Animal Waste Update

Doug Parker
University of Maryland
dparker@arec.umd.edu

Non-Point Water Pollution

- Increasing concern that poultry litter on the Delmarva Peninsula (Delaware, Maryland and Virginia) causes nutrient pollution to the Chesapeake Bay.
- Majority of poultry litter applied to land as a source of nutrients for crop production.
- 1996 survey: 2/3rds Delmarva poultry growers transfer some poultry litter off-farm.
- Water Quality Concerns Prevalent in Other States.
- Water Quality Concerns Surpass Concerns About Poultry Litter to Include Other Animal Manures and Commercial Fertilizer.

Regulatory Response

- Federal CAFO Rules for Large Operations
- All CAFOS to Create and Implement a Nutrient Management Plan
- Does Not Regulate Manure and Commercial Fertilizer Use On Farms That are Not CAFOs
- Does Not Regulate the Use of Exported Manures
- Encourages Voluntary Adoption of Nutrient Management Plans for All Farms through NRCS

Regulatory Response:
Maryland's Water Quality Improvement Act of 1998

- All Crop Growers (>$2,500 Revenue)

  -All Crop Growers Have and Implement a Nutrient Management Plan

  -Soil Test and P-Site Index Determine Type of Nutrient Management Plan
    -Nitrogen Based (N-Based)
    -Phosphorus Based (P-Based)

  -Controls the Use of All Nutrients
    -Animal Manure and Commercial Fertilizer

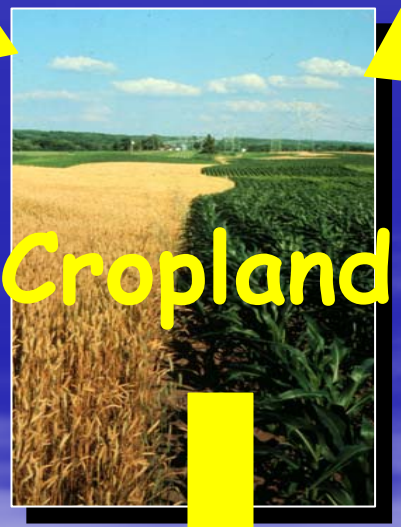
Delaware and Virginia Responses

- Require Nutrient Management Plans for All Poultry Operations
- Voluntary Plans for Other Users of Nutrients

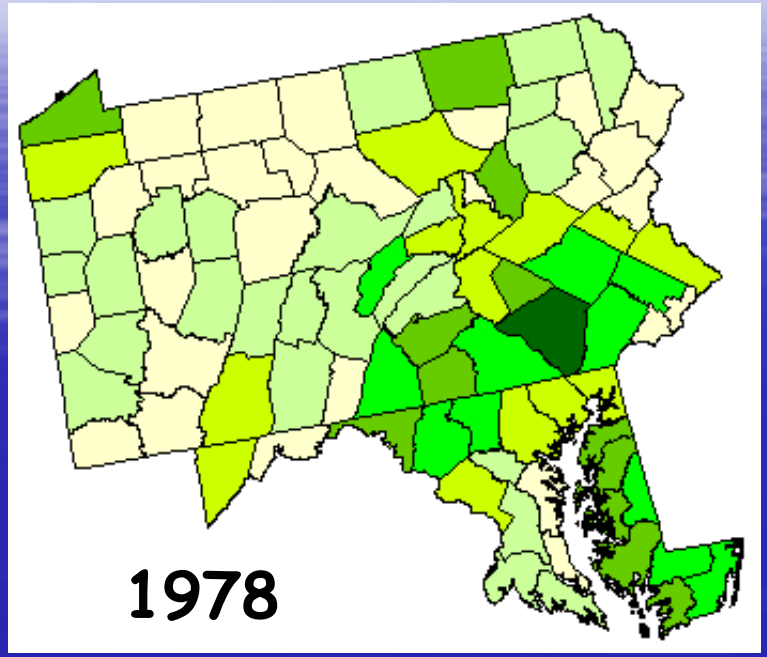
Nutrient Management Planning

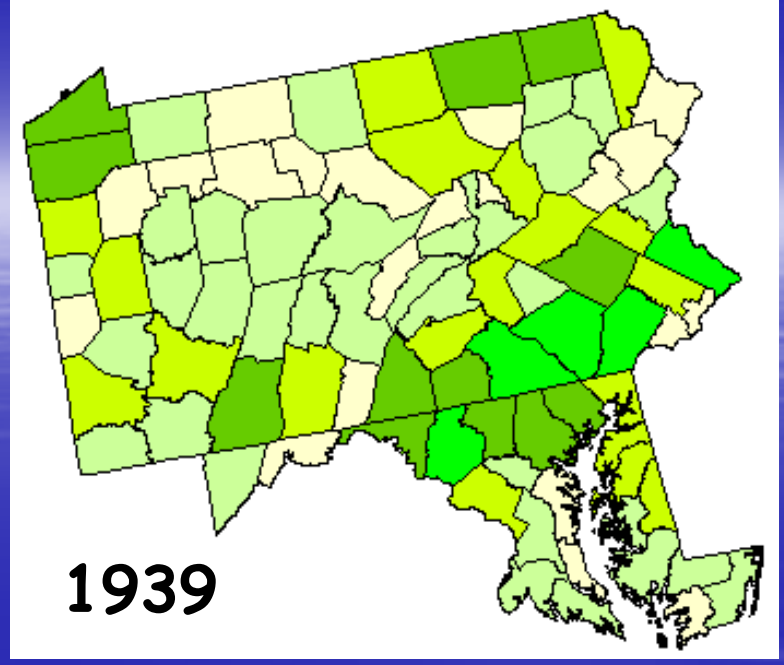
- Reintegrates On-Farm Nutrient Flows
  - Credit Nutrients in Manure
  - Set Realistic Yield Expectations
  - Analyze Manure Nutrient Levels
  - Value Manure for its Crop Nutrients
  - Nitrogen Based Planning
  - Phosphorus Based Planning
- Will Nutrient Management Planning Lead to Excess Manure in the Region?

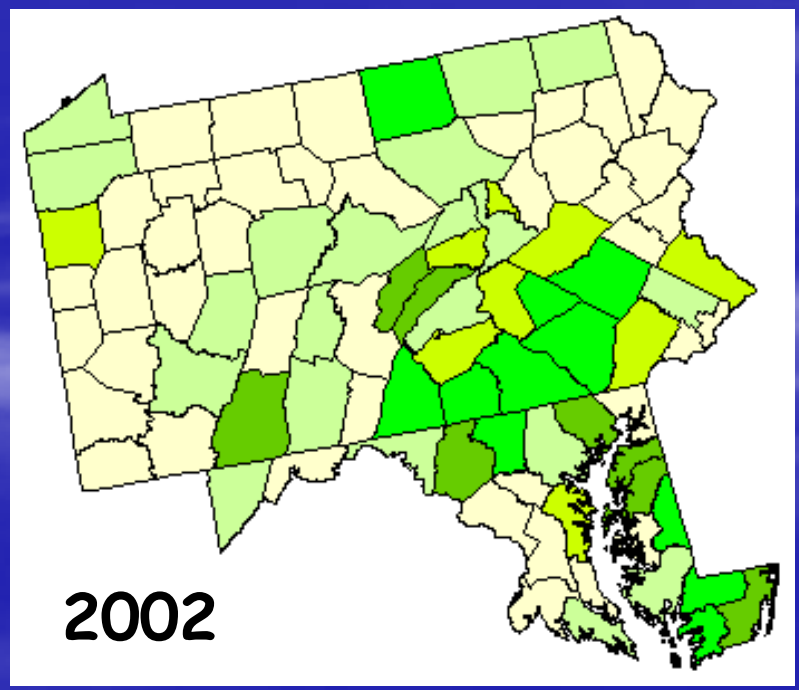
Cropland Pathways



County P Balance





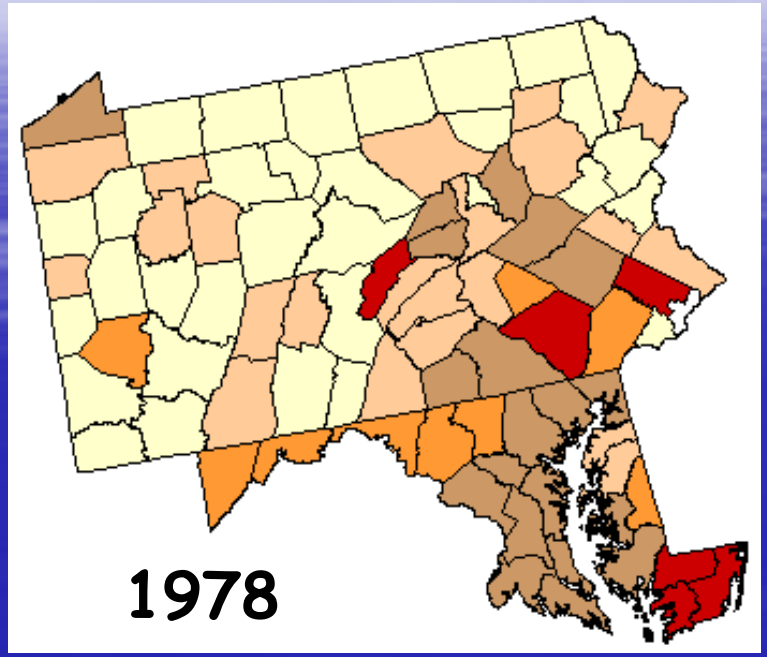


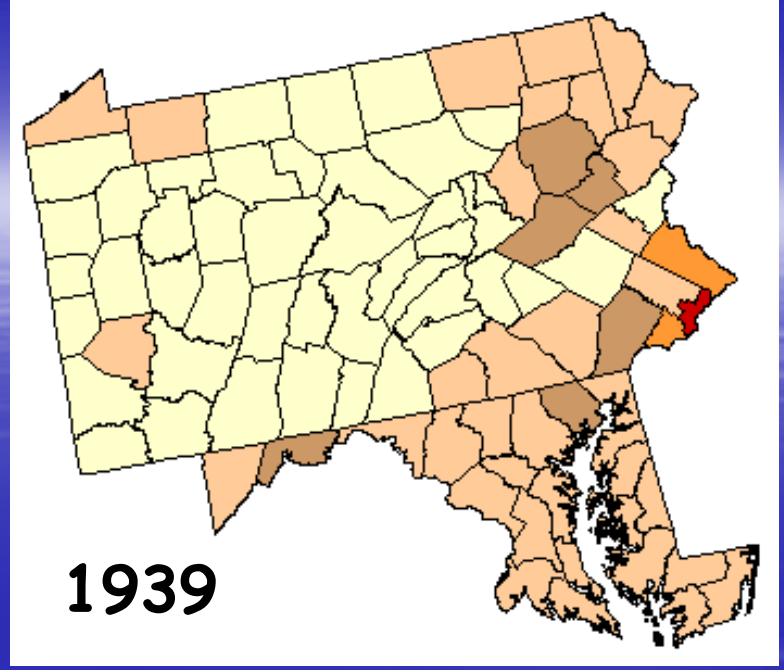
Legend

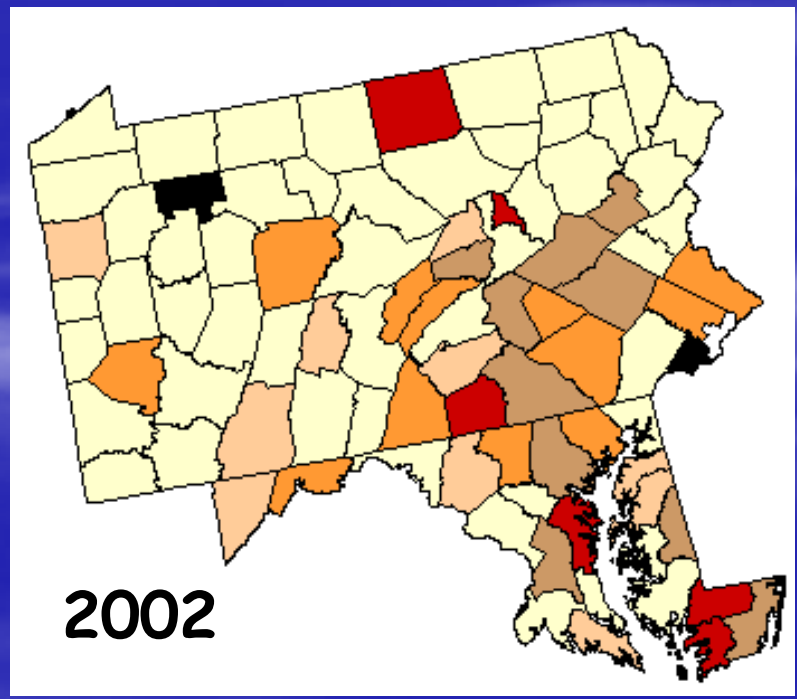
P balance (tons)

- -200 - 200
- 200 - 400
- 400 - 600
- 600 - 1000
- 1000 - 5000
- 5000 - 10000

County P Balance per acre







Legend

P balance (lbs/ac)

- -5 - 10
- 10 - 15
- 15 - 20
- 20 - 40
- 40 - 60
- > 60
- No cropland acres

Impacts of Federal and State Regulations

- Dependent Upon the Market for Poultry Litter
- Market for Poultry Litter Dependent Upon Possible Uses for Poultry Litter.
  - Land Application as Crop Fertilizer
  - Pelletizing
  - Composting
  - Land Application as Forest Fertilizer
  - Cogeneration for Electricity and Steam Production
  - Electricity Production

Demand for Poultry Litter

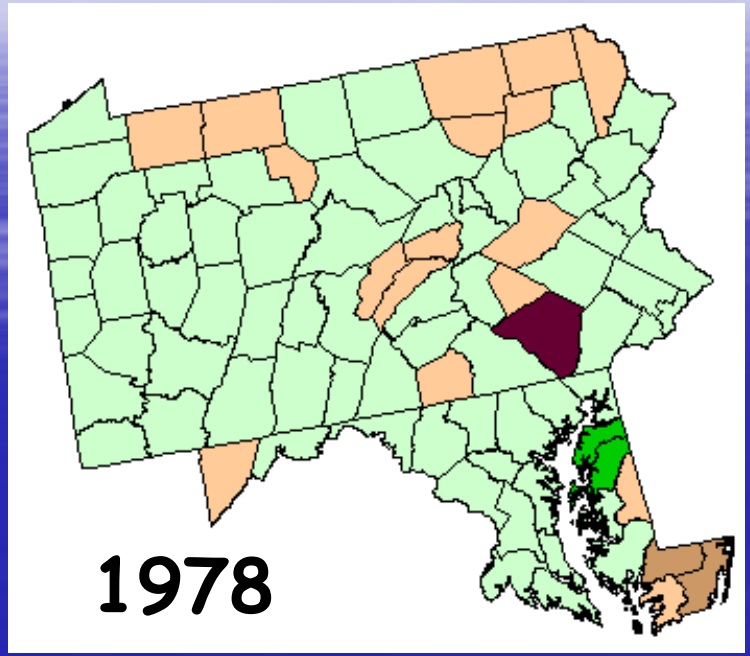
Use	Current Use	Potential	Value (at farm)
Crop Fertilization	675,000 tons	695,000 tons	$3.85/ton - $22.75/ton
Pelletize	60,000 tons	150,000 tons	$8.50/ton
Compost	<10,000 tons	15,000 tons	$1/ton - $4.40/ton
Forest Fertilization	--	23,750 tons	$6/ton - $13/ton
Energy Conversion	--	??	Negative
Cogeneration	--	80,000 tons	$0*

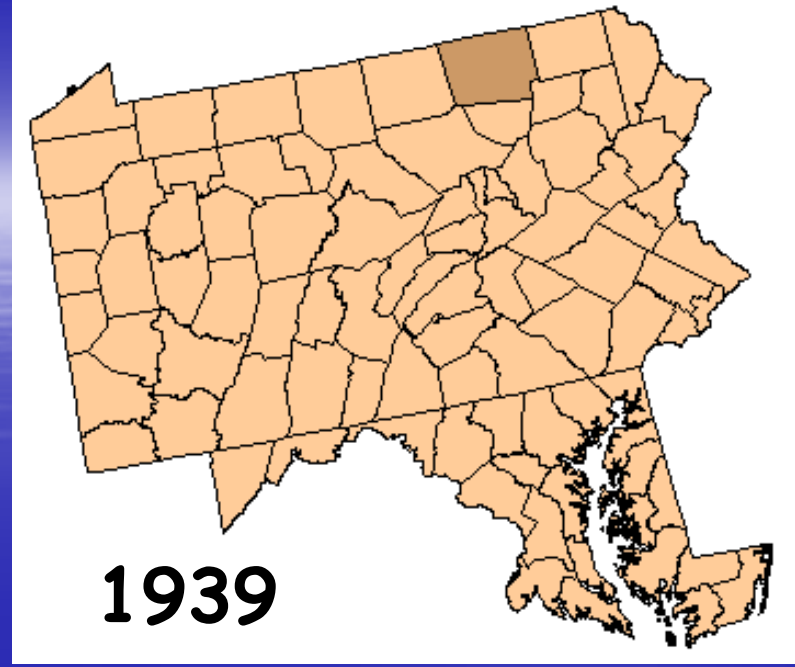
* Up to $5.70/ton Implicit Value if Energy Tax Credits Secured.

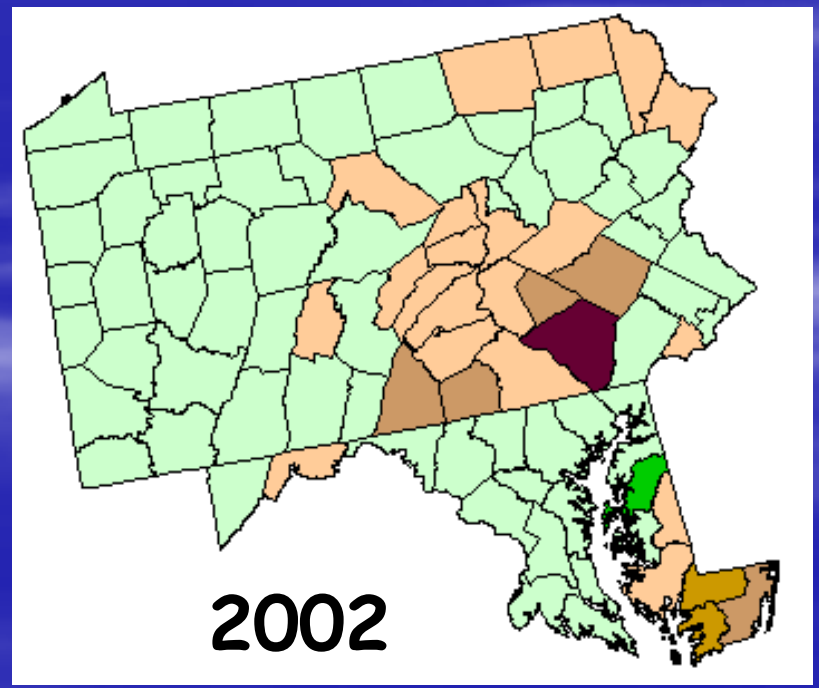
Need to Integrate Across Farm Economy

- Decentralized Markets
  - Transaction Costs
    - Discovery
    - Clean-out, Storage, Shipping and Application
- Centralized Markets (Broker, Integrator)
  - Information Management
    - Inventory Issues (Storage)
    - Transportation and Shipping Issues

County Manure P – Crop P







Legend

Manure P - Crop P (tons)

- -1000 - -500
- -500 - 0
- 0 - 500
- 500 - 1000
- 1000 - 2500
- 2500 - 5000

Regulatory Response:
Maryland's Water Quality Improvement Act of 1998

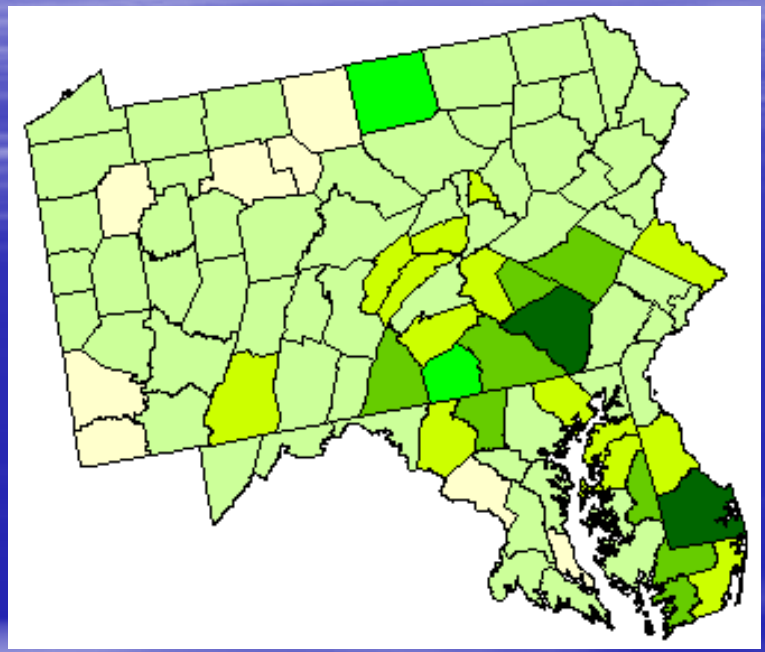
- Poultry Integrators

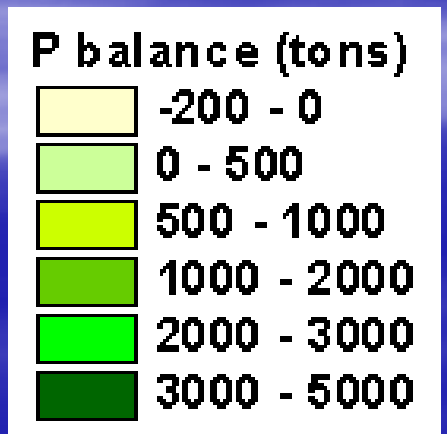
  -Poultry Integrators Required to Incorporate Phytase or Other Feed Additives to Reduce Phosphorus in Litter

  -Integrators also Contribute to State's Manure Transport Program

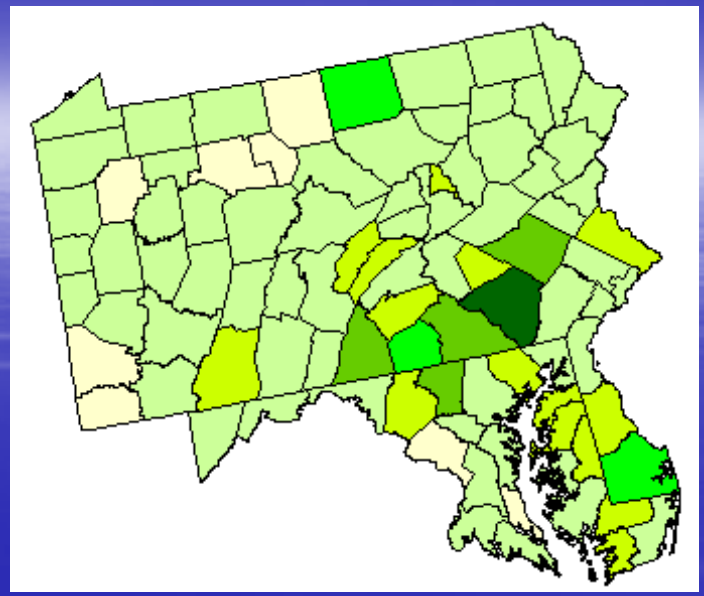
P Balance

2002

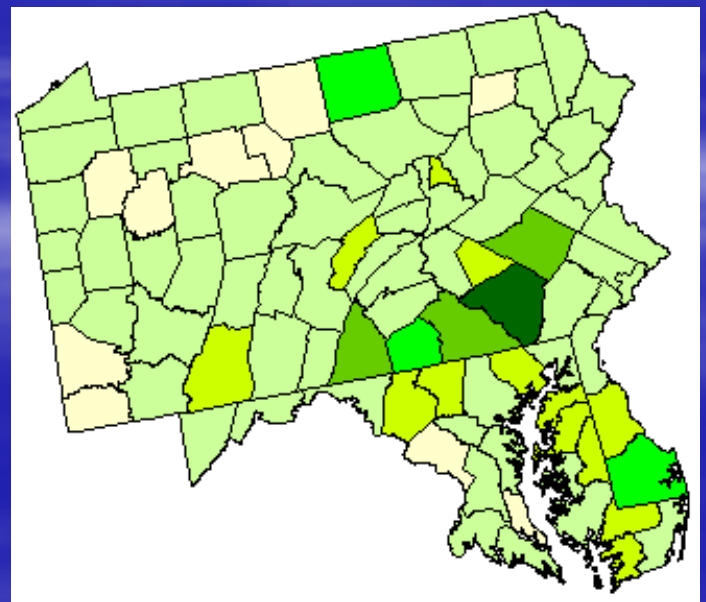




40% reduction in poultry manure P

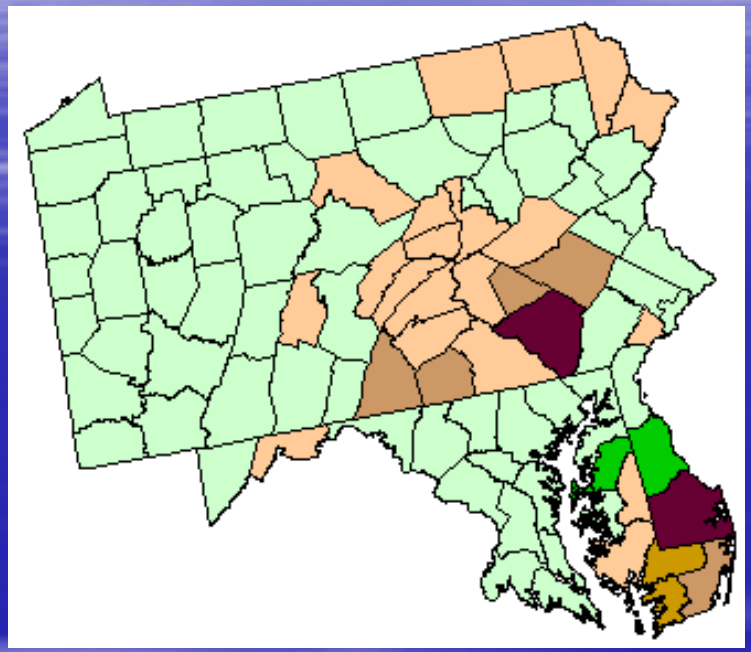


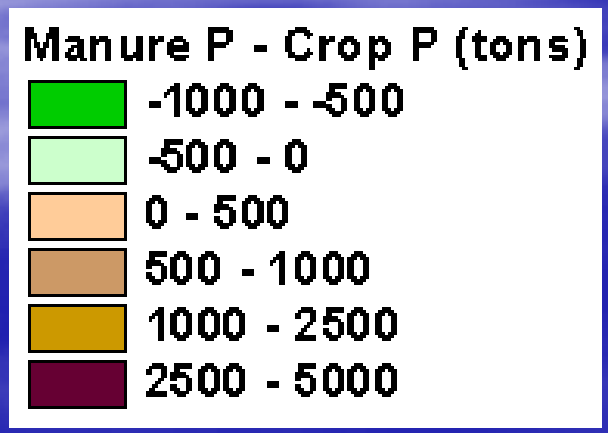
40% reduction in poultry manure P and
25% reduction in dairy manure P



Manure P- Crop P

2002





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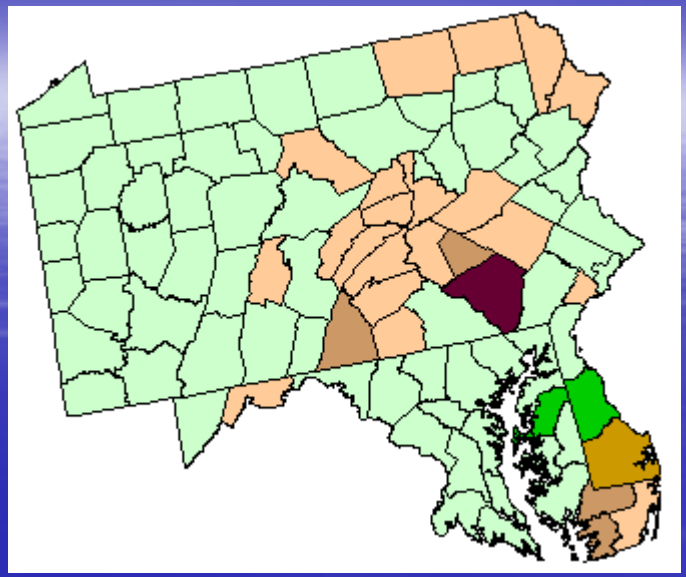

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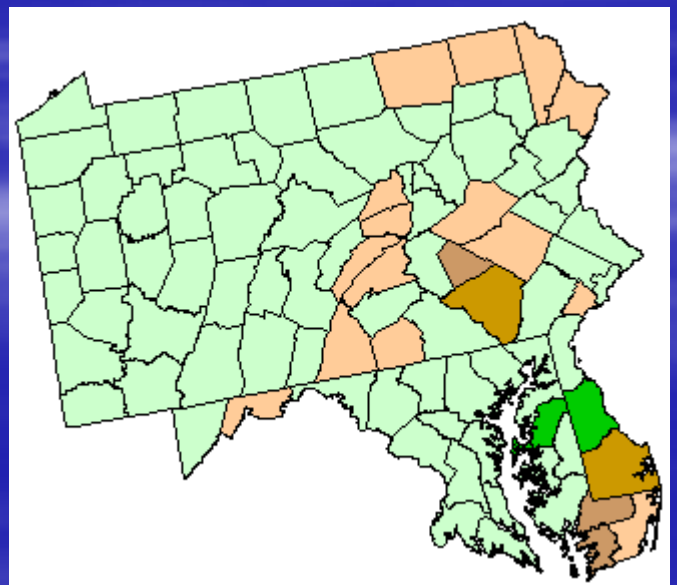

Conclusions

- Application to Crop Land Highest Value Use.
- Value Ranking of Other Poultry Litter Uses, in Order of Declining Value

  *Forest Fertilization

  *Pelletization

  *Compost

  *Co-generation

  *Electricity Generation (with a Negative Value)

Conclusions

- Long Distance Transport Not Necessary (Except for Pelletized Product)
- Unreasonable to Expect all Crop Growers to Use Poultry Litter
- Educational Programs (such as Nutrient Management Planning) to Emphasize Value of Poultry Litter
- Promote Marketing of Poultry Litter for Crop Production
- Alternative Uses for Poultry Litter Important

Extensions and Limitations

- Logistical Issues for Nutrient Transportation and Marketing
- Assess Educational Constraints to Manure Marketing
- Industry Reluctance to Centralize Manure Information

MID-ATLANTIC Regional Water Quality Program