

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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College of Agricultural Sciences

Reasons for the Survey



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- 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



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- Developed collaboratively by:

Penn State University

PennAg Industries

PA Assoc of Conservation Districts

PA Assoc of Sustainable Agriculture

PA Dept of Agriculture

PA Dept of Environmental Protection

PA Farm Bureau

PA Farmers Union

Professional Dairy Managers of PA

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



About Your Farming Operations

1. Please provide your name and the physical address of your farming operation.

First Name I Last Name

Number & Street Address

City State Zip Code

Municipality (township, borough, etc.) County

Watershed, if known: ☐ Delaware ☐ Erie ☐ Genesee ☐ Ohio ☐ Potomac ☐ Susquehanna

2. How many acres is your farming operation? For purposes of answering this question and filling out the remainder of the survey, your farming operation includes all land which you manage for agricultural activities, including owned ground and rented ground.

Number of acres

3. For calendar year 2015, please indicate what crops you grew, how many acres of each, whether they were grown on owned or rented ground, and whether any of the acres grown were a double crop.

Crop	Acres on Owned Ground	Acres on Rented Ground	Acres Grown at a Double Crop
Corn Grain	<input type="text"/>	<input type="text"/>	<input type="text"/>
Corn Silage	<input type="text"/>	<input type="text"/>	<input type="text"/>
Soybeans	<input type="text"/>	<input type="text"/>	<input type="text"/>
Wheat	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rye	<input type="text"/>	<input type="text"/>	<input type="text"/>
Barley	<input type="text"/>	<input type="text"/>	<input type="text"/>
Alfalfa	<input type="text"/>	<input type="text"/>	<input type="text"/>
Hay	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other (please specify):	<input type="text"/>	<input type="text"/>	<input type="text"/>

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Survey Overview

Part Two: Your Conservation Practices



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- Questions about 11 conservation practices or plans:

Nutrient/Manure Mgt Plans
Enhanced Nitrogen Mgt
Manure Transport
Animal Waste Storage Systems
Barnyard Runoff Controls
Ag E&S Plans/Conservation Plans

No Till
Cover Crops
Stream Bank Fencing
Riparian Buffers
Land Retirement

- 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

14. Do you have any streamside riparian buffers on land that is part of your farming operation?

☐ No → Please proceed to Question 15.

☐ Yes → 14a. How many acres is the buffer? acres

14b. What is the average width of the buffer? feet

14c. Are trees and/or shrubs growing in the buffer? ☐ No ☐ Yes

14d. Were any county, state or federal government funds used to construct this buffer?

☐ No → Please proceed to Question 15.

☐ Yes → 14e. How many acres of buffer was funded using county, state or federal government funds? acres

15. Excluding any riparian buffers identified in your answer to Question 14, have you retired any cropland from your farming operation to permanent vegetation such as perennial grasses, trees or shrubs?

☐ No → Please proceed to Question 16.

☐ Yes → 15a. Indicate what year you retired your cropland, how many acres have been retired, and whether trees and/or shrubs are growing in the retired acreage.

Year	Acres	Are trees and/or shrubs growing?
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> No <input type="radio"/> Yes
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> No <input type="radio"/> Yes
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> No <input type="radio"/> Yes

15b. Were any county, state or federal government funds used to retire this acreage?

☐ No → Please proceed to Question 16.

☐ Yes → 15c. How many acres of retired cropland was funded using county, state or federal government funds? acres

Survey Administration

Penn State Survey Research Center



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- 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)**

The screenshot shows a web browser window with the URL src.survey.psu.edu/terms.asp. The page header includes the Penn State Survey Research Center logo and the text "Part of the Social Science Research Institute". The main title is "Chesapeake Bay Watershed Farm Study". Below the title, it says "Please Enter the 5 Digit code from your invitation letter" and provides a text input field for the code, with a "Submit" button next to it. The page contains several paragraphs of text, including an invitation to participate in the study, a link to a PDF of the survey, and a section titled "Farmers to be surveyed on use of conservation practices in Chesapeake Bay watershed". The text mentions that the survey is being administered by the Penn State Survey Research Center and that the results will be used to document the practices farmers have adopted to conserve soil and water and to protect water quality. It also mentions that the survey is part of a larger effort to improve water quality in the Chesapeake Bay watershed.

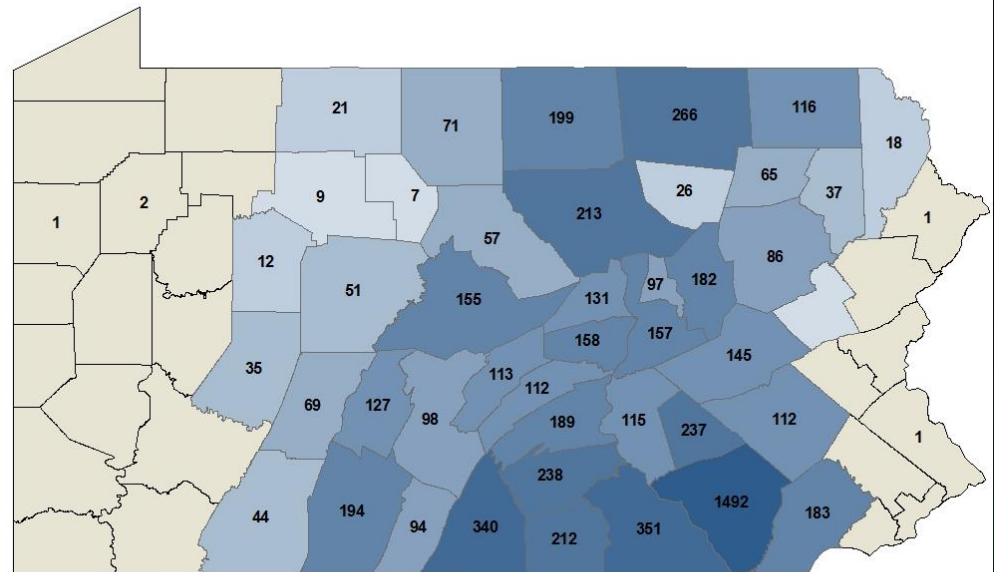
Survey Participation

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



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- 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



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- 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



PennState Extension

Survey Analysis

Analyzing Results: Reporting BMPs



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- 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



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

Survey Analysis

Statistical Analysis



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

Nutrient/Manure Mgt Plans
Enhanced Nutrient Management
Animal Waste Storage Systems
Barnyard Runoff Controls

Ag E&S Plans
Conservation Plans
Stream Bank Fencing
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



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- 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

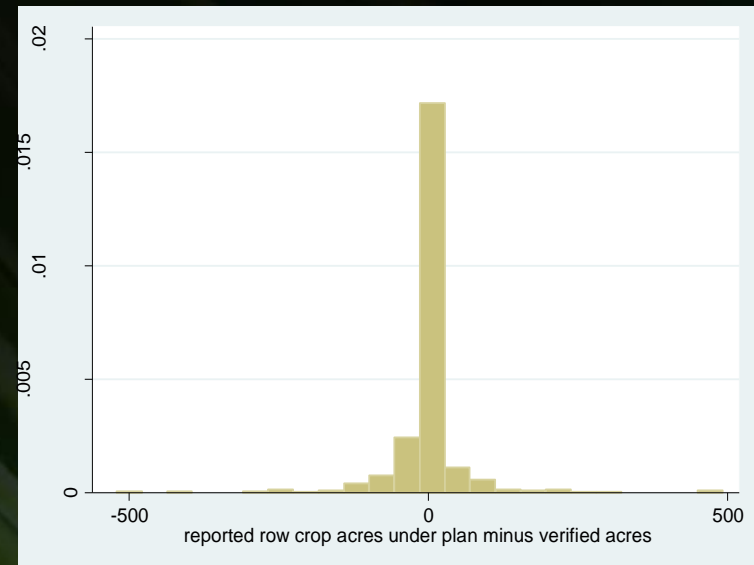
Nutrient/Manure Management Plans



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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



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- 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

Questions?



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