

Scrh 010

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	5
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	5
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	6
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	4
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	6
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	5
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	3
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	6
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	3
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	4
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	4
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	6
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						89

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

Date: 5 September 2014	Project/Site: ACP	Latitude: 34° 45' 39.527
Evaluator: DD West	County: Robeson	Longitude: 79° 05' 12.936"
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 36	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other sroh010 e.g. Quad Name: Red Springs, NC

A. Geomorphology (Subtotal = 15.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

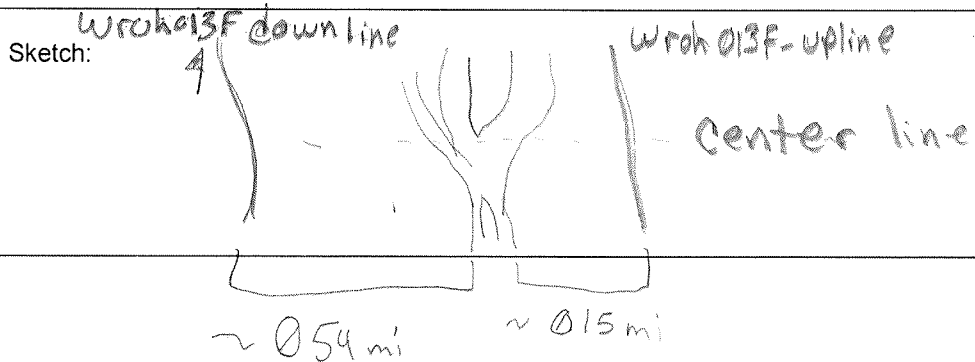
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 11.5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Braided System



*sroh010*



sroh010 upstream, north



sroh010 downstream, south

sroh010



sroh010 side, west



## STREAM QUALITY ASSESSMENT WORKSHEET

SFOC002



Provide the following information for the stream reach under assessment:

1. Applicant's name: Dominion
2. Evaluator's name: Natural Resource Group
3. Date of evaluation: 2/19/2015
4. Time of evaluation: 11:00 AM
5. Name of stream: UT to Richland Swamp
6. River basin: Lower Pee Dee
7. Approximate drainage area: ~25 acres
8. Stream order: 1<sup>st</sup>
9. Length of reach evaluated: 100 Feet
10. County: Robeson
11. Site coordinates (if known): prefer in decimal degrees.
12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34° 44' 10.45" N
- Longitude (ex. -77.556611): 79° 07' 47.71" W
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
n/a
14. Proposed channel work (if any): None
15. Recent weather conditions: light rain previous day
16. Site conditions at time of visit: Normal, light rain
17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat  
NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_
19. Does channel appear on USGS quad map? YES NO
20. Does channel appear on USDA Soil Survey? YES NO
21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 50 % Agricultural  
50 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
22. Bankfull width: 3.5
23. Bank height (from bed to top of bank): 5
24. Channel slope down center of stream:  Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
25. Channel sinuosity: \_\_\_\_\_ Straight  Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 40 Comments: Stream runs under road through culvert and receives some inputs from the nearby agricultural field

Evaluator's Signature Cole Reager Date 2-19-15

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

5706002

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
HABITAT	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						<del>37</del> 40

\* These characteristics are not assessed in coastal streams.

**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

*Sr060002*

**NC DWQ Stream Identification Form Version 4.11**

Date: <i>2/19/2015</i>	Project/Site: <i>ACP</i>	Latitude: <i>34° 44' 10.45" N</i>
Evaluator: <i>Natural Resource Group</i>	County: <i>Robeson</i>	Longitude: <i>79° 07' 47.71" W</i>
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) <u>Ephemeral</u> Intermittent Perennial	Other e.g. Quad Name:

**A. Geomorphology (Subtotal = 8.5)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	<u>2</u>	3
2. Sinuosity of channel along thalweg	0	1	<u>2</u>	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	<u>1</u>	2	3
4. Particle size of stream substrate	0	<u>1</u>	2	3
5. Active/relict floodplain	<u>0</u>	1	2	3
6. Depositional bars or benches	0	<u>1</u>	2	3
7. Recent alluvial deposits	<u>0</u>	1	2	3
8. Headcuts	0	<u>1</u>	2	3
9. Grade control	<u>0</u>	0.5	1	1.5
10. Natural valley	0	<u>0.5</u>	1	1.5
11. Second or greater order channel	<u>No = 0</u>		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

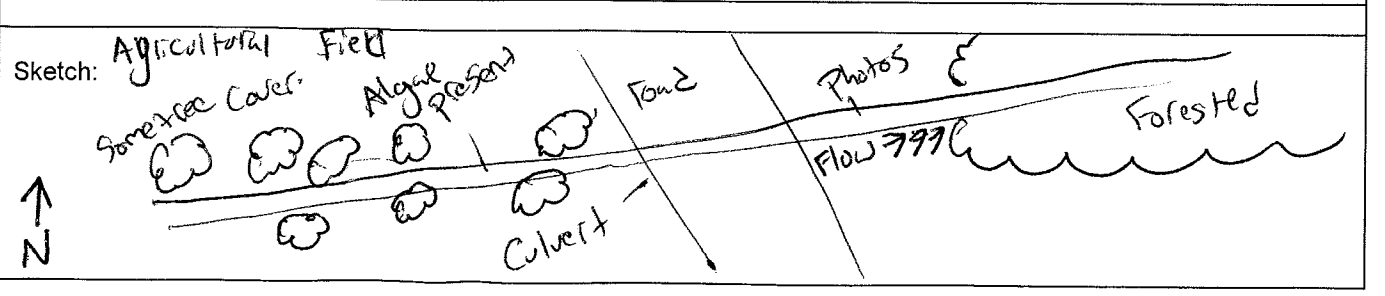
**B. Hydrology (Subtotal = 2)**

12. Presence of Baseflow	0	<u>1</u>	2	3
13. Iron oxidizing bacteria	<u>0</u>	1	2	3
14. Leaf litter	1.5	1	<u>0.5</u>	0
15. Sediment on plants or debris	<u>0</u>	0.5	1	1.5
16. Organic debris lines or piles	0	<u>0.5</u>	1	1.5
17. Soil-based evidence of high water table?	<u>No = 0</u>		Yes = 3	

**C. Biology (Subtotal = 5.75)**

18. Fibrous roots in streambed	<u>3</u>	<u>2</u>	1	0
19. Rooted upland plants in streambed	<u>3</u>	<u>2</u>	1	0
20. Macroinvertebrates (note diversity and abundance)	<u>0</u>	1	2	3
21. Aquatic Mollusks	<u>0</u>	1	2	3
22. Fish	<u>0</u>	0.5	1	1.5
23. Crayfish	<u>0</u>	0.5	1	1.5
24. Amphibians	<u>0</u>	0.5	1	1.5
25. Algae	0	<del>1</del>	<u>1</u>	1.5
26. Wetland plants in streambed	<u>FACW = 0.75; OBL = 1.5 Other = 0</u>			

\*perennial streams may also be identified using other methods. See p. 35 of manual.





Waterbody SROC002 facing west upstream



Waterbody SROC002 facing north across





Waterbody SROC002 facing east downstream

SRO H009

USACE AID# \_\_\_\_\_ DWQ # \_\_\_\_\_ Site # \_\_\_\_\_ (indicate on attached map)



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-29-14
- 4. Time of evaluation: 12:05
- 5. Name of stream: unnamed to the burnt swamp
- 6. River basin: Lumber
- 7. Approximate drainage area: 750 acres
- 8. Stream order: 1st
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34°43'40.697"
- Longitude (ex. -77.556611): 79°08'28.081"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly dry - few showers
- 16. Site conditions at time of visit: Normal

17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)

- 18. Is there a pond or lake located upstream of the evaluation point? YES  NO  If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES  NO
- 20. Does channel appear on USDA Soil Survey? YES  NO
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 90% % Agricultural  
\_\_\_\_\_ % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)
- 22. Bankfull width: 3
- 23. Bank height (from bed to top of bank): 7
- 24. Channel slope down center of stream:  Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity:  Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 15 Comments: Man-made ditch between ag field and highway

Evaluator's Signature [Signature] Date 8-29-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

SROH009

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	1
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						15

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

SROM009

Date: 8-29-14	Project/Site: SERIP	Latitude: 34°43' 40.697"
Evaluator: DDWEST	County: Robeson	Longitude: 79°08' 28.081"
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 20.75	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other: UNT to Burnt Swamp e.g. Quad Name:

A. Geomorphology (Subtotal = 6)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	<del>1</del>	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.75)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

*sroh009*



Waterbody sroh009 facing upstream



Waterbody sroh009 facing downstream

*sroh009*



Waterbody sroh009 facing upline cross stream

Srop001



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (W. Vaughan)
- 3. Date of evaluation: 7-11-16
- 4. Time of evaluation: 9:30 am
- 5. Name of stream: Burnt Swamp
- 6. River basin: Lumber River
- 7. Approximate drainage area: 4340 acres
- 8. Stream order: 3rd
- 9. Length of reach evaluated: 20 feet
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): None
- Latitude (ex. 34.872312): 34.72491
- Longitude (ex. -77.556611): -79.1425520

Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
Stream passes under Evergreen church Rd, north of Stafford Dr

14. Proposed channel work (if any): Proposed Pipeline

15. Recent weather conditions: Rain within 24 hours

16. Site conditions at time of visit: bridge over channelized swamp

17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  
 Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed IV (I-IV)

18. Is there a pond or lake located upstream of the evaluation point? YES  NO  If yes, estimate the water surface area: NA

19. Does channel appear on USGS quad map?  YES  NO

20. Does channel appear on USDA Soil Survey?  YES  NO

21. Estimated watershed land use: 15 % Residential  % Commercial  % Industrial 50 % Agricultural  
20 % Forested 15 % Cleared / Logged  % Other ( \_\_\_\_\_ )

22. Bankfull width: 25 ft.

23. Bank height (from bed to top of bank): 5 ft

24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)

25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 77      Comments: Flooded Swamp System

Evaluator's Signature Vicki E. Vaughn      Date 7-13-16

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	5
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	6
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	5
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	5
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	6
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	-
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	5
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	-
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	3
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	4
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						77

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

Stop001

Date: 7-11-16	Project/Site: ACP	Latitude: 34.72491
Evaluator: ESI (W. Vaughan)	County: Robeson	Longitude: 79.1425520
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 32.5	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other e.g. Quad Name: Pembedoke

A. Geomorphology (Subtotal = 12.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	(1)	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	(3)
6. Depositional bars or benches	(0)	(1)	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		(Yes = 3)	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

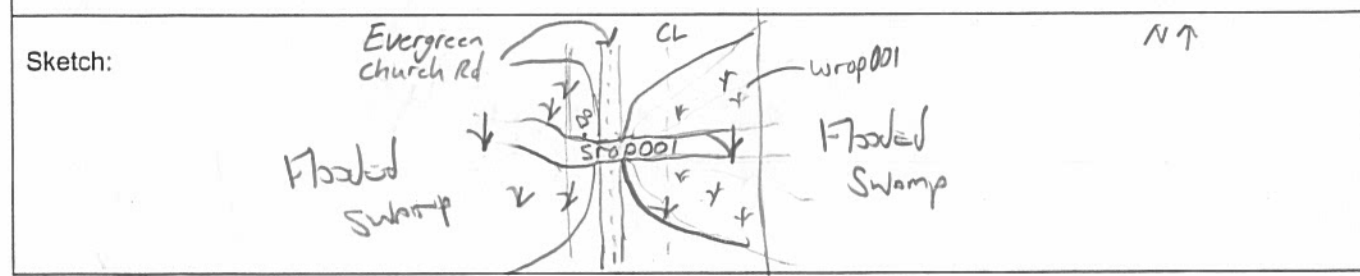
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	1	(0.5)	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 12.5)

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	(3)
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	0.5	1	(1.5)
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5; Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:



OHWM width: 25'  
Bank width: 25'

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point srop001 facing northwest upstream.**



**Waterbody data point srop001 facing southeast downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point srop001 facing south across bank.**

Strop 002



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: EST (Vaughan)
- 3. Date of evaluation: 7-11-16
- 4. Time of evaluation: 11:15
- 5. Name of stream: WT to Burnt Swamp
- 6. River basin: Lumber River
- 7. Approximate drainage area: 24 acres
- 8. Stream order: 10
- 9. Length of reach evaluated: 20 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): None
- Latitude (ex. 34.872312): 34.723206
- Longitude (ex. -77.556611): -79.143703
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
South of Stafford Rd and west of Evergreen Church Rd
- 14. Proposed channel work (if any): Proposed Pipeline
- 15. Recent weather conditions: Rain within 24 hours
- 16. Site conditions at time of visit: ditch between two fields
- 17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed IV (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES  NO If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES  NO
- 20. Does channel appear on USDA Soil Survey? YES  NO
- 21. Estimated watershed land use: 10% Residential % Commercial % Industrial 90% Agricultural % Forested % Cleared / Logged % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 10 ft
- 23. Bank height (from bed to top of bank): 4 ft
- 24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)
- 25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 33      Comments: \_\_\_\_\_

Evaluator's Signature Will E. Vaughn      Date 7-13-16

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	4
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	-
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	4
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	-
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>33</b>

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

Strop 002

Date: 7-11-16	Project/Site: ACP	Latitude: 34.723206
Evaluator: EST - W. Vaughan	County: Robeson	Longitude: -79.143703
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 16.5	Stream Determination (circle one) <u>Ephemeral</u> Intermittent Perennial	Other e.g. Quad Name: Rembroke

A. Geomorphology (Subtotal = 5 )

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank ditch	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6 )

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 5.5 )

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

OHWm width: 8ft  
Bank width: 10ft

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point srop002 facing southwest upstream.**



**Waterbody data point srop002 facing northeast downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point srop002 facing southeast across bank.**



Strop 003



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (W. H. Vaughan)
- 3. Date of evaluation: 7-11-16
- 4. Time of evaluation: 12:00
- 5. Name of stream: UT to Burnt Swamp
- 6. River basin: Lumber River
- 7. Approximate drainage area: 147 acres
- 8. Stream order: 1st
- 9. Length of reach evaluated: 20 feet
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): None

Latitude (ex. 34.872312): 34.723222 Longitude (ex. -77.556611): -79.151386

Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
ditch is east of Townsends chapel Rd and west of Stafford Dr

14. Proposed channel work (if any): Proposed pipeline

15. Recent weather conditions: Rain within 24 hours

16. Site conditions at time of visit: forested ditch between fields

17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed IV (I-IV)

18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_

19. Does channel appear on USGS quad map? YES NO 20. Does channel appear on USDA Soil Survey? YES NO

21. Estimated watershed land use: 10 % Residential  % Commercial  % Industrial 45 % Agricultural  % Forested 45 % Cleared / Logged  % Other (\_\_\_\_\_)

22. Bankfull width: 12 ft 23. Bank height (from bed to top of bank): 15 ft

24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)

25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 61 Comments: \_\_\_\_\_

Evaluator's Signature W. H. Vaughan Date 7-13-16

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	5
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	5
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	-
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	5
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	4
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	-
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	4
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	4
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						61

\* These characteristics are not assessed in coastal streams.

srp003

NC DWQ Stream Identification Form Version 4.11

Date: 7-11-16	Project/Site: ACP	Latitude: 34.723222
Evaluator: ESI (Matt Smith)	County: Robeson	Longitude: -79.151386
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 27	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other <u>Pembroke</u> e.g. Quad Name:

NA

A. Geomorphology (Subtotal = 6.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank <u>Ditch</u>	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 10.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 10.0)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Determined to be perennial in field

Sketch:

srp003

OHWM 10 ft  
Bank width 12 ft  
15 ft

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point srop003 facing southwest upstream.**



**Waterbody data point srop003 facing northeast downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point srop003 facing southeast across bank.**



### STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-28-14
- 4. Time of evaluation: 10:11
- 5. Name of stream: Moss Neck Swamp
- 6. River basin: Lumber
- 7. Approximate drainage area: > 100 ACRES
- 8. Stream order: 2<sup>nd</sup>
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34° 43' 39.002" Longitude (ex. -77.556611): 79° 11' 05.487"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_
- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly Dry - few showers
- 16. Site conditions at time of visit: Normal
- 17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES NO
- 20. Does channel appear on USDA Soil Survey? YES NO
- 21. Estimated watershed land use: 10 % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 70 % Agricultural 80 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 20
- 23. Bank height (from bed to top of bank): 30
- 24. Channel slope down center of stream:  Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity: \_\_\_\_\_ Straight  Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 37 Comments: Channelized stream. Large man-made canal

Evaluator's Signature [Signature] Date 8-28-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

SROH008

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						37

\* These characteristics are not assessed in coastal streams.

SROH008

NC DWQ Stream Identification Form Version 4.11

Date: 8-28-14	Project/Site: SERP	Latitude: 34°43'39.002"
Evaluator: DDWEST	County: Robeson	Longitude: 79°11'05.487"
Total Points: 38.5 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other Moss Neck Swamp e.g. Quad Name:

A. Geomorphology (Subtotal = 17)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	<u>2</u>	3
2. Sinuosity of channel along thalweg	0	<u>1</u>	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	<u>2</u>	3
4. Particle size of stream substrate	0	1	<u>2</u>	3
5. Active/relict floodplain	0	<u>1</u>	2	3
6. Depositional bars or benches	0	<u>1</u>	2	3
7. Recent alluvial deposits	0	1	<u>2</u>	3
8. Headcuts	0	<u>1</u>	2	3
9. Grade control	0	0.5	<u>1</u>	<del>3</del>
10. Natural valley	0	0.5	<u>1</u>	1.5
11. Second or greater order channel	No = 0		Yes = <u>3</u>	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 10)

12. Presence of Baseflow	0	1	<u>2</u>	3
13. Iron oxidizing bacteria	0	1	<u>2</u>	3
14. Leaf litter	1.5	<u>1</u>	0.5	0
15. Sediment on plants or debris	0	0.5	<u>1</u>	1.5
16. Organic debris lines or piles	0	0.5	<u>1</u>	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = <u>3</u>	

C. Biology (Subtotal = 11.5)

18. Fibrous roots in streambed	3	<u>2</u>	1	0
19. Rooted upland plants in streambed	<u>3</u>	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	<u>2</u>	3
21. Aquatic Mollusks	<u>0</u>	1	2	3
22. Fish	<u>0</u>	0.5	<del>1</del>	1.5
23. Crayfish	0	0.5	<u>1</u>	1.5
24. Amphibians	0	0.5	<u>1</u>	1.5
25. Algae	0	0.5	<u>1</u>	1.5
26. Wetland plants in streambed	FACW = 0.75; <u>OBL = 1.5</u> ; Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

A hand-drawn sketch of a stream channel. The channel is depicted as a curved line with a vertical line on the left side representing a bank. An arrow labeled 'FLOW' points to the right, indicating the direction of water movement. The sketch is simple and appears to be a field drawing.



*sroh008*



Waterbody sroh008 facing upstream



Waterbody sroh008 facing downstream

*sroh008*



Waterbody sroh008 facing upline cross stream

SP0H007

USACE AID# \_\_\_\_\_

DWQ # \_\_\_\_\_

Site # \_\_\_\_\_ (indicate on attached map)



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-28-14 Moss Neck
- 4. Time of evaluation: 9:20
- 5. Name of stream: unnamed tributary swamp
- 6. River basin: Lumber
- 7. Approximate drainage area: 750 acres
- 8. Stream order: 1<sup>st</sup>
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34°43' 37.102"
- Longitude (ex. -77.556611): 79°11' 12.184"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly dry - few showers
- 16. Site conditions at time of visit: Normal
- 17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat NA Frout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES NO
- 20. Does channel appear on USDA Soil Survey? YES NO
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 80 % Agricultural  
20 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 2
- 23. Bank height (from bed to top of bank): 4
- 24. Channel slope down center of stream: X Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity: X Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 14 Comments: Man-made ditch on edge of road and agriculture field

Evaluator's Signature: [Signature] Date: 8-28-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

SROH007

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	1
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	0
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						14

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

SROH007

Date: 8-28-14	Project/Site: SERP	Latitude: 34°43'37.102"
Evaluator: DDWEST	County: Robeson	Longitude: 79°11'12.184"
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 21.25	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other: UNT to Moss Neck Swamp e.g. Quad Name:

A. Geomorphology (Subtotal = 7)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6.75)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

sroh007



Waterbody sroh007 facing upstream



Waterbody sroh007 facing downstream

*sroh007*



Waterbody sroh007 facing upline cross stream

USACE AID# \_\_\_\_\_

DWQ # \_\_\_\_\_

Site # \_\_\_\_\_ (indicate on attached map)



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-27-14
- 4. Time of evaluation: 2:46
- 5. Name of stream: unnamed trib to lower swamp
- 6. River basin: Lumber
- 7. Approximate drainage area: 750 acres
- 8. Stream order: 1st
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34° 43' 27.538"
- Longitude (ex. -77.556611): 79° 11' 27.423"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): NONE
- 15. Recent weather conditions: Mainly dry - few showers
- 16. Site conditions at time of visit: Normal
- 17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES (NO)
- 20. Does channel appear on USDA Soil Survey? YES (NO)
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 80% Agricultural  
70% Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 6
- 23. Bank height (from bed to top of bank): 10
- 24. Channel slope down center of stream: X Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity: X Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 20      Comments: Main-made ditch on edge of ag field and forest

Evaluator's Signature [Signature]      Date 8-27-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.



SROH006

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	1
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	<del>1</del> 1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						20

\* These characteristics are not assessed in coastal streams.

NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11

SRDH006

NC DWQ Stream Identification Form Version 4.11

Date: 8-27-14	Project/Site: SERP	Latitude: 34°43'27.538"
Evaluator: DDWEST	County: Robeson	Longitude: 79°11'27.423"
Total Points: 23.75 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other: UNT to Bear Swamp e.g. Quad Name:

A. Geomorphology (Subtotal = 8)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
		No = 0	Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

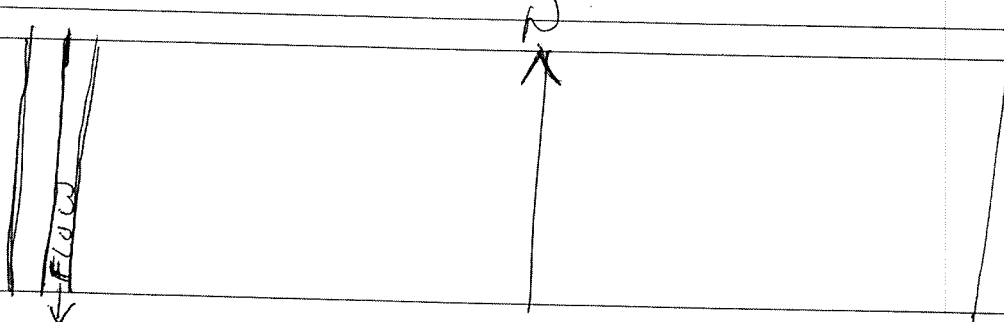
C. Biology (Subtotal = 8.75)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	0	0.5	1	1.5
		FACW = 0.75	OBL = 1.5	Other = 0

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:



sroh006



Waterbody sroh006 facing upstream



Waterbody sroh006 facing downstream

*sroh006*



Waterbody sroh006 facing upline cross stream

**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

**NC DWQ Stream Identification Form Version 4.11**

Spec 001

<b>Date:</b> 1/18/2016	<b>Project/Site:</b> ACP	<b>Latitude:</b> 34.726011
<b>Evaluator:</b> Colin Gearty	<b>County:</b> Robeson	<b>Longitude:</b> -79.190402
<b>Total Points:</b> Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 23	<b>Stream Determination (circle one)</b> Ephemeral (Intermittent) Perennial	<b>Other</b> e.g. Quad Name:

**A. Geomorphology (Subtotal = 9.5)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	(0)	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	(0)	1	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	(0)	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 8.5)**

12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

**C. Biology (Subtotal = 5)**

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

**Notes:** Survey timing is not conducive to finding aquatic organisms

**Sketch:**

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	0
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	0
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	0
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						20

\* These characteristics are not assessed in coastal streams.



## STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: ACP
  2. Evaluator's name: Colin Gentry
  3. Date of evaluation: 1/18/2016
  4. Time of evaluation: 1200
  5. Name of stream: UNT (TO Moss Neck Swamp?)
  6. River basin: Lower Pee Dee 030402
  7. Approximate drainage area: \_\_\_\_\_
  8. Stream order: \_\_\_\_\_
  9. Length of reach evaluated: \_\_\_\_\_
  10. County: Robeson
  11. Site coordinates (if known): prefer in decimal degrees.
  12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34.726011 Longitude (ex. -77.556611): -79.190402
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_
- 
14. Proposed channel work (if any): N/A
15. Recent weather conditions: normal
16. Site conditions at time of visit: Clear and cold
17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  
 Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed  (I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES  NO  If yes, estimate the water surface area: \_\_\_\_\_
19. Does channel appear on USGS quad map? YES  NO  20. Does channel appear on USDA Soil Survey? YES  NO
21. Estimated watershed land use:  % Residential  % Commercial  % Industrial  % Agricultural  
 % Forested  % Cleared / Logged  % Other ( \_\_\_\_\_ )
22. Bankfull width: 5 ft 23. Bank height (from bed to top of bank): 7 ft
24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)
25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 20 Comments: Waterbody B an artificially created ditch

Evaluator's Signature Colin Gentry Date 1/18/2016

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.



Waterbody SROE001 facing north upstream



Waterbody SROE001 facing south downstream





Waterbody SROE001 facing west across

**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

**NC DWQ Stream Identification Form Version 4.11**

Spoe 002

Date: 1/18/2016	Project/Site: ACP	Latitude: 34.725659
Evaluator: Colin Gearty	County: Robeson	Longitude: -79.191118
<b>Total Points:</b> Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 23	<b>Stream Determination (circle one)</b> Ephemeral (Intermittent) Perennial	<b>Other</b> e.g. Quad Name:

**A. Geomorphology (Subtotal = 9.5)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 8.5)**

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

**C. Biology (Subtotal = 6)**

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Winter B visit (2000) done to survey for aquatic organisms

Sketch:

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	0
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	0
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	0
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						20

\* These characteristics are not assessed in coastal streams.



## STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- |   |   |
|---|---|
| 1. Applicant's name: <u>ACP</u>                             | 2. Evaluator's name: <u>Colin Coatsy</u>      |
| 3. Date of evaluation: <u>1/18/2016</u>                     | 4. Time of evaluation: <u>1230</u>            |
| 5. Name of stream: <u>UNT</u>                               | 6. River basin: <u>Lower Pee Dee 030402</u>   |
| 7. Approximate drainage area: _____                         | 8. Stream order: _____                        |
| 9. Length of reach evaluated: _____                         | 10. County: <u>Robeson</u>                    |
| 11. Site coordinates (if known): prefer in decimal degrees. | 12. Subdivision name (if any): _____          |
| Latitude (ex. 34.872312): <u>34.725659</u>                  | Longitude (ex. -77.556611): <u>-79.191118</u> |
- Method location determined (circle):  GPS  Topo Sheet  Ortho (Aerial) Photo/GIS  Other GIS  Other \_\_\_\_\_
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

14. Proposed channel work (if any): N/A
15. Recent weather conditions: normal
16. Site conditions at time of visit: Clear and cool
17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  
 Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed  (I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES  NO  If yes, estimate the water surface area: \_\_\_\_\_
19. Does channel appear on USGS quad map? YES  NO  20. Does channel appear on USDA Soil Survey? YES  NO
21. Estimated watershed land use: \_\_\_\_\_% Residential \_\_\_\_\_% Commercial \_\_\_\_\_% Industrial \_\_\_\_\_% Agricultural  
 \_\_\_\_\_% Forested \_\_\_\_\_% Cleared / Logged \_\_\_\_\_% Other (\_\_\_\_\_)
22. Bankfull width: 4 ft 23. Bank height (from bed to top of bank): 5 ft
24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)
25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 20      Comments: Artificial agricultural ditch

Evaluator's Signature: [Signature]      Date: 1/18/2016

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.



Waterbody SROE002 facing west upstream



Waterbody SROE002 facing east downstream



Waterbody SROE002 facing north across

USACE AID# \_\_\_\_\_

DWQ # \_\_\_\_\_

Site # \_\_\_\_\_ (indicate on attached map)

SR041005



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-27-14
- 4. Time of evaluation: ~~2:21~~ 2:21
- 5. Name of stream: unnamed trib to Bear Swamp River basin: Lumber
- 7. Approximate drainage area: 7100 acres
- 8. Stream order: 1st
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34°43'26.098
- Longitude (ex. -77.556611): 79°11'27.564"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly Dry - few showers
- 16. Site conditions at time of visit: Normal
- 17. Identify any special waterway classifications known: ND Section 10 NA Tidal Waters NA Essential Fisheries Habitat NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES NO
- 20. Does channel appear on USDA Soil Survey? YES NO
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 60 % Agricultural 40 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 7
- 23. Bank height (from bed to top of bank): 10
- 24. Channel slope down center of stream: X Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity: X Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 29 Comments: man made ditch on edge of ag field and 10 year old clear cut forest

Evaluator's Signature [Signature] Date 8-27-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

SRDH005

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						29

\* These characteristics are not assessed in coastal streams.



**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

SR04005

**NC DWQ Stream Identification Form Version 4.11**

Date: 8-27-12	Project/Site: SERP	Latitude: 34°43'26.098"
Evaluator: DDWEST	County: Robeson	Longitude: 79°11'27.564"
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> 30: 50	Stream Determination (circle one) Ephemeral Intermittent <input type="radio"/> Perennial <input checked="" type="radio"/>	Other: UNT to Bear Swamp e.g. Quad Name:

**A. Geomorphology (Subtotal = 9)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 10)**

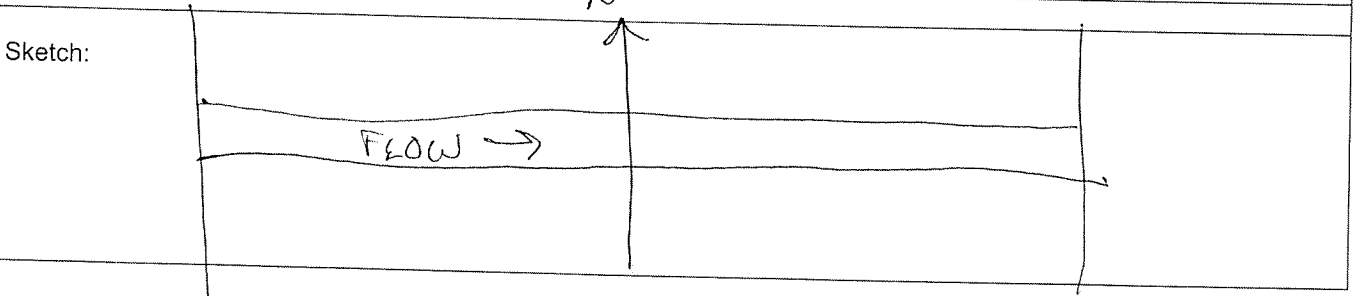
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

**C. Biology (Subtotal = 11.5)**

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	0	0.5	1	1.5
	FACW = 0.75 DOBL = 1.5 Other = 0			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:



sroh005



Waterbody sroh005 facing upstream



Waterbody sroh005 facing downstream

*sroh005*



Waterbody sroh005 facing upline cross stream

USACE AID# \_\_\_\_\_

DWQ # \_\_\_\_\_

Site # \_\_\_\_\_ (indicate on attached map)



# STREAM QUALITY ASSESSMENT WORKSHEET

SROH004

Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: PDWEST
- 3. Date of evaluation: 8-27
- 4. Time of evaluation: 1:27
- 5. Name of stream: unnamed trib to bears camp River basin: Lumber
- 7. Approximate drainage area: 750 acres
- 8. Stream order: 1st
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34° 43' 25.154" Longitude (ex. -77.556611): 79° 11' 31.296"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly dry - few showers
- 16. Site conditions at time of visit: Normal
- 17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat  
NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES  NO If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES  NO
- 20. Does channel appear on USDA Soil Survey? YES  NO
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 70 % Agricultural  
80 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 3
- 23. Bank height (from bed to top of bank): 7
- 24. Channel slope down center of stream:  Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity:  Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 19 Comments: Man made ditch in recent clearcut

Evaluator's Signature JJ Date 08/27/2014

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

SR0H004

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	1
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	2
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	1
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						19

\* These characteristics are not assessed in coastal streams.

**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

**NC DWQ Stream Identification Form Version 4.11**

SR0110041

<b>Date:</b> 8-27-14	<b>Project/Site:</b> SERP	<b>Latitude:</b> 34°43'25.154"
<b>Evaluator:</b> DDWEST	<b>County:</b> Robeson	<b>Longitude:</b> 79°11'31.291"
<b>Total Points:</b> <i>Stream is at least intermittent 22.75' if ≥ 19 or perennial if ≥ 30*</i>	<b>Stream Determination (circle one)</b> Ephemeral ( ) Intermittent (X) Perennial ( )	<b>Other:</b> UNT to Bear Swamp <i>e.g. Quad Name:</i>

**A. Geomorphology (Subtotal = 7)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
		No = 0	Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 7.5)**

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

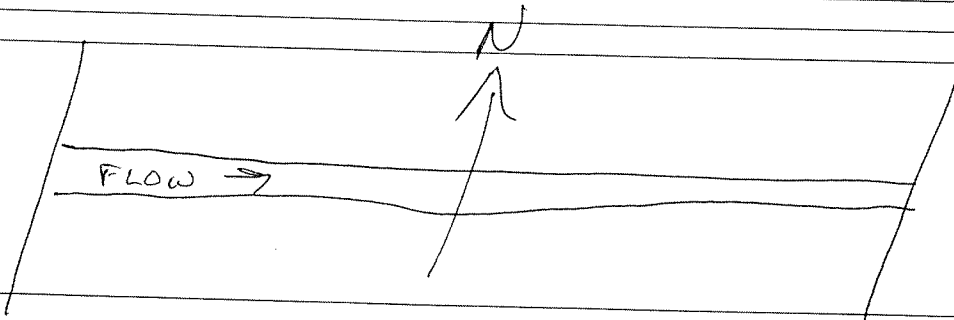
**C. Biology (Subtotal = 8.25)**

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	2	3
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	0	0.5	1	1.5
		FACW = 0.75;	OBL = 1.5	Other = 0

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:



*sroh004*



Waterbody sroh004 facing upstream



Waterbody sroh004 facing downstream

*sroh004*



Waterbody sroh004 facing upline cross stream



USACE AID# \_\_\_\_\_

DWQ # \_\_\_\_\_

Site # \_\_\_\_\_ (indicate on attached map)



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-27-14
- 4. Time of evaluation: 12:20
- 5. Name of stream: unnamed trib to Bear Swamp River basin: Lumber
- 7. Approximate drainage area: 750 acres
- 8. Stream order: 1<sup>st</sup>
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34° 43' 24.262" Longitude (ex. -77.556611): 79° 11' 36.130"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly dry - few showers
- 16. Site conditions at time of visit: Normal
- 17. Identify any special waterway classifications known: N/A Section 10 N/A Tidal Waters N/A Essential Fisheries Habitat N/A Trout Waters N/A Outstanding Resource Waters N/A Nutrient Sensitive Waters N/A Water Supply Watershed N/A (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES (NO)
- 20. Does channel appear on USDA Soil Survey? YES (NO)
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 70 % Agricultural 30 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 3
- 23. Bank height (from bed to top of bank): 7
- 24. Channel slope down center of stream: X Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity: X Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 16 Comments: Man-made agriculture ditch

Evaluator's Signature [Signature] Date 8-27-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

SROH003

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	1
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	0
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						16

\* These characteristics are not assessed in coastal streams.

NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11

SRDH003

NC DWQ Stream Identification Form Version 4.11

Date: 8-27-14	Project/Site: SERP	Latitude: 34°43'24.262"
Evaluator: DDWEST	County: Robeson	Longitude: 79°11'36.130"
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 22.5	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other: UNT to Bear Swamp e.g. Quad Name:

A. Geomorphology (Subtotal = 8)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
	No = 0		Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

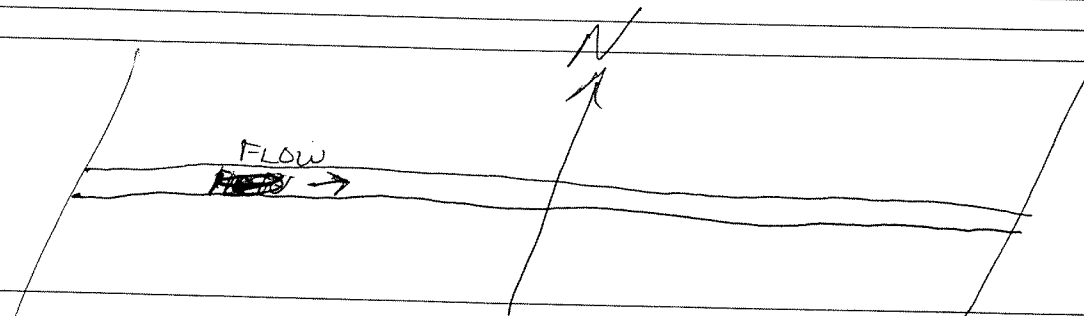
C. Biology (Subtotal = 6.5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	0	0.5	1	1.5
	FACW = 0.75; OBL = 1.5 (Other = 0)			

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:



*sroh003*

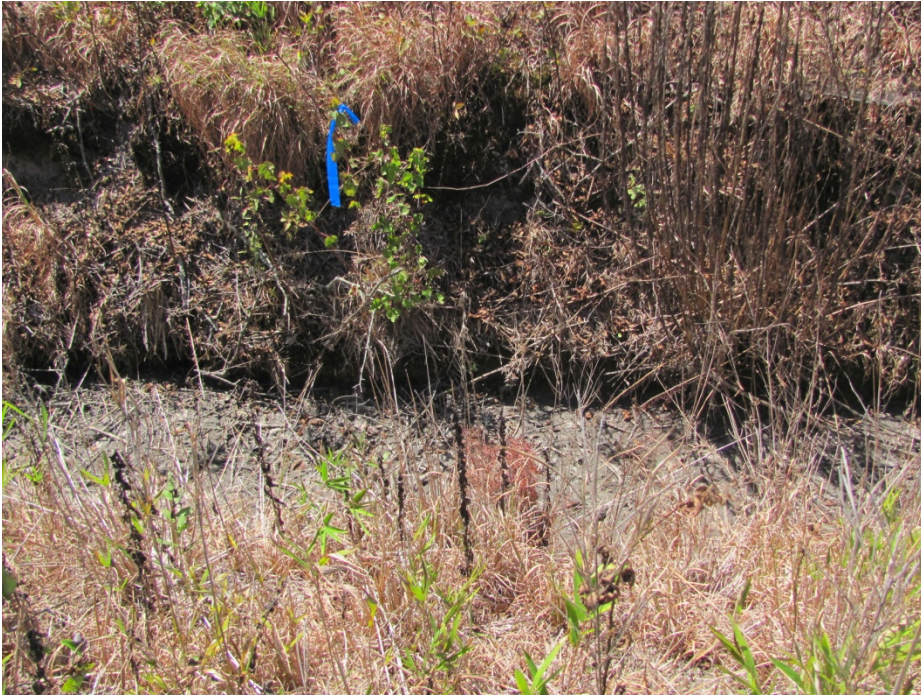


Waterbody sroh003 facing upstream



Waterbody sroh003 facing downstream

*sroh003*



Waterbody sroh003 facing upline cross stream

SR0H002

USACE AID# \_\_\_\_\_ DWQ # \_\_\_\_\_ Site # \_\_\_\_\_ (indicate on attached map)



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: DDWEST
- 3. Date of evaluation: 8-27-14
- 4. Time of evaluation: 9:55
- 5. Name of stream: unnamed trib to Bear Swamp
- 6. River basin: Lumber
- 7. Approximate drainage area: 750 acre
- 8. Stream order: 1<sup>st</sup>
- 9. Length of reach evaluated: 100 ft
- 10. County: Robeson
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 34° 43' 19.804"
- Longitude (ex. -77.556611): 79° 12' 10.726"
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Mainly dry - few showers
- 16. Site conditions at time of visit: Normal

17. Identify any special waterway classifications known: N/A Section 10 N/A Tidal Waters N/A Essential Fisheries Habitat  
N/A Trout Waters N/A Outstanding Resource Waters N/A Nutrient Sensitive Waters N/A Water Supply Watershed N/A (I-IV)

- 18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map? YES NO
- 20. Does channel appear on USDA Soil Survey? YES NO
- 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 100 % Agricultural  
 \_\_\_\_\_ % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 3
- 23. Bank height (from bed to top of bank): 6
- 24. Channel slope down center of stream: X Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)
- 25. Channel sinuosity: X Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 19      Comments: Man-made agriculture ditch

Evaluator's Signature [Signature]      Date 8-27-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

5R0H002

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	0
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						19

\* These characteristics are not assessed in coastal streams.

**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

SR01002

**NC DWQ Stream Identification Form Version 4.11**

<b>Date:</b> 8-27-14	<b>Project/Site:</b> SERP	<b>Latitude:</b> 34°43'19.804"
<b>Evaluator:</b> DDWEST	<b>County:</b> Robeson	<b>Longitude:</b> 79°12'10.726"
<b>Total Points:</b> <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> 21.25	<b>Stream Determination (circle one)</b> Ephemeral <u>Intermittent</u> Perennial	<b>Other</b> UNT to Bear Swamp <i>e.g. Quad Name:</i>

**A. Geomorphology (Subtotal = 6)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	No = 0	1	1.5
			Yes = 3	

<sup>a</sup> artificial ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 7)**

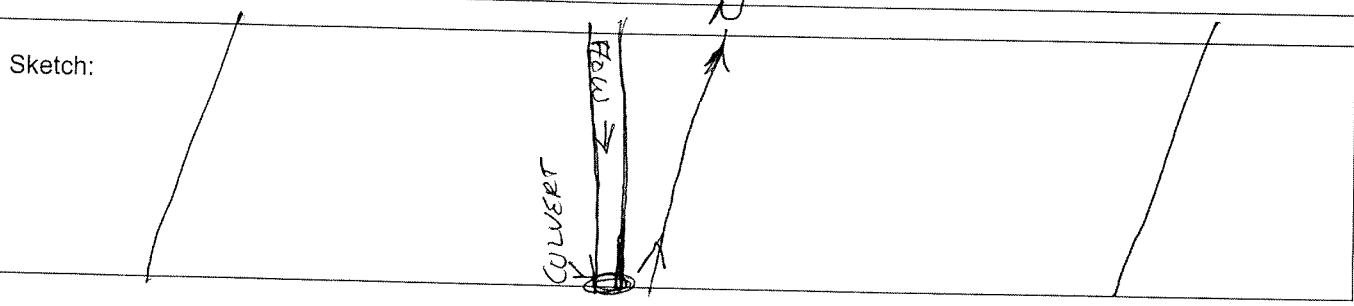
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	0	No = 0	1	Yes = 3

**C. Biology (Subtotal = 8.25)**

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	0	0.5	1	1.5
			FACW = 0.75; OBL = 1.5 Other = 0	

\*perennial streams may also be identified using other methods. See p. 35 of manual.

**Notes:**





*sroh002*



Waterbody sroh002 facing upstream



Waterbody sroh002 facing downstream

*sroh002*



Waterbody sroh002 facing upline cross stream



# STREAM QUALITY ASSESSMENT WORKSHEET

SRO4001

Provide the following information for the stream reach under assessment:

1. Applicant's name: Dominion 2. Evaluator's name: PDWEST  
 3. Date of evaluation: 8-27-14 4. Time of evaluation: 9:45  
 5. Name of stream: Unnamed to Bear swamp 6. River basin: Lumber  
 7. Approximate drainage area: 750 acres 8. Stream order: 1<sup>st</sup>  
 9. Length of reach evaluated: 100 ft 10. County: Robeson  
 11. Site coordinates (if known): prefer in decimal degrees. 12. Subdivision name (if any): \_\_\_\_\_  
 Latitude (ex. 34.872312): 34° 43' 19.662" Longitude (ex. -77.556611): 79° 12' 11.433"  
 Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_  
 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

14. Proposed channel work (if any): None  
 15. Recent weather conditions: Mainly dry - few showers  
 16. Site conditions at time of visit: Normal  
 17. Identify any special waterway classifications known: NA Section 10 NA Tidal Waters NA Essential Fisheries Habitat  
NA Trout Waters NA Outstanding Resource Waters NA Nutrient Sensitive Waters NA Water Supply Watershed NA (I-IV)  
 18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: \_\_\_\_\_  
 19. Does channel appear on USGS quad map? YES NO 20. Does channel appear on USDA Soil Survey? YES NO  
 21. Estimated watershed land use: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 100 % Agricultural  
 \_\_\_\_\_ % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )  
 22. Bankfull width: 5 23. Bank height (from bed to top of bank): 8  
 24. Channel slope down center of stream: X Flat (0 to 2%) \_\_\_\_\_ Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)  
 25. Channel sinuosity: X Straight \_\_\_\_\_ Occasional bends \_\_\_\_\_ Frequent meander \_\_\_\_\_ Very sinuous \_\_\_\_\_ Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 24 Comments: Man-made Agriculture  
ditch

Evaluator's Signature [Signature] Date 8-27-14

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

# STREAM QUALITY ASSESSMENT WORKSHEET

3RO HOD

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	NA
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	0
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	NA
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						24

\* These characteristics are not assessed in coastal streams.

**NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11**

**NC DWQ Stream Identification Form Version 4.11**

SROH00T

Date: 8-27-14	Project/Site: SERP	Latitude: 34° 43' 19.662"
Evaluator: DDWEST	County: Robeson	Longitude: 79° 12' 11.433"
Total Points: 33.25 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other: UNT to Bear Swamp e.g. Quad Name:

**A. Geomorphology (Subtotal = 7)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0			Yes = 3

<sup>a</sup> artificial ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 11.5)**

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0			Yes = 3

**C. Biology (Subtotal = 14.75)**

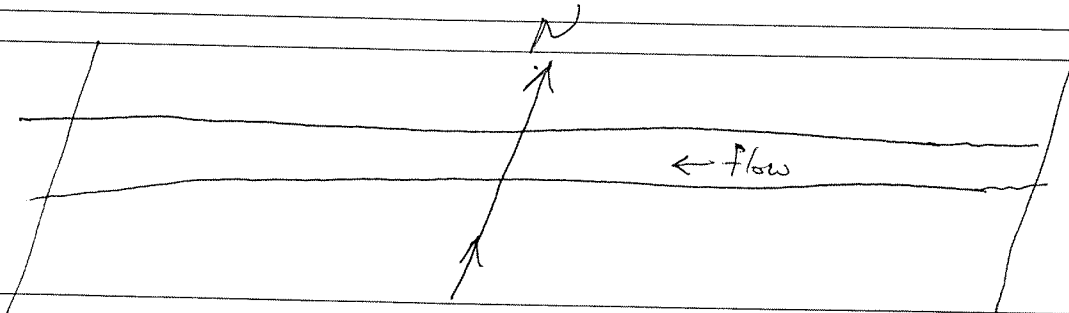
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		0.5	1	1.5

FACW = 0.75; OBL = 1.5 Other = 0

\*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:



*sroh001*



Waterbody sroh001 facing upstream



Waterbody sroh001 facing downstream

*sroh001*



Waterbody sroh001 facing upline cross stream