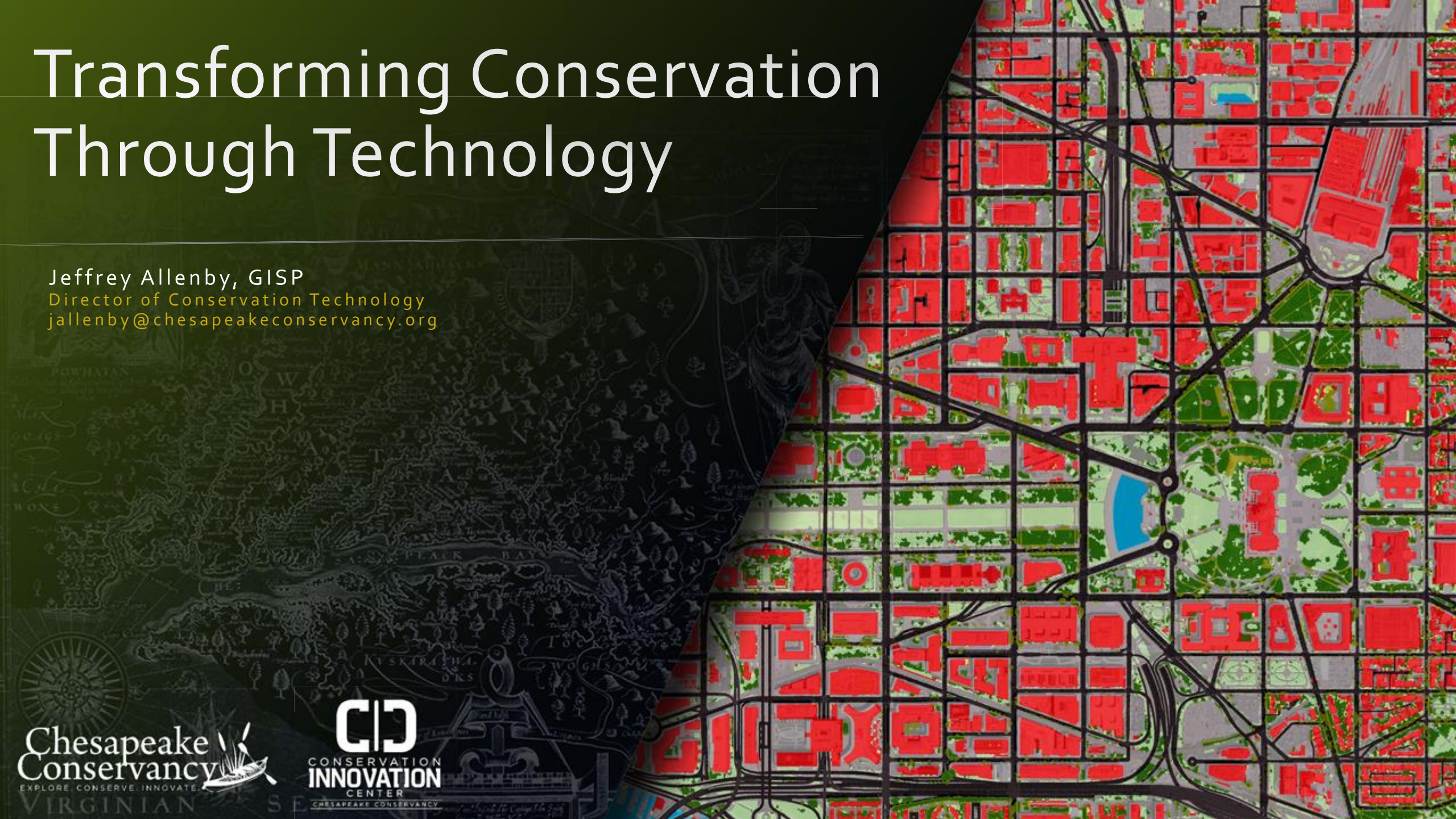
Transforming Conservation Through Technology

Jeffrey Allenby, GISP
Director of Conservation Technology
jallenby@chesapeakeconservancy.org



Chesapeake Conservancy
EXPLORE. CONSERVE. INNOVATE.

CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

Our Mission

CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

Measuring Progress

Measuring Progress

Enabling Partners

Data

Land Cover/Use

Flow Path Maps

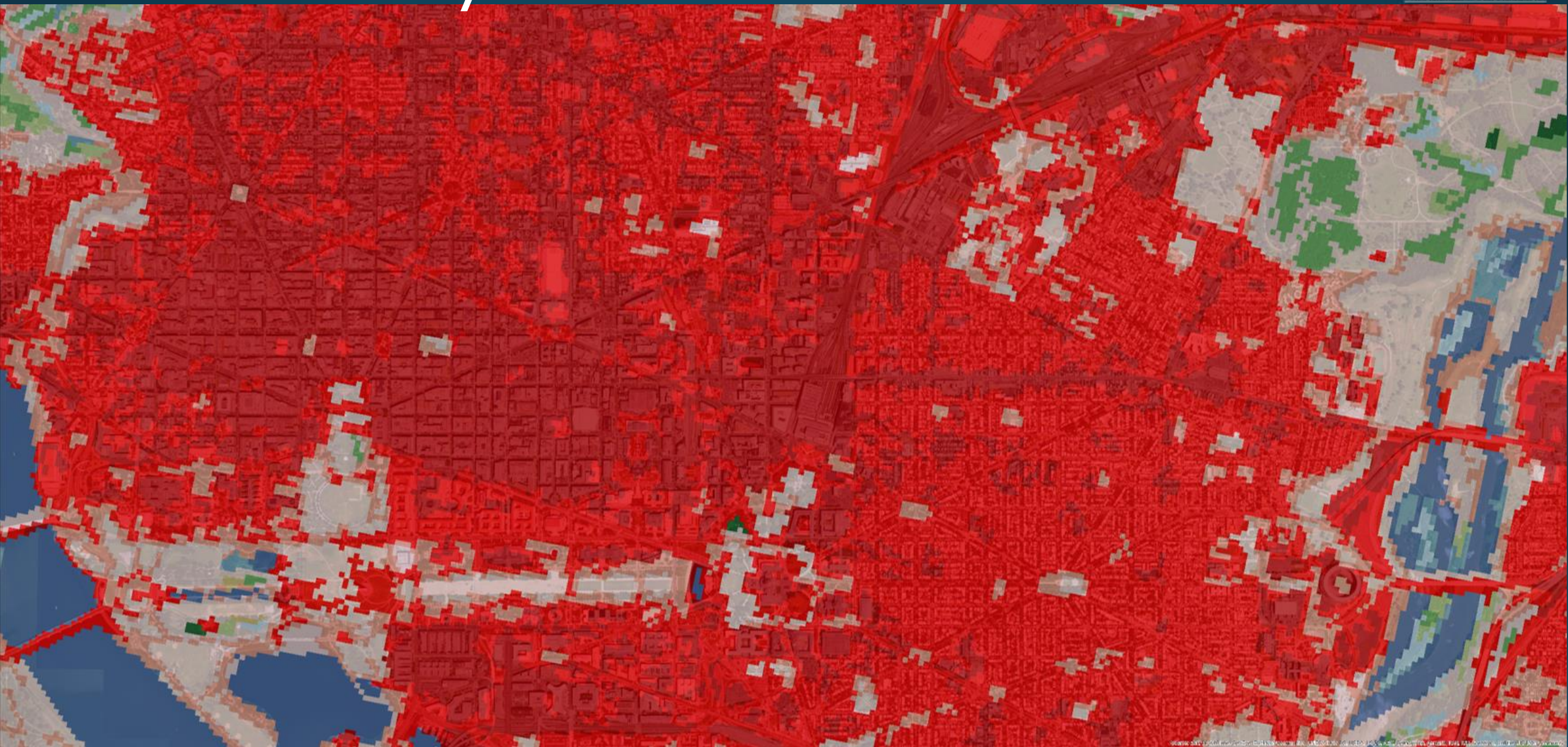
Prioritization

Web-based tools

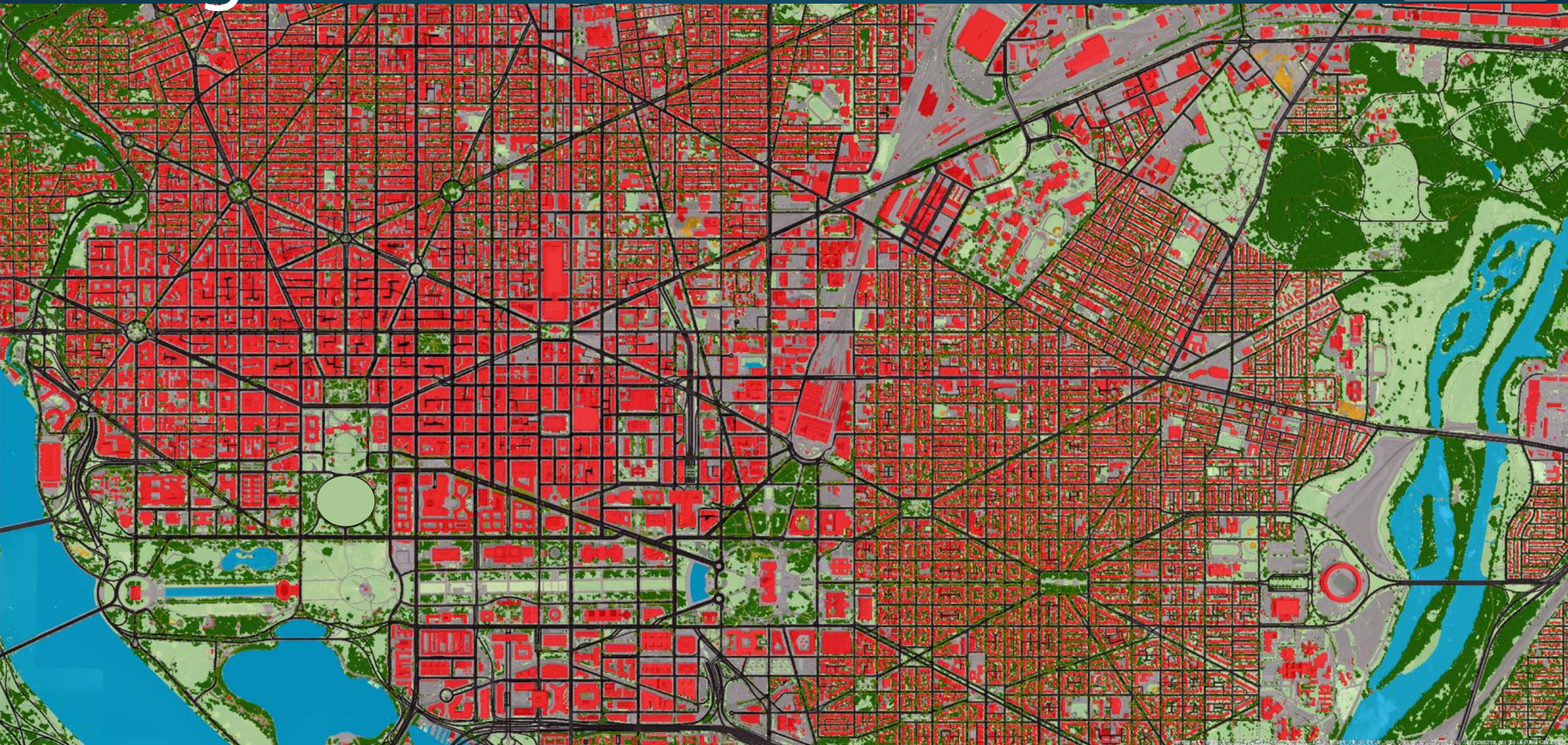
Access

Products

Previously Available Data



High-resolution Data

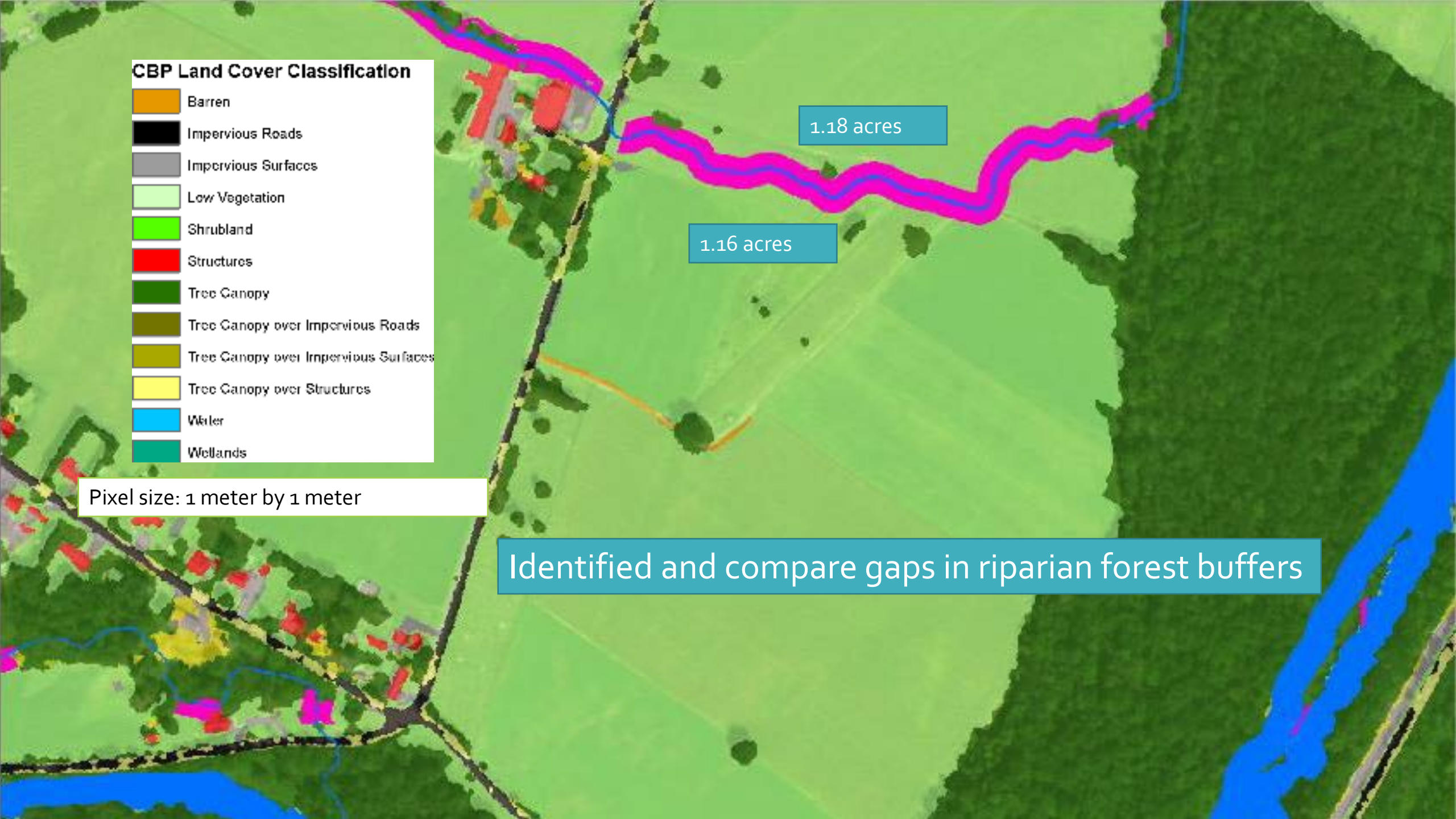


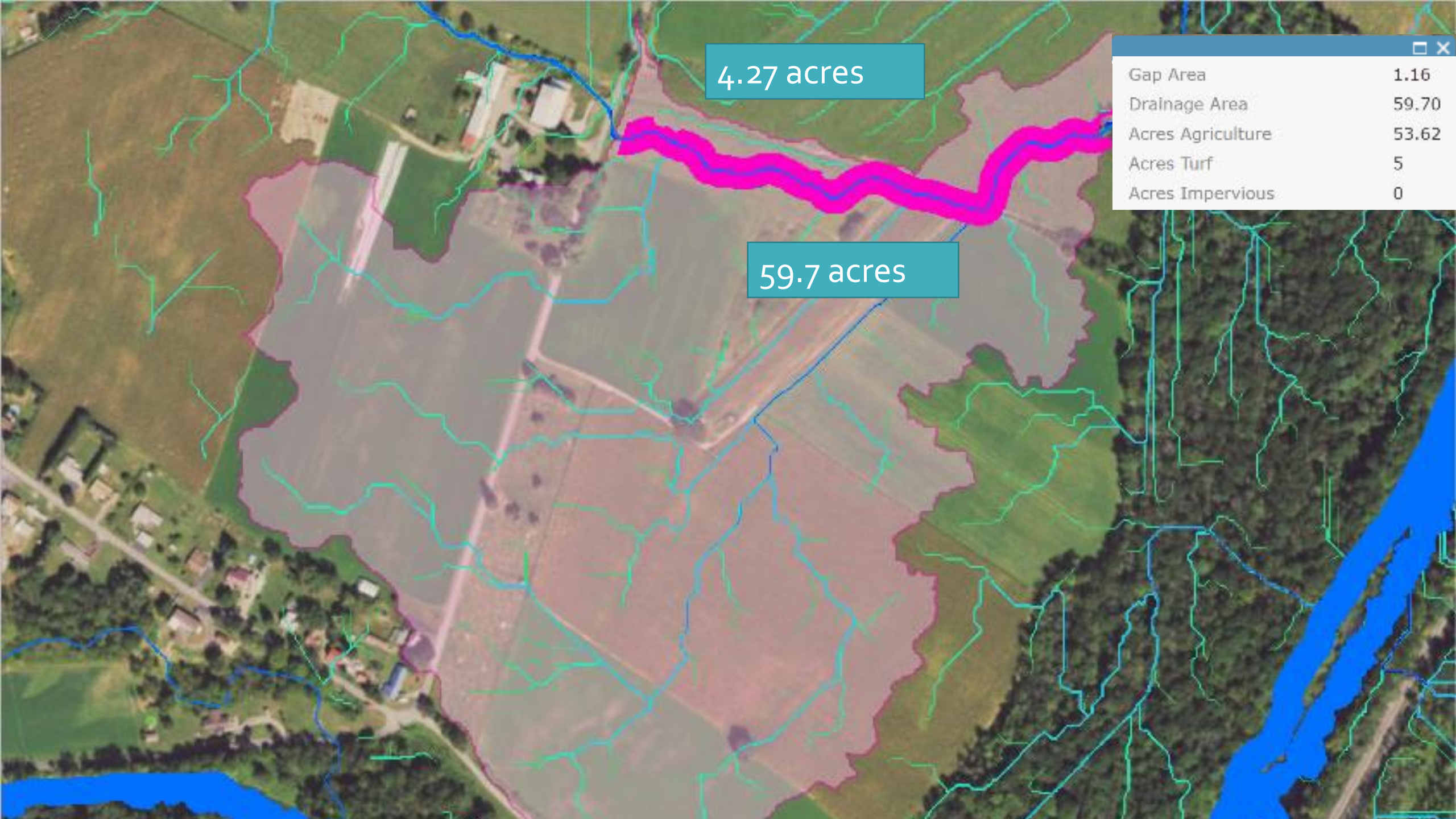
Lidar Flow Path Mapping

Lidar Flow Path Mapping

CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

High Resolution Land Cover & Concentrated Flow Paths


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
1.18 acres
1.16 acres
Pixel size: 1 meter by 1 meter
Identified and compare gaps in riparian forest buffers


4.27 acres
59.7 acres
Gap Area 1.16
Drainage Area 59.70
Acres Agriculture 53.62
Acres Turf 5
Acres Impervious 0

Landowner Outreach

CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

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.

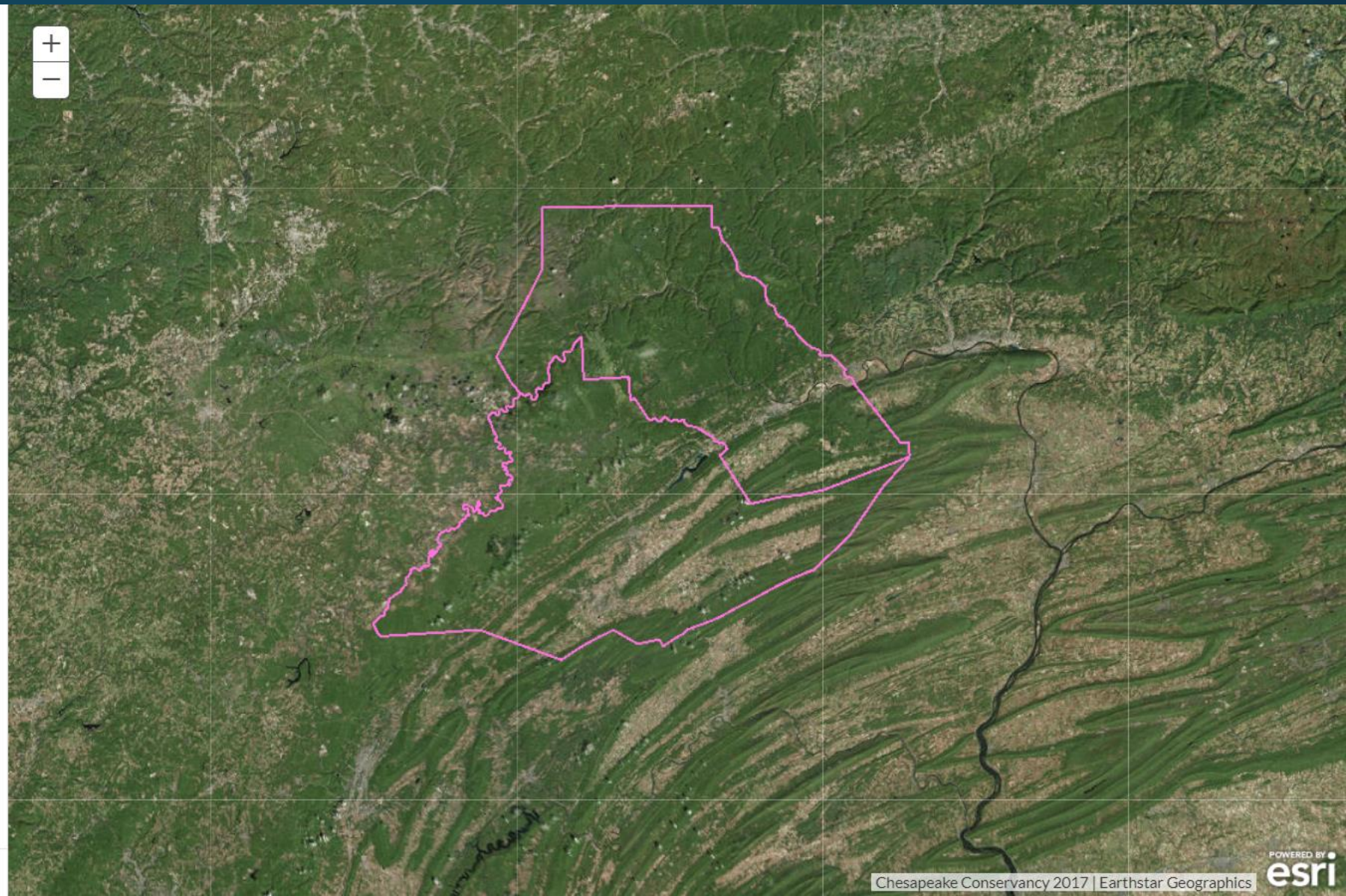
Using state-of-the art data analysis, Restoration Reports generates a customized report for your property, including the watershed you are a part of, the wildlife species that may live on your property, and whether you are in close proximity to an impaired stream.

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

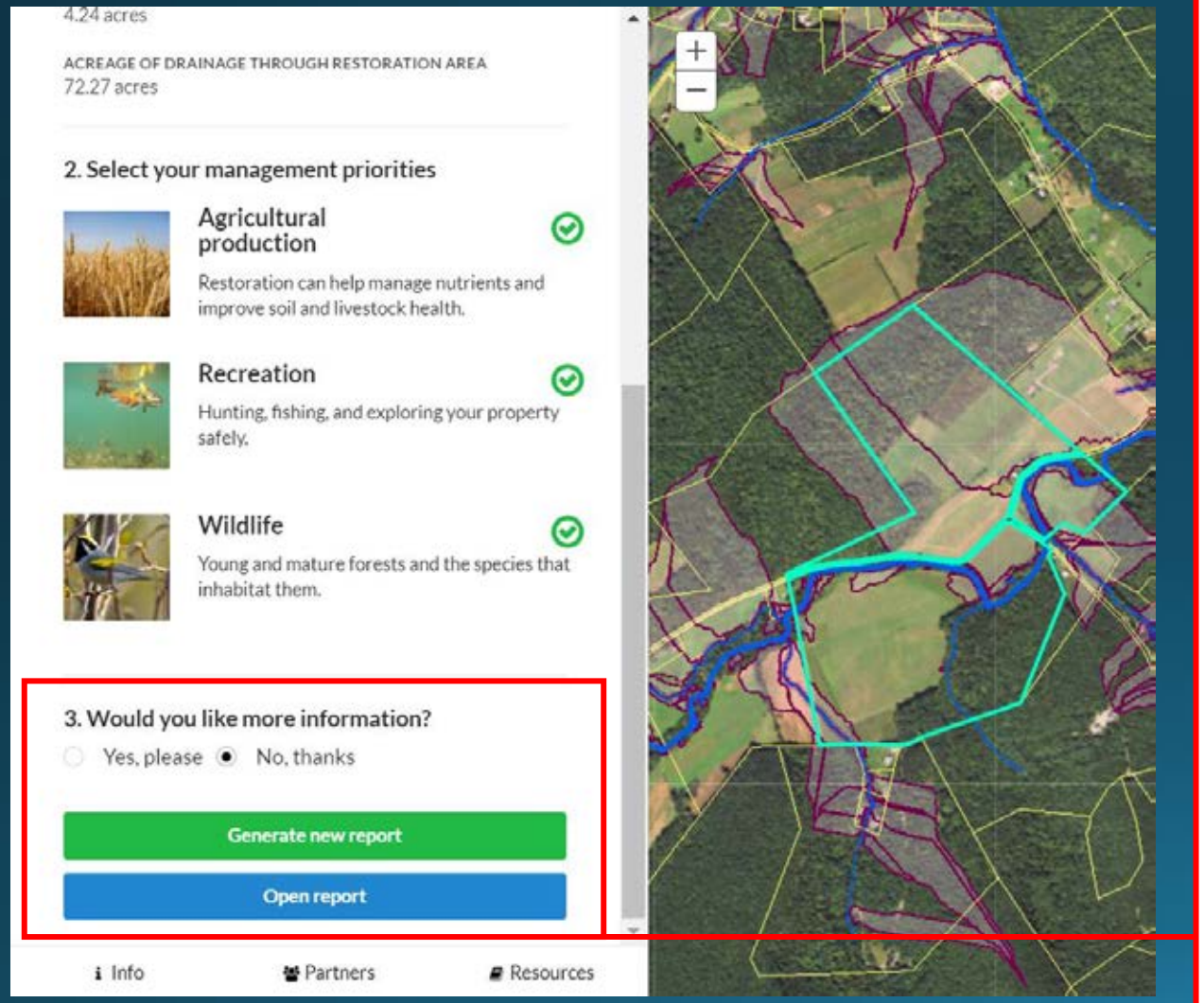
Get started

restorationreports.com

Info Partners Resources



Customized Reporting



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

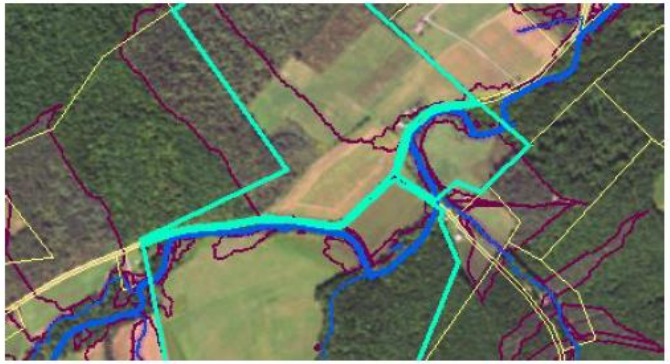
1. **Land cover** includes: forests, shrubs, and wetlands; impervious surfaces (structures, driveways, and roads); low vegetation (lawns, farm fields); and barren (exposed dirt). **Low vegetation and barren are most readily restorable.**

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.

conservationinnovationcenter.org

jallenby@chesapeakeconservancy.org

Chesapeake & Coastal Service

MARYLAND DEPARTMENT OF NATURAL RESOURCES

New DIY Parcel Report Cards Conservation Values Just a Click Away!

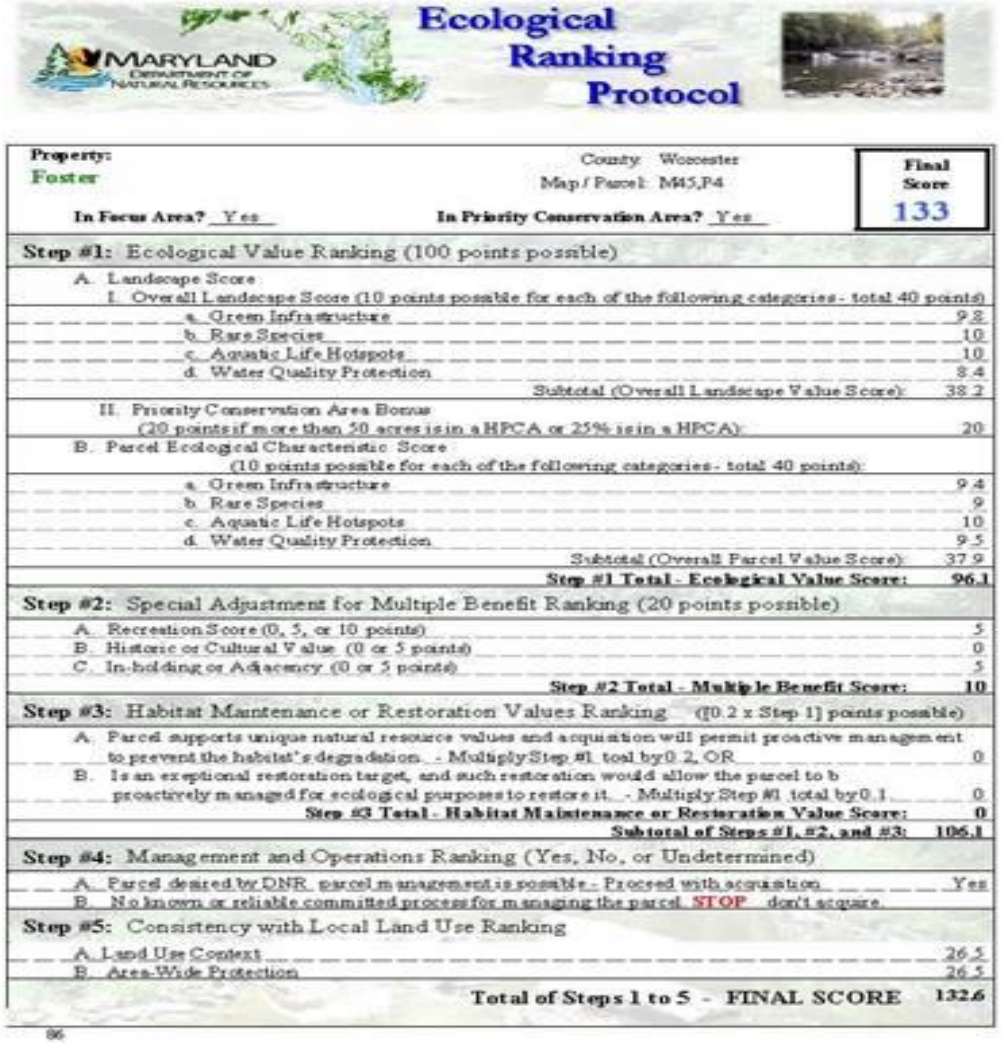
Christine Conn and Rachel Marks

2018 Maryland Land Conservation Conference

Stateside Program Open Space

GreenPrint Scorecard

- Project scorecards and maps provided to the Board of Public Works
- Provides transparency and accountability
- Decisions based on ecologically defensible criteria and management objectives



MARYLAND DEPARTMENT OF NATURAL RESOURCES

Ecological Ranking Protocol

Property: Foster	County: Worcester Map / Parcel: M45,P4	**Final Score** 133
In Focus Area? Yes	**In Priority Conservation Area?** Yes	

Step #1: Ecological Value Ranking (100 points possible)	
A. Landscape Score	
I. Overall Landscape Score (10 points possible for each of the following categories - total 40 points)	
a. Green Infrastructure	9.8
b. Rare Species	10
c. Aquatic Life Hotspots	10
d. Water Quality Protection	8.4
Subtotal (Overall Landscape Value Score):	38.2
II. Priority Conservation Area Bonus (20 points if more than 50 acres is in a HPCA or 25% is in a HPCA):	20
B. Parcel Ecological Characteristic Score (10 points possible for each of the following categories - total 40 points):	
a. Green Infrastructure	9.4
b. Rare Species	9
c. Aquatic Life Hotspots	10
d. Water Quality Protection	9.5
Subtotal (Overall Parcel Value Score):	37.9
Step #1 Total - Ecological Value Score:	**96.1**
Step #2: Special Adjustment for Multiple Benefit Ranking (20 points possible)	
A. Recreation Score (0, 5, or 10 points)	5
B. Historic or Cultural Value (0 or 5 points)	0
C. In-holding or Adjacency (0 or 5 points)	5
Step #2 Total - Multiple Benefit Score:	**10**
Step #3: Habitat Maintenance or Restoration Values Ranking ([0.2 x Step 1] points possible)	
A. Parcel supports unique natural resource values and acquisition will permit proactive management to prevent the habitat's degradation. - Multiply Step #1 total by 0.2, OR	0
B. Is an exceptional restoration target, and such restoration would allow the parcel to b proactively managed for ecological purposes to restore it. - Multiply Step #1 total by 0.1	0
Step #3 Total - Habitat Maintenance or Restoration Value Score:	**0**
Subtotal of Steps #1, #2, and #3:	**106.1**
Step #4: Management and Operations Ranking (Yes, No, or Undetermined)	
A. Parcel desired by DNR, parcel management is possible - Proceed with acquisition	Yes
B. No known or reliable committed process for managing the parcel. STOP - don't acquire.	
Step #5: Consistency with Local Land Use Ranking	
A. Land Use Context	26.5
B. Area-Wide Protection	26.5
Total of Steps 1 to 5 - FINAL SCORE	**132.6**

86

Documentation of Conservation Values

Targeted Ecological Areas

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Local Conservation Strategies

MARYLAND DEPARTMENT OF NATURAL RESOURCES

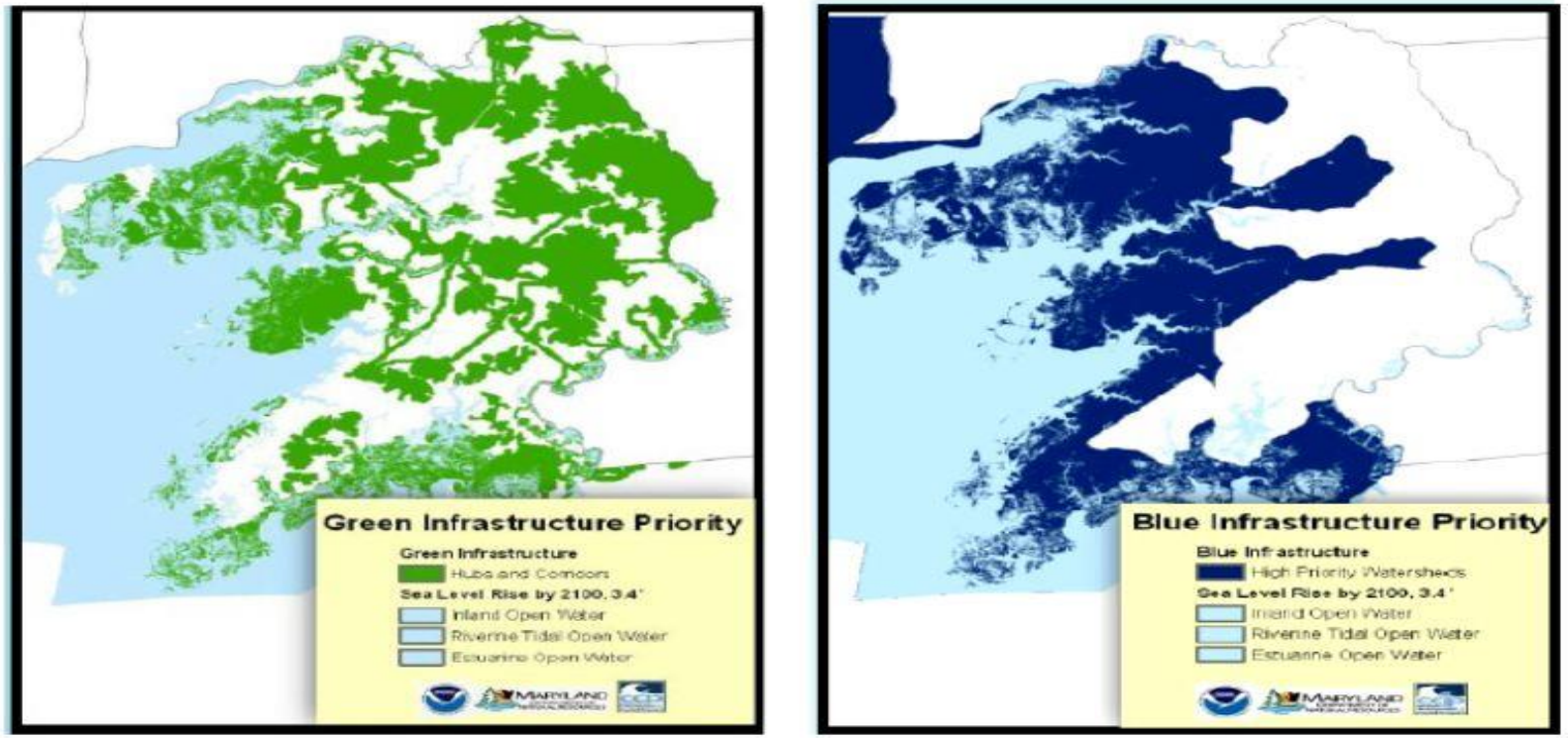


Figure 1. These maps are outputs of SLAMM that display high priority nearshore wetlands coincident with the green infrastructure network and high-priority watersheds identified in the blue infrastructure analysis, given sea level rise projected for 2100 in the Chesapeake Bay and a portion of Maryland's Eastern Shore.

Resiliency

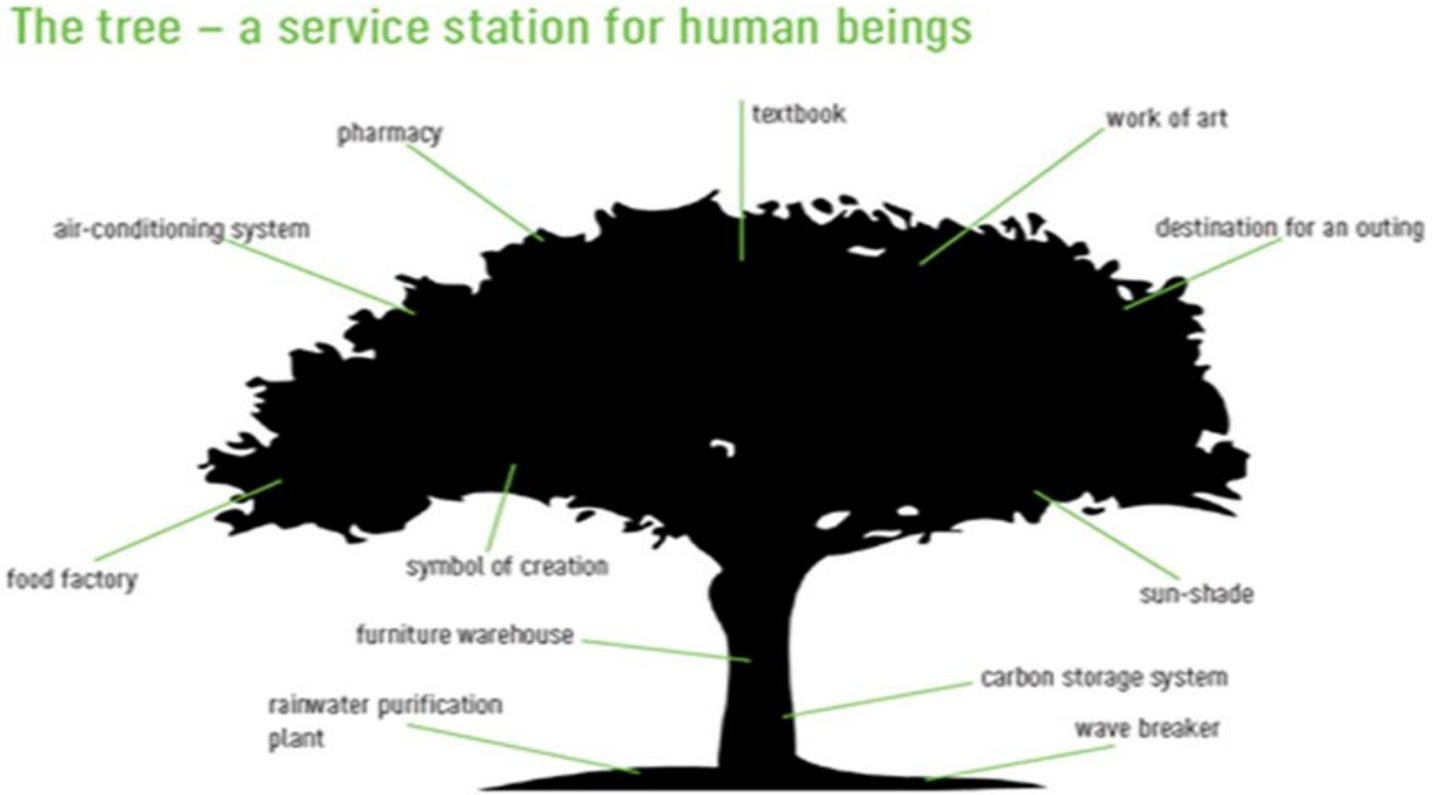
Nature based solutions that improve the capacity of communities to recover quickly from hazardous events

Coastal wetlands prevented $625 million in property damages during Hurricane Sandy. They can reduce annual storm damages by more than 20%.

The Nature Conservancy. The value of coastal wetlands for reducing property damage factsheet.

Nature's Services

MARYLAND DEPARTMENT OF NATURAL RESOURCES



Accounting for Maryland's Ecosystem Services (AMES)

Ecosystem services are any benefit that people receive from the environment

Air Pollution Removal	**Nutrient Uptake**
Carbon Sequestration	**Biodiversity/Wildlife Habitat**
Groundwater Recharge	**Stormwater Abatement**

When lost, they must be replaced or the public does without

- Public Health
- Quality of Life
- TMDLs

Return on Conservation

Making the Case for Land Conservation

- 1:7 Ecosystem Service Return on Conservation
- Northhampton Co. (PA) Commissioners increased open space budget by $2.2 million for FY2016

Parcel Evaluation Widget

The Parcel Evaluation Tool was prepared by the Maryland Environmental Service using Federal funds under award number NA15NOS4190165 from NOAA, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce. The authors acknowledge the financial assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office for Coastal Management, National Oceanic and Atmospheric Administration.

Learn More!

Targeting Conservation:
Using the Right Tools at the Right Time
Concurrent Session II
2:45 – 4:45

RE-IMAGINING THE USE OF TECHNOLOGY IN STEWARDSHIP

Maryland Environmental Trust

Updating Stewardship & Monitoring Protocol

- Over 1,000 easements to monitor on 134,088 acres!
- More than half co-held with our Local Land Trust Partners

Maryland Environmental Trust's old monitoring process:

- Paper-based
- Microsoft Access database
- Manual photo-point entry

The Database & Monitoring Toolset

Maryland Environmental Trust

BackOffice Thinking

LOCATE

- Easement management database
- Reporting tools
- Strategic stewardship

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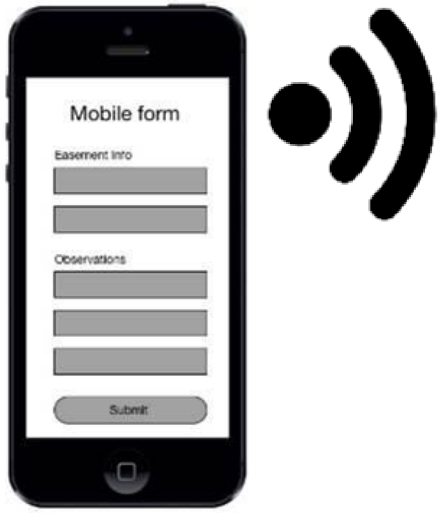
Monitoring Toolset

- Monitoring reports
- Photo summary
- Due Diligence
- Flag items of concern

The Monitoring Toolset

1. Mobile field report form



2. Web application for storage / display

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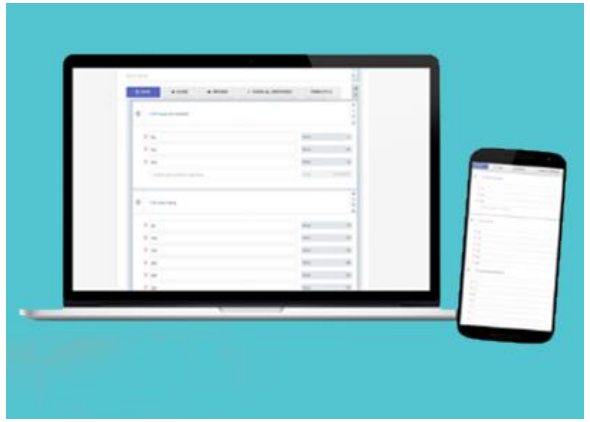
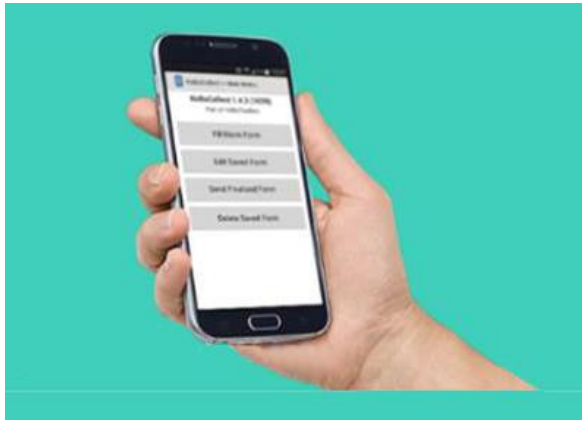
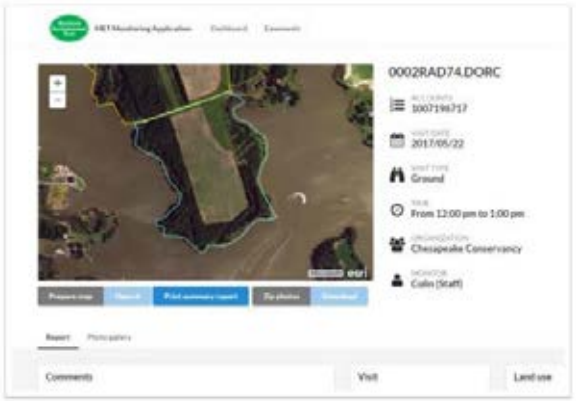


TAKE GEOTAGGED PHOTOS





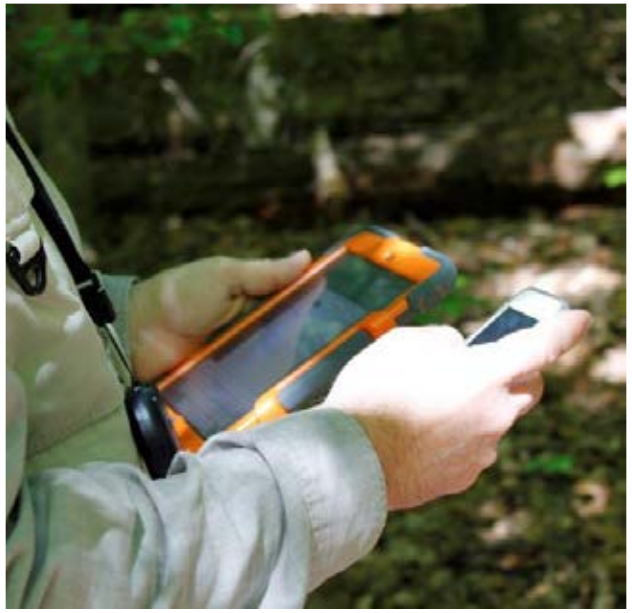
ADD CAPTIONS

SWIPE TO ADD PHOTOS

SUBMIT DRAFT REPORTS

MARK AS FINALIZED

Field Tested



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Customized Freeware

Essential Functionality

Monitoring Training Using the KOBO App

Monitoring easements with

Maryland Conservation Corps and Volunteers

The Right “Data”-base

BackOffice Thinking

BackOffice Thinking

We focus on your technology, so you can focus on your mission.

BackOffice Thinking

CE/FT by Acquisition Type

ACQUISITION TYPE	RECORD COUNT
	70
Donated	1K
Bargaln Sale	5
Purchased	188
Term	1

Monitoring Reports by CY

LOCATE

LOCATE

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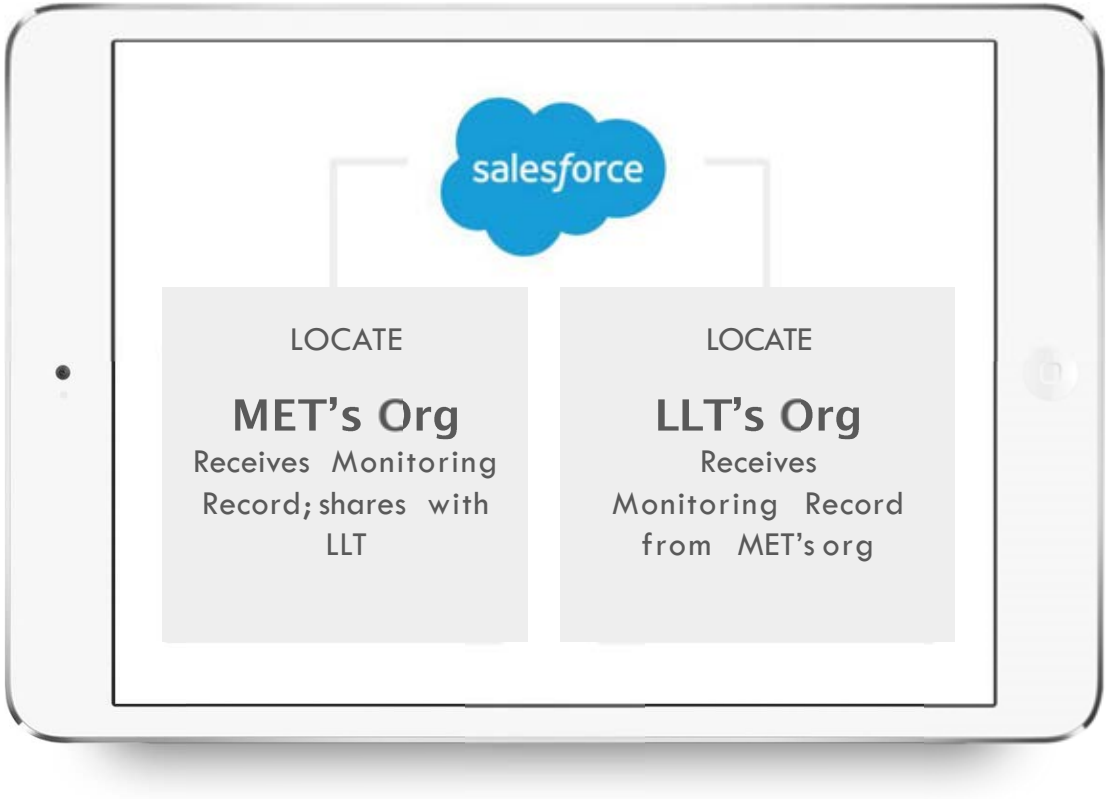
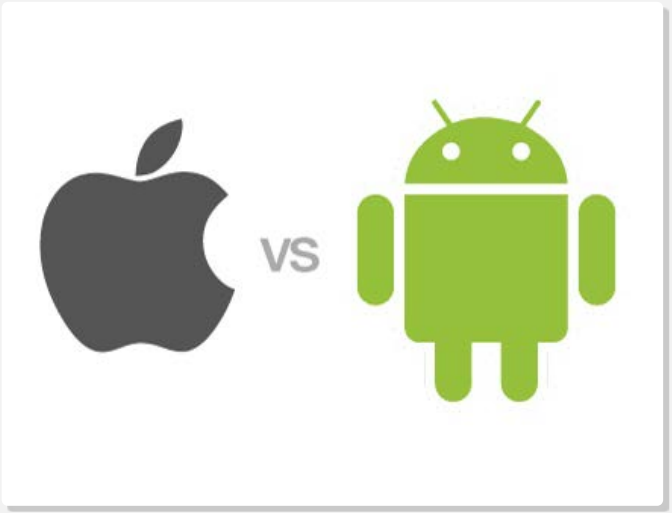
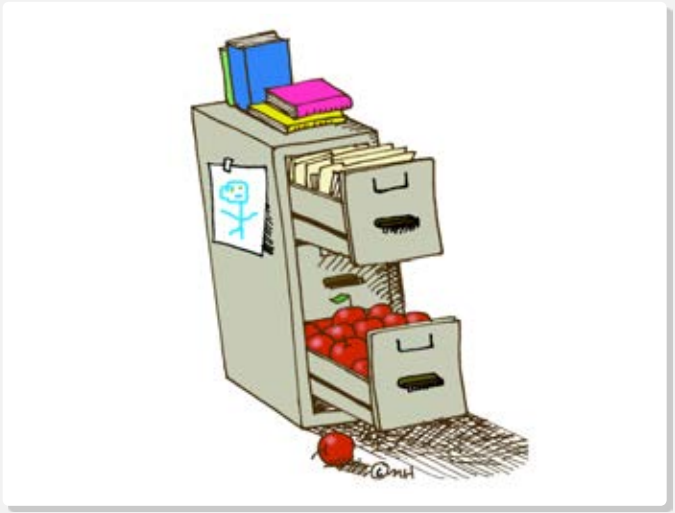
BackOffice Thinking

Chesapeake Innovations Center's Field Data Collection App from KOBO

- Land is Monitored using Kobo Monitoring App
- MET Approves Monitoring Record in web-based Admin Portal
- Monitoring Data pushed to LOCATE







HICCUPS & BURPS

Phase one completed.

We are excited to push forward with phase two and continue to open the door for more land trust partners.....

Looking Ahead

In FY2019 and FY2020 Maryland Environmental Trust will continue to work with both Back Office Thinking and Chesapeake Conservancy to engage the next group of land trusts that will be adopting this toolset.

Maryland Environmental Trust

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mherz@menv.com | menv.com
410.729.8256 (office) | 443.370.9289 (cell)

Innovation Through Collaboration

Improving Government One Project At A Time....

About MES

- Independent Not-For-Profit State Agency
- Provide Wide Array of Environmental Services
- MES' Partners: States, Counties, Municipalities, Federal Government, Private Sector
- Work through: MOU's, IGA's, Grants, Executive Order & Other Contractual Instruments.

Our Mission

"…to protect and enhance the environment for the benefit of the people…."

Innovation Through Collaboration

- How is this being achieved?
  - Multi-Agency Coordination
  - Seeking Goals & Objectives that Yield Multiple Benefits
  - Drawing from Pooled Resources / Interdisciplinary Teams
  - Full Engagement with Stakeholders

Tapping into the ‘Silos of Excellence’

3 Examples

- Deep Mine Archive
- Resiliency Partnership
- Watershed Resources Registry

Deep Mine Archive

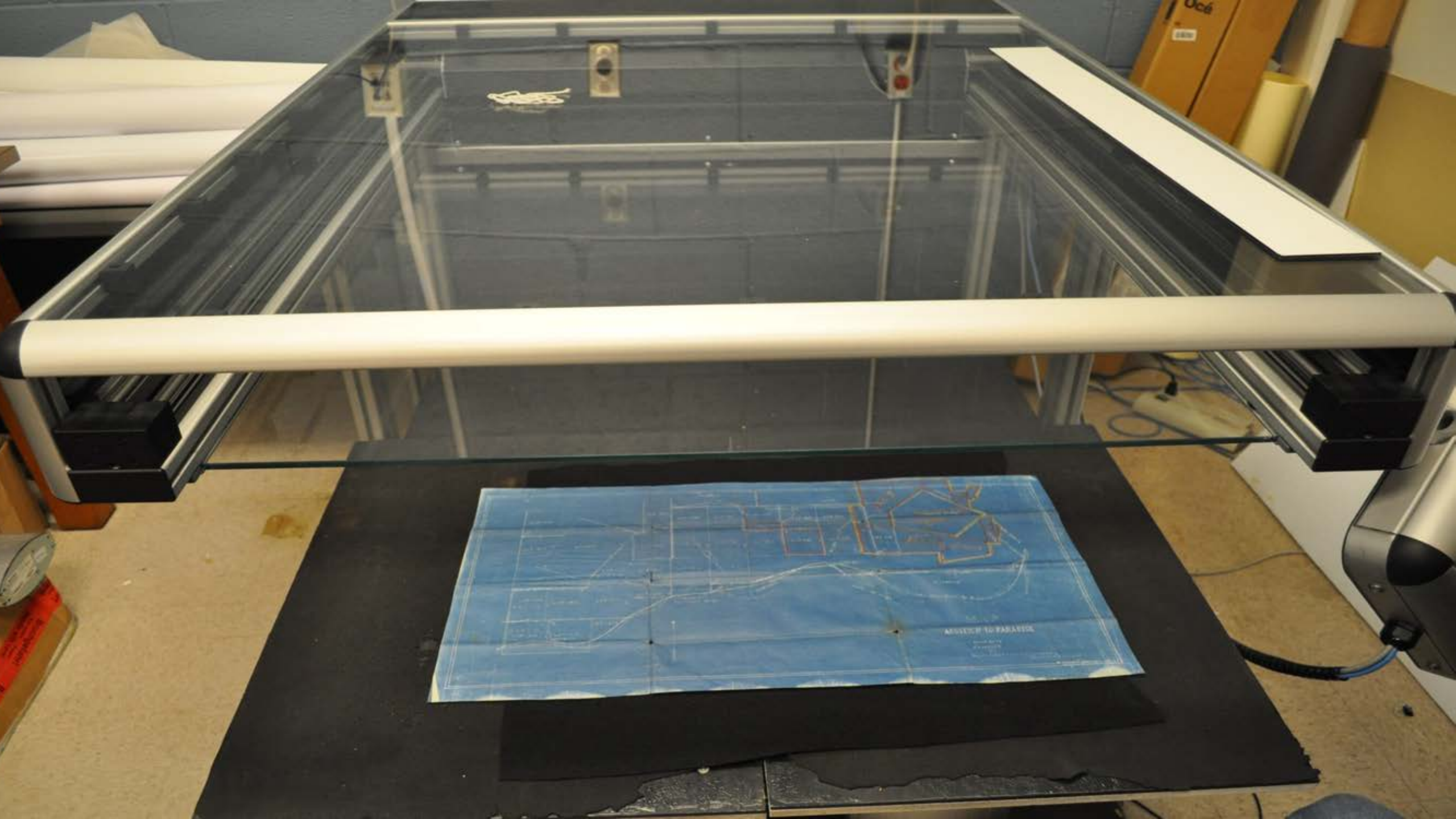
- State Partners: MDE, MSA, MES
- Private collection of 120 deep mine maps from late 1700's early 1900's
- Federal Partners: MDE received grant through Office of Surface Mines (OSM), to acquire, restore, scan, and publish maps

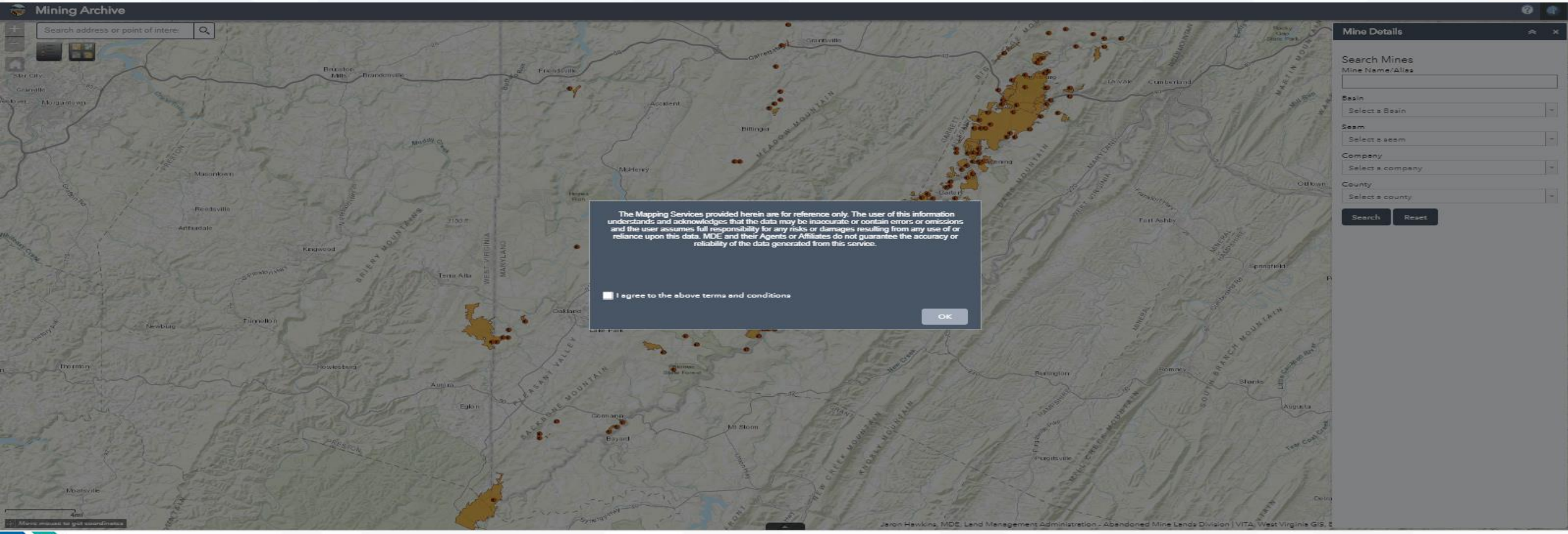
Acquisition, Scanning, Restoration, & Publication

- MES - purchased private collection
- MSA – restored and scanned all maps
- MDE – geo-located maps using GIS
- MES – developed GIS application for viewing and downloading
- MDE – published application on their servers

Medium: mix of paper, linen, mylar and blueprints drawn in pencil or ink, both black and colored.

Q. X. HDG.
This section in the past was squeezed. The rashings are missing, and in their place is found a heavy draw slate which is exceedingly difficult to hold. These conditions add greatly to the cost of tubbing, as it is estimated, that in that part tinted black, three times the amount of timber required for normal recovery will be used
The rooms in the black section are very wide, making the cleaning almost twice the normal amount.
Normal:-
The above conditions render it impossible to mine the coal shown in black at a cost of less than $0.76 per T. in excess of normal cost.

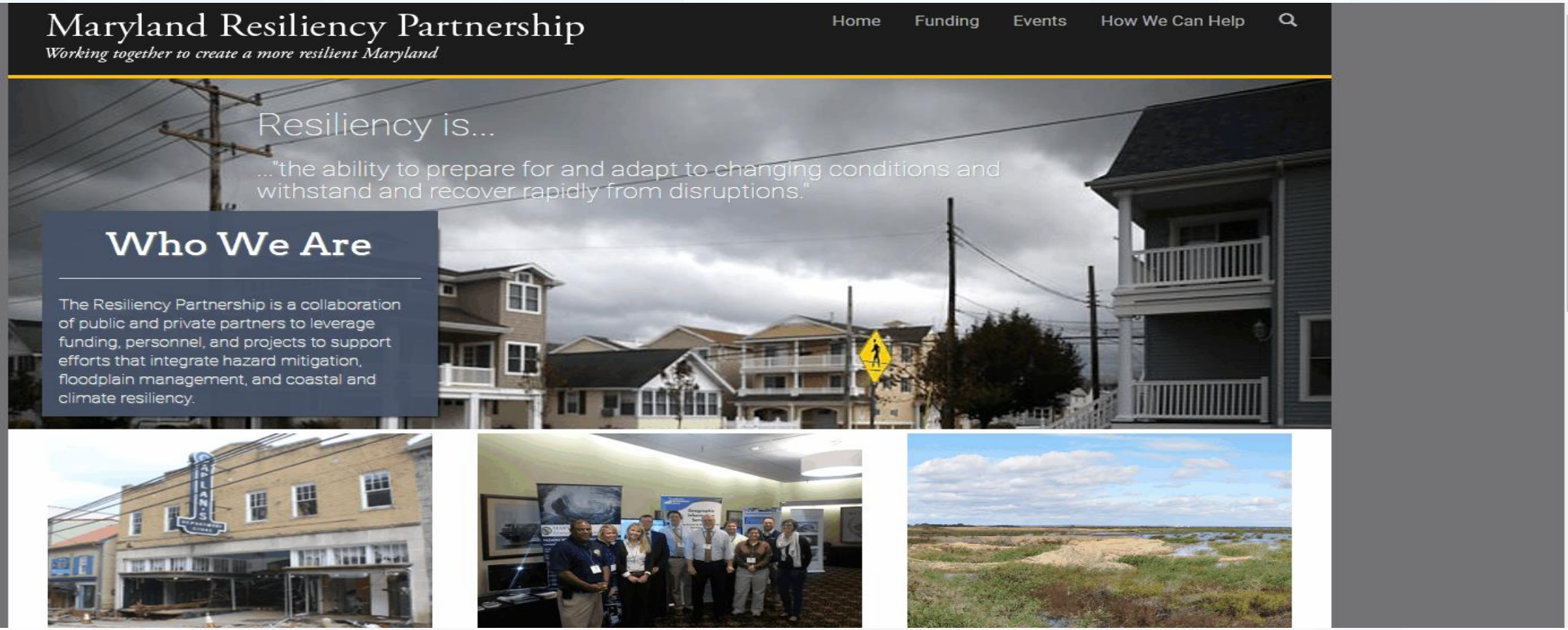




http://mde.maryland.gov/programs/LAND/mining/Pages/mapping.aspx

Resiliency Partnership

- Partners: MDE, MEMA, DNR, MHT, MTA, DHCD, DoIT, SHA, MIA, MAFSM, MES
- Capitalize on resource sharing
- Support comprehensive projects
- Integrate Hazard Mitigation, Floodplain Management, and Coastal & Climate Resiliency
- Federal partners: FEMA, NOAA, FTA, & FHWA



http://resiliencypartnership.org

RESIDENTIAL CONTRACT OF SALE

This is a Legally Binding Contract; If Not Understood, Seek Competent Legal Advice.

THIS FORM IS DESIGNED AND INTENDED FOR THE SALE AND PURCHASE OF IMPROVED SINGLE FAMILY RESIDENTIAL REAL ESTATE LOCATED IN MARYLAND ONLY. *FOR OTHER TYPES OF PROPERTY INCLUDE APPROPRIATE ADDENDA.*

41. FLOOD DISCLOSURE NOTICE:

A. FLOOD INSURANCE PREMIUMS: The Property or part of the Property may be located in an area established by the government as a "flood plain" or otherwise in an area where flood insurance could be required by Buyer's mortgage lender as a condition of granting a mortgage. In addition, construction on the Property could be prohibited or restricted.

The National Flood Insurance Program ("NFIP") provides for the availability of flood insurance but also establishes flood insurance policy premiums based on the risk of flooding in the area where properties are located. Due to amendments to federal law governing the NFIP those premiums are increasing, and in some cases will rise by a substantial amount over the premiums previously charged for flood insurance. As a result, Buyer should not rely on the premiums paid for flood insurance on the Property as an indication of the premiums that will apply after Buyer completes the purchase. In considering the purchase of this Property, Buyer should consult with one or more carriers of flood insurance for better understanding of flood insurance coverage, the premiums that are likely to be required to purchase such insurance and any available information about how those premiums may increase in the future. Detailed information regarding flood insurance coverage may be obtained at: http://www.fema.gov/flood-insurance-reform-act-2012.

B. FLOOD INSURANCE RATE MAPS: The State of Maryland in conjunction with the Federal Emergency Management Agency has been systematically updating flood insurance rate maps. The Property may be affected. Buyer is advised to contact the Maryland Department of the Environment and consult a flood insurance carrier to inquire about the status of the Property. Detailed information regarding updated maps may be obtained at: http://www.mdfloodmaps.net/home.html.

Watershed Resources Registry (WRR)

- **Partners:** Delaware Department of Transportation, Delaware Natural Resources and Environmental Control, Federal Highway Administration, Maryland Department of Natural Resources, Maryland Department of Planning, Maryland Department of the Environment, Maryland Department of Transportation, Maryland Department of Transportation, State Highway Administration, Maryland Environmental Service, Maryland Department of Information Technology, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Transportation, US Army Corps of Engineers Baltimore District, US Army Corps of Engineers Huntington District, US Army Corps of Engineers Norfolk District, US Army Corps of Engineers Philadelphia District, US Army Corps of Engineers Pittsburg District, US Environmental Protection, Agency Region 3, US Fish and Wildlife Service, Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality, Virginia Department of Game and Inland Fisheries, Virginia Institute of Marine Science, Virginia Marine Resource Commission, West Virginia Department of Environmental Protection, West Virginia Department of Highways, West Virginia Department of Transportation, West Virginia Division of Forestry, West Virginia Division of Natural Resources

WRR Explained

- A web-based user friendly mapping application, encompassing multi-agency collaboration, designed to achieve regulatory streamlining by scoring sites to promote sustainable watershed restoration and preservation

WRR Explained

A comprehensive mapping tool and replicable framework that:

- Transparent, predictable and reliable
- Facilitates multi-agency input and coordination
- Utilizes both national and regional datasets
- Includes site visit **registered** information

WRR Use Cases

- *The Watershed Approach for Water Quality Improvements*
- *Clean Water Act Sections: 303(d), 319, 401, 402, 404*
  - *Watershed planning, permit review, mitigation assessments*
  - *Total Maximum Daily Load (TMDL) and Watershed Implementation Plan (WIP) applications*
- *National Environmental Policy Act (NEPA) Review*
- *Land Conservation Priorities to Protect Ecologically Valuable areas including Rare, Threatened and Endangered Species*
- *21st Century Act (MAP-21) and Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users (SAFETEA-LU)*
- *State Transportation and Land Use planning decision making*
- *Resource Conservation/Environmental Resource planning*
- *Other State and Local regulations*

MDOT
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

MARYLAND
ENVIRONMENTAL SERVICE

AASHTO
Innovation Initiative

MARYLAND
DEPARTMENT OF NATURAL RESOURCES

Maryland
Department of
the Environment

PLANNING

WEST VIRGINIA
DIVISION OF
FORESTRY

US Army Corps
of Engineers

U.S.
FISH & WILDLIFE
SERVICE

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

WVDOT
DIVISION OF HIGHWAYS

west virginia
dep

AASHTO
1914

DelDOT

DELAWARE DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

DELAWARE CENTER FOR THE
INLAND BAYS

AASHTO
1914

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

pennsylvania
DEPARTMENT OF TRANSPORTATION

pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

DCNR

DCR

VIRGINIA
MARINE RESOURCES COMMISSION

VIMS
WILLIAM & MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE

DEQ
VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

VIRGINIA

AASHTO
1914

Want to learn more?

- Targeting Conservation Session: Using the Right Tools at the Right Place at the Right Time 2:45pm - 4:15pm
- Or visit: *https://watershedresourcesregistry.org*

Thank You!

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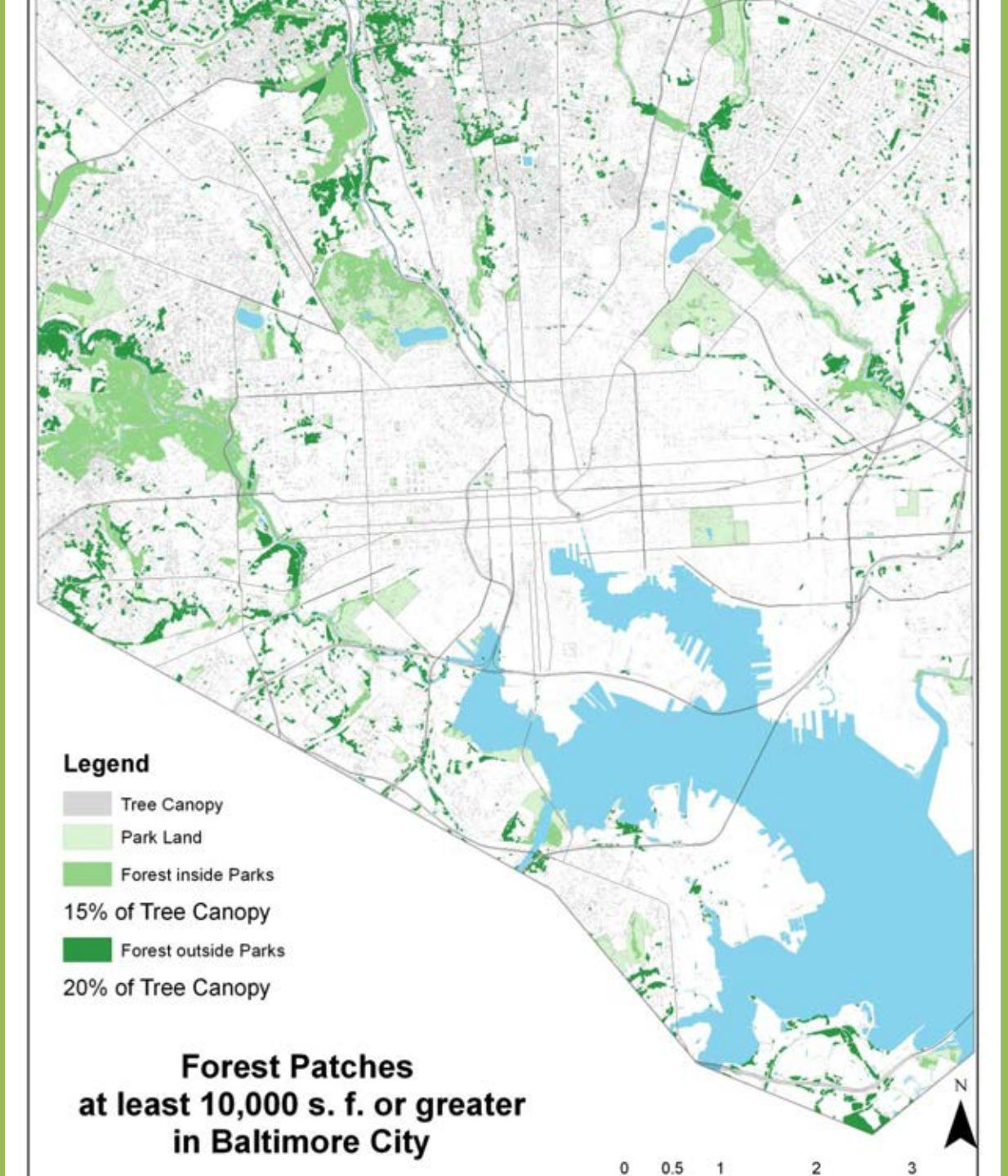
baltimore greenspace

Driving Engagement & Advocacy With Science

Katie Lautar
Program Director

>1,000 forest patches

20% of Baltimore's Tree Canopy is in Forest Patches Outside of Parks

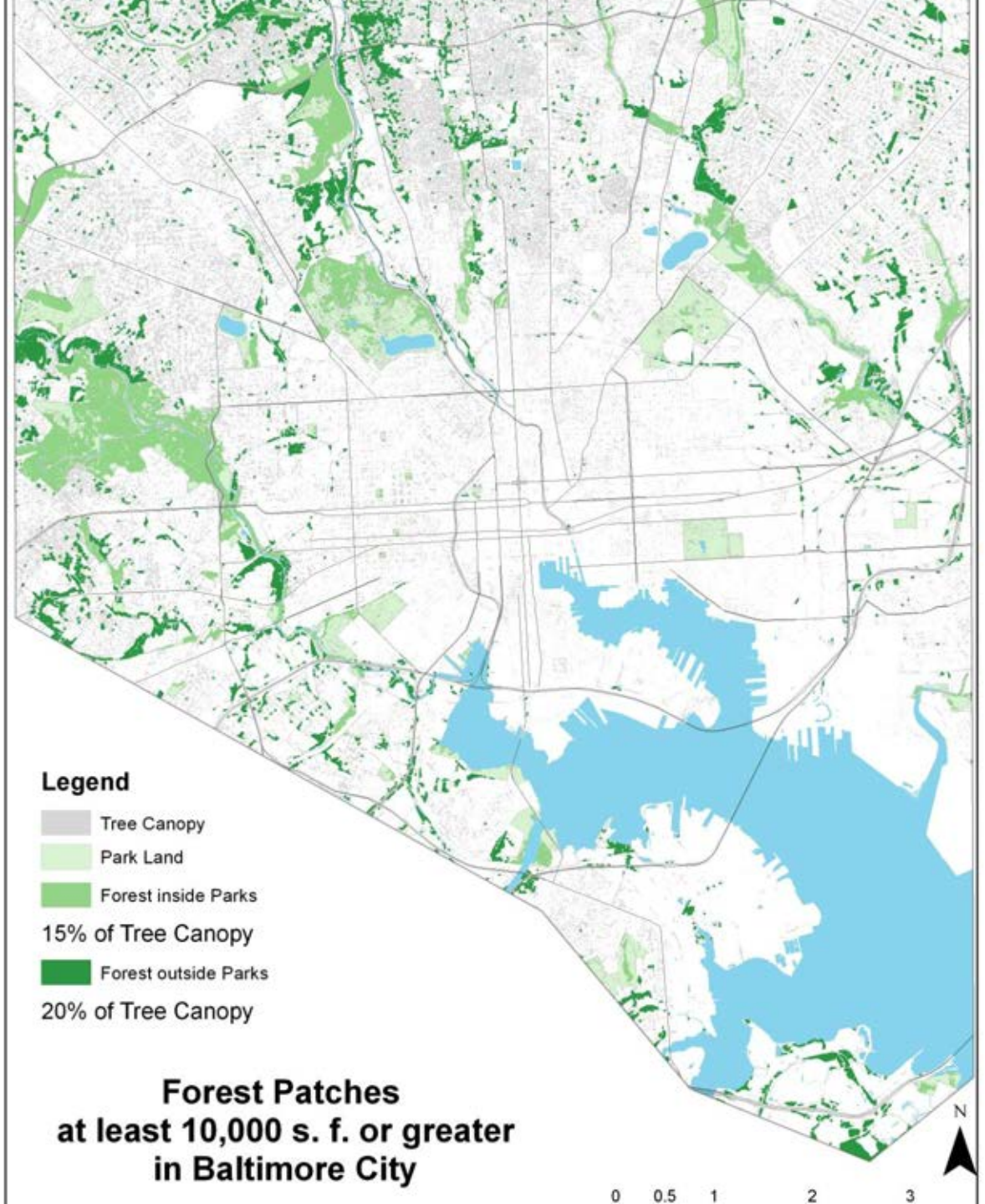


>1,000 forest patches

100 on- the-ground surveys

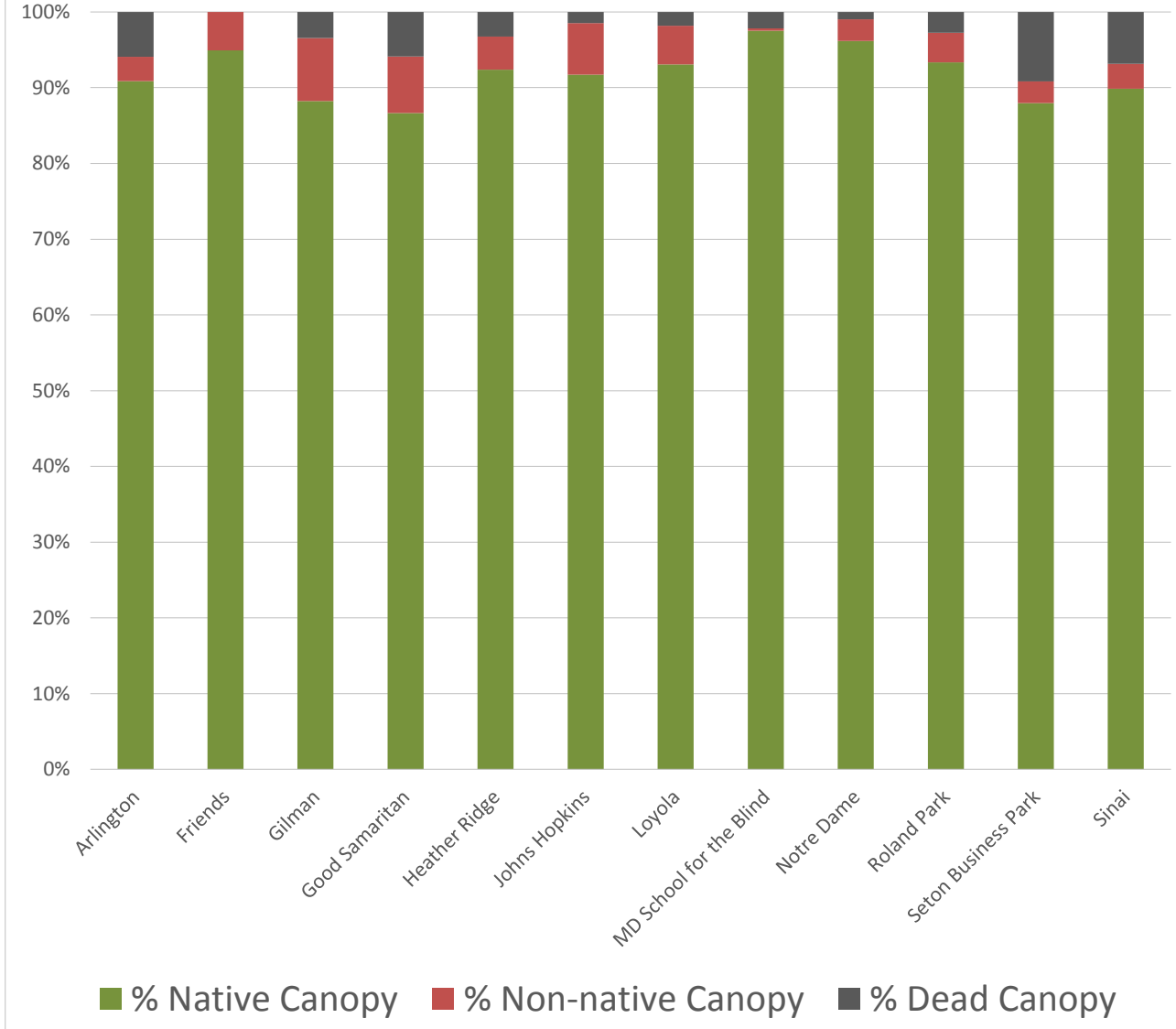
88 quick surveys

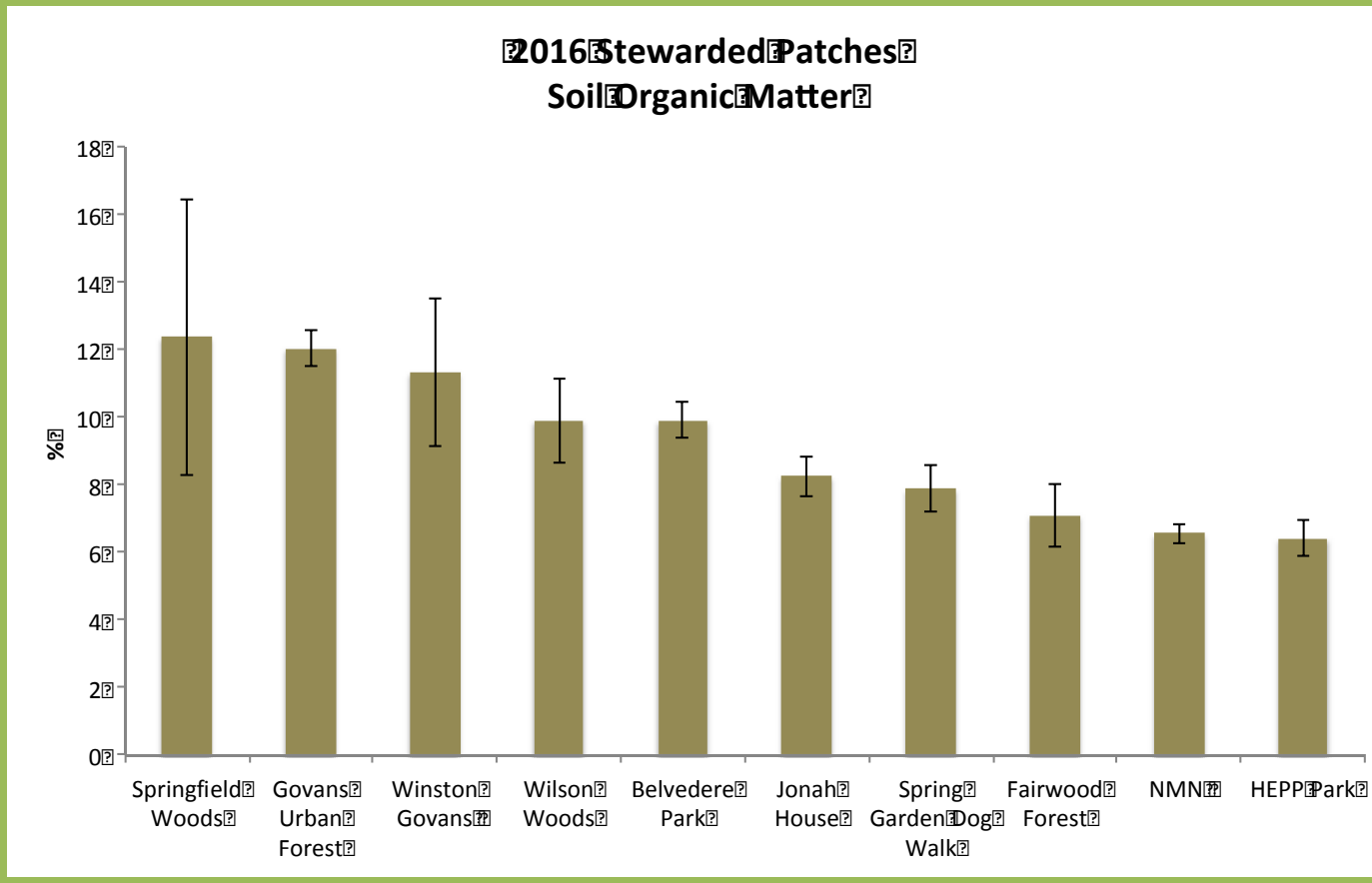
22 in depth forest health protocol



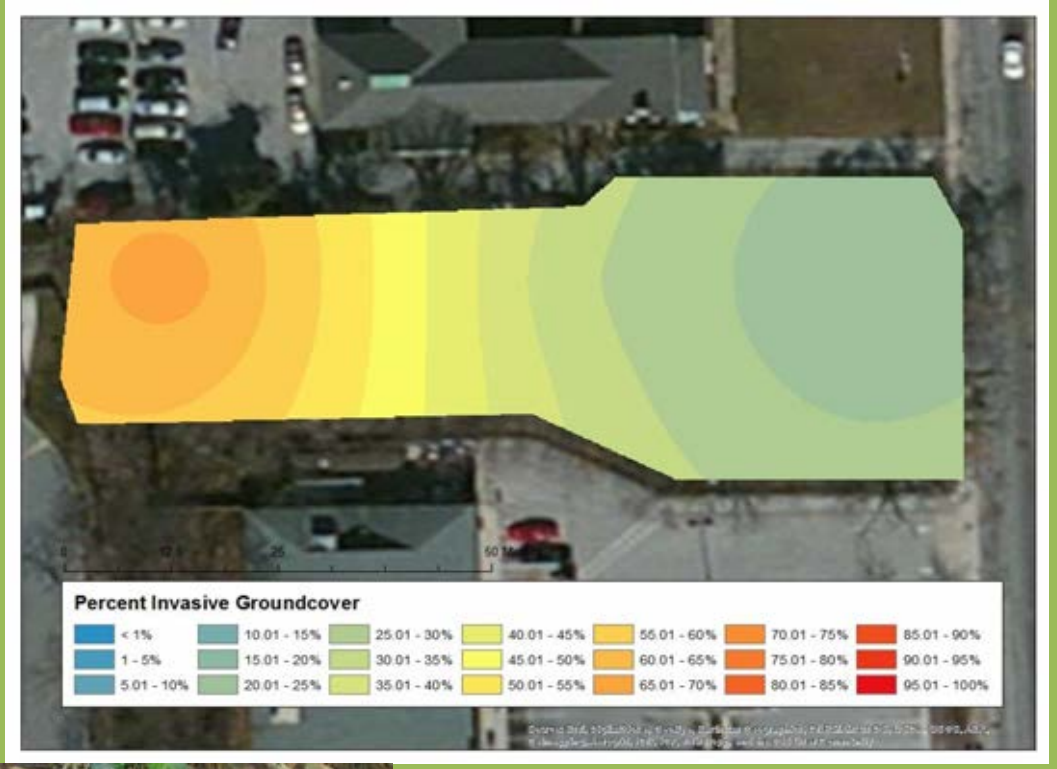
FOREST CONSERVATION EASEMENT AREA
FOREST CONSERVATION EASEMENT AREA 3.6057 ACRES
TOTAL FOREST CONSERVATION EASEMENT AREA 3.60 ACRES
LEGEND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
Google earth
Tour Guide
1994
lat 39.356266° lon -76.632348° elev 341 ft eye alt 3084 ft

2015 Easement Study
Natives, Non-natives, and Dead Trees




2016 Stewarded Patches
Soil Organic Matter
%
18
16
14
12
10
8
6
4
2
0
Springfield Woods
Govans Urban Forest
Winston Govans
Wilson Woods
Belvedere Park
Jonah House
Spring Garden Dog Walk
Fairwood Forest
NMN
HEPP Park

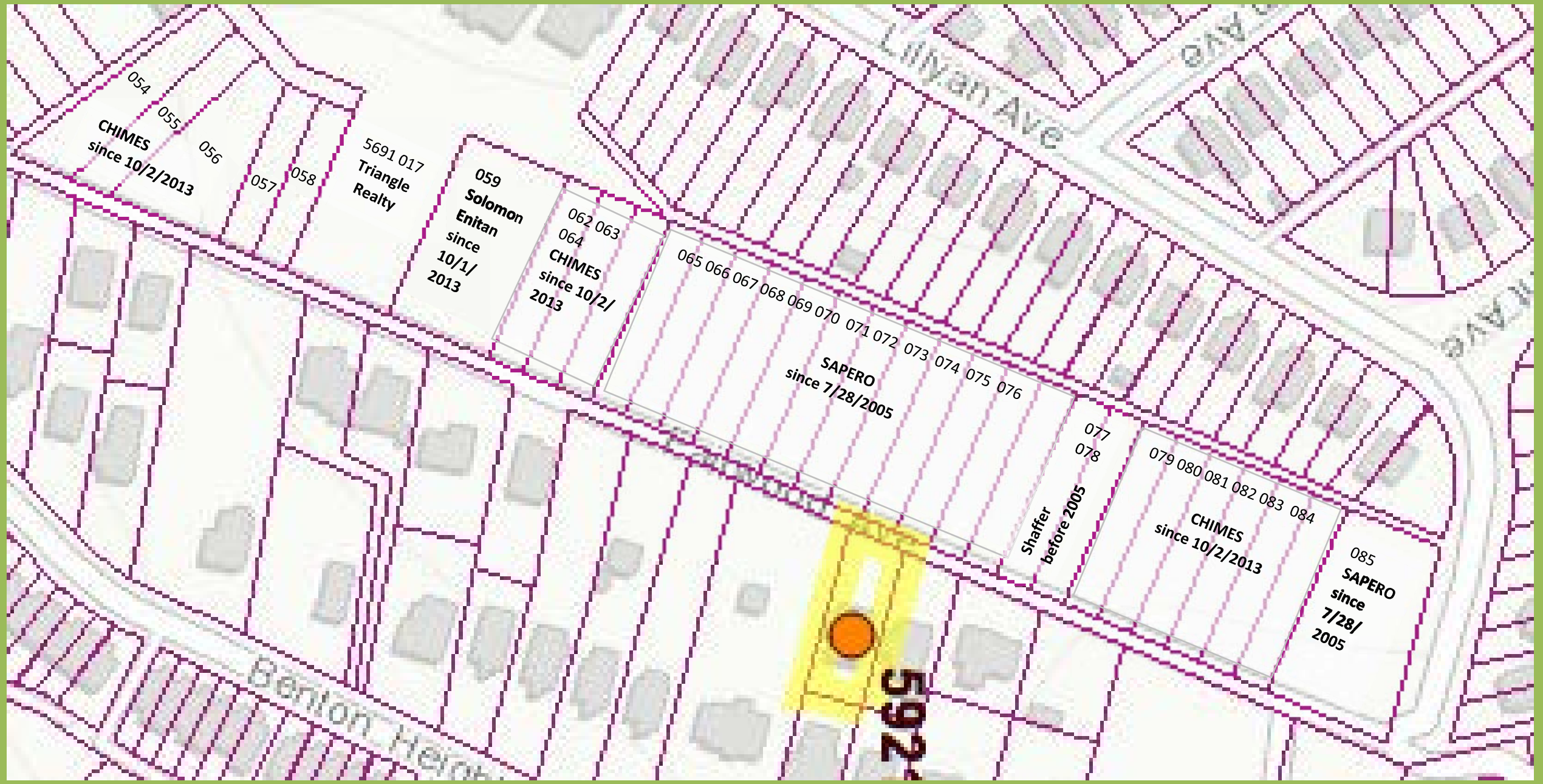
Average Schumacher Invasion Score
0
1
2
3
4
5


Percent Invasive Groundcover
< 1%
1 - 5%
5.01 - 10%
10.01 - 15%
15.01 - 20%
20.01 - 25%
25.01 - 30%
30.01 - 35%
35.01 - 40%
40.01 - 45%
45.01 - 50%
50.01 - 55%
55.01 - 60%
60.01 - 65%
65.01 - 70%
70.01 - 75%
75.01 - 80%
80.01 - 85%
85.01 - 90%
90.01 - 95%
95.01 - 100%

We Lead

We Support Leadership

Fairwood Forest Lot Map
Prepared May 2017



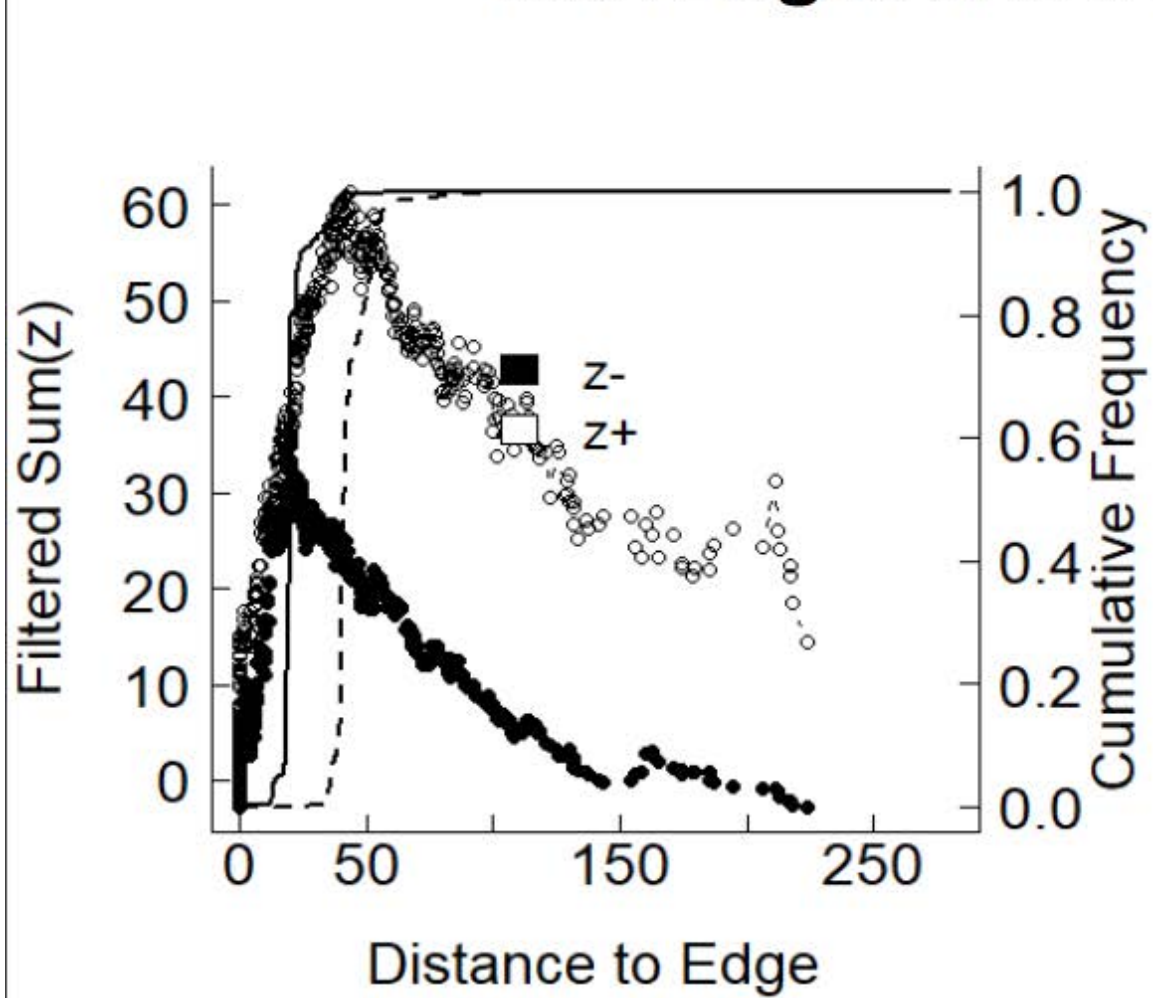
Fantastic FOREST FORUM

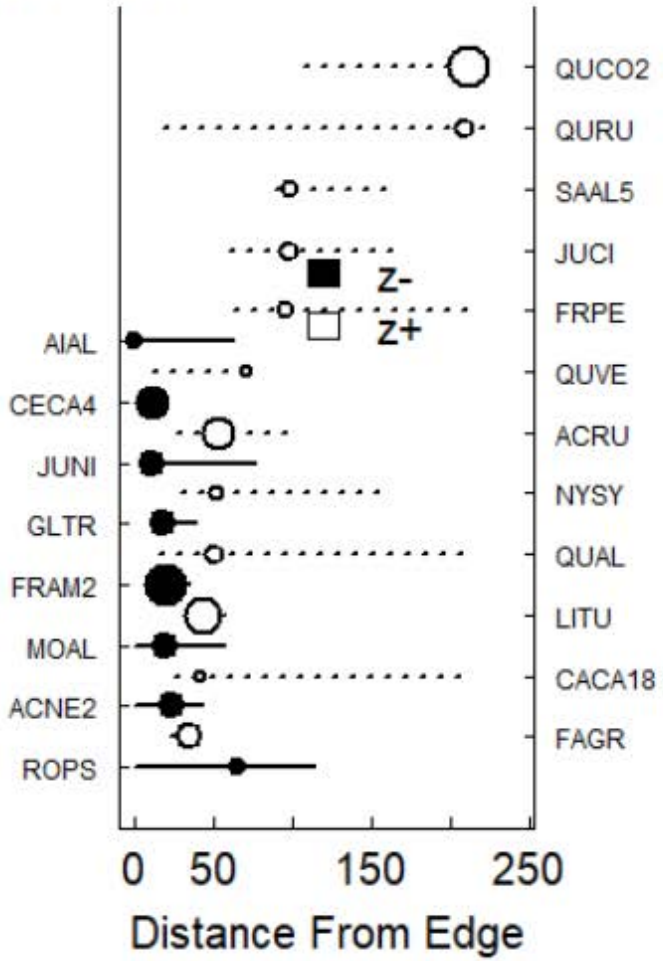
THU. NOV. 9, 2017

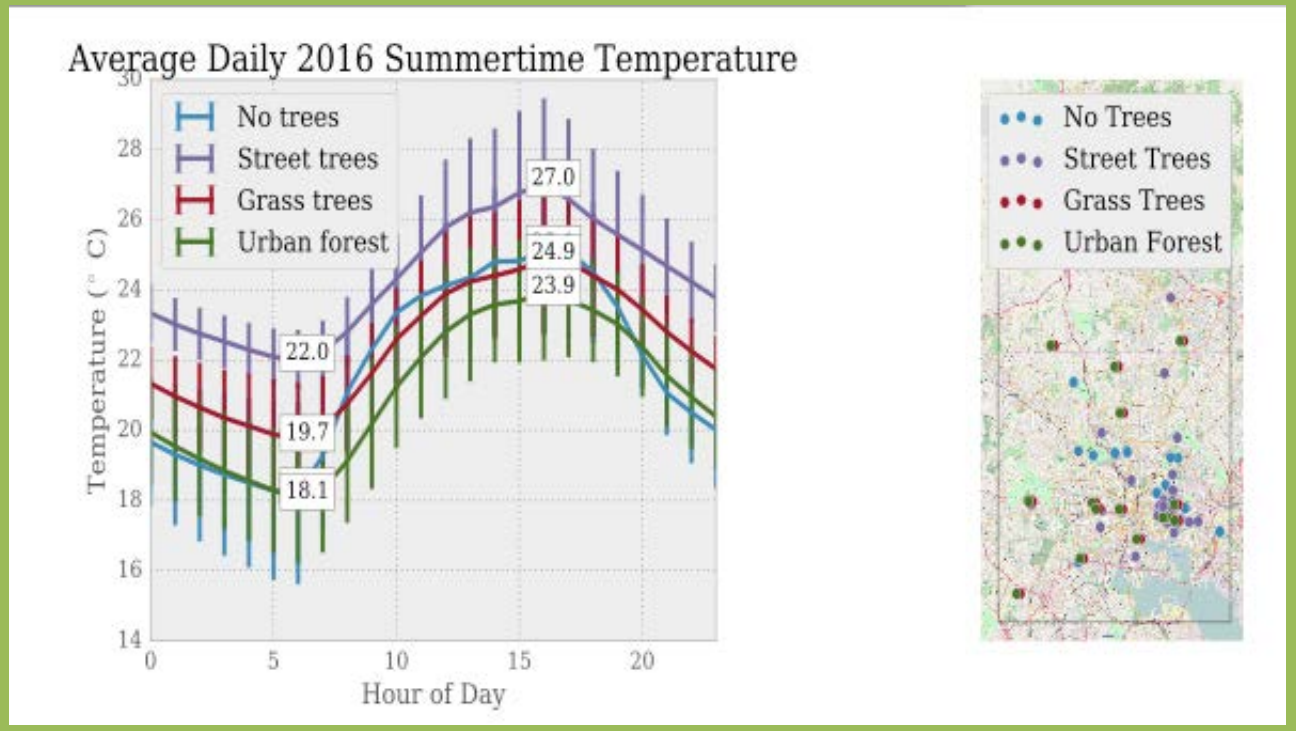
98 species have been found in the forest patches...

…including forest specialists

Different Species Associated with Edges and Interiors



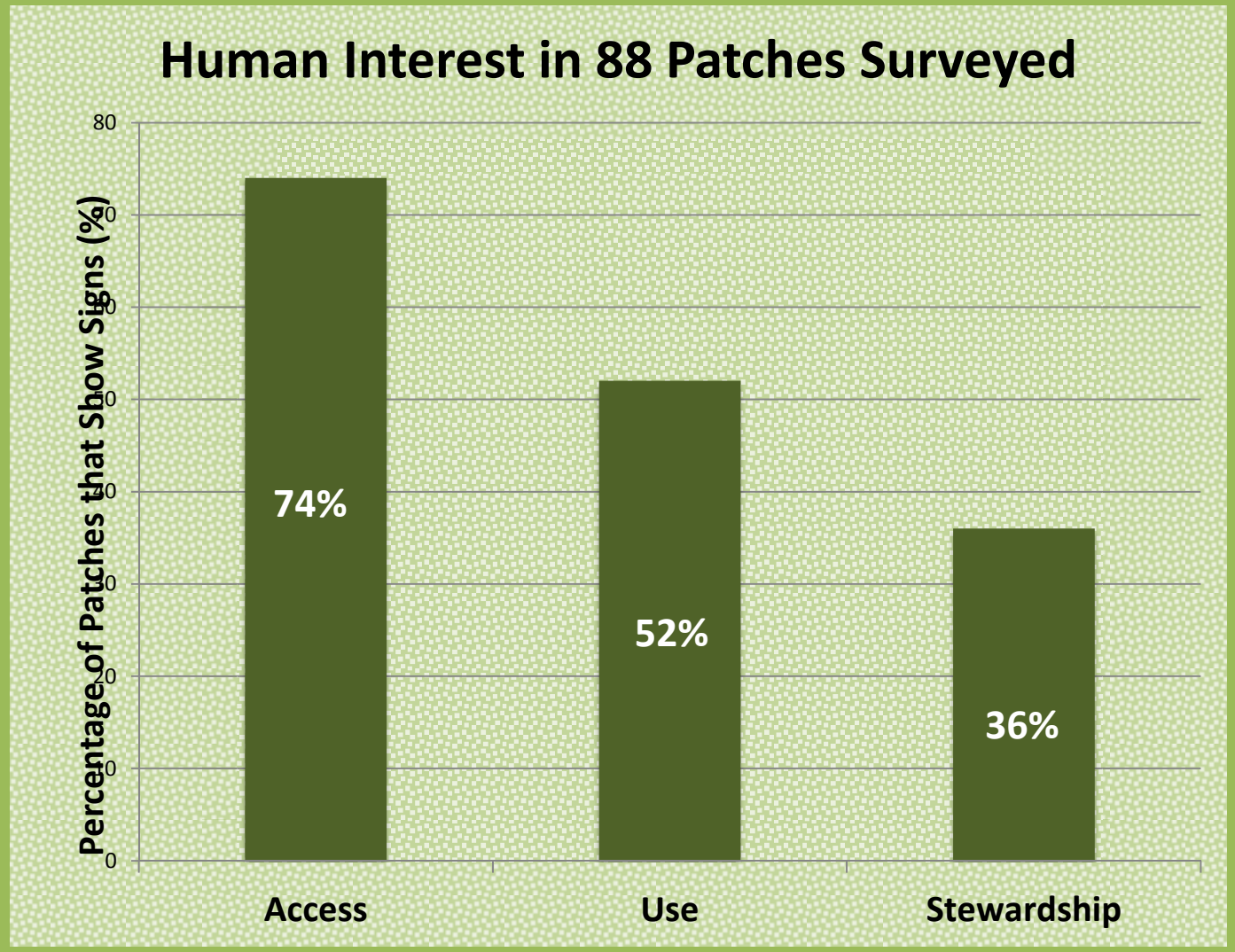


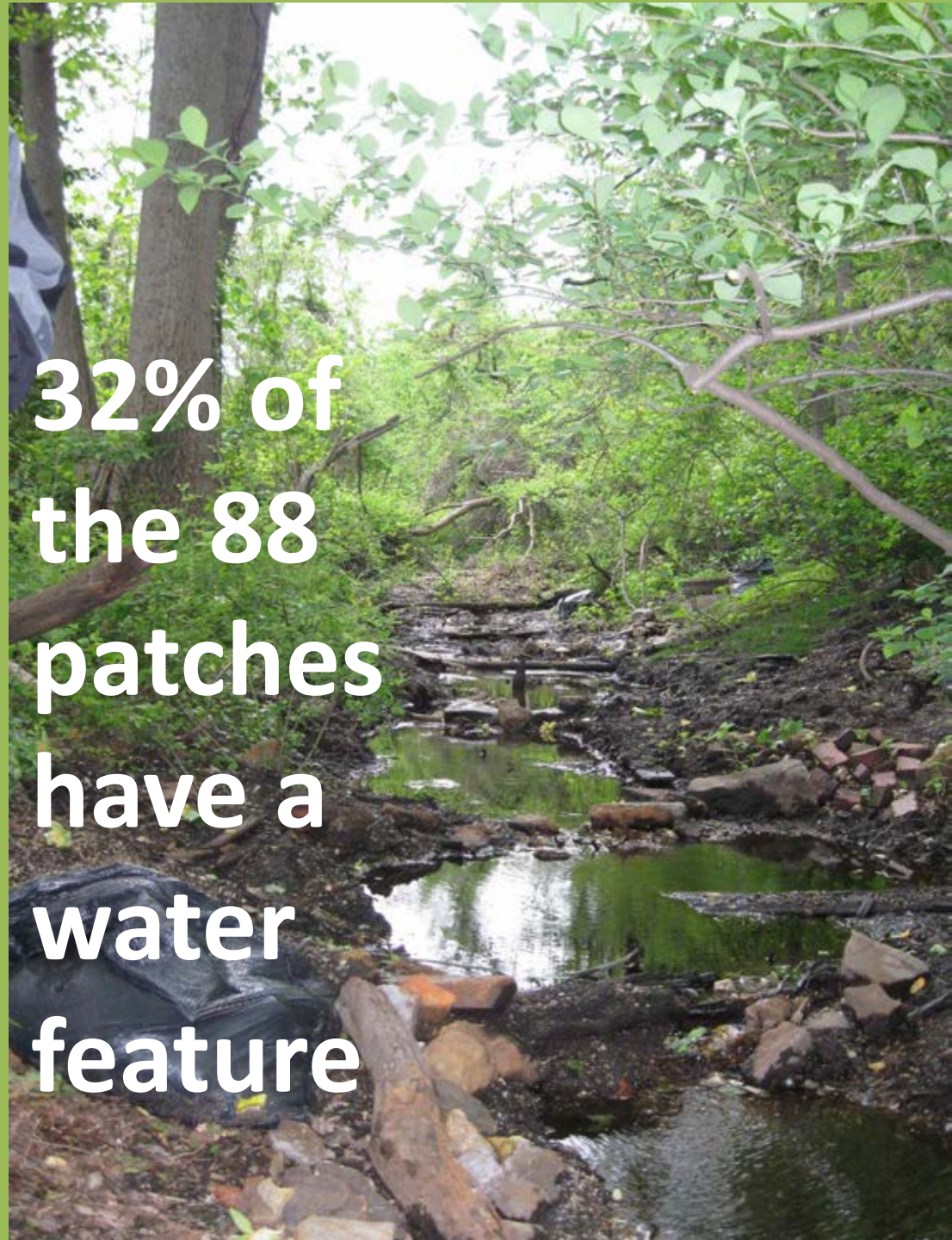


Tracking Bird Movements on Migration

Results: Forest Patch Perceptions

Theme	% of Respondents	Description
KIDS / EDUCATION	45%	exploration, nature walks, treehouse, student projects “we take pictures when we see a lot of deer, and then I allow my little babies to come out and see” “we used to have bonfires…everybody used to sit around the fire”
IDENTITY	38%	sense of place, cultural heritage “I’m a nature lover” “I am connected to the earth” “it reminds me of home…it’s the closest I get to home” “that’s my thing..I love woods” “I’ve been a woods person for a lot of yrs” “I’m a strong advocate for the forest!”
ENVIRONMENTAL BENEFITS	17%	oxygen, erosion control, shade, water quality
PRIVACY / REFUGE	14%	quiet, peaceful, relaxing, escape, sense of place “I enjoy the peacefulness” “Hearing the birds…it’s just very relaxing” “that’s a good private place for talking…the woods don’t tell”


Human Interest in 88 Patches Surveyed
Percentage of Patches that Show Signs (%)
80
0
74%
52%
36%
Access
Use
Stewardship


32% of the 88 patches have a water feature

NatureServe®

A Network Connecting Science With Conservation

NatureServe

Communication and Engagement Among MET Stakeholders

Nicholas Moy

LandScope America Coordinator

www. LandScope.org

NatureServe

NatureServe

LandScope America

The shared conservation priority system for the Americas

American Marten (*Martes americana*)
NatureServe Global Status: Secure (G5)
Photo | Larry Master

NatureServe

LandScope America

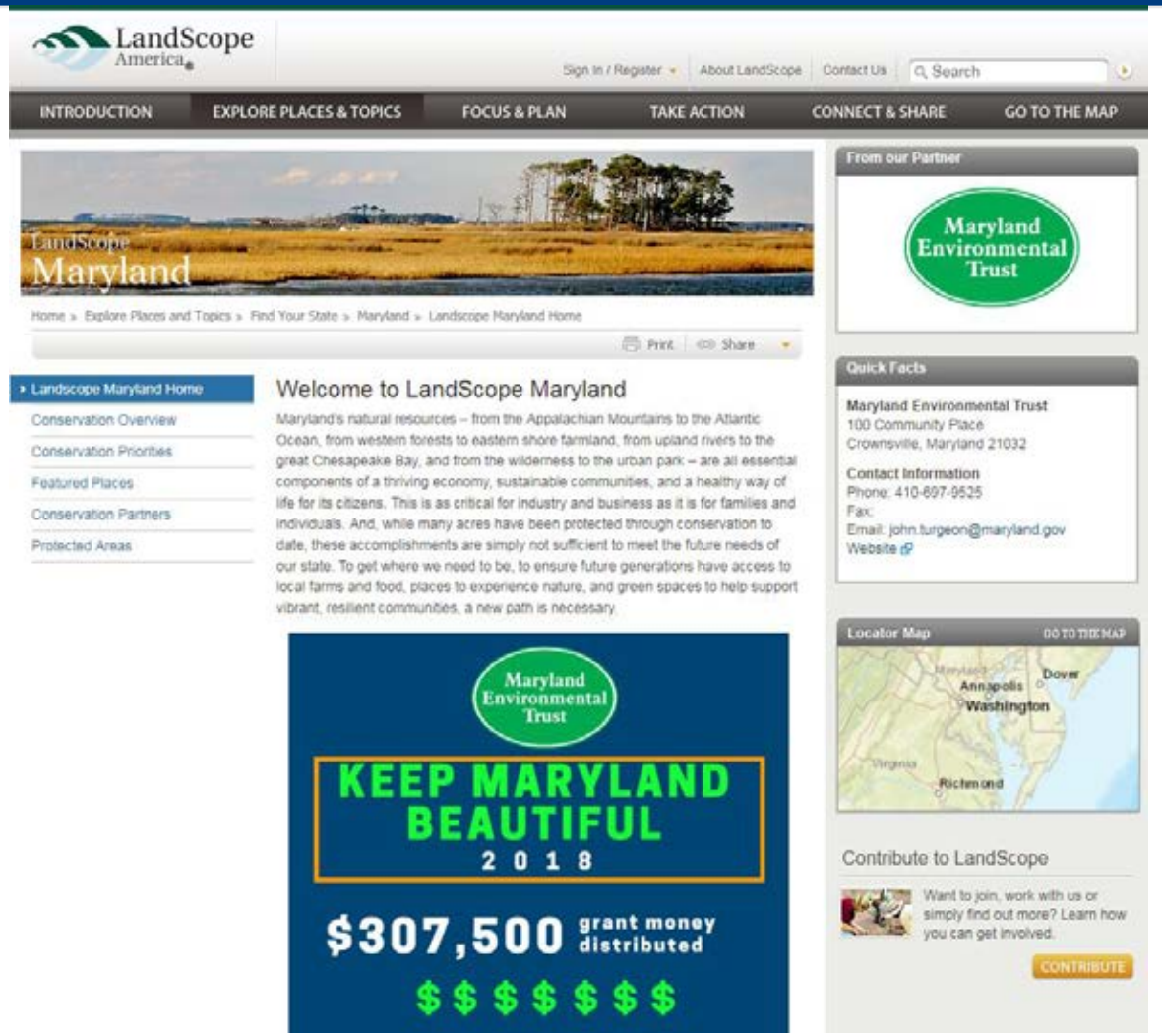
+

Maryland Environmental Trust

www. LandScope.org/Maryland

NatureServe

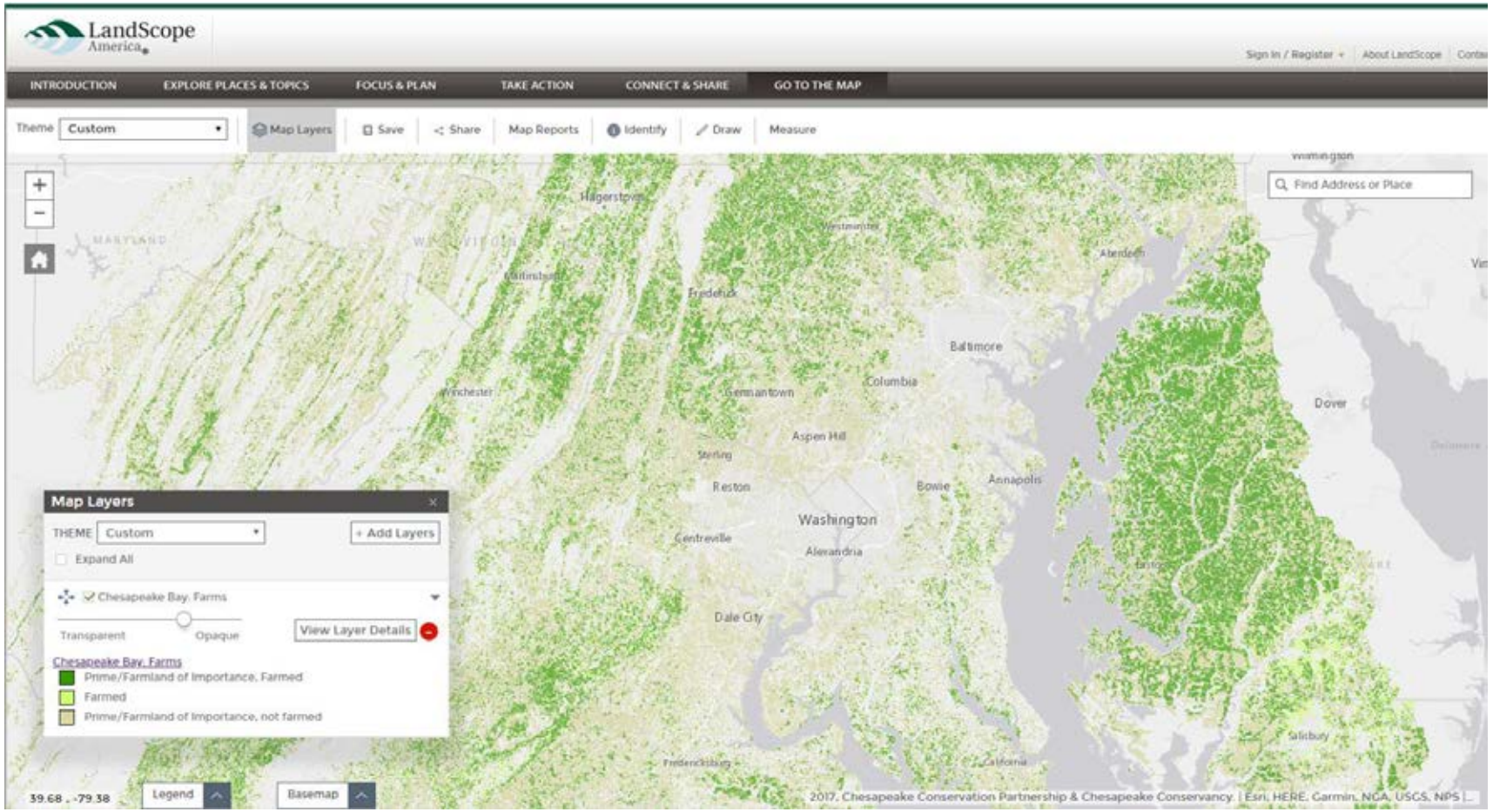
Communicate with Partners and the Public



Maryland Environmental Trust
LandScope Portal Homepage
www.LandScope.org/Maryland

NatureServe

Access the Conservation Communities Go-to Map Resources

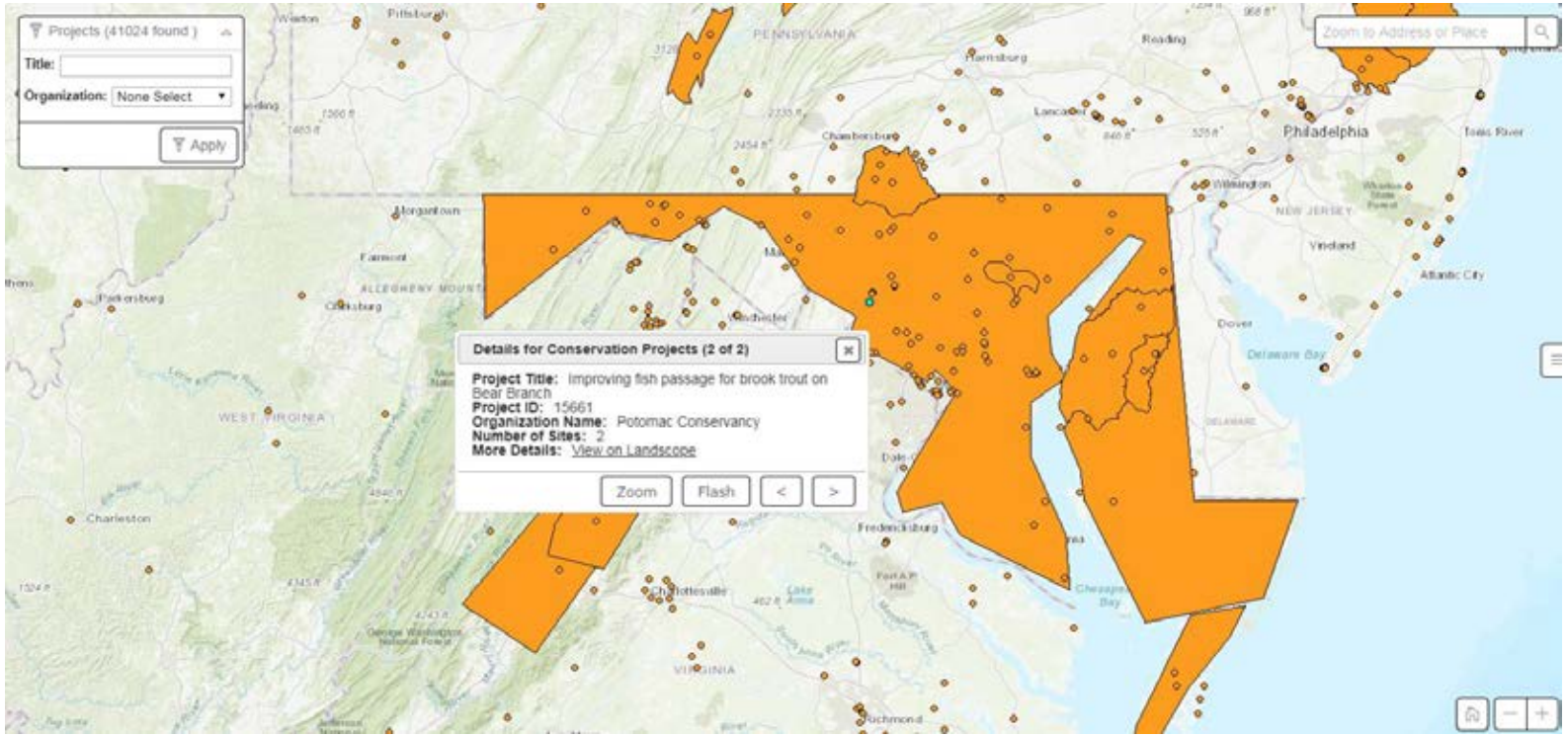


LandScope makes available over 300 maps from conservation partners including prime farmlands pictured here

Coming soon: Your maps!

NatureServe

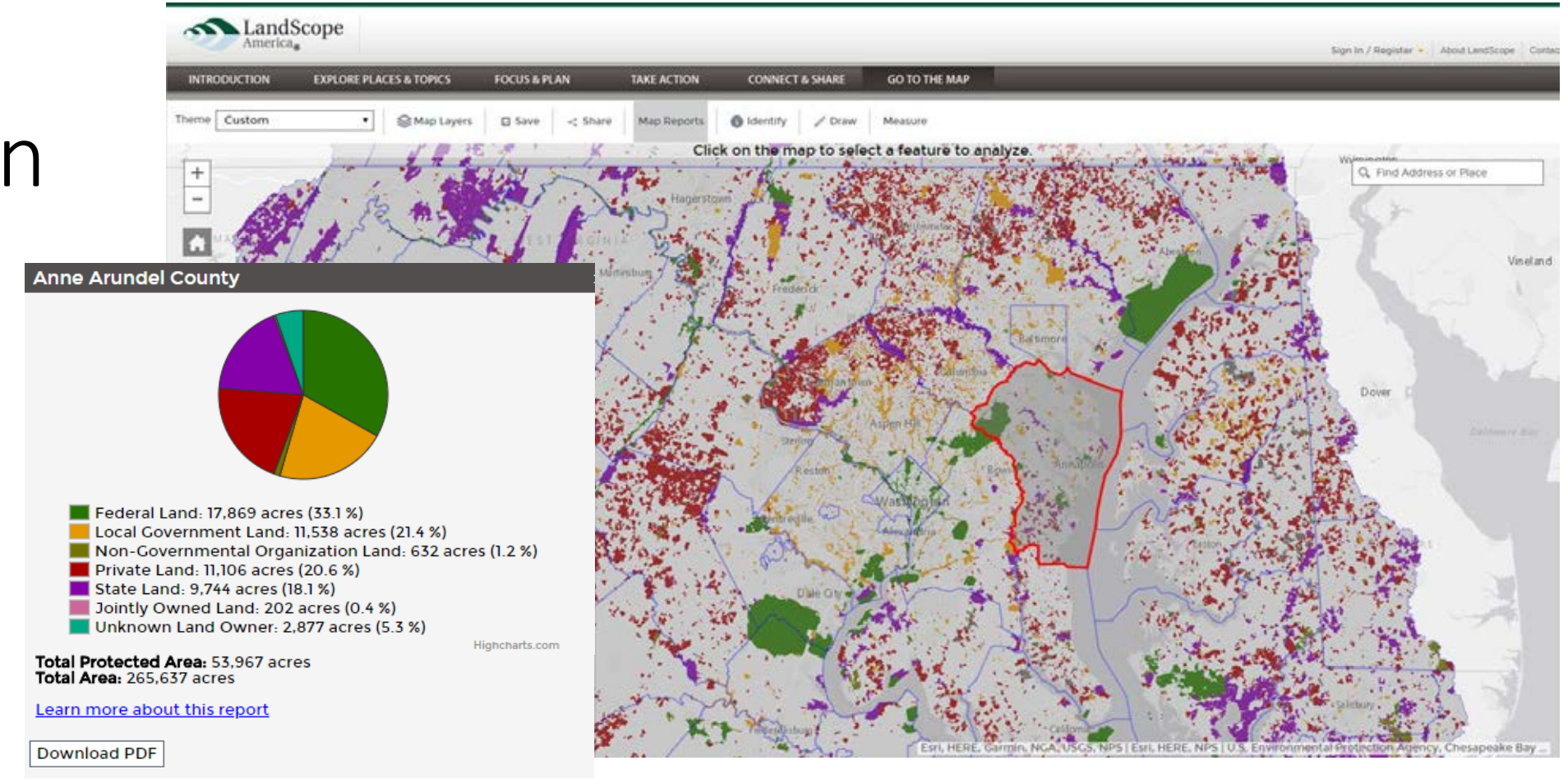
Join the Largest Registry of Conservation Projects



Register conservation projects in the region
Coming Soon: easy project registration through portal

NatureServe

Track Conservation Success



Run reports by county or watershed to determine the status of land conservation

Coming Soon: custom reporting based on partnership goals

NatureServe

Nicholas Moy

NatureServe

LandScope America Coordinator

User Experience & Design Specialist

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