AUGUST 11 2014 REVISED FINAL DRAFT-SUBJECT TO REVIEW BY THE CBP MANAGEMENT BOARD

Strengthening Verification of Best Management Practices Implemented in the Chesapeake Bay Watershed: A Basinwide Framework

Report and Documentation from the Chesapeake Bay Program Water Quality Goal Implementation Team's BMP Verification Committee

Chesapeake Bay Program
Science. Restoration. Partnership.

Strengthening Verification of Best Management Practices Implemented in the Chesapeake Bay Watershed: A Basinwide Framework

Report and Documentation
from the
Chesapeake Bay Program's
Water Quality Goal Implementation Team

REVISED FINAL DRAFT – SUBJECT TO CBP MANAGEMENT BOARD REVIEW

August 11, 2014

Executive Summary

Stakeholder groups, communities and people across the 64,000 square mile Chesapeake Bay region must have confidence that there is strong science behind the Chesapeake Bay "pollution diet" (known as the Total Maximum Daily Load or TMDL) and each jurisdiction's strategy (called a Watershed Implementation Plan or WIP) for putting practices in place to meet nutrient and sediment reduction goals. In order to foster this confidence, the Chesapeake Bay Program (CBP) partners' work must be open and transparent for all interested parties. We must also be fully responsive to calls by the Chesapeake Executive Council, CBP's Citizens Advisory Committee, and Scientific and Technical Advisory Committee, and groups such as the National Academy of Sciences and mandates under the federal Executive Order—all of which demand improvements in the transparency and scientific rigor of our efforts. While our attention must be given to the tracking and crediting of the diverse technologies, treatment techniques and practices intended to reduce the flow of nutrients and sediments to our waters, we must also be vigilant in our efforts to verify that these practices, known as 'best management practices" or BMPs, are working and continue to work properly. This document provides a detailed framework by which the Bay Program partners will build rigor and transparency for BMP verification up through the partnership and disseminate it through our many local partners who are ultimately responsible for the on-the-ground implementation of BMPs that will reduce the pollutants reaching local waters and the Bay.

Importance of BMP's and Verification in Bay and Watershed Restoration

Properly installed and functioning practices and technologies reduce local flooding, protect sources of drinking water, ensure against the collapse of stream banks, and support local economies through the return of clean water and viable habitats suitable for recreational activities. Conversely, improperly installed or functioning practices do little to mitigate the effects that runoff of nutrients and sediment can have on local waterways. As the Bay Program tracks partners' progress toward goals for cleaner waters, verifying that practices are being implemented correctly and are reducing nutrient and sediment pollution as expected will be critical in measuring success. It will also help ensure that these efforts are doing the job of protecting people's properties, lands, riparian habitats and local streams.

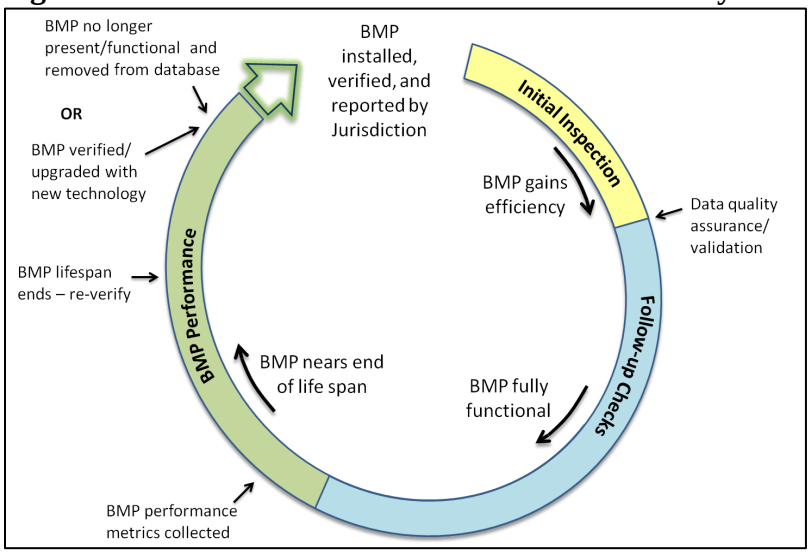
BMP Verification as a Life Cycle

Within its BMP verification principles, the Bay Program partners have formally defined verification "as 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." Our BMP Verification Review Panel has recommended the partners view verification as a life cycle process, including initial inspection, follow-up checks, and evaluation of BMP performance (Figure 1).

What is a Basinwide BMP Verification Framework

The Chesapeake Bay basinwide BMP Verification Framework provides a structure by which the Bay Program partners will improve consistency throughout our collective analysis of the effectiveness and efficiency of various BMPs. It applies across local, regional, state, and federal agencies and facilities, institutions, organizations, and businesses involved in the implementation, tracking, verification, and reporting of practices, treatments and technologies for nutrient and sediment pollutant load reduction crediting.

Figure 1. Illustration of the BMP Verification Life Cycle



The framework is defined by 12 elements with four key components:

- Five **BMP verification principles** adopted by CBP that recognize the need for internal, organizational changes and enhancements that will create consistency in efforts across the watershed.
- **BMP Verification Guidance** from the Bay Program's six technical sector and habitat workgroups.
- The **BMP Verification Review Panel's recommendations** for the jurisdictions' enhanced BMP tracking, verification, and reporting programs.
- The Bay Program's commitments to **ongoing evaluation and oversight**.

Must Fully Account for All Pollution Reduction Efforts

There is a growing demand for the tracking and reporting of nutrient and sediment pollutant load reducing practices, treatments, and technologies to expand well beyond the sources and cost share programs the Chesapeake Bay watershed jurisdictions have traditionally relied upon—state agricultural departments, conservation and environmental agencies, the USDA, and conservation districts. Public and private entities as well as individual homeowners are now implementing and reporting on nutrient and sediment pollutant load reducing practices. One of the primary areas of concern expressed by all seven watershed jurisdictions and many local stakeholders regarding the accountability under the Chesapeake Bay TMDL is receiving credit for nutrient and sediment pollutant reducing practices implemented outside of state or federal regulatory programs and without the benefit of state or federal cost share funding.

Developing Enhanced Jurisdictional BMP Verification Protocols and Programs

While there is an opportunity to build from existing local, state, and federal jurisdictional BMP tracking and reporting programs, the partners recognize that none of the seven jurisdictions' existing BMP tracking, verification, and reporting programs, fully achieves all five principles across *all* sectors and habitats. Therefore, in the process of developing new and revising existing BMP tracking, verification and reporting protocols and programs, the jurisdictions are strongly encouraged to consult the four products and extensive recommendations developed by the Bay

Program's independent BMP Verification Review Panel. The Panel recommended the jurisdictions focus on:

- Taking full advantage of their choice to vary to the level of BMP verification based on the relative importance of a specific practice to achieving the jurisdiction's Watershed Implementation Plan nutrient and sediment pollutant load reduction targets.

- Grouping the hundreds of BMPs they be tracking and reporting into categories that make sense for each jurisdiction and then develop and document the appropriate protocols and procedures followed for each logical grouping of BMPs.

- Structuring their verification programs to carry out an initial inspection for answering the question "is the BMP there?" and then follow-up checks carried out at the appropriate frequency to answer the question "is the BMP still there and operating?" throughout the lifespan of the practice.

- Providing documentation on procedures in place which prompt the need for conducting a follow-up check of a BMP at the end of its approved lifespan and for removing BMPs which go beyond their lifespans and are not follow-up checked to confirm the BMP is still there and operational.

- Having written procedures in place for assuring the quality of the BMP data for which the jurisdictions are now accountable for, which includes any practice data reported to the jurisdictions by other local, regional, and federal agencies, and non-governmental organizations.

Implementation of the Basinwide Framework

The Chesapeake Bay Program partners have committed to carry out a series of actions, processes, and procedures to ensure full, equitable, implementation of this BMP verification framework across all jurisdictions, source sectors and habitats. In the two years immediately after this framework is adopted (by the CBP Principals' Staff Committee), the partners will ramp up their verification programs and make the necessary internal adjustments and adaptations for its implementation In the first full annual progress reporting cycle, jurisdictions will need to provide verification documentation through the NEIEN report system. Only those practices, treatment, or technologies supported by this documentation may be given credit for nitrogen, phosphorus, or sediment pollutant load reductions for that year.

Ensuring Ongoing Evaluation and Oversight

The Bay Program partners have committed to a suite of ongoing evaluation and oversight procedures to ensure the six BMP verification principles are adhered to and effectively carried out:

- Amending CBP BMP protocol to address BMP verification
- Amending CBP Grant Guidance to reflect BMP verification
- Annual reviews of progress data submissions to confirm verification of each submitted practice
- Annual reviews of the jurisdictions' quality assurance plans by EPA
- Periodic audits of the jurisdictions' verification programs by EPA.

Basinwide BMP Verification Framework

Supporting Documentation

All supporting documents are available online under the Project & Resources tab at http://www.chesapeakebay.net/groups/group/best_management_practices_bmp_verification_committee

Foreword

The Chesapeake Bay Program must be fully responsive to calls by the Bay Program's Citizens Advisory Committee and Scientific and Technical Advisory Committee, the National Academy of Sciences, the President's Executive Order and others to make improvements in the transparency and scientific rigor of our efforts to verify the implementation and continued function of nutrient and sediment pollutant reducing technologies, treatment techniques and practices. Verification of these best management practices (BMPs) is fundamental to ensuring increased public confidence in the accounting for implementation under the 2-year milestones. Estimated load reductions using the Bay Program partners' models and other decision support tools, used in shared decision-making as a common currency for defining implementation progress, depend on accurate reporting of BMPs. The Bay Program partners must have confidence that these reported practices are being implemented, are functioning and are reducing pollutant loads as they will be used in explaining the observed water quality trends. Municipalities and conservation districts need to fully understand what practices have been implemented and that they are functioning as designed so that they can make better local decisions on investment of their resources to benefit local streams and rivers as well as Chesapeake Bay.

The Bay Program partners and the public at large must have confidence in scientific rigor and transparency of the Chesapeake Bay Total Maximum Daily Load and watershed implementation plans accountability system. Therefore, we must build this rigor and transparency for verification up through the Bay Program partners and out through our many local partners who have pollutant load reduction implementation responsibilities.

The five BMP Verification Principles adopted by the Bay Program partners recognize the need for changes and enhancements and the opportunity to build from existing local, state, and federal jurisdictional BMP tracking and reporting programs. There are local, state, and federal programs with strong BMP verification programs in place and working effectively in carrying out the principles. However, the Bay Program partners recognize none of the seven jurisdictions' existing BMP tracking, verification and reporting programs, across *all* sectors and habitats, fully achieves all five principles. The National Academy of Science's in-depth evaluation of the Bay Program partners' existing practice accountability systems made that very clear. The task before us is to ensure that each jurisdiction's comprehensive verification program, across all source sectors and habitats, achieves the adopted principles.

The Bay Program partners' work on BMP verification is a foundational element that is absolutely essential to the success of the Chesapeake Bay restoration efforts. This report describes the basinwide framework for ensuring we continue our restoration actions, building on a solid, transparent scientific foundation.

Nicholas A. DiPasquale, Director
Chesapeake Bay Program

Section 1. Background

The implementation, tracking and reporting of best management practices (BMPs), which lead to reductions in nutrient and sediment pollutant loads to local waters and the tidal Chesapeake Bay, have been at the center of the Chesapeake Bay Program's restoration efforts for close to three decades. Within the past five years, there have been numerous requests and commitments to improve the accountability of the actions taken to prevent or reduce the loads of nutrient and sediment pollutants to the Chesapeake Bay, its tidal tributaries and embayments.

There is also a growing demand for the tracking and reporting of nutrient and sediment pollutant load reducing practices, treatments and technologies to expand well beyond the sources and cost share programs the Chesapeake Bay watershed jurisdictions have traditionally relied upon—state agriculture departments and environmental agencies, USDA and conservation districts. Counties, municipalities, non-governmental organizations, private sector third party consultants, technical certified planners, businesses, agricultural producers and even individual homeowners are now implementing and reporting on nutrient and sediment pollutant load reducing practices. One of the primary areas of concern expressed by all seven watershed jurisdictions and many local stakeholders regarding the accountability under the Chesapeake Bay Total Maximum Daily Load is receiving credit for nutrient and sediment pollutant reducing practices implemented outside of state or federal regulatory programs and without the benefit of state or federal cost share funding.

It is evident that existing state and federal programs for verifying BMP installation and operation vary widely, and that existing programs are often insufficient to meet a confidence level that could be called robust.

Calls for/Commitments to BMP Verification within the Chesapeake Bay Watershed

Executive Order 13508

The *Chesapeake Bay Protection and Restoration Executive Order*--Executive Order 13508, signed by President Obama on May 12, 2009, called for the development of a system of accountability for tracking and reporting conservation[1] (Appendix R). The Executive Order describes the full accounting of conservation practices applied to the land as "a necessary data input for improving the quality of information and ensuring that the practices are properly credited in the Bay model." In the development of this system, the Executive Order directs the U.S. Department of Agriculture (USDA) to uphold all privacy requirements as called for in Section 1619 of the 2008 Farm Bill.

The Executive Order also directed the USDA and the U.S. Environmental Protection Agency (EPA), "by December 2011, to work with state and local partners to expand existing tracking and reporting systems for conservation practices, best management practices and treatment technologies to ensure reporting and tracking at local scales of implementation – counties, conservation districts and/or small watersheds." Furthermore, the Executive Order called for "mechanisms for tracking and reporting of voluntary conservation practices and other best

[1] Executive Order No. 13508. Signed May 12, 2009, printed 74 FR 23099, May 15, 2009. See the CBP Partnership's Executive Order website for more details: http://executiveorder.chesapeakebay.net/default.aspx

management practices installed on agricultural lands will be developed and implemented by July 2012."

National Academy of Sciences' Chesapeake Bay Evaluation Committee

At the November 2008 Chesapeake Executive Council meeting,[2] members requested "that the Chesapeake Bay Partnership be evaluated by a nationally recognized independent science organization" to increase accountability. The Bay Program, under the leadership of the Principals' Staff Committee,[3] convened an Independent Evaluator Action Team[4] to construct the evaluation questions and work with the EPA to establish and manage a contract with the National Academy of Sciences.

In 2009, the EPA requested that the National Research Council (NRC) of the National Academy of Sciences evaluate and provide advice on the Bay Program's nutrient and sediment reduction programs and strategies. The NRC established the "Committee on the Evaluation of Chesapeake Bay Program Implementation for Nutrient Reduction to Improve Water Quality." The Committee was charged with assessing the framework used by the six Chesapeake Bay watershed states, the District of Columbia and the overall Bay Program for tracking nutrient and sediment control practices that are implemented in the Bay watershed and used to evaluate the two-year milestones. The committee was also charged with assessing existing adaptive management strategies and recommending improvements that could help the Bay Program partners meet their nutrient and sediment reduction goals.

On May 4, 2011, the NRC released the report, *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*.[5] The NRC Committee reached a number of findings and conclusions about the Bay Program's BMP tracking and accounting efforts, including:[6]

- Accurate tracking of BMPs is of paramount importance because the Bay Program relies upon the resulting data to estimate current and future nutrient and sediment loads to the Bay.

- The current accounting of BMPs is not consistent across the Bay jurisdictions. Additionally, given that some source-sector BMPs are not tracked in all jurisdictions, the current accounting cannot on the whole be viewed as accurate.

- The committee was unable to determine the reliability and accuracy of the BMP data reported by the Bay jurisdictions.

- The committee was not able to quantify the magnitude or the likely direction of the error introduced by BMP reporting issues.

[2] http://www.chesapeakebay.net/about/ecmeeting/2008_executive_council_meeting
[3] http://www.chesapeakebay.net/groups/group/principals_staff_committee
[4] http://www.chesapeakebay.net/groups/group/independent_evaluator_action_team
[5] National Research Council. 2011. *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*. Washington, DC: The National Academies Press. Available online at http://www.nap.edu/catalog.php?record_id=13131
[6] The list of conclusions is adapted from Chapter 2, National Research Council (2011). (See Appendix S).

- A consolidated regional BMP program to account for voluntary practices and increase geo-referencing of BMPs presents opportunities to improve the tracking and accounting process.

- Additional guidance from the EPA on the optimal extent of field verification of practices in relation to expected benefits would improve tracking and accounting of both cost-shared and voluntary practices.

- Electronic tracking and data transfer systems are likely to improve the quality of reporting and reduce the jurisdictions' tracking and accounting burden but may currently be contributing to delayed assessments of implementation progress.

Please see Appendix S for more information about the NRC's detailed findings and conclusions relevant to BMP tracking, verification and reporting.

USDA NRCS 2011 CEAP Report

In 2011, the USDA's Natural Resources Conservation Service (NRCS) released results from a Conservation Effects Assessment Program (CEAP) study of the Chesapeake Bay watershed.[7] The study was performed through a combination of surveys from more than 800 producers between 2003 and 2006. In the study, modeling was used to estimate the impact of conservation practices on the landscape. Among its findings, the study found a significant level of voluntary conservation practices implementation on cropland. For example, 88 percent of cropland acres were found to have a conservation tillage system in place. The study also identified opportunities to improve water quality in the region, such as through more complete and consistent application of nutrient management.

USDA/U.S. EPA Chesapeake Bay Conservation Data Collaboration

In response to the President's May 2009 Chesapeake Bay Executive Order, EPA's publication of the December 2010 Chesapeake Bay TMDL and the findings from the 2011 USDA CEAP report, the USDA and the EPA developed the Chesapeake Bay Conservation Data Collaboration[8] and a supporting work plan.

The EPA and USDA committed to collaborate to ensure consistency between the Bay Program and CEAP modeling efforts and to ensure that both are informed by the best conservation data available that describes implementation by farmers in the Bay region through the following commitments:[9]

- The USDA and EPA will work with state agricultural agencies, conservation districts and other key agricultural groups to develop a mechanism for tracking, verifying and

[7] USDA NRCS. 2011. *Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Chesapeake Bay Region.* Available online at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/pub/?cid=stelprdb1041684

[8] U.S. EPA Associate Administrator Arvin R. Ganesan June 28, 2011 letter to the Honorable Glenn Thompson, Chairman, U.S. House of Representatives Committee on Agriculture, Subcommittee on Conservation, Energy, and Forestry, Washington, DC.

[9] http://www.chesapeakebay.net/channel_files/18692/final_usda_epa_data_collaboration_workplan.pdf.

reporting non-cost shared conservation practices on agricultural lands for use in the Bay Program's Chesapeake Bay Watershed Model.

- Using CEAP results from 2003-2006 and the pending 2011-12 analysis, the USDA and the Bay Program will explore the inclusion of the additional practices identified in these surveys into the Bay Program's Chesapeake Bay Watershed Model.

CBP Citizens Advisory Committee

The Bay Program's Citizens Advisory Committee is responsible for representing residents and stakeholders of the Bay watershed in the restoration effort and advising the Bay Program on all aspects of Bay restoration. In this role, they have been strong, vocal advocates for increased transparency, accountability and independent evaluation of the restoration work of the Bay Program (See Appendix T).

CBP Scientific and Technical Advisory Committee

The Bay Program's Scientific and Technical Advisory Committee (STAC) provides scientific and technical guidance to the Bay Program partners on measures to restore and protect the Chesapeake Bay. In this role, STAC has actively recommended the Bay Program partners' focus on the need to collect information on the performance of BMPs (see Appendix U).

Chesapeake Bay TMDL

Under the Chesapeake Bay Total Maximum Daily Load (TMDL) published in December 2010[10], the EPA set forth the expectation for the seven watershed jurisdictions to account for and manage new or increased loadings of nitrogen, phosphorus and sediment (U.S. EPA 2010a). The EPA described its expectations that each of the jurisdictions will accommodate any new or increased loadings of nitrogen, phosphorus or sediment that lack a specific allocation in the Chesapeake Bay TMDL with appropriate pollutant load reduction offsets supported by credible and transparent offset programs subject to EPA and independent oversight. The EPA outlined expectations for common elements of such offset programs in Appendix S of the Chesapeake Bay TMDL (U.S. EPA 2010b)[11]. Verification, tracking and accountability are among the elements described in Appendix S. Credits generated to offset new pollutants are expected to be routinely verified–through monitoring, inspection, reporting or some other mechanism–to ensure they are producing, and continue to produce, the expected pollutant load reductions.

The verification and accountability procedures and requirements for offset programs are currently under various stages of development in the seven Chesapeake Bay watershed jurisdictions. While the jurisdictions continue to define verification for their offset programs and for trading programs, it is considered by the Bay Program to be separate from verification of conservation practices reported to the EPA Chesapeake Bay Program Office for annual progress assessment.

[10] U.S. Environmental Protection Agency. 2010. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment. December 29, 2010. Available on-line at: http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html

[11] U.S. Environmental Protection Agency. 2010. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment: Technical Appendices. December 29, 2010. Available on-line at: http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html

The seven watershed jurisdictions are required to report BMP implementation data on an annual basis to the EPA Chesapeake Bay Program (U.S. EPA 2009). Although the jurisdictions have reported annual progress since the 1990s, this reporting has come under additional public scrutiny since 2010, when the EPA issued the Chesapeake Bay TMDL allocations for nitrogen, phosphorus and sediment (U.S. EPA 2010a). The Bay Program's Annual Progress Review is used to assess to what extent the seven watershed jurisdictions are making progress towards meeting their respective set of nutrient and sediment pollutant load allocations. Each jurisdiction reports annual progress (July 1 to June 30) in its implementation of conservation practices and treatment technologies for all pollutant source sectors: agriculture, forestry, urban stormwater, wastewater treatment facilities, septic systems and air emissions.

Importance of BMP Verification to the Bay Program Partners

The Bay Program partners must view verification as the means to strengthen our confidence in local implementation efforts. The Bay Program partners must have confidence that these reported practices are actually being implemented, are functioning and are preventing and reducing pollution runoff to local streams, groundwater and the Bay. The implementation of the verification protocols described here will not only increase public certainty in the reported practices, but it will help ensure those practices are operating in the intended ways to reduce nutrient and sediment pollutant loads to local streams, groundwater and Bay tidal waters.

Credit All That's Been Implemented on the Ground and is Working. The Bay Program partners wants to make sure all jurisdictions are fully accounting for all nutrient and sediment pollutant reduction actions taken across the watershed. For example, we know partners are under accounting the non-cost shared practices that agricultural producers are implementing without government funding.

Increased Confidence of Pollutant Reduction Outcomes. Furthermore, verifying what's on the ground and is functioning gives everyone confidence that Bay Program partners will achieve the expected nitrogen, phosphorus and sediment pollution reductions over time.

Direct Benefits to Local Decision Making. Having better data at the municipality, county and state levels better informs local decision-making by conservation districts, townships, cities and counties, and helps them relate their local decisions focused on local water quality, flooding, resource protection and conservation benefits to downstream improvements in Bay water quality. As an added benefit, the same information can be used to inform decision-making at the state, federal and Bay Program levels.

Consistency Across Pollutant Source Sectors. The Bay Program partners want to ensure that BMP verification protocols and procedures have a consistent level of rigor, transparency and confidence across all pollutant source sectors and habitats.

Planning and Targeting Implementation of Conservation Practices. Obtaining accurate, consistent, detailed information on conservation practice implementation can improve the knowledge used for planning and targeting conservation practices, promoting sustainable management strategies and supporting an adaptive management approach to improving water quality in the watershed. Tracking conservation progress provides the information necessary

for prioritizing BMP implementation across the landscape and comparing implementation to pollutant load trends and local and downstream water-quality response.

Focus Verification on Practices with Greatest Reductions. Jurisdictions are strongly encouraged to focus more rigorous verification on the practices that account for the greatest reductions. The Bay Program partners support focusing BMP verification on those practices on which individual jurisdictions are relying upon for the majority of their nutrient and sediment pollutant load reductions called for in their Watershed Implementation Plans as a result of the Chesapeake Bay TMDL allocations.

Inform and Promote Changes in Management Given Better Information. A key objective of BMP verification is to provide information to promote adaptive management by providing data to help improve future performance, assess management effectiveness and identify further opportunities for directing/targeting program implementation.

Inform Explanation of Observed Trends in Water Quality Conditions. The Bay Program partners benefit from direct observations of water quality conditions in local streams, rivers and the Bay's tidal waters at hundreds of monitoring stations, many with data records dating back to the mid-1980s or earlier. Information on the practices implemented on lands upstream (and up-tide) of these monitoring stations is used in the interpretation of causes leading to the long-term trends in observed water quality conditions in local streams, rivers and the Bay's tidal waters.

It's a Partnership Approach. All the Bay Program partners recognize the importance of maintaining flexibility and not being overly prescriptive given the unique nature of each of the seven watershed jurisdictions in how they work with their localities and citizens and differences in their Watershed Implementation Plans. The Bay Program is offering up a partner-focused, common sense approach to working towards a consistent level of rigor and transparency across geography and source sectors, but whereby each jurisdiction can take a different path toward this common objective.

Increased Confidence Practices are Reducing Pollutant Loads. Estimated pollution reductions using the Bay Program partners' suite of environmental models and other decision support tools used in shared, collaborated decision-making, depend on accurate, comprehensive reporting of BMPs. The Bay Program's scientific experts are continuing to interpret the reasons behind the trends in the decades of monitored observations of water quality in local streams, larger rivers throughout the watershed of the Bay and across the Bay's tidal waters. The Bay Program partners must have confidence that these reported practices are actually being implemented and reducing nutrient and sediment pollution as they will be used in explaining the observed water quality trends.

BMP Verification Definition

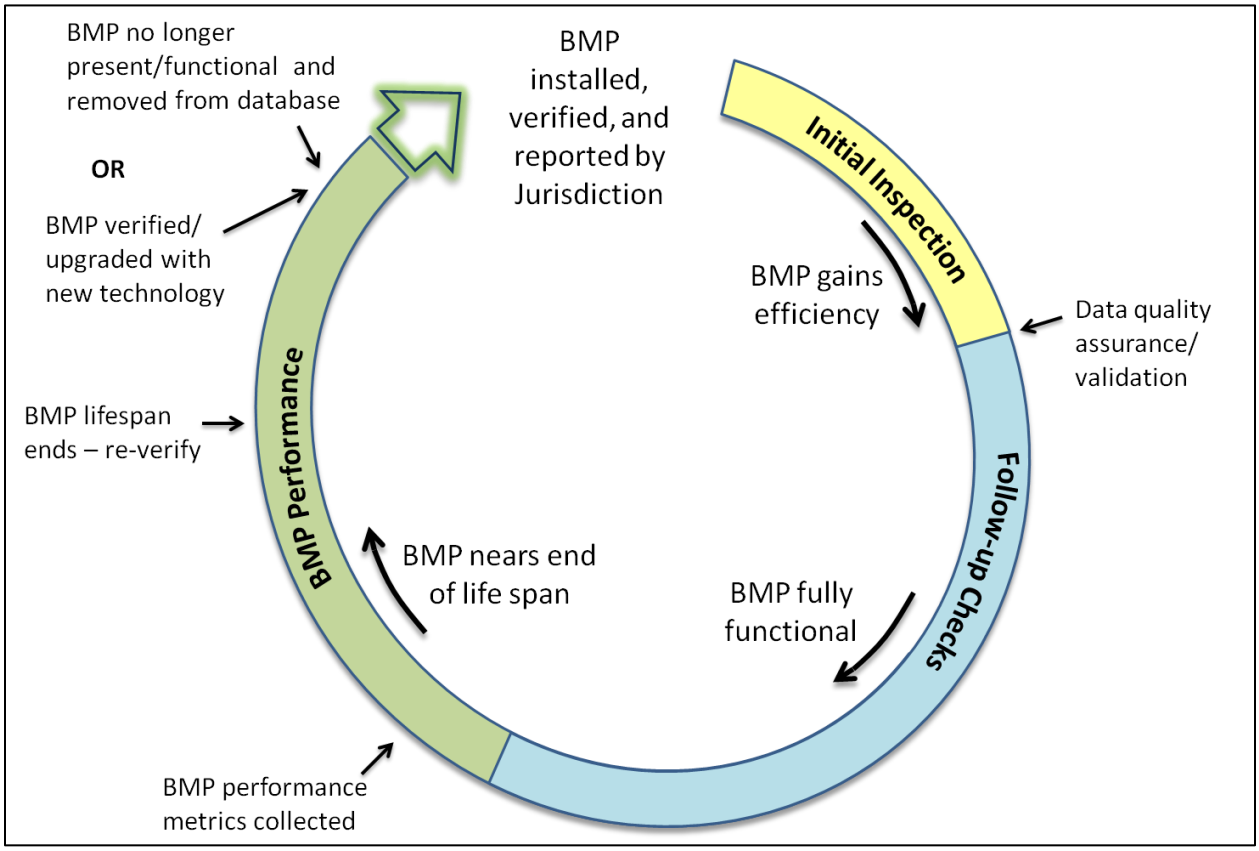
The Bay Program has formally defined verification as "the process through which agency partners ensure practices, treatments and technologies resulting in reductions of nitrogen, phosphorus and/or sediment pollutant loads are implemented and operating correctly." This

definition was based on the work of the USDA's Office of Environmental Markets[12] and the Willamette Partnership[13].

BMP Verification as a Life Cycle

The Bay Program's independent BMP Verification Review Panel has recommended the Bay Program partners view BMP verification as a life cycle process (Figure 1), including initial inspection, follow-up checks and evaluation of BMP performance.

Figure 1. Illustration of the BMP Verification Life Cycle



The first part of the life cycle is the initial inspection upon the installation of the BMP, meant to answer the question, "Is the BMP there?" Following the initial inspection and reporting of the data, quality assurance and validation of the data ensures the review of the submitted data to determine if the data was collected, compiled and submitted correctly and that issues of double counting and the clean-up of historical data have been addressed.

The second part of the life cycle is the follow-up checks carried out at the appropriate frequency to answer the question, "Is the BMP still there and operating correctly?" throughout the lifespan of the practice.

[12] Chesapeake Bay Environmental Markets Team. 2011. *Verification of Environmental Credits: Chesapeake Bay Environmental Markets Team Discussion Paper*. Prepared by Katie Cerretani and Al Todd. Available online at www.usda.gov/oce/environmental_markets/index.htm.
[13] Willamette Partnership. "Pilot Verification Protocol: Willamette Basin Version 1.0." September 1, 2009.

The third part of the life cycle is performance outcomes, focused on the systematic collection of data to be used to ensure the BMPs are working as expected, adapt approaches to future installation and maintenance of practices, and to help further refine the pollutant reduction efficiencies into the future.

BMP Verification Framework

The Chesapeake Bay Basinwide BMP Verification Framework contains twelve elements described in more detail in the sections which follow, and in the separate supporting documentation appendices.

Section 2. Basinwide Verification Framework Elements

The Chesapeake Bay Basinwide BMP Verification Framework contains twelve specific elements addressed in the sections of this report and the separate supporting documentation provided as appendices. Please see Table 1 for a complete listing of the twelve framework elements and where their documentation is located.

Table 1. The 12 Components of the Chesapeake Bay Basinwide BMP Verification Framework

Framework Element	*Documentation Location*
BMP Verification Principles	Section 2, Appendix A
BMP Verification Review Panel	Sections 2, 4, Appendix C
Source sector and habitat specific BMP verification guidance	Section 2, Appendix B
Practice life spans	Sections 2, 4, Appendix D
Ensuring full access to federal cost-shared agricultural conservation practice data	Sections 2, 3, 4 Appendices E, F
Enhance data collection and reporting of federally cost-shared practices	Section 2, Appendices F, G
Accounting for non-cost-shared practices	Sections 2, 3, Appendix H
Preventing double counting	Sections 2, 3, Appendix F
Clean-up of historic BMP databases	Sections 2, 3, 4
Development and documentation of jurisdictional BMP verification programs	Sections 2, 3, 4
Partnership processes for evaluation and oversight	Sections 2, 4
Communications and outreach	Sections 2, 4, Appendix I

BMP Verification Principles

The Chesapeake Bay Program defined and adopted five principles to guide partners' efforts as they build on existing local, state and federal practice tracking and reporting systems and make enhancements to their BMP verification programs (Table 2). The five principles are discussed in detail in Appendix A.

Table 2. Chesapeake Bay BMP Verification Principles adopted in December 2012.

Principle	**Description**
Practice Reporting	Affirms that verification is required for practices, treatments and technologies reported for nitrogen, phosphorus and/or sediment pollutant load reduction credit through the Bay Program. This principle also outlines general expectations for BMP verification protocols.
Scientific Rigor	Asserts that BMP verification should assure effective implementation through scientifically rigorous and defensible, professionally established and accepted sampling, inspection and certification protocols. Recognizes that BMP verification shall allow for varying methods of data collection that balance scientific rigor with cost-effectiveness and the significance of or priority placed upon the practice in achieving pollution reduction.
Public Confidence	Calls for BMP verification protocols to incorporate transparency in both the processes of verification and tracking and reporting of the underlying data. Recognizes that levels of transparency will vary

	depending upon source sector, acknowledging existing legal limitations and the need to respect individual confidentiality to ensure access to non-cost shared practice data.
Adaptive Management	Recognizes that advancements in practice reporting and scientific rigor, as described above, are integral to assuring desired long-term outcomes while reducing the uncertainty found in natural systems and human behaviors. Calls for BMP verification protocols to recognize existing funding and allow for reasonable levels of flexibility in the allocation or targeting of funds.
Sector Equity	Calls for each jurisdiction's BMP verification program to strive to achieve equity in the measurement of functionality and effectiveness of implemented BMPs among and across the source sectors.

BMP Verification Review Panel

Through a process described in Appendix C, an independent BMP Verification Review Panel[14] of 13 regionally and nationally recognized experts was established to examine the degree to which jurisdictions' practice tracking, verification and reporting programs meet the parameters delineated in the Bay Program's adopted verification principles and verification guidance. The Panel members and the Panel's charge are provided in Appendix C.

Source Sector and Habitat Specific BMP Verification Guidance

Six technical workgroups under the Bay Program's Water Quality Goal Implementation Team[15] and the Vital Habitats Goal Implementation Team[16], respectively, were tasked with developing verification guidance for use by the seven watershed jurisdictions in further developing and enhancing their existing BMP tracking, verification and reporting programs. The six sets of workgroup-based verification guidance are: agriculture, forestry, urban stormwater, wastewater, wetlands, and streams. The six sets of source sector and habitat specific BMP verification guidance are provided in Appendix B.

Practice Life Spans

The BMP Verification Review Panel recommended that the Bay Program partners establish practice life spans for all of the Bay Program approved BMPs and apply these life spans with within the workgroups' verification guidance and the jurisdictions' verification programs and underlying protocols (Appendix D)[17]. The Panel recommended that the Bay Program partners support continued crediting of a practice after its recorded lifespan as long as the proper level of re-verification occurs confirming the practice is still present and functioning. The Panel recommended the following specific steps be taken in factoring practice life spans into the

[14] http://www.chesapeakebay.net/groups/group/bmp_verification_review_panel
[15] http://www.chesapeakebay.net/groups/group/water_quality_goal_implementation_team
[16] http://www.chesapeakebay.net/groups/group/habitat_goal_implementation_team
[17] *Chesapeake Bay Program Partnership BMP Verification Review Panel's Guidance and Recommendations to the Six Source Sector Workgroups, the CBP BMP Verification Committee, and the Seven Watershed Jurisdictions*. Distributed November 19, 2013. Available online at: http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf (See Appendix D)

workgroup's BMP verification guidance, the basinwide BMP verification framework, and the jurisdictions' BMP verification programs:

- For the existing Bay Program approved BMPs, the **respective source sector workgroup** needs to assign a life span/expiration date for each approved BMP. In doing so, the workgroup needs to consider contract/permit life span, engineering design life span, and actual life span.

- For all future BMP expert panels convened by the Bay Program, the lead **workgroups** need to ensure each panel they convene is charged with establishing a recommended life span/expiration date for each of the practices at which time them must be re-verified or be removed from the data submitted for crediting.

- **Workgroups** need to develop specific guidance for how to sunset specific reported practices which have gone beyond their lifespan and have not received the level of required re-verification after the designated lifespan. The seven watershed **jurisdictions** need to build systems for carrying this out this process within their larger verification programs.

- The **Watershed Technical Workgroup**[18] needs to develop specific guidance that ensures the Bay Program's National Environmental Information Exchange Network (NEIEN)-based, BMP reporting system specifically addresses the issue of practice life span. This includes building in a system for flagging reported practices which are past their established life spans, and confirmation there was follow up re-verification of their continued presence and functionality or removal from the data submitted for crediting.

The Bay Program partners recognize practice life spans can take the form of contractual or regulatory life spans as well as physical or functional life spans. Within a BMP verification context, the Bay Program partners are focused on the functional life span of a given practice.

The BMP Verification Committee and BMP Verification Review Panel members agreed that in verifying practices are "still there and functioning" over the course of a practice's established life span, the jurisdictions can rely on statistically valid sub-sampling of the entire population of practices. Within their BMP verification program documentation, each jurisdiction will need to carefully spell out not only the design of their statistically valid sub-sampling methodologies, but exactly how the jurisdiction will apply the results from the sub-sampling to determine what portion of the entire population of practices are considered "still there" through time.

Ensuring Full Access to Federal Conservation Practice Data

The conservation assistance that is provided to farmers by the USDA is authorized under Section 1619 of the 2008 Farm Bill which states that, "USDA, or any contractor or cooperator of USDA, shall not disclose information provided by an agricultural producer or owner of agricultural land concerning the agricultural operation, farming or conservation practices, or the land itself, in

[18] The BMP Verification Review Panel's original recommendation charged the BMP Verification Committee with this responsibility. Given the Watershed Technical Workgroup has responsibility for oversight of the Partnership's NEIEN-based BMP reporting system, the responsibility was switched from the Committee to the Workgroup.

order to participate in the programs of the Department . . ," except to agencies and individuals that have been established as USDA 1619 Conservation Cooperators. This means that information that is used by a farmer to enroll in Federal agricultural programs is defined as confidential between the farmer and the Federal Government.

Organizations can be established as 1619 Conservation Cooperators if they agree to maintain data confidentiality and if their use of the data provides technical or financial assistance to USDA conservation programs. Signing a 1619 Conservation Cooperator Agreement provides the cooperator with confidential access to the USDA's datasets of conservation practice information. The data can be released to the public if they are aggregated so that farmer privacy is protected, as discussed below. These 1619 aggregation requirements are regularly followed by USDA agencies such as the National Agricultural Statistics Service when they are publishing county statistics. Farmers can also release their site-specific data on an individual basis.

Four watershed states—Maryland, New York, Virginia, and West Virginia—currently have established USDA 1619 Conservation Cooperator Agreements between the NRCS and one or more of their state conservation agencies.[19] The remaining two states—Delaware and Pennsylvania—have not yet established conservation cooperator status for any of their state conservation agencies (see Appendix E for more details). The agreements state that "those individuals or organizations (governmental or nongovernmental) that assist the NRCS with providing conservation related services are known as NRCS Conservation Cooperators."

Each of the six states has identified a key state agency with responsibility for submitting aggregated agricultural conservation practice data to the Bay Program's Annual Progress Review, through their respective state's NEIEN data transfer node and those state agencies with responsibility for providing conservation services (e.g., technical assistance, cost share program administration) (Table 3). These state agencies work in partnership with additional jurisdictional, regional, local, and Federal agencies and non-governmental organizations to collect and compile the necessary conservation practice implementation data, often funded in the process by the EPA's Chesapeake Bay Regulatory and Accountability Program Grants to the jurisdictions.

Table 3. State jurisdictional agencies that have been approved by the USDA for participation in 1619 conservation cooperator data-sharing agreements

Jurisdiction	Agency	Role	1619 agreement in place?
Delaware	DE-DNREC	Responsible for NEIEN submission.	No
	DE-DA	Provides conservation services.	No
	DE-FS	Provides conservation services.	No
Maryland	MDA	Provides conservation services.	Yes
	MDE	Responsible for NEIEN submission.	No
New York	USC	Provides conservation services.	Yes
	NY-DEC	Responsible for 2013 NEIEN submission.	No
Pennsylvania	PA-DEP	Responsible for NEIEN submission.	No

[19] In addition, USGS has signed 1619 Conservation Cooperator Agreements with both NRCS and FSA.

	PA-DA	Provides conservation services.	No
Virginia	VA-DCR	Provides conservation services.	Yes
	VA-DEQ	Responsible for NEIEN submission.	No
West Virginia	WV-DEP	Responsible for NEIEN submission	No
	WV-DA	Provides conservation services	Yes
	WV-CA	Provides conservation services	Yes

Source: Hively et al. 2013

The bottom line objective is ensuring that all six states have full access to all federally cost shared conservation practice data to be used to give the six states a greater capacity for analysis and understanding of agricultural conservation practice implementation across the landscape, to support the adaptive management and targeting of conservation programs, fully credit producers for their implemented conservation practices, to eliminate any double counting, and promote success in attaining water-quality goals. To ensure that all six states obtain full and complete access to all Federal cost-shared agricultural conservation practice data, the BMP Verification Committee recommends that the six states:

1) Adopt the broadest, most consistent language in the existing Maryland, New York, Virginia, West Virginia, and USGS 1619 conservation cooperator agreements as described in Appendix F.

2) Institute 1619 conservation cooperator agreements in Delaware and Pennsylvania and for all the jurisdictional agencies in Maryland, New York, Virginia, West Virginia listed in Table 3 which have direct responsibilities for planning, funding, delivery, reporting, and/or submission of agricultural conservation practice data.

3) Establish an annual data handling protocol that will ensure routine, thorough, and consistent data access for all USDA Farm Bill agricultural conservation programs. This uniform data access can be tailored to formats that integrate effectively within each state's respective conservation practice tracking and reporting system.

Enhance Collection and Reporting of Cost-Shared Practices

The Bay Program's Agriculture Workgroup has identified opportunities to enhance the record-keeping associated with USDA conservation practices, in order to capture specific information that can be used to more efficiently integrate the data with jurisdictional datasets and to more accurately represent the practices in the Bay Program partner's Scenario Builder tool, and in its various Chesapeake Bay watershed and estuarine water quality models. A number of USDA conservation practices were identified in Table 4 and described below as having substantial limitation in the amount of data available for translating between USDA conservation practice codes and Bay Program-approved practice definitions. These practices are described in more detail in Appendix G. Other conservation practices not represented here may also have data limitations depending on their use and reporting. In many cases, these limitations could be addressed through simple techniques such as the use of modifying letter codes to distinguish among the various conservation techniques that fall within each practice code definition. The Bay Program's BMP protocols generally assume the lowest available estimated load reductions

for conservation practices whenever there is not detailed information available to support a higher conservation effectiveness estimate.

Table 4: Possibilities for improved recordkeeping for USDA conservation practices.

Category	USDA code	Possibility	Relation to currently collected data
Land Use	Many	Record land use and land use change "from" and "to," and integrate datasets to make land use information consistently available in the National Conservation Planning (NCP) dataset.	NRCS has a data field for land use ID, but it is generally not populated in the NCP database. The change "from" and "to" are not available in any NRCS business tool.
Livestock Animal Type	Many	Record livestock animal type (for example, beef, dairy, poultry) for relevant conservation practices.	NRCS has a data field for livestock_ID in ProTracts, but in the 2012 dataset it was only sparsely populated in the NCP database.
Cover Crops	340	Record cover crop management details including species, planting date, planting method, commodity vs. regular, and if manure was applied (for example, commodity early drilled rye-aerial-no manure).	Cover crop is defined broadly in NRCS data, whereas the Bay Program partners apply nitrogen conservation effectiveness values that range from 5% to 45%, depending on management. This information is currently not available in any NRCS business tool, so the Bay Program partners' Scenario Builder assigns conservative estimates for NRCS cover crops.
Fencing	382	Identify the location and use of the fencing, or the associated components of the management system.	NRCS currently defines, tracks, and reports livestock fencing under a single Conservation Practice Code (382). The practice Access Control could show where animals are excluded from stream corridor, but this currently is not in any current NRCS business tool.
Nutrient Management	590, 104/105	Differentiate various nutrient management planning and implementation strategies to match CBP Partnership definitions.	NRCS currently defines, tracks, and reports nutrient management under a single Conservation Practice code (590), and nutrient management plans are contracted as practice 104 (written) and 105 (applied).

Feed Management	592	Record the animal type, management strategy, and differentiate between nitrogen- vs. phosphorus-based feed management.	NRCS currently tracks and reports feed management under a single Conservation Practice code (592) for multiple livestock species and does not typically track the type and amount of manure nutrient reductions resulting from changes in feed management.
Forestry Practices	CP-22	Record length and width of the buffer rather than acreage. Indicate consistently and accurately if a buffer is re-enrolled vs. newly installed.	Forest buffers are currently tracked by the Farm Service Agency (FSA) in units of acres. Including length and width would take into account different load reductions for narrower vs. wider buffers. Double counting could be avoided if FSA indicates consistently and accurately whether a buffer is re-enrolled vs. newly installed.
Tillage Practices	324, 329, 345, 346, 761, 778	Include the residue cover amount in the practice standard to indicate minimum percent of cover remaining after harvest.	Current NRCS practice standards for tillage do not include a minimum amount of residue remaining after harvest. Bay Program convened BMP Expert Panels have found that water quality benefits for tillage practices vary greatly depending on the amount of cover, and states can more accurately show improvement if they have this information.

Source: Hively et al. 2013

The NRCS is currently undertaking a Conservation Delivery Streamlining Initiative (CDSI) and has plans to integrate the NCP and IDEA data systems. Similarly, the FSA is reengineering its conservation practice database under the Modernize and Innovate the Delivery of Agricultural Systems (MIDAS). It will be important to maintain the level of discussion and collaboration achieved in 2012 and 2013 to smoothly integrate these expected changes with jurisdictional datasets and facilitate data transfer between State and Federal agencies.

The BMP Verification Committee recommends continued close collaboration with NRCS and FSA on working to enhance data collection and reporting in the areas identified in detail in Appendix G and summarized in Table 4. NRCS has committed to taking advantage of the opportunities afforded the Bay Program partners through the Conservation Data Streamlining Initiative to work to address the needs identified by the Bay Program's Agriculture Workgroup.

Accounting for Non-Cost Shared Practices

There are three principal categories of implemented practices:

1) those implemented under regulatory programs;

2) those installed through cost-share programs; and

3) those implemented without cost share and not under the guise of a regulatory program.

For those practices implemented under a Clean Water Act regulatory programs—NPDES permitted wastewater discharge, stormwater, or concentrated animal feeding operations—the underlying permitting and inspection programs provide clear legal requirements for verification and public access to the data. Through federal cost-share programs (e.g., USDA) and their state counterparts (e.g., Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia), there are privacy restrictions in place which lead to data aggregation but there are established mechanisms for ensuring verification of implementation and practice functionally on the ground. Contracts, explicit documentation of the practices, and inspections by certified professionals can provide a trustworthy, generally transparent system of BMP verification.

For practices installed outside of a regulatory program and without the assistance of a federal or state cost-shared program, there is no permit or contractual vehicle to ensure adherence to specific practice standards, specific planning requirements, and project performance. There is no established mechanism for requiring reporting or monitoring through time or for ensuring public access to the practice data. These are the challenges facing the Bay Program partners and their shared desire to ensure the accurate and transparent accounting for and crediting of *all* nutrient and sediment pollutant load reducing practices which are in place and operating correctly.

As Chesapeake Bay states implement their Watershed Implementation Plans to meet the 2010 Total Maximum Daily Load requirements for the Chesapeake Bay Watershed, a more accurate accounting of all conservation measures on agricultural lands is critical to ensure that appropriate nutrient load reductions are being credited in the Bay Program partner's Chesapeake Bay Watershed Model. Traditionally, states have relied upon both state and federal cost-share programs as the source of conservation implementation data for progress to report in their Watershed Implementation Plans.

Recognizing that many conservation measures have been, and are being, implemented without Federal or State financial assistance, the Bay Program partners have agreed to credit BMPs that meet Bay Program or NRCS definitions and standards *and* Resource Improvement Practices that have been implemented without public cost-share funds provided they are providing a reduction of sediment and nutrients to the Chesapeake Bay.

As described on page 4 of the *Chesapeake Bay Program Resource Improvement Practice Definitions and Verification Visual Indicators Report*:[20]

> "Resource Improvement Best Management Practices (RI) are non-cost shared BMPs that are typically financed by the operator or other non-public entity or source and may or may not meet the practice standards associated with federal and state cost-share programs. RI practices may lack the contractual provisions of

[20] Agriculture Workgroup's Resource Improvement Technical Review Panel. 2014. *Chesapeake Bay Program Resource Improvement Practice Definitions and Verification Visual Indicators Report.* Approved by WQGIT August 11, 2014. Available online at: http://www.chesapeakebay.net/publications/title/21973

cost-shared BMPs as well as the corresponding implementation and maintenance oversight.

Resource Improvement BMP's are practices which provide similar annual environmental benefits for water quality but may not fully meet all the design criteria of existing governmental design standards. RI BMP's are usually identified during a visit with the farmer. RI BMP's are implemented by a farmer and are not cost shared through a federal or state program. RI BMP's can be the result of a farmer choosing not to completely follow all the details of the design standard from the District or NRCS, but will contain all the critical elements for water quality resource improvement. Approved CBP RI BMP's definitions contain descriptions of the practice with Visual Indicators. A Visual Indicator is a means of assessing the presence of key elements that must be present to achieve the water quality benefits of the RI practice and to be reported in Jurisdictional WIPs. The re-verification interval of an agricultural Resource Improvement BMP may be more frequent than practices meeting state or federal programs to insure proper functioning."

The *Chesapeake Bay Program Resource Improvement Practice Definitions and Verification Visual Indicators Report* (Appendix H) provides the Bay Program partners with the guidance required for the collection and verification of non-cost-shared agricultural conservation practices that meet the Bay Program Partners' BMP definitions and establish definitions and verifications methods for Resource Improvement Practices**.** The goal is to account for <u>all</u> verified farmer implemented conservation practices that result in nutrient and sediment pollutant load reductions.

The process of identifying non-cost shared practices will normally happen when local conservation district or other trained technical staffs are on farms working with cooperators and landowners assisting them with the planning process to correct any potential environmental concerns that the landowner may have. It is extremely important for technical staff to establish a dialogue with landowners to encourage the proper use and maintenance of all BMPs. It is the intent of the Resource Improvement Guidance document to provide guidance for the states to develop verification protocols for the reporting all non cost-shared agricultural conservation practices for crediting toward nutrient and sediment pollutant load reduction progress in their state Watershed Implementation Plans.

Preventing Double-Counting

There are many situations where a jurisdiction tracks an implemented conservation practice and the USDA also tracks the identical practice. Typically, both the state and the USDA are tracking the same practice because they both provided financial assistance to the farmer for the practice implementation. In these cases, there must be a clear protocol in place to choose which data to report in order to avoid double counting. In 2012, the six watershed states employed various techniques to address this issue. The solutions, which are documented in the Hively et al. 2013 report included here as Appendix F, were tailored to address specific practices that could potentially receive financial assistance from both State and Federal programs, based on the range of conservation programs available to farmers within each jurisdiction. Each jurisdiction has developed their own combination of methods to remove duplicate record and prevent double

counting. Appendix F (see pages 20-23) documents the state-specific methods which apply to cost-shared and non-cost shared practice data.

The most general approach for removing double counting was to compare practice codes and definitions, identify which practice types could potentially be duplicated on the basis of knowledge of program structure, and exclude all records for those particular practice codes from either the USDA dataset or the jurisdictional dataset, generally retaining the records that contain a greater level of detail. For example, a cover crop practice might be funded at 40 percent of cost by State programs and 60 percent by the NRCS. Double counting of practices that could be co-cost-shared can be avoided by excluding records for those practices from either the State or NRCS dataset. For example, in Virginia, nutrient management plans were reported from the jurisdictional dataset and removed from the USDA dataset. Once the patterns of possible double counting are identified and the choices of which practice codes to remove from which dataset are made, this broad-brush approach is relatively simple to implement and can be applied to aggregated datasets. The only drawback is that the method may perhaps remove some records in error, in the cases where similar practices can be either co-funded or separately funded by the USDA and state programs (for example, cover crops in Lancaster County, Pennsylvania). In those cases the separately funded instances would be removed as potential duplicates when they were in fact valid records.

Alternatively, a record-by-record comparison was employed to examine record details and determine which records were an exact match between USDA and state datasets (the same practice applied to the same field location and acreage within the same implementation year). In those cases, all but one of the practices would be removed. This method is fairly accurate but is time consuming and requires access to the unaggregated USDA dataset (available only to 1619 Conservation Cooperators).

A third approach, available to the states that are 1619 Conservation Cooperators, was to maintain an integrated database that tracks all implemented conservation practices, whether funded by Federal or State governments or not financially assisted. In these data systems, when the soil conservation district staff work with farmers to implement conservation practices that receive financial assistance from both the State and Federal programs, the various funding sources are recorded as associated with a single data record, and it becomes straightforward to query the database and report implementation progress without risk of record duplication. Each state arrived at its own combination of methods to remove duplicate records, with generally good results. However, the process is not perfect, and continued attention to detail is required to successfully manage the complex task of obtaining and integrating implementation data for each specific type of conservation practice that is promoted by the various State and Federal conservation agencies.

Within their enhanced BMP tracking, verification and reporting programs, all seven watershed jurisdictions are required to also document their procedures for preventing double-counting of non-agricultural BMPs. For non-agriculture conservation practice data, the jurisdictions will be increasingly encountering situations where there may be two or more entities funding a single practice. As the watershed's counties, municipalities, businesses and nongovernmental organizations step up their efforts to finance, fund and directly support on the ground

implementation, implementers will have opportunities to combine funds from multiple sources to support their restoration and protection work. The jurisdictions will need to describe their protocols and procedures for preventing double counting of all practices, regardless of the source sector or the original source of the data.

Historical Data Clean-up

The Bay Program's Watershed Technical Workgroup is responsible for organizing the efforts across all partners to create more accurate BMP records from 1985 through the present. The clean-up of the jurisdictions' historical BMP databases is being done in response to: the need for re-calibration of the Bay Program partners' Chesapeake Bay Watershed Model as part of the 2017 Chesapeake Bay TMDL Mid-point Assessment; and to better support the basinwide and baywide efforts underway to explain observed long-term water quality trends in the hundreds of monitoring stations across the watershed and tidal waters.

The re-calibration of the Chesapeake Bay Watershed Model will attempt to match simulated nutrient and sediment pollutant loads to monitored nutrient and sediment in-stream concentration and loads throughout the watershed's streams and rivers given a certain set of land uses, agricultural animals, septic systems, wastewater treatment facilities, implemented BMPs and human population for each year of the calibration period. The most successful re-calibration will only result based on the most accurate information for all of these base conditions when including the actual implemented and functioning BMPs over time which had not exceeded their assigned life spans.

The work being coordinated by the Bay Program's Scientific, Technical, Assessment, and Reporting (STAR) Team focused on understanding and explaining trends in observed water quality conditions depends heavily on an accurate history of implemented nutrient and sediment pollutant load reduction practices, treatments, and technologies. The objective is to use the Bay Program partners' collective understanding of management actions taken, along with corresponding time series of land use, human and agricultural animal populations, hydrology, and other factors to tease out the effect of the reported implementation practices, treatments, and technologies on observed watershed and tidal water quality conditions since the mid-1980s and explain the observed trends through time.

Historical Data Clean-up Guidance

The seven watershed jurisdictions received the following guidance from the BMP Verification Committee at its March 13, 2013 meeting:

- Jurisdictions should focus efforts to clean up historical BMPs on those practices in place during the proposed calibration years for the next phase of the Chesapeake Bay Watershed Model. These calibration years have yet to be determined by the Bay Program partners[21].

[21] Until a decision is made on the Chesapeake Bay Watershed Model calibration period, the BMP Verification Committee recommends the six watershed states and the District focus on the key years of data that were provided to them from the Partnership's Scenario Builder tool's history. These years include key calibration year from the Partnership's Phase 5.3.2 Chesapeake Bay Watershed Model calibration, including years with an Agricultural Census: 1985, 1987, 1992, 1997, 2002, 2005, and 2009.

- It will be up to each jurisdiction to determine which BMPs will receive a higher priority in the clean-up process. Some jurisdictions may place emphasis on cleaning up a subset of practices with high implementation levels and/or practices in specific geographic areas.

- As much as possible, jurisdictions should follow the BMP verification guidance developed by the source sector and habitat workgroups in an effort to verify practices in place for any given year (see Appendix B).

- Jurisdictions should focus on those geographic areas and BMPs which are currently being 'cut off' in the Bay Program partners' Scenario Builder tool.

Development and Documentation of Jurisdictional BMP Verification Programs
In the process of developing new and revising existing BMP verification protocols and programs, the jurisdictions are strongly encouraged to consult the four products developed by the Bay Program's independent BMP Verification Review Panel:

- The *Chesapeake Bay Program BMP Verification Program Design Matrix*

- The *Jurisdictional BMP Verification Program Development Decision Steps for Implementation*

- The *Jurisdictional Verification Protocol Design Table*

- The *State Verification Protocol Components Checklist*

Each of these matrices and checklists are presented and described in Section 3.

Bay Program Processes for Evaluation and Oversight
The Bay Program partners have agreed to a suite of ongoing evaluation and oversight procedures and processes to ensure the five BMP verification principles adopted by partners are adhered to and effectively carried out. As described in Section 4, these procedures and processes also reflect the Bay Program partners' commitment to adapt to new scientific findings and experiences from verification efforts underway.

Communication and Outreach Strategy
The Bay Program's Communications Workgroup[22] has developed a BMP verification communications and outreach strategy to enable partners to have consistent, clear internal messages as they gradually build toward public implementation of the BMP verification framework. As described in Appendix I, having solid internal understanding and messaging will enable the Bay Program partners to more smoothly and consistently communicate about BMP verification with various external audiences and "implementers" across the watershed as the BMP verification process moves forward.

[22] http://www.chesapeakebay.net/groups/group/communications_workgroup

Partnership Development of the Basinwide Framework

Hundreds of individuals (Appendix J) worked through the Bay Program (Appendix K) to develop the basinwide BMP verification framework building directly from a number of existing and ongoing programs and efforts (Appendix L) and using the Bay Program's full management organizational structure (Appendix M). A record of Bay Program sponsored meetings and conference calls within which BMP verification was a topic on the agenda is provided in Appendix N. At the center of this process was the technical workgroups' development of their verification guidance (see Appendix B).

Section 3. Development and Documentation of the Jurisdictional BMP Verification Programs

Panel's Recommendations to the Jurisdictions

Within the BMP Verification Review Panel's November 19, 2013 recommendations document (see Appendix D)[23], there were nine recommendations directed towards the jurisdictions, each of which is described below.

Use the Verification Program Design Matrix in Developing Your Program. The Panel envisions the jurisdictions using the BMP Verification Program Design Matrix (Table 5) to structure their BMP verification programs, using the series of program elements as a series of prompts to ensure the jurisdictions have fully considered everything needed to be documented in their individual BMP verification protocols.

Consider the 14 Development Decisions steps when Creating Your Verification Program. The Panel recommends each jurisdiction walk through the 14 steps and questions in Table 6 prompting specific decisions along the way as they work to enhance their current BMP tracking and reporting programs to include verification.

Use the State Protocol Components Checklist. The Panel plans to evaluate the jurisdictions' BMP verification programs and their underlying BMP verification protocols using the state protocol components checklist provided in Table 7. The Panel recommends the jurisdictions use this checklist to ensure their individual verification protocols include all the necessary components as appropriate. The final state protocols will be reviewed by the Panel to make sure they meet the intent of the Bay Program's five verification principles.

Address Certification/Training of Verifiers in Your Programs. The Panel recommends each jurisdiction clearly document the certification and training requirements for those personnel involved in all the steps of the verification program. The Panel specifically recommends each of the jurisdictions:

- Describe the required qualifications/certification for the personnel who are carrying out the various elements of the jurisdiction's verification program; and

- Ensure certification/training programs are in place for those individuals involved in verification and data entry to assure individuals are qualified to do either task.

Aim High or Explain Why. The Panel asks jurisdictions to adopt the "robust" levels of verification over time described in the respective workgroups' BMP verification guidance (see Appendix B) or explain in their quality assurance plan why they cannot, recognizing the legal as

[23] *Chesapeake Bay Program Partnership BMP Verification Review Panel's Guidance and Recommendations to the Six Source Sector Workgroups, the CBP BMP Verification Committee, and the Seven Watershed Jurisdictions*. Distributed November 19, 2013. Available online at: http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

well as funding issues that may impede the levels of BMP verification recommended by the six workgroups.

Prioritize Verification Towards Priority Practices. Jurisdictions should feel empowered to target their verification programs and their most robust verification protocols towards those practices on which the jurisdictions' are depending on the most to achieve the nutrient and sediment pollutant loads reductions through their Watershed Implementation Plans (WIPs) (Appendix P). For verification of lower priority practices, jurisdictions can rely on less intensive methods of verification. Specifically, statistical sampling methods can be considered if there is a large BMP population and the jurisdiction is able to reliably extrapolate findings rather than visit every site. Several workgroups—e.g., Urban Stormwater, Forestry and Agriculture workgroups—provide specific guidance for the jurisdictions to consider in prioritizing application of their verification program and protocols (see Appendix B).

Robust Upfront Verification Yields Less Intensive Follow up Reviews. The more intense the initial review of a specific practice (i.e., in person review vs. a paper review), the less intense the required follow up spot-checking will be after the fact. For example, if a BMP has been visually reviewed in the field, a less rigorous sample may be needed for evaluating continued BMP presence and function into the future.

Understand the Basis on which the Panel will Evaluate each Jurisdiction's Draft Verification Program. The Panel intends to refer to following source materials during its review of the seven jurisdictions' proposed BMP verification programs:

- The Chesapeake Bay Program's five BMP verification principles (see Appendix A);
- The six source sector workgroups' sets of BMP verification guidance (see Appendix B);
- The matrix, list of steps/questions, protocol table, and checklist provided in the Panel's November 2013 guidance and recommendations (see Tables 5, 6, and 7, respectively);
- The *Jurisdictional Verification Design Table* provided by the Panel to the jurisdictions in April 2014 (see Table 8); and
- The Chesapeake Bay Program's final published basinwide BMP verification framework document.

The Panel strongly encourages jurisdictions to ensure their proposed BMP verification programs are consistent with the principles and guidance agreed to and adopted by the partners through the Principals' Staff Committee.

Build in time for Continuous Improvement Early. The Panel recommends more intensive review of new verification systems early in their initial implementation to adjust for unforeseen outcomes of the selected system design. It is not unusual to have to make adjustments to the protocols, personnel, and documentation tools/electronic systems during actual implementation

and use. The more a BMP verification system is tested prior to full scale implementation, the better the protocol implementation outcomes and protocol accuracy will be.

Developing the Jurisdictions' BMP Verification Protocols and Programs

The Panel's Design Matrix, Decision Steps and Checklist

In the process of developing new and revising existing BMP verification protocols and programs, jurisdictions are encouraged to consult the following four products developed by the Chesapeake Bay Program's BMP Verification Review Panel.

The *Chesapeake Bay Program BMP Verification Program Design Matrix* (Table 5) is meant to help each jurisdiction ensure they are addressing all the needed program elements within their BMP verification program. Jurisdictions should view the matrix as a guide, not a set of requirements, to be used in structuring their verification programs.

The *Jurisdictional BMP Verification Program Development Decision Steps for Implementation* (Table 6) spells out the 14 steps each jurisdiction should consider when developing their BMP verification program. Under each step are questions that will prompt decisions that may be needed to develop verification protocols. Jurisdictions should use the 14 steps as prompts to ensure their verification protocols and programs are adequately structured to answer the questions under each step. There are no expectations that each jurisdiction address every single step or answer every one of the questions posed. Jurisdictions should view the 14 steps and the underlying questions as prompts, not requirements, to be used in developing and enhancing their verification programs and protocols.

The *State Verification Protocol Components Checklist* (Table 7) is a checklist meant to ensure each jurisdiction's verification protocols contain all the necessary elements. The BMP Verification Panel *will* use this checklist directly in their review of each of the jurisdictions' proposed verification programs. Beyond a check-off, the Panel will also be evaluating whether the jurisdiction has followed the applicable source sector/habitat workgroup's verification guidance or provided documentation and a rationale for following an alternative approach.

The *Jurisdictional Verification Protocol Design Table* (Table 8) provides an example format a jurisdiction could choose to organize the documentation of their verification protocol choices for their preferred groupings of BMPs covered by common verification protocols.

Table 5. Chesapeake Bay Program BMP Verification Program Design Matrix

A. Program Component	B. Program Elements	C. Program Element Options
i. BMP Verification	1. What was the driver for BMP installation?	Regulation, permit, cost-share, non-cost-share
	2. How many BMPs will be inspected?	All, percentage, subsample, those targeted
	3. How is inspection frequency and location determined?	Workgroup guidance, statistics, targeting, law, available funding
	4. How often are BMPs/groups of BMPs inspected?	Benchmark in BMP implementation timeline, 0-<1 yr, 1yr, 1-3 yrs, >5 yrs
	5. What is the method of inspection?	Field visual, aerial, paperwork review, phone/paper survey
	6. Who will conduct the inspection and is he/she certified/trained?	Regulatory agency, non-regulatory agency, independent party, self-reported
	7. What needs to be recorded for each inspection?	Meets specifications/standards, visual functioning, location
	8. Is execution of the inspection process documented in and checked against an updated quality assurance (QA) plan?	QA plan in place, program checked and amended to ensure compliance; QA plan in place but not actually applied; and no QA plan

	9. How is collected data recorded?	Database, spreadsheet, written files	
	10. At what resolution are results reported to EPA and/or the public?	Individual practice level, site-level, by sub-watershed, by county, by state	
ii. BMP Data Validation	11. What is the QA/QC process to prevent double-counting or counting of BMPs no longer in place?	BASIC: Database/paper check of adequate statistical sample	PREFERRED: Visual field check of adequate statistical sample
	12. What is the method used to validate state's ability to collect and report correct data?	BASIC: Database/paper check of adequate statistical sample	PREFERRED: Visual field check of adequate statistical sample
	13. If data is provided by external independent party or industry, what method is used to provide adequate QA for acceptance by the Chesapeake Bay Program?	BASIC: Database/paper check of adequate statistical sample	PREFERRED: Analytical comparison to a known database and review of data collection procedures
	14. Who conducts data validation?	BASIC: Non-regulatory agency	PREFERRED: Regulatory agency, independent external party
iii. BMP Performance	15. What is the process to collect data to assess BMP performance and confirm consistency with the Chesapeake Bay Program's approved BMP efficiencies?	BASIC: Visual field assessment of statistical sample (check for signs of failure)	PREFERRED: Analytical measurement of performance for a statistical sample (water quality monitoring, soils test, manure sample, etc.)
	16. Who collects BMP effectiveness data?	BASIC: Non-regulatory agency, nongovernmental organization	PREFERRED: Regulatory agency, university

Source: BMP Verification Review Panel November 19, 2013 Recommendations Document

Table 6. Jurisdictional BMP Verification Program Development Decision Steps for Implementation

Below are the 14 steps for each Chesapeake Bay watershed jurisdiction to consider when developing their BMP verification program. Under each step are questions for consideration which will prompt decisions that may be needed to develop jurisdictions' verification protocols.

1) Determine what BMPs to collect:

a) Do you want to collect all BMPs that were listed in your jurisdiction's Phase II WIP? Additional/or some other combination of BMPs?
b) Do the listed BMPs meet NRCS standards, state standards, and/or Chesapeake Bay Program (CBP) definitions?
c) Do you want to report BMPs that are considered resource improvement practices (i.e., they do not meet NRCS standards, state standards, or CBP BMP definitions but do result in nutrient and/or sediment pollutant load reductions)?
d) When collecting the selected BMPs, do you know the year they were implemented?
e) For reported BMPs, are you collecting all the elements required for CBP model application (for example, for cover crops, do you know species, date planted, kill down date, fertilization if any, etc.?) or will you take the lowest credited efficiency available?
f) Have the selected BMPs been approved by CBP? If not, do the BMPs have CBP provisional acceptance status as an interim BMP?
g) Are the practices you plan to collect worth the cost of collection?

2) Determine where to collect BMPs:

a) Depending on the BMPs you choose to collect, at what level will you report these? (i.e., site specific scale; on a county level; on a (sub-) watershed level, etc.)?
b) Does the whole state need to be canvassed or only certain areas where there is a resource concern or particular practice implementation (i.e., Eastern Shore vs. rest of state)?

3) Protocol—how to collect BMPs:

a) What system/method have you decided to use to collect the BMPs?
b) If the BMP is only present at a certain time of year (i.e., cover crops, conservation tillage, etc.), does your verification method and associated workload requirements take this into account?
c) What is the cost benefit ratio on the system selected (high, medium, low)?
d) Do you have current funding for the BMP collection system selected?
e) Do you plan to collect BMPs in the selected areas only during certain seasons of the year, throughout the fiscal year, or will it take several years to determine if they are properly functioning?
f) Has your selected system been accepted by the people who will be collecting the BMPs—i.e., conservation districts, municipalities, state agencies, farm community, special interest groups, NGO's, USDA, EPA, USFWS, or other federal agencies?

4) **BMP verification system development:**
   a) What system/method will be used for the verification of collected BMPs?
   b) Does it require: trained state or federal employees; other trained specialists; self-certification; or technological expertise (i.e., aerial photograph interpretation)?
   c) Has your selected system been approved by the appropriate CBP workgroup?

5) **Training on selected data collection and verification systems:**
   a) Do you have written guidance and documentation on the data collection and verification systems?
   b) How will you train data collectors and verifiers to use the selected system/method (i.e., in person, webcast, etc.)?
   c) Does your system require independent verification?
   d) Is there a "certification requirement" for anyone who collects data and a follow-up CEU requirement?
   e) Who do the data or verification collectors call if there is a question?

6) **Use of existing electronic data collection system or update/development of new systems:**
   a) Does the electronic data collection and storage system exist for recording BMP implementation, or do you have to build a new one, or make adjustments to the existing system?
   b) What is the cost to develop updates or create the system and do you have funding?
   c) How long will the system be viable (due to technology or other changes)?
   d) What is the ease of use for the BMP verifiers and data entry personnel?
   e) What is the ease of use for the landowner (if applicable in self-certification)?
   f) Where will the data be maintained and is the system secure?
   g) Is the system mapped to provide the data required to NEIEN and to CBP?
   h) Who will transmit the data?
   i) How will you update the data in the future and remove BMPs that are not being maintained, no longer in use, no longer in existence or expired?
   j) Does the electronic system have standard reports that can be provided to leadership or others if requested or will someone have to build reports?
   k) Have you taken into account BMPs that may have more than one funding source so that you do not have double counting?
   l) Is the data available to the public? Do you have appropriate FOIA, Section 1619 or other protection needed for the data?

7) **Training on data entry:**
   a) Will the training on the selected data entry system be given by: reading documentation or guidance documents; group training; net meetings; field training; or any combination?
   b) Will there be a "certification" requirement to use the data entry system?
   c) If you are recording initial verification determinations on paper, how do you make

sure they are accurately entered into the electronic system?
d) Will training be required for the landowners (if they are entering data)?
e) How and when is the best time to conduct the training for data entry personnel?
f) Will there be a "certification" requirement for those who enter data?

8) Pilot of collection, verification and data entry systems:
a) Where will the state pilot the data collection and verification systems?
b) How long will the pilots(s) take?
c) Who will be involved in the pilot (s)?
d) How will debriefing be conducted to determine pilot success and/or system changes needed after the pilot?

9) Reliability and validity testing of the new system:
a) Reliability assures that every time you ask the data collection question, you get the same answer. How will you test this?
b) Validity is when you compare what you collected to another system of collection, to see if you get the same or a similar answer. How will you test this? (For example? (Example: looking at the same data in another system like ChesapeakeStat, USDA's CEAP and NASS data systems, etc.)

10) Adjust systems and training:
a) After testing the systems, how will you implement adjustments you have to make and are there documentation changes, system changes, or re-training involved in making the changes?

11) Implement tested and adjusted data collection and verification systems:
a) After you have tested the system you should re-test the adjusted system to make sure you still have adequate reliability and validity of the data.
b) If the tested system changes the use of the system, documentation, output of data or timeline for collection, you may need to re-train all employees.
c) Realize that new systems are very seldom right the "first time" implemented.
d) Allow for the system to operate without continuous changes (usually one year, unless the problem is really significant) for data collection personnel to get used to the system.
b) Set up a system for users to report problems to system designers.

12) Follow-up checking procedures:Procedures
a) What method is used to select the statistical sample for quality assurance?
b) What documentation is needed for follow-up check findings?
c) What actions will be taken if problems are found (i.e., additional training, removal or correction of data in system, etc.)

13) Communication strategy:
a) Do you need to prepare and conduct communication strategies for: the data collection

event; landowners; local, state or federal leadership; general public?
b) How will information be provided: written, electronic, news or media, public meetings or any combination?
c) Do you want feedback about what you propose to do before you start the process?
d) Will you make changes if you accept feedback?
e) Will there be communication of findings throughout the process or at a specific time in the process?
f) Who does the landowner or general public call if they have questions?
g) Will there be a published document of the findings and outcomes of the collection of BMPs?

14) Future year systemsSystems: things to think about:About

a) As BMP technologies or electronic computer systems change, will you be able to change how often you collect and verify data (i.e., moving from on the ground collection to satellite imaging)?
b) Will new technology change how to determine if the practice is still in existence or needs to be re-verified?
c) How will you remove practices from the database that are not being maintained, no longer in existence or have expired in the future?
d) If you use different systems in the future, have you gone through all of the above steps?

Source: CBP Partnership's BMP Verification Review Panel November 19, 2013 Recommendations Document

Table 7. Jurisdiction BMP Verification Protocol Components Checklist

	State:			
	Sector:			
	BMP Verification	Present	N/A	Comments
1	**BMPs Collected**			
	Type (structural, management, annual, etc.)			
	BMP funding/cost shared (federal, state, NGO, non-cost shared)			
	Distinct state standards/specifications			
	Matching CBP BMP definition/efficiencies			

2	**Method/System of Verification/Assessment**			
	Description of methods/systems to be used			
	Documentation of procedures used to verify BMPs			
	Instruction manual for system users			
3	**Who will Complete the Verification**			
	Qualification requirements			
	Training requirements			
	Certification requirements			
	CEU follow-up training requirements in the future			
4	**Documentation of Verification Finding**			
	Date of installation			
	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:			
	Pictures			
	Worksheets			
	Electronic Tool			
	Aerial Photos			
	Maps			
	Other			
	Report Generator			
5	**How Often Reviewed (Cycle of review)**			
	1-2 years			
	5 years			
	10 years			
	Other			
6	**Independent Verification of Finding**			
	Is this a requirement?			
	Internal Independent			
	External Independent			

	BMP Data Validation			
7	**Quality Assurance/Spot Checking**			
	Who-qualifications/training/certification			
	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?			
	Who enters data (training/certification)?			
	Does the system connect to NEIEN?			
	System in place prevent double counting?			
9	**External Provided Data Validation Meeting CBP Guidance**			
	Method to validate data			
	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 analyzes collected data and reports to CBP?			
12	**Additional Comments/Requests**			
13	**CBP Approval Process**			

Jurisdictional assurance that their protocols meet the five verification principles:

1) Practice Reporting
2) Scientific Rigor
3) Public Confidence
4) Adaptive Management
5) Sector Equity

Source: BMP Verification Review Panel November 19, 2013 Recommendations Document

Table 8. Jurisdictional Verification Protocol Design Table

A. WIP Priority	B. Data Grouping	C. BMP Type	D. Initial Inspection *(Is the BMP there?)*				E. Follow-up Check *(Is the BMP still there?)*			F. Lifespan/ Sunset *(Is the BMP no longer there?)*	G. Data QA, Recording & Reporting
			Method	Frequency	Who inspects	Documentation	Follow-up Inspection	Statistical Sub-sample	Response if Problem		

A. WIP Priority: What relative priority is the BMP type in the jurisdiction's WIP in terms of contribution to needed load reductions—high, medium or low?

B. Data Grouping: How is data grouped within each priority level? By pollution source sector, by agency, by data source, by cost-share or non-cost share, etc.?

C. BMP Type: What type of BMP does the specific protocol cover? Is it structural, management, etc.? Note that the remainder of this table keys off BMP type, but jurisdictions could key off a BMP category, WIP priority or other type of BMP grouping.

D. Initial Inspection: The BMP type/category/grouping is initially inspected when made operational to confirm it is in place on the ground.

Method: What method is used to inspect the BMP type? Remote sensing, aerial photos, field visit, etc.? Is the jurisdiction following recommendations in the Sector Guidance for the BMP type? If not, provide documentation supporting the jurisdiction's method.

Frequency: How often is the BMP type inspected? Is the jurisdiction following the frequency recommended for the BMP type by Sector Guidance?

Who inspects: Who conducts the initial inspection? Is the jurisdiction following the recommended inspection personnel qualifications for the BMP type in the Sector Guidance?

Documentation: What type of documentation is recorded for the BMP? Is there specific data recommended to be collected for the BMP type by Sector Guidance?

E. Follow-up Check: Is a system in place to confirm that the BMP is still there and operational some time after initial inspection as specified by Sector Guidance? The follow-up check may be accomplished by methods recommended in the Sector Guidance such as: a second in-person visit to the BMP; a spot check of a statistically valid sub-sample; etc.

Follow-up Inspection: Is the follow-up check conducted using the recommended Sector Guidance? Are the methods, frequency, inspector and documentation specified?

Statistical Sub-sample: Is the follow-up check conducted by collecting a statistical sub-sample of the BMP type? Are the statistical confidence levels, qualifications of data collector, etc., specified? Are the procedures specified on how the results of the statistical sub-sampling will be translated for reporting a specific number/aerial coverage/linear coverage of BMPs in place for a specified geographical area?

Response if Problem: What steps will be taken by the jurisdiction if problems are found during the follow-up check—i.e., BMP is no longer present/functioning; BMP needs repair to be operational; etc.?

F. Lifespan/Sunset: What procedures are in place for the jurisdiction to prompt the need to conduct a follow-up check of the BMP type at the end of its approved lifespan? Are there sunset provisions/procedures in place for BMPs going beyond their lifespan that are not follow-up checked and should be removed from the jurisdiction's data set?

G. Data QA, Recording & Reporting: What systems/processes are used to confirm the initial inspections/follow-up checks were conducted, prevent double counting and quality assure the reported data before it is accepted by the jurisdiction? What are the additional steps taken by the jurisdictions to properly record the accepted data prior to its reporting through the jurisdiction's NEIEN node?

Jurisdictional Verification Protocol Design Table

The *Jurisdictional Verification Protocol Design Table* (Design Table) (Table 8) provides an example format a jurisdiction could choose to organize the documentation of their verification protocol choices for their preferred groupings of BMPs covered by common verification protocols.

WIP Priority

As described previously, jurisdictions can choose to vary the level of BMP verification based on the relative importance of a specific practice to achieving the jurisdiction's WIP nutrient and sediment pollutant load reduction targets. By clearly documenting the relative WIP priority for a BMP or group of related BMPs, a jurisdiction can proceed with documenting the verification protocols for that lower contributing BMP/group of BMPs which can be different from the verification of practices accounting for higher levels of pollutant load reductions. The different sets of sector BMP verification guidance in Appendix B provide more detailed guidance to the jurisdictions on how to identify such low contributing BMPs/groups of BMPs.

BMP Grouping

Jurisdictions do not need to develop and document detailed protocols for each individual BMP of the potentially hundreds of BMPs which they track, verify and report for nutrient and sediment load reduction credit. Jurisdictions should take their complete listing of tracked and reported BMPs and organize them by the categories that best account for the jurisdiction's relative WIP priority, any logical grouping of the data specific to the jurisdiction and consideration of the BMP types described in the relevant sector BMP verification guidance in Appendix B. Then, as presented within the Design Table (Table 8), the jurisdiction would document the appropriate protocols and procedures followed for each logical grouping of BMPs.

Initial Inspection and Follow-up Checks

The Design Table illustrates the BMP Verification Review Panel's recommendation to the jurisdictions for structuring their verification programs to carry out an **initial inspection** for answering the question "is the BMP there?" and then **follow-up checks** carried out at the appropriate frequency to answer the question "is the BMP still there and operating correctly?" throughout the lifespan of the practice (Figure 1 in Section 1).

Lifespans and Sunsetting Practices

The Design Table prompts jurisdictions to provide documentation on procedures in place which prompt the need for conducting a follow-up check of a BMP at the end of its approved lifespan. The Design Table calls on jurisdictions to also document procedures for removing BMPs which go beyond their lifespan and are not follow-up checked to confirm the BMP is still there and operational.

Data Quality Assuring, Recording, and Reporting

The Design Table calls on jurisdictions to clearly document the systems/processes the jurisdiction uses to confirm the initial inspections/follow-up checks were conducted, prevent double counting and quality assure the reported data before it is accepted by the jurisdiction. Given BMP data will likely be reported to a jurisdiction from a multitude of sources outsides of state agencies, jurisdictions need to have written procedures in place for assuring the quality of the data for which they are now accountable. The jurisdictions are prompted to document any

additional steps taken by the jurisdictions in properly recording the accepted data prior to its reporting through the jurisdiction's NEIEN node.

Verification Program Documentation Expectations

Ultimately, each jurisdiction is responsible for ensuring the quality of the BMP data, including verification, submitted via NEIEN for credit under the annual progress submission. The jurisdictions' quality assurance plans need to reference, cite, or provide links to the documentation of the submitting agencies' or organizations' verification programs and procedures.

The documentation of each jurisdiction's BMP verification program will build directly upon their existing Chesapeake Bay Implementation Grant and Chesapeake Bay Regulatory and Accountability Grant quality assurance (QA) plans. Given the seven jurisdictions' existing QA plans are principally focused on documentation of their extensive BMP tracking and reporting programs and procedures for submitting the collected data to EPA through their state's NEIEN node, the additional BMP verification program documentation expectations are summarized below and provided in Appendix Q.

BMP Verification Principles

Each jurisdiction will describe, using specific references to specific adopted verification guidance, procedures, and processes, how its overall BMP verification program achieves the five BMP verification principles.

Documentation of BMP Verification Protocols

By logical groupings of BMPs determined by the jurisdiction as described previously (see Table 8), each jurisdiction will provide the following detailed documentation within their QA plans:

- Provide copies of or cite 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, nongovernmental 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.

- Provide copies of or cite specific references (with URL links) to the BMP verification guidance and procedures adopted by the Bay Program partners.

- Describe and fully document any jurisdiction-specific modifications to/variations from the Bay Program partners' adopted BMP verification guidance and procedures.

- Document any jurisdictional decisions for focusing verification programs/protocols on a subset of nutrient and sediment pollutant load reduction practices, treatments, or technologies or geographic areas.

- Document how each respective set of grouped BMP verification protocols will be implemented by whom, how, and through what programs/mechanisms.

- Document what/which set of grouped BMP verification protocols/procedures are already in place, fully operational, and being routinely carried out.

- Document what/which set of grouped BMP verification protocols/procedures are planned for future implementation, by when, by whom, how and through what programs/mechanisms.

- Describe what further programmatic changes are necessary to be carried out by whom in order to make the each set of grouped BMP verification protocols/procedures fully operational and routinely carried out.

Access to Federal Cost Share Practices
Each jurisdiction will address assurance for the jurisdiction's full access to federal cost share practices by:

- Providing as an appendix or providing URL links to the existing jurisdictional agencies' 1619 data sharing agreement(s) with USDA.

- Documenting plans to enhance an existing or sign a new 1619 data sharing agreements with USDA.

- Documenting procedures in place for handling the federal cost share practice data in adherence to the 1619 data sharing agreement(s).

Accounting for Non-cost Shared Practices
Jurisdictions will document their procedures for tracking, verifying, and reporting practices across all sector which are implemented without cost share funding building from the BMP verification guidance provided by the respective sector workgroup.

Preventing Double Counting Procedures
Each jurisdiction will, within their respective quality assurance plan, clearly document their specific methods employed to prevent double counting of any submitted practices.

Historical BMP Database Clean-up
Each jurisdiction will address historical BMP database clean up by providing documentation on how the jurisdiction plans to carry out the clean up their historical BMP implementation data base and over what time period.

Section 4. Basinwide BMP Verification Framework Implementation

Through the adoption of the Chesapeake Bay basinwide BMP verification framework, the Chesapeake Bay Program partners commit to carry out the following series of actions, processes and procedures following the recommended timelines to ensure basinwide implementation of the BMP verification framework equitably across all jurisdictions, source sectors and habitats.

Ongoing Decision-Making Roles within the Chesapeake Bay Program

The Chesapeake Bay Program must and will continue to be the decision makers on the development, implementation and continued refinement of the basinwide BMP verification framework and underlying processes. The jurisdictional partners will be principally responsible for, directly or indirectly, verifying practices implemented within their portions of the watershed. All data providers must incorporate BMP verification directly into their day-to-day program management and implementation efforts. The EPA will continue its Chesapeake Bay TMDL accountability role and ensure each jurisdiction's verification program meets the measure of reasonable assurance already well established during the two rounds of Watershed Implementation Plan and two-year milestone development and evaluation.

Chesapeake Bay Program BMP Verification Review Panel. The Panel has been formally charged by the Chesapeake Bay Program to use the verification principles as criteria for assessing the strengths and any possible vulnerabilities in the seven jurisdictions' verification programs. The Panel is responsible for providing written feedback and recommendations to the Chesapeake Bay Program's BMP Verification Committee on each jurisdiction's program. The Panel will also evaluate whether the level of verification rigor is consistent across source sectors and across all seven watershed jurisdictions. The Chesapeake Bay Program's BMP Verification Committee will synthesize and formally transmit the Panel's feedback and recommendations through the Management Board to the Principals' Staff Committee. The Panel will present its recommendations directly to the Principals' Staff Committee.

Chesapeake Bay Program Principals' Staff Committee. The Principals' Staff Committee will review and approve the Chesapeake Bay basinwide BMP verification framework on behalf of the Chesapeake Bay Program.

Chesapeake Bay Program Advisory Committees. The Scientific and Technical, Citizens, and Local Government advisory committees will continue to fulfill their well defined advisory roles.

Chesapeake Bay Program's Technical Workgroups. The technical source sector, habitat restoration and other related workgroups under the Water Quality, Vital Habitats, Sustainable Fisheries and Healthy Watersheds goal implementation teams will continue to be responsible for convening and overseeing expert BMP panels and their development of new and revised BMPs. The workgroups will decide when the new/revised BMPs are ready for Chesapeake Bay Program approval working through the Bay Program's established BMP protocol (CBP WQGIT 2014). The workgroups will continue to be responsible for developing, with input from their respective BMP expert panels, verification procedures for new Bay Program approved BMPs, as needed.

Jurisdictions. Jurisdictions are ultimately responsible for providing the necessary documentation of verification of all practices implemented within their part of the Chesapeake Bay watershed and submitted through each respective state's NEIEN node for crediting of nutrient and sediment pollutant load reductions. They are responsible for documenting—in detail or by reference—the verification programs, protocols and procedures for all agencies, organizations, institutions and businesses contributing to the collective set of tracked, verified and reported practices for nutrient and sediment load reduction credit. The jurisdictions will decide what BMP verification protocols they will build into their existing BMP tracking, verification and reporting programs in order to meet the Chesapeake Bay Program's adopted BMP verification principles. They may make the decisions on prioritizing verification efforts based on practices, effectiveness, geography or any other considerations. Jurisdictions will be responsible for either removing a reported practice at the end of its specified lifespan or documenting that the practice has been re-verified and assigning the new lifespan consistent with their approved verification program.

Federal Agencies and Federal Facilities. Federal agencies and their respective federal facilities are responsible for undertaking verification of their installed nutrient and sediment pollutant load reduction practices, treatments and technologies and sharing documentation of their verification protocols with their respective state counterparts. Federal agencies and their respective federal verification procedures must meet or exceed the standards established in the jurisdictions' verification program to which they are reporting. Federal agencies commit to provide specific documented references, or develop new agency specific BMP verification documentation, which each jurisdiction can directly site/reference/link to within its quality assurance plan.

U. S Environmental Protection Agency. Through the review and approval of each of the seven jurisdictions' quality assurance plans, which are required for award of their Chesapeake Bay Implementation Grants and Chesapeake Bay Regulatory and Accountability Grants, EPA will approve, or provide specific requests for changes prior to approval, each of the seven jurisdictions' proposed BMP verification programs based on the feedback from and the recommendations of the Chesapeake Bay Program's BMP Verification Review Panel. It is within these quality assurance plans where each jurisdiction will document, in detail, their verification program. As clearly described in EPA's Chesapeake Bay Program Grants Guidance[24], approval of these quality assurance plans are required for successful award and use of federal funding involving environmental data collection and evaluation activities. In the case of these grants, it's the tracking, verification and reporting of practices, treatments and technologies that reduce nutrient and sediment pollutant loads which triggers the requirements for a quality assurance plan. EPA's review and approval of each jurisdiction's QA Plan will focus on whether each jurisdiction has provided reasonable assurance for ensuring the implementation of the reported practices, treatments and technologies funded through these grants and the jurisdictions' matching fund programs.

[24] U.S. Environmental Protection Agency Chesapeake Bay Program Office Grant and Cooperative Agreement Guidance accessible at http://www.epa.gov/region3/chesapeake/grants.htm

Evaluation and Oversight Procedures and Processes

The following suite of evaluation and oversight procedures and processes are recommended to ensure the five BMP verification principles adopted by the Chesapeake Bay Program partners are adhered to and effectively carried out.

Amendments to the Chesapeake Bay Program Grant Guidance. As the Chesapeake Bay Program works through its seven jurisdictional partners in the implementation of the enhanced and expanded BMP tracking, verification and reporting programs, the EPA will work with the jurisdictions in further amending the annual Chesapeake Bay Program Grant Guidance to fully document the Bay Program's BMP verification expectations as contained within the basinwide framework. The CBP Grant Guidance will describe how EPA grant funding can be used directly by the jurisdictions to support the development or enhancement of their BMP verification programs and their continued operation.

Annual Reviews of Progress Data Submissions. Chesapeake Bay Program Office staff will review the jurisdictions' annual NEIEN-based submissions of implementation progress data for the documentation of BMP verification as part of their routine evaluations of the quality and completeness of the submitted data. The progress data reviews will be conducted following the specific guidelines and protocols agreed to by the Chesapeake Bay Program through the Water Quality Goal Implementation Team's Watershed Technical Workgroup. Any progress data submitted without the required verification documentation will be returned to the jurisdiction for the incorporation of required documentation and resubmission.

Annual Reviews of Changes to Quality Assurance Plans. EPA will annually review and approve any changes to the jurisdictions' quality assurance plans submitted as part of their annual applications for their Chesapeake Bay Implementation Grants/Chesapeake Bay Regulatory and Accountability Grants. EPA anticipates periodic changes to each jurisdiction's quality assurance plan over time as the relative importance of practices changes and the jurisdictions adapt to new information in the implementation of their Watershed Implementation Plans.

Periodic Audits of Jurisdictions' Verification Programs. Structured like the field collection and analytical laboratory audits conducted with the Chesapeake Bay Program's watershed and tidal monitoring networks (with very successful outcomes for almost three decades), EPA will conduct periodic on-site audits of the jurisdictions' BMP verification programs. The audits, to be conducted by teams of recognized experts, will be carried out to ensure the BMP verification procedures and protocols documented within the jurisdictions' quality assurance plans are being effectively carried out.

BMP Verification Principles

Amend the CBP Grant Guidance to Reflect the Verification Principles. Starting in the 2015 *Chesapeake Bay Program Grant and Cooperative Agreement Guidance*, include a specific reference to the Chesapeake Bay Program's adopted BMP verification principles to fully ensure the expectation is clear that all seven jurisdictions will develop, document and submit for EPA review and approval enhanced BMP tracking, verification and reporting programs which are fully consistent with and supportive of the Bay Program's adopted BMP verification principles.

Ensure Jurisdictional Verification Programs are fully Consistent with BMP Verification Principles. During the Chesapeake Bay Program's BMP Verification Review Panel's review of each of the seven jurisdictions' proposed enhanced BMP tracking, verification and reporting programs, the Panel will determine if the proposed verification protocols, procedures and processes are fully consistent with and supportive of the Bay Program's adopted verification principles.

EPA Approval of Jurisdictions' Programs Based on Meeting BMP Verification Principles. During EPA's review of each of the seven jurisdictions' proposed enhanced BMP tracking, verification and reporting programs, the EPA will only approve a jurisdiction's proposed verification protocol, procedure or process if it is fully consistent with and supportive of the Chesapeake Bay Program's adopted verification principles. An approvable jurisdictional quality assurance plan could also provide a detailed schedule and process for how the proposed verification protocols, procedures, and processes will become fully consistent over time.

BMP Verification Guidance

Amend the Chesapeake Bay Program's BMP Protocol to Address Verification. The Chesapeake Bay Program will formally amend, through action by the Water Quality Goal Implementation Team, its *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model* to specifically address BMP verification (CBP WQGIT 2014). The amended protocol will commit the Bay Program partners to develop and adopt, as needed, new verification requirements for new BMPs through its existing BMP expert panel, workgroup review and goal implementation team decision-making process. The future membership make-up of and charges to the BMP expert panels convened by the Bay Program's technical workgroups will need to incorporate verification expertise and responsibilities, respectively. The BMP expert panels will be charged with recommending potential verification protocols as they develop their practice-specific nutrient and sediment load reduction effectiveness recommendations. The respective source sector/habitat restoration workgroup will still be responsible for the development of any new verification procedures for new practices.

Seek to Strengthen Ability to Verify Chesapeake Bay Program-Defined BMPs. In order to ensure practices have been implemented and are operating correctly, the verifier must have distinct BMP definitions/standards in hand so that the BMP may be reliably reported using the approved verification method. Therefore, in addition to relying on existing standards like those from NRCS, the Chesapeake Bay Program will build into its BMP protocol process requests that future BMP expert panels provide distinct practice definitions which incorporate descriptive elements that can be checked by anyone involved in the verification process and result in similar verification findings.

Provide partners with Access to Statistical Design Expertise. The Chesapeake Bay Program will develop, fund and maintain a long-term mechanism through which the seven watershed jurisdictions can directly access statistical survey design experts and expertise in support of continued implementation and adaptation of their BMP verification programs.

Adapt Protocols to Reflect New Verification Technologies. As new BMP implementation strategies, products and technologies develop and evolve, workgroups and jurisdictions will actively adapt their protocols and procedures used to verify BMP implementation. For example, as satellite and other remote sensing techniques continue to develop, the accuracy of their use as compared with on-the-ground inspection will increase, thus providing jurisdictions with a new verification technology consistent with the Chesapeake Bay Program's BMP verification principles.

BMP Data Transparency, Privacy and Public Access

Aggregated Data Considered Transparent Upon Validation. Aggregated data can be used, be considered validated, be provided to the public and still be considered consistent with the Chesapeake Bay Program's transparency principle if the data are collected and reported in accordance with a jurisdiction's approved verification program.

Treat Cost-Shared and Non Cost-Shared Agricultural Conservation Practice Data the Same in Terms of Applying Privacy Restrictions. The Panel recommends the Chesapeake Bay Program allow for the same privacy protections provided to cost-shared data for non cost-shared data not associated with a regulated entity. This means partners would follow the same privacy and aggregation requirements, for example, under Section 1619 of the Farm Bill for both cost-shared and non cost-shared reported agricultural conservation practices. In order for jurisdictions to carry out this recommendation, they may need new or amended state legislation to ensure their existing state privacy restrictions apply across all agricultural conservation practices data.

Public Access to All Credited Practice Data. All practices, treatments and technologies data reported for the crediting of nutrient and sediment pollutant load reductions and used in some form by the Chesapeake Bay Program in accounting for implementation progress will be made publically accessible through the Bay Program partners' Chesapeake Stat website.[25] It is the Bay Program partners' intent to look for opportunities to provide data at even more geographically specific levels as that data becomes available through the jurisdictions' enhanced BMP tracking, verification, reporting, and modeling systems into the future.

Practice Lifespans

Adopt Lifespans for Existing CBP Approved BMPs. The respective source sector workgroups will develop and assign a lifespan/expiration date for each Chesapeake Bay Program-approved BMP. In doing so, the workgroups will consider contract/permit lifespan, engineering design lifespan and actual lifespan. The lifespan/expiration date for each practice will determine when it must be removed from the data submitted for crediting, unless it has since been re-verified.

Develop Lifespans for all Future CBP BMPs. All future BMP expert panels convened by Chesapeake Bay Program workgroups will be responsible for establishing a recommended lifespan/expiration date for each of the practices at which time they must be re-verified or removed from the data submitted for crediting. The Bay Program's BMP Protocol will be amended to provide this charge to all future BMP expert panels.

[25] http://stat.chesapeakebay.net/

Develop Guidance for Sunsetting Practices. Sector workgroups will develop specific guidance for how to sunset specific reported practices which have gone beyond their lifespan and have not received the level of required re-verification after the designated lifespan.

Develop NEIEN-Based Procedures for Removing Practice Data. The Chesapeake Bay Program's Watershed Technical Workgroup will oversee the development of and approve specific procedures that ensure the Bay Program's NEIEN-based BMP reporting system includes mechanisms for both flagging reported practices that are past their established lifespan and confirming there was follow-up re-verification of their continued presence and function or removal from the data submitted for crediting.

Incorporate Practice Data Removal Procedures into Verification Programs. Jurisdictions will build systems for carrying out the process of removing previously reported practices from their NEIEN-based annual progress submission data sets that have gone beyond their lifespan and have not received the level of required re-verification after the designated lifespan. These systems will be nested within the jurisdictions' larger BMP tracking, verification and reporting programs.

Ensuring Jurisdictions' Full Access to Federal Conservation Practice Data

Ensure 1619 Agreements are in Place for All Involved State Agencies. Institute 1619 Conservation Cooperator agreements in all six states covering all state agencies both directly involved in conservation planning, funding, delivery, reporting and submission of conservation practice data *and* with responsibility for submitting aggregated agricultural conservation practice data to the Chesapeake Bay Program's Annual Progress Review through their respective state's NEIEN node. By jurisdiction, these state agencies include:

- Delaware:
  - Department of Agriculture
  - Department of Natural Resources and Environmental Control
  - Forest Service

- Maryland
  - Department of Agriculture
  - Department of the Environment

- New York
  - Department of Environmental Conservation
  - Upper Susquehanna Coalition

- Pennsylvania
  - Department of Agriculture
  - Department of Environmental Protection

- Virginia
  - Department of Conservation and Recreation
  - Department of Environmental Quality

- West Virginia
  - Conservation Agency
  - Department of Agriculture
  - Department of Environmental Protection

To address USDA's concerns over signing agreements with state agencies with clear agricultural conservation practice delivery responsibilities—e.g., running state agricultural cost share programs, delivering technical assistance, responsibility for agricultural conservation data tracking, verification and reporting—that also have regulatory responsibilities, 1619 Conservation Cooperator agreements can be structured so as to limit access to the non-aggregate data to the specific individual agency employees involved in data reporting. This is exactly the approach taken within the Virginia Department of Conservation and Recreation (e.g., Hively et al. 2013; see Appendix F).

Use Consistent Language in All Bay Watershed States 1619 Agreements. Ensure each of the above listed 1619 Conservation Cooperator agreements adopts the broadest, most consistent language as described in the USGS report, *Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms* (Hively et al. 2013; see Appendix F).

Chespeake Bay Program Agreement to Ensure Full Access to Federal Cost Share Practice Data. The six states, USDA and other appropriate partners will sign a cover page referencing all of the six states' agency-specific 1619 agreements collectively committing to ensure all six states have full access to federal financially assisted practice data into the future.

Ensure States Credit Conservation Technical Assistance. The six states need to work directly with their NRCS and FSA state offices to ensure full access to the unaggregated, federally reported Conservation Technical Assistance (CTA) and take the necessary steps to prevent any double counting prior to reporting CTA for nutrient and sediment pollutant load reduction crediting. Chesapeake Bay Program Office staff will assist states in this effort.

Provide State 1619 Conservation Cooperators Access to CEAP Data. State agencies with 1619 Conservation Cooperator Agreements in place will be given access to the Chesapeake Bay watershed CEAP data strictly for purposes of informing adaptation of their conservation delivery programs.

Establish Protocols for Annually Accessing Federal Cost-Shared Practice Data. Each of the six Chesapeake Bay states will establish a well-documented data access and processing protocol that will ensure annual routine, thorough and consistent data access for all USDA Farm Bill agricultural conservation programs within their jurisdiction.

Develop Common Federal Cost-Share Practice Data Template. The Chesapeake Bay Program partners will develop a common template for requesting NRCS and FSA Farm Bill Program conservation practice data for Chesapeake Bay farmland to support consistent annual reporting of federal conservation practice implementation, facilitate consistency and

transparency among the jurisdictions, and ensure a more complete, comprehensive accounting of implemented conservation practices.

Hold USDA Agencies Accountable to Commitment to Enhance Data Collection/Reporting. The Chesapeake Bay Program will work with NRCS and FSA to fully carry out their commitment to enhance data collection, verification, and reporting in the areas identified by the Bay Program's Agriculture Workgroup (see Appendices F and G).

Adhere to Common Schedule for Accessing Federal Cost-Shared Practice Data. The six watershed states, NRCS and FSA will follow the below timeline each year for ensuring comprehensive, consistent reporting of federal cost-shared conservation practice data across all six states:

- July 15 – States submit their data requests to NRCS
- July 15 – States submit their data requests to FSA
- August 15 – States receive their FSA dataset
- October 1 – The Chesapeake Bay Program's Scenario Builder tool practice definitions are finalized for the year by the Watershed Technical Workgroup
- October 15 – The Chesapeake Bay Program's Agriculture Workgroup and Watershed Technical Workgroup approve updated Bay Program-approved BMPs/NRCS standards crosswalk
- October 15 – States receive their NRCS dataset
- December 1 – States submit their integrated federal-state-local dataset to the Chesapeake Bay Program's Annual Progress Review via their state's NEIEN node

Ensuring Jurisdictions Full Access to Federal Facilities/Lands BMP data. Each federal agency will provide a link to its quality assurance plan for the BMP data provided as well as a certification that the quality assurance plan is consistent with the verification guidance in this document.

Clean-up of Historical BMP Databases

Jurisdictions Must Commit to Historical Data Clean-up. An approvable jurisdictional BMP verification program must include clear commitments to and specific plans/schedules for the cleaning up of their historical BMP databases by a specific date, but not beyond October 2015, which is the deadline for providing a complete BMP implementation history for use in calibrating the Chesapeake Bay Program partners' Phase 6 Chesapeake Bay Watershed Model. Jurisdictions will have opportunities to make further adjustments to their historical BMP databases during the first half of 2016, during the time period designated by the Bay Program for comprehensive review of the full suite of revised and updated modeling and other decision support tools under the Chesapeake Bay TMDL Midpoint Assessment. After that time,

jurisdictions' historical databases will be considered "locked in" from the perspective of the Bay Program partners' Chesapeake Bay Watershed Model calibration.

Move Forward with Historical Data Clean-up in Parallel with Reporting Non-Cost Share Practices. The process for cleaning up historical databases must proceed alongside efforts to credit non-cost share practices. To help establish a current baseline of non-cost share practices and prevent double counting, jurisdictions need to be well down the road on cleaning up their historical databases as they begin to actively expand their tracking, verification and reporting of non-cost share practices.

Annual Progress Reporting

Use the Chesapeake Bay Program's Data Exchange Network to Document Verification Status. Since the early 2000s, the Chesapeake Bay Program has been designing, implementing and now actively using a state node-based data exchange network approach to sharing BMP data building from the National Environmental Information Exchange Network or NEIEN (see Appendix L). The Bay Program partners have agreed upon a set of Chesapeake NEIEN Node Codes[26] that describe all of the current possible fields within NEIEN. Fields can be added at any time to the Codes list and to the NEIEN system itself—the Bay Program's Watershed Technical Workgroup reviews and approves all additions and changes to the Chesapeake NEIEN Node Codes list every year prior to December 1. The Watershed Technical Workgroup is responsible for determining which set of BMP event status codes and BMP funding source codes all seven jurisdictions will be responsible for reporting into the future to ensure full implementation of the basinwide BMP verification framework. The Chesapeake Bay Program's Grant Guidance will be amended to reflect a reference to the jurisdictional responsibilities for reporting information for the designated codes for all submitted practices.

Annually Review, Update and Approve the NRCS Standards/CBP Approved BMPs Crosswalk. Working with the Chesapeake Bay Program's Watershed Technical Workgroup, the Agriculture Workgroup will annually review the crosswalk between NRCS standard practice codes and the Bay Program-approved BMPs and their definitions. Any changes or additions to the crosswalk will be jointly approved by the Bay Program's Agriculture Workgroup and Watershed Technical Workgroup. The Watershed Technical Workgroup will then ensure the approved changes or additions are incorporated into the appropriate Bay Program partners' models and other decision support tools as well as the Chesapeake NEIEN Node Codes list. The appropriate documentation will be updated annually by the Watershed Technical Workgroup to reflect these decisions.

CBPO Review of Annual Implementation Progress Data Submissions. Chesapeake Bay Program Office staff will review the jurisdictions' annual NEIEN-based submissions of implementation progress data for the documentation of verification as part of their routine evaluations of the quality and completeness of the submitted data. The annual progress data reviews will be conducted following the specific guidelines and protocols agreed to by the Bay Program partners through the Watershed Technical Workgroup. Any implementation progress

[26] For the most recent version of the NEIEN codes list, contact the current staff or coordinator of the Watershed Technical Workgroup: http://www.chesapeakebay.net/groups/group/watershed_technical_workgroup

practice data submitted without the required verification documentation will be returned to the jurisdiction for incorporation of required documentation and resubmission.

Maintain and Approve Updated Documentation on Entire Annual Progress Data Submission/Review Process. The Chesapeake Bay Program's Watershed Technical Workgroup will be responsible for reviewing and approving any updates to the documentation of the steps, processes and procedures followed by Chesapeake Bay Program Office staff in receiving, reviewing, processing and submitting to the watershed model for the crediting of each jurisdiction's annual implementation data submissions. Chesapeake Bay Program Office staff will be responsible for updating and maintaining the documentation of the annual progress data submission and review process.

BMP Verification Framework Implementation Timeline

Take Specific Steps to Implement the Basinwide BMP Verification Framework. Upon the Principals' Staff Committee's adoption of the basinwide BMP verification framework, the Chesapeake Bay Program and its partners will undertake the following series of actions:

1. All seven jurisdictions will develop/further enhance their BMP tracking, verification and reporting programs to be consistent with BMP verification principles and all other elements of the basinwide BMP verification framework.

2. Jurisdictions will fully document their BMP tracking, verification and reporting programs within their existing Chesapeake Bay Implementation Grant and Chesapeake Bay Regulatory and Accountability Grants' required quality assurance plans.

3. The BMP Verification Review Panel will review each jurisdiction's BMP verification program documentation, assessing the strengths and any possible vulnerabilities in states' BMP verification programs using the Chesapeake Bay Program's BMP verification principles as criteria.

4. The BMP Verification Review Panel will meet with each jurisdiction to discuss the jurisdiction's respective BMP tracking, verification and reporting programs, working to identify and address any discrepancies between the jurisdiction's proposed verification program and the Chesapeake Bay Program's basinwide verification framework.

5. Jurisdictions will be given the opportunity to respond to the Panel's findings.

6. The BMP Verification Review Panel will provide written feedback and recommendations to the BMP Verification Committee on each jurisdiction's BMP verification program.

7. The BMP Verification Review Panel will report its findings and recommendations directly to the Chesapeake Bay Program's Principals' Staff Committee.

8. The EPA will approve each jurisdiction's BMP verification program or request specific enhancements to address the Panel's findings and recommendations prior to EPA approval.

Use First Two Years to Ramp-up Jurisdictions' Verification Programs. The Chesapeake Bay Program partners will use the two years following the Principals' Staff Committee's adoption of the basinwide BMP verification framework as the period within which to ramp up the jurisdictions' verification programs and make necessary internal adjustments and adaptations for implementation of the basinwide BMP verification framework.

Only Verified Practices may be Credited After the Initial Two Year Ramp-up Period. In the first full annual progress reporting cycle coming two years after the date of adoption of the basinwide BMP verification framework by the Principals' Staff Committee, those reported practices, treatments or technologies for which documentation of verification has not been provided through each jurisdictions' NEIEN-based report systems may not be credited for nitrogen, phosphorus or sediment pollutant load reductions for that year.

Communications and Outreach

Provide for Training for Partners and Stakeholders. EPA, working with other Bay Program partners, will provide training (e.g., webinars, meetings) and support the development and distribution of outreach materials.

Verification Program Development and Implementation Funding

Take Full Advantage of EPA Funding Available to Support Verification. EPA established the Chesapeake Bay Regulatory and Accountability Program (CBRAP) Grants to provide the seven watershed jurisdictions with the funds needed to establish, strengthen and expand existing BMP tracking, verification and reporting programs among other jurisdictional regulatory and accountability programs. Within its 2014 *Chesapeake Bay Program Grant and Cooperative Agreement Guidance*, the EPA took extra steps to clearly spell out that these CBRAP grants can be used to fund BMP verification programs (please see pages 13, 30 and 31).

Looking Towards the Future

Undertake Collection of BMP Performance Data through the Chesapeake Bay Program. Following the Chesapeake Bay Program partners' adaptive management BMP verification principle, partners will support a continued evolution of the understanding of the performance of practices. The Bay Program will work with its Scientific and Technical Advisory Committee (STAC) to develop and implement a longer-term process of collecting, analyzing and using the resulting scientific evidence to assist in quantifying the performance of the individual and collective reported BMPs into the future. Analyses of such data would focus on evaluating the degree of consistency with the pollutant load reduction efficiency adopted by the Bay Program and estimated pollutant reductions simulated by the Bay Program partners' suite of models and other decision support tools. Applying the results of these analyses, following an adaptive management process, can help the Bay Program partners refine BMP efficiencies and jurisdictional policy decisions and support continued research and development into new BMPs.

This is *not* recommended as a required program component of a jurisdiction's verification program. The success of these BMP performance evaluations will be based on jurisdictional and the larger Bay Program's commitment and ability to collect this data and further integrate work by outside experts. The findings could assist in confirming the accuracy of the existing BMP efficiencies and of the Bay Program partners' Chesapeake Bay Watershed Model predictions.

Monitoring and a certain amount of performance checks may be needed from jurisdictions to collect adequate data for determining actual BMP performance.

Look to a Point in the Future Where Outcomes will be Measured in Place of BMPs for Verification of Implementation Actions. Landscape management, particularly production agriculture, is accomplished within a network of professionals. Decision making is a dynamic process completed on a daily, seasonal and annual basis, relying on conservation districts, NRCS, agronomists, seed dealers, fertilizer sales, equipment, labor, weather, markets (local, regional, national and international), regulation, personal knowledge/preferences, economic conditions, etc. The reporting of individual conservation practices does not begin to fully capture all the myriad incremental decisions that affect landscape management. We are already witnessing this shift in the management of urban stormwater, with the movement from individual BMPs to performance-based management systems. The Chesapeake Bay Program should consider this continued shift as it works to implement, continually enhance and adapt its basinwide BMP verification framework.

Section 5. References

Agriculture Workgroup's Resource Improvement Technical Review Panel. 2014. Chesapeake Bay Program Resource Improvement Practice Definitions and Verification Visual Indicators Report. Approved by WQGIT August 11, 2014. Available online at: http://www.chesapeakebay.net/publications/title/21973

Chesapeake Bay Environmental Markets Team. 2011. *A Registry for Environmental Credits: Chesapeake Bay Environmental Markets Team White Paper*. Prepared by Kate Bennett and Al Todd. Available online at www.usda.gov/oce/environmental_markets/index.htm.

Chesapeake Bay Environmental Markets Team. 2011. *Verification of Environmental Credits: Chesapeake Bay Environmental Markets Team Discussion Paper*. Prepared by Katie Cerretani and Al Todd. Available online at www.usda.gov/oce/environmental_markets/index.htm.

CBP WQGIT (Chesapeake Bay Program Water Quality Goal Implementation Team). 2014. *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*. Original: March 15, 2010; amended: June 13, 2011, January 9, 2012, February 11, 2013, July 16, 2013. Revised July 14, 2014. Chesapeake Bay Program Partnership, Annapolis, Maryland. Available online at http://www.chesapeakebay.net/publications/title/bmp_review_protocol

Executive Order No. 13508. Signed May 12, 2009, printed 74 FR 23099, on May 15, 2009. http://executiveorder.chesapeakebay.net/default.aspx

Federal Leadership Committee for the Chesapeake Bay. 2010. *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*. http://executiveorder.chesapeakebay.net/page/Reports-Documents.aspx

Hively, W.D., O.H. Devereux, and P. Claggett. 2013. Integrating Federal and State Data Record to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms. U.S. Geological Survey. Open-File Report 2013-1287, 36 p. http://dx.doi.org/10.3133/ofr20131287.

National Research Council. 2011. *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*. Washington, DC: The National Academies Press. http://www.nap.edu/catalog.php?record_id=13131

NRCS (Natural Resources Conservation Service). 2010. "Conservation Program Contracting." *Manuals; Title 440 - Programs; Part 512.* October 2010.

NRCS (Natural Resources Conservation Service). 2009. "Documentation, Certification, and Spot Checking." *General Manual;Title 450 - Technology; Part 407* . October 2009.

U.S. EPA (U.S. Environmental Protection Agency). 2009. Letter from Region 3, Acting Administrator William C. Early to Secretary L. Preston Bryant, Virginia Department of Natural

Resources, November 4, 2009.
http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/tmdl_implementation_letter_110409.pdf

U.S. EPA (U.S. Environmental Protection Agency). 2010a. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment. December 29, 2010.
http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html

U.S. EPA (U.S. Environmental Protection Agency). 2010b. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment: Technical Appendices. December 29, 2010.
http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html

Willamette Partnership. "Pilot Verification Protocol: Willamette Basin Version 1.0." September 1, 2009.

Section 6. Abbreviations

ACE	U.S. Army Corps of Engineers
AEM	Agriculture Environmental Management
BMP	best management practice
CAC	Citizens' Advisory Committee
CAST	Chesapeake Assessment and Scenario Tool
CBEMT	Chesapeake Bay Environmental Markets Team
CBP	Chesapeake Bay Program
CBRAP	Chesapeake Bay Regulatory and Accountability Program
CBWI	Chesapeake Bay Watershed Initiative
CDSI	Conservation Delivery Streamlining Initiative
CEAP	Conservation Effects Assessment Program
CLU	common land unit
CREP	Conservation Reserve Enhancement Program
CGP	construction general permit
CRP	Conservation Reserve Program
CSO	combined sewer overflow
CTA	Conservation technical assistance
DC	District of Columbia
DC DOE	District of Columbia Department of Environment
DE	Delaware
DE DA	Delaware Department of Agriculture
DE DNREC	Delaware Department of Natural Resources and Environmental Control
DE FS	Delaware Forest Service
DMR	discharge monitoring report
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FOIA	Freedom of Information Act
FSA	Farm Service Agency
FR	Federal Register
IDEA	Integrated Data for Enterprise Analysis
IP	Individual Permit
LBS	pounds
LGAC	Local Government Advisory Committee
MB	Management Board
MD	Maryland
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MGD	million gallons per day
MIDAS	Modernize and Innovate the Delivery of Agricultural Systems
MS4	municipal separate storm sewer system
NACD	National Association of Conservation Districts
NAS	National Academy of Sciences
NEIEN	National Environmental Information Exchange Network
NGO	non-government organization

NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NRCS	USDA Natural Resource Conservation Service
NWP	Nationwide Permit
NY	New York
NY DAM	New York State Department of Agriculture and Markets
NY DEC	New York State Department of Environmental Conservation
OWTS	On-site wastewater treatment system
PA	Pennsylvania
PA DEP	Pennsylvania Department of Environmental Protection
PA DA	Pennsylvania Department of Agriculture
PSC	Principals' Staff Committee
QA/QC	quality assurance/quality control
SPGP	State programmatic general permit
STAC	Scientific & Technical Advisory Committee
TSP	technical service provider
USC	Upper Susquehanna Coalition
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VA	Virginia
VA DCR	Virginia Department of Conservation and Recreation
VA DEQ	Virginia Department of Environmental Quality
WIP	watershed implementation plan
WRP	Wetland Reserve Program
WQGIT	Water Quality Goal Implementation Team
WV	West Virginia
WVCA	West Virginia Conservation Agency
WVDA	West Virginia Department of Agriculture
WV DEP	West Virginia Department of Environmental Protection