Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model

June 6, 2014

Introduction

The Chesapeake Bay Program (CBP) uses loading estimates to quantify expected amounts of nutrients (nitrogen and phosphorus) or sediment loads to water from specific land uses or point sources. Changes in estimated loads from a particular piece of land can occur in a number of ways, including: 1) A change in the land use (e.g. forest instead of grassland), 2) an adjustment based on an estimate of effectiveness of a best management practice (BMP), 3) a measured reduction in direct load to the land use, and 4) a measured reduction from a treatment process. The CBP uses these effectiveness estimates and direct load reductions to land to modify the existing baseline loading for particular land uses and practices. Loads from point sources can be adjusted based on a new treatment process or practice.

The Water Quality Goal Implementation Team (WQGIT) is responsible for approving the loading rates, and percentage adjustments to these rates, used in the Chesapeake Bay Watershed Model (CBWM). The CBP Executive Council's 2009 commitment to meet two-year milestones that accelerate the pace of Chesapeake Bay restoration, and the need to quantify practices to be used in Watershed Implementation Plans (WIPs) that will achieve Total Maximum Daily Load (TMDL) allocations, will likely spur innovation and identification of new BMPs.

Direct nutrient and sediment load reductions and reductions from treatment processes often can be estimated, or measured, with a relatively high degree of accuracy. However, due to the variability of available data, loading rates and effectiveness estimates for BMPs that are not treatment processes may be based largely on best professional judgment. While the use of best professional judgment is reasonable under those circumstances, other sources of scientific information should be used to support the basis of this judgment and clearly referenced in the recommendations. Since the definitions and values used for both loading and effectiveness estimates have important implications for the CBP, it is critical that they be developed in a process that is consistent, transparent, and scientifically defensible.

This document contains three sections addressing the following process steps:

I. Determine the need for a review process,
II. Review process:
    a. For new estimates
    b. For existing estimates or treatment processes
III. Chesapeake Bay Program review and approval

I. Determine the Need for a Review Process for Estimates:

A. New Requests for Evaluation of Technologies and Practices
Requests should be submitted to the Chair and Vice Chair of the relevant source sector Workgroup or the appropriate Goal Implementation Team (GIT). The GIT or Workgroup Chair may propose that the BMP be routed to an alternative GIT or Workgroup if he/she feels that placement in another group is more appropriate. These groups will determine if sufficient credible data is available for a full review process. This determination will be made within 60 days from the date received by the GIT or Workgroup Chair.

Requests should include the following information: (a) a clear and concise definition of the practice with specific information on how it reduces nitrogen, phosphorus and sediment, and (b) reference available science/data on the nutrient and sediment removal efficiencies with the contact information and affiliation of the lead researchers, including the geographical location of where the data was collected. The decision to proceed will be made by the hosting GIT and source sector Workgroup, and will include an estimated timeframe for completion of the review that will be based on the complexity of the review and workload issues. Proposed technologies and practices that have been identified by jurisdictions in their WIPs will be given highest priority.

As the Executive Order and Bay TMDL processes unfold, the CBP expects to receive numerous requests to evaluate technologies and practices for the reduction of nutrients and sediment. It will be necessary to review and prioritize these requests. The source sector Workgroups determine the level of priority for BMPs and will develop a list of priority BMPs for which they intend to convene Expert Panels over the course of the coming year. Workgroup Chairs or Coordinators will present this list to all GITs on no less than a six month basis. The GIT Chairs, working with their respective Workgroup Chairs, should reach agreement each year on the forthcoming list of priority BMPs for which new BMP Expert Panels will be convened. Final approval to convene a BMP Expert Panel rests with the sponsoring source sector Workgroup or GIT.

B. *Proprietary Devices*
Proprietary BMPs are currently not eligible for nutrient and sediment reduction credits within the CBP modeling framework. When a sufficient number of non-proprietary designs for the BMP (e.g., floating wetland treatment BMP) have become available and been researched for removal efficiencies, then that class of BMPs will be eligible for the Expert Panel process.

C. Existing estimates or treatment processes
The WQGIT will evaluate existing loading and effectiveness estimates on a five year schedule, or sooner, if new science or information becomes available, to determine if a review is warranted. Such reviews can be prompted by the availability of new information, such as a new treatment process or new information on efficiencies. Reviews can also be initiated if current estimates produce illogical model outputs or if there is reason to believe that they were developed using inaccurate information. Requests for reviews are typically submitted by a source sector Workgroup or GIT but are not restricted to these groups.

D. Communication of Requests to the Chesapeake Bay Program
The WQGIT Coordinator will distribute on a monthly basis an email with a status update on the existing BMP Expert Panels and a notification of those Panels that are expected to be convened within the next three months. These email communications will be sent to all of the GITs, STAC, and STAR so the

Partnership is fully aware of the Panels underway and what is expected to undergo the Panel process in the near future. Specific questions about the Panels listed in the monthly email updates should be sent to the WQGIT Coordinator and Staffers.

IIA. Review Process for New Estimates

Convene a Panel
The source sector Workgroup, in consultation with the WTWG, WQGIT Chair, and any other GIT Chair will identify and convene a Panel of experts on the relevant topic. Each request for review should include suggestions for Panel members. Panel membership should strive to have a balanced representation of the scientific understanding and application of the BMP and the geography of the Bay watershed. The Panel must include at least eight individuals; three recognized topic experts; three individuals with expertise in environmental and water quality-related issues; a representative from the WTWG; and a representative from the CBP modeling team.

The source sector Workgroup and Panel Coordinators could also consider the option that individuals can be invited to serve as guests on the Panel, either for a few meetings or all of them, such that they can provide input but are not voting members of the Panel.

A proposed list of Panelists, as well as the draft scope and charge of the Panel, will be sent to the source sector Workgroups, the WQGIT Chair and Vice Chair, and the other GITs for their review and comment. The Scientific and Technical Advisory Committee (STAC) will also be afforded the opportunity to comment before final approval. Final approval of the Panel scope and charge, as well as Panel membership, will be reserved for the appropriate source sector Workgroup or GIT.

Expectations of Panel members
Panel members should not represent entities with potential conflicts of interest, such as entities that could receive a financial benefit from Panel recommendations or where there is a conflict between the private interests and the official responsibilities of those entities. All Panelists are required to identify any potential financial or other conflicts of interest prior to serving on the Panel.

These conditions will minimize the risk that Expert Panels are biased toward particular interests or regions. The Panel may elect to solicit input or presentations from groups that may not qualify as Panel participants to ensure that the Panel receives the full range of information and science available on the Panel topic.

Panel members will be responsible for following the specific charge of the Panel, as well as this Protocol. Copies of the Protocol will be distributed to all Panel members in advance of their first call or meeting.

The Panel Chair and Coordinator will be the primary points of contact during the Expert Panel process. While it is recognized that the majority of Panel members serve on a voluntary basis, there are several support mechanisms in place (e.g. contracts, grants) that can provide additional resources to aid in the Expert Panel process. It is up to the Panel Chair and Coordinator on how best assign responsibilities amongst the Panel members. Questions and requests to utilize these resources should be directed to the WQGIT Coordinator.

When objections or dissenting opinion are raised in the context of Panel discussions and in the development of Panel reports, consensus should be the primary approach taken to resolve such dissent. If consensus cannot be reached, a supermajority will be utilized. Definitions of a supermajority and consensus-based approach can be found in the WQGIT governance protocols (provide link here).

Notices of the date and time of Panel meetings and calls will be posted to the Chesapeake Bay Program's website, www.chesapeakebay.net by the Panel Staffer. Contact information for the Panel Coordinator and Staffer will be available on the meeting page for anyone interested in additional information about a Panel. In the event that a non-Panel member participates in a Panel call or meeting, it should be noted upfront that discussion and deliberation is reserved for Panel members only. Panel reports will become publicly available when it goes before a source sector Workgroup for review and comment. Final recommendations from the Panel will be posted to the following site: http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=3

Although the Panel Chair and Coordinator are responsible for managing the comment process, Panel members may be expected to address and respond to comments received during the comment period for the relevant draft of the Panel's recommendations, as appropriate. Once the comment period has ended and the reports finalized by the GIT, the charge of the Panel has been met and Panel members are released from duty.

The Expert Panel will develop definitions and loading or effectiveness estimates for nutrient- and sediment-reducing technologies and practices. The Panel will work with the source Workgroup and WTWG to develop a report that includes the following:

- Identity and expertise of Panel members
- Land Use or practice name/title
- Detailed definition of the land use or practice
- Recommended nitrogen, phosphorus, and sediment loading or effectiveness estimates
  - Discussion may include alternative modeling approaches if appropriate
- Justification for the selected effectiveness estimates, including
  - List of references used (peer-reviewed, unpublished, etc.)
  - Detailed discussion of how each reference was considered, or if another source was investigated, but not considered.
- Description of how best professional judgment was used, if applicable
- Land uses to which the BMP is applied
- Load sources that the BMP will address and potential interactions with other practices
- Description of pre-BMP and post-BMP circumstances, including the baseline conditions for individual practices
- Conditions under which the BMP works:
  - Should include conditions where the BMP will not work, or will be less effective. An example is large storms that overwhelm the design.
  - Any variations in BMP effectiveness across the watershed due to climate, hydrogeomorphic region, or other measureable factors.
- Temporal performance of the BMP including lag times between establishment and full functioning (if applicable)
- Unit of measure (e.g., feet, acres)
- Locations within the Chesapeake Bay watershed where this practice is applicable
- Useful life; effectiveness of practice over time
- Cumulative or annual practice

- Description of how the BMP will be tracked, reported, and verified:
  - Include a clear indication that this BMP will be used and reported by jurisdictions
- Suggestion for a review timeline; when will additional information be available that may warrant a re-evaluation of the estimate
- Outstanding issues that need to be resolved in the future and a list of ongoing studies, if any
- Documentation of any dissenting opinion(s) if consensus cannot be reached
- Operation and Maintenance requirements and how neglect alters performance

Ancillary Benefits and Unintended Consequences

The scope of the BMP Expert Panels is to develop definitions and loading or effectiveness estimates for nutrient- and sediment-reducing technologies and practices. However, Panel members will be expected to identify any ancillary benefits or unintended consequences beyond impacts on nitrogen, phosphorus and sediment loads. This expectation will be included in the Panel's charge. Examples include increased, or reduced, air emissions and changes to habitat. It is recognized that an expanded analyses into ancillary benefits or unintended consequences could be a significant and useful contribution to the final Panel report. Therefore, if there is interest to develop and provide such information, a request must be submitted to the Panel Chair and to the sponsoring GIT Chair and Vice Chair. If approved, the requesting party will be responsible for drafting such document that will serve as an appendix to the final Panel report.

The appendix will include the authors involved in the analyses, as well as the finalization date. It is anticipated that further research into any ancillary benefits or unintended consequences will be conducted in concurrence with the Panel itself; however, this assumption does not preclude the development of such an appendix after the Panel report is final.

It is important to note that the purpose of the Panels is not to incentivize or promote the use of any BMP; it's to increase the understanding of the nutrient and sediment reductions associated with these practices. In addition, any appendix on ancillary benefits or unintended consequences does not change the definitions and loading or effectiveness estimates for nutrient- and sediment-reducing technologies and practices in the final Panel report. State and local governments may then consider both the definitions and effectiveness estimates from the main panel report, as well as from the appendix, when deciding upon which technologies and practices they intend to select, fund, and implement within their respective jurisdictions.

Additional guidelines:

- Include negative results
  - Where studies with negative pollution reduction data are found (i.e. the BMP acted as a source of pollutants), they should be considered the same as all other data.
- Include results where the practice relocated pollutants to a different location. An example is where a practice eliminates a pollutant from surface transport but moves the pollutant into groundwater.

Data applicability

Determining which data should be used to develop loading and effectiveness estimates is a critical step. When considering sources of data, the Panel must decide: 1) if the data is appropriate, and 2) how much influence each data source should have on the final estimate. Each of these decisions should be discussed explicitly in the final report for each data source.

Data sources should be characterized using Table 1 (below) and included in the Panel report.

Table 1. Data source characterization matrix

	High confidence	**Medium confidence**	**Lowest confidence**
Applicability [a]	Definition matches technical specifications	Generally representative	Somewhat representative
Study location [b]	Very representative of soils and hydrology	Generally representative	Somewhat representative
Variability [c]	Relatively Low	Medium	Relatively High
Number of studies [d]	Many	Moderate	Few
Scientific support [e]	Operational scale research (peer reviewed)	Research scale (peer reviewed)	Not peer reviewed ("gray" literature)

a = How well does the practice match any established technical standards (according to participating professionals).
b = How well does the location of the reported practice match conditions in the Chesapeake Bay watershed (e.g. soil type, hydrologic flow paths, and species composition)?
c = How much variability is there in the reported results?
d = The number of studies included in the reference.
e = Has the source been peer reviewed in a scientific setting, and was the work done on an operational or a smaller (research/small plot) scale?

The Panel should also consider the following:

- Was the data generated from a BMP design and implementation consistent with those found in the Chesapeake Bay watershed?
- How does the duration of the experiment compare to the intended timeline of the BMP? If the experiment is substantially shorter, how might that influence the evaluation of operational effectiveness of the practice?
- Do results reflect changes in pollution reduction benefits over the lifetime of the practice?
- What parameters were sampled and monitored (paired watershed study, grab samples, ground water, etc.)?
- What, if any, assumptions were made during the experiment and conclusion?

Once the Panel has characterized a data source, they must determine how much influence (i.e. 'weight') the data should have on resulting estimates. For example, peer-reviewed publications will usually have more weight than non-reviewed sources. However, the exact influence of a particular data source will also consider other factors, such as those listed in the questions above, which the Panel will consider.

Incremental Recommendations. The duration of a Panel is dependent upon the complexity of the review and workload issues. However, the Partnership may recommend expediting an element of the review

process (e.g. partner's request for BMP effectiveness estimates that have immediate implications for progress or planning purposes). Therefore, a Panel is welcome to make incremental recommendations that can be sent forward for final approval to the WQGIT by working through the normal review and approval procedures identified above and more clearly defined in Section III of the Protocol. If the Panel is charged with producing incremental recommendations at the inception of the Panel, it will be the responsibility of the Panel to produce those incremental recommendations. However, if the request for incremental recommendations is made after the Panel has received its charge and has begun work on those charges, it is at the Panel's discretion as to whether or not the interim or incremental recommendations will be pursued. The Panel is still expected to complete and finalize the Panel report which will contain the more comprehensive set of recommendations. These more comprehensive set of recommendations should not modify the incremental recommendations that were previously approved by the WQGIT. If any modifications are proposed, the Panel will be directed to seek Partnership approval of those changes, following the procedures articulated in this Protocol.

Technical Appendices. In an effort for the Partnership to more efficiently approve the technical requirements for Scenario Builder, National Environmental Information Exchange Network (NEIEN), and the Watershed Model that are required by each Panel report, the CBPO Scenario Builder and Modeling Team will work with the Panel members and the WTWG to develop a technical appendix that describes changes that will be made to the modeling and reporting tools to accommodate the BMP(s). Once drafted, each technical appendix will move through the comment process in conjunction with its parent report and must be approved by the source sector Workgroup, the WTWG, and the WQGIT. Any future changes to the approved appendix should be brought to the attention of the appropriate source sector Workgroup, WTWG, and WQGIT.

IIB. Review Process for Existing Estimates or Treatment Processes

If approved by the WQGIT Chair, the review of existing estimates and, when applicable, the definition of a BMP can be conducted within a source Workgroup in consultation with the WTWG. This approach should reduce the amount of time necessary to conduct the review because the definition(s) have already been developed, a background of available data already exists, and issues of how the practices or land use is incorporated into the CBWM have been addressed. Reviews of existing estimates should follow the guidelines listed in IIA above except that a separate Panel is not convened and the information generated is added to the existing support documentation for the estimate.

III. Chesapeake Bay Program Review and Approval

All Expert Panel recommendations will undergo a two-stage formal review and comment process that will include, at a minimum, the following groups:

- Relevant source sector Workgroup. This group will be responsible for reviewing the scientific basis of the recommendation, ensuring that all of the pollutant(s) source loading(s) or BMP pollution reduction mechanisms have been included.

- Watershed Technical Workgroup. This group will be responsible for analyzing the technical components of the recommendation(s) and determining that the tracking and reporting data that is needed to receive credit is available in the appropriate Chesapeake Bay jurisdiction(s) thereby ensuring that no double counting is occurring.

- Water Quality Goal Implementation Team. This group will be responsible for reviewing the process used and the recommendation's consistency with other approved BMP effectiveness estimates.

It should be noted that often times technical, policy, and management issues may have cross-Workgroup and GIT implications that cannot be addressed in isolation by one particular group. Although the definitions above serve to articulate the primary function of these groups in relation to the Expert Panel process, flexibility of those roles should be allowed.

The first review stage will consist of the relevant source sector Workgroup, the WTWG, other Partnership GITs and associated Workgroup(s), and the Modeling Workgroup. Any other Partnership group interested in reviewing the draft recommendations is welcome to do so and can contact the Panel Coordinator. Approval of the draft report will be sought from the relevant source sector Workgroup and the WTWG after the comment period has closed.

Once approval has been reached by the source sector Workgroup and the WTWG, the draft review Panel recommendations will enter the second and final stage of review and approval by the WQGIT and any other GIT, as appropriate.

To initiate each review and comment stage, the Panel Chair and source sector Workgroup Coordinator will host a kick-off meeting to provide a presentation that includes:

- Rationale for review Panel
- The recommendations/findings of the Panel for effectiveness and loading estimates
- A table containing the number of studies used for the findings by state, the range of the studies' findings, and range of the years of the studies
- Any dissenting opinion as it relates to the effectiveness and loading estimates
- Next steps and comment period logistics

The Panel Coordinator and/or sector Workgroup Chair will be responsible for distributing the draft Expert Panel report at least ten business days in advance of each kick-off meeting, and at least ten business days in advance of the approval meeting of the (1) source sector Workgroup and WTWG; and (2) the WQGIT.

The review and comment period for each stage shall be twenty business days in duration beginning the business day after each kick-off meeting and ten business days prior to the approval meeting. Any requests for review extensions can be submitted to the Panel Chair for consideration. During this time, commenters should send comments in track change format to the Panel Chair and Panel Coordinator.

The Panel Chair and Coordinator will be responsible for developing a "response to comments" document that provides a response to comments received. This document will be posted as an appendix to the final Panel's report. Specific responses will **not** be provided for:

- Overlapping comments (one response will be provided)
- Comments outside the scope of the Panel or demonstrate no relevancy to the report's findings
- Editorial changes, such as grammatical edits

In the event that a comment does not result in a change to the review Panel's report, the Panel Chair and Panel Coordinator shall work with the specific commenter(s) to resolve the issue. Commenters are

requested to notify the Panel Chair, Panel Coordinator and the Workgroup/GIT Chair prior to the approval meeting if they intend to register a major objection to an Expert Panel report, and request time on the meeting agenda to explain their perspectives. If objections to a Panel report are not addressed in time of the approval meeting, the Workgroup/GIT Chair may table the action until the next meeting of the Workgroup/GIT. In cases where an objection is not identified before an approval meeting, the Workgroup/GIT Chair may choose, at his or her discretion, to ask the Workgroup or GIT to vote to approve the report. Although the goal is consensus, the report can move forward with a supermajority vote (provide link to WQGIT governance procedures).

In the interim between the two approval meetings, the objecting member(s) shall work with the respective Panel Coordinator, Panel Chair, Workgroup/GIT Chair and Coordinator to resolve the objection, including drafting clarifying text or proposing an alternative option.

The second approval meeting shall be structured to achieve consensus. A consensus-based approach is the first and preferred option. If consensus cannot be reached, the issue will go before the WQGIT for final discussion and decision.

In the event that the Expert Panel recommendation(s) are modified during the review and comment period, a separate section will be added to the Expert Panel final report explicitly detailing the original Expert Panel recommendations and how those recommendations were modified as reflected in the final report. In addition, any unresolved issue(s) or dissenting opinions should also be included. The WQGIT Coordinator will be responsible for providing that section to the Panel Chair who will be responsible for ensuring that it is entered into the final Panel report.

The WQGIT Staffers will be responsible for maintaining two lists that will accompany each Panel report:

- Follow up actions identified in the Panel reports along with the due dates of those actions and responsible party (such as trial periods, updates, reevaluation schedule, etc.)
- Research needs identified by Panel reports

Once the Panel report has been approved by the WQGIT, the Panel Chair and Coordinator will distribute the final Panel report to the Partnership and post online at:
http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=3