

Paul Spring Branch @ Sherwood Hall Stream Restoration Project

Department of Public Works and Environmental Services
Working for You!



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Agenda

- Introductions
- Programmatic Considerations
- Watershed
- Existing Conditions
- Design Goals and Process
- Next steps
- Contact information

Project Team

- Civic Associations, residents and other community organizations
- Stormwater Planning Division
- McCormick Taylor
- Land Acquisition
- Utilities Design and Construction
- Urban Forestry
- Wastewater
- Maintenance and Stormwater Management
- Mount Vernon District Supervisor's Office

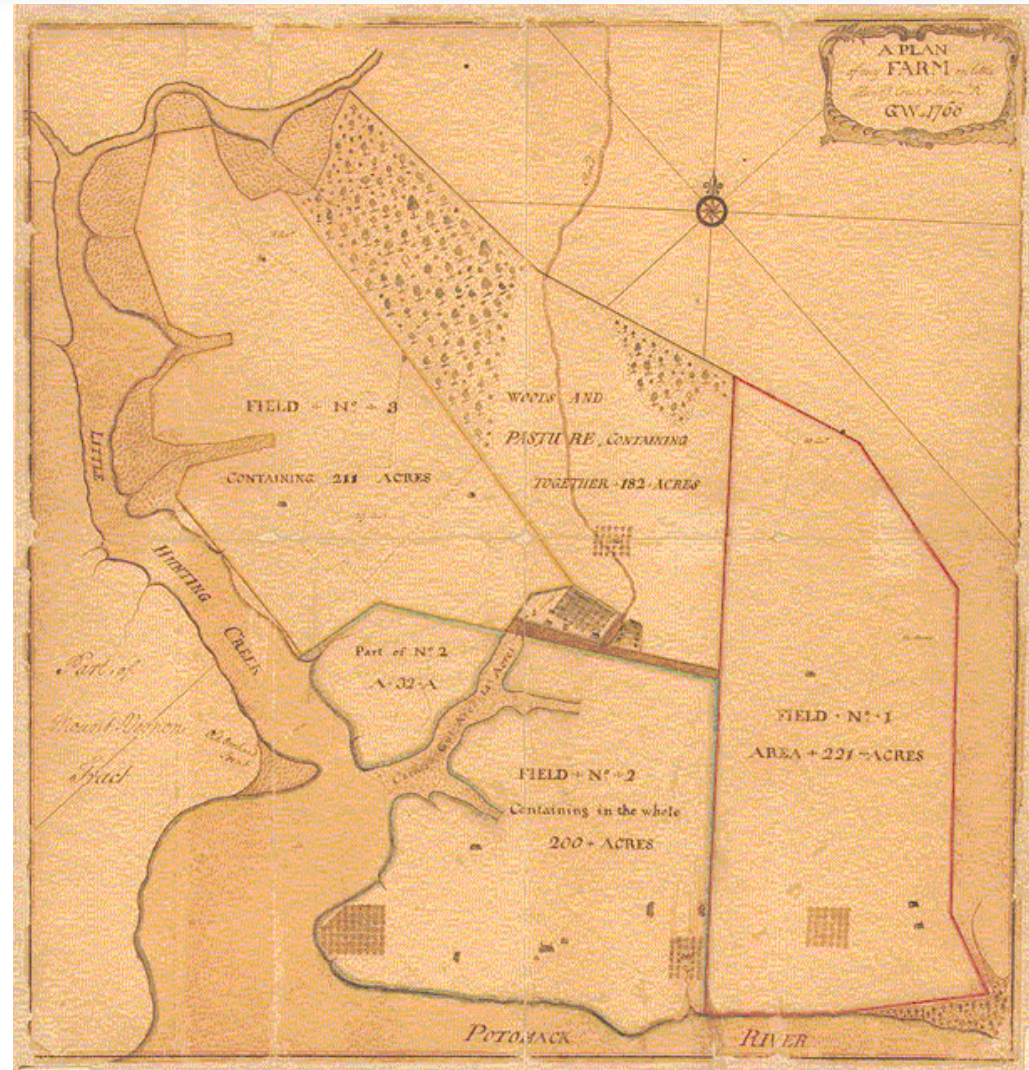
Stormwater Program Drivers

- Clean Water Act, 1972
- Municipal Separate Storm Sewer Permit (MS-4)
- Chesapeake Bay Total Maximum Daily Loads (TMDL)
 - Regulates amount of pollutants in waterways (Nitrogen, Phosphorus, and Total Suspended Solids)
- Local TMDLs (sediment, bacteria, and PCBs)
- Maintenance of Existing Facilities and public infrastructure

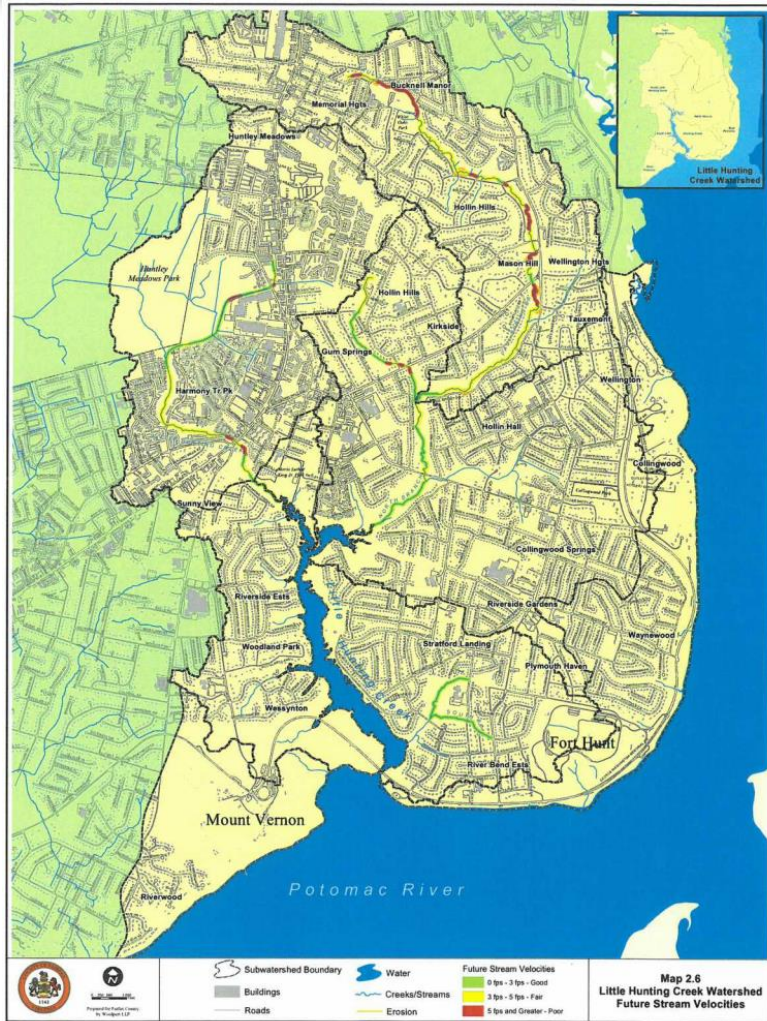
Historic Watershed

Figure 2.2 Map of Little Hunting Creek drawn by General George Washington. From Little Hunting Creek Watershed Management Plan.

<https://www.fairfaxcounty.gov/dpwes/watersheds/littlehuntingcreek.htm>



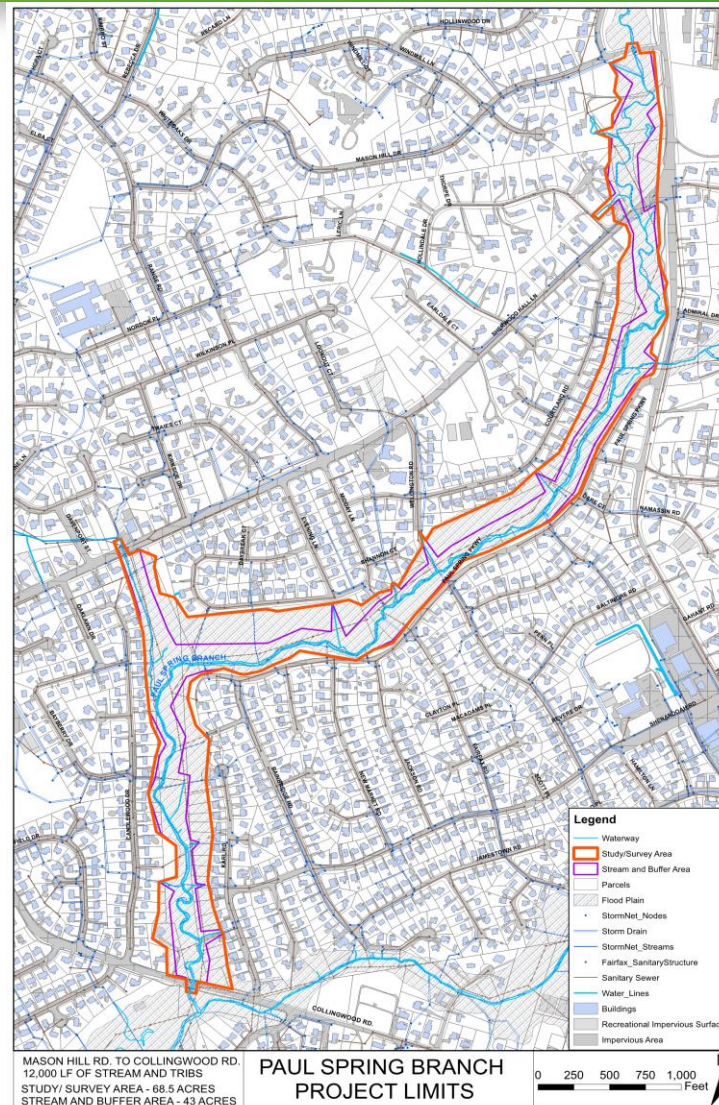
Little Hunting Creek Watershed



- ~ 2 sq. mile drainage area
- One of the most developed watersheds in Fairfax County at about 75% to 80% developed land area.
- Discharges into Potomac River.
- Stream Restoration - Returning the form and function of the channel to dynamic equilibrium and improve the ecological processes of the riparian corridor within the constraints of a developed landscape.

<https://www.fairfaxcounty.gov/dpwes/watersheds/littlehuntingcreek.htm>

Project Area



Existing Conditions



Bank erosion sends sediment and nutrients downstream.

Existing Conditions

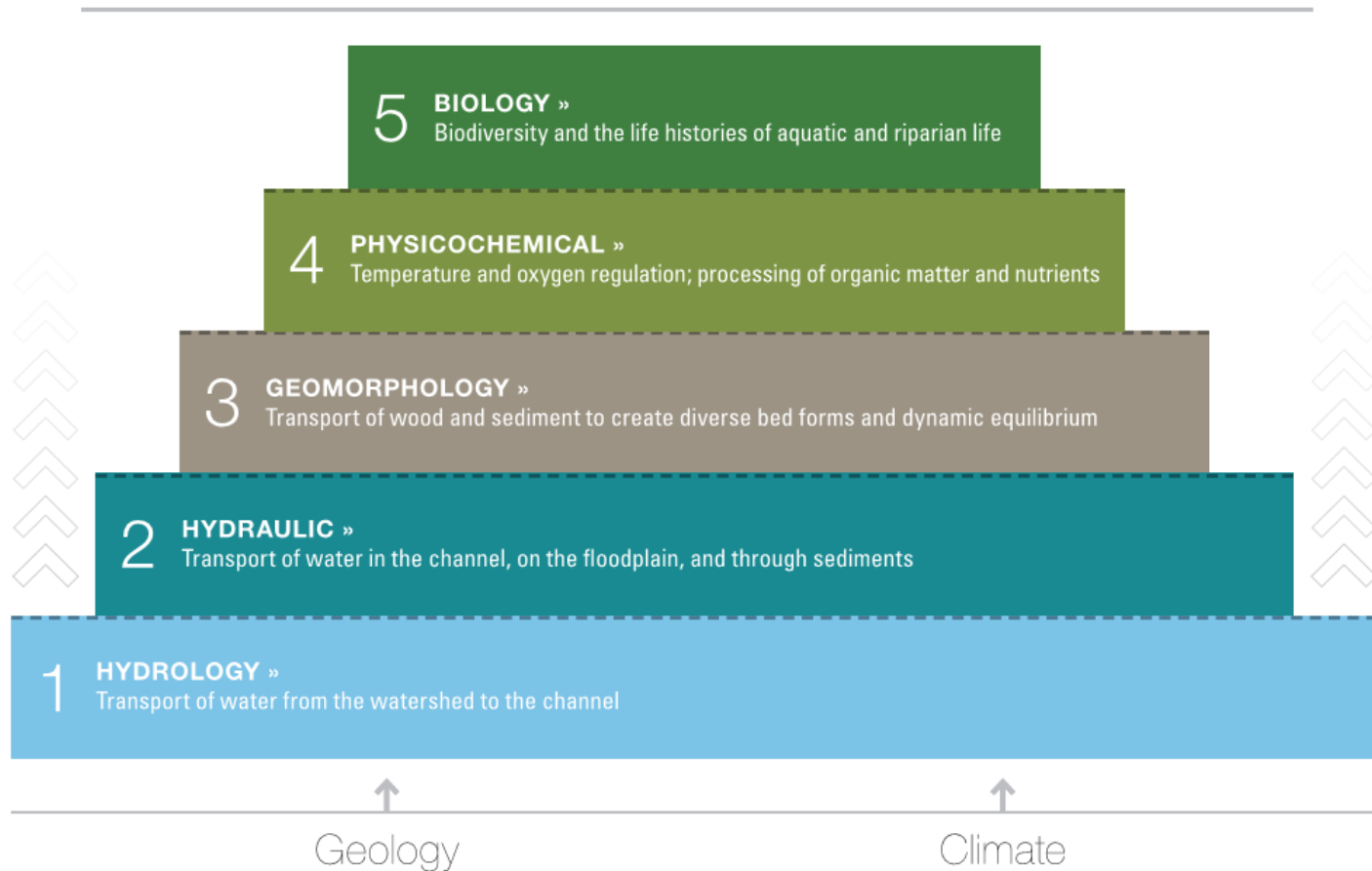


Existing Dimensions = approximately +/- 30' wide and +/- 5' deep.
Regional Curve data suggest stable dimensions = 15.4' wide and 1.5' deep

Stream Restoration

Stream Functions Pyramid

A Guide for Assessing & Restoring Stream Functions » OVERVIEW



Project Goals

Restoration of 12,000 linear feet of Paul Spring Branch in the Stream Valley Park

➤ Improve Water Quality

➤ Stabilize streambed and banks

- Reduces sediment and nutrient inputs into stream system

➤ Improve floodplain connectivity

- Increase frequency & residence time of water on floodplain
- Reduce force and volume of water

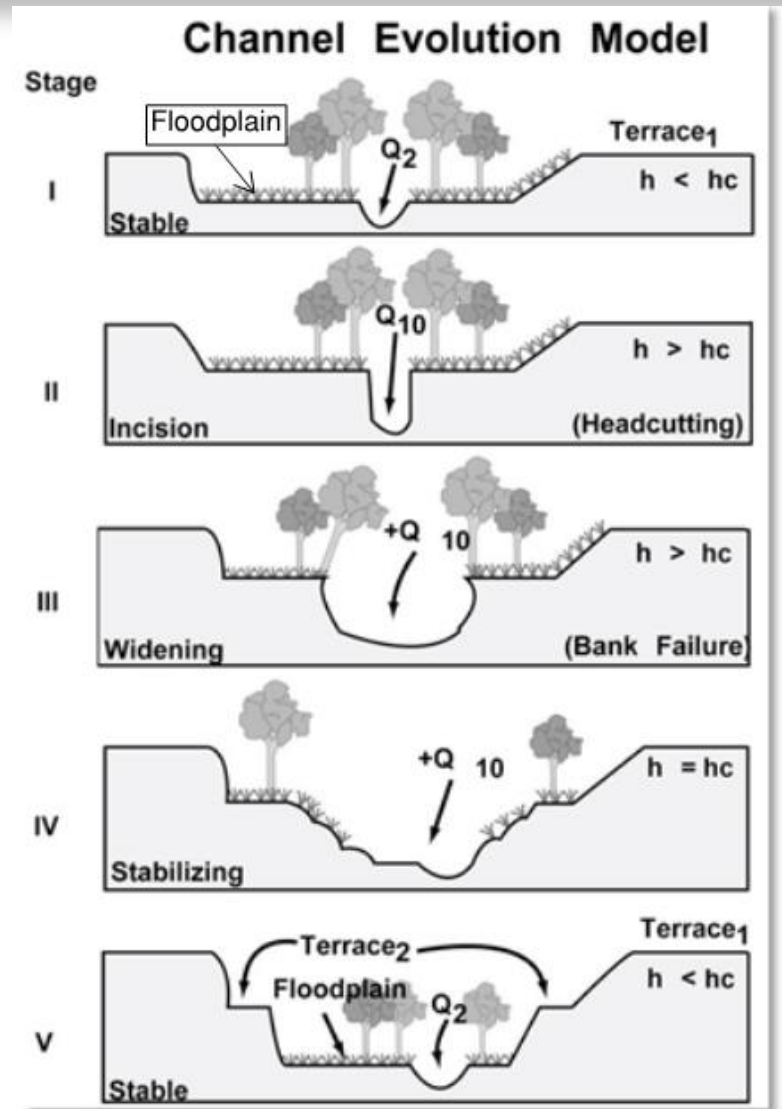
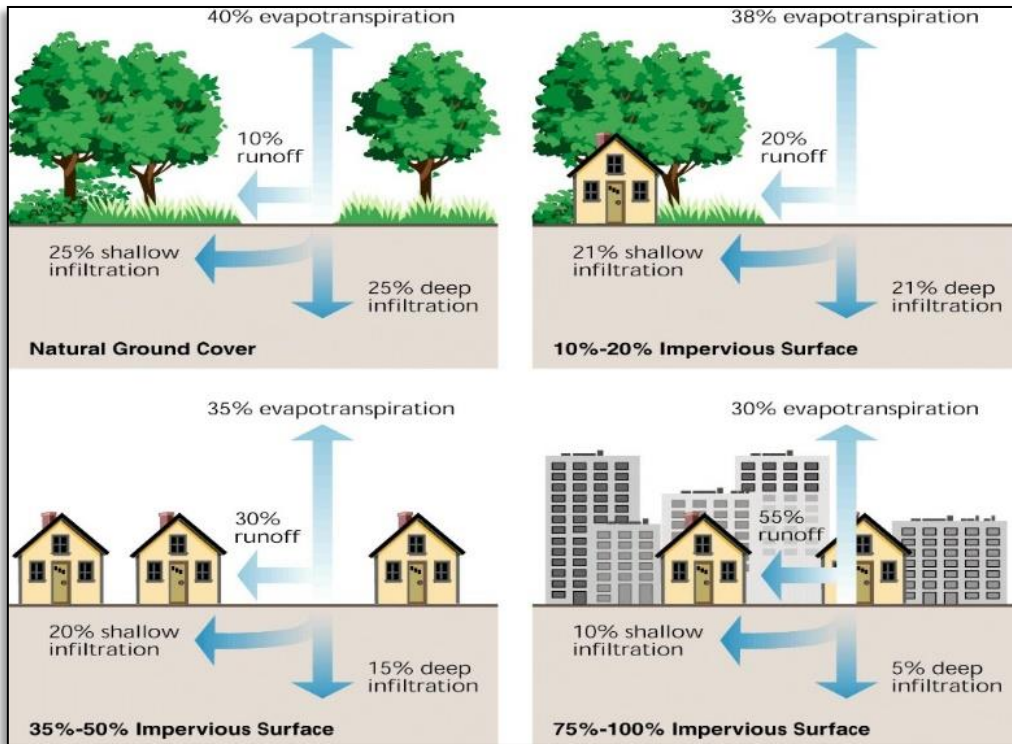
➤ Improve habitat and ecological processes

- Native landscaping, biological community, regenerative

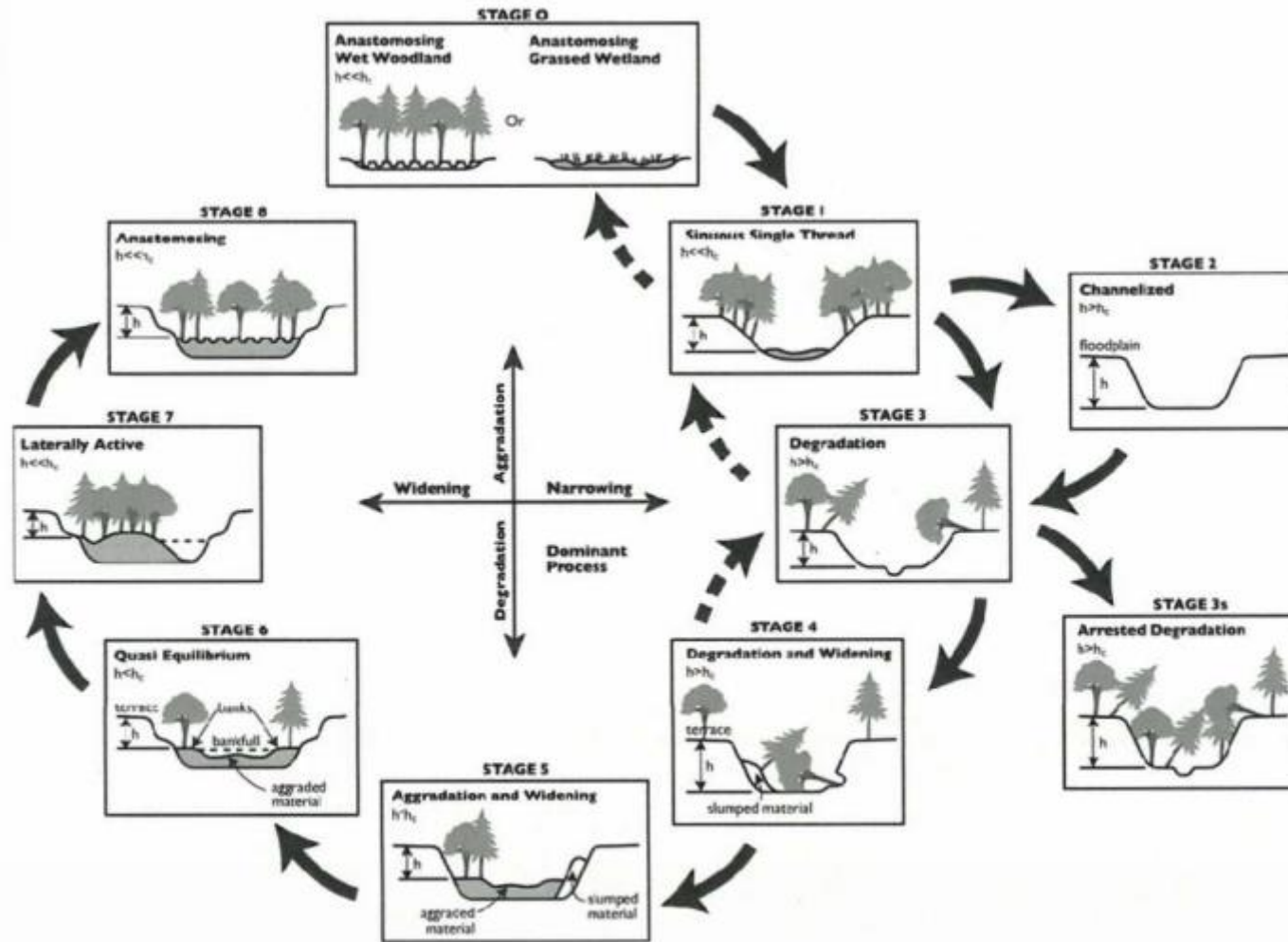
➤ Protect Infrastructure (sanitary, water, etc.)

➤ Maintain close coordination with stakeholders

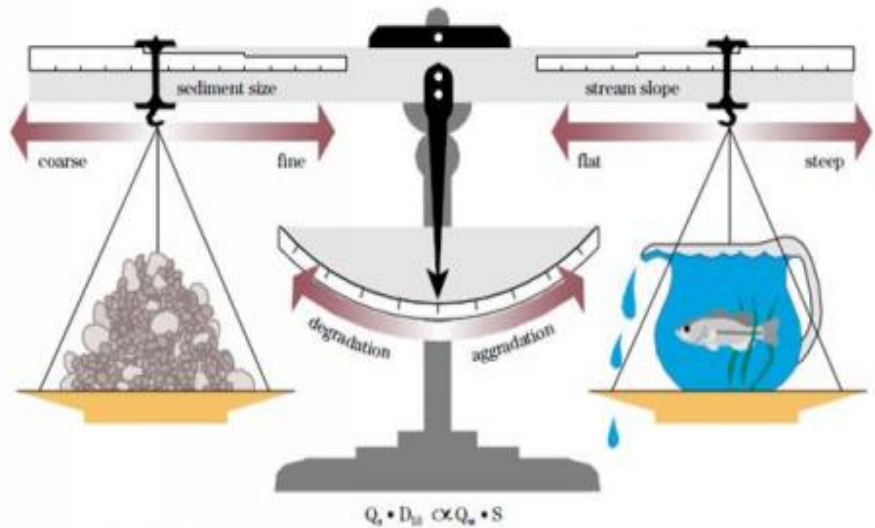
Hydrology and Channel Evolution



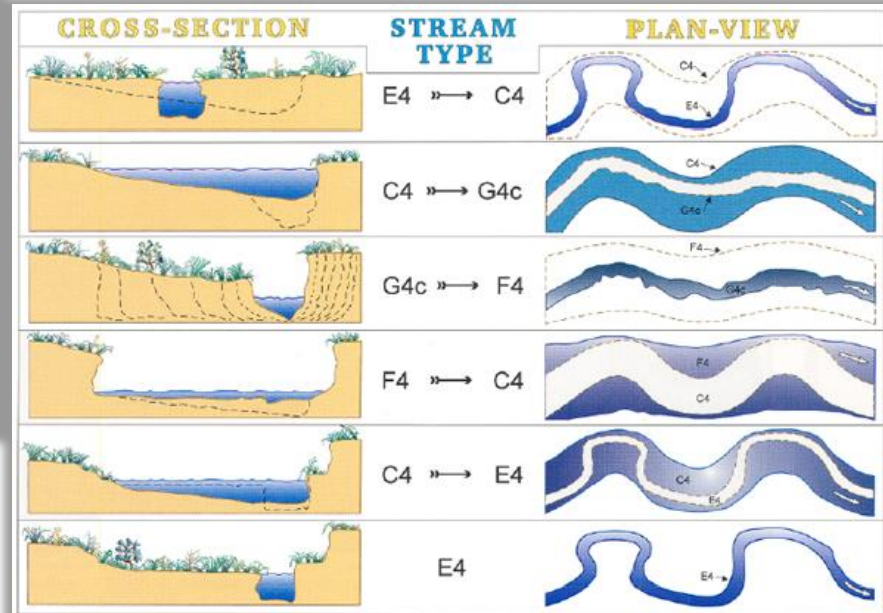
Stream Evolution Model



Hydraulics and Channel Evolution

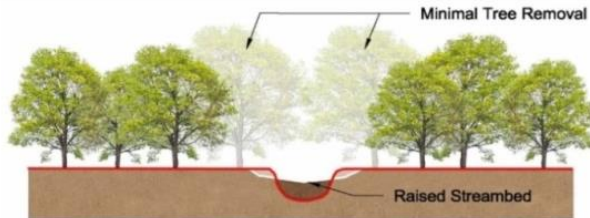


From Rosgen (1996), from Lane, Proceedings, 1955.
Published with the permission of American Society of Civil Engineers.



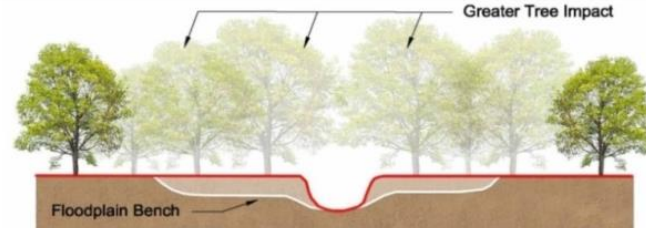
Adjustments of channel cross-section and plan-view patterns as stream types change or shift through an evolutionary cycle (Rosgen 1996)

Natural Channel Design



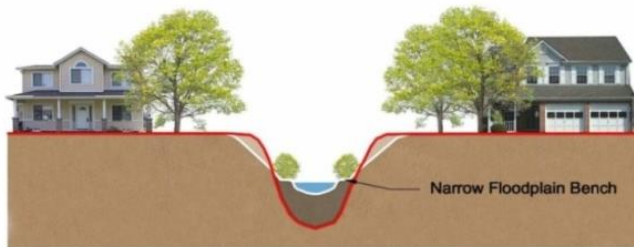
Priority 1 Restoration:

1. Reconnects flows with floodplain.
2. Improves riparian health by raising water table elevation.
3. Minimizes flow depth during floods resulting in lower shear stresses and reduced channel scour.
4. Minimizes construction related disturbance to the riparian corridor.



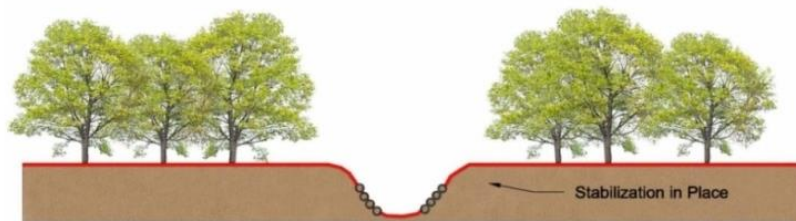
Priority 2 Restoration:

1. Method advocated by proponents of legacy sediment removal.
2. Seeks to restore pre-colonial stream invert elevation.
3. Requires significant floodplain excavation to create a bankfull bench (≥ 2.2 times design bankfull channel width).
4. Necessitates significant tree removal.



Priority 3 Restoration:

1. Applicable to restoration in confined stream valleys.
2. Bankfull bench provides limited overland relief for smaller storm events.
3. Design subject to high shear stresses in larger storm events.



Priority 4 Restoration:

1. Stabilization in place.
2. Long-term stability not achieved using this approach.
3. Requires stabilization/armoring techniques to provide localized scour protection.
4. Minimal disturbance associated with construction activities.

Natural Channel Design (part 2)



Minimize tree loss

Establish native
Vegetation

Grade control and floodplain connectivity

Social Goals

1. Maintain open dialog and share information.
2. Coordinate with stakeholders and the community.
3. Build partnerships with local organizations.

Water Quality Benefits

- Draft Pollutant Load Reductions:

Table 8-1 Protocol 1 Pollutant Load Reduction Credits for Design Concept

Stream Reach	Total Streambank length* (ft.)	Streambank Sediment (tons/yr)	Total Phosphorus (lbs/yr)	Total Nitrogen (lbs/yr)
PSB1	1,108.25	11.89	12.48	27.10
PSB2	2,657.29	237.56	249.43	541.63
PSB3	3,138.04	268.51	281.94	612.20
PSB4	1,797.63	61.50	64.57	140.21
PSB5	2,118.78	19.76	20.75	45.05
PSB6	968.36	35.34	37.11	80.58
PSB7	7,868.64	227.41	238.78	49.12
NB1	4,096.25	21.55	22.62	518.49
NB2	2,833.49	60.22	63.23	137.30
SH1	2,729.54	6.05	6.35	13.79
Total	29,316.26	949.77	997.26	2,165.48

*Total Streambank Length = Left Bank + Right Bank

Typical Structures Used – Cross Vanes



Engineered Riffle w/Boulders and Wood



Riffle With Log Toe and Boulder Clusters



Construction Example



Construction Example



Construction Example



Construction Example



Construction Example



Construction Example



Growing Season Following Construction Completion



One Year After Construction Completion



Three Years After Construction Completion



Before and After Examples

Big Rocky Run II



Before



1 year After

Before and After Example

Rabbit Branch Stream Restoration



Before



After

Next Steps – Schedule

- Complete stream assessment and pre-design analysis – Spring, 2023
- Conceptual Design – Fall, 2023
 - Charrette and Public Meeting
- Land Rights – Winter 2023/2024
 - Easements must be acquired for project to continue
- Preliminary Design – Spring, 2024
 - Public Information Meeting
- Final Design – Summer, 2024
 - Public Information Meeting
- Construction – Fall, 2024
 - Dependent upon future funding

Next Steps – Advisory Committee

- Volunteers from the community needed to serve on a Stream Team Advisory Committee
 - Review plan set submittals
 - Site walks and field validation of the design
 - Serve as a liaison to help share project information and community feedback

Online Resources

Stormwater Planning Division Website

<http://www.fairfaxcounty.gov/dpwes/stormwater/>

Fairfax County Watershed Planning

<https://www.fairfaxcounty.gov/publicworks/stormwater/little-hunting-creek-watershed>

EPA Water Quality Laws and Regulations

<http://www.epa.gov/water/laws.html>