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

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

Chesapeake Bay Program Partnership

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REVISED DRAFT – SUBJECT TO REVISION

FEBRUARY 13, 2014

Executive Summary

[Editor's Note: The Executive Summary will be written following the joint spring 2014 BMP Verification Committee/BMP Verification Review Panel meeting. The draft Executive Summary will be distributed for review and comment by both the Committee and the Panel.]

<u>Contents</u>

Appendices

Foreword

The Chesapeake Bay Program Partnership must be fully responsive to calls by the Partnership's Citizens 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 of nutrient and sediment pollutant reducing technologies, treatment techniques, and practices. Verification of these best management practices or BMPs is fundamental to ensuring increased public confidence in the Partnership's accounting for implementation under the 2-year milestones. Estimated load reductions using the Partnership's 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 Partners must have confidence that these reported practices are actually 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 for benefits to local streams and rivers as well as Chesapeake Bay.

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

The five BMP Verification Principles adopted by the Partnership recognize the need for changes and enhancements and the opportunity to build from existing local, state, and federal jurisdictional tracking and reporting programs. There are local, state, and federal programs with strong verification programs in place and working effectively in carrying out the principles. However, the Partnership recognizes none of our 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 Partnership's 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.

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

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Nicholas A. DiPasquale, Director
Chesapeake Bay Program

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Acknowledgements

This document, and the principles, guidance, and supporting evaluation and oversight procedures contained within it, were developed through the collaborative efforts of the Chesapeake Bay Program Partnership. Principally, this document was developed through the efforts of the Chesapeake Bay Program (CBP) Water Quality Goal Implementation Team's BMP Verification Committee, and the Team's Agriculture, Forestry, Urban Stormwater, and Wastewater Treatment workgroups, the Habitat Goal Implementation Team's Wetland and Stream Health Workgroups, and the CBP Partnership's independent BMP Verification Review Panel. The CBP's Principals' Staff Committee made final decisions on behalf of the partnership and CBP's Management Board and the Water Quality Goal Implementation Team provided direction to the BMP Verification Committee. Advice, reviews, and independent perspectives were provided throughout the framework development process by the CBP's Citizen's Advisory Committee, Scientific and Technical Advisory Committee, and Local Government Advisory Committee.

The document resulted from the collaborative expertise, input, feedback, comments, and recommendations from literally hundreds of individuals from the multitude of CBP partnering agencies and institutions, local governments, nongovernmental organizations, businesses, and many other involved stakeholders. Their individual and collective contributions are hereby acknowledged.

Special acknowledgment is made to members the following CBP committees, teams, workgroups, and panels: BMP Verification Committee, Agriculture Workgroup, the Agriculture Workgroup's Functional Equivalents Expert Review Panel, the Agriculture Workgroup's Management Plan Verification Expert Panel, Forestry Workgroup, Urban Stormwater Workgroup, Wastewater Treatment Workgroup, Wetland Workgroup, Stream Health Workgroup, Water Quality Goal Implementation Team, Habitat Goal Implementation Team, BMP Verification Review Panel, Scientific and Technical Advisory Committee, the Scientific and Technical Advisory Committee's BMP Verification Subgroup, Local Government Advisory Committee, Citizens Advisory Committee, the Citizens' Advisory Committee's Workgroup on Verification and Transparency, Management Board, and the Principals' Staff Committee. Appendix A provides detailed members listings of each of these panels, committees, teams, and workgroups who were instrumental developing this Basinwide Chesapeake Bay Verification Framework.

The work of the members of the Partnership's BMP Verification Committee in leading and coordinating the work going into development, review, and approval of the basinwide verification framework is hereby acknowledged. Those members include the following individuals (in alphabetical order): Bill Angstadt, Delaware Maryland Agribusiness Association; Rich Batiuk, U.S. Environmental Protection Agency; Russ Baxter, Virginia Department of Environmental Quality; Evan Branosky, World Resources Institute; Pat Buckley, Pennsylvania Department of Environmental Protection; Valerie Frances, U.S. Department of Agriculture; Melanie Frisch, U.S. Department of Defense; Jack Frye, Chesapeake Bay Commission; Roy Hoagland, HOPE Impacts; Susan Marquart, U.S. Department of Agriculture; Beth McGee, Chesapeake Bay Foundation; Matt Monroe, West Virginia Department of Agriculture; Tom Morgart, U.S. Department of Agriculture; George Onyullo, District of Columbia Department of Environment; Marel Raub, Chesapeake Bay Commission John Rhoderick, Maryland Department of Agriculture; Aaron Ristow, Upper Susquehanna Coalition; Ann Swanson, Chesapeake Bay

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Commission; Jennifer Volk, University of Delaware; Andy Zemba, Pennsylvania Department of Environmental Protection; and Hank Zygmunt, Resource Dynamics, Inc.

The following members of the Partnership's BMP Verification Review Panel, an external independent group of expertise selected because of their varied verification experiences, provided invaluable advice, feedback, and recommendations during the development of the framework (in alphabetical order): Dr. Curtis Dell, U.S. Department of Agriculture Agricultural Research Service, University Park, Pennsylvania; Mike Gerel, Sustainable Northwest, Portland, Oregon; Dr. Tim Gieseke, Ag Resource Strategies, New Ulm, Minnesota; Rebecca Hanmer, U.S. Environmental Protection Agency (retired), Fredericksburg, Virginia; Dr. Dianna Hogan, U.S. Geological Survey Eastern Geographic Science Center, Reston, Virginia; Richard Klein, Community and Environmental Defense Services, Owings Mills, Maryland; Dr. Andrew Sharpley, University of Arkansas, Fayetteville, Arkansas; Dr. Tom Simpson, Watershed Stewardship, Annapolis, Maryland; Dr. Gordon Smith, Wildlife Works Carbon LLC, Mill Valley, California; Dr. Rebecca Stack, District of Columbia Department of Environment, Washington, DC; Dr. Robert Traver, Villanova University's Dept. of Civil and Environmental Engineering, Philadelphia, Pennsylvania; Dana York, Green Earth Connection, Centreville, Maryland; and Dan Zimmerman, Warwick Township, Lancaster County, Pennsylvania.

A very special acknowledgement is also made to the following individuals (in alphabetical order) for their leadership within the Partnership and their tireless contributions to the development of the components of the basinwide verification framework: Sally Claggett, Coordinator, CBP Forestry Workgroup, U.S. Forest Service; Denise Clearwater, Chair, Wetland Workgroup, Maryland Department of the Environment; Dr, Frank Coale, Chair, CBP Agriculture Workgroup, University of Maryland; Mark Dubin, Coordinator, CBP Agriculture Workgroup, University of Maryland; Norm Goulet, Coordinator, CBP Urban Stormwater Workgroup, Northern Virginia Regional Planning Commission; Jennifer Greiner, Coordinator, CBP Wetland Workgroup, U.S. Fish and Wildlife Service; Rebecca Hanmer, Chair, CBP Forestry Workgroup, retired-U.S. Environmental Protection Agency; Debbie Hopkins, Coordinator, Stream Health Workgroup, U.S. Fish and Wildlife Service; Ron Klauda, Co-chair, CBP Stream Health Workgroup, Maryland Department of Natural Resources; Bernie Marczyk, Co-Chair, CBP Wetland Workgroup, Ducks Unlimited; Tom Schueler, Coordinator, CBP Urban Stormwater Workgroup, Chesapeake Stormwater Network; Mark Secrist, Co-Chair, CBP Stream Health Workgroup, U.S. Fish and Wildlife Service; Tanya Spano, Chair, CBP Wastewater Treatment Workgroup, Metropolitan Washington Council of Governments; and Ning Zhou, Coordinator, CBP Wastewater Treatment Workgroup, Virginia Tech. The work of the CBP Partnership's technical source sector and habitat restoration workgroups laid the solid technical and programmatic foundation on which the Partnership built the overarching framework.

Thanks to Jeremy Hanson, Chesapeake Research Consortium/Chesapeake Bay Program Office, and Rich Batiuk, U.S. Environmental Protection Agency Chesapeake Bay Program Office, for drafting and editing the several versions of this document in response to comments from the CBP Partnership and the Partnership's BMP Verification Review Panel members.

Section 1. Background

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

- The CBP Partnership's Citizens Advisory Committee has repeatedly called on the Partnership to provide for transparent and open verification of cost shared as well as non-cost shared best management practices tracked and reported by the Chesapeake Bay watershed's seven jurisdictions.

- The President's Chesapeake Bay Executive Order and resultant Strategy committed the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA) to develop and implement "mechanisms for tracking and reporting of voluntary conservation practices and other best management practices installed on agricultural lands" by July 2012.

- Within its Chesapeake Bay Independent Evaluation Report, the National Academy of Sciences National Research Council's Chesapeake Bay panel put forth a series of five specific science-based conclusions all focused on their key finding that "accurate tracking of BMPs is of paramount importance because the CBP relies upon the resulting data to estimate current and future nutrient and sediment loads to the Bay."

- In 2011, the U.S. Department of Agriculture released results from a Conservation Effects Assessment Program (CEAP) study of the Chesapeake Bay watershed. The study, based on a combination of surveys from over 1,400 producers from 2003 to 2006 and modeling, found a significant level of voluntary implementation on cropland. For example, 88 percent of the cropland acres were found to have a conservation tillage system in place. It also identified opportunities to improve water quality in the region, such as through more complete and consistent application of nutrient management.

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 any confidence level that could be termed robust.

There is also a growing, increasingly vocal 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 and environmental agencies, USDA, and county 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 TMDL is receiving credit for nutrient and sediment pollutant reducing practices implemented outside of state or federal regulatory programs without the benefit of state or federal cost share funding.

BMP Verification Definition

This chorus of calls for improved and expanded tracking and reporting of practices points to the need for strengthened verification of the installation and maintenance of the array of pollutant load prevention and reduction practices. Within its BMP verification principles (see Section 5), the Partnership 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 U.S. Department of Agriculture's Office of Environmental Markets[1] and the Willamette Partnership[2].

BMP Verification Framework

There has been significant increases in the importance placed on accounting for implemented practices within the partnership in recent years due to:

- Publication of the December 2010 Chesapeake Bay TMDL and its underlying tracking and accountability system;

- Acceleration of implementation through the jurisdictions' Phase I and Phase II Watershed Implementation Plans;

- Focus on demonstrating reasonable assurance;

- In-depth EPA evaluation of achievement of the jurisdictions' two-year milestones;

- Requiring offsets to new sources of nutrient and sediment pollutants;

- Increasing demand for tradable credits; and

- Interpretation and explanation of the observed trends in local streams and Bay tidal water quality conditions based on reported up-stream and up-tide pollutant load reducing practices.

As a direct result, the Partnership has built a basinwide BMP verification framework, as described in this document, whereby the Partners can have both expanded tracking and reporting of practices *and* verifiable confidence in the outcome of those implemented practices.

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

Working to verify that practices are properly designed, installed, and maintained over time is a critical and integral component of transparent, cost efficient, and pollutant reduction effective program implementation. We all must view verification as the means to strengthen our confidence in local implementation efforts to ensure they are designed to help land owners, municipalities, and local, state and federal facility managers take the actions necessary to protect their properties, lands, riparian habitats, and local streams.

Verification helps ensure the public of achievement of the expected nitrogen, phosphorus, and sediment pollutant load reductions over time. The Partnership will build from existing local, state, and federal agency practice tracking and reporting systems and work towards achieving or maintaining the verification principles adopted by the Partnership.

BMP Verification as a Life Cycle

The Partnership's BMP Verification Review Panel has recommended the Partnership view verification as a life cycle process (Figure 1), including BMP verification, data validation, and evaluation of BMP performance.

Figure 1. Illustration of BMP Verification Life Cycle
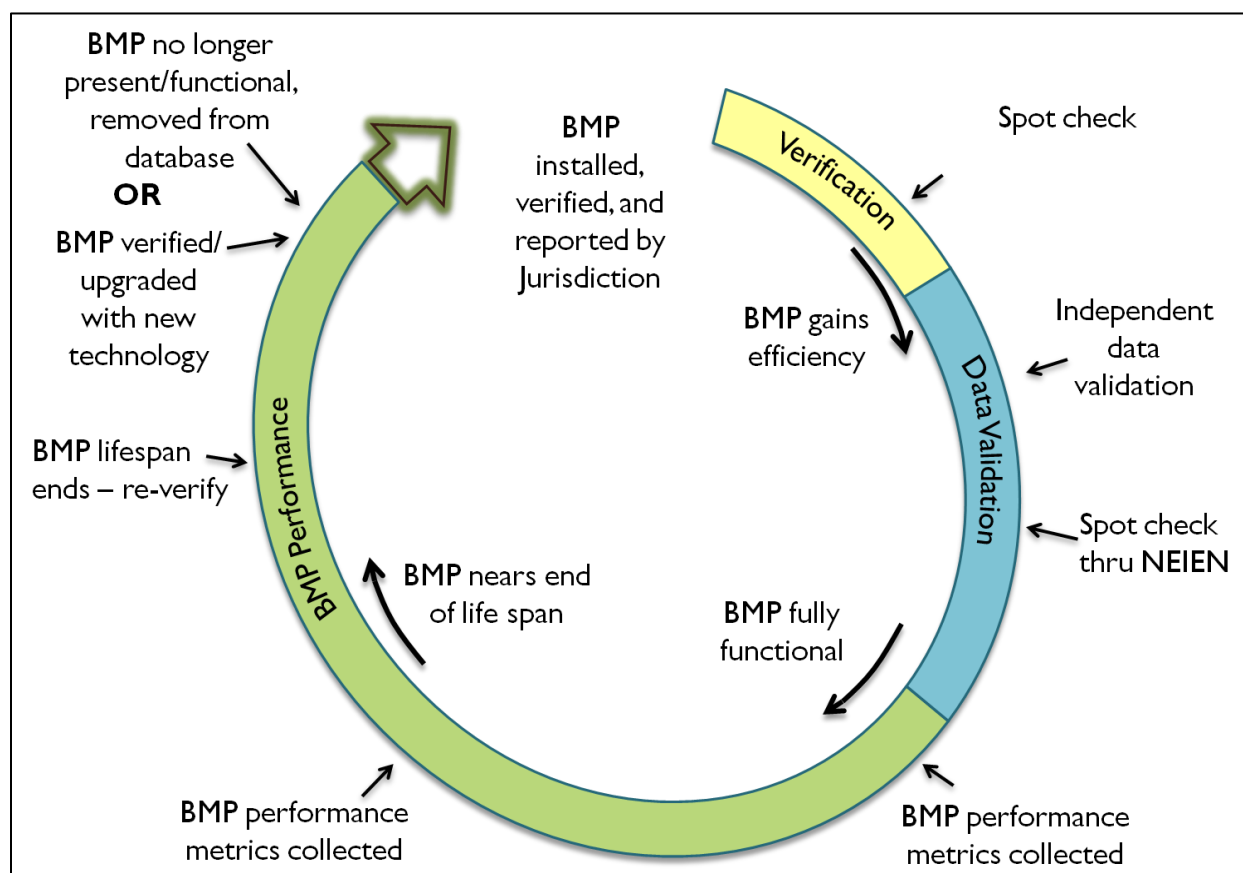
So what is verification? It's the process through which agency partners ensure practices, treatments and technologies resulting in reductions of nitrogen, phosphorus, and sediment pollutant loads are implemented and operating correctly.

The second part of the life cycle is data validation which refers to 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 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 and to help further refine the pollutant reduction efficiencies into the future.

Application of the Basinwide Framework

As described in more detail later in the document, this basinwide BMP verification framework applies across all local, regional, state, and federal agencies, federal facilities, institutions, and organizations involved in the implementation, tracking, verification, and reporting of practices for nutrient and sediment pollutant load reduction crediting.

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 development of a system of accountability for tracking and reporting conservation[3] (Appendix B). The Executive Order describes 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 development of this system, the Executive Order directs USDA to uphold all privacy requirements as called for in Section 1619 of the 2008 Farm Bill.

The Executive Order also directed USDA and 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 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,[4] the Governors, the Mayor, the EPA Administrator, and the Chesapeake Bay Commission Chair requested "that the Chesapeake Bay Partnership be evaluated by a nationally recognized independent science organization" to increase accountability. The Partnership, under the leadership of the Principals' Staff Committee,[5] convened an Independent Evaluator Action Team[6] to construct the evaluation questions and work with EPA to establish and manage a contract with the National Academy of Sciences.

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[3] 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
[4] http://www.chesapeakebay.net/about/ecmeeting/2008_executive_council_meeting
[5] http://www.chesapeakebay.net/groups/group/principals_staff_committee
[6] http://www.chesapeakebay.net/groups/group/independent_evaluator_action_team

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

On May 4, 2011, the National Research Council released the report entitled *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation.* [7] The NRC Committee reached a number of conclusions and recommendations about the Partnership's BMP tracking and accounting efforts, including: [8]

- Accurate tracking of BMPs is of paramount importance because the CBP 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.

- 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.

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[7] 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
[8] The list of conclusions is adapted from Chapter 2, National Research Council (2011). (See Appendix C).

Please see Appendix C 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 U.S. Department of Agriculture released results from a Conservation Effects Assessment Program (CEAP) study of the Chesapeake Bay watershed.[9] The study was performed through a combination of surveys from over 800 producers over 2003 to 2006 and modeling used to estimate the impact of conservation practices on the landscape. Among its findings, the study found a significant level of voluntary BMP implementation on cropland. For example, 88 percent of the 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.

Following the release of the 2011 report, EPA and USDA committed to collaborate to ensure consistency between the CBP Partnership and CEAP modeling efforts and that both are informed by the best conservation data available that describes implementation by farmers in the Bay region. EPA and USDA developed a work plan to this end that included a goal to improve tracking and reporting of conservation practices in the Partnership's Chesapeake Bay Watershed Model through the following commitments:[10]

- The USDA and the EPA will work with state agricultural agencies, conservation districts, and other key agricultural groups to develop a mechanism for tracking, verifying, and reporting non-cost shared conservation practices on agricultural lands for use in the CBP Partnership's Chesapeake Bay Watershed Model.

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

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, USDA and EPA have develop Chesapeake Bay Conservation Data Collaboration[11] and supporting work plan as described above.

CBP Citizens Advisory Committee
The Partnership's Citizens Advisory Committee (CAC) is charged with responsibility for representing residents and stakeholders of the Chesapeake Bay watershed in the restoration effort and advising the CBP Partnership on all aspects of Chesapeake Bay restoration. In this role, they have been strong, vocal advocates for increased transparency, accountability, and independent

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[9] 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
[10] http://www.chesapeakebay.net/channel_files/18692/final_usda_epa_data_collaboration_workplan.pdf.
[11] 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.

evaluation of the restoration work of the Partnership. In their January 3, 2012 letter[12] addressed to the Partnership's Principals' Staff Committee, the CAC called on the partners to begin implementation of the National Research Council Chesapeake Bay Panel's recommendations. The CAC specifically recommended implementation of the action to "bring forward through the Partnership a set of integrated recommendations for a comprehensive BMP tracking, verification and reporting system" (Appendix D). In their December 17, 2012 letter[13] addressed to Chesapeake Bay Program Director Nicholas DiPasquale, the CAC outlined their concerns and challenges back to the Partnership on the development of the basinwide BMP verification framework (Appendix D). In their July 25, 2013 letter[14], the CAC followed through on their previous correspondence and provided six specific recommendations for addressing the need for transparency throughout the verification process (Appendix D).

Chesapeake Bay TMDL
Under the Chesapeake Bay total maximum daily load (TMDL) published in December 2010[15], 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. 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. EPA outlined expectations for common elements of such offset programs in Appendix S of the Chesapeake Bay TMDL[16]. Verification, tracking, and accountability are among the elements described in Appendix S. Credits generated to offset new pollutant loads 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 and through the Partnership's Trading and Offsets Workgroup.[17] While the jurisdictions continue to define verification for their offset programs and for trading programs, it

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[12] Citizens Advisory Committee to the Chesapeake Executive Council's January 3, 2012 Letter to the Principals' Staff Committee. Available on-line at
http://www.chesapeakebay.net/channel_files/20829/cac_letter_to_psc_on_nas_recs_jan_2012.pdf
[13] Citizens Advisory Committee to the Chesapeake Executive Council December 17, 2012 Letter to Nick DiPasquale, Director, Chesapeake Bay Program. Available on-line at:
http://www.chesapeakebay.net/channel_files/19255/final_cac_letter_to_cbpo_on_ag_bmp_verification_dec_17_2012.pdf
[14] Citizens Advisory Committee to the Chesapeake Executive Council's July 25, 2013 Letter to Nick DiPasquale, Director, Chesapeake Bay Program. Available on-line at:
http://www.chesapeakebay.net/channel_files/20829/cac_bmp_verification_letter_final_july_25_2013.pdf
[15] 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
[16] 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
[17] http://www.chesapeakebay.net/groups/group/trading_and_offsets_workgroup

is considered by the Partnership to be separate from BMP verification of practices reported to the Partnership's for annual progress assessment.

The Chesapeake Bay watershed jurisdictions are required to report conservation practice implementation on an annual basis to the EPA Chesapeake Bay Program Office and the Partnership for use in the Partnership's Chesapeake Bay Watershed Model (U.S. EPA 2009). Although the jurisdictions have reported annual progress since the 1990s, this reporting has come under additional scrutiny since 2010, when the EPA issued the Chesapeake Bay TMDL allocations for nitrogen, phosphorus, and sediment (U.S. EPA 2010). The Partnership's Annual Progress Review is used to assess to what extent the seven Chesapeake Bay watershed jurisdictions are making progress towards meeting their respective set of watershed nutrient and sediment pollutant load allocations. Each jurisdiction reports annual progress (July 1 to June 30) in 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 Partnership
As described in the foreword, the Partnership must view verification as the means to strengthen our confidence in local implementation efforts to ensure they are designed to help land owners, municipalities, and facility managers take the actions necessary to protect their properties, lands, riparian habitats, and local streams. Practices which are not properly installed and functioning as designed *don't* prevent local flooding, protect sources of drinking water, ensure against the collapse of stream banks, support local economies through the return of clean water and viable habitats suitable for recreational activities. Implementation of the verification protocols described here will not only increase public certainty in the reported practices, it will help ensure those practices are operating in the intended ways to carry out these local benefits and reduce nutrient and sediment pollutant loads to local streams and Chesapeake Bay tidal waters.

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

Increased Confidence of Pollutant Reduction Outcomes. Verifying what's on the ground and is functioning gives everyone confidence that we will achieve the expected nitrogen, phosphorus, and sediment pollutant load reductions over time.

Direct Benefits to Local Decision Making. Having better data at the municipality, county, or state level better informs local decision-making by conservation districts, townships, cities, and counties. Improved local decisions for local water quality, flooding, and conservation benefits will lead to downstream improvements in Chesapeake Bay water quality. As an added benefit, the same information can be used to inform decision-making at the state, federal and partnership levels.

Consistency Across Pollutant Source Sectors. The Partnership wants to ensure that verification protocols and procedures have an equivalent level of rigor, transparency and confidence across

all source sectors and habitats, so that appropriate level of credit for implementation actions undertaken to date are fully and fairly accounted for.

Planning and Targeting Implementation of Agricultural Conservation Practices. Obtaining accurate, consistent, detailed information on conservation practice implementation can improve the knowledge used for planning and targeting conservation practices, promoting sustainable agricultural management strategies, and supporting an adaptive management approach to improving water-quality in the Chesapeake Bay watershed. Tracking conservation progress provides the information necessary for prioritizing BMP implementation across the landscape and comparing implementation to pollutant load trends and water-quality response.

Inform and Promote Changes in Management Given Better Information. A key objective of verification is to provide information to promote adaptive management. It is not directed towards confirming performance of a practice, but to providing data to 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 Partnership directly benefits 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. 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 in local streams, rivers, and the Bay's tidal waters.

Save Staff and Financial Resources. By enhancing efforts for ensuring states have full access to federal cost shared practice data, the states could save time and dollars that would otherwise be expended trying to ensure their agricultural producers were fully credited for their conservation efforts.

It's a Partnership Approach. All the partners recognize the importance of maintaining flexibility and not being overly prescriptive given the unique nature of each of the seven watershed jurisdictions and how they work with their localities and citizens. The Partnership is offering up a partner-focused, common sense approach to work 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 load reductions using the Partnership's models and other decision support tools, used in shared, collaborated decision-making, depend on accurate, comprehensive reporting of BMPs. The Partnership's scientific experts are continuing to interpret and the reasons behind the trends in the decades of monitored observations of water quality in local streams, larger rivers throughout the watershed of the Chesapeake Bay and across the Bay's tidal waters. The Partners must have confidence that these reported practices are actually being implemented and reducing pollutant loads as they will be used in explaining the observed water quality trends.

Section 2. Building the Framework

The Partnership developed its basinwide BMP verification framework building directly from a number of existing and ongoing programs and efforts which addressed specific components of the overall framework. Those programs and efforts are briefly described below.

Jurisdictions' Existing BMP Tracking, Verification and Reporting Programs

All seven watershed jurisdictions—Delaware, District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia—have existing programs in place for tracking, verifying, and reporting on implementation of BMPs and other treatments and technologies leading to reductions in nutrient and sediment pollutant loads. As a condition for receiving Chesapeake Bay Implementation Grant and Chesapeake Bay Regulatory and Accountability Grant funding from EPA, each of the seven jurisdictions have developed quality assurance project plans describing their collection, management, and reporting of environmental data.[18] The seven jurisdictions' existing quality assurance project 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 national environmental information exchange network (NEIEN) node. The Partnership's work on BMP verification builds directly on these existing jurisdictions' tracking, verification, and reporting programs.

USDA Agricultural Conservation Practice Verification[19]

USDA cost-share programs provide incentives for a number of conservation practices. Individual agencies— Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA)—have procedures in place to evaluate landowner eligibility, validate practices, and monitor implementation. A multi-agency effort—the Conservation Effects Assessment Project, or CEAP—evaluates the environmental outcomes of USDA-supported conservation practices.

NRCS Conservation Practices. NRCS provides technical and financial assistance to landowners to implement specific conservation practices through programs like the Environmental Quality Incentives Program (EQIP). After a practice is implemented, agency personnel check compliance with plans and specifications and certify the practice(s) as qualified for cost share. While third party technical service providers (TSPs) may perform this function, they typically do not. In the Chesapeake Bay watershed, some non-governmental (NGO) organizations such as the Chesapeake Bay Foundation have become TSPs for supporting implementation of specific practices such as riparian buffers under the Conservation Reserve Enhancement Program (CREP). Data used to support practice certification includes location identification, practice design and specifications, and field notes from on-site inspections. Practice specifications are laid out at the county level in the various NRCS Field Office Technical Guides.

In addition to certifying cost-shared practices, NRCS policies require the agency to perform spot checks on offices that certify conservation practices, the practices themselves, and practices

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[18] The seven Chesapeake Bay watershed jurisdictions' quality assurance plans are available under the "Projects & Resources" tab at
http://www.chesapeakebay.net/groups/group/best_management_practices_bmp_verification_committee.
[19] Text summarized from the June 2011 USDA Office of Environmental Markets' *Verification of Environmental Credits: Chesapeake Bay Environmental Markets Team Discussion Paper*.

performed by technical service providers. Offices are to be checked once every third year. Each fiscal year, the agency performs spot checks on 5 percent of practices, up to a total of 20 practices per state. Spot checks are distributed among different types of practices and technical work of agency employees. They focus on practices that are more costly, represent a high proportion of total cost-share funds, or have higher risk of failure. There is a requirement to spot check all cost-shared practices on farms owned by NRCS employees, or in which agency employees have an interest. Further requirements are in place to ensure employees are not checking their own work. Spot checking of TSPs is more intense during the first three years in which the contractor is a certified TSP (NRCS 2009).

NRCS Conservation Program Contracts. NRCS also evaluates its conservation planning activities. Conservation program contracts may include a number of conservation practices. These contracts are reviewed on an annual basis, either by an NRCS conservationist or a TSP performing conservation planning work. Review elements include adequacy of the plan, whether or not practices are completed or on track to be completed, status of operation and maintenance, status of payments, and agreement on practices to be implemented in the following year. The agency also checks 5 percent of contracts annually to verify farmer self-certifications. These include being certified as a limited-resource farmer, a beginning farmer, or having control of the land for the life of the contract. The agency may also check up on additional landowners if it receives a complaint or suspects the certification to be incorrect (NRCS 2010).

Conservation Reserve Program. FSA administers the Conservation Reserve Program (CRP), which compensates roughly one million landowners or producers for long-term conservation. FSA has a partnership with NRCS to achieve program goals. Once FSA determines who is eligible for payment, NRCS works with those producers to develop conservation plans. Producers then sign contracts with FSA to implement their plan. In the past, USDA staff would certify all practices before making payments. However, spurred by USDA Office of the Inspector General's recommendations to reduce spending on site visits, FSA now allows producers to self-certify that they have implemented practices. Roughly 90 percent of practices are self-certified; the remainder being certified by USDA staff. Of the 90 percent that are self-certified, the agency spot checks 5 percent per year. Thus about 14 percent of practices are verified via site visits each year.

Due to the nature of the CRP practices, FSA or other USDA agency staff can use aerial photos to monitor land cover throughout the life of the contract. The agency's National Agricultural Imagery Program acquires these photos on a three-year cycle. During a recent reenrollment/ extension cycle, FSA inspected all CRP practices up for renewal or extension, spending about $19 million to verify 28 million acres of conservation practices. At that time, only a small percentage of practices were found to be below standard.

The National Environmental Information Exchange Network
The National Environmental Information Exchange Network (NEIEN) is a state-federal data-sharing partnership by which environmental information can be shared, integrated, analyzed, and reported without having to take possession of the data. Within the Partnership, NEIEN is being used an internet- and standards-based method for securely exchanging non-point source BMP information between jurisdictional partners and EPA through a system of "nodes" that communicate and handle requests (Appendix E). The Partnership is building on the existing

NEIEN system to incorporate data field and standards for exchanging information relevant to verification of individual practices, treatments, and technologies (see Section 17).

National Association of Conservation Districts

The *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*,[20] developed by the Federal Leadership Committee under Executive Order 13508,[21] called for increased commitment from federal agencies in the Chesapeake Bay watershed to assist the six watershed states to reach their water quality goals. As described previously, one of the issues highlighted in the Executive Order and its Strategy was for USDA to assist states to get a full accounting of both cost- and non-cost-shared conservation practices. It was in this spirit that USDA contracted with the National Association of Conservation Districts (NACD) to determine if there was a common protocol possible to collect information on voluntary practices, and to assist states to develop state protocols to collect additional non-cost shared practices that have been implemented in the six Chesapeake Bay watershed states.

The NACD concluded that development of a common protocol for collection of non-cost shared conservation practices for use by all six watershed states would be extremely difficult at that time.[22] This was due to a variety of factors, including widely varying funding among the states, legal challenges from both agricultural and environmental groups, and the skepticism among the states. All six watershed states now see the value in gathering as much information as possible on BMPs that are farmer funded and not in a database anywhere, but the lack of adequate funds was a major stumbling block. The cross-state discussions proved very valuable and encouraged many in decision making and funding positions to consider the payback on the investment to gather voluntary BMP information. The Partnership's basinwide BMP verification framework has drawn from these lessons learned through the NACD process in building verification protocols which can be used to account for and credit non-cost shared practices installed by agricultural producers (see Section 11).

USGS 1619 Data Sharing Agreements with NRCS and FSA

Concerns have long been expressed by the agricultural community that nutrient and sediment load reductions were not being fully reported by the Chesapeake Bay watershed states nor fully credited in the Annual Progress Review, owing to lack of consistent access to USDA conservation practice implementation data and to reporting inconsistencies among the six watershed states.

In 2010, NRCS entered a partnership with the U.S. Geological Survey (USGS) establishing USGS as a Conservation Cooperator with privacy protected access to USDA farmland datasets. The USGS coordinated with NRCS and the Partnership and assisted in the compilation of an accurate, comprehensive dataset that has been well integrated with the jurisdictional datasets that are also used to assess, track, and reporting implementation progress in conservation practices.

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[20] Federal Leadership Committee for the Chesapeake Bay. 2010. Strategy for Protecting and Restoring the Chesapeake Bay Watershed. Available online at http://executiveorder.chesapeakebay.net/page/Reports-Documents.aspx
[21] http://executiveorder.chesapeakebay.net/
[22] Ensor, R., and D. York. 2011. Final Report. *National Association of Conservation Districts State Protocol Collection of Non-Cost Shared BMPs.* Available online at http://howardscd.org/SCD/scd_nacdprotocolproject.htm

To help provide consistency and completeness of conservation practice reporting among the six Chesapeake Bay watershed states, USDA requested USGS take on the role as a facilitator to use its expertise to acquire and process conservation data from NRCS and FSA. As an impartial scientific third party, USGS was able to play a key role in communication and data transfer between the agencies responsible for implementation of Federal conservation programs—NRCS and FSA, the six watershed states— Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia, and the organization responsible for tracking progress towards attaining conservation goals—the Partnership. Recognizing 1619 data sharing agreements are a fundamental building block on which the state partners will be assured full access to federal cost shared conservation practice data, modification of existing and development of new 1619 data sharing agreement between USDA and the six watershed states are building off of the experiences of USGS's data sharing agreements (see Section 9).

USGS took on the task of acquiring, assessing, and evaluating agricultural conservation practice data records for USDA programs and transferring those datasets in aggregated format to state agencies for use in reporting conservation progress to the Partnership. The USGS role was to pilot this work, resolve issues, and set a foundation for future tracking and reporting of USDA practices by the six watershed states[23]. A methodology was developed to request and acquire the USDA conservation practice datasets, clean them to remove internal duplication, aggregate the data to protect farmer privacy, and transfer the data to the six watershed states.

The objectives of the project were the following:

- Provide the six watershed states with a consistent dataset of USDA financially assisted agricultural conservation practices implemented by NRCS and FSA throughout the Chesapeake Bay watershed, along with consistent definitions for agricultural conservation practices.

- Document the various methods used by the six watershed states to obtain agricultural conservation data and address double counting where financial assistance was jointly provided through federal and state programs.

- Provide a "crosswalk" document that translates between USDA conservation practice codes and the Partnership's approved practice definitions.

- Streamline the overall tracking and reporting process to reduce the workload for the six watershed states.

- Document and improve existing protocols to support ongoing adaptive management of conservation practice data reporting for Chesapeake Bay watershed agricultural lands and operations.

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[23] The USGS is providing only short-term assistance with obtaining and aggregating USDA conservation practice data, given the USGS-USDA 1619 Conservation Cooperator Agreements are set to expire in 2015.

In 2013, USGS published the findings of its work with NRCS, FSA, and the six watershed states in a detailed report entitled *Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms*[24] (see Appendix O).

Maryland Non-cost Share Practice Tracking and Report Pilot Study
[Placeholder for text coming from John Rhoderick, Maryland Department of Agriculture.]

Virginia Non-cost Share Practice Tracking and Report Pilot Study
At the direction of their state General Assembly, the Virginia Department of Conservation and Recreation undertook a pilot study for further developing a strategy for collecting and reporting non-cost shared agricultural and forestry conservation practices. Grant agreements were initiated with six soil and water conservation districts—Blue Ridge, Holtson River, Shenandoah Valley, Thomas Jefferson, Three Rivers, and Virginia Dare—to pilot procedures for on-farm assessment, data collection, entry and reporting of non-cost shared practices. These Districts were selected to represent the diversity of agricultural operations that exists throughout Virginia. Each District was directed to develop and document their outreach and assessment procedures, develop necessary assessment tools, and conduct a minimum of 10 on-farm assessments per month.

The results of these assessments were evaluated to determine if the practices met established standards and specifications for design and construction. In total, 725 farm visits were conducted resulting in 519 practices collected during the pilot study. Assuming the farm visits conducted and the BMPs collected during the pilot study were representative of the state as a whole, extrapolation would suggest that an additional 5-10 percent additional non-cost shared BMPs could be reported beyond the federal and state cost share program practices already tracked and reported by Virginia[25].

West Virginia Non-cost Share Practice Tracking and Report Pilot Study
[Place holder for text coming from Matt Monroe, West Virginia Department of Agriculture.]

USDA Office of Environmental Markets
The USDA Office of Environmental Market's Chesapeake Bay Environmental Markets Team (CB EMT) was chartered by the *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*, issued on May 12, 2010 as directed by Executive Order 13508. The CB EMT facilitated collaboration among federal agencies in development of the infrastructure needed for enabling environmental markets to function effectively in the Chesapeake Bay watershed. The CB EMT's working papers[26,27] presented the perspectives of technical experts on a broad variety of issues related to the development and operation of environmental markets. USDA helped lead

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[24] Hively, W.D., Devereux, O.H., and Claggett, P. 2013. *Integrating Federal and State data records 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. http://pubs.usgs.gov/of/2013/1287/

[25] Stephanie Martin. Personal Communication. Draft Report on Virginia Department of Conservation and Recreation Non-Cost Shared Practices Tracking and Reporting Pilot Study. October 31, 2012. Virginia Department of Conservation and Recreation, Richmond, Virginia.

[26] 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. Provided as Appendix F.

[27] Chesapeake Bay Environmental Markets Team. 2011. Verification of Environmental Credits: Chesapeake Bay Environmental Markets Team Discussion Paper. Prepared by Katie Cerretani and Al Todd. Provided as Appendix G.

the way on thinking through the different approaches to undertaking verification through these key Office of Environmental Markets publications (Appendices F and G).

Response to NAS Chesapeake Bay Evaluation Panel Report

On May 4, 2011, the National Research Council (NRC) of the National Academy of Sciences publically released the report entitled *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*.[28] This work was conducted under the direction of the Chesapeake Executive Council. The Principals' Staff Committee, at its May 10, 2011 meeting, directed the Partnership to provide a formal written response to all 25 of the NRC panel's science based conclusions within 90 days (by August 4, 2011); the deadline was later extended to 180 days (November 4, 2011) by the CBP's Management Board. The Principals' Staff Committee reconvened the Independent Evaluator Action Team to produce a written response to provide a public record on how the Partnership was implementing the NRC panel's science based conclusions.

The Chesapeake Bay Partnership's formal response was comprised of two documents—*Key Challenges*[29] and *CBP Partnership Suggested Responses to May 2011 NRC Report*[30]–were formally transmitted to the Principals' Staff Committee on November 3, 2011[31]. Both documents specifically addressed the NRC Panel's science based conclusions in regards to Best Management Practice effectiveness with a focus on monitoring, tracking and accountability. The Panel's conclusions were a major driver for the Partnership's development and adoption of the Chesapeake Bay Basinwide BMP Verification Framework.

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[28] 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 on-line at: http://www.nap.edu/catalog.php?record_id=13131

[29] *Key Challenges Identified by the Chesapeake Bay Program Partners from the NAS/NRC Report Entitled 'Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation.'* 2011. November 2011 version. Available on the February 16th, 2012 PSC meeting page, or: http://www.chesapeakebay.net/channel_files/17880/%28attachment_iii.d%29_key_challenges_v11-1-2011_v11-17-2011.pdf

[30] *CBP Partnership Suggested Responses to May 2011 NRC Report*. 2011. November 2011 version. Available on-line on the February 16th, 2012 PSC meeting page, or: http://www.chesapeakebay.net/channel_files/17880/%28attachment_iii.c%29_cbp_partner_suggested_responses_to_may_2011_nrc_report_v11-17-2011.pdf

[31] Memorandum from Nicholas DiPasquale, Chair CBP Management Board, to Shawn Garvin, Chair, CBP Principals' Staff Committee, November 3, 2011. Available on-line on February 16th, 2012 PSC meeting page, or: http://www.chesapeakebay.net/channel_files/17880/%28attachment_iii.b%29_memo_mb_to_psc_ie_recommendations_final_11-3-2011.pdf .

Section 3. Chesapeake Bay Basinwide BMP Verification Framework

The Chesapeake Bay Basinwide BMP Verification Framework contains twelve specific components:

- BMP verification principles
- BMP Verification Review Panel
- Source sector and habitat specific BMP verification guidance
- Practice life spans
- Ensuring full access to federal cost-shared agricultural conservation practice data
- Enhance data collection and reporting of federally cost shared practices
- Accounting for non-cost shared practices
- Jurisdiction specific procedures for preventing double counting
- Clean-up of historical BMP databases
- Partnership processes for evaluation and oversight
- Expectations for development and documentation of jurisdictional BMP verification programs
- Communications and outreach

These twelve components are summarized below and described in more detail in the sections which follow.

BMP Verification Principles
The Chesapeake Bay Program Partnership defined five principles to guide partners' efforts as they build on existing state and federal practice tracking and reporting systems and make enhancements to their BMP verification programs. The five principles are discussed in detailed in the Section 5 of this document, with the complete Partnership-approved principles provided in Appendix H.

BMP Verification Review Panel
Through a process described in Section 6, a BMP Verification Review Panel[32] 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 Partnership's adopted verification principles and verification guidance. The panel members are listed in Appendix I and the panel's charge is provided in Appendix J.

Source Sector and Habitat Specific BMP Verification Guidance
Six technical workgroups under the Partnership's Water Quality Goal Implementation Team[33] and the Habitats Goal Implementation Team[34], respectively, were tasked with the development of verification guidance for use by the seven watershed jurisdictions in further developing and

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[32] http://www.chesapeakebay.net/groups/group/bmp_verification_review_panel
[33] http://www.chesapeakebay.net/groups/group/water_quality_goal_implementation_team
[34] http://www.chesapeakebay.net/groups/group/habitat_goal_implementation_team

enhancing the their existing BMP tracking, verification, and reporting programs. The six sets of workgroup-based verification guidance are as follows:

- Agriculture
- Forestry
- Urban stormwater
- Wastewater
- Wetlands
- Streams

The six sets of source sector and habitat specific verification guidance are further described in Section 7 and provided in full detail in Appendix K.

Practice Life Spans
The BMP Verification Review Panel recommended the Partnership establish practice life spans for all Partnership approved BMPs and apply these life spans following the workgroups' verification guidance and within the jurisdictions' verification programs and underlying protocols[35]. The Panel recommended the Partnership's support for continued crediting of a practice even after its recorded lifespan as long as the proper level of re-verification occurs confirming the practice is still present and functioning (see Section 8).

Ensuring Full Access to Federal Cost-shared Agricultural Conservation Practice Data
A number of the six Chesapeake Bay watershed states do not have access to and therefore, have less than a full accounting for practices implemented on agricultural lands within their jurisdiction supported by federal cost-share programs (Hively et al. 2013). Comprehensive and consistent 1619 data sharing agreements in place across all six watershed states is a key objective for ensuring each state has full access to federal conservation practice data for crediting the implementation efforts of their agricultural producers. Efforts underway and commitments to ensure full access to this data by all six Chesapeake Bay watershed states are described in Section 9.

Enhance Data Collection and Reporting of Federally Cost Shared Practices
The jurisdictions directly depend on USDA's tracking and reporting of federal cost shared agricultural conservation practices as part of their larger efforts to credit producers for all their actions to prevent and reduce pollutant runoff from their agricultural production operations.   As described in Section 10, the Partnership's Agriculture Workgroup has identified opportunities to enhance the tracking and reporting of USDA conservation practice data attributes. USDA has committed to working towards addressing these identified jurisdictional needs for enhanced data collection and reporting systems.

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[35] *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.
http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

Accounting for Non-cost Shared Practices
Account for agricultural conservation practices implemented throughout the Chesapeake Bay watershed, including those practices funded solely by the farmer, not funded by state or federal cost share funding or required by regulation (see Section 11).

Preventing Double Counting
There are many situations where a state tracks an implemented conservation practice and the USDA also tracks the identical practice. Typically, both the state and USDA are tracking the same practice because they both provided cost-share to the producer for the practice implementation. Section 12 describes the state-specific procedures being followed in choosing which data to report, to avoid double counting.

Clean-up of Historical BMP Data Bases
The seven watershed jurisdictions have built up records of pollutant load reducing practice and treatment technology implementation starting in the mid-1980s and continuing through up to today as part of the Partnership. As further described in Section 13, each jurisdiction has developed a plan for clean-up of their historical BMP data bases directed towards eliminating past practices which have since expired and are no longer reducing nutrient and sediment pollutant loads.

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 three products developed by the Partnership's BMP Verification Review Panel:

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

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

- The *State Verification Protocol Components Checklist*

Each of these matrices and checklists are presented and described in Section 14.

Partnership Processes for Evaluation and Oversight
The Partnership has agreed to a suite of ongoing evaluation and oversight procedures and processes to ensure the five BMP verification principles adopted by the Partners are in adhered to and effectively carried out. As described in Section 15, these procedures and processes also reflect the Partnership's commitment to adapt to new scientific findings and experiences from verification efforts underway.

Communication and Outreach Strategy
The Partnership's Communications Workgroup[36] has developed a communications and outreach strategy to enable the partners and the Partnership to have consistent, clear messages internally as they gradually build toward public implementation of the BMP verification framework. As

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

described in Section 16, having solid internal understanding and messages will enable 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.

Section 4. Partnership Process for Development of the Basinwide BMP Verification Framework

At the February 16, 2012 Principals' Staff Committee meeting[37], the Partnership reached agreement to proceed forward with development of a basinwide BMP verification framework. The Principals' Staff Committee agreed to proceed with the proposed work plan, the initial schedule, and a process for developing a comprehensive BMP tracking, verification and reporting system on behalf of the Partnership. The Water Quality Goal Implementation Team's BMP Verification Committee[38] was established and charged with communicating the Partnership work on this initiative widely with stakeholders and tracking the framework development and review progress. The Principals' Staff Committee agreed it would resolve and approve issues related to reviewing, modifying, and adopting the BMP verification framework and schedule on behalf of the partnership—as recommended by the Management Board—and to communicate the adoption of the basinwide BMP verification framework widely with stakeholders.

Roles and Responsibilities within the Partnership

The overall decision making process on the components of the basinwide BMP verification framework was based on work flowing up from the source sector and habitat restoration workgroups to the BMP Verification Committee (Table 1). The BMP Verification Committee then worked closely with the BMP Verification Review Panel, seeking their review of the BMP verification principles, guidance, and the other framework components.

Factoring in feedback from the Panel, the BMP Verification Committee then worked up through the Water Quality Goal Implementation Team, Habitat Goal Implementation Team, and Fisheries Goal Implementation Team as well as briefings and seeking feedback from the Partnership's three advisory committees—Scientific and Technical Advisory Committee, Citizen Advisory Committee, and Local Government Advisory Committee, prior to going to the Management Board. Based on discussions and decisions by the Management Board, recommendations were then presented to the Principals' Staff Committee for final review, decisions, and adoption. As the Partnership entered the final stages of review, approval, and adoption of the basinwide framework, the BMP Verification Panel presented its feedback and recommendations directly to the Management Board and Principals' Staff Committee.

Table 1. BMP verification framework development and decision making roles within the Chesapeake Bay Program management structure.

Partnership Group	Description of Role
Technical Workgroups	Development of the source sector/habitat specific verification guidance
BMP Verification Committee	Oversight of development of the components of the BMP verification framework; initial decision making on what is included in the framework components, factoring in reviews

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[37] http://www.chesapeakebay.net/S=0/calendar/event/17880/
[38] http://www.chesapeakebay.net/groups/group/best_management_practices_bmp_verification_committee

	and feedback received from the BMP Verification Review Panel, the Goal Implementation Teams, and the Partnership's three advisory committees
BMP Verification Review Panel	Reviewing and providing feedback on the principles, guidance, and other components of the basinwide BMP verification framework; responsible for the review of the jurisdictions' proposed BMP verification programs and providing recommendations back to the Principals' Staff Committee for final decisions
Goal Implementation Teams	Reviewing recommendations coming from the BMP Verification Committee; providing feedback to the BMP Verification Committee; agreeing on what gets forwarded to the Management Board for further review and decisions
Management Board	Reviewing recommendations from the Goal Implementation Teams; receives the direct feedback and recommendations from the BMP Verification Review Panel; decides what will be forwarded to the Principals' Staff Committee for review and final decisions
Principals' Staff Committee	Final decision-making on the basinwide BMP verification framework on behalf of the larger Partnership based on recommendations from the Management Board and the BMP Verification Review Panel; review and approval (or not) of the jurisdictions' proposed BMP verification programs, factoring feedback and recommendations from the BMP Verification Review Panel

Framework Development and Decision Making Sequence over Time

The basinwide BMP verification framework development and decision making process directly reflected the above described roles and responsibilities within the CBP management structure. The BMP Verification Committee took its charge from the Principals' Staff Committee, developed a BMP verification framework work plan and schedule, sought review and input from the Water Quality Goal Implementation Team, the Partnership's three advisory committees, and the BMP Verification Review Panel, and requested review and approval by the Management Board.

As described above, the development of the framework worked from the technical level up to the policy level, with built-in feedback loops. All the workgroup, goal implementation team, board, committee, and panel conference calls and meetings where BMP verification was a topic on the agenda were open to the public. All these conference calls and meetings were also announced in advance via the web, with full public access to all conference call/meeting agendas, advance briefing materials, presentations, and conference call/meeting summaries through the Partnership's web site calendar accessible at http://www.chesapeakebay.net/calendar. A complete listings of all the Partnership's workgroup, goal implementation team, board,

committee, and panel conference calls and meetings at which discussion of any BMP verification related items were on the agenda is provided in Appendix L, with links to each respective web-based conference call/meeting calendar event listing.

The framework development schedule evolved through time as the Partnership's workgroups, teams, committees, and panel got a better understanding of just how long it was going to take to develop, review and reach agreement within the Partnership on the different components of the basinwide framework. The BMP Verification Committee formally requested the Management Board's approval of changes to the Partnership's basinwide BMP verification framework development schedule. The approved, updated schedule was then posted on the BMP Verification Committee's web page for public access.

The Water Quality Goal Implementation Team and Habitat Goal Implementation Team's six **technical workgroups**—Agriculture, Forestry, Urban Stormwater, Wastewater Treatment, Wetlands, and Streams—developed their sector specific BMP verification guidance over the course of their normal schedules of workgroup conference calls and face-to-face meetings. Each set of verification guidance underwent numerous reviews as drafts were distributed along workgroup members and interested parties, discussed by the workgroup during publically scheduled conference calls and face to face meetings, and direction from the collective workgroup membership was given on further changes to be made.

At several BMP Verification Committee meetings over the course of 2012 and 2013 (e.g., June 19, 2012, September 12, 2012, and February 21, 2013), all six sets of workgroup chairs and workgroup coordinators were invited to present their respective workgroup's most recent version of their draft verification guidance and answer questions from the full Committee membership. As a follow up to each of these Committee meetings, the workgroups received written feedback and requests for further enhancements to their draft guidance from the BMP Verification Committee chair.

In parallel, the BMP Verification Review Panel invited the workgroup chairs to present their verification guidance at Panel meetings (e.g., December 6, 2012 and August 28-29, 2013). The Panel's distributed its overall recommendations to all the workgroups on development of their guidance along with specific comments directed to each individual workgroup on November 19, 2013[39] (Appendix M).

The **BMP Verification Committee** scheduled conference calls and face-to-face meetings timed to coincide with the availability of the next round of draft verification guidance documents and other draft components of the larger BMP verification framework. Each meeting and conference call was structured so that the members had access to advance briefing materials and the requested decisions and actions were outlined in the agendas themselves so members could come prepared to make decisions and provide the requested feedback/direction.

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[39] *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.
http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

Early on in the development process, the Committee established a series of web pages on the Partnership's web site for publically sharing the draft and interim products of its collective work[40]. The Committee continued to use its series of web pages as a forum for ensuring the Partnership and other interested parties had access to the most recent draft versions of components of the basinwide framework, so they could follow the progress of the Committee's work over time.

The Committee formed an Ad-hoc Transparency Subgroup to work directly with the Citizens Advisory Committee (see below) on exactly how transparency would be built into the basinwide BMP verification framework. See Appendix A for a listing of the Subgroup members and see Section 5 for documentation of the efforts of the Subgroup.

The **BMP Verification Review Panel** established its meeting and conference call schedule based on the timing when the BMP principles, guidance, and other components of the basinwide framework were already well formed drafts, but not yet close to final. The Panel's feedback and recommendations from each conference call/meeting were provided to the BMP Verification Committee for follow up action or assignment to one of the six technical workgroups. And as with the workgroups, goal implementation teams, and committees, all the Panel's meetings and conference calls were open to the public with all the agendas, advance briefing materials, and presentations posted on the Partnership's web site in advance (see Appendix L for the list of the specific meeting dates).

The **Water Quality Goal Implementation Team** received regular verbal and written updates on the progress of development of the basinwide BMP verification framework during its regularly scheduled monthly conference calls (see Appendix L for the list of the specific conference call dates). The BMP Verification Committee would periodically bring specific draft framework components to the attention of the Team for review and feedback. Once the BMP Verification Committee had developed the entire draft BMP verification framework, the Water Quality Goal Implementation Team was asked for their review and approval to bring the framework forward to the Management Board.

The CBP Partnership's three **advisory committees**—Scientific and Technical, Citizens, and Local Government—were periodically briefed on the progress being made in development of the basinwide verification framework (see Appendix L for the list of the specific meeting dates). Each advisory committee was focused on particular issues or components of the overall BMP verification framework as described here. The Partnership asked each respective advisory committee to help work through the resolution of the issues they raised.

The Scientific and Technical Advisory Committee (STAC) focused its attention on the process of verification and ensuring there were clear oversight, evaluation, and follow through review functions built into the basinwide BMP verification framework (see Appendix L for list of specific meeting dates). The STAC formed a BMP Verification Subgroup (see Appendix A for

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[40] All the various draft versions of the workgroups' BMP verification guidance were made publically accessible at http://www.chesapeakebay.net/groups/group/best_management_practices_bmp_verification_committee under the Projects and Resources tab.

the membership list) charged with responsibility for reviewing the proposed approach to ensuring evaluation and oversight of the jurisdictions' verification programs. The Subgroup provided its draft review findings and recommendations to the BMP Verification Committee in August 2013[41] (see Appendix P).

The Local Governments Advisory Committee (LGAC) placed its emphasis on ensuring the proposed verification procedures could be effectively carried out by local governments throughout the Chesapeake Bay watershed (see Appendix L for list of specific meeting dates). LGAC was aided by the presence of a Pennsylvania Township Manager on the BMP Verification Review Panel (see Appendix A), ensuring a local perspective was factored into the discussions and recommendation of the Panel.

The Citizens Advisory Committee (CAC) provided the most specific documentation on their concerns and recommendations for addressing those concerns in their correspondence with the Partnership (see Appendix D).[42, 43, 44, 45, 46] The CAC pursued clarity in how the Partnership was going to ensure full transparency throughout the basinwide BMP verification framework and the resultant jurisdictional BMP verification programs. CAC formed a Workgroup on Verification and Transparency (see Appendix A for a list of members) in response to a request from the Partnership to help describe exactly how transparency could be built into the BMP verification framework.

The **Management Board** received regular verbal and written updates from the BMP Verification Committee on the progress of development of the basinwide BMP verification framework during its regularly scheduled conference calls and face-to-face meetings (see Appendix L for the list of the specific meeting and conference call dates). The BMP Verification Committee would periodically bring specific draft framework components or requests for modification to the overall work plan/schedule to the attention of the Board for review, feedback, and decisions. Once the Water Quality Goal Implementation Team reviewed the entire draft basinwide BMP

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[41] CBP Scientific and Technical Advisory Committee. August 16, 2013. Draft Review by STAC BMP Verification Subgroup. Annapolis, MD.
http://www.chesapeakebay.net/channel_files/20832/draft_stac_verification_oversight_subgroup_16aug2013.pdf

[42] Citizens' Advisory Committee. January 3, 2012. Letter to the Principals' Staff Committee. Provided as Appendix D. Available at http://www.chesapeakebay.net/channel_files/20829/cac_letter_to_psc_on_nas_recs_jan_2012.pdf

[43] Citizens' Advisory Committee. December 17, 2012. Letter to Nick DiPasquale. Provided as Appendix E. Available on-line at:
http://www.chesapeakebay.net/channel_files/19255/final_cac_letter_to_cbpo_on_ag_bmp_verification_dec_17_2012.pdf

[44] DiPasquale, N. February 4, 2013. Letter to John Dawes, Chair, Citizens' Advisory Committee. Provided as Appendix L. Available on-line at:
http://www.chesapeakebay.net/channel_files/19255/cbpo_response_to_cac_on_bmp_verification_020413.pdf

[45] Harrison, V., Hanmer, R., Der, A., and J. Blackburn. May 22, 2013. Recommendations of the CAC workgroup on verification and transparency. Provided as Appendix M. Available on-line at:
http://www.chesapeakebay.net/channel_files/20829/memo_to_cac_from_verification_and_transparency_workgroup_may_22_2013.pdf

[46] Citizens Advisory Committee to the Chesapeake Executive Council's July 25, 2013 Letter to Nick DiPasquale, Director, Chesapeake Bay Program. Available on-line at:
http://www.chesapeakebay.net/channel_files/20829/cac_bmp_verification_letter_final_july_25_2013.pdf

verification framework, the Management Board was asked for their review and approval to bring the draft framework forward to the Principals' Staff Committee for final review and approval.

The **Principals' Staff Committee** was periodically briefed on the progress of development of the basinwide BMP verification framework (see Appendix L for the list of the specific meeting dates). At these meetings, the Principals' Staff Committee was asked to affirm that the Partnership was heading the right direction on the development of the verification framework or provide other direction. Once the Management Board reviewed the entire draft BMP verification framework, the Principals' Staff Committee was asked for their final review and approval.

Section 5. BMP Verification Principles

The CBP Partnership developed and adopted a set of BMP verification principles to both guide the development of the verification guidance by the workgroups and other components of the basinwide verification framework and establish the basis on which to evaluate the development and implementation of enhanced jurisdictional BMP verification programs (Table 2; Appendix H). The BMP Verification Committee developed the five verification principles, with review and input provided by the BMP Verification Review Panel, Water Quality Goal Implementation Team, and Management Board, and approval by the Principals' Staff Committee. The Partnership had these five original verification principles approved at the Principals' Staff Committee's December 5, 2012 meeting[47] and in place more than a year prior to final review and approval of the workgroup's BMP verification guidance along with the rest of the verification framework. The principles have provided the common bar with which the partners could judge the distinct components of the framework to ensure in the end, everything would be aligned to hit the same mark.

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 CBP partnership. This principle also outlines general expectations for verification protocols.
Scientific Rigor	Asserts that verification should assure effective implementation through scientifically rigorous and defensible, professionally established and accepted sampling, inspection, and certification protocols. Recognizes that 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 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 verification protocols to recognize existing funding and allow for reasonable levels of flexibility in the allocation or targeting funds.

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[47] http://www.chesapeakebay.net/calendar/event/19044/

Sector Equity	Calls for each jurisdiction's program to strive to achieve equity in the measurement of functionality and effectiveness of implemented BMPs among and across the source sectors.

The public confidence principle was amended from its original form adopted in the fall of 2013 in response to separate requests originating from the Partnership's Agriculture Workgroup and the Citizens Advisory Committee for a specific definition of transparency and descriptions of how it would be operationally applied (Table 3). The Transparency Subgroup of BMP Verification Committee members,[48] along with Rebecca Hanmer, Citizen Advisory Committee member, drafted up the addendum to the public confidence principle working closely with the Partnership's Agriculture Workgroup, the BMP Verification Review Panel, and the BMP Verification Committee (Appendix N).

As described in the May 22, 2013 Recommendations of the CAC workgroup on verification and transparency memorandum[49]:

> "Transparency means operating in a way that is easy for others to see what actions are performed. Thus, when applied to government programs, transparency is a method where decision-making is carried out in a manner readily accessible to the public. Absent a legal constraint, all draft documents, work products, and final decisions or document, and the decision making process itself, are made public and remain publicly available. Transparency means an outside reviewer can determine what data were used as a basis for a deliberative decision or conclusion to generate a report. Included would be how the data were obtained, what measure are employed to ensure the data is accurate, who is responsible for data generation and collection as well as who is responsible for ensuring data accuracy, and the methods of analysis utilized."

Transparency is incorporated in the Clean Water Act and its regulatory and policy frameworks, which establishes public access and site-specific data transparency requirements for all sources of nutrients and sediments regulated as point sources. The following transparency definition and numbered descriptions of how this definition will be applied (Table 3) were recommended to the Partnership by the Committee to clarify how the concept of transparency operationally applied across all nonpoint sources of nutrient and sediment pollutants.

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[48] http://www.chesapeakebay.net/groups/group/bmp_verification_transparency_subgroup

[49] Harrison, V., Hanmer, R., Der, A., and J. Blackburn. May 22, 2013. Recommendations of the CAC workgroup on verification and transparency. Available on-line at: http://www.chesapeakebay.net/channel_files/20829/memo_to_cac_from_verification_and_transparency_workgroup_may_22_2013.pdf

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Table 3. Transparency Addendum to the BMP Verification Public Confidence Principle

Transparency means operating in a way so any outside reviewer can determine what actions were taken, which data were synthesized to generate a report or conclusion, how data was collected and obtained, what measures were employed to ensure data accuracy, who is responsible for data collection and synthesis, who is responsible for ensuring data accuracy, and the methods of data analysis utilized.

1. The measure of transparency will be applied to three primary areas of verification: data collection, data validation, and data reporting.
2. Transparency of the process of data collection must incorporate clearly defined quality assurance/quality control (QA/QC) procedures, which may be implemented by the data-collecting agency or by an independent external party.
3. Transparency of the data reported should be transparent at the finest possible scale that conforms with legal and programmatic constraints, and at a scale compatible with data input for the Chesapeake Bay Program Partnership's modeling tools.
4. It is recognized that transparency of data reported will vary across verification methods and data collection and reporting programs. This variance, however, should not negate the commitment and obligation to ensure transparency at the highest level possible in collection, synthesis and reporting.

[**Editor's note**: The transparency addendum text in Table 3 is still draft and subject to change pending final review and approval by the CBP Partnership's Principals' Staff Committee]

The definition for transparency and its operational application were largely drawn from the work of the Partnership's Citizens Advisory Committee and its Workgroup on Verification and Transparency as documented within their May 22, 2013 memorandum[50] (see Appendix D). The BMP Verification Review Panel carefully reviewed the proposed transparency addendum and provided their recommended text changes in their transmitted November 19, 2013 recommendations document (Appendix M). The BMP Verification Committee made its decisions on the transparency addendum text that was then forwarded to the Partnership for final review and decisions by the PSC as part of the larger basinwide BMP verification framework.

In its November 19, 2013 recommendation document[51], the BMP Verification Review Panel recommended the Partnership adopt and use the following terms and definitions in all its

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[50] Harrison, V., Hanmer, R., Der, A., and J. Blackburn. May 22, 2013. Recommendations of the CAC workgroup on verification and transparency. Available on-line at:
http://www.chesapeakebay.net/channel_files/20829/memo_to_cac_from_verification_and_transparency_workgroup_may_22_2013.pdf
[51] 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.
http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

individual partners' and collective programmatic descriptions and documentation of verification, particularly in place of the terms like "third party". The Panel recommended the following definitions to both compliment and further clarify the application of the transparency addendum to the BMP public confidence principle as well as clarify the use of these terms in the workgroup's BMP verification guidance and the resultant jurisdictions' BMP verification programs.

Each of these terms has significant implications when they are used in verification guidance and protocols, each carrying with it time and resource investment implications. The use of the terms "independent" and "external independent" and parts of the wording for the definitions below were drawn directly from publications on the topic of peer review authored by the National Research Council, the U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency, and are consistent with USDA Natural Resources Conservation Service verification procedures.

Independent Review: a review carried out by someone within the same organization having technical expertise in the subject matter to a degree at least equivalent to that needed for the original work, but who was not involved as a participant, supervisor, technical reviewer, or advisor in the development or operations of the program/practice under review.

External Independent Review: a review carried out by a separate outside organization with technical expertise in the subject matter to a degree at least equivalent to that needed for the original work. Generally, this level of review is sought when considering key decisions that are being made that could affect the overall verification program.

Section 6. BMP Verification Review Panel

The Chesapeake Bay Program Partnership convened the BMP Verification Review Panel in September 2012 to provide an independent perspective and expert evaluation of both the components of the basinwide verification framework as they were being developed as well as the jurisdictions' proposed enhanced verification programs. There were no examples to follow in terms of a comprehensive BMP verification program extending across a large, multi-state watershed, addressing a multitude of source sectors all at the same time. Therefore, the Partnership sought the expertise and advice of recognized experts in related disciplines. The Panel brought to the Partnership a diversity of experiences and expertise, drawn from programs, institutions, and agencies around the Chesapeake Bay watershed and across the country.

Review Panel Charge
The BMP Verification Committee drafted and the Management Board approved a charge to the Panel which addressed two major objectives:

- Providing advice, feedback, and recommendations to the Chesapeake Bay Program partnership as it develops its basinwide verification framework; and

- Using the verification principles as criteria for assessing the strengths and any possible vulnerabilities in the state verification programs and providing written feedback and recommendations on each jurisdiction's program.

The approved Panel's charge is provided in Appendix J. The charge to the Panel also asked that the Panel review and provide feedback on and recommendations for changes to the draft set of BMP verification principles. Further, the charge requested that individual panel members work directly with the appropriate source sector/habitat restoration workgroups, providing advice, feedback, and recommendations during the respective workgroup's development of verification guidance specific to their pollutant source sector/habitat. Finally, the Partnership charged the Panel with evaluating whether the level of verification rigor is consistent across source sectors and across all seven watershed jurisdictions.

Review Panel Membership
In convening the Panel, the Partnership sought a membership that would be comprised of recognized regional and national verification, certification, and mitigation tracking experts who were independent of the Chesapeake Bay Program Partnership. The BMP Verification Committee outlined a series of desired expertise and proficiencies which would be reflected in the Panel membership (Appendix I). Examples included applied knowledge and experience in developing and managing verification programs as well as knowledge of the variety of verification tools available (e.g., on-the-ground data collection, verification techniques, statistical techniques, survey techniques, etc.) and their utility and application for verifying practices across a multitude of source sectors and habitats.

The Partnership was looking for a balance of Panel membership from government, academia, non-governmental organizations, and the private sector. Towards this objective, the BMP Verification Committee included a specific request for proposed members which included a detailed listing of the types of members being sought as part of its widely distributed call for

panel members (Appendix J). Two specific examples were members were sought with specific source sector experience in agriculture, stormwater, and on-site treatment systems and a member from the prior National Academy of Sciences National Research Council's Chesapeake Bay Independent Evaluation Committee. However, there was no requirement applied for ensuring all of these potential member types were included on the panel.

In making decisions on the Panel members to recommend to the Management Board for final approval, as described below, the BMP Verification Committee sought a Panel membership which would have an equitable representation of experts, affiliations, source sectors, and geographic knowledge. All panelists were asked to identify any potential financial or other conflicts of interest prior to serving on the Panel. These conditions were set up in advance to ensure the Panel was not biased toward particular interests or regions.

Process for Review Panel Membership Selection

At its February 2012 meeting, the Partnership's Principals' Staff Committee agreed to proceed forward with development of a basinwide BMP verification framework, including convening of a panel of verification experts.[52] That same month, the Partnership's Management Board decided at its February 9, 2012 meeting that it would be responsible for making decisions on the BMP Verification Review Panel's final membership and charge based on recommendations from the BMP Verification Committee.[53]

Based on the June 21, 2012 call for nominations distributed via email to the Partnership's Water Quality and Habitat goal implementation teams, their respective workgroups, and the Partnership's three advisory committees—Citizens, Local Government, and Scientific and Technical, the BMP Verification Committee received a total of 27 nominations for panel members. Committee members then were asked to provide their top five nominees as well as identify any nominee(s) they felt had either a conflict of interest or did not have the expertise being sought for the panel members.

The results from Committee members' voting were compiled and shared with the full Committee membership in advance of its August 16, 2012 conference call.[54] Committee members narrowed down the list of nominees to a set of 13 experts. The Committee had one final review of the narrowed down list through the end of August, with a number of Committee members concurring with the full list for final selection by the Management Board. The Management Board accepted the 13 nominees at its September 13, 2012 meeting, and also approved the BMP Verification Review Panel's Charge and Operations as recommended by the BMP Verification Committee.[55] The full list of Panel members, their contact information, and short biographies is provided in Appendix I.

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[52] www.chesapeakebay.net/calendar/event/17880/
[53] www.chesapeakebay.net/calendar/event/17872/
[54] www.chesapeakebay.net/calendar/event/18556/
[55] www.chesapeakebay.net/calendar/event/18086/

Panel Role in Development of the Verification Framework

Since being formally convened in September 2012,[56] the Panel has met in two face-to-face meetings (December 6, 2012 and August 28-29, 2013) and through five conference calls (October 12, 2102, June 19, 2013, July 31, 2013, October 31, 2013, and November 1, 2013). In carrying out its charge to date, the Panel has reviewed and provided feedback in the following areas:

- Reviewed and provided comments on the draft BMP verification principles to the BMP Verification Committee following its introductory conference call in October 2012;

- Heard detailed briefings from the six technical source sector workgroup chairs and coordinators on their initial draft BMP verification protocols and provided detailed feedback during the course of the Panel's December 2012 meeting;

- Provided initial feedback and recommendations on plans for clean-up of historic BMP databases back to the chair and coordinator of the Partnership's Watershed Technical Workgroup;

- In response to detailed briefings on the steps being considered for ensuring full access to federal cost shared conservation practices and addressing double counting, Panel members provided the U.S. Geological Survey team with specific feedback and recommendations;

- Provided several rounds of feedback to the workgroups' chairs and coordinators on their draft and revised draft sets BMP verification guidance; and

- Provided a comprehensive set of recommendations directed to the workgroups, jurisdictions, and BMP Verification Committee in November 2013.

Panel's Findings and Recommendations

As a follow through to its face to face meeting in August 2013 and follow-up conference calls in October and November 2013, the Panel drafted and distributed its *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*[57] (Appendix M). In the spring of 2014, the Panel met in joint session with the BMP Verification Committee… [Editor's Note: this section will be completed following the joint meeting.]

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[56] Invitation letters were sent to the 13 nominated panelists on September 18th, 2012. The letters are available online at http://www.chesapeakebay.net/groups/group/bmp_verification_review_panel, under the "Projects & Resources" tab.

[57] 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.
http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

Section 7. Source Sector/Habitat Specific BMP Verification Guidance

Role of the Workgroups' Guidance within the Larger Framework

At the heart of the basinwide BMP verification framework has been the development of the source sector and habitat specific BMP verification guidance by the Partnership's six technical workgroups. These six sets of guidance, as described below and provided in detail in Appendix K, outline the Partnership's recommended guidance for consideration by local, state, and federal agency partners as they work to document and carry out specific procedures and protocols to ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and/or sediment pollutant loads are implemented and operating correctly.

Verification Guidance Development and Review Process

The six technical workgroups—Agriculture, Forestry, Urban Stormwater, Wastewater Treatment, Wetlands, and Streams—developed their source sector and habitat specific BMP verification guidance over the course of their normal schedules of workgroup conference calls and face-to-face meetings. Each set of verification guidance underwent numerous reviews as drafts and revisions were distributed among workgroup members and interested parties, discussed by the workgroup, and direction from the collective workgroup membership was given on further changes to be made. Although each set of guidance was developed independently by the six workgroups, the workgroups were all using the same set of five BMP verification principles (see Section 5, Appendix H) to guide the verification guidance development process. In addition, all six workgroups collectively presented incrementally updated draft versions of their respective protocols to the BMP Verification Committee and then the BMP Verification Review Panel, respectively, over the course of spring 2012 through late summer 2013, receiving detailed feedback and direction along the way.

After more than year in development, the six technical workgroups provided the BMP Verification Committee with their recommended BMP verification protocols in early July 2013. These recommended verification protocols were incorporated into the July 15, 2013 draft of this document and distributed to members of the BMP Verification Review Panel and the BMP Verification Committee for their review over the course of the summer. The BMP Verification Review Panel developed the formal comments, responses, and recommendations during their August 28-29, 2013 meeting[58] and follow-up October 31, 2013[59] and November 1, 2013[60] conference calls, all of which were contained within the Panel's November 19, 2013 recommendations document[61]. The Panel's recommendations to the workgroups are summarized in Table 4 and provided in Appendix M. The six workgroups provided their revised verification guidance documents to the BMP Verification Committee in early February 2014 for incorporation into the revised draft version of this document which was then distributed to

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[58] http://www.chesapeakebay.net/calendar/event/20832
[59] http://www.chesapeakebay.net/calendar/event/21023/
[60] http://www.chesapeakebay.net/calendar/event/21024/
[61] 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.
http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

Table 4. Summary of the BMP Verification Review Panel's recommendations to the six technical workgroups.

- Workgroups provide guidance, the jurisdictions develop protocols.

- Use the Urban Stormwater Workgroup's narrative as a model to follow.

- Use the Panel's Verification Program Design Matrix in the form of a checklist in developing the workgroup's guidance.

- Consider the Panel's 14-steps when developing the workgroup's verification guidance.

- Use the Panel's State Protocol Components Checklist as a checklist for ensuring the guidance provides each jurisdiction with the workgroup's best insights how to address.

- Consider the need for the jurisdictions to submit any additional documents for protocol approval beyond referencing the workgroup's guidance.

- Consider the Panel's comments on workgroup's previous draft guidance.

- Group practices and verification options together within the workgroup's guidance.

- Aim high: provide recommendations on "robust" levels of verification.

- Define how to verify and at what frequency.

- Address inspection frequency for functional equivalents.

- Provide guidance on intensity of verification choices.

- Confirm cross-walks between CBP BMPs and NRCS/State BMP practice design definitions/standards.

- Establish practice life spans and use within the workgroup's verification guidance.

- Enable adaptation in the jurisdictions' verification protocols with the use emerging technologies in conducting the actual verification procedures.

members of the BMP Verification Review Panel and the BMP Verification Committee for their review for comment.

Achieving Internal Consistency Across the Workgroups' Guidance

The BMP Verification Committee, with the direct assistance of the BMP Verification Review Panel, worked to ensure there was a common 'level of fairness' in the expectations expressed within each workgroup's set of verification guidance. Below are summarizes of the specific steps taken to ensured a level of internal consistency across the workgroups' guidance.

Ensuring Equity Across Sectors/ Habitats

The BMP Verification Review Panel's set of 15 specific recommendations directed at all six technical workgroups (see Table 4, Appendix M) provided a uniform charge to all six workgroups and established a common bar for each workgroup to strive for in their respective guidance documents. The Panel's call for use of the Urban Stormwater Workgroup's guidance narrative as a template for use by the other five workgroups ensure each set of guidance addressed a common suite of elements and was written in a form understandable by readers not as familiar with each source sector and habitat.

Application of the Panel's Verification Program Design Matrix

The BMP Verification Review Panel developed a *Chesapeake Bay Program BMP Verification Program Design Matrix* (see Table 9 in Section 14) which outlined three recommended program components along with the underlying program elements of a jurisdiction's verification program. The Panel saw the workgroups using the matrix essentially as a checklist to ensure their guidance was addressing all

the program elements the Panel envisioned within each jurisdiction's verification program.

Use of the Panel's 14 Verification Program Development Steps

The *Jurisdictional BMP Verification Program Development Decision Steps for Implementation* developed by the BMP Verification Review Panel (see Table 10 in Section 10) spells out the 14 steps for each Chesapeake Bay watershed jurisdiction to consider when developing their jurisdiction's BMP verification program. Under each step are a series questions for consideration which will prompt decisions that may be needed to develop the jurisdiction's verification protocols. The Panel envisioned the workgroups using the 14 steps as prompts to ensure their respective guidance provided the jurisdictions with part of the information needed to answer the questions under each step.

State Verification Protocol Components Checklist

The *State Verification Protocol Components Checklist* (see Table 11 in Section 14) developed by the BMP Verification Review Panel was provided to the workgroup as a checklist to ensure their guidance was addressing all the components the Panel envisioned within each jurisdiction's verification protocols.

Practices Which Cross Source Sector/Habitat Boundaries

The workgroup chairs and coordinators worked collectively, at the strong urging of the BMP Verification Committee and BMP Verification Review Panel, to clearly define which specific set of workgroup verification guidance applied to practices which could apply across two or more source sectors or habitats. In each of these cases, whether its wetlands restoration or tree planting, each workgroup's verification guidance clearly spells out the appropriate guidance the jurisdictions should follow for those practices spanning multiple source sectors/habitats.

Verification of Management Plan-based Practices

There is a significant verification challenge posed in ensuring practices which take the form of management plans are implemented and operating correctly. At the request of the BMP Verification Committee, the Agriculture Workgroup convened an expert panel to develop specific verification guidance for how jurisdictions could verify management plan-based practices (Appendix Q). [Editor's Note: this text will be further fleshed out once the Agriculture Workgroup's expert panel reports out.]

Types of BMP Implementation

There were generally found to be three types of BMPs being implemented which required verification:

- Voluntary or required BMPs implemented with cost share support.

- Required BMPs without cost share support.

- Voluntary BMPs implemented without cost share support.

Each of the workgroups provided upfront definitions and groupings of their BMPs and addressed how they recommended the jurisdictions verify the resultant categories of BMPs within their guidance. Taking this approach ensured a level of consistency within and across the workgroup's guidance documents.

Key Phases for Verification

There are essentially three phases for verification common across most of the sectors and habitats:

- BMP installation (year 1).

- Post-BMP implementation while under a contract (state or federal cost share program) or regulatory oversight (state/federal permit).

- Post-BMP implementation after the contract expires and/or regulatory oversight ends.

Each workgroup addressed how it recommended verifying practices under these phases, generally building off of and, in some cases, enhancing existing regulatory and permitting inspection and maintenance programs.

Recognizing Diversity of Choices in Conducting Verification

The six technical workgroups provided the jurisdictions with guidance, as recommended by the BMP Verification Review Panel, not specific protocols. It's each jurisdiction's responsibility for developing verification protocols which best address their implementation programs, local communities, and circumstances. As recognized in each workgroup's verification guidance document, the jurisdictions have choices to make within and across the source sectors and habitats in terms of the exact nature of their verification protocols.

To effective illustrate the diversity of choices, Dr. Tim Gieseke, BMP Verification Review Panel member from Ag Resource Strategies in New Ulm, Minnesota, developed the illustration in Figure 2.

Figure 2. Illustration of Diversity of Verification Approaches Tailored to Reflect Practices							
Sector	**Inspected**	**Frequency**	**Timing**	**Method**	**Inspector**	**Data Recorded**	**Scale**
Stormwater	All	Statistics	<1 year	Monitoring	Independent	Water quality data	Site
	Percentage	Targeting	1-3 yrs	Visual	Regulator	Meets Specs	Subwatershed
	Subsample	Law	3-5 yrs	Aerial	Non-Regulator	Visual functioning	County
	Targeted	Funding	>5 yrs	Phone Survey	Self	Location	State
Agriculture	All	Statistics	<1 year	Monitoring	Independent	Water quality data	Site
	Percentage	Targeting	1-3 yrs	Visual	Regulator	Meets Specs	Subwatershed
	Subsample	Law	3-5 yrs	Aerial	Non-Regulator	Visual functioning	County
	Targeted	Funding	>5 yrs	Phone Survey	Self	Location	State

Forestry	All	Statistics	<1 year	Monitoring	Independent	Water quality data	Site
	Percentage	Targeting	1-3 yrs	Visual	Regulator	Meets Specs	Subwatershed
	Subsample	Law	3-5 yrs	Aerial	Non-Regulator	Visual functioning	County
	Targeted	Funding	>5 yrs	Phone Survey	Self	Location	State

The figure illustrates the choices being made by the jurisdictions, following guidance from the workgroups, for specific practices within three representative source sectors—urban stormwater, agriculture, and forestry. Through application of the workgroups' guidance, choices can be made by the jurisdictions about how much of the practice population will be inspected, the underlying basis for the frequency on inspections, the timing for the inspections, the method of verification, who the inspector represents, the data reported, and the scale at which the data are reported out at.

Agriculture Verification Guidance[62]
Utilizing the BMP verification principles adopted by the Partnership, the Agriculture Workgroup[63] developed and considered a series of potential options for agricultural verification. The potential options were weighed on their individual merits, with both positive and non-positive attributes identified in the Agricultural BMP Verification Guidance. The workgroup conducted a literature review and interviewed many experts on agricultural verification techniques. After developing and revising multiple versions of their guidance, the workgroup is currently on Version 3.6.0 of its verification guidance and verification matrix (Appendix K). Under the current guidance all options are available to the partnership, depending on the practice or type of practice that is being verified.

Defining Agricultural BMPs
Partnership approved agricultural BMPs represent the largest and most diverse of conservation practices and land use conversions for any sector currently represented in the Chesapeake Bay Program Partnership's Phase 5.3.2 Watershed Modeling Suite. The diversity of BMPs is reflective of the corresponding diversity of agricultural production and land uses across the Bay watershed, a diversity not replicated by any other sector within the partnership (Figure 3). Consequently, the challenge is providing verification guidance for multiple methods in a simple format lead to the organization of agricultural BMPs into four BMP categories. These generalist BMP categories are based on the respective life spans or permanence on the landscape, as well as their physical presence.

- **Annual BMPs**: A category of BMPs which have a very limited physical presence on the landscape, lasting as short as several months to a single growing season. In order to retain their nutrient and sediment load reduction benefits, this class of BMPs are required to be re-implemented on an annual basis.

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[62] The Agriculture Workgroup continues to refine and improve its narrative guidance. As of the February 7th, 2014 revision of this document, the Agriculture Workgroup is on Version 3.6.0 of its BMP verification guidance and accompanying matrix.
[63] http://www.chesapeakebay.net/groups/group/agriculture_workgroup

- **Structural BMPs**: A category of BMPs which have a relatively protracted physical presence on the landscape and can be more easily detected for verification than most other BMP types. These BMPs are typically more intensive of technical and financial resources to implement, but can achieve both nutrient and sediment load reductions for multiple years if properly maintained and operated.

- **Management Plan BMPs - Plans**: A limited category of BMPs which have a diverse life span ranging from a single growing season to multiple years. Due to their nature as a management system vs. a physical BMP, this class of BMPs creates the most challenge in implementing an effective verification method. However, these BMPs can generate considerable model credits in reducing nutrient and sediment loads.

- **Management Plan BMPs - Practices**: This category of BMPs is reflective of conservation practices associated with management systems which are physically present on the landscape. These BMPs typically have moderate to protracted physical life spans and are diverse in their ability to be detected for verification.

Figure 3. Example Agricultural Best Management Practices by Category			
Annual	**Structural**	**Management Plan - Plans**	**Management Plan - Practices**
Conservation Tillage	Animal Waste Management Systems	Decision/Precision Agriculture	Alternative Crops
Traditional/Commodity Cover Crops	Barnyard Runoff Control	Enhanced Nutrient Management Plans	Continuous No-Till
Dairy Precision Feeding	Bio-filters	Horse Pasture Management	Grass Buffers
Manure Transport	Mortality Composters	Prescribed Grazing	Stream-Side Grass Buffers
Swine Phytase	Water Control Structures	Soil Conservation and Water Quality Plans	Stream-Side Forest Buffers

Defining Sources and Oversight of Agricultural BMPs

The Partnership's primary source of BMP implementation data has historically originated from publicly funded financial incentive or cost-share programs managed by federal, state, and county agencies. BMPs implemented through these programs typically have contractual oversight from certified engineers, planners, and technicians using approved design standards to ensure the practices are installed and maintained over the life span of the agreement. Verification, to some degree, typically accompanies this oversight due to the expenditure of public funds for the cost-share. Consequently, BMPs implemented through public cost-share programs and under contractual agreements are more easily tracked and reported.

A second important source of BMP implementation data is through federal and state agricultural regulatory programs. Two major types of regularly programs fall under this category; i.e. *permitting* and *general regulatory oversight*. An example of *permitting* is the federal CAFO program which is normally administered by state agencies under agreement with U.S. EPA. Agricultural operations meeting the thresholds of the CAFO program are required to develop and submit operational plans, as well as implemented BMPs where needed to address nutrient losses.

Federal, state, and/or county agency oversight to verify compliance with the permit requirements may also provide useful BMP verification information.

In some cases *general regulatory oversight* occurs for particular agricultural production systems or management practices effecting nutrient and sediment losses. This type of regulatory program is chiefly the domain of state policies, administered by both state and county agencies. Since regulations differ by state, there is a wide diversity of regulatory programs across the Bay watershed. The level of oversight and verification by public agencies also varies widely, with some programs requiring operators to submit a report annually followed by detailed inspections, and others focusing on responses to complaints and easily identified environmental impacts from major spills or runoff events. The ability to track and report BMP information from general regulatory programs differs due to the level of oversight by public entities.

An emerging source of agricultural BMP implementation is from practices that were installed without public cost-share, and may not be part of an operational permit or regulatory oversight program. They are typically financed by the operator, and may or may not meet the practice standards associated with federal and state cost-share programs. BMPs that do not meet a federal or state practice standard but which provide the same level of environmental protection on an annual basis are known as "functional equivalent" BMPs. Identifying, verifying, tracking, and reporting non-cost shared BMPs is more challenging than the other sources of BMP information for a number of reasons, including voluntary reporting and access by operators, potentially non-standard materials and designs, and at times the absence of an obligation to maintain the practice.

Some overlaps exist between all sources and oversights of agricultural BMPs. Practices that were originally cost-shared can function similarly to non-cost shared BMPs after their contractual obligations are satisfied and they become the sole responsibility of the operator. Both cost-shared and non-cost shared practices can co-exist to satisfy regulatory program requirements. Depending on the jurisdiction, a significant population of agricultural farms can potentially legally operate outside of federal and state permitting and regulatory oversight programs.

The challenge of providing verification guidance for multiple BMP sources and oversight for the diversity of agricultural production systems found in the Bay watershed can be significant. The approach taken by the Agriculture Workgroup is to create a multi-optioned but uniform approach to the range of BMP sources and oversight using the annual environmental benefits as a guide post. Thus as an example, cost-shared and non-cost shared BMPs can both be verified using different methodologies but meet the same verification standard.

Use of the Agricultural Verification Matrix and Supporting Documentation
The final approved agricultural verification guidance matrix with supporting documentation is intended to provide the partnership with the structure and expectations of verifying tracked agricultural data for reporting to the Chesapeake Bay Program. The completed verification guidance package will include the approved guidance matrix, a full version of the guidance document, and the completed Tetra Tech summary verification report providing the documented findings from the national literature search and expert interviews. Verified and tracked data that meets the criteria of the agricultural verification guidance will be eligible for reporting to the Partnership's models for full BMP credit reduction values. See Appendix K for the current full version of the Agricultural Verification Matrix and description.

Forestry Verification Guidance

Forests are not generally pollution sources. Instead, they absorb and use nutrients (greatly reducing nutrients from airborne sources, for example) and retain and use sediment, thus aiding pollution prevention. Four of the five forestry BMPs covered by this guidance are types of tree planting designed to improve environmental and water quality conditions in currently non-forested areas, including tree planting in riparian areas. These tree planting practices apply to Agriculture and Urban landscapes. The forest harvesting BMPs are the only BMPs applied specifically to current forest landscapes at this time.

The five forestry BMPs covered under the Forestry Workgroup[64] verification guidance are: a) agricultural riparian forest buffers; b) agricultural tree planting; c) expanded tree canopy; d) urban riparian forest buffers; and e) forest harvesting BMPs. Because of similarities in how the two agricultural BMPs are implemented, and how the urban forestry BMPs are implemented, they are grouped accordingly. This guidance is for use by the states and, in general, applies to federal installations as well, so they may use it to write their protocols for verification.

Expanded Tree Canopy

The Urban Stormwater Workgroup BMP verification guidance outlines a number of general principles that apply to Expanded Tree Cover when used by a locality for stormwater management. Those that pertain to Tree Canopy include: 1) verification methods will be appropriate for the level of enforcement (e.g., consent decree or voluntary homeowner practice; 2) maintenance is essential to performance; and 3) BMP reporting must be consistent with the Partnership adopted BMPs and definitions.

The Forestry Workgroup's guidance, provided in Appendix K, adds the following forestry-specific recommendations:

1. Establish urban forestry partner and support mechanisms

For a decentralized practice, primarily on private land, a local urban forestry partner provides confidence in tree survival/health and accuracy in tree reporting in a defined locality. An urban forest partner may be a local government entity, or a non-governmental organization with necessary expertise who works cooperatively with the locality. The partner is endorsed by the state forestry agency, which provides oversight and support with training, tools, etc. In turn, urban forest partners provide outreach and technical assistance on urban tree planting, tree care, and other issues that arise.

2. Urban forestry partner tracks and reports new acres of tree canopy in locality

For new plantings, collect 1) acres of planting, 2) dates of planting, and 3) anticipated stature of trees at maturity (e.g. large or small). Urban tree canopy plantings can be credited once planting is confirmed. All plantings over ½ acre should be site-checked by the urban forestry partner.

For natural regeneration acres, two similar pieces of data should be recorded: 1) acres of treatment, and 2) date started. But because of the difficulty to establish tree canopy in this way, this information is reported for credit only after a 4-year maintenance period. Regeneration areas can be mowed, fenced or signed as deemed necessary.

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[64] http://www.chesapeakebay.net/groups/group/forestry_workgroup

To credit new acres reported voluntarily by a landowner or other partner, the reporting partner must conduct a site visit or obtain additional information (e.g., information in the bullet above and photographs) to verify the new acres.

3. Urban forestry partner maintains new areas of canopy

New urban plantings can have a high rate of mortality, succumbing to weed suppression, dehydration, physical damage, or other injury. Removing competing vegetation is often necessary. An individually planted tree (e.g., a tree pit or open planting; non-contiguous) that dies should be replaced, or removed from the NEIEN database.

For natural regeneration areas, ensure desirable tree growth is not suppressed until a density of 100 trees/acre is reached and the trees are of a height where they can grow unhampered (above competing vegetation and deer browsing level of 4 feet). Area of intended tree canopy via natural regeneration should be a minimum of 1/4 acre (or adjoin to existing forest).

4. Reported practice represents a net gain

Every 5 years, a locality should re-assess the tree canopy in its defined boundaries to show that there has not been a decrease in overall canopy. If tree canopy decreases, the amount of decrease will be deducted from the total acres credited in that 5-year period.

5. State oversight of reporting localities

To provide accountability, state forestry agencies regularly spot-check a subset of a locality/urban forest partner BMP project files and/or 5-year assessments of net gain for accuracy and thoroughness. This may also entail site visits to tree planting sites on record. The state oversight process needs to be transparent and publicly accessible so that NGOs, watershed groups and other stakeholders can be confident that BMP implementation is real. Improvements on reporting are suggested. The state forestry agency should coordinate with the state MS4 oversight program, where local partners are implementing tree planting BMPs regulated by that program.

Urban Riparian Forest Buffers
The Forestry Workgroup recommends the following verification procedures for riparian buffer projects in urban areas (more details in the full guidance in Appendix K):

1. *Partner maintains information at local level of each new urban riparian forest buffer.*

   - For new plantings, record: location (lat/long) and name of property, 2) acres planted (if appropriate) and width, and date(s) planted.

   - For natural regeneration acres, data to be recorded includes: location, acres of treatment, width, and date started. Naturally regenerating urban buffers are reported after 4 years of establishment if there are 100 or more live native trees per acre.

   - All new buffer areas will be visited by the local urban partner.

2. *Urban forestry partner maintains riparian buffer*

- New buffer plantings can have a high rate of mortality, succumbing to weed suppression, dehydration, physical damage, or other injury. Removing competing vegetation is often necessary.

- Reporting localities should be 80% confident that maintenance is occurring to avoid impacts to water quality pollution reduction efficiencies. Spot checking and/or statistical sampling is recommended. The sampling design should focus on specific maintenance issues that have the biggest potential impact on water quality such as concentrated flow. See guidance for maintenance of Agricultural Riparian Forest Buffers for more direction.

3. *Reported practice represents a net gain*

- Assessment of total urban forest buffer cover in a locality should be done every 5 years to ascertain that there is not a net loss of urban buffer. If a loss of urban buffer in a locality is detected, the credits received over that 5-year period will be deducted by the same amount.

4. *State oversight of reporting localities*

- To provide accountability, state forestry agencies should regularly spot-check a locality/urban forest partner BMP project files on urban forest buffer establishment and/or 5-year assessments of net gain in for accuracy and thoroughness.

Agricultural Riparian Forest Buffers

Agricultural riparian forest buffers are linear wooded areas along rivers, streams, and tidal shorelines. Forest buffers help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. The Forestry workgroup recommends the following general guidance for riparian buffer projects on agricultural lands (see the full guidance in Appendix K):

1. Verification methods for cost-shared agricultural riparian forest buffers will utilize and build upon the verification programs already implemented for cost-share contracts.

2. Inspection and maintenance are critical: a) to insure riparian forest buffers become established effectively; and b) to verify that the buffer is being maintained throughout the contract.

3. Special attention is needed at the end of contract life (10 or 15 years), to determine if a new contract will ensure continuation of the buffer or if the buffer will be maintained voluntarily without a contract. In lieu of confirmation that the buffer will still be on the landscape, it will need to be removed from NEIEN after the contract expires.

4. Any new acreage of riparian forest buffer reported represents **a net gain** in overall buffer for a county or land-river segment. The following examples support this point:

    a) Laws or ordinances that encourage conservation of existing buffers are in place.

    b) Monitoring and maintenance occurs on both newly planted buffers and also on existing buffers.

    c) Periodic sampling of total buffer area to indicate that overall riparian buffer canopy in the county or watershed segment is increasing.

5. Where agricultural riparian forest buffers are being planted voluntarily and reported by farmers or non-governmental organizations, jurisdictions may give them credit for an initial four years without inspection, if such plantings are a small percentage (less than 10%) of the total acreage of buffer plantings reported in a given year.

Agricultural Tree Planting

Agricultural tree planting is a cost-shared practice under the Environmental Quality Improvement Practice. It is not a commonly reported practice to the Bay Program, however there are new and expanding opportunities through agroforestry to plant trees on agriculture land. Verification methods for cost-shared agricultural tree planting will utilize the verification programs already implemented for cost-share contracts.

- For purposes of verification, this practice will follow the BMP Verification Guidance put forth by the Agriculture Workgroup.

- For tracking and crediting purposes, 100 trees planted equals one acre of practice (the same as for expanded urban canopy).

- For plantings over an acre, a forester-developed planting plan is recommended.

Forest Harvesting

Forest harvesting practices are a suite of BMPs that minimize the environmental impacts of logging, including road building and site preparation. These practices can greatly reduce the suspended sediments and other pollutants that can enter waterways as a result of timber operations. The Forestry Workgroup recommends the following general guidance (full details in Appendix K):

1. Track total acres of forest harvest BMP implementation, or rate of implementation on private land, and conduct site visits after harvest to ensure proper installation.

2. States should describe their existing and planned inspection programs for Forest Harvest BMPs in Verification Protocols.

3. Monitor use of forest harvest BMPs for Adaptive Management

Urban Stormwater Verification Guidance

At the request of the Water Quality Goal Implementation Team, the Urban Stormwater Work Group devoted much of 2012 to developing principles and protocols for urban BMP verification (Appendix K). The topic was discussed at based on extensive discussion at the February, March, April , June and October 2012 Urban Stormwater Workgroup meetings, and five drafts of the guidance were made in response to verbal and written comments by local and state partners. In addition, recommendations for BMP reporting, tracking and verification were an integral element of the deliberations of four urban BMP expert panels: stormwater retrofits, new State Stormwater Performance Standards, urban nutrient management, and stream restoration.[65]

In this context, urban BMPs are defined as stormwater practices for which definitions and removal rates have been developed and approved through the CBP BMP review protocol. These urban BMPs fall into four broad categories:

1. *Traditional stormwater BMPs* that were historically installed through a local stormwater plan review process in response to state stormwater requirements (e.g., wet ponds, dry extended detention ponds, bioretention, infiltration, filtering practices, bioswales, grass channels, permeable pavement).

2. *New runoff reduction BMPs that* will be implemented in the future to meet new state stormwater performance standards that typically do through a local stormwater review process.

3. *Non-structural or operational BMPs* that are typically applied by a municipal agency (e.g., street sweeping, urban nutrient management, illicit discharge elimination).

4. *Restoration BMPs* installed by localities to treat existing impervious cover (e.g., stormwater retrofits and stream restoration).

For the purpose of drafting their urban stormwater verification protocol, the Urban Stormwater Workgroup defined four types of BMPs based on their regulated status:

Regulated BMPs refer to any BMP that is installed in a jurisdiction that has a Phase 1 or 2 Municipal Separate Storm Sewer System (MS4) permit.

Semi-Regulated BMPs refer to any BMP that is installed locally under a state construction general permit (CGP) outside of a MS4 community.

Non-regulated BMPs refer to any BMP that is voluntarily installed in a community that was not triggered by an explicit MS4 requirement or stormwater regulation.

Legacy BMPs refer to the population of urban BMPs in a community that the jurisdiction has reported to EPA for inclusion into any past version of the Chesapeake Bay watershed model for sediment or nutrient reduction credit.

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[65] These BMP expert panel reports are available at http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=3

Discovered BMPs refer to any BMP that was installed in the past but was never reported to the state or the CBP Partnership, and has not received any prior nutrient removal credit.

Guidance for Verifying Regulated BMPs
The existing development review process in localities and Phase 1 and Phase 2 communities have NPDES MS4 permit conditions which require them to have programs and staff in place to ensure that maintenance inspections are done according to a prescribed cycle. Therefore, an inspection framework currently exists in much of the watershed which can be adapted to provide the foundation for a reliable BMP reporting, tracking and verification system. Recognizing a number of problems need to be overcome to develop an effective verification system (see Appendix J for details), the Urban Stormwater Workgroup established the following principles to guide the urban BMP verification process for MS4s in each of the seven watershed jurisdictions:

1. Verification methods will differ depending on the class of urban BMPs.

2. Regular inspections and maintenance of BMPs are critical to ensure their pollutant removal performance is maintained and extended over time, as well as maintain other local design objectives (e.g., flood control, public safety, stream protection and landscape amenity).

3. The existing MS4 inspection and maintenance framework for hundreds of communities in the Bay watershed should be the foundation of any BMP verification system for the Bay TMDL.

4. Urban BMPs will have a defined time-frame in which the pollutant removal rate applies, which can be renewed or extended based on a visual inspection that confirms that the BMP still exists, is adequately maintained and is operating as designed.

5. The purpose of verification is to maintain or expand the pollutant removal performance of existing and future local stormwater infrastructure assets.

6. BMP reporting must be consistent with CBP Partnership adopted practices and definitions.

7. More flexible NEIEN reporting standards are needed for certain classes of urban BMPs. Some BMPs – e.g., street sweeping, urban nutrient management plans, or non-regulated BMPs such as homeowner BMPs – do not lend themselves to specific geographic requirements of NEIEN. In these situations it is recommended that aggregate BMP data be reported for the county or land-river segment in which is occurs. Local governments are still required to retain specific geographic data records for individual practices for tracking and verification purposes over time.

8. MS4s will need to verify that urban BMPs are installed properly, meets or exceeds the design standards for its CBP BMP classification, and is functioning hydrologically as designed prior to submitting the BMP for credit in the state tracking database.

9. Local inspectors should perform field performance verification for all of their BMPs at least once every other MS4 permit cycle (typically a permit cycle is 5 years).

10. There will be a process for BMP downgrades if identified corrective maintenance or rehabilitation actions are not taken in the defined timeframe.

11. Special procedures are needed for urban BMPs used for offsets, mitigation and trading.

12. The intensity of verification efforts should be in direct proportion to contribution that a BMP makes to overall TMDL pollutant reductions in a state's urban sector. The basic notion is to prioritize state and local verification resources on the practices that produce the greatest load reductions. This implies that less verification resources be devoted to BMPs that make only minor overall load reductions. Operationally, the workgroup defines "minor BMPs" as a class of practices that collectively contribute to less than 1% to the overall total urban source sector nutrient reduction in the most recent progress run submission to the CBP.

13. Jurisdictions should audit a subset of local BMP project files, analyze local maintenance inspection records, or conduct joint field BMP inspections to verify performance under their existing MS4 regulatory authority.

14. EPA, under its existing NPDES MS4 permit oversight role, should periodically review the implementation of state BMP verification protocols to ensure they are being effectively implemented.

15. The accounting methods and verification procedures used by the Bay Program must be clear and transparent so that local governments and the states can readily understand how the urban BMPs they report are being used to calculate pollutant reductions in the Bay Model.

16. More tools and technology are needed to streamline the BMP verification process. Major needs include visual indicators to rapidly assess BMP performance in the field, training and certification programs, GIS/web-based platforms to directly upload BMP data, and quality control checks to validate uploaded data.

17. Urban BMP definitions preclude the need for "functional equivalency," as defined by the agricultural sector. The Urban Stormwater Workgroup has developed urban BMP definitions that are based on the design manuals and regulations of each respective Bay jurisdiction. The BMP design specifications in each state are very prescriptive as to minimum sizing and design criteria that each urban BMP must meet to receive permit approval.

Protocol for Verification of Semi-Regulated BMPs
The Urban Stormwater Workgroup created several options to address verification for semi-regulated BMPs—BMPs typically installed locally under a state construction general permit outside of a MS4 community.

Option 1: Local or state agency follows the verification inspection process outlined in Part 4 of the urban guidance and gets the same credit as a MS4 community.

Option 2: Local, state or third party performs verification inspections on a sub-sample of their BMP inventory at least once during the prescribed credit duration of the BMP. Non-MS4 communities may elect to reduce the scope of their visual inspections by sub-sampling a representative fraction of their local BMPs and applying the results to their entire population of BMPs that are credited in the CBWM. The sub-sampling method must be designed to have at least and 80% confidence level that the BMPs are reported accurately.

Option 3: State or third party conducts a sub-sample of BMP verification in a representative non-MS4 community, and applies the results to other comparable non-Ms4s in their portion of the watershed.

If a local government does not perform verification inspections and accepts gradual downgrades in BMP performance. Full performance credit is given for the first five years, and then is downgraded by 20% each year over the next five years, such that entire BMP credits expire in ten years.

Guidance for Verifying Non-Regulatory BMPs

Non-regulatory refers to any BMP that is voluntarily installed in a community (i.e., not triggered by a MS4 permit requirement or stormwater management regulation). The most common examples are homeowner BMPs that are installed on private land (e.g., rain gardens, permeable pavers, downspout disconnection, etc.). To promote greater engagement by land owners in Bay restoration, the work group developed streamlined verification procedures for this class of non-regulatory BMPs (USWG, 2013) which is considered a minor source of state-wide urban sector nutrient reductions, as defined by the CBP-VRP (2013).

The basic premise is to simplify the homeowner BMP reporting process while still retaining a high degree of verification rigor, using the following measures:

- Allow localities to aggregate individual homeowner BMP data into a single practice at the county level, which is then reported to the state without any specific geographic location data (apart from the river-basin segment in which it occurred).
- To receive credit, local governments must maintain records for each individual homeowner BMP, including contact information and geographic information (lat/long or street address).
- The actual installation of each homeowner BMP must be field-verified by the local government or designated third party at the time of construction, and homeowner submitted BMP data will require validation, by spot checking it against typical default values for the practice.
- The credit duration for homeowner BMPs has been reduced to 5 years as compared to the 10 years afforded to larger retrofits. The credit duration for urban nutrient management is 3 years. Credit can be renewed based on verification that the practice still exists and is working.

- Local governments may opt to use the sub-sampling approach outlined in Part 5, Option 2 of this memo. Alternatively, they may request homeowners to submit digital photos to confirm their practices, with the final decision on BMP condition made by the locality.

Protocol for Verifying Legacy BMPs
Legacy BMPs are those that have been reported to CBP Partnership in past two decades. The goal over time is to clean up local and/or state BMP databases so that all entries are actual BMPs with a geographic address that can be subject to inspection verification. This implies that desktop and/or field inspections will be needed to confirm the geographic address of the BMP and determine whether estimated BMPs actually exist. Assembling an actual BMP inventory from historical data is a major task, and may take several years in some communities.

Localities may benefit when the clean up their BMP inventory since it is likely they will discover BMPs that were installed in the past but was never reported to the state for credit in the Chesapeake Bay Watershed Model. They may also find cost-effective retrofit opportunities involving BMP conversion, enhancement, or restoration. The Urban Stormwater Workgroup recommends that the MS4 communities seek to assess their entire BMP population with two MS4 permit cycles using the methods outlined in the recently Partnership approved Stormwater Performance Standards.

Wastewater Verification Guidance
In the Chesapeake Bay watershed, wastewater discharge facilities include municipal sewage treatment facilities and industrial facilities with direct discharges to waters of the United States. These facilities contributed 17 percent of the nitrogen and 16 percent of the phosphorus loads delivered to Chesapeake Bay tidal waters in 2011. Of these total nutrient loads from wastewater dischargers, the 468 significant facilities contributed 90 percent of nitrogen and 72 percent of phosphorus. The remaining loads came from the 5,215 non-significant facilities. There are currently 50 reported active reported combined sewer overflow (CSO) communities[66], contributing less than 1 percent of the total nitrogen and total phosphorus loads delivered to Chesapeake Bay tidal waters. The Chesapeake Bay Program estimates that about 25 percent of the homes in the Chesapeake Bay watershed have on-site treatment/septic systems that provide basic treatment to household wastewater, contributing about 3 percent of the nitrogen load to the Chesapeake Bay.

The Wastewater Treatment Workgroup's process to develop the verification protocols was:
1. Evaluate the existing verification/inspection programs among the seven Chesapeake Bay watershed jurisdictions;

2. Determine what needed to be improved to meet the Partnership's BMP Verification Principles; and

3. Develop principles and guidance based on the best existing BMP verification/inspection programs that met or exceeded the BMP Verification Principles for the jurisdictions' use as they build upon their existing verification elements.

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[66] A total of 64 CSOs have been tracked by the Chesapeake Bay Program Partnership across the Chesapeake Bay watershed, with 14 of them currently documented as having been eliminated.

Verification for Wastewater Treatment Facilities

Wastewater treatment facilities are municipal sewage treatment facilities and industrial facilities with direct discharges to waters of the United States. These facilities can be classified as *significant* or *non-significant* based on their treatment volume.

> *Significant facilities* are dischargers that are subject to NPDES permits for nutrient pollutants and meet one of the following criteria.

- West Virginia, Delaware and New York - Facility treating domestic wastewater and the design flow is greater than or equal to 0.4 million gallons per day (MGD).

- Pennsylvania - Facility treating domestic wastewater and discharging greater than or equal to 0.4 MGD.

- Maryland - Facility treating domestic wastewater and the design flow is greater than or equal to 0.5 MGD.

- Virginia - Facility treating domestic wastewater with a design capacity of greater than or equal to 0.5 MGD west of the fall line or 0.1 MGD east of the fall line or an industrial facility discharging an equivalent load in either location.

- Industrial facilities with a nutrient load equivalent to 3,800 total phosphorus lbs/year or 27,000 total nitrogen lbs/year.

- Any other municipal and industrial wastewater treatment plants identified as significant facilities within a jurisdictional Watershed Implementation Plan (WIP).

> *Non-significant facilities* are municipal or industrial dischargers that do not meet the above criteria for significant facilities.

All significant facilities have or will have nutrient permit limits and specific nutrient monitoring requirements in place under the Chesapeake Bay TMDL. These numeric nutrient limits will ensure that significant wastewater treatment facilities continue to provide the most reliably verified load reductions in the restoration effort.

The NPDES compliance system and monitoring requirements provides the most stringent verification for implementation of a facility upgrade. Some Chesapeake Bay watershed jurisdictions also have or will have individual nutrient permit limits or monitoring requirements on some of their non-significant facilities.

With the exception of Maryland, there are currently no load reduction goals for non-significant facilities in the remaining six Chesapeake Bay watershed jurisdictions; there are only aggregate waste load allocations set at existing loads. Maryland and Virginia NPDES permits for new, expanding, and certain upgraded non-significant facilities include nutrient wasteload allocations and DMR reporting requirements.

For non-significant wastewater facilities, existing federal and state NPDES regulations and the discharge monitoring report (DMR) reporting system will provide sufficient verification. The DMRs will be used to report the load reductions from a non-significant facility that undergoes any upgrades or offsets new or expanding flows. Jurisdictions will annually track the universe of nutrient- and sediment-contributing non-significant wastewater discharging facilities against established inventories for aggregated wasteload allocations, reporting on loads using the various mechanisms described in jurisdictions' WIPs. Jurisdictions will document and report any allocation redistribution or changes that result from trading or offsets.

The existing national regulations and delegated state NPDES permitting programs have very specific verification and inspection requirements for wastewater treatment facilities, which meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles (Table 5). The verification/inspection programs for all non-significant wastewater treatment facility upgrades will rely on the existing NPDES regulations and DMR reporting system.

Verification for Combined Sewer Overflows (CSOs)

Long-term Control Plans are required by the national CSO control policy to reduce overflows from CSO outfalls as published in the Federal Register[67]. The existing national regulations and delegated state NPDES permitting programs have very specific verification/inspection requirements for CSOs, which meet or exceed the Partnership's BMP verification principles (Table 5).

Verification for advanced on-site treatment systems

There is no national regulation for on-site treatment systems. Existing state regulations or programs vary dramatically among the six Chesapeake Bay states[68], ranging from construction permits to more complex regulation through operating permits with inspection and monitoring requirements. The recommended verification principles and guidance were developed based on the best existing state regulations for on-site treatment system that meet or exceed the Partnership's BMP verification principles (Table 5).

Verification of on-site treatment systems only applies to nitrogen-reducing treatment systems, or *advanced on-site treatment systems* that are reported by a state for load reduction credit, and not other septic systems that do not receive credit as a BMP. The jurisdictions that intend to seek nitrogen load reduction credit for installation, operation and maintenance of on-site treatment systems will need to adopt and implement the recommended protocols through their regulations (existing or upcoming) or management programs required for advanced on-site treatment systems. These on-site treatment system regulations or programs should have specific maintenance and inspection requirements tailored to specific on-site treatment systems.

Currently, Delaware[69], Maryland[70], and Virginia[71] have advanced on-site treatment system regulations in place. West Virginia is committed to meeting the Wastewater Treatment

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[67] 59 FR 18688, April 19, 1994.

[68] The District of Columbia has no on-site treatment systems within its jurisdictional boundaries.

[69] Delaware Department of Natural Resources and Environmental Control, Division of Water, Groundwater Discharges Section, 7Del.C.Ch. 60, Delaware Regulations Governing the Design, Installation, Operation of On-Site Wastewater Treatment and Disposal System (amended January 11, 2014) http://www.dnrec.delaware.gov/wr/information/gwdinfo/documents/delawarefinalonsiteregulations_01112014.pdf

Workgroup's minimum verification guidance described in this section if they seek credit for advanced on-site treatment systems. Pennsylvania and New York currently do not plan to seek nitrogen load reduction credit for installation, operation, and maintenance of on-site treatment systems, so they will not need to document verification for these systems unless they wish to seek credit in the future.

Verification of advanced on-site systems will ensure proper installation and continued operation and maintenance of the systems. Specific requirements (e.g., inspection or sampling frequency) will be based on existing state regulations or will follow the below set of minimum elements for verification based on existing state programs:

- State or local authorities will verify, track and report proper installation and operation and maintenance of new advanced on-site treatment systems. Verification may also occur through inspections performed by a certified design professional.

- The design and installation of on-site BMP systems will be done and reported by certified service providers and verified in the permitting processes.

- The maintenance and inspection of on-site BMP systems will be conducted and reported annually, or more frequently, by certified service providers and tracked by the authorities. For some technologies, state or local authorities may stipulate an inspection frequency that is less than annual.[72]

- Tracking and reporting through databases managed by state agencies.

Maryland and Virginia already have comprehensive regulations for advanced on-site systems; Delaware amended its regulations, effective January 11, 2014. Key verification elements of these three states' regulations are summarized in below, along with management recommendations from the On-Site Wastewater Treatment Systems (OWTS) Expert Panel. Table 3 relates the three states' program elements with the verification principles and guidance described in the above section. For full details on the Delaware, Maryland, and Virginia programs, please see Appendices A, B, and C, respectively, within the Wastewater Treatment Workgroup's verification guidance provided in Appendix K.

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[70] Maryland Regulation of Water Supply, Sewage Disposal, and Solid Waste. Chapter 02 Sewage Disposal and Certain Water Systems for Homes and Other Establishments in the Counties of Maryland Where a Public Sewage System is Not Available Authority
http://www.dsd.state.md.us/comar/SubtitleSearch.aspx?search=26.04.02

[71] Virginia Regulations for Alternative On-Site Sewage Systems
http://lis.virginia.gov/000/reg/TOC12005.HTM#C0613

[72] The Chesapeake Bay Program Partnership's on-site treatment systems BMP expert panel recommended O&M inspection frequencies by practice. Upon approval by the Partnership's Wastewater Treatment Workgroup and the Water Quality Goal Implementation Team, the recommended inspection frequency will be ready for adoption by the states into their written verification procedures. However, states may stipulate different requirements in their own regulations or programs for on-site BMP systems. For example, Delaware does not require annual inspections for shallow placed pressure dosed, or elevated sand mound systems because they are confident in the performance of these technologies based on decades of experience. Additionally, there are other requirements in place, such as an inspection of any on-site system when a property is sold, that act as sufficient verification mechanisms for these technologies.

Verification of Septic Pumping BMP
The OWTS Expert Panel recommended keeping septic pumping as a BMP with a 5 percent total nitrogen reduction rate for conventional septic systems that have no other BMPs, since other BMPs include a requirement for routine septic tank pumping. For any given system, this 5 percent credit should not be given more frequently than every 5 years, even though more frequent pumping for some systems may be appropriate for other reasons. Verification principles and guidance for advanced on-site treatment systems also apply to septic pumping BMP. Septic pumping should be performed by licensed service providers. Reported septic pumping events should be tracked and documented by the State or local authorities.

Table 5. Summary of recommended verification guidance for wastewater treatment facilities, CSOs and on-site treatment systems				
	Significant Wastewater Treatment Facilities	*Non-Significant Wastewater Treatment Facilities*	*Combined Sewer Overflows*	*On-Site BMP Treatment Systems*
Principles and guidance for jurisdictions	Monitoring and monthly reporting of flows and loads via DMRs. In addition, (a) annual loading reports are also submitted where trading or general permit conditions apply to a facility, and; (b) annual WIP reporting also applies**.**	• The existing NPDES DMR will be used to report the load reductions due to non-significant wastewater treatment facilities' BMPs that include upgrades and offsets of new or expanding non-significant facilities. • Track the universe of nutrient- and sediment-contributing non-significant facilities against aggregate wasteload allocations, annually report loads using various mechanisms including those described in the jurisdictions' WIPs and document any allocation redistribution or changes in reporting structure that result from trading, offsetting or assimilation by other facilities.	• Construction Verification: properly designed, installed, and maintained by the certified service providers. • Post construction monitoring and Inspection. • Existing compliance and enforcement procedures. • Tracking and reporting	Verification of advanced on-site treatment systems will ensure proper installation and continued operation and maintenance of the systems. Specific requirements (e.g., inspection or sampling frequency) will be based on existing state regulations or will follow the below set of minimum elements for verification based on existing state programs in Delaware (DE), Maryland (MD), and Virginia (VA). • State or local authorities will verify, track and report proper installation and O&M of on-site BMP systems. • The design and installation on-site BMP systems will be done and reported by certified service providers and verified in the permitting processes. • The maintenance and inspection of on-site BMP systems will be conducted and reported annually by certified providers and tracked by the authorities. For some technologies, state or local authorities may stipulate an inspection frequency that is less than annual. The OWTS Expert Panel recommended the O&M inspection frequencies by practice, summarized in Table 3. Upon approval from the WWTWG and WQGIT, the final recommended inspection frequency may be adopted by the states. • Tracking and reporting through the databases managed by state agencies.
Applicable jurisdictions	All seven jurisdictions	All seven jurisdictions	All seven jurisdictions	DE, MD, VA, and WV
How to apply the principles and guidance	Use existing NPDES DMR and state-defined procedures	Use existing NPDES DMR and state-defined procedures	Use the existing CSO regulatory process	• DE, MD, VA, and WV agreed to verify on-site BMP systems. PA and NY do not currently plan to seek credit for on-site BMP systems so do not have plans for verification. • Use existing state regulations for on-site treatment systems. • The expert panel recommended septic BMP inspection frequencies, but inspection frequency may vary by technology and state.

Wetlands Verification Guidance

Restoration, creation and enhancement provide a range of living resource (including American black duck) and water quality benefits. Restoration and creation, which result in actual gain of wetland acreage, are tracked separately from enhancement, which results in functional gains of existing wetlands.

Tracking, reporting, and verifying wetland acres are a challenge in that these projects cross various source sectors and habitats. Verification for wetlands falls under different sets of guidance developed by the Partnership's technical workgroups including those for wetland restoration projects, stream restoration projects (as related to floodplain reconnection), the agriculture sector (as a structural BMP), and the urban stormwater sector. In addition, various types of wetlands are covered under different BMPs and ongoing/upcoming BMP expert review panels.

Cost-share incentive programs

There are a variety of drivers and goals for wetland projects implemented under one of the major federal cost-share programs for wetland projects:

- Wetland Reserve Program (WRP): Through the WRP, the NRCS provides technical and financial assistance to landowners for wetland protection, restoration, and enhancement projects on privately owned property. WRP projects include a specific monitoring regime throughout the lifespan of the wetland, which is discussed in more detail in a later section.
- Conservation Reserve Program (CRP): The CRP is administered by the Farm Service Agency (FSA) and is a private lands conservation program. Under the CRP, farmers who enroll in the program agree to take environmentally sensitive land out of agricultural production and plant species that support improvement of environmental health and quality. The contracts for agricultural land enrolled in CRP are ten to fifteen years in length with the long-term goal of re-establishing valuable land cover to assist in water quality improvement, soil erosion prevention, and reduction of wildlife habitat loss. Wetland buffers and wetland restoration are practices included in the CRP.
- Conservation Reserve Enhancement Program (CREP): CREP is also administered by the FSA and is a branch off of the CRP. As such, the CREP serves a similar purpose and contract length as described for CRP above. Under CREP, high-priority conservation issues identified by state, local, or tribal governments are targeted and participation by landowners is voluntary
- EQIP/WHIP:

Regulatory offset and mitigation requirements

Some wetland restoration projects are built to offset, compensate or otherwise mitigate for impacts caused by development elsewhere in the watershed. This includes projects implemented in accordance with the compensatory mitigation regulations under Section 404 of the Clean Water Act, as amended, as well as applicable state wetland mitigation regulations. States reporting wetland acreage gains to the Chesapeake Bay Program currently use a spreadsheet prepared by the Program to distinguish between wetland increases due to voluntary projects versus those constructed as compensation from regulated losses.

Stream Restoration Verification Guidance

Defining Stream Restoration Projects

*Stream Restoration Projects r*efers to any natural channel design, baseflow channel design, or legacy sediment removal, or other restoration project that meets the qualifying conditions for credits as described in *[Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects](#)*, including environmental limitations and stream functional improvements. The types of stream restoration projects are defined as:

1. *Legacy Sediment Removal (LSR)* projects are a class of aquatic resource restoration that seeks to remove legacy sediments and restore the natural potential of aquatic resources including a combination of streams, floodplains, and palustrine wetlands.

2. *Natural Channel Design (NCD*) is an application of fluvial geomorphology to create stable channels that maintain a state of dynamic equilibrium among water, sediment, and vegetation such that the channel does not aggrade or degrade over time.

3. *Wet Channel Regenerative Stormwater Conveyance (RSC)* projects, also known as baseflow channel design, are practices located further down the perennial stream network and use instream weirs to spread storm flows across the floodplain at minor increases in the stream stage for events much smaller than the 1.5-year storm event, which has been traditionally been assumed to govern stream geomorphology and channel capacity. Wet channel RSC may also include sand seepage wetlands or other wetland types in the floodplain that increase floodplain connection or interactions with the stream.

Legacy Stream Restoration Projects refers to the population of stream restoration projects in a community that the state has reported to EPA for inclusion into any past version of the Chesapeake Bay Watershed Model for sediment or nutrient reduction credit.

Guidance for verifying stream restoration projects

Verification of the initial and long term performance of urban and non-urban stream restoration projects is critical to ensure that pollutant reductions are achieved and sustained across the watershed and provides a consistent means by which state agencies/regulators can also measure functional loss or gain related to these projects. The stream restoration verification principles are based on the premise that the most important step to assure a project is performing correctly is to first determine that the project is designed correctly and supports clearly articulated goals and objectives. The Center for Watershed Protection, in their role as the Chesapeake Bay Program's Sediment Reduction and Stream Corridor Restoration Coordinator, developed the guidance with input from the CBP Partnership's Habitat Goal Implementation Team. The principles were adapted from the Urban Stormwater Workgroup BMP Verification Guidance because elements are applicable to stream restoration and should guide the verification process in each of the Bay States (Appendix K). A summary of the full guidance from Appendix K is provided below.

1. Verification methods will differ slightly among individual stream restoration projects.

2. Regular inspections and maintenance of stream restoration projects are critical to ensure their pollutant removal performance is maintained and extended over time, as well as to

maintain other local design objectives (e.g., habitat improvement, channel stability, and landscape amenity).

3. The existing MS4 and 404 Permit/401 Certification inspection and maintenance frameworks and local sediment control regulations for hundreds of communities in the Bay watershed should be the foundation of any stream restoration verification system.

4. Removal rate should be tied to field-based measurement methods that verify stream design criteria.

5. The purpose of verification is to credit appropriately the pollutant removal performance of existing and future stream restoration projects. Field assessments are used to identify which projects are working well and which ones require preventative or corrective maintenance to maintain their functions.

6. Stream restoration reporting must be consistent with CBP adopted practices and definitions.

7. The installing agency will need to provide a post-construction certification that the stream restoration project was installed properly, meets or exceeds its functional restoration objectives, and is hydraulically and vegetatively stable, prior to submitting the project for credit in the state tracking database.

8. The installing agency needs to conduct inspections initially two years after construction as this is the most critical period especially for assurance that vegetative practices are surviving. Afterwards the frequency of inspections should be once every 5 years or within a year after a catastrophic event of at least a 25 year return interval to ensure that individual projects are still capable of removing nutrients and sediments.

9. If a field inspection indicates that a project is not performing to its original design criteria, the locality would have up to one year to take corrective maintenance or rehabilitation actions. If a project is not fixed after one year, the pollutant reduction rate for the project would be eliminated. The load reduction can be renewed if evidence is provided that corrective maintenance actions have restored its performance.

10. Special procedures are needed for stream restoration projects used for offsets, mitigation and trading.

11. The installing agency must submit basic documentation to the appropriate state agency to document the nutrient and sediment reduction claimed for each individual stream restoration project installed.

12. EPA should use its existing NPDES MS4 permit review process to provide periodic reviews the implementation of state BMP verification protocols to ensure they are being effectively implemented.

13. The accounting methods and verification procedures used by the Chesapeake Bay Program partners must be clear and transparent so that local governments and the states

can readily understand how the urban BMPs they report are being used to calculate pollutant reductions in the Chesapeake Bay Watershed Model.

Section 8. Practice Life Spans

The BMP Verification Review Panel recommended the Partnership establish practice life spans for all Partnership approved BMPs and apply these life spans with within the workgroups' verification guidance and the jurisdictions' verification programs and underlying protocols[73]. The Panel recommended the Partnership 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 workgroup's BMP verification guidance, the Committee's basinwide framework, and the jurisdictions' BMP verification programs:

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

- For all future BMP expert panels convened by the Partnership, the **workgroups** need to ensure each panel 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 and the jurisdictions need to build systems for carrying this out this process within the larger verification programs.

- The **Watershed Technical Workgroup**[74] needs to develop specific guidance that ensures the Partnership's 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 functional or removal from the data submitted for crediting.

The Partnership recognizes practice life spans can take the form of contractual or regulatory life spans as well as physical or functional life spans. Within a verification context, the Partnership is focused on the functional life span of a given practice.

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[73] *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. http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

[74] 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.

Section 9. Ensuring Full Access to Federal Conservation Practice Data

It should be emphasized that the primary purpose of gaining complete access to Federal, State, and private agricultural conservation implementation data is to give the six watershed states with 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, and promote success in attaining water-quality goals. The reporting aspect is also important because it will assist the jurisdictions in coordinating the development of knowledge to understand and document their producers' progress toward water-quality goals.

1619 Conservation Cooperator Agreements

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 order to participate in the programs of the Department . . ," except to agencies and individuals that have been established as USDA 1619 Conservation Cooperators (see Appendix B in Hively et al. 2013). 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.

The 1619 Conservation Cooperator Agreements can be authorized by State and regional officials of the NRCS or FSA. Ultimately, responsibility for enforcing Section 1619 of the 2008 Farm Bill lies with the FSA, and at the national level the FSA Privacy Officer (John Underwood) has authority to review and approve 1619 Conservation Cooperator Agreements for both the FSA and NRCS, and to sign for the FSA. Because the NRCS collaborates closely with is sister agency in delivering conservation services, and NRCS planners have access to the FSA Common Land Unit field boundary dataset, the NRCS agreements tend to specify that they apply to both NRCS and FSA conservation information. Therefore, state jurisdictional agencies do not necessarily have to sign agreements with the FSA to gain access to FSA-managed conservation datasets, which include geospatial Common Land Unit (CLU) field boundaries as well as Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) practices.

Table 6. Status of 1619 Conservation Cooperator Agreements for each Chesapeake Bay state. These agreements facilitate access to USDA agricultural conservation data on a privacy protected basis. Source: Hively et al 2013

Jurisdiction	Agency	Purpose	Limits	Data covered	Start date	End date
Maryland	MDA	Assist NRCS in the delivery of conservation-related services.	Provide conservation-related services; monitor, assess, evaluate conservation benefits.	Not limited; lists specific data that may be viewed.	10/27/2009	None
New York	USC	Assist NRCS in the delivery of conservation-related services.	Provide conservation related services.	Not limited; lists specific data that may be viewed.	3/3/2011	None
Virginia	DCR	Provide technical assistance for USDA conservation programs.	Lists authorized activities including "compliance and status reviews."	Not limited; lists specific data that may be viewed.	12/4/2009	None
West Virginia	DA	Assist NRCS in the delivery of conservation-related services.	Provide conservation-related services.	Not limited; lists specific data that may be viewed.	4/7/2012	None
West Virginia	CA	Collect data to document and verify practices.	WV animal operations in the Potomac Basin.	Animal waste management and mortality disposal systems.	2/21/2012	3/1/2013
Federal	USGS	Provide technical assistance for a USDA program.	Monitoring, assessment, and evaluation; impact of farming practices on water-quality in the Chesapeake Bay watershed.	CRP and CREP, field boundaries, for States in Chesapeake Bay.	8/2/2010	9/30/2015
Federal	USGS	Provide technical assistance for a USDA program.	Monitoring, assessment, and evaluation; impact of farming practices on water-quality in the Chesapeake Bay watershed.	Farm Bill programs.	11/20/2010	9/30/2015

The agreements have start and end dates in most cases. The presence of an end date depends on the preference of the USDA signing official. Agreements may be amended by mutual agreement of all parties with signatory authority.

Chesapeake Bay States and Conservation Cooperator Agreements

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. The remaining two states—Delaware and

Pennsylvania—have not yet established conservation cooperator status for any of their state conservation agencies. 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."

The following state agencies have established 1619 Conservation Cooperator Agreements with the USDA (Table 6) for the purpose of providing privacy-protected access to USDA conservation data:

- Maryland: Maryland Department of Agriculture (MDA)

- New York: Upper Susquehanna Coalition (USC)

- Virginia: Virginia Department of Conservation and Recreation (VA DCR)

- West Virginia: West Virginia Department of Agriculture (WVDA)

- West Virginia: West Virginia Conservation Agency (WVCA)

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

Table 7. State jurisdictional agencies that have been approved by the USDA for participation in 1619 data-sharing agreements to support the objectives of the NRCS Chesapeake Bay Watershed Initiative and increase the capacity for consistent, integrated analysis, and reporting of conservation practice implementation data for the Chesapeake Bay watershed. Source: Hively et al 2013			
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
	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

Each of the six states has identified a key state agency with responsibility for submitting aggregated agricultural conservation practice data to the Partnership'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 7). 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.

Delaware

Delaware does not currently have a 1619 data sharing agreement. The Committee recommends establishing an agreement between USDA and the Delaware Department of Natural Resources and Environmental Control, the agency with responsibility for integrating conservation datasets and making the data submission to the Annual Progress Review through Delaware's state NEIEN node, as well as the Delaware Department of Agriculture and the Delaware Forest Service. The Committee recommends adopting the broadest and most up to date language for each key factor of the 1619 agreement—purpose, limits, aggregation, privacy, and access—as described within Hively et al. 2013.

Maryland

In Maryland, the Department of Agriculture (MDA) has been established as a 1619 Conservation Cooperator with the NRCS. Supported by this jurisdictional 1619 data-sharing agreement, Maryland has developed an integrated "Conservation Tracker" database that is used within each Conservation District office to document Federal, State, and nongovernmental organizations' financial assistance and conservation practices installed without Federal or State financial assistance. This database has made it comparatively easy for Maryland to eliminate double counting and accurately report conservation practice implementation. MDA compiles and aggregates the Conservation Tracker dataset; joins the resulting data with additional jurisdictional databases documenting cover crops, manure transport, and nutrient management; and then transmits the aggregated data to the Maryland Department of the Environment (MDE), which is the lead Maryland agency for operation and maintenance of Maryland's State NEIEN node.

The Committee recommends that Maryland continue to operate under its existing Maryland Department of Agriculture 1619 agreement, and consider, during any future amendments to the agreement, adopting broader language regarding access, specifically including the phrase "*data can be obtained from USDA, directly from farmers, or from Federal established 1619 Conservation Cooperators.*" The Committee recommends that Maryland consider establishing 1619 status for specific individuals within the MDE, the agency responsible for the NEIEN data submission. Maryland would also benefit by investing the time to compare USGS-sourced data with jurisdiction-sourced data from Maryland Department of Agriculture, to check for accuracy and identify any useful information that one or the other of the datasets might be missing.

New York
In New York, the Upper Susquehanna Coalition (USC) has been established as a 1619
Conservation Cooperator with the NRCS. The USC is made up of various collaborators within
the Soil and Water Conservation Districts serving the area of New York in the Chesapeake Bay
watershed. The USC currently provides an umbrella organization whereby pertinent personnel
from the multiple organizations that collaborate with New York Soil Conservation Districts
can gain authorized access to USDA privacy protected conservation data. Because the portion
of New York that falls within the Chesapeake Bay watershed is relatively small (comprising 16
Soil and Water Conservation Districts), the USC has established a method of meeting with each
of its member Soil and Water Conservation Districts to obtain annual conservation
implementation data. During this process, the USC also collects information on practice
implementation from partners such as the NRCS and Cornell Cooperative Extension.

The USC's Soil and Water Conservation Districts organize conservation data within the New
York's Agricultural Environmental Management (NYAEM) framework that they use to track
both State and federally financed conservation practices. The NYAEM is part of the overall
Agricultural Environmental Management umbrella, which, by State law, partners the New York
State (NYS) Department of Agriculture and Markets, the NYS Soil and Water Conservation
Committee, and the Soil and Water Conservation Districts in a multifaceted program for
conservation on farms. Within this framework the USC has developed an online tool to record
and report State and federally financed conservation practices. Although the NYAEM online
tool was not used for progress reporting in 2012, it has the potential to make it comparatively
easy for the USC to eliminate double counting and accurately and consistently report
conservation practice implementation for the Partnership's Annual Progress Review.

In 2013, responsibility for operation and maintenance of New York's State NEIEN node (in
terms of submission of annual Chesapeake Bay watershed agricultural conservation practice
data) was transferred from the USC to the NY State Department of Environmental Conservation
(NY DEC). The Committee recommends that New York Department of Environmental
Conservation consider establishing a 1619 data sharing agreement modeled after the existing
Upper Susquehanna Coalition agreement, or become a signatory to the Upper Susquehanna
Coalition agreement. Any new agreements would benefit from including more precise
language regarding data privacy (non-applicability of sunshine law) and data access (including
the specific language "*data can be obtained from USDA, directly from farmers, or from Federal
established 1619 Conservation Cooperators*") (see Hively et al. 2013).

Pennsylvania
Pennsylvania does not currently have a 1619 Conservation Cooperator agreement in place. In
Pennsylvania, the Department of Environmental Protection (DEP) has responsibility for reporting
practices for the Partnership's Annual Progress Review, including data submission through
Pennsylvania's State NEIEN node. PA DEP has is the lead state agency provide conservation
services. Because this agency does not have a 1619 agreement in place, in 2012 and again in
2013, Pennsylvania relied upon the USGS to provide an aggregated dataset of USDA
conservation practices, which was then integrated with the jurisdictional spreadsheet of State-
funded practices. The Committee recommends establishing an agreement between USDA and
the Pennsylvania Department of Environmental Protection, adopting the broadest and most up to

date language for each key factor of the 1619 agreement: purpose, limits, aggregation, privacy, and access.

Because Pennsylvania Department of Environmental Protection delivers conservation services and is also a regulatory agency, 1619 access should be limited to those individuals directly involved in preparing data for the Annual Progress Review. In addition, the Soil Conservation Districts could work to establish an integrated tracking system for both Federal and State-sponsored conservation practices that operates under the cooperative data sharing agreements that have been signed between the NRCS and each individual Soil Conservation District, and could use that system to provide consistent aggregated data reports to the Pennsylvania Department of Environmental Protection, as well as to strengthen their infrastructure for providing conservation planning and implementation. The Committee also recommends that the Pennsylvania Department of Agriculture, which provides additional conservation services, also establish a 1619 agreement with USDA.

Virginia
In Virginia, the Department of Conservation and Recreation (VA-DCR) has been established as a1619 Conservation Cooperator with the NRCS. However, until 2013, VA DCR had full responsibility for reporting practices, including data submission to the CBP Partnership's Annual Progress Review—that responsibility has since transitioned over to the Virginia Department of Environmental Quality (VA DEQ). The Virginia 1619 agreement limits data access to the specific individuals within VA DCR that is responsible for the Annual Progress Review. Because VA DCR or VA DEQ do not have an integrated Federal-State data tracking system, this person obtains USDA conservation practice data by requesting them from the Virginia State NRCS office, where the data are compiled by querying the NRCS Integrated Data for Enterprise Analysis (IDEA) database. This data-set is then integrated with the jurisdictional database of State-funded practices and the data are aggregated prior to submission to the Annual Progress Review by using node client software for reporting extensible markup language files.

The Committee recommends that Virginia continue to operate under its existing Virginia Department of Conservation and Recreation 1619 agreement, but plan to amend the agreement to adopt broader language regarding purpose and limits (explicitly including "*monitoring, assessing, or evaluating of conservation benefits from USDA conservation programs")* and more precise language regarding privacy (non-applicability of sunshine law) and data access (include "*data can be obtained from USDA, directly from farmers, or from Federal established 1619 Conservation Cooperators*"). It may also be necessary to broaden or update the list of individuals within the Virginia Department of Conservation and Recreation who are permitted access to the data.

The Committee recommends that Virginia Department of Environmental Quality establish a 1619 agreement, particularly since the 2012 point person for conservation data handling has moved from the Virginia Department of Conservation and Recreation to the Virginia Department of Environmental Quality. Since Virginia Department of Environmental Quality is a regulatory agency, any agreement should limit access to those individuals that are directly involved in conservation data reporting.

West Virginia
In West Virginia, the Department of Agriculture (WVDA) has been established as a 1619 Conservation Cooperator with the NRCS but cannot share unaggregated conservation practice information with the West Virginia Department of Environmental Protection (WV DEP), which is the agency responsible for submitting data through West Virginia's State NEIEN node. The West Virginia Conservation Agency (WVCA) was also established as a cooperator with the NRCS under a memorandum of understanding covering only animal waste disposal and poultry mortality disposal in the Potomac Basin. Although West Virginia is a 1619 Conservation Cooperator (via the WVDA and WVCA), NRCS staffing and priorities led the WVDEP to rely upon the USGS to provide aggregated datasets of 2012 and 2013 USDA conservation practices, which was then integrated with the jurisdictional database of State-funded practices and submitted through West Virginia's State NEIEN node.

The Committee recommends that West Virginia continue to operate under its existing WVDA 1619 agreement, but plan future amendments to the agreement to adopt broader language regarding limits (including the specific language "*monitoring, assessing, or evaluating of conservation benefits*") and access (include "*data can be obtained from USDA, directly from farmers, or from Federal established 1619 Conservation Cooperators*") (see Hively et al. 2013).

The Committee also recommends that the West Virginia Conservation Agency and the West Virginia Department of Environmental Protection establish 1619 agreements with USDA to promote consistent access to conservation data. Because West Virginia Department of Environmental Protection is a regulatory agency, any agreement should limit access to those individuals that are directly involved in conservation data reporting.

All Chesapeake Bay Watershed States
Interestingly, the two jurisdictions with the most comprehensive 1619 agreements—Maryland and New York—have established jurisdictional integrated databases of federal and state-sponsored agricultural conservation practices. This allows these two states to directly track cost-shared conservation practices regardless of the source of financial assistance (State, Federal, or private) and address the removal of double counting in a relatively straightforward manner. It also has greatly simplified their annual reporting to the CBP Partnership's Annual Progress Review. These results imply that Virginia, for example, might benefit from establishing a combined jurisdictional database of Federal and State practices. Currently, Virginia has a labor-intensive data submission process, owing to the State's use of record-by-record comparison for removal of double-counted practices, as described below. The other states—Delaware, Pennsylvania, and West Virginia—would likely great benefit from developing similar systems for integrating Federal and State-sponsored agricultural conservation practices.

Establishing New 1619 Conservation Cooperator Agreements
The following jurisdictional agencies with responsibility for conservation data reporting *do not* currently have 1619 Conservation Cooperator Agreements in place and must rely upon obtaining aggregated conservation data from their collaborators:

- *Delaware Department of Natural Resources and Environmental Control*—Receives aggregated conservation practice data from the conservation districts and the USGS,

and submits the data to the Partnership's Annual Progress Review through the Delaware NEIEN node.

- *Maryland Department of the Environment.*—Receives aggregated conservation practice data from Maryland Department of Agriculture and submits the data to the Partnership's Annual Progress Review through the Maryland State NEIEN node.

- *New York Department of Environmental Conservation*—Assumed responsibility for submission of data to the New York NEIEN node in 2013, working in partnership with the Upper Susquehanna Coalition.

- *Pennsylvania Department of Environmental Protection*—Receives aggregated conservation data from conservation program leads, conservation districts, and the USGS, and submits the data for the CBP Partnership's Annual Progress Review through Pennsylvania's State NEIEN node. The Department of Environmental Protection is the Pennsylvania State agency with direct responsibilities for planning, funding, delivery, reporting, and submission of conservation-practice data. In addition to providing conservation services, it is also a regulatory agency.

- *Virginia Department of Environmental Quality*—Assumed responsibility for the Annual Progress Review from the VA DCR in 2013, and a number of conservation programs were also transitioned from the VA DCR to VA DEQ following recently enacted legislation.

- *West Virginia Department of Environmental Protection*—Receives aggregated conservation data from the West Virginia Department of Agriculture, the West Virginia Conservation Agency, and the USGS, and submits the data for the Partnership's Annual Progress Review through West Virginia's State NEIEN node.

Several additional state agencies that are directly involved in conservation planning, funding, delivery, and reporting of conservation-practice data also do not have 1619 data-sharing agreements in place:

- *Delaware Department of Agriculture*—Currently provides aggregated jurisdictional records to the DE-DNREC for use in reporting to the CBP Partnership's Annual Progress Review.

- *Delaware Forest Service*—Promotes forestry conservation practices with USDA financial assistance.

- *Pennsylvania Department of Agriculture*—Promotes conservation practices in collaboration with the USDA and PA DEP.

- *West Virginia Conservation Agency*—Has established a 1619 agreement covering animal waste and mortality data only. The agency currently provides aggregated conservation data to the WVDEP.

In support of the NRCS Chesapeake Bay Watershed Initiative (CBWI), the NRCS has encouraged jurisdictional conservation agencies that do not have 1619 agreements in place to request to establish one (Hively et al. 2013). Each of the jurisdictional agencies listed in Table 7 has been vetted and approved by the FSA Privacy Officer, in collaboration with the NRCS regional conservationists, as eligible for USDA 1619 Conservation Cooperator status because the agency supplies conservation technical assistance to NRCS programs under the definitions established by the NRCS Chesapeake Bay Watershed Initiative (Hively et al. 2013).

The two lists above do contain state regulatory agencies including the DE DNREC, MDE, NY DEC, PA DEP, VA DEQ, and WV DEP, although most of these agencies also have direct responsibility for planning, funding, and implementation of conservation practices and provide conservation technical assistance to farmers. Several of the NRCS State Conservationists in the Chesapeake Bay have stated that 1619 agreements will not be provided to regulatory agencies. However, it is possible to word 1619 agreements to specifically limit access to the few key individuals within those agencies who are responsible for conservation data reporting (see suggested language in Appendix B:10 in Hively et al. 2013). For example, at the USGS only employees who have signed an internal 1619 data-handling agreement with specific data-use objectives (see Appendix B:8 in Hively et al. 2013) are allowed access to the protected conservation dataset. A similar strategy could be used by the state agencies (e.g., Virginia Department of Conservation and Recreation) to maintain a firewall between regulation and conservation implementation/reporting while still allowing critical staff access to the USDA dataset to assist in jurisdictional conservation reporting and management.

The existing Chesapeake Bay watershed jurisdictional 1619 agreements (see Appendix B:1-5 in Hively et al. 2013) are fairly consistent, but they differ in the wording of several key factors. As a result, there are some important differences in the level of data access provided by the agreements, with some jurisdictions including a broader array of programs and practices than others (Table 6). The broadest language for each of the key factors, which will ensure full access to all USDA conservation practice data, is provided on page 6 in Hively et al. 2013. It should be mentioned that, despite differences in language, the effective interpretation of the agreements by the NRCS has been fairly broad and uniform, and was sufficient to provide full access to USDA data by the signatory jurisdictions in 2012 and 2013.

Accounting for and Crediting Conservation Technical Assistance Data
Conservation technical assistance (CTA) data can be accessed by the jurisdictions with 1619 agreements in place, but the jurisdictions have not been submitting the data for nutrient and sediment pollutant load reduction credits due to concerns about possible double counting (e.g., differentiating between NRCS and state funded CTA) and lack of verification.

Jurisdictional Access to Chesapeake Bay CEAP Data
[Editor's note: this section still needs to be written pending follow up discussions with USDA.]

Recommendations for Ensuring Full Access to Federal Conservation Practice Data
The bottom line objective remains the same: ensuring that all six states have full access to all federally cost shared conservation practice data to be used to eliminate any double counting, support effective conservation program implementation, and fully credit their producers for their

nutrient and sediment load reduction implementation actions. To ensure that all six Chesapeake Bay watershed jurisdictions obtain full and complete access to all Federal cost-shared agricultural conservation practice data, the BMP Verification Committee recommends that the six Chesapeake Bay watershed states:

1) Adopt the broadest, most consistent language in the existing Maryland, New York, Virginia, West Virginia, and USGS 1619 agreements as described on page 6 in Hively et al. 2013;

2) Institute 1619 data sharing agreements in Delaware and Pennsylvania and for all jurisdictional agencies in Maryland, New York, Virginia, West Virginia listed in Table 7 which have direct responsibilities for planning, funding, delivery, reporting, and/or submission of agricultural conservation practice data; and

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 tracking and reporting system.

When considering signatories for 1619 agreements, it's important to consider all state agencies that have responsibility for data compilation, data submission to NEIEN network node, and involvement in funding and directing staff to deliver technical and financial assistance for implementing agricultural conservation programs on the ground. The BMP Verification Committee recommends that each of the listed jurisdictional agencies in Table 7, particularly those directly involved in the NEIEN submissions, sign their states' 1619 agreements to gain access to privacy protected USDA conservation data records. This would greatly increase the capacity for integrated analysis, preventing double counting, and reporting of conservation implementation. Furthermore, it would support the use of a single data request to obtain USDA data for all six states, which would promote equity in conservation reporting across the Chesapeake Bay watershed.

The BMP Verification Committee recommends adopting consistent 1619 language for each of the key elements within the Chesapeake Bay Conservation Cooperator agreements as identified by USGS—purpose, limits, aggregation, data, and access (see page 6 in Hively et al. 2013) (Appendix O). Taking this approach would greatly assist the jurisdictions in meeting the objective of increasing capacity for analysis and understanding of implementation in support of adaptive management of conservation programs, as well as establishing consistency and accuracy in reporting of USDA conservation data among the Chesapeake Bay watershed jurisdictions.

Further, the BMP Verification Committee recommends that the six states, USDA, and other appropriate partners sign a cover page referencing the attached six state-specific 1619 agreements collectively ensure all six states have full access to federal cost shared practice data. This recommendation replaces the original proposal for a single, integrated six-state 1619 agreement and acts to document to continued commitment by all the parties to ensure these

separate agreements continue to support the collective partnership's commitment to ensuring full access to federal cost shared practices.

The USGS report by Hively et al. (2013) provides a draft 1619 agreement template that adopts suggested language for establishing a 1619 agreement between a Chesapeake Bay watershed jurisdictional agency and the USDA—the recommended language was reviewed and approved by the USDA FSA Privacy Officer (see Appendix B in Hively et al. 2013) (Appendix O).

Section 10. Enhance Collection and Reporting of Cost Shared Practices

The Partnership's Agriculture Workgroup has identified opportunities to enhance the recordkeeping 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 Partnership's Scenario Builder tool, and in the various Partnership's Chesapeake Bay watershed and water quality models. A number of USDA conservation practices were identified in Table 8 and described below as having substantial limitation in the amount of data available for translating between USDA conservation practice codes and Partnership approved practice definitions. 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 Partnership's 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 8: Possibilities for improved recordkeeping for USDA conservation practices.
(Source: Hively et al 2013)

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 CBP applies 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 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 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. CBP Partnership Expert Panels have found that water quality benefits for tillage practices vary greatly depending on the amount of cover, and jurisdictions can more accurately show improvement if they have this information.

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 below and in Table 8. NRCS has committed to taking advantage of the opportunities afforded the Partnership through the Conservation Data Streamlining Initiative to work to address the needs identified by the Partnership's Agriculture Workgroup.

The following text extracted, from Hively et al. 2013, with permission of the authors, provides clear examples of where limitations in NRCS and FSA data collection are directly impacting the ability of the six Chesapeake Bay watershed states to get full credit for their farmers implemented agricultural conservation practices.

Land Use and Livestock Animal Type

Limitation: The NRCS currently has fields in its data collection system for land use and livestock type, associated with a variety of conservation practices. However, these data fields were rarely populated in the 2012 NRCS dataset provided to the USGS from the NCP database. The Partnership's BMP definitions place practices in the context of land use (for example, pasture fencing receives a reduction only when applied to riparian areas).

Opportunities: Populating the data fields for land use and livestock type could allow the six watershed jurisdictions to receive more accurate crediting for many different conservation practices whenever conservation practice efficiency in reducing nutrient and sediment loads is modified by land use (for example, farm headquarters, forest, crop/hay, range/pasture) or animal type (for example, manure management, feed management). Currently, default values are assigned to unreported elements by using conservative effectiveness values. Although populating these fields would represent additional effort on the part of NRCS staff, the benefit could be more accurate recognition of increased pollutant load reductions from agricultural lands.

The current land-use and animal-type information may possibly exist in other NRCS datasets such as the IDEA system, in which case the problem becomes one of linking the data to the NCP records rather than ensuring data entry in the Service Center Offices. The land use changes "from" and "to" do not presently exist in NRCS databases, only the current land use. The livestock animal type is available in ProTracts, but is not in Toolkit or the field is not populated in the NCP database. The number of animals or animal units associated with a livestock conservation practices could also be useful for obtaining full nutrient conservation credits in the CBP Partnership's water-quality models. [Note: data for land use and livestock types were successfully acquired in October 2013 by USGS. This acquisition was made possible by changes in the NRCS database that fully linked the land use and livestock type to the practice implementation data. However, numerous cases of missing land use and livestock type data entries persisted.]

Cover Crops

Limitation: The NRCS currently defines, tracks, and reports cover crops under a single conservation practice code (340) and standard. The Partnership currently defines cover crops by four attributes (species, planting method, timing of planting, and harvest strategy) to determine their effectiveness in reducing the loss of nutrients and sediments to the environment. In particular, the NRCS lumps leguminous cover crop types with all cover crops. The Partnership does not currently consider leguminous cover crops as having a nitrogen benefit since they fix nitrogen in the soil. These additional attributes presently are not currently available in any NRCS business tool.

Opportunities: Enhancements to record keeping for the USDA conservation practice code for cover crops that could track and report additional management details identifying all four cover crop attributes, or even a single attribute such as species, could allow the six watershed jurisdictions to receive more accurate crediting of cover crops and more thorough representation in the Partnership's models. In the Partnership's Scenario Builder tool, conservative default values are assigned to unreported elements when clarifying information is not available. At present, NRCS staff have indicated that they are unlikely to track cover crops with more specificity because the present system does not allow for enhancements to record keeping.

Fencing

Limitation: The NRCS currently defines, tracks, and reports fencing practices under a single conservation practice code (382) and standard, whereas the Partnership's Scenario Builder tool defines the nutrient benefits associated with fencing as a component of the management change the practice creates. Examples include the establishment of riparian buffers versus rotational grazing of livestock.

Opportunities: Enhancements to recordkeeping for the USDA conservation practice code for fencing that could identify the location and use of the fencing, or the associated components of the management system, could allow for better utilization within the CBP water-quality models. One example would be to link riparian forest buffers (391), riparian herbaceous cover (390), or stream crossings (578) by using a modifier to the fencing code representing riparian fencing. For grazing and pasture management improvements, the fencing code could be linked with prescribed grazing (528) or animal trails and walkways (575). Other conservation practices that potentially could be associated with fencing-related agricultural land management changes include watering facilities (614) and spring developments (574). The Pennsylvania State Office for USDA-NRCS has been investigating opportunities to enhance data collection for conservation practice code 382 (fence) through linkage to associated conservation management practices. The NRCS maintains a practice code for access control (472) where animals are excluded from the stream corridor, but the other information is not currently present in any NRCS business tool.

Nutrient Management

Limitation: The NRCS currently defines, tracks, and reports nutrient management under a single conservation practice code (590) and standard, with additional codes for Comprehensive Nutrient Management (304) and Nutrient Management Planning (104, 105). The Partnership currently defines nutrient management under three management levels including crop group nutrient application management, enhanced application nutrient management, and decision/precision agricultural nutrient application management, with different associated effectiveness values for reducing nutrient losses to the environment. The 'crop group nutrient application management' category was recently developed to replace the former category of nitrogen-based nutrient management. The Partnership is also currently reviewing the enhanced and decision/precision nutrient application management practices, and will likely revise the definitions for these practices so they are more focused on the use of field-scale nutrient applications.

Opportunities: Enhancements to recordkeeping for the USDA conservation practice codes for nutrient management that could more readily identify differences among the three tiers of practice categories, and allow for improved data utilization by the jurisdictional partners and within the Partnership's models. The new nutrient management standards for practice 590 standards have substantially expanded the categories of nutrient management that are eligible for NRCS technical support, but without an associated identifying code that can be used for reporting. Nutrient management plans for cropland are contracted as NRCS activities 104 (written) or 105 (applied) using a single practice code, which does not allow for differentiation among the planning strategies identified in the Partnership's nutrient management planning definitions. An example of possible practice code enhancements was developed by the

Maryland State Office of USDA-NRCS to track and report multiple (four) nutrient management categories through the use of a letter suffix to the conservation practice code.

Feed Management

Limitation: The NRCS currently defines, tracks, and reports feed management under a single conservation practice code (592) and standard for multiple livestock species and does not typically track and report the type and amount of manure nutrient reductions resulting from changes in feed management. Feed management systems can focus on nitrogen and phosphorus individually or in combination, leading to different results. The Partnership defines feed management effectiveness as the change in pounds of nitrogen and phosphorus reduced in a particular animal type's manure as a result of the reduction or enhancement of feed nutritional components.

Opportunities: Enhancements to recordkeeping for the USDA conservation practice code for feed management that could identify differences in feed management focused on nitrogen and phosphorus separately or in combination, and could track and report changes in manure nutrient concentrations as a result of the practice, could allow for improved data utilization by the jurisdictional partners and within the Partnership's water-quality models. Associated livestock type and number could also be useful. The Pennsylvania State Office of USDA-NRCS has taken the initiative to obtain copies of farm feed management plans and to work with agricultural technical service providers to record and analyze theses data and enable tracking of the results. This information is currently not available in any NRCS business tool.

Forestry Practices

Limitation: Forest buffers are tracked by the FSA in units of acres. As part of the 2007 Forest Directive[75] adopted by the Partnership's Chesapeake Executive Council, forest buffer goals were established and are tracked by length and width of stream miles buffered, rather than acres. Also, in the FSA CRP/CREP database, the distinction between new forest buffers versus re-enrollment of existing forest buffers is not recorded consistently, so avoiding double counting can be difficult.

Opportunities: Jurisdictions provide the length and width of implemented forest buffers to the Partnership's Forestry Workgroup for assessment of goal achievement. However, jurisdictions rely on the FSA data for reporting to the Partnership's Annual Progress Review. The tracking of forest buffer length and width by the FSA could provide more precise information that could take into account different load reductions for narrower versus wider buffers (for example, 35 feet versus 100 feet). In addition, potential double counting between historic and current implementation could be avoided if the FSA were to record consistently and accurately whether a buffer was re-enrolled as opposed to newly installed. A similar issue of re-enrollment may exist for land retirement.

Wetlands

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[75] http://www.chesapeakebay.net/content/publications/cbp_27761.pdf

Limitation: The NRCS currently defines, tracks, and reports wetland conservation practices under four separate conservation practice codes (644, 658, 657, and 659) and standards. The Partnership currently defines wetland conservation practice efficiencies on the basis of a single practice of wetland restoration that includes restoration, enhancement, or creation of wetlands, and distinguishes between streamside and other areas. The NRCS practice definition includes *Phragmites* spraying for invasive weed control, whereas the Partnership's BMP definition does not accommodate *Phragmites* spraying. The Partnership is addressing this discrepancy through its [Wetlands Workgroup](#).

Opportunities: Enhancements to the Partnership's practice definitions for wetlands could enable more accurate calculation of nutrient and sediment loads associated with the variety of NRCS wetland conservation practices and could allow for improved data utilization by the jurisdictional partners and within the Partnership's Chesapeake Bay watershed and estuarine water quality models.

Tillage

Limitation: The NRCS tillage practice definitions do not define the minimum amount of residue remaining on the field. All Partnership approved tillage BMPs include a minimum residue coverage percent. This is because water-quality benefits are most tied to the residue coverage.

Opportunities: Refine the NRCS tillage practice definitions to include the minimum residue coverage. Because a high degree of soil cover dramatically increases water infiltration and storage and decreases soil erosion and soil-bound nutrient losses, encouraging the use of tiers of residue management could benefit water-quality conditions.

Section 11. 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., Maryland, 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 provide a trustworthy, generally transparent system of 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 Partnership and its shared desire to ensure the accurate and transparent accounting for and crediting of *all* pollutant load reducing practices which are in place and operating correctly.

[Editor's Note: Based on the decision by the BMP Verification Committee at its January 28, 2014 meeting, a complete set of text for this section of the framework document will be drafted after: 1) the existing Agriculture Workgroup's expert panel completes its review of the Maryland's functional equivalents report; and 2) the CBP WQGIT chair and CBP BMP Verification Committee chairs determine where and how to best address the verification and non-verification related component of this topic.]

Section 12. 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 jurisdiction 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. 2103 report included here as Appendix O, 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.

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 jurisdictional programs (for example, cover crops in Lancaster County, PA). 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 jurisdictional 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 jurisdictions 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 jurisdiction 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 jurisdictional and Federal conservation agencies.

Each jurisdiction has developed their own combination of methods to remove duplicate record and prevent double counting. Appendix O (see pages 20-23) documents the jurisdiction-specific methods which apply to cost-shared and non-cost shared practice data.

Section 13. Historical Data Clean-up

The Partnership's Watershed Technical Workgroup is responsible for organizing the partnership-wide efforts 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 both the need for re-calibration of the Partnership's Chesapeake Bay Watershed Model and to better support the basinwide and baywide efforts underway to explain observed water quality trends in the hundreds of monitoring stations across the watershed and tidal waters.

The re-calibration of the Partnership's Chesapeake Bay Watershed Model will attempt to match simulated nutrient loads to monitored nutrient loads throughout the watershed's streams and rivers given a certain set of land uses, animals, septic systems, and implemented BMPs for each year of the calibration period. The most successful re-calibration will only result from the most accurate information for all of these base conditions, including reported BMPs over time.

The work being coordinated by the Partnership'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 pollutant load reduction practices, treatments, and technologies. The objective is to use the Partnership's 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.

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 Partnership[76].

- 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 verification guidance developed by the source sector and habitat workgroups in an effort to verify practices in place for any given year (see Appendix K).

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[76] Until a decision is made on the watershed model calibration period, the 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 Phase 5.3.2 Chesapeake Bay Watershed Model calibration, including years with an Agricultural Census: 1985, 1987, 1992, 1997, 2002, 2005, and 2009.

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

Section 14. Development and Documentation of the Jurisdictional BMP Verification Programs

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, the jurisdictions are strongly encouraged to consult the following three products developed by the Partnership's BMP Verification Review Panel.

The *Chesapeake Bay Program BMP Verification Program Design Matrix* (Table 9) was envisioned by the Panel as helping each jurisdiction ensure they were addressing all the needed program elements within each jurisdiction's verification program. The matrix should be viewed by the jurisdictions 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 10) spells out the 14 steps for each Chesapeake Bay watershed jurisdiction to consider when developing their jurisdiction's BMP verification program. Under each step are questions for consideration which will prompt decisions that may be needed to develop jurisdiction's verification protocols. The Panel envisioned the jurisdictions using the 14 steps as prompts to ensure their verification protocols and programs were 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—both the 14 steps and the underlying questions are to be used by the jurisdictions as prompts, not requirements, as they develop and enhance their verification programs and protocols.

The *State Verification Protocol Components Checklist* (Table 11) is provided to the jurisdictions as a checklist to ensure each jurisdiction's verification protocols contained all the necessary elements. The BMP Verification Panel *will* use this checklist directly in their review of each of the jurisdictions' proposed verification programs.

Table 9. Chesapeake Bay Program Best Management Practice Verification Program Design Matrix

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

A. Program Component	B. Program Elements	C. Program Element Options
i. BMP Verification	1. What was the driver for BMP Installation?	Regulation, cost-share, non-cost-share
	2. How many BMPs will be inspected?	All, percentage, subsample, those targeted
	3. How is the frequency and location of inspections determined?	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 yr, >5 yrs
	5. What is the method of inspection?	Field visual, aerial, paperwork review, phone/paper survey
	6. Who will conduct the BMP inspection and are the certified/trained?	Regulatory agency, non-regulatory agency, independent party, self-reported
	7. What needs to be recorded for each BMP 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 <u>and</u> amended to ensure compliance, QA plan in place but not actually applied, no QA plan

	9. Into what type of system is collected data entered?	Database, spreadsheet, written files	
	10. At what resolution are results reported out 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 quality assurance for acceptance by the Chesapeake Bay Program Partnership?	BASIC: Database/paper check of adequate statistical sample	PREFERRED: Analytical comparison to a know 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 BMP efficiencies in Chesapeake Bay models?	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

**Table 10. Jurisdictional BMP Verification Program
Development Decision Steps for Implementation**
Source: CBP Partnership's BMP Verification Review Panel November 19, 2013
Recommendations Document

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

1) **Determine what BMP's to collect:**
   a) Do you want to collect all BMPs that were listed to 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 functionally equivalent (they do not meet NRCS standards, state standards, or CBP definitions but do result in nutrient and/or sediment pollutant load reductions)?
   d) When collecting the selected BMPs, do you have the year they were implemented?
   e) For reported BMPs, are you collecting all the BMP elements required for the CBP model determination (example: for cover crops, to do you have species, date planted, kill down date, fertilization if any) or will you take the lowest credited efficiency available?
   f) Have the selected BMPs been approved by the CBP Partnership? If not, do the BMPs have CBP Partnership 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 BMP's:**
   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 BMP's:**
   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 the 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 entities?

4) BMP verification system development:
   a) What system/method will be used for 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 workgroup in the CBP Partnership?

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 the Chesapeake Bay Program Office?
   h) Who will transmit 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 to you make sure it is 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? (Example: looking at the same data in another system like the Chesapeake Bay Program Partnership's Chesapeake Stat web site, 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 all 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 assure 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, 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) Spot Checking Procedures
    a) What method is used to select the statistical sample for quality assurance?
    b) What documentation is needed for spot 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:

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

14) Future Year Systems: Things to Think About
a) As BMP technologies or the 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?

Table 11. State Protocol Components Checklist

	Source: BMP Verification Review Panel November 19, 2013 Recommendations Document			
	State:			
	Sector:			
	BMP Verification	Present	N/A	Comments
1	**BMP's Collected**			
	Type (structural, management, functional equivalent, 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 BMP's			
	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, HUA, 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 spot 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 Partnership 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 analyses collected data and report 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

Panel's Recommendations to the Jurisdictions

Within the BMP Verification Review Panel's November 19, 2013 recommendations document[77], 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 9) to structure their BMP verification programs, using the series of program elements as a series of prompts to ensure they 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 10 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 11. 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 should be reviewed to make sure they meet the intent of the Partnership'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:

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[77] *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.
http://www.chesapeakebay.net/channel_files/21511/cbp_bmp_verif_review_panel_recommendations_11_19_2013.pdf

- 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 described in the respective workgroups' guidance (see Section 7 and Appendix K) or explain in their quality assurance plan why they cannot, recognizing the legal as well as funding issues that may impede the levels of verification recommended by the Partnership's 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 R). 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 Workgroup and Forestry Workgroup—provide specific guidance for the jurisdictions to consider in prioritizing application of their verification program and protocols (see Appendix K).

Robust Upfront Verification Yields Less Intensive Follow up Reviews. The more intense the on-site 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 functionality 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 Partnership's five BMP verification principles (see Section 5);

- The six source sector workgroups' sets of BMP verification guidance (see Section 7, Appendix K);

- The matrix, list of steps/questions, and checklist provided in the Panel's November 2013 guidance and recommendations (see Tables 9, 10, and 11, respectively); and

- The Chesapeake Bay Program Partnership's final published basinwide BMP verification framework document.

The Panel strongly encourages jurisdictions to ensure their proposed verification programs are consistent with the principles and guidance agreed to and adopted by the Partnership 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, documentation tools/electronic systems implementation and use. The more a system is tested prior to full scale implementation, the better the protocol implementation outcomes and protocol accuracy will be.

Panel's Overall Recommendations to the Jurisdictions

In addition to the above elements, which can be considered as improving the state of the art of verification procedures, there is a strategic element: targeting the most robust verification programs toward those BMPs on which the jurisdiction is depending most strongly to achieve the nutrient-sediment reductions in their WIPs. Just as BMP choices differ among the states' WIPs, then the robust level of verification may be applied differently in different jurisdictions. "Equity" here must be defined as all jurisdictions addressing the highest priority BMPS, not all jurisdictions doing the same thing with a given set of BMPs. Therefore, the best answer for why a jurisdiction has proposed a less than robust verification program is that the BMPs in question are lower priority for meeting the jurisdiction's WIP and that more resources must be applied to maintaining and improving verification protocols and programs for the highest priority BMPs.

In their review of each of the jurisdictions' BMP verification programs, the Panel will be looking for evidence that the jurisdictions have actually given deep thought to what they are doing now, its shortcomings, and proposed improvements—a solid example is the Urban Stormwater Workgroup's BMP verification guidance narrative (see Appendix K).

Verification Program Documentation Expectations

The BMP Verification Committee recommends documentation of each jurisdiction's BMP verification program build directly upon their existing quality assurance (QA) plans already drafted, approved by EPA, and in place supporting their Chesapeake Bay Implementation Grant and Chesapeake Bay Regulatory and Accountability Grant. 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 national environmental information exchange network (NEIEN) node, the additional BMP verification program documentation expectations are described below.

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 CBP Partnership's five BMP verification principles.

Source Sectors and Habitats

By the major source sectors (e.g., agriculture, forestry, stormwater, and wastewater) and habitats (e.g., wetlands and streams), 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 other partners—e.g., NRCS, FSA, other federal agencies, federal facilities, conservation districts, municipalities—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 Partnership.

- Describe and fully document any jurisdiction-specific modifications to/variations from the Partnership adopted guidance and procedures.

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

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

- Document what/which source sector/habitat BMP verification protocols/procedures are already in place, fully operational, and being routinely carried out.

- Document what/which 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 source sector/habitat BMP verification protocols/procedures fully operational and routinely carried out.

- Document the agency, departmental, and organizational responsibilities for carrying out the source sector/habitat BMP verification protocols/procedures cross walked with existing or planned regulatory programs, cost share programs, and programs providing technical services.

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 1619 data sharing agreements with USDA.

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

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

Preventing Double Counting
Each jurisdiction will address preventing double counting by:

- Providing documentation on the jurisdiction specific procedures either being carried out or which will be carried out to eliminate double (or more) counting of a single reported practice receiving funds from two or more sources which, in turn, are independently tracking and reporting the same practice.

Historical BMP Database Clean-up
Each jurisdiction will address historical BMP database clean up:

- Provide documentation on how the jurisdiction plans to carry out the clean up their historical BMP implementation data base and over what time period.

CBPO Verification and Data Validation Documentation

The Chesapeake Bay Program Office will need to update and expand its own QA plan to fully document the internal procedures it will follow into the future in validating the jurisdictions' annually submitted implementation practice data.

Section 15. Partnership Processes for Evaluation and Oversight

Ongoing Decision-Making Roles within the CBP Partnership

The Partnership must and will continue to be the decision makers on the development and implementation of the basinwide verification framework and underlying processes. The jurisdictional partners, who will be principally responsible for verifying practices implemented within their portions of the watershed, must embrace effective verification. EPA will continue in its Chesapeake Bay TMDL accountability role and ensure each jurisdiction's verification program meets the measure of reasonable assurance well already established during the two rounds of watershed implementation plan and 2-year milestone development and evaluation. A number of the Partnership's panels, committees, teams, and workgroups, along with EPA, will have decision making, advisory, evaluation, and oversight roles with the continued implementation of enhanced and expanded jurisdictional BMP verification programs as described below.

Chesapeake Bay Program BMP Verification Review Panel. The Panel has been formally charged by the Chesapeake Bay Program Partnership 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 its written collective 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 up 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 approve or provide specific requests for changes prior to approval of each of the seven jurisdictions' proposed BMP verification programs based on the feedback from and the recommendations of the Partnership's BMP Verification Review Panel.

Chesapeake Bay Program Advisory Committees: The Scientific and Technical, Citizens, and Local Government advisory committees will continue to play a critical advisory and independent evaluation role in calling attention to where the Partnership has fallen short of stated expectations and prior commitments.

Chesapeake Bay Program's Technical Workgroups. The technical source sector and habitat restoration workgroups under the Water Quality, Habitat, Fisheries and Healthy Watersheds goal implementation team will continue to be responsible for convening and overseeing expert BMP panels and their development of new and revision of existing BMPs. The workgroups will decide when the new/revised BMPs are ready for Partnership approval through the Water Quality Goal Implementation Team. The workgroups will continue to be responsible for developing, with input from their respective BMP expert panels, verification procedures for new BMPs, as needed.

Chesapeake Bay Program's Water Quality Goal Implementation Team. The Water Quality Goal Implementation Team, in coordination with the Fisheries, Habitat and Healthy Watershed goal implementation teams, will continue to review and approve new or revised BMPs, including revised, enhanced, or new BMP verification guidance and protocols for those newly approved BMPs.

Jurisdictions. The 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 the 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 carried by the jurisdiction, local municipalities, conservation districts, USDA, other federal agencies, federal facilities, non-governmental organizations, and all other agencies, organizations, and institutions contributing to the 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 Partnership's adopted BMP verification principles. They will 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 life span or document the practice has been re-verified and assign the new life span.

Federal Agencies and Federal Facilities. Federal agencies and their respective federal facilities are responsible for undertaking verification of their installed practices, treatments, and technologies and sharing documentation of their verification protocols with their state counterparts.

U. S Environmental Protection Agency. EPA will review and approve 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. 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[78] , 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 which reduce nutrient and sediment pollutant loads which triggers the requirements for a quality assurance plan. EPA's review will focus on whether each jurisdiction has provided reasonable assurance for ensuring the implementation of the reported practices, treatments, and technologies and supporting programmatic activities funded through these grants and the states' matching fund programs.

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[78] 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 Partnership are adhered to and effectively carried out.

Amended Partnership BMP Protocol to Address Verification. The Partnership will commit to develop and adopt, as needed, new verification requirements for new BMPs through the Partnership's *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*. The existing BMP protocol will need to be formally amended to specifically address BMP verification. The future membership make-up of and charges to the BMP expert panels convened by the Partnership'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 development of any new verification procedures for new practices.

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

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

Annual Reviews of Quality Assurance Plans. EPA will annually review and approve 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 will focus its annual reviews on any changes to the plans as submitted by the jurisdictions. EPA must review and approve the quality assurance plans prior to the annual grant awards.

Periodic Audits of Jurisdictions' Verification Programs. Structured like the field collection and analytical laboratory audits conducted with the Partnership'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 procedures and

protocols documented within the jurisdictions' quality assurance plans are being effectively carried out.

Independent Evaluations. At the request of the Partnership, the Scientific and Technical Advisory Committee, working with the Citizens and Local Government advisory committees, will sponsor periodic—every 3-5 years—independent evaluations of the effectiveness of the basinwide BMP verification framework and the individual jurisdictions' BMP verification programs in achieving the five BMP verification principles adopted by the Partnership. Findings and recommendations from these periodic independent evaluations will be presented directly to the Principals' Staff Committee for consideration and follow-through actions and decisions.

Section 16. Communications and Outreach

[Editors Note: This Section's text has not been updated since the release of the July 15, 2013 draft basinwide framework report. Work is underway through the Communications Workgroup to further develop the Partnership's communications and outreach strategy. Once a revised draft of that strategy has been agreed to by the Communications Workgroup, copies will be distributed to the Committee and Panel members with a request for review and comment.]

Through collaboration with the CBP's Communications Workgroup, the BMP Verification Committee can incorporate a communications component into the BMP verification process that will enable CBP partners and the partnership to have consistent, clear messages internally as they gradually build toward public implementation of the overall effort. Having solid internal understanding and messages will enable 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.

Implementation of a communications strategy is dependent on adoption of the overall BMP verification framework and the strategy. Thus, members of the Committee felt it would be best to develop a Communication Strategy once the full framework (principles, protocols, and review panel) are more finalized.

CBP partner jurisdictions already have verification processes and mechanisms for communicating with implementers in place for many but not all sectors. This communications strategy is not intended to replace existing outreach or communications by the jurisdictions. Instead, the Communications Workgroup offers it as a guideline to:

- Support all CBP partners in understanding each other and the BMP Verification process;

- Support and strengthen work by partners with existing BMP implementers; and

- Offer a guideline for communications if/when partners begin reach out to new people (audiences) to engage in the BMP verification.

Communication Strategy Goals

1) To build understanding and support for BMP Verification process as a cross-jurisdiction, partnership effort through use of clear, consistent messaging by various partners as they work with each other and eventually "implementers"
   a. By using similar messages, we all appear to be on the same page with our efforts, which strengthens our individual work

2) To provide partners and communicators within the partnership with clear, structured messaging that they can reference as they reach out to various audiences and "implementers"

3) To have consistent public messaging across partnership about what BMP Verification

actually is.

4) To educate and engage more people across the watershed in Bay restoration work and cleaner waters.

Audiences

Audiences for communicating about BMP verification are widely varied and are likely to become more so as the campaign progresses over time. At its top level, the BMP Verification audiences can be divided into three categories:

1. People who understand BMPs and whose BMP practices **are being** verified
    a. Agricultural community – farmers, land owners, conservation districts
    b. Large and small wastewater treatment facilities

2. People who understand BMPs and whose BMP practices **aren't currently being** verified
    a. Watershed restoration experts/groups

3. People who **don't understand** BMPs and verification

Section 17. Basinwide BMP Verification Framework Implementation

The BMP Verification Committee recommends the Partnership commit to and carry out the following series of recommendations, processes, and procedures following the recommended timelines to ensure full, basinwide implementation of the BMP verification framework equitably across all jurisdictions, source sectors, and habitats.

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 Partnership's adopted BMP verification principles to fully ensure the expectation is clear that all seven jurisdictions will develop, document, and submit for review and approval enhanced BMP tracking, verification and reporting programs which are fully consistent with and supportive of the Partnership's adopted BMP verification principles.

Ensure Jurisdictional Verification Programs are Fully Consistent with BMP Verification Principles. During the Partnership'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 Partnership's adopted verification principles.

PSC Approval of Jurisdictions' Program Based on Meeting BMP Verification Principles. During the Partnership's Principals' Staff Committee review of each of the seven jurisdictions' proposed enhanced BMP tracking, verification and reporting programs, the Committee will only approve a jurisdiction's proposed verification protocols, procedures, and processes if they are fully consistent with and supportive of the Partnership's adopted verification principles.

BMP Verification Protocols

Amend the Partnership's BMP Protocol to Address Verification. The Partnership 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. The amended protocol will commit the Partnership to develop and adopt, as needed, new verification requirements for new BMPs through the Partnership's 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 Partnership'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 development of any new verification procedures for new practices.

Seek to Strengthen Ability to Verify Partnership-Defined BMPs. In order to verify 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 with using the approved verification method. Therefore, in addition to relying on existing standards like NRCS conservation practice standards, the Panel recommends the Partnership build into its BMP protocol process requests that future BMP expert panels provide distinct practice definitions which incorporate descriptive elements which 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 Partnership 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 BMP implementation strategies, products, and technologies develop, workgroups and jurisdictions should adapt their protocols and procedures used to verify practice implementation. For example, as satellite and 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 Partnership'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 Partnership's transparency principle if there is independent verification/validation of the underlying data. The Partnership should develop and adopt a set of data validation procedures.

Treat Cost-Shared and Non Cost-Shared Agricultural Conservation Practice Data the Same in Terms of Applying Privacy Restrictions. The Panel recommends the Partnership allow for the same privacy protections provided to cost-shared data for non-cost shared data not associated with a regulated entity. This means the 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 agriculture conservation practices. In order for jurisdictions to carry out this recommendation, they may need new or to amend existing state legislation to ensure their existing state privacy restrictions apply across all agricultural conservation practices data.

Public Access to All Credited Practice Data. All practice and treatment data reported for crediting of nutrient and sediment pollutant load reductions and used in some form by the Partnership in accounting for implementation progress will be made publically accessible through the Partnership's Chesapeake Stat website.[79]

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

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

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 Partnership'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
    - Maryland Department of Agriculture
    - Maryland 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 expressed about 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—which 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).

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 entitled *Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms* (Hively et al. 2013).

Partnership 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 State 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 or CTA and take the necessary steps to prevent any double counting prior to reporting CTA for nutrient and sediment pollutant load reduction crediting.

Provide State 1619 Conservation Cooperators Access to CEAP Data. State agencies with 1619 Conservation Cooperator Agreements in place will be provided access to the Chesapeake Bay watershed CEAP data strictly for purposes of informing adaptation of their conservation delivery programs. [Editor's Note: The editor is continuing to work with Kelly Shenk, Mark Dubin, and USDA colleagues on additional language for this recommendation.]

Establish Protocols for Annually Accessing Federal Cost Shared Practice Data. Each of the six Chesapeake Bay states should establish a well-documented data access and processing protocols 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 Partnership 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 Partnership will work with NRCS and FSA to fully carry out their commitment to enhance data collection and reporting in the areas identified by the Partnership's Agriculture Workgroup.

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 Partnership's Scenario Builder tool practice definitions finalized for the year by the Watershed Technical Workgroup

- October 15 – The Partnership's Agriculture Workgroup and Watershed Technical Workgroup approve updated Partnership approved BMPs/NRCS standards crosswalk

- October 15 – States receive their NRCS dataset

- December 1 – States submit their integrated federal-state-local dataset to the Partnership's Annual Progress Review via their state's NEIEN node

Preventing Double Counting

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

Clean-up of Historical BMP Data Bases

Jurisdictions Must Commit to Historical Data Clean-up. An approvable jurisdictional BMP verification program must include clear commitments to and specific plans/schedules for cleaning up their historical BMP databases by a specific date, but not beyond July 2015, the deadline for providing a complete BMP implementation history for use in calibrating the Partnership's Phase 6 Chesapeake Bay watershed model. Jurisdictions will have opportunities for making further adjustments to their historical BMP databases during the first half of 2016, during the time period designated by the Partnership for comprehensive review of the full suite of revised and updated Partnership's modeling and other decision support tools. After that time frame, their historical databases will be considered locked in from the perspective of the Partnership's 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 data bases must proceed in parallel with efforts to credit non-cost share practices. To both help establish a current baseline of non-cost share practices as well as to prevent double counting, the jurisdictions need to be well down the road on cleaning up their historical databases as they begin to actively track, verify, and report non-cost share practices.

Jurisdictional BMP Verification Documentation

Build Upon Existing Quality Assurance Plans. Documentation of each jurisdiction's BMP verification program will build directly upon their existing quality assurance plans already drafted, approved by EPA, and in place supporting their Chesapeake Bay Implementation Grant and Chesapeake Bay Regulatory and Accountability Grant.

Prioritizing and Target BMP Verification

Empower Jurisdictions to Prioritize and Target BMP Verification. Jurisdictions are fully 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.

Annual Progress Reporting

Use the Partnership's Data Exchange Network to Document Verification Status. As described in Section 2, since early 2000s, the Partnership 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. The Partnership has developed an agreed to set of Chesapeake NEIEN Node Codes[80] which describe all the current possible fields within NEIEN. Fields can be added at any time to the Codes list and to the NEIEN system itself—the Partnership's Watershed Technical Workgroup reviews and approved all additions and changes to the Codes list every year prior to December 1st. The Watershed Technical Workgroup is charged with the responsibility 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. The Partnership's Agriculture Workgroup will be responsible for annually reviewing the crosswalk between NRCS standard and Partnership's approved BMPs, factoring in any new or revised NRCS standards and Partnership approved BMPs. Based on any Agriculture Workgroup approved changes to the crosswalk, the Watershed Technical Workgroup will review and approve the necessary changes to Chesapeake NEIEN Node Codes Lists as well as required changes to the rules for how these BMPs will be applied within the Partnership's Scenario Builder tool.

CBPO Review of Annual Implementation Progress Data Submissions. Chesapeake Bay Program Office staff (CBPO) will review the jurisdictions annual NEIEN-based submissions of implementation progress data for documentation of verification as part of their routine evaluations of the quality and completeness of the data. The annual progress data reviews will be conducted following the specific guidelines and protocols agreed to by the Partnership through the Watershed Technical Workgroup. Any submitted implementation progress practice data 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 Partnership's Watershed Technical Workgroup will be responsible for reviewing and approving any updates to documentation of the steps, processes, and procedures followed by the Chesapeake Bay Program Office staff in receiving, reviewing, processing, and submitting to the watershed model for 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.

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[80] 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

Partnership Processes for Evaluation and Oversight

EPA Review of Jurisdictions' Quality Assurance Plans. EPA will annually review and formally approve the jurisdictions' quality assurance plans submitted as part of their annual applications for their Chesapeake Bay Implementation Grants and Chesapeake Bay Regulatory and Accountability Grants. EPA will focus its annual reviews on any changes to the plans description of the jurisdictions' BMP verification programs for consistency with the Partnership's BMP verification framework. EPA must review and approve the quality assurance plans prior to the annual grant awards.

Periodic EPA Audits of Jurisdictions' BMP Verification Programs. Structured like the field collection and analytical laboratory audits conducted with the Partnership'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 procedures and protocols documented within the jurisdictions' quality assurance plans are being effectively carried out consistent with the Partnership's basinwide BMP verification framework.

Independent Evaluations by the Partnership's Advisory Committees. At the request of the Partnership, the Scientific and Technical Advisory Committee, working with the Citizens and Local Government advisory committees, will sponsor periodic—every 3-5 years—independent evaluations of the effectiveness of the basinwide BMP verification framework and the individual jurisdictions' BMP verification programs in achieving the five BMP verification principles adopted by the Partnership. Findings and recommendations from these periodic independent evaluations will be presented directly to the Principals' Staff Committee for consideration and follow-through actions and decisions. The initial review will be conducted 3 years following PSC approval of the seven jurisdictions' BMP verification programs.

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 Partnership and the individual 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 the other components of the basinwide BMP verification framework.

2. The jurisdictions will fully document their BMP tracking, verification and reporting programs within their existing Chesapeake Bay Implementation Grant required quality assurance plans.

3. The BMP Verification Review Panel will review each jurisdiction's quality assurance plan, for assessing the strengths and any possible vulnerabilities in the state verification programs using the Partnership's BMP verification principles as criteria.

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

5. The 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 program

7. The BMP Verification Review Panel will report its findings and recommendations to the Partnership's PSC.

8. The Principals' Staff Committee will approve each jurisdiction's BMP verification program or request specific enhancements to address the Panel's findings and recommendation prior to Partnership approval.

Use First Two Years to Ramp-up Jurisdictions' Verification Programs. The Partnership will use the two years following Principals' Staff Committee 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 will 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, treatment, or technologies for which documentation of verification has not been provided for through each jurisdictions' NEIEN-based report systems will not be credited for nitrogen, phosphorus or sediment pollutant load reductions for that year.

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 2013 *Chesapeake Bay Program Grant and Cooperative Agreement Guidance*, 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).

BMP Performance Evaluation

Undertake Collection of BMP Performance Data through the Partnership. Following the Partnership's adaptive management BMP verification principle, the partners will support a continued evolution of the understanding of the performance of practices. The Partnership will work with its Scientific and Technical Advisory Committee to develop and implement a longer

term process of collecting, analyzing, and then using scientific evidence that will assist in quantifying the performance of the individual and collective reported BMPs. Analyses of such data would focus on evaluating the degree of consistency with the pollutant load reduction efficiency adopted by the Partnership and estimated pollutant reductions simulated by the Partnership's suite of models and other decision support tools. Applying the results of these analyses, following an adaptive management process, can help the Partnership refine BMP efficiencies, 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 Partnership's ability to collect this data, and further work by outside experts. The findings could assist in the confirming the accuracy of the existing BMP efficiencies and Partnership's Chesapeake Bay watershed model predictions. Monitoring and a certain amount of performance checks may be required for each jurisdiction to collect adequate data for determining actual BMP performance.

Looking Towards the Future

Look Out 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 on a daily, seasonal, and annual basis, replying 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. Reporting of individual conservation practices does not begin to fully capture all the myriad of incremental decisions that affect landscape management. We are already witnessing this shift in the management of urban stormwater, with the movement from individual best practices to performance-based management systems. The Partnership should…. [Tim Gieseke, the editor needs help in spelling out what exactly should the Partnership do differently into the future.]

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Section 19. 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
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
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