



Bureau of Waterways Engineering and Wetlands

# **Chapter 105**

## **Program Development Updates**

**Society of Women Environmental Professionals**  
**2018 Annual Regulatory Update Seminar**  
**November 1, 2018**

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# Overview of Efforts

- Finalize Function Based Compensation Protocol
- L2RAP Revision – Headwaters
- In Lieu Fee Draft Instrument
- Restoration Environmental Assessment



# Overview of Efforts

- Current Program Development Efforts
  - PA Wetland Probability of Occurrence and Restorable Lands Mapping
  - Vegetation Communities Predictor Tool
  - HARRS - Legacy Watershed Alteration Characterization/Profile Development
  - Watercourse Identification Tools

# Function Based Compensation Protocol

## ➤ Revised Riverine Function Group Structure

➤ RS or HYD1

➤ BGC1

➤ HAB1

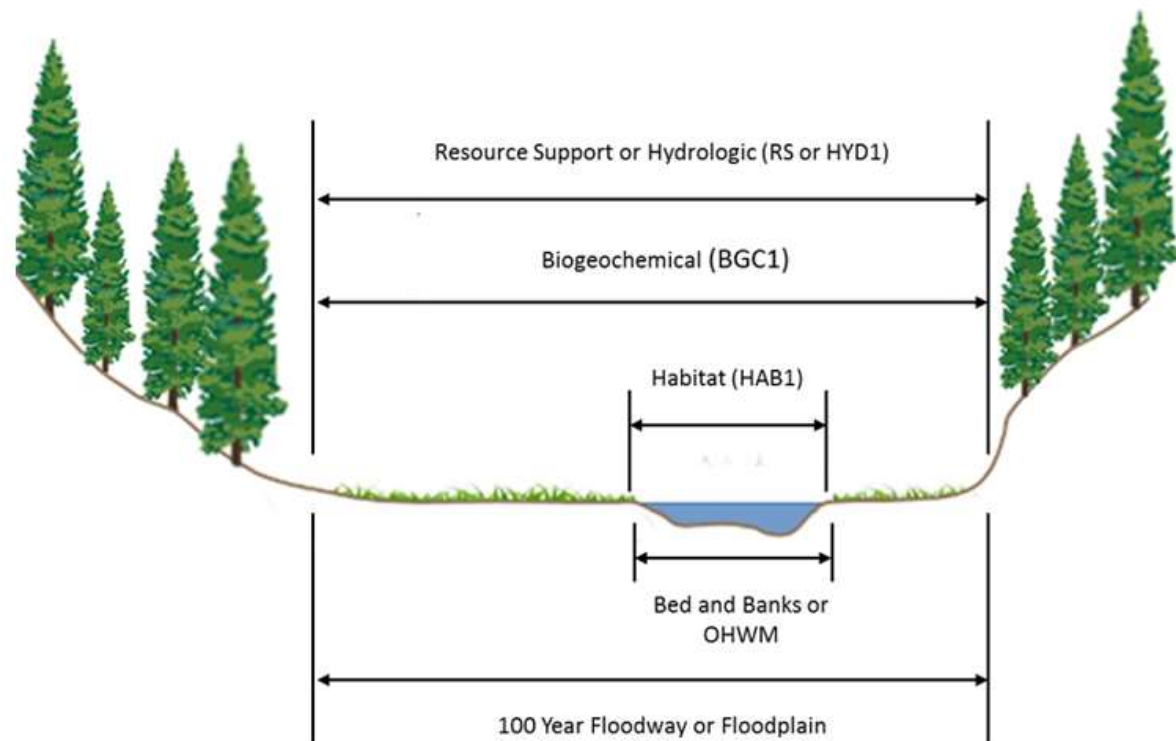


Figure 1 Riverine Function Groups and Common Boundary Features

# Function Based Compensation Protocol

- Determining RS vs HYD1 Function Group
  - Watershed size, gradient and valley type

**Table 1. Riverine RS/HYD1 Selection Criteria**

Watershed Size (WS)		Drainage Area		Function Group	Gradient Classes
Class	Description				
1	Headwater	>0	≤2 mi <sup>2</sup>	RS Only	All (1, 2 or 3)
2	Small Stream	>2	≤10 mi <sup>2</sup>	RS or HYD1	RS: 2 – confined valley and 3; HYD1: 1 and 2 – unconfined valley.
3	Mid-reach Stream	>10	≤100 mi <sup>2</sup>	HYD1 Only	All (1, 2 or 3)
4	Large Stream/River	>100 mi <sup>2</sup>		HYD1 Only	All (1, 2 or 3)

# Function Based Compensation Protocol

- Confined - confinement ratio less than 4.0 and  
Unconfined Valleys - confinement ratio  $\geq 4.0$

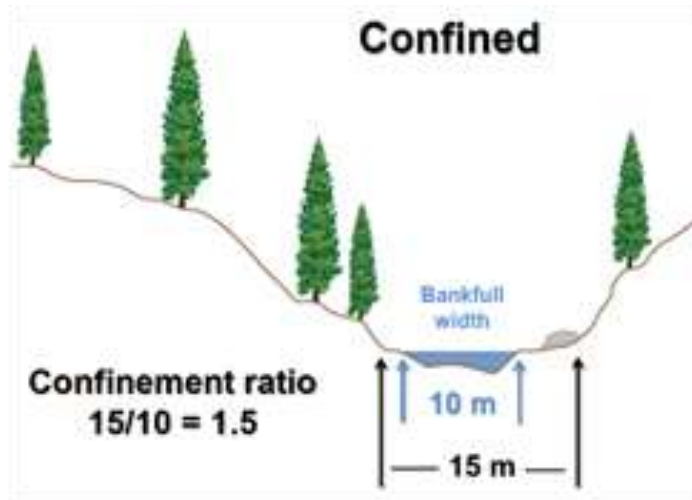


Figure 2. Confined Valley (Nagel, 2013)

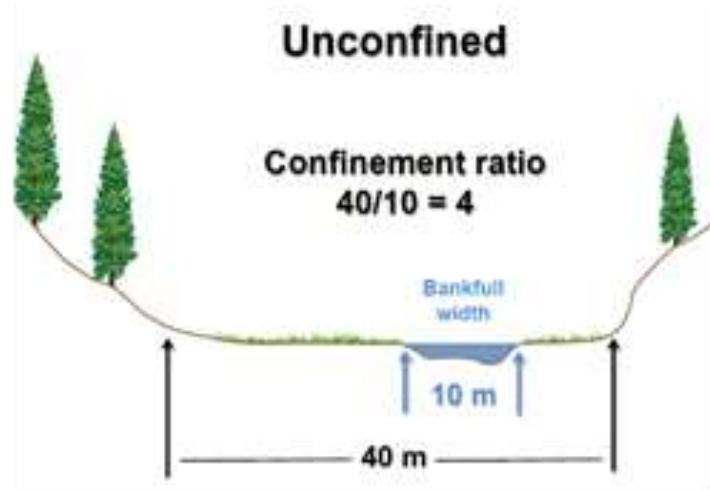
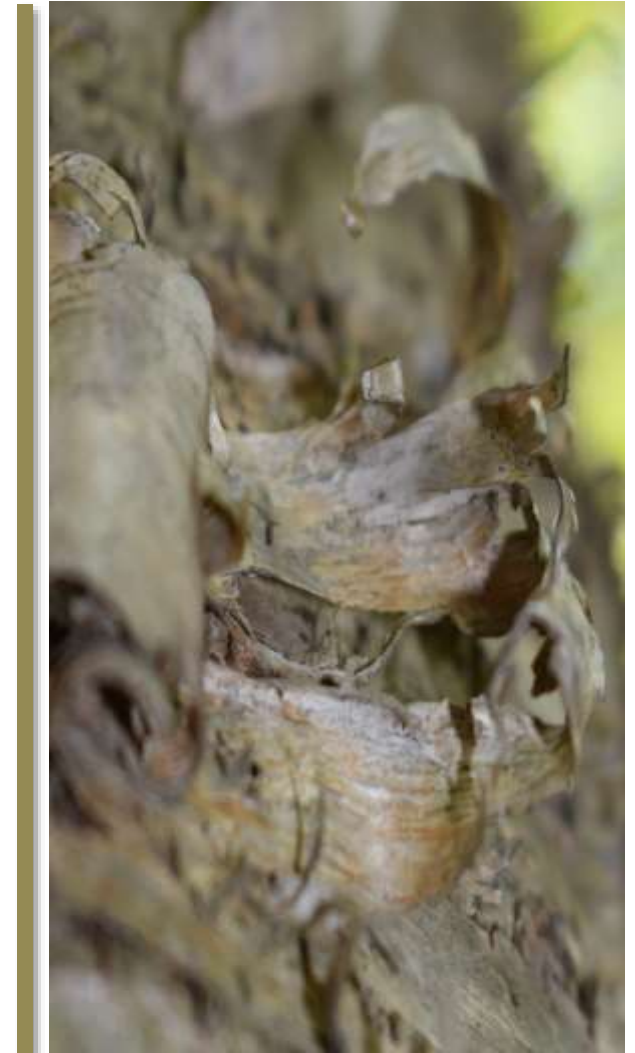


Figure 3. Unconfined Valley (Nagel, 2013)

# Function Based Compensation Protocol

- Finalizing Draft Guidance
  - Final Legal review
  - Publication in first quarter 2019
  - Effective date TBD – likely 3-4<sup>th</sup> quarter 2019
  - Completion of ILF Approval process
  - Training and overview in 2019





# L2RAPS Revision - Headwaters

- Utilization of existing Wetland and Riverine Guidance
  - Better address linear headwater systems that exhibit both resource features
  - Utilize a combination of existing condition indices
    - Landcover
    - Stressors/Alteration
    - Channel Conditions
    - Roadbed Presence



# Restoration Environmental Assessment

- EA Form specifically for Restoration Activities
- Demonstration of Degradation
  - Evaluate resource degradation at a “system” level - considers multiple measures and indicators, including “legacy” alterations and current resource responses.
  - Resource Degradation Demonstration Establishes the Basis for the Alternatives Analysis

# Restoration Environmental Assessment

- Demonstration of Degradation
  - Identifying cause of degradation critical to process
  - Evaluate both historic (legacy) and modern alterations causing degradation
  - Emphasis on landscape and resource appropriate restorative practices that support long-term dynamically stable resources

# ➤ HARRS - Legacy Alteration Profiles

- Utilizing EPA Wetland Program Development Grant project to
  - Identify and characterize the effect of watershed legacy alterations on the Hydrologic, Geomorphic and Biogeochemical beyond legacy sediment
  - Use as a basis for future Categorical Environmental Assessments

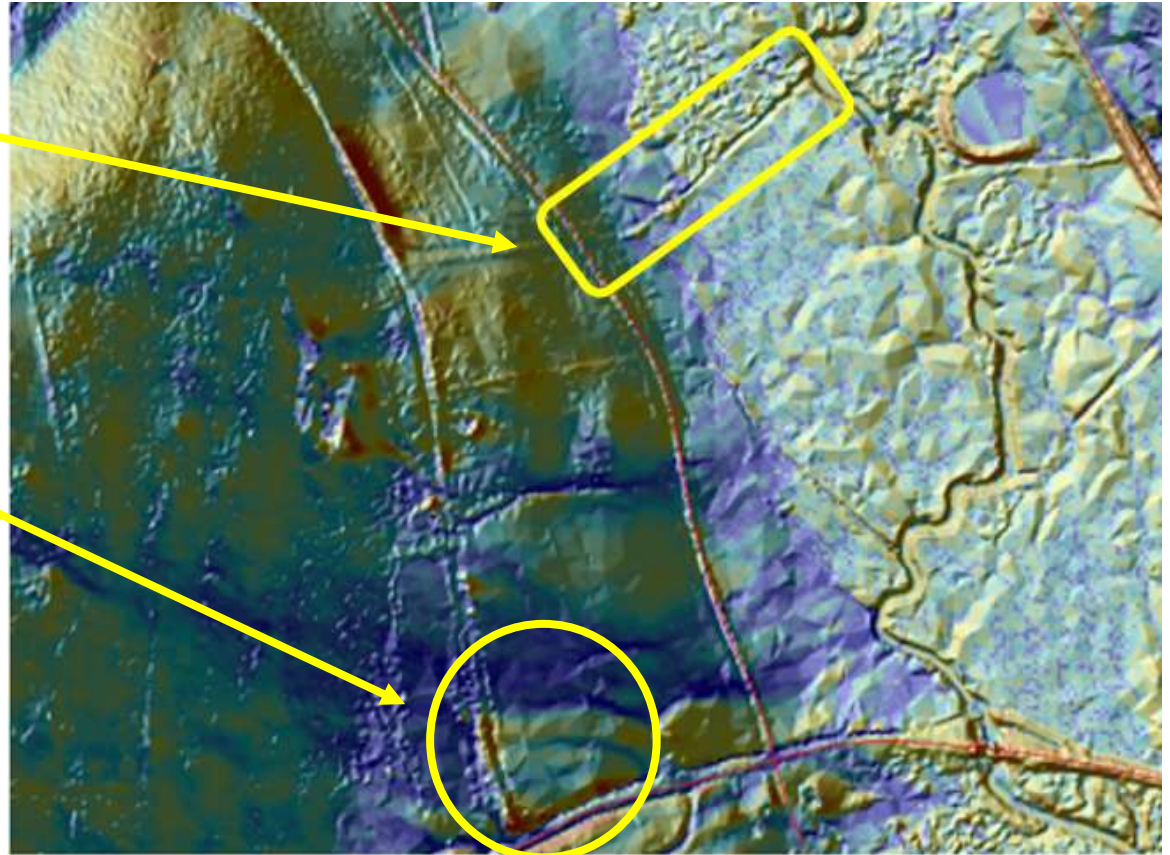
# ➤ HARRS - Legacy Alteration Profiles

- Create Legacy Alteration Profiles
  - Profiles Identify and characterize historic alterations and the effects
    - Industrial Timbering Era
    - Water Power Era
    - Agriculture
    - Mineral Extraction



# HARRS - Hydrologic Legacies

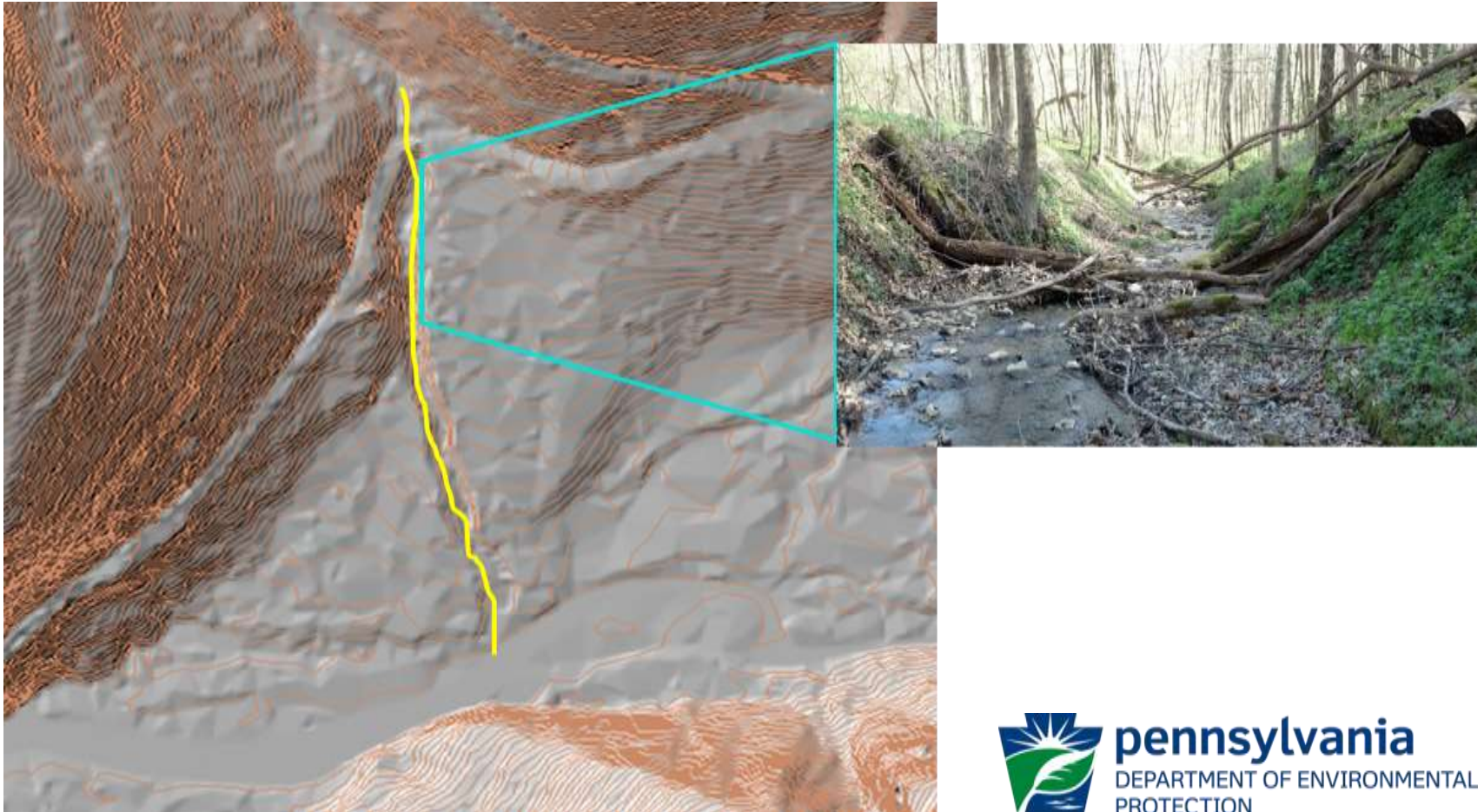
- Agriculture tile and ditch practices
- Road cuts intercept hillslope processes





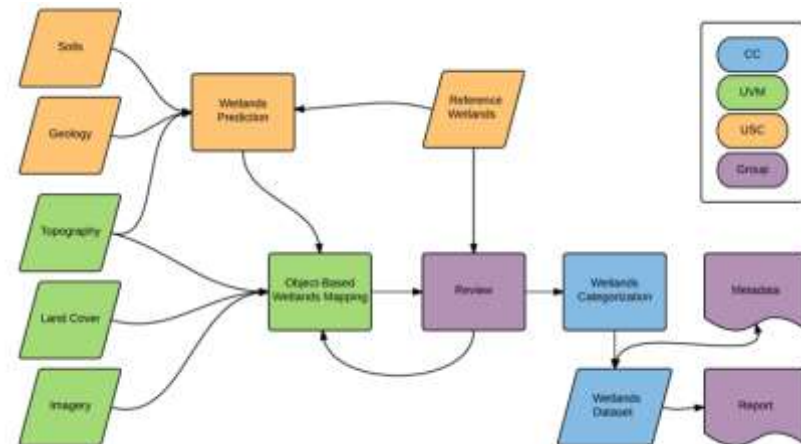
# HARRS - Geomorphic Legacies

## ➤ Stream Relocation



# PA Wetland Occurrence Probability Mapping

- Mapping using a two-step modeling process combining raster and vector based approaches
  - Identify existing/unmapped wetlands and restorable lands
  - Complete high resolution landcover for western PA
  - Chesapeake Bay Drainage **Completed**
  - Remainder of PA 2018-19

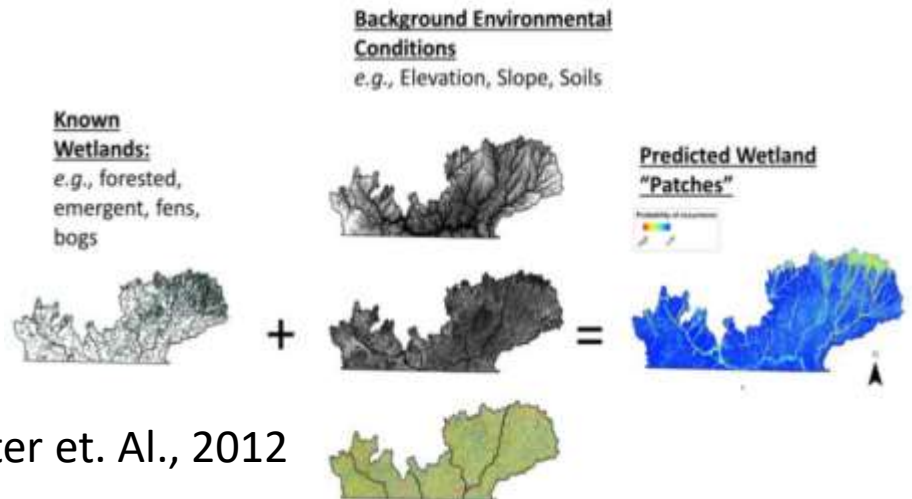




# PA Wetland Occurrence Probability Mapping

- Numerous uses for updated wetland mapping
  - Determine Level 1 resource conditions
    - Assist in Level 2 preparation
  - ILF and Banking Compensation Planning Framework
  - Basic Planning
  - Updatable layer / geodatabase for related wetland data

- Environmental conditions determines wetland distribution and characteristics
- MaxEnt assumes conditions that produce and characterize specific wetland communities are repeated across the landscape, and are therefore searchable



Hunter et. Al., 2012

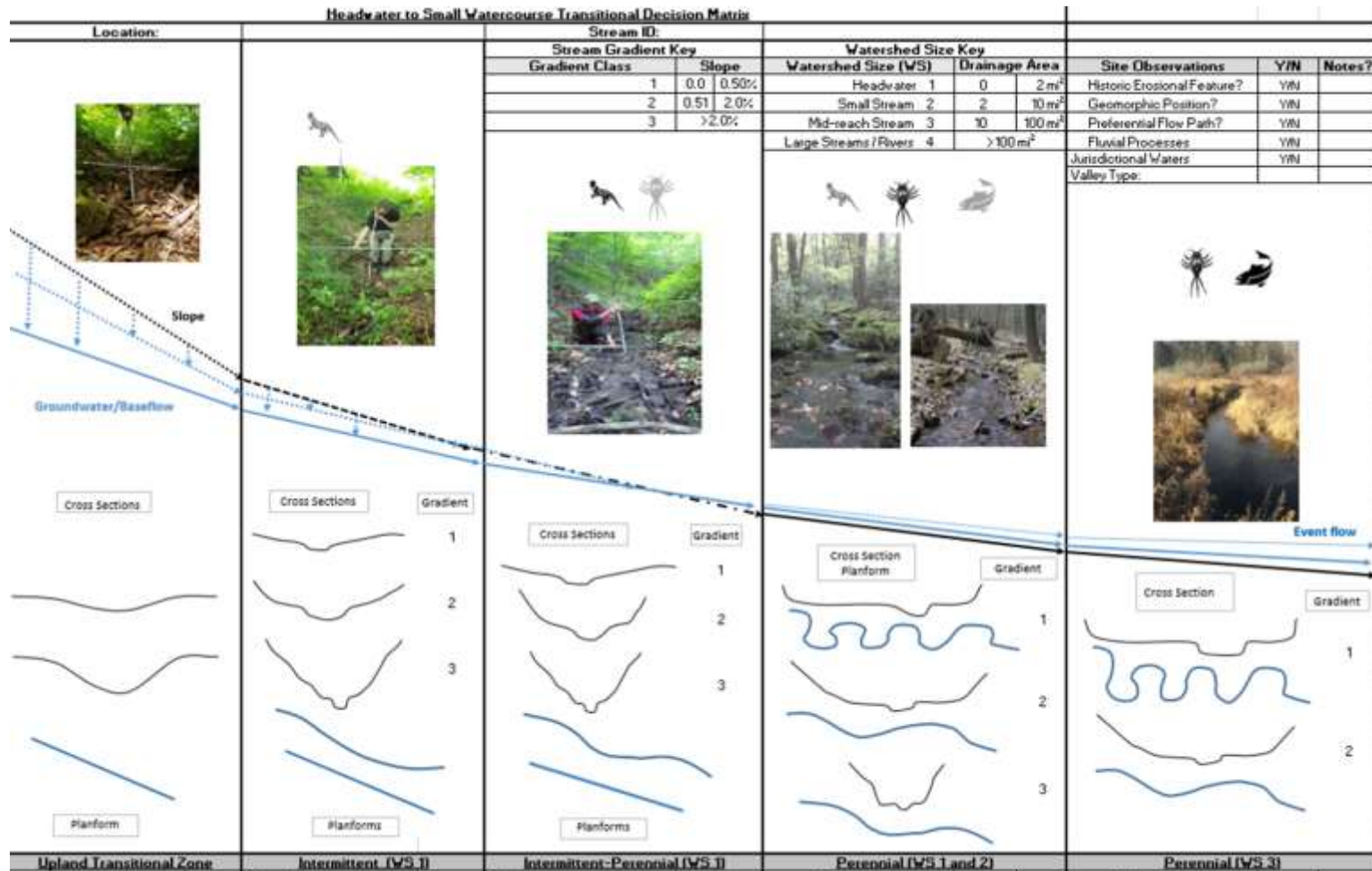
# ➤ Vegetation Community Predictor Tool

- Online predictive plant community planting tool - Pennsylvania Restoration Planting Community Prediction Tool (2019)
  - Guide management, restoration, and compensation activities at specific sites in Pennsylvania (and portions of Maryland).
  - Linked to supporting resources such as the Pennsylvania Plant Community Classification (<http://www.naturalheritage.state.pa.us/Communities.aspx>)

# ➤ Vegetation Community Predictor Tool

- Past EPA Wetland Program Development Grant projects done to identify and classify wetland and *riparian* vegetation communities (Zimmerman 2008, 2012)
- Prediction based on similarity of abiotic data from existing PNHP vegetation community
- Intend to develop a web based geospatial tool to identify likely terrestrial, palustrine and riparian vegetation communities based on delineation data and calculate Rapid FQI scores (2019-20)

# Watercourse Identification



# References

- Hunter, E.A., Raney, P.A., Gibbs, J.P., and Leopold, D.J. 2012. Improving wetland mitigation through community distribution modeling and a patch based ranking scheme. *Wetlands*. 32:841-850.
- Walsh, M.C., J. Deeds, and B. Nightingale. 2007. *User's Manual and Data Guide to the Pennsylvania Aquatic Community Classification*. Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Middletown, PA, and Pittsburgh, PA.
- Zimmerman, E.A. T. Davis, M. Furedi, B. Eichelberger, J.I. McPherson, S.D. Seymour, G. Podniesinski, N.M. Dewar, and J. Wagner (editors). 2012. *Terrestrial and Palustrine Plant Communities of Pennsylvania 2<sup>nd</sup> Edition (Wetlands)*. Pennsylvania Natural Heritage Program, Pennsylvania Department of Conservation and Natural Resources, Harrisburg, Pennsylvania. <http://www.naturalheritage.state.pa.us/communities.aspx>
- Zimmerman, E., and G. Podniesinski. 2008. *Classification, Assessment and Protection of Floodplain Wetlands of the Ohio Drainage*. U.S. EPA Wetland Protection State Development Grant no. CD- 973081-01-0. Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Pittsburgh, PA.

# Questions?



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