

The Watershed Resources Registry (WRR)

<http://watershedresourcesregistry.org>

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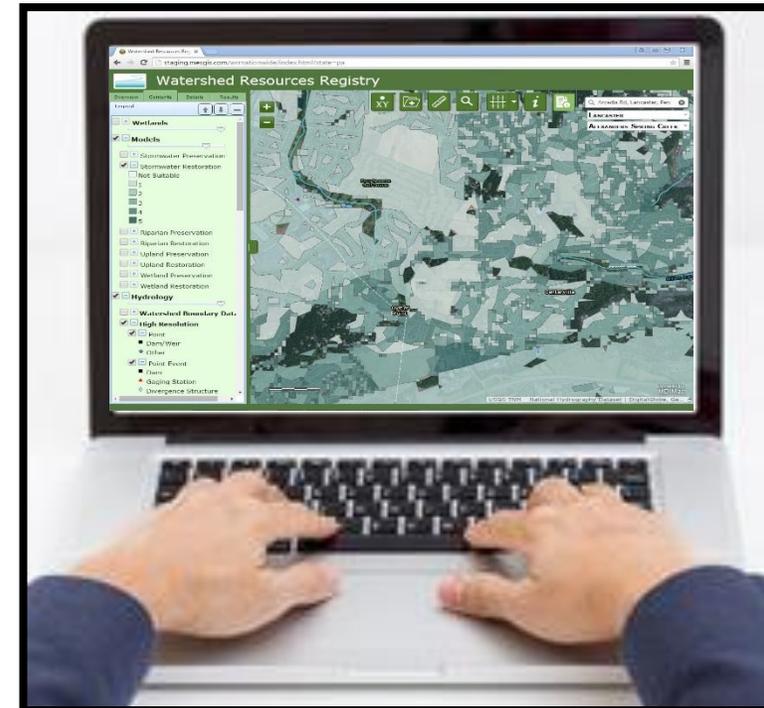
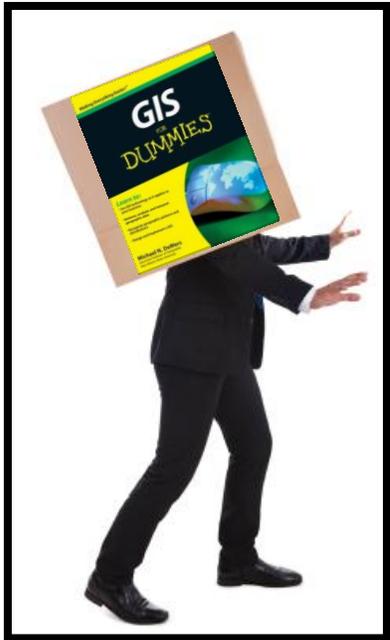
215-814-2718

Ellen Bryson
Geographer
Corps of Engineers, Baltimore
District
Ellen.A.Bryson@usace.army.
mil

410-962-6084



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



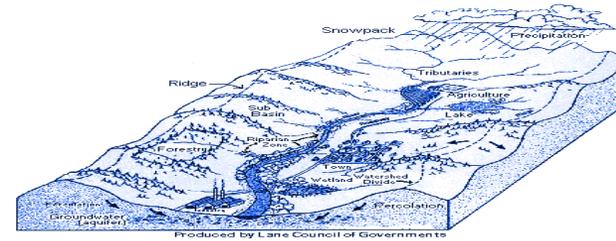
Collaboration (in Maryland)

- Current partner agencies:
 - U.S. Environmental Protection Agency (EPA), Region III
 - U.S. Army Corps of Engineers , Baltimore District (ACE)
 - Maryland Department of the Environment (MDE)
 - State Highway Administration (SHA)
 - U.S. Fish and Wildlife Services (FWS)
 - Maryland Environmental Service (MES)
 - Maryland Department of Natural Resources (MDNR)
 - U.S. Federal Highway Administration (FHWA)
 - Maryland Department of Planning (MDP)

Advantages of Watershed Approach



Stove Pipe Approach



Watershed Approach

- Interdisciplinary approach that integrates solution
- Addresses complex environmental relationships
- Uses naturally defined area
- Holistically targets problems
- Ecologically based
- Promote stakeholder/public involvement
- Compatibility with other programs

What is the WRR?

A comprehensive mapping tool and replicable framework that:

- Integrates and streamlines regulatory programs
- Promotes the watershed approach – Maximizes benefits
- Guides resource planners, and regulators
- Saves time and money, and increases program efficiencies



What is the WRR (cont'd)

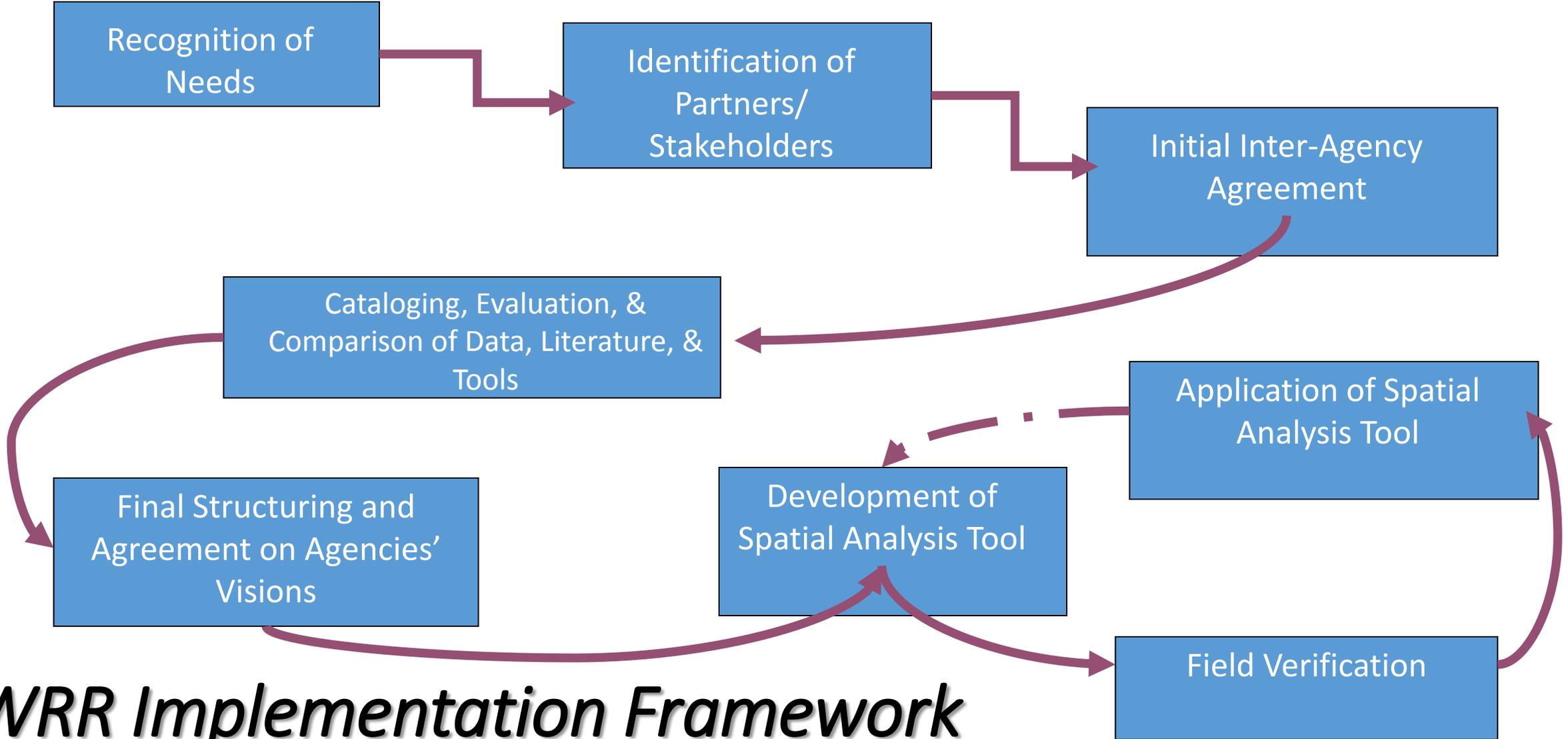
A comprehensive mapping tool and replicable framework that:

- Transparent, predictable and reliable
- Facilitates multi-agency input and coordination
- Utilizes both national and regional datasets
- Includes site visit **registered** information
- Removes sites that have been restored/preserved

What makes the WRR unique?

Unlike many mapping and targeting tools...

- There is agency collaboration and program integration
 - CWA 319, 401,402,404, 303(d)
 - watershed planning, permit review, mitigation assessments
 - TMDL and WIP applications
 - Stormwater management
 - Resource conservation/ environmental resource planning
 - Green Print and Rural Legacy priorities
 - Section 7 (Threatened and Endangered Species)
 - Transportation and land use planning
 - NEPA review

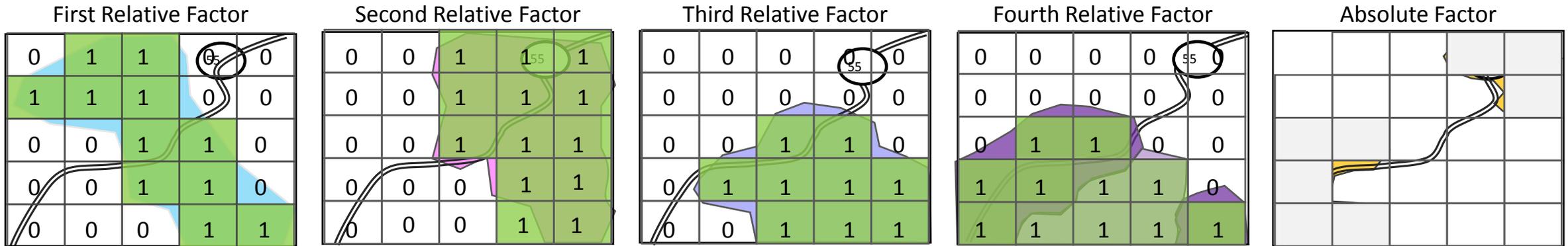


WRR Implementation Framework



GIS Analyses

GIS Suitability Analyses - How It Works



Simple Overlay:
Sum Up All Desirable Factors Found in each area

0	1	2		
1	1	2	1	
		4	3	1
	2	3	4	2
		2	4	4



The Suitability Analyses

- Upland Preservation
- Upland Restoration
- Wetland Preservation
- Wetland Restoration
- Riparian Zone Preservation
- Riparian Zone Restoration
- Preserving Natural Hydrology for Stormwater
- Restoring Natural Hydrology for Stormwater



Widely Available Datasets

- CWA 303(d) listed streams
- Streams (Anti-degradation)
- National Hydrologic Dataset
- Flood Plain (100 year)
- NWI Wetlands
- Soils
- Federal/State/Local lands
- Anadromous Fish Spawning Areas
- NPDES Point Sources
- Land Use/Land Cover
- Forested Land Areas
- Ecologically Sensitive Areas

Important Points

- The more stars the better
- Five stars is best—a really great opportunity
- But one star is not ‘bad’
- Use WRR to find the best opportunity—the highest rated area that’s big enough to meet your needs

Potential Limitations

- Data are not perfect: errors in interpreting imagery and recording attribute data
- Some information won't be correct
 - small wetlands
 - recent land developments
 - property owners with no interest
- Resolution is about 100 feet square—not as detailed as we'd like
- Interval between data updates can be long



Log In

Overview Contents Details Results

To begin, please follow the steps below:

- Use the 'Address Locator' tool or 'Zoom/Pan' tools above to find your location.
- Select the 'Find Opportunities' tool to locate resources within the study area.
- Select the 'Location Details' tool above and then click the location of interest on the map.

Find Opportunities

Select a county:
Wicomico

Select a Watershed:
All Watersheds

Select Potential Opportunities:

- Upland Preservation
- Upland Restoration
- Wetland Preservation
- Wetland Restoration
- Riparian Preservation
- Riparian Restoration
- Stormwater Natural Infrastructure Preservation
- Stormwater Compromised Infrastructure Restoration

Select Score:

- ★
- ★★
- ★★★
- ★★★★
- ★★★★★

Select Score Operator:

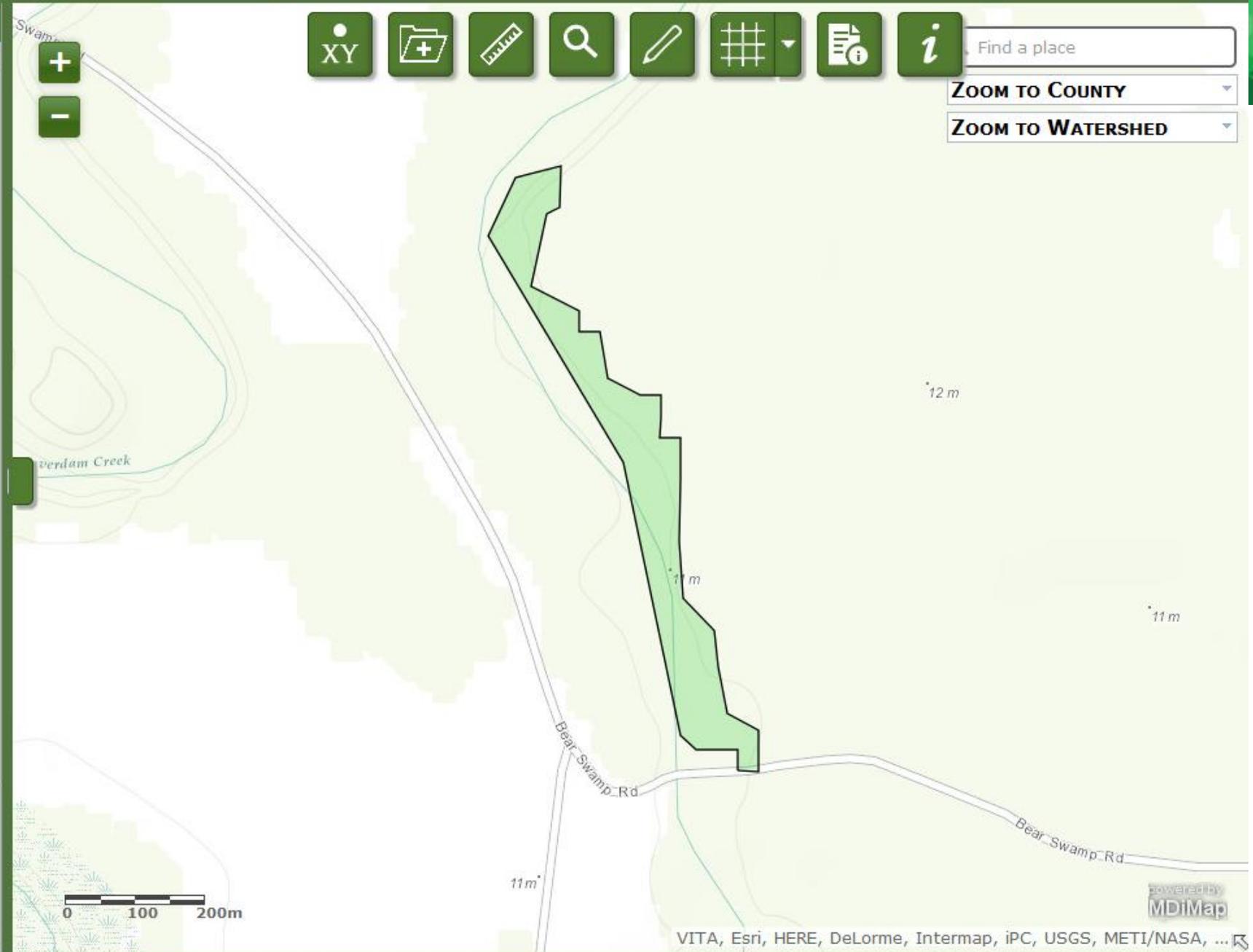
- =
- Where Acres is Greater Than (>): 5
- Where Acres is Less Than (<): 25

Find Opportunities



Found Opportunities
 Using the following criteria
 Model: Wetland Preservation
 County: Wicomico
 Score = 5
 Acreage > 5
 Acreage < 25

Zoom	Remove	Code	▲ Acres
		5	5.22
		5	5.49
		5	6.05
		5	6.33
		5	7.07
		5	9.33
		5	13.23
		5	14.52
		5	16.28
		5	19.81
		5	23.73
		5	24.65



XY

Find a place

ZOOM TO COUNTY

ZOOM TO WATERSHED



Overview Contents Details Results

Found Opportunities

Using the following criteria

Model: Wetland Preservation

County: Wicomico

Score = 5

Acrage > 5

Acrage < 25

Zoom	Remove	Code	▲ Acres
		5	5.22
		5	5.49
		5	6.05
		5	6.33
		5	7.07
		5	9.33
		5	13.23
		5	14.52
		5	16.28
		5	19.81
		5	23.73
		5	24.65

Map toolbar icons: XY, Add, Measure, Search, Edit, Grid (highlighted), Print, Info.

Search bar: Find a place

Zoom controls: ZOOM TO COUNTY, ZOOM TO WATERSHED

Scale bar: 0, 100, 200m

Footer: powered by MDiMap, DigitalGlobe, GeoEye, Microsoft, USDA FSA, CNES/Airbus DS



Overview **Contents** Details Results

Legend



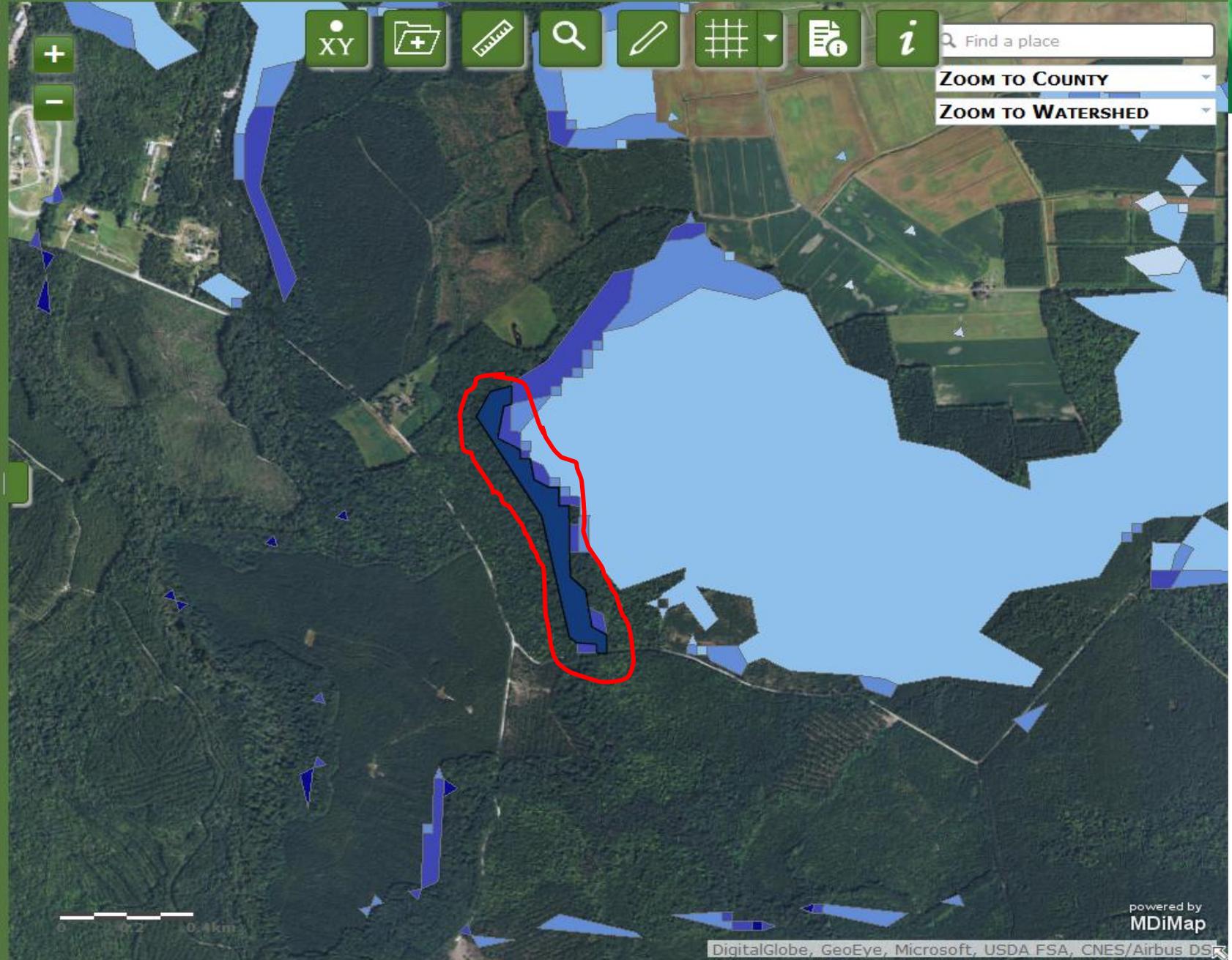
- Site Visits
- Parcel Boundaries
- Models**
- Watershed Resources Imp**
 - Upland Preservation
 - Upland Restoration
 - Wetland Preservation**
 - Not Suitable
 - 1
 - 2
 - 3
 - 4
 - 5
 - Wetland Restoration
 - Riparian Preservation
 - Riparian Restoration
 - Stormwater Natural Infras
 - Stormwater Compromiser
- Water**
- Terrain**
- Wetlands and Blue & Gree**



Find a place

ZOOM TO COUNTY

ZOOM TO WATERSHED



0 0.2 0.4km

powered by
MDiMap



Overview **Contents** Details Results

Legend

Site Visits

Parcel Boundaries

Models

Watershed Resources Imp

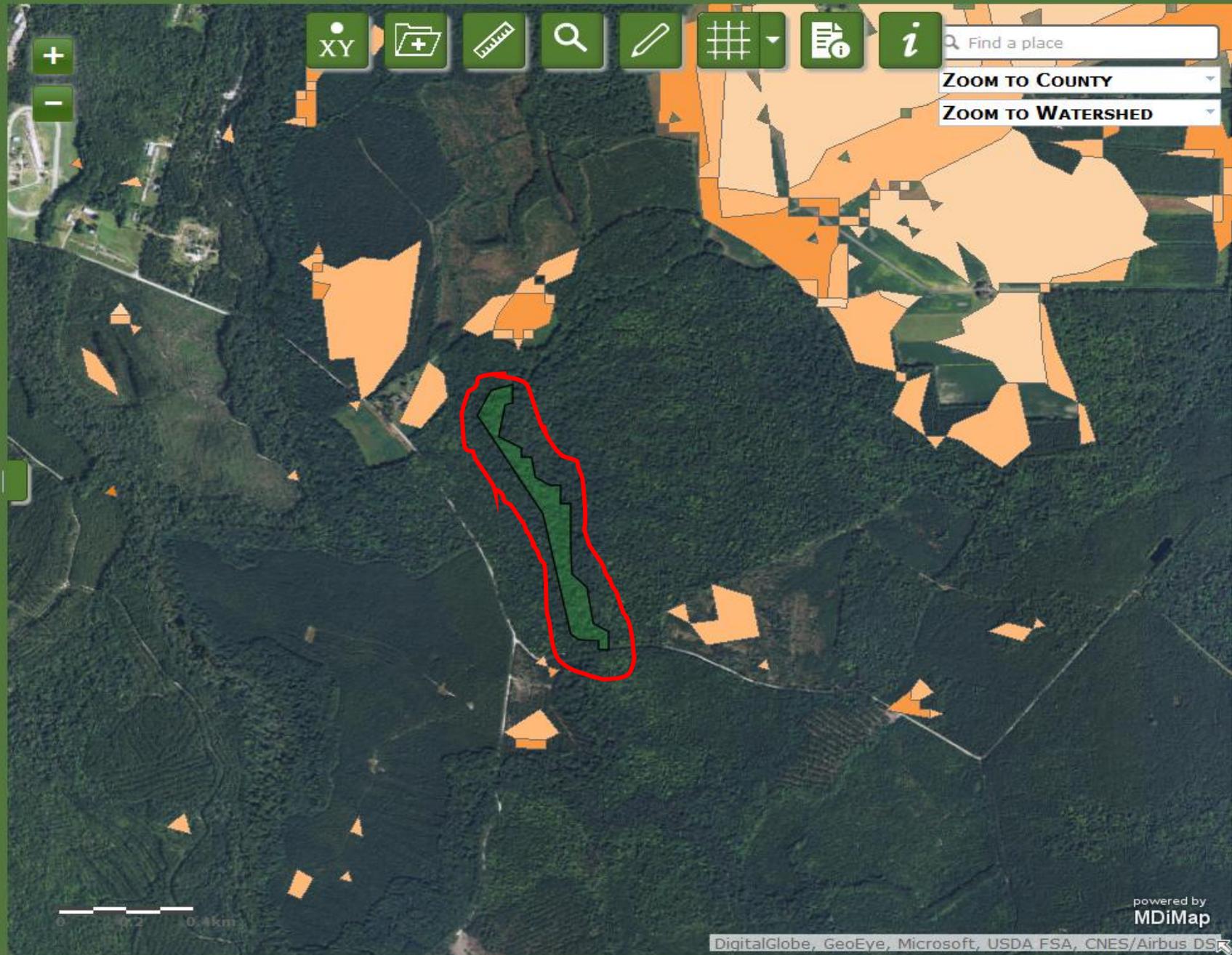
- Upland Preservation
- Upland Restoration
- Wetland Preservation
- Wetland Restoration**
- Not Suitable
- 1
- 2
- 3
- 4
- 5
- Riparian Preservation
- Riparian Restoration
- Stormwater Natural Infras
- Stormwater Compromise

Water

Terrain

Wetlands and Blue & Green

Add Data

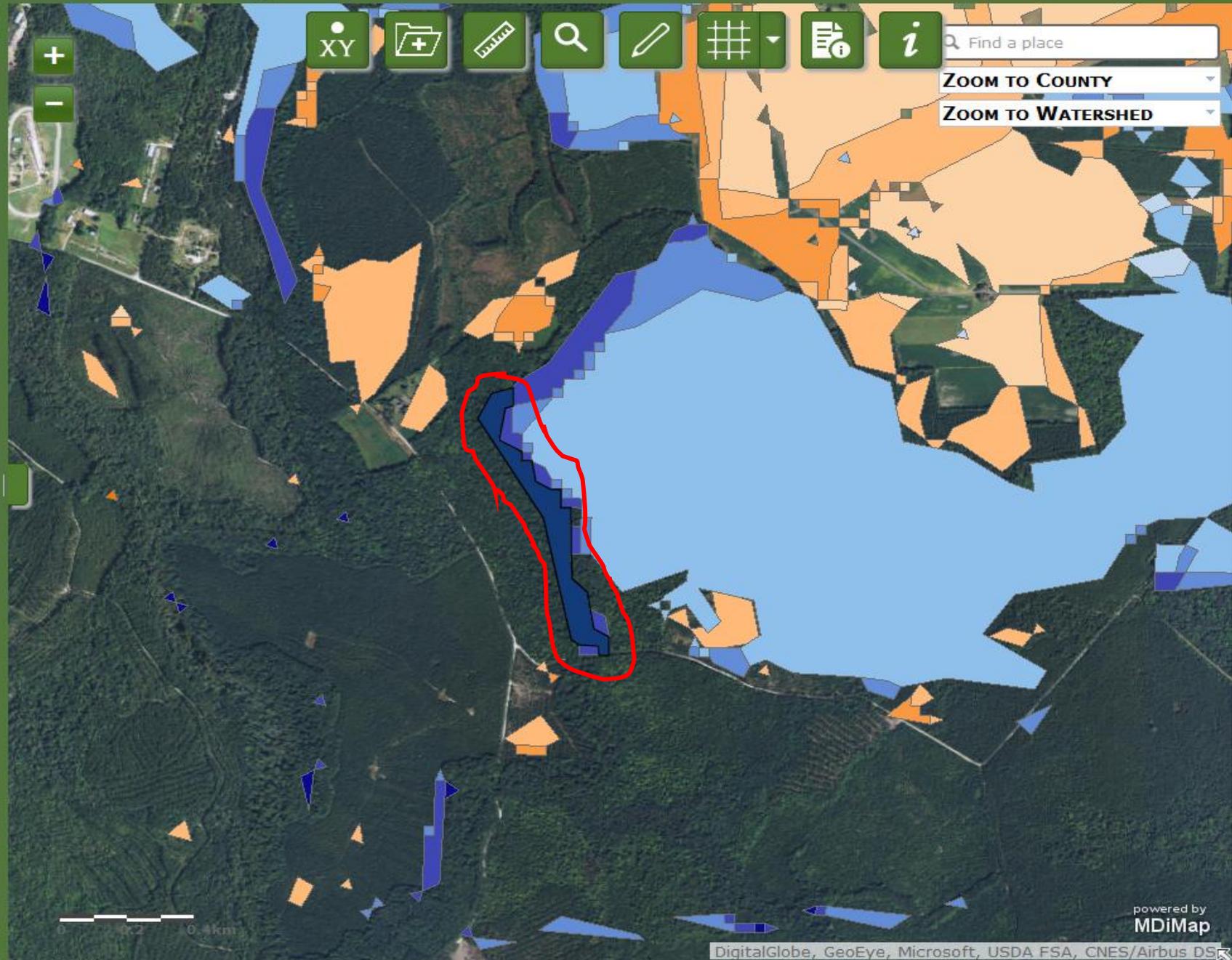




Overview **Contents** Details Results

Legend ↑ ↓ −

- Site Visits
- Parcel Boundaries
- Models**
 - Watershed Resources Imp**
 - Upland Preservation
 - Upland Restoration
 - Wetland Preservation**
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 - Not Suitable
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 - 2
 - 3
 - 4
 - 5
 - Riparian Preservation
 - Riparian Restoration
 - Stormwater Natural Infras
 - Stormwater Compromise





Print Report

Watershed Resources Improvement Opportunities

- [Upland Preservation](#): Not Suitable
- [Upland Restoration](#): Not Suitable
- [Wetland Preservation](#): 5
- [Wetland Restoration](#): Not Suitable
- [Riparian Preservation](#): 5
- [Riparian Restoration](#): Not Suitable
- [Stormwater Natural Infrastructure Preservation](#): 4
- [Stormwater Compromised Infrastructure Restoration](#): Not Suitable

Watershed Characteristics:

[View Watershed Profile](#)

HUC: 020801110101
 HUC Name: Upper Nassawango Creek
 Maryland 8 Digit Watershed: 02130205
 Maryland 12 Digit Watershed: 021302050668
 Tier II High Quality Stream Catchment: Nassawango Creek 3

Metadata: [HUC](#) | [MD Watershed](#) | [StrongholdTier II](#)

Waterways

Nearest Stream: Beech Island Creek
 Stream Use Designation: I
 Distance: 137 ft
 Water Body Distance: 44 ft

Metadata: [Stream Use Designations](#) | [Water Body](#)

Physiographic Region

[Metadata](#)
 Province: Atlantic Coastal Plain Province

Geology

[Metadata](#)
 Name: Quarternary Deposits Undivided

Wetlands

Wetlands of Special State Concern: Location inside a wetland.
 DNR: Type - PFO1E.
 NWI: Type - Freshwater Forested/Shrub Wetland.

Metadata: [WSSC](#) | [DNR](#) | [NWI](#)

Soils

[Metadata](#)
 Mapunit Symbol: Pk

The map interface includes a toolbar with icons for XY coordinates, adding layers, a ruler, search, edit, grid, and a highlighted 'Print Report' icon. A search bar at the top right contains the text 'Find a place'. Below the search bar are two dropdown menus: 'ZOOM TO COUNTY' and 'ZOOM TO WATERSHED'. A red arrow points to a specific location on the map, which is highlighted in green. A popup window titled 'Location' is open, displaying the following information:

Location [Close]

Latitude/Longitude: 38.29900, -75.44655

Watershed Resources Improvement Opportunities

- [Upland Preservation](#): Not Suitable
- [Upland Restoration](#): Not Suitable
- [Wetland Preservation](#): 5
- [Wetland Restoration](#): Not Suitable
- [Riparian Preservation](#): 5
- [Riparian Restoration](#): Not Suitable
- [Stormwater Natural Infrastructure Preservation](#): 4
- [Stormwater Compromised Infrastructure Restoration](#): Not Suitable



Overview **Contents** Details Results

Legend ↑ ↓ −

- Site Visits**
- Parcel Boundaries**
- Parcel Boundaries
- Models**
- Water**
- Terrain**
- Wetlands and Blue & Green**
- Flora and Fauna**
- Sea Level Rise**
- Stormwater Print**
- Base Data**



Find a place

ZOOM TO COUNTY

ZOOM TO WATERSHED



Parcels

Account ID 2306004326

SDAT Url [More info](#)

[Zoom to](#)



Real Property Data Search (w4)

[Guide to searching the database](#)

Search Result for WICOMICO COUNTY

[View Map](#)

[View GroundRent Redemption](#)

[View GroundRent Registration](#)

Account Identifier:

District - 06 Account Number - 004326

Owner Information

Owner Name:

MABE JAMES C

Use:

AGRICULTURAL

Principal Residence:

NO

Mailing Address:

3517 CASTLE WAY
DAVIDSONVILLE MD 21035-

Deed Reference:

/03433/ 00383

Location & Structure Information

Premises Address:

BEAR SWAMP RD
POWELLVILLE 21852-0000

Legal Description:

245.79 AC
NS BEAR SWAMP CO RD 253
BNDRY SURVEY BEAR SWAMP HUNT CLUB

Map:	Grid:	Parcel:	Sub District:	Subdivision:	Section:	Block:	Lot:	Assessment Year:	Plat No:	Plat Ref:
0060	0011	0007		0000				2014	0016/	0161

Special Tax Areas:

Town:

NONE

Ad Valorem:

Tax Class:

Primary Structure Built

Above Grade Enclosed Area

Finished Basement Area

Property Land Area

County Use

245.7900 AC



Demonstrate Basic Application Functionalities



A Real-World Stormwater Project From the Transportation Perspective



SWM Sites Search Process

- Target areas in specific watersheds that are in need for water quality/quantity improvements
- Watershed based approach to identify potential SWM retrofit opportunities to meet TMDL reduction goals





Watershed Characteristics

Identify areas to be preserved

- water resources that will be avoided:

Gunpowder River Watershed (1.1 acres credit)

•Bird River/White Marsh Watershed

Watershed Resources Registry

Overview Contents Details Results

Legend

- Stronghold Watershed
- Tier II High Quality Stream Catchment
- Waters/Streams**
 - Stream
 - Floodplain
 - Water Body
- Water Quality Impairments
- Terrain**
- Wetlands And Blue & Green Infrastructure**
 - Wetland**
 - Wetlands of Special State Concern
 - NWI
 - DNR
 - Wetland
 - Green Infrastructure**
 - Corridor
 - Gap
 - Hub
 - Blue Infrastructure

Map: Baltimore County, Maryland. Features include roads (e.g., I-695, MD-43, White Marsh Blvd), streams (Gunpowder River, Bird River, White Marsh), and various infrastructure layers. A popup window displays data for the selected watershed.

Maryland 12 Digit Watershed: GUNPOWDER RIVER

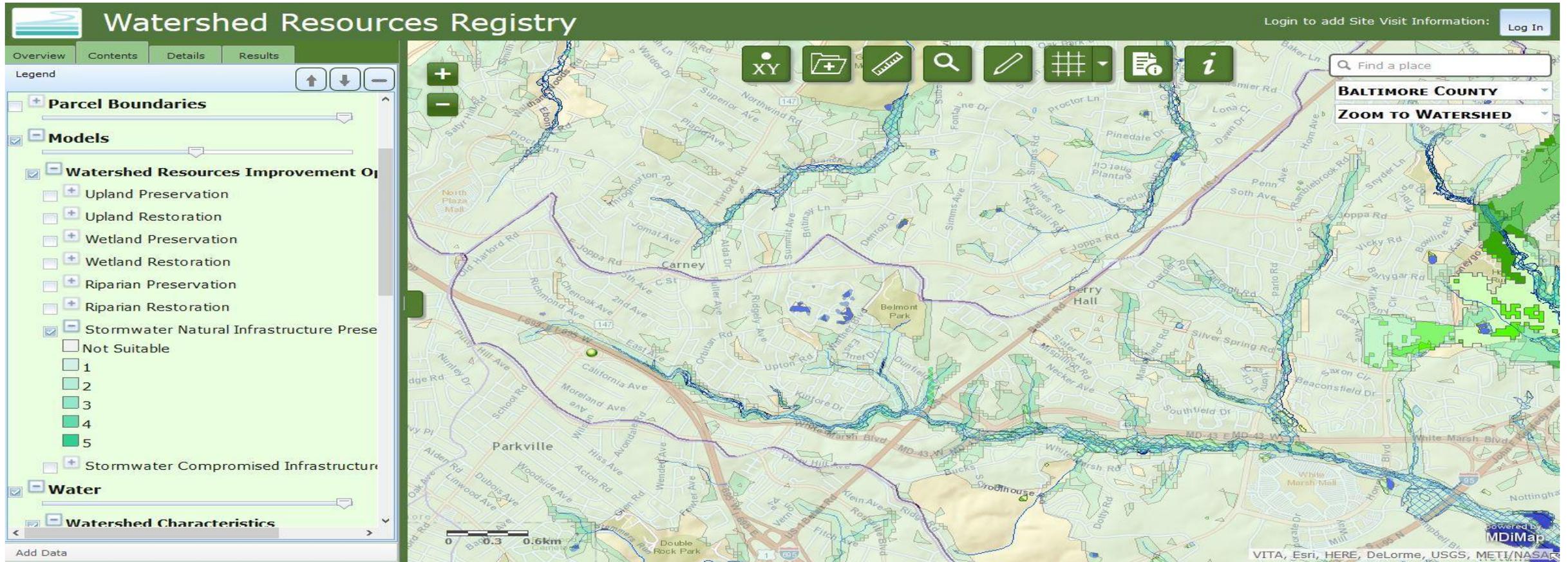
MESsde_GISADMIN_MESsde_GISA_2	
SWSH987F_	396.00
MAJOR1	396.00
MINOR1	396.00
ACRE	10,246.24
X_COORD	949,975.31
Y_COORD	563,660.50
MDE6DIGT	021308
MDE6NAME	GUNPOWDER RIVER
MDE8DIGT	02130803
MDE8NAME	Bird River
SHEDNUM	0295
DNR12DIG	021308030295
WHOLE	W
MARYLAND	M
LAND	L

Zoom to

Watershed Characteristics

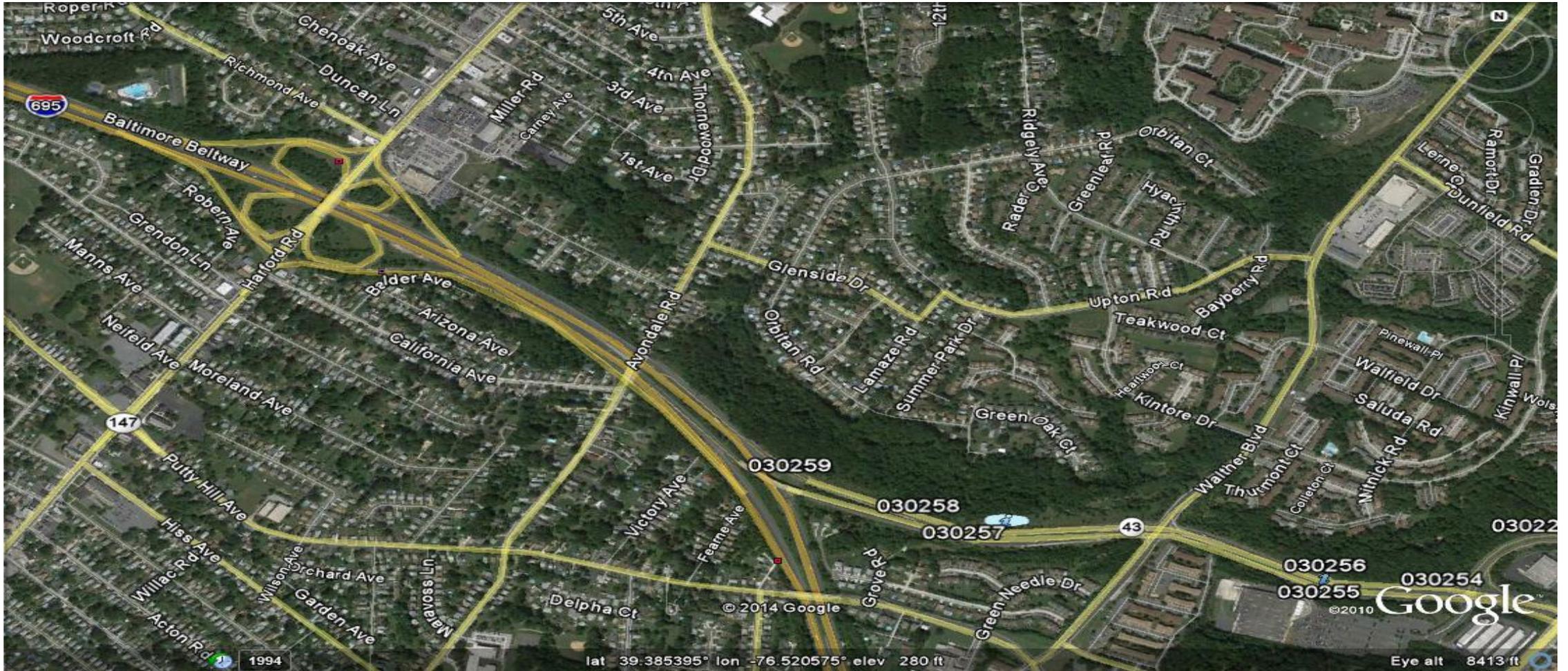
Identify areas to be preserved – SWM natural infrastructure

Evaluation of land for preserving natural storm water hydrology and avoiding impacting healthy systems





Existing SWM Infrastructure



SWM Opportunities within SHA R/W first

Evaluation for potential restoration of degraded systems through overlay analysis method and scoring system

The screenshot displays the Watershed Resources Registry web application. The interface includes a top navigation bar with 'Overview', 'Contents', 'Details', and 'Results' tabs. A search bar on the right allows users to 'Find a place' and includes a 'Log In' button. The main map area shows an aerial view of Baltimore County with various colored overlays representing different restoration opportunities. A legend on the left side of the map lists the following categories and their suitability status:

- Parcel Boundaries**
- Models**
 - Watershed Resources Improvement Opportunities**
 - Upland Preservation
 - Upland Restoration
 - Wetland Preservation
 - Wetland Restoration
 - Riparian Preservation
 - Riparian Restoration
 - Stormwater Natural Infrastructure Preservation
 - Stormwater Compromised Infrastructure Restoration
 - Not Suitable
 - 1
 - 2
 - 3
 - 4
 - 5
- Water**
- Watershed Characteristics**

A pop-up window titled 'Location (1 of 5)' is open over a specific area on the map, displaying the following information:

Latitude/Longitude: 39.38739, -76.52997

Watershed Resources Improvement Opportunities

- Upland Preservation:** Not Suitable
- Upland Restoration:** Not Suitable
- Wetland Preservation:** Not Suitable
- Wetland Restoration:** Not Suitable
- Riparian Preservation:** 1
- Riparian Restoration:** 1
- Stormwater Natural Infrastructure Preservation:** 1
- Stormwater Compromised Infrastructure Restoration:** 3

The map also features a toolbar with various navigation and analysis tools, and a 'Zoom to Watershed' button in the top right corner. The bottom right corner of the map area is powered by MDIMap.

Specific Suitable SWM Site

Site characteristics – detailed data returned by WRR

Watershed Resources Registry

Overview Contents **Details** Results

Print Report

Watershed Resources Improvement Opportunities

- [Upland Preservation](#): Not Suitable
- [Upland Restoration](#): Not Suitable
- [Wetland Preservation](#): Not Suitable
- [Wetland Restoration](#): Not Suitable
- [Riparian Preservation](#): 1
- [Riparian Restoration](#): 1
- [Stormwater Natural Infrastructure Preservation](#): 1
- [Stormwater Compromised Infrastructure Restoration](#): 3

Watershed Characteristics:

[View Watershed Profile](#)

HUC: 020600030601
HUC Name: Whitemarsh Run-Bird River
Maryland 8 Digit Watershed: 02130803
Maryland 12 Digit Watershed: 021308030295

Metadata: [HUC](#) | [MD Watershed](#) | [Stronghold](#)

Water Quality Impairments

[Metadata](#)

Impairments: Biological, Sediments

Physiographic Region

[Metadata](#)

Province: Piedmont Plateau Province

Geology

[Metadata](#)

Name: Potomac Group

Wetlands

Wetlands of Special State Concern: None within 500 ft.
DNR: None within 500 ft.
NWI: None within 500 ft.

Metadata: [WSSC](#) | [DNR](#) | [NWI](#)

Soils

Map: BALTIMORE COUNTY, ZOOM TO WATERSHED, Find a place, XY, Scale: 100m, DigitalGlobe, GeoEye, Microsof



SWM site evaluation, data collection and analysis

Soils and geology / Land use characteristics

The screenshot displays the Watershed Resources Registry web application. The interface includes a top navigation bar with 'Overview', 'Contents', 'Details', and 'Results' tabs. A 'Legend' panel on the left lists various data layers, including Floodplain, Water Body, Water Quality Impairments, Terrain (Soils, Physiographic Region, Geology), and Wetlands And Blue & Green Infrastructure (Wetland, Green Infrastructure). The main map area shows an aerial view of Baltimore County with yellow outlines indicating watershed boundaries and various colored overlays representing different resources. A search bar and 'Log In' button are visible in the top right. The map includes a toolbar with icons for navigation and information. The text 'Zone' is visible on the map, and the bottom right corner credits DigitalGlobe, GeoEye, and Microsoft.



1 year after construction





2 years after construction





Next Steps

- Federal Partners working towards National Rollout
 - Seeking early adopter pilot States
 - Offering technical assistance/oversight with agency personnel in support of implementation
 - National Webinar scheduled Fall 2015
 - Stakeholder Framework already established
 - Baseline 'National' Application already developed



Nationwide Rollout

AASHTO Outreach Website:

<http://aia.transportation.org/Pages/Watershed-Resources-Registry.aspx>

WRR National App (Beta):

<http://staging.mesgis.com/wrrnationwide/index.html?state=de>



Thank You

The Watershed Resources Registry (WRR)

<http://watershedresourcesregistry.org>