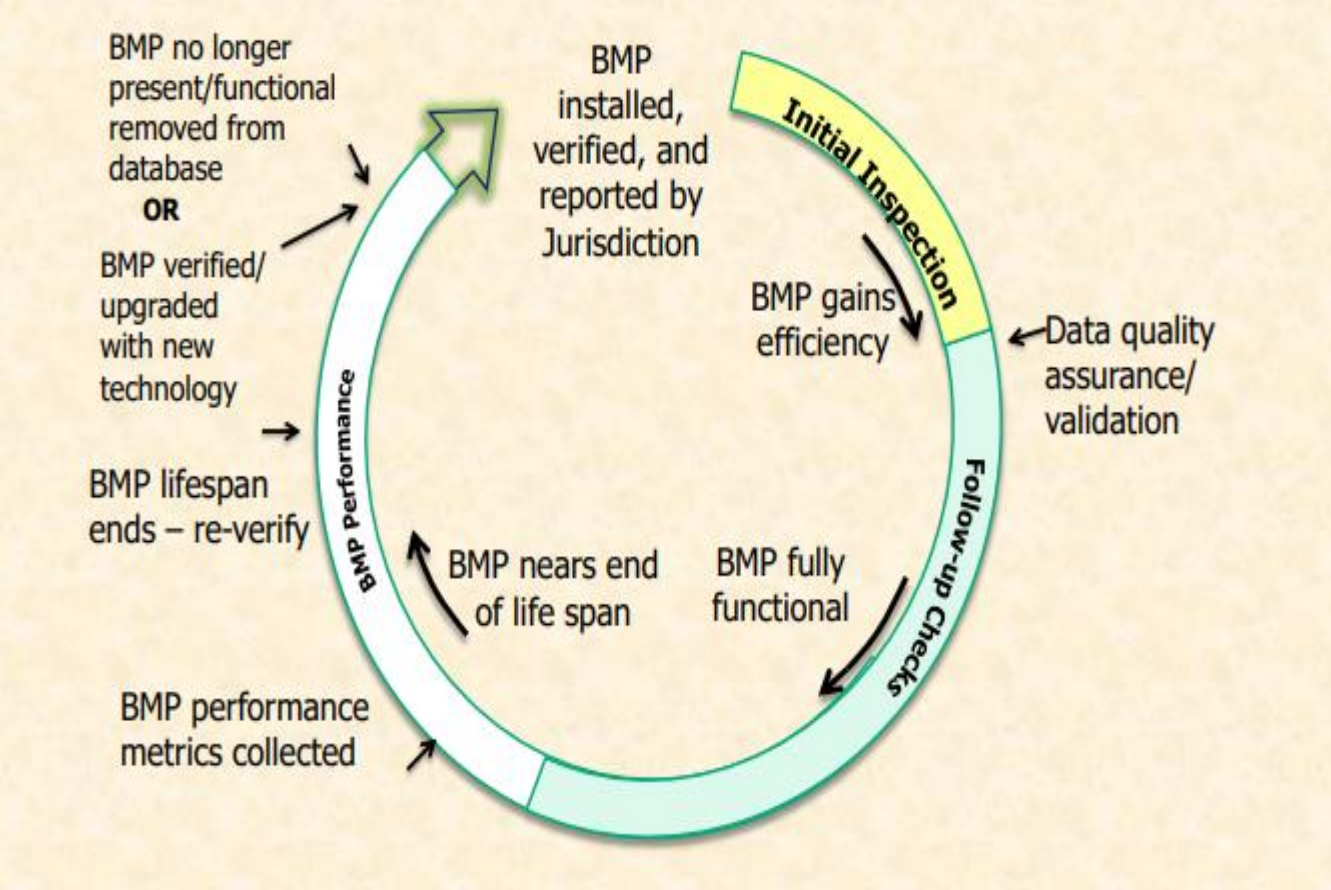
In-Depth Look at Credit Durations

Vanessa Van Note, EPA;
Coordinator

What is the purpose of credit duration and re-verification?

- Re-verification enables a BMP to be given an extended lifespan.
  - The purpose is to verify not only the existence of a BMP, but to confirm that a BMP is functioning as expected.



- CBP BMPs, while most align with NRCS conservation practice standards and available science, are a separate entity that have been developed for Bay specific purposes.

This presentation will focus on the following source sectors:

1) Agriculture
2) Forestry
3) Urban Stormwater

Why do we re-verify?

Expectation

Potential Reality

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Why do we re-verify?

Expectation

Potential Reality

As a result of the 2013 BMP Verification Review Panel's Guidance:

- "For the existing Chesapeake Bay Program Partnership approved BMPs, the respective source sector workgroup needs to assign a life span/expiration date for each approved BMP."

<u>Workgroups needed to consider:</u>

1) Contract/permit life span
2) Engineering design life span
3) Actual life span

- "For all future BMP expert panels convened by the Chesapeake Bay Program Partnership, the workgroups need to ensure each panel is charged with establishing a recommended life span/expiration date for each of the practices at which time them must be re-verified or be removed from the data submitted for crediting."

Agriculture

How many agriculture credit durations were defined?

- 141 Credit Durations were decided upon by the Agriculture Workgroup and appropriate Expert Panels.

What was considered when defining Ag Credit Durations?

- Applicable NRCS Conservation Practice Standards, of which ~52 apply to Agriculture (not including related practices)
- Expert Panels
- Best Professional Judgement
- NRCS Contracts (EQIP, CSP…)
- State CAFO Permit
- NPDES 5-Year Permits
- Resource Improvement Practices
- Available Research Publications
- 2003 CBP Nutrient Subcommittee

USDA Office of Management and Budget Guidance on Verification

- The AgWG found that USDA verifies a maximum of 5% of each conservation practice under the OMB Guidance.
  - Some Conservation Practices are verified at lower rates, or possibly not at all.

- From the Verification Framework document:

  "For verifying that installed practices are continuing to operate effectively, 10% field random sampling of cost-share and regulated practices is recommended. This appears to be an increase over the 5% sampling which now takes place under the NRCS review."

Barnyard Runoff Control

- As defined by CBP: The installation of practices to control runoff from barnyard areas. This includes practices such as roof runoff control, diversion of clean water from entering the barnyard and control of runoff from barnyard areas.
- CBP Credit Duration: 10 years
  - Main NRCS Practice: CP-558: Roof Runoff Structure and CP-362 Diversion
    - Related Practices: NRCS 570: Stormwater Runoff Control; NRCS 575: Trails and Walkways
  - CP-558 Practice Lifespan: 15 years
  - CP-362 Practice Lifespan: 10 years
- Related Technical Panel: CBP Nutrient Subcommittee (2003) which defined the BMP definitions and reductions.
- What are we verifying? That operation and maintenance, such as keeping roof structure free of obstructions, diversion capacity is being maintained, vegetation is maintained and free of pests, etc. is occurring.

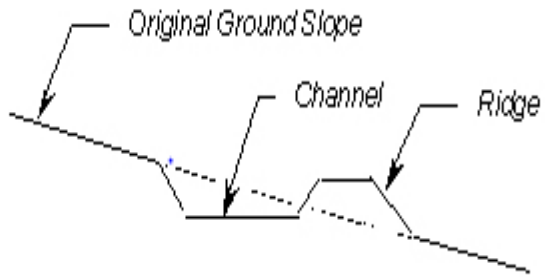
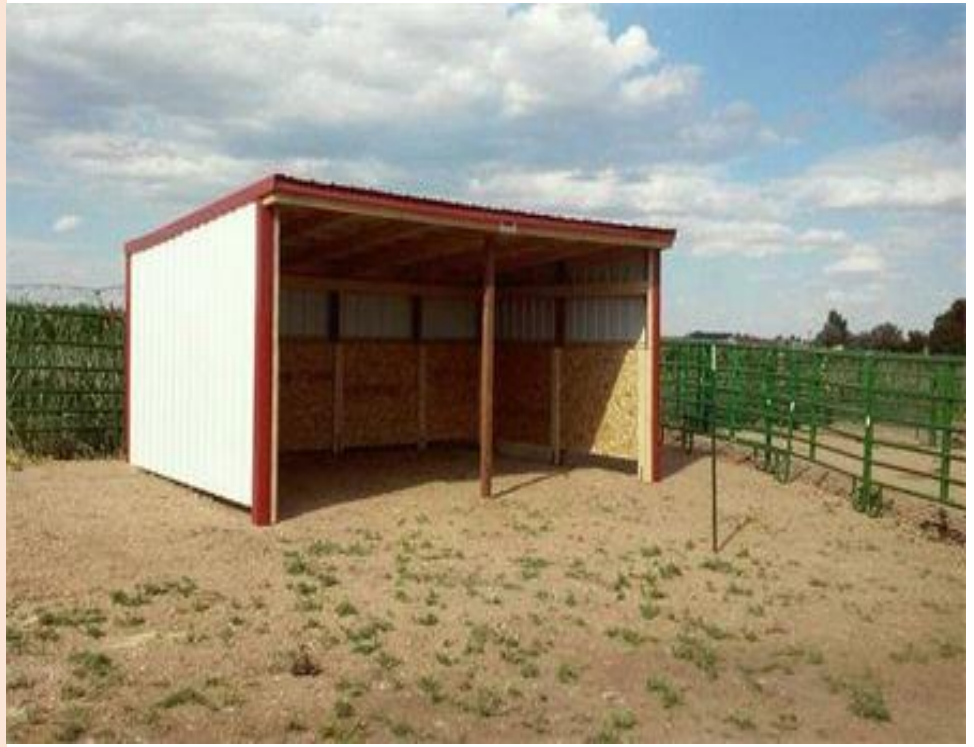


Figure 1 - Typical Runoff Diversion Cross Section

Loafing Lot Management

- As defined by CBP: The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, surfacing with suitable materials, and/or installing needed structures. This does not include poultry pad installation.
- CBP Credit Duration = 10 years
  - Main NRCS Practice: CP-561 Heavy Use Area Protection
    - Related Practices: NRCS 558: Roof Runoff Structure
- CP-561 Practice Lifespan = 10 years
- Related Technical Panel: CBP Nutrient Subcommittee (2003) which defined the BMP definitions and reductions.
- What are we verifying? That operation and maintenance, such as replacing surfaces subject to wear and erosion, proper management of manure, etc. is occurring. Additionally, in the case of loafing lot management, since verification occurs at the end of the practice lifespan, we are verifying that the practice is in condition to continue another 10 years.



Animal Waste Management System

- As defined by CBP: Any structure designed for collection, transfer and storage of manures and associated wastes generated from the confined portion of animal operations and complies with NRCS 313 (Waste Storage Facility) or NRCS 359 (Waste Treatment Lagoon) practice standards.
- Credit Duration = 15 years

  Main NRCS Practices: CP-313: Waste Storage Facility and CP-359: Waste Treatment Lagoon
  - CP-313 Practice Lifespan = 15 years
  - CP-359 Practice Lifespan = 15 years

- Relevant Expert Panel: Hawkins et al. (2016); Animal Waste Management System Recommendations: Recommendations from the BMP Expert Panel for AWMS in the Phase 6 Watershed Model
- What are we verifying? That operation and maintenance, such as ensuring there is no leakage, ensuring confined spaces are ventilated, ensuring there is a provision for emergency removal, etc. is occurring. Additionally, in the case of AWMS, since verification occurs at the end of the practice lifespan, we are verifying that the practice is in condition to continue another 15 years.

Forestry

Practices the forestry workgroup was responsible for:

- AG Riparian Forest Buffers
- AG Tree Planting
- Urban Tree Planting (Tree Canopy such as street trees)
- Urban Riparian Buffers
- Urban Forest Planting (forest-type understory)

What was considered when developing Forestry credit durations?

- Source Sector Expert Panels
  - Belt et al. : Recommendations of the Expert Panel to Reassess Removal Rates for Riparian Forest and Grass Buffers Best Management Practices (2014)
  - Law et al. : Recommendations of the Expert Panel to Define BMP Effectiveness for Urban Tree Canopy Expansion (2016)
  - Dr. Simpson and Weammert, UMD : Developing Best Management Practice Definitions and Effectiveness Estimates for Nitrogen, Phosphorus and Sediment in the Chesapeake Bay Watershed
- Best Professional Judgement
- NRCS Conservation Practices
- FSA CRP Conservation Practices
- CREP Contracts
- Available Peer Reviewed Research

Conservation Reserve Enhancement Program (CREP) Contracts

- Purpose: To establish forested buffers along streams. Land enrolled is removed from production and grazing. Subgroup under the CRP Program, an FSA land rental program.
- Highly erodible land and shallow water practices have contract lengths of 10 years, otherwise the applicant can choose a 10 to 15-year contract.
- The minimum buffer width is 35’-100’ or 30% of the active floodplain; but the maximum buffer width is 180’.
- Buffers must be constructed per NRCS Standards.

- Concern: What happens when the contract expired? Is it renewed or is the land developed? Is the contract renewed?

What was decided by the Forestry Workgroup Expert Panel?

- Which expert panel? Belt et. Al (2014) Recommendations of the Expert Panel to Reassess Removal Rates for Riparian Forest and Grass Buffers Best Management Practices
- 12 Forest Experts composed the panel.
- 14+ published papers studies consulted.

Decision:

Special attention is needed at the end of contract life (10 or 15 years), to determine if a new contract will ensure continuation of the buffer or if the buffer will be maintained voluntarily without a contract. If there is no confirmation that the buffer will be maintained on the landscape, it must be removed from NEIEN. In lieu of confirmation that the buffer will still be on the landscape, it will need to be removed from NEIEN after the contract expires. This action is recommended to encourage the conservation of existing buffers.

- "CREP contracts expire after 10 or 15 years, and a record amount of sign-ups in 2001-2007 are due to expire in the next few years. There are three likely scenarios when a contract is ending: 1) the landowner re-enrolls the buffer into another 10 or 15-year contract; 2) the landowner does not re-enroll, but plans to keep the buffer; or 3) the landowner does not re-enroll and plans to get rid of the buffer. Actions taken now by CREP partners can lead to more landowners being in the re-enrollment category (#1), and to knowing what to expect for those lands coming out of contract (#2 or #3). To re-enroll, CREP partners must determine that the buffer still meets the practice standards (survival/stocking rate)."

NRCS and FSA Practice Lifespans: Riparian Forest Buffers and Grass Buffers

- CP-391 Riparian Forest Buffer = 15 years
- CP22 (FSA) Riparian Buffer = 1-15 years depending on practice application
- CP-390 Riparian Herbaceous Cover = 5 years
- CP-393 Filter Strip = 10 years
- CP21 (FSA) Filer Strip = 10 years
- CP-386 Grass Waterway = 10 years
- CP-412 Grass Waterway = 10 years
- CP8A (FSA) Noneasement = 10 years

Comparing Forest and Grass Buffers

Forest Buffers

- Credit Duration: 10 years
- Lifespan: minimum 40-70 years.
- For a forest buffer to achieve a maximum lifespan, it needs to be designed and planted in a way that it can regenerate itself. Additionally, invasive species and deer predation effect longevity.
- Comment from Greg Noe: If there's little sedimentation and the area is relatively undisturbed, lifespan is indefinite. If there is a lot of sedimentation, hydrology can change, affecting efficiencies.
- Peter Groffman: Soil, hydrologic conditions, and buffer connection affect a forest's longevity.
- The lifespan of a forest may be 40-120 yrs once established but the concern is whether the land has been developed or continues to be functionally maintained as a forest.

Grass Buffers

- Credit Duration: 10 years
- Lifespan Newbold and Sweeney (2010) gave 15 years if the buffer is in conjunction with good upslope practices and is maintained. Other comments said ~7 before needing to be redone.
- Avg width likely to be <100'.
- No research to support grass buffers having as long of a lifespan as forest buffers.
- Grass buffers require regular maintenance and are more easily converted to cropland (ie. They can be plowed under more easily).
- Ex. If grass buffers are clogged with sediment, they would not support treatment of upslope acreage.
- Ex. Commodity prices may drive reconversion with PA CREP.
- Ex from Peter Groffman. Grass riparian buffers in VA - When you establish a grass area next to field, you get a berm and gully, sideways flow until it breaks through the buffer. The grass buffer might look fine, but isn't doing anything because it degraded over time.
- Grass provides dense protection of soil surface, but generates more runoff than a forest. Less effective at removing nutrients than forest buffers (Lowrence 1998, Mayer ef al. 2005)
- Sweeney and Newbold (2014) noted that there is a lack of research on natural grass buffers as opposed to experimental plots.

Forest and Grass Buffers with Exclusion Fencing

- As defined by CBP: When buffers are implemented along a pasture exclusion fencing is installed to prevent livestock from grazing and trampling the buffer or entering the stream.
- CBP Credit Duration for Both: 10 years
  - Related NRCS Practice for Forest Buffer: CP-391 Riparian Forest Buffer [15 years], FSA CP22 Riparian Buffer
  - Related NRCS Practice for Grass Buffer: CP-390 Riparian Herbaceous Cover [5 years]; CP-386 Field Border [10 years]; CP-412 Grass Waterway [10 years]; FSA CP21 Filter Strip; FSA CP8A Noneasement
  - While forest and grass buffers can be separate, there can be combined grass and forest buffers
- Simpson and Weammert (2009): Developing BMP Definitions and Effectiveness Estimates for Nitrogen, Phosphorus and Sediment in the Chesapeake Bay Watershed
  - “The fenced areas may be planted with trees or grass but are typically not wide enough to provide the full benefits of buffers. When a fencing system is installed, the excluded land is not considered a buffer unless specific buffer installation criteria are met, as outlined by the NRCS.”

Additional Information:

- In 2004 500 CREP forested buffer (CP 22) landowners were surveyed and 87% were likely or very likely to leave the practice in place when the contract ended. However, with grass practices, 2/3 are back into production after the incentives are over. More than 90% of forested buffers are installed on land that was not in crop production (was pasture, grass hay or idle). Thus the pressure to reconvert to crops is far less for forested buffers.

- This survey was considered when credit durations were originally determined.
- The Forestry workgroup is discussing the possibility of extending the credit duration of Riparian Forest Buffers from 10 years to 15 years.

Urban Tree Planting BMP (Urban Tree Canopy Expansion)

- Description: Planting trees in an urban or residential environment with the intent to increase and sustain the tree canopy. Planting 100 trees is equivalent to converting one acre of urban land to forest. Tree replacement may need to occur but cannot be "counted" as an additional planting
- **Credit Duration:** 10 years
  - "Once new high-resolution imagery is updated in the model, the trees will be captured through the tree canopy land uses rather than annual BMP submissions. The area of the reported canopy projects within the period of credit duration will continue to be tracked through the BMP history since these projects represent management actions."
- Practice Lifespan: 10 year minimum

  Roman and Scatena 2011: urban trees on average have an expected lifespan between 19-28 years, and longer on residential sites
- Law et al, Expert Panel Report for Urban Tree Canopy and Forest Planting BMPs
  - ➢ Further information available from:

    Center for Watershed Protection, Making Urban Trees Count (2017)

    Chesapeake Stormwater Network, Urban Tree Canopy and Planting (2016)

    Chesapeake Tree Canopy Network

    Trees and Stormwater.org

Ag Tree Planting

- Description: includes any trees planted on agricultural land, except those used to establish riparian forest buffers, targeting lands that are highly erodible or identified as critical resource areas.
- **Credit Duration:** 10 years
- Related Conservation Practices: NRCS CP-380; Windbreak/shelter establishment; CP-612; Tree/Shrub Establishment; FSA CP3; Tree Planting; FSA CP3A; Hardwood Tree Planting
- NRCS CP-380 & CP-612 Practice Lifespan: 15 years
- FSA CP3 & CP3A Practice Lifespan: 1-15 years depending on the application of the practice
- FSA CRP Contract Duration = 10 – 15 years
- There has not been an Expert Panel on Ag Tree Planting.

What is the Urban Forest Planting BMP?

Reserved for projects in urban or suburban areas designed to re-establish forest ecosystem processes and function. This land use change BMP converts developed turfgrass to forest.

➢ Credit duration: 15 years.

Urban and Nonurban Stream Restoration

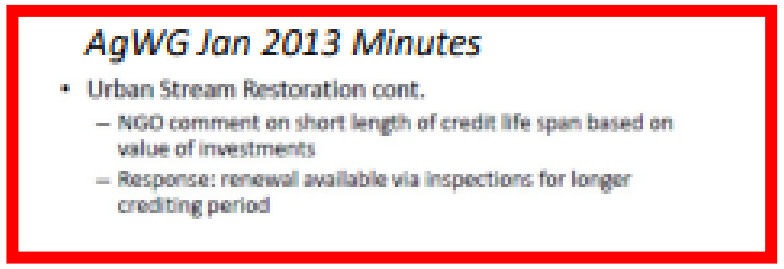
- Expert Panels
  - Berg et al., Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects (2014)
  - Urban Stormwater Group Protocols
    - 2019 Memo: Recommended Methods to Verify Stream Restoration Practices
    - 2020: Consensus Recommendations for Improving the Application of the Prevented Sediment Protocol for Urban Stream Resotration Projects Build for Pollutant Removal Credit

- Best Professional Judgement from Industry Professionals
  - Good Recipes for the Bay Pollution Diet: U-4: Urban Stream Restoration, CSN
  - BMP Resources, Urban Stream Restoration, CSN
- Research Publications
  - Langland and Cronin, 2003
  - Merritts et al., 2011
  - Literature Review Included 64 publications
- State Programmatic and Nationwide Permits
  - National Pollutant Discharge Elimination System
  - Municipal Separate Storm Sewer System
  - US Army Corps of Engineers Permits
  - State-Programmatic General Permits
  - State and Federal Cost-Share Programs
- Industry Standards
  - A Function Based Framework for Stream Assessments and Restoration Projects by Harman et al. with the EPA Office of Wetlands, Oceans, and Watersheds.
  - Stream Restoration Guidance, USDA

Information from Nonurban Stream Restoration Group Memo:

- "Non-urban SR BMPs are currently assigned a 10-year credit duration in the CBWM, in contrast to a 5-year credit duration assigned to urban SR BMPs (the clock on those 5 years begins after the typical 3- to 5-year post-construction monitoring required in permitting of urban SR projects). Because urban and non-urban SR projects are defined by the same qualifying conditions in the 2013 EP report and are treated equivalent regarding the default removal rate (lb/ft/yr), the 10-year credit duration for non-urban projects has come into question. It is likely that the 10-year lifespan for non-urban SR projects is influenced by practice lifespans associated with NRCS CPS 580 and 584, as well as a series of 2015 decisions that resulted in 10-year credit durations for the majority of CBP BMPs associated with agriculture. In any case, rationale for this decision should be cited appropriately in future documentation."

Additional Documentation:



AgWG Jan 2013 Minutes

- Urban Stream Restoration cont.
  - NGO comment on short length of credit life span based on value of investments
  - Response: renewal available via inspections for longer crediting period

NRCS Code	NRCS Practice	Definition	Shape	Units	Effective	Lifespan
580	Streambank and Shoreline Protection	Treatment(s) used to stabilize and protect bank...	Line	Ft	11/6/2018	20
584	Channel Bed Stabilization	Measure(s) used to stabilize the bed or bottom ...	Line	Ft	11/7/2018	10

From the 2014 Expert Panel:

- Recommended that the urban protocols can be applied to nonurban stream restoration projects, if they are designed using the NCD, LSR, RSC or other approaches, and meet the relevant qualifying conditions, environmental considerations and verification requirements.
- The Panel agreed that certain classes of non-urban stream restoration projects would not qualify for the removal credit;

<u>These include:</u>

1) Enhancement projects where the stream is in fair to good condition, but habitat features are added to increase fish production (e.g., trout stream habitat, brook trout restoration, removal of fish barriers, etc.)
2) Projects that seek to restore streams damaged by acid mine drainage
3) Riparian fencing projects to keep livestock out of streams

Stream Restoration

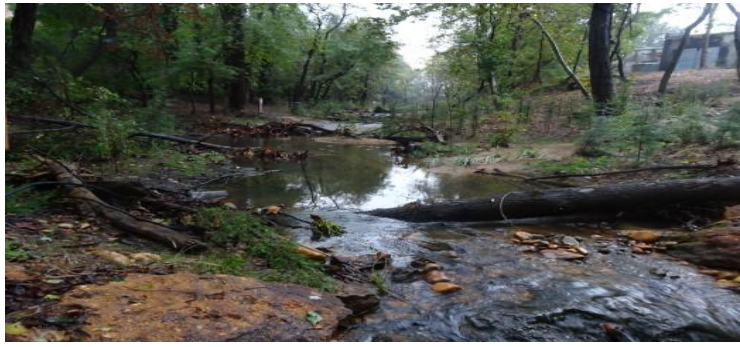
Approaches include natural channel design, regenerative stream channel, and legacy sediment removal.

Urban Stream Restoration

- Description: A sub watershed with more than 5% impervious cover. Any NCD, RSC, LSR or other restoration project that meets the qualifying conditions for credits, including environmental limitations and stream functional improvements.
  - The Expert Panel also included, upland restoration, regenerative stormwater conveyance, floodplain, etc. as practices within the stream restoration discipline.
- Credit Duration – 5 years post-construction monitoring
  - Why? These projects are subject to catastrophic damage from extreme flood events and typically have requirements for 3 to 5 years of post-construction monitoring to satisfy permit conditions.

Nonurban Stream Restoration

- Description: A sub watershed with less than 5% impervious cover, and is primarily compose of forest, ag or pasture land uses.
- Credit Duration – 10 years
- Related NRCS Practices: CP-580 Streambank/Shoreline Protection & CP-584; Channel Bed Stabilization:
- CP-580 Practice Lifespan: 20 years
- CP-584 Lifespan: 10 years
- State & Federal Cost-share Programs:
  - NRCS EQIP Contract: 3-10 years
  - VA Streambank Stabilization, WP-2A: 5-year contract
- As of 2014, Limited Research existed to document the response of non-urban streams to stream restoration projects.



The topic of partial/variable credit in the past.

In Agriculture

Ex. A buffer may not meet the width requirements, but it can still filter nutrients – this depends on the type of vegetation used as well.

Ex. Waste may be stored in one place with or without a liner, but does not meet NRCS specifications or RI Dry Waste Storage Specifications – Is this still considered waste management?

In Forestry

Ex. A forest does not lose all its functionality at once, but, on the other hand, a sapling does not remove the same quantity of nutrients or prevent erosion in the same way a 5-7 year old tree does.

Questions/Comments?