Pennsylvania Department of Environmental Protection

Quality Assurance Project Plan for Tracking, Verifying, and Reporting Nutrient and Sediment Pollutant Load Reducing Practices, Treatments, and Technologies

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A1: Title and Approval Sheet

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Note: This approval action represents EPA's determination that the document(s) under review comply

with applicable requirements of the EPA Region 3 Quality Management Plan [https://www.epa.gov/sites/production/files/2020-06/documents/r3qmp-final-r3-signatures-2020.pdf] and other applicable requirements in EPA quality regulations and policies [https://www.epa.gov/quality]. This approval action does **not** represent EPA's verification of the accuracy or completeness of document(s) under review and is **not** intended to constitute EPA direction of work by contractors, grantees or subgrantees, or other non-EPA parties.

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This table shows changes to this controlled document over time. The most recent version is presented in the top row of the table. Previous versions of the document are maintained by Quality Manager.

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A3: Distribution List

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A4: Project/Task Organization

A4.1: Introduction

This document summarizes procedures used for compiling data on best management practice (BMP) implementation within Pennsylvania for use by the United States Environmental Protection Agency's (EPA's) Chesapeake Bay Program Office (CBPO). Such information is utilized within the Chesapeake Bay watershed model for the estimation of nutrient and sediment loads generated by different source areas within the Pennsylvania portion of the Chesapeake Bay watershed. Load estimates for areas of the watershed outside of Pennsylvania are derived using similar BMP data prepared by other states as well. The submittal of such information/data is a requirements of the Chesapeake Bay Implementation (CBIG) and Chesapeake Bay Regulatory and Accountability Program (CBRAP) Grant agreements between the Pennsylvania Department of Environmental Protection (DEP) and EPA Region 3.

BMP information has been submitted to EPA by DEP and other state agencies within the Chesapeake Bay region for over two decades, and the methods utilized for compiling this information in Pennsylvania for past data submissions have been previously documented (DEP Water Planning Office, 2006, 2011, and 2015 and DEP Chesapeake Bay Office 2018, 2019, 2020, and 2021). In 2022, the DEP's Chesapeake Bay Office was retitled the Bureau of Watershed Restoration and Nonpoint Source Management (BWRNSM).

The Chesapeake Bay watershed model requires data in a format compatible with National Environmental Information Exchange Network (NEIEN) protocols that dictate the use of BMP-specific fields and units using Phase 6 requirements. A major part of DEP's data collection effort for 2010 and later involved the "translation" of various BMP descriptions and units currently used by various state and federal programs to the newer NEIEN-compatible format. Procedures for doing this are discussed in greater detail in Section B of this document.

To a large extent, the process by which data were compiled from various state and federal sources for the 2010 data submission did not differ much from the process used in previous submissions. In fact, the greatest difference was primarily related to the need to complete the additional "NEIEN data translation" step mentioned above. Since 2010 the data reporting has expanded and improved. It is likely that this process for future data compilation efforts will change, particularly given the expressed desire by DEP to move to more automated procedures. As this occurs, this document will be updated to reflect any changes in procedures.

A4.2: New Programs Providing Data

Through completion of the Phase 3 WIP process, additional programs were contacted to ensure as complete a collection of creditable BMPs for EPA reporting as possible. As outlined

in Pennsylvania's Phase 3 Watershed Implementation Plan, programs with delegated stormwater permitting authority as well as other permitting programs were contacted to collect and report their completed permits from the period between 2013 to present. Remaining not fully documented programs include Air Quality, Nutrient Trading Program, and historical data from Wetland Mitigation and Act 537 Septic Pump-outs. Records are being developed for these programs which may not yet be available for 2022 progress reporting. The Air Quality Program reporting specifically related to the VW Air Emissions Settlement (equipment replacement/NOx reductions) will be reported outside of NEIEN.

Pennsylvania Turnpike Commission Stormwater Management BMPs is a new data reporter for our 2022 Progress Submission. The Turnpike Commission provided records from February 15, 1996 through October 26, 2022. US Army Corp and Engineers was a historic reporter that provided numerical data for 2022 Progress Submission and created a new QAPP submission. Additionally, the 2022 Update of the Penn State Voluntary Producer Survey was reported for 2022 Progress. For further reporting and quality control procedures see B10.3.7 Penn State University Agricultural Voluntary BMP Reporting Outreach and Appendix F.

The following programs have created new QAPP narratives, detailed in Section B.

- B10.2.29 United States Army Corps and Engineers
- B10.2.30 PA Turnpike Commission MS4/Urban Stormwater SCMs

The PA Game Commission had previously reported forest harvesting practices to DCNR and then DCNR reported to PA DEP. Currently PA Game Commission and DCNR report their forest harvest BMPs separately because they are deriving their data from their respective lands. For example, PA Game Commission only reports forest harvesting practices on PA Game Commission lands and the same for DCNR so there no location overlap for double counting. The PA Game Commission and PA DCNR use the 1.5% is the default rate for EPA CBPO to establish the harvest forested domain. PA Game Commission and DNCR have separate QAPP submissions updated in Section B.

At the beginning of 2021 PA DEP invested additional funds through CBRAP for expanded Agriculture BMP verification efforts that is detailed in the Phase 3 WIP on page 169. This BMP verification effort utilized established Agriculture BMP inspections and reporting protocol to PracticeKeeper that is detailed in Section B10.3. For QA/QC of this data set the PracticeKeeper "BMP Instance Identifier" number associated with each BMP were compared to the existing PracticeKeeper "BMP Instance Identifier" number for possible duplicates. After this QA/QC, none of the CBRAP BMPs contained duplicate PracticeKeeper "BMP Instance Identifier" records

for the 2022 Progress Submission.

The increase in documented implemented agriculture BMPs correlates with an increase in qualified agriculture personnel entering plans and BMPs into PracticeKeeper. PA DEP and the State Conservation Commission (SCC) have developed and disseminated multiple web-based trainings, Standard Operating Procedures (SOPs), and guidance to conservation district Nutrient Management Technicians and Chesapeake Bay Technicians (partially or fully funded through CBRAP) to enter agricultural plans and BMPs as a regular part of their contracted job duties. Starting in state fiscal year 2017-2018, the Chesapeake Bay Agriculture Inspection Program (CBAIP) e-inspection module in PracticeKeeper was released and utilized for inspection tracking and documentation as part of the Chesapeake Bay Technician Required Output Measure (ROMs). Beginning in the state fiscal year 2018-2019, all Nutrient Management Plan data was required to be input into PracticeKeeper as part of the Nutrient and Manure Management Delegation ROMs. In the state fiscal year 2019-2020, all Nutrient Management status reviews and Manure Management outreach, training, and planning assistance ROMs were to be reported via PracticeKeeper. In the state fiscal year 2020-2021, PA DEP made use of PracticeKeeper a requirement for reporting of plans developed and verified as well as the proposed and implemented BMPs that the Chesapeake Bay Technicians and Chesapeake Bay Engineer Specialists/Assistants (funded through CBIG) are reporting to meet their planning and technical assistance ROMs. PA DEP has also communicated the importance of entering plan data into the PracticeKeeper Geodatabase and the direct implications on WIP and CAP implementation to county stakeholders. There is a growing understanding with county staff implementing state programs, that communicating this information in the required data management systems is vital to the success of their local initiatives to implement their CAPs. Not reflected in 2021 or 2022 reporting year, but moving into 2023, will be the availability of PracticeKeeper for trained and qualified partners external to the conservation districts to report plan and BMP data, with a QA/QC workflow completed July 2022.

For more details on PA Agricultural BMPs see the Focused Agriculture Specialized Data Compilation Procedures for Selected BMPs as follows:

- B10.3.1 Nutrient and Manure Management Program
- B10.3.2 Pennsylvania's Agriculture Inspection Program
- B10.3.3 Manure Transport Data
- B10.3.4 Pennsylvania's Agricultural Planning Reimbursement Program
- B10.3.5 Capital Area RC&D Conservation Tillage Survey

        - Appendix C: Description of the Conservation Tillage Survey
    - B10.3.6 Capital Area RC&D Cover Crops Survey
        - Appendix D: Description of the Cover Crop Survey
    - PennState Survey B10.3.7 Penn State University Agricultural Voluntary BMP Reporting Outreach
        - Appendix F Description of the Penn State Survey

In the stormwater sector, typical BMPs identified in National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Pollutant Reduction Plans (PRPs) and implemented / documented on MS4 annual reports were documented and reported from the 2022 e-reporting pilot program via exported spreadsheet to DEP BWRNWM. The pilot MS4 e-reporting system was QA/QC by DEP BWRNWM staff to ensure no duplicates from other stormwater programs. Also, PennDOT included new records with more historical BMP information from 1984 – present for 2022 Progress. These records are not duplicate from previous progress reporting period.

For more information on these data reporters see the following:

- B10.2.26 Municipal Separate Storm Sewer (MS4) Pollutant Reduction Plan (PRP) and TMDL Plan BMPs
- B10.2.20 PA Dept. of Transportation (PennDOT) Urban Stormwater BMPs

For 2022 Progress DEP BWRNSM did not report BMPs from the following cost-share, voluntary, or regulatory programs:

- USDA Rural Development Program
- Nutrient Trading Program
- Pennsylvania's Agriculture Conservation Stewardship Program (PACS)

A4.3: Primary Agency/Program Data Sources and Formats

For data compilation efforts completed since 2009, BMP-related information has been obtained from different state and federal agency/program and other sources for submittal to the CBPO. For 2022 reporting year there were 39 out of 42 cost-share or regulatory programs reporting to DEP CBO. Similar reporting with the additional new sources mentioned are expected for 2022. For the most part, this information has been obtained in electronic format (primarily as Excel spreadsheet files). A listing of the primary sources currently used is given in Table A1 below. In many cases, data for NEIEN submissions since 2010 were obtained from the same sources used in earlier data compilation efforts. In some instances, data were obtained from entirely new sources not used in previous submittals. In other cases, sources were not

used for submissions after 2010 due to lack of data (e.g. American Farmland Trust) or to the fact that the programs are not currently active (e.g., Pennsylvania Department of Agriculture (PDA) Agri-Link Program).

As indicated in Table A1, BMP data from both state and federal sources are obtained and re-formatted for submission to the CBPO via NEIEN. More detailed descriptions of the types of data obtained from these sources, and the "post-processing" that is completed in order to get these data in a format that can then be used to submit the data via established NEIEN protocols, are provided in Section B.

A4.4: Organizational Information Pertaining to Primary Data Providers

Table A1 below provides staff information related to anticipated data reporting for 2022. The data management related to this reporting can be found in Section B10 Data Management (subsections B10.2.1- B10.3.10).

Table A1. Primary Sources of BMP information.

Data Source/Type	How Information is Received	Contact	BMP Type	Implementation Mechanism
National Park Service[4]	Excel file obtained from program contact	R. Senos	Various	Cost-Share
U.S Fish and Wildlife[4]	Excel file obtained from program contact	L. Dawson	Agricultural	Cost-Share
DEP Stream Bank Fencing Program	Excel file obtained from program contact	K. Bresaw	Agricultural	Cost-Share
DEP Chesapeake Bay Implementation Grants	Excel file obtained from program contact	K. Bresaw	Agricultural	Cost-Share
DEP Section 319 Non-Point Source Program	Excel file obtained from program contact	S. Kleiner	Forestry	Non-Cost Share
DEP Abandoned Mine Land Reclamation Program	Excel file obtained from program contact	B. Bradley	Forestry	Regulatory
DCNR Forest Harvest Information	Excel file obtained from program contact	R. Reyna	Forestry	Regulatory
PGC Forest Harvest Information	Excel file obtained from program contact	P. Lupo	Agricultural	Cost-Share
PA Act 38 Nutrient Management	Excel file obtained from program contact	K. Bresaw	Various	Regulatory
PA Growing Greener Grant Program[1]	Excel file obtained from program contact	S. Kleiner	Agric/Urban	Regulatory
MS4 Program	Excel file obtained from program contact	J. Eberl	Urban	Regulatory
PA Oil and Gas Program	Excel file obtained from program contact	D. Harvey	Urban	Regulatory
PA Waste Program	Excel file obtained from program contact	J. Dunham	Various	Cost-Share
PA Air Quality Program[5]	Excel file obtained from program contact	K. Ramamurthy	Agric/Urban	Regulatory
Chapter 102 Program	Excel file obtained from program contact	S. Furjanic	Urban	Regulatory
FSA program-specific BMPs	Excel file obtained from USGS	USGS/Devereux[2]	Agricultural	Cost-Share
NRCS program-specific BMPs	Excel file obtained from USGS	USGS/Devereux[2]	Urban	Cost-Share
USDA Rural Development Program[4]	Listing received from program contact	L. Thomas	Agricultural	Cost-Share
SCC Resource Enhancement and Protection Program	Excel file from program contact	J. Semke	Agricultural	Cost-Share
DEP-funded Cover Crop Survey[3]	Excel file from program contact[3]	S. Richards	Rural land	Non-Cost Share
SCC Dirt and Gravel Road Program	Excel file obtained from program contact	K. Corradini	Various	Cost-Share
DEP Nutrient Trading Program[5]	Tabular data obtained from program	R. Colyer	Various	Non-Cost Share
PennVest Program	Excel file obtained from program contact	P. Wenrich	Stream Restoration	Cost-Share
Stream Improvement Program	Excel file obtained from program contact	W. Kcenich	Agricultural	Non-Cost Share
Grass Roots Program[4]	Excel file obtained from program contact	S. Richards	Urban	Cost-Share
TreeVitalize/Urban Forestry Program	Excel file obtained from program contact	R. Reyna	Agricultural	Cost-Share
DEP-funded Conservation Tillage Survey	Tabular data obtained from program	S. Richards	Agricultural	Non-Cost Share
NRCS Potomac Pilot[4]	Excel file provided by NRCS	S. Heidel	Agricultural	Non-Cost Share & Cost-Share
DEP-funded Ag Planning Reimbursement Program	Excel file provided by program contact	N. Miller	Agricultural	Cost-Share

Table A1. Primary Sources of BMP information (continued)

Data Source/Type	How Information is Received	Contact	BMP Type	Implementation Mechanism
DEP Ag Inspections	Excel file provided by program contact	K. Bresaw	Agricultural	Regulatory
National Fish & Wildlife Foundation	Excel file provided by program contact	J. Reilly	Various	Cost-Share
Dept. of Defense – Federal Lands	Excel file provided by program contact	K. Du Bois	Urban	Federal Funds
PA Dept. of Transportation (PennDOT)	Excel file provided by program contact	R. Heineman	Urban	Regulatory
Dept of Conservation and Natural Resources (DCNR)	Excel file provided by program contact	T. Stark	Agric/Urban	Cost-Share
Chesapeake Bay Foundation	Excel file provided by program contact	B. Sieglitz	Various	Cost-Share
FieldDoc	Excel file provided by program contact	J. Dawes	Various	Cost-Share
DEP Septic Tank Pump-outs	Excel file provided by program contact	B. Schlauderaff	Urban	Regulatory
DEP Waterways Engineering and Wetlands	Excel file provided by program contact	A. Klinger	Natural	Regulatory
PDA Penn State Producer Survey	Excel file provided by program contact	M. Royer	Agricultural	Non-Cost Share
PA Turnpike Commission	Excel file provided by program contact	J. Kaiser	Urban	Non-Cost Share
US Army Corp and Engineers (USACE)	Excel file provided by program contact	M. Spindler	Urban	Federal Funds

[1] Data for acres of land under nutrient management are also obtained from other sources as described in Section B10.3.3

[2] Data obtained from USGS via sub-contractor (Olivia Devereux) under 1619 agreement between USDA and USGS

[3] County-level cover crop are based on surveys described in Section B and Appendix D.

[4] Data have been infrequently provided from this program due to lack of activity or reporting since 2010.

[5] Program Data Submission Pending

A5: Problem Definition/Background

A5.1: Overview

DEP BWRNSM compiles and reports BMP data to the CBPO for assessments of progress towards meeting the state's Phase III Watershed Implementation Plans. The data are reported in standardized formats and codes via the NEIEN. The CBPO creates annual progress scenarios using the CBP Watershed Model (WSM) to describe, assess, and report the status of the restoration efforts, and anticipated reductions in nitrogen, phosphorus and sediment loadings to Chesapeake Bay and its tidal tributaries.

In reporting BMP data to CBPO, DEP adheres to the following principles:

- Changes in management actions include implementation of a new BMP; maintenance of an existing BMP (not to be reported as a new practice); or renewed practices such as nutrient management plans.
- Changes in management actions do not include the reporting of existing practices in a new year under a new BMP name.
- BMPs units are generally tracked directly. In other words, BMP units are not calculated by estimating a percentage of total acres available except for the two cases in which acres of BMP implementation are extrapolated based on surveys completed by a third party, funded by DEP. These two cases include the extrapolation of conservation tillage acres and cover crop acres. The process used to establish the extent of these two BMP types is discussed in more detail in Section B of this document.

DEP does not have direct access to US Department of Agriculture (USDA) cost-share practice data pertaining to Natural Resource Conservation Service (NRCS) and Farm Service Agency (FSA) activities. Consequently, such data are provided to DEP on a year-to-year basis by the US Geological Survey (USGS) under a Section 1619 agreement that it has with USDA.

Resource Improvement (RI) practices

If a practice is implemented to meet NRCS tech guide standards and specifications, it can be recorded as the NRCS practice regardless of if the practice was funded with public funds. As instructed in the Agriculture BMP Verification Training Series (2022) located on DEP's Clean Water Academy, if, there is a question of if the practice meets NRCS standards and specifications, the practice is identified as a RI practice if it meets the visual indicators identified in the *Chesapeake Bay Program Resource Improvement Practice Definitions and Verification Visual Indicators Report*, July 2014.

RI practices have been reported by county conservation district staff as part of Pennsylvania's Agriculture Inspection, Nutrient & Manure Management Programs, and the Best Management Practice verification effort funded through the Clean Water Coordinator and CAP Implementation Grant. External partners that meet the qualification criteria for either the Group 1 or Group 2 qualified professional

identified in the On-Site Best Management Practice (BMP) Verification Guidelines for Counties may verify and report RI practices that meet the visual indicators. Additionally, RI practices were reported during the 2016, 2020, 2022 Penn State Surveys.

External partners or CCD staff that are verifying and reporting RI practices must meet the qualification criteria for either a Group 1 or Group 2 Qualified Professional.

Individuals who may be considered Group 1 Qualified Professionals should have:

- Sufficient on-the-job training, with former or current NRCS Job Approval Authority, or
- Have attended NRCS trainings such as the Conservation Planner Certification Curriculum, NRCS Basic, Agronomy, and/or Engineering Bootcamps (Levels 1 and 2), or the State Conservation Commission Nutrient Management Certification series.

It is expected that verifiers will have relevant training and experience with identifying the existence and visual identification of BMP function. When possible, Group 1 Qualified Professionals should rely on their knowledge and familiarity of the standards and specifications in NRCS's Field Office Technical Guide (eFOTG), though when appropriate, Group 1 Qualified Professionals may verify Resource Improvement (RI) Practices according to the *Chesapeake Bay Program Resource Improve Practice Definitions and Verification Visual Indicators Report.*

Training Activities for Group 1 Qualified Professionals:

1. Agriculture Conservation Level II – BMP Verification on the DEP Clean Water Academy (CWA)

Staff that do not meet the qualification criteria described under Group 1 Qualified Professionals, should attend the following training activities. Once the training activities listed below are complete, staff will be considered Group 2 Qualified Professional.

Training Activities for Group 2 Qualified Professionals:

1. Agriculture Conservation Level I – New Staff Training on the DEP Clean Water Academy (CWA)
2. Agriculture BMP Verification Training Series on the DEP CWA
3. At least 40 hours relevant on-the-job training and job shadowing of experienced professionals.

Regardless of what qualified professional is reporting the practice, the procedures for reporting RI practices are described in *PracticeKeeper – Best Management Practice (BMP) Module*, CBO-DATA-003. The specific instructions related to RI practices are on page 6 of the SOP and are quoted below:

To correctly document Resource Improvement (RI) BMPs, most BMPs will require the user to enter the correct PK Practice Type and correct PK Practice Subtype. For more information about Resource Improvement (RI) Practices, see the RI Practice Name to PK Practice and Practice Subtype chart in Appendix 2 of this SOP, and Chesapeake Bay Program Resource Improvement

Practice Definitions and Verification Visual Indicators Report referenced in Appendix 6 – Additional Resources.

If the staff person is performing the data entry associated with the BMP and plan verification is not employed by the CCD, then the data entry should be completed through the PK Partner Submission Workflow. The Agriculture BMP Verification Training Series on the DEP CWA includes step-by-step instruction on how external partners should record and how CCD staff should approve practices using the PK Partner Submission Workflow. Any relevant BMP or plan verification documentation including the RI checklist, checkout documents documenting the practice meets NRCS standards and specifications, and the On-Site BMP and Plan Verification Checklist should be attached to the PracticeKeeper plan and/or BMP. Partners submit plan and BMP data to the CCD for plan verification and BMP duplicate check. If the BMP is already in the PracticeKeeper database, CCD staff deny the BMP and add the inspection date to the existing BMP.

The Resource Improvement Practices are highlighted in Yellow below:

***Sector*:** Agriculture, Natural

BMP List:

Access Road
Animal Mortality Facility
RI-2 Animal Compost Structure
Animal Trails and Walkways
Brush Management
Composting Facility
Conservation Cover
Constructed Wetland
Contour Buffer Strips
Contour Farming
Critical Area Planting
Diversion
Fence
Exclusion Fence with Forest Buffer
Exclusion Fence with Grass Buffer
Field Border
Filter Strip
Forage and Biomass Planting
Forest Stand Improvement
Grassed Waterway
Streambank and Shoreline Protection
Stripcropping
Structure for Water Control
Heavy Use Area Protection
Hedgerow Planting
Integrated Pest Management
Lined Waterway or Outlet
Pipeline
Prescribed Grazing
RI - 15 Rotational Grazing
Pumping Plant
Riparian Forest Buffer
RI-10 Forest Buffer on Watercourse
RI-9 Forest Nutrient Exclusion Area on Watercourse - Narrow
Riparian Herbaceous Cover
RI-8 Grass Buffer on Watercourse
Roof Runoff Structure
RI - 16 Barnyard Clean Water Diversion
Roofs and Covers
Seasonal High Tunnel System for Crops
Sediment Basin
Spring Development
Stream Crossing
Waste Storage Facility
RI-1 Dry Waste Storage Structure
Waste Transfer

Subsurface Drain
Terrace
Trails and Walkways
Underground Outlet
Upland Wildlife Habitat Management
Vegetated Treatment Area
RI-4a Watercourse Access Control – Narrow Grass
RI-5 Watercourse Access Control - Grass
RI-4b Watercourse Access Control – Narrow Trees
Exclusion Fence with Grass Buffer - Narrow
Water and Sediment Control Basin
Waste Treatment
Water Well
Watering Facility
RI - 18 Watering Trough
Wetland Creation
Wetland Restoration
Wetland Wildlife Habitat Management
RI-6 Watercourse Access Control - Trees
Exclusion Fence with Forest Buffer - Narrow
Waste Treatment Lagoon

A6: Project Description

BMPs that are compiled and submitted to EPA by DEP and other jurisdictions on an annual basis are described in the "NEIEN NPS CBP Data Flow Appendix" which is updated as needed by EPA. Of the total number of BMPs described in this Appendix, only a portion are actually compiled and reported by DEP. Table A2 provides a listing of these BMPs along with their corresponding default Scenario Builder names and the geographic scales at which they are compiled and reported.

In addition to the BMP names provided in Table A2 below, EPA's Appendix Q requires that the jurisdictions provide a table with BMP definitions that each state uses for describing reported BMPs. PA DEP only reports implemented practices that meet CBPO definitions or NRCS practice codes. Currently, there are no Pennsylvania-specific defined BMPs.

DEP BWRNSM Data Tracking Spreadsheets and Crosswalks

DEP BWRNSM uses the public "Detailed BMP Entry Form Template", and internal spreadsheets "2022 NEIEN Template", "NEIEN State Warehouse to CAST Crosswalk", and "Primary BMP Source Cost Share or Regulatory Programs" as cross walks and data tracking to ensure accurate BMP reporting. Internal DEP CBO spreadsheet, provided to EPA CBPO via email on December 1, 2021, descriptions are as follows:

"Detailed BMP Entry Form Template" as a public facing BMP Crosswalk at the following link: https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/WIPIII/CountyPlanningProcess/Detailed_BMP_Entry_Form_Updated_06.16.21.xlsx The **See the "BMP Definitions" tab includes the following columns:**

- Sector
- Common BMP Name
- CAST BMP Name
- CAST BMP Description
- NRCS Practice Code
- Unit
- Credit Duration (years)

"2022 NEIEN Template" that are uploaded to the BMP Warehouse that then transmits to the NEIEN . The template includes the following tabs:

- NEIEN BMP Warehouse Template
- Instructions **(*All definitions to the NEIEN BMP Warehouse columns*)**
- BMP Names
- Measures
- Localities
- HUCs
- Land Use

- Land Owner Agencies
- Funding Source
- Status

"State Warehouse to CAST Crosswalk" internal DEP BWRNSM spreadsheet. This spreadsheet details the crosswalk from NEIEN to BMP Warehouse with the following columns:

- State Warehouse Name
- CAST Name
- CAST short name
- Unit for CAST
- Load source
- Animal Group

"Primary BMP Source Cost Share or Regulatory Programs" includes BMP types typically collected from the sources in Appendix A, along with their corresponding BMP name used by CBPO for watershed modeling purposes. Some of these NRCS practices are not recognized for credit by EPA CBPO but are still reported to EPA CBPO because they have been reported DEP BWRNSM by NRCS. Also given are the sources (i.e., DEP programs, other government agencies, etc.) from which these data are typically collected. DEP BWRNSM reports applicable cross walked CBPO BMPs for annual progress from statewide cost share and regulatory programs. If a program reports a BMP to DEP BWRNSM that does not meet CBPO specifications or existing BMP name, BWRNSM does not report that BMP to CBPO.

"Read Me" Tab that has the following columns:

- PA Primary Ag Reporting Program
- PA Program
- Data Tracking
- Verifying Staff

"BMP by Primary Program" Tab that has the following columns:

- Source BMP Name
- NEIEN BMP Name
- Reporting cost share or regulatory program
    - NRCS
    - FSA
    - CBIG/CBRAP
    - NMA
    - 319
    - Growing Greener
    - Penn State Ag Voluntary BMP Reporting Outreach
    - CEG
    - REAP

- PennVest
- Municipal Separate Storm Sewer (MS4)
- PennDOT
- Chapter 102 Program Dept. of Defense
- Oil and Gas Program
- Chapter 105 Program
- DCNR
- Chesapeake Bay Foundation
- FieldDoc/NFWF
- Turnpike Commission
- US Army Corp and Engineers
- Other (Programs that report only a couple of very specific BMPs)

PA DEP BWRNSM's Process for Collecting and Submitting Data to EPA CBPO

Dr. Barry Evans from Drexel University conducts the third-party QA/QC for BWRNSM annual progress and is funded in part by the Chesapeake Bay Accountability and Regulatory Program (CBRAP) grant. Dr. Barry Evans can be contacted at bme39@drexel.edu. DEP BWRNSM collaborates with the reporting programs to establish an excel spreadsheet that has columns to encompass the required parameters. DEP BWRNSM distinguishes programs by funding source. Detailed below is a description of the extensive QA/QC for each funding source and all active BMPs in DEP BWRNSM Data Warehouse to NEIEN and follow up with EPA CBPO. An example of the process for a new and existing data reporter is provided below.

- New Data Source Partner Example: Chesapeake Bay Foundation
  - For 2020 Progress, DEP BWRNSM worked with Chesapeake Bay Foundation to establish an accurate cross walked BMP Template that to BMP CAST Name and Definition, NEIEN name and to our BMP Warehouse Name.
  - For 2021 Progress, the Chesapeake Bay Foundation worked with DEP and DCNR staff to create an electronic BMP Partner Submission Module in DEP BWRNSM geospatial electronic platform, PracticeKeeper.
  - The Chesapeake Bay Foundation only reports historic BMPs via spreadsheet and current and future BMPs through PracticeKeeper to ensure no double counting along with established DEP BWRNSM QA/QC procedures described below.

QA/QC Standard Operating Procedure for New and Existing Data Partners

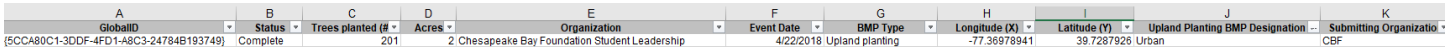
DEP BWRNSM makes sure all BMP templates are correctly cross walked to BMP CAST Name and Definition, NEIEN name and to our BMP Warehouse Name. DEP BWRNSM reports applicable cross walked CBPO BMPs for annual progress from statewide cost share and regulatory programs.

- *If a program reports a BMP to DEP BWRNSM that does not meet CBPO specifications or existing BMP name, BWRNSM does not report that BMP to CBPO.*

Please see the following Crosswalks and Template Resources that are described in the DEP BWRNSM Data Tracking Spreadsheets and Crosswalks above section:

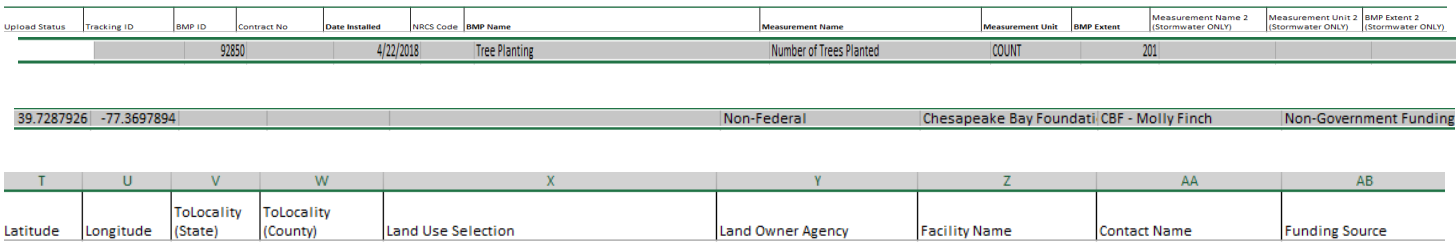
- Detailed BMP Entry Form Template – External is utilized as a PA BMP Crosswalk see the "BMP Definitions" tab that includes the following: Sector, BMP Name, NRCS Practice Code, CAST BMP Name, CAST BMP Description, Unit, Credit Duration (years). Link: https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/WIPIII/CountyPlanningProcess/Detailed_BMP_Entry_Form_Updated_06.16.21.xlsx
- "2022 NEIEN Template" for the entire NEIEN Template – *internal DEP BWRNSM*
- "NEIEN State Warehouse to CAST Crosswalk" – *internal DEP BWRNSM*
- "Primary BMP Source Cost Share or Regulatory Programs" – internal DEP BWRNSM

2. Sample spreadsheet developed with Chesapeake Bay Foundation 10 Million Tree Initiative:
   - Internally, this spreadsheet is designated by funding code 152ChesBayFound2020 / Chesapeake Bay Foundation 10 Million Tree Initiative.
   - DEP BWRNSM works with the data source to obtain the required information and incorporate their data collection systems.
   - To help data reporters, DEP BWRNSM ensures that every BMP is accurately cross walked by BMP Name, BMP Definition, NEIEN Name and BMP Warehouse Name. Please see above Crosswalks and Template Resources.
   - See screen shot below:



A	B	C	D	E	F	G	H	I	J	K
GlobalID	Status	Trees planted (#	Acres	Organization	Event Date	BMP Type	Longitude (X)	Latitude (Y)	Upland Planting BMP Designation	Submitting Organizatio
{5CCA80C1-3DDF-4FD1-A8C3-24784B193749}	Complete	201	2	Chesapeake Bay Foundation Student Leadership	4/22/2018	Upland planting	-77.36978941	39.7287926	Urban	CBF

3. The reporting program QA/QCs their own data for duplicates, correct categorization of BMPs that meet CBP definitions, and confirms data entry.
   - If the BMPs are reported to DEP BWRNSM PracticeKeeper or FieldDoc, then DEP or DCNR staff review the BMP for accuracy and geospatial duplicates, exports the data into an excel spreadsheet, and QA/QC for duplicates and errors by fund code, implementation date, BMP Instance Identifier number, BMP name and extent.
     - SOPs for PracticeKeeper and FieldDoc are referenced throughout the QAPP.
4. The reporting program sends the internal program's QA/QC spreadsheet to DEP BWRNSM and Dr. Barry Evans of Drexel University, a third-party contractor for QA/QC.
5. Data is incorporated into the established NEIEN template for consistency and duplicate checking
   - See abbreviated screen shot below:



Upload Status	Tracking ID	BMP ID	Contract No	Date Installed	NRCS Code	BMP Name	Measurement Name	Measurement Unit	BMP Extent	Measurement Name 2 (Stormwater ONLY)	Measurement Unit 2 (Stormwater ONLY)	BMP Extent 2 (Stormwater ONLY)
		92850		4/22/2018		Tree Planting	Number of Trees Planted	COUNT	201			

39.7287926	-77.3697894						Non-Federal	Chesapeake Bay Foundati	CBF - Molly Finch	Non-Government Funding		

T	U	V	W	X	Y	Z	AA	AB
Latitude	Longitude	ToLocality (State)	ToLocality (County)	Land Use Selection	Land Owner Agency	Facility Name	Contact Name	Funding Source

6. Dr. Barry Evans conducts duplicate checks based on funding program code (e.g. 152ChesBayFound2020). By funding code, Dr. Barry Evans QA/QC CAST definitions/names, BMP extent, BMP unit of measure, implementation date, county or latitude/longitude points, or other more detailed information.
7. If there are discrepancies, Dr. Barry Evans works with Ted Tesler, Chesapeake Bay Technical Coordinator in the DEP BWRNSM, to seek clarification with reporting programs.
8. The internal QA/QC for duplicate checking:
    - BMP Warehouse automatically flags duplicates based on the following parameters: a record that already exists with same BMP name, BMP extent, date, and location. Other flagged records include those with incorrect location (like misspelled locality or out of range latitude and longitude), date, and BMP name.
    - BWRNSM works to resolve any reported duplicate from the input template. If one record is flagged as a duplicate error or other parameter, then the entire template cannot be uploaded until the issue is resolved.
    - If there are any discrepancies Ted Tesler works with the program and if needed, Dr. Barry Evans to resolve the issues.
9. DEP BWRNSM sends the final submission in NEIEN format to the program to verify and confirm any changes.
10. DEP BWRNSM uploads the data into the NEIEN format and sends to Len Zaikoski or other applicable DEP Bureau of Information Technology (BIT) staff who uploads data to NEIEN.
11. DEP BWRNSM checks the NEIEN error reports weekly and makes sure any discrepancies are addressed directly with EPA CBPO.
12. DEP BWRNSM staff work with EPA CBPO to explain any data anomalies that are brought to our attention.

QA/QC to address "Double Counting:"

DEP BWRNSM is committed to submitting accurate data and addresses double counting of BMPs through a multitude of QA/QC steps with records being reported from multiple sources and years. The QA/QC process starts with working internally to ensure the reporting programs have the accurate BMP names with the associated cross walked CAST definitions, units, geography, or other tracking information like permit numbers, when applicable. DEP BWRNSM also makes sure that the BMP name is properly cross walked to the NEIEN submission name. The data reporter completes their own QA/QC process before submitting to DEP BWRNSM. Dr. Barry Evans from Drexel University completes a third-party QA/QC analysis and check based on funding program code. Dr. Barry Evans analyzes the NEIEN templates by CAST definitions/names, BMP extent, BMP unit of measure, implementation date, county or latitude/longitude points.

Dr. Barry Evans sends the QA/QC NEIEN templates to Ted Tesler of DEP BWRNSM to upload in BMP Warehouse. BMP Warehouse has automated double-counting prevention measures that include a duplicate record check at time of upload. BMP Warehouse will not allow upload of a record that contains identical BMP fields with an existing BMP record within BMP Warehouse.

BMP Warehouse includes an active inventory of BMPs from past years and the current upload year. When a duplicate (or other data error such as erroneous geography) is detected at upload, the entire upload template is rejected until the flagged record is corrected or removed. Then DEP Bureau of Information Technology transfers and uploads the information approved by DEP BWRNSM from BMP Warehouse to NEIEN. DEP BWRNSM works with EPA CBPO to resolve any outstanding errors.

Some reporting programs such as NRCS and the Penn State Voluntary Producer Survey follow data privacy policies that require that the reported BMPs are aggregated to prevent identification through locational information like latitude and longitude. To the fullest extent possible, DEP addresses this potential by selectively filtering out practices within the entire state or local records that are known to be reported within these aggregated data sets like Nutrient Management, Manure Management, Ag Erosion & Sediment Control, Chesapeake Bay Agriculture Inspection and other state and local agricultural BMPs by latitude/longitude, famer name, and address. For example, data reported from DEP's PracticeKeeper data management system is reported to exclude data identified as NRCS-funded.

There is no mechanism to link the practice to the previously reported USDA practice because PA DEP only receives an aggregated dataset from USDA through USGS. Therefore, PA DEP only reports reverified USDA practices that are past their credit duration. Because the USDA dataset only includes practices that were implemented in the reporting year and no reverified practices are included in the USDA dataset, regardless of if the contract for the original practice was renewed, only USDA practices that have been reverified and are beyond their initial credit duration are reported. A BMP is not reported if it was funded by a funding source that is reported by another program. For example, all practices funded by USDA programs or DCNR grants that are also within the credit duration of the BMP will be removed from the dataset before reporting to NEIEN but will be retained in the DEP data set for future verification and reporting needs.

PA DEP does not have access to USDA-NRCS locations, but when an NRCS practice is identified through state programs, such as but not limited to, the Chesapeake Bay Agriculture Inspection Program and Nutrient and Manure Management Program, the NRCS practice is recorded in the PracticeKeeper Geodatabase with all known attributes including the implementation date and inspection date as well as identification that the practice was funded by USDA-NRCS. The practice is purged from the data set submitted to NEIEN for annual reporting unless the practice implementation date indicates that the practice is beyond its credit duration. If the practice is beyond its credit duration, the date the practice was reverified is identified and the practice is submitted to NEIEN for annual progress as a new practice including the actual implementation date or the operator's best estimate, indicating that the practice is beyond its credit duration, and the inspection date.

Similarly, the Penn State Voluntary Producer Survey asks the BMP reporter if any cost-share funds were used in the implementation of the BMP and these cost-shared practice records are excluded from the data reported by Penn State. Additionally, data reported by Penn State is checked

against BMP records being reported out of PracticeKeeper to ensure these records are not double counted.

Matthew Royer, Penn State University Director of Agriculture and Environment Center, provided a summary procedure description for the 2016, 2020, 2022 Penn State Survey Report is detailed in B10.3.7 Penn State University Agricultural Voluntary BMP Reporting Outreach and Appendix F. Penn State did not complete a survey in Pennsylvania in 2021.

In 2023, DEP will be updating the BMP Warehouse to a more automated process and is being re-labeled as Data Warehouse. The plans for Data Warehouse include the ability to automatically cross communicate records and check for duplicate records based on geospatial data proximity across programs.

Applicable Reference Guides and Documents:

- PA BMP Verification Program Plan QAPP Addendum: The most recent version of the BMP Verification Program Plan is published on the DEP Chesapeake Bay BMP Verification webpage: https://www.dep.pa.gov/Business/Water/Pennsylvania%E2%80%99s%20Chesapeake%20Bay%20Program%20Office/agriculture/Pages/BMP-Verification.aspx All references to the "PA BMP Verification Program Plan QAPP Addendum" throughout the document should utilize this referenced link.
- DEP Strategy to Enhance Pennsylvania's Chesapeake Bay Restoration Effort (2016 Chesapeake Bay Restoration Strategy): https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/DEP%20Chesapeake%20Bay%20Restoration%20Strategy%20012116.pdf
- DEP BWRNSM internal spreadsheets sent via email to EPA CBPO on December 1, 2021.
    - "2021 NEIEN Template"
    - "State Warehouse to CAST Crosswalk"
    - "Primary BMP Source Cost Share or Regulatory Programs"
- "Detailed BMP Entry Form Template" Link: https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/WIPIII/CountyPlanningProcess/Detailed_BMP_Entry_Form_Updated_06.16.21.xlsx
- CBPO Quick Reference Guide: https://www.chesapeakebay.net/documents/BMP-Guide_Full.pdf
- PA NRCS Field Office Technical Guide: https://efotg.sc.egov.usda.gov/#/state/PA
- PA Stormwater BMP Manual: http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4673
- Resource Improvement Practices
    - CBPO approved verification protocols for Resource Improvement Practices are described in detail in the Chesapeake Bay Agricultural Inspection Program SOP

No. CBO-INSP-001 updated May 20222 linked at https://files.dep.state.pa.us/Water/BPNPSM/AgriculturalOperations/AgriculturalCompliance/Combined_CBAIP_SOP_Final_5-25-22.pdf

- Agriculture Inspections Module SOP No. CBO-DATA-002 – Internal Document sent via email to EPA CBPO on July 22, 2021
- Best Management Practice (BMP) Module SOP No. CBO-DATA-003 – Internal Document sent via email to EPA CBPO on July 22, 2021 and December 1, 2021
- CBP-23 Report PracticeKeeper Troubleshoot Guide – Internal Document sent via email to EPA CBPO on July 22, 2021
- Inspection Report for Agricultural Operations (Sample) 3830-FM-BCW0524 - https://files.dep.state.pa.us/Water/BPNPSM/AgriculturalOperations/AgriculturalCompliance/3830-FM-BCW0524_SAMPLE.pdf
- Agricultural Operation Supplemental Information (Sample) 3830-FM-BCW0524a - http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=9260&DocName=AGRICULTURAL%20OPERATION%20SUPPLEMENTAL%20INFORMATION%20(SAMPLE).PDF%20%20%3Cspan%20style%3D%22color%3Agreen%3B%22%3E%3C%2Fspan%3E%20%3Cspan%20style%3D%22color%3Ablue%3B%22%3E%3C%2Fspan%3E
- EPA Responses to Pennsylvania's Documentation of Manure Management Plans' Use of Book Values, March 10, 2017 sent via email to EPA CBPO on December 1, 2021 and published to the DEP BMP Verification website here: https://www.dep.pa.gov/Business/Water/Pennsylvania%E2%80%99s%20Chesapeake%20Bay%20Program%20Office/agriculture/Pages/BMP-Verification.aspx
- Draft EPA Animal Agriculture Program Assessment for Pennsylvania – comments/feedback provided to EPA on July 22, 2022

Table A2. List of BMPs compiled by DEP for submittal to EPA

BMP Name	Reporting Geographic Scale
Animal Mortality Facility	Statewide/County
Animal Trails and Walkways	Statewide/County/Lat Long
Animal Waste Management Systems (All Types)	Statewide/County/Lat Long
Barnyard Clean Water Diversion RI	Statewide/County
Barnyard Runoff Controls	County/Lat Long
Bioretention	County/Lat Long
Channel Bed Stabilization	Latitude and Longitude
Channel Stabilization	Lat Long
Commodity Cover Crop- Standard	County
Composting Facility	Statewide/County/Lat Long
Conservation Cover	Statewide/County/Lat Long
Conservation Plans	Statewide/County/Lat Long
Conservation Tillage	County
Cover Crops	County
CREP Riparian Forest Buffer	Statewide/County

BMP Name	Reporting Geographic Scale
CREP Wetland Restoration	Statewide
CREP Wildlife Habitat	Statewide/County
Critical Area Planting	Statewide/County/Lat Long
D&G Road - Surface Aggregate and Raised Roadbed	County
Disconnection of Rooftop Runoff	County/Lat Long
Dry Detention Ponds	County/Lat Long
Dry Detention Ponds & Hydrodynamic Structures	County/Lat Long
Dry Extended Detention Ponds	Lat Long
Dry Swale	Lat Long
Dry Waste Storage Structure RI	County
Erosion & Sediment Control	Lat Long
Erosion and Sediment Control Level 2	County
Exclusion Fence with Forest Buffer RI	County
Exclusion Fence with Grass Buffer	County
Exclusion Fence with Grass Buffer RI	County
Exclusion Fence with Narrow Forest Buffer	Statewide/County/Lat Long
Exclusion Fence with Narrow Forest Buffer RI	County
Exclusion Fence with Narrow Grass Buffer	Statewide/County/Lat Long
Exclusion Fence with Narrow Grass Buffer RI	Statewide/County
Field Border	Statewide/County/Lat Long
Filter Strip	Statewide/County/Lat Long
Filter strips	Statewide/County
Filtration	County/Lat Long
Forest Harvesting Practices	County/Lat Long
Forest Stand Improvement	Statewide/County/Lat Long
Grass Buffers	County/Lat Long
Grassed Waterway	Statewide/County/Lat Long
Grazing Land Protection	County
Green Roofs	Lat Long
High Residue Tillage Management	County
Infiltration Basin	Lat Long
Infiltration Trench	Lat Long
Land Reclamation, Abandoned Mined Land	County
Land Retirement	Statewide/County/Lat Long
Loafing Lot Management System	Statewide/County/Lat Long
Manure Incorporation High Disturbance	County
Manure Incorporation Low Disturbance	County
Manure Incorporation Low Disturbance Immediate	County
Manure Incorporation Low Disturbance Late	County
Manure Transport	County
Narrow Forest Buffers	County/Lat Long
Narrow Grass Buffers	County
New Runoff Reduction	County/Lat Long
New Stormwater Treatment	County/Lat Long
Nutrient Management Core N	Statewide/County
Nutrient Management Core P	Statewide/County
Nutrient Management N Placement	County
Nutrient Management N Rate	County
Nutrient Management N Timing	County
Nutrient Management P Placement	County

BMP Name	Reporting Geographic Scale
Nutrient Management P Rate	County
Nutrient Management P Timing	County
Pasture and Hay Planting	Statewide/County
Prescribed Grazing	Statewide/County/Lat Long
Rain Garden	Lat Long
Reduced Tillage	County
Reduction of Impervious Surface	County/Lat Long
Retrofit Runoff Reduction	County/Lat Long
Retrofit Stormwater Treatment	County/Lat Long
Riparian Forest Buffer	Statewide/County/HUC12/Lat Long
Riparian Herbaceous Cover	Statewide/County/HUC12/Lat Long
Roof runoff management	Statewide/County/Lat Long
Roof Runoff Structure	Statewide/County/Lat Long
Rotational Grazing RI	County
Septic Connections	County
Septic Tank Pumpout	County
Stream Channel Stabilization	County/Lat Long
Stream Restoration	County
Stream Restoration Ag	County/Lat Long
Streambank and Shoreline Protection	Statewide/County/HUC12/Lat Long
Streambank Restoration	County/Lat Long
Streambank Stabilization	County/Lat Long
Street Cleaning Practice 11	Lat Long
Street Sweeping	County/Lat Long
Structure for Water Control	Statewide/County/Lat Long
Tree Planting	Statewide/County/Lat Long
Tree/Shrub Establishment	Statewide/County
Urban Forest Buffer	County/Lat Long
Urban Forest Planting	County
Urban Infiltration Practices	County
Urban Nutrient Management Plan	Lat Long
Urban stream restoration	Lat Long
Vegetated Open Channels	Lat Long
Vegetated Treatment Area	Statewide/County/Lat Long
Waste Storage Facility	Statewide/County/Lat Long
Waste Storage Structure	Lat Long
Wastewater Treatment Strip	County
Water Control Structure	Lat Long
Watering Facility	Statewide/County/Lat Long
Wet Pond	County/Lat Long
Wet Ponds & Wetlands	County/Lat Long
Wetland Creation	County/HUC12/Lat Long
Wetland Functional Gains - Enhanced	County
Wetland Rehabilitation	County
Wetland Restoration	Statewide/County/HUC12/Lat Long
Windbreak/Shelterbelt Establishment	Statewide/County

Key:

Statewide reporting is associated with NRCS and Penn State Survey data that are provided without County location data due to aggregation requirements associated with these programs. More information on how these

programs are not double counted in other state records is provided in Section A6 and within the attached Penn State Survey Documentation.

County reporting is provided for most agricultural BMPs. Most BMPs are reported as located within the Chesapeake Bay Watershed within the county. County data reported as the "Whole County", such as E&S Control Level 2 is reported as such. All data reported through the Capital RC&D Transect Survey is reported at the County Scale.

HUC12 reporting is provided by just a few programs and is provided at the HUC12 scale within the Chesapeake Bay Watershed.

Lat Long reporting includes BMP data in which geospatial latitude and longitude coordinates have been provided. DEP's BMP Warehouse application does not allow the upload of coordinates outside the state of Pennsylvania.

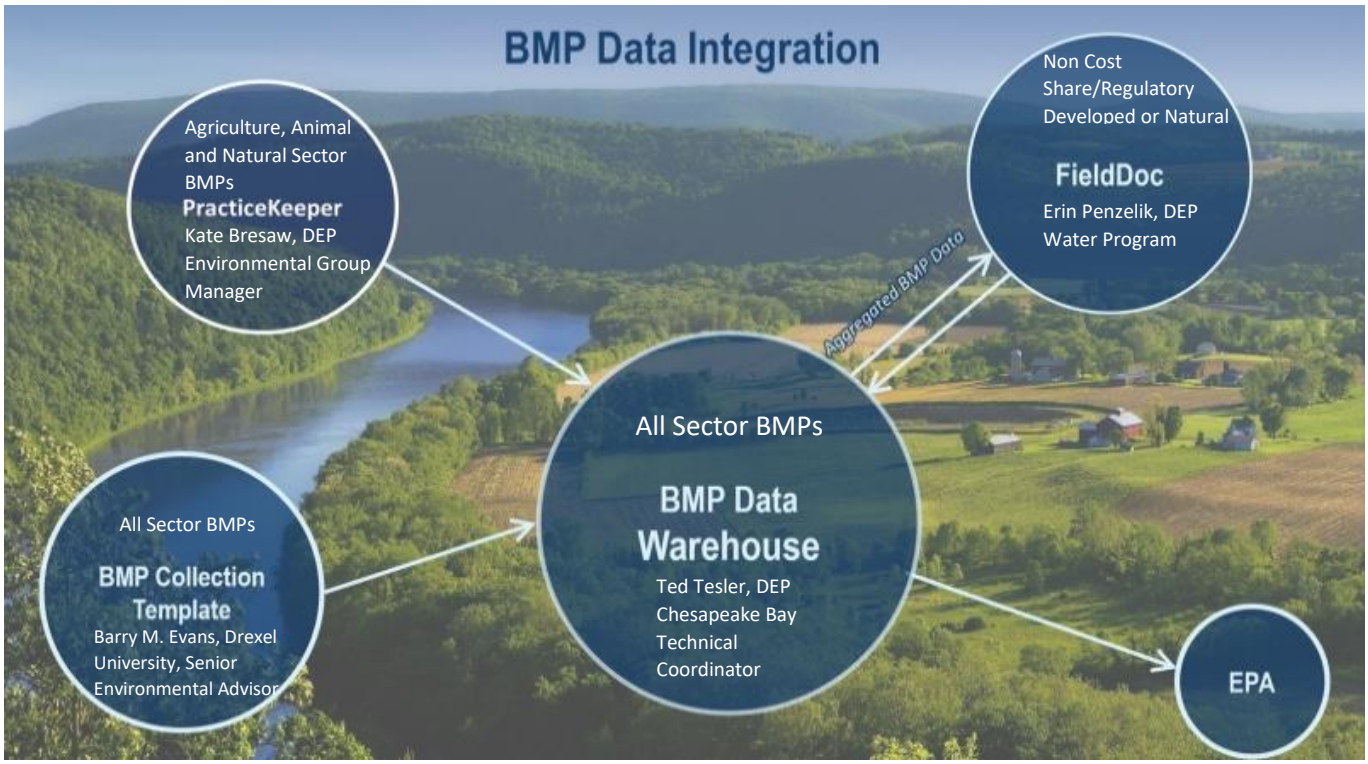
A7: Quality Objectives and Criteria

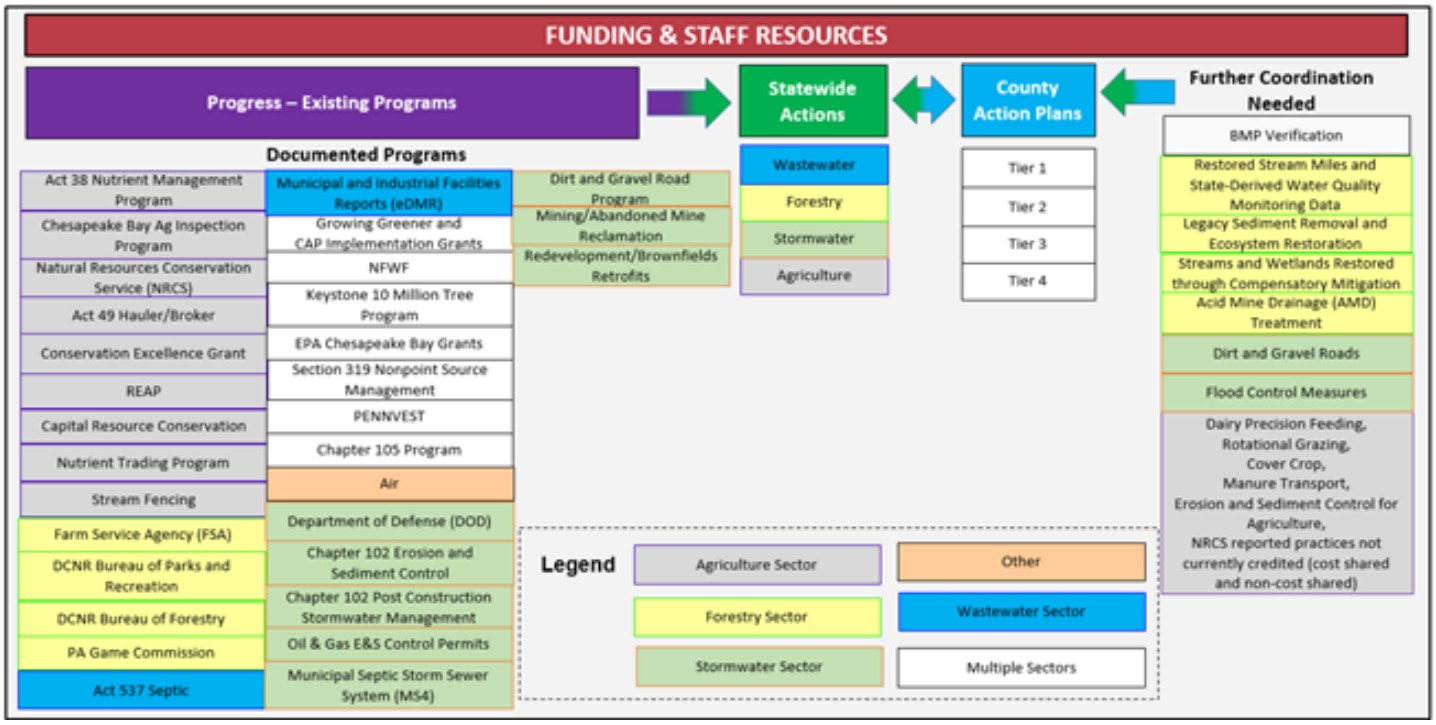
1) Accuracy Objectives (Qualitative)

Pennsylvania strives to collect the most complete information and is expanding and improving data collection sources and methods. Data providers are to submit data to DEP for the reporting period by November 1st of each reporting year. A reporting year is to include 12 months of program data from July 1st through June 30th of the reporting year. Source specific verification is addressed in PA's QAPP BMP Verification Program Plan QAPP Addendum. BWRNSM keeps a spreadsheet of active and prior reporters.

Refer to "A6: Project Description" for details on PA DEP BWRNSM QA/QC process.

High Level BWRNSM BMP Data Graphic





As part of EPA's evaluation of Pennsylvania's annual progress data, EPA evaluates expected numbers vs. actual counts using Pennsylvania's prior years' numbers. Application of credit duration(s) in the Phase 6 Model will remove and preclude continued use of unverified BMPs. Issues related to verification of implemented BMPs are addressed in Pennsylvania's BMP Verification Program Plan QAPP Addendum.

Potential for high biases have largely been caused by reporting from federal data sources that did not locate the practice or identify reverification of an existing practice. The application of CBPO credit duration beginning in 2016 has created a low bias situation due to Pennsylvania's inability to verify federal cost-shared and reported practices. Also, additional resources like trained and qualified personnel are needed to verify Pennsylvania's known BMP inventory. There is also a potential for low biases to occur because not all non-cost shared / non regulatory field implemented practices are reported or tracked. DEP CBO is continuing to develop and implement solutions to improve reporting through voluntary self-reporting efforts such Penn State Voluntary Producer Survey. Other methods like the RC&D Transect Survey work to identify BMP implementation at larger scales, however this has resource limitations like cover crop speciation and county's that are surveyed.

A8: Training and Qualifications

Staff responsible for on-site inspections and data reviews have technical expertise, qualifications, and titles established by their respective programs related to this reporting and verification. These qualifications can be found within the appropriate job descriptions, work agreements, and program specific SOPs, links to which will be contained in PA BMP Verification Program Plan QAPP Addendum http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/PA_2020_Best_Management_Practice_Verification_Program_Plan_12-01-2020.pdf and Section B10 Data Management (subsections B10.2.1- B10.3.10), when applicable.

Database Managers:

1) NRCS and State Conservation Specialists
2) Erosion and Sediment Control and Stormwater Permit Reviewers and Inspectors
3) Nutrient Management Specialists who write and review Nutrient Management Plans, write and verify Manure Management Plans, and write and verify Nutrient Balance Sheets
4) Forestry Inspectors
5) CAFO inspectors
6) Chesapeake Bay Agriculture Inspection Program inspectors

A9: Documentation and Records

Staff responsible for documentation and records retention follow specific program guidelines established by their respective programs as well as state records retention policies. BMP data are stored on Commonwealth servers that are backed up to prevent data loss.

Inspection forms, where applicable, and other documentation are available at the appropriate links or referenced as an internal document within Section B10 Data Management (subsections B10.2.1-B10.3.10).

B. Data Generation and Acquisition

B1-B9. These sections are not applicable to the acquisition and reporting of BMP data.

B10: Data Management (Tracking and Reporting Procedures)

B10.1 Overview of Process

As briefly described in Section A, BMP-related data are obtained from multiple sources. These include data on such activities as agricultural BMPs, urban BMPs, stream restoration and floodplain reconnection, manure transport, animal waste management systems, and other similar activities that can potentially result in model- simulated decreases in nutrient and sediment loads within Pennsylvania's portion of the Chesapeake Bay watershed. Depending on the source, information on a variety of BMP types and activities may be included with data obtained from state or federal programs. In some cases (e.g., NRCS, SCC REAP, DEP Growing Greener, DEP CBRAP or CBIG, and DEP 319 Program), data related to an extensive list of BMPs may be obtained. Whereas in other cases (e.g., the SCC Dirt and Gravel Road Program and the USDA Rural Development Program), information may be provided for only one or two specific BMPs. In all cases, as described in more detail in following sub-sections, additional processing is undertaken to translate BMP information into the specific BMP-related names and units required by NEIEN protocols.

Upon identifying the type of BMP information needed by CBPO, early NEIEN-related efforts were focused on ways to re-format the data to conform to the data requirements of NEIEN and Scenario Builder, and ultimately the Chesapeake Bay model. At present, this is basically done by making various adjustments to Excel files, or other tabular information, obtained from those sources listed in Table A1. These adjustments are based on data formatting guidance provided by CBPO NEIEN Data Appendices.

Using data files and reports obtained from the sources listed in Table A1, Excel files are prepared and delivered to an individual within DEP's Bureau of Watershed Restoration and Nonpoint Source Management who has the responsibility for entering BMP information contained in the Excel files into DEP's BMP Warehouse application, which is subsequently used for transferring data to CBPO in XML format via NEIEN.

BMPs are reported to NEIEN Phase 6 version of the BMP Warehouse application released in October 2018 and subsequent data submissions. Prior to uploading data, related BMPs contained in the Excel files are revised and corrected as needed to ensure that all data are properly submitted to CBPO. BMP data are error checked during the BMP import process into the BMP Warehouse. Refer to "A6: Project Description" for details on PA DEP BWRNSM QA/QC process.

B10.2 Source-Specific Data Compilation Procedures

In this section, brief descriptions of data obtained, and procedures used, for compiling BMP data for the program sources given in Table A1 are provided, along with examples of the files used and/or created during the process. It should be noted that the results of past NEIEN data submissions are still being evaluated, and that some of the sources and descriptions given may change through time. Consequently, expectations are that this procedures document will be updated as necessary in order to provide sufficient guidance on the preparation and submittal of BMP data to the CBPO in the future.

In some cases, estimates of implementation levels of various BMPs (i.e., nutrient management, cover crops, conservation tillage, street sweeping, and manure transport) are derived from several of the sources listed in Table A1 or are compiled via more specialized procedures. These are discussed separately in Section B10.3.

Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements in A8: Training and Qualifications. These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN. However, any BMP activities identified as being federally-funded (either partially or fully) are identified as such.

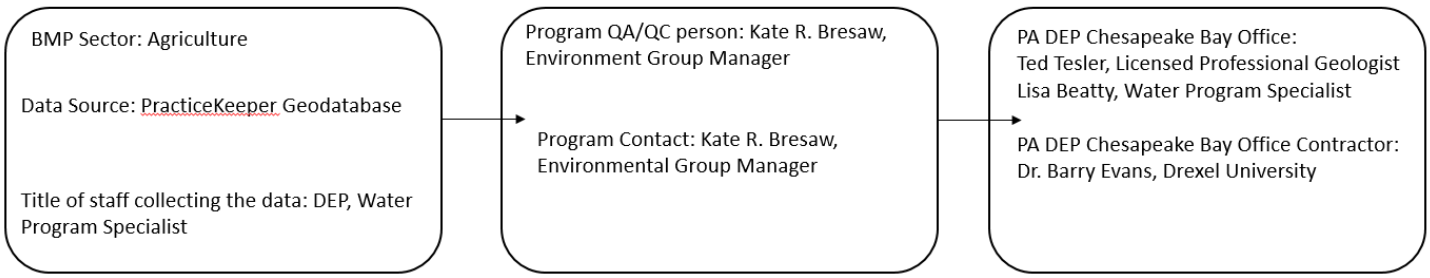
Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.2.1 DEP Stream Bank Fencing Program

Contact: Kate R. Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management (717-772-5650, kbresaw@pa.gov)
QA/QC Contact: Same as above

Data Compilation Procedures

High level data flow chart:



Sector: Agriculture
BMP List: Exclusion Fence with Forest Buffer, Exclusion Fence with Grass Buffer

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003.

Data from DEP's streambank fencing program is entered in the PracticeKeeper Geodatabase by DEP Northeast Regional Office staff. BMPs related to the following funding programs are submitted on the same excel file:

(1) Act 13 Unconventional Gas Funds
(2) Ag. Plan Reimbursement Program
(3) County Action Plan Implementation Grants
(4) Chesapeake Bay Special Projects (CBIG)
(5) DEP Streambank Fencing
(6) Exelon
(7) Mariner East 2 Grant
(8) NRCS Conservation Technical Assistance, and
(9) Privately funded BMPs

Privately funded BMPs are reported in the PracticeKeeper Geodatabase as part of the required output measures associated with the following Agricultural Programs:

(1) Nutrient Management Act Programs
(2) Chesapeake Bay Technicians
(3) Chesapeake Bay Engineers (CBIG)
(4) Pennsylvania's Agriculture Inspection Program

A BMP is not reported if it was funded by a funding source that is reported by another program. For example, all practices funded by USDA programs or DCNR grants that are also within the credit duration of the BMP will be removed from the dataset before reporting to NEIEN. The file is then submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

<u>Data Verification Procedures</u>

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003.

a) Attributes Tracked:
   i) BMP type
      (1) Fence
   ii) BMP subtype
      (1) Exclusion Fence with Forest Buffer
      (2) Exclusion Fence with Grass Buffer
   iii) Status

iv) Geographic Scale
    (1) Manually drawn BMP.
        (a) Latitude and Longitude is based on the calculated centroid of the BMP.
        (b) County is derived from the intersection of the drawn BMP and county boundaries.
        (c) Watershed is derived from the intersection of the drawn BMP and watershed boundaries.
v) Dates
    (1) Planned
    (2) Inventory & Evaluation
    (3) Surveyed
    (4) Design Approved
    (5) Implemented
vi) BMP Participants
    (1) Designer
    (2) Design Reviewer
    (3) Design Approver
    (4) Implementer
    (5) Planner
vii) Implemented Amount
viii) Unit of Measure
ix) Funding Source, Amount, and Date
x) Inspections (Reverification Data)
    (1) Inspector Name
    (2) Date Inspection Performed
    (3) BMP Compliance
    (4) Verified Amount

b) Potential sources of duplicate BMPs
    i) BMPs that were implemented using funding sources that are reported separately including USDA programs, Conservation Excellence Grant, REAP, Growing Greener, 319, NFWF, PennVest or DCNR grants.
        (1) If a BMP is solely or co-funded with any of the funding sources listed above, it is removed from the exported dataset before reporting to NEIEN.
c) Data Entry Errors
    i) Obvious data entry errors such as implementation dates, etc. are communicated with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN.
d) Qualifications
    i) DEP Northeast Regional Office staff receive classroom, web-based, and on-the-job training to determine that the installed BMP meets the BMP definition. If the BMP is reported as implemented in PracticeKeeper, it is assumed that the BMP meets the BMP definition.

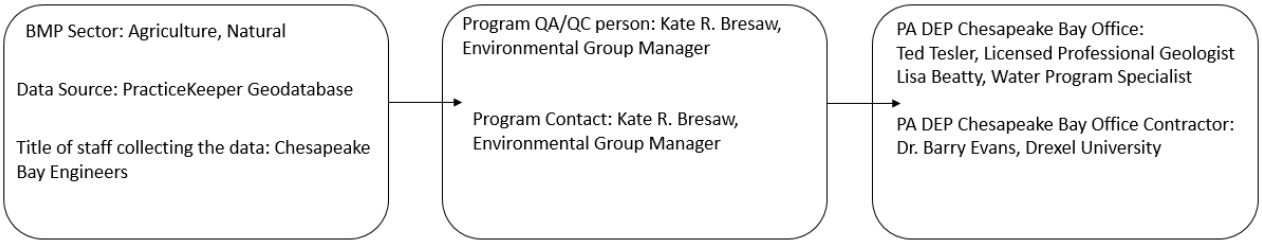
ii) DEP Northeast Regional Office staff receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. CBO-DATA-003 and the accompanying DEP Clean Water Academy Learning Module.)

B10.2.2 DEP Chesapeake Bay Implementation Grant (CBIG)

Contact: Kate R. Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management (717-772-5650, kbresaw@pa.gov)
QA/QC Contact: Same as above

Data Compilation Procedures

High level data flow chart:



Sector: Agriculture, Animals, Natural

BMP List:

Access Road
Animal Mortality Facility
RI-2 Animal Compost Structure
Animal Trails and Walkways
Brush Management
Composting Facility
Conservation Cover
Constructed Wetland
Contour Buffer Strips
Contour Farming
Critical Area Planting
Diversion
Fence
Exclusion Fence with Forest Buffer
Exclusion Fence with Grass Buffer
Field Border
Filter Strip
Forage and Biomass Planting
Forest Stand Improvement
Heavy Use Area Protection
Hedgerow Planting
Integrated Pest Management
Lined Waterway or Outlet
Pipeline
Prescribed Grazing
RI - 15 Rotational Grazing
Pumping Plant
Riparian Forest Buffer
RI-10 Forest Buffer on Watercourse
RI-9 Forest Nutrient Exclusion Area on Watercourse - Narrow
Riparian Herbaceous Cover
RI-8 Grass Buffer on Watercourse
Roof Runoff Structure
RI - 16 Barnyard Clean Water Diversion
Roofs and Covers
Seasonal High Tunnel System for Crops
Sediment Basin
Spring Development

Grassed Waterway	Stream Crossing
Streambank and Shoreline Protection	Waste Storage Facility
Stripcropping	RI-1 Dry Waste Storage Structure
Structure for Water Control	Waste Transfer
Subsurface Drain	Waste Treatment
Terrace	Water Well
Trails and Walkways	Watering Facility
Underground Outlet	RI - 18 Watering Trough
Upland Wildlife Habitat Management	Wetland Creation
Vegetated Treatment Area	Wetland Restoration
RI-4a Watercourse Access Control – Narrow Grass	Wetland Wildlife Habitat Management
RI-5 Watercourse Access Control - Grass	RI-6 Watercourse Access Control - Trees
RI-4b Watercourse Access Control – Narrow Trees	Exclusion Fence with Forest Buffer - Narrow
Exclusion Fence with Grass Buffer - Narrow	Waste Treatment Lagoon

CBIG has historically funded agricultural BMPs as part of DEP Chesapeake Bay Special Projects. BMPs that were funded as part of Chesapeake Bay Special Projects will continue to be reverified following the verification strategies outlined below. Currently, CBIG funds support Chesapeake Bay Engineer positions employed by county conservation districts. As part of the required output measures described in the Chesapeake Bay Engineer contracts, the engineers design and implement agricultural BMPs and the BMP data is tracked and verified as described below.

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003.
BMP data is entered in the PracticeKeeper Geodatabase by County Conservation District (CCD)

Chesapeake Bay Engineering staff. An export excel file is downloaded from the PracticeKeeper

Geodatabase with other BMP data. BMPs related to the following funding programs are

submitted on the same excel file:

(1) Act 13 Unconventional Gas Funds
(2) Ag. Plan Reimbursement Program
(3) County Action Plan Implementation Grants
(4) Chesapeake Bay Special Projects (CBIG)
(5) DEP Streambank Fencing
(6) Exelon
(7) Mariner East 2 Grant
(8) NRCS Conservation Technical Assistance, and
(9) Privately funded BMPs

Privately funded BMPs are reported in the PracticeKeeper Geodatabase as part of the required

output measures associated with the following Agricultural Programs:

(5) Nutrient and Manure Management Program
(6) Chesapeake Bay Technicians
(7) Chesapeake Bay Engineers (CBIG)
(8) Pennsylvania's Agriculture Inspection Program

A BMP is not reported if it was funded by a funding source that is reported by another program. For example, all practices funded by USDA programs or DCNR grants that are also within the credit duration of the BMP will be removed from the dataset before reporting to NEIEN. The file is then submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

Data Verification Procedures

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003.

a) Attributes Tracked:
    i) BMP type
    ii) BMP subtype
    iii) Status
    iv) Geographic Scale
        (1) Manually drawn BMP.
            (a) Latitude and Longitude is based on the calculated centroid of the BMP.
            (b) County is derived from the intersection of the drawn BMP and county boundaries.
            (c) Watershed is derived from the intersection of the drawn BMP and watershed boundaries.
    v) Dates
        (1) Planned
        (2) Inventory & Evaluation
        (3) Surveyed
        (4) Design Approved
        (5) Implemented
    vi) BMP Participants
        (1) Designer
        (2) Design Reviewer
        (3) Design Approver
        (4) Implementer
        (5) Planner
    vii) Implemented Amount
    viii) Unit of Measure
    ix) Funding Source, Amount, and Date
    x) Inspections (Reverification Data)
        (1) Inspector Name

(2) Date Inspection Performed
(3) BMP Compliance
(4) Verified Amount

b) Potential sources of duplicate BMPs
   i) BMPs that were implemented using funding sources that are reported separately including USDA programs, Conservation Excellence Grant, REAP, Growing Greener, 319, NFWF, PennVest or DCNR grants.
      (1) If a BMP is solely or co-funded with any of the funding sources listed above, it is removed from the exported dataset before reporting to NEIEN.
c) Data Entry Errors
   i) Obvious data entry errors such as implementation dates, etc. are communicated with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN.
d) Qualifications
   i) CCD staff receive classroom, web-based, and on-the-job training to determine that the installed BMP meets the BMP definition. If the BMP is reported as implemented in the PracticeKeeper Geodatabase, it is assumed that the BMP meets the BMP definition.
   ii) CCD Chesapeake Bay Engineers attend NRCS Bootcamps and web-based, classroom, and on-the-job trainings, obtain NRCS Job Approval Authority, and experience have appropriate oversite from NRCS engineering staff.

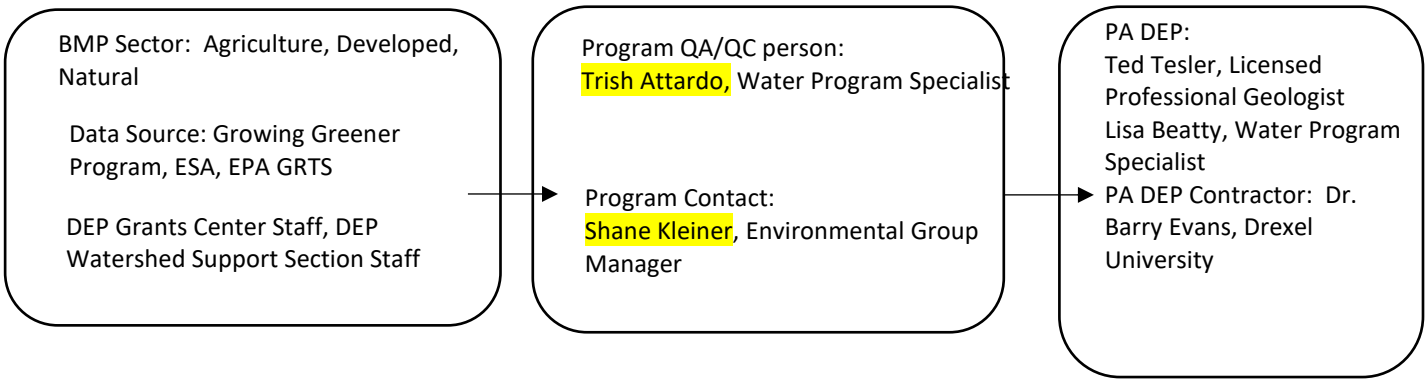
B10.2.3 DEP Growing Greener Program

Contact: Shane Kleiner DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management, Watershed Support Section (570-826-2509, shkleiner@pa.gov)

QA/QC Contact: Trish Attardo, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management, Watershed Support Section (717-772-3972, pattardo@pa.gov)

Data Compilation

High level data flow chart:



Sector: Agriculture, Developed, Natural

List of BMPs:

Note: This is a statewide program and we report applicable CBPO BMPs for annual progress.

Source BMP Name
Access Control
Animal Mortality Facility
Animal Trails & Walkways
Barnyard Runoff Controls
Brush Management
Compost Facility
Conservation Cover
Conservation Crop Rotation
Conservation Plan Supporting Organic Transition
Conservation Plans
Constructed Wetland
Contour Buffer Strips
Contour Farming
Critical Area Planting
Dead Poultry Composting Facility
Diversion
Early Successional Habitat Development/Management
Exclusion Fence with Forest Buffer
Exclusion Fence with Grass Buffer
Exclusion Fence with Narrow Forest Buffer

Exclusion Fence with Narrow Grass Buffer
Feed Management
Fencing
Field Border
Filter Strip
Forage and Biomass Planting
Forage Harvest Management
Forest Buffer
Forest Buffer-Narrow
Forest Stand Improvement
Grass Buffers
Grassed Waterway
Grassed waterways, non-easement
Grazing
Heavy Use Area Protection
Hedgerow Planting
Irrigation System, Microirrigation
Irrigation Water Management
Irrigation Water Conveyance, Pipeline, High-Pressure
Lined Waterway or Outlet
Pasture & Hayland Planting
Pipeline
Prescribed Grazing
Restoration: Buffers/Landscape/Floodplain
Riparian Forest Buffer
Riparian Herbaceous Cover
Road Stabilization
Roof Runoff Management
Roof Runoff Structure
Roofs and Covers
Solid/Liquid Waste Separation Facility
Stream Channel Stabilization
Stream Habitat Improvement and Management
Stream Restoration
Streambank & Shoreline Protection
Streambank & Shoreline Protection
Strip-cropping-Contour
Structure for Water Control
Subsurface Drain
Terrace

Tree Planting
Tree/Shrub Establishment
Trough or Tank
Upland Wildlife Habitat Management
Vegetated Treatment Area
Waste Management System
Waste Storage Facility/Systems
Waste Storage Pond
Waste Storage Structure
Wastewater Treatment
Wastewater Treatment Strip
Water and Sediment Control Basin
Watering Facility
Wetland Creation
Wetland Restoration
Wildlife food plot
Windbreak/Shelterbelt Establishment
Urban Forest Buffer
Urban stream restoration

Information on BMPs funded by Growing Greener funds are tracked by Trish Attardo in the DEP Bureau of Watershed Restoration and Nonpoint Source Management Watershed Support Section. For NEIEN reporting purposes, a request is initially made to Shane Kleiner, Environmental Group Manager for the Watershed Support Section, as the program contact. Trish Attardo prepared an Excel file that contains "raw" information on the location and extent of Growing Greener-funded BMPs. As with other programs, this information is re-formatted into NEIEN-specific fields and values for later inclusion in the BMP Warehouse. Animal Heavy Use Protection (NRCS 561) is reported as Loafing Lot Management in Pennsylvania.

Data Verification

The BMP records are verified by the Growing Greener program to ensure completeness and double counting and errors by QA/QC of BMP name, implementation date, BMP extent and location prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

Growing Greener Grant Guidance, Grant Applications, Task and Deliverables can be found at the following link:
https://www.dep.pa.gov/Citizens/GrantsLoansRebates/Growing-Greener/Pages/default.aspx and the linked Growing Greener Plus Grants Program Guidance that includes that the Chesapeake Bay Phase III WIP activities. DEP encourages applicants within the Chesapeake Bay Watershed to apply for projects that implement recommendations of the Phase 3 WIP and the Countywide

Action Plans (CAPs) related to nutrient and sediment reductions included under the Chesapeake Bay TMDL.

Act 167 (Stormwater Management) land use considerations for infrastructure or facilities construction that involve projects proposing the construction of infrastructure or facilities (including streambank restoration, or BMPs) may receive additional consideration by meeting certain local land use planning and control requirements. Act 166 (Floodplain Management) land use considerations for watershed assessment or restoration planning for projects proposing watershed assessments or restoration planning may receive additional consideration by meeting certain local land use planning and control requirements.

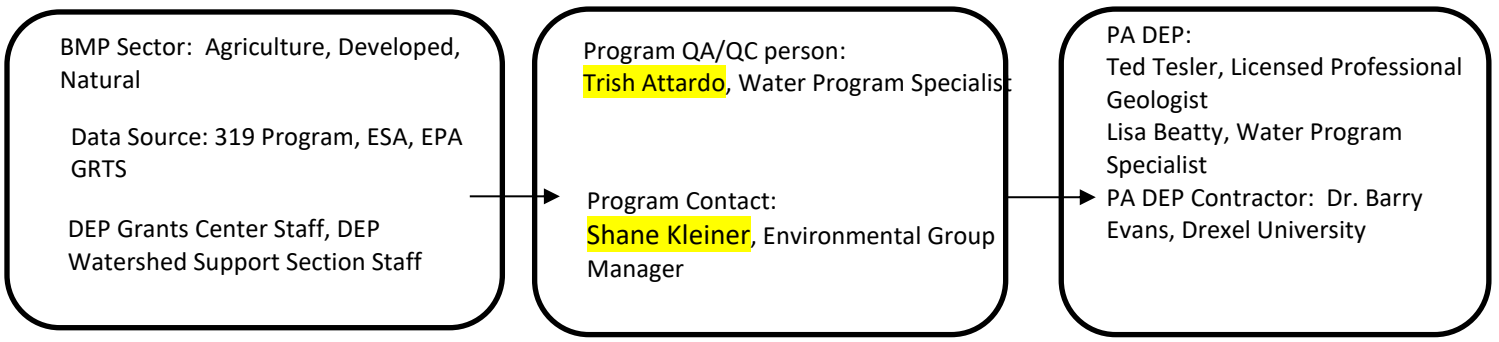
B10.2.4 DEP Section 319 Program

Contact: Shane Kleiner DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management, Watershed Support Section (570-826-2509, shkleiner@pa.gov)

QA/QC Contact: Trish Attardo, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management, Watershed Support Section (717-772-3972, pattardo@pa.gov)

Data Compilation Procedures

High level data flow chart:



Sector: Agriculture, Developed, Natural

BMP List:

Note: This is a statewide program and we report applicable CBPO BMPs for annual progress.

Source BMP Name
Access Control
AML Surface Mine Reclamation

Animal Mortality Facility
Animal Trails & Walkways
Barnyard Runoff Controls
Brush Management
Compost Facility
Conservation Cover
Conservation Crop Rotation
Conservation Plan Supporting Organic Transition
Conservation Plans
Constructed Wetland
Contour Buffer Strip
Contour Farming
Critical Area Planting
Dead Poultry Composting Facility
Diversion
Early Successional Habitat
Development/Management
Exclusion Fence with Forest Buffer
Exclusion Fence with Grass Buffer
Exclusion Fence with Narrow Forest Buffer
Exclusion Fence with Narrow Grass Buffer
Feed Management
Fencing
Field Border
Filter Strip
Forage and Biomass Planting
Forage Harvest Management
Forest Buffer
Forest Buffer-Narrow
Forest Stand Improvement
Grass Buffers
Grassed Waterway
Grassed waterways, non-easement
Grazing
Heavy Use Area Protection
Hedgerow Planting
Irrigation System, Microirrigation
Irrigation Water Conveyance, Pipeline, High-Pressure
Irrigation Water Management
Lined Waterway or Outlet

Pasture & Hayland Planting
Pipeline
Riparian Forest Buffer
Riparian Herbaceous Cover
Roof Runoff Management
Roof Runoff Structure
Roofs and Covers
Solid/Liquid Waste Separation Facility
Stream Habitat Improvement and Management
Stream Restoration
Strip-cropping-Contour
Structure for Water Control
Subsurface Drain
Terrace
Tree Planting
Tree/Shrub Establishment
Trough or Tank
Upland Wildlife Habitat Management
Vegetated Treatment Area
Waste Management System
Waste Storage Facility/Systems
Waste Storage Pond
Waste Storage Structure
Wastewater Treatment
Wastewater Treatment Strip
Water and Sediment Control Basin
Watering Facility
Wetland Creation
Wetland Restoration
Wildlife food plot
Windbreak/Shelterbelt Establishment
Urban Forest Buffer
Urban stream restoration

Information on BMPs funded by Section 319 are tracked by Trish Attardo in the DEP Bureau of Watershed Restoration and Nonpoint Source Management, Watershed Support Section. For NEIEN reporting purposes, a request is initially made to Shane Kleiner, Environmental Group Manager for the Watershed Support Section, as the program contact. Trish Attardo prepared an Excel file that contains “raw” information on the location and extent of Section 319-funded BMPs. As with other programs, this information is re-formatted into NEIEN-specific fields and values for later inclusion in the BMP Warehouse. Animal Heavy Use Protection (NRCS 561) is reported as

Loafing Lot Management in Pennsylvania.

Data Verification

Section 319 BMP records are verified by the program to ensure completeness and double counting and errors by QA/QC of BMP name, implementation date, BMP extent and location prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN. Nonpoint Source Section 319 Nonpoint Source Management Grants information can be found at https://www.dep.pa.gov/Business/Water/PlanningConservation/NonpointSource/Pages/default.aspx

When environmental data are being collected during the course of a Section 319 project, a Quality Assurance Project Plan (QAPP) must be followed in accordance with specific EPA guidelines (40 CFR 31.45 and 30.54). QAPPs outline the methods and procedures that a monitoring project will use to make sure that samples are collected and analyzed, and data are stored and reviewed to ensure quality high enough to meet the needs of the project. Project Sponsors should discuss QAPP requirements with the DEP Project Advisor as early in the grant process as possible. Specific guidelines on writing a QAPP are provided at: https://www.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5. For more specific information on 319 grant guidance regarding quality control see 319 Grant Guidance Document (PDF)

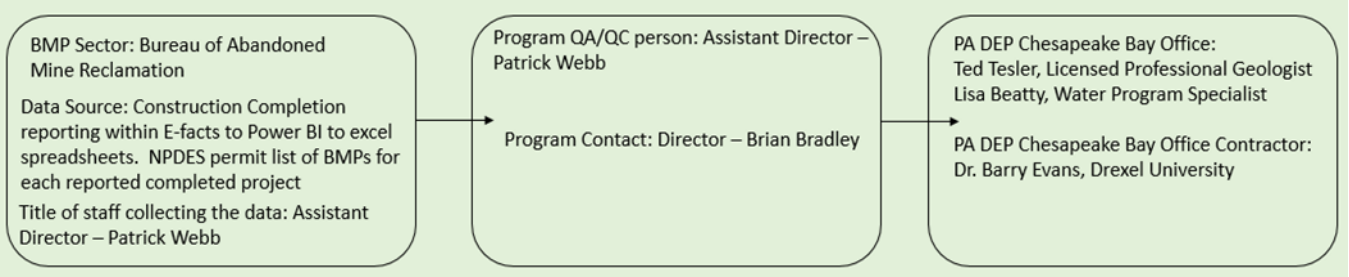
B10.2.5 DEP Abandoned Mine Land Reclamation and Active Mining Program

Contact: Brian Bradley, BAMR (at 717-783-0378 and brbradley@pa.gov)

QA/QC Data Contact Name: Patrick Webb, Assistant Director, Bureau of Abandoned Mine Reclamation (PA-DEP-BAMR) (814.472.1830, pawebb@pa.gov)

Data Compilation Procedures

High level data flow chart:



Sector: Agriculture, Natural

BMP: Abandoned Mine Reclamation

The Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation (PA-DEP-BAMR) administers and oversees the Abandoned Mine Reclamation Program in Pennsylvania. The bureau is an non regulatory program and is responsible for resolving problems such as mine fires, mine subsidence, dangerous highwalls, open shafts and portals, mining-impacted water supplies and other hazards which have resulted from past coal mining (pre-1977) practices in accordance with requirements established by the federal Office of Surface Mining under authority of the Surface Mining Control and Reclamation Act. For more information, please access the Office of Surface Mining and Reclamation and Enforcement website at:
OSMRE Reclaiming Abandoned Mine Lands).

- More detailed information of the PA-DEP-BAMR program is available on the following website: Abandoned Mine Land Reclamation (pa.gov)

BMP data are obtained, imported, and managed into the agency's data management system E-Facts, Power BI use of excel and EPA's ICIS permit system. From E-Facts to Power BI query results of completed projects during the report time period that are located within the Susquehanna River Basin, the completed projects are cross refenced against the PA-DEP-BAMR permit tracking spreadsheet. Once the permit is identified, the record of decision (ROD) is referenced to list the BMPs that approved for the projects. The Power BI output data is saved into an excel spreadsheet to illustrate the data. Hard copy information of the BMPs are within the actual NPDES permit and E&S plan with ROD. PA-DEP-BAMR construction inspector uses the printed copies of the NPDES permit, E&S plan, and ROD to inspect the abandoned mine land reclamation work that our contractors perform under the terms and conditions of the approved permit documents.

The PA-DEP-BAMR construction inspection staff inspect the site and BMPs using the Visual Inspection Report form. The Visual Inspection Report is maintained as on official contract document and remains with the project's construction file. Standard commonwealth Microsoft Office software is used and backed up on commonwealth servers.

DEP BWRNSM collaborated with DEP BAMR for BAMR to report BMPs that meet the CBPO BMP definitions.

Data Verification Procedures

The following attributes are tracked to send to DEP BWRNSM. County name, Municipality name, Acers, Cost, Date Reclamation Completed (implementation date), project number, project name, status, BMP name, BMP Description, BMP extent, BMP units.
Scale is at the Municipality and County first, then determine which project are with Susquehanna River Basin. Only the completed projects with BMPs that are within the Susquehanna River Basin are reported within the excel table.

All our reclamation contracts have a 1-year warranty period where the contractor is required to correct any deficiencies. During the warranty period, unless we get a phone call from a property owner or any other project stakeholder and have to follow up sooner, the project engineer will go out around 10 months after the final inspection to perform their warranty inspection. That way, if there is warranty work required, it gives the contractor 2 months to complete it. After the warranty is expires, we rely on calls from a property owner or any other project stakeholder to report any problems. In most cases BAMR personnel (we have very robust construction teams and equipment) will make the repairs and if it's a problem that's beyond the means of our equipment we can issue another contract for the work. The landowners, public and local officials in AML areas know how to contact us and we also leave a large sign on the site identifying that it's a DEP-BAMR project.

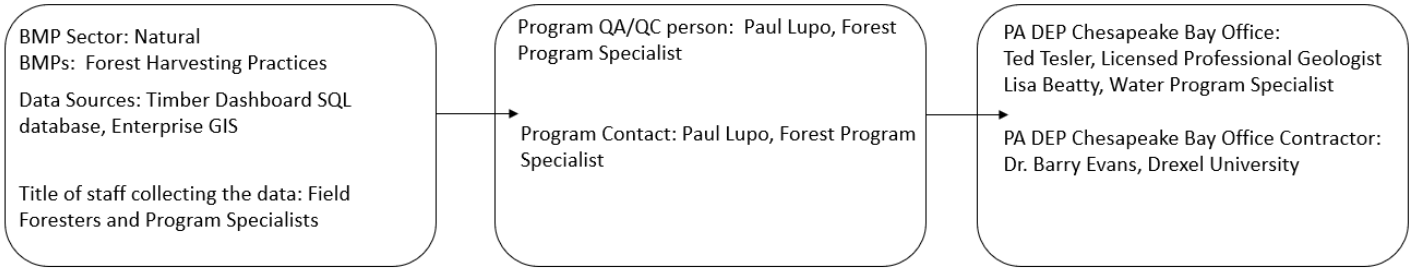
QA/QC is performed by Assistant Director Patrick Webb who reviews the list for location, Date Reclamation Completed (implementation date), project number BMP name and extent then contacts applicable PA-DEP-BAMR office for permit/BMP information to be reported within the BMP Comments cells and the submitted excel spreadsheet.

B10.2.6 PA Game Commission Forest Harvest Information

Contact: Paul Lupo, Forest Program Specialist (814-270-6903 plupo@pa.gov)
QA/QC Contact: Paul Lupo

Data Compilation Procedures

High level data flow chart:



Pennsylvania Game Commission (PGC). The PGC require that the appropriate erosion and sediment control measures be applied to land harvested for trees. Acreage data from PGC is initially compiled by an individual from PGC and then forwarded to DEP upon request for NEIEN reporting purposes.

PGC foresters verify implementation of BMP's through visual field inspections during and after harvest operations. Inspection data is collected on a mobile field application (ESRI Field

Maps) and then uploaded to the agency's Enterprise GIS. GIS specialists are responsible for QA/QC of all GIS data. All mobile field applications require a Commonwealth of PA sign in verification and multi-factor authentication (MFA). This is required for all data entry and uploads to the agency Enterprise GIS. All hardware used for data collection, such as iPhones and Juniper Android tablets, have AirWatch mobile device management software requiring security passwords to turn on and access data collection forms.

Data Verification Procedures

Timber sale blocks are usually less than 100 acres and contained in one county and one township. Sometimes timber sale blocks cross county and township lines – in those instances, only one county and one township name are selected for each block record. Sale Payment Received dates are part of a timber sale financial database that has multiple checks for accuracy within the Forestry Division, one of which is a cross-reference with our Financial Division to reconcile our accounts receivable. The Program Specialist pulls block data for the requested fiscal year from the financial database and matches it to the timber sale block polygons in the Agency's EGIS to determine the county and township for each sale block. The Specialist also performs a spatial intersect with the Chesapeake Bay watershed geometry to decide which blocks to report. Sometimes a timber sale block will have a split payment which results in more than one record for the block in the financial database. These records are unduplicated by Sale Name and Block Number prior to matching to the spatial data in the EGIS. The Specialist also visually inspects the dataset to make sure there are no duplicates. PGC has an internal SOP for conducting timber sale inspections to ensure BMP compliance during harvesting operations in the agency Forestry Manual.

PGC uses an internal inspection form that utilizes ESRI's Field Maps mobile application to collect the timber sale inspection data. The main areas of BMP data collections for forest harvest operations include evaluations of the:

- establishment and maintenance of required erosion and sedimentation controls
- protection of streams and stream buffers
- condition of skid trails
- condition of running surface on all roads
- presence of trash, spills, and other pollutants
- condition of reserve trees
- conditions of culverts and ditches

Relevant sources detailing relevant BMPs for forest harvesting practices are:
EROSION AND SEDIMENT CONTROL (E&S) PLAN TEMPLATE FOR A TIMBER HARVESTING OPERATION.PDF **3800-FM-BCW0539**
Timber Harvesting BMP Inspection Template

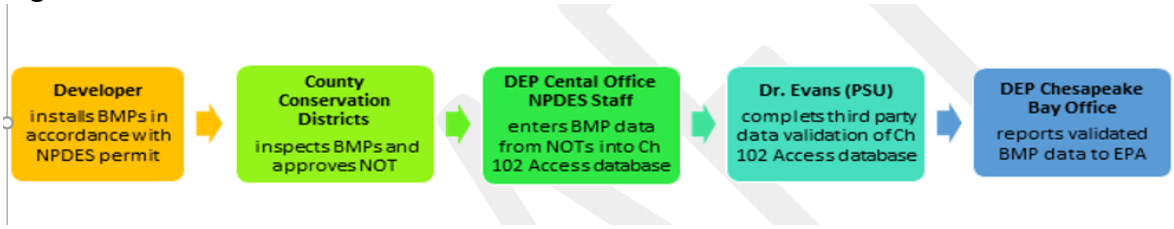
B10.2.7 Chapter 102 Program

Program Contact: Sean Furjanic, DEP Bureau of Clean Water, NPDES Permitting Division (717-787-2137; sefurjanic@pa.gov)

QA/QC Contact: Krista Brown, DEP Bureau of Clean Water, NPDES Permitting Division (484-250-5183; krisbrown@pa.gov@pa.gov)

Data Compilation Procedures

High level data flow chart:



Sector: Developed

BMP List*:*

- Detention facilities: Detention Basin, Dry Extended Detention Basin, Underground Detention
- Infiltration Practices: Dry Well/Seepage Pit, Infiltration Basin, Infiltration Berm/Retentive Grading, Infiltration Trench, Pervious Pavement, Subsurface Infiltration Bed
- Bioretention Practices: Bio-Infiltration Areas, Rain gardens/Bio-retention
- Restoration BMPs: Protect/Conserve/Enhance Riparian Areas
- Filtration BMPs: Wet Ponds and Wetlands; Vegetated Swales; Constructed Filters

Standards and criteria for minimizing erosion and preventing sediment pollution from different types of earth disturbance activities are contained within DEP's Chapter 102 rules and regulations as authorized under Pennsylvania's Clean Stream Laws (see http://www.pacode.com/secure/data/025/ chapter102/chap102toc.html).
All new residential/construction activities over a certain size require that DEP-approved BMPs be implemented to mitigate flow and water quality issues caused by an increase in impervious surface. (See www.dep.pa.gov/constructionstormwater)

The NPDES Program previously maintained an Access database where Chapter 102 permit information was logged. The information recorded included project location, applicant, receiving waters, previous land use, proposed land use, prior contaminated land use, remediation, E&S BMPs, PCSM BMPs, treated drainage area, and whether the practices address rate, volume, and/or water quality. This Access database was used to generate the data that is reported to the Chesapeake Bay Program through NEIEN.

As a result of staffing shortages this database is no longer maintained. However, in 2021 DEP launched the Chapter 102 ePermit System that will be utilized by all applicants in the future. The ePermit System collects BMP data submitted by applicants.

Data Verification Procedures

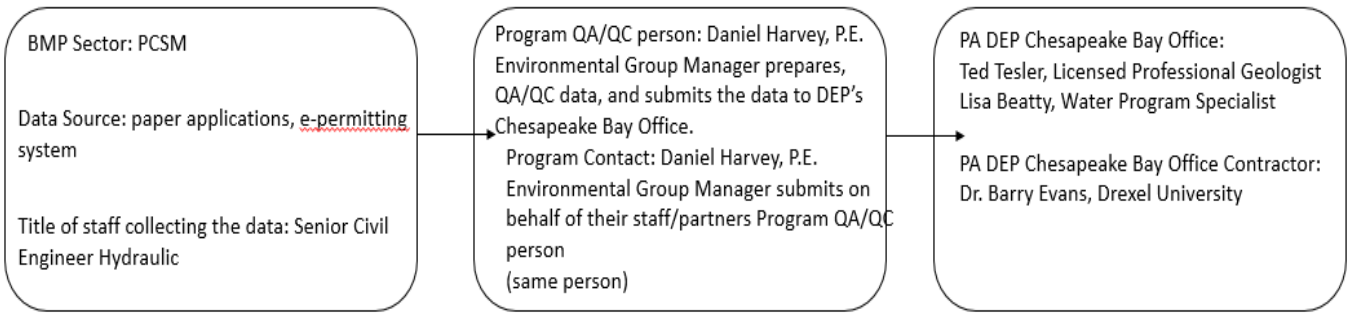
Chapter 102 requires an NPDES permit from DEP for construction activities with earth disturbances greater than or equal to one acre. The permittee is responsible for implementing any E&S and PCSM BMP required by the Chapter 102 NPDES permit.

Implementation and maintenance of E&S BMPs are self-verified by the responsible party or an authorized representative during routine weekly inspections and after storm events until the permit for the earth disturbance activity is terminated (acknowledgment of the NOT). E&S BMPs are inspected during construction by the local Conservation District. When the NOT is submitted by the permittee, information about each PCSM BMP (location, date of installation, treatment area and volume, etc.) is established in the NOT record. NOT inspections of PCSM BMPs are completed by Conservation District staff that are trained by DEP. Double counting of BMPs is prevented through independent verification of data as part of the uploading process into NEIEN.

B10.2.8 Oil and Gas Program Stormwater BMPs (Ch. 102 PCSM delegation)

Contact: Joseph Kelly and Daniel Harvey, DEP Bureau of Oil and Gas (717-772-5621, daniharvey@pa.gov)
QA/QC Contact: Daniel Harvey

Data Compilation Procedures
High level data flow chart:



Sector: Developed and Natural
BMP List:

- New Runoff Reduction
- Retrofit Runoff Reduction
- New Stormwater Treatment
- Retrofit Stormwater Treatment
- Urban Infiltration Practices

In Pennsylvania, all new Oil and Gas construction activities require that DEP-approved BMPs be implemented to mitigate flow and water quality issues caused by an increase in impervious surface. (See the following website for more information on NPDES/stormwater-related information):
http://www.portal.state.pa.us/portal/server.pt/community/office_of_oil_and_gas_management/20291

For such activities, permits are required, and information on such permits (including the type of BMP used) is recorded in a database maintained within the Bureau of Oil & Gas Planning and Program Management. For such activities, permits are required, and submitted to Oil & Gas Program staff largely via the ePermitting system but some are submitted as paper applications. Oil and Gas Program permit information was collected from the regional DEP offices and processed for reporting using the stormwater performance standard BMP for new development runoff reduction based on the activity conducted at the permit site. BMP Name, Runoff Storage Volume, Impervious Area, Site Area, and Acres Treated, Date Installed, and Location fields are provided for reporting. Information on such permits is collected by the reviewers (Senior Civil Engineer Hydraulic) during the application reviews and reported to the section chief (Environmental Group Manager) for QA/QC and inputting into an Excel spreadsheet for tracking. Project naming and locational information, disturbed area, volume of water treated, and increased impervious area are all gathered and tracked for each permit.

Efforts to collect earlier implementation data are on-going and this section of the QAPP will be updated as this information becomes available.

Data Verification Procedures

As discussed in the data compilation procedures, application reviewers review permit applications including the proposed PCSM BMPs and their design calculations. Once any deficiencies have been addressed, the reviewers email their approval recommendations to the section chief along with the corresponding bay reporting data. The section chief does his own QA/QC overview of the application and the data to be reported by BMP name, extent, implantation date, permit number, and location. Once the section chief determines that permit application meets regulatory requirements and that the data reported is accurate based on the application, the application is authorized, and the reporting data is recorded onto an Excel spreadsheet for yearly reporting to PA DEP Bureau of Watershed Restoration and Nonpoint Source Management staff. For a comprehensive list of regulations, policies and manuals please see
https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Pages/Laws,-Regulations-and-Guidelines.aspx

As more and more aspects of the ePermitting system are being created and put into use to capture all aspects of the Oil and Gas permit processes, it will be easier to directly pull information from the system for reporting purposes. The design of the ePermitting system will allow the automation of reporting data for the proposed disturbance activities as well as for each BMP proposed including drainage areas, types, locations, and dimensions. Final site plans are also immediately available through the ePermitting system.

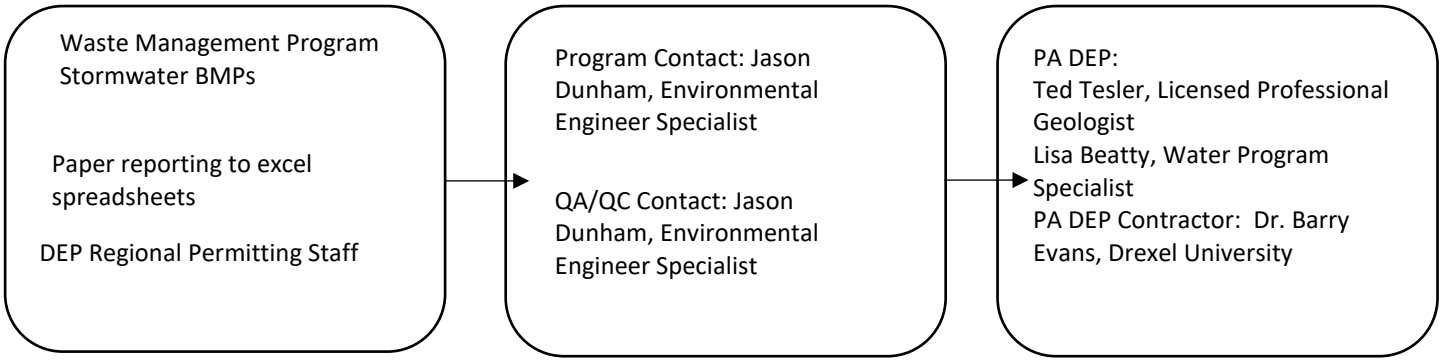
Oil and Gas Water Quality Specialists (WQS) inspect well sites; 1) During construction of the well site for E&S related issues, including BMP installation and areas of earth disturbance tributary to E&S BMPs, 2) after construction is completed for final stabilization (NOT inspection) to ensure the site is stabilized, meeting the requirements of 102.22 and that PCSM BMPs have been constructed in accordance with the PCSM Plan approved with the ESCGP NOI, 3) then after the NOT is acknowledged, during the production phase of the well site, (while oil and/or gas is being produced by the well).

WQSs continue to inspect well sites after the ESCGP is terminated because during production there are a number of other facilities such as tanks and secondary containment that must be inspected to ensure no pollution is occurring. While on site after the ESCGP is terminated, they also inspect PCSM BMPs and continue to do so until the wells are plugged or the well permits expire. Once the wells are plugged or the well permits expire, O&G regs require the well site to be restored to approximate original conditions. At that time the PCSM BMPs are removed unless a surface landowner accepts responsibility.

B10.2.9 Waste Management Program Stormwater BMPs (Ch. 102 PCSM delegation)

Contact: Jason Dunham, Environmental Engineer Specialist DEP Bureau of Waste Management (717-787-1982, jadunham@pa.gov)
QA/QC Contact: same as above

Data Compilation Procedures
High level data flow chart:



BMP Sector: Developed

BMP List:

- New Runoff Reduction
- New Stormwater Treatment

In Pennsylvania, all Solid Waste Municipal Landfill activities require that DEP-approved BMPs be implemented to mitigate flow and water quality issues caused by an increase in impervious surface. (See the following website for more information on NPDES/stormwater-related information):
https://www.dep.pa.gov/Business/Land/Waste/SolidWaste/MunicipalWaste/Pages/default.aspx

For such activities, permits are required, and information on these permits (including the design of BMP used) is recorded in permit files maintained in the DEP regional offices. Waste Program permit information was collected from the regional DEP offices and processed for reporting using the stormwater performance standard BMP for new development runoff reduction based on the activity conducted at the permit site. BMP Name, Runoff Storage Volume, Impervious Area, Site Area, and Acres Treated, Date Installed, and Location fields are provided for reporting.

Efforts to collect earlier implementation data are on-going and this section of the QAPP will be updated as this information becomes available. No new facilities or BMPs were reported for 2020 progress.

Data Verification Procedures

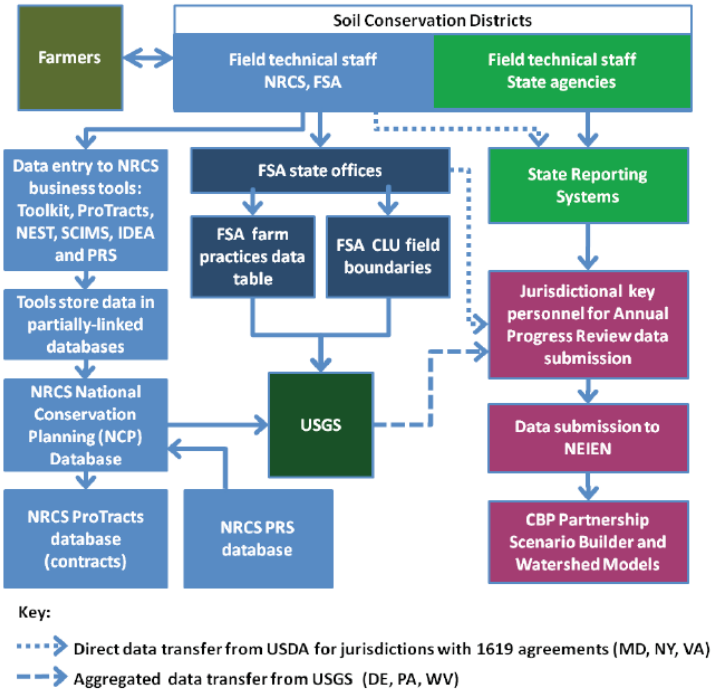
The following attributes are tracked for each applicable facility located within the Chesapeake Bay Watershed: Date Installed, BMP Name, Measurement Name, Measurement Unit, BMP Extent, Measurement Name 2, Measurement Unit 2, BMP Extent 2, Measurement Name 3, Measurement Unit 3, BMP Extent 3, Locality, Latitude, Longitude, Land Owner Agency, Facility Name, Contact Name, Inspection Date 1, and Status 1. Area units are reported in acres, and volume units are reported in acre-feet. Information is collected in the regional offices where the facilities are permitted. Since the permitting documents from which the information is collected are only located in the office from which they are collected, data will not be double counted by multiple offices. Information is collected and recorded by the permit manager and provided directly to the QA/QC Contact, and then on to DEP's Bureau of Watershed Restoration and Nonpoint Source Management.

B10.2.10 USDA – Farm Services Agency

Contact: Olivia Devereux, under contract with USGS (301-325-7449, olivia@devereuxconsulting.com)
QA/QC Contact: same as above

Data Compilation Procedures

High Level Data Flow Graphic:



Sector: Agriculture, Animals, and Natural

BMP List: NRCS Land BMPs, NRCS Animal BMPs, and FSA BMPs
Aggregated NRCS and FSA data for Annual Progress Reporting -2022

Data included: There are spreadsheets of NRCS Land BMPs, NRCS Animal BMPs, and FSA BMPs. NRCS Conservation Technical Assistance (CTA) are included in separate tabs. All FSA and NRCS practices are included. Not all FSA and NRCS practices provide a water quality benefit or are accepted by the Chesapeake Bay Program for the Annual Progress Report.

In the NRCS data, livestock and land BMPs are included in the data sets where present in the NRCS source data. Where not present, those fields are listed as null. In some cases, there were several instances of the BMP not meeting the privacy protection criteria if the animal type or land use was considered and the data were not releasable. Should you prefer that the land use or animal type be considered differently for purposes of aggregation, please let me know and I can provide the data differently or give you an idea how much drops out to protect producer privacy.

Data Quality Checks: Data are evaluated for illogical land uses and implementation amounts that are substantially different than other records. Forest buffers on forest and land practices applied to water are not included. Records without a unit are not included. Records without an implementation amount are not included. Records without a practice code or practice name are not included. Where there are two records with the same latitude and longitude, plan id, practice code, amount, practice certified date, and customer ID but one has a practice program name of a CTA and another with a practice program name such as EQIP, the CTA record is considered a duplicate. In addition, NRCS made corrections to some data prior to providing to USGS. Where practice 313-Waste Storage Facility was greater than 5 for the same customer, contract, and year, then the number was set to 1. In some cases, the original number was 313, the practice code. In others, it appeared to be the number of square feet (such as 160,602) rather than the count of facilities. NRCS made the same correction to Barnyard Runoff Management. There was a record for access control that had the unit as acres and included the planned amount. The state technical conservationist confirmed the unit should be linear feet and provided the certified installed amount. There were records for waste treatment coded as 120000 no and the unit was updated to acres since that was the unit used for planning in that year, as confirmed by the state district conservationist. There were duplicates in a 2010 record of conservation cover that the state technical conservationist confirmed using IDEA and pulling the original CREP practice maps. The duplicate was deleted.

In the FSA data, there are two columns of implementation: Practice Acres and Expired Acreage. The practice acres are the total acres implemented and includes re-enrolled acres. Since historical data is rarely removed, including the re-enrollment would result in double-counting. The expired acreage is the amount per contract, not practice. Subtracting the expired acreage for a contract from the total acres per practice may result in a negative amount, since multiple practices can be in the contract.

The record count column in the spreadsheets contains the number of producers that reported the practice in a particular geography. Generally, there is no number less than 5 , which follows the agreed upon aggregation rules to protect producer privacy. Where there is a number less than 5, it is because easements are included. Easements do not need to follow the same rule, per NRCS.

Data Notes: These NRCS data were taken from the National Planning and Agreements Database (NPAD). NPAD pulls data from multiple data systems. CSP enhancement practice can cover many land units. If any of those land units fall within the Chesapeake Bay boundary, the CSP practice is included here. The practice was assigned a lat/long for the centroid of the practice, and that centroid may not fall within a county (FIPS) that overlaps the Chesapeake Bay watershed. Likewise, the centroid may fall within a Chesapeake Bay county and located outside the watershed. Practices marked as applied and reported in PRS are included. Self-certified (farmer certified) practices do not have a report applied amount or date and are not included.

Data Source: NRCS data were provided by Anjaneyulu Kurukunda on October 11, 2022 in response to USGS's July 28, 2022 data request. FSA data were provided by Patrick McLoughlin and Christina Vander Linden in the Kansas City, Missouri central data office on October 25, 2022 in response to a data request initiated on September 5, 2022.
Aggregation for Producer Privacy: The rules specified by USDA and agreed to by USGS are that data may be shared only when each practice is reported by five or more producers. Otherwise, individual producers potentially could be identified and this would violate producer confidentiality. Where there were five or more producers reporting a practice in a county, then the data are provided at the county scale. Where there were less than five producers reporting a practice in a county, then the data are provided at the state scale. You may see some data aggregated at both the county and state scale. In these cases, it was possible to aggregate county level data in some places, but not in others. For instance, there could be some counties where there were many producers implementing a practice. In other counties, the practice was less popular. In the counties where the practice was less popular, a few of the counties were aggregated to the state scale. There were some practices where there were less than five producers reporting that practice in the state. These data cannot be shared in unaggregated form and are not included. The NRCS data were provided with the easement records separated from the other practice records. The easement records do not follow the same aggregation rule as the land is owned by the federal government. As such, these are provided regardless of record count. They are denoted as NA-Easement in the record count column.

Geographic Scale: FSA practices are included for the entire county for all counties that are in the Chesapeake Bay Watershed for your state. There are some counties that have only a portion in the Chesapeake Bay Watershed. When you report FSA practices to NEIEN, indicate that you are reporting for “state” and do not specify “CBWS-only” since the entire county is included. By providing the data at the county scale, there were fewer practices that had to be aggregated to the state scale and fewer that were not able to be reported at all. CAST apportions the BMPs throughout the entire county, which typically results in the most amount credited. NRCS BMPs are for the Chesapeake Bay watershed only.

Timeframe: The data are provided by year of practice installation. FSA data are for 2013 through July 31, 2022. Only active FSA records are provided. That means that expired contracts are not included. Since many of the records are for 10-year contracts, data include only 2013 and forward. NRCS data are for 2006 through July 31, 2022. The year is for the Chesapeake Bay Program progress reporting year of July 1 through June 30. The Chesapeake Bay Program will use the total for 2022 for annual practices. For cumulative practices, the Chesapeake Bay Program sums the 2022 number with all prior years. Data prior to 2006 for NRCS are not considered accurate by NRCS because of changes to their data systems, so those data are not provided. Inspection dates are not available in this dataset.

CTA: The NRCS Conservation Technical Assistance (CTA) data are included for your information. Conservation Technical Assistance is any practice that: is recommended by NRCS, meets NRCS technical standards, and is not funded by USDA. Those practices implemented as CTA did not

receive cost-share from USDA. Because the CTA practices are not under contract, it is not known if the practice was maintained, re-reported in other years, or what entity may have provided funding. Where another entity provided funding, it is likely that the funding entity included the CTA practice in their reporting.

Data Verification Procedures

Duplication with state data: The practices included here may have received funding from other sources as well as NRCS or FSA. Now that you have these NRCS and FSA data, please double check to make sure there is no risk of duplication. There are likely practices that you may not have previously reported and may want to check the unit conversions in NEIEN. Sometimes those unit conversions use assumptions that are state specific. In addition, program names are not included in these data, but are available upon request. Program names can be an indicator of the amount of each practice that also received state funding.

FSA and NRCS overlap: For practices that FSA cost-shares, but NRCS provides technical assistance, the practices are included in the FSA data and are not included in the NRCS data. The overlap only occurs for some CRP practices. These practices were identified by NRCS using the FSA Handbook for Agricultural Resource Conservation Program for state and county offices (2-CRP (Revision 5) 8/7/2013). The section referenced begins on page 596.

For more information and detailed quality assurance see the Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms at https://pubs.er.usgs.gov/publication/ofr20131287

The data received from USGS are presumed accurate, and are not modified once received, with one exception. That is, the unit values pertaining to "fencing" are reduced by 90% since only a portion of the fencing installed as NRCS practice code 382 is used for streambank fencing (which is what DEP utilizes this information to estimate). Based on discussions with NRCS staff in Pennsylvania, it is estimated that up to 10% of the total fencing installed in the state could be used for this BMP. Consequently, beginning with the 2017 Progress Run submission, DEP will use 10% of the total fencing as an estimate for streambank fencing until a better approach for quantifying this practice from NRCS data is developed. Animal Heavy Use Protection (NRCS 561) is reported as Loafing Lot Management in Pennsylvania.

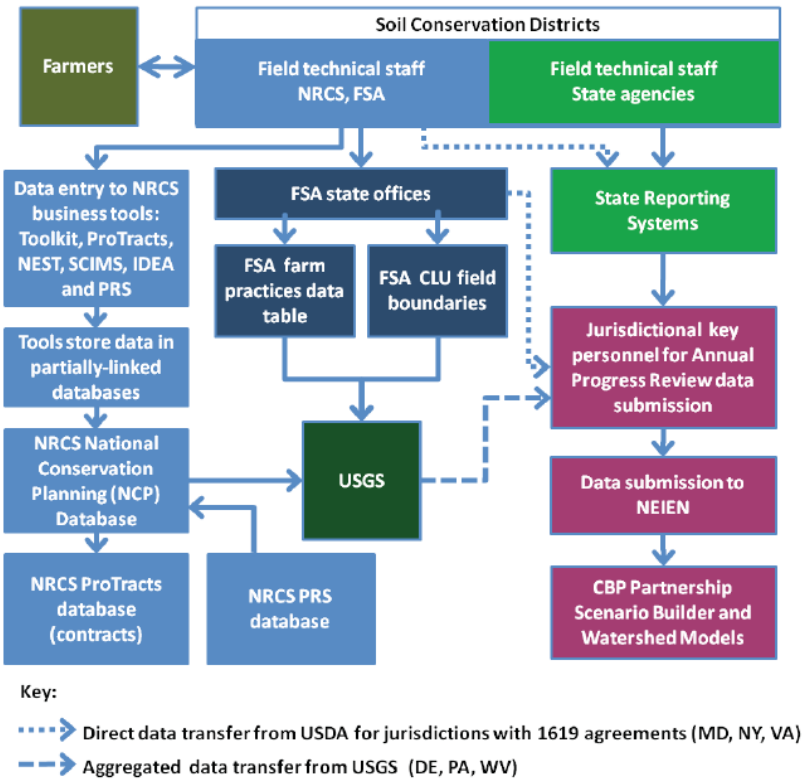
B10.2.10.1 USDA – Natural Resource Conservation Service

Contact: Olivia Devereux, under contract with USGS (301-325-7449, olivia@devereuxconsulting.com)

QA/QC Contact: same as above

Data Compilation Procedures

High Level Data Flow Graphic:



Sector: Agriculture, Animals, and Natural

BMP List: NRCS Land BMPs, NRCS Animal BMPs, and FSA BMPs, Aggregated NRCS and FSA data for Annual Progress Reporting

Data included: There are spreadsheets of NRCS Land BMPs, NRCS Animal BMPs, and FSA BMPs. NRCS Conservation Technical Assistance (CTA) are included in separate tabs. All FSA and NRCS practices are included. Not all FSA and NRCS practices provide a water quality benefit or are accepted by the Chesapeake Bay Program for the Annual Progress Report.

In the NRCS data, livestock and land BMPs are included in the data sets where present in the NRCS source data. Where not present, those fields are listed as null. In some cases, there were several instances of the BMP not meeting the privacy protection criteria if the animal type or land use was considered and the data were not releasable. Should you prefer that the land use or animal type be considered differently for purposes of aggregation, please let me know and I

can provide the data differently or give you an idea how much drops out to protect producer privacy.

Data Quality Checks: Data are evaluated for illogical land uses and implementation amounts that are substantially different than other records. Forest buffers on forest and land practices applied to water are not included. Records without a unit are not included. Records without an implementation amount are not included. Records without a practice code or practice name are not included. Where there are two records with the same latitude and longitude, plan id, practice code, amount, practice certified date, and customer ID but one has a practice program name of a CTA and another with a practice program name such as EQIP, the CTA record is considered a duplicate. In addition, NRCS made corrections to some data prior to providing to USGS. Where practice 313-Waste Storage Facility was greater than 5 for the same customer, contract, and year, then the number was set to 1. In some cases, the original number was 313, the practice code. In others, it appeared to be the number of square feet (such as 160,602) rather than the count of facilities. NRCS made the same correction to Barnyard Runoff Management. There was a record for access control that had the unit as acres and included the planned amount. The state technical conservationist confirmed the unit should be linear feet and provided the certified installed amount. There were records for waste treatment coded as 120000 no and the unit was updated to acres since that was the unit used for planning in that year, as confirmed by the state district conservationist. There were duplicates in a 2010 record of conservation cover that the state technical conservationist confirmed using IDEA and pulling the original CREP practice maps. The duplicate was deleted.

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The record count column in the spreadsheets contains the number of producers that reported the practice in a particular geography. Generally, there is no number less than 5 , which follows the agreed upon aggregation rules to protect producer privacy. Where there is a number less than 5, it is because easements are included. Easements do not need to follow the same rule, per NRCS.

Data Notes: These NRCS data were taken from the National Planning and Agreements Database (NPAD). NPAD pulls data from multiple data systems. CSP enhancement practice can cover many land units. If any of those land units fall within the Chesapeake Bay boundary, the CSP practice is included here. The practice was assigned a lat/long for the centroid of the practice, and that centroid may not fall within a county (FIPS) that overlaps the Chesapeake Bay watershed. Likewise, the centroid may fall within a Chesapeake Bay county and located outside the watershed. Practices marked as applied and reported in PRS are included. Self-certified (farmer

certified) practices do not have a report applied amount or date and are not included.

Data Source: NRCS data were provided by Anjaneyulu Kurukunda on October 11, 2022 in response to USGS's July 28, 2022 data request. FSA data were provided by Patrick McLoughlin and Christina Vander Linden in the Kansas City, Missouri central data office on October 25, 2022 in response to a data request initiated on September 5, 2022.
Aggregation for Producer Privacy: The rules specified by USDA and agreed to by USGS are that data may be shared only when each practice is reported by five or more producers. Otherwise, individual producers potentially could be identified and this would violate producer confidentiality. Where there were five or more producers reporting a practice in a county, then the data are provided at the county scale. Where there were less than five producers reporting a practice in a county, then the data are provided at the state scale. You may see some data aggregated at both the county and state scale. In these cases, it was possible to aggregate county level data in some places, but not in others. For instance, there could be some counties where there were many producers implementing a practice. In other counties, the practice was less popular. In the counties where the practice was less popular, a few of the counties were aggregated to the state scale. There were some practices where there were less than five producers reporting that practice in the state. These data cannot be shared in unaggregated form and are not included. The NRCS data were provided with the easement records separated from the other practice records. The easement records do not follow the same aggregation rule as the land is owned by the federal government. As such, these are provided regardless of record count. They are denoted as NA-Easement in the record count column.

Geographic Scale: FSA practices are included for the entire county for all counties that are in the Chesapeake Bay Watershed for your state. There are some counties that have only a portion in the Chesapeake Bay Watershed. When you report FSA practices to NEIEN, indicate that you are reporting for “state” and do not specify “CBWS-only” since the entire county is included. By providing the data at the county scale, there were fewer practices that had to be aggregated to the state scale and fewer that were not able to be reported at all. CAST apportions the BMPs throughout the entire county, which typically results in the most amount credited. NRCS BMPs are for the Chesapeake Bay watershed only.

Timeframe: The data are provided by year of practice installation. FSA data are for 2013 through July 31, 2022. Only active FSA records are provided. That means that expired contracts are not included. Since many of the records are for 10-year contracts, data include only 2013 and forward. NRCS data are for 2006 through July 31, 2022. The year is for the Chesapeake Bay Program progress reporting year of July 1 through June 30. The Chesapeake Bay Program will use the total for 2022 for annual practices. For cumulative practices, the Chesapeake Bay Program sums the 2022 number with all prior years. Data prior to 2006 for NRCS are not considered accurate by NRCS because of changes to their data systems, so those data are not provided. Inspection dates are not available in this dataset.

CTA: The NRCS Conservation Technical Assistance (CTA) data are included for your information.

Conservation Technical Assistance is any practice that: is recommended by NRCS, meets NRCS technical standards, and is not funded by USDA. Those practices implemented as CTA did not receive cost-share from USDA. Because the CTA practices are not under contract, it is not known if the practice was maintained, re-reported in other years, or what entity may have provided funding. Where another entity provided funding, it is likely that the funding entity included the CTA practice in their reporting.

Data Verification Procedures

Duplication with state data: The practices included here may have received funding from other sources as well as NRCS or FSA. Now that you have these NRCS and FSA data, please double check to make sure there is no risk of duplication. There are likely practices that you may not have previously reported and may want to check the unit conversions in NEIEN. Sometimes those unit conversions use assumptions that are state specific. In addition, program names are not included in these data, but are available upon request. Program names can be an indicator of the amount of each practice that also received state funding.

FSA and NRCS overlap: For practices that FSA cost-shares, but NRCS provides technical assistance, the practices are included in the FSA data and are not included in the NRCS data. The overlap only occurs for some CRP practices. These practices were identified by NRCS using the FSA Handbook for Agricultural Resource Conservation Program for state and county offices (2-CRP (Revision 5) 8/7/2013). The section referenced begins on page 596.

For more information and detailed quality assurance see the Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms at https://pubs.er.usgs.gov/publication/ofr20131287

The data received from USGS are presumed accurate, and are not modified once received, with one exception. That is, the unit values pertaining to "fencing" are reduced by 90% since only a portion of the fencing installed as NRCS practice code 382 is used for streambank fencing (which is what DEP utilizes this information to estimate). Based on discussions with NRCS staff in Pennsylvania, it is estimated that up to 10% of the total fencing installed in the state could be used for this BMP. Consequently, beginning with the 2017 Progress Run submission, DEP will use 10% of the total fencing as an estimate for streambank fencing until a better approach for quantifying this practice from NRCS data is developed. Animal Heavy Use Protection (NRCS 561) is reported as Loafing Lot Management in Pennsylvania.

For more information and detailed quality assurance see the Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms at https://pubs.er.usgs.gov/publication/ofr20131287

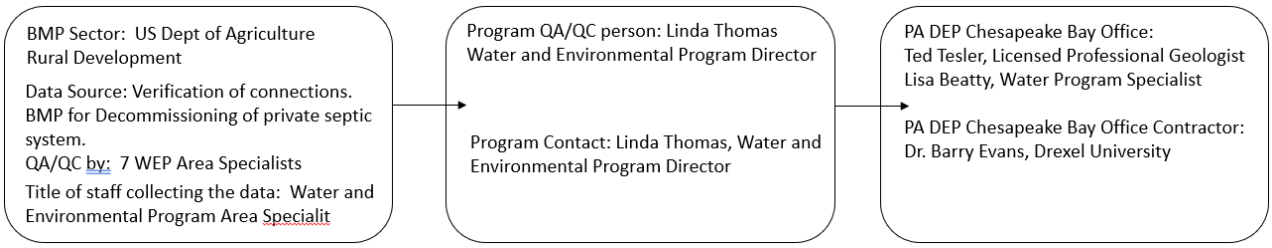
The data received from USGS are presumed accurate, and are not modified once received, with one exception. That is, the unit values pertaining to "fencing" are reduced by 90% since only a portion of the fencing installed as NRCS practice code 382 is used for streambank fencing (which is what DEP utilizes this information to estimate). Based on discussions with NRCS staff in Pennsylvania, it is estimated that up to 10% of the total fencing installed in the state could be used for this BMP. Consequently, beginning with the 2017 Progress Run submission, DEP will use 10% of the total fencing as an estimate for streambank fencing until a better approach for quantifying this practice from NRCS data is developed. Animal Heavy Use Protection (NRCS 561) is reported as Loafing Lot Management in Pennsylvania.

B10.2.11 USDA Rural Development Program

Contact: Linda Thomas, USDA Rural Development Water & Environmental Program Director, 814-547-5941, Linda.Thomas@usda.gov

QA/QC Contact: same as above

Data Compilation Procedures



The USDA Rural Development Program funds the connection of on-lot septic systems to centralized wastewater treatment plants. The reduction of nutrient loads via such connections is considered to be a "Rural" BMP within the Bay watershed model and is recognized as a "SepticConnect" BMP type within Scenario Builder. Data on such connections within the Bay watershed are obtained from the program contact (typically in list form in an email or Word document) and entered into an Excel file. From this source, the number of connections (i.e., "COUNT" data) is given as the number of equivalent domestic units (EDUs), which are equal to persons per connection.

Data Verification Procedures

Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements in A8: Training and Qualifications. These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN. Since USDA is a federal agency, it is assumed that data tracking and initial verification protocols followed by USDA meet the requirements established by the CBPO. All

users or connections are verified once the project is complete.

BMP are monitored throughout construction by the borrower's consultants project resident inspector. Rural Development Area Specialists make routine site visits throughout the construction period. Physical security inspections are completed every three years for the life of the loan.

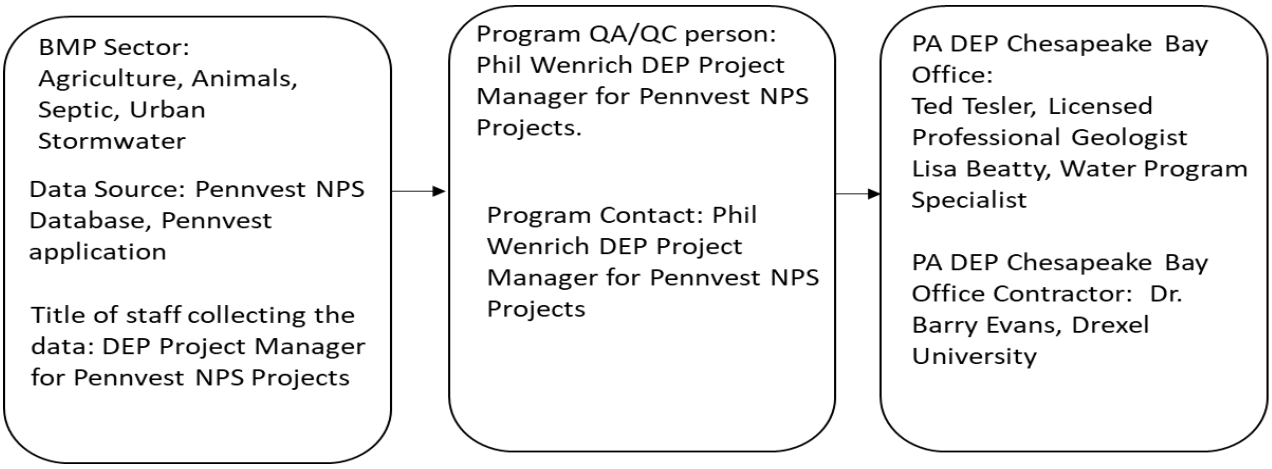
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.2.12 PA PennVest Program

Contact: Philip Wenrich, Environmental Engineer, PA DEP's Clean Water, Municipal Finance Section (717-705-6345, phwenrich@pa.gov)
QA/QC Contact: same as above

Data Compilation Procedures

High Level Data Processing Graphic:



Sector: Agriculture, Animals, Septic, Urban Stormwater

BMP List: Septic Connections, Barnyard Runoff Control, Lot Management, Animal Waste Management Systems, Detention Ponds, Vegetative Open Channels, Bioretention, Stream Restoration

BMP data are obtained from the Pennvest NPS database, project applications, Pennvest website, or the Pennvest wastewater database and input into an excel spreadsheet by the NPS project

manager. PennVest website https://www.pennvest.pa.gov/Information/Funding-Programs/Pages/default.aspx

Quantitative data about Agricultural BMPs and septic disconnections are taken from the Pennvest NPS database, the Pennvest Wastewater Database, Pennvest Clean Water Project Priority list, or project applications located on the Pennvest website. These numbers are input into an excel spreadsheet. Pennvest NPS Database, Wastewater Database are tracked through an Access database. Pennvest Clean Water Project Priority List and Pennvest Project Applications are tracked through Acrobat. Data is transferred manually to an excel spreadsheet by the DEP NPS Project Manager and conducts QA/QC for internal PennVEST project numbers for double counting and input errors. Types of BMPs and quantitative data such as size, number of systems, and EDUs will be entered. Data is not entered from online inspection forms. All data come from Access, Pennvest website, or pdf format and backed up on OneDrive

PennVest is a state program that, among other things, funds septic system connections to wastewater treatment plants and other non- point source (typically Agricultural) BMPs. Data on such connections and BMPs are obtained from PennVest (usually in report form) and entered into an Excel file. In this case, the septic system data may be provided as either "population" or "households/EDU" data. If the former is provided, the data need to be converted into EDUs (see above discussion) prior to being delivered to the appropriate staff for later inclusion in the BMP Warehouse. Non-point source BMPs are typically animal waste storage or barnyard projects and reported in a similar manner.

Data Verification Procedures

DEP NPS Project manager inspects the completed BMPs to ensure they are constructed in accordance with plans and specifications. Pennvest project managers inspecting NPS and wastewater projects are all engineers. Projects are inspected to ensure that everything has been constructed in accordance with the plans and specifications. There is an internal SOP and inspection form that guides the project manager in conducting the final inspection

BMP type, measurements, location, number of systems, implementation date, funding amount, useful life are tracked. Latitude and longitude are collected for each project site. Location data is not kept on a BMP level. Latitude and longitude coordinates are given for the project site as a whole and not broken down for each BMP. The only date recorded is the date of final inspection, this date is also used as the implementation date. The inspections dates are pulled from the internal Pennvest inspection form. All work done on a project with sources of funding is included with the Pennvest application. BMPs done with private funds would be recorded, but not inspected as part of the Pennvest project. To date, no agricultural project has used private funds for any resource improvement practices.

Pennvest project managers inspecting NPS and wastewater projects are all engineers. Projects are inspected to ensure that everything has been constructed in accordance with the plans and

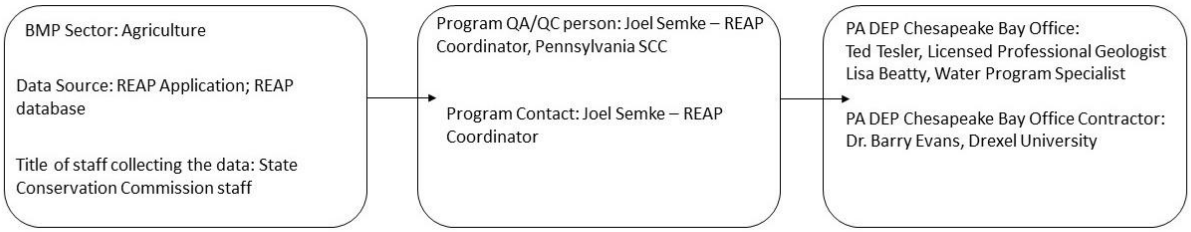
specifications. The NPS DEP Project manager is the only person to enter data getting sent to DEP's Bureau of Watershed Restoration and Nonpoint Source Management, who has managed the project from planning through construction. No other programs are counting BMPs constructed by Pennvest NPS Program. There is an internal inspection form to verify that BMPs are constructed in accordance with the plans and specifications.

B10.2.13 SCC Resource Enhancement and Protection Program

Contact: Joel Semke, SCC REAP Coordinator, (717-705-4032, jsemke@pa.gov)
QA/QC Contact: same as above

Data Compilation Procedures

High Level Data Processing Graphic:



Sector: Agriculture, Animal, Natural
BMPs: *REAP BMP List*

Pennsylvania's SCC funds the implementation of a number of BMPs through its' REAP program linked at https://www.agriculture.pa.gov/Plants_Land_Water/StateConservationCommission/REAP/Pages/default.aspx . BMP implementation data is submitted to the SCC in the REAP application packet. The application is submitted by applicant; sometimes with assistance from a Conservation District, NRCS, or private TSP. All data is entered into the REAP database and all data in the database is accessible via Excel spreadsheet.

Data gathered from the REAP application linked at https://www.agriculture.pa.gov/Documents/2021-22%20REAP%20Guidelines.pdf includes: applicant personal info, BMP location, units installed, date completed, cost, other public funding information, (if applicable), certification information, etc. Data from the REAP database is submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office.

Historically, these data had not been compiled as part of earlier BMP data submittals prior to NEIEN. Consequently, for the 2010 submittal, data on all BMPs implemented for the period 9/30/2007-6/30/2010 were compiled for subsequent delivery to CBPO. For the model reporting years of 2011 and later, all REAP data submitted have pertained only to that year's data.

In the Excel files originally received from the REAP program prior to 2014 (i.e., those containing the "raw" BMP data), most of the activities reported did not include information pertaining to the number of units installed (e.g., acres). Instead, the cost of each activity was given. Starting with 2014, the REAP program is now providing DEP with actual "units implemented" numbers for the BMPs reported.

Again, since 2014, there is no longer a need to estimate units of BMPs implemented based on unit cost such as those given in Table 3 as unit information is now being provided by the REAP program through the REAP application linked at https://www.agriculture.pa.gov/Documents/2021-22%20REAP%20Guidelines.pdf .

Data Verification

The REAP Program funds the implementation of water quality agricultural, animal, and natural BMPs contained in Ag E&S Plans, Conservation Plans, Nutrient Management Plans, or a Manure Management Plan that has been developed for the operation. The State Conservation Commission (SCC) administers the program. Eligibility for the program is verified by: Conservation District technician, NRCS technician, or by a PA Act 38-certified Nutrient Management Plan writer.

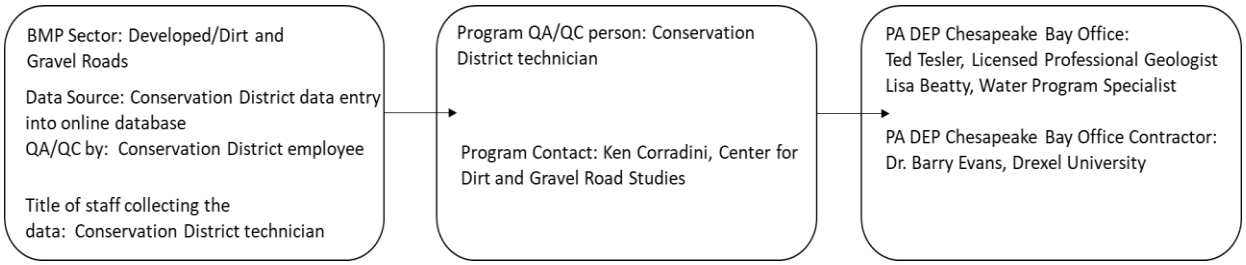
All BMP implementation data is certified prior to awarding any REAP tax credits. Cost information is submitted to the Commission in the form of copies of paid receipts. BMP completion certification is performed by the following qualified persons: Conservation District technician with appropriate NRCS job approval rating, NRCS technician with appropriate job approval rating, qualified farm equipment dealer (where applicable), or a Professional Engineer. Information on other public funding sources is submitted by the applicant, as well. The Commission includes this information QA/QC by BMP name, extent, location and implementation date with all data submissions to DEP BWRNSM and eventually to EPA Chesapeake Bay Program Office.

B10.2.14 SCC Dirt and Gravel Road Program

Contact: Ken Corradini, PSU Center for Dirt & Gravel Roads (814-571-5448, kjc139@psu.edu)

Data Compilation Procedures

High-Level Data Flow Graphic:



Sector: Developed
BMPs: Dirt and Gravel Road

Descriptive details on program administration, project management, data entry, and database management can be found on the Center's web site at the following location: https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/administrative-guidance-manual

Pennsylvania's Dirt and Gravel Road Maintenance Program provides funding to eliminate stream pollution caused by runoff and sediment from the State's 20,000+ mile network of unpaved public roads. The Program was enacted into law in April 1997 as Section 9106 of the PA Vehicle Code, with $5 Million in annual funding for "environmentally sensitive road maintenance". The goal of the Program is to create a more environmentally and economically sustainable low-volume road network through education, outreach, and project funding.

The state's "Dirt & Gravel Road" program is administered by the State Conservation Commission, and the technical work is managed by the Dirt and Gravel Road Center at Penn State University (see www.dirtandgravel.psu.edu). This particular program funds a number of activities to reduce pollutant loads from unpaved roads in rural areas of the state. Three of these activities are recognized as BMPs by Scenario Builder; however, only one of them ("Surface Aggregate and Raised Roadbed") has been validated for use in the Bay watershed model. Therefore, only information on this specific BMP is compiled for subsequent transmittal to CBPO.

On a yearly basis, data on the lengths of roads upgraded in each county within Pennsylvania are obtained from the Dirt and Gravel Road Center at Penn State in the form of an Excel file called "DirtGravelRoad_data". Data for "stabilized roads" (represented by the "RD_STAB" field in the Excel file) from only Chesapeake Bay counties are then extracted and copied into a "NEIEN_Data" tab of this file in which the data have been re-formatted for subsequent inclusion in DEP's BMP Warehouse application as previously described. Figure 13a shows a portion of the "Dirt and Gravel Road" data recently provided by the program to DEP, and Figure 13b shows data that has been re-formatted by DEP for inclusion in its' BMP Warehouse for subsequent submission to CBPO via NEIEN.

Data Verification Procedures

The Center for Dirt and Gravel Road Studies maintains a customized GIS interface called Mapper to keep track of over 16,000 potential and completed project sites throughout Pennsylvania. For Chesapeake Bay reporting purposes, the Center provides information on the "D&G Road – Surface Aggregate and Raised Roadbed" BMP on an annual basis. PA's Conservation Districts utilize the Mapper GIS system for all aspects of project tracking for sites within their County. Districts also use Mapper as a paperless reporting system to report deliverables and financial details about completed road projects to the State. The Center administers all aspects of the Mapper GIS system for the Dirt and Gravel Road Program.

Projects funded by the Center are managed at the county level by County Conservation Districts. Prior to receiving payment for such projects, each CCD is responsible for verifying that the project is completed as planned and as specified in proposals originally submitted to the Center. Upon such verification, the project details are entered by CCD staff directly into the Center's GIS Mapper interface and are subsequently stored in an SQL database that is managed by Mr. Ken Corradini at the Center. To help ensure that data entered by CCD personnel are done as error-free as possible, a number of error-checking routines have been built into the Mapper user interface. On a periodic basis, joint field visits are made by Center and CCD staff to ensure that projects are completed as documented in the Mapper SQL database.

B10.2.15 DEP Nutrient Trading Program

This is a placeholder for the emerging capacity to report BMPs from the Chesapeake Bay Program Nutrient Trading Tool (CBNTT). When more information becomes available, we will update this section of the QAPP. No BMPs are reported directly from this program at this time.

Contact: Rachel Coyer, DEP Water Program Specialist, Wastewater Operations (717.772.5884, raccolyer@pa.gov)

Data Compilation Procedures

Information on the extent of a small number of BMPs implemented as a result of various nutrient trading activities have been included in previous NEIEN submissions to CBPO. However, data on BMPs related to trades have not been submitted since 2012 due to the lack of data.

Data Verification Procedures

Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements in A8: Training and Qualifications (particularly since verification is required as part of the nutrient credit generation process). These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to

EPA through NEIEN.

Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

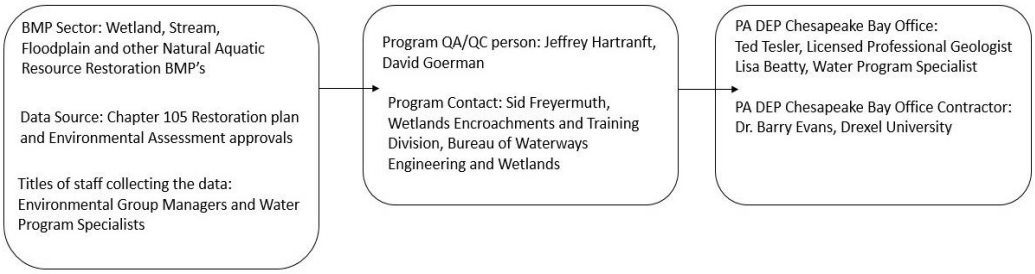
B10.2.16 DEP Chapter 105 Waterways Engineering and Wetlands

Contact: Andy Klinger, DEP Wetlands Encroachments and Training Division, Bureau of Waterways Engineering and Wetlands, (717.772.5975, anklinger@pa.gov)

QA/QC Contact: David Goerman and Jeffrey Hartranft

Data Compilation Procedures

High-Level Data Flow Graphic:



Sector: Natural

BMP List: Wetland Restoration, Stream Restoration, Floodplain Restoration, and other Natural Aquatic Resource Restoration

In Pennsylvania, all water obstruction and encroachments other than dams located in, along or across, or projecting into a watercourse, floodway or body of water, whether temporary or permanent are regulated by the Department through the 25 Pa Code Chapter 105. Dam Safety and Waterway Management regulations (see http://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter105/chap105toc.html&d=reduce

These regulations provide a regulatory approval process for projects that propose to enhance, rehabilitate and/or reestablish aquatic resources regardless of their stated "purpose". Projects require some form of authorization in writing by the Department unless they qualify for a general permit (i.e. BWEW GP1 or GP3). Among other activities, this group within DEP is

responsible for evaluating and approving plans that propose to undertake various aquatic resources restoration projects throughout the state for regulatory and non-regulatory purposes.

As part of the authorization requirements, an as-built plan submission and completion certification by a professional engineer is typically required. Even if as-built plans are not required, the Water Obstruction and Encroachment Completion Certification requires the professional engineer to certify (seal) and the permittee's signatures attesting that the project was completed in accordance with the approved maps, plans, profiles, and specifications, and applicable laws.

Authorizations typically require monitoring of the project's implementation and effectiveness is conducted at varying levels depending upon the scope of the project. Monitoring typically will occur for five years post-construction but may be shorter or longer depending upon case-specific circumstances. At a minimum monitoring, reports are submitted to the Department staff authorizing the project on an annual basis but may be comprised of semi-annual inspections for the first two growing seasons. The monitoring plan is comprised of the following:

1. Success/Performance Standards
2. Recommended Monitoring Duration and Timeframes
3. Monitoring Report Contents
4. Remedial Action/Adaptive Management Plan (RAMP)

The general monitoring requirements are outlined in The Department's Environmental Assessment instructions (see: http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4048) unless otherwise waived or directed by the Department. The completion of onsite compliance inspections performed by the Department may vary based upon numerous factors including location, program area, the scope of the project, and/or the project's purpose.

Site scale verification from Chapter 105 restoration plan (RP) and environmental assessment (EA) approvals. The approval documents are used to establish the data inputs and values for each BMP. The se BMP values are input into Excel files that are developed and maintained by WET staff Restoration plans. The restoration plans are evaluated by WET staff to determine BMP values that are input into Excel Paper files of approved RP's are stored by WET, with backup electronic copies that are maintained by staff. The Chapter 105 RP and EA approval documents currently are being transitioned to OnBase. All WET programs currently are transitioning restoration plan and environmental assessment approval documents to OnBase.

For NEIEN reporting purposes, tabular data on aquatic resource restoration projects completed by this group are obtained from the appropriate qualified staff member on an annual basis and

re-formatted for entry into DEP's BMP Warehouse as described previously.

Data Verification Procedures

Attributes being tracked include: Chapter 105 File Number, BMP Type, Implementation Year, Stream Linear Feet, Wetland Acres, Floodplain Acres, Riparian Buffer Acres (Non Wetland Area), Hydrologic Unit information (HUC 12 & HUC 8 name and number), and National Hydrography Dataset information (NHDFlowline Reachcode & Stream ID Name). Site scale from RP and EA approvals. The approvals require a Monitoring and Maintenance Plan, including the requirement to develop as-built drawings that identify Chapter 105 regulated boundaries of restored wetlands, streams, floodplains and other natural aquatic resources. The WET staff involved in RP and EA reviews provide the BMP values when developing the Chapter 105 approval project descriptions. These values are verified by additional WET staff prior to input into the Excel files used for annual tracking and reporting to BWRNSM. Some Chapter 105 RP and EA approvals also achieve compliance with NPDES requirements. Where both Chapter 105 and NPDES programs are reporting restoration BMP's, the Chapter 105 BMP reporting takes precedence because the purpose of the project is restoration, not stormwater management. Coordination between the Chapter 105 program for restoration and NPDES program for stormwater management avoids the potential for overestimating the BMP reporting for the same practices.

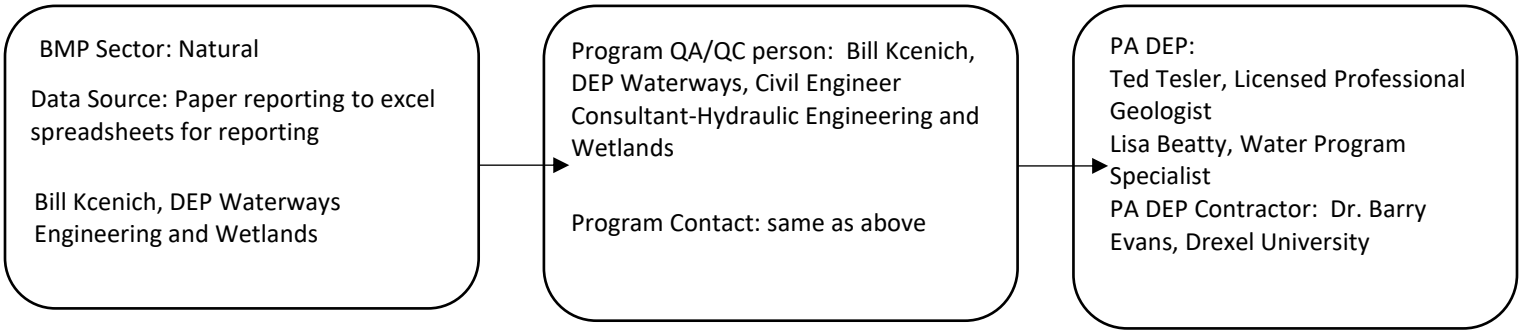
Pennsylvania submitted four wetland mitigation net gain BMP records for 2020 annual numeric progress that were accepted and published by EPA CBPO for final 2020 Progress. Pennsylvania submitted nine wetland mitigation net gain BMP records for 2021 annual numeric progress. Pennsylvania submitted six wetland mitigation net gain BMP records for 2022 annual numeric progress. EPA CBPO grant guidance and BMP Verification Framework does not explicitly prohibit the submission of wetland mitigation net gains. However, due to Chesapeake Bay Program Partnership protocols, the nutrient reductions associated with wetland mitigation net gain reported for 2021 and 2022 Progress were removed during the EPA Data Verification process. DEP will continue to report wetland mitigation net gain BMPs to ensure more accurate representation of restored wetland acres in Pennsylvania's Chesapeake Bay watershed. EPA CBPO requested the 2022 Progress records for wetland mitigation. Please see below table for the wetland mitigation submission for 2022 progress:

BMP ID	**Date Installed**	**BMP Name**	**Measurement Name**	**Measurement Unit**	**BMP Extent**
109110	1/25/2022	Stream Restoration Ag	Length Restored	FEET	10473
109111	1/25/2022	Wetland Restoration	Acre	ACRE	8.8
109112	6/23/2021	Stream Restoration Ag	Length Restored	FEET	6031
109113	6/23/2021	Wetland Restoration	Acre	ACRE	4.84
109114	5/23/2022	Stream Restoration Ag	Length Restored	FEET	22063
109115	5/23/2022	Wetland Restoration	Acre	ACRE	17.59

B10.2.16.1 DEP Stream Improvement Program

Contact: Bill Kcenich, Bureau of Waterways Engineering and Wetlands (717-783-0369, wkcenich@pa.gov)
QA/QC contact: same as a above

Data Compilation Procedures
High-Level Data Flow Graphic:



Sector: Natural
BMP List: Stream Restoration

The DEP Stream Improvement Program is responsible for undertaking various stream restoration projects throughout the state. The Stream Improvement Program offers assistance by designing and constructing small projects to restore stream channels damaged by high water or flooding events and to stabilize streambanks affected by erosion at sites where there are imminent threats to the structural integrity of homes, businesses and industries. The primary objective of this program is to provide increased public safety on a smaller scale than the larger flood protection type projects and to reduce high sediment loads and prevent them from being transported downstream and re-depositing elsewhere.

DEP's Stream Improvement Program consists of one person, a licensed Professional Engineer. This individual design, or is responsible for design oversight, on the typically 15 to 20 projects constructed Commonwealth-wide each year. This individual is also responsible for the bidding, construction, and final inspection of these projects. This individual personally collects all of the data reported to the Bureau of Watershed Restoration and Nonpoint Source Management during the final project inspections.

Data Verification Procedures

Bill Kcenich, DEP Waterways, Civil Engineer Consultant-Hydraulic Engineering and Wetlands designs and builds the projects, measure them during the final inspection. Only projects in the Chesapeake Bay Watershed are reported to DEP BWRNSM from paper copies to the respective NEIEN based excel spreadsheet. The BMP name, extent, units, county and implementation date

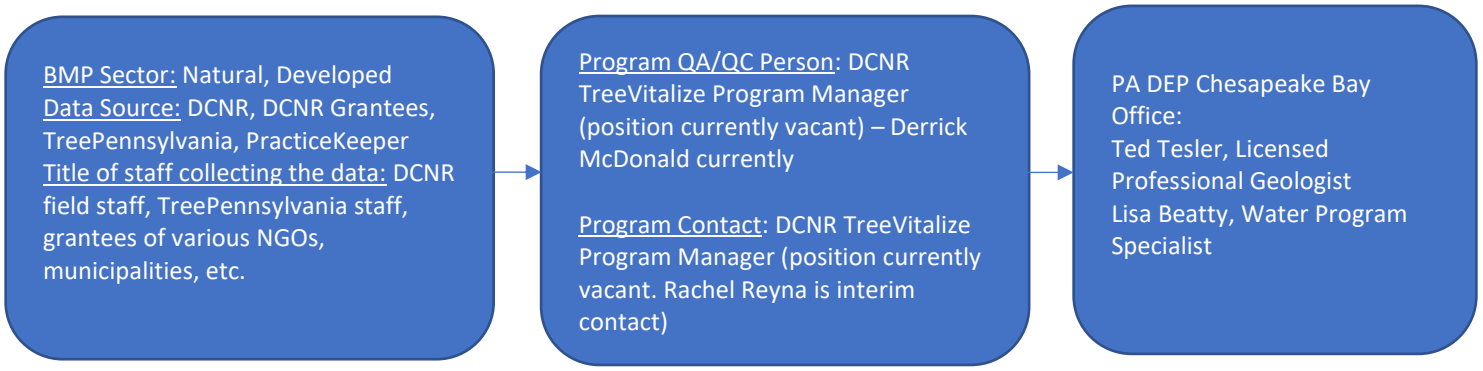
are reported with the project was completed.

For NEIEN reporting purposes, tabular data on stream restoration projects completed and obtained from the appropriate trained staff, Bill Kcenich, DEP Waterways, Civil Engineer Consultant-Hydraulic Engineering and Wetlands on a yearly basis and re-formatted for entry into DEP's NEIEN template. QA/QC for double counting and errors from BMP name, type, location, and implementation date. Before sent to DEP BWRNSM.

B10.2.17 DCNR Bureau of Forestry, TreeVitalize Program

Temporary contact: Rachel Reyna, DCNR (717-783-0385, rreyna@pa.gov) – TreeVitalize Program Manager (position currently vacant)
QA/QC Contact: Derrick McDonald for PracticeKeeper

Data Compilation Procedures
High-Level Data Flow Graphic



Sector: Natural, Developed
BMP List:
Tree Planting
Urban Forest Planting
Tree/Shrub Establishment

DCNR is responsible for a program (TreeVitalize) that undertakes the planting of trees in urbanized areas around the state. For NEIEN reporting purposes, tabular data on urban tree planting projects are obtained from the appropriate contact (currently Rachel Reyna) on a yearly basis and re-formatted for entry into DEP's BMP Warehouse application as described previously. In this case, information on the number of trees planted in various counties is obtained and subsequently reported to CBPO as "Tree Planting" (Bay BMP code 356).

Staff responsible for documentation and records retention follow specific program guidelines established by their respective programs as well as state records retention policies. BMP data are stored on Commonwealth servers that are backed up to prevent data loss. All BMPs

installed require an application from the implementation partner and reporting to DCNR and DEP via PracticeKeeper once the BMP has been fully implemented. Staff entering BMPs into PracticeKeeper are trained through the Clean Water Academy "DCNR PracticeKeeper Buffer BMP Submission" module. DCNR Staff QA/QC all TreeVitalize PracticeKeeper BMPs for geospatial location, BMP name, extent, unit of measure, and implementation date before approving the BMPs to meet DCNR Forestry BMP program requirements. DCNR use PracticeKeeper to export into an excel spreadsheet and QA/QC the data for double counting and errors based on location, BMP name, extent, unit of measure, and implementation date.

Data Verification Procedures

DCNR, TreePennsylvania, Penn State Extension, and TreeVitalize grantee organizations are responsible for verification of the Tree Plantings. Tree Planting verification is performed after trees are planted by grantees via submitted photo or visual inspection. Inspection includes if the tree is planted properly and living. If the tree is not planted properly, measures are taken to correct that. If the tree is not living, the BMP is not recorded. DCNR program personnel are all qualified at the time of hire, and all grantees are all trained and qualified via the TreeTenders program linked at https://extension.psu.edu/tree-tenders.

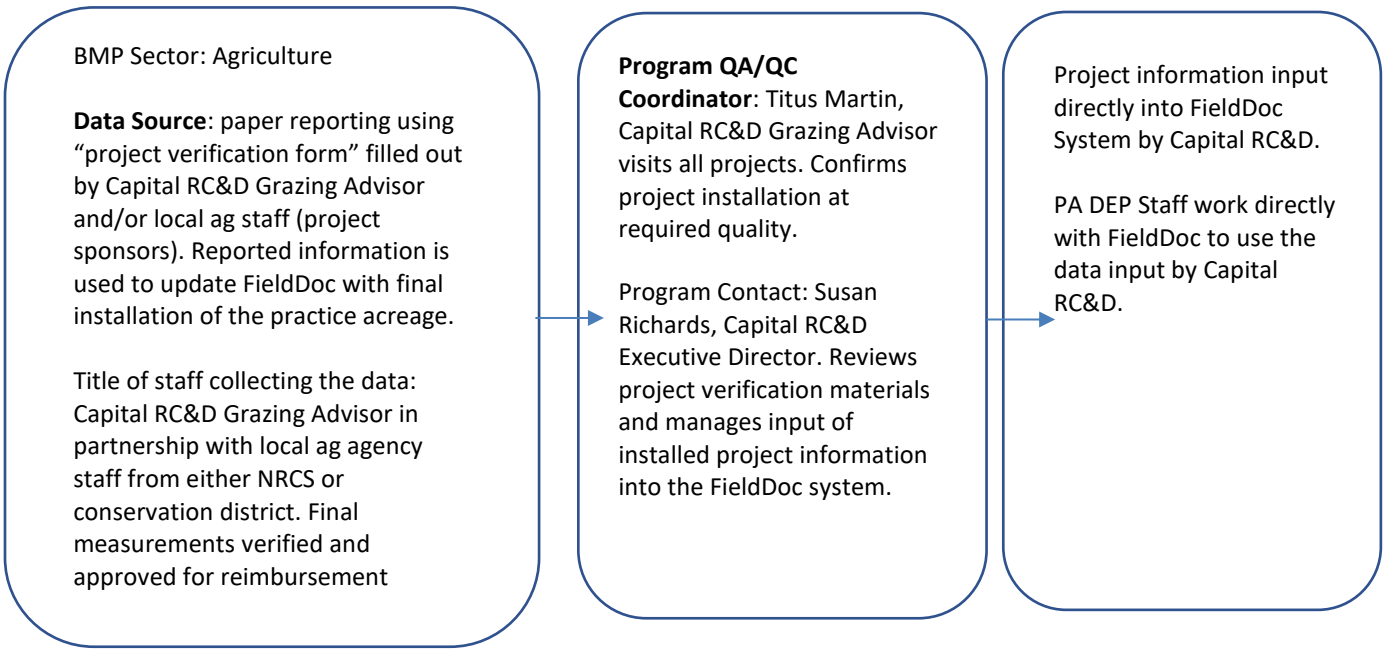
DCNR Staff QA/QC all TreeVitalize PracticeKeeper BMPs for geospatial location, BMP name, extent, unit of measure, and implementation date before approving the BMPs to meet DCNR Forestry BMP program requirements. DCNR use PracticeKeeper to export into an excel spreadsheet and QA/QC the data for double counting and errors based on location, BMP name, extent, unit of measure, and implementation date.

B10.2.18 Grass Roots Program

Contact: Susan Richards, Capital RC&D (717-241-4361, srichards@capitalrcd.org)
QA/QC Contact: Titus Martin

Data Compilation Procedures

High-Level Data Flow Graphic:



Sector: Agriculture
BMP List: Prescribed Grazing

The Grass Roots program (administered under the auspices of the Capital Resource Conservation and Development Area Council [Capital RC&D]) is an initiative funded by the National Fish and Wildlife Foundation (NFWF) that is focused on the implementation of prescribed grazing systems within the Chesapeake Bay watershed of Pennsylvania. For the last few years, tabular data on prescribed grazing projects have been obtained from the appropriate contact (currently Susan Richards) and re-formatted for entry into DEP's BMP Warehouse as described previously.

In 2020 and 2021 the Grassroot Program reported all BMPs to NFWF through FieldDoc. Installation of new grazing infrastructure is approved for cost-share by a project steering committee that reviews the proposed project plan and budget. The projects funded by the program are implemented according to the project plan and the installed infrastructure is verified by a Capital RC&D Grazing Advisor and/or the local project sponsor, either a NRCS or conservation district ag tech. When completed, the practice is inspected and measured to verify its construction and confirm that the quality of materials and workmanship meets required specifications based on NRCS standards. Installed practices are obligated to be functional for 10 years. A project verification form is filled out with a list of practices installed and acreage impacted based on the inspection of the implemented project. The form is required for each project and is filled out manually. The form is accompanied by photos of the project and receipts for the constructed practices. Each project verification form includes signatures of the inspector and landowner.

Susan Richards, Capital RC&D Executive Director, reviews and approves the project verification form and has the information input into the FieldDoc project system. The final acreage of each project is verified and compared with a separate Excel spreadsheet that contains information about all funded projects and is used as an in-house tool to report to NFWF. See https://www.capitalrcd.org/grass-roots.html for further information.

The Grass Roots program (administered under the auspices of the Capital Resource Conservation and Development Area Council [Capital RC&D]) is an initiative funded by the National Fish and Wildlife Foundation (NFWF) that is focused on the implementation of prescribed grazing systems within a 14-county area of south-central Pennsylvania, including Adams, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, Union, Snyder and York Counties. For the last few years, tabular data on prescribed grazing projects have been obtained from the appropriate contact (currently Susan Richards) and re-formatted for entry into DEP's BMP Warehouse as described previously.
In 2020 the Grassroot Program reported all BMPs to NFWF through FieldDoc.

Data Verification Procedures

Capital RC&D inputs project information directly into the FieldDoc system and only into that system. Capital RC&D does not report the project data directly to DEP to reduce the possibility of double counting. Data entered into FieldDoc includes GPS-based information including the waypoints and extent, in acres, of the newly built infrastructure.

Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements in A8: Training and Qualifications. These records are verified by the program prior to reporting all BMPs to NFWF through FieldDoc and NFWF and sent to DEP's BWRNSM for submission to EPA through NEIEN. NRCS staff occasionally provides technical assistance on prescribed grazing projects under the Grass Roots program. When such assistance is provided, this activity is typically reported as "CTA" activities in the NRCS report provided to DEP by USGS. Such activities, however, are not included in the NRCS data submitted to CBPO via NEIEN.

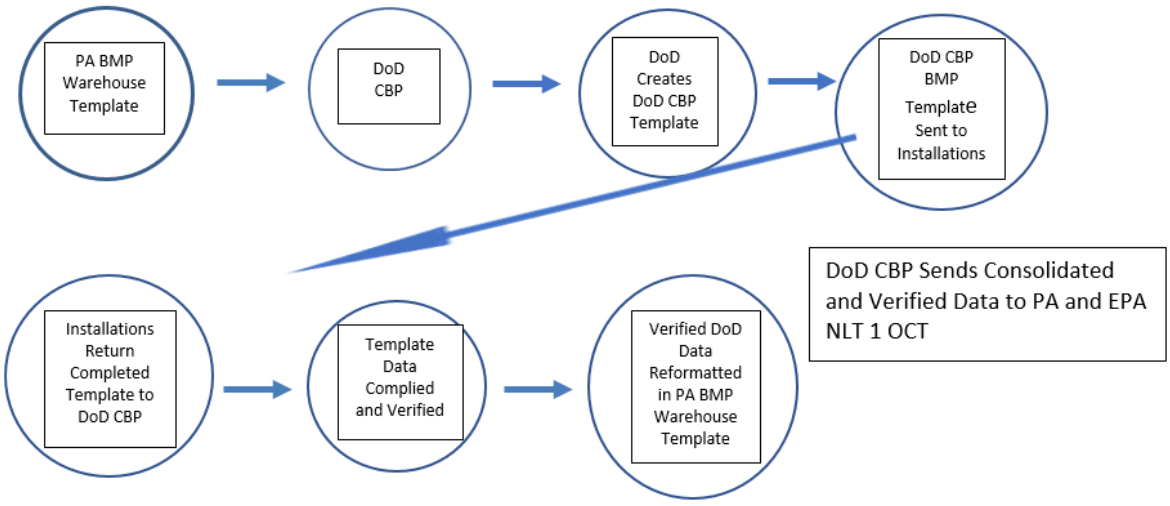
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.2.19 Federal Facilities

Contact: Kevin Du Bois, U.S. Department of Defense, DoD Chesapeake Bay Program (CBP) Coordinator (757-341-0424, kevin.r.dubois.civ@us.navy.mil)
QA/QC Contact: same as above

Data Compilation Procedures

High-Level Data Flow Graphic:



Sector: Developed

BMP List:

- Channel Stabilization
- Dry Detention Ponds
- Dry Extended Detention Ponds
- Floating Treatment Wetland
- Floodplain Restoration
- Forest Stand Improvement
- New Retrofit Runoff Reduction
- New Runoff Reduction
- New Retrofit Stormwater Treatment
- New Stormwater Treatment
- Storm Drain Cleaning
- Street Sweeping
- Tree Planting
- Urban Stream Restoration
- Wet Ponds and Wetlands

Each summer, the DoD, coordinates with the Commonwealth of PA to obtain its BMP Warehouse input template and creates a DoD-specific template to gather the information that will be used to fill the PA BMP Warehouse input template and answer any other questions the DoD deems necessary to fulfill reporting requirements to Congress or otherwise determine its TMDL or MS4 permit progress/compliance and generate reports on the credit of DoD BMPs in CAST. Once all the installation-specific data is collected, it is consolidated and undergoes a rigorous and sometimes iterative data completeness and validation process. Once complete, the data is re-entered in the BMP Warehouse input template and forwarded to the Commonwealth of PA and

the EPA no later than October 1 in each year. According to the Commonwealth of PA, DoD records comprise nearly all the reported BMPs from all federal agencies and are reported by PA without correction.

For more information about DoD program visit https://www.denix.osd.mil/chesapeake/

Data Verification Procedures

Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements in A8: Training and Qualifications. These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.2.20 PA Dept. of Transportation (PennDOT) Urban Stormwater BMPs (Ch. 102 Post Construction Stormwater Management)

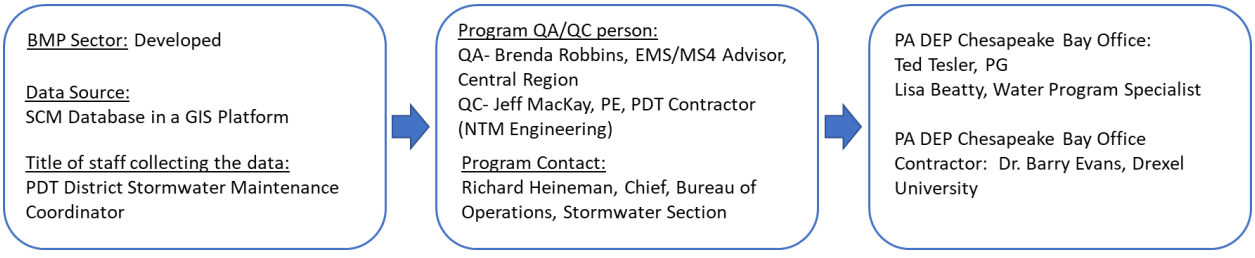
Contact Information

Richard Heineman, Section Manager, PennDOT Bureau of Operations, Stormwater Section
(717) 787-0459, rheineman@pa.gov)

QA/QC:
Brenda Robbins, EMS/MS4 Advisor
Jeff MacKay, P.E., PennDOT Contractor/NTM Engineering

Data Compilation Procedures

High-Level Data Flow Graphic:



Sector: Developed and Natural

BMP List:

- Biofiltration
- Bioretention
- Dry Detention Ponds
- Dry Detention Ponds and Hydrodynamic Structures
- Dry Extended Detention Ponds
- Filtering Practices
- Filtration
- Grass Filter Strips
- Infiltration Basin
- Infiltration Trench
- Tree Planting
- Underground Infiltration System
- Vegetated Open Channels
- Vegetated Treatment Area
- Wet Pond
- Wet Ponds and Wetlands

PennDOT conducts various construction activities to maintain and improve the state-owned highways and support facilities in Pennsylvania. Projects involving one or more acres of earth disturbance, excluding road maintenance activities, are required to obtain coverage under an NPDES Permit for Discharges of Stormwater Associated with Construction Activities. A Post-Construction Stormwater Management (PCSM) Plan is prepared and submitted for each permit which contains design information and construction drawings for Stormwater Control Measures (SCM).

PennDOT Publication 888, *Stormwater Control Measure Maintenance Manual*, contains the policies and procedures for naming, inventorying, inspecting, and maintaining SCMs. Chapter 2 describes the procedures for inventorying new and existing (i.e., constructed prior to the publication) SCMs. In general, SCM data is added to the statewide database prior to construction and then made "active" when the NPDES Notice of Termination is filed with and accepted by DEP. Data on older SCMs, such as those constructed prior to NDPES permits, are added as they are identified and assessed. Chapter 3 outlines the inspection procedures for SCMs, while Chapters 4-6 describe the routine and corrective maintenance activities that are associated with the various SCM types that PennDOT employs.

PennDOT maintains a database of SCMs that is regularly updated with information supplied by the Engineering District Offices. BOMO is responsible for quality control of the data and entering it into the database. The Maintenance Interactive Query Application (Maintenance-IQ) is the Department's Geographic Information System (GIS) visualization portal for planned

and completed maintenance activities across the state. Maintenance-IQ is an interface for showing sets of map data which can be exported and queried for attribute data. Users can find SCM data, view the results of past inspections, link to inspection documents, and schedule future inspections. Figure 1.1.2 from the publication illustrates the lifecycle of an SCM.

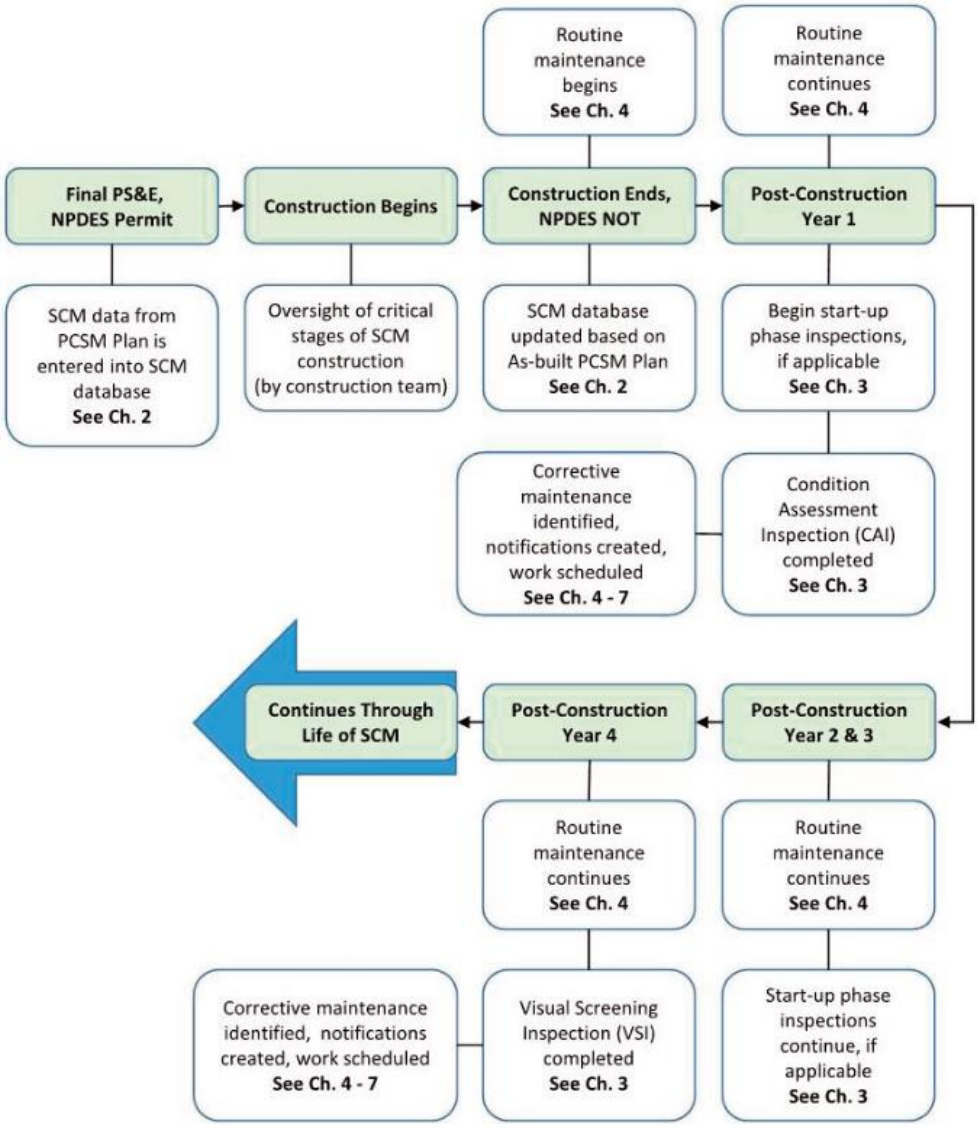


Figure 1.1.2: SCM Lifetime Maintenance Activities

Data Verification Procedures

Data verification and quality control occur at many levels, as described below. Data reported to DEP BWRNSM is reviewed for double counting and errors by SCM ID number, NPDES, Permit number, BMP name, implementation date, and location.

Construction – As required by Chapter 102, a licensed professional provides oversight of critical stages of construction of SCMs. An as-built PCSM Plan is prepared and submitted to DEP as part of the NPDES NOT process. Throughout the duration of the project, visual site inspections are conducted by PennDOT's construction inspector weekly and after rainfall events. Among the items that are evaluated is adequate protection of SCMs from compaction and sediment-laden runoff. As part of PennDOT's Construction Stormwater Compliance Management Program, a District Self Inspection and a Stormwater Self Audit are independently performed once per year on each active project. The District Self Inspection is a quality control measure in which a person who is not associated with the project performs a visual site inspection and the results are compared to the most recent inspection by the project inspector. The Stormwater Self Audit is a comprehensive quality assurance review by Central Office of the project documentation, compliance with permit conditions, etc.

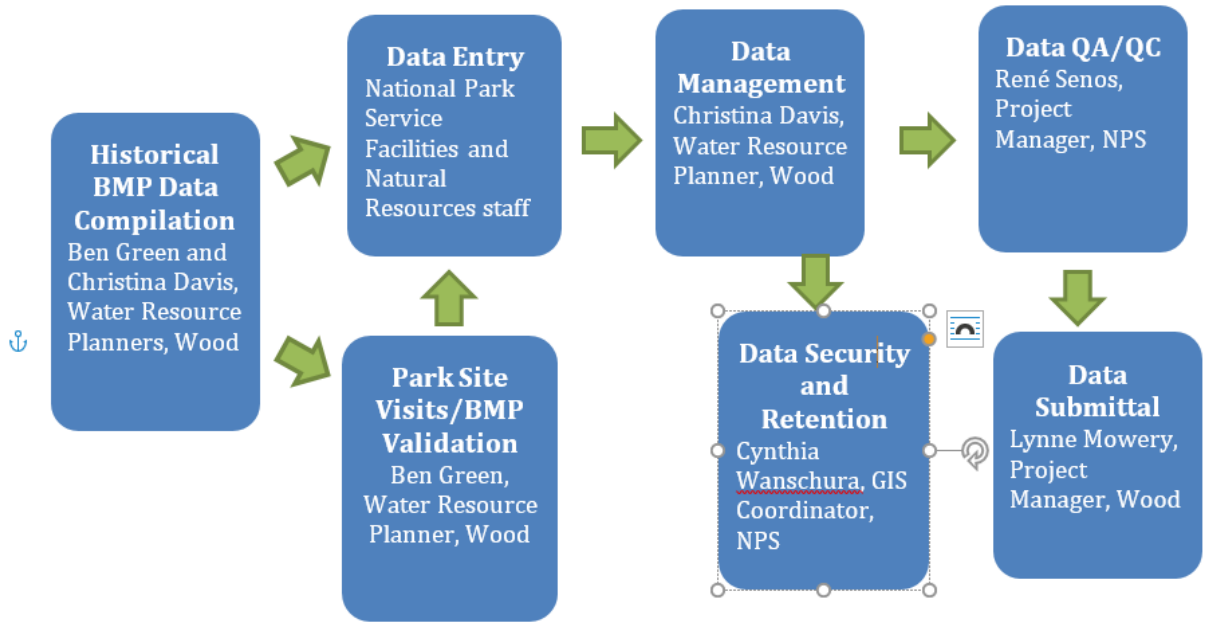
Maintenance – As indicated in Figure 1.1.2, PennDOT conducts two types of SCM inspections once they have moved from the construction phase to the maintenance phase. A Condition Assessment Inspection (CAI) is performed within one year of construction. CAIs are in-depth inspections looking at all SCM components, evaluating all aspects of functionality and performance. A passing grade on a CAI certifies that the SCM should function properly and provide its intended PCSM benefits (peak rate control, volume control, and/or water quality) if it is properly maintained. Visual Screening Inspections (VSI) are routine, non-invasive inspections intended as a "check-up" to identify any obvious problems based on visual indicators. Most SCM types require a VSI at least once every three years. BOMO staff perform quality control CAIs and VSIs to identify areas for improvement for the inspections completed by the District Engineering Offices.

Link to Publication 888
http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20888.pdf

B10.2.21 National Park Service

Contact Information - René Senos, Project Manager, National Park Service (NPS) – Region 1 – National Capital Area, Facilities Design and Construction (202-619-7078 and
Rene_Senos@nps.gov
QA/QC Data Contact Name: René Senos

Data Compilation Procedures
High-Level Data Flow Graphic:



Sector: Developed

BMP List: Below is a table of BMPs reported to DEP by National Park Service in 2021.

BMP Sector	BMP Name	Date Installed	Practice Description	Facility Name
Urban	Tree Planting	12/31/2012	Ziegler's grove tree planting- 166 trees	NPS - Gettysburg National Military Park
Urban	Reduction of Impervious Surface	12/31/2012	Ziegler's grove Rehabilitation. Removed a building and asphalt, regraded- 3 impervious acres removed.	NPS - Gettysburg National Military Park

National Park Service facilities and/or natural resources staff are asked to enter BMPs in their park to the National Park Service Stormwater BMP Project Tracking Tool. The tool is an ArcGIS Online-based web app that allows for park staff to view and enter their BMP data. Staff are provided an extensive online training on how to use the tool and must request access and be approved by Cynthia Wanschura, the National Capital Area GIS Coordinator before they receive permissions to enter data. Entered data is stored on the NPS ArcGIS Online organizational account as a hosted feature class with points for each BMP location and attributes for required BMP information. Fields in the data entry form are listed in the Data Verification Procedures section below. Staff from Wood, a National Park Service contractor, coordinate park visits at NPS request to validate the existence of BMPs and collect any missing data. Wood staff also provide assistance and data management after data entry, requesting planning documents to confirm

BMP specifications or fill data gaps. At the end of the data call, Wood staff export newly documented BMPs from the ArcGIS Online database to a csv file. BMP details from the csv file are then transferred to the PA DEP Federal Facilities BMP reporting template. The completed Excel reporting template is emailed to René Senos, NPS Project Manager for the Chesapeake Bay Watershed Improvement Plan Implementation, who performs a QA/QC check on the data. After data validation, Lynne Mowery, Project Manager for the Wood team, submits the reporting template to DEP.

Security and confidentiality specifications are incorporated into the NPS data management system. The National Park Service Stormwater BMP Project Tracking Tool is only viewable or editable by NPS staff that have been approved by an NPS GIS Coordinator. They must enter individual username and password credentials to access the BMP data. This ensures that only required personnel within NPS are able to view and modify the data. BMP data is stored in a hosted feature class within the NPS ArcGIS Online organizational account. Wood saves local copies of dated versions of the data in case data restoration is required.

Data Verification Procedures:
BMP attributes that NPS tracks for projects in Pennsylvania are below.

Jurisdiction	Impervious Acres Treated
NPS Area	Runoff Treated (acre-feet)
NPS Park Unit	Practice Description
NPS Project Title	Existing Land Use
Project Description	Comments
NPS Location Description	Contact Name
PMIS Number	Contact Email
Task Order/Contract No.	Reporting Date
Status	Milestone Year
Year Funded	Most Recent Inspection Date
BMP Estimated Cost	Inspection Status
Date Installed	Inspection Maintenance Date
Latitude	Reinspection Date
Longitude	Reinspection Status
Universal BMP Name	Latitude
Measurement Name	Longitude
BMP Extent	

BMPs must have a latitude and longitude to be entered into the database. If the BMP encompasses a large area, the point should be placed somewhere within the area close to the center. BMPs are not reported at multiple scales.

The data QA/QC process occurs at each step of data collection. Facilities and natural resources

staff at each park are asked to enter their BMP data into the database because they have the best knowledge of what BMPs exist in their park, where they are, and what the specifications are. Wood staff work closely with park staff and the NPS Project Manager to ensure BMP data is entered correctly and completely. Wood staff also conduct site visits to parks at NPS request to verify the existence of BMPs, collect missing data, and guide staff on how to enter details for BMPs that have not yet been reported. Wood staff also communicate with park staff after data entry to confirm BMP specifications or request more information. Ultimately, Wood does not transfer BMPs in the NPS database to the DEP reporting template that do not have a date installed, BMP Name, Measurement Name, Measurement Unit, BMP Extent, and location. The NPS project manager provides the final QA/QC before data is submitted. Because reported BMPs have been limited, manual checks or typos, duplicate entries, or other data errors have been successful.

Sources of double counting can arise from multiple park staff entering the same data or a new BMP record entered instead of editing an existing record for that BMP. Because we collect latitude and longitude, we can easily see when BMPs are co-located or very close to each other. We can then confirm in the attribute data or with park staff if the BMPs are duplicates or not. The number of BMPs that NPS has entered into the database and subsequently reported is conducive to manual data checks. Manually inspecting attribute information can indicate which BMP records to confirm with park staff.

References to Bay Program BMP verification guidance/SOPs/inspection forms: NPS is in the process of developing its BMP inspection/verification program and reviewing the inspection checklists/forms available from the states where NPS parks are located. The database includes functionality to track inspection and maintenance dates. The two BMPs reported in Pennsylvania were field verified by Wood staff and a desktop assessment of aerial photographs.

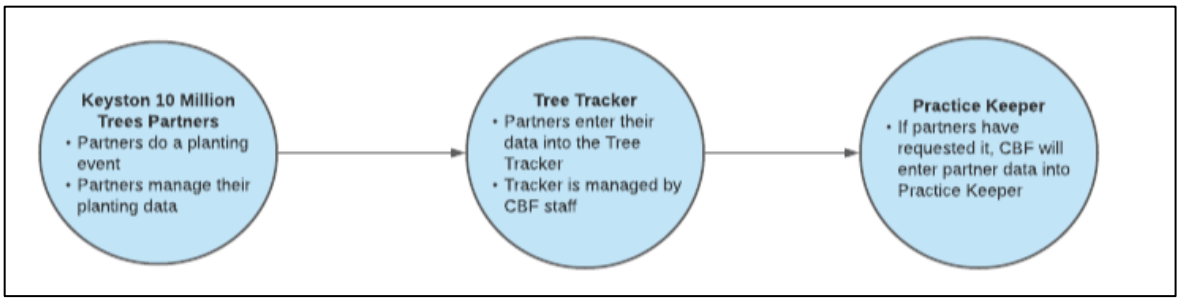
B10.2.22 Chesapeake Bay Foundation's (CBF) Keystone 10 Million Trees Program

Program Contact: Brenda Sieglitz, Keystone 10 Million Trees Partnership Senior Manager (717.234.5550; bsieglitz@cbf.org)

QA/QC Data Contact: Katie Leaverton, GIS Program Manager (443.482.2016; kleaverton@cbf.org)

Data Compilation Procedures

High-Level Data Flow Graphic:



The Chesapeake Bay Foundation (CBF) works with partners across the state to support a variety of tree planting BMP projects in the Agriculture and Developed sector.

Sector	BMP
Agriculture	Riparian Forest Buffer (RI-10 Forest Buffer on Watercourse)
	Riparian Forest Buffer – Narrow (RI-9 Forest Nutrient Exclusion Area on Watercourse – Narrow)
	Tree/Shrub Establishment
Developed	Riparian Forest Buffer (RI-10 Forest Buffer on Watercourse)
	Riparian Forest Buffer – Narrow (RI-9 Forest Nutrient Exclusion Area on Watercourse – Narrow)
	Tree/Shrub Establishment – Urban Tree Canopy
	Tree/Shrub Establishment – Urban Forest Planting

Partners submit their tree planting information to CBF staff using the "Tree Tracker", an ArcGIS web application created by the CBF GIS Program that partners are trained to use during in-person meetings hosted by CBF staff or by referencing the tool instruction document. The Tree Tracker is initially populated with planting event information when partners submit their tree requests to CBF using a Smartsheet form. All form submissions are exported from Smartsheet in a CSV file format, uploaded into an enterprise geodatabase, and published as a spatial data layer that can be accessed and edited in the Tree Tracker application.

Once partners have completed their planting event, they use the Tree Tracker tool to update their organizations planting event data to include implementation data and confirm that the plantings were completed. If partners are unable to use the web application tool they can submit their data to CBF using a shapefile template that contains all of the same information as the Tree Tracker. If the submit their data through the template, CBF appends that data to the geodatabase containing all Tree Tracker data. Data entered in the Tree Tracker is stored in

an enterprise geodatabase and can be exported as tabular or spatial data as needed and for reporting purposes.

Data stored in the enterprise geodatabase is located on a CBF server and is backed up nightly and any specific site planting data is not shared publicly to abide by program privacy policies.

Data Verification Procedures

The following attributes are being tracked for all BMP types:
Data attributes include the following:

- Global ID: Unique planting ID Status: Confirmation from partners that planting did occur.
- Trees planted (#): Number of trees planted.
- Acres: Number of acres planted.
- Organization: Organization that hosted the planting event.
- Event date: Implementation date.
- BMP type: Type of BMP tree planting.
- Longitude (X): Coordinate for planting site point in decimal degrees (GCS WGS 1984).
- Latitude (Y): Coordinate for planting site point in decimal degrees (GCS WGS 1984).
- Upland Planting BMP Designation: Marks a site as “Rural/Ag” or “Urban”; only applies to “Upland planting” BMP type, all others are coded as “NA”.

Tree plantings conducted prior to 2021 and not entered into Tree Tracker were submitted via an excel spreadsheet to DEP BWRNSM. QA/QC was conducted by location, BMP, BMP extent, and implementation date. This information is not entered in Tree Tracker so there is no duplication.

At the end of each planting season the QA/QC Data Contact compares the number of trees CBF has provided to partners with the numbers those partners have submitted to CBF through the Tree Tracker. When partners submit their planting information to the Tree Tracker they are asked if they would like CBF to submit to Practice Keeper on their behalf. If they have selected “Yes” we will submit the plantings to DEP through Practice Keeper.

As data is prepared for entry by CBF staff into the Practice Keeper system, each site is reviewed for typos and values that seem to have been entered in error before being manually entered into the system.

DCNR staff review the CBF BMP submissions for accuracy and approves the submission. DCNR utilizes PracticeKeeper data export and completes a QA/QC of the data for double counting and errors to send to DEP BWRNSM.

We estimate that 95% of plantings done under the Keystone 10 Million Trees Partnership are ground verified by a CBF staff member or CBF partner on implementation date. The remainder accounts for trees that are given away by CBF partners to program participants and are logged by CBF partners in the Tree Tracker on behalf of the participants. As part of the verification process, ground verification is one of many steps to verify BMP implementation for data reported to DEP.

Further verification procedures include checking for data duplications and tree planting density. Depending on the type of BMP planting that is submitted there is a required level of tree density for certain BMP types to be achieved. The only BMP type with tree density concerns that CBF is currently supporting the planting of is forested riparian buffers, which at a minimum, requires 100 trees/acre, but typically is recommended to be planted at 200 trees/acre.

CBF is working actively to strengthen its verification of BMPs after implementation to include a remote sensing component to complete follow-up checks of locations, land use classification, and BMPs that occurred in previous and subsequent years. There is also work being done to update the spatial data submitted by partners to include polygons instead of points for the planting locations.

B10.2.23 Dept. of Conservation and Natural Resources (DCNR)

Contact: Teddi Stark, Watershed Forestry Program Manager (717.787.0656, c-tstark@pa.gov)
QA/QC Contact: Derrick McDonald

High-Level Data Flow Graphic:

Sector: Agriculture, Developed, and Natural
BMP List:

- Forest Buffers
- Riparian Forest Buffer
- Stream Channel Stabilization

- Stream Habitat Improvement and Management Stream Restoration
- Streambank and Shoreline Protection
- Streambank Stabilization
- Conservation Landscaping
- Urban Forest Planting
- Tree Planting
- Tree/Shrub Establishment
- Urban Forest Buffer
- Urban stream restoration
- Wetland Creation
- Wetland Restoration

DCNR Staff are responsible for documentation and records retention follow specific program guidelines established by their respective programs as well as state records retention policies. BMP data are stored on Commonwealth servers that are backed up to prevent data loss.

All BMPs installed require an application from the implementation partner, as well as reporting to DEP via PracticeKeeper once the BMP has been fully implemented. Applications require an outline of BMPs to be installed, their extent (acres, feet, number of trees planted, etc.) and a description of how each BMP will meet CBPO standards. Usually, this information is captured via a planting plan for Forest Buffers, Forest Planting, and Conservation Landscaping. All additional BMPs that support the planting BMPs (stream restoration, streambank stabilization, wetland creation/restoration, etc.) must also be included in the planting plan. Planting plans may follow a variety of formats, but all planting plans require the following information:

1. Contact Information:
    a. Landowner name, mailing address, and additional contact information
    b. Project Coordinator name, mailing address, and contact information

2. Property Information: describe the location of your proposed planting location
    a. Project site address (if different), municipality, and county
    b. Coordinates of the location of the center of the proposed project
    c. HUC 12 code in which the planting is located
    d. Directions to the site and how to access the project
    e. Utilities present on site and who will make 811 call

3. Current Land Use:
    a. Describe current land use, existing dominant vegetation, and any concerns to project success (deer browse, erosion, invasive plants, soil test results, etc.)

4. Planting details:

a. Proposed planting season
b. Total number of acres to be planted – if planting separate areas, specify acres of each
c. Describe the plan for planting trees, when appropriate:
    i. Number of trees to be planted
    ii. Species of plants recommended for planting with flexibility for substitutions
    iii. Size of planting stock to be used (containerized, bare root, etc.)
    iv. Tree protection materials and methods (tube-type shelters, cages, etc.)
d. Describe the plan for planting meadow, when appropriate:
    i. Species of plants, community types, or seed mixes recommended for planting and area of each mix to be planted.
    ii. Planting method and mulching needs

5. Site Preparation: describe pre-planting site preparation activities, responsible parties, and approximate timelines for performing these activities.
    a. List specific invasive or competing species and how will they be controlled or removed
    b. Describe any major preparation needing completed prior to planting. Clearly outline the timeline for this work to take place and responsible parties, as applicable.
    c. List any other site preparation steps that need taken prior to planting (herbicide treatments, mechanical vegetation control, site disking, soil amendments, etc.)

6. Maintenance Procedures: describe post-planting establishment and maintenance activities, responsible parties, and approximate timelines for performing these activities for the duration of the landowner agreement, including but not limited to:
    a. Seasonal inspections
    b. Mowing (*meadows may not be mowed for the duration of the Landowner Agreement unless recommended and approved by DCNR*) and/or herbicide applications
    c. Replacement planting/seeding to maintain 70% stocking of original planting
7. Attachments:
    a. Map of project extent – aerial basemap with acres labeled within the planting extent
    b. Others as needed: soils map, establishment and maintenance documents, seed mix lists, invasive plant management sheets, etc.

Data Verification Procedures

Staff responsible for on-site inspections and data reviews have technical expertise, qualifications, and titles established by their respective programs related to this reporting and verification. These qualifications can be found within the appropriate job descriptions.

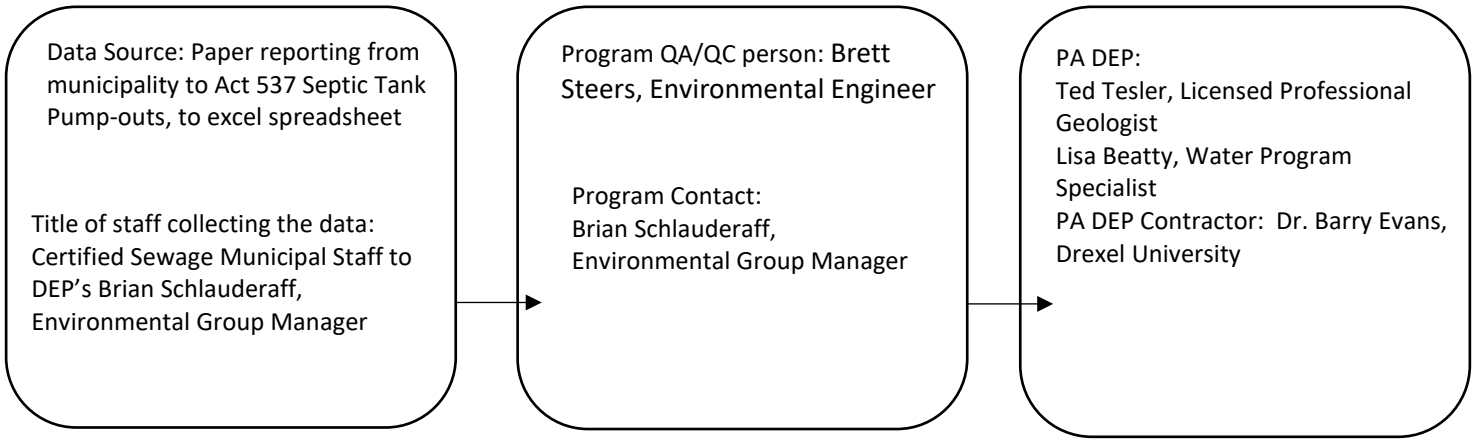
1) Regional Riparian Forest Buffer Specialists
2) Lawn Conversion Program Coordinator
3) Riparian Forest Buffer and Watershed Forestry Program Manager
4) Watershed Forestry Coordinator
5) Service Foresters

Information on initial BMP implementation obtained from the above source is presumed to be accurate as reported by the program per the requirements. After BMP installation, the implementer then reports the BMP to PracticeKeeper's "Partner BMP Submission Module". This report to PracticeKeeper captures the extent of the BMP spatially via mapping/uploading of a shape file, and the additional following input fields.

B10.2.24 DEP Bureau of Clean Water Septic Tank Pump-outs

Contact: Brian Schlauderaff, Environmental Group Manager (717-772-5620, bschlauder@pa.gov)
QA/QC Contact: Brett Steers, Environmental Engineer

Data Compilation Procedures
High-Level Data Flow Graphic:



Sector: Septic
BMP List: Septic Connections

Act 537, the Pennsylvania Sewage Facilities Act, requires that all municipalities develop, revise and implement Official Sewage Facility Plans ("Act 537 Plan" or simply "Official Plan"). A fundamental part of this Act 537 Plan is the identification and documentation of the sewage disposal needs in a municipality. For more detailed information on Act 537 Sewage Facilities

Program regulations, SOPs, training see the following link:
https://www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Act537/Pages/default.aspx

In Pennsylvania, municipalities that utilize on-lot sewage systems as a means of disposal of domestic sewage are required to submit an annual report, On-lot Sewage Disposal Program and Sewage Management Program Annual Report at https://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=122768 to PA DEP by March 1st of each year. Within this report municipalities that have implemented their Sewage Management Programs report the number of septic tank pumping events that have taken place during the previous calendar year. Because of the layered programmatic reporting schedules, this annual data is reported retroactively (2021). Due to the established scheduled reporting, the plan is to maintain this reporting structure. The PA DEP staff compile the number of septic tank pump-outs from each report and report the results to the Chesapeake Bay Program Office for incorporation in their modeling.

Data Verification Procedures

When preparing an Act 537 Plan, a community's wastewater disposal "needs" must be documented. Adequate documentation of these sewage disposal needs is considered fundamental for all following work involving sewage disposal alternatives and solutions.

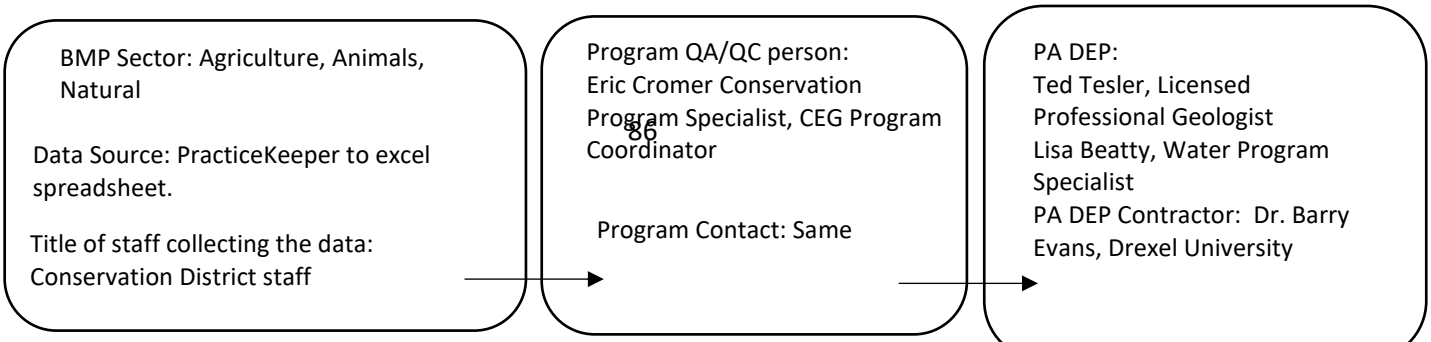
Information contained in the annual reports received from the municipalities is presumed to be accurate. Tabulation of the numbers provided by the municipality for the various categories in the report table are given a quantitative check by trained Act 537 staff when transposing the data from each municipal report to the database spreadsheet provided to the CBPO. QA/QC is conducted for double counting and errors by BMP name, extent, implementation date and location.

B10.2.25 Conservation Excellence Grant (CEG) Program

Contact: Eric Cromer, State Conservation Commission, Conservation Program Specialist, CEG Program Coordinator (223-666-2556, ecromer@pa.gov)
QA/QC Contact: Eric Cromer

Data Compilation Procedures

High-Level Data Flow Graphic:



BMP Sector: Agricultural, Animal
BMP List: CEG BMP List

BMP implementation data related to the State Conservation Commission's Conservation Excellence Grant (CEG) program is tracked through PracticeKeeper, which a GIS-based software program used by the State Conservation Commission, DEP and County Conservation District staff. BMP data verification information is collected and then the BMP data is entered into PracticeKeeper by the county conservation districts. BMP data is then compiled by using the data export option within PracticeKeeper to provide an excel spreadsheet to BWRNSM staff for entry in the BMP Warehouse and inclusion in the NEIEN submittal. A BMP is not reported if it was funded by a funding source that is reported from another program. For example, all practices funded by USDA programs, CBIG, Nutrient Management, REAP, or DCNR grants that are within the credit duration of the BMP will be removed from the exported dataset before reporting to NEIEN. The file is the submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

Data Verification Procedures

All CEG data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – *Best Management Practice (BMP) Module SOP No. CBO-DATA-003.*

a) Attributes Tracked:
    i) BMP type
    ii) CEG BMP List
    iii) BMP subtype
        (1) TBD
    iv) Status
    v) Geographic Scale
        (1) Manually drawn BMP.
            (a) Latitude and Longitude is based on the calculated centroid of the BMP.
            (b) County is derived from the intersection of the drawn BMP and county boundaries.
            (c) Watershed is derived from the intersection of the drawn BMP and watershed boundaries.
    vi) Dates
        (1) Planned
        (2) Inventory & Evaluation
        (3) Surveyed
        (4) Design Approved
        (5) Implemented
    vii) BMP Participants
        (1) Designer
        (2) Design Reviewer

(3) Design Approver
(4) Implementer
(5) Planner

viii) Implemented Amount
ix) Unit of Measure
x) Funding Source, Amount, and Date
xi) Inspections (Reverification Data)
(1) Inspector Name
(2) Date Inspection Performed
(3) BMP Compliance
(4) Verified Amount

b) Potential sources of duplicate BMPs
i) BMPs that were implemented using funding sources that are reported separately including USDA programs, Conservation Excellence Grant, REAP, Growing Greener, 319, NFWF, PennVest or DCNR grants.
(1) If a BMP is solely or co-funded with any of the funding sources listed above, it is removed from the exported dataset before reporting to NEIEN.

c) Data Entry Errors
i) Obvious data entry errors such as implementation dates, etc. are communicated with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN.

d) Qualifications
i) CCD staff receive classroom, web-based, and on-the-job training to determine that the installed BMP meets the BMP definition. If the BMP is reported as implemented in the PracticeKeeper Geodatabase, it is assumed that the BMP meets the BMP definition.
ii) CCD Nutrient Management specialists are certified through a rigorous 12-day training series and pass an exam to obtain certification. The training series includes the following:
(1) Nutrient Management Orientation
(2) Managing Manure Nutrients Workshop
(3) Stormwater and Soil Loss Workshop
(4) P-Index Workshop
(5) Plan Writing Workshop
(6) ACA and Manure Storage Workshop
(7) Plan Review Workshop
iii) CCD Chesapeake Bay Engineers attend NRCS Bootcamps and web-based, classroom, and on-the-job trainings, obtain NRCS Job Approval Authority, and experience have appropriate oversite from NRCS engineering staff.
iv) CCD staff receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. CBO-DATA-003 and the accompanying DEP Clean Water Academy Learning Module.)

Records of BMPs implemented through the CEG Program are verified by the program staff prior

to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

B10.2.26 Municipal Separate Storm Sewer (MS4) Pollutant Reduction Plan (PRP) and TMDL Plan BMPs

Program Contact: Sean Furjanic, DEP Bureau of Clean Water, NPDES Permitting Division (at (717) 787-2137; sefurjanic@pa.gov)

QA/QC Contact: Jamie Eberl, DEP Bureau of Clean Water, NPDES Permitting Division (at (717) 772-4058; jeberl@pa.gov)

Data Compilation Procedures

High-Level Data Work Flow Graphic

Sector: Developed

BMP List:

- Bioretention and Bioswales
- Dry detention basins and hydrodynamic structures
- Dry extended detention basins
- Forest Buffers and Tree Planting
- Infiltration practices (including permeable pavement, and filtering practices)
- Storm Sewer System Solids Removal
- Stream Restoration
- Street Sweeping
- Vegetated swales
- Wet ponds and wetlands

Municipalities and other entities such as universities and prisons that meet certain standards must obtain NPDES permit coverage for discharges of stormwater from their municipal separate storm sewer systems (MS4s). For the current permit term (2018 – 2023), MS4s that discharge to waters in the Chesapeake Bay watershed are required to develop Pollutant Reduction Plans (PRPS) or TMDL Plans. These plans require that permittees estimate their existing sediment, Total Phosphorus (TP), and Total Nitrogen (TN) loads to the Bay, and that the PRP identify Best Management Practices (BMPs) that that will reduce the loads by 10%, 5% and 3% respectively within 5 years following DEP's approval of coverage. See the following website for more information on PRP/TMDL Plans: https://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Stormwater/Pages/PR

PTMDL-Plans.aspx

The status of BMPs implemented to meet the pollutant load reduction obligations of the permittee's PRP or TMDL plan are reported annually in Annual MS4 Status Reports. Annual MS4 Status Reports are submitted as hard copies (mailed) or electronically (through OnBase). For the 2021 reporting year, MS4 staff at DEP's regional offices reviewed the submitted Annual MS4 Status Reports and tracked in an excel spreadsheet the BMPs implemented by permittees towards meeting the pollutant load reductions required by their PRP or TMDL Plans. The BMP data compiled by the DEP regional offices was reviewed by MS4 staff at DEP Central office and provided to the Bay Office for reporting to EPA.

The BMP reporting and tracking process will be streamlined in future reporting years. The MS4 Program is working on developing an electronic eReporting system for the submission of Annual MS4 Status Reports from all MS4 permittees. When this system becomes available, DEP users will be able to run a report to export all BMP data input into the system by permittees. This report will then be provided to the Bay Office for reporting to EPA. In 2022 reporting, year BMPs reported as part of the MS4 e-reporting pilot project were reported to DEP BWRNSM. The pilot MS4 e-reporting system was QA/QC by DEP BWRNSM staff.

The MS4 NPDES permit requires that permittees make all documentation required by the permit, including Annual MS4 Status Reports, available to the public. Since the BMP data contained within the Annual MS4 Status reports is publicly available there are no security or confidentiality concerns with this data set.

Data Verification Procedures

Several practices are in place to ensure data accuracy and to avoid the double counting of BMPs.

- When joint BMP projects are completed, each MS4 permittee reports only the load reduction that resulted from the portion of the BMP installed within their jurisdiction. MS4s under a joint PRP do not report joint BMPs in their Annual Reports unless the BMP is located within their jurisdiction. This is necessary to avoid double counting of BMP load reductions.

- BMPs from any agency that reports directly to DEP's Bureau of Watershed Restoration and Nonpoint Source Management are removed from the MS4 BMP dataset. For example, the Department of Defense (DOD) reports directly to the Bureau of Watershed Restoration and Nonpoint Source Management, therefore any BMPs reported by the DOD facility in York County as part of compliance with their MS4 permit are not included in the MS4 Program BMP dataset.

Attributes reported for each BMP in MS4 Annual Status report include: BMP name, drainage

area, the portion of the drainage area that is impervious, BMP extent, location (latitude/longitude), date installed or implemented, if the BMP is within the permittee's planning area, if the BMP is part of a Chapter 102 permit requirement, and the annual sediment load reduction. This data is checked against general BMP design guidelines from the DEP Stormwater BMP Manual (BMP Manual). Any BMP that appears to be inconsistent with the general guidelines is flagged for verification and removed from the MS4 Program BMP dataset for the reporting year.

- The sizing criteria for bioretention facilities in the BMP Manual states that these facilities should generally not exceed a maximum loading ratio of 5:1 (impervious drainage area to infiltration area). The MS4 planning area (i.e. the census defined urbanized area) within the Chesapeake Bay Watershed is 26% impervious and 74% pervious. Therefore, using an assumed maximum bioretention BMP size of 0.5 acres, the maximum drainage area that could be expected to be treated by a bioretention BMP is 10 acres. Any bioretention BMPs reported in an MS4 Annual Status Report with a drainage area larger than 10 acres is flagged for additional verification and is not reported to the Bay Office for the reporting year.

- The BMP Manual does not list a maximum recommended loading ratio for extended detention basins, therefore a variation of the loading ratio recommended for bioretention BMPs is used to determine the size of the drainage area that could be expected to be treated by an extended detention basin. These basins are generally larger and deeper than bioretention basins, so a maximum BMP size of 1 acre and loading ratio of 10:1 (impervious drainage area to treatment area) are assumed. Using these assumptions, the maximum drainage area could be expected to be treated by an extended detention basin BMP is 39 acres. Any detention basins reported in an Annual MS4 Status Report with a drainage area larger than 39 acres is flagged for additional verification and is not reported to the Bay Office for the reporting year.

All MS4 permittees will be required to submit a Final PRP Report with the first Annual MS4 Status Report due after the final year of the current permit term. Within the Final PRP Report, MS4 permittees will be required to provide additional documentation on each BMP completed to meet the pollutant load reduction obligations of their PRP. With this additional documentation, the crediting of BMPs previously flagged for verification will be reviewed. Once these BMPs are verified, they will be added to the MS4 Program BMP dataset and reported to the Bay Office.

Annual practice BMPs (i.e. street sweeping, or storm sewer solids removal reported as lbs) are also flagged for verification and removed from the MS4 Program BMP dataset for the reporting year. As these BMPs are reported as lbs TSS and not and annual load reduction (lbs/yr), there can be variation in the load reduction achieved per year. At the end of the MS4 permit term, permittees will sum the load reductions achieved by these BMPs during each year of the permit term and divide by the number of years in the permit term (5) to determine an annualized

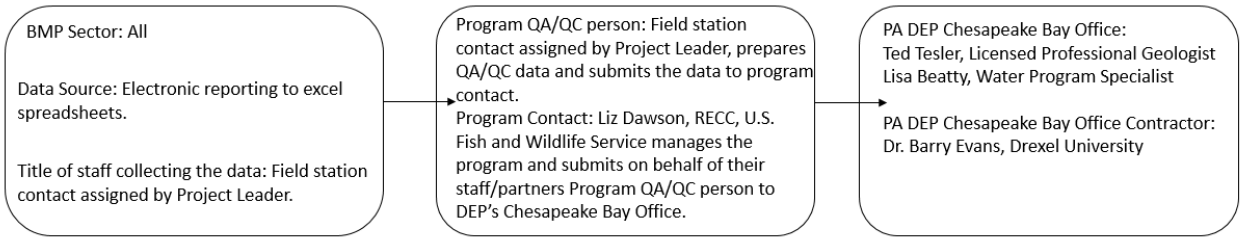
(lb/yr) load reduction. The MS4 Program will verify that the load reduction for these BMPs were calculated correctly using the data provided in the final PRP report (i.e., that the permittee is reporting only the dry sediment portion of the material collected) before adding BMP to the MS4 Program BMP dataset.

QA/QC for double counting and errors is completed by BMP name, implementation date, location, and BMP extent. DEP BWRNSM provided the MS4 program with a BMP list from Department of Defense to eliminate state and federal BMP duplication.

B10.2.27 U.S. Fish and Wildlife Service

Contact: Liz Dawson, U.S. Fish and Wildlife Service (413-253-8279, liz_dawson@fws.gov)

QA/QC Contact: Field station contact assigned by Project Leader, prepares QA/QC data and submits the data to program contact.



Sector: All
BMP List:
Soil and Water Conservation Plan
Tree Planting

Data Compilation Procedures
The U.S. Fish and Wildlife Service provides BMP records directly to DEP. The source of the data is field station contacts. This data format is a master list in an Excel spreadsheet. The U.S. Fish and Wildlife Service consistently supports the Chesapeake Bay TMDL with BMPs.

Data Verification Procedures
Verification of BMP accuracy is on an annual basis. Field station contacts verify BMP records each year. The U.S. Fish and Wildlife Service strives to maintain accurate BMP records. The U.S. Fish and Wildlife Service makes BMP records available for DEP's submission to EPA through NEIEN.

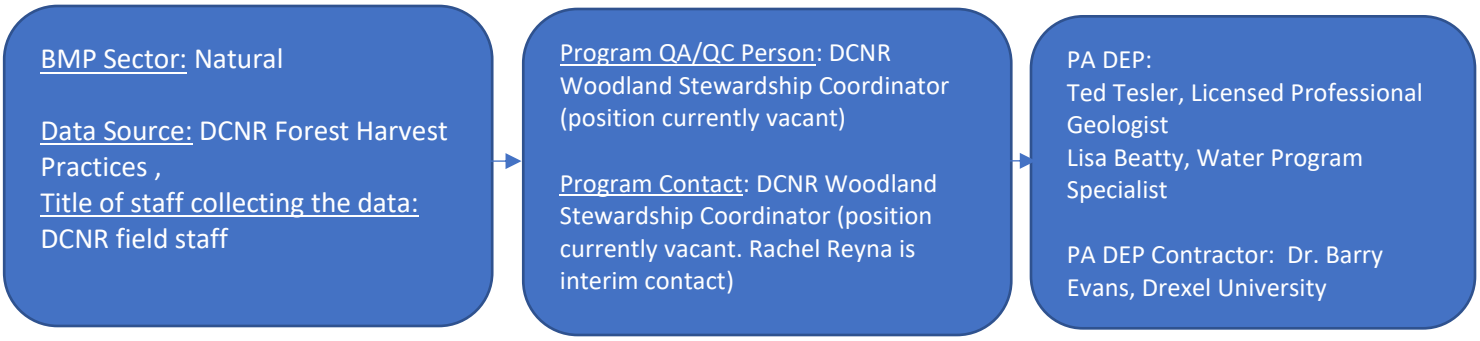
U.S. Fish and Wildlife Service (Service) has several processes in place that prevent double counting of best management practices (BMPs) in the Chesapeake Bay area. The Service maintains a BMP list that includes all BMPs. This list is divided by state and field station. With all of the BMPs on one list, it is easy to identify and eliminate double counting. Additionally, each year the field station project leader receives the BMP list for review.

The Service has one Chesapeake Bay field station area in Pennsylvania. It is the collocated Lamar National Fish Hatchery and Northeast Fishery Center. This field station's NPDES permit is up to date. New filtration and effluent dewatering practices were implemented within the last 10 years.

B10.2.28 DCNR Forest Harvesting Practices

Program Contact: DCNR Woodland Stewardship Coordinator (position currently vacant)
Temporary contact: Rachel Reyna, DCNR (717-783-0385, rreyna@pa.gov)
QA/QC Contact: same as above

Data Compilation Procedures -
High level data flow chart:



Sector: Natural
BMP: Forest Harvesting Practices
As part of the DCNR timber sale planning process, management foresters, with District Forester approval, must submit a timber sale proposal for each sale. Sale proposals contain the following at a minimum:

1. A current stand analysis. This should reflect the current stand conditions for each treatment type within a sale area. SILVAH, a computer tool for making silvicultural decisions, is the recommended program for achieving a standard analysis and prescription. Deviations from SILVAH must be justified.
2. A map of the sale area. The boundary of each sale must be surveyed with a global positioning system (GPS).
3. A current review for the presence of protected species using the Conservation Explorer tool. When search results reveal the presence of species of concern, managers must consult with the bureau's Ecological Services section to mitigate for potentially negative impacts. Conflicts may be resolved by seasonal restrictions, buffers, and in some cases, no-cut zones around sensitive areas and critical habitats.
4. A site-specific soil analysis.
5. Miscellaneous correspondences relating to sale-specific issues such as permits, reviews

for cultural/ historic resources, notifications to forest leased camp owners, notifications for oil and gas lease tract operators, or notifications to rights-of-way

Data Verification Procedures

DCNR foresters verify implementation of BMP's through visual field inspections during and after harvest operations. The DCNR Program Specialist pulls block data for the requested fiscal year from the financial database and matches it to the timber sale block polygons in the Agency's EGIS to determine the county and township for each sale block. The Specialist also performs a spatial intersect with the Chesapeake Bay watershed geometry to decide which blocks to report. Sometimes a timber sale block will have a split payment which results in more than one record for the block in the financial database. These records are unduplicated by Sale Name and Block Number prior to matching to the spatial data in the EGIS.

All DCNR field staff inspecting this BMPs are trained as foresters and are qualified by DCNR Bureau of Forestry. DCNR and PGC are responsible for the implementation and verification of these BMPs. Verification is performed by staff directly after implementation has taken place. A visual inspection of each site is compared to the BMP plans for that site, to verify BMPs specified in the plan are on the ground. As single-year practices, one visual inspection is all that is carried out.

Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements. BMP name, extent, measurement, implementation date, and location are tracked. These records are verified by the program through data review prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN. Because actual reports are used and each timber harvest is reported by only one entity, double-counting is not a concern.

Requirements for the DCNR forest harvesting can be found at the following links:
2016 State Forest Resource Management Plan (PDF)
EROSION AND SEDIMENT CONTROL (E&S) PLAN TEMPLATE FOR A TIMBER HARVESTING OPERATION.PDF **3800-FM-BCW0539**

B10.2.29 United States Army Corps and Engineers

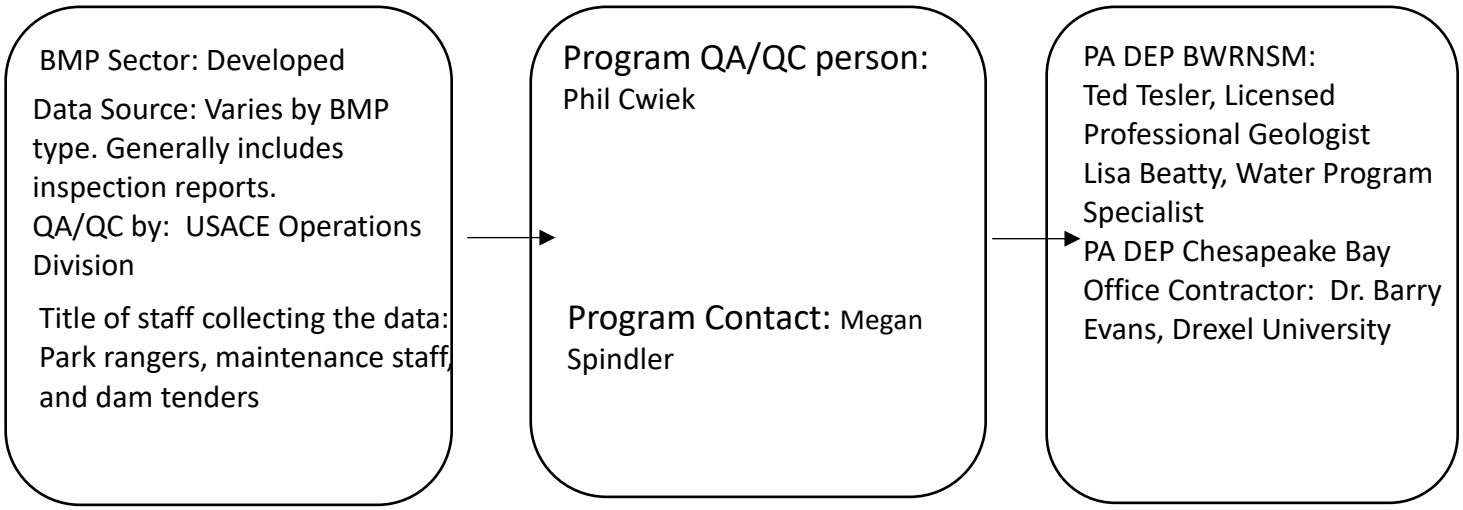
Contact Information:

Megan Spindler, U.S. Army Corps of Engineers Biologist / Study Manger Planning Division, Baltimore District (410-207-9987, Megan.L.Spindler@usace.army.mil)

QA/QC Contact:
Phil Cwiek U.S. Army Corps of Engineers, Baltimore District – Operations Division - Natural Resources Management Specialist

Data Compilation Procedures:

High-Level Data Flow Chart:



Sector: Developed, Natural

BMP List:

- Bioretention
- Non Urban Stream Restoration
- Permeable Pavement w/ Sand, Veg. - A/B soils, no underdrain
- Tree Planting
- Urban Infiltration Practices
- Wet Ponds and Wetlands

USACE coordinates with the Commonwealth of PA to obtain its BMP Warehouse input template and creates a USACE specific template to gather the information that will be used to fill the PA BMP Warehouse input template and answer any other questions the USACE deems necessary to fulfill reporting requirements to Congress or otherwise determine its TMDL progress/compliance and generate reports on the credit of USACE BMPs in CAST. Once all the installation-specific data is collected, it is consolidated and reviewed by the USACE Baltimore District Chesapeake Bay Program manager. Once complete, the data is re-entered in the BMP Warehouse input template and forwarded to the Commonwealth of PA and the EPA

Data Verification Procedures:

USACE regularly inspects reported BMPs during routine activities as part of ongoing operation and maintenance of our facilities. Records on inspections are kept by Operations field staff and QA/QC'd by management. Engineering Division completes inspections of dams, reservoirs and

appurtenances and completes reports of their findings. Each year prior to the October 1 reporting deadline, the USACE Baltimore District Chesapeake Bay Program manager (PgM) circulates a data call for newly installed BMPs and checks to verify whether previously reported BMPs have been inspected and updates the state reporting template as necessary. During this process, the PgM verifies that no BMPs have been double counted by cross-referencing the current year's BMP list against previous submissions. These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

Based on communications with USEPA and USACE seven impoundments reported in the historical data were removed as it was determined that reporting these basins as BMPs is inappropriate.

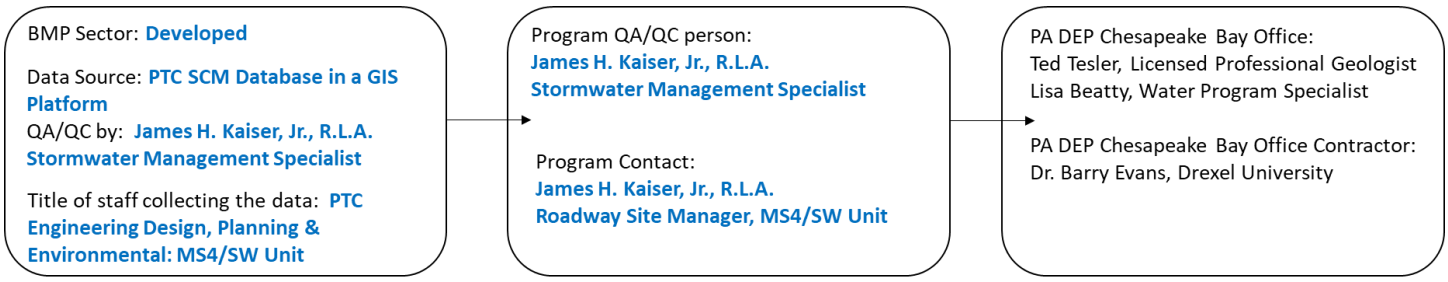
B10.2.30 PA Turnpike Commission MS4/Urban Stormwater SCMs

Contact Information

Program Contact: James H. Kaiser, Jr., R.L.A., Stormwater Management Specialist
Pennsylvania Turnpike Commission, Engineering Design, Planning and Environmental, MS4/SW Unit
700 South Eisenhower Blvd.
Middletown, PA 17057
Email: jkaiser@paturnpike.com
Office Phone: 717-831-7513

QA/QC Contact:
James H. Kaiser, Jr., R.L.A., Stormwater Management Specialist
Pennsylvania Turnpike Commission, Engineering Design, Planning and Environmental, MS4/SW Unit
700 South Eisenhower Blvd.
Middletown, PA 17057
Email: jkaiser@paturnpike.com
Office Phone: 717-831-7513

Data Compilation Procedures - *Make sure to include a high-level data work flow graphic.*
Work Flow Graphic:



Sector: Developed

Stormwater Control Measure (SCM) BMP List:
Cross walked BMPs with EPA CBPO BMP Quick Reference Guide and NEIEN reporting templat**e:**

PTC SCM Name	CAST 6.0 BMP Name
Basin, Dry Detention	Dry Detention Ponds & Hydrodynamic Structures
Basin, Dry Extended Detention	Dry Extended Detention Ponds
Basin, Dry Ultra-Extended Detention	Dry Extended Detention Ponds
Basin, Infiltration Detention	Infiltration Practices
Basin, Other	Dry Detention Ponds & Hydrodynamic Structures
Basin, Naturalized Detention	Bioretention
Basin, Wet Detention	Wet Pond
Bioretention	Bioretention
Bioretention w/ Underdrain	Bioretention
Constructed Stormwater Filter	Filtering Practices
Flow Dispersion, Forest/Buffer	Forest Buffer
Flow Dispersion, Veg. Filter Strip	Filtering Practices
Forest Preservation	Forest Buffer
Infiltration Berm	Infiltration Practices
Landscape Restoration Meadow	Grass Buffer
Level Spreader Outfall	Infiltration Practices
Manufactured Treatment Devices	Dry Detention Ponds & Hydrodynamic Structures
Media Filter Drain	Filtering Practices
Non-Basin SCM, Other	Dry Detention Ponds & Hydrodynamic Structures
Permeable Pavement	Permeable Pavement w/o Sand, Veg. - C/D soils, underdrain
Pervious Pavement, Asphalt	Stormwater Performance Standard-Runoff Reduction
Pervious Pavement, Concrete	Stormwater Performance Standard-Runoff Reduction
Pervious Pavement, Pavers	Stormwater Performance Standard-Runoff Reduction
Reforestation/Tree Plantings	Tree Planting
Regenerative Step Pool	Stream Channel Stabilization
Riparian Buffer Enhancement	Forest Buffer
Riparian Buffer Offset	Forest Buffer
Soil Amendment Restoration	Filtering Practices
Stormwater Wetland	Wet Ponds and Wetlands
Stream Restoration	Stream Restoration
Stream Stabilization	Streambank Stabilization
Subsurface Detention Storage	Dry Detention Ponds & Hydrodynamic Structures
Subsurface Infiltration Trench	Infiltration Practices

PTC SCM Name	CAST 6.0 BMP Name
Vegetated Filter Strip	Filtering Practices
Vegetated Filter Strip, Steep Slope	Filtering Practices
Vegetated Swale	Stormwater Performance Standard-Runoff Reduction
Vegetated Swale w/ Check Dams	Stormwater Performance Standard-Runoff Reduction

Pennsylvania Turnpike Commission (PTC) is guided by its Board of Commissioners and a dedicated workforce responsible for improving, operating, and maintaining more than 550 miles of roadway statewide as well as tunnels, maintenance facilities, administrative offices and service plazas across PTC's footprint. As part of this, PTC initiates numerous construction improvement projects throughout the state on a regular basis. Projects involving one or more acres of earth disturbance are required to obtain coverage under an NPDES Permit for Discharges of Stormwater Associated with Construction Activities. A Post-Construction Stormwater Management (PCSM) Plan is prepared and submitted for each permit which contains design information and construction drawings for Stormwater Control Measures (SCMs).

PTC's Stormwater Control Measure Operations and Maintenance Manual (SCMOM) contains the policies and procedures for naming, inventorying, inspecting, and maintaining SCMs. Chapter 2 describes the procedures for inventorying new and existing (i.e., constructed prior to the publication) SCMs. In general, SCM data is added to the database prior to construction and then made "active" when the NPDES Notice of Termination is filed with and accepted by PADEP. Data on older SCMs, such as those constructed prior to NDPES permits, are added as they are identified and assessed. Chapter 3 outlines the inspection procedures for SCMs, while Chapters 4-6 describe the routine and corrective maintenance activities that are associated with the various SCM types.

In accordance with SCMOM, PTC maintains a master stormwater inventory using an enterprise spatial database based upon the Esri ArcGIS platform to track PTC owned SCMs. The SCM inventory consists of over 85 individual data fields for each SCM ranging from SCM type, location, size, treatment area, watershed, maintenance access, and PCSM plan number. The inventory is updated regularly with new project SCM information and maintained by PTC Engineering in accordance with processes defined by PTC's SCMOM. The SCM information is gathered from the SCM design plans, calculations, NPDES application, and other relevant sources by the project design team. The PTC Engineering Department confirms the provided data (QA/QC) and enters it into the SCM into the inventory.

Reporting for Chesapeake Bay watershed programs is extrapolated from the electronic database into the PADEP-provided spreadsheet format.

The SCM inventory is housed on PTC's greater GIS system which adheres to PTC IT data storage and backup protection policies.

Data Verification Procedures

Double Counting may occur in the following ways:

The same SCM may have multiple identification names

To mitigate double counting: BMP Name assigned with unique ID inventory tracking number that is cross walked with EPA CBPO BMP Quick Reference Guide and utilize NEIEN reporting template

Duplicate records may exist

To mitigate double counting: Unique geo-spatial referenced location tied to name and unique ID inventory tracking number

Multiple entities may claim ownership to the same SCM

To mitigate double counting: Turnpike Commissions owns the majority of land and in the few cases where SCMs are located off the PTC's system, the entity assigned maintenance responsibility also assumes reporting responsibility.

Details of QA/QC process to mitigate Double Counting:

Unique name - Each PTC SCM has one unique ID inventory name that is tracked through the SCM's lifecycle including design, in-construction, in-service, and out-of-service. By using this unique ID inventory name throughout the SCMs lifespan, the PTC can document the status, functionality, and track maintenance and corrective actions taken to ensure continued optimal performance of each SCM without fear of counting the same SCM for pollution reduction multiple times.

Unique geo-referenced location tied to the name - The PTC's developed an Esri ArcGIS platform, Stormwater Asset Management Program (SWAMP) to manage the SCM data. GIS mapping is used to plot each SCM across PTC's system; the SCM footprint is outlined using a polygon and the centroid location is geo-referenced (latitude and longitude). SCM inventory naming conventions are described by SCMOM Chapter 2. The naming includes the SCM type and its exact location on PTC's system using milepost and offset criteria measured to the centroid of the SCM polygon in the GIS database. Because the SCM location is geo-referenced and the ID also precisely locates the SCM, duplicate SCMs are easily identified and resolved through purging any double listings during routine database clean up.

PTC owns/controls the majority of the property where the SCMs are located - Generally, PTC SCMs are located within PTC right-of-way or easement minimizing likelihood of incidental double counting by another owner or reporting entity. In the few cases where SCMs are located off the PTC's system, the entity assigned maintenance responsibility also assumes reporting responsibility.

PTC's SCMOM is located here: https://sapaturnpike.blob.core.windows.net/staging/docs/default-source/resources/clean-water/scmom-2020-06-30.pdf?sfvrsn=162c387f_5

The paragraphs below illustrate additional quality control provided to ensure stormwater pollution is minimized throughout the SCM's existence.

Construction:
Quality control is primarily ensured through compliance to PA Code Title 25, Chapter 102 National Pollution Discharge Elimination System (NPDES) Permit for stormwater discharges from construction activities. Per the Chapter 102 permit, quality is ensured by professional oversight of critical stages of construction and subsequent conversion of E&S basins to permanent SCMs, and through as-built surveys once the SCM construction reaches its permanent configuration. Additionally, before the Notice of Termination for the construction NPDES is issued, constructed work requires professional engineering certification. PTC continues to update specifications, policies and procedures to strengthen and document SCM performance.

Quality during Active construction: Documented inspections and corrective actions provide quality assurance throughout the construction process. During active construction, visual site inspections are conducted by PTC's construction inspector weekly and after rainfall events using a digital application called "DIRT" (Document Inspection Reporting Technology) to document inspections and follow-up. DIRT generates notifications initiating resolution of any corrective actions identified. The functionality of temporary Best Management Practices (BMPs) to prevent sediment discharges are assessed. BMPs include sediment basins that are usually converted to permanent SCMs, and therefore being evaluated as sediment discharge pollution preventing BMPs during active construction

Quality during SCM Conversion: During the conversion to permanent configuration, PTC relies on oversight by professional construction managers and engineers to ensure that final design configuration is achieved, critical stages are properly installed using correct construction techniques to protect the permanent SCM infiltrative surfaces from compaction, and required vegetation is established so the SCM will be functional. Final configuration is verified and documented through as-built survey.

Quality through Education: Quality control is also achieved through contractor education. Under PTC MS4 permit and current NPDES compliance requirements, PTC mandates contractor education on Construction Site Runoff Control among other relevant topics which bolsters successful E&S and PCSM feature construction.

Maintenance:
Quality performance is assured by a documented maintenance program. After construction ends, E&S measures are removed and permanent PCSM SCMs are entered into PTC's Maintenance program. The program, fully described in PTC's SCMOM, includes three (3) prongs: inspections, routine maintenance, and corrective maintenance. Most SCM types are routinely inspected every three years at a minimum. Inspectors evaluate SCM function and condition using a PTC-developed electronic post construction SCM Inspection App. Interim inspections use the same app and occur whenever an observed condition merits additional review. Routine maintenance activities include tasks that occur on regularly scheduled frequencies such as mowing. Corrective maintenance activities, those that require specialized equipment, supplies, or skills to perform

repairs, occur when needed as a response to inspection findings and field observations.

SCM Tracking:
Quality is provided by life-cycle tracking. PTC's SWAMP tracks SCM attributes that are relevant to SCM maintenance, NPDES permit compliance, MS4 permit requirements, and PTC operational needs. SCMs are tracked on an individual scale, with data sets for each individual SCM. The inventory consists of over 85 individual data fields for each SCM ranging from SCM type, location (latitude/longitude defined by SCM centroid), footprint size, treatment area, watershed, maintenance access, and PCSM plan number. For a complete list of attributes, see Appendix B of SCMOM. The ongoing tracking supports continual high-quality SCM performance.

B10.3 Specialized Data Compilation Procedures for Selected BMPs

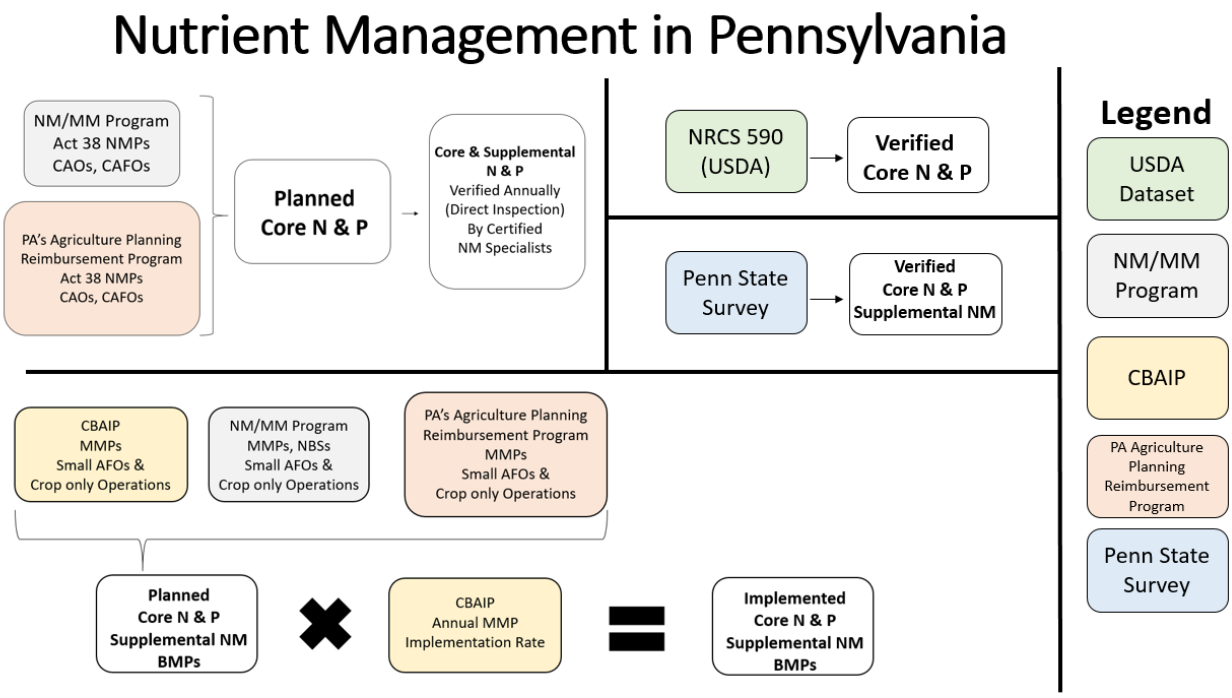
In accordance with the Chesapeake Bay Program BMP Verification Framework Guidance, Pennsylvania has developed a statistically valid process for data compilation and reporting for a select number of practices. As the universe of known BMPs expands, Pennsylvania continually assesses sub-sample processes for all reported practices.

The below Specialized Data Compilation Procedures are broken into Sectors: Agriculture from B10.3.1 to B10.3 and Developed B10.310**.**

For Agriculture, please refer to the high-level flow chart that depicts Nutrient Management in Pennsylvania.

The procedures for reporting Nutrient Management BMPs, including Supplemental NM, are outlined in the Pennsylvania Nutrient Management and Manure Management Manual Program Administrative Manual, Chesapeake Bay Agricultural Inspection Program SOP No. CBO-INSP-001, the PracticeKeeper – Agriculture Inspections Module SOP No. CBO-DATA-002, and accompanying DEP Clean Water Academy trainings.

The Agricultural Operation Supplemental Information (Sample) 3830-FM-BCW0524a is linked at http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=2701
High Level Graphic:

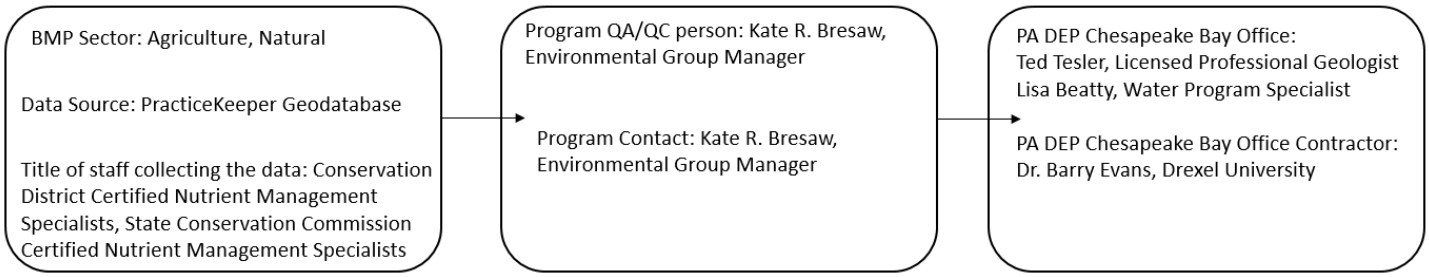


B10.3.1 Nutrient and Manure Management Program

Contact: Kate R. Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management (717-772-5650, kbresaw@pa.gov)
QA/QC Contact: Same as above

Data Compilation Procedures:

High level data flow chart:



Sector: Agriculture, Natural

BMP List:

Access Road
Animal Mortality Facility
RI-2 Animal Compost Structure
Animal Trails and Walkways
Brush Management
Composting Facility
Conservation Cover
Constructed Wetland
Contour Buffer Strips
Contour Farming
Critical Area Planting
Diversion
Fence
Exclusion Fence with Forest Buffer
Exclusion Fence with Grass Buffer
Field Border
Filter Strip
Forage and Biomass Planting
Forest Stand Improvement
Grassed Waterway
Streambank and Shoreline Protection
Heavy Use Area Protection
Hedgerow Planting
Integrated Pest Management
Lined Waterway or Outlet
Pipeline
Prescribed Grazing
RI - 15 Rotational Grazing
Pumping Plant
Riparian Forest Buffer
RI-10 Forest Buffer on Watercourse
RI-9 Forest Nutrient Exclusion Area on Watercourse - Narrow
Riparian Herbaceous Cover
RI-8 Grass Buffer on Watercourse
Roof Runoff Structure
RI - 16 Barnyard Clean Water Diversion
Roofs and Covers
Seasonal High Tunnel System for Crops
Sediment Basin
Spring Development
Stream Crossing
Waste Storage Facility

Stripcropping
Structure for Water Control
Subsurface Drain
Terrace
Trails and Walkways
Underground Outlet
Upland Wildlife Habitat Management
Vegetated Treatment Area
RI-4a Watercourse Access Control – Narrow Grass
RI-5 Watercourse Access Control - Grass
RI-4b Watercourse Access Control – Narrow Trees
Exclusion Fence with Grass Buffer - Narrow
Water and Sediment Control Basin
RI-1 Dry Waste Storage Structure
Waste Transfer
Waste Treatment
Water Well
Watering Facility
RI - 18 Watering Trough
Wetland Creation
Wetland Restoration
Wetland Wildlife Habitat Management
RI-6 Watercourse Access Control - Trees
Exclusion Fence with Forest Buffer - Narrow
Waste Treatment Lagoon

Nutrient Management BMPs: Core N, Core P, N Placement, N Rate, N Timing, P Placement, P Rate, P Timing

Program Description:

As required by the PA Nutrient Management Act (Act 38 of 2005), agricultural BMPs are recorded in Act 38 Nutrient Management Plans (see Title 25, Chapter 83, Subchapter D and the Pennsylvania Act 38 Nutrient Management Program Technical Manual). Additionally, BMPs are recorded as part of Manure Management Plans, and as part of the Nutrient Management and Manure Management Delegation Agreement found in the Pennsylvania Nutrient Management and Manure Management Manual Program Administrative Manual. These BMPs are tracked and verified as described below.

All data is tracked and recorded by County Conservation District, Certified Nutrient Management Specialists in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003, the guidance in the Nutrient Management Program Administrative Manual, and accompanying web-based trainings found on the DEP Clean Water Academy.

All data is entered in the PracticeKeeper Geodatabase by County Conservation District (CCD) or State Conservation Commission (SCC) Certified Nutrient Management Specialists.

Nutrient Management BMPs are tracked and recorded as follows:

- **Act 38 Nutrient Management Plans:** Act 38 Nutrient Management acres implemented under the State's Nutrient Management Act (NMA–Act 38) are required to do so based on animal density thresholds established by the State (see Title 25, Chapter 83, Subchapter D). Concentrated Animal Feeding Operations (CAFOs), as defined by as a

large CAFO under 40 CFR 122.23(b)(4), CAOs that with at least 300 Animal Equivalent Units (AEUs), and operations with at least 1000 AEUs, are also required to implement an Act 38 Nutrient Management Plan as a condition of their permit (See 25 Pa. Code § 92a.29). As described by program guidance, Nutrient Management Program Administrative Manual, each CAO or CAFO should be inspected annually. After follow-up from CCD and SCC staff, nearly 100% of CAOs demonstrate full compliance with the implementation of their Act 38 Nutrient Management Plan within six months of the annual status review. Therefore, all active Act 38 Nutrient Management Plans are reported for Core N and Core P. During the annual status review, as instructed by the Nutrient Management Program Administrative Manual, CCD and SCC staff review operation records compared to what is planned in the Act 38 Nutrient Management Plan to determine implementation for the Supplemental Nutrient Management BMPs: N Rate, N Placement, N Timing, P Rate, P Placement, and P Timing. Implemented acres for each Supplemental Nutrient Management BMP are recorded in the PracticeKeeper Geodatabase for every Act 38 Nutrient Management Plan where Supplemental Nutrient Management BMPs are applicable.

- **Manure Management Plans (MMP) and Nutrient Balance Sheets (NBS):** As part of the required output measures identified in the Nutrient and Manure Management Delegation Agreement found in the Nutrient Management Program Administrative Manual, CCD staff verify MMPs written by technical service providers and write MMPs meeting the regulatory requirements as defined by 25 Pa. Code § 91.36 and the Manure Management Manual. Additionally, CCD and SCC staff verify the completeness of NBSs for exported manure on agricultural operations participating in the Act 38 Nutrient Management Program. The NBSs are verified as part of the Act 38 Nutrient Management Plan review and Act 49, brokered manure, NBS reviews. The procedure for the review of NBSs is explained in the Nutrient Management Program Technical Manual. Through the state regulatory programs, 100% of the known MMPs and NBSs are initially verified. According to page 7 of the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014,* "in order to satisfy the expectation for verification of regulatory program BMPs, it is recommended that a jurisdiction verify 100% of the initial identification of annual or multi-year structural BMPs and plan implementation […] visual assessment for single year BMPs, such as tillage practices, can be statistically sub-sampled utilizing scientifically accepted procedures." At a minimum, a statistically significant subsample of agricultural operations with known MMPs and NBSs in the Pennsylvania portion of the Chesapeake Bay Watershed is inspected as part of the Chesapeake Bay Agriculture Inspection Program (CBAIP) annually. The subsample size will assure a maximum 5% margin of error and 95% confidence level. Based on inspections conducted as part of the CBAIP, a unique rate of nutrient management BMP implementation is determined for each county in the Pennsylvania portion of the Chesapeake Bay Watershed. The county-specific implementation rate is derived from a county-level analysis of data obtained during the on-site inspection of nutrient application and setback records as well as farmer

interviews during the CBAIP inspection. Consistent with 3.c.1. of the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014,* during 2021-2022, 947 unique agricultural operations with verified MMPs were inspected as part of the CBAIP and the implementation rate determined by record checks during those 947 inspections was applied across the 8,332 known MMPs and NBS that were initially verified as part of state regulatory programs. The subsample size is equivalent to 11.4%. PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years, however further guidance from EPA CBPO will be needed to proceed with 3.c.2, since it states that "the BMP Verification Review Panel shall review the alternative strategy and make a recommendation to EPA on the adequacy of the alternative;" the BMP Verification Review Panel was sunset and no longer exists. The data for each inspection is documented on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. CBO-INSP-001. It is also recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper-Agriculture Inspection Module SOP No. CBO-DATA-002, Nutrient Management Program Administrative Manual, and accompanying web-based trainings found on the DEP Clean Water Academy. Acres of each planned Supplemental Nutrient Management BMP is recorded and related to the MMP in the PracticeKeeper Geodatabase. To determine implemented acres of Core N and Core P, the county-specific implementation rate is then applied to the acres that have planned nutrient application recommendations identified in the known universe of MMPs tracked and recorded in the PracticeKeeper Geodatabase within the respective county, including those that were funded by the APRP. Only acres with verified MMPs within the Chesapeake Bay Watershed are considered. Similarly, the county specific implementation rate is applied to the acres planned of each specific Supplemental Nutrient Management BMP (Rate N & P, Placement N & P, Timing N &P) to determine the acres of implemented Supplemental Nutrient Management in the respective county.

Plans are determined to be "inactive" if they are not actively being implemented during the agriculture inspection. This is the basis of the implementation rate.

The goal is to inspect 10% of the agriculture acres in the CBWS every year to assure that we inspect the entirety of the agriculture acres in the CBWS within 10 years. When both the CBAIP Phase 1 and Phase 2 inspections were completed in the same year on the same operation, CBAIP Phase 1, CBAIP Phase 2, and Act 38 inspections factor into these rates. These percentages are not meant to be the necessary sample size for reverification of Nutrient Management BMPs associated with MMPs and instead were developed as part of the 2016 Chesapeake Bay Restoration Strategy.

All other BMPs tracked and recorded as part of the Nutrient and Manure Management Program are recorded as follows:

An export excel file is downloaded from the PracticeKeeper Geodatabase with other BMP data. BMPs related to the following funding programs are submitted on the same excel file:

(1) Act 13 Unconventional Gas Funds
(2) Ag. Plan Reimbursement Program
(3) County Action Plan Implementation Grants
(4) Chesapeake Bay Special Projects (CBIG)
(5) DEP Streambank Fencing
(6) Exelon
(7) Mariner East 2 Grant
(8) NRCS Conservation Technical Assistance, and
(9) Privately funded BMPs

Privately funded BMPs are reported in the PracticeKeeper Geodatabase as part of the required output measures associated with the following Agricultural Programs:

(10) Nutrient and Manure Management Program
(11) Chesapeake Bay Technicians
(12) Chesapeake Bay Engineers (CBIG)
(13) Pennsylvania's Agriculture Inspection Program

A BMP is not reported if it was funded by a funding source that is reported by another program. For example, all practices funded by USDA programs or DCNR grants that are also within the credit duration of the BMP will be removed from the dataset before reporting to NEIEN. The file is then submitted to Dr. Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

Data Verification Procedures

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003 and the Nutrient Management Program Administrative Manual.

a) Attributes Tracked:
   i) BMP type
   ii) BMP subtype
   iii) Status
   iv) Geographic Scale
      (1) Manually drawn BMP.
         (a) Latitude and Longitude is based on the calculated centroid of the BMP.
         (b) County is derived from the intersection of the drawn BMP and county boundaries.
         (c) Watershed is derived from the intersection of the drawn BMP and watershed boundaries.
   v) Dates
      (1) Planned
      (2) Inventory & Evaluation
      (3) Surveyed

(4) Design Approved
(5) Implemented

vi) BMP Participants
(1) Designer
(2) Design Reviewer
(3) Design Approver
(4) Implementer
(5) Planner

vii) Implemented Amount

viii) Unit of Measure

ix) Funding Source, Amount, and Date

x) Inspections (Reverification Data)
(1) Inspector Name
(2) Date Inspection Performed
(3) BMP Compliance
(4) Verified Amount

xi) Status Reviews (Act 38 Nutrient Management Plans)
(1) Nitrogen Rate Supplement Nutrient Management BMP Acres
(2) Nitrogen Placement Supplemental Nutrient Management BMP Acres
(3) Nitrogen Timing Supplemental Nutrient Management BMP Acres
(4) Phosphorus Rate Supplement Nutrient Management BMP Acres
(5) Phosphorus Placement Supplemental Nutrient Management BMP Acres
(6) Phosphorus Timing Supplemental Nutrient Management BMP Acres

b) Potential sources of duplicate BMPs
i) BMPs that were implemented using funding sources that are reported separately including USDA programs, Conservation Excellence Grant, REAP, Growing Greener, 319, NFWF, PennVest or DCNR grants.
(1) If a BMP is solely or co-funded with any of the funding sources listed above, it is removed from the exported dataset before reporting to NEIEN.

c) Data Entry Errors
i) Obvious data entry errors such as implementation dates, etc. are communicated with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN.

d) Qualifications

All Act 38 Nutrient Management Plans that are CAOs and/or CAFOS have status reviews (inspections) performed annually by certified CCD or SCC staff following guidance outlined in the Nutrient Management Program Administrative Manual to determine compliance and if Supplemental Nutrient Management BMPs are implemented. This data is reported as agriculture and the BMPs that are being tracked and reported are Core N, Core P, N Rate, N Placement, N Timing, P Rate, P Placement, and P Timing. The operators of each agriculture operation are responsible for implementation of these BMPs. Certified staff from CCDs and the SCC are responsible for verification of these BMPs after implementation and verification is performed annually. Act 38 Nutrient Management Plans are reported in the PracticeKeeper

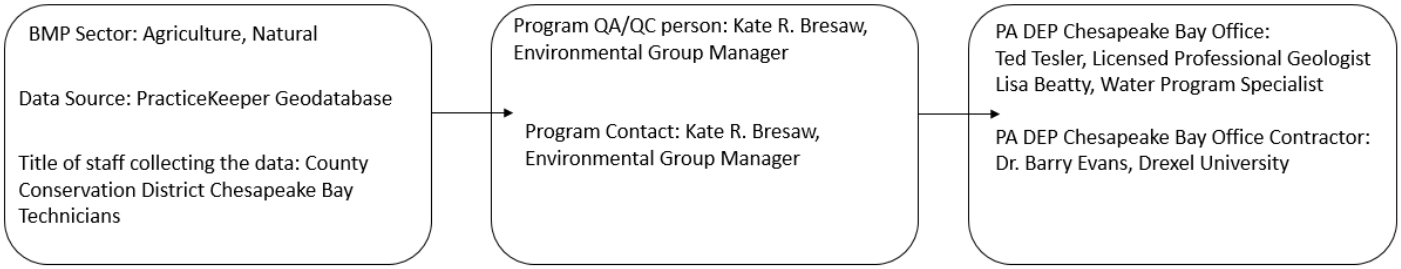
Geodatabase. These plans list the submitted date, approved date, updated date (if applicable), withdraw date (if applicable), date of status review, and date of next status review. During each status review, the operation is evaluated for compliance of the Act 38 Nutrient Management Program following guidance set forth in the Nutrient Management Program Administrative Manual. If the operation is found to not be in compliance, the operation is put on a specific timeline to obtain compliance. A follow-up inspection is required to be performed to determine compliance once again. Follow-up inspections are continued until compliance is achieved. The initial status review and any follow-up inspections are recorded in the PracticeKeeper Geodatabase.

i) CCD staff receive classroom, web-based, and on-the-job training to determine that the installed BMP meets the BMP definition. If the BMP is reported as implemented in the PracticeKeeper Geodatabase, it is assumed that the BMP meets the BMP definition.
ii) CCD Nutrient Management specialists are certified through a rigorous 12-day training series and pass an exam to obtain certification. The training series includes the following:
    (1) Nutrient Management Orientation
    (2) Managing Manure Nutrients Workshop
    (3) Stormwater and Soil Loss Workshop
    (4) P-Index Workshop
    (5) Plan Writing Workshop
    (6) ACA and Manure Storage Workshop
    (7) Plan Review Workshop
iii) CCD staff receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. CBO-DATA-003, Nutrient Management Program Administrative Manual, and the accompanying DEP Clean Water Academy Learning Modules.)

B10.3.2 Pennsylvania's Agriculture Inspection Program

Contact: Kate R. Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management (717-772-5650, kbresaw@pa.gov)
QA/QC Contact: Same as above
Data Compilation Procedures

High level data flow chart:



Sector: Agriculture, Natural

BMP List:

Access Road
Animal Mortality Facility
RI-2 Animal Compost Structure
Animal Trails and Walkways
Brush Management
Composting Facility
Conservation Cover
Constructed Wetland
Contour Buffer Strips
Contour Farming
Critical Area Planting
Diversion
Fence
Exclusion Fence with Forest Buffer
Exclusion Fence with Grass Buffer
Field Border
Filter Strip
Forage and Biomass Planting
Forest Stand Improvement
Grassed Waterway
Streambank and Shoreline Protection
Stripcropping
Structure for Water Control
Subsurface Drain
Terrace
Trails and Walkways
Underground Outlet
Upland Wildlife Habitat Management
Vegetated Treatment Area
Heavy Use Area Protection
Hedgerow Planting
Integrated Pest Management
Lined Waterway or Outlet
Pipeline
Prescribed Grazing
RI - 15 Rotational Grazing
Pumping Plant
Riparian Forest Buffer
RI-10 Forest Buffer on Watercourse
RI-9 Forest Nutrient Exclusion Area on Watercourse - Narrow
Riparian Herbaceous Cover
RI-8 Grass Buffer on Watercourse
Roof Runoff Structure
RI - 16 Barnyard Clean Water Diversion
Roofs and Covers
Seasonal High Tunnel System for Crops
Sediment Basin
Spring Development
Stream Crossing
Waste Storage Facility
RI-1 Dry Waste Storage Structure
Waste Transfer
Waste Treatment
Water Well
Watering Facility
RI - 18 Watering Trough
Wetland Creation
Wetland Restoration

Soil Conservation and Water Quality Plans

RI-4a Watercourse Access Control – Narrow Grass
RI-5 Watercourse Access Control - Grass
RI-4b Watercourse Access Control – Narrow Trees
Exclusion Fence with Grass Buffer - Narrow
Water and Sediment Control Basin

Wetland Wildlife Habitat Management

RI-6 Watercourse Access Control - Trees
Exclusion Fence with Forest Buffer - Narrow

Waste Treatment Lagoon

Nutrient Management BMPs: Core N, Core P, N Placement, N Rate, N Timing, P Placement, P Rate, P Timing

Program Description:

Pennsylvania's Chesapeake Bay Agriculture Inspection Program (CBAIP) is a phased regulatory farm inspection program implemented by DEP and participating County Conservation Districts (CCDs) to track Manure Management Plans (MMPs), Agriculture Erosion and Sediment Control (Ag. E&S) plans, Nutrient Balance Sheets (NBSs) and other agricultural BMPs. This program uses the PracticeKeeper Geodatabase to document plans, their related BMPs, and agricultural inspections. Through this program, Pennsylvania verifies plan completeness and implementation as well as BMP implementation. There are three inspection types as part of this program: Initial Inspections, Follow-up Inspections, and Phase 2 Inspections. The procedures for CBAIP inspections are outlined in the Chesapeake Bay Agricultural Inspection Program SOP No. CBO-INSP-001.

Data Verification Procedures

Nutrient Management BMPs: Core N, Core P, N Placement, N Rate, N Timing, P Placement, P Rate, P Timing

Soil Conservation and Water Quality Plans: Ag. E&S Plans are verified as part of all CBAIP inspections completed. The results of this verification are described on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. CBO-INSP-001. Soil Conservation and Water Quality Plans are directly reported from the results of the assessment of Ag. E&S Plans during the CBAIP inspection. The results of the inspections are recorded in the PracticeKeeper Geodatabase according to PracticeKeeper – Agriculture Inspections Module SOP No. CBO-DATA-002 and the accompanying DEP Clean Water Academy (CWA) learning module. An export excel file is downloaded from the PracticeKeeper Geodatabase including the data entered at the time of the inspection according to the program procedures listed above. The file is then submitted to Dr. Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake

Bay Program Office through NEIEN.

Manure Management Plans (MMP) and Nutrient Balance Sheets (NBS): As outlined in the procedures listed above, Through the state regulatory programs, 100% of the known MMPs and NBSs are initially verified. According to page 7 of the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014,* "in order to satisfy the expectation for verification of regulatory program BMPs, it is recommended that a jurisdiction verify 100% of the initial identification of annual or multi-year structural BMPs and plan implementation […] visual assessment for single year BMPs, such as tillage practices, can be statistically sub-sampled utilizing scientifically accepted procedures." The BMP Verification Framework Guidance is unclear in the description of sub-sampling approaches in 3.c.1. beginning on page 7, as it only discusses "physical lifespan period of multi-year BMPs" and, beginning on page 8 "As a default, random, follow-up assessments are recommended to be conducted on 10% of those multi-year BMPs which are known to collectively account for greater than 5% of a jurisdiction's agricultural sector nutrient and or sediment load reductions as estimated in the most recent progress scenario." However, the matrix on page 19 provides an example of Nutrient Management Plan BMPs: follow-up frequency of "10% of all Tracked and reported Nutrient Application Management Plans" and "5% QAQC Compliance Checks by State Agency/Tracking and Reporting Protocol." At a minimum, a statistically significant subsample of agricultural operations with known MMPs and Nutrient Balance Sheets (NBSs) in the Pennsylvania portion of the Chesapeake Bay Watershed is inspected as part of the CBAIP annually. The subsample size will assure a maximum 5% margin of error and 95% confidence level. Based on inspections conducted as part of the CBAIP, a unique rate of nutrient management BMP implementation is determined for each county in the Pennsylvania portion of the Chesapeake Bay Watershed. The county-specific implementation rate is derived from a county-level analysis of data obtained during the on-site inspection of nutrient application and setback records as well as farmer interviews during the CBAIP inspection. Consistent with 3.c.1. of the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014,* during 2021-2022, 947 unique agricultural operations with verified MMPs were inspected as part of the CBAIP and the implementation rate determined by record checks during those 947 inspections was applied across the 8,332 known MMPs and NBS that were initially verified as part of state regulatory programs. The subsample size is equivalent to 11.4%. PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years, however further guidance from EPA CBPO will be needed to proceed with 3.c.2, since it states that "the BMP Verification Review Panel shall review the alternative strategy and make a recommendation to EPA on the adequacy of the alternative;" the BMP Verification Review Panel was sunset and no longer exists. The data for each inspection is documented on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. CBO-INSP-001. It is also recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper-Agriculture Inspection Module SOP No. CBO-DATA-002, Nutrient Management Program Administrative Manual, and accompanying web-based trainings found on the DEP Clean Water Academy. Acres of each planned Supplemental Nutrient Management BMP is recorded and related to the MMP in the PracticeKeeper

Geodatabase. To determine implemented acres of Core N and Core P, the county-specific implementation rate is then applied to the acres that have planned nutrient application recommendations identified in the known universe of MMPs tracked and recorded in the PracticeKeeper Geodatabase within the respective county. Only acres with verified MMPs within the Chesapeake Bay Watershed are considered. Similarly, the county specific implementation rate is applied to the acres planned of each specific Supplemental Nutrient Management BMP (Rate N & P, Placement N & P, Timing N &P) to determine the acres of implemented Supplemental Nutrient Management in the respective county.

Plans are determined to be "inactive" if they are not actively being implemented during the agriculture inspection. This is the basis of the implementation rate.

The goal is to inspect 10% of the agriculture acres in the CBWS every year to assure that we inspect the entirety of the agriculture acres in the CBWS within 10 years. When both the CBAIP Phase 1 and Phase 2 inspections were completed in the same year on the same operation, CBAIP Phase 1, CBAIP Phase 2, and Act 38 inspections factor into these rates. These percentages are not meant to be the necessary sample size for reverification of Nutrient Management BMPs associated with MMPs and instead were developed as part of the 2016 Chesapeake Bay Restoration Strategy.

All other BMPs tracked and recorded as part of the CBAIP:

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003.

a) Attributes Tracked:
    i) BMP type
    ii) BMP subtype
    iii) Status
    iv) Geographic Scale
        (1) Manually drawn BMP.
            (a) Latitude and Longitude is based on the calculated centroid of the BMP.
            (b) County is derived from the intersection of the drawn BMP and county boundaries.
            (c) Watershed is derived from the intersection of the drawn BMP and watershed boundaries.
    v) Dates
        (1) Planned
        (2) Inventory & Evaluation
        (3) Surveyed
        (4) Design Approved
        (5) Implemented
    vi) BMP Participants
        (1) Designer
        (2) Design Reviewer
        (3) Design Approver

(4) Implementer
(5) Planner

vii) Implemented Amount
viii) Unit of Measure
ix) Funding Source, Amount, and Date
x) Inspections (Reverification Data)
(1) Inspector Name
(2) Date Inspection Performed
(3) BMP Compliance
(4) Verified Amount

b) Potential sources of duplicate BMPs
i) BMPs that were implemented using funding sources that are reported separately including USDA programs, Conservation Excellence Grant, REAP, Growing Greener, 319, NFWF, PennVest or DCNR grants.
(1) If a BMP is solely or co-funded with any of the funding sources listed above, it is removed from the exported dataset before reporting to NEIEN.

c) Data Entry Errors
i) Obvious data entry errors such as implementation dates, etc. are communicated with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN.

An export excel file is downloaded from the PracticeKeeper Geodatabase with other BMP data. BMPs related to the following funding programs are submitted on the same excel file:

(1) Act 13 Unconventional Gas Funds
(2) Ag. Plan Reimbursement Program
(3) County Action Plan Implementation Grants
(4) Chesapeake Bay Special Projects (CBIG)
(5) DEP Streambank Fencing
(6) Exelon
(7) Mariner East 2 Grant
(8) NRCS Conservation Technical Assistance, and
(9) Privately funded BMPs

Privately funded BMPs are reported in the PracticeKeeper Geodatabase as part of the required output measures associated with the following Agricultural Programs:

(14) Nutrient and Manure Management Program
(15) Chesapeake Bay Technicians
(16) Chesapeake Bay Engineers (CBIG)
(17) Pennsylvania's Chesapeake Bay Agriculture Inspection Program

A BMP is not reported if it was funded by a funding source that is reported by another program. For example, all practices funded by USDA programs or DCNR grants that are also within the credit duration of the BMP will be removed from the dataset before reporting to NEIEN. The file is then submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

a) Qualifications
   i) CCD staff receive classroom, web-based, and on-the-job training to determine that the installed BMP meets the BMP definition. If the BMP is reported as implemented in the PracticeKeeper Geodatabase, it is assumed that the BMP meets the BMP definition. CCD staff often have NRCS Job approval authority for planning, inventory & evaluation, design, and construction of the BMPs verified as NRCS BMPs.
   ii) CCD staff receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. CBO-DATA-003, Nutrient Management Program Administrative Manual, and the accompanying DEP Clean Water Academy Learning Modules.)

B10.3.3 Manure Transport Data

Contacts:
Kate R. Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management (717-772-5650, kbresaw@pa.gov)
Michael Aucoin, State Conservation Commission Act 49 (717-772-5218, maucoin@pa.gov)
Brady Seeley, State Conservation Commission Act 38 (717-772-4188, braseeley@pa.gov)

QA/QC Contact:
Kate R. Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management (717-772-5650, kbresaw@pa.gov)

Data Compilation Procedures
High level data flow chart:

Sector: Agriculture
BMP List: Manure Transport

Program Description:

As required by 25 Pa. Code § 83.301 and Act 49 of 2004 (the Commercial Manure Hauler and broker Certification Act) and described in the Nutrient Management and Manure Management Program Administrative Manual, Nutrient Balance Sheets (NBSs) are required for all manure exported from agricultural operations participating in the Act 38 Nutrient Management Program, regardless of if the manure is brokered or transferred to a known landowner for land

application. The NBSs are submitted to the County Conservation District (CCD) either as part of the Act 38 Nutrient Management Plan (when the manure is transferred to a known landowner for land application), or from the manure broker (when the manure is transferred through a broker for land application). CCD Nutrient Management Specialists then review the NBSs as part of the required output measures of the Nutrient and Manure Management Delegation Agreement to verify completeness. The procedures for the review of the NBSs are outlined in the Nutrient Management and Manure Management Program Administrative Manual. The NBSs and manure transferred that is associated with the NBS is tracked and recorded in the PracticeKeeper Geodatabase according the quarterly reporting requirements described in the Nutrient Management and Manure Management Program Administrative Manual and the accompanying web-based trainings found on the DEP Clean Water Academy.
Act 38 Nutrient Management Plans and the associated exported manure is entered in to the PracticeKeeper Geodatabase by County Conservation District (CCD) and State Conservation Commission (SCC) Staff according to the guidance in the Nutrient Management Program Administrative Manual and accompanying web-based trainings found on the DEP Clean Water Academy.

An export excel spreadsheet is downloaded from the PracticeKeeper Geodatabase including the county of origin, destination county, destination out of CB Watershed (Y/N), animal type, animal subtype, and amount of manure transported. From this information, out-of-county and out-of-bay transfers are isolated and submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

Data Verification Procedures:

All data is tracked and reported according to the guidance described in the Nutrient Management and Manure Management Program Administrative Manual and the accompanying web-based trainings found on the DEP Clean Water Academy.

a) Attributes Tracked (Brokered Manure):
    i) Plan type
        (1) NBS
    ii) Status
    iii) Geographic Scale
        (1) Manually drawn NBS.
            (a) County is derived from the intersection of the drawn NBS and county boundaries.
            (b) Watershed is derived from the intersection of the drawn NBS and watershed boundaries.
            (c) In CB Watershed is derived from the interaction of the drawn NBS and the CB Watershed Boundary.
    iv) Dates
        (1) Submitted
        (2) Updated

(3) Withdrawn
(4) Expiration Year

v) Special Protection Waters
vi) Total Operation Acres
vii) Total Owned Acres
viii) Total Rented Acres
ix) AEUS per Acre
x) Imported Manure
(1) Animal Type
(2) Animal Subtype
(3) Amount
(4) Manure Measurement Unit
(5) Received from Broker (Y/N)
(6) Broker Name
(7) Broker Address
(8) Broker Certification Number
(9) Exporting Operation State
(10) Exporting Operation County

b) Attributes Tracked (Landowner for known land application)
i) Exporting Plan type
(1) Act 38 NMP
ii) Exporting Plan Subtype
(1) CAFO/CAO
(2) CAFO/VAO
(3) CAO
(4) VAO
iii) Exporting Plan Status
iv) Geographic Scale for Exporting Operation
(1) Manually drawn NMP.
(a) County is derived from the intersection of the drawn Act 38 NMP and county boundaries.
(b) Watershed is derived from the intersection of the drawn Act 38 NMP and watershed boundaries.
(c) In CB Watershed is derived from the interaction of the drawn Act 38 NMP and the CB Watershed Boundary.
v) Dates
(1) Submitted
(2) Updated
(3) Withdrawn
(4) Expiration Year
vi) Special Protection Waters
vii) Total Operation Acres
viii) Total Owned Acres

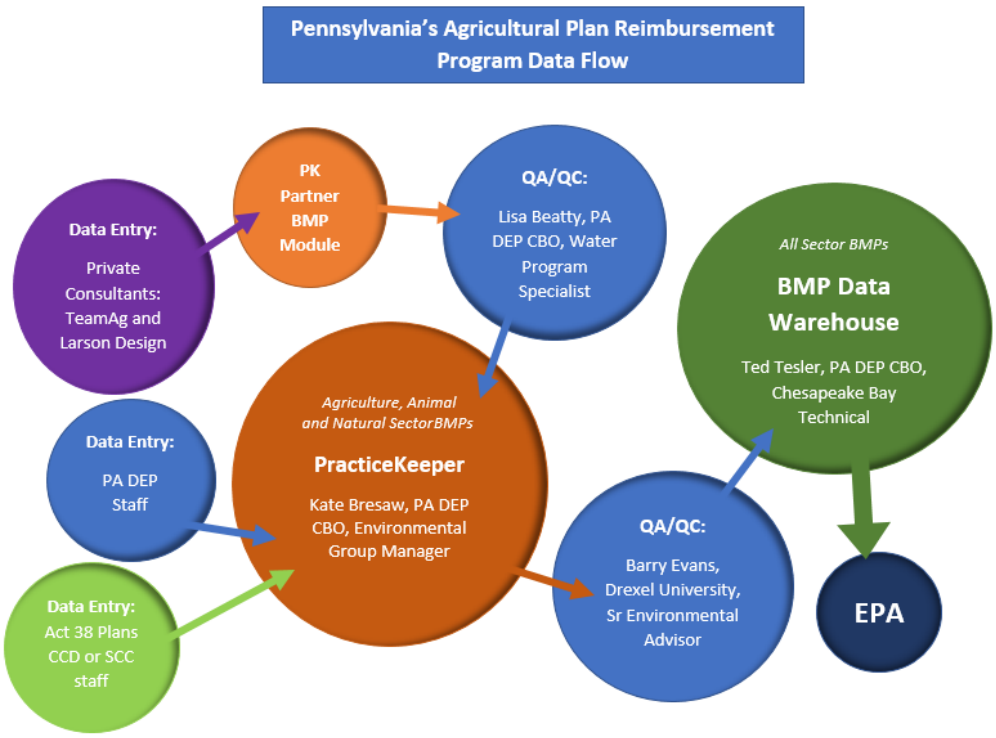
ix) Total Rented Acres
x) AEUS per Acre
xi) Exported Manure
(1) Importer Name
(2) Importer Address
(3) Importer State
(4) Importer County
(5) Importer Phone
(6) Animal Type
(7) Animal Subtype
(8) Manure Imported (Amount)
(9) Manure Measurement Unit
(10) Total Cropland
(11) Acres Available for Manure
(12) Manure Generated by Importer
(13) Is out of CB Watershed (Y/N)
(14) Other Manure Imported

c) Potential Sources of duplicate sources of transfer data (N/A)
d) Data Entry Errors
i) Obvious data entry errors such as implementation dates, etc. are communicated with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN.
e) Qualifications
i) CCD Nutrient Management specialists are certified through a rigorous 12-day training series and pass an exam to obtain certification. The training series includes the following:
(1) Nutrient Management Orientation
(2) Managing Manure Nutrients Workshop
(3) Stormwater and Soil Loss Workshop
(4) P-Index Workshop
(5) Plan Writing Workshop
(6) ACA and Manure Storage Workshop
(7) Plan Review Workshop

B10.3.4 Pennsylvania's Agricultural Planning Reimbursement Program (APRP)

Contact Information: Natahnee Miller, DEP Chesapeake Bay Watershed Restoration Division, Bureau of Watershed Restoration and Nonpoint Source Management Water Program Specialist (Email: 717-772-5952, natamiller@pa.gov)
QA/QC Data Contact Name: Kate Bresaw, DEP Nonpoint Source Management Division, Bureau of Watershed Restoration and Nonpoint Source Management

Data Compilation Procedures:
High level data flow chart:



Sector: Agriculture, Natural

BMP List:

Access Road	Roof Runoff Structure
Animal Trails and Walkways	Roofs and Covers
Composting Facility	Sediment Basin
Conservation Cover	Spring Development
Contour Farming	Stream Crossing
Critical Area Planting	Streambank and Shoreline Protection
Diversion	Stripcropping
Fence	Structure for Water Control
Field Border	Subsurface Drain
Filter Strip	Terrace
Forage and Biomass Planting	Trails and Walkways
Forest Stand Improvement	Underground Outlet
Grassed Waterway	Vegetated Treatment Area
Heavy Use Area Protection	Waste Storage Facility
Integrated Pest Management	Waste Transfer
Lined Waterway or Outlet	Water and Sediment Control Basin
Pipeline	Water Well
Prescribed Grazing	Watering Facility
Riparian Forest Buffer	Wetland Wildlife Habitat Management
Exclusion Fence with Grass Buffer	

Nutrient Management: Core N, Core P, and Supplemental Nutrient Management

Program Description:

PA's Agricultural Planning Reimbursement Program was a four- year state funded program through which agricultural operators/landowners in Pennsylvania's portion of Chesapeake Bay Watershed could be reimbursed for fees they paid to consultants to create Manure Management Plans (MMPs), Nutrient Management Plans (NMPs), and Agriculture Erosion & Sediment Control Plans (Ag E&S Plans). This program was open to all agricultural operators/landowners in Pennsylvania's Chesapeake Bay watershed from August 2017 through June 2021.

iii) Lists of reported BMPs:

(1) Nutrient Management – Core Nitrogen, Core Phosphorous, and Supplemental Nutrient Management (Nutrient Management Plans and Manure Management Plans)

(2) Agriculture: all implemented agricultural BMPs listed as implemented in an associated MMP, NMP, or Ag. E&S Plan. For example: Barnyard Runoff Control, Animal Waste Management Systems, Prescribed Grazing

(3) Natural: all implemented natural BMPs listed as implemented in an associated plan. For example: Riparian Forest Buffers

iv) How BMP data are obtained, imported, and managed:

The APRP was managed by DEP staff through two contractors (TeamAg, Inc. and Larson Design, Inc.). The contractors collected the forms, reviewed the submitted plans for completeness, where applicable, and reimbursed operators once all forms and receipts were submitted and the plan(s) deemed administratively complete. Operators with plans that had already been reviewed and approved by either the County Conservation District, State Conservation Commission, or through DEP inspection need only submit an approval letter from the reviewing entity. Contractors then submitted the planning information- both in pdf form and in an excel spreadsheet- to DEP.

For all years of the program, Act 38 Nutrient Management Plans and their related BMPs were entered in to the PracticeKeeper Geodatabase by County Conservation District (CCD) and State Conservation Commission (SCC) Staff according to the guidance in the Nutrient Management Program Administrative Manual and accompanying web-based trainings found on the DEP Clean Water Academy.

For years 1 and 2 of the contracts, DEP staff entered the complete MMPs and Ag. E&S Plans into the PracticeKeeper Geodatabase. As of this QAPP update, year 1 plans have all been entered. Year 2 plans are almost completely entered. Remaining year 2 plans are continually added as staff availability allows.

Agriculture BMPs (3.b.i.2) and Natural BMPs (3.b.i.3)

- **BMPs related to Agriculture Erosion and Sediment Control Plans and Manure Management Plans:** The PracticeKeeper Partner BMP Module was developed and available for contractors to use in February 2020. Contractors attended a half-day

training on March 3, 2020 to facilitate data entry through the PracticeKeeper Partner BMP Module. Contractors entered years 3 and 4 of program BMP data into the Partner BMP Module. Lisa Beatty, PA DEP BWRNSM, Water Program Specialist, worked with both contractors to ensure accuracy and completeness of the BMP entries. Each contractor-submitted BMP was accepted into the PracticeKeeper Geodatabase, as approved and accepted by Lisa, and connected to a plan that was separately entered into the PracticeKeeper Database by DEP staff. Known BMP duplicates are not accepted into the database during the QA/QC and BMP approval process performed by DEP Staff. DEP staff will consult spatial data, BMP type, and if needed, other identifying features of the BMP to determine a duplicate.

- **BMPs related to Act 38 Nutrient Management Plans:** BMPs related to Act 38 Nutrient Management BMP type, implementation date, implemented amount, unit of measure, location data, and other identifying information are all recorded in the PracticeKeeper Geodatabase on the related BMP by CCD or SCC staff according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. CBO-DATA-003 and accompanying DEP Clean Water Academy web-based training.
- **All Agriculture BMPs (3.b.i.2) and Natural BMPs (3.b.i.3):** An export excel file is downloaded from the PracticeKeeper Geodatabase with other BMP data. BMPs related to the following funding programs are submitted on the same excel file:
  (i) Act 13 Unconventional Gas Funds
  (ii) Ag. Plan Reimbursement Program
  (iii) County Action Plan Implementation Grants
  (iv) Chesapeake Bay Special Projects (CBIG)
  (v) DEP Streambank Fencing
  (vi) Exelon
  (vii) Mariner East 2 Grant
  (viii) NRCS Conservation Technical Assistance, and
  (ix) Privately funded BMPs

Privately funded BMPs are reported in the PracticeKeeper Geodatabase as part of the required output measures associated with the following Agricultural Programs:

(1) Nutrient Management Act Programs
(2) Chesapeake Bay Technicians
(3) Chesapeake Bay Engineers (CBIG)
(4) Pennsylvania's Agriculture Inspection Program

A BMP is not reported if it was funded by a funding source that is reported by another program. For example, all practices funded by USDA programs or DCNR grants that are also within the credit duration of the BMP will be removed from the dataset before reporting to NEIEN. The file is then submitted to Barry Evans for additional QA/QC and Ted Tesler for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

Nutrient Management BMPs (3.b.i.1)

- **Act 38 Nutrient Management Plans***:* Act 38 Nutrient Management acres implemented under the State's Nutrient Management Act (NMA–Act 38) are required to do so based on animal density thresholds established by the State (see Title 25, Chapter 83, Subchapter D). Concentrated Animal Feeding Operations (CAFOs), as defined by as a large CAFO under 40 CFR 122.23(b)(4), CAOs that with at least 300 Animal Equivalent Units (AEUs), and operations with at least 1000 AEUs, are also required to implement an Act 38 Nutrient Management Plan as a condition of their permit (See 25 Pa. Code § 92a.29). As described by program guidance, Nutrient Management Program Administrative Manual, each CAO or CAFO should be inspected annually. After follow-up from CCD and SCC staff nearly 100% of CAOs demonstrate full compliance with the implementation of their Act 38 Nutrient Management Plan within six months of the annual status review. Therefore, all active Act 38 Nutrient Management Plans are reported for Core N and Core P.

Manure Management Plans (MMP): All plans funded by the Pennsylvania's Agricultural Planning Reimbursement Program (APRP) are verified to meet program and regulatory requirements as defined by 25 Pa. Code § 91.36 and the Manure Management Manual by Technical Service Providers (TeamAg and Larson Design). At a minimum, a statistically significant subsample of agricultural operations with known MMPs and Nutrient Balance Sheets (NBSs) in the Pennsylvania portion of the Chesapeake Bay Watershed is inspected as part of the Chesapeake Bay Agriculture Inspection Program (CBAIP) annually. The subsample size will assure a maximum 5% margin of error and 95% confidence level. Based on inspections conducted as part of the CBAIP, a unique rate of nutrient management BMP implementation is determined for each county in the Pennsylvania portion of the Chesapeake Bay Watershed. The county-specific implementation rate is derived from a county-level analysis of data obtained during the on-site inspection of nutrient application and setback records as well as farmer interviews during the CBAIP inspection. Consistent with 3.c.1. of the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014,* during 2021-2022, 947 unique agricultural operations with verified MMPs were inspected as part of the CBAIP and the implementation rate determined by record checks during those 947 inspections was applied across the 8,332 known MMPs and NBS that were initially verified as part of state regulatory programs. The subsample size is equivalent to 11.4%. PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years, however further guidance from EPA CBPO will be needed to proceed with 3.c.2, since it states that "the BMP Verification Review Panel shall review the alternative strategy and make a recommendation to EPA on the adequacy of the alternative;" the BMP Verification Review Panel was sunset and no longer exists. The data for each inspection is documented on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. CBO-INSP-001. It is also recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper-Agriculture Inspection Module SOP No. CBO-DATA-002, Nutrient Management Program Administrative Manual, and accompanying web-based trainings found on the DEP Clean Water Academy. Acres of each planned Supplemental Nutrient Management BMP is recorded and related to the MMP in the PracticeKeeper Geodatabase. To determine implemented acres of Core N and Core P, the county-specific implementation rate is then applied to the acres that have planned nutrient application recommendations identified in the

known universe of MMPs tracked and recorded in the PracticeKeeper Geodatabase within the respective county, including those that were funded by the APRP. Only acres with verified MMPs within the Chesapeake Bay Watershed are considered. Similarly, the county specific implementation rate is applied to the acres planned of each specific Supplemental Nutrient Management BMP (Rate N & P, Placement N & P, Timing N &P) to determine the acres of implemented Supplemental Nutrient Management in the respective county.
Plans are determined to be "inactive" if they are not actively being implemented during the agriculture inspection. This is the basis of the implementation rate.

The goal is to inspect 10% of the agriculture acres in the CBWS every year to assure that we inspect the entirety of the agriculture acres in the CBWS within 10 years. When both the CBAIP Phase 1 and Phase 2 inspections were completed in the same year on the same operation, CBAIP Phase 1, CBAIP Phase 2, and Act 38 inspections factor into these rates. These percentages are not meant to be the necessary sample size for reverification of Nutrient Management BMPs associated with MMPs and instead were developed as part of the 2016 Chesapeake Bay Restoration Strategy.

b) Security/Confidentiality Specifications:

The PracticeKeeper Geodatabase can be accessed by licensed users only. Licensed users can only modify the data on the users' own tenant, meaning DEP can only modify geospatial data that DEP has entered, the County Conservation District (CCD) can only modify data that the particular CCD has entered, and each contractor can only view or modify the data each respective contractor has entered. DEP is capable of pulling reports across tenants for purposes of reporting and quality control purposes but cannot modify the data entered by the CCD.

<u>Data Verification Procedures</u>

a) Attributes tracked:

Plan type and verification or approval date along with, operator name, farm location, plan writer name and funding source are entered into PracticeKeeper. Information on related BMPs, such as BMP type, extent, measurement unit, location, and implementation date are also tracked in PracticeKeeper as part of the plan.

b) Geographic scale:

Plans are reported by either farm address or tract. Latitude and longitude are populated in PracticeKeeper when location information is entered numerically, or manually, as part of the GIS layer.

c) Methods to QA/QC:

Information on agricultural planning obtained as part of this program was reviewed for administrative completeness by Technical Service Providers (TeamAg and Larson Design) who have been trained by DEP staff in the administrative review process. The planning data itself was presumed to be accurate and is further verified or updated with surveys, inspections or visits by DEP or the County Conservation District and updated or verified in PracticeKeeper as needed. If a plan has been approved and entered on the Conservation District tenant, DEP did not enter or accept the BMPs from the PracticeKeeper Partner BMP Module BMP information entered on the PracticeKeeper Partner BMP Module was reviewed for accuracy by Lisa Beatty before acceptance

into the PracticeKeeper Geodatabase.

d) Potential sources of double counting:
   - Plans and associated BMPs that have been entered on a different tenant.
   - Planning and BMP information collected as part of the PSU survey.
   - BMPs that were implemented using funding sources that are reported separately including USDA-funded BMPs, DCNR-funded BMPs, GG and 319-funded BMPs, NFWF-funded BMPs, etc.

e) Qualifications:

Contractors attended an afternoon training session for completing Agricultural Planning administrative reviews via webinar on September 21, 2017. Additionally, the contractors were required to have employees certified as Act 38 Nutrient Management specialists. Guidance used by the contractors to determine whether the Ag E&S plan is administratively complete, can be found here:

Ag E & S Plan Checklist

The guidance used by the contractors to determine whether a MMP is administratively complete, can be found here:

MMP Admin Complete Guide

A copy of the reimbursement form, which must be signed by the landowner and the contractor, ensuring that the plans were reviewed and approved to be administratively complete, can be accessed here:

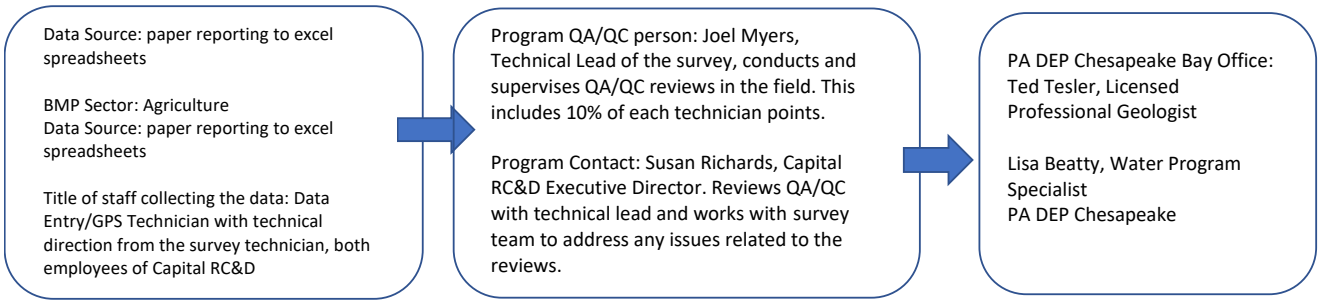
APRP Reimbursement Request Form 3020-FM-CBO0003B

B10.3.5 Capital Area RC&D Conservation Tillage Survey

Contact: Susan Richards, Executive Director, Capital RC&D (717-241-4361)
QA/QC Contact: Joel Myers, Capital RC&D Annual Survey Technical Lead

Data Compilation Procedures

High level data flow chart:



Sector: Agriculture
BMP: Reduced Tillage, Conservation Tillage, and Low Disturbance/High Residue Management (No Till)

Prior to the initiation of BMP data submissions to CBPO via NEIEN in 2010, EPA Bay watershed modelers used estimates on the extent of conservation tillage in Pennsylvania provided by the Purdue University Conservation Technology Innovation Center (CTIC) that were based on the use of infrequently conducted field surveys. For the first NEIEN submission in 2010, DEP modified this approach somewhat by using additional data obtained via a survey conducted by the Capital Resource Conservation and Development Area Council (Capital Area RC&D) in its' seven-county region. This initial survey was designed using procedures previously established by CTIC. Capital RC&D conducted its' first survey in spring of 2007 and repeated it again in 2010. The results of these first two surveys were used to update data submitted previously using only sporadically collected CTIC data and were the basis of conservation tillage acres submitted to CBPO for the 2010 and 2011 NEIEN cycles.

After 2010, Capital RC&D was engaged by DEP to conduct more extensive surveys in which additional counties were added. This first survey (conducted in spring of 2012) was used as the basis for the 2012 NEIEN submission. In 2012, fifteen (15) counties were included in the survey. In 2013, the survey was conducted in twelve (12) new counties and repeated in three (3) counties that were done in 2012. One additional county was surveyed in 2014, and in 2015 additional counties were surveyed on a two-year rotating basis. Additional surveys were completed for 2015 through 2022. A description of the survey procedures used in Pennsylvania is included in Appendix C.

Capital RC&D collects data for four different categories of crop residue management/tillage. Data on only three of these categories where residue exceeds 15% are used for NEIEN reporting purposes. In this case, BMP acres are submitted as "Reduced Conservation Tillage" are 15-30% residue, "Conservation Tillage" is 30%-60% residue, and "High Residue Management" is greater than 60% residue. An example of the type of data collected in recent surveys is shown in the figure below. Data is collected using a transect survey method on a county-by-county basis. This survey was designed using procedures previously established by the Conservation Technology Information Center (CTIC). The data is collected for 26 counties that are surveyed in their entirety and in four additional counties only the Chesapeake Bay watershed area is surveyed. All 30 counties are surveyed on a two-year cycle, so 15 counties per year. A description of the survey procedures used in Pennsylvania is available.

As reflected in the above workflow diagram, the transect survey, data is entered using pre-printed data sheets that correspond to specific, numbered GPS waypoints for each observation point. As the survey team travels the county survey route, the data entry/GPS tech identifies the location of each numbered observation point using a computer tablet loaded with the project's

county ArcGIS maps and Esri's Collector app interface. The maps show the survey route, observation points with unique observation point numbers, roads and photo imagery as well as vehicle position in real time. Data entry/GIS technicians are responsible for locating and confirming each pre-established observation point, using ArcGIS and a GPS on their device while they direct the survey driver. At each observation point, the vehicle is stopped and observation information concerning the planted crop and residue level is determined by a survey technician and the data is entered on the paper data sheet where it corresponds with the point on the map. The location of the survey vehicle is tracked with GPS and shown on the map. With this system, the data points can be found easily and entered with minimal data entry error and the written data entry can be easily reviewed for accuracy in real time during the survey.

Data collected during the survey on the handwritten data sheets is then entered into an excel spreadsheet for data compilation and analysis. Data entry accuracy is reviewed in spot-checks between the data sheets and excel spreadsheet. Following initial completion of the survey, the data is entered into an excel spreadsheet and shared with the QA/QC team (the technical lead and a data entry/GIS tech) who determine a physical segment of the route and points to review that will yield the needed number of crop and cover crop points. Following the QC review, any concerns about consistency and accuracy are identified and address with the survey tech and data entry/GIS tech.

After all counties have been surveyed on a given year the data for each county excel spreadsheet is analyzed to calculate the percentage of each residue level for each primary crop planted and the resulting table is provided to Ted Tesler, DEP BWRNSM who reviews the data and asks any pertinent questions.

Data Verification Procedures

Information on conservation tillage obtained from the above survey approach is QA/QC checked, as described above, as part of the survey methodology. The reported results are presumed to be accurate, and These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

Tillage Management as measured by crop residue level is determine by observation of the amount of crop residue left on the crop field following primary crop planting in the spring. The observations are made during a county-by-county transect survey that travels throughout the county, along pre-established travel route to pre-established crop field points, in all of the major crop production areas of the county. Compiled observations at each point are shown in the example county results chart below

Data is collected and presented on a county level. The number of total crop observations vary

each year, due to crop rotation and land use transition and are taken along a survey route of approximately 460 observation points. Following collection of observations at each crop point, the data is compiled and converted to a percentage that describes all crop fields of a particular type of crop. For example, using the collected data, the percentage of all soybean fields that were observed to have the specified percentage of residue level is calculated.

Capital RC&D Surveys roughly 30 counties on a two-year cycle, appx. 15 per year. If a county has never been surveyed or was last surveyed prior to 2010 (original 2007 survey), the lowest value from all the surveyed counties that reporting year was reported for these counties. Data in the county is applied to number of row crops in the county (% applied). If the county was not surveyed, the % from the previous year carries forward.

There are two classes of non-surveyed counties, those which are normally surveyed but were not surveyed that year (for which a survey has been completed in the last several years) and those that have not been surveyed since the original (CTIC) prior to 2010. If a county has been surveyed within the past several years these results will be carried forward if a new survey is not available. If the county was last surveyed prior to 2010 (these typically contain less than 50,000 acres of cropland), the lowest value from the current reporting counties is reported for each of these counties (as a percentage). The following counties were surveyed in 2021: Adams, Bedford, Blair, Cambria, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Indiana, Juniata, Perry, Snyder, Somerset, Union, and York. The following counties used recent "carried forward" survey data from 2020 or earlier: Berks, Bradford, Centre, Chester, Clinton, Columbia, Lancaster, Lebanon, Luzerne, Lycoming, Mifflin, Montour, Northumberland, Schuylkill, Susquehanna, and Tioga. The following counties have not been surveyed since the original CTIC 2007 effort: Cameron, Carbon, Clearfield, Elk, Jefferson, Lackawanna, McKean, Potter, Sullivan, Wayne, and Wyoming. Capital RC&D Survey activities are documented in Pennsylvania's CBRAP Semi-annual Work Progress Reports.

The percentage of BMP practice observations are reported to NEIEN as the percentage of the tillage practice observed in the county (Reduced Tillage, Conservation Tillage, or High Residue Tillage). If a county was not included in the new survey, the next most recently conducted survey data is reported for the county. Most agriculturally intensive counties are surveyed every two years.

QA/QC considerations include:

1. All survey technicians and data entry/GPS technicians have appropriate qualifications. Survey technicians are retired NRCS or conservation district ag techs with more than 20 years of agriculture field experience. Data entry/GPS techs are typically students in geo-environmental studies and have some field work experience working with ArcMap and other ESRI products.
2. Consistency over all counties by using a limited number of survey technicians and data entry/GPS techs so that the same small group of qualified and trained staff works in multiple

counties using defined procedures.

3. Training of all survey staff takes approximately one-day and includes classroom information and in-field review. Additional hands-on field training of all new survey techs or those who would like additional field support is conducted following the group training.

4. For each county, a third member of each county team is from the county conservation district. That survey team member provides additional validation of observations.

5. Independent verification of the data collected by each survey technician is performed on ten-percent of the crop observations of each technician. This is done by an independent quality control technician, currently, the technical lead for the project. The quality control technician's review of the crop points is documented and compared with the original observation. The field verification includes initial calibration of the review using the line-point transect method.

After the survey is conducted, data is entered into an Excel spreadsheet and all QC reviews are completed, the data is analyzed to provide the percentage information described above and provided to DEP's Bureau of Watershed Restoration and Nonpoint Source Management. DEP avoids double counting by using only the survey results to report conservation tillage to the Bay Program.

Example of the conservation tillage surveys funded by DEP.

COUNTY	CROP	% AT EACH RESIDUE LEVEL				TOTAL #
		0-15%	15-30%	30-60%	>60%	OBSER.
FRANKLIN	BEANS	5.9	6.9	30.6	56.4	101
2018/2019	CORN	12.8	12.5	39.4	35.1	350
	FORAGE	25.0	25.0	25.0	25.0	4
	VEG	88.8	0.0	11.1	0.0	9
	All Crops	13.0	10.9	37.5	38.6	464

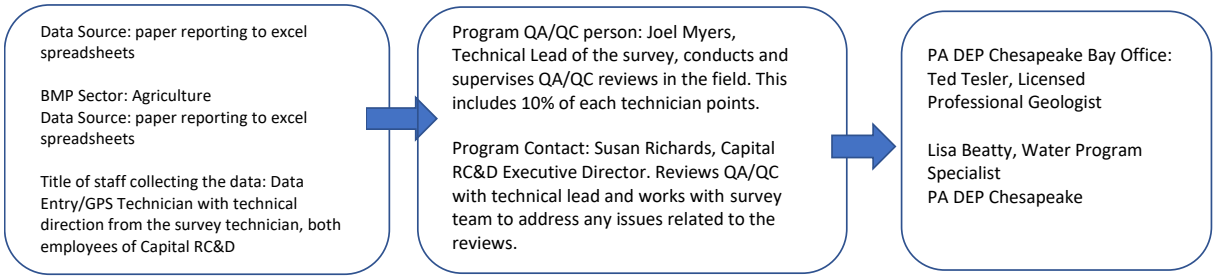
Information on conservation tillage obtained from the above survey approach is QA/QC checked as part of the survey methodology provided in Appendix C. The reported results are presumed to be accurate, and these records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN as percentages for each county.

B10.3.6 Capital Area RC&D Cover Crops Survey

Susan Richards, Executive Director, Capital RC&D (717-241-4361)
QA/QC Contact: Joel Myers, Capital RC&D Annual Survey Technical Lead

Data Compilation Procedures

High level data flow chart:



Sector: Agriculture

BMP List: Cover Crop

Starting with the 2015 NEIEN cycle, cover crop data developed as a result of a transect survey conducted by Capital Area RC&D, similar to the one conducted for determining conservation tillage acres (see section B10.3.4 above), has been used. This survey was developed with input from Mark Dubin, an agricultural advisor to CBPO. The Ag Workgroup approved the BMP verification methodology used in the PA cover crop transect survey pilot projects for cover crop BMP annual progress reporting on November 21, 2016. (A more detailed description of this survey is provided in Appendix D). For reporting purposes, the percentage of cultivated acres under two types of cover crops ("traditional cover crops" and "commodity cover crops") are calculated.

As reflected in the above workflow diagram, the transect survey, data is entered using pre-printed data sheets that correspond to specific, numbered GPS waypoints, established in 2012, for each observation point in the county being surveyed. As the survey team travels the county survey route, the data entry/GPS tech identifies the location of each numbered observation point using a computer tablet loaded with the project's county ArcGIS maps of route and points and Esri's Collector app interface. The maps show the survey route, observation points with unique observation point names (numbers), roads and imagery as well as vehicle position in real time. Data entry/GPS technicians are responsible for locating and confirming each pre-established observation point, using ArcGIS and a GPS on their device while they direct the survey driver.

The cover crop survey is conducted in two parts with the first part occurring approximately two weeks following the first average frost date for the county to be surveyed. This occurs in the fall and the survey documents planted cover crops at crop observation points along the conservation tillage transect survey route. The same points are visited again in the spring during the conservation tillage survey and follow-up information about the cover crop fields is collected. At each observation point, the vehicle is stopped and observation information concerning the primary crop that was harvested is taken along with the cover crop information; also, cover crop

density and height is recorded as a means of calculating when the cover crop was planted. This information is determined by the survey technician. The data is entered on the paper data sheet where it corresponds with the point on the map. The location of the survey vehicle is tracked with GPS and shown on the map. With this system, the data points can be found easily and entered with minimal data entry error and the hand-written data entry can be easily reviewed for accuracy in real time during the survey.

Data collected during the survey on the handwritten data sheets is then entered into an excel spreadsheet for data compilation and analysis. Data entry accuracy is reviewed in spot-checks comparing the data sheets and excel spreadsheet. After all counties have been surveyed on a given year the data for each county excel spreadsheet is analyzed to calculate the percentage of crop fields that have cover crops planted and to determine how many of the crop fields have traditional cover crops or commodity cover crops. The resulting table is provided to Dr. Barry Evans with Drexel University and Ted Tesler, DEP BWRNSM who review the data.

Data Verification Procedures

Cover crop information obtained from the above survey approach is QA/QC checked, as part of the survey methodology for conservation tillage, the QC review is conducted in the spring. The reported results are presumed to be accurate following QC review, and these records are verified by the program prior to reporting to DEP's BWRNSM for submission to EPA through NEIEN.

During the fall survey, the team collects the following information about each point: harvested crop, cover crop type, cover crop planting method, cover crop density (for establishment date estimation), cover crop height (for establishment date estimation), if manure was applied and if the point includes a non-agricultural land use on one side, the land use is collected.

Data is collected and saved on a county level. The number of total crop observations vary each year, due to crop rotation and land use transition and are taken along a survey route of approximately 460 observation points. Following collection of cover crop observations in the fall, that information is saved and used in the spring to prompt the collection of cover crop kill status to determine if the cover crop was used for winter grain and harvested or to be harvested or terminated as a traditional cover crop before the primary crop was planted.

QA/QC processes for cover crop data collection include:

- All survey technicians and data entry/GPS technicians have appropriate qualifications. Survey technicians are retired NRCS or conservation district ag techs with more than 20 years of agriculture field experience. Data entry/GPS techs are typically students in geo-environmental studies and have some field work experience working with ArcMap and other ESRI products.
- Consistency over all counties by using a limited number of survey technicians and data

entry/GPS techs so that the same small group of qualified and trained staff works in multiple counties using defined procedures.

- Training of all survey staff for the fall cover crop survey takes approximately one-half day and includes classroom information only along with photographs. During the spring the survey staff receives a full one-day that includes cover crop observation as well as conservation tillage. Additional hands-on field training of all new survey techs or those who would like additional field support is conducted following the group training.
- For each county, a third member of each county team is from the county conservation district. That survey team member provides additional validation of observations.
- Independent verification of the data collected by each survey technician is performed on ten-percent of the crop observations of each technician and ten-percent of the cover crop points. This is done by an independent quality control technician, currently, the technical lead for the project. The quality control technician's review of the crop points is documented and compared with the original observation.

After the spring conservation tillage and cover crop survey is conducted, data is entered into excel and all QC reviews are completed, the cover crop data is analyzed and assigned to two groups either *traditional cover crops* which are those burned or rolled down before the primary crop was planted and *commodity cover crops* which are those used as a harvested small grain crop. The data is then converted to a percentage of the **previous** season's crop fields and reported to DEP's Bureau of Watershed Restoration and Nonpoint Source Management along with the conservation tillage data. County BMP acreage is calculated by multiplying the observed BMP implementation percentage by the Row Crop acreage reported in the current year's CAST Base Conditions report. DEP avoids double counting by using only the survey results to report Tillage Management and Cover Crops to the Bay Program.

Example of the cover crop data obtained in recent transect surveys funded by DEP.

County	**Crop**	**% of planted crop fields at each residue level**				**Total # Observed**	**Cover Crop Results Fall 2020/Spring 2021 (percentage of 2020 crop observations)**		
		<15%	15-30%	30-60%	>60%		Commodity Cover Crops	Trad. Cover crops	Late Planted CC
Snyder	BEANS	7.7	12.4	44.4	35.5	169	**16.8**	**15.6**	**0.0**
	CORN	16.7	26.7	33.8	22.8	281			
	FORAGE	9.1	18.2	72.7	0.0	11			
	SPR GR	100.0	0.0	0.0	0.0	1			
	VEG	93.7	0.0	0.0	6.3	16			
	All Crops	**16.1**	**20.5**	**37.2**	**26.2**	**478**			
Union	BEANS	1.2	8.6	36.2	54.0	163	**25.7**	**33.4**	**0.2**
	CORN	9.5	14.3	29.8	46.4	252			
	FORAGE	7.7	53.8	30.8	7.7	13			
	SPR GR	0.0	0.0	0.0	100.0	1			

	VEG	66.7	0.0	0.0	33.3	3			
	All Crops	6.7	13.2	31.9	48.2	432			

Information on cover crops obtained from the above survey approach is QA/QC checked as part of the survey methodology (see Appendix D). Information on crop types or cover crop acres obtained from both of the above sources (NRCS or Capital Area RC&D) is presumed to be accurate, and these records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

At its November 17, 2022 meeting, the Bay Program's Agriculture Workgroup approved a hybrid verification approach presented as a pilot project for data reported from the Transect and Penn State Voluntary Producer Surveys. The project looked at the intersection of data reported from Lancaster County over the 2019-2020 winter season. This verification method was only approved for Lancaster County and progress data for 2022 implementation in Lancaster County for 2022 was reported using this newly approved method. This project allowed the reporting of additional planted species and nutrient application data that improved the Transect Survey data to allow reporting of cover crop species information (above "wheat" a lowest value default) and better informed nutrient application to these non-harvested acres. A link to the workgroup meeting page presentation and the hybrid Verification Methodology document for this annual practice is provided below:

Agriculture Workgroup Conference Call, November 2022 (chesapeakebay.net)

Decision: The AgWG approved the methods used for the Pennsylvania Cover Crop Enhancement Pilot Project for annual verification. Meeting materials that include the methodology, final cover crop table and presentation are linked at:
https://www.chesapeakebay.net/what/event/agriculture-workgroup-conference-call-november-2022

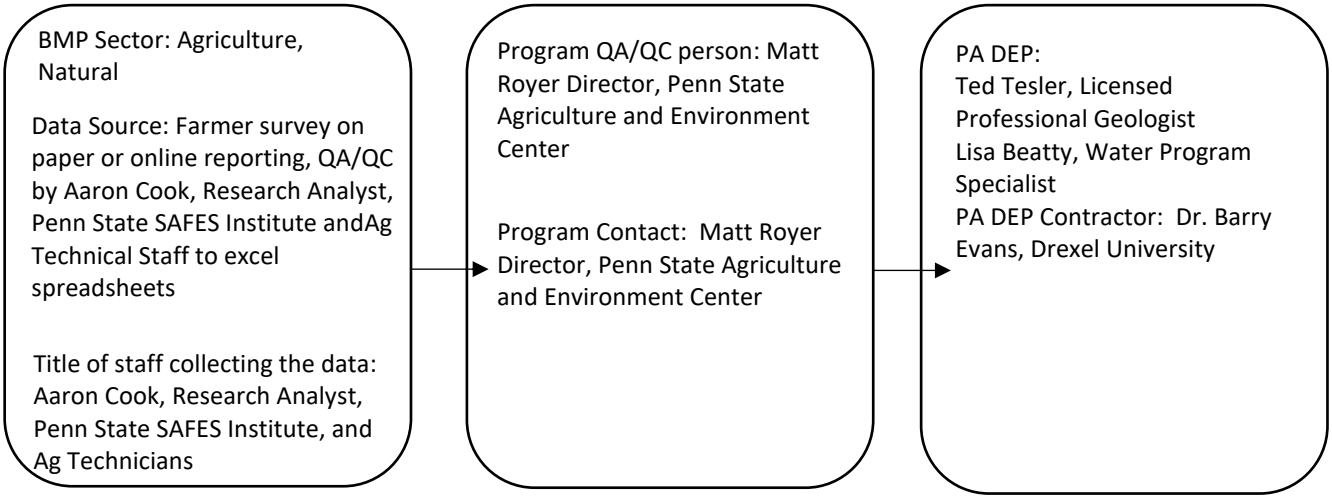
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.3.7 Penn State University Agricultural Voluntary BMP Reporting Outreach

Contact: Matt Royer, Director of Agriculture & Environment Center, PSU (814-863-8756 mzr154@psu.edu)
QA/QC Contact: same as above

Data Compilation Procedures

High level data flow graphic:



Sector: Agriculture, Animal, Natural
BMP List:

NEIEN Practices reported in Penn State Voluntary Producer Survey

- Animal Waste Management Systems
- Barnyard Clean Water Diversion RI
- Barnyard Runoff Controls
- Cover Crop Commodity Normal
- Dry Waste Storage Structure RI
- Exclusion Fence with Forest Buffer RI
- Exclusion Fence with Grass Buffer RI
- Exclusion Fence with Narrow Forest Buffer RI
- Exclusion Fence with Narrow Grass Buffer RI
- Forest Buffer
- Forest Buffer-Narrow
- Grass Buffer
- Manure Incorporation High Disturbance Late
- Manure Incorporation Low Disturbance Early
- Manure Incorporation Low Disturbance Late
- Nutrient Management Core N
- Nutrient Management Core P

- Nutrient Management N Placement
- Nutrient Management N Rate
- Nutrient Management N Timing
- Nutrient Management P Placement
- Nutrient Management P Rate
- Nutrient Management P Timing
- Prescribed Grazing
- Rotational Grazing RI
- Soil and Water Quality Conservation Plans
- Watering Trough RI

2022 Penn State Voluntary Producer Survey

The 2022 Penn State Voluntary Producer Survey followed the same QA/QC methodologies as the 2020 Penn State Voluntary Producer Survey (conducted in Lancaster, York, Adams, and Franklin Counties). For a comprehensive BMP List and QA/QC methodologies see the following:

- https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Ag%20page/Farm_Survey_2020_Final_Report_Feb_1_2021.pdf

2022 Reporting:

The 2022 survey of Pennsylvania farmers in the Tier 2 and 3 Counties included in the Chespeake Bay Watershed only: Bedford, Centre, Columbia, Cumberland, Dauphin, Huntingdon, Juniata, Lebanon, Lycoming, Mifflin, Northumberland, Perry, Snyder, and Tioga Counties were conducted to provide producers an opportunity to self-report conservation practices implemented on their farms. Also, farmers in Clinton and Union Counties sent responses to PennState Surveys. PennState cross checked the 2022 Clinton and Union Counties survey locations with the 2016 PennState Survey and PracticeKeeper and removed duplicates. The 2022 survey followed successful methodologies of a survey of all Pennsylvania farmers across the Chesapeake Bay watershed undertaken in 2016, and a follow up survey of the Phase 3 WIP pilot counties of Lancaster, York, Adams and Franklin Counties undertaken in 2020. The survey especially sought data on "voluntary," non-cost shared practices. The instrument and procedures were developed in collaboration by survey research experts in Penn State's Survey Research Center, and subject matter experts from state agencies and agriculture. The survey development and implementation process were led and managed by the Agriculture and Environment Center (AEC), Penn State University, College of Agricultural Sciences.

The survey was mailed to approximately 13,000 farmers in January 2022, with returns accepted until the end of May 2022. A total of 950 from the 14 target counties were completed and returned.

Farmers were given a choice of completing surveys online or filling out and returning by mail a

paper copy. Excel was used to tabulate all survey responses. All paper copy surveys were entered into the excel database by AEC research staff.

For a comprehensive BMP List and QA/QC methodologies for the 2022 Penn State Voluntary Producer Survey, which revisited with the same methodology that was used in the 2020 survey in the four Phase 3 WIP Pilot counties (Lancaster, York, Adams, and Franklin) see the following:

- https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Ag%20page/Farm_Survey_2020_Final_Report_Feb_1_2021.pdf
- Revised TetraTech recommendations contained within the report at the link below: https://www.chesapeakebay.net/channel_files/25874/producer_survey_recommendation_rep ort_2018-02-14.pdf

See Appendix F for a detailed description of the Penn State Survey.

Data Verification Procedures

To assess the reliability of the self-reporting, approximately 10 percent of returns were selected randomly for on-farm verifications conducted by trained and experienced Penn State Extension staff. Extension educators were able to complete a total of 110 farm visits throughout the 14 counties surveyed, which is 11.6% of total survey returns and above the recommended 10 percent of returns. Analyses of the data reject systematic under or over reporting in the sample data for the majority of relevant conservation practices and means and 95% confidence intervals indicate reliability in the reported data.

We further applied various methodologies to ensure that conservation practices reported by respondents were not already reported to the Chesapeake Bay Program through other methodologies employed by the Commonwealth. Four possible sources of other-reported conservation practices were considered in this analysis. These were:

1. Practices funded with government funds that are already counted from government sources of data.
2. Practices captured through existing regulatory programs.
3. Practices already verified and reported in PracticeKeeper by county conservation districts.
4. Non-annual practices installed prior to 2016 that were already reported by farmers who responded to the 2016 survey.

The methodologies applied to avoid double counting of these practices are discussed below for each category.

1. **Practices funded with government funds that are already counted from government sources of data.**

The survey asked whether specific BMPs were implemented using federal, state or county government funds. With the exception of nutrient management plans and soil conservation and water quality plans (explained in more detail below), for those practices where the respondent answered "yes" to the government funding question, these practices were netted out of the final data reported to DEP.

Regarding the first exception for nutrient management plans, the use of government funds to develop the plan does not mean that the acres of core nutrient management covered by these plans has been verified and reported by another government program database. Thus we did not apply the "government funds" double counting rule to core nutrient management. The only exception to this rule was for NRCS 590 Plans/CNMPs. These are NRCS plans and if the farmer indicated they were developed with government funds, we assumed they are included in the NRCS data already provided to DEP and we therefore netted them out to avoid double counting.

Regarding the second exception for soil conservation and water quality plans, the only subset of plans that would already be reported by another government data source would be NRCS Conservation Plans developed with government funds. We assumed that government-funded NRCS Conservation Plans would be part of the NRCS data that is already provided to DEP, and netted those out. NRCS Conservation Plans that the farmer indicated are not funded by government funds would be developed by a private technical service provider and therefore not part of the NRCS database, and thus they were not netted out. Finally, no Ag E&S Plans, regardless of whether they are government funded, are being reported in another government funding program database, and thus they are reported regardless of how the government funded question is answered (however, see "Practices already verified and reported in PracticeKeeper" below).

2. Practices captured through state or federal regulatory programs.

In the 2022 survey, these practices were limited to just nutrient management for which the respondent indicates they have an Act 38 Nutrient Management Plan. The Act 38 regulatory program has already captured this data, and thus all core nutrient management occurring under an Act 38 Nutrient Management Plan was netted out and not reported to avoid double counting.

3. Practices already verified and reported in PracticeKeeper.

For confidential research purposes only, DEP provided Penn State researchers with the most recent data from PracticeKeeper on BMPs and acres under plans in the 14 counties in which the farmer survey was conducted. PracticeKeeper data was provided in Excel spreadsheets. The following seven worksheets were included: (1) "BMPs" (these included reported practices such as Heavy Use Area Protection, Waste Storage Facility, Riparian Forest Buffer, Prescribed Grazing, etc.); (2) "KnownLandowner_NBS" (nutrients applied using Nutrient Balance Sheets); (3) "BrokerNBS" (nutrients applied using Nutrient Balance Sheets); (4) "AWS_ReVerified" (Waste Storage Facilities); (5) "MMPsVerifiedAI" (Manure Management Plans); and (6) AgES_Verified" (Agricultural Erosion & Sediment Control Plans); and (7) "MMPsVerified" (Manure Management Plans). All data was and is kept confidential under Penn State University's research protections.

Because practice terminology was slightly different between the PracticeKeeper data and the farmer survey, a crosswalk analysis was developed and applied to the data as set forth in Table 1.

Table 1. Crosswalk between PracticeKeeper data and farmer survey data

Practices from PracticeKeeper Data	Practices from Survey
Continuous no till with high residue	No Till >60% residue
Residue and Tillage Management, Mulch Till	No Till 30-59% residue
Residue and Tillage Management, No-Till/Strip Till/Direct Seed	Minimum Till 15-29% residue
Cover Crop	Cover Crop
Enhancement – Grazing Management	Grazing Management
Prescribed Grazing	Grazing Management
On-farm forage based grazing system	Grazing Management
Heavy Area Use Protection	Barnyard Runoff Controls
Nutrient Management	Core N & P Nutrient Management
Nutrient Management Plan – Applied	Core N & P Nutrient Management
Waste Storage Facility	Animal Waste Storage Systems
Prescribed Grazing	Prescribed Grazing
Riparian Forest Buffer	Forest Buffers on Converted Cropland
Riparian Herbaceous Buffer	Grass Buffers on Converted Cropland
KnownLandowner_NBS	Core N & P Nutrient Management
BrokerNBS	Core N & P Nutrient Management
AWS_ReVerified	Animal Waste Storage Systems
MMPsVerifiedAI	Core N & P Nutrient Management
MMPsVerified	Core N & P Nutrient Management
AgE&S_Verified	Soil Conservation and Water Quality Plans

Following this crosswalk, researchers then analyzed the survey data and the PracticeKeeper data using R statistical computing software to detect and remove duplicates. Matches between

the survey and PracticeKeeper datasets were found using farmer/operator names and addresses. For all practices, we erred on the side of removal of the practice from the farmer survey dataset in order to conservatively avoid double counting of any reported practices or associated units in the PracticeKeeper data. We did this by following several rules:

- If the practice was reported in both data sets but the date of installation was not the same, we assumed that it was the same practice and netted it out of the farmer survey data.
- If the acres of a practice reported in the PracticeKeeper data equaled or exceeded the acres of the same practice reported in the farmer survey, we did not count the practice. We only counted acres from the survey that were in excess of the amounts reported in PracticeKeeper.
- With respect to Nutrient Balance Sheets data provided in the PracticeKeeper data (worksheets entitled "KnownLandowner_NBS" and "BrokerNBS"), we assumed that nutrients applied pursuant to Nutrient Balance Sheets may possibly be calculated to meet both N-based and P-based land applications. Thus if a farmer reported on the survey they are implementing both N-based and P-based nutrient management, we assumed that the NBS is also both N- and P-based, and netted out both practices to avoid double counting.
- With respect to the Nutrient Balance Sheets data provided in the worksheet entitled "BrokerNBS" and the Manure Management Plan data provided in the worksheet entitled "MMPsVerified" of the PracticeKeeper data, no units (acres) were provided. These were the only PracticeKeeper data worksheets that did not include units. Accordingly, where we found duplicates in the "BrokerNBS" or "MMPsVerified" PracticeKeeper data and farmer survey data, we assumed that all acres of reported nutrient management were reported in the PracticeKeeper data and we netted out all reported acres in the farmer survey to avoid double counting.
- With respect to Manure Management Plan data provided in the PracticeKeeper data (worksheets entitled "MMPsVerifiedAl" and "MMPsVerified"), we assumed that nutrients applied pursuant to Manure Management Plans may possibly be calculated to meet both N-based and P-based land applications. Thus if a farmer reported on the survey they are implementing both N-based and P-based nutrient management, we assumed that the MMP is also both N- and P-based, and netted out both practices to avoid double counting.
- With respect to soil conservation and water quality plans, the PracticeKeeper data did not distinguish between row crops, hay, or pasture acres. Because conservation plans on row crops receive higher nutrient reductions pursuant to the Bay Model, we followed a netting rule ensuring that we were avoiding double counting of row crop acres in the first instance, followed by hay acres, ensuring the most conservative reporting of this practice in the farmer survey data.
- With respect to forest riparian buffers, similarly, the PracticeKeeper data did not distinguish between buffers on cropland or buffers on pasture land (animal exclusion). Because buffers on cropland receive higher nutrient reductions pursuant to the Bay

Model, we followed a netting rule ensuring that we were avoiding double counting of cropland buffers in the first instance. Specifically, if in our analysis we found that a forest riparian buffer duplicate existed, we first netted out all duplicate acres of converted cropland buffers reported in the survey followed by remaining converted pasture buffer acres, if any. If no cropland buffers were reported in the survey but pasture buffers were, we netted out the converted pasture acres. This rule ensured the most conservative reporting of this practice in the farmer survey data.

- With respect to grass riparian buffers, we followed this same rule when comparing the PracticeKeeper data (reported as "Riparian Herbaceous Buffer") with grass buffers reported on the farmer surveys.

4. Non-annual practices installed prior to 2016 and already reported in the 2016 survey.

If a farmer answered the 2016 survey and reported a non-annual practice and indicated that it was installed prior to 2016, we assumed it was already reported and we netted these practices out. All farmers who responded to the 2016 in the 14 target counties were mailed a copy of the 2022 survey. Survey returns from those who responded to the 2022 survey and also responded to the 2016 survey were compared and any previously reported practices were netted out.

Information on BMPs obtained from the above survey approach was QA/QC checked and corrected as part of the survey methodology. Given the extensive QA/QC approach deployed by Penn State, information on farm conservation practices QA/QC checked as part of the survey methodology is presumed to be accurate, and the data was not further checked or verified prior to inclusion in the annual submission to CBPO via NEIEN.

Matthew Royer, Penn State University Director of Agriculture and Environment Center provided a summary procedure description for the 2016 and 2020 Penn State Survey Report detailed in Appendix F. Penn State did not complete a survey in PA for 2021. In 2022 an updated survey was completed which will be reported with the 2022 progress submission.

2016 Reporting:

For a comprehensive BMP List and QA/QC methodologies for the 2016 Penn State Voluntary Producer Survey, The final report (December 15, 2016) is available at the link below: http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Farm%20Survey%20Report%20Final%20121516.pdf

The Penn State University Agricultural Voluntary BMP Reporting outreach was an effort to allow producers to voluntarily report BMPs implemented on their operations through paper or web-based forms. The survey was mailed to approximately 20,000 farmers in late January 2016, with returns accepted until the end of April 2016. A total of 6,782 were completed and returned. The reporting was comprised of agricultural BMPs installed without cost-share including structural and management action BMPs. (Structural BMPs reported as Resource

Improvement (RI) Practices without known design specifications (shorter Credit Duration than BMPs meeting Federal/State Cost Share standards).

The final report (December 15, 2016) is available at the link below:
http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Farm%20Survey%20Report%20Final%20121516.pdf

Revised TetraTech recommendations contained within the report at the link below:

https://www.chesapeakebay.net/channel_files/25874/producer_survey_recommendation_report_2018-02-14.pdf

B10.3.8 NRCS Remote Sensing (Potomac Pilot)

Contact: Scott Heidel, DEP Chesapeake Bay Watershed Restoration Division, Bureau of Watershed Restoration and Nonpoint Source Management, (717-72-5647, scheidel@pa.gov)

Data Compilation Procedures

Sector: Agriculture

BMP List:
Forest Buffers, Prescribed Grazing, Access Control, Fencing, and Mortality Composters.

NRCS and DEP's Remote Sensing proof of concept effort to determine if aerial imagery could be used to identify and inventory BMPs was carried out in the five counties of the Potomac River Basin by analyzing grids within the study area. A total of 28 NRCS conservation practices were targeted for identification in the pilot project. The list of practices was based on BMPs that could be detected remotely. Field verification was used to assess accuracy. Five percent of farms in Somerset, Bedford, Fulton and Adams County where visited while ten percent of the farms were visited in Franklin County. Field verification methods were established based on the agreed scope of work by NRCS, DEP, and EPA. The CBP's Agriculture Workgroup approved only a limited number of practices (limited population size) based on specific remote sensing statistical standards for accuracy developed by a contractor for the Agriculture Workgroup.

The BMPs counted included: Forest Buffers, Prescribed Grazing, Access Control, Fencing, and Mortality Composters.

The final report (December 13, 2016) is available at the link below:
https://www.chesapeakebay.net/channel_files/24633/assessment_of_pilot_remote_sensing_12-13-2016.pdf

Data Verification Procedures

Information on BMPs obtained from the above approach is QA/QC checked as part of the pilot project methodology. The data itself is presumed to be accurate and was not further checked or verified prior to inclusion in the annual submission to CBPO via NEIEN.

Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.3.9 Pennsylvania's Agriculture Conservation Stewardship Program (PACS)

Contact: Frank Schneider, Nutrient and Odor Management
Program, State Conservation Commission
(717-705-3895, fschneider@pa.gov)

This is a placeholder for future reporting. This program is not actively reporting currently.

Data Compilation Procedures

PACS is a conceptual voluntary program designed to recognize and provide certain benefits to Pennsylvania farmers who step forward to document their environmental stewardship. The program focuses on ensuring farmers meet Pennsylvania environmental regulatory compliance (soil conservation and manure management) along with the utilization of practices that demonstrate the farmer's conservation stewardship addressing all resource concerns on the farm.

The program relies on third party entities to perform environmental assessments of farms applying for recognition, with the oversight of the local county conservation district or other designated entity to administer and provide assessment of program applications.

For conservation districts that choose to support the implementation of this program, the conservation district will provide on-farm inspections on at least 10% of the farms submitting PACS program applications to the conservation district for consideration. These inspections will be considered as counting towards the county's Chesapeake Bay agriculture initial inspection goal if the farm has not been previously accounted for in the inspection program, the farm is not a prior identified Confined Animal Operation (CAO) or Confined Animal Feeding Operation (CAFO) with an approved nutrient management plan, and the inspection is performed consistent with the with Standard Operating Procedure No. BCW-INSP-018, *Chesapeake Bay Agricultural Inspection Program.*, including the completion of the required inspection report and the record keeping and compliance follow up. For every 10 applications received by

participating conservation districts, there will be a minimum of one on-farm inspection completed. This language is included in the Technician Agreement.

Program Process:

Farmer outreach and education: Farmers obtain an information packet explaining the program, including eligibility criteria and the benefits of program participation. This packet includes a checklist/self-evaluation form of program eligibility criteria.

- Packets could be available from CCDs, DEP, SCC, PDA, PSU, private sector, and on agency and organization websites, etc.
- Participating farmers would enroll at least all contiguous acres under their management control, both owned and rented.
- Farmers can use the checklist and program description information to self-assess their farm situation to determine if they appear to be eligible for program participation.

Initial farm assessments: Farmers will contact a third-party entity to do an initial farm assessment. These third-party assessors would include private sector agricultural consultants and other agriculture industry professionals. Conservation district staff would not be involved in this element of the program as their more effective role is expected to be the review of program applications and local administration of the program.

- Authorized third party verifiers need to be certified under PDA's Nutrient Management Specialist Certification Program. In addition, authorized third party verifiers will be required to attend an additional one-day training outlining the requirements for the PACS program.
- Farmers initially applying for participation in the program must at a minimum be implementing their required 102 agriculture erosion control plan (or conservation plan), as applicable, and their manure management plan (or nutrient management plan), as applicable in order to be eligible.
- Participating farms will be required to demonstrate environmental stewardship in excess of the regulatory requirements when submitting application for renewal in the program in later years.
- Third-party verifiers would work with the farmer to complete the PACS program application/verification form.

Farm application submission and review: The farmer sends the completed program application/verification form (completed by the farmer and the verifier) to the participating district (or other designated entity) for review and acceptance. Conservation districts will provide a screening review of every application to assess compliance with program criteria. Applications with questionable information will be further assessed by contacting the farmer and/or the verifier to confirm the validity of the information provided with the application. Districts will perform an on-site inspection of at least 10% of the submitted applications to assess if the verifier is properly assessing the farm. Districts may be able to count farms where they do on-site checks, as counting towards their obligations under the CB agriculture initial inspection program.

- The application/verification form includes a summary of the information relating to

implementation of the relevant erosion control and manure management plans, as well as information relating to the BMPs installed on the farm.

- This farm summary information will be submitted to the conservation district electronically to facilitate data entry for farms approved under the program.
- Districts may be able to reduce their Act 38 NM plan inspection frequency for CAOs and CAFOs if the farm has a track record of compliance in the Act 38 Program
- The review process will include an assessment to verify there are no SCC, PDA or DEP open compliance issues with the farm prior to approving the farm for program participation.
- Where a district does not participate, the SCC will authorize an alternative entity to perform the application review and administration of the program.

Application approval: Conservation districts or other authorized entities will approve the application based on SCC application review guidance. The conservation district or other authorized entity will notify the farmer of their program approval/disapproval. Once approved, the district or other authorized entity will record the farm information in a program database for PACS program tracking.

- The initial approval under the program will be valid for 5 years, at which time a renewal application would be required for consideration of continued participation.
- An annual self-certification form will be required to be completed by the farmer and submitted to the conservation district to retain program participation throughout the 5-year program approval lifespan.
- Conservation districts would update the farm information in the program database if the self-certification form indicates changes are needed.
- If major changes were made to the operation (such as inclusion of additional acreage) a new application and application review will need to take place.

The Scope of work for this program would be covered within the Ag Inspection SOP here: http://files.dep.state.pa.us/Water/BPNPSM/AgriculturalOperations/AgriculturalCompliance/Final_SOP_Chesapeake_Bay_Agricultural_Inspection_Program.pdf

Data Verification Procedures

Information on BMPs obtained from the above approach will be QA/QC checked as part of the project methodology described above. The data itself is presumed to be accurate and was not further checked or verified prior to inclusion in the annual submission to CBPO via NEIEN.

Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan is included as an appendix.

B10.3.10 Chesapeake Common's FieldDoc and National Fish and Wildlife Foundation (NFWF)

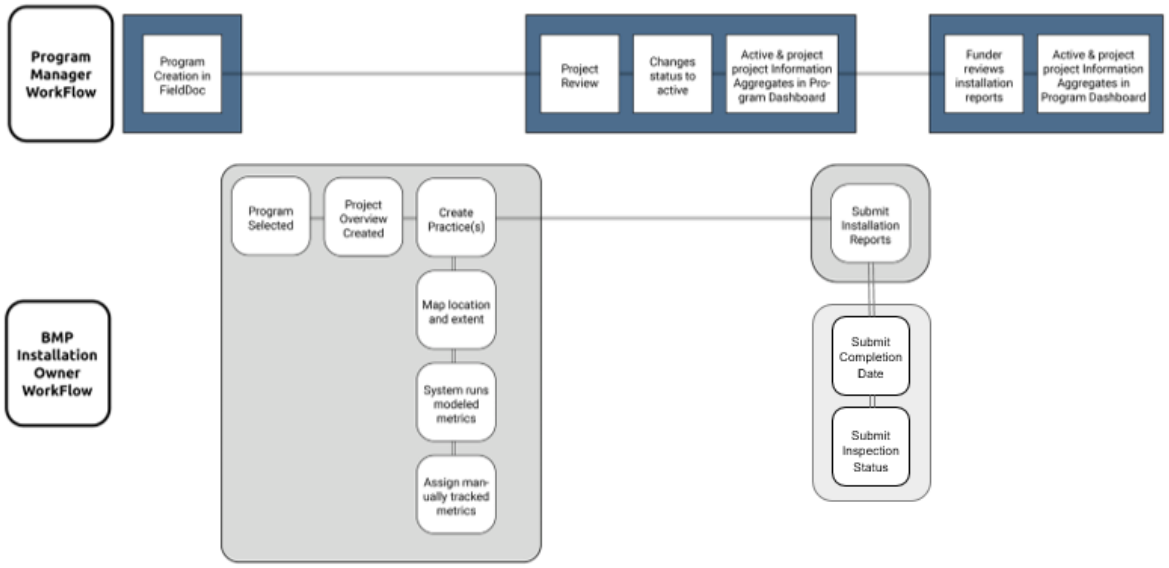
Contact: John Dawes, Chesapeake Commons, Executive Director/Co-Founder (Dawes@chesapeakecommons.org / 814.386.2865)

QA/QC Contact:
NFWF: Jake Reilly, National Fish and Wildlife Foundation

CAP Coordinator Implementation Grants: Erin Penzelik, Water Program Specialist, PA DEP Bureau of Watershed Restoration and Nonpoint Source Management

Data Compilation Procedures

High level data flow chart diagram displays the data flow for FieldDoc reporting and validation:



Sector: Developed, Natural

BMP List:

- Advanced Grey Infrastructure Nutrient Discovery Program (IDDE)
- Alternative Crops
- Bioretention/raingardens
- Bioswale
- Conservation Landscaping
- Dry Detention Ponds and Hydrodynamic Structures

- Dry Extended Detention Ponds
- Filter Strip Runoff Reduction
- Filter Strip Stormwater Treatment
- Filtering Practices
- Forest Buffer - Agriculture
- Forest Buffer - Urban
- Forest Buffer, Narrow - Agriculture
- Grass Buffer - Agriculture
- Grass Buffer, Narrow
- Impervious Surface Reduction
- Permeable Pavement
- Storm Drain Cleaning
- Stormwater Performance Standard Runoff Reduction
- Stormwater Performance Standard-Stormwater Treatment
- Stream Restoration
- Tree Planting - Agriculture
- Tree Planting - Urban Canopy
- Tree Planting - Urban Forest Planting
- Urban Nutrient Management Plan
- Vegetated Open Channels
- Wet Ponds and Wetlands
- Wetland Creation - Floodplain
- Wetland Creation - Headwater
- Wetland Enhancement
- Wetland Rehabilitation
- Wetland Restoration - Floodplain
- Wetland Restoration - Headwater

FieldDoc is the online platform restoration funders and professionals use to manage and visualize progress for their work. Via a user-friendly interface, stakeholders map their efforts and track progress across projects, with the ability to focus on work for specific conservation practices while also offering a high-level view across projects.

A general workflow consists of a user entering project, site, and practice attributes including geography into the platform for integration into larger best management practice (BMP) data collection efforts. The project information includes general project details, practice locations, and proposed practices to be implemented. FieldDoc helps funders know where investments

have been made and what impact those investments have had on meeting targets to improve water quality. The FieldDoc Platform is designed to help users:

1. Collaboratively manage and document the implementation of your organization's restoration projects;
2. Map where your organization is working to restore water quality;
3. Plan, implement, and monitor best management practices (BMPs) associated with your restoration sites and projects; and
4. Manage track and share restoration outcomes.

FieldDoc Program Users:

1. National Fish and Wildlife Foundation (NFWF) is using FieldDoc for their Small Watershed Grants program as well as the Innovative Nutrient and Sediment Reduction Grant Program. In 2019, FieldDoc, with support from NFWF, was expanded to support watershed planning in the Delaware River Watershed.
2. Pennsylvania DEP to track their Clean Water County Wide Action Plans across the Chesapeake Bay.
3. Richard K. Mellon Foundation to track implementation investments in Western Pennsylvania; Virginia Environmental Endowment.

Data Structure, Workflow and Permissions

FieldDoc supports structured collection of best management practice data as well as tracking metrics associated with each practice. To date Pennsylvania Department of Environmental Protection (DEP) uses FieldDoc to track data across its countywide action plans and the metrics associated with each practice type are aligned to the phase three Watershed Implementation Plan for a given county. County coordinators manage projects in FieldDoc that serve as the primary means for aggregating BMP data into the platform. In Fielddoc the county-wide action plan is associated with a given project and this ensures that BMPs and implementation reported through the system, count toward the county program dashboard targets developed in the system. An example of the workflow steps is provided below:

1. PA County Coordinators aggregate data and ensure it satisfies DEP requirements for reporting via FieldDoc
2. PA County Coordinators log in to FieldDoc and upload necessary BMP data to a given project that is associated with the appropriate County Action Plan in the system. Data includes:
    a. Practice Name
    b. Practice Description
    c. Practice Type
    d. Appropriate metrics (i.e.: acres of forest buffers, acres of prescribed grazing)
    e. Practice Completion Date and Inspection Status(s)

3. Data are reviewed by DEP staff
4. Data are provided as an export by DEP staff, deduplicated, and integrated into state reporting workflows.
5. Data collected are flattened and exported in the attached example files (FieldDoc-Export.CSV and FieldDoc-Export.geojson) for use in reporting progress through state National Environmental Information Exchange Node (NEIEN).

While practice type names are configurable by program administrators at the DEP, the project team has ensured that practice type names and definitions match the Chesapeake Assessment & Scenario Tool (CAST) for easier reporting the NEIEN. Permissions by general user type and function are outlined in the table below:

FieldDoc Permission Level	**User Persona**	**FieldDoc Feature Access**
Program Manager	DEP Staff	● Full create/edit/delete access to all projects associated with a County WIP Program ● Add any collaborator to any project associated with a County WIP Program ● Management of metrics & practice types ● Management of County WIP Program ● Export data for County WIP Program
General User	PA County Coordinators	● Full create/edit/delete access to projects their user account has created • Completion of practice completion date and inspection status ● Data export for projects their account has created

Data Verification Procedures

Site-specific Inputs & BMP Analysis Options:

FieldDoc uses multiple models, depending on the BMP selected by the user and the selected funding program. The models currently include the Adapted Nutrient and Sediment Load Reduction Model based on a simple algorithm including BMP efficiency and practice area;

Shoreline management BMPs created by an expert panel; In-stream load reduction estimates credited by Chesapeake Stormwater Network BMP Expert Panels; Zonal statistics for land use cover created by Drexel University's Watershed Algorithm API. FieldDoc uses default BMP efficiencies for Edge-of-Stream reduction that are aligned with the practices in the P6 WSM used in CAST. This model generates estimates to assist in developing N, P, and sediment load reduction plans. Users can set goals and input target load reduction metrics within the project's area of implementation using over 200 BMPs and their default efficiencies.

Quantified Outcomes:
FieldDoc provides Total Suspended Solids, Total Nitrogen, and Total Phosphorus reduction estimates in pounds per year associated with individual BMP implementation. FieldDoc generates loads estimates for the given practice and according to the model summary (https://help.fielddoc.org/en/articles/2816539-model-summary) is not meant to replace but align with Bay Program scenario tools or TMDL reduction targets on a site specific basis, it is useful in understanding a rough estimate of reductions if a practice were to be implemented based on size, type, and location. FieldDoc provides practice-level metrics that roll up to show the impact of all implementation within one project. This tool was designed so that users can easily report progress towards plan targets. FieldDoc will provide site-specific outcomes and can also group project sites to track overall project progress.

Attributes being tracked:

- BMP Type
- BMP Extent
- BMP unit of measurement
- BMP location
  - Geographic data is collected at the practice installation level, collecting both coordinate and geojson geographic information. County and watershed information is collected as well.
- BMP Funding Program
- BMP Installation Organization
- BMP Funding Status (active, closed)
- BMP modeled pollution estimated reduction via an iteration of Bay Program scenario tools

QA/QC Methods:
Each project must undergo a review by funding program managers before it will be accepted into the funding program. Managers can review the practice type selection, extent, and location of each practice within a proposed project. Once accepted, the project status changes to "active". At this stage the project information aggregates to the Program atlas, which allows program managers to view all practice locations on a map. This assists in identifying duplicative reporting. Project owners must self-report installation progress and can include photos or documents verifying their progress.
CAP Coordinators are given permission with username/password to enter the data and have received extensive training that is posted on DEP's Clean Water Academy. CAP Coordinators are

instructed *not to enter* federal/state non-cost share and federal/state regulatory programs BMPs into FieldDoc. CAP Coordinators are required to enter any co-funding sources so DEP BWRNSM staff can double check if the BMP is a duplicate from an existing federal/state cost share or federal/state regulatory program. DEP BWRNSM staff review and approve FieldDoc BMPs making sure there are no duplicates in the geospatial data and export through the FieldDoc data explorer. DEP BWRNSM completes a QA/QC of the data export for double counting and errors by BMP name, implementation date, location, and BMP extent.

Supporting Information:
Support materials including step-by-step instructions, downloaded pdfs, and video tutorials can be found at https://help.fielddoc.org/. For technical questions and to be added as a user, contact a FieldDoc Team member via an online chat box or via support@fielddoc.org. For programmatic questions, such as what practice to select, each funding opportunity has listed a program officer to contact.

C1: Assessment and Response Action

Assessments and response actions are the responsibility of the appropriate program delivering the data and will be outlined in the respective program's SOP and guidance where applicable. Reference or links to these documents, if applicable, can be found in Section B10 Data Management (subsections B10.2.1-B10.3.10.).

Refer to "A6: Project Description" for details on PA DEP BWRNSM QA/QC process.

C2: Reports to Management

Annual reports from data reporting sources are collected and processed for upload into the BMP Warehouse Application housed on DEP Servers. The application is designed to streamline NEIEN record submission and additionally allows for data analytics. Phase 6 BMP Warehouse application (replacing the Phase 5 version) was delivered in October 2018 and will be used each fall to create upload batch files for submission to CBPO over the NEIEN.

Refer to "A6: Project Description" for details on PA DEP BWRNSM QA/QC process.

D1: Data Review, Verification and Validation

Data review, verification and validation is addressed under each specific data source outlined above in Section B10 Data Management.

Refer to “A6: Project Description” for details on PA DEP BWRNSM QA/QC process.

D2: Verification and Validation Methods

Pennsylvania is actively participating in CBPO’s initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania’s QAPP Addendum BMP Verification Program Plan for non-point source pollution as part of the Phase 3 WIP planning process. The revised BMP Verification Program Plan was sent via email to EPA’s CBPO on December 1, 2021 with an updated version provided on September 1, 2022.

Appendix A: Primary BMP Source Cost Share or Regulatory Programs

Shown on the following pages are the information included in an Excel file called "Primary BMP Source Cost Share or Regulatory Programs". Included in this file are the BMP types typically collected from the sources. Some of these NRCS practices are not recognized for credit by EPA CBPO but are still reported to EPA CBPO because they have been reported DEP BWRNSM by NRCS. Also given are the sources (i.e., DEP programs, other government agencies, etc.) from which these data are typically collected. DEP BWRNSM reports applicable cross walked CBPO BMPs for annual progress from statewide cost share and regulatory programs. If a program reports a BMP to DEP BWRNSM that does not meet CBPO specifications or existing BMP name, BWRNSM does not report that BMP to CBPO. DEP BWRNSM sent the excel file "Primary BMP Source Cost Share or Regulatory Programs" to EPA CBPO via email on December 1, 2021.

"Read Me" Tab that has the following columns:

- PA Primary Ag Reporting Program
- PA Program
- Data Tracking
- Verifying Staff

"BMP by Primary Program" Tab that has the following columns:

- Source BMP Name
- NEIEN BMP Name
- Reporting cost share or regulatory program
    - NRCS
    - FSA
    - CBIG/CBRAP
    - NMA
    - 319
    - Growing Greener
    - Penn State Ag Voluntary BMP Reporting Outreach
    - CEG
    - REAP
    - PennVest
    - Municipal Separate Storm Sewer (MS4)
    - PennDOT
    - Chapter 102 Program Dept. of Defense
    - Oil and Gas Program
    - Chapter 105 Program
    - DCNR
    - Chesapeake Bay Foundation
    - FieldDoc/NFWF
    - Turnpike Commission
    - US Army Corp and Engineers
    - Other (Programs that report only a couple of very specific BMPs)

Refer to “A6: Project Description” for details on PA DEP BWRNSM QA/QC process.

Appendix B: Quality Document Status Memo

Applied Science & Quality Assurance Branch, Laboratory Services & Applied Science Division

Region 3 Quality System

R3_QA@epa.gov

Quality Document Status Memo

DATE	December 1, 2022		
SUBJECT	*EPA Region 3 Review of Quality Assurance Document–* *Document Title:* Quality Assurance Project Plan for Tracking, Verifying, and Reporting Nutrient and Sediment Pollutant Load Reducing Practices, Treatments, and Technologies *EPA QA Document Control #*: *Document Date:* 3/16/2022 *Document Type: Quality Assurance Project Plan (QAPP)* If other, specify: Click or tap here to enter text.		
FROM *EPA Delegated Approving Official (DAO)*	Name Division: Choose an item. Phone; E-mail	*DAO Signature*	*Durga Gosh 7/11/2022*
Additional Reviewer	☐ N/A Name: Vanessa Van Note Division: CBPO Phone; E-mail: 239-910-1801, vannote.vanessa@epa.gov	*Additional Reviewer Signature*	*VCV*
Additional Reviewer	Name: Ruth Cassilly Division: CBPO- UMD Extension Phone: 410-652-0070; E-mail: rcassilly@chesapeakebay.net	*Additional Reviewer Signature*	*RTC*
CC	Kia Long Regional Quality Assurance Manager EPA Region 3, LSASD, ASQAB	**THRU** *EPA Project Officer or equivalent*	☐ N/A Name Division: Choose an item.
TO	Name: Jill Whitcomb Organization: Pennsylvania Department of Environmental Protection		

Thank you for submitting your quality assurance document for review. The status of your document is indicated on the following page, along with next steps and comments, if applicable. The document was reviewed for compliance to the requirements outlined in:

- ☐ EPA QA/R-2, EPA Requirements for QMPs [EPA/240/B-01/002, March 2001]
- ☐ EPA QA/R-5, EPA Requirements for QAPPs [EPA/240/B-01/003, March 2001]
- ☐ Uniform Federal Policy (UFP) for QAPPs
  [Intergovernmental Data Quality Task Force, Part 1: UFP-QAPP Manual, March 2005]
- ☐ Other: Click or tap here to enter text.

If you have any questions regarding this review, contact me, the delegated approving official, as listed above. For general Region 3 quality-related questions, email the Region 3 Quality Assurance cadre at R3_QA@epa.gov.

Note: This action represents EPA's determination that the document(s) under review comply with applicable requirements of the EPA Region 3 Quality Management Plan [https://www.epa.gov/sites/production/files/2020-06/documents/r3qmp-final-r3-signatures-2020.pdf] and other applicable requirements in EPA quality regulations and policies [https://www.epa.gov/quality]. This action does **not** represent EPA's verification of technical or programmatic accuracy or completeness of document(s) under review, and is **not** intended to constitute EPA direction of work by contractors, grantees or subgrantees, or other non-EPA parties.

Document Review Status

Document Status	Next Steps
☐ Approved *addressed key requirements satisfactorily.*	• The document is valid for: ☐ 5 years ☐ Term of project, i.e., 1-2 years ☐ Other: Click or tap here to enter text. but should be reviewed annually, and if any significant changes to quality management or data collection practices, a resubmission is required of the revised document for review and subsequent approval.
☒ Conditionally Approved *satisfactorily addressed most key elements; however, minor deficiencies were noted, which do not affect quality of the data collected/used.*	• Resubmit to EPA with changes completed and the document signed within: ☐ 30 days, due by: Click or tap to enter a date. ☒ Other: 12/01/2022; 09/01/2022 for wetland mitigation and commodity cover crop data collection using transect survey edits. • Data collection may begin while these minor deficiencies are being resolved.
☐ Resubmittal Required *found to be deficient in describing key elements; further clarification of specific issues is required.*	• Resubmit to EPA with changes completed and the document signed. • Data collection may NOT occur until deficiencies are resolved, and an approved or conditionally approved EPA memo is issued.

Comments

☐ Not Applicable

General

Requested Changes by September 1st, 2022:

- Remove reference to wetland mitigation reporting on pages 2 and 62.
- Remove commodity cover crop data collection and reporting description using the transect survey and proposed calculation methodology on page 117.

Requested Changes by December 1st, 2022:

- Include a document header with running title, Document Control Number (DCN), date, and page number.
- List all figures and tables in the Table of Contents.
- All agency personnel are required to sign off on the approval page prior to submitting the final version to EPA.
- *All other changes and needed discussions are requested to be completed by December 1st, 2022.*

Specific by Document Section

Document Section	Page #	EPA Comments
A4.2: New Programs Providing Data	2	Please remove reference to wetland mitigation (may be reincorporated upon partnership approval). 12/01/22: PA DEP Response: This specific reference is in regard to non-reported potential historic wetland mitigation BMPs and not previous or currently reported BMPs. Please see details of reporting wetland

		mitigation in section B10.2.16 DEP Chapter 105 Waterways Engineering and Wetlands
Resource Improvement (RI) Practices	7	This SOP is not the correct SOP to reference for the documentation of the reporting of RI practices- The procedures for reporting RI practices are described in the following SOPs: PracticeKeeper – Best Management Practice (BMP) Module, CBO-DATA-003 and PracticeKeeper – Agriculture Inspections Module, CBO-DATA-002 Please correct this mistake for resubmission. 12/01/22: PA DEP Response: Removed reference to CBO-INSP-001; added description of qualification/training criteria for each level of qualified professional. Please see Section A5.1: Overview on pages 8 – 11.
Resource Improvement (RI) Practices	7	The "trained professional" performing verification of NRCS practices needs to have NRCS engineering and/or agronomic job approval authority to verify or reverify NRCS practices, please make this requested change clear in the QAPP and also to the staff and other stakeholders involved in verification of NRCS practices 12/01/22: PA DEP Response: Described qualification criteria for each level of qualified professional please see Section A5.1: Overview on pages 8 – 11.
Resource Improvement (RI) Practices	8	Fulfills request for RI practice documentation made during 2021 QAPP review, however staff verifying NRCS practices must have qualifications mentioned in the comment above, and this should be made clear to local stakeholders personnel involved in practice verification- as per the request on page 7 12/01/22: PA DEP Response: Described qualification criteria for each level of qualified professional please see Section A5.1: Overview on pages 8 – 11.
QA/QC to address "Double Counting"	15	Fulfills request for further documentation on the process used to avoid double counting when reverifying and reporting expired NRCS practices in QAPP during 2021 Progress review. Please clarify if, when expired practices are re-verified, inspectors are making certain that the NRCS contract for the original practice was not renewed. 12/01/22: PA DEP Response: Double Counting Section: Because the USDA dataset only includes practices that were implemented in the reporting year and no reverified practices are included in the USDA dataset, regardless of if the contract for the original practice was renewed, only USDA practices that have been reverified and are beyond their initial credit duration are reported. Please see the "QA/QC to address Double Counting:" section page 17 and for context pages 16 – 18.
B10.2.5 DEP Abandoned Mine Land	38	Please specify that reported practices are (acreage is) meeting the CBP BMP definition (land use change to forested land).

Reclamation and Active Mining Program		12/01/22: PA DEP Response: Please see B10.2.5 DEP Abandoned Mine Land Reclamation and Active Mining Program. "DEP BWRNSM collaborated with DEP BAMR for BAMR to report BMPs that meet the CBPO BMP definitions," on page 41.
B10.2.16 DEP Chapter 105 Waterways Engineering and Wetlands	62	Please remove paragraph describing wetland mitigation net gain reporting. 12/01/22: PA DEP Response: DEP will continue to report wetland mitigation net gain BMPs to ensure more accurate representation of restored wetland acres in Pennsylvania's Chesapeake Bay watershed. EPA CBPO requested the 2022 Progress records for wetland mitigation. Please see the requested 2022 BMPs at B10.2.16 DEP Chapter 105 Waterways Engineering and Wetlands on page 66.
B10.3.1 Nutrient and Manure Management Program	94	Please link documentation or describe calculation to arrive at the 10% sample size. Please define the minimum allowable sample size for the program. (Goal to inspect 10% of agricultural acres in CBWS annually.) 12/01/22: PA DEP Response: Please see Section B10.3.1 Nutrient and Manure Management Program – pages 103 - 109; B10.3.2 Pennsylvania's Agriculture Inspection Program 109 - 115; B10.3.4 Pennsylvania's Agricultural Planning Reimbursement Program (APRP) – pages 118 – 124.
Manure Management Plans (MMP) and Nutrient Balance Sheets (NBS):	99	Please link documentation or describe calculation to arrive at the 10% sample size. Please define the minimum allowable sample size for the program. (Goal to inspect 10% of agricultural acres in CBWS annually.) Sufficient to describe process and reference it in following applicable sections of the QAPP. Please see Section B10.3.1 Nutrient and Manure Management Program – pages 103 - 109; B10.3.2 Pennsylvania's Agriculture Inspection Program 109 - 115; B10.3.4 Pennsylvania's Agricultural Planning Reimbursement Program (APRP) – pages 118 – 124.
Manure Management Plans (MMP):	109	Please link documentation or describe calculation to arrive at the 10% sample size. Please define the minimum allowable sample size for the program. (Goal to inspect 10% of agricultural acres in CBWS annually.) Sufficient to describe process and reference it in following applicable sections of the QAPP. Please see Section B10.3.1 Nutrient and Manure Management Program – pages 103 - 109; B10.3.2 Pennsylvania's Agriculture Inspection Program 109 - 115; B10.3.4 Pennsylvania's Agricultural Planning Reimbursement Program (APRP) – pages 118 – 124.

B10.3.5 Capital Area RC&D Conservation Tillage Survey	113	If there is a documented process for how carrying data forward of non-surveyed counties from previous years was decided upon, please link it here. 12/01/22: PA DEP Response: There is no change to the B10.3.5 Capital Area RC&D Conservation Tillage Survey's Data Compilation Data Verification Procedures.
B10.3.5 Capital Area RC&D Conservation Tillage Survey	115	Please add updates from 2021 survey. DEP stated in their response on EPA CBPO's verification summary document that they would be providing the details included below in their updated QAPP document: "See full updates in QAPP: B10.3.5 Capital Area RC&D Conservation Tillage Survey and B10.3.6 Capital Area RC&D Cover Crops Survey" Information provided in PA DEP's Verification Summary responses: "As explained above, there are two classes of non-surveyed counties, those which are normally surveyed but were not surveyed that year (for which a survey has been completed in the last several years) and those that have not been surveyed since the original (CTIC) prior to 2010. If a county has been surveyed within the past several years these results will be carried forward if a new survey is not available. If the county was last surveyed prior to 2010 (these typically contain less than 50,000 acres of cropland), the lowest value from the current reporting counties is reported for each of these counties (as a percentage). The following counties were surveyed in 2021: Adams, Bedford, Blair, Cambria, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Indiana, Juniata, Perry, Snyder, Somerset, Union, and York. The following counties used recent "carried forward" survey data from 2020 or earlier: Berks, Bradford, Centre, Chester, Clinton, Columbia, Lancaster, Lebanon, Luzerne, Lycoming, Mifflin, Montour, Northumberland, Schuylkill, Susquehanna, and Tioga. The following counties have not been surveyed since the original CTIC 2007 effort: Cameron, Carbon, Clearfield, Elk, Jefferson, Lackawanna, McKean, Potter, Sullivan, Wayne, and Wyoming. Capital RC&D Survey activities are documented in Pennsylvania's CBRAP Semi-annual Work Progress Reports. " This level of detail is not provided in the QAPP updates to Section B 10 3.5 and 3.6- Please add these details to the QAPP. 12/01/22: PA DEP Response: There is no change to the B10.3.5 Capital Area RC&D Conservation Tillage Survey's Data Compilation Data Verification Procedures
B10.3.6 Capital Area RC&D Cover Crops Survey	117	The transect survey and corresponding proposed calculation methodology is not currently approved for reporting commodity cover crops. Please leave the description of the traditional cover crop

		reporting and remove the description behind the commodity cover crop calculation (until such time that this is approved by the partnership). 12/01/22: PA DEP Response: B10.3.6 Capital Area RC&D Cover Crops Survey updated their QAPP submission to include EPA's CBPO November 2022 Agriculture Workgroup approval for the verification approach presented as a pilot project for data reported from the Transect and Penn State Voluntary Producer Surveys. See pages 128 - 132
Appendix D: Description of the Cover Crop Survey	148	PA QAPP mentions the original Capital Area RC&D Cover Crop Survey (2012/2013) and the 2015 survey, has anything changed in the survey methodology since 2015? Can PA update the section to include the current years' (2020 to 2021) survey protocols and details? 12/01/22: PA DEP Response: B10.3.6 Capital Area RC&D Cover Crops Survey updated their QAPP submission to include EPA's CBPO November 2022 Agriculture Workgroup approval for the verification approach presented as a pilot project for data reported from the Transect and Penn State Voluntary Producer Surveys. See pages 128 - 132
Additional Sections		**Sections below added to the review memo in October 2022- not part of the original 2021 Progress QAPP memo, added during the 2022 Progress revised 9-1-22 QAPP review**
B10.3.7 Penn State University Agricultural Voluntary BMP Reporting Outreach	123	This section will need to be updated to reflect the 2022 PSU Producer Survey which was conducted in 14 counties across the middle and northern areas of the Bay Watershed in PA if the resulting data is being prepared for inclusion in the PA 2022 annual progress reporting. PA's QAPP Section A4.2 New Programs Providing Data page 2 states: *"Additionally, a 2022 Update of the Penn State Voluntary Producer Survey will be reported for 2022 Progress which has not yet been received and is expected for reporting by December 1, 2022 or prior to the February EPA Progress Evaluation in 2023.* EPA is considering whether any exceptions to the Dec. 1, 2022 deadline will be allowed. According to USEPA Chesapeake Bay Program Office 2022 Grant and Cooperative Agreement Guidance: • September 1 – Jurisdictions are encouraged to begin submitting their BMP implementation to NEIEN for the progress assessment. Ongoing review of submissions will occur between September and December, **with the expectation that December 1 submissions are final.** • CBPO may require additional changes to jurisdictional QAPPs as the **data submitted for annual progress is evaluated after the December 1st deadline.** • **No later than December 1 – Final BMP submissions** for the previous July 1 to June 30 data period due from jurisdictions for the 2022 Progress Phase 6 model assessment – both wastewater data and non-wastewater BMPs. • **February 7 – Final progress run information for progress available to jurisdictions** – needed for outside reporting of progress on commitments and to keep results relevant.

		12/01/22: PA DEP Response: Matt Royer from PennState updated the B10.3.7 Penn State University Agricultural Voluntary BMP Reporting Outreach section pages 132 – 140 and Appendix F: Description of the Penn State Survey pages 176 – 183.
QA/QC to address "Double Counting" (Relates to original comment/question made above on QAPP pg 15)	16	The QAPP states: "*If the practice is beyond its credit duration, the date the practice was reverified is identified and practice is submitted to NEIEN for annual progress including the implementation date (beyond its credit duration) and the inspection date.*" Please clarify this statement by answering the following question: If the practice is beyond its credit duration, is the BMP then re-reported or re-submitted to NEIEN as an existing practice with the original date of implementation and the date of reverification/inspection, or as a new practice with the reverification date used as the date of implementation? 12/01/22: PA DEP Response: If the practice is beyond its credit duration, the date the practice was reverified is identified and the practice is submitted to NEIEN for annual progress as a new practice including the actual implementation date or the operator's best estimate, indicating that the practice is beyond its credit duration, and the inspection date. Please see the "QA/QC to address Double Counting:" section for additional context. Please see the "QA/QC to address Double Counting:" section page 17 and for context pages 16 – 18.

Appendix C: Description of the Conservation Tillage Survey

Included on the following pages is a description of the conservation tillage survey conducted by the Capital Area RC&D for DEP.

Residue Survey of the Chesapeake Bay Watershed Counties in Pennsylvania Quality Assurance and Quality Control Components for BMP Verification

Developed and Implemented by Capital Resource Conservation and Development Area Council (Capital RC&D)

Method

Cropland residue transect survey procedures used by the Pennsylvania Chesapeake Bay Counties Survey were adapted from those developed by the Conservation Technology Information Center (CTIC) and detailed by the National Crop Residue Management Survey on their website, http://www.crmsurvey.org/. Survey procedures are described in "Cropland Roadside Transect Survey: Procedures for Using the Cropland Roadside Transect Survey for Obtaining Tillage/Crop Residue Data," available online through Purdue University, http://www2.**ctic**.purdue.edu/core4/ct/transect/TransectF.doc. According to this document, "When conducted properly, this cropland transect survey procedure provides a high degree of confidence in the data summaries. Users can have 90% or more confidence in the accuracy of the results". The Chesapeake Bay Counties Survey uses CTIC procedures and data collection standards with the goal of collecting data that can be authenticated and published by CTIC.

In addition to working within CTIC guidelines, quality assurance and quality control components are detailed below.

Survey Routes - Routes were developed for each county using the CTIC procedures and were adapted to a hilly geography. Each county survey route was developed by a local county agriculture technician with route development guidance adapted from CTIC guidelines. The routes will be reused for each future resurvey.

Survey Teams and Qualifications – County survey teams are staffed by three individuals; two of whom work in multiple counties in order to achieve greater consistency of process between counties. Each team includes one county agriculture agency staffer (from the county to be surveyed), one consulting technician and one data entry technician, the consulting and data entry technicians staff multiple counties. A description of each observation (identification of the growing crop and estimation of the percentage of residue cover) is made by the consulting technicians. Qualifications for this position include extensive experience as an agricultural professional working with crop land. The Data Entry Technician qualifications include experience with mapping and GIS data. The county agricultural agency member is typically

from the conservation district and is selected for their knowledge of agriculture in the surveyed county.

Training – The training was developed by the survey organizer, Capital RC&D, in collaboration with a technical consultant, Joel Myers**.** A one-day training is required for the entire survey team. Training includes an overview of the entire survey process and review of multiple in-field examples of crop residue. The training is supported by multiple photo guides and written survey procedures. Training may be modified and expanded depending upon the experience of the consulting technicians. In-field post-training testing of the consulting technicians is done during the first week of the survey by the technical consultant and documented for quality assurance. Evaluation of the data entry technicians is also conducted by the technical consultant and documented. This training was shown to be effective for the 2012/2013 tillage survey.

Data Collection and Entry – Survey data is entered electronically during the survey using an Excel-based data entry sheet with drop-down data selection on a tablet computer. The data entry technicians are responsible for locating and confirming each data point, using GPS and entry of the observation information for each data point into the data entry sheet. The GPS waypoints are pre-loaded and also appear on screen in a map of the survey route. The pre-entered points were visited in previous surveys. The location of the survey vehicle is tracked on the tablet GPS and shown on the map. With this system the data points can be found easily and entered with minimal data entry error.

Independent Verification of Data – Independent verification of the data collected by each survey technician is conducted by the technical consultant during the first two weeks of the survey. Ten-percent of the crop observations of each technician is visited and documented. Review of the verification documents is performed by Capital RC&D and results of that review are reported to the technical consultant and the survey technician team. Any concerns are appropriately addressed to ensure data reliability.

External Validation of Data – Data summaries are developed from the collected data for each county and entered in the CTIC data collection system. CTIC authenticates and publishes the residue data on an annual basis.

Agricultural Workgroup Approval:

https://www.chesapeakebay.net/channel_files/24633/agwg_draft_call_summary_121516_2.pdf

Agriculture Workgroup (AgWG)

December 15th, 2016

10:00 AM – 3:30 PM

Face-to-Face Meeting Summary

Meeting materials: http://www.chesapeakebay.net/calendar/event/24633/

Actions & Decisions:

DECISION: The AgWG reached consensus to officially close the work of the Phase 6 Nutrient Management Panel.

DECISION: The AgWG approved the Turkey Characterization Pilot Project report.

DECISION: The AgWG approved the Manure Incorporation/Injection panel report as-presented, with the understanding that the AgWG requests to re-evaluate the interaction of this BMP with other BMPs after Phase 6 model runs, and that the AgWG is still open to considering additional addendum proposals after the approval as-written.

DECISION: The AgWG approved a motion to charge the Manure Incorporation/Injection expert panel to re-evaluate the proposal put forward by NY relating to immediate high disturbance incorporation for P, and to use best available science and professional judgement to determine a resolution.

DECISION: The WTWG approved the Manure Incorporation/Injection Panel's report and Appendix A pending revisions to land use eligibility for the practices and an explanation of how the BMPs are combined.

DECISION: The AgWG approved the Conservation Tillage Panel report as-written.

DECISION: The WTWG approved the Conservation Tillage Panel report Appendix A, as-written, with edits to be made on which BMPs can and cannot be combined.

DECISION: The AgWG approved the Animal Waste Management Systems report.

DECISION: The WTWG approved the Animal Waste Management Systems report Appendix A.

DECISION: The AgWG approved the Pennsylvania Conservation Survey methodology for use in reporting and crediting verified practices in the model. Ag conservation practices that have been proven to be statistically defensible will be reported as RIs with the RI designated lifespans.

DECISION: The AgWG approved of the PA NRCS remote sensing methodology as a proof of concept and tasks the AgWG with defining the minimum observation level and the acceptable levels of the metrics provided in the Tetra tech evaluation report (CSI, HR, FAR), as well as any other statistical metrics, for use in future reporting to the Bay Program. The AgWG also recommends this methodology align itself with a CBP verification protocol.

Appendix D: Description of the Cover Crop Survey

Below is a description of the cover crop survey conducted by the Capital Area RC&D for DEP.

Cover Crop Survey of the Chesapeake Bay Watershed Counties in Pennsylvania Quality Assurance and Control Components for BMP Verification

Capital Resource Conservation and Development Area Council (Capital RC&D)

BMP Collected – A transect survey of cover cropping following an agronomic season will provide a statistically valid county-wide assessment. The survey is completed in two parts; in the fall, cover crop species, estimated establishment date, establishment density, planting method and manure application are recorded. In late spring confirmation of cover crop species (if possible) and termination method - either harvest or burn down, are recorded for the same points.

Method

Cover crop transect survey procedures were developed with the technical expertise of a project team consisting of four former NRCS technical staff and reviewed by Mark Dubin, the Chesapeake Bay Program *Cover Crop Expert Panel* Coordinator. The project team considered important variables identified in the Chesapeake Bay Program's "Cover Crop Expert Panel Draft Report" to determine observable cover crop attributes that impact nitrogen reduction. The first survey was implemented in five counties to test if these attributes could be reliably collected using a transect survey method. These attributes included cover crop species, estimated date of planting, density of the planted crop, planting method and occurrence of fall application of manure.

The transect survey route for each county was created using procedures adapted from a method developed and tested by the Conservation Technology Information Center (CTIC) and detailed as the National Crop Residue Management Survey on their website, http://www.crmsurvey.org/. The cover crop transect survey route and observation points were determined and used by a transect survey of crop residue carried out during 2012 and 2013. Routes were developed for each county using the CTIC procedures adapted to the regional road layout in Pennsylvania

Information collected by the 2015 cover crop survey teams included attributes required to characterize cover cropping for the Chesapeake Bay Model and provide data useful for ag agency understanding of current practices. They include, harvested crop, cover crop species, planting method, cover crop density, estimated days from planting (based on cover crop height), and manure application.

Survey Team Duties and Qualifications – County survey teams are staffed by three individuals, two of whom survey multiple counties in order to achieve greater consistency between counties. Each team includes:

1. County Agriculture Agency Staffer to drive the team along the survey route. This person is selected for their knowledge of agriculture in the surveyed county.
2. The Consulting Technician surveys multiple counties each year and provides the description of each observation (harvested crop, cover crop, planting method, cover crop density, estimated days from planting and manure application). The primary qualification for this position is extensive experience as an agricultural professional working with agronomic crops.

3. The Data Entry Technician also works in multiple counties each year. The technician guides the team along the survey route, identifies each pre-determined observation point and enters the cover crop data determined by the consulting technician. Qualification required for this position includes experience with mapping and GIS data.

Training – Training was developed by the survey organizer, Capital RC&D, in collaboration with a technical consultant, Joel Myers**.** A half-day training was required for the consulting technicians and data entry technicians and a hour-long training was provided to the county agency staff. Training included an overview of the entire survey process and review of multiple in-field cover crop examples. The training is supported by photos and written survey procedures. Training may be modified and expanded depending upon the experience of the consulting technicians.

Data Collection and Entry – Survey data is entered electronically during the survey using an Excel-based data entry sheet with drop-down data options. Data entry techs use a laptop computer with county-specific data sheets and ArcGIS maps with the survey route and points identified. The data entry technicians are responsible for locating and confirming each pre-established data point, using ArcGIS and a GPS device. At each observation point, observation information is entered into the Excel-based data entry sheet. The GPS waypoints are pre-loaded and appear on screen in a map of the survey route. The location of the survey vehicle is tracked on the GPS and shown on the map. With this system, the data points can be found easily and entered with minimal data entry error.

Following the five county survey effort, a post-survey discussion including all participants did not identify areas of significant concern regarding field identification of cover crop establishment date and estimation of cover crop density however, distinguishing between annual rye and small winter grains – particularly when the plants are very small is difficult. The group discussed the cost/benefit of taking the time to make a determination between those crops using a magnifying glass or other method that would result in significantly increasing the time needed to complete the survey. The consensus of the group was that sacrificing the determination of exact species (of winter grain/rye) to a default species grouping was a necessary sacrifice. The default crop species or group will be the species that has a lower

nutrient impact on the model. When exact species of winter grain or rye is easily identified it will be recorded.

Internal Independent Verification of Data – Independent verification of the data collected by each survey technician is performed in the spring when the cover crop points are revisited to determine if the cover was harvested or burned down. Ten-percent of the crop observations of each technician are visited by an independent quality control technician and documented. Review of the verification documents are performed by Capital RC&D and results of that review reported to the technical consultant and the survey technician team. Any concerns are appropriately addressed to ensure data reliability.

Agricultural Workgroup Approval:

At its November 17, 2022 meeting, the Bay Program's Agriculture Workgroup approved a hybrid verification approach presented as a pilot project for data reported from the Transect and Penn State Voluntary Producer Surveys. The project looked at the intersection of data reported from Lancaster County over the 2019-2020 winter season. This verification method was only approved for Lancaster County and progress data for 2022 implementation in Lancaster County for 2022 was reported using this newly approved method. This project allowed the reporting of additional planted species and nutrient application data that improved the Transect Survey data to allow reporting of cover crop species information (above "wheat" a lowest value default) and better-informed nutrient application to these non-harvested acres. A link to the workgroup meeting page presentation and the hybrid Verification Methodology document for this annual practice is provided below:

Agriculture Workgroup Conference Call, November 2022 (chesapeakebay.net)

Decision: The AgWG approved the methods used for the Pennsylvania Cover Crop Enhancement Pilot Project for annual verification. Meeting materials that include the methodology, final cover crop table and presentation are linked at:
https://www.chesapeakebay.net/what/event/agriculture-workgroup-conference-call-november-2022

2016 Ag Workgroup Decision

https://www.chesapeakebay.net/channel_files/24633/agwg_draft_call_summary_112116.pdf

Agriculture Workgroup (AgWG)

November 21st, 2016

10:00 AM – 3:30 PM

Face-to-Face Meeting Summary

Meeting materials: http://www.chesapeakebay.net/calendar/event/23305/

Actions and Decisions:

Decision: The AgWG approved the AMS draft responses to comments on the STAC Review of Nutrient Inputs to Phase 6 Scenario Builder.

Decision: The AgWG approved AMS recommended changes to Scenario Builder, including: the proposed ammonium/nitrate split for fertilizer, the proposed weighting factors for forecasting, and the delivery of nutrients from riparian pasture. The AgWG also requested the AMS examine the sources informing the values for delivery of nutrients from riparian pasture.

Action: The AMS will hold a conference call in early December to review the Phase 6 model input data hosted on the Mid-Point Assessment Tableau site. Participation from interested parties and jurisdictions is encouraged. Contact Lindsey Gordon (Gordon.lindsey@epa.gov) if you would like to participate.

Decision: The AgWG approved the BMP verification methodology used in Delaware and Pennsylvania's Cover Crop Transect Survey Pilot Projects for Cover Crop BMP annual progress reporting.

Appendix E: Historic BMP Information

Attachment 6 of the 2015 CBPO Grant Guidance states that grant recipients are expected to submit draft historical BMP data by June 30, 2015 and final historical BMP data by September 30, 2015. This data will be used to inform the initial calibration of the Partnership's Phase 6 Watershed Model. Towards this end, Pennsylvania has decided to focus on a select number of key BMP types and sources with respect to primary data collection and update efforts (including nutrient management, conservation tillage, cover crops, urban stormwater BMPs, NRCS pasture fencing and other USDA-related measures). An attempt will be made to re-construct the historic implementation of other BMPs as well, but information associated with these will likely be less precise given the amount of available data. Descriptions of these historic BMP data collection/update efforts follow.

Cover Crops

A new approach has recently been developed that DEP believes to be a more reasonable way of estimating cover crop acres than was previously done. Consequently, all previous estimates of cover crop acres dating back to 1985 will be replaced with new estimates based on the most recent CEAP report prepared by USDA/NRCS (2013). In the CEAP report, it is estimated that cover crop implementation levels for the Susquehanna River and Potomac River Basins were 13% and 26%, respectively, for the years 2011-2014; and 5% and 10%, respectively, for the years 2003-2006. For the purpose of estimating historic county-level cover crop implementation levels for the Pennsylvania portion of the Chesapeake Bay watershed, percentages based on the CEAP estimates were derived for each county for the years 1985-2014. For the counties that are partially within the Potomac River Basin (Adams, Bedford, Franklin, Fulton and Somerset), the percent implementation levels for the periods 2003-2006 and 2011-2014 were assumed to be 8% and 20%, respectively. For those counties within the Susquehanna River Basin, the percentage estimates cited in the CEAP report were used. The years before and after these periods were either increased or decreased linearly as shown in Table E1. In estimating cover crop levels from year to year, the above percentages were applied to "Harvested Acres" for each county as reflected in the 2007 summary for Pennsylvania as prepared by the USDA National Agricultural Statistics Service (www.nass.usda.gov).

Table E1. Estimated cover crop implementation levels (%) for Pennsylvania counties falling within the Susquehanna River Basin (SRB) or Potomac River Basin (PRB) for the periods 2003-2006 and 2011-2014.

Year	SRB	PRB	Year	SRB	PRB
1985	0	2	2000	4	6
1986	1	2	2001	4	6
1987	1	2	2002	4	6
1988	1	2	2003	5	8
1989	1	2	2004	5	8
1990	1	2	2005	5	8
1991	2	4	2006	5	8
1992	2	4	2007	6	10
1993	2	4	2008	8	12
1994	2	4	2009	10	14
1995	3	4	2010	12	17
1996	3	4	2011	13	20
1997	3	6	2012	13	20
1998	3	6	2013	13	20
1999	4	6	2014	13	20

Pasture Fencing

With regard to historic increases in pasture fencing (i.e., Stream Access Control with Fencing in Scenario Builder), it has recently been discovered that an unusually large jump in fencing implementation occurred between 2009 and 2010 (the year in which the NEIEN protocol was initiated). This has since been attributed to the fact that estimates of streambank fencing based on NRCS data were inflated (i.e., the total values for the NRCS measure "Fence" were used to represent streambank fencing rather than some percentage of the total). To rectify this situation, a call was made to NRCS staff in Pennsylvania to ascertain if any data were available that indicated how much of the total value of this measure was actually used for streambank fencing. In response, NRCS staff indicated that while figures were not available that gave the actual breakdown, it was their opinion that "no more than 30%" should be assumed for this purpose. Consequently, historic fencing values from NRCS for the years 2010-2013 were reduced by 70% and re-submitted to EPA for the purpose of updating this particular data set. After further investigation and discussion with state NRCS personnel it was determined that 10% of the reported fencing value was a more representative value to reflect the streamside (exclusion) portion of their fencing projects. This 10% correction factor was used for reporting NRCS fencing data in the 2016 progress run going forward.

State Streambank fencing data submitted prior to 2010 are not available on a county basis; rather, they have been submitted as "statewide" totals. Also, since neither the width of the buffer between the fences and the stream nor the type of vegetation could be determined from the NRCS data, the new BMP "Exclusion Fence with Narrow Grass Buffer" was used for these particular activities.

Nutrient Management

It has recently been determined that historic reporting on this particular BMP has a fair degree of inaccuracy associated with it because of the imprecise way in which it was estimated in years past. For this reason, it is believed that nutrient management acres have been significantly over-reported since about 2000. Basically, all acreage estimates for nutrient management dating back to 1998 that are currently stored in Scenario Builder need to be deleted and subsequently replaced with new acreage estimates based on a much more precise approach. This more precise approach is the one that that was used for the 2013 and 2014 Progress Runs. These past two estimates, however, also have to be updated since the DEP databases from which they were derived have been corrected, which has resulted in new acreage values for each county.

This new approach involves estimating nutrient management acres from three primary sources, which for the purposes of this description are referred to as "NRCS", "CAO/VAO", and "Imported Acres". NRCS data, in this case, refers to implemented nutrient management (590) acres as reported in a recent NRCS/FSA data extract provided to DEP by Olivia Deveraux. In this data extract, nutrient management acres are given for the years 2007-2014. Consequently, the NRCS portion of the total nutrient management acres have been revised for this period as well.

CAO/VAO data refers to nutrient management acres reported to DEP as required by Pennsylvania's Nutrient Management Law (initiated as Act 6 in 1993 and revised as Act 38 in 2005). Within DEP, staff associated with the Conservation Program maintain an ACCESS database that contains information on both regulated Concentrated Animal Operations (CAOs) and Voluntary Animal Operations (VAOs) dating back to 1998. Included in this database is information on the location of confined animal operations where animal manures are used for crop fertilization. In addition to the number of nutrient management acres implemented at each location (which may be either owned or rented), information on permit start and end dates is also recorded. Using this database, estimates have been developed for the years 1998-2014.

The "Imported Acres" data is somewhat similar to the "CAO/VAO" data, except that rather than using manures from animals located on the property, the farms represented in this data source import manures from CAOs for use as a crop fertilizer. These farms, however, are subject to the same permit regulations as the CAOs from which manures are imported. Unlike the "CAO/VAO" data, the records in this data set do not include permit start and end dates. Rather, on the recommendation of DEP's nutrient management experts, it is assumed that all

new acres added to the data set on a yearly basis only have an expected lifetime of three (3) years. Consequently, with this particular source, new acres are constantly being added and "retired" on a year-to-year basis.

Consequently, for each year (starting in 1998), the nutrient management acres reported to EPA are the sum total of "NRCS" acres, "CAO/VAO" acres, and "Imported Acres", with this yearly total being adjusted for new "added" acres and expired "deleted" acres. For the time being, these acres are being reported as "Core N" acres. When appropriate, these acres will be subject to conversion to "Core N&P" acres as new nutrient management protocols are approved.

Conservation Tillage

From 1985-2010, the extent of conservation tillage for Pennsylvania counties within the Chesapeake Bay Basin was based on county-level estimates available from the Conservation Technology Innovation Center (CTIC) located at Purdue University. Starting in 2011, these estimates have been replaced on a county-specific basis with estimates based on the results of the tillage survey conducted annually by the Capital Area RC&D with funding from DEP (see Appendix C). Table E2 shows the CTIC estimates for a select number of years from 1985-2010.

Pasture Alternative Watering

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, the first non-zero Scenario Builder estimate for Pasture Alternative Watering starts in 2002, with the value for the year 1997 being "0". Consequently, historic estimates are submitted via NEIEN on a "statewide" basis for the years 1998-2009, with the values for "missing" years (i.e., 1998, 1999, 2000, etc.) being interpolated using values for years in which they are available (i.e., 2002, 2005, 2007 and 2009). Table D3 gives the acreage values (i.e., "acres served") for "Watering Facilities" that have been estimated using this approach.

Table E2. CTIC conservation tillage estimates for selected years from 1985-2010.

County	1985	1990	1995	2000	2005	2010
Adams	72.9	50.1	38.0	51.9	64.7	69.8
Bedford	57.4	63.1	45.6	15.5	36.8	45.3
Berks	46.4	52.0	51.0	35.3	42.4	45.3
Blair	24.2	10.3	41.9	15.9	36.9	45.3
Bradford	2.2	6.6	2.4	12.1	35.8	45.3
Cambria	7.1	23.9	31.6	34.1	42.1	45.3
Cameron	0.1	0.1	0.1	0.1	32.3	45.3
Carbon	0.1	0.1	0.1	0.1	0.1	0.1
Centre	49.3	39.8	48.1	42.6	44.5	45.3
Chester	68.3	75.0	67.7	70.4	52.4	45.3
Clearfield	18.9	30.7	10.7	9.6	35.1	45.3
Clinton	36.2	38.4	58.8	65.6	51.1	45.3
Columbia	25.0	44.3	37.2	35.8	42.6	45.3
Cumberland	65.9	71.5	62.0	52.7	40.7	35.9
Dauphin	20.1	40.0	49.2	27.7	50.0	59.0
Elk	0.4	1.8	2.2	5.2	33.8	45.3
Franklin	56.7	56.1	63.7	67.5	45.6	36.8
Fulton	52.7	61.9	23.9	17.8	37.4	45.3
Huntingdon	44.3	49.7	52.5	30.1	40.9	45.3
Indiana	26.4	38.1	38.4	27.4	40.1	45.3
Jefferson	75.0	75.0	75.0	17.8	37.4	45.3
Juniata	29.5	36.1	30.8	30.3	41.0	45.3
Lackawanna	37.2	34.5	45.0	46.2	45.5	45.3
Lancaster	43.0	43.3	20.3	12.7	32.7	40.7
Lebanon	25.5	34.3	35.6	33.4	30.1	28.7
Luzerne	21.1	16.4	26.4	29.8	40.8	45.3
Lycoming	62.6	73.4	19.9	6.1	34.1	45.3
Mckean	0.7	0.1	1.7	6.2	34.1	45.3
Mifflin	45.9	47.8	35.3	39.6	43.6	45.3
Montour	31.1	31.9	47.5	47.2	45.8	45.3
Northumberland	43.8	45.1	50.1	59.5	49.3	45.3
Perry	63.4	72.9	61.0	22.7	38.8	45.3
Potter	1.2	0.1	1.7	4.9	33.7	45.3
Schuylkill	41.0	37.5	30.7	30.3	41.0	45.3
Snyder	46.3	50.8	59.9	51.0	46.9	45.3
Somerset	42.3	36.0	27.0	5.3	33.8	45.3
Sullivan	10.8	10.3	16.1	18.5	37.6	45.3
Susquehanna	28.7	34.0	15.1	18.3	37.6	45.3
Tioga	27.3	46.1	14.0	42.2	44.4	45.3
Union	37.4	37.6	25.6	36.0	42.6	45.3
Wayne	47.6	49.5	40.1	44.3	45.0	45.3
Wyoming	29.1	35.1	37.8	39.4	43.6	45.3
York	65.5	66.1	40.6	55.2	64.7	68.4

Table E3. Estimated Pasture Alternative Watering acres for the years 1998-2009

Year	Acres Implemented	Accumulated Total
1998	426	426
1999	426	852
2000	426	1270
2001	426	1704
2002	426	2130*
2003	1468	3598
2004	1468	5066
2005	1469	6535*
2006	405	6940
2007	405	7345*
2008	145	7490
2009	145	7635*

* Value recorded in Scenario Builder for year indicated

Prescribed Grazing

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, the first non-zero Scenario Builder estimate for Prescribed Grazing starts in 2002, with the value for the year 1997 being "0". Consequently, similar to the approach used for Pasture Alternative Watering described above, historic estimates are submitted via NEIEN on a "statewide" basis for the years 1998-2009, with the values for "missing" years (i.e., 1998, 1999, 2000, etc.) being interpolated using values for years in which they are available (i.e., 2002, 2005, 2007 and 2009).

Forest Buffers

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, the first non-zero Scenario Builder estimate for Forest Buffers starts in 2002, with the value for the year 1997 being "0". Consequently, similar to the approach for Pasture Alternative Watering described above, historic estimates are submitted via NEIEN on a "statewide" basis for the years 1998-2009, with the values for "missing" years (i.e., 1998, 1999, 2000, etc.) being interpolated using values for years in which

they are available (i.e., 2002, 2005, 2007 and 2009).

Wetland Restoration

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, Scenario Builder estimates for Wetland Restoration go all the way back to 1985. Consequently, similar to the approach used for Pasture Alternative Watering described above, historic estimates are submitted via NEIEN on a "statewide" basis for the years 1985-2009, with the values for "missing" years (i.e., 1986, 1988, 1989, 1990, 1991, 1993, 1994, 1995, 1996, etc.) being interpolated using values for years in which they are available (i.e., 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009).

Land Retirement

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, Scenario Builder estimates for Land Retirement only start in the year 2007. Because the acreage value for that year was relatively high (110,515), it was decided to interpolate values all the way back to 1985 to lessen the effect of going from 0 acres in 2006 to 110,515 acres in 2007. Consequently, interpolated values of 4420 acres per year are used for the period 1985-2008, with a final value of 4435 used for 2009 in order to arrive at the accumulated Scenario Builder value of 147,376 acres for the year 2009.

Grass Buffers

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, the first non-zero Scenario Builder estimate for Grass Buffers starts in 2002, with the value for the year 1997 being "0". Consequently, similar to the approach used for Pasture Alternative Watering described above, historic estimates are submitted via NEIEN on a "statewide" basis for the years 1998-2009, with the values for "missing" years (i.e., 1998, 1999, 2000, etc.) being interpolated using values for years in which they are available (i.e., 2002, 2005, 2007 and 2009).

Conservation Plans

Estimates of historic acres implemented prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, Scenario Builder estimates for Conservation Plans go all the way back to 1985. Consequently, similar to the approach used for Pasture Alternative Watering described above, historic estimates are submitted via NEIEN on a "statewide" basis

for the years 1985-2009, with the values for "missing" years (i.e., 1986, 1988, 1989, 1990, 1991, 1993, 1994, 1995, 1996, etc.) being interpolated using values for years in which they are available (i.e., 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009).

Non-Urban Stream Restoration

Estimates of historic BMP implementation prior to 2010 are based on the summary Scenario Builder data provided by EPA for the years 1985, 1987, 1992, 1997, 2002, 2005, 2007 and 2009 (Excel file "PA_V4_01162015"). In this case, the first non-zero Scenario Builder estimate for Non-Urban Stream Restoration starts in 2007, with the value for the year 2005 being "0". Consequently, similar to the approach used for Pasture Alternative Watering described above, historic estimates are submitted via NEIEN on a "statewide" basis for the years 2006-2009, with the values for "missing" years (i.e., 2006 and 2008) being interpolated using values for years in which they are available (i.e., 2007 and 2009). In this particular instance, the BMP "Streambank and Shoreline Protection" is used to represent Non-Urban Stream Restoration.

Urban/Suburban Practices

For the 2014 Progress Run, data on urban BMPs were submitted differently than they had been up to that point. Specifically, much of the data for that cycle were submitted using the new "performance standard" option as described in Section B10.2.8. After that particular submission, it was noticed that some of the data elements required by NEIEN were not calculated quite correctly. Therefore, it was arranged to have an EPA sub-contractor (Tetra Tech) come in to develop a software program to calculate all of the "Stormwater Treatment" and "Runoff Reduction" elements required by the new performance standard (e.g., Volume, Site Area, Impervious Acres, etc.) directly from the ACCESS database maintained by the group within DEP responsible for tracking urban stormwater permits. For historic reporting purposes, urban stormwater BMP data for the period 2003-2014 were extracted from that database and submitted to CBPO. In this case, data were submitted using the "performance standard" format specific to Phase 6 of the Bay watershed model.

Appendix F: Description of the Penn State Survey

Summary of 2022 Penn State Survey

The 2022 survey of Pennsylvania farmers in the Tier 2 and 3 Counties included in the Chespeake Bay Watershed only: Bedford, Centre, Columbia, Cumberland, Dauphin, Huntingdon, Juniata, Lebanon, Lycoming, Mifflin, Northumberland, Perry, Snyder, and Tioga Counties were conducted to provide producers an opportunity to self-report conservation practices implemented on their farms. Also, farmers in Clinton and Union Counties sent responses to PennState Surveys. PennState cross checked the 2022 Clinton and Union Counties survey locations with the 2016 PennState Survey and PracticeKeeper and removed duplicates. The 2022 survey followed successful methodologies of a survey of all Pennsylvania farmers across the Chesapeake Bay watershed undertaken in 2016, and a follow up survey of the Phase 3 WIP pilot counties of Lancaster, York, Adams and Franklin Counties undertaken in 2020. The survey especially sought data on "voluntary," non-cost shared practices. The instrument and procedures were developed in collaboration by survey research experts in Penn State's Survey Research Center, and subject matter experts from state agencies and agriculture. The survey development and implementation process were led and managed by the Agriculture and Environment Center (AEC), Penn State University, College of Agricultural Sciences.

The survey was mailed to approximately 13,000 farmers in January 2022, with returns accepted until the end of May 2022. A total of 950 from the 14 target counties were completed and returned.

Farmers were given a choice of completing surveys online or filling out and returning by mail a paper copy. Excel was used to tabulate all survey responses. All paper copy surveys were entered into the excel database by AEC research staff.

For comprehensive QA/QC methodologies for the 2016 Penn State Voluntary Producer Survey see the following:

- https://www.chesapeakebay.net/channel_files/23301/agwg_draft_call_summary_071416_fina l.pdf

For comprehensive QA/QC methodologies for the 2020 Penn State Voluntary Producer Survey, revisited with the same methodology in four Pilot counties (Lancaster, York, Adams and Franklin) see the following:

- https://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Ag%20page/Farm_Survey_2020_Final_Report_Feb_1_2021.pdf

The 2022 survey followed these same CBP-approved QA/QC methodologies that were developed, followed, and implemented in 2016 and 2020.

2022 Data Verification Procedures

To assess the reliability of the self-reporting, approximately 10 percent of returns were selected randomly for on-farm verifications conducted by trained and experienced Penn State Extension staff. Extension educators were able to complete a total of 110 farm visits throughout the 14 counties surveyed, which is 11.6% of total survey returns and above the recommended 10 percent of returns. Analyses of the data reject systematic under or over reporting in the sample data for the majority of relevant conservation practices and means and 95% confidence intervals indicate reliability in the reported data.

We further applied various methodologies to ensure that conservation practices reported by respondents were not already reported to the Chesapeake Bay Program through other methodologies employed by the Commonwealth. Four possible sources of other-reported conservation practices were considered in this analysis. These were:

5. Practices funded with government funds that are already counted from government sources of data.
6. Practices captured through existing regulatory programs.
7. Practices already verified and reported in PracticeKeeper by county conservation districts.
8. Non-annual practices installed prior to 2016 that were already reported by farmers who responded to the 2016 survey.

The methodologies applied to avoid double counting of these practices are discussed below for each category.

5. Practices funded with government funds that are already counted from government sources of data.

The survey asked whether specific BMPs were implemented using federal, state or county government funds. With the exception of nutrient management plans and soil conservation and water quality plans (explained in more detail below), for those practices where the respondent answered “yes” to the government funding question, these practices were netted out of the final data reported to DEP.

Regarding the first exception for nutrient management plans, the use of government funds to develop the plan does not mean that the acres of core nutrient management covered by these plans has been verified and reported by another government program database. Thus we did not apply the “government funds” double counting rule to core nutrient management. The only exception to this rule was for NRCS 590 Plans/CNMPs. These are NRCS plans and if the farmer indicated they were developed with government funds, we assumed they are included in the

NRCS data already provided to DEP and we therefore netted them out to avoid double counting.

Regarding the second exception for soil conservation and water quality plans, the only subset of plans that would already be reported by another government data source would be NRCS Conservation Plans developed with government funds. We assumed that government-funded NRCS Conservation Plans would be part of the NRCS data that is already provided to DEP, and netted those out. NRCS Conservation Plans that the farmer indicated are not funded by government funds would be developed by a private technical service provider and therefore not part of the NRCS database, and thus they were not netted out. Finally, no Ag E&S Plans, regardless of whether they are government funded, are being reported in another government funding program database, and thus they are reported regardless of how the government funded question is answered (however, see "Practices already verified and reported in PracticeKeeper" below).

6. **Practices captured through state or federal regulatory programs.**

In the 2022 survey, these practices were limited to just nutrient management for which the respondent indicates they have an Act 38 Nutrient Management Plan. The Act 38 regulatory program has already captured this data, and thus all core nutrient management occurring under an Act 38 Nutrient Management Plan was netted out and not reported to avoid double counting.

7. **Practices already verified and reported in PracticeKeeper.**

For confidential research purposes only, DEP provided Penn State researchers with the most recent data from PracticeKeeper on BMPs and acres under plans in the 14 counties in which the farmer survey was conducted. PracticeKeeper data was provided in Excel spreadsheets. The following seven worksheets were included: (1) "BMPs" (these included reported practices such as Heavy Use Area Protection, Waste Storage Facility, Riparian Forest Buffer, Prescribed Grazing, etc.); (2) "KnownLandowner_NBS" (nutrients applied using Nutrient Balance Sheets); (3) "BrokerNBS" (nutrients applied using Nutrient Balance Sheets); (4) "AWS_ReVerified" (Waste Storage Facilities); (5) "MMPsVerifiedAI" (Manure Management Plans); and (6) AgES_Verified" (Agricultural Erosion & Sediment Control Plans); and (7) "MMPsVerified" (Manure Management Plans). All data was and is kept confidential under Penn State University's research protections.

Because practice terminology was slightly different between the PracticeKeeper data and the farmer survey, a crosswalk analysis was developed and applied to the data as set forth in Table 1.

Table 1. Crosswalk between PracticeKeeper data and farmer survey data

Practices from PracticeKeeper Data	Practices from Survey
Continuous no till with high residue	No Till >60% residue
Residue and Tillage Management, Mulch	No Till 30-59% residue

Till	
Residue and Tillage Management, No-Till/Strip Till/Direct Seed	Minimum Till 15-29% residue
Cover Crop	Cover Crop
Enhancement – Grazing Management	Grazing Management
Prescribed Grazing	Grazing Management
On-farm forage based grazing system	Grazing Management
Heavy Area Use Protection	Barnyard Runoff Controls
Nutrient Management	Core N & P Nutrient Management
Nutrient Management Plan – Applied	Core N & P Nutrient Management
Waste Storage Facility	Animal Waste Storage Systems
Prescribed Grazing	Prescribed Grazing
Riparian Forest Buffer	Forest Buffers on Converted Cropland
Riparian Herbaceous Buffer	Grass Buffers on Converted Cropland
KnownLandowner_NBS	Core N & P Nutrient Management
BrokerNBS	Core N & P Nutrient Management
AWS_ReVerified	Animal Waste Storage Systems
MMPsVerifiedAI	Core N & P Nutrient Management
MMPsVerified	Core N & P Nutrient Management
AgE&S_Verified	Soil Conservation and Water Quality Plans

Following this crosswalk, researchers then analyzed the survey data and the PracticeKeeper data using R statistical computing software to detect and remove duplicates. Matches between the survey and PracticeKeeper datasets were found using farmer/operator names and addresses. For all practices, we erred on the side of removal of the practice from the farmer survey dataset in order to conservatively avoid double counting of any reported practices or associated units in the PracticeKeeper data. We did this by following several rules:

- If the practice was reported in both data sets but the date of installation was not the same, we assumed that it was the same practice and netted it out of the farmer survey data.

- If the acres of a practice reported in the PracticeKeeper data equaled or exceeded the acres of the same practice reported in the farmer survey, we did not count the practice. We only counted acres from the survey that were in excess of the amounts reported in PracticeKeeper.
- With respect to Nutrient Balance Sheets data provided in the PracticeKeeper data (worksheets entitled "KnownLandowner_NBS" and "BrokerNBS"), we assumed that nutrients applied pursuant to Nutrient Balance Sheets may possibly be calculated to meet both N-based and P-based land applications. Thus if a farmer reported on the survey they are implementing both N-based and P-based nutrient management, we assumed that the NBS is also both N- and P-based, and netted out both practices to avoid double counting.
- With respect to the Nutrient Balance Sheets data provided in the worksheet entitled "BrokerNBS" and the Manure Management Plan data provided in the worksheet entitled "MMPsVerified" of the PracticeKeeper data, no units (acres) were provided. These were the only PracticeKeeper data worksheets that did not include units. Accordingly, where we found duplicates in the "BrokerNBS" or "MMPsVerified" PracticeKeeper data and farmer survey data, we assumed that all acres of reported nutrient management were reported in the PracticeKeeper data and we netted out all reported acres in the farmer survey to avoid double counting.
- With respect to Manure Management Plan data provided in the PracticeKeeper data (worksheets entitled "MMPsVerifiedAI" and "MMPsVerified"), we assumed that nutrients applied pursuant to Manure Management Plans may possibly be calculated to meet both N-based and P-based land applications. Thus if a farmer reported on the survey they are implementing both N-based and P-based nutrient management, we assumed that the MMP is also both N- and P-based, and netted out both practices to avoid double counting.
- With respect to soil conservation and water quality plans, the PracticeKeeper data did not distinguish between row crops, hay, or pasture acres. Because conservation plans on row crops receive higher nutrient reductions pursuant to the Bay Model, we followed a netting rule ensuring that we were avoiding double counting of row crop acres in the first instance, followed by hay acres, ensuring the most conservative reporting of this practice in the farmer survey data.
- With respect to forest riparian buffers, similarly, the PracticeKeeper data did not distinguish between buffers on cropland or buffers on pasture land (animal exclusion). Because buffers on cropland receive higher nutrient reductions pursuant to the Bay Model, we followed a netting rule ensuring that we were avoiding double counting of cropland buffers in the first instance. Specifically, if in our analysis we found that a forest riparian buffer duplicate existed, we first netted out all duplicate acres of converted cropland buffers reported in the survey followed by remaining converted pasture buffer acres, if any. If no cropland buffers were reported in the survey but pasture buffers were, we netted out the converted pasture acres. This rule ensured the most conservative reporting of this practice in the farmer survey data.

- With respect to grass riparian buffers, we followed this same rule when comparing the PracticeKeeper data (reported as "Riparian Herbaceous Buffer") with grass buffers reported on the farmer surveys.

8. Non-annual practices installed prior to 2016 and already reported in the 2016 survey.

If a farmer answered the 2016 survey and reported a non-annual practice and indicated that it was installed prior to 2016, we assumed it was already reported and we netted these practices out. All farmers who responded to the 2016 in the 14 target counties were mailed a copy of the 2022 survey. Survey returns from those who responded to the 2022 survey and also responded to the 2016 survey were compared and any previously reported practices were netted out.

Information on BMPs obtained from the above survey approach was QA/QC checked and corrected as part of the survey methodology. Given the extensive QA/QC approach deployed by Penn State, information on farm conservation practices QA/QC checked as part of the survey methodology is presumed to be accurate, and the data was not further checked or verified prior to inclusion in the annual submission to CBPO via NEIEN.

Verification protocols and procedures are routinely carried out as follows:

i) Farm operators are responsible for the initial implementation of these BMPs.

ii) Verification is provided through self-reporting of practices through the farm survey, with 10% of survey respondents randomly selected for verification farm visits conducted by trained Penn State Extension Educators.

iii) Extension Educators set up farm visits, asking farmers to provide copies of relevant plans for review during the visit. A farm visit form is used which asks the farmer about the various BMPs asked about in the farmer survey. Visual inspection is also conducted of all BMPs that can be visually assessed on the farm. Where relevant Resource Improvement visual assessment standards are provided, these are deployed by the Extension Educator in verifying that particular practice.

b) How verification protocols and procedures are routinely carried out:

i) Dates for implementation or plan renewal area asked about on the farmer survey, and are also inquired about during the farm visit and recorded on the farm visit form. Dates of the actual verification farm visit are also recorded on the farm visit form by the Extension Educator.

ii) Actual BMPs and their locations are being confirmed during the farm visit verifications by actual visual assessment conducted by the Extension Educators.

iii) Extension Educators are trained on and deploy Resource Improvement visual assessment protocols to determine if BMPs are functioning and should be counted. If any standards are not being met, the practice is not considered verified and it not counted as an implemented, functional practice.

iv) See iii) above.

v) The survey questions are developed in a manner that asks particular questions necessary to determine whether a practice is meeting CBP approved definitions. The survey was vetted with CBP's Mark Dubin and DEP personnel to ensure these definitions are met.

c) In this particular methodology, verification is conducted to ensure that the survey data submitted by farmers is accurate and can be counted through the approved self-reporting of practices methodologies. 10% of survey respondents are randomly selected for verification, which provides a robust subsample of data for data reliability analysis conducted by the research team.

d) Qualifications of Program Personnel:

i) All Extension Educators conducting verification farm visits for the survey are members of the Agronomy Extension Team and experienced in agricultural conservation practices. In addition, a full day training was developed by Penn State researchers together with PA DEP, the PA State Conservation Commission, PA Department of Agriculture, and CBP's Ag Technical Coordinator Mark Dubin. All Educators took this training before conducting farm visit verifications.

In addition, DEP BWRNSM is working with Mark Dubin, CBPO to explore on how to continue and improve this survey by updating these approved protocols on a regular basis.

View EPA's CBPO approval of the PennState Survey Methodology at the following Agriculture Workgroup Link:

Agriculture Workgroup (AgWG)

July 14th, 2016

1:00 PM – 4:00 PM

Conference Call Summary

Meeting materials: http://www.chesapeakebay.net/calendar/event/24157/

Actions and Decision:

DECISION: The AgWG approved the motion put forth by Bill Angstadt to approve PA DEP's proposal for verification as an alternative acceptance mechanism, with the understanding that in October 2016, the AgWG will be able to review their statistical methodologies used in the final process, and consider appropriate modifications to the BMP verification guidance document if requested and determined necessary.

Appendix G: Description of NRCS Potomac Pilot Remote Sensing Project

Description of PA DEP Agricultural Workgroup Approvals: NRCS Potomac Pilot

https://www.chesapeakebay.net/channel_files/23301/agwg_call_summary_07202116.pdf

https://www.chesapeakebay.net/channel_files/24633/agwg_draft_call_summary_121516_2.pdf

Agriculture Workgroup (AgWG)

July 20 - 21, 2016

Face-to-Face Meeting Summary

U.S. Geological Survey
5522 Research Park Drive
Catonsville, MD 21228

Meeting materials: http://www.chesapeakebay.net/calendar/event/23301/

Action and Decision Items:

DECISION: The AgWG reached consensus to approve the Manure Treatment Technologies Panel Report recommendations for submission to the WTWG, with the understanding that the policy group process and the Modeling Workgroup decision will clarify the panel's recommendations in the context of the overall Phase 6 Modeling Suite and for water quality trading programs, but that the outcome of the policy group and the decision of the Modeling Workgroup do not change the panel's technical assessment of the total N and P that leaves the 'black box', and remains available for field application or transport in the modeling tools.

DECISION: The AgWG reached consensus to approve the Cover Crops BMP Expert Panel's preliminary report.

DECISION: The AgWG agreed to hold their upcoming meetings on Wednesday, August 24th, Wednesday, September 7th, and Thursday September 22nd. By Thursday, September 22nd, the AgWG expects to have the 5 priority panel reports to approve for inclusion in the Phase 6 model. The September 15th meeting date will be held tentatively in case a conference call is needed.

ACTION: The AgWG should provide comments to the AMS on the Beta 3 documentation in advance of Friday August 19th to prepare for the AgWG August 23rd meeting. Comments should be sent to Matt Johnston (mjohnston@chesapeakebay.net) and Lindsey Gordon (Gordon.lindsey@epa.gov).

DECISION: The AgWG reached consensus on making a formal recommendation to use the Beta 3a(1) approach to represent nutrient spread for N and P in the Beta 4 version of the Phase 6 model.

ACTION: The Nutrient Management Panel will work on developing explanatory materials that may be used to help communicate the panel recommendations to stakeholders.

DECISION: The AgWG agreed to move forward with PA Agricultural Remote Sensing Pilot Project's data collected for the Potomac River Basin. EPA will provide statistical support to examine the validity of the methodology and verification of a subset of the project data. EPA will also provide additional technical

support to PA DEP to analyze data in terms of how it will be submitted for historical calibration in the Phase 6 model. The statistical workup and historical dataset will be presented back to the AgWG during the September meeting, where the AgWG will decide whether to approve the methodology for input into the model.

Agriculture Workgroup (AgWG)

December 15th, 2016

10:00 AM – 3:30 PM

Face-to-Face Meeting Summary

Meeting materials: http://www.chesapeakebay.net/calendar/event/24633/

Actions & Decisions:

DECISION: The AgWG reached consensus to officially close the work of the Phase 6 Nutrient Management Panel.

DECISION: The AgWG approved the Turkey Characterization Pilot Project report.

DECISION: The AgWG approved the Manure Incorporation/Injection panel report as-presented, with the understanding that the AgWG requests to re-evaluate the interaction of this BMP with other BMPs after Phase 6 model runs, and that the AgWG is still open to considering additional addendum proposals after the approval as-written.

DECISION: The AgWG approved a motion to charge the Manure Incorporation/Injection expert panel to re-evaluate the proposal put forward by NY relating to immediate high disturbance incorporation for P, and to use best available science and professional judgement to determine a resolution.

DECISION: The WTWG approved the Manure Incorporation/Injection Panel's report and Appendix A pending revisions to land use eligibility for the practices and an explanation of how the BMPs are combined.

DECISION: The AgWG approved the Conservation Tillage Panel report as-written.

DECISION: The WTWG approved the Conservation Tillage Panel report Appendix A, as-written, with edits to be made on which BMPs can and cannot be combined.

DECISION: The AgWG approved the Animal Waste Management Systems report.

DECISION: The WTWG approved the Animal Waste Management Systems report Appendix A.

DECISION: The AgWG approved the Pennsylvania Conservation Survey methodology for use in reporting and crediting verified practices in the model. Ag conservation practices that have been proven to be statistically defensible will be reported as RIs with the RI designated lifespans.

DECISION: The AgWG approved of the PA NRCS remote sensing methodology as a proof of concept and tasks the AgWG with defining the minimum observation level and the acceptable levels of the metrics provided in the Tetra tech evaluation report (CSI, HR, FAR), as well as any other statistical metrics, for use in future reporting to the Bay Program. The AgWG also recommends this methodology align itself with a CBP verification protocol.

http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Final_SOP_Chesapeake_Bay_Agricultural_Inspection_Program.pdf

Appendix H: QAPP Addendum BMP Verification Program Plan

The BMP Verification Program Plan: QAPP Addendum was sent via email to EPA CBPO on September 1, 2022. The BMP Verification Program Plan: QAPP Addendum is also published on the DEP BMP Verification website.