Alternatives Analysis

No Action or "Do Nothing" Option

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35+ years working on rivers and streams

Stream Health Improvement

Fluvial Geomorphology

Study of how streams respond to human land use and channel alterations

River Doctor

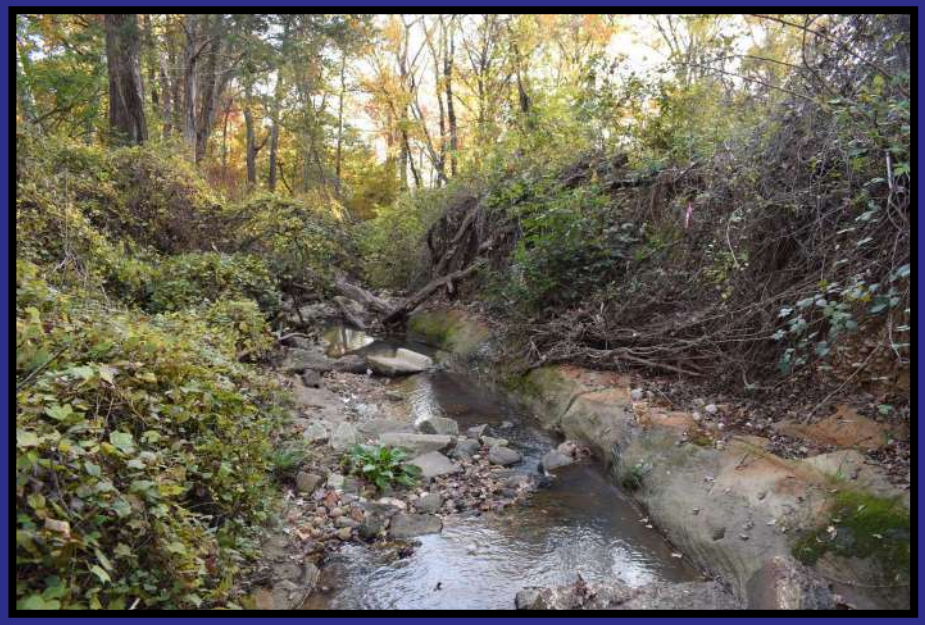
Questions for the Doctor

Why do I feel bad?

What can I do to feel better?

What would happen if I did nothing?

What Will Happen if Nothing Is Done on Strawberry Run and Taylor Run?



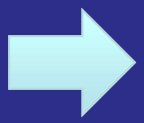
Strawberry Run

Taylor Run

A stream will

ALWAYS

heal or self-stabilize itself

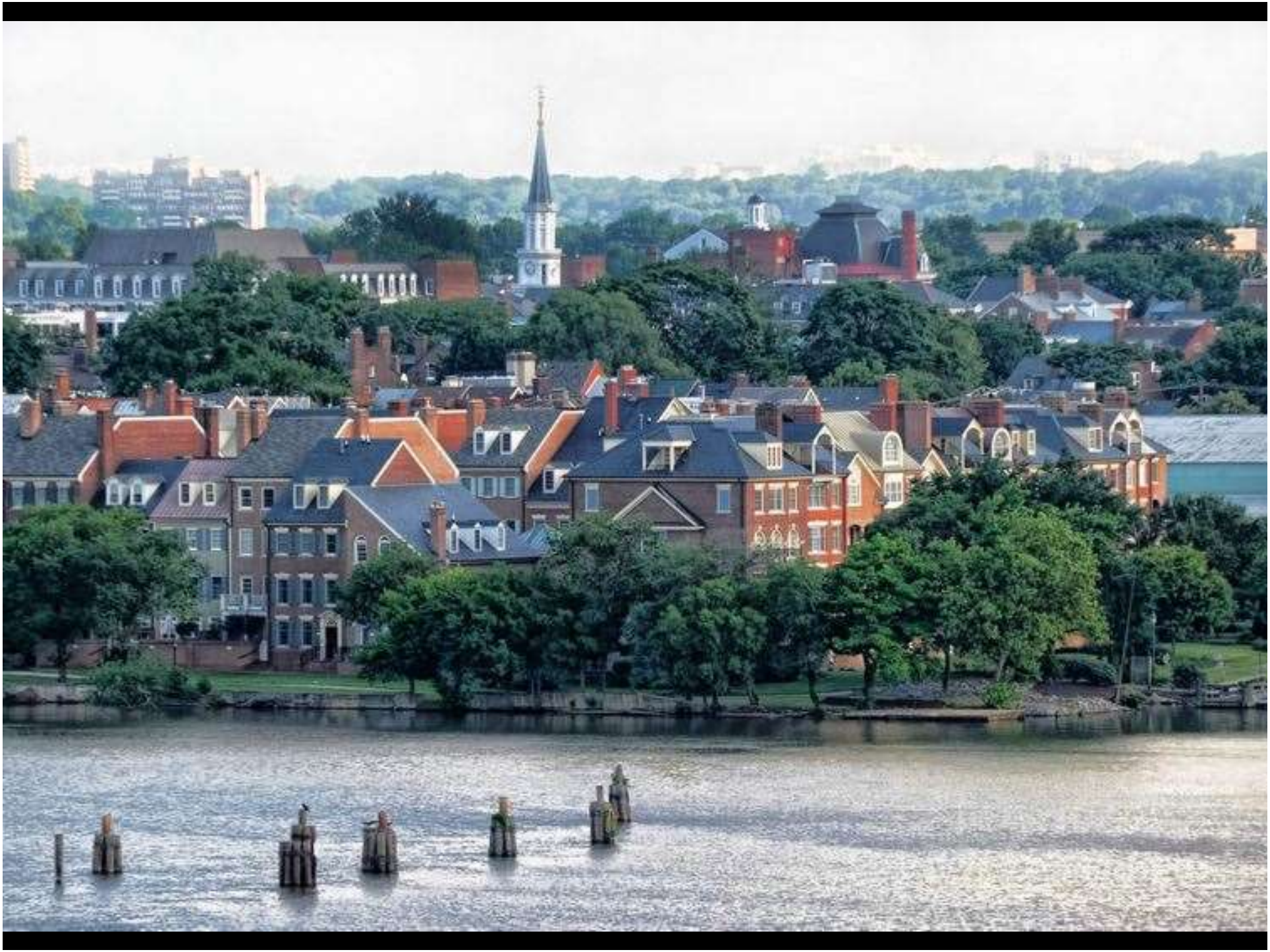


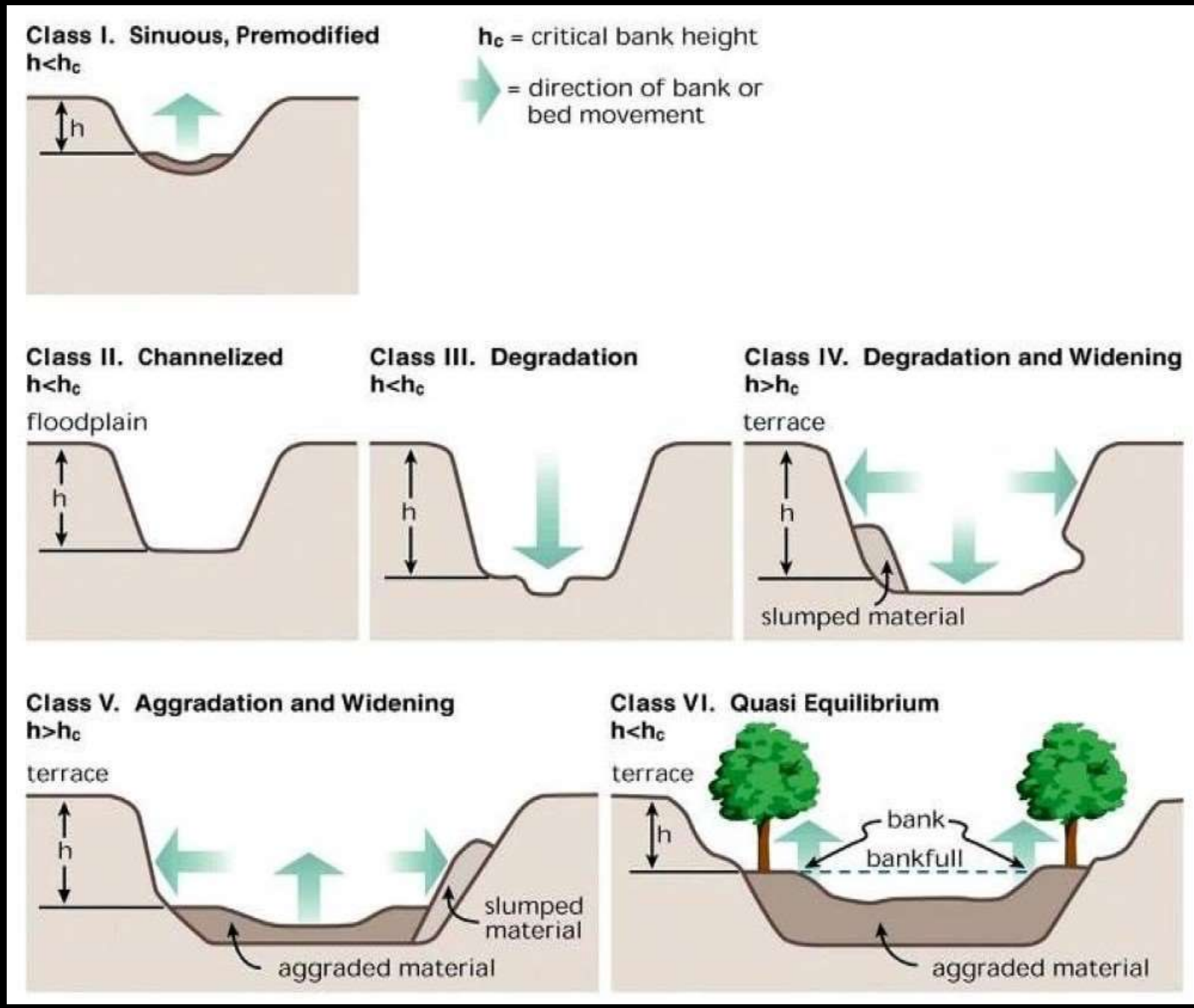
Flowing water…

…carries sediment


Mendon, VT

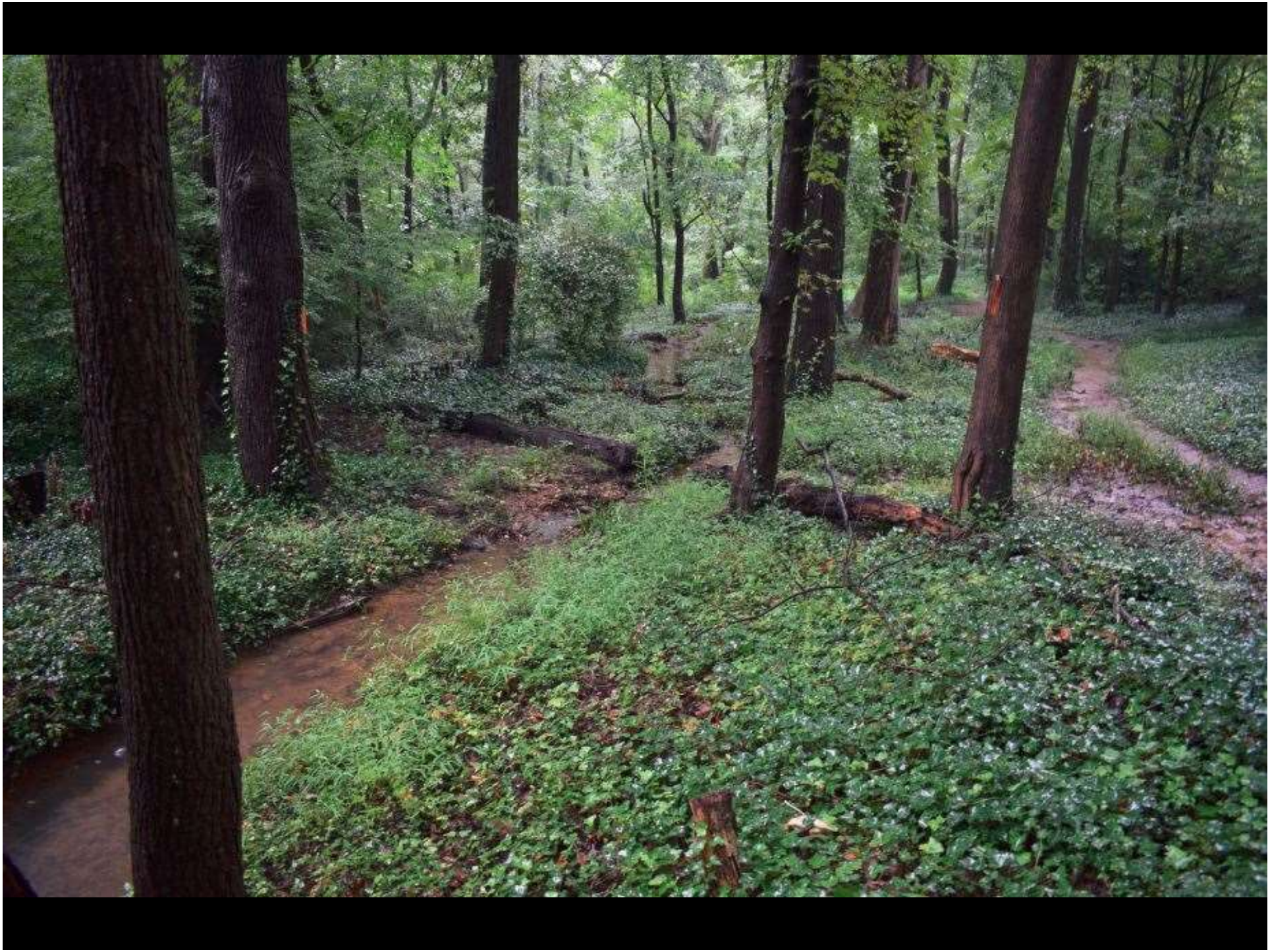

Alstead, NH

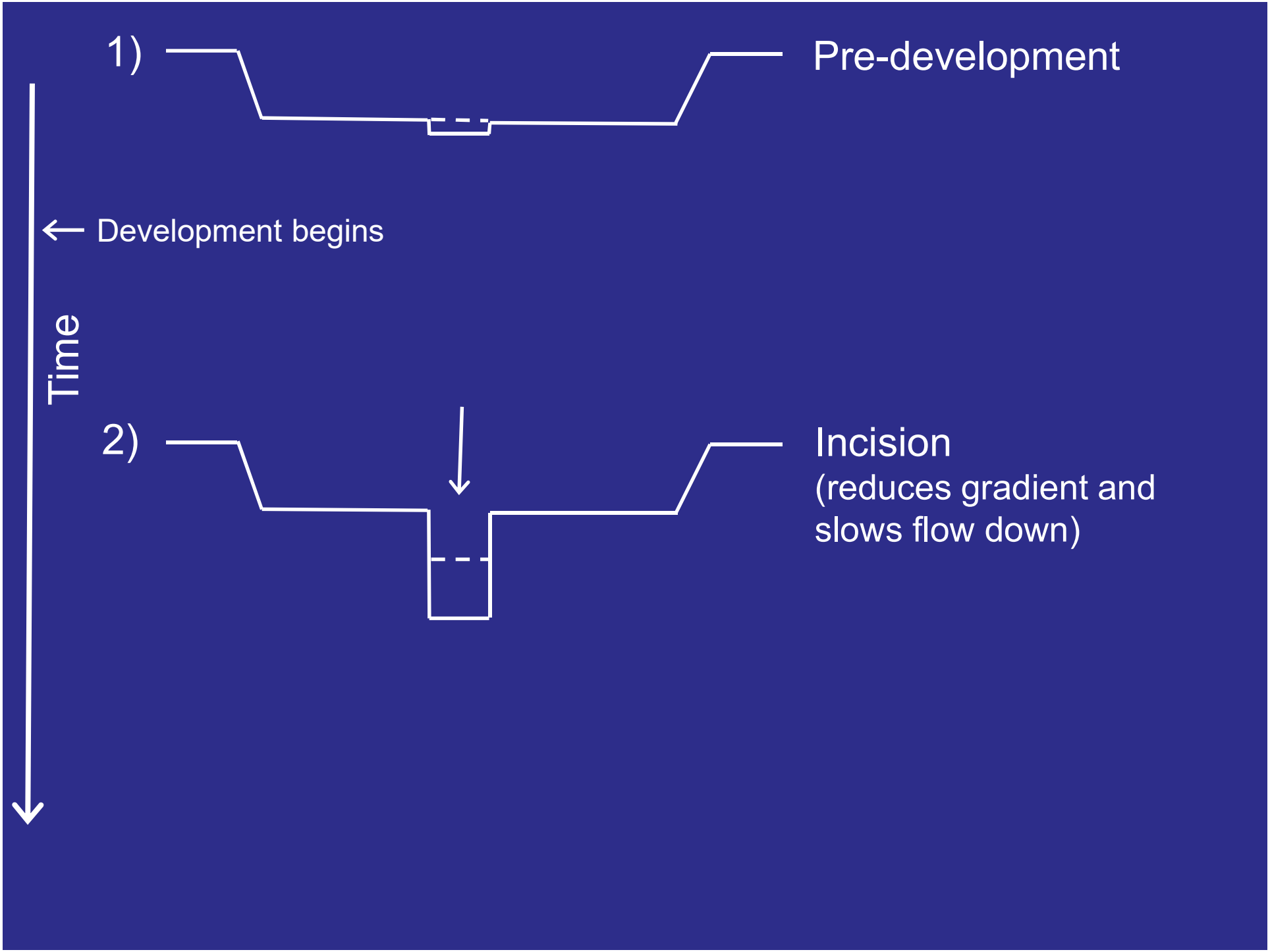



Class I. Sinuous, Premodified
h<hc
h
hc = critical bank height
= direction of bank or bed movement
Class II. Channelized
h<hc
floodplain
h
Class III. Degradation
h<hc
h
Class IV. Degradation and Widening
h>hc
terrace
h
slumped material
Class V. Aggradation and Widening
h>hc
terrace
h
slumped material
aggraded material
Class VI. Quasi Equilibrium
h<hc
terrace
h
bank
bankfull
aggraded material

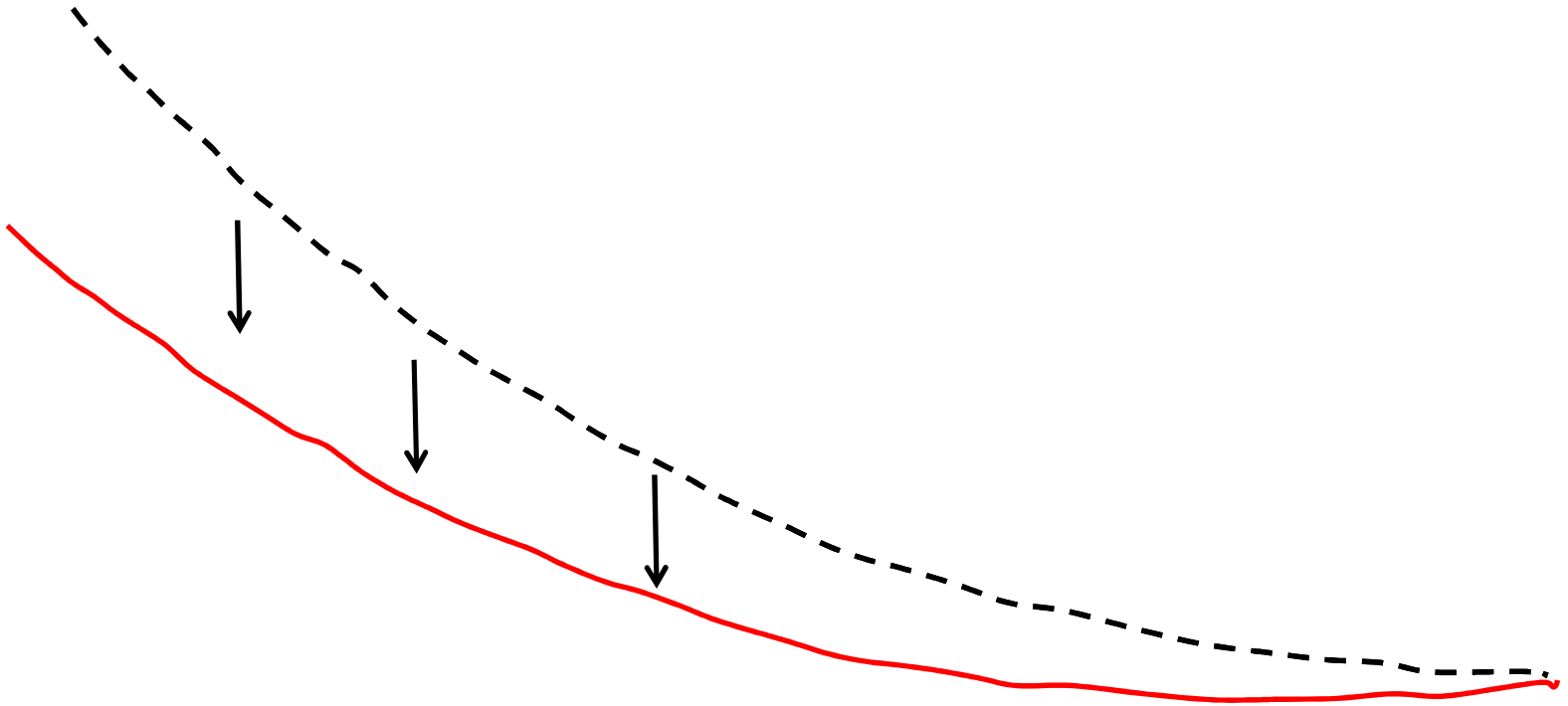
1) 

Pre-development




1)
Pre-development
Development begins
Time
2)
Incision
(reduces gradient and
slows flow down)

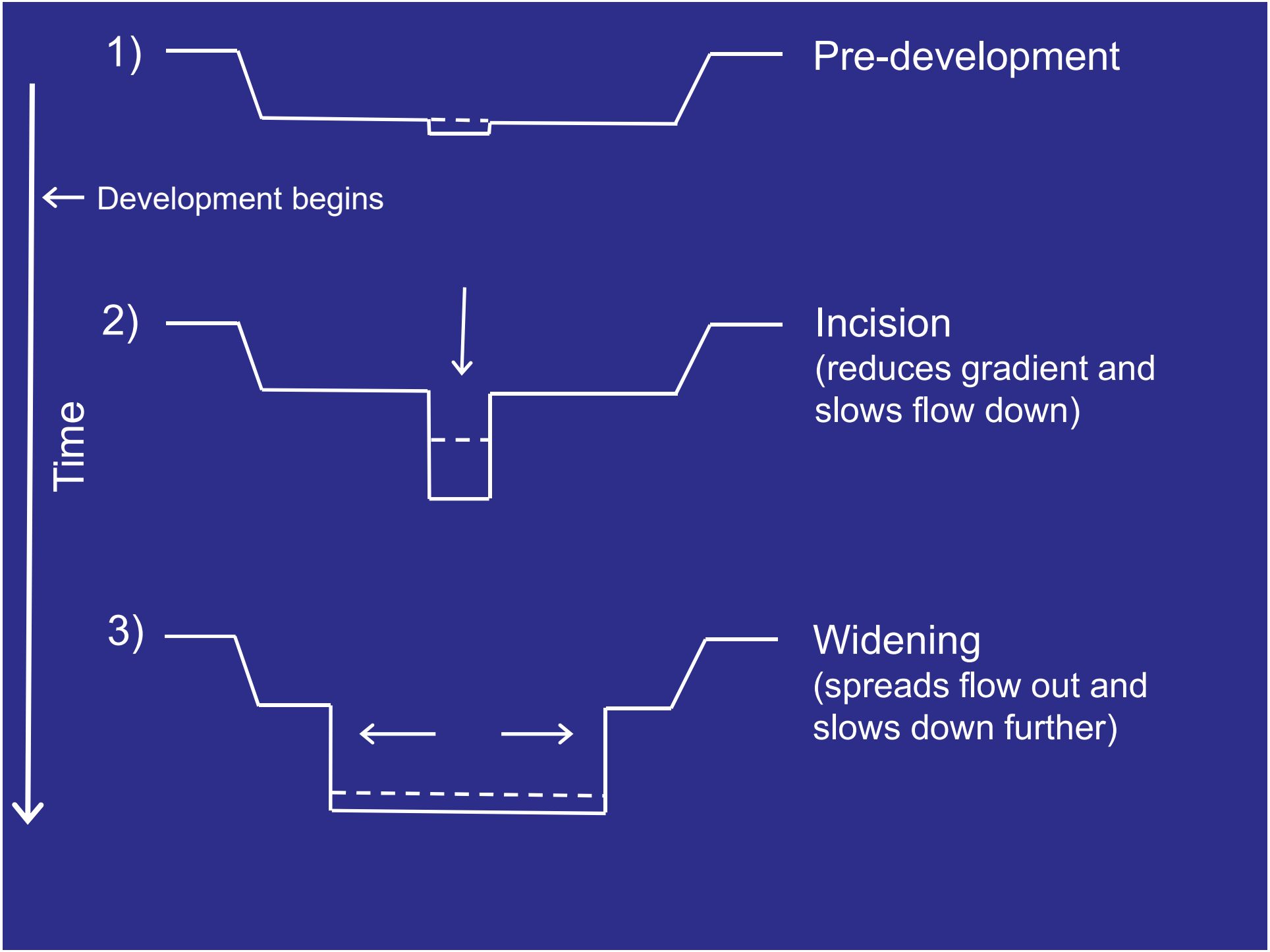
If the amount of flow increases, the stream bed erodes

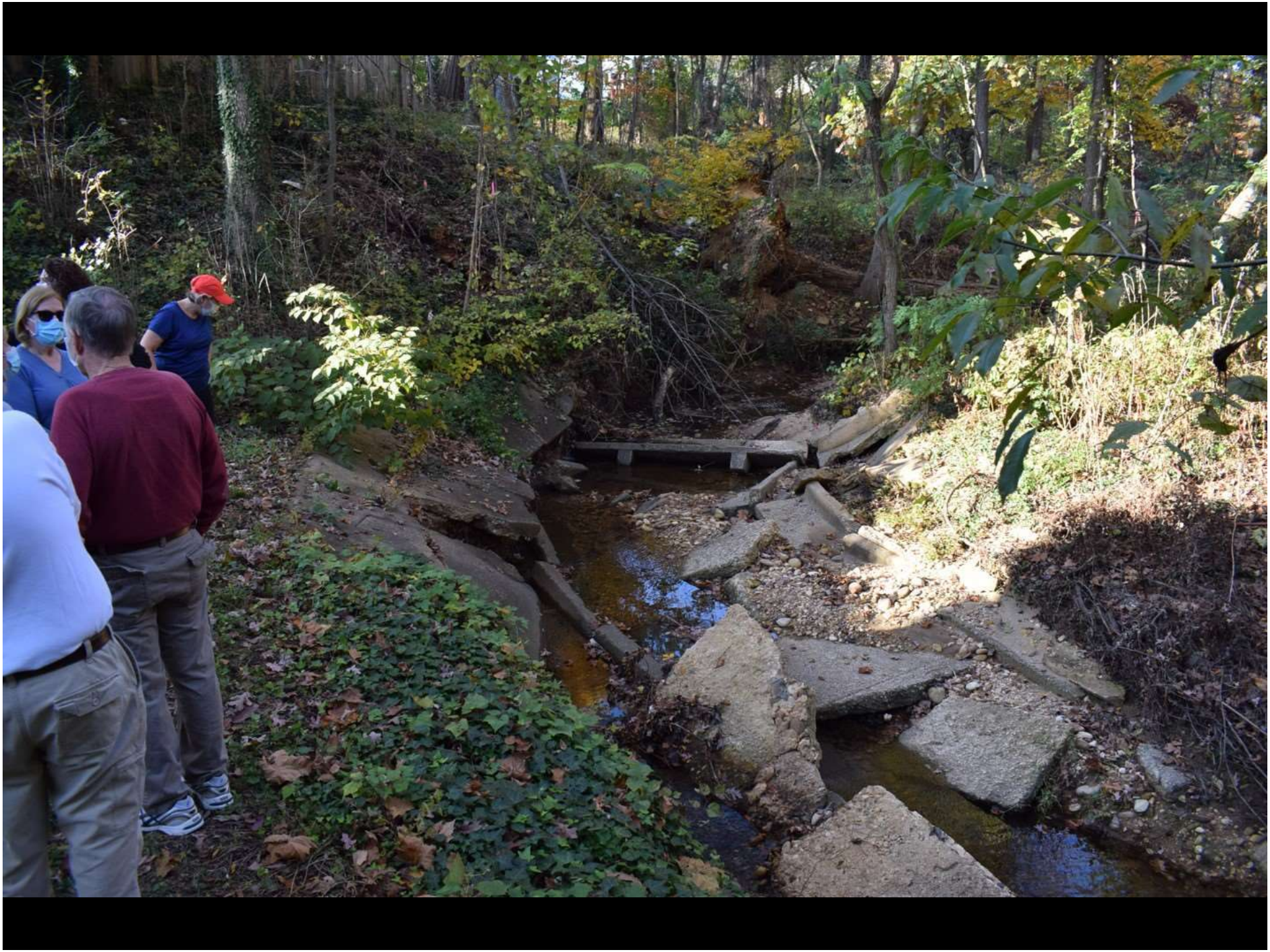


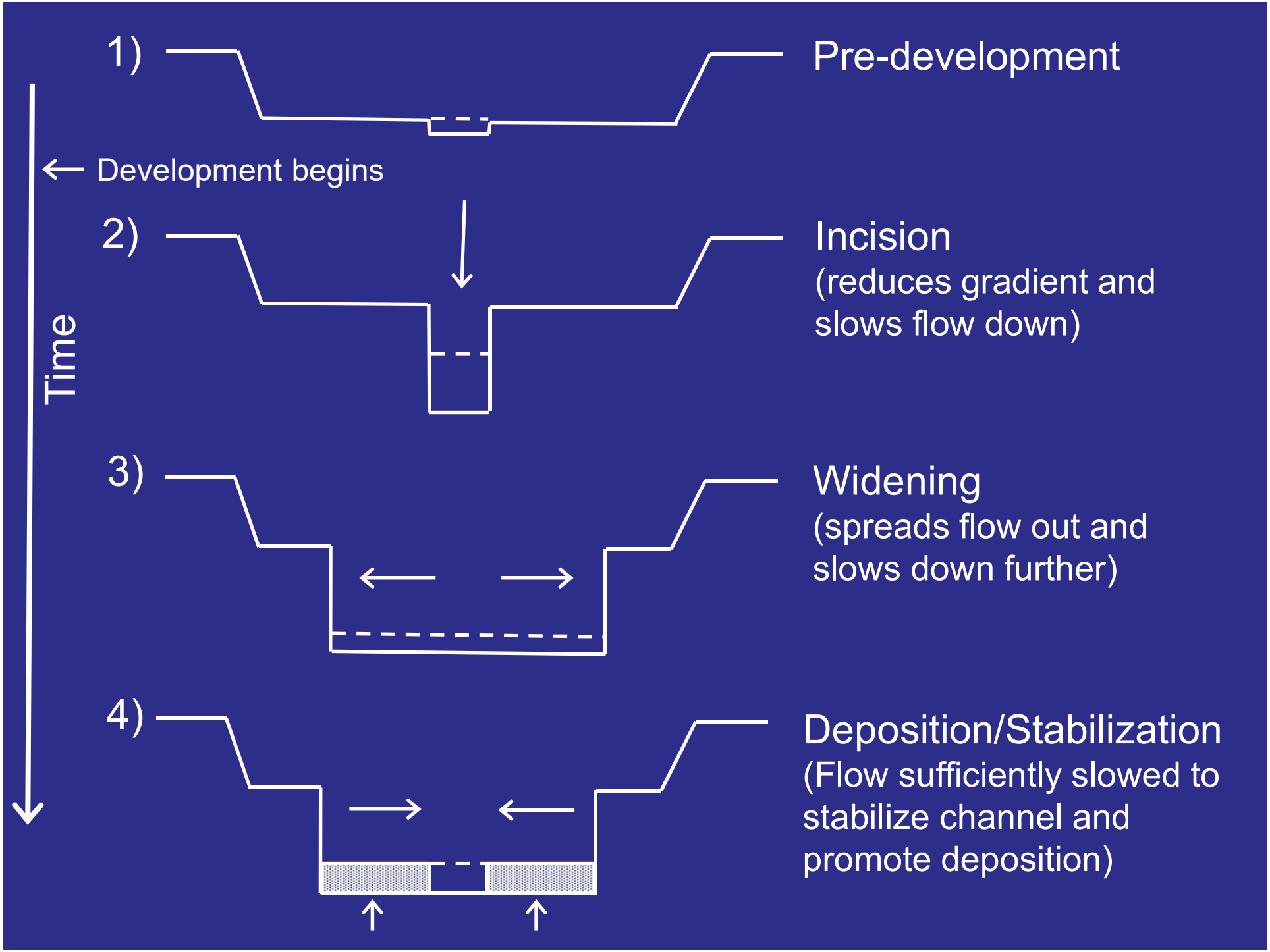
That erosion reduces slope and water flows slower – less capacity to carry sediment

Strawberry Run

Taylor Run


1)
Pre-development
Development begins
2)
Incision
(reduces gradient and
slows flow down)
Time
3)
Widening
(spreads flow out and
slows down further)

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(reduces gradient and slows flow down)
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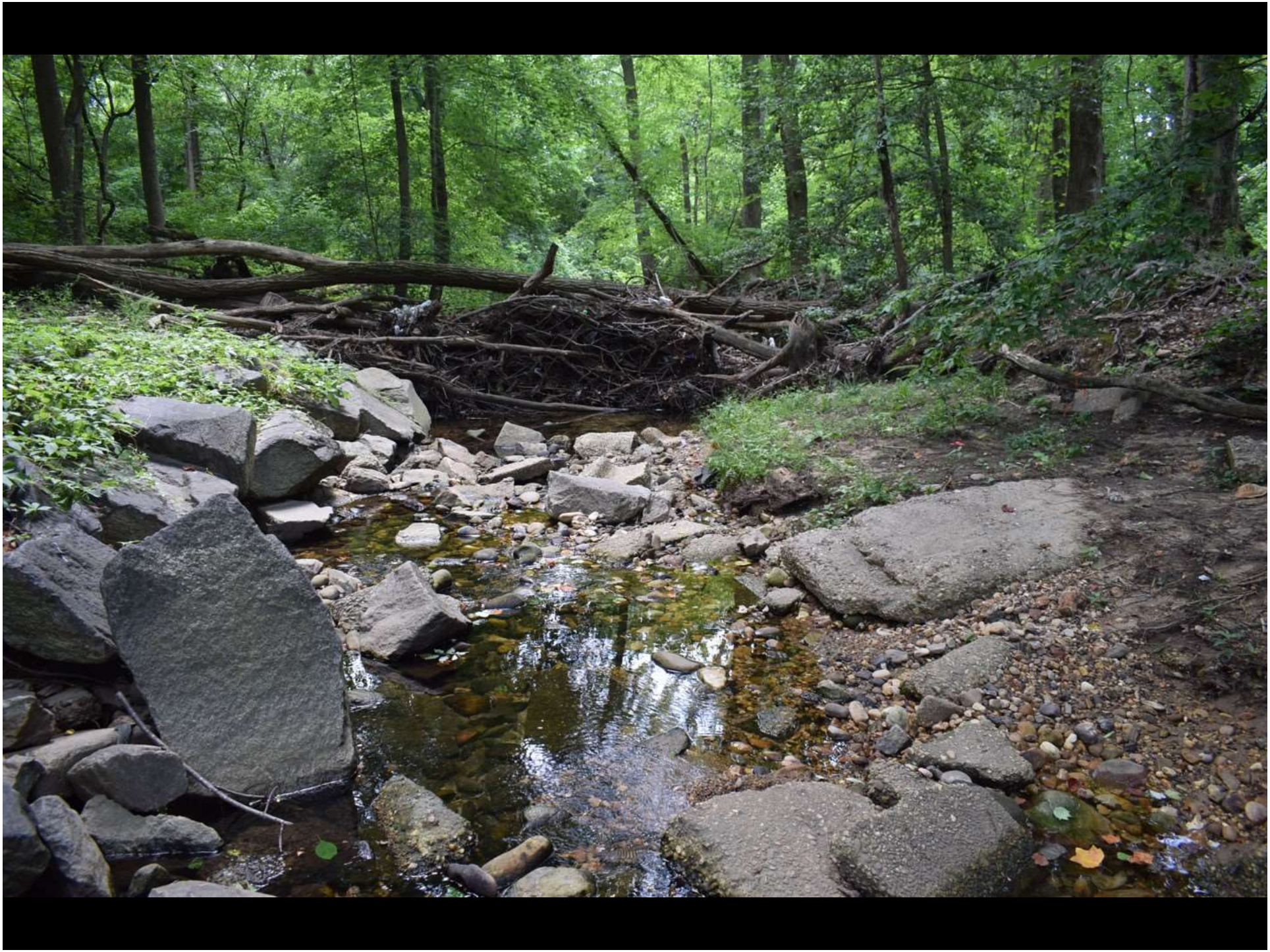
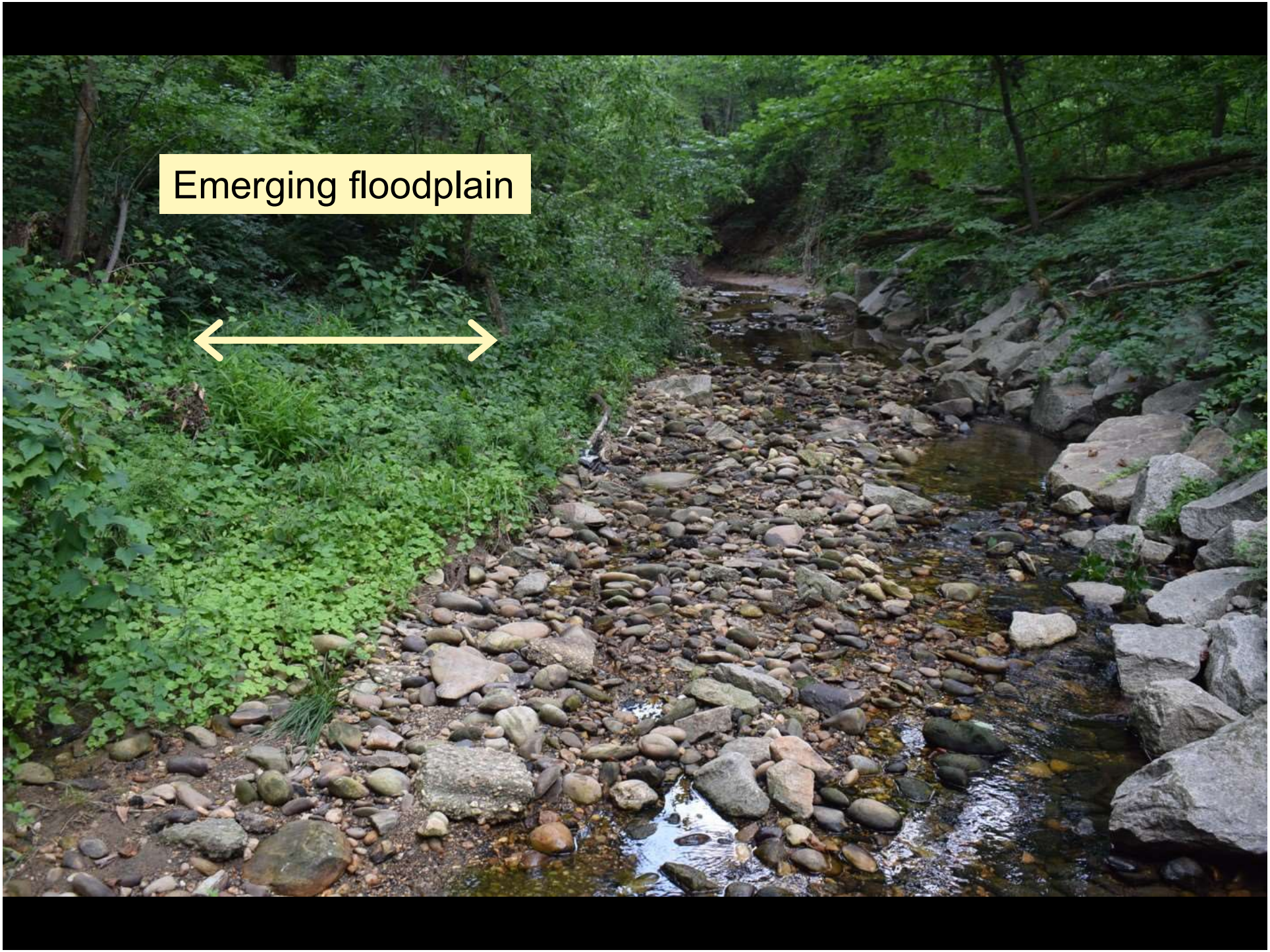
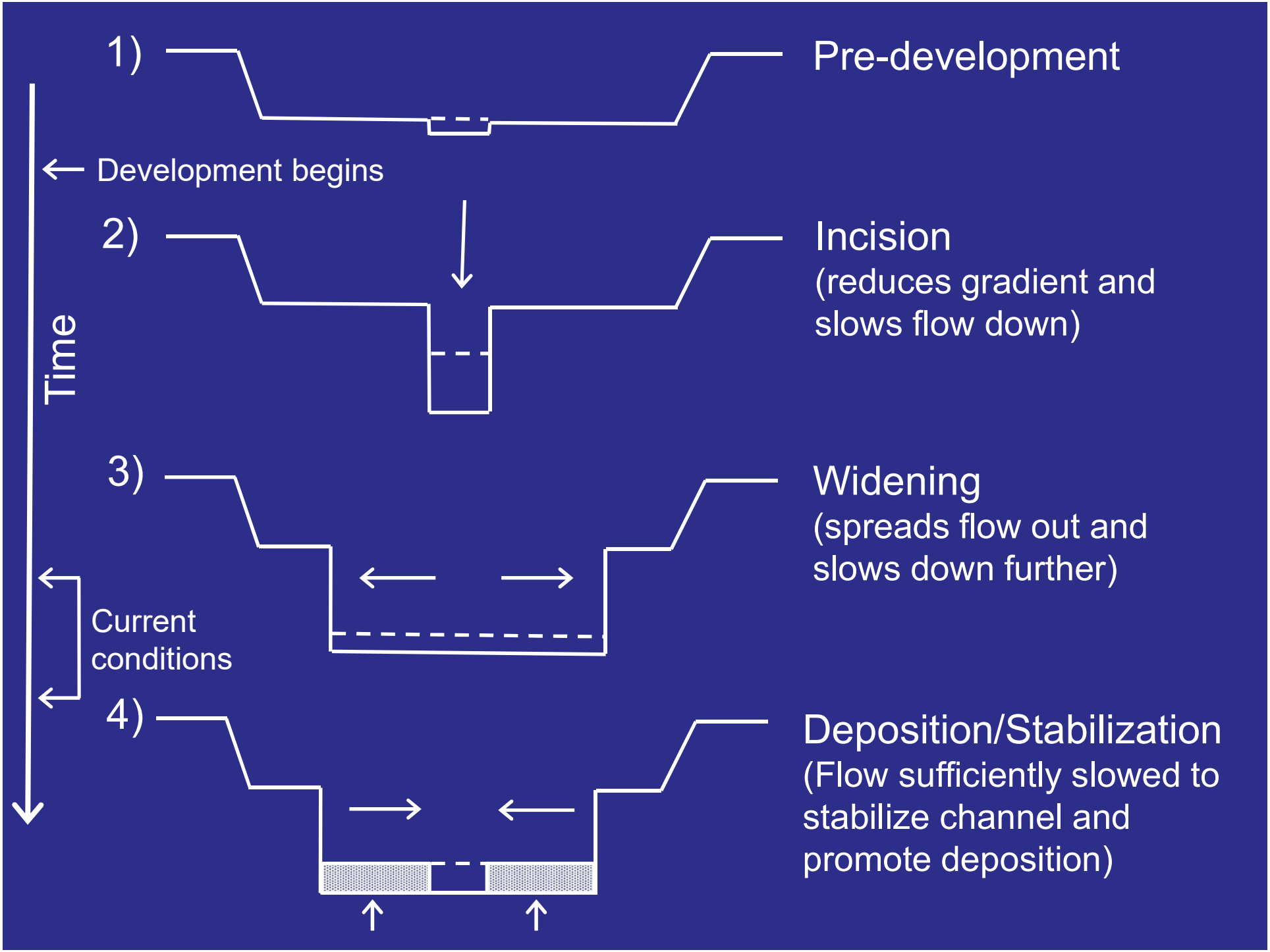
(spreads flow out and slows down further)
4)
Deposition/Stabilization
(Flow sufficiently slowed to stabilize channel and promote deposition)




Emerging floodplain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(spreads flow out and slows down further)
Current conditions
4)
Deposition/Stabilization
(Flow sufficiently slowed to stabilize channel and promote deposition)

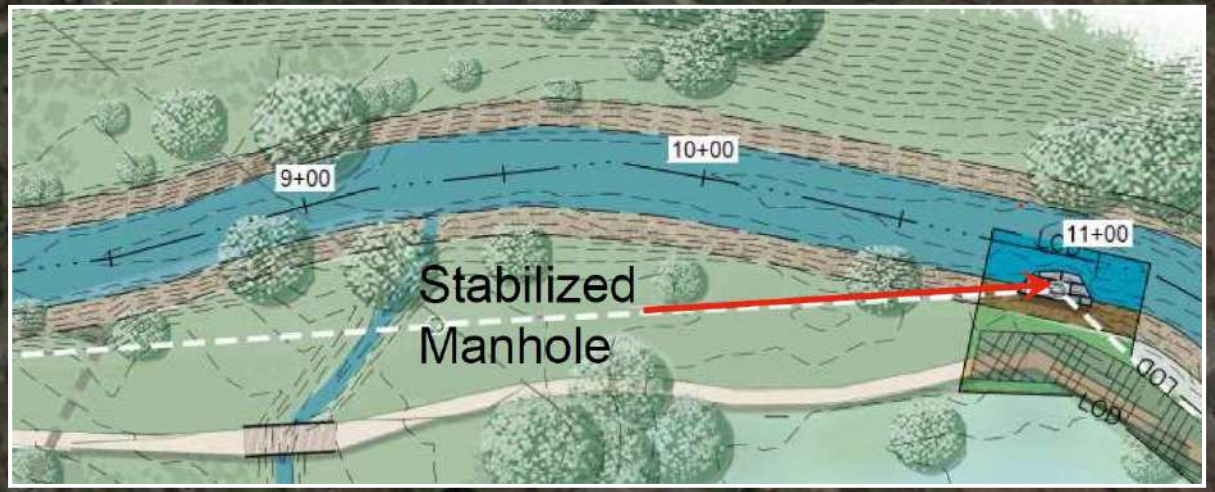
Diagnosis:

- Erosion symptoms diminishing w/ time
- Wood is key to self-stabilization
- Ecosystem rich and complex

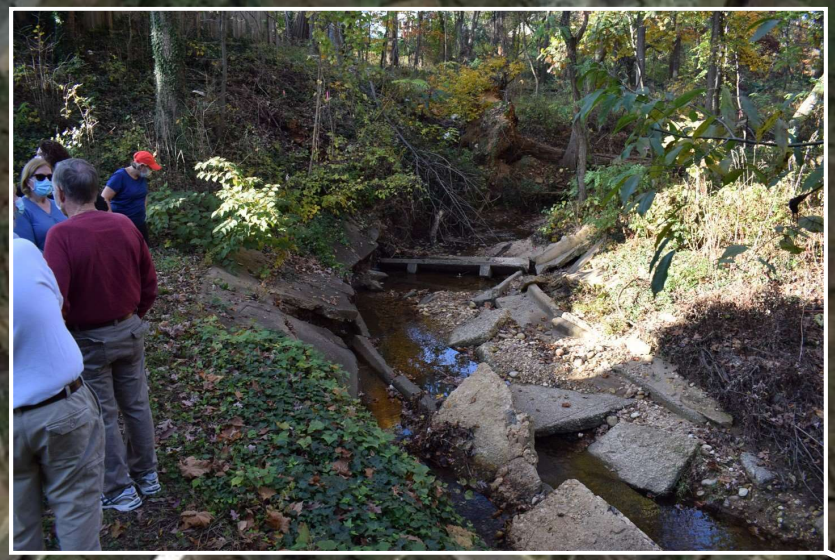
Treatments:

- No action/“Do nothing”

Taylor Run



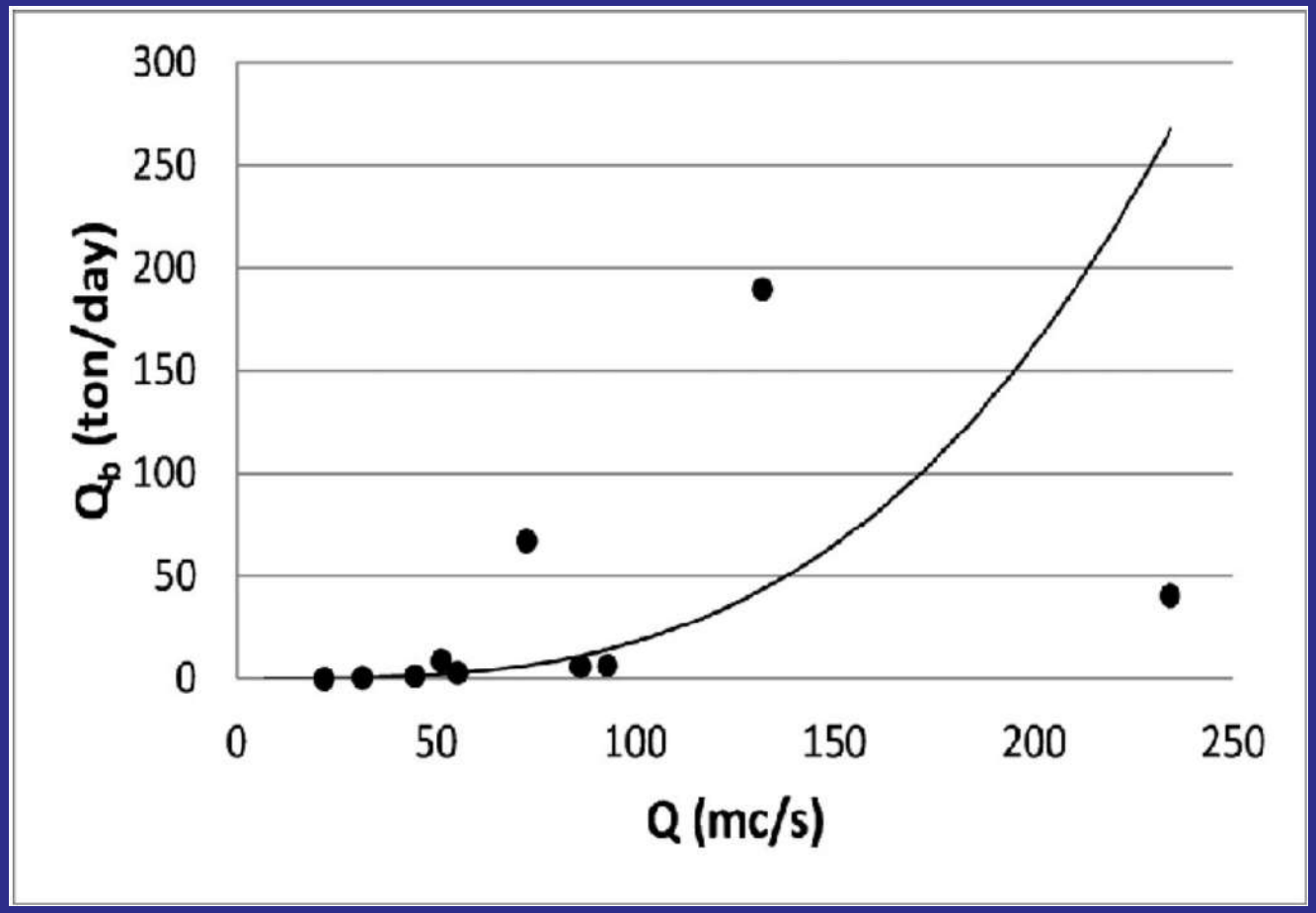
Strawberry Run



Treatments:

- No action/“Do nothing”
- Large wood
- Hard armoring
- Bioengineering
- Minimal intervention
- Upland stormwater BMPs

Flowing Water Carries Sediment!!!



Small reductions in stormwater runoff result in great reductions in erosion potential

Alternatives Analysis

"Large Wood" Option

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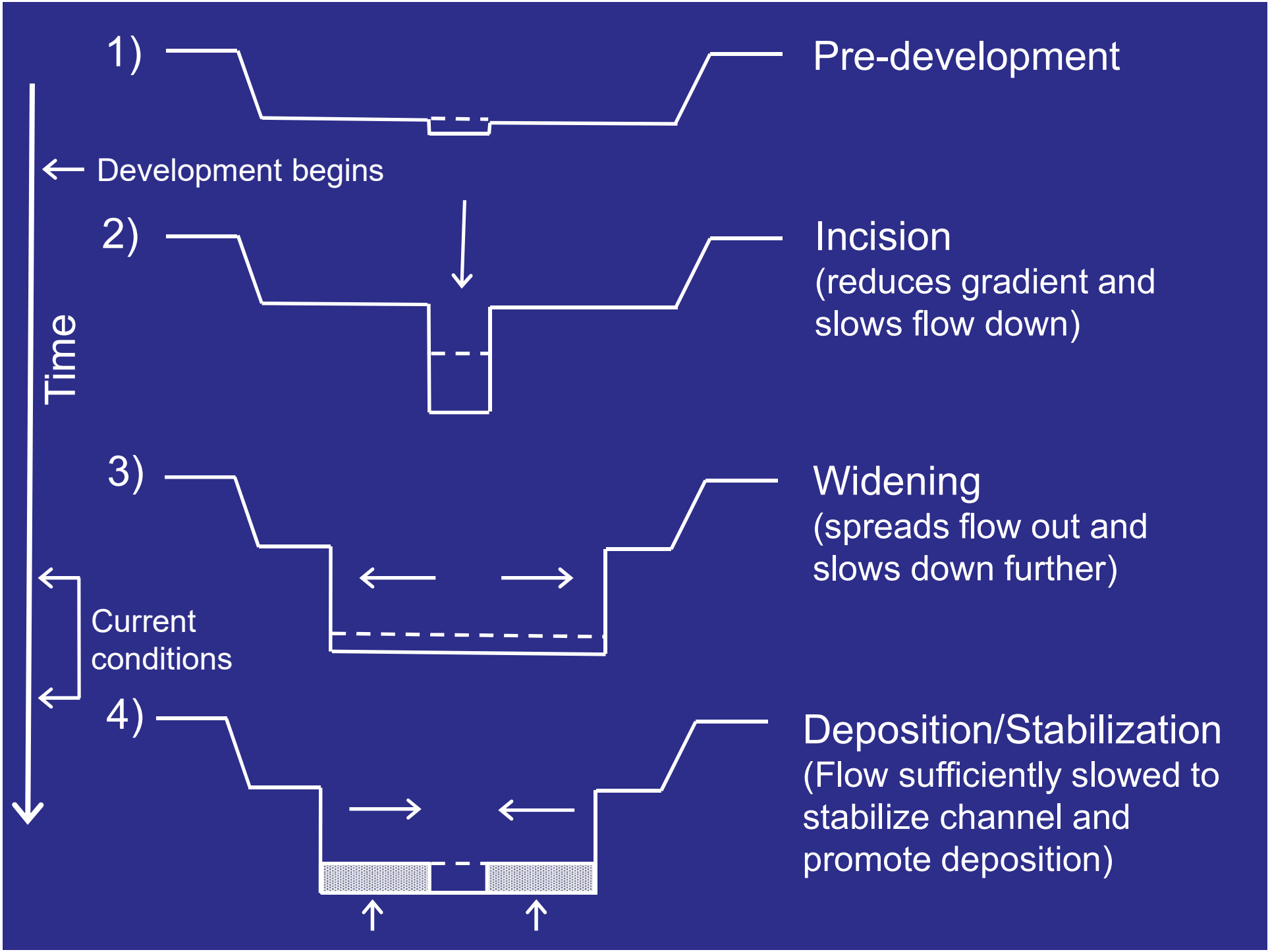
Fluvial Geomorphology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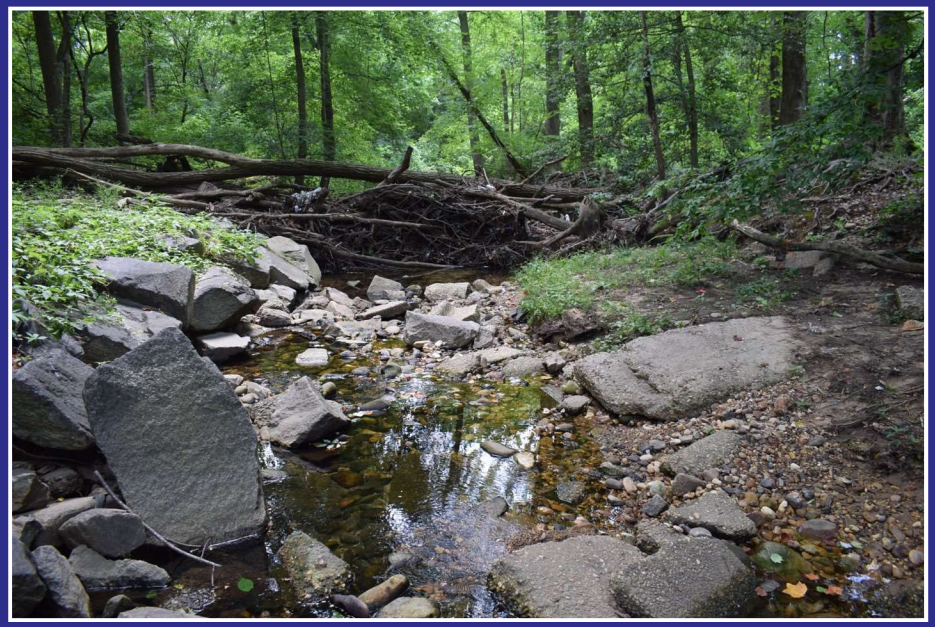
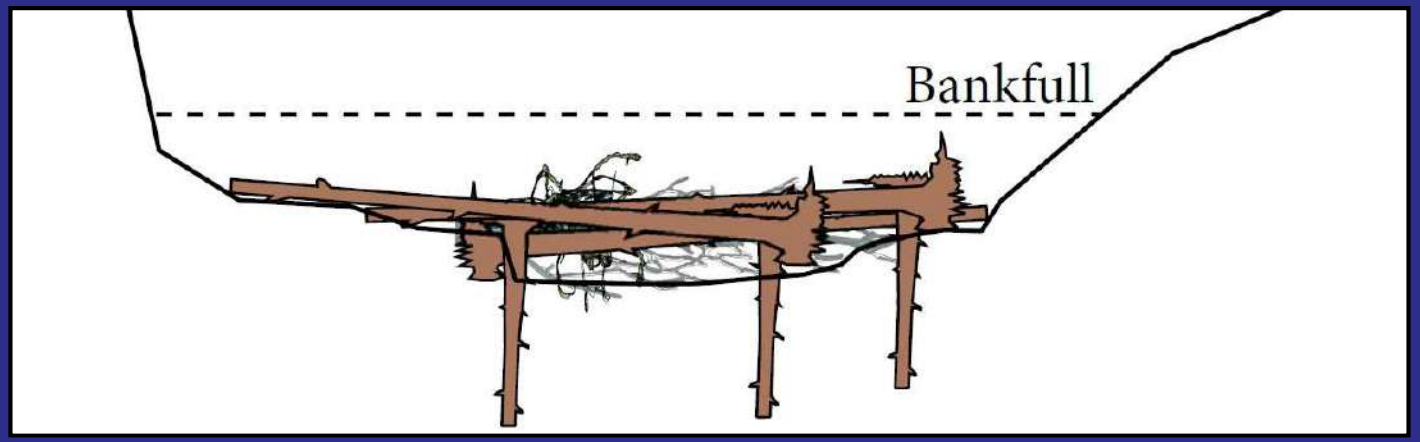
Purpose of Wood Additions

- *Reduce erosive forces*
- *Promote sediment deposition*
- *Bank stabilization*
- *Enhance aquatic habitat*



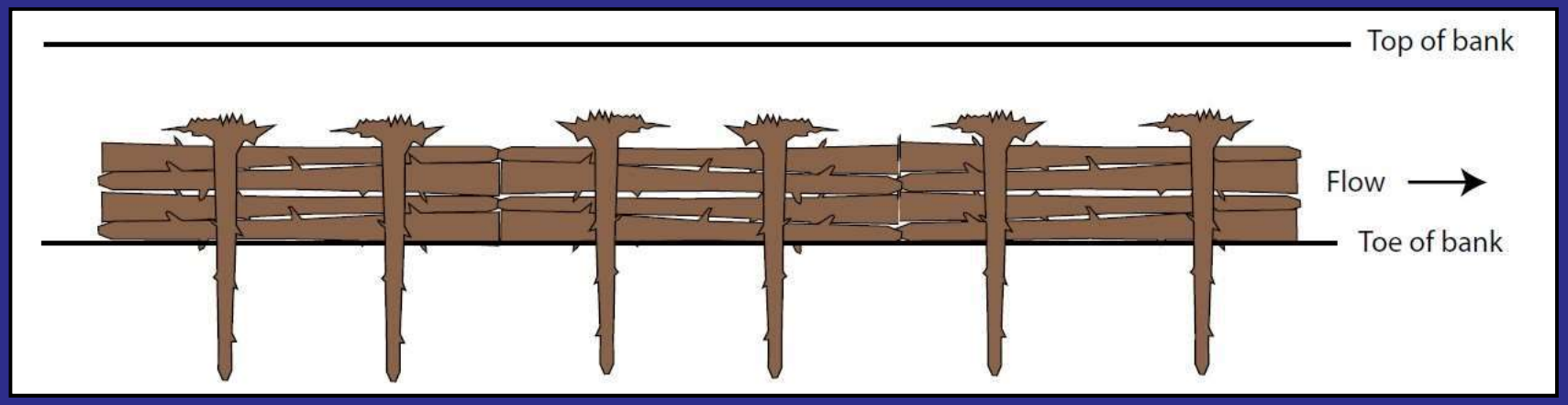
Wood Treatments

- *Channel spanning log jams – reduce erosive force, trap sediment, protect sewer, and enhance habitat*



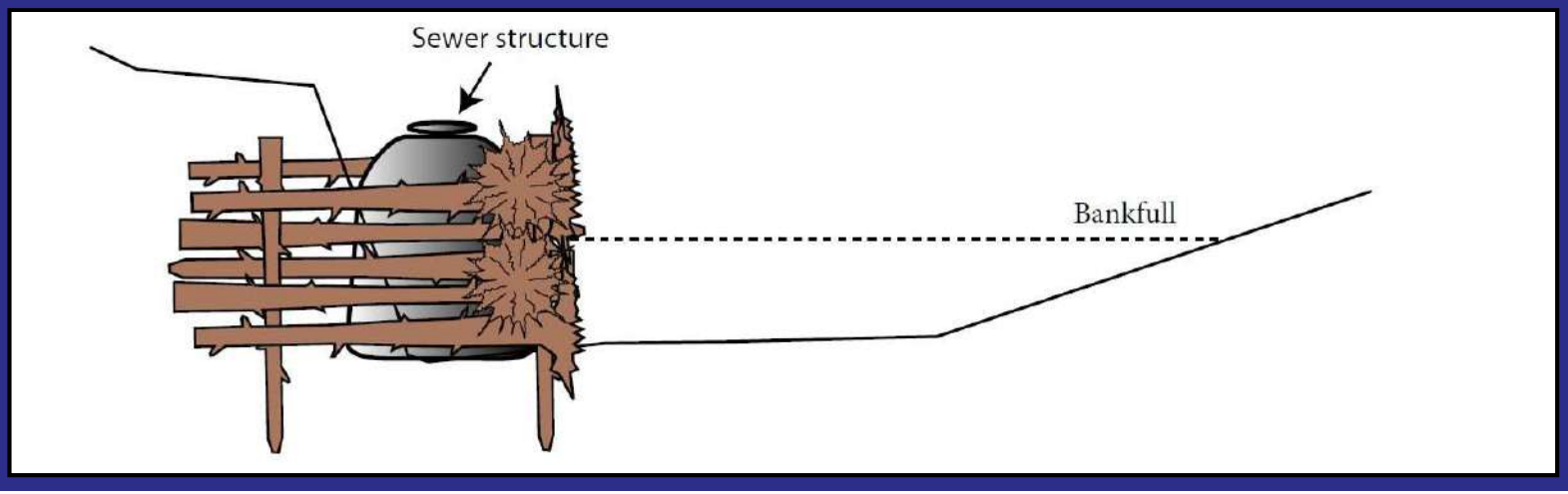
Wood Treatments

- *Log crib wall – bank stabilization and enhance habitat*



Wood Treatments

- *Marginal log jams – bank stabilization, protect sewer, and enhance habitat*



Wood Treatments

- *Individual logs – reduce erosive force and trap sediment*

Where Place Treatments?

- *Channel spanning log jams*
  - *Culvert outlets*
  - *Upstream of culvert inlets*
  - *Upstream of sanitary sewer line crossings*
  - *Periodically through project reaches*

Strawberry Run

Taylor Run

Where Place Treatments?

- *Log crib walls*
  - *Protect banks around channel spanning log jams*
  - *Protect banks around sanitary sewer lines*
  - *Protect banks where nearby infrastructure or private property threatened*

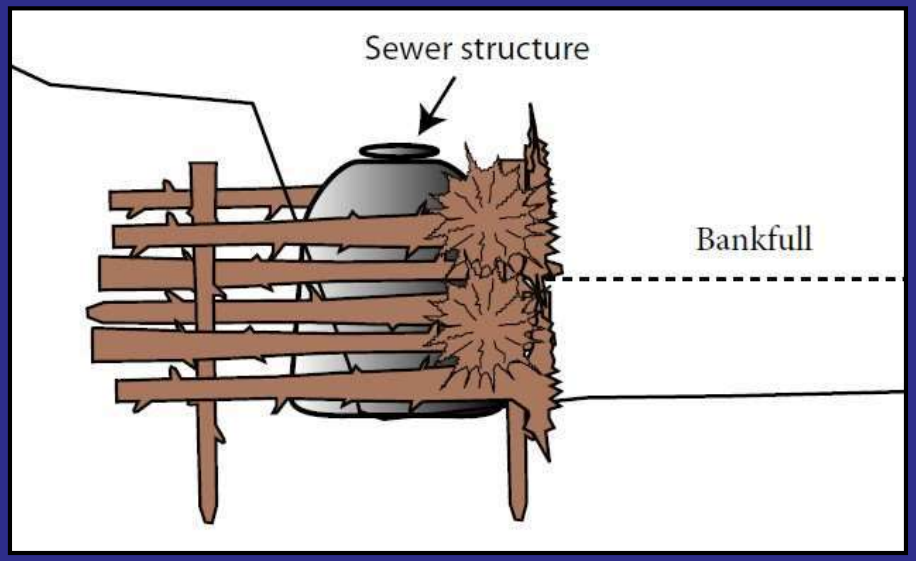
Strawberry Run

Taylor Run

Where Place Treatments?

- *Marginal log jams (Taylor Run only)*
  - *Protect infrastructure in channel*

Taylor Run



Taylor Run

Where Place Treatments?

- *Individual logs (Strawberry Run only)*
  - *Promote sediment deposition in existing side gullies*

Strawberry Run

New Hampshire

Concerns With Using Wood

- *Anchoring of logs*
  - *Vertical piles*
  - *Steel cable*
  - *Boulder ballast*

Concerns With Using Wood

- *Wood decays*
  - *Use rot-resistant species (White oak, Black locust)*
  - *Functional life at least equivalent to hard armor*

Concerns With Using Wood

- *Strength and stability of wood structures*
  - *Interlocking logs act as single entity*
  - *Wood widely accepted practice nationwide*

National Large Wood Manual

Assessment, Planning, Design, and Maintenance of Large Wood in Fluvial Ecosystems: Restoring Process, Function, and Structure

January 2016

US Army Corps of Engineers®
Engineer Research and Development Center

Benefits of Using Wood

- *Accelerates self-stabilization process*
- *Potentially install with minimal impacts*
- *Should qualify for clean-up “credits”*
- *Integrates well with other potential treatments*

Integration With Other Alternatives

- Hard armoring
- Bioengineering
- Minimal intervention
- Upland stormwater BMPs