Agricultural Data Verification Protocol for the Chesapeake Bay Program Partnership

November 26, 2012

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) <u>Verification Methodology</u> (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) <u>Verification Issues</u> (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) <u>Relative Cost</u> (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) <u>Relative Scientific Defensibility</u> (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) <u>Relative Accountability</u> (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) <u>Relative Transparency</u> (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.