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.

Revision History

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 a Quality Manager.

Document Control Number	History/ Changes	Effective Date
220065	2023 QAPP Submission; Major revisions include: - Addition of Appendix I: Non-Intrusive BMP Verification Standard of Procedure - Update of cover crop BMP information - Update of wetland mitigation data	2/8/2024
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A2: Table of Contents

A3: Distribution List

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A4: Project/Task Organization

A4.1: Introduction

This Quality Assurance Project Plan (QAPP) document summarizes the data collection procedures administered between July 1, 2022 - June 30, 2023 for best management practice (BMP) implementation within the state of Pennsylvania (PA), for use by the United States Environmental Protection Agency's (EPA's) Chesapeake Bay Program Office (CBPO). The data described within this document are utilized within the Chesapeake Bay watershed model for the estimation of nutrient and sedimentloads 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 being gathered and prepared by other states. The submittal of such information and data is a requirement 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 Region3.

BMP information has been submitted to EPA by DEP and other state agencies within the Chesapeake Bay region for over two decades. 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 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 aspect of DEP's data collection effort for 2010 and subsequent years involved the "translation" of various BMP descriptions and units currently used by various state andfederal programs to the newer NEIEN-compatible format. Procedures detailing this translation process are discussedin 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 significantly differ from the process used in previous submissions. The primary difference was related to the need to completethe additional "NEIEN data translation" step, noted above. Since 2010, the data reporting has expanded and improved. The process for future data compilation efforts will likely be modified, given the expressed intention by DEP to increase the use of automated procedures. As this shift occurs, the document will be updated to reflect modifications to procedures.

A4.2: New Programs Providing Data

Through completion of the Phase 3 Watershed Implementation Plan (WIP) process, outreach and coordination among multiple programs ensures reliable and accurate data collection of BMPs for EPA reporting. As outlined by Pennsylvania's Phase 3 WIP, programs with delegated stormwater permitting authority along with additional permitting programs were contacted to collect and report their completed permits during the period between 2013 to present. The remaining programs not fully documented include Air Quality, Nutrient Trading Program and historical data from Wetland Mitigation. Data are being recorded for these programs, which may not yet be available to report for the current progress year. The Air Quality Program reporting related specifically to the Volkswagen Air Emissions Settlement (equipment replacement/NOx reductions) will be reported outside of NEIEN.

The newest data reporter for progress year 2023 is Larson Design Group (LDG) with their methodology for Non-Intrusive BMP Verification. Larson Design Group (LDG) has been continually working with County Conservation Districts in the Northern tier of PA for a length of time trying to perfect this method of reporting BMPs. This dataset includes both historic and current progress year data with accurate implementation dates as well as BMPs implemented in the current progress year. LDG's QAPP is a current place holder as the methodology was only approved by the Chesapeake Bay Partnership (CBP) Agriculture Workgroup on August 17, 2023, two weeks prior to the QAPP submission deadline.

Agricultural Conservation Assistance Program (ACAP) will be our newest data reporter coming up in progress year 2024. The Clean Streams Fund was initiated with the State Fiscal Year 2022-2023 budget. Delegation agreements were signed by Conservation Districts in January – June of 2023. ACAP funded projects will be reported in the 2024 annual numeric progress report.

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 progress. PA Turnpike Commission provides MS4/NPDES data. These records are not duplicate from previous progress reporting period and confirmed that they do not overlap for duplication. The process of the e-reporting pilot program is ongoing. For more information on these data reporters see the following:

- B10.2.20 PA Dept. of Transportation (PennDOT) Urban Stormwater BMPs
- B10.2.26 Municipal Separate Storm Sewer (MS4) Pollutant Reduction Plan (PRP) and TMDL Plan BMPs
- B10.2.30 PA Turnpike Commission MS4/Urban Stormwater SCMs

For current progress, DEP BWRNSM did not report BMPs from the following cost-share, voluntary, or regulatory programs, as no data was submitted to DEP for reporting:

- Capital RC&D Grass Roots Program
- National Park Service BMPs
- NRCS Potomac Pilot
- PA DEP's Nutrient Trading Program
- US Army Corps and Engineers Developed BMPs
- USDA Rural Development Septic Hookups Per County
- PA DEP's Waterways Engineering Stream Restoration/Stabilization
- Pennsylvania's Agriculture Conservation Stewardship Program (PACS)
- PDA Penn State Producer Survey

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. Current reporting year includes 34 out of 42 cost-share or regulatory programs reporting to PA DEP BWRNSM. 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, datawere 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.

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 provides staff information related to anticipated data reporting for 2023. 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
US Fish and Wildlife[4]	Excel file obtained from program contact	L. Dawson	Various	Cost-Share
DEP Stream Bank Fencing Program	PracticeKeeper Report to Data Warehouse	K. Bresaw	Agricultural	Cost-Share
DEP Chesapeake Bay Implementation Grants	PracticeKeeper Report to Data Warehouse	K. Bresaw	Agricultural	Cost-Share
DEP Section 319 Non-Point Source Program	PracticeKeeper Report to Data Warehouse	S. Kleiner	Forestry	Non-Cost Share
DEP Abandoned Mine Land Reclamation Program	Excel file obtained from program contact	J. Sassaman	Rural Land	Regulatory
DCNR Forest Harvest Information	Excel file obtained from program contact	R. Beleski	Forestry	Regulatory
PGC Forest Harvest Information	Excel file obtained from program contact	P. Lupo	Agricultural	Cost-Share
PA Act 38 Nutrient Management	PracticeKeeper Report to Data Warehouse	K. Bresaw	Various	Regulatory
PA Growing Greener Grant Program[1]	PracticeKeeper Report to Data Warehouse	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	V. Trivedi	Agric/Urban	Regulatory
Chapter 102 Program	Excel file obtained from program contact	K. Bloom	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]	A. Basehore	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	Various	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	A. Basehore	Urban	Cost-Share
TreeVitalize/Urban Forestry Program	PracticeKeeper Report to Data Warehouse	J. Brockmeyer	Agricultural	Cost-Share
DEP-funded Conservation Tillage Survey	Tabular data obtained from program Tabular	A. Basehore	Agricultural	Non-Cost Share
NRCS Potomac Pilot[4]	Excel file provided by NRCS	J.Kraft	Agricultural	Non-Cost Share & Cost-
DEP-funded Ag Planning Reimbursement Program	PracticeKeeper Report to Data Warehouse	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	PracticeKeeper Report to Data Warehouse	K. Bresaw	Agricultural	Regulatory
National Fish & Wildlife Foundation		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	K. Leaverton	Various	Cost-Share
FieldDoc	PracticeKeeper Report to Data Warehouse	J. Dawes	Various	Cost-Share
DEP Septic Tank Pump-outs		B. Schlauderaff	Urban	Regulatory
DEP Waterways Engineering and Wetlands	PracticeKeeper Report to	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
Larson Design Group (LDG)	PracticeKeeper Report to Data Warehouse	J. Glace	Agriculture	Non-Regulatory

[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 assessment of PA's progress towards meeting its Phase 3 WIP. 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 annually renewed practices such asnutrient management plans.
- Changes in management actions do not include the reporting of existing practices in a new year under a new BMP name.
- BMP 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) through their Section 1619 agreement with USDA.

Resource Improvement (RI) practices

If a practice is implemented to meet NRCS technical guide standards and specifications, it can be recorded as an NRCS practice even if the practice was not funded with public funds. As instructed in the Agriculture BMP Verification Training Series (2022) from DEP's Clean Water Academy (CWA), in case of questions about whether a practice meets NRCS standards and specifications, the practice in question is considered 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 (CCD) staff as part of Pennsylvania's Agriculture Inspection, Nutrient & Manure Management Programs, and the BMP 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, as 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). However, 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 include:

- 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 include:

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

The procedures for reporting RI practices are the same for any qualified professional that is reporting the practice, as described in *PracticeKeeper – Best Management Practice (BMP) Module*, BWRNSM-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 PracticeKeeper (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.

Resource Improvement (RI) Practices, highlighted in yellow-coded cells

Sector: Agriculture, Natural	
Access Road	Filter Strip
Animal Mortality Facility	Forest Nutrient Exclusion Area on Watercourse RI
Animal Compost Structure RI	Forest Stand Improvement
Animal Trails and Walkways	Grass Buffer on Watercourse RI
Barnyard Clean Water Diversion RI	Grass Nutrient Exclusion on Watercourse Narrow RI
Bio Retention	Grassed Waterway
Brush Management	Hedgerow Planting
Channel Bed Stabilization	Integrated Pest Management (IPM)
Cisterns & Rain Barrels	Intensive Management of Rotational Grazing
Composting Facility	Irrigation System, Microirrigation
Conservation Cover	Irrigation System, Sprinkler
Conservation Crop Rotation	Land Reclamation, Abandoned Mined Land
Constructed Wetland	Lined Waterway or Outlet
Contour Buffer Strips	Loafing Lot Management System
Contour Farming	Nutrient Management Core N
Contour Orchard and Other Fruit Area	Nutrient Management Core P
Conversion of cropped land to grass-based agriculture	Nutrient Management N Placement
Critical Area Planting	Nutrient Management N Rate
Diversion	Nutrient Management N Timing
Drainage Water Management	Nutrient Management P Placement
Dry Waste Storage Structure RI	Nutrient Management P Timing
Establishment of permanent native grasses	Obstruction Removal
Exclusion Fence with Forest Buffer RI	Pipeline
Exclusion Fence with Forest Buffer	Prescribed Grazing
Exclusion Fence with Narrow Forest Buffer RI	Pumping Plant
Exclusion Fence with Grass Buffer RI	Riparian Forest Buffer
Exclusion Fence with Grass Buffer	Riparian Herbaceous Cover
Exclusion Fence with Narrow Grass Buffer RI	Roof Runoff Structure

Sector: Agriculture, Natural	
Fence	Roofs and Covers
Field Border	Rotational Grazing RI
Floodplain Restoration	Solid/Liquid Waste Separation Facility
Forage and Biomass Planting	Spring Development
Forage Harvest Management	Stream Habitat Improvement and Management
Forest Buffer on Watercourse RI	Stream Restoration Ag
Streambank and Shoreline Protection	Waste Facility Closure
Stripcropping	Waste Storage Facility
Structure for Water Control	Waste Transfer
Subsurface Drain	Waste Treatment
Surface Drainage, Main or Lateral	Waste Treatment Lagoon
Terrace	Water and Sediment Control Basin
Trails and Walkways	Water Well
Tree Planting	Watering Facility
Tree/Shrub Establishment	Watering Trough RI
Underground Outlet	Wetland Buffer
Upland Wildlife Habitat Management	Wetland Creation
Urban Forest Planting	Wetland Restoration
Vegetated Treatment Area	Windbreak/Shelterbelt Establishment

A6: Project Description

BMPs that are compiled and submitted by DEP and other jurisdictions to EPA on an annual basis are described in the "NEIEN NPS CBP Data Flow Appendix," which is provided by and updated as needed by EPA. Of thetotal number of BMPs described in this Appendix, only a portion are compiled and reported byDEP. 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 arenoPennsylvania-specific defined BMPs.

DEP BWRNSM Data Tracking Spreadsheets and Crosswalks
DEP BWRNSM uses the public "Detailed BMP Entry Form Template," and internal spreadsheets "2023 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. The DEP spreadsheet for internal use was 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

"BMP Definitions" tab includes the following columns:

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

"2023 NEIEN Template" that are uploaded to the Data Warehouse that then transmits to the NEIEN. The template includes the following tabs:

NEIEN Data Warehouse Template
Instructions **(*All definitions to the NEIEN Data Warehouse columns*)**
BMP Names
Measures
NEIEN Data Warehouse Template

Localities
HUCs
Land Use
Land Owner Agencies
Funding Source
Status

The "State Warehouse to CAST Crosswalk" is a DEP BWRNSM internal spreadsheet that details the crosswalk from NEIEN to Data 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 to 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 Programs	
NRCS	PennDOT
FSA	Chapter 102 Program
CBIG/CBRAP	Oil and Gas Program
Reporting Cost Share or Regulatory Programs	
NMA	Chapter 105 Program

319	DCNR
Growing Greener	Chesapeake Bay Foundation
Penn State Ag Voluntary BMP Reporting Outreach	FieldDoc/NFWF
CEG	Turnpike Commission
REAP	US Army Corps of Engineers
PennVest	Other (Programs that report only a couple of very specific BMPs)
Municipal Separate Storm Sewer (MS4)	

PA DEP BWRNSM's Process for Collecting and Submitting Data to EPA CBPO
DEP BWRNSM collaborates with a designated data reporter for each reporting program to establish an excel spreadsheet containing columns that align with the required NEIEN parameters. DEP BWRNSM distinguishes programs by funding source. The following sections provide 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.

Dr. Barry Evans, Senior Water Resource Scientist at 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. Evans can be contacted at bme39@drexel.edu.

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 Data 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 prevent 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 verifies that all BMP templates are correctly cross walked to BMP CAST Name and Definition, NEIEN name, and to an assigned, internal Data 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.*

Refer to the following Crosswalks and Template Resources that are described in the DEP BWRNSM Data Tracking Spreadsheets and Crosswalks (pages 20-22):

- Detailed BMP Entry Form Template – External is utilized as a PA BMP Crosswalk. See the "BMP Definitions" tab that includes the following attributes: 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
- "2023 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*

Sample spreadsheet developed with Chesapeake Bay Foundation 10 Million Tree Initiative:

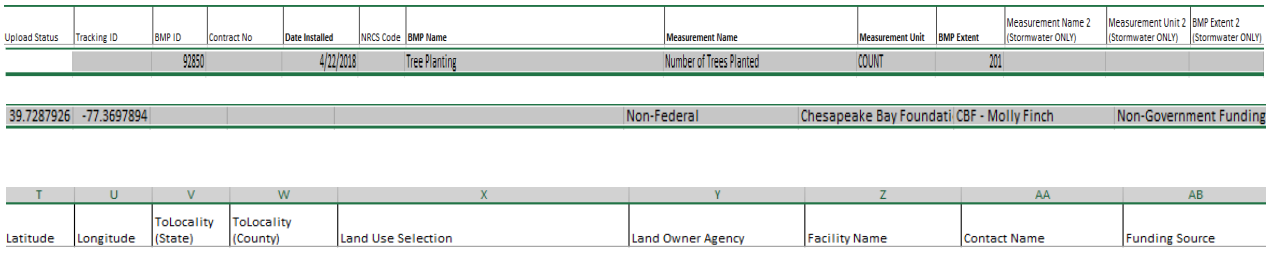
- Internally, this spreadsheet is designated by funding code 152ChesBayFound2020 / Chesapeake Bay Foundation 10 Million Tree Initiative.
- DEP BWRNSM works with the data source to obtain the required information and incorporate their data collection systems.
  To help data reporters, DEP BWRNSM ensures that every BMP is accurately cross walked by BMP Name, BMP Definition, NEIEN Name and Data 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

The reporting program performs QA/QC on their 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 to identify 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.

Once the reporting program sends the internal program's QA/QC spreadsheet to DEP BWRNSM, it receives an initial inspection by DEP staff and then is sent to Dr. Evans for third party review and formatting. 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

Dr. Evans conducts duplicate checks based on funding program code (e.g.

152ChesBayFound2020). Systematically by funding code, Dr. Evans QA/QC CAST reviews definitions/names, BMP extent, BMP unit of measure, implementation date, county or latitude/longitude points, or other more detailed information. If discrepancies are found, Dr. Evans works with Tyler Trostle, Water Program Specialist in the DEP BWRNSM, to seek clarification with reporting programs.
The internal QA/QC for duplicate checking:

- Data 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 (e.g. 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 discrepancies, Tyler Trostle works with the program and, if needed, Dr. Evans to resolve the issues.

DEP BWRNSM sends the final submission in NEIEN format to the program to verify and confirm any changes. DEP BWRNSM uploads the data into the NEIEN format and sends to Len Zaikoski or other applicable DEP Conservation and Environment Delivery Center (CEDC) staff who uploads data to NEIEN. DEP BWRNSM checks the NEIEN error reports weekly and makes sure any discrepancies are addressed directly with EPA CBPO. 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 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. Evans sends the QA/QC NEIEN templates to Tyler Trostle of DEP BWRNSM to upload in Data Warehouse. Data Warehouse has automated double-counting prevention measures that include a duplicate record check at time of upload. Data Warehouse will not allow upload of a record that contains identical BMP fields with an existing BMP record within Data Warehouse. Data 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 Data 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. Data sets such as Nutrient Management, Manure Management, Ag Erosion & Sediment Control, Chesapeake Bay Agriculture Inspection and other state and local agricultural BMPs by latitude/longitude, farmer 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 to record if any cost-share funds were used in the implementation of the BMP. These cost-shared practice records are excluded from the data reported by Penn State. Additionally, data reported by Penn State is cross checked against BMP records from PracticeKeeper to ensure these records are not double counted. Dr. 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, which 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 update the Data Warehouse to involve expanded automated processes and will be renamed "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. BWRNSM-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. BWRNSM-DATA-002: Internal Document sent via email to EPA CBPO on July 22, 2021
- Best Management Practice (BMP) Module SOP No. BWRNSM-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) 3320-FM-BWRNSM008: https://files.dep.state.pa.us/Water/BPNPSM/AgriculturalOperations/AgriculturalCompliance/3320-FM-BWRNSM0008-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
- EPA Animal Agriculture Program Assessment Update for Pennsylvania, published January 3, 2022 to the EPA Chesapeake Bay TMDL website here: https://www.epa.gov/chesapeake-bay-tmdl/epas-assessments-animal-agriculture-programs-chesapeake-bay-watershed

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
BMP Name	**Reporting Geographic Scale**
Conservation Plans	Statewide/County/Lat Long
Conservation Tillage	County
Cover Crops	County
CREP Riparian Forest Buffer	Statewide/County
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
BMP Name	**Reporting Geographic Scale**
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
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
BMP Name	**Reporting Geographic Scale**
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 Data Warehouse application does not allow the upload of coordinates outside the state of Pennsylvania.

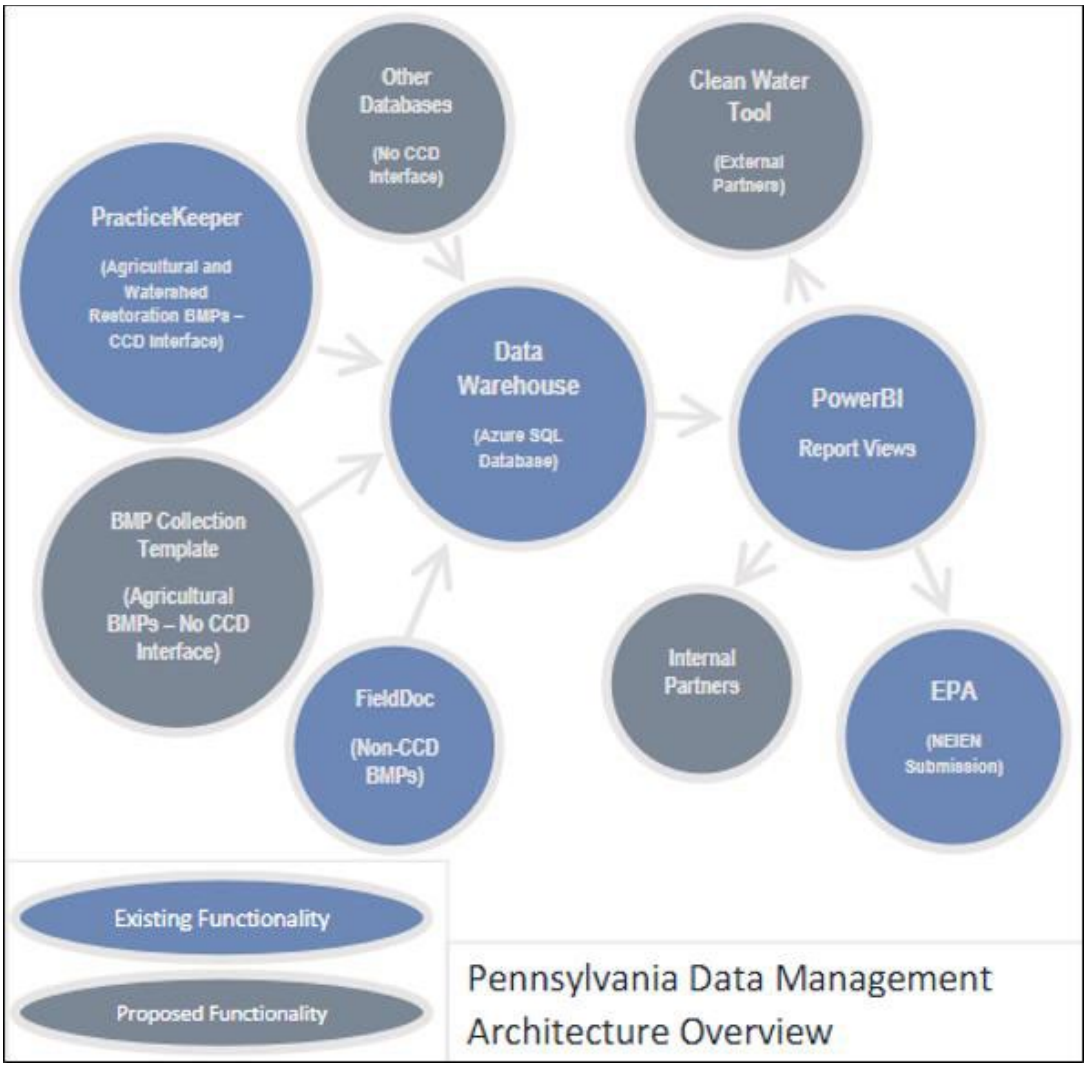
A7: Quality Objectives and Criteria

Accuracy Objectives (Qualitative)

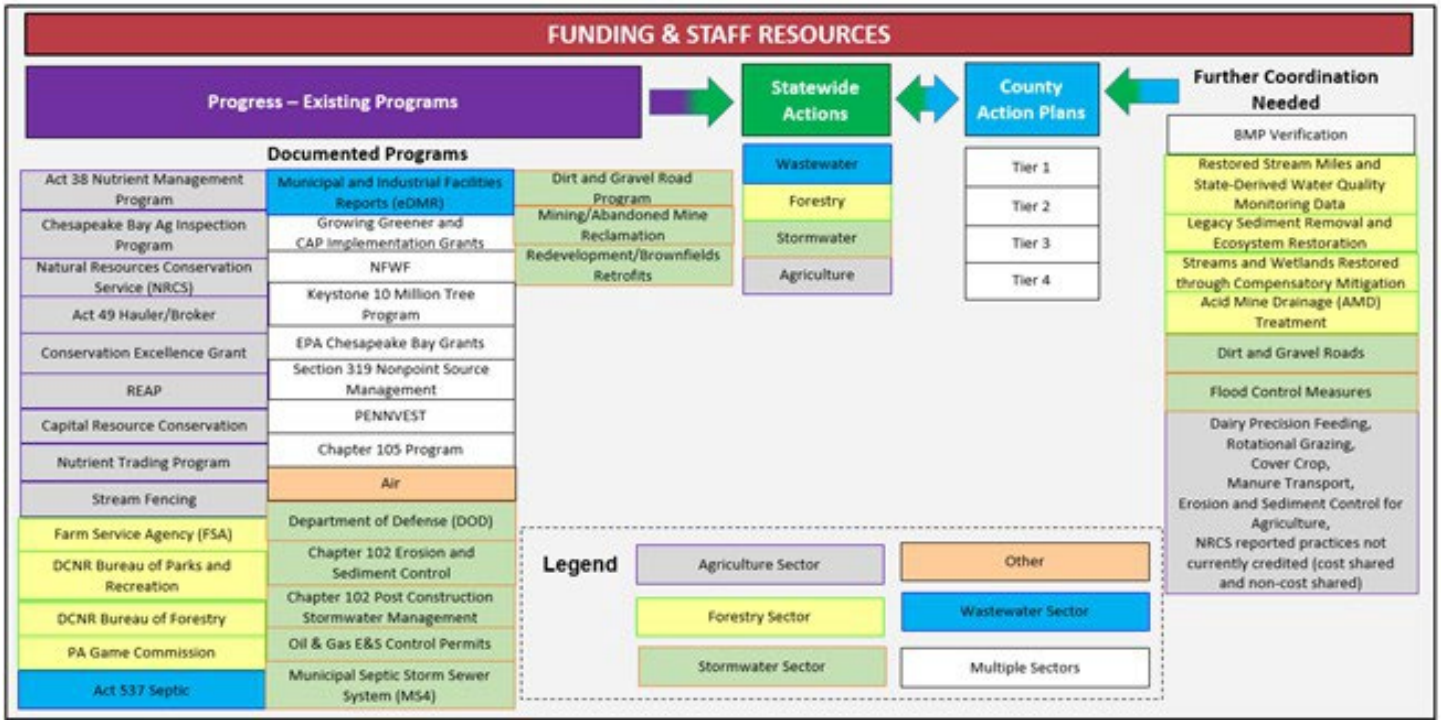
Pennsylvania strives to collect the most complete information and is expanding and improving data collection sources and methods. Data providers are to submit data to DEP for the reporting period by August 1st of each reporting year. A reporting year is to include 12 months of program data from July 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 section "A6: Project Description" for details on PA DEP BWRNSM QA/QC process.

High Level BWRNSM BMP Data Graphic



Existing Programs, Statewide Actions, County Action Plans, and BMP Verification



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.

The potential for high biases has 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 or 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, andprogram specific SOPs. The linked information be found in the 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:

- NRCS and State Conservation Specialists
- Erosion and Sediment Control and Stormwater Permit Reviewers and Inspectors
- Nutrient Management Specialists who write and review Nutrient Management Plans, write and verify Manure Management Plans, and write and verify Nutrient Balance Sheets
- Forestry Inspectors
- CAFO inspectors
- 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: Sections 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, manuretransport, 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 maybe 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 effortswere 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 makingvarious 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 DataAppendices. 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 Data 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 Data Warehouse application released in October 2018 and subsequent data submissions. Prior to uploadingdata, 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 Data Warehouse. Refer to "A6: Project Description" for details on PA DEP BWRNSM QA/QC process.

B10.2: Source-Specific Data Compilation Procedures

This section includes brief descriptions of the collected data and procedures used for compiling BMP information by the program sources provided in Table A1, 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 under evaluation, and some of the data sources and descriptions given may

change through time. Consequently, expectations are that this procedures document willbe updated as necessary in order to provide enough 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.

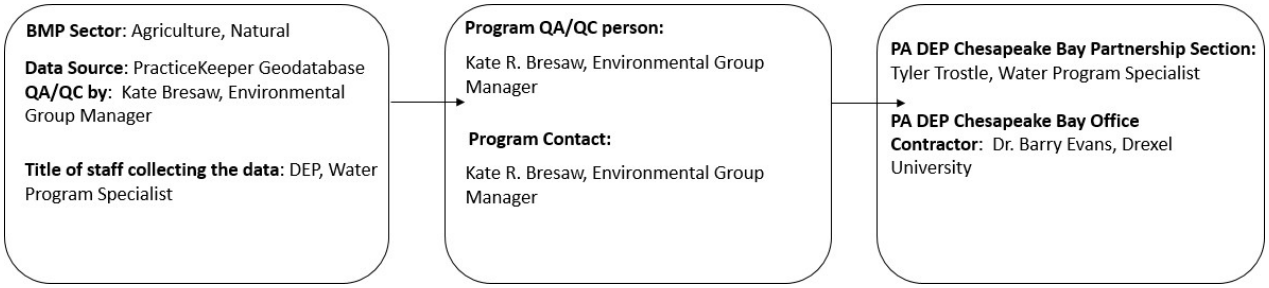
Information on initial BMP implementation obtained from the above source is accurate as reported by the program per the requirements in A8: Training and Qualifications. These records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN. However,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

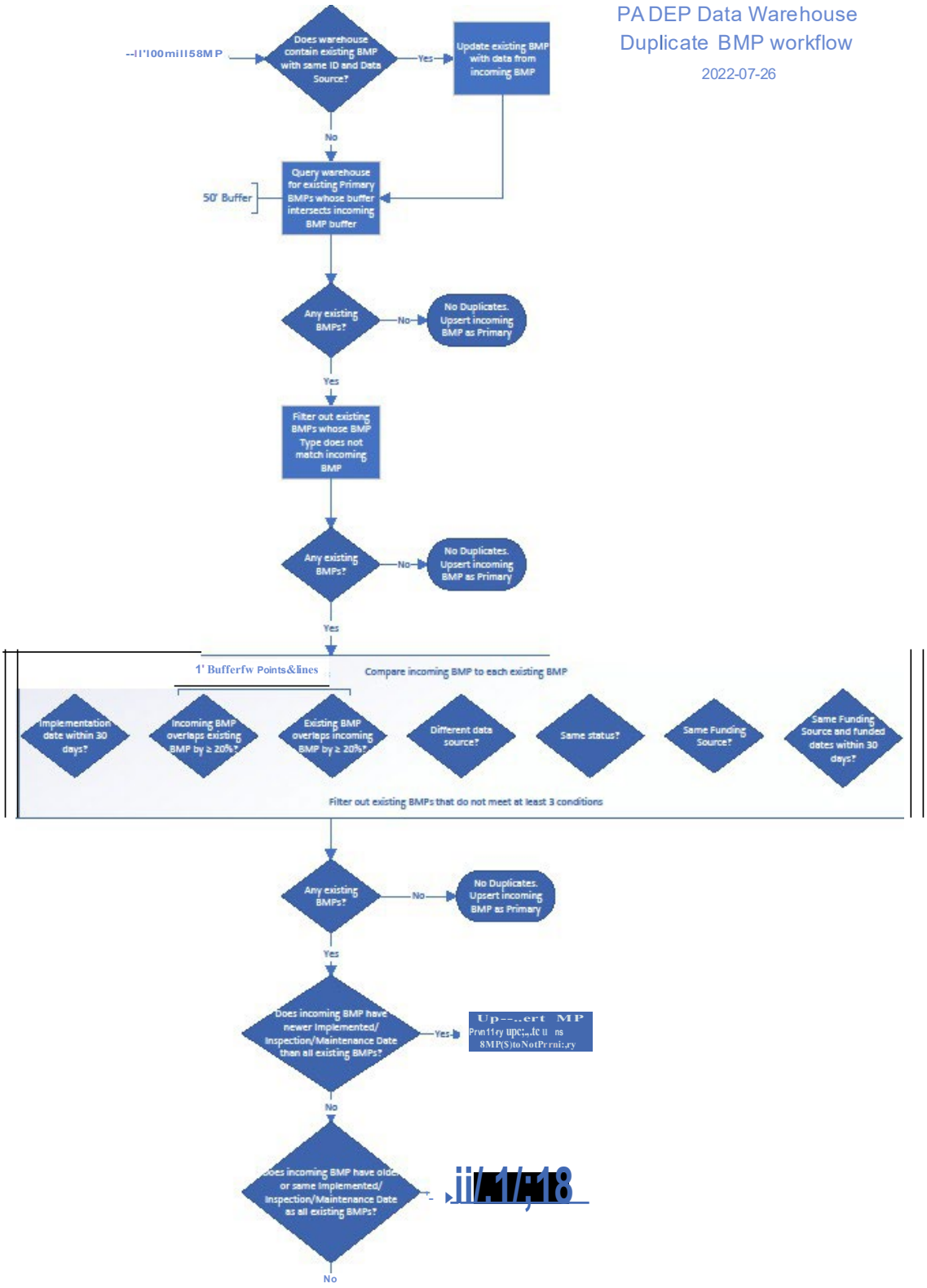
All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. BWRNSM-DATA-003. Data from DEP's streambank fencing program is entered in the PracticeKeeper Geodatabase by DEP Northeast Regional Office staff.

A daily refresh of PracticeKeeper data is pushed to Data Warehouse, the Azure SQL Database repository for all PracticeKeeper and Field Doc agriculture and watershed restoration BMPs, via an Application Program Interface (API) where duplicate BMPs are identified based on the criteria outlined in the workflow below.

NOTE: The primary BMP is the record that will be upserted into the NEIEN Submission Report including PracticeKeeper and FieldDoc data sources. The NEIEN Submission Report will then undergo further quality assurance review by a third party consultant.

PA DEP Data Warehouse
Duplicate BMP workflow

2022-07-26



Once all duplicates are identified per the workflow above and errors corrected via the data verification procedures below, a PowerBI report view of the Data Warehouse data which includes all BMPs for NEIEN submission for the current progress year is downloaded by DEP staff and shared with a QA/QC Evaluator for third-party QA/QC.

DATA VERIFICATION PROCEDURES

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

The BMP that is tracked for the streambank fencing program is fence. The subtype of BMPs is more specifically Exclusion Fence with Forest Buffer and Exclusion Fence with Grass Buffer. The BMPs are manually drawn within PracticeKeepers mapping system. Latitude and longitude are based on the calculated centroid of the BMPs extent. County ID is derived from the intersections of the drawn BMP and county boundaries. Watershed is derived from the intersection of the drawn BMP and watershed boundaries. Dates which are recorded for each BMP are the Planned, Inventory & Evaluation, Surveyed, Design Approved and Implemented dates. BMP participants who take part in record keeping are Designer, Design Reviewer, Design Approver, Planner and Implementer. Items of record keeping are implanted amounts, units of measure, funding source, amount of funding, date of funding, and inspections. Inspections for reverification data have items such as inspector name, date inspection performed, BMP compliance, and verified amount.

Potential sources of duplicate BMPs: BMPs that are reported outside of Data Warehouse including USDA programs, the Penn State Survey, REAP, NFWF, or PennVest. See pages 22-24 for QA/QC methods to address double counting for sources reporting outside of Data Warehouse.

Data Entry Errors: An error report identifying the reason the BMP is flagged as an error is shared with the data reporter. The data reporter then communicates with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN. Any records with outstanding errors after July 25 are held until they can be corrected and are submitted to NEIEN as part of a subsequent year's progress submission.

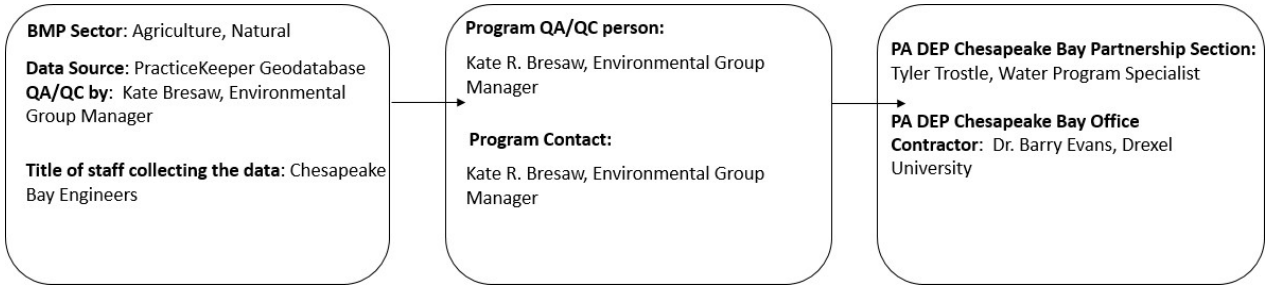
DEP Northeast Regional Office staff receive classroom, web-based, and on-the-job training to determine that the installed BMP meets the BMP definition. If the BMP is reported as implemented in PracticeKeeper, it is assumed that the BMP meets the BMP definition. DEP Northeast Regional Office staff also receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. BWRNSM-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	Filter Strip
Animal Mortality Facility	Forest Nutrient Exclusion Area on Watercourse RI
Animal Compost Structure RI	Forest Stand Improvement
Animal Trails and Walkways	Grass Buffer on Watercourse RI
Barnyard Clean Water Diversion RI	Grass Nutrient Exclusion on Watercourse Narrow RI
Bio Retention	Grassed Waterway
Brush Management	Hedgerow Planting
Channel Bed Stabilization	Integrated Pest Management (IPM)
Cisterns & Rain Barrels	Intensive Management of Rotational Grazing
Composting Facility	Irrigation System, Microirrigation
Conservation Cover	Irrigation System, Sprinkler
Conservation Crop Rotation	Land Reclamation, Abandoned Mined Land
Constructed Wetland	Lined Waterway or Outlet
Contour Buffer Strips	Loafing Lot Management System
Contour Farming	Nutrient Management Core N
Contour Orchard and Other Fruit Area	Nutrient Management Core P

BMP List:	
Conversion of cropped land to grass-based agriculture	Nutrient Management N Placement
Critical Area Planting	Nutrient Management N Rate
Diversion	Nutrient Management N Timing
Drainage Water Management	Nutrient Management P Placement
Dry Waste Storage Structure RI	Nutrient Management P Timing
Establishment of permanent native grasses	Obstruction Removal
Exclusion Fence with Forest Buffer RI	Pipeline
Exclusion Fence with Forest Buffer	Prescribed Grazing
Exclusion Fence with Narrow Forest Buffer RI	Pumping Plant
Exclusion Fence with Grass Buffer RI	Riparian Forest Buffer
Exclusion Fence with Grass Buffer	Riparian Herbaceous Cover
Exclusion Fence with Narrow Grass Buffer RI	Roof Runoff Structure
Fence	Roofs and Covers
Field Border	Rotational Grazing RI
Floodplain Restoration	Solid/Liquid Waste Separation Facility
Forage and Biomass Planting	Spring Development
Forage Harvest Management	Stream Habitat Improvement and Management
Forest Buffer on Watercourse RI	Stream Restoration Ag
Streambank and Shoreline Protection	Waste Storage Facility
Stripcropping	Waste Transfer
Structure for Water Control	Waste Treatment
Subsurface Drain	Waste Treatment Lagoon
Surface Drainage, Main or Lateral	Water and Sediment Control Basin
Terrace	Water Well
Trails and Walkways	Watering Facility
Tree Planting	Watering Trough RI
Tree/Shrub Establishment	Wetland Buffer
Underground Outlet	Wetland Creation
Upland Wildlife Habitat Management	Wetland Restoration
Urban Forest Planting	Windbreak/Shelterbelt Establishment
Vegetated Treatment Area	Waste Facility Closure

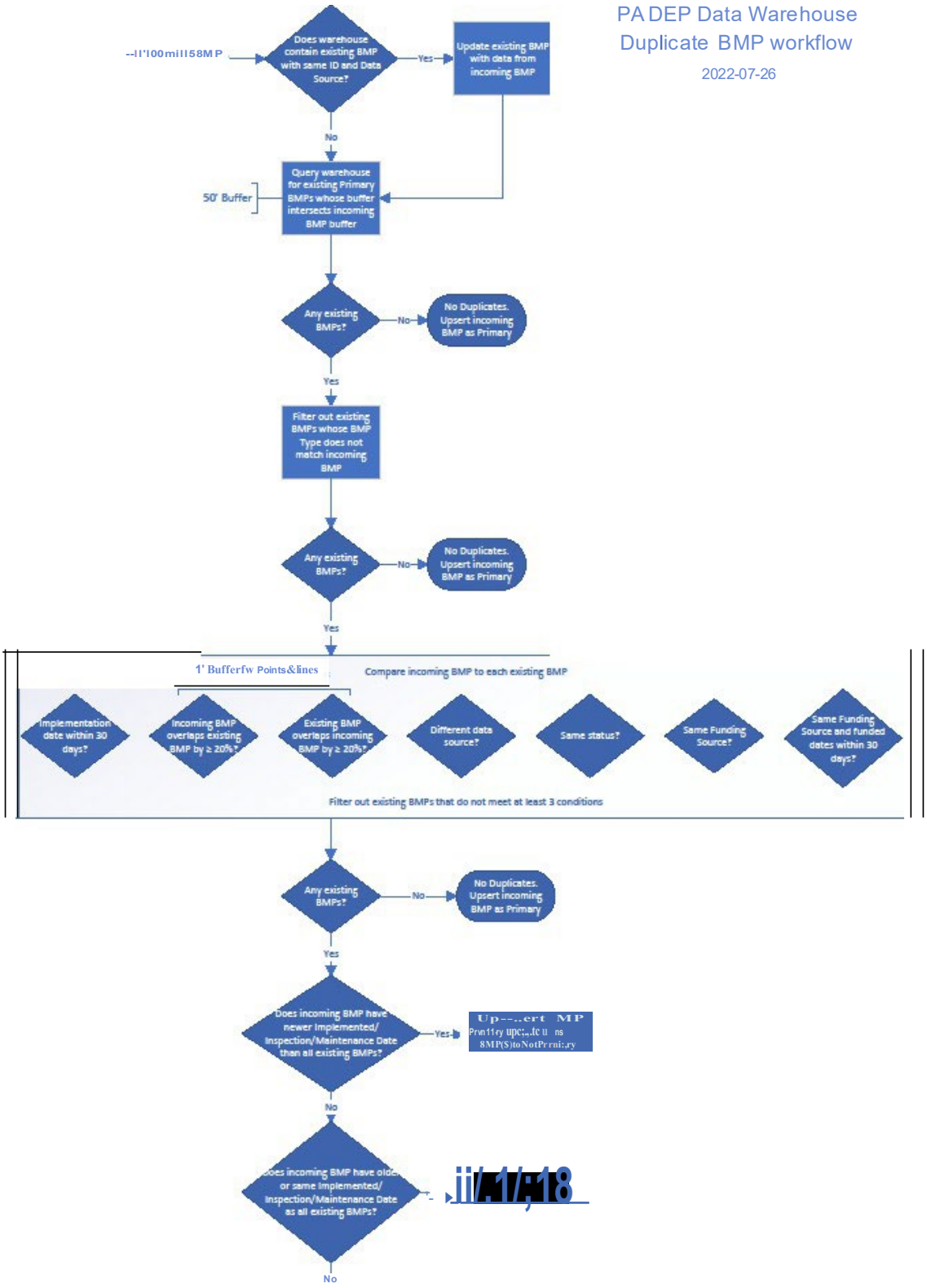
CBIG has historically funded agricultural BMPs as part of DEP Chesapeake Bay Special Projects. BMPs that were funded as part of Chesapeake Bay Special Projects will continue to be reverified following the verification strategies outlined below. Currently, CBIG funds support Chesapeake Bay Engineer positions 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. BWRNSM-DATA-003. BMP data is entered in the PracticeKeeper Geodatabase by County Conservation District (CCD) Chesapeake Bay Engineering staff. A daily refresh of PracticeKeeper data is pushed to Data Warehouse, the Azure SQL Database repository for all PracticeKeeper and Field Doc agriculture and watershed restoration BMPs, via an Application Program Interface (API) where duplicate BMPs are identified based on the criteria outlined in the workflow below.

NOTE: The primary BMP is the record that will be upserted into the NEIEN Submission Report including PracticeKeeper and FieldDoc data sources. The NEIEN Submission Report will then undergo further quality assurance review by a third party consultant.

PA DEP Data Warehouse
Duplicate BMP workflow

2022-07-26



Once all duplicates are identified per the workflow above and errors corrected via the data verification procedures below, a PowerBI report view of the Data Warehouse data which includes all BMPs for NEIEN submission for the current progress year is downloaded by DEP staff and shared with a QA/QC Evaluator for third-party QA/QC.

DATA VERIFICATION PROCEDURES

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. BWRNSM-DATA-003. Attributes tracked are BMP type and subtype, status, and geographic scale. The BMPs are manually drawn within PracticeKeepers mapping system. Latitude and longitude are based on the calculated centroid of the BMPs extent. County ID is derived from the intersections of the drawn BMP and county boundaries. Watershed is derived from the intersection of the drawn BMP and watershed boundaries. Dates which are recorded for each BMP are the Planned, Inventory & Evaluation, Surveyed, Design Approved and Implemented dates. BMP participants who take part in record keeping are Designer, Design Reviewer, Design Approver, Planner and Implementer. Items of record keeping are implanted amounts, units of measure, funding source, amount of funding, date of funding, and inspections. Inspections for reverification data have items such as inspector name, date inspection performed, BMP compliance, and verified amount.

Potential sources of duplicate BMPs: BMPs that are reported outside of Data Warehouse including USDA programs, the Penn State Survey, REAP, NFWF, or PennVest.

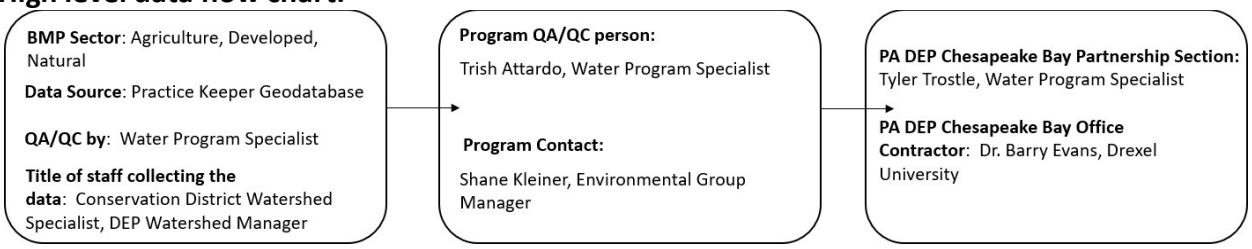
Data Entry Errors: An error report identifying the reason the BMP is flagged as an error is shared with the data reporter. The data reporter then communicates with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN. Any records with outstanding errors after July 25 are held until they can be corrected and are submitted to NEIEN as part of a subsequent year's progress submission.
County Conservation District Staff receive classroom, web-base, 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. County Conservation District 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 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.

Agricultural Sector	Stormwater Sector	Stream/Riparian Sector
Access Road	Constructed Filter	Channel Bed Stabilization
Cover Crop	Constructed Wetland	Channel Floodplain Restoration
Critical Area Planting	Conversion of Dry Retention to Wet	Dam Removal
Diversion	Dry Extended Detention Basin	Filter Strip
Fence	Infiltration Basin	Herbaceous Weed Control
Heavy Use Area Protection	Infiltration Berm/Retentive	Invasive Species Removal
Lined Waterway or Outlet	Grading	Lake Aeration
Nutrient Management	Infiltration Trench	Native Planting
Prescribed Grazing	Level Spreader	Riparian Forest Buffer
Roof Runoff Structure	Pervious Pavement	Riparian Herbaceous Cover

Agricultural Sector	Stormwater Sector	Stream/Riparian Sector
Stormwater Runoff Control	Rain Garden/Bio-retention	Streambank & Shoreline Protection
Stream Crossing	Rooftop Disconnection	Wetland Sector
Terrace	Sediment Fore Bay	Wetland Creation
Trails and Walkways	Subsurface Infiltration Bed	Wetland Enhancement
Underground Outlet	Vegetated Roof	Wetland Protection
Waste Storage Facility	Vegetate Swale	Wetland Restoration
Watering Facility	Water Quality Inserts/Inlets	
	Wet Pond	

Currently, BMPs are obtained from Growing Greener grantees at the time of project closeout via a Goals and Accomplishments Form. The form is reviewed by a DEP Watershed Manager or Water Program Specialist and forwarded to the appropriate county conservation district for entry into the PracticeKeeper geodatabase by a Watershed Specialist. Late in the 2023 calendar year, this process will be revised to allow for direct entry of grant project and BMP data by the grantee with follow-up review and acceptance of the BMPs by DEP Watershed Managers, DEP Water Program Specialists, and conservation district Watershed Specialists.

Instructions for grantees are provided in the Goals & Accomplishments Form Instructions document and trainings available on the Clean Water Academy, while the process for conservation district Watershed Specialists is outlined in an internal Clean Water Academy course containing demonstration videos, PracticeKeeper – Growing Greener Project Module User Guide SOP No. CBO-DATA-005, and other resource materials.

DATA VERIFICATION PROCEDURES

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – Growing Greener Project Module User Guide SOP No. CBO-DATA-005. Attributes being tracked: BMP type (name), BMP subtype, status, BMP location, implemented date, implemented amount, unit measure, and funding source. BMP location; Latitude and Longitude is based on the calculated centroid of the BMP, County is derived from the intersection of the drawn BMP and county boundaries, HUC Watershed is derived from the intersection of the drawn BMP and watershed boundaries. For scale, BMPs are manually drawn on a map from which location data is derived.

Due to the recent rollout of the current reporting process, on a semi-annual basis, DEP grant project advisors, made up of Water Program Specialists and Watershed Managers, generate and export an Excel file from PracticeKeeper to check for obvious data entry errors and communicate those errors to the submitting conservation district Watershed Specialist. In the near future, the verifications of project and BMP data submitted by grantees through the partner module will be conducted by DEP project advisors and conservation district Watershed Specialists prior to acceptance into the PracticeKeeper geodatabase as reportable BMPs.

As per the User Guide listed below, after the user enters a grant project site into the database, any BMPs that are spatially located within the bounds of the project site may be added to the project and thus have its attributes edited further. For example, if a BMP was planned via another funding source but is now being implemented through Growing Greener, that existing BMP may be added to the project and edited further to provide final implementation data. The conservation District Watershed Specialist is the key individual responsible for ensuring that duplicate entries are not occurring for BMPs located in their county.

In addition, each BMP entered into the PracticeKeeper geodatabase is assigned a unique identifier. Each year, the DEP Chesapeake Bay Watershed Restoration Division will generate the report of BMPs and attributes which have been entered into the PracticeKeeper geodatabase and communicate with our program if any issues are identified with a BMP for which Growing Greener is a funding source. A QA/QC Evaluator will provide additional QA/QC and the DEP Chesapeake Bay Watershed Restoration Division staff will incorporate the final data set into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

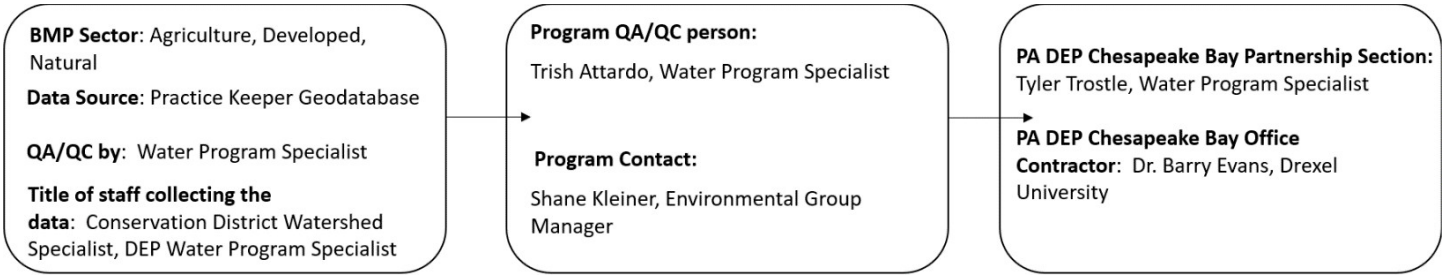
Site specific references: PracticeKeeper – Growing Greener Project Module User Guide SOP No. CBO-DATA-005.

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.

Agricultural Sector	Agricultural Sector	Stormwater Sector
Access Control	Irrigation Water Management	Catch Basin Vacuum Truck or Unit
Access Road	Lined Waterway or Outlet	Constructed Wetland
Agrichemical Handling Facility	Livestock Shelter Structure	Dry Extended Detention Basin
Alley Cropping	Monitoring Well	Impervious Surface Removal
Animal Mortality Facility	Nutrient Management	Infiltration Basin
Closure of Waste Impoundment	Pasture & Hayland Management	Planter Boxes
Composting Facility	Pipeline	Pervious Pavement
Conservation Cover	Prescribed Grazing	Rain Garden/Bio-retention
Conservation Crop Rotation	Residue and Tillage	Rooftop Disconnection
Agricultural Sector	Agricultural Sector	Stormwater Sector

	Management	
Continuous Cover Crops	Roofs and Covers	Sediment Basin
Contour Buffer Strips	Silvopasture Establishment	Sediment Fore Bay
Contour Farming	Spring Development	Street Sweeping
Cover Crop	Stormwater Runoff Control	Subsurface Infiltration Bed
Critical Area Planting	Stream Crossing	Vegetated Roof
Deep Tillage	Stripcropping	Vegetated Swale
Diversion	Structure for Water Control	Water Quality Inserts/Inlets
Drainage Water Management	Subsurface Drain	
Feed Management	Surface Drain, Field Ditch	Stream/Riparian Sector
Fence	Terrace	Channel Bed Stabilization
Field Border	Trails and Walkways	Channel Floodplain Restoration
Filter Strip	Waste Storage Facility	Dam Removal
Forage and Biomass Planting	Waste Transfer	Fish Passage
Forage Harvest Management	Waste Treatment Lagoon	Riparian Forest Buffer
Grazing Land Mechanical Treatment	Waste Utilization	Riparian Herbaceous Cover
Heavy Use Area Protection	Water and Sediment Control Basin	Streambank & Shoreline Protection
Intercropping	Water Well	Wetland Sector
Irrigation Water Conveyance	Water Well Decommissioning	Wetland Acquisition for Protection
Irrigation Reservoir	Watering Facility	Wetland Creation
Irrigation System, (various)		Wetland Enhancement
		Wetland Restoration

Currently, BMPs are obtained from Section 319 grantees at the time of project closeout via a Goals and Accomplishments Form. The form is reviewed by a DEP Water Program Specialist and forwarded to the appropriate county conservation district for entry into the PracticeKeeper geodatabase by a Watershed Specialist. Late in the 2023 calendar year, this process will be revised to allow for direct entry of grant project and BMP data by the grantee with follow-up review and acceptance of the BMPs by DEP Water Program Specialists and conservation district Watershed Specialists.

Instructions for grantees are provided in the Goals & Accomplishments Form Instructions document and trainings available on the Clean Water Academy, while the process for conservation district Watershed Specialists is outlined in an internal Clean Water Academy course

containing demonstration videos, PracticeKeeper – 319 Project Module User Guide SOP No. CBO-DATA-004, and other resource materials.

DATA VERIFICATION PROCEDURES

All data is tracked and recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper – 319 Project Module User Guide SOP No. CBO-DATA-004. Attributes being tracked: BMP type (name), BMP subtype, status, BMP location, implemented date, implemented amount, unit measure, and funding source. BMP location; Latitude and Longitude is based on the calculated centroid of the BMP, County is derived from the intersection of the drawn BMP and county boundaries, HUC Watershed is derived from the intersection of the drawn BMP and watershed boundaries. For scale, BMPs are manually drawn on a map from which location data is derived.

Due to the recent rollout of the current reporting process, on a semi-annual basis, DEP grant project advisors/Water Program Specialists, generate and export an Excel file from PracticeKeeper to check for obvious data entry errors and communicate those to the submitting conservation district Watershed Specialist. In the near future, the verifications of project and BMP data submitted by grantees through the partner module will be conducted by DEP project advisors and conservation district Watershed Specialists prior to acceptance into the PracticeKeeper geodatabase as reportable BMPs.

As per the User Guide listed below, after the user enters a grant project site into the database, any BMPs that are spatially located within the bounds of the project site may be added to the project and thus have its attributes edited further. For example, if a BMP was planned via another funding source but is now being implemented through Section 319, that existing BMP may be added to the project and edited further to provide final implementation data. The conservation District Watershed Specialist is the key individual responsible for ensuring that duplicate entries are not occurring for BMPs located in their county.

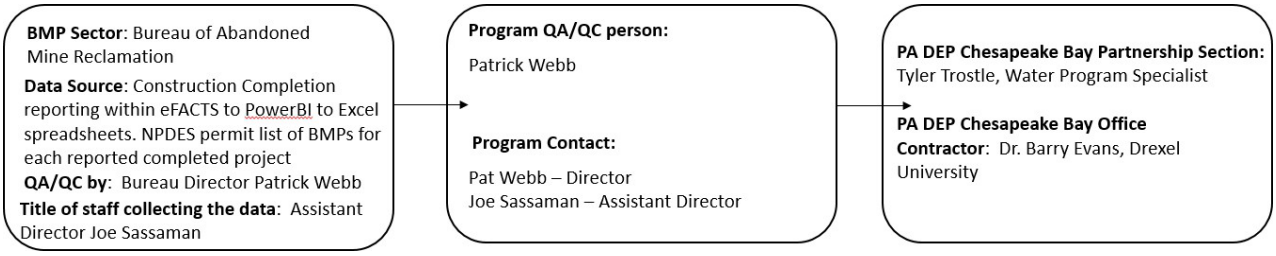
In addition, each BMP entered into the PracticeKeeper geodatabase is assigned a unique identifier. Each year, the DEP Chesapeake Bay Watershed Restoration Division will generate the report of BMPs and attributes which have been entered into the PracticeKeeper geodatabase and communicate with our program if any issues are identified with a BMP for which Section 319 is a funding source. A QA/QC Evaluator will provide additional QA/QC and DEP Chesapeake Bay Watershed Restoration Division staff will incorporate the final dataset into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN. Site specific references: PracticeKeeper – 319 Project Module User Guide SOP No. CBO-DATA-004.

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

Contact: Joe Sassaman, Assistant Director, Bureau of Abandoned Mine Reclamation (PA-DEP-BAMR) - (717) 503.4673, jsassaman@pa.gov
QA/QC Data Contact Name: Patrick Webb, Director, Bureau of Abandoned Mine Reclamation (PA-DEP-BAMR) - (814) 472-1830, pawebb@pa.gov

DATA COMPILATION PROCEDURES

High level data flow chart:



Sector*:* Rural Land

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 (see figure below).

COUNTY_NAME	MUNICIPALITY_NAME	ACRES	COST	RECLAMATION_COMPLETED_YEAR	PROJECT_NUMBER	PROJECT_NAME	STATUS	TYPE_DESCRIPTION	DATE_RECLAMATION_COMPLETED	PROGRAM	BMP_Comments

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.

PA-DEP-BAMR Construction Engineering and Construction Inspection Staff verify BMP's. Hard copy information of the BMPs are within the actual NPDES permit NPDES permit and E&S plan with ROD is maintained at the active abandoned mine reclamation construction site. 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/verify 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. Record keeping is as followed, initial implementation and compliance; inspection, re-inspection and verification; plan renewal; and maintenance.

All PA-DEP-BAMR 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.

The PA-DEP-BAMR Construction Inspection staff include a Construction Engineer that is either a licensed professional engineer or an engineer in training. The inspection staff includes construction inspectors that are trained to inspect BMPs. Routine training is available in which PA-DEP-BAMR staff attended to achieve the minimum amount of professional development unit hours as required by professional engineer licensure.

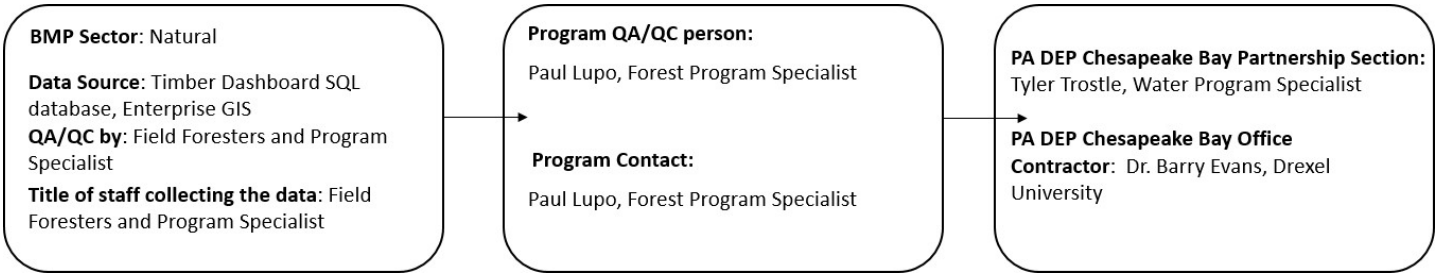
QA/QC is performed by Director Patrick Webb who reviews the list for location, Date Reclamation Completed (implementation date), project number BMP name and extent then contacts applicable PA-DEP-BAMR office for permit/BMP information to be reported within the BMP Comments cells and the submitted excel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

DATA COMPILATION PROCEDURES

High level data flow chart:



Sector: Natural

BMP: Forest Harvesting Practices

Information on the acres of forest land harvested on a yearly basis is obtained from the 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

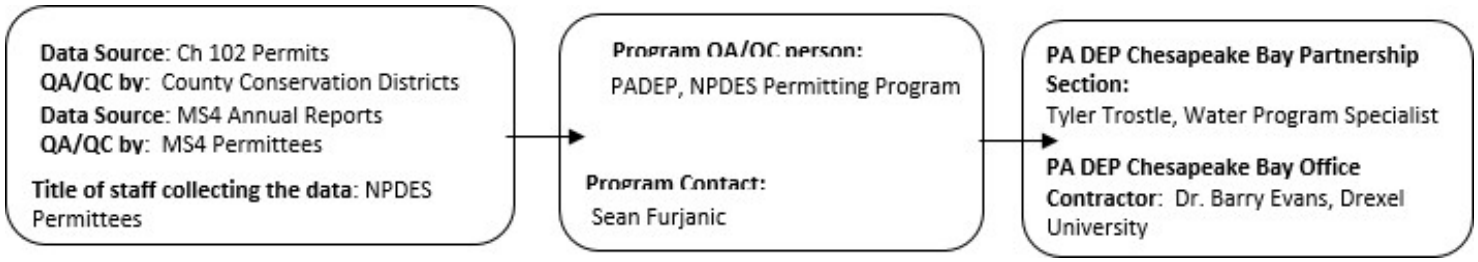
Relevant sources detailing relevant BMPs for forest harvesting practices are:
EROSION AND SEDIMENT CONTROL (E&S) PLAN TEMPLATE FOR A TIMBER HARVESTING OPERATION.PDF **3800-FM-BCW0539**
Timber Harvesting BMP Inspection Template

B10.2.7 Chapter 102 Program

Contact: Sean Furjanic, DEP Bureau of Clean Water, NPDES Permitting Division - (717) 787-2137, sefurjanic@pa.gov
QA/QC Contact: Krystal Bloom, NPDES Permitting Division, Environmental Group Manager - (717) 783-3496, krbloom@pa.gov

DATA COMPILATION PROCEDURES

High level data flow chart:



Sector: Developed

BMP List*:* Three databases are used to track PCSM BMPs.

- 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

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.

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. However, IT has not provided the program with a mechanism to extract BMP data as of August 2023.

Facilities with NPDES MS4 permits are required to ensure adequate O&M of all PCSM BMPs that have been installed at development or redevelopment projects that disturb greater than or equal to one acre within the area regulated by their MS4 permit. In their MS4 Annual Status Reports, MS4 permittees report the inventory of PCSM BMPs that were installed to meet requirements in NPDES Permits for Stormwater Discharges Associated with Construction Activities approved since March 10, 2003.

Steps of transfer for PADEP NPDES Permitting, Ch 102 and MS4 programs. The PCSM BMPs from MS4 eReporting system are exported from those systems and provided to BWRNSM staff. Data sets are exported from reporting systems and provided to BWRNSM in an excel spreadsheet. BMP data submitted in hard copy format is not reported to BWRNSM. Instructions to permittees for using the Ch 102 ePermit and MS4 eReporting systems are posted DEP's stormwater websites. There are no security concerns with any of the data sets listed above.

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. GPS locations and BMP types are cross reference to ensure that duplicates that appear on more than one dataset are removed.

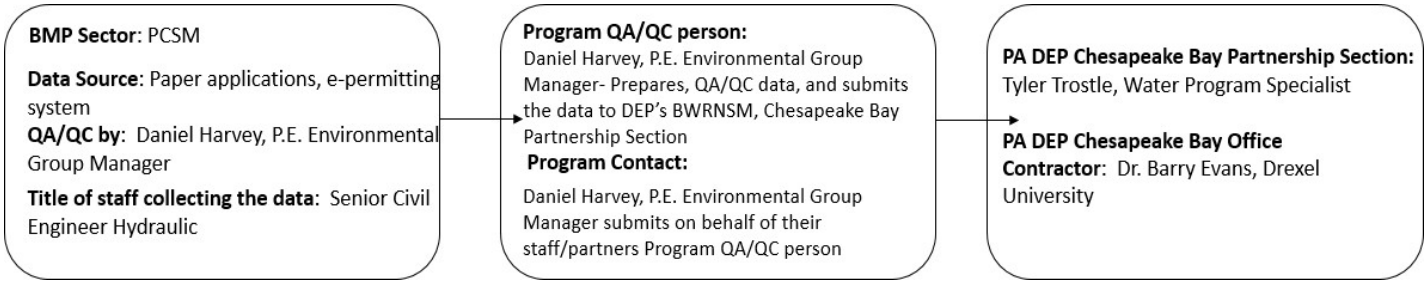
Review of PAG-02 General NPDES Permit NOIs Stormwater Discharges Associated with Construction Activities through the ePermit System are reviewing in accordance with SOP No. BCW-PMT-042-E. MS4 Annual Status reports are reviewing in accordance with SOP No. BCW-INSP-002, SOP for Clean Water Program Compliance and Program Activities for Municipal Separate Storm Sewer Systems (MS4s). Instructions to permittees for using the Ch 102 ePermit and MS4 eReporting systems are posted DEP's stormwater websites.

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 QAPPwill 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:

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.asp x

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 QAPPwill 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:

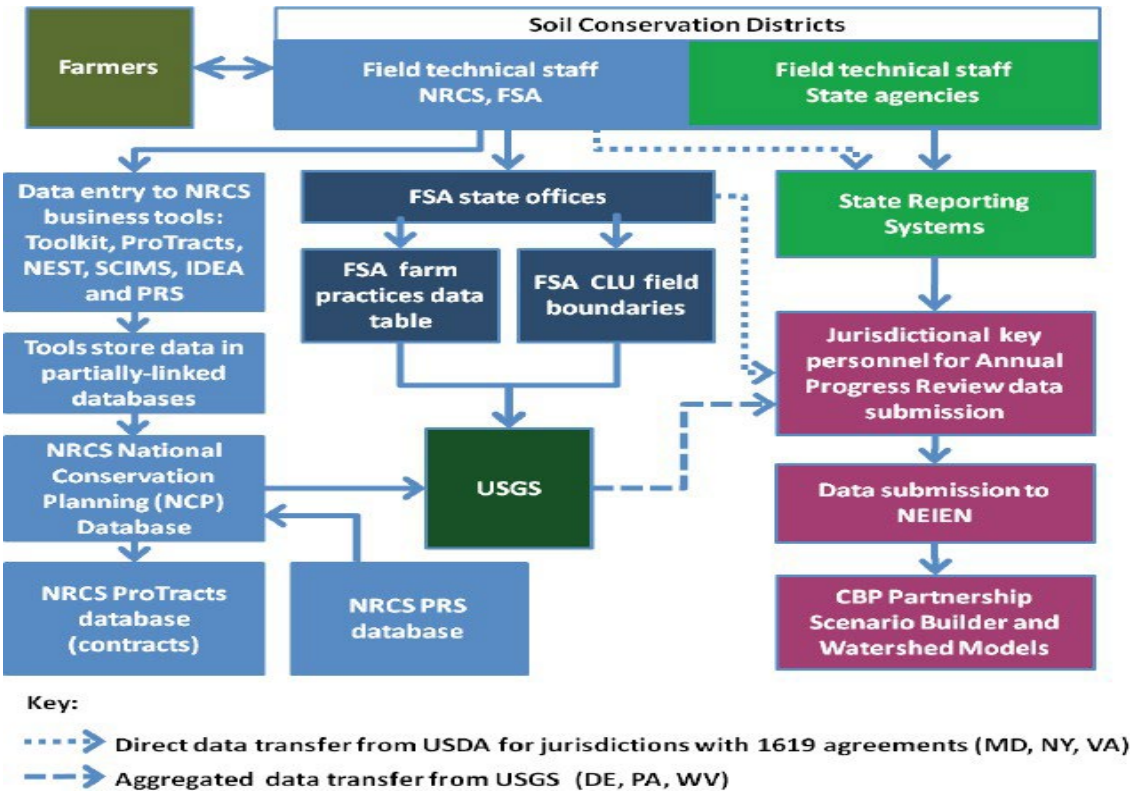
BMP Sector: Agriculture, Animals, Natural
Data Source: Electronic submission, Aggregated data transfer from USGS
QA/QC by: FSA, NRCS Staff QA/QC data before entering into data tracking system
Title of staff collecting the data: FSA, NRCS Field Technical Staff

Program QA/QC person:
Olivia Devereux, Devereux Consulting

Program Contact:
Olivia Devereux, Devereux Consulting

PA DEP Chesapeake Bay Partnership Section:
Tyler Trostle, Water Program Specialist

PA DEP Chesapeake Bay Office
Contractor: Dr. Barry Evans, Drexel University



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

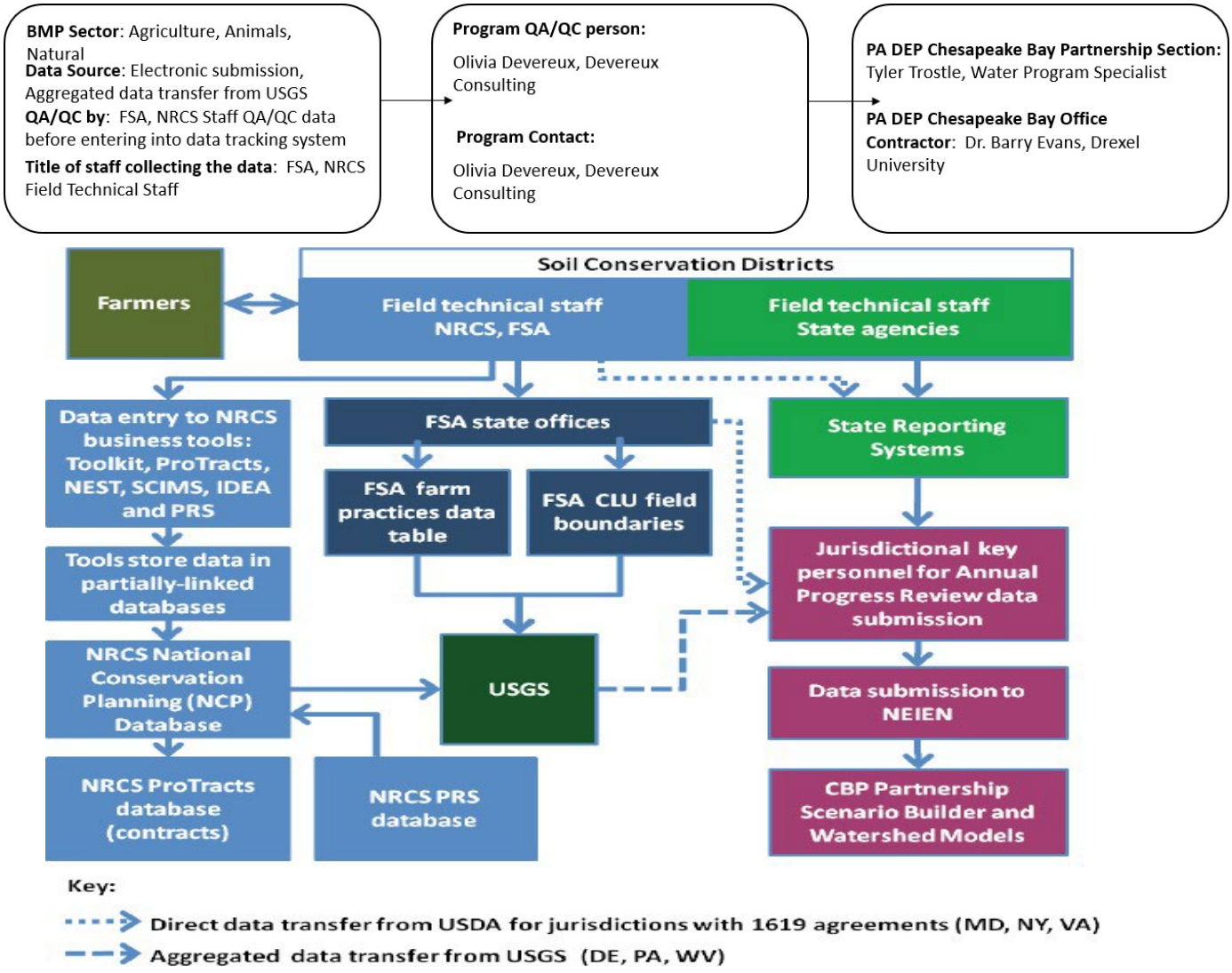
The data received from USGS are presumed accurate and are not modified once received, with one exception. That is, the unit values pertaining to "fencing" are reduced by 90% since only a portion of the fencing installed as NRCS practice code 382 is used for streambank fencing (which is what DEP utilizes 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:
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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:
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Data Source:
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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

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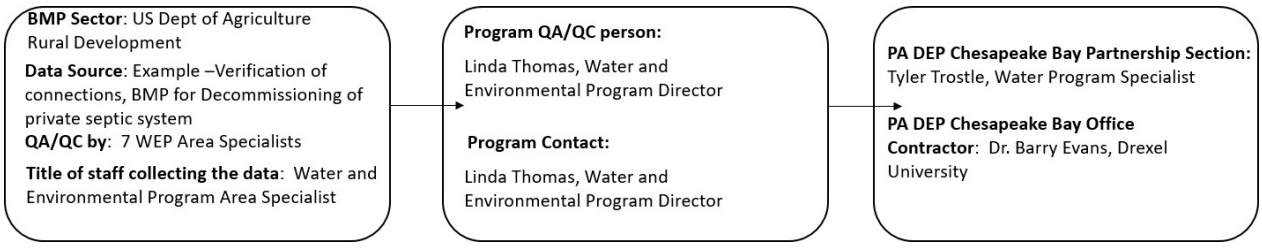
B10.2.11 USDA Rural Development Program

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. As part of the contract specifications for projects, once the public sewer mains are installed, individual septic systems are disconnected, emptied and decommissioned permanently, typically with fill. All contract work is completed by insured, experienced contractors through a publicly bid process. All connections are reverified at the end of construction. Mandatory connections are required for the public sewer systems installed as per PA DEP requirements.

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.

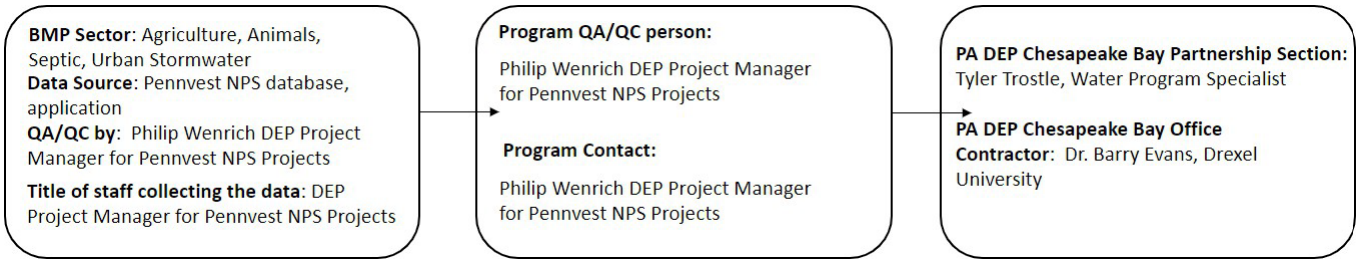
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for 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: Philip Wenrich, Environmental Engineer, PA DEP's Clean Water, Municipal Finance Section - (717) 705-6345, phwenrich@pa.gov

DATA COMPILATION PROCEDURES

High Level Data Processing Graphic:



Sector: (Various) Agriculture, Animals, Septic, Urban Stormwater

BMP List:	
Septic Connections	Detention Ponds
Barnyard Runoff Control	Vegetative Open Channels
Lot Management	Bioretention
Animal Waste Management Systems	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 Data 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.

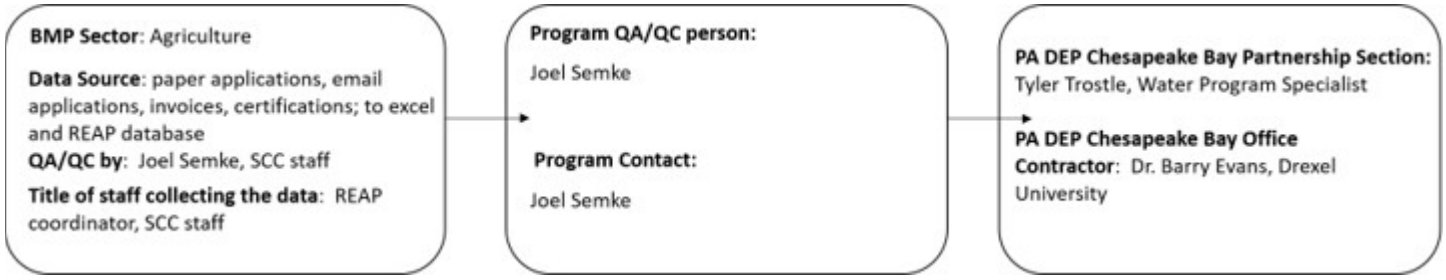
Pennvest project managers inspecting NPS and wastewater projects are all engineers. Projects are inspected to ensure that everything has been constructed in accordance with the plans and specifications. The NPS DEP Project manager is the only person to enter data getting sent to DEP's Bureau of Watershed 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

BMP List:

BMP Name	BMP Name (cont)	BMP Name (cont)	BMP Name (cont)
Access Road	Cover Crop Rollers	No Till Planting Equipment - Planter	Solid/Liquid Waste Separation Facility
Agriculture E&S Plan	Cover Crop Spinners	Nutrient Management Plan	Spring Development
Animal Mortality Facility	Diversion - 50%	Nutrient Management Plan (NRCS 590)	Stream Crossing
Animal Trails and Walkways	Fence - 50%	Precision Nutrient Application Equipment	Structure for Water Control - 50%
Animal Trails and Walkways - 75%	Forest Buffer	Prescribed Grazing	Subsurface Drainage - 50%
Animal Trails and Walkways	Grassed waterway - 50%	Pumping Plant for Waste Water Control	Terrace
Channel Stabilization	Heavy Use Area Protection - 75%	Riparian Forest Buffer	Underground Outlet - 50%
Closure of Waste Impoundments	Lined Waterway or Outlet - 50%	Riparian Herbaceous Buffer	Waste Facility Cover
Composting Equipment -New	Livestock Housing Vegetative Buffer	Roof Runoff Structure - 75%	Waste Storage Facility
Composting Facility	Manure Injection Equipment - New	Roofs and Covers - 75%	Waste Transfer - 50%
Conservation Plan	Manure Management Plan	Sediment Basin	Waste Treatment - 50%
Constructed Wetland	Manure Separation Equipment-New	Silage Leachate Management	Water Well
Cover Crop	No Till Planting Equipment - Drill	Soil Management	Watering Facility
Cover Crop - Multi-species			

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.

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 includes: applicant personal info, BMP location, units installed, date completed, cost, other public funding information, (if applicable), certification information, etc. 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 a QA/QC Evaluator for additional QA/QC and DEP Chesapeake Bay Watershed Restoration Division staff for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office.

REAP applications are submitted via email or mail; data is manually entered into the REAP database; all data is transferred to cooperating groups via excel sheets. Paper copies are manually placed into the REAP database which intern become excel files. REAP database is password-protected. All physical files are locked. All data (except personal identity info) is accessible via RTK.

DATA VERIFICATION PROCEDURES

Data gathered from the REAP application includes applicant personal info, BMP location, units installed, date completed, cost, other public funding information (if applicable), certification information, etc. Link: https://www.agriculture.pa.gov/Documents/2021-22%20REAP%20Guidelines.pdf

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 one of 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 with all data submissions to the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office.

Last Name	First Name	Business Name	Street1	City	State	Zip	Phone	Email	SSN	EIN	Taxpayer Type	County	BMP Name	Bmp Units	Reap Id	Application Received	Application Status
Shipley	Thomas		128 Cove Road	Buffalo Mills	PA	15534	8148426185				Individual	BEDFORD	Heavy Use Area Protection - 75%	6600	23-080-01	#######	Credit Awarded
Shipley	Thomas		128 Cove Road	Buffalo Mills	PA	15534	8148426185				Individual	BEDFORD	Roofs and Covers	7400	23-080-02	#######	Credit
Shipley	Thomas		128 Cove Road	Buffalo Mills	PA	15534	8148426185				Individual	BEDFORD	Waste Storage	16000	23-080-03	#######	Credit

Actual Cost	Public Funding	Source	Reap Eligible Amount	Reap Request Amount	Conservation Plan	Nutrient Management Plan	Agricultural Erosion	Manure Management Plan	Equipment Serial Number	Completed Revenue	Completed Date	Credit Granted Date	Credit Granted Amount	Compliance	Notes
140762	119805	CEG, NRCS	20957	15718	FALSE	TRUE	TRUE	TRUE		#######	#######	#######	15718	Not Inspected	
300000	244047	CEG, NRCS	55953	37489	FALSE	TRUE	TRUE	TRUE		#######	#######	#######	37489	Not	
92816	79870	CEG, NRCS	12946	6473	FALSE	TRUE	TRUE	TRUE		#######	#######	#######	6473	Not	

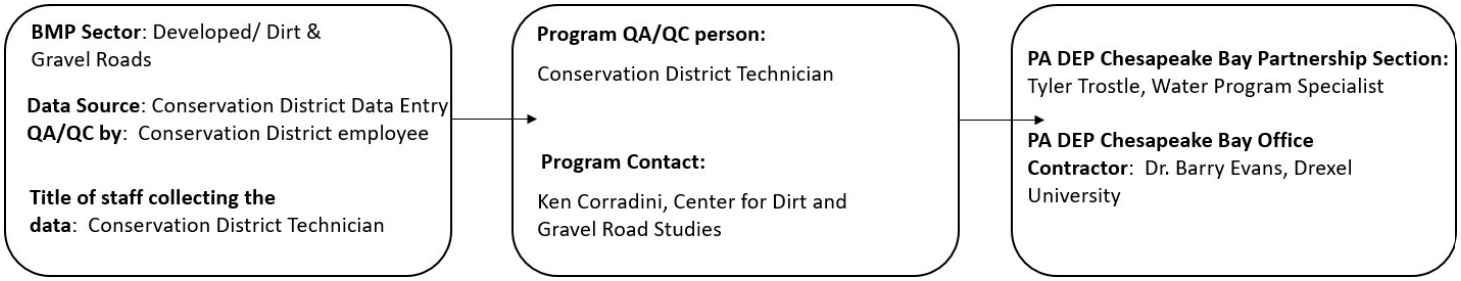
For BMPs covering many acres, the home address of the ag operation is the location of the project. Joel Semke performs QA/QC. All projects require receipts and completion certification (provided by Conservation District, NRCS, Profession Engineer, or SCC staff). Excel sheets are maintained to check for duplicate equipment (based on serial numbers). Maintain contacts with DEP and Districts to check for double-dipping when questions arise. All REAP applications are personally reviewed for accuracy and eligibility for the program is verified by one of the following: Conservation District technician, NRCS technician, Act 38-certifiied NMP writer. : Applicant could neglect to mention that other funding sources were involved in a project. Data entry errors that result in duplicate are highly unlikely due to the nature of the database.

B10.2.14 SCC Dirt and Gravel Road Program

Contact: Ken Corradini, PSU Center for Dirt & Gravel Roads - (814) 571-5448, kjc139@psu.edu
QA/QC Contact: Same as above

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-manualDescriptive 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 technicalwork 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 Excelfile 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 Data 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' Data 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.

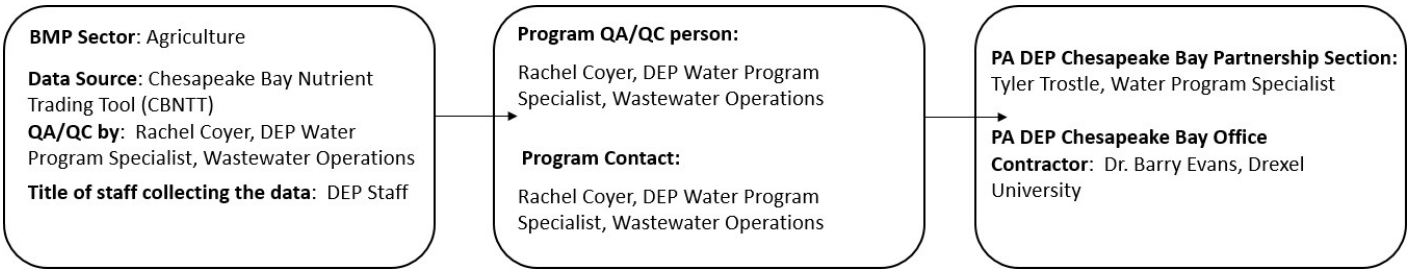
B10.2.15 DEP Nutrient Trading Program

Note: This is a placeholder for the emerging capacity to report BMPs from the Chesapeake Bay 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

High-Level Data Flow Graphic:



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 thelack 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, alongor across, or projecting into a watercourse, floodway or body of water, whether temporaryor 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:

- Success/Performance Standards
- Recommended Monitoring Duration and Timeframes
- Monitoring Report Contents
- Remedial Action/Adaptive Management Plan (RAMP)

The general monitoring requirements are outlined in The Department's Environmental Assessment instructions unless otherwise waived or directed by the Department. See: http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4048

The completion of onsite compliance inspections performed by the Department may varybased 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 Data 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 requests that wetland mitigation BMPs are to be recorded in the QAPP for each Progress Year that PA continues to report wetland mitigation acres to the CBP for annual progress. Please see below table for the wetland mitigation submission for the current Progress Year:

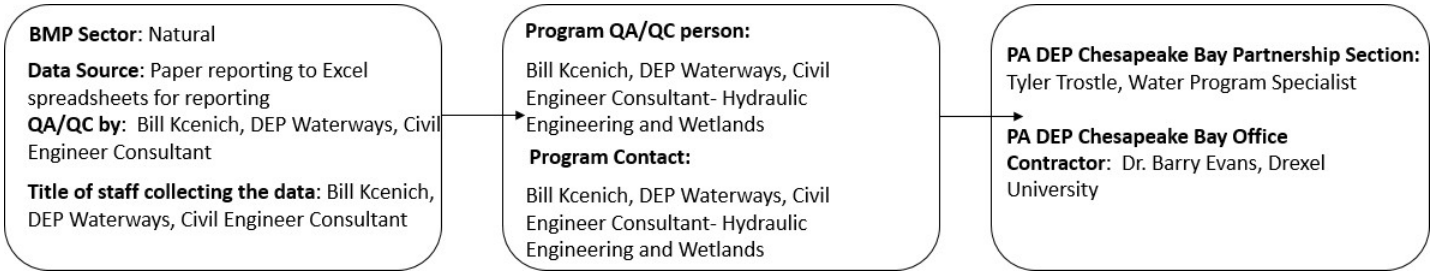
BMP ID	Date Installed	BMP Name	Measurement Name	Measurement Unit	BMP Extent
117141	9/1/2022	Wetland Restoration	Acre	ACRE	3.5
117142	9/1/2022	Stream Restoration Ag	Length Restored	FEET	6100
117143	12/1/2022	Wetland Restoration	Acre	ACRE	5.2
117144	12/1/2022	Stream Restoration Ag	Length Restored	FEET	6000
117145	2/1/2023	Wetland Restoration	Acre	ACRE	3.3
117146	2/1/2023	Stream Restoration Ag	Length Restored	FEET	4600
117147	3/1/2023	Wetland Restoration	Acre	ACRE	1.9
117148	3/1/2023	Stream Restoration Ag	Length Restored	FEET	7250
117149	5/1/2023	Wetland Restoration	Acre	ACRE	2.6
117150	5/1/2023	Stream Restoration Ag	Length Restored	FEET	3000

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.

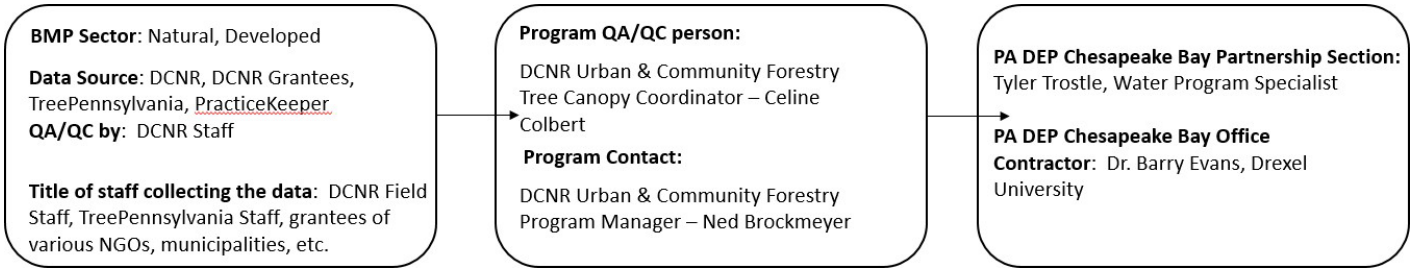
For NEIEN reporting purposes, tabular data on stream restoration projects completed and obtained from the appropriate trained staff, Bill Kcenich, DEP Waterways, Civil Engineer Consultant-Hydraulic Engineering and Wetlands on a yearly basis and re-formatted for entry into DEP's NEIEN template. QA/QC 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, Urban and Community Forestry Program

Contact: Ned Brockmeyer, Urban and Community Forestry Program Manager - (717) 772-8298, c-jobrockm@pa.gov
QA/QC Contact: Celine Colbert, Urban and Community Forestry Tree Canopy Coordinator

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 (Urban and Community Forestry) 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 Data 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 Urban and Community Forestry 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, Pennsylvania, Penn State Extension, and Urban and Community Forestry 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.

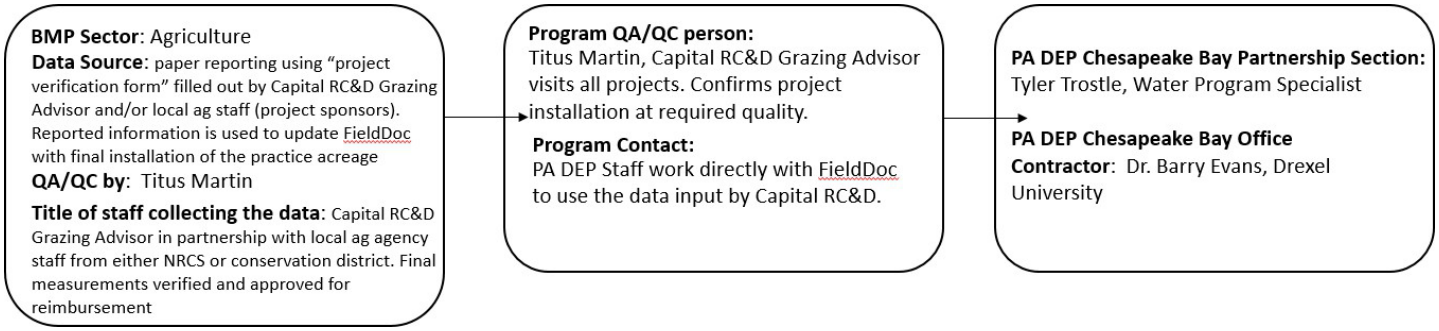
DCNR Staff QA/QC all Urban and Community Forestry PracticeKeeper BMPs for geospatial location, BMP name, extent, unit of measure, and implementation date before approving the BMPs to meet DCNR Forestry BMP program requirements. DCNR use PracticeKeeper to export into an excel spreadsheet and QA/QC the 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: Ann Basehore, Capital RC&D Executive Director - (717) 241-4361, abasehore@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 Ann Basehore) and re-formatted for entry into DEP's Data Warehouse as described previously.

In 2021 and 2022 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.

Ann Basehore, 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 Ann Basehore) and re-formatted for entry into DEP's Data Warehouse as described previously. In 2022 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.

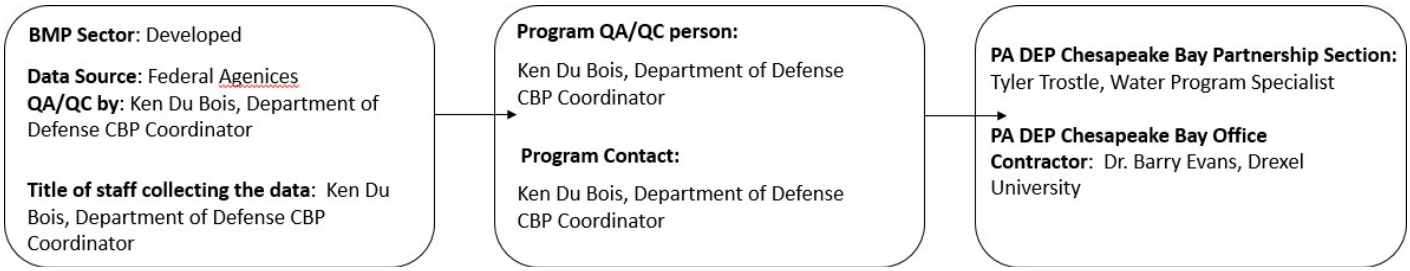
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for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

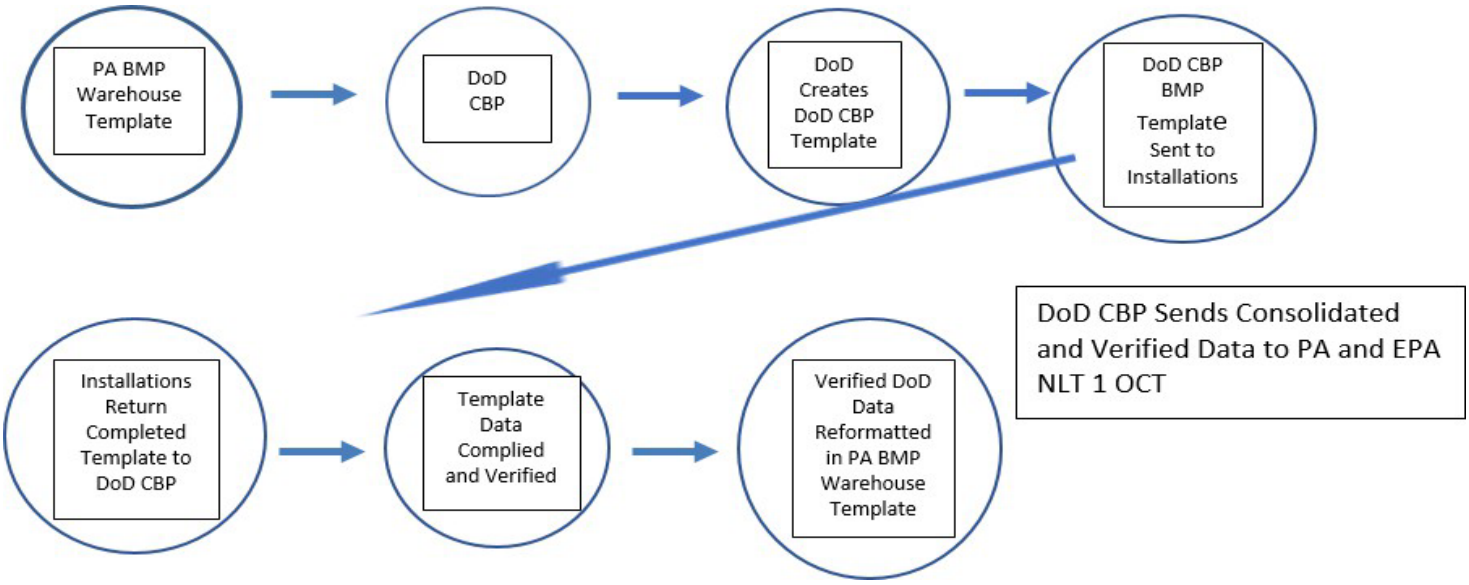
B10.2.19 Federal Facilities

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

Each summer, the DoD, coordinates with the Commonwealth of PA to obtain its Data Warehouse input template and creates a DoD-specific template to gather the information that will be used to fill the PA Data 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 Data 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 submissionto EPA through NEIEN.

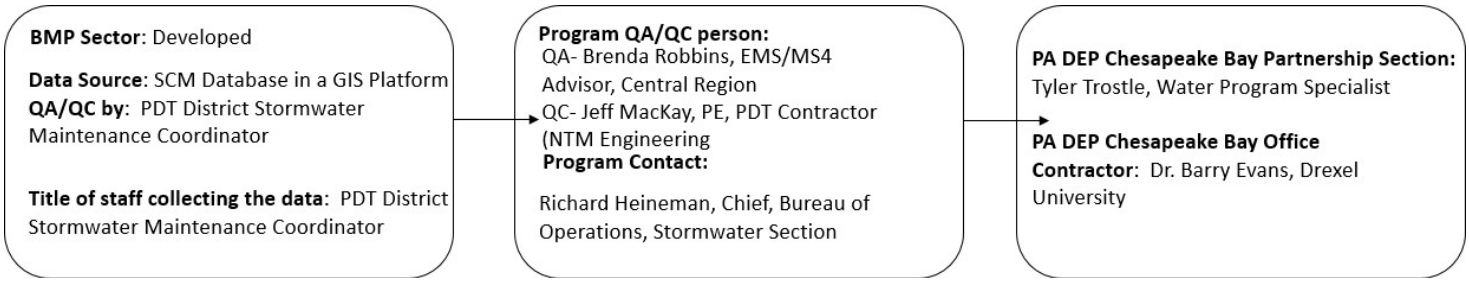
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for 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: Richard Heineman, Section Manager, PennDOT Bureau of Operations, Stormwater Section - (717) 787-0459, rheineman@pa.gov
QA/QC Contact:
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

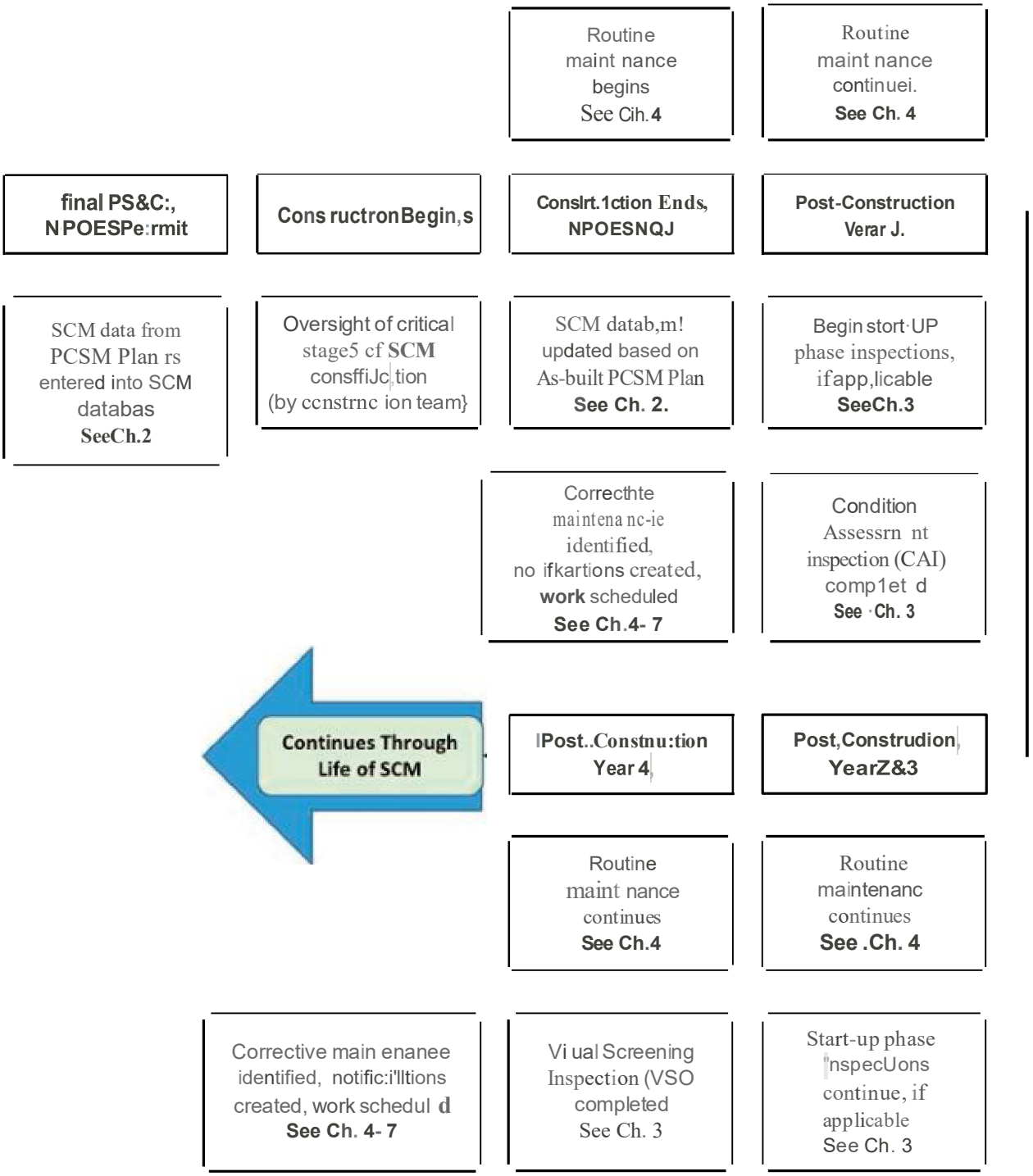
BMP List:	
Biofiltration	Infiltration Basin
Bioretention	Infiltration Trench
Dry Detention Ponds	Tree Planting
Dry Detention Ponds and Hydrodynamic Structures	Underground Infiltration System
Dry Extended Detention Ponds	Vegetated Open Channels
Filtering Practices	Vegetated Treatment Area
Filtration	Wet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



1Figure 1.1.2: SCM Lifeti.me 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.

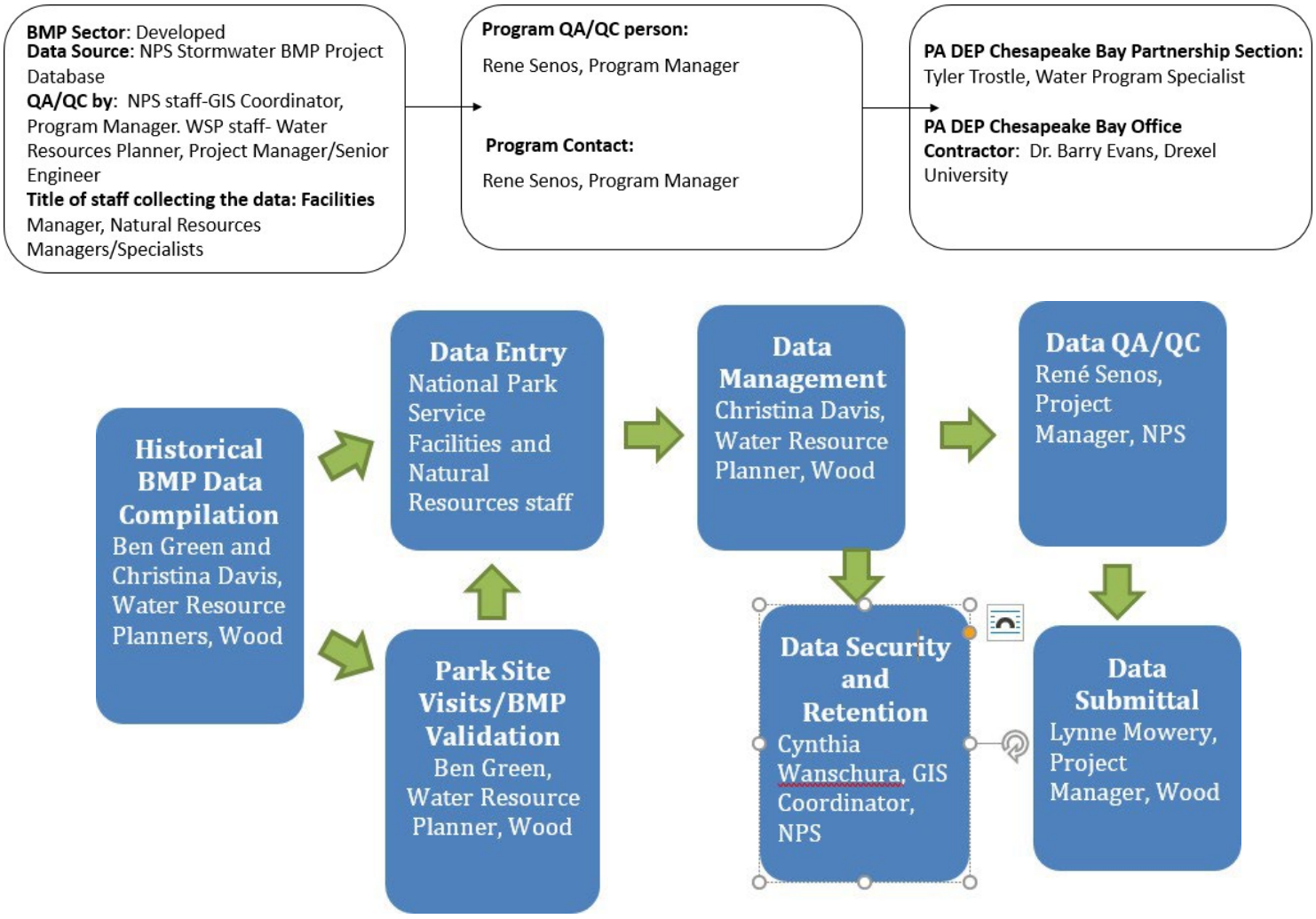
Link to Publication 888:
http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20888.pdf

B10.2.21 National Park Service

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

Contact: Brenda Sieglitz, Keystone 10 Million Trees Partnership Senior Manager - (717) 234-5550, bsieglitz@cbf.org
QA/QC 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, including the data attributes:

- 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: Everald (Derrick) McDonald, emcdonald@pa.gov

DATA COMPILATION PROCEDURES

High-Level Data Flow Graphic:

Sector: Agriculture, Developed, and Natural

BMP List:	
Forest Buffers	Urban Forest Planting
Riparian Forest Buffer	Tree Planting
Stream Channel Stabilization	Tree/Shrub Establishment
Stream Habitat Improvement and Management Stream Restoration	Urban Forest Buffer
Streambank and Shoreline Protection	Urban stream restoration
Streambank Stabilization	Wetland Creation
Conservation Landscaping	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: Contact information, which includes the landowner name, mailing address, and additional contact information. Also included is the project coordinator name, mailing address, and contact information. Property information, which includes description of the location of your proposed planting location. Project site address if it is different from municipality and county. Coordinates of the location of the center of the proposed project. HUC 12 code in which the planting is located. Directions to the site and how to access the project. Utilities present on site and who will make the 811 contact. The current land use includes description of land use, existing dominant vegetation, and any concerns to project success such as (deer browse, erosion, invasive plants, soil test results and so on).

Planting plans have a variety of planting details associated. Details include, proposed plating season, total number of acres to be planted (if planting separate areas, and specify acres of each). Description of the plan for planting trees should be included when appropriate. Description includes, number of trees to be planted, species of plants recommended for planting with flexibility for substitutions, size of planting stock to be used (containerized, bare root, etc.) and tree protection materials and methods (tube-type shelters, cages, etc.). Description of plan for planting meadows should be included when appropriate. This includes, species of plants, community types, or seed mixes recommended for planting, area of each mix to be planted, and planting method with mulching needs.

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

Maintenance procedures includes description of post-planting establishment and maintenance activities, responsible parties, and approximate timelines for performing these activities for the duration of the landowner agreement. This includes, seasonal inspections, mowing (meadows may not be mowed for the duration of the landowner agreement unless recommended and approved by DCNR) and/or herbicide, and replacement planting/seeding to maintain 70% stocking of original planting.

Planting plans should also have some attachments. These attachments include, map of the project extent (aerial basemap with acres labeled within the planting extent. Also, other items as needed include, soils map, establishment and maintenance documents, seed mix lists, invasive plant management sheets and etc.

In addition, each BMP entered into the PracticeKeeper geodatabase is assigned a unique identifier. Each year, the DEP Chesapeake Bay Watershed Restoration Division will generate the report of BMPs and attributes which have been entered into the PracticeKeeper geodatabase and communicate with the DCNR Watershed Forestry Program if any issues are identified with a BMP for which DCNR Watershed Forestry is responsible. A QA/QC Evaluator will provide additional QA/QC QA/QC Evaluator will incorporate the final data set into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

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.

- Regional Riparian Forest Buffer Specialists
- Lawn Conversion Program Coordinator
- Riparian Forest Buffer and Watershed Forestry Program Manager
- Watershed Forestry Coordinator
- Service Foresters

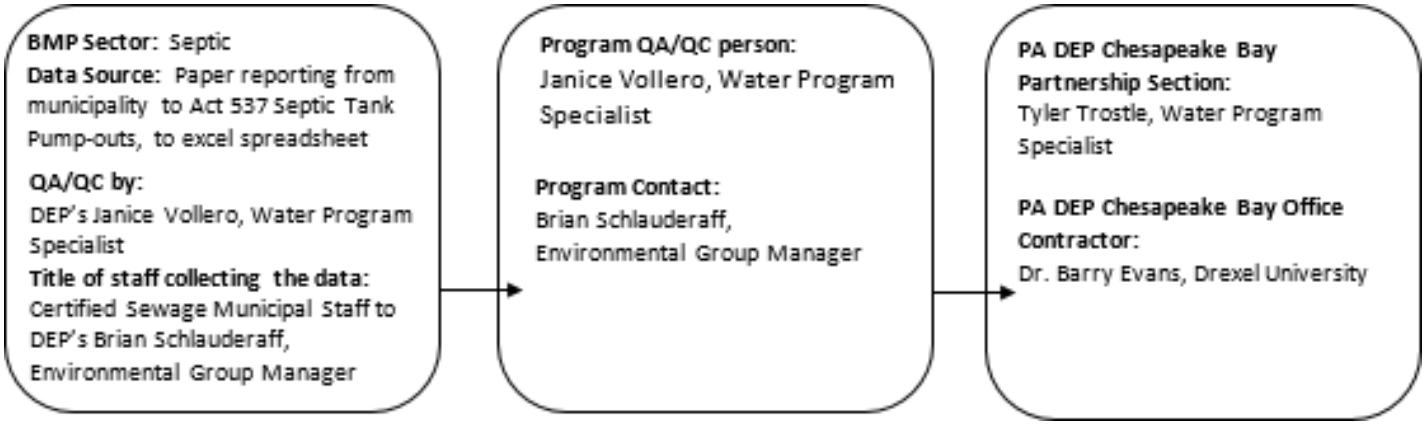
Information on initial BMP implementation obtained from the above source is presumed to be accurate as reported by the program per the requirements. After BMP installation, the implementer then reports the BMP to PracticeKeeper's "Partner BMP Submission Module". This report to PracticeKeeper captures 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: Janice Vollero, Water Program Specialist

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 (2022). 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.

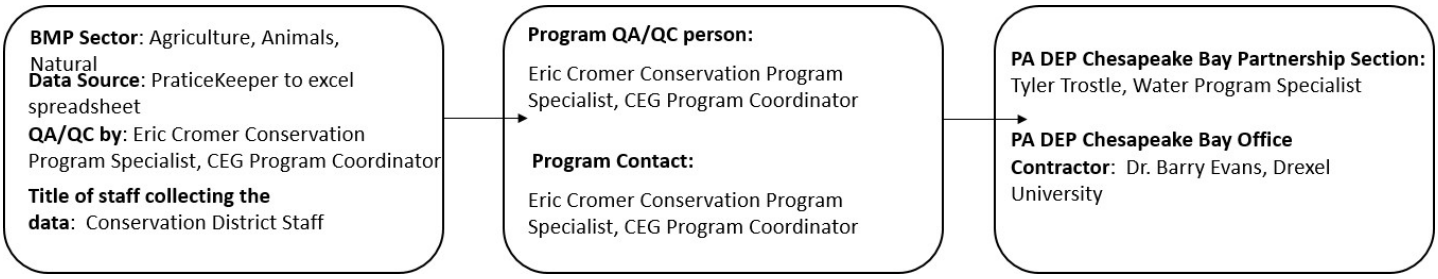
Information contained in the annual reports received from the municipalities is presumed to be accurate. Tabulation of the numbers provided by the municipality for the various categories in the report table are given a quantitative check by trained Act 537 staff when transposing the data from each municipal 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: Same as above

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 Data 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 a QA/QC Evaluator for additional QA/QC and DEP Chesapeake Bay Watershed Restoration Division staff 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. BWRNSM-DATA-003.* Attributes tracked are BMP type, CEG BMP list, BMP subtype (TBD), Status, and Geographic scale.

Geographic scale includes manually drawn BMP's and the following: Latitude and Longitude is based on the calculated centroid of the BMP. County is derived from the intersection of the drawn BMP and county boundaries. Watershed is derived from the intersection of the drawn BMP and watershed boundaries. The following are tracked dates; planned, inventory & evaluation, surveyed, design approved, and implemented date. The BMP participants are as followed; designer, design reviewer, design approver, implementer, and planner. Other items tracked are implemented amount and unit measure of practice, the funding source, funding amount and funding dates. CEGs inspections for reverification data items that are tracked; inspector name, date the inspection was performed, bmp compliance, and the verified bmp amount.

The CEG program has potential sources of duplication for BMP data. BMPs that were implemented using funding sources that are reported separately including USDA programs, REAP, NFWF, and PennVest. A separately reported BMP is any BMP that is not reported through the Practicekeeper interface into Datawarehouse, instead email in excel to the PA DEP CBPS. 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. 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.

In addition, each BMP entered into the PracticeKeeper geodatabase is assigned a unique identifier. Each year, the DEP Chesapeake Bay Watershed Restoration Division will generate the report of BMPs and attributes which have been entered into the PracticeKeeper geodatabase and communicate with our program if any issues are identified with a BMP for which CEG is a funding source. A QA/QC Evaluator will provide additional QA/QC and DEP Chesapeake Bay Watershed Restoration Division staff will incorporate the final data set into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

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 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:

- Nutrient Management Orientation
- Managing Manure Nutrients Workshop
- Stormwater and Soil Loss Workshop
- P-Index Workshop
- Plan Writing Workshop
- ACA and Manure Storage Workshop
- Plan Review Workshop

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

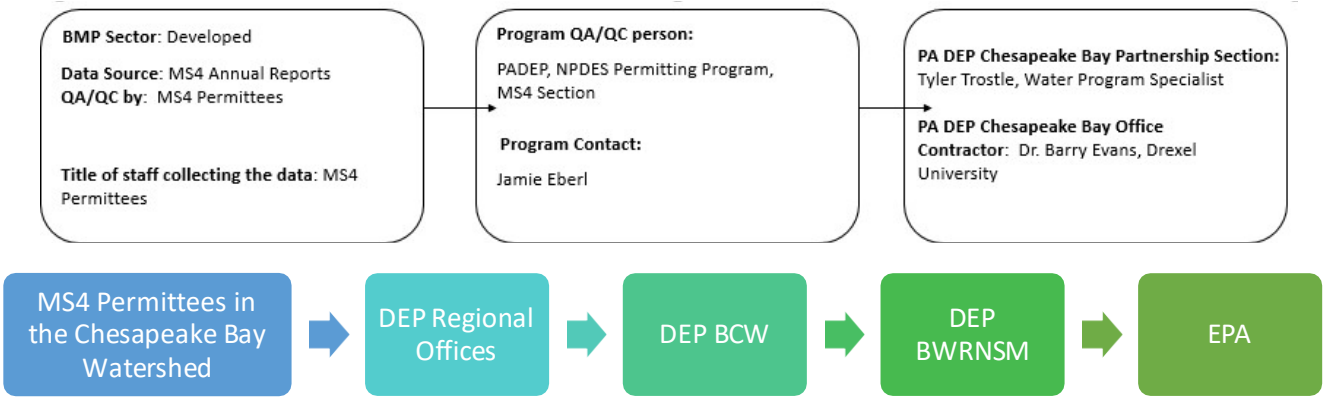
Records of BMPs implemented through the CEG Program are verified by the program staff prior to reporting and sent to DEP's BWRNSM for submission to EPA through NEIEN.

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

Contact: Sean Furjanic, DEP Bureau of Clean Water, NPDES Permitting Division - (717) 787-2137, sefurjanic@pa.gov
QA/QC Contact: Jamie Eberl, DEP Bureau of Clean Water, NPDES Permitting Division - (717) 772-4058; jeberl@pa.gov

DATA COMPILATION PROCEDURES

High-Level Data Flow Graphic:



Sector: Developed

BMP List:	
Bioretention and Bioswales	Storm Sewer System Solids Removal
Dry detention basins and hydrodynamic structures	Stream Restoration
Dry extended detention basins	Street Sweeping
Forest Buffers and Tree Planting	Vegetated swales
Infiltration practices (including permeable pavement, and filtering practices)	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/PRPTMDL-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), electronically (through OnBase), or through the eReporting system (currently being tested with small group of permittees).

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 for all permittees, 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 2023 reporting year BMPs reported as part of the MS4 e-reporting pilot project will be reported to DEP BWRNSM. The pilot MS4 eReporting system was QA/QC by DEP BWRNSM staff.

BMP data submitted by permittees through the eReporting system will be exported from the eReporting system by MS4 Program staff, QA/QC by MS4 Program staff, and provided to BWRNSM in an excel spreadsheet. Instructions for completing MS4 Annual Reports are posted to DEP's MS4 website:
https://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Stormwater/Pages/Reporting.aspx.

Instructions for using the MS4 eReporting system to complete and submit Annual Reports are posted to DEP's MS4 website:
https://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Stormwater/Pages/Reporting.aspx

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

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 BMPs scale is derived from municipalities using the sheet below to identify the (latitude/longitude) for the program to then report.

NEW BMPs FOR PRP/TMDL PLAN IMPLEMENTATION

Table 2. List all new structural BMPs installed and ongoing non-structural BMPs implemented during the reporting period that are being used toward achieving load reductions in the permittee's PRP and/or TMDL Plan (see instructions).

BMP No.	BMP Name	DA (ac)	% Imp.	BMP Extent	Units	Latitude	Longitude	Date Installed or Implemented	Planning Area?	Ch. 102?	Annual Sediment Load Reduction (lbs/yr)
						° ' "	° ' "		☐	☐	

- 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.

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.

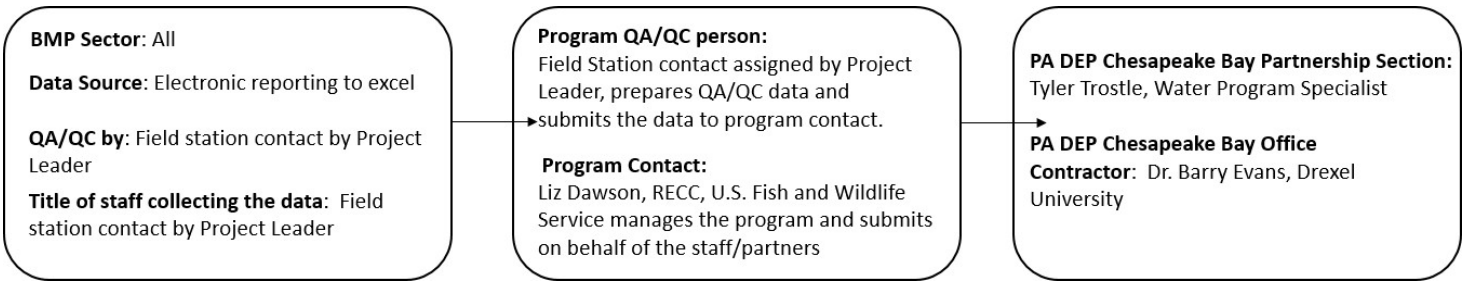
QA/QC for double counting and errors is completed by BMP name, implementation date, location, and BMP extent. DEP BWRNSM provided the MS4 program with a BMP list from Department of Defense to eliminate state and federal BMP duplication.

B10.2.27 US Fish and Wildlife Service

Contact: Liz Dawson, US 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.

DATA COMPILATION PROCEDURES

High-Level Data Flow Graphic:



Sector: All

BMP List: Soil and Water Conservation Plan, Tree Planting

The US 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 US 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 US 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.

US 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 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

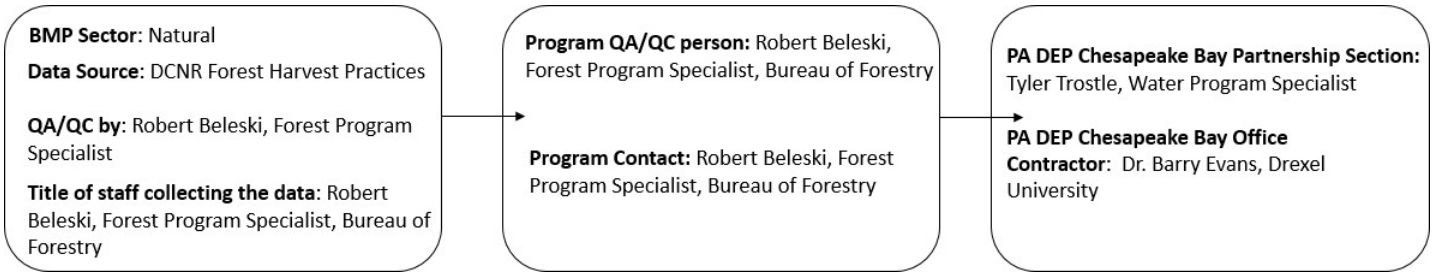
National Fish Hatchery and Northeast Fishery Center. This field station's NPDES permit is up to date. New filtration and effluent dewatering practices were implemented within the last 10 years.

B10.2.28 DCNR Forest Harvesting Practices

Contact: Derrick McDonald, PA DCNR Bureau of Forestry - emcdonald@pa.gov
QA/QC Contact: Robert Beleski, PA DCNR Bureau of Forestry – (717) 783-7932, rbeleski@pa.gov

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.

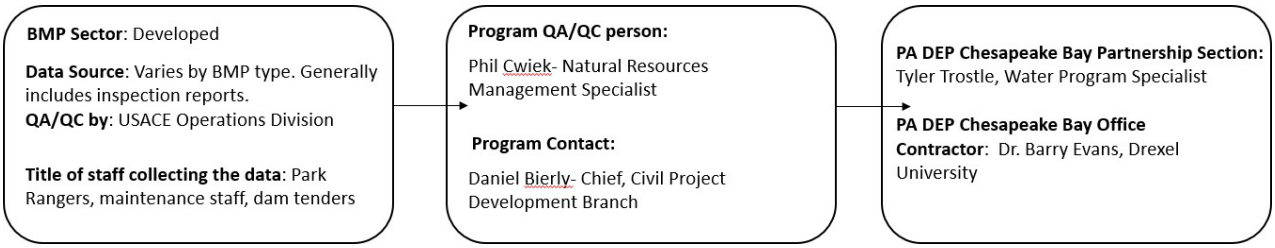
Requirements for the DCNR forest harvesting can be found at the following links:
2016 State Forest Resource Management Plan (PDF)
EROSION AND SEDIMENT CONTROL (E&S) PLAN TEMPLATE FOR A TIMBER HARVESTING OPERATION.PDF **3800-FM-BCW0539**

B10.2.29 US Army Corps of Engineers

Contact: Daniel Bierly, US Army Corps of Engineers, Chief, Civil Project Development Branch, Planning Division, Baltimore District - (410) 962-6139, Daniel.M.Bierly@usace.army.mil
QA/QC Contact: Phil Cwiek, US 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 Data Warehouse input template and creates a USACE specific template to gather the information that will be used to fill the PA Data 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 Data 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.

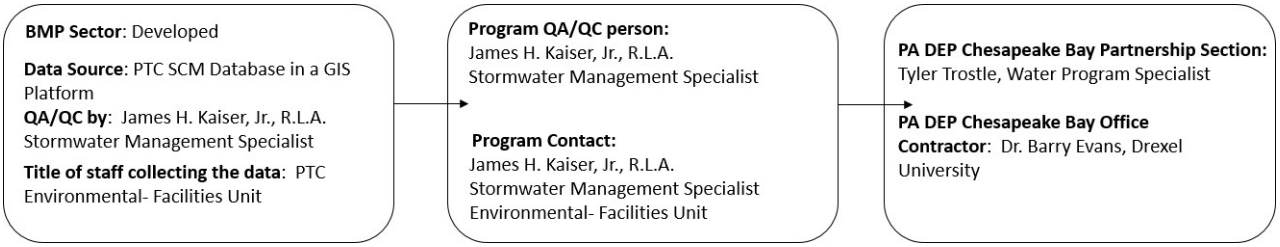
Based on communications with USEPA and USACE seven impoundments reported in the historical data were removed as it was determined that reporting these basins as BMPs is inappropriate.

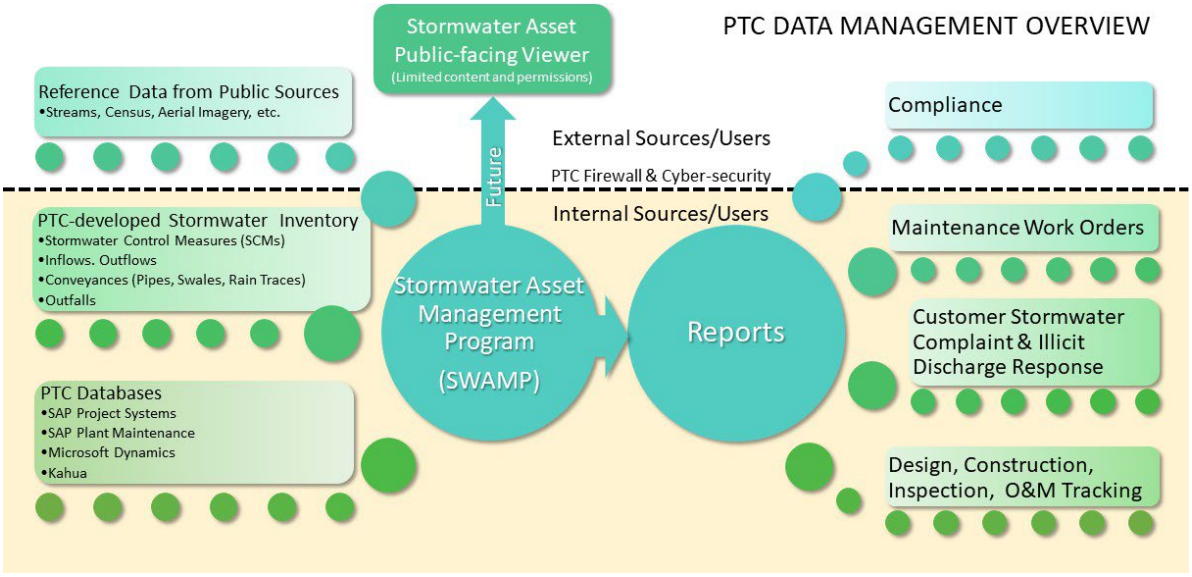
B10.2.30 PA Turnpike Commission MS4/Urban Stormwater SCMs

Contact: James H. Kaiser, Jr., R.L.A., Stormwater Management Specialist
Pennsylvania Turnpike Commission, Engineering Design, Planning and Environmental, MS4/SW Unit - (717) 831-7513, jkaiser@paturnpike.com
QA/QC Contact: Same as above

DATA COMPILATION PROCEDURES

High-Level Data Flow Chart:





Sector: Developed

Stormwater Control Measure (SCM) BMP List:

PTC SCM Name	CAST 6.0 BMP Name
Basin, Dry Detention	Dry Detention Ponds
Basin, Dry Extended Detention	Dry Extended Detention Ponds
Basin, Dry Ultra-Extended Detention	Dry Extended Detention Ponds
Basin, Infiltration Detention	Infiltration Basin
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	Proprietary Stormwater Treatment Device
Media Filter Drain	Filtering Practices
Non-Basin SCM, Other	Proprietary Stormwater Treatment Device
Pervious Pavement, Asphalt	Permeable Pavement
Pervious Pavement, Concrete	Permeable Pavement
Pervious Pavement, Pavers	Permeable Pavement
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	Stream Channel Stabilization
Subsurface Detention Storage	Dry Detention Ponds & Hydrodynamic Structures
Subsurface Infiltration Trench	Infiltration Trench
Vegetated Filter Strip	Filtering Practices
Vegetated Filter Strip, Steep Slope	Filtering Practices
Vegetated Swale	Vegetated Open Channels
Vegetated Swale w/ Check Dams	Vegetated Open Channels

Cross walked BMPs with EPA CBPO BMP Quick Reference Guide and NEIEN reporting template:

BMPs for the Pennsylvania Turnpike Commission (PTC) MS4 regulatory compliance are stormwater control measures (SCMs) that reduce stormwater pollution. SCMs also regulate stormwater runoff volume and peak-discharge rate. Most frequently deployed BMPs are stormwater detention basins. However, PTC's stormwater network supports a host of other stormwater control measures (SCMs) including but not limited to dry and extended dry detention basins; bioretention; hydrodynamic devices; proprietary stormwater treatment systems; infiltration basins, trenches, and other infiltration practices; vegetated open channels and vegetated treatment areas; wet ponds; and constructed wetlands. Additionally, PTC historically restored streams to mitigate environmental impacts of roadway construction and will undertake new stream restoration projects to reduce stormwater-related sediment pollution.

BMP data is gathered from the best-available plans (design, construction, as-built) and by field collection of SCM and stormwater network locations and attributes. Plan data is georeferenced into the GIS environment and digitized on the layers in the schema. All BMPs are then verified by field visits. All field collected data are imported into the GIS environment, analyzed, and augmented by the IT Department and its consultants, if required, to ensure that the information is connected to the stormwater network and useable.

As shown in the PTC Data Management Overview Diagram, PTC developed a customized GIS Database (acronym SWAMP) that features an interactive GIS map for viewing the stormwater asset inventory, inspection, and maintenance history data for SCMs and Outfalls. SWAMP also allows for management of the stormwater system and related drainage issues.

The other linked PTC databases that support stormwater assets are populated and managed by PTC departments including Engineering, Maintenance, and Communications and Customer Experience during performance of their routine work.

Data transfer to DEP for Chesapeake Bay watershed programs QAPP reporting is extrapolated from the PTC electronic database and transferred into the provided Excel spreadsheet, PA DEP BMP Upload Template. Data is manually reviewed and adjusted where SWAMP data fields don't parallel information or format of the PA DEP BMP Upload Template. Most stormwater data in the system is developed by PTC staff or PTC consultants. Information acquired from publicly-available sources, PTC customers, adjacent property owners and municipalities, or other unverified resources is examined and analyzed by the database experts before transfer (upload) to the database of record. The IT Department and its consultants are responsible for the data transfer. Transfers between PTC and its other consultants requiring coordination with SWAMP to perform their assignments is performed by the IT Department. Snapshots of the database are provided and transferred between PTC and consultants in the GIS environment but separated from the database of record. Data is reviewed, cleaned, and edited as a separated file before upload of any revision into the database of record.

To date, raw data from PTC files has not been directly transferred from the PTC system to

regulatory agencies or non-PTC-affiliated entities due to cyber-security concerns and maintaining the accuracy and integrity of data ascribed to PTC. Future plans include development of a public-facing viewer that will limit access to stormwater network information appropriate for non-PTC users by defining user permissions. The viewer will allow viewing but not downloading or manipulation of data.

PTC uses publicly available source data within its GIS system as background reference data. Some examples include the US Census Bureau 2010 Urbanized Area, PA DEP's Chapter 93 streams layers, and similar background reference data. The data generally consists of GIS databases or similarly georeferenced information that can be directly imported in the Esri GIS enterprise system used by PTC. PTC IT staff and IT Department consultants are responsible for download, review, and import of data for PTC's use.

SCMs and the stormwater network data including inflows, discharges conveyances, are digitized by PTC IT professionals and consultants, or field collected via mobile inspection applications. Desktop and field collected information is provide in the GIS environment as a database or as population of attribute fields in the database. PTC IT Department, and consultants are responsible reviewing information accuracy and upload for PTC use.

Other PTC databases like SAP Project Systems, SAP Plant Maintenance, Microsoft Dynamics, and Kahua, that contain design, construction, maintenance, management information are integrated into SWAMP to facilitate stormwater system maintenance, documentation, and regulatory compliance. Maintenance of the data links is the responsibility of PTC's IT Department. Creation and management of the documentation, which can be PDFs, Word files, Excel files or links within the other databases, is the responsibility of the PTC Department that use the respective databases in performance of their regular assigned duties. Maintenance of all databases (software and firmware updates, archiving, etc.) is performed by the IT Department.

Datasets are owned and maintained by PTC for PTC use. Data is managed and maintained by each department in separate databases. The data is linked and not transferred for PTC internal use. PTC stormwater data is not directly transferred to outside agencies, the public, or non-PTC-affiliated entities.

Hard-copy data is entered into the system through conversion to digital format. PTC-assigned GIS experts use multiple levels review to authenticate the data. If used as part of GIS mapping, the information is entered by GIS professionals, digitizing and truthing information against as-built construction plans, field collected data, and aerial imagery. If the data is a documentation record, it is attached to a GIS feature usually as a PDF but may also be another file format.

Construction stormwater inspections, SCM inspections, and outfall inspections all use customized ESRi Arc GIS Online mobile data collection applications that report directly to their respective databases. Inspections may be QA/QC'ed through a QC viewer for data authentication.

The SCM inventory is housed on PTC's greater GIS system which adheres to PTC IT data storage and backup protection policies. PTC chooses to decline detailing sensitive security measures in this document since PTC is not directly sharing data with non-PTC entities. PTC will discuss the protocols with regulatory entities if and when data transfer requires sharing of security measures.

DATA VERIFICATION PROCEDURES

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. A sample list of the highest level of the attributes for tracking is provided below. Note that PTC nomenclature refers to stormwater best management practices (BMPs) as stormwater control measures (SCMs).

General list of SCM Attributes:

SCM Location	SCM Cut slope
SCM Type (36 Types)	SCM Liners
SCM Status (in-design, in-construction, in-service)	SCM Impounding Embankments
SCM Vegetation (7 types)	SCM Outflows (4 Types)
SCM Inflows (5 types)	SCM Emergency Spillways
SCM Surface Storage (2 types)	SCM Discharge Points
SCM Subsurface Storage (3 types)	SCM Fencing/Gates/Lock/Signage

SCMs are located by the latitude and longitude of their centroid, or in the case of water-quality swales, the latitude and longitude of the upstream end of the swale. County, municipality, and HUC 12 watershed data are also attributed and available for searches and queries. SCMs, regardless of type, are uniformly reported at the same geographic scale throughout PTC's system. SCM location is reported at a uniform scale. No one determines alternative methods of reporting because there are no alternative reporting methods.
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

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 Stormwater Control Measure Operations and Maintenance Manual (SCMOM) contains the policies and procedures for naming, inventorying, inspecting, and maintaining SCMs. A copy of the SCMOM is available on the PTC's Clean Water page at the following link. https://files.paturnpike.com/production/docs/default-source/resources/clean-water/scmom-2020-06-30.pdf?sfvrsn=162c387f_8

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.

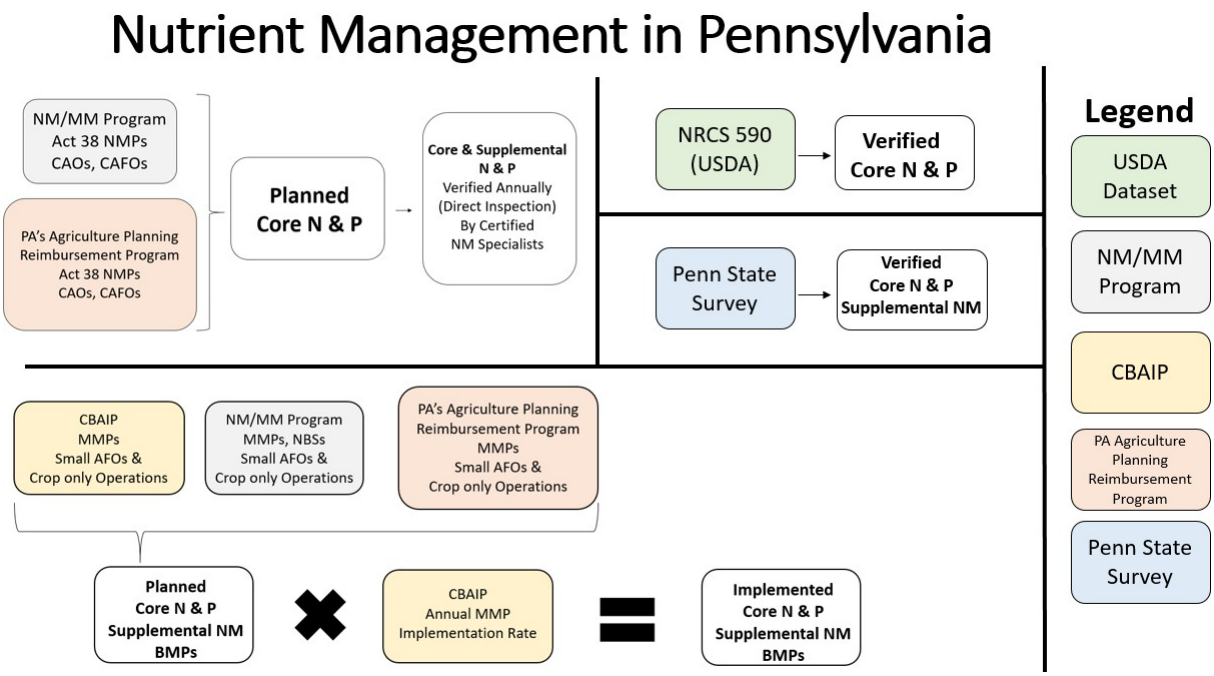
The Specialized Data Compilation Procedures are broken into Sectors: Agriculture from B10.3.1 to B10.3 and Developed B10.310.

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. BWRNSM-INSP-001, the PracticeKeeper – Agriculture Inspections Module SOP No. BWRNSM-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:

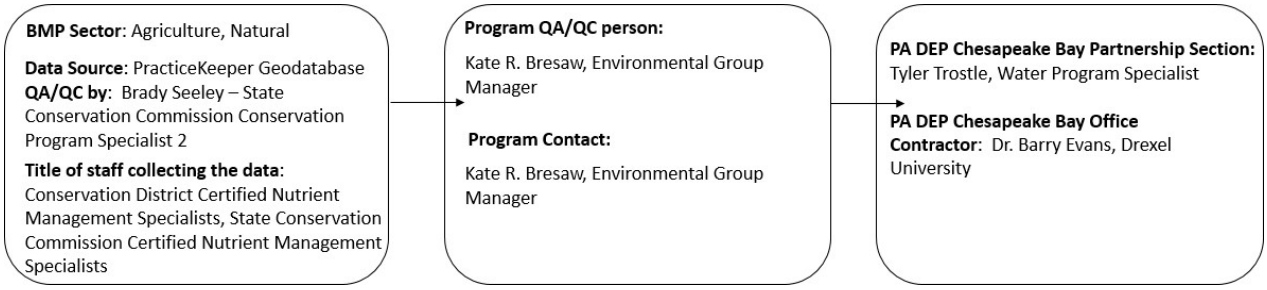


B10.3.1 Nutrient and Manure Management Program

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	Filter Strip
Animal Mortality Facility	Forest Nutrient Exclusion Area on Watercourse RI
Animal Compost Structure RI	Forest Stand Improvement
Animal Trails and Walkways	Grass Buffer on Watercourse RI
Barnyard Clean Water Diversion RI	Grass Nutrient Exclusion on Watercourse Narrow RI
Bio Retention	Grassed Waterway
Brush Management	Hedgerow Planting
Channel Bed Stabilization	Integrated Pest Management (IPM)
Cisterns & Rain Barrels	Intensive Management of Rotational Grazing
Composting Facility	Irrigation System, Microirrigation
Conservation Cover	Irrigation System, Sprinkler
Conservation Crop Rotation	Land Reclamation, Abandoned Mined Land
Constructed Wetland	Lined Waterway or Outlet
Contour Buffer Strips	Loafing Lot Management System

BMP List:	
Contour Buffer Strips	Loafing Lot Management System
Contour Farming	Nutrient Management Core N
Contour Orchard and Other Fruit Area	Nutrient Management Core P
Conversion of cropped land to grass-based agriculture	Nutrient Management N Placement
Critical Area Planting	Nutrient Management N Rate
Diversion	Nutrient Management N Timing
Drainage Water Management	Nutrient Management P Placement
Dry Waste Storage Structure RI	Nutrient Management P Timing
Establishment of permanent native grasses	Obstruction Removal
Exclusion Fence with Forest Buffer RI	Pipeline
Exclusion Fence with Forest Buffer	Prescribed Grazing
Exclusion Fence with Narrow Forest Buffer RI	Pumping Plant
Exclusion Fence with Grass Buffer RI	Riparian Forest Buffer
Exclusion Fence with Grass Buffer	Riparian Herbaceous Cover
Exclusion Fence with Narrow Grass Buffer RI	Roof Runoff Structure
Fence	Roofs and Covers
Field Border	Rotational Grazing RI
Floodplain Restoration	Solid/Liquid Waste Separation Facility
Forage and Biomass Planting	Spring Development
Forage Harvest Management	Stream Habitat Improvement and Management
Forest Buffer on Watercourse RI	Stream Restoration Ag
Streambank and Shoreline Protection	Waste Storage Facility
Stripcropping	Waste Transfer
Structure for Water Control	Waste Treatment
Subsurface Drain	Waste Treatment Lagoon
Surface Drainage, Main or Lateral	Water and Sediment Control Basin
Terrace	Water Well
Trails and Walkways	Watering Facility
Tree Planting	Watering Trough RI
Tree/Shrub Establishment	Wetland Buffer
Underground Outlet	Wetland Creation
Upland Wildlife Habitat Management	Wetland Restoration
Urban Forest Planting	Windbreak/Shelterbelt Establishment
Vegetated Treatment Area	
Waste Facility Closure	

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. BWRNSM-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. The MMPs and NBSs meeting the definitions of Core Nutrient Management are then recorded with any associated planned Supplemental Nutrient Management BMPs in the PracticeKeeper Database. 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 which include information found on the Agricultural Operation Supplemental Information form (3320-FM-BWRNSM0008a) 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,* the subsample size is greater than or equal to 10% as is calculated by the ratio of the number unique agricultural operations that received an inspection in the current reporting year during which MMP records were reviewed to the total number of known MMPs and NBSs that were initially verified as part of state regulatory program. However, PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years. At which time, because the BMP Verification Review Panel has sunset, further guidance from EPA CBPO will be needed to proceed with 3.c.2. to comply with the following statement in the guidance: "the BMP Verification Review Panel shall review the alternative strategy and make a recommendation to EPA on the adequacy of the alternative." The data for each inspection is documented on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. BWRNSM-INSP-001. It is also recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper-Agriculture Inspection Module SOP No. BWRNSM-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.

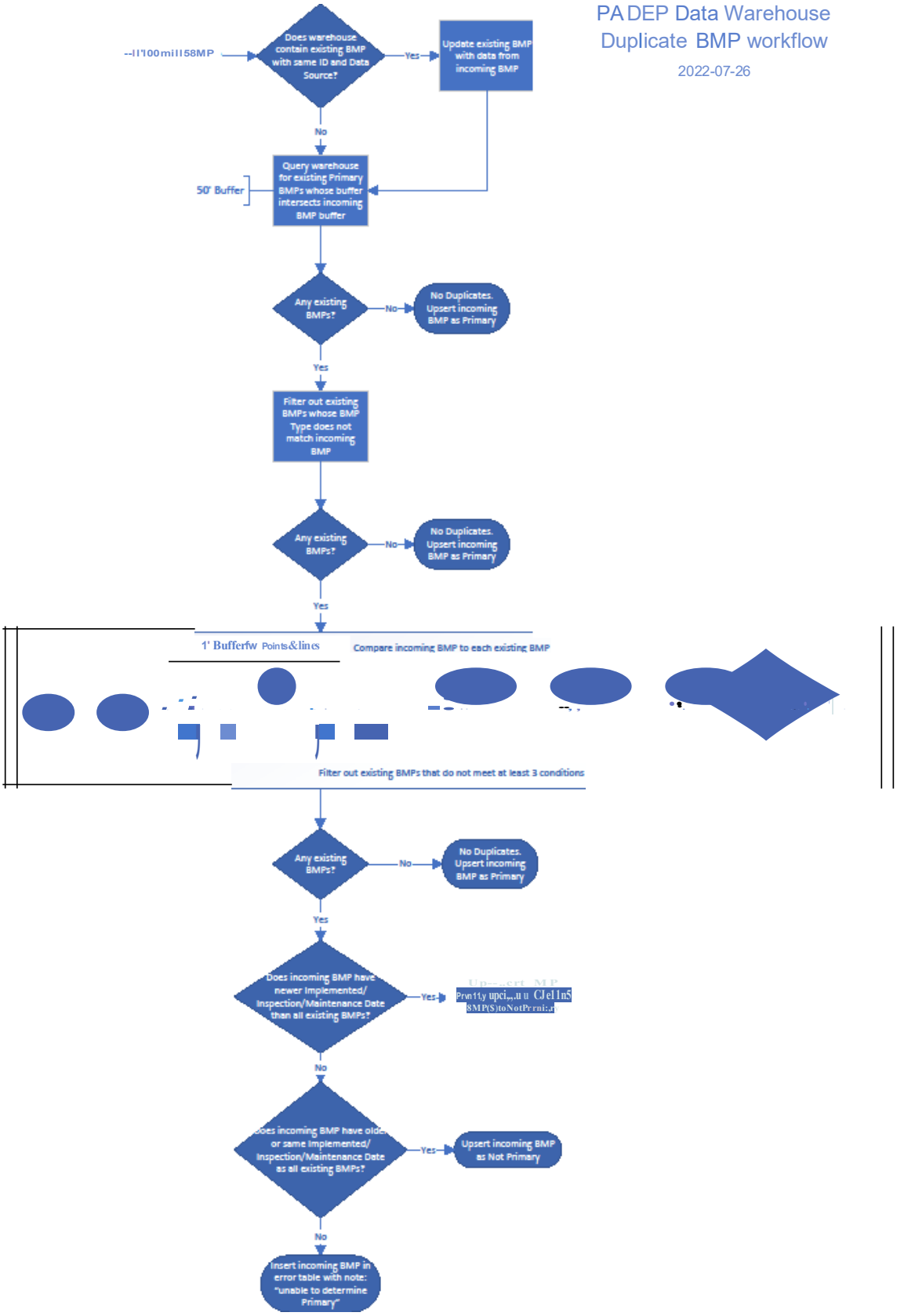
All BMPS: All BMPs tracked and recorded as part of the Nutrient and Manure Management Program are recorded as follows:

A daily refresh of PracticeKeeper data is pushed to Data Warehouse, the Azure SQL Database repository for all PracticeKeeper and Field Doc agriculture and watershed restoration BMPs, via an Application Program Interface (API) where duplicate BMPs are identified based on the criteria outlined in the workflow below.

NOTE: The primary BMP is the record that will be upserted into the NEIEN Submission Report including PracticeKeeper and FieldDoc data sources. The NEIEN Submission Report will then undergo further quality assurance review by a third party consultant.

PA DEP Data Warehouse
Duplicate BMP workflow

2022-07-26



Once all duplicates are identified per the workflow above and errors corrected via the data verification procedures below, a PowerBI report view of the Data Warehouse data which includes all BMPs for NEIEN submission for the current progress year is downloaded by DEP Chesapeake Bay Watershed Restoration Division staff and shared with a QA/QC Evaluator for third-party QA/QC.

DATA VERIFICATION PROCEDURES

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

Attributes Tracked by the Nutrient and Manure Management Program are as followed; BMP Type, BMP subtype, Status, and Geographic Scale. Geographic scale includes manually drawn BMPs. The latitude and longitude is based on the calculated centroid of the BMP. County is derived from the intersection of the drawn BMP and county boundaries. Watershed is derived from the intersection of the drawn BMP and watershed boundaries. Dates included are planned, inventory & evaluation, surveyed, design approved, and implemented. The BMP participants are as followed, designer, design reviewer, design approver, implementer and planner. Other items are implemented amount, unit of measure, funding source, amount of funding, data of funding and inspections. Inspections (reverification) have multiple attributes, inspector name, date inspection performed, bmp compliance, and verified amount. Status reviews for act 38 nutrient management plans includes;

(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

Potential sources of duplicate, BMPs that are reported outside of Data Warehouse including USDA programs, the Penn State Survey, REAP, NFWF, or PennVest. Data Entry Errors, an error report identifying the reason the BMP is flagged as an error is shared with the data reporter. The data reporter then communicates with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN. Any records with outstanding errors after July 25 are held until they can be corrected and are submitted to NEIEN as part of a subsequent year's progress submission.

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.

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 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:

- Nutrient Management Orientation
- Managing Manure Nutrients Workshop
- Stormwater and Soil Loss Workshop
- P-Index Workshop
- Plan Writing Workshop
- ACA and Manure Storage Workshop
- Plan Review Workshop

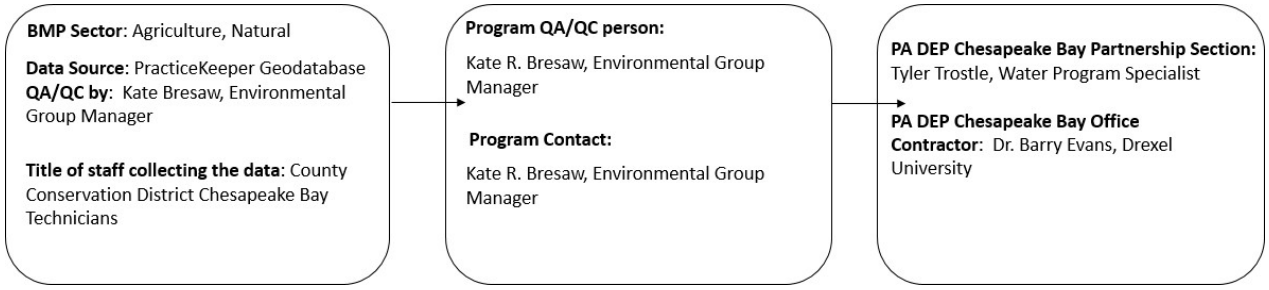
CCD staff receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. BWRNSM-DATA-003, Nutrient Management Program Administrative Manual, and the accompanying DEP Clean Water Academy Learning Modules.)

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	Filter Strip
Animal Mortality Facility	Forest Nutrient Exclusion Area on Watercourse RI
Animal Compost Structure RI	Forest Stand Improvement
Animal Trails and Walkways	Grass Buffer on Watercourse RI
Barnyard Clean Water Diversion RI	Grass Nutrient Exclusion on Watercourse Narrow RI
Bio Retention	Grassed Waterway
Brush Management	Hedgerow Planting
Channel Bed Stabilization	Integrated Pest Management (IPM)
Cisterns & Rain Barrels	Intensive Management of Rotational Grazing
Composting Facility	Irrigation System, Microirrigation
Conservation Cover	Irrigation System, Sprinkler
Conservation Crop Rotation	Land Reclamation, Abandoned Mined Land
Constructed Wetland	Lined Waterway or Outlet

BMP List:	
Access Road	Filter Strip
Animal Mortality Facility	Forest Nutrient Exclusion Area on Watercourse RI

Animal Compost Structure RI	Forest Stand Improvement
Animal Trails and Walkways	Grass Buffer on Watercourse RI
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Conservation Cover	Irrigation System, Sprinkler
Conservation Crop Rotation	Land Reclamation, Abandoned Mined Land
Constructed Wetland	Lined Waterway or Outlet
BMP List:	
Contour Buffer Strips	Loafing Lot Management System
Contour Farming	Nutrient Management Core N
Contour Orchard and Other Fruit Area	Nutrient Management Core P
Conversion of cropped land to grass-based agriculture	Nutrient Management N Placement
Critical Area Planting	Nutrient Management N Rate
Diversion	Nutrient Management N Timing
Drainage Water Management	Nutrient Management P Placement
Dry Waste Storage Structure RI	Nutrient Management P Timing
Establishment of permanent native grasses	Obstruction Removal
Exclusion Fence with Forest Buffer RI	Pipeline
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Exclusion Fence with Narrow Forest Buffer RI	Pumping Plant
Exclusion Fence with Grass Buffer RI	Riparian Forest Buffer
Exclusion Fence with Grass Buffer	Riparian Herbaceous Cover
Exclusion Fence with Narrow Grass Buffer RI	Roof Runoff Structure
Fence	Roofs and Covers
Field Border	Rotational Grazing RI
Floodplain Restoration	Solid/Liquid Waste Separation Facility
Forage and Biomass Planting	Spring Development
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Structure for Water Control	Waste Treatment
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Terrace	Water Well
Trails and Walkways	Watering Facility
Tree Planting	Watering Trough RI
Tree/Shrub Establishment	Wetland Buffer

Underground Outlet	Wetland Creation
Upland Wildlife Habitat Management	Wetland Restoration
Urban Forest Planting	Windbreak/Shelterbelt Establishment
Vegetated Treatment Area	
Waste Facility Closure	

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. BWRNSM-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. BWRNSM-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. BWRNSM-DATA-002 and the accompanying DEP Clean Water Academy (CWA) learning module.

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. The MMPs and NBSs meeting the definitions of Core Nutrient Management are then recorded with any associated planned Supplemental Nutrient Management BMPs in the PracticeKeeper Database. 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 which include information found on the Agricultural Operation Supplemental Information form (3320-FM-BWRNSM0008a) 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,* the subsample size is greater than or equal to 10% as is calculated by the ratio of the number unique agricultural operations that received an inspection in the current reporting year during which MMP records were reviewed to the total number of known MMPs and NBSs that were initially verified as part of state regulatory program. However, PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years. At which time, because the BMP Verification Review Panel has sunset, further guidance from EPA CBPO will be needed to proceed with 3.c.2. to comply with the following statement in the guidance: "the BMP Verification Review Panel shall review the alternative strategy and make a recommendation to EPA on the adequacy of the alternative." The data for each inspection is documented on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. BWRNSM-INSP-001. It is also recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper-Agriculture Inspection Module SOP No. BWRNSM-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. BWRNSM-DATA-003.

Attributes Tracked by the Nutrient and Manure Management Program are as follows: BMP Type, BMP subtype, Status, and Geographic Scale. Geographic scale includes manually drawn BMPs. The latitude and longitude is based on the calculated centroid of the BMP. County is derived from the intersection of the drawn BMP and county boundaries. Watershed is derived from the intersection of the drawn BMP and watershed boundaries. Dates included are planned, inventory & evaluation, surveyed, design approved, and implemented. The BMP participants are as followed, designer, design reviewer, design approver, implementer and planner. Other items are implemented amount, unit of measure, funding source, amount of funding, data of funding and inspections. Inspections (reverification) have multiple attributes, inspector name, date inspection performed, bmp compliance, and verified amount. Potential sources of duplicate, BMPs that are reported outside of Data Warehouse including USDA programs, the Penn State Survey, REAP, NFWF, or PennVest.

Data Entry Errors report identifying the reason the BMP is flagged as an error is shared with the data reporter. The data reporter then communicates with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN. Any records with outstanding errors after July 25 are held until they can be corrected and are submitted to NEIEN as part of a subsequent year’s progress submission.

Qualifications; 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. CCD staff receive web-based training and written guidance on the procedures to document the BMP in the PracticeKeeper Geodatabase (SOP No. BWRNSM-DATA-003, Nutrient Management Program Administrative Manual, and the

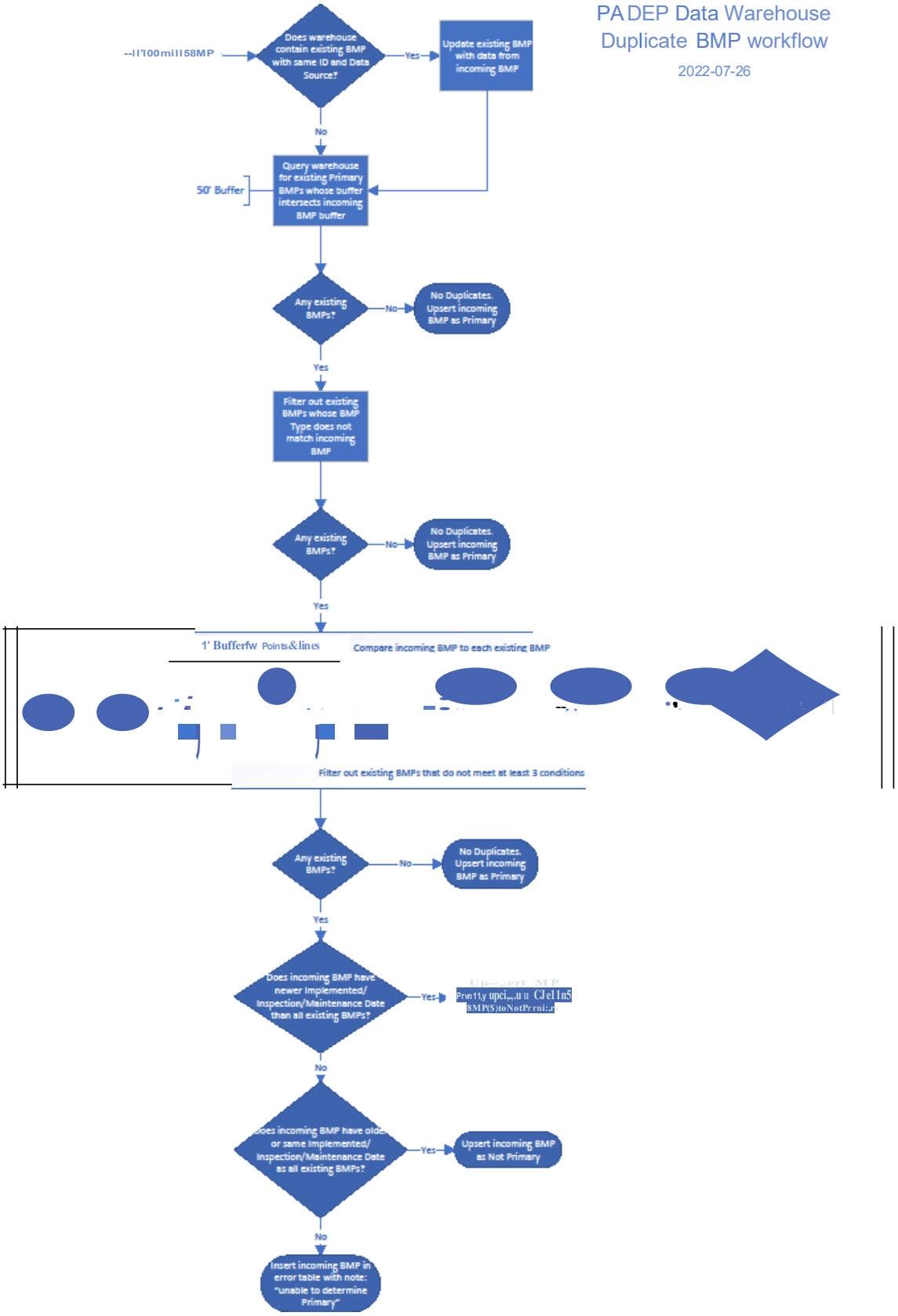
accompanying DEP Clean Water Academy Learning Modules.)

All BMPs: A daily refresh of PracticeKeeper data is pushed to Data Warehouse, the Azure SQL Database repository for all PracticeKeeper and Field Doc agriculture and watershed restoration BMPs, via an Application Program Interface (API) where duplicate BMPs are identified based on the criteria outlined in the workflow below.

NOTE: The primary BMP is the record that will be upserted into the NEIEN Submission Report including PracticeKeeper and FieldDoc data sources. The NEIEN Submission Report will then undergo further quality assurance review by a third party consultant.

PA DEP Data Warehouse
Duplicate BMP workflow

2022-07-26



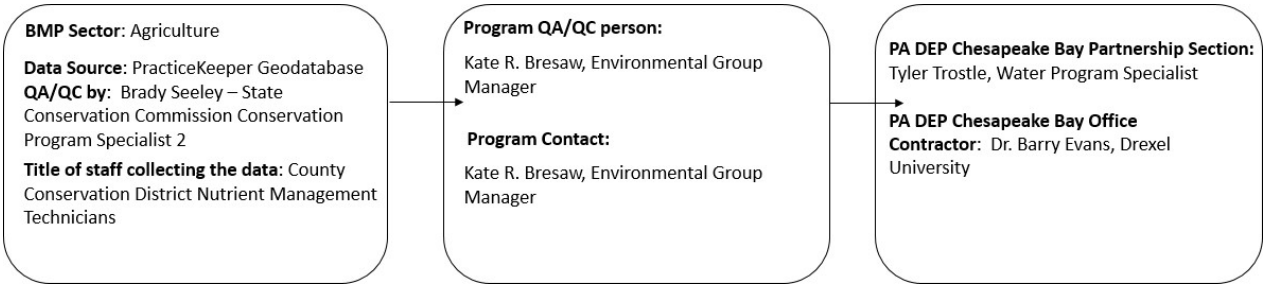
Once all duplicates are identified per the workflow above and errors corrected via the data verification procedures above, a PowerBI report view of the Data Warehouse data which includes all BMPs for NEIEN submission for the current progress year is downloaded by DEP staff and shared with QA/QC Evaluator for third-party QA/QC and DEP Chesapeake Bay Watershed Restoration Division staff for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

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 QA/QC Evaluator for additional QA/QC and a DEP Chesapeake Bay Watershed Restoration Division staff 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.

Attributes tracked for brokered manure are as followed; plan type (NBS), status and geographic scale. Geographic scale includes manually drawn NBS. County is derived from the intersection of the drawn NBS and county boundaries. Watershed is derived from the intersection of the drawn NBS and watershed boundaries. In CB watershed is derived from the interaction of the drawn NBS and the CB watershed boundary. Dates tracked are as followed, submitted, updated, withdrawn, and expiration year. Other attributes are special protection waters, total operation acres, total owned acres, total rented acres AEUS per acres and imported manure. Imported manure includes, animal type, animal sub type, amount, manure measurement unit, received from broker (Y/N), broker name, broker address, broker certification number, exporting operation states, and exporting operation county.

Attributes tracked for landowner for known land applications are as follows: exporting plan type (act 38 NMP), exporting plan subtype (CAFO/CAO, CAFO/VAO, CAO, VAO), exporting plan status, and geographic scale for exporting operation. This geographic scale includes manually drawn NMP. County is derived from the intersection of the drawn act 38 NMP and county boundaries. Watershed is derived from the intersection of the drawn act 38 NMP and watershed boundaries. In CB watershed is derived from the interaction of the drawn acct 38 NMP and CB watershed boundary. Another set of attributes are dates; submitted, updated, withdrawn, and expiration year. Other attributes are; special protection waters, total operation acres, total owned acres, total rented acres, AEUs per acre, and exported manure. Exported manure includes; importer name, address, state, county, phone number, animal type, animal sub type, manure imported

amount, manure measurement unit, total cropland, acres available for manure, manure generated by importer, out of CB watershed (y/n), and other manure imported.

Potential Sources of duplicate sources of transfer data (N/A). Data Entry Errors: 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.

Qualifications: 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:

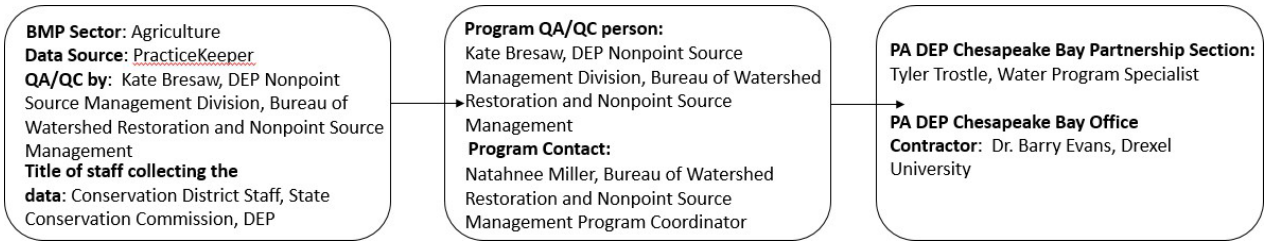
(1) Nutrient Management Orientation
(2) Managing Manure Nutrients Workshop
(3) Stormwater and Soil Loss Workshop
(4) P-Index Workshop
(5) Plan Writing Workshop
(6) ACA and Manure Storage Workshop
(7) Plan Review Workshop

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

Contact Information: Natahnee Miller, Bureau of Watershed Restoration and Nonpoint Source Management Program Coordinator - (717) 772-5952, natamiller@pa.gov
QA/QC Contact: Kate 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, Natural

BMP List:	
Access Road	Filter Strip
Animal Mortality Facility	Forest Nutrient Exclusion Area on Watercourse RI
Animal Compost Structure RI	Forest Stand Improvement
Animal Trails and Walkways	Grass Buffer on Watercourse RI
Barnyard Clean Water Diversion RI	Grass Nutrient Exclusion on Watercourse Narrow RI
Bio Retention	Grassed Waterway
Brush Management	Hedgerow Planting
Channel Bed Stabilization	Integrated Pest Management (IPM)
Cisterns & Rain Barrels	Intensive Management of Rotational Grazing
Composting Facility	Irrigation System, Microirrigation
Conservation Cover	Irrigation System, Sprinkler
Conservation Crop Rotation	Land Reclamation, Abandoned Mined Land
Constructed Wetland	Lined Waterway or Outlet
Contour Buffer Strips	Loafing Lot Management System
Contour Farming	Nutrient Management Core N
BMP List:	
Contour Orchard and Other Fruit Area	Nutrient Management Core P

Conversion of cropped land to grass-based agriculture	Nutrient Management N Placement
Critical Area Planting	Nutrient Management N Rate
Diversion	Nutrient Management N Timing
Drainage Water Management	Nutrient Management P Placement
Dry Waste Storage Structure RI	Nutrient Management P Timing
Establishment of permanent native grasses	Obstruction Removal
Exclusion Fence with Forest Buffer RI	Pipeline
Exclusion Fence with Forest Buffer	Prescribed Grazing
Exclusion Fence with Narrow Forest Buffer RI	Pumping Plant
Exclusion Fence with Grass Buffer RI	Riparian Forest Buffer
Exclusion Fence with Grass Buffer	Riparian Herbaceous Cover
Exclusion Fence with Narrow Grass Buffer RI	Roof Runoff Structure
Fence	Roofs and Covers
Field Border	Rotational Grazing RI
Floodplain Restoration	Solid/Liquid Waste Separation Facility
Forage and Biomass Planting	Spring Development
Forage Harvest Management	Stream Habitat Improvement and Management
Forest Buffer on Watercourse RI	Stream Restoration Ag
Streambank and Shoreline Protection	Waste Storage Facility
Stripcropping	Waste Transfer
Structure for Water Control	Waste Treatment
Subsurface Drain	Waste Treatment Lagoon
Surface Drainage, Main or Lateral	Water and Sediment Control Basin
Terrace	Water Well
Trails and Walkways	Watering Facility
Tree Planting	Watering Trough RI
Tree/Shrub Establishment	Wetland Buffer
Underground Outlet	Wetland Creation
Upland Wildlife Habitat Management	Wetland Restoration
Urban Forest Planting	Windbreak/Shelterbelt Establishment
Vegetated Treatment Area	
Waste Facility Closure	

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

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.

Lists of reported BMP by program breakdown:

- Nutrient Management – Core Nitrogen, Core Phosphorous, and Supplemental Nutrient Management (Nutrient Management Plans and Manure Management Plans)
- 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
- Natural: all implemented natural BMPs listed as implemented in an associated plan. For example: Riparian Forest Buffers

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 one and two 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.

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.

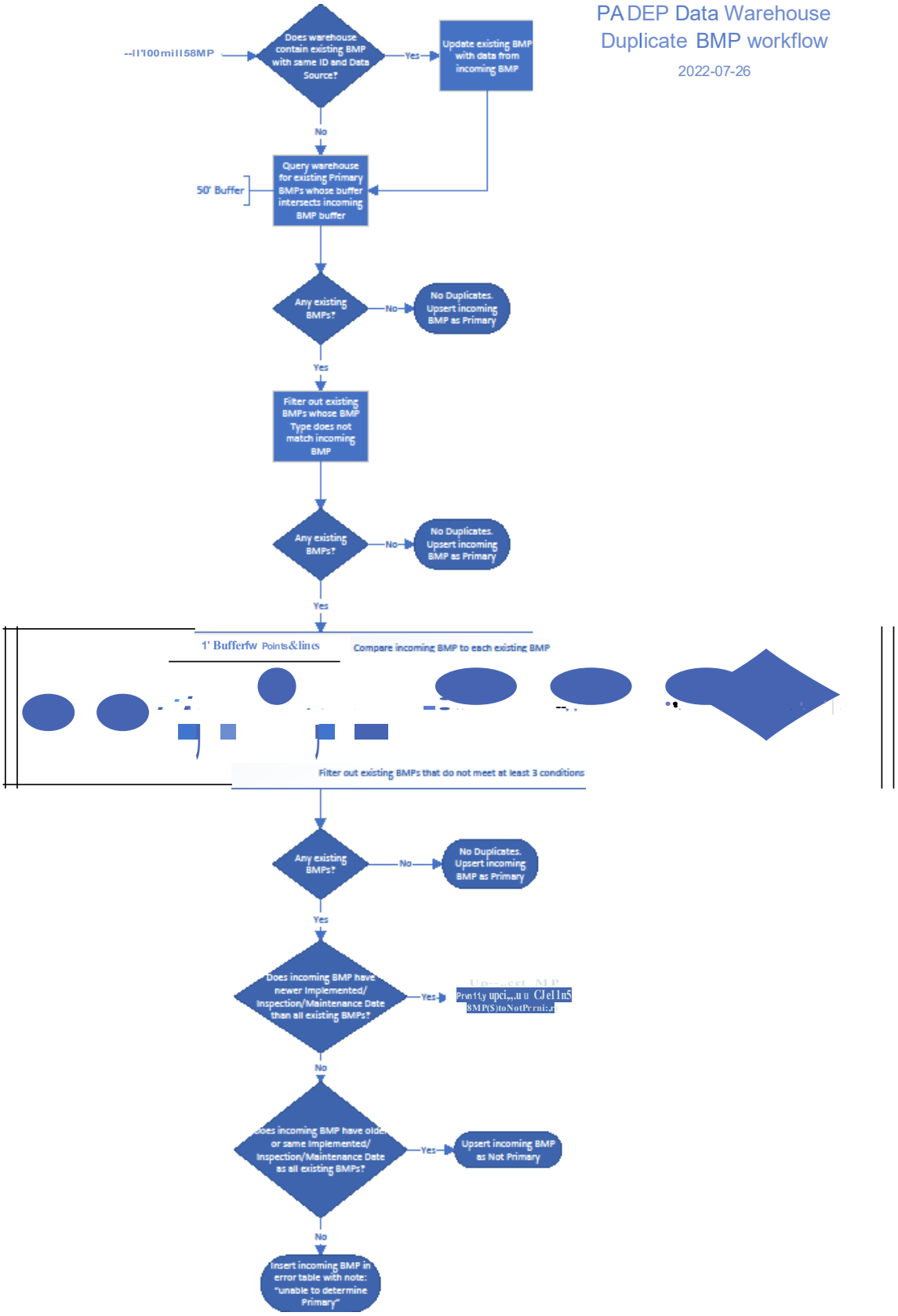
BMPs related to Act 38 Nutrient Management Plans: BMPs related to Act 38 Nutrient Management BMP type, implementation date, implemented amount, unit of measure, location data, and other identifying information are all recorded in the PracticeKeeper Geodatabase on the related BMP by CCD or SCC staff according to the PracticeKeeper – Best Management Practice (BMP) Module SOP No. BWRNSM-DATA-003 and accompanying DEP Clean Water Academy web-based training.

All BMPs: A daily refresh of PracticeKeeper data is pushed to Data Warehouse, the Azure SQL Database repository for all PracticeKeeper and Field Doc agriculture and watershed restoration BMPs, via an Application Program Interface (API) where duplicate BMPs are identified based on the criteria outlined in the workflow below.

NOTE: The primary BMP is the record that will be upserted into the NEIEN Submission Report including PracticeKeeper and FieldDoc data sources. The NEIEN Submission Report will then undergo further quality assurance review by a third party consultant.

PA DEP Data Warehouse
Duplicate BMP workflow

2022-07-26



Once all duplicates are identified per the workflow above and errors corrected via the data verification procedures above, a PowerBI report view of the Data Warehouse data which includes all BMPs for NEIEN submission for the current progress year is downloaded by DEP staff and shared with QA/QC Evaluator for third-party QA/QC and a DEP Chesapeake Bay Watershed Restoration Division staff for incorporation into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

Nutrient Management BMPs

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,* subsample size is greater than or equal to 10%; however, PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years. At which time, because the BMP Verification Review Panel has sunset, further guidance from EPA CBPO will be needed to proceed with 3.c.2. to comply with the following statement in the guidance: "the BMP Verification Review Panel shall review the alternative strategy and make a recommendation to EPA on the adequacy of the alternative." The data for each inspection is documented on the CBAIP Inspection Report according to the Chesapeake Bay Agricultural Inspection Program SOP No. BWRNSM-INSP-001. It is also recorded in the PracticeKeeper Geodatabase according to the PracticeKeeper-Agriculture Inspection

Module SOP No. BWRNSM-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.

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 unless it is transferred the DEP tenant.

DATA VERIFICATION PROCEDURES

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. 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.

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.

Potential sources of duplicate BMPs: BMPs that are reported outside of Data Warehouse including USDA programs, the Penn State Survey, REAP, NFWF, or PennVest.

Data Entry Errors: An error report identifying the reason the BMP is flagged as an error is shared with the data reporter. The data reporter then communicates with the entity responsible for data entry and they are asked to correct the data before submission to NEIEN. Any records with outstanding errors after July 25 are held until they can be corrected and are submitted to NEIEN as part of a subsequent year's progress submission.

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 thecontractors 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

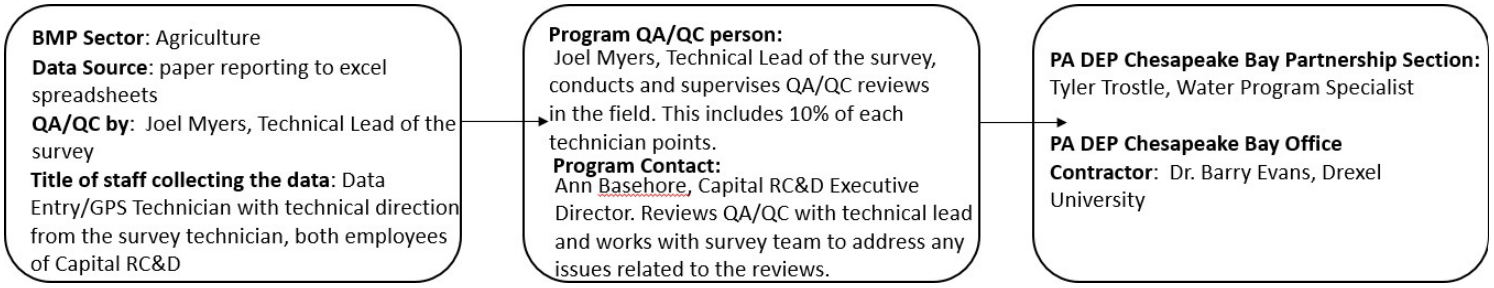
A copy of the reimbursement form, which must be signed by the landowner and the contractor ensuring that the plans were reviewed and approved to be administratively complete, can be accessed here: APRP Reimbursement Request Form 3020-FM-CBO0003B

B10.3.5 Capital RC&D Conservation Tillage Survey

Contact: Ann Basehore, Capital RC&D Executive Director - (717) 241-4361, abasehore@capitalrcd.org
QA/QC Contact: Joel Myers, Capital RC&D Annual Survey Technical Lead

DATA COMPILATION PROCEDURES

High level data flow chart:



Sector: Agriculture

BMP: Conservation Tillage Survey

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 29 counties that are surveyed in their entirety and in four additional counties only the Chesapeake Bay watershed area is surveyed. All 33 counties are surveyed on a two-year cycle, so 16 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 Tyler Trostle, 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.

Conservation tillage 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 2023: 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 2022 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 Partnership Section.

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.

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

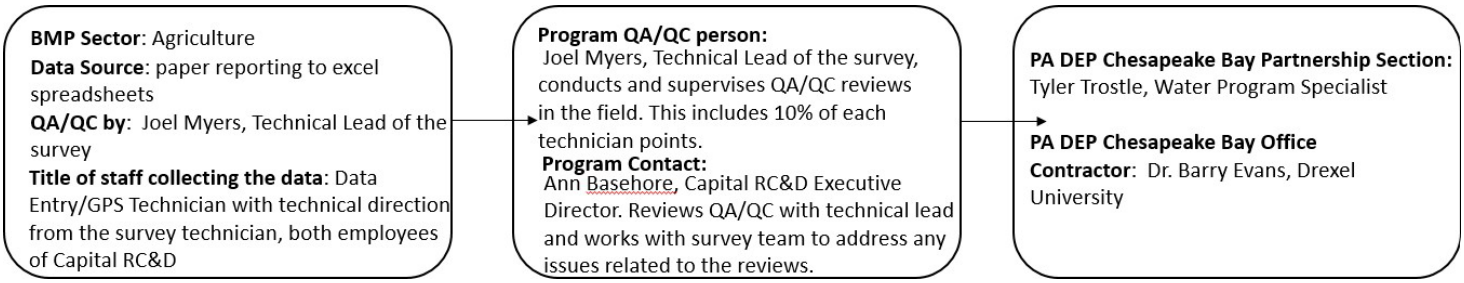
Information on conservation tillage obtained from the above survey approach is QA/QC checked as part of the survey methodology provided in Appendix C. The reported results are presumed to be accurate, and these records are verified by the program prior to reporting and sent to DEP's BWRNSM for submission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

B10.3.6 Capital RC&D Cover Crops Survey

Contact: Ann Basehore, Capital RC&D Executive Director - (717) 241-4361, abasehore@capitalrcd.org
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 RC&D, similar to the one conducted for determining conservation tillage acres (see section B10.3.5 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 are calculated: “traditional cover crops” and “commodity cover crops.”

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 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 cover crop planted and the resulting table is provided to a QA/QC Evaluator & a DEP Chesapeake Bay Watershed Restoration Division staff, DEP BWRNSM, who reviews the data and asks any pertinent questions.

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 resultsare presumed to be accurate following QC review, and these records are verified by the program prior to reportingto 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.

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

COUNTY	CROP	% AT EACH RESIDUE LEVEL (1)				TOTAL #	COVER CROP (2) as percentage of crop fields surveyed in the fall			
		0-15%	15-30%	30-60%	>60%	OBSER.	% COMMODITY	% TRADITIONAL	% Trad. W/Fall Applied Manure	% Late Planted CC
YORK	BEANS	1.8	17.7	52.2	28.3	113	22.20%	12.10%	0.00	2.70%
2020/2021	CORN	5.8	27.1	47.9	19.2	292				
	FORAGE	100.0	0.0	0.0	0.0	2				
	VEG	100.0	0.0	0.0	0.0	1				
	TOBACCO	100.0	0.0	0.0	0.0	4				
	All Crops	6.3	24.0	48.3	21.4	412				

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 for traditional cover crops only 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.

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

Pennsylvania Cover Crop Enhancement Project
At its November 17, 2022 meeting, the Bay Program's Agriculture Workgroup approved a hybrid verification approach presented as a pilot project for commodity crops and cover crops with fall nutrients data reported from the Transect and Penn State Voluntary Producer Surveys. The Pennsylvania Cover Crop Enhancement 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. This approved Ag WG methodology for the Pennsylvania Cover Crop Enhancement Project will be utilized for commodity cover crops and cover crops with fall nutrients in the future PennState / Capital RC&D annual reporting. PA DEP can differentiate the counties that the approved Pennsylvania Cover Crop Enhancement Project method was utilized for the progress year.

A link to the EPA CBPO November 17, 2022 Agriculture workgroup meeting page presentation and the hybrid Pennsylvania Cover Crop Enhancement Project Verification Methodology document for this annual practice is linked at Agriculture Workgroup Conference Call, November 2022 (chesapeakebay.net)

EPA Ag WG Decision: "The Ag WG approved the methods used for the Pennsylvania Cover Crop Enhancement Pilot Project for annual verification." November 17, 2022 Ag WG Meeting Minutes with linked approval:
https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/AgWG-Minutes-Nov-2022.pdf

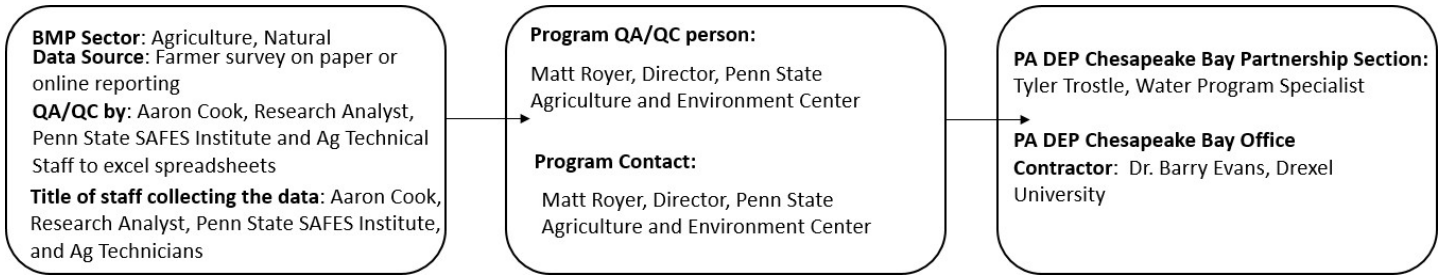
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for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

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

NEIEN Practices reported in Penn State Voluntary Producer Survey.

BMP List:	
Animal Waste Management Systems	Manure Incorporation Low Disturbance Late
Barnyard Clean Water Diversion RI	Nutrient Management Core N
Barnyard Runoff Controls	Nutrient Management Core P
Cover Crop Commodity Normal	Nutrient Management N Placement
Dry Waste Storage Structure RI	Nutrient Management N Rate
Exclusion Fence with Forest Buffer RI	Nutrient Management N Timing
Exclusion Fence with Grass Buffer RI	Nutrient Management P Placement
Exclusion Fence with Narrow Forest Buffer RI	Nutrient Management P Rate
Exclusion Fence with Narrow Grass Buffer RI	Nutrient Management P Timing
Forest Buffer	Prescribed Grazing

BMP List:	
Forest Buffer-Narrow	Rotational Grazing RI
Grass Buffer	Soil and Water Quality Conservation Plans
Manure Incorporation High Disturbance Late	Watering Trough RI
Manure Incorporation Low Disturbance Early	

There was no new information provided by the Penn State Voluntary Producer Survey for 2023 reporting year. However, the commodity cover crop data collected by PSU for 2022 Progress reporting – through the hybrid method to verify commodity cover crops in Lancaster County – was carried forward for 2023 progress reporting until a new hybrid survey is conducted in Lancaster County.

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_report_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 "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.

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 Sharestandards).

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)-772-5647, 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: Brady Seeley, Nutrient and Odor Management Program, State Conservation Commission - (717) 705-3895, braseeley@pa.gov

Note: 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.

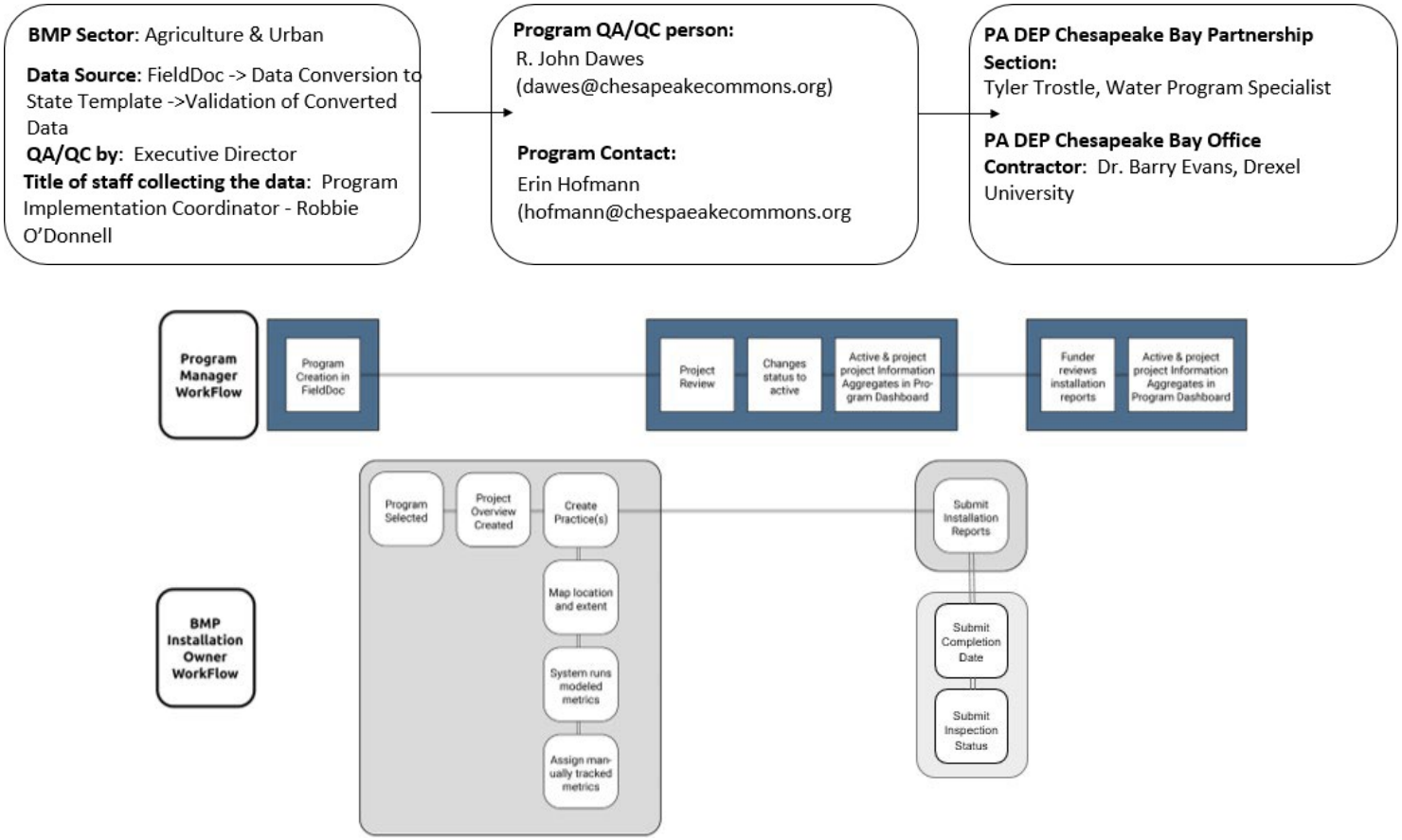
Pennsylvania is actively participating in CBPO's initiative to strengthen the verification of BMPs. DEP has convened several meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to update Pennsylvania's QAPP Addendum BMP Verification Program Plan for 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 – (814) 386-2865, Dawes@chesapeakecommons.org
QA/QC Contact: 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:	Permeable Pavement
Advanced Grey Infrastructure Nutrient Discovery Program (IDDE)	Storm Drain Cleaning
Alternative Crops	Stormwater Performance Standard Runoff Reduction
Bioretention/raingardens	Stormwater Performance Standard-Stormwater Treatment
Bioswale	Stream Restoration
Conservation Landscaping	Tree Planting - Agriculture
Dry Detention Ponds and Hydrodynamic Structures	Tree Planting - Urban Canopy
Dry Extended Detention Ponds	Tree Planting - Urban Forest Planting
Filter Strip Runoff Reduction	Urban Nutrient Management Plan
Filter Strip Stormwater Treatment	Vegetated Open Channels
Filtering Practices	Wet Ponds and Wetlands
Forest Buffer - Agriculture	Wetland Creation - Floodplain
Forest Buffer - Urban	Wetland Creation - Headwater
Forest Buffer, Narrow - Agriculture	Wetland Enhancement
Grass Buffer - Agriculture	Wetland Rehabilitation
BMP List:	
Grass Buffer, Narrow	Wetland Restoration - Floodplain
Impervious Surface Reduction	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 theirefforts 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 helpusers:

- Collaboratively manage and document the implementation of your organization's restoration projects;

- Map where your organization is working to restore water quality;
- Plan, implement, and monitor best management practices (BMPs) associated with your restoration sites and projects; and
- Manage track and share restoration outcomes.

FieldDoc Program Users:

- 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.
- Pennsylvania DEP to track their Clean Water County Wide Action Plans across the Chesapeake Bay.
- Richard K. Mellon Foundation to track implementation investments in Western Pennsylvania; Virginia Environmental Endowment.

Cheesecake Commons 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 FieldDocthat serve as the primary means for aggregating BMP data into the platform. In Fielddocthe 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:

- PA County Coordinators aggregate data and ensure it satisfies DEP requirements for reporting via FieldDoc
- PA County Coordinators log in to FieldDoc and upload necessary BMP data to agiven project that is associated with the appropriate County Action Plan in the system. Data includes:
    - Practice Name
    - Practice Description
    - Practice Type
    - Appropriate metrics (i.e.: acres of forest buffers, acres of prescribed grazing)
    - Practice Completion Date and Inspection Status(s)
- Data are reviewed by DEP staff
- Data are provided as an export by DEP staff, deduplicated, and integrated into state reporting workflows.
- 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 generaluser type and function are outlined in the table below:

FieldDoc Permission Level	User	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
FieldDoc Permission Level	**User**	**FieldDoc Feature Access**
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 • Add any collaborator to a project their account has created.

DATA VERIFICATION PROCEDURES

Cheesecake Commons site-specific inputs and 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 theproject's area of implementation using over 200 BMPs and their default efficiencies.

Chesapeake Commons 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 replacebut 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 beimplemented 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
BMP Funding Program
BMP Installation Organization
BMP Funding Status (active, closed)
BMP modeled pollution estimated reduction via an iteration of Bay Program scenario tools

Geographic data is collected at the practice installation level, collecting both coordinate and geojson geographic information. County and watershed information is collected as well.

Chesapeake Commons 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.

Chesapeake Commons Support materials including step-by-step instructions, downloaded pdfs, and video tutorialscan 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.

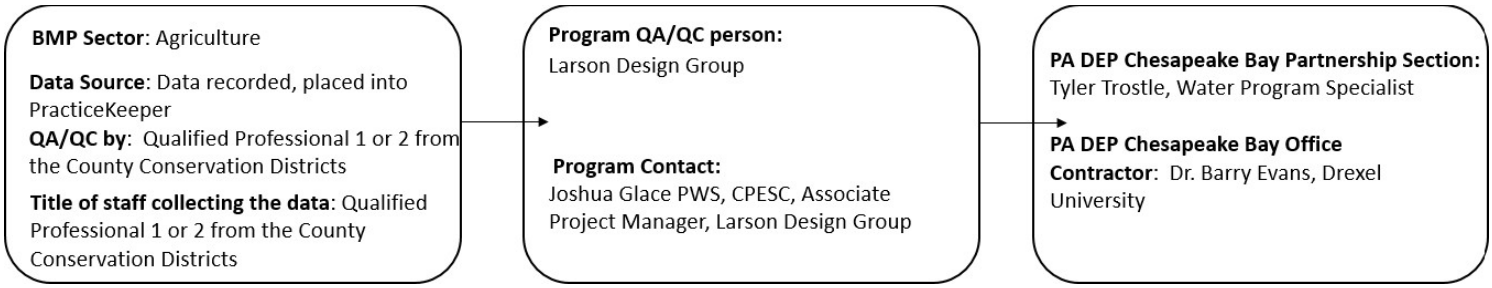
B10.3.11 Larson Design Group (Pilot Program)

Contact: Joshua Glace PWS, CPESC, Associate Project Manager, Larson Design Group – (570) 600-9026, jglace@larsondesigngroup.com
QA/QC Contact: Joshua Glace PWS, CPESC, Associate Project Manager, Larson Design Group – (570) 600-9026, jglace@larsondesigngroup.com

Note: This is a placeholder for the Non-Intrusive BMP Verification Methodology that was approved at August 17, 2023 Agriculture Workgroup. For further information, please reference Larson Design Group's Non-Intrusive BMP Verification Methodology SOP.

DATA COMPILATION PROCEDURES:

High level data flow chart:



Sector: Agriculture

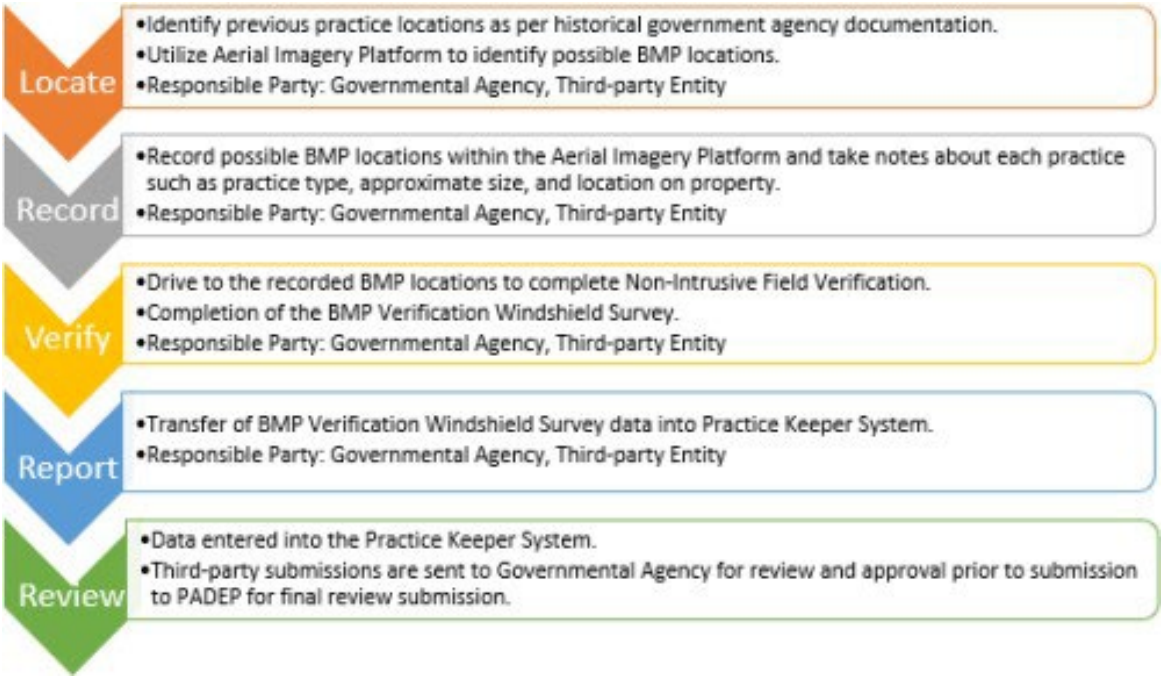
BMP List: Grassed Nutrient Exclusion Area on Watercourse (RI-7) & (RI-8), Forest Nutrient Exclusion Area on Watercourse (RI-9) & (RI-10), Barnyard Clean Water Diversion (RI-16), and Watering Trough (RI-18)

This pilot program methodology was developed for utilization within the northern Chesapeake Bay Region of Pennsylvania. This is a large area with agricultural activities scattered across the landscape. This trend in land use contributes to substantial driving time to travel to farms and properties within an agency's area. This methodology was developed to address this concern and allow coverage of large, expansive areas in a timely manner. The process is used to identify and verify both new (previously un-identified) and existing known BMPs. The verification initiates a new RI BMP or re-establishes the verification timeline on existing BMPs. See Appendix I for LDG's Non-Intrusive BMP Standard of Procedure.

For a preliminary review of each county's landscape, an aerial desktop review was completed using a developed ArcGIS Map Portal. Mapping portals allow you to create a published version of an ArcGIS map through a web browser. The mapping portal platforms are created on a county level and hold county-specific data sets that are publicly accessible. Layers utilized within the

portal creation included aerial imagery, roadways, parcel lines, mapped streams, and county municipality boundaries. All map layers are county specific references to aid in the detection of BMP locations across each landscape.

Data collection forms were created through the utilization of the Survey123 Application. Survey123 is a web-based, form-centric application employed for field survey and data collection processes for various in-field tasks. The Survey123 Data Forms can be customized for specified requirements for any given project and can be accessed through the Survey123 App on a compatible mobile device or tablet. Field data forms were constructed in reference to the verification checklists and visual indicators outlined within the Chesapeake Bay RI Practice Definitions and Verification Visual Indicators Report, as well as the sample data collection forms provided by Franklin County Conservation District that received approval for program utilization through the DEP Chesapeake Bay Office.



DATA VERIFICATION PROCEDURES

After the entry of the BMP into the Practice Keeper System, the BMP instance is submitted to the associated governmental agency for qualified Group 1 professionals to review. This procedure ensures that the practices that are entered are accurate and confirms that this is not an existing practice in the Practice Keeper database to prevent duplication of record submissions. All practices have required data that needs to be entered in order to receive credit for the BMP. Any accuracy issues with the recorded BMPs are rejected and sent back to the partnership portal to be corrected and re-submitted for review. Any identified duplicate practices are removed from the Practice Keeper system.

In addition, each BMP entered into the PracticeKeeper geodatabase is assigned a unique identifier. Each year, the DEP Chesapeake Bay Watershed Restoration Division will generate the report of BMPs and attributes which have been entered into the PracticeKeeper geodatabase and communicate with our program if any issues are identified with a BMP for which LDG is a tenant. A QA/QC Evaluator will provide additional QA/QC and DEP Chesapeake Bay Watershed Restoration Division staff will incorporate the final data set into the BMP Data Warehouse and eventually to EPA Chesapeake Bay Program Office through NEIEN.

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 Data Warehouse Application housed on DEP Servers. The application is designed tostreamline NEIEN record submission and additionally allows for data analytics. Phase 6 Data Warehouse application (replacing the Phase 5 version) was delivered in October 2018 andwill 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, 2023.

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

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

Region 3 Quality System

R3_QA@epa.gov

Quality Document Status Memo

DATE	2-9-24		
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 #*: DCN 220065.2 *Document Date:* February 9, 2023 *Document Type: Quality Assurance Project Plan (QAPP)* If other, specify: Click or tap here to enter text.		
FROM *EPA Delegated Approving Official (DAO)*	Name: Durga Ghosh Division: CBPO Phone: E-mail: dghosh@chesapeakebay.net	*DAO Signature*	Durga Ghosh 02/14/2024
Additional Reviewer	Name: Auston Smith Division: CBPO Phone: E-mail: smith.auston@epa.gov	*Additional Reviewer Signature*	
Additional Reviewer	Name: Ruth Cassilly Division: CBPO- UMD Phone: E-mail: rcassilly@chesapeakebay.net	*Additional Reviewer Signature*	*Ruth Cassilly 2-9-24*
CC	Kia Long Regional Quality Assurance Manager EPA Region 3, LSASD, ASQAB	**THRU** *EPA Project Officer or equivalent*	☐ N/A Name: Autumn Rose Division: CBPO
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
X Approved *addressed key requirements satisfactorily.*	• The document is valid for: ☐ 5 years ☐ Term of project, i.e., 1-2 years ☒ Other: To 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: • 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:

2023 Progress Submission Comments:

- All future updates to the QAPP for the current progress year should be submitted in a track changes, colored or highlighted text format so that they are easily distinguishable from previously existing QAPP documentation, which should be black.

- **2-9-24 CBPO Comment: All revision requests for the final 2-8-24 submission have been resolved, please refer to 2-9-24 CBP Comments in the Specific by Document Section below for additional detail.**

Specific by Document Section

Document Section	Page #	EPA Comments
A3 Distribution List	8	Please add Auston Smith here and move Jeff to copy 10/19/2023 PA DEP Response: Added Auston Smith and moved Jeff Sweeney to copy.- **11-2-23 CBP: Resolved- thankyou**

A4.2: New Programs Providing Data	10	*"Data will be included into the progress submission for the current year."* should be changed to reflect the submission of both historic data and current progress year data in this dataset- something similar to: "This dataset will include historic BMP data with accurate implementation

		dates as well as BMPs implemented in the current progress year." 10/19/2023 PA DEP Response: Replaced the original statement with the suggested wording. **11-2-23 CBP: Resolved- thankyou**
Table A1. Primary Sources of BMP information	12	If some of these programs are now reporting to the Data Warehouse through Practice Keeper or Field Doc, please update those accordingly in Table A1's 'How Information is Received' column. 10/19/2023 PA DEP Response: Data sources that were previously identified as "Data Warehouse NEIEN Submission Report" were revised to "PracticeKeeper Report to Data Warehouse" in the "How information is Received" column of Table A1. **11-2-23 CBP: Resolved- thankyou**
PA DEP Data Warehouse Duplicate BMP Workflow Diagram	35	Please explain what a "Primary BMP" is, does this mean a newly implemented BMP or a re-verified BMP? What does it mean when a BMP is not a Primary BMP? 10/30/2023 PA DEP Response: Added notes to page 34, 39, 132, 141, 150. "NOTE: The primary BMP is the record that will be upserted into the NEIEN Submission Report including PracticeKeeper and FieldDoc data sources. The NEIEN Submission Report will then undergo further quality assurance review by a third party consultant." **11/6/23 CBP Comment** **Is the red underlined word supposed to read inserted or uploaded? If the primary BMP is replacing a previously existing BMP that has been re-verified, is the original information pertaining to implementation date retained in the dataset?** 11/6/2023 Note: Yes, "upserted" is correct, as provided by contractor. E.g., "The BMP is upserted into a higher table." **11/20/23 CBP Comment: Thank you- resolved** *Comparison of incoming BMP Data to existing BMP data*- If the purpose here is to filter out existing BMPs that are duplicative of the newly incoming BMP, then shouldn't sentence here read-- Filter out existing BMPs that DO MEET at least 3 conditions? Please provide clarification concerning this process in the QAPP 10/30/2023 PA DEP Response: Disagree. Unless at least 3 of the criteria are met, then the BMP is not deemed a potential duplicate and further analysis will not be necessary. If there are BMPs that meet at least 3 of

		the criteria, the analysis below that point in the flow chart will be run. **11/6/23 CBP Comment** **From DEP's response comment- CBP understands that if a BMP doesn't meet at least 3 criteria in the long rectangle, it is reported as a primary BMP in the NEIEN dataset- if it does, it undergoes additional duplication checks-is that correct?** 11/6/2023 Note: Yes, if it does meet 3 criteria, it goes through additional checks in flow chart. **11/20/23 CBP Comment- resolved**
B10.2.1 DEP Stream Bank Fencing Program- Duplicate Workflow	36	Does the dataset described here include all BMPs- those in the historical record as well as the current progress year? The CBP office's verification procedures compare the change in the most recent one year period to the change since 2009. 10/30/2023 PA DEP Response: The dataset described here includes newly verified and inspected BMPs regardless of the date of implementation. It includes BMPs that were previously reported and received an inspection in the current year, BMPs that were not previously known and were implemented before the current year, and BMPs that were implemented during the current year. **11/6/23 CBP Comment: Accurate dates of initial implementation, inspection and reverification are expected for all BMPs reported to the CBP for annual progress.** 11/6/2023 Note: To best of ability, DEP attempts to record implementation and inspected-on date. QAPP currently describes/documents those verification efforts, including on pages 23, 150, 153, and elsewhere. **11/20/23 CBP Comment -thank you. Resolved**
Data Verification Procedures- Potential Sources of Duplicate BMPs	36	Please reference the page or section of the QAPP where it explains how possible double-counting is addressed among these programs reporting outside of the Data Warehouse 10/19/2023 PA DEP Response: Added following in-text reference to applicable section: "See pages 22-24 for QA/QC methods to address double counting for sources reporting outside of Data Warehouse." **11-2-23 CBP: Resolved- thankyou**
B10.2.5 DEP Abandoned Mine Land Reclamation and Active Mining Program- Data Verification Procedure	49	Are multiple types of BMPs are being reported from abandoned mine reclamation sites? Is one of these BMPs being reported as the CBP defined ABR BMP, which by definition would include tree planting on the reclamation site? Is active mine reclamation construction being reported as E&S in the model? 10/19/2023 PA DEP Response: PA DEP BAMR only reports "Land Reclamation, Abandoned Mined Land" as a BMP. Additional information from Patrick Weber, BAMR, received on

		10.20.2023: "Land Reclamation, Abandoned Mine Land (AML)" BMP entails reclaiming AML to approximate original contour (AOC) be moving un-reclaimed spoil piles to fill in abandoned surface mining pits against dangerous vertical highwall surfaces and then either (as per the request/approval of the property owner) planting native grasses and or tree planting in loosely backfilled spoil to promote infiltration. Additionally, mine refuse piles with no vegetation are also ether regraded and or removed to result in finished area that is then revegetated with native grasses. Additionally, influent abandoned mine drainage (AMD) is collected, treated by reducing acidity and metals through raising the pH and then being released as treated effluent to downstream water courses. Temporary sediment filter barriers, sediment filter basins, and temporary seeding are also utilized during the construction phase. **11-2-23 CBP: Thank you very much for this additional information, it is very helpful. CBP will discuss this information internally and await further elaboration from Barry Evans before responding.** 10/25/2023 PA DEP Response: Received confirmation from Dr. Barry Evans that BMPs are not counted as E&S in the model. **11/20/2023 CBP Comment- Resolved in terms of E&S BMP reporting question. Resolved in terms of reporting the AMR BMP for 2023 Annual Progress credit.** **CBP will follow-up with PA DEP concerning the CBP Abandoned Mine Reclamation (AMR) BMP definition and future reporting for annual progress. In the C23 model, the AMR BMP will receive a land-use change credit from the *mixed open* to *forested* land-use. In order to ensure that AMR practices that involve the establishment of grass vegetation rather than tree planting can still be reported to the CBP for credit in C23 and future model versions, the CBP will be working to amend the NEIEN Appendix for 2024 Progress to include a definition for AMR revegetation using grass or other vegetative cover beyond the use of tree planting. To that end, if they are not already doing so, PA DEP Dept. of Mine Reclamation should begin tracking acres of mine reclamation that involve the establishment of tree cover separately from the establishment of grasses, as these practices will need to be reported separately for crediting in the future.**
B10.2.25 Conservation Excellence Grant (CEG) Program: Data Verification Procedures	108	Please omit programs that are now also reporting through the PK database and include only sources still reported separately. Please also elaborate on what is meant by "reported separately", is this separately from the PK database, or separately from the Data Warehouse database. 10/19/2023 PA DEP Response: The programs not reporting through PK

		have been removed from paragraph. A separately reported BMP is any BMP that is not reported through the PracticeKeeper interface into Data Warehouse, instead email in excel to the PA DEP CBPS, as described on page 32. Clarifying question: does EPA want to modify additional QAPP content? **11-2-23 CBP Comment: Thank you for making the reporting revision, and for adding the clarifying comment concerning "separately reported" BMPs to the QAPP on page 108- no additional revisions are necessary- Resolved.**
B10.2.30 PA Turnpike Commission MS4/Urban Stormwater SCMs	122	*Cross walked BMPs with EPA CBPO BMP Quick Reference Guide and NEIEN reporting template*: What is being reported here in the NEIEN dataset - plan data and field collected data or one or the other? 10/19/2023 PA DEP Response: The reported BMPs are field-verified plan data, e.g., these plans were physically verified in the field, as described in the Data Compilation and Data Verification Procedures sections, pages 122-125. Clarifying question: are the compilation and verification procedures descriptions sufficient or is more information required? **11-2-23 CBP Comment- If only field verified BMP data is being reported as stated above, PA DEP should clarify that in the QAPP, this paragraph on page 122 states that BMPs are being reported from both plans and from the field:** *"BMP data is gathered from the best-available plans (design, construction, as-built) and by field collection of SCM and stormwater network locations and attributes. Plan data is georeferenced into the GIS environment and digitized on the layers in the schema. All BMPs are then verified by field visits. All field collected data are imported into the GIS environment, analyzed, and augmented by the IT Department and its consultants, if required, to ensure that the information is connected to the stormwater network and useable."* **Presumably BMPs from "as built" plan inspections have been field verified, if this is the case- suggest revising the paragraph to add this clarity** 11/3/2023 PA DEP Response: The clarifying text was added to address reviewer comments, highlighted in yellow above. **11/20/23 CBP Comment- Thank you for making this revision in the QAPP. Resolved**

B10.3.1 Nutrient and Manure Management Program: Data Compilation Procedures	131	Related to subsample size calculation documentation- In the 2022 Progress version of the QAPP, there was an explanation for the calculation of the subsample size, which was requested by CBPO in 2022, please restore the explanation of the calculation of the subsample size- **please refer to the 2023 QAPP w/CBP Comments for further elaboration.** 10/30/2023 PA DEP Response: The following statement was removed from the QAPP because it is not relevant to the current 2022-2023 reporting year: …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. And replaced with the generalized text to allow for this section of the QAPP to remain correct as long as it remains consistent with 3.c.1. of the *Chesapeake Bay Program Partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014* to avoid revisions relating the specific number of unique operations and records inspected each year. This was done to maintain as much consistency in the QAPP from year to year as possible. Consistent with 3.c.1. of the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014,* subsample size is greater than or equal to 10%; however, PA may propose an alternative strategy for follow-up sampling of regulatory programs in future years. DEP believes that the language provided adequately assures that the requirements set forth in the *Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance,* are met and asks that EPA reconsider the request. 11/6/2023 Note: PA DEP will provide overview information about the general methodology but does not need to include actual figures/numbers. **11/8/2023 PA DEP Response: Revised language as follows on page 131, 138:** *Consistent with 3.c.1. of the Chesapeake Bay Program partner's Agricultural Workgroup's Agricultural BMP Verification Guidance, August 8, 2014, the subsample size is greater than or equal to 10% as is calculated by the ratio of the number unique agricultural operations that received an inspection in the current reporting year during which MMP records were reviewed to the total number of known MMPs and NBSs that were initially verified as part of state regulatory program. However…* **11/20/23 CBP Comment- thank you. Resolved**

Supplemental NM BMPs	132	In order to obtain the data needed to determine Supplemental NM practice implementation within the CBAIP, is PA using information collected from completed Agricultural Operation Supplemental

		Information forms (3830-FM-BCW0524a) in addition to completed MMPs? If so, please document the use of this data source in the QAPP 10/30/2023 PA DEP Response: No. 11/6/2023 Note- PA DEP will include additional explanation about how information from optional supplemental forms are collected and incorporated. Provide general overview of process: e.g., Inspectors are referred to supplemental form, including examples of types of questions, etc. Include revision in QAPP and note text changes on pages. **11/8/2023 PA DEP Response: The following was added on page 131, 139:** ***Through the state regulatory programs, 100% of the known MMPs and NBSs are initially verified. The MMPs and NBSs meeting the definitions of Core Nutrient Management are then recorded with any associated planned Supplemental Nutrient Management BMPs in the PracticeKeeper Database.*** ***… 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 which include information found on the Agricultural Operation Supplemental Information form (3320-FM-BWRNSM0008a) during the CBAIP inspection.*** **11/20/23 CBP Comment- thank you. Resolved.**
B10.3.6 Capital Area RC&D Cover Crops Survey- Data Verification Procedures	160	The RC&D survey alone is not an approved methodology for the verification of commodity cover crops- the extrapolation method used for the calculation of traditional cover crop acreage cannot be used for commodity cover crops or traditional cover crops with fall manure. This method cannot be used to verify commodity or traditional with fall nutrient cover crops for annual progress reporting. Please correct this paragraph to reflect these facts. **11-2-23 CBP Comment regarding highlighted request above, referring to this passage on page 161 of the QAPP, please make the revision included in red text to the QAPP to resolve this issue** *"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 for traditional cover crops only 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." 11/3/2023 PA DEP Comment: Revised text, as suggested, on page 162. **11/20/23 CBP Comment: Thank you- resolved** 10/23/23 If PA intends to report either commodity or fall nutrient cover crop types for 2023 Progress or in future years, documentation on data collection, QA/QC and the approved verification methods for both should be added and remain in this section of the QAPP going forward. **Please refer to the 2023 QAPP w/CBP Comments for further elaboration.** 10/23/2023 PA DEP Response: Provided the description of the approved hybrid survey approach that was included in 2022, including the link to AgWG Nov 2022 decision and documentation. **11-2-23 CBP Comment**- Thank you for documenting the verification method approved for commodity cover crops- **Resolved** **1-8-24 CBP Comment:** PA has reported the *cover crops with fall nutrients* BMP for both the 2022 and 2023 Progress years. In order for CBPO to credit this BMP towards annual Progress- it needs to be documented in the NPS QAPP 2-8-24 submission. Documentation should include an accounting of the data sources, collection, reporting, quality assurance and verification methods used for this BMP. Please also refer to the *Cover Crop Verification Discussion Summary* included in the CBPO email sent with this Memo on 1-8-24 for further elaboration and reach out to CBPO verification staff with any questions if needed. 1-11-24 PA DEP Response: Provided clarifying information on page 159 to specify that the data compilation and verification procedures apply to all traditional cover crops with or without fall nutrients: **BMP List:** Cover Crop, Cover Crop with Fall Nutrients … For reporting purposes, the percentage of cultivated acres under two types of cover crops are calculated: "traditional cover crops" (with or without fall nutrients applied) and "commodity cover crops." **1-23-24 CBP Comment**: *Cover crop with fall nutrients BMP* cannot be verified using the Capital RC&D Survey method- for 2023 Progress: the hybrid transect survey/PSU (Pennsylvania Cover Crop Enhancement Project) correlation method (currently produced for Lancaster County only)- is the approved method PA can use to collect data and verify this BMP- this data can be extrapolated to the entire county and carried

		forward in future years until a new Cover Crop Enhancement survey is completed. For 2023 Progress, PA should include data sources, tracking, reporting, and verification information for the *cover crop with fall nutrients BMP* in the PSU/Transect Hybrid survey section of the QAPP pg 162 **1-11-24 PA DEP Revised Response**: Corrected information on page 162 re: the hybrid transect survey/PSU (Pennsylvania Cover Crop Enhancement Project) correlation method, approved by the Agriculture Workgroup on November 17, 2022, for commodity crops and cover crops with fall nutrients data reported from the Transect and Penn State Voluntary Producer Surveys. **CBP 2/9/24 Comment: Resolved- thank you** Provided clarifying information about commodity crop data collection on page 165: "However, the commodity cover crop data collected by PSU for 2022 Progress reporting – through the hybrid method to verify commodity cover crops in Lancaster County – was carried forward for 2023 Progress reporting until a new hybrid survey is conducted in Lancaster County." **CBP 1/23/24 Comment-** noted thank you- nothing further needed for commodity cover crops- **resolved** Corrected all instances of "Capital Area RC&D" to "Capital RC&D" **11-2-23 CBP Comment: Resolved, thank you**
B10.3.11 Larson Design Group (Pilot Program)-Data Compilation Procedures	181	Please include in the documentation of the data source description that the process is used to identify and verify both new (previously un-identified) and existing known BMPs, and that the verification either initiates a new RI BMP or re-establishes the verification timeline on existing BMPs. Please provide a link to the latest documentation from LDG detailing the data collection, recording, reporting, quality assurance and verification procedures of this pilot program. 10/20/2023 PA DEP Response: LDG's Non-Intrusive BMP Standard of Procedure (SOP) was added as Appendix I for reference and cited in text on page 181. The process is used to identify and verify both new (previously un-identified) and existing known BMPs. The verification

		initiates a new RI BMP or re-establishes the verification timeline on existing BMPs. **11-2-23 CBP Comment- Thank you for adding the SOP as Appendix I and citing that within the text- that portion of this revision is resolved.** **Please add the highlighted statement above to the QAPP documentation for this LGD verification method to resolve the request.** 11/3/2023 PA DEP Comment: Revised text, as suggested, on page 183. **11/20/23 CBP Comment- thank you. Resolved**
Appendix D: Description of the Cover Crop Survey- Ag Workgroup Approval	192	Information in this paragraph specifically stating that this method was developed and approved for commodity cover crop verification has been omitted from the QAPP for 2023 Progress submission. Please revise this paragraph to include that information if PA intends to report commodity cover crops using this method going forward. As a reminder, the Cover Crop Enhancement verification method that the CBP approved was based on the data analysis for Lancaster County, so additional progress reporting using this method would be limited to that county unless a similar data analysis is completed for other counties with similar available data. When reporting this BMP from this data source, PA will be expected to detail the specific counties for which this method was used for the applicable progress year in the QAPP. 10/19/2023 PA DEP Response: Provided the 2022 statement that had been omitted, as submitted and approved in the 2022 QAPP report: "This approved AgWG methodology for the Pennsylvania Cover Crop Enhancement Project will be utilized for only commodity cover crops in the future PennState / Capital RC&D annual reporting. PA DEP can differentiate the counties that the approved Pennsylvania Cover Crop Enhancement Project method was utilized for the progress year." **11-2-23 CBP Comment: Thankyou- Resolved**
B10.2.16 DEP Chapter 105 Waterways Engineering and Wetlands	82	**1-23-24 CBPO Comment**: If PA submitted wetland mitigation acreage for 2023 Progress, please provide the records for the amount submitted in the 2-8-24 QAPP submission- Please 1-24-24 QAPP with CBP Comments for elaboration. As long as PA continues to report wetland mitigation acres to the CBP for annual progress, these acres need to be recorded separately in the QAPP for the current Progress Year. 1/25/2024 PA DEP Response: The BMP table on page 82 was updated with current Progress Year data. **2-9-24 CBP Comment Resolved- thank you**
Appendix H: BMP QAPP Addendum		

Priority Initiative 1: Agricultural Compliance Cover Crop -Commodity	16	CTIC Survey method is not an approved verification method for commodity cover crops, and cannot be used for data collection and verification for CBP progress reporting. The recently approved hybrid verification method combining CTIC survey points and PSU survey data, known as the Cover Crop Enhancement verification method, can be used as a data collection and verification method for commodity cover crops- please amend this portion of the QAPP to reflect this information. 10/19/2023 PA DEP Response: Provided the following revised responses in tracked change - "Follow the approved hybrid verification method combining CTIC survey points and PSU survey data, known as the Cover Crop Enhancement verification method, as the data collection and verification method for commodity cover crops (see Appendix D)" and "Actively participate in and convene meetings with Agriculture, Stormwater, and Forestry Sector leads and stakeholders in an ongoing effort to strengthen the verification of BMPs." **11-2-23 CBP Comment: Resolved, thank you**

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 Surveyfor 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 onscreen 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.

DRAFT

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 thesame 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 dateof 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 pointswere 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 threeindividuals, two of whom survey multiple counties in order to achieve greater consistency between counties. Each team includes:

- 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.
- Consulting Technician surveys multiple counties each year and provides the description of each observation (i.e., 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 agronomiccrops.
- 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 andenters the cover crop data determined by the consulting technician. Qualification required forthis 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 arepre-loaded and appear on screen in a map of the survey route. The location of the survey vehicle istracked 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 betweenthose 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 revisitedto 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 (AgWG) 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. This approved AgWG methodology for the Pennsylvania Cover Crop Enhancement Project will be utilized for only commodity cover crops in the future PennState / Capital RC&D annual reporting. PA DEP can differentiate the counties that the approved Pennsylvania Cover Crop Enhancement Project method was utilized for the progress year.

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

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 thatwas used for the 2013 and 2014 Progress Runs. These past two estimates, however, also have to beupdated 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 samepermit 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 ona county-specific basis with estimates based on the results of the tillage survey conducted annually bythe 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 effectof 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 usingthe 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 thegroup within DEP responsible for tracking urban stormwater permits. For historic reportingpurposes, 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 Bedford, Centre, Columbia, Cumberland, Dauphin, Huntingdon, Juniata, Lebanon, Lycoming, Mifflin, Northumberland, Perry, Snyder, and Tioga Countieswas conducted to provide producers an opportunity to self-report conservation practices implemented on their farms. This survey followed successful, CBP-approved 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_final.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:

- Practices funded with government funds that are already counted from government sources of data.
- Practices captured through existing regulatory programs.
- Practices already verified and reported in PracticeKeeper by county conservation districts.
- 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.

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).

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.

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 "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.

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.

a) 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.

b) 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.

c) 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)

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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 Project Plan

The BMP Verification Project Plan: QAPP Addendum was sent via email to EPA CBPO on September 1, 2023. The BMP Verification Program Plan: QAPP Addendum is also published on the DEP BMP Verification website.

Appendix I: Non-Intrusive BMP Verification Standard of Procedure

The Non-Intrusive BMP Standard of Procedure was sent via email to EPA CBPO on October 23, 2023 and published on the DEP BMP Verification website.