

STREAM RESTORATION BEST PRACTICES

Voluntary guidance for stormwater program managers on best practices for implementing stream restoration projects in the COG region

Jason Papacosma, Arlington County
Chair, Water Resources Technical Committee

CBPC Meeting
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The Issue

Doing nothing not an option

- Most urban streams have suffered decades of deterioration from increased runoff
- Increases in precipitation intensity worsening channel instability
- Incised channels with continual bank erosion
 - Loss of public and private property
 - Exposed water, sewer, storm, and trail infrastructure requiring repairs
 - Tree loss happening anyway



Falling and damaged trees and exposed sewer line in Arlington County



The Issue

In recent years, implementation has expanded greatly

- MDE has permitted more than 600 projects since 2014
- VADEQ has permitted more than 300 projects

With increased implementation, far more interaction with public

- Generated concerns about side effects, particularly tree loss
- Can be hard to see long-term benefits outweighing short-term harm



Restoration work is often disruptive, requiring careful site design to minimize disturbance



The Issue

Concerns have included:

- Tree loss during construction
- Disturbance of sensitive habitat
- Potential lack of habitat response
- Lack of public input



Typically, steam projects see many more new trees planted than may have been lost during construction



Benefits of Stream Restoration

- **Repair and protection of infrastructure**
 - Sewer mains, storm drain outfalls, trails, culverts
- **Improvement in stream structure**
 - Bank stabilization
 - Floodplain reconnection
 - May help to mitigate inland flooding
- **Reduction in sediment and nutrient pollution**
 - Help to meet MS4 permit requirements
- **Improvement in riparian corridor**
 - Near stream forest stability
 - More native flora and fauna
- **Improvement in aquatic habitat**
 - May take many years to manifest



Example of a stream that has been lifted and reconnected to its floodplain



Water Resources Tech Committee Action

- **WRTC set up workgroup in December 2020 to address recent concerns**
 - Benefits of regional collaboration and learning from each other
 - Workgroup met 12 times from December - September
- **Shared consensus:**

Stream restoration, done well, is an essential tool in the stormwater management toolbox.
- **Need for stormwater managers to respond to public concerns**
 - Much of the concern involves tree loss; many of the best practices address this issue
 - Also need for citizen engagement, consistent education and outreach



COG WRTC Stream Workgroup Members

Members

- **Chair, Jason Papacosma, Arlington County (also Christin Jolicoeur and Aileen Winquist)**
- **Tom Dombrowski, Prince William County**
- **Charles Smith, Fairfax County**
- **Jesse Maines, City of Alexandria**
- **Norm Goulet, Northern Virginia Regional Commission**
- **Josh Burch, District of Columbia**
- **Erik Michelson, Anne Arundel County**
- **Jerry Maldonado, Prince George's County**
- **Beth Forbes, City of Gaithersburg**
- **Heather Gewandter, City of Rockville**
- **Kate Bennett and Ryan Zerbe, Montgomery County**
- **Best practices developed solely by local government managers, not consultants or other outside entities**



Workgroup Output – Best Practices

- **Workgroup identified 15 best practices that cover:**
 - Planning/Design
 - Siting/Final project selection
 - Public engagement
 - Construction/Maintenance/Monitoring
- **Voluntary guidelines that jurisdictions can follow in whole or in part**
- **Final report illustrates best practices with case studies and other local examples**
- **Main audience for report is local government stormwater managers**

Best Practices Report Organization

- **Executive Summary**
 - Plain description of practices
- **Main Body**
 - Detailed description of practices with case studies and links
- **Appendix with before and after photos of restoration projects**

RECOMMENDED STREAM RESTORATION BEST PRACTICES

Voluntary guidance for stormwater program managers in the COG region on best practices for implementing stream restoration projects

November 2021



Metropolitan Washington
Council of Governments

Key Themes of the Best Practices

- **Choose, design, and site projects carefully to address problems while protecting high quality habitat**
- **Set clear and measurable goals**
- **Document baseline conditions**
- **Identify stakeholders early and seek their input in project planning**
- **Engage the public throughout project lifecycle**
- **Monitor construction closely**
- **Plan and fund for long-term maintenance and monitoring to sustain project outcomes**

Next Steps

- **After addressing comments from Bay Policy Committee members, COG staff will publish Best Practices report on the COG web site**
 - Feedback today
 - Feedback after more time to review
- **Stream workgroup will respond to comments**
- **Send comments to Christine Howard, cdhoward@mwcog.org**

Additional Resources

- **Northern Virginia Regional Commission virtual tour and frequently asked questions:**

<https://www.novaregion.org/1468/Stream-Corridor-Restoration>

- **Chesapeake Stormwater Network Bay Program Expert Panel reports and other guidance:**

<http://chesapeakestormwater.net/bmp-resources/urban-stream-restoration/>

COG staff contacts:

- Karl Berger, kberger@mwkog.org
- Christine Howard, cdhoward@mwkog.org

Extras



Practice #1: Planning/Design

Provide a clear *road map* for the site selection process that documents how a decision to pursue a stream restoration project will be reached and what its goals are. The road map may include:



Figure 1: Example of site map for the Stickfoot Branch Stream Restoration Project in the District of Columbia showing site location, access road, and areas to be avoided.

Practice #2: Planning/Design

For each project, consider different restoration priorities, protocols and channel design approaches that best meet site conditions and restoration goals

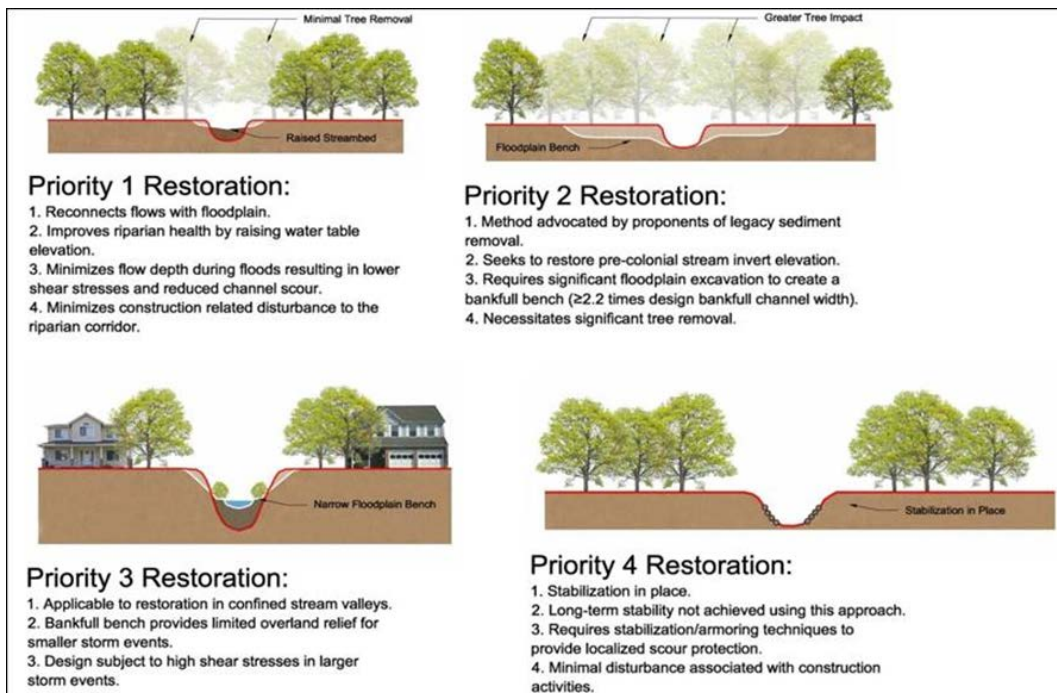


Figure 2: Restoration Priority System (based on Rosgen)

Practice #3: Planning/Design

Establish metrics for measuring success of projects, based on the primary and secondary goals set for each individual project.

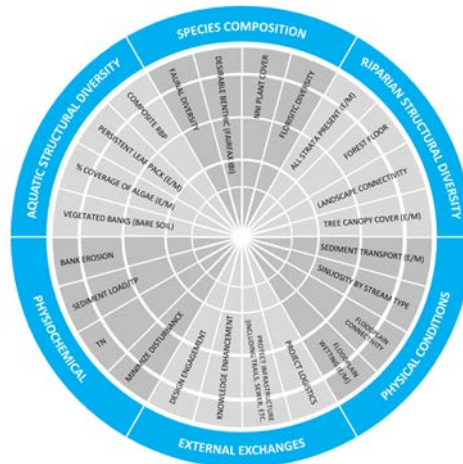


Figure 4. The Fairfax County restoration recovery wheel, based on a recovery wheel created by the Society for Ecological Restoration. The focus is on assessment and monitoring based on 24 metrics of program drivers and ecosystem function.

Practice #4: Planning/Design

Create a plan for inspection and maintenance of projects over time as tied to project goals.

PART 3 – EXECUTION

3.1 Watering

A. In accordance with the approved plans, 20-gallon gator bags or an approved equal shall be installed on all upland and steep slope trees. Trees shall be watered weekly during periods with rainfall of <1 inch from installation to One (1) year following the date of substantial completion.

3.2 Tree Shelter Maintenance

A. Tree shelters shall be inspected bi-monthly during the growing season (April to October) and maintained for five (5) years following the date of substantial completion in accordance with Section 02806 Bio-degradable Tree Shelters

3.3 Plant Maintenance and Replacement

- A. All plantings shall be inspected annually during the growing season (April to October) starting with the first growing season following substantial completion.
- B. Dead, dying and diseased plants shall be replaced. Any plant that is 25% dead or more shall be considered dead and shall be replaced at no charge to the County. A tree shall be considered dead when the main leader has died back, or 25% of the crown is dead.
- C. The Contractor shall submit an inspection report summarizing the inspection findings and proposed replacement species, quantities and schedule to the Project Officer by 10/15 of each year.
- D. Live Stakes: A target survival rate of 80 percent shall apply to live stakes, based on the installed quantity from the approved plan. The Contractor shall replace any dead live stakes with bare root plants to account for lost growth, unless otherwise authorized by the Project Officer.
- E. Herbaceous Plants: Replace dead or dying herbaceous plants between April 1 and May 15 of each year at no additional cost to the County.

Excerpt from an Arlington County contract specifying need for continual inspection and maintenance of plant materials from project.



Practice #5: Siting/Final Project Selection

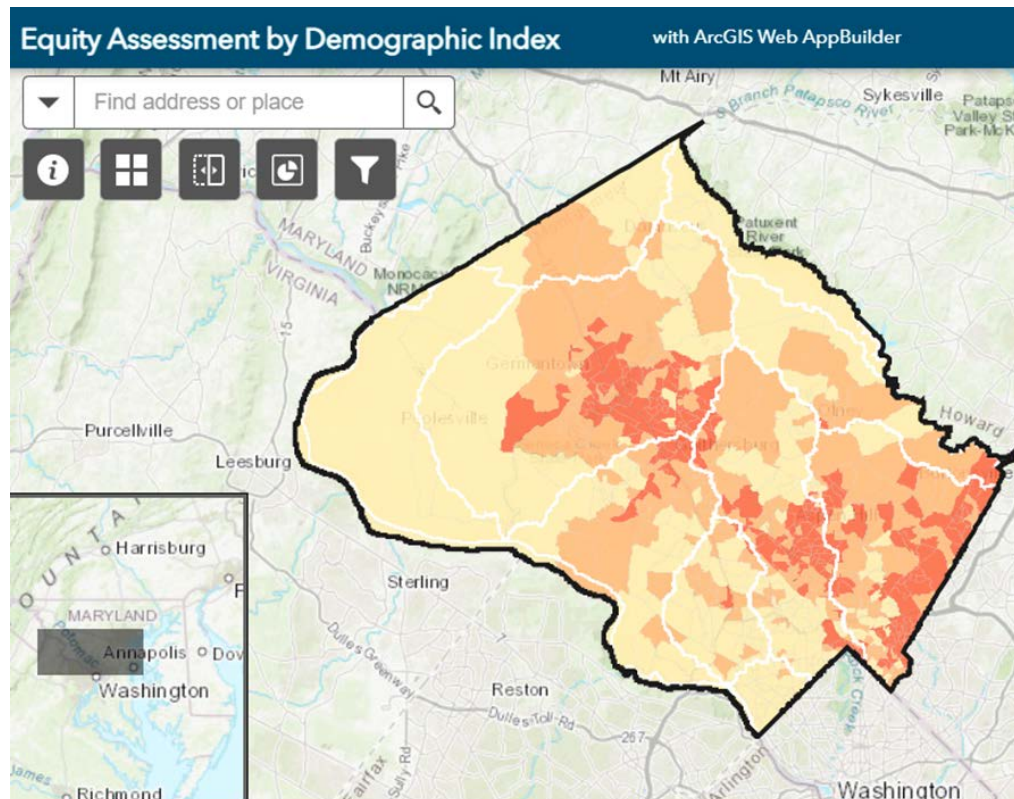
Determine specifications for individual projects based on the set of goals set for each project. In doing so, minimize impacts to high quality aquatic and terrestrial habitat in the stream corridor.



Before restoration, streambank erosion in this section of Powell's Creek in Prince William County led to loss of mature trees

Practice #6: Siting/Final Project Selection

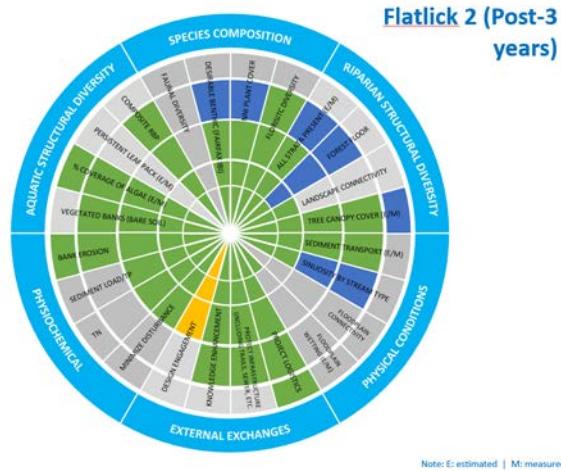
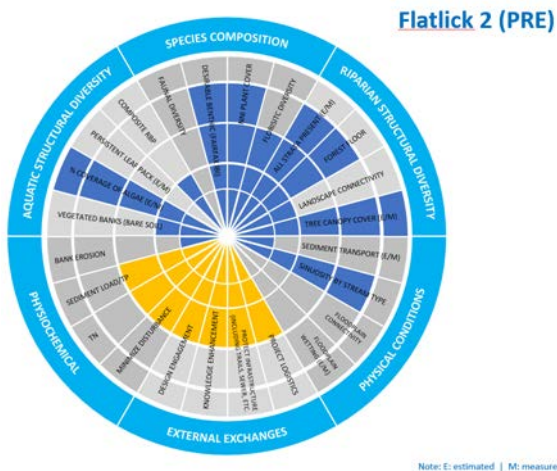
Incorporate DEIJ project siting considerations in overall program management.



Equity Assessment by Demographic Index: Montgomery County DEP Equity Assessment Map showing different tiers of demographic categories of low income and people of color within the county.

Practice #7: Planning/Design

During the site identification and selection phase, conduct assessments before the project starts to develop a baseline for the metrics used to measure its success as determined in the ‘Planning/design’ step above. Assessments may include but not be limited to:



Use of Fairfax County Restoration Recovery Wheel to measure change in pre-project metrics. .

Practice #8: Public Engagement

Define the stakeholders and develop a process for involving them in planning, site selection, and construction

Case Study: Gulf Branch Stream Project in Arlington County, VA

Public Process

County staff sponsored several community meetings and open houses about this project over a period of 10 months. The county also established an advisory group with membership; from 5 separate commissions and organizations and four civic associations. During the public meetings...



Practice #9: Public Engagement

Begin public outreach early in the design phase of individual projects to explain project goals and seek input from stakeholders. Involve stakeholders in the site selection and project design process through advisory groups, participation on the design team or other means.

Case Study: Breewood Tributary Stream Restoration in Montgomery County, MD

Project Website

Breewood Tributary Stream Restoration Project Blog

Practice #10: Public Engagement

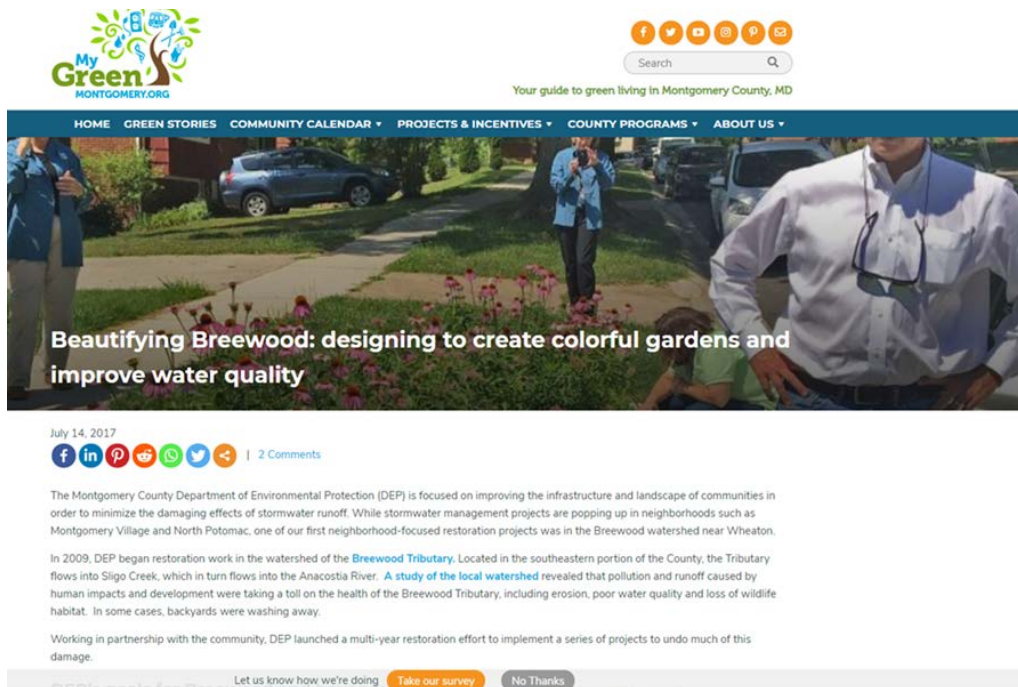
Demonstrate need for project through visual evidence and site visits whether in person or virtually; explain what will happen if project is not undertaken



Prince William County DPW staff conducting a site tour of the Dewey's Creek Stream Restoration Project located along the eastern boundary between the Town of Dumfries and Prince William County.

Practice #11: Public Engagement

Continue to communicate with stakeholders through construction and post-construction periods; highlight where community input was used to make changes or influence the project.



Montgomery County DEP staff established a Project Blog for the Breewood Tributary Restoration

Practice #12: Construction/Assessment/Maintenance

Use construction techniques that minimize impact on high quality aquatic and terrestrial habitat, as identified during the Planning/Design phase.



Example of the use of felled trees in stream project in Dewey's Creek Stream Restoration Project in Prince William County

Practice #13: Construction/Assessment/Maintenance

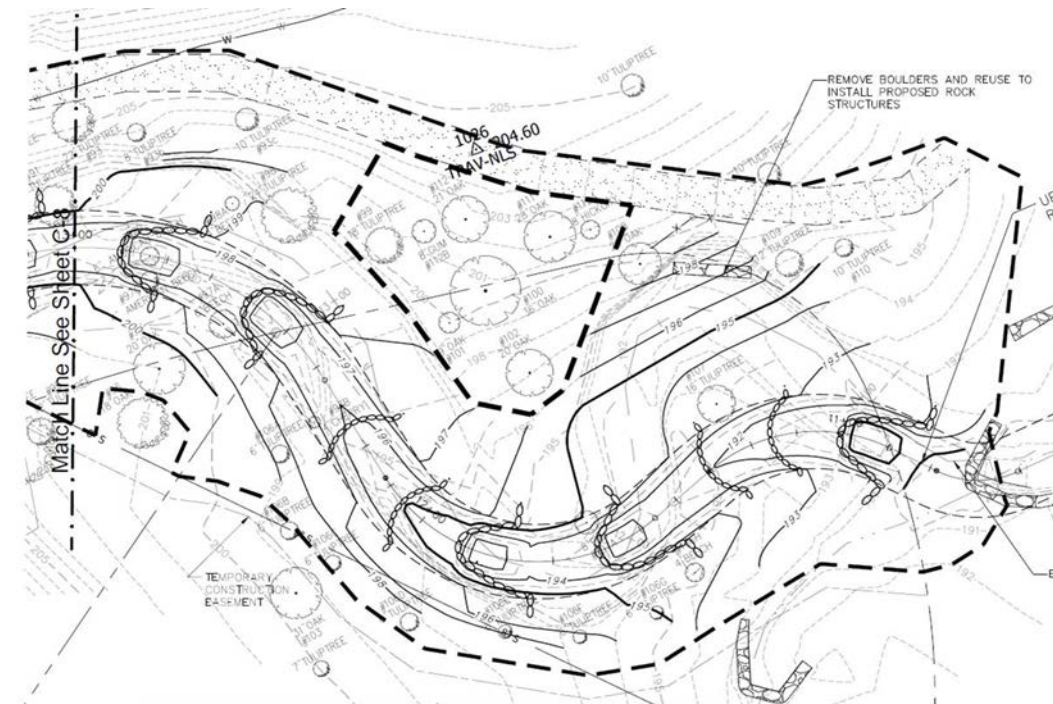
Adhere to quality control practices in restoration planting.

- Require plant submittals for source of materials well in advance of planting time
- Require adherence to strict planting windows based on plant material types
- Conduct rigorous plant materials inspections for correct species, root condition, container size and adherence overall to ANSI Z60 requirements



Practice #14: Construction/Assessment/Maintenance

Make field adjustments at start of construction



Site map for Donaldson Run Tributary B Stream Restoration Project in Arlington County showing efforts to save high quality trees via reduction of the limits of disturbance and establishment of tree save areas (area inside dotted line). The site access shown in the lower left uses an existing trail as the project access for construction

Practice #15: Construction/Assessment/Maintenance

Budget for and pursue follow-up assessment and maintenance activities to maximize the project's long-term benefits.

1.3. Plant Warranty and Replacement

- A. **Warranty: Guarantee that plants will be alive and in satisfactory growth for a period of five (5) years, beginning the date of substantial completion as determined by the Project Officer.**

Excerpt from an Arlington County contract specifying need to maintain plantings for at least five years after construction was completed.

