

**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**

*SOME COOL*

Date: <i>1/21/2016</i>	Project/Site: <i>ACP</i>	Latitude: <i>35.227393</i>
Evaluator: <i>Colum County</i>	County: <i>Cumberland</i>	Longitude: <i>-78.625808</i>
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> <i>32.5</i>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other e.g. Quad Name:

**A. Geomorphology (Subtotal = 17.5)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	<u>(3)</u>
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	1	<u>(2)</u>	3
5. Active/relict floodplain	0	<u>(1)</u>	2	3
6. Depositional bars or benches	0	1	<u>(2)</u>	3
7. Recent alluvial deposits	0	1	<u>(2)</u>	3
8. Headcuts	0	<u>(1)</u>	2	3
9. Grade control	0	<u>(0.5)</u>	1	1.5
10. Natural valley	<u>(0)</u>	0.5	1	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 = 8)**

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

**C. Biology (Subtotal = 7)**

18. Fibrous roots in streambed	<u>(3)</u>	2	1	0
19. Rooted upland plants in streambed	<u>(3)</u>	2	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	0	0.5	<u>(1)</u>	1.5
23. Crayfish	<u>(0)</u>	0.5	1	1.5
24. Amphibians	<u>(0)</u>	0.5	1	1.5
25. Algae	<u>(0)</u>	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 <u>(Other = 0)</u>			

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

Notes:

---

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	4
	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	2
	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	2
	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	3
	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	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
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	0
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	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)						33

\* 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: 1/21/2016
4. Time of evaluation: 1100
5. Name of stream: UNT to Mingo Swamp
6. River basin: Cape Fear 030300
7. Approximate drainage area: \_\_\_\_\_
8. Stream order: \_\_\_\_\_
9. Length of reach evaluated: \_\_\_\_\_
10. County: Cumberland
11. Site coordinates (if known): prefer in decimal degrees.
12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 35.227636 Longitude (ex. -77.556611): -78.626310
- 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: Clean and cool
16. Site conditions at time of visit: Clean 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: 14 ft
23. Bank height (from bed to top of bank): 2 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: Impacted greatly from roads, ditches, and agricultural fields. Greatest ecological benefit is in its ability to retain water year round, but it is highly impacted by land use.

Evaluator's Signature Colin Gentry Date 1/21/2016

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 SCME001 facing northeast upstream



Waterbody SCME001 facing south downstream





Waterbody SCME001 facing southeast across

SCMO 014



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: K. Murphrey, K. Markham
- 3. Date of evaluation: October 6, 2014
- 4. Time of evaluation: 1610
- 5. Name of stream: UNT to Mingo Swamp
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 1600 acres
- 8. Stream order: 1
- 9. Length of reach evaluated: 50 ft.
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.22878
- Longitude (ex. -77.556611): -78.62789

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 is located southeast of Rhodes Pond Rd.

- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: SUNNY
- 16. Site conditions at time of visit: undisturbed

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: 30 % Residential  % Commercial  % Industrial 50 % Agricultural  % Cleared / Logged  % Other ( \_\_\_\_\_ )

\* (Top of Bank) 22. Bankfull width: 12 ft. 23. Bank height (from bed to top of bank): 10 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): 24 Comments: This feature was considered a man-made canal.

Evaluator's Signature Kelly Murphy Date 10/6/14

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

	#	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	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	0
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	0
	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	3
	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	2
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	—
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	0
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	0
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	—
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
	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	1
	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	
<b>TOTAL SCORE</b> (also enter on first page)						24

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

SCM0014

Date: <u>October 6, 2014</u>	Project/Site: <u>ACP</u>	Latitude: <u>35.22878</u>
Evaluator: <u>K. Murphrey, K. Markham</u>	County: <u>Cumberland</u>	Longitude: <u>-78.62789</u>
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ <u>30</u>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other <u>Wade</u> e.g. Quad Name:

A. Geomorphology (Subtotal = 11.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	<u>3</u>
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>	<u>2</u>	3
5. Active/relict floodplain	0	<u>1</u>	2	3
6. Depositional bars or benches	<u>0</u>	1	<u>2</u>	3
7. Recent alluvial deposits	0	1	<u>2</u>	3
8. Headcuts	<u>0</u>	1	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	No = <u>0</u>		Yes = 3	

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

B. Hydrology (Subtotal = 11)

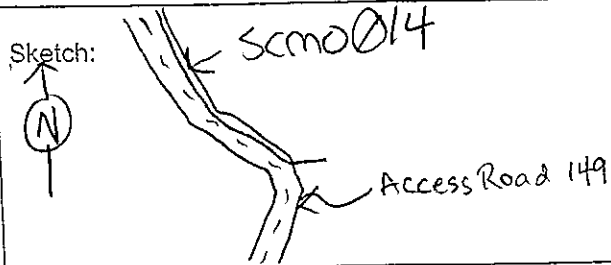
12. Presence of Baseflow	0	1	2	<u>3</u>
13. Iron oxidizing bacteria	0	<u>1</u>	2	3
14. Leaf litter	<u>1.5</u>	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	<u>1.5</u>
16. Organic debris lines or piles	0	0.5	<u>1</u>	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = <u>3</u>	

C. Biology (Subtotal = 7.5)

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	<u>1</u>	2	3
21. Aquatic Mollusks	<u>0</u>	1	2	3
22. Fish	0	<u>0.5</u>	1	1.5
23. Crayfish	0	0.5	<u>1</u>	1.5
24. Amphibians	<u>0</u>	0.5	1	1.5
25. Algae	<u>0</u>	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = <u>0</u>			

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

Notes: ACCESS ROAD 149



OHWM width: 10

Top of Bank width: 12



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmo014 facing north upstream.**



**Waterbody scmo014 facing south downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmo014 facing east across channel.**

scmo 016



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: K. Murphy, K. Markham
- 3. Date of evaluation: October 6, 2014
- 4. Time of evaluation: 1530
- 5. Name of stream: cut to Mingo Swamp
- 6. River basin: Cape Fear
- 7. Approximate drainage area: > 50 acres
- 8. Stream order: 1
- 9. Length of reach evaluated: 50 ft.
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.22561
- Longitude (ex. -77.556611): -78.62551

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):  
Located southeast of Rhodes Pond Rd.

14. Proposed channel work (if any): TBD

15. Recent weather conditions: SUNNY

16. Site conditions at time of visit: undisturbed

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: 30% Residential  Commercial  Industrial 50% Agricultural  
20% Forested  Cleared / Logged  Other ( \_\_\_\_\_ )

\* (Top of Bank) 22. Bankfull width: 8 ft. 23. Bank height (from bed to top of bank): 6 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): 62 Comments: \_\_\_\_\_

Evaluator's Signature [Signature] Date 10/6/14

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

	#	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	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	5
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	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	5
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	6
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	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	—
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	5
	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	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
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	5
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	—
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	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	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>62</b>

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

SCMO 016

Date: 10/6/14	Project/Site: ACP	Latitude: 35.22561
Evaluator: ESI-K. Murphy, K. Markham	County: Cumberland	Longitude: -78.62551
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 32	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other Wade e.g. Quad Name:

A. Geomorphology (Subtotal = 11)

	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 = 10)

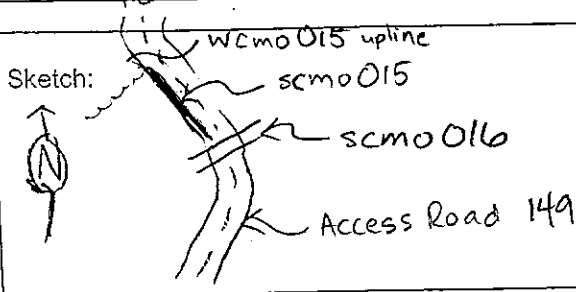
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 11)

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: ACCESS ROAD 149



OHWM width: 7 ft

Top of Bank width: 8 ft

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmo016 facing east upstream.**



**Waterbody scmo016 facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmo016 facing south across channel.**

SCMC004



**STREAM QUALITY ASSESSMENT WORKSHEET**



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: 2/11/2015
- 4. Time of evaluation: 9:30 AM
- 5. Name of stream: UT to Black River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: ~ 25 acres
- 8. Stream order: 1<sup>st</sup>
- 9. Length of reach evaluated: ~ 100 Feet
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 35° 12' 52.789" N
- Longitude (ex. -77.556611): 78° 39' 29.817" 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): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: Rain within previous 24 hours
- 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 30 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 5'
- 23. Bank height (from bed to top of bank): 3'
- 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): 53 Comments: Stream flows through a culvert under I-95. Stream runs through an agricultural field.

Evaluator's Signature Cole Reym Date 2-11-15

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

SCMCO04

	#	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	3
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	4
	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	3
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	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	2
	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	1
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	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	2
	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	2
	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	3
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
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)						<b>53</b>

\* 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**

SCMCOOH

**NC DWQ Stream Identification Form Version 4.11**

Date: 2/11/2015	Project/Site: ACP	Latitude: 35° 12' 52.79" N
Evaluator: Natural Resource Group	County: Cumberland	Longitude: 78° 39' 29.82" W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 20.75	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 10)

	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 = 4)

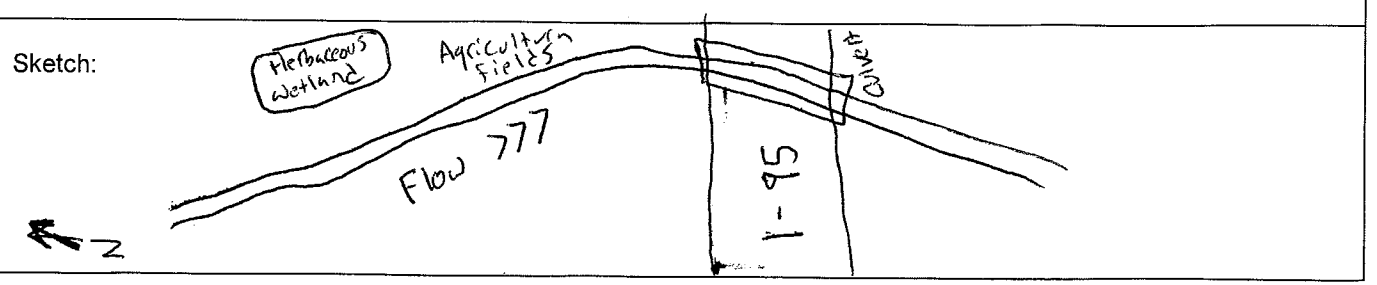
12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	(No = 0)		Yes = 3	

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:







Waterbody SCMC004 facing west upstream



Waterbody SCMC004 facing north across





Waterbody SCMC004 facing east downstream





### STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI-K. Murphy
- 3. Date of evaluation: 5/26/15
- 4. Time of evaluation: 11:30 AM
- 5. Name of stream: UNT to South River
- 6. River basin: CAPE FEAR
- 7. Approximate drainage area: 30 acres
- 8. Stream order: 0
- 9. Length of reach evaluated: 50ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.21137
- Longitude (ex. -77.556611): -78.66574
- 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 Dumster Road.
- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: Sunny
- 16. Site conditions at time of visit: undisturbed
- 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 V (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 20 % Agricultural  
70 % Forested  % Cleared / Logged  % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 12 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): 39 Comments: This stream didn't score as  
intermittent, but was OHWM  
Man-made ditch.  
This is an extension due to Re-route.

Evaluator's Signature Keith Murphy Date 5/26/15

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

	#	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	1
	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	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	5
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	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	0
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	1
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	4
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
HABITAT	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	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
	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	3
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)					<b>39</b>	

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

Date: <u>5/26/15</u>	Project/Site: <u>ACP</u>	Latitude: <u>35.21137</u>
Evaluator: <u>ESI-K. Murphy</u>	County: <u>Cumberland</u>	Longitude: <u>-78.66574</u>
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ <u>14.5</u>	Stream Determination (circle one) <u>Ephemeral</u> Intermittent Perennial	Other <u>Wade, NC</u> e.g. Quad Name:

A. Geomorphology (Subtotal = 3.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	<u>0</u>	1	2	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	1	<u>2</u>	3
5. Active/relict floodplain	<u>0</u>	1	2	3
6. Depositional bars or benches	<u>0</u>	1	2	3
7. Recent alluvial deposits	<u>0</u>	1	2	3
8. Headcuts	<u>0</u>	1	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	No = <u>0</u>		Yes = 3	

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

B. Hydrology (Subtotal = 5.5)

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	0.5	<u>1</u>	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = <u>3</u>	

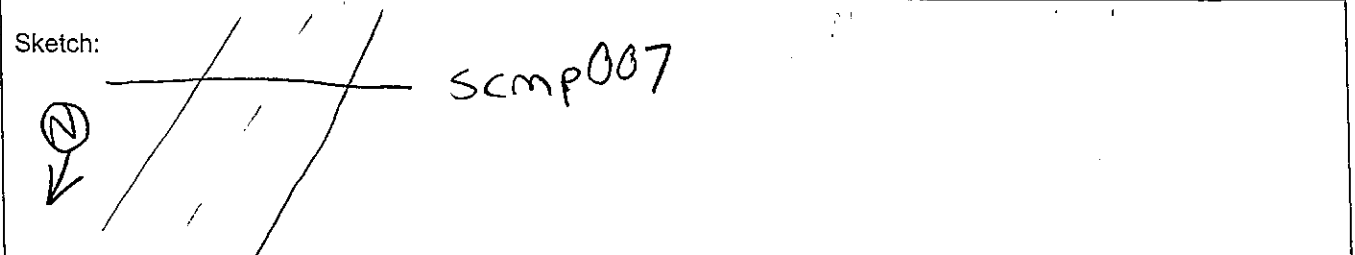
C. Biology (Subtotal = 5.5)

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)	<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	0	<u>0.5</u>	1	1.5
24. Amphibians	<u>0</u>	0.5	1	1.5
25. Algae	<u>0</u>	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = <u>0</u>			

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

Notes: Stream didn't score as intermittent, but is a man-made ditch with an OHWM. This is an extension due to re-route.

Sketch:



OHWM width: 8 ft.

Bank width: 12 ft.



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007e facing west upstream.**



**Waterbody scmp007e facing east downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007e facing south 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: ESI (LRoper)
- 3. Date of evaluation: 9/9/14
- 4. Time of evaluation: 8:45 am
- 5. Name of stream: UNT to South River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 30 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 50 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none
- 1. latitude (ex. 34.872312): 35.21139
- Longitude (ex. -77.556611): -78.66668

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 Dumpster Road

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

15. Recent weather conditions: heavy rain in 24 hrs., scattered showers

16. Site conditions at time of visit: young flat, maintained ditch

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 V (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 20% Agricultural  
70% Forested \_\_\_\_\_% Cleared / Logged \_\_\_\_\_% Other (\_\_\_\_\_)

\* (Top of Bank)  
22. Bankfull width: 15 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): 47 Comments: \_\_\_\_\_

Evaluator's Signature Jan Piser Date 9/9/14

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

	#	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	5
	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	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
	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	/
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	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	/
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	3
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						47

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

Date: 9/9/14	Project/Site: ACP	Latitude: 35.21139
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.66668
Total Points: 22 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <del>Intermittent</del> Perennial	Other e.g. Quad Name: Wade

A. Geomorphology (Subtotal = 6.5)

	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	0	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 = 9.5)

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	

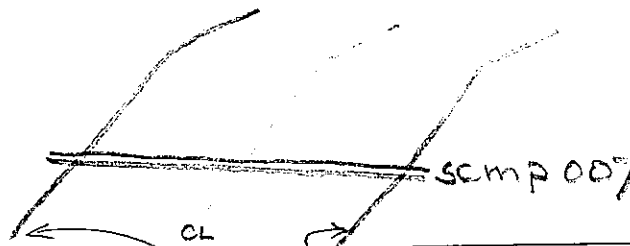
C. Biology (Subtotal = 6)

18. Fibrous roots in streambed	0	2	1	0
19. Rooted upland plants in streambed	0	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: man-made ditch with OHWM present

Sketch:



OHWM width: 10 ft.  
Top of Bank width: 15 ft.  
study corridor

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007i facing east upstream.**



**Waterbody scmp007i facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007i facing southwest across channel**



### STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI-K. Murphy
- 3. Date of evaluation: 5/26/15
- 4. Time of evaluation: 11:30 AM
- 5. Name of stream: UNT to South River
- 6. River basin: CAPE FEAR
- 7. Approximate drainage area: 30 acres
- 8. Stream order: 0
- 9. Length of reach evaluated: 50ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.21137
- Longitude (ex. -77.556611): -78.66574
- 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 Dumfries Road.
- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: Sunny
- 16. Site conditions at time of visit: undisturbed
- 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 V (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 20% Agricultural  
70% Forested  Cleared / Logged  Other ( \_\_\_\_\_ )
- 22. Bankfull width: 12 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): 39 Comments: This stream didn't score as  
intermittent, but was OHWM  
Man-made ditch.  
This is an extension due to Re-route.

Evaluator's Signature Keith Murphy Date 5/26/15

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

	#	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	1
	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	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	5
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	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	0
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	1
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	4
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
HABITAT	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	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
	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	3
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)					39	

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

Date: <u>5/26/15</u>	Project/Site: <u>ACP</u>	Latitude: <u>35.21137</u>
Evaluator: <u>ESI-K. Murphy</u>	County: <u>Cumberland</u>	Longitude: <u>-78.66574</u>
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ <u>14.5</u>	Stream Determination (circle one) <u>Ephemeral</u> Intermittent Perennial	Other <u>Wade, NC</u> e.g. Quad Name:

A. Geomorphology (Subtotal = 3.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	<u>(0)</u>	1	2	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	1	<u>(2)</u>	3
5. Active/relict floodplain	<u>(0)</u>	1	2	3
6. Depositional bars or benches	<u>(0)</u>	1	2	3
7. Recent alluvial deposits	<u>(0)</u>	1	2	3
8. Headcuts	<u>(0)</u>	1	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	No = <u>(0)</u>		Yes = 3	

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

B. Hydrology (Subtotal = 5.5)

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	0.5	<u>(1)</u>	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = <u>3</u>	

C. Biology (Subtotal = 5.5)

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)	<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	0	<u>(0.5)</u>	1	1.5
24. Amphibians	<u>(0)</u>	0.5	1	1.5
25. Algae	<u>(0)</u>	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = <u>(0)</u>			

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

Notes: Stream didn't score as intermittent, but is a man-made ditch with an OHWM. This is an extension due to re-route.

Sketch:

scmp007

OHWM width: 8 ft.  
Bank width: 12 ft.

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007e facing west upstream.**



**Waterbody scmp007e facing east downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007e facing south 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: ESI (LRoper)
- 3. Date of evaluation: 9/9/14
- 4. Time of evaluation: 8:45 am
- 5. Name of stream: UNT to South River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 30 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 50 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none
- 1. latitude (ex. 34.872312): 35.21139
- Longitude (ex. -77.556611): -78.66668

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 Dumpster Road

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

15. Recent weather conditions: heavy rain in 24 hrs., scattered showers

16. Site conditions at time of visit: young flat, maintained ditch

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 V (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 20% Agricultural  
70% Forested \_\_\_\_\_% Cleared / Logged \_\_\_\_\_% Other (\_\_\_\_\_)

\* (Top of Bank)  
22. Bankfull width: 15 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): 47 Comments: \_\_\_\_\_

Evaluator's Signature Jan Piser Date 9/9/14

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

	#	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	5
	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	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
	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	/
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	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	/
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	3
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						47

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

Date: 9/9/14	Project/Site: ACP	Latitude: 35.21139
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.66668
Total Points: 22 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <del>Intermittent</del> Perennial	Other e.g. Quad Name: Wade

A. Geomorphology (Subtotal = 6.5)

	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	0	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 = 9.5)

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	

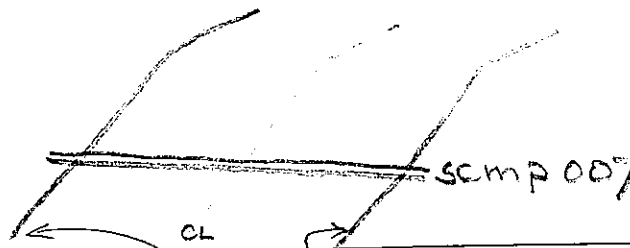
C. Biology (Subtotal = 6)

18. Fibrous roots in streambed	0	2	1	0
19. Rooted upland plants in streambed	0	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: man-made ditch with OHWM present

Sketch:



OHWM width: 10 ft.  
Top of Bank width: 15 ft.  
study corridor



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007i facing east upstream.**



**Waterbody scmp007i facing west downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp007i facing southwest across channel**

scmp 008



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 9/9/14
- 4. Time of evaluation: 2pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 50 acres
- 8. Stream order: 0
- 9. Length of reach evaluated: 50 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.20256
- Longitude (ex. -77.556611): -78.67659

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

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
in agricultural field at end of Moses Rd near Godwin Falcon Rd

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

15. Recent weather conditions: heavy rain within 24 hrs.

16. Site conditions at time of visit: ditch in active tobacco field

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: 10% Residential  % Commercial  % Industrial 50% Agricultural  
40% Forested  % Cleared / Logged  % Other ( \_\_\_\_\_ )

\* (Top of Bank)  
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): 23 Comments: veg. filled ditch in active ag. fields

Evaluator's Signature Jean Roper Date 9/9/14

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

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountains	
PHYSICAL	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	1
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	0
	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	0
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	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	0
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	1
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	4
	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	0
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	1
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
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	0
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						23

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

SCMP008

Date: 9/19/14	Project/Site: ACP	Latitude: 35.20256
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.67659
Total Points: 8 <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: Wade

A. Geomorphology (Subtotal = 2)

	Absent	Weak	Moderate	Strong	
1 <sup>a</sup> . Continuity of channel bed and bank	N/A	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 = 4)

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	

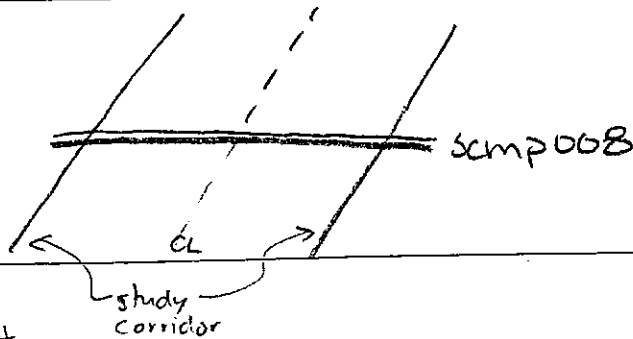
C. Biology (Subtotal = 2)

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: ditch filled with vegetation through ag field, OHWM present

Sketch:



OHWM width: 4 ft  
Top of Bank width: 10 ft

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp008 facing east upstream.**



**Waterbody scmp008 facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp008 facing southwest across channel**

SCMP 009



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 9/9/14
- 4. Time of evaluation: 2:30 pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 300 acres
- 8. Stream order: 1
- 9. Length of reach evaluated: 50 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.20067
- Longitude (ex. -77.556611): -78.67812

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):  
in between ag fields at the end of Moses Rd

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

15. Recent weather conditions: heavy rain within 24 hrs.

16. Site conditions at time of visit: undisturbed drainage between ag 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 V (I-IV)

18. Is there a pond or lake located upstream of the evaluation point?  YES  NO If yes, estimate the water surface area: 1 ac

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 20% Agricultural

70% Forested  % Cleared / Logged  % Other ( \_\_\_\_\_ )

\* (Top of Bank)  
22. Bankfull width: 10 ft.

23. Bank height (from bed to top of bank): 1 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): 67      Comments: \_\_\_\_\_

Evaluator's Signature Jamie Roper      Date 9/9/14

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

	#	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	5
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	5
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	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	3
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	4
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	5
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
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	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	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	/
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	3
	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	5
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						67

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

scmp009

Date: 9/9/14	Project/Site: ACP	Latitude: 35.20067
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.167812
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other e.g. Quad Name: Wade

A. Geomorphology (Subtotal = 13.5)

	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	

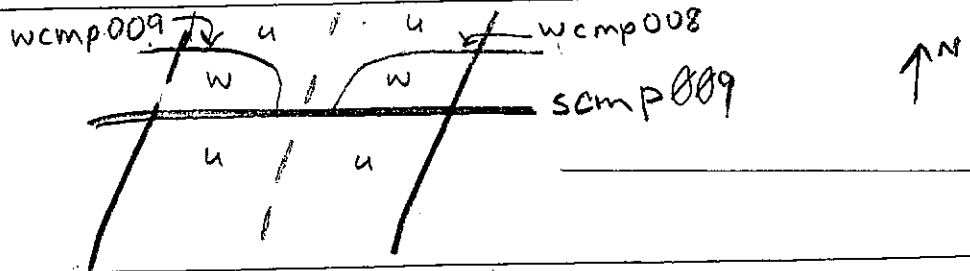
C. Biology (Subtotal = 7.5)

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: 8 ft.

Top of Bank width: 10 ft.

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp009 facing northeast upstream.**



**Waterbody scmp009 facing southwest downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp009 facing south across channel**



Scmp 010



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 9/10/14
- 4. Time of evaluation: 9:45 am
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 200 ac
- 8. Stream order: 1
- 9. Length of reach evaluated: 50ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.19527
- Longitude (ex. -77.556611): -78.68217

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):  
between US 301 and 95 south of Godwin Falcon Rd

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

15. Recent weather conditions: Rain within 48 hrs.

16. Site conditions at time of visit: undisturbed

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: 3 ac

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: 5% Residential  Commercial  Industrial 45% Agricultural

50% Forested  Cleared / Logged  Other (\_\_\_\_\_)

\* (Top of Bank)  
22. Bankfull width: 7 ft

23. Bank height (from bed to top of bank): 2 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): 7/ Comments: \_\_\_\_\_

Evaluator's Signature Jam Roper Date 9/10/14

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

	#	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	5
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	5
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	5
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	5
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	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	/
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	4
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	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
	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	/
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	2
	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	5
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						71

\* These characteristics are not assessed in coastal streams.

Scmp010

NC DWQ Stream Identification Form Version 4.11

Date: 9/10/14	Project/Site: ACP	Latitude: 35.19527
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.68217
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 30.5	Stream Determination (circle one) Ephemeral Intermittent <del>( )</del> Perennial <u>( )</u>	Other e.g. Quad Name: Wade

A. Geomorphology (Subtotal = 15)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	<u>(3)</u>
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	1	<u>(2)</u>	3
4. Particle size of stream substrate	0	1	<u>(2)</u>	3
5. Active/relict floodplain	0	1	<u>(2)</u>	3
6. Depositional bars or benches	0	1	<u>(2)</u>	3
7. Recent alluvial deposits	0	<u>(1)</u>	2	3
8. Headcuts	<u>(0)</u>	1	2	3
9. Grade control	0	<u>(0.5)</u>	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 = 8.5)

12. Presence of Baseflow	0	1	2	<u>(3)</u>
13. Iron oxidizing bacteria	<u>(0)</u>	1	2	3
14. Leaf litter	<u>(1.5)</u>	1	0.5	0
15. Sediment on plants or debris	0	<u>(1.5)</u>	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?	No = 0		Yes = 3	

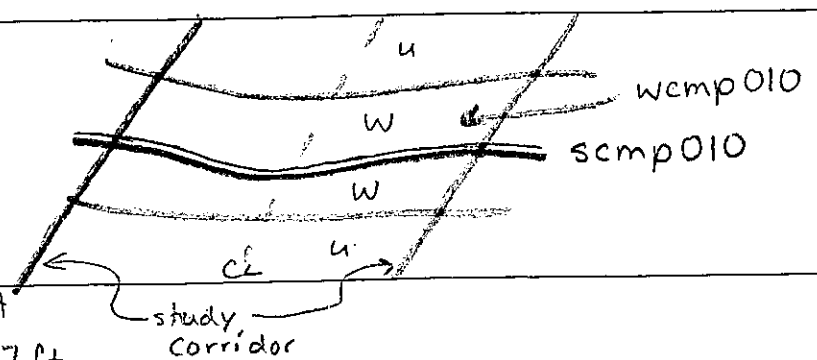
C. Biology (Subtotal = 7)

18. Fibrous roots in streambed	<u>(3)</u>	2	1	0
19. Rooted upland plants in streambed	<u>(3)</u>	2	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	0	0.5	<u>(1)</u>	1.5
25. Algae	<u>(0)</u>	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: 6 ft  
Top of Bank width: 7 ft

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp010 facing southwest upstream.**



**Waterbody scmp010 facing northeast downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp010 facing southwest across channel**

Scmp 011



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: EST (L Roper)
- 3. Date of evaluation: 9/10/14
- 4. Time of evaluation: 1130 am
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 75 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 30 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): n/a
- Latitude (ex. 34.872312): 35.19291
- Longitude (ex. -77.556611): -78.68623

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):  
between 95 + US301, east of McCollum Ln

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

15. Recent weather conditions: Rain within 48 hr

16. Site conditions at time of visit: undisturbed

17. Identify any special waterway classifications known: \_\_\_\_\_ Section 10 \_\_\_\_\_ Tidal Waters \_\_\_\_\_ Essential Fisheries Habitat  
\_\_\_\_\_ Trout Waters \_\_\_\_\_ Outstanding Resource Waters \_\_\_\_\_ Nutrient Sensitive Waters X 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: 1 ac

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 60% Agricultural  
30% Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)

\* (Top of Bank)  
22. Bankfull width: 4 ft 23. Bank height (from bed to top of bank): 1 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): 65 Comments: \_\_\_\_\_

Evaluator's Signature [Signature] Date 9/10/14

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

	#	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	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	5
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	4
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
STABILITY	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	4
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	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	3
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	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	/
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	2
	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	4
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)					65	

\* These characteristics are not assessed in coastal streams.

scmp011

NC DWQ Stream Identification Form Version 4.11

Date: 9/10/14	Project/Site: ACP	Latitude: 35.19291
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.68673
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30$	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other e.g. Quad Name: Wade

A. Geomorphology (Subtotal = 15)

	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	0	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)

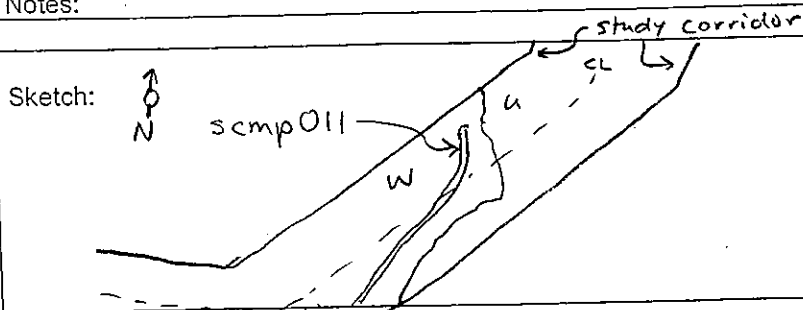
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0			Yes = 3

C. Biology (Subtotal = 6.5)

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: 4 ft

Top of Bank width: 4 ft



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp011 facing south upstream.**



**Waterbody scmp011 facing north downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp011 facing southwest across channel**



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 10/16/14
- 4. Time of evaluation: 10am
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: > 50 ac
- 8. Stream order: 1
- 9. Length of reach evaluated: Soft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA

Latitude (ex. 34.872312): 35.18788 Longitude (ex. -77.556611): -78.70469

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): \_\_\_\_\_

between Sisk Culbreth Rd and US301 near McLollum Ln

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

15. Recent weather conditions: heavy rain within 24hrs.

16. Site conditions at time of visit: undisturbed, forested

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: 5% Residential  Commercial  Industrial 45% Agricultural

50% Forested  Cleared / Logged  Other ( \_\_\_\_\_ )

\* (Top of Bank) 22. Bankfull width: 3.5 ft 23. Bank height (from bed to top of bank): 6 in

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): 67 Comments: \_\_\_\_\_

Evaluator's Signature Jamie Roper Date 10/16/14

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

	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	5
	2 Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	5
	3 Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4 Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5 Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6 Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7 Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	4
	8 Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	4
	9 Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	10 Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11 Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
STABILITY	12 Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13 Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14 Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15 Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	4
	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
HABITAT	17 Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	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	/
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	4
Total Points Possible		100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)					<b>67</b>

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

Scmp022

Date: 10/16/14	Project/Site: ACP	Latitude: 35.18788
Evaluator: EST (L Roper)	County: Cumberland	Longitude: -78.70469
Total Points: 23.5 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other e.g. Quad Name: Wade

A. Geomorphology (Subtotal = 10.5)

	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)

	Absent	Weak	Moderate	Strong
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	

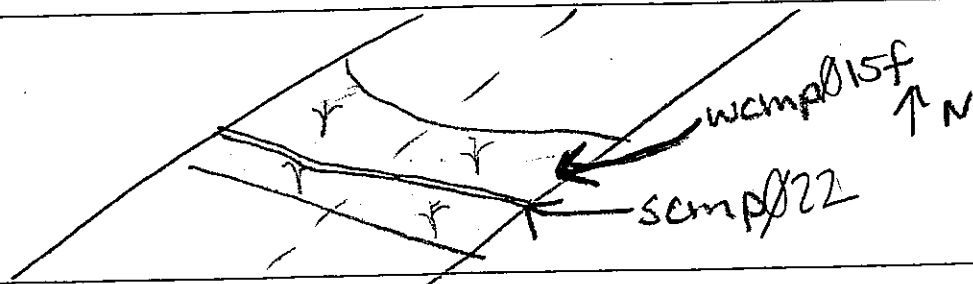
C. Biology (Subtotal = 6)

	Absent	Weak	Moderate	Strong
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: Heavy rain within 24 hrs.

Sketch:



OHWM width: 3ft.

Top of Bank width: 3.5 ft.

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp022 facing south upstream.**



**Waterbody scmp022 facing north downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp022 facing west across channel**

NC DWQ Stream Identification Form Version 4.11

scmo041

Date: 10/18/16	Project/Site: ACP	Latitude: 35.18954
Evaluator: ESI-Roper	County: scmo041	Longitude: -78.71167
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ <span style="float: right;">30</span>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 14)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank	0	1	2	<u>3</u>
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	1	<u>2</u>	3
4. Particle size of stream substrate	0	1	2	<u>3</u>
5. Active/relict floodplain	<u>0</u>	1	2	3
6. Depositional bars or benches	0	1	<u>2</u>	3
7. Recent alluvial deposits	<u>0</u>	1	2	3
8. Headcuts	<u>0</u>	1	2	3
9. Grade control	0	0.5	<u>1</u>	1.5
10. Natural valley	0	0.5	<u>1</u>	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)

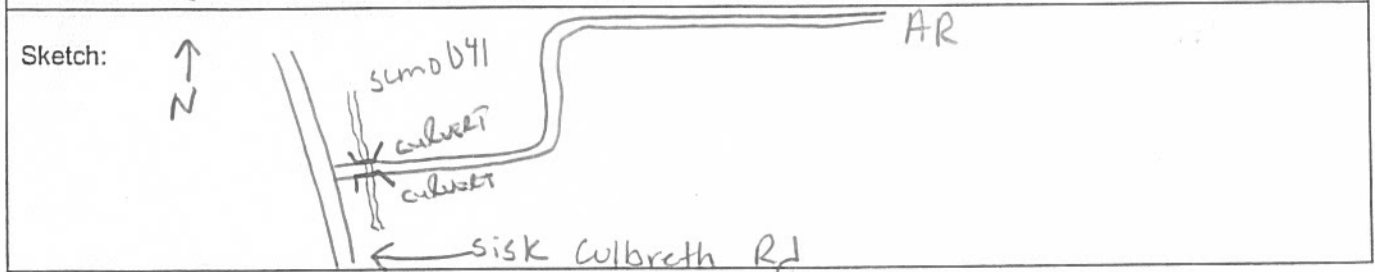
12. Presence of Baseflow	0	1	2	<u>3</u>
13. Iron oxidizing bacteria	<u>0</u>	1	2	3
14. Leaf litter	<u>1.5</u>	1	0.5	0
15. Sediment on plants or debris	0	<u>0.5</u>	1	1.5
16. Organic debris lines or piles	0	0.5	<u>1</u>	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7)

18. Fibrous roots in streambed	<u>3</u>	2	1	0
19. Rooted upland plants in streambed	<u>3</u>	2	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	0	0.5	<u>1</u>	1.5
25. Algae	<u>0</u>	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: deeply incised channel, culverted under access road



OHWM: 4 ft

Bank: 6 ft





# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
  - 2. Evaluator's name: ESI - Roper
  - 3. Date of evaluation: 10/18/16
  - 4. Time of evaluation: 10am
  - 5. Name of stream: UNT to Cape Fear River
  - 6. River basin: Cape Fear
  - 7. Approximate drainage area: 100 ac
  - 8. Stream order: 0
  - 9. Length of reach evaluated: 30ft
  - 10. County: Cumberland
  - 11. Site coordinates (if known): prefer in decimal degrees.
  - 12. Subdivision name (if any): none
- Latitude (ex. 34.872312): 35.18954 Longitude (ex. -77.556611): -78.71167

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):  
East of Sisk Colbreth Rd

- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: warm and dry
- 16. Site conditions at time of visit: ag. field + wooded edges

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: 10% Residential  % Commercial  % Industrial 40% Agricultural  
50% Forested  % Cleared / Logged  % Other ( \_\_\_\_\_ )

22. Bankfull width: 6 ft 23. Bank height (from bed to top of bank): 6 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): 41 Comments: \_\_\_\_\_

Evaluator's Signature [Signature] Date 10/18/16

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	2
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
	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	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	3
	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	1
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	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	2
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
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	2
	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	4
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
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	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	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						41

\* These characteristics are not assessed in coastal streams.



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point scmo041 facing north upstream.**



**Waterbody data point scmo041 facing south downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point scmo041 facing east across.**



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

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

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



# STREAM QUALITY ASSESSMENT WORKSHEET

SCMCOO1



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: 2/10/2015
- 4. Time of evaluation: 11:10 AM
- 5. Name of stream: UT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: ~ 50 acres
- 8. Stream order: 1<sup>st</sup>
- 9. Length of reach evaluated: ~ 100 feet
- 10. County: Comberland
- 11. Site coordinates (if known); prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 35°10'58.97" N Longitude (ex. -77.556611): 78°42'36.18" 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): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: light rain within previous 24 hours
- 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 \_\_\_\_\_% Agricultural 7' 95% ~~100%~~ Forested \_\_\_\_\_% Cleared / Logged 5 % Other (Railroad tracks)
- 22. Bankfull width: \_\_\_\_\_
- 23. Bank height (from bed to top of bank): 2.5'
- 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): 68 Comments: Stream flows through under a railroad track with a raised gravel, berm base. Stream is associated with a forested wetland.

Evaluator's Signature Care Peyer Date 2-10-15

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

SCMCOO1

	#	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	5
	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	4
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	4
	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	4
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	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	2
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	4
	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	3
	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	3
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
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	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						68

\* 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

SCMCOO001

Date: 2/10/2015	Project/Site: ACP	Latitude: 35°10'58.97"N
Evaluator: Natural Resource Group	County: Cumberland	Longitude: 78°42'36.18"W
Total Points: 32.75 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 18)

	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)

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	

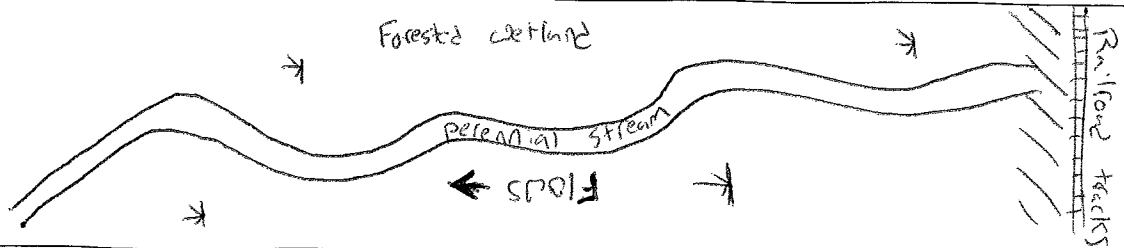
C. Biology (Subtotal = 6.75)

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:







Waterbody SCMC001 facing south upstream



Waterbody SCMC001 facing west across



Waterbody SCMC001 facing north downstream





## STREAM QUALITY ASSESSMENT WORKSHEET



SCMCOO2

Provide the following information for the stream reach under assessment:

- |   |   |
|---|---|
| 1. Applicant's name: <u>Dominion</u>                        | 2. Evaluator's name: <u>Natural Resource Group</u>  |
| 3. Date of evaluation: <u>2/10/2015</u>                     | 4. Time of evaluation: <u>1:00 PM</u>               |
| 5. Name of stream: <u>JT to Cape Fear River</u>             | 6. River basin: <u>Cape Fear</u>                    |
| 7. Approximate drainage area: <u>~50 acres</u>              | 8. Stream order: <u>2nd</u>                         |
| 9. Length of reach evaluated: <u>~200 Feet</u>              | 10. County: <u>Cumberland</u>                       |
| 11. Site coordinates (if known): prefer in decimal degrees. | 12. Subdivision name (if any): _____                |
| Latitude (ex. 34.872312): <u>35° 10' 57.51" N</u>           | Longitude (ex. -77.556611): <u>78° 42' 44.19" W</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): None
15. Recent weather conditions: light rain within previous 24 hours
16. Site conditions at time of visit: Started to rain at the time of survey
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 \_\_\_\_\_ % Agricultural  
100 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
22. Bankfull width: 30' 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): 77 Comments: Braided channel that has been altered by a beaver dam located upstream. Stream runs through a forested wetland. The total width of the braided system varies from 150 feet to 200 feet.

Evaluator's Signature Cole Reym Date 2-10-15

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

SCMCOO2

	#	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	5
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	4
	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	4
	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	4
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	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	0
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	4
	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	5
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
	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	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	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>77</b>

\* 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**

SCMCO02

**NC DWQ Stream Identification Form Version 4.11**

<b>Date:</b> 2/10/2015	<b>Project/Site:</b> ACP	<b>Latitude:</b> 35° 10' 57.51" N
<b>Evaluator:</b> Natural Resource Group	<b>County:</b> Cumberland	<b>Longitude:</b> 78° 42' 44.19" W
<b>Total Points:</b> Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 39.75	<b>Stream Determination (circle one)</b> Ephemeral Intermittent <u>Perennial</u>	<b>Other</b> e.g. Quad Name:

**A. Geomorphology (Subtotal = 22.5)**

	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 = 9.5)**

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 = 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:** Large beaver dam upstream and several small beaver dams along stream result in a braided system





Waterbody SCMC002 facing south upstream



Waterbody SCMC002 facing west across





Waterbody SCMC002 facing north downstream





## STREAM QUALITY ASSESSMENT WORKSHEET

SCMCO03



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: 2/10/2015
- 4. Time of evaluation: 9:15 AM
- 5. Name of stream: UT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: ~ 25 acres
- 8. Stream order: 1<sup>st</sup>
- 9. Length of reach evaluated: 100 Ft.
- 10. County: Comberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_
- Latitude (ex. 34.872312): 35° 10' 54.902" N
- Longitude (ex. -77.556611): 78° 42' 49.282" 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): \_\_\_\_\_

- 14. Proposed channel work (if any): None
- 15. Recent weather conditions: light rain within previous 24 hours
- 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 60% % Agricultural 3 ~~40%~~ % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )

- 22. Bankfull width: \_\_\_\_\_
- 23. Bank height (from bed to top of bank): 4 1'

- 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): 45 Comments: Ephemeral channel that drains the agricultural field located upstream.

Evaluator's Signature Cole Peyer Date 2-10-15

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

SCMCO03

	#	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	4
	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	4
	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	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	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	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	0
STABILITY	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	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	4
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
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	2
	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	3
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
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)						45

\* 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**

SCM003

**NC DWQ Stream Identification Form Version 4.11**

Date: 2/10/2015	Project/Site: ACP	Latitude: 35° 10' 54.90" N
Evaluator: Natural Resource Group	County: Cumberland	Longitude: 78° 42' 49.28" W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 14.75	Stream Determination (circle one) <u>Ephemeral</u> Intermittent Perennial	Other e.g. Quad Name:

**A. Geomorphology (Subtotal = 10.5)**

	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 = 1.5)**

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	

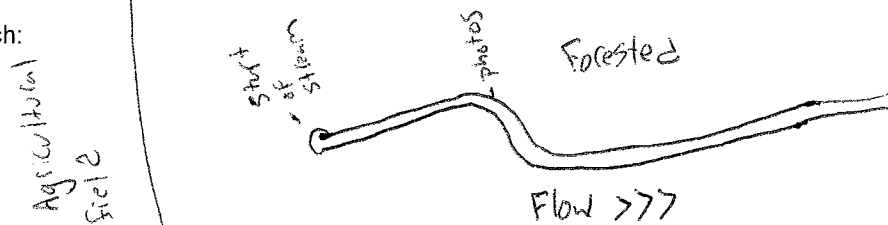
**C. Biology (Subtotal = 2.75)**

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:







Waterbody SCMC003 facing north upstream



Waterbody SCMC003 facing west across



Waterbody SCMC003 facing south downstream



## STREAM QUALITY ASSESSMENT WORKSHEET

SCM005



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: 2/13/2015
4. Time of evaluation: 11:15
5. Name of stream: UT to Cape Fear River
6. River basin: Cape Fear
7. Approximate drainage area: ~25 acres
8. Stream order: 1st
9. Length of reach evaluated: 100 feet
10. County: Cumberland
11. Site coordinates (if known): prefer in decimal degrees.  
Latitude (ex. 34.872312): 35° 10' 44.815" N  
Longitude (ex. -77.556611): 78° 43' 10.669" W
12. Subdivision name (if any): \_\_\_\_\_
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/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: light rain within the past 24 hours
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  
10 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
22. Bankfull width: 3.5'
23. Bank height (from bed to top of bank): 2.5'
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): 49 Comments: Stream runs through agricultural land. Stream is entrenched and shows signs of bank failures. Densely vegetated where it was entrenched.

Evaluator's Signature Cole Reagin Date 2/13/2015

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

SCMCO05

	#	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	3
	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	3
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	4
	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	3
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	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	1
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	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	3
	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	3
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	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	2
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						49

\* 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**

SMC 005

**NC DWQ Stream Identification Form Version 4.11**

<b>Date:</b> 2/13/15	<b>Project/Site:</b> ACP	<b>Latitude:</b> 35° 10' 44.815" N
<b>Evaluator:</b> Natural Resource Group	<b>County:</b> Cumberland	<b>Longitude:</b> 78° 43' 10.669" W
<b>Total Points:</b> Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 22	<b>Stream Determination (circle one)</b> Ephemeral <u>Intermittent</u> Perennial	<b>Other</b> e.g. Quad Name:

**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	①	1	2	3
9. Grade control	①	0.5	1	1.5
10. Natural valley	0	①.5	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 = 4.5)**

12. Presence of Baseflow	0	1	2	③
13. Iron oxidizing bacteria	0	①	2	3
14. Leaf litter	1.5	1	①.5	0
15. Sediment on plants or debris	①	0.5	1	1.5
16. Organic debris lines or piles	①	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)	①	1	2	3
21. Aquatic Mollusks	①	1	2	3
22. Fish	①	0.5	1	1.5
23. Crayfish	①	0.5	1	1.5
24. Amphibians	①	0.5	1	1.5
25. Algae	①	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:





Waterbody SCMC005 facing east upstream



Waterbody SCMC005 facing north across





Waterbody SCMC005 facing West downstream

scmp 021



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI-J. Harbour, K. Murphy
- 3. Date of evaluation: 10/1/14
- 4. Time of evaluation: 1:00pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: CAPE FEAR
- 7. Approximate drainage area: 15 acres
- 8. Stream order: 1
- 9. Length of reach evaluated: 50ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.16927
- Longitude (ex. -77.556611): -78.73514

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): \_\_\_\_\_

this canal is located at the end of House St., off Church St.

- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: Sunny
- 16. Site conditions at time of visit: undisturbed

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: 8 acres

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: 5 % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 40 % Agricultural \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )

\* (Top of Bank) 22. Bankfull width: 6 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): 47 Comments: This is a man made canal with no flow. Duckweed present.

Evaluator's Signature [Signature] Date 10/1/14

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

	#	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	0
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	0
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	—
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	5
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
HABITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	—
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	2
	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	3
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>47</b>

\* These characteristics are not assessed in coastal streams.



SCMP021

NC DWQ Stream Identification Form Version 4.11

Date: 10/1/14	Project/Site: ACP	Latitude: 35.16927
Evaluator: ESI-K. Maroney, J. Harbour	County: Cumberland	Longitude: -78.73514
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 22.5	Stream Determination (circle one) Ephemeral <u>intermittent</u> Perennial	Other Wade, NC e.g. Quad Name:

A. Geomorphology (Subtotal = 5.5)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank NA	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)

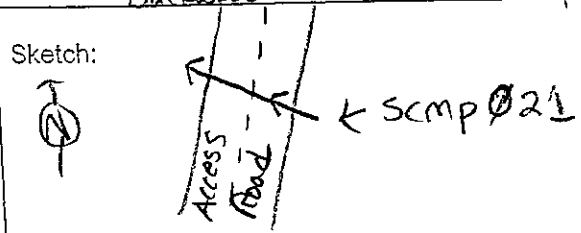
12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 9)

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: This feature is a man made canal. Access road  
Duckweed abundant in portion of canal



OHWM width: 4  
Top of Bank width: 6

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp021 facing northeast upstream.**



**Waterbody scmp021 facing southwest downstream.**

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp021 facing north across channel**



scmp 005



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: EST (L. Roper)
- 3. Date of evaluation: 8/28/14
- 4. Time of evaluation: 2:15 pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 30-40 ac
- 8. Stream order: 2nd
- 9. Length of reach evaluated: 15 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NDNR
- Latitude (ex. 34.872312): 35.17212
- Longitude (ex. -77.556611): -78.74164

Method location determined (circle):  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): \_\_\_\_\_

Parcel 22-069; East of River Rd

14. Proposed channel work (if any): TBD

15. Recent weather conditions: Clear/dry

16. Site conditions at time of visit: undisturbed

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 V (I-IV)

18. Is there a pond or lake located upstream of the evaluation point?  YES  NO If yes, estimate the water surface area: 2 ac

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: 5 % Residential  % Commercial  % Industrial 25 % Agricultural

70 % Forested  % Cleared / Logged  % Other ( \_\_\_\_\_ )

22. <sup>Top of bank</sup> ~~Bankfull~~ width: ± 50; varies greatly

23. Bank height (from bed to top of bank): 15 - 20 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): 51 Comments: Channel located in bottom of steep gorge; bank heights range from 15-20 ft. to areas where they exceed 30 ft.

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

	#	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	5
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	5
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	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	2
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	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	5
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
STABILITY	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	0
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	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	4
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	3
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	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	/
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	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	3
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>51</b>

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

scmp005

Date: <u>8/28/14</u>	Project/Site: <u>SERP</u>	Latitude: <u>35.17212</u>
Evaluator: <u>ESI (L Roper)</u>	County: <u>Cumberland</u>	Longitude: <u>-78.74164</u>
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ <u>40</u>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other <u>WADE, NC</u> e.g. Quad Name:

A. Geomorphology (Subtotal = 20)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuity of channel bed and bank	0	1	2	<u>3</u>
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	1	2	<u>3</u>
4. Particle size of stream substrate	0	1	2	<u>3</u>
5. Active/relict floodplain	0	<u>1</u>	2	3
6. Depositional bars or benches	0	1	<u>2</u>	3
7. Recent alluvial deposits	0	<u>1</u>	2	3
8. Headcuts	<u>0</u>	1	2	3
9. Grade control	0	0.5	<u>1</u>	1.5
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	2	<u>3</u>
13. Iron oxidizing bacteria	0	<u>1</u>	2	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>	

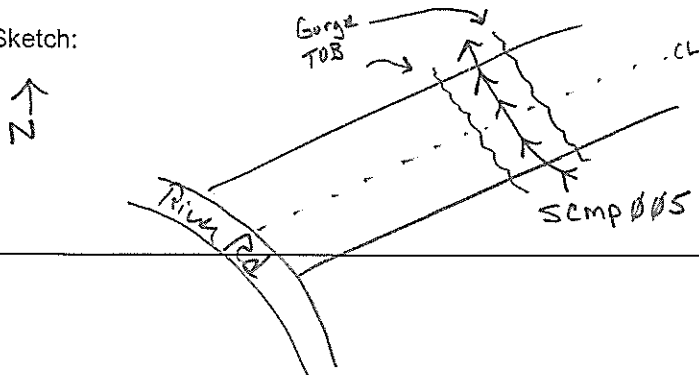
C. Biology (Subtotal = 10)

18. Fibrous roots in streambed	<u>3</u>	2	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	1	1.5
23. Crayfish	<u>0</u>	0.5	1	1.5
24. Amphibians	0	0.5	1	<u>1.5</u>
25. Algae	0	<u>0.5</u>	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = <u>0</u>			

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

Notes:

Sketch:



OHWM width = 5 ft  
Top of bank = 50ft ±  
Varies greatly



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp005 facing south upstream.**



**Waterbody scmp005 facing north downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp005 facing west across channel**



# SCMB102 STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: Dominion - ACP
  2. Evaluator's name: Todd Preuninger
  3. Date of evaluation: 3/4/15
  4. Time of evaluation: AM
  5. Name of stream: SCMB102 - UNT to Cape Fear
  6. River basin: Cape Fear
  7. Approximate drainage area: \_\_\_\_\_
  8. Stream order: 1st
  9. Length of reach evaluated: ~100'
  10. County: Cumberland
  11. Site coordinates (if known): prefer in decimal degrees.  
Latitude (ex. 34.872312): 35°10'19"N
  12. Subdivision name (if any): \_\_\_\_\_  
Longitude (ex. -77.556611): 78°44'38"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):  
~ feet north of River Rd.
  14. Proposed channel work (if any): \_\_\_\_\_
  15. Recent weather conditions: rain in last 24 hours
  16. Site conditions at time of visit: cloudy ~ 45°
  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: 10 % Residential  % Commercial  % Industrial 40 % Agricultural  
40 % Forested 10 % Cleared / Logged  % Other ( \_\_\_\_\_ )
  22. Bankfull width: 3
  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): 16 Comments: ephemeral channel/ditch conveying run off from adjacent agricultural field

Evaluator's Signature Todd Preuninger Date 3/4/15

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

	#	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	1
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	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	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	1
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	0
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
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	0
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	0
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
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	1
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE (also enter on first page)</b>						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**

**NC DWQ Stream Identification Form Version 4.11**

SCMB102

Date: 3/4/15	Project/Site: Dominion / ACP	Latitude: 35°10'19"N
Evaluator: Todd Preuninger	County: Cumberland	Longitude: 78°44'38"W
<b>Total Points:</b> Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 13	<b>Stream Determination (circle one)</b> Ephemeral Intermittent Perennial	<b>Other</b> e.g. Quad Name:

**A. Geomorphology (Subtotal = 4)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank - <i>ditch adjacent to ag. field</i>	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 = 5)**

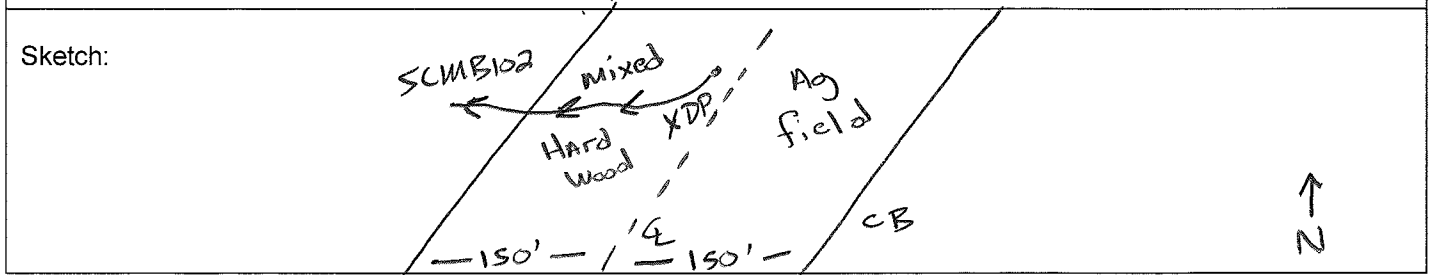
12. Presence of Baseflow - <i>Rain in last 24 hours</i>	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

**C. Biology (Subtotal = 4)**

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (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: Ephemeral channel/ditch conveying run-off from adjacent agricultural field







Waterbody SCMB102 facing southeast upstream



Waterbody SCMB102 facing north across





Waterbody SCMB102 facing west downstream

scmp002



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 8/28/14
- 4. Time of evaluation: 12pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 60 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 50 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none
- Latitude (ex. 34.872312): 35.17052
- Longitude (ex. -77.556611): -78.74486

Method location determined (circle):  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):  
Parcel 22-070 ; west of River Road

14. Proposed channel work (if any): TBD

15. Recent weather conditions: cool & dry

16. Site conditions at time of visit: undisturbed

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 V (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  
 40 % Forested  10 % Cleared / Logged  % Other ( \_\_\_\_\_ )

22. <sup>Top of bank</sup> ~~Bankfull~~ width: 6 ft 23. Bank height (from bed to top of bank): 2 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): 63 Comments: Appears to be a stream that was channelized long ago.

Evaluator's Signature Jam Roper 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

	#	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	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	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	2
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	4
	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	4
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
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	4
	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	2
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
HABITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	/
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	1
	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	5
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>63</b>

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

scmp002

Date: 8/28/14	Project/Site: SERP	Latitude: 35.17052
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.74486
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 27.5	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other WADE, NC e.g. Quad Name:

A. Geomorphology (Subtotal = 13)

	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)

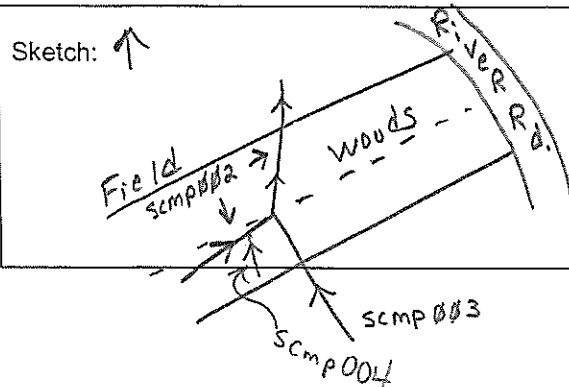
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.5)

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: Appears to be a channelized stream



OHWM width = 3 ft.  
TOB width = 6 ft.

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp002 facing west upstream.**



**Waterbody scmp002 facing east downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp002 facing north across channel**



SCMB103



## STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: Dominion / ACP 2. Evaluator's name: Todd Previnger  
 3. Date of evaluation: 3/4/15 4. Time of evaluation: AM  
 5. Name of stream: SCMB103 - UNT to Cape Fear 6. River basin: Cape Fear  
 7. Approximate drainage area: \_\_\_\_\_ 8. Stream order: 1st  
 9. Length of reach evaluated: ~ 75' 10. County: Cumberland  
 11. Site coordinates (if known): prefer in decimal degrees. 12. Subdivision name (if any): \_\_\_\_\_  
 Latitude (ex. 34.872312): 35°10'14"N Longitude (ex. -77.556611): 78°44'40"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):  
~ Feet south of River Rd  
 14. Proposed channel work (if any): \_\_\_\_\_  
 15. Recent weather conditions: rain in last 24 hours  
 16. Site conditions at time of visit: cloudy, 45° F  
 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: 10 % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 40 % Agricultural  
40 % Forested 10 % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)  
 22. Bankfull width: 2 23. Bank height (from bed to top of bank): 3  
 24. Channel slope down center of stream: \_\_\_\_\_ Flat (0 to 2%) X Gentle (2 to 4%) \_\_\_\_\_ Moderate (4 to 10%) \_\_\_\_\_ Steep (>10%)  
 25. Channel sinuosity: \_\_\_\_\_ Straight X 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): 28 Comments: Ephemeral channel, noted saplings and leaf litter in base of channel. Impacted by 2 roads + sewer easement

Evaluator's Signature Todd Previnger Date 3/4/15

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

	#	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	1
	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	2
	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	0
	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	2
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	1
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	0
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
HABITAT	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	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
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	1
Total Points Possible			100	100	100	
<b>TOTAL SCORE (also enter on first page)</b>						28

\* 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**

SCMB103

Date: 3/4/15	Project/Site: Dominion / ACP	Latitude: 35°10'14"N
Evaluator: Todd Preninger	County: Cumberland	Longitude: 78°44'40"W
<b>Total Points:</b> Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 11.5	<b>Stream Determination (circle one)</b> Ephemeral Intermittent Perennial	<b>Other</b> e.g. Quad Name:

**A. Geomorphology (Subtotal = 4.5)**

	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 = 3.5)**

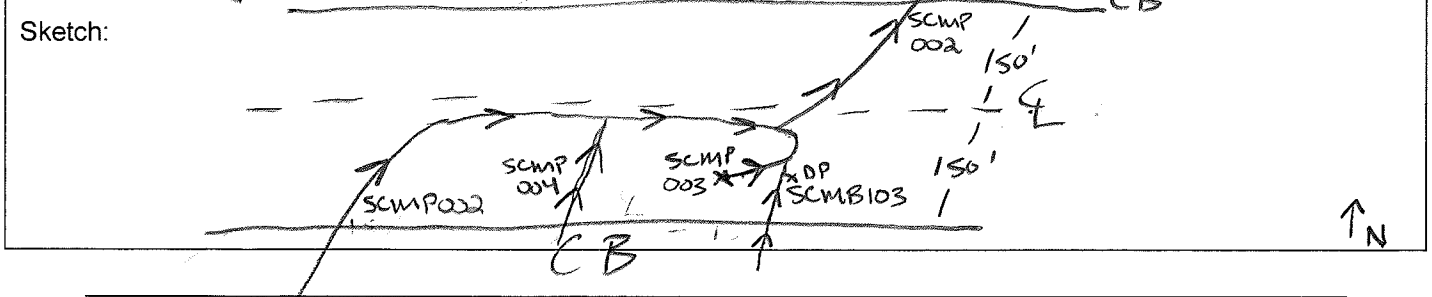
12. Presence of Baseflow - Rain in last 24 hours	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

**C. Biology (Subtotal = 2)**

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: Ephemeral channel, noted saplings and leaf litter in base of channel  
Impacted by 2 roads + sewer placement.







Waterbody SCMB103 facing east upstream



Waterbody SCMB103 facing north across





Waterbody SCMB103 facing west downstream

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

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

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

scmp 003



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Domination
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 8/28/14
- 4. Time of evaluation: 12:30pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 60 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 50 ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none

Latitude (ex. 34.872312): 35.17051 Longitude (ex. -77.556611): -78.74477

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): \_\_\_\_\_

Parcel 22-070; west of River Rd

14. Proposed channel work (if any): TBD

15. Recent weather conditions: clear / dry

16. Site conditions at time of visit: undisturbed

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 (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

Top of bank 40 % Forested 10 % Cleared / Logged  % Other ( \_\_\_\_\_ )

22. ~~Bankfull~~ width: 5 ft. 23. Bank height (from bed to top of bank): 2 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): 63 Comments: \_\_\_\_\_

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

	#	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	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	4
	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	4
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
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	4
	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	2
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	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	/
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	5
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>63</b>

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

scmp003

Date: 8/28/14	Project/Site: SERP	Latitude: 35.170511
Evaluator: BSI (L Roper)	County: Cumberland	Longitude: -78.74477
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 27.5	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other WADE, NC e.g. Quad Name:

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	

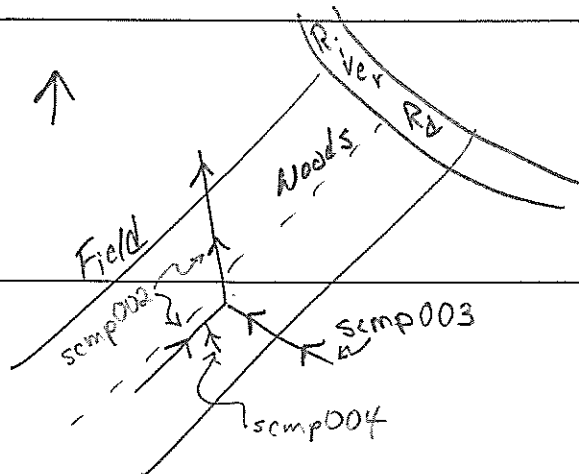
C. Biology (Subtotal = 7.5)

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:



OHWB width = 2.5 ft  
TOB width = 5 ft



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp003 facing east upstream.**



**Waterbody scmp003 facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp003 facing north across channel**

USACE AID= \_\_\_\_\_

DWQ= \_\_\_\_\_

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

scmp 004



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI (L Roper)
- 3. Date of evaluation: 8/28/14
- 4. Time of evaluation: 12:50 pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 60 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 50 ft.
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none
- Latitude (ex. 34.872312): 35.17029
- Longitude (ex. -77.556611): -78.174312

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):  
Parcel 22-070; west of River Rd.

14. Proposed channel work (if any): TBD

15. Recent weather conditions: Clear/dry

16. Site conditions at time of visit: undisturbed

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 V (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  
40 % Forested 10 % Cleared / Logged  % Other ( \_\_\_\_\_ )

22. <sup>Top of bank</sup> ~~Bankfull~~ width: 9 ft. 23. Bank height (from bed to top of bank): 3 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): 62 Comments: \_\_\_\_\_

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

	#	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	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	5
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	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	4
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	1
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	4
	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	2
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	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
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	5
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						62

\* These characteristics are not assessed in coastal streams.



NC DWQ Stream Identification Form Version 4.11

scmp004

Date: 8/28/14	Project/Site: SERP	Latitude: 35.17029
Evaluator: EST (L. Roper)	County: Cumberland	Longitude: -78.74512
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 23	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other WADE, NC 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	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)

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	

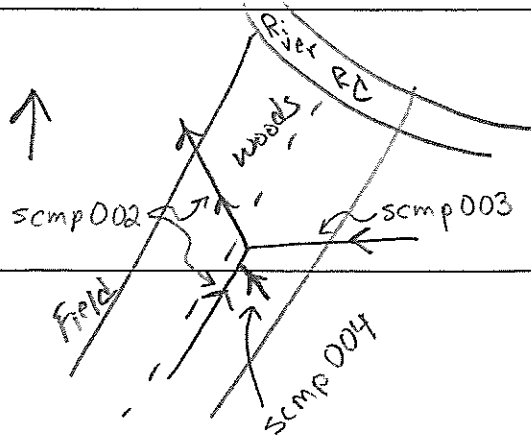
C. Biology (Subtotal = 7)

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: Channelized stream

Sketch:



OHWM width = 4 ft  
TDB width = 9 ft

*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp004 facing south upstream.**



**Waterbody scmp004 facing north downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp004 facing west across channel**



USACE AID= \_\_\_\_\_

DWQ = \_\_\_\_\_

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

Scmp 001



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: EST (L Roper)
- 3. Date of evaluation: 8/28/14
- 4. Time of evaluation: 9am
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 30 ac
- 8. Stream order: 0
- 9. Length of reach evaluated: 50ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none
- Latitude (ex. 34.872312): 35.16040
- Longitude (ex. -77.556611): -78.75485
- 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):  
Parcel 22-080, north of Swamp Rd.
- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: cool & dry, some scattered showers
- 16. Site conditions at time of visit: undisturbed
- 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: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 70 % Agricultural  
Top of Bank 25 % Forested 5 % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
- 22. Bankfull width: 15 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): 26      Comments: Channelized

Evaluator's Signature Janner Roper      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 06/05. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	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	0
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	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	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	/
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	4
	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	0
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	1
	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	/
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	3
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						<b>26</b>

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

scmp001

Date: 8/28/14	Project/Site: SERP	Latitude: 35.160404
Evaluator: ESI (L Roper)	County: Cumberland	Longitude: -78.75485
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 19	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Slocum, NC 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 = 5.5)

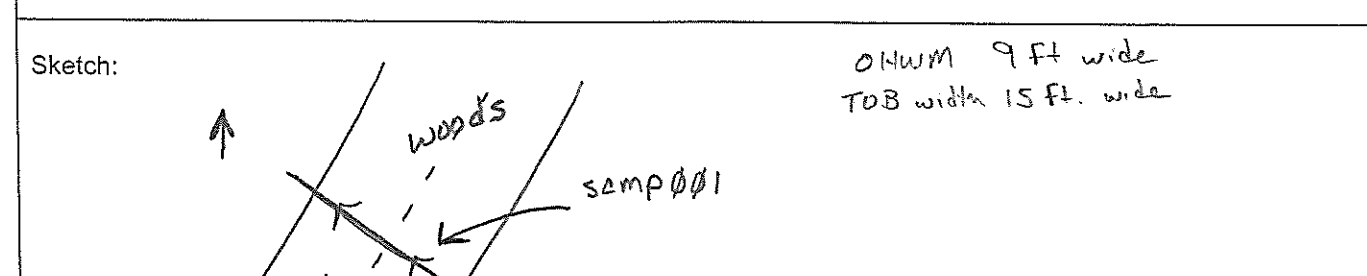
12. Presence of Baseflow	(0)	1	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.5)

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: Channelized





*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp001 facing southeast upstream.**



**Waterbody scmp001 facing northwest downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp001 facing northeast across channel**

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

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

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

scmp001\_s2



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: L. Roper
- 3. Date of evaluation: 4/26/16
- 4. Time of evaluation: 12pm
- 5. Name of stream: VT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 30 ac.
- 8. Stream order: 0
- 9. Length of reach evaluated: 50ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none
- Latitude (ex. 34.872312): 35.161088
- Longitude (ex. -77.556611): -78.756104
- 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):  
Parcel 22-080, north of Swamp Rd
- 14. Proposed channel work (if any): TBD
- 15. Recent weather conditions: cool + dry
- 16. Site conditions at time of visit: clear cut
- 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: \_\_\_\_\_% Residential \_\_\_\_\_% Commercial \_\_\_\_\_% Industrial 70% Agricultural  
25% Forested 5% Cleared / Logged \_\_\_\_\_% Other (\_\_\_\_\_)
- 22. Bankfull width: 11 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): 26      Comments: Channelized

Evaluator's Signature L. Roper      Date 4/26/16

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	0
	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	2
	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	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	-
STABILITY	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	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	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	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	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	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	6
	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)					<b>26</b>	

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

scmp001-52

Date: 4/26/16	Project/Site: ACP	Latitude: 35.161088
Evaluator: L. Roper	County: Cumberland	Longitude: -78.756104
Total Points: 19 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <del>Intermittent</del> Perennial	Other e.g. Quad Name: Slocumb

A. Geomorphology (Subtotal = 6)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank <i>ditched</i>	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 = 5.5)

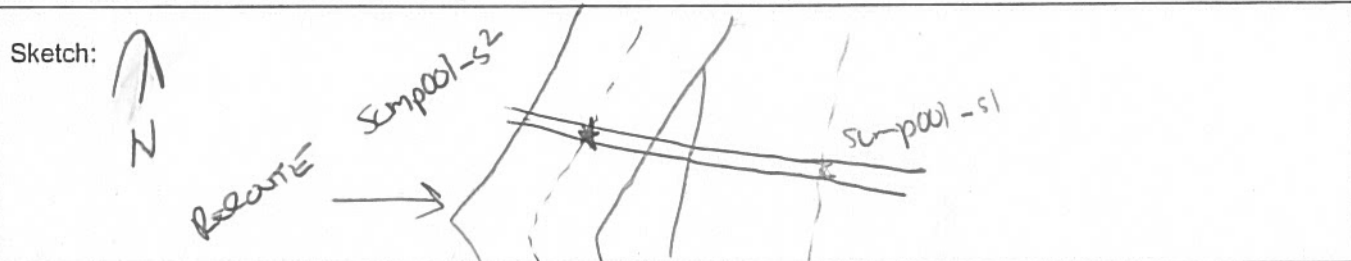
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.5)

18. Fibrous roots in streambed	0	2	1	0
19. Rooted upland plants in streambed	0	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: channelized



GHWM: 9 ft

bank width: 11 ft



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point scmp001\_s2 facing east upstream.**



**Waterbody data point scmp001\_s2 facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point scmp001\_s2 facing south across.**

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

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

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

scmo037

scmo037



# 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, L. Roper)
- 3. Date of evaluation: 4-26-16
- 4. Time of evaluation: 11:30 am
- 5. Name of stream: UNT to CAPE FEAR
- 6. River basin: Cape Fear
- 7. Approximate drainage area: 500 acres
- 8. Stream order: 2nd
- 9. Length of reach evaluated: 20ft
- 10. County: Cumberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): none

Latitude (ex. 34.872312): 35.1597777 Longitude (ex. -77.556611): -78.758523

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):  
North of Swamp Rd and South of River Rd

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

15. Recent weather conditions: Warm, Sunny, breezy

16. Site conditions at time of visit: Stream near clearcut and agriculture field

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: 5 % Residential 45 % Forested \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 50 % Agricultural  
\_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)

\* (Top of Bank) 22. Bankfull width: 10 ft 23. Bank height (from bed to top of bank): 6

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): 47 Comments: \_\_\_\_\_

Evaluator's Signature Willa E. Vaughn Date 4/26/16

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 05. To Comment, please call 919-876-8441 x.26.



## STREAM QUALITY ASSESSMENT WORKSHEET

	#	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	5
	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	5
	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	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	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	—
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	5
	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	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	1
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
HABITAT	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	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	—
	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
BIOLOGY	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	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
<b>TOTAL SCORE</b> (also enter on first page)					<b>47</b>	

\* These characteristics are not assessed in coastal streams.



SCM0037

NC DWQ Stream Identification Form Version 4.11

Date: 4-26-16	Project/Site: ACP	Latitude: 35.1597777
Evaluator: ESI (L. Roper, W. Vaughan)	County: Cumberland	Longitude: -78.758523
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 33	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other e.g. Quad Name: Slocomb

A. Geomorphology (Subtotal = 11)

	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 = 12)

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	

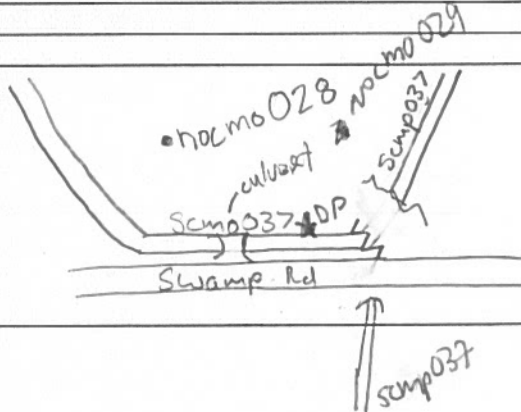
C. Biology (Subtotal = 10)

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: 4  
Bank width: 10



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point scmo037 facing west upstream.**



**Waterbody data point scmo037 facing east downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody data point scmo037 facing south across.**



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

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

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

scmp 038



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: Dominion
  2. Evaluator's name: ESS-J. Harbour, K. Murphy
  3. Date of evaluation: 3/28/16
  4. Time of evaluation: 10AM
  5. Name of stream: UNT TO CAPE FEAR RIVER
  6. River basin: CAPE FEAR
  7. Approximate drainage area: 5 acres
  8. Stream order: 2nd
  9. Length of reach evaluated: 100ft
  10. County: Cumberland
  11. Site coordinates (if known): prefer in decimal degrees.
  12. Subdivision name (if any): NA
  - Latitude (ex. 34.872312): 35.15468
  - Longitude (ex. -77.556611): -76.75773
- 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):  
Located south of Swamp Road in Cumberland County, NC
  14. Proposed channel work (if any): Proposed pipeline
  15. Recent weather conditions: Sunny, rain within past 24 hours
  16. Site conditions at time of visit: undisturbed
  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: \_\_\_\_\_ % Residential \_\_\_\_\_ % Commercial \_\_\_\_\_ % Industrial 80 % Agricultural  
20 % Forested \_\_\_\_\_ % Cleared / Logged \_\_\_\_\_ % Other ( \_\_\_\_\_ )
  - \* (Top of Bank)  
22. Bankfull width: 10ft
  23. Bank height (from bed to top of bank): 10ft
  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): 31      Comments: \_\_\_\_\_

Evaluator's Signature Neil Murphy      Date 3/28/16

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 05. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	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	4
	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	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	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	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	—
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
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	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	—
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	3
Total Points Possible			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)					<b>31</b>	

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

scmp038

Date: 3/28/16	Project/Site: ACP	Latitude: 35.15468
Evaluator: ESI-J. Harbour, K. Murphy	County: Cumberland	Longitude: -78.75773
Total Points: Stream is at least intermittent if $\geq 19$ or perennial if $\geq 30^*$ 26	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Slocumb, NC e.g. Quad Name:

A. Geomorphology (Subtotal = 12)

	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)

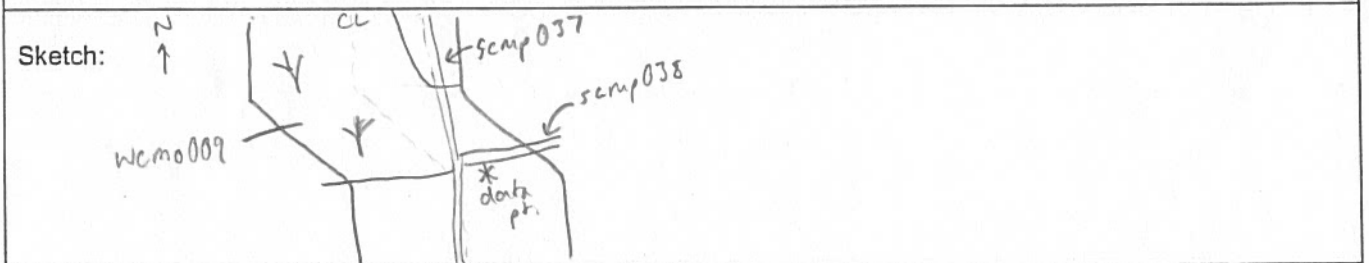
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7)

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: Rain within past 24 hours, ditched



OHWM width: 3  
TOP OF BANK width: 10ft



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp038 facing east upstream.**



**Waterbody scmp038 facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp038 facing south across bank.**

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

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

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

scmp 039



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: Dominion
- 2. Evaluator's name: ESI-J. Harbour, K. Murphy
- 3. Date of evaluation: 3/28/16
- 4. Time of evaluation: 1pm
- 5. Name of stream: UNT to Cape Fear River
- 6. River basin: Cape Fear
- 7. Approximate drainage area: < 5 acres
- 8. Stream order: 2nd
- 9. Length of reach evaluated: 50ft
- 10. County: Chamberland
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NA
- Latitude (ex. 34.872312): 35.15128
- Longitude (ex. -77.556611): -78.75711
- 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):  
Located south of Swamp Road
- 14. Proposed channel work (if any): Proposed Pipeline
- 15. Recent weather conditions: Rain within past 24hrs
- 16. Site conditions at time of visit: man-made ditch in ag field
- 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:  % Residential  % Commercial  % Industrial 90 % Agricultural  
10 % Forested  % Cleared / Logged  % Other (\_\_\_\_\_)
- \* (Top of Bank) 6ft
- 22. Bankfull width: 6ft
- 23. Bank height (from bed to top of bank): 7ft
- 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): 21      Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Evaluator's Signature Kevin Murphy      Date 3/28/16

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 05. To Comment, please call 919-876-8441 x 26.



## STREAM QUALITY ASSESSMENT WORKSHEET

	#	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	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	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	0
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	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	0
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	0
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	-
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	4
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	0
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
HABITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	0
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	-
	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
BIOLOGY	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)					21	

\* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

scmp039

Date: 3/28/16	Project/Site: ACP	Latitude: 35.15128
Evaluator: ESI-J. Harbort, K. Murphy	County: Cumberland	Longitude: -78.75711
Total Points: 23.5 <small>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</small>	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other e.g. Quad Name: Slocomb, NC

A. Geomorphology (Subtotal = 10)

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> Continuity of channel bed and bank <i>Ditch</i>	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)

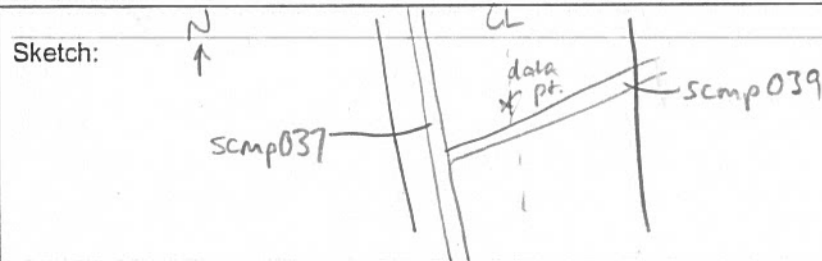
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6)

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: ditch; Rain in previous 24 hours



OHWM width: 3ft  
TOP OF BANK width: 6ft



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp039 facing east upstream.**



**Waterbody scmp039 facing west downstream.**



*Environmental Field Surveys*  
*Waterbody Photo Page*



**Waterbody scmp039 facing south across bank.**