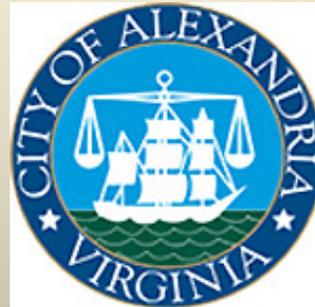


Holmes Run/ Chambliss
Crossing Study & Stream
Bank Stabilization/
Restoration Project
**Public Information
Session**

May 30, 2009



Purpose of This Meeting

- Provide a general overview of rivers and streams
- Discuss stabilization and restoration techniques
- Discuss stabilizing and/or restoring Holmes Run
 - Opportunities
 - Constraints
- Similar projects
 - Case studies
- Field trip – Holmes Run



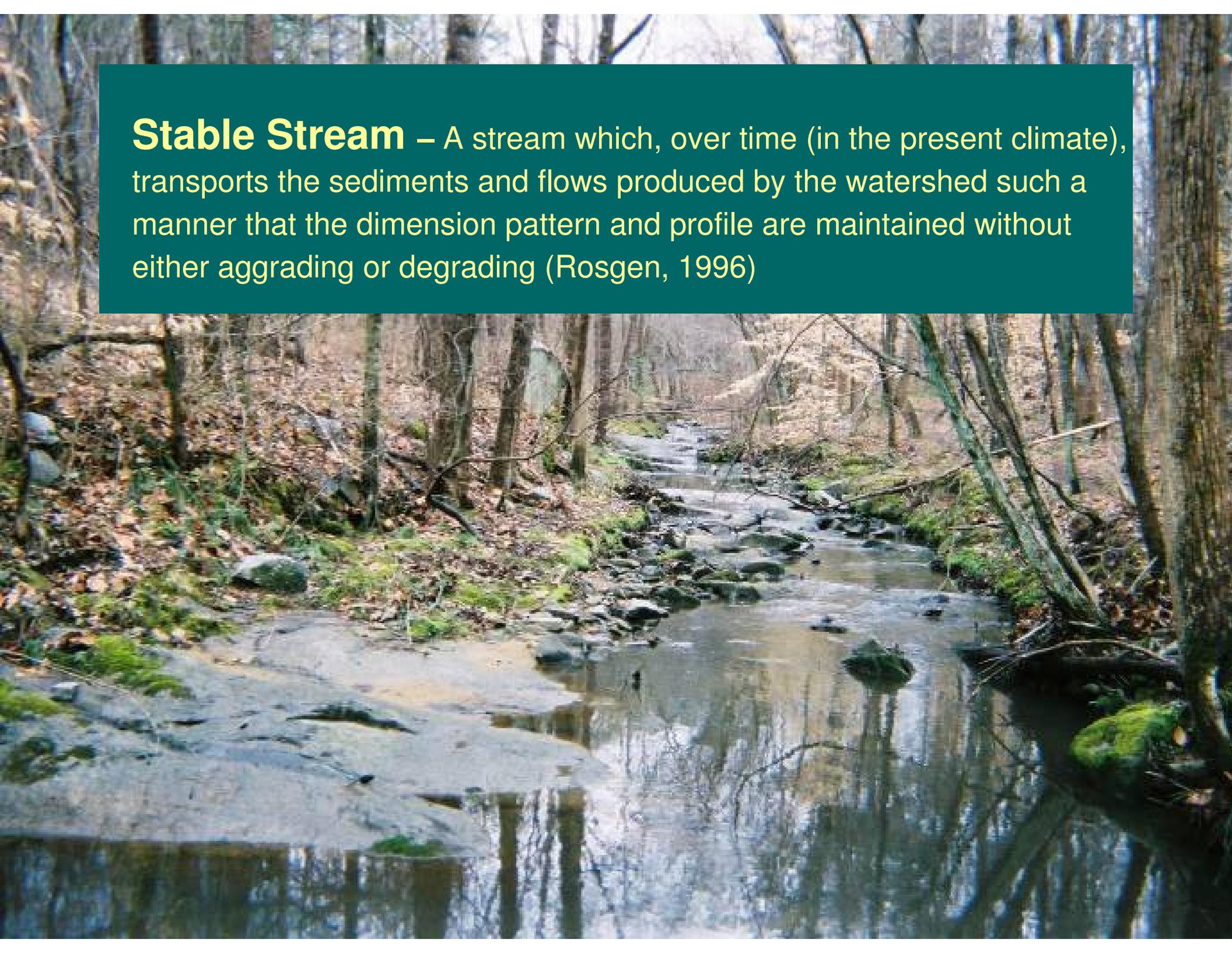
Rivers and Streams 101



Are rivers and streams naturally unstable?

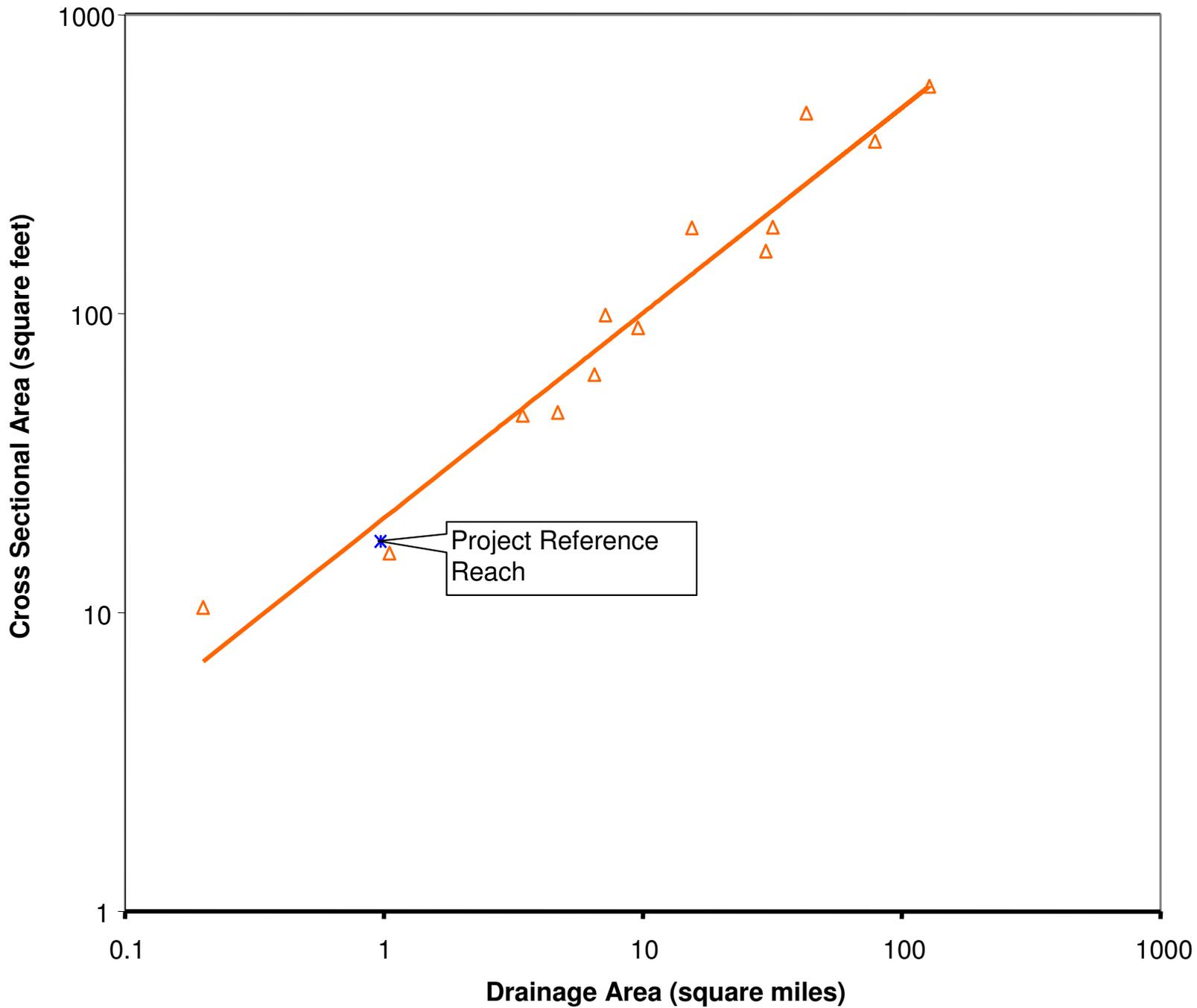


Stable Stream – A stream which, over time (in the present climate), transports the sediments and flows produced by the watershed such a manner that the dimension pattern and profile are maintained without either aggrading or degrading (Rosgen, 1996)





Regional Curves: Cross Sectional Area vs. Drainage Area

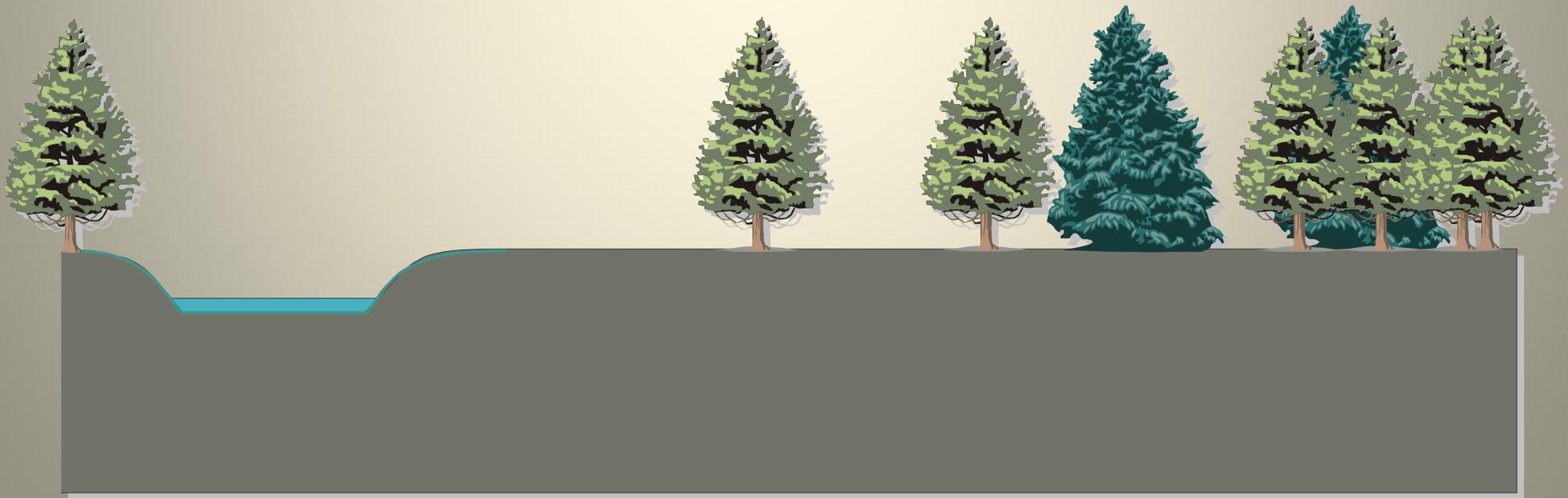


- △ Rural Piedmont
- Power (Rural Piedmont)

$$y = 20.704x^{0.6858}$$
$$R^2 = 0.9546$$

Chronology of stream deterioration

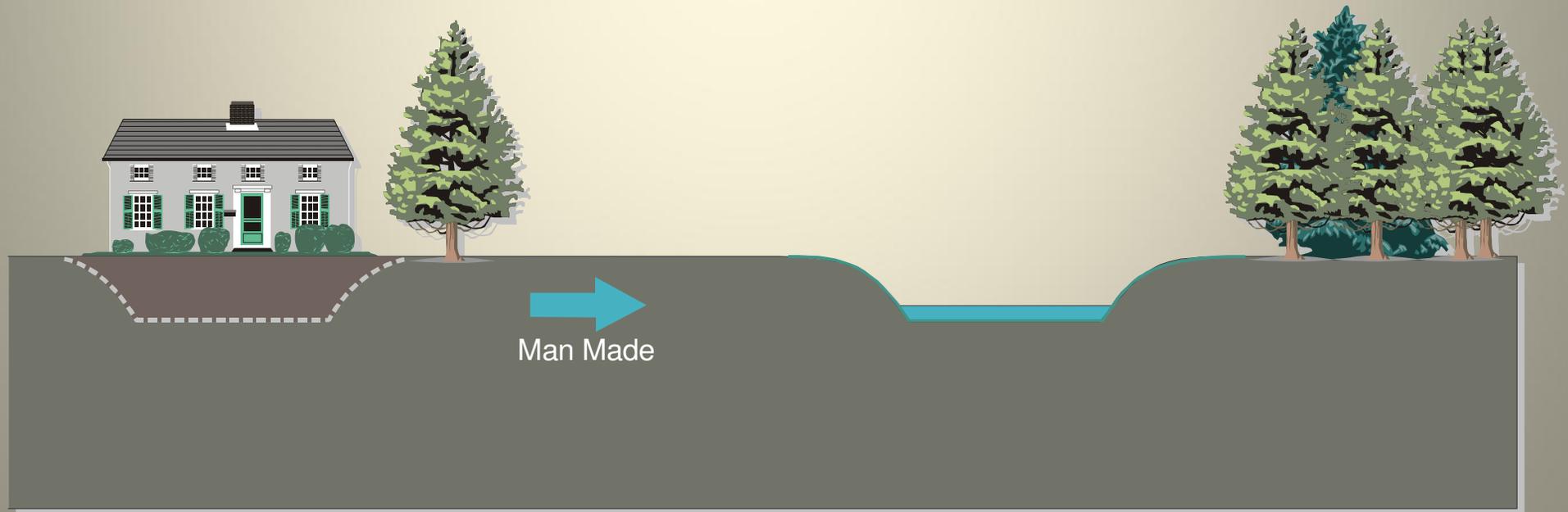
- **PRE-DEVELOPMENT**





Chronology of stream deterioration

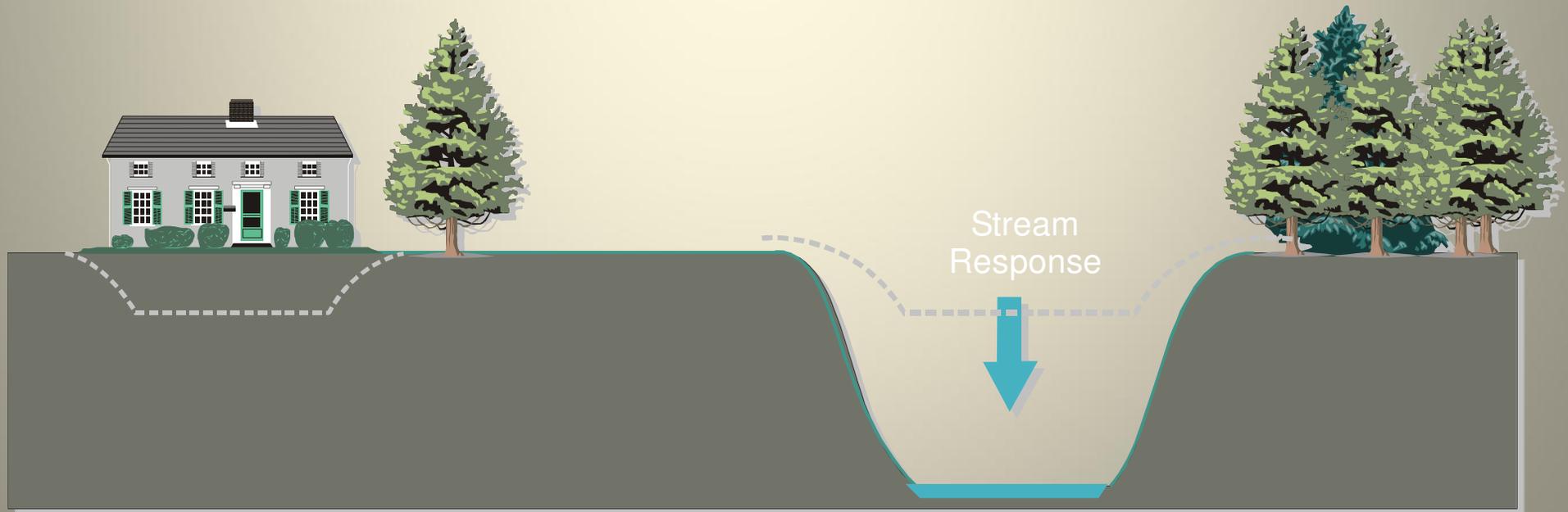
- **WATERSHED DEVELOPMENT** - Stream is relocated to the edge of the valley and straightened.



Chronology of stream deterioration

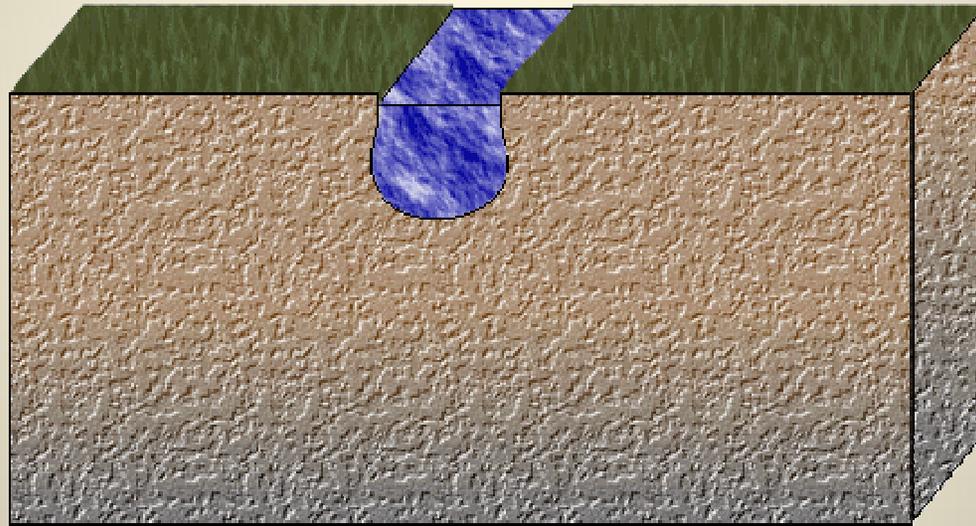
• **STREAM RESPONSE TO DEVELOPMENT** -

Unstable stream down cuts in response to straightening and removal of vegetation, along with development upstream within the watershed.

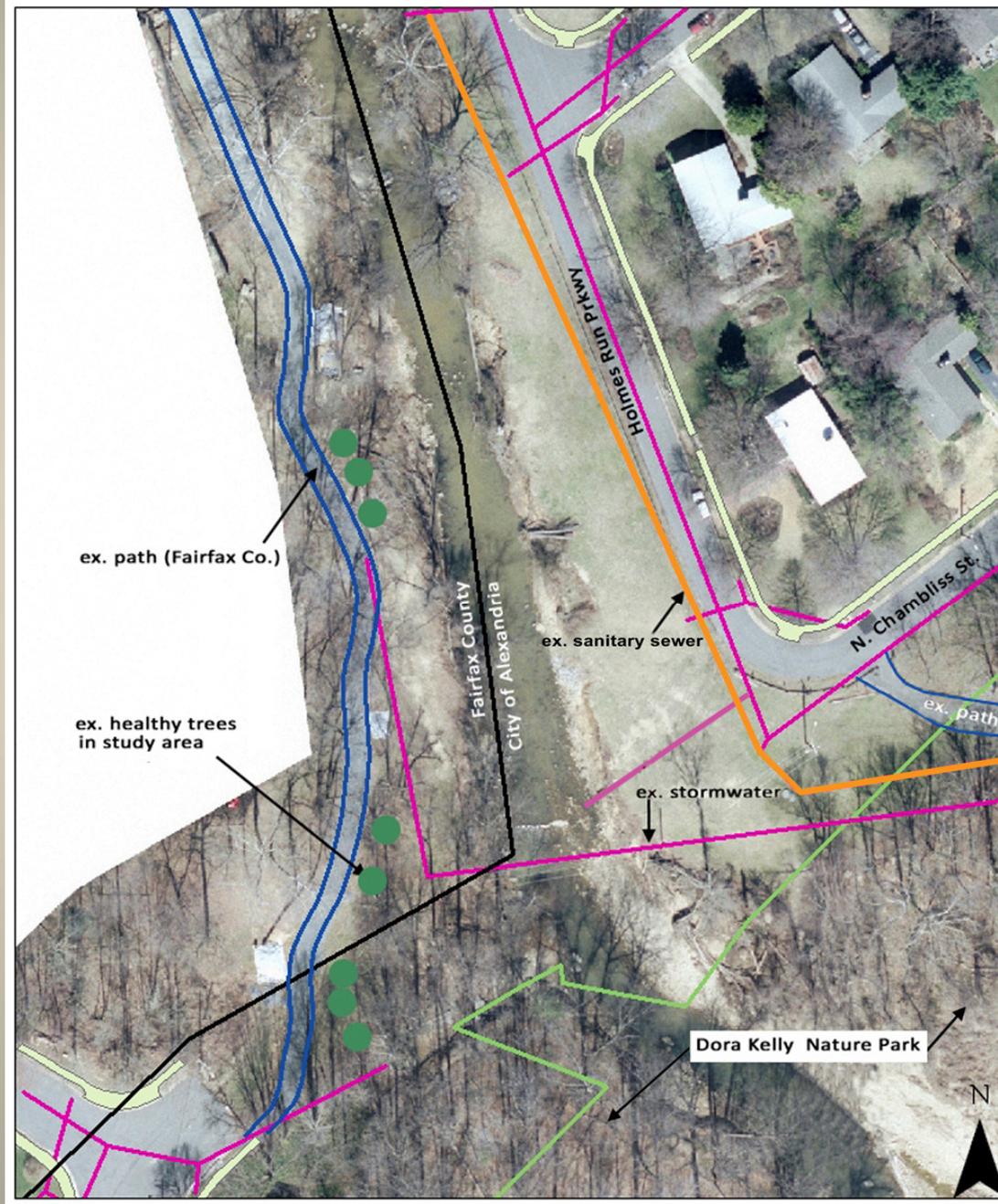




Chronology of stream deterioration



Study Boundaries



Holmes Run – Existing Condition

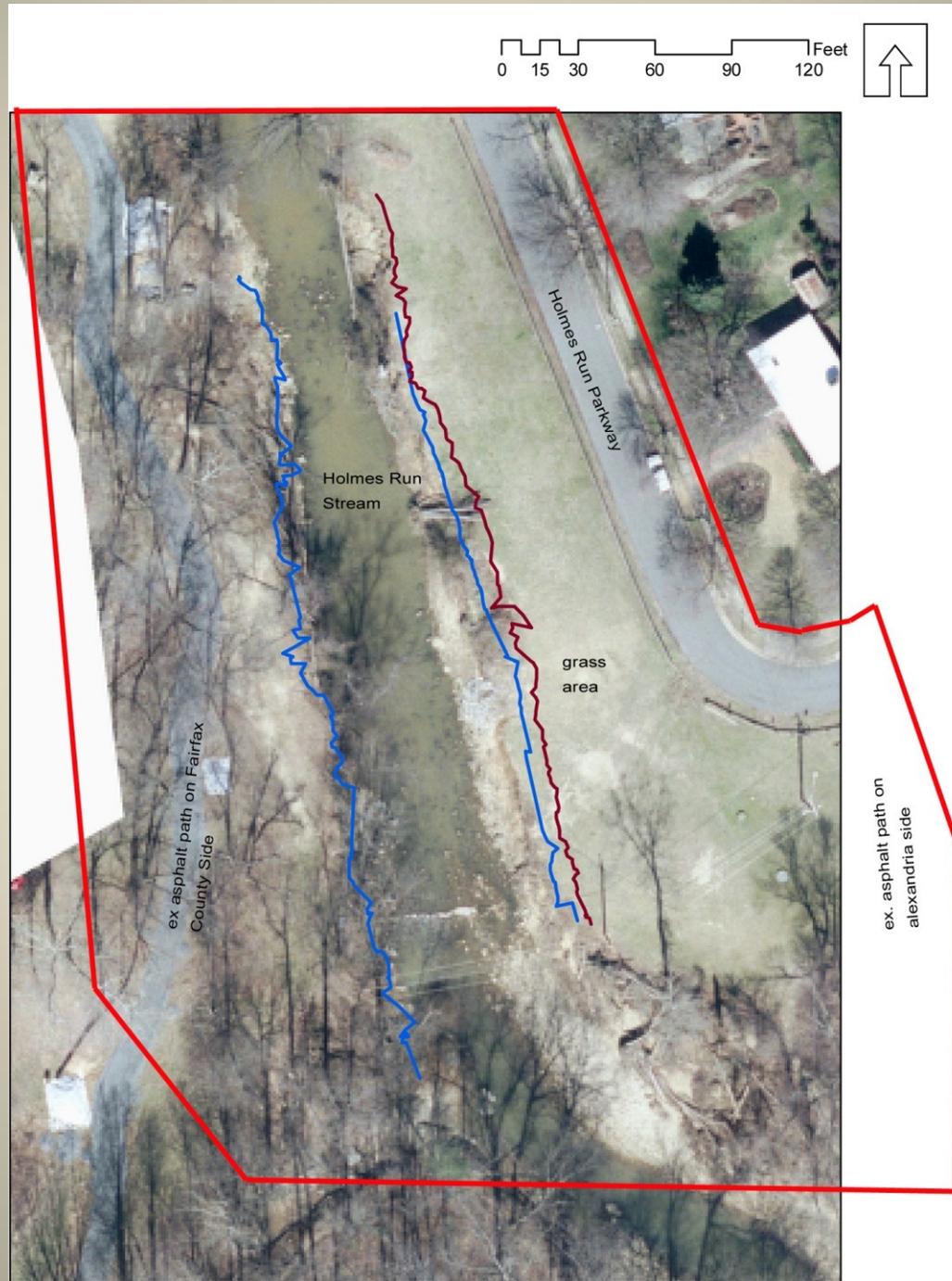
Erosive Unstable Stream Banks

- Water Quality and Habitat
- Loss of Property
 - Infrastructure
 - Trees
- Safety
- Aesthetics

-Problem Is Getting Worse



Stream bank Erosion



Opportunities – Holmes Run

- Reference Reach Downstream



Constraints – Holmes Run



How Do We Fix It?

Potential Solutions

-Bank Stabilization

-Hard Engineering

- Rock

- Concrete block

-Bio-engineering

- Stabilize with Vegetation

- Some Rock Usually Incorporated

-Stream Restoration

- Natural Channel Design

- In-Stream Structures

- “Reference Reach” approach



Stream Bank Stabilization

Bank Stabilization

-Hard Engineering

- Rock
- Concrete block

-Bio-engineering

- Stabilize With Vegetation
- Rock Typically Used Also



Stream Bank Stabilization

Advantages:

- Stops Erosion
- Protects Property

Disadvantages:

- Hard/Rock Not Preferred by Regulatory Agencies
 - Permitting Issues
- Does not improve Habitat



Stream Restoration

Natural Channel Design – The process of converting an unstable, altered, stream corridor, including adjacent riparian zones (buffers) and flood-prone areas, to its natural stable condition considering recent and future watershed conditions ... in order to achieve dynamic equilibrium (USACE 2003)



Stream Restoration

Advantages:

- Stops Erosion
- Protects Property
- Improves Habitat
- Holistic Approach
- Supported by Regulatory Agencies



Disadvantages:

- Greater Temporary Impacts
 - Longer to Construct
- Larger Footprint than Stabilization
 - Need more space
- Cost



Stream Restoration - Projects



Stream Restoration - Projects



Holmes Run Public Information Session

THANK YOU.

