

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*



PennState
College of Agricultural Sciences

Reasons for the Survey



PennState
College of Agricultural Sciences

- 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



PennState

College of Agricultural Sciences

- 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



PennState
College of Agricultural Sciences

- 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"/>

2600232768 2

Survey Overview

Part Two: Your Conservation Practices



PennState
College of Agricultural Sciences

- 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



PennState
College of Agricultural Sciences

- 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



PennState
College of Agricultural Sciences

- 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 displaying the survey invitation page for the "Chesapeake Bay Watershed Farm Study". The page header includes the Penn State Survey Research Center logo and the title of the study. Below the title, there is a text input field for a 5-digit code from an invitation letter, followed by a "Submit" button. The main body of the page contains several paragraphs of text providing information about the survey, including the mailing date (January 25), the survey period (January 29 to April 30, 2016), and the purpose of the study (to document conservation practices and their impact on water quality). The page also includes a link to a PDF version of the survey and a note about the response rate.

Penn State Survey Research Center

Chesapeake Bay Watershed Farm Study

Please Enter the 5 Digit code from your invitation letter

Code: Submit

Invitations to participate in this study will be mailed the week of January 25. If you did not receive an invitation in the mail by February 5 and you would like to participate in this study, please email: websurvey@survey.psu.edu and include the subject line: farm study. Please include your name, address and farm name; you will then receive a code via email. You can request a paper version of the survey if you would prefer to complete the survey through the mail.

If you would like to view a PDF of the survey, click [HERE](#). This is a sample version and is not intended for responses.

=====

Penn State Ag Sciences News 1/8/2016

=====

Farmers to be surveyed on use of conservation practices in Chesapeake Bay watershed

UNIVERSITY PARK, Pa. -- If you're a farm operator in the Chesapeake Bay watershed, you soon will have a chance to highlight what steps you and your fellow farmers have taken to protect and enhance water quality in the region. Several agricultural and governmental organizations have partnered to develop a survey that will ask producers to document conservation practices they have adopted to promote water quality and soil health in the bay watershed. "Pennsylvania agriculture has done much to improve water quality in our local rivers and streams and the Chesapeake Bay," said Matthew Royer, director of the Agriculture and Environment Center in Penn State's College of Agricultural Sciences. "Not that positive story often is not told. We want to give farmers in the bay watershed a chance to tell that story."

More than half of Pennsylvania's land area drains to the Chesapeake Bay. The Susquehanna River, which flows through the state's most fertile farming region, is the bay's largest tributary.

The survey will be administered by the Penn State Survey Research Center, which soon will mail a letter to farmers in the watershed seeking their participation. College of Agricultural Sciences researchers will analyze the survey responses, and cumulative results will be provided to the Pennsylvania Department of Environmental Protection to document the practices farmers have adopted to conserve soil and water and to protect water quality.

Ten percent of the participants will be selected randomly for farm visits by Penn State Extension to assess inventory results and help researchers better understand the methods used and challenges encountered when adopting various management practices.

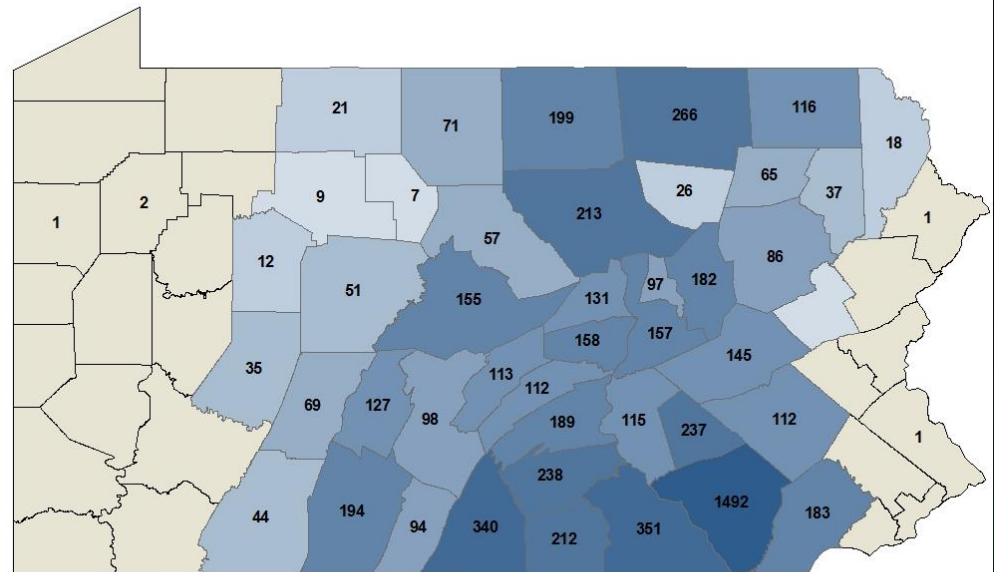
Survey Participation

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



PennState

College of Agricultural Sciences

- 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



PennState Extension

Survey Analysis

Verification Process Details



PennState

College of Agricultural Sciences

- 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



PennState

College of Agricultural Sciences

- 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



PennState
College of Agricultural Sciences

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

Survey Analysis

Statistical Analysis



PennState
College of Agricultural Sciences

- 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



PennState
College of Agricultural Sciences

- 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

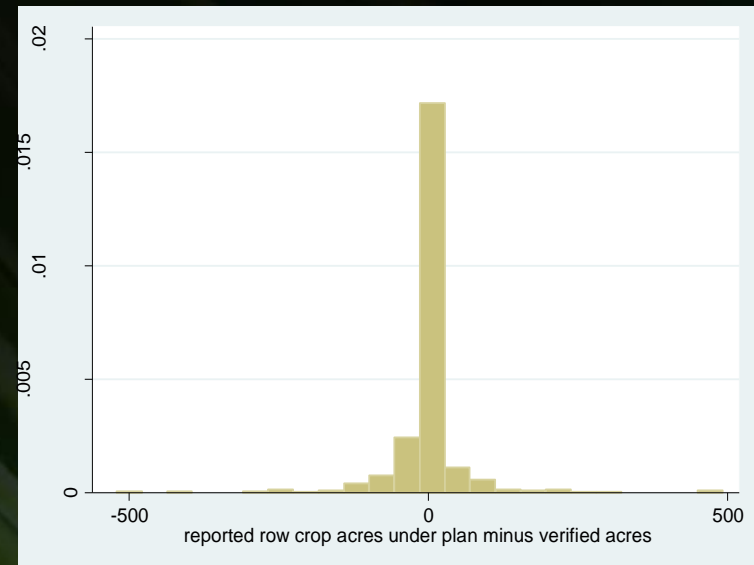
Nutrient/Manure Management Plans



PennState
College of Agricultural Sciences

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



PennState

College of Agricultural Sciences

- 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?



PennState
College of Agricultural Sciences

- Jim Shortle
Director, Environment and Natural Resources Institute
jshortle@psu.edu
- Matt Royer
Director, Agriculture and Environment Center
mroyer@psu.edu
- Chris Houser
Director, Crops and Natural Resources Programs,
Penn State Extension
cdh13@psu.edu