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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Waterways Engineering and Wetlands

Restoration Targeting

2023 Mid-Atlantic Wetland Workgroup Meeting

November 14-16, 2023

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Bureau of Waterways Engineering and Wetlands

Josh Shapiro, Governor

Jessica Shirley, Interim Secretary

Targeting for What?????

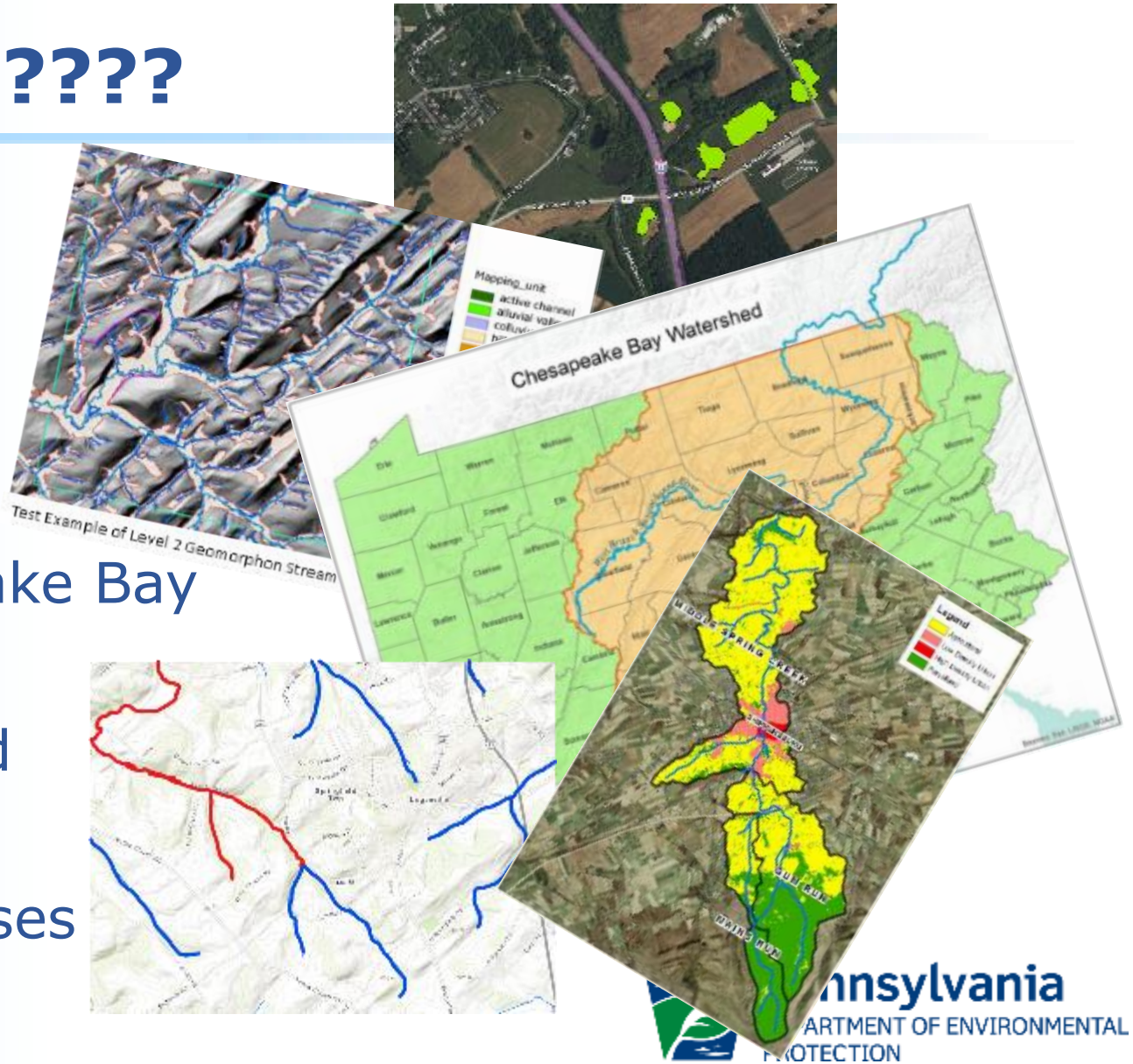
Regulatory vs Voluntary

Watershed vs Discrete Areas

Jurisdiction Wide vs Chesapeake Bay

Altered/Degraded vs Impaired

Legacy Losses vs Modern Losses



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Waterways and Wetlands Regulatory Program Perspective

Charged with considering a broader perspective of the resource

- **§ 105.2. Purposes**….(4) Protect the natural resources, environmental rights and values secured by PA. CONST. art. I, § 27 and conserve and protect the water quality, natural regime and carrying capacity of watercourses.
- **Regulated waters of this Commonwealth**—Watercourses, streams or bodies of water and their floodways wholly or partly within or forming part of the boundary of this Commonwealth.

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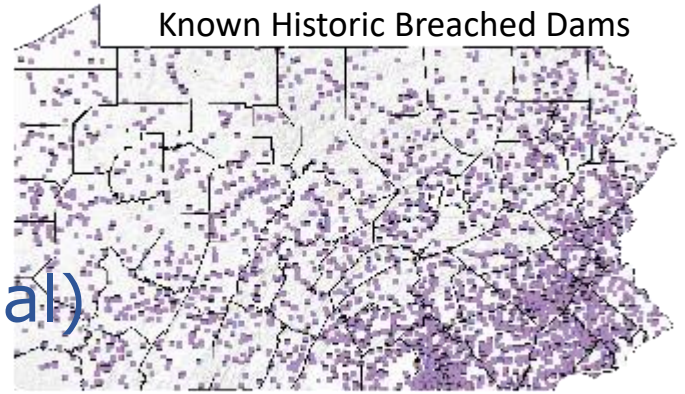
Existing Data and Developed Tools

- Habitat Models
- Palustrine and Floodplain Plant Community Classification
- Plant Community Fact Sheets/Profiles
- Wetland Reference Data
- HGM Classifications
- HGM Level 3 Models
- Level 2 RAPs
- Modeled Wetland Data– Existing Wetland and Restorable Lands
- TWI Statewide Coverage
- Watershed Resource Registry
- Level 1 Geomorphon Landform Statewide Coverage
- Restoration Community Predictor Tool

Data and Tools Under Development

- Level 2 Geomorphon Valley/Channel Mapping Statewide Coverage
- Watershed Legacy Alteration Index
- Dam Related Legacy Sediment Mapping (regional)
- Breached Dam Database Statewide Mapping (≈4,000 from circa 1917-present) Another 8,000 unknown breached dams likely!
- Pennsylvania Aquatic Resource Compensation Determination Process



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Targeting Factors

Evidence-Based Approach

- **Legacy sediments are everywhere – depths vary by alteration profile (2-20 feet)**
- **Historic unaltered conditions persisted from 6,000 – 300 yrs. bp**
- Pre-Alteration Resource(s) - evidence indicates most unconfined valleys were comprised of stream/floodplain wetland conditions.
    - Both Mineral and Organic hydric soils
- Hydrologic Disconnection(s) resulting from historic alterations greatest driver of degradation and constraint on resource recovery

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Go Big or Go Home Approach

- Small discreet projects have limited effect, are rife with resiliency problems, and have high per unit and long-term costs
- Focus is on larger voluntary mill dam legacy sediment projects
  - Easy Targeting – locate historic dams, mills or easily observed legacy sediment deposits (*they really are everywhere!*)
  - Relatively large projects – 1,000-5,000 feet in length
- Compensatory Bank and ILF Mitigation
  - Credit Demand Component
  - Large to extensive in size – 2,000 – 100,000 feet in length
  - Economic Drivers

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Compensation Value

Table 8. Project Approach Values

Project Approach	C_{VPA}
Reestablishment	3
Rehabilitation	2
Enhancement	1
Preservation	0

Table 10. Riverine Resource Factor

Class	Watershed Size Description	Drainage Area		C_{VRF}
1	Headwater	>0	≤2 mi²	3.0
2	Small Stream	>2	≤10 mi²	2.0
3	Mid-reach Stream	>10	≤100 mi²	1.0
4	Large Stream/River		>100 mi²	0.5

Compensation Value Factor = (Project Approach + Resource Factor)/2

- Headwater – Small Stream portion of watersheds
  - Incentivize through credit yields
- Legacy Sediment/Headcut Depth
  - < 4 feet of depth – Rehabilitation
  - ≥ 4 feet of depth – Reestablishment
- L2 Condition Depth Scaled Reduction
- Hydrodynamic reconnection provides basis for increasing Rehabilitation and Enhancement Project Approach Value (0.25 increments)

% Riverine Condition Index Baseline Reduction = 25 x (max depth)

Figure 4. Percent RCI Reduction by Legacy Sediment/Headcut Depth

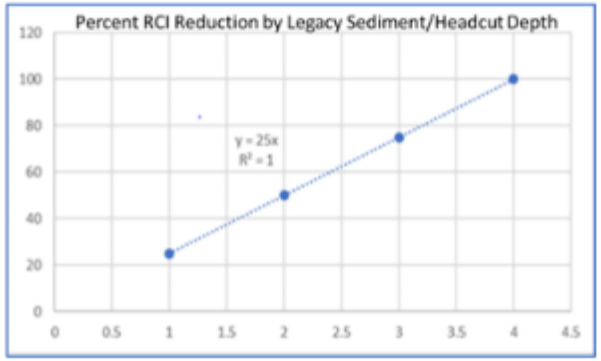

Table 9. Wetland/Lacustrine Resource Factor

Size of Area			CVRF
Description	Acreage		
Extensive	>15		3.0
Large	>10	≤15	2.5
Med-Large	>7.5	≤10	2.0
Medium	>5	≤7.5	1.5
Small-Medium	>2	≤5	1.0
Small	≤ 2		0.5

Compensation Value

Table 10. Riverine Resource Factor

Watershed Size				C_{VRF}
Class	Description	Drainage Area		
1	Headwater	>0	≤2 mi^2	3.0
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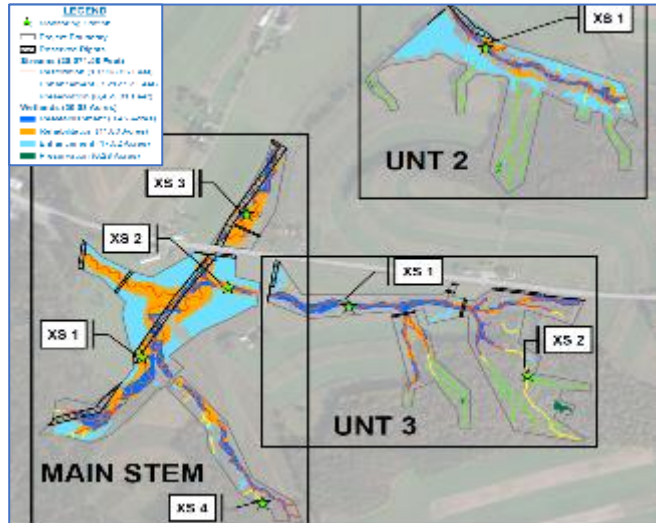
4	Large Stream/River	>100 mi^2		0.5

Comprehensive Project Compensation Value Adjustment

The riverine factor can be modified if more than one watershed size classes are integrated into the overall project. If a larger class project area also has a lower class draining to it and the lower class is also undergoing work that has a CVPA value of a 2 or 3, the CVRF value is adjusted upward by 0.5 for each WSC included.

If a rehabilitation or reestablishment project on a WSC 2 watercourse has a WSC 1 stream draining to it and that stream is being rehabilitated or reestablished the CVRF factor for the WSC 2 stream could be adjusted upward 0.5, from 2.0 to a value of 2.5.



Introduction to Guiding Principles of Aquatic Ecosystem Restoration

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