NEW PROTOCOLS FOR STREAM AND FLOODPLAIN RESTORATION PROJECTS

STREAM HEALTH WORKGROUP

DECEMBER 15, 2023

QUICK BACKGROUND ON STREAM RESTORATION PRACTICES FOR THE TMDL

HISTORY OF CBP STREAM RESTORATION CREDITING

- Expert Panel Report approved in 2013

- Report was revised after a "test-drive" period in 2014

- Changes in how streams and sediment are simulated in Phase 6 watershed model in 2017

- USWG approves SR Protocol FAQ document in early 2018

- 5 Groups formed to revisit Protocols in mid-2018

KEY ELEMENTS OF THE ORIGINAL REPORT

- 3 Protocols to address different pollutant removal pathways

- Qualifying conditions to define eligible practices

- Emphasis on functional uplift and comprehensive restoration

- No "mud-slinging" at other design approaches
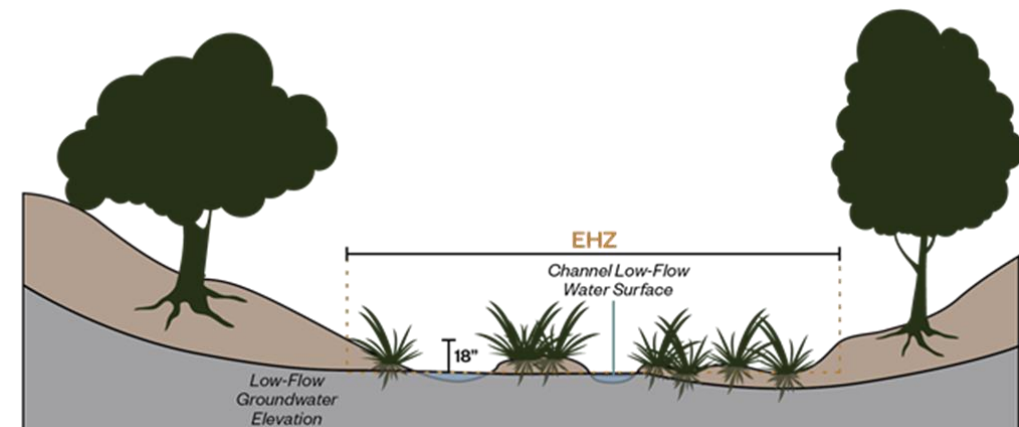
THE NEW GUIDANCE

QUALIFYING CONDITIONS

- Keep all the original qualifying conditions from the Expert Panel report (2014)

Some examples:

- Must utilize a **comprehensive approach to stream restoration design**.

- Must be still **actively enlarging or degrading**

- Stream restoration project must **provide functional lift** and be part of a **comprehensive watershed management plan.**

- A qualifying project must demonstrate that it will **maintain or expand riparian vegetation** in the stream corridor, and compensate for any project-related tree losses in project work areas.

NEW QUALIFYING CONDITIONS

- Specific limits to bank armoring

- Project must meet applicable floodplain management requirements in the stream corridor

- Project must evaluate the duration of floodplain ponding in the context of the restoration goals

- Project must demonstrate consideration of potential unintended consequences of the restoration

DEALING WITH THE DEFAULTS

Original EPR

- Nutrient Concentration Default Rates
- Bulk Density Example Being Used as Default
- Over-Use of Default Nutrient and Sediment Reductions

New Protocols

- Site Specific Monitoring for Bulk-Density, Nutrient Concentration and More
- Recommended Field and Lab Methods
- Stronger language on need to use the Protocols
- Separate section on recommendations for planning level estimates

PROTOCOL 1 (PREVENTED SEDIMENT)

APPROVED: FEBRUARY 2020

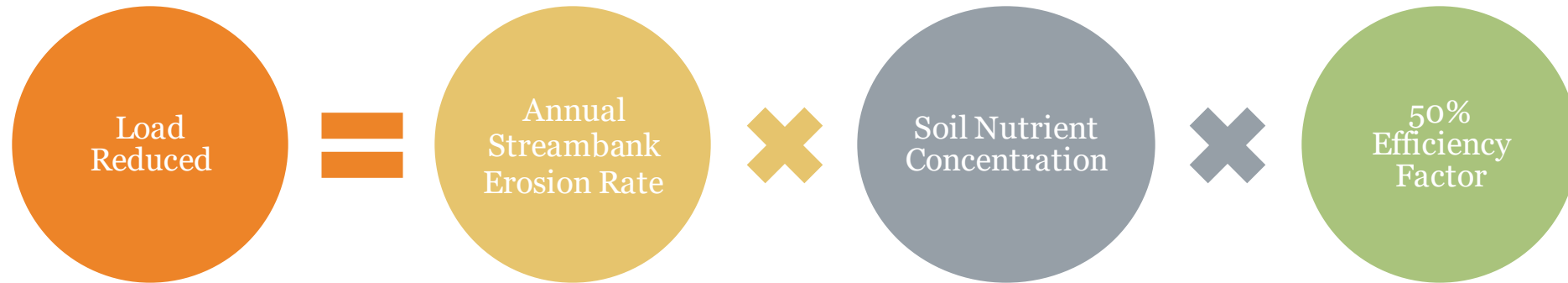# BANK ARMORING

Original EPR

- "Projects primarily designed to protect public infrastructure by bank armoring or rip rap do not qualify for a credit."

Group 3 Memo

- Reinforces EP statement on armoring for the sole purpose of infrastructure protection
- Narrative Definition of Bank Armoring
- Armoring techniques categories as Non-Creditable, Creditable with Limits, and Creditable
- Specific guidance on pollutant load discounts and calculation examples for each category

PROTOCOL 1: PREVENTED SEDIMENT

Load Reduced = Annual Streambank Erosion Rate × Soil Nutrient Concentration × 50% Efficiency Factor

Courtesy: Kip Mumaw

MEASURING BANK EROSION RATES

- BANCS Method: Near Bank Stress and Bank Erosion Hazard Index
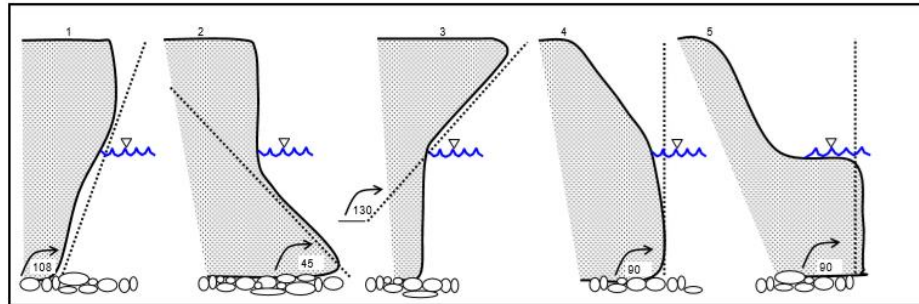
- Bank Pins

- LiDAR

Figure 11. Bank angle scenarios (perspective: cross-section view)(Rosgen 2003).
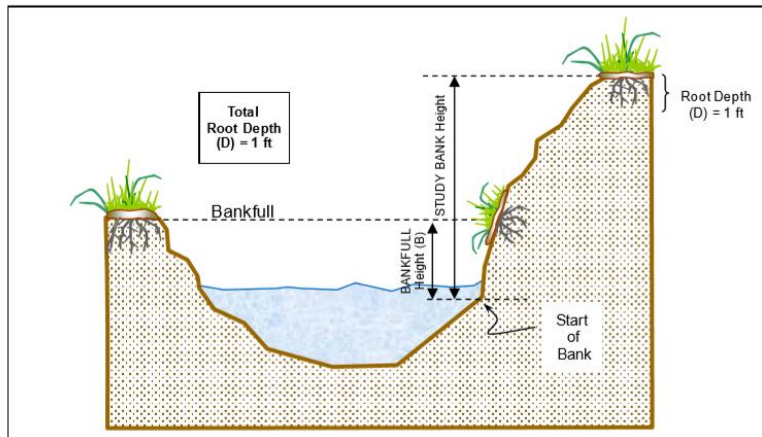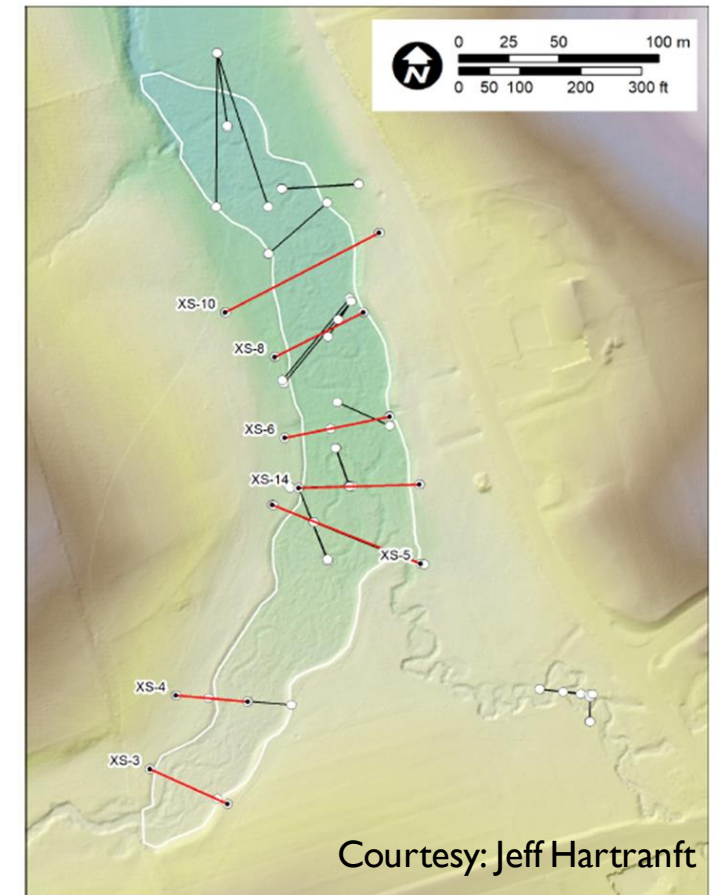

Figure 5. Root depth for partial grass vegetation bank coverage

Courtesy: Jeff Hartranft

DENITRIFICATION IN THE EFFECTIVE HYPORHEIC ZONE (PROTOCOL 2)

APPROVED: OCTOBER 2020
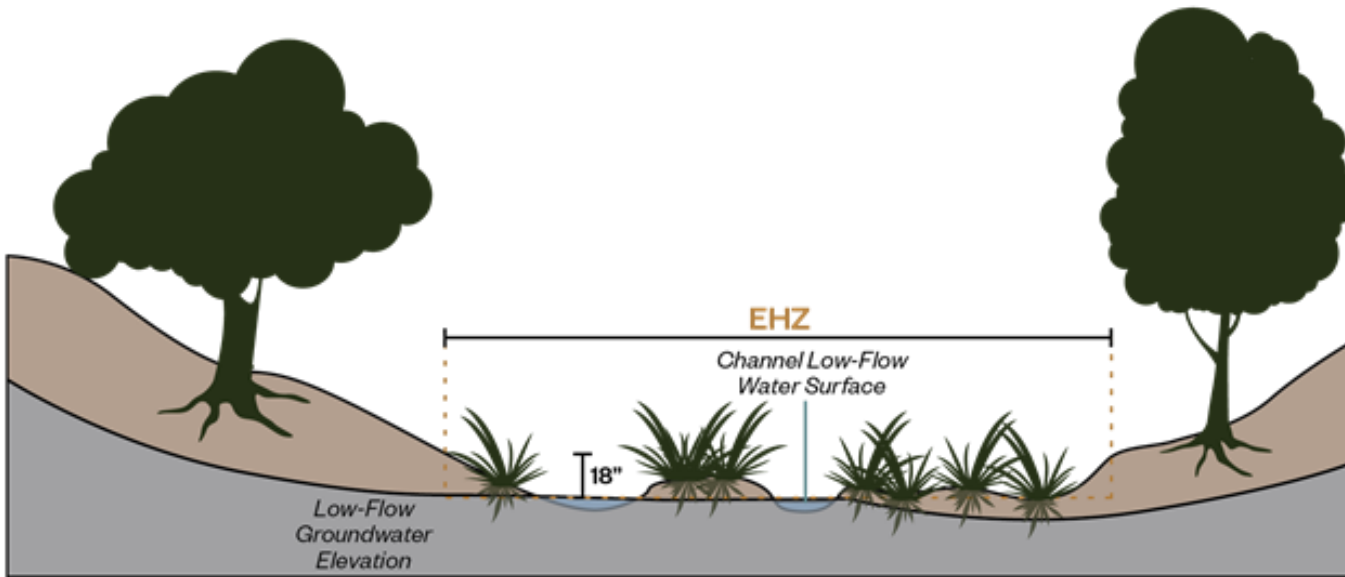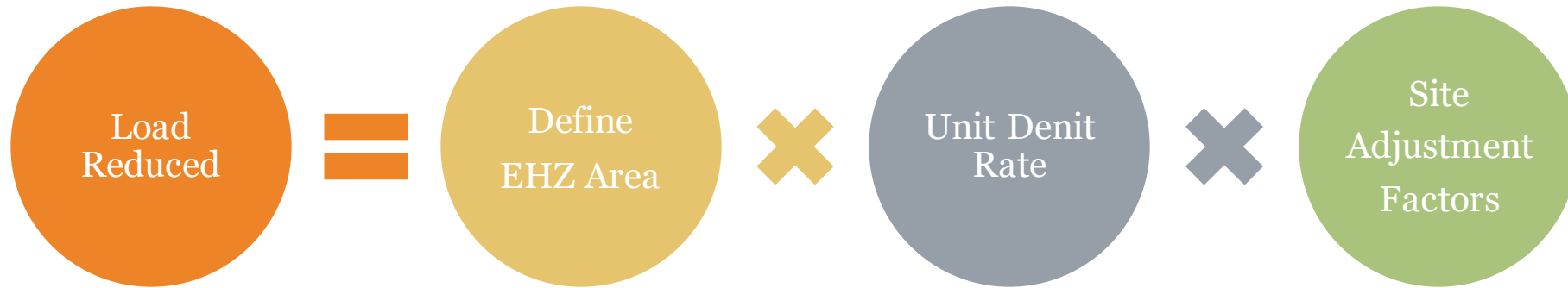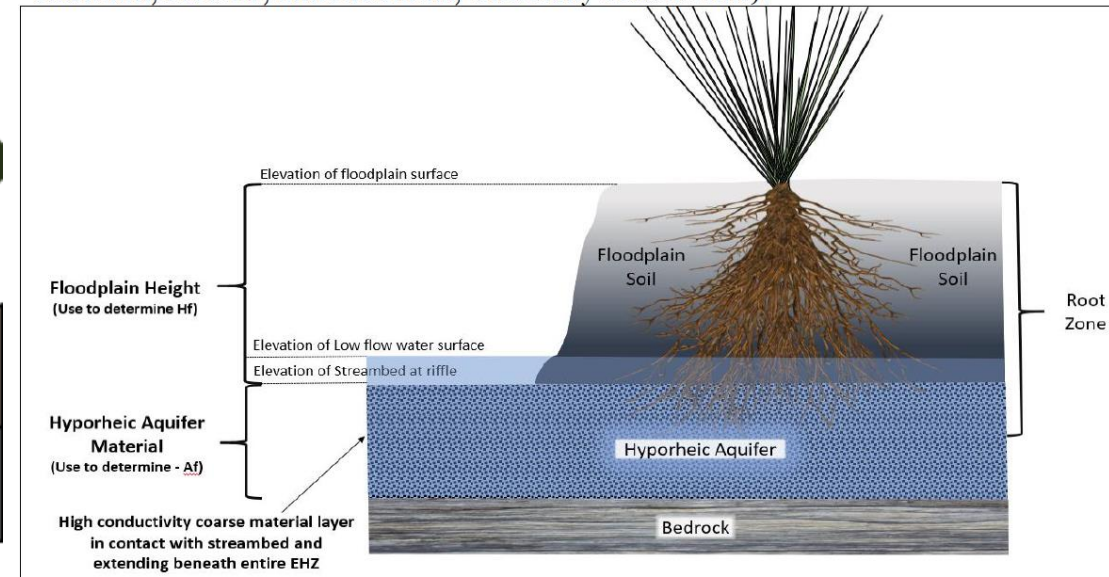
PROTOCOL 2: DENITRIFICATION DURING BASEFLOW

Figure 4. Illustration of site-specific discount factors for Protocol 2 (Courtesy: Jeff Hartranft, PA DEP; and Art Parola, University of Louisville).
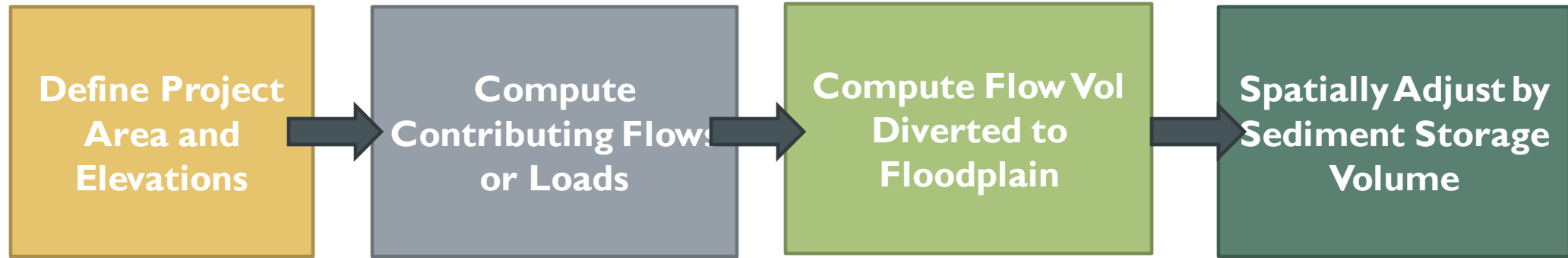
EXPANDED FLOODPLAIN TRAPPING (PROTOCOL 3)
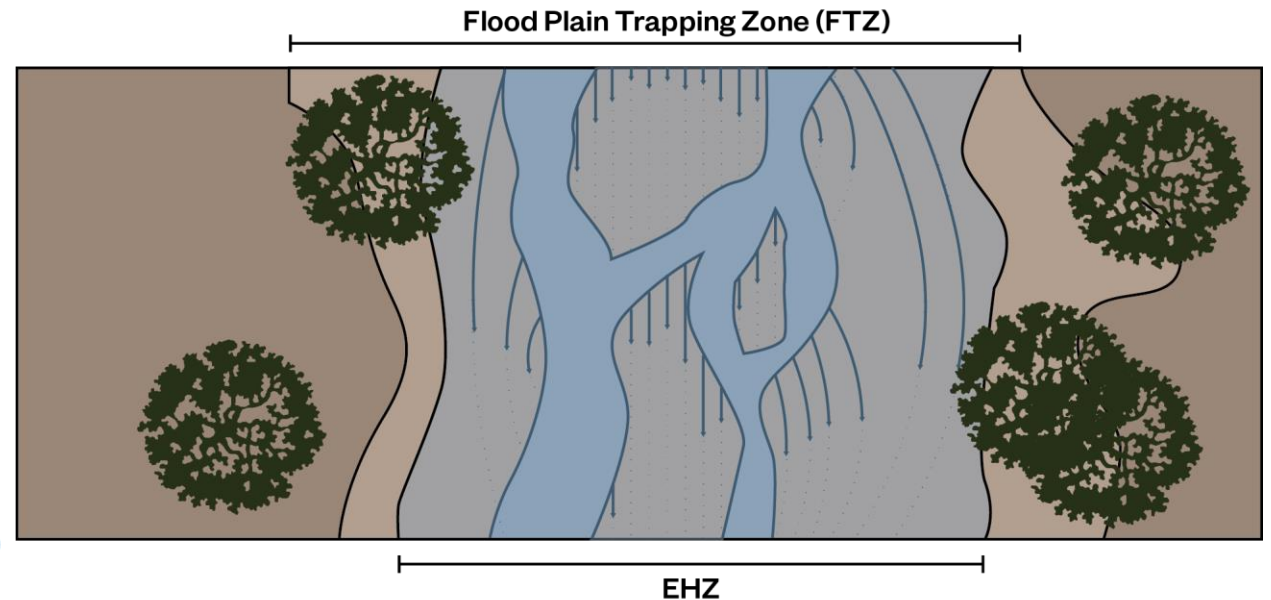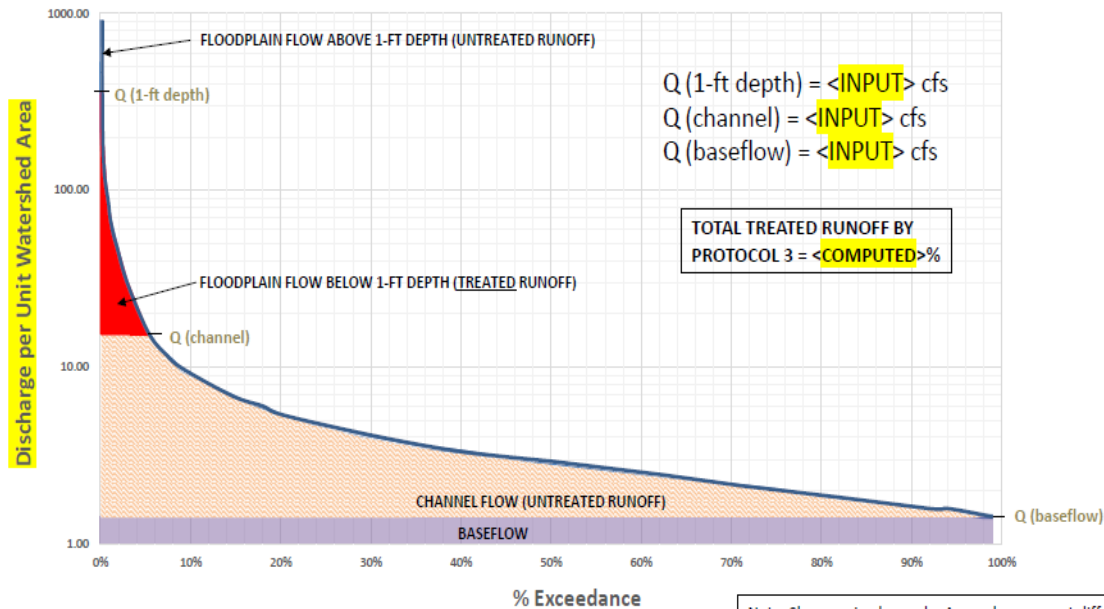
APPROVED: OCTOBER 2020

REVISED: NOVEMBER 2023

PROTOCOL 3: FLOODPLAIN TRAPPING

| Define Project Area and Elevations | → | Compute Contributing Flows or Loads | → | Compute Flow Vol Diverted to Floodplain | → | Spatially Adjust by Sediment Storage Volume |

Develop Regional Flow Duration Curve(s) from Stream Gage Data – 15 Minute Interval

Q (1-ft depth) = <INPUT> cfs
Q (channel) = <INPUT> cfs
Q (baseflow) = <INPUT> cfs

TOTAL TREATED RUNOFF BY PROTOCOL 3 = <COMPUTED>%

FLOODPLAIN FLOW ABOVE 1-FT DEPTH (UNTREATED RUNOFF)

Q (1-ft depth)

FLOODPLAIN FLOW BELOW 1-FT DEPTH (TREATED RUNOFF)

Q (channel)

CHANNEL FLOW (UNTREATED RUNOFF)

BASEFLOW

Q (baseflow)

Discharge per Unit Watershed Area

% Exceedance

Note: Shown using log scale. Areas shown are at different scales.

Flood Plain Trapping Zone (FTZ)

EHZ

PROTOCOL 5: OUTFALL AND GULLY STABILIZATION

APPROVED: OCTOBER 2019

PRIMARY PURPOSE

Addressing erosion driven by vertical incision.

Often caused by:

- Uncontrolled runoff upstream,

- Migrating nick points,

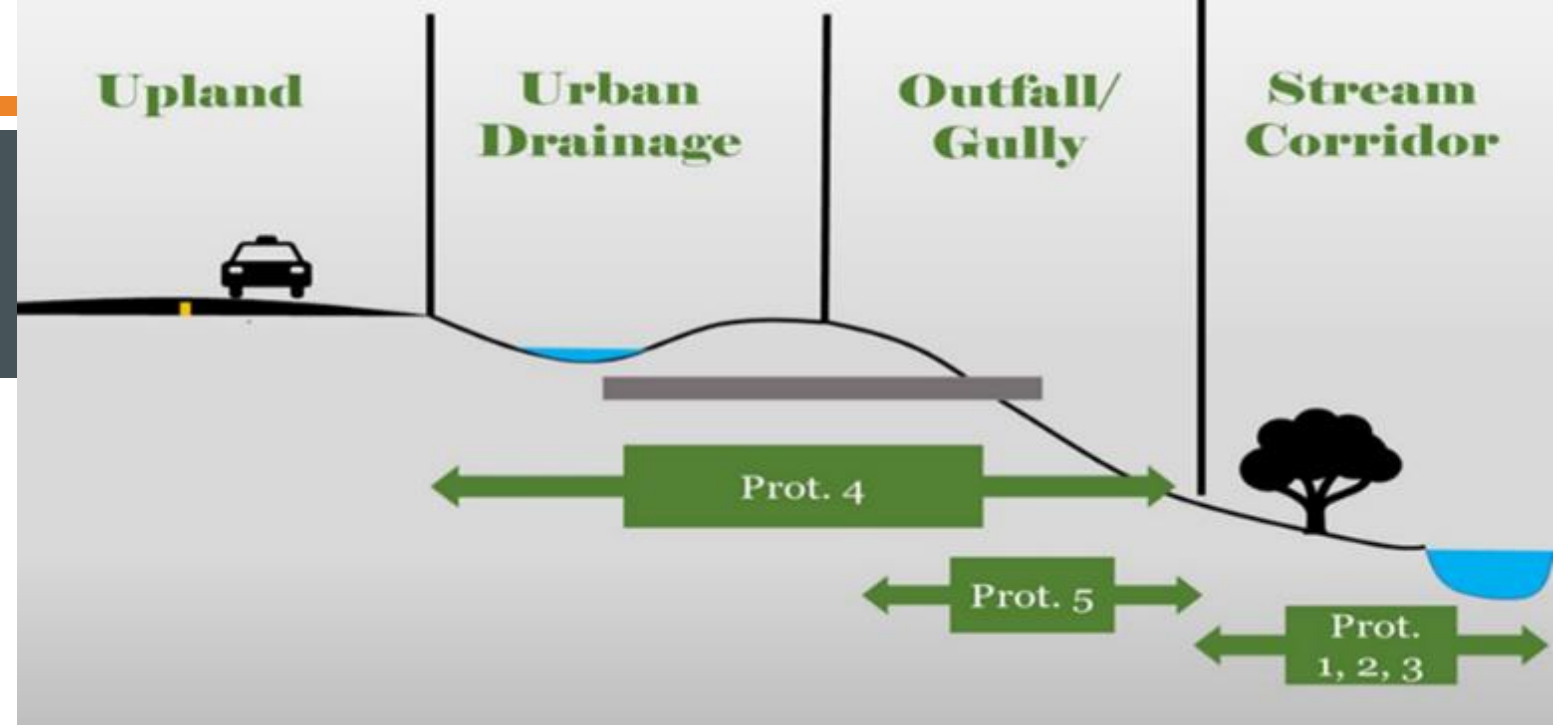- Poor slope stabilization or energy dissipation structures.

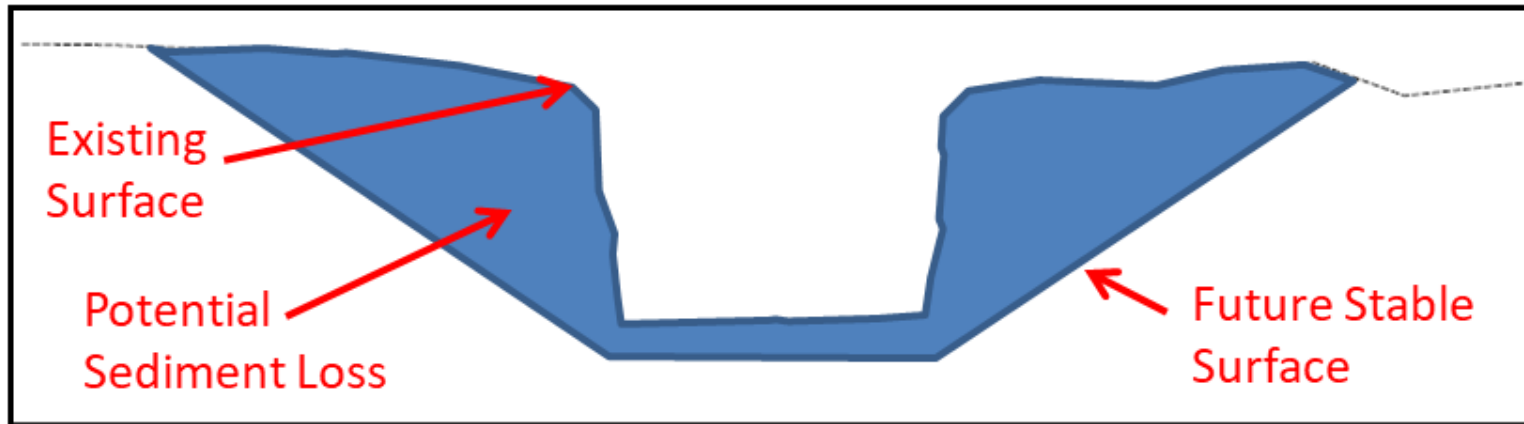Figure 2. Examples of Severe Outfall Erosion in the Headwater Transition Zone

THE OUTFALL PROTOCOL

- Assess Existing Conditions
- Identify Equilibrium/Stable Conditions
- Determine Expected Sediment Loss on an Annualized Basis

WHERE TO FIND ALL THE DETAILS

- A Unified Guide to Crediting Stream and Floodplain Restoration Practices in the Chesapeake Bay Watershed

  - https://chesapeakestormwater.net/resource/a-unified-guide-to-crediting-stream-and-floodplain-restoration-practices-in-the-chesapeake-bay-watershed/

  - Will be updated in January to reflect new Protocol 3 Guidance

- Protocol 3 Memo (Approved November 2023)

  - https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/P3-Fix-Memo_FINAL_clean.pdf

QUESTIONS

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