

Best Management Practices Mapping and Tracking


CBP Citizens Advisory Committee Meeting

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Chesapeake
Conservancy
EXPLORE. CONSERVE. INNOVATE.

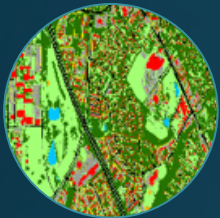
CIC
CONSERVATION
INNOVATION
CENTER
CHESAPEAKE CONSERVANCY

Precision Conservation

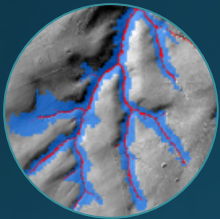
An aerial photograph of a river winding through a landscape. The land is overlaid with various colors: green for agricultural fields, brown for forested areas, and blue for the river. The background shows a distant shoreline with trees and a few buildings under a hazy sky.

*“Getting the right practices, in the right places,
at the right scale, and
making sure they are working”*

Geospatial Support: CBP



(1) 1m Land Cover and Land Use data (2017 and 2021); change products (2013-2021)



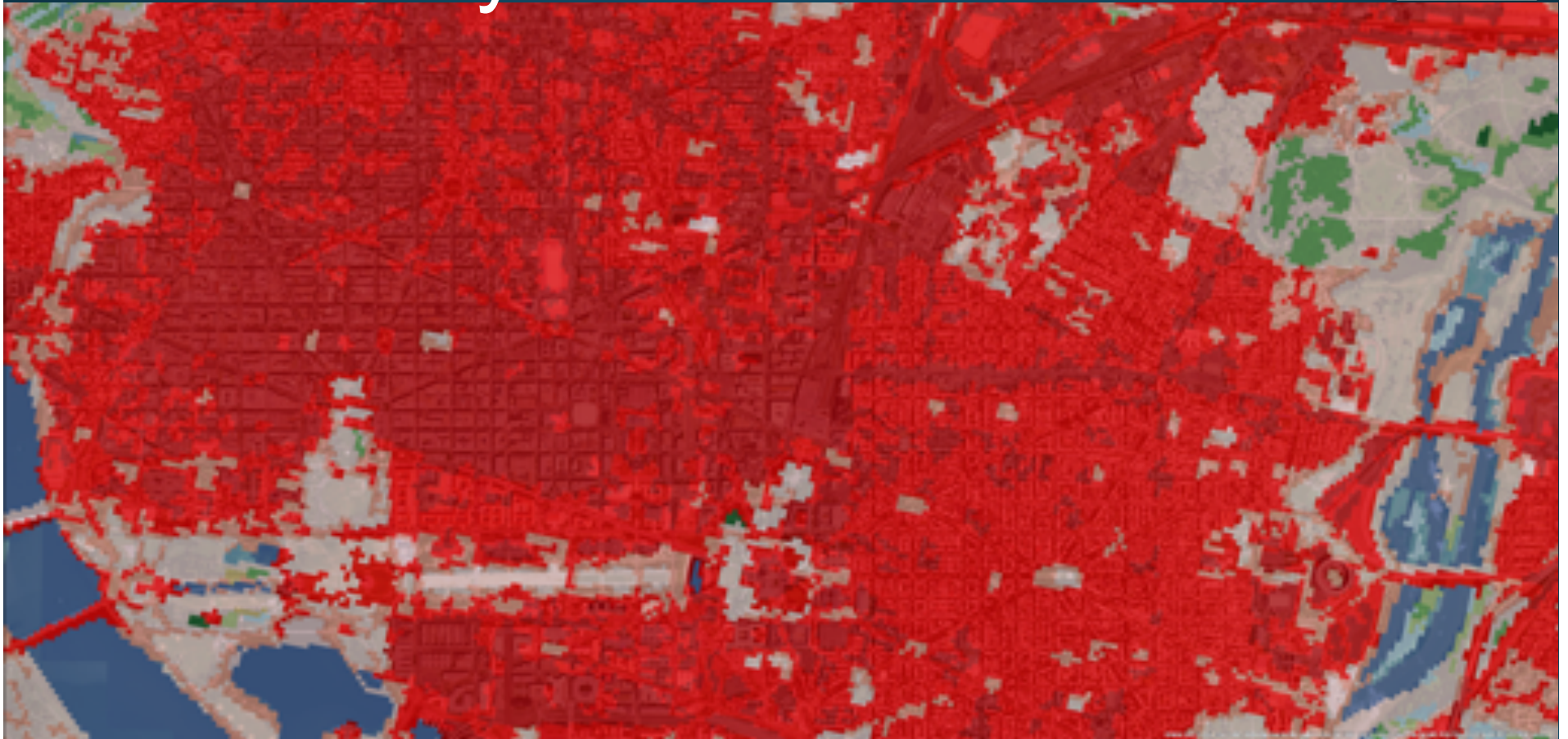
(2) LiDAR derived hydrography and ditch delineation



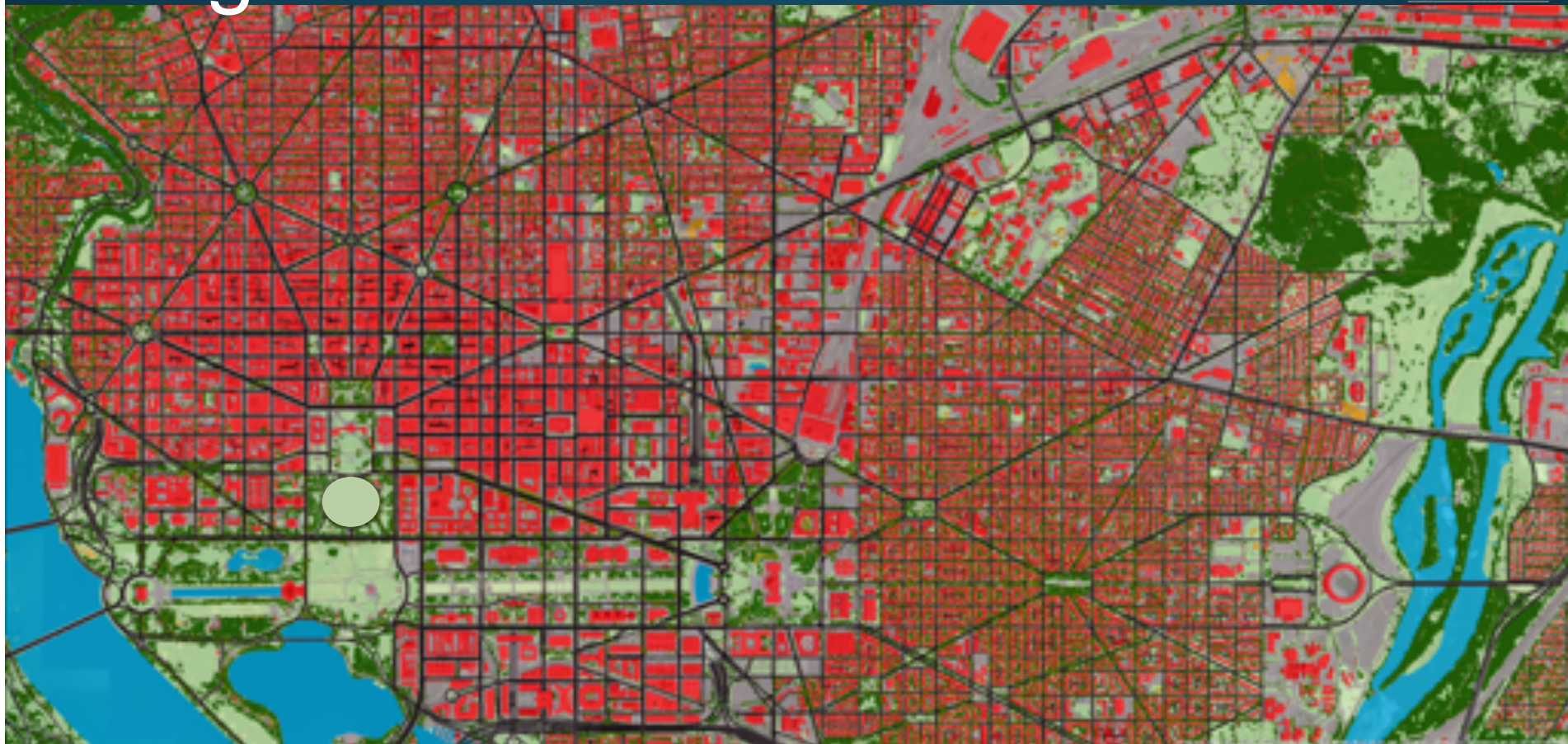
(3) Best Management Practices (BMP) opportunity mapping, tracking, and reporting

(4) Synthesizing geospatial data and integration opportunities

Previously Available Data



High-resolution Data

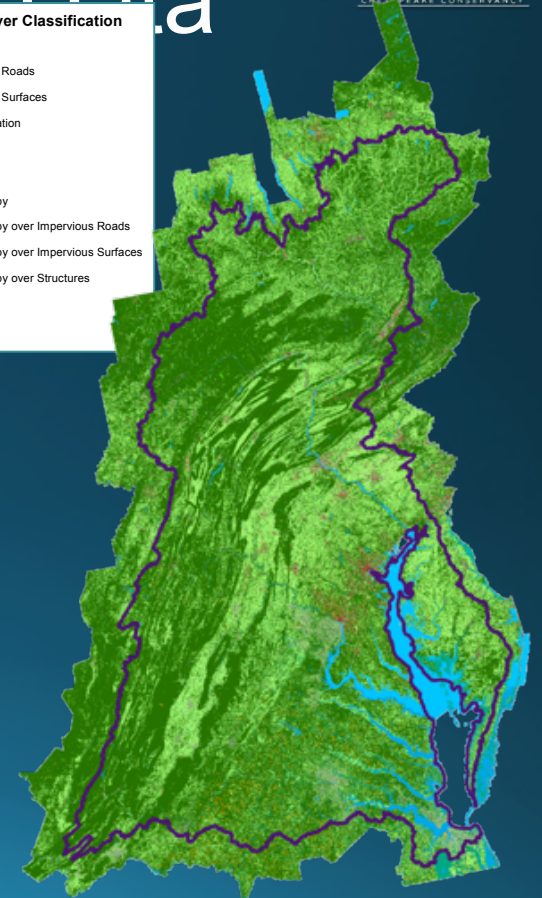


High Resolution Land Cover Data



CBP Land Cover Classification

Orange	Barren
Black	Impervious Roads
Grey	Impervious Surfaces
Light Green	Low Vegetation
Bright Green	Shrubland
Red	Structures
Dark Green	Tree Canopy
Brown	Tree Canopy over Impervious Roads
Olive Green	Tree Canopy over Impervious Surfaces
Yellow	Tree Canopy over Structures
Blue	Water
Teal	Wetlands



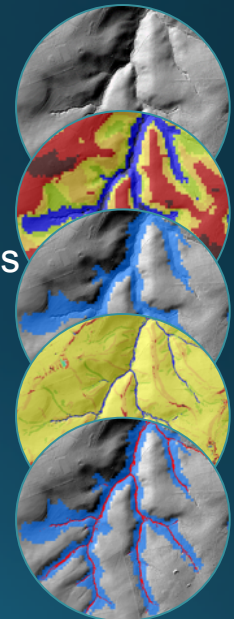
Previously available hydrography data



High Resolution Hydrography Data



1. High-Resolution LiDAR
2. Classify Terrain (10m)
3. Delineate Stream Valleys
4. Classify Terrain (1m)
5. Extract Channels
6. Manual Corrections





The Academy of
Natural Sciences
of DREXEL UNIVERSITY



Objective 3: BMP Mapping & Tracking

Partnering with Chesapeake Commons and Drexel University

Main Goal: To analyze the landscape for potential BMP implementation opportunities for the entire Chesapeake Bay watershed; and designing a streamlined platform for project identification, prioritization, tracking, and standardized reporting.

Agricultural BMPs in the Chesapeake



Water and Sediment
Control Basins



Nutrient Removal
Wetlands



Forested Buffers



Contour Buffer Strips



Grassed Waterways

BMP Identification and Mapping with ACPF: Agricultural Conservation Planning Framework (USDA)

- acpf_V3_Pro.tbx
- 1. DEM Preparation
- 2. Develop Stream Network and Catchments
- 3. Field Characterization
 - a. By-Field Slope Statistics
 - b. Tile-Drainage Classification
 - c. D8 Distance To Stream
 - d. Runoff Risk Assessment
- 4. Precision Conservation Practice Siting
 - a. Depression Identification
 - b. Depression Drainage Area
 - c. Drainage Water Management
 - d. Moore Terrain Derivatives
 - e. Grassed Waterways - SPIThreshold
 - f. Contour Buffer Strips
 - g. Edge-of-field Bioreactors
- 5. Impoundment Siting
- 6. Riparian Assessment
- Utilities

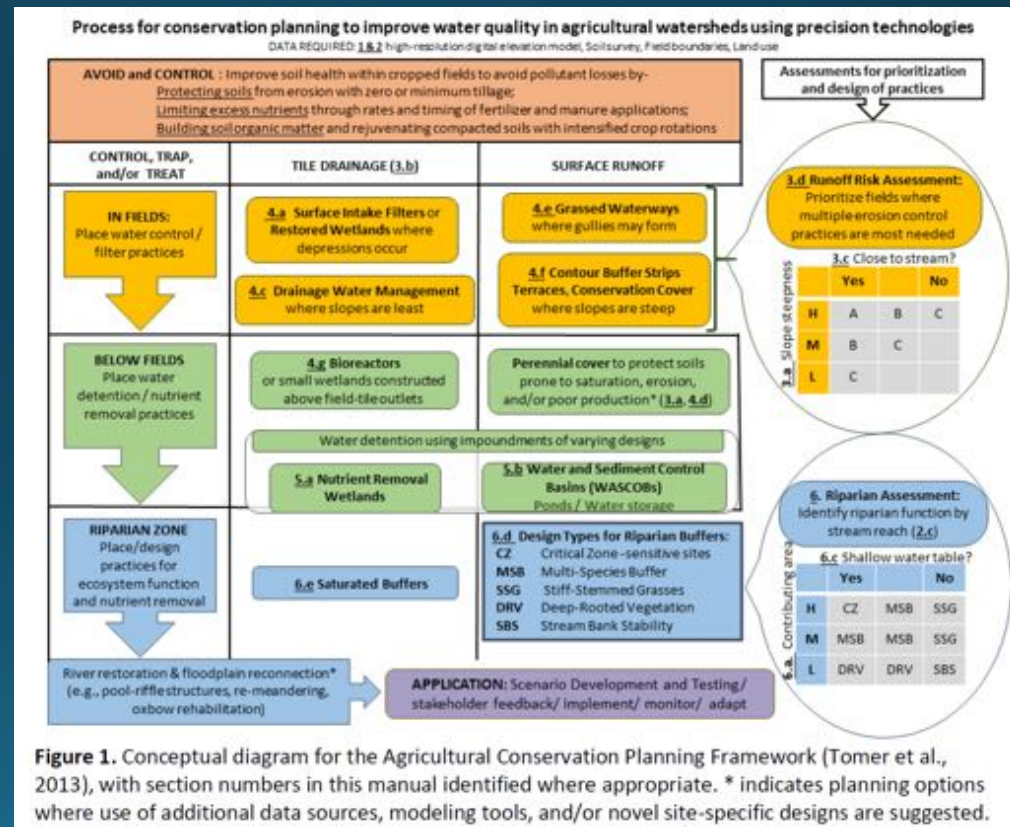














Figure 1. Conceptual diagram for the Agricultural Conservation Planning Framework (Tomer et al., 2013), with section numbers in this manual identified where appropriate. * indicates planning options where use of additional data sources, modeling tools, and/or novel site-specific designs are suggested.













CBP Land Cover Classification

	Barren
	Impervious Roads
	Impervious Surfaces
	Low Vegetation
	Shrubland
	Structures
	Tree Canopy
	Tree Canopy over Impervious Roads
	Tree Canopy over Impervious Surfaces
	Tree Canopy over Structures
	Water
	Wetlands

Pixel size: 1 meter by 1 meter

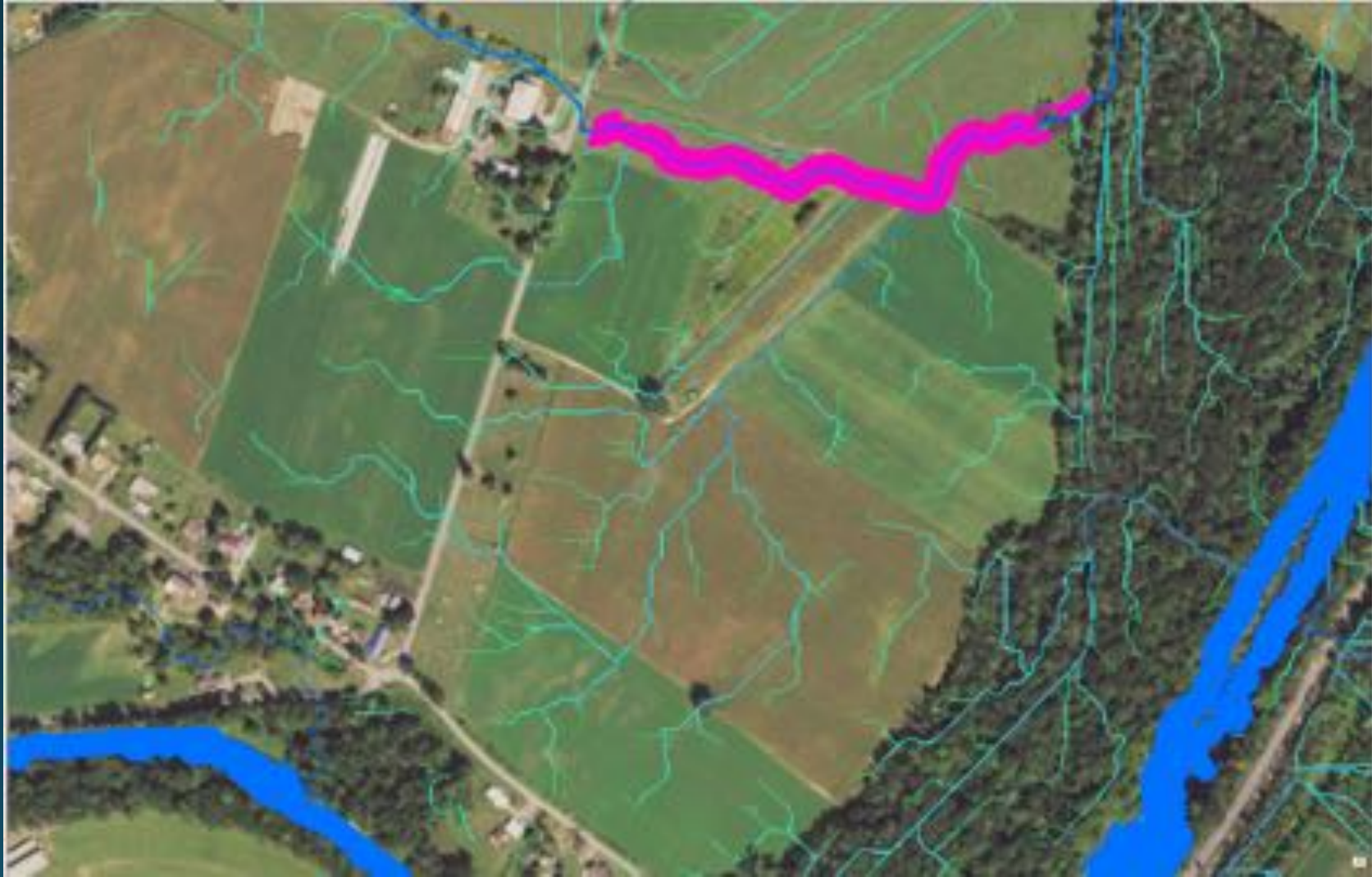
High Resolution Land Cover Dataset

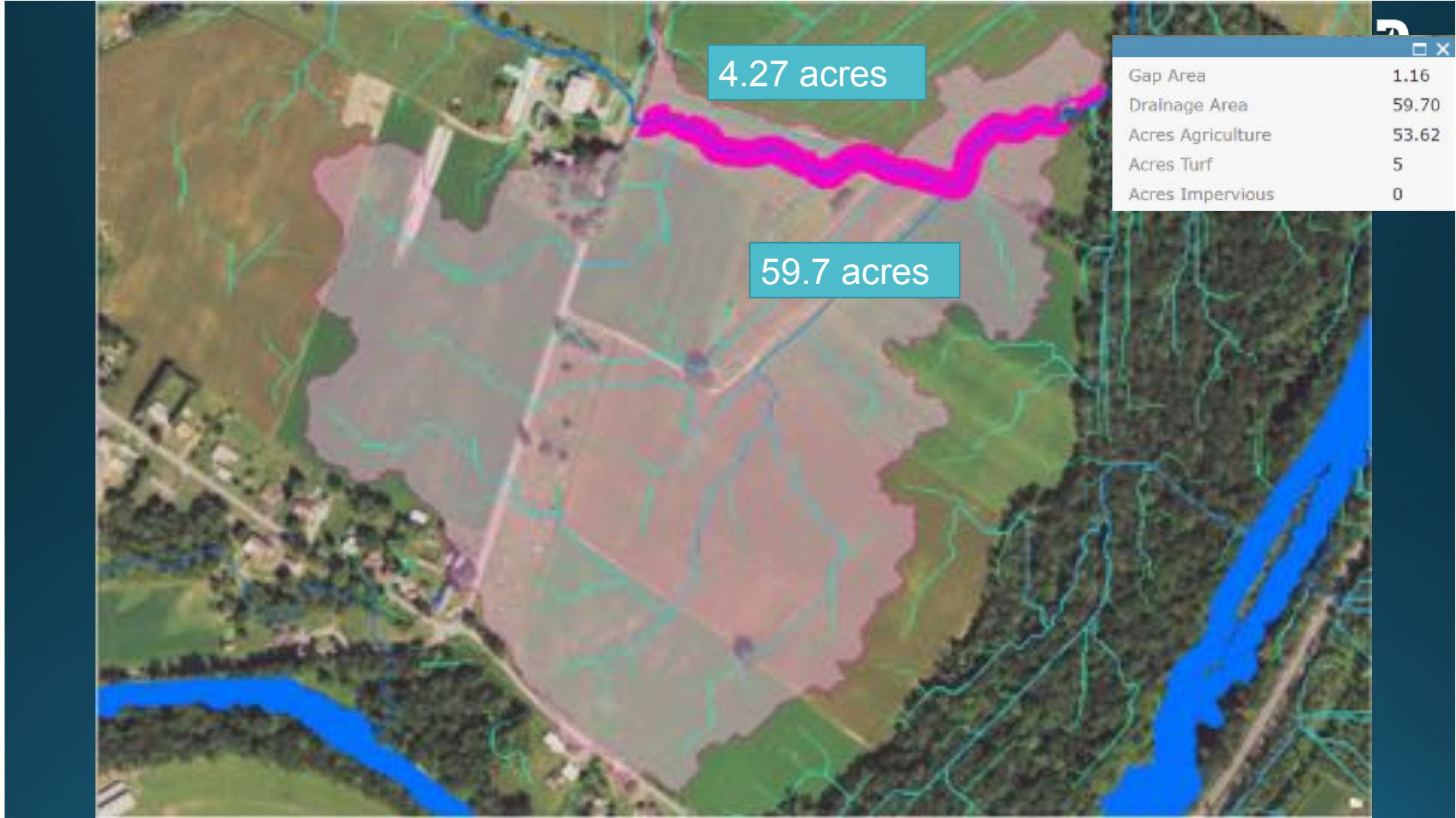
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Identified gaps in riparian forest buffer coverage





An aerial photograph of a suburban residential area. The landscape is characterized by numerous small, red-roofed houses interspersed with green lawns and trees. A network of dark, winding roads and paths crisscrosses the area. In the upper right, a larger building with a red and white striped roof is visible. The bottom right corner shows a blue body of water, likely a lake or river. The overall scene depicts a typical suburban neighborhood layout.

Integrating additional R&D



Fixed width buffer

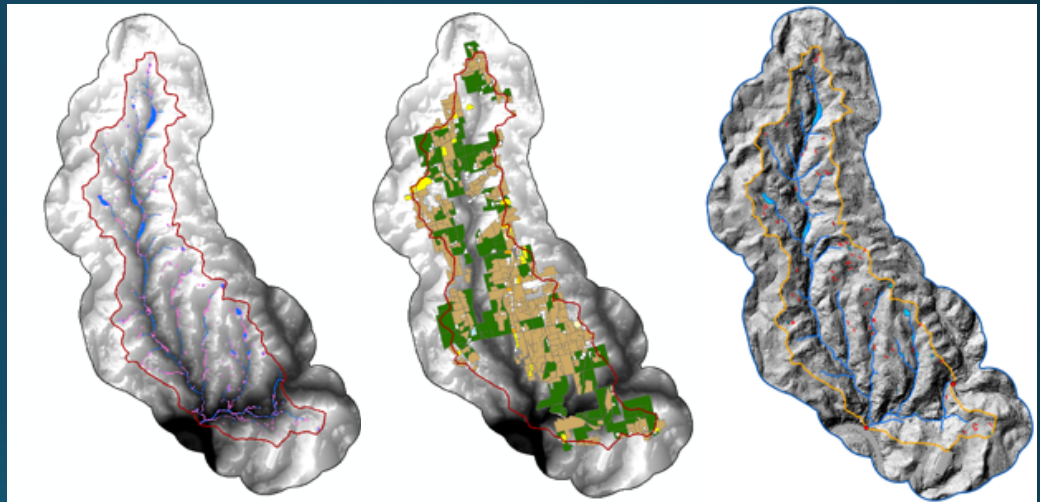


Precision buffer

Fares, Hawaii Water Quality Conference, March 24-25 2008

Pilot region

- BMP opportunity analysis by October 2019
- 73 HUC12s covering York and Lancaster counties, PA
- Technical advisory group
 - Validation
 - Informing tool parameters



Urban Stormwater BMP Opportunity Mapping

- Upcoming research over the next few years
 - Working with Drexel ANS
 - Modeling surface flow of water
 - Utilizing stormwater infrastructure GIS data
- Top counties with greatest potential to achieve pollution reductions from stormwater practices?
- Potential urban BMPs of most interest for mapping?
 - Ponds
 - Infiltration/filtering practices
 - Runoff reduction/stormwater treatment
 - Nutrient management
 - Stream restoration
 - Erosion/sediment control
 - Forest buffers/tree planting



https://commons.wikimedia.org/wiki/File:Prefabricated_culverts_under_country_road_in_Rocklea_Queensland_Australia.jpg



<https://www.flickr.com/photos/taestell/15013858234>

More Information



- CIC

<http://conservationinnovationcenter.org>

- Chesapeake Bay Program Cooperative Agreement

<https://chesapeakeconservancy.org/conservation-innovation-center/precision-conservation/chesapeake-bay-program/>

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