

**NC SAM FIELD ASSESSMENT FORM**  
**Accompanies User Manual Version 2.1**

USACE AID #:	NCDWR #												
<p><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" section if supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.</p> <p><b>NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).</b></p> <p><b>PROJECT/SITE INFORMATION:</b></p> <p>1. Project name (if any): _____ 2. Date of evaluation: _____</p> <p>3. Applicant/owner name: _____ 4. Assessor name/organization: _____</p> <p>5. County: _____ 6. Nearest named water body _____</p> <p>7. River basin: _____ on USGS 7.5-minute quad: _____</p> <p>8. Site coordinates (decimal degrees, at lower end of assessment reach): _____</p> <p><b>STREAM INFORMATION: (depth and width can be approximations)</b></p> <p>9. Site number (show on attached map): _____ 10. Length of assessment reach evaluated (feet): _____</p> <p>11. Channel depth from bed (in riffle, if present) to top of bank (feet): _____ <input type="checkbox"/> Unable to assess channel depth.</p> <p>12. Channel width at top of bank (feet): _____ 13. Is assessment reach a swamp stream? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>14. Feature type: <input type="checkbox"/> Perennial flow <input type="checkbox"/> Intermittent flow <input type="checkbox"/> Tidal Marsh Stream</p> <p><b>STREAM CATEGORY INFORMATION:</b></p> <p>15. NC SAM Zone: <input type="checkbox"/> Mountains (M) <input type="checkbox"/> Piedmont (P) <input type="checkbox"/> Inner Coastal Plain (I) <input type="checkbox"/> Outer Coastal Plain (O)</p> <p>16. Estimated geomorphic valley shape (skip for Tidal Marsh Stream): <input type="checkbox"/> a  (more sinuous stream, flatter valley slope) <input type="checkbox"/> b  (less sinuous stream, steeper valley slope)</p> <p>17. Watershed size: (skip for Tidal Marsh Stream) <input type="checkbox"/> Size 1 (&lt; 0.1 mi<sup>2</sup>) <input type="checkbox"/> Size 2 (0.1 to &lt; 0.5 mi<sup>2</sup>) <input type="checkbox"/> Size 3 (0.5 to &lt; 5 mi<sup>2</sup>) <input type="checkbox"/> Size 4 (≥ 5 mi<sup>2</sup>)</p> <p><b>ADDITIONAL INFORMATION:</b></p> <p>18. Were regulatory considerations evaluated? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, check all that apply to the assessment area.</p> <table style="width:100%; border:none;"> <tr> <td><input type="checkbox"/> Section 10 water</td> <td><input type="checkbox"/> Classified Trout Waters</td> <td><input type="checkbox"/> Water Supply Watershed (<input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> V)</td> </tr> <tr> <td><input type="checkbox"/> Essential Fish Habitat</td> <td><input type="checkbox"/> Primary Nursery Area</td> <td><input type="checkbox"/> High Quality Waters/Outstanding Resource Waters</td> </tr> <tr> <td><input type="checkbox"/> Publicly owned property</td> <td><input type="checkbox"/> NCDWR riparian buffer rule in effect</td> <td><input type="checkbox"/> Nutrient Sensitive Waters</td> </tr> <tr> <td><input type="checkbox"/> Anadromous fish</td> <td><input type="checkbox"/> 303(d) List</td> <td><input type="checkbox"/> CAMA Area of Environmental Concern (AEC)</td> </tr> </table> <p><input type="checkbox"/> Documented presence of a federal and/or state listed protected species within the assessment area.  List species: _____</p> <p><input type="checkbox"/> Designated Critical Habitat (list species) _____</p> <p>19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input type="checkbox"/> Water Supply Watershed ( <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> V)	<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters	<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters	<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> CAMA Area of Environmental Concern (AEC)
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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**
  - A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the 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).
  - 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 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).

- |                            |                            |   |
|----------------------------|----------------------------|---|
| LB                         | RB                         |   |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Little or no evidence of conditions that adversely affect reference interaction   |
| <input type="checkbox"/> B | <input type="checkbox"/> 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])   |
| <input type="checkbox"/> C | <input type="checkbox"/> 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] <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.

- A 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” 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.)
- I 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 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)**

- |  |                                    |   |
|--|------------------------------------|---|
| <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (including liverworts, lichens, and algal mats) | Check for Tidal Marsh Streams Only | <input type="checkbox"/> F 5% oysters or other natural hard bottoms |
| <input type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation                                    |                                    | <input type="checkbox"/> G Submerged aquatic vegetation             |
| <input type="checkbox"/> C Multiple snags and logs (including lap trees)   |                                    | <input type="checkbox"/> H Low-tide refugia (pools)                 |
| <input type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter  |                                    | <input type="checkbox"/> I Sand bottom                              |
| <input type="checkbox"/> E Little or no habitat  |                                    | <input type="checkbox"/> J 5% vertical bank along the marsh         |
|  |                                    | <input type="checkbox"/> K Little or no habitat                     |

\*\*\*\*\*REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS\*\*\*\*\*

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

11a. Yes 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.** 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	
<input type="checkbox"/>	Bedrock/saprolite				
<input type="checkbox"/>	Boulder (256 – 4096 mm)				
<input type="checkbox"/>	Cobble (64 – 256 mm)				
<input type="checkbox"/>	Gravel (2 – 64 mm)				
<input type="checkbox"/>	Sand (.062 – 2 mm)				
<input type="checkbox"/>	Silt/clay (< 0.062 mm)				
<input type="checkbox"/>	Detritus				
<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)				

11d. Yes No Are pools filled with sediment?

**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 >1 Numbers over columns refer to “individuals” for Size 1 and 2 streams and “taxa” for Size 3 and 4 streams.

- Adult frogs
- Aquatic reptiles
- Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- Beetles (including water pennies)
- Caddisfly larvae (Trichoptera [T])
- Asian clam (*Corbicula*)
- Crustacean (isopod/amphipod/crayfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans (true flies)
- Mayfly larvae (Ephemeroptera [E])
- Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midge/mosquito larvae
- Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
- Mussels/Clams (not *Corbicula*)
- Other fish
- Salamanders/tadpoles
- Snails
- Stonefly larvae (Plecoptera [P])
- Tipulid larvae (Cranefly)
- 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                         |  |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Little or no alteration to water storage capacity over a majority of the streamside area   |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate alteration to water storage capacity over a majority of the streamside area   |
| <input type="checkbox"/> C | <input type="checkbox"/> 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                         |  |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of streamside area with depressions able to pond water $\geq$ 6 inches deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep   |
| <input type="checkbox"/> C | <input type="checkbox"/> 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.

- |                            |                            |  |
|----------------------------|----------------------------|--|
| LB                         | RB                         |  |
| <input type="checkbox"/> Y | <input type="checkbox"/> Y | Are wetlands present in the streamside area? |
| <input type="checkbox"/> N | <input type="checkbox"/> N |  |

**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.**

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods affecting assessment reach (ex: beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E 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.**

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream ( $\geq$  24% impervious surface for watershed)
- D Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
- E 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.

- A Stream shading is appropriate for the stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream shading is gone or largely absent

**19. Buffer Width – streamside area metric (skip for Tidal Marsh 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	
<input type="checkbox"/> A	<input type="checkbox"/> A	<input type="checkbox"/> A	<input type="checkbox"/> A	≥ 100 feet wide <u>or</u> extends to the edge of the watershed
<input type="checkbox"/> B	<input type="checkbox"/> B	<input type="checkbox"/> B	<input type="checkbox"/> B	From 50 to < 100 feet wide
<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	From 30 to < 50 feet wide
<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	From 10 to < 30 feet wide
<input type="checkbox"/> E	<input type="checkbox"/> E	<input type="checkbox"/> E	<input type="checkbox"/> 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	
<input type="checkbox"/> A	<input type="checkbox"/> A	Mature forest
<input type="checkbox"/> B	<input type="checkbox"/> B	Non-mature woody vegetation <u>or</u> modified vegetation structure
<input type="checkbox"/> C	<input type="checkbox"/> C	Herbaceous vegetation with or without a strip of trees < 10 feet wide
<input type="checkbox"/> D	<input type="checkbox"/> D	Maintained shrubs
<input type="checkbox"/> E	<input type="checkbox"/> 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	
<input type="checkbox"/> A	Row crops					
<input type="checkbox"/> B	Maintained turf					
<input type="checkbox"/> C	Pasture (no livestock)/commercial horticulture					
<input type="checkbox"/> 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	
<input type="checkbox"/> A	<input type="checkbox"/> A	Medium to high stem density
<input type="checkbox"/> B	<input type="checkbox"/> B	Low stem density
<input type="checkbox"/> C	<input type="checkbox"/> 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	
<input type="checkbox"/> A	<input type="checkbox"/> A	The total length of buffer breaks is < 25 percent.
<input type="checkbox"/> B	<input type="checkbox"/> B	The total length of buffer breaks is between 25 and 50 percent.
<input type="checkbox"/> C	<input type="checkbox"/> C	The total length of buffer breaks is > 50 percent.

**24. Vegetative Composition – First 100 feet of 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	
<input type="checkbox"/> A	<input type="checkbox"/> 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.
<input type="checkbox"/> B	<input type="checkbox"/> 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> communities missing understory but retaining canopy trees.
<input type="checkbox"/> C	<input type="checkbox"/> 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?

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: