

Stream Restoration

Definition/Purpose

A *stream restoration* system means the use of bioengineering practices, native material revetments, channel stability structures and/or the restoration or management of riparian corridors in order to protect upland BMPs, restore the natural function of the stream corridor and improve water quality by reducing sedimentation to streams from streambank.

Policies

1. The use of this BMP for CCAP funding is intended for sites where the natural streambank has been severely damaged by human or animal access, other activities or natural processes. Each site should be reviewed by the District Board to determine the eligibility for cost share funding and prioritize the sites as to the direct effects, long term benefits and the landowner's willingness to be involved, maintain and support the practice.
2. Planned practices require a contact with the U.S. Army Corps of Engineers and the N.C. Wildlife Resources Commission for all proposed sites to determine if a Section 404 permit is needed. A Section 401 Water Quality certification may also be needed from the N. C. Division of Water Resources.
3. A minimum setback of 20 feet of undisturbed native vegetation or restored riparian area adjacent to the installed practice is mandatory in all situations. Division staff is authorized to approve contracts with a lesser setback for instances where site conditions make a 20-foot setback infeasible, but the Division may not approve a setback that is less than 10 feet.
4. An analysis of the existing stream condition and the degree of departure for the existing stream condition from its full operating potential must be made as a part of the planning and design process for this BMP. The analysis of stream condition and departure may be made following the procedures established by Dave Rosgen in *Applied River Morphology*, Chapter 6 (Rosgen, 1996). Rosgen's field survey form, "Summary of Condition Categories for Level III Inventory" may be used to document the analysis. The form is located on page 3 of this standard.
5. If the analysis, when completed as outlined in item 4 (above), shows that the profile, pattern and/or dimensions of the stream need to be restored in order to restore the natural stability and function of the stream, assistance will be required from a person who has successfully completed Rosgen's Restoration Course or equivalent natural channel design training.
6. Installations of this BMP will be monitored upstream and downstream as necessary to determine the effects and compare the condition of the stream before versus after the installation. Monitoring can include physical measurements, biological/water quality indicator measurements, chemical measurements (WQ sampling) and/or documentation of visual observations. If documented visual observation is the only monitoring technique used, the observations will be mandatory for the first five years after installation. Other monitoring will be conducted for a minimum of three years.

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7. This practice may further be supported by other BMPs such as, critical area planting and riparian buffer. In-stream techniques such as weirs, deflectors and other proven practices may also be used to address the stabilization of the streambanks.
8. Additional measures to minimize or manage access or traffic may be necessary to ensure the long-term stability of the restored stream/streambank.
9. Estimates of streambank erosion in tons/yr. may be substituted for soil loss calculations on the contract.
10. Effects:
 - Streambank erosion (required)
 - Runoff and flooding (required)
 - Turbidity (required)
 - Surface water temperature (optional)
 - Stream fish population (optional)
 - Stream benthic invertebrates (optional)
11. Repairs on established sites will require a new analysis to determine the suitability of repairing the BMP before the district can commit funds to a repair CPO.

| STREAM RESTORATION | |
|--------------------------------|--|
| Lifespan | 5 years single-family home, 10 years all other properties |
| BMP Units | LINEAR FEET |
| Required Effects | Soil saved (volumetric calculation) |
| JAA | There is no job approval authority for stream restoration, a division or private engineer must design the practice |
| CS2 Reference Materials | <ul style="list-style-type: none">• NC-ACSP-11 Signature Page• Map with BMP location and fields |

Specifications

N.C. NRCS Technical Guide, Section IV, Specifications #580 (Stream and Shoreline Protection)
http://efotg.sc.egov.usda.gov/references/public/NC/NC580StrmbkProt_10.2011.pdf

N.C. NRCS Technical Guide, Section IV, Specifications #612 (Tree and Shrub Establishment)

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http://efotg.sc.egov.usda.gov/references/public/NC/nc612_12-2011.pdf

N.C. NRCS Technical Guide, Section IV, Specifications #472 (Access Control)

http://efotg.sc.egov.usda.gov/references/public/NC/NC472AccessCntrl_10.2011.pdf

N.C. NRCS Technical Guide, Section IV, Specifications #391 (Riparian Forest Buffer)

http://efotg.sc.egov.usda.gov/references/public/NC/NC391RipForBuffer_10.2011.pdf

Buffers \geq 35 feet this NRCS Standard 391 shall be used; for buffers less than 35 feet in width the above standard shall be used with the exception of the zones. Native tree and/or shrub species must be planted.

N.C. NRCS Technical Guide, Section IV, Specifications #584 (Channel Bed Stabilization)

http://efotg.sc.egov.usda.gov/references/public/NC/NC584ChnIBEDStab_10.2011.pdf

NRCS Engineering Field Handbook Chapter 16, Streambank and Shoreline Protection

<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17553.wba>

**LEVEL III: ASSESSMENT OF STREAM CONDITION AND DEPARTURE
SUMMARY OF "CONDITION" CATEGORIES FOR LEVEL III INVENTORY**

Stream name _____ Observers _____
Location _____ Stream Type _____ Date _____
Riparian Vegetation _____ Flow regime _____
Stream Size, Stream order _____ Depositional pattern _____
Meander pattern _____ Debris/channel blockages _____
Channel stability rating (Pfankuch) _____ Altered Channel State: _____
Sediment supply (check appropriate category): Dimension/shape:
Extreme _____ Width _____
Very High _____ Depth _____
High _____ Width/depth ratio _____
Moderate _____ Patterns: (*show as funct. of Wbkf):
Low _____ Meander length* _____
Streambed (vertical) stability Radius of curve* _____
Aggrading _____ Belt width* _____
Degrading _____ Sinuosity _____
Stable _____ Profile:
Width/depth ratio condition: Water surface slope _____
Normal (stable) _____ Valley slope _____
High _____ Bed features:
Very high _____ Riffle/pool _____
Streambank erosion Potential: Step/pool _____
Bank erodibility: Near-bank stress: Conver./divrg. _____
Extreme _____ Extreme _____ Plane bed _____
High _____ High _____ Other _____
Moderate _____ Moderate _____ Spacing* _____
Low _____ Low _____ Describe alterations: _____

General Remarks

- Attach photographs taken mid-stream looking up and downstream. Make site map.
- Attach vicinity map of reach and/or aerial photo for specific location.
- Note any permanent cross-section for level IV verification of cross-section stability, actual erosion rates, change in pebble counts, deposition studies, sediment sampling, etc.
- Attach copy of: stream classification field form, channel Stability rating form, bank erosion rating form, profiles, cross-sections, pebble counts, etc.

Signature: _____