

# CWP Stream Restoration Webinar Series - No. 3

## *Assessing Alternatives: Tools and Best Practices*

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**STRAUGHAN**  
ENVIRONMENTAL



# What is Restoration?



Restoration: “the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed”

## **Principles for the Ecological Restoration of Aquatic Resources**

Restoration: “the return of a degraded ecosystem to a close approximation of its remaining natural potential”

**KEY TERMS – RETURN/RECOVER THE REMAINING NATURAL POTENTIAL**



# Identify Modern Impacts and Constraints



# Assess Pre-Colonial Conditions

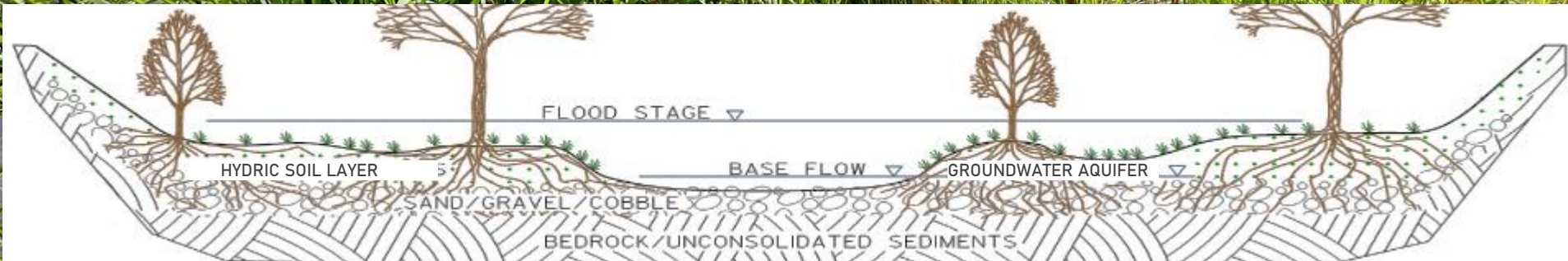
*Identify past configuration and lost today's functions*



# Common Pre-Colonial (pre-1600s) Form

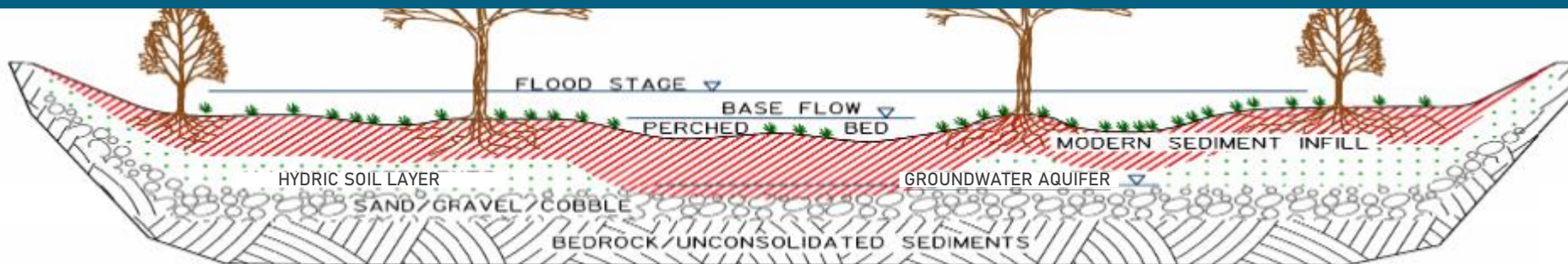
*Floodplain root zone connected to groundwater aquifer (often with expansive floodplain wetlands)*

- **Sediment/nutrient/organic carbon retention/treatment system**
- **Stable epifaunal substrate**
- **Groundwater temp regulation**

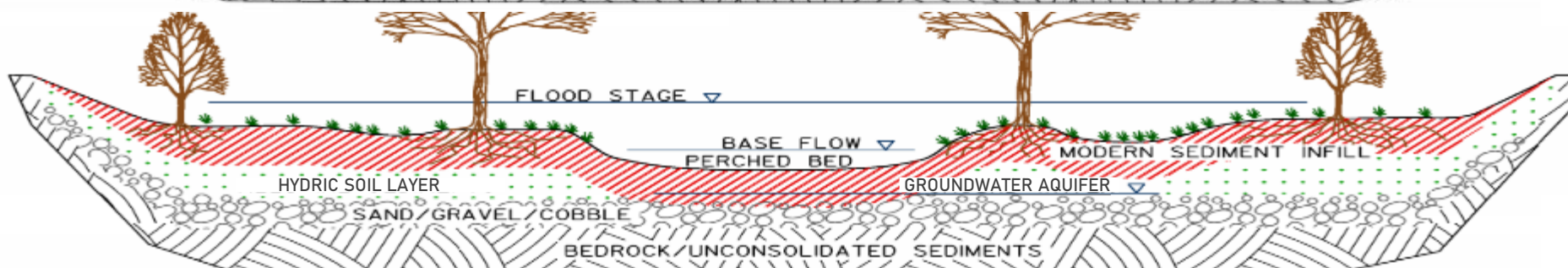


# Common Modern Stream Forms

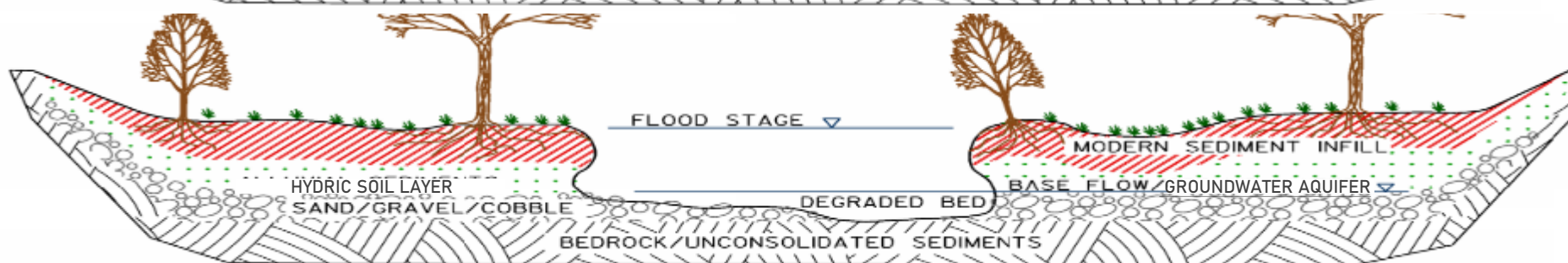
*Identify reach specific impacts and lost functions*



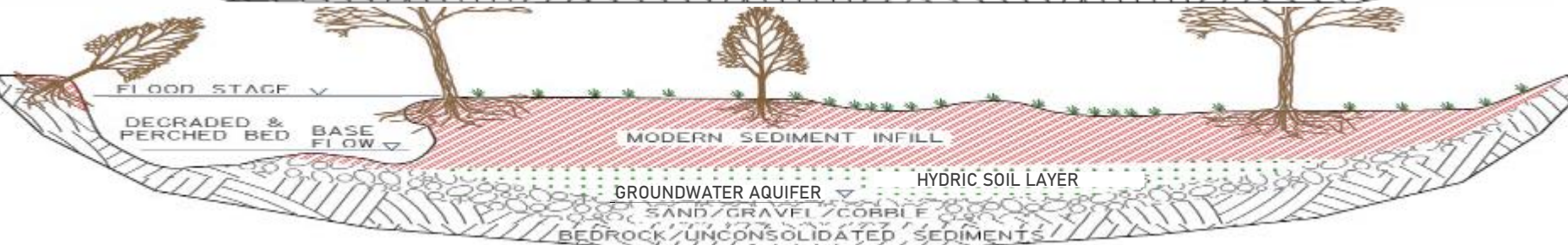
Perched streambed and floodplain with extensive floodplain wetlands.



Perched streambed and floodplain with incised channel and drier floodplain.



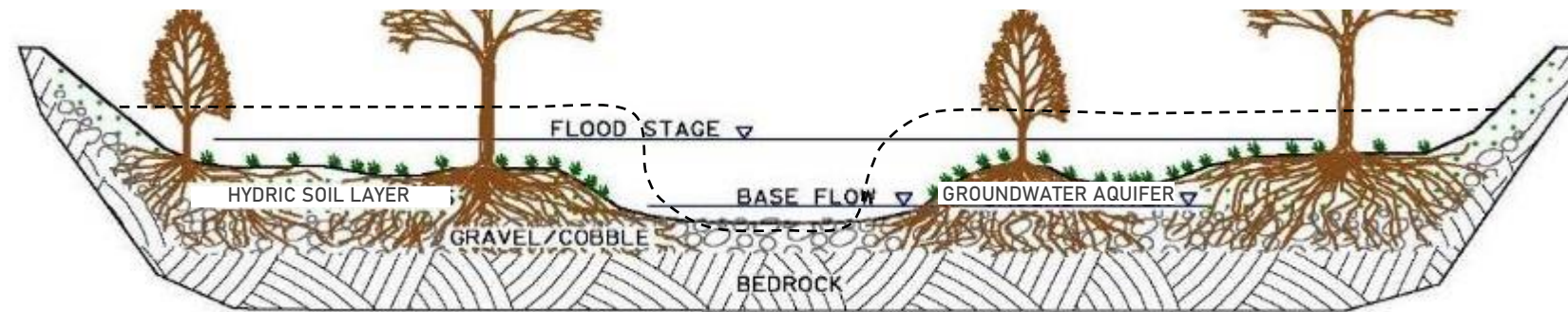
Channel incised to historic features with perched and dry floodplain.



Channel relocated to valley margins, perched on coarse material with dry floodplain.

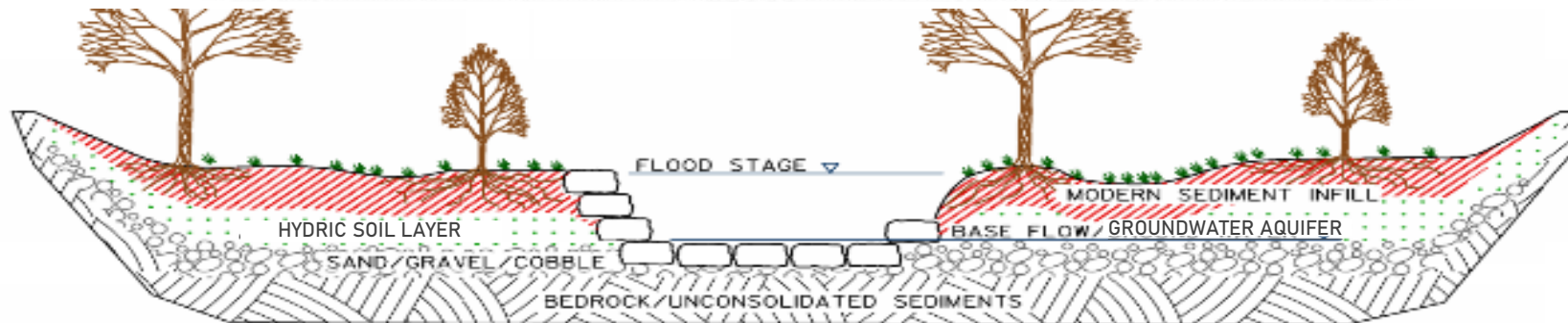
# Basic Intervention Approaches

## *Incised channel restoration / stabilization*



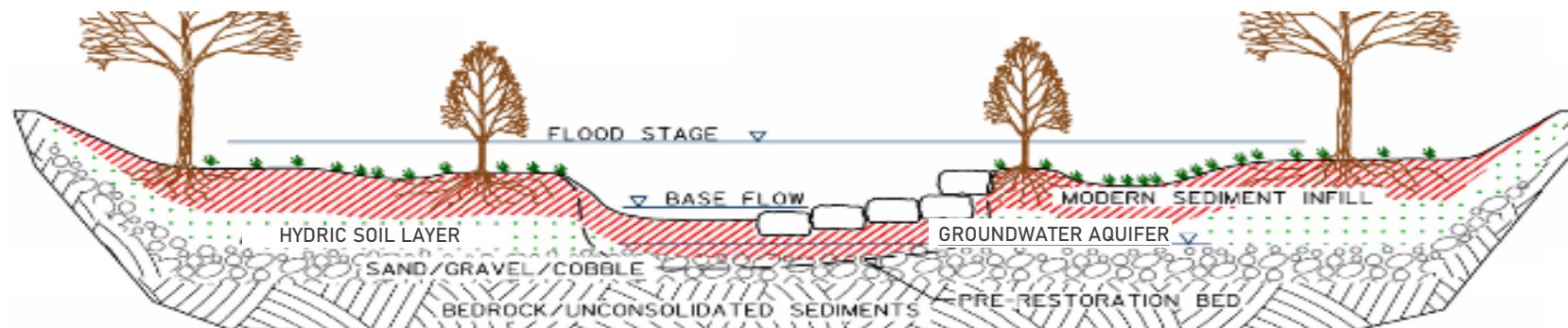
1

Lower floodplain / remove modern sediment to reconnect floodplain. Focus on root zone connection to groundwater aquifer.



2

Incised channel stabilization to store modern sediment. Typically, limited floodplain connection at  $\geq 1$ -year storm.



3

Raise streambed to reconnect floodplain by storing modern sediment. Focus on elevating localized groundwater to modern root zone.



# Restoration vs. Stabilization

## Lower Floodplain Stream/Wetland Approach 1:

- Retention system
- Root zone connection to groundwater aquifer
- Temp regulated by groundwater aquifer
- Stable epifaunal substrate



## Natural Channel Design Approach 2:

- Transport system
- Root zone disconnected to groundwater aquifer
- Drier riparian zone – invasive plants
- Vulnerable to erosion
- Mobile epifaunal substrate



# Restoration vs. Stabilization

## Raise Streambed Stream/Wetland Approach 3:

- Retention system
- Elevate groundwater locally
- Runoff on low permeability infill
- More susceptible to heating & drying
- Vulnerable to future incision



## Protect Channel In-Place Approach 2:

- High in-channel stress
- Root zone groundwater aquifer disconnect
- Drier riparian zone – more invasive plants
- Mobile bed & epifaunal substrate



# Restoration vs. Stabilization

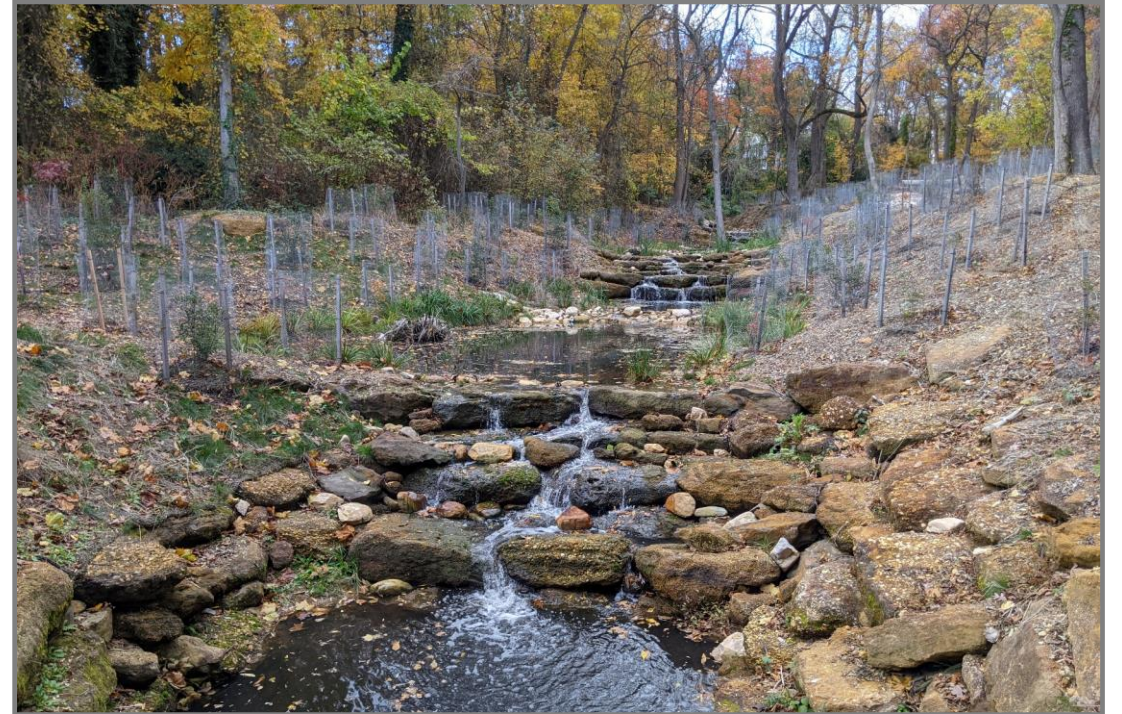
## High Gradient Stream / Wetland Approach 1:

- Primarily rely on vegetative stability
- Spread flow across vegetated floodplain
- More focus on floodplain design
- Root zone connection to groundwater aquifer



## High Gradient Step / Pool Approach 3:

- Primarily rely on rock for stability
- Concentrate flow at rock steps
- More focus on channel design
- Elevate groundwater locally



# Questions/Comments

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