

# Eden Area Watershed Project Prioritization

---

## GIS METHODOLOGY

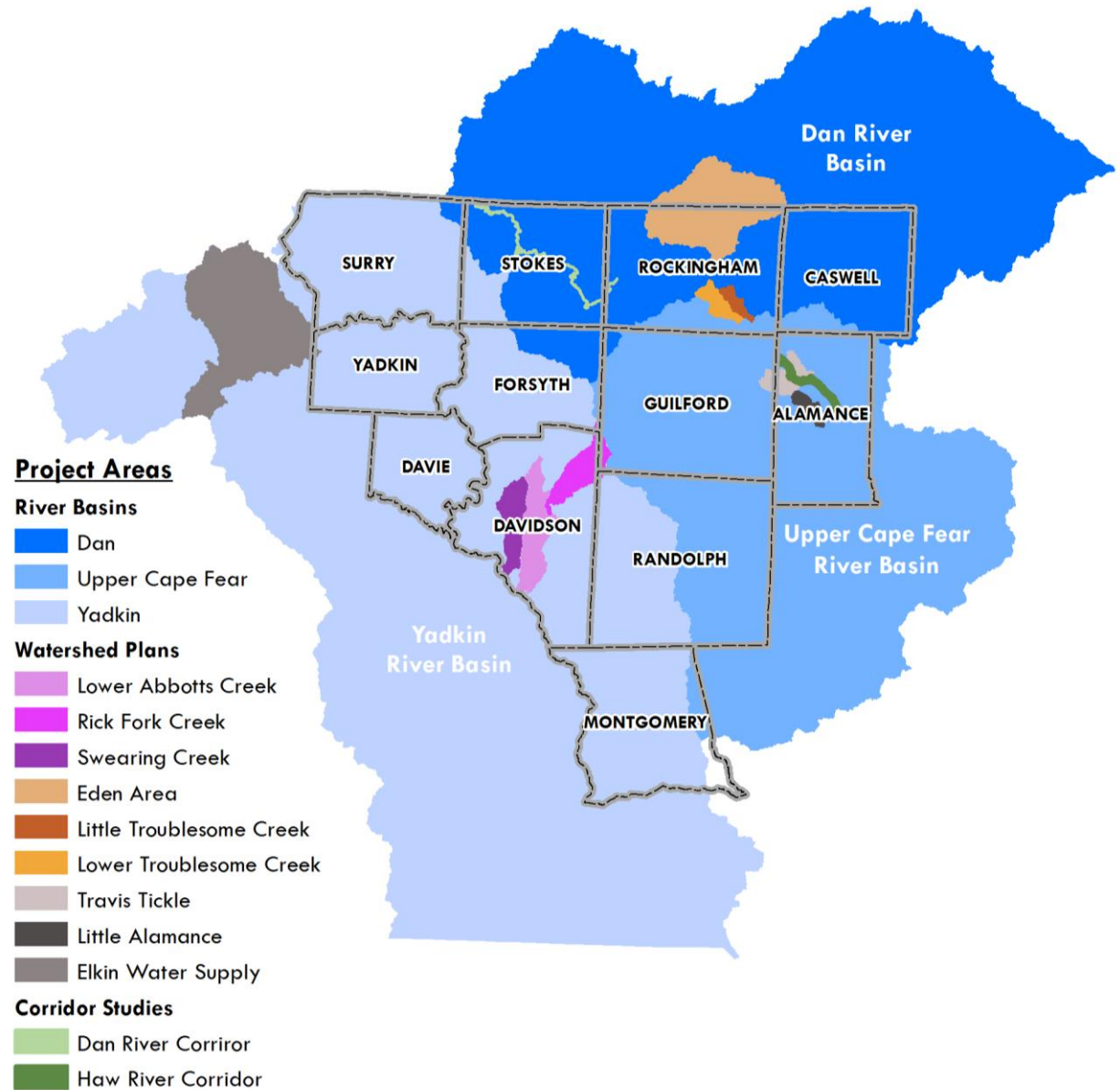


# GIS Methodology

- Past Local Watershed Projects
  1. What geography for project prioritization?
  2. How to incorporate new data for Eden Area Watershed?
  3. How to incorporate data from Piedmont Together Scenario Modeling & Green Infrastructure Network?



# Current & Previous Projects



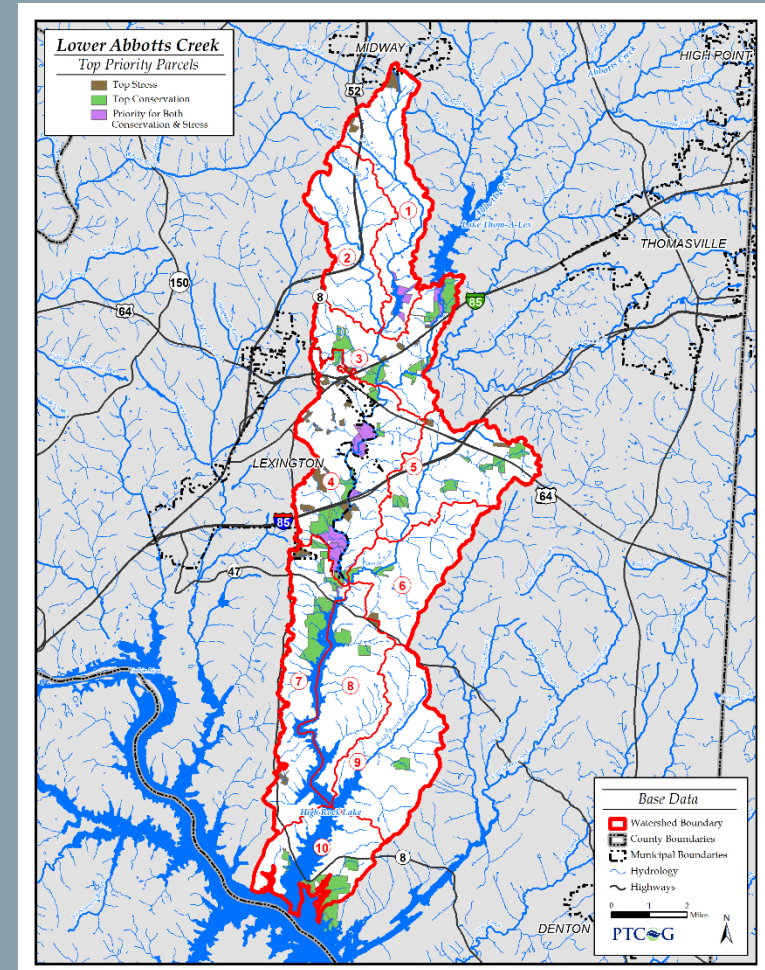
# Lower Abbotts Creek

- Watershed Assessment
- Field Assessment (focused on 6 out of 10 subwatersheds)
  - 1,733 opportunities identified at 830 sites using 17 BMP categories
- Restoration Plan – to coordinate needs identified in the assessment
  - 4 phases outline actions steps to implement:
    - ✧ 10 policy recommendations
    - ✧ 25 projects



# Lower Abbots Creek

- GIS Analysis to identify and rank projects
  - 50 restoration opportunities
  - 50 conservation sites



# Conservation & Restoration (Stress) Analysis

- Conservation Analysis selects projects that:

- Will protect ecosystem services
- We don't want to lose
- Act as good demonstrations in the watershed

- Restoration(Stress) Analysis selects projects that:

- Highlight areas we want to improve
- Aim to recover function and value to the watershed

# Lower Abbotts Creek

## Conservation Input Layers

Point System for Parcel Conservation Assessment and Ranking				
Criteria	Data Source	Factors	Possible Points	Weight
Low Impervious Surface Cover	2001 NLCD	0-4%	3	1
		5-9%	2	
		10-19%	1	
High Forest Cover	2001 NLCD	> 50%	1	1
1st & 2nd Order Streams	NC CGIA	Within 50 foot buffer	3	1
		Within 100 foot buffer	2	
		Within 330 foot buffer	1	
Large Parcel Size	Davidson County	> 50 acres	3	2
		20-49 acres	2	
		10-19 acres	1	
Low Impact Land Use	2011 County Data (Updated)	Forest, Recreation	1	2
		Agriculture, SFR (Rural Res. >= 5 acres), Vacant, VAD	1	1
Publicly Owned Land & Managed Conservation Lands	2011 County Data	City, County, or State	1	2
Significant Natural Heritage Area & Natural Heritage Element Occurrences*	DENR (Oct 2010)	4 points - any SNHA	6	1
		3 points - any NHEO S1 or S2 rank that is not a SNHA	5	
		2 points - any NHEO S3 or S4 rank that is not a SNHA	4	
		1 point - floodzones of the Greensboro Burrowing Crayfish combined areas (even though "very low" spatial accuracy)	3	
		0 points - all other "very low" spatial accuracy or "historic" species	2	
		**overlapping polygons were summed; values range from 0 to 6	1	
Landscape Habitat Indicator Guilds	NHP		1	1
Parcels with Lake/River Access	PTCOG; Davidson County	Existing Public	2	1
		Existing Private or Proposed Public	1	
Wetlands	NWI		1	1
Hydric Soils	SSURGO	All Hydric	2	1
		Partially Hydric	1	
Erodibility (K factor)	SSURGO	0.40-0.49	2	1
		0.24-0.39	1	
500 Year Floodplain	NC Flood Map		1	1
Steep Slopes	USGS 1/9 Arc Second DEM	> 15% Gradient	1	1
Conservation BMP Locations	PTCOG Field Data	Point	2	1
		0.25 mile buffer	1	
Proposed Greenways	PTCOG; Davidson County	Primary	2	1
		Secondary	1	
Bike Paths	PTCOG; Davidson County	0.25 mile buffer	1	1
<b>Total Possible Points</b>			<b>39</b>	



# Lower Abbotts Creek

## Stress Input Layers

Point System for Parcel Stressor Assessment and Ranking				
Criteria	Data Source	Factors	Possible Points	Weight
High Impervious Surface Cover	2001 NLCD	> 20%	3	1
		10-19%	2	
		5-9%	1	
Low Forest Cover	2001 NLCD	<50%	1	1
1st & 2nd Order Streams	NC CGIA	Within 50 foot buffer	3	1
		Within 100 foot buffer	2	
		Within 330 foot buffer	1	
Large Parcel Size	Davidson County	> 20 acres	3	2
		10-20 acres	2	
		5-10 acres	1	
High Impact Land Use	2011 County Data (Updated)	Commercial, Industrial	1	2
		Government, Institutional, MFR, Office, Utilities	1	1
Publically Owned Land	2011 County Data	City, County, or State	1	2
Wetlands	NWI		1	1
Hydric Soils	SSURGO	All Hydric	2	1
		Partially Hydric	1	
Erodibility (K factor)	SSURGO	0.40-0.49	2	1
		0.24-0.39	1	
500 Year Floodplain	NC Flood Map		1	1
Steep Slopes	USGS 1/9 Arc Second DEM	>1.5% Gradient	1	1
Stress BMP Locations	PTCOG Field Data	Point	2	1
		0.25 mile buffer	1	
Animal Operation Permits	NC CGIA		1	1
High Potential for Future Growth			0 - 18	0.25
<b>Total Possible Points</b>			<b>32.5</b>	





# Lower Abbotts Creek

## Future Growth Input Layers

Point System for Future Growth Layer				
Criteria	Data Source	Factors	Possible Points	Weight
Municipal Boundaries	Davidson County		1	1
ETJ Boundaries	Davidson County		1	2
Sewer (Outside City)	City GIS website (selected parcels that intersected sewer lines outside city)		1	3
Water (Outside City)	City GIS website (selected parcels that intersected water lines outside city)		1	2
Future Sewer	NC CGIA		1	2
Future Water	NC CGIA		1	1
Davidson County and City of Lexington CTPs	6 - Expressway/Freeway - Needs Improvement (0.25 Mile Buffer) 5 - Expressway/Freeway - Existing (0.25 Mile Buffer) 4 - Boulevard/Major Thoroughfare - Needs Improvement (0.25 Mile Buffer) 3 - Boulevard/Major Thoroughfare - Existing (0.25 Mile Buffer) 2 - Minor Thoroughfare - Needs Improvement (0.10 Mile Buffer) 1 - Minor Thoroughfare - Existing (0.10 Mile Buffer) **The points from overlapping road buffer areas were summed (values ranged from 0 to 16)	13 - 16	5	1
		10 - 12	4	
		7 - 9	3	
		4 - 6	2	
		1 - 3	1	
		11 - 298	1	
Population Density (Persons/Sq Mi)	2010 Census	298 - 789	2	1
		789 - 1,871	3	
		1,871 - 23,525	4	
		1 - 3	1	
Population Density Change	2000 & 2010 Census	12 - 55	2	1
		71 - 109	3	
		1-16	1	
Vacant Household Density (Vacant HH/Sq Mi)	2010 Census	16-83	2	1
		83-248	3	
		248-4,253	4	
		Total Possible Points	27	



## Lower Abbotts Creek

*Putting the data  
layers together:*

**Data Layer**

**Raw Input Data**

**Reclassified Raster**

**Impervious  
Land Cover**

26	24	14
18	9	9
16	5	1



0	0	1
1	2	2
1	2	3



# Lower Abbotts Creek

Putting the data layers together:

**Data Layer**

**Raw Input Data**

**Reclassified Raster**

**Impervious Land Cover**

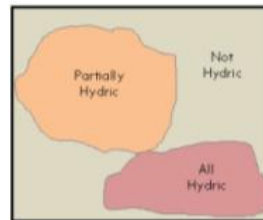
26	24	14
18	9	9
16	5	1



0	0	1
1	2	2
1	2	3



**Hydric Soils**



1	1	0
1	1	0
0	2	2



# Lower Abbotts Creek

Putting the data layers together:

**Data Layer**

**Raw Input Data**

**Reclassified Raster**

**Impervious Land Cover**

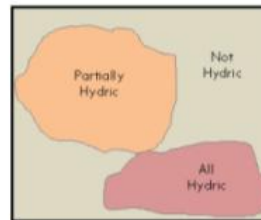
26	24	14
18	9	9
16	5	1



0	0	1
1	2	2
1	2	3



**Hydric Soils**



1	1	0
1	1	0
0	2	2



**Greenway Buffer**

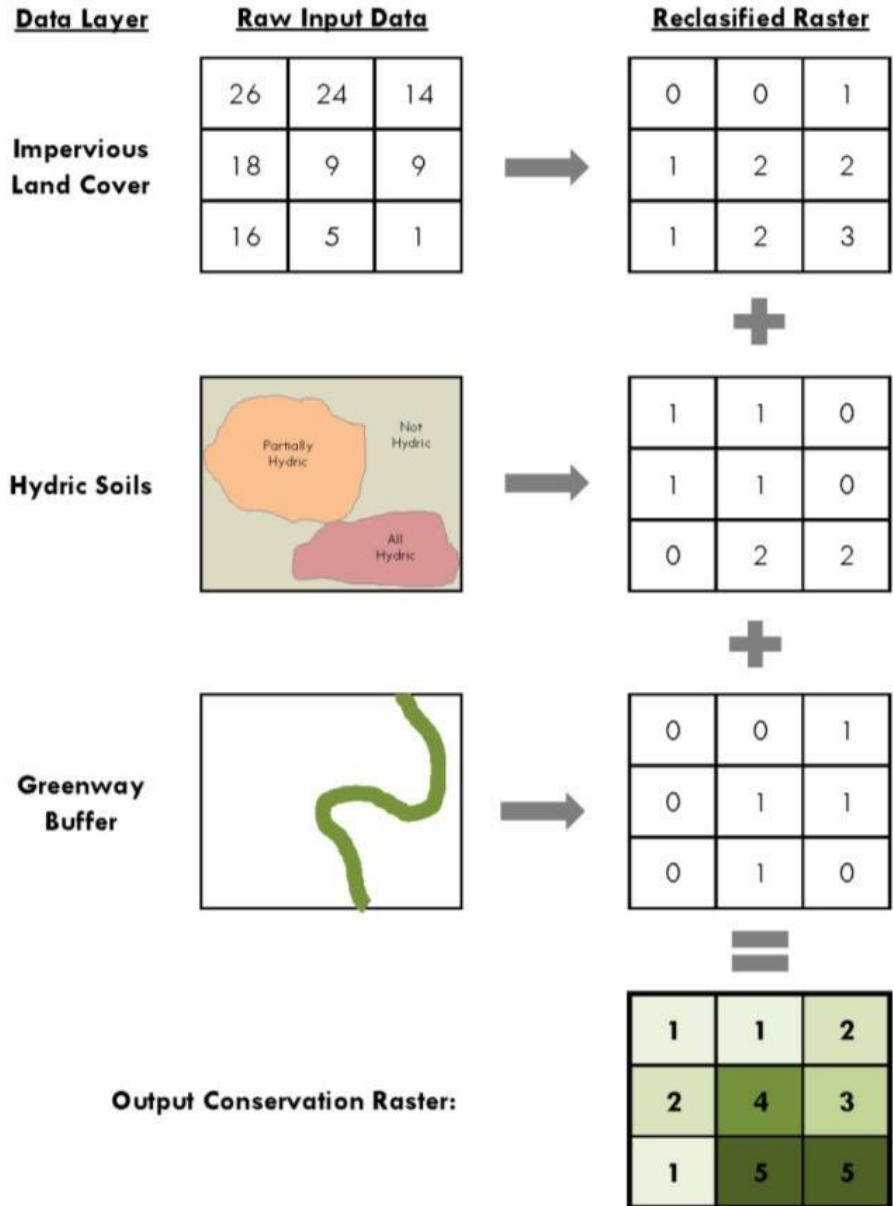


0	0	1
0	1	1
0	1	0



# Lower Abbotts Creek

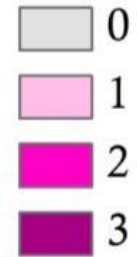
Putting the data layers together:



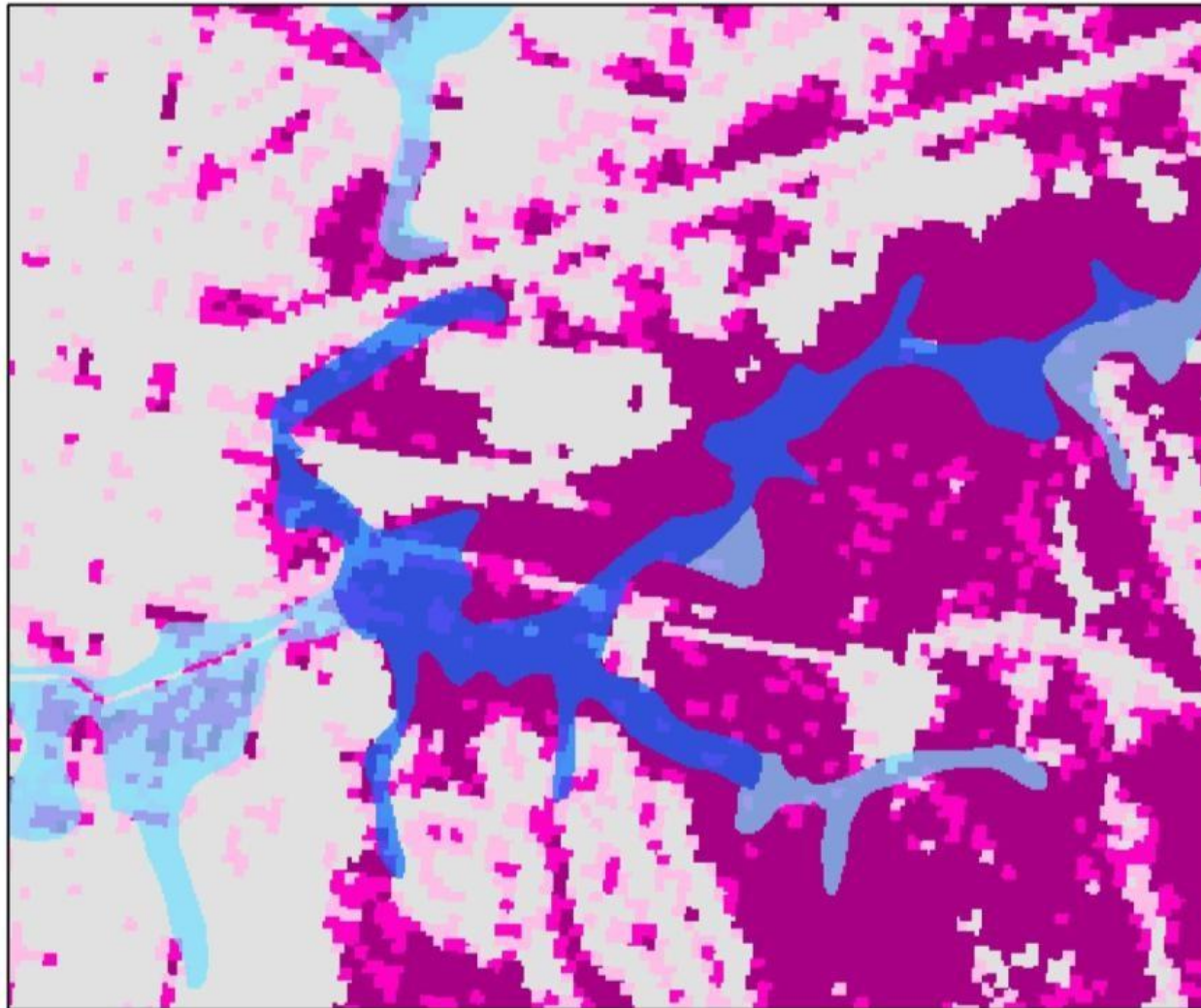
# Putting the data layers together:



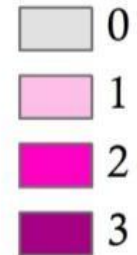
Impervious Cover



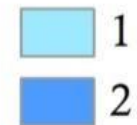
# Putting the data layers together:



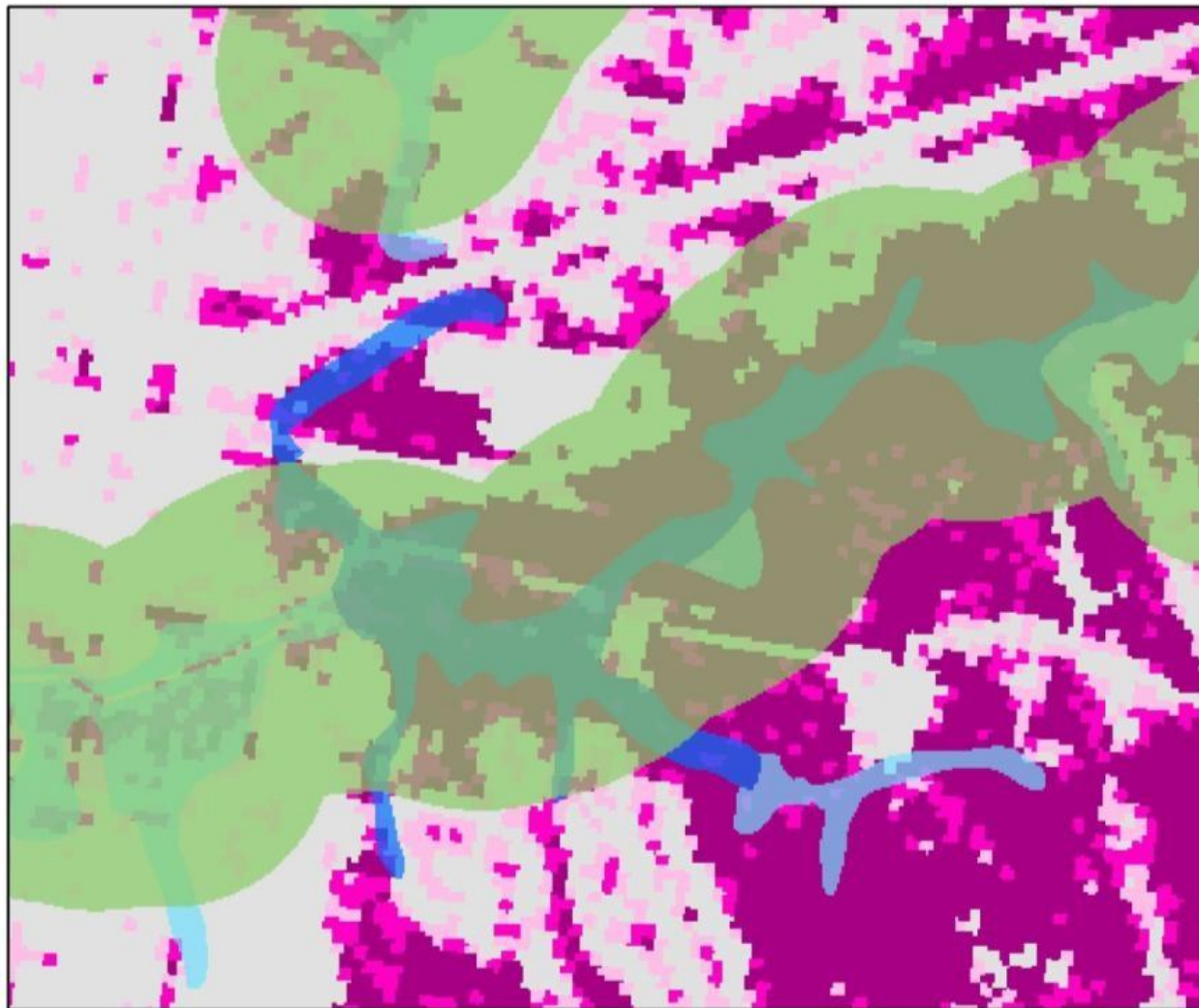
Impervious Cover



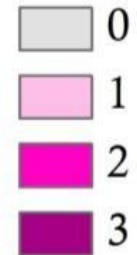
Hydric Soils



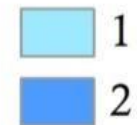
# Putting the data layers together:



## Impervious Cover



## Hydric Soils



## Greenways

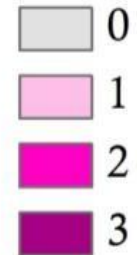




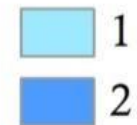
# Weighted Sum Tool



Impervious Cover



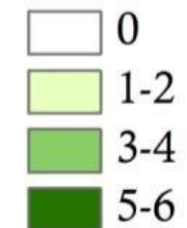
Hydric Soils



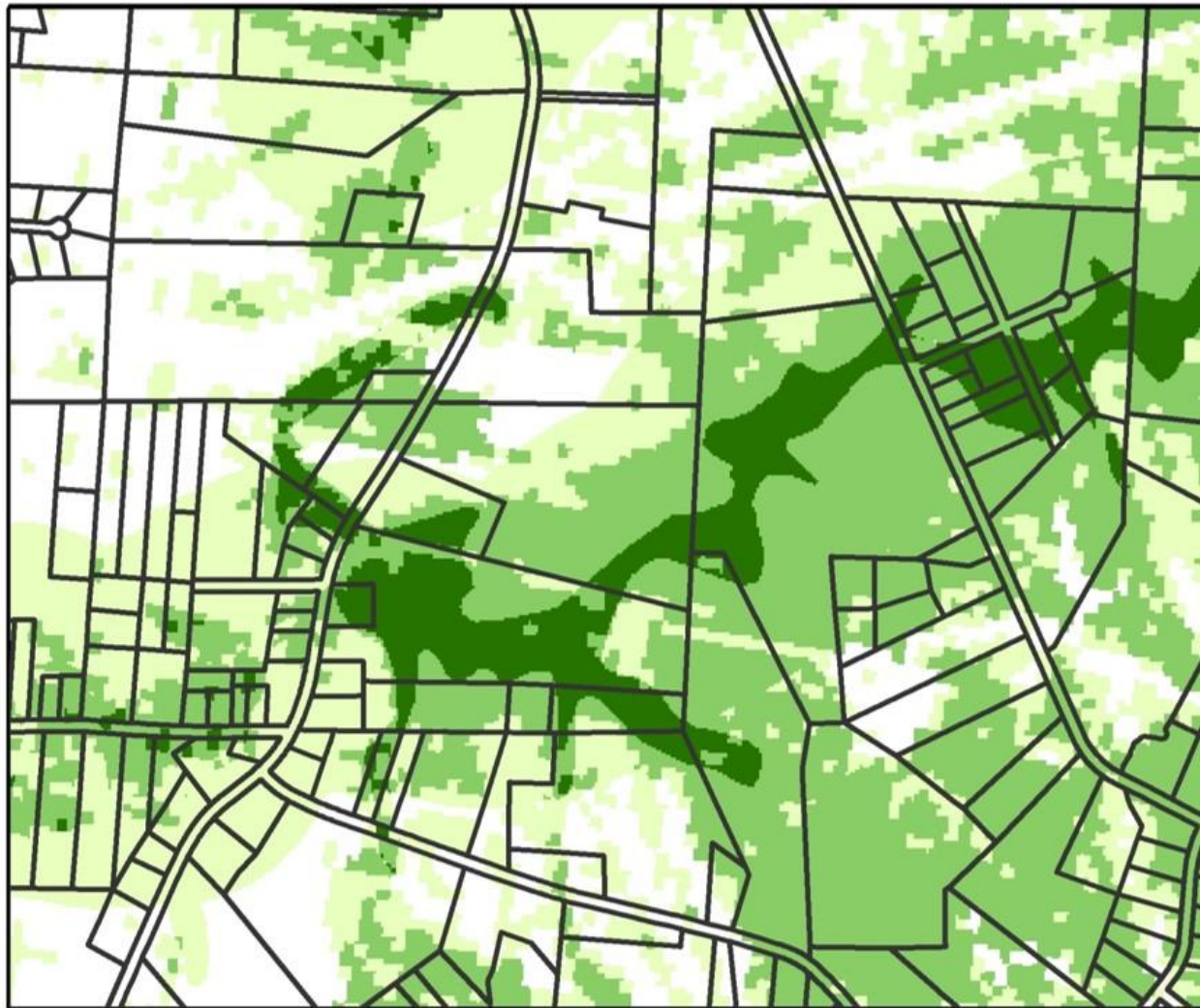
Greenways



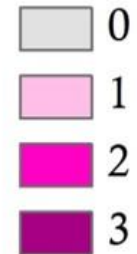
Weighted Sum:



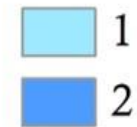
# Overlay parcel boundaries



## Impervious Cover



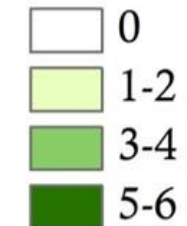
## Hydric Soils



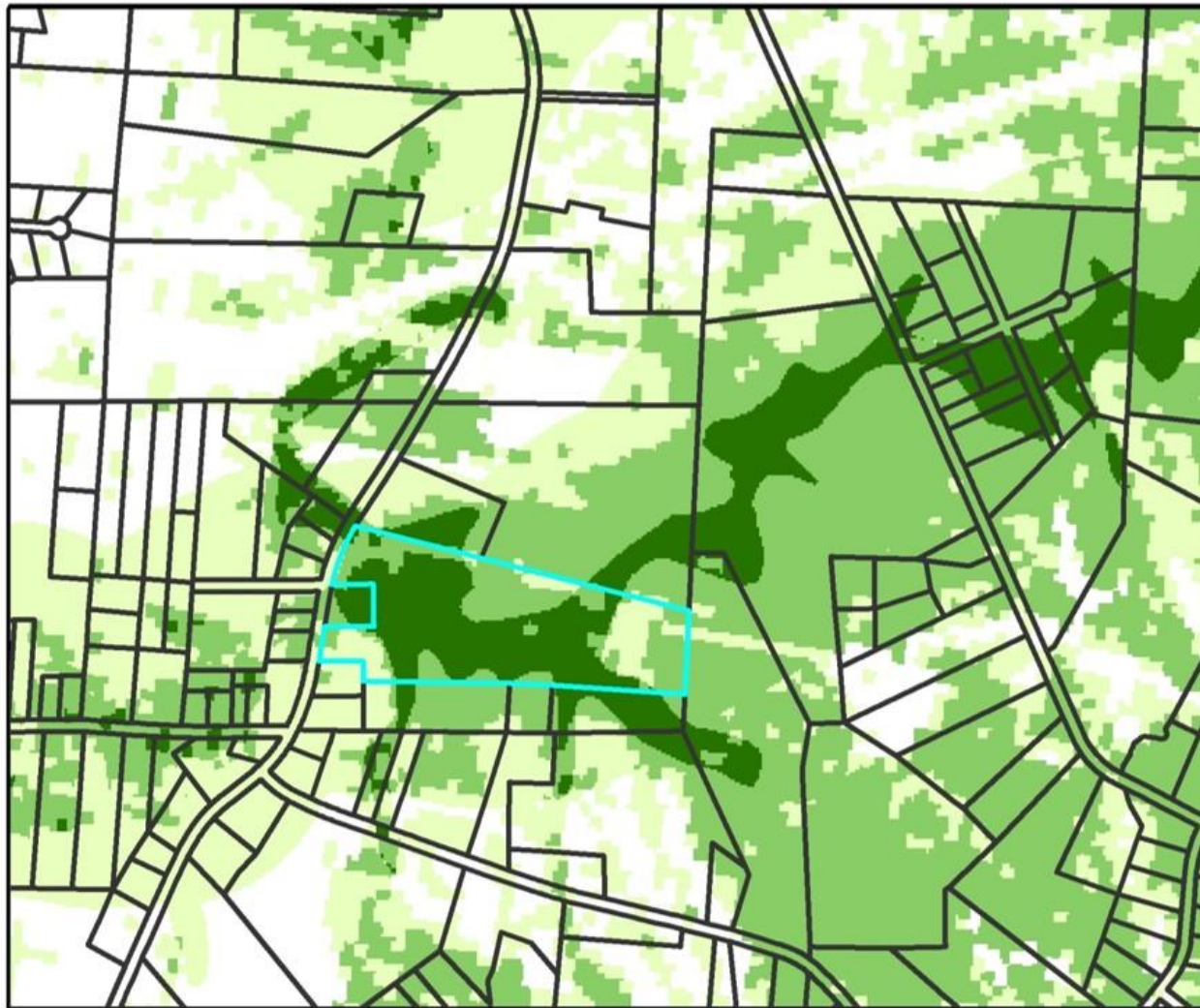
## Greenways



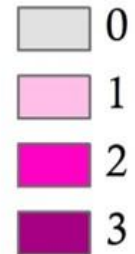
## Weighted Sum:



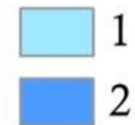
# Zonal Statistics to rank mean values



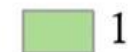
Impervious Cover



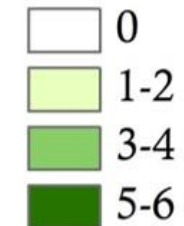
Hydric Soils



Greenways



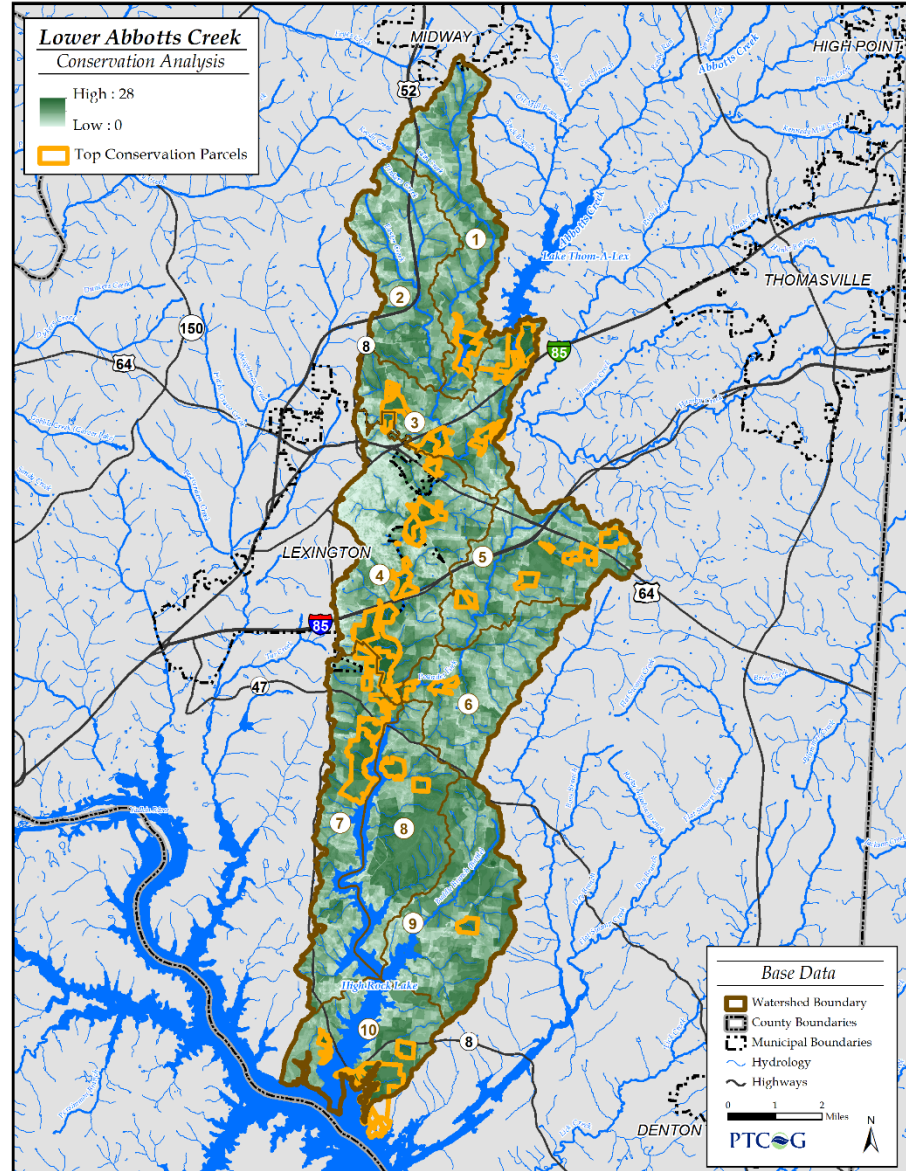
Weighted Sum:



# Lower Abbotts Creek Creek

## Conservation Output Raster

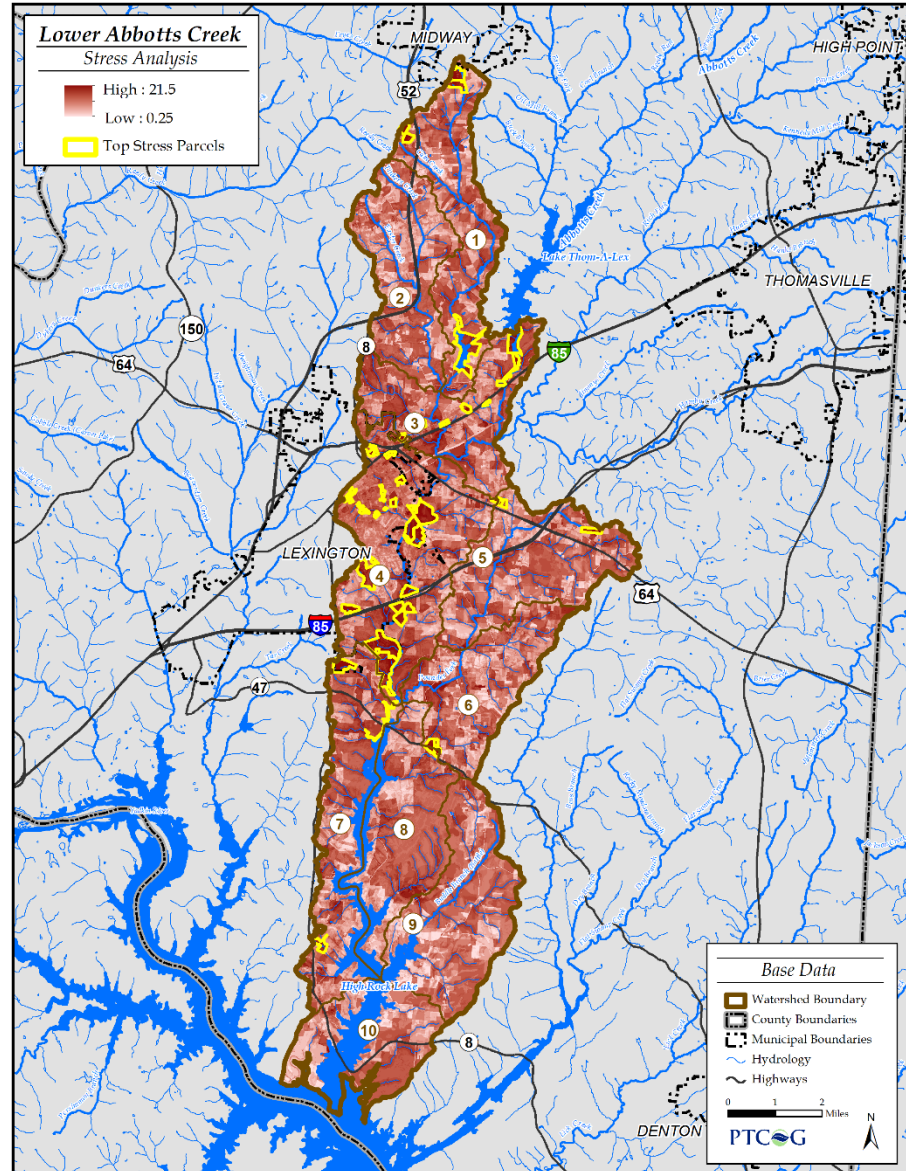
Pick top 50 parcels  
with highest mean  
conservation values



# Lower Abbots Creek Creek

Stress  
Output Raster

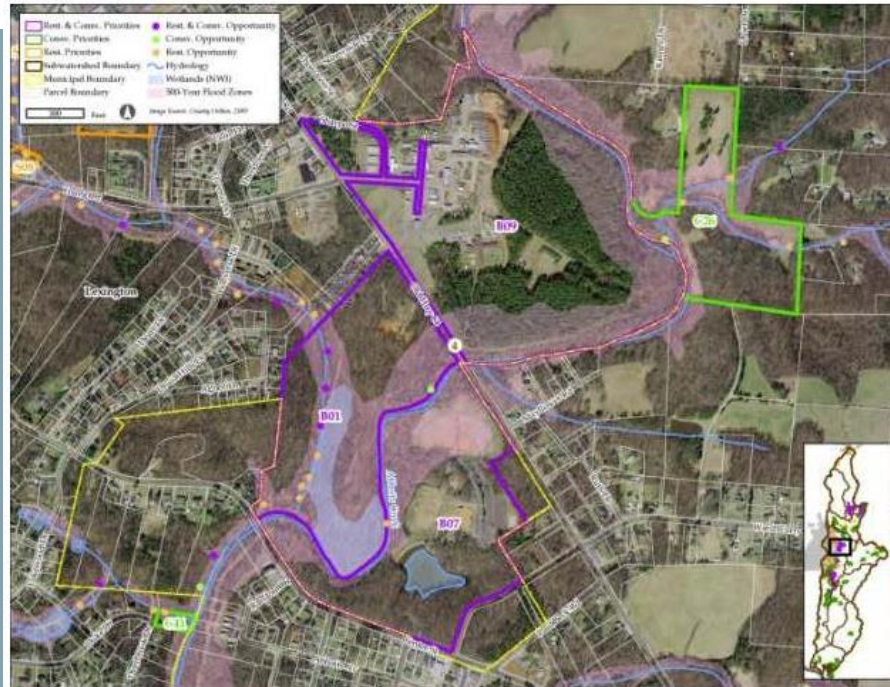
Pick top 50 parcels  
with highest mean  
stress values



# Lower Abbots Creek

## Project Atlas

### Project 01: Finch Park



#### **Recommended Actions:**

- Permanently protect the 6,900-ft, 500-yr floodplain (16 acres) as an unmanaged buffer that could serve greenway/blueway purposes
- Highlight ecosystem services and regionally-unusual ecology of the 126 acres in Finch Park and the Davidson Co. Prison with NC WRC and Stormwater SMART
- Use CCAP and PART-F monies to expand unmanaged areas to adjacent and highlighted lands, and feature residential leaders
- Integrate burial of water-sewer pipes below Abbots Creek into Lexington CIP
- Expand upon the recreational and watershed management opportunities at Finch Park with expansions of trails system, alternative recreation options (i.e. mountain biking), creation of parking lot stormwater BMPs, and the creation of a canoe landing
  - Hold regular and well-publicized community events here
- Permanently protect the 11-acre wetland in Finch Park



# What geography do we want to prioritize?

---

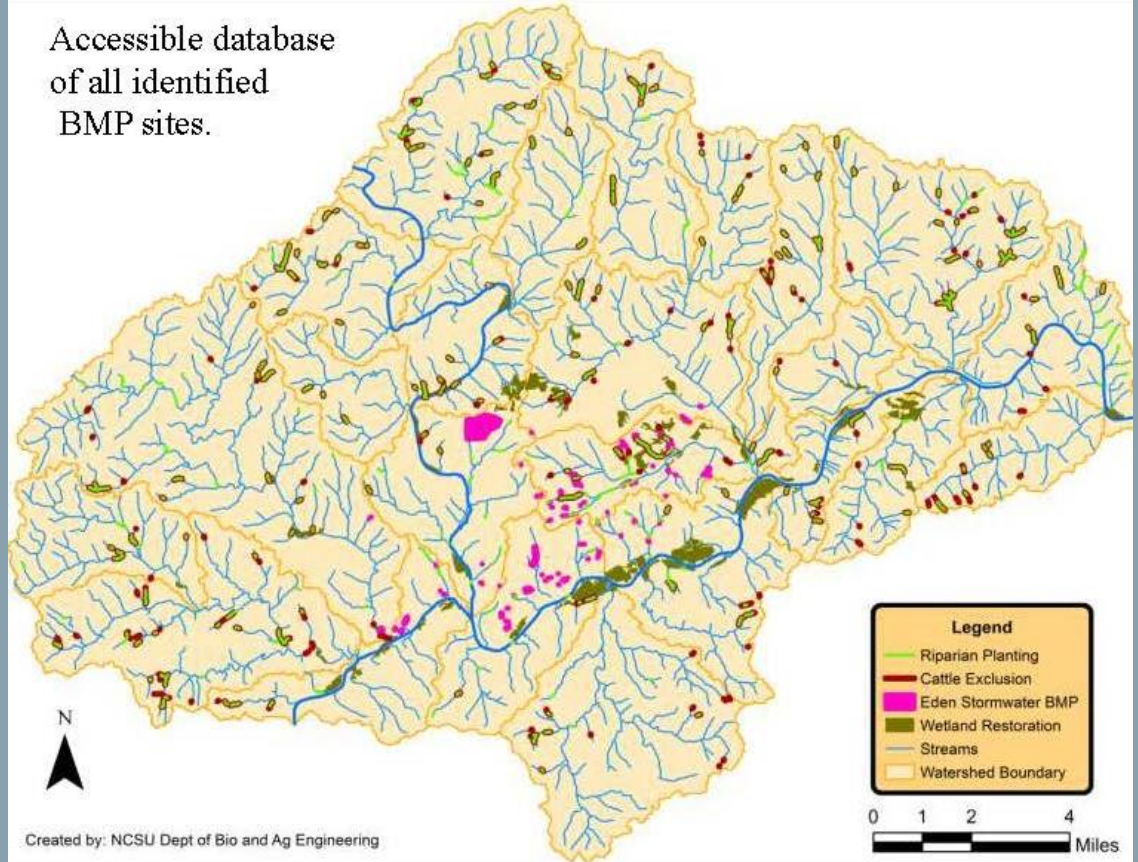
- Stream segments/reaches
- Hydrologic catchments
- Individual properties (parcels)



# How do we incorporate new data?

- **NC State BMP Data**

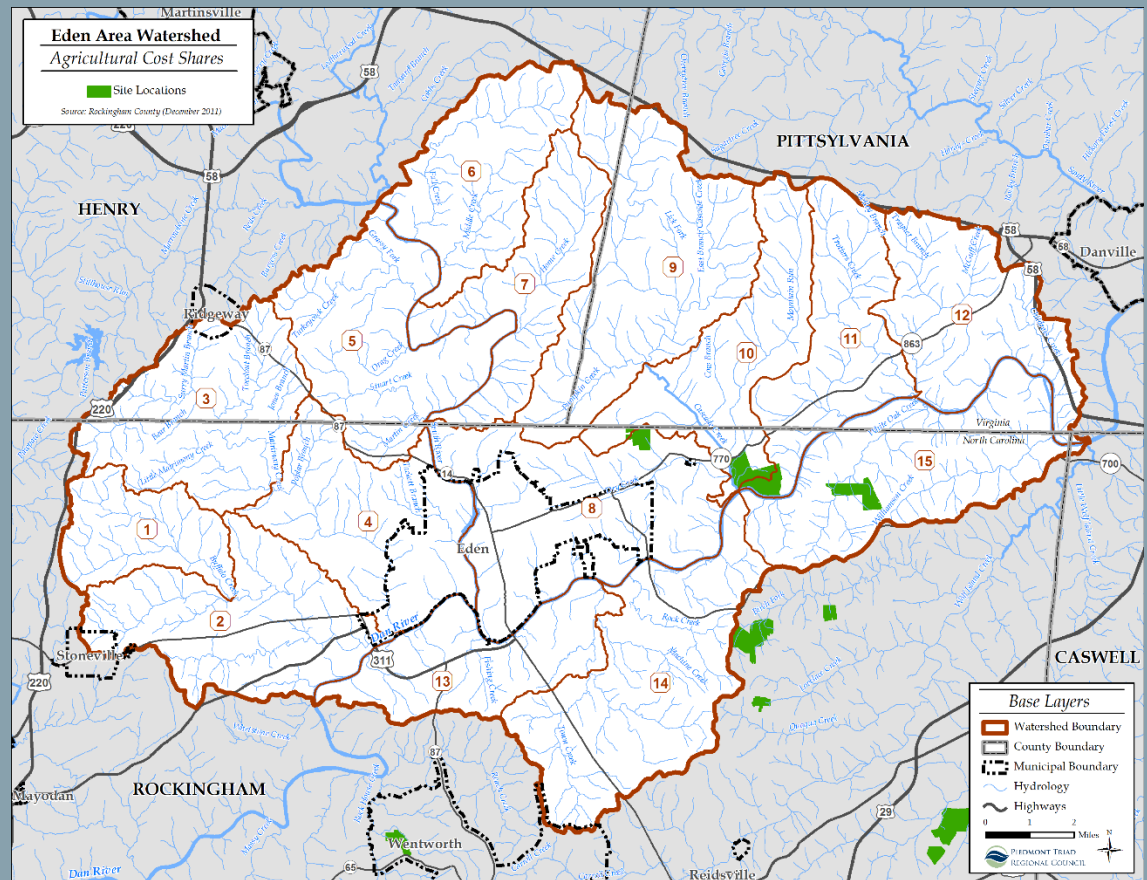
Accessible database  
of all identified  
BMP sites.





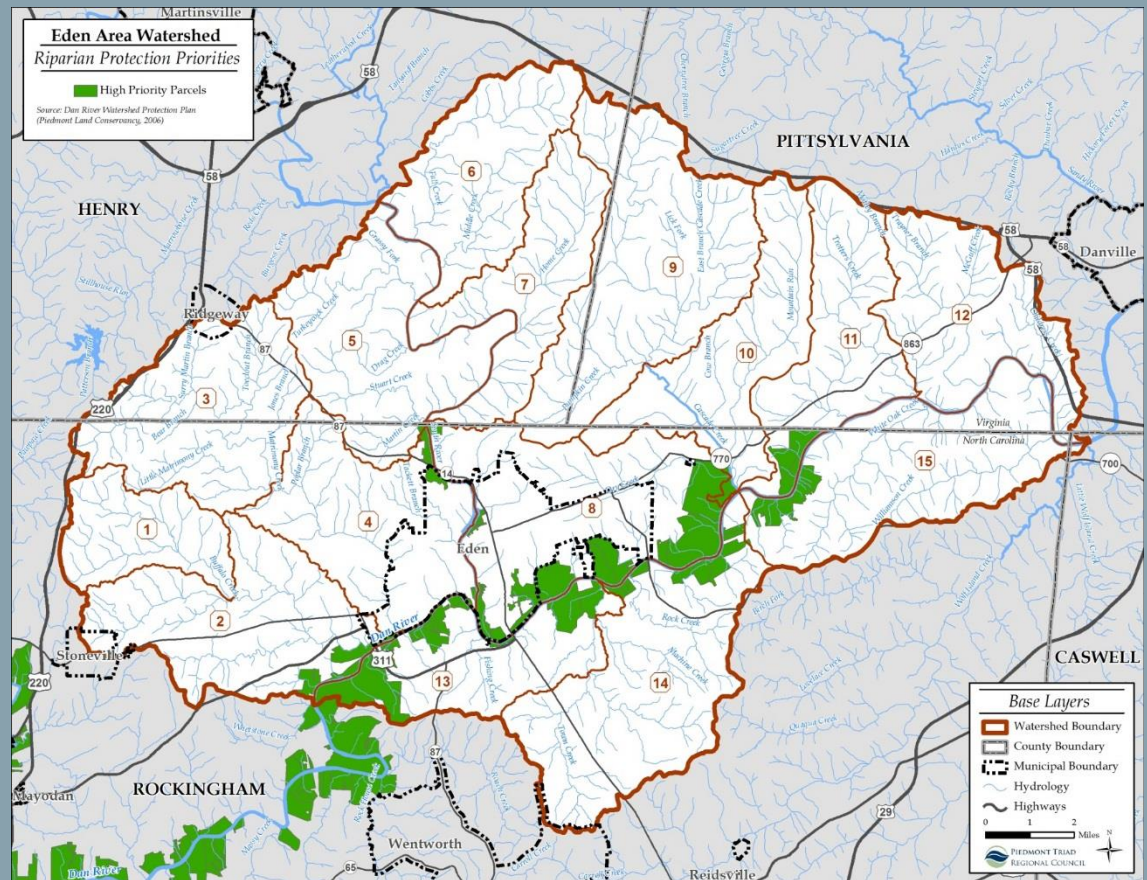
# How do we incorporate new data?

- NC State BMP Data
- County BMPs



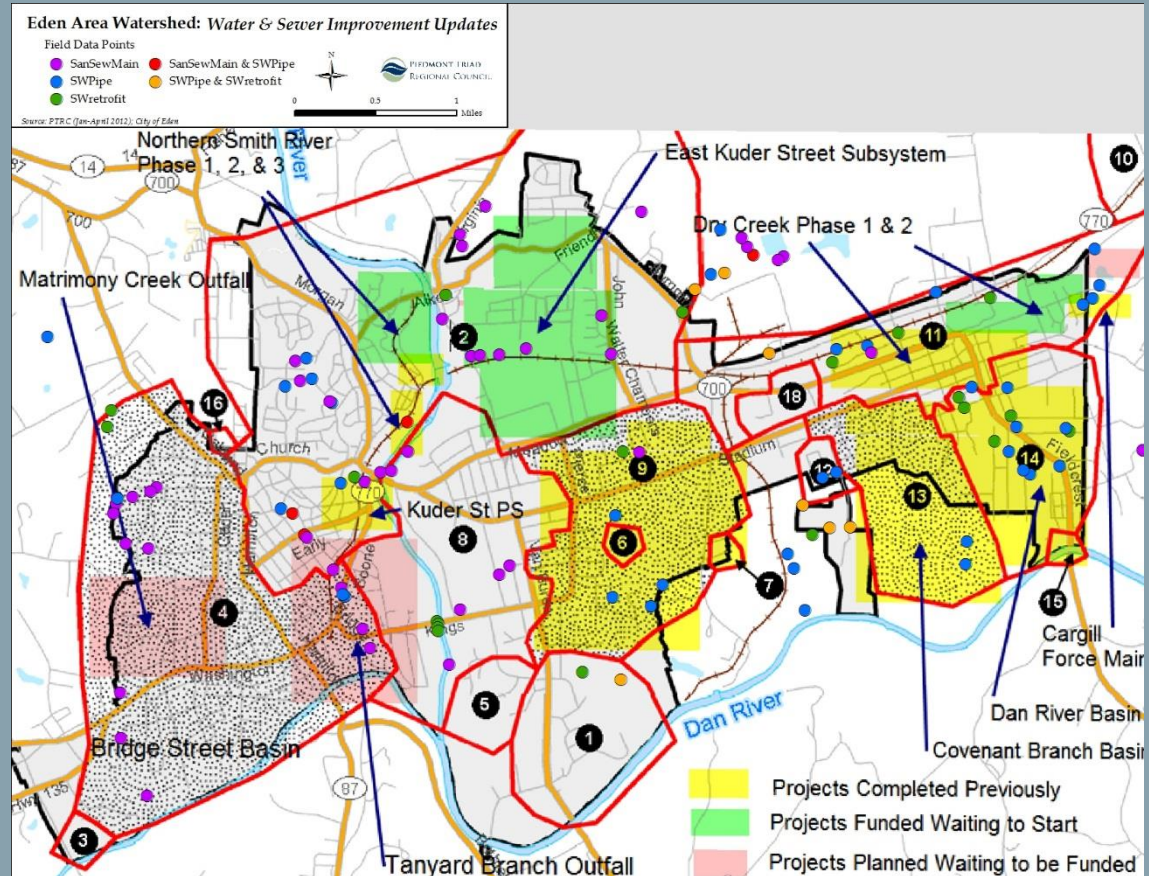
# How do we incorporate new data?

- NC State BMP Data
- County BMPs
- PLC Data



# How do we incorporate new data?

- NC State BMP Data
- County BMPs
- PLC Data
- City Projects



# How do we incorporate new data?

---

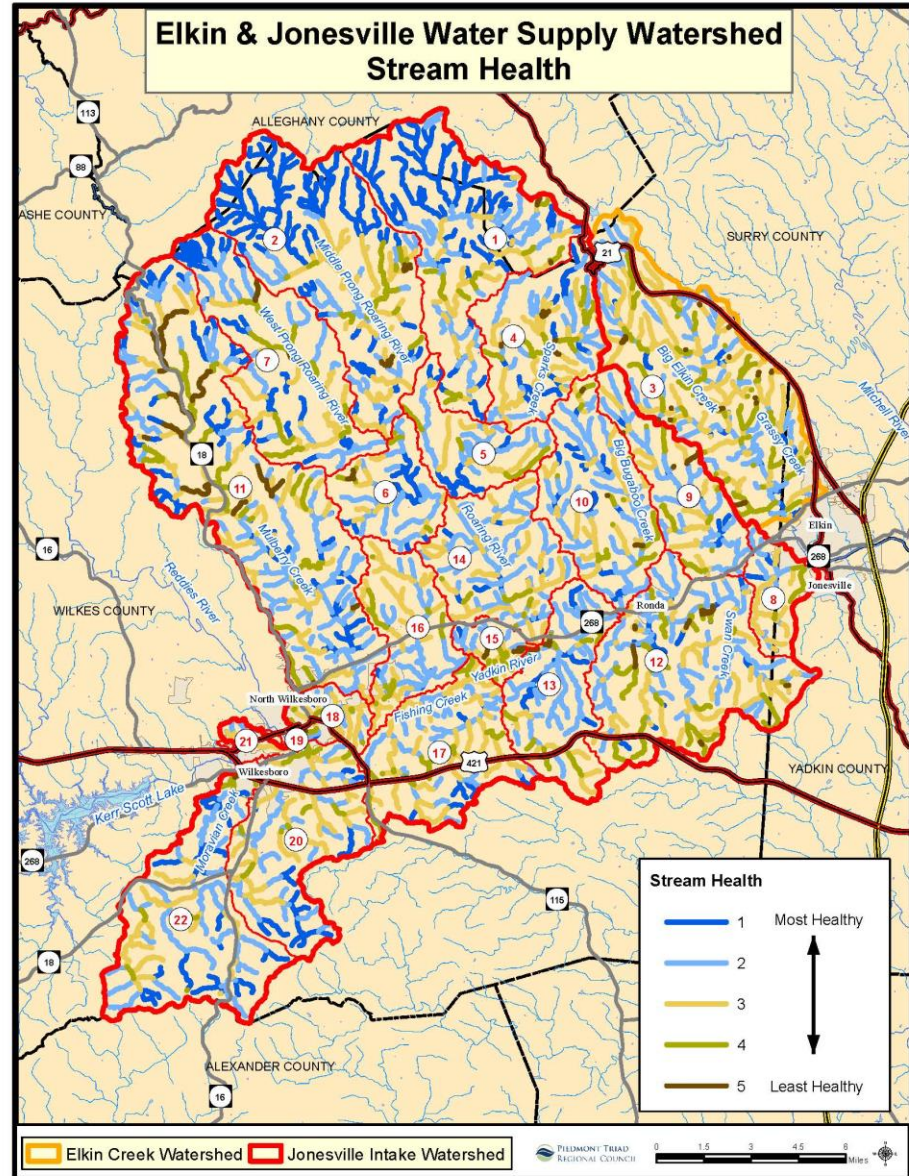
- NC State BMP Data
- County BMPs
- PLC Data
- City Projects
- Buffer Analysis (VA TMDL on Dan/Smith)



# Elkin Water Supply Watershed

Buffer analysis

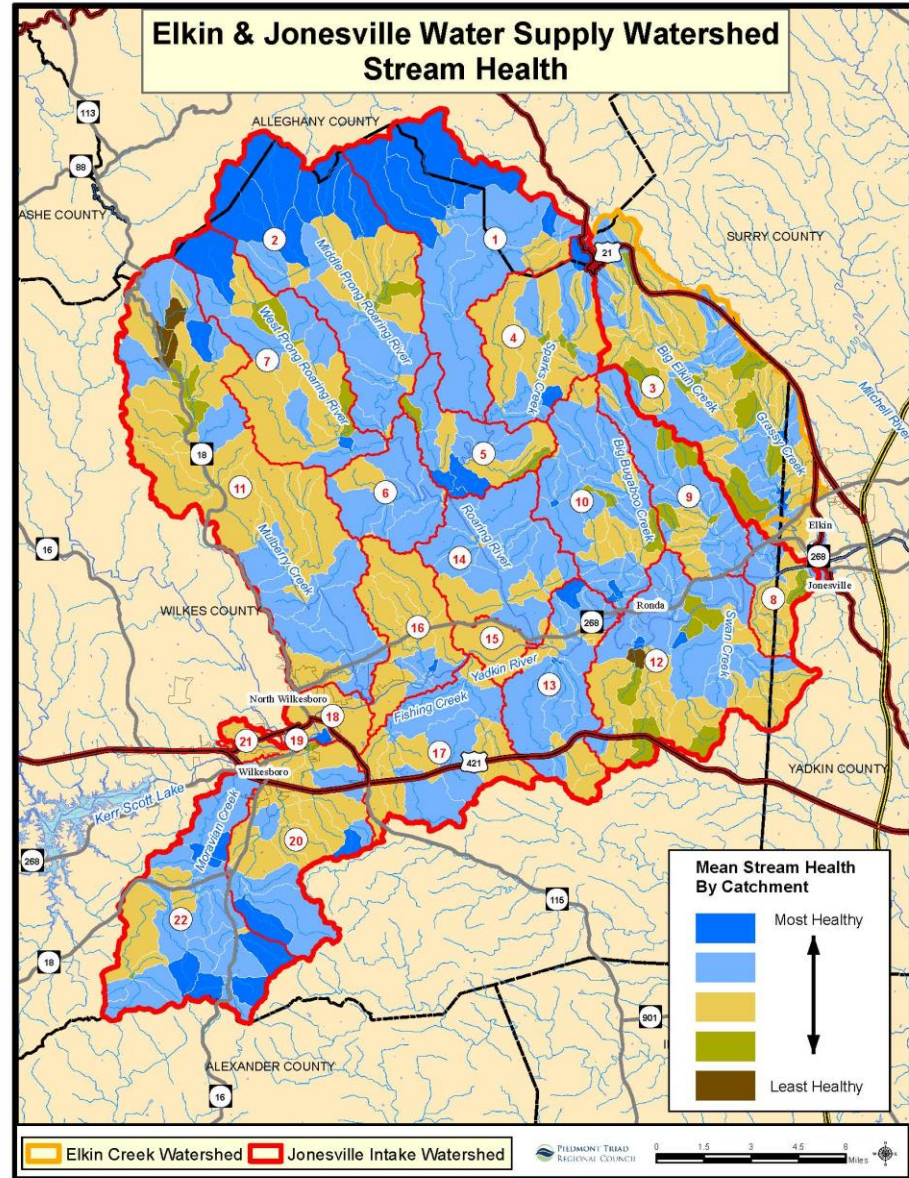
Stream Health



# Elkin Water Supply Watershed

Buffer analysis

Stream Health



# Buffer Analysis

- NHD Flowline provides 364 stream segment



# Buffer Analysis

- NHD Flowline provides 364 stream segment
- ArcHydro burned-in 2,103 stream segments





# Buffer Analysis

- Riparian buffer analysis to build upon GIS model
- Review vegetated cover within 100-foot stream buffer for each stream segment
- 5 tiered system:
  1. Pristine – complete cover
  2. Impacted – majority cover with some human activity
  3. Managed – human activity actively degrades streams; buffer absent on one side
  4. Degraded – buffer mostly absent on both sides
  5. Absent – no vegetated buffer



# How do we incorporate new data?

---

- NC State BMP Data
- County BMPs
- PLC Data
- City Projects
- Buffer Analysis (VA TMDL on Dan/Smith)



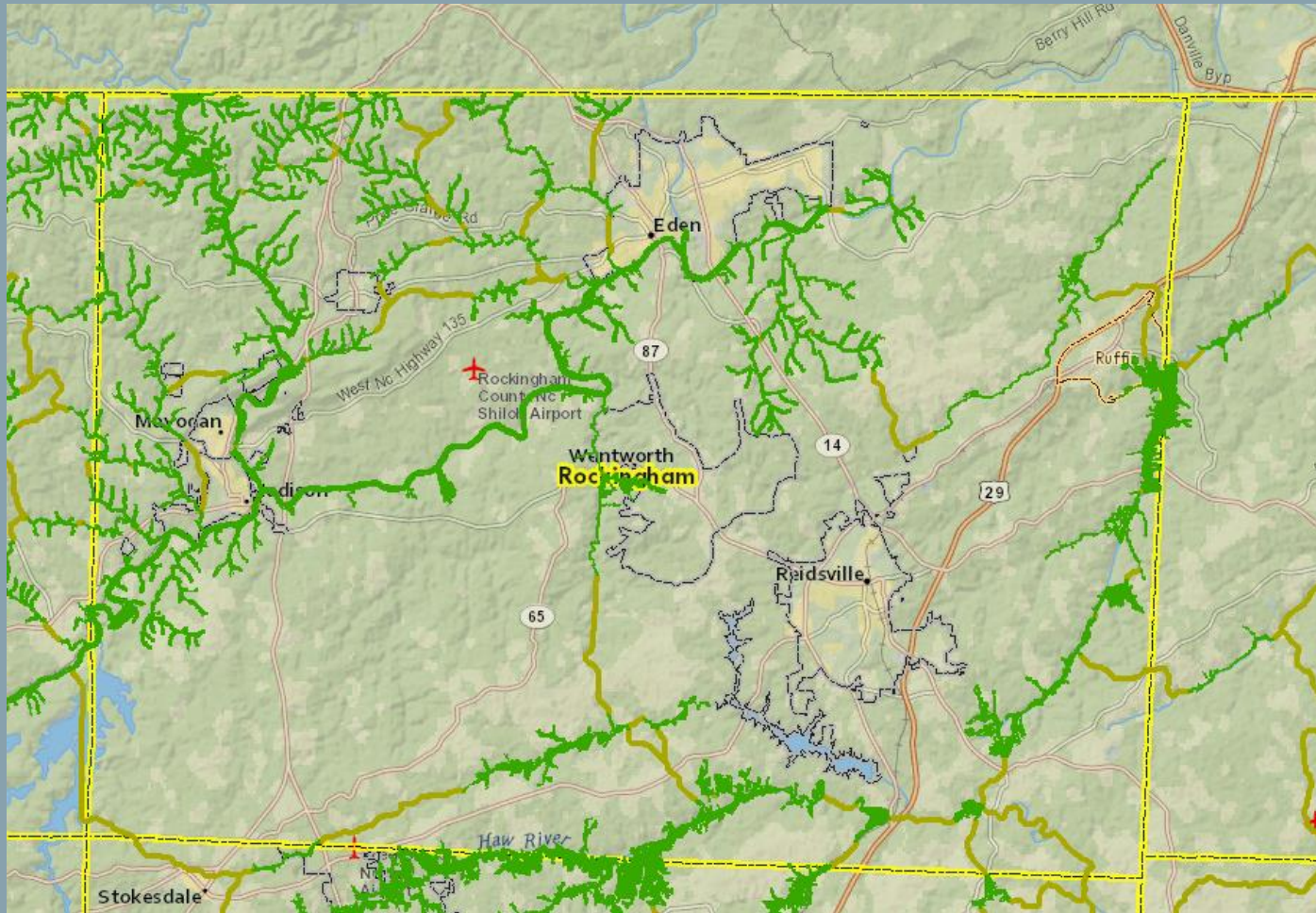
# How do we incorporate new data?

---

- NC State BMP Data
- County BMPs
- PLC Data
- City Projects
- Buffer Analysis (VA TMDL on Dan/Smith)
- Piedmont Together – Green Infrastructure Network



# Green Infrastructure Network



## PlacesSpaces

### Natural Features

Green Infrastructure Network

Green Infrastructure Hubs



Green Infrastructure Corridors



## Boundaries

County Boundary



Municipal Boundary



Unincorporated Places



# Green Infrastructure Network

## Input Layers:

1. Water (PTRC regional assessment)
2. Biodiversity (state assessment)
3. Farm & Forest
  1. PUV
  2. Prime Farmland Soils
  3. Contiguous Forest Cover



# Map Viewers

<http://ptrc.maps.arcgis.com/home/>

## Piedmont Together

