Conservation Innovation:

Leveraging GIS to Identify Landscape-scale Conservation and Restoration Priorities

CASSANDRA PALLAI
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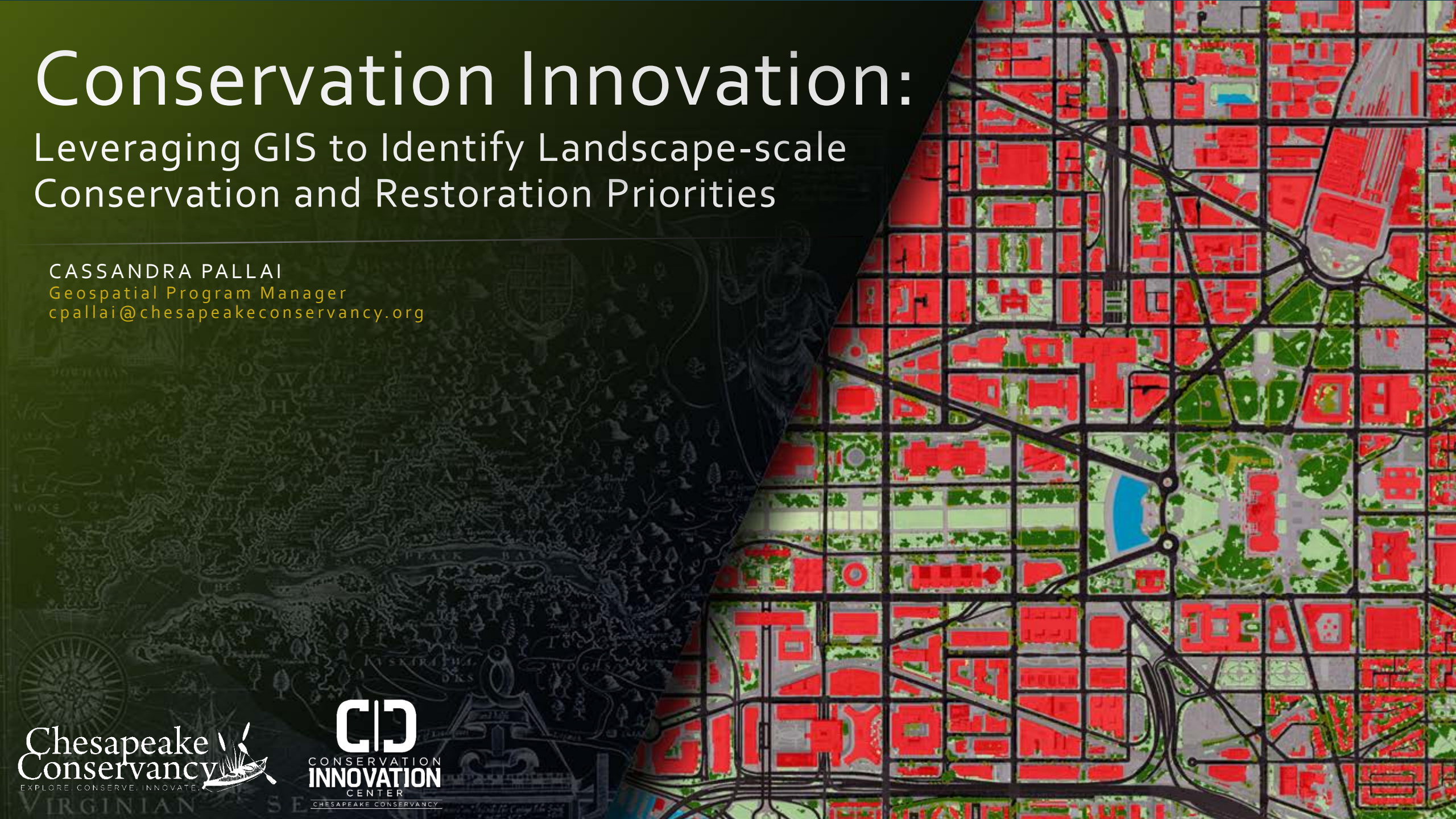
cpallai@chesapeakeconservancy.org



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Our Mission

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Precision Conservation

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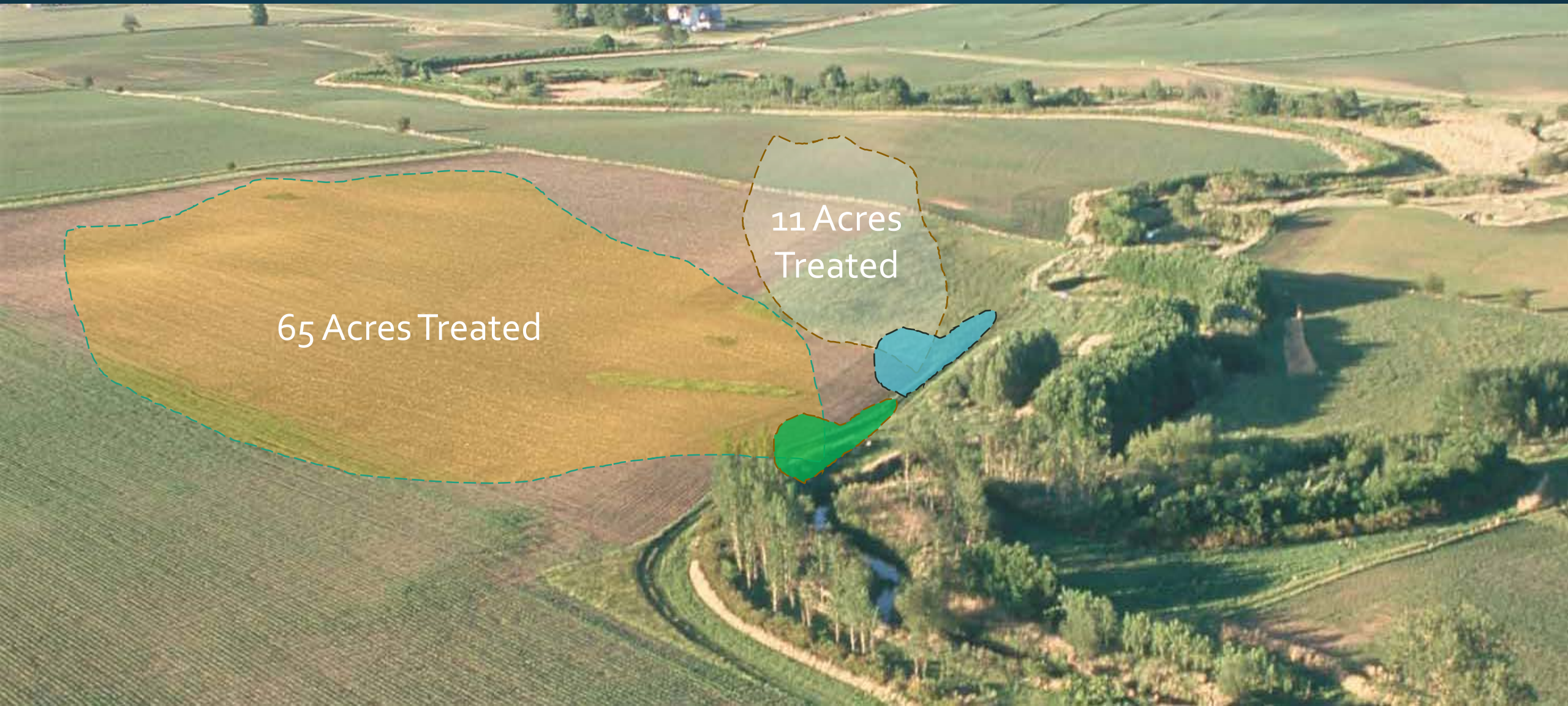
"Getting the right projects, in the right places, at the right geographic scale, and making sure they are working"

Impacts on the Ground

Measuring Progress



Enabling Partners

Data

Land Cover/Use

Flow Path Maps

Prioritizations

Web-based tools

Access

Products


CANADA
UNITED STATES
CONSERVATION
INNOVATION
CENTER
CHESAPEAKE CONSERVANCY
University of Vermont
Spatial Analysis Lab
WorldView
SOLUTIONS
DEQ
Virginia Department of
Environmental Quality
Chesapeake Bay Program
Science. Restoration. Partnership.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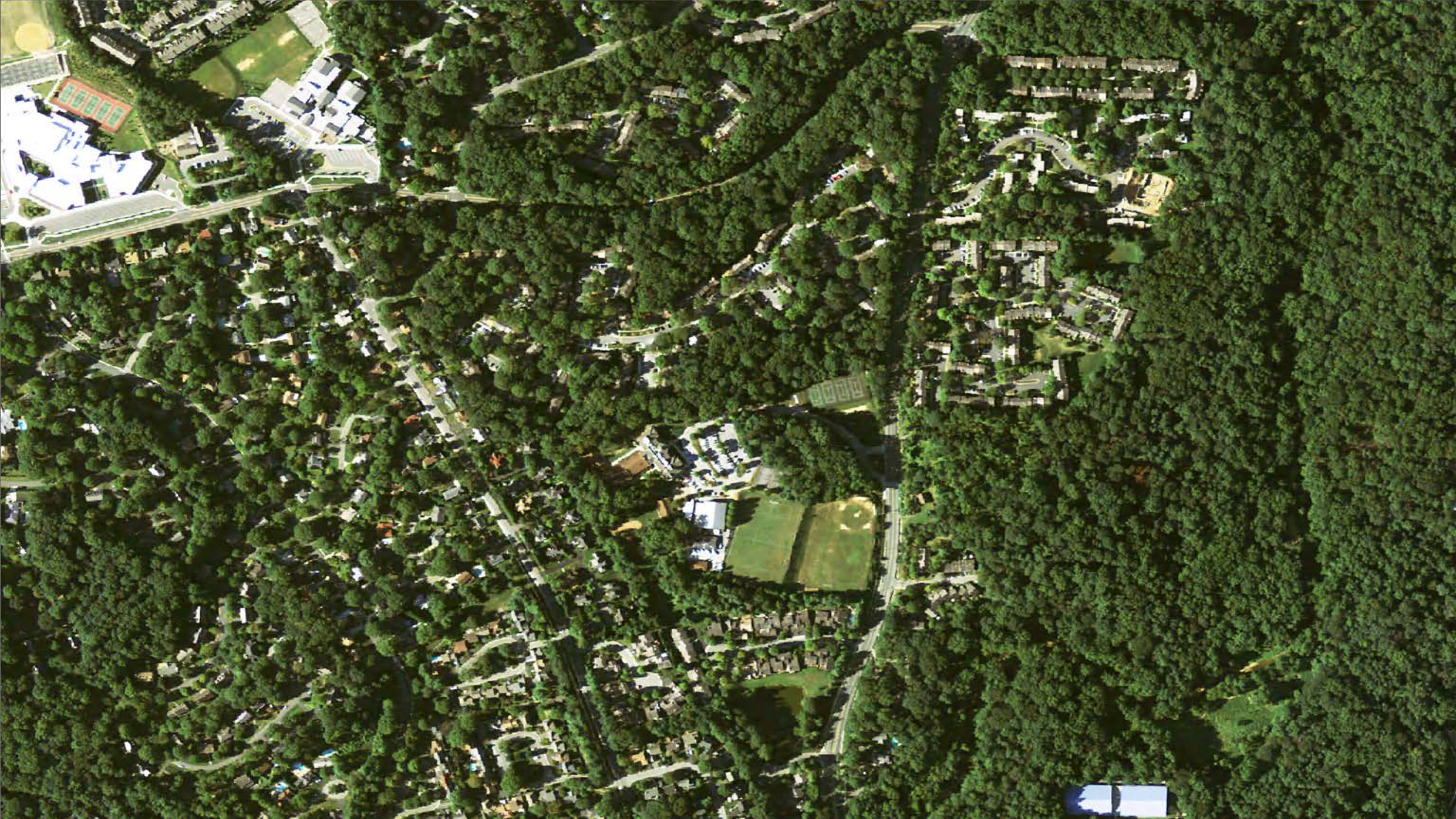

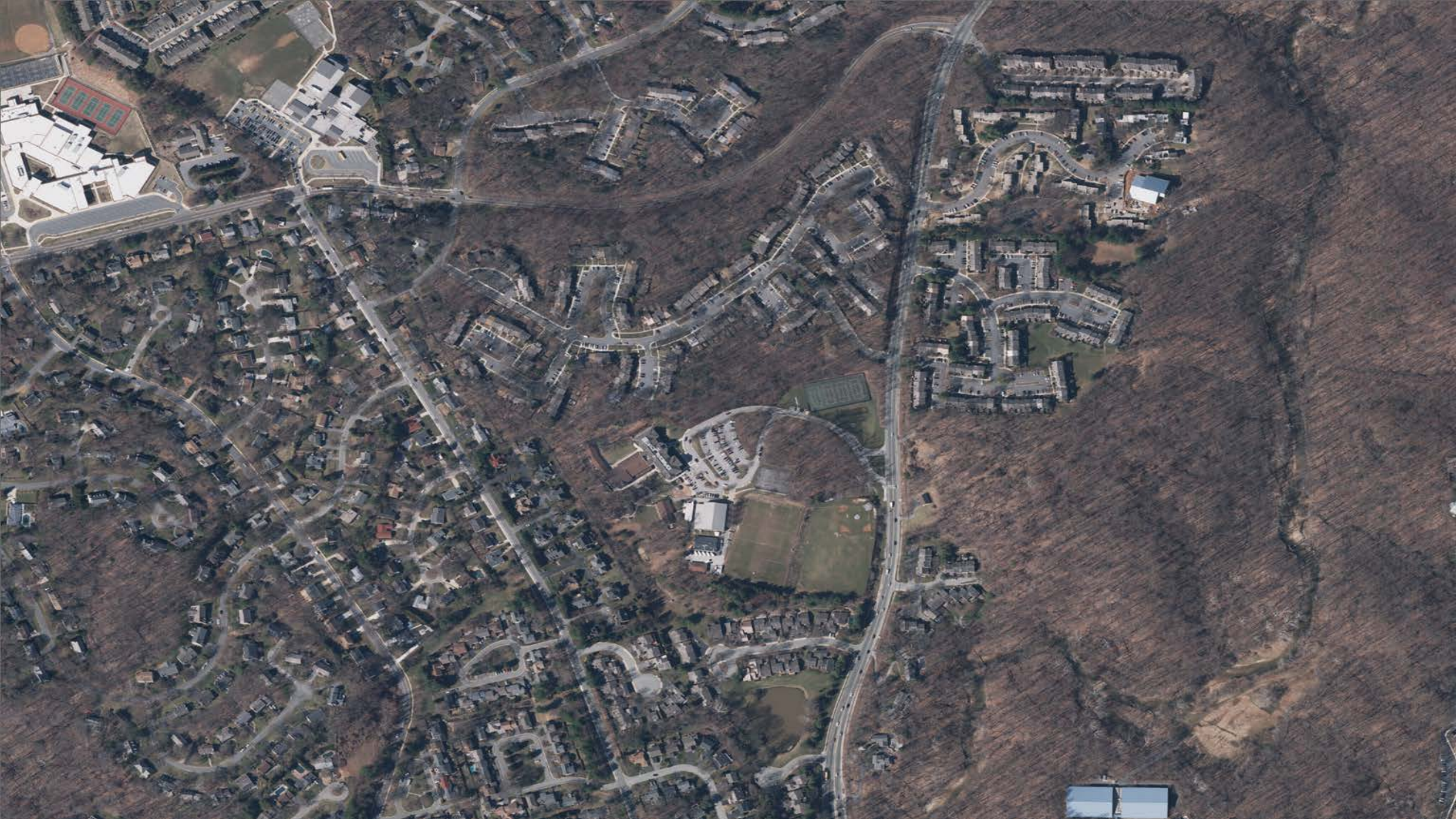

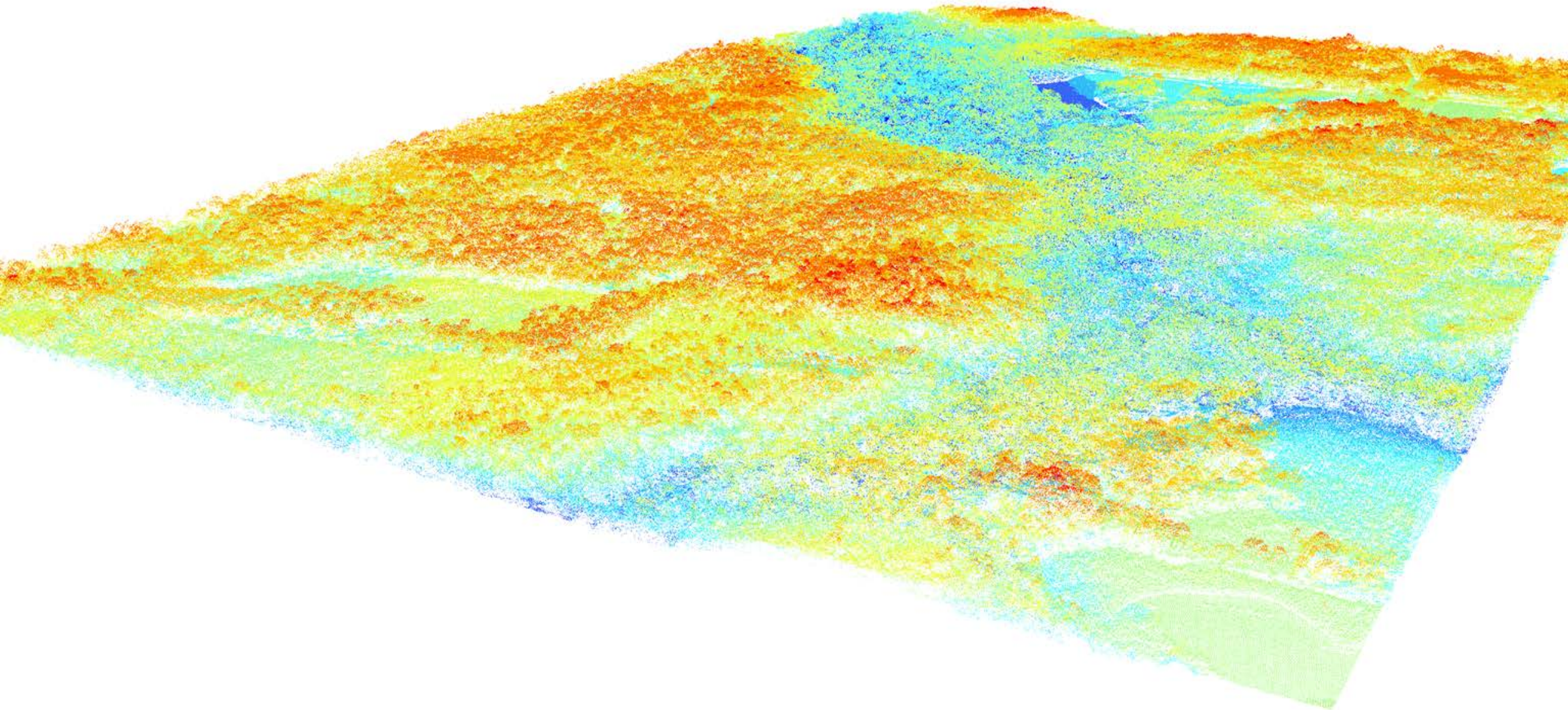

Workflow

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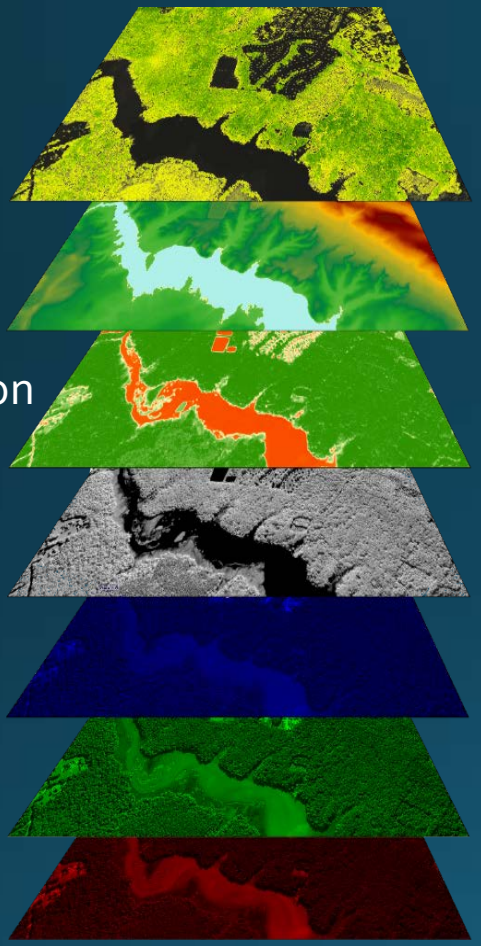
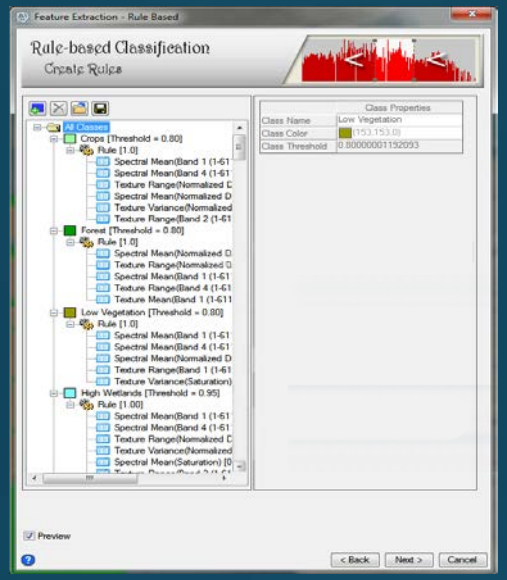
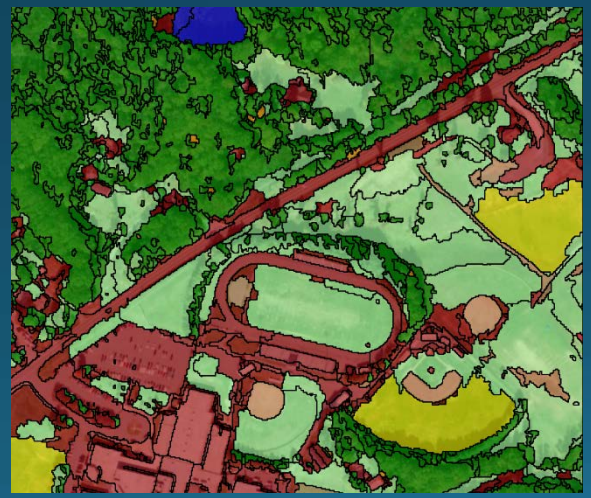
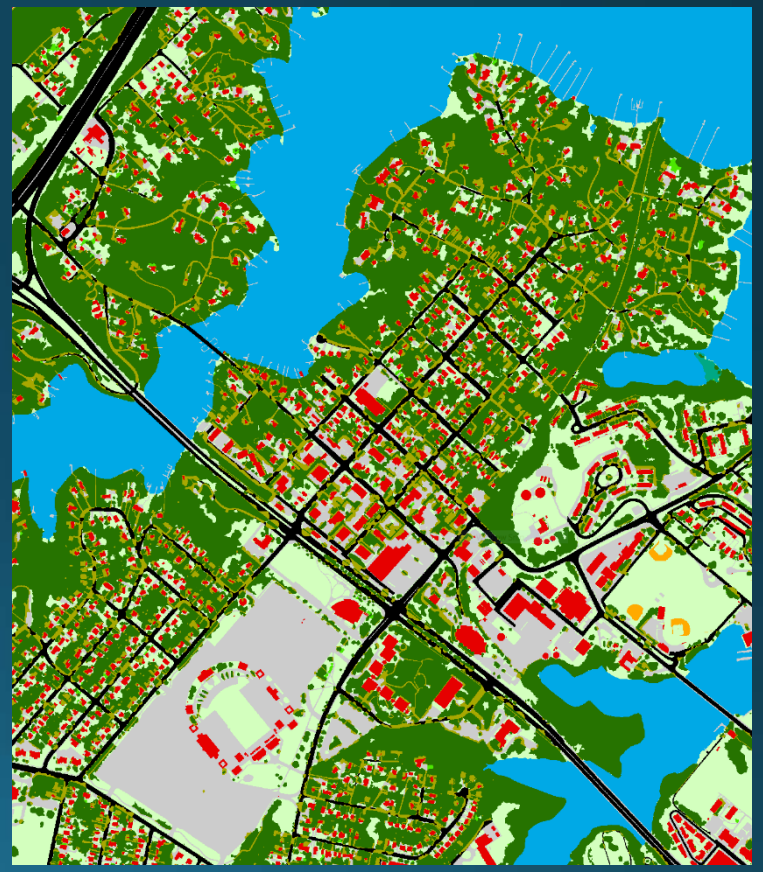


Collect Data for Landscape





Classify Data for Landscape



Correct Mistakes

CBPP High-resolution Land Cover Data

2013-2014 snapshot

Incorporates stakeholder review

Raster format

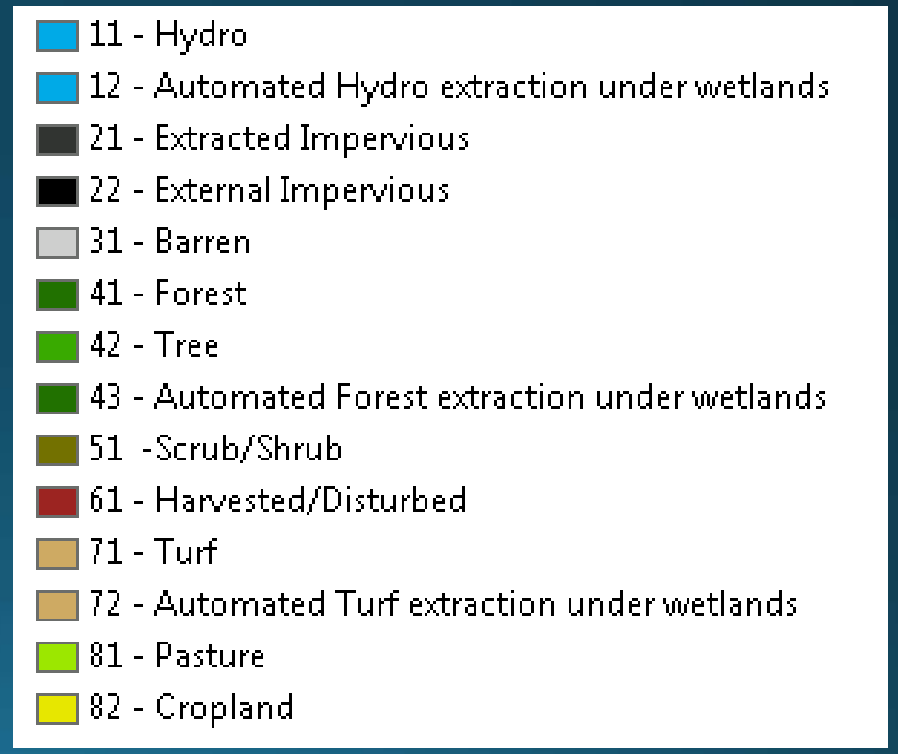
1 meter pixel size

Projection:
Albers Equal Area – USGS version

MD, WV, PA, NY, DE, D.C.

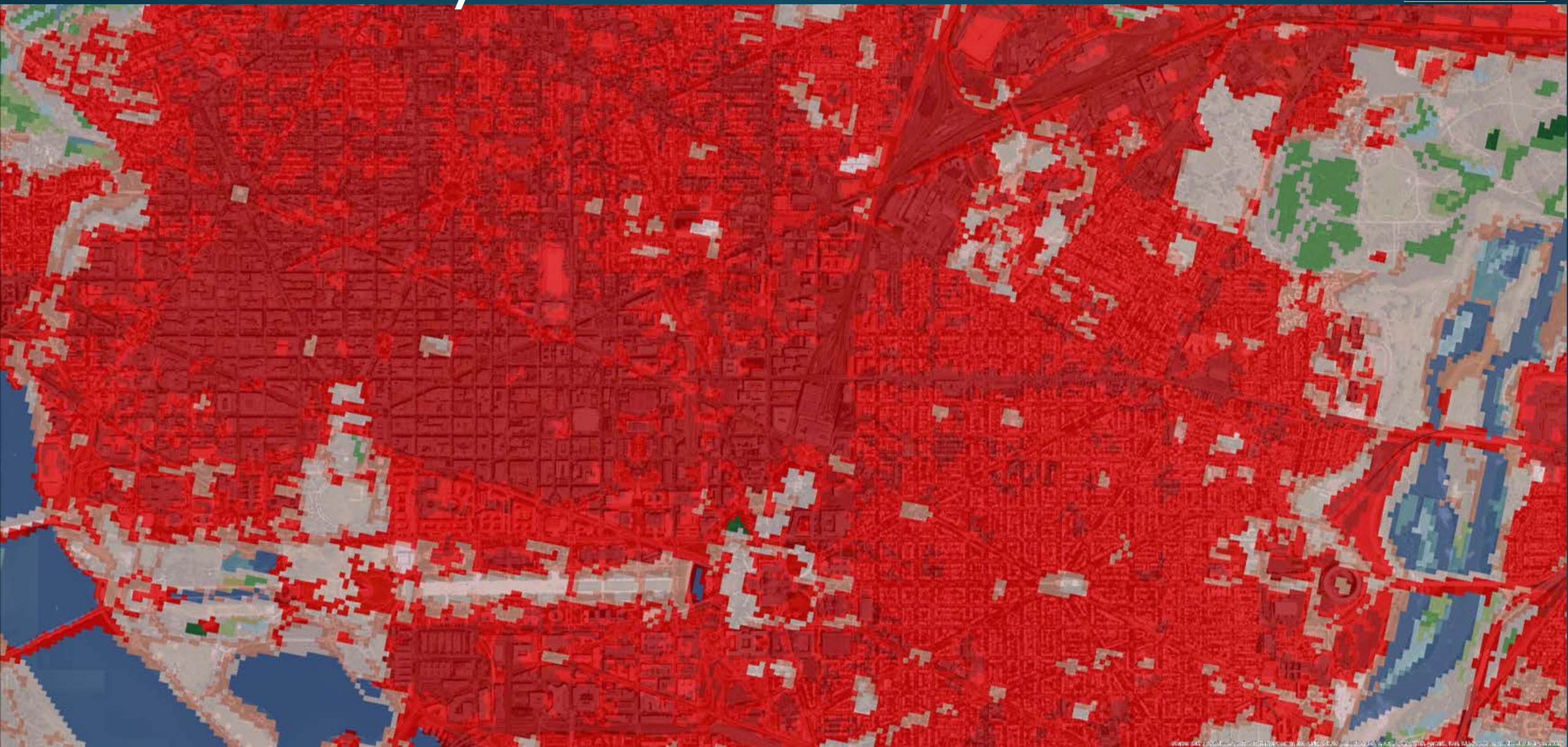
https://www.conservationinnovationcenter.org/land-cover-data-project/

VA

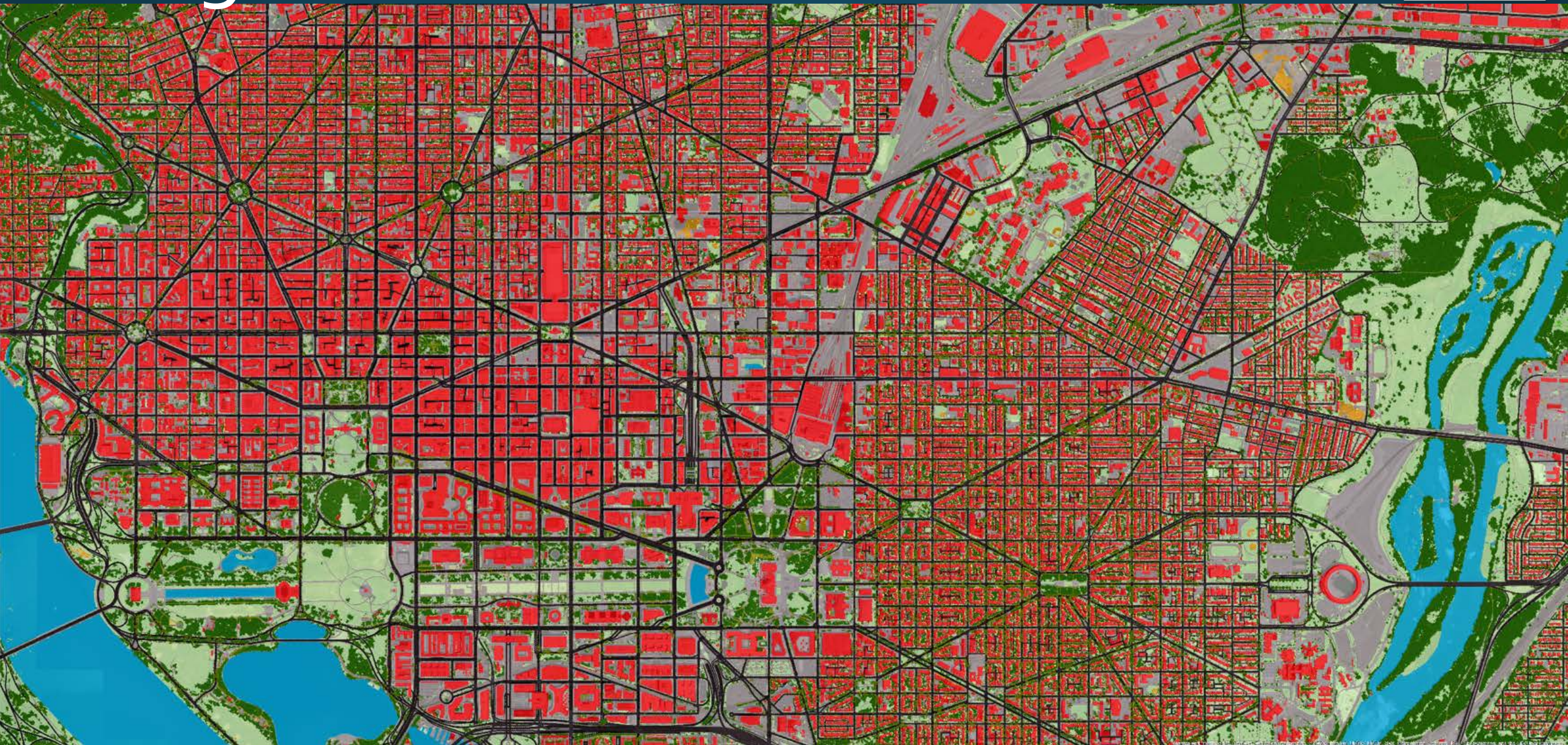


https://www.vita.virginia.gov/integrated-services/vgin-geospatial-services/land-cover/

Previously Available Data



High-resolution Data



High-resolution Data

Planning at the Parcel Scale

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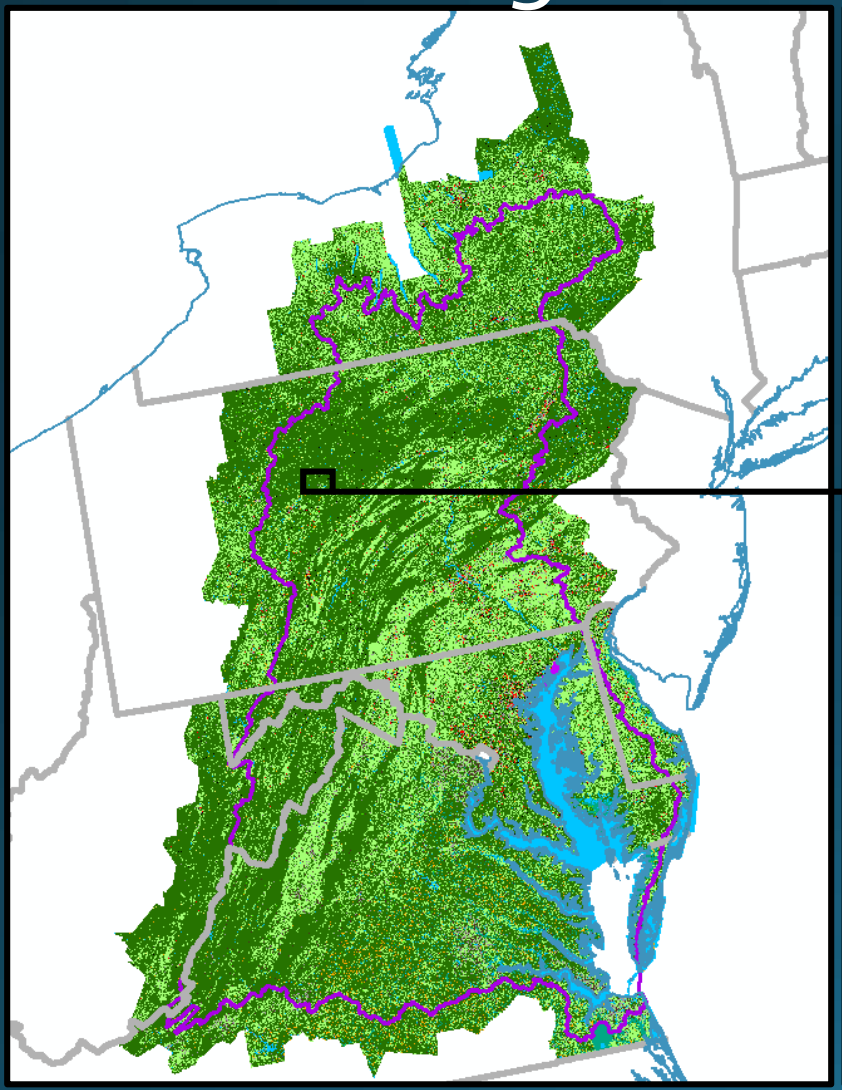

Enabling Partners

Data

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Flow Path Maps

Prioritizations

Web-based tools

Access

Products

Lidar Flow Path Mapping

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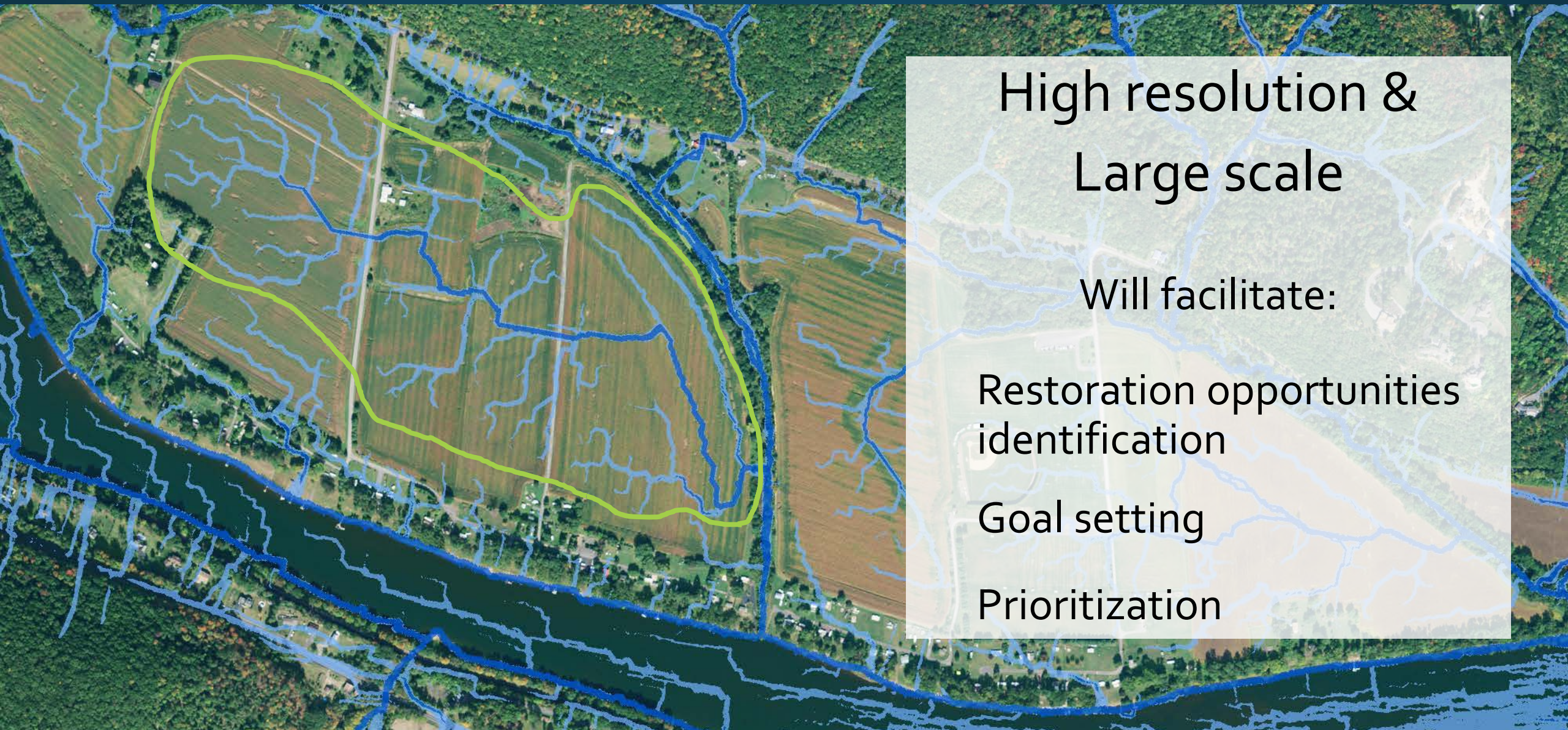
Lidar Flow Path Mapping



High resolution & Large scale

Will facilitate:

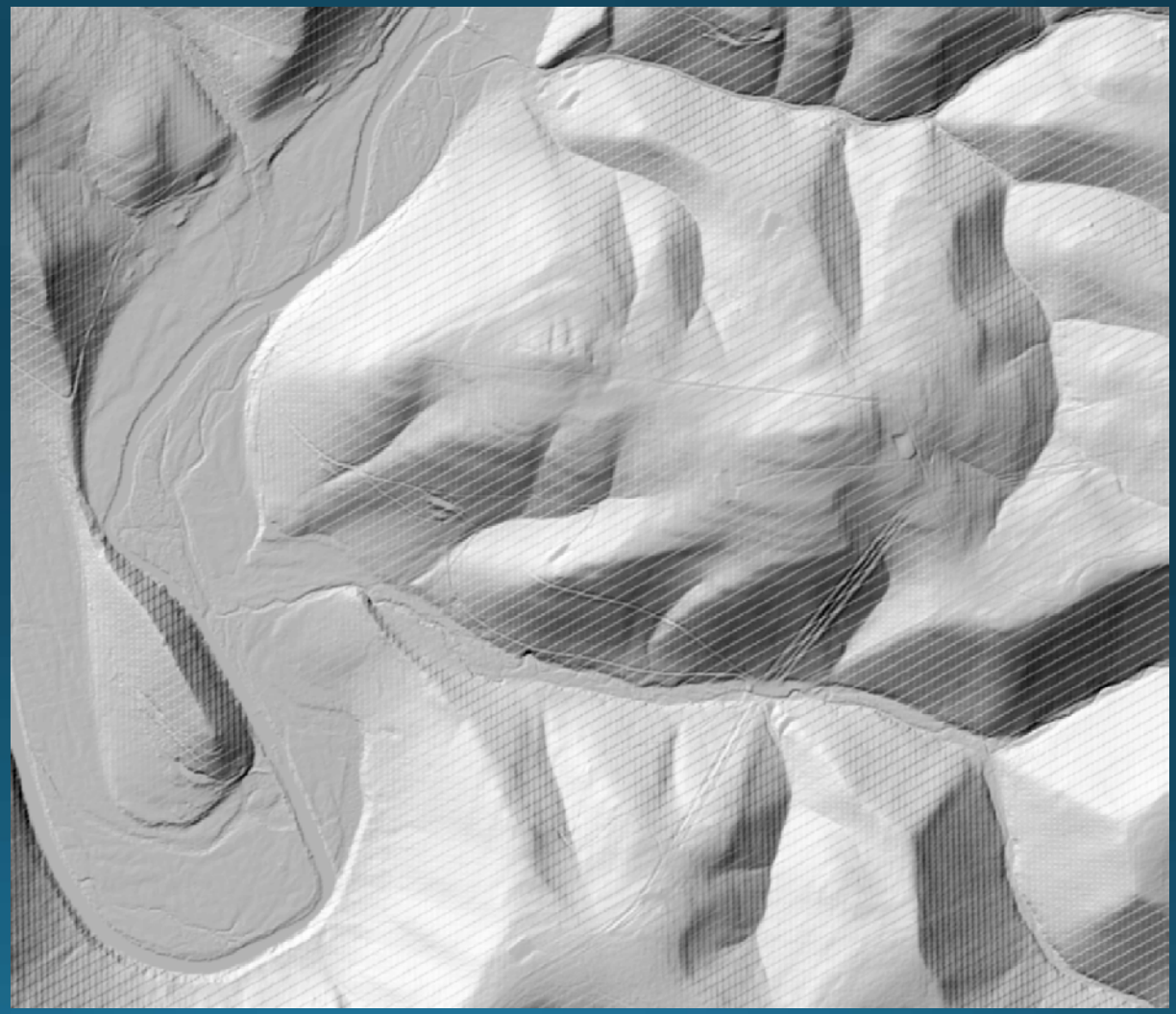
Restoration opportunities identification

Goal setting

Prioritization

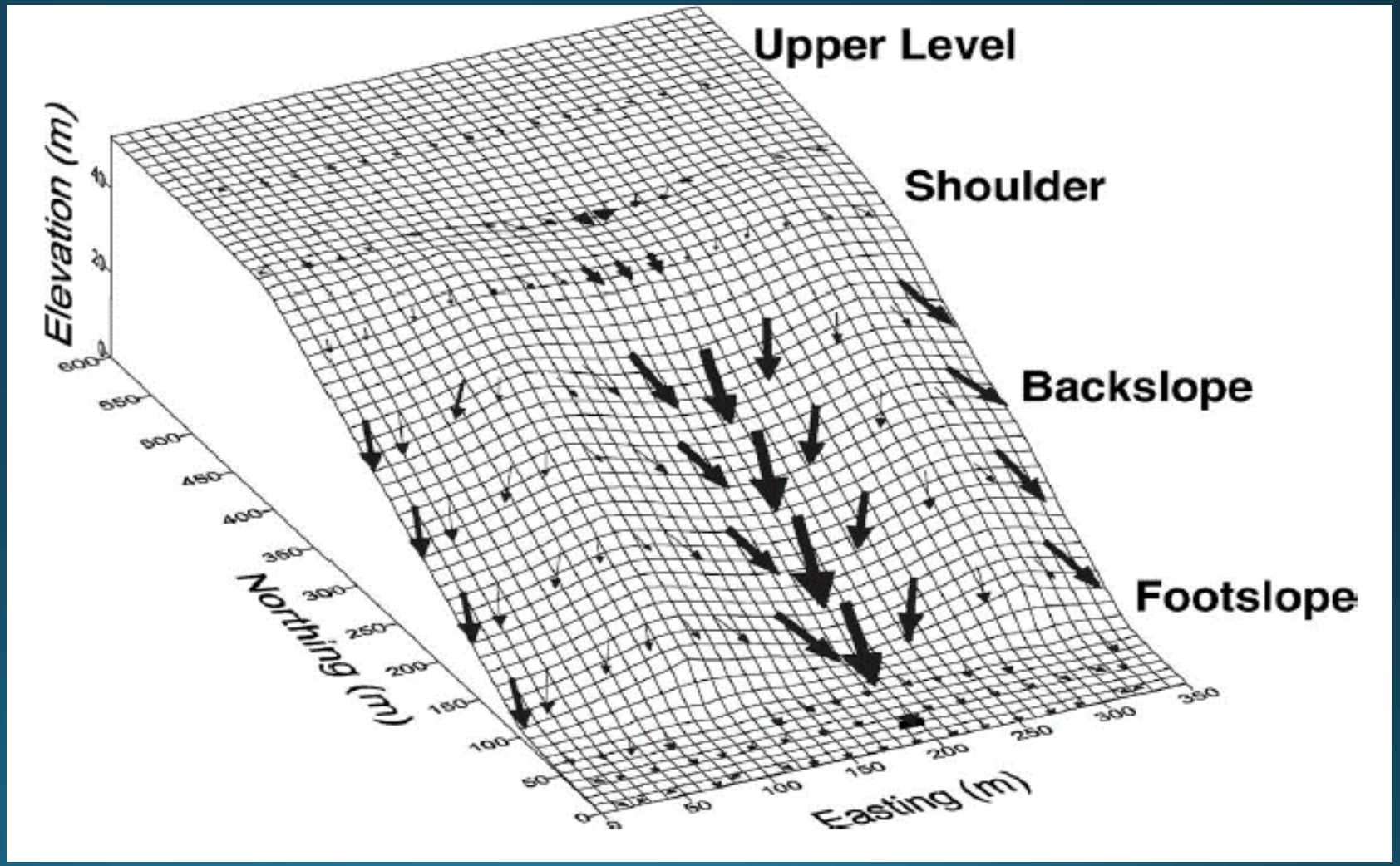
Lidar Flow Path Mapping

1) Start with a Digital Elevation Model.



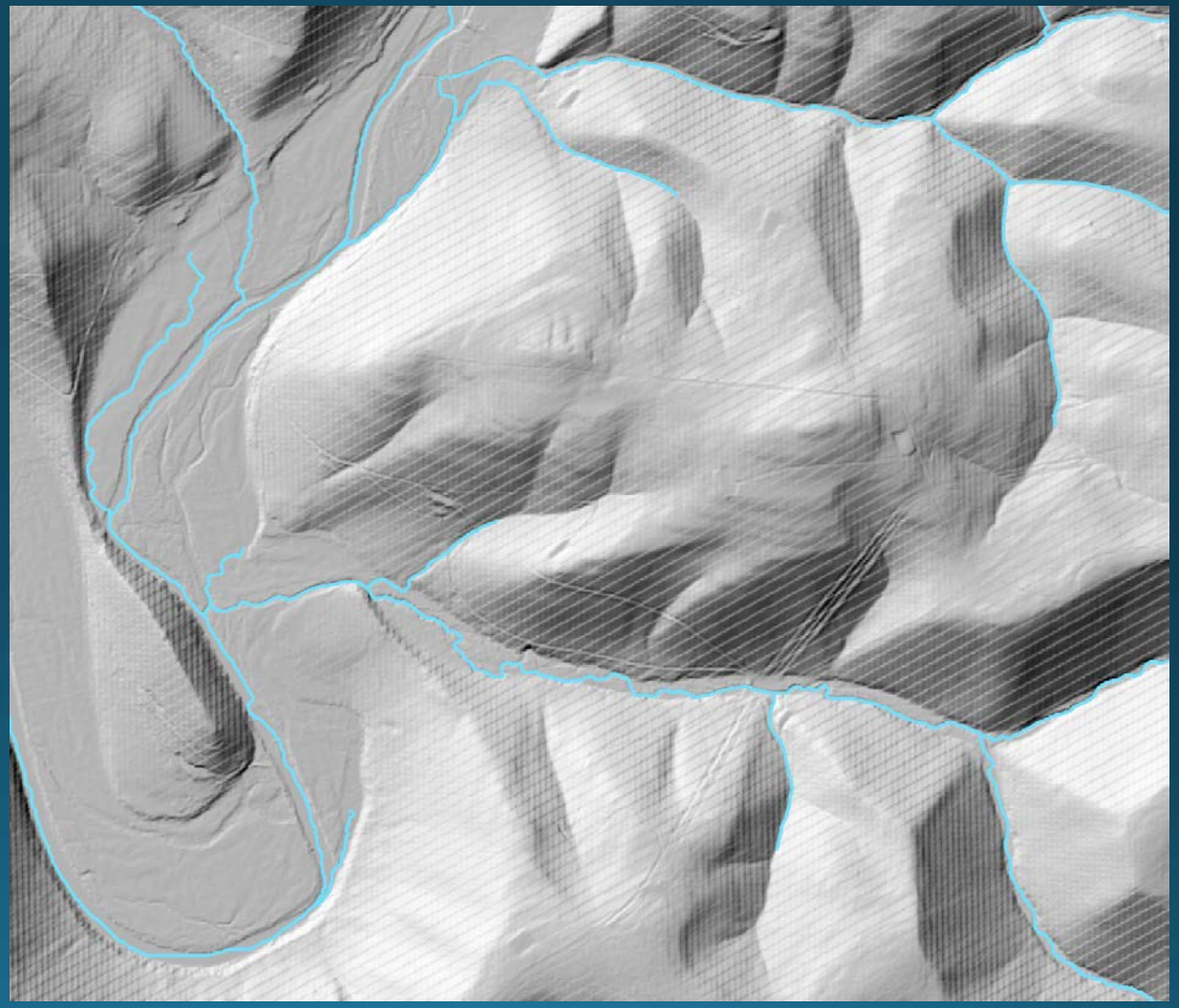
Lidar Flow Path Mapping

2) Figure out how water moves across the landscape.



Lidar Flow Path Mapping

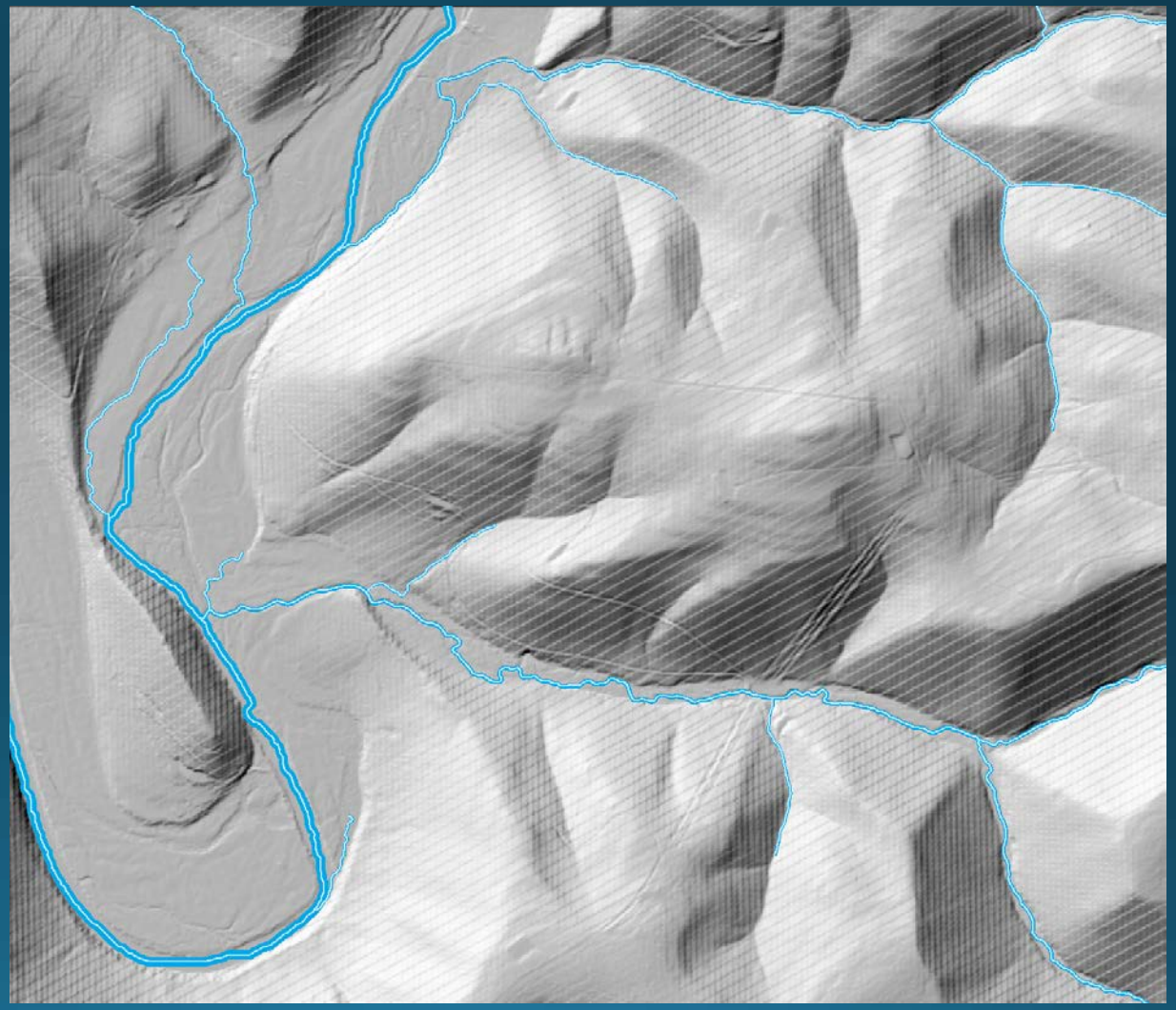
3) Find the areas where water accumulates.



Flow path

Lidar Flow Path Mapping

4) Determine stream width based on drainage area and stream order.



Stream width

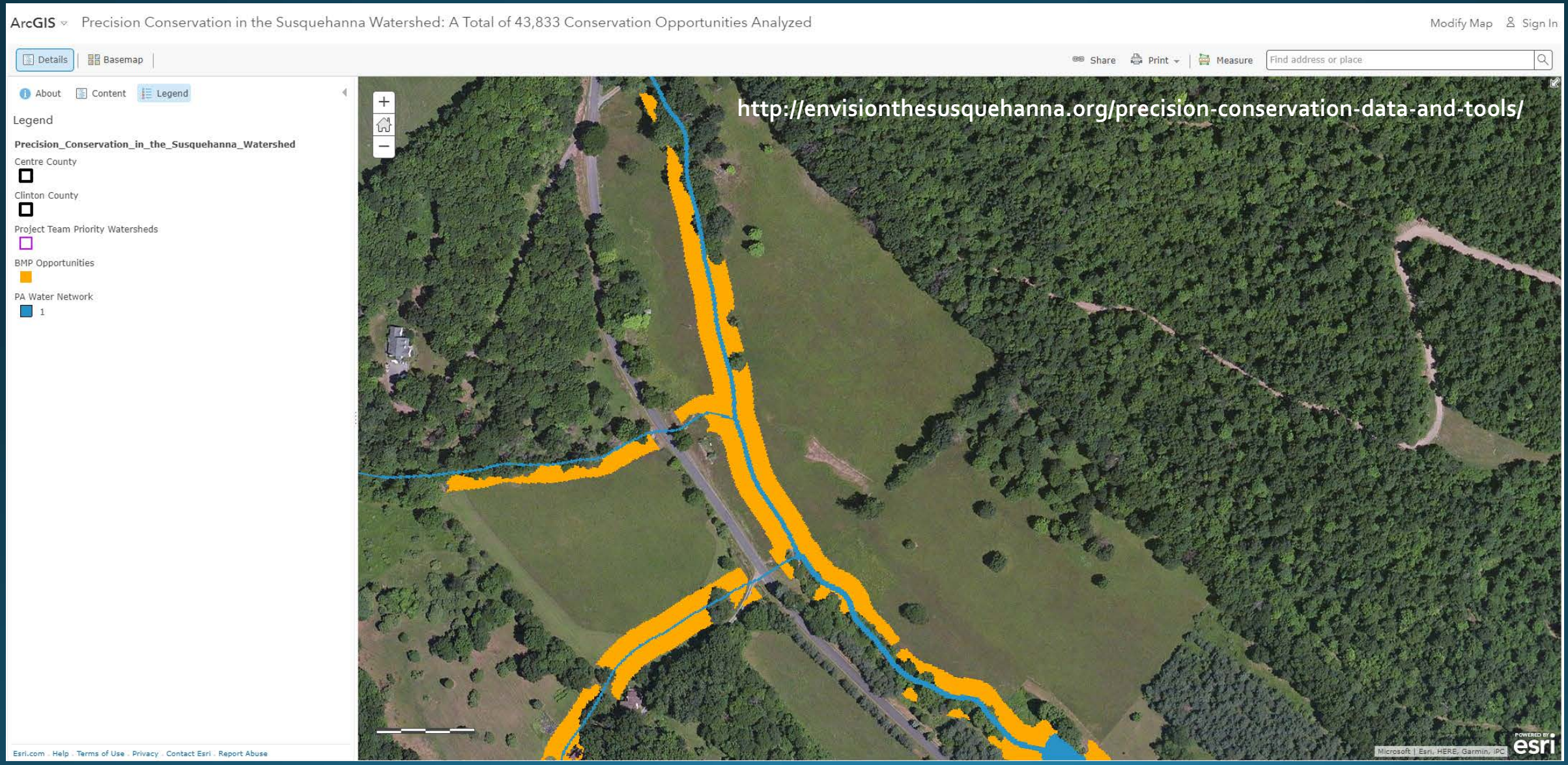
Flow path

Lidar Flow Path Mapping

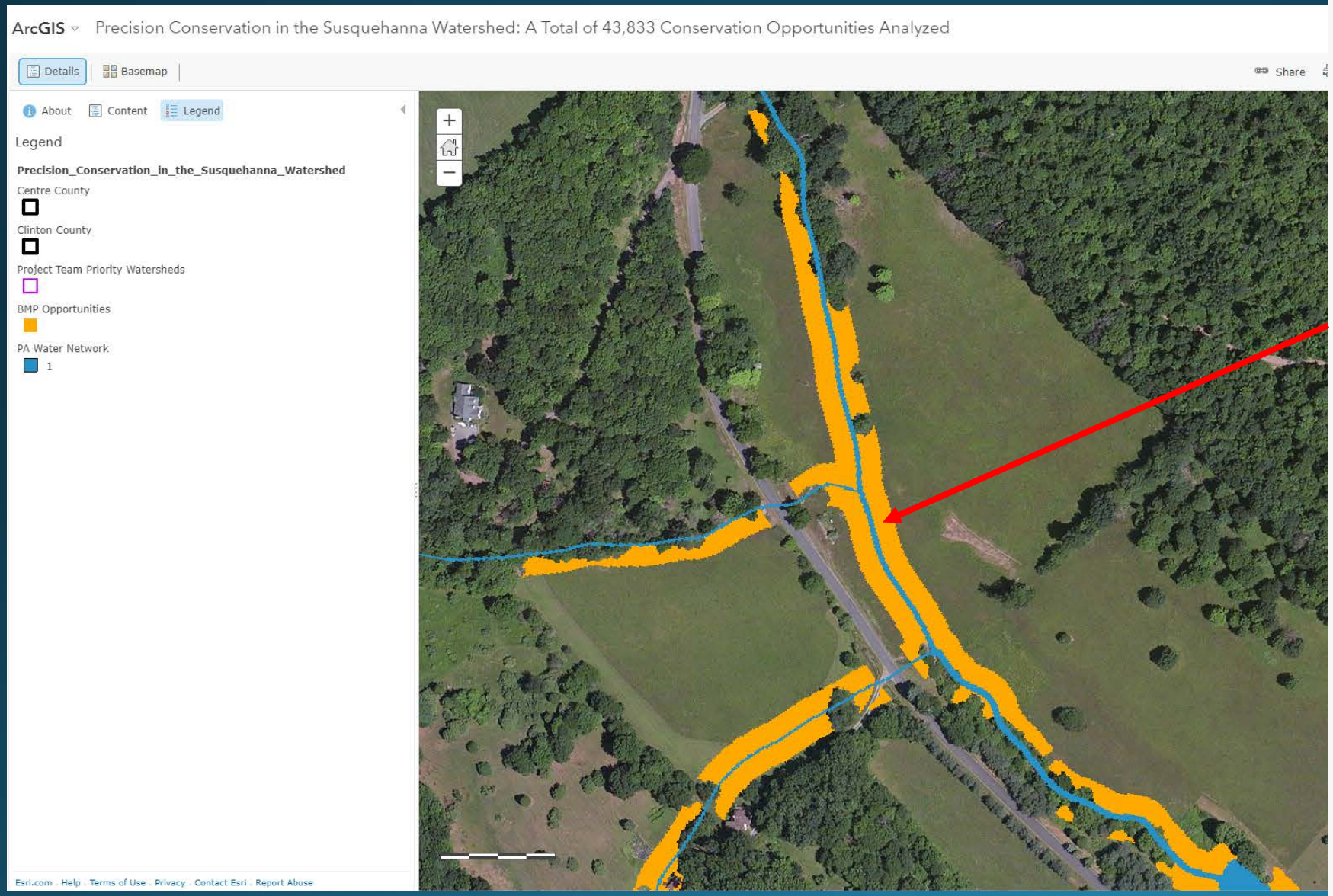
Lidar Flow Path Mapping

Lidar Flow Path Mapping

Restoration Opportunity Areas



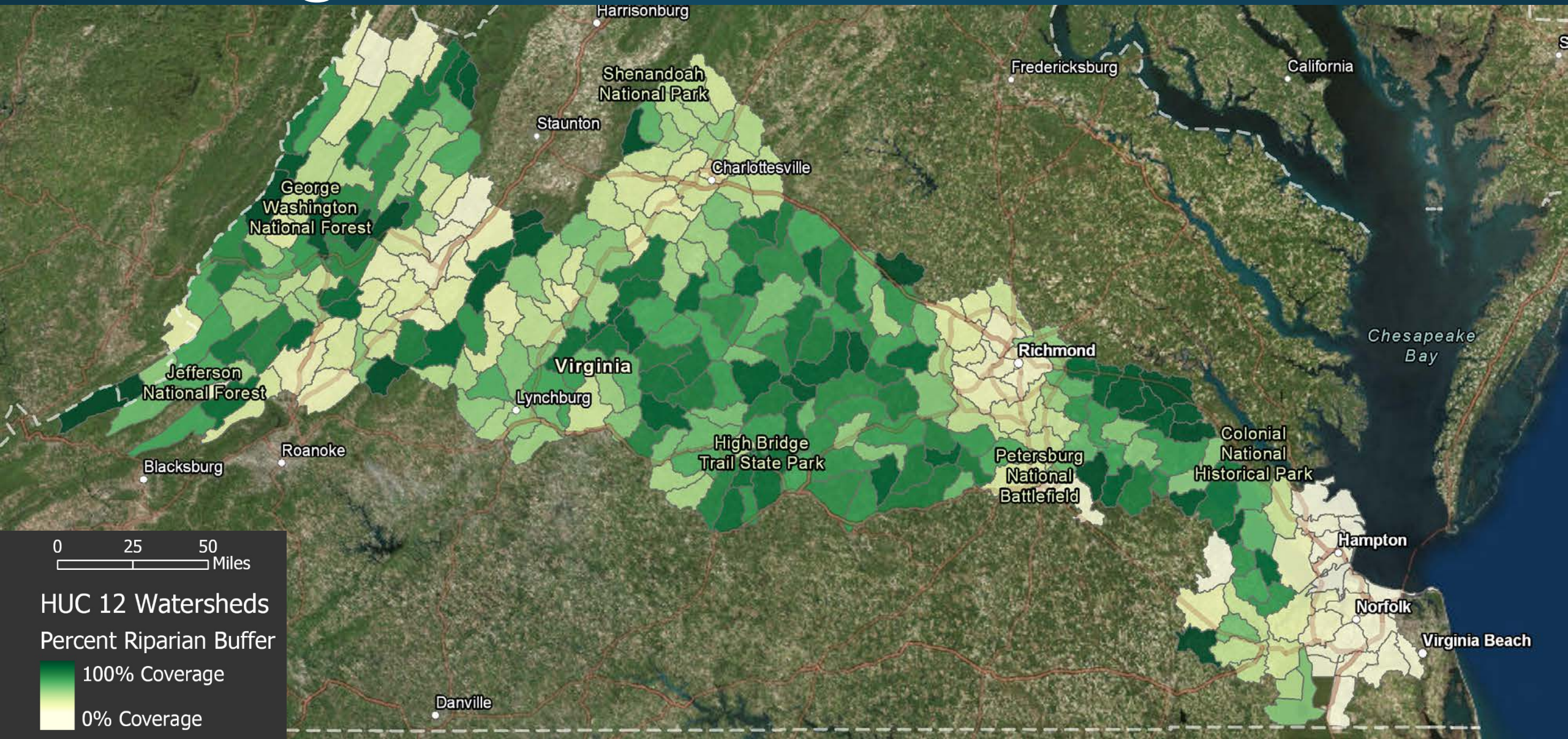
Restoration Opportunity Areas



Riparian Buffer Gaps: 0.52

Gap Area	0.52
Drainage Area	10.77
Acres Agriculture	3.67
Acres Turf	0
Acres Impervious	0
Drainage Area to Gap Size	7.15
Channel Meander	0.99
Trout Water	0
Impaired	1
Exceptional Value or High Quality Stream	0
Habitat Connectivity	5
Brook Trout	1
American Woodcock	1
Cerulean Warbler	0
Louisiana Waterthrush	1
Black-throated Blue Warbler	0
Hellbender	0
Golden-winged Warbler	1
Total Species of Interest	3
Soil Erodibility Factor	0.71
No Karst	1
Area Low Gap Slope	0.52
Area Medium Gap Slope	0.00
Area High Gap Slope	0.00
Final Rank	5,986

In Virginia


Harrisonburg
Shenandoah National Park
Staunton
Fredericksburg
California
Charlottesville
George Washington National Forest
Jefferson National Forest
Virginia
Lynchburg
Richmond
Chesapeake Bay
Blacksburg
Roanoke
High Bridge Trail State Park
Petersburg National Battlefield
Colonial National Historical Park
Hampton
Norfolk
Virginia Beach
Danville
0 25 50 Miles
HUC 12 Watersheds
Percent Riparian Buffer
100% Coverage
0% Coverage

Enabling Partners

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Stream Maps

Prioritization

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Products

Web-enabling Data

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RESTORATION REPORTS

Precision conservation for your property

If you are a landowner in Clinton or Centre Counties, Pennsylvania, this free, confidential tool can help you get information about the restoration opportunities on your property that can improve the ecological conditions you care about.

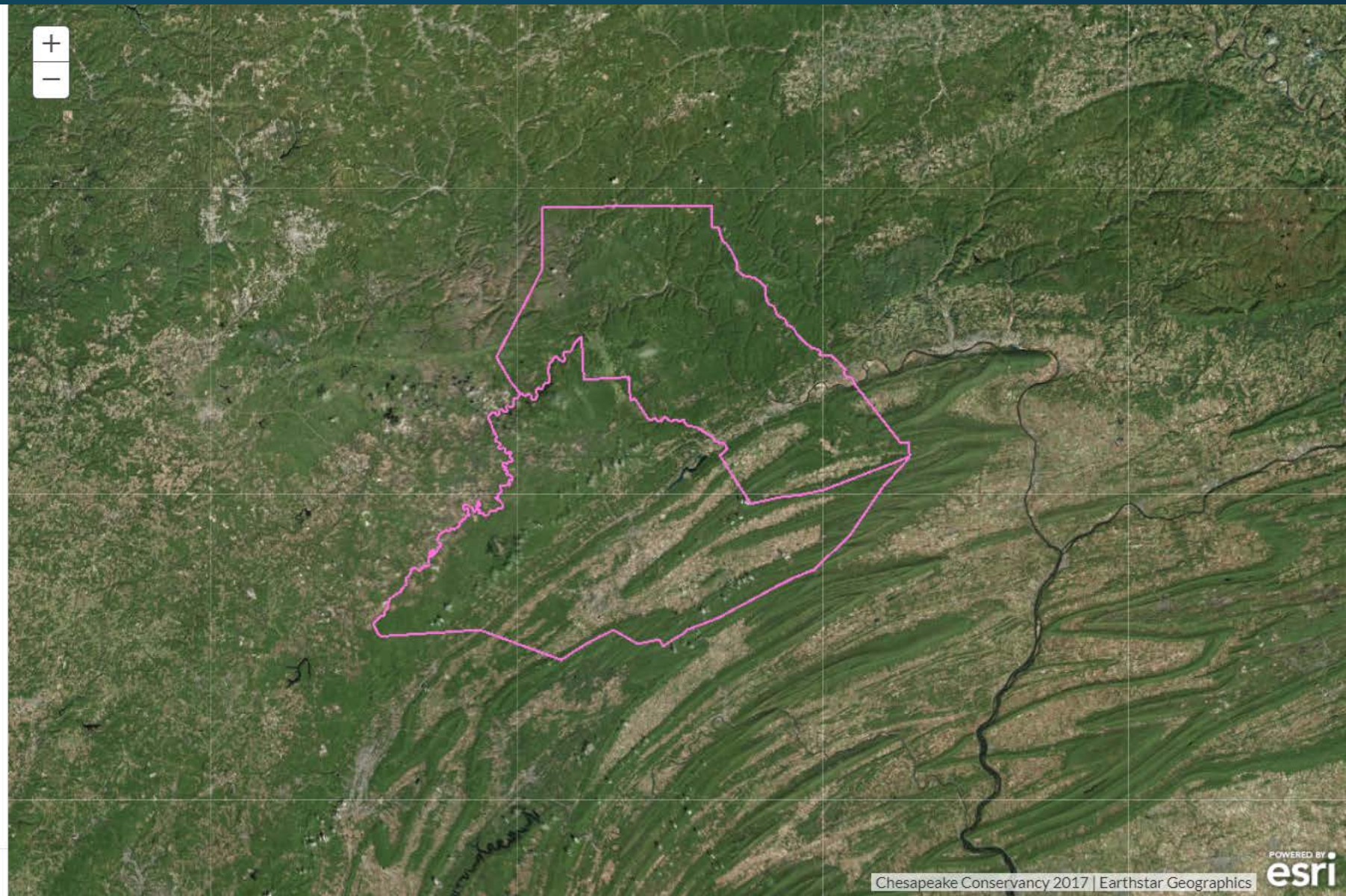
Using state-of-the art data analysis, Restoration Reports generates a customized report for your property, including the watershed you are a part of, the wildlife species that may live on your property, and whether you are in close proximity to an impaired stream.

You can then select your management priorities, for example, improving the hunting and fishing on your property, or supporting your agricultural land uses.

Get started

restorationreports.com

Info Partners Resources



Web-enabling Data

Start over

1. Explore your property

PARCEL IDENTIFIER
No ID available

WATERSHED
Bald Eagle Creek

LAND COVER COMPOSITION (ACRES)

Land cover type	Within parcel
Tree canopy	61.76
Tree canopy over impervious surface	0.12
Shrubs and wetland	0
Low vegetation	87.34
Bare earth	0.00
Impervious surface	0.46
Water	1.80

ACREAGE OF RESTORATION AREA
4.24 acres

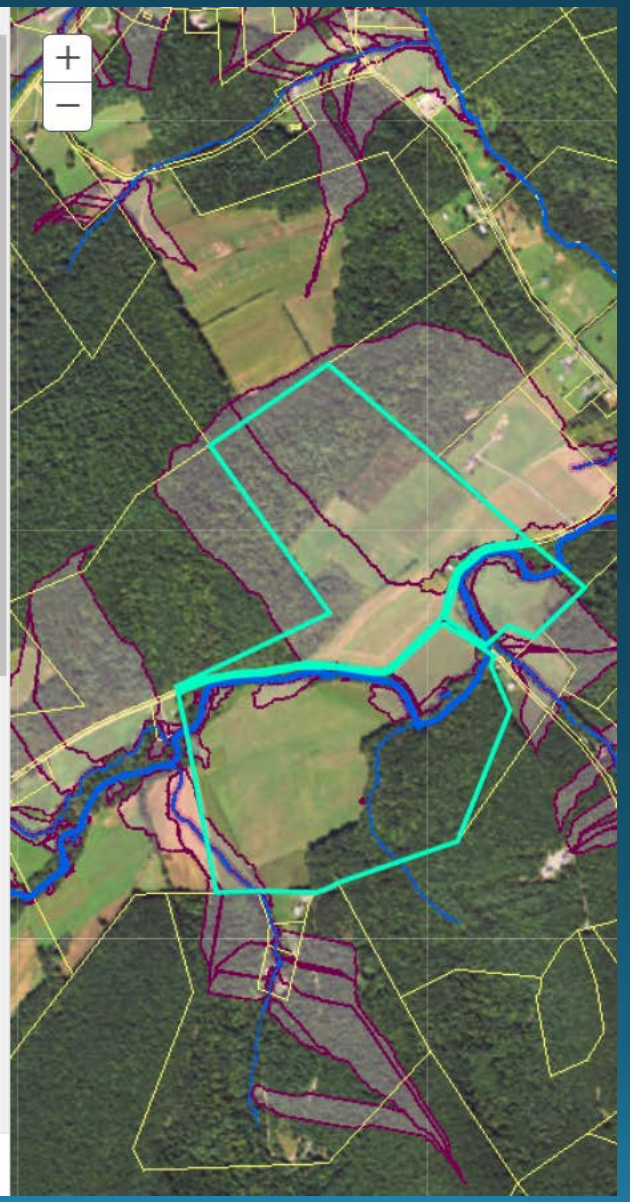
ACREAGE OF DRAINAGE THROUGH RESTORATION AREA
72.27 acres

2. Select your management priorities

Agricultural production

Restoration can help manage nutrients and improve soil and livestock health.

Info Partners Resources



Web-enabling Data

4.24 acres

ACREAGE OF DRAINAGE THROUGH RESTORATION AREA
72.27 acres

2. Select your management priorities

Agricultural production

Restoration can help manage nutrients and improve soil and livestock health.

Recreation

Hunting, fishing, and exploring your property safely.

Wildlife

Young and mature forests and the species that inhabitat them.

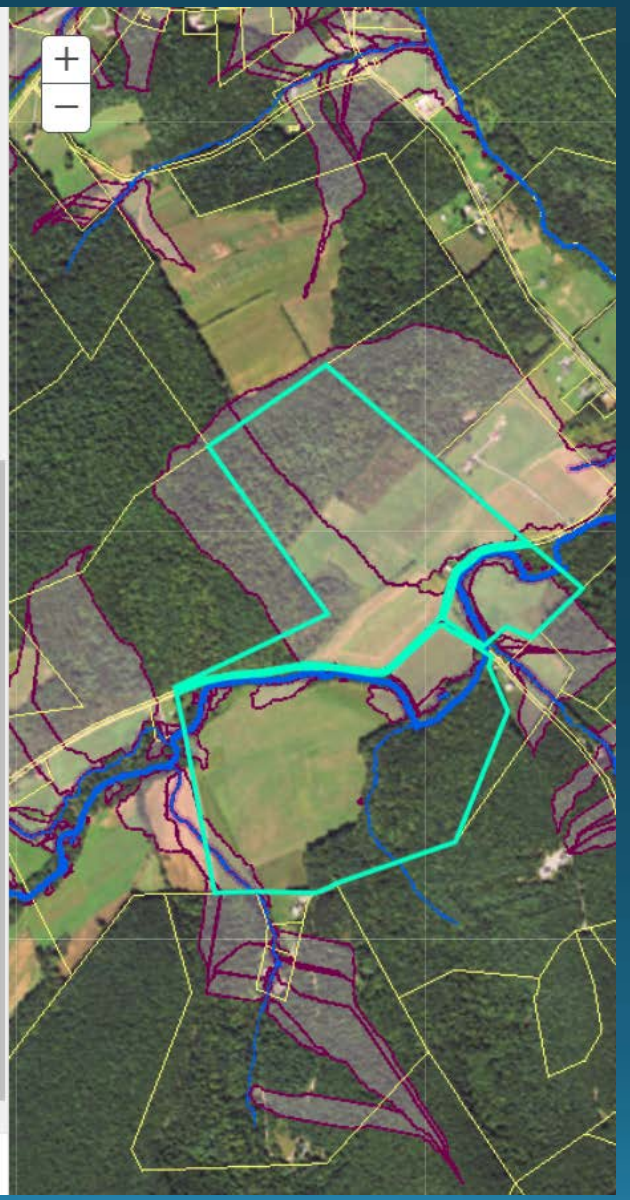
3. Would you like more information?

○ Yes, please ◉ No, thanks

Generate new report

Open report

ℹ Info Partners Resources



Web-enabling Data

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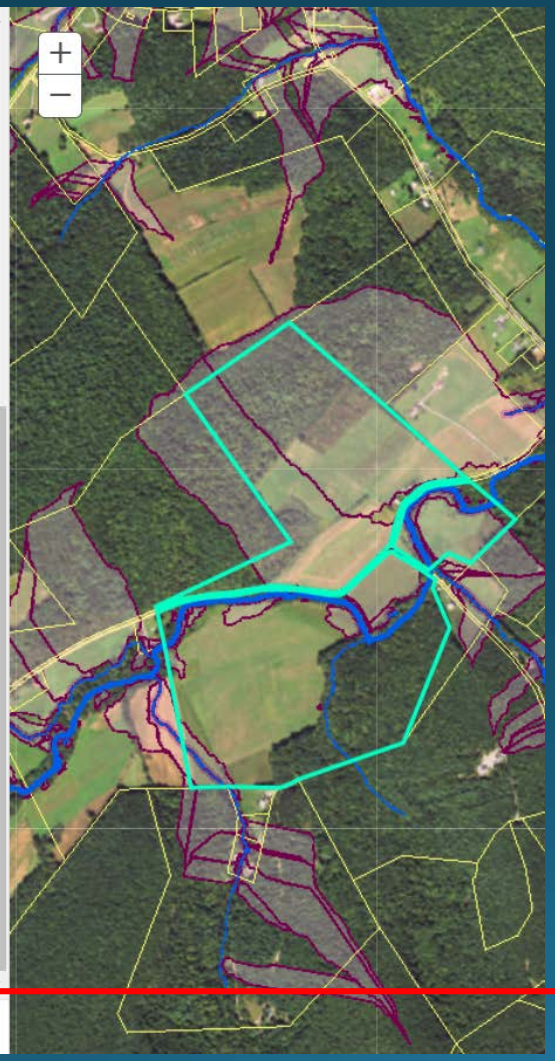


RESTORATION REPORTS
Precision conservation for your property

Restoration Reports details specific locations on your land where you can install best management practices.

Parcel ID: No ID available
In the Bald Eagle Creek watershed

Restoration on your Property

This report identifies locations on your property where restoration could be most effective. The highest restoration priorities are areas next to streams without trees, shrubs, or wetlands. We suggest planting **riparian forest buffers** in these areas to filter water before it enters a stream. If there are no streams on your property, planting native trees and shrubs can provide many of the same benefits described in this Restoration Report because rainwater that falls onto your property ends up in nearby streams.

Example: Identifying restoration areas

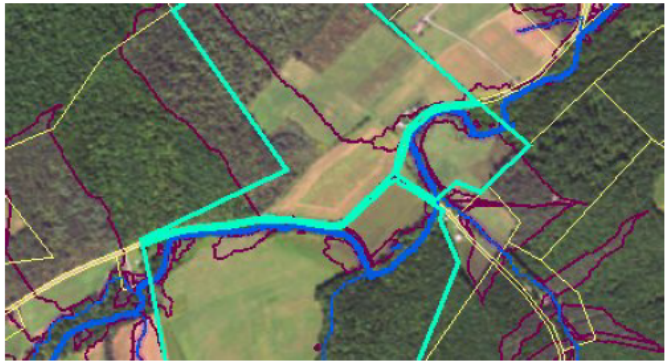
1. **Land cover** includes: forests, shrubs, and wetlands; impervious surfaces (structures, driveways, and roads); low vegetation (lawns, farm fields); and barren (exposed dirt). **Low vegetation and barren are most readily restorable.**

2. We focus on **flow paths**, or where rainwater accumulates and travels downslope before a stream is formed and continues as the stream itself.

3. Areas along flow paths that are restorable can filter water from upstream **drainage areas** before it enters a stream. These **flow path restoration areas** are the highest priority for **riparian forest buffer** restoration.

Acres of land cover within your parcel					Most readily restorable		
Tree canopy	Canopy over impervious	Shrub or wetland	Water	Impervious	Low vegetation	Bare	Total acres
61.76	0.12	0	1.80	0.46	87.34	0.00	151.48

Restorable land within a 35 ft. distance of flow paths intersecting your parcel are called **Flow Path Restoration Areas** → **4.24**



The 4.24 acres of **flow path restoration area** intersecting your property have a total **drainage area of 72.27 acres from your property and your neighbors' property**, including 0 acres of bare earth, 1.14 acres of impervious surface, and 36.34 acres of low vegetation.

Evaluate and Compare

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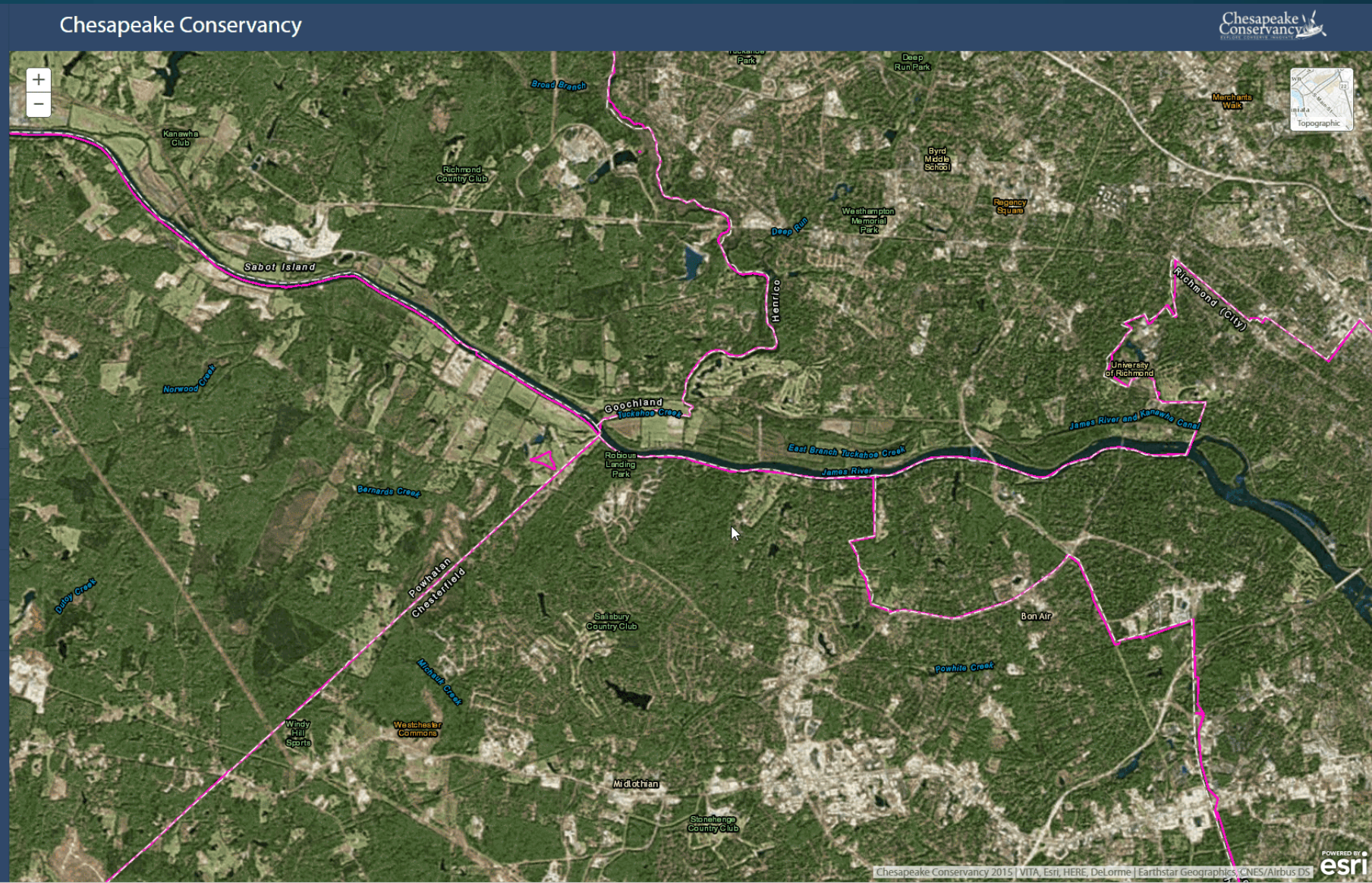
CONSERVATION TOOLBOX

- Map Layers
- Search
- Filter
- Land Cover
- Report Generator
- Watershed Delineation



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Search

Search for a parcel using the search box or by clicking the map.

GPIN or parcel ID | Search

Parcel ID: 32-42A

Attribute	Value
County	Powhatan
Area (GIS Acres)	202.25
Area (Public Record Acres)	205.76
Protected	No
Adjacent	No
Estimated Buffer Length (ft.)	9557
100 Year Floodplain	Yes
Historical Point/Site	No

Evaluate and Compare

Land Cover

Select a parcel to view a breakdown of land cover using the seven classes shown in the legend. Navigate to the report panel to export a PDF of this information.

- Forest
- Developed
- Low Vegetation
- Standing Crops
- Bare Earth / Tilled Field
- Wetland
- Water

Parcel ID: 32-42A
Acreage: 202.25

Entire Parcel

Land Cover	Acres
Forest	31.72
Developed	0.94
Low Vegetation	30.38
Standing Crops	127.89
Bare Earth/Tilled Field	10.82
Wetland	0
Water	0.69

35 ft. Buffer (Inland from stream edge)

Land Cover	Acres
Forest	5.48
Developed	0.12
Low Vegetation	1.52
Standing Crops	0.06
Bare Earth/Tilled Field	0.21
Wetland	0
Water	0

100 ft. Buffer (Inland from stream edge)

Land Cover	Acres
Forest	11.31
Developed	0.23
Low Vegetation	5.01
Standing Crops	4.06
Bare Earth/Tilled Field	1.27
Wetland	0
Water	0.06

Chesapeake Conservancy

Evaluate and Compare

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Watershed Delineation

Calculate the 3 largest watersheds (drainage areas) for the selected parcel. This analysis is based on LIDAR-derived elevation and flow path datasets from ArcGIS.

Zoom to Chester

1. Define your area of analysis

- Select Parcel
- Draw Polygon
- Place Point

10 meter buffer

2. Choose the number of drainage areas to display

1 2 3 4 5

3. Begin process (approx. 30 seconds per drainage area)

Delineate watersheds

Chesapeake Conservancy

Conservation Toolboxes

Capital Region Land Conservancy

- Charles City
- Chesterfield
- Goochland
- Hanover
- Henrico
- New Kent
- Powhatan
- Richmond

Monacan Soil and Water Conservation District (SWCD)

- Goochland
- Powhatan

Natural Bridge (SWCD)

- Rockbridge
- Buena Vista
- Lexington

Robert E. Lee (SWCD)

- Amherst
- Appomattox
- Campbell
- Lynchburg

Thomas Jefferson (SWCD)

- Albemarle
- Fluvanna
- Louisa
- Nelson
- Charlottesville

More Information

- Conservation Innovation Center
  conservationinnovationcenter.org
- Chesapeake Bay Land Cover
  conservationinnovationcenter.org/land-cover-data-project
- Pennsylvania Case Study – Conservation Opportunities Analysis
  envisionthesusquehanna.org/precision-conservation-data-and-tools
- Pennsylvania Case Study – Restoration Reporting
  restorationreports.com
- Maryland Case Study – Watershed Delineation Tools
  chesapeakeconservancy.org/apps/ConservationToolbox
  Watershed Delineation -> "Zoom to Chester"
- Maryland Case Study – Prince George's County Stormwater Prioritization Tool
  chesapeakeconservancy.org/apps/PG_Stormwater

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cpallai@chesapeakeconservancy.org