

Guidance for Revising the
Jurisdictions' Chesapeake Bay
Implementation Grant Quality
Assurance Project Plans for
Tracking, Verifying, and
Reporting Nutrient and
Sediment Pollutant Load
Reducing Practices, Treatments,
and Technologies

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Introduction

Chesapeake Bay Program jurisdictional partners have reported nonpoint source BMP data since the early 2000s using financial assistance provided through EPA grants. BMP data primarily are used to assess progress towards the jurisdictions meeting their Phase II Watershed Implementation Plans and two year milestones. Each jurisdictional grantee is required to have a quality assurance project plan (QAPP) that describes how BMP data are tracked, verified, and reported to the Chesapeake Bay Program Office (CBPO) and how the accuracy of the data is assured.

The jurisdictional Chesapeake Bay Implementation Grant recipients review their QAPPs *annually* as a condition of the grant and revise them to reflect any changes that have occurred since the last approval. Bay Program partners have made significant improvements in recent years related to practices and the procedures and quality controls for gathering, checking, verifying, and reporting their BMP implementation data. The purpose of this guidance is to standardize and communicate quality expectations for revising the jurisdictions' QAPPs both in anticipation of submission of the 2014 progress data, which is the next reporting period beginning July 2014 and ending June 2015, as well as for review by the Bay Program partners' BMP Verification Review Panel and approval by EPA.

All of the seven jurisdictions' QAPPs can better document improvements made for reporting data through the National Environmental Information Exchange Network (NEIEN). Enhanced documentation is also needed for describing each jurisdiction's plans and procedures to verify the implementation and continued function of all practices, treatments, and technologies to be credited for nutrient and sediment pollutant load reductions as specified in Chesapeake Bay Program approved BMP verification guidance documents for agriculture, forestry, urban stormwater, wastewater, streams, and wetlands.

Guidance for Revising Jurisdictions' CBIG Quality Assurance Project Plans

The EPA Quality Assurance Project Plan format is used below to explain the content expected in the jurisdictions' enhanced BMP tracking, verification, and reporting QAPPs. This guidance can be used for both overall QAPPs and the underlying sources sector- and habitat-specific sections.

GROUP A: PROJECT MANAGEMENT

A1: Title and Approval Sheet

A2: Table of Contents

A3: Distribution List

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A4: Project/Task Organization

- 1) Identify all Sources and Providers of Data – Include all organizations that provide BMP data to reporting agency.
 - a. For each data provider, give the agency name, contact person, and BMP types provided.
 - b. Organize and link to sector-specific QAPP, if applicable.
 - c. Indicate the implementation mechanism for each data source, i.e., cost-share, non cost-share, regulatory, permit-issuing, etc.
- 2) Provide organizational charts for major data providers showing the organizational units and staff positions responsible for data entry, data management, and reporting.
 - a. Include staff responsible for QA/QC checks – they should be independent from those responsible for data collection and entry.
 - b. Include staff positions responsible for on-site inspections and record reviews.

A5: Problem Definition/Background

- 1) Summarize by source sector each agency's history and involvement with BMP data compilation and reporting. Cite lead agencies, state cost-share programs, what year the agency began reporting practices to the CBPO via NEIEN exchange, etc.
- 2) Explain why the data are being reported, for example:

State agencies compile and report BMP data to the CBPO for assessments of progress towards meeting the state's Phase II Watershed Implementation Plan. 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.
- 3) Emphasize the following points:
 - a. Changes in management actions include: implementation of a new BMP; maintenance of an existing BMP (not to be reported as a new practice); or renewed practices such as nutrient management plans.
 - b. Changes in management actions *do not* include the reporting existing practices in a new year under a new BMP name.
 - c. BMPs units will be tracked directly. Units should not be calculated by estimating a percentage of total acres available.

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- d. Explain how your agency plans to access federal cost-share practice data, i.e., an existing, updated or future 1619 data sharing agreement with the U.S. Department of Agriculture.
- e. Include your agency plans to report resource improvement practices.

A6: Project Description

- 1) Reference and attach the jurisdiction's version of the table found in the Excel file **NEIEN NPS BMP CBP Data Flow Appendix8.26_01032014**, which lists the state-reported BMP names and associated default Scenario Builder names.
 - a. All BMP names and units should be identical to what the jurisdiction uses to track the practice. (The Chesapeake Bay Program may use different names, definitions and units, and will cross-walk the BMP data accordingly.)
 - b. Identify any new or changed BMPs anticipated for 2014-15.
 - c. Specify the geographic scale at which BMPs are collected (e.g., latitude/longitude, county, watershed, etc.).
 - d. Report BMPs at the most site-specific scale that conforms to legal and programmatic constraints. If data for the same practice are reported at different scales, describe the method and rationale for grouping the practices at a different scale.
- 2) Reference and commit to assigning the most recent NPS BMPs codes for NEIEN input tables. The most recent version is the *NEIEN Chesapeake Node Codes List - Version 2.11* (Dec. 2013).
- 3) BMP Definitions

Provide a name and definition for each BMP reported to the CBPO. Definitions shall include the required criteria or design standards for achieving the intended water quality benefit. Definitions may be organized by source sector, agency or other grouping that will facilitate review of verification programs. For example, West Virginia Department of Environmental Protection uses the well documented format below to define each of their BMPs.

State BMP Name	Grass Buffers
Units	Acres
Definition	Grass plantings between fields and rivers and streams. Linear strips of vegetation along rivers and streams, helping to filter nutrients, sediment, and other pollutants carried in runoff. Min width = 35',

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	recommended 100' (SB 8.4.10).
Lifespan	5 years
NRCS practice(s) counted	390 (Riparian Herbaceous Cover), 393 (Filter Strip) and 412 (Grassed Waterway)
Source(s) of data	Aggregated NRCS/FSA data and State cost-share.
Verification Priority	
Procedure used to compile data	SCD staff enter acreages into a table by county
Checks for Accuracy	Cross-checked with FSA reporting sheet to local Conservation Districts for CREP projects

Alternatively, definitions may be incorporated by reference to a BMP manual or an Administrative Code and the reference provided in pdf format or the URL cited. For example, the Virginia Department of Conservation and Recreation's Cost-Share Manual is on the Internet with complete descriptions for each BMP by name.

Selected BMP Names and URL links to definitions:

[Long Term Continuous No Till Planting Systems \(CCI - CNT\)](#)

[Stream Exclusion \(CCI-SE-1\)](#)

Documenting this basic information in this manner will hasten the review process.

A7: Quality Objectives and Criteria

- 1) Accuracy Objectives (Qualitative)
 - a. Compare expected numbers vs. actual counts using prior years' numbers.
 - b. Describe potential for high biases to occur, as a result of double counting, inclusion of expired and non-functional BMPs, failure to implement nutrient management plans.
 - c. Describe potential for low biases to occur, such as not capturing non cost-share BMPs.
- 2) Completeness Objectives – Have all the data sets expected from internal and external sources been received?
 - a. Data Providers are to submit data to Agency for the reporting period by (DATE).

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- b. All months of the year are included.
- c. For each Data Provider, were the types of BMPs expected actually received?
- d. Minimum percentage of new practices that were verified.
- e. Minimum percentage of multi-year practices verified.

A8: Training and Certification

Describe the staff positions responsible for on-site inspections and data reviews. Describe their technical expertise, certifications, titles, etc., that qualify a person to be an inspector. Explain the training and certification requirements necessary for:

- 1) Database Managers
- 2) NRCS and State Conservation Specialists
- 3) Stormwater Inspectors
- 4) Nutrient Management Specialists who write Nutrient Management Plans
- 5) Forestry Inspectors
- 6) CAFO Inspectors

If the training requirements are described in Section D, Verification and Validation Methods, please note here and reference where they are documented.

A9: Documentation and Records

- 1) Describe how each data provider documents and stores information related to an individual BMP, location or facility. State the data providers' policies for access to and retention times for hard copy and electronic records such as applications, design specifications, conservation plans, photographs, inspection forms, reports and approval letters, etc.
- 2) Provide the jurisdiction's retention time for compiled BMP data sets. Include jurisdiction procedures for backing-up and preventing loss of electronic records.
- 3) Insert inspection forms and describe the critical information that is documented. If the documentation and records requirements are described in Section D, Verification and Validation Methods, please note here and reference where they are documented.

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GROUP B: DATA GENERATION AND ACQUISITION

Note: Sections B1 through B8 are not applicable to the acquisition and reporting of BMP data.

B9: Non-direct Measurements

B10: DATA MANAGEMENT (Tracking and Reporting Procedures)

Describe in this section the details of how BMP data are obtained, imported, and managed into the agency's data management system. Describe computer software, hardware, and back-up systems.

Explain how datasets are obtained from the sources in a given format, how and what data will be entered and verified if obtained in a hard copy format, and how certain security or confidentiality specifications will be incorporated into the state agency's data management system.

- 1) Include a simplified work-flow diagram showing the data flow for each BMP data source, listed in the QAPP. Be sure to include sources of non cost-share practices. The diagram should show the position responsible for data entry/recording and the position responsible for validating (QA/QC) the data records. Identify any intermediate steps of transfer of data via spreadsheet, linked databases, or other methods, along with the position(s) responsible. This graphic is meant to show the overall data acquisition and management structure with diagrams of all databases whose content is reported through NEIEN.
- 2) Reporting to NEIEN
 - a. Reference/link to NEIEN input tables.
 - b. Commit to assigning the most recent NPS BMPs codes for NEIEN input tables. Reference the most recent version, *NEIEN Chesapeake Node Codes List - Version 2.11* (Dec. 2013).
- 3) Describe how the BMP lifespans are tracked and the method used to either re-verify the BMP or to remove the BMP from the data tracking system once the lifespan has expired.
- 4) Identify potential sources of double-counting of the same practice and steps taken to eliminate it. Where multiple agencies/organizations fund and report the same BMP, describe coordination mechanisms among agencies/organizations and/or identifiers in the database.

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GROUP C: ASSESSMENT AND OVERSIGHT

C1: Assessment and Response Action

- 1) List the assessments done to ensure that:
 - a. The acquired data meet the specifications and are suitable for reporting.
 - b. The data were obtained according to the procedures in Section B10.
 - c. The data were verified according to procedures in Section D.

Note: Describe the actual verification and validation procedures in Section D2.

- 2) Identify which sectors and practices or groups of practices on which the jurisdictions will focus its verification efforts given they account for the greatest nutrient and sediment pollutant load reductions as described in their Phase II Watershed Implementation Plans.

C2: Reports to Management

GROUP D: DATA VALIDATION AND USABILITY

D1: Data Review, Verification and Validation

In this section, describe how the overall BMP verification program achieves the CBP partnership's five BMP verification principles. Summarize the jurisdiction's processes to review, verify and validate management practice information; reference specific CBP approved verification guidance, procedures and processes as appropriate. If the state agency reports BMP data that has been reviewed, verified, and/or validated by another agency/organization, provide references to that agency's/organization's procedures.

Section 4 of the Chesapeake Bay Program partners' *Strengthening Verification of Best Management Practices Implemented in the Chesapeake Bay Watershed: A Basinwide Framework* recommends that each jurisdiction's QAPP cover the following items and activities for each logical group of BMPs:

- Copies of, or specific references (with URL links) to the documentation of existing BMP verification programs in operation and overseen by all partners—e.g., NRCS, FSA, other federal agencies, federal facilities, conservation districts, municipalities, businesses, non-governmental organizations—which are actively verifying practices implemented within the jurisdiction and which will be reported by the jurisdiction for nutrient and sediment pollutant load reduction credit.

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- Copies of or specific references (with URL links) to the BMP verification guidance and procedures adopted by the Bay Program partners.
- Jurisdiction-specific modifications to and variations from the Bay Program’s adopted BMP verification guidance and procedures.
- Decisions that focus verification programs and protocols on a subset of nutrient and sediment pollutant load reduction practices, treatments, or technologies or geographic areas.
- Document how each set of grouped BMP verification protocols will be implemented by whom, how, and through what programs/mechanisms.
- Describe which sets of grouped BMP verification protocols and procedures are already in place, fully operational, and being routinely carried out.
- Describe which sets of grouped BMP verification protocols and procedures are planned for future implementation, by when, by whom, how, and through what programs/mechanisms.
- Describe further programmatic and organizational changes needed to make the each set of grouped BMP verification protocols and procedures fully operational and routinely carried out.

For the purposes of reporting BMP data, the Chesapeake Bay Program partners have agreed upon the following definitions for data review, verification, and validation:

Data Review – Data reviews should be *independent*, meaning that they are carried out by someone within the same organization having technical expertise in the subject matter to a degree at least equivalent to that needed for the original work, but who was not involved as a participant, supervisor, technical reviewer, or advisor in the development or operations of the program/practice under review. An *external independent review* is done by someone from an outside organization with technical expertise in the subject matter to a degree at least equivalent to that needed for the original work. (CBP 2014)

Verification – BMP verification is: “the process through which agency partners ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and/or sediment pollutant loads are implemented and operating correctly.” (Review Panel, Nov. 2013).

Data Validation – BMP data validation is defined as a QA/QC check of a data record. The CBP’s preferred validation method is a visual field check of an adequate statistical sample. It is

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expected that all BMPs, both internal and external, have at least a basic database or paper check of an adequate statistical sample.

D2: Verification and Validation Methods

1) Organization and Summary Tables

The CBP BMP Verification Committee developed expectations for verification programs that will be used to approve the jurisdictions' verification methods. Table 7, *Jurisdiction BMP Verification Protocol Components Checklist*, in the basinwide BMP verification framework report, contains the components that should be addressed for each BMP sector or grouping. If any of these items are not covered in the QAPP, jurisdictions should document an explanation.

Jurisdictions may choose to have sector-specific sections within the QAPP to document the verification and validation procedures for that sector. Within such sector-specific sections of the QAPP, attach a sector-specific checklist (see Table 1 below) to indicate where in the QAPP the various components are documented. Note that components may be described in multiple sections of the QAPP.

Table 1. Mapping of Jurisdiction BMP Verification Protocol Components to the Relevant QAPP Sections.

Sector:		
	BMP Verification Component	QAPP Section
1	BMP's Collected	
	Type (structural, management, annual, etc.)	A6: Project Description and Table 8 – Verification Protocol Design
	BMP Funding/Cost shared (federal, state, NGO, non-cost shared)	A6: Project Description and Table 8 – Verification Protocol Design
	Distinct state standards/specifications	A6: Project Description and/or D2: Verification & Validation Methods
	Matching CBP BMP definition/efficiencies	Spreadsheet: <i>NEIEN NPS BMP CBP Data Flow (Appendix8.26_01032014)</i>
2	Method/System of Verification/Assessment	
	Description of methods/systems to be used	D2: Verification Methods and Table 8 – Verification Protocol Design
	Documentation of procedures used to verify BMP's	D2: Verification & Validation Methods

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Sector:		
	BMP Verification Component	QAPP Section
	Instruction manual for system users	D2: Verification & Validation Methods
3	Who will Complete the Verification	
	Qualification requirements	A8: Training & Certification and/or D2: Verification & Validation Methods
	Training requirements	
	Certification requirements	
	CEU follow-up training requirements in the future	
4	Documentation of Verification Finding	
	Date of installation	A9: Documentation & Records D2: Verification & Validation Methods
	Location (lat/long if applicable)	
	Level of reporting (watershed, HUC, county, site specific, etc.)	
	Units (number, acres, length, etc.) needed for NEIEN	
	Ownership (public, private)	
	Documentation:	A9: Documentation & Records and/or D2: Verification & Validation Methods
	Pictures	
	Worksheets	
	Electronic Tool	
	Aerial Photos	
	Maps	
	Other	
	Report Generator	
5	How Often Reviewed (Cycle of review)	
	1-2 years	D2: Verification & Validation Methods and Table 8 – Verification Protocol Design
	5 years	
	10 years	
	Other	
6	Independent Verification of Finding	
	Is this a requirement?	D2: Verification & Validation Methods
	Internal Independent	
	External Independent	

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Sector:		
	BMP Verification Component	QAPP Section
	BMP Data Validation	
7	Quality Assurance/Spot Checking	
	Who-qualifications/training/certification	A8: Training & Certification D2: Verification & Validation Methods
	Method to select BMP for follow-up check	
	Method to select the number of BMPs to review	
	Other	
8	Data Entry of BMP Implementation	
	What is the system?	B10: Data Management (Tracking & Reporting Procedures)
	Who enters data (training/certification)?	
	Does the system connect to NEIEN?	
	System in place prevent double counting	
9	External Provided Data Validation Meeting CBP Partnership Guidance	
	Method to validate data	D2: Verification & Validation Methods
	Who will validate data (training/certification)?	
10	Historic Data Verification	
	System to re-certify or remove	
	Who will verify historic data (training/certification)?	
	Documentation of action	
	BMP Performance	
11	Does state collect data to assess BMP Performance?	
	System used to collect BMP performance data?	
	Who collects BMP performance data?	
	Who analyses collected data and report to CBP?	

Source: Derived from Table 7 in CBP 2014.

2) Data Validation Methods

For the purposes of reporting BMP data, validation is defined as a QA/QC check of a data record. It is preferred that validation reviews are independent and that validation methods are based on a visual field check of an adequate statistical sample. The minimum procedure is to conduct a basic database or paper check of an adequate

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statistical sample. In this section of the QAPP, the jurisdictions need to address:

- a. Expired BMPs - Describe how records are selected and then checked to ensure that expired BMPs are either re-verified and submitted to NEIEN or considered beyond their lifespan and not be submitted to NEIEN.
- b. Double Counting - Describe which records are selected then checked to ensure that double-counting has not occurred.
- c. Describe how data from external data providers are evaluated or checked for accuracy.
- d. For each of the checks above, cite the position responsible, training, and certification.

Describe or reference the procedures used by an external independent reviewers to validate BMP data. The preferred approach for external reviewers is to compare the data to a known database and to assess the data collection procedures. The minimum, basic expectation is a database or paper check of an adequate statistical sample. In the case of NRCS and FSA data, having a current data sharing agreement that meets Section 1619 requirements will help ensure accurate validation.

3) Data Verification

Verification methods should to consistent with the sector-specific guidance documents for verifying agricultural, forestry, storm water, wastewater treatment, stream and wetland best management practices or the jurisdictions will need to provide documentation justify taking alternative approaches which still achieve the Bay Program partners BMP verification principles.

References Cited

CBP (Chesapeake Bay Program). 2014. *Strengthening Verification of Best Management Practices Implemented in the Chesapeake Bay Watershed: A Basinwide Framework*. Annapolis, MD.