

Agriculture: A Cost-Effective Greening Solution to MS4s and TMDLs

Stephanie Smith Armpriester
Municipal Outreach Coordinator
Lancaster Farmland Trust
Strasburg, PA
Lancaster County

PA DEP Chesapeake Bay
Stormwater Workgroup Meeting
Southcentral Regional Office
August 6, 2015

Presentation Outline

- MS4 Background
- Lancaster County's Water Quality Challenge
- Agriculture in MS4/TMDL Planning
- Lancaster Farmland Trust's Role in Water Quality
- BMP Assessment Model (West Lampeter Case Study)
 - Overview
 - Methodology
 - Results
 - Phase II Implementation
- Sample Data for 6 municipalities in Lancaster County
- Challenges/Barriers
- Possible Solutions to Meet Bay Goals/Achieve Permit Compliance

Presentation Objectives

- Introduce an “innovative” greening model to improve water quality that is both cost-effective and environmentally friendly
- Offer a new approach to reporting requirements for MS4 permitting and TMDL plans
- Provide a spectrum of green infrastructure solutions to be replicated in any watershed with agricultural or open space land uses.
- Identify and discuss challenges/ barriers in implementing this approach



MS4 Background

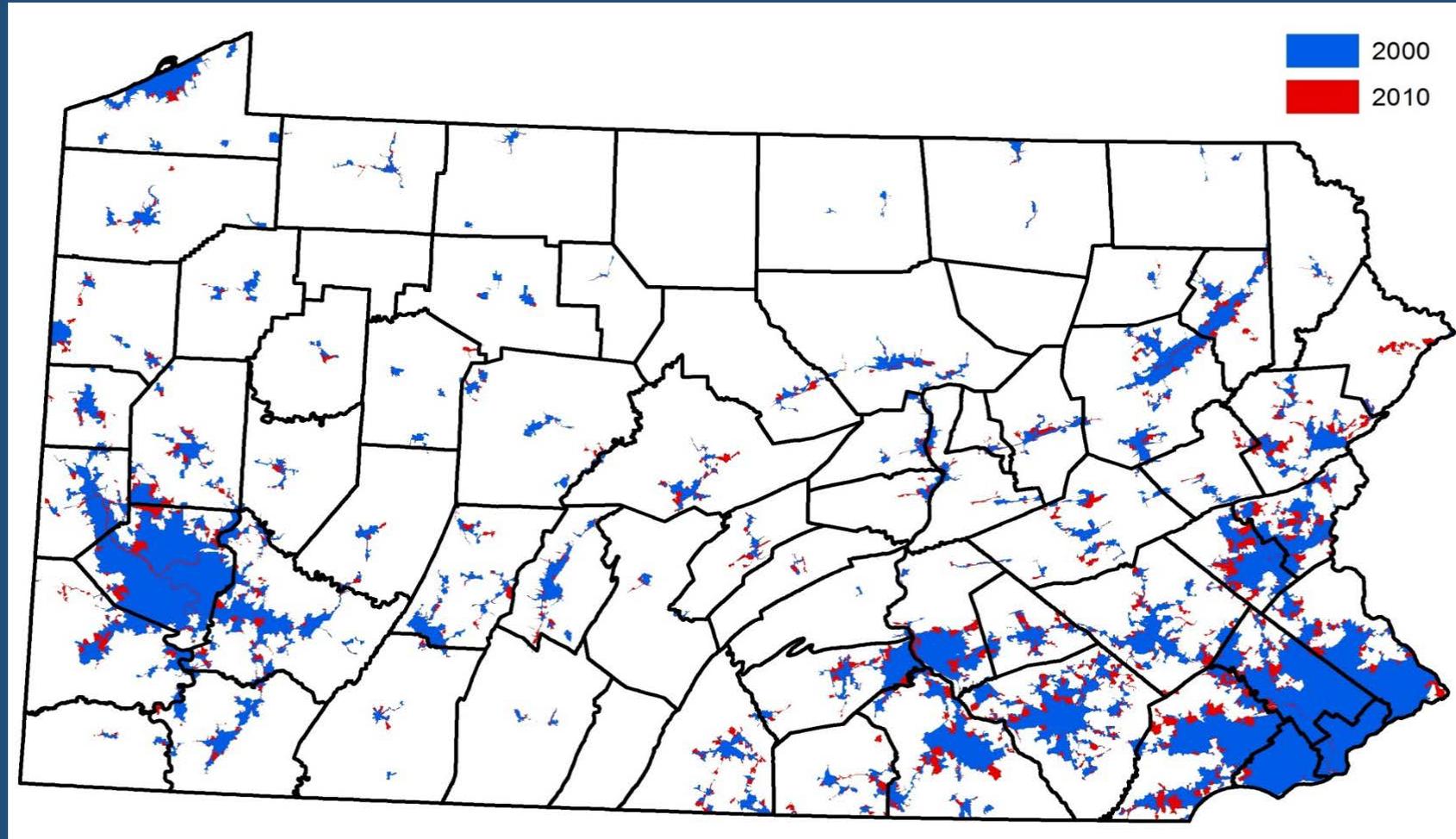
Urbanized Area

Urbanized Area - Bureau of the Census in 2010 - "urban area" refers generically to urbanized areas of 50,000 or more population and urban clusters of at least 2,500 and less than 50,000 population.

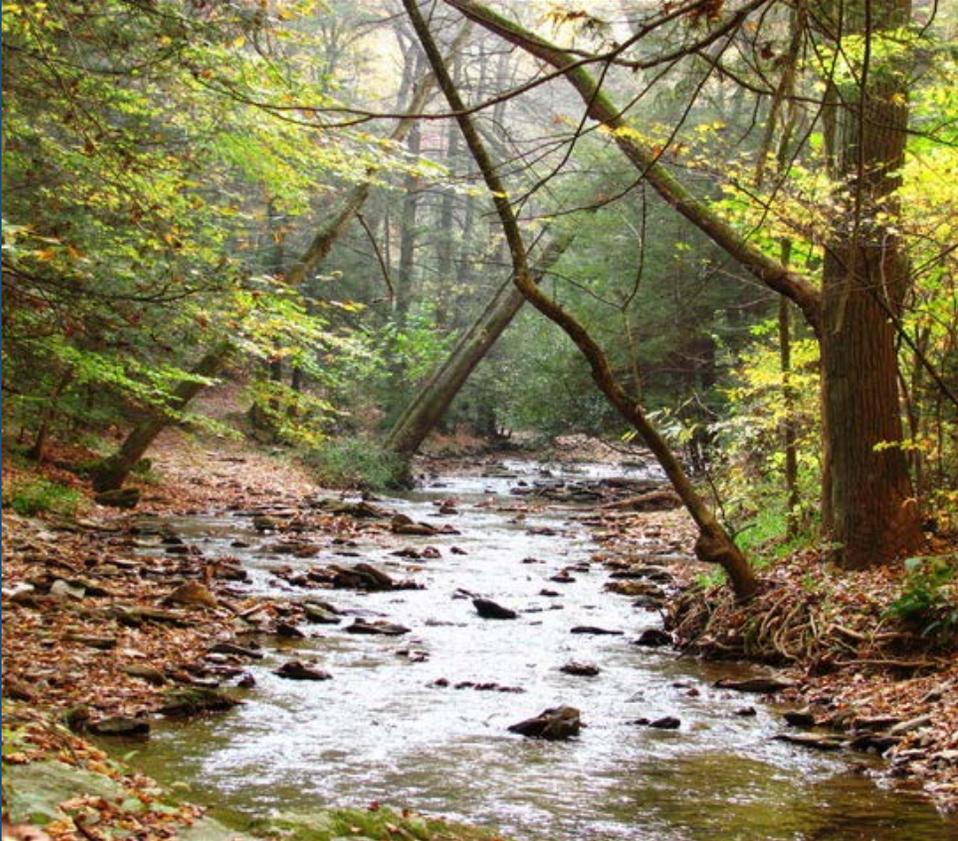


MS4 – Who's Impacted

2000 & 2010 Urbanized Areas
(Source: US Census Bureau)



MS4 – Requirements for Municipalities



- **MS4 – TMDL Plan**
To MEP, prepare and implement as MS4 TMDL Plan that is consistent with requirements for waste load allocations
- **Chesapeake Bay TMDL**
Chesapeake Bay Pollutant Reduction Plan
- **Impaired Waters without TMDL**
Prevent new discharges from causing or contributing to impairments.

MS4/TMDL Planning



Timeline for implementation and ultimately for clean up of the water in a local TMDL

- 5 – 10 – 15 years?
- Chesapeake Bay Timeline
 - 2017 60% Milestones
 - 2025 100% Implementation

MS4 TMDL Plan

- The TMDL plans have been developed with the renewal/new permit applications and are being reviewed at DEP offices across the state.
 - MS4s that discharges stormwater into streams/water bodies with applicable wasteload allocations in approved TMDLs, must develop, submit, and ensure implementation of a written MS4 TMDL Plan.
 - The plan must be designed to achieve pollutant reductions consistent with the conditions and assumptions of the applicable wasteload allocations in the approved TMDLs.
 - An MS4 TMDL Plan consists of two components:
 - MS4 TMDL Strategy
 - MS4 TMDL Design Details (BMPs to reduce contaminant runoff).
- A few Chesapeake Bay Pollutant Reduction Plans (CBPRP) have been developed and submitted.

MS4/TMDL Challenges for Municipalities

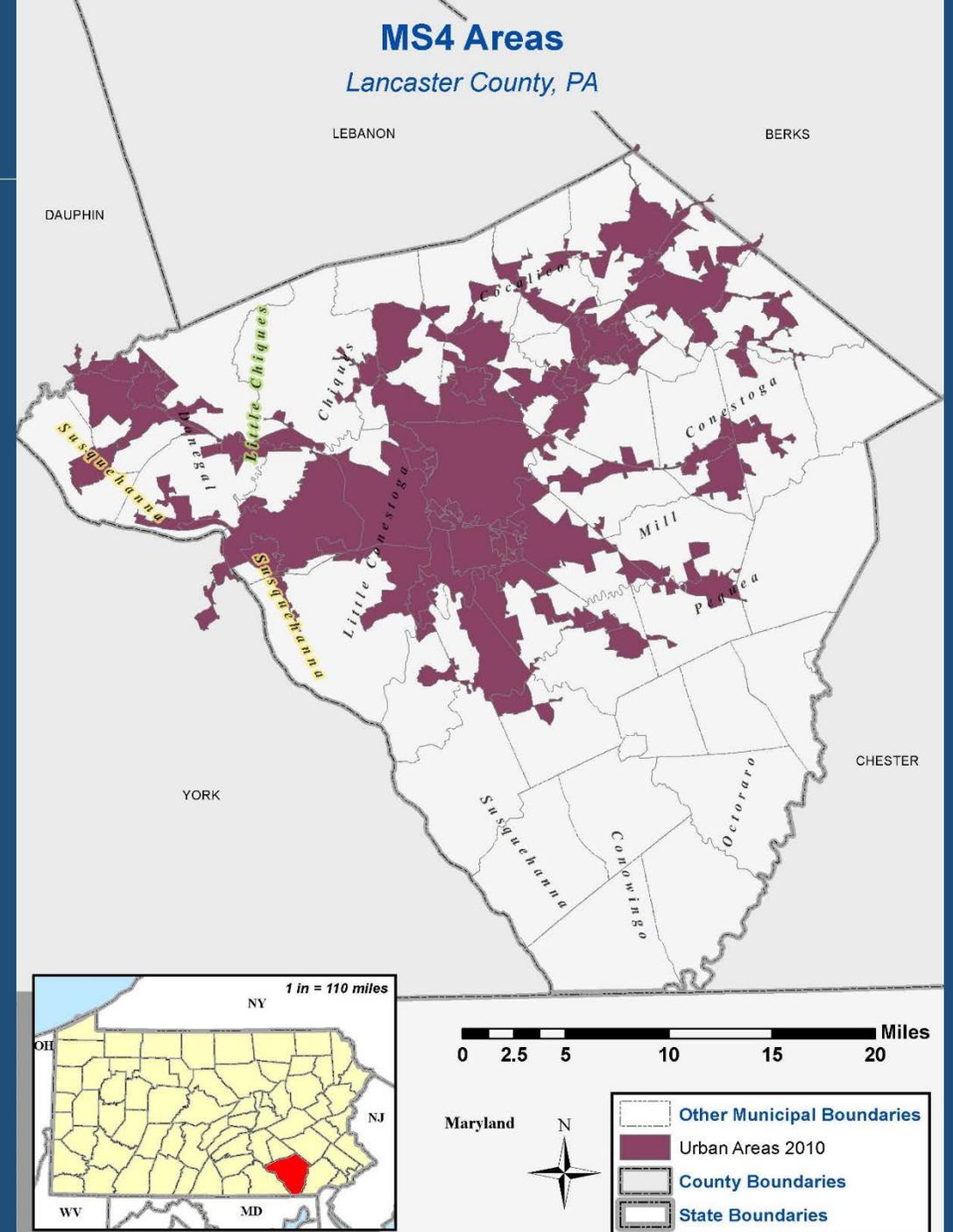


- Need for specific direction from DEP
- Availability of land to make reductions
- Cost of improvements/reductions on small municipal budgets
- Municipal Needs
 - Baseline data
 - Implementation assistance
 - The work itself
 - A location to cost effectively implement BMPs that reduce the contaminants listed in the TMDL
 - Reporting assistance

Lancaster County's Water Quality Challenges

Lancaster County has 46 MS4 Municipalities:

- 1 City
- 16 Boroughs
- 29 Townships



Long Term Stormwater Management Costs

Municipality	Average program funding needs (1 year estimate)		Program funding needs (5 year estimate)	
	Low end estimates	High end estimates	Low end estimates	High end estimates
East Cocalico Township	\$74,759	\$550,298	\$373,795	\$2,751,490
Lititz Borough	\$67,837	\$499,348	\$339,187	\$2,496,742
Manheim Township	--	\$2,017,047	--	\$10,085,237
Mount Joy Borough	\$53,436	\$393,337	\$267,178	\$1,966,685
Warwick Township	\$127,854	--	\$639,268	--
West Lampeter Township	\$109,062	\$802,803	\$545,311	\$4,014,014

UMD's Environmental Finance Center completed the *Lancaster County Municipal Stormwater Management Financing Feasibility Study* in 2013

Worked with 6 Lancaster County municipalities (listed on left)

The objective of this effort was to:

- Identify the current level of stormwater service
- Determine the future level of service needed to deliver a comprehensive stormwater management program
- Highlight any and all opportunities to work collaboratively across the collective municipalities

Agricultural Land Use in MS4 & TMDL Planning

- Agriculture has been the odd man out, since it has been accepted that agriculture is left to the county conservation district
- However, a significant portion of land within an MS4 (at least in Lancaster County) is in agricultural use
- There is a real opportunity to look at ag as an opportunity to achieve Bay Goals
- **Most information put into Bay model ONLY reflects plans written by NRCS/Conservation Districts and practices implemented by cost share programs (ie EQIP)**
 - Many plans and BMPs paid with farmer's own dollar not reflected in model (a large percentage of plain sect farmers in Lancaster County do not take government money but implement many BMPs)
 - Data suggests only 25% of practices accurately reported (other 25% not up-to-date, other 50% not in model at all)
- Need further direction from DEP if this would be acceptable (and counted) toward nutrient and sediment reductions

A New Model to Improve Water Quality

Agriculture can assist in alleviating water quality issues!

- Farmers are implementing good practices! Just not documented.
- Green infrastructure BMPs happening all over Lancaster County
- Lancaster County's current and future land use
- Rising maintenance costs for existing (and future) infrastructure
- Opportunities to build relationships with farmers
- Reinvest in region's biggest industry, agriculture



Lancaster Farmland Trust: Preserving and Stewarding Lancaster County's Farmland



Easement Acquisition
(Preserve)

Stewardship/
Smart Farms
(Conserve)

Municipal Outreach
(Protect)

Specialize in:

- Building relationships, primarily with plain-sect Amish and Mennonite (75% of our constituency)
- Trained in boots-on-the-ground work
- A resource, not a regulator (private, non-profit organization)
- Connecting farmers with municipalities (conduit for outreach)
- A leader in ag water quality work, including BMP Assessments for MS4 reporting

What are BMP Assessments?

Project Description

Individually visiting identified ag-use properties in a particular township to assess compliance with Chapter 102 and 91 and document types of BMPs (best management practices) currently occurring on the farm, whether in a plan or not.

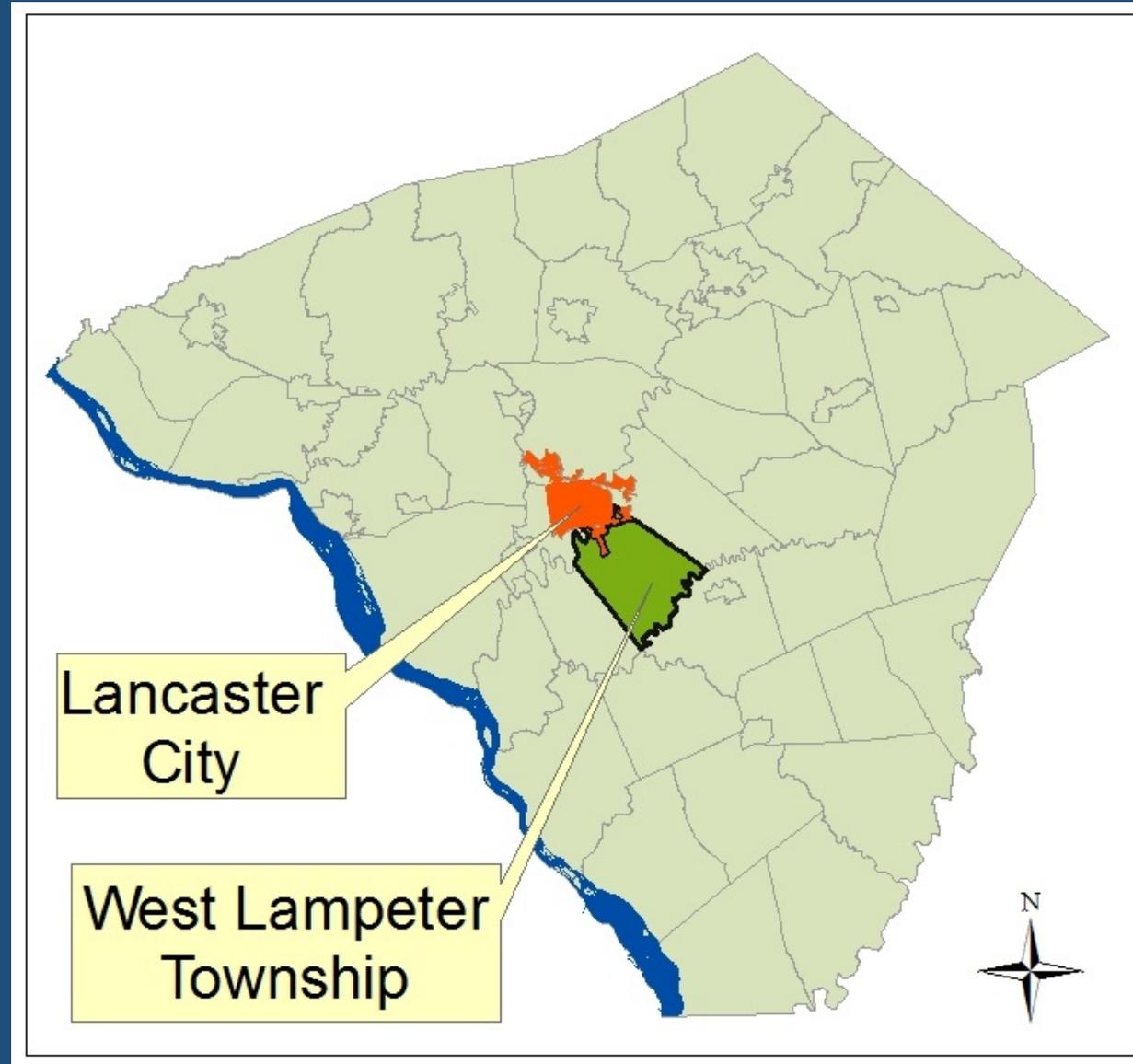
Scope includes visiting all of a given Township's ag-use properties 10 acres or more to get a baseline of the following:

- In compliance?
 - Document BMPs
 - Listen to farmers' concerns
 - Find opportunities for partnerships between farmer and municipality
-

Purpose

To capture ALL best management practices on agricultural lands not previously documented to efficiently and effectively improve water quality in the Chesapeake Bay watershed. In addition, individual visits that develop relationships with farmers can result in voluntary partnerships for BMP implementation.

Case Study: West Lampeter Township, Lancaster County, PA



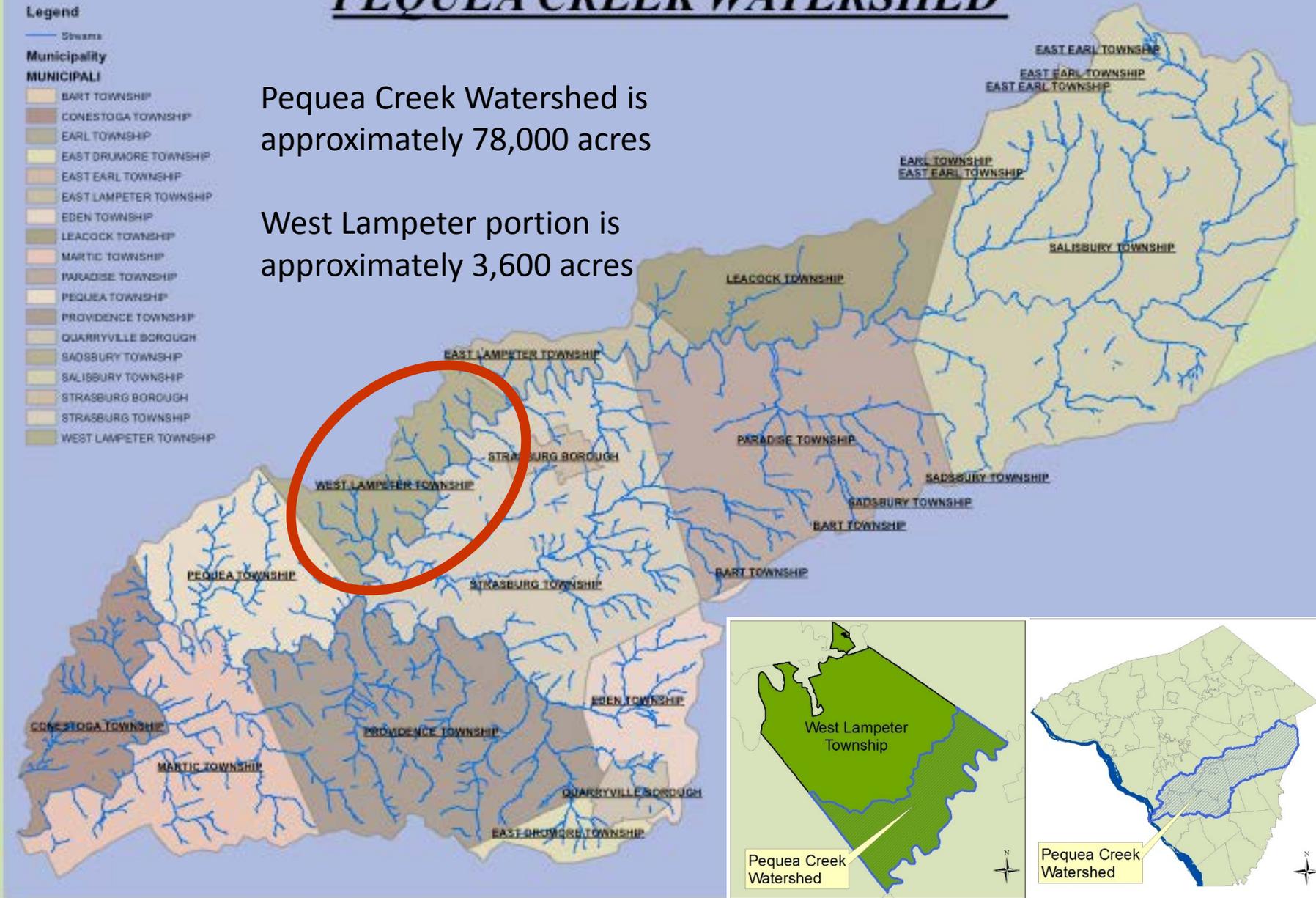
PEQUEA CREEK WATERSHED

Legend

- Streams
- Municipality
- MUNICIPALI
- BART TOWNSHIP
- CONESTOGA TOWNSHIP
- EARL TOWNSHIP
- EAST DRUMORE TOWNSHIP
- EAST EARL TOWNSHIP
- EAST LAMPETER TOWNSHIP
- EDEN TOWNSHIP
- LEACOCK TOWNSHIP
- MARTIC TOWNSHIP
- PARADISE TOWNSHIP
- PEQUEA TOWNSHIP
- PROVIDENCE TOWNSHIP
- QUARRYVILLE BOROUGH
- SAOSBURY TOWNSHIP
- SALISBURY TOWNSHIP
- STRASBURG BOROUGH
- STRASBURG TOWNSHIP
- WEST LAMPETER TOWNSHIP

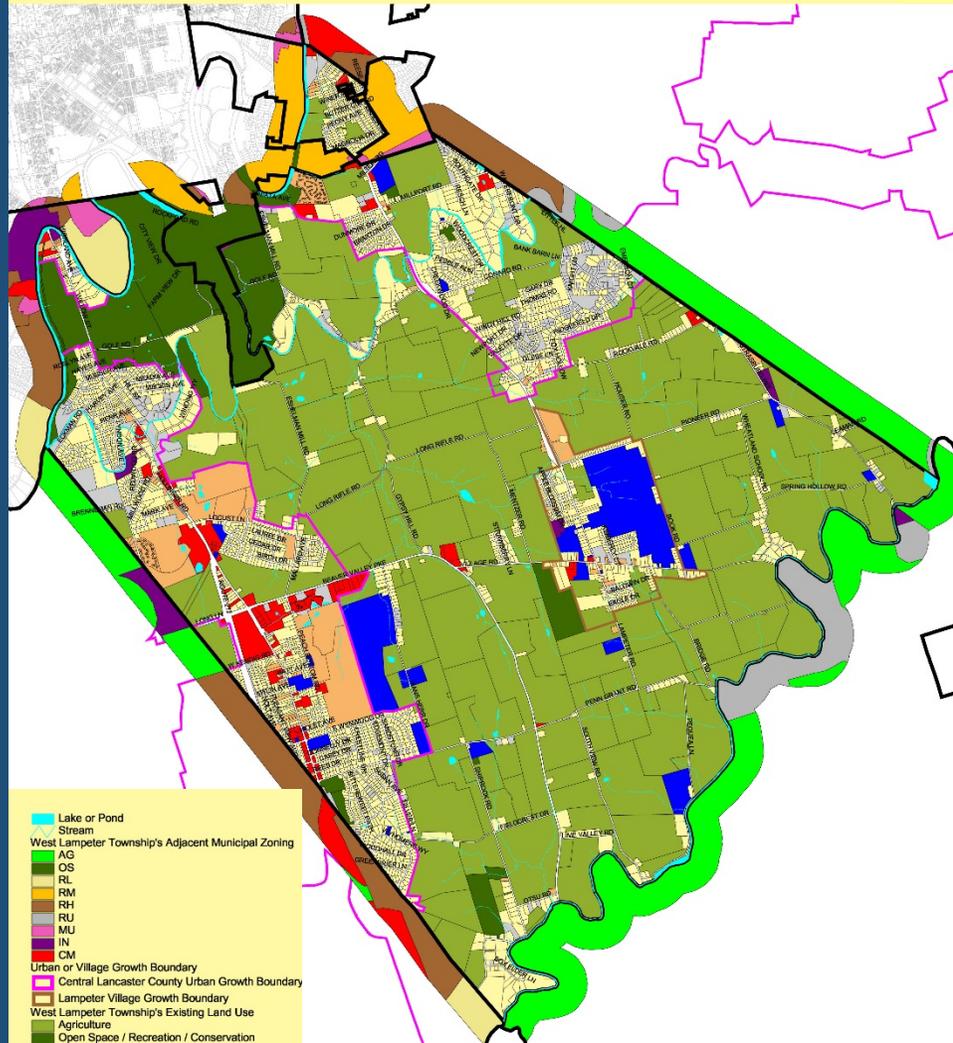
Pequea Creek Watershed is approximately 78,000 acres

West Lampeter portion is approximately 3,600 acres

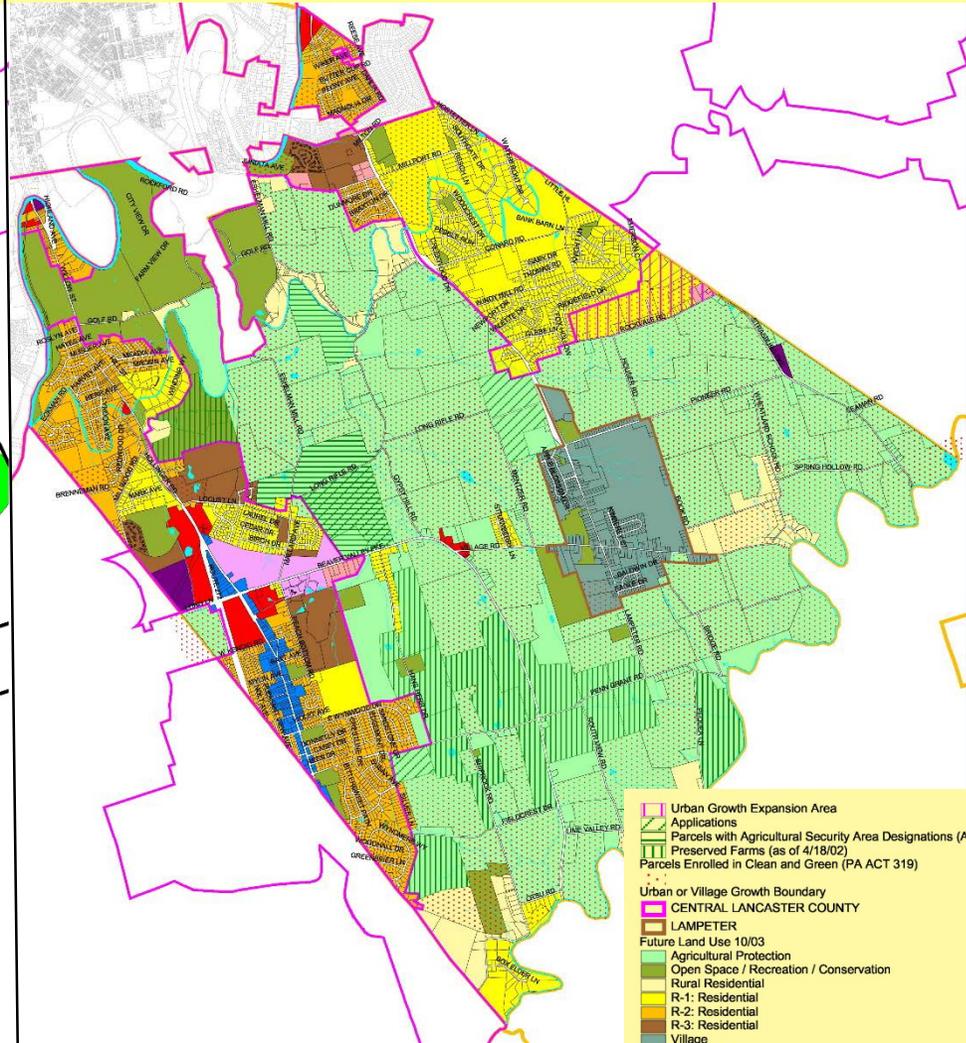


Case Study: West Lampeter Township, Lancaster County, PA

Adjacent Zoning and Existing Land Use
West Lampeter Township, Lancaster County

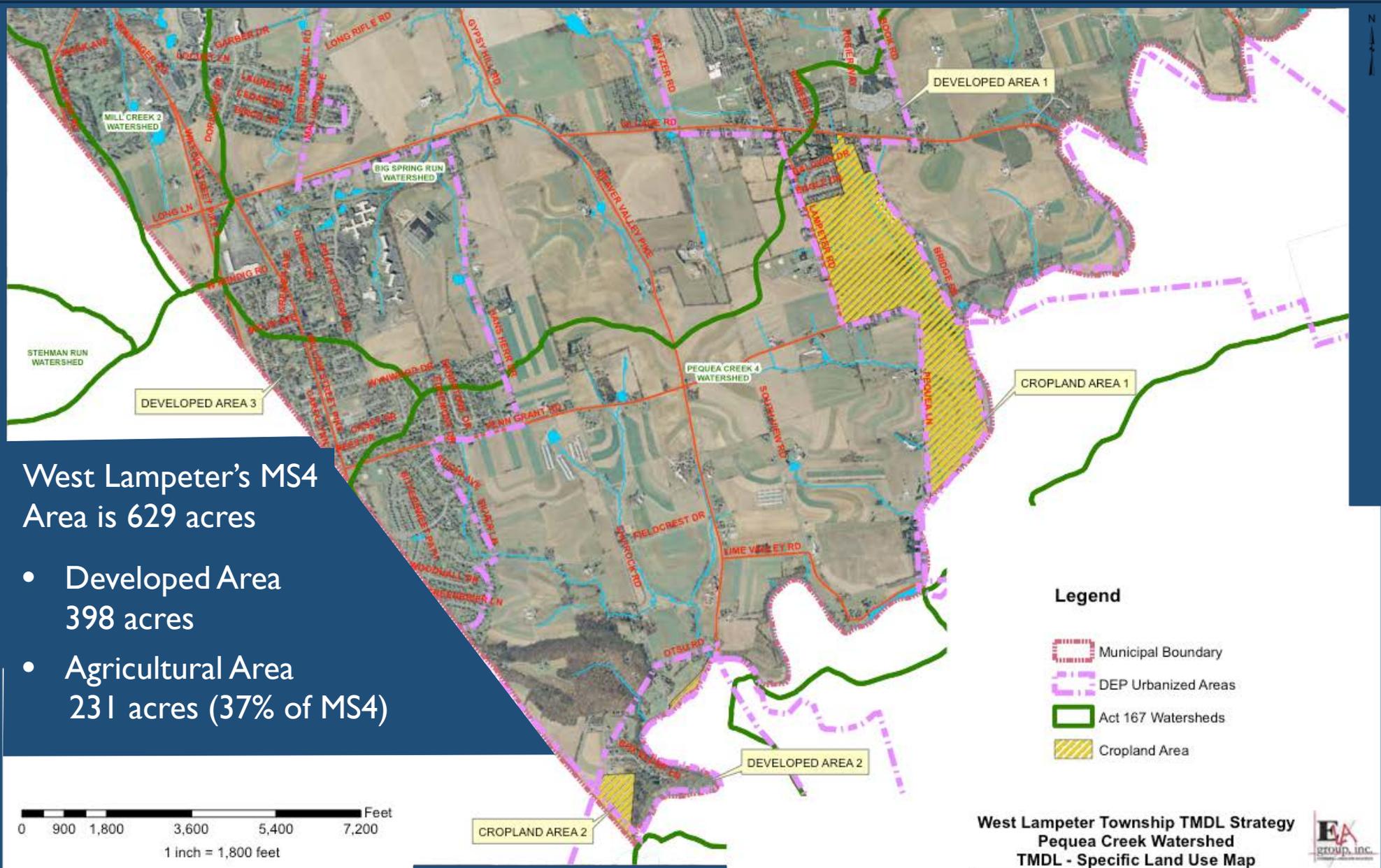


Future Land Use
West Lampeter Township, Lancaster County



****From 2003 Comprehensive Plan****

West Lampeter Township's TMDL Strategy for the Pequea Creek Watershed

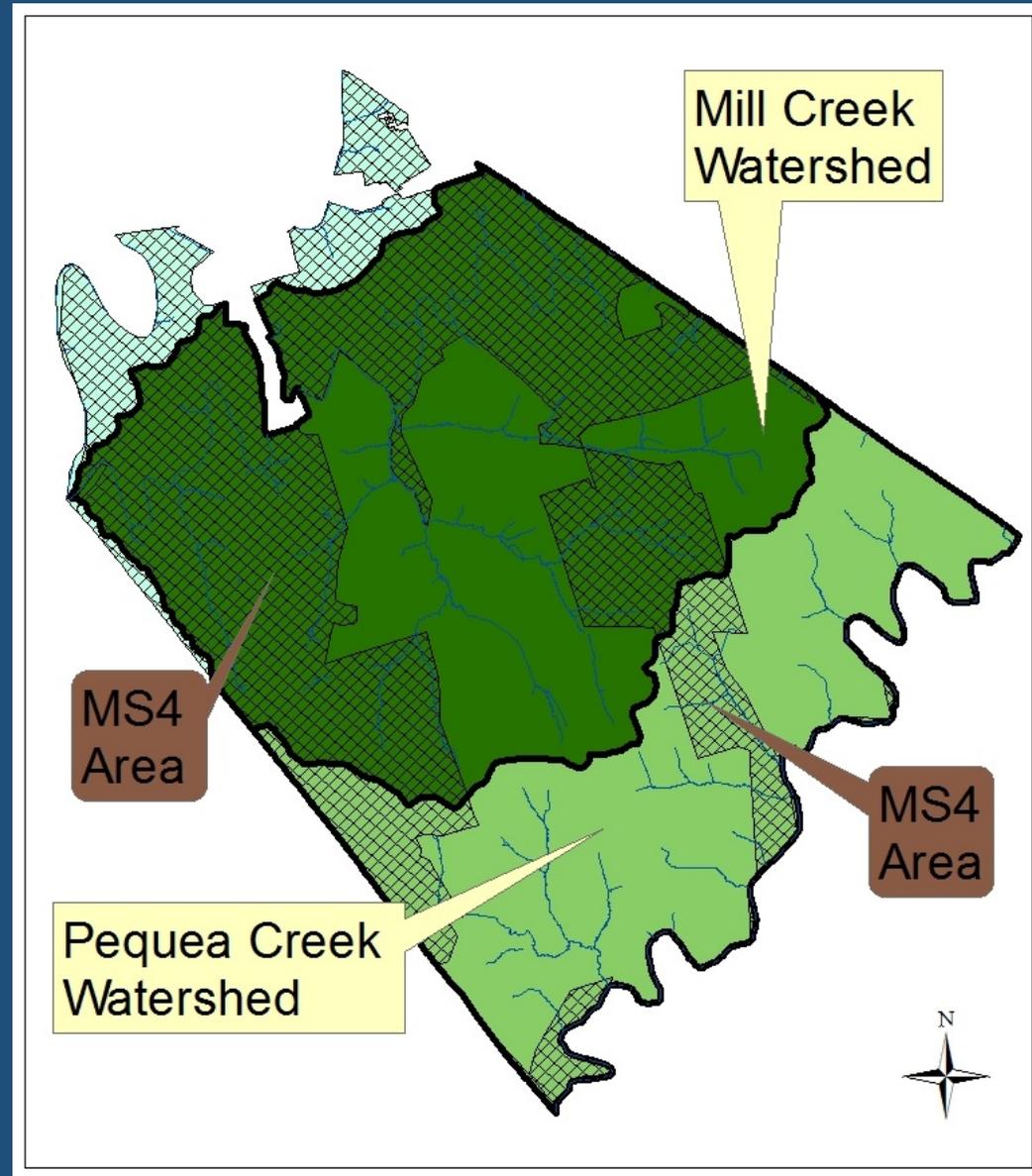


West Lampeter's MS4 Area is 629 acres

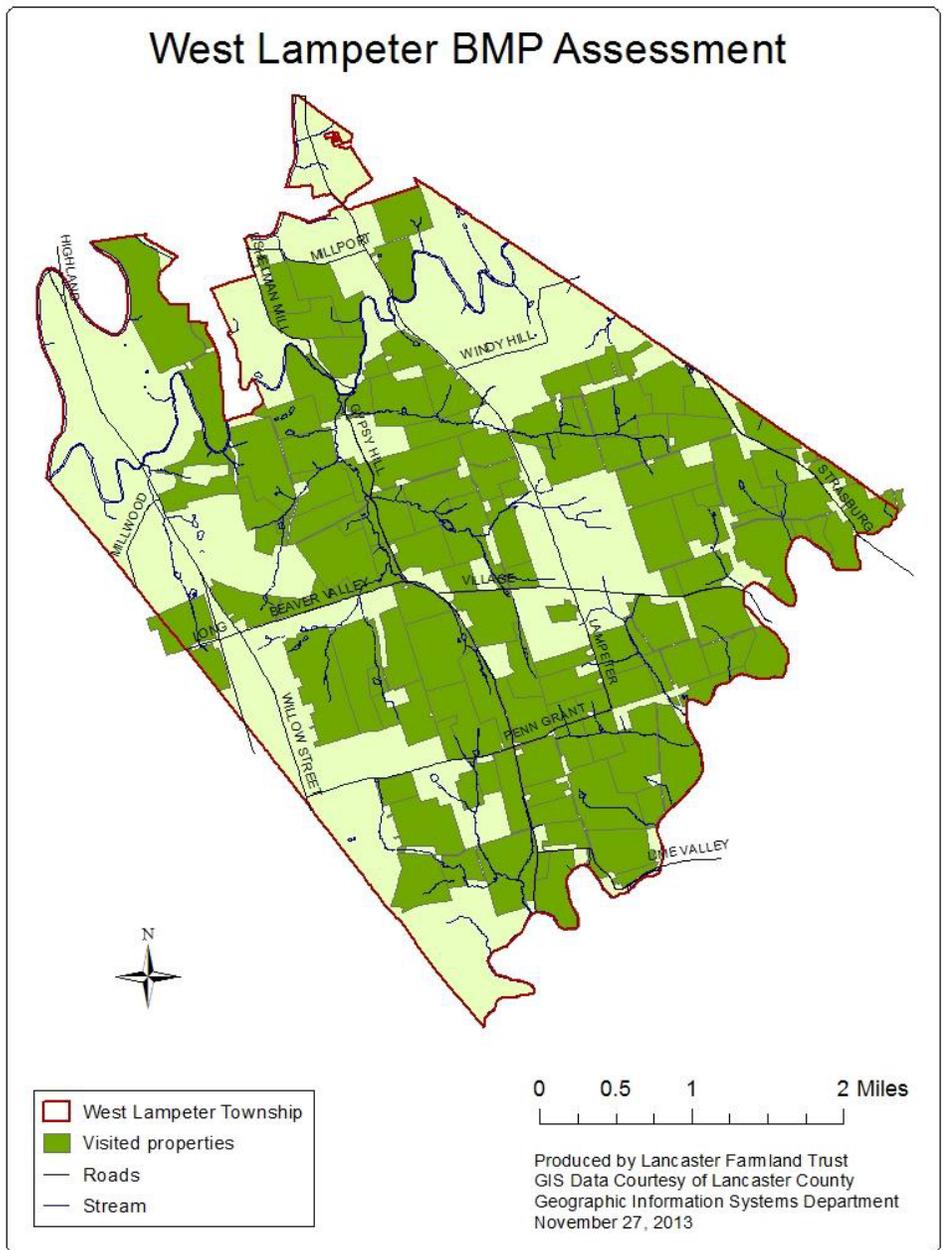
- Developed Area 398 acres
- Agricultural Area 231 acres (37% of MS4)

West Lampeter's MS4 Permit and TMDL Plan

- Notice of Intent for renewal of MS4 Permit Submitted to PA DEP in Sept. 2012
- Requires Township to provide a MS4 Total Maximum Daily Load (TMDL) Plan to achieve the required reductions outlined in TMDL Plan for Pequea Creek (2006)
 - **Phosphorus** Reduction **57%**
 - **Sediment** Reduction **83%**

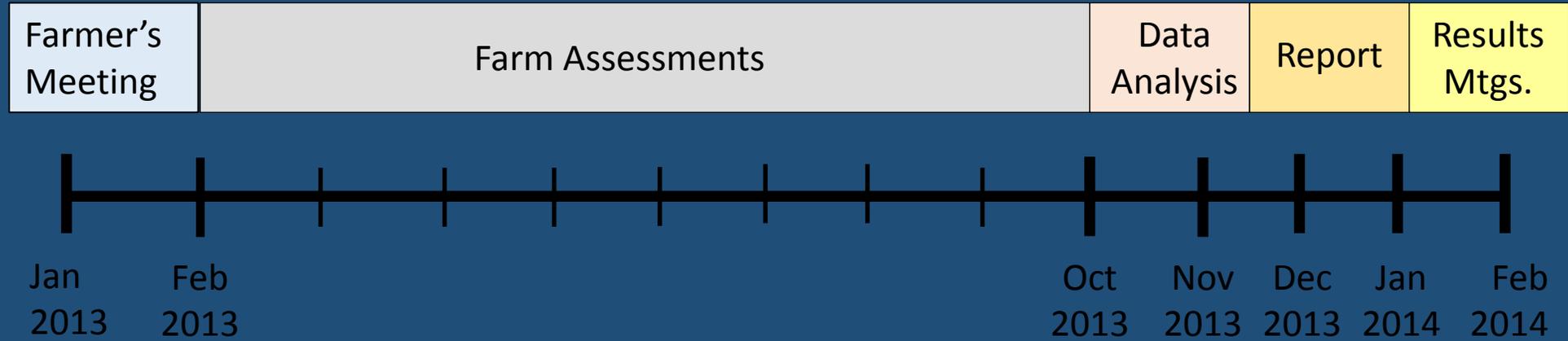


Identified Properties



93 properties
visited

West Lampeter Township BMP Assessment Timeline



THE WEST LAMPETER
BEST MANAGEMENT PRACTICE (BMP)
ASSESSMENT PROJECT



FINAL REPORT



DECEMBER 2013

DRAFT

Results

Conservation Practices

- **2,582 acres in no-till**
- **1,316 acres of cover crops**
- **2,619 acres of contour farming**
- **38,103 linear feet of grassed waterways**
- **107,487 linear feet of terracing**

Conservation Plans/Nutrient Management Plans

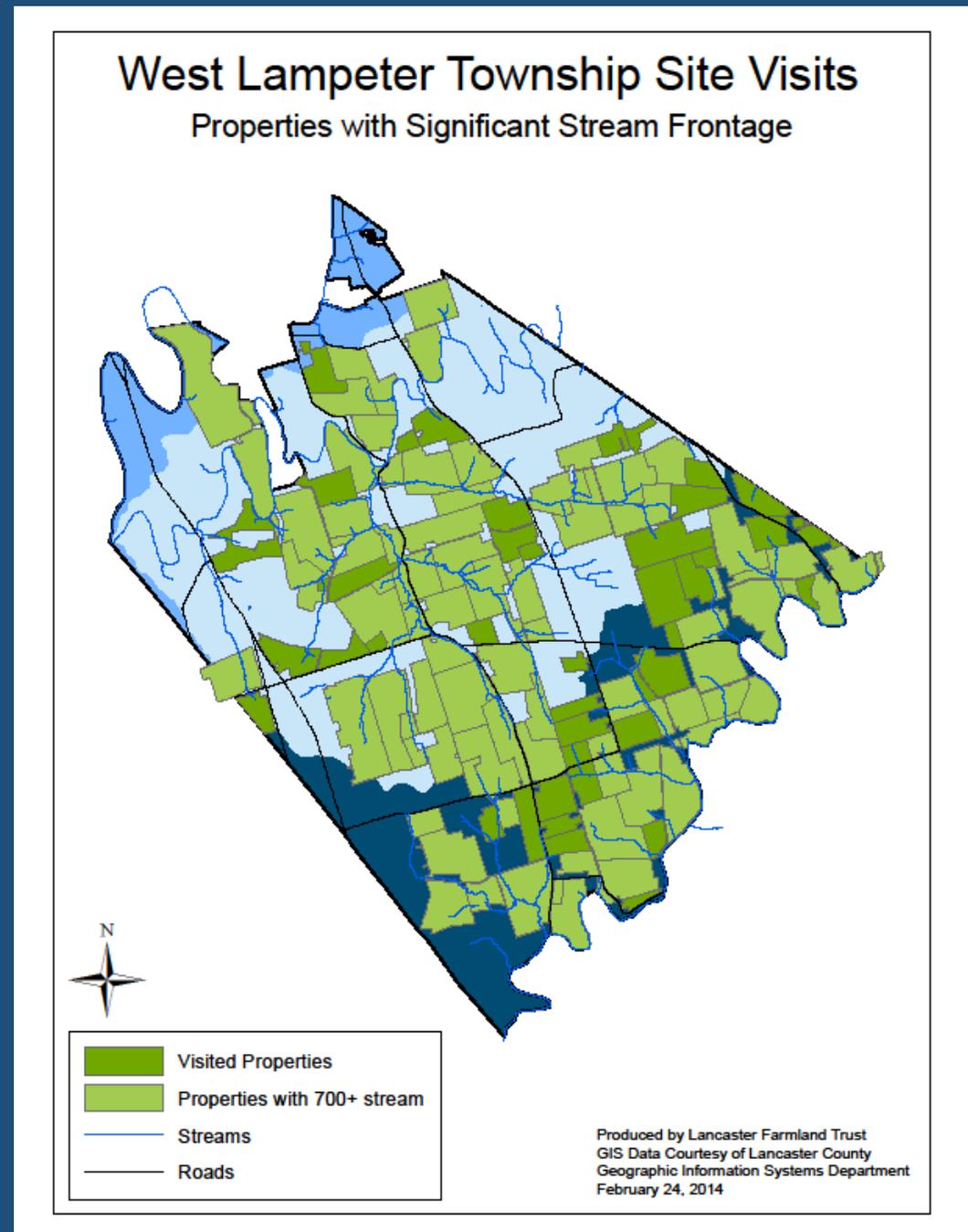
- **47% have a Conservation Plan/Ag E&S Plan**
- **53% have Manure/Nutrient Management Plan**

53% of BMPs found were NOT documented in any plan, and only 26% were implemented, accurate, and up-to-date. (21% had outdated information)

Streams on Farms

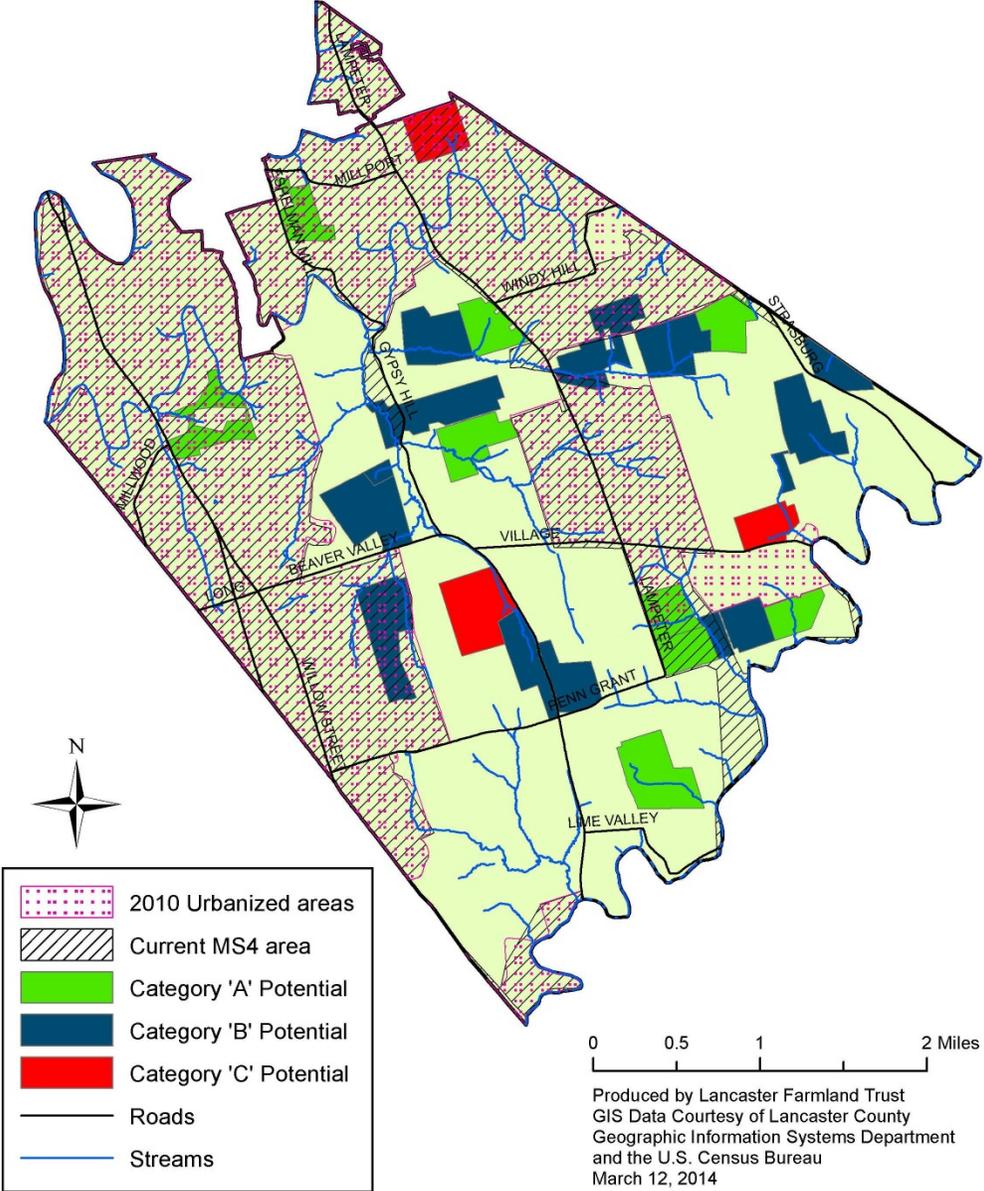
- **80% of properties have a stream**
- **63% of properties with a stream have some type of tree buffer on at least a portion of the stream**
- **59 properties (63%) have 700+ feet of stream**

AGRICULTURE IS ON THE FRONT LINES OF IMPROVING WATER QUALITY!



Future Partnership Opportunities Identified

West Lampeter Township Future Opportunities with Urbanized Overlay



PHASE II: Planning, Compliance, and Implementation

- Design possible BMPs to implement
- Follow up with farmers to have discussion about their future plans and implementation goals
- Create local Conservation Plan cost-share program (\$250/plan)?
- Match \$\$\$ for partnerships: National Fish and Wildlife Foundation (NFWF) grant to get farmers in compliance AND go above baseline (CIP program)
- Started water quality sampling on the Pequea

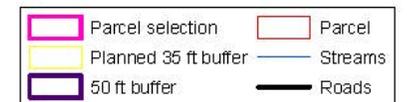


Property Address:
Account Number:
Owner name:



Stream Length: 2,594 ft
Buffer:
35 ft Buffer: 4.17 ac (planned)
50 ft Buffer: 5.96 ac

0 250 500 1,000 Feet



Other Ways to Utilize Baseline Information

Baseline information can be used for modeling

- To get accurate picture of ground conditions for better results



LFT using BMP Assessment information in East Lampeter Township to enter data into MapShed. LandStudies contracted to do the work.

Aggregate Results from 6 Municipal BMP Assessments

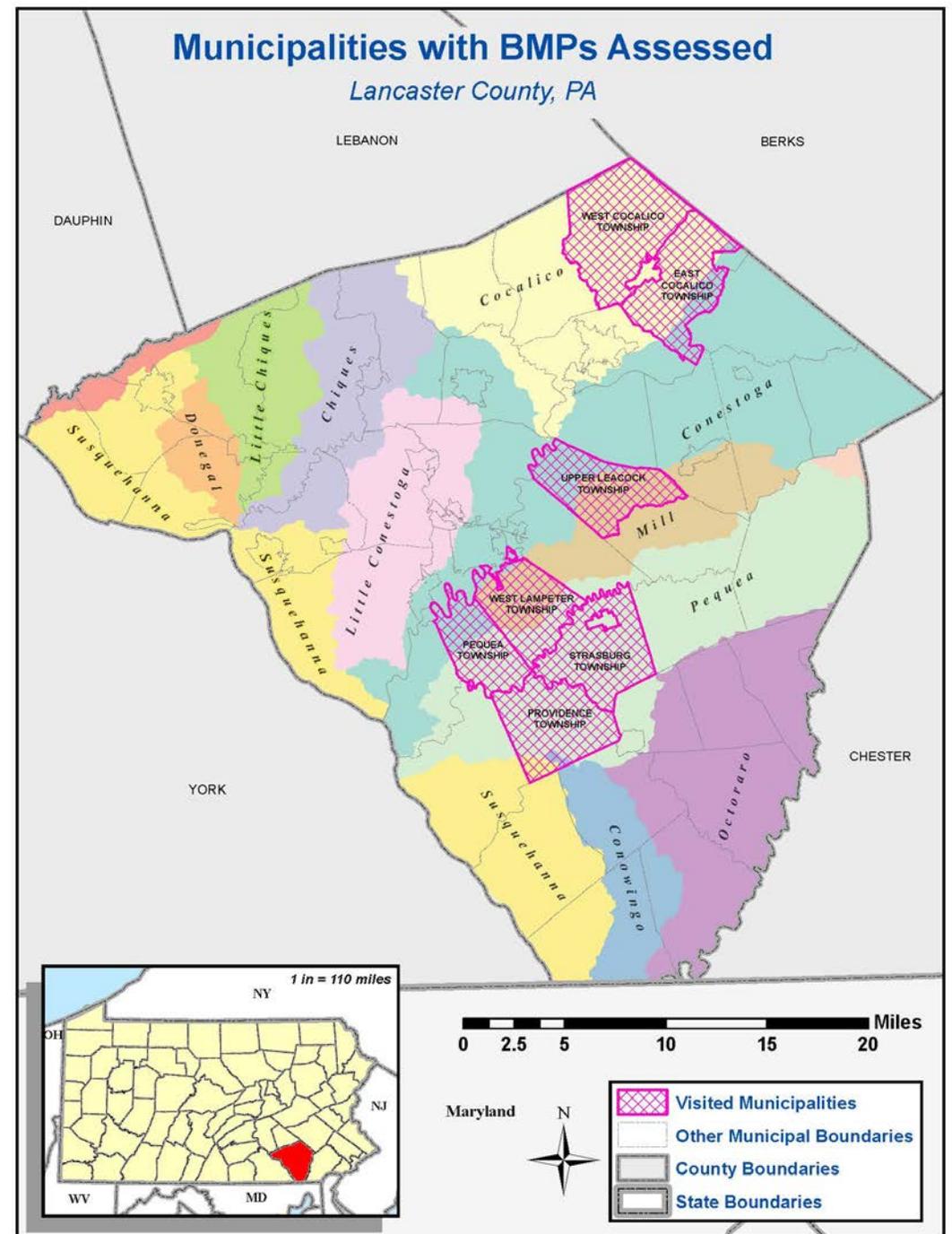
- West Lampeter Township
- Strasburg Township
- Pequea Township
- Providence Township
- Portion of Upper Leacock Township
- East Cocalico Township
- West Cocalico Township (50% complete)
- East Lampeter Township (just starting)

1,041 farm visits total

Total current reporting:

693 farm visits

Totaling 30,595 acres



MS4 Areas – East Cocalico

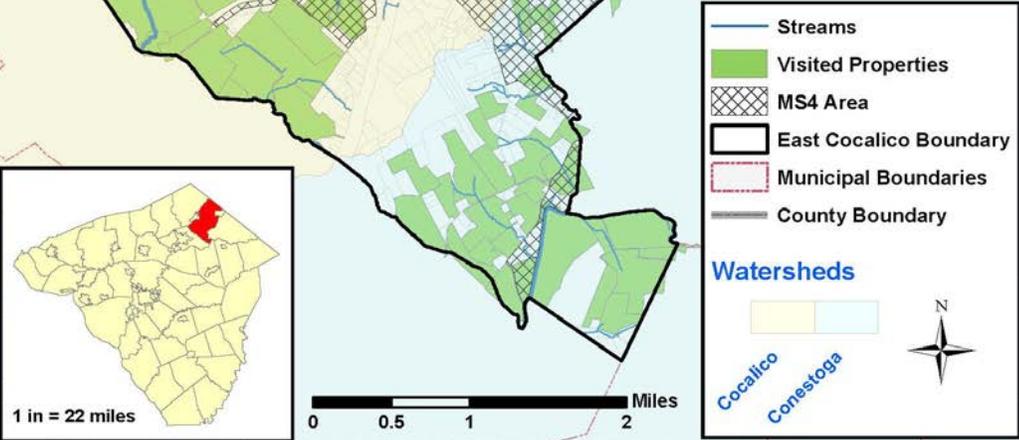
East Cocalico Twp's
TOTAL MS4 area is
6,509 acres

Visited Acres in MS4
2,197 acres
(34%)

East Cocalico Township

BMP Inventory Visits, MS4 Areas,
and Watersheds

BERKS
COUNTY



MS4 Areas – Pequea Township

Pequea Twp's TOTAL MS4 area is 6,316 acres

Developed area
1934

Non-Developed area (Ag/Open Space/Woodland)
4517 (71%)

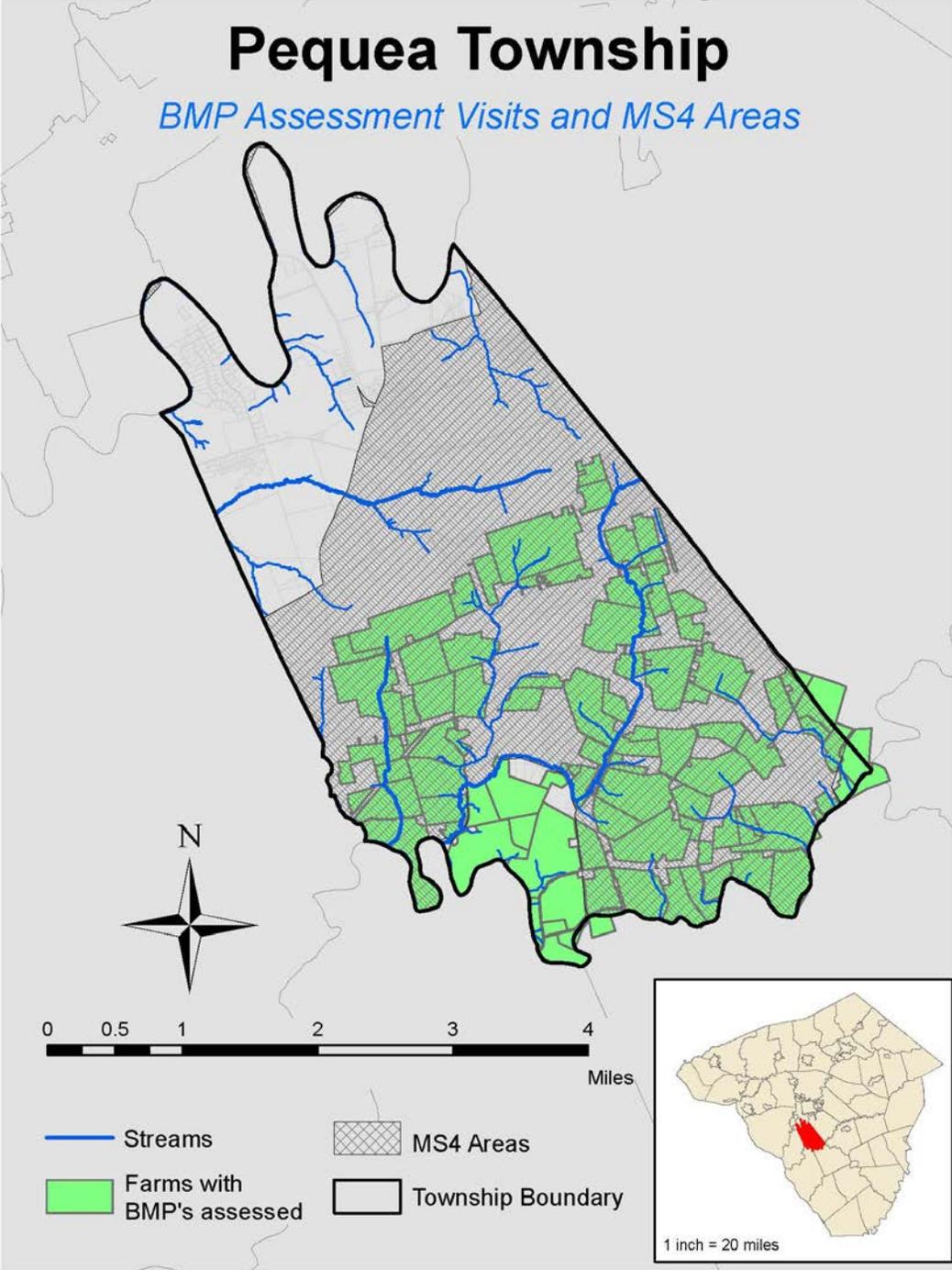
In the Pequea Creek Watershed (where visits were performed):

Total acreage
4568

Developed area
1487

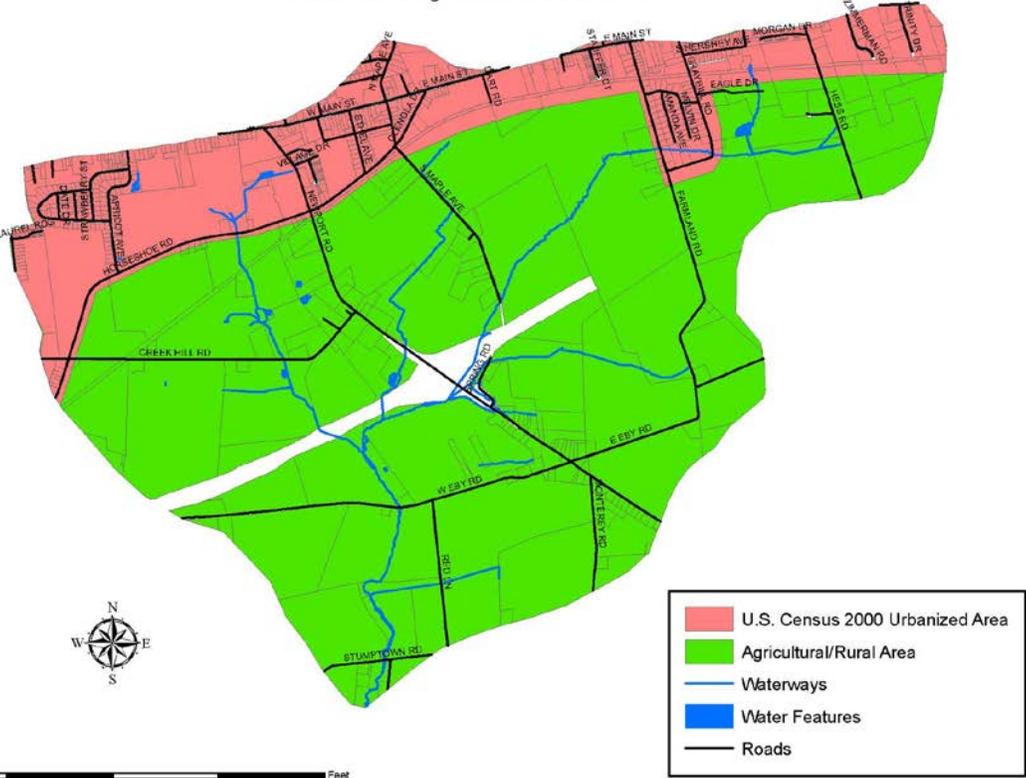
Non-Developed area (Ag/Open Space/Woodland)
3081

Opportunity acres
2,425 acres (53%)

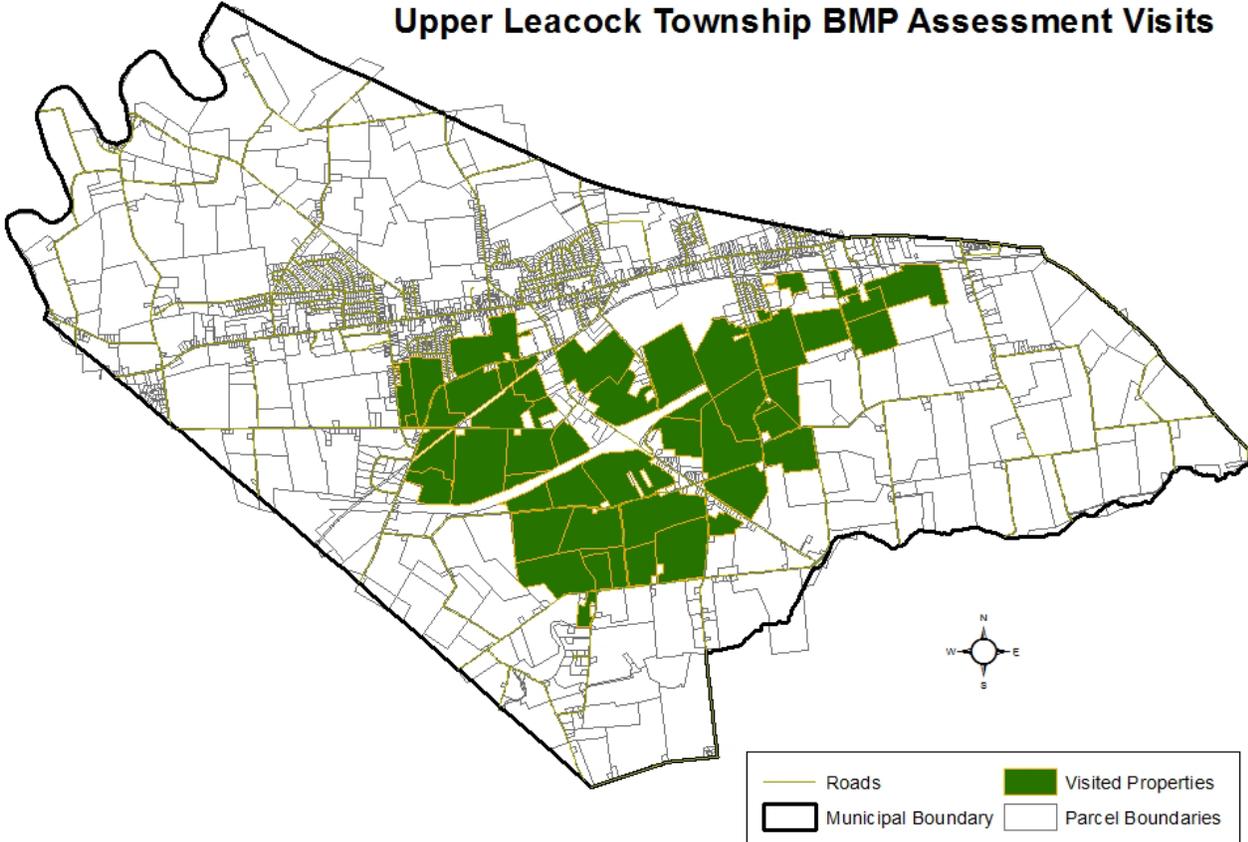


MS4 Areas – UNT to the Mill Creek, Upper Leacock Township

UNT Mill Creek Watershed
Upper Leacock Twp., Lancaster Co. PA
Urbanized & Agricultural/Rural Areas

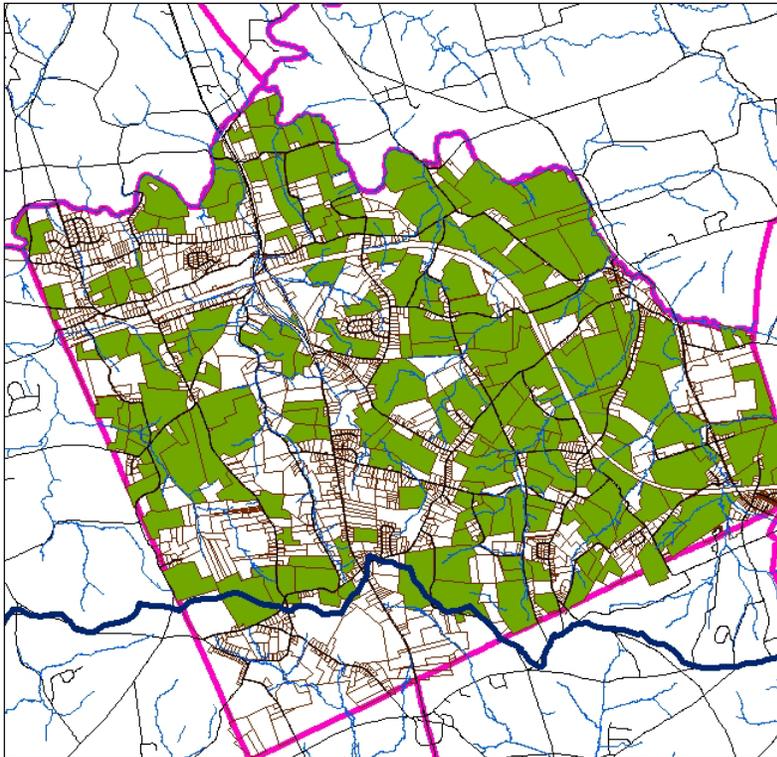


Upper Leacock Township BMP Assessment Visits

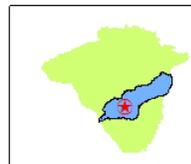


MS4 Areas – Providence Township

Providence Township Visits



- Pequea Creek Watershed
- Streams
- Providence Township parcels
- Providence Township visits
- Municipal boundaries



Map produced by Lancaster Farmland T...
GIS Data Courtesy of Lancaster County
Geographic Information Systems Department
April 9, 2014

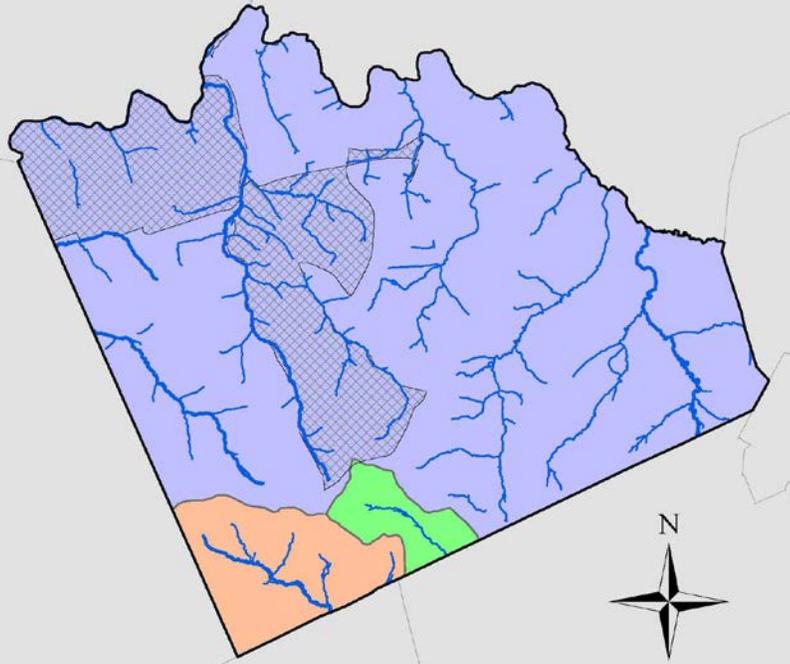
Providence's MS4 area is
3,473 acres

Developed area
1,615 acres

Non-Developed area
(Ag/Open
Space/Woodland)
1,858 acres (53%)

Opportunity Acres
997 acres (29%)

Providence Township
Watersheds and MS4 Areas

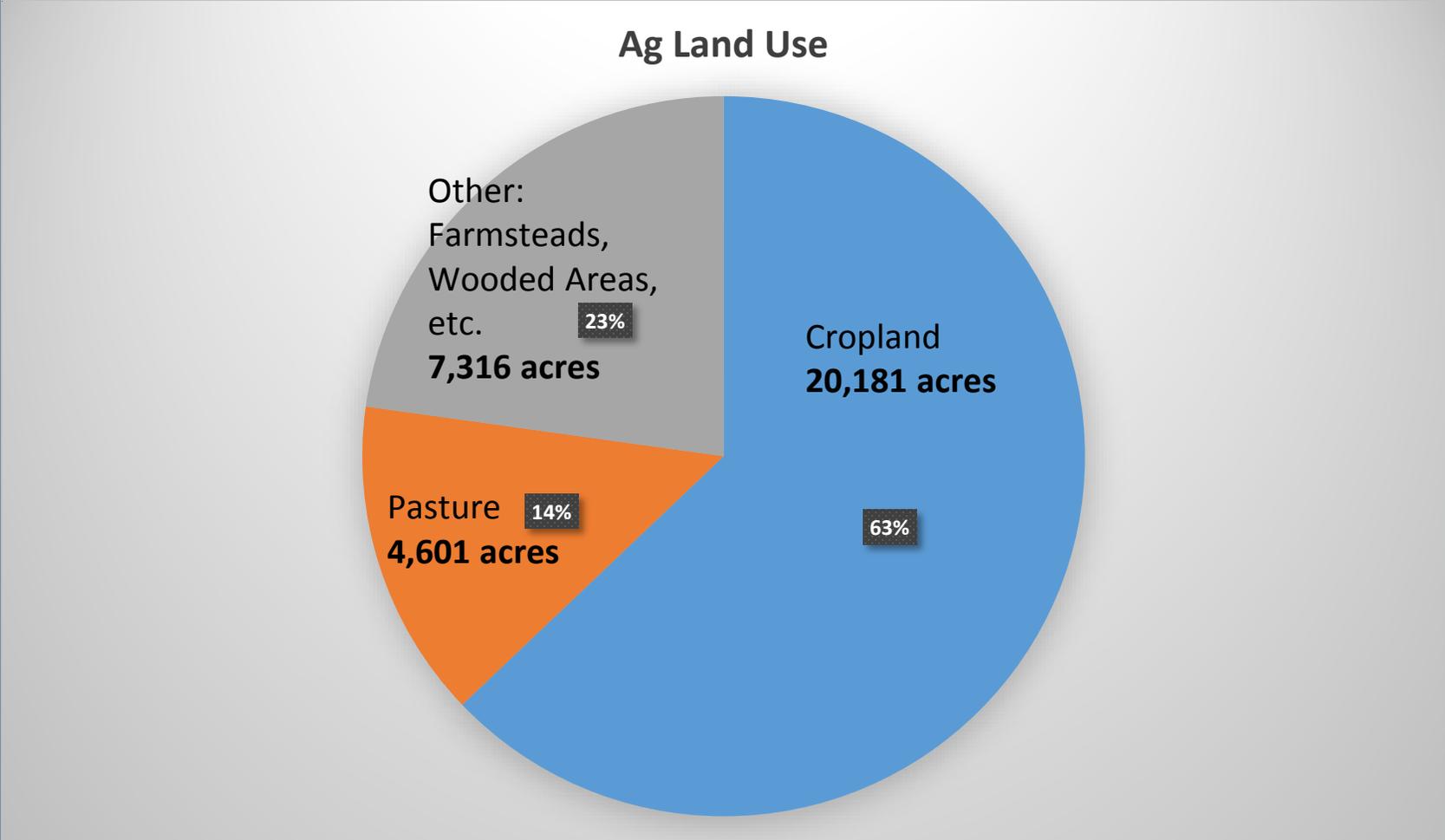


0 0.5 1 2 3 4 Miles

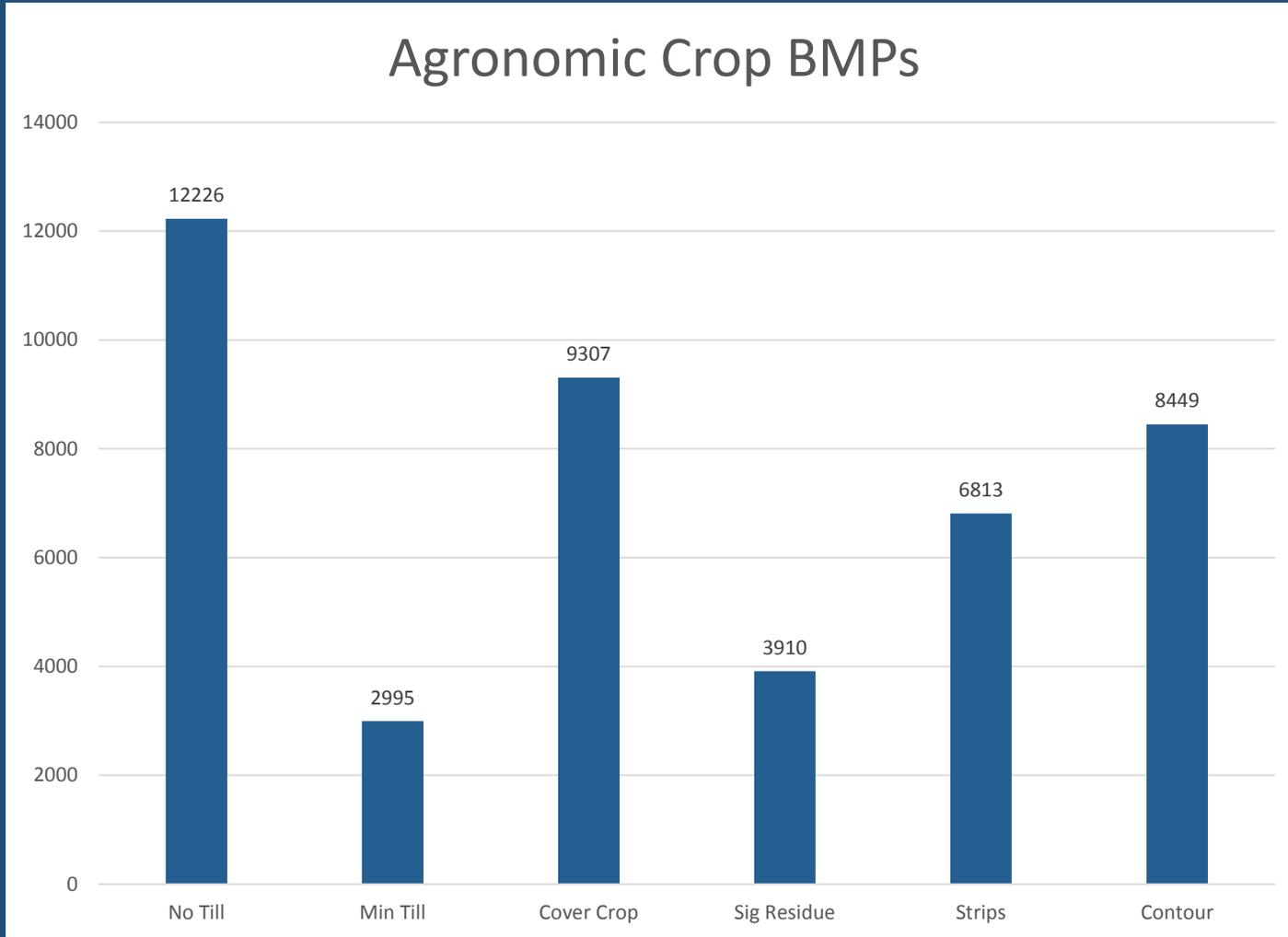
Watersheds		Streams	MS4 Areas	Township Boundary
	Conowingo			
	Pequea			
	Susquehanna			



Aggregate Data – 6 Municipalities Reporting

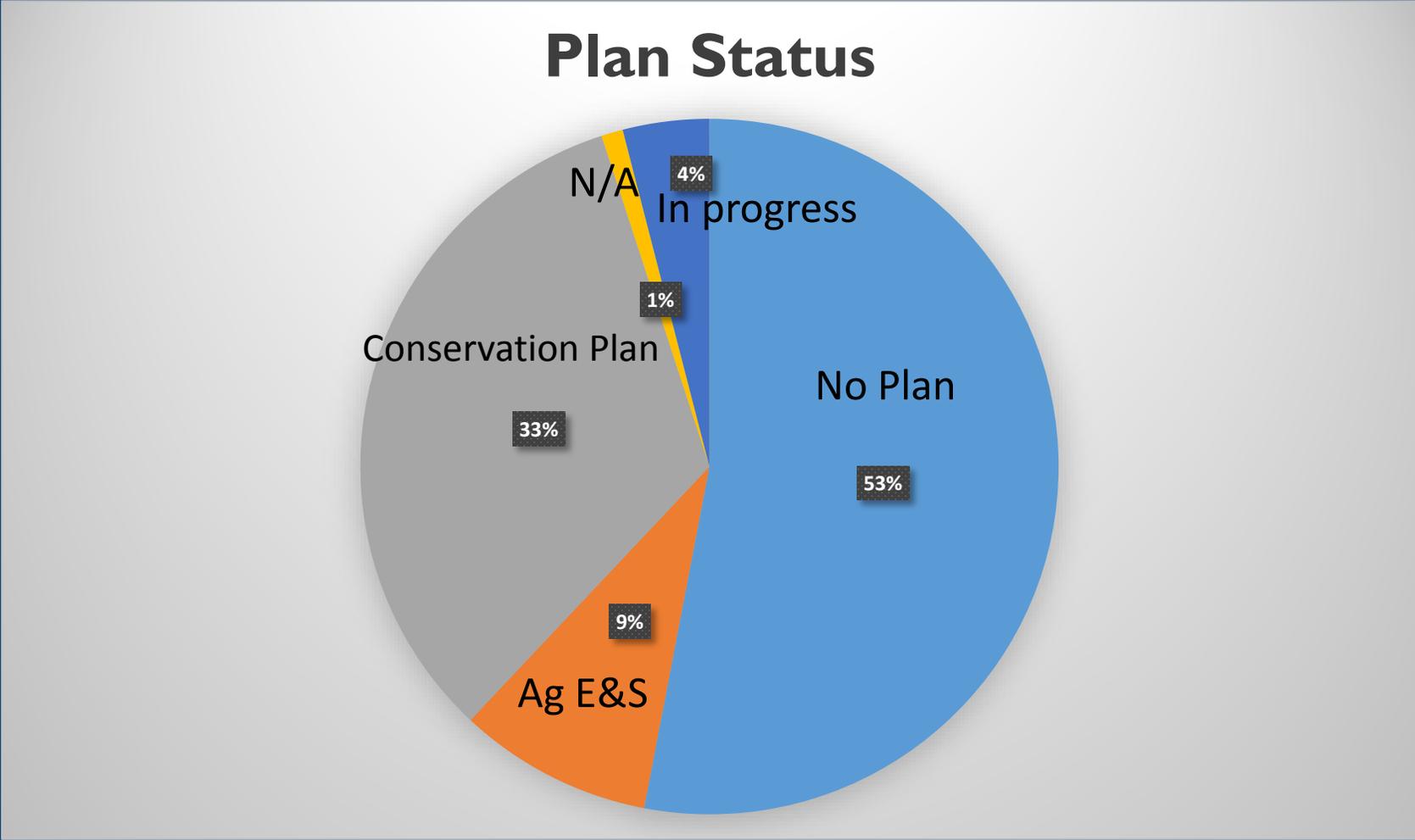


Aggregate Data – 6 Municipalities Reporting



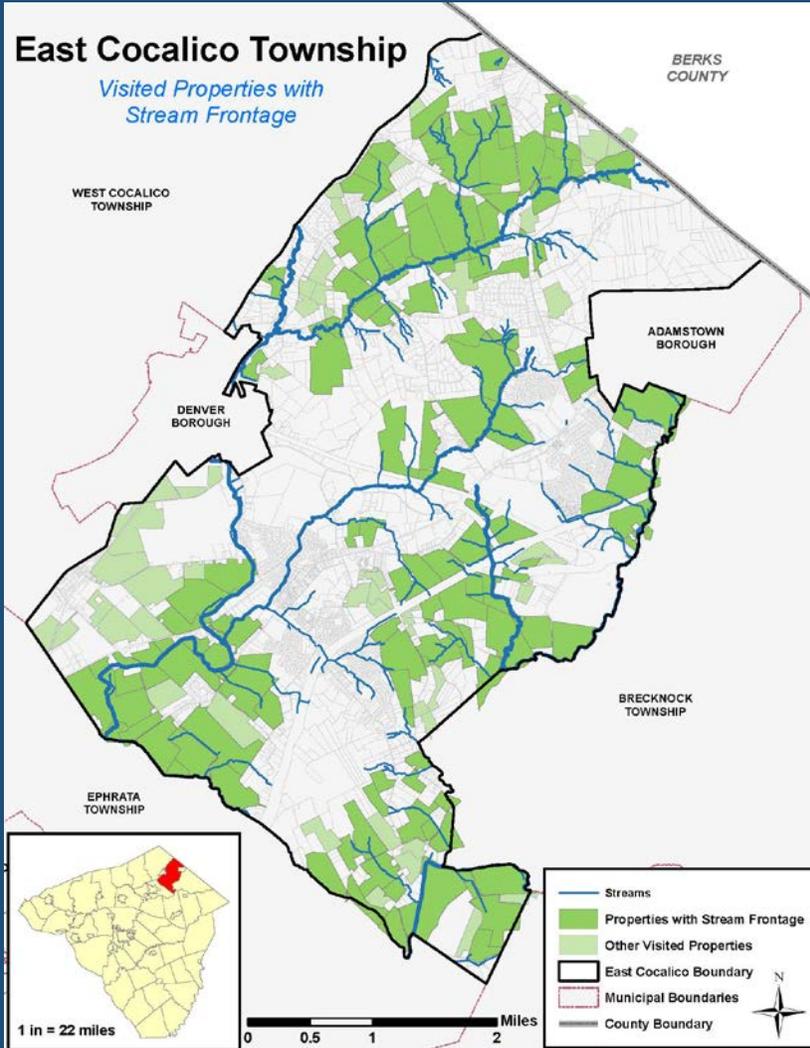
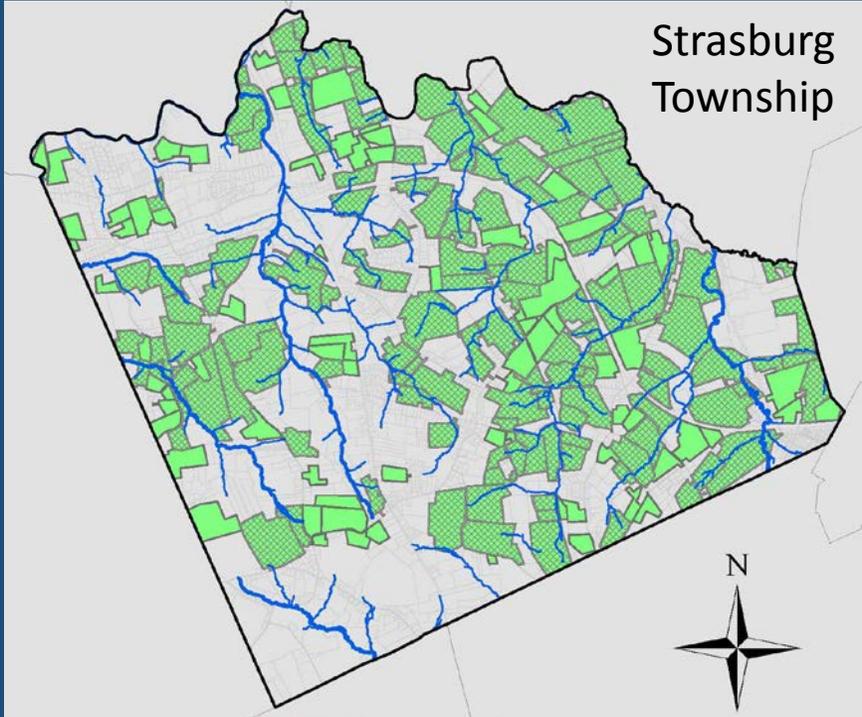
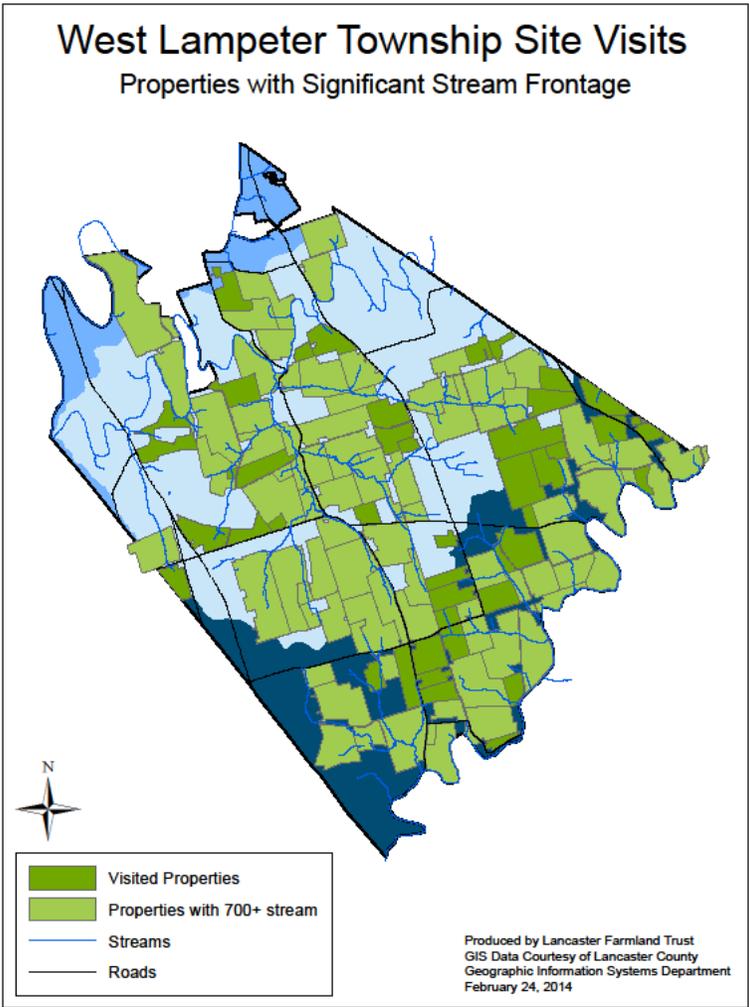
- Over 60% of cropland is no-till
- Over 46% of cropland is cover cropped

Aggregate Data – Status of Plan – 6 Municipalities Reporting



Aggregate Data – Stream Frontage – 6 Municipalities Reporting

Almost 70% of properties visited had some type of stream frontage (69.6%)



Aggregate Data – Manure/Nutrient Mgt– 6 Municipalities Reporting

Manure/Nutrient Management Compliance Percentages

58% in compliance



Challenges/Barriers to Approach

- Information sharing (data collector to Conservation District/NRCS)
- Private Funding
- Offset policy
- Functional equivalents

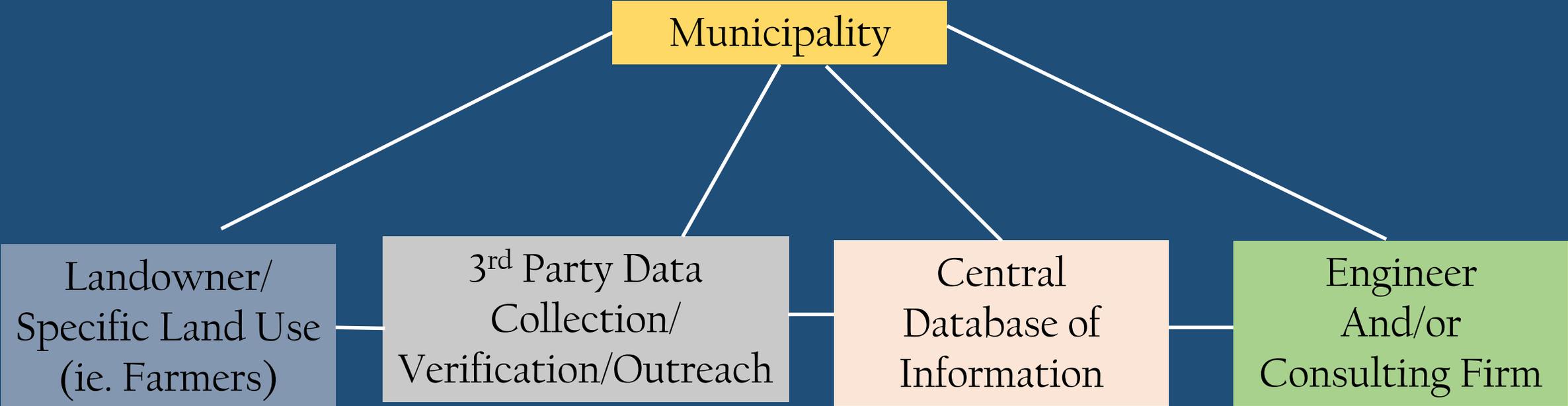


Challenges/Barriers to Approach

- Site-specific BMPs
- Recognition of multiple benefits of floodplain restoration
 - Creation of ecosystem
 - Stormwater controls
 - Denitrification system
 - Removal of sediment
- Having municipalities understanding the value and cost-effectiveness of BMPs
- Working on a watershed basis
 - Water knows no municipal boundary
 - Thinking and working together collaboratively CAN make the difference (sharing resources, planning cohesively)



A Model for Replication



QUESTIONS?

Stephanie Smith Armpriester
Municipal Outreach Coordinator
Lancaster Farmland Trust
717-687-8484

