Q: What do we know about the relative effectiveness at the watershed scale of practices designed to prevent mobilization of sediment and associated nutrients from sources other than legacy sediment?

RESPONSE:

* 1000's of cuts require targeted restoration.

* Refined Understanding: BMP Opportunities Depends on Location and Climate Conditions

* Knowledge gaps require coordinated research.

Kathy Boomer, The Nature Conservancy
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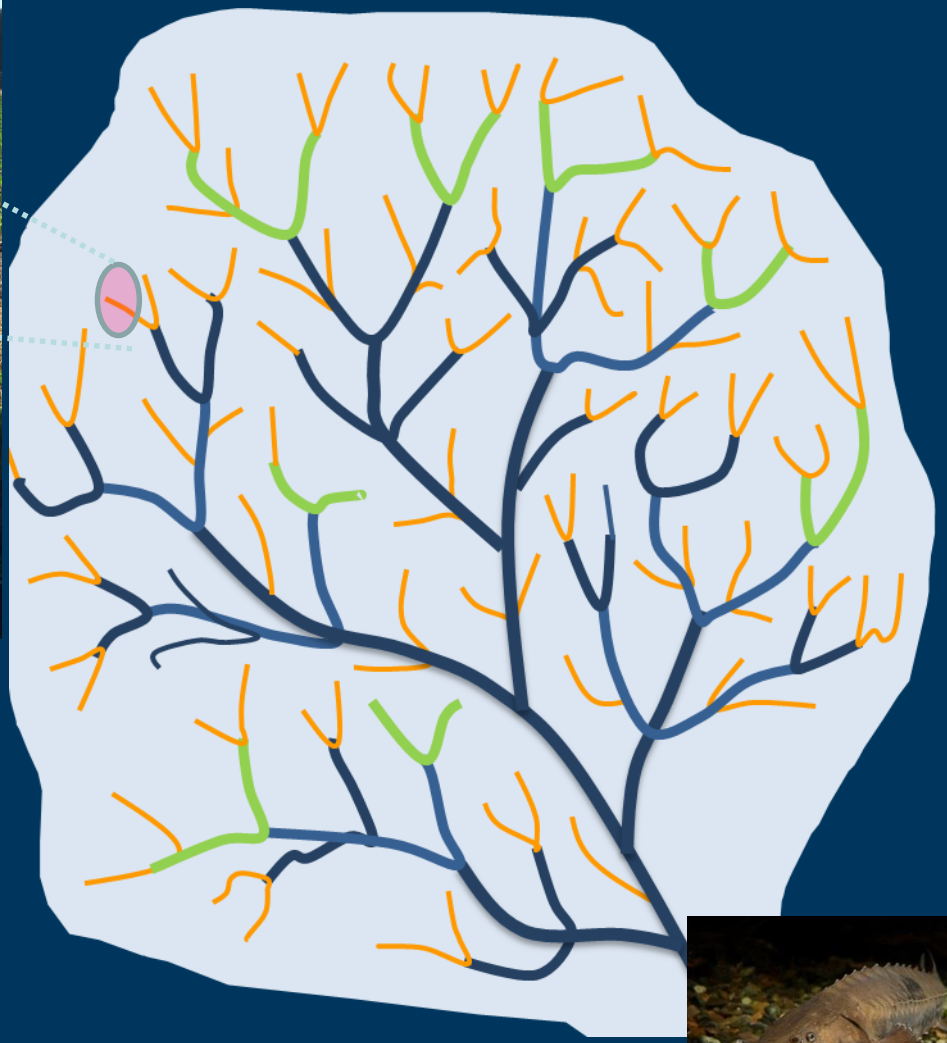
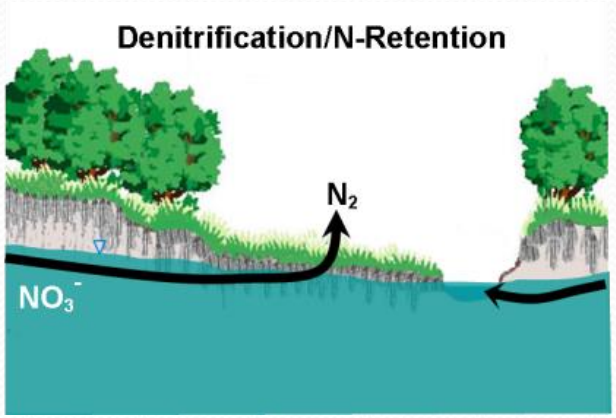
1000's of Cuts Require Targeted Restoration

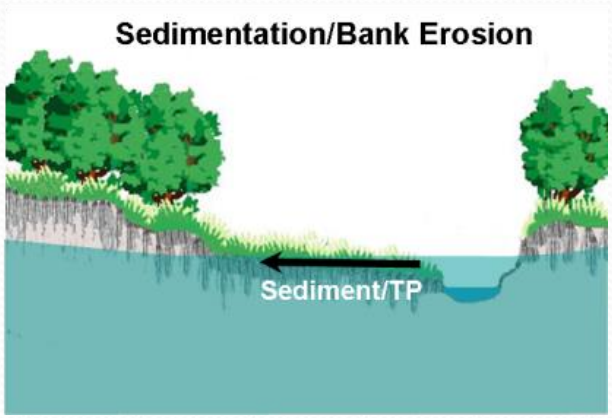


Key (Investment) Decisions:

- Where?
- How much?
- Best design?

Step 1: Identify Universe of Opportunities





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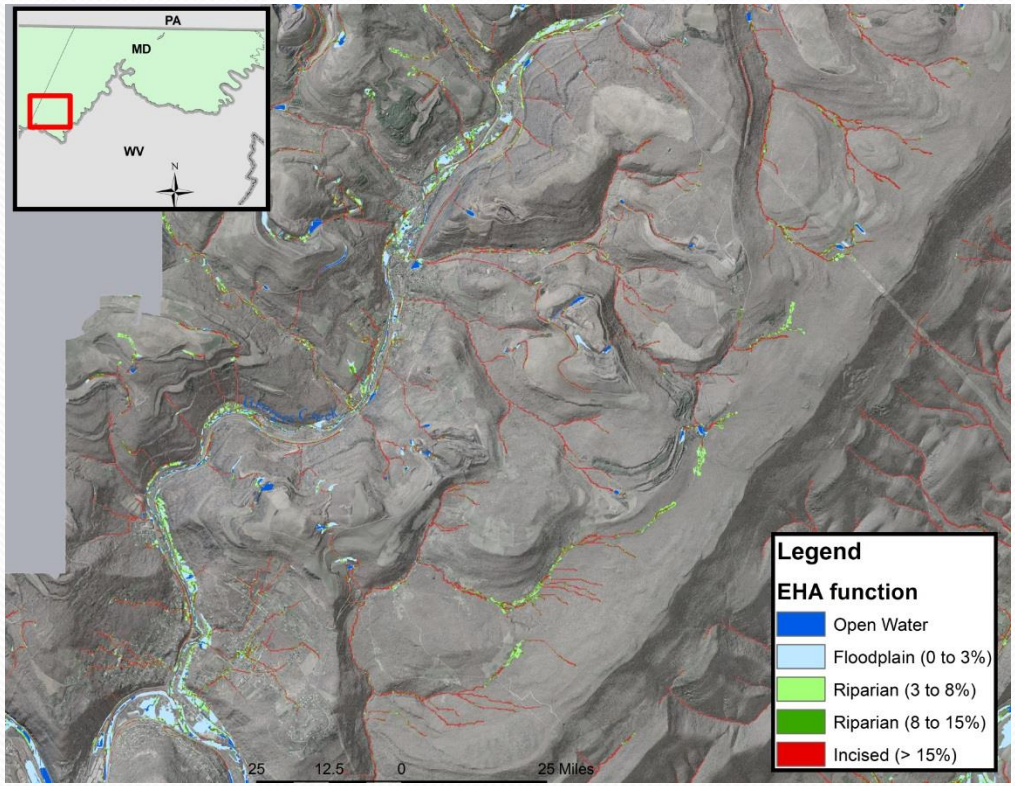
High Resolution Topography Data Derived from Light Detection And Ranging (LIDAR) Remote Sensing Data

Flood and Gutellius 1997
J. of Photogrammetry & Remote Sensing



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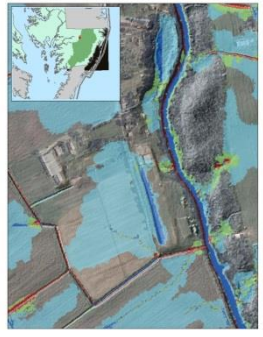
BMP Opportunities Depend on Location and Climate Conditions



GENERAL PHYSIOGRAPHIC REGIONS OF MARYLAND

MOUNTAINS

Appalachian Plateaus
- Allegheny Mountain

Ridge and Valley
- Folded Appalachian Mtns.
- Great Valley

Blue Ridge
- Blue Ridge

PIEDMONT
- Lowlands
- Uplands

COASTAL PLAIN
- Western Shore Uplands
- Western Shore Lowlands
- Delmarva Penninsula

MARINE
- Chesapeake Bay
- Atlantic Shelf

scale
0 miles 50

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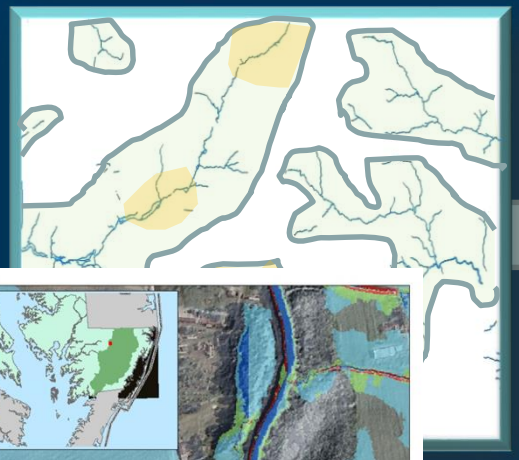
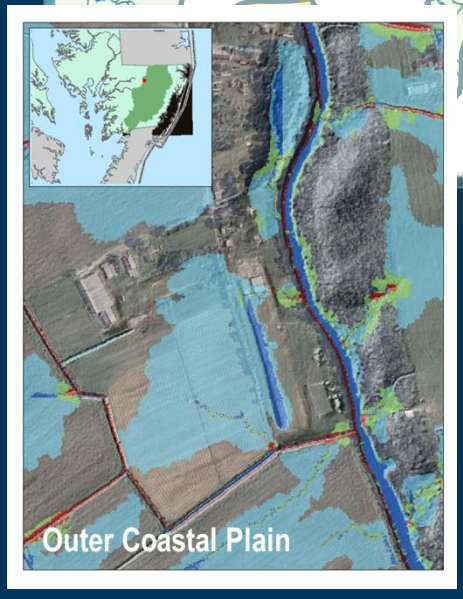
BMP Implementation Challenge:
Where, What, How Much?

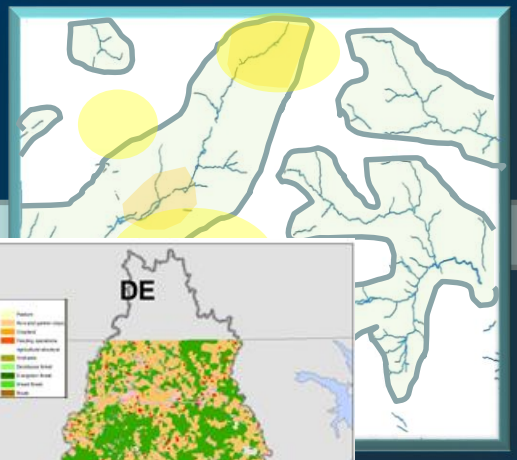
Conceptual Approach:

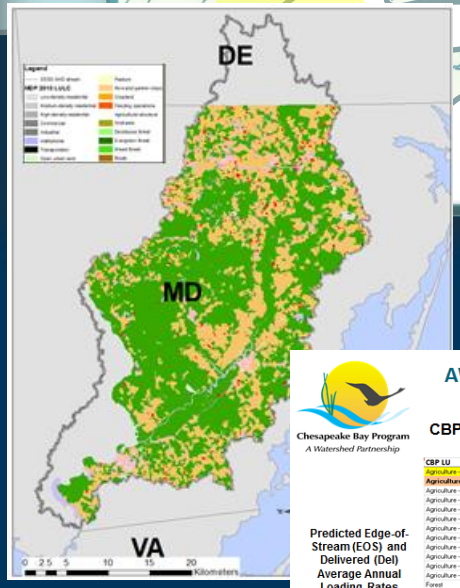
I. Identify Field Opportunities

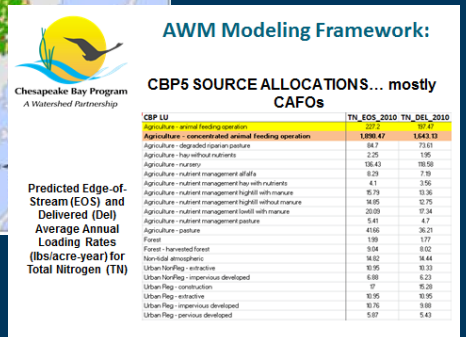




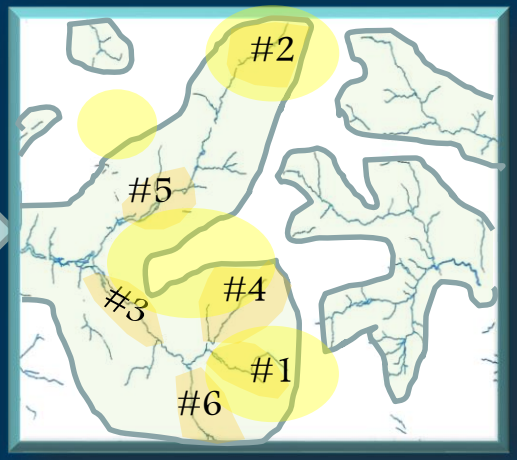
II. Quantify Costs/Benefits







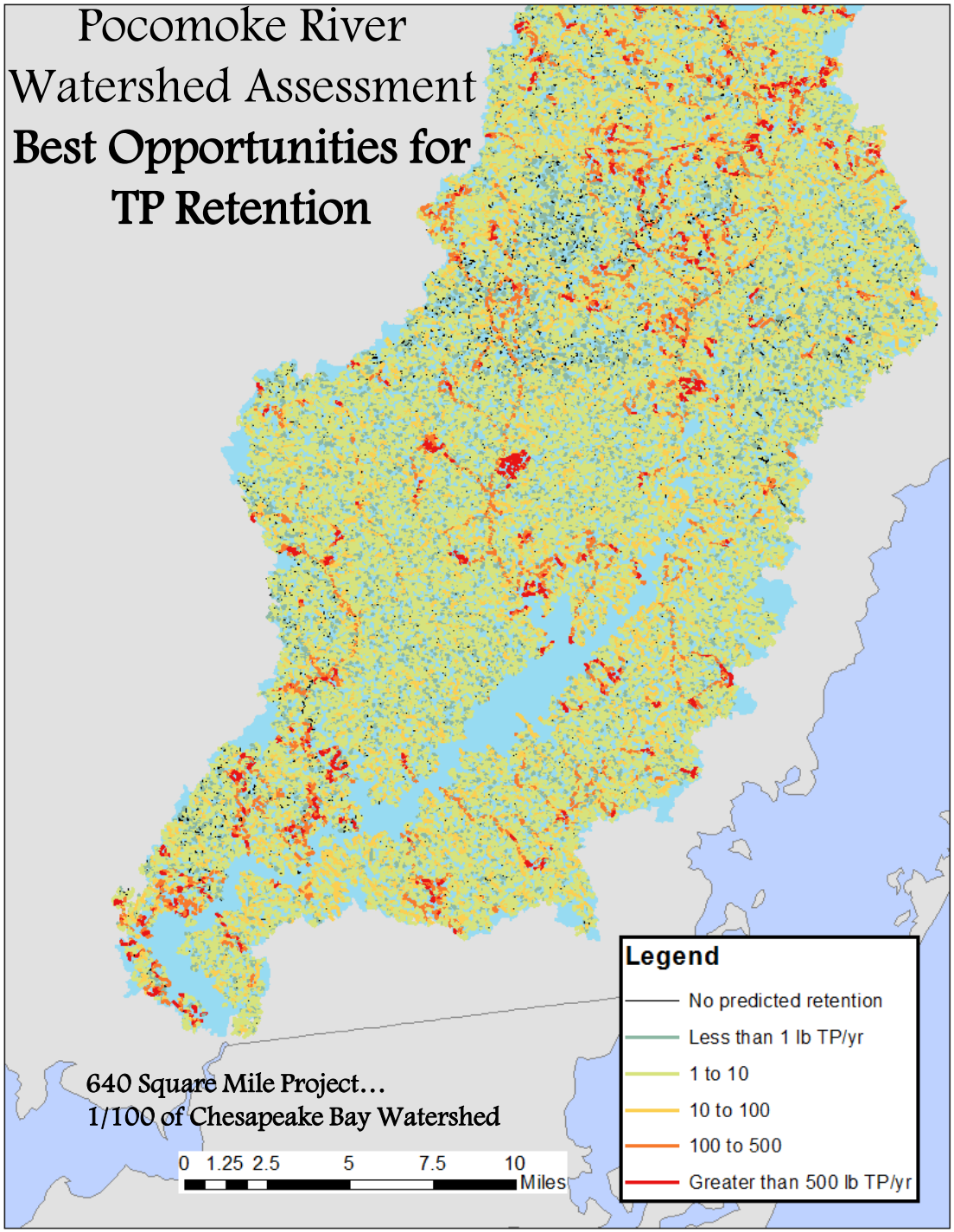
III. Ranked Opportunities



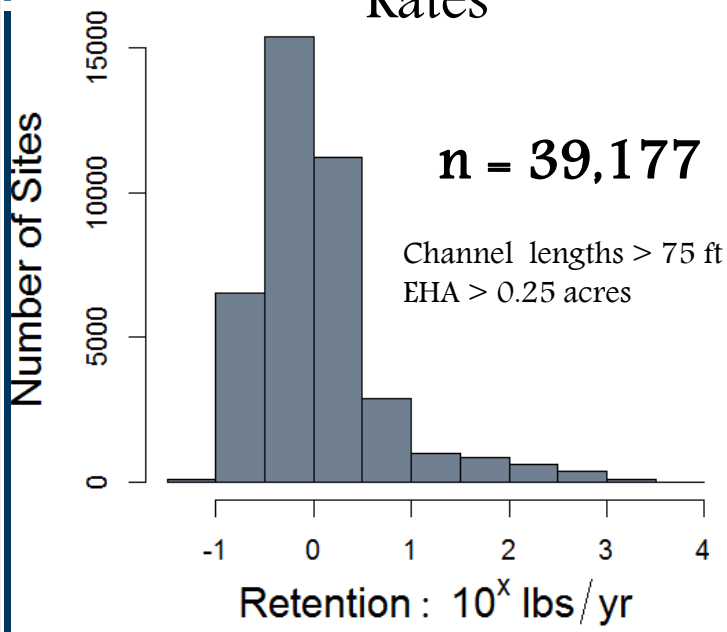
Results:
Ranked/Summed opportunities to maximize return on $$ invested to install bmp's and provide services.

Pocomoke River Watershed Assessment

Best Opportunities for TP Retention



Predicted TP Retention Rates



Percentile	TP Retention lbs per site per year
50	< 1
95	32 (1,966 sites)

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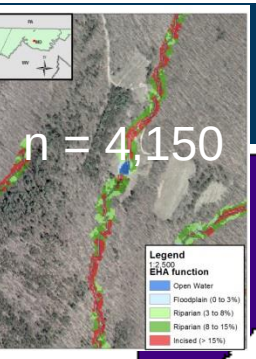
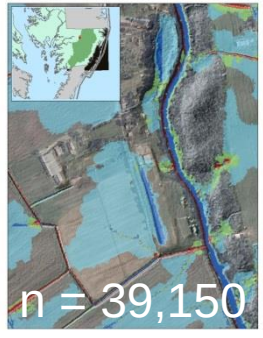
BMP Opportunities Depend on Location and Climate Conditions





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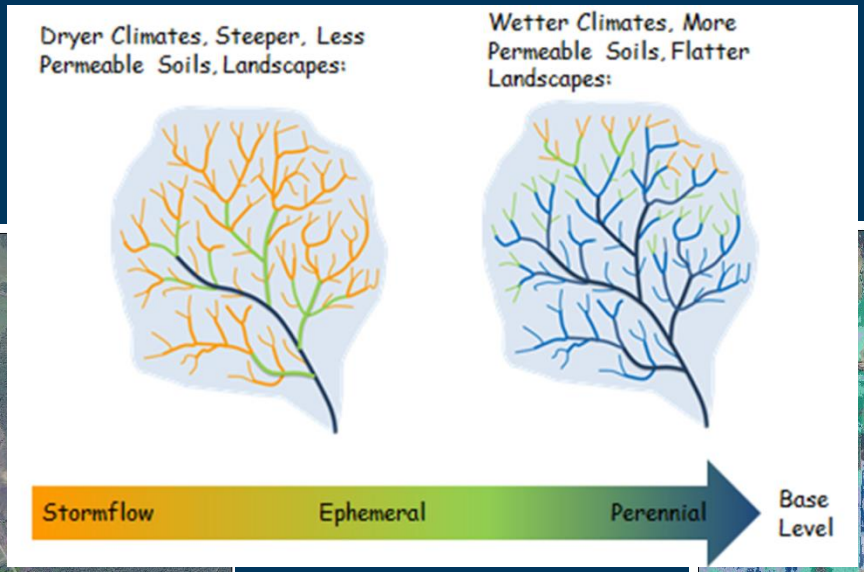
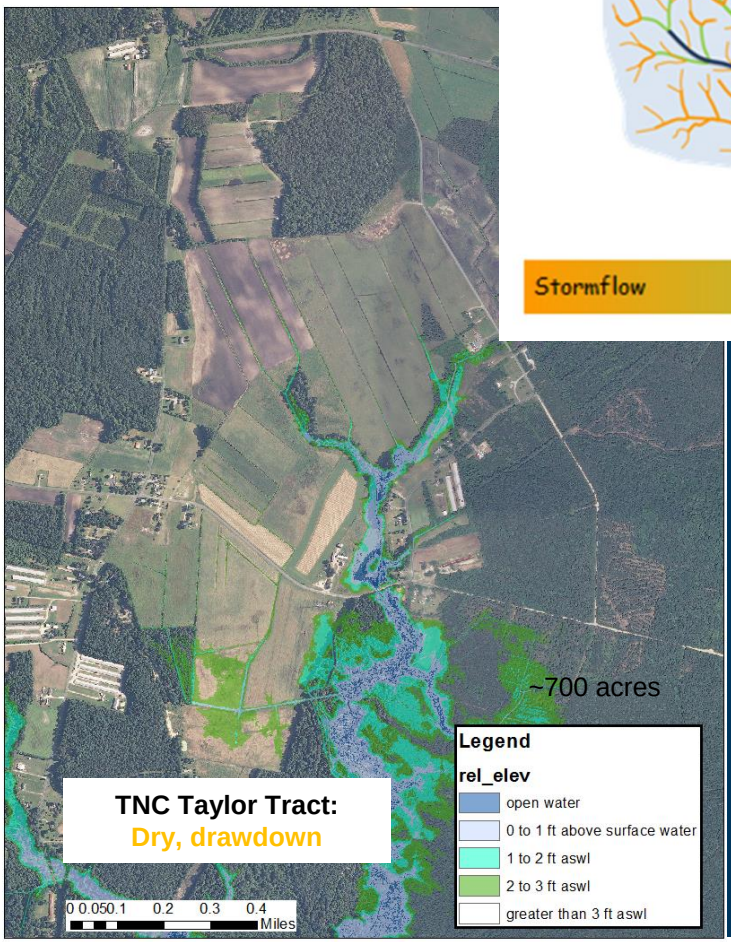
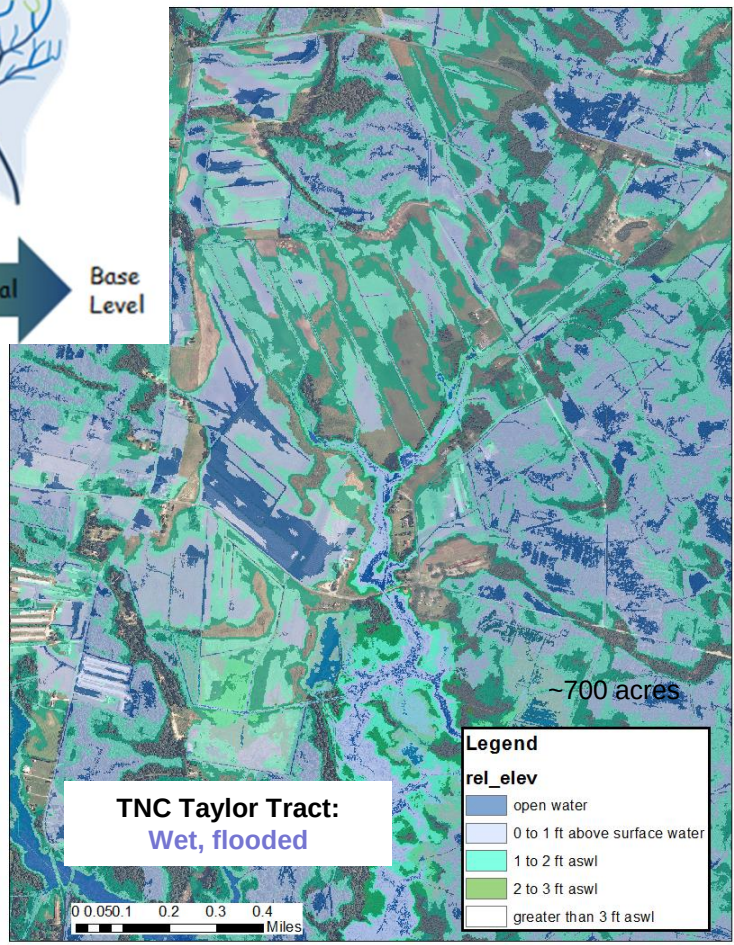




TNC Taylor Tract:
Dry, drawdown

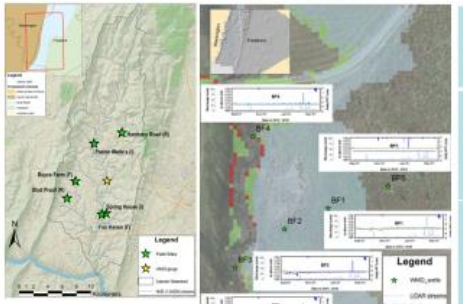


TNC Taylor Tract:
Wet, flooded

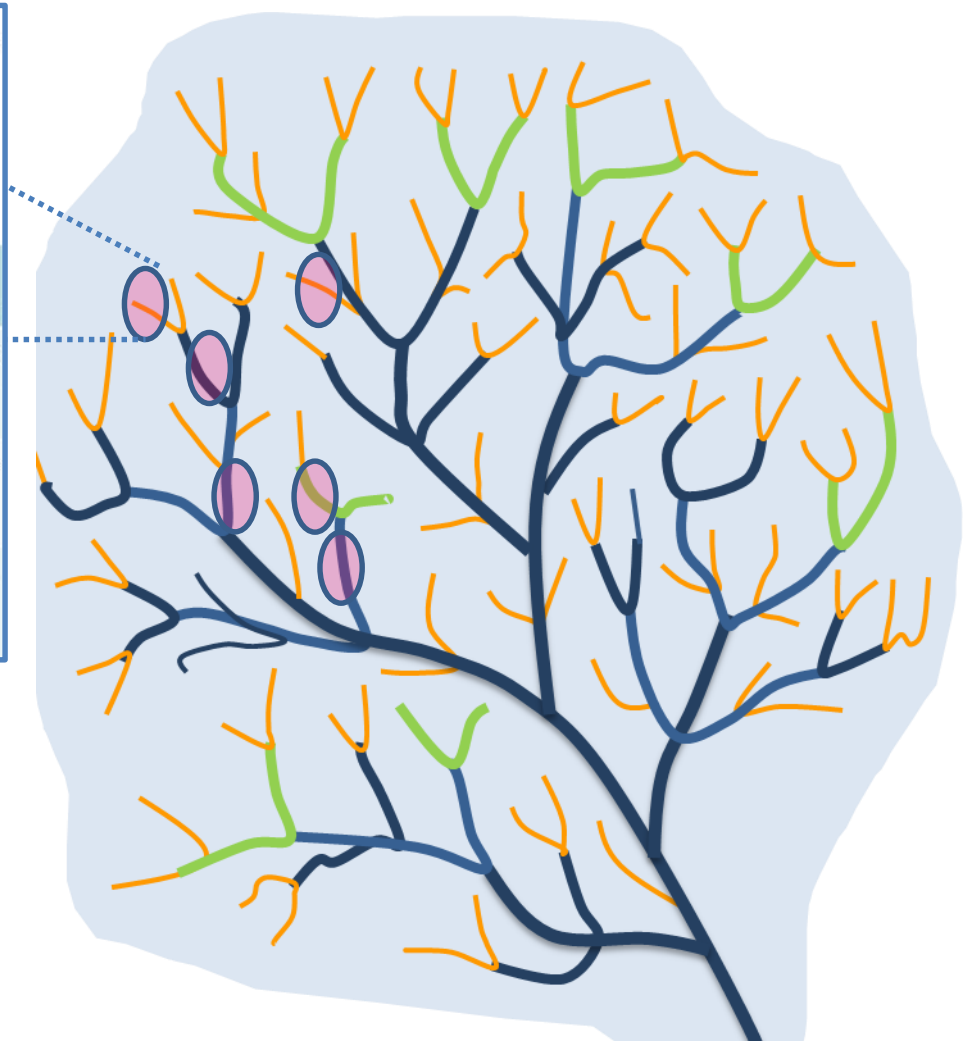
Advancing Water Quality Goals Requires Coordinated Research

FAQ: Can we ground-truth targeting tools?

A: Piece by piece… for example, Catoctin Creek Field Study:



Predicted Buffer Type (Expected WT Condition)	High Nutrient/Sediment Retention Opportunity	Low Nutrient/Sediment Retention Opportunity
Riparian (saturated, not flooded; subdued storm response)	Shot Proof (n = 7) WT Depth Range: 0 to 25 cm below LS TN-N: 0.5 to 12.5 mg/L TP: BD mg/L	Harmony Road (n = 5) WT Depth Range: 25 to 50 cm below LS TN-N: 0.6 to 2.6 TP: 0.03 to 0.3
Floodplain (inundation with overbank storm events)	Boyce Farm (n = 3) WT Depth Range: 0 to 5 cm below LS TN-N: 0.5 to 0.6 TP: 0.02 to 0.07	Fox Haven (n = 2) WT Depth Range: >150 cm below LS TN-N: 0.5 TP: 0.05 to 0.06
Incised (deep water table)	Spring House (n = 4) WT Depth Range: 75 to 125 cm below LS TN-N: 0.7 to 3.1 TP: < 0.03	Pastor Wade's (n = 0) WT Depth Range: > 100 cm below cm



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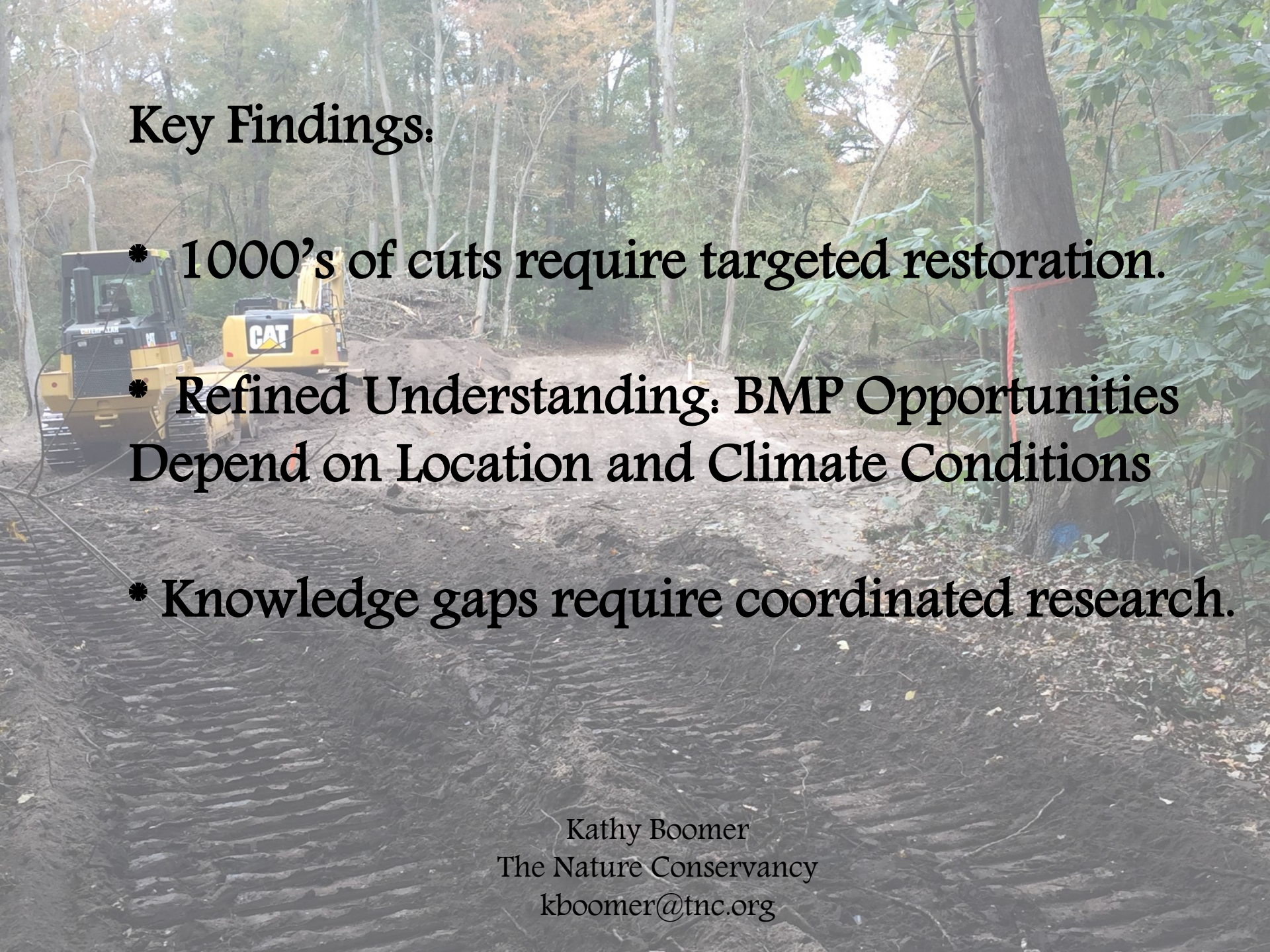

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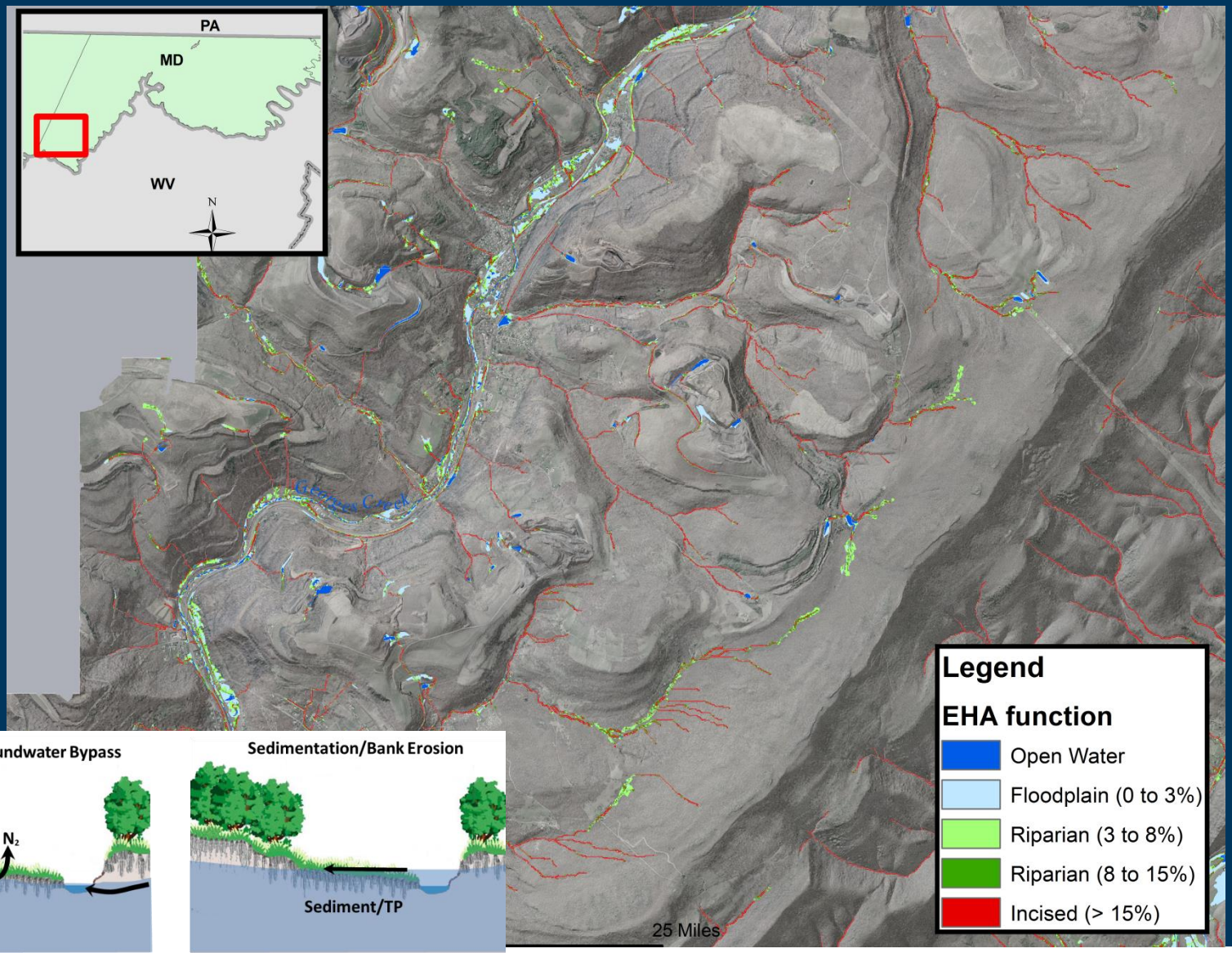
Identifying Opportunities to Target Natural Filters



Characterizing Uncertainty

Depending on which retention efficiencies applied, restoration of TOP100 sites predicted to provide 11 to 71 percent of MD TMDL goal.