

Northern Virginia Stream Restoration Bank– Friends Of Reston Status Report

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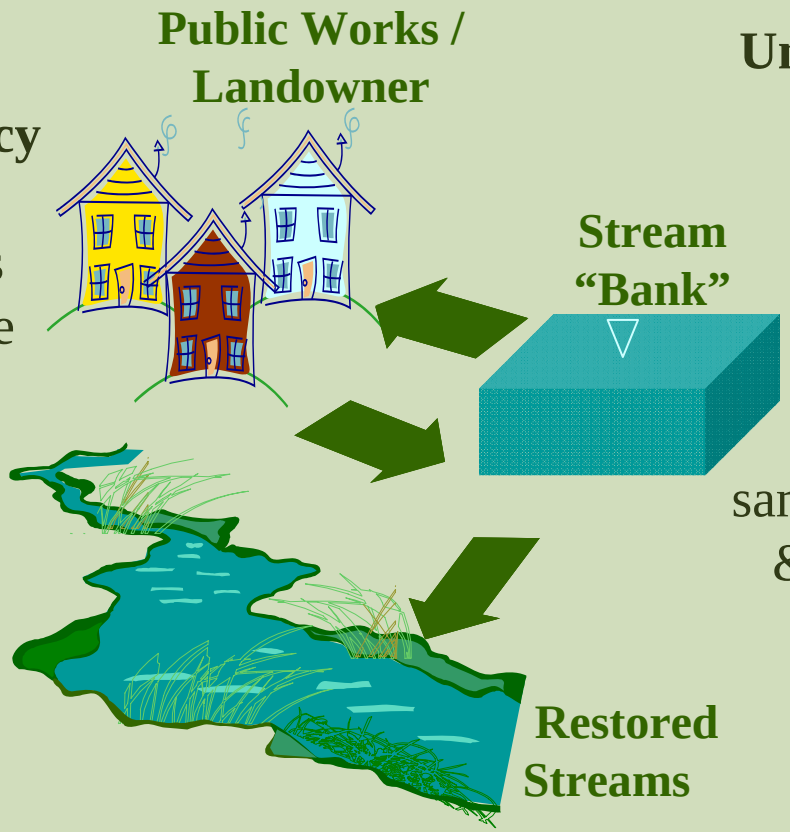
WHAT IS MITIGATION BANKING ?
HOW IT WORKS

A Public Works Agency or private landowner needs to impact streams on their property. In the past, they would have had to restore streams as compensation, either on- or off-site.

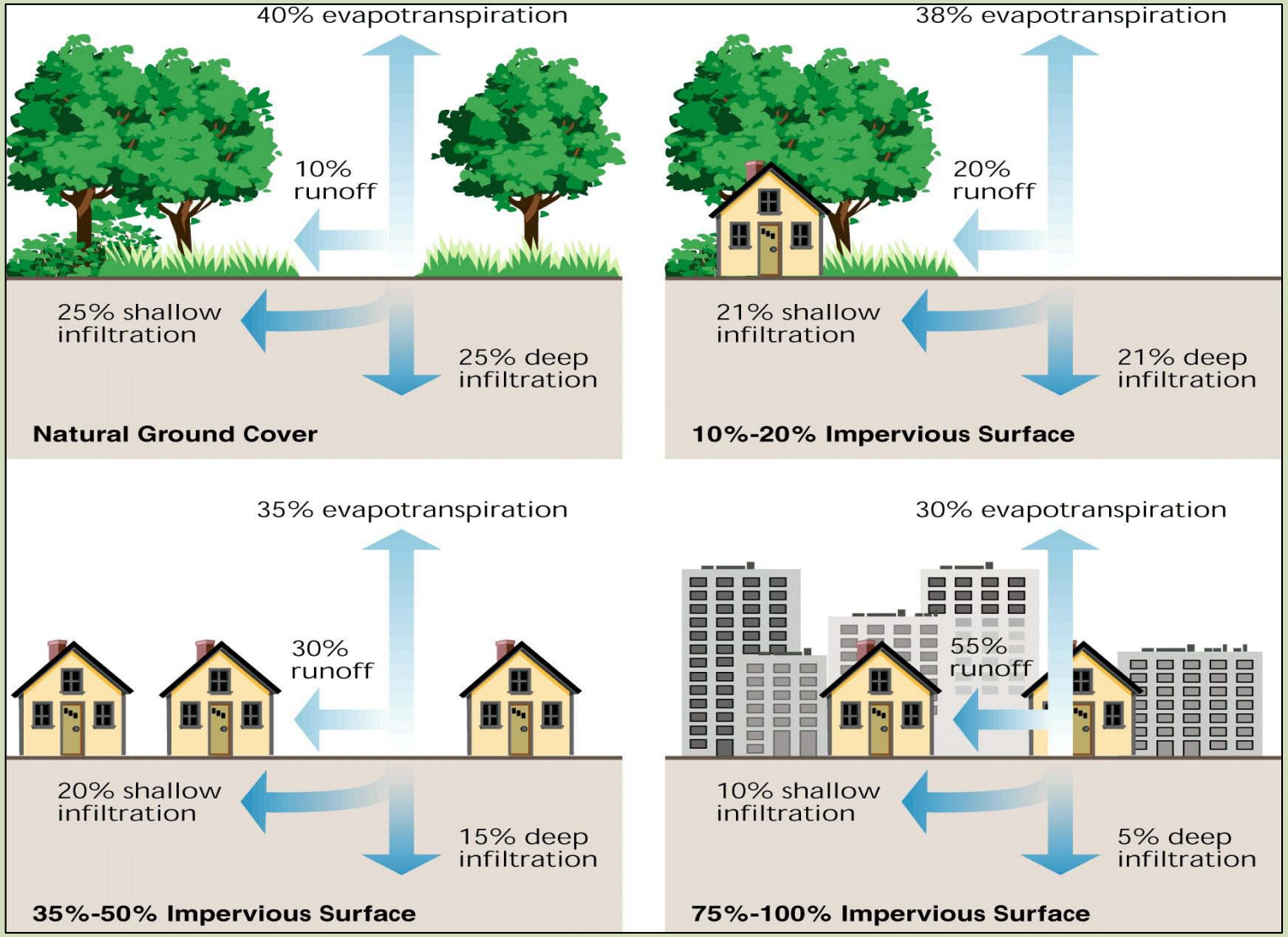


Under the market-oriented system, they can go to a "bank" created by a Bank Sponsor who has obtained credit for restoring impaired streams elsewhere in the same portion of the rivershed & physiographic province.

By purchasing stream credits from the Bank Sponsor, the mitigation requirements of a permit for stream impacts is satisfied. Stream restorers use this pooled money to create much larger, well-designed, & ecologically valuable conservation projects.

Adapted from The Washington Post, February 15, 1996

The Urban Watershed Problem



Source: USDA

URBAN STREAM SYNDROME (USS)

- Total Phosphorus (TP), Total Nitrogen (TN), and Total Suspended Solids (TSS) flows downstream

Eroding meander bend adjacent to Wiehle Ave in Reston

Exposed sewer manhole – Reach 12 in Snakeden

Correcting the Problem

Option 1: Watershed Improvements- remove impervious areas

- Retrofit hard surfaces with pervious pavements- pervious concrete or pavers
- Retrofit buildings with green roofs

A reduction in impervious area results in a reduction in runoff

Green roof at WSSI

Pervious concrete at WSSI

GravelPave2 infiltrating a large rainstorm at WSSI

Pervious pavers at WSSI

Correcting the Problem

Option 2: Watershed Improvements – stormwater management

- Provide conventional stormwater management facilities throughout the watershed
- Install low-impact development features- swales, rain gardens, green roofs, and pervious pavements

Conventional dry pond in Fairfax County

Green roof at WSSI

Water quality swale at WSSI

Rain Garden at WSSI

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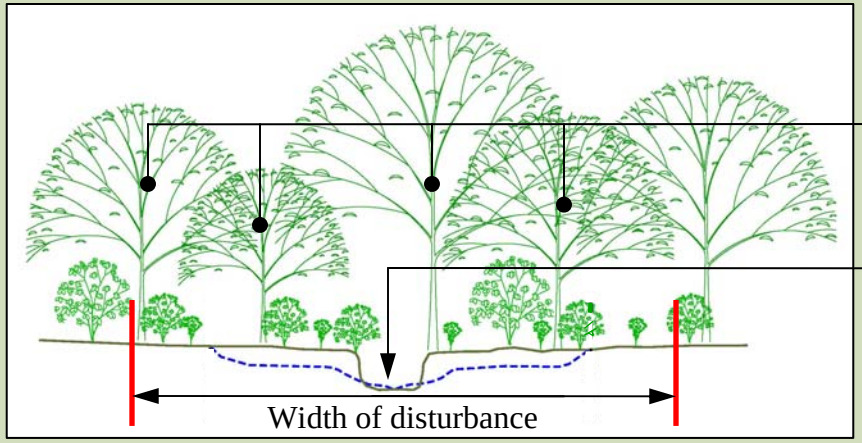
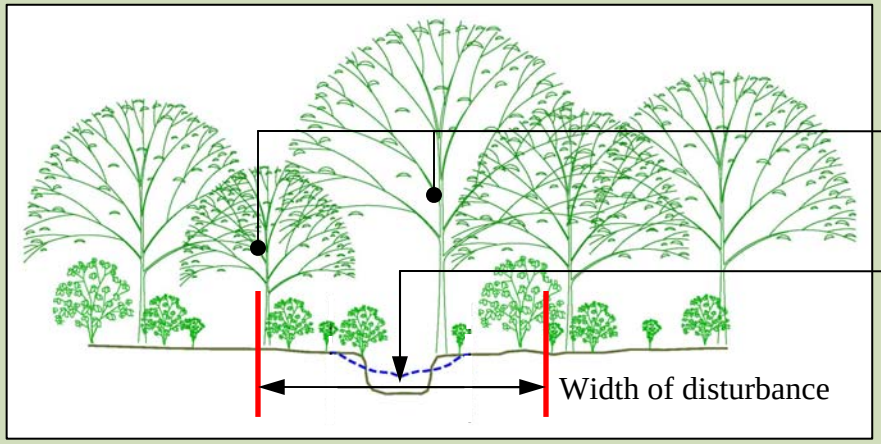
Correcting the Problem

Option 3: Restore streams to handle these flowrates.

Lowering the floodplain results in a larger project area.



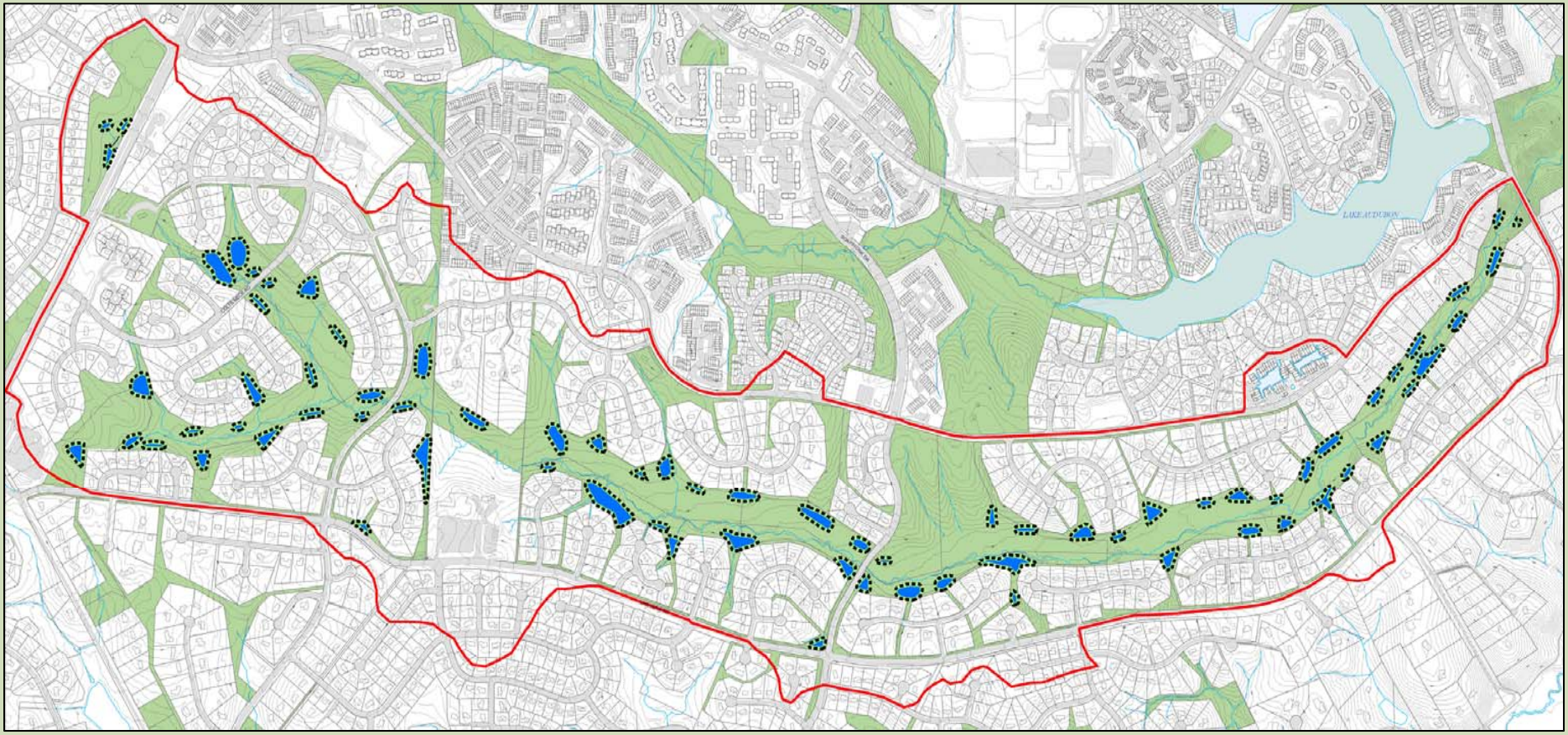
Raising the bed is much less disruptive.



Conventional Stormwater Scenario

Results

- 75 ponds
- 29.3 acres disturbance from grading



Bio-Retention Scenario

Results

- 830 Bio-retention facilities
- 36.7 acres disturbance from grading

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WHY RESTORE ?

Reconnect to the existing floodplain to:

- Slow velocities
- Increase evapotranspiration
- Remove pollutants (TP, TN, and TSS)
- Improve riparian habitat
- Restore groundwater levels

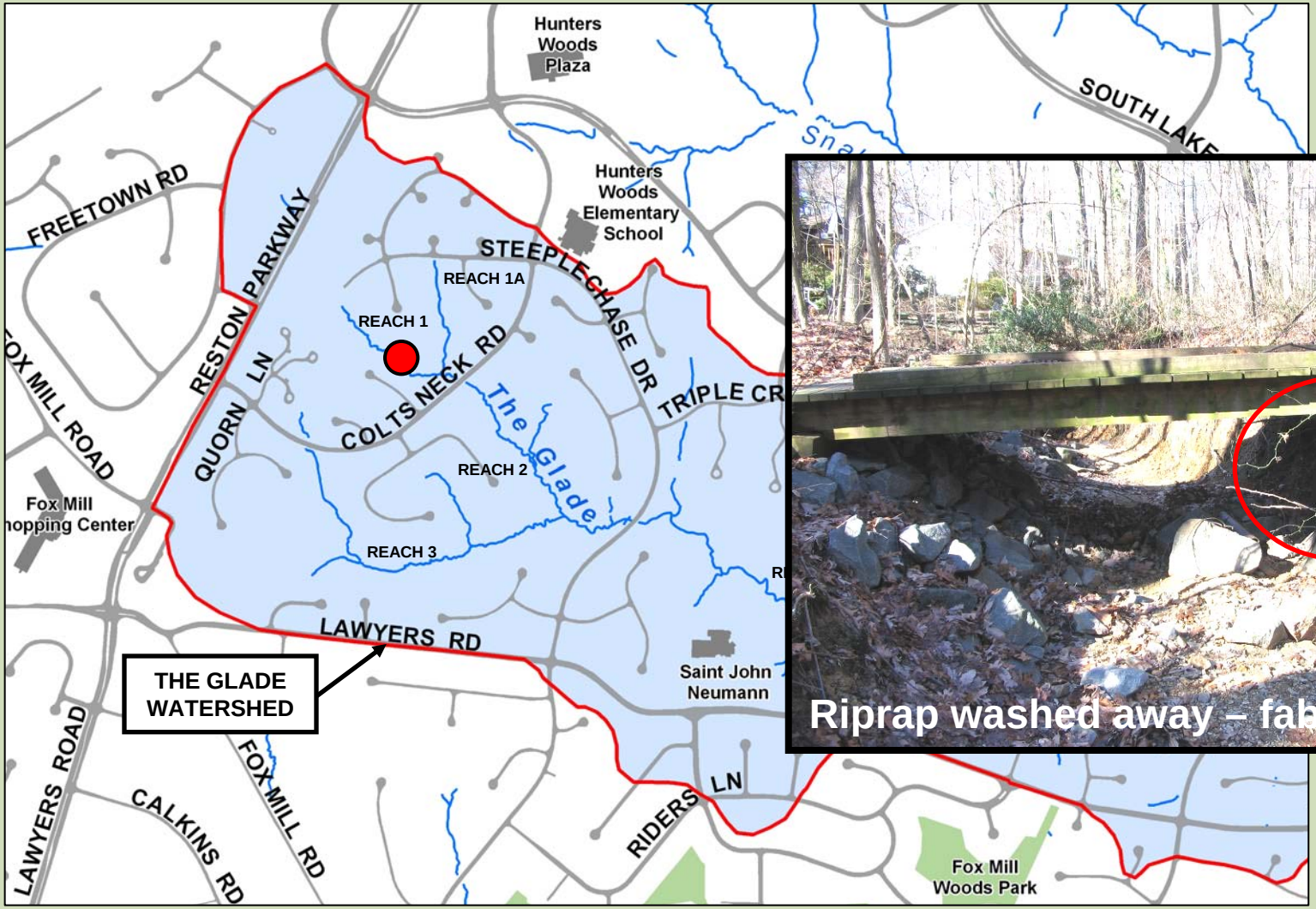
Stream relocation - 1999

UVA Research Park – Charlottesville, VA

After planting

Same stream - 2007

Existing Conditions In The Glade



Reach 1

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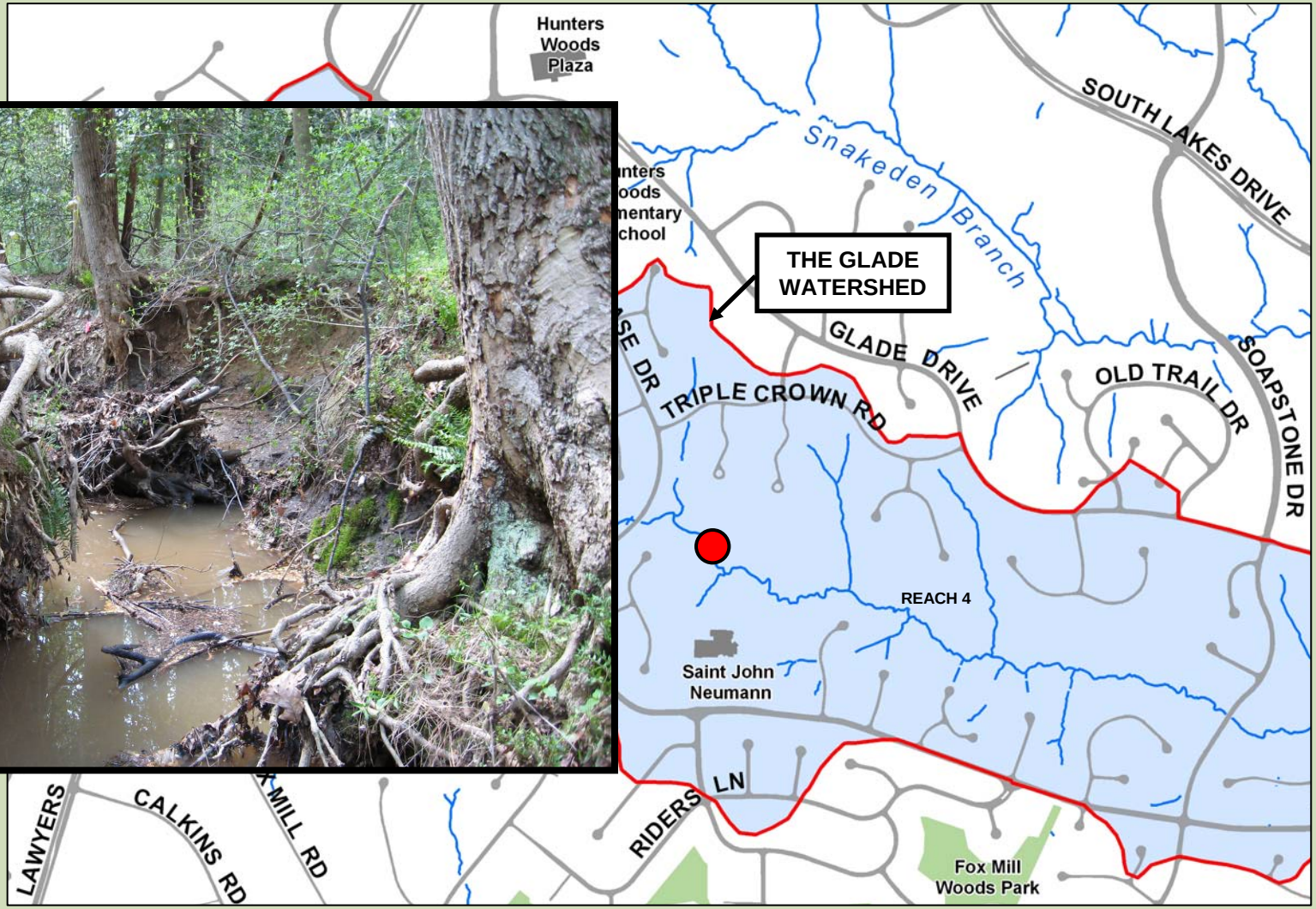
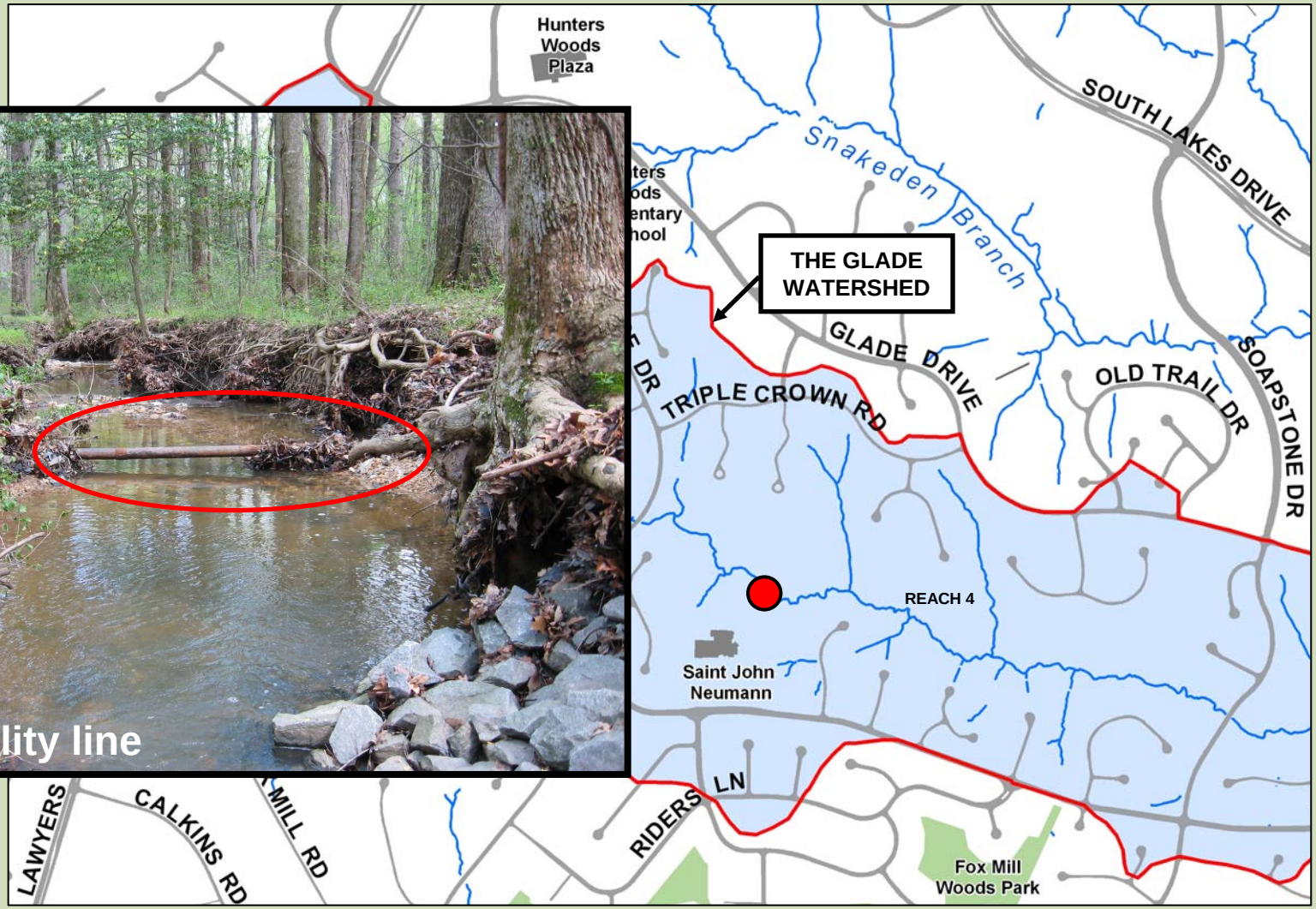
Existing Conditions In The Glade

Reach 4A



Existing Conditions In The Glade

Reach 4A



URBAN STREAM - DESIGN REALITIES

1. Significantly more flow than rural streams.
2. Significantly more "*bankfull*" events than in rural watersheds.
3. Given site constraints, reinforcement is necessary.
    - Rock structures – using native diabase rock
    - Reinforced bed
    - Heavy planting densities – native vegetation only

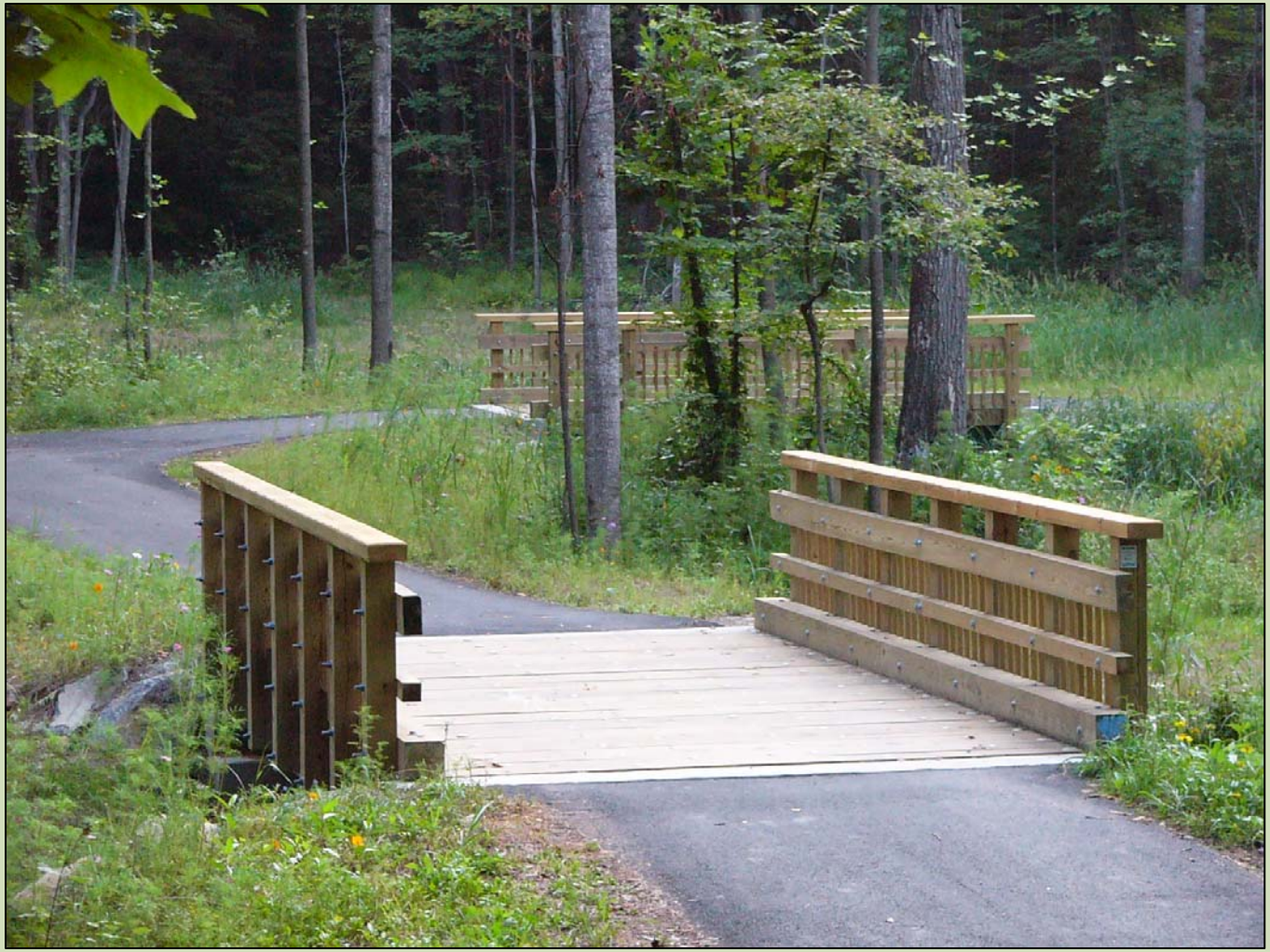
Snakeden Branch – Reach 3 (after 6 months)

McLean Place (after 4.5 yrs)

Construction – Reach 1

Construction – Reach 3

Snakeden Bridges – Reach 3



Construction – Reach 12

TROPICAL STORM HANNA (9/06/08)

100-YR EVENT (6.22" IN 9 HOURS)

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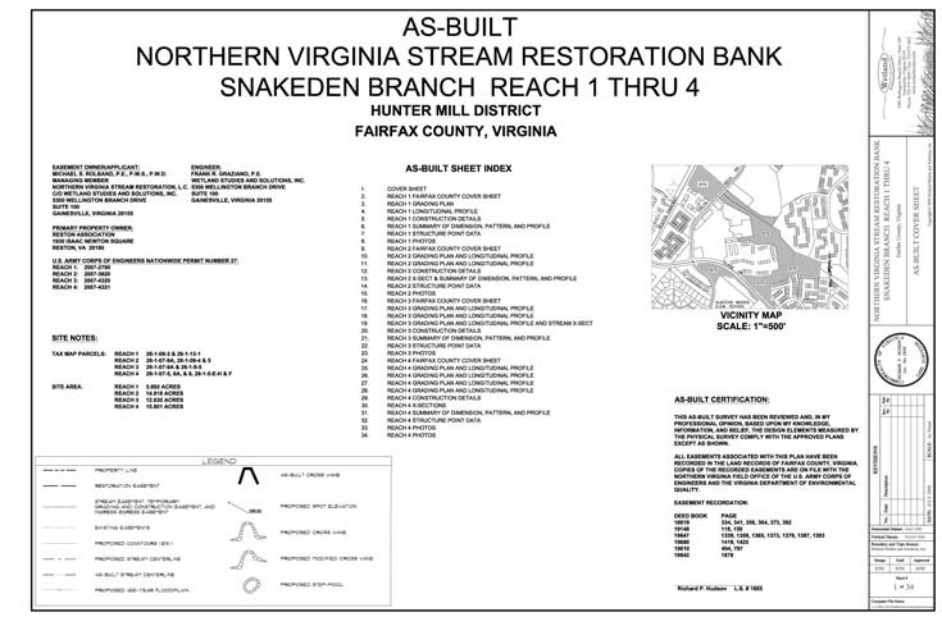
Tropical Storm Hanna

2 - DAYS LATER

Monitoring and Maintenance


AS-BUILT
NORTHERN VIRGINIA STREAM RESTORATION BANK
SNAKEDEN BRANCH REACH 1 THRU 4
HUNTER MILL DISTRICT
FAIRFAX COUNTY, VIRGINIA

AS-BUILT SHEET INDEX

VICINITY MAP
SCALE: 1"=500'

AS-BUILT CERTIFICATION:

10-year monitoring program

- Streambed surveys
- Structure surveys
- Vegetation surveys
- Biological Surveys
- As-built for Reaches 1- 4 has been approved.

Post 10-year

- No legal requirement for monitoring and maintenance

Must meet success criteria outlined in MBI – or fix!

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Monitoring / Maintenance and Catastrophic Event Fund

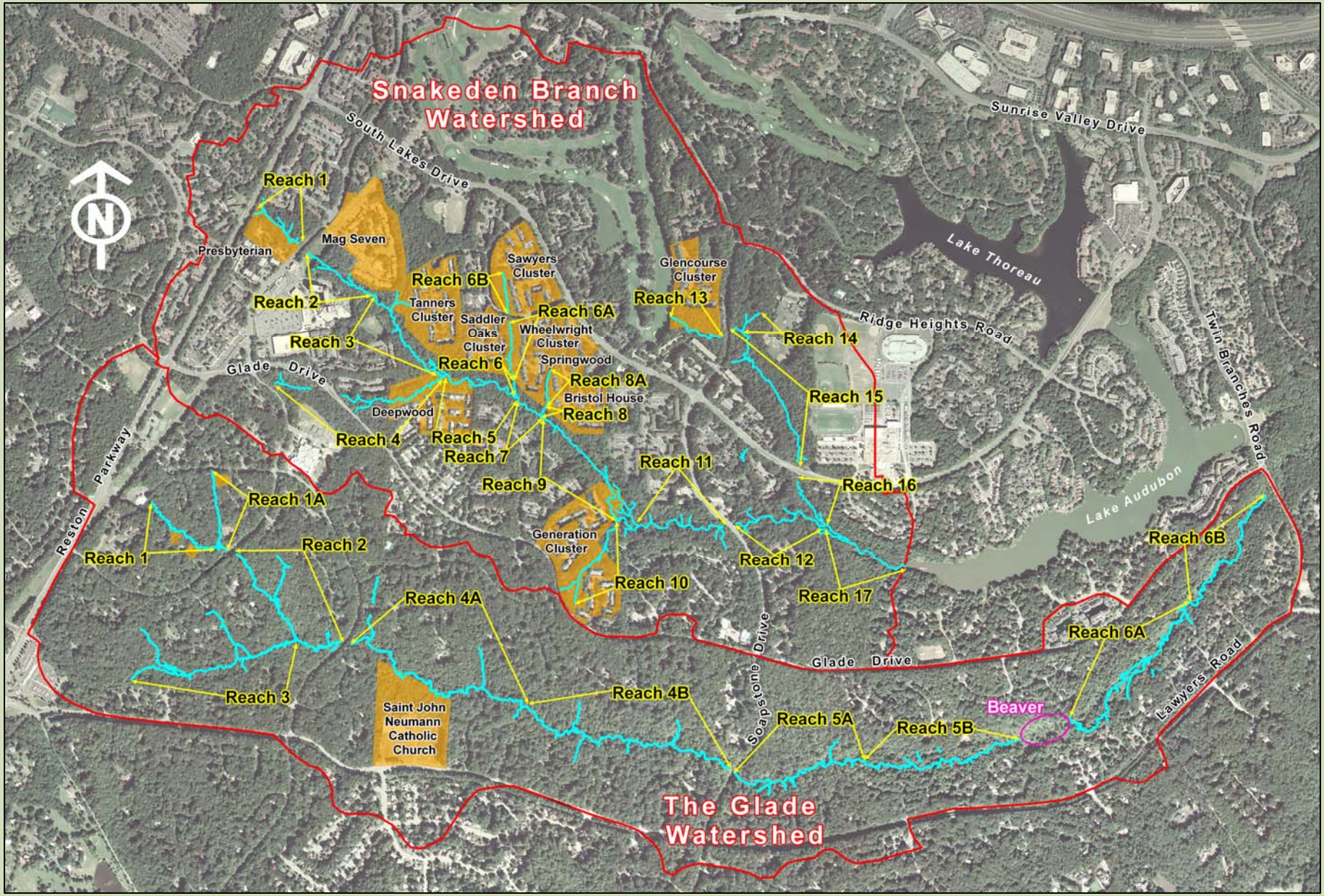
How is it funded?

Catastrophic Event

- 5% of all sale proceeds placed in interest bearing account.
- $5 million, plus interest.
- Available for RA use after 10-yr monitoring period.
- Currently ***no funds*** available unless paid with RA dues.

Monitoring and Maintenance

- 15% of all sales proceeds ($15 million value).
- 1/10 released per year if stream criteria achieved.

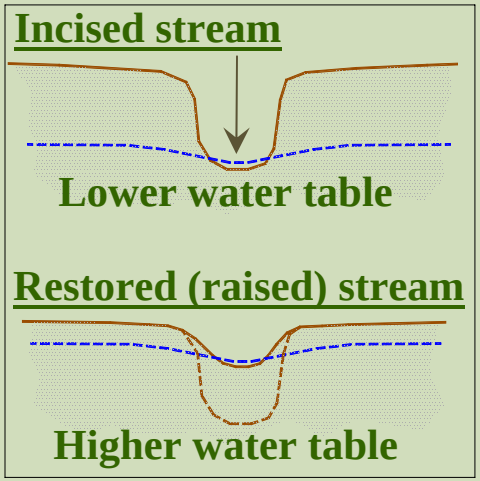

Snakeden Branch Watershed
South Lakes Drive
Sunrise Valley Drive
Lake Thoreau
Ridge Heights Road
Twin Branches Road
Lake Audubon
Reach 1
Mag Seven
Presbyterian
Sawyers Cluster
Glencourse Cluster
Reach 6B
Reach 2
Tanners Cluster
Saddler Oaks Cluster
Reach 6A
Wheelwright Cluster
Reach 13
Reach 14
Reach 3
Springwood
Glade Drive
Reach 6
Reach 8A
Bristol House
Reach 15
Deepwood
Reach 8
Reach 4
Reach 5
Reach 7
Reach 11
Reach 16
Reach 9
Reach 1A
Reston Parkway
Generation Cluster
Reach 1
Reach 2
Reach 12
Reach 6B
Reach 10
Reach 17
Reach 4A
Soapstone Drive
Reach 6A
Glade Drive
Reach 3
Saint John Neumann Catholic Church
Reach 4B
Reach 5A
Beaver
Reach 5B
Lawyers Road
The Glade Watershed

Cross Section Comparison
The Glade Versus Similar Size Projects

Stream/Reach	Bankfull Width
The Glade	
The Glade, Reach 3	6’ – 11.2’
The Glade, Reach 1A	8.5’
The Glade, Reach 1	10’
The Glade, Reach 2	13’ – 18’
Similar Size Projects	
Tributary to Snakeden, Reach 11	8’
Snakeden, Reach 6B	9’
Snakeden, Reach 6A	10’
Chesterbrook (Haycock-Longfellow Park)	11’
Snakeden, Reach 1	14’
Snakeden, Reach 2	17.5’

Stream Restoration Design & Minimizing Tree Impacts

Snakeden Reach 3



SHORT TERM IMPACT FOR LONG TERM BENEFIT

- **Cleared trees "recycled"** as in-stream habitat, grade control, wood-chip trails, habitat "brush" piles, timber products
- **Restoration raises the water table,** (raises stream bed) which increases stream access to floodplain and nutrient delivery to roots.
- **Healthier ecosystem will develop** with the density and species variety of replacement plantings
  - Mosquito population control via predator habitat
  - Dense streambank planting will provide shade, reduce water temperatures, increase oxygenation, increase fish survivability
  - Dragonfly larva molting access via heavily planted streambank with shallower slope
- **Canopy loss will close** as remaining trees adjust and react to increased sunlight, growing to fill in openings

FEWER TREES CUT = LOWER RESTORATION COST

- **Tree-climbing removal method** vs. traditional forestry timbering (*minimize impacts to neighboring trees*) is expensive.

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Kingstowne, Fairfax County
(NVSWCD Project)

End of Construction – Fall, 2000

Sixth Growing Season – Summer, 2006

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Restoration Area Plantings

- Seed mix includes 6 grass, 21 forb, 5 shrub and 5 tree species
- Plantings include 8 tree and 10 shrub species
- Riparian Forest: 640 trees/shrubs per acre
- Streamside:
  - 1 gallon container 3’ O.C.
  - live stake/tubling 1’ O.C.
- Increased sunlight on forest floor
- Edge effect established

Oxeye Sunflower

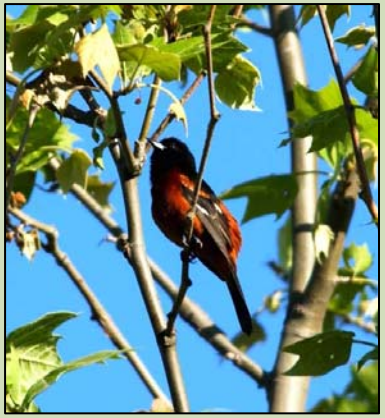
Eastern Redbud

Greater Wildlife Species Richness

- Mature forest continues to provide habitat for raptors, wood peckers, bats and deer
- Recently planted areas provide habitat for small mammals, song birds, fox and deer
- All species benefit from the “edge effect”
- Restored stream allows detrital input to be processed, thus increasing stream health and function

Red-shouldered Hawk


Cottontail Rabbit


Orchard Oriole

Conclusion

1. Reston streams are seriously degraded due to urbanization – a situation made even worse by a lack of stormwater management. An ideal place to establish the NVSRB.

2. Fully restored streams will provide long-term stability & financial benefits to the community:
   - Phase I: $70 million Restoration
   - $450,000 to Reston Association
   - $950,000 to Friends of Reston
   - $3 million of new bridges for Reston
   - Reduced dredging costs for RA lakes
   - $5 million Catastrophic Event Fund
3. Short-term construction disturbance will provide long-term societal and ecological benefits to a heavily used, urban stream valley network.

Talking Points

- The development of our homes, roads, schools, churches, and businesses have destroyed our streams with runoff.
- We need to restore our eroded streams to handle the resulting flows of water.
- Trees, unlike streams, are a renewable resource – they will grow back, and our stream valley will be a healthier ecosystem as a result of this project, both now and in the long term for future generations.
- We need to conserve our common resources by restoring the damage our society caused by building Reston without stormwater management systems.
- Contributions from this project to help build the Nature House should be commended. It is an investment in our community. This is a project for future generations of Reston residents – giving them streams connected to our floodplains instead of vertical chasms and a home base for nature education activities.
- This project is an incredibly positive investment in our community's green infrastructure – one that would not be needed if we had acted promptly as our streams began to rapidly erode. Instead, we ignored the problem since most of the consequences are felt downstream and the most effected (our aquatic web of life) can't speak out. We no longer have a swimming hole in The Glade as it filled up with sediment – and simply have walked along our trails ignoring the problem that we all created. Now is the time and place to begin the process of making amends for our ignorance – and approve this project tonight.