PA FARM CONSERVATION PRACTICES INVENTORY

A survey of Pennsylvania farmers to document conservation practice implementation in the Chesapeake Bay Watershed

Survey Analysis Update
October 20, 2016

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Reasons for the Survey

- PA farmers have done much to improve water quality and soil health
- Yet many practices not counted toward water quality goals (ex: Chesapeake Bay)
- Especially true with "voluntary" practices
- Survey captures this data

Development of the Survey
A Collaborative Effort

- Developed collaboratively by:

Penn State University	PA Dept of Environmental Protection
PennAg Industries	PA Farm Bureau
PA Assoc of Conservation Districts	PA Farmers Union
PA Assoc of Sustainable Agriculture	Professional Dairy Managers of PA
PA Dept of Agriculture	State Conservation Commission

- Questions were pre-tested and refined by farmers and conservation professionals
- Survey being conducted by the College of Agricultural Sciences

Survey Overview
Part One: About Your Farming Operations

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- Name, address, county, municipality, watershed
- Farm operation size (acres)
- Types and acres of crops grown
- Rented and owned ground
- Types and numbers of animals

Survey Overview
Part Two: Your Conservation Practices

- Questions about 11 conservation practices or plans:

Nutrient/Manure Mgt Plans	No Till
Enhanced Nitrogen Mgt	Cover Crops
Manure Transport	Stream Bank Fencing
Animal Waste Storage Systems	Riparian Buffers
Barnyard Runoff Controls	Land Retirement
Ag E&S Plans/Conservation Plans	

- These are priority practices that achieve high levels of nutrient and sediment reductions, may have high instances of volunteer implementation, and are accepted into Bay model

Survey Overview
Part Two: Your Conservation Practices

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- For each practice, several questions asked
- Questions necessary to determine whether practices meet BMP definitions and will count toward Chesapeake Bay goals
- Space at end to report other practices or provide other comments

Survey Administration
Penn State Survey Research Center

- Survey administered by the Penn State Survey Research Center
- Web and mail option
- Survey ran January 29 – April 30, 2016
- **6,787 survey returns (35% response rate)**

Survey Participation
Responses by County

Top 5 Counties:
- Lancaster County 1492
- York County 340
- Franklin County 340
- Bradford County 266
- Cumberland County 238
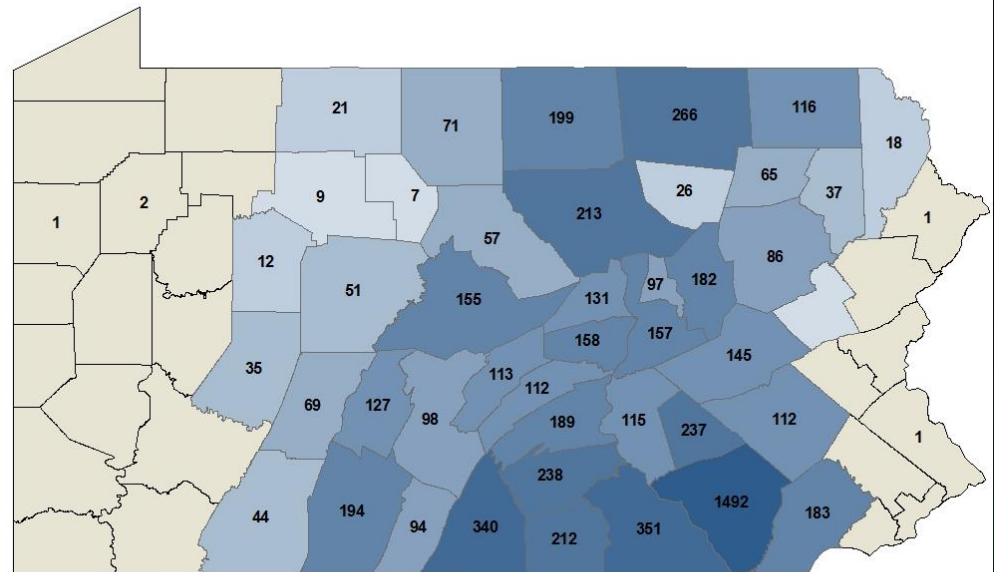
Survey Analysis
Analyzing Results: Verification Process

- 10% randomly selected for farm visits by Penn State Extension to assess inventory results and help researchers analyze data
- Extension staff trained in July; conducted farm visits August through first week of Sept.
- 42 Extension agents typically trained in agronomy, horticulture, nutrient management, livestock systems with Master's degree or higher
- Farm visit data entered through Sept. 16

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Survey Analysis
Verification Process Details

- Extension staff did not have copies of completed surveys
- Plans and acres covered by plans verified through on farm completeness review of plans
- Structural practices (storages, barnyard runoff controls, fencing, buffers) field verified through visual assessments using available RI standards
- If plans or practices did not meet standards, they were not counted

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Survey Analysis
Analyzing Results: Reporting BMPs

- Cumulative results (by county) provided to PA DEP to document conservation practices implemented to be reported to Chesapeake Bay Program
- Care taken to avoid "double counting"
    - Practices receiving government cost share not reported
    - Practices already captured through regulatory programs not reported (Act 38 plans)
    - Practices for which DEP using other data collection methods not reported (i.e., no till, cover crops)

Survey Analysis
Analyzing Results

- Data analysis team:
    - Jim Shortle, PI
    - Aaron Cook, Ph.D. Candidate
    - Matt Royer
    - Chris Houser
    - Rob Ost, Undergraduate Intern

Survey Analysis
Statistical Analysis

- Subsample of farm visit data compared to survey returns for the following BMPs:

Nutrient/Manure Mgt Plans	Ag E&S Plans
Enhanced Nutrient Management	Conservation Plans
Animal Waste Storage Systems	Stream Bank Fencing
Barnyard Runoff Controls	Riparian Buffers

- For all these BMPs, adequate sample size existed to develop statistically acceptable results
- Manure transport not statistically analyzed because of small sample size

Survey Analysis
Statistical Analysis

- Survey responses compared to farm visit reports
- Analysis completed separately for each BMP
- Determined difference in reporting (survey response minus farm visit report)
  - Negative number = under reported by farmer
  - Positive number = over reporting by farmer
  - Zero = accurately reported by farmer
- Developed mean difference and 95% confidence interval for each BMP
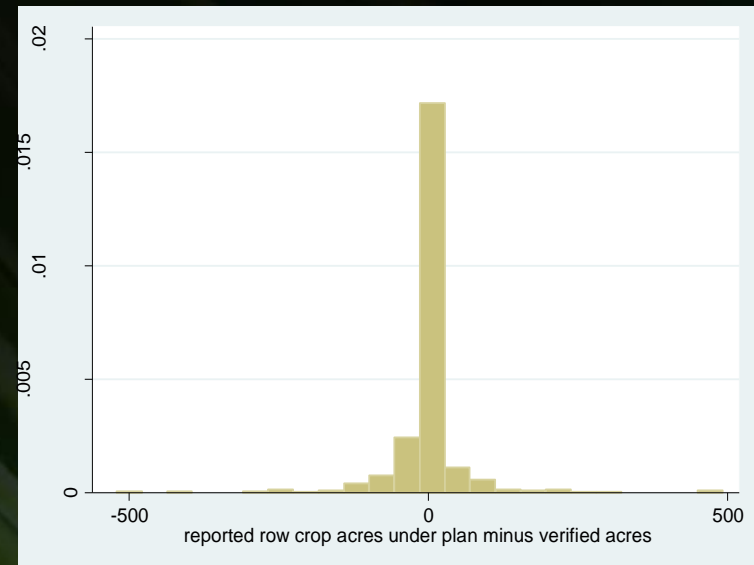
Sample Statistical Analysis
Nutrient/Manure Management Plans

For acres of row crops:

- Mean difference between reported and verified acres: -2.86 acres
- 95% confidence interval: -8.44, 2.73

- Example:

  - If farmer reported 300 acres, we expect him to actually have 302.86 (and we are 95% confident he actually has between 297.2 and 308.4 acres)

Survey Analysis
Next steps

- So far, data is showing statistically significant accuracy of reporting as we work through the BMPs
- Research team will complete statistical analysis by end of the month
- Tetra tech review of data to proceed immediately following

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Questions?

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