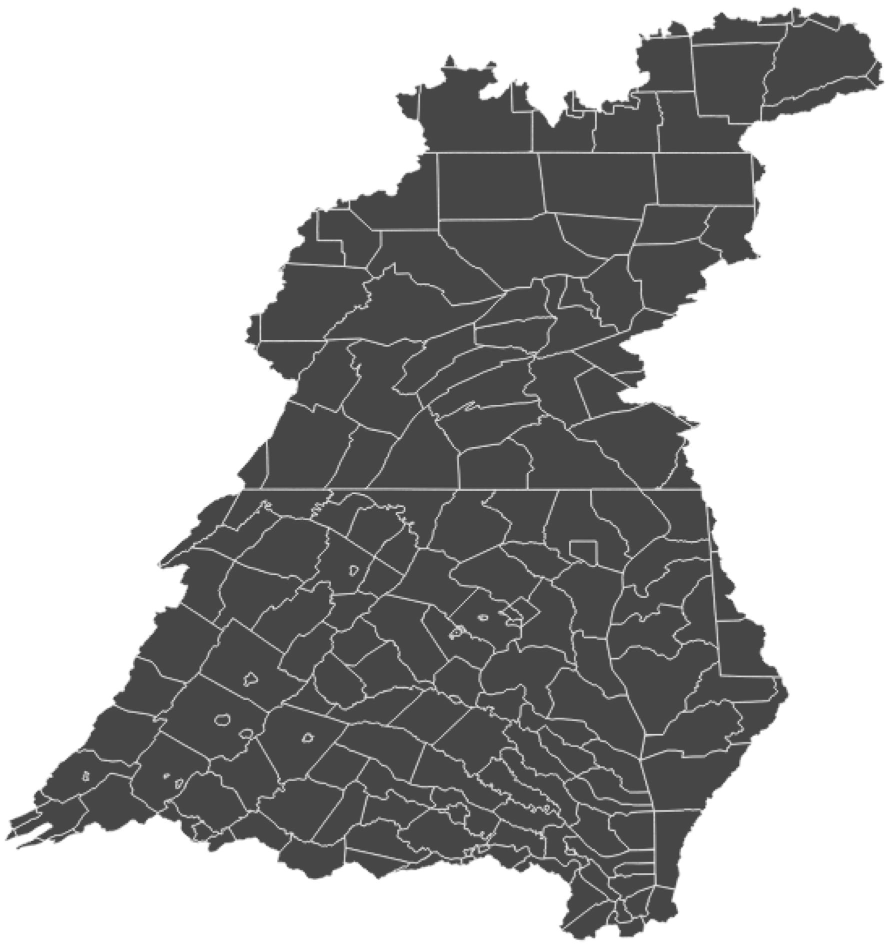
Creating the code for change

Programmatic Challenges to Restoration Tracking

Over $7,500 MM in Bay restoration spending and we…

- *have no means of tracking restoration goals transactionally*
- *still lack centralized data on BMP location and status.*
- *continue to rely on yesterday's data and models to help inform tomorrows decisions.*



FIELDDOC

Search your workspace

LOGOUT NEED HELP?

Delaware River Watershed Initiative

PROJECTS 13

GRANTEES 13

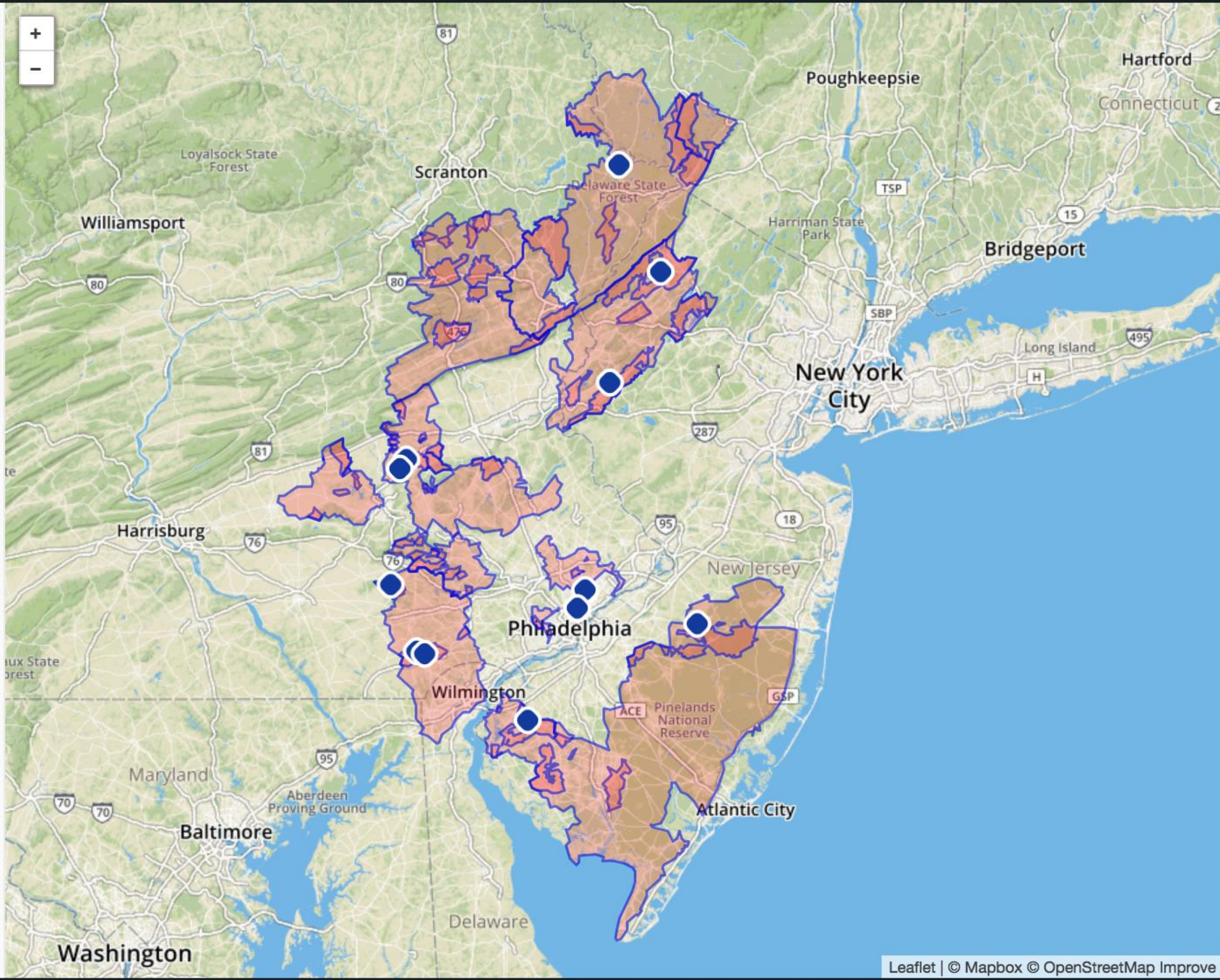
Metrics

0.00 of 9,292.00 lbs/yr
Nitrogen

0.00 of 1,290.00 lbs/yr
Phosphorus

0.00 of 833,348.00 tons/yr
Sediment

Metric	Installed To-Date	% Installed
Dollars of Federal Farm Bill and state funding leveraged by DRWI within focus areas	0.00 count of 2,963,400.00	0.0%
# of landowners with newly adopted stormwater restoration and prevention strategies (GSI) in focus areas	0.00 count of 50.00	0.0%
# of municipalities within focus areas that improve codes, ordinances and programs to promote GSI and pollution prevention practices, or request impervious cover	0.00 count of 2.00	0.0%



Strategic Partners & Multipliers

Academy of Natural Sciences

- Algorithm and model development
  - Load reduction modeling
  - Watershed Delineation
  - Fast Zonal Stats

The Academy of Natural Sciences of Drexel University

Rapid Watershed Delineation

Academy of Natural Sciences has developed a rapid zonal stats algorithm. We will be working to bring this service online to dynamically analyze an area draining to a specific BMP.

ELSEVIER

Environmental Modelling & Software
Volume 109, November 2018, Pages 420-428

A new rapid watershed delineation algorithm for 2D flow direction grids

Scott Haag [a, b], Bahareh Shakibajahromi [b], Ali Shokoufandeh [b]

Show more

https://doi.org/10.1016/j.envsoft.2018.08.017

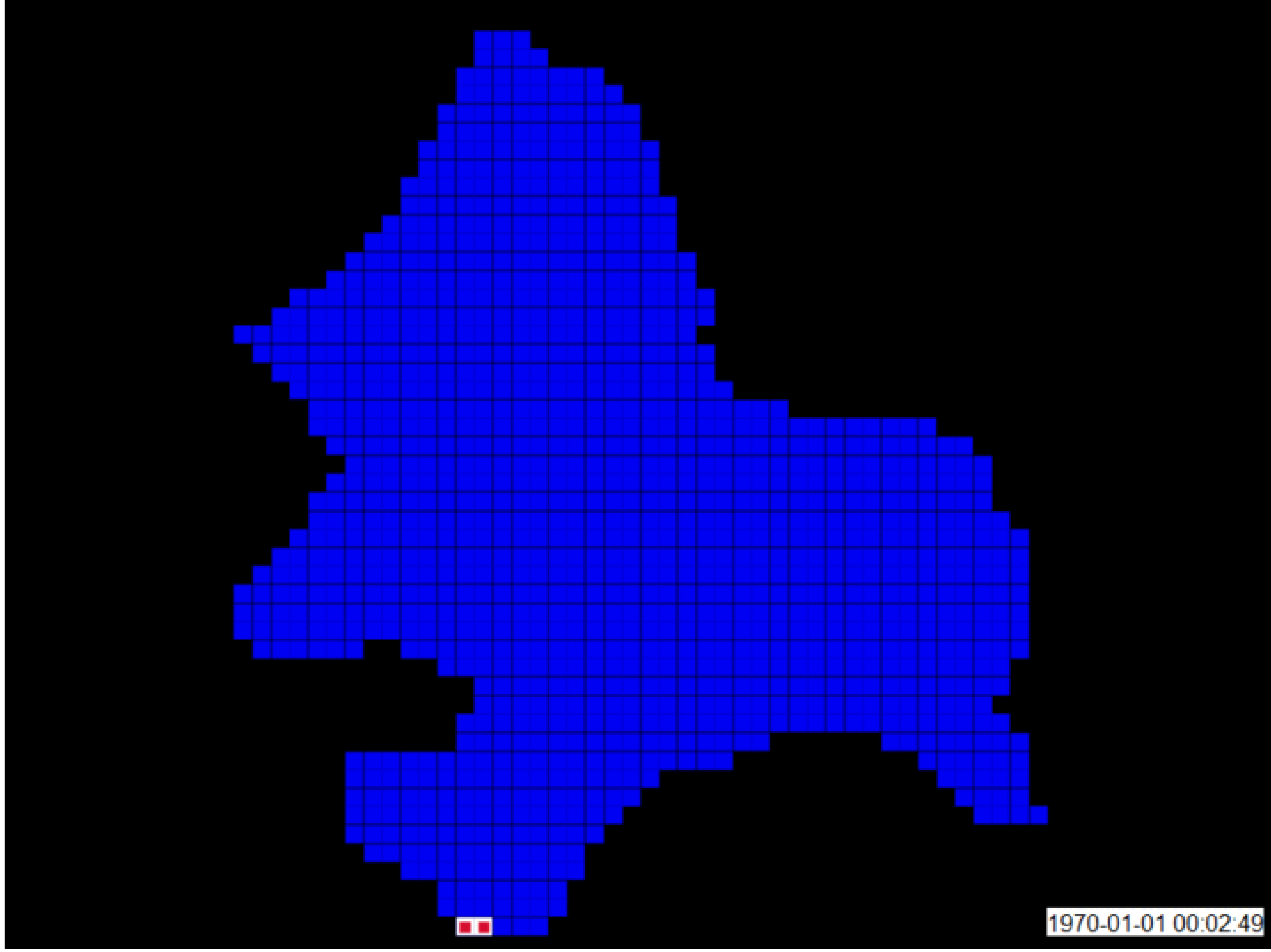
Abstract

In this paper we propose an algorithm for retrieving an arbitrary watershed boundary from a 2D Flow Direction Grid. The proposed algorithm and associated data model provides geometric speed increases in watershed boundary retrieval while keeping storage constraints linear in comparison to existing techniques. The algorithm called Watershed Marching Algorithm (WMA) relies on an existing data structure, the modified nested set model, originally described by Celko and applied to hydrodynamic models by Haag and Shokoufandeh in 2017. In contrast to existing algorithms that scale proportionally to the area of the underlying region, the complexity of the WMA algorithm is proportional to the boundary length. Results for a group of tested watersheds ($n = 14{,}718$) in the ≈ 36,000 km^2 Delaware River Watershed show a reduction of between 0 and 99% in computational complexity using a 30 m DEM vs. existing techniques.

Delineation
Pepsi Challenge

Comparison of ESRI watershed delineation algorithm to Academy of Natural Science algorithm

- The Academy of Natural Sciences of Drexel University
- esri



Delineation Pepsi Challenge

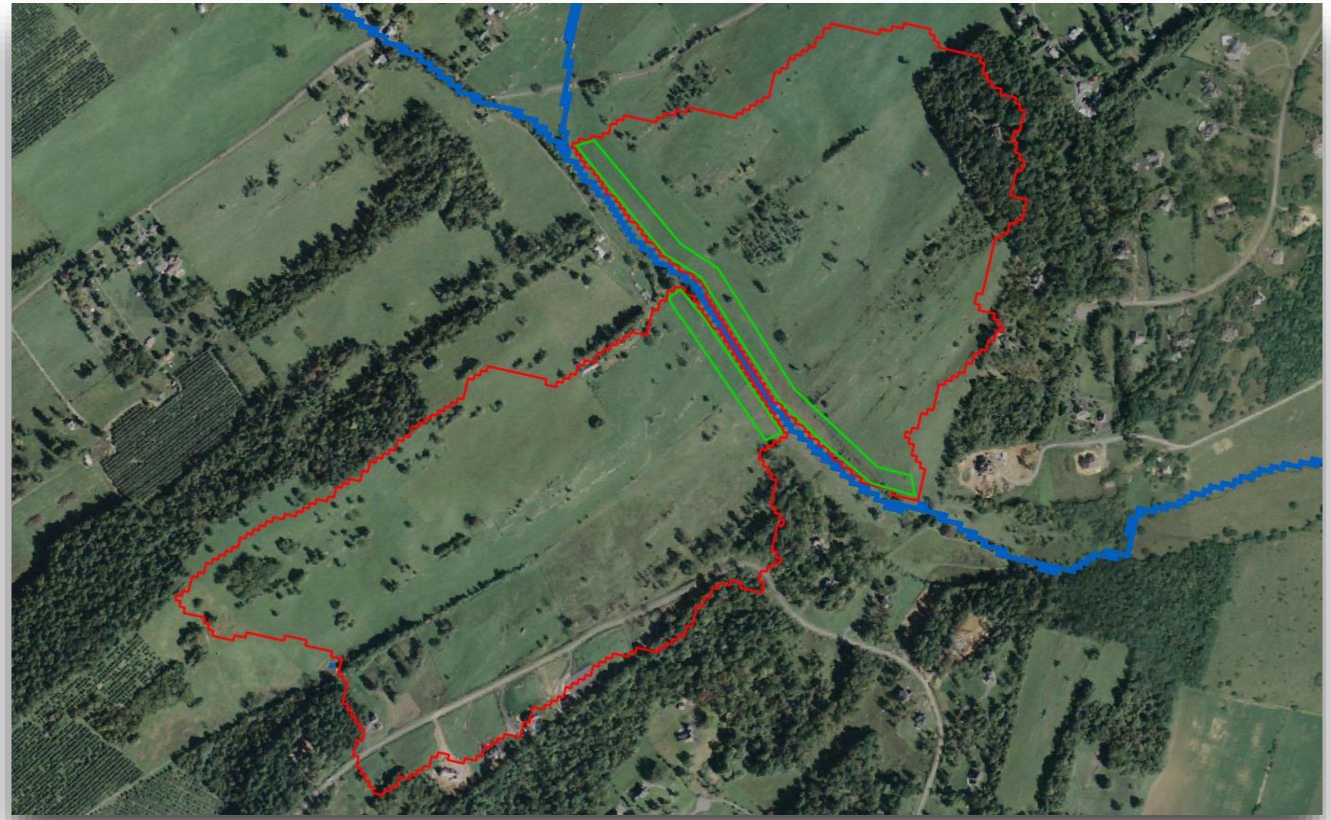
How much faster? Orders of magnitude faster.

Test ID	Polygon Size (km2)	Watershed Size (km2)	WMA-P Time (seconds)	ESRI Time (seconds)	WMA-P times faster (x)
0	1.96E-03	2.90E-03	0.50	372	706
1	8.13E-01	7.78E+01	1.2	394	324
2	1.96E+01	1.87E+02	4.2	474	114
3	6.49E+00	3.98E+01	0.80	384	461
4	2.43E+02	7.81E+03	6.2	4387	703
5	5.64E+01	2.84E+03	5.5	1173	212
6	1.25E+03	4.44E+03	6.6	2161	327
7	1.39E-01	6.98E+04	15	17890	1175
8	1.10E+02	8.84E+02	5.7	746	131
9	2.21E+00	6.68E+02	2.3	693	308
10	1.07E+02	7.37E+02	6.2	737	119
TOTAL			54.5	29410	540

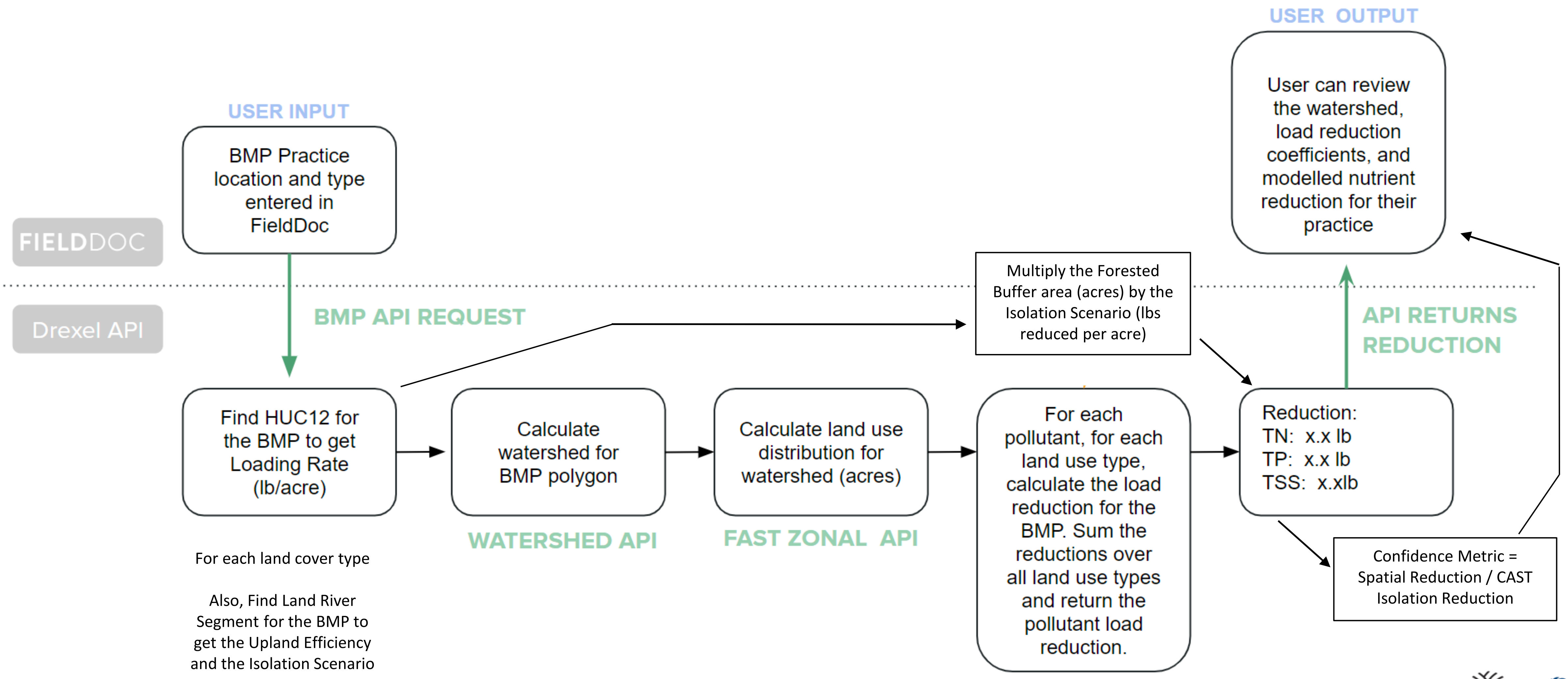
Table 1: Results of timing comparisons between WMA-P and ESRI's batch watershed from polygons function on 11 test polygons.

Modeling Approach

We establish modeling algorithms at the finest scale possible, IE the action, its associated data, and the effect on the landscape



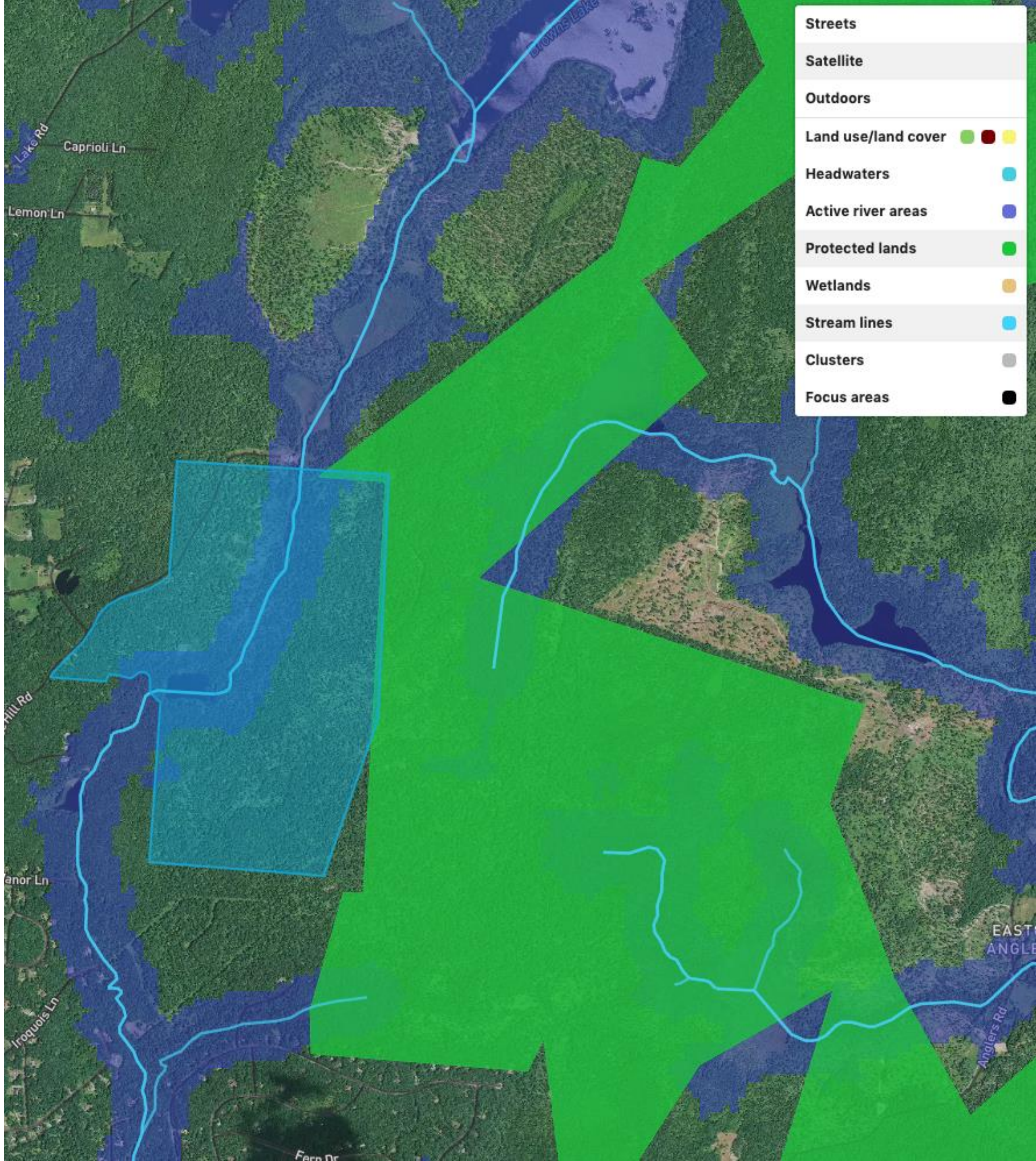
Modeling Approach: Forest Buffer



Customizable Base Layers and Analytics

FieldDoc now supports the ability for users to provide their own GIS layers in order to see their project in the context of investment portfolio priorities and targets.

View Site



FIELDDOC

NJDEP-Bain

PRACTICES
1

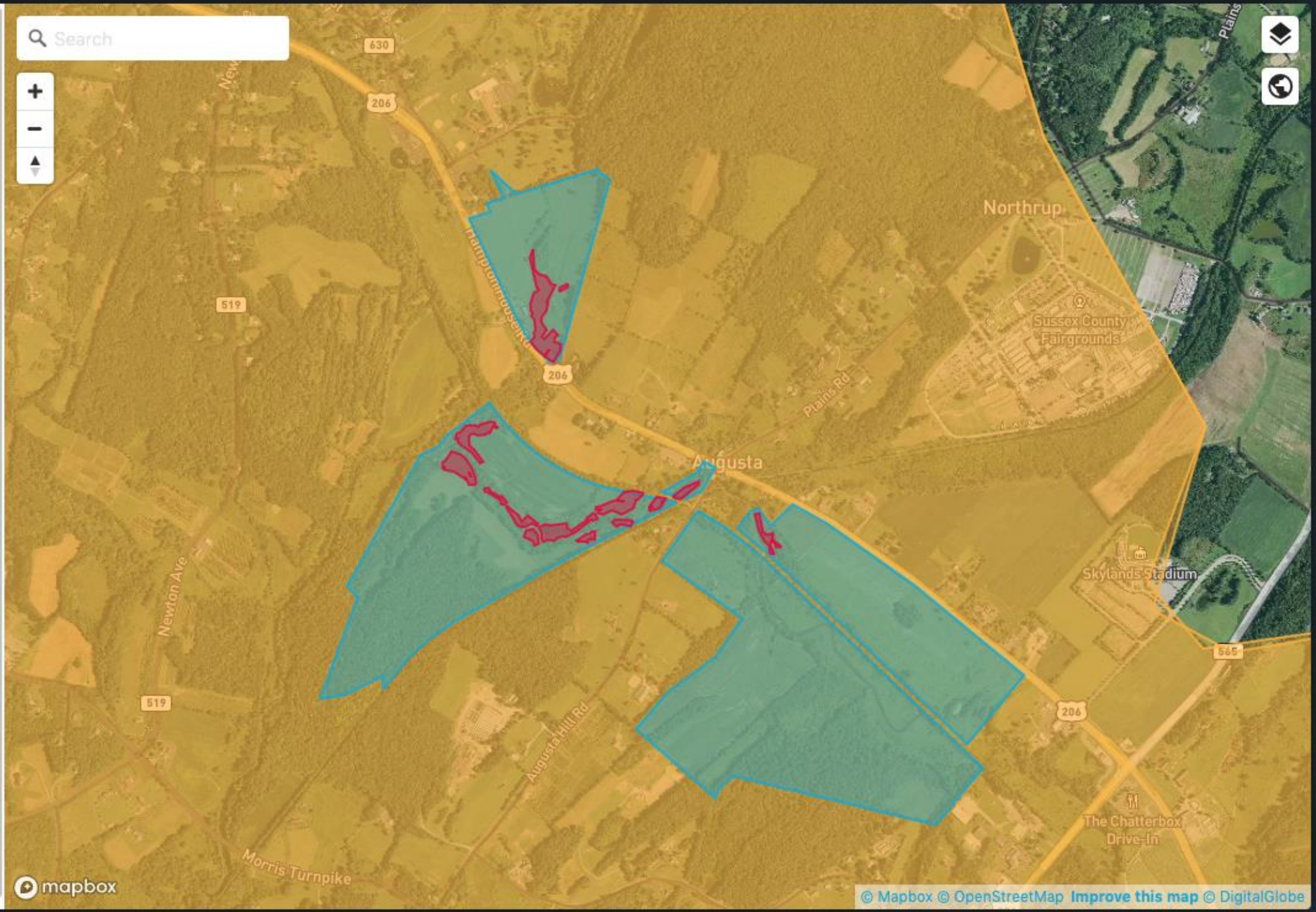
101.05 acres

Project EZG #53363: Restoring Paulins Kill Floodplain Forests and Functions - Phase 2

No description provided

Metrics

	Installed To-Date	% Installed
$ of public and private funds leveraged by DRWI within focus areas	88,230.63 dollars of 84,245.00	104.7%
Dollars of Federal Farm Bill and state funding leveraged by DRWI within focus areas	28,213.26 dollars of 15,000.00	188.1%
# of volunteers	150.00 of 50.00	300.0%
Miles of forested buffer restored within focus areas	0.80 miles of 1.12	71.4%



FIELDDOC

NJDEP-Bain

PRACTICES
1

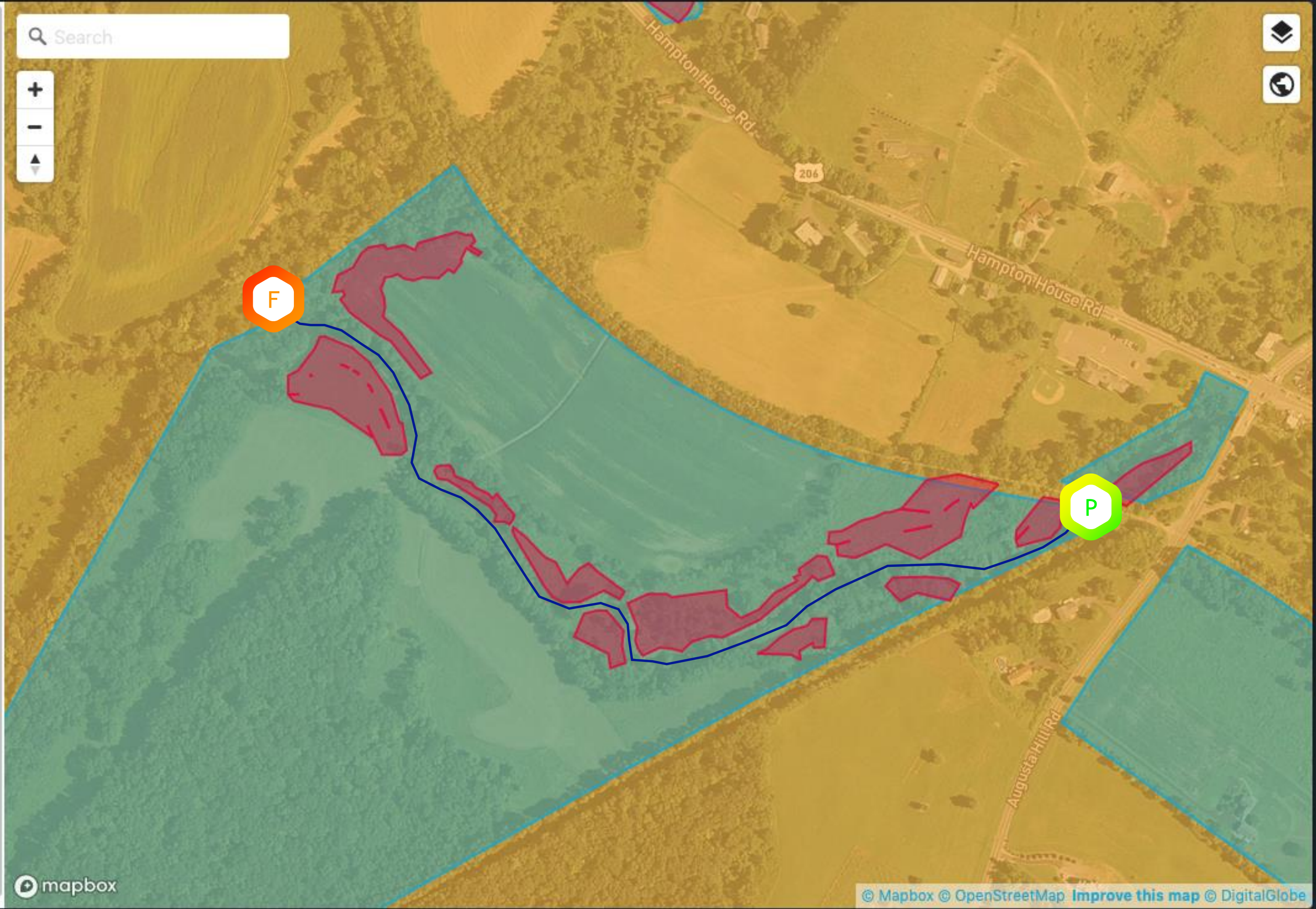
101.05 acres

Project EZG #53363: Restoring Paulins Kill Floodplain Forests and Functions - Phase 2

No description provided

Metrics

	Installed To-Date	% Installed
$ of public and private funds leveraged by DRWI within focus areas	88,230.63 dollars of 84,245.00	104.7%
Dollars of Federal Farm Bill and state funding leveraged by DRWI within focus areas	28,213.26 dollars of 15,000.00	188.1%
# of volunteers	150.00 of 50.00	300.0%
Miles of forested buffer restored within focus areas	0.80 miles of 1.12	71.4%



FIELDDOC

NJDEP-Bain

PRACTICES
1

101.05 acres

Project EZG #53363: Restoring Paulins Kill Floodplain Forests and Functions - Phase 2

No description provided

Metrics

	Installed To-Date	% Installed
$ of public and private funds leveraged by DRWI within focus areas	88,230.63 dollars of 84,245.00	104.7%
Dollars of Federal Farm Bill and state funding leveraged by DRWI within focus areas	28,213.26 dollars of 15,000.00	188.1%
# of volunteers	150.00 of 50.00	300.0%
Miles of forested buffer restored within focus areas	0.80 miles of 1.12	71.4%

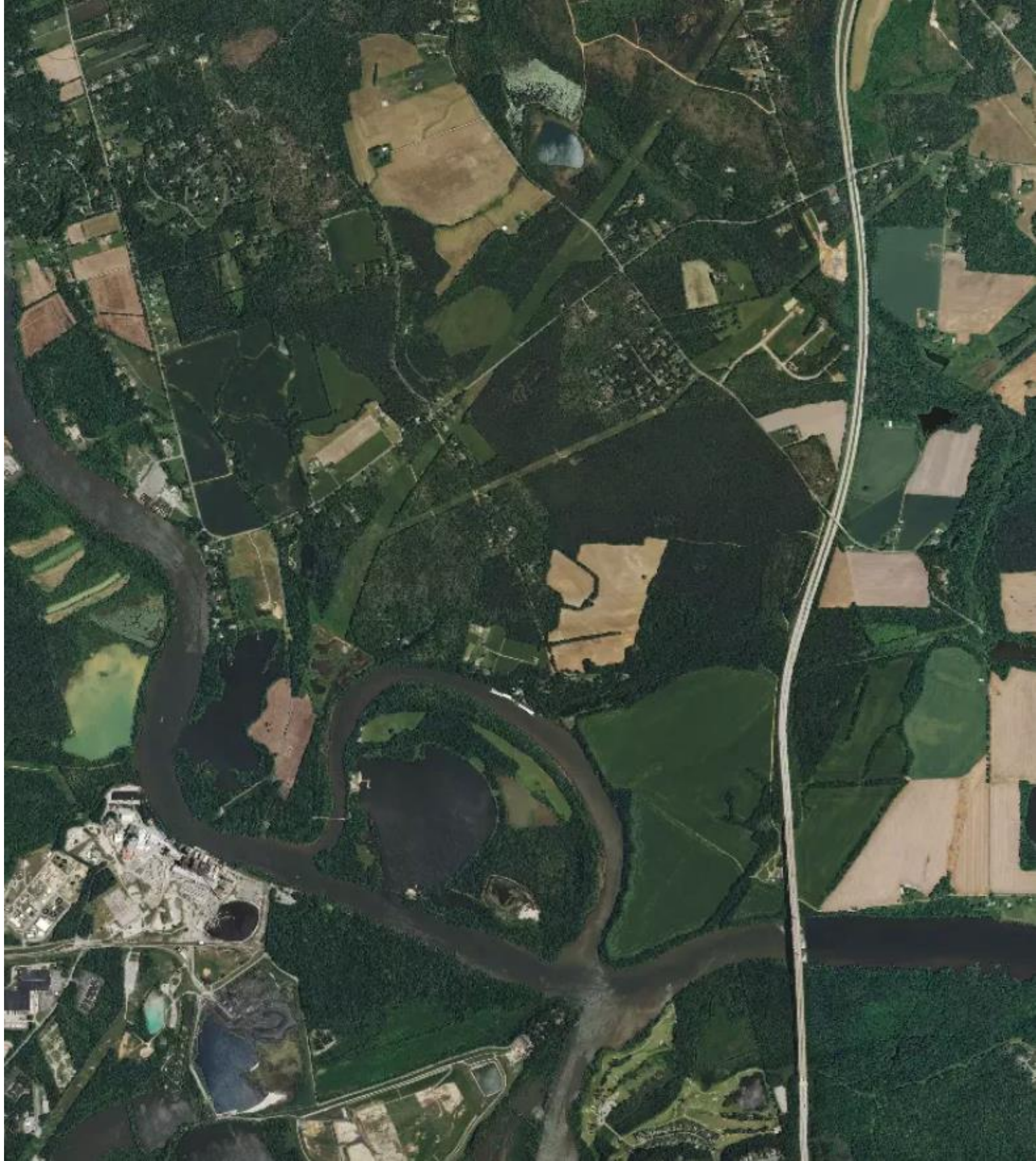
Questions & Discussion

Prioritization in Use

- Identification of priority buffers opportunities
  - Buffer opportunity area (100ft)
- Parcel prioritization
  - Tier 1 (Highest Priority)
  - Tier 2
  - Tier 3
  - Tier 4
  - Tier 5 (Lowest Priority)

Data provided by Chesapeake Conservancy

EXPLORE. CONSERVE. INNOVATE.



Prioritization in Use

- Identification of priority buffers opportunities
  - d Buffer opportunity area (100ft)
- Parcel prioritization
  - d Tier 1 (Highest Priority)
  - d Tier 2
  - d Tier 3
  - d Tier 4
  - d Tier 5 (Lowest Priority)

Data provided by Chesapeake Conservancy EXPLORE. CONSERVE. INNOVATE.

Prioritization in Use

- Identification of priority buffers opportunities
  - d Buffer opportunity area (100ft)
- Parcel prioritization
  - d Tier 1 (Highest Priority)
  - d Tier 2
  - d Tier 3
  - d Tier 4
  - d Tier 5 (Lowest Priority)

Data provided by Chesapeake Conservancy

Prioritization in Use

- Identification of priority buffers opportunities
  - d Buffer opportunity area (100ft)
- Parcel prioritization
  - d Tier 1 (Highest Priority)
  - d Tier 2
  - d Tier 3
  - d Tier 4
  - d Tier 5 (Lowest Priority)

Data provided by Chesapeake Conservancy

Prioritization in Use

- Identification of priority buffers opportunities
  - d Buffer opportunity area (100ft)
- Parcel prioritization
  - d Tier 1 (Highest Priority)
  - d Tier 2
  - d Tier 3
  - d Tier 4
  - d Tier 5 (Lowest Priority)

Data provided by Chesapeake Conservancy