	Accompanies Use	r Manual Version 2.1		
USACE AID #:		NCDWR #:		
	etch of the assessment area and photog			
	stream reach under evaluation. If multip			
	ached map, and include a separate form			
	d information. Record in the "Notes/Ske		arements were performed. See the	
	mples of additional measurements that			
NOTE EVIDENCE OF STRES	SORS AFFECTING THE ASSESSMEN	NT AREA (do not need to be within	the assessment area).	
PROJECT/SITE INFORMATION				
1. Project name (if any):	U-5706,Falling Creek	2. Date of evaluation: 7/12/20		
3. Applicant/owner name:	NCDOT	4. Assessor name/organization:	A.Keith/Axiom	
5. County:	Rockingham	6. Nearest named water body		
7. River basin:	Yadkin-PeeDee	on USGS 7.5-minute quad:	Falling Creek-east	
8. Site coordinates (decimal d	egrees, at lower end of assessment rea	ch): 34.938082 -79.753796		
	epth and width can be approximation			
9. Site number (show on attac		. Length of assessment reach evaluation		
	n riffle, if present) to top of bank (feet):		nable to assess channel depth.	
12. Channel width at top of ba		s assessment reach a swamp steam	? □Yes ⊠No	
14. Feature type:	I flow Intermittent flow Tidal Mars	h Stream		
STREAM CATEGORY INFOR				
15. NC SAM Zone:	Mountains (M) Piedmont	(P) 🛛 Inner Coastal Plain (I)	Outer Coastal Plain (O)	
		ι	/	
16. Estimated geomorphic				
valley shape (skip for				
Tidal Marsh Stream):	(more sinuous stream, flatter valley	slope) (less sinuous str	eam, steeper valley slope)	
17. Watershed size: (skip	□Size 1 (< 0.1 mi <sup>2</sup> ) □Size 2 (0.	1 to < 0.5 mi <sup>2</sup> ) Size 3 (0.5 to <	5 mi²) ⊠Size 4 (≥ 5 mi²)	
for Tidal Marsh Stream)				
ADDITIONAL INFORMATION:				
18. Were regulatory considerations evaluated? Xes INo If Yes, check all that apply to the assessment area.				
Section 10 water Classified Trout Waters Water Supply Watershed (				
Essential Fish Habitat	Primary Nursery Area		/Outstanding Resource Waters	
Publicly owned property  NCDWR Riparian buffer rule in effect  Nutrient Sensitive Waters				
Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)				
Documented presence of a federal and/or state listed protected species within the assessment area.				
List species:				
Designated Critical Hab				
19. Are additional stream infor	rmation/supplementary measurements in	ncluded in "Notes/Sketch" section or	attached? Xes No	
	ment reach metric (skip for Size 1 stre	eams and Tidal Marsh Streams)		
A Water throughout ☐B No flow, water in	t assessment reach.			
$\square$ C No water in asse				
—	tion - assessment reach metric			

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- B Not A

# 3. Feature Pattern – assessment reach metric

- A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). Not A
- 4. Feature Longitudinal Profile assessment reach metric
  - A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
  - B Not A

## 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

A < 10% of channel unstable

B 10 to 25% of channel unstable

C > 25% of channel unstable

#### Streamside Area Interaction – streamside area metric 6. Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Bank
LB	RB	
⊠Α	⊠A	Little or no
ПВ	ПВ	Moderate

- ΔA Little or no evidence of conditions that adversely affect reference interaction
  - Πв Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- ПС Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7.	Water Quality Stressors – assessment reach/intertidal	zone metric
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## Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- Пв Excessive sedimentation (burying of stream features or intertidal zone)
- Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- Odor (not including natural sulfide odors) DD
- Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" ΠE section.
- □F Livestock with access to stream or intertidal zone
- ŪG Excessive algae in stream or intertidal zone
- Πн Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- $\boxtimes$ Other: (explain in "Notes/Sketch" section)
- ΠJ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours ΠA
- Πв Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠C No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. ⊠Yes □No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

LA	Multiple aquatic macrophytes and aquatic mosses	
	(include liverworts, lichens, and algal mats)	
□В	Multiple sticks and/or leaf packs and/or emergent	
	vegetation	
□C	Multiple snags and logs (including lap trees)	
D	5% undercut banks and/or root mats and/or roots	
	in banks optand to the normal wotted perimeter	

- banks extend to the normal wetted perimeter
- ΠE Little or no habitat

Check for Tidal Marsh Streams Only A C I H D J M C I H D J	
--	--

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams) 11a. TYes

11b. Bedform evaluated. Check the appropriate box(es).

- ⊠Α Riffle-run section (evaluate 11c)
- ⊠В Pool-glide section (evaluate 11d)
- ПС Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but < 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach. ND р C ۸

			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm)
H		$\square$	
	$\boxtimes$		Silt/clay (< 0.062 mm)
			Detritus
ß			Artificial (rip-rap, concrete, etc.)

11d. Xes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
  - Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
  - Beetles
  - Caddisfly larvae (T)
  - Asian clam (Corbicula)
  - Crustacean (isopod/amphipod/crayfish/shrimp)
  - Dipterans
  - Mayfly larvae (E)
  - Megaloptera (alderfly, fishfly, dobsonfly larvae)
  - Midges/mosquito larvae
  - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish
    - Salamanders/tadpoles
    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

# 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
ΜA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
□В	⊠B	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- LB RB ΠA ΠA ⊡в ⊠в □с
  - Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
  - Majority of streamside area with depressions able to pond water 3 to 6 inches deep
  - ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊠в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- ⊠C Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
- ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

# Check all that apply.

- ПΑ Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- ⊠в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- ΔD Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

# 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ⊠В Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

	to the first break.VegetatedWoodedLBRBLBRBLBRB $\boxtimes A \boxtimes A \boxtimes A \boxtimes A \boxtimes A \cong 100$ feet wide or extends to the edge of the watershed $\square B \square B \square B \square B$ From 50 to < 100 feet wide $\square C \square C \square C \square C \square C$ From 30 to < 50 feet wide $\square D \square D \square D$ $\square D \square D$ $\square E \square E \square E \square E \subseteq C$ < 10 feet wide or no trees
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).         LB       RB         A       A         Mature forest         B       B         Non-mature woody vegetation or modified vegetation structure         C       C         Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D         Maintained shrubs         E       E
21.	Buffer Stressors - streamside area metric (skip for Tidal Marsh Streams)         Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet       30-50 feet         LB       RB       LB       RB         A       A       A       A         B       B       B       B         B       B       B       B         B       B       B       B         C       C       C       C         D       D       D       D       Pasture (active livestock use)
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).         LB       RB         \[\Beta A \]       Medium to high stem density         \[\Beta B \]       Low stem density         \[\Beta C \]       No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)         Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.         LB       RB         ⊠A       ⊠A         The total length of buffer breaks is < 25 percent.         □B       □B         The total length of buffer breaks is between 25 and 50 percent.         □C       □C         The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB $\Box A$ $\Box A$ Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	<ul> <li>☑B ☑B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.</li> <li>□C □C □C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.</li> </ul>
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)         25a. □Yes □No Was conductivity measurement recorded? If No, select one of the following reasons. □No Water □Other:         25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). □A < 46 □B 46 to < 67 □C 67 to < 79 □D 79 to < 230 □E ≥ 230

Notes/Sketch:

Portion of Falling Creek below Hinson Lake and below beaver impoundment. East side of Long Drive.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706,Falling Creek Date of Assessm	ent 7/12/2018	
Stream Category	Ia4 Assessor Name/Organizat		
			-
Notes of Field Asses	ssment Form (Y/N)	YES	
	bry considerations (Y/N)	NO	
÷	formation/supplementary measurements included (Y/N)	YES	
	e (perennial, intermittent, Tidal Marsh Stream)	Perennia	<u> </u>
			·
		USACE/	NCDWR
	Function Class Rating Summary	All Streams	Intermittent
	(1) Hydrology	HIGH	
	(2) Baseflow	HIGH	
	(2) Flood Flow	HIGH	
	(3) Streamside Area Attenuation	HIGH	
	(4) Floodplain Access	HIGH	
	(4) Wooded Riparian Buffer	HIGH	
	(4) Microtopography	MEDIUM	
	(3) Stream Stability	HIGH	
	(4) Channel Stability	HIGH	
	(4) Sediment Transport	NA	
	(4) Stream Geomorphology	HIGH	
	(2) Stream/Intertidal Zone Interaction	NA	
	(2) Longitudinal Tidal Flow	NA	
	(2) Tidal Marsh Stream Stability	NA	
	(2) Tidal Marsh Channel Stability	NA	
	(3) Tidal Marsh Stream Geomorphology	NA	
	(1) Water Quality	MEDIUM	
	(1) Water addancy (2) Baseflow	HIGH	
	(2) Streamside Area Vegetation	HIGH	
	(3) Upland Pollutant Filtration	HIGH	
	(3) Thermoregulation	MEDIUM	
		NO	
	(2) Indicators of Stressors		
	(2) Aquatic Life Tolerance		
	(2) Intertidal Zone Filtration	NA	
	(1) Habitat	HIGH	
	(2) In-stream Habitat	HIGH	
	(3) Baseflow	HIGH	
	(3) Substrate	NA	
	(3) Stream Stability	HIGH	
	(3) In-stream Habitat	MEDIUM	
	(2) Stream-side Habitat	HIGH	
	(3) Stream-side Habitat	HIGH	
	(3) Thermoregulation	MEDIUM	
	(2) Tidal Marsh In-stream Habitat	NA	
	(3) Flow Restriction	NA	
	(3) Tidal Marsh Stream Stability	NA	
	(4) Tidal Marsh Channel Stability	NA	
	(4) Tidal Marsh Stream Geomorphology	NA	
	(3) Tidal Marsh In-stream Habitat	NA	
	(2) Intertidal Zone	NA	
	Overall	HIGH	

Accompanies User Manual Version 2.1				
USACE AID #:	NCDWR #:			
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,				
	stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and			
	ached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions			
	d information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the			
	imples of additional measurements that may be relevant.			
NOTE EVIDENCE OF STRES	SSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).			
PROJECT/SITE INFORMATI				
1. Project name (if any):	U-5706 Falling Creek west 2. Date of evaluation: 7/12/2018			
3. Applicant/owner name:	NCDOT         4. Assessor name/organization:         A.Keith/Axiom			
5. County:	Rockingham 6. Nearest named water body			
7. River basin:	Yadkin-PeeDee     on USGS 7.5-minute quad:     Falling Creek			
8. Site coordinates (decimal d	legrees, at lower end of assessment reach): 34.938082 -79.753796			
	lepth and width can be approximations)			
9. Site number (show on attac				
	in riffle, if present) to top of bank (feet): 2-5 Unable to assess channel depth.			
12. Channel width at top of ba				
• •	al flow Intermittent flow Tidal Marsh Stream			
STREAM CATEGORY INFOR				
15. NC SAM Zone:	🗌 Mountains (M) 🛛 Piedmont (P) 🛛 Inner Coastal Plain (I) 🗌 Outer Coastal Plain (O)			
16. Estimated geomorphic				
valley shape (skip for				
Tidal Marsh Stream):	(more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)			
17. Watershed size: (skip	☐Size 1 (< 0.1 mi <sup>2</sup> ) ☐Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) ☐Size 3 (0.5 to < 5 mi <sup>2</sup> ) ⊠Size 4 (≥ 5 mi <sup>2</sup> )			
for Tidal Marsh Stream)				
ADDITIONAL INFORMATION	٧:			
18. Were regulatory considera	ations evaluated? $\square$ Yes $\square$ No If Yes, check all that apply to the assessment area.			
Section 10 water	Classified Trout Waters Water Supply Watershed (			
Essential Fish Habitat				
Publicly owned property  NCDWR Riparian buffer rule in effect  Nutrient Sensitive Waters				
Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)				
Documented presence of a federal and/or state listed protected species within the assessment area.				
List species:				
Designated Critical Habitat (list species)				
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? XYes No				
1. Channel Water – assessi	ment reach metric (skip for Size 1 streams and Tidal Marsh Streams)			

- B No flow, water in pools only.
- $\square C$  No water in assessment reach.

#### 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- B Not A

# 3. Feature Pattern – assessment reach metric

- A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). Not A
- 4. Feature Longitudinal Profile assessment reach metric
  - A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
  - B Not A

## 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- A < 10% of channel unstable
- B 10 to 25% of channel unstable
- C > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left I
LB	RB	
ΠA	ΠA	Little
⊠в	⊠в	Moc

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors – assessment reach/intertidal zone metric

#### Check all that apply.

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

# 8. Recent Weather - watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. XYes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
   B Multiple sticks and/or leaf packs and/or emergent vegetation
   C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]J J K
--	--------------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. TYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand ( $.062 - 2$ mm) Silt/clay (< 0.062 mm) Detritus
		Detritus Artificial (rip-rap, concrete, etc.)

11d. Tyes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
    - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)
    - Dipterans
    - Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish
    - Salamanders/tadpoles
    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

# 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

- Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB
  - ΠA ΠA Little or no alteration to water storage capacity over a majority of the streamside area Πв ⊠в Moderate alteration to water storage capacity over a majority of the streamside area ⊠C □C Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA ⊡в ⊠в □с

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊠в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- ⊠C Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
- ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ПΑ
- ⊠в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

# 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

	o the first break.
	egetatedWoodedBRBLBRB $\[A\]A\]A\]A\]A\]A\]A\]A\]A\]A\]A\]A\]A\]A$
20.	uffer Structure – streamside area metric (skip for Tidal Marsh Streams) consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	B       RB         A       A Mature forest         B       B         B       B         Non-mature woody vegetation or modified vegetation structure         C       A         Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D         Maintained shrubs         E       E         Little or no vegetation
21.	suffer Stressors – streamside area metric (skip for Tidal Marsh Streams)         check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is         ithin 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         none of the following stressors occurs on either bank, check here and skip to Metric 22:         buts       < 30 feet
	B       RB       LB       RB         ]A       [A       [A       [A       [A         ]B       [B       [B       [B       [B       [B         ]C       [C       [C       [C       [C       Pasture (no livestock)/commercial horticulture         ]D       [D       [D       [D       Pasture (active livestock use)
22.	tem Density – streamside area metric (skip for Tidal Marsh Streams) consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	B RB ③A □A Medium to high stem density ]B ⊠B Low stem density ]C □C No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.	continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams) consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	B RB $\square$ A The total length of buffer breaks is < 25 percent. $\square$ B $\square$ B The total length of buffer breaks is between 25 and 50 percent. $\square$ C $\square$ C The total length of buffer breaks is > 50 percent.
24.	egetative Composition – streamside area metric (skip for Tidal Marsh Streams) valuate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to ssessment reach habitat. B RB
	A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or
	Communities missing understory but retaining canopy trees. C S Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	conductivity – assessment reach metric (skip for all Coastal Plain streams) 5a.       Yes      ⊠No      Was conductivity measurement recorded?
	If No, select one of the following reasons.  No Water  Other:
	5b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46$ $\square B = 46$ to < 67 $\square C = 67$ to < 79 $\square D = 79$ to < 230 $\square E \ge 230$

Notes/Sketch:

Portion of Falling Creek below Hinson Lake and below beaver impoundment. West side of Long Drive. This section of Falling Creek has development on left and right bank.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706,Falling Creek-west	Date of Assessmer	nt 7/12/2018	
Stream Category	la4	Assessor Name/Organization	n A.Keith/Ax	kiom
Notes of Field Asses	ssment Form (Y/N)		YES	
Presence of regulate	ory considerations (Y/N)		NO	
Additional stream in	formation/supplementary measu	rements included (Y/N)	YES	
NC SAM feature typ	Marsh Stream)	Perennia	Perennial	
			USACE/	NCDWR
	Function Class Rating Summ	nary	All Streams	Intermittent
	(1) Hydrology		LOW	
	(2) Baseflow	—	HIGH	
	(2) Flood Flow	—	LOW	
	(0) 0:	A.uu:		

(2) Baseflow	HIGH	
(2) Flood Flow	LOW	
(3) Streamside Area Attenuation	LOW	
(4) Floodplain Access	MEDIUM	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	MEDIUM	
(4) Channel Stability	MEDIUM	
(4) Sediment Transport	NA	
(4) Stream Geomorphology	MEDIUM	
(2) Stream/Intertidal Zone Interaction	NA	
(2) Longitudinal Tidal Flow	NA	
(2) Tidal Marsh Stream Stability	NA	
(3) Tidal Marsh Channel Stability	NA	
(3) Tidal Marsh Stream Geomorphology	NA	
(1) Water Quality	MEDIUM	
(2) Baseflow	HIGH	
(2) Streamside Area Vegetation	HIGH	
(3) Upland Pollutant Filtration	HIGH	
(3) Thermoregulation	LOW	
(2) Indicators of Stressors	YES	
(2) Aquatic Life Tolerance	LOW	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	LOW	
(2) In-stream Habitat	MEDIUM	
(3) Baseflow	HIGH	
(3) Substrate	NA	
(3) Stream Stability	MEDIUM	
(3) In-stream Habitat	MEDIUM	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	LOW	
(2) Tidal Marsh In-stream Habitat	NA	
(3) Flow Restriction	NA	
(3) Tidal Marsh Stream Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone	NA	
Overall	LOW	

Accompanies User Manual Version 2.1

USACE AID #:	NCDWR #:
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photogr	
and circle the location of the stream reach under evaluation. If multiple	
number all reaches on the attached map, and include a separate form for	
and explanations of requested information. Record in the "Notes/Skete	
NC SAM User Manual for examples of additional measurements that m	
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMEN	Γ AREA (do not need to be within the assessment area).
PROJECT/SITE INFORMATION: 1. Project name (if any): U-5706, Stream SA	2. Date of evaluation: 7/12/2018
3. Applicant/owner name: NCDOT	4. Assessor name/organization: A.Keith/Axiom
5. County: Rockingham	6. Nearest named water body
7. River basin: Yadkin-PeeDee	on USGS 7.5-minute quad: Falling Creek
8. Site coordinates (decimal degrees, at lower end of assessment react	Ŭ
STREAM INFORMATION: (depth and width can be approximations	
	Length of assessment reach evaluated (feet): 100
11. Channel depth from bed (in riffle, if present) to top of bank (feet):	1-2 Unable to assess channel depth.
	assessment reach a swamp steam? □Yes ⊠No
14. Feature type: Perennial flow Intermittent flow Tidal Marsh	
STREAM CATEGORY INFORMATION:	
15. NC SAM Zone:	P) 🛛 Inner Coastal Plain (I) 🗌 Outer Coastal Plain (O)
16. Estimated geomorphic	
valley shape (skip for	
Tidal Marsh Stream): (more sinuous stream, flatter valley sl	ope) (less sinuous stream, steeper valley slope)
17. Watershed size: (skip $\Box$ Size 1 (< 0.1 mi <sup>2</sup> ) $\Box$ Size 2 (0.1	to < 0.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 (≥ 5 mi <sup>2</sup> )
for Tidal Marsh Stream)	
ADDITIONAL INFORMATION:	
18. Were regulatory considerations evaluated? ⊠Yes □No If Yes, c	heck all that apply to the assessment area.
Section 10 water Classified Trout Waters	□Water Supply Watershed (□I □II □III □IV □V)
Essential Fish Habitat Primary Nursery Area	High Quality Waters/Outstanding Resource Waters
Publicly owned property  NCDWR Riparian buffer rule	
Anadromous fish 303(d) List	CAMA Area of Environmental Concern (AEC)
Documented presence of a federal and/or state listed protected s	species within the assessment area.
List species: Designated Critical Habitat (list species)	
19. Are additional stream information/supplementary measurements inc	cluded in "Notes/Sketch" section or attached? XYes
Lis. Are auditional stream information/supplementary measurements inc	
1. Channel Water – assessment reach metric (skip for Size 1 strea	ams and Tidal Marsh Streams)
A Water throughout assessment reach.	· · · · · · · · · · · · · · · · · · ·
B No flow, water in pools only.	
C No water in assessment reach.	
2. Evidence of Flow Restriction – assessment reach metric	
	fle-pool sequence is severely affected by a flow restriction or fill to the
	macrophytes or ponded water or impoundment on flood or ebb within
the assessment reach (examples: undersized or perched	culverts, causeways that constrict the channel, tidal gates, debris jams,
beaver dams).	
⊠B Not A	
3. Feature Pattern – assessment reach metric	
	camples: straightening, modification above or below culvert).
⊠B Not A	
4. Feature Longitudinal Profile – assessment reach metric	
	tream profile (examples: channel down-cutting, existing damming, over
	where appropriate channel profile has not reformed from any of these
disturbances).	
⊠B Not A	
5. Signs of Active Instability – assessment reach metric	
Consider only current instability, not past events from which	the stream has currently recovered. Examples of instability include
active bank failure, active channel down-cutting (head-cut), active w	
$\square A$ < 10% of channel unstable	
B 10 to 25% of channel unstable	

 $\Box C$  > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Bank (L
LB	RB	
ΜA	$\boxtimes A$	Little or no e
□в	□в	Moderate ev

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
  - Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

# 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   □B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	□F □G □H □J □K
--	----------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

	,		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus
$\boxtimes$			

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- ⊠No Was an in-stream aquatic life assessment performed as described in the User Manual? 12a. 🗌 Yes If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

	Adult frogs
	Aquatic reptiles
	Aquatic macrophyte
	Beetles
Π	Caddisfly larvae (T)
Π	Asian clam (Corbic
Ē	Crustacean (isopod
Ē	Damselfly and drag
Ē	Dipterans
Π	Mayfly larvae (E)
Ē	Megaloptera (alderf
Ē	Midges/mosquito la
Ē	Mosquito fish (Gam
H	Mussels/Clams (not
H	Other fish
H	Salamanders/tadpo

- Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/cravfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans
- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
- Other fish Salamanders/tadpoles
- Stonefly larvae (P)
- Tipulid larvae
- Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

1

LB	RB	
ΜA	$\boxtimes A$	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB		RB
ΠA		
□в		ΠE
⊠C		$\boxtimes C$

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- D Evidence of bank seepage or sweating (iron in water indicates seepage)
- ΞE Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ⊠F None of the above

# 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ⊠Α Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	<b>b the first break.</b> egetated       Wooded         B       RB       LB       RB $A \square A \square A \square A \square A$ ≥ 100 feet wide <u>or</u> extends to the edge of the watershed $B \square B \square B \square B$ From 50 to < 100 feet wide $C \square C \square C \square C$ From 30 to < 50 feet wide $D \square D \square D$ From 10 to < 30 feet wide $E \square E \square E \square E < 10$ feet wide <u>or</u> no trees	
20.	uffer Structure – streamside area metric (skip for Tidal Marsh Streams) onsider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).	
	B       RB         A       A         B       B         B       B         B       B         B       B         B       B         B       B         Non-mature woody vegetation or modified vegetation structure         C       C         Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D         Maintained shrubs         E       Little or no vegetation	
21.	uffer Stressors – streamside area metric (skip for Tidal Marsh Streams) heck all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but it is 20 feet of stream (2.20 feet), or is between 20 to 50 feet of stream (20 50 feet).	t is
	ithin 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet). none of the following stressors occurs on either bank, check here and skip to Metric 22:	
	buts < 30 feet 30-50 feet B RB LB RB LB RB	
	]A □A □A □A □A Row crops ]B □B □B □B □B Maintained turf ]C □C □C □C □C □C Besture (as livesteels) (commencial herticulture	
	]C       [C       [C       Pasture (no livestock)/commercial horticulture         ]D       [D       [D       [D       [D         ]D       [D       [D       [D       Pasture (active livestock use)	
22.	tem Density – streamside area metric (skip for Tidal Marsh Streams) onsider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).	
	$\mathbb{R}$ RB $\mathbb{A}$ $\mathbb{A}$ Medium to high stem density	
	]B ☐B Low stem density ]C ☐C No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground	
23.	ontinuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)	
	onsider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide. B RB	
	$A \square A$ The total length of buffer breaks is < 25 percent. B $\square B$ The total length of buffer breaks is between 25 and 50 percent.	
~ .	$]C$ $\Box C$ The total length of buffer breaks is > 50 percent.	
24.	egetative Composition – streamside area metric (skip for Tidal Marsh Streams) valuate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes ssessment reach habitat.	s to
	B RB A ⊠A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native specie	~~
	with non-native invasive species absent or sparse. B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of nati	
	species. This may include communities of weedy native species that develop after clear-cutting or clearing communities with non-native invasive species present, but not dominant, over a large portion of the expected strata	or
	communities missing understory but retaining canopy trees. ]C □C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communit	ies
	with non-native invasive species dominant over a large portion of expected strata or communities composed of plant stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.	
25.	onductivity – assessment reach metric (skip for all Coastal Plain streams) 5a.       Yes      ⊠No     Was conductivity measurement recorded?	
	If No, select one of the following reasons. No Water Other:	
	5b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A$ < 46 $\square B$ 46 to < 67 $\square C$ 67 to < 79 $\square D$ 79 to < 230 $\square E$ ≥ 230	

Notes/Sketch:

Intermittent channel within forested crenulation draining to Falling Creek. Shallow channel with inconsistant bed and bank. Ordinary high water mark present.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706, Stream SA	Date of Assessment	7/12/2018	
Stream Category	la2 As	ssessor Name/Organization	A.Keith/Ax	iom
		-		
Notes of Field Asses	sment Form (Y/N)		YES	
Presence of regulate	ory considerations (Y/N)		NO	
Additional stream inf	ormation/supplementary measurem	ents included (Y/N)	YES	
NC SAM feature typ	e (perennial, intermittent, Tidal Mars	sh Stream)	Perennial	
			USACE/	NCDWR
	Function Class Rating Summary	y A	Il Streams	Intermittent
	(1) Hydrology		LOW	
	(2) Baseflow		LOW	
	(2) Flood Flow		LOW	
	(3) Streamside Area	Attenuation	LOW	
	(4) Floodplain A	Access	LOW	
	(4) Wooded Ri	parian Buffer	LOW	
	(4) Microtopogi	raphy	LOW	
	(3) Stream Stability		LOW	
	(4) Channel Sta	ability	LOW	
	(4) Sediment T	-	HIGH	
	(4) Stream Geo		LOW	
	(2) Stream/Intertidal Z	· · · ·	NA	NA
	(2) Longitudinal Tidal F		NA	NA
	(2) Tidal Marsh Stream		NA	NA
		Channel Stability	NA	NA
		Stream Geomorphology	NA	NA
	(1) Water Quality	Stream Geomorphology	LOW	
	(2) Baseflow		LOW	
	(2) Streamside Area Vegeta		MEDIUM	
	(3) Upland Pollutant F			
	(3) Thermoregulation		MEDIUM	
	(2) Indicators of Stressors		YES	
	(2) Aquatic Life Tolerance		LOW	<u> </u>
	(2) Intertidal Zone Filtration		NA	NA
	(1) Habitat		LOW	
	(2) In-stream Habitat		LOW	
	(3) Baseflow		LOW	
	(3) Substrate		HIGH	
	(3) Stream Stability		LOW	
	(3) In-stream Habitat		LOW	
	(2) Stream-side Habitat		LOW	
	(3) Stream-side Habit	at	LOW	
	(3) Thermoregulation		LOW	
	(2) Tidal Marsh In-stream Hal	bitat	NA	NA
	(3) Flow Restriction		NA	NA
	(3) Tidal Marsh Stream	n Stability	NA	NA
	(4) Tidal Marsh	Channel Stability	NA	NA
	(4) Tidal Marsh	Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-strea		NA	NA
	(2) Intertidal Zone		NA	NA
	Overall		LOW	

Accompanies User Manual Version 2.1

USACE AID #:	NCDWR #:					
	-					
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and						
	rate form for each reach. See the NC SAM User Manual for detailed descriptions					
	lotes/Sketch" section if supplementary measurements were performed. See the					
NC SAM User Manual for examples of additional measureme						
	ESSMENT AREA (do not need to be within the assessment area).					
PROJECT/SITE INFORMATION:						
1. Project name (if any): U-5706, Stream SB	2. Date of evaluation: 7/12/2018					
3. Applicant/owner name: NCDOT	4. Assessor name/organization: A.Keith/Axiom					
5. County: Rockingham	6. Nearest named water body					
7. River basin: Yadkin-PeeDee	on USGS 7.5-minute quad: Falling Creek					
8. Site coordinates (decimal degrees, at lower end of assess						
STREAM INFORMATION: (depth and width can be approx						
9. Site number (show on attached map): Stream SB	10. Length of assessment reach evaluated (feet): 100					
11. Channel depth from bed (in riffle, if present) to top of ban						
12. Channel width at top of bank (feet): 2-4	13. Is assessment reach a swamp steam? □Yes ⊠No					
14. Feature type: □Perennial flow □Ti	dal Marsh Stream					
STREAM CATEGORY INFORMATION: 15. NC SAM Zone:	Nedmant (D) M Inner Capatel Plain (I) Outer Capatel Plain (O)					
15. NC SAM Zone:	Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)					
16. Estimated geomorphic						
valley snape (skip for						
Tidal Marsh Stream): (more sinuous stream, flatte						
	Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 (≥ 5 mi <sup>2</sup> )					
for Tidal Marsh Stream)						
ADDITIONAL INFORMATION: 18. Were regulatory considerations evaluated?	. If Vas, check all that apply to the assessment area					
Section 10 water						
Essential Fish Habitat						
Publicly owned property  NCDWR Riparian						
Anadromous fish	CAMA Area of Environmental Concern (AEC)					
Documented presence of a federal and/or state listed p						
List species:						
Designated Critical Habitat (list species)						
19. Are additional stream information/supplementary measure	ements included in "Notes/Sketch" section or attached? Yes No					
1. Channel Water – assessment reach metric (skip for Si	ize 1 streams and Tidal Marsh Streams)					
A Water throughout assessment reach. B No flow, water in pools only.						
<ul> <li>□B No flow, water in pools only.</li> <li>□C No water in assessment reach.</li> </ul>						
2. Evidence of Flow Restriction – assessment reach met						
At least 10% of assessment reach in-stream ha	abitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the					
	vith aquatic macrophytes or ponded water or impoundment on flood or ebb within or perched culverts, causeways that constrict the channel, tidal gates, debris jams,					
beaver dams).	" perched curvents, causeways that construct the charmer, tidal gates, debits jams,					
B Not A						
	nattorn (overmales: straightening, modification above or below autwort)					
$\square$ B Not A	pattern (examples: straightening, modification above or below culvert).					
4. Feature Longitudinal Profile – assessment reach metr						
	y altered stream profile (examples: channel down-cutting, existing damming, over					
widening, active aggradation, dredging, and ex disturbances).	ccavation where appropriate channel profile has not reformed from any of these					
$\square$ B Not A						
5. Signs of Active Instability – assessment reach metric						
	m which the stream has currently recovered. Examples of instability include t), active widening, and artificial hardening (such as concrete, gabion, rip-rap).					
$\square$ A < 10% of channel unstable	$J_{J}$ , active widening, and armotal nardening (such as concrete, gabion, np-rdp).					
$\square$ B 10 to 25% of channel unstable						

 $\Box C$  > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Bank (L
LB	RB	
ΜA	$\boxtimes A$	Little or no e
□в	□в	Moderate ev

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
  - Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

# 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   □B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	□F □G □H □J □K
--	----------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

	,		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus
$\boxtimes$			

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- ⊠No Was an in-stream aquatic life assessment performed as described in the User Manual? 12a. 🗌 Yes If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

	Adult frogs
	Aquatic reptiles
	Aquatic macrophyte
	Beetles
Π	Caddisfly larvae (T)
Π	Asian clam (Corbic
Ē	Crustacean (isopod
Ē	Damselfly and drag
Ē	Dipterans
Π	Mayfly larvae (E)
Ē	Megaloptera (alderf
Ē	Midges/mosquito la
Ē	Mosquito fish (Gam
H	Mussels/Clams (not
H	Other fish
H	Salamanders/tadpo

- Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/cravfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans
- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
- Other fish Salamanders/tadpoles
- Stonefly larvae (P)
- Tipulid larvae
- Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

1

LB	RB	
ΜA	$\boxtimes A$	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB		RB
ΠA		
□в		ΠE
⊠C		$\boxtimes C$

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- D Evidence of bank seepage or sweating (iron in water indicates seepage)
- ΞE Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- ⊡в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ⊠F None of the above

# 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ⊠Α Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
---	------------

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break. Vegetated Wooded LB RB LB RB $\square A \square A \square A \supseteq 100$ feet wide <u>or</u> extends to the edge of the watershed $\square B \square B \square B \square B From 50$ to < 100 feet wide $\square C \square C \square C \square C \square C From 30$ to < 50 feet wide $\square D \square D \square D \square D From 10$ to < 30 feet wide $\square E \square E \square E \square E \square E < 10$ feet wide <u>or</u> no trees
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)
	Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	Image: A mature forest         Image: B mature woody vegetation or modified vegetation structure
	C       C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D       Maintained shrubs
	E E Little or no vegetation
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams) Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is
	within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
	If none of the following stressors occurs on either bank, check here and skip to Metric 22: Abuts < 30 feet 30-50 feet 30-50 feet
	LB RB LB RB LB RB
	B       B       B       B       B       B       Maintained turf         C       C       C       C       C       C       Pasture (no livestock)/commercial horticulture
	D D D D D D Pasture (active livestock use)
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB
	Image: Matrix A Medium to high stem density       Image: B B Low stem density
~~	C C No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams) Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	LB RB ⊠A ⊠A The total length of buffer breaks is < 25 percent.
	B       B       The total length of buffer breaks is between 25 and 50 percent.         C       C       The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
	Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.
	LB RB
	A       A       Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or
	communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	C C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted
	stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams) 25a.  Yes  No Was conductivity measurement recorded?
	If No, select one of the following reasons. No Water Other:
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46 \qquad \square B  46 \text{ to} < 67 \qquad \square C  67 \text{ to} < 79 \qquad \square D  79 \text{ to} < 230 \qquad \square E \geq 230$

Notes/Sketch:

Channelized feature forming below drainage patterns. Origin at headcut where bed and bank become more naturalized and ordinary high water mark present.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stroom Cotogon	U-5706, Stream SB Date of Assessm		
Stream Category	la2 Assessor Name/Organizat	ion A.Keith/A	dom
lates of Field Asses		VEO	
Notes of Field Asses		YES NO	
-	ry considerations (Y/N) prmation/supplementary measurements included (Y/N)	YES	
	(inv) (perennial, intermittent, Tidal Marsh Stream)	Intermitter	
C SAM leature type			<u>n</u>
		USACE/	NCDWR
	Function Class Rating Summary	All Streams	Intermittent
-	(1) Hydrology	MEDIUM	MEDIUM
	(2) Baseflow	HIGH	HIGH
	(2) Flood Flow	MEDIUM	MEDIUM
	(3) Streamside Area Attenuation	HIGH	HIGH
	(4) Floodplain Access	HIGH	HIGH
	(4) Wooded Riparian Buffer	HIGH	HIGH
	(4) Microtopography	LOW	LOW
		LOW	LOW
	(3) Stream Stability		
	(4) Channel Stability	HIGH	HIGH
	(4) Sediment Transport	LOW	LOW
	(4) Stream Geomorphology	LOW	LOW
	(2) Stream/Intertidal Zone Interaction	NA	NA
	(2) Longitudinal Tidal Flow	NA	NA
	(2) Tidal Marsh Stream Stability	NA	NA
	(3) Tidal Marsh Channel Stability	NA	NA
-	(3) Tidal Marsh Stream Geomorphology	NA	NA
	(1) Water Quality	HIGH	HIGH
	(2) Baseflow	HIGH	HIGH
	(2) Streamside Area Vegetation	HIGH	HIGH
	(3) Upland Pollutant Filtration	HIGH	HIGH
	(3) Thermoregulation	HIGH	HIGH
	(2) Indicators of Stressors	NO	NO
	(2) Aquatic Life Tolerance	OMITTED	NA
	(2) Intertidal Zone Filtration	NA	NA
-	(1) Habitat	LOW	LOW
	(2) In-stream Habitat	LOW	LOW
	(3) Baseflow	HIGH	HIGH
	(3) Substrate	MEDIUM	MEDIUM
	(3) Stream Stability	MEDIUM	MEDIUM
	(3) In-stream Habitat	LOW	LOW
	(2) Stream-side Habitat	HIGH	HIGH
	(3) Stream-side Habitat	HIGH	HIGH
	(3) Thermoregulation	HIGH	HIGH
	(2) Tidal Marsh In-stream Habitat		
		NA	NA
	(3) Flow Restriction	NA	NA
	(3) Tidal Marsh Stream Stability	NA	NA
	(4) Tidal Marsh Channel Stability	NA	NA
	(4) Tidal Marsh Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-stream Habitat	NA	NA
-	(2) Intertidal Zone	NA	NA
	Overall	MEDIUM	MEDIUM

Accompanies User Manual Version 2.1

USACE AID #: NCDWR #: INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,						
and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and						
number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descrip						
and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See						
NC SAM User Manual for examples of additional measurements that may be relevant.						
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).						
PROJECT/SITE INFORMATION:						
1. Project name (if any):       U-5706, Stream SC       2. Date of evaluation:       7/12/2018						
3. Applicant/owner name:         NCDOT         4. Assessor name/organization:         A.Keith/Axiom						
5. County: Rockingham 6. Nearest named water body						
7. River basin: Yadkin-PeeDee on USGS 7.5-minute quad: Hinson Lake						
8. Site coordinates (decimal degrees, at lower end of assessment reach): 34.951631, -79.732338						
STREAM INFORMATION: (depth and width can be approximations)9. Site number (show on attached map):Stream SC10. Length of assessment reach evaluated (feet):100						
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 1-3						
12. Channel width at top of bank (feet): $2-4$ 13. Is assessment reach a swamp steam? $\Box$ Yes $\boxtimes$ No	•					
14. Feature type: □Perennial flow ⊠Intermittent flow □Tidal Marsh Stream						
STREAM CATEGORY INFORMATION:						
15. NC SAM Zone: Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)						
16. Estimated geomorphic						
valley shape (skip for — — — —						
Tidal Marsh Stream):       (more sinuous stream, flatter valley slope)       (less sinuous stream, steeper valley slope)						
17. Watershed size: (skip $\square$ Size 1 (< 0.1 mi <sup>2</sup> ) $\square$ Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) $\square$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\square$ Size 4 (≥ 5 mi <sup>2</sup> )						
for Tidal Marsh Stream) ADDITIONAL INFORMATION:						
18. Were regulatory considerations evaluated? Xes No If Yes, check all that apply to the assessment area.						
Section 10 water Classified Trout Waters Waters Water Supply Watershed (	$ \rangle\rangle$					
Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters	,					
Publicly owned property INCDWR Riparian buffer rule in effect INutrient Sensitive Waters	,					
Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)						
Documented presence of a federal and/or state listed protected species within the assessment area.						
List species:						
Designated Critical Habitat (list species)						
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? Xes No						
1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)						
A Water throughout assessment reach.						
B No flow, water in pools only.						
C No water in assessment reach.						
2. Evidence of Flow Restriction – assessment reach metric						
At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill						
point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris						
beaver dams).	jams,					
B Not A						
3. Feature Pattern – assessment reach metric						
A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).						
B Not A						
4. Feature Longitudinal Profile – assessment reach metric						
A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming	, over					
widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of	these					
disturbances).						
⊠B Not A						
5. Signs of Active Instability – assessment reach metric						
Consider only current instability, not past events from which the stream has currently recovered. Examples of instability in						
active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap	<i>)</i> .					
$\square$ B 10 to 25% of channel unstable						

C > 25% of channel unstable

#### Streamside Area Interaction - streamside area metric 6. Consider for the Left Bank (LB) and the Right Bank (RB).

LB RB

- ΠА Little or no evidence of conditions that adversely affect reference interaction
  - ⊠в Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
  - ПС Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### Water Quality Stressors - assessment reach/intertidal zone metric 7.

## Check all that apply.

ΠA ⊠в

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- Excessive sedimentation (burying of stream features or intertidal zone) ПВ
- Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- Odor (not including natural sulfide odors) DD
- Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" ΠE section.
- ΠF Livestock with access to stream or intertidal zone
- ΠG Excessive algae in stream or intertidal zone
- Πн Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- $\boxtimes$ I Other: (explain in "Notes/Sketch" section)
- ΠJ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- □в Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠c No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. 🗌 Yes ⊠No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- Multiple aquatic macrophytes and aquatic mosses ΠA
- (include liverworts, lichens, and algal mats) ⊠Β Multiple sticks and/or leaf packs and/or emergent vegetation
- ПС Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter

no habitat

Check for Tidal Marsh Streams Only	
--	--

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - ⊠Α Riffle-run section (evaluate 11c)
  - Pool-glide section (evaluate 11d) □в
  - ⊡с Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but  $\leq$  10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach. ND р C ۸

			Bedrock/saprolite Boulder ( $256 - 4096 \text{ mm}$ ) Cobble ( $64 - 256 \text{ mm}$ ) Gravel ( $2 - 64 \text{ mm}$ ) Sand ( $.062 - 2 \text{ mm}$ ) Silt/clay (< $0.062 \text{ mm}$ ) Detritus
$\boxtimes$			Artificial (rip-rap, concrete, etc.)

11d. 
Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

⊠Adul	lt frogs	

- Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/crayfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans
- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
  - Other fish Salamanders/tadpoles
  - Snails
  - Stonefly larvae (P)
  - Tipulid larvae
  - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

1

LB	RB	
ΜA	ΜA	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB		RB
ΠA		
□в		ΠE
⊠C		$\boxtimes C$

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΔD Evidence of bank seepage or sweating (iron in water indicates seepage)
- ⊠Ε Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- Пв Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

#### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ⊠Α Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19.	Buffer Width -	<ul> <li>streamside area</li> </ul>	metric (ski	p for Tida	I Marsh Stre	eams)
-----	----------------	-------------------------------------	-------------	------------	--------------	-------

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break. Vegetated Wooded LB RB LB RB $\square A \square A \square A \square A \supseteq 100$ feet wide <u>or</u> extends to the edge of the watershed $\square B \square B \square B \square B From 50 to < 100$ feet wide $\square C \square C \square C \square C From 30 to < 50$ feet wide $\square D \square D \square D \square D From 10 to < 30$ feet wide $\square E \square E \square E \square E \square E < 10$ feet wide <u>or</u> no trees
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).         LB       RB         ⊠A       ⊠A         Mature forest
	C       C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D       Maintained shrubs         E       E       Little or no vegetation
21.	Buffer Stressors - streamside area metric (skip for Tidal Marsh Streams)         Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet         B       B         B       B         B       B         B       B         B       B         B       B         C       C         C       C         D       D         D       D         D       D
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).         LB       RB         \[\Beta A \]       Medium to high stem density         \[\Beta B \]       Low stem density         \[\Beta C \]       No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)         Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.         LB       RB         ⊠A       ⊠A         The total length of buffer breaks is < 25 percent.         B       B         The total length of buffer breaks is between 25 and 50 percent.         C       C         The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB         □A       ⊠A         WB       □B         Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.         WB       □B         Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or
	<ul> <li>communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.</li> <li>□C □C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.</li> </ul>
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)         25a. □Yes ⊠No Was conductivity measurement recorded?         If No, select one of the following reasons. □No Water □Other:
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46$ $\square B$ 46 to < 67 $\square C$ 67 to < 79 $\square D$ 79 to < 230 $\square E \ge 230$

Notes/Sketch:

Stream receiving accelerated runoff from US Hwy 1 and Mt. Olive Church Road.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706, Stream SC	Date of Assessment	7/12/2018	
Stream Category	la1	Assessor Name/Organization	A.Keith/Ax	iom
Notes of Field Asses	ssment Form (Y/N)		YES	
Presence of regulate	ory considerations (Y/N)		NO	
	formation/supplementary measu		YES	
NC SAM feature typ	e (perennial, intermittent, Tidal M	Marsh Stream)	Intermitten	it
			USACE/	NCDWR
	Function Class Rating Summ	nary A	II Streams	Intermittent
	(1) Hydrology		HIGH	HIGH
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Flood Flow		HIGH	HIGH
	(3) Streamside Ar	ea Attenuation	HIGH	HIGH
	(4) Floodpla	ain Access	MEDIUM	MEDIUM
	(4) Wooded	l Riparian Buffer	HIGH	HIGH
	(4) Microtor	ography	HIGH	HIGH
	(3) Stream Stabili		MEDIUM	MEDIUM
	(4) Channe	·	HIGH	HIGH
		nt Transport	LOW	LOW
		· · · · · · · · · · · · · · · · · · ·	MEDIUM	MEDIUM
		dal Zone Interaction	NA	NA
	(2) Longitudinal Tic		NA	NA
	(2) Eongraduinal Fic		NA	NA
		rsh Channel Stability		
		· · · · · · · · · · · · · · · · · · ·	NA	NA
		rsh Stream Geomorphology	NA	NA
	(1) Water Quality		MEDIUM	MEDIUM
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Streamside Area Ve		HIGH	HIGH
	(3) Upland Polluta		HIGH	HIGH
	(3) Thermoregula		HIGH	HIGH
	(2) Indicators of Stresso		NO	NO
	(2) Aquatic Life Tolerand	ce	MEDIUM	NA
	(2) Intertidal Zone Filtration	on	NA	NA
	(1) Habitat		HIGH	HIGH
	(2) In-stream Habitat		MEDIUM	HIGH
	(3) Baseflow		MEDIUM	MEDIUM
	(3) Substrate		HIGH	HIGH
	(3) Stream Stabili		HIGH	HIGH
	(3) In-stream Hab		LOW	HIGH
	(2) Stream-side Habitat		HIGH	HIGH
	(3) Stream-side H	abitat	HIGH	HIGH
	(3) Thermoregula		HIGH	HIGH
	(2) Tidal Marsh In-stream		NA	NA
	(3) Flow Restriction		NA	NA
			NA	NA
	(3) Tidal Marsh Str (4) Tidal Ma	eam Stability	NA	NA NA
		· · · ·		
	(4) Tidal Ma (3) Tidal Marsh In-	rsh Stream Geomorphology	NA	NA
			NA	NA
	(2) Intertidal Zone		NA	NA
	Overall		HIGH	HIGH

Accompanies User Manual Version 2.1

USACE AID #:		NCDWR #:			
	<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,				
		tiple stream reaches will be evaluated			
		m for each reach. See the NC SAM L			
and explanations of requested inf	ormation. Record in the "Notes/S	ketch" section if supplementary meas	urements were performed. See the		
NC SAM User Manual for exampl	les of additional measurements tha	t may be relevant.			
NOTE EVIDENCE OF STRESSO	RS AFFECTING THE ASSESSMI	ENT AREA (do not need to be withi	n the assessment area).		
PROJECT/SITE INFORMATION:					
	-5706, Stream SD	2. Date of evaluation: 7/12/20			
	CDOT	4. Assessor name/organization:	A.Keith/Axiom		
	ockingham	6. Nearest named water body			
	adkin-PeeDee	on USGS 7.5-minute quad:	Hinson Lake		
	ees, at lower end of assessment re	· · · · · · · · · · · · · · · · · · ·			
9. Site number (show on attached	h and width can be approximatic d map): Stream SD	o <b>ns)</b> I0. Length of assessment reach evalu	uated (feet): 50		
	ffle, if present) to top of bank (feet)		Jnable to assess channel depth.		
12. Channel width at top of bank (		Is assessment reach a swamp stean			
	w Intermittent flow Tidal Ma				
STREAM CATEGORY INFORMA		Siroticam			
	Mountains (M) Piedmor	it (P) 🛛 🖾 Inner Coastal Plain (I)	Outer Coastal Plain (O)		
16. Estimated geomorphic					
valley shape ( <b>skip for</b>					
Tidal Marsh Stream):	(more sinuous stream, flatter valle	y slope) (less sinuous st	ream, steeper valley slope)		
17. Watershed size: (skip	⊠Size 1 (< 0.1 mi <sup>2</sup> ) □Size 2 (0	0.1 to < 0.5 mi <sup>2</sup> ) Size 3 (0.5 to <	< 5 mi²) □Size 4 (≥ 5 mi²)		
for Tidal Marsh Stream)					
ADDITIONAL INFORMATION:					
		s, check all that apply to the assessme			
Section 10 water	Classified Trout Waters Primary Nursery Area				
Publicly owned property	NCDWR Riparian buffer r		s/Outstanding Resource Waters		
			ronmental Concern (AEC)		
		ed species within the assessment are			
List species:	· · · · · · · · · · · · · · · · · · ·				
Designated Critical Habitat	(list species)				
19. Are additional stream information	tion/supplementary measurements	included in "Notes/Sketch" section o	r attached? ⊠Yes □No		
4 Ohennel Water and an and	et ne est meetrie (ellin fen Cine 4 et	norma and Tidal Manak O(norma)			
<ol> <li>Channel Water – assessmer</li> <li>A Water throughout as</li> </ol>		reams and Tidal Marsh Streams)			
$\square$					
$\square C$ No water in assessm					
	n – assessment reach metric				
		r riffle-pool sequence is severely affe	ected by a flow restriction or fill to the		
			impoundment on flood or ebb within		
			the channel, tidal gates, debris jams,		
beaver dams).					
🖾 B Not A					
3. Feature Pattern – assessme	nt reach metric				
	essment reach has altered pattern	(examples: straightening, modificatio	n above or below culvert).		
B Not A					
4. Feature Longitudinal Profile	- assessment reach metric				
		d stream profile (examples: channel	down-cutting, existing damming, over		
widening, active age			has not reformed from any of these		
disturbances).					
⊠B Not A					
5. Signs of Active Instability –					
			ered. Examples of instability include		
active bank failure, active chai $\square A = < 10\%$ of channel un		e widening, and artificial hardening (s	uch as concrete, gabion, rip-rap).		
$\square$ B 10 to 25% of channel					
=					

C > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consi	der for the	e Left Bank (L
LB	RB	
ΜA	$\boxtimes A$	Little or no e
□в	□в	Moderate e

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
  - Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

# 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B <u>Excessive</u> sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

# 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. 
Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   ⊠B Multiple sticks and/or leaf packs and/or emergent vegetation
- C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus
$\square$	$\square$		

11d. Tyes XNo Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

⊠Adult	frogs	

- Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/crayfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans
- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
  - Other fish Salamanders/tadpoles

  - Stonefly larvae (P)
  - Tipulid larvae
  - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

1

LB	RB	
×Α	×Α	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
ПС	ПС	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
_		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB		RB
ΠA		ΠA
□в		□в
⊠C		$\boxtimes C$

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΔD Evidence of bank seepage or sweating (iron in water indicates seepage)
- ⊠Ε Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- Пв Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

# 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ⊠Α Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the fir Vegetate		oded		<b>,</b> ,,,,,,,,,,,,,,,,		g	()	
	LB RB	A ⊠A B ⊟B C ⊡C D ⊡D	RB ⊠A B B C C D D D	From 50 to < 1 From 30 to < 5 From 10 to < 3	50 feet wide 30 feet wide	e of the watershe	d		
20			E	< 10 feet wide	—	Streeme)			
20.	D. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).         LB       RB         △A       △A         Mature forest         □B       □B         □C       □C         Herbaceous vegetation with or without a strip of trees < 10 feet wide         □D       □D         □E       □E								
21.	Check al within 30	II approp feet of st of the foll < 30 b LB A B B B C C C	riate boxe ream (< 30 owing stre ) feet RB □ □ A □ □ B □ □ C	es for left bank D feet), or is betw	c (skip for Tidal Marsh (LB) and right bank (R ween 30 to 50 feet of str on either bank, check Row crops Maintained turf Pasture (no livestock)/ Pasture (active livesto	B). Indicate if lis eam (30-50 feet) here and skip to commercial horti	o Metric 22: 🛛		ts), does not abut but is
22.					kip for Tidal Marsh Str ( (RB) for Metric 19 ("V		Width)		
	LB ⊠A □B □C	RB ⊠A □B □C	Medium t Low stem	o high stem den i density			·		
23.					ide area metric (skip fo uous along stream (para			egetation > 10	feet wide.
	∐A □B □C	⊠A □B □C	The total	length of buffer	breaks is < 25 percent. breaks is between 25 a breaks is > 50 percent.	nd 50 percent.			
24.	Evaluate	the domi ent reach	nant veget		a metric (skip for Tida ) feet of each bank or to			chever comes f	first) as it contributes to
	LB 🗌 A	RB □A			disturbed in species pre		roportions. Low	ver strata comp	osed of native species,
	<ul> <li>with non-native invasive species absent or sparse.</li> <li>Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.</li> </ul>								
	□c	□c	Vegetatio with non-	n is severely dia native invasive	sturbed in terms of spe species dominant over a stic species <u>or</u> communi	cies diversity or a large portion of	expected strata	a <u>or</u> communitie	es composed of planted
25.	25a. 🗌	Yes 🛛	No Was	conductivity me	(skip for all Coastal Pla easurement recorded? ons. □No Water □Oth	-			
	25b. Ch □A			onding to the co 46 to < 67	onductivity measuremen ☐C 67 to < 79	t (units of micros □D 79 to < 2			
Note	es/Sketch	:							

Intermittent channel below steep fill from US Hwy 1 which cuts across valley. Stream receiving roadside runoff. No culvert found.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Category       Ia1       Assessor Name/Organization       Akeith/Axiom         Notes of Field Assessment Form (Y/N)       YES       NO         Presence of regulatory considerations (Y/N)       NO       YES         Additional stream information/supplementary measurements included (Y/N)       YES       Intermittent         NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)       USACE/       NCDWR         (1) Hydrology       HIGH       HIGH       HIGH         (2) Basellow       MEDIUM       MEDIUM       MEDIUM         (2) Basellow       HIGH       HIGH       HIGH         (3) Streamside Area Attenuation       HIGH       HIGH       HIGH         (4) Woodparphy       HIGH       HIGH       HIGH         (4) Koodparaphy       HIGH       HIGH       HIGH         (4) Stream Stability       HIGH       HIGH       HIGH         (4) Stream Stability       HIGH       HIGH       HIGH         (4) Stream Stability       HIGH       HIGH       HIGH         (2) Congludinal Tidal Flow       NA       NA       NA         (2) Total Marsh Stream Stability       NA       NA       NA         (1) Water Quality       (2) Total Marsh Stream Stability       NA       NA </th <th>Stream Site Name</th> <th>U-5706, Stream SD Date of Assessme</th> <th>ent 7/12/2018</th> <th></th>	Stream Site Name	U-5706, Stream SD Date of Assessme	ent 7/12/2018	
Presence of regulatory considerations (YM) Additional stream information/supplementary measurements included (Y/N) NC SAM feature type (perennial, intermittent. Tidal Marsh Stream) Function Class Rating Summary (1) Hydrology (2) Baseflow (2) Flood Flow (2) Flood Flow (3) Streamside Area Attenuation (4) Floodplain Access HIGH	Stream Category	la1 Assessor Name/Organizati	on A.Keith/Ax	kiom
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Function Class Rating Summary         USACE/ All Streams Intermittent         NCDWR Intermittent           (1) Hydrology         HIGH         HIGH         HIGH           (2) Baseflow         HIGH         HIGH         HIGH           (2) Flood Flow         HIGH         HIGH         HIGH           (3) Streamside Area Attenuation         HIGH         HIGH         HIGH           (4) Wooded Riparian Buffer         HIGH         HIGH         HIGH           (4) Wooded Riparian Buffer         HIGH         HIGH         HIGH           (4) Ocannel Stability         HIGH         HIGH         HIGH           (4) Stream Stability         HIGH         HIGH         HIGH           (4) Stream Geomorphology         HIGH         HIGH         HIGH           (2) Stream/Intertidal Zone Interaction         NA         NA           (2) Longitudinal Tidal Flow         NA         NA           (3) Tidal Marsh Channel Stability         NA         NA           (1) Water Quality         MEDIUM         MEDIUM           (2) Indicators of Stressors         NO         NO           (2) Indicators of Stressors         NO         NO           (2) Indicators of Stressors         NO         NO           (2) Indicators				
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(4) Floodplain Access     HIGH     HIGH       (4) Wooded Riparian Buffer     HIGH     HIGH       (4) Microtopography     HIGH     HIGH       (3) Stream Stability     HIGH     HIGH       (4) Channel Stability     HIGH     HIGH       (4) Channel Stability     HIGH     HIGH       (4) Stream Stability     HIGH     HIGH       (4) Stream Stream Stability     HIGH     HIGH       (2) Stream/Intertidal Zone Interaction     NA     NA       (2) Tidal Marsh Stream Stability     NA     NA       (2) Tidal Marsh Stream Geomorphology     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) Streamside Area Vegetation     HIGH     HIGH       (3) Upland Poliutant Filtration     HIGH     HIGH       (2) Intertidal Zone Filtration     HIGH     HIGH       (2) Intertidal Zone Filtration     NA     NA       (2) Intertidal Zone Filtration     HIGH     HIGH       (3) Upland Poliutant Filtration     HIGH     HIGH       (2) Intertidal Zone Filtration     NA     NA       (1) Habitat     HIGH     HIGH     HIGH       (2) Intertidal Zone Filtration     NA     NA       (3) Substrate		· · ·		
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(4) Sediment Transport       HIGH       HIGH         (4) Stream Geomorphology       HIGH       HIGH         (2) Stream/Intertidal Zone Interaction       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Geomorphology       NA       NA         (1) Water Quality       MEDIUM       MEDIUM         (2) Baseflow       MEDIUM       MEDIUM         (1) Water Quality       MEDIUM       MEDIUM         (2) Istreamside Area Vegetation       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       HIGH       HIGH         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       HIGH       HIGH         (3) Substrate       HIGH       HIGH         (3) Stream Stability       HIGH       HIGH         (3) Stream-side Habitat       HIGH		(3) Stream Stability	HIGH	HIGH
(4) Sediment Transport       HIGH       HIGH         (4) Stream Geomorphology       HIGH       HIGH         (2) Stream/Intertidal Zone Interaction       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Geomorphology       NA       NA         (1) Water Quality       MEDIUM       MEDIUM         (2) Baseflow       MEDIUM       MEDIUM         (2) Streamside Area Vegetation       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (2) Indicators of Stressors       NO       NO         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       HIGH       HIGH         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       HIGH       HIGH         (2) Intertidal Zone Filtration       NA       NA         (3) Substrate       HIGH       HIGH         (3) Substrate       HIGH       HIGH         (3) Stream Stability       HIGH		(4) Channel Stability	HIGH	HIGH
(4) Stream Geomorphology       HIGH       HIGH         (2) Stream/Intertidal Zone Interaction       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Geomorphology       NA       NA         (1) Water Quality       MEDIUM       MEDIUM         (2) Streamside Area Vegetation       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (3) Thermoregulation       HIGH       HIGH         (2) Indicators of Stressors       NO       NO         (2) Indicators of Stressors       NA       NA         (1) Habitat       HIGH       HIGH         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       HIGH       HIGH         (3) Substrate       HIGH       HIGH         (3) Stream Stability       HIGH       HIGH         (3) Thermoregulation       HIGH       H		• • •		
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		Overall	HIGH	HIGH

Accompanies User Manual Version 2.1

USACE AID #:			NCDWR	#:	
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,					
					on the same property, identify and
					ser Manual for detailed descriptions
					rements were performed. See the
NC SAM User Manual for examp				, ,	
NOTE EVIDENCE OF STRESS				need to be within	the assessment area).
PROJECT/SITE INFORMATION	l:				
- <b>j</b>	J-5706- Stream SE		. Date of eval		
	ICDOT			me/organization:	A.Keith/Axiom
	Rockingham	6		ned water body	
	adkin-PeeDee			.5-minute quad:	Falling Creek
8. Site coordinates (decimal deg			34.93902	22, -79.725261	
<b>STREAM INFORMATION: (dep</b> 9. Site number (show on attache			nath of accor	sment reach evalua	ated (feet): 50
11. Channel depth from bed (in r			1-3		nable to assess channel depth.
12. Channel width at top of bank				ch a swamp steam	•
14. Feature type: Perennial fl				on a owamp oteam	
STREAM CATEGORY INFORM			loann		
15. NC SAM Zone:	-	] Piedmont (P)	🖂 Inner	Coastal Plain (I)	Outer Coastal Plain (O)
				1	
16. Estimated geomorphic					~
valley shape (skip for				□в	
Tidal Marsh Stream):	(more sinuous stream, fl	atter valley slop	e)	(less sinuous stre	eam, steeper valley slope)
17. Watershed size: (skip	⊠Size 1 (< 0.1 mi²) [	□Size 2 (0.1 to	< 0.5 mi²)	□Size 3 (0.5 to < 5	5 mi²) □Size 4 (≥ 5 mi²)
for Tidal Marsh Stream)					
ADDITIONAL INFORMATION:					
18. Were regulatory consideration	ons evaluated? ⊠Yes Classified Trout				
Section 10 water	Primary Nursery				shed ( I III III IV V) /Outstanding Resource Waters
Publicly owned property				utrient Sensitive Wa	•
	□303(d) List				onmental Concern (AEC)
Documented presence of		ed protected spe			
List species:					
Designated Critical Habita	t (list species)				
19. Are additional stream information	ation/supplementary meas	surements inclu	ded in "Notes	/Sketch" section or	attached? 🛛 Yes 🗌 No
		0.			
1. Channel Water – assessme	• •	r Size 1 stream	s and Tidal N	larsh Streams)	
☑A Water throughout a ☑B No flow, water in point					
$\square C$ No water in assess					
2. Evidence of Flow Restriction	n – accoccmont roach n	notric			
			-nool sequen	ce is severely affec	ted by a flow restriction or fill to the
					impoundment on flood or ebb within
					he channel, tidal gates, debris jams,
beaver dams).					
⊠B Not A					
3. Feature Pattern – assessme	ent reach metric				
	sessment reach has altered	ed pattern (exar	nples: straigh	tening, modification	above or below culvert).
B Not A					
4. Feature Longitudinal Profile	e – assessment reach m	netric			
A Majority of assessm	nent reach has a substanti	ially altered stre			own-cutting, existing damming, over
	gradation, dredging, and	excavation who	ere appropria	te channel profile h	has not reformed from any of these
disturbances).					
		_			
5. Signs of Active Instability -					
					red. Examples of instability include
$\square$ A < 10% of channel u		out, active wide	anu art	incial natuening (Su	ch as concrete, gabion, rip-rap).
$\square$ B 10 to 25% of channel d					

 $\Box C$  > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Bank
LB	RB	
ΠA	ΠA	Little or r
⊠в	⊠в	Moderate

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

# 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

# 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

# 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. 
Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

# 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]J J K
--	--------------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

# 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

	,0008000		Bedrock/saprolite Boulder (256 $-$ 4096 mm) Cobble (64 $-$ 256 mm) Gravel (2 $-$ 64 mm) Sand (.062 $-$ 2 mm) Silt/clay (< 0.062 mm) Dotring
$\square\boxtimes\boxtimes$			Silt/clay (< 0.062 mm) Detritus Artificial (rip-rap, concrete, etc.)

11d. Tyes XNo Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
      - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/cravfish/shrimp) Damselfly and dragonfly larvae
    - Dipterans
    - Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
    - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

# 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
⊠В	⊠В	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB
ΠA	ΠA
⊠В	⊠В
□c	□C

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- Majority of streamside area with depressions able to pond water < 3 inches deep ШС

## 15. Wetland Presence - streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

# Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- D Evidence of bank seepage or sweating (iron in water indicates seepage)
- ΞE Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

# Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- Пв Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

# 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip f	or Tidal	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break. Vegetated Wooded LB RB LB RB $\square A \square A \supseteq 100$ feet wide <u>or</u> extends to the edge of the watershed $\square B \square B \square B \square B$ From 50 to < 100 feet wide $\square C \square C \square C \square C$ From 30 to < 50 feet wide $\square D \square D \square D$ From 10 to < 30 feet wide $\square E \square E \square E \square E \square E \square E = < 10$ feet wide <u>or</u> no trees
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width). LB RB
	A       Mature forest         B       B       Non-mature woody vegetation or modified vegetation structure         C       C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D       Maintained shrubs         E       E       Little or no vegetation
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)         Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet         30-50 feet         LB       RB         LB       RB         A       A         A       A         B       B         B       B         B       B         B       B         B       B         C       C         C       C         C       C         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D         D       D
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB A A Medium to high stem density B B Low stem density C XC No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)         Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.         LB       RB         \[\Begin{bmatrix} A & The total length of buffer breaks is < 25 percent.         \[Begin{bmatrix} B & The total length of buffer breaks is between 25 and 50 percent.         \[Centerline] C       The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams) Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.
	LB RB A A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	☑C ☑C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams) 25a.
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A$ < 46 $\square B$ 46 to < 67 $\square C$ 67 to < 79 $\square D$ 79 to < 230 $\square E$ ≥ 230

Notes/Sketch:

Stream flows from forest into a maintained clear-cut powerline easement. No wooded buffer or canopy present.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706- Stream SE	Date of Assessmer	nt 7/12/2018	
Stream Category	la1	Assessor Name/Organizatio	n A.Keith/Ax	iom
Notes of Field Asses	ssment Form (Y/N)		YES	
Presence of regulate	ory considerations (Y/N)		NO	
Additional stream information/supplementary measurements included (Y/N)			YES	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)			Perennial	
			USACE/	NCDWR
	Function Class Rating Sum	mary	All Streams	Intermittent
	(1) Hydrology	_	LOW	
	(2) Baseflow		MEDIUM	
	(2) Flood Flow		LOW	
	(3) Streamside A		LOW	
	(4) Floodpl		MEDIUM	
		d Riparian Buffer	LOW	
	(4) Microto	• • • • • -	MEDIUM	
	(3) Stream Stabili		MEDIUM	
	(4) Channe	el Stability	HIGH	
	(4) Sedime	nt Transport	HIGH	
	(4) Stream	Geomorphology	LOW	
	(2) Stream/Intertie	dal Zone Interaction	NA	
	(2) Longitudinal Ti	dal Flow	NA	
	(2) Tidal Marsh St	ream Stability	NA	
	(3) Tidal Ma	arsh Channel Stability	NA	
	(3) Tidal Ma	arsh Stream Geomorphology	NA	
	(1) Water Quality		LOW	
	(2) Baseflow	—	MEDIUM	
	(2) Streamside Area Ve	getation	MEDIUM	
	(3) Upland Polluta		HIGH	
	(3) Thermoregula		LOW	
	(2) Indicators of Stresso		NO	
	(2) Aquatic Life Toleran		LOW	
	(2) Intertidal Zone Filtratio		NA	
	(1) Habitat		LOW	
	(2) In-stream Habitat	—	LOW	
	(3) Baseflow	—	MEDIUM	
	(3) Substrate	—	LOW	
	(3) Stream Stabili	ity —	MEDIUM	
	(3) In-stream Hat		MEDIUM	
	(2) Stream-side Habitat		LOW	
	(3) Stream-side Habitat		LOW	
	(3) Thermoregula		LOW	
	(2) Tidal Marsh In-stream		NA	
	(3) Flow Restrictio		NA	
			NA	
	(3) Tidal Marsh Sti (4) Tidal Ma	arsh Channel Stability	NA	
		arsh Stream Geomorphology	NA	
	(3) Tidal Marsh In-		NA	
	(2) Intertidal Zone			
			NA	
	Overall		LOW	

Accompanies User Manual Version 2.1

USACE AID #: NCDWR #:					
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,					
and circle the location of the stream reach under evaluation. If multiple stream					
number all reaches on the attached map, and include a separate form for eac					
and explanations of requested information. Record in the "Notes/Sketch" se					
NC SAM User Manual for examples of additional measurements that may be					
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT ARE					
PROJECT/SITE INFORMATION:					
	ate of evaluation: 7/12/2018				
	ssessor name/organization: A.Keith/Axiom				
	earest named water body				
	n USGS 7.5-minute quad: Terry's Pond				
8. Site coordinates (decimal degrees, at lower end of assessment reach):	34.957567, -79.732787				
STREAM INFORMATION: (depth and width can be approximations)9. Site number (show on attached map):Stream SF10. Lengti	h of assessment reach evaluated (feet): 50				
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0-2					
	sment reach a swamp steam?   Yes  No				
14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream					
STREAM CATEGORY INFORMATION:					
15. NC SAM Zone:	⊠ Inner Coastal Plain (I) □ Outer Coastal Plain (O)				
	$\mathbf{X}$				
16. Estimated geomorphic					
valley snape (skip for —					
<b>Tidal Marsh Stream</b> ): (more sinuous stream, flatter valley slope)	(less sinuous stream, steeper valley slope)				
17. Watershed size: (skip Size 1 (< 0.1 mi <sup>2</sup> ) Size 2 (0.1 to < 0 for Tidal Marsh Stream)	.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 ( $\geq$ 5 mi <sup>2</sup> )				
ADDITIONAL INFORMATION:					
18. Were regulatory considerations evaluated? ⊠Yes □No If Yes, check a	all that apply to the assessment area.				
Section 10 water	□Water Supply Watershed (□I □II ⊠III □IV □V)				
Essential Fish Habitat	High Quality Waters/Outstanding Resource Waters				
Publicly owned property  NCDWR Riparian buffer rule in effet					
Anadromous fish 303(d) List	CAMA Area of Environmental Concern (AEC)				
Documented presence of a federal and/or state listed protected specie	s within the assessment area.				
List species: Designated Critical Habitat (list species)					
19. Are additional stream information/supplementary measurements included	I in "Notes/Sketch" section or attached? XYes INo				
1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)					
A Water throughout assessment reach.					
B No flow, water in pools only. C No water in assessment reach.					
2. Evidence of Flow Restriction – assessment reach metric	al an anna is an anna h-affanta a' bu a flau an triation an fill to the				
	ol sequence is severely affected by a flow restriction or fill to the rophytes or ponded water or impoundment on flood or ebb within				
	rts, causeways that constrict the channel, tidal gates, debris jams,				
beaver dams).					
⊠B Not A					
3. Feature Pattern – assessment reach metric					
A majority of the assessment reach has altered pattern (example	es: straightening, modification above or below culvert).				
⊠B Not A					
4. Feature Longitudinal Profile – assessment reach metric					
A Majority of assessment reach has a substantially altered stream	profile (examples: channel down-cutting, existing damming, over				
	appropriate channel profile has not reformed from any of these				
disturbances). ⊠B Not A					
5. Signs of Active Instability – assessment reach metric	ream has currently recovered. Evemplos of instability include				
<b>Consider only current instability, not past events from which the stream has currently recovered.</b> Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).					
⊠A < 10% of channel unstable					
B 10 to 25% of channel unstable					

C > 25% of channel unstable
#### 6. Streamside Area Interaction – streamside area metric k (LB) and the Right Bank (RB).

Consi	der for the	e Left Bank (L
LB	RB	
×Ν	×Α	Little or no
□в	□в	Moderate e

- ⊠A □B Little or no evidence of conditions that adversely affect reference interaction
  - Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
  - ПС Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### Water Quality Stressors - assessment reach/intertidal zone metric 7.

#### Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- Excessive sedimentation (burying of stream features or intertidal zone) ПВ
- Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- Odor (not including natural sulfide odors) DD
- Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" ΠE section.
- ΠF Livestock with access to stream or intertidal zone
- ΠG Excessive algae in stream or intertidal zone
- Πн Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- $\boxtimes$ I Other: (explain in "Notes/Sketch" section)
- ΠJ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- □в Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠c No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. 🗌 Yes ⊠No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- Multiple aquatic macrophytes and aquatic mosses ΠA
- (include liverworts, lichens, and algal mats) ⊠Β Multiple sticks and/or leaf packs and/or emergent vegetation
- ПС Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- ΠE Little or no habitat

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - ⊠Α Riffle-run section (evaluate 11c)
  - Pool-glide section (evaluate 11d) □в
  - ⊡с Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but  $\leq$  10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach. NP D C ۸

Image: Second system       Image: Second system       Image: Cobble (64 - 256 mm)         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system         Image: Second system       Image: Second system       Image: Second system	Bedrock/sap		Ĕ	
Image: Construction     Image: Construction     Image: Construction     Image: Construction       Image: Construction     Image: Construction     Image: Construction     Image: Construction	Cobble (64 - Gravel (2 - 6 Sand (.062 - Silt/clay (< 0 Detritus			

11d. 
Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
  - Aquatic reptiles
    - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
  - Beetles
  - Caddisfly larvae (T)
  - Asian clam (Corbicula)
  - Crustacean (isopod/amphipod/crayfish/shrimp) Damselfly and dragonfly larvae
  - Dipterans
  - Mayfly larvae (E)
  - Megaloptera (alderfly, fishfly, dobsonfly larvae)
  - Midges/mosquito larvae
  - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
⊠В	⊠В	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB
ΠA	ΠA
□В	B
⊠C	⊠C

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep 2
- Majority of streamside area with depressions able to pond water < 3 inches deep ⊠C

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

#### Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΔD Evidence of bank seepage or sweating (iron in water indicates seepage)
- ⊠Ε Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

#### 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- Пв Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

#### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ⊠Α Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the fir Vegetate LB RB A A B C D C D E	B LB A ⊠A B □B C □C D □D	oded RB △ ⊠A 3 □B 2 □C 0 □D	≥ 100 feet wide From 50 to < 1 From 30 to < 5 From 10 to < 3 < 10 feet wide	0 feet wide 0 feet wide	edge of the v	watershed				
20.			bank (LB) Mature fo Non-matu Herbaceo Maintaine	and right bank prest ure woody veget pus vegetation w	(skip for Tidal I (RB) for Metric ation <u>or</u> modified ith or without a s	<b>19 ("Vegetate</b> vegetation stru	ed" Buffer W	/idth).			
21.	Check a within 30	II approp           feet of st           of the foll           < 30           B           B           B           C	riate boxe ream (< 30 owing stro ) feet RB A A B B B C B C	es for left bank D feet), or is betw	k (skip for Tidal I (LB) and right back veen 30 to 50 fee on either bank, of Row crops Maintained turf Pasture (no live Pasture (active	ank (RB). Indi et of stream (30 check here an stock)/commen	icate if listed 0-50 feet). Id skip to Me	etric 22: 🛛	ts stream (A	buts), does n	ot abut but is
22.			bank (LB) Medium te Low stem	and right bank o high stem den i density	kip for Tidal Mar : (RB) for Metric sity r <u>or</u> predominantl	19 ("Wooded		-			
23.			vegetated The total The total	buffer is continu length of buffer length of buffer	<b>de area metric (</b> lous along strean breaks is < 25 pe breaks is betwee breaks is > 50 pe	n (parallel). Br ercent. n 25 and 50 pe	eaks are are		egetation > 1	0 feet wide.	
24.	Evaluate		nant veget habitat. Vegetatio with non-i Vegetatio species. communit	tation within 100 n is close to un native invasive s n indicates dist This may incl ties with non-na	a metric (skip for feet of each bar disturbed in spec species absent or urbance in terms ude communities tive invasive spe erstory but retain	hk or to the edg cies present an sparse. s of species d s of weedy n cies present, b	ge of the war nd their propo liversity or p ative specie but not domin	ortions. Low roportions, b s that devel	er strata cor ut is still lar op after cle	nposed of na rgely compos ear-cutting of	tive species, sed of native r clearing <u>or</u>
	□C	□C	Vegetatio	n is severely dia native invasive	sturbed in terms species dominant tic species <u>or</u> cor	of species dive t over a large p	ersity or prop portion of exp	pected strata	or commun	ities compos	ed of planted
25.	25a. 🗌 🗋	Yes 🛛	No Was	conductivity me	skip for all Coas asurement recorns. No Water	ded?	ams)				
	25b. Ch □A			onding to the co 46 to < 67	nductivity measu □C 67 to < 7		of microsiem 79 to < 230	ens per centi ∏E ≥			
Note	es/Sketch	:									

Intermittent stream originating in headwater forest- stream channel bed and bank inconsistant above origin.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706, Stream SF	Date of Assessment	7/12/2018	
Stream Category	la1	Assessor Name/Organization	A.Keith/Ax	iom
Notes of Field Asses	ssment Form (Y/N)		YES	
Presence of regulate	ory considerations (Y/N)		NO	
Additional stream inf	formation/supplementary measu	rements included (Y/N)	YES	
NC SAM feature typ	e (perennial, intermittent, Tidal N	Marsh Stream)	Intermitten	t
			USACE/	NCDWR
	Function Class Rating Summ	nary A	II Streams	Intermittent
	(1) Hydrology		HIGH	HIGH
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Flood Flow		HIGH	HIGH
	(3) Streamside Ar	ea Attenuation	HIGH	HIGH
	(4) Floodpla	ain Access	HIGH	HIGH
	(4) Wooded	d Riparian Buffer	HIGH	HIGH
	(4) Microtop	· · · · · · · · · · · · · · · · · · ·	MEDIUM	MEDIUM
	(3) Stream Stabili	<u> </u>	HIGH	HIGH
	(4) Channe	·	HIGH	HIGH
		nt Transport	LOW	LOW
		Geomorphology	HIGH	HIGH
		dal Zone Interaction	NA	NA
	(2) Longitudinal Tic		NA	NA
	(2) Longitudinal Tic (2) Tidal Marsh Str		NA	NA
		rsh Channel Stability		
		· · · · · · · · · · · · · · · · · · ·	NA	NA
		rsh Stream Geomorphology	NA	NA
	(1) Water Quality		MEDIUM	MEDIUM
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Streamside Area Ve	-	HIGH	HIGH
	(3) Upland Polluta		HIGH	HIGH
	(3) Thermoregula		HIGH	HIGH
	(2) Indicators of Stresso	rs	NO	NO
	(2) Aquatic Life Tolerand		LOW	NA
	(2) Intertidal Zone Filtratio	n	NA	NA
	(1) Habitat		HIGH	HIGH
	(2) In-stream Habitat		MEDIUM	HIGH
	(3) Baseflow		MEDIUM	MEDIUM
	(3) Substrate		HIGH	HIGH
	(3) Stream Stabili	ty	HIGH	HIGH
	(3) In-stream Hab	itat	LOW	HIGH
	(2) Stream-side Habitat		HIGH	HIGH
	(3) Stream-side H	labitat	HIGH	HIGH
	(3) Thermoregula	tion	HIGH	HIGH
	(2) Tidal Marsh In-stream		NA	NA
	(3) Flow Restriction		NA	NA
	(3) Tidal Marsh Str		NA	NA
	. ,	rsh Channel Stability	NA	NA
		rsh Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-		NA	NA
	(2) Intertidal Zone			
	Overall		HIGH	HIGH

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User	Manual Version 2.1
USACE AID #:		NCDWR #:
		aphs. Attach a copy of the USGS 7.5-minute topographic quadrangle,
		e stream reaches will be evaluated on the same property, identify and
		or each reach. See the NC SAM User Manual for detailed descriptions
		ch" section if supplementary measurements were performed. See the
	mples of additional measurements that m	
NOTE EVIDENCE OF STRES	SSORS AFFECTING THE ASSESSMENT	AREA (do not need to be within the assessment area).
PROJECT/SITE INFORMATI	-	
1. Project name (if any):	U-5706 Stream SG	2. Date of evaluation: 190110
3. Applicant/owner name:	NCDOT	4. Assessor name/organization: A.Keith/Axiom
5. County:	Rockingham	6. Nearest named water body
7. River basin:	Yadkin-PeeDee	on USGS 7.5-minute quad: Hitchcock Creek
	legrees, at lower end of assessment reach	
	epth and width can be approximations	
9. Site number (show on attac		Length of assessment reach evaluated (feet): 50
	in riffle, if present) to top of bank (feet):	0-1 Unable to assess channel depth.
12. Channel width at top of ba		assessment reach a swamp steam? □Yes ⊠No
14. Feature type: Perennia	al flow Intermittent flow Tidal Marsh	Stream
STREAM CATEGORY INFO		
15. NC SAM Zone:	☐ Mountains (M) ☐ Piedmont (F	P) 🛛 Inner Coastal Plain (I) 🗌 Outer Coastal Plain (O)
		\ /
16. Estimated geomorphic		
valley shape (skip for		ZB →
Tidal Marsh Stream):	(more sinuous stream, flatter valley sl	ope) (less sinuous stream, steeper valley slope)
17. Watershed size: (skip	⊠Size 1 (< 0.1 mi²) □Size 2 (0.1	to < 0.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 (≥ 5 mi <sup>2</sup> )
for Tidal Marsh Stream)		, _ , , _ , ,
ADDITIONAL INFORMATION	N:	
18. Were regulatory considera	ations evaluated? ⊠Yes ⊟No If Yes, cl	neck all that apply to the assessment area.
Section 10 water	Classified Trout Waters	□Water Supply Watershed (□I □II □III □IV □V)
Essential Fish Habitat	Primary Nursery Area	High Quality Waters/Outstanding Resource Waters
Publicly owned property		in effect INutrient Sensitive Waters
Anadromous fish	303(d) List	CAMA Area of Environmental Concern (AEC)
· · ·	of a federal and/or state listed protected s	pecies within the assessment area.
List species:		
Designated Critical Hat		
19. Are additional stream info	rmation/supplementary measurements inc	luded in "Notes/Sketch" section or attached?  Yes  No
	ment reach metric (skip for Size 1 strea	ms and Tidal Marsh Streams)
	it assessment reach.	
B No flow, water in		
	ction – assessment reach metric	the pool converse is conversely offected by a flow restriction or fill to the

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the ШA point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- ⊠Β Not A

#### 3. Feature Pattern – assessment reach metric

- ⊠Α A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). ΠВ Not A
- 4. Feature Longitudinal Profile – assessment reach metric
  - ⊠Α Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
  - ⊡в Not A

#### Signs of Active Instability – assessment reach metric 5.

Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- ⊠Α < 10% of channel unstable □в
  - 10 to 25% of channel unstable
- ПС > 25% of channel unstable

#### 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Bai
LB	RB	
ΠA	ΠA	Little or
ØВ	⊠в	Modera

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7.	Water Quality Stressors – assessment reach/intertidal	zone metric
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#### Check all that apply.

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

#### 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

#### 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. 
Yes 
No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

LΑ	Multiple aquatic macrophytes and aquatic mosses
	(include liverworts, lichens, and algal mats)
⊠в	Multiple sticks and/or leaf packs and/or emergent
	vegetation
□C	Multiple snags and logs (including lap trees)
D	5% undercut banks and/or root mats and/or roots

- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]J ]K
--	----------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Sill/day ( $< 0.062$ mm)
$\boxtimes$			
		$\square$	Silt/clay (< 0.062 mm) Detritus
$\boxtimes$			Artificial (rip-rap, concrete, etc.)

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
      - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)

    - Dipterans Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
×Α	$\bowtie A$	Little or no alteration to water storage capacity over a majority of the streamside area
⊟в	Β	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- LB RB ΠA ΠA ⊠в ⊠В □с
  - Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
  - Majority of streamside area with depressions able to pond water 3 to 6 inches deep
  - □C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - ΠA Streams and/or springs (jurisdictional discharges)
  - ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
  - ΠF None of the above

# 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA

□в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)

- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

#### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- $\square A$ Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLBRBLBRB $\boxtimes A$ $\boxtimes A$ $\boxtimes A$ $\supseteq B$ BB $\square C$ $\square C$ $\square C$ $\square D$ $\square C$ $\square C$ $\square C$ $\square D$ <	·
20.	<ul> <li>20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width). LB RB ⊠A ⊠A Mature forest □B □B Non-mature woody vegetation or modified vegetation structure □C □C Herbaceous vegetation with or without a strip of trees &lt; 10 feet wide </li> </ul>	
21.	D D Maintained shrubs E E Little or no vegetation 21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)	
	Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet         B       B       B         B       B       B         B       B       B         B       B       B         C       C       C         C       C       C         D       D       D	), does not abut but is
22.	<ul> <li>22. Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width). LB RB A A Medium to high stem density B B Low stem density C □C No wooded riparian buffer or predominantly herbaceous species or bare ground</li> </ul>	
23.	<ul> <li>23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)</li> <li>Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation &gt; 10 fe</li> <li>LB RB</li> <li>△A △A The total length of buffer breaks is &lt; 25 percent.</li> <li>□B □B The total length of buffer breaks is between 25 and 50 percent.</li> <li>□C □C The total length of buffer breaks is &gt; 50 percent.</li> </ul>	et wide.
24.	<ul> <li>Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes fir assessment reach habitat.         LB RB         A DA Vegetation is close to undisturbed in species present and their proportions. Lower strata composition     </li> </ul>	
	With non-native invasive species absent or sparse. Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely species. This may include communities of weedy native species that develop after clear-or communities with non-native invasive species present, but not dominant, over a large portion of the communities missing understory but retaining canopy trees.	cutting or clearing <u>or</u> the expected strata <u>or</u>
	C C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is a with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species	composed of planted
25.	<ul> <li>25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)</li> <li>25a. ☐Yes</li></ul>	
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46$ $\square B$ 46 to < 67 $\square C$ 67 to < 79 $\square D$ 79 to < 230 $\square E \ge 230$	

#### Notes/Sketch:

Intermittent stream originating at culvert(21.5 on SWIT form). Top of stream appears to be excavated. Low energy, abundant iron oxidizing bacteria and detritus making little habitat for benthics. Stream stream flows into wetland.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Category     Ibit     Assessor Name/Organization     A:Keith/Axiom       Notes of Field Assessment Form (V/N)     YES     NO       Presence of regulatory considerations (V/N)     NC     NC       Additional stream informations/upplementary measurements included (V/N)     NC     NC       NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)     Intermittent     NCDWR       (1) Hydrology     LOW     LOW     LOW       (2) Flood Flow     LOW     LOW     LOW       (3) Streamside Area Attenuation     MEDIUM     MEDIUM     MEDIUM       (4) Floodplain Access     HIGH     HIGH     HIGH       (4) Wooded Riparian Buffer     HIGH     HIGH     HIGH       (4) Wooded Riparian Buffer     HIGH     HIGH     HIGH       (4) Stream Stability     LOW     LOW     LOW       (2) Longiturinal Tidal Flow     NA     NA       (3) Streams Stability     LOW     LOW     LOW       (2) Longiturinal Tidal Flow     NA     NA       (3) Urdal Marsh Stream Stability     NA     NA       (2) Longiturinal Tidal Flow     NA     NA       (3) Urdal Marsh Stream Stability     NA     NA       (2) Longiturinal Tidal Flow     NA     NA       (3) Urdal Marsh Stream Stability     NA     <	Stream Site Name	U-5706 Stream SG	Date of Assessment	190110	
Presence of regulatory considerations (VN) Additional stream information/supplementary measurements included (VN) NC SAM leature type (perennial, intermittent, Tidal Marsh Stream) <u>Function Class Rating Summary</u> (1) Hydrology (2) Basellow (2) Basellow (2) Flood Flow (3) Streamside Area Attenuation (4) Floodplain Access MEDIUM MEDIUM (4) Floodplain Access MEDIUM MEDIUM (4) Floodplain Access MEDIUM MEDIUM (4) Wooded Riparian Buffer (4) Microtopography NA NA (3) Stream Stability (4) Stream Geomorphology (2) Stream/Interfue Interaction (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (4) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (3) Tidal Marsh Stream Geomorphology NA (3) Jplane Pollutant Filtration HIGH HIGH (3) Determent Habitat (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (4) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (5) Tidal Marsh Stream Stability NA (6) Tidal Marsh Stream Geomorphology NA (	Stream Category	lb1	Assessor Name/Organization	A.Keith/Ax	iom
Presence of regulatory considerations (VN) Additional stream information/supplementary measurements included (VN) NC SAM leature type (perennial, intermittent, Tidal Marsh Stream) <u>Function Class Rating Summary</u> (1) Hydrology (2) Basellow (2) Basellow (2) Flood Flow (3) Streamside Area Attenuation (4) Floodplain Access MEDIUM MEDIUM (4) Floodplain Access MEDIUM MEDIUM (4) Floodplain Access MEDIUM MEDIUM (4) Wooded Riparian Buffer (4) Microtopography NA NA (3) Stream Stability (4) Stream Geomorphology (2) Stream/Interfue Interaction (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (4) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Streamside Area Vegetation (3) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (3) Tidal Marsh Stream Geomorphology NA (3) Jplane Pollutant Filtration HIGH HIGH (3) Determent Habitat (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (4) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (3) Stream Stability (4) Tidal Marsh Stream Geomorphology NA (5) Tidal Marsh Stream Stability NA (6) Tidal Marsh Stream Geomorphology NA (			=		
Additional stream information/supplementary measurements included (Y/N) NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)           Function Class Rating Summary         All Streams         NCDWR           (1) Hydrology         LOW         LOW         LOW           (2) Baseflow         MEDIUM         MEDIUM         MEDIUM           (2) Streamside Area Attenuation         MEDIUM         MEDIUM         MEDIUM           (4) Wooded Riparian Buffer         HIGH         HIGH         HIGH           (4) Wooded Riparian Buffer         HIGH         HIGH         HIGH           (4) Stream Stability         LOW         LOW         LOW           (3) Stream Stability         LOW         LOW         LOW           (4) Stream Comorphology         LOW         LOW         LOW           (2) Stream/Intertidal Zone Interaction         NA         NA           (2) Total Marsh Stream Stability         NA         NA           (2) Total Marsh Stream Geomorphology         NA         NA           (1) Water Quality         MEDIUM         MEDIUM           (2) Streamside Area Vegetation         HIGH         HIGH           (3) Tabl Marsh Stream Geomorphology         NA         NA           (2) Interindel Zone Filtration         HIGH         HIGH <td< td=""><td>Notes of Field Asses</td><td>ssment Form (Y/N)</td><td></td><td>YES</td><td></td></td<>	Notes of Field Asses	ssment Form (Y/N)		YES	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)           Intermittent         Intermittent           (1) Hydrology         USACE/         NCDWR           (1) Hydrology         UOW         LOW         LOW           (2) Baseflow         Intermittent         MEDIUM         MEDIUM           (2) Flood Flow         LOW         LOW         LOW           (3) Streamside Area Attenuation         MEDIUM         MEDIUM         MEDIUM           (4) Floodplain Access         MEDIUM         MEDIUM         MEDIUM           (4) Wooded Riparian Buffer         HIGH         HIGH         HIGH           (4) Wooded Riparian Buffer         HIGH         HIGH         HIGH           (4) Stream Stability         LOW         LOW         LOW           (4) Stream Geomorphology         LOW         LOW         LOW           (2) Stream/Intervitidal Zone Interaction         NA         NA           (3) Tidal Marsh Stream Stability         NA         NA           (2) Streamide Area Vegetation         HIGH         HIGH           (3) Tidal Marsh Stream Geomorphology         NA         NA           (2) Streamide Area Vegetation         HIGH         HIGH           (3) Tidal Marsh Stream Geomorphology         NA         NA	-				
Function Class Rating Summary         USACE/ All Streams         NCDWR Intermittent           (1) Hydrology         LOW         LOW         LOW           (2) Baseflow         MEDIUM         MEDIUM           (2) Flood Flow         LOW         LOW           (3) Streamside Area Attenuation         MEDIUM         MEDIUM           (4) Wooded Riparian Buffer         HIGH         HIGH           (4) Wooded Riparian Buffer         HIGH         HIGH           (4) Microtopography         NA         NA           (3) Stream Stability         LOW         LOW           (4) Channel Stability         HIGH         HIGH           (4) Stream Geomorphology         LOW         LOW           (2) Stream/Interificial Zone Interaction         NA         NA           (2) Tidal Marsh Stream Stability         NA         NA           (3) Tidal Marsh Stream Stability         NA         NA           (2) Tidal Marsh Stream Stability         NA         NA           (3) Tidal Marsh Stream Stability         NA         NA           (2) Tidal Marsh Stream Stability         NA         NA           (2) Tidal Marsh Stream Stability         NA         NA           (2) Tidal Marsh Stream Stability         MEDIUM         MEDIUM<					
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(2) Baseflow     MEDIUM     MEDIUM       (2) Flood Flow     LOW     LOW       (3) Streamside Area Attenuation     MEDIUM     MEDIUM       (4) Floodplain Access     MEDIUM     MEDIUM       (4) Wooded Riparian Buffer     HIGH     HIGH       (4) Wicrotopography     NA     NA       (3) Stream Stability     LOW     LOW       (4) Stream Stability     LOW     LOW       (4) Stream Geomorphology     LOW     LOW       (2) Stream/Intertidal Zone Interaction     NA     NA       (2) Stream/Intertidal Zone Interaction     NA     NA       (2) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) Indial Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) India Marsh Stream Stability     NA     NA       (2) India Marsh Stream Stability     NA     NA       (2) India Marsh Stream Stability     MEDIUM     MEDIUM       (2) India Marsh Stream Stability     MEDIUM     MEDIUM       (2) Intertidal Zone Filtration     HIGH     HIGH       (3) Substrate					
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(3) Streamside Area Attenuation     MEDIUM     MEDIUM       (4) Floodplain Access     MEDIUM     MEDIUM       (4) Wooded Riparian Buffer     HIGH     HIGH       (4) Microtopography     NA     NA       (3) Stream Stability     LOW     LOW       (4) Sediment Transport     LOW     LOW       (4) Stream Geomorphology     LOW     LOW       (2) Stream/Intertidal Zone     NA     NA       (2) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (2) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) Streamside Area Vegetation     HIGH     HIGH       (3) Upland Pollutant Filtration     HIGH     HIGH       (2) Indicators of Stressors     NO     NO       (2) Aquatic Life Tolerance     LOW     NA       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM       (3) Instream Habitat     LOW     NA       (2) Indicators of Stressors     NO     NO       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM					
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(4) Wooded Riparian Buffer     HIGH     HIGH       (4) Wicrotopography     NA     NA       (3) Stream Stability     LOW     LOW       (4) Channel Stability     HIGH     HIGH       (4) Sediment Transport     LOW     LOW       (4) Stream Geomorphology     LOW     LOW       (2) Stream/Intertidal Zone Interaction     NA     NA       (2) Longitudinal Tidal Flow     NA     NA       (2) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) Indicators of Stressors     NO     NO       (2) Indicators of Stressors     NO     NO       (2) Indicators of Stressors     NO     NA       (1) Habitat     LOW     HIGH       (2) In-stream Habitat     LOW     HIGH       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM       (2) Inertidal Zone Filtration     HIGH     HIGH       (3) Tidan Marsh Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM <tr< td=""><td></td><td></td><td></td><td></td><td></td></tr<>					
(4) Microtopography     NA     NA       (3) Stream Stability     LOW     LOW       (4) Channel Stability     HIGH     HIGH       (4) Sediment Transport     LOW     LOW       (4) Stream Geomorphology     LOW     LOW       (2) Stream/Intertidal Zone Interaction     NA     NA       (2) Congitudinal Tidal Flow     NA     NA       (2) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) Streamside Area Vegetation     HIGH     HIGH       (3) Thermoregulation     HIGH     HIGH       (2) Indicators of Stressors     NO     NO       (2) Indicators of Stressors     NO     NO       (2) Indicidors of Stressors     NO     NA       (1) Habitat     LOW     HIGH       (2) In-stream Habitat     LOW     HIGH       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM <td< td=""><td></td><td></td><td></td><td></td><td></td></td<>					
(3) Stream Stability     LOW     LOW       (4) Channel Stability     HIGH     HIGH       (4) Stream Geomorphology     LOW     LOW       (4) Stream Geomorphology     LOW     LOW       (2) Stream/Intertidal Zone Interaction     NA     NA       (2) Congludinal Tidal Flow     NA     NA       (3) Tidal Marsh Stream Stability     NA     NA       (3) Tidal Marsh Stream Geomorphology     NA     NA       (1) Water Quality     MEDIUM     MEDIUM       (2) Baseflow     MEDIUM     MEDIUM       (2) Streamside Area Vegetation     HIGH     HIGH       (3) Upland Pollutant Filtration     HIGH     HIGH       (2) Indicators of Stressors     NO     NO       (2) Intertidal Zone Filtration     HIGH     HIGH       (3) Tidal Marsh Stream Ceomorphology     NA     NA       (1) Indicators of Stressors     NO     NO       (2) Intertidal Zone Filtration     HIGH     HIGH       (3) Thermoregulation     NA     NA       (1) Habitat     LOW     HIGH       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM       (3) Stream Stability     MEDIUM     MEDIUM       (3) Strearm-side Habitat     HIGH     HIGH			· · · · · · · · · · · · · · · · · · ·		
(4) Channel Stability       HIGH       HIGH         (4) Sediment Transport       LOW       LOW         (4) Stream/Intervidal Zone Interaction       NA       NA         (2) Stream/Intervidal Zone Interaction       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Geomorphology       NA       NA         (1) Water Quality       MEDIUM       MEDIUM         (2) Streamside Area Vegetation       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (2) Indicators of Stressors       NO       NO         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       LOW       HIGH         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       LOW       HIGH         (3) Stream Stability       MEDIUM       MEDIUM         (3) Stream Stability       MEDIUM       MEDIUM         (3) Stream Stability       MEDIUM       MEDIUM         (3) Stream Stability					
(4) Sediment Transport       LOW       LOW         (4) Stream Geomorphology       LOW       LOW         (2) Stream/Intertidal Zone Interaction       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Stream Geomorphology       NA       NA         (1) Water Quality       MEDIUM       MEDIUM         (2) Streamside Area Vegetation       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (3) Thermoregulation       HIGH       HIGH         (2) Indicators of Stressors       NO       NO         (2) Indicators of Stressors       NO       NO         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       LOW       HIGH         (2) Intertidal Zone Filtration       NA       NA         (3) Stream Habitat       LOW       HIGH         (3) Stream Habitat       LOW       HIGH         (3) Stream-side Habitat       HIGH       HIGH         (3) Stream-side Habitat       HIGH       HIGH         (3) Thermoregulation       HI					
(4) Stream Geomorphology       LOW       LOW         (2) Stream/Intertidal Zone Interaction       NA       NA         (2) Longitudinal Tidal Flow       NA       NA         (2) Tidal Marsh Stream Stability       NA       NA         (3) Tidal Marsh Channel Stability       NA       NA         (3) Tidal Marsh Stream Geomorphology       NA       NA         (1) Water Quality       MEDIUM       MEDIUM         (2) Streamside Area Vegetation       HIGH       HIGH         (3) Upland Pollutant Filtration       HIGH       HIGH         (3) Thermoregulation       HIGH       HIGH         (2) Indicators of Stressors       NO       NO         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       LOW       HIGH         (2) Intertidal Zone Filtration       NA       NA         (1) Habitat       LOW       HIGH         (3) Substrate       MEDIUM       MEDIUM         (3) Stream Stability       MEDIUM       MEDIUM         (3) Tidal Marsh Stream Stabilitat <td></td> <td></td> <td></td> <td></td> <td></td>					
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(4) Tidal Marsh Stream GeomorphologyNANA(3) Tidal Marsh In-stream HabitatNANA(2) Intertidal ZoneNANA		(3) Tidal Marsh St	ream Stability	NA	NA
(3) Tidal Marsh In-stream HabitatNANA(2) Intertidal ZoneNANA		(4) Tidal Ma	arsh Channel Stability	NA	NA
(2) Intertidal Zone NA NA		(4) Tidal Ma	arsh Stream Geomorphology	NA	NA
		(3) Tidal Marsh In-	stream Habitat	NA	NA
Overall LOW MEDIUM		(2) Intertidal Zone		NA	NA
		Overall		LOW	MEDIUM

# NC SAM FIELD ASSESSMENT RESULTS

Accomp	anies	User	Manual	Version	2.1

USACE AID #: NCDWR #:	
INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quad	angle,
and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identi	
number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descr	-
and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. S	
NC SAM User Manual for examples of additional measurements that may be relevant.	-
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).	
PROJECT/SITE INFORMATION:	
1. Project name (if any): U-5706- Stream SH 2. Date of evaluation: 180717	
3. Applicant/owner name: NCDOT 4. Assessor name/organization: Perkinson/Axiom	
5. County: Richmond 6. Nearest named water body	
7. River basin: Yadkin-PeeDee on USGS 7.5-minute quad: Hitchcock Creek	
8. Site coordinates (decimal degrees, at lower end of assessment reach): 34.963017, -79.743343	
STREAM INFORMATION: (depth and width can be approximations)	
9. Site number (show on attached map): Stream SH 10. Length of assessment reach evaluated (feet): 150	I-
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 3	n.
12. Channel width at top of bank (feet): 8 13. Is assessment reach a swamp steam? Yes No	
14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream	
STREAM CATEGORY INFORMATION:	
15. NC SAM Zone:	
16. Estimated geomorphic	
valley shape (skip for	
<b>Tidal Marsh Stream</b> ): (more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)	
17. Watershed size: (skip $\Box$ Size 1 (< 0.1 mi <sup>2</sup> ) $\Box$ Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 (≥ 5 mi <sup>2</sup> )	
for Tidal Marsh Stream)	
ADDITIONAL INFORMATION:	
18. Were regulatory considerations evaluated? $\square$ Yes $\square$ No If Yes, check all that apply to the assessment area.	
Section 10 water Classified Trout Waters Water Supply Watershed (	
Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Water	
Publicly owned property INCDWR Riparian buffer rule in effect INutrient Sensitive Waters	10
Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)	
Documented presence of a federal and/or state listed protected species within the assessment area.	
List species:	
Designated Critical Habitat (list species)	
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? ☐Yes ⊠No	
1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)	
$\square$ A Water throughout assessment reach.	
$\square$ B No flow, water in pools only.	
$\Box$ C No water in assessment reach.	
—	
2. Evidence of Flow Restriction – assessment reach metric	
A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or f	
point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or eb the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debr	
beaver dams).	s jams,
B Not A	
3. Feature Pattern – assessment reach metric	
A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).	
B Not A	
4. Feature Longitudinal Profile – assessment reach metric	
A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing dammi	ıg, over
widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any o	
disturbances).	
B Not A	
5. Signs of Active Instability – assessment reach metric	
	include
<b>Consider only current instability, not past events from which the stream has currently recovered.</b> Examples of instability active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-ri-	
$\square$ < 10% of channel unstable	ιp).
$\square$ B 10 to 25% of channel unstable	

□c > 25% of channel unstable

#### Streamside Area Interaction - streamside area metric 6. nk (LB) and the Right Bank (RB).

Consi	der for the	e Left Ban
LB	RB	
ΠA	ΠA	Little or
ПВ	В	Moderat

- □A □B Little or no evidence of conditions that adversely affect reference interaction
  - Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- ⊠C Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### Water Quality Stressors - assessment reach/intertidal zone metric 7.

#### Check all that apply.

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam) ΠA
- Excessive sedimentation (burying of stream features or intertidal zone) Πв
- Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- Odor (not including natural sulfide odors) DD
- Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" ΠE section.
- □F Livestock with access to stream or intertidal zone
- ŪG Excessive algae in stream or intertidal zone
- Πн Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- $\boxtimes$ I Other: (explain in "Notes/Sketch" section)
- ΠJ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours ΠA
- Πв Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠C No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. 🗌 Yes □No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- Multiple aquatic macrophytes and aquatic mosses ΠA (include liverworts, lichens, and algal mats) ⊠в Multiple sticks and/or leaf packs and/or emergent vegetation ПС Multiple snags and logs (including lap trees) ΠD 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only March Child	
---	--

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - ⊠Α Riffle-run section (evaluate 11c)
  - ⊠В Pool-glide section (evaluate 11d)
  - ПС Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but < 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach. ND р C ۸

		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm)

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
  - Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
  - Beetles
  - Caddisfly larvae (T)
  - Asian clam (Corbicula)
  - Crustacean (isopod/amphipod/crayfish/shrimp)
  - - Dipterans Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB

ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□В	Moderate alteration to water storage capacity over a majority of the streamside area
⊠C	⊠C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA ⊡в □в ⊠c

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

#### Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- DD Evidence of bank seepage or sweating (iron in water indicates seepage)
- Ξe Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

#### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- ПВ Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

#### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- $\square A$ Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
---	------------

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	LB RB LB A A A A B B B B C C C 0	noded RBA $\supseteq$ AA $\supseteq$ ABFrom 50 to < 100 feet wideC $\Box$ CFrom 30 to < 50 feet wideD $\Box$ DFrom 10 to < 30 feet wide
20.		<ul> <li>streamside area metric (skip for Tidal Marsh Streams)</li> <li>bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).</li> <li>Mature forest</li> </ul>
	□B □B ⊠C ⊠C □D □D □E □E	Non-mature woody vegetation <u>or</u> modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.	Check all appropriedwithin 30 feet of sIf none of the foldAbuts< 3LBRBLBRBLBRBLBRBLBRBLBRBLBRBLBRBLBRB	A       B       B       Row crops         B       B       Maintained turf         C       C       C       Pasture (no livestock)/commercial horticulture
22.		streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB □A □A □B □B ⊠C ⊠C	Medium to high stem density Low stem density No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.	-	getated Buffer – streamside area metric (skip for Tidal Marsh Streams) vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	LB RB A AA B B C C	The total length of buffer breaks is < 25 percent. The total length of buffer breaks is between 25 and 50 percent. The total length of buffer breaks is > 50 percent.
24.		position – streamside area metric (skip for Tidal Marsh Streams) inant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to habitat.
	□a □a	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	⊠в ⊠в	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	□c □c	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. 🗌 Yes 🛛 🛛	ssessment reach metric (skip for all Coastal Plain streams) No Was conductivity measurement recorded? t one of the following reasons.  No Water  Other:
	25b. Check the b □A < 46	box corresponding to the conductivity measurement (units of microsiemens per centimeter). ☐B 46 to < 67

#### Notes/Sketch:

Assessment completed on the north side of Richmond Road. South of road the stream is piped through part of the study area, the pipe is failing. On north/west side of the road the channel is incised . Mature trees growing from stream bank, beyond the few mature trees maintained yards abut stream. Stream is intrenched.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name U-5706- Stream SH Date of Assessm	ent 180717	
Stream Category Ia2 Assessor Name/Organizat	ion Perkinson	/Axiom
Notes of Field Assessment Form (Y/N)	YES	
Presence of regulatory considerations (Y/N)	NO	
Additional stream information/supplementary measurements included (Y/N)	NO	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Perennia	1
	USACE/	NCDWR
Function Class Rating Summary	All Streams	Intermittent
(1) Hydrology	LOW	
(2) Baseflow	MEDIUM	
(2) Flood Flow	LOW	
(3) Streamside Area Attenuation	LOW	
(4) Floodplain Access	LOW	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	HIGH	
(4) Sediment Transport	LOW	
(4) Stream Geomorphology	LOW	
(2) Stream/Intertidal Zone Interaction	NA	
(2) Longitudinal Tidal Flow	NA	
	NA	
(2) Tidal Marsh Stream Stability (3) Tidal Marsh Channel Stability		
	NA	
(3) Tidal Marsh Stream Geomorphology	NA	
(1) Water Quality	LOW	
(2) Baseflow	MEDIUM	
(2) Streamside Area Vegetation	MEDIUM	
(3) Upland Pollutant Filtration	LOW	
(3) Thermoregulation	HIGH	
(2) Indicators of Stressors	NO	
(2) Aquatic Life Tolerance	LOW	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	LOW	
(2) In-stream Habitat	LOW	
(3) Baseflow	MEDIUM	
(3) Substrate	MEDIUM	
(3) Stream Stability	MEDIUM	
(3) In-stream Habitat	LOW	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	MEDIUM	
(2) Tidal Marsh In-stream Habitat	NA	
(3) Flow Restriction	NA	
(3) Tidal Marsh Stream Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone	NA	
Overall	LOW	

# NC SAM FIELD ASSESSMENT RESULTS

Accompanies User Manual Version 2.1

USACE AID #:	NCDWR #:				
	-				
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and					
number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions					
and explanations of requested information. Record in the "Notes/Sket					
NC SAM User Manual for examples of additional measurements that m					
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMEN					
PROJECT/SITE INFORMATION:					
1. Project name (if any): U-5706, Stream SI	2. Date of evaluation: 7/12/2018				
3. Applicant/owner name: NCDOT	4. Assessor name/organization: A.Keith/Axiom				
5. County: Rockingham	6. Nearest named water body				
7. River basin: Yadkin-PeeDee	on USGS 7.5-minute quad: Hitchcock Creek				
8. Site coordinates (decimal degrees, at lower end of assessment reac	h): 34.961418, -79.744127				
STREAM INFORMATION: (depth and width can be approximations					
	Length of assessment reach evaluated (feet): 50				
11. Channel depth from bed (in riffle, if present) to top of bank (feet):	4-7 Unable to assess channel depth.				
	assessment reach a swamp steam? □Yes ⊠No				
14. Feature type: Perennial flow Intermittent flow Tidal Marsh	Stream				
15. NC SAM Zone:	P) Inner Coastal Plain (I) Outer Coastal Plain (O)				
16. Estimated geomorphic					
valley shape ( <b>skip for</b> —					
Tidal Marsh Stream): (more sinuous stream, flatter valley s					
17. Watershed size: (skip □Size 1 (< 0.1 mi <sup>2</sup> ) ⊠Size 2 (0.1	to < 0.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 ( $\geq$ 5 mi <sup>2</sup> )				
for Tidal Marsh Stream) ADDITIONAL INFORMATION:					
18. Were regulatory considerations evaluated? ⊠Yes ⊡No If Yes, c	heck all that apply to the assessment area				
Section 10 water Classified Trout Waters	Water Supply Watershed (				
Essential Fish Habitat	High Quality Waters/Outstanding Resource Waters				
Publicly owned property  NCDWR Riparian buffer rule					
Anadromous fish 303(d) List	CAMA Area of Environmental Concern (AEC)				
Documented presence of a federal and/or state listed protected s	species within the assessment area.				
List species:					
Designated Critical Habitat (list species)					
19. Are additional stream information/supplementary measurements in	cluded in "Notes/Sketch" section or attached? Yes No				
1. Channel Water – assessment reach metric (skip for Size 1 stream	ame and Tidal March Stroame)				
$\square A$ Water throughout assessment reach.					
$\square$ B No flow, water in pools only.					
C No water in assessment reach.					
2. Evidence of Flow Restriction – assessment reach metric					
	ffle-pool sequence is severely affected by a flow restriction or fill to the				
	c macrophytes or ponded water or impoundment on flood or ebb within				
	culverts, causeways that constrict the channel, tidal gates, debris jams,				
beaver dams).					
⊠B Not A					
3. Feature Pattern – assessment reach metric					
	xamples: straightening, modification above or below culvert).				
B Not A					
4. Feature Longitudinal Profile – assessment reach metric					
A Majority of assessment reach has a substantially altered s	stream profile (examples: channel down-cutting, existing damming, over				
	where appropriate channel profile has not reformed from any of these				
disturbances).					
B Not A					
5. Signs of Active Instability – assessment reach metric					
	the stream has currently recovered. Examples of instability include				
	videning, and artificial hardening (such as concrete, gabion, rip-rap).				
<ul> <li>☐A &lt; 10% of channel unstable</li> <li>☐B 10 to 25% of channel unstable</li> </ul>					

C > 25% of channel unstable

# 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consider for the Left Bank (LB) an LB RB

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### 7. Water Quality Stressors – assessment reach/intertidal zone metric

#### Check all that apply.

□A □B

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B <u>Excessive</u> sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

#### 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

#### 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   ⊠B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	
--	--

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

□ □ □ □ □ Silt/clay (< 0.062 mm) □ □ □ □ □ □ □ Detritus			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand ( 062 – 2 mm)
			Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm)

11d. Tyes XNo Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

Adul	t frogs	

- Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/cravfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans
- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
  - Other fish Salamanders/tadpoles

  - Stonefly larvae (P)
  - Tipulid larvae
  - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

1

LB	RB	
ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
⊠в	⊠В	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

RB
ΠA
ΠE
⊠C

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep 2
- Majority of streamside area with depressions able to pond water < 3 inches deep ⊠C

#### 15. Wetland Presence - streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - ΠA Streams and/or springs (jurisdictional discharges)
  - ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - D Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ΞE Stream bed or bank soil reduced (dig through deposited sediment if present)
  - ΠF None of the above

### 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ⊠Ε Assessment reach relocated to valley edge
- ΠF None of the above

### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ⊠в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19.	Buffer Width -	<ul> <li>streamside area</li> </ul>	metric (ski	p for Tida	I Marsh Stre	eams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLB $\boxtimes A$ $\square A$ $\square A$ $\supseteq B$ $\square B$ $\square B$ $\square B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square D$ $\square B$
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	LB       RB         A       A         B       B         Non-mature woody vegetation <u>or</u> modified vegetation structure         C       C         Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D         Maintained shrubs         E       E
21.	Buffer Stressors - streamside area metric (skip for Tidal Marsh Streams)         Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet         AB       B         B       B         B       B         B       B         B       B         B       B         C       C         C       C         D       D         D       D         D       D
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB       RB         A       A         Medium to high stem density         B       B         Low stem density         C       No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)         Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.         LB       RB         MA       MA         The total length of buffer breaks is < 25 percent.         B       B         The total length of buffer breaks is between 25 and 50 percent.         C       The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB         A       A         Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species,
	<ul> <li>with non-native invasive species absent or sparse.</li> <li>B</li> <li>B</li></ul>
	<ul> <li>Communities missing understory but retaining canopy trees.</li> <li>✓C ✓C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.</li> </ul>
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams) 25a. ☐Yes ⊠No Was conductivity measurement recorded? If No, select one of the following reasons. ☐No Water ☐Other:
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46$ $\square B$ 46 to < 67 $\square C$ 67 to < 79 $\square D$ 79 to < 230 $\square E \ge 230$

Notes/Sketch: Urban stream flowing between two maintained residential yards. Incised with no streamside interaction.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name U-5706, Stream SI Date of Assessn	nent 7/12/2018	
Stream Category Ia2 Assessor Name/Organiza	ation A.Keith/Ax	tiom
Notes of Field Assessment Form (Y/N)	YES	
Presence of regulatory considerations (Y/N)	NO	
Additional stream information/supplementary measurements included (Y/N)	YES	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Perennia	I
	USACE/	NCDWR
Function Class Rating Summary	All Streams	Intermittent
(1) Hydrology	LOW	
(2) Baseflow	LOW	
(2) Flood Flow	LOW	
(3) Streamside Area Attenuation	LOW	
(4) Floodplain Access	LOW	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	LOW	
(4) Sediment Transport	HIGH	
(4) Stream Geomorphology	LOW	
(2) Stream/Intertidal Zone Interaction	NA	
(2) Longitudinal Tidal Flow	NA	
(2) Tidal Marsh Stream Stability	NA	
(2) Tidal Marsh Otean Otability (3) Tidal Marsh Channel Stability	NA	
	NA	
(3) Tidal Marsh Stream Geomorphology	LOW	
(1) Water Quality		
(2) Baseflow		
(2) Streamside Area Vegetation	MEDIUM	
(3) Upland Pollutant Filtration	MEDIUM	
(3) Thermoregulation	MEDIUM	
(2) Indicators of Stressors	YES	
(2) Aquatic Life Tolerance	LOW	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	LOW	
(2) In-stream Habitat	LOW	
(3) Baseflow	LOW	
(3) Substrate	HIGH	
(3) Stream Stability	LOW	
(3) In-stream Habitat	LOW	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	LOW	
(2) Tidal Marsh In-stream Habitat	NA	
(3) Flow Restriction	NA	
	NA	
(3) Tidal Marsh Stream Stability (4) Tidal Marsh Channel Stability		
	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone	NA LOW	
Overall		

# NC SAM FIELD ASSESSMENT RESULTS

Accompanies User Manual Version 2.1

USACE AID #:	NCDWR #:			
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,				
and circle the location of the stream reach under evaluation. If multiple				
number all reaches on the attached map, and include a separate form for				
and explanations of requested information. Record in the "Notes/Sketc				
NC SAM User Manual for examples of additional measurements that ma				
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT				
PROJECT/SITE INFORMATION:				
1. Project name (if any): U-5706 Stream SJ	2. Date of evaluation: 7/12/2018			
3. Applicant/owner name: NCDOT	4. Assessor name/organization: A.Keith/Axiom			
5. County: Rockingham	6. Nearest named water body			
7. River basin: Yadkin-PeeDee	on USGS 7.5-minute quad: Hitchcock Creek			
8. Site coordinates (decimal degrees, at lower end of assessment reach				
<b>STREAM INFORMATION: (depth and width can be approximations)</b> 9. Site number (show on attached map): Stream SJ 10. 1	Length of assessment reach evaluated (feet): 50			
11. Channel depth from bed (in riffle, if present) to top of bank (feet):	1-2 Unable to assess channel depth.			
	assessment reach a swamp steam? □Yes ⊠No			
14. Feature type: □Perennial flow ⊠Intermittent flow □Tidal Marsh				
STREAM CATEGORY INFORMATION:				
15. NC SAM Zone: Mountains (M) Piedmont (F	P) 🛛 Inner Coastal Plain (I) 🗌 Outer Coastal Plain (O)			
16. Estimated geomorphic				
valley shape (skip for				
Tidal Marsh Stream):         (more sinuous stream, flatter valley slope)	ope) (less sinuous stream, steeper valley slope)			
17. Watershed size: <b>(skip</b> Size 1 (< 0.1 mi <sup>2</sup> ) Size 2 (0.1 mi <sup>2</sup> )	to < 0.5 mi <sup>2</sup> ) $\Box$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 ( $\geq$ 5 mi <sup>2</sup> )			
for Tidal Marsh Stream)				
18. Were regulatory considerations evaluated? Xes INo If Yes, ct Section 10 water IClassified Trout Waters				
Section 10 water       Classified Trout Waters       Water Supply Watershed (				
Publicly owned property INCDWR Riparian buffer rule				
Anadromous fish	CAMA Area of Environmental Concern (AEC)			
Documented presence of a federal and/or state listed protected s				
List species:				
Designated Critical Habitat (list species)				
19. Are additional stream information/supplementary measurements inc	cluded in "Notes/Sketch" section or attached?			
1. Channel Water – assessment reach metric (skip for Size 1 strea	ms and Tidal March Streams)			
$\square A$ Water throughout assessment reach.				
B No flow, water in pools only.				
C No water in assessment reach.				
2. Evidence of Flow Restriction – assessment reach metric				
At least 10% of assessment reach in-stream habitat or rif	fle-pool sequence is severely affected by a flow restriction or fill to the			
point of obstructing flow <u>or</u> a channel choked with aquatic	macrophytes or ponded water or impoundment on flood or ebb within			
	culverts, causeways that constrict the channel, tidal gates, debris jams,			
beaver dams). ⊠B Not A				
3. Feature Pattern – assessment reach metric	complexe straightening modification shows or holes where the			
⊠A A majority of the assessment reach has altered pattern (ex ☐B Not A	amples: straightening, modification above or below culvert).			
4. Feature Longitudinal Profile – assessment reach metric	waam nyafila (ayamalaay ahannal daya ayttiga ayistiga daga daga			
	tream profile (examples: channel down-cutting, existing damming, over			
widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).				
B Not A				
5. Signs of Active Instability – assessment reach metric				
	the stream has currently recovered. Examples of instability include			
active bank failure, active channel down-cutting (head-cut), active w				
A < 10% of channel unstable				
B 10 to 25% of channel unstable				

 $\Box C$  > 25% of channel unstable

# 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

LB RB

□a ⊠b

ПС

- A Little or no evidence of conditions that adversely affect reference interaction
- B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

#### 7. Water Quality Stressors – assessment reach/intertidal zone metric

#### Check all that apply.

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B <u>Excessive</u> sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

#### 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

#### 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. XYes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   □B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	   G H = J K
Check for Ti Marsh Strea Only	□ □ □ □ H

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus
$\boxtimes$			

11d. Tyes XNo Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

Adu	lt frogs	

- Aquatic reptiles
  - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/cravfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans
- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
  - Other fish Salamanders/tadpoles

  - Stonefly larvae (P)
  - Tipulid larvae
  - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

1

LB	RB	
ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
⊠В	⊠В	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB
ΠA	ΠA
□В	B
⊠C	⊠C

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep 2
- Majority of streamside area with depressions able to pond water < 3 inches deep ⊠C

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

#### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - ΠA Streams and/or springs (jurisdictional discharges)
  - ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - D Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ΞE Stream bed or bank soil reduced (dig through deposited sediment if present)
  - ΠF None of the above

### 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- Пв Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ⊠в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodeLBRBLB $\square A$ $\square A$ $\square A$ $\square B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square E$ $\square E$ $\square E$	RB $\square$ A ≥ 100 feet wide <u>or</u> extends to the edge of the watershed $\square$ B From 50 to < 100 feet wide $\square$ C From 30 to < 50 feet wide $\square$ D From 10 to < 30 feet wide
20.		treamside area metric (skip for Tidal Marsh Streams) nk (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	LB RB □A □A M ⊠B □B N □C ⊠C H □D □D M	lature forest on-mature woody vegetation <u>or</u> modified vegetation structure erbaceous vegetation with or without a strip of trees < 10 feet wide laintained shrubs ttle or no vegetation
21.		streamside area metric (skip for Tidal Marsh Streams) te boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is
	within 30 feet of stream	am (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet). <i>r</i> ing stressors occurs on either bank, check here and skip to Metric 22:
	Abuts < 30 fe	30-50 feet
		$\Box A \Box A Row crops$
		C C Pasture (no livestock)/commercial horticulture
<b>วว</b>		D D Pasture (active livestock use)
<b>ZZ</b> .	Consider for left ba	nk (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
		ledium to high stem density
		ow stem density o wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.		ated Buffer – streamside area metric (skip for Tidal Marsh Streams) getated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	LB RB	he total length of buffer breaks is < 25 percent.
	□B □B TI	he total length of buffer breaks is between 25 and 50 percent. he total length of buffer breaks is > 50 percent.
24.		ition – streamside area metric (skip for Tidal Marsh Streams)
		nt vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to
	W	egetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, ith non-native invasive species absent or sparse.
	sp	egetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native becies. This may include communities of weedy native species that develop after clear-cutting or clearing <u>or</u> communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u>
		ommunities missing understory but retaining canopy trees. egetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities ith non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted ands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. □Yes ⊠No	essment reach metric (skip for all Coastal Plain streams) Was conductivity measurement recorded? e of the following reasons.  No Water  Other:
	25b. Check the box □A < 46	corresponding to the conductivity measurement (units of microsiemens per centimeter). ☐B 46 to < 67

#### Notes/Sketch:

Intermittent stream that flows into wetland with maintaitn yard on the right bank. Large decaying animal carcass creating debris jam. Left bank comprised of invasive vegetation near road, with native wetland vegetation occuring downstream.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name U-5706 Stream SJ Date of	Assessment 7/12/2018	
Stream Category Ia1 Assessor Name/C		m
<u> </u>	J	
Notes of Field Assessment Form (Y/N)	YES	
Presence of regulatory considerations (Y/N)	NO	_
Additional stream information/supplementary measurements included (		_
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent	_
		_
	USACE/	NCDWR
Function Class Rating Summary		Intermittent
(1) Hydrology	MEDIUM	MEDIUM
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	MEDIUM	MEDIUM
(3) Streamside Area Attenuation	MEDIUM	MEDIUM
(3) Streamside Area Attendation (4) Floodplain Access	MEDIUM	MEDIUM
	MEDIUM	MEDIUM
(4) Wooded Riparian Buffer		
(4) Microtopography	MEDIUM	MEDIUM
(3) Stream Stability	MEDIUM	MEDIUM
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	HIGH	HIGH
(4) Stream Geomorphology	LOW	LOW
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomor	hology NA	NA
(1) Water Quality	LOW	LOW
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	MEDIUM	MEDIUM
(2) Indicators of Stressors	YES	YES
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	MEDIUM	MEDIUM
(2) In-stream Habitat	MEDIUM	MEDIUM
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	HIGH	HIGH
(3) Stream Stability	MEDIUM	MEDIUM
(3) In-stream Habitat	LOW	LOW
(2) Stream-side Habitat	MEDIUM	MEDIUM
(2) Stream-side Habitat	MEDIUM	MEDIUM
(3) Thermoregulation	MEDIUM	MEDIUM
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
	NA NA	NA
(3) Tidal Marsh Stream Stability (4) Tidal Marsh Channel Stability		NA
(4) Tidal Marsh Stream Geomor (3) Tidal Marsh In-stream Habitat		NA
	NA	NA
(2) Intertidal Zone	NA	NA
Overall	MEDIUM	MEDIUM

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User Manual Version 2.1		
USACE AID #:	NCDWR #:		
	ketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,		
	stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and		
	tached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions		
	ed information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the		
	amples of additional measurements that may be relevant.		
	SSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).		
PROJECT/SITE INFORMATI	ION:		
1. Project name (if any):	U-5706- Stream SK 2. Date of evaluation: 180717		
3. Applicant/owner name:	NCDOT 4. Assessor name/organization: Perkinson/Axiom		
5. County:	Richmond 6. Nearest named water body		
7. River basin:	Yadkin-PeeDee on USGS 7.5-minute quad: Hitchcock Creek		
8. Site coordinates (decimal d	degrees, at lower end of assessment reach): 34.953309, -79.753081		
	depth and width can be approximations)		
9. Site number (show on attac	· · · · · · · · · · · · · · · · · · ·		
	(in riffle, if present) to top of bank (feet): <u>1-2</u> Unable to assess channel depth.		
12. Channel width at top of ba			
14. Feature type: Perennia	al flow Intermittent flow ITidal Marsh Stream		
STREAM CATEGORY INFO	RMATION:		
15. NC SAM Zone:	🗌 Mountains (M) 🛛 Piedmont (P) 🛛 Inner Coastal Plain (I) 🗌 Outer Coastal Plain (O)		
16. Estimated geomorphic			
valley shape ( <b>skip for</b>			
Tidal Marsh Stream):	(more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)		
17. Watershed size: (skip	Size 1 (< 0.1 mi <sup>2</sup> ) Size 2 (0.1 to < 0.5 mi <sup>2</sup> )		
for Tidal Marsh Stream)			
ADDITIONAL INFORMATION			
18. Were regulatory considera	rations evaluated? $\Box$ Yes $\Box$ No If Yes, check all that apply to the assessment area.		
Section 10 water	Classified Trout Waters		
Essential Fish Habitat			
Publicly owned property INCDWR Riparian buffer rule in effect INutrient Sensitive Waters			
Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)			
Anadromous fish	303(d) List     CAMA Area of Environmental Concern (AEC)		
	□ 303(d) List □ CAMA Area of Environmental Concern (AEC) e of a federal and/or state listed protected species within the assessment area.		
Documented presence	e of a federal and/or state listed protected species within the assessment area.		
Documented presence List species: Designated Critical Hat	e of a federal and/or state listed protected species within the assessment area.		
Documented presence List species: Designated Critical Hab 19. Are additional stream info	e of a federal and/or state listed protected species within the assessment area. bitat (list species)		
Documented presence List species: Designated Critical Hab 19. Are additional stream info 1. Channel Water – assess	e of a federal and/or state listed protected species within the assessment area. bitat (list species) commation/supplementary measurements included in "Notes/Sketch" section or attached?		
Documented presence List species: Designated Critical Hab 19. Are additional stream info  Channel Water – assess A Water throughou	e of a federal and/or state listed protected species within the assessment area. bitat (list species) commation/supplementary measurements included in "Notes/Sketch" section or attached?  Yes No sement reach metric (skip for Size 1 streams and Tidal Marsh Streams) ut assessment reach.		
Documented presence List species: Designated Critical Hab 19. Are additional stream info 1. Channel Water – assess	e of a federal and/or state listed protected species within the assessment area. bitat (list species) commation/supplementary measurements included in "Notes/Sketch" section or attached?  Yes No sement reach metric (skip for Size 1 streams and Tidal Marsh Streams) ut assessment reach. n pools only.		

#### 2. Evidence of Flow Restriction – assessment reach metric

At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).

B Not A

#### 3. Feature Pattern – assessment reach metric

A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). Not A

#### 4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- B Not A

### 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

A < 10% of channel unstable

B 10 to 25% of channel unstable

C > 25% of channel unstable

#### Streamside Area Interaction – streamside area metric 6. ELeft Bank (LB) and the Right Bank (RB).

Consid	der for the	e lett e
LB	RB	
ΠA	$\boxtimes A$	Little
⊠В	ПВ	Mod

- ⊠A ⊡B Little or no evidence of conditions that adversely affect reference interaction
  - Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- C Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### 7. Water Quality Stressors - assessment reach/intertidal zone metric

#### Check all that apply.

C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam) LΑ
- ⊡в Excessive sedimentation (burying of stream features or intertidal zone)
- □с Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- ΠG Excessive algae in stream or intertidal zone
- Н Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: (explain in "Notes/Sketch" section)
- Μ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours ΠA
- ПВ Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠c No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. 🗌 Yes 🗌 No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- Multiple aquatic macrophytes and aquatic mosses ΠА (include liverworts, lichens, and algal mats) ⊠в Multiple sticks and/or leaf packs and/or emergent vegetation ПС Multiple snags and logs (including lap trees) D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- ΠE Little or no habitat

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- ⊠A ⊠B Riffle-run section (evaluate 11c)
  - Pool-glide section (evaluate 11d)
- ПС Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but  $\leq$  10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.



11d. Xes Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams) No

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:

12b. ⊠Yes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

>1 Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 st
--

Adult frogs

Aquatic reptiles

Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)

- Beetles
- Caddisfly larvae (T)
- Asian clam (*Corbicula*) Crustacean (isopod/amphipod/crayfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans

- Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
  - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
  - Other fish Salamanders/tadpoles
  - Snails]
  - Stonefly larvae (P)
  - Tipulid larvae
  - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB

ΠA	$\boxtimes A$	Little or no alteration to water storage capacity over a majority of the streamside area
□A ⊠B	□В	Moderate alteration to water storage capacity over a majority of the streamside area
□c	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

001101	
LB	RB
ΠA	
□в	⊠E
⊠C	

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- Majority of streamside area with depressions able to pond water < 3 inches deep ⊔С

#### 15. Wetland Presence - streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB
  - ×Ν
- ×Ν ΠN ΠN
- Are wetlands present in the streamside area?

### 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - Streams and/or springs (jurisdictional discharges) A
  - В Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - ⊟c ⊠D Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ĒΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
  - ΠF None of the above

### 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

### Check all that apply.

- ΠA Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- ⊡в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- D Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
- Ē Assessment reach relocated to valley edge
- F None of the above

### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- $\square A$ Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ∏в Degraded (example: scattered trees)
- ПС Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mar</li></ol>	sh Streams)
---	-------------

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

	to the first break.
	VegetatedWoodedLBRBLBRB $\boxtimes A$ $\boxtimes A$ $\cong A$ $\ge 100$ feet wide or extends to the edge of the watershed $\square B$ $\square B$ $\square B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square C$ $\square D$ $\square B$ $\square B$ $\square D$ $\square B$ $\square B$ $\square D$ $\square B$ $\square D$ <
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	LB       RB         MA       Mature forest         B       B       Non-mature woody vegetation or modified vegetation structure         C       C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D       Maintained shrubs         E       E       Little or no vegetation
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams) Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet). If none of the following stressors occurs on either bank, check here and skip to Metric 22:
	Abuts < 30 feet 30-50 feet
	LB RB LB RB LB RB
	B       B       B       B       B       B       Maintained turf         C       C       C       C       C       C       Pasture (no livestock)/commercial horticulture
	D D D D D D Pasture (active livestock use)
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB
	B B Low stem density
23	C       C       No wooded riparian buffer or predominantly herbaceous species or bare ground         Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)
20.	Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	LB RB $\square A$ $\square A$ The total length of buffer breaks is < 25 percent.
	B       B       The total length of buffer breaks is between 25 and 50 percent.         C       C       The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
	Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.
	LB RB A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species,
	with non-native invasive species absent or sparse. $\boxtimes B$ $\boxtimes B$ Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native
	species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	C C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)
	25a. ☐Yes ⊠No Was conductivity measurement recorded? If No, select one of the following reasons. ☐No Water ☐Other:
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). □A < 46 □B 46 to < 67 □C 67 to < 79 □D 79 to < 230 □E ≥ 230

#### Notes/Sketch:

Urban stream with lots of "wrack" and debris. NCSAM completed upstream of road crossing, downstream of culverted crossing stream bed drops several feet. Wetlands on either bank most likely culvert is partially blocked restricting storm events. Lots of rip rap detritus in channel. either side of the road is being regularly maintained.

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

Stream Site Name	U-5706 -Stream SK Date of Assessm	ient 180717	
Stream Category	la2 Assessor Name/Organizat	tion Perkinson	/Axiom
Notes of Field Asses	sment Form (Y/N)	YES	
Presence of regulato	ory considerations (Y/N)	NO	
Additional stream inf	ormation/supplementary measurements included (Y/N)	YES	
NC SAM feature type	e (perennial, intermittent, Tidal Marsh Stream)	Perennia	
		USACE/	NCDWR
	Function Class Rating Summary	All Streams	Intermittent
	(1) Hydrology	LOW	
	(2) Baseflow	LOW	
	(2) Flood Flow	MEDIUM	
	(3) Streamside Area Attenuation	HIGH	
	(4) Floodplain Access	HIGH	
	(4) Wooded Riparian Buffer	HIGH	
	(4) Microtopography	LOW	
	(3) Stream Stability	LOW	
	(4) Channel Stability	MEDIUM	
	(4) Sediment Transport	LOW	
	(4) Stream Geomorphology	MEDIUM	
	(2) Stream/Intertidal Zone Interaction	NA	
	(2) Longitudinal Tidal Flow	NA	
	(2) Tidal Marsh Stream Stability	NA	
	(3) Tidal Marsh Channel Stability	NA	
	(3) Tidal Marsh Stream Geomorphology	NA	
	(1) Water Quality	LOW	
	(2) Baseflow	LOW	
	(2) Streamside Area Vegetation	HIGH	
	(3) Upland Pollutant Filtration	HIGH	
	(3) Thermoregulation	HIGH	
	(2) Indicators of Stressors	NO	
	(2) Aquatic Life Tolerance		
	(2) Intertidal Zone Filtration	NA	
	(1) Habitat	LOW	
	(2) In-stream Habitat	LOW	
	(3) Baseflow		
	(3) Substrate	MEDIUM	
	(3) Stream Stability	MEDIUM	
	(3) In-stream Habitat	LOW	
	(2) Stream-side Habitat	HIGH	
	(3) Stream-side Habitat	HIGH	
	(3) Thermoregulation	HIGH	
	(2) Tidal Marsh In-stream Habitat	NA	
	(3) Flow Restriction	NA	
	(3) Tidal Marsh Stream Stability	NA	
	(4) Tidal Marsh Channel Stability	NA	
	(4) Tidal Marsh Stream Geomorphology	NA	
	(3) Tidal Marsh In-stream Habitat	NA	
	(2) Intertidal Zone	NA	
	Overall	LOW	

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User Manual Version 2.1
USACE AID #:	NCDWR #:
<b>INSTRUCTIONS:</b> Attach a sk	ketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,
and circle the location of the s	stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and
number all reaches on the atta	ached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions
and explanations of requested	d information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the
	mples of additional measurements that may be relevant.
	SORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).
PROJECT/SITE INFORMATION	ON:
1. Project name (if any):	U-5706 Stream SL-int 2. Date of evaluation: 180717
3. Applicant/owner name:	NCDOT 4. Assessor name/organization: Axiom/Perkinson
5. County:	Richmond 6. Nearest named water body
7. River basin:	Yadkin-PeeDee on USGS 7.5-minute quad: Hitchcock Creek
8. Site coordinates (decimal d	egrees, at lower end of assessment reach): 34.951273, -79.755373
STREAM INFORMATION: (de	epth and width can be approximations)
9. Site number (show on attac	thed map): Stream SL-int 10. Length of assessment reach evaluated (feet): 50
11. Channel depth from bed (i	in riffle, if present) to top of bank (feet): 1 Unable to assess channel depth.
12. Channel width at top of ba	nk (feet): 1-3 13. Is assessment reach a swamp steam? □Yes ⊠No
	I flow Intermittent flow Tidal Marsh Stream
STREAM CATEGORY INFOR	
15. NC SAM Zone:	Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)
16. Estimated geomorphic	
valley shape ( <b>skip for</b> Tidal Marsh Stream):	(more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)
17. Watershed size: (skip	□Size 1 (< 0.1 mi <sup>2</sup> )  Size 2 (0.1 to < 0.5 mi <sup>2</sup> )  Size 3 (0.5 to < 5 mi <sup>2</sup> )  Size 4 (≥ 5 mi <sup>2</sup> )
for Tidal Marsh Stream)	
ADDITIONAL INFORMATION	
• •	ations evaluated? X Yes No If Yes, check all that apply to the assessment area.
Section 10 water	□Classified Trout Waters □Water Supply Watershed (□I □II □II □IV □V)
Essential Fish Habitat	Primary Nursery Area High Quality Waters/Outstanding Resource Waters
Publicly owned property	
Anadromous fish	303(d) List     CAMA Area of Environmental Concern (AEC)
	of a federal and/or state listed protected species within the assessment area.
List species:	
Designated Critical Hab	
19. Are additional stream infor	rmation/supplementary measurements included in "Notes/Sketch" section or attached? ⊠Yes □No
	ment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

B No flow, water in pools only.

C No water in assessment reach.

#### 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- B Not A

4.

#### 3. Feature Pattern – assessment reach metric

- A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).

#### Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- B Not A

#### 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

A < 10% of channel unstable

B 10 to 25% of channel unstable

C > 25% of channel unstable

#### 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Ba
LB	RB	
ΠA	ΠA	Little o
ПВ	ПВ	Moder

- A Little or no evidence of conditions that adversely affect reference interaction Moderate evidence of conditions (examples: berms, levees, down-cutting, a
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### 7. Water Quality Stressors - assessment reach/intertidal zone metric

#### Check all that apply.

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

#### 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

#### 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. XYes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
   B Multiple sticks and/or leaf packs and/or emergent vegetation
   C Multiple snags and logs (including lap trees)
   D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
- In banks extend to the normal wetted pe
- E Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]J K
--	---------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand ( $.062 - 2$ mm) Silt/clay (< 0.062 mm) Detritus
		(

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

#### 12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
    - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)
    - Dipterans
    - Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

#### 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB

ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□В	Moderate alteration to water storage capacity over a majority of the streamside area
⊠C	⊠C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

#### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA ⊡в □в ⊠c

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

#### 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

#### Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- DD Evidence of bank seepage or sweating (iron in water indicates seepage)
- Ξe Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

# 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

### Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- ПВ Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

### 18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars</li></ol>	n Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLB $\boxtimes A$ $\boxtimes A$ $\square A$ $\supseteq B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square E$ $\square E$ $\boxtimes E$ $< 100$ feet $\square C$ </th <th>wide wide</th>	wide wide			
20.	<ul> <li>Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)</li> <li>Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).</li> <li>LB RB</li> <li>A A Mature forest</li> <li>B B Non-mature woody vegetation or modified vegetation structure</li> </ul>				
		without a strip of trees < 10 feet wide			
21.	within 30 feet of stream (< 30 feet), or is between 3         If none of the following stressors occurs on eit         Abuts       < 30 feet         30-50 feet         LB       RB         LB       RB         LB       RB         LB       B         B       B         B       B         B       B         B       B         B       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         A       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C         C       C <th>and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is 80 to 50 feet of stream (30-50 feet).</th>	and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is 80 to 50 feet of stream (30-50 feet).			
22.	22. Stem Density – streamside area metric (skip fo Consider for left bank (LB) and right bank (RB)				
	LB RB □A □A Medium to high stem density □B □B Low stem density ⊠C ⊠C No wooded riparian buffer <u>or</u> pr	edominantly herbaceous species <u>or</u> bare ground			
23.	LB RB ⊠A ⊠A The total length of buffer break	long stream (parallel). Breaks are areas lacking vegetation > 10 feet wide. s is < 25 percent. s is between 25 and 50 percent.			
24.	4. Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams) Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat. LB RB				
	with non-native invasive specie	ce in terms of species diversity or proportions, but is still largely composed of native			
	<ul> <li>species. This may include communities of weedy native species that develop after clear-cutting or clearing <u>c</u> communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>c</u> communities missing understory but retaining canopy trees.</li> <li></li></ul>				
25.	25a. 🗌 Yes 🖾 No 🛛 Was conductivity measure	5. Conductivity – assessment reach metric (skip for all Coastal Plain streams) 25a. □Yes ⊠No Was conductivity measurement recorded? If No, select one of the following reasons. □No Water □Other:			
	25b. Check the box corresponding to the conduct □A < 46 □B 46 to < 67 □C	ivity measurement (units of microsiemens per centimeter). C 67 to < 79 □D 79 to < 230 □E $\ge$ 230			

#### Notes/Sketch:

Narrow stream orginating outside project area and flowing through several regualry maintained residential yards....stream enters culvet in yard and daylights from underneath a private shed a perennial stream

# Draft NC SAM Stream Rating Sheet Accompanies User Manual Version 2.1

tream Site Name	U-5706 Stream SL-int Date of Assessm		dia a a a
Stream Category	la2 Assessor Name/Organizat	tion Axiom/Perk	anson
		VEO	
Notes of Field Asses		YES	
-	ory considerations (Y/N) formation/supplementary measurements included (Y/N)	NO YES	
	e (perennial, intermittent, Tidal Marsh Stream)	Intermitten	+
C SAIN leature typ	e (perenniai, internittent, ridai Marsh Stream)	Internitten	<u> </u>
			NCDWR
	Function Class Rating Summary	USACE/ All Streams	Intermittent
	(1) Hydrology	LOW	LOW
	(2) Baseflow	MEDIUM	MEDIUM
	(2) Flood Flow	LOW	LOW
	(3) Streamside Area Attenuation	LOW	LOW
	(4) Floodplain Access	LOW	LOW
	(4) Wooded Riparian Buffer		LOW
	(4) Microtopography	LOW	LOW
	(3) Stream Stability		LOW
	(4) Channel Stability	MEDIUM	MEDIUM
	(4) Sediment Transport	LOW	LOW
	(4) Stream Geomorphology	LOW	LOW
	(2) Stream/Intertidal Zone Interaction	NA	NA
	(2) Longitudinal Tidal Flow	NA	NA
	(2) Tidal Marsh Stream Stability	NA	NA
	(3) Tidal Marsh Channel Stability	NA	NA
	(3) Tidal Marsh Stream Geomorphology	NA	NA
	(1) Water Quality	LOW	LOW
	(2) Baseflow	MEDIUM	MEDIUM
	(2) Streamside Area Vegetation	MEDIUM	MEDIUM
	(3) Upland Pollutant Filtration	HIGH	HIGH
	(3) Thermoregulation	LOW	LOW
	(2) Indicators of Stressors	YES	YES
	(2) Aquatic Life Tolerance	LOW	NA
	(2) Intertidal Zone Filtration	NA	NA
	(1) Habitat	LOW	LOW
	(2) In-stream Habitat	LOW	LOW
	(3) Baseflow	MEDIUM	MEDIUM
	(3) Substrate		
	(3) Stream Stability	MEDIUM	MEDIUM
	(3) In-stream Habitat		LOW
	(2) Stream-side Habitat	LOW	LOW
	(3) Stream-side Habitat	LOW	LOW
	(3) Thermoregulation	LOW	LOW
	(2) Tidal Marsh In-stream Habitat	NA	NA
	(3) Flow Restriction	NA	NA
	(3) Tidal Marsh Stream Stability	NA	NA
	(4) Tidal Marsh Channel Stability	NA	NA
	(4) Tidal Marsh Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-stream Habitat	NA	NA
	(2) Intertidal Zone	NA	NA
	Overall	LOW	LOW

# NC SAM FIELD ASSESSMENT RESULTS

Accompanies User Manual Version 2
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USACE AID #: NCDWR #:			
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,			
and circle the location of the stream reach under evaluation. If multiple stream reaches w			
number all reaches on the attached map, and include a separate form for each reach. See			
and explanations of requested information. Record in the "Notes/Sketch" section if supple	ementary measurements were performed. See the		
NC SAM User Manual for examples of additional measurements that may be relevant.			
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not ne	eed to be within the assessment area).		
PROJECT/SITE INFORMATION:			
1. Project name (if any): U-5706- Stream SL (perennial) 2. Date of evaluat			
3. Applicant/owner name: NCDOT 4. Assessor name	e/organization: Axiom/Perkinson		
5. County: Richmond 6. Nearest named			
7. River basin: Yadkin-PeeDee on USGS 7.5-r			
8. Site coordinates (decimal degrees, at lower end of assessment reach): 34.951273,	-79.755373		
STREAM INFORMATION: (depth and width can be approximations)			
	ent reach evaluated (feet): 150		
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 3	Unable to assess channel depth.		
	a swamp steam?		
14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream			
STREAM CATEGORY INFORMATION:			
15. NC SAM Zone:	astal Plain (I)		
16. Estimated geomorphic			
valley shape (skip to	(less sinuous stream, steeper valley slope)		
	Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\Box$ Size 4 (≥ 5 mi <sup>2</sup> )		
for Tidal Marsh Stream) ADDITIONAL INFORMATION:			
18. Were regulatory considerations evaluated? ⊠Yes ⊡No If Yes, check all that apply t	to the assessment area		
	er Supply Watershed (		
	h Quality Waters/Outstanding Resource Waters		
	ient Sensitive Waters		
	IA Area of Environmental Concern (AEC)		
Documented presence of a federal and/or state listed protected species within the a	ssessment area.		
List species:			
Designated Critical Habitat (list species)			
19. Are additional stream information/supplementary measurements included in "Notes/Sk	tetch" section or attached?  Yes  No		
4 Ohennel Water and another water (align for Circ 4 attracts and Tidal Mar			
<ol> <li>Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marson A)</li> <li>Water throughout assessment reach.</li> </ol>	sn Streams)		
$\square$ B No flow, water in pools only.			
$\Box C$ No water in assessment reach.			
<ol> <li>Evidence of Flow Restriction – assessment reach metric</li> <li>A At least 10% of assessment reach in-stream habitat or riffle-pool sequence in the stream habitat or riffle-pool sequence in</li></ol>	is soverely affected by a flow restriction or fill to the		
point of obstructing flow or a channel choked with aquatic macrophytes or p			
the assessment reach (examples: undersized or perched culverts, causeway			
beaver dams).			
⊠B Not A			
3. Feature Pattern – assessment reach metric			
A majority of the assessment reach has altered pattern (examples: straighten	ing, modification above or below culvert).		
B Not A	-		
4. Feature Longitudinal Profile – assessment reach metric			
$\square$ A Majority of assessment reach has a substantially altered stream profile (exam	ples: channel down-cutting. existing damming. over		
widening, active aggradation, dredging, and excavation where appropriate of			
disturbances).			
B Not A			
5. Signs of Active Instability – assessment reach metric			
Consider only current instability, not past events from which the stream has cu	urrently recovered. Examples of instability include		
active bank failure, active channel down-cutting (head-cut), active widening, and artifici			
$\Box A < 10\% \text{ of channel unstable}$			
⊠B 10 to 25% of channel unstable			

C > 25% of channel unstable

#### 6. Streamside Area Interaction – streamside area metric Left Bank (LB) and the Right Bank (RB).

Consi	der for the	e Left Bank (L
B	RB	
A	ΠA	Little or no

- Little or no evidence of conditions that adversely affect reference interaction ΠA
  - Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- ⊠C Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### Water Quality Stressors - assessment reach/intertidal zone metric 7.

#### Check all that apply.

□в

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam) ΠА
- Excessive sedimentation (burying of stream features or intertidal zone) ⊠в
- Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- Odor (not including natural sulfide odors) DD
- Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" ΠE section.
- □F Livestock with access to stream or intertidal zone
- ŪG Excessive algae in stream or intertidal zone
- Πн Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: (explain in "Notes/Sketch" section)
- ΠJ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours ΠA
- Πв Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠C No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

#### 10. Natural In-stream Habitat Types - assessment reach metric

10a. 🗌 Yes □No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

#### 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- Multiple aquatic macrophytes and aquatic mosses ΠA (include liverworts, lichens, and algal mats) ΠВ Multiple sticks and/or leaf packs and/or emergent vegetation ПС Multiple snags and logs (including lap trees) ΠD 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- ⊠Ε Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]I ]J ]K
--	----------------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

### 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - ⊠Α Riffle-run section (evaluate 11c)
  - ⊠В Pool-glide section (evaluate 11d)
  - ПС Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but < 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach. ND р C ۸

			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus Artificial (rip-rap, concrete, etc.)
$\bowtie$			Artificial (rip-rap, concrete, etc.)

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)
- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Xes □No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1

$\boxtimes$	Adult frogs
	Aquatic reptiles
	Aquatic macrophyt
	Beetles
	Caddisfly larvae (T
	Asian clam (Corbic
	Crustacean (isopod
	Damselfly and drag
	Dipterans
	☐Mayfly larvae (E)
	Megaloptera (alder
	Midges/mosquito la

1

- Aquatic reptiles
- Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles
- Caddisfly larvae (T)
- Asian clam (Corbicula)
- Crustacean (isopod/amphipod/cravfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans Mayfly larvae (E)
- Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
- Mussels/Clams (not Corbicula)
  - Other fish Salamanders/tadpoles

  - Stonefly larvae (P)
  - Tipulid larvae
  - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB

ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
⊠C	⊠C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB
ΠA	ΠA
□в	□в
⊠C	⊠C

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- Majority of streamside area with depressions able to pond water < 3 inches deep ⊠C

## 15. Wetland Presence - streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

## 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

## Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- D Evidence of bank seepage or sweating (iron in water indicates seepage)
- Ξe Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- ПВ Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
---	------------

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLB $\boxtimes A$ $\square A$ $\square A$ $\supseteq B$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square D$ $\square B$ <th></th>	
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).         LB       RB         \[]A       \[]A         Mature forest	
	B       B       Non-mature woody vegetation <u>or</u> modified vegetation structure         C       C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D       Maintained shrubs         E       E       Little or no vegetation	
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams) Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).	t but is
	If none of the following stressors occurs on either bank, check here and skip to Metric 22: Abuts < 30 feet 30-50 feet	
	LB RB LB RB LB RB	
	B    B    B    B    B    Maintained turf      C    C    C    C    C    Pasture (no livestock)/commercial horticulture	
	$ \Box \Box$	
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)	
	Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width). LB RB	
	A       A       Medium to high stem density         B       B       Low stem density	
	C No wooded riparian buffer or predominantly herbaceous species or bare ground	
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams) Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.	
	LB RB	
	⊠A       ⊠A       The total length of buffer breaks is < 25 percent.         □B       □B       The total length of buffer breaks is between 25 and 50 percent.	
	$\Box C$ $\Box C$ The total length of buffer breaks is > 50 percent.	
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams) Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contribut assessment reach habitat. LB RB	utes to
	A CA Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native sp with non-native invasive species absent or sparse.	becies,
	B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of species. This may include communities of weedy native species that develop after clear-cutting or clear communities with non-native invasive species present, but not dominant, over a large portion of the expected st	ring <u>or</u>
	<ul> <li>C ⊠C</li> <li>C ⊠C</li> <li>C ⊠C</li> <li>C ⊠C</li> <li>C ⊠C</li> <li>C ≅C</li> <li>C ≅C</li> <li>C ≅C</li> <li>C ≅C</li> <li>C ⇒ C </li> <li>C ⇒ C </li> <li>C <th>unities</th></li></ul>	unities
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams) 25a.  Yes  No Was conductivity measurement recorded? If No, select one of the following reasons.  No Water  Other:	
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46 \qquad \square B  46 \text{ to } < 67 \qquad \square C  67 \text{ to } < 79 \qquad \square D  79 \text{ to } < 230 \qquad \square E \geq 230$	

#### Notes/Sketch:

Stream side area recently clear cut, no woody vegetation. Evidence that herbicide applications have been based on observations of dead ligustrum, watershed is urban, draining a large residential area. Perennial origin was unable to be located, no rain in several days, strong baseflow.

Stream Site Name	U-5706 Stream SL (perennial) Date of Assessm	ent 180717	
Stream Category	la2 Assessor Name/Organizat	ion Axiom/Per	kinson
Notes of Field Asses	ssment Form (Y/N)	YES	
Presence of regulate	ory considerations (Y/N)	NO	
Additional stream in	formation/supplementary measurements included (Y/N)		
NC SAM feature typ	e (perennial, intermittent, Tidal Marsh Stream)	Perennia	l
		USACE/	NCDWR
	Function Class Rating Summary	All Streams	Intermittent
	(1) Hydrology	LOW	
	(2) Baseflow	MEDIUM	
	(2) Flood Flow	LOW	
	(3) Streamside Area Attenuation	LOW	
	(4) Floodplain Access	LOW	
	(4) Wooded Riparian Buffer	LOW	
	(4) Microtopography	LOW	
	(3) Stream Stability	LOW	
	(4) Channel Stability	MEDIUM	
	(4) Sediment Transport	LOW	
	(4) Stream Geomorphology	LOW	
	(2) Stream/Intertidal Zone Interaction	NA	
	(2) Longitudinal Tidal Flow	NA	
	(2) Tidal Marsh Stream Stability	NA	
	(3) Tidal Marsh Channel Stability	NA	
		NA	
	(3) Tidal Marsh Stream Geomorphology		
	(1) Water Quality		
	(2) Baseflow	MEDIUM	
	(2) Streamside Area Vegetation	MEDIUM	
	(3) Upland Pollutant Filtration	HIGH	
	(3) Thermoregulation	LOW	
	(2) Indicators of Stressors	NO	
	(2) Aquatic Life Tolerance	LOW	
	(2) Intertidal Zone Filtration	NA	
	(1) Habitat	LOW	
	(2) In-stream Habitat	LOW	
	(3) Baseflow	MEDIUM	
	(3) Substrate	MEDIUM	
	(3) Stream Stability	MEDIUM	
	(3) In-stream Habitat	LOW	
	(2) Stream-side Habitat	LOW	
	(3) Stream-side Habitat	LOW	
	(3) Thermoregulation	LOW	
	(2) Tidal Marsh In-stream Habitat	NA	
	(3) Flow Restriction	NA	
	(3) Tidal Marsh Stream Stability	NA	
	(4) Tidal Marsh Channel Stability	NA	
	(4) Tidal Marsh Stream Geomorphology	NA	
	(3) Tidal Marsh In-stream Habitat	NA	
	(3) Intertidal Zone	NA	
	Overall	LOW	

# NC SAM FIELD ASSESSMENT RESULTS

Accompanies User Manual Version 2.1

		•		
USACE AID #:			NCDWR #:	
				7.5-minute topographic quadrangle,
		•		on the same property, identify and
				ser Manual for detailed descriptions
				rements were performed. See the
	anual for examples of additional E OF STRESSORS AFFECTING			the assessment area)
		DINE ASSESSMENT A		nne assessment area).
PROJECT/SITE			Data of evolucitions 400717	
1. Project name			Date of evaluation: 180717	Axiom/Perkinson
3. Applicant/own	Richmond		Assessor name/organization:	AXION/PEIKINSON
5. County: 7. River basin:	Yadkin-PeeDee		Nearest named water body on USGS 7.5-minute quad:	Hitchcock Creek
	es (decimal degrees, at lower en	l of accoccmont roach):	34.951482 -79.755150	HICHCOCK CIEEK
	MATION: (depth and width ca	,	54.351402 -73.755150	
	show on attached map): SM	•••	igth of assessment reach evalua	ated (feet): 150
	h from bed (in riffle, if present) to		-	nable to assess channel depth.
	h at top of bank (feet): 5		essment reach a swamp steam	
	Perennial flow Intermitter		•	
	GORY INFORMATION:			
15. NC SAM Zor		<ol> <li>Piedmont (P)</li> </ol>	🛛 Inner Coastal Plain (I)	Outer Coastal Plain (O)
	<u> </u>	,		
16 Estimated as	omorphic	J	$\sim$	
16. Estimated ge valley shape		$\overline{}$	□в –	
Tidal Marsh		tream, flatter valley slope	e) (less sinuous str	eam, steeper valley slope)
17. Watershed s	,			
for Tidal Ma				
ADDITIONAL IN	/			
	ory considerations evaluated?	Yes No If Yes, chec	k all that apply to the assessme	nt area.
Section 10		ed Trout Waters		shed ( II  III  III  IV  V)
Essential		Nursery Area	High Quality Waters	/Outstanding Resource Waters
		R Riparian buffer rule in e		
	<u> </u>			onmental Concern (AEC)
	ed presence of a federal and/or	tate listed protected spec	cies within the assessment area	
List specie				
	d Critical Habitat (list species)	any mogeuremente inclus	lad in "Notas/Skotah" apotion an	attached? Myas DNa
I. S. Ale additiona	I stream information/supplement	ary measurements includ	IEU III INULES/SKEICH SECTION OF	
1. Channel Wa	er – assessment reach metric	skip for Size 1 streams	and Tidal Marsh Streams)	
	er throughout assessment reach	· ·	······································	
	low, water in pools only.			
	water in assessment reach.			
2. Evidence of	Flow Restriction – assessmen	reach metric		
			pool sequence is severely affect	ted by a flow restriction or fill to the
poir	t of obstructing flow or a channe	I choked with aquatic mathematic mathematics	acrophytes or ponded water or	impoundment on flood or ebb within
		ndersized or perched cul	verts, causeways that constrict t	he channel, tidal gates, debris jams,
	ver dams).			
⊠B Not				
	ern – assessment reach metric			
	ajority of the assessment reach	has altered pattern (exam	ples: straightening, modification	above or below culvert).
B Not	A			
4. Feature Lon	gitudinal Profile – assessment	reach metric		
🖾 A Maj	ority of assessment reach has a	substantially altered strea		lown-cutting, existing damming, over
		ng, and excavation whe	re appropriate channel profile h	has not reformed from any of these
	urbances).			
B Not	A			
	ve Instability – assessment re			
				red. Examples of instability include
		g (head-cut), active wide	ning, and artificial hardening (su	ich as concrete, gabion, rip-rap).
_	0% of channel unstable o 25% of channel unstable			

 $\Box C$  > 25% of channel unstable

# 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

LB RB

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

□А □В

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B <u>Excessive</u> sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- J Little to no stressors

## 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   □B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- $\boxtimes$ E Little or no habitat

Check for Tidal Marsh Streams Only	_F _G _H _J K
--	---------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  R
  C
  A
  P

		,X			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus Artificial (rip-rap, concrete, etc.)
--	--	----	--	--	--

11d. XYes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
  - Aquatic reptiles
    - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
  - Beetles
  - Caddisfly larvae (T)
  - Asian clam (Corbicula)
  - Crustacean (isopod/amphipod/crayfish/shrimp)
  - Damselfly and dragonfly larvae
  - Dipterans
  - Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
  - Midges/mosquito larvae
  - Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
ΠA	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
⊠C	⊠C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- LB RB ΠA □В ⊠c
  - Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
  - ⊡в Majority of streamside area with depressions able to pond water 3 to 6 inches deep
  - ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ΠY Are wetlands present in the streamside area?
- ΠN ΜN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

## Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- D Evidence of bank seepage or sweating (iron in water indicates seepage)
- ΞE Stream bed or bank soil reduced (dig through deposited sediment if present)
- □F None of the above

## 17. Baseflow Detractors - assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA

Пв Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ⊠C Urban stream (≥ 24% impervious surface for watershed)

- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLBRBLBRB $\boxtimes A$ $\square A$ $\square A$ $\supseteq B$ BBFrom 50 to < 100 feet wide $\square C$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square D$ $\square B$ $\square C$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square D$ $\square B$
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	LB RB
	A       A       Mature forest         B       B       Non-mature woody vegetation or modified vegetation structure
	□C       □C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         □D       □D       Maintained shrubs
	E E Little or no vegetation
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams) Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is
	within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet). If none of the following stressors occurs on either bank, check here and skip to Metric 22:
	Abuts < 30 feet 30-50 feet LB RB LB RB LB RB
	A A A A A A Row crops
	B       B       B       B       B       Maintained turf         C       C       C       C       C       Pasture (no livestock)/commercial horticulture
~~	D D D D D D Pasture (active livestock use)
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB
	B       B       Low stem density         C       C       No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)
	Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide. LB RB
	$\square A$ $\square A$ The total length of buffer breaks is < 25 percent.
	B       B       The total length of buffer breaks is between 25 and 50 percent.         C       C       The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
	Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.
	LB RB A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species,
	with non-native invasive species absent or sparse. B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native
	species. This may include communities of weedy native species that develop after clear-cutting or clearing <u>or</u> communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u>
	<ul> <li>communities missing understory but retaining canopy trees.</li> <li>⊠C ⊠C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities</li> </ul>
	with non-native invasive species dominant over a large portion of expected strata or communities composed of planted
25.	stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation. Conductivity – assessment reach metric (skip for all Coastal Plain streams)
_0.	25a. Yes XNo Was conductivity measurement recorded?
	If No, select one of the following reasons. No Water Other:
	$\Box A < 46 \qquad \Box B \ 46 \ to < 67 \qquad \Box C \ 67 \ to < 79 \qquad \Box D \ 79 \ to < 230 \qquad \Box E \ge 230$

## Notes/Sketch:

Adjacent to Stream SL. Stream side area recently clear cut, no woody vegetation. Evidence that herbicide applications have been based on observations of dead ligustrum, watershed is urban, draining a large residential area. Perennial origin was unable to be located, no rain in several days, strong baseflow.

Stream Category       Ia2       Assessor Name/Organization       Axiom/Perkinson         Notes of Field Assessment Form (Y/N)       YES       NO         Victor onsiderations (Y/N)       YES       NO         Victorial Stream Status       NO       YES         Victorial Stream Status       USACE/ All Streams       NO         Victorial Stream Status       USACE/ All Streams       NCDWR Intermittent         (1) Hydrology       LOW       LOW         (2) Baseflow       LOW       Intermittent         (2) Flood Flow       LOW       Intermittent         (1) Hydrology       LOW       LOW       NO         (2) Stood Flow       LOW       IOW       IOW         (3) Stream Stability       LOW       LOW       IOW         (4) Wooded Riparian Buffer       LOW       IOW       IOW         (4) Sodiment Transport       LOW       IOW       IOW         (2) Stream/Interiidal Zone Interaction       NA       IOW       IOW         (2) Idal Marsh Stream Stability       NA       IOW       IOW         (3) Tidal Marsh Stream Geomorphology       NA       IOW       IOW         (2) Streamside Area Vegetation       MEDIUM       IOW       IOW         (3)	Stream Site Name	U-5706 Stream SM Date of Assessme	ent 180717	
Presence of regulatory considerations (V/N) viditional stream information/supplementary measurements included (V/N) VES VC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Perennial Function Class Rating Summary Al Streams intermittent (1) Hydrology LOW MEDIUM (2) Baseflow MEDIUM (2) Flood Flow LOW (3) Streamside Area Attenuation LOW (4) Floodplain Access LOW (4) Wooded Riparian Buffer LOW (3) Stream Stability LOW (4) Wooded Riparian Buffer LOW (4) Wicrotopography LOW (3) Stream Stability HIGH (4) Sediment Transport LOW (4) Stream Geomorphology LOW (2) Stream/Interitidal Zone Interaction NA (2) Tidal Marsh Stream Stability NA (3) Tidal Marsh Stream Stability NA (1) Water Quality (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Esteam/Interitidal Zone Interaction NA (2) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Esteam/Interitidal Zone Interaction HIGH (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Esteam/Interitidal Zone Interaction HIGH (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Esteam Medite Area Vegetation HIGH (3) Upland Pollutant Filtration HIGH (3) Upland Pollutant Filtration HIGH (3) Upland Pollutant Filtration HIGH (3) Stream Stability MEDIUM (3) Stream Stability MEDIUM (4) Tidal Marsh Channel Stability NA (4) Tidal Marsh Channel Stability NA (4) Tidal Marsh Stream Babitat LOW (3) Thermoregulation NA (4) Tidal Marsh Stream Stability NA (4) Tidal Marsh Stream Stability NA (4) Tidal Marsh Stream Stability NA (5	Stream Category	la2 Assessor Name/Organizat	ion Axiom/Per	rkinson
Presence of regulatory considerations (V/N) viditional stream information/supplementary measurements included (V/N) VES VC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Perennial Function Class Rating Summary Al Streams intermittent (1) Hydrology LOW MEDIUM (2) Baseflow MEDIUM (2) Flood Flow LOW (3) Streamside Area Attenuation LOW (4) Floodplain Access LOW (4) Wooded Riparian Buffer LOW (3) Stream Stability LOW (4) Wooded Riparian Buffer LOW (4) Wicrotopography LOW (3) Stream Stability HIGH (4) Sediment Transport LOW (4) Stream Geomorphology LOW (3) Stream Stability NA (4) Stream Geomorphology LOW (2) Stream/Interitial Zone Interaction NA (2) Tidal Marsh Stream Stability NA (3) Tidal Marsh Stream Geomorphology NA (1) Water Quality (2) Estensive Area Vegetation MEDIUM (2) Streamside Area Vegetation HIGH (3) Upland Pollutant Filtration HIGH (3) Upland Pollutant Filtration HIGH (3) Upland Pollutant Filtration HIGH (3) Upland Pollutant Filtration HIGH (3) Stream Stability NA (1) Habitat LOW (2) Intertidal Zone Filtration NA (3) Stream Stability NA (4) Stream Stream Stream Geomorphology (2) Aquatic Life Tolerance LOW (2) Intertidal Zone Filtration NA (3) Stream Stability MEDIUM (3) Tidal Marsh Channel Stability NA (4) Tidal Marsh Channel Stability NA (5) Tidal Marsh Stream Babitat LOW (2) Intervidal Zone NA (2) Intervidal Zone NA (3) Total Marsh Stream Stability NA (4) Tidal Marsh Stream Stability NA (5) Tidal Marsh Stream Stability NA (4) Tidal Marsh Stream Stability NA (5) Tidal Marsh Stream Stabilit				
vdditional stream information/supplementary measurements included (Y/N)       YES         Perennial       Perennial         VC SAM feature type (perennial, intermittent, Tidal Marsh Stream)       USACE/         All Streams       Intermittent         (1) Hydrology       LOW         (2) Baseflow       MEDIUM         (2) Flood Flow       LOW         (3) Streamside Area Attenuation       LOW         (4) Floodplain Access       LOW         (4) Microtopography       LOW         (4) Microtopography       LOW         (4) Stream Stability       HIGH         (4) Stream Stability       LOW         (4) Stream Stability       LOW         (4) Stream Stability       LOW         (4) Stream Stability       NA         (2) Longitudinal Tidal Flow       NA         (2) Longitudinal Tidal Flow       NA         (2) Longitudinal Tidal Flow       NA         (2) Streamside Area Vegetation       MEDIUM         (2) Streamside Area Vegetation       MEDIUM         (3) Tidal Marsh Stream Stability       NA         (2) Indicators of Stressors       YES         (2) Indicators of Stressors       YES         (2) Indicators of Stressors       YES         (2)	Notes of Field Asses	sment Form (Y/N)	YES	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)           Purction Class Rating Summary         USACE/ All Streams (1) Hydrology         NCDWR All Streams (2) Baseflow           (2) Baseflow         LOW         LOW           (2) Flood Flow         LOW         LOW           (2) Flood Flow         LOW         LOW           (2) Flood Flow         LOW         LOW           (3) Streamside Area Attenuation         LOW         LOW           (4) Nicrotopography         LOW         LOW           (4) Nicrotopography         LOW         LOW           (4) Stream Stability         HIGH         LOW           (4) Stream Geomorphology         LOW         LOW           (2) Stream/Intertidal Zone Interaction         NA         Intermittent           (2) Tidal Marsh Stream Stability         NA         INA           (2) Tidal Marsh Stream Stability         NA         INA           (3) Tidal Marsh Stream Geomorphology         NA         INA           (1) Water Quality         LOW         IOH         IOH           (2) Indicators of Stressors         YES         IOW         IOH           (3) Upland Pollutant Filtration         HIGH         IOW         IOW         IOH           (2) Interidal Zone Filtration         NA	Presence of regulato	NO		
Function Class Rating Summary         USACE/ All Streams         Intermittent Intermittent           (1) Hydrology         LOW         LOW         Intermittent           (2) Baseflow         LOW         LOW         Intermittent           (2) Flood Flow         LOW         LOW         Intermittent           (3) Streamside Area Attenuation         LOW         Intermittent         Intermittent           (4) Wooded Riparian Buffer         LOW         Intermittent         Intermittent           (4) Microtopography         LOW         Intermittent         Intermittent           (4) Stream Stability         HIGH         Intermittent         Intermittent           (4) Stream Geomorphology         LOW         Intermittent         Intermittent           (2) Longitudinal Tital Flow         NA         Intermittent         Intermittent           (3) Tidal Marsh Stream Geomorphology         NA         Intermoregulation         Intermoregulation           (2) Instruct Area Vegetation         MEDIUM         Intermoregulation         Intermoregulation         Intermoregulation           (2) Interind Zone Filtration         HIGH         Intermoregulation         Intermoregulation         Intermoregulation           (2) Interind Zone Filtration         LOW         Intermoregulation         Interm	Additional stream inf	ormation/supplementary measurements included (Y/N)	YES	
Function Class Rating SummaryAll StreamsIntermittent(1) HydrologyLOWLOW(2) BaseflowEDUM(3) Streamside Area AttenuationLOW(4) Floodplain AccessLOW(4) Wooded Riparian BufferLOW(4) Wooded Riparian BufferLOW(3) Stream StabilityHIGH(4) Channel StabilityHIGH(4) Stream GeomorphologyLOW(2) Stream/Intertidal Zone InteractionNA(2) Longitudinal Tidal HowNA(2) Stream/Intertidal Zone InteractionNA(3) Tidal Marsh Stream StabilityNA(3) Tidal Marsh Stream GeomorphologyNA(1) Water QualityLOW(2) Streamside Area VegetationMEDIUM(3) Upland Pollutant FiltrationHIGH(3) Total Marsh Stream GeomorphologyNA(1) HabitatLOW(2) Instream HabitatLOW(2) Instream StabilityNA(3) Tidal Marsh Stream GeomorphologyNA(1) HabitatLOW(2) Instream HabitatLOW(3) ThermoregulationLOW(2) Instream HabitatLOW(3) Stream-side HabitatLOW(3) Stream-side HabitatLOW(4) Tidal Marsh Stream StabilityMEDIUM(3) Stream-side HabitatLOW(3) TormoregulationLOW(3) Stream-side HabitatLOW(3) Stream-side HabitatLOW(3) Stream-side HabitatLOW(3) Tidal Marsh Channel StabilityNA(4) Tidal Marsh Str	NC SAM feature type	e (perennial, intermittent, Tidal Marsh Stream)	Perennia	1
Function Class Rating SummaryAll StreamsIntermittent(1) HydrologyLOWLOW(2) BaseflowEDUM(3) Streamside Area AttenuationLOW(4) Floodplain AccessLOW(4) Wooded Riparian BufferLOW(4) Wooded Riparian BufferLOW(3) Stream StabilityHIGH(4) Channel StabilityHIGH(4) Stream GeomorphologyLOW(2) Stream/Intertidal Zone InteractionNA(2) Longitudinal Tidal HowNA(2) Stream/Intertidal Zone InteractionNA(3) Tidal Marsh Stream StabilityNA(3) Tidal Marsh Stream GeomorphologyNA(1) Water QualityLOW(2) Streamside Area VegetationMEDIUM(3) Upland Pollutant FiltrationHIGH(3) Total Marsh Stream GeomorphologyNA(1) HabitatLOW(2) Instream HabitatLOW(2) Instream StabilityNA(3) Tidal Marsh Stream GeomorphologyNA(1) HabitatLOW(2) Instream HabitatLOW(3) ThermoregulationLOW(2) Instream HabitatLOW(3) Stream-side HabitatLOW(3) Stream-side HabitatLOW(4) Tidal Marsh Stream StabilityMEDIUM(3) Stream-side HabitatLOW(3) TormoregulationLOW(3) Stream-side HabitatLOW(3) Stream-side HabitatLOW(3) Stream-side HabitatLOW(3) Tidal Marsh Channel StabilityNA(4) Tidal Marsh Str				
(1) Hydrology     LOW       (2) Baseflow     MEDIUM       (2) Flood Flow     LOW       (3) Streamside Area Attenuation     LOW       (4) Floodplain Access     LOW       (4) Wooded Riparian Buffer     LOW       (4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Stream Geomorphology     LOW       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Stream/Intertidal Flow     NA       (3) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (2) Indial Marsh Stream Geomorphology     NA       (3) Tidal Marsh Stream Geomorphology     NA       (2) Indial Marsh Stream Geomorphology     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Upland Pollutant Filtration     LOW       (2) Indicators of Stressors     YES       (2) Aquatic Life Tolerance     LOW       (3) Substrate     MEDIUM       (3) Stream Stability     MEDIUM       (3) Stream Stability     MEDIUM       (3) Stream Stability     MEDIUM       (3) Stream St			USACE/	NCDWR
(2) Baseflow     MEDIUM       (2) Flood Flow     LOW       (3) Streamside Area Attenuation     LOW       (4) Floodplain Access     LOW       (4) Wooded Riparian Buffer     LOW       (4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Sediment Transport     LOW       (4) Stream Geomorphology     LOW       (2) India Marsh Stream Stability     HIGH       (2) Tidal Marsh Stream Stability     NA       (2) Tidal Marsh Stream Stability     NA       (2) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Upland Pollutant Filtration     LOW       (2) Indicators of Stressors     YES       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Intertidal Zone Filtration     NA       (3) Stream Stability     MEDIUM       (3) Stream Stability     MEDIUM       (3) Stream-side Habitat     LOW       (3) Thermoregulation <td< td=""><td></td><td>Function Class Rating Summary</td><td></td><td>Intermittent</td></td<>		Function Class Rating Summary		Intermittent
(2) Flood Flow       LOW         (3) Streamside Area Attenuation       LOW         (4) Floodplain Access       LOW         (4) Wooded Riparian Buffer       LOW         (4) Microtopography       LOW         (3) Stream Stability       LOW         (4) Channel Stability       HIGH         (4) Scdiment Transport       LOW         (2) Stream/Intertidal Zone Interaction       NA         (2) Stream/Intertidal Flow       NA         (2) Tidal Marsh Stream Stability       NA         (3) Tidal Marsh Stream Geomorphology       NA         (1) Water Quality       LOW         (2) Baseflow       MEDIUM         (2) Streamside Area Vegetation       MEDIUM         (3) Tidal Marsh Stream Geomorphology       NA         (1) Water Quality       LOW         (2) Indicators of Stressors       YES         (2) Aquatic Life Tolerance       LOW         (2) Indicators of Stressors       YES         (2) Aquatic Life Tolerance       LOW         (3) Stream-side Habitat       LOW         (3) Stream-side Habitat       LOW         (3) Stream-side Habitat       LOW         (3) Stream-side Habitat       LOW         (3) Tidal Marsh In-stream Habitat <t< td=""><td></td><td>(1) Hydrology</td><td>LOW</td><td></td></t<>		(1) Hydrology	LOW	
(3) Streamside Area Attenuation     LOW       (4) Floodplain Access     LOW       (4) Wooded Riparian Buffer     LOW       (4) Wooded Riparian Buffer     LOW       (4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Channel Stability     HIGH       (4) Stream Stability     HIGH       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     NA       (2) Streamside Area Vegetation     MEDIUM       (2) Streamside Area Vegetation     MEDIUM       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Baseflow     MEDIUM       (2) Indicators of Stressors     YES       (2) Aquatic Life Tolerance     LOW       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Instream Habitat     LOW       (3) Substrate     MEDIUM       (3) Substrate     MEDIUM       (3) Stream-side Habitat     LOW       (2) Stream-side Habitat     LOW       (3) Tidal Marsh In-stream Habitat     LOW <td></td> <td>(2) Baseflow</td> <td>MEDIUM</td> <td></td>		(2) Baseflow	MEDIUM	
(4) Floodplain Access     LOW       (4) Wooded Riparian Buffer     LOW       (4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Channel Stability     HIGH       (4) Stream Stability     HIGH       (4) Stream Stability     HIGH       (4) Stream Stream Stability     HIGH       (4) Stream Cherridial Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Longitudinal Tidal Flow     NA       (2) Longitudinal Tidal Flow     NA       (3) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Thermoregulation     LOW       (2) Indicators of Stressors     YES       (2) Aquatic Life Tolerance     LOW       (2) Interidal Zone Filtration     NA       (1) Habitat     LOW       (2) Interidal Zone Filtration     NA       (3) Substrate     MEDIUM       (3) Substrate     MEDIUM       (3) Substrate     MEDIUM       (3) Stream-Side Habitat     LOW       (2) Stream-Side Habitat     LOW       (3) Tidal Marsh Stream Habitat     NA		(2) Flood Flow	LOW	
(4) Wooded Riparian Buffer     LOW       (4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Channel Stability     HIGH       (4) Sediment Transport     LOW       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Stability     NA       (1) Water Quality     LOW       (2) Streamside Area Vegetation     MEDIUM       (3) Tidal Marsh Stream Geomorphology     NA       (3) Upland Pollutant Filtration     HIGH       (3) Upland Pollutant Filtration     NA       (1) Habitat     LOW       (2) Instream Habitat     LOW       (2) Instream Habitat     LOW       (3) Substrate     MEDIUM       (3) Stream-side Habitat     LOW       (3) Stream-side Habitat     LOW       (2) Stream-side Habitat     LOW       (3) Tidal Mars		(3) Streamside Area Attenuation	LOW	
(4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Channel Stability     HIGH       (4) Sediment Transport     LOW       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Congitudinal Tidal Flow     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Upland Pollutant Filtration     NA       (1) Habitat     LOW       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Instream Habitat     LOW       (3) Substrate     MEDIUM       (3) Substrate     MEDIUM       (3) Stream-side Habitat     LOW       (2) Stream-side Ha		(4) Floodplain Access	LOW	
(4) Microtopography     LOW       (3) Stream Stability     LOW       (4) Channel Stability     HIGH       (4) Sediment Transport     LOW       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Logitudinal Tidal Flow     NA       (2) Logitudinal Tidal Flow     NA       (3) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Upland Pollutant Filtration     NA       (1) Habitat     LOW       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Intertidal Zone Filtration     NA       (3) Substrate     MEDIUM       (3) Substrate     MEDIUM       (3) Stream-side Habitat     LOW       (2) Stream-side		(4) Wooded Riparian Buffer	LOW	
(3) Stream Stability     LOW       (4) Channel Stability     HIGH       (4) Channel Stability     HIGH       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Baseflow     MEDIUM       (2) Streamside Area Vegetation     MEDIUM       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Baseflow     MEDIUM       (2) Streamside Area Vegetation     MEDIUM       (3) Thermoregulation     LOW       (2) Indicators of Stressors     YES       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Instream Habitat     LOW       (3) Substrate     MEDIUM       (3) Stream-side Habitat     LOW       (3) Stream-side Habitat     LOW       (2) Stream-side Habitat     LOW       (3) Tidal Marsh In-stream Habitat     LOW       (3) Flow Restriction     NA       (4) Tidal Marsh Stream Stability     NA       (4) Tidal Marsh In-stream Habitat     NA       (3) Tidal Marsh Stream Stability     NA <td></td> <td>· · · · · · · · · · · · · · · · · · ·</td> <td>LOW</td> <td></td>		· · · · · · · · · · · · · · · · · · ·	LOW	
(4) Channel Stability     HIGH       (4) Sediment Transport     LOW       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Baseflow     MEDIUM       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Thermoregulation     LOW       (2) Indicators of Stressors     YES       (2) Indicators of Stressors     YES       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) In-stream Habitat     LOW       (3) Stream-side Habitat     LOW       (3) Stream-side Habitat     LOW       (3) Stream-side Habitat     LOW       (3) Thermoregulation     LOW       (3) Thermare Habitat     LOW       (3) Stream-side Habitat     LOW       (3) Stream-side Habitat     LOW       (3) Thermoregulation     LOW       (3) Thermoregulation     LOW       (4) Tidal Marsh Stream Stability     NA       (3) Flow Restriction     NA				
(4) Sediment Transport     LOW       (4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Baseflow     MEDIUM       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Thermoregulation     LOW       (2) Indicators of Stressors     YES       (2) Indicators of Stressors     YES       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) In-stream Habitat     LOW       (3) Stream Stability     MEDIUM       (3) Thermoregulation     LOW       (2) Stream-side Habitat     LOW       (3) Thermoregulation     LOW       (2) Stream-side Habitat     LOW				
(4) Stream Geomorphology     LOW       (2) Stream/Intertidal Zone Interaction     NA       (2) Longitudinal Tidal Flow     NA       (2) Tidal Marsh Stream Stability     NA       (3) Tidal Marsh Stream Geomorphology     NA       (1) Water Quality     LOW       (2) Baseflow     MEDIUM       (2) Streamside Area Vegetation     MEDIUM       (3) Upland Pollutant Filtration     HIGH       (3) Upland Pollutant Filtration     LOW       (2) Indicators of Stressors     YES       (2) Aquatic Life Tolerance     LOW       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Intertidal Zone Filtration     NA       (1) Habitat     LOW       (2) Instream Habitat     LOW       (3) Substrate     MEDIUM       (3) Substrate     MEDIUM       (3) Stream Stability     MEDIUM       (3) Substrate     MEDIUM       (3) Stream Habitat     LOW       (2) Stream-side Habitat     LOW       (3) Thermoregulation     LOW       (3) Stream Stability     MEDIUM       (3) Stream Stability     MEDIUM       (3) Stream Stream Habitat     LOW       (2) Tidal Marsh In-stream Habitat     LOW       (3) Flow Restriction     NA       (3) Ti				
(2) Stream/Intertidal Zone Interaction       NA         (2) Longitudinal Tidal Flow       NA         (2) Tidal Marsh Stream Stability       NA         (3) Tidal Marsh Stream Stability       NA         (3) Tidal Marsh Stream Geomorphology       NA         (1) Water Quality       LOW         (2) Baseflow       MEDIUM         (2) Streamside Area Vegetation       MEDIUM         (3) Upland Pollutant Filtration       HIGH         (3) Upland Pollutant Filtration       LOW         (2) Indicators of Stressors       YES         (2) Aquatic Life Tolerance       LOW         (2) Indicators of Stressors       YES         (2) Intertidal Zone Filtration       NA         (1) Habitat       LOW         (2) Intertidal Zone Filtration       NA         (3) Baseflow       MEDIUM         (3) Substrate       MEDIUM         (3) Stream Stability       MEDIUM         (3) Stream Stability       MEDIUM         (3) Stream-side Habitat       LOW         (2) Tidal Marsh In-stream Habitat       LOW         (3) Thermoregulation       LOW         (3) Thermoregulation       LOW         (3) Thermoregulation       LOW         (3) Tidal Marsh Stream Stability <td></td> <td></td> <td></td> <td></td>				
(2) Longitudinal Tidal Flow       NA         (2) Tidal Marsh Stream Stability       NA         (3) Tidal Marsh Channel Stability       NA         (3) Tidal Marsh Stream Geomorphology       NA         (1) Water Quality       LOW         (2) Baseflow       MEDIUM         (2) Streamside Area Vegetation       MEDIUM         (3) Upland Pollutant Filtration       HIGH         (3) Upland Pollutant Filtration       HIGH         (3) Thermoregulation       LOW         (2) Indicators of Stressors       YES         (2) Aquatic Life Tolerance       LOW         (2) Intertidal Zone Filtration       NA         (1) Habitat       LOW         (2) Intertidal Zone Filtration       NA         (3) Substrate       MEDIUM         (3) Substrate       MEDIUM         (3) Substrate       MEDIUM         (3) Stream-Stability       MEDIUM         (3) Stream-Stability       MEDIUM         (3) Stream-side Habitat       LOW         (2) Stream-side Habitat       LOW         (3) Stream-side Habitat       LOW         (3) Thermoregulation       LOW         (3) Thermoregulation       LOW         (3) Tidal Marsh Stream Stability       NA				
(2) Tidal Marsh Stream Stability       NA         (3) Tidal Marsh Channel Stability       NA         (3) Tidal Marsh Stream Geomorphology       NA         (1) Water Quality       LOW         (2) Baseflow       MEDIUM         (2) Streamside Area Vegetation       MEDIUM         (3) Upland Pollutant Filtration       HIGH         (3) Upland Pollutant Filtration       HIGH         (3) Thermoregulation       LOW         (2) Indicators of Stressors       YES         (2) Indicators of Stressors       YES         (2) Intertidal Zone Filtration       NA         (1) Habitat       LOW         (2) In-stream Habitat       LOW         (3) Substrate       MEDIUM         (3) Substrate       MEDIUM         (3) Stream-Stability       MEDIUM         (3) Stream-Stability       MEDIUM         (3) Stream-side Habitat       LOW         (2) Tidal Marsh In-stream Habitat       LOW         (3) Tidal Marsh In-stream Stability       NA         (4) Tidal Marsh Stream Geomorphology       NA         (4) Tidal Marsh In-stream Habitat       NA         (2) Intertidal Zone       NA				
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	-	Overall	LOW	

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User M	lanual Version 2.1	
USACE AID #:		NCDWR #:	
	etch of the assessment area and photogra		
	tream reach under evaluation. If multiple		
	ched map, and include a separate form fo		
	information. Record in the "Notes/Sketch		rements were performed. See the
	nples of additional measurements that ma		
	SORS AFFECTING THE ASSESSMENT	AREA (do not need to be within	the assessment area).
PROJECT/SITE INFORMATIC			
1. Project name (if any):	U-5706 Stream SN	2. Date of evaluation: 1/10/201	-
3. Applicant/owner name:		4. Assessor name/organization:	Axiom Smith/Radecki
5. County:		6. Nearest named water body	
7. River basin:	Yadkin-PeeDee	on USGS 7.5-minute quad:	Falling Creek
	grees, at lower end of assessment reach	34.934901, -79.726055	
	pth and width can be approximations)		(to d (fo ot)) (100
9. Site number (show on attack		ength of assessment reach evalua	
	n riffle, if present) to top of bank (feet):		hable to assess channel depth.
12. Channel width at top of bar		ssessment reach a swamp steam?	
	flow Intermittent flow Tidal Marsh S	Stream	
STREAM CATEGORY INFOR 15. NC SAM Zone:	MATION: Mountains (M) Piedmont (P	) 🛛 Inner Coastal Plain (I)	Outer Coastal Plain (O)
15. NC SAM ZONE.			
	1		
16. Estimated geomorphic		Г ПВ 🔨	
valley shape ( <b>skip for</b> Tidal Marsh Stream):	(more sinuous stream, flatter valley slo	ne) (less sinuous stra	eam, steeper valley slope)
,			
17. Watershed size: (skip	⊠Size 1 (< 0.1 mi²) □Size 2 (0.1 t	$c < 0.5 \text{ mi}^2$ Size 3 (0.5 to < 5	5 mi²)
for Tidal Marsh Stream) ADDITIONAL INFORMATION			
	: tions evaluated? ⊠Yes ⊡No If Yes, ch	ock all that apply to the assessme	
Section 10 water	Classified Trout Waters		shed (
Essential Fish Habitat	Primary Nursery Area		Outstanding Resource Waters
Publicly owned property	,		
	□303(d) List		onmental Concern (AEC)
	of a federal and/or state listed protected sp		
List species:			
Designated Critical Habi	tat (list species)		
	mation/supplementary measurements incl	uded in "Notes/Sketch" section or a	attached? ⊠Yes □No
	· · ·		

#### 1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- $\square A$  Water throughout assessment reach.
- B No flow, water in pools only.
- C No water in assessment reach.

#### 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- B Not A

## 3. Feature Pattern – assessment reach metric

- A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). Not A
- \_\_\_\_\_

## 4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- B Not A

## 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- $\square A$  < 10% of channel unstable
- B 10 to 25% of channel unstable
- $\Box C > 25\%$  of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Ba
LB	RB	
ΠA	ΠA	Little c
ПВ	⊠в	Moder

- A Little or no evidence of conditions that adversely affect reference interaction
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors - assessment reach/intertidal zone metric

## Check all that apply.

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- ☐J Little to no stressors

## 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Tyes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- □A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
   □B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
   □D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	□F □G □H □J □K
--	----------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  P
  C
  A
  P

		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm)

11d. Tyes XNo Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
    - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T) Asian clam (Corbicula)

    - Crustacean (isopod/amphipod/crayfish/shrimp)
    - Dipterans
    - Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB

	ΠA	Little or no alteration to water storage capacity over a majority of the streamside area
□в	⊠В	Moderate alteration to water storage capacity over a majority of the streamside area
⊠C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA □В ⊠В ⊠c

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- □C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

## 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - ΠA Streams and/or springs (jurisdictional discharges)
  - ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
  - □F None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

	LB RB LB $\boxtimes A \boxtimes A \square $ $\square B \square B \square I$ $\square C \square C \square C$	podedRBA $\square$ A> 100 feet wide or extends to the edge of the watershedB $\square$ BFrom 50 to < 100 feet wideC $\square$ CFrom 30 to < 50 feet wideD $\square$ DFrom 10 to < 30 feet wide
20.	Consider for left LB RB □A □A	<ul> <li>streamside area metric (skip for Tidal Marsh Streams)</li> <li>bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).</li> <li>Mature forest</li> </ul>
	□B ⊠B ⊠C □C □D □D □E □E	Non-mature woody vegetation <u>or</u> modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.	Check all appropwithin 30 feet of sIf none of the foldAbuts< 3LBRBLBAAABB	A □A □A Row crops B □B □B Maintained turf C □C ⊠C □C Pasture (no livestock)/commercial horticulture
22.	-	streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	$ \begin{array}{ccc} LB & RB \\ \Box A & \boxtimes A \\ \boxtimes B & \Box B \\ \Box C & \Box C \end{array} $	Medium to high stem density Low stem density No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.	Consider whether LB RB A AA B BB	getated Buffer – streamside area metric (skip for Tidal Marsh Streams) vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide. The total length of buffer breaks is < 25 percent. The total length of buffer breaks is between 25 and 50 percent.
24.	C C Vegetative Com	The total length of buffer breaks is > 50 percent. cosition – streamside area metric (skip for Tidal Marsh Streams)
	Evaluate the dom assessment read LB RB	inant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to h habitat.
		Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	□в ⊠в	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	⊠c ⊡c	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. 🗌 Yes 🛛 🛛	ssessment reach metric (skip for all Coastal Plain streams) No Was conductivity measurement recorded? t one of the following reasons. ONo Water Other:
	25b. Check the t □A < 46	box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\Box$ B 46 to < 67 □C 67 to < 79 □D 79 to < 230 □E ≥ 230

Notes/Sketch:

Stream along side thin wooded strip in farm field.

Stream Site Name	U-5706 Stream SN	Date of Assessmen	t 1/10/2019	
Stream Category	la1	Assessor Name/Organizatior		ith/Radecki
Notes of Field Asses	YES			
Presence of regulate	ory considerations (Y/N)		NO	
Additional stream inf	formation/supplementary measu	rements included (Y/N)	YES	
NC SAM feature typ	e (perennial, intermittent, Tidal N	Marsh Stream)	Intermitter	it
			USACE/	NCDWR
	Function Class Rating Summ	nary /	All Streams	Intermittent
	(1) Hydrology		LOW	LOW
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Flood Flow		LOW	LOW
	(3) Streamside Ar	ea Attenuation	LOW	LOW
	(4) Floodpla	ain Access	LOW	LOW
	(4) Wooded	Riparian Buffer	MEDIUM	MEDIUM
	(4) Microtop	bography	LOW	LOW
	(3) Stream Stabili	ty	MEDIUM	MEDIUM
	(4) Channe	I Stability	HIGH	HIGH
	(4) Sedime	nt Transport	HIGH	HIGH
	(4) Stream	Geomorphology	LOW	LOW
		al Zone Interaction	NA	NA
	(2) Longitudinal Tic		NA	NA
	(2) Tidal Marsh Str		NA	NA
		rsh Channel Stability	NA	NA
		rsh Stream Geomorphology	NA	NA
	(1) Water Quality		LOW	LOW
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Streamside Area Ve	metation	LOW	LOW
	(3) Upland Polluta		MEDIUM	MEDIUM
	(3) Thermoregula		LOW	LOW
	(2) Indicators of Stresso		NO	NO
	(2) Aquatic Life Tolerand		LOW	
	(2) Intertidal Zone Filtratio		NA	NA
	(1) Habitat		LOW	MEDIUM
	(2) In-stream Habitat		MEDIUM	HIGH
	(2) In-stream rabitat		MEDIUM	MEDIUM
	(3) Substrate		HIGH	HIGH
	(3) Stream Stabili		MEDIUM	MEDIUM
	(3) In-stream Hab		LOW	HIGH
	( )			
	(2) Stream-side Habitat		LOW	LOW
	(3) Stream-side H		LOW	LOW
	(3) Thermoregulat		LOW	LOW
	(2) Tidal Marsh In-stream		NA	NA
	(3) Flow Restriction		NA	NA
	(3) Tidal Marsh Str		NA	NA
		rsh Channel Stability	NA	NA
		rsh Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-	stream Habitat	NA	NA
	(2) Intertidal Zone		NA	NA
	Overall		LOW	LOW

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User Manual Version 2.1
USACE AID #:	NCDWR #:
INSTRUCTIONS: Attach a sk	ketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,
	stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and
number all reaches on the atta	ached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions
and explanations of requested	d information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the
NC SAM User Manual for exa	mples of additional measurements that may be relevant.
NOTE EVIDENCE OF STRES	SSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).
PROJECT/SITE INFORMATI	ON:
1. Project name (if any):	U-5706 Stream SO 2. Date of evaluation: 190109
3. Applicant/owner name:	NCDOT 4. Assessor name/organization: A.Keith/Axiom
5. County:	Rockingham 6. Nearest named water body
7. River basin:	Yadkin-PeeDee on USGS 7.5-minute quad: Falling Creek
8. Site coordinates (decimal d	legrees, at lower end of assessment reach): 34.940894, -79.729212
STREAM INFORMATION: (d	epth and width can be approximations)
9. Site number (show on attac	
11. Channel depth from bed (	in riffle, if present) to top of bank (feet): 1-2 Unable to assess channel depth.
12. Channel width at top of ba	ank (feet): 1-4 13. Is assessment reach a swamp steam? ☐Yes ⊠No
14. Feature type: Perennia	al flow Intermittent flow Tidal Marsh Stream
STREAM CATEGORY INFO	
15. NC SAM Zone:	🗌 Mountains (M) 🛛 Piedmont (P) 🛛 Inner Coastal Plain (I) 🗌 Outer Coastal Plain (O)
16. Estimated geomorphic	
valley shape ( <b>skip for</b>	
Tidal Marsh Stream):	(more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)
17. Watershed size: (skip	Size 1 (< 0.1 mi <sup>2</sup> ) Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) Size 3 (0.5 to < 5 mi <sup>2</sup> ) Size 4 ( $\ge$ 5 mi <sup>2</sup> )
for Tidal Marsh Stream)	
ADDITIONAL INFORMATION	J:
	ations evaluated? $\square$ Yes $\square$ No If Yes, check all that apply to the assessment area.
Section 10 water	Classified Trout Waters Water Supply Watershed (
Essential Fish Habitat	Primary Nursery Area
Publicly owned property	
	□ 303(d) List □ CAMA Area of Environmental Concern (AEC)
	of a federal and/or state listed protected species within the assessment area.
List species:	
Designated Critical Hat	pitat (list species)
	rmation/supplementary measurements included in "Notes/Sketch" section or attached? Xes No
1. Channel Water – assess	ment reach metric (skip for Size 1 streams and Tidal Marsh Streams)
A Water throughou	it assessment reach.

□в No flow, water in pools only.

Пс No water in assessment reach.

#### 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the ⊠Α point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- □в Not A

#### 3. Feature Pattern – assessment reach metric

- ΠA A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). ⊠в Not A
- Feature Longitudinal Profile assessment reach metric 4.
  - ΠA Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
  - ⊠Β Not A

#### Signs of Active Instability - assessment reach metric 5.

Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

⊠Α < 10% of channel unstable Πв

10 to 25% of channel unstable

> 25% of channel unstable 

#### Streamside Area Interaction – streamside area metric 6. k (LB) and the Right Bank (RB).

Consid	der for the	e Left Bank
LB	RB	
ΜA	ΜA	Little or r
ПВ	ПВ	Moderate

- ⊠A ⊡B Little or no evidence of conditions that adversely affect reference interaction
  - Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- ПС Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

#### 7. Water Quality Stressors - assessment reach/intertidal zone metric

## Check all that apply.

ПС

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam) ΠA
- Excessive sedimentation (burying of stream features or intertidal zone) Πв
- Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- Odor (not including natural sulfide odors) DD
- Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" ΠE section.
- □F Livestock with access to stream or intertidal zone
- ŪG Excessive algae in stream or intertidal zone
- Πн Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: (explain in "Notes/Sketch" section)
- ΜJ Little to no stressors

#### Recent Weather - watershed metric (skip for Tidal Marsh Streams) 8.

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours ΠA
- Πв Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ⊠C No drought conditions

#### Large or Dangerous Stream - assessment reach metric 9.

Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. 🗌 Yes ⊠No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

LΑ	Multiple aquatic macrophytes and aquatic mosses
	(include liverworts, lichens, and algal mats)
⊠в	Multiple sticks and/or leaf packs and/or emergent
	vegetation
□C	Multiple snags and logs (including lap trees)
D	5% undercut banks and/or root mats and/or roots

- in banks extend to the normal wetted perimeter
- ΠE Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]J JJ K
--	---------------------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- ⊠Α Riffle-run section (evaluate 11c)
- ⊠В Pool-glide section (evaluate 11d)
- ПС Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but < 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach. NP D C ۸ D

			Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus
$\square$			Artificial (rip-rap, concrete, etc.)

11d. Xes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
      - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T) Asian clam (Corbicula)

    - Crustacean (isopod/amphipod/crayfish/shrimp)
    - Dipterans
    - Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

- Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB
  - ⊠Α ⊠Α Little or no alteration to water storage capacity over a majority of the streamside area ⊡в ⊡в Moderate alteration to water storage capacity over a majority of the streamside area □с □C Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

## 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA □В ⊡в ⊠c

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

## 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

## Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
- ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ⊠F None of the above

- Consider aspect. Consider "leaf-on" condition.
- $\boxtimes \mathsf{A}$ Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
---	------------

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLB $\boxtimes A$ $\boxtimes A$ $\boxtimes A$ $\boxtimes A$ $\boxtimes A$ $\boxtimes A$ $\boxtimes B$ $\boxtimes B$ $\boxtimes B$ $\square B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square D$ $\square B$
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).         LB       RB         △A       Mature forest         □B       □B       Non-mature woody vegetation or modified vegetation structure         □C       □C       Herbaceous vegetation with or without a strip of trees < 10 feet wide         □D       □D       Maintained shrubs         □E       □E       Little or no vegetation
21.	Buffer Stressors - streamside area metric (skip for Tidal Marsh Streams)         Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet       30-50 feet         LB       RB       LB       RB         A       A       A       A         B       B       B       B         B       B       B       B         B       B       B       B         C       C       C       C         D       D       D       D       Pasture (active livestock use)
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB       RB         ⊠A       ⊠A         Medium to high stem density         □B       □B         LOW stem density         □C       □C         No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)         Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.         LB       RB         A       A       The total length of buffer breaks is < 25 percent.         B       B       The total length of buffer breaks is between 25 and 50 percent.         C       C       The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB
	<ul> <li>☑A ☑A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.</li> <li>☑B ☑B ☑B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or</li> </ul>
	$\square$
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams) 25a.  Yes  No Was conductivity measurement recorded? If No, select one of the following reasons.  No Water  Other:
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\square A < 46$ $\square B = 46$ to < 67 $\square C = 67$ to < 79 $\square D = 79$ to < 230 $\square E \ge 230$

## Notes/Sketch:

Intermittent stream channel within large wetland. Bed and bank frequently interupted, spreading out into wetland and then reforming downstream. A large tree has fallen at the lower end of stream allowing sediment and debris build up--stream diverting around debris jam.

Stream Site Name U-5706 Stream SO Date of Assessn	nent 190109	
Stream Category Ia1 Assessor Name/Organiza	ation A.Keith/Ax	tiom
· · · · · · · · · · · · · · · · · · ·		
Notes of Field Assessment Form (Y/N)	YES	
Presence of regulatory considerations (Y/N)	NO	
Additional stream information/supplementary measurements included (Y/N)	YES	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermitter	nt
	USACE/	NCDWR
Function Class Rating Summary	All Streams	Intermittent
(1) Hydrology	HIGH	HIGH
(2) Baseflow	HIGH	HIGH
(2) Flood Flow	HIGH	HIGH
(3) Streamside Area Attenuation	HIGH	HIGH
(4) Floodplain Access	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	HIGH	HIGH
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	LOW HIGH	
(4) Stream Geomorphology		HIGH
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	MEDIUM	MEDIUM
(2) Baseflow	HIGH	HIGH
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	LOW	HIGH
(2) In-stream Habitat	LOW	MEDIUM
(3) Baseflow	HIGH	HIGH
(3) Substrate	MEDIUM	MEDIUM
(3) Substrate (3) Stream Stability	HIGH	HIGH
(3) Stream Stability (3) In-stream Habitat	-	
		MEDIUM
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
	NA	NA
(3) Flow Restriction		
	NA	NA
(3) Flow Restriction		NA NA
<ul><li>(3) Flow Restriction</li><li>(3) Tidal Marsh Stream Stability</li></ul>	NA	· · · · ·
<ul><li>(3) Flow Restriction</li><li>(3) Tidal Marsh Stream Stability</li><li>(4) Tidal Marsh Channel Stability</li></ul>	NA NA	NA
<ul> <li>(3) Flow Restriction</li> <li>(3) Tidal Marsh Stream Stability</li> <li>(4) Tidal Marsh Channel Stability</li> <li>(4) Tidal Marsh Stream Geomorphology</li> </ul>	NA NA NA	NA NA

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User Manual Version 2.1
USACE AID #:	NCDWR #:
	etch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, tream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and
	ched map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions
	information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the
NC SAM User Manual for exar	nples of additional measurements that may be relevant.
NOTE EVIDENCE OF STRES	SORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).
PROJECT/SITE INFORMATIC	DN:
1. Project name (if any):	U-5706 Stream SP 2. Date of evaluation: 1/10/2019
3. Applicant/owner name:	NCDOT 4. Assessor name/organization: Axiom Smith/Radecki
5. County:	Richmond 6. Nearest named water body
7. River basin:	Yadkin-PeeDee         on USGS 7.5-minute quad:         Falling Creek
	egrees, at lower end of assessment reach): 34.939442, -79.730284
	pth and width can be approximations)
9. Site number (show on attack	
	n riffle, if present) to top of bank (feet): 1 Unable to assess channel depth.
12. Channel width at top of bar	
	flow Intermittent flow Tidal Marsh Stream
STREAM CATEGORY INFOR 15. NC SAM Zone:	
15. NC SAM Zone:	☐ Mountains (M)  ☐ Piedmont (P)  ☑ Inner Coastal Plain (I)  ☐ Outer Coastal Plain (O)
16. Estimated geomorphic	
valley shape ( <b>skip for</b> Tidal Marsh Stream):	(more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)
,	
17. Watershed size: (skip for Tidal Marsh Stream)	Size 1 (< 0.1 mi <sup>2</sup> ) Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) Size 3 (0.5 to < 5 mi <sup>2</sup> ) Size 4 (≥ 5 mi <sup>2</sup> )
ADDITIONAL INFORMATION	
	tions evaluated? ⊠Yes □No If Yes, check all that apply to the assessment area.
Section 10 water	Classified Trout Waters Water Supply Watershed (
Essential Fish Habitat	Primary Nursery Area High Quality Waters/Outstanding Resource Waters
Publicly owned property	NCDWR Riparian buffer rule in effect     INutrient Sensitive Waters
Anadromous fish	303(d) List     CAMA Area of Environmental Concern (AEC)
·	of a federal and/or state listed protected species within the assessment area.
List species:	
Designated Critical Habi	
19. Are additional stream infor	mation/supplementary measurements included in "Notes/Sketch" section or attached? ⊠Yes □No
1 Channel Water - accord	pent reach metric (skin for Size 1 streams and Tidal Marsh Streams)

#### 1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- $\square A$  Water throughout assessment reach.
- B No flow, water in pools only.
- C No water in assessment reach.

## 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- B Not A

## 3. Feature Pattern – assessment reach metric

- A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). Not A
- 4. Feature Longitudinal Profile assessment reach metric
  - A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
  - B Not A

## 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- $\square A$  < 10% of channel unstable
- B 10 to 25% of channel unstable
- $\Box C > 25\%$  of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	э се
LB	RB	
ΠA	ΠA	Li
⊠В	⊠в	Μ

ПС

- A Little or no evidence of conditions that adversely affect reference interaction
- B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B <u>Excessive</u> sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- ∐J Little to no stressors

## 8. Recent Weather - watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats) ⊠B Multiple sticks and/or leaf packs and/or emergent vegetation
- C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only A C I H D H	
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5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm)

11d. Tyes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
      - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)

    - Dipterans Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

- Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB
  - ΠA ΠA Little or no alteration to water storage capacity over a majority of the streamside area Πв ΠВ Moderate alteration to water storage capacity over a majority of the streamside area ⊠c ⊠C Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ⊠Α  $\square A$ □В ⊡в □с

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ПС Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ×Ν
  - ×Ν Are wetlands present in the streamside area?
- ΠN ΠN

## 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - ΠA Streams and/or springs (jurisdictional discharges)
  - ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
  - ΠF None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ⊠F None of the above

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

19. B	uffer Width	<ul> <li>streamside are</li> </ul>	a metric (	(skip fo	or Tidal	Marsh	Streams)	1
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	$ \begin{array}{cccc} LB & RB & LB \\ \boxtimes A & \boxtimes A & \boxtimes A \\ \square B & \square B & \square B \\ \square C & \square C & \square C \\ \square D & \square D & \square D \end{array} $	oded RB $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$
20.		– streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	$ \begin{array}{c} LB & RB \\ \square A & \square A \\ \square B & \square B \\ \square C & \square C \\ \square D & \square D \\ \square E & \square E \end{array} $	Mature forest Non-mature woody vegetation <u>or</u> modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.		- streamside area metric (skip for Tidal Marsh Streams)
	within 30 feet of st	riate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is ream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
	Abuts < 30	owing stressors occurs on either bank, check here and skip to Metric 22: ) feet 30-50 feet
		B B B Maintained turf C C C Pasture (no livestock)/commercial horticulture
~~		
<b>ZZ</b> .	Consider for left	treamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB ⊠A ⊠A	Medium to high stem density
	□B □B □C □C	Low stem density No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.		getated Buffer – streamside area metric (skip for Tidal Marsh Streams)
	LB RB	vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	⊠A ⊠A □B □B	The total length of buffer breaks is < 25 percent. The total length of buffer breaks is between 25 and 50 percent.
~ 4		The total length of buffer breaks is > 50 percent.
24.	Evaluate the domi	osition – streamside area metric (skip for Tidal Marsh Streams) nant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to
	assessment reach	
		Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	□в □в	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or
		communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u> communities missing understory but retaining canopy trees.
	⊠c ⊠c	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.		ssessment reach metric (skip for all Coastal Plain streams)
		No Was conductivity measurement recorded? one of the following reasons. No Water Other:
	25b. Check the b □A < 46	ox corresponding to the conductivity measurement (units of microsiemens per centimeter). □B 46 to < 67 □C 67 to < 79 □D 79 to < 230 □E ≥ 230

Notes/Sketch:

Stream originates at culvert south of Washington Street and flows through regularly maintained residential yards before entering into a <5year old clear-cut tract of land with abundant debris left in place. Stream looses energy and dies into a large wetland.

Stream Site Name	U-5706 Stream SP Date of Assessm	nent 1/10/2019	
Stream Category	la1 Assessor Name/Organiza	tion Axiom Sm	ith/Radecki
Notes of Field Asses	ssment Form (Y/N)	YES	
Presence of regulate	bry considerations (Y/N)	NO	
Additional stream inf	formation/supplementary measurements included (Y/N)	YES	
NC SAM feature typ	e (perennial, intermittent, Tidal Marsh Stream)	Intermitter	nt
		USACE/	NCDWR
	Function Class Rating Summary	All Streams	Intermittent
	(1) Hydrology	HIGH	HIGH
	(2) Baseflow	HIGH	HIGH
	(2) Flood Flow	HIGH	HIGH
	(3) Streamside Area Attenuation	MEDIUM	MEDIUM
	(4) Floodplain Access	MEDIUM	MEDIUM
	(4) Wooded Riparian Buffer	HIGH	HIGH
	(4) Microtopography	LOW	LOW
	(3) Stream Stability	HIGH	HIGH
	(4) Channel Stability	HIGH	HIGH
	(4) Sediment Transport	HIGH	HIGH
	(4) Stream Geomorphology	MEDIUM	MEDIUM
	(2) Stream/Intertidal Zone Interaction	NA	NA
	(2) Longitudinal Tidal Flow	NA	NA
		NA	NA
	(2) Tidal Marsh Stream Stability		
	(3) Tidal Marsh Channel Stability	NA	NA
	(3) Tidal Marsh Stream Geomorphology	NA	NA
	(1) Water Quality	LOW	LOW
	(2) Baseflow	HIGH	HIGH
	(2) Streamside Area Vegetation	MEDIUM	MEDIUM
	(3) Upland Pollutant Filtration	HIGH	HIGH
	(3) Thermoregulation	LOW	LOW
	(2) Indicators of Stressors	NO	NO
	(2) Aquatic Life Tolerance	LOW	NA
	(2) Intertidal Zone Filtration	NA	NA
	(1) Habitat	MEDIUM	MEDIUM
	(2) In-stream Habitat	HIGH	HIGH
	(3) Baseflow	HIGH	HIGH
	(3) Substrate	HIGH	HIGH
	(3) Stream Stability	MEDIUM	MEDIUM
	(3) In-stream Habitat	MEDIUM	MEDIUM
	(2) Stream-side Habitat	LOW	LOW
	(3) Stream-side Habitat	MEDIUM	MEDIUM
	(3) Thermoregulation	LOW	LOW
	(2) Tidal Marsh In-stream Habitat	NA	NA
	(3) Flow Restriction	NA	NA
	(3) Tidal Marsh Stream Stability	NA	NA
	(4) Tidal Marsh Channel Stability	NA	NA
	(4) Tidal Marsh Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-stream Habitat	NA	NA
	(2) Intertidal Zone	NA	NA
	Overall	MEDIUM	MEDIUM

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User Manual Version 2.1			
USACE AID #:	NCDWR #:			
<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,				
	stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and			
	ached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions			
	d information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the			
	mples of additional measurements that may be relevant.			
NOTE EVIDENCE OF STRES	SSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).			
PROJECT/SITE INFORMATION				
1. Project name (if any):	U-5706 Stream SP-upper 2. Date of evaluation: 1/10/2019			
3. Applicant/owner name:	NCDOT         4. Assessor name/organization:         Axiom Smith/Radecki			
5. County:	Richmond 6. Nearest named water body			
7. River basin:	Yadkin-PeeDee     on USGS 7.5-minute quad:     Falling Creek			
,	legrees, at lower end of assessment reach): 34.942323, -79.731634			
STREAM INFORMATION: (d	epth and width can be approximations)			
9. Site number (show on attac				
	in riffle, if present) to top of bank (feet): 1			
12. Channel width at top of ba				
	al flow Intermittent flow Tidal Marsh Stream			
STREAM CATEGORY INFOR				
15. NC SAM Zone:	□ Mountains (M) □ Piedmont (P)			
16. Estimated geomorphic				
valley shape ( <b>skip for</b>				
Tidal Marsh Stream):	(more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)			
17. Watershed size: (skip	Size 1 (< 0.1 mi <sup>2</sup> ) □Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) □Size 3 (0.5 to < 5 mi <sup>2</sup> ) □Size 4 (≥ 5 mi <sup>2</sup> )			
for Tidal Marsh Stream)				
ADDITIONAL INFORMATION				
• •	ations evaluated? Xes No If Yes, check all that apply to the assessment area.			
Section 10 water	□Classified Trout Waters □Water Supply Watershed (□I □II □III □IV □V)			
	Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters			
Publicly owned property				
Anadromous fish	CAMA Area of Environmental Concern (AEC)			
List species:	of a federal and/or state listed protected species within the assessment area.			
Designated Critical Hab	nitat (list spacies)			
	rmation/supplementary measurements included in "Notes/Sketch" section or attached? XYes \No			
1. Channel Water – assessr	ment reach metric (skip for Size 1 streams and Tidal Marsh Streams)			

- Water throughout assessment reach. ×Α □в
  - No flow, water in pools only.
- ПС No water in assessment reach.

#### 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the ΠA point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- ⊠Β Not A

#### 3. Feature Pattern – assessment reach metric

- ⊠Α A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert). ΠВ Not A

#### Feature Longitudinal Profile – assessment reach metric 4.

- ⊠Α Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- ⊡в Not A

#### Signs of Active Instability - assessment reach metric 5.

Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- ⊠Α < 10% of channel unstable ⊡в
  - 10 to 25% of channel unstable
- > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Ba
LB	RB	
ΠA	ΠA	Little o
ПВ	ПВ	Modera

- A Little or no evidence of conditions that adversely affect reference interaction Moderate evidence of conditions (examples: berms, levees, down-cutting, a
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors - assessment reach/intertidal zone metric

## Check all that apply.

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- ON Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- ☐J Little to no stressors

## 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- □A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
   □B Multiple sticks and/or leaf packs and/or emergent vegetation
   □C Multiple snags and logs (including lap trees)
   □D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
- In banks extend to the normal wetted pe
- E Little or no habitat

Check for Tidal Marsh Streams Only	]F ]G ]H ]I ]J ]K
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5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

INP	ĸ	C	A	Р	
$\boxtimes$					Bedrock/saprolite
$\boxtimes$					Boulder (256 – 4096 mm)
$\boxtimes$					Cobble (64 – 256 mm)
$\boxtimes$					Gravel (2 – 64 mm)
				$\boxtimes$	Sand (.062 – 2 mm)
$\boxtimes$					Silt/clay (< 0.062 mm)
		$\boxtimes$			Detritus
$\boxtimes$					Artificial (rip-rap, concrete, etc.)

11d. Tyes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
      - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)

    - Dipterans Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

- Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB
  - ΠA ΠA Little or no alteration to water storage capacity over a majority of the streamside area Πв ΠВ Moderate alteration to water storage capacity over a majority of the streamside area ⊠c ⊠C Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA □В ⊡в ⊠c

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN

## 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

## Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- DD Evidence of bank seepage or sweating (iron in water indicates seepage)
- Ξe Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ΠE Assessment reach relocated to valley edge
- ΠF None of the above

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ⊠В Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break. Vegetated Woo LB RB LB	
	B B B B C C C C D D D	$\square A$ $\geq$ 100 feet wide or extends to the edge of the watershed $\square B$ From 50 to < 100 feet wide $\square C$ From 30 to < 50 feet wide $\square D$ From 10 to < 30 feet wide $\square E$ < 10 feet wide or no trees
20.	Consider for left to LB RB	- streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	□B □B ⊠C ⊠C □D □D	Mature forest Non-mature woody vegetation <u>or</u> modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.	Check all appropr within 30 feet of str	- streamside area metric (skip for Tidal Marsh Streams) riate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is ream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
		owing stressors occurs on either bank, check here and skip to Metric 22: 🛛 feet 30-50 feet
	LB RB LB □A □A □A	RB LB RB
		B B Maintained turf
22.		reamside area metric (skip for Tidal Marsh Streams) pank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB	
	🗆 В 🔤 В	Medium to high stem density Low stem density
22		No wooded riparian buffer or predominantly herbaceous species or bare ground
23.		etated Buffer – streamside area metric (skip for Tidal Marsh Streams) vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	LB RB ⊠A ⊠A	The total length of buffer breaks is < 25 percent.
	□в □в	The total length of buffer breaks is between 25 and 50 percent. The total length of buffer breaks is > 50 percent.
24.	Vegetative Compo	osition – streamside area metric (skip for Tidal Marsh Streams)
	Evaluate the domir assessment reach	nant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to habitat.
	LB RB □A □A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species,
		with non-native invasive species absent or sparse.
		Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or
		communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
		Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. 🗌 Yes 🛛 🕅	sessment reach metric (skip for all Coastal Plain streams) No Was conductivity measurement recorded? one of the following reasons.  DNo Water  Other:
	25b. Check the bo □A < 46	ox corresponding to the conductivity measurement (units of microsiemens per centimeter). ☐B 46 to < 67

Notes/Sketch:

Stream runs along side residential properties with maintained lawns

Stream Site Name	U-5706 Stream SP-lower Date of Asses	ssment	1/10/2019	
Stream Category	la1 Assessor Name/Organ			ith/Radecki
Notes of Field Asses	ssment Form (Y/N)		YES	
Presence of regulate	ory considerations (Y/N)		NO	
	formation/supplementary measurements included (Y/N)		YES	
NC SAM feature typ	e (perennial, intermittent, Tidal Marsh Stream)		Intermitten	<u>it</u>
			USACE/	NCDWR
	Function Class Rating Summary	AI	I Streams	Intermittent
	(1) Hydrology		LOW	LOW
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Flood Flow		LOW	LOW
	(3) Streamside Area Attenuation		LOW	LOW
	(4) Floodplain Access		LOW	LOW
	(4) Wooded Riparian Buffer		LOW	LOW
	(4) Microtopography		LOW	LOW
	(3) Stream Stability	ſ	MEDIUM	MEDIUM
	(4) Channel Stability		HIGH	HIGH
	(4) Sediment Transport		HIGH	HIGH
	(4) Stream Geomorphology		LOW	LOW
	(2) Stream/Intertidal Zone Interaction		NA	NA
	(2) Longitudinal Tidal Flow		NA	NA
	(2) Tidal Marsh Stream Stability		NA	NA
	(3) Tidal Marsh Channel Stability		NA	NA
	(3) Tidal Marsh Stream Geomorpholog	 VC	NA	NA
	(1) Water Quality	<u>.</u>	LOW	LOW
	(2) Baseflow		MEDIUM	MEDIUM
	(2) Streamside Area Vegetation		MEDIUM	MEDIUM
	(3) Upland Pollutant Filtration		MEDIUM	MEDIUM
	(3) Thermoregulation		MEDIUM	MEDIUM
	(2) Indicators of Stressors		NO	NO
	(2) Aquatic Life Tolerance		LOW	NA
	(2) Intertidal Zone Filtration		NA	NA
	(1) Habitat		LOW	MEDIUM
	(2) In-stream Habitat		MEDIUM	HIGH
	(3) Baseflow		MEDIUM	MEDIUM
	(3) Substrate		HIGH	HIGH
	(3) Stream Stability		MEDIUM	MEDIUM
	(3) In-stream Habitat		LOW	HIGH
	(2) Stream-side Habitat		LOW	LOW
	(2) Stream-side Habitat		LOW	
	(3) Thermoregulation		LOW	LOW
	(3) Thermolegulation (2) Tidal Marsh In-stream Habitat			
			NA	NA NA
	(3) Flow Restriction		NA	
	(3) Tidal Marsh Stream Stability		NA	NA
	(4) Tidal Marsh Channel Stability		NA	NA
	(4) Tidal Marsh Stream Geomorpholog	ду	NA	NA
	(3) Tidal Marsh In-stream Habitat		NA	NA
	(2) Intertidal Zone		NA	NA
	Overall		LOW	LOW

# NC SAM FIELD ASSESSMENT RESULTS

	Accompanies User I	Manual Version 2.1			
USACE AID #:		NCDWR #:			
INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,					
		e stream reaches will be evaluated on the same property, identify and			
		or each reach. See the NC SAM User Manual for detailed descriptions			
		ch" section if supplementary measurements were performed. See the			
	les of additional measurements that m				
NOTE EVIDENCE OF STRESSO	ORS AFFECTING THE ASSESSMENT	Γ AREA (do not need to be within the assessment area).			
PROJECT/SITE INFORMATION	:				
1. Project name (if any): U-	5706 Stream SQ	2. Date of evaluation: 1/10/2019			
3. Applicant/owner name: N	CDOT	4. Assessor name/organization: Axiom Smith/Radecki			
5. County: R	ichmond	6. Nearest named water body			
7. River basin: Ya	adkin-PeeDee	on USGS 7.5-minute quad: Falling Creek			
8. Site coordinates (decimal degr	ees, at lower end of assessment reach	n): 34.947115, -79.728010			
STREAM INFORMATION: (dept	h and width can be approximations)	)			
9. Site number (show on attached	d map): Stream SQ 10.	Length of assessment reach evaluated (feet): 100			
11. Channel depth from bed (in ri	ffle, if present) to top of bank (feet):	1 Unable to assess channel depth.			
12. Channel width at top of bank	(feet): 4 13. Is a	assessment reach a swamp steam? □Yes ⊠No			
14. Feature type: Perennial flo	w ⊠Intermittent flow □Tidal Marsh	Stream			
STREAM CATEGORY INFORM	ATION:				
15. NC SAM Zone:	Mountains (M) Piedmont (F	P) Inner Coastal Plain (I) Outer Coastal Plain (O)			
16. Estimated geomorphic	_ \				
valley shape ( <b>skip for</b>					
Tidal Marsh Stream):	(more sinuous stream, flatter valley sl	ope) (less sinuous stream, steeper valley slope)			
17. Watershed size: (skip	Size 1 (< 0.1 mi <sup>2</sup> ) Size 2 (0.1				
for Tidal Marsh Stream)					
ADDITIONAL INFORMATION:					
	ns evaluated? ⊠Yes ⊡No. If Yes. ct	heck all that apply to the assessment area.			
Section 10 water	Classified Trout Waters	Water Supply Watershed (			
Essential Fish Habitat	Primary Nursery Area	☐ High Quality Waters/Outstanding Resource Waters			
Publicly owned property	NCDWR Riparian buffer rule				
Documented presence of a federal and/or state listed protected species within the assessment area.					
Documented presence of a	303(d) List a federal and/or state listed protected s	CAMA Area of Environmental Concern (AEC) geocies within the assessment area.			
·					
List species:	a federal and/or state listed protected s				
List species:	a federal and/or state listed protected s t (list species)				

#### 1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- $\square A$  Water throughout assessment reach.
- B No flow, water in pools only.
- C No water in assessment reach.

#### 2. Evidence of Flow Restriction – assessment reach metric

- At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction <u>or</u> fill to the point of obstructing flow <u>or</u> a channel choked with aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- B Not A

4.

## 3. Feature Pattern – assessment reach metric

- A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).

## Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- ⊠B Not A

## 5. Signs of Active Instability – assessment reach metric

**Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- $\square A$  < 10% of channel unstable
- B 10 to 25% of channel unstable
- C > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	ier for the	э се
LB	RB	
ΠA	ΠA	L
ØВ	⊠в	N

ПС

- A Little or no evidence of conditions that adversely affect reference interaction
- Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

## 7. Water Quality Stressors – assessment reach/intertidal zone metric

## Check all that apply.

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- ∐J Little to no stressors

## 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses
- (include liverworts, lichens, and algal mats)
   Multiple sticks and/or leaf packs and/or emergent vegetation
- C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	]⊦ ]H ]H JK
--	----------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)
- 11b. Bedform evaluated. Check the appropriate box(es).
  - A Riffle-run section (evaluate 11c)
  - B Pool-glide section (evaluate 11d)
  - C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

			Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus
$\square \boxtimes$			

11d. Tyes XNo Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
    - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)
    - Dipterans
    - Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
ΜA	×Α	Little or no alteration to water storage capacity over a majority of the streamside area
□в	□в	Moderate alteration to water storage capacity over a majority of the streamside area
□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction,
		livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- LB RB ΠA ΠA ⊠в ⊠В □с
  - Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
  - Majority of streamside area with depressions able to pond water 3 to 6 inches deep
  - □C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN
- 16. Baseflow Contributors assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

## Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- ΠA Streams and/or springs (jurisdictional discharges)
- ⊠в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
- Ξe Stream bed or bank soil reduced (dig through deposited sediment if present)
- ΠF None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA

□в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)

- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach DD
- ΠE Assessment reach relocated to valley edge
- ⊠F None of the above

- Consider aspect. Consider "leaf-on" condition.
- $\square A$ Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- □С Stream shading is gone or largely absent

19. 🛛	Buffer Width	<ul> <li>streamside area</li> </ul>	metric	(skip fo	r Tidal I	Marsh	Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

	to the first break.VegetatedWoodedLBRBLBRBLBRB $\square A$ $\square A$ $\square A$ $\supseteq B$ $\square B$ $\square B$ $\square B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square D$ $\square B$
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).         LB       RB         A       A         B       B         Non-mature woody vegetation or modified vegetation structure         C       C         Herbaceous vegetation with or without a strip of trees < 10 feet wide         D       D         Maintained shrubs         E       E
21.	Buffer Stressors - streamside area metric (skip for Tidal Marsh Streams)         Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).         If none of the following stressors occurs on either bank, check here and skip to Metric 22:         Abuts       < 30 feet         Abuts       < 30 feet         B       B       B         B       B       B         B       B       B         B       B       B         C       C       C         D       D       D         D       D       D
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)         Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).         LB       RB         A       A         Medium to high stem density         B       B         LOW stem density         C       C         No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)         Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.         LB       RB         A       A         The total length of buffer breaks is < 25 percent.         B       B         The total length of buffer breaks is between 25 and 50 percent.         C       C         The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB         □A       □A         Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.         ⊠B       ⊠B         ∨egetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or
	<ul> <li>communities missing understory but retaining canopy trees.</li> <li>Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.</li> </ul>
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)         25a.       Yes       No       Was conductivity measurement recorded? If No, select one of the following reasons.       No       Water       Other:         25b.       Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).       A       < 46       B       46 to < 67       C       67 to < 79       D       79 to < 230       E       ≥ 230

Notes/Sketch:

Intermittent feature within channelized ditch, two dams and a large pond upstream.

Stream Site Name	U-5706 Stream SQ Date of Assessme	nt 1/10/2019	
Stream Category	la1 Assessor Name/Organizatio		th/Radecki
Notes of Field Asses	sment Form (Y/N)	YES	
Presence of regulato	bry considerations (Y/N)	NO	
Additional stream inf	ormation/supplementary measurements included (Y/N)	YES	
NC SAM feature type	e (perennial, intermittent, Tidal Marsh Stream)	Intermitten	t
		USACE/	NCDWR
		All Streams	Intermittent
	(1) Hydrology	HIGH	HIGH
	(2) Baseflow	HIGH	HIGH
	(2) Flood Flow	HIGH	HIGH
	(3) Streamside Area Attenuation	HIGH	HIGH
	(4) Floodplain Access	MEDIUM	MEDIUM
	(4) Wooded Riparian Buffer	HIGH	HIGH
	(4) Microtopography	HIGH	HIGH
	(3) Stream Stability	HIGH	HIGH
	(4) Channel Stability	HIGH	HIGH
	(4) Sediment Transport	HIGH	HIGH
	(4) Stream Geomorphology	MEDIUM	MEDIUM
	(2) Stream/Intertidal Zone Interaction	NA	NA
	(2) Longitudinal Tidal Flow	NA	NA
	(2) Tidal Marsh Stream Stability	NA	NA
	(3) Tidal Marsh Channel Stability	NA	NA
	(3) Tidal Marsh Stream Geomorphology	NA	NA
	(1) Water Quality	MEDIUM	MEDIUM
	(2) Baseflow	HIGH	HIGH
	(2) Streamside Area Vegetation	HIGH	HIGH
	(3) Upland Pollutant Filtration	HIGH	HIGH
	(3) Thermoregulation	HIGH	HIGH
	(2) Indicators of Stressors	NO	NO
	(2) Aquatic Life Tolerance	LOW	NA
	(2) Intertidal Zone Filtration	NA	NA
	(1) Habitat	HIGH	HIGH
	(2) In-stream Habitat	HIGH	HIGH
	(3) Baseflow	HIGH	HIGH
	(3) Substrate	HIGH	HIGH
	(3) Stream Stability	HIGH	HIGH
	(3) In-stream Habitat	MEDIUM	HIGH
	(2) Stream-side Habitat	HIGH	HIGH
	(3) Stream-side Habitat	HIGH	HIGH
	(3) Thermoregulation	HIGH	HIGH
	(2) Tidal Marsh In-stream Habitat	NA	NA
	(3) Flow Restriction	NA	NA
	(3) Tidal Marsh Stream Stability	NA	NA
	(4) Tidal Marsh Channel Stability	NA	NA
	(4) Tidal Marsh Stream Geomorphology	NA	NA
	(3) Tidal Marsh In-stream Habitat	NA	NA
	(2) Intertidal Zone	NA	NA

# NC SAM FIELD ASSESSMENT RESULTS

Accomp	anies	User	Manual	Version	2.1

USACE AID #:		NCDWR #:	
	ch a sketch of the assessment area and photographs.		
	of the stream reach under evaluation. If multiple strea		
	the attached map, and include a separate form for eacl		
	uested information. Record in the "Notes/Sketch" see		urements were performed. See the
	for examples of additional measurements that may be		
NOTE EVIDENCE OF S	STRESSORS AFFECTING THE ASSESSMENT ARE	A (do not need to be within	n the assessment area).
PROJECT/SITE INFOR	RMATION:		
1. Project name (if any):	: U-5706 Stream SR 2. Da	te of evaluation: 1/23/19	
3. Applicant/owner nam	ne: NCDOT 4. As	sessor name/organization:	Smith/Axiom
5. County:	Richmond 6. Ne	arest named water body	
7. River basin:	Yadkin-PeeDee or	USGS 7.5-minute quad:	Hitchcock Creek
8. Site coordinates (dec	cimal degrees, at lower end of assessment reach):	34.960682, -079.746231	
STREAM INFORMATIC	ON: (depth and width can be approximations)		
9. Site number (show or		of assessment reach evalu	ated (feet): 590
11. Channel depth from	bed (in riffle, if present) to top of bank (feet): 3		Inable to assess channel depth.
12. Channel width at top	p of bank (feet): 5 13. Is assess	sment reach a swamp steam	? □Yes ⊠No
	erennial flow		
STREAM CATEGORY			
15. NC SAM Zone:	Mountains (M) Piedmont (P)	Inner Coastal Plain (I)	Outer Coastal Plain (O)
	_ (), _ (),		
16. Estimated geomorpl	hia /		
valley shape (skip f		□в	
Tidal Marsh Stream		(less sinuous st	ream, steeper valley slope)
17. Watershed size: (sk			
for Tidal Marsh Str			
ADDITIONAL INFORM	,		
	nsiderations evaluated? ⊠Yes ⊡No If Yes, check a	Il that apply to the assessme	ent area.
Section 10 water			shed ( I III III IV V)
Essential Fish Ha			s/Outstanding Resource Waters
Publicly owned p	_ , ,	• •	•
Anadromous fish			onmental Concern (AEC)
Documented pres	sence of a federal and/or state listed protected species	within the assessment area	1.
List species:			
Designated Critic	cal Habitat (list species)		
19. Are additional stream	m information/supplementary measurements included	in "Notes/Sketch" section or	attached? □Yes ⊠No
	ssessment reach metric (skip for Size 1 streams ar	nd Tidal Marsh Streams)	
	oughout assessment reach.		
	rater in pools only.		
C No water in	n assessment reach.		
	Restriction – assessment reach metric		
	0% of assessment reach in-stream habitat or riffle-poo		
	ostructing flow or a channel choked with aquatic macr		
	sment reach (examples: undersized or perched culver	ts, causeways that constrict	the channel, tidal gates, debris jams,
beaver dar	ms).		
⊠B Not A			
3. Feature Pattern – a	assessment reach metric		
	of the assessment reach has altered pattern (example	s: straightening, modification	n above or below culvert).
B Not A			
4. Feature Longitudin	nal Profile – assessment reach metric		
	assessment reach has a substantially altered stream	profile (examples: channel o	down-cutting, existing damming. over
	active aggradation, dredging, and excavation where		
disturbanc			-
B Not A			
5. Signs of Active Ins	stability – assessment reach metric		
_	rent instability, not past events from which the st	ream has currently recover	red. Examples of instability include
	active channel down-cutting (head-cut), active widenin		
	channel unstable		
	of channel unstable		

□c > 25% of channel unstable

## 6. Streamside Area Interaction – streamside area metric Consider for the Left Bank (LB) and the Right Bank (RB).

Consid	der for the	e Left Ban
LB	RB	
ΠA	ΠA	Little or
ПВ	ПВ	Modera

- A Little or no evidence of conditions that adversely affect reference interaction Moderate evidence of conditions (examples: berms, levees, down-cutting, a
  - B Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
- Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7.	Water Quality	Stressors –	assessment	reach/intertidal	zone metric
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## Check all that apply.

⊠C

- Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- Other: \_\_\_\_\_ (explain in "Notes/Sketch" section)
- ☐J Little to no stressors

## 8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)

- For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

## 9. Large or Dangerous Stream – assessment reach metric

□Yes ⊠No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

## 10. Natural In-stream Habitat Types - assessment reach metric

10a. Yes Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)

## 10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
   Multiple sticks and/or leaf packs and/or emergent
- vegetation
  C Multiple snags and logs (including lap trees)
- D 5% undercut banks and/or root mats and/or roots
- in banks extend to the normal wetted perimeter
- E Little or no habitat

Check for Tidal Marsh Streams Only	□F □∃ □J K
--	---------------------

5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools) Sand bottom 5% vertical bank along the marsh Little or no habitat

## 11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. XYes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)
- 11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.
  NP
  P
  C
  A
  P

		Bedrock/saprolite Boulder (256 – 4096 mm) Cobble (64 – 256 mm) Gravel (2 – 64 mm) Sand (.062 – 2 mm) Silt/clay (< 0.062 mm) Detritus

11d. Tyes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

- 12a. ⊠Yes □No Was an in-stream aquatic life assessment performed as described in the User Manual? If No, select one of the following reasons and skip to Metric 13. No Water Other:
- 12b. Yes ⊠No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
  - Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. >1
  - Adult frogs
    - Aquatic reptiles
      - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
    - Beetles
    - Caddisfly larvae (T)
    - Asian clam (Corbicula)
    - Crustacean (isopod/amphipod/crayfish/shrimp)

    - Dipterans Mayfly larvae (E)
    - Megaloptera (alderfly, fishfly, dobsonfly larvae)
    - Midges/mosquito larvae
    - Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)
  - Mussels/Clams (not Corbicula)
    - Other fish Salamanders/tadpoles

    - Stonefly larvae (P)
    - Tipulid larvae
    - Worms/leeches

## 13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

- Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff. LB RB
  - ΠA ΠA Little or no alteration to water storage capacity over a majority of the streamside area Πв ΠВ Moderate alteration to water storage capacity over a majority of the streamside area ⊠c ⊠C Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

### 14. Streamside Area Water Storage - streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB ΠA ΠA □В ⊡в ⊠c

- Majority of streamside area with depressions able to pond water  $\geq 6$  inches deep
- Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- ⊠C Majority of streamside area with depressions able to pond water < 3 inches deep

## 15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach. RB

- LB ΠY
  - ΠY Are wetlands present in the streamside area?
- ΜN ΜN

## 16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)

- Check all contributors within the assessment reach or within view of and draining to the assessment reach.
  - ΠA Streams and/or springs (jurisdictional discharges)
  - ⊡в Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
  - □с Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
  - ΜD Evidence of bank seepage or sweating (iron in water indicates seepage)
  - ØΕ Stream bed or bank soil reduced (dig through deposited sediment if present)
  - ΠF None of the above

## 17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

## Check all that apply.

- Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ΠA
- □в Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) □с Urban stream (≥ 24% impervious surface for watershed)
- Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ΔD
- ØΕ Assessment reach relocated to valley edge
- ΠF None of the above

- Consider aspect. Consider "leaf-on" condition.
- ΠA Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- □в Degraded (example: scattered trees)
- ⊠C Stream shading is gone or largely absent

<ol><li>Buffer Width – streamside area metric (skip for Tidal Mars)</li></ol>	n Streams)
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Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out

	to the first break.VegetatedWoodedLBRBLB $\square A$ $\square A$ $\square A$ $\square B$ $\square B$ $\square B$ $\square C$ $\square C$ $\square C$ $\square D$ $\square D$ $\square D$ $\square E$ $\square E$ $\square E$	$\geq$ 100 feet wide <u>or</u> extends to the edge of the watershed From 50 to < 100 feet wide From 30 to < 50 feet wide From 10 to < 30 feet wide < 10 feet wide <u>or</u> no trees
20.	Consider for left bank ( LB RB □A □A Matur	imside area metric (skip for Tidal Marsh Streams) LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width). e forest
	⊠C ⊠C Herba □D □D Mainta	nature woody vegetation <u>or</u> modified vegetation structure aceous vegetation with or without a strip of trees < 10 feet wide ained shrubs or no vegetation
21.	Check all appropriate b within 30 feet of stream (-	amside area metric (skip for Tidal Marsh Streams) oxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is < 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
	Abuts < 30 feet	stressors occurs on either bank, check here and skip to Metric 22: 30-50 feet LB RB
		□A □A Row crops
	□B □B □B □B □C □C □C □C □D □D □D □D	B       B       Maintained turf         C       C       Pasture (no livestock)/commercial horticulture         D       D       Pasture (active livestock use)
22.		side area metric (skip for Tidal Marsh Streams) LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB	
	B B Low s	im to high stem density tem density poded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.		I Buffer – streamside area metric (skip for Tidal Marsh Streams) ted buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.
	LB RB	
	B B The to	otal length of buffer breaks is < 25 percent. otal length of buffer breaks is between 25 and 50 percent. otal length of buffer breaks is > 50 percent.
24.		n – streamside area metric (skip for Tidal Marsh Streams)
		egetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to
		ation is close to undisturbed in species present and their proportions. Lower strata composed of native species, on-native invasive species absent or sparse.
	B B Veget specie comm	ation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native es. This may include communities of weedy native species that develop after clear-cutting or clearing <u>or</u> nunities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u>
	C ⊠C Veget with n	nunities missing understory but retaining canopy trees. ation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities on-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted s of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. □Yes ⊠No V	nent reach metric (skip for all Coastal Plain streams) Vas conductivity measurement recorded? the following reasons.
		esponding to the conductivity measurement (units of microsiemens per centimeter). $B 46 \text{ to} < 67 \qquad \Box C 67 \text{ to} < 79 \qquad \Box D 79 \text{ to} < 230 \qquad \Box E \ge 230$

Notes/Sketch:

Roadside ditch in a natural topographic crenulation - more water than other ditches in the area. Maintained residential on LB and road shoulder on the RB.

Stream Site Name U-5706 Stream SR Date of Assessr	ment 1/23/19	
Stream Category la1 Assessor Name/Organiza	ation Smith/Axid	om
· · · · · · · · · · · · · · · · ·		
Notes of Field Assessment Form (Y/N)	YES	
Presence of regulatory considerations (Y/N)	NO	
Additional stream information/supplementary measurements included (Y/N)	NO	
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermitte	nt
	USACE/	NCDWR
Function Class Rating Summary	All Streams	Intermittent
(1) Hydrology	LOW	LOW
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	LOW	LOW
(3) Streamside Area Attenuation	LOW	LOW
(4) Floodplain Access	LOW	LOW
(4) Wooded Riparian Buffer	LOW	LOW
(4) Microtopography	LOW	LOW
(3) Stream Stability	LOW	LOW
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	LOW	LOW
(4) Stream Geomorphology	LOW	LOW
(2) Stream/Intertidal Zone Interaction	NA	NA
	NA	NA
(2) Longitudinal Tidal Flow	-	
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	LOW	LOW
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	LOW	LOW
(3) Upland Pollutant Filtration	LOW	LOW
(3) Thermoregulation	LOW	LOW
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	LOW	LOW
(2) In-stream Habitat	LOW	MEDIUM
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	LOW	LOW
(3) Stream Stability	MEDIUM	MEDIUM
(3) In-stream Habitat	LOW	HIGH
(2) Stream-side Habitat	LOW	LOW
	-	
(3) Stream-side Habitat		
(3) Thermoregulation		LOW
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
	NA	NA
(3) Tidal Marsh Stream Stability	-	
(4) Tidal Marsh Channel Stability	NA	NA
	NA NA	NA NA
(4) Tidal Marsh Channel Stability	-	
<ul><li>(4) Tidal Marsh Channel Stability</li><li>(4) Tidal Marsh Stream Geomorphology</li></ul>	NA	NA