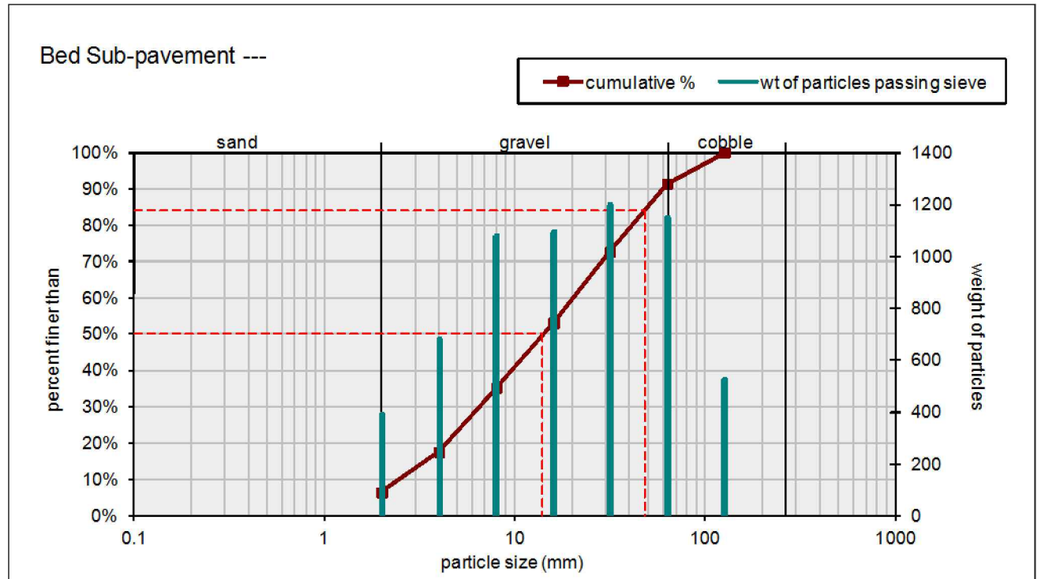


Size (mm)	
D16	12
D35	20
D50	32
D65	48
D84	120
D95	200

Size Distribution	
mean	37.9
dispersion	3.2
skewness	0.07

Type	
silt/clay	0%
sand	4%
gravel	66%
cobble	28%
boulder	2%

Sub-Pavement Analysis



Size (mm)			
D16	3.6	D65	24
D35	8	D84	48
D50	14	D95	84

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JOB #:	080-502
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CHECKED BY:	JDH
DATE:	2/2/12

SHEET: 9

Stream Riparian Area Tree and Shrub Species to be Planted

Common Name	*Scientific Name*
American Basswood	*Tilia americana*
American Beech	*Fagus grandifolia*
American Elm	*Ulmus americana*
Bitternut Hickory	*Carya cordiformis*
Black Oak	*Quercus velutina*
Black Walnut	*Juglans nigra*
Blackberry	*Rubus spp.*
Bur Oak*	*Quercus macrocarpa*
Cherrybark Oak*	*Quercus pagoda*
Chinkapin Oak	*Quercus muehlenbergii*
Kentucky Coffeetree	*Gymnocladus dioicus*
Northern Red Oak	*Quercus rubra*
Overcup Oak*	*Quercus lyrata*
Pignut Hickory	*Carya glabra*
Pin Oak*	*Quercus palustris*
Rock Elm	*Ulmus thomasii*
Shagbark Hickory	*Carya ovata*
Sugar Maple	*Acer saccharum*
Swamp Chestnut Oak*	*Quercus michauxii*
Swamp White Oak*	*Quercus bicolor*
White Oak	*Quercus alba*
Willow Oak*	*Quercus phellos*

** Wetland Species*

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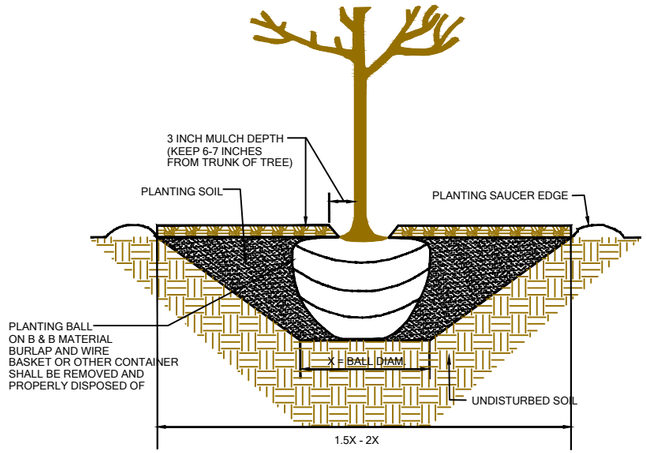
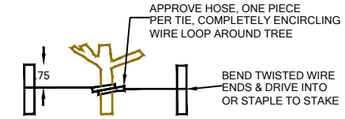
DATE:	2/2/12

SHEET: 10

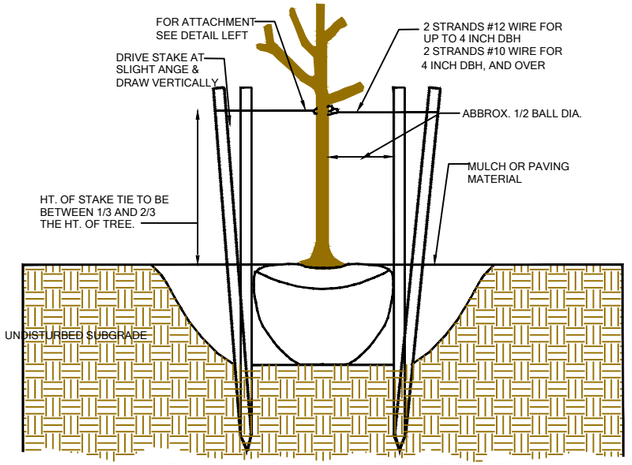
Tree Planting Specifications



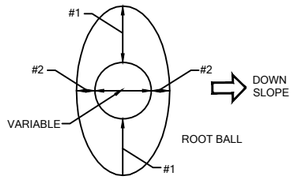
GENERAL TREE PLANTING



DETAIL OF STAKING TIE



STAKING TREES (WHEN SPECIFIED)



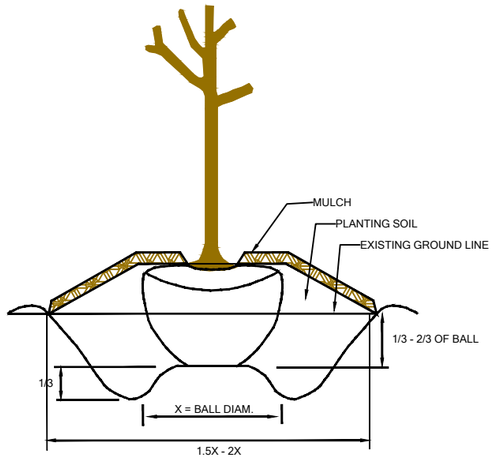
ELONGATED SLOPE PIT

#1 = BALL DIAMETER
#2 = 1/3 BALL DIA.

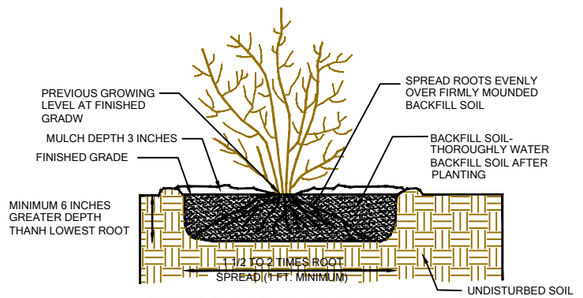
ELONGATED PITS MAY BE USED ON SLOPES AS DIRECTED BY THE DESIGNER, RECTANGULAR OR SQUARE PITS ARE ACCEPTABLE PROVIDED THEY ACCOMIDATE THE PLANTS AS SHOWN

PLANT PLACEMENT ON SLOPE

ALL PLANT MATERIALS



TREE PLANTING IN WET/HEAVY SOILS



BARE ROOT SHRUB PLANTING

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Stream S1A and S1A7
Permit No. 889-0130
for
Oxford Mining Company - Kentucky, LLC
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REVISIONS

SCALE:	As Shown
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DETAILED BY:	NKB
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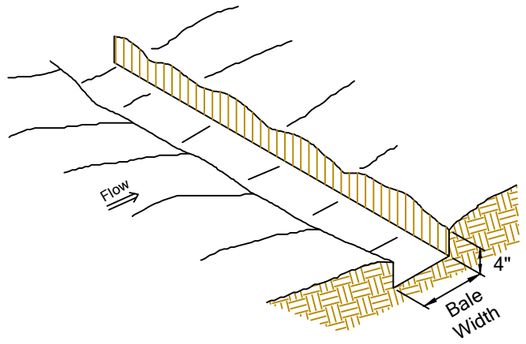
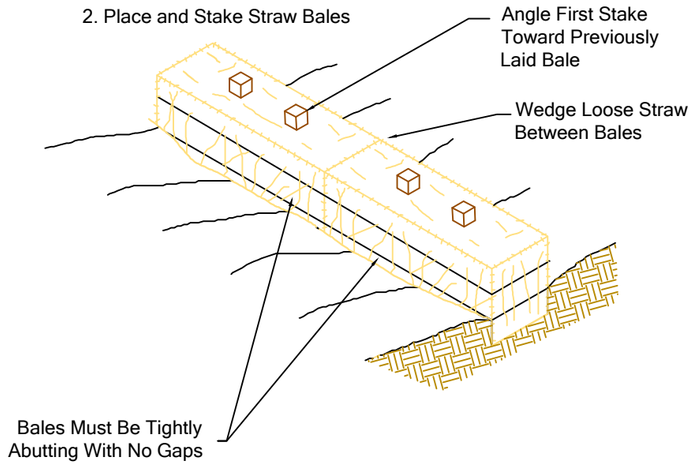
SHEET: 11

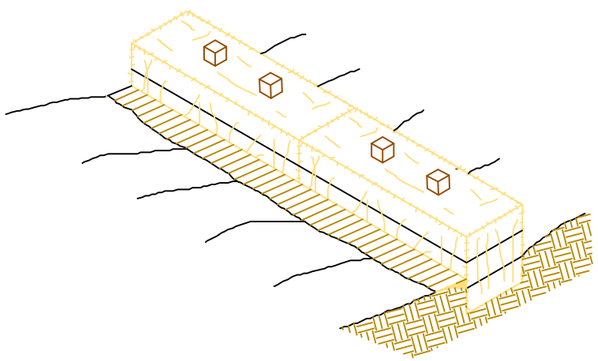
Erosion Control

1. Excavate the Trench

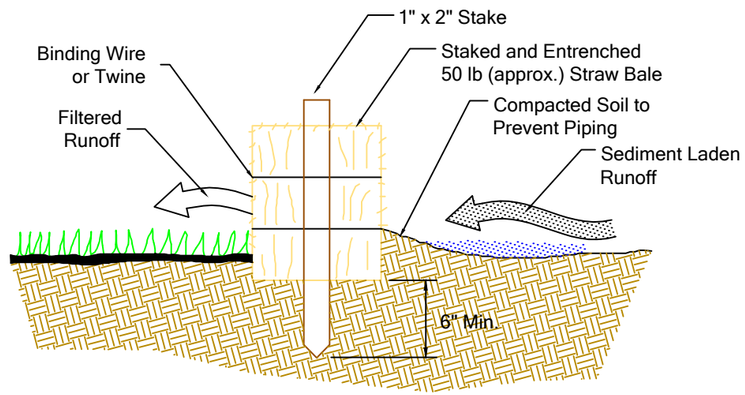


2. Place and Stake Straw Bales





3. Backfill and Compact the
Excavated Soil



Properly Installed Straw Bale

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Stream S1A and S1A7
Permit No. 889-0130
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REVISIONS

SCALE:	As Shown
JOB #:	080-502
DESIGNED BY:	NKB
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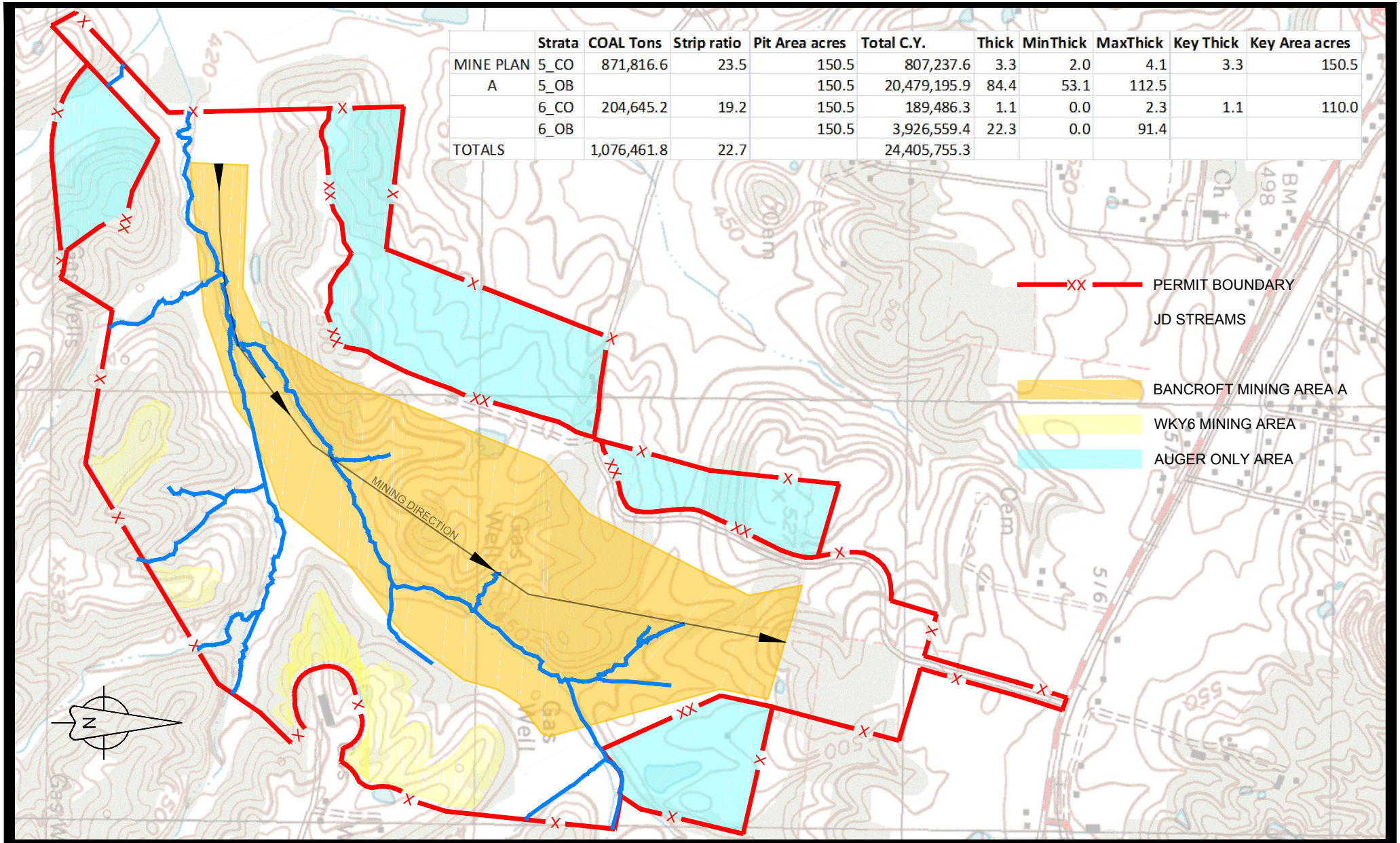
DATE:	2/2/12

SHEET:
12

Appendix J Area Mining Method Plans A & B

	Strata	COAL Tons	Strip ratio	Pit Area acres	Total C.Y.	Thick	MinThick	MaxThick	Key Thick	Key Area acres
MINE PLAN	5_CO	871,816.6	23.5	150.5	807,237.6	3.3	2.0	4.1	3.3	150.5
A	5_OB			150.5	20,479,195.9	84.4	53.1	112.5		
	6_CO	204,645.2	19.2	150.5	189,486.3	1.1	0.0	2.3	1.1	110.0
	6_OB			150.5	3,926,559.4	22.3	0.0	91.4		
TOTALS		1,076,461.8	22.7		24,405,755.3					



Drawn: RDD	Date: 2/14/12
Job: 080-002	Scale: 1"= 1000
Drawing: AA Mine Plans	

0' 1000'

OXFORD MINING COMPANY - KENTUCKY, LLC

889-0130 NW

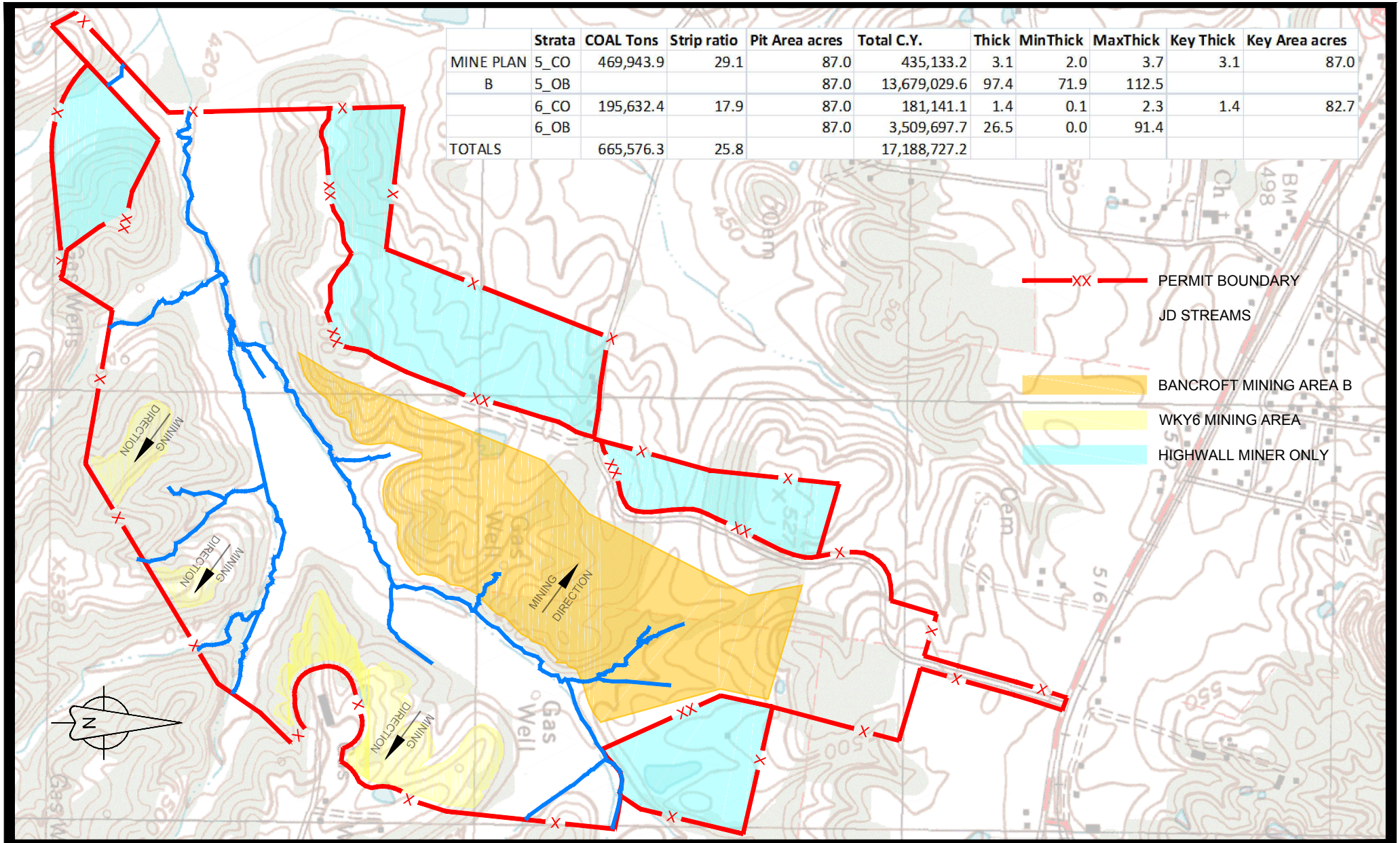
SURFACE AREA MINING ALTERNATIVE

MINE PLAN A

ErMC²

229 Madison Square Drive
Madisonville, KY 42431
(270) 452-2740
engineering@ermc2.us

	Strata	COAL Tons	Strip ratio	Pit Area acres	Total C.Y.	Thick	MinThick	MaxThick	Key Thick	Key Area acres
MINE PLAN	5_CO	469,943.9	29.1	87.0	435,133.2	3.1	2.0	3.7	3.1	87.0
B	5_OB			87.0	13,679,029.6	97.4	71.9	112.5		
	6_CO	195,632.4	17.9	87.0	181,141.1	1.4	0.1	2.3	1.4	82.7
	6_OB			87.0	3,509,697.7	26.5	0.0	91.4		
TOTALS		665,576.3	25.8		17,188,727.2					



Drawn: RDD	Date: 2/14/12
Job: 080-002	Scale: 1"= 1000
Drawing: AA Mine Plans	

OXFORD MINING COMPANY - KENTUCKY, LLC

889-0130 NW

SURFACE AREA MINING ALTERNATIVE

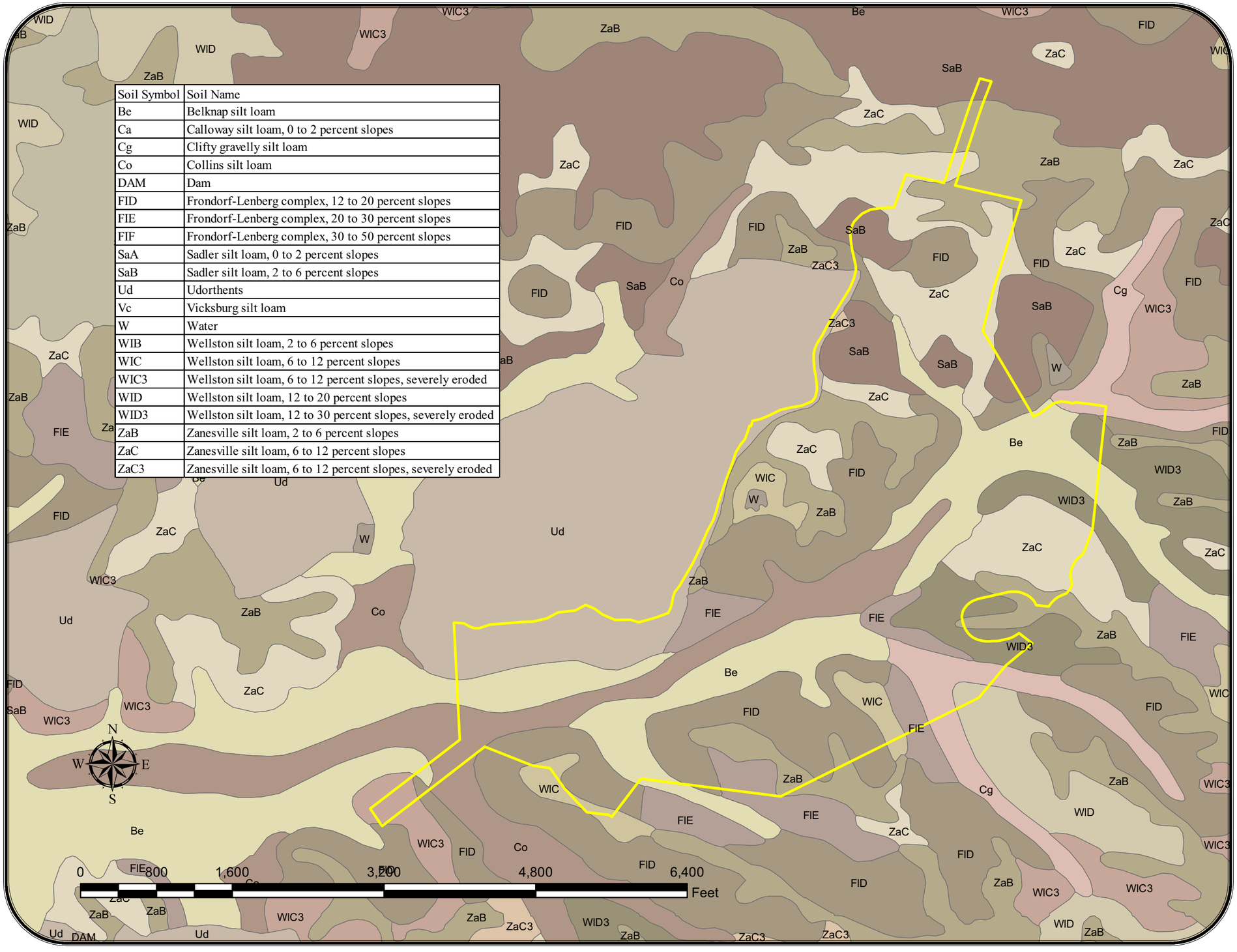
MINE PLAN B

ErMC²

229 Madison Square Drive
Madisonville, KY 42431
(270) 452-2740
engineering@ermc2.us

Appendix K Soil Characterization Map

Soils Location Map



Soil Symbol	Soil Name
Be	Belknap silt loam
Ca	Calloway silt loam, 0 to 2 percent slopes
Cg	Clifty gravelly silt loam
Co	Collins silt loam
DAM	Dam
FID	Frondorf-Lenberg complex, 12 to 20 percent slopes
FIE	Frondorf-Lenberg complex, 20 to 30 percent slopes
FIF	Frondorf-Lenberg complex, 30 to 50 percent slopes
SaA	Sadler silt loam, 0 to 2 percent slopes
SaB	Sadler silt loam, 2 to 6 percent slopes
Ud	Udorthents
Vc	Vicksburg silt loam
W	Water
WIB	Wellston silt loam, 2 to 6 percent slopes
WIC	Wellston silt loam, 6 to 12 percent slopes
WIC3	Wellston silt loam, 6 to 12 percent slopes, severely eroded
WID	Wellston silt loam, 12 to 20 percent slopes
WID3	Wellston silt loam, 12 to 30 percent slopes, severely eroded
ZaB	Zanesville silt loam, 2 to 6 percent slopes
ZaC	Zanesville silt loam, 6 to 12 percent slopes
ZaC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded

Legend

- Permit Boundary
- Be
- Ca
- Cg
- Co
- DAM
- FID
- FIE
- FIF
- SaA
- SaB
- Ud
- Vc
- W
- WIB
- WIC
- WIC3
- WID
- WID3
- ZaB
- ZaC
- ZaC3

Oxford Mining Company
889-0130

Oxford Resource Partners
Reliability Matters

P.O. Box 427, 544 Chestnut Street, Coshoctin, OH 43812

Date: 2/3/2012 Drawn By: CJR

ARM Project #: 080-502

Aquatic Resources Management
2265 Harrodsburg Rd., Suite 210
Lexington, KY 40504
(859) 388-9595

Appendix L Stream Characterization Data Forms

Habitat Assessment Field Data - Low Gradient Streams, Rapid Bioassessment Protocol, USEPA, Geibel Permit Area, Muhlenberg County, KY.

Parameter #	1	2	3	4	5	6	7	8		9		10		Score
Stream #	Epifaunal Substrate	Pool Substrate	Pool Variabilty	Sediment Deposition	Channel Flow	Channel Alterations	Channel Sinuosity	Bank Stability		Vegetative Protection		Riparian Vegetative Zone Width		
								LB	*RB*		*RB*	*LB*	*RB*	
s1a	10	9	10	6	15	13	6	2	2	2	2	5	5	87
s1a3	5	6	9	8	13	13	6	5	5	6	6	10	4	96
s1a5	6	6	5	3	15	20	7	6	6	4	4	5	5	92
s1a6	7	6	8	3	15	20	6	6	6	5	5	5	5	97
s1a6a	5	6	4	5	8	20	6	7	7	6	6	4	4	88
s1a6a1	3	6	3	6	8	20	6	7	7	6	6	8	8	94
s1a6a2	4	6	3	3	8	20	6	7	7	4	4	5	5	82
s1a6b	6	6	8	5	15	20	7	4	4	5	5	5	5	95
s1a6b1	3	6	2	10	11	20	6	3	3	3	3	10	10	90
s1a6b2	2	6	1	10	11	20	7	6	6	5	5	8	8	95
s1a6c	6	6	5	5	10	20	6	8	8	5	5	5	5	94
s1a6c1	5	6	3	8	10	20	7	4	4	5	5	5	5	87
s1a6c2	1	6	1	2	13	13	6	6	6	4	4	5	5	72
s1a7	7	6	6	5	15	13	6	5	2	4	4	4	10	87
s1a7a	3	6	1	5	8	11	5	3	3	4	4	5	5	63
s1a7b	1	6	2	5	15	13	6	6	6	5	5	10	10	90
s1a7c	6	6	1	2	4	11	5	7	7	6	6	4	4	69
s1a7d	5	5	3	6	8	20	8	4	4	5	5	5	5	83
s1a7e	10	5	13	7	15	15	7	7	7	5	5	2	5	103
s1a7e1	5	6	3	5	10	20	6	7	7	6	6	5	5	91
s1a7e2	1	6	1	1	13	13	6	7	7	6	6	7	7	81
s1a7e3	3	0	0	6	10	6	6	7	7	6	6	2	2	61
s1a7f	10	6	8	13	18	13	5	4	4	5	5	2	5	98
s1a7g	8	6	7	8	14	13	5	5	5	5	5	5	8	94
s1a7g2	8	6	6	10	13	11	5	5	5	5	5	5	5	89

Stream ID: s1a, plot 1

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/13/2008 **Investigator:** AP and RP

Stream Characterization

Flow Regime	intermitten	Slope	<0.02	Stream Order	4
Bankful width	19.2	Bankfull depth	1.7	Width Depth Ratio	11.29411765
Floodplain width	23.7	Terrace depth	6.2	Terrace width	29
Stream Length	3835	Straight length	3348	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: tulip poplar, sycamore, am elm

Right Bank: 100+ft wide: Sugar maple, sycamore

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	50
Sand	0.06 - 2mm	40
Silt	0.004 - 0.06mm	10
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	5
Muck-Mud	black, FPOM	2

Depositional Features

Describe: Point bars

Meander Patterns

None/**Channelized** Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes: Logging along south side of stream. Stream historically channelized

Stream ID: s1a, plot 2

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/13/2008 **Investigator:** AP and RP

Stream Characterization

Flow Regime	intermitten	Slope	<0.02	Stream Order	4
Bankful width	18.5	Bankfull depth	2.4	Width Depth Ratio	7.708333333
Floodplain width	21.4	Terrace depth	6.3	Terrace width	28
Stream Length	3835	Straight length	3348	Sinuosity	1.1

Riparian Vegetaion

Left Bank 100+ft wide: slippery elm, black cherry, dogwood, sugar maple, am elm (recent logging)

Right Bank 25 ft wide: Sugar maple, sycamore

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	1
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	20			
Sand	0.06 - 2mm	60			
Silt	0.004 - 0.06mm	20			
Clay	<0.004mm	0			

Depositional Features

Describe: Point bars, with few mid channel bars

Meander Patterns

None **Channelized** Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes: Logging along south side of stream.

Stream ID: s1a3

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/13/2008 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	3
Bankful width	15.2	Bankfull depth	1.2	Width Depth Ratio	12.66666667
Floodplain width	16.6	Terrace depth	4	Terrace width	19
Stream Length	1645	Straight length	1504	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: black cherry, sugar maple, green ash

Right Bank: 20 ft wide: american elm, tulip poplar. Soybean field beyond trees

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	8
Boulder	>256 mm	0	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	60			
Sand	0.06 - 2mm	30			
Silt	0.004 - 0.06mm	10			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars dominated by sand

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes:

Stream ID: s1a5, plot 1

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/13/2008 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	<0.02	Stream Order	2
Bankful width	4.7	Bankfull depth	0.5	Width Depth Ratio	9.4
Floodplain width	6.3	Terrace depth	1.6	Terrace width	7.5
Stream Length	1078	Straight length	914	Sinuosity	1.2

Riparian Vegetaion

Left Bank: 100+ft wide: LOGGED. Sweetgum, tulip poplar, red maple, japanese honeysuckle

Right Bank: 100+ft wide: LOGGED. Sweetgum, tulip poplar, red maple, japanese honeysuckle

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	5
Sand	0.06 - 2mm	20
Silt	0.004 - 0.06mm	75
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	20
Muck-Mud	black, FPOM	2

Depositional Features

Describe: point bars

Meander Patterns

None Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate Numerous **Extensive** Dominating Beaver Human

Notes: Extensive logging on both sides of banks. Temporary logging crossing has disrupted stream flow. Slash in stream channel.

Stream ID: s1a5, plot 2

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/13/2008 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	<0.02	Stream Order	2
Bankful width	4.3	Bankfull depth	0.8	Width Depth Ratio	5.375
Floodplain width	6	Terrace depth	2.1	Terrace width	16
Stream Length	1078	Straight length	914	Sinuosity	1.2

Riparian Vegetaion

Left Bank	100+ft wide: sugar maple, white oak, red oak, beech, christmas fern, japanese honeysuckle
Right Bank	100+ft wide: sugar maple, white oak, red oak, beech, christmas fern, japanese honeysuckle

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	20
Sand	0.06 - 2mm	60
Silt	0.004 - 0.06mm	20
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	5
Muck-Mud	black, FPOM	5

Depositional Features

Describe: point bars

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes:

Stream ID: s1a6, plot 1

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/11/2008 & 2/4/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope		Stream Order	3
Bankful width	6.3	Bankfull depth	0.8	Width Depth Ratio	7.875
Floodplain width	12.6	Terrace depth	3.5	Terrace width	22
Stream Length	2497	Straight length	2310	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: LOGGED. american elm, sweetgum, sycamore, green ash

Right Bank: 25ft wide: Amerian elm, sweetgum

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	10
Sand	0.06 - 2mm	30
Silt	0.004 - 0.06mm	60
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	5
Muck-Mud	black, FPOM	2

Depositional Features

Describe: point bars. Increased bar development due to siltation from logging

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w Oxbows

Debris Blockages

None Infrequent Moderate Numerous **Extensive** Dominating Beaver Human

Notes: Recent logging. A lot of slash in stream. Extreme siltation from logging

Stream ID: s1a6, plot 2

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/11/2008 & 2/4/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	3
Bankful width	7.8	Bankfull depth	1.4	Width Depth Ratio	5.571428571
Floodplain width	9.7	Terrace depth	4.3	Terrace width	14
Stream Length	2497	Straight length	2310	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: LOGGED. black cherry, dogwood, sweetgum, sassafras, sycamore

Right Bank: 25ft wide: Amerian elm, sweetgum, abandoned ag field beyond

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	1
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	20			
Sand	0.06 - 2mm	40			
Silt	0.004 - 0.06mm	40			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars. Increased bar development due to siltation from logging

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate Numerous **Extensive** Dominating Beaver Human

Notes: Recent logging. A lot of slash in stream. Extreme siltation from logging

Stream ID: s1a6a

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/11/08 & 2/4/2010**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	ephemeral	Slope	<0.02	Stream Order	2
Bankful width	2.8	Bankfull depth	0.6	Width Depth Ratio	4.7
Floodplain width	5.5	Terrace depth	3.5	Terrace width	9.5
Stream Length	345	Straight length	325	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: LOGGED, maple, sweetgum, japanese honeysuckle, unknown grass

Right Bank: 100+ft wide: logged, maple, sweetgum

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	20
Sand	0.06 - 2mm	30
Silt	0.004 - 0.06mm	50
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	20
Muck-Mud	black, FPOM	1

Depositional Features

Describe: point bars. Siltation from logging induced erosion.

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate **Numerous** Extensive Dominating Beaver Human

Notes: Extensive logging. Debris jams from logging slash. Siltation.

Stream ID: s1a6a1

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/11/08 & 2/4/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope		Stream Order	1
Bankful width	3.5	Bankfull depth	0.5	Width Depth Ratio	7
Floodplain width	6	Terrace depth	4	Terrace width	10
Stream Length	494	Straight length	445	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide:LOGGED, maple

Right Bank: 100+ft wide:LOGGED, maple

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	10
Boulder	>256 mm	0	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	10			
Sand	0.06 - 2mm	40			
Silt	0.004 - 0.06mm	50			
Clay	<0.004mm	0			

Depositional Features

Describe: heavy siltation. Little point bar development

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes: Riparian area extensively logged. Siltation in stream from logging induced erosion.

Stream ID: s1a6a2

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/11/08 & 2/4/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope		Stream Order	1
Bankful width	3.8	Bankfull depth	0.6	Width Depth Ratio	6.333333333
Floodplain width	5.6	Terrace depth	2.6	Terrace width	11
Stream Length	494	Straight length	445	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: LOGGED, maple

Right Bank: 100+ft wide: LOGGED, maple

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	10
Sand	0.06 - 2mm	40
Silt	0.004 - 0.06mm	50
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	10
Muck-Mud	black, FPOM	3

Depositional Features

Describe: heavy siltation. Little point bar development

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes: Riparian area extensively logged. Siltation in stream from logging induced erosion.

Stream ID:s1a6b

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/12/08 & 2/4/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	2
Bankful width	9.5	Bankfull depth	1.2	Width Depth Ratio	7.916666667
Floodplain width	13	Terrace depth	5.5	Terrace width	17.8
Stream Length	2879	Straight length	2456	Sinuosity	1.2

Riparian Vegetaion

Left Bank	100+ft: LOGGED. Sweetgum, japanese honeysuckle
Right Bank	100+ft: LOGGED. Sweetgum, japanese honeysuckle

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	8
Boulder	>256 mm	0	Muck-Mud	black, FPOM	3
Cobble	64 - 256 mm	5			
Gravel	2 - 64 mm	45			
Sand	0.06 - 2mm	40			
Silt	0.004 - 0.06mm	10			
Clay	<0.004mm	0			

Depositional Features

Describe: large point bars (sand and gravel)

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes: riparian area logged.

Stream ID: s1a6c

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/12/2008 & 2/4/2010**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	2
Bankful width	9.6	Bankfull depth	0.6	Width Depth Ratio	16
Floodplain width	13.7	Terrace depth	5.5	Terrace width	21.6
Stream Length	2998	Straight length	2627	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft wide: LOGGED. Sugar maple, beech, white oak sweetgum

Right Bank: 100+ft wide: LOGGED. Sugar maple, beech, white oak sweetgum

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	3
Gravel	2 - 64 mm	47
Sand	0.06 - 2mm	30
Silt	0.004 - 0.06mm	20
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	10
Muck-Mud	black, FPOM	3

Depositional Features

Describe: point bars.

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate **Numerous** Extensive Dominating Beaver Human

Notes:

Stream ID: s1a7, plot 1

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/12/10 & 1/27/10 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	3
Bankful width	13	Bankfull depth	1.1	Width Depth Ratio	11.81818182
Floodplain width	14	Terrace depth	4.7	Terrace width	20
Stream Length	5042	Straight length	4650	Sinuosity	1.1

Riparian Vegetaion

Left Bank: abandoned ag field. Sweet gum, green ash, rubus, japanese honesuckle

Right Bank: 100+ft wide: elm, sugar maple, shagbark, japanise honeysuckle, sassafras

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	4
Boulder	>256 mm	0	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	5			
Gravel	2 - 64 mm	50			
Sand	0.06 - 2mm	35			
Silt	0.004 - 0.06mm	10			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars

Meander Patterns

None/**Channelized** Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate **Numerous** Extensive Dominating Beaver Human

Notes:

Stream ID: s1a7, plot 2

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/12/10 & 1/27/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	3
Bankful width	16.5	Bankfull depth	2.8	Width Depth Ratio	5.892857143
Floodplain width	20.8	Terrace depth	6	Terrace width	27
Stream Length	5042	Straight length	4650	Sinuosity	1.1

Riparian Vegetaion

Left Bank: ag field

Right Bank: 100+ft wide: elm, sugar maple, shagbark, japanise honeysuckle, sassafras

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	5
Gravel	2 - 64 mm	50
Sand	0.06 - 2mm	35
Silt	0.004 - 0.06mm	10
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	4
Muck-Mud	black, FPOM	2

Depositional Features

Describe: point bars

Meander Patterns

None/**Channelized** Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes: measurements taken at pool

Stream ID: s1a7a

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 11/11/08 & 1/26/10 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	<0.02	Stream Order	1
Bankful width	3.8	Bankfull depth	1.1	Width Depth Ratio	3.5
Floodplain width	10.4	Terrace depth	6.2	Terrace width	22
Stream Length	319	Straight length	287	Sinuosity	1.1

Riparian Vegetaion

Left Bank: abandoned ag field, shurbs. Sweetgum, green ash, elymus, rubus

Right Bank: abandoned ag field, shurbs. Sweetgum, green ash, elymus, rubus

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	1
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	20			
Sand	0.06 - 2mm	30			
Silt	0.004 - 0.06mm	50			
Clay	<0.004mm	0			

Depositional Features

Describe:

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes: severe bank erosion. Channelized ditch

Stream ID: s1a7b

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/12/08 & 1/27/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	>0.02	Stream Order	1
Bankful width	4.6	Bankfull depth	1.4	Width Depth Ratio	3.3
Floodplain width	8.8	Terrace depth	5.7	Terrace width	14.8
Stream Length	461	Straight length	445	Sinuosity	1

Riparian Vegetaion

Left Bank 100+ft: sweetgum, eastern red cedar, japanese honeysuckle

Right Bank 100+ft: sweetgum, eastern red cedar, japanese honeysuckle

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	5
Gravel	2 - 64 mm	20
Sand	0.06 - 2mm	70
Silt	0.004 - 0.06mm	5
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	5
Muck-Mud	black, FPOM	2

Depositional Features

Describe: few point bars

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes:

Stream ID: s1a7c

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/11/08 & 1/26/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	<0.02	Stream Order	1
Bankful width	4.6	Bankfull depth	0.8	Width Depth Ratio	5.75
Floodplain width	5.6	Terrace depth	3.2	Terrace width	10.9
Stream Length	319	Straight length	287	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100+ft: LOGGED. Maple, beech, oak, sweet gum

Right Bank: 10ft forest buffer, sweet gum, maple, rubus. Ag field beyond buffer

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	1
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	5			
Sand	0.06 - 2mm	20			
Silt	0.004 - 0.06mm	75			
Clay	<0.004mm	0			

Depositional Features

Describe: few point bars

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes: Channelized ditch

Stream ID: s1a7d

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project:	**Geibel**	**Date:**	**11/13/08 & 1/26/10**	**Investigator:**	AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	>0.02	Stream Order	1
Bankful width	2.9	Bankfull depth	0.7	Width Depth Ratio	4.1
Floodplain width	4.3	Terrace depth	5.3	Terrace width	13
Stream Length	435	Straight length	343	Sinuosity	1.3

Riparian Vegetaion

Left Bank 100+ft: LOGGED. Sugar maple, dogwood, sweetgum, sassafras, japanese honeysuckle

Right Bank 100+ft: LOGGED. Sugar maple, dogwood, sweetgum, sassafras, japanese honeysuckle

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	3
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	10			
Sand	0.06 - 2mm	20			
Silt	0.004 - 0.06mm	70			
Clay	<0.004mm	0			

Depositional Features

Describe: few point bars

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes: incised channel

Stream ID: s1a7e

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project: Geibel **Date:** 1/26/2010 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	<0.02	Stream Order	2
Bankful width	4.8	Bankfull depth	0.9	Width Depth Ratio	5.333333333
Floodplain width	7.3	Terrace depth	2.5	Terrace width	7.8
Stream Length	716	Straight length	604	Sinuosity	1.2

Riparian Vegetaion

Left Bank: ag field

Right Bank: 100+ft: LOGGED. Maple, sweetgum, elm, japanese honeysuckle

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	10			
Sand	0.06 - 2mm	40			
Silt	0.004 - 0.06mm	50			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars. Siltation

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate **Numerous** Extensive Dominating Beaver Human

Notes: Siltation

Stream ID: s1a7e1

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 1/26/2010 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	>0.02	Stream Order	1
Bankful width	3.4	Bankfull depth	0.6	Width Depth Ratio	5.666666667
Floodplain width	4.1	Terrace depth	1.9	Terrace width	6.2
Stream Length	1678	Straight length	1588	Sinuosity	1.1

Riparian Vegetaion

Left Bank: LOGGED. Few shrubs left

Right Bank: LOGGED: Few shrubs left

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	10
Boulder	>256 mm	0	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	0			
Sand	0.06 - 2mm	20			
Silt	0.004 - 0.06mm	80			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent **Moderate** Numerous Extensive Dominating Beaver Human

Notes: Logging. Siltation from logging induced erosion.

Stream ID:_____

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 1/26/2010 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope		Stream Order	1
Bankful width	2.4	Bankfull depth	0.4	Width Depth Ratio	6
Floodplain width	5	Terrace depth	1.5	Terrace width	7.6
Stream Length	183	Straight length	160	Sinuosity	1.1

Riparian Vegetaion

Left Bank: 100 ft: LOGGING, american elm, black cherry, sugar maple

Right Bank: 100+ft: LOGGING, american elm, black cherry, sugar maple

Substrate Components

Type	Diameter	%
Bedrock		0
Boulder	>256 mm	0
Cobble	64 - 256 mm	0
Gravel	2 - 64 mm	0
Sand	0.06 - 2mm	20
Silt	0.004 - 0.06mm	80
Clay	<0.004mm	0

Type	Description	%
Detritus	sticks, wood, CPOM	10
Muck-Mud	black, FPOM	2

Depositional Features

Describe: point bars

Meander Patterns

None/Channelized Regular Tortuous **Irregular** Truncated Unconfined Scrolls
Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate **Numerous** Extensive Dominating Beaver Human

Notes: Silt 5+ inches deep in places

Stream ID: s1a7e3

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 1/26/2010 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Ephemeral	Slope	<0.02	Stream Order	1
Bankful width	2	Bankfull depth	0.3	Width Depth Ratio	6.7
Floodplain width	5.5	Terrace depth	0.6	Terrace width	5.5
Stream Length	561	Straight length	559	Sinuosity	1

Riparian Vegetaion

Left Bank: abandoned ag field, sweetgum, red maple

Right Bank: abandoned ag field, sweetgum, red maple

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	10
Boulder	>256 mm	0	Muck-Mud	black, FPOM	1
Cobble	64 - 256 mm	0			
Gravel	2 - 64 mm	0			
Sand	0.06 - 2mm	20			
Silt	0.004 - 0.06mm	80			
Clay	<0.004mm	0			

Depositional Features

Describe: few point bars

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate Numerous **Extensive** Dominating Beaver Human

Notes: filled with slash.

Stream ID: s1a7f

Stream Characterization Data Form
(adapted from Rosgen 1996)

Project: Geibel **Date:** 1/26/2010 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	2
Bankful width	7.6	Bankfull depth	1.2	Width Depth Ratio	6.333333333
Floodplain width	10.2	Terrace depth	3.3	Terrace width	17
Stream Length	2590	Straight length	2429	Sinuosity	1.1

Riparian Vegetaion

Left Bank: ag field

Right Bank: 100+ft: LOGGED

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	0	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	5			
Gravel	2 - 64 mm	45			
Sand	0.06 - 2mm	30			
Silt	0.004 - 0.06mm	20			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None Infrequent Moderate **Numerous** Extensive Dominating Beaver Human

Notes:

Stream ID: s1a7g

Stream Characterization Data Form

(adapted from Rosgen 1996)

Project: Geibel **Date:** 1/26/2010 **Investigator:** AP and RP

Stream Characterization

Flow Regime	Intermitten	Slope	<0.02	Stream Order	3
Bankful width	13.1	Bankfull depth	0.9	Width Depth Ratio	14.55555556
Floodplain width	15.4	Terrace depth	3.9	Terrace width	24.8
Stream Length	313	Straight length	284	Sinuosity	1.1

Riparian Vegetaion

Left Bank: abandoned ag field

Right Bank: 30 ft of trees, sweetgum, red maple and pasture beyond

Substrate Components

Type	Diameter	%	Type	Description	%
Bedrock		0	Detritus	sticks, wood, CPOM	5
Boulder	>256 mm	10	Muck-Mud	black, FPOM	2
Cobble	64 - 256 mm	10			
Gravel	2 - 64 mm	50			
Sand	0.06 - 2mm	20			
Silt	0.004 - 0.06mm	10			
Clay	<0.004mm	0			

Depositional Features

Describe: point bars

Meander Patterns

None/Channelized Regular Tortuous Irregular Truncated Unconfined Scrolls Confined Scrolls Distorted Loops Irregular w/ Oxbows

Debris Blockages

None **Infrequent** Moderate Numerous Extensive Dominating Beaver Human

Notes:

Appendix M Habitat Assessment Form

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 10	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
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 13	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)					The bends in the stream increase the stream length 2 to 3 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 6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
	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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.		
Score (LB) 2			☐			☐			☐			☐
	Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB) 2			☐			☐			☑			☐
	Right Bank 10	9	8	7	6	5	4	3	2	1		

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

	grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.			
Score (LB)	**2**	☐ 10 ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☑ 2 ☐ 1 ☐			
	Left Bank				
Score (RB)	**2**	☐ 10 ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☑ 2 ☐ 1 ☐			
	Right Bank				
10. Riparian Vegstative 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)	**5**	☐ 10 ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☑ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐			
	Left Bank				
Score (RB)	**5**	☐ 10 ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☑ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐			
	Right Bank				
TOTAL SCORE	**87**				

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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			
. Pool Variability	Even mix of largeshallow, large-deep, smallshallow, 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 9	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 13	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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	13	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
		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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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	6	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐ ☐
		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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	5	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
		Left Bank 10 9 8	7 6 5	4 3 2	1
Score (RB)	5	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
		Right Bank 10 9 8	7 6 5	4 3 2	1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.			half of the potential plant stubble height remaining.							
core (LB)	6	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
core (RB)	6	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	10	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
core (RB)	4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
OTAL SCORE	96											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 5	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 *mimimal* 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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	☑			
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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

	10 9 8	7 6	5 4 3	2 1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 6		☑		
Left Bank	10 9 8	7 6	5 4 3	2 1
Score (RB) 6		☑		
Right Bank	10 9 8	7 6	5 4 3	2 1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	**92**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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			
. Pool Variability	Even mix of largeshallow, large-deep, smallshallow, 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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 mimimal 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16 15 14 13 12 11	10 9 8 7 6 5 4 3 2 1
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	☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
	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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐
	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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 6	☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐	☐
	Left Bank 10 9 8 7 6 5 4 3 2 1	
Score (RB) 6	☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐	☐
	Right Bank 10 9 8 7 6 5 4 3 2 1	
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

	grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.			
Score (LB)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
10. Riparian Vegstative 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)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
TOTAL SCORE	97				

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 4	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	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 mimimal 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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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	☑			
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 6	☑			
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

		10	9	8	7	6	5	4	3	2	1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Score (LB) 7					☑						
	Left Bank	10	9	8	7	6	5	4	3	2	1
Score (RB) 7					☑						
	Right Bank	10	9	8	7	6	5	4	3	2	1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	**88**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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**	☑	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
		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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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	**6**	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐ ☐
		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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	**7**	☐ ☐ ☐ ☑ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐
		Left Bank 10 9 8	7 6	5 4 3	2 1
Score (RB)	**7**	☐ ☐ ☐ ☑ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐
		Right Bank 10 9 8	7 6	5 4 3	2 1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.									
Score (LB)	6	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	
		Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB)	6	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	
		Right Bank 10	9	8	7	6	5	4	3	2	1		
10. Riparian Vegstative 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)	8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	
		Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB)	8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	
		Right Bank 10	9	8	7	6	5	4	3	2	1		
TOTAL SCORE	94												

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 4	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 mimimal 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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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**	☑			
		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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	**6**			☑	
		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

		10 9 8	7 6	5 4 3	2 1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	**7**		☑		
		Left Bank 10 9 8	7 6	5 4 3	2 1
Score (RB)	**7**		☑		
		Right Bank 10 9 8	7 6	5 4 3	2 1

		10 9 8	7 6	5 4 3	2 1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	**82**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 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 mimimal 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16 15 14 13 12 11	10 9 8 7 6 5 4 3 2 1		
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	☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		
	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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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		
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 4	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	Left Bank 10 9 8 7 6 5 4 3 2 1			
Score (RB) 4	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	Right Bank 10 9 8 7 6 5 4 3 2 1			
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	5	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	5	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	5	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	5	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	**95**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 5	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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
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	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)					The bends in the stream increase the stream length 2 to 3 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	6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

		10	9	8	7	6	5	4	3	2	1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Score (LB)	8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Left Bank	10	9	8	7	6	5	4	3	2	1
Score (RB)	8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Right Bank	10	9	8	7	6	5	4	3	2	1

		10	9	8	7	6	5	4	3	2	1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through		70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-			50-70% of the stream-bank 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.	

	grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.			
Score (LB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
10. Riparian Vegstative 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)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
TOTAL SCORE	**94**				

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 13	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 6	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

	10	9	8	7	6	5	4	3	2	1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Score (LB) 5					☐	☑	☐	☐	☐	☐
Left Bank	10	9	8	7	6	5	4	3	2	1
Score (RB) 2					☐	☐	☐	☐	☑	☐
Right Bank	10	9	8	7	6	5	4	3	2	1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

	grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.			
Score (LB)	4	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	4	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
10. Riparian Vegstative 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)	4	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	10	☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
TOTAL SCORE	87				

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 1	☐ ☑ ☐			
	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 mimimal 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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 11	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 5	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

	10 9 8 7 6	5 4 3 2 1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 3	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐
Left Bank	10 9 8 7 6	5 4 3 2 1
Score (RB) 3	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐
Right Bank	10 9 8 7 6	5 4 3 2 1

	10 9 8 7 6	5 4 3 2 1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

	grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.		
Score (LB)	**4**	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	**4**	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
10. Riparian Vegstative 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)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
Score (RB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
TOTAL SCORE	**63**				

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 1	☐ ☑ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 mimimal 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 13	☐ ☐ ☐ ☐ ☐	☐ ☑ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 6	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 6	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐		
	Left Bank 10 9 8 7 6	5 4 3 2 1		
Score (RB) 6	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐		
	Right Bank 10 9 8 7 6	5 4 3 2 1		
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank	10	9	8	7	6	5	4	3	2	1
Score (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank	10	9	8	7	6	5	4	3	2	1
10. Riparian Vegstative 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)	**10**	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Left Bank	10	9	8	7	6	5	4	3	2	1
Score (RB)	**10**	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Right Bank	10	9	8	7	6	5	4	3	2	1
TOTAL SCORE	**90**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 1	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐			
	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 2	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐			
	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 mimimal 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 4	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 11	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 5	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

	10 9 8	7 6	5 4 3	2 1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 7	☐ ☐ ☐	☑ ☐	☐ ☐ ☐	☐ ☐ ☐
	Left Bank 10 9 8	7 6	5 4 3	2 1
Score (RB) 7	☐ ☐ ☐	☑ ☐	☐ ☐ ☐	☐ ☐ ☐
	Right Bank 10 9 8	7 6	5 4 3	2 1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**4**	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	**69**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of bedrock: no root mat or vegetation.
Score 5	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	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 largeshallow, large-deep, smallshallow, 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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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**	☑	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
		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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	**4**	☐ ☐ ☐ ☐ ☐	☐ ☑ ☐ ☐ ☐		
		Left Bank 10 9 8 7 6	5 4 3 2 1		
Score (RB)	**4**	☐ ☐ ☐ ☐ ☐	☐ ☑ ☐ ☐ ☐		
		Right Bank 10 9 8 7 6	5 4 3 2 1		
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody *macrophytes*; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.									
core (LB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
core (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
OTAL SCORE	**83**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 10	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of bedrock: no root mat or vegetation.
Score 5	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	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 largeshallow, large-deep, smallshallow, 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 13	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 15	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 15	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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

	10 9 8	7 6	5 4 3	2 1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 7	☐ ☐ ☐	☑ ☐	☐ ☐ ☐	☐ ☐
Left Bank	10 9 8	7 6	5 4 3	2 1
Score (RB) 7	☐ ☐ ☐	☑ ☐	☐ ☐ ☐	☐ ☐
Right Bank	10 9 8	7 6	5 4 3	2 1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.		
Score (LB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
		Left Bank 10 9 8 7 6 5 4 3 2 1			
Score (RB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
		Right Bank 10 9 8 7 6 5 4 3 2 1			
10. Riparian Vegstative 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)	**2**	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐			
		Left Bank 10 9 8 7 6 5 4 3 2 1			
Score (RB)	**5**	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
		Right Bank 10 9 8 7 6 5 4 3 2 1			
TOTAL SCORE	**103**				

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 3	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐			
	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 mimimal 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		
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	☑			
	20 19 18 17 16 15 14 13 12 11	10 9 8 7 6 5 4 3 2 1 0		

	20 19 18 17 16 15 14 13 12 11	10 9 8 7 6 5 4 3 2 1		
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 6			☑	
	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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 7				
	Left Bank 10 9 8 7 6 5 4 3 2 1			
Score (RB) 7				
	Right Bank 10 9 8 7 6 5 4 3 2 1			
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.									
Score (LB)	6		☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Left Bank	10	9	8	7	6	5	4	3	2	1	
Score (RB)	6		☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Right Bank	10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	5		☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Left Bank	10	9	8	7	6	5	4	3	2	1	
Score (RB)	5		☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
		Right Bank	10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	91												

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 1	☐ ☑ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 1	☐ ☑ ☐			
	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 1	☐ ☑ ☐			
	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 mimimal 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 13	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 13	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 6	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☑	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

	10	9	8	7	6	5	4	3	2	1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Score (LB) 7				☑						
Left Bank	10	9	8	7	6	5	4	3	2	1
Score (RB) 7				☑						
Right Bank	10	9	8	7	6	5	4	3	2	1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.								
Score (LB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
10. Riparian Vegstative 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)	**7**	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
		Left Bank 10	9	8	7	6	5	4	3	2	1	
Score (RB)	**7**	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
		Right Bank 10	9	8	7	6	5	4	3	2	1	
TOTAL SCORE	**81**											

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) 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.	Hardpan clay of bedrock: no root mat or vegetation.
Score 0	☐ ☑			
	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 largeshallow, large-deep, smallshallow, 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 0	☐ ☑			
	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 6	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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
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	6	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☑ ☐	☐ ☐ ☐ ☐ ☐ ☐
		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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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	6	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☑ ☐	☐ ☐ ☐ ☐ ☐ ☐
		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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	7	☐ ☐ ☐ ☑ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
		Left Bank 10 9 8	7 6	5 4 3	2 1
Score (RB)	7	☐ ☐ ☐ ☑ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
		Right Bank 10 9 8	7 6	5 4 3	2 1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.									
Score (LB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	
		Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB)	**6**	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	
		Right Bank 10	9	8	7	6	5	4	3	2	1		
10. Riparian Vegstative 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)	**2**	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	
		Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB)	**2**	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	
		Right Bank 10	9	8	7	6	5	4	3	2	1		
TOTAL SCORE	**61**												

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 10	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 13	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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
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 13	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 5	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

	10 9 8 7 6	5 4 3 2 1
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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 4	☐ ☐ ☐ ☐ ☐	☐ ☑ ☐ ☐ ☐ ☐
Left Bank	10 9 8 7 6	5 4 3 2 1
Score (RB) 4	☐ ☐ ☐ ☐ ☐	☐ ☑ ☐ ☐ ☐ ☐
Right Bank	10 9 8 7 6	5 4 3 2 1

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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

		grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		half of the potential plant stubble height remaining.									
Score (LB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	
		Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	
		Right Bank 10	9	8	7	6	5	4	3	2	1		
10. Riparian Vegstative 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)	**2**	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	
		Left Bank 10	9	8	7	6	5	4	3	2	1		
Score (RB)	**5**	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	
		Right Bank 10	9	8	7	6	5	4	3	2	1		
TOTAL SCORE	**98**												

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADINET STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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.	Hardpan clay of 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 largeshallow, large-deep, smallshallow, 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 8	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	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 mimimal 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 14	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			

	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
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 13	☐ ☐ ☐ ☐ ☐	☐ ☐ ☑ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
	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 coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 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 5	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐ ☐
	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) 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 frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 5	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
	Left Bank 10 9 8	7 6 5	4 3 2	1
Score (RB) 5	☐ ☐ ☐ ☐ ☐	☑ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
	Right Bank 10 9 8	7 6 5	4 3 2	1
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 zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through	70-90% of the stream--bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-	50-70% of the stream-bank 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.

	grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	half of the potential plant stubble height remaining.			
core (LB)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
core (RB)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
10. Riparian Vegstative 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.	
core (LB)	5	☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐			
	Left Bank	10 9 8 7 6 5 4 3 2 1			
core (RB)	8	☐ ☐ ☑ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
	Right Bank	10 9 8 7 6 5 4 3 2 1			
OTAL SCORE	94				

Appendix N Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont (DRAFT)

Project/Site: Geibel Permit Area City/County: Muhlenberg Sampling Date: 1/26/10

Applicant/Owner: Oxford Mine State: KY Sampling Point: 8 in

Investigator(s): Amanda Pankau and Ryan Pankau Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 6-13 Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Wellston silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

Steep side slopes and abrupt pond boundary.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Liquidambar styciflua*	12	Yes	FACW
2. *Pantanus occidentalis*	18	Yes	FACW
3.			
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	50	Yes	FACW
2. *Andropogon virginicus*	10	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: _____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation criteria met.