



# Partnering with Farmers for Successful Watershed Improvement Projects

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**MONTGOMERY COUNTY  
CONSERVATION DISTRICT**

# Montgomery County Conservation District

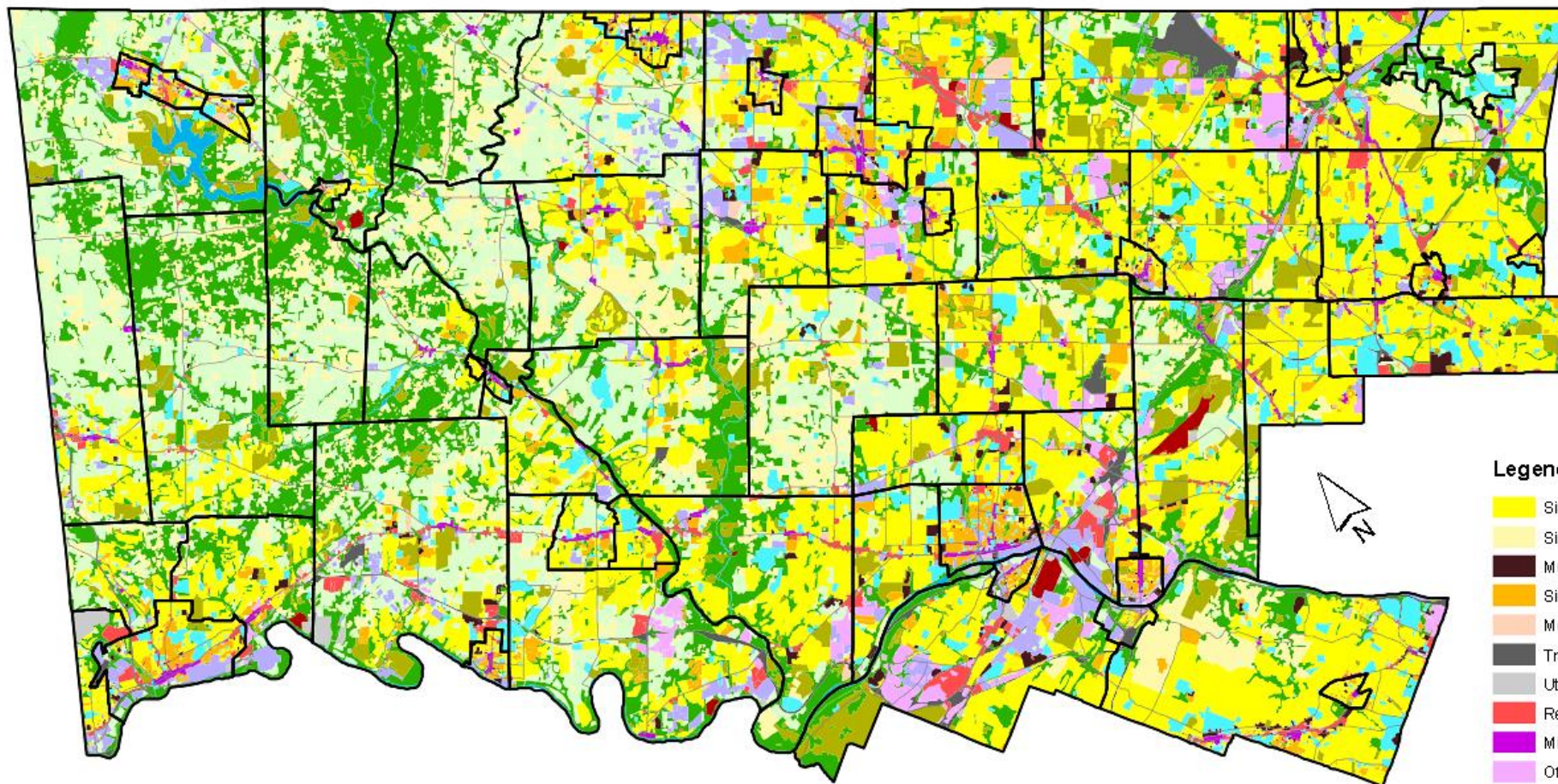
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*To protect and improve the quality of life of the residents of Montgomery County and surrounding communities by providing, in cooperation with others, timely and efficient service, education, and technical guidance for the wise use of our soil, water, and related resources.*

- 1945 Conservation District Law brought a Conservation District to every county in PA except Philadelphia.
- Each Conservation District is led by a Board of Directors made up of local people from all walks of life.



# Existing Land Use Map - 2010



### Legend

- Single Family Detached
- Single Family Detached Low Density
- Multifamily
- Single Family Attached
- Mobile Home
- Transportation
- Utility
- Retail
- Mixed Use
- Office
- Institutional
- Industrial
- Recreation and Parkland
- Wooded
- Vacant/Agriculture
- Water
- Mining

**2012 Census of Agric. total farms:**  
**Montco: 596 farms / 30,780 acres**  
**PA: 59,309 farms / 7,704,444 acres**

# Who Interfaces with Agriculture

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- Conservation Districts
- PA DEP
- USDA
- Penn State Extension
- Community- YOU!



# Why partner with farmers?

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**Agricultural nonpoint source (NPS) pollution was the leading source of water quality impacts on surveyed rivers and lakes, the second largest source of impairments to wetlands, and a major contributor to contamination of surveyed estuaries and groundwater.**

*-2000 National Water Quality Inventory*



# Water Quality Concerns from Ag Impacts

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- Nutrients
  - N,P
- Sedimentation
- Fecal coliform
- Thermal impacts
- Streambed/bank destruction
  - Effect on macros, fish





What types of pollution do you see in this photo?

# Water Quality Concerns

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# Nutrients of Importance: N, P

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N & P are crucial for farms but can be harmful to waterways.

- Nitrogen

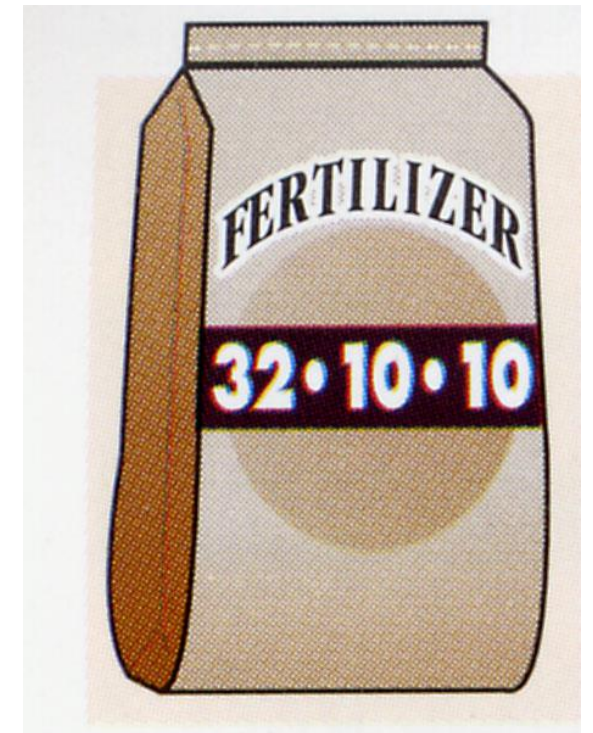
- Used by plants and animals to synthesize proteins
- Soluble in solution

(easily lost if over-applied, applied at wrong time, or not incorporated)

- Phosphorus

- Plants need to convert sunlight into energy; essential for cellular growth and reproduction
- Not soluble in solution

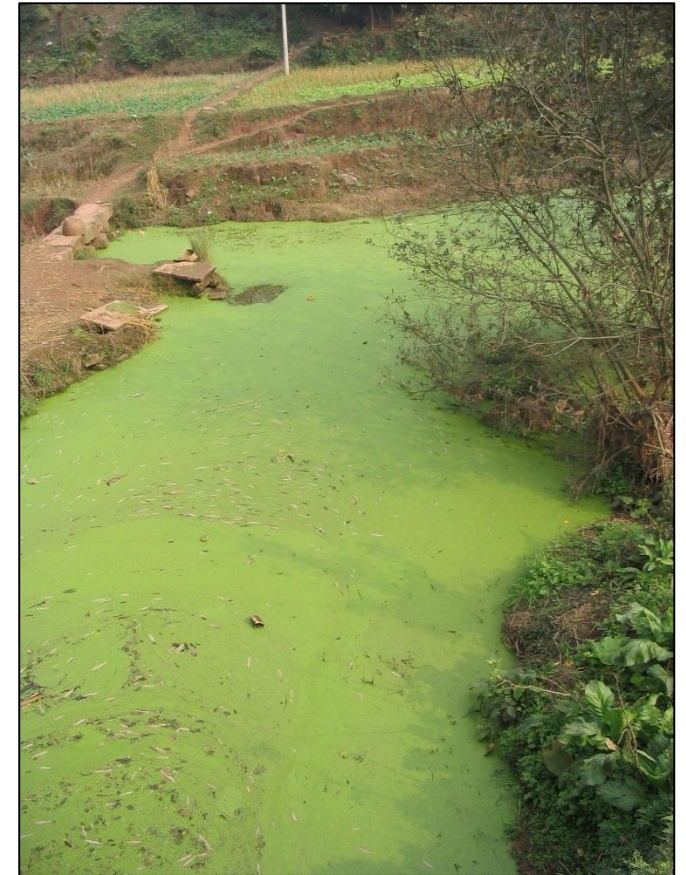
(binds to soil particles and lost through erosion)



# N & P Impacts on Water Quality

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- Algae growth
  - Eutrophication
    - Fish kills
    - Possibility for blue-green (toxic) algae/harmful bacteria growth
- Nitrogen in groundwater
  - Harmful to human health
  - Infants vulnerable to nitrates



# Sediment

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- Most prevalent source of impairment
- Turbidity
  - Destroys ecology of stream
  - Makes treatment more difficult
- Can carry other contaminants
  - Nutrients
  - Oil and grease
  - PCBs
  - Metals



# Regulations in PA

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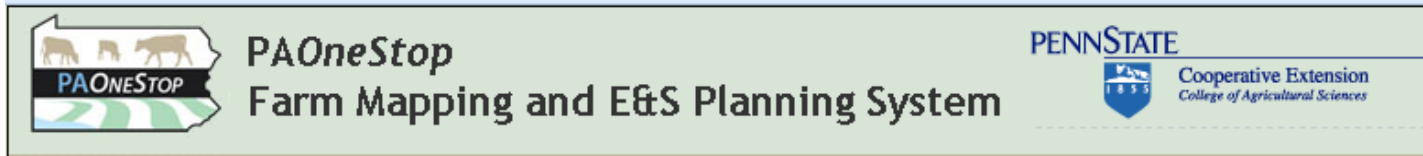
1. PA Chapter 91 (91.36) – Manure Management
2. PA Title 25 Chapter 102 – Erosion and Sediment Control
3. PA Act 38 - Nutrient Management

# PA Title 25 Chapter 102 – Erosion and Sediment Control

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- Written plan describing how soil loss will be prevented
- Applies to any farm that plows or tills more than 5,000 square feet or has an animal heavy use area
- “Meeting T”
- T = Tolerable Soil Loss (Difference between soil created and soil lost)
- Soil is constantly created and eroded naturally, but farming has potential for soil loss to exceed soil creation
- PA One Stop

# PA OneStop Farm Mapping & Ag E&S



- PAOneStop is an online tool to help farmers meet regulatory requirements for Conservation and Nutrient Management Planning.



**PAOneStop Ag E&S Report**

**Field: 1 Soil Loss: 1 T value: 3 Implementation Date: 8/29/2014**  
 County: Montgomery Soil: GsA Glenville silt loam, 0 to 3 percent slopes - Glenville Silt loam 90 percent  
 Slope (%) 4 Slope Length (ft): 180 Rock Content (%) 3

Year	Crop#	Crop	Tillage	Planting	Yield	Notes
1	1	/f/soya/cool season grass/soybean/141/yr	if no tillage	9/27		F

**BMPs**  
 Contouring: contour-systems/b. absolute row grade 2 percent  
 Strip/Barrier:  
 Diversion/Terrace:

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**Field: 2 Soil Loss: 1 T value: 3 Implementation Date: 8/29/2014**  
 County: Montgomery Soil: GsA Glenville silt loam, 0 to 3 percent slopes - Glenville Silt loam 90 percent  
 Slope (%) 7 Slope Length (ft): 140 Rock Content (%) 3

Year	Crop#	Crop	Tillage	Planting	Yield	Notes
1	1	/f/soya/cool season grass/soybean/141/yr	if no tillage	9/27		F

**BMPs**  
 Contouring: contour-systems/b. absolute row grade 2 percent  
 Strip/Barrier:  
 Diversion/Terrace:

# PA Chapter 91 (91.36) – Manure Management

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- Requires everyone who produces, imports or spreads livestock manure to develop and implement a written manure management plan & keep records
- Plan focusses on where manure is applied, to what crops, when it is applied, and in what quantity
- Goal: Keep manure on field and out of waterways
- Manure is a fantastic fertilizer when handled properly
- Overseen by PA Department of Environmental Protection and State Conservation Commission

# PA Act 38 - Nutrient Management

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- Require all Concentrated Animal Operations to develop and implement a plan for the safe utilization of the manure
- CAOs
  - Farms with more than two animal equivalent units (AEUs) of livestock per acre available for manure application
  - An AEU = 1,000lb of livestock on an annualized basis
- Must have a nutrient management plan prepared by a certified nutrient management specialist
- Overseen by PA Department of Environmental Protection and State Conservation Commission



# Challenges to Meeting Regulations

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- Equipment
- Cost
- Need for continued education
- Cultural beliefs
- Habit
- Crop yields → Bottom line



# On-Farm Pollution Potential

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## In the Barnyard

- Heavy use area location
- Stormwater management
- Manure storage

## In the Pasture

- Overgrazing
- Stream access

## On the Field

- Plowing too often or at the wrong time
- Improper/poorly timed application of pesticides, manure and fertilizer
- Tillage erosion

# Ag BMPs

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Best management practices (BMPs) are practical and cost-effective methods to achieve pollution reduction while making the optimum use of the farm's resources.

Goal:

BMPs are designed to benefit water quality and water conservation while maintaining or enhancing agricultural productivity.

# Management BMPs

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- Follow soil test recommendations

*“If soil test calls for 50lb/ac, I should apply 100lb/ac to be safe, right?”*

- Consider livestock turnout and grazing pressure during touch growing conditions
- Consider field conditions before running equipment

# Cropland BMP: Grassed Waterway

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- Diversion intercepts runoff upslope and conveys it to a stable waterway
- Slows water velocity and reduces erosion
- Conveys stormwater to stable outlet

# Cropland BMP: Cover Crops

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- Stabilize soil
- Intercept rain drop impact on soil
- Increase soil organic matter
- Improve soil structure
- Facilitate soil microbial action
- Increases N fixation
- Helps to retain nutrients in soil



Farmprogress.com

# Cropland BMP: Conservation Tillage

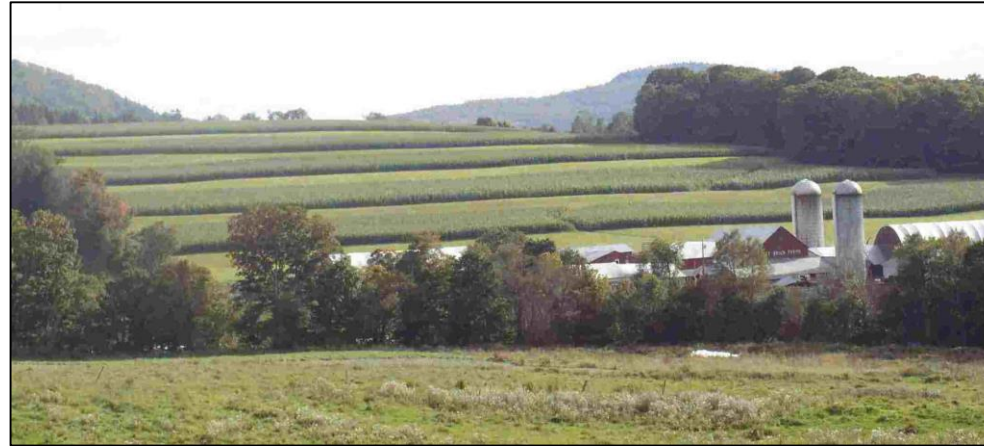
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- No-till or reduced tillage reduces need to turn soil
- Crop residue and roots left to decompose naturally
- Improves soil structure and quality
- Reduces erosion
- Increases soil microbes
- Retains soil moisture longer in summer



# Cropland BMP: Terrace

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- Earthen ridges and channels constructed across-the-slope to collect runoff from the area above
- Can be designed to channel excess water into grass waterways or direct it underground to drainage tile



# Cropland BMP: Contour Farming

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- Tilling sloped land along lines of consistent elevation, perpendicular to the slope
- Changes direction of runoff from directly downslope to across the hillside
- Reduced velocity, reduces soil loss through erosion



# Livestock BMPs: Roof Gutters

- Divert clean water
- Collect/filter dirty water



# Livestock BMPs: Manure Stacking Pad/Storage



Stacking Pads



Liquid Storages/Ponds



Composting Pads

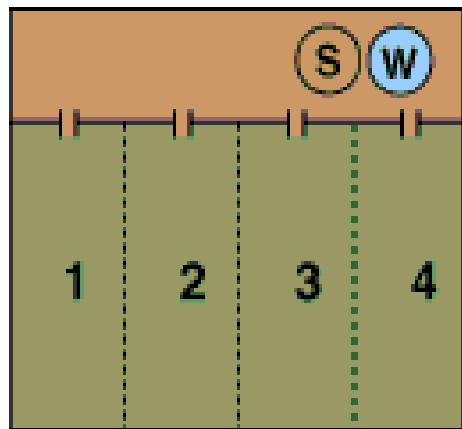
# Livestock BMPs: Livestock Exclusion Fencing/Crossings

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# Livestock BMPs: Grazing Management

- Following a NRCS grazing plan or managing pasture for dense vegetation: minimum height of 3”
- Overgrazing depletes the grass to a height at which the grass cannot survive
- Carbohydrates are stored in the first 2-3” of the stem. When overgrazed, plant can't carry out photosynthesis and, therefore, dies



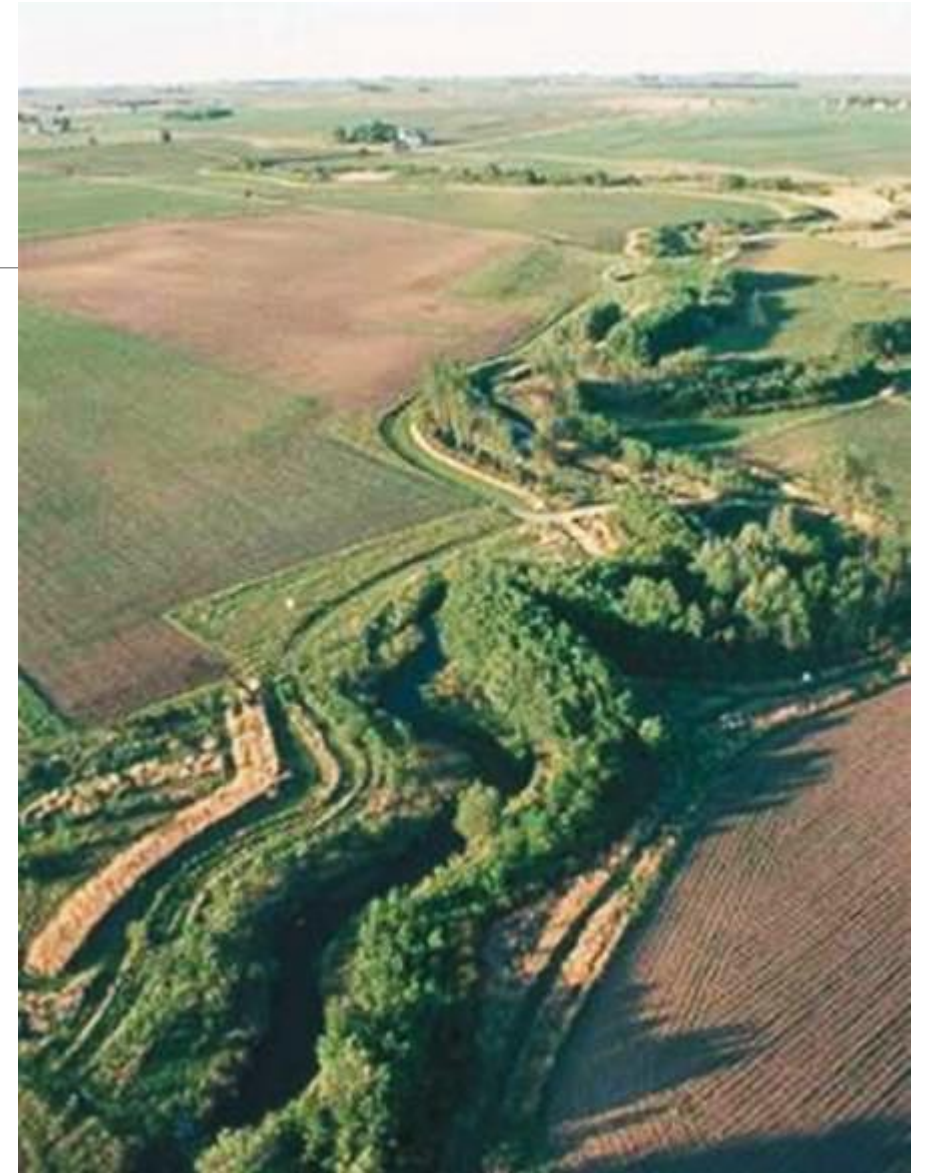
# THE ULTIMATE BMP: Riparian Buffers

## Benefits

- Reduce the amount of nutrients and sediment reaching the stream
- Help to process contaminants
- Limit animal access to streams
- Provide wildlife habitat on the farm

## Benefits to farmer

- Reduces manure application setback
  - 100' of stream but 35' exception with an established buffer
- Provide shade for animals
- Windbreaks



# 5 Steps for Forming Successful Farm Partnerships

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1. Find a willing, invested landowner.
2. Perform site evaluation to identify all resource concerns and educate landowner.
3. Recruit technical assistance from Conservation District; look for potential partnerships.
4. Design plan for property to “achieve pollution reduction while making the optimum use of the farm’s resources.”
5. Apply for funding.

# 1. Partnering with Farmers-Landowners

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- Project will be best received if the resource concern is also affecting the farmers' operation
- Important to consider farmers' goals and land use needs
- Aesthetic value of land is often a low priority of a farmer
- Proposed solutions need to be feasible for the operation!
  - Ex: May not be able to fence out animals if no alternative watering source is available



## 2. Site Evaluation

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- Inspect concerns of farmer; then ask to tour the rest of the property.
- Point out resource concerns and explain. Provide educational materials.
- Invite CD Ag Specialist



It is illegal to allow erosion gullies to form. A 'gully' is defined as an un-vegetated channel of conveyance that is too big for a tractor to drive over.

# 3. Recruit Technical Assistance and Partners

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## Conservation District

- Site visit; I&E/Resource Concern Inventory
- Knowledge on regulations & compliance
- PACD engineering assistance programs

## Penn State Extension

- Soil testing
- Technical assistance
- Research based practical ag information

## NRCS

- Technical & financial assistance for Farm Bill programs
- Project design & design specs
- Engineering of BMPs



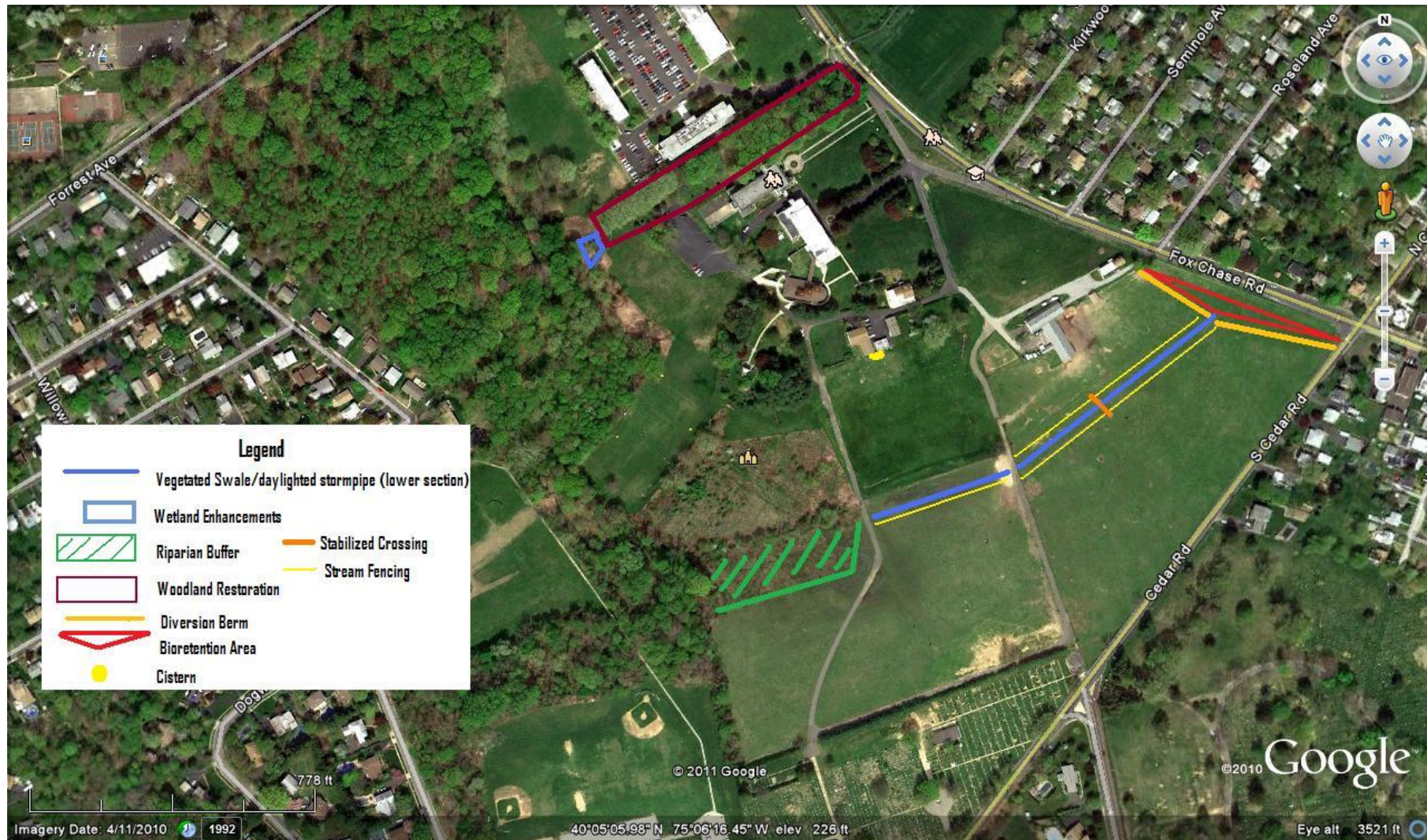
# 4. Design Plan/Select BMPs

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- Consider all goals of project:
  - Water quality improvements
  - Habitat restoration, preservation
  - **Farmer's goals**  
(*e.g.* crop yield, soil conservation, pasture improvement)
- Must consider land use and feasibility for farmer!
  - Case Study: St. Basil's Equine Operation



# Initial Plan



Designed by engineers based on watershed modeling, restoration goals only.

# Final Plan



Currently in construction!

# Bringing Farmers into Regulatory Compliance

As a result of the St. Basil's project:

- Completed Ag E&S and Manure Management plans (required)
  - Require filter strip around HUA
  - Improved spreading practices
  - Better record-keeping
- Addressed landowner concern
- Recommended additional BMPs
  - Tarp for manure pile



# 5. Apply for Funding

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## Conservation District Programs

- Resource Enhancement and Protection (REAP)

## NRCS cost-share programs

- Environmental Quality Incentives Program (EQUIP)
- Conservation Reserve Program (CRP)

## Grant Opportunities

- DEP Growing Greener/ Section 319
- CFA Watershed Restoration Grants
- William Penn Watershed Protection Grants (Middle Schuylkill Cluster!)
- TreeVitalize Watersheds (for preserved properties)



# Conclusions

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- Farmers can be great partners for watershed improvement projects!
- Farms can have great potential for watershed protection and restoration.
- There is a suite of BMPs farmers and partners can implement to protect water quality AND improve farm operations.
- Conservation District Ag Specialists are here to help!





# Contact Information

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