JULY 15, 2013 DRAFT-SUBJECT TO REVISION

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

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




Chesapeake Bay Program
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Executive Summary

[Editor's Note: The Executive Summary will be drafted following receipt of feedback on the entire draft report from the BMP Verification Review Panel at its August 28-29 meeting and the BMP Verification Committee at its September 16 meeting.]

Chesapeake Bay Program Water Quality Goal Implementation Team's BMP Verification Committee

Chesapeake Bay Program Partnership's BMP Verification Program Document

Contents

Appendices

Foreword

The Chesapeake Bay Program Partnership must be fully responsive to calls by the 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, depend on accurate reporting of BMPs. Our scientific experts are continuing to interpret the trends in the decades of monitored observations of water quality in local streams, larger rivers and the tidal waters throughout the watershed of the Chesapeake Bay. 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.

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

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 facility managers take the actions necessary to protect their properties, lands, riparian habitats, and local streams. Improperly installed practices that do not function as designed allow local flooding, jeopardize sources of drinking water, encourage the collapse of stream banks, and deprive local economies of opportunities that clean water and viable habitats suitable for recreational activities can offer. 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.

The five BMP Verification Principles adopted by the Partnership recognize the need for changes and enhancements and the opportunity to build from existing jurisdictional tracking and reporting programs. There are 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 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 Bay restoration efforts. This report describes the basinwide framework for ensuring we continue our restoration actions, building on a solid foundation.

Nicholas A. DiPasquale, Director
Chesapeake Bay Program

Acknowledgements

This document, and the principles, protocols, and supporting evaluation and oversight procedures contained within it, were developed through the collaborative efforts of the Chesapeake Bay Program Partnership. Principally, it was through the efforts of the Chesapeake Bay Program (CBP) Water Quality Goal Implementation Team's BMP Verification Committee, its Agriculture, Forestry, Urban Stormwater, and Wastewater Treatment workgroups, the Habitat Goal Implementation Team's Wetland and Stream Restoration 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 by the CBP's Scientific and Technical Advisory Committee, the Local Government Advisory Committee, and the Citizen's Advisory Committee.

The document resulted from the collaborative expertise, input, feedback, comments, and input from 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: BMP Verification Committee, Agriculture Workgroup, 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, Local Government Advisory Committee, Citizen's Advisory Committee, 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.

Special acknowledgement is also made to the following individuals (in alphabetical order) for their leadership and 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; 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, 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, Stream Health Workgroup, Maryland Department of Natural Resources; Bernie Marczyk, Co-Chair, 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, Wastewater Treatment Workgroup, Metropolitan Washington Council of Governments; and Ning Zhou, Coordinator, Wastewater Treatment Workgroup, Virginia Tech. The work of the CBP Partnership's technical source sector and habitat restoration workgroups laid the solid 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 this document in response to comments from the CBP Partnership.

Section 1. Background

The implementation, tracking, and reporting of best management practices or BMPs, which lead to reductions in nutrient and sediment pollutant loads, has been at the center of the Partnership's Chesapeake Bay restoration efforts for close to three decades. Within the past several years, there have been numerous requests and commitments to improve the accountability of actions taken which prevent or reduce the loads of nutrients and sediment to Chesapeake Bay.

- 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 watershed's seven jurisdictions.

- The President's Chesapeake Bay Executive Order and resultant Strategy committed the U.S. Department of Agricultural and the U.S. Environmental Protection Agency 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 Research Council's 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.[1] 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.

There is also a growing, increasing vocal demand for the tracking and reporting of practices and technologies to expand well beyond the sources the Bay watershed jurisdictions have traditionally relied upon—state agricultural departments and environmental agencies, USDA, and county conservation districts. 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 practices implemented without state or federal cost share funding.

[1]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

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 pollution prevention and reduction practices. Given the ever increasing importance that accounting for implemented practices is taking on within the partnership—Chesapeake Bay TMDL tracking and accountability, focus on demonstrating reasonable assurance, evaluation of two-year milestones, requiring offsets to new sources of nutrient and sediment pollutants, increasing demand for tradable credits, interpretation of observed trends in local and Bay tidal water quality conditions—the CBP Partnership has built a basinwide framework, as described in this document, whereby we can have both expanded tracking and reporting of practices AND verifiable confidence in the outcome of those implemented practices.

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. Verification helps ensure the public of achievement of the expected nitrogen, phosphorus, and sediment pollutant load reductions over time. The CBP 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.

Defining BMP Verification
Within its BMP verification principles (see Section 5), the CBP 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 (USDA) Office of Environmental Markets[1] and the Willamette Partnership.[1]

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[2] (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

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

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, 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, convened an Independent Evaluator Action Team to construct the evaluation questions and work with EPA to establish and manage a contract with the National Academy of Sciences.

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 states, the District of Columbia, and the overall CBP Partnership for tracking nutrient and sediment control practices that are implemented in the Chesapeake Bay watershed and used to evaluate the two-year milestone strategy. The Committee was also charged to assess existing adaptive management strategies and to recommend improvements that could help the CBP 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*.[3] The NRC Committee reached a number of conclusions and recommendations about the Partnership's BMP tracking and accounting efforts, including:[4]

- 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.

[3] 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

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

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

- Additional guidance from the EPA on the optimal extent of field verification of practices in relation to expected benefits would improve tracking and accounting of both cost-shared and voluntary practices.
- Electronic tracking and data transfer systems are likely to improve the quality of reporting and reduce the jurisdictions' tracking and accounting burden but may currently be contributing to delayed assessments of implementation progress.

Please see Appendix C for more information about the NRC's detailed findings and conclusions relevant to BMP tracking 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.[5] The study was performed through a combination of surveys from over 800 producers over 2003 to 2006 and modeling. 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 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, among other things, a goal to improve tracking and reporting of conservation practices in the CBP Watershed Model through the following commitments:[6]

- 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 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 Watershed Model.

[Editor's note: This section on the CEAP report will be slightly expanded and revised for the next version]

[5] 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

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

CBP Citizens Advisory Committee

The CBP 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 Bay restoration. In this role, they have been strong, vocal advocates for increased transparency, accountability, and independent evaluation of the restoration work of the Partnership. In their January 3, 2012 letter[7] 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[8] 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 E).

Chesapeake Bay TMDL

Under the Chesapeake Bay total maximum daily load (TMDL) published in December 2010[9], the U.S. Environmental Protection Agency (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 the jurisdictions will accommodate any new or increased loadings of nitrogen, phosphorus, or sediment that lack a specific allocation in the TMDL with appropriate 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[10]. Verification, tracking, and accountability are among the elements described in Appendix S. Credits generated to offset new 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 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 CBP Partnership's Trading and Offsets Workgroup.[11] While the jurisdictions continue to define verification for their offset programs and for trading programs, it

[7] 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

[8] 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

[9] 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

[10] 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

[11] 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 CBP for annual progress.

Importance of BMP Verification to the Partnership

Estimated load reductions using the Partnership's models and other decision support tools, used in shared decision-making, depend on accurate reporting of BMPs. Our scientific experts are continuing to interpret the trends in the decades of monitored observations of water quality in local streams, larger rivers and the tidal waters throughout the watershed of the Chesapeake Bay. 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.

> 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.

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

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 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.

Section 2. Work Underway on Which the Verification Framework Was Built

The CBP 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 funding from EPA, each of the seven jurisdictions have developed quality assurance project plans describing their collection, management, and reporting of environmental data.[12] 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 CBP Partnership's work on BMP verification builds directly on these existing jurisdictions' tracking, verification, and reporting programs.

USDA Agricultural Conservation Practice Verification[13]

USDA cost-share programs provide incentives for a number of conservation practices. Individual agencies—NRCS and 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. The Natural Resources Conservation Service (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 support 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 Field Office Technical Guides.

[12] 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.

[13] Text summarized from the June 2011 USDA Office of Environmental Markets' *Verification of Environmental Credits: Chesapeake Bay Environmental Markets Team Discussion Paper*.

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 performed by technical service providers. Offices are to be checked once every third year. Each fiscal year, the agency performs spot checks on 5% 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% 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. The Farm Service Agency (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% of practices are self-certified; the remainder being certified by USDA staff. Of the 90% that are self-certified, the agency spot checks 5% per year. Thus about 14% 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 CBP 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 F). The CBP 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.

National Association of Conservation Districts

The *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*,[14] developed by the Federal Leadership Committee under Executive Order 13508,[15] called for increased commitment from federal agencies in the Bay to assist 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 (voluntary) conservation practices for use by all the Bay states would be extremely difficult at that time.[16] 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 CBP'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.

USGS 1619 Data Sharing Agreements with NRCS and FSA

To help provide consistency and completeness of conservation practice reporting among the six Chesapeake Bay watershed jurisdictions, 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 jurisdictions— Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia, and the organization responsible for tracking progress towards attaining conservation goals—the Chesapeake Bay Program Partnership. This was made possible by the signing of 1619 Conservation Cooperator Agreements between USGS and USDA that allowed access to Federal conservation data while assuring the privacy of farmers as mandated under Section 1619 of the 2008 Farm Bill. Recognizing 1619 data sharing

[14] 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

[15] http://executiveorder.chesapeakebay.net/

[16] 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

agreements are a fundamental building block on which the jurisdictional 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 were build off of the experiences of USGS's data sharing agreements (see Section 8 for more details).

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[17,18] (Appendices S and T) presented the perspectives of technical experts on a broad variety of issues related to the development and operation of environmental markets. USDA helped lead the way on thinking through the different approaches to undertaking verification through these key Office of Environmental Markets publications.

Response to NAS Chesapeake Bay Evaluation Panel Report

On May 4, 2011, the National Research Council 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*.[19] This work was conducted under the direction of the Chesapeake Executive Council. The Principals' Staff Committee, at its May 10, 2011 meeting, directed the CBP 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 PSC 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*[20] and *CBP Partnership Suggested Responses to May 2011 NRC Report*[21]–were

[17] 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 S.
[18] 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 T.
[19] 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
[20] *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
[21] *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

formally transmitted to the Principals' Staff Committee on November 3, 2011[22]. 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.

Section 3. Chesapeake Bay Basinwide BMP Verification Framework Overview

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

- BMP verification principles
- BMP Verification Review Panel
- BMP verification protocols
- Jurisdiction specific procedures for eliminating double counting
- Consistent 1619 data sharing agreements across the six states
- USDA agreement to enhance data collection and reporting of cost shared practices
- Procedures for clean-up of historical BMP databases
- Partnership processes for evaluation and oversight
- Jurisdictional BMP verification documentation expectations
- Communications strategy

These ten 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 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 G.

BMP Verification Review Panel

Through a process described in Section 6, a BMP Verification Review Panel[23] 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

[22] 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 .

[23] http://www.chesapeakebay.net/groups/group/bmp_verification_review_panel

Partnership's adopted verification principles and the verification protocols. The panel members are listed in Appendix H and the panel charge is provided in Appendix I.

BMP Verification Protocols

Six technical workgroups under the CBP Partnership's Water Quality Goal Implementation Team[24] and the Habitats Goal Implementation Team[25] were tasked with the development of verification protocols that could be applied to their pollutant source or habitat restoration sector. The six verification protocols were as follows:

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

The six verification protocols are further described in Section 7 and provided in full detail in Appendix J.

Ensuring Full Access to Federal Conservation Practice Data

Comprehensive and consistent 1619 data sharing agreements in place across all six states is a key objective for ensuring each jurisdiction 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 8.

Eliminating 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 USDA are tracking the same practice because they both provided cost-share to the producer for the practice implementation. Section 9 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 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 10, 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.

USDA Agreement to Enhance Data Collection and Reporting of 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

[24] http://www.chesapeakebay.net/groups/group/water_quality_goal_implementation_team
[25] http://www.chesapeakebay.net/groups/group/habitat_goal_implementation_team

actions to prevent and reduce pollutant runoff from their agricultural operations. As described in Section 11, the CBP Partnership's Agriculture Workgroup has identified opportunities to enhance USDA Conservation Practice data attributes and USDA has committed to working towards addressing these identified jurisdictional needs for enhanced data collection and reporting systems.

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 12, these procedures and processes also reflect the Partnership's commitment to adapt to new scientific findings and experiences from verification efforts underway.

Jurisdictional BMP Verification Documentation Expectations

The BMP Verification Committee recommends the documentation of each jurisdiction's BMP verification program build directly upon their existing quality assurance project plans (QA plans) already drafted, approved by EPA, and in place supporting receipt of funding through 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, BMP verification documentation expectations are described in Section 13.

Communication strategy

The CBP Partnership's Communications Workgroup[26] has developed a communications 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 described in Section 14, 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.

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

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

At the February 16, 2012 Principals' Staff Committee meeting[27], the Partnership reached agreement to proceed forward with development of a basinwide BMP verification framework. The PSC agreed to proceed with the framework, an initial schedule, and a process for developing a comprehensive BMP tracking, verification and reporting system on behalf of the CBP Partnership. The Water Quality Goal Implementation Team's BMP Verification Committee[28] was charged with communicating the Partnership work on this initiative widely with stakeholders and tracking the development and review progress. The PSC 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 BMP verification framework widely with stakeholders.

Roles and Responsibilities within the CBP Partnership

The overall decision making process on the components of the basinwide 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, protocols, 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 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 protocols and related procedures
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 and feedback received from the BMP Verification Review Panel and the Goal Implementation Teams
BMP Verification Review Panel	Reviewing and providing feedback on the principles, protocols, and other components of the basinwide BMP verification framework;

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

	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 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 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, and committee, and panel meetings and conference calls where BMP verification was a topic on the agenda were open to the public. All these workgroup 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 Chesapeake Bay Program Partnership's web site calendar accessible at http://www.chesapeakebay.net/calendar. A complete listings of all the Chesapeake Bay Program workgroup, goal implementation team, and committee conference calls and meetings at which discussion of any BMP verification related items were on the agenda is provided in Appendix K, with links to each respective web-based meeting/conference call calendar event listing.

The framework development schedule evolved through time as the Partnership's workgroups and committees 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 BMP Verification Framework development schedule. The approved, updated schedule was then posted on the BMP Verification Committee's web page for public access.

The **technical workgroups** developed their sector specific BMP verification protocols over the course of their normal schedules of workgroup conference calls and face-to-face meetings. Each set of verification protocols underwent numerous reviews as drafts were distributed along workgroup members and interested parties, discussed by the workgroup during 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 the workgroups' most recent version of their draft verification protocol and answer questions from the full Committee. As a follow up to each of these Committee meetings, the workgroups would receive written feedback and requests for further enhancements to their draft protocols from the BMP Verification Committee chair.

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 protocols 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 requested feedback/direction.

Early on in the development process, the Committee established a series of web pages on the Chesapeake Bay Program Partnership's web site for publically sharing the draft and interim products of its collective work[29]. 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 **BMP Verification Review Panel** established its meeting and conference call schedule based on the timing when the BMP principles, protocols, 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 technical workgroups. And as with the workgroups, goal implementation teams, and committees, all the Panels meetings and conference calls were open to the public with all the agendas, advance briefing materials and presentations posted on the Chesapeake Bay Program Partnership's web site in advance.

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. 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.

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

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 K for the list of meeting dates). Each advisory committee was focused on particular issues or components of the overall BMP verification framework. The Partnership asked each respective advisory committee to help work through resolution of the issues they raised. The Citizens Advisory Committee provided the most specific documentation on their concerns and recommendations for addressing those concerns in their correspondence with the Partnership (see Appendices D, E, L, and M).[30, 31, 32, 33]

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. 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 Team reviewed the entire draft BMP 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.

Twice a year, the **Principals' Staff Committee** was briefed on the progress of development of the basinwide BMP verification framework. 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.

[30] 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

[31] 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

[32] 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

[33] 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

Section 5. BMP Verification Principles

The CBP Partners developed and adopted a set of BMP verification principles to both guide the development of the verification protocols 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; See Appendix G). 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[34] and in place a solid year prior to final review and approval of the BMP verification protocols along with the rest of the verification framework. The principles have provided the common bar with which the partners could judge the disparate 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.
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.

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

A sixth principle, transparency, was amended to the original five principles in the fall of 2013 in response to separate requests originating from the Partnership's Agriculture Workgroup and the Citizens Advisory Committee (Table 3). The Transparency Subgroup of BMP Verification Committee members,[35] along with Rebecca Hanmer, Citizen Advisory Committee member, drafted up the transparency principle working closely with the Partnership's Agriculture Workgroup (Appendix N).

Table 3. Transparency Addendum to the BMP Verification Principles

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 synthesis and data reporting.
2. Transparency of the process of data collection must incorporate independent quality assurance/quality control (QA/QC) procedures, which may be implemented by the data-collecting agency or by an independent third party.
3. Transparency of the data reported should be transparent at the most site-specific scale that conforms with legal and programmatic constraints, and at a scale compatible with data input for the Chesapeake Bay Program partnership 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 text in Table 3 is still draft and subject to change]

The definition for transparency and its operational application were largely drawn from the work of the Partnership's Citizens Advisory Committee as documented within their May 22, 2013 memorandum[36] (Appendix M).

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

[36] 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

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 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 I. 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 protocols 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 Review Panel, the CBP 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 (see Appendix H). 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 CBP 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 (see Appendix I). 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.[37] 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.[38]

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.[39] 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.[40] The full list of Panel members, their contact information, and short biographies is provided in Appendix H.

[37] www.chesapeakebay.net/calendar/event/17880/
[38] www.chesapeakebay.net/calendar/event/17872/
[39] www.chesapeakebay.net/calendar/event/18556/
[40] www.chesapeakebay.net/calendar/event/18086/

Panel Role in Development of the Verification Framework

Since being formally convened in September 2012,[41] the Panel has met in two face-to-face meetings (December 6, 2012 and August 28-29, 2013) and through three conference calls (October 12, 2102, June 19, 2013, and July 31, 2013). In carrying out its charge to date, the Panel has reviewed and provided feedback in the following areas:

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

[Editors Note: this bulleted list and this subsection of text will be further fleshed out following the Panel's August 28-29, 2013 meeting.]

Panel's Findings and Recommendations

[Editors Note: This sub-section will be completed once the Panel completes its work on its first formal report back to the CBP Partnership in the September/October 2013 timeframe. Appendix O is reserved for inserting the Panel's report to the CBP Partnership.]

[41] 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.

Section 7. Summary of BMP Verification Protocols

Role of the Protocols within the Larger Framework

At the heart of the basinwide BMP verification framework has been the development of the source sector specific BMP verification protocols by the Partnership's six technical workgroups. These protocols, as described below and provided in detail in Appendix J, define the Partnership's recommended processes through which local, state, and federal agency partners ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and/or sediment pollutant loads are implemented and operating correctly.

Protocol Development and Review Process

The six source sector technical workgroups developed their sector specific BMP verification protocols over the course of their normal schedules of workgroup conference calls and face-to-face meetings. Each set of verification protocols 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 source sector protocol—agriculture, forestry, urban stormwater, wastewater, streams, and wetlands—was developed independently by the six workgroups, the workgroups were all using the same set of five BMP verification principles (see Section 5, Appendix G) to guide the protocol 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 Panel, respectively, over the course of Spring 2012 through early 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 provided formal comments, responses and recommendations during their August 28-29, 2013 meeting[42] with the BMP Verification Committee doing the same at their September 16, 2013 meeting.[43]

[Editor's Note: the description of the protocol development and review process will be completed once the process itself has been finished within the Partnership.]

Agriculture Verification Protocol

Utilizing BMP verification principles adopted by the Partnership, the Agriculture Workgroup[44] developed and considered a series of potential options for developing an agricultural verification protocol over the course of a year. The potential options were weighed on their individual merits, with both positive and non-positive attributes identified. After significant consideration and deliberation, the Agriculture Workgroup recommended multiple protocol options to address the

[42] http://www.chesapeakebay.net/calendar/event/20832
[43] http://www.chesapeakebay.net/calendar/event/20790/
[44] http://www.chesapeakebay.net/groups/group/agriculture_workgroup

diversity of agricultural practices and jurisdictions (Appendix J). For all the listed agricultural BMP verification protocol categories, the verification procedures, employed by state or other partner agencies, must be established that demonstrate an 80 percent (or greater) confidence level that the subject BMP have been implemented, is currently operational, and is being maintained to meet the BMP definition for standards and requirements (Table 4) (Appendix J).

All protocol options are available to the Partnership, but the established minimum data confidence threshold—80 percent—is required to be met to allow all tracked BMPs to be reported for full nutrient and sediment pollutant load reduction credit. Based on the verification literature search and national expert interview process[45] implemented by the Agriculture Workgroup, it appears there is adequate scientific documentation available to the Partnership to assign a defensible threshold relative data verification levels to all protocol options for all practices. The Agriculture Workgroup recognizes benefits in exceeding the minimum data confidence threshold and encourages targeting higher threshold levels by the partnership where possible.

All tracked agricultural BMP data to be reported to and credited by the Chesapeake Bay Program Partnership is required to verified through a protocol meeting a minimum of a documented 80 percent level of statistical confidence. The preference would be for the level of statistical data confidence to be higher than the minimum. The proposed figure of 80 percent is based on the mid-point of a range of documented data confidence levels identified by the Tetra Tech verification study commissioned by the Agriculture Workgroup.[46] This level of statistical confidence is representative of a minimum of 80 percent of tracked BMP units (e.g. acres, number, etc.) that could be verified under a full on-site assessment to be implemented, operated and maintained according to the appropriate BMP standards.

Agricultural Practice Verification Matrix

There are eight identified categories of verification based on the type of tracking assessment and the type of entity that would be collecting and verifying the data:

- Permit issuing programs
- Regulatory programs
- Financial incentive programs
- Farm inventory
- Office records
- Farm records
- Transect survey
- CEAP survey

[**Editor's note**: The Agriculture Workgroup approved its Verification Matrix (Table 4) on July 11th, and the descriptive narrative is still under development]

[45] Agriculture Workgroup. 2012. *BMP Verification—Supporting Information*. Draft. September 13, 2012. Prepared by Tetra Tech. Available online at: http://www.chesapeakebay.net/channel_files/18626/bmp_verification_supporting_information_final_draft_9-13-2012.pdf

[46] http://www.chesapeakebay.net/channel_files/18626/bmp_verification_supporting_information_final_draft_9-13-2012.pdf

Both the CBP Partnership's approved agricultural BMPs and provisionally approved interim BMPs[47] have been categorized into four types: annual; structural; management BMPs: plans; and management BMPs: practices (Table 4). The appropriate assessment method and its associated data confidence level is affected by the type of agricultural BMPs being assessed. The appropriate verification method for annual practices such as cover crops would likely be different from structural or management BMPs. Management BMPs were further subdivided into Plans and Practices due to the same differences as noted above.

Each verification protocol method has been reviewed in terms of the conservation practice categories to determine if the assessment method is appropriate and realistically able to achieve the confidence threshold. Categories with a "Yes" are viewed as appropriate and those with a "No" are not. Even if an assessment method is noted as being appropriate for a category of BMPs, significant verification efforts may still be required to meet the confidence threshold such as increased percentages of QA/QC spot checks or more frequent compliance inspections for example.

The protocol addresses the potential verification differences for BMPs designed and financed through federal, state, non-governmental organization (NGO), and private sources for each assessment method. Not all methods are appropriate to track and verify practices implemented, operated, and maintained under these categories.

The Agriculture Workgroup's verification matrix describes the ability of each assessment method to verify if the tracked practice meets the appropriate BMP specification, or if it represents a functional equivalent or non-functional equivalent BMP (see the 'Other BMP Information' columns in Table 4). In addition, the identification of the date of practice implementation is critical to determining if the BMP is considered part of the Chesapeake Bay Watershed Model calibration period or afterward for reporting purposes.

Each assessment method utilizes a unique methodology to track, verify and report implemented practices (see the 'Verification Methodology' column in Table 4). BMPs being assessed and verified through permit or financial incentive programs are limited to the period of the active permit or contractual agreement for the practice(s). Once outside of the requirements of a permit or financial incentive program, entities are directed to the use of alternative assessment methods for the tracking, verification, and reporting of these practices.

Each assessment method poses limitations and potential verification issues that need to be recognized and addressed in order to obtain the statistical data confidence threshold requirements. The frequency of compliance inspections, the use of appropriately trained and certified personnel, and the availability of data at the required scale are examples of potential data errors which may lower the statistical confidence of the data (see the 'Verification Issues' column in Table 4).

[47] A comprehensive list of existing BMPs is available in the Scenario Builder documentation: http://www.chesapeakebay.net/publications/title/documentation_for_scenario_builder
A list of existing, new, and interim BMPs that are scheduled for review by a BMP expert panel is available at: http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=3

A relative cost column provides a generalist view of the relative costs in comparison to one another (Table 4). The relative costs are represented as high, medium or low based on the range of implementation costs identified in the Tetra Tech research report commissioned by the Agriculture Workgroup.

Relative comparative values of high, medium or low are assigned to each assessment method pertaining to their scientific defensibility based on the findings of the Tetra Tech research commissioned by the Agriculture Workgroup (Table 4). The values are reflective of available documentation to support the assessment method in verifying data at or above the threshold level.

Relative comparative values of high, medium or low are assigned to each assessment method pertaining to the accountability of the entity tracking and verifying the data (Table 4). Data originating from permit or financial assistance programs with tracking and verification by trained agency staff, and potential consequences for data misrepresentation, will have a relatively high level of accountability for example. Voluntary self-reported information by private individuals with limited or no training would consequently have a low potential value of accountability.

Finally, a relative transparency column provide relative comparative values of high, medium or low are assigned to each assessment method based on the transparency of the reported data by outside reviewers (Table 4). Practices identified through permit programs would have a high transparency since the information is part of the public record and are reviewable by outside entities. Assessment methods that aggregate the tracked and verified data to protect individual entities would have a lower transparency for an outside review.

Intended Partner Use of the Agricultural Practice Verification Matrix and Supporting Documentation

The agricultural verification protocol matrix with supporting documentation is intended to provide the Partnership with the structure and expectations of verifying tracked data for reporting to the Chesapeake Bay Program for nutrient and sediment reduction credits. The full agricultural practice verification protocol package includes the approved protocol matrix (Table 4), supporting documentation (Appendix J), the Tetra Tech summary verification report providing the documented findings from the national literature search and expert interviews (Appendix P), and a protocol application tool (Appendix P). The protocol package has been designed to provide the guidance for agencies and partners to develop more program specific and detailed data verification plans for submission to the Chesapeake Bay Program Partnership and the independent Verification Review Panel for review and acceptance. In the absence of documented statistical data confidence information, the services of a qualified statistician could be invaluable to demonstrate that a verification protocol meets the minimum threshold level. Agency or partner verification plans that fail to meet the minimum confidence threshold will need to consider implementing increased levels of QA/QC procedures, or adopting a more robust assessment method for the particular practice as examples. Verified tracked data that meets the criteria of the approved agricultural verification protocols will be eligible for reporting to the Chesapeake Bay Program Partnership for full BMP credit of nutrient and sediment load reduction values.

Table 4. Agricultural Verification Protocol Concept (Final, AgWG Approved Version 3.5.5)

Chesapeake Bay Program Agriculture Workgroup (AgWG)

For all agricultural BMP protocol activities, verification procedures must: 1) be established that demonstrate an 80% or greater confidence level that the subject BMP has been implemented, is currently operational, and is being maintained to meet the BMP definition for standards and requirements; and 2) be in compliance with the Chesapeake Bay Program Partnership BMP Verification Principles, including any supporting addendums.

Annual BMPs: Cover Crops; Commodity Cover Crops; Dairy precision feeding; Swine Phytase; Poultry litter transport; Poultry Litter Injection; Poultry litter treatment; Poultry Phytase; Conservation Tillage / **Interim BMPs-** Dairy manure injection; Annual No-till

Structural BMPs: Animal waste management system; Barnyard runoff control; Decision agriculture; Biofilters; Lagoon covers; Loafing lot management; Mortality composters; Non-urban stream restoration: shoreline erosion control; Off-steam watering w/o fencing; Stream access control with fencing; Pasture alternate watering systems; Soil conservation & water quality plan elements; Water control structures; Wetland restoration / **Interim BMPs-** Dirt & gravel road erosion & sediment control; Non-urban steam restoration; P sorbing materials in Ag ditches;

Management BMPs- Plans: Enhanced nutrient management; Horse pasture management; Nutrient management; Precision Intensive rotational grazing; Prescribed grazing; Soil conservation & water quality plans / **Interim BMPs-** Nutrient management as BMP only

Management BMPs- Practices: Alternate crops; Continuous no-till; Forest buffers; Grass buffers; Land retirement; Steam-side forest buffers; Stream-side grass buffers; Stream-side forest buffers; Stream-side wetland restoration; Tree planting / **Interim BMPs-** Cropland irrigation management; Irrigation water capture reuse; Tree planting: vegetative environmental buffers- poultry;

Agricultural BMP Verification Protocol Category	Assessment Method	Conservation Practice Category				Cost-Sharing Information					BMP Performance							Verification Methodology	Verification Issues
		Annual BMPs	Structural BMPs	Management BMPs: Plans	Management BMPs: Practices	Federal C/S	State C/S	NGO C/S	Private Funded	Previously C/S BMPs (Expired Contract)	BMP Detection	Meets USDA/State Design Specs	Meets O&M Specs	Functionally Equivalent (Non-spec)	Non-functional Equivalent (Non-spec)	Installation Date (M/Y)	Expiration Date (M/Y)		
1.) Permit Issuing Programs	Verified compliance with federal NPDES (CAFO) or state agricultural operational permit program requirements.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	Through on-site permit compliance inspections by trained agency personnel.	Frequency of compliance inspections during permit life span.
2.) Regulatory Programs	Verified compliance with federal or state agricultural regulatory requirements (non-operational permit).	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	Through on-site regulatory compliance inspections by trained agency personnel.	Frequency and percent coverage of regulatory compliance inspections.
3.) Financial Incentive Programs	Verified compliance with federal or state program contractual requirements.	✓	✓		✓	✓	✓	?	✗	✗	✓	✓	✓	✗	✗	✓	✓	Through on-site contractual compliance inspections by trained agency personnel.	Frequency of compliance inspections during contractual life span.
4.) Farm Inventory	Farm inventory by trained and certified federal, state, and/or county agency personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel while collecting data, check databases.	Accredited data source through training/certification.
5.) Farm Inventory	Farm inventory by trained and certified independent third-party personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel while collecting data, check databases.	Accredited data source through training/certification.
6.) Farm Inventory	Farm inventory by trained and certified agricultural consultant personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel while collecting data, check databases.	Accredited data source through training/certification.
7.) Farm Inventory	Farmer completes self-certified inventory survey and trained and certified federal, state and/or county personnel visit site to confirm.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel.	% of checks determines acceptance of some practices.
8.) Farm Inventory	Farmer completes in-office self-certified inventory with trained and certified federal, state and/or county agency personnel.	✓	✗		✓	?	?	?	?	?	✓	✗	✗	✗	✗	?	?	Farmer certified during the visit at USDA or governmental office.	Farmer Self certification with Professional Assistance

9.) Farm Inventory	Farmer with training and certification completes self-certified inventory survey.	✓	x		✓	?	?	?	?	?	✓	x	x	x	x	?	?	Farmer trained and certified by governmental agency.	Farmer self-certification with training and certification.
10.) Farm Inventory	Farmer completes self-certified inventory survey.	?	x		✓	?	?	?	?	?	?	?	?	?	?	?	?	By Farmer self certification when submitted.	Wide variance in knowledge of farmers.
11.) Office Records	Review of existing office records by trained and certified federal, state and/or county agency personnel.	?	✓		?	✓	✓	?	?	✓	x	x	x	x	x	?	?	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Identifies formerly contractual BMPs and may miss many non C/S practices.
12.) Farm Records	Review of existing on-farm records by trained and certified federal, state and/or county agency personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Misses many non-C/S practices
13.) Farm Records	Review of existing on-farm records by trained and certified independent third-party personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Misses many non C/S practices
14.) Farm Records	Review of existing on-farm records by trained and certified agricultural consultant personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Misses many non C/S practices.
15.) Transect Survey	Transect completed by trained and certified personnel on a County or Watershed scale.	✓	x		x	x	x	x	x	x	✓	✓	✓	✓	✓	?	?	Verified by the trained personnel completing the transect on the ground.	Can only determine existence and quality of practices not source of funding.
16.) CEAP Survey	CEAP survey conducted in-person at field-level with NASS trained and certified personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	?	?	✓	?	NASS certification procedures.	Availability of data at required scale.
17.) NASS Survey	NASS survey conducted via survey with trained and certified personnel.	✓	✓		✓	?	?	?	?	?	✓	?	?	?	?	✓	?	NASS certification procedures.	Availability of data at required scale.
18.) Aerial Photography and Remote Sensing	Remote Sensing with Field Level Visits to Ground Truth Data.	✓	✓		✓	x	x	x	x	x	?	x	x	x	x	?	x	Verification can be same as Aerial Remote Sensing method or by visit to each site to collect and certify data.	Availability of data at required scale, resolution, and timing.
19.) NRI Point (NRCS) or some other statistically selected sites	Statistical survey conducted in-person at field-level with NASS trained and certified personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	NASS certification procedures.	Availability of data at required scale.

Forestry Verification Protocol

Forests cover the majority of the landscape in each Chesapeake Bay watershed state, however, there has been a notable disparity in how (and whether) the seven watershed jurisdictions have collected forestry BMP data. In the jurisdictions' Phase II watershed implementation plans[48], forestry BMP's play an increasingly important role—especially urban forestry BMPs, with thousands of acres of planting planned through the 2025 time frame. The forestry BMPs on agricultural lands are generally state or federal cost-share practices and have been tracked and verified, at least in part, as agricultural conservation practices, for decades. Urban forestry BMPs (urban riparian buffers and expanded tree canopy), however, have only just begun to be regularly reported by the jurisdictions despite having been defined practices for over 10 years. In some states, forest harvesting BMPs are closely tracked and regulated on both public and private land, while in other states, there is no record of where private forests are harvested, much less BMPs on those acres.

With these challenges in mind, the Partnership's Forestry Workgroup[49] developed its verification protocol based on four sets of BMPs: expanded tree cover (formerly referred to as urban tree planting), urban riparian forest buffers, agricultural riparian forest buffers and tree planting, and forest harvesting. Full definitions of these practices are provided in the complete protocol located in Appendix J. The Forestry Workgroup developed its own set of principles, specific to forestry practices, yet consistent with verification principles adopted by the Partnership.

Expanded Tree Canopy

Based on the expanded tree cover BMP principle that ''any new acreage of tree canopy represents a net gain in overall tree cover for a reporting jurisdiction", there are two steps needed to realize full credit for this practice:

1) Annually report acres of new tree cover; and
2) Periodically verify (every ~5 years) that overall tree cover is being maintained/not decreasing.

There are three parts to the verification protocol for expanded tree cover:

1) Establish urban forestry program support mechanisms;
2) Urban forestry partner tracks new acres of tree canopy; and
3) Urban forestry partner maintains new areas of tree canopy and sample overall canopy cover.

Urban Riparian Forest Buffers

Urban riparian forest buffers are defined as an area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs, and other vegetation that is adjacent to a body of water. The riparian area is managed to maintain the integrity of stream channels and shorelines, to reduce the impacts of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals. Urban riparian forest buffers are any riparian buffer

[48] See Phase II WIPs at: http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/EnsuringResults.html?tab2=1&tab1=2
[49] http://www.chesapeakebay.net/groups/group/forestry_workgroup

not in agriculture or forest setting. Software tools and aerial imagery have become prevalent and sophisticated enough to isolate urban riparian forests and determine a practice baseline for a reporting area. Verification of urban riparian forest buffers is similar to the Expanded Tree Cover practice described above.

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 CBP Partnership's recommended buffer width for riparian forest buffers (agriculture) is 100 feet, with a 35 feet minimum width required. The vast majority of agricultural riparian forest buffers are a cost-shared conservation practice on agricultural land that are long-term in nature—once established, the practice often continues in perpetuity without need for management or maintenance—and originate with a Conservation Reserve Enhancement Program (CREP) contract. The verification of this practice can be accounted for similar to other cost-shared agricultural practices (please see additional verification guidance in the Agriculture Workgroup's BMP Verification Protocol in Appendix J).

This practice differs from other cost-shared agriculture BMPs in its principle—any new acreage of riparian forest buffer reported represents a net gain in overall buffer for a county or watershed segment, the need to account for width of the buffer (not currently tracked in USDA databases), and the appeal for monitoring 10 years after planting to ensure proper functioning. The agricultural riparian forest buffer and tree planting protocol is based on:

1) collection and review data; and

2) monitoring and maintaining new plantings or regeneration areas, as well as existence and functioning of other riparian buffers.

Agricultural tree planting includes any tree planting, except those used to establish riparian buffers and those on non-urban land, targeting lands that are highly erodible or identified as critical resource areas.

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. Agroforestry is the intentional mixing of trees and shrubs into crop and animal production systems for environmental, economic, and social benefits, and includes practices such as windbreaks, silvopasture, and alley cropping. For purposes of verification, this practice will follow guidelines put forth in the Agriculture Workgroup's Protocols.

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 help reduce suspended sediments and associated nutrients that can result from forest harvesting operations. Most acres that are logged have BMPs applied to reduce harmful effects to primarily water quality. Most watershed states have good reporting on forest harvest practices on public land, but there is a big

disparity among the six watershed states on how forest harvesting BMP's on private land are tracked. The Forestry Workgroup developed the forest harvesting BMP principle as tracking forest harvest acres annually and determining rate of harvest BMP implementation every 5-10 years by state. The forest harvesting BMP protocol itself contains three parts:

1) State forestry agency submission of actual acres of forest harvest to NEIEN, overriding the 1% harvest rate assumption, if possible.

2) State forestry agency submitting the actual acres of forest harvest BMPs in lieu of a sampling rate, if possible; or

3) State forestry agency determining the acreage rate of implementation in a given jurisdiction.

Urban Stormwater Verification Protocols

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 J). 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 this memo 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 expert panels: stormwater retrofits, new State Stormwater Performance Standards, urban nutrient management, and stream restoration.[50]

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).

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

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.

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.

Principles 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. 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.

8. 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).

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

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

11. 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.

12. 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.

13. 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.

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 D 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. 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.

Option 4: 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 all BMP credits expire in ten years. This option is not intended to promote non-inspection, but rather, to give smaller communities more time to develop local inspection and verification programs.

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 CBP approved Stormwater Performance Standards.

Wastewater Verification Protocol

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[51], 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) evaluation the existing verification/inspection programs among the seven Chesapeake Bay watershed jurisdictions;

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

[51] 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.

3) developing the protocols based on the best existing BMP verification/inspection programs that met or exceeded the BMP Verification Principles.

Regulatory-Based Verification Programs

The existing national and state regulatory systems for significant and non-significant wastewater discharging facilities and CSOs meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles through a rigorous system of permits, inspections, and monitoring requirements that ensure accountability, proper design, implementation, operation and maintenance (Table 5). For on-site treatment systems, the recommended verification protocols are based on the best existing regulations and programs. Verification through existing regulatory programs will confirm if the upgraded wastewater facilities, CSOs, or on-site treatment systems are designed, installed, and maintained over time and meeting their assigned load reduction targets.

Wastewater Facilities NPDES Permits

The NPDES compliance system and monitoring requirements provides the most stringent verification for the implementation of a facility upgrade (Appendix J). All significant facilities have or will have nutrient permit limits and specific nutrient monitoring requirement in place under the Chesapeake Bay TMDL. Some jurisdictions also have or will have individual nutrient permit limits or monitoring requirements on some of their non-significant facilities.
For non-significant wastewater facilities, the 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 due to non-significant facility undergoing any upgrades and offsets of 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 watershed implementation plans (WIPs). Jurisdictions will document and report any allocation redistribution or changes that result from trading or offsets.

CSO Long Term Control Plans

Long-term Control Plans are required by the national CSO control policy to reduce overflows from CSO outfalls as published in the Federal Register[52]. The existing national regulations and delegated state NPDES permitting programs have very specific verification/inspection requirements for CSOs, which meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles (Appendix J).

On-site Systems – Construction Permit and Inspection Requirements

Existing regulations for on-site systems are different among the six Chesapeake Bay watershed states[53] (Appendix J). They vary from construction permits to more complex regulation through operating permits with inspection and monitoring requirements. Maryland and Virginia already have comprehensive regulations for on-site systems; Delaware was currently developing regulations at the time this report was published.

[52] 59 FR 18688, April 19, 1994.
[53] The District of Columbia does not have on-site treatment systems within its boundaries.

Table 5. Proposed Verification Protocols for Wastewater Treatment Facilities, CSOs and On-Site Treatment Systems				
	Significant Wastewater Treatment Facilities	***Significant Wastewater Treatment Facilities***	***Combined Sewer Overflows***	***On-Site Treatment Systems***
Draft Protocols	Daily/weekly 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 Discharge Monitoring Report (DMR) will be used to report the load reductions due to non-sig wwtp BMPs that include upgrades and offsets of new or expanding nonsig plants. • Annually track the universe of nutrient- and sediment-contributing nonsignificant facilities against established inventories for grouped wasteload allocations, report loads using the various mechanisms described in jurisdiction 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	State regulations on septic systems or following minimum requirements that were developed based on the existing or upcoming state regulations in DE, MD and VA. • State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems. • The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes. • The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as the enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend the inspection frequency by practice, which will be available in April 2013. Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states. • Tracking and reporting through the databases managed by state agencies.
State Applicable	All	All	All	DE, MD, VA and WV
Recommendations And Comments	Use existing NPDES DMR and state WIP defined procedures	Use existing NPDES DMR and state WIP defined procedures	Use 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 or upcoming state regulations on on-site systems. • The expert panel may make recommendations for consideration by stakeholders regarding septic BMP inspection frequencies.

Verification of the installation and continued operation and maintenance of on-site treatment systems will be based on implementation of existing state regulations or following the below set of minimum elements for verification based on the existing state regulations:

- State or local authorities should verify, track and report proper installation and operation and maintenance of new on-site treatment systems. Verification may be through inspections by the design professional.

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

- The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified service providers and tracked by the authorities. For some low maintenance systems, such as enhanced conventional systems, the inspection frequency could be lower.

- Tracking and reporting through the databases managed by state agencies.

Stream Restoration Verification Protocol

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 principles with input and guidance from the CBP Partnership's Habitat Goal Implementation Team. The principles were adapted from the Urban Stormwater Workgroup BMP Verification Protocol because elements are applicable to stream restoration and should guide the verification process in each of the Bay States (Appendix J).

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 function-based field methods.

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

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.

Wetlands Verification Protocol

Situated between the land and the water, wetlands act as buffers by slowing the flow of pollutants into the Bay and its tributaries. As polluted stormwater runs off the land and passes through wetlands, the trees and grasses in wetlands filter and absorb nutrients, suspended sediments and chemical contaminants before these pollutants can flow to nearby waterways.

In order to verify that restored/created wetlands are sustainable, the CBP Habitat Goal Implementation Team and its Wetland Workgroup advocate that protocols be implemented to verify not only the wetlands physical extent (acreage) and efficiency (nutrient uptake/sediment deposition), but also the sustainability of the wetlands for the life of the practice, which indicates their ability to provide function as designed. The Wetland Workgroup recommends future

verification programs for wetlands be built on the verification/inspection programs already in place.

The following series of principles should guide the wetland restoration project verification process in each of the seven Chesapeake Bay watershed jurisdictions.

1. Protocols will be implemented to verify that projects are built as designed; that structures are operating properly; that there is a predominance of native wetland vegetation and hydrology is as planned.

2. Projects should be located in areas suitable for wetland creation or restoration and to meet clear project objectives.

3. The verification process needs to be practical with regard to available staff, time, and resources while still maintaining a certain level of rigor and integrity.

4. Sites will be visited after construction and planting to ensure that the project was completed as designed

5. Structural features (e.g. berms, water control structures) will be inspected for operational integrity. Invasive species will be managed to maintain desired plant species composition and abundance.

6. Regular inspections and maintenance of wetland 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 and landscape amenity).

7. The existing inspection and maintenance framework and maintenance and inspection performed as part of state and federal agricultural cost-share programs in the Bay watershed should be the foundation of any wetland restoration verification system.

8. Field assessments are used to identify which projects are still in place and functioning as intended and which ones require preventative or corrective maintenance.

9. Wetland restoration reporting must be consistent with CBP standards.

10. The recommended cycle for field verification of wetland restoration projects is based on existing programs (e.g., USDA-NRCS Wetlands Reserve Program (WRP) easements, Conservation Reserve Program and Conservation Reserve Enhancement Program (CRP/CREP) projects).

11. Special procedures for wetland restoration projects used for offsets, mitigation and trading.

12. The installing agency must submit basic documentation to the appropriate state agency for each individual wetland restoration project installed.

13. 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 wetland restoration projects they report are being used to calculate pollutant reductions in the Chesapeake Bay Watershed Model.

14. The process for verification of wetland restoration projects needs to be transparent and publicly accessible for all stakeholders to ensure confidence that these projects are implemented and continue to function as reported by jurisdictions. The verification process for NRCS practices are included in the conservation practice standards, which are publicly available. However, due to Section 1619 of the Farm Bill and other privacy concerns, information on individual projects is not publicly available.

Section 8. Ensuring Full Access to Federal Conservation Practice Data

As the CBP Partnership works to ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and/or sediment pollutant loads are operating correctly, the partners are also committed to ensuring a full accounting for all implemented practices. One area where the jurisdictions have not been full accounting for implemented practices has been the federally cost shared agricultural conservation practices. The key solution is ensuring all six watershed states have signed comprehensive, consistent data sharing agreements with USDA. States 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 the 1619 Conservation Cooperator agreements provides them with confidential access to the USDA's datasets of conservation practice information for use in their work. The data can be released to the public if it is aggregated so that farmer privacy is protected.

The USGS was established as a USDA 1619 Conservation Cooperator in 2010, under separate agreements with the FSA and the NRCS (Appendix Q). These agreements contain particular language developed to support the broad USGS objective of facilitating jurisdictional access to agricultural conservation practice data for farmland within the Chesapeake Bay watershed. These two 1619 agreements specifically authorize the USGS "release aggregated statistical information to Chesapeake Bay Program partner organizations and the public following review and approval by USDA of data aggregation procedures to ensure compliance with Section 1619." These two data sharing agreements have been put in place, in part, as part of a larger effort provide the six state watershed states with full access to federally cost shared agricultural conservation practice data while the partners worked to put in place more permanent solutions.

In addition to USGS, four states currently have USDA 1619 Conservation Cooperator agreements in place—Maryland, New York, Virginia, and West Virginia (Appendix Q). These various agreements each identify a similar overall purpose 'to provide conservation services or to monitor, assess, and evaluate conservation benefits,' but employ various language to describe key factors, as described above. 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). In practice, each of these agreements is functioning well in providing the jurisdictional agencies with access to NRCS and FSA data. Each jurisdiction has identified an agency responsible for submitting all conservation data to the CBP Partnership's Annual Progress Review, and these agencies work in partnership with additional jurisdictional and Federal agencies to collect and compile the necessary data, often funded in the process by U.S. EPA's Chesapeake Bay Regulatory and Accountability Program Grants (Appendix R).[54]

[54]Grant guidance also available online: http://www.epa.gov/region03/chesapeake/grants.htm

Table 6. Status of 1619 Conservation Cooperator Agreements for each Chesapeake Bay jurisdiction. See text for agency abbreviations. Two jurisdictions (DE, PA) do not currently have 1619 agreements in place. Source: Hively, Devereux, and Claggett. 2013.

Jurisdic-tion	Agency	Purpose	Limits	Data covered	Start date	End date
MD	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
NY	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
VA	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
WV	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
WV	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

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 each of the key factors identified above under the existing Maryland, New York, Virginia, West Virginia, and USGS 1619 agreements;

2) Institute 1619 data sharing agreements in Delaware and Pennsylvania and for all jurisdictional agencies in Maryland, New York, Virginia, West Virginia that have direct responsibilities for planning, funding, delivery, reporting, and/or submission of 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 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 Appendix A within Appendix Q,). 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.

Table 7. State agencies recommended to consider participation in 1619 data sharing agreements, to increase the capacity for consistent, integrated analysis and reporting of conservation practice implementation data for the Chesapeake Bay watershed. Source: Hively, Devereux, & Claggett. 2013(draft).

Jurisdiction	Agency	Status
DE	**DE-DNREC**	**responsible for NEIEN submission**
	DE-DA	**provides conservation services**
	DE-FS	**provides conservation services**
MD	**MDA**	**1619 Conservation Cooperator**
	MDE	**responsible for NEIEN submission**
NY	**USC**	**1619 Conservation Cooperator**
	NY-DEC	**responsible for NEIEN submission**
PA	**PA-DEP**	**responsible for NEIEN submission***
	PA-DA	**provides conservation services**
VA	**VA-DCR**	**1619 Conservation Cooperator**
	VA-DEQ	**responsible for NEIEN submission**
WV	**WVCA**	**1619 Conservation Cooperator****
	WVDA	**1619 Conservation Cooperator**
	WVDEP	**responsible for NEIEN submission**

* Also provides conservation services

** Animal waste and mortality disposalpractices only

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 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 A within Appendix Q).

Section 9. Eliminating 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 USDA are tracking the same practice because they both provided co-cost-share to the producer for the practice implementation. In these cases, there must be a clear solution to choose which data to report, to avoid double counting. In 2012, the six states employed various techniques to address this issue.[55] The solutions were tailored to address specific practices that could potentially be co-cost shared, based on the range of conservation programs available to producers within each jurisdiction.

The most general approach was to compare practice codes and definitions, identify which practice types could potentially be duplicated based on 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, in Virginia nutrient management conservation practices were reported from the jurisdictional dataset, and removed from the USDA dataset. Once the patterns are identified and the choices of which codes to remove 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 USDA and jurisdictional programs (e.g., cover crops in Lancaster County, PA) and, therefore, the separately funded occasions are removed as potential duplicates when they are 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, state, or voluntary adoption. In these data systems, when the Soil Conservation Districts help farmers to implement conservation practices that are co-cost shared, the various funding sources are recorded but the data are entered as a single record item, 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. Appendix Q (see pages 32-36) documents the jurisdiction-specific methods that were used to avoid double counting in 2012.

[55] Hively, W.D., Devereux, O.H., & P. Claggett. 2013. *Tracking Progress Toward Achieving Water Quality in the Chesapeake Bay Using USDA Farmland Conservation Data*. Draft manuscript, July 2013.

Section 10. Historical Data Clean-up

The CBP Partnership's Watershed Technical Workgroup is 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 combination with the re-calibration of the Chesapeake Bay Program Partnership's Chesapeake Bay Watershed Model. The re-calibration of the 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 BMPs.

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.

- 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 protocols being developed by the source sector workgroups in an effort to verify practices in place for any given year.

The seven jurisdictions are moving forward with the above guidance and will continue to check-in with the CBP Partnership's Watershed Technical Workgroup to share their status, lessons learned, and questions as they clean up their BMP datasets for the next calibration.

Section 11. USDA Agreement to Enhance Data Collection and Reporting of Cost Shared Practices

In preparation for discussions with the USDA, the members of the Chesapeake Bay Program Partnership's Agriculture Workgroup have identified opportunities to enhance the recordkeeping associated with USDA conservation practices. More specific information needs to be tracked and reported so it can be used to more efficiently integrate the data with jurisdictional datasets, and to more accurately represent the practices in Scenario Builder and in the various CBP Partnership's watershed and water quality models. A list of USDA conservation practices (Table 8) was identified as having an obviously high degree of limitation in the amount of data available for translating between USDA conservation practice codes and Chesapeake Bay Program practice definitions. Other conservation practices not represented here may also have data limitations depending on their use and reporting. The CBP Partnership's BMP protocol 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.

The NRCS is currently undertaking a Conservation Data Streamlining Initiative and has plans to integrate the National Conservation Planning Database and Integrated Data for Enterprise Analysis data systems. The dataset that will be available in future years may look quite different from the 2012 dataset. It will be important to maintain the level of discussion and collaboration achieved in 2012 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 on working to enhance data collection and reporting in the areas identified 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.

Table 8. Recommendations for improved recordkeeping for NRCS conservation practices (Source: Hively et al 2013)

Data Category	NRCS Codes	Proposal	Relation to currently collected data
Land Use	many	Record land use change "from" and "to" (e.g., pasture fencing receives a reduction for CBP only when applied to riparian areas. NRCS allows pasture fencing to be cost shared when on any landscape position)	NRCS has a data field for land use ID. It is generally not populated in the NCP database. The change "from" and "to" are not available in any NRCS business tool, but the present land use is a data field.
Livestock Animal Type	many	Record livestock animal type (e.g.: 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. This data field is not available in Toolkit.
Cover Crops	340	Include variety, plant date, plant method, commodity vs. regular, and if manure was applied (e.g., commodity early drilled rye-aerial-no manure).	Cover crop is defined broadly in NRCS data. CBP applies effectiveness values that range from 5% to 45% for nitrogen. Default values are assigned that limit credit in those higher ranges. These practice attributes currently are not available in any NRCS business tool.
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 currently is not in any current NRCS business tool.
Nutrient Management	590	Differentiate nutrient management planning and implementation strategies	NRCS currently defines, tracks, and reports nutrient management planning under a single Conservation Practice code (590). Nutrient plans now are contracted as activities 104. There is only one practice code for nutrient management, which does not allow for differentiation.
Feed Management	592	Report the feed additive or management change used.	NRCS currently tracks and reports feed management under a single Conservation Practice code (592) for multiple livestock species. This is currently not available in any NRCS business tool.
Forestry Practices	CP-22	Collect both length and width of the buffer. Indicate if a buffer is re-enrolled vs. installed new.	FSA currently tracks 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 if a buffer is re-enrolled vs. installed new.

Section 12. Partnership Processes for Evaluation and Oversight

[Editor's Note: The CBP Patnership's Scientific and Technical Advisory Committee has convened a six member 'BMP Verification Subgroup' at the request of CBP Director Nick DiPasquale, to review and provide detailed feedback on the below described evaluation and oversight processes. The Subgroup provided an initial set of comments/recommendations on June 29, 2013 to aid in the development of this draft report. The Subgroup's final report, due August 15, 2013, will be distributed to members of the CBP's BMP Verification Review Panel and the BMP Verification Committee for discussion and reaction at the August 28-29 and September 16 meetings, respectively.]

Ongoing Decision-Making Roles within the CBP Partnership

The CBP Partnership must and will continue to be the decision makers on the development and implementation of the verification process. 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 established during the two rounds of watershed implementation plan 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 Chesapeake Bay Program'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 CBP 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 continued 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 continued to review and approve new or revised BMPs, including revised, enhanced, or new BMP verification 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, non-governmental organizations and other 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.

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 Grants Guidance (Appendix R), 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.

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 CBP Partnership are adhered to and effectively carried out.

Independent Review/Approval of Verification Procedures/Surveys. The Chesapeake Bay Program Partnership will seek establishment of an independent consortium of land grant universities and charge them with responsibility for determining whether the jurisdictions' designed verification procedures/surveys meet the 80 percent minimum threshold of relative data confidence. This independent university consortium will follow the appropriate procedures and apply the tools adopted by the Partnership in evaluating whether the minimum threshold has been met.

Amended Partnership BMP Protocol to Address Verification. The Chesapeake Bay Program 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 CBP 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 CBP 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 (Appendix R) to fully document verification expectations and how EPA grant funding can be used to support 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 guidelines and protocols agreed to by the CBP 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 Chesapeake Bay Program 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.

[Editor's Note: The following is an early recommendation from the STAC BMP Verification Subgroup. CBPO staff are drafting up a proposed flow chart/timeline which will be presented for discussion at the August 28-29 BMP Verification Review Panel meeting and the September 16 BMP Verification Committee meeting.

> "Recommendation: Develop a flow chart and timeline that documents the BMP verification protocol development and evaluation. Include in that flow chart/timeline the proposed periodic verification protocol reviews and the annual reviews of jurisdiction-reported verification data/documentation. The flow chart should clearly define responsible parties, various paths for the suite of possible actions/activities/ consequences, i.e. what happens if a jurisdiction's quality assurance plan is deemed to be lacking."]

Section 13. Jurisdictional BMP Verification Documentation Expectations

The BMP Verification Committee recommends documentation of each jurisdiction's BMP verification program build directly upon their existing quality assurance program plans (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, BMP verification documentation expectations are described below.

BMP Verification Principles

Each jurisdiction will describe, using references to specific adopted verification protocols, procedures, and processes, how its BMP verification program achieves the CBP Partnership's five BMP principles.

Source Sectors

By the major source sectors (e.g., forestry, agriculture, stormwater, wastewater), each jurisdiction will provide the following detailed documentation within their QA plans:

- Provide copies of or specific references to the documentation of existing BMP verification programs in operation and overseen by other partners—e.g., NRCS, FSA—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 references to the BMP verification protocols and procedures adopted by the CBP Partnership.

- Describe and fully document any state specific modifications to/variations from the CBP Partnership adopted protocols and procedures.

- Document any jurisdictional decisions to focus verification efforts on a subset of nutrient and sediment pollutant load reduction practices, treatment or technologies.

- Document how the respective source sector/habitat BMP verification protocol(s) will be implemented by whom, how, and through what programs/mechanisms.

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

- Document the agency, departmental, and organizational responsibilities for carrying out the 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 procedures in place for handling the federal cost share practice data in adherence to the agreement(s).

Elimination of Double Counting
Each jurisdiction will address elimination of 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:

- Based on the procedures developed and recommended by the Watershed Technical Workgroup and adopted by the CBP Partnership, provide documentation on how the jurisdiction plans to carry out the clean up their historical BMP implementation data base and over what time period.

Verification Program Check List
The CBP Partnership's BMP Verification Review Panel has developed a jurisdictional BMP verification program check list which the Panel will use as a guide in reviewing each jurisdiction's BMP verification program (Table 8). Jurisdictions are encourages to refer to this check list as they develop their enhanced verification programs and expand their existing quality assurance plan documentation.

[Editor's Note: The BMP Verification Panel will be developing the check list during their August 28-29, 2013 meeting.]

Section 14. Communication Strategy

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 15. Implementation of the BMP Verification Framework

[Editor's Note: This section is being drafted by CBPO staff. The completed draft section will be distributed to BMP Verification Review Panel members and BMP Verification Committee members prior to their respective August and September meetings.]

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Section 17. Abbreviations

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
CEAP	Conservation Effects Assessment Program
CREP	Conservation Reserve Enhancement Program
CGP	construction general permit
CRP	Conservation Reserve Program
CSO	combined sewer overflow
DMR	discharge monitoring report
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
FR	Federal Register
LGAC	Local Government Advisory Committee
MB	Management Board
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
PSC	Principals' Staff Committee
QA/QC	quality assurance/quality control
STAC	Scientific & Technical Advisory Committee
TSP	technical service provider
USGS	U.S. Geological Survey
WIP	watershed implementation plan
WQGIT	Water Quality Goal Implementation Team

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Denice Wardrop, Pennsylvania State University Cooperative Wetlands Center
Donald Weller, Smithsonian Environmental Research Center
Claire Welty, University of Maryland Baltimore County
Gene Yagow, Virginia Tech University

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John Dawes (Chair), Foundation for Pennsylvania Watersheds
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Jessica Blackburn (Coordinator), Alliance for the Chesapeake Bay
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Bill Achor, York Ag Products, Inc
Nancy Alexander, AMC Technology, LLC
Elizabeth Burdick, Bucknell University
John Cosgrove, Virginia House of Delegates
Andrew Der, Andrew T. Der & Associates, LLC
Matt Ehrhart, Stroud Water Research Center
Jim Elliott, Spilman Thomas & Battle
Christina Everett, Chesapeake Bay Foundation
Scott Fickbohm, Otsego Soil & Water Conservation District
Victor Funk (Retired), Pennsylvania Department of Environmental Protection
Rebecca Hanmer, Retired
Verna Harrison, Keith Campbell Foundation for the Environment
Jeff Holland, Annapolis Maritime Museum
Stella Koch, Audubon Naturalist Society
Patricia Levin, Franklin & Marshall College
Joseph Maroon, Maroon Consulting
Bill Martin, US Patent Office
Karen McJunkin, Elm Street Development
Dan Milstein, U.S. Department of Energy
Betsy Quant, Canoe Susquehanna
Angana Shah, International Affairs
Charlie Stek, No Child Left Inside Coalition Chesapeake Conservancy
Adam Thompson
Nikki Tinsley, NT Inc. Citizens Advisory Committee
Victor Ukpolo, Montgomery County Environmental Protection
Neil Wilkie, Davidson Capital Group

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Richard Gray (Chair), City of Lancaster (PA)
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Bruce Williams, City of Takoma Park (MD)
Diane Davis, District of Columbia Department of the Environment (DDOE)
David Dunmyer, Queen Anne's County (MD)
Sheila Finlayson, City of Annapolis (MD)
Richard Gray, City of Lancaster (PA)
Penny Gross, Fairfax County (VA)

Adriana Hochberg, District of Columbia
Mary Labert , McAdoo Borough
Mary Ann Lisanti, Harford County Council (MD)
Sheila Noll, York County (VA)
Kelly Porter, Seat Pleasant City Council (MD)
Debbie S. Ritter, City of Chesapeake (VA)
Ann Simonetti, Marysville Borough (PA)
John V. Thomas, Hampden Township (PA)
Tommy Wells, Council of the District of Columbia
Jeff Wheeland, Lycoming County (PA)
James Wheeler, Pennsylvania State Association of Township Supervisors (PA)
Robert Willey, Town of Easton (MD)
Rosemary Wilson, City of Virginia Beach (VA)

Federal Register

Friday,
May 15, 2009

Part IV

The President

Executive Order 13508—Chesapeake Bay Protection and Restoration

APPENDIX B. Executive Order 13508

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Friday, May 15, 2009

Presidential Documents

Title 3—

The President

Executive Order 13508 of May 12, 2009

Chesapeake Bay Protection and Restoration

By the authority vested in me as President by the Constitution and the laws of the United States of America and in furtherance of the purposes of the Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*), and other laws, and to protect and restore the health, heritage, natural resources, and social and economic value of the Nation's largest estuarine ecosystem and the natural sustainability of its watershed, it is hereby ordered as follows:

PART 1—PREAMBLE

The Chesapeake Bay is a national treasure constituting the largest estuary in the United States and one of the largest and most biologically productive estuaries in the world. The Federal Government has nationally significant assets in the Chesapeake Bay and its watershed in the form of public lands, facilities, military installations, parks, forests, wildlife refuges, monuments, and museums.

Despite significant efforts by Federal, State, and local governments and other interested parties, water pollution in the Chesapeake Bay prevents the attainment of existing State water quality standards and the ''fishable and swimmable'' goals of the Clean Water Act. At the current level and scope of pollution control within the Chesapeake Bay's watershed, restoration of the Chesapeake Bay is not expected for many years. The pollutants that are largely responsible for pollution of the Chesapeake Bay are nutrients, in the form of nitrogen and phosphorus, and sediment. These pollutants come from many sources, including sewage treatment plants, city streets, development sites, agricultural operations, and deposition from the air onto the waters of the Chesapeake Bay and the lands of the watershed.

Restoration of the health of the Chesapeake Bay will require a renewed commitment to controlling pollution from all sources as well as protecting and restoring habitat and living resources, conserving lands, and improving management of natural resources, all of which contribute to improved water quality and ecosystem health. The Federal Government should lead this effort. Executive departments and agencies (agencies), working in collaboration, can use their expertise and resources to contribute significantly to improving the health of the Chesapeake Bay. Progress in restoring the Chesapeake Bay also will depend on the support of State and local governments, the enterprise of the private sector, and the stewardship provided to the Chesapeake Bay by all the people who make this region their home.

PART 2—SHARED FEDERAL LEADERSHIP, PLANNING, AND ACCOUNTABILITY

Sec. 201. *Federal Leadership Committee.* In order to begin a new era of shared Federal leadership with respect to the protection and restoration of the Chesapeake Bay, a Federal Leadership Committee (Committee) for the Chesapeake Bay is established to oversee the development and coordination of programs and activities, including data management and reporting, of agencies participating in protection and restoration of the Chesapeake Bay. The Committee shall manage the development of strategies and program plans for the watershed and ecosystem of the Chesapeake Bay and oversee their implementation. The Committee shall be chaired by the Administrator of the Environmental Protection Agency (EPA), or the Administrator's designee, and include senior representatives of the Departments of Agriculture

(USDA), Commerce (DOC), Defense (DOD), Homeland Security (DHS), the Interior (DOI), Transportation (DOT), and such other agencies as determined by the Committee. Representatives serving on the Committee shall be officers of the United States.

Sec. 202. *Reports on Key Challenges to Protecting and Restoring the Chesapeake Bay.* Within 120 days from the date of this order, the agencies identified in this section as the lead agencies shall prepare and submit draft reports to the Committee making recommendations for accomplishing the following steps to protect and restore the Chesapeake Bay:

(a) define the next generation of tools and actions to restore water quality in the Chesapeake Bay and describe the changes to be made to regulations, programs, and policies to implement these actions;

(b) target resources to better protect the Chesapeake Bay and its tributary waters, including resources under the Food Security Act of 1985 as amended, the Clean Water Act, and other laws;

(c) strengthen storm water management practices at Federal facilities and on Federal lands within the Chesapeake Bay watershed and develop storm water best practices guidance;

(d) assess the impacts of a changing climate on the Chesapeake Bay and develop a strategy for adapting natural resource programs and public infrastructure to the impacts of a changing climate on water quality and living resources of the Chesapeake Bay watershed;

(e) expand public access to waters and open spaces of the Chesapeake Bay and its tributaries from Federal lands and conserve landscapes and ecosystems of the Chesapeake Bay watershed;

(f) strengthen scientific support for decisionmaking to restore the Chesapeake Bay and its watershed, including expanded environmental research and monitoring and observing systems; and

(g) develop focused and coordinated habitat and research activities that protect and restore living resources and water quality of the Chesapeake Bay and its watershed.

The EPA shall be the lead agency for subsection (a) of this section and the development of the storm water best practices guide under subsection (c). The USDA shall be the lead agency for subsection (b). The DOD shall lead on storm water management practices at Federal facilities and on Federal lands under subsection (c). The DOI and the DOC shall share the lead on subsections (d), (f), and (g), and the DOI shall be lead on subsection (e). The lead agencies shall provide final reports to the Committee within 180 days of the date of this order.

Sec. 203. *Strategy for Protecting and Restoring the Chesapeake Bay.* The Committee shall prepare and publish a strategy for coordinated implementation of existing programs and projects to guide efforts to protect and restore the Chesapeake Bay. The strategy shall, to the extent permitted by law:

(a) define environmental goals for the Chesapeake Bay and describe milestones for making progress toward attainment of these goals;

(b) identify key measureable indicators of environmental condition and changes that are critical to effective Federal leadership;

(c) describe the specific programs and strategies to be implemented, including the programs and strategies described in draft reports developed under section 202 of this order;

(d) identify the mechanisms that will assure that governmental and other activities, including data collection and distribution, are coordinated and effective, relying on existing mechanisms where appropriate; and

(e) describe a process for the implementation of adaptive management principles, including a periodic evaluation of protection and restoration activities.

The Committee shall review the draft reports submitted by lead agencies under section 202 of this order and, in consultation with relevant State agencies, suggest appropriate revisions to the agency that provided the draft report. It shall then integrate these reports into a coordinated strategy for restoration and protection of the Chesapeake Bay consistent with the requirements of this order. Together with the final reports prepared by the lead agencies, the draft strategy shall be published for public review and comment within 180 days of the date of this order and a final strategy shall be published within 1 year. To the extent practicable and authorized under their existing authorities, agencies may begin implementing core elements of restoration and protection programs and strategies, in consultation with the Committee, as soon as possible and prior to release of a final strategy.

Sec. 204. *Collaboration with State Partners.* In preparing the reports under section 202 and the strategy under section 203, the lead agencies and the Committee shall consult extensively with the States of Virginia, Maryland, Pennsylvania, West Virginia, New York, and Delaware and the District of Columbia. The goal of this consultation is to ensure that Federal actions to protect and restore the Chesapeake Bay are closely coordinated with actions by State and local agencies in the watershed and that the resources, authorities, and expertise of Federal, State, and local agencies are used as efficiently as possible for the benefit of the Chesapeake Bay's water quality and ecosystem and habitat health and viability.

Sec. 205. *Annual Action Plan and Progress Report.* Beginning in 2010, the Committee shall publish an annual Chesapeake Bay Action Plan (Action Plan) describing how Federal funding proposed in the President's Budget will be used to protect and restore the Chesapeake Bay during the upcoming fiscal year. This plan will be accompanied by an Annual Progress Report reviewing indicators of environmental conditions in the Chesapeake Bay, assessing implementation of the Action Plan during the preceding fiscal year, and recommending steps to improve progress in restoring and protecting the Chesapeake Bay. The Committee shall consult with stakeholders (including relevant State agencies) and members of the public in developing the Action Plan and Annual Progress Report.

Sec. 206. *Strengthen Accountability.* The Committee, in collaboration with State agencies, shall ensure that an independent evaluator periodically reports to the Committee on progress toward meeting the goals of this order. The Committee shall ensure that all program evaluation reports, including data on practice or system implementation and maintenance funded through agency programs, as appropriate, are made available to the public by posting on a website maintained by the Chair of the Committee.

PART 3—RESTORE CHESAPEAKE BAY WATER QUALITY

Sec. 301. *Water Pollution Control Strategies.* In preparing the report required by subsection 202(a) of this order, the Administrator of the EPA (Administrator) shall, after consulting with appropriate State agencies, examine how to make full use of its authorities under the Clean Water Act to protect and restore the Chesapeake Bay and its tributary waters and, as appropriate, shall consider revising any guidance and regulations. The Administrator shall identify pollution control strategies and actions authorized by the EPA's existing authorities to restore the Chesapeake Bay that:

(a) establish a clear path to meeting, as expeditiously as practicable, water quality and environmental restoration goals for the Chesapeake Bay;

(b) are based on sound science and reflect adaptive management principles;

(c) are performance oriented and publicly accountable;

(d) apply innovative and cost-effective pollution control measures;

(e) can be replicated in efforts to protect other bodies of water, where appropriate; and

(f) build on the strengths and expertise of Federal, State, and local governments, the private sector, and citizen organizations.

Sec. 302. *Elements of EPA Reports.* The strategies and actions identified by the Administrator of the EPA in preparing the report under subsection 202(a) shall include, to the extent permitted by law:

(a) using Clean Water Act tools, including strengthening existing permit programs and extending coverage where appropriate;

(b) establishing new, minimum standards of performance where appropriate, including:

(i) establishing a schedule for the implementation of key actions in cooperation with States, local governments, and others;

(ii) constructing watershed-based frameworks that assign pollution reduction responsibilities to pollution sources and maximize the reliability and cost-effectiveness of pollution reduction programs; and

(iii) implementing a compliance and enforcement strategy.

PART 4—AGRICULTURAL PRACTICES TO PROTECT THE CHESAPEAKE BAY

Sec. 401. In developing recommendations for focusing resources to protect the Chesapeake Bay in the report required by subsection 202(b) of this order, the Secretary of Agriculture shall, as appropriate, concentrate the USDA's working lands and land retirement programs within priority watersheds in counties in the Chesapeake Bay watershed. These programs should apply priority conservation practices that most efficiently reduce nutrient and sediment loads to the Chesapeake Bay, as identified by USDA and EPA data and scientific analysis. The Secretary of Agriculture shall work with State agriculture and conservation agencies in developing the report.

PART 5—REDUCE WATER POLLUTION FROM FEDERAL LANDS AND FACILITIES

Sec. 501. Agencies with land, facilities, or installation management responsibilities affecting ten or more acres within the watershed of the Chesapeake Bay shall, as expeditiously as practicable and to the extent permitted by law, implement land management practices to protect the Chesapeake Bay and its tributary waters consistent with the report required by section 202 of this order and as described in guidance published by the EPA under section 502.

Sec. 502. The Administrator of the EPA shall, within 1 year of the date of this order and after consulting with the Committee and providing for public review and comment, publish guidance for Federal land management in the Chesapeake Bay watershed describing proven, cost-effective tools and practices that reduce water pollution, including practices that are available for use by Federal agencies.

PART 6—PROTECT CHESAPEAKE BAY AS THE CLIMATE CHANGES

Sec. 601. The Secretaries of Commerce and the Interior shall, to the extent permitted by law, organize and conduct research and scientific assessments to support development of the strategy to adapt to climate change impacts on the Chesapeake Bay watershed as required in section 202 of this order and to evaluate the impacts of climate change on the Chesapeake Bay in future years. Such research should include assessment of:

(a) the impact of sea level rise on the aquatic ecosystem of the Chesapeake Bay, including nutrient and sediment load contributions from stream banks and shorelines;

(b) the impacts of increasing temperature, acidity, and salinity levels of waters in the Chesapeake Bay;

(c) the impacts of changing rainfall levels and changes in rainfall intensity on water quality and aquatic life;

(d) potential impacts of climate change on fish, wildlife, and their habitats in the Chesapeake Bay and its watershed; and

(e) potential impacts of more severe storms on Chesapeake Bay resources.

PART 7—EXPAND PUBLIC ACCESS TO THE CHESAPEAKE BAY AND CONSERVE LANDSCAPES AND ECOSYSTEMS

Sec. 701. (a) Agencies participating in the Committee shall assist the Secretary of the Interior in development of the report addressing expanded public access to the waters of the Chesapeake Bay and conservation of landscapes and ecosystems required in subsection 202(e) of this order by providing to the Secretary:

(i) a list and description of existing sites on agency lands and facilities where public access to the Chesapeake Bay or its tributary waters is offered;

(ii) a description of options for expanding public access at these agency sites;

(iii) a description of agency sites where new opportunities for public access might be provided;

(iv) a description of safety and national security issues related to expanded public access to Department of Defense installations;

(v) a description of landscapes and ecosystems in the Chesapeake Bay watershed that merit recognition for their historical, cultural, ecological, or scientific values; and

(vi) options for conserving these landscapes and ecosystems.

(b) In developing the report addressing expanded public access on agency lands to the waters of the Chesapeake Bay and options for conserving landscapes and ecosystems in the Chesapeake Bay, as required in subsection 202(e) of this order, the Secretary of the Interior shall coordinate any recommendations with State and local agencies in the watershed and programs such as the Captain John Smith Chesapeake National Historic Trail, the Chesapeake Bay Gateways and Watertrails Network, and the Star-Spangled Banner National Historic Trail.

PART 8—MONITORING AND DECISION SUPPORT FOR ECOSYSTEM MANAGEMENT

Sec. 801. The Secretaries of Commerce and the Interior shall, to the extent permitted by law, organize and conduct their monitoring, research, and scientific assessments to support decisionmaking for the Chesapeake Bay ecosystem and to develop the report addressing strengthening environmental monitoring of the Chesapeake Bay and its watershed required in section 202 of this order. This report will assess existing monitoring programs and gaps in data collection, and shall also include the following topics:

(a) the health of fish and wildlife in the Chesapeake Bay watershed;

(b) factors affecting changes in water quality and habitat conditions; and

(c) using adaptive management to plan, monitor, evaluate, and adjust environmental management actions.

PART 9—LIVING RESOURCES PROTECTION AND RESTORATION

Sec. 901. The Secretaries of Commerce and the Interior shall, to the extent permitted by law, identify and prioritize critical living resources of the Chesapeake Bay and its watershed, conduct collaborative research and habitat protection activities that address expected outcomes for these species, and develop a report addressing these topics as required in section 202 of this order. The Secretaries of Commerce and the Interior shall coordinate agency activities related to living resources in estuarine waters to ensure maximum benefit to the Chesapeake Bay resources.

PART 10—EXCEPTIONS

Sec. 1001. The heads of agencies may authorize exceptions to this order, in the following circumstances:

(a) during time of war or national emergency;

(b) when necessary for reasons of national security;

(c) during emergencies posing an unacceptable threat to human health or safety or to the marine environment and admitting of no other feasible solution; or

(d) in any case that constitutes a danger to human life or a real threat to vessels, aircraft, platforms, or other man-made structures at sea, such as cases of *force majeure* caused by stress of weather or other act of God.

PART 11—GENERAL PROVISIONS

Sec. 1101. (a) Nothing in this order shall be construed to impair or otherwise affect:

(i) authority granted by law to a department, agency, or the head thereof; or

(ii) functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(b) This order shall be implemented consistent with applicable law and subject to the availability of appropriations.

(c) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity, by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

THE WHITE HOUSE,
May 12, 2009.

[FR Doc. E9–11547
Filed 5–14–09; 8:45 am]
Billing code 3195–W9–P

2

Tracking and Accounting

The term "tracking," as applied in the Chesapeake Bay Program (CBP), describes approaches to document the implementation of nutrient and sediment reduction practices and treatment technology upgrades and the basic associated practice characteristics needed to estimate resulting changes in nutrient and sediment loads. The term "accounting" describes the process of analyzing and reporting the practice information and quantifying the estimated the resulting load reductions. Reliable tracking and accounting of point and nonpoint nutrient reduction efforts are essential for program managers and policy makers to determine if current strategies are sufficient or if new strategies are necessary to meet established milestones. In addition, accurate and transparent tracking and accounting are key to maintaining public confidence that funds for Bay restoration are being wisely invested and that CBP partners are fulfilling their commitments to reduce nutrient and sediment loads.

By examining the strengths and weaknesses of current jurisdictional tracking and accounting practices, the committee provides insights into their reliability, accuracy, and consistency. In this chapter, the committee reviews and critiques the tracking and accounting practices for nutrient and sediment reduction efforts in the Chesapeake Bay.

TRACKING AND ACCOUNTING FRAMEWORKS

Diverse activities have been implemented within the Bay watershed to reduce nutrient and sediment loads, and many more are planned for the years ahead. The six states and the District of Columbia (i.e., the Bay jurisdictions) have developed separate and distinct strategies within their regulatory and nonregulatory programs to identify, quantify, and attempt to control point and nonpoint sources of nutrients. In addition, state and federal agencies fund wastewater infrastructure improvements through the federal Clean Water Act State Revolving Funds and other programs designed to improve land management and reduce nutrient and sediment pollution. Finally, there are voluntary efforts that are not cost-shared by any particular state or federal agency. Ideally, tracking and accounting in the Bay watershed would account for all of these activities consistently and accurately, without duplication, and in a centralized framework.

The Bay jurisdictions bear the primary responsibility for tracking nutrient and sediment control efforts and reporting them to the CBP. Through a variety of state and local agencies, each jurisdiction compiles information about the nutrient and sediment control practices implemented in the Bay watershed to address point and nonpoint sources of pollution. The CBP has approved more than 60 agricultural and urban best management practices (BMPs) for credit in the Chesapeake Bay Watershed Model (see Appendix B) and has used a peer-review process to assign pollutant load-reduction effectiveness estimates to each BMP.

Any practice approved by the CBP and implemented since 1985 is included in the tracking and accounting of nutrient and sediment reduction strategies. In 1987, the CBP partners agreed to specific goals for pollution control (see Chapter 1), including a goal to reduce nitrogen and phosphorus discharges by 40 percent below 1985 levels by the year 2000. All nutrient reduction that has taken place since 1985 is, therefore, credited toward the achievement of those CBP goals and tracked in the Watershed Model.

All of the Bay jurisdictions report annually to the U.S. Environmental Protection Agency (EPA) data concerning compliance with National Pollutant Discharge Elimination System (NPDES) permits associated with point-source discharges, including for entities such as wastewater treatment plants and urban and suburban Municipal Separate Storm Sewer Systems (MS4s). All Bay jurisdictions have been delegated authority from the EPA to implement the NPDES program and, therefore, assume that regulatory responsibility. As part of that responsibility, the Bay jurisdictions check the quality and completeness of permit compliance and monitoring data in accordance with EPA-approved quality assurance plans and programmatic requirements before submitting the data to the CBP for incorporation into the Chesapeake Bay Model and tracking and accounting systems. Data from NPDES compliance monitoring are used in the tracking and accounting of significant wastewater treatment facilities. However, water quality monitoring is largely not part of the tracking and accounting process for nonpoint-source pollution control measures.

National permitting programs do not exist for nonpoint sources of pollution, which include general agricultural and forestry land uses, stormwater runoff from small communities that do not exceed population thresholds, and stormwater runoff from undeveloped native forested uplands and wetlands, including both privately and publically owned properties. Because national data collecting and reporting standards do not exist for nonpoint sources, individual Bay jurisdictions and the CBP have faced many challenges in their efforts to accurately account for the implementation of nutrient reduction practices. Activities can be especially difficult to track when BMPs are implemented on a voluntary basis rather than under a more formal governmental program.

Each of the Bay jurisdictions submits data to the CBP at least annually on the nonpoint source nutrient and sediment pollution control programs implemented in the watershed. In past years, the CBP struggled to handle the wide variety of data formats and spent a large amount of staff time incorporating these data into the Chesapeake Bay Model. However, since 2003, the CBP and Bay jurisdictions have devoted substantial efforts and resources to standardize data formats and develop approaches for electronic submission of both permit compliance and BMP data. The EPA provided grants to Virginia, Pennsylvania, and Maryland to develop templates for submitting nonpoint source and stormwater BMP data to a statewide database, which would then facilitate transferral to the CBP via the National Environmental Information Exchange Network (NEIEN) schema (see Figure 2-1). Data can be submitted using one or more of the following

types of information to identify BMP locations: (1) latitude and longitude, (2) watershed code, (3) county name, or (4) national hydrography dataset (stream reach) codes. Data are then translated for use in the Watershed Model and related tools (see Figure 1-3) to assess progress toward program goals, based on nitrogen, phosphorus, and sediment load reduction efficiencies assigned to each practice. The usefulness of the NEIEN-exchanged data is highly dependent on the quality of the data entered into the system. NEIEN was completed in late 2010, and by December 2010 all agencies were required to submit their BMP implementation data through NEIEN (B. Burch, EPA CBPO, personal communication, 2010).

Tracking changes in atmospheric deposition of nitrogen to the Bay watershed is the responsibility of the EPA, which uses data from several national monitoring networks. These networks provide a good estimate of wet deposition of nitrate and ammonium, a fair estimate of dry deposition of nitric acid, nitrate, and ammonium, and poor estimates of ammonia dry deposition (see Box 2-1 for details).

ASSESSMENT OF TRACKING AND ACCOUNTING

The committee was tasked to evaluate whether the tracking for implementation of nutrient and sediment control BMPs appears to be reliable, accurate, and consistent and to assess what is working and not working in each Bay jurisdiction and at the federal level (Tasks 1 and 2, Box S-1). To complete these tasks, the committee reviewed two main sources of information from each of the Bay jurisdictions: (1) a committee-generated questionnaire submitted to each of

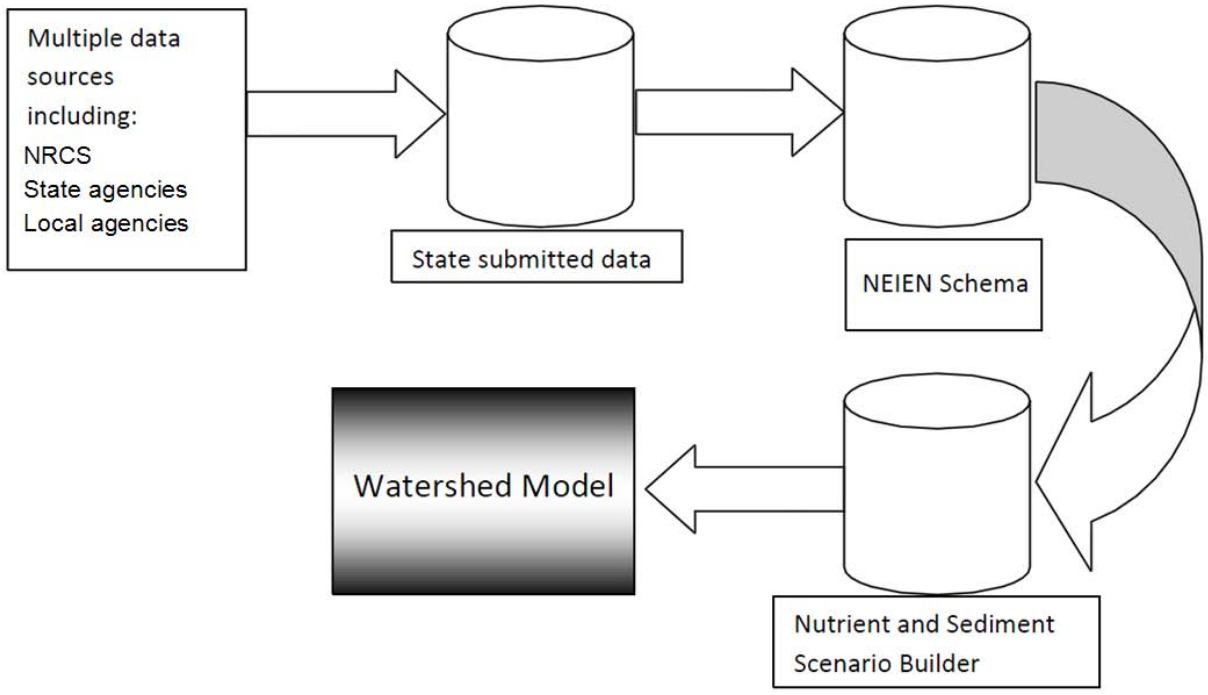

FIGURE 2-1 Role of NEIEN in data transmission to the Watershed Model.
SOURCE: Modified from Devereux (2009).

BOX 2-1

Tracking Nitrogen Deposition in the Bay Watershed

Tracking of nitrogen deposition is dependent upon measurements for specific locations and calibration/validation of models for regional assessments. A complete understanding of nitrogen loadings from the atmosphere requires information on the wet deposition of nitrate, ammonium, and organic nitrogen and on dry deposition of the gases nitric acid and ammonia and the aerosols nitrate and ammonium.

The most intensive coverage for atmospheric nitrogen loadings exists for wet deposition of nitrate and ammonium through the National Trends Network of the National Atmospheric Deposition Program (NADP); within the Chesapeake Bay watersheds, there are 16 sites, 5 of which have been in place since 1987. There is no systematic program to determine the deposition of organic nitrogen to the Bay watershed, which probably leads to underestimates of nitrogen deposition by up to 25 percent (Neff et al., 2002).

The next most detailed coverage is provided by the Clean Air Status and Trends Network (CASTNET) program, established in 1991, which measures the concentrations of nitric acid, ammonium, and nitrate and then uses the Multi-Layer Model (MLM) to estimate the dry deposition flux. Within the Chesapeake Bay watershed, there are six measurement sites across three states—in Maryland (BEL116, BWR139), Pennsylvania (ARE128, PSU106), and Virginia (PED108, SHN418), with starting dates from 1991 to 1995.

Estimates of the dry deposition of ammonia, an important source of nitrogen loadings to the Bay watershed, are not made within CASTNET. A new program, the Ammonia Monitoring Network (AMON), was initiated in 2010 as part of the NADP to provide this information. Unfortunately, only three sites (PA00, MD08, and MD99) are in the Bay watershed.

In summary, monitoring data exist to provide good estimates of wet deposition and fair estimates of dry deposition of nitric acid, nitrate, and ammonium; however, understanding of ammonia dry deposition is poor and deposition estimates are, therefore, weak. Importantly, funding for the NADP and CASTNET sites has declined in real terms, leading to a reduction in the number of sites. Static funding over the past decade, combined with increasing operational and maintenance costs, means further loss of sites is likely. A decline in monitoring sites and funding seriously limits the ability to understand and track changes in atmospheric nitrogen loadings in response to management actions.

the Bay jurisdictions and the EPA and (2) relevant information submitted in the draft (September 1, 2010) and final (November 29, 2010) watershed implementation plans (WIPs). In this section, the committee provides a general assessment of tracking and accounting efforts and identifies key issues that affect multiple states. Jurisdiction-specific strengths and weaknesses in tracking and accounting are discussed briefly at the end of the section, summarized in Table 2-1, and detailed in Appendix C.

TABLE 2-1 Summary of Tracking and Verification Efforts for Land-based BMPs by Bay Jurisdiction

Jurisdiction	Who Collects Information for Nonpoint Source BMPs? (federal agencies not included)	Point Locations Provided?	Verification Process	Process for Removing BMPs from the Database When Expired or Not Functioning?	Processes to Protect Against Double Counting?	Underreported Practices
Delaware	Multiple agencies, including: • Dept. of Natural Resources and Environmental Control • Dept. of Agriculture • local government agencies for stormwater BMPs	SOME (mostly in development)	Aerial photography is used to verify agricultural BMPs, although the percentage of BMPs verified is unknown. No field verification process reported. Cost-share reporting data is used to verify practice implementation. Stormwater BMPs field verified.	NO	YES for ag. BMPs In development for stormwater BMPs	Non-cost-shared practices Stormwater and septic practices where databases are lacking
District of Columbia	Dept. of the Environment (DOE)	YES, for most practices	DOE conducts maintenance inspections of all stormwater management facilities. Inspections of wetland mitigation projects and recent tree plantings are also conducted.	No information provided. However, permitted facilities have maintenance plans.	YES, through Plan Review Database	Street sweeping Practices on private lands with no permit Forest conservation
Maryland	Multiple agencies including: • Dept. of Agriculture • Dept. of Environment (MDE) • Dept. of Natural Resources • Dept. of Planning • local government agencies Data compiled by MDE.	YES, for most practices	Field verification for all sectors. See Appendix C for details.	YES	YES for ag BMPs In development for stormwater BMPs	Stream restoration Septic upgrades funded by local govt. Innovative BMPs not yet approved by the CBP
New York	The Upper Susquehanna Coalition (USC) collects and reports all nonpoint source data.	YES for ag. practices	USC field checks agricultural and wetland-related practices. Only field verified practices are reported. Frequency of verification not reported.	No information provided	No information provided	Urban and septic practices are generally not reported

Pennsylvania	Dept. of Environmental Protection tracks and collects BMP data for most sectors, with assistance from other agencies, including: • Bureau of Forestry • State Conservation Districts • Department of Agriculture • Infrastructure Investment Authority (PennVest)	NO	Verification and quality assurance of implemented agricultural BMPs are considered to be the responsibility of the federal and state agencies and the nongovernmental organizations providing the information. It is beyond the capacity or responsibility of PA's Water Planning Office to complete such tasks. No information is provided about state agency-level verification. Construction-related stormwater BMPs are permitted and verified.	No information provided	NO (No additional processes beyond those used by all states to track BMPs by funding sources)	• Cover crops • No-till cultivation • Manure storage • Stream fencing • Rotational grazing • Precision feeding • Septic tank hook-ups to central sewer No tracking of construction-related stormwater BMPs (an estimate of practices is instead provided)
Virginia	Many agencies including: • Dept. of Health • Dept. of Environmental Quality • Dept. of Forestry • Dept. of Conservation and Recreation • Dept. of Agriculture and Consumer Services	YES for cost-shared ag. practices (others in development)	• Permitted CAFOs currently inspected annually, after 7/1/2011 on a risk-based inspection schedule at least once every 5 years • Inspections on land-disturbing activities for stormwater pollution prevention • Up to 5% installed agricultural BMPs annually • BMPs that are also alternative onsite sewage systems inspected at least annually.	No practice life reported, but BMPs can be removed if found on random inspections to be insufficient	YES for ag BMPs	Septic systems connections Non-cost shared practices Urban stormwater BMPs over past 20 years Practices not approved by CBP
West Virginia	Dept. of Environmental Protection tracks and collects BMP data for most sectors, with assistance from: • Dept. of Agriculture • Conservation Agency	YES for stormwater practices	No current field verification process in place, although WV plans to develop verification protocols for stormwater and agricultural BMPs.	No information provided	YES	Non-cost-shared practices Practices missed because of poor tracking

NOTE: This table summarizes the more detailed data provided by each Bay jurisdiction on tracking and accounting (see Appendix C).

Jurisdiction-wide Issues in Tracking and Accounting

In general, the Bay jurisdictions responded that they have a good understanding of wastewater discharges and state cost-shared BMP data. However, key issues affecting the reliability, accuracy, and consistency of BMP tracking and accounting data include: (1) data privacy restrictions, (2) the challenge of accounting for voluntary practices, (3) limitations in staff resources for data management and quality assurance/quality control (QA/QC), (4) limitations in staff resources for field verification of practices, and (5) uncertainty in BMP load reduction effectiveness.

Data Privacy Restrictions

Much information regarding agricultural point and nonpoint source nutrient and sediment reduction activities within the Bay watershed resides within the U.S. Department of Agriculture (USDA), but privacy requirements associated with Section 1619 of the 2008 Farm Bill create challenges for accurately tracking agricultural BMPs. Under Farm Bill privacy requirements, federal and state agencies may not publicly release the addresses (or location data) for Farm Service Agency (FSA) or National Resources Conservation Service (NRCS) grant recipients. To comply with these privacy restrictions, these data previously have been submitted to the CBP aggregated at the county level, which reduces the spatial accuracy of calculated nutrient and sediment loads in the Watershed Model. However, a recent data sharing project between the U.S. Geological Survey (USGS), the FSA, and the NRCS in all Bay states allows the USGS to receive the point location data in confidence and aggregate these data at a watershed scale (hydrologic unit code [HUC] 8 or 11), for improved BMP location attributes in the Watershed Model, before submitting these data to the CBP. Aggregated data that do not divulge individual landowner information is not confidential.

This data sharing project has the potential to fill many of the information gaps about distribution of Farm Bill–funded BMPs implemented across the landscape. Additional opportunities to access aggregated data that do not violate the confidentiality provision of the Farm Bill could be used by the CBP. For example, records of nutrient management plans developed under Farm Bill programs could be compiled and reported in such a way that Bay jurisdiction administrators would at least know how many agricultural acres in each watershed county were being managed under an NRCS-developed or NRCS-approved nutrient management plan. However, some nutrient management plans are developed by state-certified plan writers. Because these plans are paid for by the land owners, they are proprietary. Thus, important nutrient management information may not be available to the USDA-USGS data sharing effort and to the CBP.

Non-cost-shared (Voluntary) Practices

Every Bay jurisdiction reports that there is little to no accounting for the implementation of BMPs that are installed without the support of federal or state cost-shared programs, sometimes called “voluntary practices.” Many agricultural and other BMPs are voluntarily implemented because of their inherent benefits to landowners. For example, significant acreage

is farmed within no-till and other conservation tillage practices without regard to the CBP because they are good agronomic practices that permit double cropping and increase economic returns. The under-reporting of non-cost-shared practices also affects the accounting of suburban and urban practices (e.g., stream restoration efforts by nonprofit organizations, non-cost-shared sewer line hook-ups). See Table 2-1 for examples of practices described by each jurisdiction as under-reported.

Pennsylvania recently conducted several regional studies to document this data gap, focusing on key subsets of agricultural conservation practices. A pilot study that surveyed 17 percent of the farmland in Bradford County in northeastern Pennsylvania reported that up to 88 percent of the nutrient-control practices being used were not reported to the CBP because they were not cost-shared (PA DEP, 2010; see Table 2-2). However, the study did not attempt to quantify the effect of this under-reporting on the county's (or the state's) reported nutrient or sediment loads. The Pennsylvania study suggests that key practices may be significantly under-reported in some areas. Overall, available data are insufficient for the committee to assess the implications of non-cost-shared practices for accuracy of current BMP reporting in the various states or to evaluate the relative magnitude of this error against other potential accounting errors.

Maryland has recently implemented an aggressive inventory strategy to track and verify non-cost-shared practices and in 2009 launched the Conservation Tracker database, which can be used to track both cost-shared and non-cost-shared BMPs (MDE et al., 2010). However, as of fall 2010, Conservation Tracker was only being used to track cost-shared practices (MD DNR, 2010b). In November 2010, Virginia outlined a multi-phased strategy to collect, store, and report non-cost-shared agricultural and forestry BMP data, although it acknowledged that better accounting for non-cost-shared practices alone would not enable the state to reach its milestone goals (VA DNR, 2010). Delaware developed a BMP survey form through a pilot study in the Choptank River watershed that could be used in the future to collect data on non-cost-shared practices (DE DNREC, 2010).

If voluntary BMP implementation is not significant in a particular state, then federal or state cost-shared practice information will by necessity have to suffice. However, if states find that non-cost-shared practices significantly affect their total loads, then rigorous state-level programs would be of value to facilitate data collection, verification, and quality control and to assess progress towards management goals. President Obama's 2009 Executive Order 13508 pledged: "By July 2012, mechanisms for tracking and reporting of voluntary conservation practices and other best management practices installed on agricultural lands will be developed and implemented." As of early 2011, the CBP partners, with USDA and state leadership, were

TABLE 2-2 Surveyed Agricultural BMPs in Bradford County, Pennsylvania

Practice	Data Reported	Percent Not Cost-Shared
No till	6,039 acres	85
Cover crop	3,335 acres	74
Manure storage	81 units	43
Stream fencing	79 farms/339 acres	51
Rotational grazing	74 farms/4,679 acres	88

SOURCE: PA DEP (2010).

still considering how they will implement non-cost-shared BMP tracking while ensuring that data meet CBP expectations for reliability, accuracy, and verification. The EPA has explained its expectations for non-cost-shared BMP data, including procedures to prevent double counting, to allow for field verification, and to ensure that the datasets are updated over time to reflect land conversions or maintenance failures (EPA, 2010c, 2010d; K. Shenk, CBP, personal communication, 2011). The CBP will also need to consider that current models have been calibrated with many of these uncounted practices in place. Therefore, if these non-cost-shared practices are eventually added to the model even though they were in place during the model calibration period, their load reductions may effectively be double counted.

Data Management

Currently, CBP data management and quality control efforts are staff- and resource-intensive endeavors, especially as the program transitions to electronic BMP reporting. Tracking BMP data from multiple data sources requires rigorous QA/QC efforts, and weaknesses in state-level programs combined with resource limitations will contribute to reduced accuracy and reliability. For example, double counting can occur when a specific BMP receives both state and federal funding. USDA privacy restrictions may also limit the capacity to cross-check state- and federally funded BMPs and other conservation efforts to minimize double counting. Other errors that affect data quality include incorrect entry of BMP data from stormwater permit reporting or failure by states to remove from the database BMPs that are no longer in operation, perhaps because they have exceeded their reasonable lifespan or because the land use has changed since the BMP was implemented.

Of the seven Bay jurisdictions, only Maryland, the District of Columbia, Virginia, and Delaware reported specific practices to reduce double counting, and those practices were sometimes limited only to certain sectors (see Appendix C). Additionally, only Maryland reported that BMPs were assigned specific lifespans, after which those BMPs would be removed from the database. Many states expressed optimism that electronic reporting via NEIEN would significantly reduce double counting of cost-shared BMPs. NEIEN, however, may simply transfer this problem from the states to the CBP if the cost-share data are not first screened for double-counting at the state level prior to electronic submissions. Cost-share privacy issues would need to be addressed to fully resolve this problem as each BMP would require a unique identifier such as a specific location to facilitate cross-checking of activities between state and federal databases.

In addition to improving data quality, electronic submissions of local and state BMP data should also significantly reduce the data management burden on state staff, particularly for those states that previously had to compile data from paper files.. Nevertheless, there appears to be unequal progress toward improving data management among the Bay jurisdictions. Those jurisdictions with greater resources can devote more attention to data management and electronic data submissions. Those with greater resources are also more likely to invest in training for local agency staff on how to manage data effectively and accurately and how to use available tools for nutrient accounting.

Resources not only affect the staffing levels for data management and QA/QC, they also affect the ability to record precise locations of practices (i.e., geo-referencing), which is under

way in some states (see Table 2-1). The precise location of a BMP within a watershed (e.g., distance from a stream) will affect its performance; thus, geo-referencing BMPs is critical to improving the Watershed Model's predictions of nutrient load reductions (Djojic et al, 2002). States with limited resources would, understandably, prefer to spend available funding on BMP implementation rather than on tracking and accounting efforts, perhaps sacrificing some level of reporting accuracy for greater load reductions in the long run.

Field Verification

The extent of field verification of urban and agricultural nutrient and sediment BMPs varies widely with state resources. Field verification ensures that the BMP implementation data are reliable and accurate and that the installed practices meet the definitions and design standards used by the CBP to estimate efficiency and performance. However, the necessary staff and travel expenses make field verification extremely costly. Field inspections ideally should occur when BMPs are actually performing (e.g., during or shortly after rain events). Timing field inspections in this way would significantly improve the reliability of verification results. Virginia, the District of Columbia, Maryland, and New York reported that they have programs in place to field verify BMP implementation and maintenance . However, at most, these programs field verify approximately 8-10 percent of agricultural BMPs per year; most programs verify far fewer or do not report the number of verified sites. Details on these verification programs are provided in Appendix C. Because of staffing and financial limitations, adequate state or federal funding to visit every participating landowner to verify recordkeeping and other implementation-related data, seems unlikely. Also, in many cases, agencies charged with implementing BMPs are the same as those conducting the tracking and accounting, sometimes leading to a perception of a biased verification system. Random verification programs by agencies/personnel independent of those advising installation help to build confidence that reported data are accurate and reliable and can be sized to available resources.

Ultimately, a reasonable balance of implementation and verification is necessary to optimize resources while maintaining the CBP's credibility. The EPA has indicated that jurisdications will need to develop programs to verify that BMPs are properly designed, installed or implemented, and maintained to get full credit in the Watershed Model (EPA, 2010c). Additional EPA guidance on the extent of verification in relation to expected benefits would be useful. As a surrogate for field verification, grower and developer survey questionnaires could be mailed to gauge participation, followed by some percentage of field visits to confirm the reliability of the survey data. For example, available trends in county-level fertilizer sales data could be used to gauge the extent of nutrient management related BMP implementation. Remote sensing also might offer lower cost verification of some practices. Early verification is important to determine whether practices have been implemented according to recommended standards, but some level of periodic verification is also needed to determine whether practices are still in place and are being maintained properly. Developing ways to optimize field verification efforts will ultimately enhance the reliability of the BMP data sets, perhaps through some combination of remote sensing data, written surveys, phone calls, and site visits.

BMP Efficiencies

Data on BMP implementation are converted into load reductions by the Watershed Model using load reduction efficiencies established by the Water Quality Goal Implementation Team (WQGIT) of the CBP. Thus, load reduction efficiencies are critical components of both goal-setting and implementation progress accounting.

The efficiencies of municipal and industrial wastewater nutrient control technologies are well understood because of the high level of process control at centralized wastewater treatment facilities. In addition, NPDES permitting requires monitoring at centralized treatment facilities, so results of management actions accurately reflect nutrient and sediment load reductions in the field.

In contrast, the BMP efficiencies for diffuse sources, such as suburban, urban, and agricultural nonpoint sources, are less predictable and vary widely with local site conditions. Many factors affect the pollutant removal efficiency of BMPs and create challenges for establishing BMP efficiencies for the Watershed Model. Field monitoring of BMPs on a comprehensive basis is neither practical nor affordable.

Performance of BMPs in the field may vary with age and level of maintenance. The lack of adequate maintenance and life-cycle replacement can reduce intrinsic pollutant removal design capabilities and negatively affect performance. BMP efficiency can also change as treatment systems age; those systems that rely on natural biological features may improve with maturity but act as a sink during the growing season and a source of nutrients during the non-growing season even after they mature. Technology-based BMPs (e.g., storm drain filter inserts) may lose effectiveness with time due to clogging and general wear and tear.

BMP efficiency is also a function of location and site conditions, which vary widely. BMP efficiency is heavily influenced by rainfall amount, intensity, and duration; soil type and slope; land use; and proximity to the receiving water body. Implementation, operation, and maintenance of agricultural BMPs also may vary widely from the NRCS Conservation Practice Standard. For instance, cover crops can vary by type of crop used, extent of ground cover achieved, application of manure, and whether the cover crop is harvested, plowed in, or left as protective cover on the field, each of which affects the overall practice efficiency. Thus, as noted previously, it is important to verify that the installed practices meet the definitions used by the CBP to establish efficiency estimates.

BMP efficiency in a field situation can be difficult to study because of the costs and challenges associated with monitoring, especially when pollutant loading is driven by weather events that can be erratically distributed in time and space. As a result, BMP efficiencies are often derived from limited research or small-scale, intensive, field-monitoring studies in which they may perform better than they would in aggregate in larger applications, particularly at the watershed scale. Thus, estimates of load reduction efficiencies are subject to a high degree of uncertainty.

Concerns about the accuracy of BMP load reduction efficiencies used in the Watershed Model led to a detailed review of currently available science for both urban and agricultural practices (Simpson and Weammert, 2009). The EPA (2010e) also provided extensive land management guidance that is applicable to federal and non-federal lands and that addresses agriculture, urban and suburban areas, forestry, riparian areas, decentralized wastewater

treatment systems, and hydromodification. Simpson and Weammert (2009) and the EPA (2010e) provide detailed assessments of BMP applications and efficiencies, including offsets for land use changes. A review of the Simpson and Weammert (2009) efficiencies acknowledges a predictably high degree of spatial and temporal variability and uncertainty depending on hydrogeomorphic region, land use, and to a certain extent type of BMP (Table 2-3). Because of the variety of factors affecting BMP efficiency, including maintenance and longevity effects, Simpson and Weammert (2009) were conservative in their efficiency estimates.

The committee did not undertake a separate detailed review of BMP load reduction efficiencies, although the original documentation by Simpson and Weammert (2009) and the EPA (2010e) were thoroughly peer-reviewed prior to publication. In addition, BMP efficiencies have been the subject of numerous studies, especially by the Center for Watershed Protection (CWP), the Water Environment Research Foundation (WERF), and the EPA[MS1].[1] Although unable to review and assess the technical aspects of BMPs and their efficiencies, the committee endorses the approach taken by the CBP to develop research-based BMP efficiencies and concludes that the general approach and associated conservative assumptions are reasonable given currently available science.

Despite this endorsement, the committee acknowledges the need to continuously assess

TABLE 2-3 Range in Load Reduction Efficiency (percent decrease) Estimates for Select Best Management Practices implemented in the Chesapeake Bay Watershed

Best Management Practice	Total N	Total P	Sediment
Conservation plans	3–8	5-15	8-25
Conservation tillage	8	22	30
Forest buffer	19-65	30-45	48-60
Grass buffer	13-46	30-45	40-60
Wetland creation and restoration	7-25	12-50	15
Cover crops			
Coastal plains/Piedmont— – crystalline	11-45	0-15	0-20
Mesozoic lowlands/Ridge and Valley— –siliciclastic	9-34	0-15	0-20
Ammonia emission reduction	15-60	NA	NA
Dairy feed management	24	25	0
Mortality composting	40	10	0

SOURCE: Adapted from Simpson and Weammert (2009).

[1] For details and references, see CWP - http://cwp.org/; WERF - http://www.werf.org//AM/Template.cfm?Section=Home; and EPA water programs - http://www.epa.gov/gateway/science/water.html.

and improve upon the current understanding of BMP efficiencies. Therefore, targeted monitoring programs in representative urban and agricultural streams are needed to evaluate associated water quality changes over time and to validate or improve model predictions, particularly at the watershed scale.

As new field research becomes available, BMP efficiencies for the Watershed Model should be updated. The CBP WQGIT recently developed a protocol by which estimates of BMP efficiencies can be revised or additional BMPs can be accepted for use in the Watershed Model (CBP WQGIT, 2010). This protocol provides an adaptive approach to reducing the high levels of uncertainty in estimates of BMP efficiencies. The protocol requires a six-person panel composed of experts in water quality and experts in the proposed BMP to work with the relevant source-sector workgroup to develop a report that includes:

- Detailed definition of the land use or practice,
- Estimates of recommended nitrogen, phosphorus, and sediment loading or efficiency, and justification for the selected efficiency estimates,
- Locations in the watershed and land uses to which the BMP is applicable,
- Conditions under which the BMP works and does not work,
- Temporal performance,
- Useful life and effectiveness over time, and
- Operation and maintenance requirements (and impacts of neglect).

The relevant source sector workgroups, the Watershed Technical Workgroup, and the WQGIP review the panel's recommendations before the BMP is adopted for use in the Watershed Model. This strategy appears to be a reasonable, consensus-based mechanism to assign pollutant removal efficiencies to new practices not currently represented in the model (e.g., low-impact design, state-of-the-art stormwater controls) and update BMP efficiencies or offsets from land-use conversions with new data, while maintaining rigorous review standards. Past experience, however, has shown that credited BMP efficiencies have more commonly been decreased rather than increased in the light of new field information.

What Is Working and Not Working in Each Jurisdiction and in the Federal Agencies

As previously described, the Bay jurisdictions' tracking and accounting approaches vary substantially. Programmatic components are summarized in Table 2-1, and full details are provided in Appendix C. Ideally, each Bay jurisdiction would have a clear organizational framework for BMP reporting, geo-located data for accurate conversion of the data into the Watershed Model, a rigorous QA/QC process that includes some level of field verification, a process for removing BMPs when they have expired or are not functioning, processes to prevent double counting, and few unreported practices. In reality, most jurisdictions are still working through these challenges, and there are significant disparities between the human and financial resources applied to tracking and accounting across the states. All of the Bay jurisdictions are working to improve their practices, but resources remain the primary limiting factor.

BMP Reporting and Transparency

All Bay jurisdictions have identified an organizational reporting structure for tracking and accounting among various state and local agencies, although the complexity of these structures varies widely. The District of Columbia reports all data through a single agency, which simplifies data collection, quality control, and reporting, but most states have more complex multi-agency reporting responsibilities. Some Bay jurisdictions suggested communication would improve if each jurisdiction and the CBP had a single point of contact for tracking and reporting issues.

Most Bay jurisdictions report BMP implementation on an annual basis to the CBP (on December 31, for the prior July-June period), and all jurisdictions are required to submit these data through NEIEN. Although the recent conversion to the NEIEN schema promises to improve data management, the system appears to have made the data less accessible to some jurisdictions. Whereas, previously, states compiled their BMP data from multiple agencies on an annual basis, now many state and local agencies submit their data separately. Thus, a jurisdiction may now only see its overall annual progress update after it has been compiled by the CBP, unless it has procedures in place to separately compile the data. Because of the time it takes for the CBP to compile the data and run the models to convert the BMP data into load reductions, significant delays (currently a minimum of 9 months) occur between BMP implementation and progress assessments, which hinder the application of adaptive management (see Chapter 4). Only Maryland reports its implementation progress more frequently via its own BayStat website, which it uses to make frequent adjustments to its BMP program to ensure achievement of its milestone goals.[2]

In January 2011, the CBP launched a new tracking and accounting system (Bay TMDL Tracking and Accounting System [BayTAS]) to track all of the Bay jurisdictions' progress toward meeting the TMDL requirements. BayTAS will be used to track progress for both point and nonpoint sources using geographic information system (GIS) technologies and the Watershed Model, and data will be displayed by state, segment, or facility on the CBP's new ChesapeakeStat website.[3] Among the questions the EPA expects to answer with BayTAS are:

- What is the status of BMP practice implementation and programmatic activities?
- What is the status of two-year milestone achievement?
- Are point source wasteload allocations being achieved? Are nonpoint source load allocations being achieved?
- Are states on target to achieve the Bay TMDL?

Because the forum is publicly accessible, BayTAS also improves the transparency of implementation data (P. Rana, EPA, personal communication, 2011). It remains unclear whether the system could be used for more frequent reporting by Bay jurisdictions to provide them with a tool to assess their progress toward the two-year milestones.

All Bay jurisdictions reported challenges in counting and reporting voluntary practices, as discussed earlier in the chapter. Only Maryland has developed a process to report voluntary

[2]See http://www.baystat.maryland.gov/.
[3]See http://stat.chesapeakebay.net/.

practices, although it has not yet been implemented. Virginia and Delaware are actively developing and other states are considering such a process. Some jurisdictions also mentioned that they do not report some practices because of insufficient databases (e.g., septic system upgrades or hook-ups, stormwater practices) or challenges in converting the data into the format expected by the CBP (e.g., street sweeping). The EPA is working to overlay wastewater service areas to identify those areas served by septic systems in Phase 5.3 of the Watershed Model.

Geo-referencing

Three Bay jurisdictions geo-reference all or most BMPs that are tracked (i.e., New York, Maryland, District of Columbia); three states provide point locations for at least some BMPs (Virginia, West Virginia, Delaware; see Appendix C for details). Pennsylvania does not provide point locations for BMPs but instead reports them by county. Those locations that are not geo-referenced are typically reported by county, although some are reported by watershed or stream reach. Even Bay jurisdictions that collect location data for all new practices face challenges in siting historical BMPs that remain in the database. If BMPs are reported by county, then the EPA must make assumptions regarding the locations of these practices within specific watersheds. Proximity of the land use and BMPs to a water body is one of the major factors that affect the delivery of pollutants (Djojic et al., 2002). Thus, without accurate geo-location of urban and agricultural BMPs, there will be errors in accounting for BMP impacts on pollutant loads.

Quality Assurance and Quality Control

Field verification of agricultural BMPs is nonexistent for some Bay jurisdictions (West Virginia, Delaware, and Pennsylvania), while other jurisdictions have implemented structured field verification programs (e.g., Virginia verifies up to 5 percent of agricultural BMPs annually, Maryland verifies 7-8 percent of agricultural BMPs annually, and New York verifies all reported practices). Most states reported some level of field verification for permitted stormwater management practices.

QA/QC of BMP data varies across the states. Maryland, the District of Columbia, Virginia, West Virginia, and Delaware reported specific strategies in their WIPs to reduce double counting of BMPs (DDOE, 2010; DE DNREC, 2010; MDE et al., 2010). Virginia reported that privacy agreements have only recently allowed its agencies to examine FSA or NRCS data to check for double counting in a manner that is consistent with Farm Bill privacy-related restrictions. Only Maryland and Virginia reported processes to remove BMPs when they are no longer functioning or have expired. As a result, "legacy" BMPs and double-counted BMPs from some jurisdictions will result in overestimating the extent of nutrient load reductions.

Despite inconsistencies in philosophy and approach, a great deal of information is available, and good faith efforts are under way to resolve some of the hindrances to data access, collection, and standardization (see Appendix C). The Bay jurisdictions are not likely to modify their respective programs to bring them into perfect alignment, but they are developing their own tailored programs based on their own circumstances and priorities. Although statewide programs are unlikely to be identical to one another in process or in fiscal and personnel allocations, the CBP has recently made strides toward common reporting goals and data requirements, in part

because of the WIP process. The Bay jurisdictions are adapting to these data quality expectations, and some jurisdictions are much closer to meeting these expectations than others. However, electronic data management, new databases, and data transfer schema should ultimately reduce the BMP tracking and accounting burden for all jurisdictions.

How Do Gaps and Inconsistencies in Tracking Affect Reported Program Results?

As described above, the current tracking and accounting of BMPs is not consistent across the Bay jurisdictions. The committee was also tasked to evaluate the accuracy and reliability of the BMP tracking data and assess how gaps and inconsistencies appear to impact reported program results (Tasks 1 and 3, Box S-1). Thus, the committee attempted to estimate the extent of error in the BMP implementation data. On the one hand, the CBP could under-count BMP implementation rates and levels because state-reported data do not include non-cost-shared practices. Given that at least some of these practices were in place when the model was calibrated, the extent of error that these uncounted practices introduce into the overall simulations is unclear. Even recent pilot studies to quantify these differences at a county scale (e.g., Table 2-2) did not extrapolate the findings to nutrient load estimates. On the other hand, the model could over-count BMP implementation rates and levels, because few states account for the loss of BMPs when they are no longer in place or no longer effective or for known double-counting problems. State quality assurance project plans (QAPPs) generally do not specify procedures to evaluate differences between quantities of activities reported to the CBP and actual on-the-ground implementation, despite the EPA's request that jurisdictions include such information in the QAPPs (J. Winters, EPA, personal communication, 2010).

The nonuniformity of BMP efficiencies can lead to inaccuracies in Watershed Model simulations. Any error in accounting for the areal extent of implemented BMPs will have direct impact on the load simulations. Such errors can cause either under- or over-estimation of loads by the Watershed Model. Furthermore, there are several discrepancies between a state's and CBP's definitions of BMP management that affect the accuracy of the calculated nutrient load reductions. For example, states allow application of manure to cover crops, while the CBP definition for cover crops assumes no manure is applied.[4]

Based on the information provided, the overall accounting of BMPs in the Bay watershed cannot be viewed as accurate. However, the committee was not able to determine the magnitude or the likely direction of the overall reporting error (that is, whether the actual load reductions of currently implemented practices are likely to be greater or less than the current modeled output based on the practices counted). Some of these errors will likely cancel each other out, but there is substantial room for improvement. Additionally, the committee was unable to determine whether the actual data reported by each jurisdiction are reliable and accurate. The only way to truly assess the reliability and accuracy of the reported data would be through independent (third-party) auditing of the tracking and reporting at state and local levels.

[4] except on commodity cover crops after March 1.

HOW CAN THE TRACKING SYSTEM BE STRATEGICALLY IMPROVED?

Although many programs are actively in place to improve the tracking and accounting system, in this section the committee proposes additional strategies that could improve BMP tracking in the CBP.

A Consolidated Chesapeake Bay Region Agricultural BMP Program

All Bay jurisdictions lack the ability to reliably and consistently document agricultural nonpoint source BMPs that are implemented without the assistance of federal or state cost-share programs. These shortcomings could be overcome by the development and implementation of BMP programs similar to those that exist elsewhere in the nation whereby agricultural producers report voluntary conservation practices that would otherwise be unaccounted for (see Florida example in Box 2-2).

The establishment of a regional BMP program, perhaps coordinated by an independent organization or alliance of organizations (e.g., the American Farm Bureau Federation, the National Association of Conservation Districts) with close coordination with the Bay jurisdictions' respective Departments of Agriculture, would lay the foundation for a more formal program to track and account for voluntary BMPs. This BMP program could include record keeping and reporting requirements, including reporting of geo-locations for BMP data. Verification of BMP implementation could occur through random field inspections of a percentage of program participants. The BMP efficiencies could be assessed through representative site water quality monitoring coupled with watershed or sub- watershed-scale monitoring, which would serve to document a range of nutrient load reduction estimates for prioritized conservation practices. Initially, financial and human resources for this program could be focused on the regions of each state that are within the Bay watershed, although state TMDL initiatives would likely benefit from such programs implemented statewide.

Coupling cost-share eligibility (for those states that allocate cost-share funds) to BMP program participation is an effective mechanism to entice landowners to participate. Structured properly, a state program can also leverage USDA cost-share funds and further reduce landowner costs for BMP implementation. Reducing property taxes for participating agricultural landowners would likely be an effective incentive, although local governments would suffer lost revenues. Finally, disincentives are possible tools, such as requiring parcel-scale water quality monitoring if landowners choose not to implement BMPs. Providing agricultural producers who implement, report, and maintain BMPs with a presumption of compliance with water quality standards has proven to be a powerful incentive for landowners in Florida and has contributed to successful long-term operation and maintenance of implemented BMPs (Box 2-2). USDA has recently begun discussions with EPA and Bay jurisdictions about developing a similar such program in the Chesapeake Bay, where farmers would agree to implement certain practices in exchange for presumptive compliance with regulations (A. Mills, USDA, personal communication, 2011).

Box 2-2

Florida Agricultural Nonpoint Source Best Management Practices Summary

The Florida agricultural BMP program was formalized in state law with the passage of the Watershed Restoration Act (WRA) (Ch. 403.067 F.S.) in 1999. The WRA is Florida's blueprint for development and implementation of TMDL provisions of the Clean Water Act primarily focused on achieving nutrient load reductions to impaired water bodies. Implementation of a TMDL through adoption of a Basin Management Action Plan requires agricultural landowners to either implement BMPs or monitor water quality. The WRA charges the Florida Department of Agriculture and Consumer Services (FDACS) with the responsibility for agricultural BMP development.

The WRA mandates that agricultural BMPs be: (1) based on sound science (generally using University of Florida expertise); (2) adopted by administrative rule into the Florida Administrative Code; (3) verified as effective by the Florida Department of Environmental Protection initially using best professional judgment followed by water quality monitoring; and (4) revised accordingly, with revisions implemented by participating landowners, if BMPs are found ineffective in meeting water quality goals. All FDACS BMP programs mandate the implementation of nutrient management plans.

The WRA also requires that FDACS develop and adopt by Rule a formal procedure for agricultural landowners to enroll their lands in the BMP program. This procedure requires landowners to submit name and contact information, land parcel tax identification number(s), crops being produced, and specific BMPs being implemented. Landowners who enroll in the BMP program and implement all applicable BMPs receive a "presumption of compliance" with nutrient water quality standards and become eligible for state cost-share funding. Eighty-three percent (1.5 million acres) of statewide irrigated agricultural acreage is enrolled. An additional 6.6 million acres of nonirrigated land is also enrolled. The current total of 8.1 million acres will expand dramatically over the next year as the focus for enrollment will be on the largest agricultural land use in Florida: improved and unimproved pasture land for beef cattle production. FDACS BMP programs now cover forestry, citrus, vegetables and row crops, sod, containerized nurseries, specialty crops (tropical fruit, blueberries, pecans, etc.), and beef cattle. BMP programs are under development for the equine and field-grown nursery industries.

FDACS has also developed a quality assurance program to follow up with enrolled landowners to verify that they are implementing the BMPs identified on their submitted documentation. On a statewide basis, the quality assurance program consists of grower surveys and site visits to verify survey results for a fraction of the respondents. In high-priority watersheds (the Suwannee River and Lake Okeechobee Basins) participating landowners are visited in greater proportion and frequency.

Since the inception of the program, Florida has spent $75.5 million in developing, implementing, and evaluating agricultural BMPs. This state money has leveraged in excess of $200 million in USDA/NRCS Environmental Quality Incentives Program (EQIP) funding over the same period of time. FDACS estimates that landowners have contributed at least $60 million in capital costs, not including long-term operation and maintenance.

Expanded Geo-location Data

Although some states are working toward geo-referencing all BMPs, most states are far from this goal. Geo-referencing will improve the tracking of implemented BMPs with time, allowing easier quality control checks for double counting and improving the accuracy of siting in the Watershed Model, thereby improving the accuracy of the modeled loads. Once accurately geo-located, the information can be used in increasingly finer scale models. Geo-referenced data

can also help to assign proper pollutant delivery ratios in the Watershed Model and to prioritize BMP inspections based on the proximity of BMP implementation to the receiving water body, as described by Djojic et al. (2002).

CONCLUSIONS AND RECOMMENDATIONS

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. However, many Bay jurisdictions and localities are struggling with limited resources, complex and rapidly changing data reporting mechanisms, data privacy constraints, and QA/QC needs. Verifying the continued functioning and effectiveness of historical activities presents a significant challenge. Although state tracking and accounting programs are unlikely to be identical, the CBP has recently made strides toward common reporting goals and data requirements through the watershed implementation plan (WIP) process, the NEIEN, and the recent launch of BayTAS.

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. Although the Bay jurisdictions have a good understanding of point-source (i.e., wastewater) discharges, numerous issues affect the accuracy, reliability, and consistency of BMP reporting to the CBP. Only four of the seven Bay jurisdictions conduct any level of field verification of agricultural practices, and there are known problems with double counting that agencies are working to resolve. Only one Bay jurisdiction specifies a lifespan for practices recorded in the database, and few jurisdictions have mechanisms to identify and remove from the database practices that are no longer functioning or even in place. Current tracking systems do not account for agricultural practices that are not cost-shared by a government agency. Given these limitations, current accounting can be considered, at best, an estimate.

The committee was unable to determine the reliability and accuracy of the BMP data reported by the Bay jurisdictions. Independent (third-party) auditing of the tracking and accounting at state and local levels would be necessary to ensure the reliability and accuracy of the data reported.

The committee was not able to quantify the magnitude or the likely direction of the error introduced by BMP reporting issues. On the one hand, there is under-counting of BMPs because the jurisdictions do not currently report non-cost-shared practices, although the model calibration may include the effects of some of these practices. On the other hand, there is over-counting of BMPs because few states account for the loss of BMPs when they are no longer properly maintained, functioning, or in place. Furthermore, there are errors introduced by site-level variability in BMP effectiveness, insufficient data on the location of BMPs, and discrepancies between state and CBP definitions of BMP management.

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. A regional BMP program with incentives for participation as well as penalties for lack of participation has been effectively used in Florida to increase participation and improve data quality. Geo-referencing enables managers and modelers to identify the parcel-level location of BMPs, which would aid in inspecting, tracking, and assigning proper delivery ratios and BMP efficiencies, thereby improving the accuracy of the modeled estimates of nutrient and sediment loads delivered to the Bay.

Targeted monitoring programs in representative urban and agricultural watersheds and subwatersheds would provide valuable data to refine BMP efficiency estimates, particularly at the watershed scale, and thereby improve Watershed Model predictions. Current BMP load reduction efficiency estimates used in the Watershed Model are reasonable estimates of the short- to intermediate-term reduction efficiencies of newly installed BMPs at the field scale and gross representations of the same at the watershed scale. These estimates contain significant uncertainties caused by site-specific factors, practice design, extent of maintenance, and challenges in scaling up the data from the plot or field scale. Pilot studies in several subwatersheds should be conducted to quantify BMP performance, particularly for the most common practices with the greatest uncertainty in their efficiency estimates. The CBP has recently implemented a review process to refine BMP efficiencies used in the Watershed Model based on emerging research findings.

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. Field verification is costly, and several states have questioned its value given the resource constraints that limit BMP implementation. Although independent random or probabilistic verification programs increase public confidence that reported data are accurate and reliable, attention should be given to developing ways to optimize field verification efforts that enhance the reliability of the BMP data sets, perhaps through the combined use of remote sensing data, written surveys, phone calls, and in-person visits.

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. Despite the concerns in tracking and accounting noted above, a great deal of information is available, and a plausible and collective effort seems to be under way to resolve some of the hindrances to data access, collection, and standardization. However, because implementation data are now reported electronically, several jurisdictions noted that the data are less accessible for assessments of statewide progress. Some Bay jurisdictions have mechanisms in place to compile progress updates as needed, but others have to wait approximately 9 months after the end of the reporting period for a summary of BMP implementation progress from the CBP. The recently launched tracking and accountability system for the TMDL (BayTAS) and ChesapeakeStat, which documents each jurisdiction's progress in a publicly accessible website, should incorporate mechanisms for more timely reporting and consolidation of federal and state data submissions.

Citizens Advisory Committee
TO THE CHESAPEAKE EXECUTIVE COUNCIL

January 3, 2012

Dear Principals' Staff Committee:

As your citizen advisors, we respectfully offer our recommendations for action that you can take now to increase public trust in your process of expending scarce public resources on restoring our national treasure, the Chesapeake Bay Watershed. Having been deeply involved with the Program deliberations since the initial discussions of the value of Independent Evaluation, we believe that we have credibility and perspective to offer these recommendations.

We understand that there has been some resistance to the idea of external evaluation. However, we agree with those that recognize its importance and acknowledge that accountability is a critical issue right now. During our meeting discussions we often ask "Why is the bay not getting better?" It seems as though we are merely holding the line in some areas while losing ground in others. CAC believes there are three possible answers: 1) We are not doing what we say we are, 2) we are doing the wrong things, or 3) we are not doing enough. Herein lies the importance of independent evaluation as opposed to only relying on adaptive management. While we are still unsure what the Chesapeake Bay Program (Program) specifically means by adaptive management and how it will occur, the practice still implies *internal assessment* and correction of actions. These are certainly critical components to program implementation, but by its nature, internal adaptive management can inhibit new thinking, new ideas and potential innovations that could ignite an acceleration of progress that the twenty-plus years of the restoration effort honestly requires to finally meet the clean-up goals.

Analysis of Bay progress cannot be fully conducted without being able to determine whether practices are being implemented as reported. When that can be determined within a reasonable standard, then management actions can be adapted to adjust the type and volume of practices necessary to accelerate progress and more effectively utilize scarce funding. In sum, external review can identify needed improvements with a discipline and mandate that saves tax payers' money and improves program performance in the long term.

Furthermore, it is our belief that the Chesapeake Bay Program cannot afford to be seen by the public, Congress or the state legislatures as unwilling to adopt recommended measures from a well respected independent scientific body, the National Academy of Sciences (NAS), to improve its accountability through adoption of a mechanism of external review.

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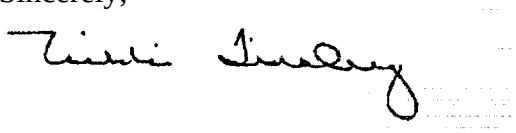
Alliance for the Chesapeake Bay

The NAS study identified some very critical actions that must be taken to allow the Program to identify how funding could be better targeted and areas that lack accountability that must be addressed in order to gain the full effect of the dollars expended on restoration activities.

The Citizens Advisory Committee recommends that the Program begin implementation of the NAS recommendations by identifying short and long term actions including directing the Program to accelerate action to implement the provision in the Regional Administrator's November 3, 2011 memo to "….bring forward through the Partnership a set of integrated recommendations for a comprehensive BMP tracking; verification and reporting system (#11).

In conclusion, we believe that the Program cannot afford to be without an independent means to evaluate its progress and urge the PSC to continue to advance the discussion on how best to institutionalize independent, external evaluation of the Bay Program. We offer our assistance in whatever way best serves the Partnership's efforts in this matter.

Sincerely,



Nikki L. Tinsley
Chair, Citizens Advisory Committee

CC: Nick DiPasquale

Citizens Advisory Committee
TO THE CHESAPEAKE EXECUTIVE COUNCIL

December 17, 2012

Nick DiPasquale
Director, Chesapeake Bay Program
Environmental Protection Agency
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Dear Mr. DiPasquale,

The Citizens Advisory Committee heard a presentation from Mark Dubin on the Agriculture Workgroup's verification efforts at our quarterly meeting on November 30, 2012. We have also received a copy of the letter sent by several members of the workgroup; reviewed the principles adopted by the BMP Verification Committee; and considered recent correspondence from Rich Batiuk to the chairs of the source sector workgroups.

It is our understanding that this current verification process looks to fundamentally change, for the better, the way in which the CBP verifies the implementation of practices designed to reduce nutrient and sediment pollution. In this way, the CBP will significantly improve the accounting for reductions in the Watershed Model.

What remains unclear to us is the "who" and the "how" of the final decisions on any verification protocols. To have such decisions made by the PSC may not be prudent, given the state partners' repeated cries of inadequate funds and repeated defense of existing evaluative practices. EPA must strengthen its role in providing guidance, direction and feedback on the level of verification it anticipates as sufficient to meet the reasonable assurance standard. Currently, it remains unclear exactly who will determine the sufficiency of any proposed verification protocol. However, since the level of verification is directly linked to any finding of reasonable assurance, and since any credit given in the Model is directly tied to a determination of jurisdictional accomplishment of its TMDL pollution reduction goals, it is clear to us that the final decision-maker must be EPA.

The Verification Principles established by the BMP Verification Committee are broad principles crafted at the 10,000 foot level. There is a need for EPA to provide explicit implementation guidance to the source sector workgroups providing more specificity on how the Verification Principles must be utilized as they develop their

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protocols. Of particular interest to us is the need for guidance delineating what is and is not sufficient transparency as required in the "Public Confidence" principle. Absent a significant level of heightened transparency in the verification process itself and the underlying data to support any conclusions; we will not meet the public confidence standard envisioned in the principle. Also to be included in the guidance, for example, should be an EPA implementation directive establishing that the level of "scientific rigor" will necessitate relational levels of credit application in the model and that every protocol needs to recognize this "sliding scale" approach. In addition, EPA should use the findings of the BMP Verification Review Panel—the only wholly nonpolitical and scientific group engaged in the verification process—as weighted guidance in making its determination.

We also remain concerned with many specifics relating to the verification process. We have attached a list of these specifics.

1) Reliance on use of the existing state verification protocols, the status quo, is not acceptable although it appears that many on the Agriculture workgroup support this approach.
2) Different levels of credit should be given in the model for different levels of verification.
    a. As it is inevitable that achievement of a high level of certainty will prove difficult when applied to certain BMPs, the workgroup should endorse the concept of providing different levels of credit based on different levels of certainty. A sliding scale certainty/credit ratio system would allow for greater flexibility and greater accuracy.
    b. It is not possible to pass the test of public credibility or the legal scrutiny of "reasonable assurance" by adoption of a procedure that allows BMPs verified by "self-certification" to be given the same credit in the model for pollution reduction as the same practice that has been verified by more stringent measures.
    c. Verification can include technical and qualitative measures.
    d. The process for transparency must be clearly explained.
3) The new protocols must solve the problem of accounting for expired practices. How to remedy the existing situation where reductions from a BMP are included in the model after a contract period (for federal/state payment for implementation) has expired.
4) The new protocols must solve the problem of double counting of existing practices. While there is the need to count all that is implemented, it must be clear that they are not counted twice.
5) The verification concept under discussion by the Agriculture Workgroup involves a complex and not-yet transparent approach relating to "certainty"; the process for selecting any numerical certainty level must be transparent, clearly defined, and based on technically defensible information.
6) The ongoing complaint from the states that there is insufficient funding to implement new, more robust verification protocols should not be an excuse for lack of verification.
    a. Currently, the states receive Chesapeake Bay Regulatory and Accountability funding from EPA. These grants provide dollars for verification. It is unclear whether states have dollars unspent and available under these grants.

b. Additionally, implementation should, by definition, include verification. Targeting of funding to critical areas should be employed.

Lastly, verification for the most important and the least important practices appear to be receiving the same degree of focus and development. The CBP needs to target the most important practices and direct the workgroups to pay particular attention to them. We understand that bringing BMP verification to the level which satisfies the "Public Confidence" principle mentioned above, as well as addressing concerns in the National Academy of Science's evaluation will require some significant upgrading of the partnership's programs. There is a long list of BMPs and it isn't feasible to do everything at once. Therefore, it is critical to focus on those BMPs which are most important for meeting the TMDL.

We respectfully request a formal response to this letter. In order to assist you, knowing your schedule is a full one, we would be glad to receive a verbal response via a meeting among you and your staff with available members of CAC at a time convenient for you.

Sincerely,

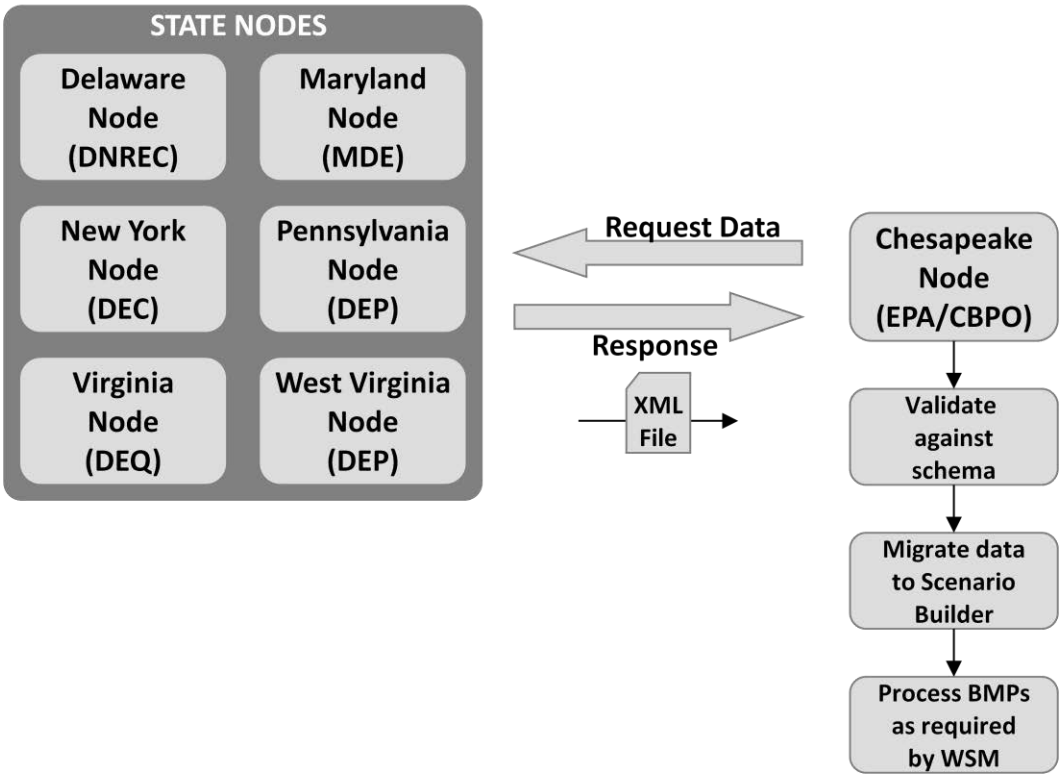
John Dawes
Chair, Citizens Advisory Committee

APPENDIX F. NEIEN Description

[Editor's note: This is a very rough, simple description. Citations are still needed. The appendix will be expanded for the next version]

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 CBP 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. The CBP 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.

In the Bay Program partnership each state has at least one node. EPA has one node, the "Central Data Exchange" (CDX), and the CBPO has one node, the "Chesapeake Node." A node can push data to, or pull data from, another node if the node has correct permission, and the data is formatted according to a standard (schema) and transmitted in an exchange format (typically an XML file). Data exchanges are governed by Trading Partner Agreements (TPA's) that document the rules of the exchange – permissions, standards, etc. BMP data from the XML is migrated into Scenario Builder and is processed according to Watershed Model needs, based on rules developed in consultation with the state and documented in the appropriate Quality Assurance Project Plan (QAPP).



APPENDIX G. Chesapeake Bay Program Partnership's BMP Verification Principles[1]

The priority of the Chesapeake Bay Program (CBP) Partnership is the implementation of the Chesapeake Bay TMDL, the jurisdictions' Watershed Implementation Plans, and 2-year milestones. The Partnership has committed to the development of a basinwide best management practice (BMP) verification framework for use by the seven watershed jurisdictions to assure data quality for BMP reporting for annual Model Progress runs. The CBP Partnership will establish a BMP Verification Review Panel which will examine the degree to which a jurisdiction's program meets the parameters established by the Partnership's BMP verification framework. This review will include an examination of existing BMP measurements, accounting, and inspection systems and any proposed improvements to those systems submitted for CBP Partnership review. The Partnership recognizes that some jurisdictional programs may already achieve some of these principles and may not require significant modification or enhancements.

The CBP Partnership has 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. The process for verifying tradable nutrient credits or offsets is a separate, distinct process not addressed either by these principles or through the partnership's BMP verification framework.

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. Verification helps ensure the public of achievement of the expected nitrogen, phosphorus, and sediment pollutant load reductions over time. The CBP Partnership will build from existing practice tracking and reporting systems and work towards achieving or maintaining the following principles.

PRINCIPLE 1: PRACTICE REPORTING
Verification is required for practices, treatments, and technologies reported for nitrogen, phosphorus, and/or sediment pollutant load reduction credit through the Chesapeake Bay Program (CBP) partnership.

Verification protocols may reflect differing tools and timelines for measurement, as appropriate, for a specific BMP. For example:

- A permit (e.g., MS4) may establish periodic inspections for a regulatory BMP;
- A contract may govern examinations of a cost-shared structural (e.g., manure storage structure) or annual (e.g., cover crops) BMPs; or
- A statistical sampling may best define measurement for non-cost shared structural, annual and/or management BMPs.

[1] Adopted by the Chesapeake Bay Program Partnership's Principals' Staff Committee at its December 5, 2012 meeting.

Verification protocols will ensure that under normal operating conditions:

- Structural practices are properly designed, installed, and functionally maintained to ensure that they are achieving the expected nitrogen, phosphorus, and sediment pollutant load reductions reviewed and approved to by the CBP Partnership;
- Practices, including annual practices, meet the CBP Partnership's implementation and management definitions;
- Practices are consistent with or functionally equivalent to established practice definitions and/or standards;
- Practices are not double counted; and
- Practices are currently functional at the time of seeking credit and not removed from the landscape.

For verified practices not consistent with, nor fully or partially functionally equivalent to, established practice definitions and/or standards, partners and stakeholders can seek CBP Partnership approval for crediting through the established CBP Partnership's BMP review protocol.

Any practice, treatment, and technology (or partial or full equivalency) approved by the CBP Partnership that is properly tracked, verified, and reported will be incorporated into the CBP Partnership's models and credited in the accounting of progress toward the jurisdictions' milestones and in the interpretation of observed trends in monitoring data.

PRINCIPLE 2: SCIENTIFIC RIGOR

Verification of practices assure effective implementation through scientifically rigorous and defensible, professionally established and accepted sampling, inspection, and certification protocols regardless of funding source (cost share versus non-cost share), source sector (agriculture, urban, etc.), and jurisdiction (state, local). A method and schedule for confirmations to account for implementation progress over time will help ensure scientific rigor. 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.

PRINCIPLE 3: PUBLIC CONFIDENCE

Verification protocols incorporate transparency in both the processes of verification and tracking and reporting of the underlying data. 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.

PRINCIPLE 4: ADAPTIVE MANAGEMENT

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. Verification protocols will recognize existing funding and allow for reasonable levels of flexibility in the allocation or targeting of those funds. Funding shortfalls and process improvements will be identified and acted upon when feasible.

PRINCIPLE 5: SECTOR EQUITY
Each jurisdiction's program should strive to achieve equity in the measurement of functionality and effectiveness of the implemented BMPs among and across the source sectors.

APPENDIX H – BMP Verification Review Panel members

Name	Affiliation
Rich Batiuk (Coord.)	U.S. EPA, Chesapeake Bay Program Office (CBPO)
Jeremy Hanson (Staff)	Chesapeake Research Consortium, CBPO
Curtis Dell	USDA NRCS & USDA Agricultural Research Service
Mike Gerel	Sustainable Northwest
Tim Gieseke	Ag Resource Strategies
Rebecca Hanmer	Retired Citizens Advisory Committee
Dianna Hogan	U.S. Geological Survey Eastern Geographic Science Center
Richard Klein	Community and Environmental Defense Services
Andrew Sharpley	University of Arkansas
Tom Simpson	Water Stewardship, Inc
Gordon Smith	Wildlife Works Carbon LLC
Rebecca Stack	District of Columbia Department of the Environment (DDOE)
Robert Traver	Villanova University, Department of Civil & Environmental Engineering
Dana York	Green Earth Connection
Dan Zimmerman	Warwick Township

Curtis Dell, Ph.D.
Research Soil Scientist, USDA-ARS-Pasture Systems and Watershed Management Research Unit; USDA-NRCS Science Advisor for the Chesapeake Bay Watershed, and; Adjunct Associate Professor, Ecosystem Science and Management Department, Penn State University.

Curtis Dell received a B.S. in Agronomy (1985) and M.S. in Soil Microbiology (1991) from Purdue University, and a Ph.D. in Soil Microbiology from Kansas State University (1998). After completing his PhD, he spent one year as a Congressional Science Fellow in the office of U.S. Senator Kent Conrad of North Dakota and two years as a post-doctoral Research Associate at Michigan State University. Since 2001, he has been a Research Soil Scientist with the USDAARS at University Park, Pennsylvania. His research has focused on carbon and nitrogen cycling in agricultural soils and the impact of nutrient management on water and air quality. Dr. Dell currently lead projects studying impacts of using various manure application equipment on ammonia and nitrous oxide emissions from soil; soil carbon sequestration and nitrous oxide emissions with switchgrass grown for biofuel feedstocks and in sustainable dairy forage rotations; and utilization of slow release and inhibitor- treated nitrogen fertilizers to reduce nitrogen gas emissions and enhance crop uptake. He is also part of a team researching impacts of various aspects of manure management on water quality. Currently, he is on a special assignment with USDA-NRCS as Science Advisory for the Chesapeake Bay Watershed, where he provides input on the new and modified agricultural conservation practices to help reduce nutrient inputs into the Bay.

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Mike Gerel
Klamath Program Director, Sustainable Northwest

Mike Gerel leads Sustainable Northwest's work in the Klamath River Basin to help resolve years of high profile water disputes and bring environmental and economic health to a region uniquely rich in biodiversity, agricultural productivity, culture. He has 20 years' experience directing complex water resource science and policy efforts with stops at the Chesapeake Bay Foundation, Sustainable Conservation, the Virginia Department of Conservation, and U.S. EPA contractors. Mike was integral to the creation of the landmark new plan that will guide restoration of the Chesapeake Bay ecosystem. He is a skilled communicator and strategic thinker with a special knack for finding science-based, collaborative solutions that balance the needs of natural resources and people. Mike has a Masters in Environmental Science & Policy from Johns Hopkins University, Bachelors in Biology from the University of Richmond, is a fellow with the Virginia Natural Resource Leadership Institute, and serves on an U.S. EPA Chesapeake Bay restoration practice verification expert panel. Mike is both an avid outdoorsman and indoorsman, enjoying hiking, biking, independent music, baseball on TV, and trying to keep up with his fiancée Jess and 3-year old lab Moka.

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Tim Gieseke
President, Ag Resource Strategies, LLC

Tim Gieseke is president of Ag Resource Strategies, LLC; a business addressing the challenge of integrating food production and natural resource management to reap the best of both worlds. His current and past efforts include natural resource assessment projects with non-government organizations and local, state and federal agencies. He has developed and implemented environmental quality assurance processes on several hundred farms with support from livestock groups including Minnesota Milk Producers Association, and the Minnesota Department of Agriculture.
He consults with organizations and project such as United Nations Foundation, 25x25, and US Water Alliance on ecosystem service market research and development. For the CRP Readiness Initiative, an effort by NRCS and the University of Wisconsin to expand the conservation delivery system by training local government, NGO and private sector professionals, he develops curriculum and provides training in the Midwest. In 2011, he published *EcoCommerce 101: Adding an ecological dimension to the economy*, a book describing a process for including agro-environmental externalities into the economy.
In the decades prior to beginning his business in 2007, his career included farming, local government conservation, farm bill policy analysis, and he received his master's degree in environmental sciences.

He, his wife and three boys reside on and manage their fourth-generation farm in southern Minnesota.

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Rebecca Hanmer
Retired, Chesapeake Bay Program Citizens Advisory Committee

Rebecca W. Hanmer is a member of the Chesapeake Bay Program's Citizens Advisory Committee. She retired in 2007 after a four decade government career that included over 30 years in the U.S. Environmental Protection Agency. At EPA, she held a number of senior positions, including Director of EPA's Office of Federal Activities; Deputy Regional Administrator in Region I (Boston); Regional Administrator in Region IV (Atlanta); Director, HQ Office of Water Enforcement and Permits; Deputy Assistant Administrator for Water and Acting Assistant Administrator for Water; Acting Regional Administrator in Region VIII (Denver); Water Protection Division Director in Region III (Philadelphia) and Director, Chesapeake Bay Program Office (2002-2007). She has administered Clean Water Act programs at both policy and operational levels, including water quality standards and the NPDES permit program.

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Dianna Hogan, Ph.D.
Research Physical Scientist, Eastern Geographic Science Center, U.S. Geological Survey

Dianna Hogan is a Research Physical Scientist with the U.S. Geological Survey Eastern Geographic Science Center in Reston, Virginia. She has a BS in Biochemistry, a MS in Biology, and a PhD in Environmental Science and Public Policy. Her research focuses on ecosystem services and the environmental effects of land use on natural systems. Current and recent projects include an assessment of the ability of urban stormwater Best Management Practices (BMPs) in the Chesapeake Bay Watershed to mitigate water quality, quantity, and flow; and the development of an ecological value model to support land use decision-making in south Florida.

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Richard Klein
Founder and President, Community & Environmental Defense Services

Richard Klein is the author of *How To Win Land Development Issues* and *Everyone Wins: A Citizens Guide To Development*, which was published by the American Planning Association. He has been working in the community and environmental advocacy field for 36 years. From 1979 to 1987 he worked for the Maryland Department of Natural Resources and spent ten of those years as director of the Maryland Save Our Streams program.

In 1987, the author founded Community & Environmental Defense Services (www.ceds.org), a company which assists people in resolving their concerns about activities posing a threat to a neighborhood or the environment. Since 1987 he has evaluated hundreds of proposed development projects for impacts to neighborhoods, aquatic systems, and other environmental resources. These projects range from a single acre to massive residential-commercial complexes and range from coast to coast. In most cases these evaluations result in recommendations for minimizing impacts while allowing applicants to achieve most of their goals. The author has testified before many administrative and judicial decision-makers both as a lay and expert witness.

Over his 36-year career the author has helped citizens with just about every form of growth and growth impact imaginable; not just those presented in *How To Win Land Development Issues* but many more. This experience allows Mr. Klein to quickly identify the impacts likely to result from a proposed development project and to swiftly formulate winning solutions. His background as both an agency insider and citizen advocate also allows the author to effectively negotiate with regulatory staff and other decision-makers. This experience accounts for the unusually high success rate (75%) of CEDS in resolving citizen concerns.

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Andrew Sharpley, Ph.D.
In 2006, Andrew Sharpley joined the Department of Crop, Soil and Environmental Sciences, University of Arkansas, Fayetteville. He is Co-Chair of the Division of Agriculture's Environmental Task Force and Discovery Farms Program. He received degrees from the University of North Wales, United Kingdom in 1973 and Massey University, New Zealand in 1977, and spent 25 years with the USDA-ARS in Oklahoma and then Pennsylvania. His research investigates the cycling of phosphorus in soil-plant-water systems in relation to soil productivity and water quality and includes the management of animal manures, fertilizers, and crop residues. He also evaluates the role of stream and river sediments in modifying phosphorus transport and response of receiving lakes and reservoirs. He developed decision making tools widely used by US EPA and NRCS for agricultural field staff, to identify sensitive areas of the landscape and to target management alternatives and remedial measures that have reduced the risk of nutrient loss from farms. He is Editor-in-Chief of the Soil Science Society of America, in 2008 was inducted into the USDA-ARS Hall of Fame, and in 2012 received the Christopher Columbus Foundation Agriscience Award. Dr. Sharpley serves on National Academy of Science Panels and EPA's Scientific Advisory Board.

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President and Executive Director, Water Stewardship, Inc.

Tom Simpson was a Professor of Soil Science at VA Tech and University of Maryland prior to founding Water Stewardship, Inc. in 2008 where he is Senior Scientist and Executive Director for Water Stewardship Inc. He manages the organization and provides scientific leadership in developing new and innovative approaches and tools that support conservation assessment, verification and implementation primarily related to water quality. Dr. Simpson led WSI's development of assessment and verification protocols for farm conservation and ecosystem service markets and developed the logic framework for the WSI Nutrient Load Estimator software. He helps lead efforts on systems approaches to BMP implementation, and BMP interactions and function at the landscape level in the U.S. and internationally. He led the 2006-2009 project to revise definitions and efficiencies for Chesapeake Bay Program BMPs. Dr. Simpson has written numerous papers and book chapters on soil and water quality and BMP effectiveness and has served on numerous expert panels to inform policy decisions and continues to provide science support to both public and private decision makers.

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Gordon Smith, Ph.D
Carbon Development Director, Wildlife Works

Since 1994, Gordon Smith, Ph.D., has worked on mitigating greenhouse gas emissions by changing land use. He has expertise in forest carbon sequestration, avoided forest emissions (REDD+), soil carbon, manure management, fertilizer nitrous oxide, and soil methane. Dr. Smith has worked world wide on the entire spectrum of mitigation, including modeling likely emission benefits of project and programmatic activities, policy analysis for governments, standard and methodology development for offset registries, project development, project and methodology validation and verification, and verifier accreditation. He is an expert in biomass carbon sampling efficiency and designing sampling systems to meet precision goals. He is on the editorial board of the journal *Greenhouse Gas Measurement & Management*, is a member of the Greenhouse Gas Management Institute advisory committee, is a VCS expert in afforestation/deforestation, improved forest management, avoided deforestation (REDD), and

agricultural land management, and is a member of the ACR AFOLU Technical Committee. He is currently Carbon Development Director for the REDD project developer Wildlife Works.

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Rebecca Stack
Low Impact Development (LID) Specialist, District of Columbia Department of Environment

Rebecca Stack serves as the Low Impact Development (LID) Specialist for the District of Columbia Department of Environment. Her work focuses on removing barriers to wide spread implementation of LID in the District. She collaborates across the public and private sector and works with permit reviewers to incorporate LID into projects. Rebecca received her civil engineering degree from Northeastern University and has researched bioretention field performance at University Maryland College Park. Rebecca has several years teaching experience including stream restoration, water quality and wetland ecology courses. Rebecca is currently leading the effort to update the District of Columbia's Stormwater Management Guidebook to include the latest suite of low impact development BMPs. Rebecca is a co-principal investigator on several District-wide research projects including a neighborhood scale investigation of the effects of low impact development retrofits on stormwater volumes.

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Robert Traver is a Professor in the Department of Civil and Environmental Engineering at Villanova University, and Director of both Center for the Advancement of Sustainability in Engineering, and the Villanva Urban Stormwater Partnership. He has conducted research on topics that include modeling of stream hydraulics, urban hydrology, water quality, and sustainable stormwater management. He initiated the Stormwater Best Management Practice Demonstration and Research Park on the Villanova Campus. Dr Traver served on ASCE's External Review Panel (ERP) of the Corps investigation of Hurricane Katrina, and was a member of the National Academies Committee entitled *Reducing Stormwater Discharge Contributions to Water Pollution*. Dr Traver received his BSCE degree from the Virginia Military Institute, his MCE from Villanova, and his Ph.D. from The Pennsylvania State University. He is a licensed Professional Engineer.

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Dana York
President, Green Earth Connection, LLC

Dana York retired from the Natural Resource Conservation Service in January 2011 after a 34-year career with the Agency. She has formed a consulting group, Green Earth Connection to bring her expertise to the agricultural and environmental communities. Her training and organization leadership experience is also used to help organizations become more effective and efficient within current, expanding or decreasing resources. Her expertise includes: training and implementing BMP Identification projects, nutrient management, nutrient trading, the EPA Chesapeake Bay model and partnership building. She specializes in the development of dynamic business plans and project implementation with implementable and measurable goals and actions.

Prior to her retirement she was the Director of the Watershed and Landscape Programs Division, NRCS, in January 2010, where she directed the NRCS Watershed, Conservation Technical Assistance and Conservation Initiatives Programs. These programs assist communities with planning and implementing natural resource conservation on private lands from individual farms to large-scale watershed projects. She also coordinated the Agency's targeted efforts in large watersheds such as the Chesapeake Bay, Great Lakes and Upper Mississippi River Basin. Prior to returning to Washington, she was the Senior Advisor to the Chesapeake Bay Program in Annapolis, MD. As the Senior Advisor, she was the Agency's representative at the Environmental Protection Agency's Bay Program office and worked to implement the 2009 Chesapeake Bay Presidential Executive Order. From 2004 to 2009 she served at the Associate Chief for the Natural Resources Conservation Service. As the Associate Chief she managed the agency's overall programs and operations, including a $3.2 billion annual budget.
She joined the NRCS National Headquarters staff in 1999 as a special assistant to the Chief and then as the Acting Director of Budget Planning Analysis Division, which is responsible for all Agency budget formulation. In 2001, she became the director of the NRCS Operations Management and Oversight Division with responsibility for the agency's operations management, including monitoring operations, business planning and accountability, and development and monitoring of accountability information systems. She also led the agency's efforts on quality assurance, oversight and evaluation.

York began her 34-year career with the former Soil Conservation Service (SCS) as a student trainee while attending Tennessee Technological University. She has held various positions with the agency in Tennessee, Georgia and Ohio, including Soil Conservationist, District Conservationist, State Resource Conservationist, Partnership Liaison and Deputy State Conservationist.

York is a native of Tennessee. She received a Bachelor of Science degree in Agricultural Science from Tennessee Technological University and a Master's degree in Industrial/Organizational Psychology from Middle Tennessee State University with an emphasis in organizational design and measurement, business planning and leading organizations and employees through change.

In September of 2007 Dana was awarded the President's Distinguished Rank Award, which is the highest award a career employee can receive for their career as a Senior Executive. In 2008 she received 2008 Agricultural Alumnus of the year from Tennessee Technological University.

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Dan Zimmerman
Manager, Warwick Township, Lancaster County

As manager of Warwick Township since 1994, Dan Zimmerman oversees the day to day operations of the Administration, Public Works, and Police Departments. He also serves as the Administrator for the Warwick Township Municipal Authority. During his tenure, he has implemented a successful Transfer of Development Rights program. He continues to work with the Lancaster County Agricultural Preserve Board, Farmland Trust, and property owners to facilitate the Township's agricultural preservation program. He also works cooperatively with multiple agencies, land owners and developers to improve traffic movement through Warwick Township, including extensive improvements along the SR 501 corridor. Mr. Zimmerman has also fostered an innovative Lititz Run watershed management plan and a township-wide trails program. He serves as Secretary to the Lititz Run Watershed Alliance, and continues to facilitate stream improvement projects in Warwick Township.

Before joining Warwick Township, Dan was Manager of Mount Joy Borough, Lancaster County, for seven years, and was with Hanover Borough, Lancaster County, also for seven years. He served as the Region Four Representative for the Lancaster County Planning Commission from 1992 to 2004, including serving as Chairman in 2001 and 2002. Dan has served on the Lancaster County Metropolitan Planning Organization since 1992, and is also Vice-Chairman of the Lancaster County Transportation Authority, which he has served on since 2000. Dan has also been a member of the Lancaster County Agricultural Preserve Board since 2005. He serves as Secretary to the Lititz Run Watershed Alliance, and is a member of the Pennsylvania Planning Association. He holds both a Masters and Bachelors degree from Shippensburg University.

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APPENDIX I. BMP Verification Review Panel charge

Approved September 13, 2012
by CBP Management Board

Overview

The Chesapeake Bay Program partnership has embarked on a precedent-setting process for developing a basinwide BMP verification framework supporting state specific BMP verification programs. In addition to partnership adoption of a set of verification principles and development of sector focused verification protocols, an independent panel of national and regional verification experts will be established. The BMP Verification Review Panel will provide advice, feedback, and recommendations to the Chesapeake Bay Program partnership as it develops a BMP Verification Program for confirming nutrient and sediment reductions from the full array of best management practices and technologies implemented across all sources (agriculture, urban, on-site treatment systems, wastewater dischargers, etc.) in the Chesapeake Bay Watershed.

Charge

The BMP Verification Review Panel (the Panel) will provide advice, feedback, and recommendations to the Chesapeake Bay Program partnership as it develops its Verification Program.

The Panel will review and provide feedback on and recommendations for changes to the draft set of BMP verification principles.

Individual panel members will work directly with the appropriate source sector/habitat restoration workgroups, providing advice, feedback, and recommendations during the respective workgroup's development of verification protocol specific to their sector/habitat.

The Panel will use the verification principles as criteria for assessing the strengths and any possible vulnerabilities in the state verification programs, providing written feedback and recommendations to the Chesapeake Bay Program's BMP Verification Committee on each jurisdiction's program.

The Panel will also evaluate whether the level of verification rigor is consistent across source sectors and across all seven watershed jurisdictions.

Membership

The Panel will be comprised of recognized national and regional verification, certification, and mitigation tracking experts who are independent of the Chesapeake Bay Program partnership.

The panel as a whole will include expertise and proficiencies in as many of the following areas as possible:

- Applied knowledge and experience in developing and managing verification programs.
- Applied knowledge and experience in balancing verification needs with resource/staff needs.

- Knowledge of variety of verification tools (on-the-ground data collection, verification techniques, statistical techniques, survey techniques, etc.) available and their utility and application for verifying practices across a multitude of sources.
- Expertise in the social sciences with regard to understanding how to best structure surveys and other mechanisms for gathering data and verifying actions taken.
- Knowledge of water quality-related nutrient and sediment reduction practices and innovative technologies within various source sectors (agriculture, urban, on-site systems, wastewater, etc.).
- Knowledge of the Chesapeake Bay Program, TMDLs, and concept of reasonable assurance for nonpoint source nutrient/sediment reductions.
- Knowledge and expertise necessary to really work through the entire verification framework coming forth from the work of the partnership.
- Understanding of how practices and technologies and their effectiveness may vary by geographic region in the watershed.
- Balance of membership from government, academic, programmatic, private sector, etc.

Specific members are sought from the following types of members, but there is no requirement for ensuring all of these potential members are included on the panel:

- Members with specific source sector experience in agriculture, stormwater, and on-site treatment systems.
- Member from the prior National Academy of Science/National Research Council's Chesapeake Bay Independent Evaluation Committee (see separate file listing the Committee members).
- Member(s) with recognized national perspective and can provide a larger view than just a regional and local focus.
- Member with from a local government with well recognized hands-on experience with verification at the locality scale.
- Member with demonstrated habitat restoration and mitigation program verification related experience.
- Private sector member with ISO 9000/14000 experience.
- Member with LEED/Green Building Council experience with verification procedures.
- Member(s) from the Chesapeake Bay Commission's Economics of Nutrient Trading Study Advisory Council members (see separate file listing Advisory Council members).
- Members with recognized regional/local expertise so the members come to the table already knowing the Bay watershed states, the issues, and the challenges being faced.

All panelists will be asked to identify any potential financial or other conflicts of interest prior to serving on the Panel. The Panel will have an equitable representation of experts, affiliations, and source sector and geographic knowledge. These conditions will ensure the Panel is not biased toward particular interests or regions.

The Panel may elect to solicit input or presentations from groups that may not qualify as panel participants but may provide valuable insights into the verification issue that will help with its review.

Appendix J. BMP Verification Protocols

I. Agriculture Verification Protocol

Version: November 26, 2012 [draft]

[Editor's note: This narrative was developed for a November 2012 version (v3.4) of the Protocol Concept. It is being updated to reflect the final version that was approved by the AgWG on July 11th, 2013.]

Summary

In response to an independent program evaluation by the National Academy of Sciences, and the federal documentation requirements of the EPA Chesapeake Bay TMDL, the Chesapeake Bay Program (CBP) partnership has set in motion a partnership led process for developing a programmatic data verification standard. The partnership's Agriculture Workgroup (AgWG) has subsequently taken responsibility for developing a verification protocol for providing agricultural data to the EPA Chesapeake Bay Program Office (CBPO) for representing actions to address both nutrient and sediment sources of contributions to the Bay. The following paper is intended to provide background assistance support for the partnership review of the AgWG verification document entitled "***Draft Agricultural Verification Protocol Concept Version 3.4***" dated November 21, 2012. The Concept Version 3.4 represents multiple months of discussions and suggestions by the diverse membership of the AgWG in order to create a programmatic verification standard for implementation by the partnership.

Decision Background

Utilizing programmatic BMP verification principles developed by the Water Quality Goal Implementation Team's (WQGIT) BMP Verification Steering Committee, the membership of the AgWG has considered a series of potential options for developing an agricultural verification protocol. The potential options have each been weighed on their individual merits, and both positive and non-positive attributes identified.

> Version 1: Create a limited and uniform verification protocol standard for all practices and programs.
>
> Version 2.1: Create diverse verification protocol options and identify the levels of confidence for each protocol. Limit the units of BMP implementation reported by the degree of relative data confidence (e.g. 90% relative data confidence x tracked units = reported units). The standard model BMP effectiveness values would be applied to the reported units.
>
> Version 2.2: Create diverse protocol options and identify the levels of confidence for each protocol. Limit the model reduction credits for the units of BMP implementation reported by the degree of relative data confidence (e.g. 90% relative data confidence x BMP effectiveness values = modified BMP effectiveness values to be applied).
>
> Version 3: Create diverse protocol options and apply a standard minimum threshold of relative data confidence to allow 100% of tracked BMP units to be reported and receive 100% of BMP effectiveness values.

In considering the above verification options, the membership of the AgWG identified concerns with Version 1 in that it did not conform to the diversity of agricultural practices and implementation programs across six jurisdictions. Implementing a limited verification protocol standard would likely not offer sufficient capacity to allow adequate BMP implementation reporting. Of the positive considerations, Version 1 option does provide 100% acceptance of tracked and reported practices and the application of 100% of the model BMP effectiveness values.

In contrast with Version 1, Versions 2.1 and 2.2 offers multiple potential verification protocol options that are more reflective of the diversity of agricultural practices and programs. The multiple protocol options also produce varying levels of relative data confidence between the protocol options, as well as between practice types within a single protocol. To address the issue of widely varying relative data confidence levels, the Version 2.1 implements a calculation method to align the protocol's level of confidence to the units of reported BMPs. The foremost concern of this method by the AgWG was that by limiting the units of tracked BMPs that would be reported to the CBP models could jeopardize local community support. In addition, the verification literature search and national expert interview process that was implemented by the AgWG did not yield adequate scientific documentation to assign defensible relative data verification levels to all protocol options for all practices.

Version 2.2 addresses the issue of widely varying relative data confidence levels by implementing a calculation method similar to Version 2.2. Instead of aligning the protocol's level of confidence to the units of reported BMPs, this version applies the alignment to the model BMP effectiveness values. Version 2.2 allows all tracked practices to be reported for nutrient and sediment reduction credits, however, the BMP effectiveness values are reflective of the associated level of data confidence. Verification protocols yielding lower relative data confidence levels would receive compensate model BMP effectiveness credit. The chief concern of the AgWG was that the verification literature search and national expert interview process that was implemented by the workgroup did not yield adequate scientific documentation to assign defensible relative data verification levels to all protocol options for all practices.

The current Version 3 protocol encompasses the positive benefits of Versions 2.1 and 2.2 by incorporating multiple protocol options to address the diversity of agricultural practices and jurisdictions. In contrast to the earlier versions, Version 3 recognizes the widely varying relative data confidence levels between protocol options, as well as between practices within a single protocol, by establishing an up-front standard confidence level threshold for 100% model BMP effectiveness credit. All protocol options are available to the partnership, but a minimum data confidence threshold is required to be met to allow all tracked BMPs to be reported for full model credit. The verification literature search and national expert interview process that was implemented by the AgWG appears capable to yield adequate scientific documentation to assign a defensible threshold relative data verification levels to all protocol options for all practices. The AgWG recognizes benefits in exceeding the minimum data confidence threshold, and could encourage higher levels by the partnership where possible.

Verification Protocol Elements (Version 3.4 Matrix)

1) Statistical Data Confidence Threshold (Header)
   All tracked BMP data to be reported to and credited by the Chesapeake Bay Program models would be required to meet at a minimum a documented 80 percent level of statistical confidence. The

preference would be for the level of statistical data confidence to be higher than the minimum. The proposed figure of 80 percent is based on the mid-point of a range of documented data confidence levels identified by the Tetra Tech verification study commissioned by the Agriculture Workgroup. This level of statistical confidence is representative of a minimum of 80 percent of tracked BMP units (e.g. acres, number, etc.) that could be verified under a full on-site assessment to be implemented, operated and maintained according to the appropriate BMP standards.

2) Agricultural BMP Verification Protocol (Column 1)
This column lists identified categories of verification based on the type of tracking assessment and the type of entity that would be collecting and verifying the data.

3) Assessment Method (Column 2)
This describes in greater detail the general assessment method and the entity that would be collecting and verifying the data.

4) Conservation Practice Category (Columns 3-7)
The appropriate assessment method and its associated data confidence level is affected by the type of agricultural BMPs being assessed. The appropriate verification method for annual practices such as cover crops would likely be different from structural or management BMPs. Management BMPs were further subdivided into Plans and Practices due to the same differences as noted above. Each verification protocol method has been reviewed in terms of the conservation practice categories to determine if the assessment method is appropriate and realistically able to achieve the confidence threshold. Categories with a "Yes" are viewed as appropriate and those with a "No" are not. Even if a assessment method is noted as being appropriate for a category of BMPs, significant verification efforts may still be required to meet the confidence threshold such as increased percentages of QA/QC spot checks or more frequent compliance inspections for example.

5) Cost-Sharing Information (Columns 8-11)
These columns denote the potential differences for BMPs designed and financed through federal, state, NGO and private sources for each assessment method. Not all methods are appropriate to track and verify practices implemented, operated, and maintained under these categories.

6) Other BMP Information (Columns 12-15)
This section of the verification matrix describe the ability of each assessment method to verify if the tracked practice meets the appropriate BMP specification, or if it represents a functional equivalent or non-functional equivalent BMP. In addition, the identification of the date of practice implementation is critical to determining if the BMP is considered part of the model calibration period or afterward for reporting purposes.

7) Verification Methodology (Column 16)
Each assessment method utilizes a unique methodology to track, verify and report implemented practices. BMPs being assessed and verified through permit or financial incentive programs are limited to the period of the active permit or contractual agreement for the practice(s). Once outside of the requirements of a permit or financial incentive program, entities are directed to the use of alternative assessment methods for the tracking, verification and reporting of these practices.

8) Verification Issues (Column 17)
   Each assessment method poses limitations and potential verification issues that need to be recognized and addressed in order to obtain the statistical data confidence threshold requirements. The frequency of compliance inspections, the use of appropriately trained and certified personnel, and the availability of data at the required scale are examples of potential data errors which may lower the statistical confidence of the data.

9) Relative Cost (Column 18)
   The cost column provides a generalist view of the relative costs in comparison to one another. They are represented as high, medium or low based on the range of implementation costs identified in the Tetra Tech research report commissioned by the Agriculture Workgroup.

10) Relative Scientific Defensibility (Column 19)
    Relative comparative values of high, medium or low are assigned to each assessment method pertaining to their scientific defensibility based on the findings of the Tetra Tech research commissioned by the Agriculture Workgroup. The values are reflective of available documentation to support the assessment method in verifying data at or above the threshold level.

11) Relative Accountability (Column 20)
    Relative comparative values of high, medium or low are assigned to each assessment method pertaining to the accountability of the entity tracking and verifying the data. Data originating from permit or financial assistance programs with tracking and verification by trained agency staff, and potential consequences for data misrepresentation, will have a relatively high level of accountability for example. Voluntary self-reported information by private individuals with limited or no training would consequently have a low potential value of accountability.

12) Relative Transparency (Column 21)
    Relative comparative values of high, medium or low are assigned to each assessment method based on the transparency of the reported data by outside reviewers. Practices identified through permit programs would have a high transparency since the information is part of the public record and are reviewable by outside entities. Assessment methods that aggregate the tracked and verified data to protect individual entities would have a lower transparency for an outside review.

Intended Use of the Verification Matrix and Supporting Documentation

The final approved agricultural verification protocol matrix with supporting documentation is intended to provide the partnership with the structure and expectations of verifying tracked data for reporting to the Chesapeake Bay Program for nutrient and sediment reduction credits. The completed verification protocol package will include the approved protocol matrix, an expanded version of this document, and the completed Tetra Tech summary verification report providing the documented findings from the national literature search and expert interviews. The protocol package will be designed to provide the guidance for agencies and partners to develop more program specific and detailed data verification plans for submission to the Chesapeake Bay Program partnership and the independent verification review panel for review and acceptance. In the absence of documented statistical data confidence information, the services of a qualified statistician could be invaluable to demonstrate that a verification protocol meets the minimum threshold level. Agency or partner verification plans that fail to meet the minimum confidence threshold will need to consider implementing increased levels of QA/QC procedures, or

adopting a more robust assessment method for the particular practice as examples. Verified tracked data that meets the criteria of the approved agricultural verification protocols will be eligible for reporting to the Chesapeake Bay Program models for full BMP credit reduction values.

Table 4. Agricultural Verification Protocol Concept (Final, AgWG Approved Version 3.5.5)

Chesapeake Bay Program Agriculture Workgroup (AgWG)

For all agricultural BMP protocol activities, verification procedures must: 1) be established that demonstrate an 80% or greater confidence level that the subject BMP has been implemented, is currently operational, and is being maintained to meet the BMP definition for standards and requirements; and 2) be in compliance with the Chesapeake Bay Program Partnership BMP Verification Principles, including any supporting addendums.

Annual BMPs: Cover Crops; Commodity Cover Crops; Dairy precision feeding; Swine Phytase; Poultry litter transport; Poultry Litter Injection; Poultry litter treatment; Poultry Phytase; Conservation Tillage / **Interim BMPs-** Dairy manure injection; Annual No-till

Structural BMPs: Animal waste management system; Barnyard runoff control; Decision agriculture; Biofilters; Lagoon covers; Loafing lot management; Mortality composters; Non-urban stream restoration: shoreline erosion control; Off-steam watering w/o fencing; Stream access control with fencing; Pasture alternate watering systems; Soil conservation & water quality plan elements; Water control structures; Wetland restoration / **Interim BMPs-** Dirt & gravel road erosion & sediment control; Non-urban steam restoration; P sorbing materials in Ag ditches;

Management BMPs- Plans: Enhanced nutrient management; Horse pasture management; Nutrient management; Precision Intensive rotational grazing; Prescribed grazing; Soil conservation & water quality plans / **Interim BMPs-** Nutrient management as BMP only

Management BMPs- Practices: Alternate crops; Continuous no-till; Forest buffers; Grass buffers; Land retirement; Steam-side forest buffers; Stream-side grass buffers; Stream-side forest buffers; Stream-side wetland restoration; Tree planting / **Interim BMPs-** Cropland irrigation management; Irrigation water capture reuse; Tree planting: vegetative environmental buffers- poultry;

Agricultural BMP Verification Protocol Category	Assessment Method	Conservation Practice Category				Cost-Sharing Information					BMP Performance							Verification Methodology	Verification Issues
		Annual BMPs	Structural BMPs	Management BMPs: Plans	Management BMPs: Practices	Federal C/S	State C/S	NGO C/S	Private Funded	Previously C/S BMPs (Expired Contract)	BMP Detection	Meets USDA/State Design Specs	Meets O&M Specs	Functionally Equivalent (Non-spec)	Non-functional Equivalent (Non-spec)	Installation Date (M/Y)	Expiration Date (M/Y)		
1.) Permit Issuing Programs	Verified compliance with federal NPDES (CAFO) or state agricultural operational permit program requirements.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	Through on-site permit compliance inspections by trained agency personnel.	Frequency of compliance inspections during permit life span.
2.) Regulatory Programs	Verified compliance with federal or state agricultural regulatory requirements (non-operational permit).	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	Through on-site regulatory compliance inspections by trained agency personnel.	Frequency and percent coverage of regulatory compliance inspections.
3.) Financial Incentive Programs	Verified compliance with federal or state program contractual requirements.	✓	✓		✓	✓	✓	?	✗	✗	✓	✓	✓	✗	✗	✓	✓	Through on-site contractual compliance inspections by trained agency personnel.	Frequency of compliance inspections during contractual life span.
4.) Farm Inventory	Farm inventory by trained and certified federal, state, and/or county agency personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel while collecting data, check databases.	Accredited data source through training/certification.
5.) Farm Inventory	Farm inventory by trained and certified independent third-party personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel while collecting data, check databases.	Accredited data source through training/certification.
6.) Farm Inventory	Farm inventory by trained and certified agricultural consultant personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel while collecting data, check databases.	Accredited data source through training/certification.
7.) Farm Inventory	Farmer completes self-certified inventory survey and trained and certified federal, state and/or county personnel visit site to confirm.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Through on-site visit by trained personnel.	% of checks determines acceptance of some practices.
8.) Farm Inventory	Farmer completes in-office self-certified inventory with trained and certified federal, state and/or county agency personnel.	✓	✗		✓	?	?	?	?	?	✓	✗	✗	✗	✗	?	?	Farmer certified during the visit at USDA or governmental office.	Farmer Self certification with Professional Assistance

9.) Farm Inventory	Farmer with training and certification completes self-certified inventory survey.	✓	x		✓	?	?	?	?	?	✓	x	x	x	x	?	?	Farmer trained and certified by governmental agency.	Farmer self-certification with training and certification.
10.) Farm Inventory	Farmer completes self-certified inventory survey.	?	x		✓	?	?	?	?	?	?	?	?	?	?	?	?	By Farmer self certification when submitted.	Wide variance in knowledge of farmers.
11.) Office Records	Review of existing office records by trained and certified federal, state and/or county agency personnel.	?	✓		?	✓	✓	?	?	✓	x	x	x	x	x	?	?	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Identifies formerly contractual BMPs and may miss many non C/S practices.
12.) Farm Records	Review of existing on-farm records by trained and certified federal, state and/or county agency personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Misses many non-C/S practices
13.) Farm Records	Review of existing on-farm records by trained and certified independent third-party personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Misses many non C/S practices
14.) Farm Records	Review of existing on-farm records by trained and certified agricultural consultant personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓	Trained personnel verify through knowledge of the farm or through calls made to the farmer.	Misses many non C/S practices.
15.) Transect Survey	Transect completed by trained and certified personnel on a County or Watershed scale.	✓	x		x	x	x	x	x	x	✓	✓	✓	✓	✓	?	?	Verified by the trained personnel completing the transect on the ground.	Can only determine existence and quality of practices not source of funding.
16.) CEAP Survey	CEAP survey conducted in-person at field-level with NASS trained and certified personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	?	?	✓	?	NASS certification procedures.	Availability of data at required scale.
17.) NASS Survey	NASS survey conducted via survey with trained and certified personnel.	✓	✓		✓	?	?	?	?	?	✓	?	?	?	?	✓	?	NASS certification procedures.	Availability of data at required scale.
18.) Aerial Photography and Remote Sensing	Remote Sensing with Field Level Visits to Ground Truth Data.	✓	✓		✓	x	x	x	x	x	?	x	x	x	x	?	x	Verification can be same as Aerial Remote Sensing method or by visit to each site to collect and certify data.	Availability of data at required scale, resolution, and timing.
19.) NRI Point (NRCS) or some other statistically selected sites	Statistical survey conducted in-person at field-level with NASS trained and certified personnel.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	NASS certification procedures.	Availability of data at required scale.

II. Forestry Verification Protocol

Version: Final review draft, June 17th, 2013

This section provides information on forestry best management practices (BMPs) and guidance on how to verify them. The principles and protocols described here are consistent with Verification Principles previously established regarding science, performance, technology, and monitoring. Included in this section is a description of how the Forestry Workgroup developed principles and protocols to verify forestry BMPs in the Bay watershed. It is organized as follows:

1. Introduction
2. Forestry BMPs Background
3. Descriptions of Principles and Protocols for Forestry BMPs
4. Process for Developing Forestry BMP Verification Protocols

1. Introduction

The Chesapeake Bay Program partners have, over the past several decades, worked to define, credit, and incentivize practices to help restore the Bay. Pressure to improve the accountability of restoration practices that have been implemented has come from multiple sources including the National Research Council and the Citizens Advisory Committee. The Partnership is undertaking the development of a framework to allow for expanded and more accurate capture of practice implementation and greater confidence in the outcome of those practices. This procedural framework will amount to an affirmation of practices and is called "Verification."

Role of Forestry Work Group in Verification: In 2012, at the request of the Water Quality Goal Implementation Team, the Forestry Work Group began developing principles and protocols for verifying forestry BMPs. The Forestry Work Group, which meets monthly, discussed these principles and protocols at their February, March, June, and August meetings in 2012. In 2013, they were discussed at the February and June meetings. Several written versions of this document were shared with the group over this time and many comments received. Other verbal and written comments were contributed by the Expert Panels for Riparian Forest Buffers and Tree Canopy. The process was greatly aided by interactions with the Agriculture and Stormwater Work Groups who are keenly interested in the forestry practices taking place on those lands. This memo combines all the input that was received and is summarized in Table 1.

1. Table 1. Summary of pertinent information regarding forestry verification protocols.

Verification Protocol	Assessment Method	Conservation Practice Category	Cost-Sharing Information	Verification Methodology	Verification Issues	Relative Cost	Relative Scientific Defensibility	Relative Accountability	Relative Transparency
Expanded Urban Tree Canopy	Local-> State reporting	Urban manage-ment Practice	Not cost-shared	Professional program and satellite monitoring	Aerial sampling and accurate use of tools	Low	High	High	High
Urban Riparian Forest Buffer	Local->State reporting	Urban management Practice	Not cost-shared	Professional program and satellite monitoring	Aerial sampling and accurate use of tools	Med	High	High	High
Ag Riparian Forest Buffer	Verified compliance with federal and/or state program contractual requirements.	Agricultural Management Practice	Primarily cost-shared	Through on-site contractual compliance inspections by trained agency personnel.	In frequency compliance inspections during contractual life span.	Med	Med	High	Med
Ag Tree Planting	Verified compliance with federal or state program contractual requirements.	Agricultural Management Practice	Primarily cost-shared	Through on-site contractual compliance inspections by trained agency personnel.	Infrequent compliance inspections during contractual life span.	Low	Med	High	Med
Forest Harvesting BMPs	Verified compliance with state and local regulations in most places.	Suite of Forest Harvesting Management Practices	Not cost-shared	Through on-site contractual compliance inspections by trained agency personnel.	Harvesting on private land is not regulated in PA, NY	Med	High	Med	High

2. Background on Forestry BMPs

The following Best Management Practices are considered to be forestry BMPs for the purposes of the Verification exercise. Four of the five BMP's are types of tree planting, including tree planting in riparian areas. Tree planting practices apply to Agriculture and Urban landscapes. Forest harvesting BMPs are the only BMPs applied to forest land at this time.

A. Expanded Tree Canopy
B. Urban Riparian Forest Buffers
C. Agricultural Riparian Forest Buffers
D. Agricultural Tree Planting
E. Forest Harvesting

Forests cover the majority of the landscape in each Bay state. Forests are usually not pollution sources, except during forest harvest. There has been a notable disparity in how and whether jurisdictions collect forestry BMP data. Riparian forest buffers planted on agricultural land are one of the BMP's most relied upon to achieve water quality goals in Phase II of State WIPs (Sweeney, pers. comm). Other forestry BMP's play an increasingly important role—especially in the urban sector. For instance, urban forestry BMPs (urban riparian buffers and expanded tree canopy) have only just begun to be regularly reported by the jurisdictions despite having been defined practices for over 10 years.

Agricultural riparian forest buffers and tree planting- These two BMPs overlap with the agriculture source sector and additional protocols may apply. The Forestry Work Group has ample experience in tracking riparian forest buffers on agricultural land having done so since 1997. Each fall, the FWG requests geo-spatial data from the Bay states. The following 10 fields are requested from the state contacts and every year CBPO maps the point data for analysis and record-keeping.

Field 1: Unique identifier (parcel id, etc.)
Field 2: State
Field 3: Latitude
Field 4: Longitude
Field 5: Miles of forest buffer
Field 6: Width of forest buffer
Field 7: Planting date
Field 8: Ownership type (public/private: Federal, state, other public, private)
Field 9: Notes/Comments Field
Field 10: Watershed name or HUC

Riparian forest buffer information now also comes through the USDA data agreement with EPA and USGS. The Forestry Work Group however has not stopped collecting the above data in part because the USDA data does not include width of the buffer. Acres of agricultural tree planting, while not previously reported with regularity to the Bay Program, could be part of this

submission from USDA. These agriculture BMPs are often cost-shared practices and as such, a single project may be funded by multiple agencies.

Expanded Tree Canopy and Urban Buffers—These two practices overlap with the urban sector and additional protocols may apply. Bay states have had urban forestry programs for the past ~30 years having been established after the 1978 Cooperative Forestry Assistance Act. These programs provide assistance through competitive matching grants for urban and community forestry projects including tree planting and maintenance. Other urban forestry grants to localities have become established and localities have developed their own programs because they realize the many benefits (water quality being one) that urban trees bring people and because the investment by the Programs in planning and maintenance of trees has been shown to pay back in multitudes. Other efforts are grassroots. Many localities in the watershed have had assessments done of their tree canopy and have set goals to increase their urban tree canopy (Figure 1). Still the practice has not been consistently reported to the Bay Program for credit.

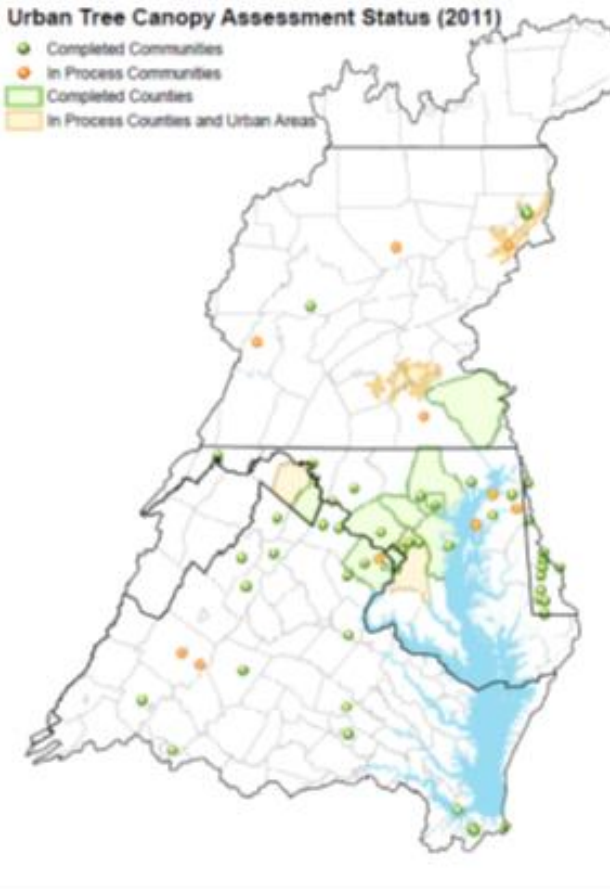

Figure 1. Urban tree canopy assessment status in the Chesapeake watershed.

In recent years, the number of tools available for assessing and monitoring an urban canopy has soared, especially those using aerial imagery and software technology. In 2004, the Science and Technology Advisory Committee (STAC) held a workshop introducing these tools (STAC 2004). One leading program, the iTree suite of tools, is a free, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools (www.itree.com). Even more basic is the use of Google Earth® imagery to view tree canopy.

Forest Harvesting BMPs All states have adopted recommended BMPs for timber harvesting and forest management activities that have the potential to impact water quality. Consistent and reliable data on the use and effectiveness of BMPs remains the most important evidence of a State's enforcement of and compliance with the Clean Water Act. Forest harvesting BMPs are closely regulated on both public and private land in some Bay states. Other states have no accessible record of where private forests are harvested, much less what BMPs are used on those harvests. Extensive protocols are available for monitoring forest harvest BMPs, also called Silvicultural BMPs. (Welsh et al 2006, Southern Group of State Foresters 2008). Public forests in all states are usually exemplary in following these BMPs. However, roughly 95% of forest

harvest is on private land. On-site visits of harvesting operations are routinely made by agency foresters in most parts of the Bay watershed.

Description of Principles and Protocols for Forestry BMPs

1) ***Expanded Tree Cover*** (formerly Urban Tree Planting. The name, definition, and credit for this BMP, is currently being updated, pending recommendations from an Expert Panel.)

Draft Description: *The primary strategies for expanding tree cover include 1) conserving existing tree cover as much as possible, 2) planting trees, and 3) allowing for natural regeneration. Credit is applied according to the number of new acres intended for tree cover. If trees are reported as number planted (not acres, non-contiguous) a conversion factor of 100 trees = one acre of new tree cover. Area of intended tree canopy via natural regeneration should be a minimum of ¼ acre (or adjoin to existing forest) and maintained such that after 4 years there is a density of at least 100 trees/acre (not counting invasive species).*

Urban forestry partner— a local government staff or non-governmental partner that is approved by the state forestry agency and likely to satisfy the above 4 principle bullets.

There are two steps needed to realize credit for this practice:
1) The reporting jurisdiction reports acres of new tree cover; and
2) The reporting jurisdiction verifies every 5 years that overall tree cover is being maintained/not decreasing. This is most efficiently done using aerial imagery and easy-to-use software programs.

Expanded Tree Canopy BMP Principles

A. *Any new acreage of tree canopy represents a **net gain** in overall tree cover for a reporting jurisdiction. The following examples support this principle:*
   - Conservation measures are in place to help maintain existing canopy.
   - Monitoring and maintenance occurs on all acres of tree canopy, whether new or existing (e.g., community street trees are watered during periods of drought).
   - Periodic analysis of existing tree canopy within a reporting jurisdiction is used as assurance that overall tree canopy is not decreasing.
   - Ordinances protective of tree canopy.

B. *State Oversight of Local Tree Canopy Reporting*. To provide accountability, Bay state forestry agencies should audit a subset of local partners by analyzing their tree canopy records, project files, and/or 5-year assessments of overall canopy expanse. 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.

Expanded Tree Canopy Protocol:
Part 1: Establish Urban Forestry program support mechanisms

Reporting jurisdiction has an urban forestry program (e.g., plan or partner) and therefore has more certainty of survival/net gain in tree canopy. Having a program in place will facilitate with all bullets mentioned in the Principle statement above. Land managers and tree stewards are educated about tree care and use good planting techniques.

Part 2: Urban forestry partner tracks and reports new acres of tree canopy

A. **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). All plantings over ½ acre should be site-checked by partner.
B. **For natural regeneration acres**, three similar pieces of data should be recorded: 1) acres of treatment, and 2) date started. Because of the difficulty to establish tree canopy in this way, this information is reported for credit only after 4-year maintenance period. Regeneration areas can be mowed, fenced or signed as deemed necessary.

Part 3: Urban forestry partner maintains new areas of tree canopy and samples overall canopy

A. **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., tree pit) that dies should be replaced, or removed from the National Environmental Information Exchange Network (NEIEN) database.
B. **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).
C. **For existing tree canopy** within reporting area/jurisdiction, every 5 years, a locality should re-assess the canopy of the entire jurisdiction to show that there has not been a decrease in overall canopy. If tree canopy decreases, NEIEN tree canopy credit for that jurisdiction should be removed.

   Use of free aerial imagery and assessment tools such as iTree Canopy (http://itreetools.org/) or the Land Image Analyst (not yet released) can be a cost-effective means of sampling and creating a quick assessment of canopy cover.

   iTree Canopy is designed to allow users to easily and accurately estimate tree cover within selected jurisdiction. This tool randomly lays points (number determined by the user) onto Google Earth imagery and the user then classifies what cover class each point falls upon. The user can define any cover classes that they like and the program will show estimation results throughout the interpretation process. The more points completed per size of the area to be sampled, the better the cover estimate. From this classification of points, a statistical estimate of the amount or percent tree canopy can be calculated along with an estimate of uncertainty of the estimate (standard error (SE)). A confidence interval of 95% should be reached to show no loss of canopy in the 5 year period.

Example Canopy Assessment from iTree Canopy

To illustrate how to use iTree Canopy to estimate canopy cover, let us assume 1,000 points have been interpreted and classified within a city as either "tree" or "non-tree" as a means to ascertain the tree cover within that city, and 330 points were classified as "tree".

To calculate the percent tree cover and Standard Error (SE), let:

N = total number of sampled points (i.e., 1,000)
n = total number of points classified as tree (i.e., 330), and
p = n/N (i.e., 330/1,000 = 0.33)
q = 1 – p (i.e., 1 - 0.33 = 0.67)
SE = √ (pq/N) (i.e., √ (0.33 x 0.67 / 1,000) = 0.0149)

Thus in this example, tree cover in the city is estimated at 33% with a SE of 1.5%.

This process should take an average user several hours to complete and is requested once every five years.

For more information on iTree Canopy and for similar directions on how to calculate Confidence Interval of 95%, go to http://www.itreetools.org/canopy/index.php.

2) ***Urban Riparian Forest Buffers***

Description: An area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs and other vegetation that is adjacent to a body of water. An urban riparian forest buffer is any riparian buffer not in an agriculture or forest setting-- it is on developed land.

Verification of this practice is similar to the Expanded Tree Canopy practice (page 5). The principle and protocol are the same except for the need to focus within the riparian area of a jurisdiction.

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

i. **For new plantings,** record: 1) location (lat/long) and name of property, 2) acres planted (if appropriate) and width, and 3) dates planted.
ii. **For natural regeneration acres**, data to be recorded includes: 1) location, 2) acres of treatment, 3) width, and 4) date started. Naturally regenerating urban buffers should be reported after 4 years of regeneration if there are 100 or more live native trees per acre.
iii. **To demonstrate there has been no loss of urban buffer in the jurisdiction,** a similar procedure using iTree Canopy is recommended, with more points being selected in riparian areas. Other software may be equally useful in demonstrating there has not been a loss of buffer. Any known loss of urban buffer in a jurisdiction should be mitigated prior to reporting new acres of this BMP.

3) ***Agricultural Riparian Forest Buffer***

Description: Agricultural riparian forest buffers are linear wooded areas along rivers, streams, and shorelines. Forest buffers help filter nutrients, sediments and other pollutants from runoff as well as groundwater. The recommended buffer width for riparian forest buffers (agriculture) is 100 feet, with a 35 foot minimum width required.

Current Procedures for Verifying Establishment of Buffers: The vast majority of Forest Buffers and Tree Planting practices are a cost-shared conservation practices on agricultural land that are long-term in nature (once established, the practice often continues in perpetuity without need for management or maintenance) and originate with a Conservation Reserve Enhancement Program (CREP) contract. Often, more than one agency has oversight of these agriculture-tree practices including Farm Services Agency, forestry, and a technical service provider group. For simplicity, and because roles vary from state-to-state all those providing oversight are referred to

as CREP partners. For instance, Farm Service Agency will keep contracts for CREP, a forestry agency will write a planting plan and check for compliance, and a technical service providing agency may make multiple site visits and have landowner contact. Sometimes multiple databases track the same practice.

There are well-developed procedures on how to successfully establish a riparian forest buffer (MD DNR 2005). It starts with a planting plan usually made by a forester. Aspects of a good plan include: species selection, site preparation, and spacing of trees, among other factors. Forest buffer plantings almost always use tree shelters (e.g., 98% of the time in VA) to protect against herbivory. Shelters increase survival from 12% (no shelter) to 74% (with 4 foot shelter). Herbicide treatment is also highly recommended. Some of the trees planted are expected to perish. Repeated visits are made during establishment. Sometimes replanting is necessary to comply with contractual specifications.

A minor portion of riparian forest buffers are volunteer plantings and not cost-shared. These are generally orchestrated and reported by larger, organized non-governmental organizations that regularly do this work using volunteers. Until non-cost shared buffers comprise more than 10% of the buffers being reported from a jurisdiction, no verification protocol is recommended at this time.

While the Riparian Forest Buffer practice is similar to other cost-shared agricultural practices, it differs in its Principle (new acres are a net gain in forest buffer) and the need to account for width of the buffer (not currently tracked in USDA state database summaries). Any buffer with a width 35' or greater counts.

Below is the current protocol for verifying contractual agreements in CREP.

a) Verify Seedling Establishment

- FSA guidance requires that onsite spot checks be conducted on 10% of CRP/CREP contracts to confirm that the practice is established; for forest buffers, "established" means that the buffer meets the NRCS forest buffer practice standards (practice 391) and any additional state requirements (required stocking/survival rates vary by state).
- In practice, NRCS or other technical assistance partner (e.g. state forestry) may confirm establishment on every site at the 1 or 2 year point.
- If site visits determine that practice has not yet been established, replanting occurs to get the buffer up to the standard and a site visit to confirm establishment occurs; if practice never becomes established, it is taken out of contract.

b) Verify Practice Establishment

- After practice has been reported as established, FSA has a standard program of compliance checks on a portion of all FSA contracts (CRP as well as non-conservation FSA financial assistance to farmers); the requirement is for 10% of the buffer practices are definitely checked (heard that PA FSA is not doing this spot checking due to staff limitations)
- State agriculture conservation programs that provide a portion of CREP cost-share may have additional verification requirements; for example VA DCR requires spot checks on 5% of practices under contract each year throughout their lifespan (including CREP).

Agricultural Riparian Buffer BMP Principle

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 principle:

- Laws or ordinances that encourage conservation of existing buffers are in place.
- Monitoring and maintenance occurs on both USDA cost share and non-cost share practices.
- Periodic sampling of existing buffers indicates that overall riparian buffer canopy in the county or watershed segment is increasing (Protocol 3 below).

Additional Recommended Agricultural Riparian Forest Buffer Protocol

Part 1: Collect and review data

a. Reporting agency should capture width of buffer in addition to acres of practice and location (lat/long).

Part 2: Monitor and maintain new plantings or regeneration areas, as well as existence and functioning of other riparian buffers.

a. Reporting agency (state forestry or watershed protection division) should establish a baseline for total riparian forest buffer acreage in a given county using high resolution aerial imagery, Land Image Analyst, or other tool. Every 10 years, the reporting agency will re-sample the three counties in each state that have experienced the most development or increase in agriculture (per agriculture census) to show there has not been a loss in total buffer cover. Loss of overall riparian forest buffer coverage in these counties will result in county-wide removal of buffers reported as a "net gain" for those years.
b. Reporting agency should continue to collect volunteer planting data (non-cost shared). If a jurisdiction has more than 10% of buffers coming from volunteer plantings, these will be subject to similar verification requirements as cost-shared buffers (i.e., revisit 10% of RFB installations after one year). The responsible party for verification compliance on volunteer plantings is the project lead.

Optional Part 3: Verification at Contract Expiration/Re-enrollment

This protocol is recommended as an option for encouraging conservation of existing buffers to support the principle of reporting only a net gain in buffers. CRP/CREP contracts expire after 10 or 15 years, and there was a record amount of sign-ups in 2001-2007 that are due to expire. There are three likely scenarios when a contract is ending: 1) the landowner re-enrolls the buffer into another 10 or 15 year contract; 2) the landowner does not re-enroll, but plans to keep the buffer; or 3) the landowner plans to get rid of the buffer. Actions taken now by CREP partners can translate to more buffers known to be in one of these scenarios. Landowners have a narrow window of time the year the contract expires in which to re-enroll of which they may not be aware. To re-enroll, FSA must determine that the buffer meets the practice standards (survival/stocking rate). To facilitate the re-enrollment process, the following actions are recommended.

a. CREP partners field check buffer sites in the last 2-3 years of contract to assess whether buffers meet standards and will be continuing after contract expiration, either through re-enrollment in CREP or voluntary retention of buffer.
b. Acres of buffer that do not meet the practice standard or will not be retained, should be taken out of the CB model. FSA will assign a unique identifier to each project in the future so they can be tracked better and don't become double-counted with re-enrollment.
c. CREP partners conduct outreach/technical assistance to landowners with expiring contracts.

4) ***Agricultural Tree Planting***

Description: Agricultural tree planting includes any tree planting, except those used to establish riparian buffers and those on non-urban land, targeting lands that are highly erodible or identified as critical resource areas.

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. **(Agroforestry is the intentional mixing of trees and shrubs into crop and animal production systems for environmental, economic, and social benefits, and includes practices such as windbreaks, silvopasture, and alley cropping.) For purposes of verification, this practice will follow guidelines put forth in the Agriculture Protocols. For tracking and crediting purposes, it is important to note that 100 trees planted equals one acre of practice (the same as for expanded urban canopy).**

5) ***Forest Harvesting BMP***

Description: Forest harvesting practices are a suite of BMPs that minimize the environmental impacts of logging including road building and site preparation. These practices help reduce suspended sediments and associated nutrients that can result from forest operations.

Forest Harvesting BMP Principle

Track forest harvest acres annually and apply an implementation rate for forest harvest BMPs in that state. Public and private land harvesting operations should be tracked similarly. However, if only public land forest harvesting BMPs are tracked, acres of BMP implementation can only be reported on those lands.

Forest Harvesting BMP Protocol

Part 1—State forestry agency will submit actual number of forest harvest acres to NEIEN if they are available, overriding the 1% harvest rate assumption made by the Bay Program. (If not available, the 1% rate will be assumed for acres of both public and private forests.)

Part 2-- State forestry agency will submit actual acres of forest harvest BMPs implemented to NEIEN, or

Part 3-- State forestry agency will determine average rate of implementation in a given jurisdiction in lieu of actual acres of forest harvest BMPs. The rate of BMP implementation should be determined at least every 10 years. Forestry staff or Cooperative Extension Offices can get this by assessing the overall rate of BMP implementation in a state by using data collected directly from local forest district offices. Harvest plan reviews provide one such record. If the record of BMP implementation is insufficient, forestry staff should interview regional forestry staff most familiar with timber operations. Private acres reported as using BMPs are calculated by multiplying acres being harvested by the average BMP implementation rate for a given 10-year period.

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III. Urban Stormwater Verification Protocol

Version: Final review draft, June 27th, 2013

This section describes how the Urban Stormwater Workgroup developed principles and protocols to verify the performance of urban BMPs in the Bay watershed, and is organized into 7 parts.

A. The Need for BMP Verification and the CBP Process to Define it.
B. Key Verification Definitions
C. Background on Urban BMP Verification
D. Verification Principles for BMPs Located in MS4 areas
E. Verification Principles for BMPs Located in non-MS4 areas
F. Verification Principles for Legacy BMPs
G. Process for Developing Urban BMP Verification Protocols

Part A: The Need for Verification and the CBP Process to Define it
Given the ever increasing importance that accounting for implemented practices is taking on within the partnership—Bay TMDL reasonable assurance, two-year milestones, offsets, tradable credits—the Partnership must agree to a framework whereby we can have both expanded tracking and reporting of practices AND verifiable confidence in the outcome of those implemented practices.

The implementation, tracking, and reporting of BMPs has been at the center of the Partnership's Bay restoration efforts for close to three decades. Within the past two years, there have been numerous requests and commitments to improve the accountability of actions taken to install BMPs which prevent or reduce the loads of nutrients and sediment to Chesapeake Bay.

- The 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 watershed's seven jurisdictions.

- The President's Chesapeake Bay Executive Order Strategy committed the U.S. Department of Agricultural (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 Research Council's (NRC) 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."

- The 2010 Chesapeake Bay TMDL's Appendix S outlines the common elements from which EPA expects the watershed jurisdictions to develop and implement offset programs.

At the request of the Water Quality Goal Implementation, the Urban Stormwater Workgroup (USWG) devoted much of 2012 to developing principles and protocols for urban BMP verification. The topic was discussed at the February, March, April, May and October USWG meetings, and six drafts of this memo 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
- Stream Restoration

This memo represents a synthesis of the consensus reached by the Workgroup on urban sector verification issues.

Part B: Key Definitions for Urban BMP Verification:

The following terms are defined to clarify the issues related to urban BMP verification.

Urban BMPs: In this context, they 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 ED 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 go through a local stormwater review process (e.g., impervious surface disconnection, green roofs).

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).

Regulated BMPs: Refers to any BMP that is installed in a jurisdiction that has a Phase 1 or 2 Municipal Separate Storm Sewer System (MS4) permit. These permits establish a requirement that a locality have a BMP maintenance program and the capacity to inspect all of their BMPs within a portion or all of each permit cycle (typically 5 year cycle). As can be seen in Figure 1, only a portion of the developed/developing land in the Bay watershed occurs within communities that are regulated under MS4 permits.

Semi-Regulated BMPs: Refers to any BMP that is installed locally under a state construction general permit (CGP) outside of a MS4 community. While the permit applicant must sign an agreement that they will maintain the BMP, the locality is not required to have an inspection

program to enforce maintenance, and the state may not have sufficient staff resources to do so on their behalf.

Non-regulated BMPs: Refers to any BMP that is voluntarily installed in a community that was not triggered by an explicit MS4 requirement or stormwater regulation. Examples might include rain gardens built by homeowners or demonstration BMPs constructed through grants.

Legacy BMPs: Refers to the population of urban BMPs in a community that the state has reported to EPA for inclusion into any past version of the CBWM for sediment or nutrient reduction credit. Legacy BMPs fall into three categories:

- *Actual BMPs with a geographic address*
- *Actual BMPs that lack a specific geographic address*
- *Estimated BMPs* that were projected based on some assumed level of development activity and compliance with state stormwater regulations.

Discovered BMPs: Refers to any BMP that was installed in the past but was never reported to the state or CBP, and has not received any prior nutrient removal credit. Examples include older BMPs installed prior to the establishment of state BMP reporting systems, and voluntary BMPs.

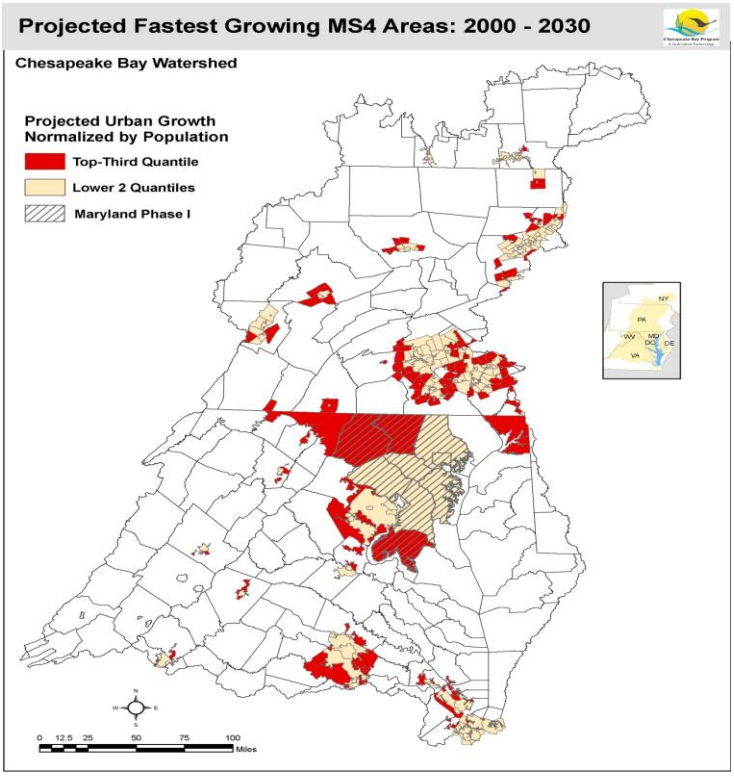

Figure: Distribution of MS4 Communities in the Bay Watershed
Source: Claggett, 2010

Part C: Background on Verification of Urban Stormwater BMPs

As part of the development review process, localities in the Chesapeake Bay typically conduct a post-construction inspection of stormwater BMPs to ensure that they are functional, maintain project engineering files and inspect them periodically to ensure they are still performing.

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. The frequency of maintenance inspections ranges from 3 to 5 years, depending on the permit status of the jurisdiction.

In addition, most MS4 communities have an annual reporting requirement, and often provide aggregate information to the state on the number and type of BMPs that are installed during the reporting period.

Consequently, 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. However, several problems need to be overcome to develop an effective system:

- Larger MS4 communities have an existing urban BMP inventory that numbers in the thousands, with hundreds more being added each year.
- Some Ms4s do not currently report all of the individual BMP information needed by the state to prepare the input deck for the Chesapeake Bay Watershed Model (CBWM), such as Chesapeake Bay Program (CBP) BMP classification, drainage area served, geographic location and year of installation.
- Very few localities have digitized their individual BMP files and integrated them within a spreadsheet and/or GIS system.
- In the absence of good geo-spatial data, the prospect for double counting of BMPs is significant, particularly when multiple BMPs of different ages are located within same drainage area. In other cases, BMPs that have failed or don't really meet the CBP BMP definition are counted when they should not be.
- Most non-MS4 localities have little experience in reporting BMP implementation data for new or existing development (e.g., retrofits). These communities are classified as being semi-regulated, in that they have limited authority to inspect or enforce maintenance on private land.
- Several urban BMPs are implemented outside the MS4 permit or local/state stormwater review process, and therefore may not be properly counted or reported (e.g., street sweeping, reforestation, urban nutrient management, tree planting and stream restoration). Localities may need to internally coordinate with multiple agencies and/or departments to accurately report this BMP data.
- Most localities do not currently report on voluntary BMPs that are installed by homeowners or watershed groups, even if they provide them financial or other incentives to do so.

- Most Bay states are just now developing BMP reporting systems to track the BMPs installed within individual localities, and several have not been able to keep up with BMP information submitted by 70 to 400 MS4s in their jurisdiction.

- Up to now, few states have allocated sufficient staff resources to fully enforce MS4 permit maintenance conditions, verify that local BMP information is accurate, and cull out BMPs from the CBWM input deck that are no longer achieving their intended nutrient or sediment removal rate.

- Some urban BMPs are installed in non-regulated areas in the watershed (i.e., not covered by MS4 permits). Consequently some of these communities may not have all of the legally required BMP inspection and maintenance provisions found in MS4 communities. As a consequence, BMP reporting and verification may be challenging in non-MS4 communities, particularly in smaller communities with limited staff resources.

- Perhaps the greatest weakness of the current system is that current post construction and maintenance inspection efforts are not oriented toward verifying the actual pollutant removal performance of the BMP in the field. Instead, local inspections primarily focus on whether a BMP was installed per design, and that its future condition will not cause harm to public safety and/or cause nuisance problems in the community. Consequently, it will be necessary to develop improved inspection guidelines that utilize visual indicators to verify that the hydrologic performance of the BMP is adequate to still achieve the intended nutrient and sediment removal rate.

- The past assumption is that nearly all structural urban BMPs are permanent in nature. This means that a twenty year old wet pond keeps on performing in perpetuity, with no discount for their age, diminished capacity and lack of maintenance.

Part D: Principles for Verifying Regulated BMPs (e.g., MS4s)

The following principles should guide the urban BMP verification process for MS4s in each of the Bay States:

1. *Verification methods will differ depending on the class of urban BMPs (traditional, runoff reduction, operational, and restoration*. The CBP has approved nearly 20 different BMPs in the urban sector, and expert panels are adding more every year. Consequently, specific verification protocols need to be crafted to address each class of BMPs.

2. *Key Role of Maintenance in Performance*. 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). Therefore, a core verification principle is to ensure that BMPs are installed and maintained properly over their design life to qualify for their pollutant removal rates. To ensure this, verification protocols are needed to define (1) the cycle for field verification of BMPs and (2) the process for BMP downgrades if maintenance is not performed.

3. *Utilize Existing MS4 Framework.* 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. Ongoing BMP reporting and maintenance inspections requirements in MS4 permits may need to be adjusted slightly to verify BMP performance, but the modifications should be limited to reduce the administrative burden for local and state agencies.

4. *Removal Rate Tied to Visual Inspections*. The basic concept is that 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. An example of how BMP verification can be integrated with ongoing MS4 BMP inspections is shown Figure 2.

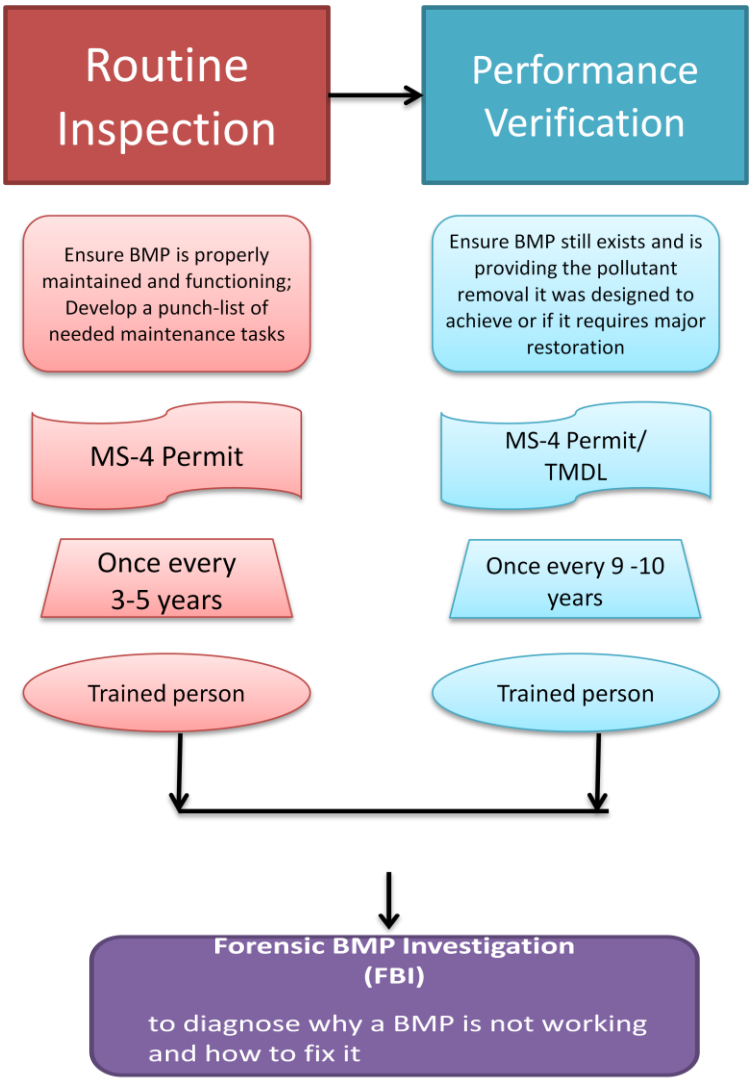

Figure 2: Relationship of Routine MS4 BMP Inspections to Verification Inspections

A rapid inspection is conducted to quickly assess urban BMP performance in the field using simple visual indicators. This approach was refined and tested through an extensive analysis of BMPs located in the James River Basin of the Chesapeake Bay watershed. More detail on the methods and results can be found in Hirschman et al (Hirschman, D., L. Woodworth and S. Drescher. 2009. *Technical Report: Stormwater BMPs in Virginia's James River Basin – An Assessment of Field Conditions and Programs*. Center for Watershed Protection. Ellicott City, MD). The basic form can be modified or adapted to meet the unique BMP terminology and design criteria employed in each Bay jurisdiction. CSN is also developing a broader visual indicator method to assess BMP performance which it plans to release in 2013 (Bioretention Illustrated:A Visual Guide for Constructing, Inspecting, Maintaining and Verifying the Practice, http://chesapeakestormwater.net/wp-content/uploads/downloads/2013/04/REVIEW-DRAFT-OF-BIORETENTION-ILLUSTRATED-040113.pdf).

5. *BMP Verification as Adaptive Management.* The purpose of verification is to maintain or expand the pollutant removal performance of existing and future local stormwater infrastructure assets. Field assessments are used to identify which BMPs are working well and which ones require preventative or corrective maintenance to maintain their function. In addition, field verification enables local governments to analyze their historical inventory of private and public stormwater BMPs to identify which individual projects present the best opportunities for additional nutrient reduction through retrofits or restoration of existing BMPs.

The real world data collected on actual BMP performance also enables local and state agencies to improve the next generation of BMPs in an adaptive management process. This process can isolate the specific site conditions, design features and maintenance tasks that influence BMP longevity and performance, and incorporate these into improved design specifications, review and inspection procedures and maintenance requirements. Future BMP expert panels would review such data to determine if these improved BMPs would qualify for a higher removal rate.

6. *BMP Reporting Must Be Consistent with CBP Standards.* Each state has a unique system to report BMPs as part of their MS4 permit. In some cases, states are still developing and refining their BMP reporting systems. Consequently, it may not be possible or even desirable to implement a Bay-wide BMP reporting format. However, to get credit in the context of CBWM progress runs, states will need to report BMP implementation data using CBP-approved rates or methods, reporting units and geographic location (consistent with NEIEN standards), and periodically update data based on the local verification of BMPs in the field.

7. *Initial Verification of BMP Installation*. 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. This initial verification is provided either by the BMP designer or the local inspector as a condition of project acceptance, as part of the normal local stormwater BMP plan review process. From a reporting standpoint, the MS4 community should outline the BMP review and inspection procedures it has in place and indicate if adequate staff is available to implement them.

8. *Recommended Cycle for Field Verification of Urban BMPs.* 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). It is recommended that these rapid investigations of visual indicators be integrated into the routine stormwater BMP inspections already required under MS4 permits.

9. *Suggested Process for BMP Downgrades*. If a field inspection indicates that a BMP is not performing to its original design, the localities would have a defined time frame (e.g., one year) to take corrective maintenance or rehabilitation actions to bring it back into compliance. If a facility is not fixed during the defined timeframe, the pollutant reduction rate for the BMP would be eliminated, and the locality would report this to the state in its annual MS4 report. If corrective maintenance actions were verified for the BMP at a later date, the MS4 could take credit for it then.

10. *Special Procedures for Urban BMPs Used for Offsets, Mitigation and Trading*. Some urban BMPs are built to offset, compensate or otherwise mitigate for impacts caused by development elsewhere in the watershed. Examples include stream restoration mitigation and stormwater retrofit offsets when full compliance with stormwater performance standards is not possible at a new development site.

In other cases, urban BMPs may be built for purposes of trading nutrient credits within a community or a state. Special procedures need to be developed in both cases to prevent double counting of BMPs. In addition, states and localities may elect to require more frequent BMP field inspection for these types of projects to assure they are meeting their intended nutrient reduction objectives.

11. *State Oversight of Local BMP Reporting*. To provide accountability, Bay states 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. 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.

12. *EPA Review of State Verification Oversight*. EPA Region 3, 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.

13. *Review and Verification of CBP BMP Accounting*: 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. Better communication among the Bay Program and its state and local government partners will help to improve BMP reporting and ensure a fair representation of State and local program implementation.

Part E: Principles for Verification for Semi-Regulated BMPs

The Workgroup created several options to address verification for semi-regulated BMPs (see Part B). These BMP are typically installed locally under a state construction general permit (CGP) outside of a MS4 community. Some of these non-regulated communities are not required to have an inspection program to enforce maintenance, or rely on the state to do it on their behalf (who in turn, may currently lack inspection/enforcement resources). The following options are recommended:

> *Option 1*: Local or state agency follows the verification inspection process outlined in Part D and gets the same credit as a MS4 community.
>
> *Option 2:* Local or third party performs verification inspections on a sub-sample of their BMP inventory. 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. There are several well accepted approaches to determining the sample size. These include using a census for a small population of BMPs, imitating a sample size of similar studies, using published tables, and/or applying formulas to calculate a sample size.
>
> *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.
>
> *Option 4:* 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 all BMP credits expire in ten years. This option is not intended to promote non-inspection, but rather, to give smaller communities more time to develop local inspection and verification programs.

Given the importance of BMP verification, states may wish to allocate some of their CBRAP grants to support BMP targeting and verification efforts in targeted non-MS4 communities.

Part F: Principles for Verifying Legacy BMPs

The Workgroup discussed the process by which states and MS4 communities would account for both legacy and discovered BMPs.

Legacy BMPs are those that have been reported to EPA CBP for inclusion into any past version of the CBWM for reduction credit over the 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 CBWM. They may also find cost-effective retrofit opportunities involving BMP conversion, enhancement or restoration (Retrofit Panel Expert Panel Report, http://www.chesapeakebay.net/documents/Final_CBP_Approved_Expert_Panel_Report_on_Stormwater_Retrofits--_long.pdf). CSN will be providing some methods for analyzing the local BMP inventory in a forthcoming Technical Bulletin to be released in 2013.

The Workgroup noted that the MS4 communities should seek to assess their entire BMP population with two MS4 permit cycles using the methods outline in the recently approved Stormwater Performance Standards Expert Panel. The Workgroup also noted that the burden of assessing legacy BMPs could be sharply reduced if the most problematic older BMPs were targeted first. For example:

- Assess all pre-2000 BMPs in first permit cycle, and focus on pre-1990 BMPs in the first two years of that cycle.
- Initially sub-sample their population of BMPs by type and year installed to look for problematic BMP types and design eras, and then focus inspection efforts on the problem BMPs in future years.
- Focus initial efforts to confirm whether estimated BMPs actually exist, and what their current condition is.

Part G: Process for Developing More Specific BMP Verification Protocols

The Workgroup is in the process of developing specific urban BMP protocols based on the work of numerous expert panels, as shown in Table 1. Additional verification protocols for other urban BMPs will be developed as new expert panels are formed.

Table 1: Status of Verification Protocol Development for Urban BMPs

BMP Class	BMP Types	Developed By	Status
Traditional Stormwater BMPs (CBP-approved)	Wet ponds, Dry ED Ponds, Constructed Wetlands, Bioretention, Infiltration, Filtering Practices, Grass Channels, Bioswales, Permeable Pavement	Use Verification Protocol Developed by Stormwater Performance Standards Panel	Agreed to at 10/16/2012 USWG meeting
Runoff Reduction Practices	ESD and LID practices installed in response to new state SWM regulations	Stormwater Performance Standards Panel	Approved by WQGIT
Operational	Urban Nutrient Management	Expert Panel	Approved by WQGIT

BMPs	Street Sweeping	Expert Panel	Projected early 2014
	Illicit Discharge Elimination	Expert Panel	Projected late 2013
	Erosion and Sediment Control	Expert Panel	Projected late 2013
Restoration BMPs	Stormwater Retrofits	Expert Panel	Approved by WQGIT
	Stream Restoration	Expert Panel	Approved by WQGIT
	Reforestation/Tree Planting	Expert Panel	Projected late 2013
	Shoreline Erosion Control	Expert Panel	Projected late 2013

III. Wastewater BMP Verification Protocol

Version: Final reformatted draft, July 1st, 2013

Background

Wastewater discharge facilities include municipal sewage treatment facilities and industrial facilities with direct discharges to waters of the United States. These facilities contributed 17.4 percent of the total nitrogen (TN) and 16.3 percent of the total phosphorus (TP) 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.

In the Bay watershed, there are currently 50 reported active reported **combined sewer overflow** (CSO) communities. A total of 64 CSOs have been tracked by the Chesapeake Bay Program, with 14 of them are currently documented as having been eliminated. In 2011, based on the modeling estimates, the remaining CSOs contributed 0.57 percent of the total nitrogen (TN) and 0.87 percent of the total phosphorus (TP) loads delivered to Chesapeake Bay tidal waters in 2011.

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. Based on the Phase 5.3.2 Chesapeake Bay Watershed Model, these on-site treatment systems contributed approximately 8.3 million pounds or 3.4% of the total nitrogen load to the Bay in 2011.

The existing national and state regulatory systems for non-significant wastewater discharging facilities and CSOs meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles through a rigorous system of permits, inspections, and monitoring requirements that ensure accountability, proper design, implementation, operation and maintenance. For on-site treatment systems, the recommended verification protocols are based on the best existing regulations and programs. Verification through existing regulatory programs will confirm if the upgraded wastewater facilities, CSOs, or on-site treatment systems are designed, installed, and maintained over time and meeting their assigned load reduction targets.

The workgroup's process to develop the verification protocols was:

1. Evaluation the existing verification/inspection programs among the seven Chesapeake Bay watershed jurisdictions;

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

3. Developing the protocols based on the best existing BMP verification/inspection programs that met or exceeded the BMP Verification Principles.

Regulatory-Based Verification Programs

<u>Wastewater Facilities NPDES Permits</u>

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

The wastewater load reduction goals in the Bay TMDL and jurisdictions' WIPs are only applied to the significant facilities. There are currently no load reduction goals for non-significant facilities in any of the seven Chesapeake Bay watershed jurisdictions; there are only aggregate waste load allocations set at existing loads.

For non-significant wastewater facilities, the 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 due to non-significant facility undergoing any upgrades and offsets of 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 watershed implementation plans (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/inspection requirements for wastewater discharging facilities, which meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles. The verification/inspection programs for all non-significant wastewater treatment facility upgrades will rely on the existing NPDES regulations and DMR reporting system.

CSO Long Term Control Plans

Long-term Control Plans are required by the national CSO control policy to reduce overflows from CSO outfalls (59 FR 18688, April 19, 1994). The existing national regulations and delegated state NPDES permitting programs have very specific verification/inspection requirements for CSOs, which meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles.

On-site Systems – Construction Permit and Inspection Requirements

Existing regulations for on-site systems are different among the Chesapeake Bay watershed jurisdictions. They vary from construction permits to more complex regulation through operating permits with inspection and monitoring requirements. Maryland and Virginia already have comprehensive regulations for on-site systems; Delaware is currently developing regulations.

Verification of the installation and continued operation and maintenance of on-site treatment systems will be based on implementation of existing state regulations or following the below set of minimum elements for verification based on the existing state regulations:

- State or local authorities should verify, track and report proper installation and operation and maintenance of new on-site treatment systems. Verification may be through inspections by the design professional.

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

- The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified service providers and tracked by the authorities. For some low maintenance systems, such as enhanced conventional systems, the inspection frequency could be lower.[1]

- Tracking and reporting through the databases managed by state agencies.

There is no national regulation for on-site treatment systems. Existing state regulations or programs vary dramatically among the six Chesapeake Bay states, as does the willingness to participate in this verification effort. The recommended verification protocols were developed based on the best existing state regulations for on-site treatment system that meet or exceed the Chesapeake Bay Program Partnership's BMP Verification Principles.

Verification of on-site treatment systems only applies to nitrogen-reducing treatment systems, not traditional septic systems that do not receive credit. 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, Maryland[2] and Virginia[3] on-site treatment system regulations in place; Delaware[4] has a draft regulation that will become effective soon (Appendices A, B, and C). West Virginia is committed to meeting minimum verification requirements described above. The District of Columbia has no 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 verification is not needed.

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[1] The Chesapeake Bay Program Partnership's on-site treatment systems BMP expert panel will recommend inspection frequency by practice. Upon approval by the Partnership's Wastewater Treatment Workgroup and the Water Quality Goal Implementation Team, the final recommended inspection frequency will be ready for adopting by the states into their written verification procedures.

[2] 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

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

[4] Delaware Regulations Governing the Design, Installation, Operation of On-Site Wastewater Treatment and Disposal System (in draft)
http://www.dnrec.delaware.gov/wr/Information/GWDInfo/Documents/AmendedRegDraft2Clean1.pdf

Table 1. Proposed Verification Protocols for Wastewater Treatment Facilities, CSOs and On-Site Treatment Systems

	Significant Wastewater Treatment Facilities	***Significant Wastewater Treatment Facilities***	***Combined Sewer Overflows***	***On-Site Treatment Systems***
Draft Protocols	Daily/weekly 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 Discharge Monitoring Report (DMR) will be used to report the load reductions due to non-sig wwtp BMPs that include upgrades and offsets of new or expanding nonsig plants. • Annually track the universe of nutrient- and sediment-contributing nonsignificant facilities against established inventories for grouped wasteload allocations, report loads using the various mechanisms described in jurisdiction 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	State regulations on septic systems or following minimum requirements that were developed based on the existing or upcoming state regulations in DE, MD and VA. • State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems. • The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes. • The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as the enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend the inspection frequency by practice, which will be available in April 2013. Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states. • Tracking and reporting through the databases managed by state agencies.
State Applicable	All	All	All	DE, MD, VA and WV
Recommendations And Comments	Use existing NPDES DMR and state WIP defined procedures	Use existing NPDES DMR and state WIP defined procedures	Use 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 or upcoming state regulations on on-site systems. • The expert panel may make recommendations for consideration by stakeholders regarding septic BMP inspection frequencies.

APPENDIX J.IV.A

Summary of Delaware's regulatory program for onsite systems

Delaware has language in the on-site regulations allowing guidelines to be developed for Innovative/Alternative (I/A) systems by the Delaware Department of Natural Resources & Environmental Control which permittees must follow. Because of this language, the Department developed Operation and Maintenance (O&M) Guidelines for all I/A systems permitted after February 1st, 2007 (attached). Onsite BMP systems are part of the I/A system category. This guideline has been incorporated into DE regulation update and will become a regulation once the update has passed.

Systems permitted and installed prior to Feb 1st, 2007 do not have to follow the O&M requirement and are inspected by the Department every three years. This is tracked by an Access database at DNREC.

Systems permitted after Feb 1st 2007 fall under the O&M guidelines. BMP systems are inspected every 6 months by the service provider. Tracking of systems with O&M requirements is also done through an Access database.

All Onsite BMP systems are inspected by the Department and system designer when installation is complete and before the system has been covered and backfilled. A "Certificate of Satisfactory Completion" (COC) is not granted until: the installation has been found to be satisfactory by the Department and system designer (a DNREC licensed PE), a service contract for a minimum for two years has been submitted for the system, the manufacturer representative submits in writing, if not present at the time of inspection, that the installation has been performed correctly. A system cannot be put into use until a COC has been issued. The construction phase of all I/A system is tracked with a database accessible by the Ground Water Discharge Section.

Innovative and Alternative On-Site Wastewater Treatment and Disposal Systems

Operation & Maintenance Guideline

February 1, 2007

Purpose:

This guideline is intended for all Innovative and Alternative On-Site Wastewater Treatment and Disposal Systems ≤ 2,500 gallons per day.

Overview:

Innovative and Alternative (IA) on-site wastewater treatment and disposal systems are classified as anything other than conventional systems. These systems include but are not limited to advanced treatment units, peat biofilters, drip dispersal or a combination thereof. In order to ensure the proper operation and maintenance of IA systems, the Department of Natural Resources and Environmental Control (DNREC) requires the permittee, through permit

conditions, to maintain service contracts with certified service providers for the life of the system.

Definition:

For the purpose of this guideline, a **certified service provider** shall be defined as the following:

1. An individual representative of a manufacturer/supplier who holds a DNREC Class E System Contractor or Class H System Inspector license; or,

2. A Class E System Contractor who is certified, through DNREC approved training, on the operation and maintenance of the advanced treatment unit or system; or,

3. A Class H System Inspector who has become certified through DNREC approved training on the operation and maintenance of the advanced treatment unit or system; or,

4. A Homeowner who has obtained DNREC individual homeowner service provider certification and has been certified through DNREC approved training on the operation and maintenance of the advanced treatment unit or system. The DNREC homeowner certification allows the homeowner to operate and maintain their IA system at their primary place of residence only.

Operation and Maintenance Guideline with Permit Conditions

1. Prior to the Ground Water Discharges Section (GWDS) of DNREC granting a Certificate of Completion, the permittee must enter into a service contract with a certified service provider initially, for a minimum of two (2) years starting at the onset of initial system operation. Specifically the service contract shall prescribe an Inspection Program and Homeowner Training Program as outlined below:

a. Inspection Program

The inspection program shall include the following: a schedule indicating inspection frequency; inspection objective(s); inspection details; necessary operation and maintenance activities; additional sampling if required; and record keeping requirements.

i. Inspection Frequency/Objective: The service contract must outline that the certified service provider is to inspect the system once every six (6) months, or otherwise as approved by the GWDS.

ii. Inspection Reports: The contract must outline that the certified service provider must document all inspections. Operation inspection reports shall indicate the following: date and time of the inspection; sampling and laboratory analysis results; operation and maintenance performed; repairs; an assessment indicating the current performance status of the entire treatment and disposal system; and any corrective actions that must be taken prior to the next inspection. All inspection reports shall be on forms approved by the GWDS.

b. Homeowner Training Program

The service contract must state that the certified service provider is required to meet with the homeowner during the first 6th month inspection. The certified service provider is to educate the homeowner on the components of the system and on the proper operation and maintenance requirements. At this time, the certified service provider shall provide the homeowner with an operation and maintenance manual.

2. Following the initial two (2) year period, the permittee is required to

maintain a service contract for the life of the system by either: renewing the existing contract annually, at a minimum, or by contracting with another certified service provider. The service contract must contain the inspection program requirements from 1(a) above.

3. The permittee must submit all inspection reports and updated contracts from the previous year by February 1st of each year to the GWDS. The GWDS will mail out reminders.

4. The GWDS reserves the right to collect and analyze samples to ensure proper treatment levels and system performance.

5. Right of Entry

The Secretary of the DNREC or his or her authorized representatives, in regulating water pollution or any other matter over which he or she has jurisdiction under 7 Del. C., Chapter 60, may for the purposes of inspection of on-site wastewater treatment and disposal system(s) installed and or to determine whether a violation exists under 7 Del. C., Chapter 60 or regulation enforceable by the Secretary of the DNREC, may enter, private or public property at reasonable times, upon given verbal notice, after the presentation of official identification to the owner, occupant, custodian or agent of the property,.

6. The GWDS may increase inspection frequencies as warranted. A notice outlining new frequencies and cause will be provided to the permittee prior to initiation.

7. Transferability

This permit is personal and may not be transferred without the prior written consent of the GWDS. Thirty days prior to the transfer of the real property, the owner shall obtain the written consent of the GWDS to transfer this permit to the new property owner. Transfer of the maintenance agreement must also be completed and approved prior to transfer. Failure to obtain such written consent may result in the revocation of this permit.

APPENDIX J.IV.B

Overview of Maryland's processes and regulation in regards to best available technologies for removal of nitrogen (BAT)

- WWTWG protocol: State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems.
- COMAR 26.04.02.07F. "Within 1 month of the completion of an installation, a person installing a BAT system shall report to the Department, or the Department's designee, in a manner acceptable to the Department, the address and date of completion of the BAT installation and the type of BAT installed."
- WWTWG protocol: The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes.
- COMAR 26.04.02.07E "A person who has completed a course of study approved by the Department for the installation of BAT, and has a certification of qualification for installing BAT systems from the manufacturer, must be present on the property while a BAT unit is installed." The design of the BAT must be approved by MDE."
- WWTWG protocol: The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as the enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend the inspection frequency by practice, which will be available in April 2013. Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states.

COMAR 26.04.02.07D

D. Operation and Maintenance of BAT Systems.

(8) A BAT system shall be operated by and maintained by a certified service provider.

(2) The owner shall ensure that each BAT system is inspected and has necessary operation and maintenance performed by a certified service provider at a minimum of once per year.

(3) The Department shall maintain a list of certified service providers.

(4) Individuals may become certified upon completion of a course of study on operation and maintenance of BAT systems approved by the Department. The course of study must include instruction on how BAT systems function as well as elements on operation, maintenance, and repair of BAT systems.

(5) Certification as a service provider for BAT systems may be revoked at any time by the Department for violation of these regulations.

(6) The certified service provider shall report on inspection, operation, and maintenance activities to the Department, or the Department's designee, in a manner acceptable to the Department on a yearly basis prior to the yearly anniversary of the date of installation.

(7) The certified service provider must have a certificate of qualification from the manufacturer of the BAT system being serviced.

(8) A property owner may obtain certification as a service provider to maintain the property owner's system, subject to all the requirements of this regulation pertaining to operating and maintaining BAT systems."

- WWTWG protocol: Tracking and reporting through the databases managed by state agencies.

26.04.02.07D (6) "The certified service provider shall report on inspection, operation, and maintenance activities to the Department, or the Department's designee, in a manner acceptable to the Department on a yearly basis prior to the yearly anniversary of the date of installation."

COMAR 26.04.02.07F. "Within 1 month of the completion of an installation, a person installing a BAT system shall report to the Department, or the Department's designee, in a manner acceptable to the Department, the address and date of completion of the BAT installation and the type of BAT installed."

APPENDIX J.IV.C

Summary of Virginia's regulatory program for onsite systems

The onsite program is regulated by two different regulations. The *Sewage Handling and Disposal Regulations* (SHDR), 12 VAC 5-610, and the *Regulations for Alternative Onsite Sewage Systems* (AOSS Regulations), 12 VAC 5-613. The regulations can be found at http://lis.virginia.gov/000/reg/TOC12005.HTM#C0610 and

http://lis.virginia.gov/000/reg/TOC12005.HTM#C0613 respectively.

The SHDR provide the administrative and procedural regulations along with prescriptive design criteria for conventional and some alternative systems. Mechanisms to ensure that systems are designed and constructed properly are found here. Those mechanisms include:

1. Submittal of a construction application with supporting soils work; site layout; verification of horizontal separation to wells, surface waters, shellfish, etc.; supporting calculations; and other pertinent design information.

2. Review of the application by environmental health specialists and, as needed, by staff engineers.

3. Confirmation of installation according to plans through completion statements based on inspections by the design professional.

The AOSS Regulations expand upon the design options for alternative systems using performance standards and require monitoring and operation and maintenance to verify compliance. All onsite BMPs are expected to be alternative systems and would be subject to the requirements of this regulation. For small systems (≤1,000 gpd), the following requirements apply:

1. The procedural requirements of the SHDR apply as described above.

2. An operation and maintenance manual is required.

3. At a minimum all AOSSs must be visited by a licensed operator at least once a year and a report submitted to VDH. Additional operator visits may be needed as described by the O&M manual.

4. Generally Approved treatment units (systems that have gone through 3rd party testing) have an initial sample collected within 180 days of startup and then every 5 years. Sampling is for BOD_5 and, if disinfection is in place, for total residual chlorine (TRC) or fecal coliform.

5. Non-generally Approved treatment units (systems that have not gone through 3rd party testing) have an initial sample collected within 180 days of startup and then semi annually for two years. If the mean of the samples complies with the given effluent limit, then the sampling is reduced to annually. Sample parameters are as in 4 above.

6. The annual inspection frequency is retroactive and applies to all AOSSs in Virginia. The sampling requirement only applies to systems constructed under the new regulation.

For large AOSSs, the requirements increase as the design flow increases. For large AOSSs, the following requirements apply:

1. The procedural requirements of the SHDR apply.
2. An operation and maintenance manual is required.
3. A renewable operating permit is required.
4. Sampling required in accordance with Table 3 below.
5. Operator attendance in accordance with Table 4 below for facilities over 1,000 gpd and up to 40,000 gpd.
6. For facilities with design flows >40,000 gpd, the frequency reverts to the same frequency for systems under the VPDES discharging permit program as found in 9 VAC 5-790. http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-790-300.
7. Reports required by 15th of month.

Table 3. Sampling and Monitoring for Large AOSSs

PLANT SIZE	>2.0 MGD	>1.0 - to 2.0 MGD	> 100,000 GPD to 1.0 MGD	> 40,000 GPD to 100,000 GPD	>10,000 GPD to 40,000 GPD	>1,000 GPD to 10,000 GPD
Flow	Totalizing, Indicating, & Recording	Totalizing, Indicating, & Recording	Totalizing, Indicating, & Recording	Totalizing, Indicating, & Recording	Measured	Measured or Estimate
BOD_5, TSS	24-HC* 1/day	24-HC 5 days/wk	8-HC 3 days/wk	4-HC 1 day/wk	Grab quarterly	Grab 1/yr
Total Nitrogen	24-HC weekly	24-HC weekly	8-HC monthly	4-HC quarterly	Grab quarterly	Grab 1/yr
TRC, End of Contact Tank**	Grab daily	Grab daily	Grab weekly	Grab weekly	Grab weekly	Grab 1/yr
Fecal Coliform***	Grab weekly	Grab weekly	Grab monthly	Grab monthly	Grab quarterly	Grab 1/yr

*HC – hourly, flow weighted composite samples

**if disinfection required and chlorine used

***if disinfection required and a disinfectant other than chlorine used

Table 4. Minimum Operator Visit Frequency for AOSSs up to 40,000 GPD

Avg. Daily Flow	Initial Visit	Regular visits following initial visit
≤1,000 GPD	Within 180 calendar days of the issuance of the operation permit	Every 12 months
>1,000 GPD to 10,000 GPD	First week of actual operation	Quarterly
>10,000 GPD to 40,000 GPD	First week of actual operation	Monthly

Therefore, the annual inspections for the small systems will verify that the system is operating according to its intended design and the BMP is functioning as designed. For the larger systems, monitoring will verify compliance with the required effluent limit.

Nitrogen limits will be effective December 7, 2013, for all new AOSS construction applications received after that date. For small systems, the requirement is for a 50% reduction in TN as compared to a conventional system. The AOSS Regulations reference approved BMPs as suitable for compliance, but the detail on acceptable BMPs is in development. Larger systems have more stringent TN limits and will utilize end of pipe (prior to application to soil) sampling for TN. Those limits are 20 mg/l TN for systems 10,000 gpd or less and 8 mg/l TN for larger systems. Additional removal through the soil dispersal field and then attenuation rates from the edge of drainfield to edge of stream will effectively reduce the input of TN from large systems to negligible.

V. Stream Verification Protocols

Version: Final review draft, July 1st, 2013

Background

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 principles included in this section 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 (Center) in their role as the Chesapeake Bay Program's Sediment Reduction and Stream Corridor Restoration Coordinator developed the principles with input and guidance from the Habitat Goal Implementation Team (GIT). The principles were adapted from the 2013 Urban Stormwater Workgroup Memo, *Final Recommended Principles and Protocols for Urban Stormwater BMP Verification*, because elements are applicable to stream restoration and should guide the verification process in each of the Bay States. In addition, the Maryland Department of the Environment (MDE) and U.S. Fish and Wildlife Service (USFWS) are partnering to develop guidelines for a detailed function-based stream assessment method, a rapid function-based stream assessment method, and a stream restoration design review method. These methods will be based on the guidelines provided in the document: *A Function-based Framework for Stream Assessment and Restoration Projects* (Harman et al, 2012) (http://water.epa.gov/lawsregs/guidance/wetlands/upload/A_Function-Based_Framework-2.pdf),
as well as input from stream restoration experts that use alternative design approaches to the Natural Channel Design method (e.g., floodplain restoration). While these methods include assessments for the purposes of design, they ensure that the design supports clearly articulated goals and objectives which are critical to the verification and evaluation process. Further, monitoring stream restoration projects is a key step to make links between performance and goals. Although developed for Maryland, these methods could serve as a model for all Bay states to provide the basis for a consistent function-based stream assessment protocol used in the verification of stream restoration projects.

The USFWS is also finalizing a performance-based Rapid Stream Restoration Monitoring Protocol which will provide greater detail in verifying project performance after construction. This monitoring protocol will follow a process similar to the USFWS's Natural Channel Design Checklist (Harman and Starr, 2011) (http://www.fws.gov/chesapeakebay/StreamReports/NCD%20Review%20Checklist/Natural%20Channel%20Design%20Checklist%20Doc%20V2%20Final%2011-4-11.pdf), but will be more comprehensive and support other stream restoration design approaches. The protocol will provide valuable guidance on the key components of a stream restoration plan from watershed assessment to post construction maintenance and performance monitoring.

The Habitat Goal Implementation Team has asked the Center to help coordinate the Stream Health Work Group (SHWG) with the USFWS, who will be charged with promoting and coordinating the adoption of the Stream Restoration Verification Principles among the Bay

States. Members of the SHWG are being recruited and the Work Group will likely begin meeting in early fall 2013.

It should be noted that some stream restoration projects may include aspects of wetland restoration (riparian or floodplain). Tracking, reporting, and verifying wetland acres are a challenge in that these projects cross various sector and habitat groups. Verification for wetlands falls under different sets of protocols developed by Chesapeake Bay Program 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. This intersection of wetlands, stream restoration, and various sectors will require coordination and collaboration among the appropriate Habitat and Water Quality GIT workgroups, agencies, and practitioners to reconcile how wetland restoration projects are tracked, reported, and verified in order to account for and credit all acres while avoiding duplication.

Principles for Verifying Stream Restoration Projects

The following series of principles should guide the stream restoration project verification process in each of the seven Chesapeake Bay watershed jurisdictions.

1. *Verification Methods will Differ Slightly among Individual Stream Restoration Projects.* The level of detail needed for verification will be based on the type of project (natural channel design, regenerative stormwater conveyance, and removal of legacy sediments), the clearly articulated project objectives, as well as the size, complexity, and landscape position of the proposed project. The stream assessment methods that are being developed by USFWS for MDE may provide specific guidance on the selection of the appropriate verification methods and will include a post construction checklist which may serve as a useful guide to develop project-specific verification methods. The value of using this approach is that it ties together the assessment, design and project goals to the verification process.

2. *Maintenance and Monitoring in Performance.* Regular inspections and maintenance of stream restoration projects are critical to ensure their benefits in preventing sediment and nutrient pollution are maintained and extended over time, as well as to maintain other local design objectives (e.g., habitat improvement, channel stability, and landscape amenity). Therefore, a core verification principle is to ensure that stream restoration projects are installed and maintained properly over their design life to qualify for their sediment and nutrient reduction credits. To ensure this, verification protocols are needed to define (1) the frequency for field verification of stream restoration practices, and (2) the process for downgrades if maintenance is not performed. All qualifying projects must have a designated authority responsible for development of a project maintenance program that includes routine maintenance and long-term repairs. The stream assessment method being developed by USFWS for MDE may serve as a useful guide to define maintenance triggers for stream restoration projects, as well as the Rapid Stream Restoration Protocol that is under development. Again, these tools are part of a comprehensive approach to stream restoration design that includes assessment, design and monitoring. The monitoring is the

actual part of verification which can be used to determine if the project is functioning as designed. If it is not functioning as designed, then the monitoring data may be used to identify factors such as improper construction or the need for maintenance.

3. *Utilize Existing Maintenance and Inspection Frameworks.* The existing MS4 and 404 Permit/401 Certification inspection and maintenance framework and local sediment control regulations for hundreds of communities in the Bay watershed should be the foundation of any stream restoration verification system for the Bay TMDL. Routine maintenance data collected under these frameworks will ultimately inform the verification process described in #8. In addition, maintenance and inspection included in state and federal agricultural cost-share programs should be incorporated into verification of non-urban stream restoration projects. The Habitat GIT will work with the state and federal regulatory agencies to determine how their existing maintenance and inspection programs can support the Chesapeake Bay Program.

4. *Removal Rate Tied to Function-Based Field Methods*. These methods referenced in "Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects" (http://www.cwp.org/online-watershed-library/doc_download/583-chesapeake-bay-program-urban-stream-restoration-panel-final-recommendations) are similar to those being developed by the USFWS that are cited above. The maximum duration for which the stream restoration pollutant removal rate applies is 5 years, which can be renewed based on a field performance inspection that verifies the project still exists, is adequately maintained, and is operating as designed. The protocols being developed by USFWS for MDE may be helpful in defining performance indicators to assess project performance.

5. *Stream Restoration Verification as Adaptive Management.* The purpose of verification is to appropriately credit the prevention of sediment and nutrient pollution and 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. In addition, field verification enables local governments to analyze their historical inventory of private and public stream restoration projects to identify which individual projects present the best opportunities to retrofit for additional sediment and nutrient reduction. The assessment tools used in verification may also be adapted to allow local governments to determine if other stream restoration objectives (e.g., habitat) are being met.

Until recently, post-project monitoring has been rarely conducted to assess how well stream restoration projects meet their intended design objectives over time. Real world data collected on actual stream restoration performance enables local and state agencies to improve the next generation of projects in an adaptive management process. This process can isolate the specific site conditions, design features and maintenance tasks that influence stream restoration longevity and performance, and incorporate these into improved design specifications, review and inspection procedures and maintenance requirements. Future stream restoration expert panels would review such data to determine if these improved projects would qualify for a higher removal rate, and refine restoration methods and practices that ultimately ensure greater project success.

6. *Stream Restoration Reporting Must be Consistent with CBP Standards.* Each state has a unique system to report stream restoration projects as part of their MS4 and 404/401 permits. In some cases, states are still developing and refining their reporting systems. Consequently, it may not be possible or even desirable to implement a Bay-wide stream restoration reporting format. However, to get credit in the context of CBWM progress runs, stream restoration implementation data using CBP-approved rates or methods, reporting units and geographic location (consistent with NEIEN standards), and periodically updated data based on the local verification of projects in the field is needed. The Habitat GIT will initiate discussions with regulatory agencies to determine how their operations may support this data reporting, with a goal of not increasing the burden to regulatory agencies.

7. *Initial Verification of Stream Restoration Installation.* 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. To receive sediment and nutrient reduction credit for stream restoration projects that involve the restoration of riparian wetlands, the installing agency will need to verify that the riparian area associated with the project meets the state's legal definition of a wetland (e.g., hydrophytic vegetation, hydric soils).

8. *Recommended Cycle for Field Verification of Stream Restoration Projects.* The installing agency needs to conduct inspections two years after initial construction, as this is the most critical period, especially for assurance that vegetative practices are surviving. After this initial two year period, 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. The protocols being developed by USFWS may be helpful in defining performance indicators to assess project performance. The routine maintenance and inspection frameworks referenced in #3 are a critical component to assure that stream restoration projects are functioning between the verification periods.

9. *Suggested Process for Stream Restoration Project Downgrades.* If a field inspection indicates that a project is not performing to its original specifications, the locality would have up to one year to take corrective maintenance or rehabilitation actions to bring it back into compliance. If a project is not fixed after one year, the pollutant reduction rate for the project would be eliminated, and the locality would report this to the state in its annual MS4 report. Non-permitted municipalities would be expected to submit annual progress reports. The load reduction can be renewed, however, if evidence is provided that corrective maintenance actions have restored its performance.

10. *Special Procedures for Stream Restoration Projects Used for Offsets, Mitigation and Trading.* Some stream restoration projects are built to offset, compensate or otherwise mitigate for impacts caused by development elsewhere in the watershed. In other cases, stream restoration projects may be built for purposes of trading nutrient credits within a community or a state. Special procedures need to be developed in both cases to prevent double counting of practices.

11. *State Oversight of Local Stream Restoration Reporting.* 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. Localities should check with their state agency on the specific data to report for individual projects. Some typical reporting information includes:

    a. Type, length and width of stream restoration project
    b. Location coordinates
    c. Year of installation and maximum duration of credit
    d. 12 digit watershed in which it is located
    e. Protocol(s) used
    f. Projected sediment, nitrogen, and phosphorus load reduction

Projects that involve the restoration of riparian wetlands will need to provide basic information, such as wetland area and drainage area. In addition, the installing agency should maintain an extensive project file for each stream restoration project installed (i.e., construction drawings, as-build survey, credit calculations, digital photos, post construction monitoring, inspection records, and maintenance agreement). The file should be maintained for the lifetime for which the load reduction will be claimed.

To provide accountability, Bay states will be asked to use their existing MS4 regulatory authority that could include periodic field inspections review of local maintenance inspection records, to verify performance of local stream restoration practices. The state oversight process should be transparent and publicly accessible so that NGOs, watershed groups, and other stakeholders can be confident that BMP implementation is real.

12. *EPA Review of State Verification Oversight.* So as to not create an additional regulatory burden, the Habitat GIT will discuss with EPA Region 3 the feasibility of using 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. *Review and Verification of CBP BMP Accounting.* 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 stream restoration projects they report are being used to calculate pollutant reductions in the Chesapeake Bay Watershed Model. Better communication among the Bay Program and its state and local government partners will help to improve BMP reporting and ensure a fair representation of state and local program implementation.

References:

Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs, C. Miller. 2012. A Function-Based Framework for Stream Assessment and Restoration Projects. US Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, D.C. EPA 843-K-12-006.

Harman, W., R. Starr. 2011. Natural Channel Design Review Checklist. US Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD and US Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Wetlands Division. Washington, D.C. EPA 843-B-12-005.

VI. Wetland Restoration and Creation Verification Protocol

Version: Updated for July 1, 2013 due date WWG May 2013 comments

These principles may apply to tidal and nontidal wetlands. Protocols for wetlands created or restored that also qualify under agricultural or urban BMPs will be verified according to those protocols, as appropriate. Level of verification and available information may differ between urban and agricultural wetlands.

Background

Situated between the land and the water, wetlands act as buffers by slowing the flow of pollutants into the Bay and its tributaries. As polluted stormwater runs off the land and passes through wetlands, the trees and grasses in wetlands filter and absorb nutrients, suspended sediments and chemical contaminants before these pollutants can flow to nearby waterways.

Countless wildlife species that live in the Chesapeake Bay watershed depend on wetlands for their survival.

- Tidal wetlands are a winter home for waterfowl that visit the Chesapeake Bay as they migrate along the Atlantic Flyway.
- Muskrats, wading birds and other wildlife rely on wetlands for food and cover.
- Many commercially valuable species of fish and shellfish use wetlands as spawning or nursery areas.
- Thousands of aquatic species, including worms, snails, insects, mussels, tiny crustaceans and reptiles and amphibians, thrive in wetlands. In turn, larger animals depend on these small aquatic species for food.
- Wetlands are economically valuable because they provide opportunities for fishing, crabbing and hunting. Since they are habitat for commercially important fish and shellfish, wetlands are vital to the health of the Chesapeake Bay's commercial fishing industries.
- Additionally, many people visit wetlands for popular hobbies and family activities such as boating, bird watching, photography and wildlife study.

Goals

During the period 2011-2025, the goal is to restore 30,000 and enhance 150,000 acres of tidal and non-tidal wetlands across the Chesapeake Bay watershed. It should also be noted that the jurisdictions' WIP goals for wetland restoration BMP implementation totals approximately 83,000 acres between 2012 and 2025 for the agricultural sector, which is more than double the 30,000-acre wetland restoration goal set forth in the Executive Order. In cooperation with other GIT Working Groups and Chesapeake Bay partners, another goal is to protect an additional 225,000 acres of wetlands within the entire Chesapeake Bay Watershed. *Comment: The Wetland Work Group (WWG) noted the confusion that results with two goals for wetland acreage gains. We recommend that there continue to be 2 goals, however, CBP reporting should distinguish between wetlands created in stormwater facilities from wetlands established or re-*

established with habitat improvement among other goals. A suggested goal of 75,00 acres has been circulated for comment.

Both restoration and enhancement are intended to 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, for purposes of clarity and accuracy.

Protocol development process

The workgroup members received a draft background document and were asked to describe their monitoring efforts; what level of project verification would be reasonable given existing resources; and what could be accomplished if more resources were available. Personal solicitation was also made to certain practitioners. Responses were received from NRCS, USFWS, Ducks Unlimited, USEPA, and New York State Department of Environmental Conservation,, the National Association of Home Builders, and U.S. Army Corps of Engineers.

These draft protocols/principles were revised and further developed based on feedback received from the BMP Verification Review Panel on December 6, 2012 and the Comparison Matrix of source sector and habitat workgroup BMP verification protocols. The wetland protocols/principles have also been reformatted and enhanced based on comments received in May 2013 during the Habitat GIT's review and comment process.

Tracking, reporting, and verifying wetland acres are a challenge in that these projects cross various sector and habitat groups. Verification for wetlands falls under different sets of protocols developed by Chesapeake Bay Program 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. This intersection of sectors, wetlands, and stream restoration will require coordination and collaboration among the appropriate Habitat and Water Quality GIT workgroups, agencies, and practitioners to reconcile how wetland restoration projects are tracked, reported, and verified in order to account for and credit all acres while avoiding duplication.

Principles for Verifying Wetland Restoration Projects

The following series of principles should guide the wetland restoration project verification process in each of the seven Chesapeake Bay watershed jurisdictions.

1. Protocols will be implemented to verify that projects are built as designed; that structures are operating properly; that there is a predominance of native wetland vegetation and hydrology is as planned. For wetland restoration projects, it will also be noted that the project is on hydric soil. A wetland restoration practice has a 15 year lifespan; however, projects enrolled in the Wetlands Reserve Program must be maintained in perpetuity. Most projects are designed to minimize long-term maintenance and, therefore, should remain effective for longer than 15 years

2. *Proper Project Siting for Success*. Planning and site selection criteria have a great influence on the success of projects. Projects should be located in areas suitable for wetland creation or restoration and to meet clear project objectives. This includes siting projects at locations capable of supporting suitable hydrology, hydrophytic vegetation, and hydric soils.

3. *Practicality and Rigor*. The verification process needs to be practical with regard to available staff, time, and resources while still maintaining a certain level of rigor and integrity. Responses from practitioners indicate that monitoring would continue as before, unless other resources are provided. Wetland practices reported by the various agencies and organizations are compiled by a state-designated data steward and cross-checked for duplication. The verification process must be simple, preferably following a short checklist that can be completed with minimal examination.

   The WWG recommends developing a checklist that may be used as an application on handheld devices, with a camera, and that can be uploaded to a designated site. The WWG requests CBP assistance in developing and testing this application.

   The WWG observed that it would be useful to have a method of ensuring that a single identifier is assigned to wetland projects to avoid double counting.

4. *Initial Verification of Wetland Restoration Installation.* Sites will be visited after construction and planting to ensure that the project was completed as designed. The installing agency will need to provide a post-construction certification that the wetland restoration project was installed properly, prior to submitting the project for credit in the state tracking database. The WWG does not find that a functional assessment, nor formal wetland determination, can be accomplished given staff constraints. In addition to the time and expense of conducting formal assessments, the WWG felt that, since the verification is for crediting the project as a water quality BMP, it would not be appropriate to consider the project's success or failure in meeting other functional objectives through the BMP process. Wetland projects should not be rejected as water quality BMPs due to a failure to meet standards not related to the water quality objective.

5. *Structural Inspection and Controlling Invasives*. Structural features (e.g. berms, water control structures) will be inspected for operational integrity. Invasive species will be managed to maintain desired plant species composition and abundance. However, the WWG does believe that presence of certain invasive species (e.g., cattail, Phragmites) should not disqualify a project from receiving credit as a BMP.

6. *Maintenance and Monitoring in Performance.* Regular inspections and maintenance of wetland 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 and landscape amenity). Therefore, a core verification principle is to ensure that wetland restoration projects are installed and maintained properly over their design life to qualify for their pollutant removal rates. To ensure this, verification protocols are needed to define (1) the frequency for field verification of wetland restoration practices and (2) the process for downgrades if maintenance is not

performed. All qualifying projects must have a designated authority responsible for development of a project maintenance program that includes routine maintenance and long-term repairs. Monitoring is the actual part of verification which can be used to determine if the project is functioning as designed. If the wetland project is not functioning as designed, then the monitoring data may be used to identify factors such as improper construction or the need for maintenance. Despite this recommendation, the WWG does not believe that repeated, scheduled maintenance and monitoring is possible given current resources. Exceptions are projects that are monitored through other protocols, such as those for urban BMPs, or as previously described for WRP or CREP projects. Unless there are problems observed, projects will be visited one time. Use of aerial imagery for remote observations may be possible.

Projects requiring a Department of the Army authorization may have added monitoring and maintenance requirements than those identified herein.

7. *Utilize Existing Maintenance and Inspection Frameworks.* The existing inspection and maintenance framework and maintenance and inspection performed as part of state and federal agricultural cost-share programs in the Bay watershed should be the foundation of any wetland restoration verification system for the Bay TMDL. Routine maintenance data collected under these frameworks will ultimately inform the verification process. In addition, the Habitat Goal Implementation Team (Habitat GIT) will work with the state and federal regulatory agencies to determine how their existing maintenance and inspection programs can support the Chesapeake Bay Program.

8. *Wetland Restoration Verification as Adaptive Management*. The purpose of verification is to credit appropriately the pollutant removal performance of existing wetland restoration projects. Field assessments are used to identify which projects are still in place and functioning as intended and which ones require preventative or corrective maintenance. In addition, field verification enables local governments to analyze their historical inventory of private and public wetland restoration projects to identify which individual projects present the best opportunities to retrofit for additional sediment and nutrient reduction. The assessment tools used in verification may also be adapted to allow local governments to determine if other wetland restoration objectives (e.g., habitat) are being achieved.

Real world data collected on actual wetland restoration performance enables local and state agencies to improve the next generation of projects in an adaptive management process. This process can isolate the specific site conditions, design features and maintenance tasks that influence wetland restoration longevity and performance, and incorporate these into improved design specifications, review and inspection procedures and maintenance requirements. Future wetland restoration expert panels would review such data to determine if these improved projects would qualify for a higher removal rate, and refine restoration methods and practices that ultimately ensure greater project success. NRCS conservation practice standards are reviewed every 5 years and updated if necessary. Updates could include revised design techniques to address new scientific findings, as well as changes in certification (i.e. certified as implemented according to the standard) procedures if existing procedures were determined to be inadequate.

9. *Wetland Restoration Reporting Must Be Consistent with CBP Standards.* In some cases, states are still developing and refining their reporting systems. Consequently, it may not be possible or even desirable to implement a Bay-wide wetland restoration reporting format. However, to get credit in the context of CBWM progress runs, wetland restoration implementation data using CBP-approved rates or methods, reporting units and geographic location (consistent with NEIEN standards), and periodically updated data based on the local verification of projects in the field is needed. The Habitat GIT again will initiate discussions with regulatory and resource conservation agencies to determine how their operations may support this data reporting, with a goal of not increasing the burden to agencies.

10. *Recommended Cycle for Field Verification of Wetland Restoration Projects.* No cycle for repeated verification is recommended beyond what currently occurs in existing programs. USDA-NRCS Wetlands Reserve Program (WRP) easements are monitored annually for three years, followed by an ownership review in the fourth year, and then three years of remote sensing review. Onsite monitoring would occur every five years after that. Monitoring may be more frequent if there are violations or if compatible uses of the wetland (e.g. prescribed grazing, habitat management) have been approved. However, many WRP projects occur in existing wetlands and count as enhancement, which does not have a BMP efficiency for nutrient removal. Conservation Reserve Program and Conservation Reserve Enhancement Program (CRP/CREP) projects are verified for correct installation. Annual monitoring is required for 10% of contracts. A fully implemented project is not subject to further status reviews, but a project that is not successful or has a problem may be monitored for two more years. All of these projects are implemented on private lands where landowners typically inspect the sites a few times throughout the year. Landowners contact NRCS regarding any problems noted during these inspections (e.g., structural failure or invasive species). For urban wetland projects, the cycle will follow the cycles described in the urban stormwater protocol.

    There is no agreement on a cycle of verification for projects funded by other programs. Monitoring and field verification, after the initial post-construction review, will be on a project-by-project basis.

11. *Special Procedures for Wetland Restoration Projects Used for Offsets, Mitigation and Trading.* Some wetland restoration projects are built to offset, compensate or otherwise mitigate for impacts caused by development elsewhere in the watershed. 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.

12. *State Oversight of Local Wetland Restoration Reporting.* The installing agency must submit basic documentation to the appropriate state agency for each individual wetland restoration project installed. Localities should check with their state agency on the specific data to report for individual projects. Some typical reporting information includes: project identifier, county, watershed, project partners, drainage area, wetland type(s) by acreage, practice type and duration of protection mechanism.

In addition, it is recommended that the installing agency maintain a project file for each wetland restoration project installed (i.e., construction drawings, as-build survey, digital photos, post construction monitoring, inspection records, and maintenance agreement). The file would be maintained for the lifetime for which the load reduction will be claimed.

13. *Review and Verification of CBP BMP Accounting.* 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 wetland restoration projects they report are being used to calculate pollutant reductions in the Bay Model. Better communication among the Bay Program and its state and local government partners will help to improve BMP reporting and ensure a fair representation of State and local program implementation.

14. *Public Confidence.* The process for verification of wetland restoration projects needs to be transparent and publicly accessible for all stakeholders to ensure confidence that these projects are implemented and continue to function as reported by jurisdictions. The verification process for NRCS practices are included in the conservation practice standards, which are publicly available. However, due to Section 1619 of the Farm Bill and other privacy concerns, information on individual projects is not publicly available.

References:

Protocols for agricultural BMPs and urban stormwater BMP verification.

APPENDIX K. Record of Partnership Meetings and Teleconferences including BMP Verification

Below are lists of meetings and teleconferences that occurred, or were scheduled, as of July 2013 and included BMP verification on the agenda. The most recent events are listed first. Links are provided to the CBP calendar entry or other site with an agenda, minutes, and meeting materials.

BMP Verification Steering Committee

- September 16, 2013: www.chesapeakebay.net/calendar/event/20790/
- March 13, 2013: www.chesapeakebay.net/calendar/event/19218/
- February 21, 2013: www.chesapeakebay.net/calendar/event/18958/
- January 22, 2013: www.chesapeakebay.net/calendar/event/18957/
- November 26, 2012: www.chesapeakebay.net/calendar/event/18951/
- October 31, 2012: www.chesapeakebay.net/calendar/event/18700/
- September 12, 2012: www.chesapeakebay.net/calendar/event/18557/
- August 16, 2012: www.chesapeakebay.net/calendar/event/18556/
- July 19, 2012: www.chesapeakebay.net/calendar/event/18512/
- June 19, 2012: www.chesapeakebay.net/calendar/event/18404/
- May 18, 2012: www.chesapeakebay.net/calendar/event/18318/
- April 30, 2012: www.chesapeakebay.net/calendar/event/18241/
- March 27, 2012: www.chesapeakebay.net/calendar/event/18703/

BMP Verification Review Panel

- August 28-29, 2013: www.chesapeakebay.net/calendar/event/20832/
- July 31, 2013: www.chesapeakebay.net/calendar/event/19543/
- June 19, 2013: www.chesapeakebay.net/calendar/event/19542/
- December 6, 2012: www.chesapeakebay.net/calendar/event/18952/
- October 12, 2012: www.chesapeakebay.net/calendar/event/18810/

Water Quality Goal Implementation Team

- January 14, 2013: http://www.chesapeakebay.net/calendar/event/18967/
- November 13, 2012: http://www.chesapeakebay.net/calendar/event/18150/
- October 9, 2012: http://www.chesapeakebay.net/calendar/event/18149/
- September 24, 2012: http://www.chesapeakebay.net/calendar/event/18727/
- September 10, 2012: http://www.chesapeakebay.net/calendar/event/18148/
- August 13, 2012: http://www.chesapeakebay.net/calendar/event/18147/
- July 16, 2012: http://www.chesapeakebay.net/calendar/event/18146/

- May 21, 2012: http://www.chesapeakebay.net/calendar/event/18144/
- April 9, 2012: www.chesapeakebay.net/calendar/event/18143/
- March 12, 2012: http://www.chesapeakebay.net/calendar/event/18046/
- February 13, 2012: http://www.chesapeakebay.net/calendar/event/17887/
- January 9, 2012: http://www.chesapeakebay.net/calendar/event/17704/
- November 14, 2011: www.chesapeakebay.net/calendar/event/13095/
- September 12, 2011: www.chesapeakebay.net/calendar/event/13140/
- August 8, 2011: www.chesapeakebay.net/calendar/event/13148/
- June 13, 2011: http://www.chesapeakebay.net/calendar/event/13182/
- July 6, 2010: www.chesapeakebay.net/calendar/event/13389/
- September 29-30, 2009: www.chesapeakebay.net/calendar/event/18326/
- August 24, 2009: www.chesapeakebay.net/calendar/event/18330/

Habitats Goal Implementation Team

- May 22, 2012: www.chesapeakebay.net/calendar/event/18279/

Agriculture Workgroup

- June 20, 2013: www.chesapeakebay.net/calendar/event/20725/
- May 9, 2013: http://www.chesapeakebay.net/calendar/event/19183/
- April 11, 2013: http://www.chesapeakebay.net/calendar/event/19182/
- February 14, 2013: http://www.chesapeakebay.net/calendar/event/19180/
- January 10, 2013: http://www.chesapeakebay.net/calendar/event/19070/
- November 29, 2012: http://www.chesapeakebay.net/calendar/event/19011/
- October 11, 2012: http://www.chesapeakebay.net/calendar/event/18692/
- September 20, 2012: http://www.chesapeakebay.net/calendar/event/18626/
- August 9, 2012: http://www.chesapeakebay.net/calendar/event/18581/
- July 19, 2012: http://www.chesapeakebay.net/calendar/event/17696/
- June 14, 2012: http://www.chesapeakebay.net/calendar/event/18322/
- May 10, 2012: http://www.chesapeakebay.net/calendar/event/18253/
- March 8, 2012: http://www.chesapeakebay.net/calendar/event/18040/
- February 23, 2012: http://www.chesapeakebay.net/calendar/event/17876/
- January 12, 2012: http://www.chesapeakebay.net/calendar/event/17697/

Forestry Workgroup

- June 5, 2013: www.chesapeakebay.net/calendar/event/20728/
- February 6, 2013: http://www.chesapeakebay.net/calendar/event/19238/
- August 1, 2012: http://www.chesapeakebay.net/calendar/event/18577/
- June 6, 2012: http://www.chesapeakebay.net/calendar/event/18386/
- March 6, 2012: http://www.chesapeakebay.net/calendar/event/18030/

- February 1, 2012: http://www.chesapeakebay.net/calendar/event/17705/

Urban Stormwater Workgroup

- November 27, 2012: http://www.chesapeakebay.net/calendar/event/18547/
- October 16, 2012: http://www.chesapeakebay.net/calendar/event/18546/
- August 14, 2012: http://www.chesapeakebay.net/calendar/event/18487/
- April 30, 2012: http://www.chesapeakebay.net/calendar/event/18220/
- March 20, 2012: http://www.chesapeakebay.net/calendar/event/18069/
- February 8, 2012: http://www.chesapeakebay.net/calendar/event/17888/
- October 25, 2011: www.chesapeakebay.net/calendar/event/13109/

Wastewater Treatment Workgroup

- March 5, 2013: www.chesapeakebay.net/calendar/event/19145/
- January 16, 2013: www.chesapeakebay.net/calendar/event/19074/
- December 4, 2012: www.chesapeakebay.net/calendar/event/18611/
- September 4, 2012: www.chesapeakebay.net/calendar/event/18608/
- July 10, 2012: www.chesapeakebay.net/calendar/event/18324/
- April 3, 2012: www.chesapeakebay.net/calendar/event/18154/
- February 7, 2012: www.chesapeakebay.net/calendar/event/17868/

Wetlands Action Team

- May 21, 2013: www.chesapeakebay.net/calendar/event/19519/

Scientific and Technical Advisory Committee

- March 12, 2013: http://www.chesapeake.org/stac/meeting.php?activity_id=216
- December 4, 2012: http://www.chesapeake.org/stac/meeting.php?activity_id=220
- March 28, 2012: http://www.chesapeake.org/stac/meeting.php?activity_id=200

Citizens' Advisory Committee

- February 22, 2013: www.chesapeakebay.net/calendar/event/19067/
- March 1, 2012: www.chesapeakebay.net/calendar/event/17761/
- November 17, 2011: www.chesapeakebay.net/calendar/event/13091/

Local Government Advisory Committee

- April 12, 2013: www.chesapeakebay.net/calendar/event/19233/
- March 1, 2012: www.chesapeakebay.net/calendar/event/17709/

Management Board

- April 11, 2013: www.chesapeakebay.net/calendar/event/18753/
- September 13, 2012: www.chesapeakebay.net/calendar/event/18086/
- May 9, 2012: www.chesapeakebay.net/calendar/event/18082/

- February 9, 2012: www.chesapeakebay.net/calendar/event/17872/

For the following meetings and conference calls, the MB was provided a detailed written update:

- November 14, 2012: www.chesapeakebay.net/calendar/event/18088/
- August 2, 2012: www.chesapeakebay.net/calendar/event/18085/
- April 11, 2012: www.chesapeakebay.net/calendar/event/18081/
- March 6, 2012: www.chesapeakebay.net/calendar/event/18027/

Principals' Staff Committee

- March 7, 2013: www.chesapeakebay.net/calendar/event/19314/
- December 5, 2012: www.chesapeakebay.net/calendar/event/19044/
- February 16, 2012: www.chesapeakebay.net/calendar/event/17880/

APPENDIX L. Nick DiPasquale February 4, 2013 Letter to CAC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 3
CHESAPEAKE BAY PROGRAM OFFICE
410 SEVERN AVENUE
ANNAPOLIS, MD 21403

February 4, 2013

Mr. John Dawes, Chair
Citizens Advisory Committee
Chesapeake Bay Program Partnership
c/o Alliance for Chesapeake Bay
P.O. Box 1981
Richmond, Virginia23218

Dear Mr. Dawes:

Thank you and the members of the Chesapeake Bay Program Partnership's Citizens Advisory Committee (CAC) for your letter of December 17, 2012. Given the detailed nature of your letter and the important points and concerns you raised, I wanted to first respond in writing, as well as take you up on your offer for a follow up meeting with a group of CAC members. Finally, I would like to ask you for an opportunity to speak with the full membership of CAC at its February 2013 meeting.

I am responding to your letter in both my role as the Director of the Chesapeake Bay Program Office and as the chair of the Chesapeake Bay Program Partnership's Management Board. A draft of this letter was shared in advance with the members of the Partnership's BMP Verification Committee for review and comment during their January 22 conference call. Though I was not seeking their approval, I have incorporated elements of their feedback in this final letter. Given the diversity of important topics and concerns raised, I wanted to ensure I was communicating on behalf of the larger Partnership.

Within the body of this letter, I have included excerpts from your original letter, in the italicized text, followed by detailed responses to each of the points and concerns you raised. Given the critical importance of best management practice or BMP verification to the integrity of the Partnership's accountability system, I wanted to clearly communicate where the Partnership is heading in working through these many challenges, especially since there are no national examples of similar breath and complexity to serve as models.

The Citizens Advisory Committee heard a presentation from Mark Dubin on the Agriculture Workgroup's verification efforts at our quarterly meeting on November 30, 2012. We have also received a copy of the letter sent by several members of the workgroup; reviewed the principles adopted by the BMP Verification Committee; and considered recent correspondence from Rich Batiuk to the chairs of the source sector workgroups.

Thank for continuing to put a focus on verification, transparency, and accountability on your quarterly meeting agendas and follow through actions between your meetings. The CAC membership will find even more information on the Partnership's development of a basinwide

verification framework on-line through the BMP Verification Committee's web page at http://www.chesapeakebay.net/groups/group/best_management_practices_bmp_verification_committee. This web page provides links to ongoing work of the Partnership's independent BMP Verification Review Panel, as well as the latest protocols under development by the Partnership's source sector and habitat restoration workgroups.

It is our understanding that this current verification process looks to fundamentally change, for the better, the way in which the CBP verifies the implementation of practices designed to reduce nutrient and sediment pollution. In this way, the CBP will significantly improve the accounting for reductions in the Watershed Model.

I reiterate for you past statements I have made publicly that the Partnership's work on BMP verification is a foundational element that is absolutely essential to the success of the Partnership's Bay restoration efforts.

We must be fully responsive to calls by the 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. BMP verification is fundamental to ensuring increased public confidence in our accounting for implementation under the 2-year milestones and estimated load reductions using the Partnership's models and other decision support tools. Our scientific experts are continuing to interpret the trends in the decades of monitored observations of water quality in local streams, larger rivers and the tidal waters throughout the watershed of the Chesapeake Bay. We must have trust that these reported practices are actually being implemented and reducing pollutant loads as we use them in explaining the observed water quality trends.

We all must view verification not as a bean counting burden, but 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 local streams and riparian habitats. We must also recognize that there are currently successful state and federal verification programs currently operating that meet high standards. Our challenge is to improve tracking and reporting programs that need verification improvement while not harming successful programs.

What remains unclear to us is the "who" and the "how" of the final decisions on any verification protocols. To have such decisions made by the PSC may not be prudent, given the state partners' repeated cries of inadequate funds and repeated defense of existing evaluative practices.

The Partnership must and will continue to be the decision makers on the development and implementation of the verification process. 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 Bay TMDL accountability role and ensure each jurisdiction's verification program meets the measure of

reasonable assurance well established during the two rounds of watershed implementation plan development and evaluation.

I believe the "cries" from the states are real—state budgets are under significant pressure. State agency managers and staff want to make sure funds are used wisely given the Partnership's focus on implementation on the jurisdiction's watershed implementation plans.

Given these concerns and considerations, we have built into the decision making process the following series of checks and balances to ensure the Partnership as a whole is fully responsive to the documented calls for verification of implemented practices.

- The Citizen Advisory Committee will continue to play a critical advisory role in calling attention to where they view the Partnership has fallen short of stated expectations and prior commitments.
- The Partnership has publically committed to responding in full to the findings and recommendations of the National Academy of Science's report entitled *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay.*
- The Federal Partners are publically committed to carrying out the actions necessary to meet the commitments within *Executive Order 13508 Strategy for Protecting and Restoring the Chesapeake Bay Watershed.*
- The set of five BMP Verification Principles, adopted by the Principals' Staff Committee at their December 5, 2012 meeting, stand as a public commitment and as a set of clear expectations to be achieved in all aspects of our individual and collective verification efforts.
- The Partnership has established an independent BMP Verification Review Panel. The Panel is charged with responsibility for using "the verification principles as criteria for assessing the strengths and possible vulnerabilities in the state verification programs, providing written feedback and recommendations…" and to "…evaluate whether the level of verification rigor is consistent across source sectors and across all seven watershed jurisdictions."
- Within the Principals' Staff Committee, beyond the cabinet level secretaries for the seven watershed jurisdictions, and with the input of the advisory committees, EPA, its principal federal partners, and the Chesapeake Bay Commission will all be at the table. These agencies and the Commission will part of all decisions regarding verification of practice implementation, thereby, ensuring a balanced and objective review and evaluation of the Panel's recommendations and advice.
- EPA will review and approve each of the seven jurisdictions' quality assurance plans where each jurisdiction will document their verification program in detail.

The Principals' Staff Committee will be responsible for adoption of the BMP Verification Principles, approval of the initial suite of source sector and habitat specific BMP verification protocols, and approval of other key components of the overarching BMP verification framework—procedures for eliminating double counting, basinwide agreements to ensuring full access to federal cost share practice data, and procedures for the clean-up of historical BMP databases. The Principals' Staff Committee will, in response to the feedback and recommendations from the independent BMP Verification Review Panel, act to approve or

request further changes prior to approval of each watershed jurisdiction's recommended BMP verification program.

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 Grants Guidance, 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, treatment and technologies which reduce nutrient and sediment pollutant loads which triggers the requirements for a quality assurance plan. EPA review will focus on whether the jurisdictions have 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.

EPA has already started conversations with the Scientific and Technical Advisory Committee about how to put in place a long term evaluation process to ensure periodic assessment of the effectiveness of the collective verification protocols and procedures put in place. We would welcome the Citizen Advisory Committee's ideas and inputs on this topic in the coming months.

Among the options we would request you consider are:

- Making the BMP Verification Review Panel a permanent CBP Partnership mechanism for ongoing verification protocol review.

- Enhancing the membership make-up of and charge to the existing BMP expert panels sufficiently to incorporate both verification expertise and responsibility into the ongoing and future work of these panels. Currently, these expert panels deal with development, review, and recommendation adoption of new or revised BMPs. If this is done, we recognize we will need to amend the Partnership's existing *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model,* adopted by the Water Quality Goal Implementation Team on March 15, 2010, to specifically address BMP verification.

- Offering some alternative valuation mechanism for review and approval of future verification protocols and procedures not yet adopted by the Partnership through the current process underway. Given the current BMP expert panels' charges for determination of BMP efficiencies and load reduction effectiveness is different from the accounting necessary to verify BMP implementation, a different document or approach may be required.

EPA must strengthen its role in providing guidance, direction and feedback on the level of verification it anticipates as sufficient to meet the reasonable assurance standard.

EPA already is an active participant in all phases of development and decision making on the BMP verification framework, helping shape the BMP Verification Principles recently adopted by the Partnership through the Principals' Staff Committee. However, EPA cannot act unilaterally on verification—we must build the foundation for what we collectively consider as verification up through the Partnership as a whole, working closely with all who are responsible for implementation of pollution reduction actions. Otherwise, we will have no hope for making verification an integral component of program implementation and the delivery of technical and technological assistance supporting practice implementation.

EPA believes the adopted set of five BMP Verification Principles embody reasonable assurance. The challenges before all of us is to further define verification and how it will be carried out as an integral component of our long standing programs promoting implementation of technologies, treatment techniques and practices which reduce or prevent nutrient and sediment pollutant loads. EPA will stand firm in ensuring the BMP Verification Principles are upheld in spirit and in action.

Currently, it remains unclear exactly who will determine the sufficiency of any proposed verification protocol.

The Principals' Staff Committee will approve the initial suite of source sector and habitat specific BMP verification protocols. The process for future evaluation of new verification protocols and procedures has yet to be determined, as noted above, and I welcome your input on how the Partnership should proceed forward.

However, since the level of verification is directly linked to any finding of reasonable assurance, and since any credit given in the Model is directly tied to a determination of jurisdictional accomplishment of its TMDL pollution reduction goals, it is clear to us that the final decision-maker must be EPA.

EPA has clearly and frequently communicated its expectations for accountability under the Chesapeake Bay TMDL beginning in 2008. BMP verification is an integral component of accountability under the Bay TMDL.

EPA retains responsibility for ensuring full jurisdictional accountability to achievement of the nutrient and sediment load allocations embodied within the Chesapeake Bay TMDL through implementation of the jurisdictions' Watershed Implementation Plans and their 2-year milestones.

The Agency also retains responsibility for assessing reasonable assurance of the jurisdictions' verification programs through review and approval of the jurisdiction's quality assurance plans as required by the jurisdictions' Chesapeake Bay Implementation Grants and Chesapeake Bay Regulatory and Accountability Grants.

Verification is another, though extremely important, component of a larger accountability system. The Partnership and the public at large, not EPA alone, must have confidence in scientific rigor and transparency of the accountability system. Therefore, we must build this

rigor and transparency for verification up through the Partnership and out through our many partners with implementation responsibilities.

The Verification Principles established by the BMP Verification Committee are broad principles crafted at the 10,000 foot level. There is a need for EPA to provide explicit implementation guidance to the source sector workgroups providing more specificity on how the Verification Principles must be utilized as they develop their protocols.

The BMP Verification Principles were developed and adopted by the Partnership prior to final consideration of the verification protocols so that the principles would help form and drive development of the protocols. As stated previously, there is no playbook, no existing example to follow, or precedent to adhere to regarding the size and complexity of the task before us.

Through the Partnership, we are developing the necessary insights for how to frame our verification efforts as we move forward. We are building on decades of shared experience supporting widespread implementation of pollutant load reduction actions and the subsequent tracking and reporting of those actions. We are soliciting the expertise of independent experts from around the watershed and across the country to help ensure we are setting the bar appropriately and adhering to our established principles.

It would be of value to me if, when we meet, you share with me some specific examples of the concepts or details that you would suggest EPA include in the requested guidance which have not been addressed to date.

Of particular interest to us is the need for guidance delineating what is and is not sufficient transparency as required in the "Public Confidence" principle. Absent a significant level of heightened transparency in the verification process itself and the underlying data to support any conclusions; we will not meet the public confidence standard envisioned in the principle.

This is an issue on which the Citizens Advisory Committee must advise the Partnership—help us collectively define what we mean by transparency and how that transparency can be achieved. The Committee should share specific examples which can be applied across source sector and jurisdiction as is the intent behind the Partnership's adopted public confidence principle.

Also to be included in the guidance, for example, should be an EPA implementation directive establishing that the level of "scientific rigor" will necessitate relational levels of credit application in the model and that every protocol needs to recognize this "sliding scale" approach.

The Partnership has a long history of defining 'scientific rigor' by establishing panels of recognized experts and seeking independent scientific peer review to advise the partners on what stands as scientifically rigorous given the current state of knowledge and scientific understanding. As we develop and employ verification as an integral component of our varied implementation programs, the Partnership will continue to use both expert panels and

independent scientific peer reviews to help define and re-enforce scientific rigor in our shared decision making.

Building from BMP Verification Review Panel, we are considering whether the Partnership could charge the BMP expert review panels to include the review of new verification protocols and the continued adaptation of existing protocols to factor in new insights and scientific understandings and technological developments. Regardless of the final process the Partnership selects for these future evaluations, the Partnership will need to establish a new level of commitment to verification oversight and review. We must make verification an integral component of our long standing, shared decision-making on BMP definitions, estimated pollutant reduction effectiveness, tracking, reporting, and public accountability.

In addition, EPA should use the findings of the BMP Verification Review Panel—the only wholly nonpolitical and scientific group engaged in the verification process—as weighted guidance in making its determination.

The BMP Verification Review Panel was established and charged to provide the Partnership with independent findings and recommendations on the verification principles, the workgroup's verification protocols, and the jurisdictions' verification programs. In convening the Panel, the Partnership has publically committed to full consideration of the Panel's findings and recommendations at each decision point in the implementation of a rigorous, transparent system of practice verification.

The professional staff in our state, regional, and federal agencies and academic institutions, along with the many other partners represented on our technical workgroups, our goal implementation teams, and our BMP Verification Committee, have also brought important contributions and insights to this entire process. EPA and its partners will consider all the available recommendations and input from both the independent Panel and our professional staff.

We also remain concerned with many specifics relating to the verification process. We have attached a list of these specifics.

We welcome and greatly appreciate the time and attention the Citizen Advisory Committee has devoted to verification, recognizing you were one of the early and major drivers behind the efforts now underway within the Partnership. Your current and continued identification of specific concerns are critical to the ultimate success and credibility of the Partnership's verification framework.

1) Reliance on use of the existing state verification protocols, the status quo, is not acceptable although it appears that many on the Agriculture workgroup support this approach.

The five BMP Verification Principles recognize the need for changes and enhancements and the opportunity to build from existing jurisdictional tracking and reporting programs. There are state and federal programs with strong verification programs in place and working effectively in carrying out the principles. However, we recognize none of our seven jurisdictions' existing BMP tracking, verification and reporting programs, across <u>all</u>

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 even prior to development of the principles.

The National Academy of Science's report did also note the rigor of the jurisdictions' existing NPDES verification programs. We should not presume, a priori, that all existing programs are not operating effectively. The task before us is to ensure that each jurisdiction's comprehensive verification program, across all sectors and habitats, achieves the adopted principles.

2) Different levels of credit should be given in the model for different levels of verification.

a. As it is inevitable that achievement of a high level of certainty will prove difficult when applied to certain BMPs, the workgroup should endorse the concept of providing different levels of credit based on different levels of certainty. A sliding scale certainty/credit ratio system would allow for greater flexibility and greater accuracy.

The Partnership's two principal source sector workgroups—Urban Stormwater and Agriculture—both evaluated and then rejected recommending a sliding scale approach due to a lack of sufficient scientific data and information on which to establish such a scale.

While the Urban Stormwater Workgroup investigated the concept of a sliding scale, it could find no definitive research to define a scientifically rigorous or defensible way to quantify how the scale would actually work in practice. Any discounts associated with a sliding scale would necessarily be arbitrary. The Urban Stormwater Workgroup elected to take a more stringent approach whereby each urban BMP would have a defined expiration date, which can only be extended based upon an on-site inspection that utilizes visual indicators to determine practice function and performance.

The Agriculture Workgroup identified the need early in 2012 to research the available scientific literature and collect pertinent information from identified experts on a national basis to support the development of verification protocols and associated pollution reduction credits. This research, being conducted by Tetra Tech under the oversight of the Agriculture Workgroup, has resulted in a comprehensive synthesis of information on existing agricultural verification examples. Unfortunately, a creditable level of scientific data to support the establishment of varying pollution reduction crediting via separate verification methods and BMPs has not been identified to date. Consequently, the Agriculture Workgroup has decided not to pursue this verification protocol process originally proposed by the workgroup itself. Instead, the Agriculture Workgroup has identified an alternative verification process which establishes a minimum threshold level of data certainty across all verification methods and practices; a process which can be more adequately supported by the limited available scientific data.

b. It is not possible to pass the test of public credibility or the legal scrutiny of "reasonable assurance" by adoption of a procedure that allows BMPs verified by "self-certification" to be given the same credit in the model for pollution reduction as the same practice that has been verified by more stringent measures.

The Partnership's two principal source sector workgroups—Urban Stormwater and Agriculture—are addressing self certification in different ways, reflective of their source sector and available means for ensuring verification. I concur that self-certification, standing alone, is unlikely to meet the EPA's reasonable assurance measure. However, in combination with an effective auditing program, self-certification could be considered a viable verification protocol. Self-certification can serve as an important first step—but certainly not the final step—in the verification process for BMPs in the urban stormwater sector. The vast majority of urban BMPs are reported under legally enforceable MS4 stormwater permits or construction general permits. The Urban Stormwater Workgroup has recommended numerous oversight and sampling procedures at the local, state, and federal level to ensure the reporting is accurate and verifiable.

The current draft agricultural verification protocol being developed by the Agriculture Workgroup encompasses as many partnership-identified verification methods as possible, including self-certification. Self-certification is presently utilized by a number of federal and nationally recognized agricultural databases, including the USDA-NASS Agriculture Census, which has served in the past and currently as the basis for numerous agricultural calculations in the suite of Chesapeake Bay Program models. Rather than eliminating self-certification as a potential method for the verification of data, the Agriculture Workgroup draft agricultural verification protocol recognizes the importance and potential limitations of self certification. The draft verification protocol places the same minimum level of data confidence on self-reported data as that obtained from other methods such as field-level assessments by trained and certified professionals. Only when this same minimum level of data certainty is obtained, perhaps through independent auditing of a percentage of the practices, will any self-certified agricultural data be credited for pollutant load reductions.

c. Verification can include technical and qualitative measures.

The Partnership's two principal source sector workgroups—Urban Stormwater and Agriculture—are taking different approaches to using both technical and qualitative measures of verification.

While the Urban Stormwater Workgroup agreed in its recommended protocols that verification requires clear visual indicators to assess practice condition and performance, it also noted that many of these indicators do not currently exist. Consequently, the Urban Stormwater Workgroup has asked both its convened and future BMP expert review panels and the Chesapeake Bay Program Partnership's stormwater coordinator (Tom Schueler, Chesapeake Stormwater Network) to develop templates for such indicators as a very high priority in 2013. The Chesapeake Stormwater Network, through a separate grant, will devise visual indicators for low impact development or LID practices in the first quarter of 2013.

The present Agriculture Workgroup draft verification protocol recognizes not only the diversity of potential verification methods, but also the diversity of BMPs that are being verified. The workgroup has identified four major categories of practices including annual, structural, management plans and management practices. Each verification method is being

evaluated against each BMP category to identify where particular methods may or may not adequately attain the expected minimum level of data certainly. Structural BMPs such as a waste storage facility will require a technical engineering evaluation compared to an annual practice such as cover crops which will be qualitative. Thus, implementing a qualitative verification method would not be recommended for structural category practices, for example.

d. The process for transparency must be clearly explained.

As the Partnership collectively defines transparency within the overall verification process, including the Citizen Advisory Committee's assistance in the development of this definition, we will act to embed the specific actions and commitments within all relevant components of the basinwide BMP verification framework.

3) The new protocols must solve the problem of accounting for expired practices. How to remedy the existing situation where reductions from a BMP are included in the model after a contract period (for federal/state payment for implementation) has expired.

Each of the six source sector workgroups and habitat workgroups are actively addressing the issue of enforcing life spans for best management practices, treatment processes, and reduction technologies. One of the more notable accomplishments of the Urban Stormwater Workgroup's work on verification has been the shift from perpetual BMPs to BMPs with defined expiration dates. The expiration dates are being defined by the expert BMP review panels and range from 3 to 9 years depending on the longevity of the particular BMP. After that date, pollutant removal credits also expire, unless verifiable evidence indicates that the practice still exists, is operating as originally designed, and is being adequately maintained, all of which can only be done through an on-site inspection performed by a qualified evaluator.

The draft verification protocol being developed by the Agriculture Workgroup recognizes that BMPs being verified under permitting, regulatory, and financial incentive programs which may have inherent obligatory life spans. For example, the BMPs implemented under a financial incentive program can only obtain the required threshold of data certainty under that verification method as long as the practice is under contract. Once the contractual lifespan between the program entity and the implementing entity has expired, the associated BMPs will need to be verified into the future under alternative methods to obtain pollution reduction credits. The alternative verification method employed will require meeting the minimum level of data certainty as with any source of agricultural BMP data.

4) The new protocols must solve the problem of double counting of existing practices. While there is the need to count all that is implemented, it must be clear that they are not counted twice.

The opportunity for double counting practices is most prevalent in the agricultural sector, given producers are receiving cost share funding from state agencies, federal agencies, and non-governmental organizations. Led by the efforts of Dr. Dean Hively and Olivia

Devereux, the U.S. Geological Survey has been actively working with Natural Resources Conservation Service, the Farm Services Administration, and the lead state agricultural departments and conservation agencies across the six states to develop state-specific procedures for eliminating double counting. The state-specific procedures will be an integral component of the larger BMP verification framework presented to the Partnership's Principals' Staff Committee for review and adoption.

5) The verification concept under discussion by the Agriculture Workgroup involves a complex and not-yet transparent approach relating to "certainty"; the process for selecting any numerical certainty level must be transparent, clearly defined, and based on technically defensible information.

The verification protocol proposal currently being developed by the Agriculture Workgroup is based on the concept of applying a minimum threshold of data certainty across all verification methods and BMPs. The proposed threshold of 80 percent data certainty has been derived as a mid-point value based on the range of values identified through the workgroup commissioned research on agricultural verification by Tetra Tech. It is my understanding that the Agriculture Workgroup plans to have the completed research report serve as a key technical support element of a more extensive protocol recommendation package that will provide a more clearly and technically defined protocol. The Agriculture Workgroup has discussed having the completed verification recommendation package also include a recommendation for a transparent and technically defensible review and approval process. All of this is currently under discussion by the Agricultural Workgroup with no final decisions made by the Partnership. Incorporating effective auditing programs could be another means of providing both more transparency and certainty in all the forthcoming verification protocols. The forthcoming recommendations of the Agriculture Workgroup will be presented up through the CBP Partnership's management structure, including all three advisory committees, for review and discussion over the course of the coming winter and spring.

6) The ongoing complaint from the states that there is insufficient funding to implement new, more robust verification protocols should not be an excuse for lack of verification.

EPA agrees that funding cannot be used as an excuse for lack of verification. However, the Partnership's 'adaptive management' verification principle recognizes that funding does play a critical role in decisions on how to best structure the jurisdictions' verification programs:

> *Verification protocols will recognize existing funding and allow for reasonable levels of flexibility in the allocation or targeting of those funds. Funding shortfalls and process improvements will be identified and acted upon when feasible.*

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

recently released 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 within the 2013 grant guidance document).

a. Currently, the states receive Chesapeake Bay Regulatory and Accountability funding from EPA. These grants provide dollars for verification. It is unclear whether states have dollars unspent and available under these grants.

All seven jurisdictions have some level of unspent funds under their existing and past CBRAP grant awards. EPA is actively working with each jurisdiction to ensure timely expenditure of all funds consistent with the Agency's grant guidance. EPA's 2013 *Chesapeake Bay Program Grant and Cooperative Agreement Guidance* spells out the Agency's expectations regarding past unexpended funding and actions it could take to ensure these funds are fully expended. It is the Agency's goal that each of the jurisdictions fully utilize their awarded CBRAP grant funds to make important, long lasting investments in each jurisdiction's regulatory and accountability programs and infrastructure.

b. Additionally, implementation should, by definition, include verification. Targeting of funding to critical areas should be employed.

The Partnership's 'adaptive management' verification principle acknowledges that "verification protocols will recognize existing funding and allow for reasonable levels of flexibility in the allocation or targeting of those funds." EPA's 2013 *Chesapeake Bay Program Grant and Cooperative Agreement Guidance* spells out the Agency's expectations with respect to application of EPA grant and cooperative agreement funding towards specific targeted practices and geographies.

Lastly, verification for the most important and the least important practices appear to be receiving the same degree of focus and development.

Yes, the verification protocols currently under development by the Partnership's source sector and habitat restoration workgroups are essentially 'blind' to the relative importance a jurisdiction may place on a specific practice. While the Partnership's 'sector equity' principle does not mandate 'equality' among each and every protocol, the six workgroups are looking at all practices with similar levels of scrutiny. The BMP Verification Committee, in turn, is looking across the six workgroup's proposed protocols to ensure equity across sectors and habitats.

The CBP needs to target the most important practices and direct the workgroups to pay particular attention to them. We understand that bringing BMP verification to the level which satisfies the "Public Confidence" principle mentioned above, as well as addressing concerns in the National Academy of Science's evaluation will require some significant upgrading of the partnership's programs. There is a long list of BMPs and it isn't feasible to do everything at

once. Therefore, it is critical to focus on those BMPs which are most important for meeting the TMDL.

The Citizen Advisory Committee's calls for targeting verification efforts towards the most important practices—those on which the jurisdictions are depending upon providing for the highest level of nutrient and sediment pollutant load reductions— have been strongly echoed by recommendations put forth by the BMP Verification Review Panel during their October 12, 2012 conference call and their December 6, 2012 meeting. The Panel requested specific documentation of the most frequently employed and the most pollutant reduction effective practices which the jurisdictions have committed to implement through their Phase II Watershed Implementation Plans. Chesapeake Bay Program Office staff is actively working on addressing the Panel's request for additional information and documentation.

It is a jurisdictional decision to put more or less verification emphasis on a select set of practices, treatments, or technologies, recognizing they will not receive credit for unverified practices. Based on the above described work underway by Chesapeake Bay Program Office staff, along with their continued application of tools like the Chesapeake Assessment and Scenario Tool or CAST (actively being tailored to individual jurisdictions), the jurisdictions will be well positioned to make such verification targeting decisions.

We respectfully request a formal response to this letter. In order to assist you, knowing your schedule is a full one, we would be glad to receive a verbal response via a meeting among you and your staff with available members of CAC at a time convenient for you.

Given the detailed nature of your letter and the important points and concerns you raised, I wanted to first respond in writing, than take you up on your offer for a follow up meeting with a group of CAC members. Finally, I would like to ask you for an opportunity to speak with the full membership of CAC at its February 2013 meeting.

Please extend my personal gratitude and appreciation, as well as that of the Partnership, to your members for their continued dedicated service to the restoration of the Chesapeake Bay ecosystem and its watershed. The Committee's long focus on enhancing transparency and accountability in our individual and collective restoration efforts is fully recognized by the Partnership. I forward to meeting with you.

Sincerely,

Nicholas A. DiPasquale
Director

cc. CBP Citizen Advisory Committee Members
CBP Local Government Advisory Committee Members
CBP Scientific and Technical Advisory Committee Members
CBP Management Board Members
CBP BMP Verification Review Panel Members
CBP BMP Verification Committee Members

Memo: **Recommendations of the CAC workgroup on verification and transparency**

Members: **Verna Harrison, Rebecca Hanmer, Andrew Der and staff Jessica Blackburn**

To: **Citizens Advisory Committee**

Date: **May 22, 2013**

An action item of the CAC February 21-22, 2013 quarterly meeting was the formation of a CAC workgroup to continue to engage with the Chesapeake Bay Program (CBP or Program) on their work to improve verification and transparency of Best Management Practices (BMPs). The CBP has asked CAC to help the partnership define operational *transparency* and suggest how the partnership can develop protocols for *verification* that meets CAC's continued call for sufficient transparency as required in the "Public Confidence" principles of the BMP Verification Committee.

As Rebecca was part of a group that was asked to provide a definition of *"transparency"* by March 25, she and Verna collaborated on a definition of transparency which was given to the Ag Workgroup. The definition is in part III below of the outlined letter to Nick.

The focus of the draft outline of a letter below is on the issue of verification and transparency in nutrient management of agricultural practices. (See comment on Section V)

The CAC workgroup has talked with colleagues, researched literature and reports, and Rebecca Hanmer has participated in the CBP Verification Committee meetings. The workgroup held a conference call on March 26, 2013 and have exchanged many workgroup emails and phone calls over the course of the last month. On behalf of the CAC workgroup the following recommendations are brought to you as suggested responses to Nick DiPasquale's request for further information from CAC.

CAC response to request for recommendations on BMP Verification and Transparency
DRAFT OUTLINE

I. Introduction

A. Previous exchanges on Verification- reference Dec 17, 2012 CAC letter listing concerns with verification process:
"Of particular interest to us is the need for guidance delineating what is and is not sufficient transparency as required in the "public Confidence' principle. Absent a significant level of heightened transparency in the verification process itself and the underlying data to support any conclusions; we will not meet the public confidence standard envisioned by the principle"

B. Nick's Transparency request to CAC- reference Feb 4, 2013 CBP letter to CAC in response to verification concerns and the request to ask CAC help with transparency: "This is an issue on which the Citizens Advisory Committee must advise the Partnership- help us collectively define what we mean by transparency and how that transparency can be achieved. The Committee should share specific examples which can be applied across source sector and jurisdiction as is the intent behind the Partnership's adopted public confidence principle."

II. Basic definition of "transparency"- answering the specific request from CBP, Given to the Agricultural Workgroup by Rebecca Hanmer

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 documents, 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 measures 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.

III. Acknowledgment of decision to create special task force

Welcome recent progress in creating a small "Plan Assessment" workgroup of technical experts to develop quantifiable verification protocol approaches for on-farm application of fertilizer, manure, and bio-solids. CAC's recommendations for what this special group should look in last section of this memo.

IV. Target practices in WIPs

We recognize that states face many challenges in strengthening verification and transparency for all the BMPs in the WIPs. Therefore, support giving highest priority to making the necessary investments in verification/transparency for those practices which are most significant in the state WIPs in terms of effectiveness and the extent to which state is depending on implementation of these practices to achieve the nutrient and sediment TMDL allocations.

V. Why focus on nonpoint source agricultural nutrient management

CAC's greatest concern is about the current problems with verification and transparency for agricultural nonpoint sources of nutrients and sediment because of the importance these practices have in achieving the WIP requirements. Although we recognize that there are legal limitations for reporting farm-specific information for BMPs supported under the Farm Bill, and there are practical limitations associated with gathering and reporting information when BMPs are implemented voluntarily, CAC believes that the general standard of transparency for nonpoint sources should be the same as for point sources. (Even for point sources, the NPDES regulations recognize distinctions in reporting between major and minor sources, and protect confidential business

information.) We also recognize that generally the agricultural management practices are the most cost-effective practices which underscore the importance of verifying them.

A. **Adaptive Management, a guiding principle of the Bay program, must be employed to address findings from both the extensive external review by the National Academy of Sciences and the USDA's Conservation Effects Assessment Project (CEAP) report.** These reports describe serious flaws in the ability to account and verify implementation of nutrient management plans.

For example, only 9% of cropped acres met the criteria for *both* phosphorus and nitrogen management, if rate, form, time and method of application are considered (CEAP 2011). Results indicate, for example, that only 35% of cropped acres met criteria for application rate for nitrogen and 37% for phosphorus and for "manured" acres only, these percentages drop to 30% and 19%, respectively. These results are in contrast to the high rates of nutrient management implementation reported by the Bay jurisdictions.

The CEAP report (Nov 2012) finds that despite improvements in nitrogen application rates, about 66% of corn acreage does not achieve the rate, timing, and method criteria that minimize environmental losses of nitrogen. As a result, improved nitrogen management on cropland continues to be a major conservation policy goal." In sum, there are significant differences between reported progress from the Bay model and that reported by farmers themselves via the CEAP process.

B. **Make the verification process and aggregate analyses of the fate of manure available to ensure transparency.** For the purposes of this discussion, the onus is not on the individual farmers to do more than either their permit or their nutrient management plan requires. We are not interested in farm-by-farm information that is protected by the Farm Bill, but we do think aggregate information should be reviewed by a third party, like EPA or USGS to compare with real world modeling data and analyze water quality implications. The review process and results are aggregated at the county level (at a minimum) and should be made available.

There is also the need to know where manure goes as many animal producers do not have land on which it can be appropriately spread. Clean Water Act permitted farms, like CAFOs, are required to have permits for how manure will be handled on the farm's land (although many of these permits have yet to be issued). If a CAFO transports manure from its farm to a non-CAFO farm, then there is no account (chain of custody) of where the manure goes or if it is applied to an area that is already too nutrient rich. A better understanding of the fate of manure will help Bay Program modelers to determine where manure can be spread and whether there is enough appropriate land available for manure application in a region of the watershed.

C. **The status quo, where there is very limited to almost non-existent transparency for agricultural nonpoint source information, cannot be allowed to continue.** Where state nonpoint source verification protocols cannot achieve the same level of transparency as their protocols for point sources of a similar size, states should document what measures

they are taking to improve transparency, such as third-party verification. There are some critical questions a state should be able to answer as a way to verify this aspect of nutrient management plans are providing the pollution protection intended.

This third party verification team should seek to answer:

1. Where are the organic and inorganic fertilizers and bio-solids going to be applied?
2. Based on a soil test prior to application, how much nitrogen and phosphorus is currently in the soil? How much fertilizer is being applied and how is it documented?
3. When is the fertilizer applied?
4. If manure is being transported out of state, where is it being applied?

VI. Extensive transparency is built-into point sources, but some improvements can be made

Also recognize that the Clean Water Act and the implementing regulations for the National Pollutant Discharge Elimination System (NPDES) contain extensive transparency requirements. CAC supports the general position that the states should use the legally-established NPDES verification and transparency mechanisms for those nutrient and sediment sources which are regulated as "point sources". However, practical limitations on transparency need to be corrected. The MS4 process would lend itself to even better transparency as the annual reporting requirements are already in the public domain and efforts to makes them more available and understandable would have a lot more return on the effort investment.

Address backlog of permits- Where NPDES permits with the appropriate Chesapeake Bay TMDL-related requirements have not been completed, then transparency is lacking because the necessary monitoring and reporting are not being done. In particular:

A. Jurisdictions should make sure that all sewage treatment plant NPDES permits contain the necessary nutrient limits, monitoring and reporting requirements. We understand that some "significant" treatment plants still lack numerical nutrient limits years after the Bay permitting strategy was issued.

B. Jurisdictions should expedite improvements to NPDES stormwater permitting and implementation, especially by reissuing Phase I MS4 permits and issuing Phase 2 MS4 permits which contain the necessary requirements for achieving the Bay WIP requirements. In addition, EPA should enhance transparency by reconsidering its characterization of all stormwater permits as "minors", thus limiting electronic reporting of MS4 information (ICIS system).

VII. Current approach by the verification committees- Tetra Tech method

The Agriculture Workgroup has sponsored development of a verification assessment tool by consultant Tetra Tech (Tt method), in lieu of drafting BMP-specific protocols. Although the Tt method may have potential, in its current state it is decreasing rather than adding to transparency. One of our CAC team, Rebecca Hanmer, participated in the only

practical trial of the method of which we have been informed, for the draft riparian forest buffer (RFB) protocol. Although the method provoked useful discussion, it was complex and very time-consuming to employ. It should not be called a numerical scoring method at all as it relies on the professional judgment of the evaluation teams whose composition is currently unknown.

VIII. Problems with the current approach (1)- test the method with independent experts

We object to providing this method to the jurisdictions for use in its present form. There should be several more Bay Program-level trials of different types of BMP protocols, using teams who are expert in the selected BMPs but also including some members who are independent of the current agricultural assistance establishment. The results of these trials need to be written up and made publicly available for discussion (e.g. by the BMP Verification Committee).

Problems with the current approach (2)- use plain English, not codes and insider references

Even with better, more user-friendly guidance, application of the method could still be non-transparent. Because the method depends upon team scoring, the composition of the teams is of prime importance. State scoring teams should also include independent experts. Results of team scoring need to be written up and submitted to the Bay Program along with the BMP verification protocols, with clear information about how potential weaknesses were addressed. The BMP protocols themselves must be written out in plain English, not simply keyed to the spreadsheet which the Agriculture Workgroup has developed.

IX. Conclusion

Lastly, CAC is committed to preserving healthy agriculture in our communities. Rural landscapes are integral to the fabric of our region's culture. Just as clean water is important to healthy communities, so are healthy, local food sources. We believe responsible agricultural practices are good land uses. The states led the design of their WIPs to accommodate agricultural viability and should also be accountable for the responsible farming practices that seek to credit towards the WIPs congruent with urban stormwater verification requirements. We encourage the EPA to use the Chesapeake Bay Program as a venue to promote and share successful examples across the watershed that demonstrate healthy farm practices, the community ethos that support them and the mechanisms that promote practice verification.

APPENDIX N. Transparency Subgroup's Draft Recommended Transparency Principle

Chesapeake Bay Program Partnership
BMP Verification Committee
Ad Hoc Transparency Subgroup
June 12, 2013

Background

The Agriculture Workgroup sought guidance on a particular aspect of the BMP Verification Principles – transparency – described in Principle 3, Public Confidence:

> Verification protocols incorporate transparency in both the processes of verification and tracking and reporting of the underlying data. 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.

Transparency is incorporated in the Clean Water Act (CWA), and its regulatory and policy framework, which establishes public access and site-specific data transparency requirements for all sources of nutrients and sediments regulated as point sources. The following definition and recommendations are proposed to clarify the concept of transparency across all nonpoint sources.

Proposed Addendum to the BMP Verification Principles[1]: Transparency

Definition of transparency

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.

Recommendations

1. The measure of transparency will be applied to three primary areas of verification: data collection, data synthesis and data reporting.
2. Transparency of the process of data collection must incorporate independent QA/QC procedures, which may be implemented by the data-collecting agency or by an independent third party.
3. Transparency of the data reported should be transparent at the most site-specific scale that conforms with legal and programmatic constraints, and at a scale compatible with data input for the Chesapeake Bay Program partnership 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.

[1] http://www.chesapeakebay.net/documents/Ches_Bay_Program_Partnership_BMP_Verification_Principles.pdf

Agricultural BMP Implementation Verification Supporting Information

DRAFT January 22, 2013

Prepared for

Agriculture Work Group

Chesapeake Bay Program

Prepared by

Tetra Tech, Inc.

10306 Eaton Place, Suite 340

Fairfax, VA 22030

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 PURPOSE

The Chesapeake Bay Program's Agriculture Workgroup (AgWG) is exploring options to verify the implementation and operation of agricultural Best Management Practices (BMPs) in the Chesapeake Bay Watershed (CBW). The objectives of this effort are to identify approaches or protocols for verifying agricultural BMP implementation, to assess the varying levels of data confidence associated with different protocols, and to reflect the varying confidence levels by establishing a minimum threshold of data confidence for crediting BMP implementation in the Chesapeake Bay Watershed Model (CBWM). Verification of both cost-shared (c/s) and non-cost-shared practices is desired. Major options identified by the AgWG fall into five categories:

- On-farm assessment by trained personnel;
- Farmer self-assessment, with or without spot check by agency personnel;
- Review of existing agency or on-farm records;
- Statistical sampling; and
- Remote sensing.

1.2 METHODS

Two approaches were taken to assemble supporting information for BMP verification. First, a search of scientific literature and published reports was conducted to document past and ongoing BMP verification protocols relevant to the Chesapeake Bay Watershed. Second, brief telephone interviews and email exchanges were conducted with 19 individuals both within and outside of the CBW who had been identified by the AgWG as having significant experience and/or expertise in BMP verification. The purpose of these interviews was to identify specific verification programs and key principles that should be applied to future verification efforts. The names and affiliations of the interviewees are listed at the end of this report.

2.0 OVERVIEW OF VERIFICATION

2.1 WHAT IS VERIFICATION?

The Chesapeake Bay Program (CBP) Partnership has defined verification as the process through which agency partners ensure practices, treatments, and technologies resulting in credited reductions of nitrogen, phosphorus, and/or sediment pollutant loads are implemented, maintained, and operating correctly. The process for certifying tradable nutrient credits is a separate, distinct process not addressed either by these principles or through the partnership's BMP verification framework. In the context of this report, verification refers to the accurate tracking, documenting, and accounting of the use of agricultural BMPs at a watershed or larger scale. The term "verification" does not refer to measuring specific BMP performance or pollution-reduction

efficiency, but rather to the confirmation of the presence of functional BMPs (i.e., those BMPs operating to provide a water quality benefit) across the landscape. Thus, verification is essentially a detailed inventory of all BMPs implemented within an area of interest.

2.1.1 PURPOSES

Verification efforts may serve a number of purposes, including providing accountability for government-funded programs, documenting compliance with regulations or progress toward a management goal (e.g., a total maximum daily load or TMDL), or assessing the effectiveness of a watershed management program (e.g., through modeling). Tracking of on-site conservation practice implementation is an important first step for assessing watershed management effectiveness. If BMP tracking is insufficient, it makes it difficult to assess how much is being done to reduce pollution from agricultural sources and what the resulting reductions are likely to be.

In some parts of the U.S., verification of agricultural BMPs is conducted in support of trading programs, wherein pollution reductions estimated to be achieved through BMP implementation can be traded to other pollutant emitters; the Maryland Nutrient Trading Program and the Ohio River Basin Trading Project (EPRI 2012) are two examples of such programs. Some states have programs to document implementation of BMPs in support of agricultural certainty programs that protect farmers from regulatory action as long as they follow certain procedures which may include implementation of BMPs Examples include the Florida Department of Agriculture and Consumer Services (FDACS) BMP manuals, the Louisiana Master Farmer Program, Michigan's Agricultural Environmental Assistance Program (MAEAP), the developing Minnesota Ag Water Quality Certification Program (a multi-agency state and federal cooperative venture), and the Virginia Department of Conservation and Recreation (VDCR) Resource Management Plans (Craig and Noto 2012). Some regions or states conduct BMP verification as part of regulatory programs, e.g., the Florida Implementation Assurance Program for the Lake Okeechobee and other priority watersheds (FDACS 2008).

2.1.2 METHODS

BMP verification can be conducted using several different approaches, including direct on-the-ground inventory, self-reporting by landowners, examination of agency records, statistical sampling, or remote sensing. These approaches are discussed extensively in this report. A discussion of how different approaches may be most appropriate for different types of BMPs can be found in section 4.0. For example, the presence of structural BMPs may be verified visually (on the ground or by remote sensing), while existence of a nutrient management BMP cannot be verified visually, but instead requires detailed information on management activities by the farmer. While specific procedures vary among different general approaches, some basic guidelines intended to ensure high quality work can be found in *Government Auditing Standards* (GAO 2007), which includes methods for designing performance appraisals that may also be useful in designing verification programs.

An important step in implementing a verification effort is gaining knowledge of the BMPs implemented in the area of interest. In the CBW, the specific list of agricultural BMPs of interest for verification is defined by the practices that are included in the CBWM through NEIEN (National Environmental Information Exchange Network) (Sweeny 2012). Practices associated with agriculture are listed in Table 1.

Table 1. Agricultural practices reported through NEIEN (TO BE UPDATED).

Nutrient Management	**Other Agricultural Practices (cont.)**
Nutrient Management	Manure Transport
Decision Agriculture	Water Control Structures
Enhanced Nutrient Management	Non-Urban Stream Restoration
Conservation Tillage	Poultry and Swine Phytase
Continuous No-Till	Dairy Precision Feeding
Other Conservation Tillage	Ammonia Emissions Reductions
Cover Crops	**Other Practices***
Cover Crops and Commodity Cover Crops	Brush Management
• Early, standard, late-planting	Contour Buffer strips
• Species	Contour Orchard and Other Fruit Area
• Seeding method	Fishpond Management
Pasture Grazing Practices	Firebreak
Alternative Watering Facilities	Hedgerow Planting
Stream Access Control with Fencing	Irrigation System, Microirrigation
Prescribed Grazing	Irrigation System, Sprinkler
Precision Intensive Rotational Grazing	Irrigation System, Tailwater Recovery
Horse Pasture Management	Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic
Other Agricultural Practices	Irrigation Water Management
Forest Buffers	Strip cropping
Wetland Restoration	Strip-Cropping, Field
Land Retirement	Strip-Cropping, Wind
Grass Buffers	Terrace
Tree Planting	Transition to Organic Production
Carbon Sequestration/Alternative Crops	Tree/Shrub Pruning
Conservation Plans/SCWQP	Underground Outlet
Animal Waste Management Systems	Upland Wildlife Habitat Management
Barnyard Runoff Control	Contour Farming
Mortality Composters	*These practices are grouped/credited as a "Conservation Plan" according to the Scenario Builder requirements appendix.

Detailed information about BMPs employed in the CBW – including definitions and estimates of pollutant reduction effectiveness – has been published by Simpson and Weammert (2009).

Verification of BMP implementation is comprised of documenting two principal components:

- Presence of the BMP (does the practice exist at the location reported?) and
- Quality of the BMP (does the installation, maintenance, and operation follow acceptable design standards to ensure water quality benefits?).

2.1.3 DATA CONFIDENCE

Regardless of the specific approach taken for verification, confidence in the results is an issue of prime importance. In this report, confidence refers primarily to statistical assessment of the accuracy (or uncertainty) of the BMP verification **result**; for example, reporting the number of acres of cover crops determined by a survey as accurate to within ± 10 percent is a quantitative expression of confidence in the estimate. In a related use of the term, confidence can also refer to knowledge of the level of achievement of a required or desired level of implementation in a specific program or area of interest; for example, reporting that 80 percent of planned BMPs have been verified is a measure of confidence that the desired level of treatment has been applied. As the term is used here, confidence does not refer to BMP efficiency. Understanding of uncertainty in BMP implementation data is an essential component of documenting statistical confidence in model results or other applications using verified BMP implementation data. In the CBW, for example, accurate tracking and accounting of the use of BMPs is of paramount importance, because the CBP relies on these data to estimate current and future nutrient and sediment loads to the Bay (NAS 2011). Documentation of statistical confidence is not an easy task, however, and few quantitative assessments of confidence in BMP verification efforts inside or outside of the CBW have been reported (see section 4).

Whether the BMP implementation data are used for tracking progress against program implementation goals or generating input for modeling runs, the ultimate goal of verification efforts is to give stakeholders confidence that the right actions are being taken on the land according to schedule to achieve water quality goals for the CBW. Verification is essential to understanding what has been accomplished on the ground regardless of the extent to which water quality goals have been met. At best, with appropriate verification it can be claimed that BMP implementation efforts have contributed to observed improvements in water quality, while, at worst, verified implementation in the absence of water quality improvement forms a solid basis for determining the next steps in an adaptive management process to ultimately meet water quality goals.

Regarding individual practices, the confidence with which one can assess and report implementation varies both with the specific practice and the tracking method used. One could assess the confidence level associated with reporting implementation (presence and adherence to design standards) of each practice (e.g., nutrient management, cover crops) using each tracking method (e.g., farmer self-reporting, remote sensing), but the literature is essentially devoid of such experience. Even if confidence levels were available for all combinations of practices and tracking or verification methods, it would be a daunting if not impossible task to combine that information to derive a suitable measure of overall confidence in state reporting of BMP implementation. One reason for this is the very nature of watersheds and pollutant pathways; some practices are more

important than others by virtue of their locations and their potential for reducing pollutant loads. For example, performing on-site assessments at all animal operations to confirm implementation of animal waste management systems may be less important than auditing 20 percent of NMPs if the relative pollutant load from cropland is far greater than that from animal operations.

Because of the many complexities associated with assigning data confidence levels to tracking individual BMPs via various approaches, let alone combining that information in some way to derive overall measures of confidence, it is appropriate to consider ways in which one can determine levels of confidence at the program or state level. For example, how confident can we be that implementation levels reported by the state are accurate? Or, how confident can we be that the state program is achieving its implementation goals on schedule? There may be multiple confidence levels that could be appropriate for each state depending on the range of combinations of practices, programs supporting practice implementation, and tracking or verification methods the state employs.

In order to assign confidence levels at the program or state levels it is necessary to examine the methods used by each program or state to track and verify BMP implementation. Such an assessment, however, would undoubtedly create some discomfort if presented on a state basis. It would be more palatable, perhaps, if the methods used by all Bay states were pooled and assessed independent of which state used them. Bay states could then select (or alter existing) methods for their own programs based on the confidence levels they hoped to achieve.

When assessing alternative verification methods, it is important to keep in mind the various factors that impact uncertainty even from a qualitative perspective (e.g., "low" or "high"). The types of questions that should be considered when assessing verification methods include:

- How was the BMP identified (e.g., by survey or remote sensing)?
- At what spatial scale was the BMP identified (e.g., farm or watershed)?
- What specifications defined the BMP design (e.g., NRCS or other)?
- Who installed the BMP?
- How was the BMP implemented?
- How was the BMP funded?
- When in the year was the BMP implemented?
- Who approved the final product?
- How frequently is the BMP inspected or maintained?

2.2 VERIFICATION IN THE CBW

Since 2010, the National Environmental Information Exchange Network (NEIEN) has been the mechanism used to report non-point source (NPS) BMP implementation for progress reporting from the Bay states and jurisdictions to the Chesapeake Bay Program Office (CBPO). The NPSBMP exchange and its database framework were developed through a cooperative effort of the trading partners initiated in 2005. Prior to 2010, progress reporting was conducted by email and ftp

distribution of spreadsheet files and reports with manual processes to compile, standardize, and process the information.

The NPSBMP exchange has multiple facets and levels of validation that may or may not be relevant to verification efforts. In addition to facilitating the exchange of practice implementation details, the framework contains modules to report detailed information and metadata for the primary point of contact and agency, data source contact and agencies, funding and financial components, geographic location, land use, and binary objects. There are 181 different distinct data elements defined in the data exchange template (DET), which also defines the attributes (numeric, character, length, number of decimals permitted, whether elements are required, conditionally required, or optional) which are enforced by the NPSBMP node plugin software. If a submission does not conform to the reporting requirements, it is rejected by the system with error messages for submitters that can be used to troubleshoot the issues and re-submit the data. No data is saved in the NPSBMP database until all errors in a submission are addressed.

Each jurisdiction maintains their own tracking system or mechanism for tracking BMP implementation and provides data to CBPO through the exchange network using the agreed upon data formatting structures and definitions. Each record submitted to CBPO is required to contain a "state unique identifier" which can be used for traceability and tracking data flow through various systems.

The NPSBMP exchange allows for an individual record of practice data to be reported at 5 different geographic scales, from statewide (least specific) to latitude and longitude coordinates (most specific). In between these two in order of specificity, are HUC8 (8-digit hydrologic unit code), County, HUC10, and HUC12. Rules stipulate that the most precise level specified in the data will be used, but some jurisdictions simply report county or statewide summaries.

Although the data exchange has a distinct list of practice codes (see Table 1) that are validated according to the DET, it is designed to be flexible and accept a variety of different state-specific "free text" measures for each practice (such as Buffer Area, Length Fenced, Width Fenced, or Area Protected). The system also accepts a variety of potentially "synonymous" measures (such as Buffer Area and Area Protected in the previous example). Jurisdictions are requested to document and define all of the free text measures reported through NEIEN so that they can be handled correctly by CBPO's Scenario Builder and the Watershed Model. Input data are checked for both NEIEN and Scenario Builder compliance, and it is possible that reported data can be NEIEN-compliant, but not compliant with Scenario Builder requirements; such data cannot be used for progress reporting.

In 2010, the newly developed Chesapeake Bay Tracking and Accounting System (BayTAS) was enhanced to support NEIEN data submissions. The BayTAS system provides jurisdictions with a series of validation reports that include summaries (& details) of the practice data reported. These reports identify and flag data that do not comply with Scenario Builder requirements so that jurisdictions may address issues if needed. The reports are designed so that jurisdictions can confirm every record submitted and whether it passed or failed validations and is passed to

scenario builder for progress reporting. CBPO staff and jurisdiction data submitters use these feedback reports to highlight potential outliers and confirm implementation rates in an iterative (submit-check-fix, resubmit-check-fix) manner, until all data quality issues identified are addressed or accepted by both parties.

CBPO has identified that an effort should be undertaken to address issues known to be in the historic BMP implementation record (prior to 2010) prior to the 2017 calibration effort. Because these files were transferred via email and handled manually, there is little traceability or documentation to support the record or address the issues.

A 2011 report by the National Academy of Sciences (NAS 2011) was highly critical of BMP verification efforts in the CBW. The report stated that tracking and accounting of BMPs is incomplete and inconsistent across the CBW because many Bay jurisdictions are struggling with limited resources, complex and rapidly changing data collection and reporting protocols, data privacy constraints, and quality assurance and control needs. Furthermore, given that some BMPs are not tracked in all Bay jurisdictions, the NAS report stated that current accounting cannot be viewed as accurate. The committee concluded that independent auditing of the tracking and accounting at state and local levels would be necessary to ensure the reliability and accuracy of the data reported.

2.3 Assessment of Verification Confidence

2.3.1 Verification Pathways and Potential Error Sources

Verification is a multidisciplinary process that can involve multiple individuals, groups, or agencies, as well as multiple technical and administrative approaches. As noted in section 2.1.2, verification needs to address both the presence or implementation of a practice and the degree to which the practice meets standards and specifications of performance. These two determinations could be made via direct observation, analysis of records and reporting (presumably based on direct observation made by one or more others), or a statistically-based approach that applies direct observation or analysis of records and reporting to a sampled subset of locations where the practice should be implemented.

The pathways associated with direct observation, analysis of records/reporting, and statistical sampling approaches are conceptually illustrated in Figures 1-3, respectively. Headers in the blue boxes indicate the phase (e.g., BMP Detection) in the verification process.

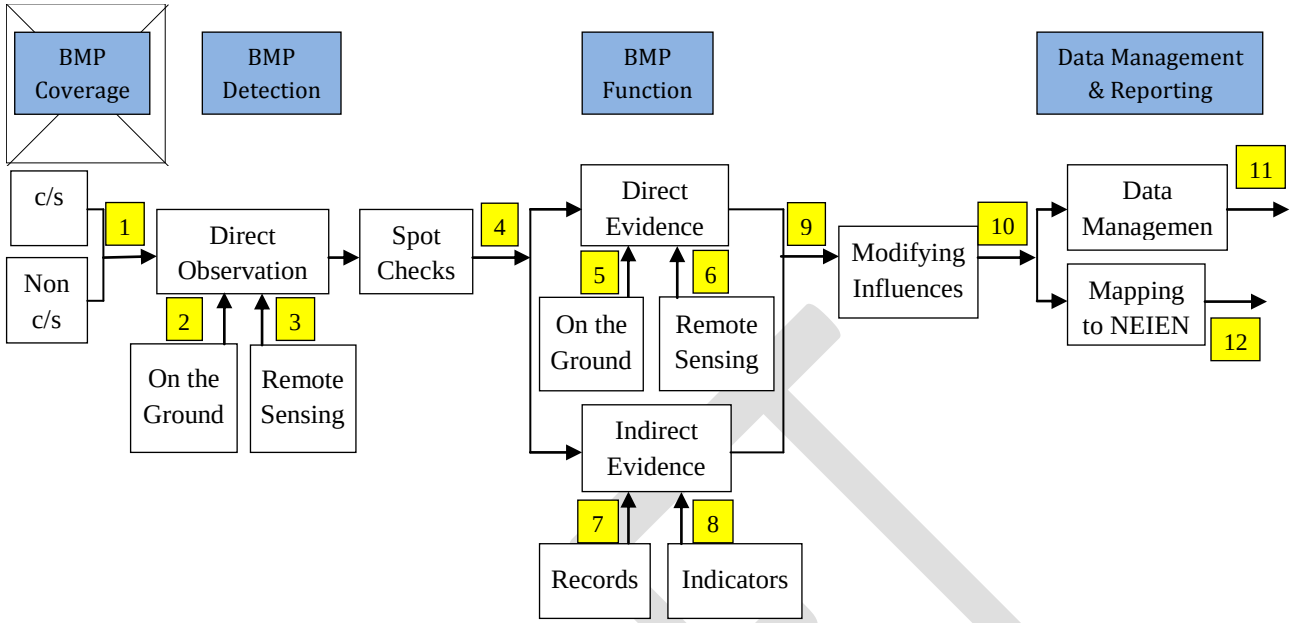

Figure 1. Pathway and error sources for direct observation. Numbered boxes denote steps where error or confidence can be evaluated.

Key to Figure 1.

Error Term	Description
1	Uncertainty whether both c/s and non c/s BMPs are detected.
2	Confidence in quality of on-the ground observation detecting BMP.
3	Confidence in quality of remote sensing detecting BMP.
4	Confidence in spot-checking approach.
5	Confidence that on-the-ground observation adequately determines BMP function.
6	Confidence that remote sensing data adequately characterize BMP functionality.
7	Confidence that records (e.g., NMP) capture BMP function.
8	Confidence that indicators support assumption of BMP function.
9	Overall confidence in scoring of BMP functionality.
10	Confidence that modifying influences (e.g., season, timing observations) are accounted for.
11	Uncertainty in effectiveness of data management to accurately record BMP data.
12	Uncertainty in mapping state/local BMP to NEIEN.

The pathways illustrated in Figure 1 include the option to use on-the-ground or remote sensing methods for detection, as well as a choice between direct or indirect evidence of function. Both the direct (on-the-ground or remote sensing) and indirect (records or indicators) evidence options for function also include options. Figure 1 identifies eleven unique (9 is the combined or overall error or confidence associated with assessment of functionality) error sources associated with using direct observation to verify BMP implementation. Clearly, the magnitude of these various error sources is likely to differ for each BMP (e.g., on-the-ground observation is usually better than

remote sensing for detecting practices), and will vary for different BMPs (e.g., remote sensing is more reliable for structural and visible practices).

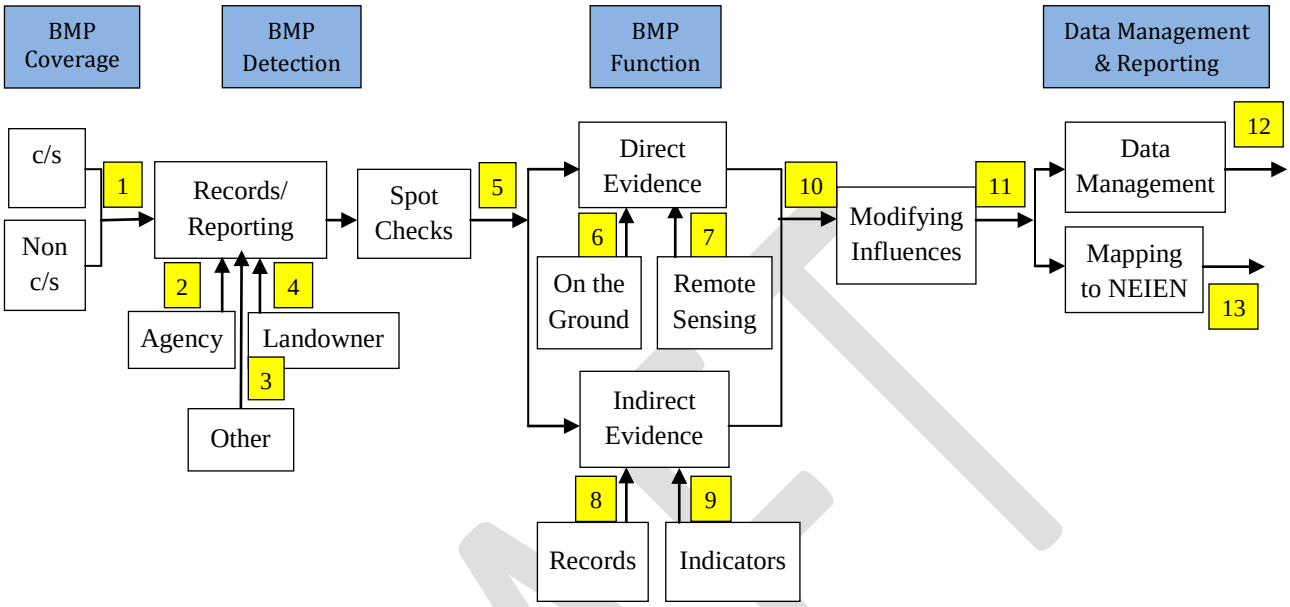

Figure 2. Pathway and error sources for records/reporting. Numbered boxes denote steps where error or confidence can be evaluated.

Key to Figure 2.

Error Term	Description
1	Uncertainty whether both c/s and non c/s BMPs are detected.
2	Confidence in quality of agency records documenting BMPs.
3	Confidence in quality of other organization documenting BMPs.
4	Confidence in quality of landowner self-reporting of BMPs.
5	Confidence in spot-checking approach.
6	Confidence that on-the-ground observation adequately determines BMP function.
7	Confidence that remote sensing data adequately characterize BMP functionality.
8	Confidence that records (e.g., NMP) capture BMP function.
9	Confidence that indicators support assumption of BMP function.
10	Overall confidence in scoring of BMP functionality.
11	Confidence that modifying influences (e.g., season, timing observations) are accounted for.
12	Uncertainty in effectiveness of data management to accurately record BMP data.
13	Uncertainty in mapping state/local BMP to NEIEN.

The pathways illustrated in Figure 2 include the option to use agency, landowner or other records/reporting for detection, as well as a choice between direct or indirect evidence of function. Both the direct (on-the-ground or remote sensing) and indirect (records or indicators) evidence options for function also include options. Figure 2 identifies twelve unique (10 is the combined or overall error or confidence associated with assessment of functionality) error sources associated

with using records and reporting to verify BMP implementation. As for direct observation, the magnitude of these various error sources is likely to differ for each BMP (e.g., agency records and reporting may be more consistent than landowner records and reporting, but may be less detailed in some cases), and will vary for different BMPs (e.g., records are likely to be a better source of information for nutrient management than is remote sensing).

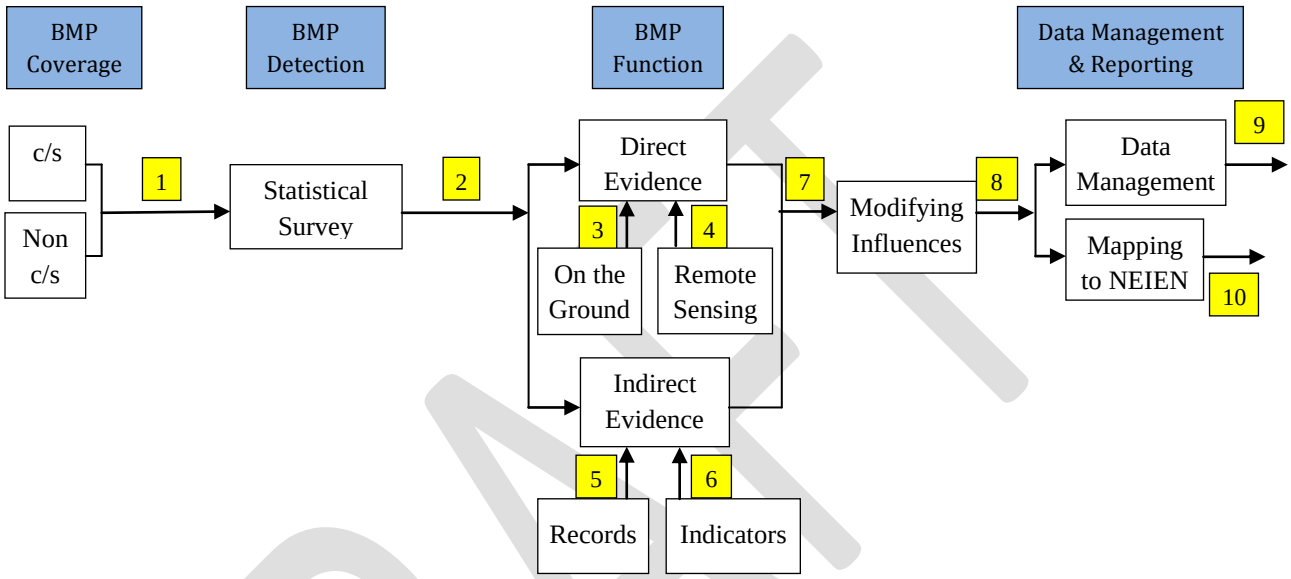

Figure 3. Pathway and error sources for statistical surveys. Numbered boxes denote steps where error or confidence can be evaluated.

Key to Figure 3.

Error Term	Description
1	Uncertainty whether both c/s and non c/s BMPs are detected
2	Confidence/error in statistical sampling (e.g., NASS)
3	Confidence that on-the-ground observation adequately determines BMP function
4	Confidence that remote sensing data adequately characterize BMP functionality
5	Confidence that records (e.g., NMP) capture BMP function
6	Confidence that indicators support assumption of BMP function
7	Overall confidence in scoring of BMP functionality
8	Confidence that modifying influences (e.g., season, timing observations) are accounted for
9	Uncertainty in effectiveness of data management to accurately record BMP data
10	Uncertainty in mapping state/local BMP to NEIEN

Figure 3 for statistical surveys does not include spot checking but well-designed statistically-based sampling approaches will include QA/QC procedures that serve essentially the same purpose. Only ten unique sources of error are shown in Figure 3, but it should be noted that multiple factors determine the confidence or error (error term 2) associated with a statistically-based sampling

approach, including sampling design, sample size, and methods used for detection of BMPs at sampled sites.

2.3.2 A VERIFICATION INDEX

As described and illustrated in section 2.3.1, verification of the implementation of BMPs is a multifaceted process that varies across BMPs, sectors, and jurisdictions. While the importance of a specific BMP or sector in terms of meeting CBW water quality goals will differ from county to county across the CBW, each sector and jurisdiction is expected to fully implement its elements of approved watershed implementation plans and report accurately on the extent of such implementation. Consistency in how the various verification procedures to be used in the CBW are assessed is important to both comprehending the quality of implementation data reported by the states and determining how best to incorporate such data in the CBWM.

A "Verification Index" is being considered as a potential means to:

- Generate qualitative assessments of relative confidence in BMP verification procedures.
- Provide a framework for assessing the relative strengths and weaknesses of alternative verification procedures for documenting BMP implementation, and
- Provide consistency in the assessment of verification protocols across BMPs, sectors, and states.

Building from the description and illustration of pathways and error sources in Figures 1-3, Table 2 illustrates a weighting system that could be used as the basic framework for a verification index. The relative weighting for each phase in the verification pathway could be adjusted based on user preferences. It is important to note that the proposed verification index would be used as a planning or advisory tool rather than as a decision tool.

Table 2. Potential framework for a verification index.

Verification Pathway Phase	Weighting	Maximum Rating	Maximum Score
BMP Coverage (c/s, non-c/s)	6	5	30
BMP Detection	9	5	45
BMP Function	9	5	45
Data Management & Reporting	6	5	30
TOTAL	**30**	**5**	**150**

Table 3 illustrates a scoring system that could be used to compare the relative error of different direct observation approaches shown in Figure 1. It is important to note that Table 3 incorporates choices among error terms based on the specific elements or "operations" employed by the verification protocol. For example, BMP Detection scoring may be based on error term 4 (spot checks) and *either* error term 2 or 3 depending on whether on-the-ground detection or remote

sensing, respectively, is used[1]. Similar choices are found under BMP Function. Whatever the scenario, however, the sum of weightings for error terms included in the scoring for each phase will equal the weightings shown in Table 2. For example, selection of remote sensing for direct evidence of BMP Function (error term 6) has a weighting of 4.5, which summed with the weighting for error term 10 (modifying influences) gives a total weighting of 9 for BMP Function.

Table 3. Direct observation scoring. Ratings and scores are examples of highest level of confidence.

Phase	Error Term	Operation	Rating[1]	Weighting	Term Score[2]
BMP Coverage	1	c/s & non-c/s	5	6	30
BMP Detection	2	On-the-Ground[3]	5	4.5	22.5
		OR			
	3	Remote Sensing[3]		4.5	0
	AND				
	4	Spot Checks	5	4.5	22.5
BMP Function	***Direct Evidence***[4]				
	5	On-the-Ground	5	4.5	22.5
		OR			
	6	Remote Sensing		4.5	0
	OR				
	Indirect Evidence[4]				
	7	Records		4.5	0
		OR			
	8	Indicators		4.5	0
	AND				
	10	Modifying Influences	5	4.5	22.5
Data Management & Reporting	11	Data Management	5	3	15
	12	Mapping to NEIEN	5	3	15
				TOTAL	150

[1]Rate confidence in results of operation on a scale of 1 (lowest) to 5 (highest).
[2]Rating x Weighting = Term Score.
[3]Choose either On-the-Ground or Remote Sensing.
[4]Choose either Direct Evidence or Indirect Evidence. For Direct Evidence, rate 5 or 6. For Indirect Evidence, rate 7 or 8.

[1] If both methods are employed, users could average or otherwise combine the ratings for the two methods to give an overall indication of how well the methods are used together to detect BMPs. For example, if remote sensing is a weak tool for the specific BMP yet is used for most of the BMP detection, whereas on-the-ground detection is a very good approach for detection yet used sparingly, an overall rating of 2 may be appropriate.

It is important to note that error term 9 from Figure 1 is not included in the scoring for direct observation. This error term is the overall error/uncertainty for BMP Function, integrating the errors/uncertainties of terms 5-8. It would therefore be redundant if included in the Index.

Each error term used in the scoring for a particular verification protocol is rated from 1 (lowest) to 5 (highest), resulting in a scoring system scaled from 30 (worst) to 150 (best). It should be noted that at present the assignment of the error term values and the scoring system will likely be categorical best-professional-judgment values (i.e., 1 - 5), but where actual numerical confidence/error terms are or will be available, the concept could be relatively easily retooled to use more absolute or quantitative expressions of confidence. Spot-checking could be scored based on the percentage of BMP sites that are checked, assuming that knowledge exists showing how the quality of spot checking improves with increasing percentage covered. For example, a rating of 1 might be assigned when 0-5% of population is spot checked, possibly increasing to a rating of 5 if 50 percent or more of the population is spot checked. Both the ratings and weightings incorporated in the examples presented here are intended as initial suggestions that can be changed to reflect the judgment of the AgWG membership.

Tables 4 and 5 show parallel scoring for records/reporting (Figure 2) and statistical sampling approaches (Figure 3), respectively. For the same reason set forth above for the scoring for direct observation, error term 10 (Figure 2) and error term 7 (Figure 3) are not included in the indices for records/reporting (Table 4) and statistical sampling (Table 5), respectively.

Index scores are not intended to translate directly into a measure of statistical confidence, but are instead intended to provide an indication of the relative confidence in verification procedures as measured by their BMP coverage, BMP detection, assessment of BMP functionality, and the conveyance of information to NEIEN and the CBWM. Table 6 illustrates one method for converting total index scores to qualitative indicators. The use of categorical ratings is recommended both because of the heavy reliance on best professional judgment to rate verification procedures and to avoid potential confusion in interpretation (i.e., to stay away from scores that may be confused with statistical confidence levels).

In summary, the framework described here is intended to illustrate an approach that could be used to objectively and consistently rate the various approaches that are and could be used by CB states to verify implementation of agricultural practices. This framework includes a broad accounting of potential error sources to help establish proper context when determining the relative importance and magnitude of errors associated with the detection and functional assessment of BMPs. Although this framework was developed for consideration by the AgWG, the general nature of the terminology used should facilitate application to other source sectors in the CBW.

Several issues for the application of this framework should be noted. First and foremost, the selection of the proper scoring scheme (direct observation, records/reporting, or statistical survey) is critical; the best option may not always be obvious, especially in the case of hybrid approaches. In the case of the Black Creek, IN retrospective BMP assessment (Bracmort et al. 2004 and 2006,

Section 4.1.1), for example, assessment of BMP status was based on direct observation, while the sites to be assessed were selected at random from a population of all BMPs implemented. Although it is possible to interpret this as a case of direct observation, the statistical survey scoring scheme would be the preferred choice because all the BMPs assessed were drawn as a sample and the results are intended to be extrapolated to the population. It is suggested that all situations in which the BMPs verified are selected as a sample of a larger population be evaluated as a statistical survey, while situations where all BMPs in a watershed or region are verified (i.e., a census) should be evaluated as either direct observation or records/reporting.

Table 4. Records and reporting scoring. Ratings and scores are examples of highest level of confidence.

Phase	Error Term	Operation	Rating[1]	Weighting	Term Score[2]
BMP Coverage	1	c/s & non-c/s	5	6	30
BMP Detection	2	Agency[3]	5	4.5	22.5
		OR			
	3	Other[3]		4.5	0
		OR			
	4	Landowner[3]		4.5	0
	AND				
	5	Spot Checks	5	4.5	22.5
BMP Function	***Direct Evidence***[4]				
	6	On-the-Ground	5	4.5	22.5
		OR			
	7	Remote Sensing		4.5	0
	OR				
	Indirect Evidence[4]				
	8	Records		4.5	0
		OR			
	9	Indicators		4.5	0
	AND				
	11	Modifying Influences	5	4.5	22.5
Data Management & Reporting	12	Data Management	5	3	15
	13	Mapping to NEIEN	5	3	15
				TOTAL	150

[1]Rate confidence in results of operation on a scale of 1 (lowest) to 5 (highest).
[2]Rating x Weighting = Term Score.
[3]Choose Agency (term 2) or Other (term 3) or Landowner (term 4).
[4]Choose either Direct Evidence or Indirect Evidence. For Direct Evidence, rate 6 or 7. For Indirect Evidence, rate 8 or 9.

Table 5. Statistical survey scoring. Ratings and scores are examples of highest level of confidence.

Phase	Error Term	Operation	Rating[1]	Weighting	Term Score[2]
BMP Coverage	1	c/s & non c/s	5	6	30
BMP Detection	2	Statistical Sampling	5	9	45
BMP Function	***Direct Evidence***[3]				
	3	On-the-Ground	5	4.5	22.5
		OR			
	4	Remote Sensing		4.5	0
	OR				
	Indirect Evidence[3]				
	5	Records		4.5	0
		OR			
	6	Indicators		4.5	0
	AND				
	8	Modifying Influences	5	4.5	22.5
Data Management & Reporting	9	Data Management	5	3	15
	10	Mapping to NEIEN	5	3	15
				TOTAL	150

[1]Rate confidence in results of operation on a scale of 1 (lowest) to 5 (highest).
[2]Rating x Weighting = Term Score.
[3]Choose either Direct Evidence or Indirect Evidence. For Direct Evidence, rate 3 or 4. For Indirect Evidence, rate 5 or 6.

Table 6. Verification index scores and ratings.

Index Score	Rating
>125	Very High
101-125	High
76-100	Moderate
<76	Low

Secondly, it is strongly recommended that each assessment using this framework be done by more than a single rater, as ratings are strongly based on best professional judgment, which will naturally vary among individuals. A panel of 6 or more raters may be a good choice. At the outset, some procedure for arriving at a consensus rating should be worked out. This may range from a simple averaging of all scores to an interactive process where individuals adjust their ratings to achieve consensus.

Thirdly, it is critical to document assumptions and individual interpretations supporting individual ratings. Such documentation will help justify individual scores and help assure repeatability of results.

Finally, if this framework is applied across multiple jurisdictions over the long term, it would be important to perform periodic cross-checks among different groups of raters (e.g., among states) to ensure comparability and consistency of ratings across the Bay watershed.

2.3.3 Application of a Verification Index to the CBW

The verification index described in section 2.3.2 is being considered as a potential planning tool, and is intended primarily to provide organization and consistency to the assessment of various BMP implementation verification protocols that are and could be used to meet reporting requirements in the CBW. Index results themselves (i.e., the scores and ratings) are not intended to trigger automatic decisions regarding the acceptability of any given verification protocol, but are instead intended to inform decisions made both within state agencies, for example, and by the independent Verification Review Panel (VRP) and the partnership.

The process for reviewing and deciding on the suitability of BMP implementation verification protocols has not yet been determined, but a 3-step process is one possibility. Under this scenario, states would perform an internal review of verification protocols using the verification index as one tool to inform decisions. States could include their self-assessments of proposed protocols in the packages they submit for review by an independent team, perhaps the VRP. The VRP could also apply the verification index as part of their independent assessment of proposed protocols, using ratings they develop to help inform their recommendations to the Principals' Staff Committee which would then make final decisions on protocol suitability.

The robustness of any scoring or rating achieved through use of the verification index is highly dependent on the procedure for applying the index. For example, scores and ratings developed by an agency reviewing its own programs would be much less robust than scores and ratings developed through an inclusive and transparent process that involved a team of reviewers from state and federal agencies, industry groups, landowners, citizen groups, and non-governmental organizations (NGOs). Ratings developed by an agency through an internal process, could, however, provide that agency with useful information to include with its submittal proposing the BMP implementation verification protocols it will use to meet CBW requirements.

As discussed above, teams of 6 or more raters should review each protocol. Individual scores and ratings may vary considerably because of differing knowledge bases and perspectives of the reviewers, necessitating establishment of procedures to determine overall ratings from potentially widely disparate scores. Where index ratings are submitted as part of state verification protocol packages it would be essential to also submit documentation of the process used to determine the ratings, including individuals and organizations or groups involved, the process used for developing individual scores, and how differing scores were reconciled into single ratings. The transparency

and inclusiveness of the overall process would necessarily weigh heavily in how the VRP would value any ratings provided.

3.0 CURRENT BMP VERIFICATION PROGRAMS AND ACTIVITIES IN THE CHESAPEAKE BAY WATERSHED

3.1 DELAWARE

[information will be added as it becomes available]

3.2 MARYLAND

Maryland programs that address issues of agricultural BMP verification include several components and each includes a rigorous set of quality assurance/quality control (QA/QC) procedures:

3.2.1 THE MARYLAND AGRICULTURAL WATER QUALITY COST SHARE PROGRAM (MACS)

The Maryland Agricultural Water Quality Cost Share Program (MACS) has a procedures manual used by all 24 soil conservation districts that sets forth all of the policies and procedures of installing the BMPs for MACS. It also includes information on spot checks. The USDA's Natural Resources Conservation Service (NRCS) also has a series of manuals (Field Office Technical Guides – FOTG) that describe the standards and specifications for all federally cost-shared BMPs. The MACS Program manual relies on the NRCS technical standards and specifications in the FOTG for the placement and installation of all BMPs.

The MACS annual Quality Assurance Review (QAR) process consists of an overall review of the state's 24 Soil Conservation District (SCD) operations to determine if programs are administered according to applicable technical guidelines. The review team consists of a representative from the Maryland Department of Agriculture (MDA), Office of Resource Conservation (usually the Operations Office Area Coordinator and/or someone from the MACS Staff), an NRCS engineer, and local SCD staff. A list of MACS practices installed within the last year is supplied to the review team using a standardized protocol. The review team inspects the project files in the SCD Office and conducts field verification of the practices and their operation installed in the field. The results of the review are communicated to the SCD's staff and all other parties involved. Any deficiencies are noted and training and/or follow up is offered to or required of the field staff or the operator to bring the practice into compliance. Follow-up reports or revaluations are conducted later.

The MACS spot-check review process is also conducted once a year. All completed practices within their maintenance life are eligible for review. A random, computer generated sample of 10% of all practices is generated by the MACS Office at MDA Headquarters for field review by the SCDs. This field inspection (which is in addition to the monitoring and inspection that takes place during BMP construction) determines whether the BMPs were constructed according to plan specifications and whether the BMPs are being maintained. Where the teams find unsatisfactory conditions, a letter of

notification is sent to the farmer identifying the issue to be addressed and establishing a time frame to correct the problem. The BMP is re-inspected again, normally within a year, to ensure compliance and performance. Possible reasons for unsatisfactory conditions could include a lack of maintenance or a change of ownership. If there has been a change in ownership, MDA institutes a transfer of maintenance requirements to the new owner through the Property Transfer process. If the new owner does not agree to maintain the BMP, MDA seeks repayment from the original owner of principle and in some cases, interest. Maintenance issue are required to be addressed using the same technical standards applied during design and construction.

When a project is reviewed and determined satisfactory, it is removed from the inspection-eligible list for two years. Once the maintenance life (typically ten or fifteen years, depending on the practice) is completed, the practice is removed from the eligible list. A practice is not reviewed if it is within 6 months of expiring. The review team consists of staff from SCD offices.

3.2.2 Farm Stewardship Certification Program

The Farm Stewardship Certification Program (FSCP), run by a third party sanctioned by MDA, is an incentive program to document practice implementation at the farm scale by inventorying farms and inspecting all practices and nutrient management records. Trained assessors determine compliance with regulatory requirements, determining whether BMPs are functioning, identifying any water quality concerns, and judging whether the farmer can be certified as a good farm steward. Those who are meeting TMDL requirements are declared farm stewards.

3.2.3 Inventory of Non-Cost Shared Practices

All types of practices (federal, state, self-implemented) are assessed under the Inventory of Non-Cost Shared Practices (INCSP). An established protocol is used to assess farmer-installed BMPs, including taking photos, recording information in a file, and ascertaining whether practices meet standards and specifications. Funding is made possible through a conservation and innovation grant. Data accuracy is considered high, partly because assessment specialists are trained and certified to collect, record, and verify information.

3.2.4 Nutrient Trading

A nutrient trading on-farm assessment tool is used for assessing TMDL compliance and the potential for creating additional nutrient reductions to trade. This is similar to what is done for both the FSCP and the INCSP. Field-by-field assessments by trained staff (similar to training for the FSCP) are performed to ascertain whether the farm has met its TMDL obligations. Staff also explore and discuss with the farmer opportunities for creating offsets for trading. Management records are pulled from the farm record during site visits to verify implementation of nutrient management and other practices – this information is used in assessing the farm's performance. Nutrient trading QA/QC is similar to that for the FSCP and INCSP. On-farm assessments are performed by two separate teams to confirm offsets for trading and to provide certification. A 10% spot check of those farms entering the trading market is performed, and Maryland Department of Environment (MDE) will also do random spot checks (credits are written into an NPDES permit). The buyer of offsets is

required to hire an independent 3rd party to check all farms in trades over the lifetime of trades to confirm their accuracy. MDA's effort (training, staffing) is paid for through a conservation/innovation grant. Because trading involves an NPDES permit, accuracy and confidence have to be very high. If a farm is out of compliance with the permit, there are Clean Water Act fines.

3.2.5 Verification of State Cost-Share

The SWCDs work with farms on practice installation. MDA and NRCS use standard plans for inspection and verification of practices installed, and federal and state c/s funded BMPs are inspected jointly. On the front end, once a practice is installed the SWCD certifies implementation and compliance with standards and specifications. MDA and NRCS pull a random list from each SWCD and inspect farms with practices newly installed that year. When on farms, however, they inspect and document all practices installed at any time, including previous years to ensure that they are in compliance with standards and specifications. An inspection report is generated, and correction notices (60-day and 30-day) are given if necessary. If the farmer does not fix the identified problems, they are no longer eligible for c/s. State headquarters staff perform the verification of state c/s as part of their normal duties – there is no special grant. Data confidence is high because technical experts verify everything via on-site inspections.

3.2.6 Manure Transport Program

MDA has developed inspection and verification of program compliance procedures for the Manure Transport Program. These procedures cover activities at the application and claim stages, and guidelines have been developed for on-site farm status reviews. On-site reviews take place during or immediately after implementation and focus on determining whether (a) the receiving operation utilization of transported manure is consistent with the nutrient management plan, (b) crops or crop residue in a field are consistent with the nutrient management plan, (c) "Delivery Site Guidelines" or "Stockpiling Guidelines" have been followed or are being followed, and (d) any residual manure will cause any water quality concerns. The review procedures include (a) selection of up to 10% of any of the active and completed agreements, (b) inspections conducted resulting from a complaint from an adjacent property owner or others, and (c) inspections in conjunction with a nutrient management implementation review. If the applicant fails to comply with program guidelines, follow-up action may include requiring corrective actions, possible exclusion from future participation, liability for funds paid, and referral to the Nutrient Management Implementation team for compliance enforcement.

3.2.7 COVER CROP PROGRAM

Because this is the biggest program in Maryland ($18M/yr), verification is much more intense. On the front end, the eligibility of all farmers signing up for the program is reviewed. Participants must certify when the cover crop is planted, the type of cover crop, and areas in the field where it is planted. Staff are sent out to field verify the acreage, type, date, location, stand (80% or greater stand is required), and seed quality to determine planting information. Because they may be eligible for planting incentives based on early planting dates, farmers are required to certify in the fall ("fall certify") any fields planted in accordance with up to three deadlines. SCDs conduct field checks on at least 20% of acres of small grains on each farm for which there is fall certification. If participants fall certify for more than one planting date, the participant may have multiple field checks. If any issues arise with the participant's 20% field check, the SCD then expands the field check to include all of the participant's certified acres. An additional random check of 10% of contracts is conducted in the spring to verify killdown. Copies of all records are kept and used in the payment process, and MDA is currently piloting an effort to convert hard-copy maps to geographic information system (GIS) files.

Going forward MDA is investigating remote sensing of cover crops not involved in c/s programs using satellite imagery and field-scale verification. The current cover crop program covers only about ¾ of what is implemented; remote sensing is used to capture the rest (includes farmer-implemented cover crops). Preliminary pilot studies have shown that remote sensing can be used to provide reliable information to communicate with farmers about their cover crop's performance, including presence/absence of a cover crop, and N and P benefits that might be derived from the cover crop. This additional information will provide a more complete picture of cover crops in the state.

3.2.8 NUTRIENT MANAGEMENT PROGRAM

The Water Quality Improvement Act of 1998 requires farmers with gross annual income of $2,500 or more or livestock operations with 8,000 pounds or more of live animal weight to manage their farms using nutrient management plans (NMPs) that protect waterways from excess crop fertilizers and animal waste.

Reviews of NMPs are conducted to determine whether the plans were written accurately and implemented properly. Farmers are required to have and implement NMPs for their operations and are also required to submit nutrient management Annual Implementation Reports (AIRs) by March 1st of each year to document nutrients applied by crop type during the previous year.

MDA's Nutrient Management Program maintains a separate database for regulatory compliance. Nutrient management implementation in the agricultural sector is tracked to comply with multiple regulatory requirements:

- Farmers submit an initial NMP to MDA written by a certified nutrient management planner.

- Farmers must submit an AIR to MDA by March 1 for the previous calendar year. The AIR notes any changes to the operation, crops grown, fertilizer use, acreage managed, animal production, etc.

- Farmers are responsible for keeping prescribed records of nutrient inputs and outputs.

NMPs are reviewed and certified by 3 regional MDA staff to ensure plans are prepared in accordance with appropriate requirements. This review is an evaluation of the work of the professional individuals certified and licensed by MDA to develop plans for Maryland farmers and is designed to ensure the quality of plans prepared. MDA has been conducting reviews of plans since 2003. Plans can be prepared by the farmer (with technical assistance from a University of Maryland Extension expert) or consultants, but plans can only be prepared by those that have been certified (farmer or consultant). Consultants who do not prepare the plans properly risk losing their licenses.

Field inspections of plans started in 2005 and MDA officials strive to complete about 400 inspections per year. The review process includes a targeted selection of farms to be reviewed. The strategy for identifying farms to inspect is weighted toward those operations considered to have the greatest risk for water quality impacts-primarily operations managing manure. For example, of the 427 implementation reviews planned statewide for 2010, 282 (66%) were focused on operations involving manure. In the regions of the state with the highest concentrations of animals, (Western Maryland, and the Eastern Shore), 79% of the reviews were targeted toward operations involving manure. Three fields are reviewed at each farm selected, with farmer-reported crops and fertilizer applications compared with the NMP. The farmer is required to maintain records documenting the rate, timing, and method of nutrient applications, as well as crop yields. Farmer requirements are included in the Maryland Nutrient Management Program Plan Implementation Review Process for Operators, which is available to all farmers and prepared by the MDA Office of Resource Conservation. A four-part Nutrient Management Program Plan Implementation Evaluation report is prepared to document the review and serves as the compliance enforcement notification when certain deficiencies are noted in the review. Any problems identified during the review require notation on the evaluation form and a follow-up review. The timing of the follow-up review depends on the deficiency noted. Failure to correct the deficiency within the allotted time warrants further enforcement action, including fines. The most common problem cited during recent implementation reviews is the failure to have a current NMP.

As a more efficient use of staff resources, and to leverage performance, MDA staff conducts cross compliance checks between nutrient management compliance and applications for financial assistance programs. Farmers who are out of nutrient management compliance or have not submitted required nutrient management documentation are not eligible to participate in state incentive programs. Farmers who receive financial assistance for agricultural waste management BMPs must have their NMP reviewed and approved by nutrient management staff prior to receiving payment. Farmers who receive financial assistance for nutrient management planning services are required to have their plan reviewed and approved prior to receiving payment. MDA annually

reviews at least three NMPs prepared by each state certified nutrient management service provider to ensure they meet standards. Follow-up actions can include suspension of plan writing certification. Farmers or service providers who apply nutrients to agricultural land are required to become state certified and attend training to maintain their certification. Farmers who fail to have a plan or file yearly AIRs are subject to enforcement with fines of up to $250 from MDA and $10,000 from MDE.

Tables 7-10 provide recent information on inspection activities for nutrient management:

Program Performance & Verification:
Nutrient Management Plan Submission

FY	NMP ac submittals outstanding	Enforcement Actions
2006	223,000	1,099
2007	201,000	1,635
2008	100,000	1,733
2009	4,300	55
2010	700	20

Table 7. Nutrient Management Plan Enforcement Actions.

Program Performance & Verification: Nutrient Management Annual Reports

FY	AIR required	% Submitted in FY	Enforcement Actions
2006	5969	75%	154
2007	6080	86%	254
2008	5800	98%	302
2009	5514	97%	553
2010	5554	96%	473

Table 8. Nutrient Management Annual Report Enforcement Actions.

Program Performance & Verification: Nutrient Management Field Inspections

FY	NMP Site Inspections	NMP Compliance	Enforcement Actions
2006	167	78%	0
2007	500	89%	0
2008	450	65%	90
2009	400	69%	191
2010	391	73%	173

Table 9. Nutrient Management Plan Field Inspection Enforcement Actions.

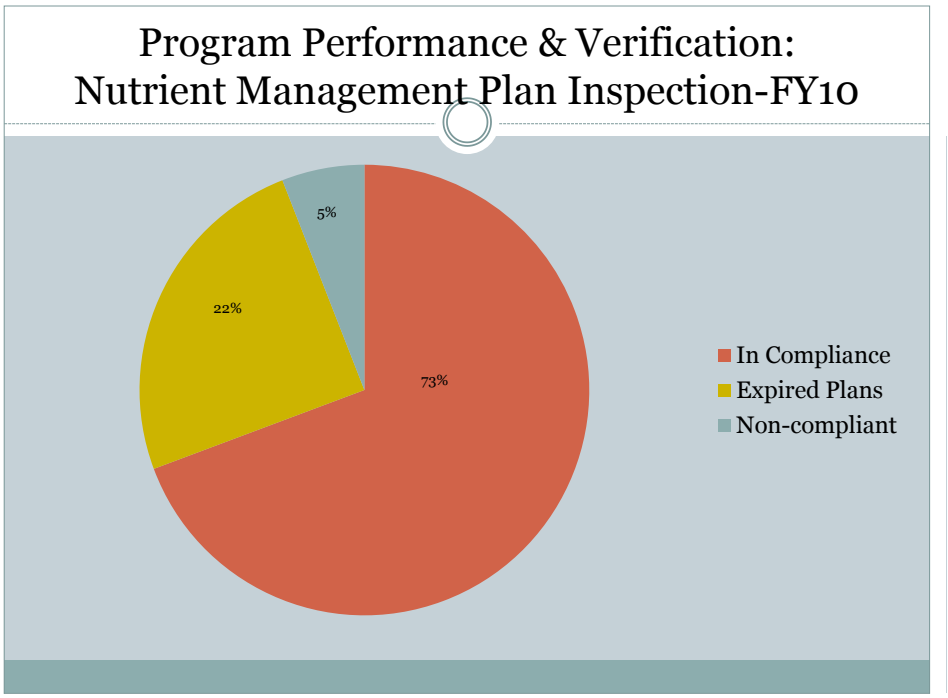

Table 10. FY 10 Nutrient Management Plan Inspections.

3.2.9 CONSERVATION TRACKER

About four years ago Maryland developed Conservation Tracker ("Tracker") to address a concern that the existing federal tracking/accounting systems being used were not complete (i.e., missed state and farmer-installed practices). Tracker is a comprehensive system employed at the SWCD level for tracking all farm conservation programs and all practices on the farm. The state uses Tracker to report annual implementation progress to the CBP, but the system also has manure transport data, CREP data, cover crop data, and other data.

MDA has a QA/QC protocol involving state c/s program records to confirm that data in Tracker are accurate. Conservation data obtained using Tracker will be reviewed and verified for conformation to program requirements and validated using data quality objectives established by the MDA Office of Resource Conservation Operations. Only data that are supported by appropriate quality control criteria and meet the data quality objectives will be considered acceptable for reporting. Data validation occurs at the time of entry into Tracker through the extensive use of field validations, including table lookups, formulas, and data-type restrictions. Once processed in the database, MDA generates various quality control charts and reports on a quarterly basis to identify potential data quality issues. Evaluation and verification of any data issue is resolved locally by SCD staff. The same process is followed for federal data to ensure that Tracker data are correct. Additionally, field validation of BMP implementation is managed through annual Quality Assurance Reviews (QARs). Field checks of 10% of all BMPs implemented within the active maintenance life span are conducted and documented to ensure they

continue to function in accordance with design standards and specifications. Cross checks/validation are conducted with MACS Agreements and Nutrient Trading Program assessment reports for accuracy.

3.3 NEW YORK

[some information has been received from the Upper Susquehanna Coalition; more information will be added as it becomes available]

New York reports BMP implementation to the CBP through the Upper Susquehanna Coalition (USC) of Conservation Districts that encompass the headwaters of the Chesapeake Bay Watershed. The USC relies on the New York State funded Agricultural Environmental Management (AEM) program (http://www.nys-soilandwater.org) as its framework for data collection, reporting, and verification. AEM is the state-wide umbrella program that provides a consistent format to efficiently identify and address environmental concerns through a comprehensive on-farm assessment. AEM is administered and implemented by trained professionals at the local level through county Soil and Water Conservation Districts (SWCDs) and their partners. AEM uses a tiered process that includes inventory, assessment, plan development, implementation and evaluation (http://www.nys-soilandwater.org/aem/index.html). The inventory and documentation of existing BMPs occurs during any one of the five tiers, but varies depending on where the individual farm is in the process. Farmer participation in the AEM program is voluntary and designed to be highly interactive. This framework increases farmer awareness of the impact their farm activities have on the environment; it encourages farmer participation and seeks behavioral changes, important overall goals for meeting TMDL targets. The tiered approach combined with permitting programs for larger farms has been in place for over a decade in New York and has strong agricultural community support.

The USC has put in place its own structure within the AEM framework for data collection and reporting of agricultural BMPs. An Ag Team (consisting of a Team Leader, Coordinator, GIS specialist, lead data collectors, and technicians) works to collect data on as many conservation practices on the ground as possible, including both c/s and non-c/s practices. The AEM program and its associated federal programs, the NYS Ag Nonpoint Source Abatement and Control Program and General Permitting for Concentrated Animal Feeding Operations (CAFO) work together to provide a comprehensive framework to use these protocols effectively with farms active in the AEM process and/or permitted farms. The USC and its partners will continue to evolve and to develop a finer level of detail within the current system to better capture non-c/s, non-structural, and annual practices, as long as funding becomes available to match a program at the increased level. For example, New York and other jurisdictions are currently working with the CBP to account for cases where non-c/s practices do not meet CBP or NRCS standards but have some functional equivalency to c/s BMPs. The USC is attempting to collect data on these practices for future use. To accomplish this and other improvements to BMP reporting, it will be necessary to adopt additional methods of data collection such as phone surveys, farmer self-certifications, and the use of aerial imagery/dashboard surveying of cropland.

To facilitate data reporting, the USC is finalizing the first phase of an online AEM Data Management Application for SWCDs to use to report data directly from their offices that are stored on a server. The tool has mapping capabilities and tracks individual farms and BMPs. It formats data to be ready to submit via the NEIEN.

To maintain reliability and accuracy, most data collection will be performed or verified by trained technicians during individual farm assessments. The USC also uses GIS technology to map each reported practice and the farms where they are located. Additionally, aerial photography will be used in some cases to document areas with difficult access or to measure BMP size and distance from a waterbody. Moreover, the USC has a strong partnership with the Farm Service Agency (FSA) and NRCS in New York and obtains their data directly prior to reporting it to the CBP. The Ag Coordinator and GIS Specialist visit each District office and consult with the District Manager and NRCS District Conservationist on practices that were implemented in that county for the year. In this way, double-counting of BMP data is minimized. Furthermore, USC's reported data can be partially validated by comparing data from the FSA and NRCS state and national offices, and Ag Census data, where appropriate. If farmers report BMPs to the USC, then USC technicians can visit the farm to verify that information. USC also compares reported data to New York State Department of Ag and Markets AEM data for each county in the watershed.

The USC currently communicates to its 19 member Districts using existing infrastructure and well-established relationships. The USC has, for example, conducted regional or county workshops in the past and will have them again in the future. Other communication tools include USC bi-monthly meetings, partnerships with crop consultants, nutrient management and CAFO planners, New York Farm Bureau and the Northeast Dairy Producers Association. Moreover, the USC has a strong partnership with the USDA in New York where NRCS and FSA professionals attend member District board meetings and the USC bi-monthly meetings. As a result, USC is in a strong position to communicate our approach or changes to it accurately and efficiently. This will be important to provide a clear, consistent message to farmers from the various agencies and provide a well-coordinated overall effort.

3.4 PENNSYLVANIA

Application of a comprehensive BMP verification protocol in Pennsylvania is currently considered cost-prohibitive. Pennsylvania relies on USDA-NRCS records for verification of implementation of federally cost-shared practices. There is no single protocol for non-cost shared practices; rather there are protocols for individual BMP types – e.g. the QA/QC procedures in the recent tillage survey by the RC&D.

Monitoring and inspection of nutrient management and other BMPs are conducted for verification in Chesapeake Bay Special Projects (PA DEP 2007). Monitoring compliance of the implementation and maintenance of individual special projects and nutrient management programs of those farms under non-expired Landowner/Operator-Conservation District Agreements (CBP-SP3) is an important factor in judging the effectiveness of Pennsylvania's CBP. All farms under a non-expired CBP-SP3 in the Bay Special Projects Funding Program (SPFP) are subject to compliance inspections once every four years.

Monitoring of special projects is a responsibility of the conservation district (CD) that should be ongoing throughout the lifespan of the special project/BMP. The initial implementation of a project is documented through the CBP-SP5, Cost Verification Form, during the completion stages of the project. Upon completion and throughout the lifespan of the CBP-SP3, the landowner could be subject to a formal Field Interview & Compliance Field Inspection Report (CBP-SP9). Compliance

inspections are designed to randomly sample at least one landowner, but no more than three, from each special project sponsored by the CD.

Annual field reviews and compliance field inspections are scheduled and coordinated by CDs. These inspections include an appropriate representative from the Pennsylvania Department of Environmental Protection (DEP) and should include a representative from NRCS when necessary due to BMP design and/or job approval authority.

If problems are noted during inspections, corrective actions must be taken by the landowner/operator within 30 to 60 days. The date for a follow-up inspection will be noted on the CBP-SP9 form and verified by the Chesapeake Bay Field Representative (CBFR). If landowners are not fulfilling applicable program requirements, CDs can be required to return state funds to the Commonwealth.

3.5 VIRGINIA

Virginia conducts spot checks to determine practice viability and lifespan. For structural practices, spot checks should be conducted after the close of the program year but early enough to allow modification and vegetation to be re-established (if needed). Annual practices such as WQ-4 (legume cover crop) and SL-8 (protective cover for specialty cropland) are not subject to spot-checking, but technical certification inspections can be carried out during the program year as appropriate. Spot checks are intended only to verify that a practice exists on the farm, and are not intended to be technical inspections. Technical accuracy was determined at the time of certification by technical personnel. If technical problems exist however, the CD and the appropriate technical agency are notified.

Random spot checks are conducted annually by the District Conservation Specialist/Technician under the guidance of the Conservation District Coordinator (CDC) to determine that the individual practice is still viable. Technical agencies involved (NRCS and Virginia Department of Forestry) are notified that spot checks are to occur but they are not required to be present. A random 5% sample of each type of practice is completed. In addition, a 5% sample of the total number of selected practices from previous years is conducted to monitor long-term compliance. The CDC will conduct administrative reviews periodically.

Upon the completion of the spot checks, CD personnel must inform the appropriate technical agency that corrective action is needed and can begin, and must also inform the District Board at its next regularly scheduled meeting. Copies of all spot-check forms are sent to the CDC and copies are maintained in the CD files. Spot-check reports on practices receiving c/s from other sources are copied to the appropriate agency.

CDCs consolidate all spot-check information into a table indicating how many inspections were conducted, how many practices were in compliance, and how many practices require additional CD follow-up. A copy of this report is forwarded to the Agricultural Incentives Program Manager. The

report is used by the CDC to ensure that those practices that need additional CD attention are taken care of and all issues are resolved or a pro rata return of c/s and tax credits are returned to the CD.

In conjunction with spot-checking, each assigned CDC may examine cooperator files to ensure accordance with plans, policies, and procedures. The assigned CDC may choose to examine only those cooperator files that have been selected for spot-checking or they may choose an overall sampling of no more than 10% of all cooperator files currently under the practice lifespan.

3.6 West Virginia

West Virginia is in the process of developing a tracking and reporting system for both cost-shared (current and expired) and non-cost-shared BMPs in order to credit farmers who have installed practices with or without federal or state c/s dollars and use the data collected in the CBWM. The development of this process is described in Appendix G to the *WV Phase II Final Chesapeake Bay Watershed Implementation Plan,* dated 3/30/2012 (West Virginia WIP Development Team 2012). Development of the tracking program has been done in collaboration with the National Association of Conservation Districts (NACD), USDA, U.S. Environmental Protection Agency (USEPA), West Virginia Conservation Agency (WVCA), West Virginia Department of Environmental Protection (WVDEP), and other state departments of agriculture.

The West Virginia Department of Agriculture (WVDA) has hired a Tracking and Reporting Specialist to focus on tracking and reporting of BMPs. In particular, this person has developed, field-tested, and refined protocols for capturing the details of previously unreported or non-cost-share BMPs that contribute to water quality primarily through a farm-by-farm voluntary approach. The key points of the tracking and reporting protocol are:

1. Working with 4 pilot farms to develop a tracking sheet and Reference Book (includes the Bay Program BMP name, definition, reduction efficiency, the corresponding NRCS practice standard, and an example picture).

2. Testing of the tracking sheet and Reference Book on the pilot farms to make adjustments.

3. Reliability and validity testing of the information collected on the pilot farms by a third party. The University of Maryland Agricultural Technical Coordinator provided assistance at this stage.

4. Adjusting the protocol such as modifying pre-planning tasks, how to ask questions to get all the data needed, and how to determine the level of function of each BMP.

5. Training of WVDA staff to collect data in a consistent manner from farm to farm and staff member to staff member.

6. Working with Tetra Tech to develop a database to store the data and submit to the CBWM.

7. Outreach to farmers to let them know that the program is up and running so they can volunteer their information.

8. Collecting data. All data collected are submitted to the Tracking and Reporting Specialist to enter into the database.

9. Re-checks of farms will be performed every 10 years and will be done through a mailer survey that will list the BMPs found on the farm and ask the farmer if the practice is still in existence, has been modified, or if new BMPs have been added to the farm.

10. Data will be aggregated on the county level by the database and be sent to the WVDEP BMP reporting database to be submitted to the NEIEN.

Field testing of the first-cut tracking spreadsheet resulted in the development of a new Farm Assessment Sheet (FAS) used for gathering the necessary information in the field needed to properly credit the BMP. The BMPs being collected include all those approved by the CBP and interim BMPs. The Field Assessment Sheet includes basic contact information, a list of the BMPs being tracked and/or credited by the CBP, and cells to enter the practice name, tract and field number, number of units or systems, level of function, the year it was installed, the latitude and longitude, notes, and who verified the practice. The FAS also includes a decision tools list to help the field staff consider the necessary standards a practice must meet to determine its level of function. NACD assisted in formulating the definitions of BMP function that the WVDA is using on the farms to assess BMPs:

- **Meets NRCS Standard and Specifications**- practices that comply with all the requirements in the State Technical Guide and Engineering Field Manual.
- **Functional Equivalent**- practices that provide nutrient and sediment reductions equal to practices that fully meet NRCS Standards and Specifications but do not meet the rigorous NRCS criteria. Deviation from a NRCS conservation practice technical standard in construction materials may still provide the same annual water quality benefits but may have a shorter physical lifespan. An example would be a grassed buffer strip along a stream that is correct width, species compositions, etc., to meet NRCS Standards and Specifications but the fence keeping livestock out of the area does not meet the standard.
- **Almost Functional Equivalent**- practices that do not meet NRCS Standards and Specifications yet provide some degree of nutrient and sediment reduction. This may include practices that do not meet the NRCS conservation practice standard due to design factors. An example would be a grassed buffer strip along a stream that is less than correct width, or does not have the correct species composition, etc. to meet NRCS Standards and Specifications.
- **Expired Cost-Shared Practices**- are those beyond the contractual lifespan. The practice was originally cost-shared, installed and met NRCS Standards and Specifications. The farmer is voluntarily continuing maintenance of the practice as it continues to provide sediment and nutrient reduction benefits. It now becomes a functional equivalent reported by the state.

Although USEPA does not currently credit practices that meet the "almost functional" standard, the WVDA will continue to collect information on these BMPs in order to present them to the CBP's AgWG for scientific review in the event that they can be approved and credited in the CBWM.

Further field testing has led to updates of the BMP Reference Book, improved consistency of BMP naming between the CBP and West Virginia, and resolution of privacy concerns of farmers by limiting geo-locating to use of a central global positioning system (GPS) coordinate for a farm or field.

As a result of the new tests on the pilot farm, slight adjustments have been made to the tracking and reporting protocol. The WVDA will still use the five Nutrient Management Specialists to collect non-cost-share BMP data. However, when they are in the field mainly for collecting nutrient management information, they will only focus on collecting information on the BMPs that have the highest reduction efficiency, have the greatest effect on scenarios, and are some of the more common/easily identifiable practices on West Virginia farms. The BMPs that the Nutrient Management Specialist will focus on are: animal waste management systems, riparian forest buffers, grass buffers, cover crops, stream protection with fencing, and conservation tillage. The Tracking and Reporting Specialist, however, will gather information on all BMPs present when on the farm.

After training of staff is complete, the WVDA will begin the farm-by-farm voluntary tracking and reporting program. Farmers will be made aware of the program through education and outreach and will call the Tracking and Reporting Specialist to begin participation in the program. A WVDA staff member will make an on-site visit and collect all necessary data and submit it to the Tracking and Reporting Specialist who will then enter the data into the database. The Tracking and Reporting Specialist has been working to promote why the WVDA is conducting this program and what it means to landowners through displays at county fairs, meeting with the Conservation District Board members, and attending the Farmer Feedback Nights sponsored by the West Virginia University (WVU) Extension. Once the program is off the ground, the Tracking and Reporting Specialist will use news articles in local newspapers, Conservation District newsletters, and extension newsletters to spread the word about this program. The WVDA sees the success of this program being linked to efficient execution of the protocol when staff are on the farm so that the farmer will recommend participation to other farmers

Concurrently, the Tracking and Reporting Specialist is working with Tetra Tech to develop a database that will store the information collected. It will be the responsibility of the Tracking and Reporting Specialist to enter all the data collected into the database. Tetra Tech is designing the database to reflect the Field Assessment Sheet. The database will aggregate the data on a county level basis when the report is needed to report to the WVDEP database that serves as the node to the NEIEN. Generating county level data reports for decision makers will also be a feature of the database. The database will also be able to generate farm by farm reports solely for the purpose of re-checking a farm after ten years to verify practices are still in place and to account for any new BMPs a landowner may have installed or the CBP may have approved.

The other side of the tracking and reporting program includes reporting those practices that have lived their contractual lifespan with NRCS or FSA and are therefore no longer reported by the agency, leading to their deletion from the CBWM system. However, the WVDA will try to re-check and verify that such practices are still in place and functioning. This will require cooperation with NRCS and FSA to be able to identify these practices. NRCS and U.S. Geological Survey (USGS) are already cooperating to extract the data so that the practices can be verified. The WVDA looks forward to the result of that cooperation in order to continue to use the expired BMPs in the CBWM.

The WVDA Tracking and Reporting Specialist has also been working with NRCS, FSA, WVCA and WVDEP to develop a Cost-share Tracking Sheet (CSTS) that reporting agencies can use when they report their BMPs for purposes of the CBWM. The CSTS lists the NRCS practice standard and code with the corresponding Chesapeake Bay BMP name so that the agency can report their BMPs properly and include information such as the Chesapeake Bay units, sizes, and land use. The purpose of creating the CSTS is to streamline the process of taking the data given to WVDEP staff to input into the West Virginia node of NEIEN. The CSTS also aims to capture actual field data, such as buffer sizes and stream fencing, to substitute for the assumptions being made in the CBWM. In the future, the CSTS will be reported on the county level by each county field office and will cover the appropriate reporting period.

Because this type of program has never been attempted before by the WVDA, an adaptive management approach will be used to make adjustments to the protocol or database in order to accurately and efficiently collect and submit data. This technique will also be useful as BMPs are revised by the AgWG. The WVDA will be evaluating the program effectiveness and cost/benefit at the end of each year to determine areas of the program that need to be adjusted and determine if the farm-by-farm method is effective. The WVDA is committed to making the process, especially the voluntary process on the farm, as efficient as possible as it recognizes that this program is a major undertaking for its staff and West Virginia's farmers. The initial cost estimate for this program is $950,000 which includes employee travel and wages, database development, and inputting and maintaining the data for each farm. Funding is made possible through the Chesapeake Bay Regulatory and Accountability Program.

In the event that the farm-by-farm approach is not effective, the alternative plan to collect non-cost-share BMPs is to use the farmer self-certification method with a 10-20% spot check of farms as outlined by NACD. At this time, the WVDA will work with USEPA and appropriate NACD staff to develop a protocol for implementing the farmer self-certification method; local stakeholders at the Farmer Feedback Nights preferred this method over the farm-by-farm method. WVDA needs to be assured, however, that information collected via self-certification is accurate and follows the standards outlined by NACD that were developed in conjunction with USEPA. The WVDA believes the farm-by-farm method will achieve the most accurate results and that by re-checking farms in ten years through a survey of BMPs found on the farm previously, the WVDA will be able to meet the desires of the farmers to have a self-certification program.

4.0 LITERATURE FINDINGS

4.1 AGRICULTURAL WORK GROUP PROPOSED PROTOCOLS

Results of the literature review are summarized below, generally organized by the main protocols initially proposed by the AgWG.

4.1.1 ON-FARM ASSESSMENT BY TRAINED PERSONNEL

Bracmort et al. (2004 and 2006) conducted a retrospective examination of BMPs implemented in the Black Creek Watershed (IN). A representative sample of grassed waterways, grade stabilization structures, field borders, and parallel terraces installed about 20 years earlier during the Black Creek Project were inspected and assigned a condition score using evaluation tools developed for that purpose. Evaluation of the current condition of the BMPs found that one-third of the practices no longer existed and that the two-thirds that still existed were in fair condition and partially functional. Efficacy of BMPs in reducing nonpoint source (NPS) pollution (evaluated using the SWAT (Soil and Water Assessment Tool) model) varied with their condition. Under good conditions, BMPs alleviated average annual sediment and phosphorus yields at the outlet by 32% and 24%, respectively. As BMPs deteriorate, their ability to reduce sediment and total P diminishes. Modeling results for BMPs in varying conditions revealed that the average annual sediment yield was reduced by only 10%, which is nearly 3 times less than the reduction corresponding to BMPs in good condition. Estimated average annual phosphorus yield at the watershed outlet was reduced by 17% for BMPs in their current condition, providing nearly 70% of the phosphorus reduction estimated for BMPs in good condition.

4.1.2 FARMER SELF-ASSESSMENT, WITH OR WITHOUT SPOT-CHECK BY AGENCY PERSONNEL

The Minnesota Department of Agriculture (MDA) conducts statewide monitoring and evaluation of pesticide BMP use (2007). The MDA conducts biennial surveys of pesticide use practices reported by farmers and conducts field audits within select watersheds.

Florida conducts a number of BMP verification programs based on farmer self-assessment. Under Rule 40E-63 permitting, landowners are required to submit BMP plans based on a point system for various BMPs - 25 BMP equivalents or points were set as the minimum target BMP level (South Florida Water Management (SFWMD) 1999). After the BMP permit plans are approved, Rule 40E-63 requires follow-up post-permit verification of the approved BMP plans on two levels: (1) BMP implementation reports and (2) BMP field verification. Annual BMP implementation reports are required to be submitted to the District; they are to summarize not only the initial implementation of BMPs but also ongoing BMP maintenance and documentation. SFWMD Everglades Regulation Section staff conduct BMP site verifications on an eighteen-month rotational basis to allow examination of BMPs implemented in both wet and dry seasons. Field verification procedures begin with generating a database-driven BMP checklist specific to the permit drainage basin. The checklist consists of all BMPs selected by the permittee to be implemented. The checklist is mailed to the permittee prior to the verification to assist the landowner in preparing his documentation for the inspection. The verifications involve a combination of visual field observations and a review of

office records. During the office review the SFWMD staff focuses on records that document soil test results, fertilizer recommendations and applications, BMP training of farm personnel, pump logs, and any other material that supports BMP implementation. While in the field, SFWMD staff note any visual evidence that the selected BMPs have been implemented. This evidence may range from spoil on canal banks indicating canal cleaning was performed, fertilizer banding or land leveling equipment operating, and maintenance of vegetation on ditch banks to reduce sedimentation, to any other observable evidence that supports BMP implementation. The verifications are a "spot check" of the landowner's implemented BMPs. This spot check is a snapshot in time of how and when BMPs were implemented for that particular field and land use. The SFWMD knows which types of BMPs have been chosen by the landowner for each particular land use and location so a verification can be conducted.

In several other regions of the state, the Florida Department of Agriculture and Consumer Services (FDACS) Office of Agricultural Water Policy (OAWP) runs an Implementation Assurance Program (FDACS 2008). Producers participate by submitting a Notice of Intent (NOI) to implement a checklist of practices applicable to acres being enrolled. The OAWP developed a Best Management Practices Tracking System (BMPTS) to record the submittal of NOIs and assist in tracking BMP implementation. The OAWP issues detailed reports on results of the program. For example, in the Lake Okeechobee Watershed Implementation Assurance Process, each operation is visited upon completion of c/s structural BMPs, to ensure these BMPs have been properly installed, prior to receiving state c/s funds. Overall, Implementation Assurance site inspections are conducted in order of when conservation plans are completed and implemented, generally within 6 months of plan implementation. Staff fill out a review/checklist form and assign an overall rating of "Satisfactory," "Needs Improvement," or "Unsatisfactory," based on the observed condition of BMPs relative to the conservation plan. For operations that receive a "Satisfactory" rating, no follow-up visit is necessary. However, OAWP staff will conduct "routine" site visits approximately annually, depending on the inspection workload. At this time, maintenance of structural BMPs will be reviewed and rated. For a rating of "Unsatisfactory" or "Needs Improvement," there will be a scheduled follow-up inspection, usually within 120 days to check on progress. Additional follow-up site visits will be scheduled as circumstances warrant. BMPs commonly reviewed during site inspections include both structural (e.g., culverts, culvert risers, fences, water troughs, well capping) and management (e.g., nutrient management, maintenance of structural practices, record keeping) BMPs.

OAWP reports include extensive presentation of findings, survey/review forms, and flow charts of the verification process. No assessment of accuracy or confidence is provided.

4.1.3 REVIEW OF EXISTING AGENCY OR ON-FARM RECORDS

Because NRCS is the primary agency involved in BMP planning and implementation, NRCS records are often used as a source of verification information. According to the NRCS electronic Field Office Technical Guide (eFOTG), conservation practice standards and statements of work indicate elements of practice implementation/installation that field staff need to report into NRCS records.

Following are four examples of deliverables contained in statements of work. It should be noted that state-specific deliverables may be added as appropriate.

Nutrient Management (590) Statement of Work National Template

Deliverables

1. Records of implementation.
    a. Extent of practice units applied, acres.
2. Guidance for record keeping (implementation records maintained by the producer or agent).
    a. Records of crops produced, planting and harvest dates, yields, residue management.
    b. Records of recurring soil tests, and other tests (e.g. manure, plant tissue, water) used to implement the plan.
    c. Records of recommended nutrient application rates.
    d. Records of nutrient applications including quantities, analyses, and sources of nutrients applied; dates and methods of application.
    e. Records of recurring review of the plan including the dates or review, individual performing the review, and recommendations that resulted from the review.
3. Certification that the application meets NRCS standards and specifications and is in compliance with permits.
4. Progress reporting.

Riparian Forest Buffer (391) Statement of Work National Template

Deliverables

1. Records of application.
    a. Extent of practice units applied.
    b. Width and extent of buffer zones.
    c. Actual plant materials used and protective measures.
2. Certification that the application meets NRCS standards and specifications and is in compliance with permits.
3. Progress reporting.

Cover Crop (340) Statement of Work National Template

Deliverables

1. Records of application.
    a. Extent of practice units applied.
    b. Actual materials used.
2. Certification that the application meets NRCS standards and specifications and is in compliance with permits.
3. Progress reporting.

Water and Sediment Control Basin (638) Statement of Work National Template

Deliverables

1. As-built documentation.
    a. Extent of practice units applied.
    b. Drawings.
    c. Final quantities.
2. Certification that the installation meets NRCS standards and specifications and is in compliance with permits.
3. Progress reporting.

The USDA- Agricultural Research Service (ARS) Little River Experimental Watershed (LREW) in Georgia has been the site of several BMP verification efforts. Sullivan and Batten (2007) used historical paper files and maps (circa 1980-2006) to develop a digital geographic database of conservation practices supported by the NRCS. Watershed boundary, USDA tract boundaries, and field boundaries were digitized from USGS quadrangles. An associated database file was created containing county names, tract and field numbers, the NRCS program under which the practice was granted, the NRCS practice number and description, the NRCS estimated acreage covered by the practice, the completion date, and whether the practice was of cost or no cost to NRCS. Results showed that nearly 16% of the land area in the LREW had participated in one or more NRCS recommended conservation programs within the last 30 years. Forty-seven different conservation practices were observed within the LREW, ranging from fish pond management to grassed waterways. The most predominant conservation practices observed were: nutrient management (13.1% of all practices), pest management (12.9%), grassed waterways (9.6%), contour farming (9.5%), seasonal residue management (8.9%), and terraces (8.8%). Some 46% of BMPs were implemented voluntarily with technical assistance provided by NRCS field staff. Cost-share programs predominantly funded the establishment of grassed waterways, terraces, nutrient management, and pest management. Voluntarily implemented practices consisted primarily of contour farming, residue management, and nutrient management.

Settimi et al. (2010) subsequently used the LREW BMP database in a USDA Conservation Effects Assessment Project (CEAP) study to evaluate the effectiveness of federally funded conservation programs. Using a subwatershed database having complete field coverage of four LREW subwatersheds (with and without NRCS assistance), GIS databases were queried to evaluate the adoption and placement of erosion control practices that were visible in a 2005 digital orthoquad. Forty-seven percent of all fields in the subwatershed database had implemented visible erosion control–specific conservation practices. Implementation was linearly related to slope class (r^2 = 0.64, $p < 0.10$). Fields identified as having participated in federally funded conservation programs coincided with high resource concern areas 35% of the time.

Reid-Rhoades et al. (2008) and Wilson et al. (2008) endeavored to determine the effectiveness of conservation practices for reducing sediment yield in Topashaw Canal watershed (TCW) in north-

central Mississippi. A census of conservation practices installed within the TCW by various governmental agencies (NRCS, USDA Farm Service Agency, and US Army Corps of Engineers) was compiled by collecting land management history for tracts that were currently or had participated in conservation incentive programs such as EQIP (Environmental Quality Incentives Program), CRP (Conservation Reserve Program), and special regional erosion control projects. Descriptive data were entered into spreadsheets with the funded conservation program identified by tract number and sensitive information (e.g., landowner identifiers) removed. Spatial coordinates associated with each practice were recorded to prepare data sets for watershed modeling with AGNPS (AGricultural Non-Point Source Pollution Model) and SWAT. This was done using 1996 aerial photographs from the Farm Service Agency (FSA) offices with the tract numbers for each funded conservation practice identified. Satellite imagery for December of 2006 provided current aerial photography of land use. These images were verified by making GPS measurements at about 30 known points within the TCW that were easily identified in the images. The practice data were interpolated into spatial information through the creation of digitized polygons using scanned aerial photos that associate land use management schemes with tract numbers. Land use practices that were not included in government incentive programs were compiled from agency data and satellite imagery.

Jackson-Smith et al. (2010) used intensive field surveys and interviews with program participants to assess the accuracy of using official records as a measure of short- and long-term BMP use in a northern Utah watershed. The researchers worked in the local USDA offices to review the official contract files for each of the 90 landowners or farmers who participated in the Little Bear River Watershed Project (LBRWP) from 1992 to 2006. They gathered and entered into a database (1) official NRCS practice codes and additional detailed information about each specific conservation practice that participants were contracted to implement during the life of the LBRWP, (2) the FSA farm tract and field numbers describing where each practice was located, (3) general information about each operation, and (4) contact information for each program participant. The researchers focused on whether or not the BMP still existed or was actively being used and maintained, regardless of current contract status, although contract dates were noted. In addition, aerial photographs of each participant's land were photocopied, and based on the information from the files, markings were placed on the photocopied images to signify where each of the contracted BMPs was located on the physical landscape. Face-to-face interviews were conducted with 55 of the original 90 participants. Following each interview, the original database of LBRWP BMPs was updated to note instances where the participant reported information that conflicted with that obtained from the NRCS files. Subsequently, researchers determined the implementation status for each BMP included in a participant's original files using several techniques. Initially, they shared a list of BMPs on file and the aerial photographs with respondents and systematically reviewed each practice to discover whether or not the practice was successfully implemented, whether they encountered any problems during the implementation of the practice, and whether or not they were still using the practice. While a seemingly simple exercise, coding the implementation status for BMPs was sometimes complex. During interviews, several instances were encountered where a respondent indicated no recollection of a particular BMP being part of their contract and numerous others where they insisted that the description of the practice (usually drawn from the NRCS

practice code definitions) was not a completely accurate characterization of what happened. The net result of post-interview coding was to create a new set of tabular and spatial databases that represent an updated (and presumably more accurate) catalogue of conservation behaviors in the Little Bear River watershed.

Overall, Jackson-Smith et al. (2010) determined that project participants could not verify implementation for 88 (16%) of the contracted BMPs. Most of these were instances where all available evidence pointed to a failure to successfully implement the practice, though a handful of cases involved misclassified BMPs where a different type of practice was actually carried out. In almost every case of non-implemented BMPs, respondents simply did not recognize the practice as being part of their original project. Another group of respondents described what they had done in connection to a contracted management BMP, but it was apparent to the research team that their actions did not meet even a minimal definition of the changes in behavior implied by adoption of this type of BMP. Overall, it was determined that over 20% of implemented BMPs appeared to be no longer maintained or in use. BMPs related to crop production enterprises and irrigation systems had the lowest rate of continued use and maintenance (74% to 75%), followed by pasture and grazing planting and management BMPs (81%). By contrast, nearly every instance of fencing and riparian protection structures in the files were found to have been implemented on the study farms. Generally speaking, structural BMPs and practices for which c/s was available were more likely to be implemented, perhaps because they involved greater investment of public and private funds. However, the implementation gap between cost-shared and non-cost-shared practices was not as significant as anticipated. Although c/s is often believed to be an essential incentive to encourage use of BMPs, in this study, the majority of practices implemented were unfunded, although the rate of implementation of unfunded practices was significantly lower than the rate of c/s practices.

The study findings suggested that official watershed program contracts and related records can be a very useful resource for describing patterns of conservation behaviors at the watershed scale but that they may not provide a complete and accurate description of BMP adoption and related behaviors instigated by a conservation program. Management practices are particularly susceptible to non-implementation and maintenance.

4.1.4 SURVEYS AND STATISTICAL SAMPLING

Tetra Tech, Inc. developed for USEPA (USEPA 1997) a guidance document intended to assist state, regional, and local environmental professionals in tracking the implementation of BMPs used to control agricultural NPS pollution. Information is provided on methods for selecting sites for evaluation, sample size estimation, sampling, and results evaluation and presentation. The focus of the guidance is on the statistical approaches needed to properly collect and analyze data that are accurate and defensible. Probabilistic sampling designs are discussed – including simple random sampling, stratified random sampling, cluster sampling, and systematic sampling – to meet specific objectives for tracking and evaluating the implementation of BMPs. Measurement and sampling errors are also examined. Sources of information are listed, including the USDA NRI (National

Resources Inventory), the USDA Census of Agriculture, the National Agricultural Statistics Service (NASS), local USDA program information, FSA data, and state Cooperative Extension.

The guidance documents methods for estimating sample sizes required to compute point estimates such as proportions and means, as well as detecting changes with a given significance level for a variety of sampling designs. Methods for evaluating data through statistical hypothesis testing are presented. A chapter addresses the process of determining whether agricultural BMPs are being implemented and whether they are being implemented according to approved standards or specifications. Guidance is provided on what should be measured to assess BMP implementation, as well as methods for collecting the information, including physical farm or field evaluations, mail- and/or telephone-based surveys, personal interviews, and aerial reconnaissance and photography. Designing survey instruments to avoid error and rating BMP implementation are also discussed. Self-evaluations, while often not a reliable source of BMP implementation data, are proposed as a way to augment data collected through expert evaluations or in place of expert evaluations where the latter cannot be conducted. Aerial reconnaissance and photography are also discussed as data collection tools, although newer and better technology is now available.

NASS provides timely, accurate, and useful statistics in service to U.S. agriculture using both censuses and surveys. A survey employs a sample selected from a target population and uses statistical techniques to make inferences about that population. Most NASS programs use a survey to obtain representative data. A census is a complete enumeration of the entire population. The Census of Agriculture is the largest and best known census administered by NASS. The most important survey data sources are farm or ranch operators who voluntarily supply information about their operations. NASS reports provide broad coverage of agriculture, including about 120 crops and livestock items, and supplies statistics on a variety of additional subjects important to agriculture, e.g., cropping practices and land use, fertilizer, number and size of farms, farm labor and wages, prices received and paid by farmers, and weekly weather and crop reports. Data are collected through mail, telephone, face-to-face interviews, and on line.

While NASS does not ordinarily collect comprehensive data on BMPs, for the upcoming 2012 Census of Agriculture, farmers and ranchers will be asked to report number of acres on their operations that were drained by tile, artificially drained by ditches, and under a conservation easement. NASS will also ask for the number of cropland acres under no-till, conservation tillage, conventional tillage, and planted to cover crop (excluding CRP). NASS will conduct special projects for other agencies or states under contract, as long as NASS standards and protocols are followed. Statistical measures of accuracy and confidence are computed for all surveys and data are included with each report. Details on NASS programs and procedures are available at: http://www.nass.usda.gov/Education_and_Outreach/Understanding_Statistics/index.asp.

Lambert et al. (2007) presented information on the CEAP-Agricultural Resource Management Survey (CEAP-ARMS) of 2004. This survey represents an annual source of data on the finances and practices of a nationally representative sample of U.S. farms that also includes information on the characteristics of the farm operators and their households. The CEAP-ARMS questionnaire links ARMS

farm household, resource, and economic data directly to CEAP production practice and program participation data, and corresponding field-specific NRI data. The paper is an exercise of integrating different data sources of varying precision to draw conclusions about influences of socio-economic factors on adoption of conservation practices and environmental benefits.

Cunningham (2003) and Benham et al. (2005) developed sixteen survey-like assessment tools to address the need for a low-cost, rapid method of quantifying the quality of agricultural BMPs. BMP quality was defined as the adherence to design, site selection, implementation, and maintenance criteria as specified by state and federal conservation practice standards. Quality assessments are made based upon visual observations of BMPs rather than traditional assessment methods such as water quality monitoring. Tools were developed and tested as part of a proof of concept study. A different assessment tool was designed for each of 16 distinct BMP types (e.g., waste storage, grassed filter strips, cover crops, stream fencing) based on c/s guidelines, NRCS standards, and other practice criteria. Each tool included a mix of nine types of question/answer sets: interview open-ended, interview multiple-choice, interview binary (yes/no), interview multiple-choice photograph selection, assessor chosen open-ended, assessor chosen binary, assessor chosen multiple-choice, binary post-data collection, and multiple-choice post-data collection. A scale of one to five was used as the scoring system for each assessment question. One hundred and fifty-five cost-shared and 150 non-cost-shared BMPs were assessed on 128 farms in the James River Basin of Virginia. Results indicated no significant statistical difference between the overall quality of cost-share and non-cost-share practices within any indicator BMP category. Overall, the quality of the cost-share and non-cost-share practices assessed was roughly equal. No consistent identifiable trend of c/s status and BMP quality was readily evident from the data.

Storm et al. (2006) reported on a detailed 2005 survey given to Oklahoma State University Cooperative Extension Service agents and specialists to gain an understanding of agricultural practices and land covers that occurred from 1996 to 2001 in the Fort Cobb (OK) basin. This survey went into great detail about the different types of crops in the basin along with different tillage practices, common double crops, fertilization rates, cattle stocking rates, and harvest dates. Results from the survey indicated that over thirty different agricultural land covers/practices occurred in the basin. During the summer of 2005, an additional field survey of all cultivated fields in the basin was conducted, including several pieces of pertinent information to develop a new land cover map. The information collected included current crop, previous double crop, tillage practice, presence of irrigation, cattle grazing, and vegetation height. Each cultivated field was mapped using National Agricultural Imagery Program (NAIP) aerial photos and ArcMap software**.** Survey staff drove the entire basin with a laptop connected to a GPS unit with real time tracking. When they encountered a cultivated field, they delineated field boundaries and other information using NAIP photos displayed within ArcMap. To improve accuracy, the GPS unit would plot an icon or marker to represent their location on the aerial photos. The survey was compiled to create a highly detailed crop data layer. The advantage to this approach compared to the previous model was the ability to distinguish crop types.

Veith et al. (2008) compared SWAT modeling of a small northeast watershed under two different resolutions of input data. Management practices of individual fields over an 11-year period (1994-2004) were obtained from annual farmer surveys. The surveys included tillage, fertilizer, plant, and harvest dates and methods for each crop. Results suggested that while detailed input data can enable the model to provide valuable water quality information, research efficiency during exploratory and initial problem-solving efforts might be maximized by using more easily obtained, although more general, data.

In Canada, MacKay et al. (undated) reported that BMP adoption information is collected by a variety of organizations including government, producer groups, and conservation authorities, and is often driven by a specific agri-environmental program. This information is often not synthesized in a way that can provide information on overall BMP adoption across the country, and therefore is challenging for policy makers to make use of it. A BMP Adoption Index has been developed to synthesize this variable information. The BMP Adoption Index calculates a BMP adoption score for farmers based on their responses to the Farm Environmental Management Survey (FEMS). This survey was conducted by Statistics Canada using a representative stratified sample of 20,000 crop and livestock farmers across Canada after the 2006 growing season. The questionnaire asked crop farmers about manure and fertilizer spreading, pesticide application practices, tillage practices, and crop residue management, and asked livestock producers about livestock housing, manure storage and treatment, and grazing management practices. Both crop and livestock farmers were asked about land and water management, hazardous waste management, and environmental farm planning. The survey collected data on all practices being implemented, not just BMPs, in order to gain an understanding of the range of practices being implemented on farms across Canada. In total, 184 practices were included in the calculation from the crop questionnaire and 214 practices were included from the livestock questionnaire. Ninety-six of these practices were common to both questionnaires. The BMP Adoption Index is calculated by combining the management practices being implemented by each survey respondent in 2006 with a ranking that reflects the efficacy of the management practice in improving the environmental performance of a farm. The ranking scale ranges from 1 to 5 where 1 indicates a poor practice that is expected to cause environmental degradation, 3 indicates a neutral practice and 5 indicates the most beneficial practice that is expected to reduce or eliminate risk and provide benefits to the environment. Note that the use of the Index aggregates all BMPs.

The Conservation Technology Information Center (CTIC) conducts an annual tillage/crop residue survey in the Midwest using a detailed roadside transect survey procedure (CTIC 2008). The cropland roadside transect survey method is designed to gather information on tillage and crop residue management systems. Experience has been that counties with a grid road system, those with fields readily visible from the road, where crops are planted in a relatively short period of time, and where conservation tillage is being adopted are the most likely candidates for conducting a transect. Note that the deliberate selection of areas where conservation tillage is being adopted may represent a significant bias to the survey. The purpose of the survey is threefold: (1) to provide information that can be used by individual soil and water conservation districts and others in

establishing priorities for educational or other programs, (2) to evaluate progress achieved in reaching county or statewide goals, and (3) to provide accurate data on the adoption of conservation tillage systems by crop for the CTIC National Crop Residue Management Survey. This makes the transect survey an ideal tool for assessment as well as measuring progress for locally led conservation. When conducted properly, this cropland transect survey procedure provides a high degree of confidence in the data summaries. Users can have 90% or more confidence in the accuracy of the results. This level of reliability translates into data summaries that can help guide the local or state decision-making process. Several states have used transect data to allocate cost-share funds, develop new resource management goals, and to provide information to the general public about the positive impact of progress on land use trends. CTIC describes the specific steps involved in conducting the survey, addressing issues such as establishing a driving route, selecting the survey date and team, collecting the survey data, and calculating the crop acreage and percentage of coverage for each tillage system.

Shukla et al. (2006 a and b, 2010) reported on Florida surveys conducted in cooperation with the Gulf Citrus Growers Association (GCGA) and FDACS to document and assess adoption of BMPs by Florida citrus producers. The survey questionnaire included five major water quality BMP categories: water volume, sediment control, aquatic plant control, pesticide use, and nutrients. The survey captured grove-specific BMP adoption data by asking general questions descriptive of grove management and the importance of BMPs with regard to water quality benefits and grove profits. To determine if a particular practice was in use, growers were asked if they implemented it consistently or not. A third choice of "sometimes" indicated that this practice was not implemented on a regular basis. To understand whether or not a practice was acceptable to the growers, one of the choices was "disagree with the practice." To determine whether a grower would be willing to implement a practice in the future, two additional choices, "plan to use" and "would if cost-shared," were also included. The latter choice determined the potential for implementation of a specific BMP if federal and/or state c/s funds were made available to offset a portion of the implementation cost. Sixty groves covering an area of 115,791 acres were surveyed by personally interviewing the farm manager. The surveyed acreage was distributed between large (>1,000 acres), medium (250-1,000 acres), and small groves (<250 acres). From a water quality standpoint, the percentage of grove land area affected by a specific BMP is more important than the percentage of total grove number. Therefore, almost all of the *large* groves in the region (104,170 acres) were included in the survey. In addition, 75% of *medium*-size groves (9,982 acres) in the Gulf Citrus Production Area were included in the survey. The area occupied by the surveyed *small* groves was 1,639 acres. The grove name and location were kept confidential. The results report the percentage of surveyed area using various BMPs, but includes no assessment of error or statistical confidence.

In April 2010, the USDA NASS conducted a survey of Maryland's commercial agricultural producers regarding BMP implementation and nutrient management planning (Lichtenberg et al. 2010). The University of Maryland commissioned the survey to provide a snapshot into current practice implementation to assist the state when developing its Chesapeake Bay TMDL Watershed Implementation Plan (WIP). Survey questions specifically highlighted prevalence of BMP usage,

BMP adoption by farm size and use of c/s by farm size. Results also provided information on NMP compliance, preparation, and content, particularly nutrient targeting and testing. Results indicated that most conservation and nutrient management BMPs are used by relatively small shares of farm operations. A breakdown of adoption rates by farm size indicates BMP use is substantially greater among larger operations than small ones. Use of c/s is relatively low for conservation BMPs and nutrient management practice use, indicating that most BMP adoption is self-funded. However, a strong relationship was not observed between farm size and use of c/s to implement BMPs. Of those who are required to have an NMP, 63% have a plan while the remaining 37% do not; however, compliance varies systematically with farm size. Small operations have the lowest compliance rates. UMD Extension personnel prepare the largest share of plans.

The NRCS reported on a farmer survey conducted to obtain information on the extent of conservation practice use in the Chesapeake Bay region for the period 2003–06 (USDA-NRCS 2011). Information on farming activities and conservation practices was obtained primarily from a farmer survey conducted as part of the overall CEAP assessment. The assessment included not only practices associated with Federal conservation programs but also the conservation efforts of states, independent organizations, and individual landowners and farm operators Conservation practices that were evaluated include structural practices, annual practices, and long-term conserving cover. Data on structural BMPs were obtained from the NRI-CEAP cropland survey, NRCS field office records, FSA CRP information, and the 2003 NRI.

The survey results define the "baseline conservation condition."

- Structural practices for controlling water erosion are in use on 46% of cropped acres, including 63% of the highly erodible land (HEL).
- About 88% of the acres have a conservation tillage system in use including no-till (48%) or mulch till (40%).
- Producers use residue and tillage management practices, structural practices, or both, on nearly all (96%) cropped acres in the region.
- Appropriate rates of nitrogen application are in use on about 35% of the acres receiving nitrogen (including manure) for all crops in the rotation.
- Appropriate timing of nitrogen application is in use on about 54% of the acres receiving nitrogen (including manure) for all crops in the rotation.
- Good nitrogen management practices (rate, timing, and method) are in use on about 13% of the acres receiving nitrogen (including manure) for all crops during every year of production.
- Good phosphorus management practices (rate, timing, and method) are in use on 17% of the acres receiving phosphorus (including manure) for all crops during every year of production.
- While most acres have evidence of some nitrogen or phosphorus management, there is an opportunity to enhance existing nutrient management practices on most acres, especially those receiving manure.

- Land in long-term conserving cover, as represented by enrollment in the CRP General Signup, consists of about 100,000 acres in the region (2% of cultivated cropland acres), of which 67% is HEL.

4.1.5 REMOTE SENSING

NASS employs three major applications of remote sensing with respect to crop acreage estimates. First is the operational construction of the nation's area sampling frame for agricultural statistics, which has used satellite imagery as a major input since 1978. The area sampling frame is the statistical foundation for providing agricultural estimates with complete coverage of American agriculture. Crop acreage estimation is only one part of this system. The second application, which is now done for seven to ten states per year, has been the use of satellite imagery to improve the statistical precision of crop acreage estimate indicators, especially at the county level in those states. This was the first NASS application of Landsat data and it began in 1972.
The third application, and most popular with GIS data users, is the formation of a public use GIS data file called the Cropland Data Layer. The Cropland Data Layer is the crop specific categorization of the "best available" set of Landsat (30 meter resolution) digital imagery for the crop(s) season of interest. Data users have recently used the Cropland Data Layer to aid in watershed monitoring, soils utilization analysis, agribusiness planning, crop rotation practices analysis, animal habitat monitoring, prairie water pothole monitoring, and in the remote sensing/GIS value added industry. Additional information on NASS use of remote sensing data can be found at:

NASS http://www.nass.usda.gov/Surveys/Remotely_Sensed_Data_Crop_Acreage/index.asp.

Daughtry et al. (2004) set out to determine the spectral reflectance of crop residues and soils and to assess the limits of discrimination that can be expected in mixed scenes. Spectral reflectances of dry and wet crop residues plus three diverse soils were measured over the 400–2400 nm wavelength region. Reflectance values for scenes with varying proportions of crop residues and soils were simulated. Additional spectra of scenes with mixtures of crop residues, green vegetation, and soil were also acquired in corn, soybean, and wheat fields with different tillage treatments. The spectra of dry crop residues displayed a broad absorption feature near 2100 nm, associated with cellulose-lignin, that was absent in spectra of soils. Crop residue cover was linearly related ($r^2 = 0.89$) to the Cellulose Absorption Index (CAI), which was defined as the relative depth of this absorption feature. Green vegetation cover in the scene attenuated CAI, but was linearly related to the Normalized Difference Vegetation Index (NDVI, $r^2 = 0.93$). A novel method is proposed to assess soil tillage intensity classes using CAI and NDVI. Regional surveys of soil conservation practices that affect soil carbon dynamics may be feasible using advanced multispectral or hyperspectral imaging systems.

Sullivan et al. (2008) evaluated the usefulness of Landsat TM data as a tool to depict conservation tillage in the Little River Experimental Watershed in Georgia. Satellite imagery was used to calculate four commonly used indices: NDVI, Crop Residue Cover Index, Normalized Difference Tillage Index, and the Simple Tillage Index. Ground truth data consisted of a windshield survey, assigning each site a tillage regime (conventional or conservation tillage) at 138 locations

throughout the watershed and surrounding areas. A logistical regression approach was used on two subsets of the data set *(n* = 20 or n = 44) to determine the influence of the number of ground control points on the success of modeling the occurrence of conservation tillage. The most accurate model was re-applied to the satellite image and evaluated using an independent sample of 94 survey sites. Results indicate that the normalized difference tillage and simple tillage indices performed best, with an overall accuracy of 7l% and 78% for models developed using n = 20 and n = 44 sample locations, respectively. Errors were typically in the form of commission, e.g., misclassification based on unusual soil color. Results are encouraging and suggest that currently available satellite imagery can be used for rapid assessment of conservation tillage adoption using minimal a priori information.

Hively et al. (2009a and b) combined cost-share program enrollment data with satellite imagery and on-farm sampling to evaluate cover crop N uptake on 136 fields within the Choptank River watershed, on Maryland's eastern shore. The NDVI was a successful predictor of aboveground biomass for fields with >210 kg/ha (>187 lb/ac) of vegetation (corresponding to 4.2 kg/ha [3.7 lb/ac] of plant N), below which the background reflectance of soils and crop residues obstructed the cover crop signal. Cover crops planted in the two weeks prior to the regional average first frost date (October 15) exhibited average fall aboveground N uptake rates of 18, 13, and 5 kg/ha (16, 12, 4 lb/ac) for rye, barley, and wheat, respectively, corresponding to 1,260, 725, and 311 kg/ha (1,124, 647, 277 lb/ac) of aboveground biomass, with associated c/s implementation costs of $5.49, $7.60, and $19.77 /kg N ($2.50, $3.46, and $8.99 /lb N). Cover crops planted after October 15 exhibited significantly reduced biomass and nutrient uptake, with associated program costs of $15.44 to $20.59/ kg N ($7.02 to $9.36 /lb N). Agronomic factors influencing cover crop performance included species, planting date, planting method, and previous crop. Field sampling locations with >1,000 kg/ha (>890 lb/ac) of springtime cover crop biomass exhibited greatly reduced soil nitrate (<3 mg/ kg [<3 ppm]) in comparison to fields with low cover crop biomass (up to 14 mg/kg soil nitrate), indicating a target biomass threshold for maximum water quality impact. Additional sampling years will be necessary to account for cover crop response to climate variability. Combining remote sensing with farm program data can provide important information to scientists and regulators working to improve conservation programs. Results can be used to more effectively use scarce conservation resources and increase water quality protection.

Summarizing the methods of Hively et al. (2009a and b):

Cover Crop Implementation Data. Cover crop implementation data, including digitized field boundaries, cover crop species, planting date, planting method, and previous crop were obtained from the MDA. These data were transcribed from cover crop c/s program enrollment documents that were filled out by participating farmers in the fall of 2005. A total of 136 cover-cropped fields located within the study area were included in the evaluation. A digitized boundary polygon delineating each cover-cropped field was provided by the MDA, based on FSA Common Land Use boundaries and field-specific SCD farm planning documents.

On-Farm Sampling. On-farm sampling was performed on a subset of cover-cropped fields within a week of each satellite image acquisition. The collected data were used to provide calibration of satellite image interpretation (correlation of NDVI to biomass), to estimate cover crop tissue N content for use in calculating nutrient uptake, and to monitor residual soil nitrate.

Remote Sensing Imagery. Multispectral satellite images of the study area (SPOT 5, >90% cloud-free, <20° incidence angle, 10 m [32.8 ft] resolution, four spectral bands, 60 × 60 km [37.3 × 37.3 mi] coverage) were acquired on December 22, 2005, and March 31, 2006. These image acquisition dates were respectively selected to represent total fall and total springtime cover crop nutrient sequestration. Cost-share program data associated with each enrolled field were then used to correlate estimated biomass production and nutrient uptake with agronomic factors (cover crop species, growing degree day, planting method, and previous crop).

Results. A multivariate log-linear model of biomass production, $\ln(\text{Biomass}) = a + b(\text{NDVI}) + c(\text{ImageDate}) + d(\text{Species}) + \varepsilon$, (2) where a is the intercept, b, c, and d are linear coefficients, and ε is residual error, revealed significant effects of NDVI (primary predictor variable, explaining 73% of observed variation), satellite image acquisition date (explaining 3.7% of variability, likely attributable to differences in atmospheric optical conditions at times of satellite overpass), and cover crop species (explaining, in addition to NDVI signal, 4.2% of observed variation, likely attributable to differences in cover crop growth habits and leaf angle in relationship to leaf area index). The remaining 19% of observed variability in measured cover crop biomass was attributed to the unexplained error term. Further research might succeed in reducing model error by attributing components of observed variability to additional predictive factors.

Using remotely sensed satellite imagery, cover crop nutrient uptake efficiencies can be derived at the landscape scale, accounting for the effects of spatial variability and providing insight into agronomic factors affecting cover crop productivity. The results of this study, although they must be corroborated over several growing seasons to account for the effects of climate variability, have strong implications for evaluating and improving the success of cover crop programs and promoting effective water quality protection strategies.

4.2 HYBRID APPROACHES

Several BMP verification efforts have comprised combinations of two or more of the broad protocols identified by the AgWG.

Tomer et al. (2008) conducted a conservation practice inventory for the South Fork of the Iowa River, 85% in corn and soybean rotations, to describe the extent and placement of key conservation practices in the watershed and evaluate the results in the context of four years of concurrent, detailed water quality data. Cropping rotations were determined using annual classified satellite data made available by NASS (USDA NASS 2007). The satellite data are subject to a supervised classification (i.e., a classification guided by human judgment) aimed to identify commodity-crop acreages (i.e., corn and soybean in Iowa) with minimal error. Five years of classified data (2000 to 2004) were overlaid to map the dominant crop rotations occurring on agricultural lands within the

watershed. Agricultural field boundaries, provided by FSA, were used as a majority filter for each year of crop-cover data to provide a single five-year sequence of cover for each field. The observed crop-cover sequences were then grouped to represent dominant rotations in the watershed, including two-year (corn-soybean), three-year (corn-corn-soybean), and longer rotations based on number of consecutive years with corn up to five years (ie., continuous corn). Fields with sequences dominated by grass (pasture) were assigned as permanent cover, and perennial rotations were assigned to fields where the crop sequence included a third crop (in addition to corn and soybean) because the third crop was typically classified as alfalfa or hay in the NASS data.

The distribution of manure applications within the watershed was estimated using a GIS model that divided the N load from each concentrated animal feeding operation (CAFO) facility by the areas of increasingly sized circles (in 40-m [131-ft] radius increments, without overlap) until the area within the circle accommodated the N load at an application rate of 200 kg N ha^{-1} (179 lb ac^{-1}) for corn. The application rates assigned to fields within the circles were varied to account for the observed crop rotation by assigning the full rate to fields where three or more consecutive years of corn and half the rate where 2- or 3-year corn-soybean rotations were observed. This essentially assumes manure application occurs prior to corn and not prior to soybean.

An inventory of conservation practices was conducted during the first half of 2005. The inventory was conducted by NRCS and included four steps. First, a search of records of the agency's progress reporting system with contributions from four local NRCS field offices was conducted. Second, aerial photos were interpreted and digitized to map visible conservation practices such as terraces and grass waterways. Third, a field-by-field, drive-by survey was conducted during May 2005 to provide a snapshot of tillage practices throughout the watershed and confirm the progress reporting system data and air photo interpretations where possible. The survey was conducted by NRCS personnel with knowledge of local tillage systems and experience in estimating residue cover. Data were digitally collected in the field, using tablet-style, touch-screen computers equipped with GPS signal tracking to ensure mapping accuracy. A GIS coverage of the watershed's fields, with field boundaries provided by the FSA common land unit system that documents agricultural lands participating in USDA programs, provided the base map for touch-screen linkage to a data-entry interface. Specialized GIS software was developed to expedite the survey process, which included pull-down menus, accessible by field, with tag-lists of common practices and opportunity to annotate the record, correct existing information, and digitize features missing from the office-prepared map coverage that were observed in the field. Four persons, paired in two trucks, completed the field survey in about three weeks. The final step was to combine the survey data entered by crews and build the final inventory product, a completed GIS project detailing practices by field, which excluded all ownership information. Evaluation of conservation practices in the watershed was conducted by GIS overlay with NRCS Soil Survey Geographic data, particularly HEL and hydric soils, stream proximity, and with crop rotations and anticipated manure application areas, determined as described above. All this information was placed onto a single spreadsheet, which was sorted and filtered to determine areas where resource concerns and conservation practices overlapped.

The survey of conservation practices showed mulch tillage (>30% residue cover) was the dominant class of residue management, covering 58% including one large field (226 ha [558 ac]) under ridge tillage in the Tipton Creek subbasin. Conventional tillage (herein, conventional tillage refers to tillage systems that result in >70% of crop residue being incorporated beneath the soil surface) occupied about 29% of the agricultural land, with no-tillage more limited in extent (7%). About 20% of the cropland is in fields with grassed waterways and/or terraces. There are also water and sediment control structures in 46 fields, protecting 1,185 ha (2,925 ac). Unfortunately, no assessment of error or statistical confidence was reported.

Grady et al. (undated) demonstrated and evaluated three different methods for obtaining geospatial information for BMPs in a mixed use watershed in central Indiana. The researchers obtained geospatial information for BMPs through government records, producer interviews, and remote sensing aerial photo interpretation. Aerial photos were also used to validate the government records and producer interviews. This study shows the variation in results obtained from the three sources of information as well as the benefits and drawbacks of each method. Using only one method for obtaining BMP information can be incomplete, and this study demonstrates how multiple methods can be used for the most accurate picture.

Summarizing the methods of Grady et al. (undated):

> ***Government Records*.** Records from three agencies were obtained in 2010. USDA agency records required a Memorandum of Understanding (MOU) to follow the requirements of Farm Bill Section 1619.
>
> ***Producer Interview Data***. Agricultural land owners and operators were interviewed in the winter of 2007/2008. All 54 producers in the watershed were contacted to participate; 32 were interviewed, for a response rate of 59%. Interviews followed a semi-structured interview guide, dealing with a range of topics related to conservation on the producer's land. These topics included reasons for use/non-use of conservation practices, environmental awareness and attitudes, and funding for agricultural practices. In addition to qualitative data collected, producers were asked to provide locations of structural conservation practices and to outline fields with various operational practices on provided maps. These spatial locations were then digitized into a GIS. The interviews collected data on six conservation practices: conservation tillage, cover crops, grassed waterways, filter strips, nutrient management, and pest management.
>
> ***Aerial Photo Interpretation***. Orthophotos of the watershed were available for each year between 2003 and 2010. High resolution imagery from 2005 with a resolution of 1 foot collected as a part of the Indiana Statewide Orthophotography Project served as the basis for analysis and classification of BMPs. These photos were taken before the growing season and therefore show agricultural fields without vegetation and trees without leaves (leaf-off). Photos taken in the summer (leaf-on) with 1 meter resolution from the National Agricultural Imagery Program (NAIP) at the USDA for all other years provided

complementary information, such as evidence of the rapid land use changes in this watershed. The 2010 photos helped with identifying BMPs in cases where records indicated past management practices but the land was no longer in agriculture. In addition, seasonality between orthophotos enhanced the ability to interpret these images. The method used for identifying BMPs from aerial photographs used a grid system. A grid layer was created using tools in ArcGIS 9.3 and overlaid on the watershed. Each grid cell was 900 m^2 which was the distance and scale at which the 2010 aerial photos can be viewed on the computer screen without compromising clarity, allowing for examination of each section of the watershed at the same scale.

Structural BMPs were analyzed separately from operational BMPs because they could be confirmed through aerial photos. Three structural practices (subsurface drain, stream bank erosion control, and wetland creation), for which information was obtained from NRCS records, could not be identified through aerial photos and therefore they were not included in the analysis of structural practices.

Government records provided information on more practices than the other two sources. However, this source of information would not be adequate on its own, due to at least four difficulties associated with the use of government records. First, obtaining information regarding spatial data for management practices from USDA agencies programs required special permission through an MOU, and then cooperation from the various agencies that provided the records. Although individual staff members were helpful, the process (resulting from the restrictive language in the 2008 Farm Bill) was cumbersome and time-consuming. In addition, important watershed stakeholders such as watershed groups may not be approved for this information release. Second, the data provided lacked some information that would have been helpful. Spatial locations provided by one of the agencies (FSA) did not contain attribute data that would provide descriptive information about the practice such as practice type and date of implementation, while the data provided by NRCS was georeferenced to the centroid point of the land unit where it was implemented, rather than including the precise location and shape of the actual practice. Government records also did not contain information about dates of practice installation. This type of temporal information would be useful for monitoring maintenance/upkeep of practices over time and for more accurate comparison with remote imagery (for which dates are always available). Third, the data provided by NRCS were in a format designed for national record-keeping, consisting in some cases of a separate record for each resource concern addressed by a practice rather than an effort to determine practices in a watershed. This facilitates crediting of practices to the resource concern at a national level, but these records had to be manually combined to represent the true number of practices installed in the watershed. Fourth, government records do not reflect the extent to which practices were fully implemented nor whether they are being adequately maintained (Jackson-Smith et al. 2010). Finally, government records were incomplete and likely under-represent the true total of BMPs in the study area

The producer interviews were the unique information source for 29 structural practices and 155 operational practices because operational BMPs such as nutrient management cannot be identified through photos or other remote sensing. If these practices are implemented without government program incentives (and therefore not present in government records), directly asking producers, either through interviews or surveys, is the only way to gather the spatial and temporal locations of these practices. However, these methods are limited by response rates within a watershed.

Photos were the unique source for 24 structural practices in this study, but if aerial photo digitization had been done without knowledge of other BMP records, this technique would have yielded many more BMPs. Current high-resolution photos provide an unprecedented source of information on agricultural practices that has not often been fully utilized. Photos taken annually can be used to estimate dates of practice implementation.

The Ohio River Basin Trading Project, a new joint venture by the Electric Power Research Institute (EPRI), the American Farmland Trust (AFT), and others, is a project that promotes the achievement of water quality goals for nutrients through a trading program that allows permitted emitters to purchase nutrient reductions from another source (EPRI 2012). In this case, farmers who install BMPs can sell their nutrient reductions to permitted emitters such as power plants and wastewater treatment facilities.

For a nonpoint source to generate a credit, it must reduce its loading of N or P below current conditions. Only non-NRCS cost-shared practices are eligible for crediting. Agricultural nonpoint sources will need to provide three years of farm practice history to document their current conditions, including crop rotations, residue management, tillage, nutrient inputs, location and type of existing conservation practices, livestock inventory, and manure handling. A new BMP will generate credits only after it is installed, and only for so long as it is properly operated and maintained, based on quantitative performance protocols. The status of installation, operation, and maintenance will be periodically inspected by an appropriate verifier, such as the state Department of Natural Resources, SWCD, or resource management specialist. Verification records will be maintained and the non-confidential portions of those records may be made available to the public upon request.

During the 2012 – 2014 Pilot Program, the state agency will arrange to periodically monitor, inspect, and verify the implemented BMPs at least annually, based on visual monitoring and inspection, as well as a review of records provided by the landowner and/or SWCD. All states will follow the same verification protocols, and rules. EPRI will ensure consistency and the credit registry will not allow for variation.

A verifier will be assigned to a particular BMP project based on: 1) knowledge of the conservation practices implemented; 2) knowledge of the geography; 3) availability; and 4) absence of significant conflicts of interest. All verifiers will be trained on the plan, credit calculation tools, processes, and protocols. They will have a working knowledge of farm operations and practices to manage

nutrients on farms in the Ohio River Basin. Verifiers will complete regular continuing education training as required by EPRI. Verifiers will confirm that (1) the landowner's eligibility information is correct, (2) the BMPs were implemented according to the standards or approved modifications, (3) credits are quantified using appropriate metrics and methodologies, (4) practices are maintained and performing as designed, and (5) appropriate arrangements are in place to ensure practices are maintained. The type of verification/monitoring will vary depending on whether the practice is structural (e.g., livestock exclusion fencing), vegetative (e.g., buffer strip), or management (e.g., nutrient management). Both structural and vegetative practices can be viewed in the field but verifiers will need to check landowner records to confirm that they are being maintained properly. Management practices will mostly be verified by examining landowner records. The verifier must prepare a report of each monitoring, inspection and verification event, along with its opinion as to whether each BMP is, in fact, verified. This report must be submitted to EPRI within 30 days after each event. Producer personal information will be held confidentially. The public can see the HUC 10 where credits are generated, but not the specific farm or field. Regulators can see the farm records.

4.3 ADDITIONAL CONSIDERATIONS

Studies show that BMP function (i.e., efficiency, pollutant reduction) cannot be assumed, even if the presence of a practice is verified by one of the protocols discussed above.

For example, Dosskey et al. (2002) reported that concentrated flow through riparian buffers can be substantial and may greatly limit buffer performance. While sediment removal of up to 99% from runoff has been reported under ideal circumstances (e.g., plot studies), because of non-uniform distribution of field runoff through a buffer, the authors estimated that only 15 – 43% of sediment would actually be removed.

Sharpley et al. (2009) reported that conservation practices vary substantially in effectiveness within and among watersheds. For example, previously reported total P reduction efficiencies for BMPs, such as cover crops can range from 7 to 63%, contour plowing 30 to 75%, livestock exclusion 32 to 76%, and riparian buffers 40 to 93%. Such variability results from inherent heterogeneity of landscape topography, hydrology, climate, and prior land use, which influences soil test P. This large variability clearly demonstrates the site-specificity of BMP reduction efficiencies and highlights the dangers of having to assign an absolute value, as required by nutrient trading programs.

As noted earlier, Bracmort et al. (2006) reported that one-third of BMPs installed in the Black Creek (IN) watershed no longer exist and the remainder were only partially functional, with efficiencies far lower than those originally attributed. Finally, as noted above, Jackson-Smith et al. (2010) found that 16% of BMPs reported as implemented in a UT watershed project were never actually installed and that 20% of implemented BMPs had been abandoned, principally management practices.

These findings emphasize the need for careful verification of both BMP presence and BMP function and the danger of simply assuming that BMPs reported as implemented are providing their full potential effects on water quality.

4.4 SUMMARY OF KEY FINDINGS FROM THE LITERATURE

- Each of the general protocols for BMP verification identified by the AgWG has been applied elsewhere in the U.S., with varying degrees of effectiveness.
- With the exception of some validation data from remote sensing analyses, and a statement of accuracy in the CTIC tillage survey, there have been essentially no assessments of statistical confidence or error reported for any of the approaches to BMP verification described in the literature.
- Verification of structural, annual, and management practices will likely require different protocols and provide different information content and accuracy.
- Hybrid approaches probably have the best potential to provide complete and accurate information on BMP implementation and performance.
- BMP function should not be assumed, even if presence is well-documented.
- To meet the objectives of the CBP, BMP verification will need to go beyond simple documentation of presence/absence; some assessment of condition, performance, or efficiency will be required.

5.0 SUMMARIES OF INTERVIEWS WITH KEY INFORMANTS

While interviewers collected detailed notes during interviews and these notes have been edited and accepted by those interviewed, this summary does not attribute specific comments to specific individuals. Rather, summary points, areas of consensus, and areas of distinct opinion are noted. The summary addresses three areas: specific verification programs identified by the interviewees, reported costs of verification programs, and key principles arising from the body of interview responses.

5.1 SPECIFIC VERIFICATION PROGRAMS REPORTED

BMP verification programs reported by interviewees are summarized below and identified by the state in which they take place. These programs are a mix of state government, non-governmental organization, and other efforts. Note that program specifics are those given by the interviewees; no attempt was made to fully document the programs from other sources. Further information is available in section 3, from other publications, web sites, etc.

Virginia

GreenSeeker is a high tech system that senses color variations by reading chlorophyll levels in plant tissue used in nutrient management in Virginia. Results consist mainly of records of precision agriculture/nutrient management in a six-county pilot program to assess the quality of the BMP record in support of a TMDL.

Data have been collected from 100 – 125 farms in the Shenandoah Valley using a proprietary protocol (by Watershed Stewardship Inc. (WSI)). In the procedure, WSI staff meet with the farmer, explain the program, and sign a confidentiality agreement stating that they will only use farm information in an aggregate at the sub-watershed or county level; no one has objected to this so far. Farmers sign a release giving electronic access to their NMP, conservation practice, and FSA information (sometimes scanning of paper forms is needed). WSI loads that information into their nutrient load estimator (NLE) software (which describes farms, fields, animals, and crops by acreage using Chesapeake Bay land use categories). They have a list of practices that have been reported and during the whole farm walk-over they verify implementation of everything reported as implemented (cost-shared and non-cost-shared). WSI assesses and verifies implementation and operation and maintenance using both Chesapeake Bay and NRCS standards. They estimate nutrient losses with and without BMPs, formulate a plan, and work with farmers to make progress on the plan as needed. WSI believes their protocol is working well if you need this level of detail, but they are currently reluctant to turn over a proprietary procedure for governmental use because of concerns regarding maintaining resources to support employment of WSI staff.

Maryland

Maryland is reported to have the most regulated BMP reporting program in the Chesapeake Bay region, especially for nutrient management. The state has a procedure for inspection based on technical standards and requirements for compliance with state laws and regulations. Inspectors use pre-printed forms and notify farmers in advance that they are coming. They collect both general farm information (operator information, operation information-type, size) and planning information (detailed information written by a consultant – e.g., current soil test, date, certified planner name and information, information on field-specific nutrient recommendations, nutrient source, application rate and timing, manure generation, and waste management practices). The process also checks for record keeping – e.g., is yield goal based on harvested crop in different years? The final product is a review and evaluation of the operation with regard to nutrient and related management (i.e., animal waste management, fate of excess manure) – this will determine if there are major or minor violations. Warnings are issued for major violations – if not corrected, penalties can result. Minor violations result in recommendations for improvements. A copy of the evaluation is given to the operator and filed in state records. About 8 to 10% of operations are inspected by agency staff annually on a rotating basis. About 70% of inspections are focused on the problem areas; the inspection/verification process applies to all types of operations, whether cost-shared or not.

A pilot program in Howard County, MD (and elsewhere in the CBW) has been conducted, consisting of farm interviews and a review of plans; this process addresses both cost-share and non-cost-share "functional equivalent" practices. The program is linked to the Maryland Nutrient Trading Tool and Tracker with a direct tie-in to NEIEN. The Howard County process involves an interview and farm walk with the farmer/operator and a farm walk to identify BMPs. Practitioners provide data collected on cropland, animal confinement, pasture and hay land, and an updated farm map with

BMP location and associated data. The data are verified by a third party (an outside SWCD Employee) and entered into Tracker by the SWCD and into the Maryland Nutrient Trading Tool by third parties.

Information about specific components of Maryland's programs can be found in section 3.2.

Pennsylvania

Warwick Township in Lancaster County has a comprehensive watershed management program that includes stormwater and agriculture. They have worked with local SWCDs to develop conservation plans on 100% of farms (all types) in the watershed. Water quality data collected through the program are used to identify the benefits of implemented agricultural BMPs and to identify hot spots and work with landowners toward water quality improvement. They do not pro-actively track implementation of conservation plans but if farmers come in for other permits (e.g., subdivisions or lot development) they try to check on progress with their conservation plan. For farms where their municipal wells are located, the Township has hired an agronomic firm to keep all management records on the farm. They get a lot of good information, the farmer benefits with a high-level NMP, and the Township protects well water quality (e.g., lower nitrate), saving money in water treatment. They do not differentiate between cost-shared vs. farmer-driven practices.

North Carolina

Agricultural information is collected beyond normal NASS data collection in designated nutrient sensitive river basins or watersheds that are regulated by the state of North Carolina, i.e., the Neuse and the Tar-Pamlico. A N Loss Estimation Worksheet (NLEW) that is used to meet the regulatory requirement tracks potential N reduction by county based on implementation of nutrient management. The worksheet requires input data from the NMP (e.g., N inputs, N uptake) as well as documentation of conservation practices on fields. Data are collected based on the needs of the tools used in the basins (NLEW, and similar tools for P loss and grazing management). Data collection needs are driven by state regulations but regulations are not reported to be an incentive for farmers to provide more data than they would normally provide. Researchers at NC State University have run four additional detailed basin surveys for N-related BMPs; a detailed description of statistical sampling methods is available. Additional details of the statistical procedures of the NC surveys are available at:

http://www.soil.ncsu.edu/publications/river/Neuse_Report.Final.11.29.2011.pdf

http://www.soil.ncsu.edu/publications/river/Cape_Fear_NCANAT_FinalRpt_11_9_07.pdf

http://www.soil.ncsu.edu/publications/river/TarPam_NCANAT_FinalRpt_Jan30_06.pdf

Minnesota

The Livestock Environmental Quality Assurance II (LEQA) Program is funded by the Minnesota Department of Agriculture. Rather than tracking individual BMPs, the LEQA system uses a "Better

Management Systems" index, which is essentially a classification of BMP systems. The process provides some qualitative assessment of BMP system function, called a Water Quality Assurance (WQA), in order to give a reasonable assurance of performance. The LEQA process consists of three steps – an initial assessment, certification, and an annual confirmation. The objectives of the initial assessment are (1) to identify resource conditions for each of the farm management units, (2) to provide an action plan on how to address or maintain the resource condition, and (3) to identify potential sources for technical and financial assistance. Certification assistance is provided by LEQA technicians for the agricultural producers that have an initial assessment and action plan completed. The intent is to give the producers direction and support as they implement a farm management strategy to improve their water quality scores and eventually meet the WQA standards. Up to 20 hours of technical assistance funded by the LEQA program are provided to each producer through the LEQA technician. Using the initial assessment and action plan, the producer and technician decide what resources of concern should be addressed. An annual confirmation process is included in the LEQA program to keep the program fresh in the minds of the producer, provide continuity in the farm and watershed data, and to maintain the value of the WQA for the producer and stakeholders. The annual confirmation addresses any changes in farm acres, cropping systems, animal units and other important factors and confirms or adjusts the WQA scores accordingly. The intention of the LEQA program is to audit 10% of those farms each year that achieve or maintain WQA status. Audits have been conducted by Ag Resource Strategies, LLC, but it is recommended that the local and/or state government conduct future audits to ensure full-circle government-to-government accounting. Additional information about the LEQA program is available at

http://www.mda.state.mn.us/en/protecting/cleanwaterfund/onfarmprojects.aspx.

Washington

A developing program to manage water quantity and quality for irrigated agriculture and fisheries involves potential transfers of water rights in return for water quality improvements among irrigators and tribes in the Klamath River Basin. Requirements for effective trading provide strong incentives for verification of BMPs installed for water quality protection.

National Agricultural Statistics Service (NASS)

NASS provides timely, accurate, and useful statistics in service to U.S. agriculture, although not specifically directed toward verification. They do not ordinarily collect extensive BMP data (although they do routinely collect information on tillage and cover crops); in special programs (e.g., CEAP) they go beyond this. NASS conducts hundreds of surveys every year and prepares reports covering virtually every aspect of U.S. agriculture. NASS conducts both full censuses and statistical surveys. Information volunteered by farmers and ranchers to trained interviewers (enumerators) is the most important data source for NASS crop and livestock statistics. The four principal types of data collection are mail, telephone, face-to-face, and web-based. Enumerators are carefully trained in survey techniques so that data collected are not biased by the survey process.

Statistical measures of survey accuracy are provided for each specific survey effort. NASS does provide their statistical survey services to external agencies and stakeholders (e.g., universities) subject to HQ approval – e.g. CEAP, USDA-Economic Research Service's Agricultural Resource Management Survey (ARMS). Requests for services must meet certain criteria (e.g., cannot do anything proprietary – needs to be made available publicly.)

U.S. Geological Survey

USGS is coordinating conservation data sharing between NRCS, FSA, and USGS, specifically the transfer of federal c/s records for all Chesapeake Bay farmland in October of each year to support the NEIEN submission process. Data are obtained from central records. Practices within their lifespan are "verified" by existing NRCS and FSA protocols, practices outside their lifespan would fall into 'voluntary verification' protocols, as yet undefined. USGS gets privacy protected information from this dataset by submitting a special data request from central records (the whole process will be documented in a report coming out in December). They work with USDA programs and states, integrating federal and state data to eliminate double counting. Data pertain only to approved federal c/s conservation practices. There are about 300,000 practices in the watershed; each practice on each farm has its own data record. If a practice is still within its lifespan it is assumed to be valid and verified. A current proposal under consideration is to follow up this assumption with a field assessment (or other protocol) to verify that the practice is indeed still in place. If a practice is not within its lifespan, then a field assessment or other protocol will be needed for verification.

USGS is also involved in remote sensing of winter ground cover for sediment and nutrient conservation, working in most of the state of Maryland, and areas of Virginia and Pennsylvania surrounding the "Showcase Watersheds." This could be expanded within a year or so for complete coverage. USGS is able to look at winter ground cover thresholds to identify green vegetation sufficient for successful cover cropping. Currently they are not able to look at crop residue, although that might be possible within five years depending on satellite technology improvements. Nor are they able to look at nutrient application, although geospatial data can be overlapped with crop type/rotation, specific watershed areas, soil types, drainage classes, etc.

USGS began this effort with the Choptank River CEAP 6-7 years ago using SPOT and Landsat imagery. The procedure looks at the reflectance of fields and calculates the ratio of near infrared (IR) to red to estimate vegetation cover in winter fields. This is then linked to performance information for cover crops. They can only look at *green* vegetation with this procedure, *not* residue, so the procedure cannot be used to estimate such practices as conservation tillage or nutrient management. They employ two strategies: (1) use public data (Landsat and NASS National Cropland Data Layer); select a county, look at crop type in summer and identify e.g. cornland; look at winter vegetation and determine the percentage of cornland in vegetation as an indicator of erosion and nutrient loss problem areas (this covers both c/s and voluntary practices unlike methods that use only c/s enrollment information), and (2) in Maryland, identify fields enrolled in cover crop c/s program through collaboration with MDA, analyze on-farm effectiveness of various

cover cropping practices, and identify areas with poor performance. Then, by using watershed-wide ground cover mapping by crop type and subtracting the areas enrolled in cover crop c/s, voluntary cover cropped areas can be identified. Verification is done via biomass performance thresholds; they can check their remote sensing data against what Maryland reports on cover crop implementation.

USGS knows where all cover crop acreage is in Maryland. The data for Virginia are not as complete, but they are working toward developing better data on cover crop location in that state. When USGS finds green winter cover they cannot tell specifically if it is a cover crop, but they can tell that it is protected from erosion. The potential exists to also use remote sensing to document stream buffers.

5.2 REPORTED COSTS OF VERIFICATION ACTIVITIES

A few interviewees reported estimated costs associated with BMP verification programs in which they were involved.

The Howard County, MD BMP inventory is reported to cost approximately $1.50/acre, including verification by trained contractors. Intensive animal operations are more costly. Data entry into the Maryland Nutrient Trading Tracker is an additional ~$2/acre.

General frameworks for estimating costs were provided for the Maryland program. If it costs $60,000 per year for an inspector who does an average of 100 inspections per year, the cost is $600 per inspection. This is perhaps for an average farm size of 200 acres, resulting in an average cost of about $3/acre. The estimated cost will be lower if one assumes that the results are more broadly representative of the larger land area. Detailed NMP implementation verification is the most time consuming and expensive practice to inspect. Nutrient management inspections cover nutrient management and animal waste management, but do not address erosion and sediment control which is addressed by the SWCDs.

USGS reported costs of ~$50,000 per year to perform their practice tracking work on all federal conservation practices in the CBW (~300,000 practices), but this should get cheaper over time. The $50,000 is in addition to what NRCS does in the field – it is the cost to USGS to get NRCS data, eliminate double counting, work with the states, perform aggregation, and work with the states to get the data into NEIEN.

Watershed Stewardship Inc. reports a cost of $3,000 - 4,000 per farm because the work so far has all been related to projects for which they agreed to do some detailed analysis and testing. This represents a "research phase" that has a higher cost than would an ongoing routine program. The cost should be lower when done on a production scale (perhaps ~$2,000 for up to 1,000 acres, or ~$2.00/acre). They would add $1.00/acre for farms larger than 1,000 acres. The Tidewater has 8,000-acre farms scattered over 50 miles; in these cases WSI is doing just the first 2,000 acres closest to their address for the project. For farms primarily in row crops the cost would be less because they are simpler to do.

NC State University personnel have run 4 basin/watershed surveys using Section 319 funds – two in the Neuse River Basin, and one each in the Tar-Pamlico and Jordan Basins. Each cost around $250,000 or more to collect detailed agricultural information. Costs were projected to be about $9.00-10.00/acre for surveying fields.

The Minnesota LEQA assessment, planning, and assurance (verification) process cost was ~$1,000/farm for the initial baseline assessment and base plan. A verification walk-through was an additional ~$400 and an annual confirmation was ~$200.

Finally, costs were reported for a verification program for forest carbon credits in Washington. It takes about 2-4 person-months to obtain and process the data (about $30,000-$50,000). Then a third party spends several weeks on the site. Payment is about 15 cents/metric ton of CO_2 equivalent (1 credit = 1 metric ton CO_2 equivalent). Participants need several hundred thousands of credits to cover the assessment costs and make it a worthy investment. Third party verifiers charge $20,000 - $40,000 per verification event, and the cost of measuring 200,000 acres, for example, is only a little greater than for 400,000 acres because they use statistically-based approaches.

5.3 SUMMARY OF KEY POINTS

The following key points were derived from comments and issues raised during the interview process. Often, but not always, these points were shared among more than one of the interviewees. In a few cases, interviewees expressed opposing views; these are presented equitably.

- Any proposed verification program, especially as applied to nutrient trading, should be scientifically defensible, and have a high degree of accountability and transparency.
- Verification programs must go beyond simple presence/absence to address actual practice efficiency.
- The Bay Program should seek the widest possible verification of implemented BMPs, rather than focusing on intensive verification of a few individual practices, e.g., for trading purposes.
- Verification is so poor at present that use of remote sensing to verify even a limited number of practices observable may be a significant improvement.
- There may be some lessons to be learned from other verification programs, e.g., urban stormwater, air pollution emitters, carbon credits from forestry.
- Different types of BMPs – i.e., structural, annual, or management – will require different verification protocols. Remote sensing, for example, may do well at finding structural or land-cover practices, but verification of nutrient management will require strong presence on the ground. Verification – either on the ground or by remote sensing – must be conducted at the right time of year to assess BMPs like cover crops.
- A hybrid approach to BMP verification will generally give better results than a single protocol.
- Some interviewees recommended that different BMP efficiency credits should be given for different (i.e., more or less rigorous) verification protocols.

- While some flexibility in verification programs among states may be desirable, some level of consistency should be ensured so that core values/principles of verification cut across all states.
- Design and implement a verification standard that relies upon third-party, independent trained professionals. This standard should be scientifically defensible, transparent for the public, and have, as an integral component, a very high degree of program accountability.
- Assessments of accuracy or statistical confidence in verification results have been reported only for statistical survey and census data from NASS and from some validation exercises in remote sensing efforts; otherwise, little reliable information exists on the confidence or accuracy of verification results.
- If required, qualitative assessments of verification accuracy should be done by people with statistical and on-the-ground experience, not simply by best professional judgment or by consensus of a committee.
- Assessment of all sources of error in any verification process will provide some measure of transparency and confidence in the process.
- Although several programs collect BMP data at the field or other spatially-explicit scales, confidentiality issues generally prevent the release of such information and require the aggregation of data to the county level.
- Ability to spatially reference practices to the field level may not be useful at present because the model is driven at the county/watershed level.
- Monitoring of response indicators (e.g., soil test P) may be easier and more productive than trying to verify all the individual management actions that go into a complex practice like nutrient management.
- Specific programs involving water quality and agricultural BMPs can provide strong incentives for verification of installed practices. The Chesapeake Bay TMDL, the Maryland Nutrient Trading Program, the Klamath River Basin irrigation/water quality trading program, the Illinois River/Eucha-Spavinaw (AR) watersheds lawsuits, and the Ohio River Basin Trading Program are examples.
- Staff expertise is important in obtaining information directly from farmers. Staff collecting information must be trusted and agriculturally literate; several programs have had success in training the right people to do the job. Some form of certification and ongoing training may be necessary. It may not be appropriate to have the same individuals that designed or installed the practices conduct the verification.
- Verification reporting by the same technicians who install practices is generally inadequate; insufficient attention is usually paid to operation and maintenance issues and the age of practices. NRCS technicians typically assume a practice is working as designed if it is present.
- Farmer self-surveys can be useful, but require some kind of driver/incentive for farmers to provide reliable information; farmers must have a clear understanding of what the BMP is so that reporting is accurate. Spot checks by professionals/agency staff may be critical.

- Work with NRCS and the U.S. Office of Management and Budget (OMB) has shown that a 5 – 10% spot-check level is generally adequate to validate self-reporting.
- Several interviewees recommend having farmers self-report, with a substantial portion of that spot-checked by government employees. A hierarchical system (broad screening followed by more detail) was recommended, where a broad population is assessed in the first level, but not too closely. If things look good, you're done. If things don't look good, go back and look in more detail. One interviewee suggests having a penalty for failure to self-report in a cost-share program that is highly certain but not excessively punitive in order to get producers' attention.
- Farmers may experience survey fatigue. They are surveyed more than anybody and are tired of filling out forms. Some farmers would rather pay a penalty than participate in additional surveys.
- Records review approaches to verification have significant limitations because non-cost-share practices are not included, nor is operation and maintenance or management information. Sparse spot checks will not be sufficient to overcome this limitation.
- Statistical sampling and/or surveys may be efficient and highly useful, but must be done with rigorous statistical methodology by trained practitioners. Different approaches for different populations of producers (e.g., CAFO, vs. non-CAFO, large vs. small, etc.) may be required.
- Even if it is limited to detecting structural or extensive practices, remote sensing should be used to the maximum extent possible as it is the most cost-effective approach.
- Remote sensing is applicable for some structural and land-cover practices, but not for management or complex practice systems. Despite the non-invasive nature of remote sensing, some negative attitudes concerning privacy may be expressed by farmers.
- Remote sensing of some practices (e.g., cover crops) has some advantages. Using enrollment information for cover crops, for example, has limitations in terms of not catching bad years when the cover isn't sufficient. Remote sensing data have the ability to verify successful cover crop implementation easily and at lower cost than for on-site inspections and can be interpreted with respect to potential function of erosion control or reduction in N leaching.
- High-resolution LiDAR (Light Detection And Ranging) and land use analysis can be used to determine if historically installed structural practices still exist on agricultural land or whether they have been replaced by larger/different structures

6.0 SUMMARY OF FINDINGS

6.1 WHERE ARE WE NOW?

These are the most important points derived from both the literature review and the interviews:

- Each of the general protocols for BMP verification initially identified by the AgWG has been applied elsewhere in the U.S., with varying degrees of effectiveness.
- To meet the objectives of the CBP, verification programs must go beyond simple presence/absence to address actual practice quality. Some assessment of condition, performance, or efficiency will be required because simple presence of a BMP does not guarantee its full performance.
- Literature and experience do not support assignment of *Relative Data Confidence* and *Relative Data Credit* values to the various protocols. There have been essentially no assessments of statistical confidence or error reported for any of the approaches to BMP verification described in the literature (exceptions are NASS and CTIC). Such assessments are essential and should be done by people with statistical and on-the-ground experience, not simply by best professional judgment or by consensus.
- Verification of structural, annual, and management practices will likely require different protocols and provide different information content and accuracy.
- Hybrid approaches probably have the best potential to provide complete and accurate information on BMP implementation and performance.
- Much of the data (e.g., location, nutrient application rates) derived from on-farm assessments can only be shared and used in modeling if allowed by the farmer.
- On-farm assessments are expensive ($1-10/acre or more) and burdensome to farmers.
- Interviewers and assessors must have a level of expertise and be trained for consistency across the many Chesapeake Bay jurisdictions.
- Farmers need to be instructed on how to perform self-assessments consistently across the many Chesapeake Bay jurisdictions.
- Remote sensing approaches are good for presence or absence of structural and visible practices but require ground-truthing and calibrated methods for development of applications specific to agricultural practices (e.g., cover crops) and are essentially useless for management practices such as nutrient management. Remote sensing also creates suspicion in some minds and jurisdictions.
- Approaches that involve on-the-ground assessments can be used for both structural and management practices, but are likely to be too expensive for most jurisdictions to apply to an entire area of concern. In addition, presence or absence of a practice such as nutrient management can be inferred from presence of specific equipment and records, but only through analysis of those records (e.g., crop yields, nutrient application rates) and perhaps soil testing (P) can an assessment of BMP functionality be made.

- Farm inventory and self-assessment information is often constrained by a narrow program focus (e.g., cost-shared practices only, NPDES only), inconsistent interpretation of inventory questions, or confidentiality concerns.
- Records reviews are limited to programs supported by and practices implemented with cost-share or technical support.
- Statistically-based sampling approaches can be conducted with less expense than examining an entire basin and results can be extended to a wider region; however, such sampling requires a high level of scientific rigor and the required expertise may not be available in many jurisdictions or coordinated across jurisdictions. NASS efforts are exceptions because their surveys are conducted with a high level of technical expertise.

6.2 WHERE DO WE NEED TO GO?

A BMP verification program for the CBW should have these core characteristics:

- Address both cost-shared and non-cost-shared practices implemented by landowners under all programs, including federal, regional, state, local, and voluntary efforts.
- Document both presence and functional quality of BMPs.
- Allow necessary flexibility among CBW states, but provide a base level of consistency across the CBW to ensure a fundamental quality of data.
- Any proposed verification program, especially as applied to nutrient trading, should be scientifically defensible, and have a high degree of accountability and transparency.
- Include estimates of confidence and uncertainty with respect to both the verification results and the achievement of treatment goals and/or requirements.

6.3 CHALLENGES AND OPPORTUNITIES

Verification, like any QA/QC activity, increases costs, but should also increase the value of the information collected. Bay states have a variety of verification activities in place to address BMP implementation programs, with small and large differences in intensity, level of detail, approaches, and history.

With regard to agriculture, every state must contend with privacy and confidentiality issues, particularly when seeking information at more specific than the county or HUC 12 level. This has ramifications for geolocating BMPs for tracking and modeling purposes.

Budgets and staffing for verification efforts vary across the Bay states. Consistency in verification efforts across the CBW is highly desirable, yet differences in available resources will make it a challenge to achieve consistency at a suitably high level of confidence. In addition, states may be reluctant to change methods for a variety of reasons even if the goal of consistency across states is appealing to them.

Linkage of verification efforts to the CBWM presents challenges with regard to scale issues. Appropriate scales for verifying BMP implementation may not be the same or be compatible with

the county scale used by the Bay model. For example, verification of BMP implementation for riparian zone protection may be best carried out at the watershed or landscape scale, whereas NMP implementation is best verified at the farm scale. In short, the best approach to verification for different BMPs under different programs may incorporate spatial and temporal scales that do not conform to those required by the CBWM.

Significant opportunities exist for Bay states if they choose to seek consistency in their verification efforts, including the possibility of leveraging agreements with USDA and agricultural interests to obtain better information on BMP implementation, cost efficiencies in applying methods such as remote sensing and on-site reviews, and enhanced capability to report to stakeholders both accomplishments and the need for additional support to achieve water quality goals in the CBW.

7.0 RECOMMENDATIONS

The CBP Partnership has 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. The process for certifying tradable nutrient credits is a separate, distinct process not addressed either by these principles or through the partnership's BMP verification framework.

[***NOTE:*** We plan to address application of existing Bay state verification programs after we obtain information from all Bay states.]

Working to verify that practices are properly designed, installed, and maintained over time is a critical and integral component of transparent, cost efficient, and effective implementation pollutant reduction programs. Verification helps ensure the public of achievement of the expected nitrogen, phosphorus, and sediment pollutant load reductions over time. The CBP Partnership is committed to building from existing practice tracking and reporting systems and working toward achieving the following principles (CBP 2012).

- Principle 1: Practice Reporting
- Principle 2: Scientific Rigor
- Principle 3: Public Confidence
- Principle 4: Adaptive Management

The emphasis on verification should be to confirm whether practices are *implemented and operating correctly* as intended, as stated above. A balance of *scientific rigor* with *cost-effectiveness* and a sense of *priority* are also essential to a successful verification effort. *Transparency* is needed in both the process of verification and tracking and reporting of the underlying data. The principles also state that verification protocols will recognize existing funding and allow for *reasonable levels of flexibility* in the allocation or targeting of those funds.

As discussed earlier (see Section 3.0) CBW states have clearly taken different approaches to BMP verification, both in process and level of intensity. It is not the purpose of this report to evaluate state verification programs. However, it must be noted that some level of consistency across the CBW should be sought in order to verify that practices are properly designed, installed, and maintained for the benefit of the Bay. At the same time, the need for flexibility in how states approach their own verification needs must be recognized, including accounting for the investments states have already made in budgets, program development, personnel resources.

7.1 Separate the Verification Effort from the Modeling Effort

The coupling of BMP implementation verification to Bay modeling creates an expectation of data confidence and precision that cannot be met. By separating verification from modeling it becomes more feasible to satisfy verification objectives and principles within current resource and political constraints. In addition, observations drawn from verification information can still be used to inform modeling decisions in a qualitative way rather than, for example, through application of numeric relative data credits. If verification results show a pattern of over-crediting nutrient management implementation in a specific geographic area, model runs for that area could be adjusted accordingly.

7.2 Consider Multi-Sector Verification

Some verification methods that are recommended for agriculture can also be used for urban and other sources. Remote sensing, for example, could be applied broadly to all land use categories and cost-efficiency could be improved through coordinated planning, execution, data analysis, and reporting. Remote sensing is particularly disliked by some individuals – broad application to all source categories could reduce resistance. If geographic targeting of verification is employed there would be opportunities to coordinate on-the-ground assessments across sectors. Again, this could reduce resistance to the activity, and would also improve the overall verification effort by virtue of developing a more comprehensive picture of implementation activities in the area.

7.3 Identify Indicators for Verification

The current approach to verification addresses all practices in all areas, a strategy that is perhaps necessitated by the linkage to modeling efforts. Much as dissolved oxygen concentration is used as an indicator of aquatic life support conditions, indicators of BMP implementation and operation status could be considered for the verification effort. For example, nutrient management as specified in NRCS Practice Code 590 includes erosion and sediment control practices in addition to direct management of nutrients. Therefore, successful implementation of the 590 practice could be considered an indicator of successful implementation of erosion and sediment control measures as well. An indicator for effective nutrient management could be trends in soil-test P values. Other indicators to consider are composite indicators such as BMS (Better/Best Management Systems) which is an index of multiple practices (e.g., a soil condition index) used in Minnesota. While these relationships may not be established sufficiently at this time to support their use as indicators, it may be worthwhile to consider and test the application of such indicators to increase the cost-efficiency of data gathering for verification purposes.

7.4 Target Verification to Problem Areas

By its very nature, verification efforts are usually targeted to areas of concern. A formal procedure for identifying priority areas and practices for verification efforts could be developed to reduce the cost of verification, enhance the impact of verification efforts on improved water quality, and increase the value of information gained through verification. State WIPs and Bay modeling are both sources of information that can be used to identify geographic areas in which verification is more important from a water quality perspective. Similarly, state agriculture programs will most likely have information that can be used to identify areas in which farmer adoption of practices is lagging, places where verification could be more important. Finally, some practices are more important to achieving Bay water quality goals than are other practices, and these could be given more attention in verification efforts; the importance of practices may vary by geographic area.

It should be noted that by targeting verification there will be no unbiased estimator of basin-wide implementation. Those areas or practices not targeted will either be unrepresented or underrepresented in the verification process. Representative sampling would be needed to develop an unbiased estimate of basin-scale implementation. Alternatively, a stratified random sampling approach could be used in which additional information is collected for certain strata (i.e., the targeted areas) while still providing a baseline level of information for all strata.

7.5 Use Hybrid Approaches in a Sampling Approach

No single approach in the draft protocols can be used to verify implementation of all practices in all jurisdictions. Many of the reasons for this have been discussed earlier.

There are several options for the type of verification activity to be performed at each sampled farm. These include walkabout assessments (on-farm surveys), farmer self-assessments, record reviews, remote sensing analyses, and NASS-type surveys. In a hybrid approach each verification tool would be applied where it is most cost-effective. A consistent hybrid approach across all Bay jurisdictions is essential to address the requirements of scientific rigor and transparency. Such consistency requires that the hybrid approach be developed with rigor and constraints and not be left as a menu-based free-for-all.

Transparency could also be enhanced by establishing diverse teams of analysts and evaluators for each verification tool used. For example, NASS could be contracted to design a statistically-based sampling approach with input from both the environmental and agricultural communities. Farm walkabouts could be conducted by teams that represent agribusiness, state agricultural and environmental agencies, and academia.

7.6 Consider Statistically-Based Sampling

Even though one jurisdiction (MD) has committed to tracking essentially every farm to confirm implementation of BMPs, a Bay-wide full census of BMPs is unlikely. Statistically-based sampling offers a way to identify a subset of farms from which meaningful verification data can be obtained – using a hybrid approach with multiple tools including walkabouts for structural/annual practices

and surveys for management practices – then extended to infer information from the entire population. Steps involved will include:

1. Define sampling objectives – (inclusion of multiple objectives to meet other state needs – e.g., incorporating NPDES inspections, may be desirable.)
    a. e.g., to determine BMP implementation and operation levels in targeted areas or for targeted practices (targeted or biased sample), or
    b. e.g., to determine BMP implementation and operation levels basin-wide (unbiased sample).
2. Define populations/sub-populations to sample:
    a. Crop agriculture (structural/annual practices)
    b. Animal agriculture (structural/annual practices)
3. Determine population of each sub-population
    c. By state
    d. By WIP watershed
    e. By county (for Bay model)
4. Determine sample size of each for XX% confidence (assuming 100% accuracy in field assessment) (scientific validity) – NASS knows how to do this.
    f. By each population/sub-population in #2
    g. Cost is ~$1-3/acre for on-farm assessments; $X for farmer self-assessments, etc.
5. Select the farms to be included in the verification round for that year.
    h. It is recommended that sample size be artificially inflated by 50 to 100 percent (pick a %) because a substantial share of farms selected for sampling will be found to be unavailable for various reasons (e.g., uncooperative, no longer a farm, etc.).
    i. From the pool of farms to sample that are able to be sampled, randomly select the number needed for statistical purposes.
    j. It is recommended that the process of farm selection be redone every year (or at some regular interval) to change the actual farms sampled (i.e., don't return to the same farms every year). This will ensure a pure, random sampling approach.
6. The type of verification activity performed at each sampled farm can vary. Options include walkabout assessments (on-farm surveys), farmer self-assessments, record reviews, remote sensing analyses, and NASS-type surveys.
7. Aggregate up from samples to estimates of implementation levels at state, WIP watershed, and county levels

The variables tracked in the verification protocol should be chosen such that they are solid indicators of BMP implementation and appropriate operation. They could also be indicators as described in section 7.3. Selecting variables or indicators that are also meaningful to the Bay modeling effort would be beneficial but not required; it is recommended that these variables/indicators are selected in consultation with those involved in the CBWM.

A clear challenge to this approach would be gaining acceptance and ensuring sustained participation by each of the Bay states. The approach could be sold on a number of fronts, including cost savings, sound science, transparency, and consistency.

7.7 Select Appropriate Protocols

The verification activities chosen for step 6 in section 7.6 should be matched with the variables to be tracked and observed. For example, on-farm assessments are needed for many annual and most management practices, whereas remote sensing could be used for cover crops and tillage. Records reviews only capture program records so are inadequate for capturing "all things" implemented on a farm. If records reviews are used, the specific variables or practices to be tracked/assessed should be compared with the information contained in records to see if supplemental information will be needed.

7.8 Use Available Resources

NASS has the most experience surveying agricultural lands and operations and could be approached with a proposal to cover some of the tracking to be performed under a hybrid approach. For example, they could develop the statistical design, train those who will be collecting the data, manage the data, and analyze and summarize the data for use by others.

Groups such as Watershed Stewardship Inc. have expertise in on-farm surveys, and ARS has expertise in using remote sensing to identify land under cover crops. If a windshield survey is desired for conservation tillage estimates, CTIC should be consulted for the design phase and possibly training.

Specialized programs such as nutrient trading programs or TMDL implementation efforts may require and/or sponsor special verification efforts. The methods and results of such efforts may provide valuable guidance for wider application.

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Tracking Progress Toward Achieving Water Quality in the Chesapeake Bay Using USDA Farmland Conservation Data

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PROLOGUE

[Editors note: A prologue by the USDA-NRCS is under draft and will be included in the final version of this document]

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

BMP ..... Best Management Practices
CBP Partnership ..... Chesapeake Bay Program Partnership
CTA..... NRCS Conservation Technical Assistance
DE-DA..... Delaware Department of Agriculture
DE-DNREC.....Delaware Department of Natural Resources and Environmental Control
DE-FS..... Delaware Forest Service
EPA.....U.S. Environmental Protection Agency
FSA ..... USDA Farm Services Agency
GIS.....Geographic Information Systems
IDEA ..... NRCS Integrated Data for Enterprise Analysis
MDA.....Maryland Department of Agriculture
MDE .....Maryland Department of the Environment
NEIEN .....National Environmental Information Exchange Network
NCP.....NRCS National Conservation Planning database
NRCS ..... USDA Natural Resources Conservation Service
NYS..... New York State
NY-DEC .....New York Department of Environmental Conservation
PA-DA..... Pennsylvania Department of Agriculture
PA-DEP.....Pennsylvania Department of Environmental Protection
SCIMS..... USDA Service Center Information System
TMDL..... Total Maximum Daily Load
USC ..... Upper Susquehanna Coalition
USDA..... U.S. Department of Agriculture
USGS ..... U.S. Geological Survey
VA-DCR ..... Virginia Department of Conservation and Recreation
VA-DEQ.....Virginia Department of Environmental Quality
WVCA.....West Virginia Conservation Agency
WVDA ..... West Virginia Department of Agriculture
WVDEP.....West Virginia Department of Environmental Protection

INTRODUCTION

In response to the Executive Order for Chesapeake Bay Protection and Restoration (E.O. #13508, May 12, 2009), the United States Geological Survey (USGS) took on the task of acquiring, assessing and evaluating agricultural conservation data records for Chesapeake Bay farmland from the United States Department of Agriculture (USDA), and transferring those datasets to State jurisdictional agencies for use in reporting conservation progress to the Chesapeake Bay Program Partnership (CBP Partnership) Annual Progress Review. This report discusses the methods that were used in 2012 to collect and process USDA farmland conservation data, and also documents methods that were used by the USGS and the State jurisdictions to integrate Federal and State data records, reduce double counting, and provide an accurate report of conservation practices to the Annual Progress Review.

The Chesapeake Bay watershed includes parts of six State jurisdictions - Delaware (DE), Maryland (MD), New York (NY), Pennsylvania (PA), Virginia (VA), and West Virginia (WV) - as well as the District of Columbia (Figure 1). The Chesapeake Bay watershed extends over 64,000 square miles, and has the largest water-to-land ratio of any estuary in the world. Water quality is impaired in 98% of the Chesapeake Bay estuary and its tidal tributaries due to the impacts of human population, land use, and development. Agricultural land use has been identified as a large contributor of nutrient, sediment, and chemical non-point source pollution to the estuary. Accordingly, there is a large and coordinated effort to restore water quality thorough the use of conservation practices on agricultural lands. These practices can be implemented through financial assistance programs sponsored by USDA agencies, by the jurisdictions, or on a voluntary basis.

The Chesapeake Bay watershed State jurisdictions are required to report conservation practice implementation on an annual basis to the U.S. Environmental Protection Agency (EPA). While 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 Total Maximum Daily Load (TMDL) allocations for nitrogen, phosphorus, and sediment. The CBP Partnership's Annual Progress Review is used to assess to what extent the 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 and pollutant load reduction practices and treatment technologies for all pollutant source sectors: urban stormwater, wastewater, septic systems, air emissions, forestry, and agriculture. This report focuses on the agricultural conservation practices that are promoted by the USDA.

Concern was expressed by the USDA Natural Resources Conservation Service (NRCS) that agricultural load reductions were not being fully credited due to lack of consistent access to USDA conservation practice implementation data, and due to reporting inconsistencies among six Chesapeake Bay watershed jurisdictions. Accordingly, in 2010 the USGS was established as a USDA 1619 Conservation Cooperator through agreements (Appendix B) signed with the USDA NRCS and the USDA Farm Service Agency (FSA). This has allowed USGS staff to obtain and handle in aggregate Federal farmland conservation data records that are privacy protected as required by Section 1619 of the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill).

The USGS has now acquired and processed USDA conservation data for the 2012 reporting period (July 1, 2011 to June 30, 2012). The USDA data came from two sources: the FSA and the NRCS. The purpose of this report is to share the methodology that was used to 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 jurisdictions. The jurisdictions then chose whether to use these data directly in conservation reporting (DE, PA, WV), or to use existing jurisdictional 1619 agreements to obtain a parallel USDA dataset from local sources (MD, NY, VA). In

either case, the six jurisdictions established protocols for removing possible duplicate records for USDA and jurisdiction co-sponsored conservation practices, summarized the practices by county and practice type, and submitted the aggregated totals to the Annual Progress Review *via* their respective state National Environmental Exchange Network (NEIEN) data transfer nodes. From there, the data were processed through Scenario Builder and credited within the CBP Partnership's Watershed Model Phase 5.3.2.

A similar tracking, reporting, and assessment will occur in 2013, as State and Federal governments and non-governmental organizations continue to work with farmers and conservation districts to reduce the impacts of agriculture on local and Chesapeake Bay water quality. This report discusses the reporting of conservation practices that reduce nutrient and sediment loads from agricultural land. Washington, D.C. is not attributed with agricultural land so was not included in this analysis.

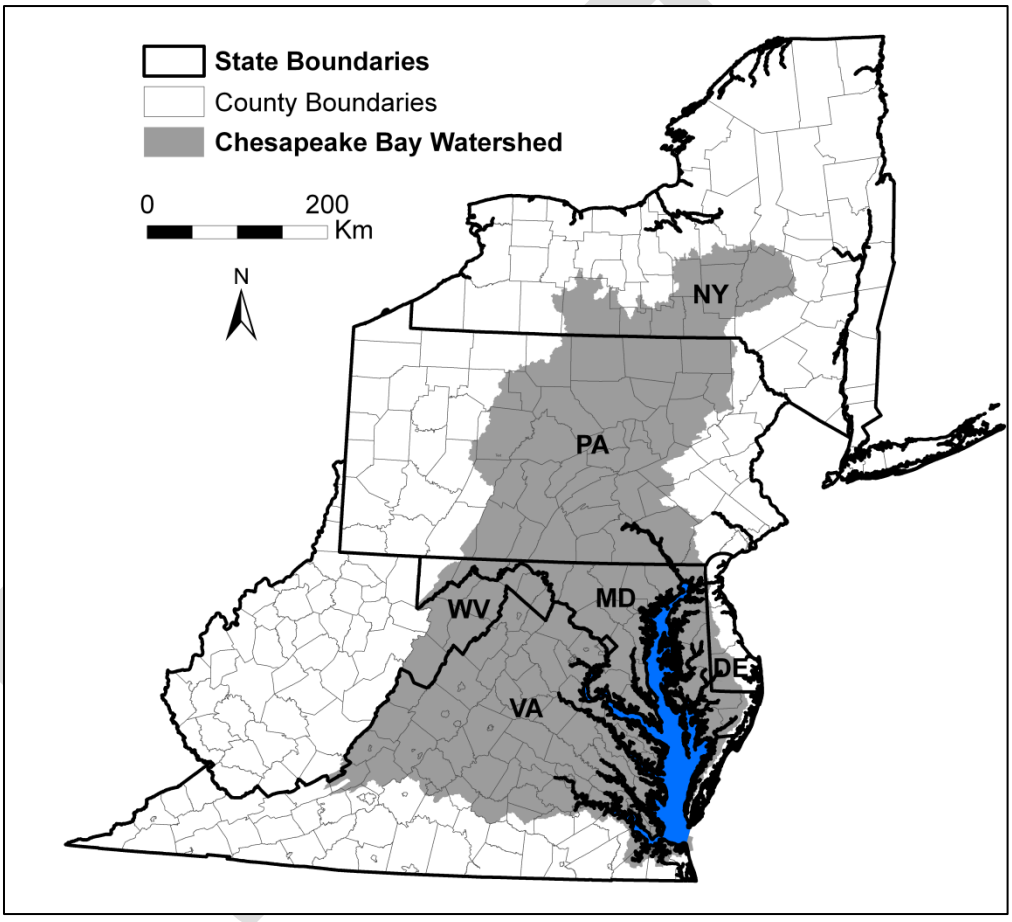

Figure 1: The Chesapeake Bay watershed (grey) with State jurisdictional borders (heavy black lines), and county boundaries (light black lines).

PURPOSE AND SCOPE

This project was initiated to provide consistency and completeness of conservation practice reporting among the six Chesapeake Bay watershed jurisdictions with agricultural lands. The USDA requested that USGS act as a facilitator and 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 facilitating communication and data transfer between the agencies responsible for implementation of Federal conservation programs (NRCS and FSA), the six watershed jurisdictions (DE, MD, NY, PA, VA, and WV), and the organization responsible for tracking progress towards attaining conservation goals (EPA and CBP Partnership). This was made possible by the signing of 1619 Conservation Cooperator Agreements between USGS and FSA and NRCS that allowed access to Federal conservation data while assuring the privacy of farmers as mandated under Section 1619 of the 2008 Farm Bill.

The objectives were to:

- Provide a consistent dataset of USDA financially-assisted agricultural conservation practices (NRCS and FSA) implemented throughout the Chesapeake Bay watershed jurisdictions along with consistent definitions for agricultural conservation practices
- Document the various methods used by the six watershed jurisdictions to obtain agricultural conservation data and address double counting where financial assistance jointly was provided through federal and state programs
- Provide a crosswalk between USDA conservation practices and the Chesapeake Bay Program Partnership's practice definitions
- Streamline the overall tracking and reporting process to reduce the workload by the jurisdictions
- Document and improve existing protocols to support ongoing adaptive management of conservation data reporting and agricultural conservation practice implementation on Chesapeake Bay watershed agricultural land

The first step in assisting with the reporting of USDA conservation practices was obtaining a comprehensive dataset. Each conservation record comprises a unique practice implementation on a single farm or field, and is associated with a practice code, amount applied, and a considerable variety of detailed information regarding the practice location and characteristics. To determine what data were required, USGS discussed with each jurisdiction the nature of potential duplication between the jurisdiction's data and USDA data. Once potential areas of duplicate reporting for each jurisdiction were identified, a list of USDA information that would be useful in identifying and eliminating double counting was compiled. This was added to the list of information that was necessary to achieve accurate reporting of conservation practices and to support linkage to the National Environmental Information Exchange Network (NEIEN) data interface and the Chesapeake Bay Program's Scenario Builder that is used to account for and credit conservation practices. Separate data requests for conservation practice information were designed and submitted to contact personnel at FSA and at NRCS.

Data were obtained in this manner for all farms within the Chesapeake Bay watershed that participate in USDA conservation programs. This method provided a consistent dataset covering all six watershed jurisdictions. The USDA conservation databases are complex, and different data requests can yield somewhat different information, depending on the timing and wording of the request. Using a single clear and documented protocol to provide data for all jurisdictions led to a streamlined process, further ensuring consistency and transparency among the jurisdictions.

Subsequent data processing steps were designed and documented to assure consistency, accuracy, and the ability to replicate the data extraction and processing in future years. Much of the data processing included removal of duplicate data. In addition, data aggregation was performed to protect farmer privacy. The methodology was developed through ongoing conversation with the six watershed jurisdictions, USDA agencies, and the larger Chesapeake Bay Program Partnership.

From this dialogue we developed and documented agreed upon jurisdiction-specific methods for incorporating USDA conservation data into the CBP Partnership's Annual Progress Review process. Three of the jurisdictions (PA, DE, and WV) chose to use the USGS-provided dataset for reporting USDA conservation practices to the Annual Progress Review. The others (MD, NY, and VA) instead chose to use locally-sourced USDA data, and used the USGS-provided data to validate the jurisdictional datasets that they used to track both Federal and State conservation practices, as supported by their jurisdictional 1619 Conservation Cooperator Agreements with the USDA. The methods employed in 2012 are documented here and shared with each watershed jurisdiction so that they may report USDA conservation data more easily, accurately, and completely in future years.

Tools that the USGS has provided to the six Chesapeake Bay watershed jurisdictions to facilitate their reporting of USDA farmland conservation data include:

- A consistent and complete database of FSA and NRCS conservation practices implemented within the Chesapeake Bay watershed (delivered to jurisdictions, aggregated data available upon request)
- A listing of useful information that can be obtained from the USDA conservation databases (Appendix D)
- A cross-walk between USDA practice codes and conservation practice categories used by the CBP Partnership (Appendix E)
- A USDA-approved methodology for data aggregation to protect confidential farmer information (Appendix B: attachment 9)
- Documentation of State-specific methods used for removing duplicate information records for practices that received financial assistance by both a jurisdiction and the USDA
- A review of existing language for 1619 Conservation Cooperator Agreements with suggested improvements to facilitate obtaining consistent and comprehensive access to USDA conservation data throughout the jurisdictions

DATA CONFIDENTIALITY – USDA 1619 CONSERVATION COOPERATOR AGREEMENTS

The conservation assistance that is provided to farmers by USDA is authorized under the 2008 Farm Bill, and Section 1619 of that bill (Appendix B: attachment 6) 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...". 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 the 1619 Conservation Cooperator agreements provides Cooperators with confidential access to the USDA's datasets of conservation practice information for use in their work. The data can be released to the public if it is aggregated so that farmer privacy is protected. 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, Appendix A) has authority to review and approve 1619 Conservation Cooperator agreements for both the FSA and NRCS. The NRCS agreements tend to specify that they

apply to both NRCS and FSA conservation information, so agencies do not necessarily have to sign agreements with both agencies to gain access to both NRCS practices and FSA managed data, which includes geospatial Common Land Unit (CLU) field boundaries as well as Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) practices.

SECTION 1619 AGREEMENTS – EXISTING LANGUAGE IN THE JURISDICTIONS

Four jurisdictions currently have USDA 1619 Conservation Cooperator agreements in place (MD, NY, VA, and WV). These various agreements each identify a similar overall purpose 'to provide conservation services or to monitor, assess, and evaluate conservation benefits,' but employ various language to describe 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 1). In practice, each of these agreements is functioning well in providing the jurisdictional agencies with access to NRCS and FSA data.

A good place to start in understanding 1619 agreements is the NRCS Attachment C (Appendix B), which has been signed in somewhat different forms by agencies in MD, NY, VA and WV. These agreements state that "Those individuals or organizations (governmental or nongovernmental) that assist NRCS with providing conservation related services are known as NRCS Conservation Cooperators." The four 1619 agreements that are currently in place between jurisdictional agencies and the NRCS are fairly consistent, apart from the wording of several key factors as described below—*for each of these factors, the broadest language is printed in italics*. It should be mentioned that, despite differences in language, the effective interpretation of the agreements by NRCS has been fairly broad and uniform, and was sufficient to provide full access to USDA data by the signatory jurisdictions in 2012.

Purpose: The agreements with MD, NY, and WV all begin by stating that each of the State signatory agencies *"assists NRCS in the delivery of conservation-related services (for example: services that sustain agricultural productivity, improve environmental quality, reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damage caused by floods and other natural disasters) or with monitoring, assessing, or evaluating of conservation benefits from USDA conservation programs."* In VA, this language is reduced to the simplest NRCS Attachment C language (Appendix B: attachment 3): "provide technical and/or financial assistance for USDA conservation programs."

Limits: The simplest NRCS Attachment C language, which is used by NY and WV, establishes that data access is limited to information necessary to "provide conservation related services." The MD agreement expands the language regarding data access to include information required to "*provide conservation related services and perform monitoring, assessing, or evaluating of conservation benefits."* In VA, data access is limited to information "necessary for the delivery of technical and/or financial assistance for conservation programs," and goes on to list six authorized technical assistance activities, including "compliance and status reviews."

Aggregation: In all four cases (MD, NY, VA, and WV)-the 1619 agreements establish that disclosure of protected information is allowed if "*the information has been transformed to statistical aggregate form without naming any owner, operator, producer, or data gathering site."* In most jurisdictional agreements this is stated explicitly, while for Virginia (Appendix B: attachment 3) it is established via reference to 'Section 1619 Attachment 1'. The Attachment C cooperators must consult with NRCS as to whether information is appropriately aggregated prior to releasing information.

Data: The existing 1619 agreements do not limit the types of data that are being made available, but do list example types of 'prohibited information' including 'all attributes for Common Land Units (CLUs) in USDA's Geospatial Information System. The existing agreements are interpreted by the FSA Privacy Officer John Underwood (Appendix A) as providing access to NRCS practice data along with CLU field boundaries and FSA CRP and CREP practice data. The broadest language currently recommended by the FSA Privacy Officer would read: "*The protected data types approved for disclosure are limited to: Fully attributed conservation practice tabular numerical and text data and geospatial information depicting NRCS and FSA conservation practices and Common Land Unit (CLU) data for the State of {state name}. The geospatial information provided will not include any producer/owner Personally Identifiable Information (PII). "*

Privacy: The agreements with MD and WV go on to explicitly state that *Section 1619 supersedes State "sunshine laws", "open records acts"* and *"the Freedom of Information Act".* All the states are encouraged to adopt consistent language into their existing or planned 1619 data sharing agreements to emphasize this point. Jurisdictions with laws stating that state acts supersede the Federal privacy regulations are not permitted to sign 1619 Conservation Cooperator agreements.

Access: Typically, the Attachment C language (see Appendix B) states that Conservation Cooperators may obtain USDA conservation data from the NRCS, or directly from farmers. The USGS agreements (see below) also state that *data can be obtained from other 1619 Conservation Cooperators*. However, the horizontal data transfer among states is not a desired functionality within state-specific 1619 data sharing agreements.

USGS SECTION 1619 AGREEMENTS FOR THE CHESAPEAKE BAY WATERSHED

The USGS was established as a USDA 1619 Conservation Cooperator in 2010, under separate agreements with the FSA ('Cooperative Agreement,' Appendix B: attachment 6) and the NRCS ('Cooperative Interagency Agreement,' Appendix B: attachment 7). These agreements contain particular language developed to support the broad USGS objective of facilitating jurisdictional access to agricultural conservation practice data for farmland within the Chesapeake Bay watershed.

Purpose: The agreements state that the USGS is "providing technical or financial assistance under a USDA program that concerns an agricultural operation, agricultural land, farming practice, or conservation practice."

Limits: The USGS is authorized to use the Federal conservation data in aggregate "to provide technical assistance, in the form of monitoring, assessment, and evaluation, of USDA Farm Bill Programs… by analyzing the impact of farming practices on water quality in the Chesapeake Bay watershed."

Aggregation: The 1619 agreements authorize the USGS to "release aggregated statistical information to Chesapeake Bay Program partner organizations and the public following review and approval by USDA of data aggregation procedures to ensure compliance with Section 1619." This wording allowed the USDA to approve the overall aggregation protocol rather than each aggregated data product (e.g., conservation practice data aggregated to the county scale, throughout the Chesapeake Bay watershed). A data handling procedure was developed by USGS and approved by the USDA (Appendix B: attachment 8), establishing that aggregate data for each particular conservation practice could be released to the public if five or more farm owner/operators were participating in a particular conservation practice within the aggregated area.

Access: Through its 1619 agreements the USGS is authorized to receive USDA data from the FSA, NRCS, individual farmers, or from other 1619 Conservation Cooperators. Through additional and explicit approval (Appendix B:

attachment 9) from the USDA Privacy Officer, the USGS was also authorized to transmit USDA data to specific 1619 Conservation Cooperators (the jurisdictional agencies with 1619 agreements in place).

Although some labor was involved in reconciling the wording of the various 1619 agreements and in receiving permissions to share data between USGS and the State agencies, the four jurisdictional agencies with 1619 Conservation Cooperator agreements in place (MD, NY, VA, and WV) were ultimately given access to the unaggregated (site-specific) USDA agricultural conservation practice data that were compiled by the USGS in 2012. In the case of the VA-DCR, due to the wording of their 1619 agreement this access was limited to two key individuals (Bill Keeling and Lawrence Fender, Appendix A).

Table 1: Status of 1619 Conservation Cooperator Agreements for each Chesapeake Bay jurisdiction. These agreements allow the use of the data in aggregate form or for furthering technical and financial assistance on the farm for producers who applied for voluntary conservation programs. See text for agency abbreviations. Two jurisdictions (DE, PA) do not currently have 1619 agreements in place.

Jurisdiction	Agency	Purpose	Limits	Data covered	Start date	End date
MD	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
NY	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
VA	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
WV	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
WV	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

DATA ACCESS FOR THE CHESAPEAKE BAY PROGRAM PARTNERSHIP'S ANNUAL PROGRESS REVIEW

Each jurisdiction has identified an agency responsible for submitting all conservation data to the CBP Partnership's Annual Progress Review, and these agencies work in partnership with additional jurisdictional and Federal agencies to collect and compile the necessary data, often funded in the process by Chesapeake Bay Regulatory and Accountability Program Grants (CBRAP).

DELAWARE

In Delaware, the Department of Natural Resources and Environmental Control (DE-DNREC) has full responsibility for reporting practices to EPA for use in the CBP Partnership's Annual Progress Review, including data submission through Delaware's state NEIEN node. Because Delaware does not have a 1619 data sharing agreement in place, in 2012 they relied upon the USGS to provide an aggregated dataset of USDA conservation practices which was then integrated with the jurisdictional database of State financially assisted agricultural conservation practices and urban stormwater and wastewater practices. The USDA data in previous years were acquired from the Delaware State NRCS Office in aggregated format.

MARYLAND

In Maryland, the Department of Agriculture (MDA) has been established as a 1619 Conservation Cooperator with the NRCS (Appendix B: attachment 1). Supported by this jurisdictional 1619 data sharing agreement, Maryland has developed an integrated 'Conservation Tracker' database that is used within each Service Center Office to document Federal, State, and non-governmental 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 data, joins it with additional jurisdictional databases documenting covering cover crops, manure transport, and nutrient management, and then transmits the aggregated data to Maryland Department of the Environment (MDE), which is the lead Maryland agency for operation and maintenance of Maryland's state NEIEN node.

NEW YORK

In New York, the Upper Susquehanna Coalition (USC) has been established as a 1619 Conservation Cooperator with the NRCS (Appendix B: attachment 2). The USC is comprised of various collaborators within the Soil and Water Conservation Districts serving the area of New York in the Chesapeake Bay watershed and currently has full responsibility for reporting practices for the CBP Partnership's Annual Progress Review, including data submission through the New York's state NEIEN node. Because the portion of New York that falls within the Chesapeake Bay watershed is relatively small, 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 NRCS and Cornell Cooperative Extension.

The USC's Soil and Water Conservation Districts organize the data within the New York's Agricultural Environmental Management (NY-AEM) framework that they use to track both State- and Federally-financed conservation practices. NY-AEM 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 Soil and Water Conservation Districts in a multi-faceted 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. While the NY-AEM 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 CBP 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) is in the process of being transferred from the USC to the NYS Department of Environmental Conservation (NY-DEC).

PENNSYLVANIA

In Pennsylvania, the Department of Environmental Protection (PA-DEP) has responsibility for reporting practices for the Chesapeake Bay Program Partnership's Annual Progress Review, including data submission through Pennsylvania's state NEIEN node. Because this agency does not have a 1619 agreement in place, in 2012 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.

VIRGINIA

In Virginia, the Department of Conservation and Recreation (VA-DCR) has been established as a 1619 Conservation Cooperator with NRCS (Appendix B: attachment 3) and has full responsibility for reporting practices, including data submission to the CBP Partnership's Annual Progress Review. Because VA-DCR does not have an integrated Federal-State data tracking system, Virginia obtains USDA conservation practice data by requesting it from the Virginia state NRCS office, where it is compiled by querying the NRCS Integrated Data for Enterprise Analysis (IDEA) database. This dataset is combined with the jurisdictional database of State-funded practices, and is aggregated prior to submission to the Annual Progress Review using node client software for reporting extensible markup language files. In 2013 responsibility for the Annual Progress review data submission is shifting from VA-DCR to the Virginia Department of Environmental Quality (VA-DEQ), and there is currently no 1619 agreement in place for that agency.

WEST VIRGINIA

In West Virginia, the Department of Agriculture (WVDA) has been established as a 1619 Conservation Cooperator with NRCS (Appendix B: attachment 4) but cannot share unaggregated conservation practice information with the Department of Environmental Protection (WVDEP), 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 (Appendix B: attachment 5). That agreement was recently renewed. Although West Virginia is a 1619 Conservation Cooperator (via WVDA and WVCA), due to NRCS staffing and priorities, WVDEP chose to rely upon the USGS to provide an aggregated dataset of 2012 USDA conservation practices that was then integrated with the jurisdictional database of State-funded practices and submitted through West Virginia's state NEIEN node.

RECCOMMENDATIONS FOR ENHANCING 1619 ACCESS TO USDA CONSERVATION DATA

To ensure that all six Chesapeake Bay watershed jurisdictions obtain full and complete access to all Federal financially assisted agricultural conservation practice data, we recommend that the Chesapeake Bay watershed jurisdictions: 1) adopt the broadest, most consistent language in each of the key factors identified above under the existing MD, NY, VA, WV, and USGS 1619 agreements; 2) institute 1619 data sharing agreements in DE and PA and for all jurisdictional agencies that have direct responsibilities for planning, funding, delivery, reporting, and/or submission of conservation practice data; and 3) establish a well-documented 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. Full jurisdictional participation in establishing 1619 Conservation Cooperator agreements is recommended because USGS is providing only short-term assistance only with obtaining and aggregating USDA conservation practice data, and the USGS-USDA 1619 Conservation Cooperator agreements are set to expire in 2015, by which time it is hoped that all jurisdictions will have established consistent direct access to USDA datasets.

In 2012, the USGS provided three of the Chesapeake Bay watershed states (DE, PA, and WV) with a database of USDA conservation practice implementation records that were aggregated by county, suitable for public release. This aggregation meets the 1619 requirements that protect agricultural producer identity. Specifically, practice implementation is only reported in aggregate form if five or more producers implemented the practice in a particular geographic area. Those data were integrated with the jurisdictional records of State-funded practices and submitted to the CBP Partnership's Annual Progress Review by each state through the respective state NEIEN node. The remaining three jurisdictions (MD, NY, and VA) had 1619 Conservation Cooperator Agreements in place, and chose to obtain USDA conservation data directly from the USDA and jurisdictional databases, without using the USGS-provided dataset.

Interestingly, the two jurisdictions with the most comprehensive 1619 agreements (MD and NY) have established jurisdictional integrated databases of Federal and State-sponsored agricultural conservation practices. This allows these states to directly track cost-shared conservation practices regardless of the source of financial assistance (state or federal) 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. This implies that Virginia might benefit from establishing a combined jurisdictional database of Federal and State practices. Currently, Virginia has the most laborious data submission, due to their use of record-by-record comparison for removal of double counted practices.

The following state agencies have established 1619 Conservation Cooperator Agreements with the USDA (Table 1) for the purpose of providing privacy-protected access to USDA conservation data:

- MD: Maryland Department of Agriculture (MDA)
- NY: Upper Susquehanna Coalition (USC)
- VA: Virginia Department of Conservation and Recreation (VA-DCR)
- WV: West Virginia Department of Agriculture (WV-DA)
- WV: West Virginia Conservation Agency (WV-CA)

Each jurisdiction has identified a key state agency with responsibility for submitting aggregated agricultural conservation practice data to the CBP Partnership's Annual Progress Review through their respective state's NEIEN node. Several of these agencies do not currently have 1619 Conservation Cooperator agreements in place, and rely upon obtaining aggregated conservation data from their collaborators:

- Delaware Department of Natural Resources and Environmental Control (DE-DNREC)
  Receives aggregated conservation practice data from the conservation districts and the USGS, and submits the data to the CBP Partnership's Annual Progress Review through the Delaware NEIEN node.
- Maryland Department of the Environment (MDE)

Receives aggregated conservation practice data from Maryland Department of Agriculture and submits the data to the Chesapeake Bay Program for the Partnership's Annual Progress Review through the Maryland state NEIEN node.

- New York Department of Environmental Conservation (NY-DEC)
  This agency will be assuming responsibility for submission of data to the New York NEIEN node, working in partnership with the Upper Susquehanna Coalition.
- Pennsylvania Department of Environmental Protection (PA-DEP)
  Receives aggregated conservation data from conservation program leads, conservation districts and the USGS and submits the data for the Chesapeake Bay Program 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 (VA-DEQ)
  This agency is assuming responsibility for the Annual Progress Review from the VA-DCR, and a number of conservation programs are also in the process being transitioned from VA-DCR to VA-DEQ following recently enacted legislation. The implications for 1619 data access in Virginia are currently unclear, pending final transition of programmatic responsibilities between the two agencies.
- West Virginia Department of Environmental Protection (WVDEP)
  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 CBP Partnership's Annual Progress Review through West Virginia's state NEIEN node.

There are several additional agencies that are involved in conservation planning, funding, and reporting that do not have 1619 data sharing agreements in place:

- Delaware Department of Agriculture (DE-DA)
  This agency currently provides aggregated jurisdictional records to the DE-DNREC for use in reporting to the CBP Partnership's Annual Progress Review
- Delaware Forest Service (DE-FS)
  Promotes forestry conservation practices with USDA financial assistance
- West Virginia Conservation Agency (WVCA)
  This agency has established a 1619 agreement covering animal waste and mortality only. The agency currently provides aggregated conservation data to WVDEP.

In support of the NRCS Chesapeake Bay Watershed Initiative, the NRCS has encouraged jurisdictional conservation agencies that do not have 1619 agreements in place to request to establish one. When considering signatories for 1619 agreements, it is important to consider all 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. We recommend that each of the listed jurisdictional agencies in Table 2 work to establish 1619 agreements to gain access to privacy-protected USDA conservation data records, for use in conservation data reporting to the Annual Progress Review and to further conservation technical and financial assistance for agricultural producers. This list does contain regulatory agencies including DE-DNREC, MDE, NY-DEC, PA-DEP, VA-DEQ, and WV-DEP, although some of these agencies also provide conservation technical assistance. The NRCS has stated that 1619 agreements will not be

provided to regulatory agencies. However, it may be possible to specifically limit access to the few key individuals within those agencies who are responsible for conservation data reporting. Establishing a comprehensive set of 1619 agreements for all jurisdictions would help to solve many technical details involved in accurate reporting of Federal and State progress toward implementing agricultural conservation practices. In the absence of 1619 Conservation Cooperator status, the jurisdictional agencies can work to develop more effective, consistent, and well-documented methods of obtaining aggregated conservation data from collaborating agencies that are 1619 Conservation Cooperators, and smoothly integrating these data with jurisdictional datasets.

In the process of establishing and maintaining 1619 Conservation Cooperator agreements, specific protocols should be established to safeguard the privacy of farm data. This can include limiting access to a specific group of individuals within each agency who have a 'need to know' in the course of their duties (reporting implementation progress; providing technical assistance for agricultural conservation programs). The development of 1619 agreements with all of the agencies listed in Table 2 would greatly increase the capacity for integrated analysis and reporting of agricultural conservation implementation. Furthermore, it would support the use of a single data request to obtain USDA data for all jurisdictions, which would promote equity in conservation data reporting across the Chesapeake Bay watershed.

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 jurisdictions a greater capacity for analysis and understanding of agricultural conservation practice implementation across the landscape, to support the adaptive management of conservation programs and promote success in attaining water quality goals. The reporting aspect is also important, as it will assist the jurisdictions in coordinating the development of knowledge to understand and document progress toward water quality goals.

Table 2: State agencies recommended to consider participation in 1619 data sharing agreements, to increase the capacity for consistent, integrated analysis and reporting of conservation practice implementation data for the Chesapeake Bay watershed.

Jurisdiction	Agency	Status
DE	DE-DNREC	responsible for NEIEN submission
	DE-DA	provides conservation services
	DE-FS	provides conservation services
MD	MDA	1619 Conservation Cooperator
	MDE	responsible for NEIEN submission
NY	USC	1619 Conservation Cooperator
	NY-DEC	responsible for NEIEN submission
PA	PA-DEP	responsible for NEIEN submission*
	PA-DA	provides conservation services
VA	VA-DCR	1619 Conservation Cooperator
	VA-DEQ	responsible for NEIEN submission
WV	WVCA	1619 Conservation Cooperator**
	WVDA	1619 Conservation Cooperator
	WVDEP	responsible for NEIEN submission

ADOPTING CONSISTENT LANGUAGE FOR 1619 AGREEMENTS

Currently, the sharing of data between Federal and jurisdictional agencies requires USDA to review each specific 1619 Agreement, which is time intensive for USDA staff, and could result in differing interpretations regarding data access among the jurisdictions. Adopting consistent 1619 language for each of the key points that we have identified (Purpose, Limits, Aggregation, Data, and Access) would help to streamline the process.

The development of a multi-organizational 1619 Conservation Cooperator Agreement was first proposed to the CBP Partnership at the September 12, 2012 Best Management Practice (BMP) Verification Committee meeting (http://www.chesapeakebay.net/calendar/event/18557/). The proposal was well received by both the jurisdictions and other members of the BMP Verification Committee, and steps were taken to further explore the creation of a multi-organizational agreement.

A multi-organizational 1619 Conservation Cooperator agreement would have several benefits, including:

1. Simplification for USDA, USGS, and jurisdictional staff (one data request rather than many)
2. Consistency of data (supporting uniform reporting throughout the Chesapeake Bay watershed)
3. Increasing access to unaggregated, farm-specific data (to increase capacity for analysis of conservation implementation to support adaptive management of conservation programs)

At the March 13, 2013 meeting of CBP's BMP Verification Committee (http://www.chesapeakebay.net/S=0/calendar/event/19218/) the Committee decided "not to pursue a single six-state 1619 agreement, but instead seeking all six states' signing their own individual 1619 agreements with NRCS and FSA. The bottom line objective remains the same: ensuring that all six states have full access only to all financially-assisted federal 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. The data are only released in aggregate form to protect the confidentiality of agricultural producers. The Committee agreed to recommend to the Partnership 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 financially assisted practice data." The NRCS has encouraged all interested agencies to engage in dialogue with their State Conservationists to discuss the establishment of 1619 Conservation Cooperator agreements.

A draft template 1619 Conservation Cooperator agreement that includes recommended language for establishing privacy protected access to USDA conservation data by a Chesapeake Bay watershed jurisdictional agency is currently being reviewed by FSA Privacy Officer John Underwood (Appendix A) and will be attached to the final version of this report.

1619 DATA SHARING AGREEMENTS: RECOMMENDATIONS

DELAWARE

Delaware does not currently have a 1619 data sharing agreement. We recommend supporting efforts to establish an agreement between USDA and the Delaware Department of Natural Resources and Environmental Control (DE-DNREC), 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. We recommend adopting the broadest and most up to date language for each key factor of the 1619 agreement: purpose, limits, aggregation, privacy, and access.

MARYLAND

We recommend that the Maryland continue to operate under its existing MDA 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.*" We also recommend that the jurisdiction consider establishing 1619 status for 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 MDA, to check for accuracy and identify any useful information that one or the other of the datasets might be missing.

NEW YORK

The Upper Susquehanna Coalition 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. However, responsibility for receiving data from the USC and making the Annual Progress Review data submissions via New York's NEIEN node is transitioning from USC to the New York State Department of Environmental Conservation (NY-DEC). We recommend that NY-DEC consider establishing a 1619 data sharing agreement modeled after the existing USC agreement, or become a signatory to the USC 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*").

PENNSYLVANIA

Pennsylvania does not currently have a 1619 Conservation Cooperator agreement in place. We recommend supporting efforts to establish an agreement between USDA and the PA-DEP, adopting the broadest and most up to date language for each key factor of the 1619 agreement: purpose, limits, aggregation, privacy, and access. Because PA-DEP 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. Alternatively, 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 PA-DEP, as well as to strengthen their infrastructure for providing conservation planning and implementation. We also recommend that the PA-DA, which provides additional conservation services, consider establishing a 1619 agreement.

VIRGINIA

We recommend that Virginia continue to operate under its existing VA-DCR 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 VA-DCR who are permitted access to the data, depending on who is responsible for the 2013 Annual Progress Review. We also recommend that VA-DEQ consider establishing a 1619 agreement, particularly since the 2012 point person for conservation data handling is moving from the PA-DCR to the PA-DEQ. Since PA-DEQ is a regulatory agency, any agreement should limit access to those individuals that are directly involved in conservation data reporting.

WEST VIRGINIA

We recommend that West Virginia continue to operate under its existing WV-DA 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*"). We also recommend that the WV-CA and the WV-DEP consider establishing 1619 agreements to promote consistent access to conservation data. Because the latter is a regulatory agency, any agreement should limit access to those individuals that are directly involved in conservation data reporting.

However it is achieved, whether agency-by-agency or through multi-organizational agreements, adopting consistent and thorough language for 1619 Conservation Cooperator agreements for all relevant jurisdicitional conservation agencies would greatly assist 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 among the jurisdictions in reporting of USDA conservation data for Chesapeake Bay farmland.

DATA COLLECTION AND PROCESSING

In 2012, the USGS obtained USDA conservation data for NRCS and FSA programs, and provided these data to the six Chesapeake Bay jurisdictions to support their reporting of conservation practice implementation to the CBP Partnership's 2012 Annual Progress Review. The methods used are detailed in this report. The data collection and processing steps required of the USGS included:

- Obtaining the data from USDA agencies (NRCS, FSA);
- Cleaning the USDA dataset to remove internal duplication;
- Aggregation of data to ensure producer privacy;
- Establishing a crosswalk between USDA and Chesapeake Bay Program practice definitions;
- Transmittal of the data to each jurisdiction for use in the reporting process; and
- Communication with each jurisdiction to establish and document solutions for avoiding double counting of practices.

The jurisdictions integrated USDA data with their state reporting systems, removed duplicate records, and delivered aggregated summaries of 2012 conservation practice implementation (new practices implemented

between July 1, 2011 and June 30, 2012) to the CBP Partnership's Annual Progress Review. The jurisdictions report conservation data from all nutrient and sediment pollutant source sectors. For agriculture, they can choose to report USDA conservation practices either from the data provided by USGS or from the jurisdiction's own data sources (site-specific data obtained from state NRCS offices under jurisdictional 1619 agreements, or aggregated totals received from the collaborating jurisdictional agencies that are responsible for practice implementation). The deadline for reporting 2012 data to the Annual Progress Review was December 31st. However, the deadline for 2013 is December 1st, a month earlier.

IMPLEMENTING AGRICULTURAL CONSERVATION PRACTICES

A farmer may have a variety of reasons for choosing to adopt agricultural conservation practices, including regulation (e.g., compliance with management requirements for highly erodible land or concentrated animal feeding operations), incentives (financial assistance for various practices), or stewardship. The typical flow of business begins with a field technical staff person working with a farmer to design and implement recommended conservation practices. The Service Center Offices that are found in nearly every county of the Nation are typically staffed by a mixture of employees working for NRCS, county conservation districts, and State conservation agencies. Additional conservation support can be provided by the FSA, university extension, private agricultural technical service providers, and non-governmental organizations.

Once a practice or set of practices is recommended, designed, and selected by the farmer, available funding sources may be determined. In some jurisdictions, and for some practices, financial assistance may only be available from USDA programs. Other jurisdictions may provide financial assistance for specific practices from State agencies, and private funds are sometimes available from sponsored programs. Additionally, everywhere financial assistance is provided, farmers may provide a significant portion of the cost. Funding availability is practice specific, and some practices are considered higher priority in certain locations and in certain years.

Conservation practices generally can be separated into two classes: structural practices, in which engineered improvements such as improved barnyards, stream crossings, manure storage structures, and filtration swales are expected to last for several-to-many years; and management practices such as cover crops and nutrient management that are expected to last only for one or three years, after which it is hoped that farmers will continue the practices on their own. Indeed, for most management practices it is the NRCS perspective that funding is designed to help a farmer through the adoption phase of new best management practices, after which the farm will be prepared continue the practice using only on-farm resources. The FSA conservation practices (funded under the CRP and the CREP) generally cover fencing, vegetative cover (grass, shrubs and trees), and set-asides of critical natural habitat and near-stream areas, with contracts lasting ten years or more.

Once a farm owner/operator commits to implementing a conservation practice, funding is identified, and the farmer determined to be eligible for the program, then a contract is signed and the practice is implemented and inspected according to established guidelines. Depending on the source of funds, the pertinent information (farmer, contract, location, and practice details) is recorded into one or more jurisdictional and/or USDA databases by an employee of the conservation district, NRCS, and/or the FSA.

DOCUMENTING AGRICULTURAL CONSERVATION PRACTICES

For FSA, conservation data records for new Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) practices are collected on a monthly basis from county FSA offices, rolled up

through FSA state coordinators, and reported to the Aerial Photography Field Office (http://www.fsa.usda.gov/FSA/apfoapp?area=apfohome&subject=landing&topic=landing). The records contain a practice code, applied date, and various implementation details and metrics.

For NRCS, conservation data records are entered into integrated agency business tools into relational databases (Figure 2) by NRCS field office staff. NRCS customer data originates with the USDA Service Center Information System (SCIMS) data. The Conservation Toolkit planning information is stored in the National Conservation Planning (NCP) database. The NRCS ProTracts system is the repository for the financial contract information for EQIP, AMA and WHIP. Progress data is recorded primarily in the Performance Results System (PRS) database. The ProTracts data and PRS data are also linked to the NCP database to track common data. For the purposes of this project, the data stored in the NCP database were most appropriate. A similar (but not identical) dataset can also be obtained using the Integrated Data for Enterprise Analysis (IDEA) interface that combines data from multiple NRCS software systems. This project worked with tabular data that was queried from the NCP database by David Butler (Appendix A), at the NRCS Information Technology Center, in Fort Collins, Colorado.

The jurisdictions also keep independent conservation tracking systems. Some jurisdictions, like Maryland (Conservation Tracker database) and New York (Agricultural Environmental Management database), require all NRCS and FSA financially-assisted practices to be entered into jurisdictional data tracking systems by Service Center Office staff, along with state-funded practices and practices for which the Service Center Office has provided conservation technical assistance without financial assistance. The other jurisdictions (DE, PA, VA, and WV) do not have state-wide combined reporting and tracking systems. Most of these jurisdictions maintain conservation data tracking systems that partially overlap with USDA databases, depending on the particular practice. Discussion of processes employed to remove duplicate data follows in later sections.

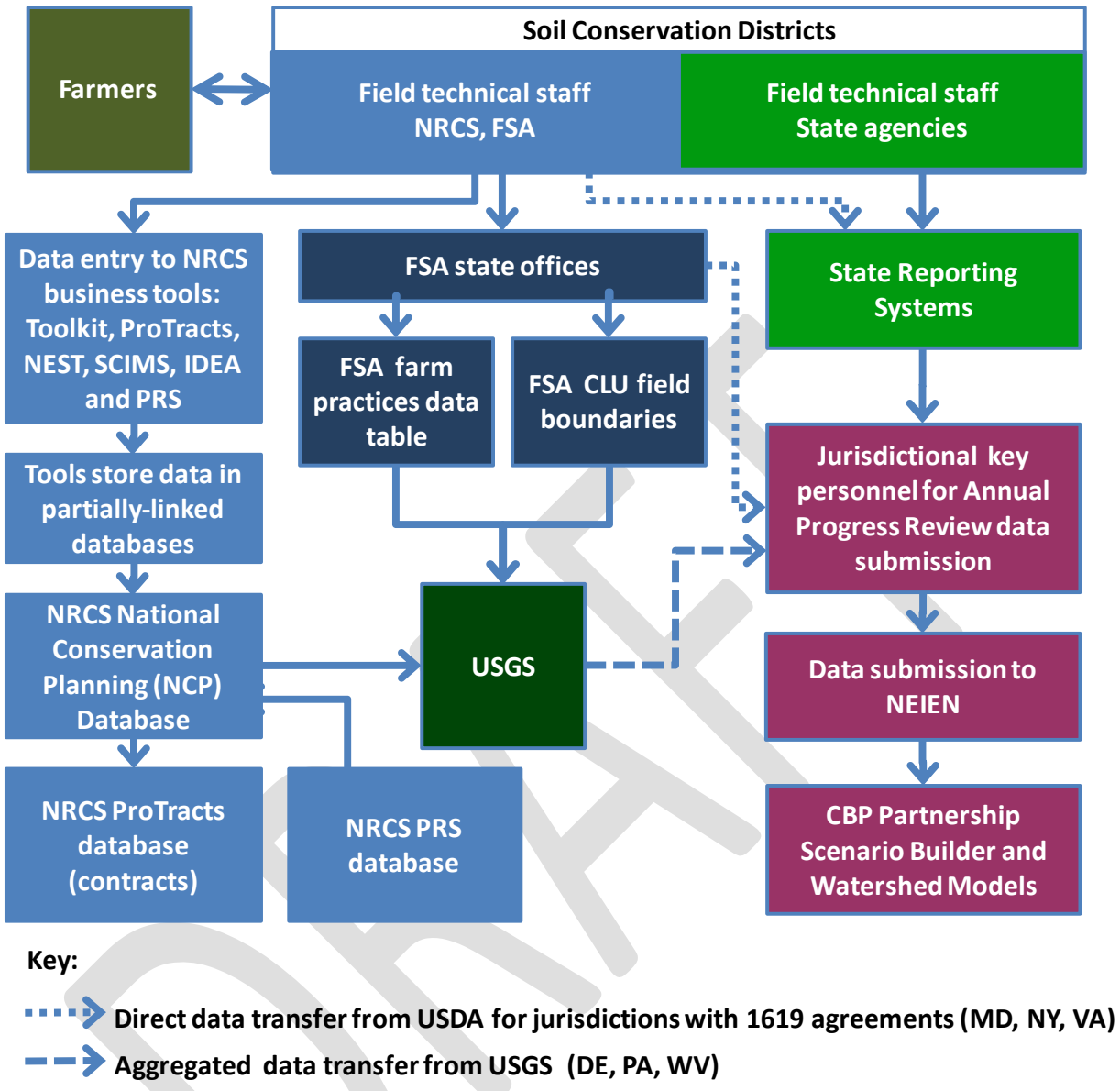

Figure 2: Flow diagram of USDA conservation data collection and reporting strategies

OBTAINING USDA AGRICULTURAL CONSERVATION PRACTICE DATA

In 2010, 1619 Conservation Cooperator agreements (Appendix B: attachments 6, 7) were signed between the USGS and USDA agencies (NRCS and FSA) allowing USGS access to conservation data records for all farms in the Chesapeake Bay watershed. This was interpreted to include every county that intersects or falls within the Chesapeake Bay watershed boundary (Figure 1). Under the authority of these agreements, USGS requested datasets from FSA and NRCS, with the primary objective of obtaining data for practices implemented within the 2012 Progress Reporting Year (July 1, 2011 to June 30, 2012), and the secondary objective of obtaining as many recent years of quality data as were readily available. Considerable discussion with various State and Federal contacts (Appendix A) was required, in order to determine the specific information to be included in each data request.

FSA DATA

The USGS requested data from FSA on August 8, 2012 (Appendix C: 2). Updates to the national FSA databases are made monthly on a rolling basis, and the best timing to obtain a database of practices implemented through the end of the each progress year (June 30) appears to be to make the request after the July monthly update has occurred (August 1). There is no particular benefit in waiting until the end of the Federal fiscal year (September 30) to make a data request.

The FSA data came from two parallel sources:

1) The FSA Farm Practices Dataset ("UnaggregatedFSAPracticeDataByState") was obtained on August 29th, 2012, from Barbara J. Clark (Appendix A) in the FSA Kansas City office. It included two spreadsheets of information: Practices and Customers. The six critical information fields used for data reporting included: county (FIPS), practice applied date (OriginalCRPStartDate), practice code (PracticeCode), acreage (PracticeAcres) and customer (CustNo), and contract number (ContractID). The dataset included FSA financially assisted applied CRP and CREP practices on agricultural land within the six-state area, with records going back to 2000. It did not include practices where federal financial assistance was not provided.

This dataset contained 1,212 records of practices that were applied between July 1st, 2011 and June 30th, 2012 (Table 3) in counties that intersect or fall within the Chesapeake Bay watershed. The data were aggregated by county to protect farmer privacy, and the information was delivered to the State jurisdictions for possible use in conservation reporting. The number of reportable records by jurisdiction is presented in Table 3. It was not necessary to use contract lifespan (YearContractEnd) to determine whether practices had expired, since we were tabulating only new practice implementation for each of the past three years, rather than all practices under active contracts, and the minimum lifespan of a CRP or CREP contract is 10 years. See Appendix D for a listing of FSA the individual conservation practices that were contained in the dataset.

Table 3: Number of practices in the USGS-delivered 2012 Farm Services Administration (FSA) dataset

	DE	MD	NY	PA	VA	WV	Total
	#	#	#	#	#	#	#
Original FSA records*	49	1046	122	1577	331	37	3162
minus duplicate records**	21	413	54	551	150	23	1212

* Obtained from FSA Aug 29, 2012

** Cleaned to remove internal duplication resulting from tabular joins

2) The FSA Geospatial Dataset, delivered by Dave Perry (Appendix A), included annotated shape files of Common Land Use (CLU) field boundaries, and a database file containing limited information on CRP and CREP enrollment for each county. This dataset included all existing practices, but did not include a practice applied date. The CLU shape files can be linked to the FSA Farm Practices tabular dataset by using the unique identifier CLU_ID that is present in both datasets. However, the practice information contained in the shape files is otherwise not as useful as the tabular Farm Practices dataset. In 2012, the CLU geospatial dataset was archived and transmitted to USGS 1619 collaborators for use in watershed studies, but was not used for reporting purposes.

NRCS DATA

The USGS received data from the NRCS on October 19, 2012 after the close of the federal fiscal year (September 30th). There are system updates that occur at the end of each fiscal year, and the most complete dataset is available once those updates are complete. We therefore recommend that the NRCS data be drawn from the National Conservation Planning (NCP) dataset [Figure 2] in mid-October of each year. This requires beginning the paperwork for the data request several months prior (recommend June or July), working in collaboration with an NRCS counterpart who will officially author the data request (this counterpart was Arlen Ricke in 2012, recommend Rich Sims in 2013, Appendix A).

While the data request can be simple (Appendix C: 3), it is important to identify the full range of desired Farm Bill contract programs to be included (Table 4). In 2012 it was sufficient to identify Conservation Technical Assistance and the full range of the NRCS Chesapeake Bay Watershed Initiatives, but as databases are updated and changed over time, it may be necessary in the future to name the individual programs for which data are needed. Although it is not required in the formal data request, it is also necessary to communicate the breadth of data categories being requested (Appendix C: 1) to the NRCS point of contact (David Butler, Appendix A), in order to obtain sufficient information to adequately address double counting and accurately credit conservation practices within the Chesapeake Bay model.

In response to the 2012 request, NRCS provided data going back to 2006, the earliest year from which digital data management has been consistent. The key contact person who prepared and delivered the NRCS dataset was Dave Butler (Appendix A). The data was delivered in a SQL Server database back up file. The database, was organized into five tables: Practices, PlanCustomers, PlanAgencyAffiliation, Contracts, and ContractCustomers (Appendix C: 1). Database operations were performed using SQL Server.

Because each NRCS conservation practice comes with a Practice_Applied_Date, it is possible to select the records that were implemented in a specific annual reporting period (July 1 – Jun 30). Each practice type is identified by a unique practice code that is described in USDA technical documentation, and each practice code has an associated practice lifespan (Appendix D: 1). Although the lifespan is not necessarily an accurate identifier of whether a practice is functioning vs. decrepit, it does represent the average time period that NRCS expects the practice to be functional. In 2012, lifespan was not used to select or remove records from consideration, because records were selected based implementation date (Practice_Applied_Date) within a single yearly time span (July 1 – June 30), and all practices have an associated lifespan of at least one year.

Each NRCS data record contained an identifier for sponsoring program (contract_program_name). The number of records per program and state contained in the dataset is listed in Table. In addition to funded programs, the NRCS also maintains records for practices that have received Conservation Technical Assistance (CTA) without financial assistance dollars from NRCS. There is currently some debate about how accurate the CTA data are, with several NRCS collaborators expressing their opinion that CTA data entry is not consistently maintained across counties and jurisdictions, and recommending that the CTA data not be used in the Annual Progress Review, because of the questions regarding data accuracy. However, other NRCS collaborators have expressed the opinion that CTA activities are only entered when the practices meet NRCS standards and specifications. The CTA entries can cover certified practices that are fully farmer-funded and for which NRCS provides technical oversight, such as often occurs within the Plain Sect farm community, which might otherwise go unreported. They can also include practices that are cost-shared by other agencies and therefore present a risk of double counting. Further discussion is warranted, to develop a policy regarding use and handling of CTA data. These records might be a useful measure of conservation practices implemented without Federal financial assistance, but without

confirmation that they meet the NRCS practice standards and specifications, the CBP Partnership currently does not currently allow them to be credited in the Annual Progress Review. The CTA practices are identified by contract_program_name = "Conservation Technical Assistance-General". These practices were included as a separate table in the aggregated dataset for informational purposes, but the jurisdictions were instructed not to report them to the CBP Partnership's Annual Progress Review. The CTA practices ranged from eight percent (Delaware) to 61% (Maryland) of total USDA conservation data records (Table 4).

Table 4: Number of USDA conservation practice records within each contract program, after removal of duplication between NRCS and FSA datasets (cleaned). These totals include all practices within counties that intersect or are contained within the Chesapeake Bay watershed and are for the 2012 progress year (July 1, 2011-June 30, 2012).

REMOVING DUPLICATION BETWEEN NRCS AND FSA DATA SOURCES

contract_program_name	DE	MD	NY	PA	VA	WV
Agricultural Management Assistance	32	130	42	144	0	24
Agricultural Water Enhancement Program	0	0	322	0	2	0
Chesapeake Bay Watershed Initiative	323	5911	164	2607	6746	505
Conservation Reserve Program	70	628	45	147	396	5
Conservation Security Program	0	0	0	0	10	0
Conservation Stewardship Program	0	0	0	4	2	0
Conservation Technical Assistance - Ge	531	16110	3049	6310	15569	1165
CTA - Great Lakes Restoration Initiative	0	0	1	6	0	0
DE-SL-District Cost Share Program	3433	9	0	0	0	0
DE-SL-District Cost-Share Funded	1420	0	0	0	0	0
Emergency Conservation Program	0	0	0	0	34	12
Environmental Quality Incentives Program	1032	3036	2385	2845	2482	1195
Grassland Reserve Program	0	0	28	1	8	0
MD-CE-Grazing Lands Conservation Init	0	2	0	0	0	0
MD-SL-MACS CostShr or Prog Admin - CTA	0	119	0	0	0	0
MD-SL-MACS-EQIP Co-Costshare	0	59	0	0	0	0
MD-SL-MACS-WHIP Co-Costshare	0	7	0	0	0	0
MD-SL-MACSGLC	0	11	0	0	0	0
PA-CE-Tuplehocken Creek	0	0	0	1	0	0
Small Watershed Operations	0	0	0	49	0	0
VA-CE-Chesapeake Bay Activities	0	0	0	0	184	0
VA-RN-DCR	0	0	0	0	5	0
VA-RN-DCR/SWCD BMP	0	0	0	0	6	0
VA-SL-GLCI	0	0	0	0	11	0
VA-SL-US-CTA-VAAGBMP	0	0	0	0	32	0
Wetlands Reserve Program	4	8	29	11	16	2
Wildlife Habitat Incentives Program	25	49	305	273	395	259
WV-CE-Chesapeake Bay Program	0	0	0	0	0	48
FSA (CRP and CREP)	21	413	54	551	150	23
Total	6,891	26,492	6,424	12,949	26,048	3,238
% CTA (Conservation Technical Assistance)	8%	61%	47%	49%	60%	36%

Once tabulated, the USDA conservation practice datasets were analyzed to identify potential duplication between the NRCS and FSA data. Possible duplication was identified for practices that were funded by FSA but for which conservation technical assistance (CTA) was provided by NRCS (Table 5). These practices, which included NRCS practice codes: 327, 332, 380, 386, 391, 393, 412, 512, 610, 612, 643, 656, 657, 658, and 659, were retained in the FSA dataset and were removed from the NRCS dataset. This removal of records did not affect the NRCS dataset that was ultimately reported to the CBP Partnership, because conservation technical assistance data were summarized for information only, and were not reported to the Annual Progress Review. After cleaning and removal of FSA-NRCS duplicates, the remaining records (Table 3) comprised the unaggregated USDA conservation practices dataset.

Table 5: List of practices where FSA provided financial assistance and NRCS provided technical assistance.

FSA	FSA Description	NRCS	NRCS Description
CP 18C	Permanent Salt Tolerant Vegetative Cover	327	Conservation Cover
CP 37	Duck Nesting Habitat	327	Conservation Cover
CP1	Permanent Introduced Grasses and Legumes	327	Conservation Cover
CP2	Permanent Native Grasses	327	Conservation Cover
CP27	Farmable Wetland Pilot Wetland	327	Conservation Cover
CP28	Farmable Wetland Pilot Wetland Buffer	327	Conservation Cover
CP33	Habitat Buffers for Upland Birds	327	Conservation Cover
CP42	Pollinator	327	Conservation Cover
CP4B	Wildlife Habitat Corridors Noneasement	327	Conservation Cover
CP4D	Wildlife Habitat Noneasement	327	Conservation Cover
CP15A	Contour Grass Strips	332	Contour Buffer Strips
CP15B	contour Grass Strips on Terraces	332	Contour Buffer Strips
CP16A	Shelterbelt Establishment	380	Windbreak/Shelterbelt Establishment
CP17A	Living Snow Fences, Noneasement	380	Windbreak/Shelterbelt Establishment
CP5A	Field Windbreak Establishment	380	Windbreak/Shelterbelt Establishment
CP33	Habitat Buffers for Upland Birds	386	Field Border
CP22	Riparian Buffer (forested)	391	Riparian Forest Buffer
CP21	Filter Strips	393	Filter Strip
CP8A	Grass Waterways, Noneasement	412	Grassed Waterway
CP1	Permanent Introduced Grasses and Legumes	512	Forage and Biomass Planting
CP2	Permanent Native Grasses	512	Forage and Biomass Planting
CP27	Farmable Wetland Pilot Wetland	512	Forage and Biomass Planting
CP28	Farmable Wetland Pilot Wetland Buffer	512	Forage and Biomass Planting
CP33	Habitat Buffers for Upland Birds	512	Forage and Biomass Planting
CP 18C	Permanent Salt Tolerant Vegetative Cover	610	Salinity and Sodic Soil Management
CP18B	Permanent Vegetation to Reduce Salinity	610	Salinity and Sodic Soil Management
CP3	Tree Planting	612	Tree/Shrub Establishment
CP31	Bottomland Timber Establishment of Wetlands	612	Tree/Shrub Establishment
CP36	Longleaf Pine - Establishment	612	Tree/Shrub Establishment
CP3A	Hardwood Tree Planting	612	Tree/Shrub Establishment
CP4B	Wildlife Habitat Corridors Noneasement	612	Tree/Shrub Establishment
CP4D	Wildlife Habitat Noneasement	612	Tree/Shrub Establishment
CP25	Rare and Declining Habitat	643	Restoration and Management of Rare and Declining Habitats
CP12	Wildlife Food Plot	645	Upland Wildlife Habitat Management
CP39	Constructed Wetland	656	Constructed Wetland
CP23	Wetland Restoration	657	Wetland Restoration
CP23A	Wetland Restoration non-floodplain	657	Wetland Restoration
CP27	Farmable Wetland Pilot Wetland	657	Wetland Restoration
CP41	FWP Flooded Prairie Wetland	657	Wetland Restoration
CP9	Shallow Water Areas for Wildlife	657	Wetland Restoration
CP40	FWP Aquaculture Wetland Restoration	658	Wetland Creation
CP40	FWP Aquaculture Wetland Restoration	659	Wetland Enhancement

DATA AGGREGATION TO PROTECT FARMER PRIVACY

According to the USGS Data Handling Agreement (Appendix B: attachment 8) that was approved by USDA Privacy Officer John Underwood (Appendix A), aggregated totals can be reported to the public when five or more farmers are enrolled in a particular conservation practice, within a particular geographical area (this is the simplest interpretation, and the one that was used by this project; see Appendix B: attachment 8 for the more nuanced language). Where there are fewer than five farmers implementing a specific practice, the practice must be reported at a larger geographical scale or go unreported. For the 2012 data submission, it was decided to

aggregate the USDA dataset to the county level. Therefore, any conservation practices that were employed by more than five farmers in a given county were reported by county.

To test this for NRCS data records, Practice_Code was joined to Customer_ID and the number of unique Practice-Customer combinations per county was counted. When one farmer implemented multiple instances of the same practice (e.g., application of the same practice to multiple fields), the farmer-practice combination was counted only once. If the total number of farmers per practice code was greater than four, then the total number of acres or units of that particular practice (report_applied_amount) was calculated and reported as an aggregated total.

Whenever there were fewer than five farmers in a county participating in a particular practice, those records were rolled up to the state geographical scale, at which point they were reported if more than five farmers were participating in these practices among all of the 'leftover' records. Only data from counties that fell within or intersected the Chesapeake Bay watershed were included. If fewer than five farmers were participating in these 'leftover' practices at the state level, the data were not reported.

For each CRP and CREP practice, the FSA data were aggregated by joining Practice Code with Customer Number, then selecting distinct records of Practice Code, Customer Number, and Contract Number, and the total number of Practice Acres was reported at either the county or statewide scale for practices with five or more participating customers, following a similar logic to that employed for the NRCS dataset. The output of these protocols comprised the aggregated dataset.

TRANSMITTAL OF DATASETS TO THE STATE JURISDICITONS

Practices implemented during the three progress years of 2010, 2011, and 2012 were provided to each jurisdiction and identified by the progress year (July 1 to June 30) in which they were implemented. The aggregation protocol was applied separately to data from each progress year. The CBP Partnership has indicated that the history of reported conservation practices prior to 2010 is not eligible to be updated by the jurisdictions through NEIEN. For the 2012 Annual Progress Review, jurisdictions could update or replace NEIEN data for progress years 2010 through 2012, or could choose to report only 2012 implementation (practices implemented between July 1, 2011 and June 30, 2012).

The USGS-processed USDA conservation practice datasets were provided to the jurisdictions in either unaggregated (NY, MD, VA) or aggregated format (PA, DE, WV), depending on preference and status of the jurisdictional 1619 Conservation Cooperator Agreements. Integration of State and Federal datasets, including removal of State-Federal double counting, was then achieved by each jurisdiction as described further below. In all cases, USDA conservation data were aggregated by either USGS or the jurisdictions prior to submission to the Chesapeake Bay Program.

Practices implemented as NRCS Conservation Technical Assistance were included in the data provided to the jurisdictions for informational purposes only, but only as statewide aggregated totals and with instructions that they not be included in the Annual Progress Review until the CBP Partnership determines how to verify implementation. Conservation Technical Assistance occurs when a NRCS field technical staff person provided consultation services but no financial assistance. Practices that are implemented under Conservation Technical Assistance do not receive the same level of quality assurance and quality control as practices for which USDA provided funding.

CROSSWALK BETWEEN USDA PRACTICES AND CHESAPEAKE BAY PROGRAM DEFINITIONS

Jurisdictions report conservation practices to the Annual Progress Review using the National Environmental Information Exchange Network (NEIEN). The input to NEIEN is then transacted and processed into the Chesapeake Bay Program's Scenario Builder (http://www.chesapeakebay.net/publications/title/documentation_for_scenario_builder), which is used to fully develop input data for the CBP's Watershed Model. The data used to calculate the inputs are fine scale and take multiple factors into consideration (e.g., mineralization from organic fertilizer, crop types, and double-cropping, etc…). To ensure that reportable USDA conservation practices would be accepted by the Chesapeake Bay Program, a crosswalk between NEIEN and USDA (FSA and NRCS) practice codes and Scenario Builder definitions was developed and provided to the manager of NEIEN System Requirements (Martin Hurd, Appendix A) for nonpoint source conservation best management practices (BMPs). Any appropriate practices that were not already available for reporting via NEIEN were added to NEIEN and mapped to the appropriate Scenario Builder practice. This crosswalk is provided in Appendix E. The crosswalk will need to be updated on an annual basis to reflect progressive changes in USDA and CBP conservation practice definitions.

Some management practices that receive financial assistance from NRCS and/or FSA are designed to conserve resources other than nitrogen, phosphorus, or sediment, and so are not transmitted from NEIEN to Scenario Builder. Some examples of practices not accepted by the CBP include fuel storage construction, tree/shrub pruning, and fish pond management. The CBP has an established protocol for considering new BMPs, and it is possible to add or change BMPs that are accepted by the CBP (http://www.chesapeakebay.net/channel_files/19491/nutrient-sediment_control_review_protocol_with_addendums_05092013.pdf).

There are some NRCS practices that are mapped to CBP practices where the definitions do not align precisely. One important example is wetland restoration, where NRCS wetland restoration (practice codes 644, 658, 657, and 659) allows for removal of phragmites from existing wetlands but this activity does not meet the CBP wetland restoration practice. Another is cover crops, where NRCS allows for use of legumes, but the CBP Partnership's definitions currently do not. These practices, along with along with a number of other BMPs are therefore only approximate matches. Recommendations for addressing these differences follow below in the section: More Comprehensive Tracking of Practices by NRCS. These suggestions also recommend that the CBP Partnership amend their BMP definitions where they do not capture NRCS standards that improve water quality.

PROTOCOLS FOR AVOIDING 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 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 solution to choose which data to report, to avoid double counting. In 2012, the six jurisdictions employed various techniques to address this issue. The solutions 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 was to compare practice codes and definitions, identify which practice types could potentially be duplicated based on 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, in Virginia nutrient management plans were reported from the jurisdictional dataset, and removed from the USDA dataset. Once the patterns are identified and the choices of which codes to remove 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 USDA and jurisdictional programs (e.g., cover crops in Lancaster County, PA) and therefore the separately funded instances are removed as potential duplicates when they are 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, state, or not financially assisted. In these data systems, when the Service Center Office staff help farmers to implement conservation practices that receive financial assistance from both the state and federal programs, the various funding sources are recorded but the data are entered as a single record item, 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. The following sections document the jurisdiction-specific methods that were used to avoid double counting in 2012. It may be beneficial to expand this documentation in 2013, to include a more through description of jurisdictional conservation datasets.

DELAWARE

Because they are not a 1619 Conservation Cooperator, DE-DNREC has access only to aggregated USDA conservation data, obtained either from the USGS or from the State NRCS and FSA offices. The jurisdiction compared the USGS-provided data for 2010 and 2011 with what they had previously submitted, and the level of implementation for most practices was the same as or higher than what Delaware had previously reported due to differences in the data requested from NRCS. In 2012, Delaware chose to use the USGS-provided aggregated dataset for all USDA practices in the 2012 Annual Progress Review data submission, and replaced the 2010 and 2011 data with the USGS-provided data. Prior to 2010, Delaware had reported NRCS and FSA practices using internal data sources.

In Delaware, most agricultural conservation practices were funded by either USDA or the jurisdiction through State voluntary participation in financial assistance programs at the Department of Agriculture or the county conservation districts, but not both, and so duplication was not an issue. The main exception was cover crops, where there are financial assistance programs offered by both NRCS and the state. For cover crops, the state data contained a greater level of detail about specific cover crop management practices that could be used to obtain

increased crediting for estimated nutrient and sediment load reductions in Scenario Builder. Delaware therefore chose to report all jurisdictional data for cover crops, and to subtract the total of the state cover crop acres from the NRCS cover crop data. If there was a remainder in the NRCS cover crop acres, then those were also reported. Cover crop attributes that are not included in the NRCS data include crop variety, planting date, planting method and whether or not the crop was sold as a commodity. However, Delaware no longer provides financial assistance for commodity cover crops as of fiscal year 2012.

Additional attention was paid to examining forestry practices in the NRCS dataset, and it was determined that there was no overlap with jurisdictional databases. Potential for overlap between NRCS and Delaware Forest Service could be possible for practices other than tree planting or forest harvesting, but those practices were not included in the NRCS dataset.

MARYLAND

As a 1619 Conservation Cooperator, Maryland was provided with unaggregated USDA conservation data by the USGS. However, they chose not to use the dataset for reporting purposes, instead relying upon their jurisdictional integrated databases, including “Conservation Tracker” as well as databases for cover crops, manure transport, and voluntarily completed Annual Implementation Report forms, all of which are maintained by the Maryland Department of Agriculture. This data system is used to record all conservation practices (financially assisted Federal and State as well as practices installed without federal or state financial assistance) regardless of the source of financial assistance, through data entry that occurs at each Service Center Office. Any submission of the USGS-provided NRCS or FSA data would therefore be a duplicate.

In Conservation Tracker, practices that were funded with financial assistance are recorded as a single record item, with data on percent of financial assistance, and duplication of records is thereby eliminated. Due to the increased level of detail and accuracy, Maryland chose to submit only data from their jurisdictional databases to the CBP Partnership’s Annual Progress Review.

The NRCS and FSA data provided by USGS can be used by Maryland Department of Agriculture as a management tool to assess the data quality and completeness of the Conservation Tracker dataset and to work with staff on improving reporting accuracy.

NEW YORK

As a 1619 Conservation Cooperator, the Upper Susquehanna Coalition (USC) was provided with unaggregated USDA conservation data by the USGS. However, they chose not to use the dataset for reporting purposes. Instead, they relied on direct query to the conservation districts. The NRCS and FSA data provided by USGS was used by USC to inform the direct queries of the conservation districts.

Because the portion of New York that falls within the Chesapeake Bay watershed is relatively small, the jurisdiction has established a system of meeting with the District Manager and the NRCS District Conservationist at each individual conservation district, to quantify the annual implementation of both Federal and State supported conservation practices. Removal of State-Federal duplication was achieved during these discussions. The NRCS and FSA data provided by USGS was used as a data check and helped to stimulate additional questions about conservation practice reporting in the data collection meetings held with the conservation districts.

The New York the jurisdiction uses the state-funded Agricultural Environmental Management (NY-AEM) data system (http://www.nys-soilandwater.org) as their framework for conservation planning, data collection, and verification. In 2013 they are transitioning to using an online toolkit linked to NY-AEM to track and report data in a consistent format for NEIEN submission. The same protocols as 2012 will be followed, but the data will be processed through the online system.

PENNSYLVANIA

Because they are not a 1619 Conservation Cooperator, the Pennsylvania Department of Environmental Protection was provided with aggregated USDA conservation data. The jurisdiction used the USGS-provided data in the 2012 Annual Progress submission to CBP, and also used a USGS-provided dataset to report NRCS and FSA practices in 2011. Prior to 2011 the jurisdiction reported FSA and NRCS conservation practices using NRCS county summaries that were then available on the web.

The PA-DEP does not have a 1619 Agreement with NRCS or FSA and, therefore, could not identify duplicates other than by using the broad-brush approach of comparing practice codes. The jurisdiction indicated that all NRCS and FSA practices were retained in the USDA dataset and that any equivalent practices were removed from Pennsylvania state data sources prior to reporting.

VIRGINIA

As a 1619 Conservation Cooperator, the Virginia Department of Conservation and Recreation was provided with the unaggregated USDA conservation dataset. The jurisdiction performed a comparison with USDA conservation data obtained directly from the Virginia state NRCS office. The two NRCS datasets differed somewhat, because the USGS data was pulled in tabular format from the NCP database, while the locally-sourced data was obtained using the IDEA geospatial interface. The jurisdiction found that they were able to link more practice data to contract data using the locally-obtained dataset than was possible with the data that the national NRCS office provided to the USGS. Virginia chose to use the state-provided NRCS data in the 2012 Annual Progress submission to CBP, and did not use the USGS-provided dataset for reporting purposes.

The majority of conservation practices that could possibly receive financial assistance from both Virginia and the NRCS, and were therefore at risk for duplication, were nutrient management practices and cover crops. Virginia decided to report these practices using the state-funded database, and to remove them from the reported NRCS practice database. Enhanced nutrient management was recorded only in the USDA dataset, and, therefore, was not subject to duplication. Additional practices that might receive financial assistance from both state and federal programs were compared on a line-by-line basis, using data for farm owner/operator, location, and acreage. Potential duplicate records were flagged and removed from the NRCS database.

Starting in July of 2013 the Virginia Department of Environmental Quality (VA-DEQ) will be the state agency receiving the CBP Chesapeake Bay Regulatory and Accountability Grant supporting reporting efforts, and will be responsible for reporting all conservation practices for the CBP Partnership's Annual Progress Review, based on actions during the recent General Assembly and decisions between the Office of the Secretary of Natural Resources and the Directors of VA-DCR and VA-DEQ. William Keeling (Appendix A) was transferred to VA-DEQ in late June of 2013. The above-described process for potential duplicate removal may therefore be changed for 2013 and future years. Specifics of the duplication analysis and reporting of data are currently being discussed by VA-DCR and VA-DEQ.

WEST VIRGINIA

Although West Virginia is a 1619 Conservation Cooperator through the WVDA and WVCA, due to state NRCS staffing and priorities the jurisdiction chose to be provided with the aggregated USDA conservation dataset. They validated the data by comparing the USGS-provided dataset with data obtained through NRCS field offices and the FSA State Office, and determined that the USGS-provided data were of similar quality to what West Virginia had previously reported, and in some cases included higher levels of implementation. West Virginia therefore chose to use the USGS-supplied aggregated dataset to report USDA conservation practices to the 2012 Annual Progress Review. Prior to 2012, West Virginia had reported NRCS and FSA practices using the then-publicly available "PRS" database from the NRCS website, as well as NRCS, FSA, and internal data sources.

To compile jurisdictional data for the Annual Progress Review, the WVDEP requests data from the WVDA and WVCA, as well as internal WVDEP sources. In 2012, the West Virginia Agricultural Enhancement Program (AEP) only funded instances of practices that were not funded by NRCS. A cross-checking procedure is in place between the agencies at the conservation districts, and the WVCA kept records for only AEP-funded instances of practices so there was no chance of duplication. Two FSA practices funded through the CREP program were also reported in West Virginia state databases: filter strips (CP-21) and riparian buffers (CP-22). The jurisdiction chose to report all USDA practices contained in the USGS-provided dataset, and removed as necessary filter strips and riparian buffers on crop or pasture from the jurisdictional dataset prior to reporting.

FINAL SUBMISSION OF 2012 CONSERVATION DATA TO THE ANNUAL PROGRESS REVIEW

Each jurisdiction submitted records of state-funded conservation practices, along with aggregated records of USDA-funded conservation practices, to their respective state's NEIEN data nodes by December 31, 2012. The USGS-sourced dataset was used by Delaware, Pennsylvania, and West Virginia to report USDA conservation practices. Maryland, New York, and Virginia chose to rely upon their individual 1619 Conservation Cooperator agreements to obtain direct access to USDA conservation data at the state level, and used the USGS-provided data only for comparison and quality control.

Once data records are submitted to NEIEN, they are processed through the CBP's Scenario Builder and each jurisdiction receives a report of what practices were given credit. At that point, the jurisdictions have the opportunity to modify, correct, and resubmit the data records. Modifications are typically made to correct for technical issues related to the NEIEN node format and proper attribution of conservation practice data records. However, at this point in the process, the role of USGS in providing USDA conservation datasets to the jurisdictions is complete.

2013 AND ONWARD - THE DRAWING BOARD FOR FURTHER IMPROVEMENTS

Our objective has been to streamline data reporting and ease the required time burden for Federal and jurisdictional partners to deliver data for the CPB Partnership's Annual Progress Review, while increasing data quality and consistency of access across the Chesapeake Bay watershed. How well have we succeeded?

The answer is fairly well, making definite advances, but with room for improvement. Suggestions for the coming year include:

IMPROVEMENTS IN REQUESTING DATA

In 2012, the USGS succeeded in obtaining conservation practice datasets from the USDA, processing them, and providing both aggregated and unaggregated data to the six jurisdictions. The USGS will again request and process USDA data for the 2013 Annual Progress Review. While this past year was a success, there is room for continued improvement in the details of how the data are obtained. Our objective for 2013 is to obtain datasets of equal or better quality that are more tailored to the needs of the jurisdictions. This report should provide the foundation to make documented improvements in data handling in 2013.

For the 2013 Annual Progress Review, the USGS will again obtain data in tabular format from the NCP database, using an updated data request (Appendix C).

Suggested timeline:

- Jul 15 – Data request to NRCS
- Jul 15 – Data request to FSA
- Aug 15 – Receive FSA dataset
- Oct 1 – Scenario Builder practice definitions 'locked down'
- Oct 15 – Verification Committee approves updated crosswalk
- Oct 15 – Receive NRCS dataset
- Nov 1 – USGS delivers USDA data to the jurisdictions
- Dec 1 – Jurisdictions submit integrated Federal-State dataset to the Annual Progress Review via NEIEN

In Virginia, the 2012 USGS-sourced dataset proved to be less desired than a similar NRCS conservation practices dataset provided by the Virginia NRCS State Office Geospatial Information Systems (GIS) Specialist, Fred Garst (Appendix A). Field headings for both datasets are compared in Appendix C: 1. Mr. Garst pulled his dataset from the Integrated Data for Enterprise Analysis (IDEA) interface that provides NRCS conservation data records in geospatial format, and he performed his queries using ArcMap. His colleague at VA-DCR, William Keeling (Appendix A) preferred the resulting dataset because it had more records with a relationship between plans and practices. Mr. Garst also reports that the land use data field is populated, and that he has not noticed any internal duplication of records. These factors imply that there might be a more efficient option for USGS data preparation for future Annual Progress Reviews.

The NRCS is currently undertaking a Conservation Data Streamlining Initiative (CDSI) and has plans to integrate the NCP and IDEA data systems. The dataset that will be available in future years may look quite different from the 2012 dataset. It will be important to maintain the level of discussion and collaboration achieved in 2012 to smoothly integrate these expected changes with jurisdictional datasets and facilitate data transfer between State and Federal agencies.

MORE COMPREHENSIVE TRACKING OF PRACTICES BY NRCS

In preparation for discussions with USDA, the members of the CBP Partnership's Agriculture Workgroup have 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 Scenario Builder and in the various CBP Partnership water quality models. A list of USDA conservation practices (Table 6) was identified as having an obviously high degree of limitation in the amount of data available for translating between USDA conservation practice codes and CBP

practice definitions. Other conservation practices not represented here may also have data limitations depending on their use and reporting. The CBP 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.

LAND USE AND LIVESTOCK ANIMAL TYPE

Limitation: The NRCS currently has fields in their data collection system for land use and livestock type. However, these data fields were rarely populated in the 2012 NRCS dataset provided to the USGS from the NCP database.

Opportunities: Populating the data fields for land use and livestock type would 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 (e.g., headquarters, forest, crop/hay, range/pasture) or animal type (e.g., manure management, feed management). Currently, default values are assigned to unreported elements using conservative effectiveness values. While populating these fields would represent additional effort on the part of NRCS staff, the benefit is recognition of increased pollutant load reductions from agricultural lands.

The current land use and animal type information may possibly already exist in other NRCS datasets, in which case the problem becomes one of linking the data to the NCP records, rather than ensuring its data entry in the Service Center Offices. The land use "from" and "to" do not exist presently in NRCS databases, only the current land use. The livestock animal type is available in ProTracts, but not in Toolkit. The number of animals or animal units is also needed, where appropriate to the practice.

COVER CROPS

Limitation: The NRCS currently defines, tracks, and reports cover crops under a single conservation practice code (340) and standard. The Chesapeake Bay Program 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, NRCS lumps leguminous cover crop types with all cover crops. The CBP does not consider leguminous cover crops as having a nitrogen benefit since they fix nitrogen in the soil. These additional attributes presently are not 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, would allow the six watershed jurisdictions to receive more accurate crediting of cover crops, and more thorough representation in the Chesapeake Bay Program Partnership's models. Default values are assigned to unreported elements using conservative effectiveness values. Presently, NRCS has indicated that they are unlikely to track cover crops with more specificity since the present system does not allow for enhancements to record keeping.

FENCING

Limitation: The NRCS currently defines, tracks, and reports livestock fencing under a single conservation practice code (382) and standard, while the Chesapeake Bay Scenario Builder defines livestock fencing as a component of the management change it creates. Examples include the establishment of riparian buffers vs. rotational grazing.

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, would

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) 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. NRCS could show in the practice Access Control where animals are excluded from the stream corridor, but the other information is not present in any NRCS business tool.

NUTRIENT MANAGEMENT

Limitation: The NRCS currently defines, tracks, and reports nutrient management planning under a single Conservation Practice code (590) and standard. The CBP Partnership currently defines nutrient management under multiple management levels including: nitrogen-based; enhanced; and precision/decision agricultural nutrient management, with different associated effectiveness values for reducing nutrient losses to the environment.

Opportunities: Enhancements to recordkeeping for the USDA conservation practice code for nutrient management that could more readily identify differences among regular, enhanced, and precision/decision nutrient management planning and implementation would allow for improved data utilization by the jurisdictional partners and within the CBP Partnership's water quality models. An example of possible practice code enhancements was previously developed by the Maryland State Office of USDA-NRCS, that now track and report multiple (four) nutrient management categories through the use of a letter suffix to the conservation practice code. The new 590 standards have significantly expanded the categories of nutrient management but without an associated indentifying code that could be used for reporting. The present system does not allow states to enhance the record keeping without changes to the system. Nutrient plans are now contracted as NRCS activities 104 and is under only one practice code, which does not allow for differentiation.

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 CBP Partnership defines feed management effectiveness as the change in pounds of nitrogen and phosphorus reduced in livestock 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 would allow for improved data utilization by the jurisdictional partners and within the CBP Partnership's water quality models. 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 this data and enable tracking of the results. This presently is not available in any NRCS business tool.

FORESTRY PRACTICES

Limitation: Forest buffers are tracked by FSA in units of acres. As part of the 2007 Forest Directive adopted by the CBP Partnership Executive Council, forest buffer goals were established and are tracked by length and width of stream miles buffered, rather than acres. Also, forest buffers are eligible for re-enrollment as part of a financially-assisted FSA practice. A clear method of recordkeeping to differentiate re-enrollment from initial enrollment has not been identified, and there is the possibility of double-counting the same buffer.

Opportunities: Jurisdictions provide length and width to the Forestry Workgroup for assessment of goal achievement. However, jurisdictions rely on the FSA data for reporting as part of the CBP Partnership's Annual Progress Review. The tracking of forest buffer length and width by USDA-FSA would provide more precise information that could take into account different load reductions for narrower vs. wider buffers (e.g.: 35 foot vs. 100 foot). In addition, potential double-counting between historic and current implementation could be avoided if FSA indicates if a buffer is re-enrolled vs. installed new. A similar issue of re-enrollment may exist for land retirement.

WETLANDS

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 CBP Partnership currently defines wetland conservation practice efficiencies based on a single practice of wetland restoration that includes restoration, enhancement, or creation of wetlands, and distinguishes between streamside vs. other areas. The NRCS practice definition includes phragmites spraying for invasive weed control, while the CBP Partnership definition does not accommodate phragmites spraying. The CBP Partnership is addressing this discrepancy through their wetlands workgroup.

Opportunities: Enhancements to the CBP Partnership's practice definitions for wetlands could assist in more accurate calculation of nutrient and sediment loads associated with NRCS wetland conservation practices would allow for improved data utilization by the jurisdictional partners and within the CBP Partnership's water quality models. This presently is not available in any NRCS business tool.

Table 6: Recommendations for improved recordkeeping for NRCS and FSA conservation practices

Data Category	NRCS Codes	Proposal	Relation to currently collected data
Land Use	many	Record land use change "from" and "to" (e.g., pasture fencing receives a reduction for CBP only when applied to riparian areas. NRCS allows pasture fencing to be cost shared when on any landscape position)	NRCS has a data field for land use ID. It is generally not populated in the NCP database. The change "from" and "to" are not available in any NRCS business tool, but the present land use is a data field.
Livestock Animal Type	many	Record livestock animal type (e.g.: 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. This data field is not available in Toolkit.
Cover Crops	340	Include variety, plant date, plant method, commodity vs. regular, and if manure was applied (e.g., commodity early drilled rye-aerial-no manure).	Cover crop is defined broadly in NRCS data. CBP applies effectiveness values that range from 5% to 45% for nitrogen. Default values are assigned that limit credit in those higher ranges. These practice attributes currently are not available in any NRCS business tool.
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 currently is not in any current NRCS business tool.
Nutrient Management	590	Differentiate nutrient management planning and implementation strategies	NRCS currently defines, tracks, and reports nutrient management planning under a single Conservation Practice code (590). Nutrient plans now are contracted as activities 104. There is only one practice code for nutrient management, which does not allow for differentiation.
Feed Management	592	Report the feed additive or management change used.	NRCS currently tracks and reports feed management under a single Conservation Practice code (592) for multiple livestock species. This is currently not available in any NRCS business tool.
Forestry Practices	CP-22	Collect both length and width of the buffer. Indicate if a buffer is re-enrolled vs. installed new.	FSA currently tracks 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 if a buffer is re-enrolled vs. installed new.
Wetlands	644, 658, 657, 659	Increase detail of the wetland activity associated with NRCS wetland conservation practices.	NRCS currently tracks wetland practices under four different codes. The CBP partnership has one BMP that is specifically defined. The NRCS codes and CBP BMP could be more closely aligned so that appropriate credit is given for implementation. This is currently not available in any NRCS business tool.

CONTINUING TO IMPROVE PRACTICE DEFINITIONS

The definition and crediting of conservation practices within the CBP Partnership's water quality models via the NEIEN and Scenario Builder data exchange and crediting system is a process that is under continuous development, negotiation, and improvement through coordination with the CBP Partnership's Watershed

Technical Workgroup and Water Quality Goal Implementation Team (http://www.chesapeakebay.net/groups/group/water_quality_goal_implementation_team). As jurisdictions interact with the CBP office to prepare for each Annual Progress Review data submission, as conservation practice financial assistance programs are modified and developed, and as new practice definitions are adopted by the CBP Partnership, the system will continue to evolve in response. In 2013, practice definitions will be 'locked down' on October 1st, at which point the crosswalk from USDA practices (Appendix E) will be updated and approved by the CBP Partnership's workgroups for use in the 2013 Annual Progress Review.

Because the USDA promotes a wide variety of conservation practices not always focused on nitrogen, phosphorus, and sediment control, and because the various datasets are sometimes kept in different measurement units, and with more or less detail, the conversion from USDA practice code to NEIEN and CBP Scenario Builder format is not always straightforward. However, a formal process of definition, verification, and accounting is in place, overseen by the CBP Partnership's Watershed Technical Workgroup, with a robust capacity for adaptive change and incorporation of new conservation practices as they become available.

Further discussion might be warranted regarding the current CBP Partnership's definition of cover crops and wetland restoration. For example, wetland restoration by NRCS can include weed control (e.g.: phragmites) for habitat restoration, and cover crops financed by NRCS can include nitrogen fixing legumes, but neither of those practices would meet CBP Partnership practice definitions for nutrient and sediment reductions. However, a large proportion of the NRCS wetland and cover crop practices do meet CBP partnership guidelines and should be credited. Unless the implementation datasets are kept in greater detail (as is happening under jurisdiction data management initiatives in MD, NY, and Lancaster County, PA), how these NRCS practices are credited is a matter of negotiation.

INCREASING INFORMATION AVAILABILITY TO THE PUBLIC

Another improvement that can be made to conservation data reporting is making the information more available to the public. While keeping the confidential information confidential, the aggregated data could be made available on public websites for use by land managers. Tracking conservation practice implementation is important for a variety of reasons that are completely separate from TMDL regulations. While the immediate impetus for such tracking is the CBP Partnership's Annual Progress Review, the long term goal is improving local and Chesapeake Bay water quality through all possible means.

Publicly-available aggregated data products that maintain farmer privacy can help farmers and conservationists to understand and document the role that agricultural conservation plays in attaining water quality objectives. Increased knowledge of what is already implemented can also help to guide water quality planning, and flexible tools for public watershed planning and conservation practice implementation that integrate this information could facilitate progress toward water quality improvements. It would be possible to create a mechanism for web-enabling access to aggregated data, making the good news about current levels of implementation more publically available.

The USDA conservation practice data described in this report are also being made available to USGS scientists who, as 1619 Conservation Cooperators, are using the information in a confidential manner, to support Chesapeake Bay watershed studies and landscape conservation initiatives.

CONCLUSION

In 2012, the coordinated partnership of Federal and State efforts resulted in a successful and more accurate reporting of the agricultural conservation practices that had been recently implemented on Chesapeake Bay farms and farmland. While the process was not perfect, the diverse data reporting strategies employed by the jurisdictions were all successful in reporting conservation practices while largely avoiding double counting of records for which financial assistance was provided by both Federal and State agencies. These methods have now been documented, and possible improvements for 2013 have been identified.

For the three jurisdictions that used the USGS-sourced dataset for reporting purposes (DE, PA, WV), streamlining the conservation data collection process enabled the development of a more consistent and complete dataset. These jurisdictions were able to report implementation of USDA conservation practices more thoroughly than they previously had, improving their ability to track progress towards achieving water quality objectives. Pennsylvania, in particular, was able to report USDA practices in 2011 and 2012 for the first time, due to the provision of the USGS-sourced datasets.

The remaining three jurisdictions (MD, NY, and VA) chose not to use the USGS-sourced dataset for reporting purposes, instead relying upon USDA conservation practice information that they obtained independently using their jurisdictional 1619 Conservation Cooperator agreements. In the case of Virginia, the jurisdiction might have preferred to use USGS-sourced data for simplicity's sake if their double counting procedure had not entailed line-by-line comparison of a fair number of records, for which the State-sourced USDA dataset contained more relationships between contracts and practices. In 2013 it should be possible to work with NRCS to improve the USGS-USDA data request to obtain any missing detail to facilitate double counting removal in Virginia.

In Maryland and New York, the jurisdictions obtained USDA data from their own State-sponsored reporting systems, where data are input by their Service Center Offices. They were able to remove double counting and calculate aggregated totals through a statewide database query, in the case of Maryland's Conservation Tracker system, or on a county by county basis, in the case of New York. Double counting issues were therefore handled internally, and were not documented in this report. It is worth noting that Lancaster County Conservation District in Pennsylvania has developed an integrated conservation planning and tracking system of comparable detail, but that data was not used by Pennsylvania Department of Environmental Protection in its submission for the CBP Partnership's Annual Progress Review. If all jurisdictions developed combined conservation tracking systems, then USGS involvement in providing a USDA data product would no longer be required.

However it is obtained, accurate, consistent, detailed information on conservation practice implementation can improve the set of 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. This project has documented a strategy for obtaining and handling USDA farmland conservation data and for integrating it with State conservation datasets for the purpose of reporting it to the public in an aggregated format that protects farmer privacy while also documenting the tremendous progress in conservation farming. It is hoped that this report will provide a useful contribution to the larger discussion of implementation and verification of the diverse range of Federal, State, and privately-funded conservation practices that are adopted by Chesapeake Bay farmers, whether in response to regulation, incentive, or a love of the land.

ACKNOWLEDGEMENTS

Acknowledgement begins with President Obama for his Executive Order #13508 that prioritized Federal collaboration in support of the Chesapeake Bay Program. Thanks to Scott Phillips, Ken Hyer, and Joel Blomquist, USGS Maryland Water Science Center, for their leadership in developing the USGS Chesapeake Pay Science Plan, and to the USGS Priority Ecosystem Studies and Climate and Land Use programs that supported this work. Thanks to Rich Batiuk, U.S. EPA Chesapeake Bay Program Office, for his excellent input and support of this project, and to Renee Thompson USGS/Chesapeake Bay Program Office, for paving the way with her work on the 2011 conservation dataset.

Thank you to Dana York, Leonard Jordan, USDA NRCS, Dave Kirtland, USGS, and Peter Claggett, USGS/Chesapeake Bay Program Office for their roles in establishing USGS-USDA 1619 Conservation Cooperator agreements without which this project would not have been possible. Thank you to the USDA REAP team for their initial descriptions of the various available USDA datasets, and their review of aggregation protocols. And thank you to Kelly Shenk, U.S. EPA Region 3 Water Protection Division, Mark Dubin University of Maryland/Chesapeake Bay Program Office, Susan Marquart Pennsylvania NRSC state office, and Anne Swanson, Chesapeake Bay Commission, for continuing to provide the discussion to move these projects along. Thank you to the Chesapeake Bay Verification Committee and many other individuals who provided review and comments on the draft versions of this report.

We are indebted to several people at USDA, including John Underwood, FSA, David Butler, NRCS, and David Parry, FSA, for their hard work in reviewing permissions and providing datasets, as well as helping to educate us on the necessary details. Special thanks goes to Richard Sims and Leonard Jordon for their work in initiating this project, reviewing this report, and providing much needed assistance along the way. We are likewise indebted to numerous people at the jurisdictional agencies for having the patience to engage in prolonged and thorough discussion of the many details involved in accurately reporting the variety of conservation practices employed by Chesapeake Bay watershed farmers.

APPENDIX A: KEY CONTACTS

USGS

Dean Hively, Research Physical Scientist, USGS Eastern Geographic Science Center Posted to: USDA-ARS Hydrology and Remote Sensing Laboratory, Bldg 007, Room 104, BARC-W, 10300 Baltimore Avenue, Beltsville, MD 20705 phone: 301-504-9031, email: whively@usgs.gov [instrumental in project coordination, communication, analysis, and drafting of report]

Olivia H. Devereux, Environmental Scientist, Devereux Environmental Consulting, (contractor to USGS), 301-325-7449, olivia@devereuxconsulting.com [instrumental in data processing, communication, analysis, and drafting of report]

Peter Claggett, Geographer, USGS Eastern Geographic Science Center, phone: 410-267-5771, email: pclagget@usgs.gov [instrumental in establishment of USGS 1619 agreement and initial project organization]

Renee Thompson, Geographer, USGS Eastern Geographic Science Center, phone: 410-267-5749, email: rthompson1@usgs.gov [instrumental in developing data aggregation techniques]

Dave Kirtland, Director, USGS Eastern Geographic Science Center, 12201 Sunrise Valley Drive, MS 521 Reston, VA 20192 phone: 703-648-4712, email: dakirtland@usgs.gov [instrumental in establishment and oversight of USGS 1619 agreement]

FSA

John Underwood, FSA Privacy Officer, phone: 816-926-6992, email: john.underwood@kcc.usda.gov [John is the one and only best contact for approval and authorization of 1619 Conservation Cooperator agreements and data aggregation requirements, for NRCS as well as FSA data]

Barbara J. Clark, USDA/MSD/KCASB/IMS, Government Information Specialist, Farm Service Agency, 9240 Troost - Mail Stop 8368, Kansas City, MO 64131-3055, Phone: phone: 816-926-2636, email: barbara.clark@kcc.usda.gov [Main contact for formatting the FSA Farm Practices data request, which was submitted to RA.mokansasc2.fsakcfoia@one.usda.gov]

David Parry, Customer Service Supervisor, USDA Farm Service Agency Aerial Photography Field Office, 2222 West 2300 South, Salt Lake City UT 84119-2020, Tel: 801-844-2923, david.parry@slc.usda.gov, Website: http://www.apfo.usda.gov, [Responsible for and delivered the FSA geospatial dataset, receives CREP and CLU data from state GIS leads to update national database]

Chris(tina) Rotz – Agricultural Program Specialist, Pennsylvania, USDA-Farm Services Administration, Phone: (717)237-2165, christina.rotz@pa.usda.gov [Chris is the Pennsylvania State GIS Specialist, and collects data from the counties and prepares the monthly data submission of FSA conservation practices that is transmitted to the national database in Utah; she was a useful consultant on the understanding the appropriate timing of a data request (August) to reflect FSA practices implemented before the June 30th reporting deadline]

Charles "Michael" Boyles FSA/ ITSD/ADC/PSCAO Farm Service Agency 6501 Beacon Drive Kansas City, MO 64133 (816) 926-1905 Mike.Boyles@kcc.usda.gov [useful contact for CREP program details]

NRCS

David Butler, NRCS Information Technology Center, Fort Collins, CO, (970) 295-5545, david.butler@ftc.usda.gov [The key point of contact for obtaining NRCS conservation practice data, provided 2012 dataset to USGS]

Arlen Ricke, Landscape Planning Specialist [NRCS signatory on 2012 USGS data request]

Rich Sims, Regional Conservationist for the Northeast, NRCS Office of the Chief, DC. [Instrumental in maintaining NRCS leadership in this project, and supporting 1619 negotiations in 2013]

Leonard Jordan, Regional Conservationist for the Southeast, NRCS Office of the Chief, DC. [Was instrumental in establishing the 1619 Conservation Cooperator agreements with USGS that were signed in 2010]

Brandon J. Schneider, J.D., M.B.A., CIPP/G, Privacy Specialist, Vistronix, Department of Agriculture/NRCS, c: 703/447-5878 [instrumental on 2012 USGS data request]

Michael A. Sheaver, Security Operations Branch Chief, NRCS, email: Michael.Sheaver@wdc.usda.gov, phone: 202-720-0040, cell: 703-200-3008 [instrumental on 2012 USGS data request]

Susan Marquart, Natural Resource Specialist, Pennsylvania Chesapeake Bay Coordinator, USDA Natural Resources Conservation Service, One Credit Union Place, Suite 340, Harrisburg, PA 17110-2993, Voice (717) 237-2237, Fax (717) 237-2238, Susan.Marquart@pa.usda.gov [Involved in discussion of data availability and 1619 agreements]

Denise Coleman, PA State Conservationist, Phone: 717-237-2203 [involved in 1619 discussions with Pat Buckley]

Barry Frantz, Assistant State Conservationist, Programs, Harrisburg Pa 17110-2993, (717) 237-2216, barry.frantz@pa.usda.gov [Provided comments about interpretation of life span]

Mary Grande, NRCS Business Tools Specialist, Ft. Collins, CO, phone: 970-295-5626 [provided input on Figure 2]

NRCS REAP Program staff were helpful consultants on available NRCS database structure and on aggregation protocol recommendations: **Janet Perry,** NRCS Resource, Analysis and Policy Division, Washington, DC, 301-504-2314, janet.perry@wdc.usda.gov; **Tish Toomer-Jones** – REAP Team Leader – 301-504-1233; **Lynn Knight** - works on national statistics - 301-504-0393; **Leroy Hall** – works with Lynn and Janet 301-504-0291

Dana York, President, Green Earth Connections, LLC. 108 South Liberty Street, Centerville, MD 21617. phone: 410-708-6794, email: dyork818@yahoo.com [At the outset of this project Dana worked for the NRCS and was instrumental in promoting the dialogue between USGS and USDA that led to the signing of the 1619 Conservation Cooperator Agreements that support USGS access to conservation data for Chesapeake Bay farmlands]

EPA

Rich Batiuk, Associate Director for Science, U.S. Environmental Protection Agency, Chesapeake Bay Program Office, 410 Severn Avenue, Suite 109, Annapolis, Maryland 21403, 410-267-5731 , 1-800-968-7229 Ext 731 , 443-223-7823 Cell Phone, 410-267-5777 FAX , batiuk.richard@epa.gov , www.chesapeakebay.net , www.epa.gov/chesapeake [Chairs the Chesapeake Bay Program Partnership's BMP Verification Committee; responsible for bringing the CBP Partnership's BMP Verification Framework through the CBP Partnership's adoption and jurisdictional implementation, provided advice and input to this report]

Jeffrey S. Sweeney, Nonpoint Source Data Manager, U.S. Environmental Protection Agency, Chesapeake Bay Program Office, 410 Severn Avenue, Suite 109, Annapolis, Maryland 21403 phone: 410-267-9844, email: jsweeney@chesapeakebay.net [EPA model input coordinator, contributed to crosswalk development]

Kelly Shenk, Nutrient Coordinator, U.S. Environmental Protection Agency, Chesapeake Bay Program Office, 410 Severn Avenue, Suite 3CB00, Annapolis, Maryland 21403 phone: 410-267-5728; email: shenk.kelly@epa.gov [Provided advice and input to this report]

EPA CONTRACTORS AND GRANTEES

Matthew Johnston, Nonpoint Source Data Analyst. University of Maryland, 410 Severn Avenue, Suite 112, Annapolis, Maryland 21403, phone: (410) 267-5707, email: mjohnston@chesapeakebay.net [will be managing the 2013 Progress Submission for the Chesapeake Bay Program]

Martin Hurd, Business Analyst, Tetra Tech, 1800 Diagonal Rd., Ste. 500, Alexandria, VA 22304, phone: (703) 385-6000, email: martin.hurd@tetratech.com [NEIEN coordinator, contributed to crosswalk development]

Vladimir Royzman, Business Analyst, Tetra Tech, U1800 Diagonal Rd., Ste. 500, Alexandria, VA 22304, phone: (703) 385-6000, email: vladislav.royzman@tetratech.com [will be the NEIEN coordinator for the 2013 Progress Submission]

Mark Dubin, Agricultural Technical Coordinator, University of Maryland, 410 Severn Avenue, Suite 112, Annapolis, Maryland 21403, phone: (410) 267-9833, email: mdubin@chesapeakebay.net [Provided advice and input to this report]

DELAWARE

Marcia Fox, Delaware Department of Natural Resources and Environmental Control (DE-DNREC), 89 Kings Highway, Dover, DE 19901, Phone: (302) 739-9939, marcia.fox@state.de.us [Responsible in 2013 for collecting data, aggregation, and submission to NEIEN]

Jennifer Volk, Environmental Quality and Management Specialist, University of Delaware, 69 Transportation Circle
Dover, Delaware 19901 Phone: (302) 730-4000 email: jennvolk@udel.edu [in 2012 Jennifer worked for DE-DNREC, and was responsible for collecting data, aggregation, and submission to NEIEN]

Paul M. Petrichenko, Assistant State Conservationist, NRCS, Dover, DE, 302-678-4180 [As the NRCS state lead for agricultural conservation practice data, Paul provided NRCS data to DE-DNREC in previous years. In 2012, Paul helped to review USDA aggregated data provided by USGS and provide background clarifying information about practices and expected implementation levels]

MARYLAND

John Rhoderick, Maryland Department of Agriculture (MDA), Office of Resource Conservation , 410-841-5876, John.Rhoderick@maryland.gov [Coordinates MDA team responsible for data preparation (Beth Horsey, Mike Stanton, Dawn Bradley)]

Elizabeth [Beth] Horsey, Agricultural Watershed Implementation Plan Coordinator, MDA Office of Resource Conservation, 410-841-5865, email: elizabeth.horsey@maryland.gov [assists in the review of progress reporting]

Mike Stanton, Agricultural Watershed Implementation Program Coordinator, MDA Office of Resource Conservation, phone: 410-841-5879, email: Michael.Stanton@maryland.gov [administers the Conservation Tracker database, assembles and prepares data for the NEIEN submission, and delivers aggregated data to Gregorio]

Dawn Bradley Admin. Officer for Conservation Grants, MDA phone: 410-677-0802 x3 or 410 -841-5946. email: Dawn.Bradley@maryland.gov [Manages MDA cover crop database]

Gregorio [Greg] Sandi, Natural Resources Planner, Environmental Science Services Administration, Maryland Department of the Environment (MDE), 1800 Washington Blvd., Baltimore, MD 21230, Tel: 410-537-3742, Fax: 410-537-3873, email: gregoriosandi@maryland.gov [Submits aggregated database to NEIEN, took over duties from Robin in 2012]

Robin Pellicano, MDE, 410-537-4215, robinpellicano@maryland.gov [Responsible for NEIEN submission prior to 2012]

NEW YORK

Aaron Ristow, Ag Coordinator, Upper Susquehanna Coalition, 1771 Hanshaw Road, Ithaca, NY 14850, Office: (607) 257-2340; Cell: (607)745-7165, - email: aaronristow@tcswcd.org, web site: www.u-s-c.org [Develops and maintains data collection system, removes double counting, collects data from Eastern districts]

Chris Yearick, GIS Specialist. Upper Susquehanna Coalition, Cornell Cooperative Extension Chemung County, 425 Pennsylvania Ave, Elmira, NY 14904, 607-734-4453, cdy3@cornell.edu [Manages database, submits aggregated data to NEIEN, collects data from Western districts]

Jacquelyn Lendrum, Research Scientist, New York Department of Environmental Conservation, jmlendru@gw.dec.state.ny.us, 518-402-8165. [Will play a future role when responsibility for the NEIEN submission is transferred from the USC to the DEC]

PENNSYLVANIA

Andy Zemba, Pennsylvania Department of Environmental Protection (PA-DEP), Office of Water Planning, Chesapeake Bay Program Director, P.O. Box 2063, 400 Market Street, 2nd Floor, Harrisburg, PA 17105-2063, phone: (717) 772-5633, email: azemba@state.pa.us [Supervises PA-DEP's involvement with the Annual progress Review]

Patricia A. Buckley, Chesapeake Bay Program Coordinator, Department of Environmental Protection (DEP)– Interstate Waters Office, Rachel Carson State Office Building, 400 Market Street, Harrisburg, PA 17101, Phone: 717.772.1675, Email: pbuckly@pa.gov [Leading discussions to establish a 1619 Conservation Cooperator Agreement between PA-DEP and NRCS]

Ted Tesler, PA Department of Environmental Planning, Water Planning Office, Chesapeake Bay Program Technical Lead, P.O. Box 2063, 400 Market Street, 2nd Floor, Harrisburg, PA 17105-2063, phone: (717) 772-5621, email: thtesler@state.pa.us [Receives aggregated conservation data from conservation program leads and submits the data to PA-DEP Information Technology Dept. who upload annual data to the Pennsylvania NEIEN node]

Barry Evans, Research Associate, Penn State Institute of Energy and the Environment, Director, GIS Support Center, 128 Land and Water Research, University Park, Telephone: (814) 865-3357, bme1@psu.edu [Works as a contractor to PA-DEP to assemble the dataset and format it for the NEIEN interface]

VIRGINIA

Fred Garst, GIS Specialist, NRCS, 540-434-1401 x125, Fred.Garst@va.usda.gov [Queries NRCS IDEA database to provide unaggregated data to Bill Keeling].

William Keeling, Non-point Source Modeling and Data Coordinator, Virginia Department of Conservation and Recreation (VA-DCR), Division of Storm water Management, 203 Governor Street, Richmond, VA 23219, Phone: (804) 371-7485, William.Keeling@dcr.virginia.gov [Received data from Fred Garst, flags and removes potential double counting, delivered aggregated data to Karl Huber. After June 2013 Bill will be working for VA-DEQ and so this process may need alteration if he can no longer receive 1619 access to confidential datasets]

Karl Huber, Virginia Department of Conservation and Recreation (VA-DCR), 203 Governor St, Richmond, VA 23219-2049 (804) 786 4356, Karl.Huber@dcr.virginia.gov [Receives data from Bill Keeling, formats it for NEIN submission, and submits the data to the Annual Progress Review via node client software]

Beverly Quinlan, Geoinformatics Specialist, VA-DCR, 203 Governor St, Richmond, VA 23219-2049 phone: 804-371-0297, email: beverly.quinlan@dcr.virginia.gov [Pulled state financial assistance data from the state database and prepared it for NEIEN submittal using node client software]

Blaine Delaney, Blaine.Delaney@va.usda.gov , Chesapeake Bay Coordinator/Emergency Watershed Protection Program Coordinator, NRCS, 1606 Santa Rosa Road, Suite 209, Richmond, VA, 23229-5014, Phone 804.287.1663, Website: http://www.va.nrcs.usda.gov [Involved in developing Virginia data reporting strategy]

Wade Biddix, Assistant NRCS State Conservationist (Programs), 1606 Santa Rosa Road, Suite 209 Richmond, VA 23229-5014, Phone: (804) 287-1675 Email: Wade.Biddix@va.usda.gov [Fred's supervisor, involved in developing Virginia data reporting strategy]

WEST VIRGINIA

Matt Monroe, WV Department of Agriculture (WVDA) Assistant Director, Moorefield Environmental Programs (Moorefield Ag Complex), phone: 304-538-2397, Ext. 6860, mmonroe@wvda.us [Has 1619 access to USDA data, provides aggregated implementation data to Alana Hartman]

Alana Hartman, West Virginia Department of Environmental Protection (WVDEP), Division of Water and Waste Management, Environmental Resources Analyst, Non-Point Source Program (Chesapeake Bay lead), 22288 Northwestern Pike, Romney WV 26757, Phone: 304-822-7266 Ext.: 3623, email: Alana.C.Hartman@wv.gov [Submits records to NEIEN, does not have 1619 access to unaggregated USDA data]

Carla Hardy, WV Conservation Agency (WVCA) Watershed Program Coordinator, Moorefield Field Office, 60 C Industrial Park Road, Moorefield, WV 26836 phone: 304-538-7581, email: chardy@wvca.us [WVCA had previously established a 1619 Conservation Cooperator Agreement covering only Animal Waste Management and Mortality Disposal in the Potomac Basin. That agreement expired in March 2013, and was not planned to be renewed]

APPENDIX B: 1619 CONSERVATION COOPERATOR AGREEMENTS

1 MDA_NRCS 1619 MOU.pdf
2 NY_USC_NRCS 1619 Compliance Agreemnet. Upper Susquehanna.pdf
2 NY_USC_NRCS Section 1619 Signatures Final 4-17-12.pdf
3 VA-DCR_NRCS 1619 attachment C example.PDF
4 WV-DA_NRCS 1619 Agreement.pdf
5 WV-CA_2012_NRCS TMDL MOU animals only .pdf
6 USGS-FSA Signed Agreement 8-2-10.pdf
7 USGS_NRCS_SignedAgreement_12-14-10.pdf
8 USGS_FSA_NRCS_Data Handling Procedures_APPROVED_03-2011.doc_Olivia.pdf
9 Approval for Bilateral sharing of data with states.pdf

APPENDIX C: USGS-USDA DATA REQUESTS

1 USDA Data_Field_Names_2.xlsx
2 FSA 2012 Data Request.docx
3 NRCS Chesapeake Bay Data Request signed.pdf
ReadMe.docx

APPENDIX D: USDA PRACTICE CODE LOOKUP TABLES

- 1 FSA and NRCS Practice List from NRT 120111.xlsx
- 2 FSA-NRCS Practice Decoder and References 043012.xlsx
- 3 Table of FSA Practice Code List2.xlsx
- 4 FSA Practices.pdf
- 5 FSA CRP Short Overview 2-crp_r05_a13.pdf
- 6 FSA Data ReadMe MD 12-003.doc
- 7 CRP Contract Type Codes.doc

APPENDIX E: CROSSWALK BETWEEN USDA PRACTICE CODES AND SCENARIO BUILDER

- NEIEN_USDA_Crosswalk.xlsx

NRCS
Natural Resources Conservation Service
339 Busch's Frontage Road, Suite 301
Annapolis, MD 21409

Phone: 410-757-0861
FAX: 410-757-0687
www.md.nrcs.usda.gov

October 22, 2009

Earl F. "Buddy" Hance
Maryland Secretary of Agriculture
50 Harry S. Truman Parkway
Annapolis, MD 21401

Dear Secretary Hance:

Enclosed you will find a USDA – Natural Resources Conservation Service (NRCS) document requesting signed acknowledgments from the Maryland Department of Agriculture. I am sure that you are aware of Section 1619 of the 2008 Farm Bill. Signing of this acknowledgment satisfies the requirements of Section 1619 of the 2008 Farm Bill.

USDA- NRCS has asked all Conservation Districts, State and local government agencies, nongovernmental organizations, and individual consultants that assist USDA in conservation program delivery to document their acknowledgement through the signing of the enclosed agreement. Our "Partners" and cooperators are to acknowledge the requirements of Section 1619 so that they can continue to receive protected program data, including personally identifiable information.

We need to have a signed copy of this acknowledgment for Maryland Department of Agriculture. If you have questions on the document, please contact Malcolm Reeves, NRCS State Administrative Officer at 443-482-2926.

JON F. HALL
State Conservationist

NATURAL RESOURCES CONSERVATION SERVICE (NRCS)
UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

ACKNOWLEDGMENT OF SECTION 1619 COMPLIANCE

Purpose and Background

The purpose of this Acknowledgment of Section 1619 compliance (hereinafter "Acknowledgment") is to require acknowledgment by Maryland Department of Agriculture of the requirements of Section 1619 of the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill), which prohibits disclosure of certain information by the Department of Agriculture (USDA) and its cooperators. Maryland Department of Agriculture assists NRCS in the delivery of conservation-related services (for example, services that sustain agricultural productivity, improve environmental quality, reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters) or with monitoring, assessing, or evaluating of conservation benefits from USDA conservation programs under a Cooperative Working Agreement. Those individuals or organizations (governmental or nongovernmental) that assist NRCS with providing conservation-related services are known as NRCS Conservation Cooperators.

NRCS Conservation Cooperator

As an NRCS Conservation Cooperator, Maryland Department of Agriculture is authorized access to otherwise-protected agricultural information. Such protected information must be strictly limited to only that information necessary for Maryland Department of Agriculture to provide conservation related services *and* to perform monitoring, assessing, or evaluating of conservation benefits. Disclosure to Maryland Department of Agriculture can include receiving the protected information either 1) directly from NRCS; 2) directly from the producer or owner as part of the process required to enable a producer or owner to participate in a USDA program; or 3) in another manner with the producer's permission.

Section 1619 of the 2008 Farm Bill

Section 1619 of the Food, Conservation, and Energy Act of 2008 (Exhibit 1) (hereinafter "section 1619" provides that USDA, or any "contractor or cooperator" of USDA, "shall not disclose—(A) 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; or (B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided." USDA may disclose protected information to a USDA cooperator when such cooperator is "providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices" if USDA determines that the protected information will not be subsequently disclosed, except in accordance with the exceptions contained in Section 1619. Maryland Department of Agriculture is a "contractor or cooperator" of USDA within the meaning of Section 1619. Accordingly,] may not subsequently disclose any information protected by section 1619. By signature on this Acknowledgment, Maryland Department of Agriculture is certifying future compliance with the statutory obligations under Section 1619. Upon execution of this Acknowledgment, NRCS may

continue to provide to Maryland Department of Agriculture the protected information provided under Cooperative Working Agreement.

Responsibilities

Maryland Department of Agriculture (hereinafter the "Conservation Cooperator") certifies that:

- Signature on this Acknowledgment indicates acknowledgment and understanding that the Conservation Cooperator is legally bound by Federal statute to comply with the provisions of Section 1619 and that the Conservation Cooperator will not subsequently disclose information protected by section 1619 to any individual or organization that is not directly covered by this Acknowledgment. Any such subsequent disclosure of the protected information (except as permitted under Section 1619) will be considered a violation of Section 1619. The Conservation Cooperator will be held responsible should disclosure of the protected information occur.

- Signature on this Acknowledgment legally binds every owner, manager, supervisor, employee, contractor, agent, and representative of the Conservation Cooperator to comply with the provisions in Section 1619. The Conservation Cooperator must consult with NRCS prior to providing protected information to an entity or individual outside of the Conservation Cooperator and as necessary to implement the program to ensure that such release is permissible.

- The Conservation Cooperator will use the protected information only to perform work that is directly connected to provide conservation related services *and* perform monitoring, assessing, or evaluating conservation benefits. Use of the protected information to perform work that is not directly connected to provide conservation related services *and* perform monitoring, assessing, or evaluating conservation benefits is expressly prohibited.

- The Conservation Cooperator must internally restrict access to the protected information to only those individuals who have a demonstrated need to know the protected information in order to provide conservation related services *and* perform monitoring, assessing, or evaluation of conservation benefits.

- The provisions in Section 1619 are continuing obligations. Even when the Conservation Cooperator is no longer an NRCS Conservation Cooperator, or when individuals currently affiliated with the Conservation Cooperator become no longer so affiliated, every person having been provided access to the protected information will continue to be legally bound to comply with the provisions of this Acknowledgment.

- The Conservation Cooperator must notify all managers, supervisors, employees, contractors, agents, and representatives about this Acknowledgment and the requirements of Section 1619. For the duration of this Acknowledgment, notifications about the existence of this Acknowledgment must be made to those individuals who are new to the organization and periodic notifications must be sent throughout the organization (as well as to all contractors and agents) to remind all about the ongoing and continuing requirements.

- When the Conservation Cooperator is unsure whether particular information is covered or protected by Section 1619, the Conservation Cooperator must consult with NRCS to determine whether the information must be withheld.

- This Acknowledgment is nontransferable and may not be bought, sold, traded, assigned, extended to, or given free of charge to any other individual or organization not directly covered by this Acknowledgment.

- Use of the protected information for any purpose is expressly prohibited when an individual or organization is no longer an NRCS Conservation Cooperator. When the Conservation Cooperator is no longer an NRCS Conservation Cooperator, any protected information provided under this Acknowledgment must be immediately destroyed or returned to NRCS. The Conservation Cooperator must provide to NRCS written certification that the protected information (paper copy, electronic copy, or both) has been properly destroyed, removed from any electronic storage media, or both.

- The State's "sunshine law," "open records act" or other version of the Freedom of Information Act is superseded by section 1619 under the Supremacy Clause of the U.S. Constitution. Accordingly, information protected from disclosure by section 1619 must not be released under such State laws.

Protected Information

An example of the type of information prohibited by disclosure under Section 1619 includes, but is **not limited to**, the following:

- State identification and county number (where reported and where located).
- Producer or landowner name, business full address, phone number, Social Security Number, and similar personal identifying information.
- Farm, tract, field, and contract numbers.
- Production shares and share of acres for each Farm Serial Number (FSN) field.
- Acreage information, including crop codes.
- All attributes for Common Land Units (CLUs) in USDA's Geospatial Information System
- Any photographic, map, or geospatial data that, when combined with other maps, can be used to identify a landowner.
- Location of conservation practices.

Section 1619 allows disclosure of "payment information (including payment information and the names and addresses of recipients of payments) under any Department program *that is otherwise authorized by law"* (emphasis added). The names and payment information of producers generally may be provided to the public; however the Conservation Cooperator shall consult with NRCS if there is any uncertainty as to the provision of such information.

Section 1619 also allows disclosure of otherwise protected information if "the information has been transformed into a statistical or aggregate form without naming any—(i) individual owner, operator, or producer; or (ii) specific data gathering cite." The Conservation Cooperator must consult with NRCS as to whether specific information falls within this exception prior to relying on this exception.

Violations

The Conservation Cooperator will be held responsible for violations of this Acknowledgment and Section 1619. A violation of this Acknowledgment by the Conservation Cooperator may result in action by NRCS, including termination of the underlying Cooperative Working Agreement.

Effective Period

This Acknowledgment will be in effect on the date of the final signature and continues until NRCS notifies the Conservation Cooperator that the Acknowledgment is no longer required based on changes in applicable Federal law.

Signature of the NRCS Conservation Cooperator and the Date Signed

_____
NRCS Conservation Cooperator

Executed this 27 day of October, 2009

SEC. 1619. *INFORMATION GATHERING.*

(a) **GEOSPATIAL SYSTEMS**—The Secretary shall ensure that all the geospatial data of the agencies of the Department of Agriculture are portable and standardized.

(b) **LIMITATION ON DISCLOSURES**—

(1) **DEFINITION OF AGRICULTURAL OPERATION**—In this subsection, the term ''agricultural operation'' includes the production and marketing of agricultural commodities and livestock.

(2) **PROHIBITION**—Except as provided in paragraphs (3) and (4), the Secretary, any officer or employee of the Department of Agriculture, or any contractor or cooperator of the Department, shall not disclose—

(A) 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 programs of the Department; or

(B) Geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.

(3) **AUTHORIZED DISCLOSURES**—

(A) LIMITED RELEASE OF INFORMATION—If the Secretary determines that the information described in paragraph (2) will not be subsequently disclosed except in accordance with paragraph (4), the Secretary may release or disclose the information to a person or Federal, State, local, or tribal agency working in cooperation with the Secretary in any Department program—

(i) When providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices; or

(ii) When responding to a disease or pest threat to agricultural operations, if the Secretary determines that a threat to agricultural operations exists and the disclosure of information to a person or cooperating government entity is necessary to assist the Secretary in responding to the disease or pest threat as authorized by law.

(4) **EXCEPTIONS**—Nothing in this subsection affects—

(A) The disclosure of payment information (including payment information and the names and addresses of recipients of payments) under any Department program that is otherwise authorized by law;

(B) The disclosure of information described in paragraph (2) if the information has been transformed into a statistical or aggregate form without naming any—

(i) Individual owner, operator, or producer; or

(ii) Specific data gathering site; or

(C) The disclosure of information described in paragraph (2) pursuant to the consent of the agricultural producer or owner of agricultural land.

(5) **CONDITION OF OTHER PROGRAMS**—The participation of the agricultural producer or owner of agricultural land in, or receipt of any benefit under, any program administered by the Secretary may not be conditioned on the consent of the agricultural producer or owner of agricultural land under paragraph 4(c).

(6) **WAIVER OF PRIVILEGE OR PROTECTION**—The disclosure of information under paragraph (2) shall not constitute a waiver of any applicable privilege or protection under Federal law, including trade secret protection.

We have read the FSA and NRCS Cooperative Agreements, Section 1619 of the Food, Conservation and Energy Act of 2008, and I agree to the above data use, analysis, storage, aggregation and reporting procedures

SWCD Employee in USC Signature	27 March 2012 Date	Jim Curatolo
SWCD Employee in USC Signature	22 March 2012 Date	Aaron Ristow
SWCD Employee in USC Signature	27 MARCH 2012 Date	Chris Yearick
SWCD Employee in USC Signature	28 march 2012 Date	Meagan O'Brien
SWCD Employee in USC Signature	30 march 2012 Date	Jody Appleby
SWCD Employee in USC Signature	27 March 2012 Date	Joann Burke
SWCD Employee in USC Signature	3/30/2012 Date	Troy Bishopp
SWCD Employee in USC Signature	4/9/2012 Date	Amanda Barber
SWCD Employee in USC Signature	4/17/2012 Date	Scott Fickbohm
SWCD Employee in USC Signature	4/17/2012 Date	John Wickham

NATURAL RESOURCES CONSERVATION SERVICE (NRCS)
UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

ACKNOWLEDGMENT OF SECTION 1619 COMPLIANCE

Purpose and Background

The purpose of this Acknowledgment of Section 1619 compliance (hereinafter "Acknowledgment") is to require acknowledgment by [*The Upper Susquehanna Coalition*] of the requirements of Section 1619 of the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill), which prohibits disclosure of certain information by the Department of Agriculture (USDA) and its cooperators. [*The Upper Susquehanna Coalition*] assists NRCS in the delivery of conservation-related services (for example, services that sustain agricultural productivity, improve environmental quality, reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters) or with monitoring, assessing, or evaluating of conservation benefits from USDA conservation programs under a [*contribution agreement*]. Those individuals or organizations (governmental or nongovernmental) that assist NRCS with providing conservation-related services are known as NRCS Conservation Cooperators.

NRCS Conservation Cooperator

As an NRCS Conservation Cooperator, [*the Upper Susquehanna Coalition*] is authorized access to otherwise-protected agricultural information. Such protected information must be strictly limited to only that information necessary for [*the Upper Susquehanna Coalition*] [to provide conservation related services]. Disclosure to [*the Upper Susquehanna Coalition*] can include receiving the protected information either 1) directly from NRCS; 2) directly from the producer or owner as part of the process required to enable a producer or owner to participate in a USDA program; or 3) in another manner with the producer's permission.

Section 1619 of the 2008 Farm Bill

Section 1619 of the Food, Conservation, and Energy Act of 2008 (Exhibit 1) (hereinafter "section 1619" provides that USDA, or any "contractor or cooperator" of USDA, "shall not disclose—(A) 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; or (B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided." USDA may disclose protected information to a USDA cooperator when such cooperator is "providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices" if USDA determines that the protected information will not be subsequently disclosed, except in accordance with the exceptions contained in Section 1619. [*The Upper Susquehanna Coalition*] is a "contractor or cooperator" of USDA within the meaning of Section 1619. Accordingly, [*the Upper Susquehanna Coalition*] may not subsequently disclose any information protected by section 1619. By signature on this Acknowledgment, [*the Upper Susquehanna Coalition*] is certifying future compliance with the statutory obligations under Section 1619. Upon execution

of this Acknowledgment, NRCS may continue to provide to [*the Upper Susquehanna Coalition*] the protected information provided under [*the contribution agreement*].

Responsibilities

[*The Upper Susquehanna Coalition*] (hereinafter the "Conservation Cooperator") certifies that:

- Signature on this Acknowledgment indicates acknowledgment and understanding that the Conservation Cooperator is legally bound by Federal statute to comply with the provisions of Section 1619 and that the Conservation Cooperator will not subsequently disclose information protected by section 1619 to any individual or organization that is not directly covered by this Acknowledgment. Any such subsequent disclosure of the protected information (except as permitted under Section 1619) will be considered a violation of Section 1619. The Conservation Cooperator will be held responsible should disclosure of the protected information occur.

- Signature on this Acknowledgment legally binds every owner, manager, supervisor, employee, contractor, agent, and representative of the Conservation Cooperator to comply with the provisions in Section 1619. The Conservation Cooperator must consult with NRCS prior to providing protected information to an entity or individual outside of the Conservation Cooperator and as necessary to implement the program to ensure that such release is permissible.

- The Conservation Cooperator will use the protected information only to perform work that is directly connected to [provide conservation related services. Use of the protected information to perform work that is not directly connected to [provide conservation related services is expressly prohibited.

- The Conservation Cooperator must internally restrict access to the protected information to only those individuals who have a demonstrated need to know the protected information in order to [provide conservation related services].

- The provisions in Section 1619 are continuing obligations. Even when the Conservation Cooperator is no longer an NRCS Conservation Cooperator, or when individuals currently affiliated with the Conservation Cooperator become no longer so affiliated, every person having been provided access to the protected information will continue to be legally bound to comply with the provisions of this Acknowledgment.

- The Conservation Cooperator must notify all managers, supervisors, employees, contractors, agents, and representatives about this Acknowledgment and the requirements of Section 1619. For the duration of this Acknowledgment, notifications about the existence of this Acknowledgment must be made to those individuals who are new to the organization and periodic notifications must be sent throughout the organization (as well as to all contractors and agents) to remind all about the ongoing and continuing requirements.

- When the Conservation Cooperator is unsure whether particular information is covered or protected by Section 1619, the Conservation Cooperator must consult with NRCS to determine whether the information must be withheld.

- This Acknowledgment is nontransferable and may not be bought, sold, traded, assigned, extended to, or given free of charge to any other individual or organization not directly covered by this Acknowledgment.

- Use of the protected information for any purpose is expressly prohibited when an individual or organization is no longer an NRCS Conservation Cooperator. When the Conservation Cooperator is no longer an NRCS Conservation Cooperator, any protected information provided under this Acknowledgment must be immediately destroyed or returned to NRCS. The Conservation Cooperator must provide to NRCS written certification that the protected information (paper copy, electronic copy, or both) has been properly destroyed, removed from any electronic storage media, or both.

Protected Information

An example of the type of information prohibited by disclosure under Section 1619 includes, but is **not limited to**, the following:

- State identification and county number (where reported and where located).
- Producer or landowner name, business full address, phone number, Social Security Number, and similar personal identifying information.
- Farm, tract, field, and contract numbers.
- Production shares and share of acres for each Farm Serial Number (FSN) field.
- Acreage information, including crop codes.
- All attributes for Common Land Units (CLUs) in USDA's Geospatial Information System
- Any photographic, map, or geospatial data that, when combined with other maps, can be used to identify a landowner.
- Location of conservation practices.

Section 1619 allows disclosure of "payment information (including payment information and the names and addresses of recipients of payments) under any Department program *that is otherwise authorized by law"* (emphasis added). The names and payment information of producers generally may be provided to the public; however the Conservation Cooperator shall consult with NRCS if there is any uncertainty as to the provision of such information.

Section 1619 also allows disclosure of otherwise protected information if "the information has been transformed into a statistical or aggregate form without naming any—(i) individual owner, operator, or producer; or (ii) specific data gathering cite." The Conservation Cooperator must consult with NRCS as to whether specific information falls within this exception prior to relying on this exception.

Violations

The Conservation Cooperator will be held responsible for violations of this Acknowledgment and Section 1619. A violation of this Acknowledgment by the Conservation Cooperator may result in action by NRCS, including termination of the underlying [*contribution agreement*].

Effective Period

This Acknowledgment will be in effect on the date of the final signature and continues until NRCS notifies the Conservation Cooperator that the Acknowledgment is no longer required based on changes in applicable Federal law.

Signature of the NRCS Conservation Cooperator and the Date Signed

Craig Schmitt, District Manager Tompkins Co. SWCD

Executed this 3rd day of March, 2011

(a) GEOSPATIAL SYSTEMS—The Secretary shall ensure that all the geospatial data of the agencies of the Department of Agriculture are portable and standardized.

(b) LIMITATION ON DISCLOSURES—

(1) **DEFINITION OF AGRICULTURAL OPERATION**—In this subsection, the term ''agricultural operation'' includes the production and marketing of agricultural commodities and livestock.

(2) **PROHIBITION**—Except as provided in paragraphs (3) and (4), the Secretary, any officer or employee of the Department of Agriculture, or any contractor or cooperator of the Department, shall not disclose—

(A) 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 programs of the Department; or

(B) Geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.

(3) **AUTHORIZED DISCLOSURES—**

(A) LIMITED RELEASE OF INFORMATION—If the Secretary determines that the information described in paragraph (2) will not be subsequently disclosed except in accordance with paragraph (4), the Secretary may release or disclose the information to a person or Federal, State, local, or tribal agency working in cooperation with the Secretary in any Department program—

(i) When providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices; or

(ii) When responding to a disease or pest threat to agricultural operations, if the Secretary determines that a threat to agricultural operations exists and the disclosure of information to a person or cooperating government entity is necessary to assist the Secretary in responding to the disease or pest threat as authorized by law.

(4) **EXCEPTIONS**—Nothing in this subsection affects—

(A) The disclosure of payment information (including payment information and the names and addresses of recipients of payments) under any Department program that is otherwise authorized by law;

(B) The disclosure of information described in paragraph (2) if the information has been transformed into a statistical or aggregate form without naming any—

(i) Individual owner, operator, or producer; or

(ii) Specific data gathering site; or

(C) The disclosure of information described in paragraph (2) pursuant to the consent of the agricultural producer or owner of agricultural land.

(5) **CONDITION OF OTHER PROGRAMS**—The participation of the agricultural producer or owner of agricultural land in, or receipt of any benefit under, any program administered by the Secretary may not be conditioned on the consent of the agricultural producer or owner of agricultural land under paragraph 4(c).

(6) **WAIVER OF PRIVILEGE OR PROTECTION**—The disclosure of information under paragraph (2) shall not constitute a waiver of any applicable privilege or protection under Federal law, including trade secret protection.

USDA

United States
Department of
Agriculture

Attachment C

CERTIFICATION OF NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION COOPERATOR

I, Lawrence Edward Fender of Virginia Dept. of Conservation and Recreation
(full name and organization identity of the employee, contractor, or agent of cooperator seeking access to data), certify that I am authorized to provide technical and/or financial assistance for U.S. Department of Agriculture (USDA) conservation programs. USDA's Natural Resources Conservation Service (NRCS) has authority for ensuring such technical and financial assistance, and has requested that data critical for implementing conservation programs be shared directly with me.

The USDA data that I am authorized to use, and am responsible for safeguarding, includes only data necessary for the delivery of technical and/or financial assistance for conservation programs. This may include, but is not limited to, the following data contained in Privacy Act System of Records FSA-2, Farm Records (Automated):

- State identification and county number (where reported and where located);
- Producer/land owner and business entity name, full address, phone number, and identification type;
- Farm, tract, field, and contract numbers;
- Production shares and share of acres for each Farm Serial Number (FSN) field;
- Acreage information including crop code;
- Practice code;
- Aerial photographs;
- Attributes for Common Land Units (CLUs) in USDA's Geospatial Information System;
- Producer Social Security Numbers (SSNs) and tax identification numbers.

USDA may authorize me to use the data for the following technical assistance activities for USDA conservation programs:

- Program eligibility determinations;
- Conservation planning;
- Conservation practice and systems implementation and certification;
- Policy and program support;
- Compliance and status reviews;
- Outreach to conservation program participants and non-participants.

USDA

I am aware that the information may be protected under Section 1619 of the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill). See Pub. L. 110-246, Title I, Section 1619; Attachment 1. I understand that, as a recognized USDA cooperator, I am personally responsible for upholding the law and safeguarding this information following USDA, U. S. Forest Service (USFS), Natural Resources Conservation Service (NRCS), and FSA guidelines and policies and in accordance with a master Memorandum of Understanding (MOU) executed with USDA's U.S. Forest Service, NRCS and FSA for sharing data. I understand that this certification will be appended to and incorporated by reference to such MOU for sharing such data.

I understand that the prohibition on releasing data covered by Section 1619 includes any data I may obtain from producers or landowners in the course of fulfilling my duties cooperating with USDA on its conservation programs. The prohibition does not cover data that is collected by local and State entities for their own use as State entities. Since I may be collecting data from producers and landowners for dual purposes (USDA and State), I will make clear to the producers and landowners the purpose of the information collection at the time the information is collected. This notification will help ensure producers and landowners are made aware that information provided for State purposes may be released under State open disclosure laws.

I will only share data subject to Section 1619 with other USDA certified, authorized employees, contractors, or agents of cooperators with a need-to-know this information in order to cooperate with USDA in implementing its conservation programs. The term "USDA certified" means the individual has proof of a completed USDA certification for securing data, such as this certification. In particular, I will not transmit any "Core Personally Identifiable Information" (PII), including any portions of SSNs or maps showing tract, field, or farm identification numbers, via mobile device including cell and cordless phones. See Attachment 2.

When my work duties no longer require me to have access to data subject to Section 1619, I will notify the designated contacts under the master MOU to which this certification is appended and incorporated by reference. I will relinquish any such data in my possession, following the instructions of the primary USDA contacts under a master MOU to which this certification is appended. I will no longer have access to such data in any form.

I will neither discuss nor reveal the contents of any such data other than to USDA certified, authorized employees, contractors, or agents of cooperators who need to know such information in order to cooperate with USDA in implementing its conservation programs. I understand that my access to USDA data may be suspended, curtailed, or eliminated at the discretion of the USDA contacts under a master MOU for sharing data, to which this certification is appended.

Lawrence E. Faudree — 12/4/09

(Signature of employee, contractor, or agent of cooperator) **(Date)**

USDA

VERIFED BY:

R. Wade Biddix

(Printed or typed name and title of authorized NRCS employee)

(Signature of authorized NRCS employee)

12/10/2009

(Date)

NOTE: The primary authority for requesting and safeguarding the information described on this certification is the Food, Conservation, and Energy Act of 2008 (Pub. L. 110-246). The information collected and shared as a result of this certification may be released to USDA employees, USDA contractors or authorized USDA cooperators who are bound to safeguard the information under Section 1619 of the Food, Conservation, and Energy Act; the Privacy Act of 1974; the E-Government Act of 2002; and related authorities. This information collection is exempted from the Paperwork Reduction Act as it is required for administration of the Food, Conservation, and Energy Act of 2008. See Pub. L. 110-246, Title I, Section 1601(C)(2)(A). The provisions of criminal and civil fraud, privacy and other statutes may be applicable to the information provided and disclosed.

Attachments

USDA

ATTACHMENT 1

Section 1619 of the 2008 Farm Bill

SEC. 1619. INFORMATION GATHERING.

(a) **GEOSPATIAL SYSTEMS.**—The Secretary shall ensure that all the geospatial data of the agencies of the Department of Agriculture are portable and standardized.

(b) **LIMITATION ON DISCLOSURES.**—

(1) **DEFINITION OF AGRICULTURAL OPERATION.**—In this subsection, the term ''agricultural operation'' includes the production and marketing of agricultural commodities and livestock.

(2) **PROHIBITION.**—Except as provided in paragraphs (3) and (4), the Secretary, any officer or employee of the Department of Agriculture, or any contractor or cooperator of the Department, shall not disclose—

(A) 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 programs of the Department; or

(B) Geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.

(3) **AUTHORIZED DISCLOSURES.**—

(A) LIMITED RELEASE OF INFORMATION.—If the Secretary determines that the information described in paragraph (2) will not be subsequently disclosed except in accordance with paragraph (4), the Secretary may release or disclose the information to a person or Federal, State, local, or tribal agency working in cooperation with the Secretary in any Department program—

(i) When providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices; or

(ii) When responding to a disease or pest threat to agricultural operations, if the Secretary determines that a threat to agricultural operations exists and the disclosure of information to a person or cooperating government entity is necessary to assist the Secretary in responding to the disease or pest threat as authorized by law.

(4) **EXCEPTIONS.**—Nothing in this subsection affects—

(A) The disclosure of payment information (including payment information and the names and addresses of recipients of payments) under any Department program that is otherwise authorized by law;

(B) The disclosure of information described in paragraph (2) if the information has been transformed into a statistical or aggregate form without naming any—

(i) Individual owner, operator, or producer; or

(ii) Specific data gathering site; or

(C) The disclosure of information described in paragraph (2) pursuant to the consent of the agricultural producer or owner of agricultural land.

(5) **CONDITION OF OTHER PROGRAMS.**—The participation of the agricultural producer or owner of agricultural land in, or receipt of any benefit under, any program administered by the Secretary may not be conditioned on the consent of the agricultural producer or owner of agricultural land under paragraph 4(c).

(6) **WAIVER OF PRIVILEGE OR PROTECTION.**—The disclosure of information under paragraph (2) shall not constitute a waiver of any applicable privilege or protection under Federal law, including trade secret protection.

USDA

ATTACHMENT 2

Definition of "Core PII"

"Core PII" may commonly be misused for identity theft. USDA, FSA defines "Core PII" to include the following:

- Social Security Number (SSN), including the "last 4 digits" or any other part of the SSN
- Tax or Owner's Identification (ID) Number, when such number is identical to SSN or any part of the SSN
- Personal phone number (landlines and cell phones for individuals)
- Personal email address
- Place and date of birth
- Mother's maiden name
- Biometric records, such as finger prints
- Personal financial information, such as, bank account number and banking information
- Personal insurance information not relating to USDA programs
- Medical information
- USDA employee administrative or disciplinary information
- Scores and comments appearing on USDA employee performance appraisals
- Responses submitted on Confidential Financial Disclosure Reports (Form OGE-450).

In most cases, "Core PII" is **not** releasable under FOIA, and is not made available to the general public. Data fields and responses on USDA, FSA , or NRCS forms containing "Core PII" need to be redacted, prior to release.

"Core PII" is highly sensitive and must be protected at all times under the PA, the E-Government Act of 2002, and related legislation, regulations, and policies, including 7 CFR Part 1, Subpart G. Documents containing "Core PII" shall not be left unattended in open spaces, and must be kept under reasonable custodial control, e.g., in locked cabinets.

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

ACKNOWLEDGMENT OF SECTION 1619 COMPLIANCE

Purpose and Background

The purpose of this Acknowledgment of Section 1619 compliance (hereinafter "Acknowledgment") is to require acknowledgment by the West Virginia Department of Agriculture of the requirements of Section 1619 of the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill), which prohibits disclosure of certain information by the Department of Agriculture (USDA) and its cooperators. The West Virginia Department of Agriculture assists NRCS in the delivery of conservation-related services (for example, services that sustain agricultural productivity, improve environmental quality, reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters) or with monitoring, assessing, or evaluating of conservation benefits from USDA conservation programs under a Cooperative Agreement. Those individuals or organizations (governmental or nongovernmental) that assist NRCS with providing conservation-related services are known as NRCS Conservation Cooperators.

NRCS Conservation Cooperator

As an NRCS Conservation Cooperator, the West Virginia Department of Agriculture is authorized access to otherwise-protected agricultural information. Such protected information must be strictly limited to only that information necessary for the West Virginia Department of Agriculture to provide conservation related services. Disclosure to the West Virginia Department of Agriculture can include receiving the protected information either 1) directly from NRCS; 2) directly from the producer or owner as part of the process required to enable a producer or owner to participate in a USDA program; or 3) in another manner with the producer's permission.

Section 1619 of the 2008 Farm Bill

Section 1619 of the Food, Conservation, and Energy Act of 2008 (Exhibit 1) (hereinafter "section 1619" provides that USDA, or any "contractor or cooperator" of USDA, "shall not disclose—(A) 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; or (B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided." USDA may disclose protected information to a USDA cooperator when such cooperator is "providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices" if USDA determines that the protected information will not be subsequently disclosed, except in accordance with the exceptions contained in Section 1619. The West Virginia Department of Agriculture is a "contractor or cooperator" of USDA within the meaning of Section 1619. Accordingly, the West Virginia Department of Agriculture may not subsequently disclose any information protected by section 1619. By signature on this Acknowledgment, the West Virginia Department of Agriculture is certifying future compliance with the statutory obligations

under Section 1619. Upon execution of this Acknowledgment, NRCS may continue to provide to the West Virginia Department of Agriculture the protected information provided under *the Cooperative Agreement.*

Responsibilities

The West Virginia Department of Agriculture (hereinafter the "Conservation Cooperator") certifies that:

- Signature on this Acknowledgment indicates acknowledgment and understanding that the Conservation Cooperator is legally bound by Federal statute to comply with the provisions of Section 1619 and that the Conservation Cooperator will not subsequently disclose information protected by section 1619 to any individual or organization that is not directly covered by this Acknowledgment. Any such subsequent disclosure of the protected information (except as permitted under Section 1619) will be considered a violation of Section 1619. The Conservation Cooperator will be held responsible should disclosure of the protected information occur.

- Signature on this Acknowledgment legally binds every owner, manager, supervisor, employee, contractor, agent, and representative of the Conservation Cooperator to comply with the provisions in Section 1619. The Conservation Cooperator must consult with NRCS prior to providing protected information to an entity or individual outside of the Conservation Cooperator and as necessary to implement the program to ensure that such release is permissible.

- The Conservation Cooperator will use the protected information only to perform work that is directly connected to provide conservation related services. Use of the protected information to perform work that is not directly connected to provide conservation related services is expressly prohibited.

- The Conservation Cooperator must internally restrict access to the protected information to only those individuals who have a demonstrated need to know the protected information in order to provide conservation related services.

- The provisions in Section 1619 are continuing obligations. Even when the Conservation Cooperator is no longer an NRCS Conservation Cooperator, or when individuals currently affiliated with the Conservation Cooperator become no longer so affiliated, every person having been provided access to the protected information will continue to be legally bound to comply with the provisions of this Acknowledgment.

- The Conservation Cooperator must notify all managers, supervisors, employees, contractors, agents, and representatives about this Acknowledgment and the requirements of Section 1619. For the duration of this Acknowledgment, notifications about the existence of this Acknowledgment must be made to those individuals who are new to the organization and periodic notifications must be sent throughout the organization (as well as to all contractors and agents) to remind all about the ongoing and continuing requirements.

- When the Conservation Cooperator is unsure whether particular information is covered or protected by Section 1619, the Conservation Cooperator must consult with NRCS to determine whether the information must be withheld.

- This Acknowledgment is nontransferable and may not be bought, sold, traded, assigned, extended to, or given free of charge to any other individual or organization not directly covered by this Acknowledgment.

- Use of the protected information for any purpose is expressly prohibited when an individual or organization is no longer an NRCS Conservation Cooperator. When the Conservation Cooperator is no longer an NRCS Conservation Cooperator, any protected information provided under this Acknowledgment must be immediately destroyed or returned to NRCS. The Conservation Cooperator must provide to NRCS written certification that the protected information (paper copy, electronic copy, or both) has been properly destroyed, removed from any electronic storage media, or both.

- The State's "sunshine law," "open records act" or other version of the Freedom of Information Act is superseded by section 1619 under the Supremacy Clause of the U.S. Constitution. Accordingly, information protected from disclosure by section 1619 must not be released under such State laws.

Protected Information

An example of the type of information prohibited by disclosure under Section 1619 includes, but is **not limited to**, the following:

- State identification and county number (where reported and where located).
- Producer or landowner name, business full address, phone number, Social Security Number, and similar personal identifying information.
- Farm, tract, field, and contract numbers.
- Production shares and share of acres for each Farm Serial Number (FSN) field.
- Acreage information, including crop codes.
- All attributes for Common Land Units (CLUs) in USDA's Geospatial Information System
- Any photographic, map, or geospatial data that, when combined with other maps, can be used to identify a landowner.
- Location of conservation practices.

Section 1619 allows disclosure of "payment information (including payment information and the names and addresses of recipients of payments) under any Department program *that is otherwise authorized by law"* (emphasis added). The names and payment information of producers generally may be provided to the public; however the Conservation Cooperator shall consult with NRCS if there is any uncertainty as to the provision of such information.

Section 1619 also allows disclosure of otherwise protected information if "the information has been transformed into a statistical or aggregate form without naming any—(i) individual owner, operator, or producer; or (ii) specific data gathering cite." The Conservation Cooperator must consult with NRCS as to whether specific information falls within this exception prior to relying on this exception.

Violations

The Conservation Cooperator will be held responsible for violations of this Acknowledgment and Section 1619. A violation of this Acknowledgment by the Conservation Cooperator may result in action by NRCS, including termination of the underlying Cooperative Agreement.

Effective Period

This Acknowledgment will be in effect on the date of the final signature and continues until NRCS notifies the Conservation Cooperator that the Acknowledgment is no longer required based on changes in applicable Federal law.

Signature of the NRCS Conservation Cooperator and the Date Signed

Executed this 9th day of April, 2012

SEC. 1619. *INFORMATION GATHERING.*

(a) **GEOSPATIAL SYSTEMS**—The Secretary shall ensure that all the geospatial data of the agencies of the Department of Agriculture are portable and standardized.

(b) **LIMITATION ON DISCLOSURES**—

(1) **DEFINITION OF AGRICULTURAL OPERATION**—In this subsection, the term ''agricultural operation'' includes the production and marketing of agricultural commodities and livestock.

(2) **PROHIBITION**—Except as provided in paragraphs (3) and (4), the Secretary, any officer or employee of the Department of Agriculture, or any contractor or cooperator of the Department, shall not disclose—

(A) 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 programs of the Department; or

(B) Geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.

(3) **AUTHORIZED DISCLOSURES**—

(A) LIMITED RELEASE OF INFORMATION—If the Secretary determines that the information described in paragraph (2) will not be subsequently disclosed except in accordance with paragraph (4), the Secretary may release or disclose the information to a person or Federal, State, local, or tribal agency working in cooperation with the Secretary in any Department program—

(i) When providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices; or

(ii) When responding to a disease or pest threat to agricultural operations, if the Secretary determines that a threat to agricultural operations exists and the disclosure of information to a person or cooperating government entity is necessary to assist the Secretary in responding to the disease or pest threat as authorized by law.

(4) **EXCEPTIONS**—Nothing in this subsection affects—

(A) The disclosure of payment information (including payment information and the names and addresses of recipients of payments) under any Department program that is otherwise authorized by law;

(B) The disclosure of information described in paragraph (2) if the information has been transformed into a statistical or aggregate form without naming any—

(i) Individual owner, operator, or producer; or

(ii) Specific data gathering site; or

(C) The disclosure of information described in paragraph (2) pursuant to the consent of the agricultural producer or owner of agricultural land.

(5) **CONDITION OF OTHER PROGRAMS**—The participation of the agricultural producer or owner of agricultural land in, or receipt of any benefit under, any program administered by the Secretary may not be conditioned on the consent of the agricultural producer or owner of agricultural land under paragraph 4(c).

(6) **WAIVER OF PRIVILEGE OR PROTECTION**—The disclosure of information under paragraph (2) shall not constitute a waiver of any applicable privilege or protection under Federal law, including trade secret protection.

SCC 1251-00

NRCS No. 3D47-MOU-12-0002

MEMORANDUM OF UNDERSTANDING
BETWEEN
WEST VIRGINIA CONSERVATION AGENCY
AND
USDA NATURAL RESOURCES CONSERVATION SERVICE
February 3, 2012

BACKGROUND:

West Virginia is one of six states and the District of Columbia that is subject to the Chesapeake Bay TMDL. This TMDL calls for reductions in nutrients and sediment to attain specific cap loads. Contributing sources include wastewater treatment plants, agriculture, urban stormwater, and septic systems. Reductions from agriculture in the Potomac drainage are required and West Virginia is working to both install best management practices (BMPs) where needed but also to accurately account for existing BMPs on the ground. In order for West Virginia and our farmers to obtain full credit for agricultural BMPs that are in place, it is necessary for West Virginia to be able to document and verify these practices.

PURPOSE:

This MOU will outline the needs, processes, and resources for WVCA and NRCS to work cooperatively to obtain specific information on animal waste management and mortality disposal systems* installed on West Virginia farms in the Potomac drainage. This information will be aggregated at the county level and reported to the Chesapeake Bay Program to ensure West Virginia is receiving full credit for installed BMPs.

RESPONSIBILITIES OF THE PARTIES:

WVCA WILL:

1. Provide staff to work in local NRCS field offices to obtain the following information on animal waste management systems (AWMS) and mortality disposal systems (MDS) in the 8 counties of the Potomac drainage
    a. Type of AWMS and MDS – poultry, dairy, beef
    b. Number of animals for which the facility was built
    c. Date installed
    d. County

2. Collect data on animal waste management and mortality disposal systems installed under both the PL-534 program and EQIP (1996 – present).

3. Adequately aggregate the data to the county level to ensure the privacy of all producers is protected and abide by the requirements of the agreement currently in place between WVCA and NRCS concerning Section 1619 of the 2008 Farm Bill.

***Should only be poultry composters and incinerators**

Schedule field office visits to accommodate local NRCS staff.

NRCS WILL:

1. Notify field offices of project and request cooperation at the local level.

2. Provide access to computer systems and paper files as necessary for WVCA to obtain the data.

3. Provide initial guidance to WVCA staff on NRCS systems and files.

IT IS MUTUALLY AGREED THAT:

1. This MOU is effective on the date of final signature and shall continue in force for one year (March 1, , 2013).

2. This MOU does not obligate funding. Nothing in this MOU shall obligate either the WVCA or NRCS to transfer any funds. Specific projects or activities that involve the transfer of funds, services, or property among the parties require execution of separate agreements and are contingent upon the availability of appropriated funds.

3. Any costs incurred by either party in implementing this MOU are the responsibility of that party.

4. This MOU may be modified by amendment duly executed by authorized officials of the WVCA and the NRCS.

5. This MOU may be terminated by either party hereto by written notice to the other party at least 30 calendar days in advance of the effective date of the termination.

6. The parties will each assume responsibility for the actions of their officials or employees acting within the scope of their employment to the extent provided by Federal and State law.

7. Employees of the WVCA or their agents shall not be considered as being federal employees or agents of the United States for any purpose whatsoever under this MOU. NRCS liability is limited to that which is covered under the Federal Tort Claims Act.

8. Any materials produced or published through this MOU will indicate that they were accomplished in cooperation between WVCA and USDA- Natural Resources Conservation Service.

PROJECT SCHEDULE:

May 1, 2012 Data collection in local field offices begins
September 30, 2012 Data collection is finalized

SIGNATURES:

West Virginia Conservation Agency	
BY:	
TITLE:	Executive Director
DATE:	2/21/2012

United States Department of Agriculture Natural Resources Conservation Service	
BY:	
TITLE:	STATE CONSERVATIONIST
DATE:	3/1/2012

UNITED STATES DEPARTMENT OF AGRICULTURE

COOPERATIVE AGREEMENT

USDA SECTION 1619 COOPERATOR

CERTIFYING USDA AGENCY: FARM SERVICE AGENCY

Purpose

This USDA Section 1619 Cooperator Cooperative Agreement is being issued by the Farm Service Agency (FSA) to establish that the U.S. Geological Survey (USGS) has been certified by FSA to be working in cooperation with the Secretary of Agriculture on a USDA program by providing technical or financial assistance to a USDA program that concerns an agricultural operation, agricultural land, farming practice, or conservation practice. Those individuals or organizations (governmental or non-governmental) certified by FSA as working in cooperation with the Secretary of Agriculture by providing this assistance to USDA programs requiring access to data protected by Section 1619 of the Food, Conservation and Energy Act of 2008 (2008 Farm Bill) are known as USDA Section 1619 Cooperators.

USDA Section 1619 Cooperator

As a certified USDA Section 1619 Cooperator, the USGS is authorized access to otherwise protected agricultural information. Protected information approved for disclosure under this Cooperative Agreement shall be strictly limited to only that information necessary for the USGS to provide technical assistance in the form of monitoring, assessment, and evaluation for the Conservation Reserve Program and Conservation Reserve Enhancement Program.

Disclosure to the USGS includes receiving the protected information from either: 1) FSA or 2) a producer, owner, or other certified USDA Section 1619 Cooperator.

USDA Section 1619 Cooperator Use of the Protected Information

The USGS has provided information to FSA indicating that the protected information shall be used to provide technical assistance in the form of monitoring, assessment, and evaluation in support of Conservation Reserve Program and Conservation Reserve Enhancement Program objectives by analyzing the impact of farming practices on water quality in the Chesapeake Bay Watershed. No other uses of the data are permitted under this Cooperative Agreement.

Responsibilities

FSA agrees to:

- Provide to the USGS the protected information that has been approved for disclosure under this Cooperative Agreement for the states in the Chesapeake Bay watershed (New York, Pennsylvania, West Virginia, Maryland, Delaware, and Virginia). The protected data types approved for disclosure are limited to:

    - spatially referenced (e.g., vector files usable in a Geographic Information System) Conservation Reserve Program databases fully attributed with non-financial information;

- spatially referenced Conservation Reserve Enhancement Program databases fully attributed with non-financial information; and

- spatially referenced and fully attributed Common Land Unit databases.

- Permit the USGS to release aggregated statistical information to Chesapeake Bay Program Partner organizations and the public following review and approval by FSA of the USGS' data aggregation procedures to ensure the protection of farmer privacy.

The USGS agrees that:

- Signature on this Cooperative Agreement indicates acknowledgement and understanding that data types identified in this Cooperative Agreement are protected from further disclosure by Section 1619 of the 2008 Farm Bill (see Exhibit 1).

- The USGS shall not subsequently disclose the protected information to any individual or organization that is not directly covered by this Cooperative Agreement. Any such subsequent disclosure of the protected information will be a violation of the Federal statute Section 1619. The USGS may be held legally liable should subsequent disclosure of the protected information occur in violation of Section 1619. Acts of disclosure of protected information include, but are not limited to providing hardcopy, electronic copy, or permitting viewing.

- The USGS shall not subsequently disclose aggregate statistical data derived from the protected information to any individual or organization not directly covered by this Cooperative Agreement without review and approval by FSA of the USGS' data aggregation procedures to ensure the protection of farmer privacy. Any such subsequent disclosure of the aggregate statistical data derived from the protected information without the review and approval of FSA of the aggregation procedures used to ensure protection of farmer privacy may be a violation of the Federal statute Section 1619. The USGS may be held legally liable should subsequent disclosure of the protected information occur in violation of Section 1619.

- Signature on this Cooperative Agreement legally binds the USGS to comply with the provisions in Section 1619. When signature is made on behalf of an organization, signature also legally binds every owner, manager, supervisor, employee, contractor, agent, and representative of the organization to comply with the provisions in Section 1619.

- The USGS shall use the protected information only to perform work that is directly connected to providing technical assistance in the form of monitoring, assessment, and evaluation in support of Conservation Reserve Program and the Conservation Reserve Enhancement Program objectives. Technical assistance includes reformatting the protected information for consistency with the National Environmental Information Exchange Network's data transfer schema and aggregating the data to a scale that protects farmer privacy. Technical assistance also includes using the protected information in small watershed studies and regional models to better understand the effects of the Conservation Reserve Program and the Conservation Reserve Enhancement Program on observed water quality and aquatic habitat conditions and trends. Use of the protected information for any other purpose is expressly prohibited.

- When signature is made on behalf of an organization, the USGS shall internally restrict access to the protected information to only those individuals within the organization that have a demonstrated need to know the protected information in order to perform work on the Conservation Reserve Program and the Conservation Reserve Enhancement Program.

- The provisions in Section 1619 are continuing obligations. Even when the USGS is no longer a USDA Section 1619 Cooperator, or when individuals currently affiliated with the organization should leave the organization, every person having been provided access to the protected information shall continue to be legally bound to comply with the provisions in Section 1619.

- When signature is made on behalf of an organization, the USGS shall notify all members of the organizational units who will have access to the restricted information about this Cooperative Agreement. For the duration of this Cooperative Agreement, notifications about the existence of this Cooperative Agreement shall be made to those individuals that are new to the organizational units that will have access to the restricted information and periodic notifications shall be sent throughout the organization units that will have access to the restricted information(and at a frequency not to exceed 180 calendar days) to remind all about the ongoing/continuing requirement to comply with this Cooperative Agreement.

- This Cooperative Agreement is non-transferable. The certification to obtain protected information may not be bought, sold, traded, assigned, extended to, or given free of charge to any other individual or organization not directly covered by this Cooperative Agreement.

- The USGS shall notify FSA immediately when the organization is no longer, or within 30 calendar days notice of the date on which the organization will no longer be a USDA Section 1619 Cooperator working in cooperation with the Secretary of Agriculture by providing technical assistance with respect to the Conservation Reserve Program and Conservation Reserve Enhancement Program, whichever is sooner.

- Use of the protected information for any purpose is expressly prohibited when an individual/organization is no longer a USDA Section 1619 Cooperator. When the USGS is no longer a USDA Section 1619 Cooperator, any protected information provided under this Cooperative Agreement must be immediately destroyed. The USGS shall provide to FSA written certification that the protected information (paper and/or electronic copy) has been properly destroyed and/or removed from any electronic storage media.

Amendments

This Cooperative Agreement may be amended at any time by mutual written agreement of the FSA and the USGS.

Termination

This Cooperative Agreement may be terminated:

- Immediately by FSA if it is confirmed or even suspected that the USGS has committed a subsequent disclosure of the protected information in violation of Section 1619.

- Immediately by FSA if it is confirmed that the USGS is no longer a USDA Section 1619 Cooperator working in cooperation with the Secretary of Agriculture by providing technical

or financial assistance to USDA programs requiring access to data protected by Section 1619 of the 2008 Farm Bill.

- Immediately at the request of the USGS upon identification that the USGS no longer requires access to Section 1619 protected information and therefore requests that the USDA Section 1619 Cooperator certification be rescinded.

- At any time by mutual written agreement of FSA and the USGS or independently by FSA or the USGS with 30 calendar days written notice to the other party.

Effective Period

This Cooperative Agreement will be in effect on the date of the final signature and continues until September 30, 2015. Should the Cooperative Agreement need to continue beyond the identified effective period, the entire Cooperative Agreement must be reviewed, updated if necessary, and revalidated prior to the expiration date of the identified effective period.

Signature of the USDA Section 1619 Cooperator and the Date Signed

Regional Director, U.S. Geological Survey

Executed this 2nd day of August, 2010

Deputy Administrator for Farm Programs, Farm Service Agency

Executed this 22 day of June, 2010

SEC. 1619. INFORMATION GATHERING.

(a) **GEOSPATIAL SYSTEMS.**—The Secretary shall ensure that all the geospatial data of the agencies of the Department of Agriculture are portable and standardized.

(b) **LIMITATION ON DISCLOSURES.**—

(1) **DEFINITION OF AGRICULTURAL OPERATION.**—In this subsection, the term ''agricultural operation'' includes the production and marketing of agricultural commodities and livestock.

(2) **PROHIBITION.**—Except as provided in paragraphs (3) and (4), the Secretary, any officer or employee of the Department of Agriculture, or any contractor or cooperator of the Department, shall not disclose—

(A) 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 programs of the Department; or

(B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.

(3) **AUTHORIZED DISCLOSURES.**—

(A) LIMITED RELEASE OF INFORMATION.—If the Secretary determines that the information described in paragraph (2) will not be subsequently disclosed except in accordance with paragraph (4), the Secretary may release or disclose the information to a person or Federal, State, local, or tribal agency working in cooperation with the Secretary in any Department program—

(i) when providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices; or

(ii) when responding to a disease or pest threat to agricultural operations, if the Secretary determines that a threat to agricultural operations exists and the disclosure of information to a person or cooperating government entity is necessary to assist the Secretary in responding to the disease or pest threat as authorized by law.

(4) **EXCEPTIONS.**—Nothing in this subsection affects—

(A) the disclosure of payment information (including payment information and the names and addresses of recipients of payments) under any Department program that is otherwise authorized by law;

(B) the disclosure of information described in paragraph (2) if the information has been transformed into a statistical or aggregate form without naming any—

(i) individual owner, operator, or producer; or

(ii) specific data gathering site; or

(C) the disclosure of information described in paragraph (2) pursuant to the consent of the agricultural producer or owner of agricultural land.

(5) **CONDITION OF OTHER PROGRAMS.**—The participation of the agricultural producer or owner of agricultural land in, or receipt of any benefit under, any program administered by the Secretary may not be conditioned on the consent of the agricultural producer or owner of agricultural land under paragraph 4(c).

(6) **WAIVER OF PRIVILEGE OR PROTECTION.**—The disclosure of information under paragraph (2) shall not constitute a waiver of any applicable privilege or protection under Federal law, including trade secret protection.

Section 1619 Cooperator Interagency Agreement

between

USDA, Natural Resources Conservation Service

and

U.S. Geological Survey

Purpose and Background

This Interagency Agreement is being issued by the USDA - Natural Resources Conservation Service (NRCS) to establish that the U.S. Geological Survey (USGS) has been certified by NRCS to be working in cooperation with the Secretary of Agriculture on a USDA program in providing technical or financial assistance under a USDA program that concerns an agricultural operation, agricultural land, farming practice, or conservation practice. This Acknowledgment ensures that USGS understands and complies with the requirements of Section 1619 of the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill), which prohibits disclosure of certain information by the Department of Agriculture (USDA) and its cooperators.

Authority

Executive Order 13508 – Chesapeake Bay Protection and Restoration, and the Food, Conservation, and Energy Act of 2008 – Sec.1619.

USDA Section 1619 Cooperator

As a USDA Section 1619 Cooperator, the USGS is authorized access to otherwise protected agricultural information. Protected information approved for disclosure under this Interagency Agreement shall be strictly limited to only that information necessary for the USGS to provide technical assistance, in the form of monitoring, assessment, and evaluation, concerning NRCS Farm Bill programs. Disclosure to the USGS can include receiving the protected information: 1) directly from NRCS; 2) directly from another USDA Section 1619 Cooperator; 3) directly from the producer or owner as part of the process required to enable a producer or owner to participate in a USDA program; or 4) in another manner with the producer's permission.

Section 1619 of the 2008 Farm Bill

Section 1619 of the Food, Conservation, and Energy Act of 2008 (Exhibit 1) (hereinafter "section 1619" provides that USDA, or any "contractor or cooperator" of USDA, "shall not disclose—(A) 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; or (B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information

described in subparagraph (A) is provided." USDA may disclose protected information to a USDA cooperator when such cooperator is "providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices" if USDA determines that the protected information will not be subsequently disclosed, except in accordance with the exceptions contained in Section 1619. USGS is a "cooperator" of USDA within the meaning of Section 1619. Accordingly, USGS may not subsequently disclose any information protected by section 1619. By signature on this Acknowledgment, USGS is certifying future compliance with the statutory obligations under Section 1619. Upon execution of this Acknowledgment, NRCS may continue to provide to USGS the protected information.

USDA Section 1619 Cooperator Use of the Protected Information

The USGS will use the protected information to provide technical assistance to the NRCS Farm Bill programs by analyzing the impact of farming practices on water quality in the Chesapeake Bay Watershed.

Responsibilities

NRCS agrees to:

Provide to the USGS the protected information that has been approved for disclosure under this Agreement for the states in the Chesapeake Bay watershed (New York, Pennsylvania, West Virginia, Maryland, Delaware, and Virginia). The protected data types approved for disclosure are limited to:

- Spatially referenced (e.g., vector files usable in a Geographic Information System) NRCS Farm Bill programs practice data for the Chesapeake Bay watershed. This data will be fully attributed and contain no financial information.

- Permit the USGS to release aggregated statistical information to Chesapeake Bay Program Partner organizations and the public following review and approval by NRCS of the USGS' data aggregation procedures to ensure compliance with section 1619 and other applicable law.

The USGS agrees that:

- Signature on this Agreement indicates acknowledgement and understanding that data types identified in this Agreement are protected from further disclosure by Section 1619 of the 2008 Farm Bill (see Exhibit 1). The USGS shall not subsequently disclose the protected information to any individual or organization that is not directly covered by this Agreement. Any such subsequent disclosure of the protected information without written permission from NRCS will be a violation of the Federal statute Section 1619. The USGS will be held responsible should disclosure of the protected information occur.

- Signature on this Agreement legally binds the USGS to comply with the provisions in Section 1619. USGS shall consult with NRCS prior to providing any protected information to an entity or individual outside the agency to ensure that such release is permissible.

- The USGS shall use the protected information only to perform work that is directly connected to providing technical assistance, in the form of monitoring, assessment, and evaluation of the NRCS Farm Bill programs. Use of the protected information to perform work that is not directly connected to the NRCS Farm Bill programs is expressly prohibited. Technical assistance includes reformatting the protected information for consistency with the National Environmental Information Exchange Network's data transfer schema and aggregating the data to a scale that protects farmer privacy. Technical assistance also includes using the protected information in small watershed studies and regional models to better understand the effects of NRCS Farm Bill programs on observed water quality and aquatic habitat conditions and trends.

- USGS shall internally restrict access to the protected information to only those individuals within the agency who have a demonstrated need to know the protected information in order to perform work on the NRCS Farm Bill programs.

- The provisions in Section 1619 are continuing obligations. Even when the USGS is no longer a USDA Section 1619 Cooperator, or when individuals currently affiliated with the organization should leave the organization, every person having been provided access to the protected information shall continue to be legally bound to comply with the provisions in Section 1619.

- USGS shall notify all agency employees who will have access to the restricted information about this Agreement and Acknowledgment. For the duration of this Agreement, notifications about the existence of this Agreement shall be made to those individuals that are new to the organization who will have access to the restricted information and periodic notifications shall be sent to individuals with access to the restricted information and their supervisors (and at a frequency not to exceed 180 calendar days) to remind all about the ongoing/continuing requirement to comply with this Agreement.

- When USGS, as a Conservation Cooperator, is unsure whether particular information is covered or protected by Section 1619, it must consult with NRCS to determine whether the information must be withheld and document the consultation for the record.

- Use of the protected information for any purpose is expressly prohibited when an individual/organization is no longer a USDA Section 1619 Cooperator. When the USGS is no longer a USDA Section 1619 Cooperator, any protected information provided under this Agreement must be immediately destroyed. The USGS shall provide to NRCS written certification that the protected information (paper and/or electronic copy) has been properly destroyed and/or removed from any electronic storage media.

Violations

USGS as a Conservation Cooperator will be held responsible for violations of this Acknowledgment and Section 1619. A violation of this Acknowledgment may result in action by NRCS, including termination of this agreement.

Effective Period

This Interagency Agreement shall be in effect on the date of the final signature and continues until September 30, 2015. Should the Agreement need to continue beyond the identified effective period, the entire Agreement must be reviewed, updated if necessary, and revalidated prior to the expiration date of the identified effective period.

The undersigned of the USGS and NRCS have the authority to enter into and carry out the provisions of this agreement. Resolutions, motions or similar actions have been duly adopted or passed as an official act of the governing bodies of USGS and NRCS, including all understandings and assurances contained therein and directing and authorizing the undersigned to act in connection with this agreement and to provide such additional information as may be required.

Accepted by:

Eloris D. Speight

ELORIS D. SPEIGHT
Deputy Chief for Management
Natural Resources Conservation Service

11-20-2010
DATE

David P. Russ

DAVID P. RUSS
Regional Executive, Northeast
U.S. Geological Survey

12/14/2010
DATE

Attachment: Exhibit 1

SEC. 1619. INFORMATION GATHERING.

(a) GEOSPATIAL SYSTEMS.—The Secretary shall ensure that all the geospatial data of the agencies of the Department of Agriculture are portable and standardized.

(b) LIMITATION ON DISCLOSURES.—

(1) **DEFINITION OF AGRICULTURAL OPERATION.**—In this subsection, the term ''agricultural operation'' includes the production and marketing of agricultural commodities and livestock.

(2) **PROHIBITION.**—Except as provided in paragraphs (3) and (4), the Secretary, any officer or employee of the Department of Agriculture, or any contractor or cooperator of the Department, shall not disclose—

(A) 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 programs of the Department; or

(B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.

(3) **AUTHORIZED DISCLOSURES.—**

(A) LIMITED RELEASE OF INFORMATION.—If the Secretary determines that the information described in paragraph (2) will not be subsequently disclosed except in accordance with paragraph (4), the Secretary may release or disclose the information to a person or Federal, State, local, or tribal agency working in cooperation with the Secretary in any Department program—

(i) when providing technical or financial assistance with respect to the agricultural operation, agricultural land, or farming or conservation practices; or

(ii) when responding to a disease or pest threat to agricultural operations, if the Secretary determines that a threat to agricultural operations exists and the disclosure of information to a person or cooperating government entity is necessary to assist the Secretary in responding to the disease or pest threat as authorized by law.

(4) **EXCEPTIONS.**—Nothing in this subsection affects—

(A) the disclosure of payment information (including payment information and the names and addresses of recipients of payments) under any Department program that is otherwise authorized by law;

(B) the disclosure of information described in paragraph (2) if the information has been transformed into a statistical or aggregate form without naming any—

(i) individual owner, operator, or producer; or

(ii) specific data gathering site; or

(C) the disclosure of information described in paragraph (2) pursuant to the consent of the agricultural producer or owner of agricultural land.

(5) **CONDITION OF OTHER PROGRAMS.**—The participation of the agricultural producer or owner of agricultural land in, or receipt of any benefit under, any program administered by the Secretary may not be conditioned on the consent of the agricultural producer or owner of agricultural land under paragraph 4(c).

(6) **WAIVER OF PRIVILEGE OR PROTECTION.**—The disclosure of information under paragraph (2) shall not constitute a waiver of any applicable privilege or protection under Federal law, including trade secret protection.

United States Geological Survey
Data Storage and Aggregation Procedures and Employee Agreement
for compliance with
Section 1619 of the 2008 Farm Bill

The USGS is an official USDA Section 1619 Cooperator and has been authorized access to protected geospatial and tabular information on farming and conservation practices in the Mid-Atlantic States (i.e., New York, Pennsylvania, West Virginia, Maryland, Delaware, and Virginia). The protected data are managed and maintained by the USDA Farm Service Agency (FSA) and the USDA Natural Resource Conservation Service (NRCS)[1]. The USGS has been granted access to these data to analyze the impact of farming practices on water quality in the Chesapeake Bay watershed. The protected data may be viewed and analyzed by any USGS employee who has signed and agreed to the terms of this Agreement.

To comply with Section 1619, all USGS employees granted access to protected FSA and NRCS information and their immediate supervisors must read the referenced Cooperative Agreements, Section 1619 of the Food, Conservation and Energy Act of 2008, and agree to and sign the data use, storage and aggregation protocols outlined below.

USGS[2] shall not disclose protected information to any individuals or organizations that are not verifiable and official USDA Section 1619 Cooperators with permitted access to the data. USGS shall use the protected information only to perform work that is directly connected to providing technical assistance, in the form of monitoring, assessment, and evaluation, concerning NRCS and FSA Farm Bill programs. USGS may be legally liable should disclosure of the protected information occur in violation of the Federal statute Section 1619.

The following procedures pertain to the storage, use, aggregation, reporting and release of data and information protected under Section 1619 of the Food, Conservation and Energy Act of 2008. These procedures have been reviewed and approved by FSA and NRCS. Any deviation from or amendment to these procedures must be approved by FSA and/or NRCS and documented for the record.

Data Analysis, Storage, and Destruction Procedures

1. All FSA and NRCS protected data shall be stored on a dedicated external storage device and in a secure location when not in use (e.g., locked cabinet

[1] USDA-NRCS Cooperative Agreement and Acknowledgement of Section 1619 Compliance, signed December 14, 2010. USDA-FSA Cooperative Agreement, USDA Section 1619 Cooperator, signed August 2, 2010.
[2] This restriction applies to all USGS employees and their immediate supervisors who have signed this agreement.

or area). The storage device should be an externally-connected hard drive that is larger than a USB stick to minimize the risk of accidental loss. Access to the external storage device shall be restricted to USGS employees who have signed this Agreement.

2. All analyses of the FSA and NRCS data that include the raw data must be saved on the dedicated external storage device. Analyses can be temporarily saved on a password protected computer that is disconnected from all networks and servers (including wireless networks), has an active firewall, and up-to-date virus protection software. All analyses, raw data, and temporary files must be deleted from the computer before it is connected to a network and the computer must be stored in a secure area when not in use
3. Only data aggregated according to procedures approved, in writing, by FSA and/or NRCS can be stored on network drives and released to the public.
4. While in use, the data will only be accessible to authorized personnel (i.e., signatories to this Agreement). Access to the data includes viewing the data in hard or softcopy formats.
5. When the protected data are no longer needed, all storage devices containing the protected data must be degaussed to ensure full destruction of the data; written, dated and signed confirmation verifying destruction of the protected data must be provided to David Kirtland (dakirtland@usgs.gov) and Peter Claggett (pclaggett@usgs.gov) within the week following destruction..

Data Aggregation Procedures

The protected conservation practice data may be aggregated to a mapping unit (e.g., watershed, grid cell, or hexagon) and released to the public if five or more farm owners or producers participate in the practice in the aggregation unit or at least three owners or producers participate in the practice in the aggregation unit and no one owner or producer provides 50% or more of the variation. **If these conditions are not met for a particular aggregation unit, the data shall not be reported, displayed or otherwise revealed for that unit.**

Options for aggregating the data while ensuring full reporting of all conservation practices in a region include:

- combining information from units that do not meet the above conditions with information from neighboring units and spatially merging those units;
- increasing the size of all units (e.g., from 12-digit to 11-digit HUCs) to ensure all units meet the above conditions;
- translating the conservation practices into their nutrient and sediment reduction equivalents (thus only revealing the net reduction in nutrients and sediment, not the individual practices) so long as a minimum of three farms exist in the unit; or
- a combination of the above.

Description of Data Use

Please describe your intended use of the protected data consistent with permitted uses described in the FSA and NRCS Cooperative Agreements. If the use changes from the description below, this Agreement must be revised and resigned. If more space is needed to describe your use, please use an additional page.

1. Developing a methodology for each state to remove duplicate data,
2. Providing assistance to states in matching the NRCS BMPs to the National Environmental Information Exchange Network (NEIEN) , and
3. Aggregating the data to ensure confidentiality of individual farm owners or producers.

I , Olivia Devereux, have read the FSA and NRCS Cooperative
Print Name

Agreements, Section 1619 of the Food, Conservation and Energy Act of 2008, and I agree to the above data use, analysis, storage, aggregation and reporting procedures.

Olivia H. Devereux — 5/17/2012

USGS Contractor Signature — Date

_____ _____

USGS Supervisor Signature — Date

IMPORTANT! Please send an electronic copy (pdf) of this signed Agreement to David Kirtland (dakirtland@usgs.gov) and Peter Claggett (pclaggett@usgs.gov). Please also send an appropriate electronic storage device to Peter Claggett (pclaggett@usgs.gov) to receive the data.

Devereux
Environmental
Consulting

Olivia Devereux <olivia@devereuxconsulting.com>

Questions Re: 1619 for Chesapeake Bay states

Underwood, John - FSA, Kansas City, MO <john.underwood@kcc.usda.gov> Sun, Aug 26, 2012 at 7:47 PM
To: Olivia Devereux <olivia@devereuxconsulting.com>
Cc: Dean Hively <whively@usgs.gov>

Olivia,

I appreciate your calling to remind me to return to this issue. And, my apologies for not making my estimated response time. As is often the case, almost immediately after we talked on Friday I was redirected to working other priority issues. I just now got the opportunity to complete my response to you.

I have reviewed the attached understandings.

The key aspect is that we must follow the text exactly as written in the understandings. For example, we can only share the data types that are specifically mentioned in the understandings. And if an individual signed the understanding only on behalf of themselves, not on behalf of an organization, release to other members of their organization is prohibited (someone with authority to legally bind the entire organization needs to sign in order for there to be organization based data sharing).

For the understanding:

1) Titled "Keeling." When considered along with the other applicable data sharing understandings, the understanding is acceptable with respect to authorizing USGS (through Devereux Environmental Consulting) to share protected data with William Gilbert Keeling of the Virginia Department of Conservation and Recreation. The understanding does not authorize disclosure of data to anyone other than William Gilbert Keeling. This understanding can't serve as the baseline for sharing protected data with other members of the Virginia Department of Conservation and Recreation.

2) Titled "VA_NRCS 1619 attachment C example." When considered along with the other applicable data sharing understandings, the understanding is acceptable with respect to authorizing USGS (through Devereux Environmental Consulting) to share protected data with Lawrence Edward Fender of the Virginia Department of Conservation and Recreation. The understanding does not authorize disclosure of data to anyone other than Lawrence Edward Fender. This understanding can't serve as the baseline for sharing protected data with other members of the Virginia Department of Conservation and Recreation.

3) Titled "1 MD_NRCS 1619 MOU." When considered along with the other applicable data sharing understandings, the understanding is acceptable with respect to authorizing USGS (through Devereux Environmental Consulting) to share protected data with the Maryland Department of Agriculture.

4) Titled "4 NY USC_NRCS 1619 Compliance Agreement. Upper Susquehanna." When considered along with the other applicable data sharing understandings, the understanding is acceptable with respect to authorizing USGS (through Devereux Environmental Consulting) to share protected data with the Upper Susquehanna Coalition.

5) Titled "WVDA USDA 1619 Agreement." When considered along with the other applicable data sharing understandings, the understanding is acceptable with respect to authorizing USGS (through Devereux Environmental Consulting) to share protected data with the West Virginia Department of Agriculture.

6) Titled "WV_ NRCS TMDL MOU animals only." The understanding is not acceptable with respect to authorizing USGS (through Devereux Environmental Consulting) to share protected data with the West Virginia Conservation Agency (WVCA). The understanding lacks the key text that binds the WVCA to comply with Section 1619. I did note the text "Adequately aggregate the data to the county level to ensure the privacy of all producers is protected and abide by the requirements of the agreement currently in place between WVCA and NRCS concerning Section 1619 of the 2008 Farm Bill". It sounds to me like there is another NRCS/WVCA understanding specifically addressing Section 1619. Can you locate/provide me with a copy of the referenced NRCS/WVCA understanding?

I have included the FSA template for the cooperator understanding (see "Template - USDA Section 1619 Cooperator Memorandum of Understanding"). The template can be easily modified to become a multi-organization data sharing understanding. Basically, it is a fill in the blank template. The normal process is for the organization(s) to complete the draft and send it to me. I'll review/vet the information and make the determination concerning whether or not the data sharing can/can't take place. If the data sharing understanding can move forward, I'll make the determination on the appropriate FSA signature level.

Based on the information reviewed to date, I see no problem with issuing a consolidated understanding for the Chesapeake Bay states (Maryland, Virginia, West Virginia, Delaware, Pennsylvania, and New York). Also, I would be in a position to sign the consolidated data sharing understanding on behalf of FSA.

I agree that a single memorandum of understanding covering approved sharing of FSA data would be much more effective/efficient. Please let me know if you have any questions.

John

From: Olivia Devereux [mailto:olivia@devereuxconsulting.com]
Sent: Friday, August 24, 2012 9:23 AM
To: Underwood, John - FSA, Kansas City, MO
Cc: Dean Hively
Subject: Re: Questions Re: 1619 for Chesapeake Bay states

[Quoted text hidden]

7 attachments

1 MD_NRCS 1619 MOU.PDF
189K

2 VA_NRCS 1619 attachment C example.pdf
223K

3 WV_ NRCS TMDL MOU animals only .pdf
910K

4 NY USC_NRCS 1619 Compliance Agreemnet. Upper Susquehanna.pdf
1950K

WVDA USDA 1619 Agreement.pdf
2148K

Keeling.pdf
222K

Template - USDA Section 1619 Cooperator Memorandum of Understanding.docx
32K

Olivia Devereux to Dean Hively 3/8/13:

Here is the FSA data request for Farm Practice CRP/CR EP records. It was sent to RA.mokansasc2.fsakcfoia@one.usda.gov in Aug 2012.
The request should also be sent to the person who passes along the geospatial dataset (David Parry).

---------- Forwarded message ----------
From: **RA.mokansasc2.fsakcfoia** <RA.mokansasc2.fsakcfoia@one.usda.gov>
Date: Thu, Aug 9, 2012 at 2:52 PM
Subject: RE: Request MD 12-003 - Devereux - Modified/Perfected/Top Priority
To: Olivia Devereux <olivia@devereuxconsulting.com>, "RA.mokansasc2.fsakcfoia" <RA.mokansasc2.fsakcfoia@one.usda.gov>
Cc: "Bankhead, Rachel - FSA, Kansas City, MO" <rachel.bankhead@kcc.usda.gov>, "Miller, Kevin - FSA, Kansas City, MO" <kevin.miller@kcc.usda.gov>, "Ross, Amber - FSA, Kansas City, MO" <amber.ross@kcc.usda.gov>, "Underwood, John - FSA, Kansas City, MO" <john.underwood@kcc.usda.gov>, "Beeler, Frederick - FSA, Kansas City, MO" <Frederick.Beeler@kcc.usda.gov>, "Dixon, Mary Ann - FSA, Kansas City, MO" <maryann.dixon@kcc.usda.gov>, "Donnici, Kathleen - FSA, Kansas City, MO" <Kathleen.Donnici@kcc.usda.gov>, "Olvera, Jerry - FSA, Kansas City, MO" <Jerry.Olvera@kcc.usda.gov>, "Walker, Kathy - FSA, Kansas City, MO" <Kathy.M.Walker@kcc.usda.gov>, "White, Loretta - FSA, Kansas City, MO" <Loretta.White@kcc.usda.gov>

Perfect.

Thanks
Barbara

Barbara J. Clark
USDA/MSD/KCASB/IMS
Government Information Specialist
Farm Service Agency
9240 Troost - Mail Stop 8368
Kansas City, MO 64131-3055
Phone: 816-926-2636
Fax: 816-627-0739
mailto:barbara.clark@kcc.usda.gov

From: Olivia Devereux [mailto:olivia@devereuxconsulting.com]
Sent: Thursday, August 09, 2012 1:49 PM
To: RA.mokansasc2.fsakcfoia
Cc: Bankhead, Rachel - FSA, Kansas City, MO; Miller, Kevin - FSA, Kansas City, MO; Ross, Amber - FSA, Kansas City, MO; Underwood, John - FSA, Kansas City, MO; Beeler, Frederick - FSA, Kansas City, MO; Dixon, Mary Ann - FSA, Kansas City, MO; Donnici, Kathleen - FSA, Kansas City, MO; Olvera, Jerry - FSA, Kansas City, MO; Walker, Kathy - FSA, Kansas City, MO; White, Loretta - FSA, Kansas City, MO
Subject: Re: Request MD 12-003 - Devereux - Modified/Perfected/Top Priority

Those are the only states I need. Thank you.

On Thu, Aug 9, 2012 at 2:42 PM, RA.mokansasc2.fsakcfoia <RA.mokansasc2.fsakcfoia@one.usda.gov> wrote:
Olivia,

After review of the MOU that you provided, please be advised that we will only be providing the most current CRP and CREP data for the states listed in the MOU for the Chesapeake Bay area. The states in the Chesapeake Bay are watershed are (New York, Pennsylvania, West Virginia, Maryland, Delaware, and Virginia).

Request MD 12-003 has been perfected and sent to the FOIA contract staff for processing.

Again, if you have questions concerning our process, please contact Government Information (GI) Specialist Barbara Clark at 816-926-2636, GI Specialist Amber R. Ross at 816-926-6371, GI Specialist Kevin Miller at 816-926-2618, GI Specialist Rachel Bankhead at 816-926-6200, or the entire MSD FOIA/PA Team at the group e-mail address RA.mokansasc2.fsakcfoia@one.usda.gov.

Sent on behalf of:
John W. Underwood
FSA Privacy Officer / FSA PII Officer
Chief, Kansas City Administrative Services Branch

By: Barbara J. Clark
USDA/MSD/KCASB/IMS
Government Information Specialist
Farm Service Agency
9240 Troost - Mail Stop 8368
Kansas City, MO 64131-3055
Phone: 816-926-2636
Fax: 816-627-0739
mailto:barbara.clark@kcc.usda.gov

From: RA.mokansasc2.fsakcfoia
Sent: Thursday, August 09, 2012 10:08 AM
To: Olivia Devereux; RA.mokansasc2.fsakcfoia
Cc: Bankhead, Rachel - FSA, Kansas City, MO; Clark, Barbara - FSA, Kansas City, MO; Miller, Kevin - FSA, Kansas City, MO; Ross, Amber - FSA, Kansas City, MO; Underwood, John - FSA, Kansas City, MO; Beeler, Frederick - FSA, Kansas City, MO; Dixon, Mary Ann - FSA, Kansas City, MO; Donnici, Kathleen - FSA, Kansas City, MO; Olvera, Jerry - FSA, Kansas City, MO; Walker, Kathy - FSA, Kansas City, MO; White, Loretta - FSA, Kansas City, MO
Subject: Request MD 12-003 - Devereux - Acknowledgment/Perfected Priority

Ms. Devereux,
Management Services Division (MSD) received your Routine Use (Transfer of Information) request on August 8, 2012 and assigned it control number: MD 12-003. Please use this control number in all future communication involving this request.

Your request is for: the most current CRP and CREP farm records for the United States.

MSD FOIA/PA will be in contact with you if we need further clarification before moving your request to Perfected/Priority status.

If you have questions concerning our process, please contact Government Information (GI) Specialist Barbara Clark at 816-926-2636, GI Specialist Amber R. Ross at 816-926-6371, GI Specialist Kevin Miller

at 816-926-2618, GI Specialist Rachel Bankhead at 816-926-6200, or the entire MSD FOIA/PA Team at the group e-mail address RA.mokansasc2.fsakcfoia@one.usda.gov.

Sent on behalf of:
John W. Underwood
FSA Privacy Officer / FSA PII Officer
Chief, Kansas City Administrative Services Branch

By:

Rachel Bankhead, MBA
KCASB-IMS - Gov't Info Specialist
USDA - Farm Service Agency
9420 Troost - Mail Stop 8368
Kansas City, MO 64131-3055
Office: 816.926.6200
Fax: 816.627.2556
mailto:RA.mokansasc2.fsakcfoia

From: Olivia Devereux [mailto:olivia@devereuxconsulting.com]
Sent: Wednesday, August 08, 2012 12:33 PM
To: Clark, Barbara - FSA, Kansas City, MO
Subject: Re: E-mail to submit a request for data - CREP Request

Barbara,
Is CREP data provided along with CRP data? I am concerned that I should have specified both in my request. Thanks for your help this morning.

--Olivia

On Wed, Aug 8, 2012 at 11:59 AM, Olivia Devereux <olivia@devereuxconsulting.com> wrote:
Data Request for all CRP farm records for the United States. The purpose is to analyze the impact of farming practices on water quality in the Chesapeake Bay Watershed. Please include:
practice name
practice dates for started and stopped
amount implemented
producer information including name and address
all other data attributes

Please provide all the CRP data sets whether stored on a mainframe and/or another database.

Requestor:
Olivia Devereux
Devereux Environmental Consulting/Contractor to U.S. Geological Survey
9219 Mintwood Street
Silver Spring, MD 20901
Phone: 301-325-7449

Attached is the 1619 Agreement between USGS and USDA. As a contractor to USGS, I am also required to abide by this Cooperative Agreement.

Please let me know if you have any questions about this data request.
Thank you,
Olivia H. Devereux
Devereux Environmental Consulting
olivia@devereuxconsulting.com
301-325-7449

On Fri, Jul 27, 2012 at 2:22 PM, Clark, Barbara - FSA, Kansas City, MO <barbara.clark@kcc.usda.gov> wrote:

Olivia,

Please submit your request for data to the e-mail address below.

RA.mokansasc2.fsakcfoia@one.usda.gov

Please be sure and include the details of your request and any reference to the old request for data that we discussed. This will help us track down what we provided in the past.

Also, we will need a Non PO Box mailing address, name, and contact phone number.

We look forward to helping you the best we can.

Sincerely,
Barbara

Barbara J. Clark
USDA/MSD/KCASB/IMS
Government Information Specialist
Farm Service Agency
9240 Troost - Mail Stop 8368
Kansas City, MO 64131-3055
Phone: 816-926-2636
Fax: 816-627-0739
mailto:barbara.clark@kcc.usda.gov

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Daen comment: there appears to have been two versions of this request:

From Olivia: Here is a follow-up email for the FSA data request.

---------- Forwarded message ----------
From: **Olivia Devereux** <olivia@devereuxconsulting.com>
Date: Tue, Sep 4, 2012 at 3:09 PM
Subject: Re: Request MD 12-004 - Devereux - Acknowledgment/Perfected Priority
To: "Underwood, John - FSA, Kansas City, MO" <john.underwood@kcc.usda.gov>

Hi John,
Please let me know what the status of this request is. I have received the CRP database that was requested at the same time as this request.

Olivia

On Thu, Aug 9, 2012 at 11:12 AM, RA.mokansasc2.fsakcfoia <RA.mokansasc2.fsakcfoia@one.usda.gov>wrote:

Ms. Devereux,

Management Services Division (MSD) received your Routine Use (Transfer of Information) request on August 8, 2012 and assigned it control number: MD 12-004. Please use this control number in all future communication involving this request.

Your request is for: all CLU data for the following states: Maryland, Virginia, Delaware, Pennsylvania, New York and West Virginia.

MSD FOIA/PA will be in contact with you if we need further clarification before moving your request to Perfected/Priority status.

If you have questions concerning our process, please contact Government Information (GI) Specialist Barbara Clark at 816-926-2636, GI Specialist Amber R. Ross at 816-926-6371, GI Specialist Kevin Miller at 816-926-2618, GI Specialist Rachel Bankhead at 816-926-6200, or the entire MSD FOIA/PA Team at the group e-mail address RA.mokansasc2.fsakcfoia@one.usda.gov.

Sent on behalf of:
John W. Underwood
FSA Privacy Officer / FSA PII Officer
Chief, Kansas City Administrative Services Branch

By:

Rachel Bankhead, MBA
KCASB-IMS - Gov't Info Specialist
USDA - Farm Service Agency
9420 Troost - Mail Stop 8368
Kansas City, MO 64131-3055
Office: 816.926.6200

Fax: 816.627.2556
mailto:RA.mokansasc2.fsakcfoia

From: Olivia Devereux [mailto:olivia@devereuxconsulting.com]
Sent: Wednesday, August 08, 2012 11:06 AM
To: Clark, Barbara - FSA, Kansas City, MO; RA.mokansasc2.fsakcfoia
Cc: Dean Hively; Peter Claggett; Parry, David - FSA, Salt Lake City, UT
Subject: Data Request for Chesapeake Bay CLU data

Data Request for all CLU data for the following states:

Maryland

Virginia

Delaware

Pennsylvania

New York

West Virginia

The purpose is to analyze the impact of farming practices on water quality in the Chesapeake Bay Watershed. Please include all data attributes. We will be joining this with the farm record tabular data.

Requestor:

Olivia Devereux

Devereux Environmental Consulting/Contractor to U.S. Geological Survey

9219 Mintwood Street

Silver Spring, MD 20901

Phone: 301-325-7449

Attached is the 1619 Agreement between USGS and USDA. As a contractor to USGS, I am also required to abide by this Cooperative Agreement.

Please let me know if you have any questions about this data request.

Thank you,

Olivia H. Devereux

Devereux Environmental Consulting

olivia@devereuxconsulting.com

301-325-7449

NRCS

IT Data Request/Disclosure Form

Request Purpose (what is intended use for data?): For purposes of providing monitoring, assessing or evaluation of practice implementation.

Requesters

1.	☒ W. Dean Hively, Federal, USGS	U.S. Geological Survey	Beltsville, MD
2.	☒ Arlen Ricke, Federal, NRCS Point of Contact	Landscape Planning Specialist, NRCS	Washington, DC
3.	☒ Olivia Devereux, Contractor	Environmental Scientist/Devereux Environmental Consulting/Contractor to USGS	9219 Mintwood Street Silver Spring, MD 20901
4.	☒ Peter Claggett*, Federal, USGS	U.S. Geological Survey	Annapolis, MD

☒ **Reflects Requesters** ***Reflects Accountable/Responsible Individual**

Form Questionnaire: Privacy compliance[1] requires that a data requester document and justify the request by completing the following information:

1.	a. Description of the request (be specific): Data is requested from the National Conservation NRCS conservation plan and conservation practice data for all counties in New York, Pennsylvania, West Virginia, Maryland, Delaware, Virginia and the District of Columbia b. Date Needed: 12/12/2012
2.	Is a formal information sharing agreement already in place (e.g., MOU, MOA)? Yes- Section 1619 Cooperator Interagency Agreement # 67-3A75-11-5 (Appendix A)
3.	List authority (citation) for requesting the data: Executive Order 13508- Chesapeake Bay Protection and Restoration, and the Flood, Conservation, and Energy Act of 2008- Sec. 1619.
4.	Data elements required? Conservation plan and practice data (see page five)
5.	Categories of individuals who may be within the data set? Farm owners/operators
6.	What is this data being used for (must be consistent with purpose for data records collected)? For providing technical assistance to the NRCS Farm Bill programs by analyzing the impact of farming practices on water quality in the Chesapeake Bay watershed. -See "USGS Data Storage and Aggregation Procedures and Employee Agreement for compliance with Section 1619 of the 2008 Farm Bill" (Appendix B).
7.	Has a system/application PIA been conducted recently? Please provide system/application or data source name. A PIA has been conducted at the system level for the Customer Service Toolkit (CST).
8.	How is data going to be protected (in transit and at rest)? See attached USGS data handling agreement.--data storage/aggregation procedures not tied to '08 technology. Will update procedures as technology. Currently are up-to-date as of 2012. -See "Section 1619 between USDA, Natural Resources Conservation Service and U.S. Geological Survey" 67-3A75-11-5 (Appendix A).
9.	Where is data going to be stored? On an external storage device in a locked cabinet.--page 1, Section 1 of the USGS Data Handling Agreement

[1] This form is based on the following NIST 800-122, Federal Information Practice Principles (FIPPS): transparency; individual participation; purpose specification; data minimization; use limitation; data quality and integrity; security and accountability; and auditing.

NRCS

10.	How long do you intend to keep/maintain the data? 5-years
11.	Upon usage completion, how are you going to dispose of data to mitigate any personally identifiable information (PII) exposure? Degaussing all data.
12.	Has data requester completed Security Awareness training? Yes ☒/No ☐ Date of Certificate _8/10/2012_ ? Please attach certificate along with this form upon form submission.

Request Date: August 24, 2012

TERMS AND CONDITIONS

1) NRCS OCIO is committed to safeguarding all personally identifiable information (PII). NRCS acknowledges appropriate data requesters/business owners/service providers/internal-external professionals (hereinafter referred to as "requester(s)") may, in the normal course of business, have a need for PII in order to provide the service requested by NRCS's customers. All data requesters are required to protect the confidentiality of this PII in accordance with federal laws-requirements/USDA regulations, and other applicable international, federal, state, and/or local laws.

2) Privacy compliance requires that a data requester present various details upon making a request (by means of a data request form), including the above questions herein previously.

3) If the NRCS Director of IT Security determines a Privacy Act violation or a possible PII risk exists (potentially revealed by the reply details above), the Director of IT Security (on behalf of the OCIO) retains the rights to withhold the data and or request that appropriate PIA/SORN be updated.

4) Data requesters shall not use or disclose confidential customer information received from or on behalf of NRCS except as permitted by or required by this Agreement, as required by law, or otherwise authorized in writing by NRCS. Furthermore, data requesters shall not share the data requested herein with a third party not identified in an accompanying PIA/SORN without the NRCS Director of IT Security's express written consent.

5) Each individual requester of data will be required to complete this data request form for review/approval by the Director of IT Security, if applicable. For a one to two time data request, this data request form herein will suffice. However, each federal agency will be required to create/provide an information sharing agreement for anticipated multiple data requests, if applicable. Before data is released, detailed information as to the following elements is required: with whom PII is to be shared, how PII would be protected, and compliance with PIA/SORN routine use(s).

6) In instances where NRCS is involved with applicable federal government agency sharing of PII which may include the interagency sharing of PII (where NRCS data requesters may come into possession of federal government agency PII), NRCS data requesters must comply with the following key privacy-related OMB memoranda: OMB M-01-05 "Guidance on Interagency Sharing of Personal Information-Protecting Personal Privacy," OMB M-04-26 "Personal Use Policies and 'File Sharing' Technology," and Computer Matching and Privacy Protection Act of 2000."

7) If the data requester(s)' privacy/security awareness training is not current, data requester (and data user(s)) will undergo current privacy security/awareness training as a prerequisite to receipt of data accessibility.

☒ Agree ☐ Do Not Agree

NRCS

DISCLAIMER/RELEASE OF LIABILITY

The data requester/and associated responsible official (hereinafter referred to as "requester(s)") named herein will indemnify and hold harmless NRCS OCIO (and or designated appointee) for any expenses associated with this possible access/sharing of data. Moreover, the requesters will accept full liability/thereby releasing NRCS OCIO (and or designated appointee) of any liability associated with this possible access/sharing. The data requesters will release and forever discharger the NRCS superiors/staff and personnel associated (e.g., administrators) with any data access/transfer from all claims/actions/causes of action/and demands whatsoever.

It is the specific intent of this disclaimer/release of liability instrument to release and discharge any and all claims and causes of action of any kind or nature whatsoever, whether known or unknown, and whether specifically mentioned or not, which may exist or might be claimed to exist at or prior to the date of this instrument and the data requesters specifically waive any claim or right to assert that any cause of action or alleged cause of action or claim or demand has been, through oversight or error or intentionally or unintentionally, omitted from this release.

- Data requesters are presumed to properly handle and or dispose of personally identifiable information (PII) in their possession so as to ensure that no PII is exposed. All materials having PII data must be kept secure at all times through the use of NIST compliant encryption (e.g. AES-256), passwords, and secure data handling/storage.
- Data collection performed by the data requesters, or a data requester contractor, for PIA/SORN specified intended purposes (e.g., statistical purposes) - (no PIA/SORN unspecified/unintended purposes permitted) must inform respondents in a cover letter or in instructions that "Your answers may be used only for (e.g., statistical) purposes and may not be disclosed, or used, in identifiable form for any other purpose except as required by law." Furthermore, the routine (e.g., statistical) purposes for which the data may be used must be explained.
- Data requesters may be required to keep their NRCS privacy/security awareness training current as a prerequisite to receipt of data accessibility.
- Data requesters/staff must be cognizant of the requirements of the law and must monitor the confidentiality of individually identifiable information in their daily activities and in the release of information to the public.
- Data requesters, following the data request form submission and the receipt of data received, will comply with all federal law and regulations (including signed non-disclosure agreements), moral and ethical duties/obligations.
- Should a data requester be found in non-compliance with federal laws-requirements/USDA regulations to the detriment of an individual, that data requester may be subject to criminal/civil penalties or other disciplinary action.

☒ Agree

NRCS

REVIEWER COMMENTS

1) Has the data requester taken Security Awareness Training? ☒ Yes ☐ No

2) Is the PIA current? ☒ Yes ☐ No

3) Does data request comply with routine use described in the applicable PIA:
☒ Yes ☐ No

4) Does data request comply with applicable SORN: ☒ Yes ☐ No
See page seven.

Comments:

Concerns:

- Privacy Impact Assessment not conducted for NCP but Customer Service Toolkit (CST) is application which owns most of NCP and does have a current PIA completed 7/6/2010.

Documentation. All required documents received except for NCP PIA.

Recommendation Rationale. Per this Form amd Interagency Agreement (Sec. 1619), the data requested would be handled properly within USDA. "Terms and Conditions" and "Disclaimer/Release of Liability" have both been checked by Mr. Claggett. With NRCS interests protected, it's best not to hold up use for which this data requested (providing technical assistance to the NRCS Farm Bill programs... in the Chesapeake Bay watershed).

Recommend signing Form to approve providing requested data. As discussed, PIA is not necessary on the NCP database level.

Form Requester Action Items

Privacy/security compliance requires that a data requester complete the following action items before the requested data may be accessed/shared.

#	Date Opened	Action Required/Taken	Assigned To	Close Date	Approve by
		Attach the following along with this form submission: training certificate, current PIA, NRCS SORN. Form will not be signed by NRCS leadership until reviewer comments/replies have been executed.	Data requester and privacy specialist	11/15	11/16--BJS

Required Data Elements

Conservation_Practices
fips_code—(Federal Information Processing Standard Code)
practice_code
practice_name
applied_date
report_applied_date
report_applied_amount
measurement_unit
program_name
national_program
latitude
longitude
huc12
conservation_plan_id
practice_instance_id
land_unit_id

Conservation_Plans
customer_folder_id
admin_fips_code
customer_id
customer_type_code
decision_maker
land_owner
conservation_plan_id
cnmp_plan_ind—(Comprehensive Nutrient Management Plan)
lu_fips_code—(Land Use)

NRCS

Signature Page

Your signature constitutes acceptance to: (i) the terms and conditions herein, (ii) the disclaimer/release of liability herein, and (iii) the integrity of the page one information replies (e.g., that this data will not be used outside the routine use scope of applicable PIA/SORN).

Responsible Official Signature

Arlen E Ricke — 10-19-12

NRCS, Landscape Planning Specialist — Date
Arlen Ricke

DECISION BY THE NRCS CIO OR Director of IT Security (CIO Designee):

Approve ☑

Disapprove ☐

Further Justification Required ☐ - (see action items on reviewer comment page)

Ray — 10-19-12

NRCS Director of IT Security — Date
Ray Coleman

NRCS

NRCS-1 SORN Compliance. SORN JUSTIFICATION FOR U.S. Geological Survey Section 1619 Cooperator Interagency Agreement October 2012—P. Claggett Data Request:

The below (#s 1 and 7) routine uses are found in the NRCS SORN.

"Purpose and Background" Section of the Section 1619 Cooperator Interagency Agreement Between USDA, NRCS and U.S. Geological Survey states "The Interagency Agreement is being issues by the USDA –NRCS to establish that the U.S. Geological Survey (USGS) has been certified by NRCS to be working in cooperation with the Secretary of Agriculture on a USDA program in providing technical or financial assistance under a USDA program that concerns an agricultural operation, agricultural land, farming practice, or conservation practice."

Arguably, working in cooperation with the Secretary of Agriculture on a USDA program in providing technical or financial assistance under a USDA program (if supported by an Interagency Agreement) could fall within both #s 1 and 7 below.

This interagency agreement could be argued to be "necessary for implementation of conservation programs" to ensure effectiveness. And, this interagency agreement could be argued "as necessary to provide NRCS technical services to landowners... for which contractors or technical services provider is hired" to ensure NRCS mission is being carried out satisfactorily.

"(1)Records may be disclosed to cooperating Federal, State, and local agencies, as necessary for implementation of conservation programs."

.
.
.

"(7) Disclosure may be made to contractors or to technical service providers as necessary to provide NRCS technical services to landowners, operators, producers, cooperators, and participants and such disclosure shall be made subject to the purposes for which the contractor or technical service provider is hired."

As a matter of federal government services/public policy, I believe this is a reasonable request (as long as the necessary federal laws and regulation compliance exists).

MD 12-003

Olivia Devereux
Devereux Environmental Consulting
9219 Mintwood Street
Silver Spring, MD 20901
Phone: 301-325-7449
olivia@devereuxconsulting.com

Data Current as of July 7, 2012

ReadMe Note

In response to your request, MSD FOIA/PA is releasing in full, one CRP Database (DB) file containing 75,057 records and one Name and Address file containing 17,492 records. The files contain data for the Chesapeake Bay area watershed, which include the States of Delaware-10, Maryland-24, New York-36, Pennsylvania-42, Virginia-51, and West Virginia-54.

The CRP file layout is provided below.
The Name and Address file layout is provided below.

Note: **The data provided reflects the current status of the files in the Kansas City Office.** The CRP file is sorted by State Code, County Code, Customer Number, Contract Number, and Contract Suffix. The Name and Address file is sorted by State Code, County Code, and Customer Number. The files are in ASCII text format and fields are delimited by semicolons.

U.S. ENVIRONMENTAL PROTECTION AGENCY
CHESAPEAKE BAY PROGRAM
GRANT AND COOPERATIVE AGREEMENT GUIDANCE

Chesapeake Bay Program
A Watershed Partnership

December 2012
Substantive updates to this Guidance are indicated in **"bold"**

U.S. Environmental Protection Agency
Chesapeake Bay Program
Grant and Cooperative Agreement Guidance

The attached guidance – the Chesapeake Bay Program Grant and Cooperative Agreement Guidance – dated December 2012 is hereby issued pursuant to EPA Delegation No. 2-46 Chesapeake Bay Program and EPA Region 3 Delegation No. 2-46, which, together, delegate to the Director of the Chesapeake Bay Program the authority to promulgate Agency Guidance for grants issued under Clean Water Act Section 117.

11/07/2012
Date

Nicholas DiPasquale, Director
Chesapeake Bay Program Office

TABLE OF CONTENTS

ATTACHMENTS

1---- *Chesapeake 2000* Agreement

2---- Estuaries and Clean Water Act, Section 117

3---- Chesapeake 2000 Commitments

4---- Work Plan Template

5---- Progress Report Template

6---- Chesapeake Bay Program (CBP) Wastewater Facility & Nonpoint Source Data Submission Specifications and Requirements

7---- Guidance in Distinguishing Between Sub-Awards and Contracts

8---- CBP Guidance and Policies for Data, Information and Document Outputs Submission

9A-- Toxics Data Acquisition Specifications

9B-- Data Submission Questionnaire

10-- U.S. EPA Region 3 CBP Administrative Cost Cap Worksheet

11-- Fact Sheet for Applicants: Intergovernmental Review Process

12-- EPA Guidance for Federal Land Management in the Chesapeake Bay Watershed Summary

13-- Twelve Executive Order Outcomes

14—July 6, 2011 Guide for Chesapeake Bay Water Quality Two-Year Milestones

FOREWORD

This guidance represents the way that the U.S. Environmental Protection Agency's (EPA) Region 3's Chesapeake Bay Program Office (CBPO) administers funds to focus on the restoration and protection of the Chesapeake Bay watershed while simultaneously recognizing that those funds are only one piece in achieving this fundamental goal. The success of the overall mission is directly tied to the success of the Chesapeake Bay Program partners' ability to effectively utilize all resources, regardless of the source, in reducing the level of nutrients and sediment in the Chesapeake Bay and restoring living resources.

The purpose of this guidance is to present organizations with the best possible information needed to apply for funding. It provides a sound framework to attain successful assistance agreements that work toward achieving the goals set forth in the first Chesapeake Bay Agreement of 1983 and subsequent agreements. This guidance will be revised and redistributed periodically, as legislative, regulatory, and/or other changes need to be incorporated. **Additional information about Chesapeake Bay Program funding is available in the Catalog of Federal Domestic Assistance (CFDA) at www.cfda.gov under program number 66.466.**

Some changes are being made to this guidance based on new agency policies and program direction. These changes are denoted by "bold text" for easier interpretation. If you have any questions regarding the new changes, please contact your project officer.

THE CHESAPEAKE BAY PROGRAM: AN OVERVIEW

The Chesapeake Bay Program (CBP) is a unique regional partnership that has been directing and conducting the restoration of the Chesapeake Bay since the signing of the historic 1983 Chesapeake Bay Agreement. Considered a national and international model for estuarine research and **watershed** restoration programs, CBP is led by the Chesapeake Executive Council – the governors of Maryland, Virginia and Pennsylvania; the mayor of the District of Columbia; the administrator of EPA; and the chair of the Chesapeake Bay Commission, a tri-state legislative body. The Executive Council meets annually to establish the policy direction for the Bay and its living resources in implementing the Chesapeake Bay agreements.

As the largest estuary in the United States and one of the most productive in the world, the Chesapeake Bay was this nation's first estuary targeted for restoration and protection. In the late 1970s, a congressionally funded $27 million**,** five-year study was conducted when scientists began to observe the loss of living resources, and the public became concerned about environmental degradation in general. The study identified the main source of the Bay's degradation as an oversupply of nutrients entering the Bay, and advocated programs that would limit nutrient loadings from point sources**,** such as wastewater treatment plants**,** and non-point sources**,** such as fertilizers running off farmland. The study pinpointed three areas requiring immediate attention: nutrient over-enrichment, dwindling underwater Bay grasses**,** and toxic pollution. Once the initial research was completed, the CBP evolved as the means to restore this exceptionally valuable resource.

The term "Chesapeake Bay Agreement" means the formal, voluntary agreements executed to achieve the goal of restoring and protecting the Chesapeake Bay ecosystem and its living resources and signed by the Chesapeake Executive Council. The following is an overview of the history of the CBP.

The original Chesapeake Bay Agreement, a simple, one-page document pledging the partners to work together to restore the Chesapeake Bay, was signed in 1983 by the group that later became known as the Chesapeake Executive Council.

In the *1987 Chesapeake Bay Agreement*, the Executive Council set a goal to reduce the nutrients entering the Bay by 40 percent by the year 2000. Achieving this nutrient reduction goal would ultimately improve the oxygen levels in Bay waters and encourage aquatic life to flourish. The Chesapeake Bay Program Office, established by EPA, was first authorized under the Clean Water Act (CWA) in 1987.

In 1992, the Chesapeake Executive Council agreed to maintain the 40 percent reduction goal beyond the year 2000 and to attack nutrients at their source – upstream in the Bay's tributaries. As a result, Pennsylvania, Maryland, Virginia, and the District of Columbia began developing tributary strategies to achieve the nutrient reduction targets.

In 1994, the Bay Program completed its re-evaluation of its Basinwide Toxics Reduction Strategy in order to better understand the impact toxics have on the Bay's resources. The Strategy was further refined, rewritten, and signed by the Executive Council in 2000 – and is now known as the Toxics 2000 Strategy.

In July 1994, high-level federal officials from 25 agencies and departments signed the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay*. The historic agreement outlined specific goals and commitments by federal agencies on federal lands throughout the watershed, as well as new cooperative efforts by federal agencies elsewhere. The 1994 federal agreement was built upon and expanded in 1998**,** with the signing of the Federal Agencies Comprehensive Ecosystem Unified Plan (FACEUP), which had specific numerical goals for federal agencies and federal lands.

After more than a year in the making, the Chesapeake Executive Council came together on June 28, 2000 to sign a historic new agreement. The *Chesapeake 2000* agreement laid the foundation and set the course for the Bay's restoration and protection for the next decade and beyond. In addition to the commitment to continue to meet goals set forth by previous agreements, this new agreement laid out five goals: (1) Living Resource Protection and Restoration; (2) Vital Habitat Protection and Restoration; (3) Water Quality Protection and Restoration; (4) Sound Land Use; and (5) Stewardship and Community Engagement. Each goal provides specific target dates and measurable objectives to achieve better results for a cleaner, more productive Bay (see Attachment 1).

***Chesapeake 2000* marked the first time that the Bay's "headwater states" – Delaware, New York and West Virginia – officially joined the Bay Program's restoration efforts.** The governors of New York and Delaware committed to ***Chesapeake 2000*'s** water quality goals

through a memorandum of understanding signed in 2000**. The governor of** West Virginia **added his signature** in 2002**.**

***Chesapeake 2000*'s success was mixed. The agreement laid the groundwork for restoration efforts in the 2000s and beyond. Bay Program partners achieved significant restoration gains in certain areas, such as land conservation, forest buffer restoration and reopening fish passage. However, limited progress was made toward many other health and restoration measures, including oyster abundance and reducing nutrient pollution from agriculture and urban areas.**

As a means to achieve these goals and commitments, EPA awards assistance agreements (grants/cooperative agreements) to state agencies, interstate agencies, other public or nonprofit agencies, institutions, organizations, and individuals. The type of projects awarded range from the monitoring of underwater bay grasses to environmental education. These projects have helped support the commitments set forth in Executive Council agreements and amendments (*The Chesapeake Bay Agreement of 1983* through *Chesapeake 2000*) and subsequent directives, adoption statements, endorsements**,** and resolutions. **This also supports Executive Order 13508. (For more complete information on eligibility, see the Assistance Agreement Guidance, Section A., Authority, Pages 13-15.)**

On May 12, 2009, President Barack Obama issued Executive Order 13508 on Chesapeake Bay Protection and Restoration calling the Bay a "national treasure." The purpose of the Executive Order (EO) is "to protect and restore the health, heritage, natural resources, and social and economic value of the nation's largest estuarine ecosystem and natural sustainability of its watershed." EO 13508 mandates increased federal leadership following extensive coordination with the jurisdictions and also mandates development of a coordinated implementation strategy and an annual action plan.

As a result of EO 13508, EPA's Chesapeake Bay Program Office receives funding for Chesapeake Bay Regulatory and Accountability Program grants (CBRAP) in order to support the additional demands and expectations it places on the jurisdictions. These funds are intended by Congress to support additional regulatory and accountability programs to control urban, suburban, and agricultural runoff in the watershed.

These CBRAP grants help **the seven watershed jurisdictions** to:

- Develop/revise regulations;
- Design and implement their watershed implementation plans (WIPs) and two-year milestones;
- **Implement regulatory, tracking, reporting, verification, assessment and/or monitoring commitments of the WIPs and/or two-year milestones or in response to EPA's evaluation of these documents;**
- Reissue and enforce permits;
- **Develop and implement nutrient credit trading and offset programs;**
- Provide technical and compliance assistance to landowners; and,
- **Provide compliance assistance** to local governments and regulated entities.

The funds are to aid the six states and the District of Columbia in implementing and expanding their jurisdictions' regulatory, accountability, **assessment, compliance,** and enforcement capabilities in support of reducing nitrogen, phosphorus, and sediment loads delivered to the Bay to meet the water quality goals of the *Chesapeake 2000* agreement. These grants are in addition to existing Chesapeake Bay Implementation Grants (CBIG) issued to Maryland, Pennsylvania, Virginia, and the District of Columbia under CWA Section 117(e)(1)(A) and the grants issued to the three headwater states – Delaware, New York, and West Virginia – for nutrient **and sediment pollution load** reduction under CWA Section 117(d).

INTRODUCTION TO THE GUIDANCE DOCUMENT

This guidance document has been developed to assist applicants for assistance agreements (grants and cooperative agreements) to support the Chesapeake Bay Program Partnership's goals**.**

This guidance has been revised to incorporate requirements and explanations of new and existing EPA Orders and Directives. Excerpts from new and recently revised EPA Orders and Directives are as follows:

1.) The Federal Funding Accountability and Transparency Act (FFATA) (Public Law 109-282, as amended) established reporting requirements for prime grant recipients on the following information: first-tier subawards; first-tier subrecipient executive compensation; and prime recipient executive compensation. This requirement is applicable to all new awards that equal or exceed $25,000 and are awarded on or after October 1, 2010. EPA will notify grant recipients of the subaward / executive compensation reporting requirement, including what specifically must be reported, through the usage of a standard term and condition located at 2 CFR Part 170, Appendix A.

FFATA also requires registration in the Central Contractor Registration (CCR) database and a current Duns and Bradstreet Data Universal Numbering System (DUNS) number. This requirement is effective for all new grants made on or after October, 1, 2010. Through a term and condition, grant recipients will be required to ensure the currency of the information reported in the CCR and to require all subrecipients to have an assigned DUNS number prior to awarding a subaward. **Be aware that on July 30, 2012, the CCR system migrated to the System for Award Management (SAM). This system is combining eight federal procurement systems and the Catalog of Federal Domestic Assistance (CFDA) into one new system – SAM. You will need to create a new account in SAM, using your current CCR username and password. Please visit http://sam.gov to set up your SAM account. SAM.gov contains quick start guides, webinars, a user guide, and other materials that provide all the information you need to get started using SAM. For more assistance using SAM, please contact the Federal Service Desk at http://fsd.gov .**

2.) For grants awarded on or after January 1, 2011, EPA project officers and grant specialists have been provided guidance on determining the allowability and reasonableness of certain cost items under assistance agreements. The guidance indicates that the use of EPA grant funds for evening banquets, evening receptions, or for light refreshments and meals at meetings,

conferences, training workshops, and outreach activities (events) must be justified by the assistance recipient, identified in the budget detail, allowable under the Office of Management and Budget (OMB) Cost Principles, and approved by the EPA award official. Further, EPA will not approve the use of grant funds for any portion of an event where alcohol is served, purchased, or otherwise available even if grant funds are not used to purchase the alcohol. To assist the EPA award official in the approval determination, certain additional information will be requested by your project officer, as discussed later in this document on pages 18 and 19.

In April 2012, the language of the Food and Refreshments programmatic condition was updated by EPA's Office of Grants and Debarment. It was updated to make the condition clearer that approval is expressly required for the use of EPA grant funds for any activities that take place after normal business hours and must be justified. This condition is included in all new and continuation awards, any monetary amendments and any re-budgets for conference costs for grants made on or after January 1, 2011.

3.) EPA has established a new policy on Indirect Cost Rates for EPA Grants/Cooperative Agreements to Non-Profit Organizations. This policy is effective for new grants and cooperative agreements awarded on or after March 31, 2012. The policy provides a new approach for negotiating indirect cost rates with non-profit organizations, including a simplified flat indirect cost rate option. A copy of the policy can be made available upon request from your EPA project officer.

4.) As you may be aware, EPA uses an internal grant management system when processing your grants for award. A new agency directive now requires data on "place of performance" in order to comply with FFATA. We will need to know the state, county, city, congressional district and zip code in which the federally funded work will be carried out. You are required to report a maximum of five "places of performance." Your project officer will be working with you for the specific information required under this directive. This requirement applies to all grants and cooperative agreements. OMB requires us to report this data for every grant within 30 days of award and the information is displayed for the public at USASpending.gov.

In the past, CBPO provided this guidance document to potential applicants on an annual basis. To reduce paperwork and the need for an annual review, CBPO will revise and redistribute this guidance periodically as legislative, regulatory, and/or other changes occur. CBPO hopes that this will make this process easier for all applicants. This guidance is posted on the following website: http://www.epa.gov/region03/chesapeake/grants.htm.

APPLICABLE REGULATIONS

For a list of applicable regulations, please consult the chart below. All cited regulations below are available at: http://www.gpoaccess.gov/ecfr.

Applicant/Recipient Type	Grant Regulation	OMB Circulars on Cost Principles	Disadvantaged Business Enterprise Regulation	Suspension and Debarment Regulation	Intergovernmental Review Regulation

Non-profit Organization	40 CFR Part 30	2 CFR Part 230	40 CFR Part 33	2 CFR Part 180, and 2 CFR Part 1532	40 CFR Part 29
Educational Institutions	40 CFR Part 30	2 CFR Part 220	40 CFR Part 33	2 CFR Part 180, and 2 CFR Part 1532	40 CFR Part 29
State, local, and Indian Tribal governments	40 CFR Part 31	2 CFR Part 225	40 CFR Part 33	2 CFR Part 180, and 2 CFR Part 1532	40 CFR Part 29

COMPETITION PROCESS

Effective January 15, 2005, EPA Order 5700.5A1, Policy for Competition of Assistance Agreements, established EPA policy and requirements for the competition of assistance agreements. **This policy was updated on July 19, 2012.** The authority for this order is the Federal Grant and Cooperative Agreement Act of 1977, as amended, 31 U.S.C. 6301(3).

Effective October 1, 2006, Grants.gov is available for electronic submission of proposal/applications under competitive announcements (called Request for Proposals or RFPs) issued by CBPO. The RFPs include eligible organizations, page limitations, funding ranges, cost-share requirements, additional requirements, submission instructions, and any other relevant information pertaining to the proposal requirements. Please follow the instructions in the RFPs for specific submission guidance.

All CBPO RFPs are announced in the following manner: (1) posted to http://www.grants.gov, (2) posted on CBPO's website located at http://www.epa.gov/region03/chesapeake/grants.htm, (3) posted on CBP's website located at http://www.chesapeakebay.net/rfps , and (4) sent to those on CBPO's RFP mailing list, and e-mailed to those on CBPO's RFP e-mail list. RFPs are posted at various times throughout the year.

If you are interested in receiving information on future RFPs, please contact EPA CBPO at 1-800-YOUR-BAY (968-7229) and request to be added to the RFP database.

UNLIQUIDATED OBLIGATIONS (ULOs)

Assistant Administrators and Regional Administrators are required to certify annually to the EPA Administrator that unneeded funds are de-obligated from EPA assistance agreements in order to implement the Government Accountability Office's Policy and Procedures Manual for Guidance of Federal Agencies, Title 7; the Federal Manager's Financial Integrity Act; and OMB Circular A-123. To accomplish this task EPA has to review all unliquidated obligations on assistance agreements.

ULOs are the unexpended balance remaining from the total amount of federal funds obligated to an EPA assistance agreement. **With the potential reduction in EPA resources, we need to ensure that the money we obligate to recipients is being utilized. One part of this is reviewing ULO balances on grants, and we may use these balances to determine funding levels for awards in FY2013 and beyond. Circumstances will be reviewed on a case-by-case basis. We will work closely with the recipient whenever we identify ULOs of concern and prior to making funding decisions based on ULO balances.**

To strengthen the identification and prevention of the unwarranted accumulation of ULOs, EPA project officers **and grant specialists** are required, as part of current monitoring activities, to monitor the disbursement of funding awarded to the recipient. Each project officer and grant specialist must validate the necessity of the remaining monies and document their files accordingly. This will require ongoing dialogue between the recipient and the project officer.

In addition, EPA will add a term and condition to all awards that will establish clear progress expectations. In instances where a history of accumulating unliquidated obligations without adequate justification is present, EPA may include a term and condition requiring the recipient to submit quarterly billing requests.

ASSISTANCE AGREEMENT GUIDANCE

Applying for assistance agreements involves developing a work plan and completing the federal application that includes various certifications and budget information. The following sections contain guidance on CBP assistance agreements.

A. AUTHORITY

This section describes the legal authorities that allow EPA to provide these funds to organizations.

On November 7, 2000, the President signed the Estuaries and Clean Waters Act of 2000, which includes Title II-Chesapeake Bay Restoration (see Attachment 2). This Act amends Section 117 of the Federal Water Pollution Control Act (Clean Water Act) and establishes new authorities for the Chesapeake Bay Program. These new legal authorities specify the type of work that can be performed with the funds appropriated for the Chesapeake Bay Program, the type of funding vehicles (e.g., assistance agreement) that can be used, and the types of organizations eligible to receive funding. The purposes of these amended authorities are: (1) to expand and strengthen cooperative efforts to restore and protect the Chesapeake Bay; and (2) to achieve the goals established in the Chesapeake Bay Agreement. The term "Chesapeake Bay Agreement" means the formal, voluntary agreements signed by the Chesapeake Executive Council and executed to achieve the goal of restoring and protecting the Chesapeake Bay ecosystem (e.g., the *1987 Chesapeake Bay Agreement, Chesapeake 2000* agreement, various Executive Council directives).

1.) *CWA Section 117(d) Technical Assistance and General Assistance Grants*
These grants will be awarded competitively to nonprofit organizations, state and local governments, colleges, universities, and interstate agencies. These grants are used by recipients to implement the goals of the Chesapeake Bay agreements through activities that support:

- Living resource protection and innovative restoration;
- Vital habitat protection and restoration;
- Water quality protection and restoration;
- Sound land use; and
- Stewardship and community engagement.

If EPA determines that sufficient progress is not being made, EPA may decide not to add additional funds to the grant. Refer to Section I, Post-award Requirements for additional information.

2.) *CWA Sections 117(e)(1)(A) and 117(d) – Chesapeake Bay Regulatory and Accountability Program Grants (CBRAP)*
These grants will help each of the six watershed states and the District of Columbia (DC) to:

- Develop/**revise** regulations, design **and implement** watershed implementation plans and two-year milestones;
- **Implement regulatory, tracking, reporting, verification, assessment and/or monitoring commitments of the WIPs and/or two-year milestones or in response to EPA's evaluation of these documents;**
- Reissue and enforce permits;
- **Develop and implement nutrient credit trading and offset programs;**
- Provide technical and compliance assistance **to landowners**; and
- Provide compliance assistance to local governments and regulated entities.

The grants are to aid the six states and DC in implementing and expanding their jurisdictions' regulatory, accountability, **assessment, compliance,** and enforcement capabilities in support of reducing nitrogen, phosphorus, and sediment loads delivered to the Bay to meet the water quality goals of the *Chesapeake 2000* agreement. These grants will be awarded non-competitively. **If EPA determines that sufficient progress is not being made, EPA may decide not to add additional funds to the grant. Refer to Section I, Post-award Requirements for additional information.**

3.) *CWA Section 117(e)(1)(A) – Chesapeake Bay Implementation Grants (CBIG)*
The Chesapeake Bay implementation grants are authorized under Section 117(e)(1)(A) to the four signatory jurisdictions – District of Columbia, Pennsylvania, Maryland and Virginia. Implementation grants are for the purpose of implementing the management mechanisms established under the Chesapeake Bay Agreement, with particular emphasis on state programs for control and abatement of non-point source nutrient and sediment pollution (including atmospheric deposition as a non-point source). These grants can be awarded non-competitively to any watershed jurisdiction that has signed the Chesapeake Bay Agreement.

In 2009, an RFP was issued for the "Reduction in Nutrients and Sediment Loads from the Headwaters of the Chesapeake Bay Watershed". The three non-signatory jurisdictions – Delaware, New York and West Virginia – were awarded grants under this RFP process.

In May 2009, **all seven watershed** jurisdictions adopted two-year milestones to accelerate **load** reductions of nutrient **and sediment** pollution. **In December 2010 and March 2012, the seven watershed jurisdictions finalized their Phase I and II WIPs, respectively, which explain how all necessary practices will be in place by 2025 to achieve water quality standards in the Chesapeake Bay and its tidal waters.** Their grants should support the jurisdictions implementation of **their WIP and milestone** commitments, **including addressing EPA's evaluation of the WIPs and milestones,** and comparable actions that support nutrient and sediment **load** reduction goals. If the signatory jurisdictions and the (non-signatory) headwater states do not use 117(e)(1)(A) grants for projects consistent with **furthering** the *Chesapeake 2000* agreement goals, EPA may reallocate, conditionally award, or withhold funds. **If EPA determines that sufficient progress is not being made, EPA may decide not to add additional funds to these grants. Refer to Section I, Post-award Requirements for additional information.**

4.) *CWA Section 117(e)(1)(B) Monitoring Grants*
The monitoring grants are authorized under Section 117(e)(1)(B) for the four signatory jurisdictions. These grants support the characterization of water and habitat quality and benthic community conditions for the main stem Chesapeake Bay and tidal tributaries, characterizing nutrient and sediment loadings to the Chesapeake Bay and its tidal tributaries **from the surrounding Chesapeake Bay watershed**, and provide data analysis support for water quality and living resources status and trends. The work supports the *Chesapeake 2000* goal of "achieving and maintaining the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health." These grants can be awarded non-competitively to any watershed jurisdiction that has signed the Chesapeake Bay Agreement. **If EPA determines that sufficient progress is not being made, EPA may decide not to add additional funds to the grant. Refer to Section I, Post-award Requirements for additional information.**

5.) *CWA Section 117(g)(2) Small Watershed Grants*
The Small Watershed Grants Program was established under Section117(g)(2), which provides that grants can be awarded under Section 117(d) to local governments, nonprofit organizations, and individuals in the Chesapeake Bay region working at a local level to protect and improve watersheds while building citizen-based resource stewardship. The purpose of this grant program is to demonstrate effective techniques and partnership-building to achieve CBP objectives at the small-watershed scale. The Small Watershed Grants Program has been designed to encourage the sharing of innovative ideas among the many organizations wishing to be involved in watershed protection activities. If EPA determines that sufficient progress is not being made, EPA may decide not to add additional funds to the grant. Refer to Section I, Post-award Requirements for additional information.

6.) ***Additional CWA Grant Requirements***
Project proposals that involve work in the waters of the United States, such as certain stream restoration projects, may require federal and state permits. For purposes of assuring compliance – and minimizing potential conflicts – with permit requirements, applicants and sub-award applicants for funding under the authorities described above will be required to ascertain whether there is a need for a permit and document successful completion of pre-application consultation with the relevant regulatory agencies. Applicants who are awarded grants under any of these authorities must include this requirement in their RFPs for subgrants, and such consultation must be completed prior to the submittal of the grant or sub-award application. If requested by the permitting agency, pre-application consultation may need to include pre-application project site visits by the permitting and regulatory review agencies. In such cases, joint (i.e., simultaneous multi-agency) site visits are strongly encouraged. Applicants and sub-award applicants should not assume that after completing the pre-application conference that the proposed project will receive authorization by the federal and state permitting agencies.

B. APPLICATION REQUIREMENTS

This section lists all the required documentation and information needed to provide EPA with a complete application. It includes time frames, contacts, and address information.

Proposals in response to RFPs must be submitted in accordance with the instructions in the RFP.

Both competitive and non-competitive final applications can be submitted to EPA in one of the following manners:

1. Through www.grants.gov under the appropriate Funding Announcement Number: "EPA-R3-001," for instance;
2. In hard copy to EPA Region 3, Grants and Audit Management Branch (3PM70), Attn: Kathleen Blinebury, 1650 Arch Street, Philadelphia, PA 19103-2029; or
3. In PDF format to electronic mail box R3_Grant_Applications@epa.gov.

Regardless of the manner used to submit an application, a courtesy copy of the submitted application should also be sent to the EPA project officer.

For new awards, the application must be submitted for review at least 90 days before the proposed start date and 60 days before the proposed start date for continuation awards or amendments. State and local governments receiving assistance under any of the provisions of Section 117 must comply with 40 CFR Part 31, and all other applicants must comply with 40 CFR Part 30. An electronic version of the application, application forms, and checklists can be found on the Internet at: http://www.epa.gov/ogd/. Office of Management & Budget Circulars may be found at: http://www.whitehouse.gov/OMB/circulars.

A complete application must include the following components to be considered for review:

1. Transmittal letter signed by the applicant

2. Standard Form (SF) 424 – Application for Federal Assistance
    - CFDA 66.466 is an EPA program eligible for intergovernmental review; therefore, the SF-424 must document the intergovernmental review (Executive Order 12372 Process) by including the date and original signature of authorized representative. Please see Attachment 11 for more information regarding the Intergovernmental Review process.
    - In addition, applications submitted under CFDA 66.466 are also subject to Section 204 of the Demonstration Cities and Metropolitan Development Act.
3. SF-424A – Budget Information for Non-Construction Programs
4. Budget detail
    - Please note that all costs associated with sub-awards- including agreements with federal agencies other than EPA-- should be placed in the "Other" budget category. For assistance in distinguishing between sub-awards and contracts, please see Attachment 7.
    - It should be noted that the budget detail should add specific detail about each budget category instead of simply repeating the information found on the S- 424A.
5. SF-424B – Assurances for Non-Construction Programs
6. A fully descriptive work plan, which includes:
    - a completed Work Plan Template (see Attachment 4); and
    - a mostly completed Progress Report Template (see Attachment 5)
7. Quality Management and Quality Assurance Project Plans – required if proposal accepted. (See Section E. Quality Assurance for more information)
8. Current indirect cost rate agreement – must use a lower indirect cost rate if staff are on-site at the EPA Chesapeake Bay Program Office in Annapolis, MD.
9. Certification Regarding Lobbying
10. SF-LLL- Disclosure of Lobbying Activities (This form only needs to be completed if the applicant has lobbying activities to disclose.)
11. EPA Form 4700-4 Pre-award Compliance Review Report
12. The Budget Detail of your Application for Federal Assistance (SF-424) must reflect how your administrative costs will comply with the cap. In accordance with the Paperwork Reduction Act, the Administrative Cap Worksheet is no longer required to be submitted as an attachment to SF-424 but is provided as Attachment 10 for assistance. The worksheet is to assist you in calculating allowable administrative costs.

Through June 30, 2013, the following organizations are not required to submit forms 5, 9, and 11 above with their grant applications unless they are submitted through Grants.gov, which requires all mandatory forms to be submitted. The New York State Department of Environmental Conservation also does not have to submit these forms in accordance with an agreement with EPA Region 2.

Invitee Name	*Date Mailed*	*Date Received*	*Date Approved*
DC Dept. of the Environment	**5-30-12**	**7-11-12**	**7-13-12**
DE Dept. of Natural Resources & Environmental Control	**5-30-12**	**6-25-12**	**6-27-12**
Delaware River Basin Commission	**5-30-12**	**7-17-12**	**7-17-12**
Interstate Commission on the Potomac River Basin	**5-30-12**	**6-26-12**	**6-25-12**
PA Dept. of Environmental Protection	**5-30-12**	**7-11-12**	**7-13-12**
PA Dept. of Health	**5-30-12**	**7-6-12**	**7-16-12**
Susquehanna River Basin Commission	**5-30-12**	**6-11-12**	**6-21-12**
VA Dept. of Environmental Quality	**5-30-12**	**7-17-12**	**7-17-12**
WV Dept. of Environmental Protection	**5-30-12**	**6-11-12**	**6-11-12**
WV Dept. of Health & Human Resources	**5-30-12**	**6-14-12**	**6-21-12**

Any incomplete application may delay processing. In addition, the recipient can expect an award only after all administrative and programmatic issues are resolved and the State Intergovernmental Review comment period has been met. Grant awards or amendments for additional funding will not be approved by EPA until all deliverables from previous or current grants are completed, unless a specific written agreement to complete all previous overdue deliverables has been approved by the EPA project officer prior to the proposed award date.

It should be noted that EPA Form 5700-49 Debarment/Suspension Certification is no longer required. Instead, applicants are required to disclose certain information **to EPA** regarding eligibility prior to award. As found in 2 CFR Section 180.335, the recipient must disclose when there is an affirmative response to any of the following questions:

- Are you or any of the principals for this award presently suspended, debarred, or otherwise ineligible?
- Have you or any of the principals for this award been convicted within the preceding three years of any of the offenses listed in 2 CFR Section 180.800(a) or had a civil judgment rendered against you for one of those offenses?
- Are you or any of the principals for this award presently indicted for or otherwise criminally or civilly charged by a governmental entity with commission of any of the offenses listed in §180.800(a)?
- Have you had one or more public transactions terminated within the preceding three years for cause or default?

There are some instances where grants will qualify as a multi-year award. For purposes of this discussion, multi-year awards are defined as awards where the project and budget periods are the same, the total award amount for the full project/budget period was

previously requested, and annual budget details were provided. For example, a three year award would be considered a multi-year award.

Application Requirements for Multi-Year Awards:

1. **When there is *no budget change*, recipient must submit:**
    a. **An email to the project officer stating there is no change to the budget or Statement of Work (SOW) and requesting the next year's funding**
        i. **If there is a change to the SOW, then the revised SOW must accompany the email request (Use Track Changes to identify said changes).**
2. **When there is a budget *change of less than 10 percent,*[*] recipient must submit:**
    a. **A revised budget detail for the current funding year only**
    b. **A revised SOW with Track Changes, if applicable**
3. **When there is a budget *change greater than 10 percent,*[*] recipient must submit:**
    a. **A revised SF-424A, which includes cumulative totals and match**
    b. **A revised budget detail**
    c. **A revised SOW with Track Changes, if applicable**

C. WORK PLAN

All applicants and recipients should use the Work Plan template included as Attachment 4 to this document. All areas of the work plan should be completed and any area not applicable to a particular project should be labeled as such.

General Information

For all proposed work plans competed through the Chesapeake Bay Program, the work plan should match the text included in the original proposal language and format (unless there are changes to the scope agreed to by the EPA project officer and the grantee, in writing).

If an assistance agreement application contains more than one objective, an introductory paragraph should describe the overall strategy your organization has developed for completing all of the tasks.

Each objective of the work plan should be sufficiently detailed in the narrative, description, and task section in order for the EPA project officers to understand exactly what the grantee plans to do under the agreement. Further, it should be clearly evident how the outputs relate to the tasks within each objective.

If a work plan includes conferences/workshops/meetings that the recipient will conduct, the following questions must be addressed in the narrative summary portion of the work plan:

- Who is initiating the conference/workshop/meeting?
- How is the conference/workshop/meeting being advertised?

[*] Ten percent of the cumulative total costs (federal and non-federal) on grants where the total federal share exceeds $100,000.

- Whose logo will be on the agenda and conference/workshop/meeting materials?
  Note: According to the Best Practices Guide for Conferences
  a) "Supporting a Conference Sponsored by a Nonfederal Entity: use of the EPA's logo in connection with promotion or sale of non-government produced goods or services is forbidden. Promotional material for conferences conducted under grants and cooperative agreements may acknowledge that the conference receives financial support from the agency under an assistance agreement, but cannot use the logo on a conference brochure in a manner that implies that the conference is being conducted by EPA. These conferences should be described as the recipient's event, not EPA's."

  b) "Jointly Sponsored Conferences: The official logo may be used on promotional and conference materials for conferences EPA jointly sponsors with outside groups. The co-sponsor's logo should also be used on promotional and conference materials and should be displayed at least as prominently as the EPA's."
- What is percentage distribution of the persons attending the conference/workshop/meeting (i.e. percent federal government, public participants, state and locals)?
- Is the recipient going to prepare the proceedings or analysis and disseminate this information back to the appropriate state/local/scientific community?
- Does the recipient anticipate any program income being generated from the conference/workshop/meeting, including registration fees?

In addition, if the work plan and/or budget detail includes activities where light refreshments and/or meals will be provided, then additional information will be necessary prior to approving the work plan or incurring expenses for such costs. The General Services Administration has defined light refreshments to include but not be limited to coffee, tea, milk, juice, soft drinks, donuts, bagels, fruit, pretzels, cookies, chips, and/or muffins.

The following information should be included in your work plan. If not included, it will be requested by your EPA project officer.

- The estimated cost of the event associated with the light refreshments and/or meals.
- An adequate description of the event.
- A statement regarding if those attending the event will receive a per diem financed with grant funds.
- A statement justifying why the provision of light refreshments and/or meals is necessary to achieve the objectives of the assistance agreement.
- A statement justifying why the provision of light refreshments and/or meals is necessary to achieve the objectives of the event.
- Information on the availability of the light refreshments and/or meals (i.e. before, during, or after the event).

Introduction Section Information

1.) *117(d) – Technical and General Assistance Grants, 117(e)(1)(B) Monitoring Grants to States/ Signatory Jurisdictions, and 117(g)(2) Small Watershed Grants*
This narrative must include background of your organization and historical perspective, if any, of work contributing to the restoration of the Chesapeake Bay. In addition, if the application is being submitted in connection with an RFP, then the work plan should match the proposal the applicant submitted in response to the RFP.

2.) *117(e)(1)(A) – Chesapeake Bay Implementation Grants (CBIG) to Signatory Jurisdictions or 117(d)* ***Headwater States Nutrient and Sediment Reduction*** *Grants*
This narrative should identify significant state and federal funding programs used to address nutrient and sediment reduction-related activities within the Chesapeake Bay watershed and the linkages between these funding sources and the objectives/projects funded through the Implementation and Headwater state grants. This narrative should also include the state and federal point and non-point source programs that are available to fund the jurisdiction's nutrient and sediment reduction efforts and explain how each program is used to address watershed implementation activities. Examples of state and federal programs include but are not limited to: Clean Water Act, Section 319, Section 104(b)(3) or 106; State Revolving Funds, USDA EQIP and Conservation Reserve (CRP) Programs; State Conservation Reserve Enhancement Program (CREP); **USDA Conservation Innovation Grants (CIGs);** and Coastal Zone Management Act Amendments, Section 6217.

This narrative should provide a general description of the objectives covered by the grant and a description of the relationship to the WIP and/or two-year milestones where applicable.

3.) *117(e)(1)(A) and 117(d) – Chesapeake Bay Regulatory and Accountability Program (CBRAP) Grants*

This narrative should identify significant state and federal funding programs used to address nutrient and sediment reduction-related activities within the Chesapeake Bay watershed and the linkages between these funding sources and the objectives/projects funded through the CBRAP grants.

This narrative should provide a general description of the objectives covered by the grant and a description of the relationship to the WIP and/or two-year milestones.

Linkage to EPA's Strategic Plan

Prior to approving an assistance agreement work plan, the agency's project officer must ensure that s/he can link the work plan to EPA's Strategic Plan. Currently, CBP has one link to EPA's Strategic Plan, which is Goal 2: Protecting America's Waters, Objective 2.2: Protect and Restore Watersheds and Aquatic Ecosystems. This link information must be included where required in completing your application, as well as progress reports (quarterly, semi-annual, final). Attachment 4 includes a section specifically for this information and has been completed in advance for your convenience.

Linkage to Chesapeake Bay Program Goals

With the exception of CBRAP grant work plans, all other types of grant work plans must include the related CBP goals, topics, and activity categories for each objective (see Attachment 3 for a list of CBP goals, topics, and activity categories).

All CBRAP grant work plans must be aligned with Goal 3, Protect and Restore Water Quality, as they appear in "Strengthening the Management, Coordination and Accountability of the Chesapeake Bay Program." Within Goal 3, work plans are limited to topic areas and activity categories related to reducing nutrient and sediment loads that cause or contribute to the impairment of water quality standards in the Chesapeake Bay and its tidal tributaries through the **Chesapeake Bay Total Maximum Daily Load (TMDL);** and development **and implementation of WIPs and two-year milestone commitments (including activities that respond to EPA evaluations of the WIPs), milestones, and/or programs, such as** expansion, implementation, **assessment, monitoring,** and/or enforcement of regulatory programs and improved tracking, **reporting, verification,** and accountability for expanded nutrient and sediment **load** reduction efforts within the state or District of Columbia. These goals, topic areas, and activity categories should be referenced when completing the work plan.

Linkage to *Chesapeake 2000* Commitments

All recipients are required to identify in the work plan the appropriate *Chesapeake 2000* commitment for each objective. Refer to Attachment 3 to determine the appropriate *Chesapeake 2000* commitment.

For CBIG and Headwater state grants, the work plan should focus on those objectives/projects that achieve the goals and milestones contained in both the *Chesapeake 2000* agreement and the jurisdiction's WIP. For outcomes related to the jurisdiction's **WIP or two-year milestones**, please include estimates of reductions in nutrient and sediment loads resulting from their implementation where appropriate. Additionally, each objective/project outcome must link to the specific *Chesapeake 2000* commitment(s) being achieved and include the amount of funds being allocated to them. If the work plan contains long-term objectives/projects that exceed one grant cycle, additional information is required. The applicant must provide information on what will be accomplished during the current grant cycle, if the objective/project is on track, the ultimate goal of the objective/project, and what has been completed in previous years. Recipients are encouraged to provide progress on previous objectives/projects in a table format if possible.

For CBRAP grants, the work plan must identify the appropriate WIPs **and two-year milestones** commitments **or issues raised in EPA's evaluation of the WIPs, two-year milestones, or the jurisdiction's programs that relate** to improved water quality in the Chesapeake Bay due to the load reductions of nutrients and sediment.

Linkage to Jurisdiction's Watershed Implementation Plan (WIP) Commitments and Two-Year Milestones

Recipients of CBIG, Headwater state grants, and CBRAP grants must complete this section. Please include a detailed citation for each objective linking it back to the jurisdiction's WIP and/or two-year milestone commitment, including any section, chapter and/or page number, as appropriate.

CBIG and Headwater state grant recipients are encouraged to align their respective grant work plans to Goal 3 implementing the jurisdiction's WIP and two-year milestones to the greatest extent possible. If no connection exists for any specific project under the grant, the section should be marked "not applicable." If a connection exists, EPA expects the specific objective to be aligned with the jurisdiction's respective WIP and/or two-year milestone.

All CBRAP grant objectives must be linked directly to WIP and/or two-year milestone commitments for achieving water quality goals. Activities related to the development of TMDL watershed implementation plans must be consistent with EPA's expectations set forth in the:

- November 4, 2009 WIP Expectations letter**,**
- April 2, 2010 Guide for EPA's Evaluation of Phase I Watershed Implementation Plans (http://archive.chesapeakebay.net/pubs/Guide_for_EPA_WIP_Evaluation_4-2-10.pdf),
- March 30, 2011 Guide for Chesapeake Bay Jurisdictions for the Development of Phase II Watershed Implementation Plans (http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/PhaseIIWIPS/GuideforthePhaseIIWIPs_330final.pdf),
- July 6, 2011 Guide for Chesapeake Bay Water Quality Two-year Milestones (see Attachment 14), and
- Phase II WIP planning targets issued to the Bay jurisdictions on August 1, 2011 (http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/letter_PA8012011.pdf).

All other recipients may insert "not applicable" in this part of the work plan.

Attachment 4 (Work Plan) and Attachment 5 (Progress Report) have been updated to create a section for this information.

Addressing Priority, Practices, Watersheds, and Strategies

On May 12, 2010, EPA issued "Strategy for Protecting and Restoring the Chesapeake Bay Watershed" in fulfillment of Section 203 of Executive Order 13508. This section of the grant guidance has been updated in accordance with the EO 13508 Strategy targeting mission, which states, "in 2011 these grant funds are being 'targeted…to better protect the Chesapeake Bay and its tributary waters, including resources under the Clean Water Act." EO 13508 Strategy is available at: http://executiveorder.chesapeakebay.net/.

Consistent with the EO 13508 Strategy, recipients of CBIG, **Headwater state grants**, and CBRAP grants must give preference to priority practices, watersheds, **and strategies in their**

work plans that will result in the greatest benefits to water quality in the Bay. This focus is consistent with the CBP's ongoing efforts to use the most accurate and appropriate science to identify priority practices, watersheds, **and activities. Priority watersheds and activities apply to CBIG, Headwater, and CBRAP grants. Priority practices apply predominately to CBIG and Headwater state grants.**

Likewise, the Innovative Nutrient and Sediment Reduction grants **should, to the greatest extent possible, target:**

- Urban areas with the highest nutrient and sediment loadings to the Chesapeake Bay;
- Communities experiencing rapid growth and new development;
- Agricultural watersheds with the highest nutrient yielding areas to the tidal Chesapeake Bay based on USGS SPARROW (SPAtially Referenced Regression on Watershed attributes) analyses;
- Watersheds with high sediment loadings; and/or
- **Innovative practices identified in the jurisdictions' WIPs and/or two-year milestones.**

Finally the Small Watershed grants **should, to the greatest extent possible for water quality improvement projects, target:**

- Areas with the highest nutrient and sediment loadings to the Chesapeake Bay;
- Tools and practices that address nonpoint source pollution using "Guidance for Federal Land Management in the Chesapeake Bay Watershed" as a guide for tool and practice selection; and/or
- **Innovative practices identified in the jurisdictions' WIPs and/or two-year milestones.**

1.) ***General*** *Priority Practices and Watersheds*
Priority practices are those proven, cost-effective practices that reduce or prevent the greatest nutrient and sediment loads to the Chesapeake Bay. Grant recipients should refer to the following resources for a representative list of proven, cost-effective practices that can reduce nutrients/sediment:

- EPA *Guidance for Federal Land Management in the Chesapeake Bay Watershed* (see attachment 12 for the summary document; the full *Guidance* is located at http://www.epa.gov/nps/chesbay502/) – provides a list of proven, cost-effective tools and practices that can reduce water pollution from nonpoint sources. Although this document was developed for federal lands, the same set of tools and practices are appropriate for both nonfederal land managers to restore and protect the Chesapeake Bay.
- EPA *202(a) Report*– provides a list of priority practices to address nutrient loads to the Chesapeake Bay (http://executiveorder.chesapeakebay.net/file.axd?file=2009%2F11%2F202a+Water+Quality+Report.pdf).
- Chesapeake Bay Program Partnership Approved Best Management Practices (BMPs) – provides a list of all practices approved by the Partnership for credit in assessing progress

towards milestones and other goals and objectives (http://www.chesapeakebay.net/publications/title/documentation_for_scenario_builder).

While all of these resources should be considered by grant recipients, EPA acknowledges that **grant recipients** may include other proven BMPs in their work plan with appropriate justification that includes the following information:

- The priority practices that will be implemented with the grant funds;
- A short justification as to why each practice is a priority for the location in which it is to be implemented;
- **A short justification of the nutrient and sediment reductions associated with the practice; and**
- A brief description of the strategies being undertaken to ensure effective implementation of the practice.

CBIG, Headwater, and CBRAP grants cannot support implementation of practices that the Chesapeake Bay Program partnership has determined do not result in nutrient and/or sediment reductions, do not contribute to the desired habitat and/or living resource restoration objectives, or are not consistent with the goals of the *Chesapeake 2000* agreement. Jurisdictions are encouraged to include priority practices associated with federal, state, and/or local regulatory and related compliance assurance programs in their CBRAP work plan content.

The U.S. Geological Survey (USGS) has issued new results on the sources of sediment within the Chesapeake Bay that could be considered in helping to select areas on which to focus water-quality improvements. The new information, based on the Chesapeake Bay sediment SPARROW model, can be accessed through: http://onlinelibrary.wiley.com/doi/10.1111/j.1752-1688.2010.00450.x/abstract. The user can find information showing areas of high sediment loads to local streams and also areas of high sediment loads to the Bay and its tidal tributaries. Results of new SPARROW models for nitrogen and phosphorus can be found at: http://water.usgs.gov/nawqa/sparrow.

2.) *Priority* ***Urban Watersheds***
In urban watersheds, grant recipients could give preference to watersheds in areas of accelerated population and impervious cover growth as well as areas requiring extensive retrofits to address urban stormwater. These priority areas can be identified using local land use/land cover data as well as recent land change data developed by USGS (http://128.118.47.34/chesapeakeview/MetadataDisplay.aspx?file=CBWLCD_2006.xml&dataset=1333). Jurisdictions should rely on recent water quality monitoring and modeling data being used for development of their WIPs and should also consider delivered loads of nitrogen and phosphorus described in the on-line USGS SPARROW website: http://water.usgs.gov/nawqa/sparrow.

3.) ***Priority Approaches and*** *Practices for Stormwater*
Approaches to stormwater management have changed notably in the past few years from extended detention approaches (big basins) to on-site retention. EPA encourages grant

recipients to consider the following sources of information when selecting their approaches and practices for addressing stormwater nutrient and sediment loads.

- **National Research Council – *Urban Stormwater Management*, 2008 http://www.epa.gov/npdes/pubs/nrc_stormwaterreport.pdf**
- **EPA technical documents – *Guidance for Federal Land Management in the Chesapeake Bay Watershed*, Chapter 3 Urban and Suburban, 2010 http://water.epa.gov/polwaste/nps/upload/chesbay_chap03.pdf**
- **EISA technical guidance – Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act, 2009, http://www.epa.gov/owow/NPS/lid/section438/pdf/final_sec438_factsht.pdf and http://www.epa.gov/greeningepa/documents/epa_swm_guidance.pdf**
- **EPA green infrastructure policy memos http://water.epa.gov/infrastructure/greeninfrastructure/gi_regulatory.cfm).**
- **EPA Region 3 July 2010 MS4 guidance – *Urban Stormwater Approach for the Mid-Atlantic Region and the Chesapeake Bay Watershed* http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/MS4GuideR3final07_29_10.pdf**
- **Chesapeake Bay Program Partnership Approved BMPs – http://www.chesapeakebay.net/publications/title/documentation_for_scenario_builder**

4.) *Priority Practices for Onsite Treatment Systems*
In the near future, EPA's *Model Program for Onsite Systems Management in the Chesapeake Bay Watershed* will be available to assist states in developing and implementing a model onsite program. The goal of the manual will be to aid the jurisdictions in the proper management of onsite systems through specific requirements for their siting, design, performance, construction, operation and maintenance and for oversight inspections. EPA encourages grant recipients to consider the information provided in this document when selecting their approaches and technologies for addressing onsite treatment system nutrient loads.

5.) *Priority Agricultural Watersheds*
Priority watersheds are those watersheds that have the greatest influence on Chesapeake Bay water quality. Priority watersheds can include watersheds in greatest need of restoration (where nutrient/sediment loads to the Bay are greatest**,** have the highest "delivery factors" for loads reaching the Bay, and/or the watershed is having a negative impact on water quality). EPA encourages grant recipients to consider the following resources when selecting agricultural priority watersheds in need of restoration:

- USGS SPARROW maps for the Chesapeake Bay watershed **– EPA has developed priority agricultural watershed maps based on an analysis of the latest SPARROW data. The priority watershed maps** and the associated list of priority watersheds are available on the Chesapeake Stat website at http://stat.chesapeakebay.net/EPAprioritywatersheds, where other data layers may be overlaid.

- GIS Shapefile tool provides jurisdictions with the ability to map out land-river segments with the highest delivery factors at: http://www.chesapeakebay.net/data .

6.) ***Guidance on the Use of This Section for Individual Grant Programs***
While the resources identified in this section should be considered by recipients of **CBIG, Headwater, and CBRAP grants**, EPA acknowledges that the jurisdictions may include other priority watersheds in their work plan with appropriate justification that includes the following information:

- The priority watersheds that will be addressed with the grant funds;
- A short justification as to why each watershed is considered a priority;
- The amount of grant funding to be allocated to each priority watershed;
- The work to be accomplished in each priority watershed; and
- A brief description of the strategies being undertaken in this watershed.

7.) ***Priority Strategies for Trading and Offset Programs***
Developing environmental markets, particularly for nutrient credit trading, is an important supporting strategy for achieving water quality goals for the Chesapeake Bay. Nutrient credit trading has the potential to reduce the costs of achieving the nutrient and sediment load reductions expected under the Bay TMDL and to generate revenue streams for some sectors. EPA supports trading programs in which appropriate baselines are used, trades are verified, trading partners are accountable, and the process is open to all interested parties. A number of Bay watershed jurisdictions already are implementing water quality trading programs.

In early 2012, EPA completed a comprehensive assessment of the watershed jurisdictions' trading and offset programs to determine whether they meet the criteria established in Section 10 and Appendix S of the Bay TMDL. These assessments identified a number of jurisdiction-specific and cross-jurisdictional common concerns that need to be addressed. EPA requested the jurisdictions to prepare action plans by 2013 to address these areas.

Grant recipients may use CBRAP funds to prepare their action plans in 2013. The jurisdictions may also use CBRAP funds to support the development and implementation of trading and offset programs as long as these programs are established and implemented in a manner consistent with the Chesapeake Bay TMDL, the Clean Water Act, and its implementing regulations.

Grant recipients should refer to the jurisdiction-specific assessments areas as they develop their actions plan and develop and implement their trading and offset programs: http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/Phase2WIPEvals/Trading_Offsets/PortfolioOfReports.pdf.

Grant recipient using CBRAP grants to fund development and implementation of trading and offset programs need to consider the following:

- **Authority,**
- **Baseline for credit generators,**

- **Minimum controls required for credit purchasers,**
- **Eligibility,**
- **Credit calculation and verification,**
- **Safeguards,**
- **Certification and enforceability,**
- **Accountability and tracking,**
- **Nutrient-impaired segments, and**
- **Credit banking.**

For more details, grant recipients should refer to Appendix S at http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/FinalBayTMDL/AppendixSOffsets_final.pdf. EPA developed a comprehensive work plan for EPA's work on trading and offsets, which was developed in coordination with the Chesapeake Bay Program Trading and Offsets Workgroup. A major component of EPA's work is developing a series of technical memoranda to assist the Bay jurisdictions in implementing their action plans and strengthening their programs. The memoranda will also provide EPA and the jurisdictions with a framework for determining whether program elements meet expectations.

Outputs and Outcomes

On January 1, 2005, EPA issued Order 5700.7, Environmental Results for Assistance Agreements. The Order states that an assistance agreement work plan must be negotiated to ensure that the work plan contains well-defined outputs and, to the maximum extent practicable, well-defined outcomes. Definitions of output and outcome are as follows:

> a. "Output" means an environmental activity, effort, and/or associated work products related to an environmental goal or objective that will be produced or provided over a period of time or by a specific date. Outputs may be quantitative but must be measurable during an assistance agreement funding period.
>
> b. "Outcome" means the result, effect, or consequence that will occur from carrying out an environmental program or activity that is related to an environmental programmatic goal or objective. Outcomes may be environmental, behavioral, health-related, or programmatic in nature, must be quantitative, and may not necessarily be achievable within an assistance agreement-funding period.

1.) *Progress and Final Reports*
Quarterly or semi-annual and final progress reports are document outputs that must be included in each work plan and must comply with EPA Order 5700.7. These reports must contain a project narrative that documents the progress made in achieving the objectives of work plans as presented in the application. Each report will contain:

- A comparison of actual accomplishments with the anticipated outputs and outcomes;
- Reasons why anticipated outcomes were exceeded or not met;

- Problems encountered during the performance period, that may have interfered with meeting program/project objectives;
- If applicable, proposed remedies;
- Information on the rate of expenditure versus progress on the project;
- If applicable, information on equipment purchased during the reporting period; and
- Any additional pertinent information, including, when appropriate, analysis of cost overruns or high unit costs or unanticipated economics.

As stated in EPA Order 5700.7, the agency's project officer must ensure that interim (quarterly or semi-annual) and final performance reports submitted by the recipients under 40 CFR Sections 30.51 and 30.71 (Non-Profit Organizations & Universities), and interim and final non-construction grant performance reports submitted by recipients under Sections 31.40 and 31.50 (i.e., Monitoring and Reporting Program Performance and Closeout for state and local governments), adequately address progress in achieving agreed-upon outputs and outcomes. This includes, where necessary, ensuring that performance reports provide a satisfactory explanation of why outcomes or outputs were not achieved.

Attached to the interim reports should be an updated work plan form that was submitted with your application. This form will enable the project officer to determine if the recipient is fulfilling its obligations as outlined in the work plan and assess the quality of the data (determine if the data have met or exceeded the level of quality specified for the needs of the project).

A comprehensive schedule for submittal of progress reports, milestones, quality management plans, quality assurance project plans, data, information, document output submissions, and final reports is required within the work plan. The recipient agrees to deliver to EPA all products by the dates outlined in the work plan accompanying the application, following the procedures described in the work plan and the most recently approved version of the applicable quality assurance project plans. The recipient will deliver to EPA all outputs resulting from all programs (federally funded and non-federal match) described within the work plan.

2.) *Data/Information and Document Outputs*
CBP has adopted a comprehensive set of guidelines and policies addressing the management and submission of data, information, and documents, which must be submitted electronically in a format identified in Attachment 8 unless otherwise stipulated in the work plan. The work plan must describe the data and information management procedures to be followed to ensure the quality and timely delivery of data and/or information. Specifically, the work plan must describe the plan for adhering to the CBP data management guidelines as documented in Attachment 8. Please refer to Attachments 8 and 9A and/or B for additional policies and guidelines, as well as specific formatting information for outputs.

In select cases where electronic submission of an output is not possible, the recipient and the project officer will determine an alternate form of submission in advance and document in the final work plan the exact format for submission of the outputs. Electronic outputs can include reports, graphics, spreadsheets, imagery, data files, audio, and digital video products. More detailed guidance regarding formats for submission of electronic outputs is provided in Attachment 8.

Outputs that are videos or printed material meant for the public, such as brochures, fact sheets, or publications, should have the CBP logo and a short narrative stating that the publication was funded in part through a grant/cooperative agreement from the EPA CBPO. These items, once finalized, are to be an output within the work plan.

All data and information generated through grant funding, whether EPA funds or cost share, is considered public information and shall be made available to the public, unless there is a grant/cooperative agreement condition that specifies otherwise.

Summary of Staff Funded

All recipients should include in their work plans a summary of the staff being funded with federal dollars or recipient cost-share as it relates to a particular objective/project in the protection and restoration of the Chesapeake Bay.

Additional Work Plan Content Specific to CBRAP Grants

Activities eligible for funding under the CBRAP grants differ from those funded by **the CBIG and Headwater state grants**. Examples of eligible CBRAP grant activities and related outputs are identified below.

1.) *Examples of eligible grant activities include:*
a. Development and Implementation of WIPs and Two-Year Milestones

- Gathering, analysis, and quality assurance of data related to: the sources and transport of nutrient and sediment loads to the Bay; the impact of future growth, changing land uses, and conservation strategies on water quality; and/or management of nutrient and sediment loads;
- Development of strategies to reduce nutrient and sediment loads delivered to the Bay;
- Drafting and implementation of Watershed Implementation Plans and two-year milestone commitments;
- Facilitation of stakeholder input into development and implementation of WIPs and two-year milestones; and/or
- Public comment and review of preliminary and draft WIPs and two-year milestones.

b. Improved or Expanded Regulation of Sources of Nitrogen, Phosphorus, and Sediment Delivered to the Bay Consistent with WIPs and/or Two-Year Milestones for Water Quality

- Development of new authorities, rules, or regulations to reduce nutrient and sediment loads delivered to the Bay through enforceable or otherwise binding commitments;
- Development or revision of state technical standards;
- Development of more stringent and clearly enforceable permits;
- Development of technical information to ensure permits contain necessary information to ensure consistency with TMDL wasteload allocations;
- Technical and/or compliance assistance for permit reviews;
- **Technical and/or compliance assistance for landowners;**

- Additional staff to develop permits and ensure consistency with water quality needs, including TMDL wasteload allocations;
- Designation for regulation of additional areas or operations as regulated under the Clean Water Act; and/or
- Development or implementation of trading programs to facilitate compliance with water quality goals.

c. Enforcement and Compliance Assurance Consistent with WIPs and/or Two-Year Milestones for Water Quality

- Develop and implement methods to assess compliance with existing or new regulations, such as those relating to municipal separate storm sewers, construction storm water and animal feeding operations, and wastewater treatment plants, and pursue appropriate enforcement responses when violations are identified;
- Develop and implement methods to target and deliver enforcement follow through or compliance assistance;
- Develop and implement transparent methods to track and publically communicate compliance and enforcement efforts including: identifying serious noncompliance, compliance and enforcement efforts to address the noncompliance, and resulting environmental benefits achieved;
- Technical compliance assistance to support enforcement and/or compliance assurance efforts;
- Increased staff resources for compliance monitoring, enforcement follow-up, reviews, reporting, inspections, investigations, audits, corrective actions, and assistance visits;
- Workshops for regulatory staff or permittees on new permit conditions, standards, or requirements; and/or
- Effectiveness monitoring for practices or management actions associated with permit conditions or contracts.

d. Improved Tracking, **Reporting**, Verification, and Accountability Consistent with WIPs and/or Two-Year Milestones for Water Quality

- Development and implementation of National Environmental Information Exchange Network (NEIEN) BMP data flows to report practices to the Chesapeake Bay Program;
- Improved verification of point and nonpoint sources of pollution and management actions (e.g., procedures for verifying that agricultural conservation practices – both cost-shared and non-cost shared – are properly designed, installed, and maintained) consistent with the November 4, 2009 and December 29, 2009 expectations letters, as well as the *Guide for EPA's Evaluation of Phase I Watershed Implementation Plans* issued April 2, 2010, **as amended or clarified by subsequent EPA Chesapeake Bay Program Partnership communications, including the CBP Partnership's BMP verification framework, which is currently under development;**
- Development and implementation of protocols and staff resources to report data that meet EPA expectations for tracking and verification into **NEIEN, Scenario Builder,** the Chesapeake Bay **Watershed Model**, ChesapeakeStat, and/or Chesapeake Bay Tracking and Accountability System (BayTAS), and are consistent with the November 4, 2009 and December 29, 2009 **expectations letters,** as well as the *Guide for EPA's Evaluation*

of Phase I Watershed Implementation Plans issued April 2, 2010, **and subsequent EPA and Chesapeake Bay Program communications;**

- Development and/or improvement of procedures for verifying practices that were designed, implemented, and maintained properly, including as specified in permit or contract conditions; and/or
- Reporting of available state data for the 12 outcome measures contained in the EO 13508 Strategy.

e. Improved Monitoring and Assessment of Compliance with Regulatory Loading Limits and Water Quality Standards Regulations

- **Development and implementation of monitoring and assessment techniques for determining and reporting progress toward achievement of local and regional watershed and jurisdictional scale Bay TMDL and WIP-based allocations; and/or**
- **Development and implementation of monitoring and assessment techniques for making regulatory decisions on listing and delisting Chesapeake Bay and tidal tributary and embayment waters.**

Activities not listed above but in support of the development **and/or implementation of the jurisdictions'** watershed implementation plans and two-year milestones for water quality, **or respond to EPA's evaluation of these documents or to EPA assessments of jurisdictions' programs,** are also eligible for CBRAP grants. **Activities should be targeted based on EPA evaluations of WIPs, milestones, trading offsets, and other program assessments.**

The following related activities are <u>not</u> eligible for CBRAP grants:

- **Cost-sharing** implementation of voluntary controls or best management practices identified in **the jurisdictions'** watershed implementation plans; and
- Corrective actions to address noncompliance, such as payment of penalties, fines, or injunctive relief.

2.) *Examples of possible outputs within each of the above five categories of eligible grant activities include but are not limited to:*

a. Development and Implementation of TMDL WIPs and Two-Year Milestones

- Submission of draft and final WIPs **by relevant deadlines**;
- **Submission of draft and final two-year milestones by relevant deadlines;**
- Number of stakeholder or public meetings; and/or
- Number of stakeholder groups engaged.

b. Improved or Expanded Regulation of Sources of Nitrogen, Phosphorus, and/or Sediment Delivered to the Bay

- Number of new authorities, rules, or regulations adopted;
- Pounds of nitrogen and phosphorus and tons of sediment **loads** now subject to new, expanded, or improved regulatory controls;
- Nitrogen, phosphorus, and/or sediment **load** reductions due to improved or expanded regulations;
- Number of operations subject to new, expanded, or improved regulatory controls;
- Acreage of area subject to new, expanded, or improved regulatory controls;

- Percent of permits reviewed;
- Percent of permits that contain appropriate conditions, controls, limits and/or consistency with local water quality needs, including TMDL wasteload allocations;
- Number of permits issued; and/or
- Number of new or improved management practices or procedures implemented.

c. Enforcement and Compliance Assurance

- Percent of permits in compliance with permit conditions;
- For those permits where serious noncompliance is identified (including instances where an NPDES permit was not applied for, but should have been), indicate estimated nitrogen, phosphorus, and/or sediment loads associated with the noncompliance and the type of action taken to address the noncompliance;
- Percent of permits inspected;
- Percent of permits inspected for compliance assurance/enforcement due to impact on Bay water quality within **a target area**;
- Percent of permittees in compliance with permit conditions in an area target for compliance assurance/enforcement due to impact on water quality in the Bay;
- Percent of targeted areas where all sources potentially contributing to the impairment have been inspected;
- Number of workshops for regulatory staff and/or permittees;
- Percent of regulatory staff and/or permittees that attend permitting workshops;
- Percent of sites with available monitoring;
- Number of enforcement actions (with locations, and types of violations addressed);
- Number of corrective actions;
- Percent of noncompliant permittees brought into compliance;
- Nitrogen, phosphorus, and/or sediment load reductions that will be required due to injunctive relief;
- Dollars spent on installing and operating required remedies;
- Penalties and/or supplemental environmental projects;
- Number of new or improved management practices or procedures implemented;
- Number of new compliance assistance outreach and educational materials available
- Audience reached by new compliance assistance outreach and educational materials; and/or
- Number of new or improved management practices resulting from compliance assistance.

Upon request, EPA can provide methodologies and tools for estimating nitrogen, phosphorus, and/or sediment load reductions from BMPs and/or corrective actions associated with improved or expanded regulatory, enforcement, and compliance assurance actions.

d. Improved Tracking, Verification, and Accountability

- Improved pollutant identification;
- Percent of sites with effectiveness monitoring;
- Percent of state tracking and verification systems compatible with Chesapeake Bay Program Office (NEIEN, **Scenario Builder, the Watershed Model,** ChesapeakeStat,

BayTAS) and consistent with the expectations of the November 4, 2009, and December 29, 2009 letters, as well as the *Guide for EPA's Evaluation of Phase I Watershed Implementation Plans* issued April 2, 2010;

- Number of state tracking and verification systems compatible with Chesapeake Bay Program Office (NEIEN, ChesapeakeStat, BayTAS) and consistent with the expectations of the November 4, 2009, and December 29, 2009 letters, as well as the *Guide for EPA's Evaluation of Phase I Watershed Implementation Plans* issued April 2, 2010. For example, verification systems for ensuring that agricultural conservation practices – both cost-shared and non-cost shared are properly designed, installed and maintained);
- Percent of sites, sources, and/or permittees captured by tracking and verification systems compatible with CBPO **systems**; and/or
- Submission of state data for each of the 12 outcome measures.

e. Improved Monitoring and Assessment of Compliance with Regulatory Loading Limits and Water Quality Standards Regulations

- **Number of watersheds assessed for compliance with Bay TMDL/WIP allocations; and/or**
- **Number of Chesapeake Bay tidal segments assessed for attainment of Chesapeake Bay water quality standards**

EPA may work with grant recipients to select appropriate programmatic and environmental outputs related to watershed implementation plans, regulatory programs, enforcement, compliance assurance, and accountability. Grant recipients should continue to refer to Attachment 3 when submitting outcomes.

D. PROGRESS REPORTS

The Progress Report Template (see Attachment 5) must be completed and included in application package. For the application submittal, complete only the recipient name, assistance number (if known), and project description. Attach the completed Work Plan and Progress Made Performance Results under Assistance Agreements template to the Progress Report Narrative.

After the assistance agreement has been awarded, the recipient will need to complete the entire Progress Report Template and submit it to the project officer when due (i.e., quarterly, or semi-annually, and final). There will be a programmatic grant condition in your Assistance Agreement award document that specifies the reporting period.

The Progress Report Template will enable the recipient to document the outputs and outcomes that are included in the application work plan and must provide information on the progress of all the outputs and outcomes for each objective. Also, this template will be instrumental in linking work plans to EPA's Strategic Plan, *Chesapeake 2000* commitments and CBP goals; **WIPs, the Bay TMDL; two-year milestones; EPA evaluations; and assessments,** topics, and activity categories. The electronic copy of this completed template will be used during the project to make revisions, as necessary, to the work plan. Revisions will require the approval of the project officer. Using this template will eliminate the need to repeatedly type the same information each

time an interim (quarterly or semi-annually) performance report is due. *This template must be completed and submitted with all work plans.*

E. FUNDING ALLOCATIONS FOR CBIG/ HEADWATER STATE AND CBRAP GRANTS

1.) *117(e)(1)(A) – Chesapeake Bay Implementation Grants (CBIG) to States/Signatory Jurisdictions or 117(d) Headwater State Grant*
In FY 2010, EPA initiated a process to discuss FY 2011 distribution of CBIG funds in accordance with the targeting goal established in the "Strategy for Protecting and Restoring the Chesapeake Bay Watershed." During this process, EPA held four conference calls with the states to develop and discuss various ways to allocate funding. After the fourth conference call, EPA briefed the Management Board and sought their input. The input received from the states and the Management Board were then evaluated and considered by the EPA Region 3 Administrator, for the purpose of deciding the FY 2011 CBIG funding allocation. The EPA Region 3 Administrator selected the option that followed the FY 2010 distribution noting that states will be required to document in their work plans which priority watersheds and/or priority practices are being targeted for implementation with these grant funds (commonly referred to as Option 5). Further, should EPA receive additional funds for CBIG, the additional funds will be allocated according to the formula based on 2009 delivered nitrogen and phosphorous loads. The FY 2011 funding formula follows the FY 2010 calculations.

It should be noted that the selected funding allocation mentioned here, and the corresponding chart listed below, are for FY 2013 funds only and is subject to change in future fiscal years.

Table 1: Distribution of FY 2013 CBIG/ Headwater State Grant Funds*

	State	*Total*
Signatory	Maryland	$2,287,000
	Virginia	$2,287,000
	Pennsylvania	$2,287,000
	D.C.	$767,000
	Total	$7,628,000
Non-Signatory	New York	$500,000
	Delaware	$500,000
	West Virginia	$500,000
	Total	$1,500,000
Total		$9,128,000

* **EPA reserves the right to change these allocations at our sole discretion**

2.) *117 (e)(1)(A) and 117(d) – Chesapeake Bay Regulatory and Accountability Program (CBRAP) grants*
In FY 2010 and 2011, grantees within each watershed state and the District of Columbia received a combination of CBRAP base and targeted funding. EPA determines the amount of targeted funds based on the relative effectiveness of nutrient reductions within a jurisdiction on water quality in the Bay and how readily nutrient sources within the jurisdiction can be controlled. EPA used these decision rules in July 2010 to distribute the amount of nitrogen that the Bay can

receive from the watershed and still meet water quality standards among the jurisdictions. Therefore, states that received proportionally lower and more aggressive nitrogen targets because they have a greater impact on water quality in the Bay received proportionally more CBRAP grant dollars in FY 2010 and 2011. As directed by the Strategy for Protecting and Restoring the Chesapeake Bay developed under Executive Order 13508, a portion of the grants is targeted to areas that would have the greatest impact on water quality in the Bay.

Table 2: Distribution of FY 2013 CBRAP Base and Targeted Funds*

	State	*Base Funding*	*Targeted Funding*	*Total*
Signatory	Maryland	$1,000,000	$1,758,047	$2,758,047
	Virginia	$1,000,000	$1,552,098	$2,552,098
	Pennsylvania	$1,000,000	$1,666,819	$2,666,819
	D.C.	$500,000	$223,036	$723,036
Non-Signatory	New York	$400,000	$607,224	$1,007,224
	Delaware	$400,000	$420,465	$820,465
	West Virginia	$400,000	$272,311	$672,311
	TOTAL:	$4,700,000	$6,500,000	$11,200,000

*** EPA reserves the right to change these allocations at our sole discretion**

Further, should EPA receive additional funds for CBRAP in the FY 2013 President's Budget, these additional funds are intended to be used to support local governments for Phase II WIP implementation.

Consistent with the agreement reached during the development of the FY 2010 and 2011 CBRAP distribution allocations, changes to future CBRAP funding allocations will not occur on an annual basis. However, EPA maintains its authority to review and revise CBRAP funding allocation formulas at some future date and will consult with the jurisdictions in making such revisions as appropriate. **EPA has reviewed the WIP Phase II Planning targets and determined that a revision to the CBRAP funding allocation formula is not warranted at this time.**

Beginning with the FY2013 award, and on an annual basis, thereafter, jurisdictions may request a portion of their annual CBRAP allocation (up to 10%) be applied to their CBIG/Headwater state grant award for implementation activities that support their WIPs and two-year milestones. EPA will review each request on a case-by-case basis. Requests should include a demonstration that there are currently adequate resources and satisfactory progress for regulatory and accountability commitments in the WIPs, milestones, and as called for in EPA's evaluations and program assessments. Requests should be submitted on an annual basis prior to CBIG/Headwater state and CBRAP grant applications being submitted to EPA. Such decisions are made at the sole discretion of EPA. All match requirements still apply.

F. ADDITIONAL REQUIREMENTS FOR CBIG, HEADWATER STATE GRANTS, AND CBRAP GRANTS

It is assumed that the results achieved by coordinating CBIG, Headwater, and CBRAP grant activities with other available state and federal programs produces cost-effective solutions that meet the current nutrient and sediment allocations in the Chesapeake Bay TMDL, WIP commitments, two-year milestones for water quality, and the *Chesapeake 2000* commitments, **and respond to EPA's evaluations of the WIPs and milestones and assessments of jurisdictions' programs.** The expenditure of public funds requires accountability and transparency through periodic cost-effectiveness evaluations. Currently, the accepted accounting measure for justifying fund expenditures uses non-point source BMP implementation, point source, and other nutrient and sediment reduction activity information as input data for the CBP Watershed Model annual progress runs.

Data Submission Schedules

Annual progress reporting is an output of grants. Grant recipients are expected to provide point source and non-point source nutrient and sediment load reduction implementation progress data on the following schedule:

Initial Submission: Between October 16, 2013 and November 26, 2013: Data from July 1, 2012 – June 30, 2013.

Final Submission: December **1, 2013**: Data from July 1, **2012** – June 30, **2013**

This schedule may not apply to the **wastewater sector for the** Commonwealth of Virginia, which may submit its data in accordance with the Nutrient Allocation Compliance and Reporting requirements under Section 62.1-44.19:18 of the Virginia Code. Those data that are submitted to CBPO are expected to be complete, quality assured, and in proper format for immediate processing in a CBP WSM annual progress scenario (See Attachment 6 for data specifications and requirements).

In addition, this schedule does not apply to the wastewater sector data for the District of Columbia due to a combination of factors, including the report schedule for DC Water's DMR reports, and the Metropolitan Washington Council of Government's role in support of DC Water and the District of Columbia to prepare the flow/load allocation reports.

The **Virginia and** DC wastewater sector data will be submitted using the following schedule:

January 31, **2014**: Data from January 1, **2013**- December 31, **2013**

In the event that data are not submitted in time, or do not use the appropriate NEIEN or wastewater format for CBPO to calculate annual progress toward the Reducing Pollutions Indicator, CBPO will use the most recent data submitted by the watershed jurisdictions.

In future years, grant recipients will be expected to submit data as necessary for the midpoint assessment by specified dates. Grant recipients can use CBIG/Headwater state and CBRAP grant funds to support these data submission activities.

Wetland Data

Wetland restoration and creation are credited as BMPs in the CBP watershed model, and wetland restoration is also a reporting level indicator for the annual Chesapeake Bay Health and Restoration Assessment. CBP needs annual wetland accomplishment data from the state partners in order to update both the model and the **indicator**. Accordingly, signatory and headwater states and the District of Columbia will submit wetland information **via the NEIEN** as a deliverable of their grant according to the Data Submission Schedule identified in this guidance. Each state should submit only one set of wetland data.

In order to build a baseline of information on wetland accomplishments not currently credited by the model (but which might be credited in the future), the Habitat Goal Implementation Team requested more detailed information on wetland projects via a memo issued October 18, 2012 to the following State Data Contacts.

This information was requested by November 16, 2012 to Hannah Martin (martin.hannah@epa.gov) in whatever format the state partners had it readily available. Jurisdictional leads for the model Input-Decks were encouraged to communicate with their counterparts on the above list to ensure accuracy of reporting.

The following are the responsible wetland data contacts for each state:

Mark Biddle (Delaware) DE Dept. of Nat. Resources & Env. Control Mark.biddle@state.de.us (302) 739-9939	Peter Hill (District of Columbia) Watershed Protection Specialist D.C. Department of Environment peter.hill@dc.gov (202) 535-2241
Denise Clearwater (Maryland) Maryland Department of the Environment dclearwater@mde.state.md.us (410) 537-3781	Alana Hartman (West Virginia) Potomac Basin Coordinator West Virginia Dept. of Environmental Protection Alana.C.Hartman@wv.gov (304) 822-7266 Teresa Koon (West Virginia) Teresa.m.koon@wv.gov
Melissa Yearick (New York) Upper Susquehanna Coalition Melissa@u-s-c.org (607) 734-1915	**Dave Davis** (Virginia) Virginia Department of Environmental Quality dave.davis@deq.virginia.gov (804) 698-**4105**
Shelby Reisinger (Pennsylvania) Pennsylvania Department of Environmental Protection shreisinge@state.pa.us (717) 783-2408	

G. QUALITY ASSURANCE

This section describes specific technical documentation and reporting requirements for assistance agreements that involve the collection or use of environmental data. This includes a description of Quality Management Plans (QMPs) and Quality Assurance Project Plans (QAPPs).

Environmental data include direct measurements of environmental conditions or releases and data collected from pre-existing sources of information, such as computer databases, computer models, literature files, and historical databases. Within CBP, direct measurements are collected for surface waters, sediment, atmospheric, living resource, and remotely-sensed data. Pre-existing data used to assess the efficiency of implemented BMPs and for environmental model development, calibration, verification, and application are subject to quality assurance requirements.

Quality assurance requirements for EPA grants and cooperative agreements are mandated in 40 CFR Section 30.54 (universities and non-profits) and Section 3l.45 (states, tribal, and local governments). The regulations state, "If the grantee's project involves environmentally related measurements or data generation, the grantee shall develop and implement quality assurance practices consisting of policies, procedures, specifications, standards, and schedule for submission of a Quality Management Plan documentation sufficient to produce data of quality adequate to meet project objects and Quality Assurance Project Plans. Quality assurance documents must be approved by EPA prior to the initiation to minimize loss of data collection activities due to out-of-control conditions or malfunctions." A recipient must establish, document, and implement a quality system that applies to all work within the scope of the agreement. See the EPA website http://www.epa.gov/ogd/grants/assurance.htm for additional information on the quality assurance requirements for organizations receiving EPA financial assistance.

Quality Management Plan

Recipients of assistance agreements having environmental data operations shall submit a QMP prepared in accordance with the specifications in ***EPA Requirements for Quality Management Plans, EPA QA/R-2*** **(see: http://www.epa.gov/quality1/qs-docs/r2-final.pdf).** The specifications include: organizational structure; quality system description; personnel qualifications and training; policies for procurement, documentation and records; computer hardware and software standards; and procedures for planning, implementing, and evaluating work. One QMP may apply to several assistance agreements if administered under the same management system. Laboratory Quality Manuals are required for ongoing monitoring programs.

A QMP must be approved by the organization's quality assurance and senior managers, and then submitted to the EPA project officer at least 45 days prior to the initiation of data collection or data compilation. QMPs are approved by the U.S. EPA Region 3 Quality Assurance Manager, located at the U.S. EPA Science Center, Ft. Meade, MD 20755-5350.

An approved Quality Management Plan is valid for up to five years unless there is a major reorganization that affects quality assurance functions and structures in the organization. If an approved plan is expected to expire during the course of the agreement, include a deliverable for the submission of a revised plan.

Organizations may be granted an exception or modification to the QMP requirement if they meet certain criteria, which may include but not be limited to the following:

- One-time, short-term, and special projects or projects of limited scope; and/or
- Organizations generating, collecting, compiling, and/or using environmental data for public education purposes.

Quality Assurance Project Plan

Recipients of assistance agreements having environmental data operations shall also submit a Quality Assurance Project Plan (QAPP) prepared according to the specifications in *EPA Requirements for Quality Assurance Project Plans, QA/R-5* (see: http://www.epa.gov/quality1/qs-docs/r5-final.pdf). The QAPP documents the technical and quality control aspects of an individual project, such as sampling design, sample collection, analytical methods, quality control, and data management activities. In developing this plan, all efforts must be made to produce data that is comparable to data collected previously and currently by other CBP grant recipients and partners. Guidance for water quality sampling and analytical procedures is described in the on-line version of *Recommended Guidelines for Sampling and Analysis in the Chesapeake Bay Monitoring Program* (see: http://www.chesapeakebay.net/publications/title/recommended_guidelines_for_sampling_and_analysis_in_the_chesapeake_bay_moni).

A QAPP must be approved by the CBP QA officer before the recipient commences associated data collection, compilation, or use. The QAPP may be submitted to the project officer along with the draft application or listed as a deliverable to be received either within 60 days of the beginning of the agreement or at least 30 days prior to the initiation of each data collection or data compilation activity (whichever comes first). QAPPs must be submitted in an electronic format as these plans will be made directly available to the users of the generated data/information through the Chesapeake Information Management System (CIMS).

For ongoing monitoring programs, the QAPP should be updated annually if there are changes to field, laboratory, quality control and data management procedures. **EPA's Office of Environmental Information requires QAPPs to be reviewed annually.** If there are no changes, the recipient must provide written documentation (e.g., a letter) to the project officer confirming that a review was conducted and no changes have occurred. The recipient must notify the project officer prior to changing the number of samples, the number of sites, or parameters measured.

H. FINANCIAL

This section provides information regarding cost-share requirements, in-kind calculations for EPA on-site grantees, and information regarding the Federal Financial Report requirements.

Cost-Share Requirements

As stated previously, CBP is funded under the Clean Water Act, Section 117. State and local governments receiving assistance under any of the provisions of Section 117 must comply with 40 CFR Section 31.24; all other applicants must comply with 40 CFR Section 30.23. Cost-share funds must be spent on activities, such as staff working on Bay-related projects or other projects in direct support of the Chesapeake Bay Agreements. Cost-share sources must be from non-federal sources. In-kind services, such as volunteer hours, can be used in-lieu of a cash match, **as long as the recipient maintains a record of these hours.** The rates associated with these volunteer hours must be similar to those of related work efforts and be approved by your project officer.

Signatory jurisdictions applying for implementation and monitoring grants under Section 117(e)(1)(A) and 117(e)(1)(B) must identify 50-percent cost-share of total project costs (equal match/dollar for dollar). All applicants applying for grants under Section 117(d) must commit to a cost-share ranging from 5 to 50 percent of the total project cost, as determined at the sole discretion of EPA. This determination will be stated in the Request for Proposals or agency policy. Applicants applying for small watershed grants under Section 117(g)(2) must commit to a cost share of 25 percent of the total project cost. EPA will seek assurances that the flow of the project funds will not be impeded by loss of personnel or services during the course of the project period.

Signatory jurisdictions applying for regulatory and accountability program grants under Section 117(e)(1)(A) must identify 50-percent cost-share of total project costs (i.e. equal match, dollar for dollar), as required by statute.

Headwater states applying for regulatory and accountability program grants under Section 117(d) must commit to a cost-share of 25 percent of the total project costs. (CBIG will remain at 50 percent.)

If the state/jurisdiction chooses to use part of their CBRAP funding to obtain contractual services through EPA's contract (as an in-kind service), they must still provide match for their full grant amount. For example, if you are awarded $2,758,047 and you decided to use $1,000,000 to obtain services from EPA contract (in-kind services). This would leave you with $1,758,047 in your grant award. However, you will still be required to match the full award amount of $2,758,047.

To calculate the specific cost-share amount, follow these two-step equations:

For 5 percent cost-share:

1.) EPA amount (including any in- kind) ÷ 95% = 100% of Total Grant Amount
2.) 100% of Total Grant Amount × 5% = Recipient's Cost-Share Amount

(e.g. $425,000 ÷ 95% = $447,368; $447,368 x 5% = $22,368; $22,368 is the recipient's cost-share amount)

For 25 percent cost-share:

1.) EPA amount (including any in- kind) ÷ 75% = 100% of Total Grant Amount
2.) 100% of Total Grant Amount × 25% = Recipient's Cost-Share Amount
(e.g. $375,000 ÷ 75% = $500,000; $500,000 × 25% = $125,000; $125,000 is the recipient's cost-share amount)

In addition to the cost-share requirement, recipients must adhere to the requirement in the Clean Water Act, Section 117 – "Administrative Costs." This section requires a 10-percent cap on administrative costs. Evidence of the cap should be included in the budget detail of the application. The cost of salaries and fringe benefits incurred in administering the grant shall not exceed 10 percent of the annual grant award. The worksheet in Attachment 10 is provided to assist you in calculating allowable administrative costs. The budget detail of your Application for Federal Assistance (SF-424) should reflect how your administrative costs will comply with the cap.

EPA In-Kind and Supplies

The dollar value associated with providing space, supplies, etc., for grantees located on-site at EPA is considered EPA in-kind. If your grant/cooperative agreement supports staff housed at the EPA Chesapeake Bay Program Office, the project budget within your application must include the cost to house the employee(s) at the EPA office. For FY 2012 and beyond (until amended), the CBPO in-kind amount is $9,400 **per person per year**.

When calculating the cost-share requirements, the total value that would be cost-shared is the federal share **plus EPA in-kind**. Contact your project officer to obtain the EPA in-kind dollar amount.

Federal Financial Report (FFR) – SF-425

All recipients must use SF-425, Federal Financial Report (FFR) to report the financial status of their grant(s). A blank, fillable FFR is available at the Las Vegas Finance Center's (LVFC) website: http://www.epa.gov/ocfo/finservices/forms.htm.

Only financial status information is required by EPA. Recipients are no longer required to submit Federal Cash Transaction information formerly reported on the SF-272 (FFR lines 10a through 10c). Therefore, all fields on the FFR need to be filled out except for 10a, 10b, and 10c. However, it should be noted that cost-share ratios stated in the application and budget must be included in the final FFR.

Final FFRs are due to EPA no later than 90 days after the end of the grant budget/project period. If your assistance agreement requires submission of an annual, interim FFR, please submit the SF-425 form (FFR) following the schedule stipulated in the terms and conditions of the agreement. All FFRs should be sent to the Las Vegas Finance Center email address at LVFC-

grants@epa.gov or to the fax number or mailing address provided at: http://www.epa.gov/ocfo/finservices/lvcontacts.htm.

If you have any questions, please contact your LVFC financial specialist. If you do not know your specialist, a list with contact information can be found at: http://www.epa.gov/ocfo/finservices/lvcontacts.htm.

I. POST-AWARD REQUIREMENTS

Monitoring

After the assistance award is approved, the project officer must ensure that federal funds are being spent appropriately. To do this, the project officer must:

1. Review the progress reports and other work outputs to ensure the recipient is fulfilling the obligations as outlined in the work plan, applicable regulations, and programmatic terms and conditions in the agreement;
2. Conduct mid-year and close-out monitoring reviews in accordance with EPA Order 5700.6; and
3. Work with the EPA grants office to make modifications as needed to the assistance agreement based on the recipient's request and EPA's discretion.

When a project officer observes, through any type of monitoring activity, that the recipient is failing to make pre-approved programmatic timelines/milestones, the project officer will require the recipient to update the work plan accordingly.

It is important to get changes to the assistance agreements in writing. A recipient's written request for a change must be accompanied by a narrative justification for the proposed revision, and must be submitted to the project officer. The project officer will then forward this change request to the grants office along with his/her recommendation.

If a recipient materially fails to comply with the terms and conditions of an award, EPA may enact one or more of the remedies for noncompliance found in 40 CFR Section 30.62 (Non-Profit Organizations and Universities) and 40 CFR Section 31.43 (State and Local Governments). The recipient will be notified in writing of the action taken, the reasons for the action, and the steps it must take to come into compliance.

EPA may exercise other options, if a Chesapeake Bay watershed state or the District of Columbia fails to meet EPA's expectations for WIPs and milestones or does not demonstrate satisfactory progress toward achieving nutrient and sediment allocations established by EPA in the Chesapeake Bay TMDL. These options were communicated to all the states and the District of Columbia in the December 29, 2009 letter from Shawn Garvin, EPA Region 3 Administrator. The December 29, 2009 letter states that EPA can condition or redirect grant funds and incorporate criteria into future Requests for Proposals based on demonstrated progress in meeting **WIPs and two-year milestones** and/or in an effort to yield higher nutrient or sediment load reductions. **If EPA determines that satisfactory progress is not being made in your CBIG, Headwater, or CBRAP grants, EPA may decide not to make new awards or add**

additional funds to grants with single or multi-year budget periods. States and the District of Columbia should also refer to the November 4, 2009 letter for EPA's expectations on the first two elements of the Chesapeake Bay accountability framework: **the WIPs and the two-year milestones. The November 4 and December 29, 2009 letters are available at http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/creatingthetmdl.html.**

Debarment and Suspension

Recipients are required to ensure that contracts or sub-awards are only awarded to responsible entities. Therefore, recipients must verify prior to award that such entities are eligible in accordance with the methods located in 2 CFR Section 180.300. EPA strongly encourages recipients to check the Excluded Parties List System, **which recently migrated over to the System for Award Management (https://www.sam.gov/portal/public/SAM/).** In addition, recipients are responsible for requiring contractors and sub-awardees to comply with Subpart C of 2 CFR Part 180 regarding suspension and debarment and passing the same requirement down, as appropriate.

If, at any point after the award, the recipient learns it failed to notify EPA prior to award with suspension and debarment information as noted in the last paragraph under the section "Application Requirements" beginning on Page 15 of this guidance, or if circumstances have changed regarding the required information to be disclosed, then the recipient must provide EPA with immediate written notification.

Modifications to Award Documents

All changes to a project, including budgetary changes, MUST be submitted to the project officer in writing. However, it should be noted that not all changes require the project officer's approval or an amendment. Please refer to the information below as to when the project officer's approval is required or when an amendment is necessary. Written notification of changes requiring project officer approval or a formal amendment should be sent to the project officer as soon as the recipient becomes aware of the necessary change(s). All budgetary changes should be submitted using SF-424A as well as a revised budget detail. In addition, any change requiring a formal amendment must also be sent to the EPA Grants and Audit Management Branch.
1.) *Changes not Requiring Project Officer Approval or Formal Amendment:*
Minor changes that are consistent with the project objective and within the scope of the agreement do not require project officer approval; **however, CBPO requests notification as a courtesy**. For example, a recipient may make minor changes to the approach or other aspects of the project to meet objectives sooner or to expedite completion.

For universities and nonprofit recipients, a one-time, no-cost extension of up to 12 months can be made without project officer approval, **though notification is required**, unless:

- The terms and conditions of the award prohibit the extension;
- The extension requires additional federal funds; or
- The extension involves any change in the approved objectives or scope of the project.

The recipient must notify the award official in writing with supporting reasons and a revised expiration date at least 10 days before the expiration date specified in the award. To merely exhaust unobligated balances is not a **valid** justification for an extension.

Minor adjustments to the project budget, provided funds are used in accordance with the approved work plan/proposal, do not require project officer approval. For universities and non-profits, EPA may restrict the transfer of funds among cost categories or programs, functions, and activities for awards in which the federal share of the project exceeds $100,000 and the cumulative amount of such transfers exceeds or is expected to exceed 10 percent of the total budget. For state, local, and tribal governments, a formal amendment is necessary.

2.) *Changes That Require Project Officer Approval (No Formal Amendment):*

- A change in a key person specified in the application or award document;
- The absence for more than three months or a 25-percent reduction in time devoted to the project by the approved project director or principle investigator;
- The transfer of amounts budgeted for indirect costs to absorb increases in direct costs or vice versa;
- The transfer of funds allotted for training allowances to other categories;
- Unless described in the application and funded in the approved award, the subaward, transfer, or contracting out of any work under an award; and/or
- Contracting out or otherwise obtaining services of a third party to perform activities central to the purpose of the award not already approved in the work plan/narrative.

3.) *Changes That Require a Formal Amendment:*
For universities, non-profits, state, local, and tribal governments:

- Any revision resulting in the increase or decrease in funds;
- Major revisions to the objectives or scope of the project (PLEASE NOTE: The recipient cannot request revisions that substantially change the original project objectives selected under the competitive process); and
- Extensions to the period of availability of funds, unless university or non-profit exercising right to one-time, 12 month extension (time extension).

For state, local, and tribal governments:

- Cumulative transfers among direct cost categories or, if applicable, among separately budgeted programs, projects, functions, or activities that exceed or are expected to exceed 10 percent of the current total approved budget, whenever EPA's share exceeds $100,000.

CONCLUSION

As you tackle the challenges of applying for assistance agreements, grants, or cooperative agreements **from** the federal government, we encourage you to call your project officer for assistance. Project officers are here to help you submit the best possible application. The ultimate goal is to support the restoration of the Chesapeake Bay and its watershed.